



## AGENDA

### City of Gig Harbor Hearing Examiner Virtual Hearing of Thursday September 2, 2021 at 1:30 PM

Due to public health concerns, this meeting will be accessible to listen by using the information below:  
link to join Webinar <https://us06web.zoom.us/j/97994083300>  
Call-in: (253) 215-8782 Meeting ID: 979 9408 3300

To speak during the meeting, press the Raise Hand button near the bottom of your Zoom window or press \*9 on your phone. Comments are only allowed during designated portions of the meeting. Please refrain from "raising your hand" until the Hearing Examiner has announced that he has opened the public comment portion of the meeting. Your name or the last four digits of your phone number will be called out when it is your turn to speak. When using your phone to call in you may need to press \*6 to unmute yourself. All speakers will have up to three minutes to speak.

If you wish to submit written public comment, please provide your comments to the Planning Division by **Thursday, September 2, 2021 at 12:00 noon**. All written comments must be able to be read in 3 minutes or less to be included in the record and have the title: **FOR PUBLIC COMMENT** included. Send comments to: [candrews@gigharborwa.gov](mailto:candrews@gigharborwa.gov). Written comments will be read during the appropriate agenda item.

#### I. Open Public Meeting

#### II. Public Hearing

Items on this agenda will be reviewed according to the following format:

1. Open public hearing
2. Staff Report
3. Applicant's presentation
4. Public Comment
5. Close public hearing

#### New Business

1. **SWEDE HILL, LLC, P.O. BOX 1553, TACOMA WA 98401**: CANTERWOOD COMMERCIAL CENTER project - (PL-SPR-07-0004, PL-CUP-13-0002, PL-DRB-07-0013, PL-SEPA-07-0060). The applicant proposes the construction of four commercial buildings totaling 28,278 square feet and a 9,000 square feet parking garage on a vacant parcel in the B-2 General Business Zoning District. The site is adjacent to Washington State Highway 16 on the west and Canterwood Blvd on the east, within the vicinity of St. Anthony's Hospital. The site contains steep slopes, wetlands and an unnamed stream. The project proposes significant fill to account for the extreme topography of the site and the filling of two category IV wetlands. Mitigation is proposed through the creation of on-site wetlands and the removal of an in-stream culvert. The project provides for two access points from Canterwood Boulevard. A parking garage under the northern-most building is proposed and drive-through facilities on the other three buildings are also proposed. The site is located at 10700 Canterwood Blvd, Gig Harbor, WA (Assessor's Parcel No. 0122254090). The site is located on the west side of Canterwood



Bld, west of St. Anthony's Hospital, approximately 2,000 feet north of the intersection with Borgen Blvd. Sec 25, Tw 22, R 01, Qtr 42.

### **III. Adjournment**



DEVELOPMENT SERVICES

**COMMUNITY DEVELOPMENT DEPARTMENT  
PLANNING DIVISION  
STAFF REPORT**

**TO:** Hearing Examiner  
**FROM:** Planning Staff  
**DATE:** August 26, 2021

**RE:** PL-SPR-07-0004, PL-CUP-13-0002, PL-DRB-07-0013, PL-SEPA-07-0060 | Canterwood Commercial Center  
Public Hearing Date: September 2, 2021

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**I. GENERAL INFORMATION**

- A. Owner/Applicant:** Swede Hill, LLC  
PO Box 1553  
Tacoma, WA 98401
- B. Agent:** Halsan EF & P, LLC  
PO Box 1447  
Gig Harbor, WA 98335

**II. APPLICANT'S REQUEST**

The applicant proposes the construction of four commercial buildings totaling 28,278 square feet and a 9,000 square feet parking garage on a vacant parcel in the B-2 General Business Zoning District. The site is adjacent to Washington State Highway 16 on the west and Canterwood Blvd on the east, within the vicinity of St. Anthony's Hospital. The site contains steep slopes, wetlands, and an unnamed stream. The project proposes significant fill to account for the extreme topography of the site and the filling of two category IV wetlands. Mitigation is proposed through the creation of on-site wetlands and the removal of an in-stream culvert. The project provides for three access points from Canterwood Boulevard. A parking garage under the northern-most building is proposed and drive-

through facilities on the other three buildings are also proposed. The conditional use permit is required to allow for the site's proposed drive-through facilities.

This request is encompassed in the site plan review (PL-SPR-07-0004), conditional use permit (PL-CUP-13-0002), and design review (PL-DRB-07-0060) applications. A Mitigated Determination of Nonsignificance (MDNS) issued in staff's processing of PL-SEPA-07-0060 has been included with this staff report as Exhibit L and is further described in Section VII of this report. The proposed site plan, architectural details, exterior elevations, and architectural renderings are included as Exhibit B to this staff report. A written statement of justification for granting the conditional use permit is included as Exhibit C to this report.

### **III. SITE DESCRIPTION**

**A. Location:** 10700 Canterwood Blvd, site is located on the west side of Canterwood Blvd, west of St. Anthony's Hospital, approximately 2,000 feet north of the intersection with Borgen Blvd. Sec 25, Tw 22, R 01, Qtr 42. Assessor's Parcel Number: 0122254090

**B. Site Area/Acreage:** 7.6 acres

**C. Existing Site Characteristics:**

- 1. Topography:** The site ranges from hilly to steep slopes with the steepest being approximately 70%.
- 2. Vegetation:** The site is currently vacant and heavily forested.
- 3. Wetlands and Critical Areas:** Seven wetlands, one unnamed stream, and steep slopes have been identified on site. Staff has issued a Mitigated Determination of Nonsignificance (MDNS) associated with permit file number PL-SEPA-07-0060 to address impacts to the critical areas on site and detail mitigation measures necessary as a result of such impacts. The MDNS is included with this staff report as Exhibit L. Please see related discussion in Section VII of this staff report for analysis related to these critical areas.

**D. Zoning:**

- 1. Subject parcel:** General Business District (B-2)
- 2. Adjacent zoning and current use:**

- a. **North:** Medium-Density Residential (R-2) – vacant forested land
- b. **East:** Commercial District (C-1) – St. Anthony’s Hospital
- c. **South:** SR-16 right-of-way; existing detention pond
- d. **West:** SR-16 right-of-way

**E. Utilities / Road Access:** The site proposes three access points from Canterwood Blvd., a public road. No utilities currently exist on the site.

#### **IV. APPLICABLE CODES AND POLICIES**

**A. Comprehensive Plan:** The site is designated as Commercial/Business (CB) by the City’s Land Use Map. The purpose of this land use category is to provide primarily retail and wholesale facilities, including service and sales. Where appropriate, mixed-use (residential with commercial) may be permitted through a planned unit development process. Commercial-business activities consist of the following: 1) Retail sales and services, 2) Business and professional offices; and, 3) Mini-warehousing.

Commercial areas which border residential designations or uses should use available natural features as boundaries. Natural features should serve as buffers, which may consist of standing timber, streams or drainage swales. A minimum buffer width should be 30 feet. The density and depth of the buffer should be proportional to the intensity of the use.

The Community Design Element of the Gig Harbor Comprehensive Plan (Pages 4-1 through 4-19) describes goals which provide for the way in which people experience their community and interact with one another, as driven by the foundational principles of a community’s design. Goal 4.3 of the Comprehensive Plan advocates for the creation of commercial centers which provide high levels of public amenities in areas determined appropriate for commercial, high density, or mixed uses. This goal further advocates for the inclusion of common areas to enhance the shopping experience, facilitate pedestrian activities, and provide a pleasing aesthetic element to commercial development.

**B. Gig Harbor Municipal Code:** The subject parcel is zoned B-2, General Business District. The following code chapters apply to this proposal:

- a. 17.14 Land Use Matrix
- b. 17.36 General Business District
- c. 17.64 Conditional Uses

- d. 17.72 Off-Street Parking and Loading Requirements
- e. 17.78 Trees, Landscaping and Screening
- f. 17.96 Site Plans
- g. 17.98 and 17.99 Design Standards and Review and Design Manual
- h. 18.04 Environmental Review (SEPA)
- i. 18.08 Critical Areas

## **V. BACKGROUND INFORMATION:**

The subject site is an undeveloped lot that was annexed into the City of Gig Harbor as a part of the Gig Harbor North Annexation in 1997 via Ordinance 746.

The application for the proposed Canterwood Commercial Center was originally submitted in March of 2006. The application languished for a number of years and was re-vitalized through an updated application in March of 2014. The application has since undergone an iterative review with City of Gig Harbor staff, requiring a number of revisions to several of the proposal's elements, until the project was found by staff to be consistent with all relevant statutory regulations and Gig Harbor Municipal Code (GHMC) provisions.

## **VI. DESIGN REVIEW:**

The Design Review process is outlined in Chapter 17.98 GHMC. Section 17.98.055 outlines the process for review of design alternatives by the Design Review Board (DRB). This section states that after a public meeting, the DRB will make a recommendation to the Community Development Director for approval or denial of the application.

The DRB shall review an application which does not strictly conform to the specific requirements of the Design Manual under the following criteria:

- a) whether the alternative design represents an equivalent or superior design solution to what would otherwise be achieved by rigidly applying specific requirements;
- b) whether the alternative design meets the intent of the general requirements of Chapter 17.99, Design Manual.

To best determine the general requirement's intent, the DRB shall consider the specific requirements as appropriate examples of compliance. General requirements include all bold and underlined text in the Design Manual. Specific standards include the more detailed text, which immediately follows general requirements.

Section 17.98.060 outlines the process for review of design exceptions by the DRB. This section states that an exception shall be processed in conjunction with a design review application, and shall follow the procedures for permit processing by the board as set forth in GHMC 17.98.055. An exception is used in those situations in which an applicant does not provide an alternative design to the requirements of Chapter 17.99 GHMC, Design Manual. Criteria for approval of a design exception is set forth in GHMC 17.98.060(D).

The applicant has proposed one design exception and several design alternatives before the DRB for review. Previous DRB meetings have been held on the following dates: October 23, 2014; December 8, 2016; June 28, 2017; July 26, 2018; September 13, 2018, and; April 8, 2021. Having considered the materials presented at these meetings, the DRB issued recommendations of approval on August 3, 2018, October 29, 2018, and April 9, 2021 regarding the one proposed design exception and each proposed design alternative. These recommendations are attached to this staff report as Exhibit D. Staff has otherwise reviewed the proposed development against the applicable provisions of the Design Manual and finds that the proposal has been designed consistent with the Design Manual, but for those alternative design and design exception requests which the DRB has recommended for approval.

## **VII. ENVIRONMENTAL REVIEW:**

The City issued a Mitigated Determination of Non-Significance (MDNS) for the proposed action on July 1, 2021. The MDNS and its adopted reference documents are collectively attached to this staff report as Exhibit L. The legal notice of the MDNS was published in The News Tribune newspaper and mailed to all property owners within 300 feet of the subject site on July 1, 2021. One comment was received by the Washington Department of Ecology in response to the MDNS; this comment is included as Exhibit E to this staff report. No appeals were timely filed on the threshold determination. The mitigation measures outlined in the MDNS have been recommended as conditions to the Hearing Examiner's decision in Section XI of this report. Staff has also recommended the Hearing Examiner adopt Condition No. 6 as described in Section XI of this staff report, which will require the applicant to comply with the comments submitted by the Department of Ecology in response to the MDNS.

## **VIII. PUBLIC NOTICE & INPUT:**

The legal notice of the proposed action and scheduled hearing (Notice of Public Hearing, "NOPH") was published in The News Tribune, posted on the subject site, and mailed to all property owners within 300 feet of the subject site on August 19, 2021. As of the date of this report, no written



comments have been received in response to the public notice. The Declarations of Mailing, Publishing, and Posting for the public hearing are attached to this staff report as Exhibit F.

Notice of public meeting (NOPM) for the applicant's participation in each previously mentioned meeting before the Design Review Board (DRB) were properly noticed to the public. No comments were submitted to staff in response to any of the NOPMs. The Declarations of Mailing, Publishing, and Posting for these public meetings are attached to this staff report as Exhibit G.

A notice of application (NOA) was appropriately noticed in February 2006, and was appropriately re-noticed via publishing in The Peninsula Gateway, posting on the subject site, and mailing to all property owners within 300 feet of the subject site in March of 2014. No comments were submitted to staff in response to either of the NOAs. The Declarations of Mailing, Publishing, and Posting are included with this staff report as Exhibit H.

## **IX. STAFF ANALYSIS AND FINDINGS:**

### **A. Planning Staff**

#### **1. Comprehensive Plan:**

The site is designated as Commercial/Business (CB) by the City's Land Use Map. The purpose of this land use category is to provide primarily retail and wholesale facilities, including service and sales. Where appropriate, mixed-use (residential with commercial) may be permitted through a planned unit development process. Commercial-business activities consist of the following: 1) Retail sales and services, 2) Business and professional offices; and, 3) Mini-warehousing.

Commercial areas which border residential designations or uses should use available natural features as boundaries. Natural features should serve as buffers, which may consist of standing timber, streams or drainage swales. A minimum buffer width should be 30 feet. The density and depth of the buffer should be proportional to the intensity of the use.

The Community Design Element of the Gig Harbor Comprehensive Plan (Pages 4-1 through 4-19) describes goals which provide for the way in which people experience their community and interact with one another, as driven by the foundational principles of a community's design. Goal 4.3 of the Comprehensive Plan advocates for the creation of commercial centers which provide high levels of

public amenities in areas determined appropriate for commercial, high density, or mixed uses. This goal further advocates for minimum common area standards to enhance the shopping experience, facilitate pedestrian activities, and provide a pleasing aesthetic element to commercial development.

The proposed Canterwood Commercial Center supports the intent of the CB land use designation, in that the proposal is for primarily retail and professional office uses, in addition to drive-thru facilities associated with dining establishments, as is conditionally permissible in the subject site's B-2 zoning district. Additionally, the site is bordered to the north by the RM Residential Medium land use designation and appropriately proposes to border its shared property line with a 40-foot-wide natural buffer, landscaped as a "dense vegetative buffer" consistent with the term's definition and planting densities set forth in the Design Manual Glossary (GHMC 17.99.590). Lastly, the applicant's proposal is inherently consistent with the Community Design goal to create commercial centers where appropriate, and has also proposed the incorporation of outdoor common areas prescriptively consistent with the minimum common area requirements set forth in GHMC 17.99.280. Therefore, the proposed Canterwood Commercial Center can be found consistent with the stated goals and intent of the relevant discussion in the Gig Harbor Comprehensive Plan.

## **2. Gig Harbor Municipal Code (GHMC):**

### **a. 17.14.020 Land Use Matrix:**

Consistent with the Land Use Matrix set forth in GHMC 17.14.020, "drive-through facility" is a conditionally permitted use in the subject site's General Business (B-2) zone. As such, the applicant has submitted a Conditional Use Permit for the Hearing Examiner's consideration to permit the proposed drive-thrus associated with the restaurant uses proposed at Buildings B, C, and D (see Exhibit C for the applicant's discussion justifying its requested conditional use).

### **b. 17.36 General Business District (ED) Zoning District and 17.78 Trees, Landscaping and Screening:**

The purpose of the B-2 district is to provide areas that offer a wide range of consumer goods and services. It is further intended to group buildings and business establishments in a manner that creates convenient, attractive and safe development. The products and services shall primarily be for sale on the premises only. All business

shall be conducted within enclosed buildings, except for approved outdoor storage, display and dining areas.

The proposed commercial center offers a range of consumer goods and services, to include professional services, retail, and restaurants with drive-thrus. The services provided, and the retail sales tendered, will occur on the premises and within enclosed buildings, save for the potential use of consumers to enjoy the proposed and encouraged outdoor common area. Lastly, the buildings are grouped in a sensible and safe manner, wherein Building A and its proposed professional office use is located north of the site's bifurcating Type 3 stream, while Buildings B-D are located to the south of the typed stream and each offer retail and dining establishments. In this manner, the site has been thoughtfully and safely oriented around general consumer needs and existing critical areas. The proposal is therefore consistent with the stated intent of the B-2 zone.

GHMC Subsection 17.36.120(B) requires compliance with the requirements of GHMC Chapter 17.78, Trees, Landscaping and Screening. Staff has reviewed the applicant's landscaping plans (Exhibit I) against the relevant provisions of GHMC 17.78 and finds the proposed landscaping, tree protection, and tree preservation consistent with the requirements therein.

Based on the preceding analysis, the applicant has designed its proposed commercial center consistent with the intent and relevant gross floor area, setback, hard surface coverage, building height, and landscaping provisions set forth in GHMC Chapter 17.36.

**c. 17.64 Conditional Uses:**

Certain uses, because of their unusual size, infrequent occurrence, special requirements, possible safety hazards or detrimental effect on surrounding properties, are classified as conditional uses. These uses may be allowed in certain use districts by a conditional use permit granted by the hearing examiner, subject to the procedures established in Chapter 2.25 GHMC.

In order for a conditional use permit to be granted, it must be found consistent with all criteria set forth in GHMC Subsection 17.64.040. The applicant has submitted an analysis of this criteria as it relates to the proposed drive-thrus associated with the restaurant uses proposed for Buildings B, C, and D; this written justification has been included with this staff report as Exhibit C. The following is staff's analysis of the proposed project's consistency with these criteria:

#### **GHMC 17.64.040, Review criteria:**

1. That the use which the conditional use permit is applied for is specified by this title as being conditionally permitted within, and is consistent with the description and purpose of the zone district in which the property is located;

##### Staff Analysis:

As is stated earlier in this staff report, the proposed “drive-thru facility” use for the subject site is specified by Title 17, GHMC as being conditionally permitted with the site’s B-2 zoning district and is consistent with the description and purpose of the B-2 zone, particularly as the drive-thrus contribute to a wide range of consumer goods and services within the site’s zone.

2. That the granting of such conditional use permit will not be detrimental to the public health, safety, comfort, convenience and general welfare, will not adversely affect the established character of the surrounding neighborhood, and will not be injurious to the property or improvements in such vicinity and/or zone in which the property is located;

##### Staff Analysis:

If appropriately conditioned, the proposed development has been designed in a manner which is not detrimental to the public health, safety, comfort, convenience, or general welfare, as has been ensured through the project’s consistency with applicable Public Works Standards and Gig Harbor Municipal Code provisions, or has otherwise been mitigated via the Mitigated Determination of Nonsignificance issued on July 1, 2021 (see Exhibit L). The proposed drive-thrus will not adversely affect the established character of the surrounding neighborhood, particularly given that the site is bordered to the south and the west by the SR-16 right-of-way, bordered to the north by vacant land, and bordered to the east by the St. Anthony’s hospital. Finally, the proposal is not injurious to property or improvements in the vicinity of the subject site; notably, impacts to the regulated critical areas on the subject site have been sufficiently mitigated to ensure no net adverse or injurious impacts to the property, as described further in the MDNS and verified via third-party environmental consultation described in Reference Nos. 3 and 5 to Exhibit L.

3. That the proposed use is properly located in relation to the other land uses and to transportation and service facilities in

the vicinity; and further, that the use can be adequately served by such public facilities and street capacities without placing an undue burden on such facilities and streets;

Staff Analysis:

If properly conditioned, the proposed development has been designed in a manner which is adequately served by public facilities and street capacities without placing an undue burden on such facilities and streets, as has been ensured via the review of the proposal from the Gig Harbor Public Works Department. To this end, the Public Works Department has provided a written analysis of the proposal's related water infrastructure, wastewater infrastructure, stormwater infrastructure, and transportation infrastructure impacts and Code requirements in Reference No. 4 to Exhibit L, and concluded that no mitigation measures or conditions were necessary to ensure the applicant's compliance with such public facilities and street capacities.

4. That the site is of sufficient size to accommodate the proposed use and all yards, open spaces, walls and fences, parking, loading, landscaping and other such features as are required by this title or as needed in the opinion of the examiner.

Staff Analysis:

As is described in Section IX.A.2.b in this staff report, the site is of sufficient size to accommodate the proposed use and all yards, walls and fences, parking, loading, and other applicable features as required by GHMC, Title 17, as the site has been designed in a manner consistent with the development standards codified for each of these features.

**d. 17.72 Off-Street Parking and Loading Requirements**

"Off-street parking" is defined as parking on privately owned property. The number of off-street parking spaces required of a development proposal is use-dependent; applicants shall provide the number of off-street parking spaces required of their site's use in a manner consistent with GHMC 17.72.030.

Building A is an 18,000 gross square foot structure intended for professional services use. As per GHMC 17.72.030, "professional services" use requires "One off-street parking space for every 300 square feet of gross floor area except for

medical and dental offices. For medical and dental offices, one off-street parking space for every 250 square feet of gross floor area.” The applicant is proposing a total of 72 off-street parking stalls to serve Building A’s professional services use. A parking garage located on the bottom floor of the structure is designed to accommodate 19 of the proposed 72 parking stalls. The applicant has, therefore, proposed sufficient off-street parking to serve the structure’s professional services use, even should the applicant elect to use the entire 18,000 square foot structure to serve professional medical and/or dental offices.

Buildings B, C, and D propose a mixture of retail (sales, level 1), fast food (restaurant, level 1), and drive-thru facility uses. As per GHMC 17.72.030:

- Sales, level 1 use requires “One off-street parking space for every 300 square feet of gross floor area.”
- Restaurant, level 1 use requires “One off-street parking space for every three seats based on a seating plan submitted to the planning director showing a reasonable seating capacity for the dining area.”
- Drive-through facility requires “One off-street space for every two employees assigned to the drive-through service area. In addition, a stacking lane or lanes capable of accommodating a minimum of 10 percent of the projected maximum hourly throughput of vehicles for the drive-through facility shall be provided near the drive-through service area. One car length within the stacking lane shall be equal to the length of a standard parking space.”

Building B is a 2,609 gross square foot structure intended for restaurant, level 1 and drive-through uses. The applicant has indicated that the restaurant will be served by 60 seats for patron use (see sheet C5 of Exhibit B) and that the drive-through will have two assigned employees. As such, Building B necessitates 21 off-street parking stalls to serve the indicated use and its described intensity. The applicant has appropriately designed the site with 21 off-street parking stalls.

Building C is a 2,609 gross square foot structure intended for restaurant, level 1 and drive-through uses. Building D is a 5,060 gross square foot structure intended for restaurant, level 1, drive-through, and retail uses. The off-street parking area designed to serve Buildings C and D is largely separated from Building B by a 24-foot-wide accessway that connects the site to the Canterwood Boulevard right-of-way; as such, the combined total

parking stalls for Buildings C and D are calculated below and collectively represent the parking needs of both structures.

- The applicant has indicated that the drive-throughs associated with Buildings C and D will each have two assigned employees, for a total of four assigned drive-through employees. Two (2) off-street parking stalls are required to serve this use.
- The applicant has indicated that the restaurants associated with Buildings C and D will collectively be served by 84 seats for patron use; that is to say, the combined total of seats between Buildings C and D will not exceed 84. 28 off-street parking stalls are required to serve this use.
- The applicant has indicated that 3,660 gross square feet of Building D's 5,060 gross square feet will serve its proposed retail use. 13 off-street parking stalls are required to serve this use.

Based on the analysis above, the applicant is required to provide a total of 43 off-street parking stalls to collectively serve Buildings C and D. However, considering Building C's gross floor area of 2,609 square feet, the applicant is required to provide 261 square feet of outdoor common area, as per GHMC 17.99.280(A), but is instead providing 466 square feet of outdoor common area. Outdoor common areas invite pedestrian activity; therefore, it is expected that impacts from automobile traffic will be decreased, and as such, applicants providing outdoor common area may make use of common area credits set forth in GHMC 17.99.280(F). As it relates to parking, required on-site parking may be reduced by one parking stall for every 200 square feet of required common area. Because the applicant is providing an excess of 205 square feet of common area, the off-street parking required for the structure's use may be reduced by one (1) parking stall. In the case of the subject request, the site's requirement to provide 43 parking stalls may be decreased by 1 parking stall, necessitating the site to provide 42 off-street parking stalls. The applicant has elected to make use of this common area credit and has designed a parking area with 42 off-street parking stalls to serve Buildings C and D.

Based on the preceding analysis, the applicant has designed its site consistent with the off-street parking and loading requirements set forth in GHMC Chapter 17.72.

#### **e. 17.96 Site Plans**

GHMC 17.96.035 sets forth the criteria for approval of major site plan review applications. The criteria are as follows:

- A. The site plan is compatible with the surrounding uses; and
- B. The site plan is compliant with all relevant statutory codes, regulations, and ordinances.

As is described in this staff report, the subject site is bordered on the south and the west by the State Route 16 right-of-way, is bordered on the north by a vacant parcel in the R-2 medium density residential zone, and is bordered to the east by the St. Anthony's hospital. Only one use is established surrounding the proposed Canterwood Commercial Center, and the proposed retail, restaurant, drive-through, and professional office uses are compatible with the established hospital, particularly given the intense use and 24-hour operation associated with the hospital. The site plan is also compliant with all relevant statutory codes, regulations, and ordinances based on the analysis included in this staff report.

As such, the major site plan included with subject request is compliant with the criteria for approval set forth in GHMC 17.96.035.

**f. 17.98 & 17.99 Design Standards and Review & Design Manual**

GHMC Chapter 17.98 sets forth the City Design Review process. Consistent with GHMC 17.98.055, an applicant may request review by the Design Review Board (DRB) of an application or portions thereof which do not strictly conform to the specific requirements of Chapter 17.99 GHMC, Design Manual. The applicant has requested the DRB to review several portions of its proposed design which do not strictly conform with GHMC 17.99.

Section 17.98.060 outlines the process for review of design exceptions by the DRB. This section states that an exception shall be processed in conjunction with a design review application, and shall follow the procedures for permit processing by the board as set forth in GHMC 17.98.055. An exception is used in those situations in which an applicant does not provide an alternative design to the requirements of Chapter 17.99 GHMC, Design Manual. Criteria for approval of a design exception is set forth in GHMC 17.98.060(D).



The applicant has proposed one design exception and several design alternatives before the DRB for review.

At public meetings held on October 23, 2014, December 8, 2016, June 28, 2017, July 26, 2018, September 13, 2018, and April 8, 2021, the applicant presented its alternative designs and design exception to the DRB. Having considered the proposed design and the criteria necessary to recommend approval of an alternative design and design exception, the DRB issued Notices of Recommendation on August 3, 2018, October 29, 2018, and April 9, 2021 recommending that the Hearing Examiner approve the proposed alternative design and design exception, subject to the following conditions:

- The site shall be landscaped as depicted in the landscape plan set included as enclosure A to the April 9, 2021 Notice of Recommendation (see Exhibit D);
- The applicant shall submit a revised Design Review application formally requesting a design exception so that the Planning Department can make a process determination post-motion;
- The applicant shall install plantings that drape over the top of the wall and work with the project's biologist to consider additional plantings at the base of the wall (reference continuous retaining wall represented as walls 7-12 on sheet C13 of Exhibit B), and;
- The applicant shall utilize natural materials for the wall (reference continuous retaining wall represented as walls 7-12 on sheet C13 of Exhibit B) that are consistent with other walls proposed throughout the project site. Proposed wall materials shall be submitted to the Planning Department for review and approval.

These Recommendations are included as Exhibit D to this staff report. Staff has also provided Exhibit I to this staff report, which includes the applicant's landscape plan set. The applicant's revised design review application requesting a design exception has been included as Exhibit K to the staff report, and a Redi-Rock catalog conveying the intended natural materials for use in constructing the retaining wall referenced in the DRB's provisional notices of recommendation is included as Exhibit J. The details and materials included in Exhibits I, J, and K demonstrate the applicant's consistency with the provisional recommendations of approval issued by the DRB for the requested design exception and design alternatives. The applicant's proposed design has otherwise been reviewed by

staff administratively and has been found consistent with the relevant provisions of GHMC Chapter 17.99.

If properly conditioned, the subject request is generally consistent with the specific requirements of GHMC 17.98, Design Standards and Review, and GHMC 17.99, Design Manual.

**g. 18.08 Critical Areas**

GHMC 18.08.090 stipulates that a wetland analysis report shall be prepared by a qualified wetland specialist and submitted to the City of Gig Harbor as part of the SEPA review process established by the city of Gig Harbor environmental policy ordinance, Chapter 18.04 GHMC. GHMC 18.08.183 stipulates that a stream analysis report shall be prepared by a qualified biologist and submitted to the department as part of the SEPA review process. The wetland analysis report shall be submitted to the department for review for any proposals that are within 300 feet of a wetland, and the stream analysis report shall be submitted for review for any proposal that is within 200 feet of a stream.

The applicant submitted the required critical area analysis in its Wetland Delineation and Habitat Assessment Report and Detailed Mitigation Plan (Reference No. 2, Exhibit L), which identified seven (7) Category IV wetlands located on the subject parcel and one (1) Type 3 stream. The on-site wetlands cover approximately 11,012 square feet of the subject site; these wetlands have been identified as Wetlands A-G in the applicant's site plans. The wetlands are palustrine forested, saturated wetlands dominated by deer fern, lady fern, slough sedge, salmonberry, red alder, western red cedar, and Douglas fir vegetation species. The unnamed stream channel is rated as a Type 3 stream and traverses the site for approximately 1,265 linear feet. The stream is a non-salmon bearing tributary which eventually connects with McCormick Creek and is associated with Wetlands D, E, and F on the subject parcel. The Type 3 stream and each of the seven Category IV wetlands have all been assigned a 50-buffer applicable to each individual critical area. In totality, approximately one-half of the subject parcel is encumbered by regulated critical areas and their associated buffers. Critical fish and wildlife species are not associated with the site.

Impacts to the above-mentioned critical areas include filling one wetland (Wetland B) to facilitate development of the proposed

commercial center and converting another wetland (Wetland C) for use as a stormwater pond. Compensatory mitigation for these impacts is proposed by the applicant; specifically, the applicant proposes to create a new wetland to mitigate for its wetland impacts in a manner consistent with GHMC 18.08.170(B). To this end, the applicant has proposed to create a new on-site wetland at a replacement ratio of 1.5:1, effectively creating 50% more wetland area than is being impacted through the site's proposed development. Table 12 included in Reference No. 2 (Exhibit L) outlines the impacted wetland area at 5,525 square feet and further outlines the area of the created wetland resultant of the site's compensatory mitigation at 8,288 square feet. The applicant further proposes out-of-kind compensatory mitigation by removing 48 linear feet of culvert associated with the on-site Type 3 tributary stream and providing subsequent stream restoration efforts to improve the overall hydrologic and water quality functions of the stream by improving runoff storage and conveyance capacity, retention of sediments, pollution assimilation, and groundwater recharge functions.

The applicant's critical area categorizations and proposed mitigation has been reviewed by the City's third-party environmental consultant, Grette Associates LLC, for consistency with the relevant provisions of GHMC Chapter 18.08, Critical Areas. Grette confirmed that the applicant accurately categorized each critical area, appropriately reported all required data, and provided adequate on-site mitigation for the impacts to the critical areas proposed as a result of the site's development (see Reference No. 3 of Exhibit L). Additional detail on the critical areas and their mitigation is described in the Mitigated Determination of Nonsignificance (MDNS) issued by staff on July 1, 2021 in its processing of permit file no. PL-SEPA-07-0060.

Based on the preceding analysis, the applicant has designed its proposed development consistent with the relevant provisions of the City of Gig Harbor's Critical Areas Ordinance, GHMC Chapter 18.08.

## **B. Operations and Engineering**

The Public Works Department has reviewed the subject request and has found the request to be generally consistent with the applicable provisions of the Code.

## **C. Fire Marshal/Building Official**

The Building Official has reviewed the subject request and has found the request to be generally consistent with the applicable provisions of the Code, although offers the following comment for the applicant's benefit in its awareness of electric vehicle (EV) infrastructure requirements which will be verified in the applicant's civil and building permit applications:

*"Although not required until construction of the building we believe it is prudent to bring to your attention the provisions of Section 429 2018- IBC WSA. This is a State amendment requiring that electric vehicle charging infrastructure be provided for Group B Occupancies with 20 or more parking stalls. This requirement effects 5% of the provided parking as well as an accessible stall."*

## **X. CONCLUSIONS:**

Based on the submitted information, site inspection and the analysis contained above, staff concludes the following:

### **A. Conditional Use Permit:**

Based upon the findings previously addressed in Section IX of this staff report, the proposed use of the subject site is consistent with the criteria for approval set forth in GHMC 17.64.040, if appropriately conditioned.

### **B. Site Plan Review:**

Based upon the findings previously addressed in Section IX of this staff report, the proposed site improvements are consistent with the criteria for site plan approval set forth in GHMC 17.96.035, if appropriately conditioned.

### **C. Design Review:**

Based upon the findings previously addressed in Section IX of this staff report, and considering the proposal's consistency with the Recommendations of Approval provided by the Design Review Board, the proposal is generally consistent with the applicable provisions of GHMC Chapter 17.99, Design Manual, if appropriately conditioned.

## **XI. RECOMMENDATIONS:**

Should the requested Conditional Use Permit, Site Plan Review, and Design Review Permit be approved, staff recommends the imposition of the following special conditions of approval:

### **Land Use Special Conditions:**

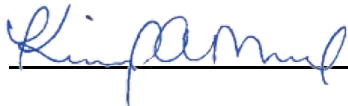
1. Prior to issuance of civil permitting necessary for the site's improvements, the applicant shall submit a detailed phase wetland mitigation plan in a manner consistent with GHMC 18.08.150(B). As needed, review of the detailed phase mitigation plan may be outsourced to the City of Gig Harbor's third-party environmental consultant, the full cost of which shall be borne by the applicant.
2. The applicant shall obtain all necessary land use, civil, and building permits from the city prior to commencing construction on the site.
3. The applicant shall develop the site consistent with the site plan, renderings, and exterior elevations included with this staff report as Exhibit B, or as otherwise revised in an approved civil permit. The applicant shall also design the site consistent with the Notices of Recommendation issued by the Design Review Board (DRB), to include the provisional recommendations contained therein, jointly included with this staff report as Exhibit D.
4. Prior to issuance of building permitting necessary for the site's improvements, the applicant shall provide the City of Gig Harbor Planning Division with a seating plan for the restaurant uses associated with Buildings B, C, and D. The seating plan shall convey a maximum of 60 seats associated with Building B. The seating plans for Buildings C and D shall convey a combined total of no more than 84 seats. Should the applicant wish to increase the seating for any of the three restaurant uses, additional off-street parking will be required at one off-street parking space for every three additional seats. Concurrency review under Chapter 19.10 GHMC may also be required if the additional seats generate any new p.m. peak-hour trips, require additional sewer capacity, or increase water consumption. Consistency with these additional parking and concurrency requirements shall be demonstrated by the applicant to the satisfaction of the City of Gig Harbor Community Development and Public Works Departments prior to the addition of seats at any of the three restaurants.
5. The applicant shall landscape the site consistent with the landscape plan included with this staff report as Exhibit I. All landscaping shall be installed prior to the issuance of certificate of occupancy or final inspection, unless the property owner submits a performance assurance equal to not less than 110 percent of a contractor's bid and which commits to install the landscaping within one year.

6. The applicant shall comply with the comments, as applicable, provided in response to the Notice of Mitigated Determination of Nonsignificance by the Department of Ecology, included as Exhibit E to this decision.

**Mitigation Measures – Mitigated Determination of Nonsignificance**  
**– File No. PL-SEPA-07-0060:**

7. All requirements and conditions contained in any documents incorporated by reference herein, and included as Exhibit L to this staff report, shall be strictly adhered to.

**Project Planner:** Kimberly Mahoney, Senior Planner



---

**Date:** August 26, 2021

cc: Planning File

The following exhibits are included for your review of the development application:

- Exhibit A – Staff report, prepared by Kimberly Mahoney, Senior Planner, for the Canterwood Commercial Center proposal (PL-SPR-07-0004 et al), dated August 26, 2021
- Exhibit B – Civil Plan Set, prepared by Barghausen Consulting Engineers, Inc., received May 10, 2021; Architectural Plan Set, prepared by Helix Design Group, Inc., received October 23, 2020, and; Building Elevations, prepared by Helix Design Group, Inc., dated May 22, 2020
- Exhibit C – Conditional Use Permit Narrative, submitted by Applicant, dated January 16, 2018
- Exhibit D – Notices of Recommendation, signed by Design Review Board (DRB) Chair on August 3, 2018, October 30, 2018, and April 9, 2021
- Exhibit E – MDNS Comment from the Department of Ecology dated July 15, 2021
- Exhibit F – Declarations of Mailing, Publishing, and Posting, Notice of Public Hearing
- Exhibit G – Declarations of Mailing, Publishing, and Posting, Notices of Public Meeting
- Exhibit H – Declarations of Mailing, Publishing, and Posting, Notices of Application
- Exhibit I – Landscape Plan Set, prepared by Barghausen Consulting Engineers, Inc., revised March 11, 2021

Exhibit J – Redi-Rock™ Retaining Wall Material Catalog  
Exhibit K – Application for Design Exception, prepared by Barghausen Consulting Engineers, Inc., dated October 15, 2019  
Exhibit L – Mitigation Determination of Nonsignificance (MDNS), issued on July 1, 2021 for PL-SEPA-07-0060

Duration of Permit Approval: The permits included in this decision shall expire three (3) years from the date of approval, unless a complete application for subsequent building permit or civil permit has been submitted and remained active, pursuant to GHMC 19.02.008. Upon written request by the property owner, prior to the date of land use permit expiration, the director may grant an extension of time up to but not exceeding one (1) year pursuant to GHMC 19.02.008(F). See GHMC 19.02.008 for complete regulations on the duration of permit approvals and expiration of permits.

Administrative Appeal: There is no administrative appeal for this decision. Any appeal of this decision shall be in accordance with RCW 36.70C.

Property Tax Valuation: Affected property owners may request a change in property tax valuation notwithstanding any program of revaluation by contacting the Pierce County Assessor-Treasurer.

Permit Documents: The complete project permit file, including official decision, findings, conclusions and conditions of approval, if any, is available for review at the City of Gig Harbor Community Development Department, 3510 Grandview Street, Gig Harbor, WA 98335, during normal business hours, Monday through Friday. Additional permit information can also be found at <https://ci-gigharbor-wa.smartgovcommunity.com/Parcels/ParcelHome> by entering the above permit numbers. Questions regarding the above stated decision should be made to Kim Mahoney, Senior Planner at [kmahoney@gigharborwa.gov](mailto:kmahoney@gigharborwa.gov) or 253-851-6170.



SECTION 25, TOWNSHIP 22, RANGE 1 EAST

CANTERWOOD COMMERCIAL  
CENTER  
PROJECT

PROJECT No. PL-SPR-07-0004  
Firm's PROJECT No. 16657

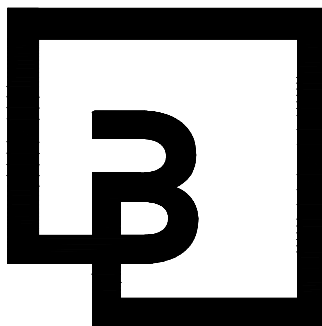
THESE PLANS ARE A REVISION TO PREVIOUSLY SUBMITTED PRELIMINARY PLANS FOR:

SITE PLAN REVIEW FILE NO. PL-SPR-07-0004  
DESIGN REVIEW BOARD FILE NO. PL-DRB-07-0013  
SEPA FILE NO'S. PL-SEPA-07-0008  
PL-SEPA-07-0060  
CUP APPLICATION OCT 2008

Canterwood Commercial Center

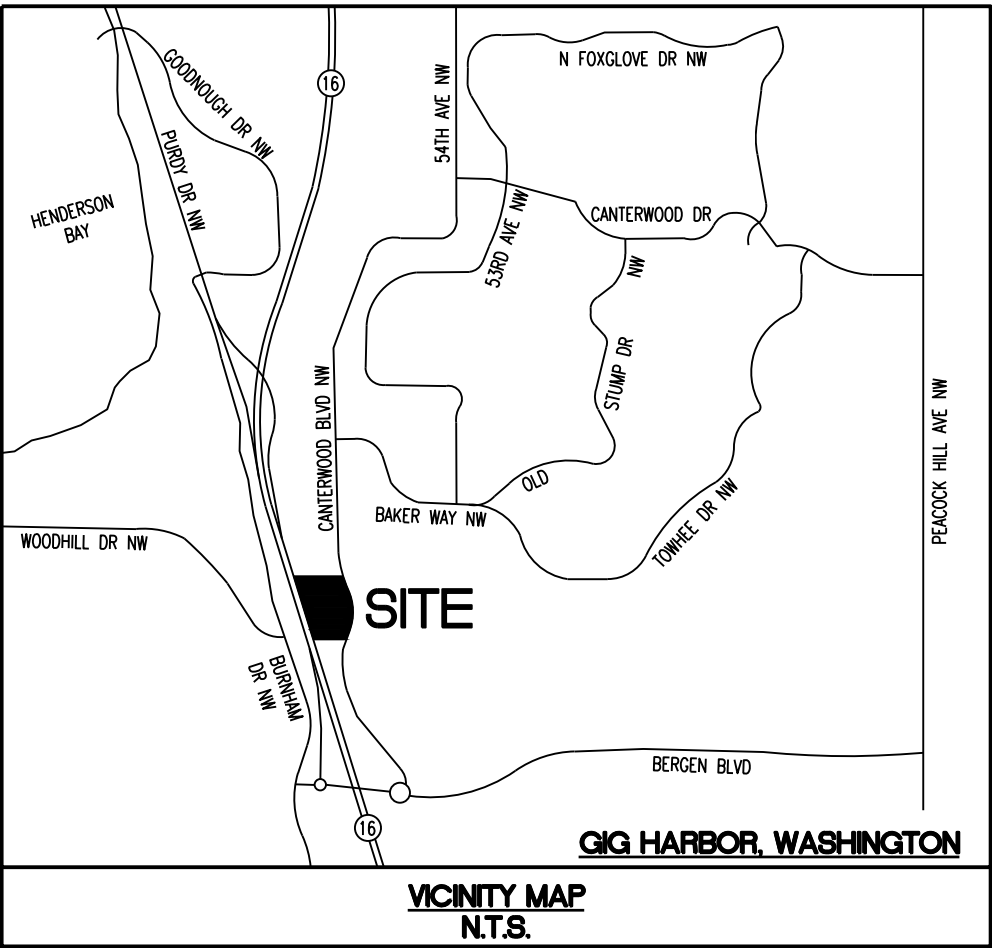
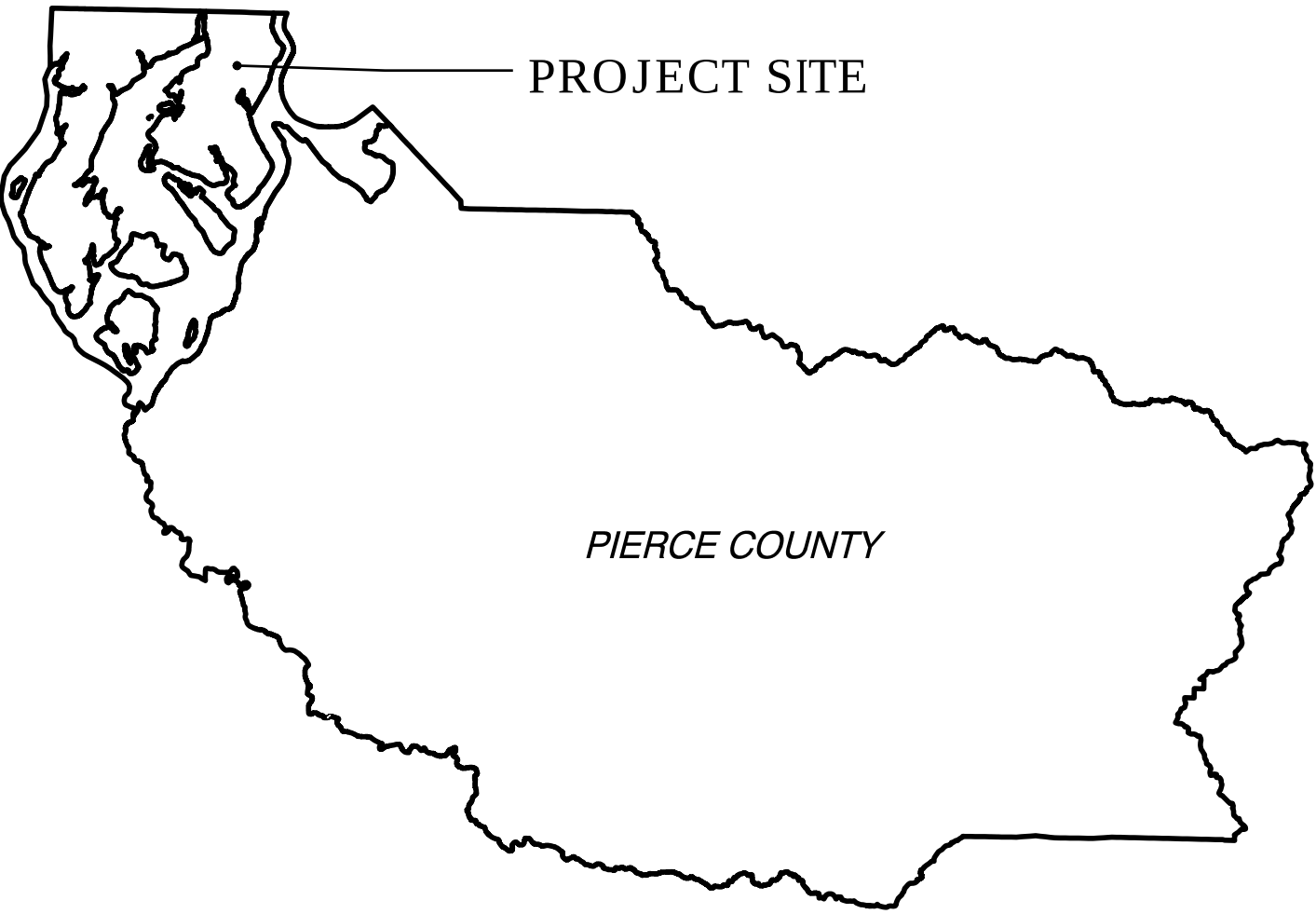
PL-SPR-07-0004 et al  
Hearing Examiner

Exhibit B



Barghausen  
Consulting Engineers, Inc.  
18215 72nd Avenue South  
Kent, WA 98032  
425.251.6222 [barghausen.com](http://barghausen.com)

VICINITY MAP  
SCALE: N.T.S.



SHEET INDEX

|           |                                        |
|-----------|----------------------------------------|
| SHEET C1  | COVER SHEET                            |
| SHEET C2  | OVERALL SITE PLAN                      |
| SHEET C3  | EXISTING CONDITIONS MAP                |
| SHEET C4  | EXISTING CONDITIONS MAP                |
| SHEET C5  | SITE PLAN                              |
| SHEET C6  | SITE PLAN DETAILS                      |
| SHEET C7  | VEHICLE MANEUVERING AND SIGHT DISTANCE |
| SHEET C8  | VEHICLE MANEUVERING AND SIGHT DISTANCE |
| SHEET C9  | CROSSWALK SIGHT DISTANCE               |
| SHEET C10 | TRASH VEHICLE MANEUVERING              |
| SHEET C11 | TRASH VEHICLE MANEUVERING              |
| SHEET C12 | UTILITY SYSTEMS MAP                    |
| SHEET C13 | GRADING AND STORM DRAINAGE PLAN        |
| SHEET C14 | GRADING AND STORM DRAINAGE PLAN        |
| SHEET C15 | SITE SECTION - A                       |
| SHEET C16 | SITE SECTION - B                       |
| SHEET C17 | SITE SECTION - C                       |
| SHEET C18 | SITE SECTION - D                       |
| SHEET C19 | SITE SECTION - E                       |
| SHEET C20 | WATER MAIN PLAN                        |
| SHEET C21 | SANITARY SEWER PLAN                    |
| SHEET C22 | SIGHT LINE SECTIONS                    |
| SHEET C23 | SIGHT LINE SECTIONS                    |



ISSUED FOR CONSTRUCTION FOR THE CITY OF GIG HARBOR  
DATE: \_\_\_\_\_



File:P:\16000s\16657\preliminary\16657-PO.dwg Date/Time:1/18/2021 2:25 PM Scale:1" = 1' Xref: ----- KHARRIS

#### NOTES:

- NO WELLS ARE KNOWN TO BE ONSITE. IF A WELL IS ENCOUNTERED DURING CONSTRUCTION IT SHALL BE ABANDONED IN PLACE PER TACOMA PIERCE COUNTY HEALTH DEPARTMENT STANDARDS.
- NO SEPTIC SYSTEMS ARE KNOWN TO BE ON THIS SITE. IF A SEPTIC SYSTEM IS DISCOVERED DURING CONSTRUCTION IT SHALL BE REMOVED AND DISPOSED OF PER TACOMA PIERCE COUNTY HEALTH DEPARTMENT STANDARDS.

#### SITE DATA

SITE AREA: 330,839± (7.60± ACRES)  
PARCEL NUMBER: 012225-4-090  
ZONING: B-2  
BUILDING FOOTPRINTS: A= 27,000 SF (18,000 SF OFFICES AND 9,000 SF GARAGE)  
B= 2,609 SF FAST FOOD WITH DRIVE-THRU  
C= 2,609 SF FAST FOOD WITH DRIVE-THRU  
D= 5,060 SF FAST FOOD WITH DRIVE-THRU (1400 SF) AND RETAIL (3660 SF)  
PARKING REQUIRED: 123-136 (122-135 WITH COMMON AREA REDUCTION)  
PARKING PROVIDED: 116 OPEN SPACES AND 19± GARAGED= 135 SPACES, INCLUDES 6 A.D.A. OPEN SPACES AND 2 ADA IN GARAGE (TOTAL DOES NOT INCLUDE DRIVE-THRU).

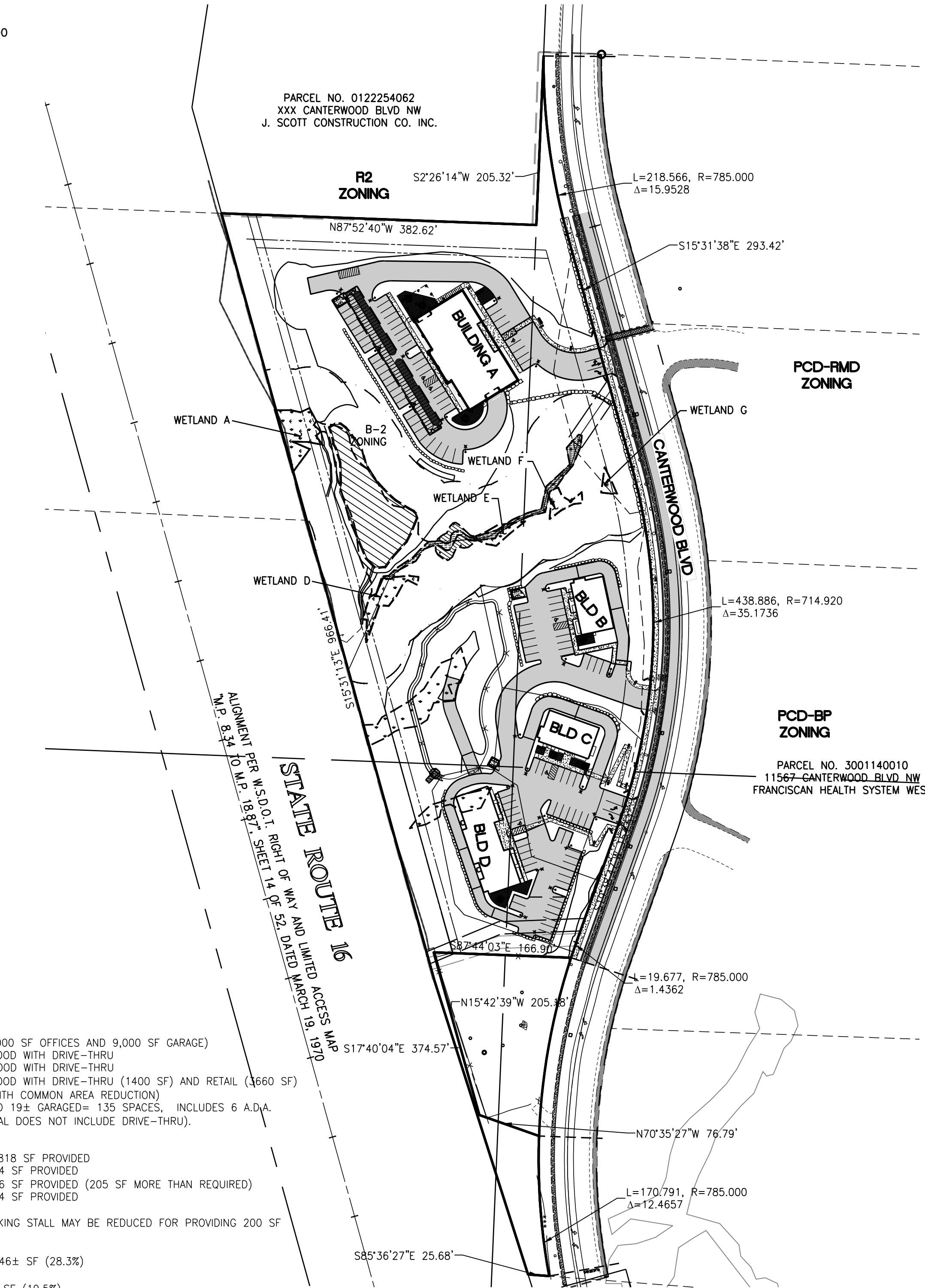
COMMON AREA:  
BUILDING A - 1800 SF REQUIRED, 1818 SF PROVIDED  
BUILDING B - 261 SF REQUIRED, 264 SF PROVIDED  
BUILDING C - 261 SF REQUIRED, 466 SF PROVIDED (205 SF MORE THAN REQUIRED)  
BUILDING D - 506 SF REQUIRED, 644 SF PROVIDED

PER GHMC 17.99.280(F)(1) ONE PARKING STALL MAY BE REDUCED FOR PROVIDING 200 SF MORE COMMON AREA THAN REQUIRED.

TOTAL IMPERVIOUS COVERAGE SHOWN: 93,546± SF (28.3%)  
BUILDINGS=19,561 SF (5.9%)  
AISLES, PARKING DUMPSTERS=64,601 SF (19.5%)  
SIDEWALKS, PATIOS, ETC.= 9,601± SF (2.9%)

BOUNDARY AND TOPOGRAPHY: BY APEX ENGINEERING, PLLC AND BCE

PROJECT ADDRESS: 10700 CANTERWOOD BLVD NW



## SURVEY INFORMATION

### HORIZONTAL DATUM:

HORIZONTAL DATUM IS NAD 1983(2011) PER WSDOT. WSDOT CONTROL POINT NO. GP27016-69 WAS HELD FOR POSITION AND A LINE BETWEEN CONTROL POINT NO. GP27016-69 AND CONTROL POINT NO. GP27016-137 WAS HELD FOR ROTATION, BEING S16°52'07"E.

### VERTICAL DATUM:

VERTICAL DATUM FOR THIS SITE IS NAVD 1988 PER WSDOT. WSDOT CONTROL POINT NO. GP27016-69 WAS HELD FOR ELEVATION, BEING 163.474 FEET(NAVD88). NAVD88 = NGVD29 + 3.458

### DATE:

THIS SURVEY WAS PERFORMED IN FEBRUARY 2015. ALL TOPOGRAPHIC INFORMATION AND MONUMENTS SHOWN HEREON WERE TIED AT THAT TIME.

### NARRATIVE:

A FIELD TRAVERSE USING A SPECTRA FOCUS 30 AND A TOPCON GR-5 SUPPLEMENTED WITH FIELD NOTES, WAS PERFORMED, ESTABLISHING THE ANGULAR, VERTICAL AND DISTANCE RELATIONSHIPS BETWEEN THE MONUMENTS, PROPERTY LINES, AND IMPROVEMENTS. THE RESULTING DATA MEETS OR EXCEEDS THE STANDARDS FOR LAND BOUNDARY SURVEYS AS SET FORTH IN WAC 332-130-090.

### NOTE:

- BOUNDARY SHOWN HEREON IS BY OTHERS.
- SITE CONTOURS ARE PER APEX SURVEY AND PIERCE COUNTY LIDAR SOURCES. ROAD AND POND ARE PER BARGHAUSEN SURVEY FROM FEBRUARY 2015.

## LEGAL DESCRIPTION:

A PARCEL OF LAND LYING WITHIN THE SOUTHEAST QUARTER OF SECTION 25, TOWNSHIP 22 NORTH, RANGE 1 EAST OF THE WILLAMETTE MERIDIAN, CITY OF GIG HARBOR, PIERCE COUNTY, WASHINGTON, AND MORE SPECIFICALLY DESCRIBED AS FOLLOWS:

COMMENCING AT THE NORTHWEST CORNER OF LOT 2 OF PIERCE COUNTY LARGE LOT NO. 2970, ACCORDING TO THE PLAT THEREOF RECORDED IN VOLUME 30 OF LARGE LOT SURVEYS AT PAGE 70, RECORDS OF PIERCE COUNTY, WASHINGTON;  
THENCE SOUTH 01°56'31" WEST ALONG THE WEST LINE THEREOF 5.10 FEET TO THE INTERSECTION OF THE WESTERLY MARGIN OF CANTERWOOD DRIVE AND THE WEST LINE OF THE AFOREMENTIONED LOT 2;  
THENCE CONTINUE SOUTH 01°56'31" WEST 205.32 FEET;  
THENCE NORTH 88°22'23" WEST 382.62 FEET TO THE EASTERLY MARGIN OF STATE ROUTE 16 (SB LINE) AS SHOWN ON THE WSDOT RIGHT-OF-WAY AND LIMITED ACCESS MAP MP 8.34 TO MP 18.87, SHEET 14 OF 52, DATED MARCH 19, 1970;  
THENCE SOUTH 16°00'56" EAST ALONG SAID RIGHT-OF-WAY LINE 996.41 FEET;  
THENCE CONTINUE ALONG SAID RIGHT-OF-WAY LINE SOUTH 18°08'47" EAST 374.57 FEET;  
THENCE SOUTH 86°06'11" EAST 25.68 FEET TO THE WESTERLY MARGIN OF CANTERWOOD DRIVE AND A POINT ON A NON-TANGENT CURVE CONCAVE EASTERLY, HAVING A RADIUS OF 785.00 FEET, AND TO WHICH POINT A RADIAL BEARS SOUTH 79°08'51" WEST;  
THENCE ALONG SAID WESTERLY MARGIN NORTHERLY AND CLOCKWISE ALONG THE ARC OF SAID CURVE THROUGH A CENTRAL ANGLE OF 12°27'57" A DISTANCE OF 170.79 FEET;  
THENCE NORTH 71°05'10" WEST ALONG SAID MARGIN 76.79 FEET;  
THENCE NORTH 16°12'22" WEST ALONG SAID MARGIN 205.18 FEET;  
THENCE SOUTH 88°13'46" EAST ALONG SAID MARGIN 166.90 FEET TO A POINT ON A NON-TANGENT CURVE CONCAVE SOUTHEASTERLY, HAVING A RADIUS OF 785.00 FEET, AND TO WHICH POINT A RADIAL BEARS NORTH 72°17'07" WEST;  
THENCE NORTHERLY AND CLOCKWISE ALONG SAID MARGIN AND THE ARC OF SAID CURVE THROUGH A CENTRAL ANGLE OF 01°26'10" A DISTANCE OF 19.68 FEET;  
THENCE NORTH 19°09'04" EAST ALONG SAID MARGIN 154.51 FEET TO THE BEGINNING OF A CURVE CONCAVE WESTERLY AND HAVING A RADIUS OF 714.92 FEET;  
THENCE ALONG THE ARC OF SAID CURVE AND SAID MARGIN THROUGH A CENTRAL ANGLE OF 35°10'25" A DISTANCE OF 438.89 FEET;  
THENCE NORTH 16°01'21" WEST ALONG SAID MARGIN 293.42 FEET TO THE BEGINNING OF A CURVE CONCAVE EASTERLY AND HAVING A RADIUS OF 785.00 FEET;  
THENCE ALONG THE ARC OF SAID CURVE AND SAID MARGIN THROUGH A CENTRAL ANGLE OF 15°57'10" A DISTANCE OF 218.57 FEET, TO THE POINT OF BEGINNING.

## UTILITY CONTACT LIST:

SANITARY SEWER:  
CITY OF GIG HARBOR PUBLIC WORKS  
3510 GRANVIEW STREET  
GIG HARBOR, WA 98335  
PHONE: (253)851-8145

POWER:  
PENNISULA LIGHT  
P.O. BOX 78  
GIG HARBOR, WA 98335  
PHONE: (253)857-5950

WATER COMPANY:  
CITY OF GIG HARBOR PUBLIC WORKS  
3510 GRANVIEW STREET  
GIG HARBOR, WA 98335  
PHONE: (253)851-8145

GAS COMPANY:  
PUGET SOUND ENERGY  
3130 S 38TH STREET  
TACOMA, WA 98409  
PHONE:(253)476-6410

TELEPHONE:  
CENTURYTEL  
8102 SKANSIE AVENUE  
GIG HARBOR, WA 98332  
PHONE: (253)851-8118

## CLIENT

SWEDE HILL, LLC  
2320 MILWAUKEE WAY  
(P.O. BOX 1397)  
TACOMA, WA 98401  
PHONE: (253)627-6179  
JOHN M. XITCO

## ENGINEER

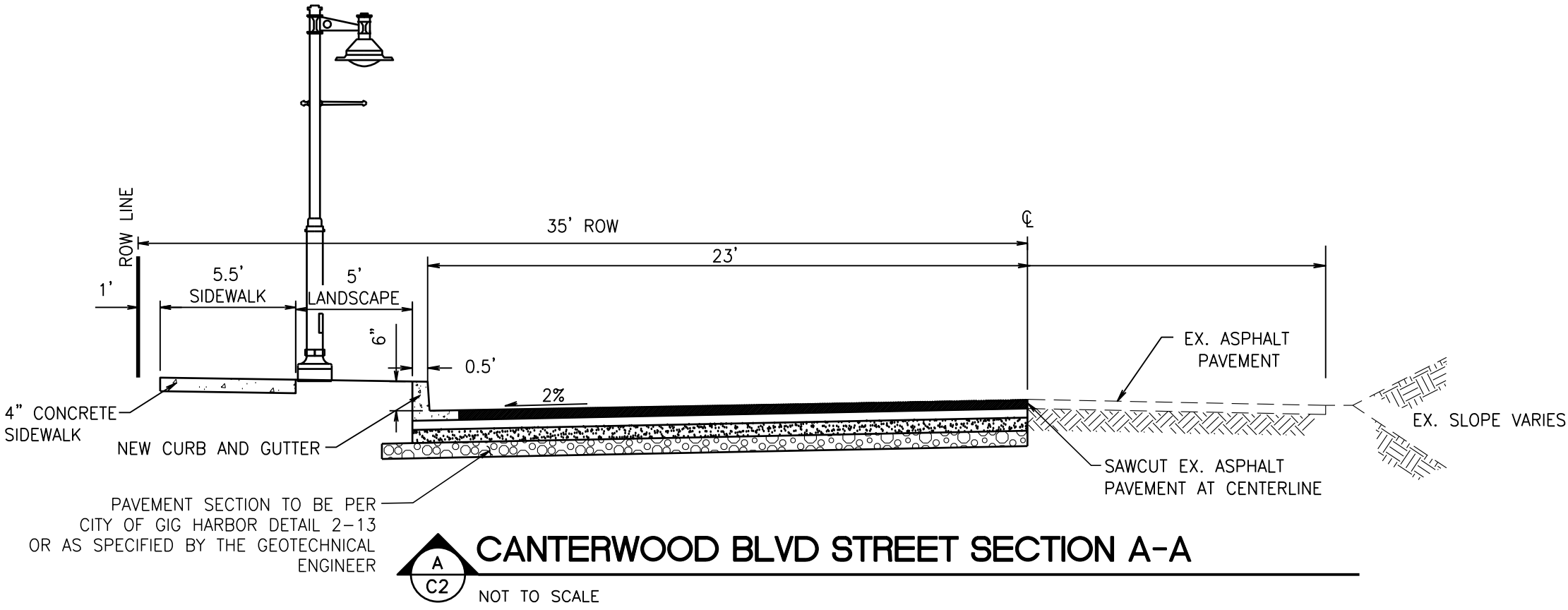
BARGHAUSEN CONSULTING ENGINEERS  
18215 72ND AVE S  
KENT, WA 98063  
(253)251-6222  
JASON HUBBELL P.E.

## SURVEYORS

WETLAND/ CANTERWOOD BLVD:  
BARGHAUSEN CONSULTING ENGINEERS  
18215 72ND AVE S  
KENT, WA 98063  
(253)251-6222  
DENNIS SALTYS

BOUNDARY/TOPO:  
APEX ENGINEERING PLLC  
2601 SOUTH 35TH, STE 200  
TACOMA, WA 98409  
PHONE:(253)473-4494

SWEDE HILL, LLC  
P.O. BOX 1397  
TACOMA, WA 98401



## LEGEND

|  |                                  |  |                              |
|--|----------------------------------|--|------------------------------|
|  | EXISTING CONCRETE                |  | PROPOSED ASPHALT             |
|  | CENTERLINE RIGHT-OF-WAY          |  | PROPOSED ASPHALT OVERLAY     |
|  | EXISTING CURB                    |  | PROPOSED CONCRETE            |
|  | EXISTING EASEMENT                |  | PROPOSED CURB                |
|  | WETLAND LINE                     |  | FLOW PATH                    |
|  | WETLAND BUFFER LINE              |  | PROPOSED SPOT GRADE          |
|  | PROPERTY LINE                    |  | MATCH EXISTING               |
|  | EXISTING EDGE OF PAVEMENT        |  | TOP OF WALL ELEVATION        |
|  | EXISTING STORM PIPE              |  | BOTTOM OF WALL ELEVATION     |
|  | EXISTING STORM DRAIN MANHOLE     |  | RIDGE LINE                   |
|  | EXISTING STORM DRAIN CATCH BASIN |  | NEW FINISHED GRADE CONTOUR   |
|  | EXISTING WETLAND                 |  | NEW 20-FOOT SITE LIGHT       |
|  | EXISTING STREAM                  |  | NEW 12-FOOT SITE LIGHT       |
|  | EXISTING GRADE CONTOUR           |  | NEW CLEANOUT                 |
|  | EXISTING SANITARY SEWER MANHOLE  |  | NEW TYPE 1 CATCH BASIN       |
|  | EXISTING SEWER PIPE              |  | NEW TYPE 2 CATCH BASIN       |
|  | EXISTING WATER PIPE              |  | NEW STORM DRAIN PIPE         |
|  | EXISTING TELEPHONE RISER         |  | NEW STORM DRAIN PIPE         |
|  | EXISTING GRAVEL HATCH            |  | PROPOSED FIRE HYDRANT        |
|  | EXISTING POWER VAULT             |  | PROPOSED WATER METER         |
|  | EXISTING TELEPHONE POLE          |  | PROPOSED SIGN                |
|  | TREE DRIP LINE ENCROACHMENT      |  | EXISTING SIGN                |
|  | PROPOSED STREET LIGHT            |  | PROPOSED WATER LINE          |
|  |                                  |  | EX. TREE'S                   |
|  |                                  |  | BUILDING SETBACK LINE        |
|  |                                  |  | PROPOSED RETAINING WALL      |
|  |                                  |  | PROPOSED RIPRAP              |
|  |                                  |  | GRAVEL DISPERSAL TRENCH      |
|  |                                  |  | FOUND MONUMENT               |
|  |                                  |  | EXISTING GUARD RAIL          |
|  |                                  |  | SECTION LINE                 |
|  |                                  |  | PROPOSED FENCE               |
|  |                                  |  | PROPOSED WETLAND LINE        |
|  |                                  |  | PROPOSED WETLAND BUFFER LINE |
|  |                                  |  | WATER QUALITY                |
|  |                                  |  | ADA PARKING SYMBOL           |

## ARCHITECT

HELIX DESIGN GROUP  
6021 12TH ST E, STE 201  
TACOMA, WA 98424  
PHONE:(253)922-9037  
BRUCE McKEAN

## LANDSCAPE ACHITECT

BARGHAUSEN CONSULTING ENGINEERS  
18215 72ND AVE S  
KENT, WA 98063  
(253)251-6222  
JEFF VARLEY

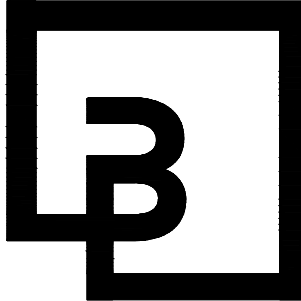


ISSUED FOR CONSTRUCTION

DATE: \_\_\_\_\_

#### REVISIONS

|    |            |                                               |
|----|------------|-----------------------------------------------|
| 10 | 11/01/2018 | REVISED PER CITY DRB COMMENTS 5/25/2018       |
| 11 | 04/02/2019 | REVISED PER CITY COMMENTS 1/25/2019           |
| 12 | 08/20/2019 | REVISED NORTH STORM OUTFALL                   |
| 13 | 09/26/2019 | REVISED WETLAND CREATION AREA                 |
| 14 | 05/13/2020 | REVISED SOUTH LAYOUT                          |
| 15 | 06/24/2020 | REVISED PER CITY REVIEW COMMENTS OCTOBER 2019 |
| 16 | 10/22/2020 | REVISED PER CITY REVIEW COMMENTS AUGUST 2020  |
| 17 | 05/05/2021 | REVISED PER CITY REVIEW COMMENTS JANUARY 2021 |



Barghausen  
Consulting Engineers, Inc.

18215 72nd Avenue South  
Kent, WA 98032  
425.251.6222 [barghausen.com](http://barghausen.com)

|              |         |
|--------------|---------|
| DESIGNED BY: | KEH     |
| DRAWN BY:    | RDC     |
| CHECKED BY:  | KEH     |
| APPROVED BY: | JGH     |
| SCALE:       | 1"=100' |
| OTHER:       |         |

## SECTION 25, TOWNSHIP 22 N, RANGE 1 E

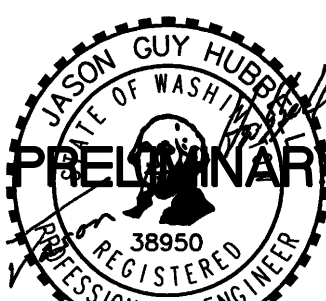
OVERALL SITE PLAN  
/SIGHT DISTANCE TRIANGLES  
CANTERWOOD COMMERCIAL  
CENTER

PERMIT NO.

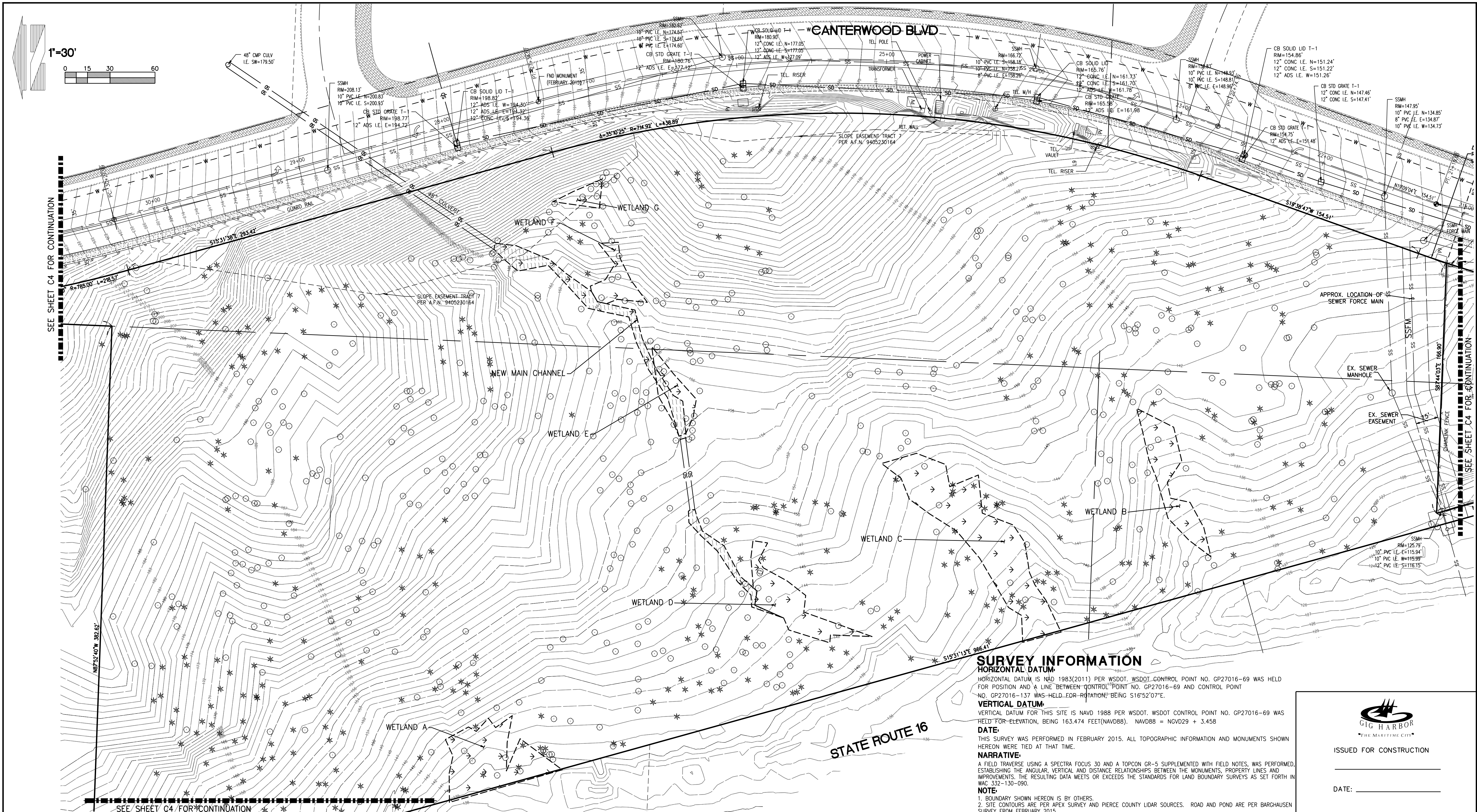
DRAWING NO.

SHEET OF  
C2 23

05/05/2021







**SURVEY INFORMATION**

**HORIZONTAL DATUM:**  
HORIZONTAL DATUM IS NAD 1983(2011) PER WSDOT. WSDOT CONTROL POINT NO. GP27016-69 WAS HELD FOR POSITION AND A LINE BETWEEN CONTROL POINT NO. GP27016-69 AND CONTROL POINT NO. GP27016-137 WAS HELD FOR ROTATION. BEING S16°52'07"E.

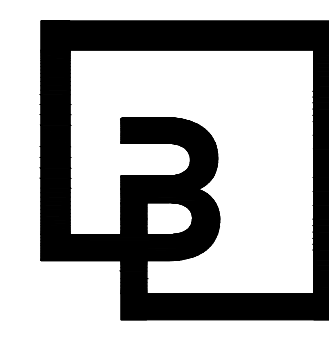
**VERTICAL DATUM:**  
VERTICAL DATUM FOR THIS SITE IS NAVD 1988 PER WSDOT. WSDOT CONTROL POINT NO. GP27016-69 WAS HELD FOR ELEVATION, BEING 163.474 FEET(NAVD88). NAVD88 = NGVD29 + 3.458

**DATE:**  
THIS SURVEY WAS PERFORMED IN FEBRUARY 2015. ALL TOPOGRAPHIC INFORMATION AND MONUMENTS SHOWN HEREON WERE TIED AT THAT TIME.

**NARRATIVE:**  
A FIELD TRAVERSE USING A SPECTRA FOCUS 30 AND A TOPCON GR-5 SUPPLEMENTED WITH FIELD NOTES, WAS PERFORMED, ESTABLISHING THE ANGULAR, VERTICAL AND DISTANCE RELATIONSHIPS BETWEEN THE MONUMENTS, PROPERTY LINES AND IMPROVEMENTS. THE RESULTING DATA MEETS OR EXCEEDS THE STANDARDS FOR LAND BOUNDARY SURVEYS AS SET FORTH IN WAC 332-130-090.

**NOTE:**  
1. BOUNDARY SHOWN HEREON IS BY OTHERS.  
2. SITE CONTOURS ARE PER APEX SURVEY AND PIERCE COUNTY LIDAR SOURCES. ROAD AND POND ARE PER BARGHAUSEN SURVEY FROM FEBRUARY 2015.

| REVISIONS |            |                                               |  |
|-----------|------------|-----------------------------------------------|--|
| 10        | 11/01/2018 | REVISED PER CITY DRB COMMENTS 5/25/2018       |  |
| 11        | 04/02/2019 | REVISED PER CITY COMMENTS 1/25/2019           |  |
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| 14        | 05/13/2020 | REVISED SOUTH LAYOUT                          |  |
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18215 72nd Avenue South  
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425.251.6222 [barghausen.com](http://barghausen.com)

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|--------------|--------|
| DESIGNED BY: | KEH    |
| DRAWN BY:    | RDC    |
| CHECKED BY:  | KEH    |
| APPROVED BY: | JGH    |
| SCALE:       | 1"=30' |
| OTHER:       |        |

**SWEDE HILL, LLC**  
P.O. BOX 1397  
TACOMA, WA 98401

**SECTION 25, TOWNSHIP 22 N, RANGE 1 E**

**EXISTING CONDITIONS MAP**

**CANTERWOOD COMMERCIAL CENTER**



ISSUED FOR CONSTRUCTION

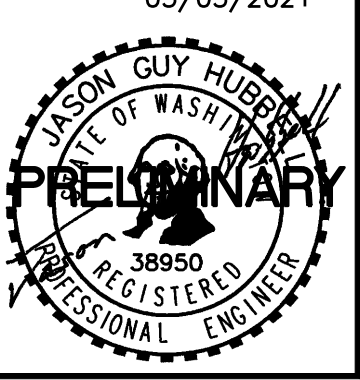
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PERMIT NO. \_\_\_\_\_

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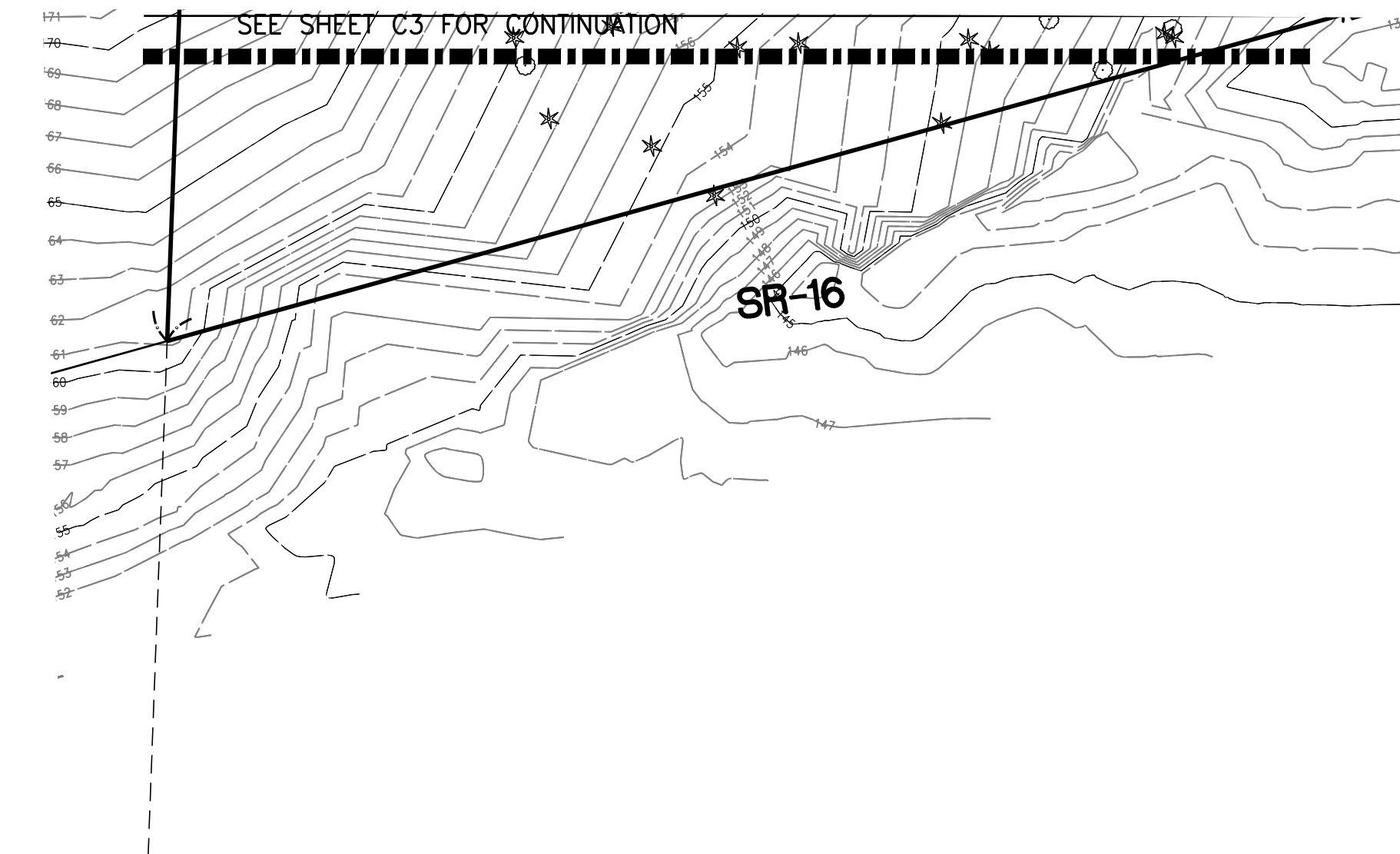
SHEET **C3** OF **23**

05/05/2021

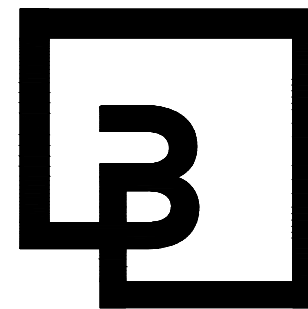


**PRELIMINARY**





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|                                      |  |
|--------------------------------------|--|
| SECTION 25, TOWNSHIP 22 N, RANGE 1 E |  |
| EXISTING CONDITIONS MAP              |  |
| CANTERWOOD COMMERCIAL<br>CENTER      |  |

PERMIT NO.

DRAWING NO.

SHEET OF  
C4 23

05/05/2021



## SURVEY INFORMATION

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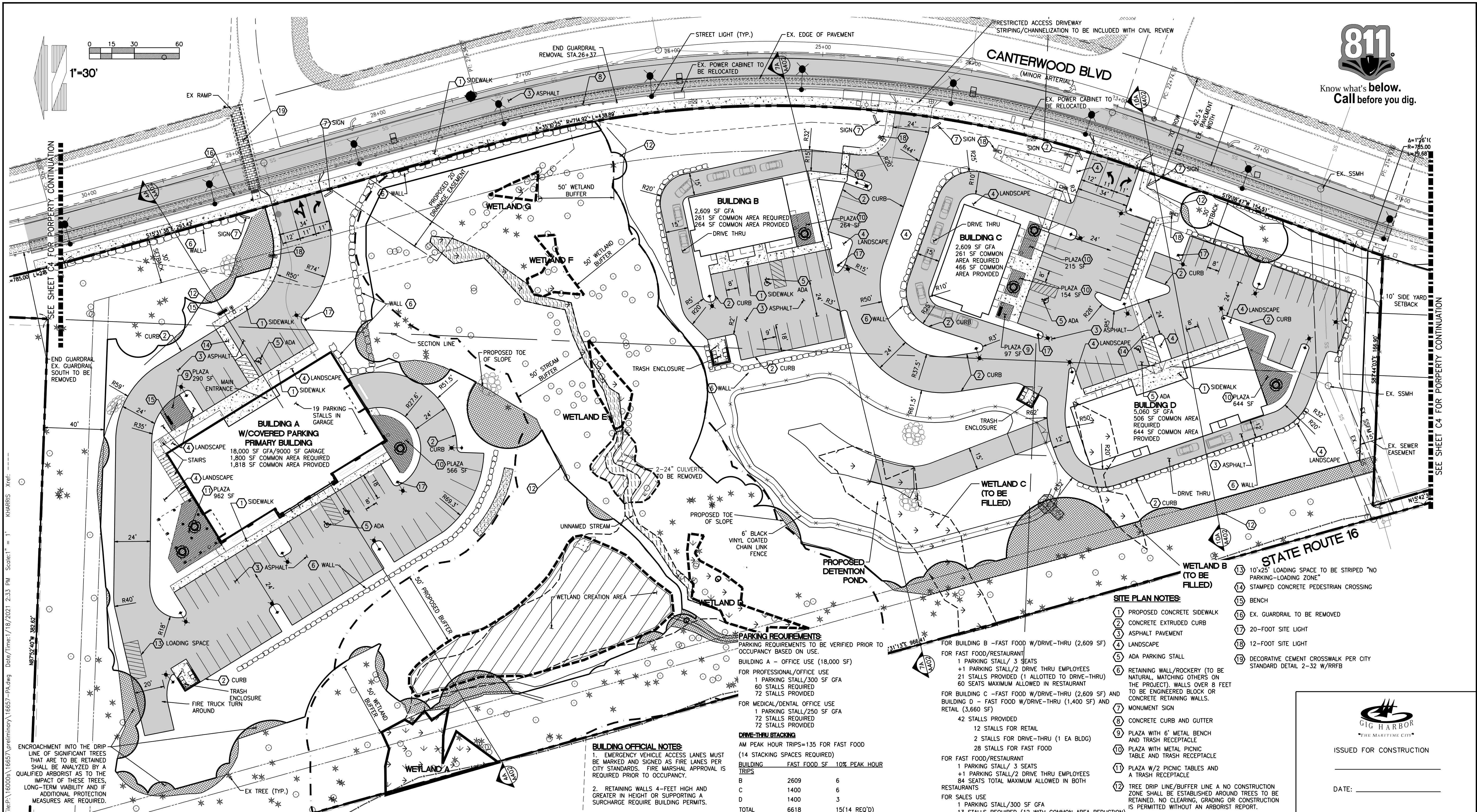
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DATE: \_\_\_\_\_





**SITE PLAN NOTES:**

- 1 PROPOSED CONCRETE SIDEWALK
- 2 CONCRETE EXTRUDED CURB
- 3 ASPHALT PAVEMENT
- 4 LANDSCAPE
- 5 ADA PARKING STALL
- 6 RETAINING WALL/ROCKERY (TO BE NATURAL, MATCHING OTHERS ON THE PROJECT). WALLS OVER 8 FEET TO BE ENGINEERED BLOCK OR CONCRETE RETAINING WALLS.
- 7 MONUMENT SIGN
- 8 CONCRETE CURB AND GUTTER
- 9 PLAZA WITH 6" METAL BENCH AND TRASH RECEPTACLE
- 10 PLAZA WITH METAL PICNIC TABLE AND TRASH RECEPTACLE
- 11 PLAZA W/2 PICNIC TABLES AND A TRASH RECEPTACLE
- 12 TREE DRIP LINE/BUFFER LINE A NO CONSTRUCTION ZONE SHALL BE ESTABLISHED AROUND TREES TO BE RETAINED. NO CLEARING, GRADING OR CONSTRUCTION IS PERMITTED WITHOUT AN ARBORIST REPORT.

- 13 10'x25' LOADING SPACE TO BE STRIPED "NO PARKING-LOADING ZONE"
- 14 STAMPED CONCRETE PEDESTRIAN CROSSING
- 15 BENCH
- 16 EX. GUARDRAIL TO BE REMOVED
- 17 20-FOOT SITE LIGHT
- 18 12-FOOT SITE LIGHT
- 19 DECORATIVE CEMENT CROSSWALK PER CITY STANDARD DETAIL 2-32 W/RRFB

**PARKING REQUIREMENTS:**

PARKING REQUIREMENTS TO BE VERIFIED PRIOR TO OCCUPANCY BASED ON USE.  
BUILDING A - OFFICE USE (18,000 SF)  
FOR PROFESSIONAL/OFFICE USE  
1 PARKING STALL/300 SF GFA  
60 STALLS REQUIRED  
72 STALLS PROVIDED  
FOR MEDICAL/DENTAL OFFICE USE  
1 PARKING STALL/250 SF GFA  
72 STALLS REQUIRED  
72 STALLS PROVIDED

**DRIVE-THRU STACKING**

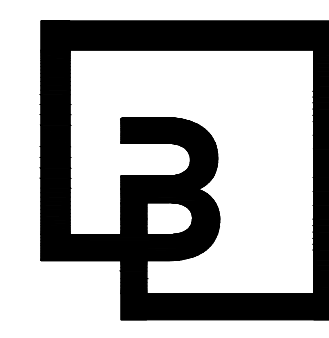
AM PEAK HOUR TRIPS=135 FOR FAST FOOD (14 STACKING SPACES REQUIRED)

| BUILDING | FAST FOOD SF | 10% PEAK HOUR TRIPS |
|----------|--------------|---------------------|
| B        | 2609         | 6                   |
| C        | 1400         | 6                   |
| D        | 1400         | 3                   |
| TOTAL    | 6618         | 15(14 REQ'D)        |

**BUILDING OFFICIAL NOTES:**

- 1. EMERGENCY VEHICLE ACCESS LANES MUST BE MARKED AND SIGNED AS FIRE LANES PER CITY STANDARDS. FIRE MARSHAL APPROVAL IS REQUIRED PRIOR TO OCCUPANCY.
- 2. RETAINING WALLS 4- FEET HIGH AND GREATER IN HEIGHT OR SUPPORTING A SURCHARGE REQUIRE BUILDING PERMITS.

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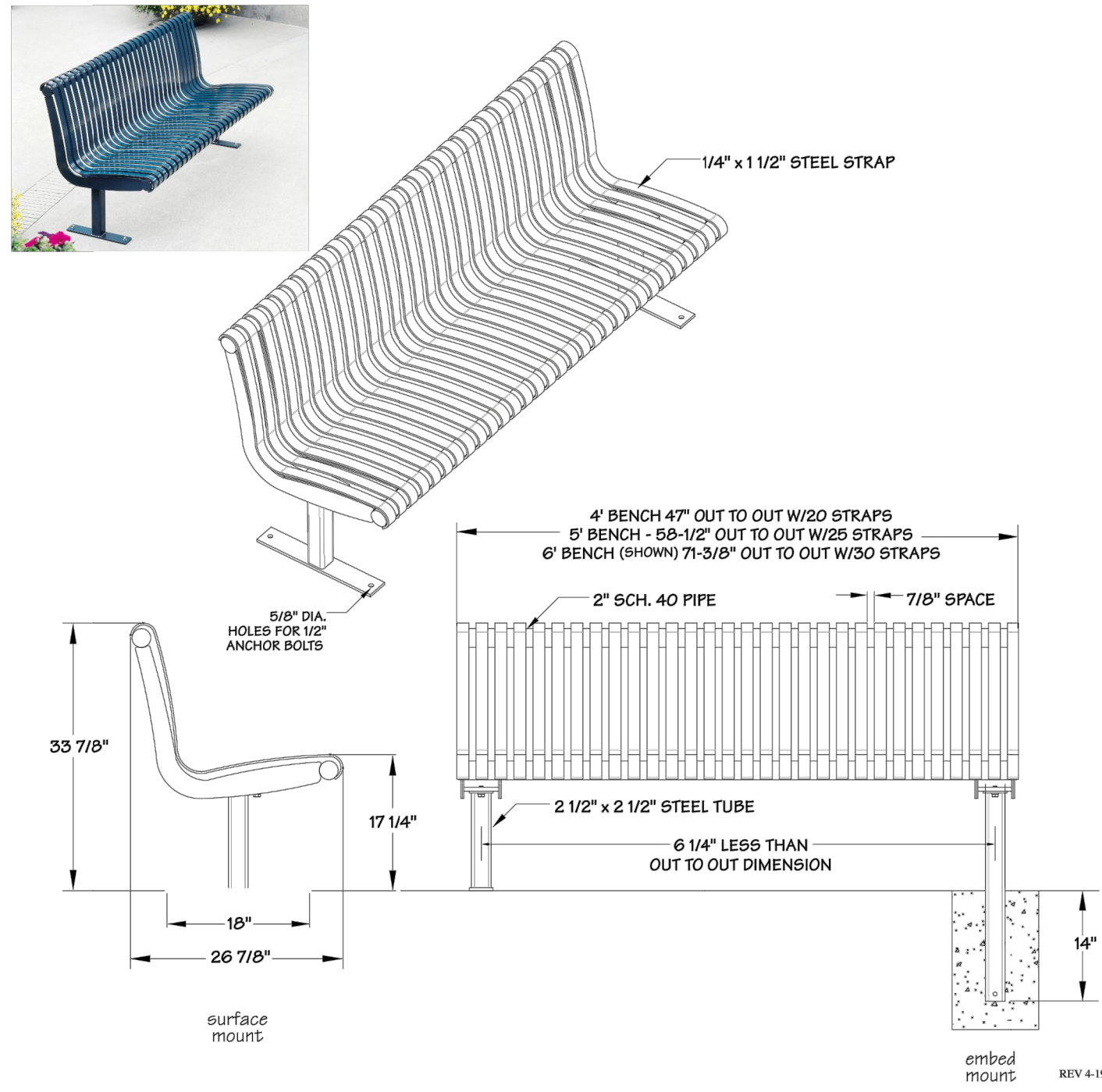
DESIGNED BY: KEH  
DRAWN BY: RDC  
CHECKED BY: KEH  
APPROVED BY: JGH  
SCALE: 1"=30'  
OTHER:

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TACOMA, WA 98401

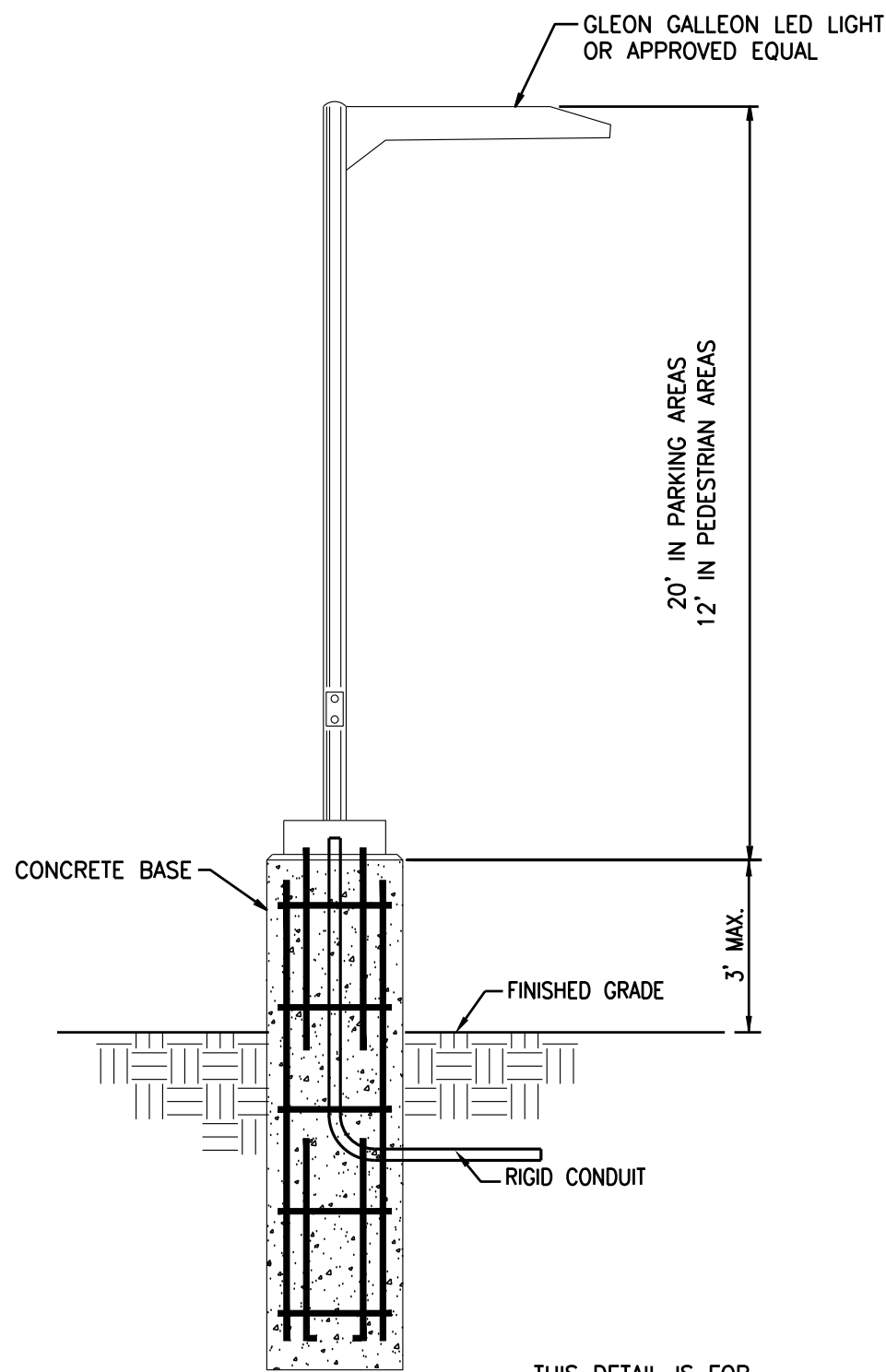
**SECTION 25, TOWNSHIP 22 N, RANGE 1 E**  
**SITE PLAN**  
**CANTERWOOD COMMERCIAL CENTER**

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| PERMIT NO.  | 05/05/2021 |
| DRAWING NO. |            |
| SHEET OF    |            |
| C5          | 23         |





## Plaza Series, Model PL-2 Bench



## LIGHTING DETAIL

NOT TO SCALE

## SPECIFICATIONS

### MATERIAL

The Plaza PL-2 bench is constructed of mild steel in 3 sections: 2 support legs and 1 seat section. All parts are drilled and precisely formed for quick assembly. Seat sections shall be fabricated with 2" sch. 40 pipe and 1/4" x 1-1/2" mild steel strap. Support legs shall be fabricated with 2-1/2" square steel tube and 3/8" x 3" steel strap. Steel shall conform to ASTM A36 hot rolled steel. All steel shall be wheelabrated prior to fabrication.

### HARDWARE

Legs shall be attached to seat with 1/2" x 1" stainless steel bolts and washers provided. For surface mount: Anchor bolts by others

### PROTECTIVE COATINGS

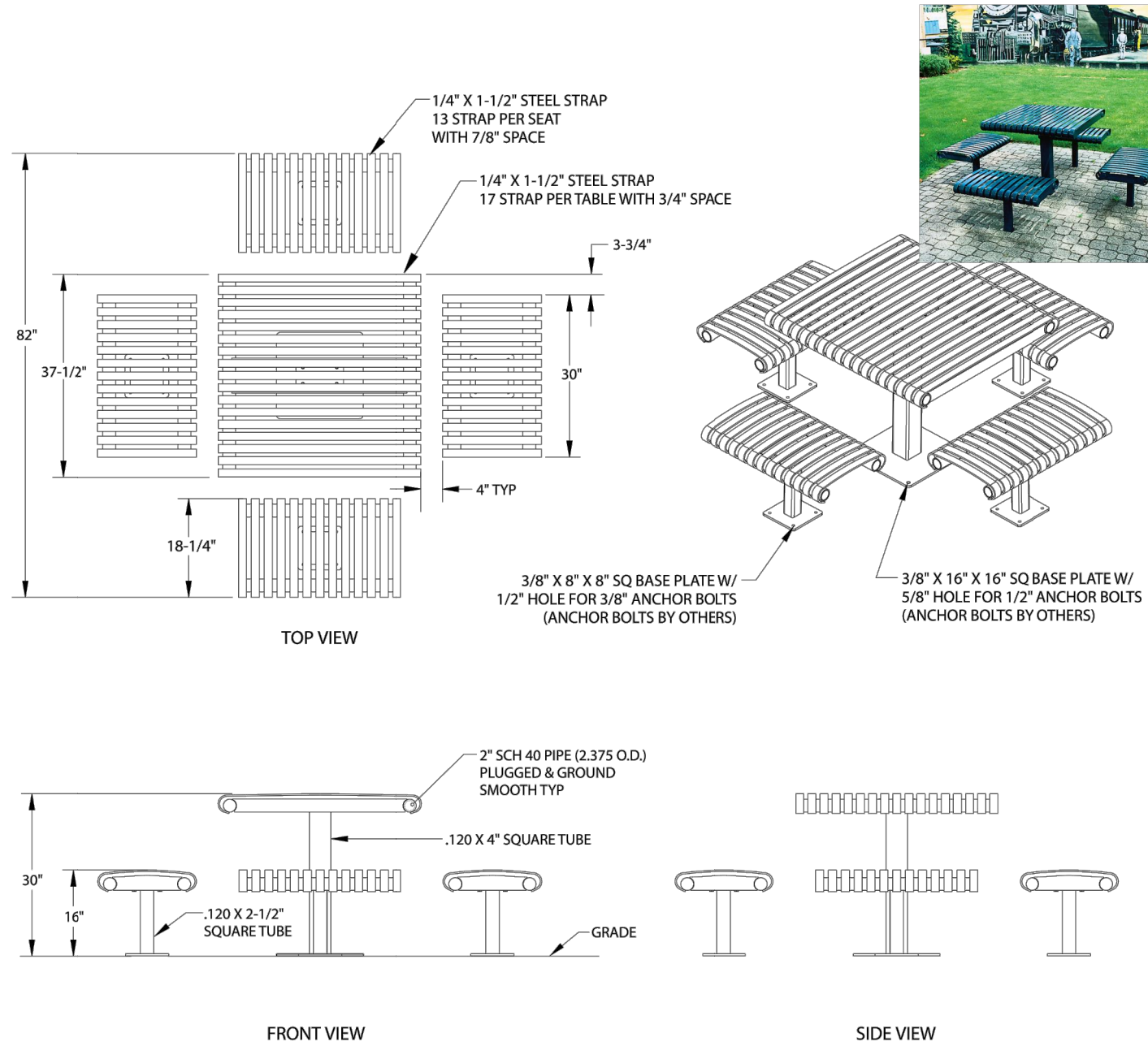
**Powder Coating:** All steel, following fabrication shall be cleaned and treated with an iron phosphate process prior to the coating application. This process shall include a non-chromated alkaline cleaner and an iron phosphate treatment followed with an acidic sealer for maximum adhesion. The protective coatings shall be either polyester or polyester TGIC powder. Following application the parts shall be baked until properly cured. The coating shall be a minimum of 4 mils thick on all surfaces. **Options for finish:** Corrosion resistant undercoat, strongly recommended

### Please Note: Embed Mounting

Depth and diameter of installation hole may vary with soil conditions. Consult project engineer for correct dimensions.

### OPTIONS

Length: 4, 5, 6, 8 ft. standard, other lengths available  
Mounting: embed or surface mount  
Arms



## Model F-7 Picnic Table with 4 Seats, Surface Mount

## SPECIFICATIONS

### MATERIAL

The F-7 table top and each seat shall be fabricated with 1/4" x 1-1/2" mild steel strap fully welded to 2" sch. 40 steel pipe. The pedestal for the table shall be fabricated with 120 x 4" square tube. Pedestals for the seats shall be fabricated with 120 x 2-1/2" square tube. Surface Mount: Table base is 16" square, 3/8" thick plate fully welded to 4" square tube, seat bases are 8" square, 3/8" thick plate fully welded to 2-1/2" square tube. All steel shall conform to ASTM A36 hot rolled steel, ASTM A53 pipe or ASTM A500 square tube and shall be wheelabrated prior to fabrication.

### HARDWARE

Pedestals shall be attached to table and seat tops with 1/2 x 1" stainless steel bolts and washers provided.

**SURFACE MOUNT:** Anchor bolts by others

### PROTECTIVE COATINGS

**Powder Coating:** All steel, Following fabrication shall be cleaned and treated with an iron phosphate process prior to the coating application. This process shall include a non-chromated alkaline cleaner and an iron phosphate treatment followed with an acidic sealer for maximum adhesion. The protective coatings shall be either polyester or polyester TGIC powder. Following application the parts shall be baked until properly cured. The coating shall be a minimum of 4 mils thick on all surfaces. **Options for finish:** Corrosion resistant undercoat, strongly recommended

**Note:** Unless otherwise specified, steel shall be powder coated a standard FairWeather color.

### OPTIONS

**Mounting:** surface mount or permanent embed  
**ADA Access (1, 2 or 3 seat)**  
**Game Board, Umbrella Hole** (removable cap and umbrella by others)

## FairWeather Site Furnishings

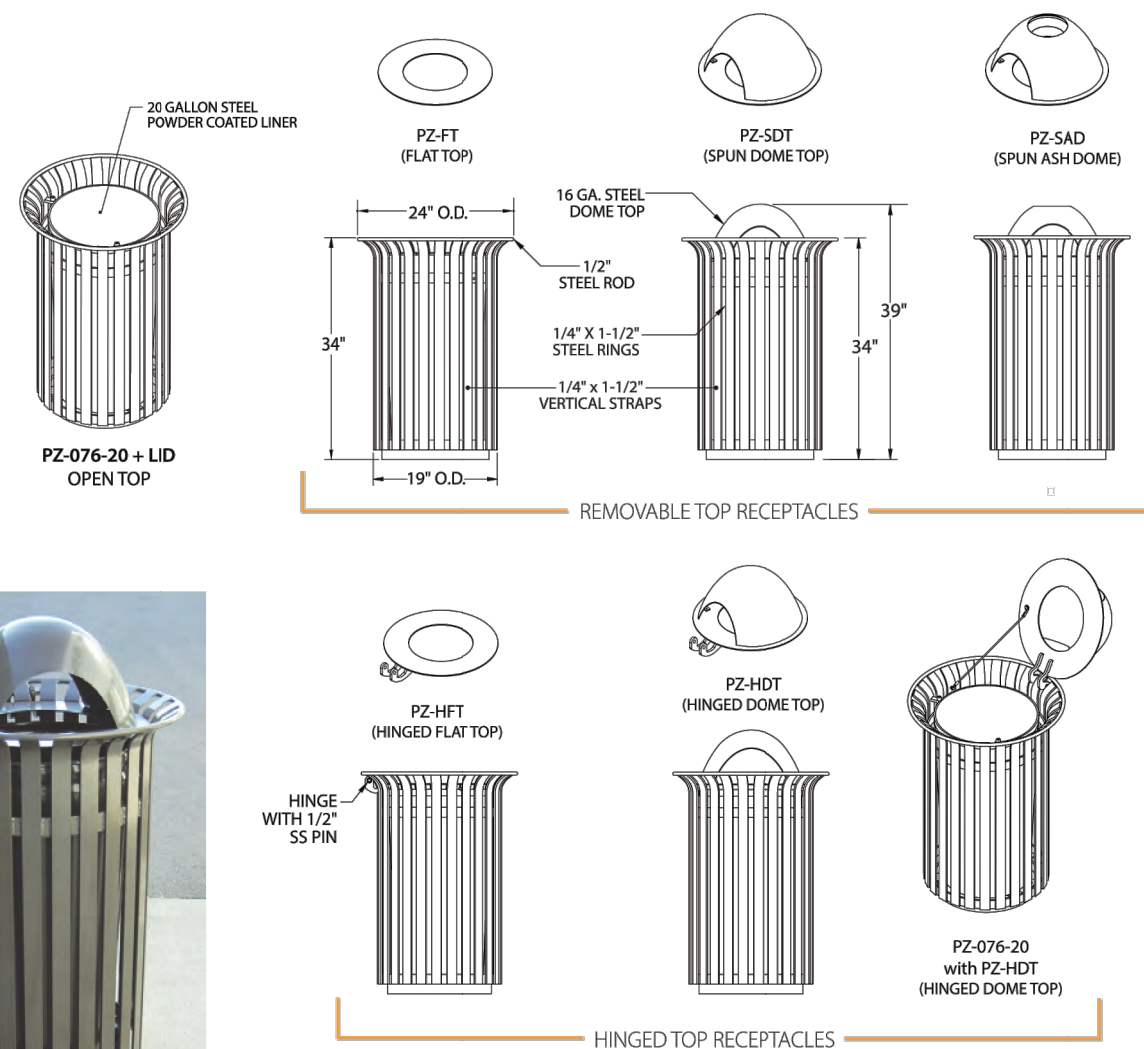
360-895-2626 or Toll Free 800-323-1798  
Port Orchard, Washington  
©1999-2012 Leader International Corporation, FairWeather Site Furnishings division  
Notice: These products are proprietary. Numerous designs are patented or patent pending under Leader Manufacturing, Inc.

## Plaza Collection Receptacles - PZ-075 and PZ-075D

### Options

| Part No.          | Description                                                                                                  | Size            | Weight Lbs. |
|-------------------|--------------------------------------------------------------------------------------------------------------|-----------------|-------------|
| PZ-076-20         | Plaza Collection Steel Strap Flared Receptacle w/20 Gal. Black Polyethylene Liner, <b>Open Top</b> (TR-1224) | 25" Dia x 32" H | 144         |
| <b>Lid Option</b> |                                                                                                              |                 |             |
| PZ-FT             | Flat Top for PZ-076-20 Plaza Collection Receptacle, includes trim lock and tab for security leash            |                 | 151         |
| PZ-SDT            | Spun Dome Top for Plaza Round Collection Receptacle                                                          |                 | 155         |
| PZ-SAD            | Spun Ash Dome Top for Plaza Round Receptacle                                                                 |                 | 156         |
| PZ-HFT            | Hinged Flat Top for Plaza Round Receptacle                                                                   |                 | 156         |
| PZ-HDT            | Hinged Top w/Dome for Plaza Round Receptacle                                                                 |                 | 151         |

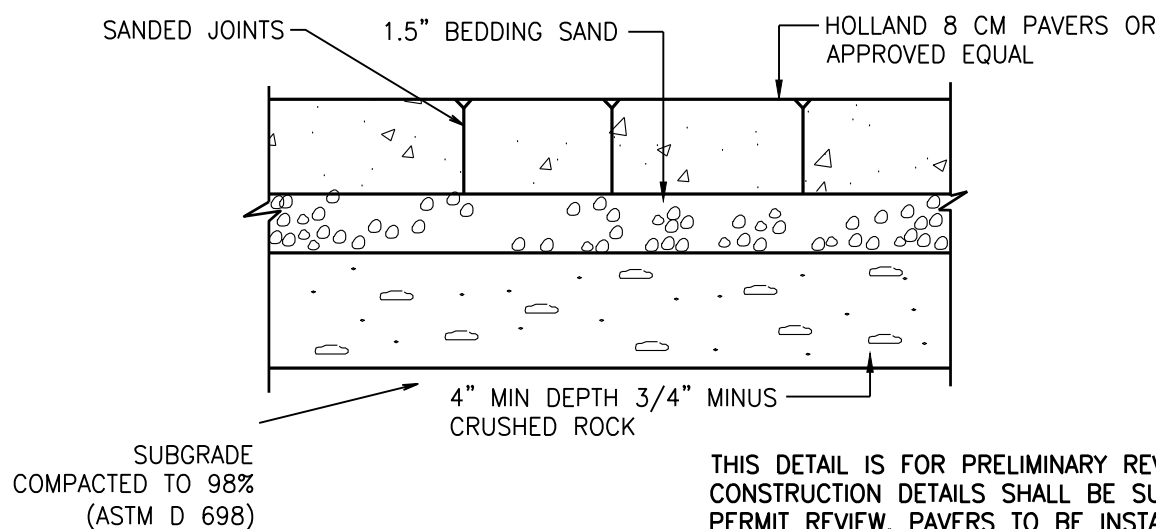
**Note:** All Plaza Collection receptacles are listed without tops. Choose from removable tops, hinged tops and side opening styles. Lid option weights are for 30 gal units. All Plaza Collection Receptacles ship fully assembled, except units with dome tops will require dome assembly.



PZ-076-20 with PZ-HDT

7

**Tournesol SITEWORKS**  
Successful sites start here™



## PLAZA PAVERS

NOT TO SCALE

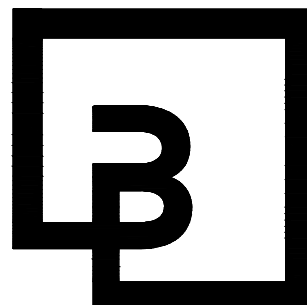
THIS DETAIL IS FOR PRELIMINARY REVIEW ONLY. CONSTRUCTION DETAILS SHALL BE SUBMITTED AT PERMIT REVIEW. PAVERS TO BE INSTALLED PER GEOTECHNICAL AND MANUFACTURER'S RECOMMENDATIONS.



ISSUED FOR CONSTRUCTION

DATE: \_\_\_\_\_

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| DRAWN BY:    | RDC |
| CHECKED BY:  | KEH |
| APPROVED BY: | JGH |
| SCALE:       | NA  |
| OTHER:       |     |

**SWEDE HILL, LLC**  
P.O. BOX 1397  
TACOMA, WA 98401

## SECTION 25, TOWNSHIP 22 N, RANGE 1 E

## SITE PLAN DETAILS

**CANTERWOOD COMMERCIAL CENTER**

PERMIT NO.

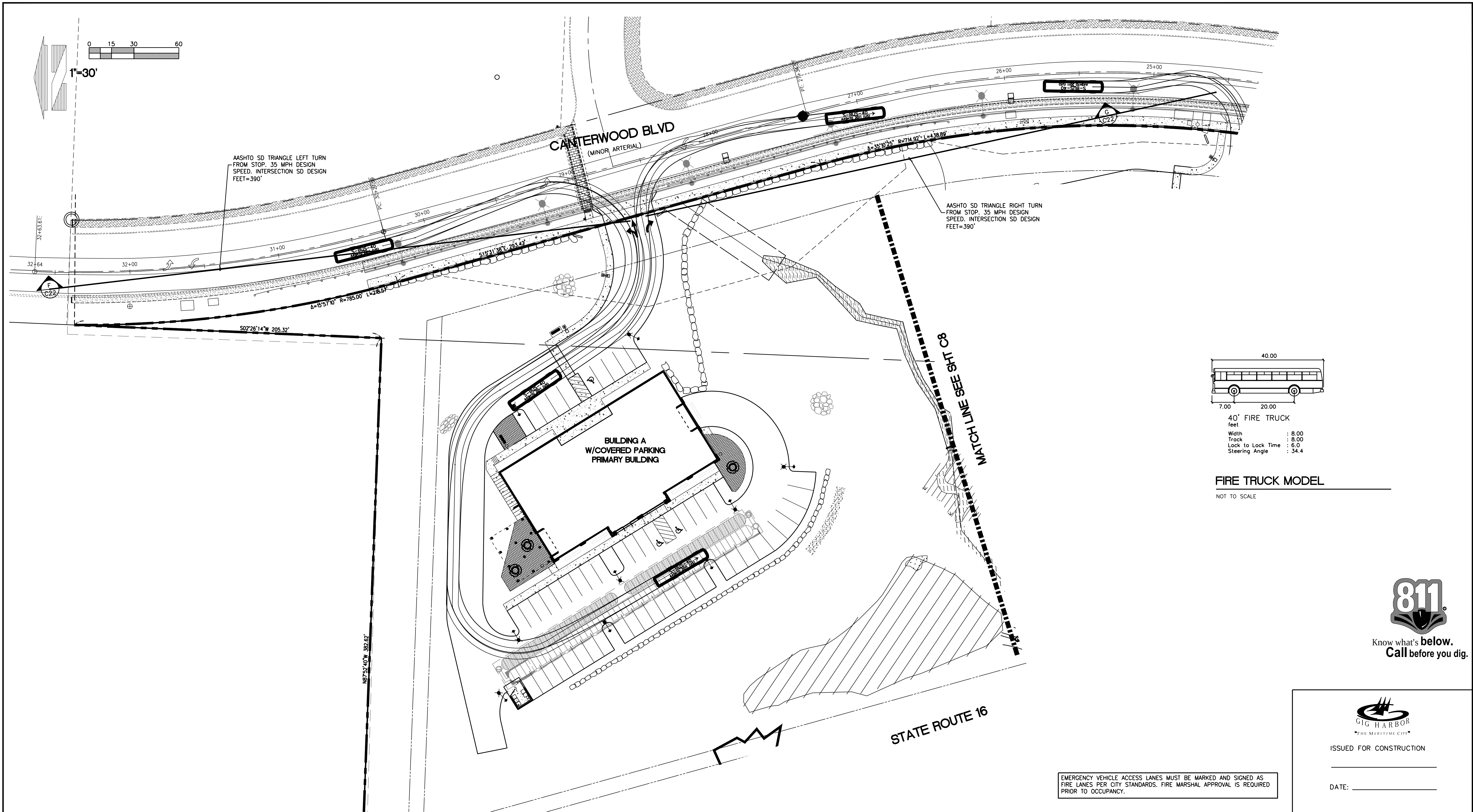
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SHEET **C6** OF **23**

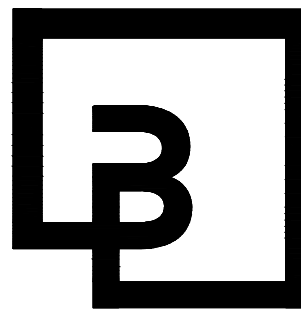
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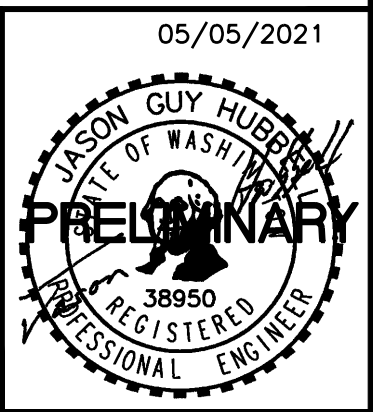
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**SECTION 25, TOWNSHIP 22 N, RANGE 1 E**  
**VEHICLE MANEUVERING  
AND SIGHT DISTANCE PLAN  
CANTERWOOD COMMERCIAL  
CENTER**

|             |           |
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| PERMIT NO.  |           |
| DRAWING NO. |           |
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| <b>C7</b>   | <b>23</b> |



Know what's below.  
Call before you dig.



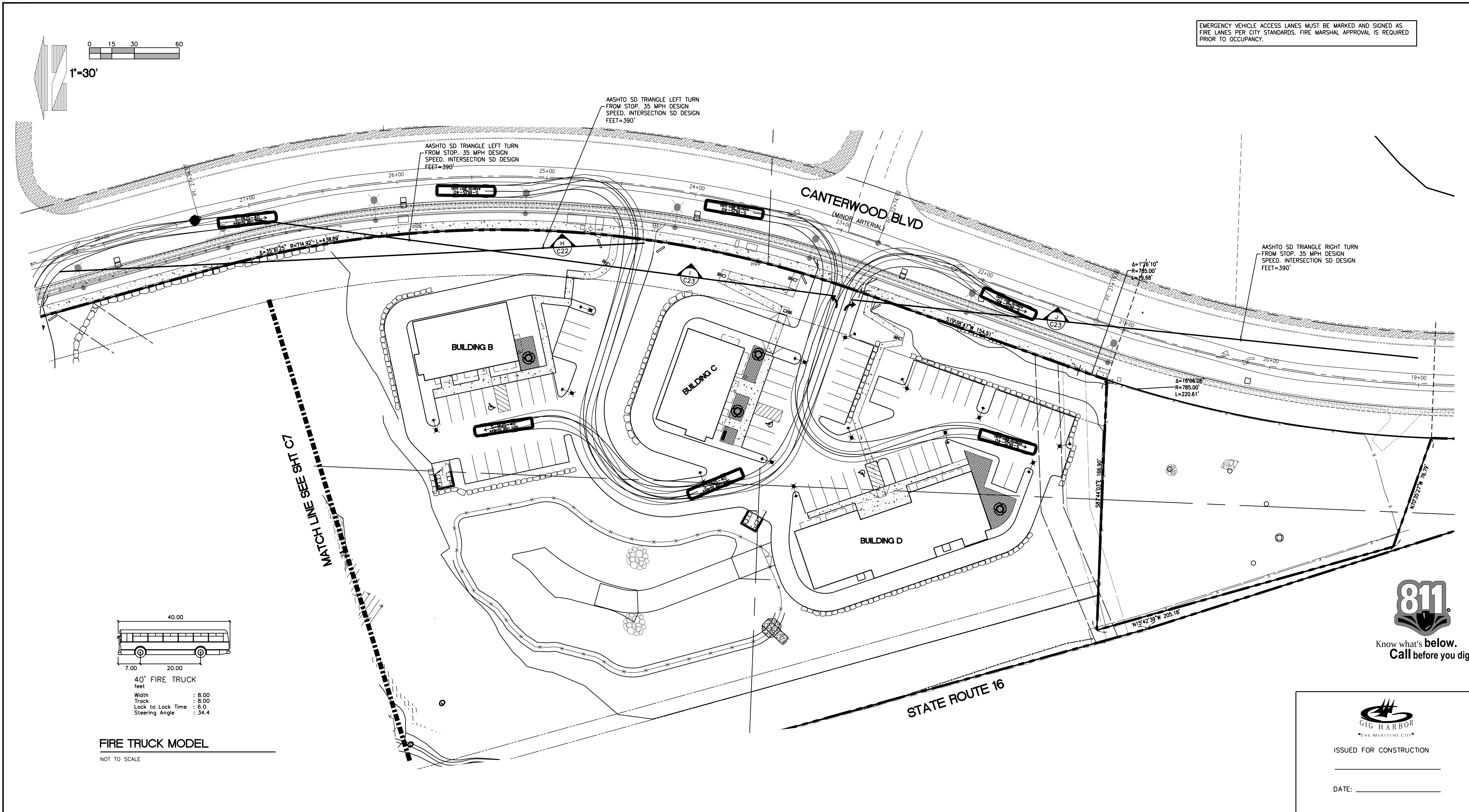
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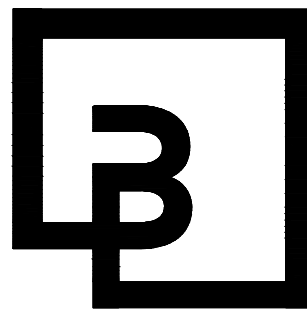
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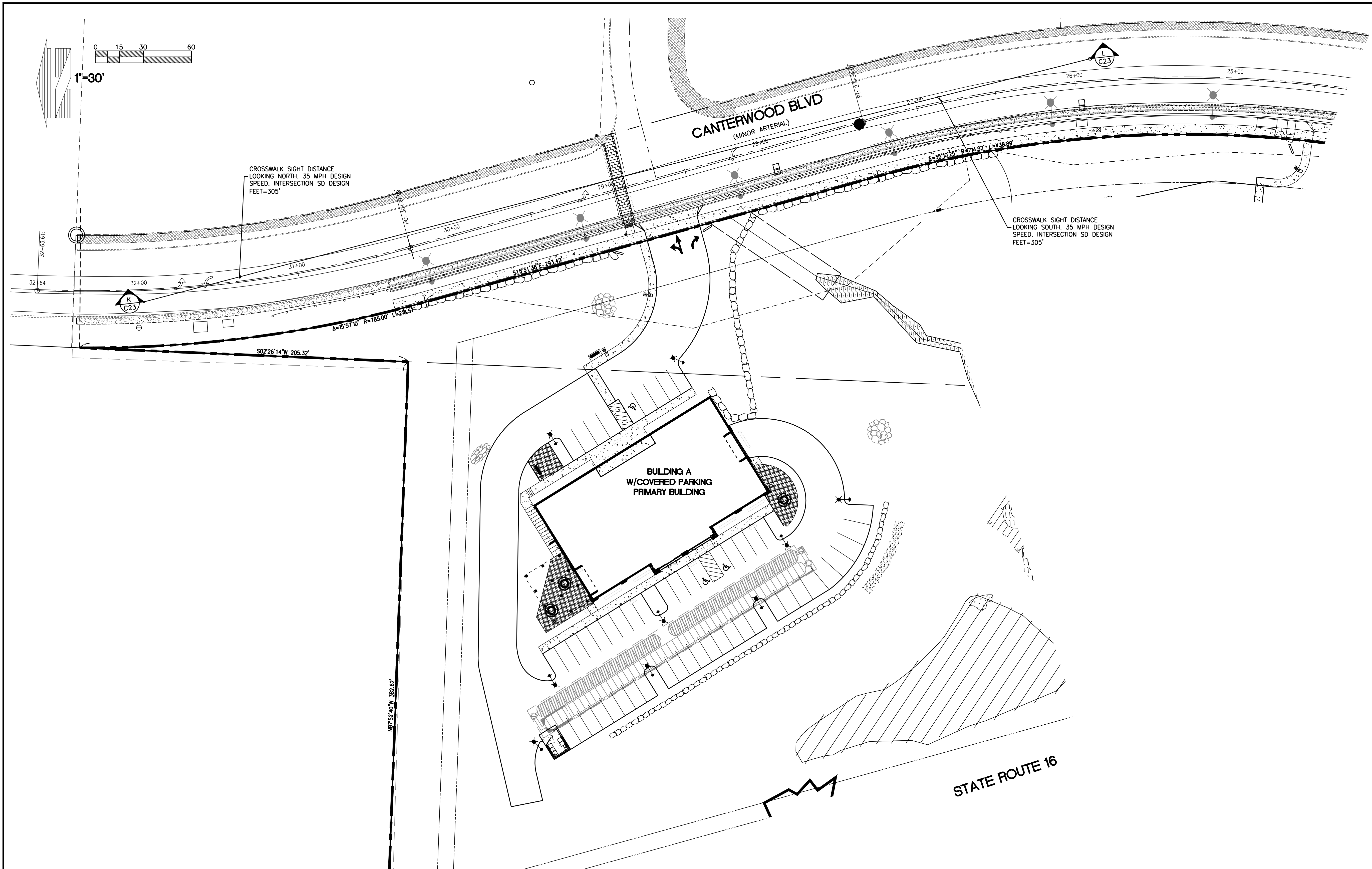
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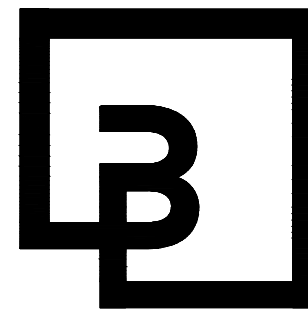
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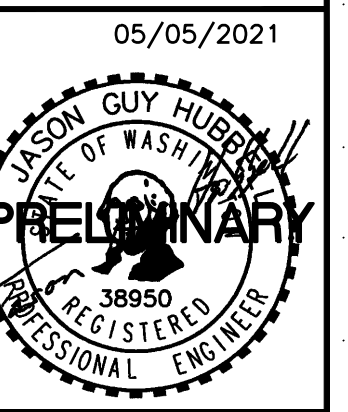
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| APPROVED BY: | JGH    |
| SCALE:       | 1"=30' |
| OTHER:       |        |

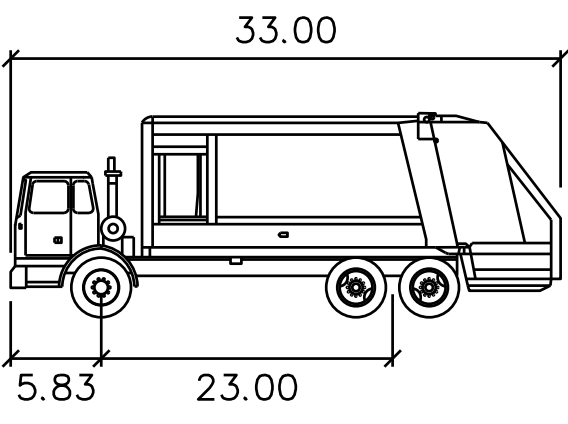
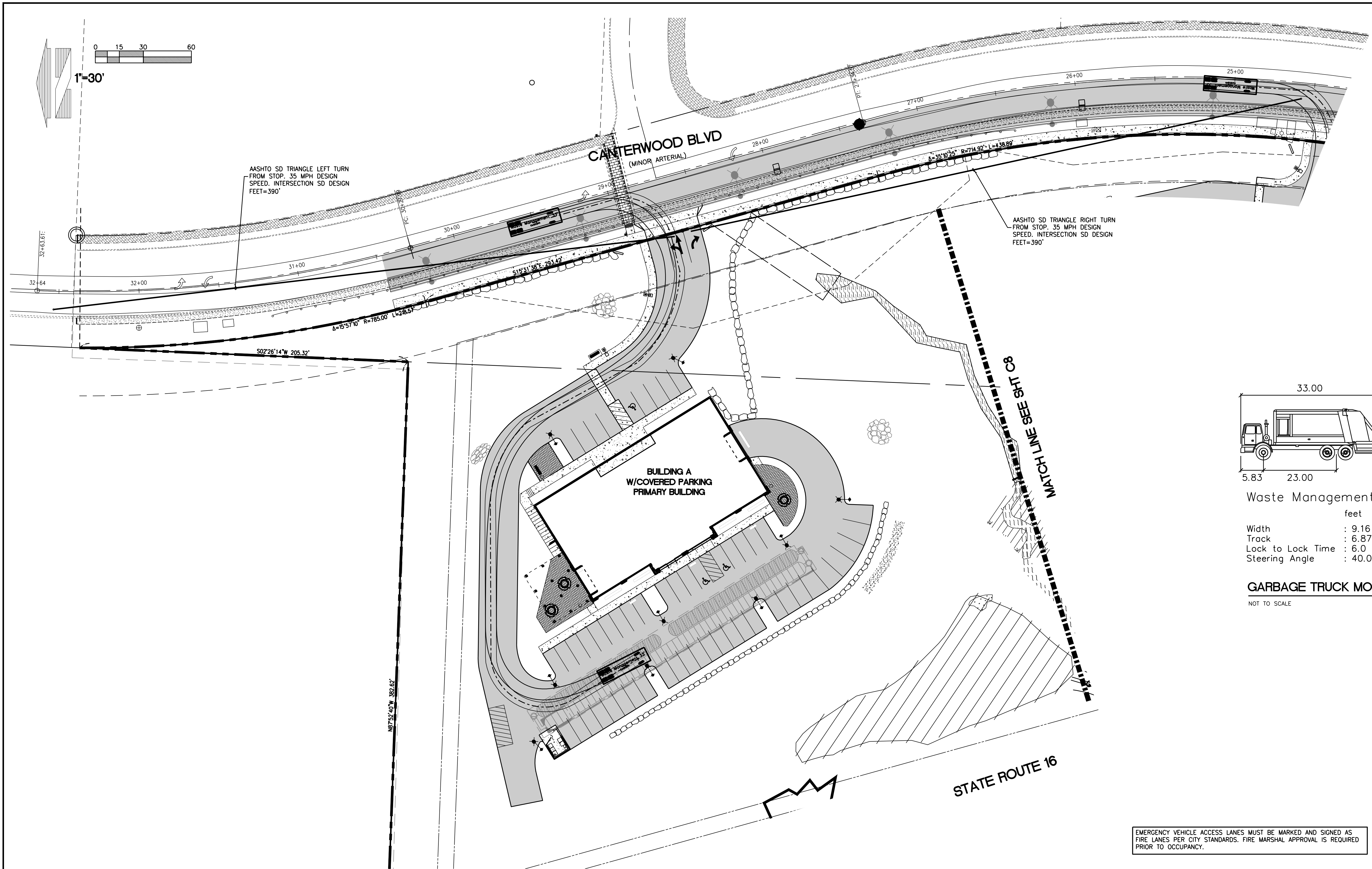
**SWEDE HILL, LLC**  
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TACOMA, WA 98401

|                                                                     |  |
|---------------------------------------------------------------------|--|
| SECTION 25, TOWNSHIP 22 N, RANGE 1 E                                |  |
| CROSSWALK<br>SIGHT DISTANCE PLAN<br>CANTERWOOD COMMERCIAL<br>CENTER |  |

|             |    |
|-------------|----|
| PERMIT NO.  |    |
| DRAWING NO. |    |
| SHEET       | OF |
| C9          | 23 |







Waste Management 33'

feet

Width : 9.16

Track : 6.87

Lock to Lock Time : 6.0

Steering Angle : 40.0

**GARBAGE TRUCK MODEL**

NOT TO SCALE



Know what's below.  
Call before you dig.

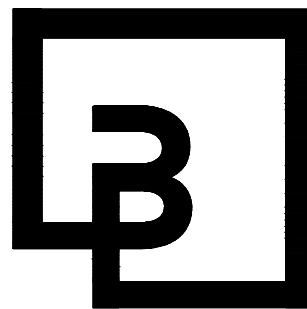


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DATE: \_\_\_\_\_

EMERGENCY VEHICLE ACCESS LANES MUST BE MARKED AND SIGNED AS FIRE LANES PER CITY STANDARDS. FIRE MARSHAL APPROVAL IS REQUIRED PRIOR TO OCCUPANCY.

| REVISIONS |            |                                               |
|-----------|------------|-----------------------------------------------|
| 10        | 11/01/2018 | REVISED PER CITY DRB COMMENTS 5/25/2018       |
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| 14        | 05/13/2020 | REVISED SOUTH LAYOUT                          |
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| 17        | 05/05/2021 | REVISED PER CITY REVIEW COMMENTS JANUARY 2021 |



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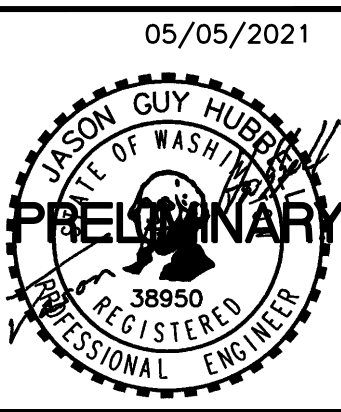
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| DRAWN BY:    | RDC    |
| CHECKED BY:  | KEH    |
| APPROVED BY: | JGH    |
| SCALE:       | 1"=30' |
| OTHER:       |        |

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TACOMA, WA 98401

**SECTION 25, TOWNSHIP 22 N, RANGE 1 E**

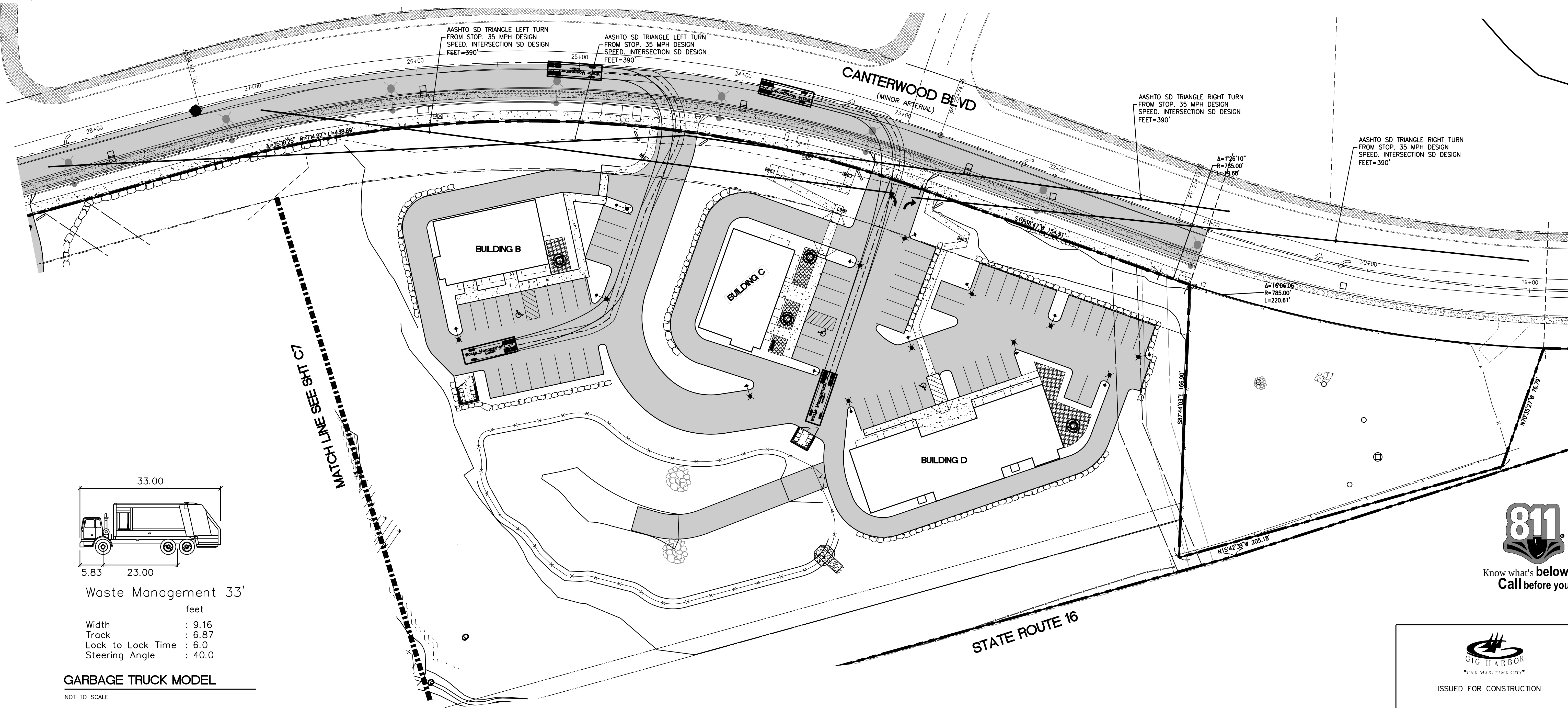
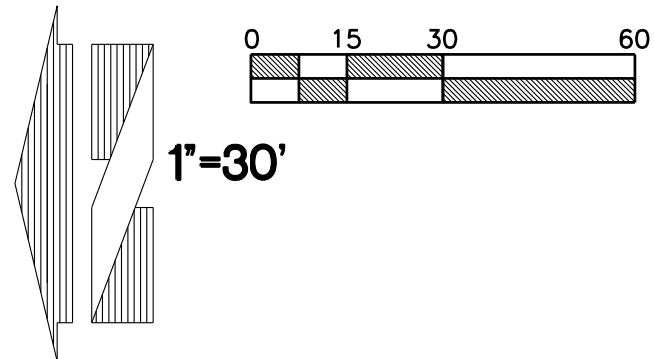
**TRASH VEHICLE  
MANUEVERING  
CANTERWOOD COMMERCIAL  
CENTER**

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| PERMIT NO.  |    |
| DRAWING NO. |    |
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| C10         | 23 |





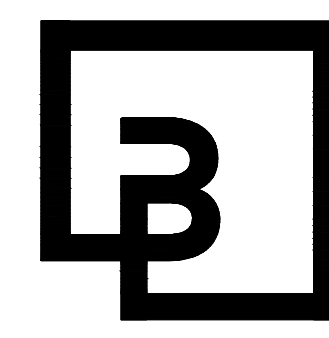
EMERGENCY VEHICLE ACCESS LANES MUST BE MARKED AND SIGNED AS FIRE LANES PER CITY STANDARDS. FIRE MARSHAL APPROVAL IS REQUIRED PRIOR TO OCCUPANCY.



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| 17        | 05/05/2021 | REVISED PER CITY REVIEW COMMENTS JANUARY 2021 |  |



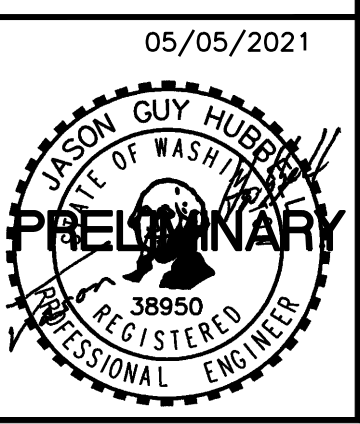
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Kent, WA 98032  
425.251.6222 [barghausen.com](http://barghausen.com)

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| DESIGNED BY: | KEH    |
| DRAWN BY:    | RDC    |
| CHECKED BY:  | KEH    |
| APPROVED BY: | JGH    |
| SCALE:       | 1"=30' |
| OTHER:       |        |

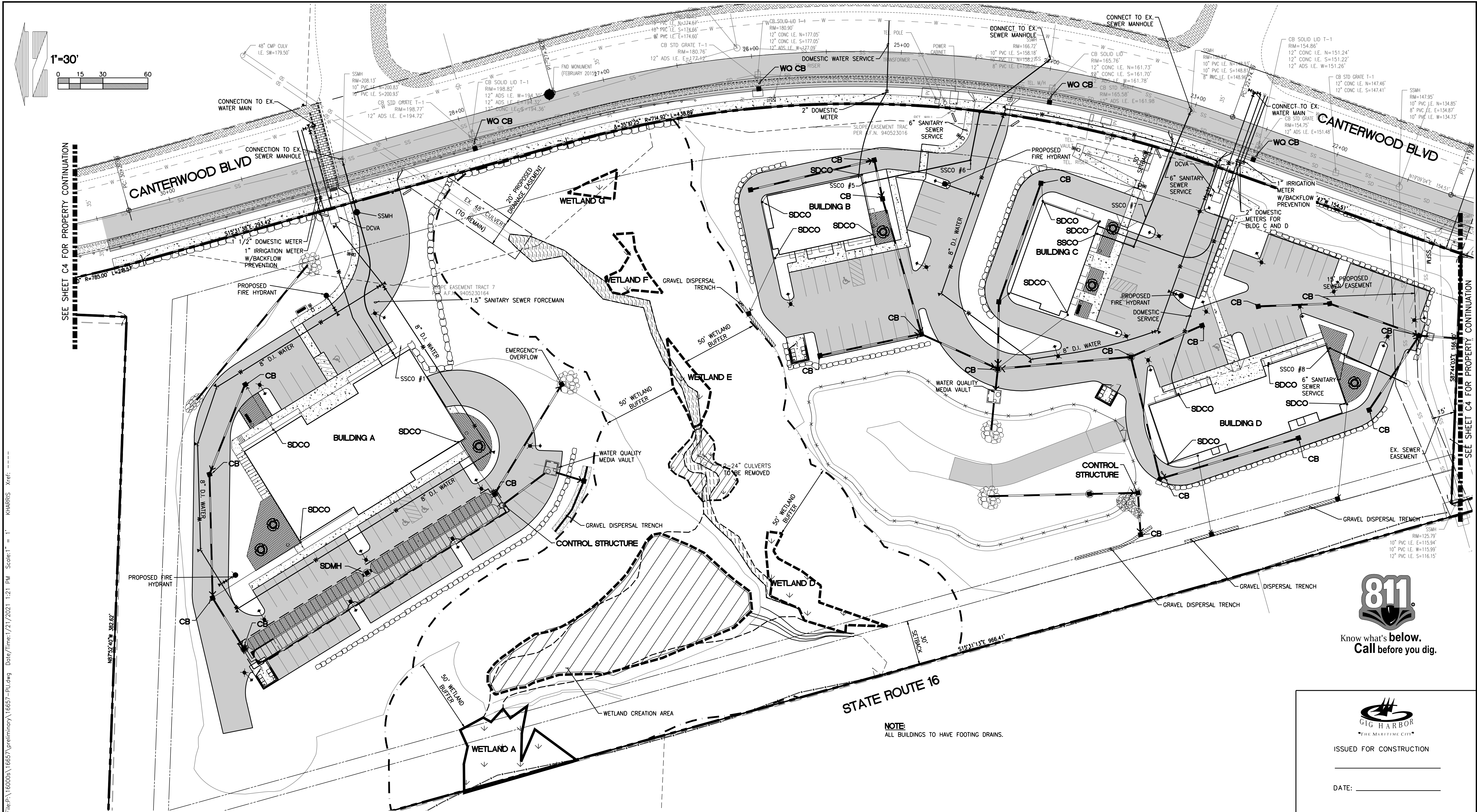
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TACOMA, WA 98401

**SECTION 25, TOWNSHIP 22 N, RANGE 1 E**  
**TRASH VEHICLE  
MANUEVERING  
CANTERWOOD COMMERCIAL  
CENTER**

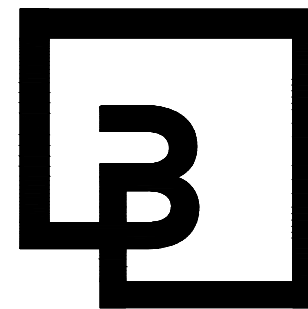
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| REVISIONS |            |                                               |  |
|-----------|------------|-----------------------------------------------|--|
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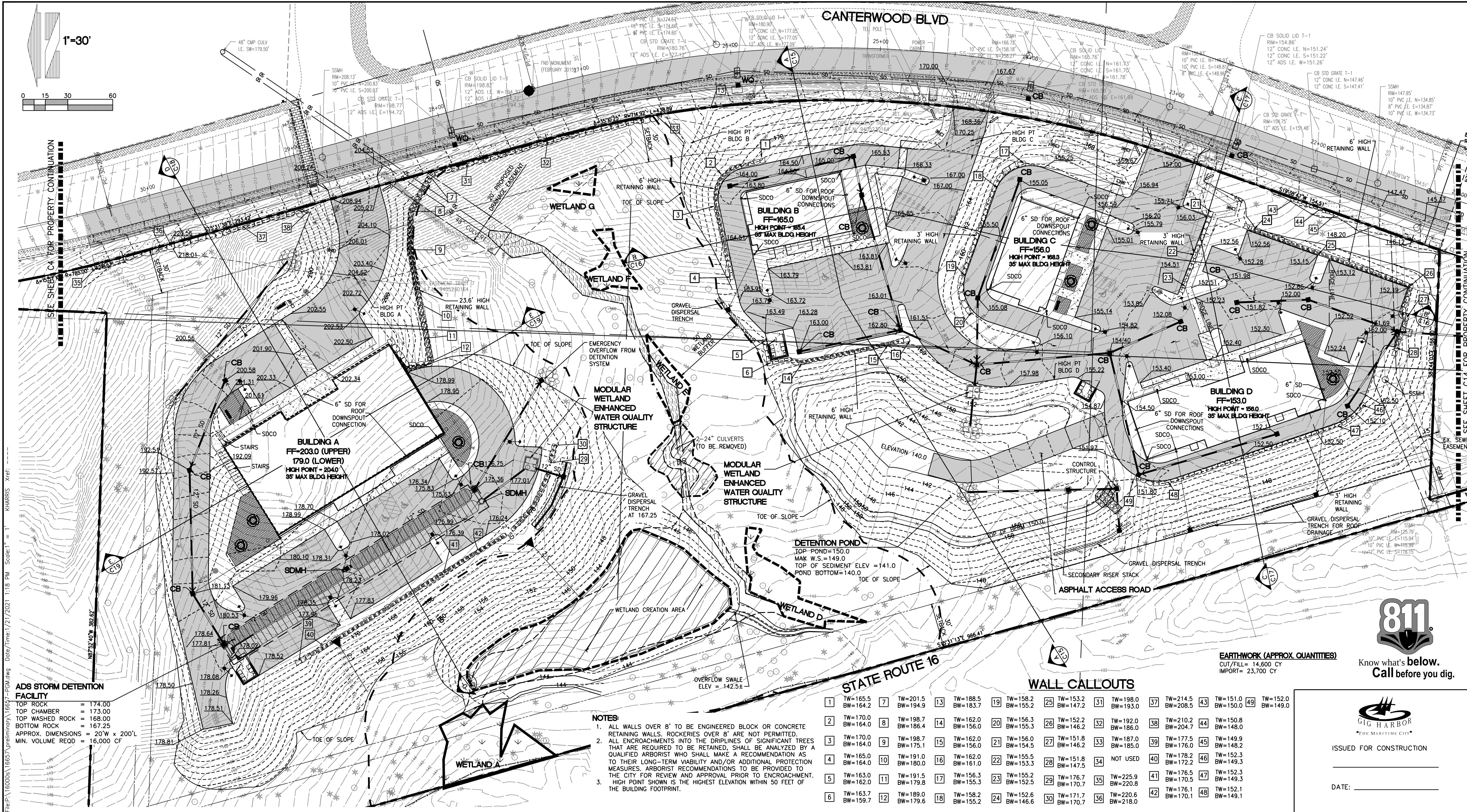
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| DRAWN BY:    | RDC    |
| CHECKED BY:  | KEH    |
| APPROVED BY: | JGH    |
| SCALE:       | 1"=30' |
| OTHER:       |        |

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**SECTION 25, TOWNSHIP 22 N, RANGE 1 E**  
**UTILITY SYSTEM MAP**  
**CANTERWOOD COMMERCIAL  
CENTER**

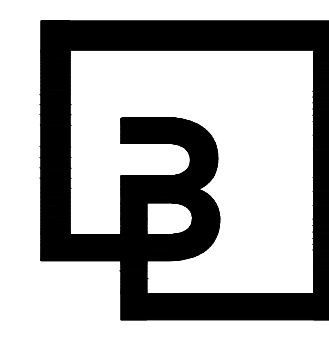
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| PERMIT NO.  | 05/05/2021 |
| DRAWING NO. |            |
| SHEET OF    |            |
| C12 23      |            |





| ADDITIONAL STORM DETENTION FACILITY |   |              |
|-------------------------------------|---|--------------|
| TOP ROCK                            | = | 174.00       |
| TOP CHAMBER                         | = | 173.00       |
| TOP WASHED ROCK                     | = | 168.00       |
| BOTTOM ROCK                         | = | 167.25       |
| APPROX. DIMENSIONS                  | = | 20'W x 200'L |
| MIN. VOLUME REQD                    | = | 16,000 CF    |

| REVISIONS |            |                                               |
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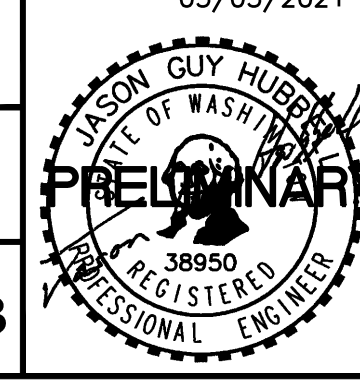
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| CHECKED BY:  | KEH    |
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| SCALE:       | 1"=30' |
| OTHER:       |        |

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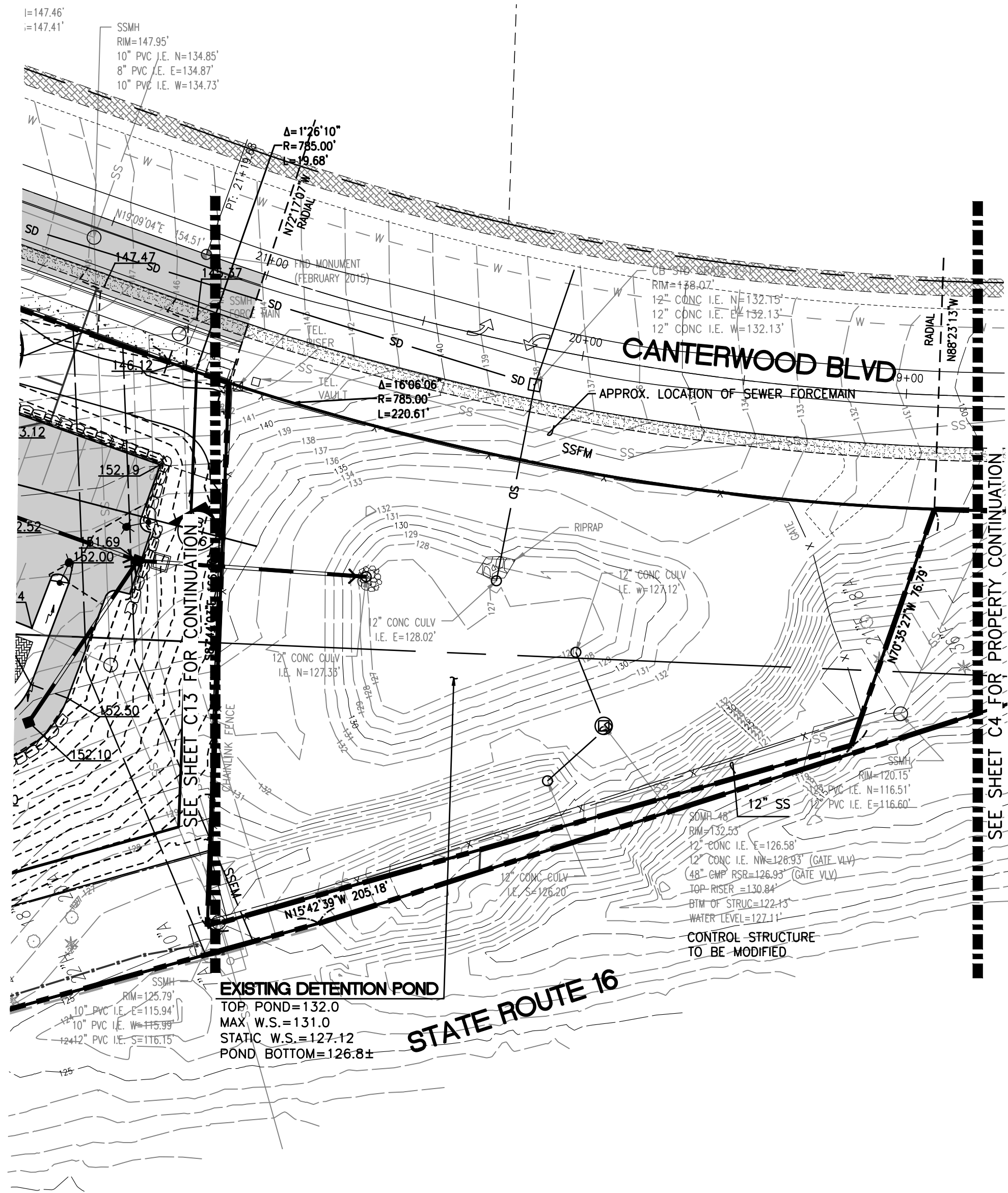
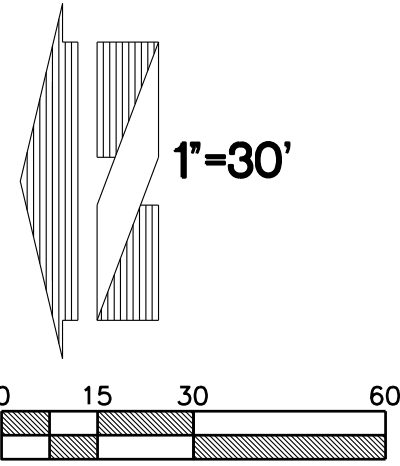
**SECTION 25, TOWNSHIP 22 N, RANGE 1 E**  
**GRADING AND STORM DRAINAGE PLAN**  
**CANTERWOOD COMMERCIAL CENTER**

|             |            |
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| PERMIT NO.  | 05/05/2021 |
| DRAWING NO. |            |
| SHEET OF    |            |
| C13         | 23         |



|   |                      |    |                      |    |                      |    |                      |    |                      |    |                      |    |                      |    |                      |    |                      |
|---|----------------------|----|----------------------|----|----------------------|----|----------------------|----|----------------------|----|----------------------|----|----------------------|----|----------------------|----|----------------------|
| 1 | TW=165.5<br>BW=164.2 | 7  | TW=201.5<br>BW=194.9 | 13 | TW=188.5<br>BW=183.7 | 19 | TW=158.2<br>BW=155.2 | 25 | TW=153.2<br>BW=147.2 | 31 | TW=198.0<br>BW=193.0 | 37 | TW=214.5<br>BW=208.5 | 43 | TW=151.0<br>BW=150.0 | 49 | TW=152.0<br>BW=149.0 |
| 2 | TW=170.0<br>BW=164.0 | 8  | TW=198.7<br>BW=186.4 | 14 | TW=162.0<br>BW=156.0 | 20 | TW=156.3<br>BW=155.3 | 26 | TW=152.2<br>BW=146.2 | 32 | TW=192.0<br>BW=186.0 | 38 | TW=210.2<br>BW=204.7 | 44 | TW=150.8<br>BW=148.0 |    |                      |
| 3 | TW=170.0<br>BW=164.0 | 9  | TW=198.7<br>BW=175.1 | 15 | TW=162.0<br>BW=156.0 | 21 | TW=156.0<br>BW=154.5 | 27 | TW=151.8<br>BW=146.2 | 33 | TW=187.0<br>BW=185.0 | 39 | TW=177.5<br>BW=176.0 | 45 | TW=149.9<br>BW=148.2 |    |                      |
| 4 | TW=165.0<br>BW=164.0 | 10 | TW=191.0<br>BW=180.0 | 16 | TW=162.0<br>BW=161.0 | 22 | TW=155.5<br>BW=153.3 | 28 | TW=151.8<br>BW=147.5 | 34 | NOT USED             | 40 | TW=178.2<br>BW=172.2 | 46 | TW=152.3<br>BW=149.3 |    |                      |
| 5 | TW=163.0<br>BW=162.0 | 11 | TW=191.5<br>BW=179.8 | 17 | TW=156.3<br>BW=155.3 | 23 | TW=155.2<br>BW=152.5 | 29 | TW=176.7<br>BW=170.7 | 35 | TW=225.9<br>BW=220.8 | 41 | TW=176.5<br>BW=170.5 | 47 | TW=152.3<br>BW=149.3 |    |                      |
| 6 | TW=163.7<br>BW=159.7 | 12 | TW=189.0<br>BW=179.6 | 18 | TW=158.2<br>BW=155.2 | 24 | TW=152.6<br>BW=146.6 | 30 | TW=171.7<br>BW=170.7 | 36 | TW=220.6<br>BW=218.0 | 42 | TW=176.1<br>BW=170.1 | 48 | TW=152.1<br>BW=149.1 |    |                      |





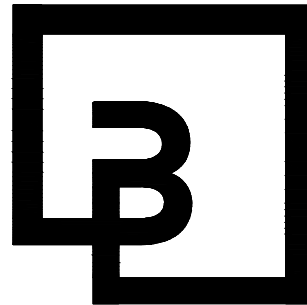
Know what's below.  
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|-----------|------------|-----------------------------------------------|--|
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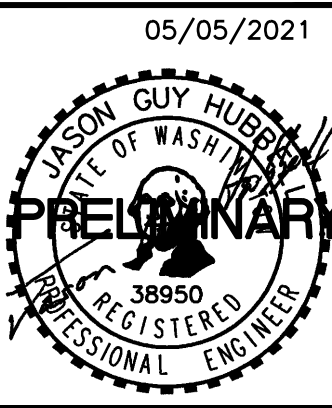
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|--------------|--------|
| DESIGNED BY: | KEH    |
| DRAWN BY:    | RDC    |
| CHECKED BY:  | KEH    |
| APPROVED BY: | JGH    |
| SCALE:       | 1"=30' |
| OTHER:       |        |

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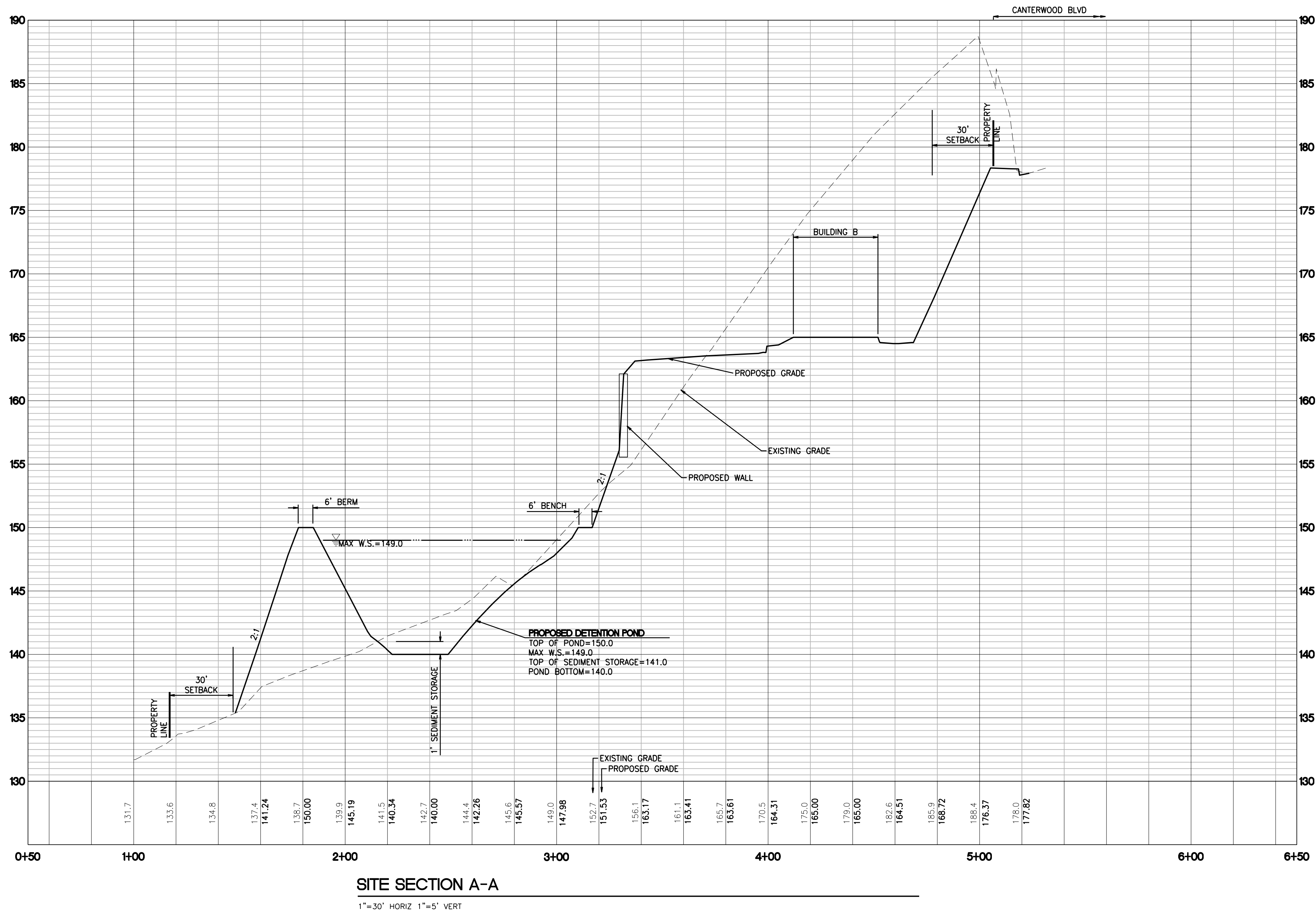
**SECTION 25, TOWNSHIP 22 N, RANGE 1 E**  
**GRADING AND STORM DRAINAGE PLAN**  
**CANTERWOOD COMMERCIAL  
CENTER**

|                     |                 |
|---------------------|-----------------|
| PERMIT NO.          |                 |
| DRAWING NO.         |                 |
| SHEET<br><b>C14</b> | OF<br><b>23</b> |





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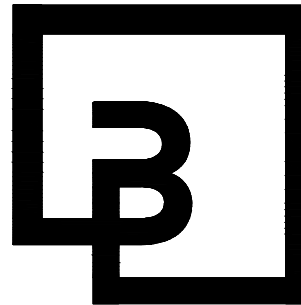


  
GIG HARBOR  
"THE MARITIME CITY"

ISSUED FOR CONSTRUCTION

DATE: \_\_\_\_\_

| REVISIONS |            |                                               |  |
|-----------|------------|-----------------------------------------------|--|
| 10        | 11/01/2018 | REVISED PER CITY DRB COMMENTS 5/25/2018       |  |
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| DESIGNED BY: | KEH    |
| DRAWN BY:    | RDC    |
| CHECKED BY:  | KEH    |
| APPROVED BY: | JGH    |
| SCALE:       | 1"=30' |
| OTHER:       |        |

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**SECTION 25, TOWNSHIP 22 N, RANGE 1 E**

**SITE SECTION-A**

**CANTERWOOD COMMERCIAL  
CENTER**

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| PERMIT NO.  |    |
| DRAWING NO. |    |
| SHEET       | OF |
| C15         | 23 |

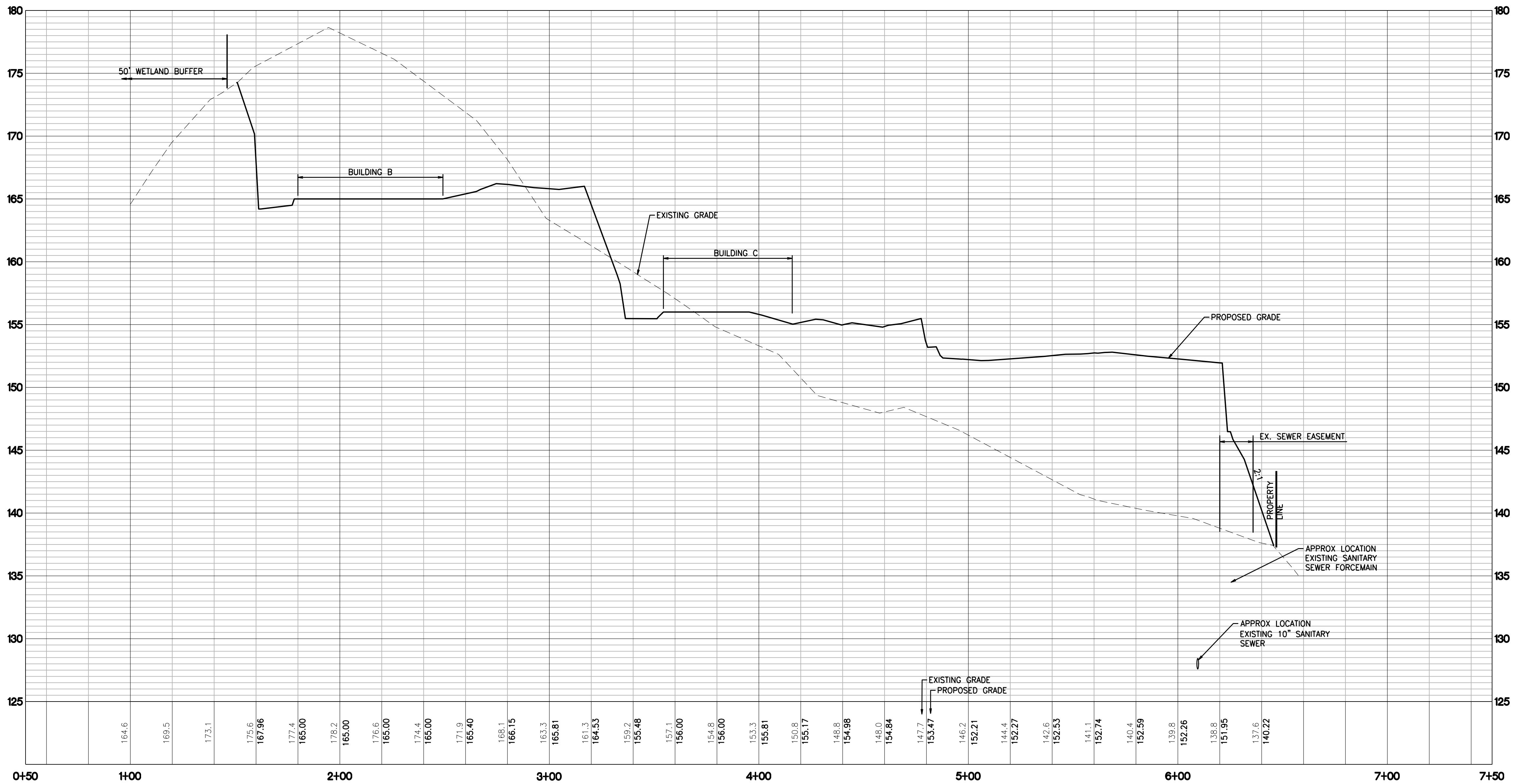
05/05/2021



**PRELIMINARY**



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SITE SECTION B-B

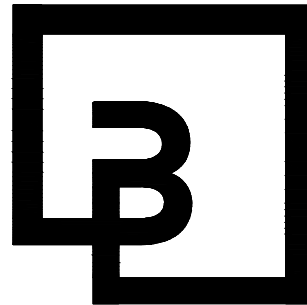
1"=30' HORIZ 1"=5' VERT



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DATE: \_\_\_\_\_

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|-----------|------------|-----------------------------------------------|--|
| 10        | 11/01/2018 | REVISED PER CITY DRB COMMENTS 5/25/2018       |  |
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| DESIGNED BY: | KEH    |
| DRAWN BY:    | RDC    |
| CHECKED BY:  | KEH    |
| APPROVED BY: | JGH    |
| SCALE:       | 1"=30' |
| OTHER:       |        |

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SECTION 25, TOWNSHIP 22 N, RANGE 1 E

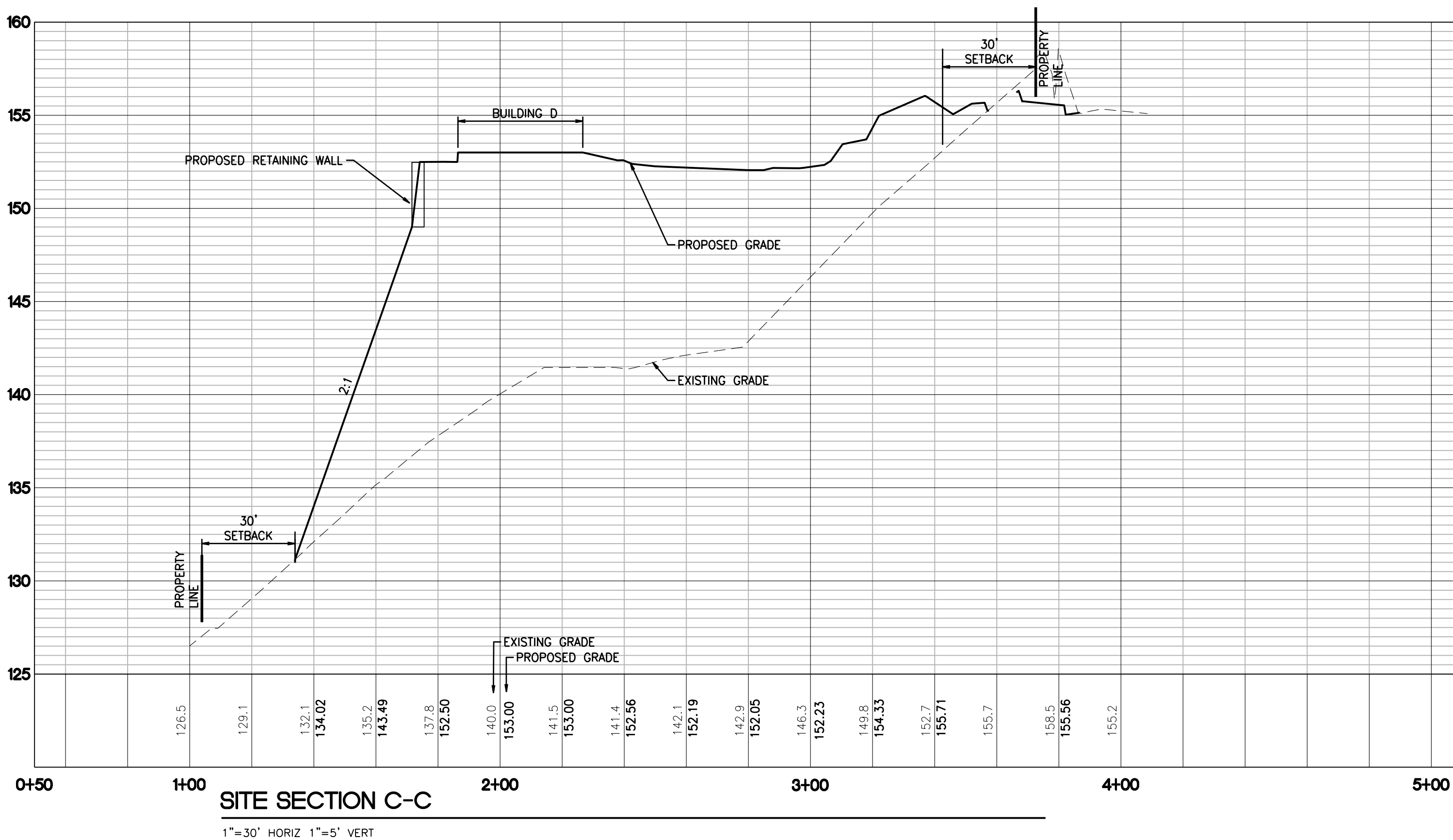
**SITE SECTION-B**  
**CANTERWOOD COMMERCIAL  
CENTER**

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| C16 23      |  |

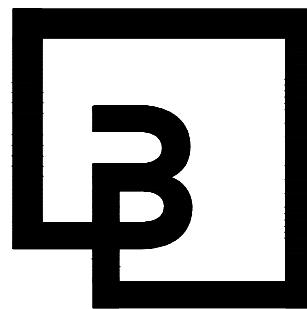




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| REVISIONS |            |                                               |
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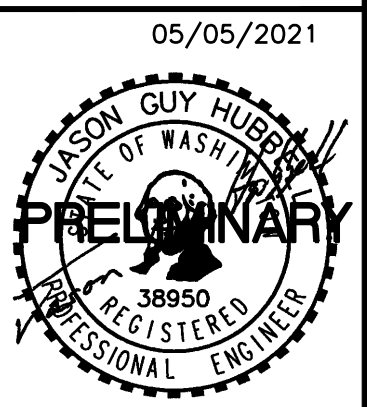
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| APPROVED BY: | JGH    |
| SCALE:       | 1"=30' |
| OTHER:       |        |

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|                                      |  |
|--------------------------------------|--|
| SECTION 25, TOWNSHIP 22 N, RANGE 1 E |  |
| SITE SECTION-C                       |  |
| CANTERWOOD COMMERCIAL<br>CENTER      |  |

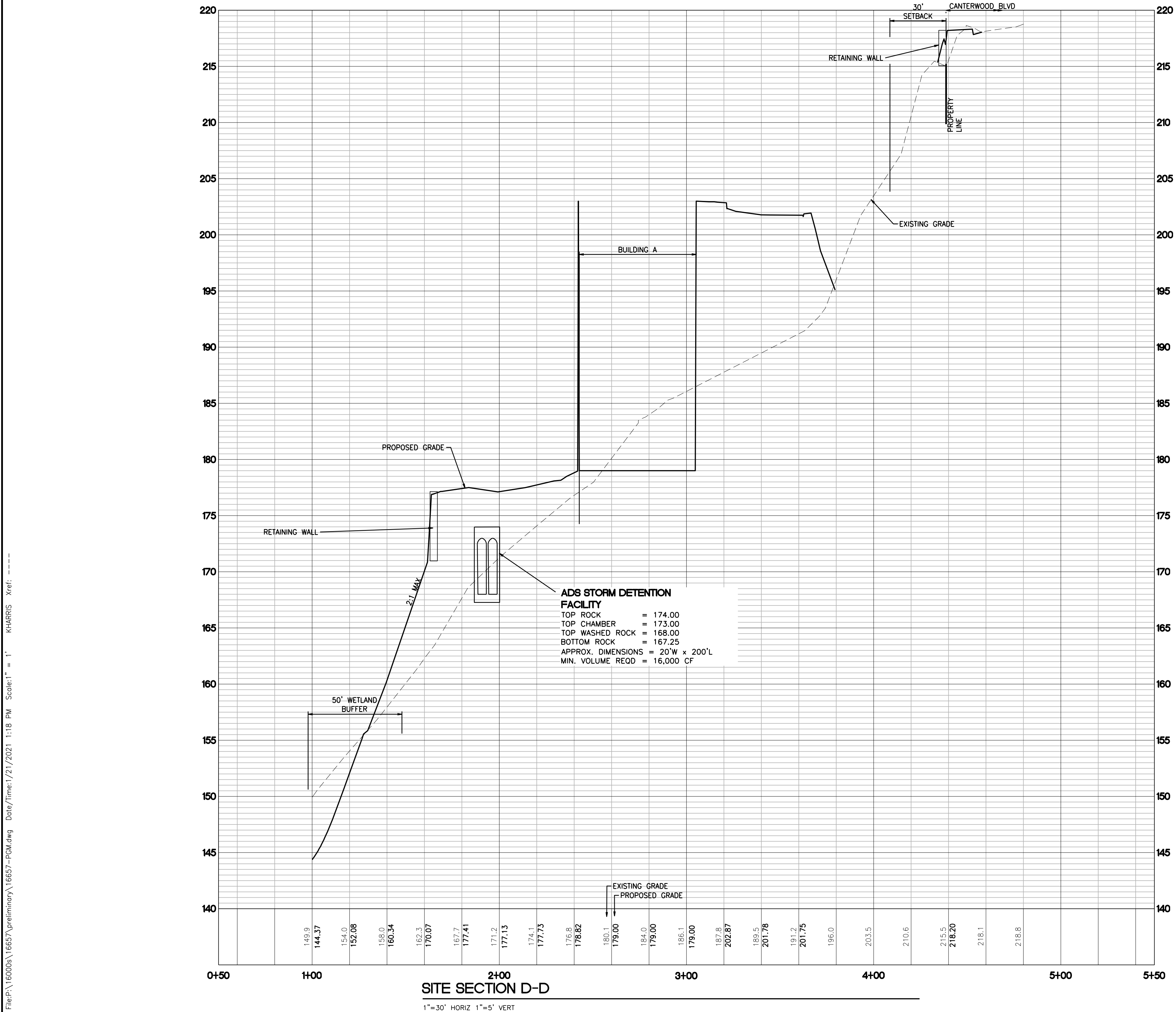
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| SHEET       | OF |
| C17         | 23 |



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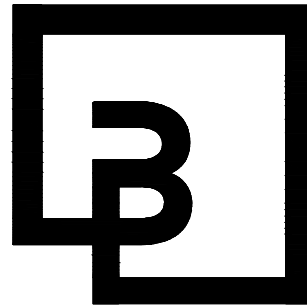
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| 11        | 04/02/2019 | REVISED PER CITY COMMENTS 1/25/2019           |  |
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| 14        | 05/13/2020 | REVISED SOUTH LAYOUT                          |  |
| 15        | 06/24/2020 | REVISED PER CITY REVIEW COMMENTS OCTOBER 2019 |  |
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|--------------|--------|
| DESIGNED BY: | KEH    |
| DRAWN BY:    | RDC    |
| CHECKED BY:  | KEH    |
| APPROVED BY: | JGH    |
| SCALE:       | 1"=20' |
| OTHER:       |        |

**SWEDE HILL, LLC**  
P.O. BOX 1397  
TACOMA, WA 98401

**SECTION 25, TOWNSHIP 22 N, RANGE 1 E**  
**SITE SECTION-D**  
**CANTERWOOD COMMERCIAL  
CENTER**

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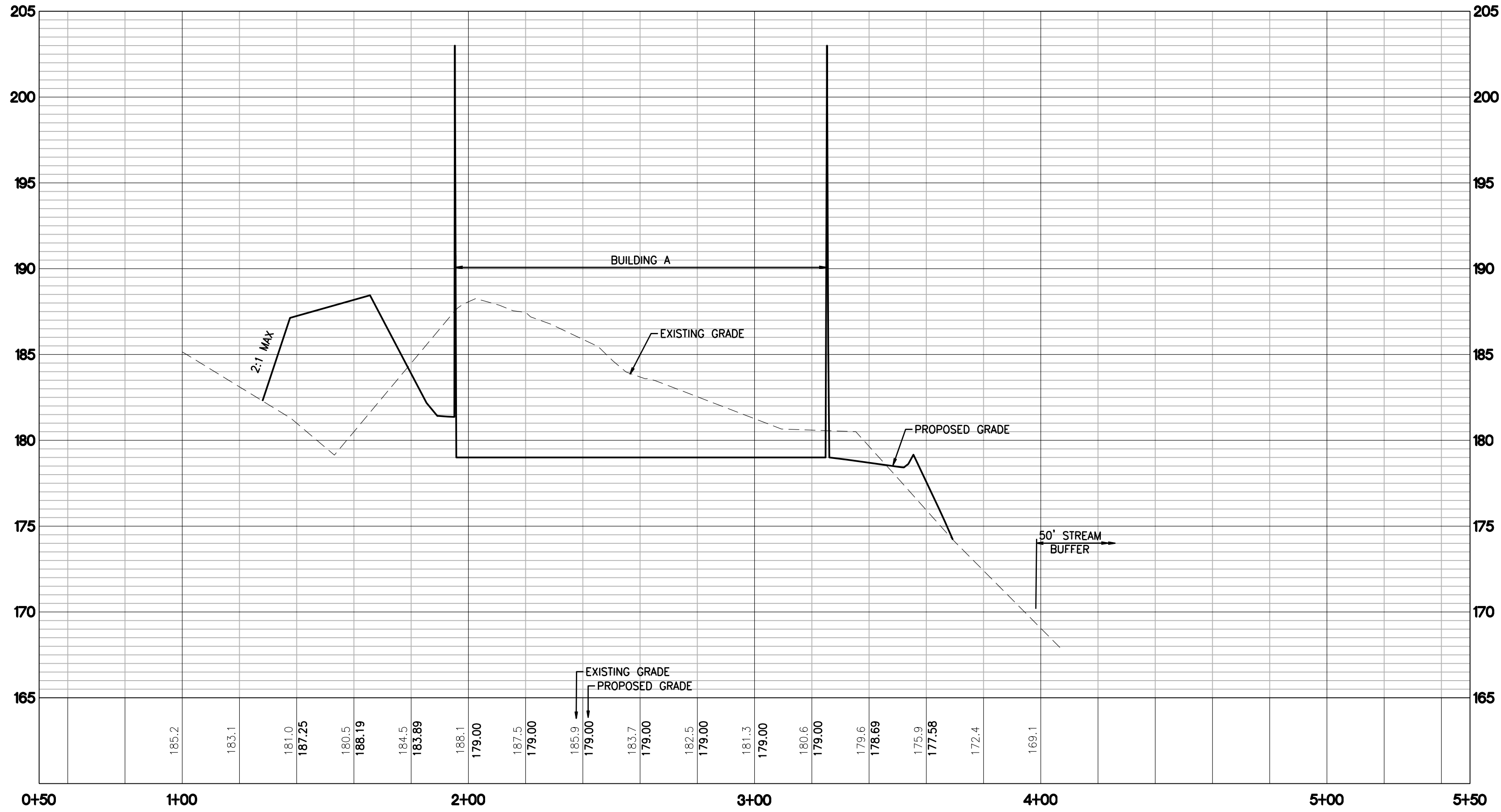
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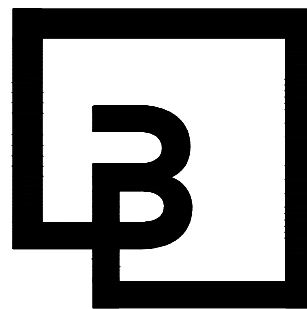
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SITE SECTION E-E

1"=30' HORIZ 1"=5' VERT

| REVISIONS |            |                                               |  |
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| 10        | 11/01/2018 | REVISED PER CITY DRB COMMENTS 5/25/2018       |  |
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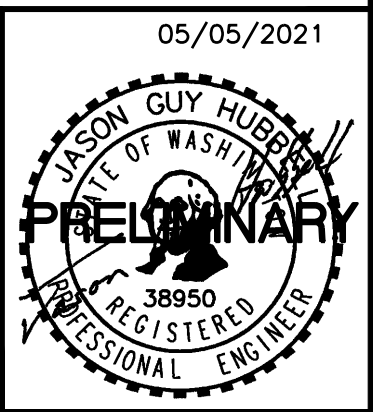
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| OTHER:       |        |

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**TACOMA, WA 98401**

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**SITE SECTION-E**  
**CANTERWOOD COMMERCIAL CENTER**

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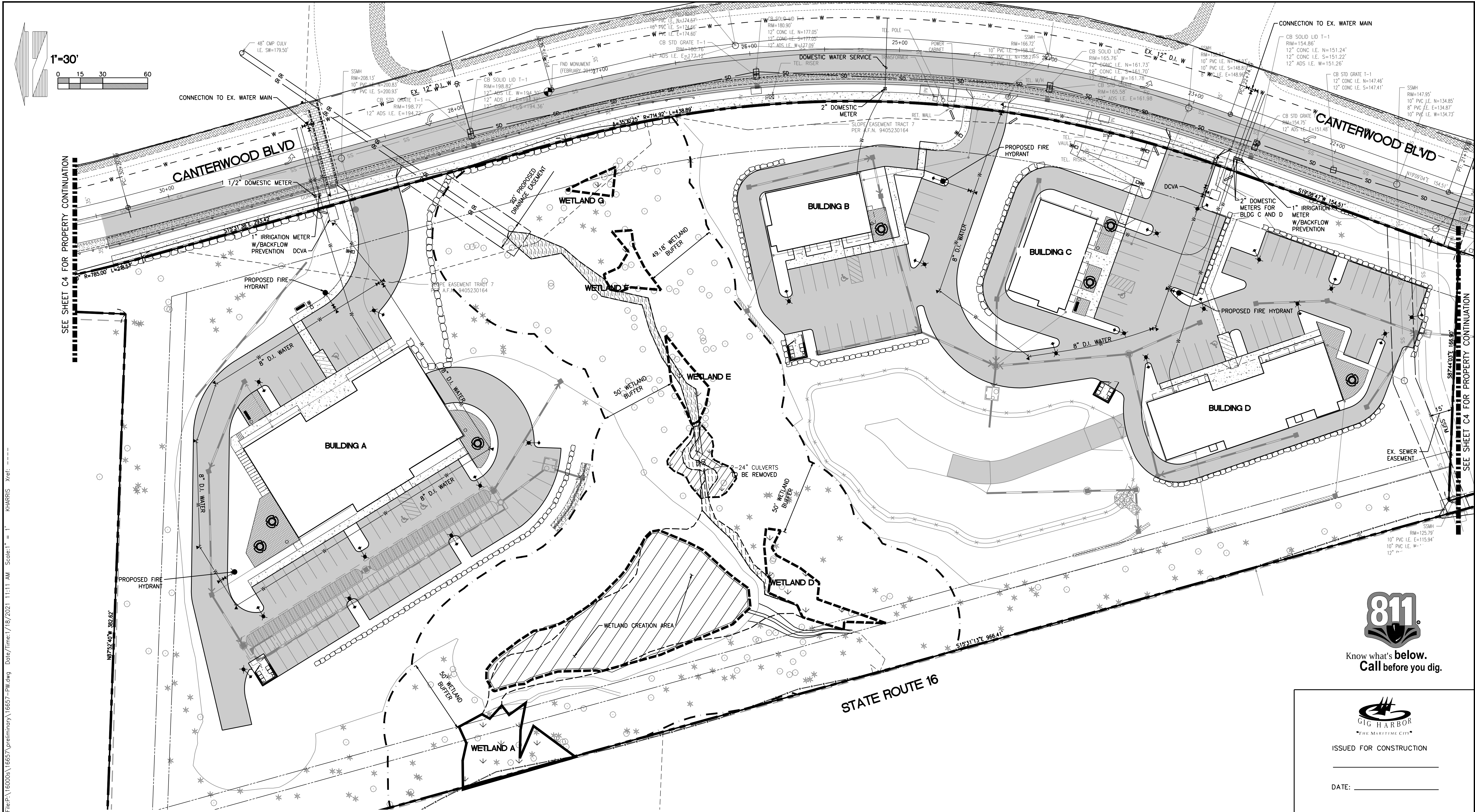


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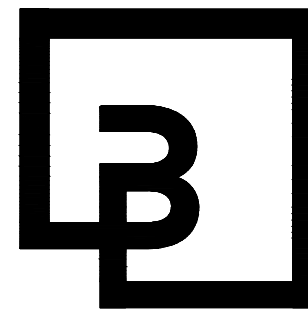
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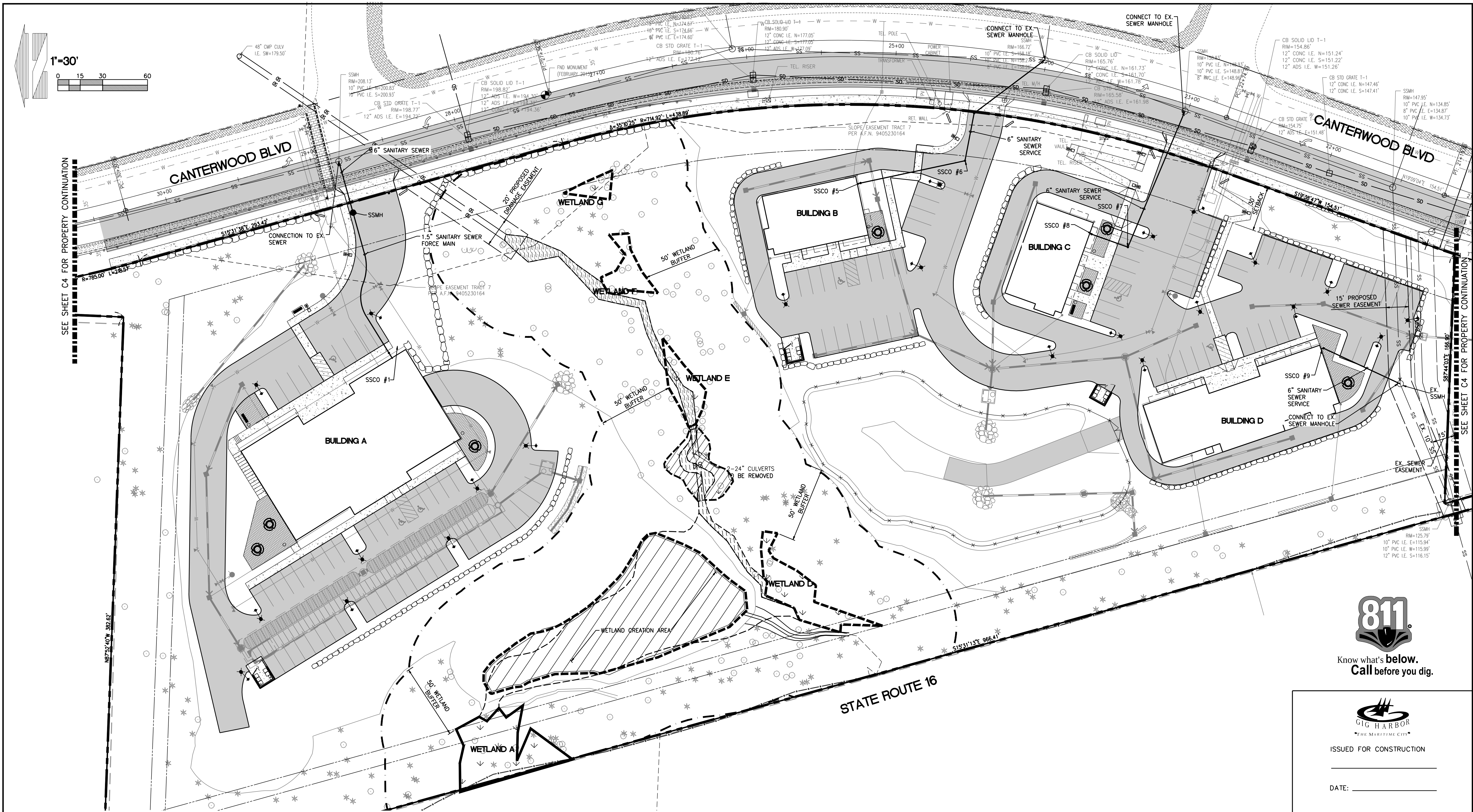
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**SECTION 25, TOWNSHIP 22 N, RANGE 1 E**  
**WATER MAIN PLAN**  
**CANTERWOOD COMMERCIAL  
CENTER**

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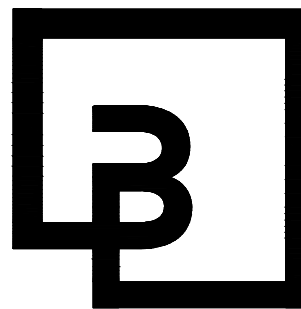
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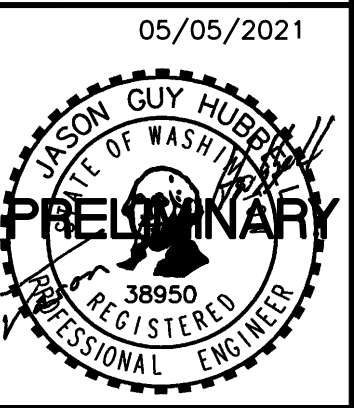
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| DRAWN BY:    | RDC    |
| CHECKED BY:  | KEH    |
| APPROVED BY: | JGH    |
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| OTHER:       |        |

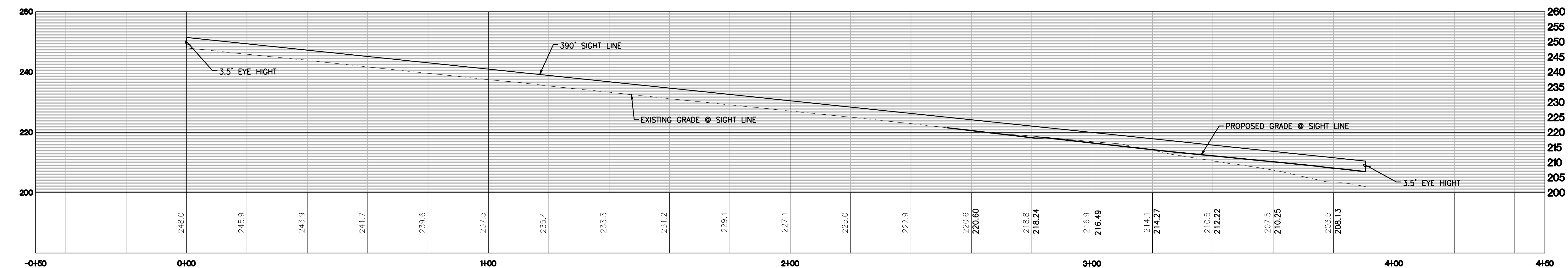
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**SECTION 25, TOWNSHIP 22 N, RANGE 1 E**  
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**CANTERWOOD COMMERCIAL  
CENTER**

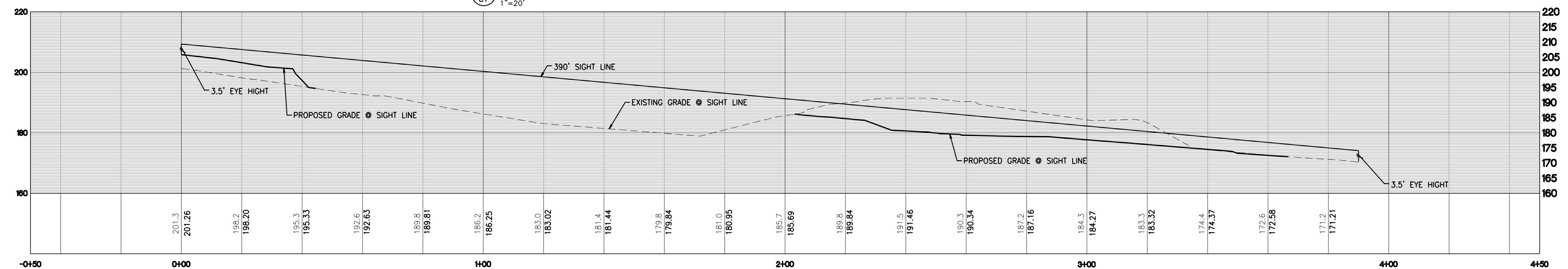
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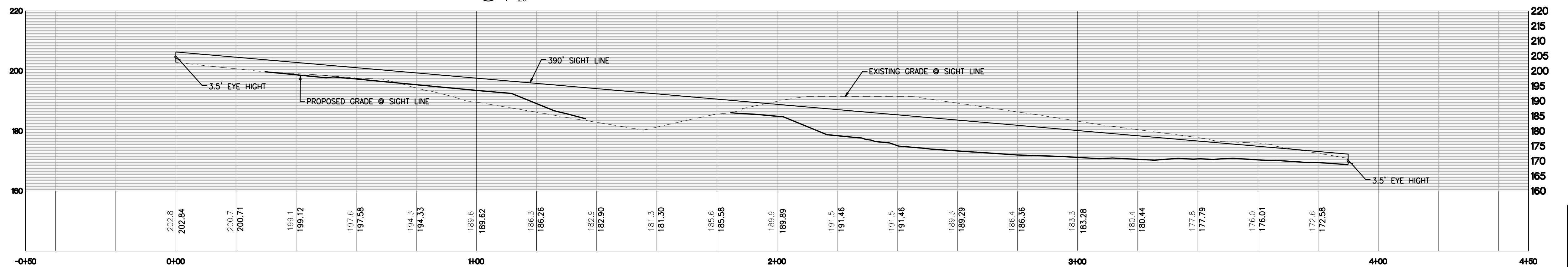




NORTH DRIVEWAY  
RIGHT TURN  
F  
C7  
1"=20'



NORTH DRIVEWAY  
LEFT TURN  
G  
C7  
1"=20'



CENTER DRIVEWAY  
RIGHT TURN  
H  
C8  
1"=20'

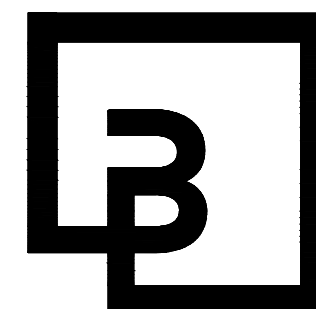


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DRAWN BY: RDC  
CHECKED BY: KEH  
APPROVED BY: JGH  
SCALE: 1"=20'  
OTHER:

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**SECTION 25, TOWNSHIP 22 N, RANGE 1 E**

**SIGHT LINE SECTIONS**

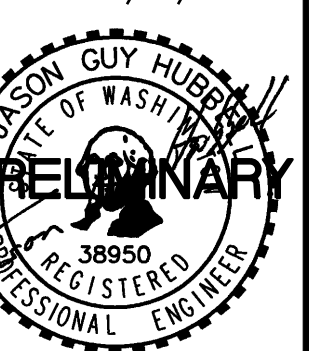
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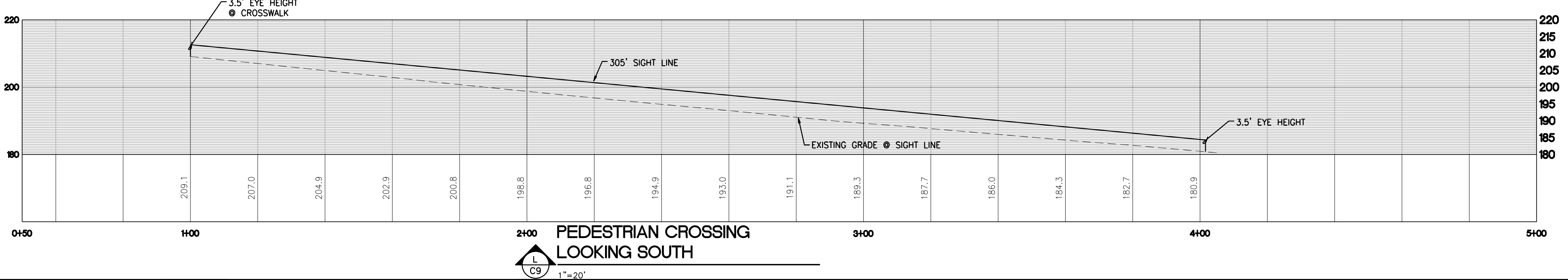
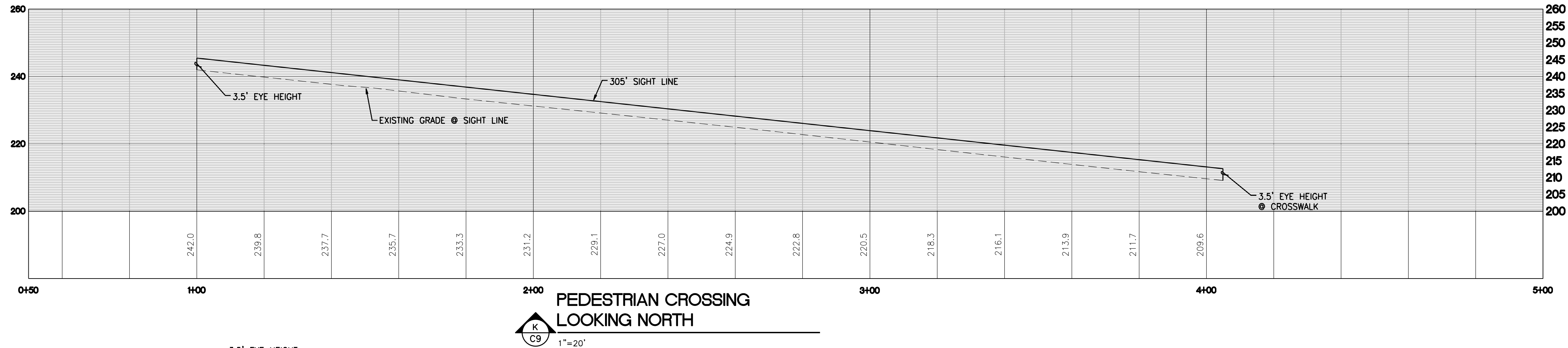
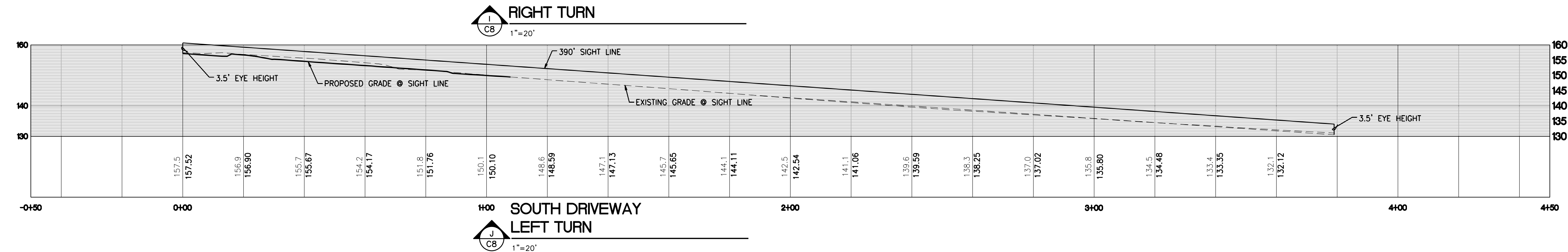
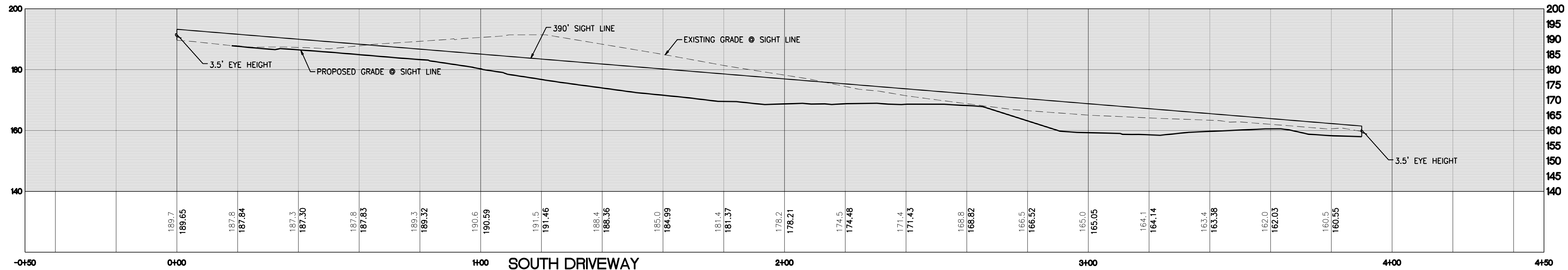
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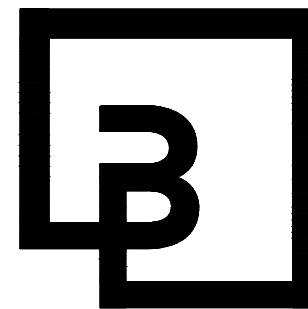
05/05/2021







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DESIGNED BY: KEH  
DRAWN BY: RDC  
CHECKED BY: KEH  
APPROVED BY: JGH  
SCALE: 1"=20'  
OTHER:

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P.O. BOX 1397  
TACOMA, WA 98401

**SECTION 25, TOWNSHIP 22 N, RANGE 1 E**  
**SIGHT LINE SECTIONS**  
**CANTERWOOD COMMERCIAL CENTER**

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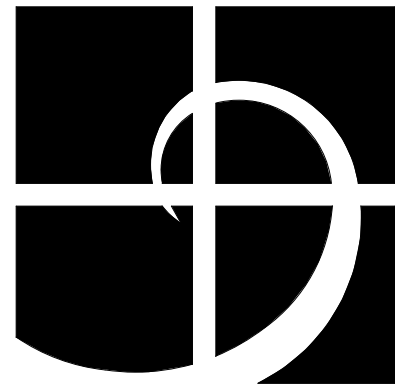
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BUILDING A  
 FIRST FLOOR  
 PLAN

CANTERWOOD  
 OFFICE-RETAIL

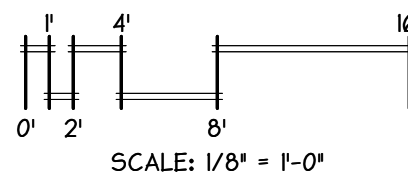
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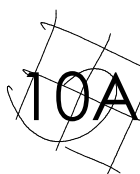
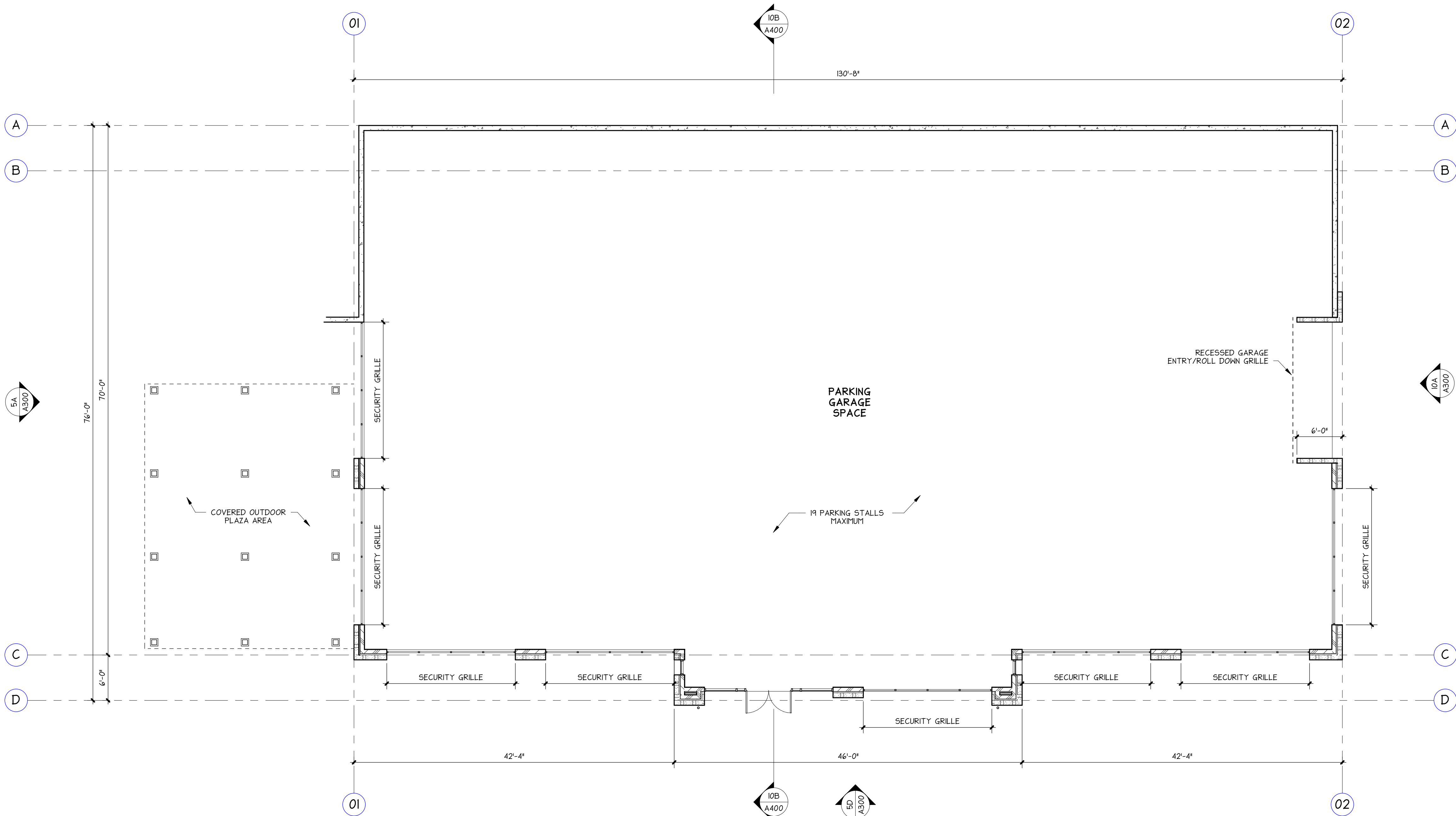
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BUILDING A FIRST FLOOR PLAN

1/8" = 1'-0"



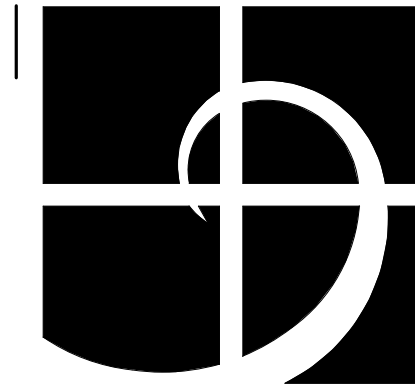
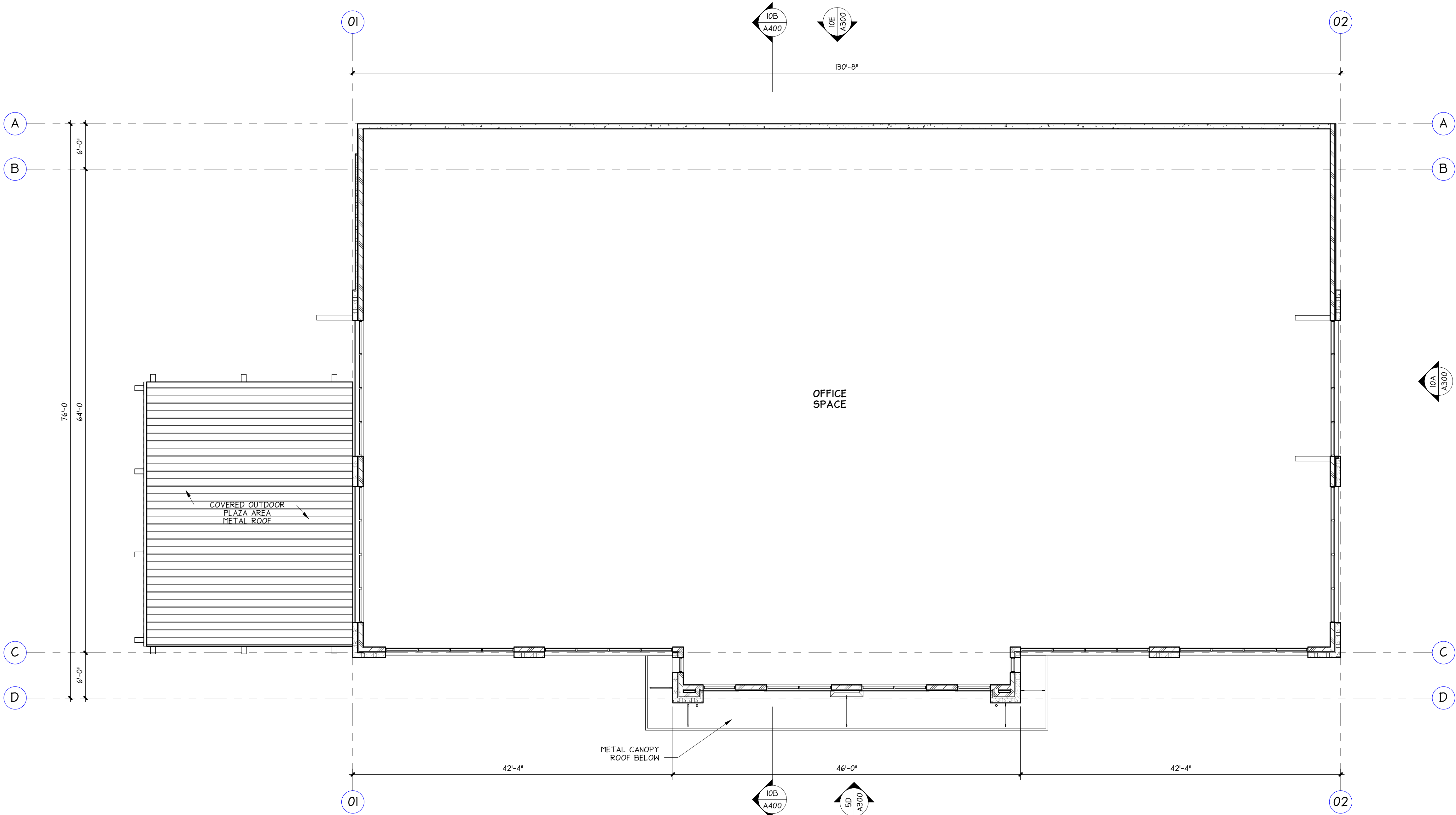


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BUILDING A SECOND FLOOR PLAN

1/8" = 1'-0"



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BUILDING A  
SECOND FLOOR  
PLAN

CANTERWOOD  
OFFICE-RETAIL

GIG HARBOR, WASHINGTON

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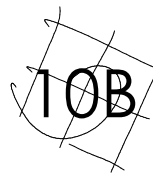
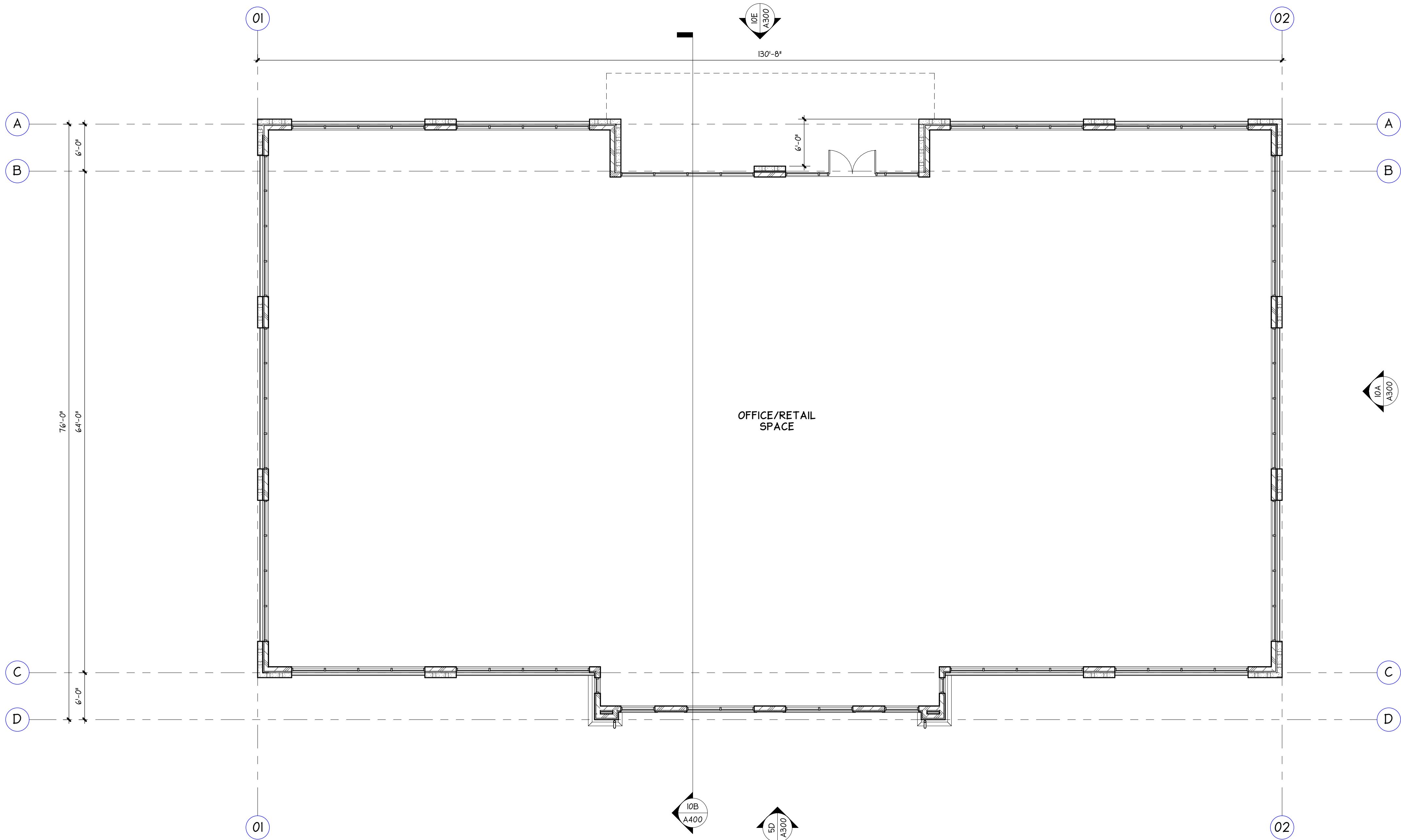
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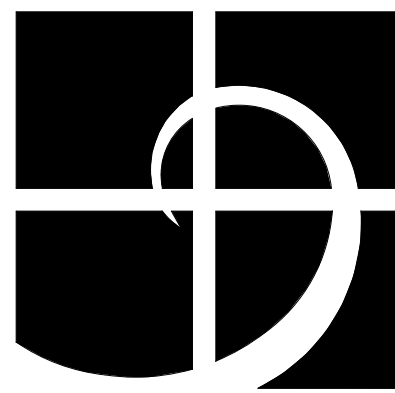


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BUILDING A THIRD FLOOR PLAN

1/8" = 1'-0"



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BUILDING A  
THIRD FLOOR  
PLAN

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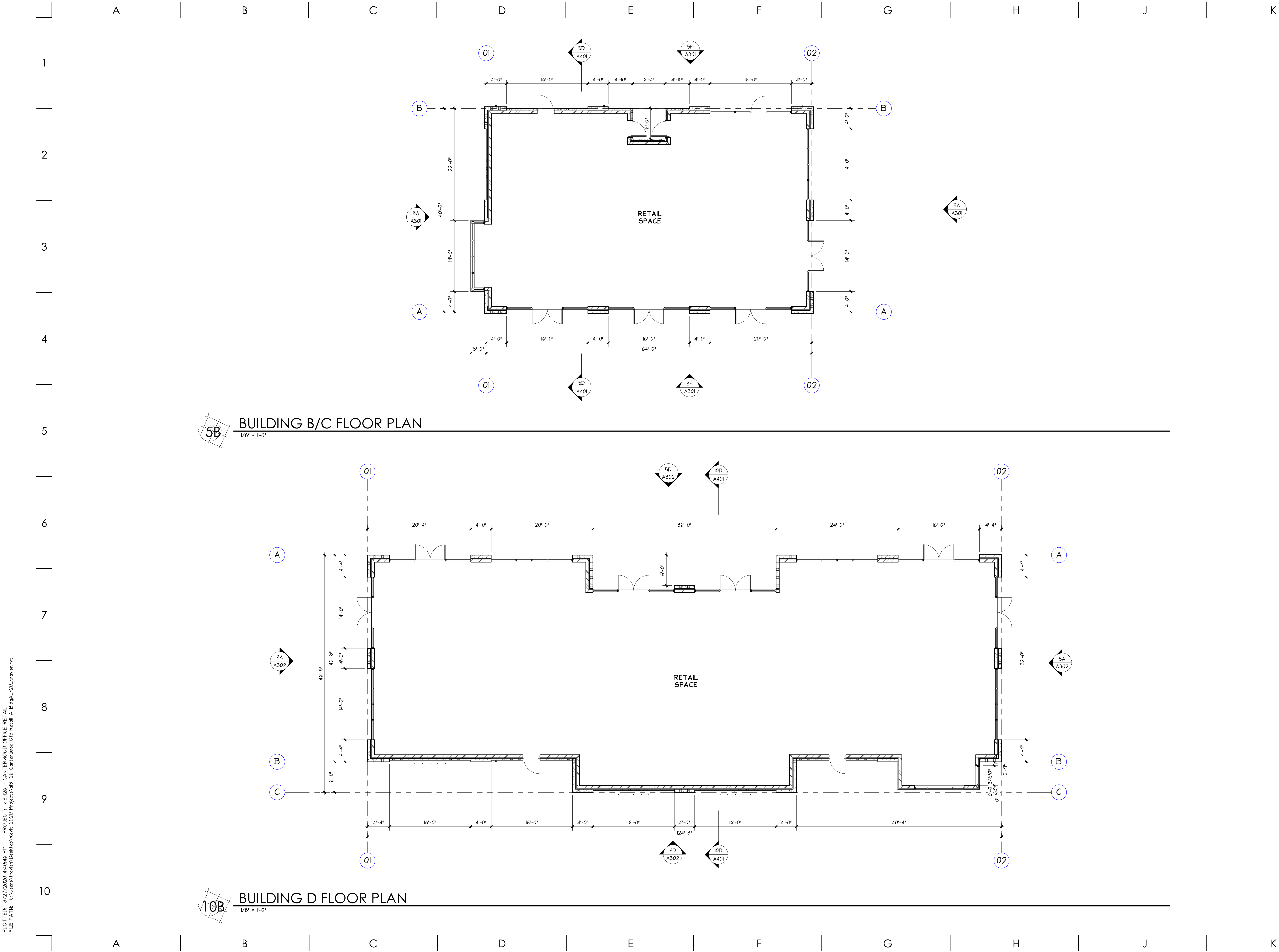
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FLOOR PLANS

CANTERWOOD OFFICE-RETAIL

GIG HARBOR, WASHINGTON

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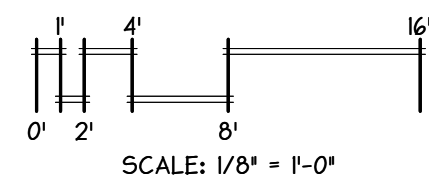
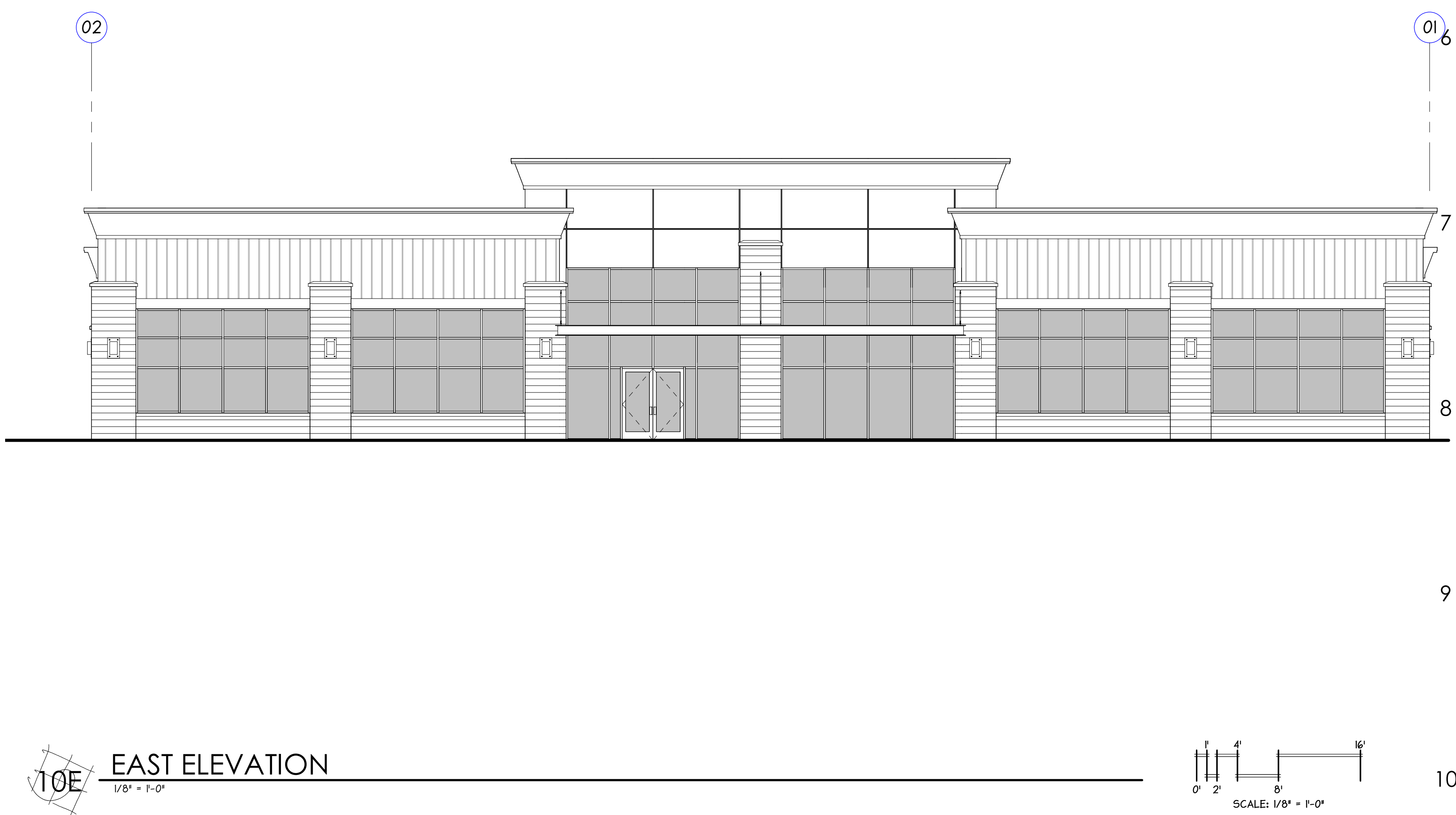
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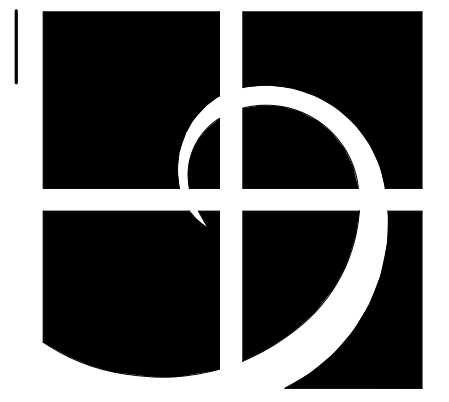
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**BUILDING A EXTERIOR ELEVATIONS**

**CANTERWOOD OFFICE-RETAIL**

GIG HARBOR, WASHINGTON

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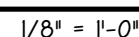
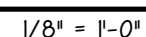
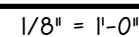
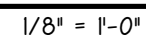
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**DRB REVIEW**

DRAWING NO.

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PLOTTED: 8/27/2020 4:40:50 PM PROJECT: a13-126 - CANTERWOOD OFFICE-RETAIL  
FILE PATH: C:\Users\ironv\OneDrive\Revit 2020 Projects\A13-126-Canterwood Off. Retail-A-Bldg-A-20-1.rvt

A

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G

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1

2

3

4

5A

SOUTH ELEVATION

1/8" = 1'-0"

5

6

7

8

9A

NORTH ELEVATION

1/8" = 1'-0"

9

10

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5D

EAST ELEVATION

1/8" = 1'-0"

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WEST ELEVATION

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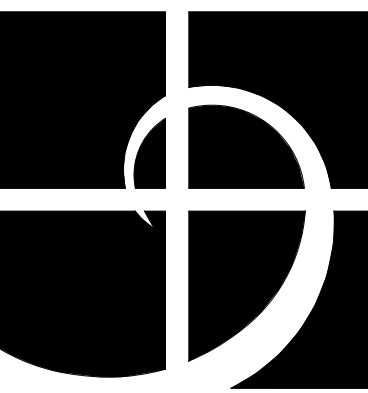
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BUILDING D  
EXTERIOR  
ELEVATIONS

CANTERWOOD  
OFFICE-RETAIL

GIG HARBOR, WASHINGTON

REVISION DATE

DATE JOB NO.  
05.20.20 a13-126

DRB REVIEW

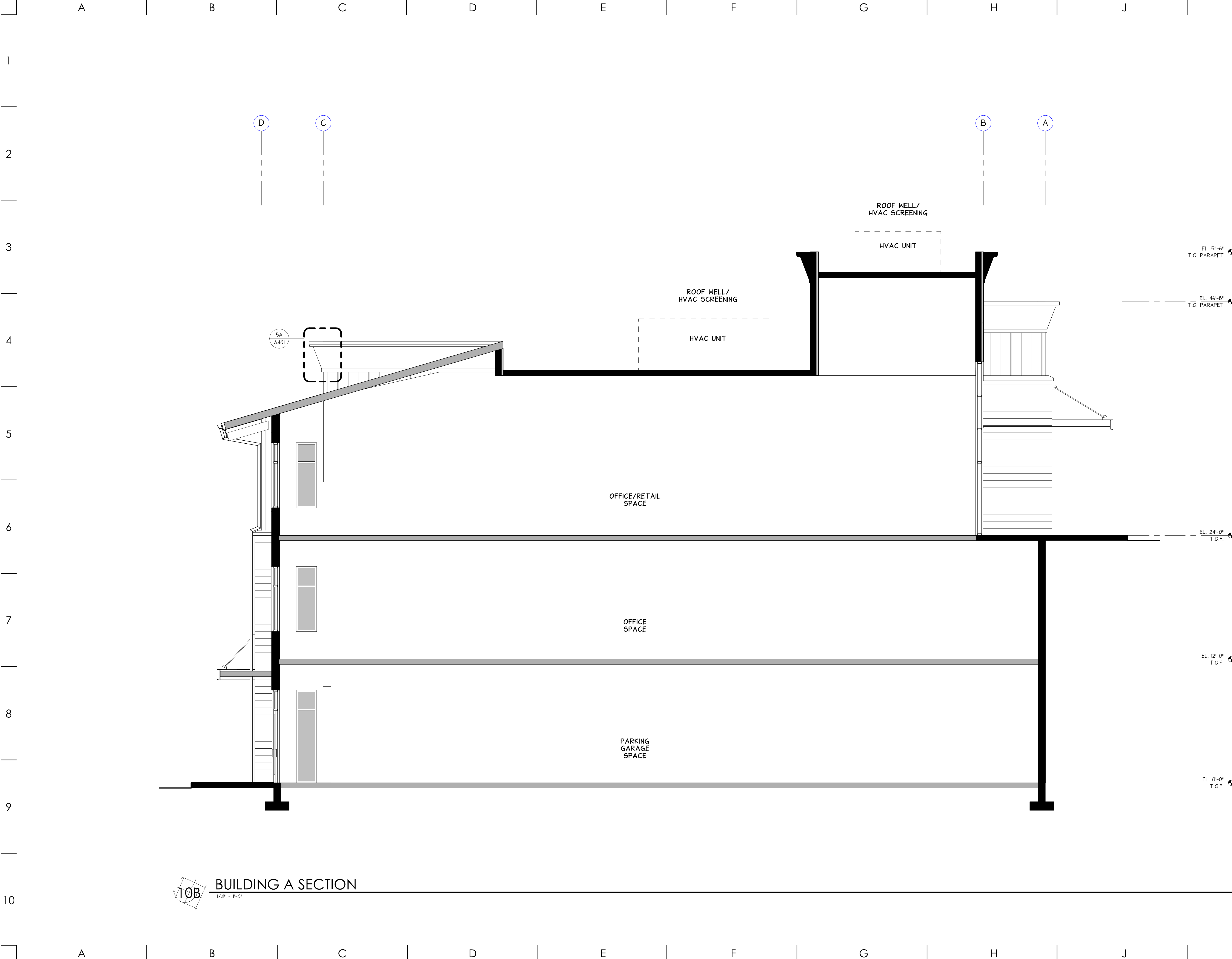
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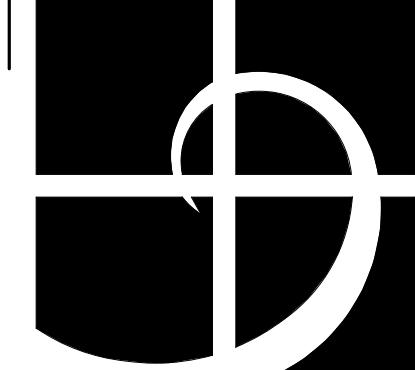
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FILE PATH: C:\Users\Ironien\Desktop\Revit 2020 Projects\103-126-Canterwood Off. Retail-A-Bldg-A-20-1.rvt



**BUILDING A SECTION**  
1/4" = 1'-0"



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**BUILDING A SECTION**

**CANTERWOOD OFFICE-RETAIL**

GIG HARBOR, WASHINGTON

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**DRB REVIEW**

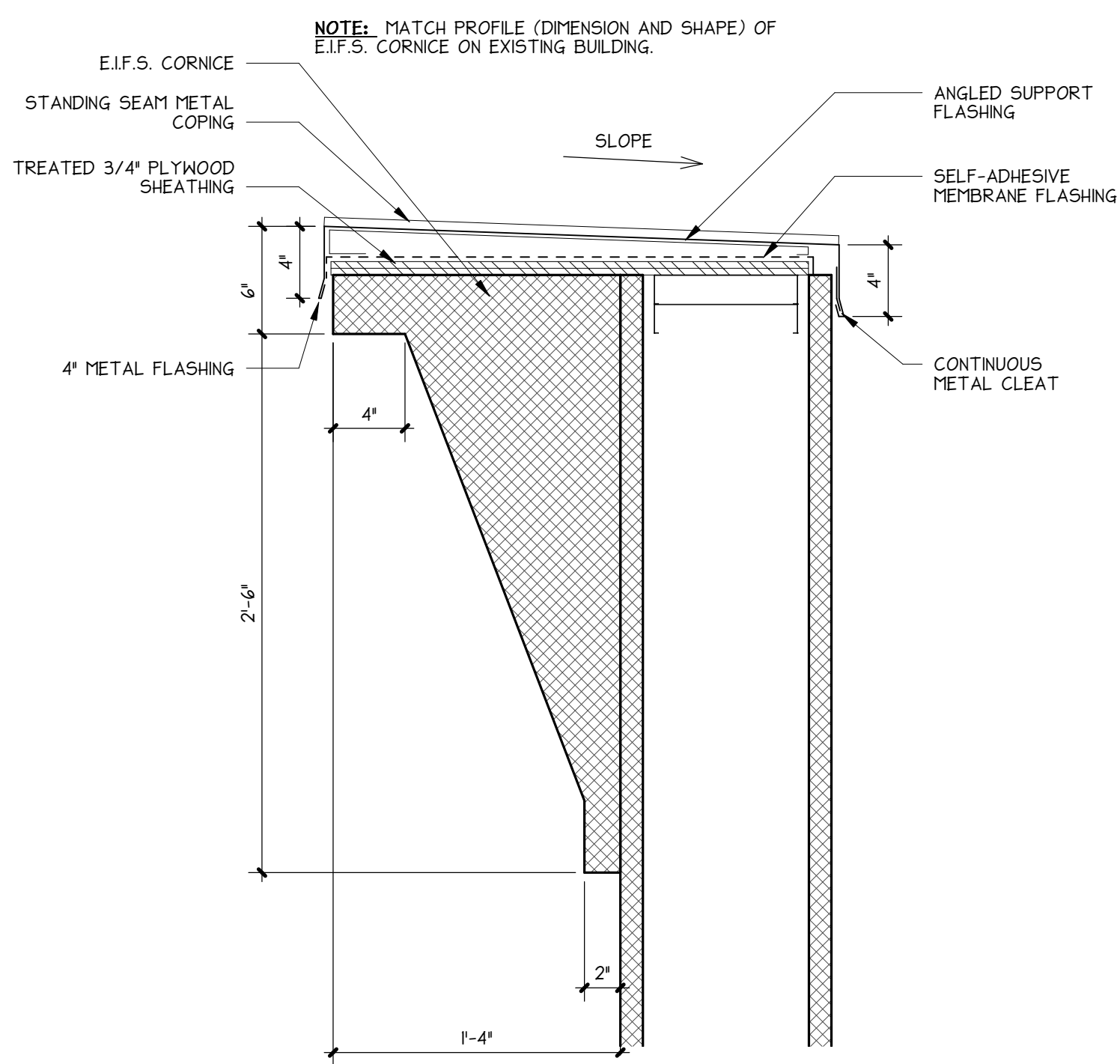
**A400**

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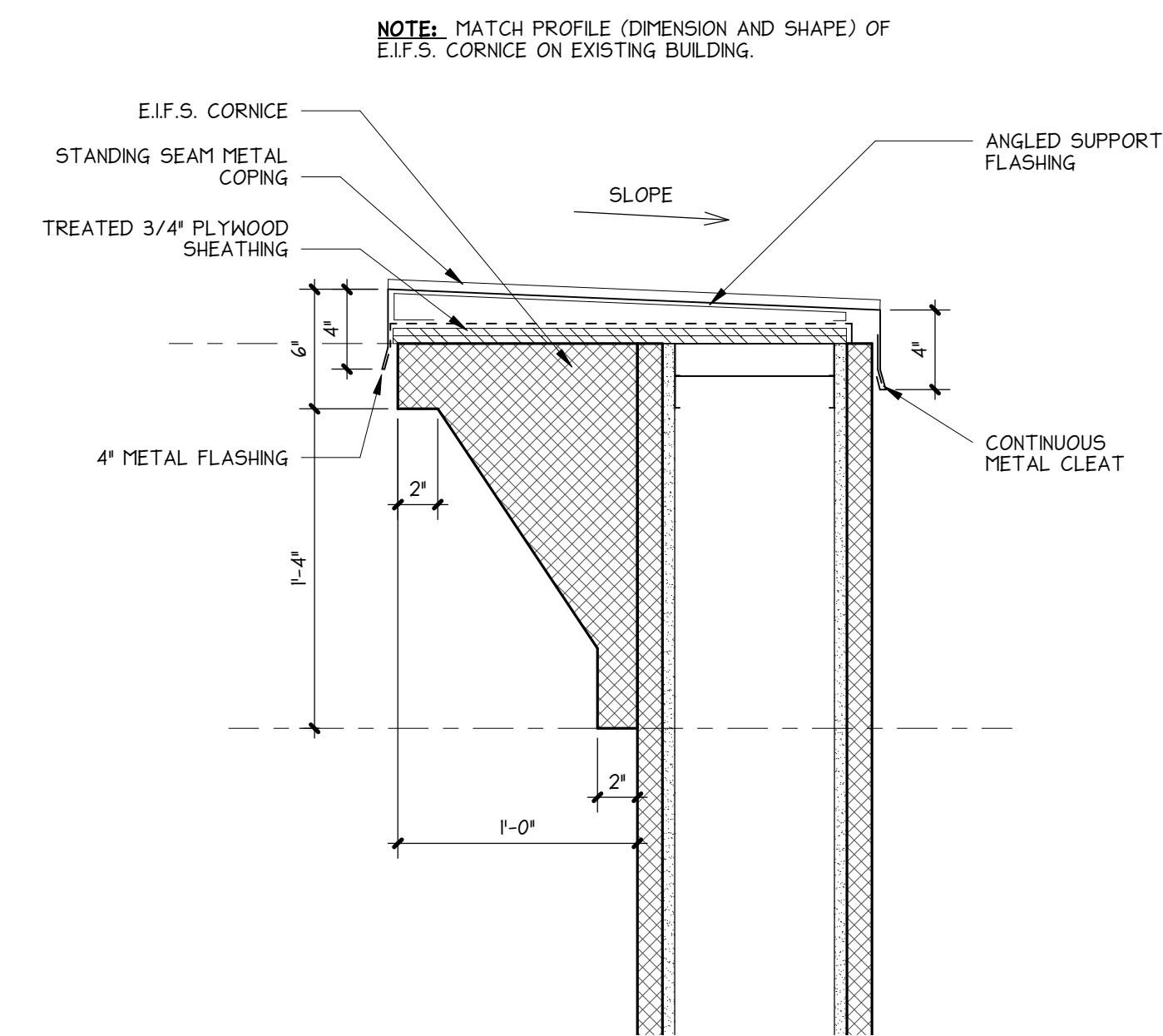
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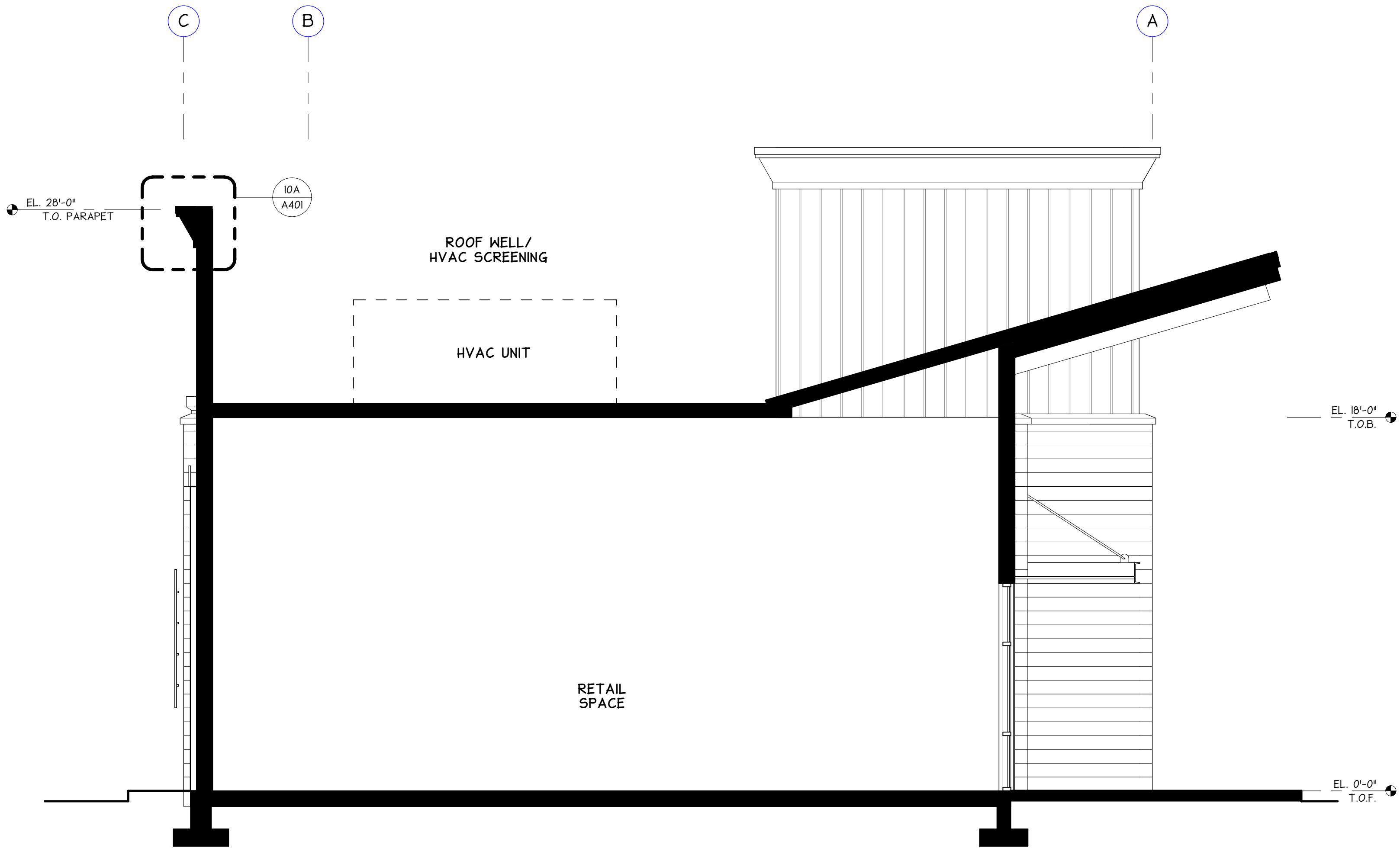
**5A** CORNICE DETAIL  
 1 1/2" = 1'-0"



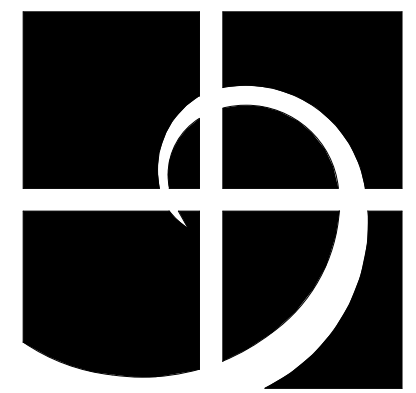
**10A** CORNICE DETAIL  
 1 1/2" = 1'-0"



**5D** BUILDING B/C SECTION  
 1/4" = 1'-0"



**10D** BUILDING D SECTION  
 1/4" = 1'-0"



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 HELIX DESIGN GROUP, INC

BUILDING  
 SECTIONS

CANTERWOOD  
 OFFICE-RETAIL

GIG HARBOR, WASHINGTON

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A401

DRAWING NO.

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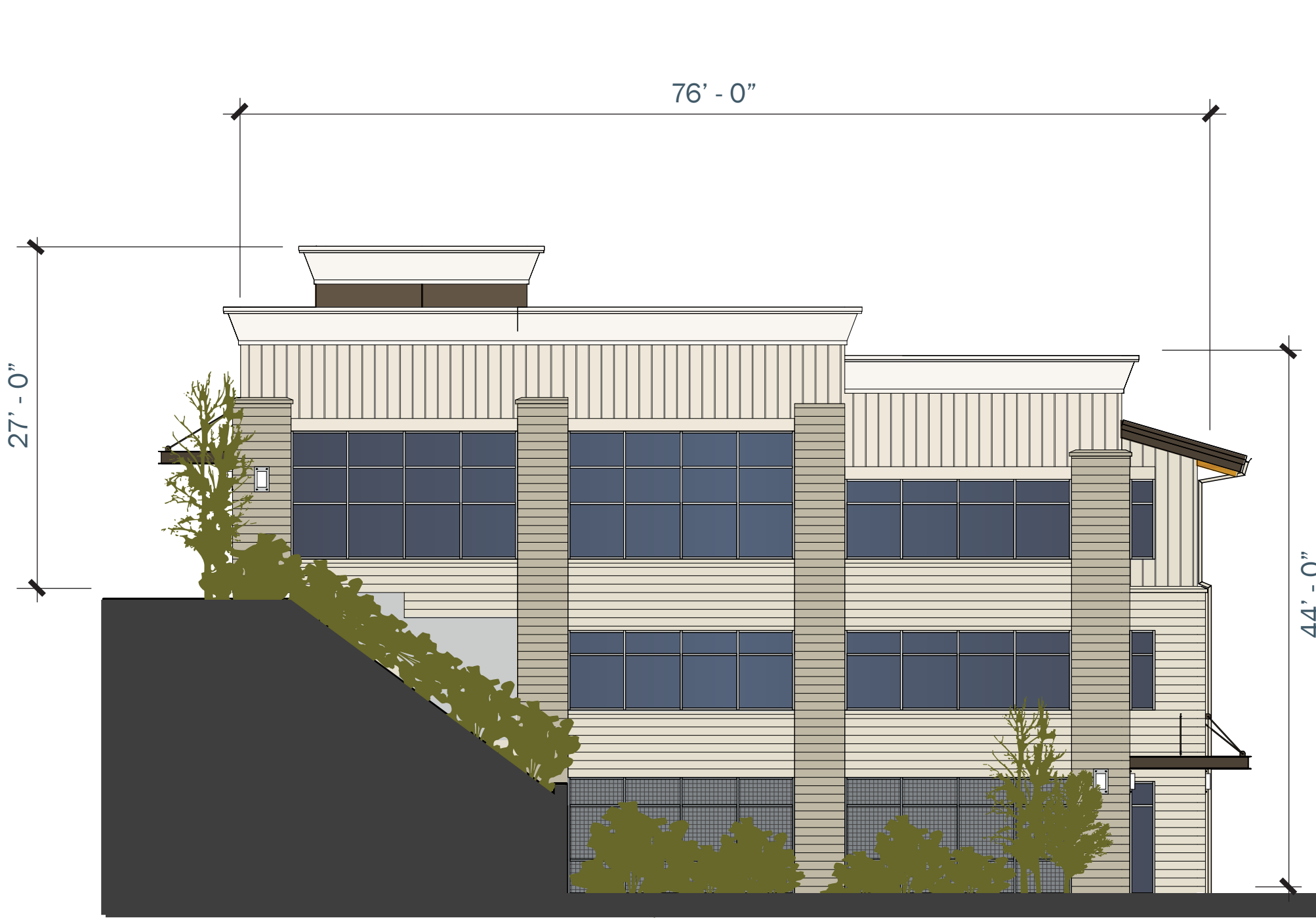


CANTERWOOD OFFICE - RETAIL

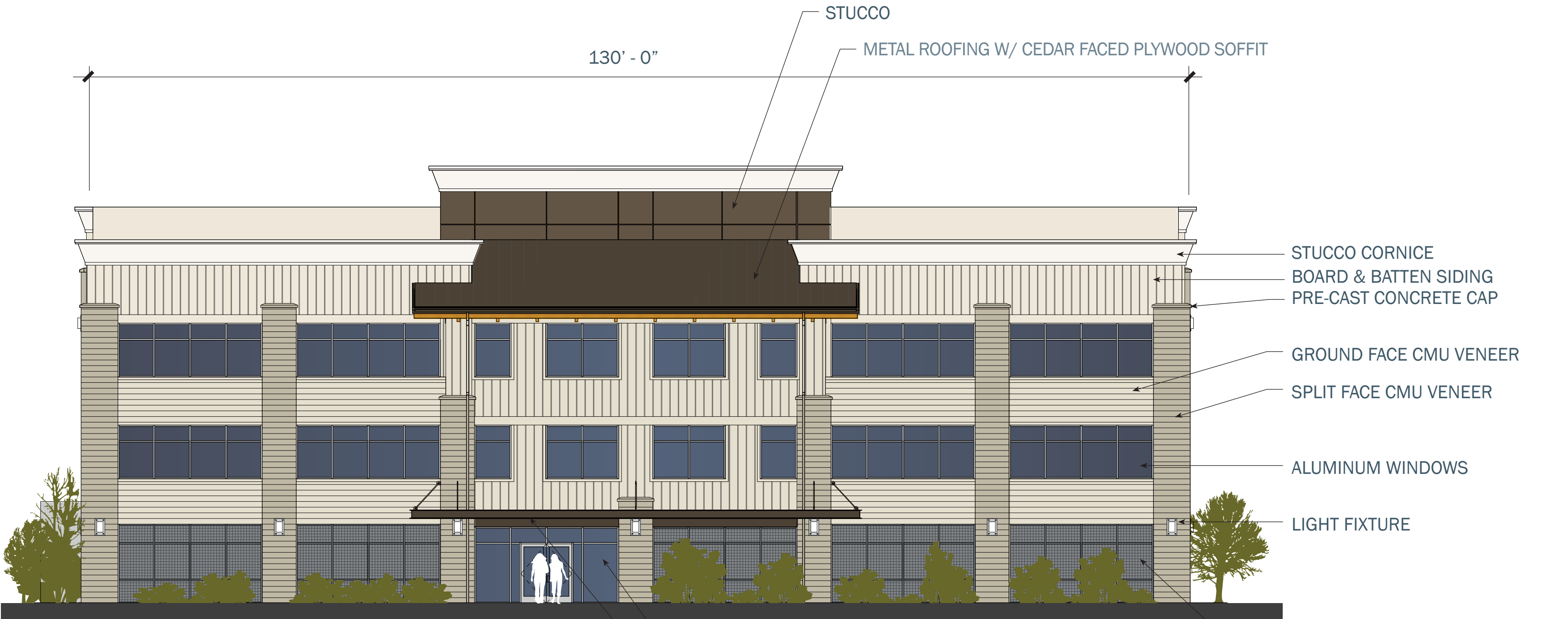
EXTERIOR ELEVATIONS AND MATERIALS

22 MAY 2020 | Pg. 1

RECEIVED  
By C. Andrews at 1:48 pm, Oct 23, 2020



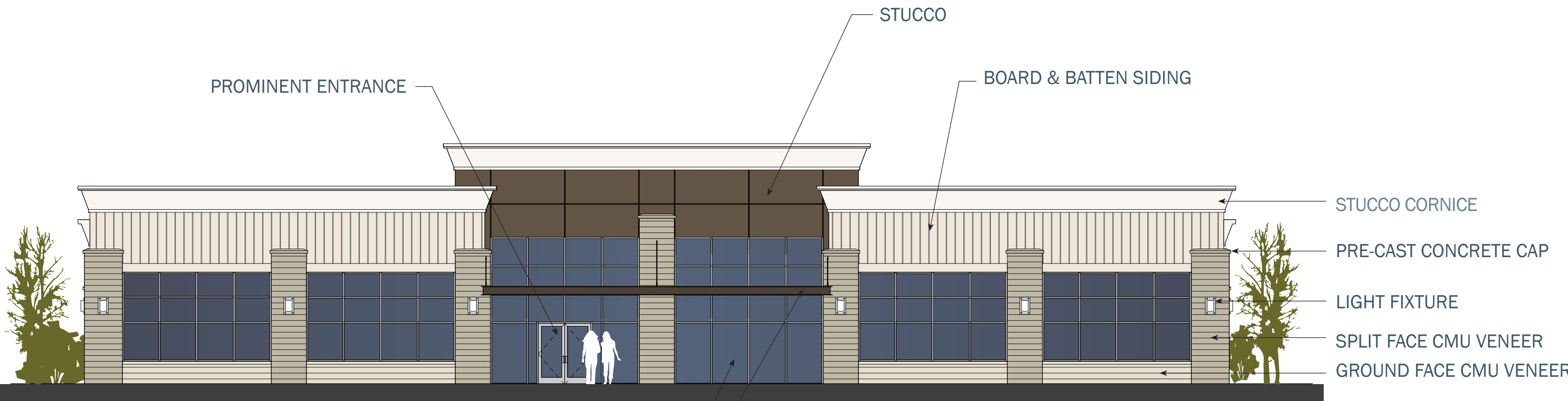
|       |       |     |                |
|-------|-------|-----|----------------|
| NORTH |       | 37% | GLASS/OPEN     |
|       |       | 10% | STUCCO         |
|       |       | 36% | CMU            |
|       |       | 17% | BOARD & BATTEN |
| 63%   | SOLID |     |                |
| 37%   | VOID  |     |                |



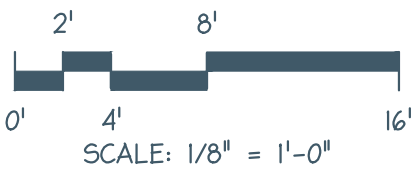
|      |       |     |                |
|------|-------|-----|----------------|
| WEST |       | 38% | GLASS/OPEN     |
|      |       | 12% | STUCCO         |
|      |       | 29% | CMU            |
|      |       | 21% | BOARD & BATTEN |
| 62%  | SOLID |     |                |
| 38%  | VOID  |     |                |



|         |       |     |                |
|---------|-------|-----|----------------|
| ← SOUTH |       | 37% | GLASS/OPEN     |
|         |       | 10% | STUCCO         |
|         |       | 36% | CMU            |
|         |       | 17% | BOARD & BATTEN |
| 63%     | SOLID |     |                |
| 37%     | VOID  |     |                |



|        |       |     |                |
|--------|-------|-----|----------------|
| ↑ EAST |       | 40% | GLASS          |
|        |       | 20% | STUCCO         |
|        |       | 21% | CMU            |
|        |       | 19% | BOARD & BATTEN |
| 60%    | SOLID |     |                |
| 40%    | VOID  |     |                |



BUILDING A



CANTERWOOD OFFICE - RETAIL

EXTERIOR ELEVATIONS AND MATERIALS

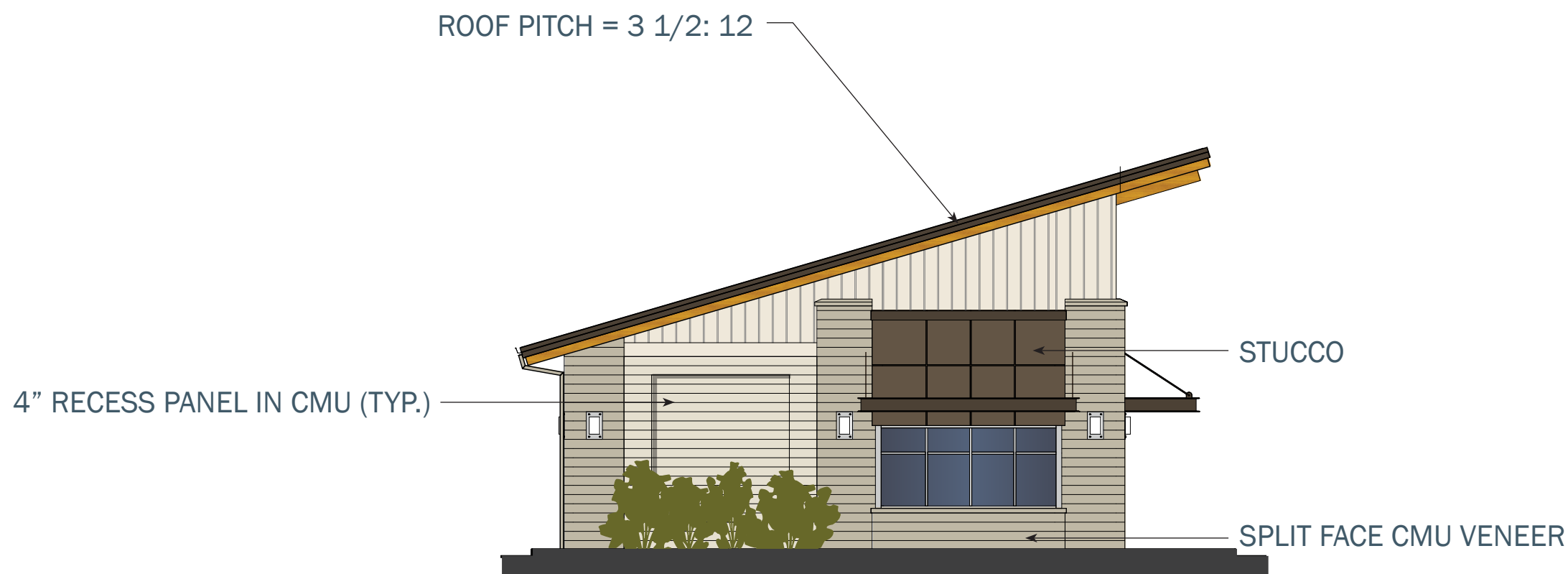
22 MAY 2020 | Pg. 2



| SOUTH |       | 52% | GLASS          |
|-------|-------|-----|----------------|
|       |       | 28% | CMU            |
| 57%   | SOLID | 20% | BOARD & BATTEN |
| 43%   | VOID  |     |                |



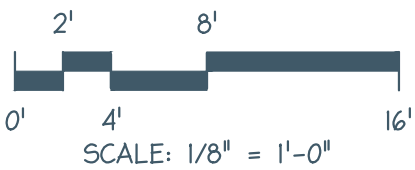
| EAST |       | 28% | GLASS |
|------|-------|-----|-------|
|      |       | 72% | CMU   |
| 72%  | SOLID |     |       |
| 28%  | VOID  |     |       |



| NORTH |       | 11% | GLASS          |
|-------|-------|-----|----------------|
|       |       | 16% | STUCCO         |
|       |       | 56% | CMU            |
| 91%   | SOLID | 19% | BOARD & BATTEN |
| 9%    | VOID  |     |                |



| WEST |       | 43% | GLASS          |
|------|-------|-----|----------------|
|      |       | 1%  | STUCCO         |
|      |       | 17% | CMU            |
| 57%  | SOLID | 39% | BOARD & BATTEN |
| 43%  | VOID  |     |                |



BUILDING B & C



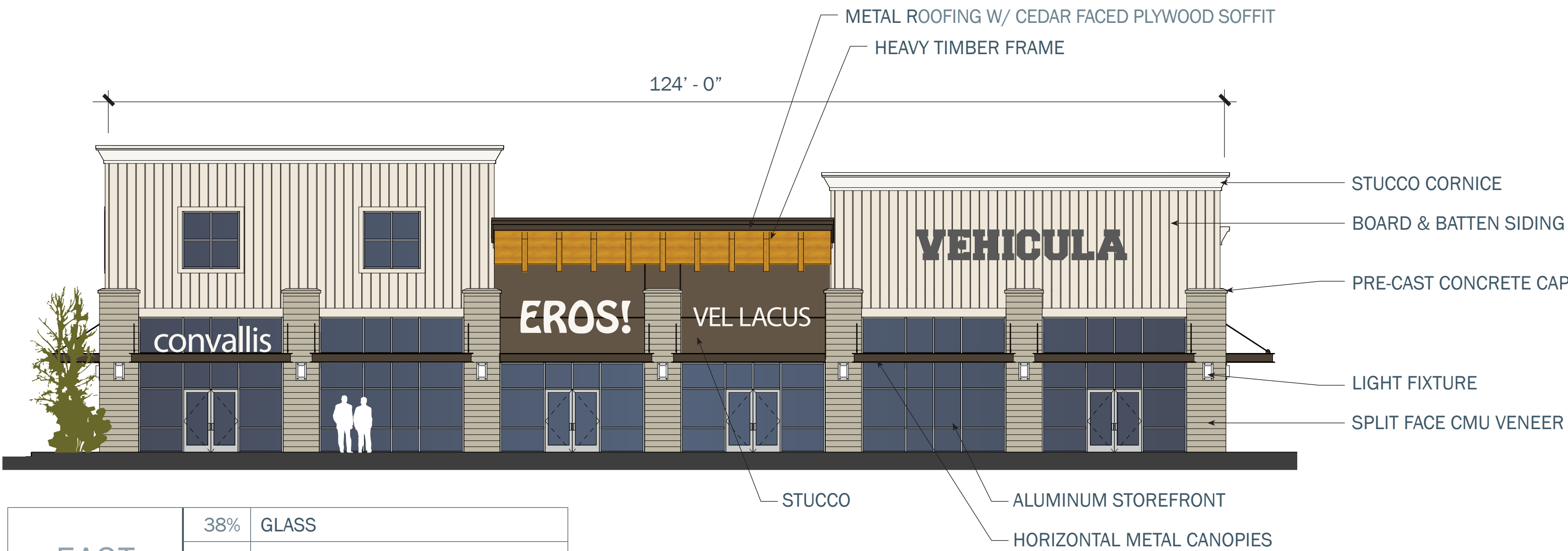
CANTERWOOD OFFICE - RETAIL

EXTERIOR ELEVATIONS AND MATERIALS

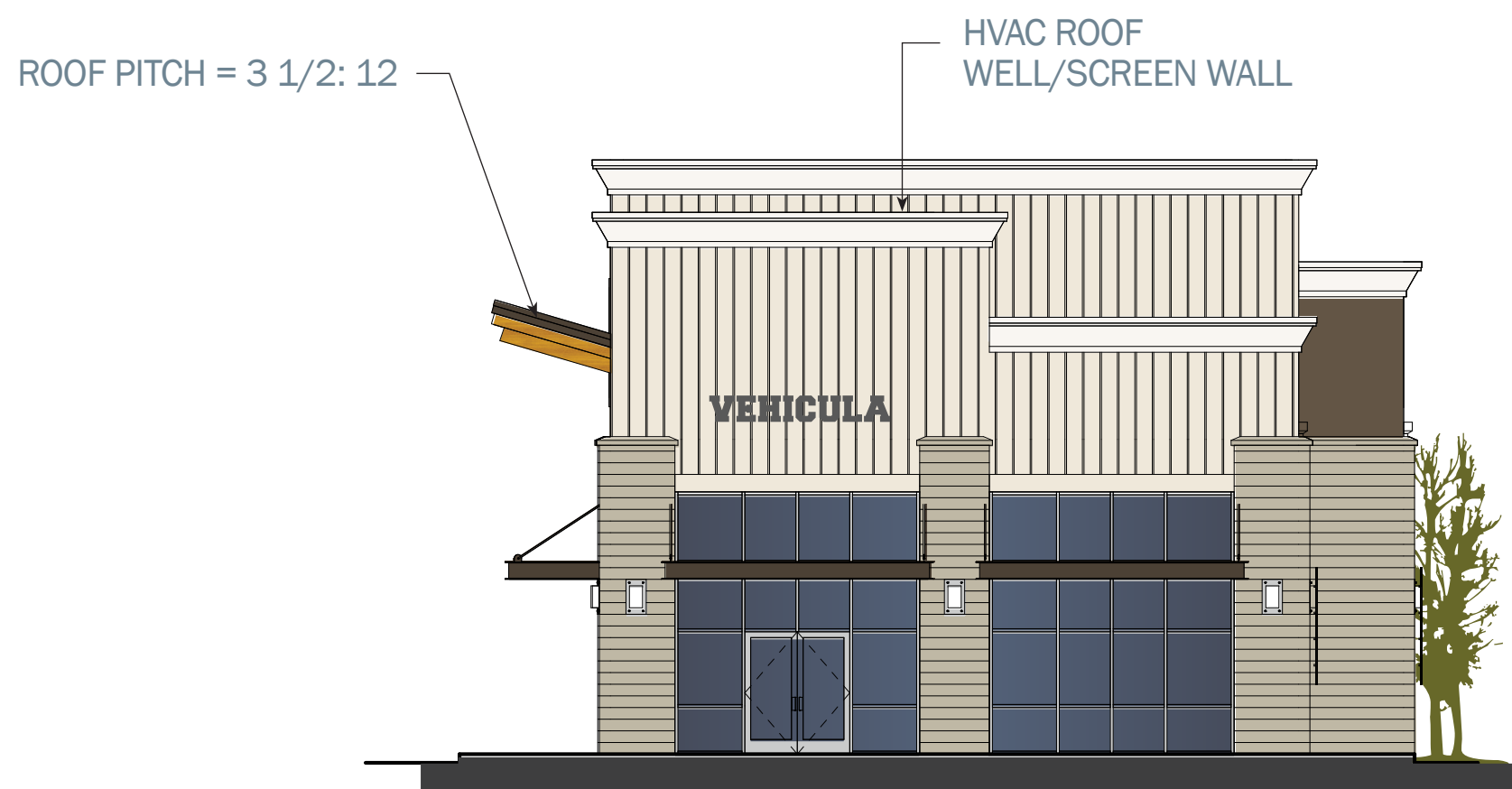
27 AUG 2020 | Pg. 1



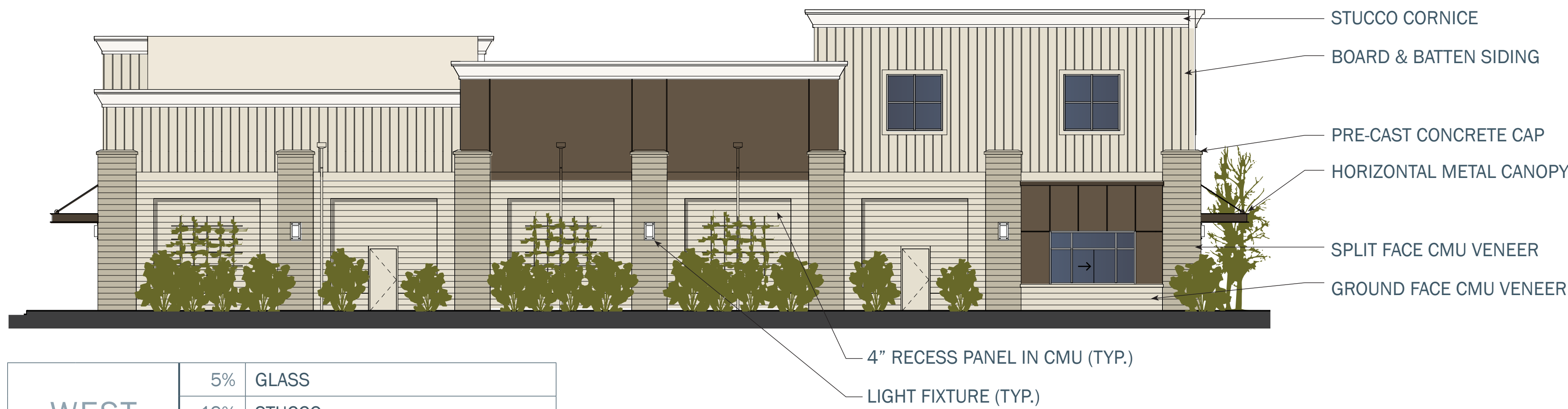
|       |       |     |                |
|-------|-------|-----|----------------|
| SOUTH |       | 34% | GLASS          |
|       |       | 11% | STUCCO         |
|       |       | 18% | CMU            |
|       |       | 37% | BOARD & BATTEN |
| 66%   | SOLID |     |                |
| 34%   | VOID  |     |                |



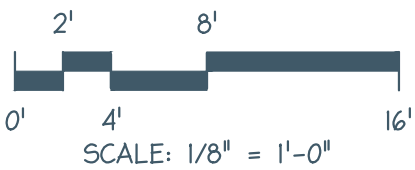
|      |       |     |                |
|------|-------|-----|----------------|
| EAST |       | 38% | GLASS          |
|      |       | 10% | STUCCO         |
|      |       | 17% | CMU            |
|      |       | 35% | BOARD & BATTEN |
| 62%  | SOLID |     |                |
| 38%  | VOID  |     |                |



|       |       |     |                |
|-------|-------|-----|----------------|
| NORTH |       | 28% | GLASS          |
|       |       | 13% | STUCCO         |
|       |       | 22% | CMU            |
|       |       | 37% | BOARD & BATTEN |
| 72%   | SOLID |     |                |
| 28%   | VOID  |     |                |



|      |       |     |                |
|------|-------|-----|----------------|
| WEST |       | 5%  | GLASS          |
|      |       | 19% | STUCCO         |
|      |       | 50% | CMU            |
|      |       | 26% | BOARD & BATTEN |
| 95%  | SOLID |     |                |
| 5%   | VOID  |     |                |

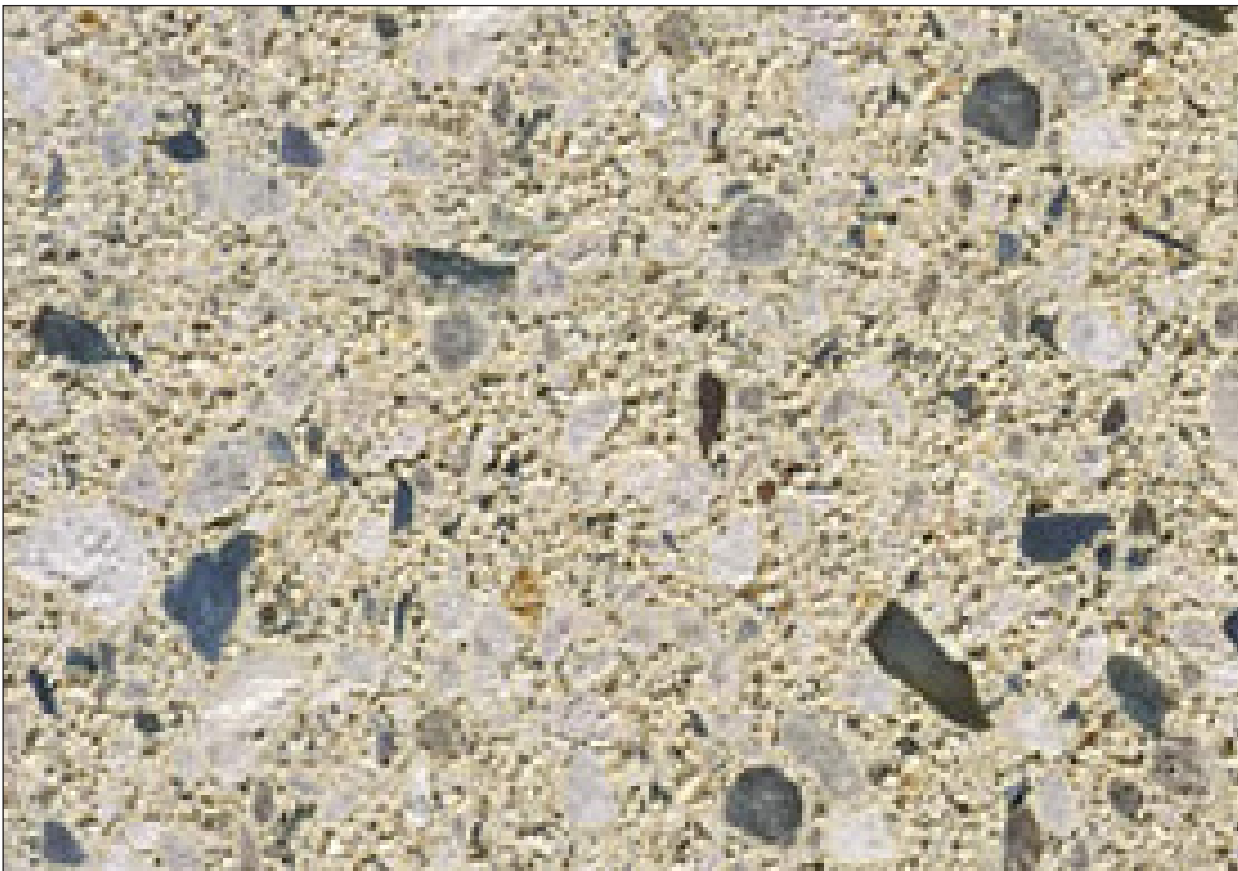


BUILDING D

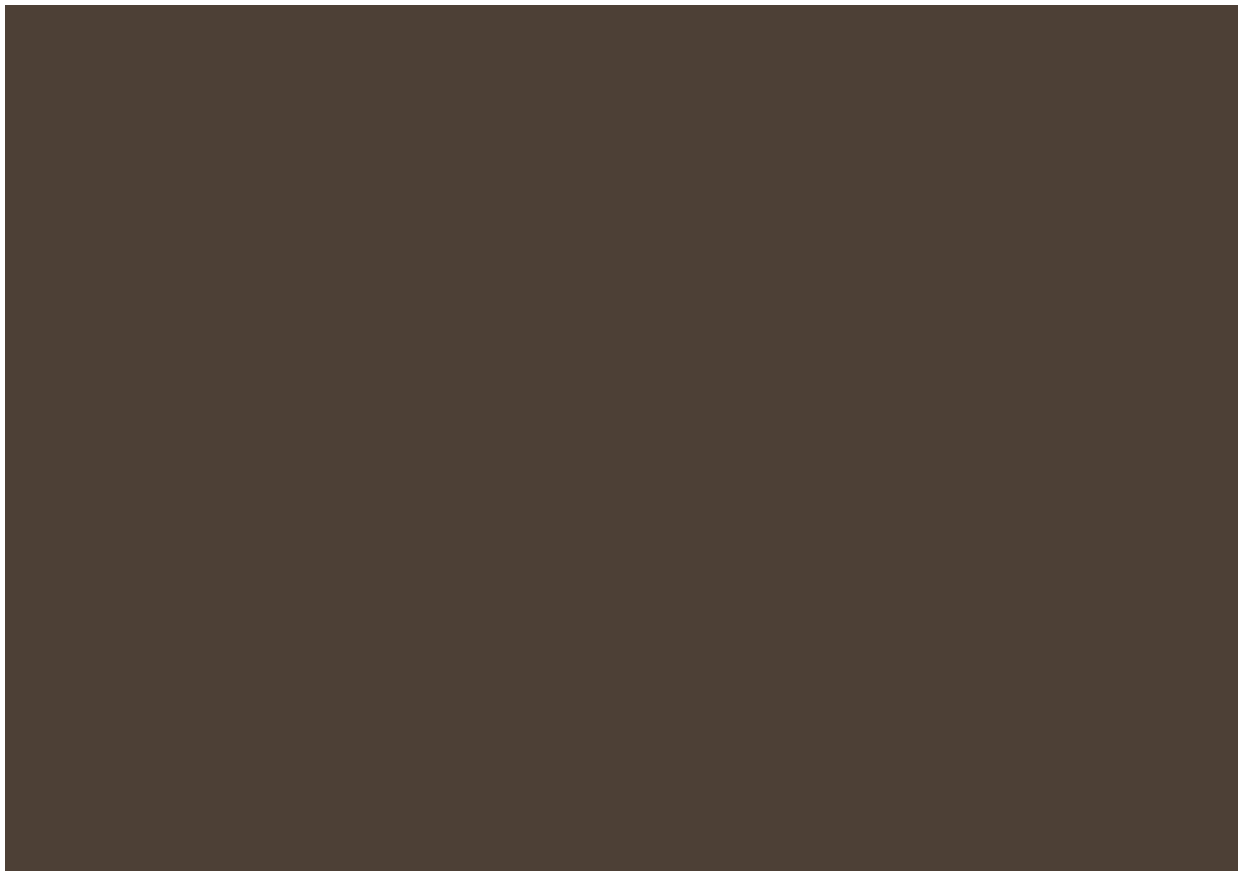




SPLIT FACE CMU VENEER:  
MUTUAL MATERIALS; KHAKI



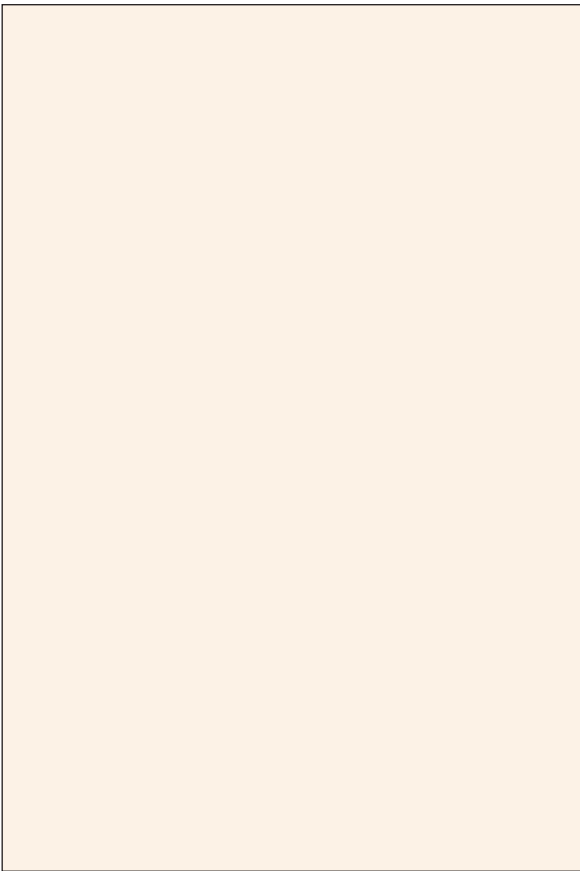
GROUND FACE CMU VENEER:  
MUTUAL MATERIALS; CASTLE WHITE



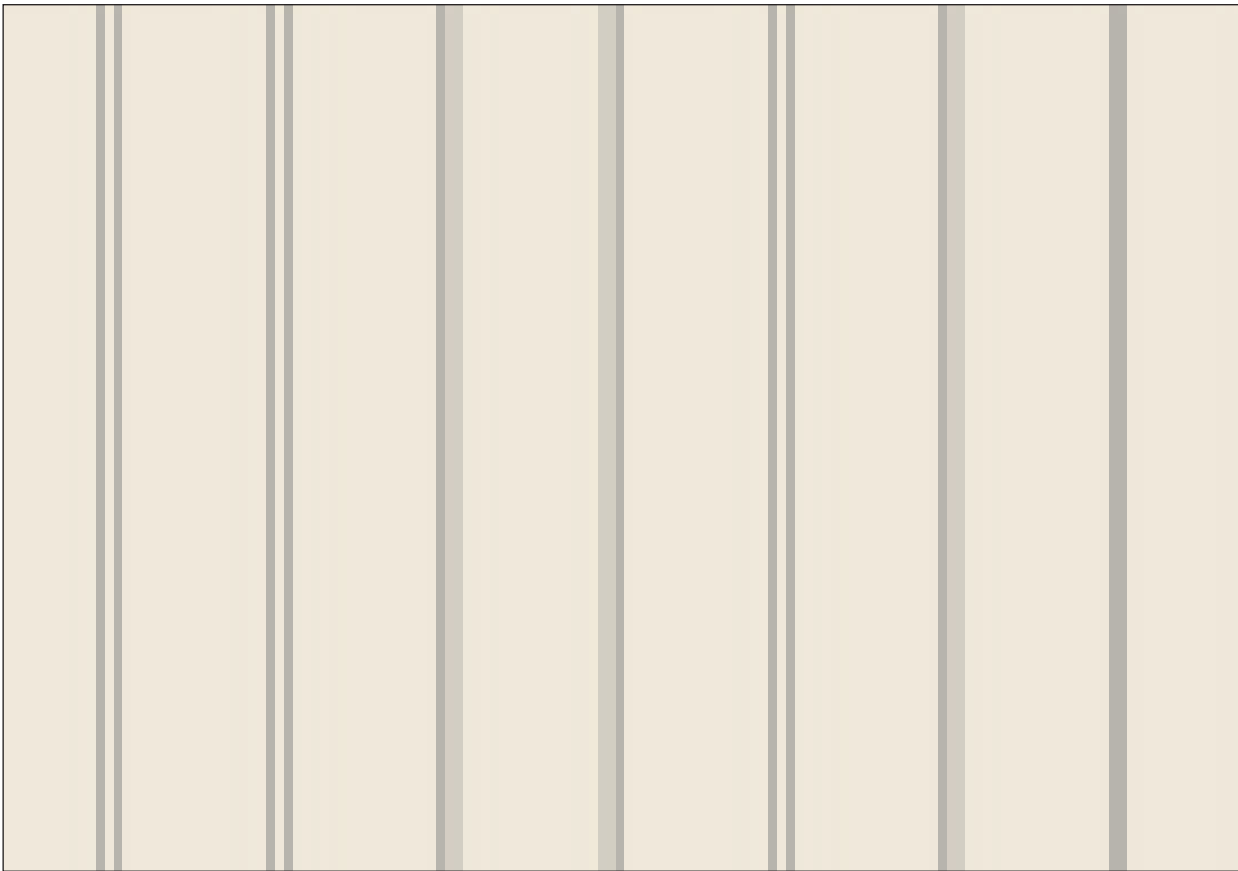
METAL ROOFING & HORIZ. METAL CANOPIES & OUTDOOR  
COVERED PLAZA (ALL STANDING SEAM ROOFING);  
AEP SPAN; COOL DARK BRONZE



STUCCO



STUCCO CORNICES



BOARD AND BATTEN SIDING



HEAVY TIMBER FRAME &  
CEDAR FACED PLYWOOD

MATERIALS PALETTE

## Canterwood Commercial Center

### Conditional Use Permit Narrative

We are requesting a Conditional Use Permit to allow a drive-through on each of the three south buildings to support proposed fast-food restaurants and/or retail businesses. As requested, below is a narrative describing how this proposed development meets the criteria in GHMC 17.64.040.

#### 17.64.040 Review Criteria

**A. That the use which the conditional use permit is applied for is specified by this title as being conditionally permitted within, and is consistent with the description and purpose of the zone district in which the property is located;**

**Response:** The site zoning is General Business District (B-2). Per the Land Use Matrix in GHMC 17.14, a restaurant is a permitted use within this zone and a drive-through facility is a conditional use.

**B. That the granting of such conditional use permit will not be detrimental to the public health, safety, comfort, convenience and general welfare, will not adversely affect the established character of the surrounding neighborhood, and will not be injurious to the property or improvements in such vicinity and/or zone in which the property is located;**

**Response:** Allowing drive-through facilities on this project will be a benefit to the public, the neighborhood, and the City of Gig Harbor. A drive-through is a convenience to the public allowing quick service from the proposed businesses. This project is across the street from St. Anthony Hospital, south of residential homes, and northwest of large retail developments along Borgen Boulevard. Providing additional restaurants with a drive-through in this vicinity will provide additional dining options for this congested retail area and will provide quick service for hospital staff, visitors, motorists, and residents. The building designs will meet City code and screening requirements so that the project will have a pleasing appearance and blend with the surrounding forested area. Care will be taken during final design to protect pedestrians from drive-through vehicles to ensure their health and safety.

**C. That the proposed use is properly located in relation to the other land uses and to transportation and service facilities in the vicinity; and further, that the use can be adequately served by such public facilities and street capacities without placing an undue burden on such facilities and streets;**

**Response:** The proposed project is just north of the numerous retail developments along Borgen Boulevard and is located in a general business zoned area. A Traffic Impact Analysis was prepared by



Heath and Associates in 2014 to support this development. The report included fast food and coffee drive-through uses to determine the traffic impact. This development will not put undue burden on the existing streets and no mitigation measures were required except improving the frontage along Canterwood Boulevard as shown on the preliminary plans. There is easy access to and from Borgen Boulevard and SR-16 to and from this project by using the round-a-bout at the Canterwood Boulevard/Borgen Boulevard intersection.

**D. That the site is of sufficient size to accommodate the proposed use and all yards, open spaces, walls and fences, parking, loading, landscaping and other such features as are required by this title or as needed in the opinion of the examiner.**

**Response:** The proposed preliminary plans show the proposed layout of the development including the required features of the City of Gig Harbor development and zoning codes. This site is large enough to accomplish this development as proposed.



**NOTICE OF RECOMMENDATION**  
**CITY OF GIG HARBOR DESIGN REVIEW BOARD**

**TO:** Swede Hill, LLC  
PO Box 1397  
Tacoma, WA 98401  
Barghausen Consulting Engineers  
Attn: Jason Hubbell  
18215 72<sup>nd</sup> Ave S  
Kent, WA 98032

**FROM:** Carl de Simas, Associate Planner

**DATE:** August 3, 2018

**RE:** PL-DRB-07-0013 – Canterwood Commercial Center

---

The applicant has requested Design Review Board review of 9 proposed design alternatives. The applicant seeks site plan approval of 4 commercial buildings and related infrastructure on a site including one parcel with a total land area of approximately 7.6 acres. The parcels will be combined through a Boundary Line Adjustment.

Having reviewed the application materials at its meeting of July 26, 2018, the City of Gig Harbor Design Review Board (DRB) has made the following findings and recommendations relative to the cited specific requirements of the City of Gig Harbor Design Manual:

**1. 17.99.160(A) Retain significant trees.**

**Findings:** Four trees within the Canterwood Blvd. Enhancement Corridor were proposed for removal due to grading for the building pad and drive-through for Building B. The trees include three firs and one maple. Originally, it was thought that only three of the four were impacted by the grading, but upon further review by the applicant, all four were found to be within the grading limits. The DRB asked that the applicant try to find a way to save the trees as their location would appear to assist in beautifying the streetscape along Canterwood Blvd. while providing extra added screening benefit. The applicant was able to commit to limbing up and saving all three of the fir trees but found that the maple was not worth saving as it has many limbs coming from it and won't complement streetscape. The DRB felt that saving

three viable trees and removing one that may not be as pleasing to the eye was a superior result to that which would otherwise be achieved by rigidly applying the specific requirement and meets the intent of the general requirement. The DRB finds that revising the site plan to save the three firs will represent a superior result to that which would otherwise be required and will better meet the intent of the general provision.

**Recommendation:** The DRB recommends the Director accept the proposed removal of one significant tree, a 9-inch diameter maple, within the 30-foot Canterwood Blvd. Enhancement Corridor. The applicant shall provide a revised clear and grade plan and site plan to the City which represents the change in grading for the area at issue and provide a replacement value for the removed tree in accordance with the applicable provisions of the GHMC.

**2. 17.99.240(C) Maintain natural topography.**

**Findings:** The applicant had originally proposed several walls over 6 feet throughout the site, however returned to the DRB with just one wall over the 6-foot threshold – Wall #15 at approximately 10-feet and located north of the Building B parking lot. The DRB asked that the applicant consider the materials used for walls over 6-feet and those that might help soften the visual effect of those walls. The applicant stated they will use a textured block wall that will be more visually pleasing. The DRB finds that given the location of this wall, abutting the critical area buffer and below the parking lot area, utilizing a textured material to construct the wall, as opposed to a tiered wall or additional vegetation for screening, would result in a superior design to that which would otherwise be achieved by rigidly applying the specific requirement and further will meet the intent of the general requirement.

**Recommendation:** The DRB recommends the Director accept the proposed design alternative to allow the construction of Wall #15, or as otherwise numbered on subsequent plans, over the 6-foot threshold allowed by code and up to 10 feet. The wall shall be a textured block wall.

**3. 17.99.270(A) Link each building with walkways.**

**Findings:** The DRB finds that the site's topography and critical area location dictates what can reasonably be described as convenient movement between structures. Therefore, utilizing the public right-of-way for the secondary walkway is a superior result to that which would otherwise be achieved by rigidly applying the specific requirements and meets the intent of the general requirement.

**Recommendation:** The DRB recommends the Director accept the design alternative, as proposed, to utilize the public right-of-way between the three site entrances as the secondary walkway.

**4. 17.99.300(B) Locate structures near front setback line.**



**Findings:** The DRB finds that due to the enhancement corridor and the requirement to retain significant vegetation within the prescribed 30-feet therein, it is appropriate to set these buildings further back from the front setback line. The DRB further finds that additional plantings are unnecessary to support this alternative as what is proposed appears to be sufficient. Overall, the DRB finds that the proposed design alternative to set the buildings back from the front setback line is a superior result to that which would otherwise be achieved by rigidly applying the specific requirement and meets the intent of the general requirement.

**Recommendation:** The DRB recommends the Director accept the design alternative, as proposed, to locate buildings further back from the front setback line of the Canterwood Blvd. Enhancement Corridor.

**5. 17.99.330(E) Minimize parking in front of buildings.**

**17.99.330(F) Avoid parking in front of building entrance.**

**Findings:** The DRB finds that due to site constraints, parking in front of buildings and building entrances will result in a superior design that which would otherwise be achieved by rigidly applying the specific requirements and meets the intent of the general requirements.

**Recommendation:** The DRB recommends the Director accept the design alternative, as proposed, to provide parking in front of buildings and building entrances.

**6. 17.99.380(C) Avoid a false-front look on building exterior.**

**17.99.380(D) Provide visual terminus to tops of buildings.**

**17.99.380(E) Avoid unusual or atypical roof forms on all structures.**

**Findings:** The DRB finds that Buildings B, C and D, as represented on the “Building B/C Elevations and Sections” received July 13, 2018 for Buildings B and C and on page 3 of the “Elevation (Color) Plan Set” dated January 15, 2018 for Building D (see Exhibits), represent a superior result to that which would otherwise be achieved by rigidly applying the specific requirements and meets the intent of the general requirements. The DRB further finds that Building A would benefit from a revised roofline, possibly removing the shed roof altogether and utilizing a more traditional flat roof in compliance with the specific requirement.

**Recommendation:** The DRB recommends the Director accept the proposed design alternatives to the roof forms of Buildings B, C and D as represented on the color elevations noted in the findings above. The DRB further recommends that the Director work with the applicant to find a code compliant design solution for the roofline of Building A.

Rick Gagliano, Chairman  
Design Review Board



Date 8/3/2018.

### Exhibits

- Planning Department Staff Report and Referenced Exhibits dated July 19, 2018
- Building B/C Elevations and Sections received July 13, 2018
- Page 3 of Elevation (Color) Plan Set dated January 15, 2018
- Agenda and Sign-in Sheet dated July 26, 2018
- Notice of Public Meeting dated July 19, 2018



## NOTICE OF RECOMMENDATION CITY OF GIG HARBOR DESIGN REVIEW BOARD

**TO:** Swede Hill, LLC  
PO Box 1397  
Tacoma, WA 98401

Barghausen Consulting Engineers  
Attn: Jason Hubbell  
18215 72<sup>nd</sup> Ave S  
Kent, WA 98032

**FROM:** Carl de Simas, Associate Planner

**DATE:** October 29, 2018

**RE:** PL-DRB-07-0013 – Canterwood Commercial Center

---

The applicant seeks site plan approval of four commercial buildings and related infrastructure on a site including one parcel with a total land area of approximately 7.6 acres. The parcels will be combined through a Boundary Line Adjustment.

The applicant requested Design Review Board (DRB) review of nine proposed design alternatives. The DRB reviewed those nine alternatives at its meeting of July 26, 2018 and issued a recommendation to the Planning Director on August 3, 2018. The applicant later found that the proposed site design included a conflict with an environmental regulation necessitating the need to request additional review and recommendation from the DRB.

Having reviewed the application materials at its meeting of September 13, 2018, the DRB has made the following findings and recommendations relative to the cited specific requirements of the City of Gig Harbor Design Manual:

- 1. 17.99.240(C) Maintain natural topography.** *Buildings and parking lots shall be designed to fit natural slopes rather than regrading the slope to fit a particular building or parking lot design. Cuts and fills on a site shall be balanced and finished grades shall not include any retaining walls that exceed six feet. Instead, designs shall complement and take advantage of natural topography. Sloped lots may require multileveled buildings, terraced parking lots and/or lower level parking garages.*



**Findings:** The applicant has proposed a wall in excess of 6-feet triggering DRB review. The wall is located directly south of the Building “A” entranceway, an area constrained by a stream buffer which must be left undisturbed in accordance with Gig Harbor Municipal Code. The applicant states the entranceway cannot be moved due to topographical constraints and standards pertaining to driveways associated with other sites in the area, particularly those directly across Canterwood Boulevard.

This area of the site is heavily vegetated and is below the existing Canterwood Boulevard grade, making it less visible from passing automobiles, but visible from the pedestrian perspective. The existing vegetation is protected from removal due to the required critical area buffers extending from the stream corridor and the required overlapping enhancement corridor buffer adjacent to Canterwood Boulevard. At its highest point of exposure, the wall would be over 23-feet tall; nearly 4-times what is allowed by the Design Manual. Given the location of the driveway and the proposed use of the site, this circumstance does not appear avoidable. The DRB has at times recommended additional vegetation or alternative wall designs to mitigate for the visual impacts of walls in similar situations, but the scale of this proposal is extreme. Therefore, the DRB is unable to find that the proposed wall design is superior or equivalent to what would otherwise be achieved by rigidly applying the specific requirements.

In this particular case, due to the special conditions and circumstances noted previously with regards to use, function, and site location, the DRB finds that, if certain mitigating conditions are imposed in support of the general scope and intent of the Design Manual, the proposal could receive an exception rather than a design alternative.

**Recommendation:** In accordance with GHMC 17.98.060, due to the specific site requirements of the opposite driveway and the stream buffer grading limitations, there are specific site conditions that require this solution; and due to preservation of existing site amenities including tree retention in front of the proposed wall and the stream buffer, the DRB recommends the Director accept the proposed wall design as an exception with the following conditions:

- The applicant shall submit a revised Design Review application formally requesting a design exception so that the Planning Department can make a process determination post-motion.
- The applicant shall install plantings that drape over the top of the wall and work with the project’s biologist to consider additional plantings at the base of the wall.
- The applicant shall utilize natural materials for the wall that are consistent with other walls proposed throughout the project site. Proposed wall materials shall be submitted to the Planning Department for review and approval.

All former recommendations associated with this application and included with the August 3, 2018 Notice of Recommendation remain valid for the Director's consideration.

Rick Gagliano, Chairman  
Design Review Board



Date 10/30/2018

### **Exhibits**

- Planning Department Staff Report dated September 7, 2018 and Enclosures
- Grading and Storm Drainage Plan (with photo call-outs) dated August 13, 2018 and Associated Photos
- Agenda and Sign-in Sheet dated September 13, 2018
- Public Meeting Notice and Associated Affidavits
- Notice of Recommendation dated August 3, 2018



COMMUNITY DEVELOPMENT DEPARTMENT  
PLANNING DIVISION

**NOTICE OF RECOMMENDATION**  
**CITY OF GIG HARBOR DESIGN REVIEW BOARD**  
**PL-DRB-07-0013**

**TO:** Swede Hill, LLC  
PO Box 1397  
Tacoma, WA 98401

Halsan EF & P, LLC  
PO Box 1447  
Gig Harbor, WA 98335

**FROM:** Planning Staff

**DATE:** April 8, 2021

**RE:** PL-DRB-07-0013 – Canterwood Commercial Center

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Having reviewed the above referenced application at its meeting on April 8, 2021, the City of Gig Harbor Design Review Board (DRB) has made the following findings and recommendations to the decision maker for the following requirements of the Design Manual:

*Article II. Neighborhood Context*

1. **GHMC Section 17.99.160(A): Enhancement Corridor Standards – Retain significant trees.**

**Findings:** The Design Manual requires that significant trees within 30 feet of the property line abutting the street rights-of-way within the enhancement corridor shall be retained.

The applicant is proposing to remove two (2) existing significant trees within the Canterwood Blvd. Enhancement Corridor and proposes to plant 35

coniferous evergreen trees 6' in height at planting near the western property line's frontage against SR-16. The existing trees have been identified in the applicant's landscape plan set as Trees #416 and #417. Tree #416 is a Douglas Fir (*Pseudotsuga menziesii*) tree measuring 18" in diameter, and Tree #417 is a Douglas Fir tree measuring 17" in diameter.

As an alternative to the requested removal of these two trees, the applicant is proposing to install 35 coniferous evergreen trees 6' tall at planting. The proposed planting schedule provides that these 35 trees will consist of Sitka Spruce (*Picea sitchensis*), Douglas Fir, and Western Red Cedar (*Thuja plicata*) trees. The replacement trees are proposed to be located on the west side of the parcel, separating Building D and the stormwater detention facility from State Route 16.

On Page 17-179 of the GHMC 17.99, Design Manual, Enhancement Corridors are described in the side panel, as follows:

*Enhancement corridors are designed to:*

- *Maintain the scenic beauty which characterizes travel across the Gig Harbor Peninsula.*
- *Maintain a more distinct city "edge."*
- *Assure a stronger sense of arrival at visual interchange and activity nodes.*
- *Provide visual separation between districts.*

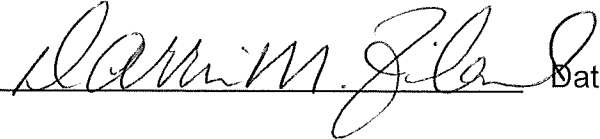
While Trees #416 and #417 are significant trees in an enhancement corridor and are therefore required to be retained, the proposed planting of 35 evergreen trees which may exceed a height of 150-feet at maturity suggests that the proposed alternative design will achieve a superiorly landscaped site. In particular, the selected location of the replacement trees is adjacent to the 30-foot-wide SR-16 Enhancement Corridor and will therefore create an even denser screen along SR-16, reducing the site's visibility from highway motorists and preserving the natural appeal of the site's eastern frontage. In this manner, and given the applicant's rendering of the subject site's frontage along Canterwood Blvd. exhibiting regard for Gig Harbor's scenic beauty intended by an Enhancement Corridor, the DRB considers the proposed alternative design as equivalent or superior to the specific requirement outlined in GHMC 17.99.160(A), and thusly represents the intent of the general requirement set forth in GHMC 17.99.160(A).

The DRB finds that the proposed design alternative meets the intent of the general requirements of GHMC 17.99.160(A) and represents an equivalent or superior design solution to what would otherwise be achieved by rigidly applying the specific requirements of GHMC 17.99.160(A), provided the site be landscaped as depicted in the landscape plan set included as enclosure A to this Recommendation.



**Recommendation:** The Design Review Board recommends the decision maker accept the proposed design alternative as compliant with the criteria of approval for an alternative design request set forth in GHMC 17.98.055(A), provided the site be landscaped as depicted in the landscape plan set included as enclosure A to this Recommendation.

Darrin Filand,  
Vice-Chair

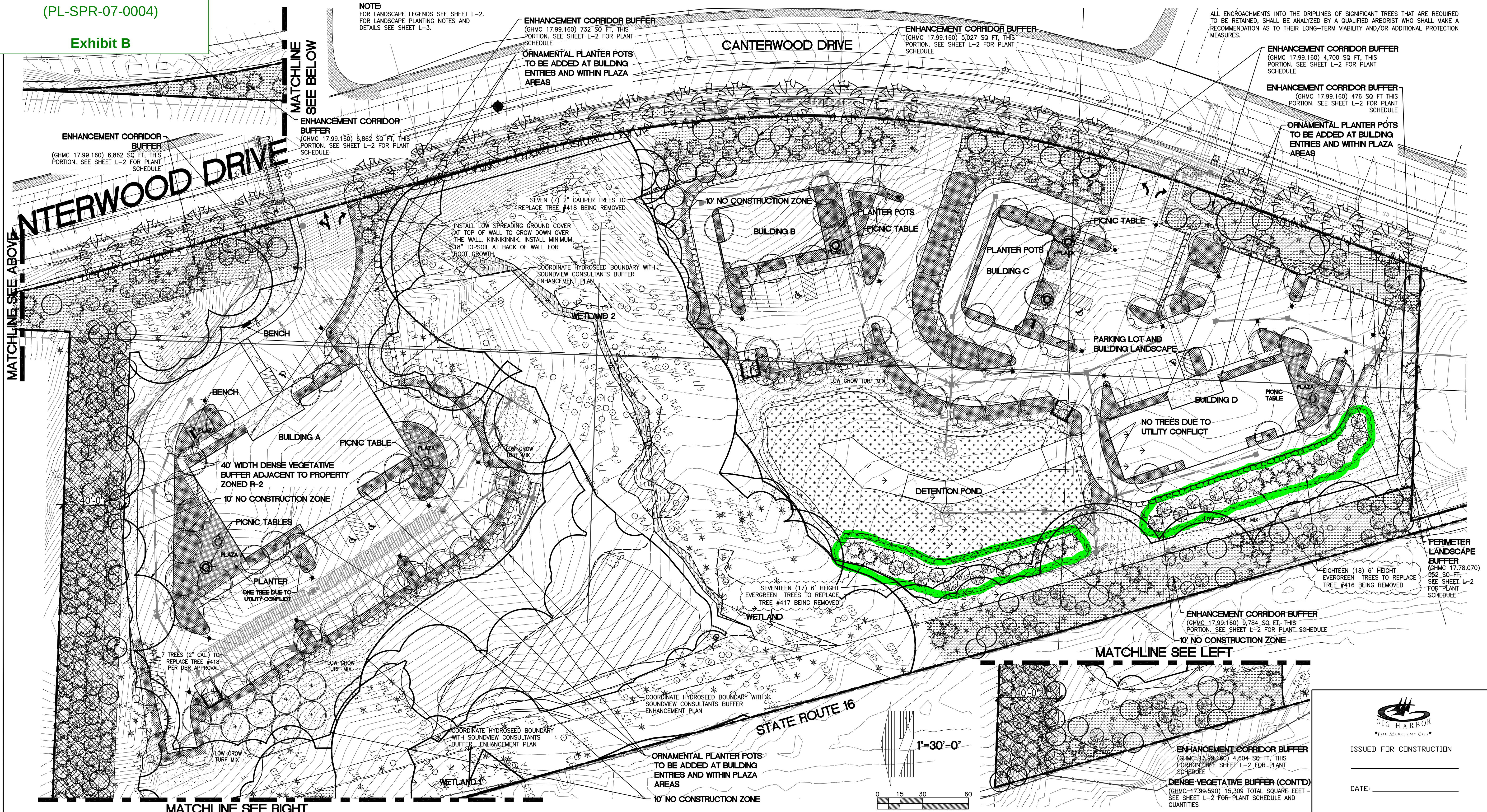
Design Review Board  Date 4/9/2021.

cc: Planning File

**The following documents pertinent to your review are enclosed:**

- A. Applicant's Preliminary Landscape Plan, prepared by Barghausen Consulting Engineers, Inc., dated March 11, 2021





| REVISIONS |            |                                               |  |
|-----------|------------|-----------------------------------------------|--|
| 4         | 10/29/2018 | REVISED PER COMMENTS                          |  |
| 5         | 4/2/2019   | REVISED PER COMMENTS                          |  |
| 6         | 9/26/2019  | REVISED WETLAND CREATION AREA                 |  |
| 7         | 10/16/2019 | PLANT MATERIAL AT TOP OF ROCK WALLS           |  |
| 8         | 5/22/2020  | REVISED PER COMMENTS                          |  |
| 9         | 10/21/2020 | REVISED PER COMMENTS                          |  |
| 10        | 1/21/2021  | REVISED PER CITY REVIEW COMMENTS JANUARY 2021 |  |
| 11        | 3/11/2021  | REVISED, TREES #416 AND #417                  |  |



**BARGHAUSEN**  
CONSULTING ENGINEERS, INC.

**BARGHAUSEN CONSULTING ENGINEERS INC.**

18215 72ND AVENUE SOUTH  
KENT, WA 98032  
(425)251-6222  
(425)251-8782 FAX

DESIGNED BY: JMV  
DRAWN BY: JMV  
CHECKED BY: KEH  
APPROVED BY: JGH  
SCALE:  
OTHER:

**SWEDE HILL, LLC**  
P.O. BOX 1397  
TACOMA, WA 98401

**PRELIMINARY LANDSCAPE PLAN**

**CANTERWOOD COMMERCIAL CENTER**  
**GIG HARBOR**

PERMIT NO.  
DRAWING NO.  
SHEET **L-1** OF **8**

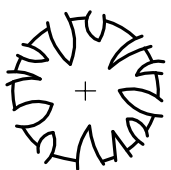
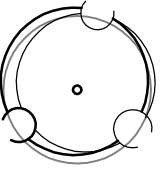
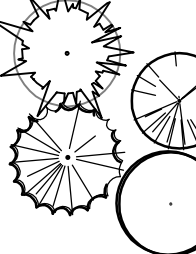
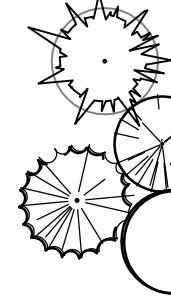
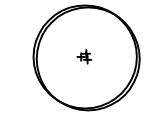
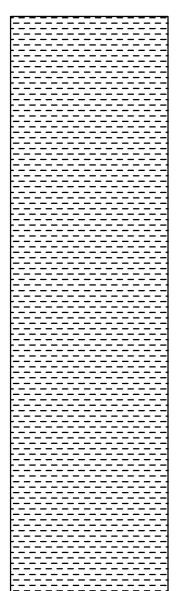
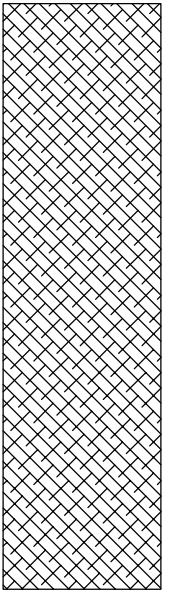
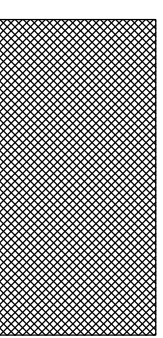
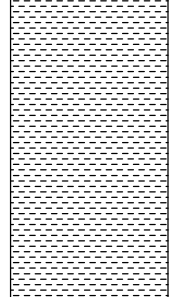
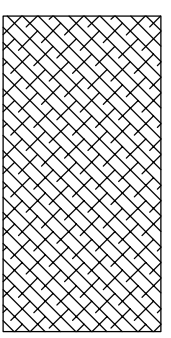
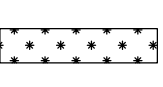
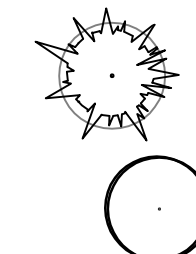
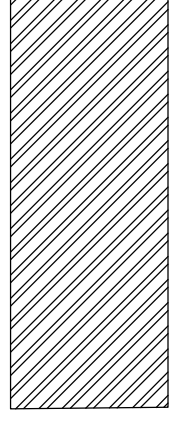
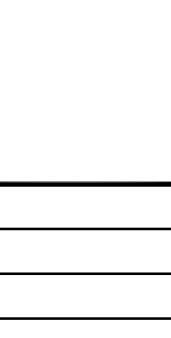
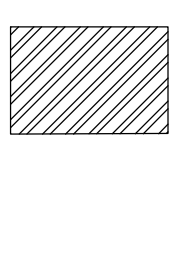
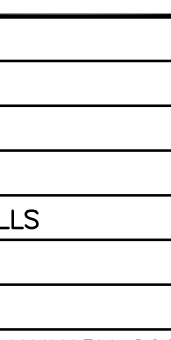
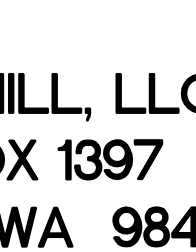


ISSUED FOR CONSTRUCTION

DATE: \_\_\_\_\_





| STREET TREE AND LANDSCAPE STRIP PLANT SCHEDULE                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  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                                                                                                                          | PARKING LOT AND BUILDING LANDSCAPE PLANT MATERIAL LEGEND                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      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BUFFER                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              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| SYMBOL                                                                              | BOTANICAL / COMMON NAMES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         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                                                                                                                          | SYMBOL                                                                                | BOTANICAL / COMMON NAMES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             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                                          | BOTANICAL / COMMON NAMES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     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                                                                                                                                  | QUANTITY                                                                 | REMARKS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|    | <b>STREET TREES:</b><br><br>PARROTTIA PERSICA 'VANESSA' /<br>PERSIAN IRONWOOD<br><br>PROPOSED STREET TREE SPECIES LISTED AS<br>ALLOWED FOR LANDSCAPE STRIPS 5' WIDTH<br><br><b>GROUNDCOVER:</b><br><br>LAWN, SEED OR SOD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 2" CAL.<br>B & B                | 35' O.C. | 24                    | STAKE & GUY ONE GROWING<br>SEASON; NURSERY GROWN<br>FOR STREET TREE USE,<br>BRANCHED AT 5'                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |    | <b>PARKING LOT TREES:</b><br><br>ACER RUBRUM 'BOWHALL' /<br>BOWHALL MAPLE<br>CORNUS KOUSA /<br>KOUSA DOGWOOD<br>CERIS CANADENSIS 'FOREST PANSY' /<br>FOREST PANSY REDBUD<br>CERCIDIPHYLLUM JAPONICUM /<br>KATSURA TREE<br><br>0% OF THE PROPOSED SPECIES ARE FROM<br>THE 'PREFERRED SPECIES LIST'<br><br><b>SMALL TREES ADJACENT TO BLDG:</b><br><br>ACER CIRCINATUM /<br>VINE MAPLE<br>ACER PALMATUM 'BLOODGOOD' /<br>SMALL JAPANESE MAPLE<br><br>50% OF THE PROPOSED SPECIES ARE FROM<br>THE 'PREFERRED SPECIES LIST'<br><br><b>PARKING LOT AND BUILDING SHRUBS:</b><br><br>RHODODENDRON MACROPHYLLUM /<br>PACIFIC RHODODENDRON<br>HOLODISCUS DISCOLOR /<br>OCEANSPRAY<br>MAHONIA AQUIFOLIUM /<br>OREGON GRAPE<br>MYRICA CALIFORNICA /<br>PACIFIC WAX MYRTLE<br><br>MAHONIA NERVOSA /<br>LOW OREGON GRAPE<br>SYMPHORICARPOS ALBUS /<br>COMMON SNOWBERRY<br>RIBES SANGUINEUM /<br>RED FLOWERING CURRENT<br>ROSA NUTKANA /<br>NOOTKA ROSE<br><br>VACCINIUM OVATUM /<br>EVERGREEN HUCKLEBERRY<br>100% OF SPECIES ARE FROM THE 'PREFERRED<br>SPECIES LIST'<br><br><b>PARKING LOT AND BUILDING GROUNDCOVERS:</b><br><br>ARCTOSTAPHYLOS UVA-URSI /<br>BEARBERRY KINKKINICK<br>FRAGARIA CHILDENSIS /<br>DUNE STRAWBERRY<br>BLECHNUM SPICANT /<br>DEER FERN<br>MAHONIA REPENS /<br>CREEPING MAHONIA<br>POLYSTICHUM MUNITUM /<br>WESTERN SWORD FERN<br>100% OF SPECIES ARE FROM THE 'PREFERRED<br>SPECIES LIST'<br><br>DETENTION AND WATER QUALITY POND<br>STORAGE SLOPE SEED MIX | 2" CAL.<br>B & B | 20' O.C.                                                                                                       | 73                                                                                                  | STAKE & GUY ONE GROWING<br>SEASON; NURSERY GROWN<br>FOR STREET TREE USE,<br>BRANCHED AT 6' |  | <b>TREES:</b><br><br>PICEA SITCHENSIS / SITKA SPRUCE<br>PSEUDOTSUGA MENZIESII / DOUGLAS FIR<br>PINUS CONTORTA / SHORE PINE<br>THUJA PLICATA / WESTERN RED CEDAR<br>ACER CIRCINATUM / VINE MAPLE<br>PRUNUS EMARGINATA / BITTER CHERRY<br>FRAXINUS LATIFOLIA / OREGON ASH<br><br>100% OF SPECIES ARE FROM THE 'PREFERRED<br>SPECIES LIST'<br><br>MINIMUM 40% OF TREES TO BE EVERGREEN, 6'<br>HEIGHT AT TIME OF INSTALLATION<br><br><b>SHRUBS:</b><br><br>CORNUS SERICA V. STOLONIFERA /<br>RED-OSIER DOGWOOD<br>OEMLERIA CERASIFORMIS / INDIAN PLUM<br>RHODODENDRON MACROPHYLLUM /<br>PACIFIC RHODODENDRON<br>PHYSCARPUS CAPITATUS / PACIFIC NINEBARK<br>RIBES SANGUINEUM / RED FLOWERING CURRENT<br>ROSA NUTKANA / NOOTKA ROSE<br>RUBUS PARVIFLORUS / THIMBLEBERRY<br>VACCINIUM OVATUM / EVERGREEN HUCKLEBERRY<br><br>100% OF SPECIES ARE FROM THE 'PREFERRED<br>SPECIES LIST'<br><br><b>GROUNDCOVERS:</b><br><br>ARCTOSTAPHYLOS UVA-URSI /<br>BEARBERRY KINKKINICK<br>NOTE: INSTALL AT TOP OF ROCK RETAINING WALLS<br>AS SHOWN. IN AREAS THAT ARE MORE SHADY,<br>INSTALL WILLOWLEAF COTONEASTER<br>MAHONIA REPENS /<br>CREEPING MAHONIA<br>BLECHNUM SPICANT /<br>DEER FERN<br>POLYSTICHUM MUNITUM /<br>WESTERN SWORD FERN<br>100% OF SPECIES ARE FROM THE 'PREFERRED<br>SPECIES LIST'<br><br>PER GHMC 17.99.160:<br>1. SEMI-TRANSPARENT SCREENS MUST PROVIDE AT LEAST 70 PERCENT YEAR-ROUND<br>FOLIAGE COVERAGE DISTRIBUTED EVENLY ACROSS THE VIEW ALONG THE SR 16<br>RIGHT-OF-WAY AND 50 PERCENT COVERAGE ALONG THE CANTERWOOD BLVD<br>RIGHT-OF-WAY. SEMI-TRANSPARENT SCREENS MAY CONSIST OF NEW VEGETATION ONLY IF<br>HEALTHY EXISTING VEGETATION IS NOT ADEQUATE TO FULFILL THIS REQUIREMENT. | 2" CAL.<br>B & B<br>6'-7" HT.<br>B & B                                                                                                                                                                                                                 |                                                                                                                                                                                                             | TOTAL 171<br>+7 2" CAL.<br>DECIDUOUS<br>TREES TO<br>REPLACE<br>TREE #418 | STAKE & GUY ONE GROWING<br>SEASON; FULL AND MATCHING;<br>EVERGREEN TREES TO HAVE<br>SINGLE UN-CUT LEADER. SPACING<br>OF TREES WILL VARY DEPENDING<br>ON THE SPECIES CHOSEN<br><br>PER GHMC 17.78.070:<br>ONE TREE (2" CAL. DECIDUOUS, 6'<br>HT. EVERGREEN) SHALL BE PROVIDED<br>FOR EVERY 200 SQUARE FEET<br>34,254 SF / 200 = 171 TREES<br><br>NOTE: VINE MAPLE AND SHORE PINE<br>ARE ONLY APPROVED IN HEIGHT RESTRICTED<br>AREAS OR UNDER POWER LINES. FINAL<br>TREE LOCATIONS TO BE DETERMINED ONCE<br>UTILITY LOCATIONS HAVE BEEN DETERMINED |
|    | <b>TREES:</b><br><br>PICEA SITCHENSIS /<br>SITKA SPRUCE<br>PSEUDOTSUGA MENZIESII /<br>DOUGLAS FIR<br>PINUS CONTORTA /<br>SHORE PINE<br>THUJA PLICATA /<br>WESTERN RED CEDAR<br><br>ACER CIRCINATUM /<br>VINE MAPLE<br>PRUNUS EMARGINATA /<br>BITTER CHERRY<br>FRAXINUS LATIFOLIA /<br>OREGON ASH<br><br>100% OF SPECIES ARE FROM THE 'PREFERRED<br>SPECIES LIST'<br><br>MINIMUM 40% OF TREES TO BE EVERGREEN, 6'<br>HEIGHT AT TIME OF INSTALLATION<br><br>ADJUSTMENTS MADE TO REQUIRED QUANTITIES TO<br>AVOID CONFLICT WITH THE ROOT SYSTEMS OF<br>EXISTING TREES PROPOSED TO BE RETAINED<br><br><b>SHRUBS:</b><br><br>CORNUS SERICA V. STOLONIFERA /<br>RED-OSIER DOGWOOD<br>MAHONIA AQUIFOLIUM /<br>TALL OREGON-GRAPE<br>RHODODENDRON MACROPHYLLUM /<br>PACIFIC RHODODENDRON<br>MAHONIA NERVOSA /<br>DULL OREGON-GRAPE<br>MYRICA CALIFORNICA /<br>PACIFIC WAX-MYRTLE<br>ROSA NUTKANA /<br>NOOTKA ROSE<br>GAULTHERIA SHALLON /<br>SALAL<br>RUBUS SPECTABILIS /<br>SALMONBERRY<br>VACCINIUM OVATUM /<br>EVERGREEN HUCKLEBERRY<br>100% OF SPECIES ARE FROM THE 'PREFERRED<br>SPECIES LIST'<br><br><b>GROUNDCOVERS:</b><br><br>ARCTOSTAPHYLOS UVA-URSI /<br>BEARBERRY KINKKINICK<br>FRAGARIA CHILDENSIS /<br>DUNE STRAWBERRY<br>BLECHNUM SPICANT /<br>DEER FERN<br>MAHONIA REPENS /<br>CREEPING MAHONIA<br>POLYSTICHUM MUNITUM /<br>WESTERN SWORD FERN<br>100% OF SPECIES ARE FROM THE 'PREFERRED<br>SPECIES LIST'<br><br>PER GHMC 17.99.590:<br>1. A MINIMUM OF ONE ROW OF EVERGREEN PLANTINGS FOR EVERY 10' OF BUFFER<br>DEPTH, WITH EACH ROW INCLUDING:<br>a. ONE FIVE-GALLON EVERGREEN SHRUB FOR EVERY FIVE FEET OF LOT LINE, OF A<br>TYPE THAT WILL GROW UP TO SIX FEET AT MATURITY; AND<br>b. ONE EVERGREEN TREE FOR EVERY 10' OF LOT LINE, WITH AT LEAST 50 PERCENT<br>OF SAID TREES BEING 12' OR TALLER, AND THE REMAINING TREES BEING AT<br>LEAST SIX FEET<br>2. ONE TWO-INCH MINIMUM CALIPER DECIDUOUS TREE PER 20 FEET OF LOT LINE AND<br>FOR EVERY 40 FEET OF BUFFER WIDTH.<br>3. EVERGREEN GROUNDCOVER THAT WILL COVER 75 PERCENT OF THE GROUND AREA<br>WITHIN THREE GROWING SEASONS.<br>4. PLANTING ROWS THAT ARE OFFSET FROM EACH OTHER OR STAGGERED IN A RANDOM<br>FASHION IN A MANNER THAT PROVIDES FULL, CONSISTENT COVERAGE THROUGHOUT THE<br>ENTIRE BUFFER AREA.<br><br>PER GHMC 17.78.070(2)(b)(iv):<br>5. PROVIDE MINIMUM THREE (3) SHRUBS FOR EVERY 200 SQUARE FEET OF ENHANCEMENT<br>PERIMETERS AND WILL ATTAIN A HEIGHT OF THREE AND ONE-HALF FEET WITHIN THREE<br>YEARS OF PLANTING | 6'-7" HT. &<br>12' HT.<br>B & B |          |                       | STAKE & GUY ONE GROWING<br>SEASON; FULL AND MATCHING;<br>EVERGREEN TREES TO HAVE<br>SINGLE UN-CUT LEADER<br><br>417 LINEAL FEET OF LOT LINE<br>ALONG NORTH<br><br>FOUR ROWS OF 42 EVERGREEN<br>TREES EACH. MIN. 50% 12' HEIGHT<br><br>TWENTY-ONE 2" CALIPER DECIDUOUS<br>TREES,<br><br>83 EVERGREEN SHRUBS PER 10'<br>BUFFER DEPTH<br><br>GROUND COVER THROUGHOUT<br><br>NOTE: VINE MAPLE AND SHORE PINE<br>ARE ONLY APPROVED IN HEIGHT RESTRICTED<br>AREAS OR UNDER POWER LINES. FINAL<br>TREE LOCATIONS TO BE DETERMINED ONCE<br>UTILITY LOCATIONS HAVE BEEN DETERMINED |    | 2" CAL.<br>B & B                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 20' O.C.         | 39                                                                                                             | FULL AND MATCHING<br>SEE PLANTING PLAN FOR TREES<br>TO REPLACE TREE #418<br>(7 VINE MAPLE, 2" CAL.) |         | MIN 5 GAL.                                                                          | 5' O.C.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 513                                                                                                                                                                                                                                                    | FULL AND BUSHY<br><br>PER GHMC 17.78.070:<br>THREE SHRUBS WHICH WILL ATTAIN A HEIGHT OF<br>3.5' WITHIN THREE YEARS SHALL BE PROVIDED<br>FOR EVERY 200 SQUARE FEET<br>34,254 SF / 200 = 171 X 3 = 513 SHRUBS |                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|   | <b>TREES:</b><br><br>PICEA SITCHENSIS /<br>SITKA SPRUCE<br>PSEUDOTSUGA MENZIESII /<br>DOUGLAS FIR<br>PINUS CONTORTA /<br>SHORE PINE<br>THUJA PLICATA /<br>WESTERN RED CEDAR<br><br>ACER CIRCINATUM /<br>VINE MAPLE<br>PRUNUS EMARGINATA /<br>BITTER CHERRY<br>FRAXINUS LATIFOLIA /<br>OREGON ASH<br><br>100% OF SPECIES ARE FROM THE 'PREFERRED<br>SPECIES LIST'<br><br>MINIMUM 40% OF TREES TO BE EVERGREEN, 6'<br>HEIGHT AT TIME OF INSTALLATION<br><br>ADJUSTMENTS MADE TO REQUIRED QUANTITIES TO<br>AVOID CONFLICT WITH THE ROOT SYSTEMS OF<br>EXISTING TREES PROPOSED TO BE RETAINED<br><br><b>SHRUBS:</b><br><br>CORNUS SERICA V. 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PROVIDE MINIMUM THREE (3) SHRUBS FOR EVERY 200 SQUARE FEET OF ENHANCEMENT<br>PERIMETERS AND WILL ATTAIN A HEIGHT OF THREE AND ONE-HALF FEET WITHIN THREE<br>YEARS OF PLANTING | MIN. 5 GAL.                     | 5' O.C.  | TOTAL 168<br>EVERGRN. | FOUR ROWS OF 42 EVERGREEN<br>TREES EACH. MIN. 50% 12' HEIGHT<br><br>TWENTY-ONE 2" CALIPER DECIDUOUS<br>TREES,<br><br>83 EVERGREEN SHRUBS PER 10'<br>BUFFER DEPTH<br><br>GROUND COVER THROUGHOUT<br><br>NOTE: VINE MAPLE AND SHORE PINE<br>ARE ONLY APPROVED IN HEIGHT RESTRICTED<br>AREAS OR UNDER POWER LINES. FINAL<br>TREE LOCATIONS TO BE DETERMINED ONCE<br>UTILITY LOCATIONS HAVE BEEN DETERMINED                                                                                                                                                                   |   | MIN. 5 GAL.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | APPX. 600        | FULL AND BUSHY; SPACING<br>WILL VARY BASED ON THE<br>SPECIES OF SHRUB<br>SPECIFIED. THE MATURE WIDTH<br>VARIES |                  | 1 GALLON                                                                                   |                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | FULL AND BUSHY. SPACING<br>OF GROUND COVER TO COVER<br>75% OF AREA WITHIN THREE<br>YEARS                                                                                                                                                               |                                                                                                                                                                                                             |                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|  | <b>TREES:</b><br><br>PICEA SITCHENSIS /<br>SITKA SPRUCE<br>PSEUDOTSUGA MENZIESII /<br>DOUGLAS FIR<br>PINUS CONTORTA /<br>SHORE PINE<br>THUJA PLICATA /<br>WESTERN RED CEDAR<br><br>ACER CIRCINATUM /<br>VINE MAPLE<br>PRUNUS EMARGINATA /<br>BITTER CHERRY<br>FRAXINUS LATIFOLIA /<br>OREGON ASH<br><br>100% OF SPECIES ARE FROM THE 'PREFERRED<br>SPECIES LIST'<br><br>MINIMUM 40% OF TREES TO BE EVERGREEN, 6'<br>HEIGHT AT TIME OF INSTALLATION<br><br>ADJUSTMENTS MADE TO REQUIRED QUANTITIES TO<br>AVOID CONFLICT WITH THE ROOT SYSTEMS OF<br>EXISTING TREES PROPOSED TO BE RETAINED<br><br><b>SHRUBS:</b><br><br>CORNUS SERICA V. 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SPACING<br>OF GROUND COVER TO COVER<br>75% OF AREA WITHIN THREE<br>YEARS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  | 1 GALLON                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                  | FULL AND BUSHY. SPACING<br>OF GROUND COVER TO COVER<br>75% OF AREA WITHIN THREE<br>YEARS                       |                | 2" CAL.<br>B & B<br>6'-7" HT.<br>B & B                                                     |                                                                                     | TOTAL 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | STAKE & GUY ONE GROWING<br>SEASON; FULL AND MATCHING;<br>EVERGREEN TREES TO HAVE<br>SINGLE UN-CUT LEADER. SPACING<br>OF TREES WILL VARY DEPENDING<br>ON THE SPECIES CHOSEN<br><br>552 SQUARE FEET OF LANDSCAPE<br>BUFFER SHOWN<br><br>3 TREES REQUIRED |                                                                                                                                                                                                             |                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|  | <b>TREES:</b><br><br>PICEA SITCHENSIS /<br>SITKA SPRUCE<br>PSEUDOTSUGA MENZIESII /<br>DOUGLAS FIR<br>PINUS CONTORTA /<br>SHORE PINE<br>THUJA PLICATA /<br>WESTERN RED CEDAR<br><br>ACER CIRCINATUM /<br>VINE MAPLE<br>PRUNUS EMARGINATA /<br>BITTER CHERRY<br>FRAXINUS LATIFOLIA /<br>OREGON ASH<br><br>100% OF SPECIES ARE FROM THE 'PREFERRED<br>SPECIES LIST'<br><br>MINIMUM 40% OF TREES TO BE EVERGREEN, 6'<br>HEIGHT AT TIME OF INSTALLATION<br><br>ADJUSTMENTS MADE TO REQUIRED QUANTITIES TO<br>AVOID CONFLICT WITH THE ROOT SYSTEMS OF<br>EXISTING TREES PROPOSED TO BE RETAINED<br><br><b>SHRUBS:</b><br><br>CORNUS SERICA V. 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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  | FULL AND BUSHY                                                                                                 |                | 2" CAL.<br>B & B<br>6'-7" HT.<br>B & B                                                     |                                                                                     | TOTAL 9                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | FULL AND BUSHY                                                                                                                                                                                                                                         |                                                                                                                                                                                                             |                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
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SPACING<br>OF GROUND COVER TO COVER<br>75% OF AREA WITHIN THREE<br>YEARS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  | 1 GALLON                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                  | FULL AND BUSHY. 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SPACING<br>OF GROUND COVER TO COVER<br>75% OF AREA WITHIN THREE<br>YEARS                       |                | 2" CAL.<br>B & B<br>6'-7" HT.<br>B & B                                                     |                                                                                     | TOTAL 9                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | FULL AND BUSHY                                                                                                                                                                                                                                         |                                                                                                                                                                                                             |                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|  | <b>TREES:</b><br><br>PICEA SITCHENSIS /<br>SITKA SPRUCE<br>PSEUDOTSUGA MENZIESII /<br>DOUGLAS FIR<br>PINUS CONTORTA /<br>SHORE PINE<br>THUJA PLICATA /<br>WESTERN RED CEDAR<br><br>ACER CIRCINATUM /<br>VINE MAPLE<br>PRUNUS EMARGINATA /<br>BITTER CHERRY<br>FRAXINUS LATIFOLIA /<br>OREGON ASH<br><br>100% OF SPECIES ARE FROM THE 'PREFERRED<br>SPECIES LIST'<br><br>MINIMUM 40% OF TREES TO BE EVERGREEN, 6'<br>HEIGHT AT TIME OF INSTALLATION<br><br>ADJUSTMENTS MADE TO REQUIRED QUANTITIES TO<br>AVOID CONFLICT WITH THE ROOT SYSTEMS OF<br>EXISTING TREES PROPOSED TO BE RETAINED<br><br><b>SHRUBS:</b><br><br>CORNUS SERICA V. STOLONIFERA /<br>RED-OSIER DOGWOOD<br>MAHONIA AQUIFOLIUM /<br>TALL OREGON-GRAPE<br>RHODODENDRON MACROPHYLLUM /<br>PACIFIC RHODODENDRON<br>MAHONIA NERVOSA /<br>DULL OREGON-GRAPE<br>MYRICA CALIFORNICA /<br>PACIFIC WAX-MYRTLE<br>ROSA NUTKANA /<br>NOOTKA ROSE<br>GAULTHERIA SHALLON /<br>SALAL<br>RUBUS SPECTABILIS /<br>SALMONBERRY<br>VACCINIUM OVATUM /<br>EVERGREEN HUCKLEBERRY<br>100% OF SPECIES ARE FROM THE 'PREFERRED<br>SPECIES LIST'<br><br><b>GROUNDCOVERS:</b><br><br>ARCTOSTAPHYLOS UVA-URSI /<br>BEARBERRY KINKKINICK<br>FRAGARIA CHILDENSIS /<br>DUNE STRAWBERRY<br>BLECHNUM SPICANT /<br>DEER FERN<br>MAHONIA REPENS /<br>CREEPING MAHONIA<br>POLYSTICHUM MUNITUM /<br>WESTERN SWORD FERN<br>100% OF SPECIES ARE FROM THE 'PREFERRED<br>SPECIES LIST'<br><br>PER GHMC 17.99.590:<br>1. A MINIMUM OF ONE ROW OF EVERGREEN PLANTINGS FOR EVERY 10' OF BUFFER<br>DEPTH, WITH EACH ROW INCLUDING:<br>a. ONE FIVE-GALLON EVERGREEN SHRUB FOR EVERY FIVE FEET OF LOT LINE, OF A<br>TYPE THAT WILL GROW UP TO SIX FEET AT MATURITY; AND<br>b. ONE EVERGREEN TREE FOR EVERY 10' OF LOT LINE, WITH AT LEAST 50 PERCENT<br>OF SAID TREES BEING 12' OR TALLER, AND THE REMAINING TREES BEING AT<br>LEAST SIX FEET<br>2. ONE TWO-INCH MINIMUM CALIPER DECIDUOUS TREE PER 20 FEET OF LOT LINE AND<br>FOR EVERY 40 FEET OF BUFFER WIDTH.<br>3. EVERGREEN GROUNDCOVER THAT WILL COVER 75 PERCENT OF THE GROUND AREA<br>WITHIN THREE GROWING SEASONS.<br>4. PLANTING ROWS THAT ARE OFFSET FROM EACH OTHER OR STAGGERED IN A RANDOM<br>FASHION IN A MANNER THAT PROVIDES FULL, CONSISTENT COVERAGE THROUGHOUT THE<br>ENTIRE BUFFER AREA.<br><br>PER GHMC 17.78.070(2)(b)(iv):<br>5. PROVIDE MINIMUM THREE (3) SHRUBS FOR EVERY 200 SQUARE FEET OF ENHANCEMENT<br>PERIMETERS AND WILL ATTAIN A HEIGHT OF THREE AND ONE-HALF FEET WITHIN THREE<br>YEARS OF PLANTING | 1 GALLON                        |          |                       | FULL AND BUSHY. SPACING<br>OF GROUND COVER TO COVER<br>75% OF AREA WITHIN THREE<br>YEARS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  | 1 GALLON                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                  | FULL AND BUSHY. 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PLANTING ROWS THAT ARE OFFSET FROM EACH OTHER OR STAGGERED IN A RANDOM<br>FASHION IN                                                                                                                                                                                                                                                                                                                 |                                 |          |                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              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LANDSCAPE PLANTING NOTES AND MATERIALS

SCOPE OF WORK

FURNISH ALL MATERIALS, LABOR, EQUIPMENT AND RELATED ITEMS NECESSARY TO ACCOMPLISH TOPSOIL, TREATMENT AND PREPARATION OF SOIL, FINISH GRADING, PLACEMENT OF SPECIFIED PLANT MATERIALS, FERTILIZER, STAKING, MULCH, CLEAN-UP, DEBRIS REMOVAL, AND 90-DAY MAINTENANCE.

QUALIFICATIONS:  
LANDSCAPE CONTRACTOR TO BE SKILLED AND KNOWLEDGEABLE IN THE FIELD OF WORK AND HAVE A MINIMUM OF FIVE (5) YEAR'S EXPERIENCE INSTALLING SIMILAR WORK. CONTRACTOR TO BE LICENSED TO PERFORM THE WORK SPECIFIED WITHIN THE PRESIDING JURISDICTION.

JOB CONDITIONS:  
IT IS THE CONTRACTOR'S RESPONSIBILITY TO REVIEW THE SITE AND REPORT ANY DISCREPANCIES TO THE OWNER OR THE OWNER'S REPRESENTATIVES. ALL PLANT MATERIAL AND FINISH GRADES ARE SUBJECT TO APPROVAL BY THE OWNER.

PROTECTION:  
SAVE AND PROTECT ALL EXISTING PLANTINGS SHOWN TO REMAIN. DO NOT PLANT UNTIL OTHER CONSTRUCTION OPERATIONS WHICH CONFLICT HAVE BEEN COMPLETED. IF AN IRRIGATION SYSTEM IS TO BE INSTALLED DO NOT PLANT UNTIL THE SYSTEM HAS BEEN INSTALLED, TESTED, AND APPROVED BY THE OWNER. HANDLE PLANTS WITH CARE - DO NOT DAMAGE OR BREAK ROOT SYSTEM, BARK, OR BRANCHES. REPAIR AND/OR REPLACE ITEMS DAMAGED AS A RESULT OF WORK, OR WORK IN COMPLIANCE WITH PLANS AND SPECIFICATIONS, AS DIRECTED BY OWNER AT NO ADDITIONAL COST TO THE OWNER.

REPAIR OF EXISTING PLANTINGS:  
DURING THE COURSE OF WORK, REPAIR ALL EXISTING PLANTING AREAS BY PRUNING DEAD GROWTH, RE-ESTABLISHING FINISH GRADE AND RE-MULCHING TO SPECIFIED DEPTH.

REPAIR OF IRRIGATION SYSTEM:  
DURING THE COURSE OF WORK, REPAIR ANY DAMAGE TO THE IRRIGATION SYSTEM TO MATCH CONDITIONS PRIOR TO THE DAMAGE.

GUARANTEE:  
GUARANTEE ALL PLANT MATERIAL FOR A PERIOD OF ONE YEAR FROM DATE OF FINAL ACCEPTANCE OF THE JOB BY OWNER.

90-DAY MAINTENANCE:  
CONTRACTOR TO PROVIDE OWNER WITH A SCOPE OF WORK AT TIME OF INITIAL PROJECT BID TO PROVIDE LANDSCAPE AND IRRIGATION MAINTENANCE FOR 90 DAYS FOLLOWING COMPLETION OF PROJECT (ACCEPTANCE) OF FACILITY BY OWNER. WORK TO INCLUDE MAINTENANCE AS DESCRIBED BELOW, IN PLANTING AND IRRIGATION MAINTENANCE.

MATERIALS:

PLANT MATERIALS:  
PLANT MATERIALS TO BE GRADE NO. 1, SIZED IN ACCORDANCE WITH (AAN) AMERICAN STANDARDS FOR NURSERY STOCK (ANSI Z60.1-1996). PRUNE PLANTS RECEIVED FROM THE NURSERY ONLY UPON AUTHORIZATION BY THE LANDSCAPE ARCHITECT. "B & B" INDICATES BALLED AND BURLAPPED; "CONT." INDICATES CONTAINER; "BR" INDICATES BARE ROOT; "CAL" INDICATES CALIPER AT 6" ABOVE SOIL LINE; "GAL" INDICATES GALLON.

- A) SPECIFIED PLANT CANOPY SIZE OR CALIPER IS THE MINIMUM ACCEPTABLE CONTAINER OR BALL SIZE AND ESTABLISHES MINIMUM PLANT CONDITION TO BE PROVIDED.
- B) QUALITY:  
PLANT MATERIAL TO COMPLY WITH STATE AND FEDERAL LAWS FOR DISEASE INSPECTION, PLANTS TO BE FULLY LIVE, VIGOROUS, WELL FORMED, WITH WELL DEVELOPED FIBROUS ROOT SYSTEMS. ROOT BALLS OF PLANTS TO BE SOLID AND FIRMLY HELD TOGETHER, SECURELY CONTAINED AND PROTECTED FROM INJURY AND DESICCATION. PLANTS DETERMINED BY LANDSCAPE ARCHITECT TO HAVE BEEN DAMAGED; HAVE DEFORMITIES OF STEM, BRANCHES, OR ROOTS; LACK SYMMETRY, HAVE MULTIPLE LEADERS OR "Y" CROTCHES LESS THAN 30 DEGREES IN TREES, OR DO NOT MEET SIZE OR ANSI STANDARDS WILL BE REJECTED. PLANT MATERIAL TO BE FROM A SINGLE NURSERY SOURCE FOR EACH SPECIFIED SPECIES/HYBRID. NURSERY SOURCES TO BE THOSE LOCATED IN THE SAME REGION AS THE JOB SITE.
- C) SUBSTITUTION:  
NO SUBSTITUTION OF PLANT MATERIAL, SPECIES OR VARIETY, WILL BE PERMITTED UNLESS WRITTEN EVIDENCE IS SUBMITTED TO THE OWNER FROM TWO QUALIFIED PLANT BROKERAGE OFFICES. SUBSTITUTIONS WHICH ARE PERMITTED TO BE IN WRITING FROM THE OWNER AND LANDSCAPE ARCHITECT. THE SPECIFIED SIZE, SPECIES AND NEAREST VARIETY, AS APPROVED, TO BE FURNISHED. SUBSTITUTIONS MAY REQUIRE SUBMITTAL TO REVISED LANDSCAPE PLAN TO CITY FOR APPROVAL.

SOIL PREPARATION:  
TOPSOIL, AMENDMENT, AND BACKFILL, ARE GENERAL REQUIREMENTS FOR ALL LANDSCAPE AREAS, UNLESS NOTED OTHERWISE ON THE PLANS. SOIL AMENDMENTS AND FERTILIZER NOTED BELOW ARE TO BE USED FOR BID PRICE BASIS ONLY. SPECIFIC AMENDMENTS AND FERTILIZERS WILL BE MADE AFTER SOIL SAMPLES ARE LABORATORY TESTED BY THE CONTRACTOR. PROVIDE CHANGE ORDER FOR ADDITIONAL OR REDUCTION OF MATERIALS REQUIRED OR NOT REQUIRED BY THE SOILS REPORT.

SOIL FERTILITY AND AGRICULTURAL SUITABILITY ANALYSIS:  
AFTER ROUGH GRADING AND PRIOR TO SOIL PREPARATION, CONTRACTOR TO OBTAIN TWO REPRESENTATIVE SOIL SAMPLES, FROM LOCATIONS AS DIRECTED BY THE LANDSCAPE ARCHITECT, TO A SOIL TESTING LABORATORY. SUBMIT RESULTS TO LANDSCAPE ARCHITECT FOR REVIEW. TESTS TO INCLUDE FERTILITY AND SUITABILITY ANALYSIS WITH WRITTEN RECOMMENDATIONS FOR SOIL AMENDMENT, FERTILIZER, CONDITIONERS, APPLICATION RATES, AND POST-CONSTRUCTION MAINTENANCE PROGRAM. TESTS TO BE CONTRACTED WITH AND PAID FOR BY THE CONTRACTOR.

- A) TOPSOIL:  
CONTRACTOR IS RESPONSIBLE FOR SUPPLYING ALL TOPSOIL AND FOR DETERMINING THE VOLUME OF TOPSOIL REQUIRED PER THE INFORMATION ON PLANS AND NOTED HERE-IN. CONTRACTOR IS RESPONSIBLE FOR ANY NECESSARY WEED CONTROL RESULTING FROM CONTAMINATED OFF SITE SOURCES.
- B) TOPSOIL TO CONSIST OF WINTER MIX AS PRODUCED AND REMIXED BY PACIFIC TOPSOILS, INC. WINTER MIX TO CONSIST OF 1/3 BY VOLUME SANDY LOAM, 1/3 BY VOLUME COMPOSTED GARDEN MULCH, AND 1/3 BY VOLUME COARSE WASHED SAND OR EQUIVALENT. AT MINIMUM, TOPSOIL PRODUCTS BROUGHT ON SITE TO CONTAIN AMENDMENTS AS LISTED IN "C".
- C) TOPSOIL TO INCLUDE THE FOLLOWING AMENDMENTS AS NECESSARY:  
THE FOLLOWING AMOUNT PER 1,000 SQUARE FEET:  
1. 6-CUBIC YARDS ORGANIC COMPOST. COMPOST TO BE FREE OR NON-FARM ANIMAL SOURCES, NOR TO BE FROM SOURCES CONTAINING REDWOOD OF CEDAR PRODUCTS.  
2. 30-POUNDS NITROFORM (38-0-0)  
3. 5-POUNDS AMMONIUM SULFATE  
4. 40-POUNDS CALCIUM CARBONATE LESTONE  
5. 40-POUNDS DOLOMITE LESTONE  
6. 5-OUNES BORON (AS BORAX)  
ALL AMENDMENTS TO BE THOROUGHLY MIXED PRIOR TO INCORPORATION INTO TOPSOIL.

- D) PLANTING BACKFILL FOR ALL TREES, SHRUBS, AND GROUNDCOVERS:  
1. 0.6-CUBIC YARDS PER VOLUME TOPSOIL  
2. 0.4-CUBIC YARDS ORGANIC COMPOST.  
3. 3-POUNDS NITROFORM (38-0-0)  
4. 1-POUNDS AMMONIUM SULFATE  
5. 2-POUNDS CALCIUM CARBONATE LESTONE  
6. 2-POUNDS DOLOMITE LESTONE
- E) TOPSOIL PREPARATION AND INSTALLATION:  
1. VERIFY SUBGRADES TO -7 INCHES IN LANDSCAPE AREAS AND -18/24 INCHES IN PARKING LOT ISLANDS BELOW FINISH ELEVATION, OR AS INDICATED ON PLANS. THIS ACCOMMODATES, TOPSOIL, AMENDMENTS, AND MULCH.  
2. ERADICATE ANY SURFACE VEGETATION ROOTED IN THE SUB-GRADE PRIOR TO SUB-GRADE PREPARATION.  
3. THOROUGHLY SCARIFY AND RIP ALL LANDSCAPE SUB-GRADES WHICH HAVE BECOME COMPACTED TO A DEPTH OF 12 INCHES WITH MULTIPLE PASSES, 90 DEGREES TO EACH OTHER. SCARIFY AREAS INACCESSIBLE TO MECHANIZED EQUIPMENT AND AROUND EXISTING PLANTINGS NOTED TO REMAIN WITH HAND TOOLS.  
4. REMOVE SOIL LUMPS, ROCK, VEGETATION AND/OR DEBRIS LARGER THAN 2 INCHES FROM ALL SUB-GRADE PRIOR TO PLACEMENT OF SPECIFIED TOPSOIL.  
5. REMOVE ANY ASPHALT EXTENDING BEYOND 6 INCHES FROM CURBS INTO ADJACENT LANDSCAPE AREAS.  
6. PARKING LOT PLANTER ISLANDS TO BE OVER EXCAVATED BY BACKHOE. REMOVE PAVING WASTE, GRAVEL BASE MATERIAL AND UNDERLYING SUBSOIL TO 18 INCHES BELOW TOP OF PAVING. SCARIFY AND OVER EXCAVATE PLANT PIT BOTTOM 12 INCHES TO MINIMIZE STRUCTURAL COMPACTION.
- F) TOPSOIL PLACEMENT:  
1. PROVIDE A TOTAL FINISH COURSE OF 4 INCHES OF TOPSOIL FOR LANDSCAPE AREAS AND 18/24 INCHES IN PARKING LOT ISLANDS.  
2. IN ALL LANDSCAPE AREAS, PLACE 2 INCHES (6 INCHES IN PARKING LOT ISLANDS) OF TOPSOIL MIX WITH AMENDMENTS OVER THE PREPARED SUB-GRADE AND THOROUGHLY ROTOTILL WITH MULTIPLE PASSES INTO THE TOP 6 INCHES OF SUB-GRADE FOR A TOTAL DEPTH OF 8 INCHES IN LANDSCAPE AREAS (12 INCHES IN PARKING LOT ISLANDS). PLACE AN ADDITIONAL 2 INCH LIFT OF TOPSOIL, IN ALL LANDSCAPE AREAS AND A MINIMUM 12 INCH LIFT IN ALL PARKING LOT ISLANDS, FOR THE FINAL TOPSOIL DEPTH OF 4 INCHES IN LANDSCAPE AREAS AND 18/24 INCHES IN PARKING LOT ISLANDS.  
3. PLACE ADDITIONAL TOPSOIL AND SOIL MIX AS REQUIRED TO MEET FINISH ELEVATIONS.

BARK MULCH (TOPDRESSING):  
ONE-HALF-INCH (1/2") SIZE, TO ONE-QUARTER (1/4"), I.E., "FINE," HEMLOCK/FIR BARK.

STAKES:  
2-INCH DIAMETER BY 8-FOOT MINIMUM LODGEPOLE PINE STAKES.

GUY MATERIAL:  
1-INCH WIDE POLYETHYLENE CHAIN LOCK TYPE TIES; OR, 3/8" DIAMETER RUBBER. NO WIRE.

LOW GROW TRUF AND SORAGE SLOPE MIX:  
COMMERCIAL SEED AS NOTED ON PLAN.

HERBICIDE:  
HERBICIDE IS NOT RECOMMENDED FOR THE FIRST YEAR AFTER INSTALLATION.

ANTI-DESICCANT:  
"WILT-PROOF," 48 HOURS PRIOR TO SHIPMENT TO SITE FROM JUNE 1 THROUGH SEPTEMBER. THOROUGHLY ROOT WATER PLANTS PRIOR TO DELIVERY. PLANT MATERIAL DELIVERED TO SITE TO BE KEPT CONTINUALLY MOIST THROUGH INSTALLATION.

EXECUTION:

FINISH GRADES:  
FINE GRADE AND REMOVE ROCKS AND FOREIGN OBJECTS OVER 2 INCHES DIAMETER FROM TOP SURFACE OF PREPARED LANDSCAPE AREAS. FINISH ELEVATIONS TO BE DEFINED AS 3 INCHES BELOW CURBS, WALKS AND/OR OTHER ADJACENT HARDSCAPE FOR ALL PLANTING BED AREAS AND 1-INCH BELOW CURBS, WALKS AND/OR OTHER ADJACENT HARDSCAPE FOR ALL LAWN AREAS. FINISH GRADE REFER TO GRADES PRIOR TO INSTALLATION OF MULCH OR LAWN. ALL FINISH GRADES TO BE SMOOTH EVEN GRADES, LIGHTLY COMPACTED, AS SHOWN ON THE PLAN AND DETAILED. PROVIDE POSITIVE DRAINAGE AWAY FROM BUILDINGS AND STRUCTURES. SITE CIVIL DRAWINGS IDENTIFY FINAL ELEVATIONS.

TREES AND SHRUBS:  
ARRANGE TREES AND SHRUBS ON SITE IN PROPOSED LOCATIONS PER DRAWINGS. EXCAVATE PIT, PLANT AND STAKE OR GUY, AS CALLED OUT AND DETAILED. ALL TREES, SHRUBS, AND SUPPORTS TO STAND VERTICAL. BACKFILL SHALL BE PIT SPOILS. SETTLE BACKFILL USING WATER ONLY. NO MECHANICAL COMPACTION.

GROUNDCOVERS:  
EXCAVATE PITS TO A MINIMUM OF 3 INCHES BELOW, AND TWICE THE ROOT BALL DIAMETER. WATER THOROUGHLY AND TAKE CARE TO ENSURE THAT ROOT CROWN IS AT PROPER GRADE, AS DETAILED.

MULCH:  
MULCH ALL LANDSCAPE AREAS NOT COVERED BY TURF/SEED. APPLY SUFFICIENT QUANTITY TO PROVIDE A 2-INCH DEPTH.

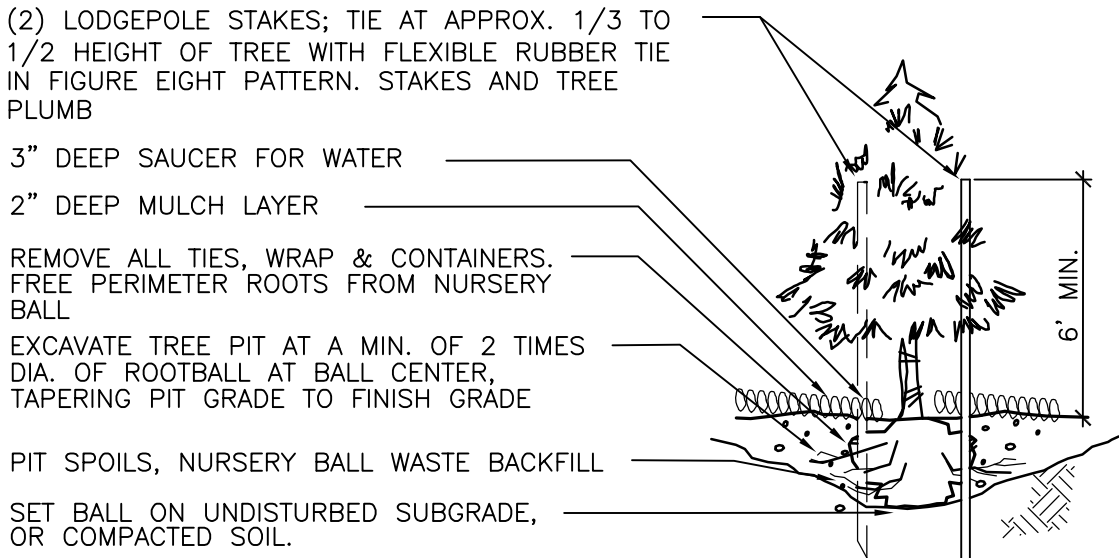
UTILITY CLEARANCES:  
FIELD ADJUST PLANT LOCATIONS FOR 8-FOOT SEPARATION OF TREES/SHRUBS AND 2-FOOT SEPARATION FOR GROUNDCOVER FROM FIRE HYDRANTS AND UTILITY VAULTS.

PLANTING MAINTENANCE:  
CONTRACTOR TO MAINTAIN PLANTINGS THROUGH COMPLETED INSTALLATION, AND UNTIL ACCEPTANCE OF LANDSCAPE INSTALLATION. PLANTING MAINTENANCE TO INCLUDE WATERING, WEEDING, CULTIVATING, TIGHTENING AND REPAIRING OF TREE GUYS, RESETTING PLANTS TO PROPER GRADES OR POSITION, RE-ESTABLISHING SETTLED GRADES; AND MOWING TURF MONTHLY AFTER TURF ESTABLISHMENT. HERBICIDE IS NOT RECOMMENDED FOR ONE YEAR FOLLOWING LANDSCAPE INSTALLATION. INCLUDED IS REPLACEMENT OF DEAD PLANTS AND PLANTS SHOWING LOSS OF 40 PERCENT OR MORE OF CANOPY.

IRRIGATION MAINTENANCE:  
THE IRRIGATION SYSTEM TO BE MAINTAINED INCLUDING ADJUSTMENTS FOR BALANCED WATER DISTRIBUTION AND PRECIPITATION. FAILED OR MALFUNCTIONING IRRIGATION EQUIPMENT SHALL BE REPLACED AND/OR CORRECTED. PLANTING AND IRRIGATION MAINTENANCE TO INCLUDE THOSE OPERATIONS NECESSARY TO THE PROPER GROWTH AND SURVIVAL OF ALL PLANT MATERIALS. CONTRACTOR TO PROVIDE THIS WORK IN ADDITION TO SPECIFIC WARRANTY/GUARANTEES.

- SIGHT DISTANCE TRIANGLE NOTES:  
1. STREET TREES AT INTERSECTIONS WITHIN SIGHT DISTANCE TRIANGLE SHALL BE LIMBED TO A HEIGHT OF 10' ABOVE STREET LEVEL.  
2. TREES (EXCLUDING STREET TREES) SHALL NOT BE PLANTED WITHIN THE SIGHT DISTANCE TRIANGLE.  
3. SHRUBS WITHIN THE SIGHT DISTANCE TRIANGLE SHALL HAVE A MATURE HEIGHT OF LESS THAN 3' TALL.

IN ORDER FOR PROPER TREE REMOVAL TO OCCUR, THE CONTRACTOR SHALL IMPLEMENT THE FOLLOWING STEPS FOR CLEARING ACTIVITIES:  
A. SURVEYOR SHALL STAKE THE CLEARING LIMITS;  
B. A RUBBER-TRACKED BACK-HOE REMOVES THE UNDERSTORY AND BRUSH TO ALLOW VISUAL AND PHYSICAL ACCESS FOR THE REVIEW OF TREES TO BE REMOVED AND/OR TREE PROTECTION ALTERNATIVES BY OWNER AND CITY PLANNING STAFF;  
C. OWNER REPRESENTATIVE, OWNER'S ARBORIST AND CITY PLANNER TO REVIEW TREES SCHEDULED FOR REMOVAL OR PROTECTION WITHIN TREE RETENTION AREAS;  
D. CONTRACTOR SHALL PLACE TREE PROTECTION FENCING AS DIRECTED BY PLANNING STAFF;  
E. PLANNING STAFF SHALL INSPECT FENCE PRIOR TO COMMENCEMENT OF CLEARING ACTIVITY; AND,  
F. PRIOR TO PLANNING DEPARTMENT APPROVAL OF OCCUPANCY PERMITS FOR THE DEVELOPMENT, THE OWNER'S ARBORIST SHALL REVISIT THE SITE TO INSPECT ALL RETAINED TREES TO ASSESS ANY IMPACTS TO THEM FROM THE DEVELOPMENT.



NOTE:  
LIGHT FERTILIZER OVER PLANTING BED AFTER BACKFILL ONLY; NO FERTILIZER IN PLANTING PIT.  
WORK PERIMETER ROOTS FREE OF NURSERY BALL BALL & PIT TO BE COARSELY SCARIFIED.

EVERGREEN TREE PLANTING/STAKING DETAIL

NOT TO SCALE

PRUNE DAMAGED TWIGS AFTER PLANTING

PLACE IN VERT. POSITION: DOUBLE LEADERS WILL BE REJECTED

NOTE:  
KEEP ROOTBALL MOIST AND PROTECTED AT ALL TIMES. HOLD CROWN OF ROOTBALL AT OR JUST ABOVE FINISH GRADE.  
PROTECT TRUNK AND LIMBS FROM INJURY.  
BACKFILL TO BE SETTLED USING WATER ONLY - NO MECHANICAL COMPACTION.  
REMOVE ALL WRAP, TIES & CONTAINERS, REGARDLESS OF MATERIAL.

(2) LODGEPOLE STAKES, PLUMB WITH ELASTIC CHAIN-LOCK TYPE OR RUBBER GUYS TIED IN FIGURE EIGHT; REMOVE AFTER ONE GROWING SEASON

PROTECTIVE WRAPPING DURING SHIPMENT TO SITE AND INSTALLATION REMOVE AT COMPLETION OF PLANTING  
TURF PLANTING; PROVIDE 3'x 8" "NO GRASS" TREE RING AND 3" MULCH LAYER IN WELL. HOLD BACK FROM TRUNK 8" TO 10"  
FINISH GRADE

PREPARE PLANTING BED PER SPEC'S; AT MIN., LOSSEN AND MIX SOIL TO 18" OR DEPTH OF ROOTBALL AND 2 TIMES BALL DIAMETER

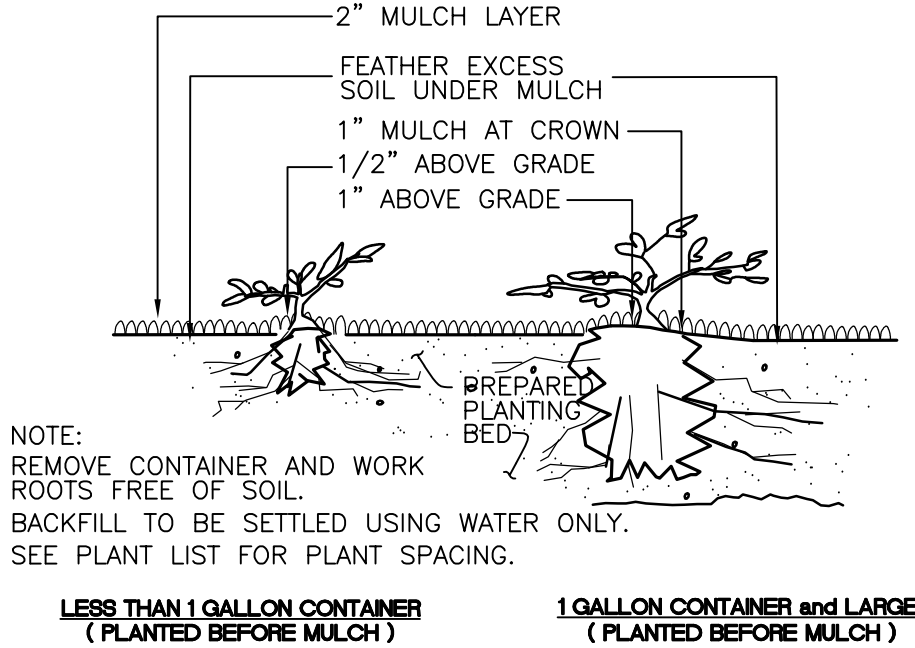
REMOVE ALL WRAP, TIES, AND CONTAINERS  
SCORE ROOTBALL AND WORK NURSERY SOIL AWAY FROM PERIMETER ROOTS

SET BALL ON UNDISTURBED BASE OR COMPACTED MOUND UNDER BALL

PENETRATION TO SUBBASE (+) 24"

DECIDUOUS TREE PLANTING/STAKING DETAIL

NOT TO SCALE

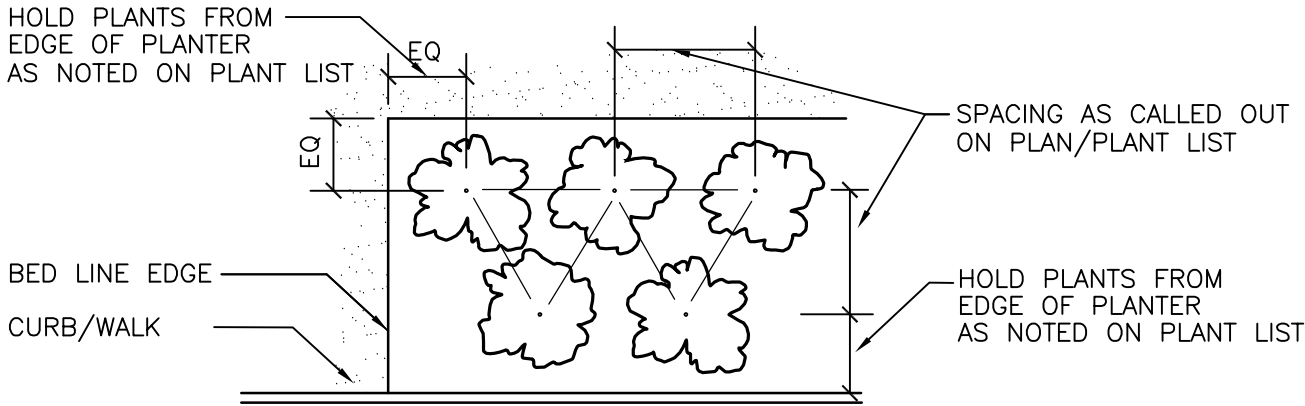


NOTE:  
REMOVE CONTAINER AND WORK ROOTS FREE OF SOIL.  
BACKFILL TO BE SETTLED USING WATER ONLY.  
SEE PLANT LIST FOR PLANT SPACING.

LESS THAN 1 GALLON CONTAINER (PLANTED BEFORE MULCH) 1 GALLON CONTAINER and LARGER (PLANTED BEFORE MULCH)

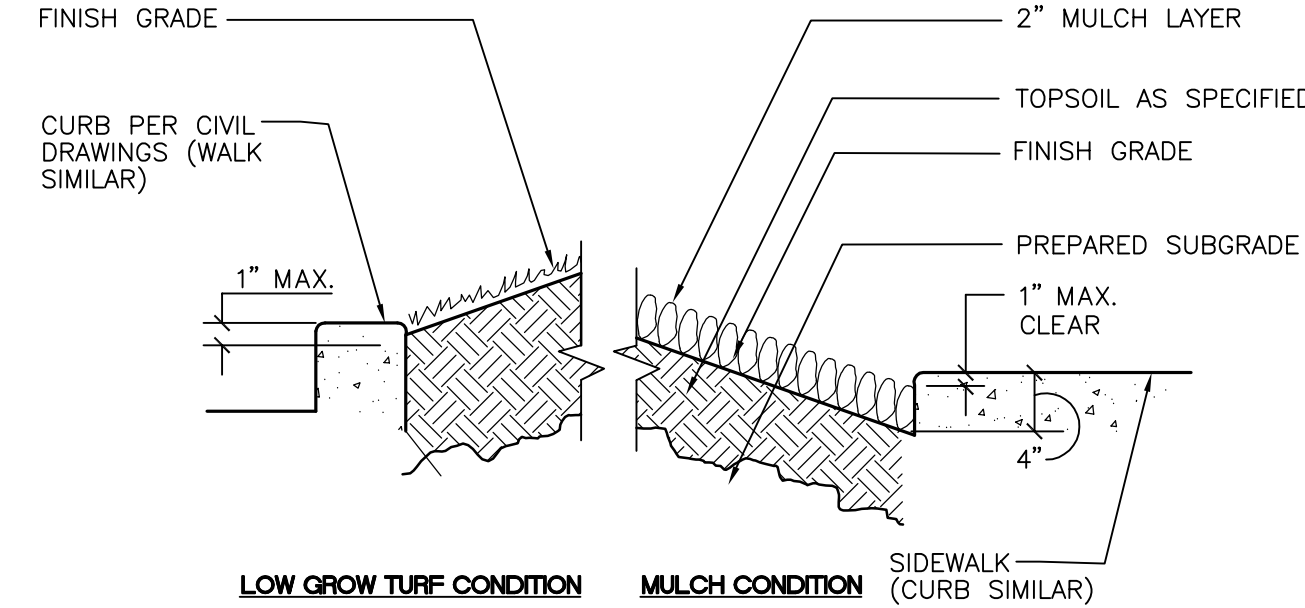
GROUNDCOVER PLANTING DETAIL

NOT TO SCALE



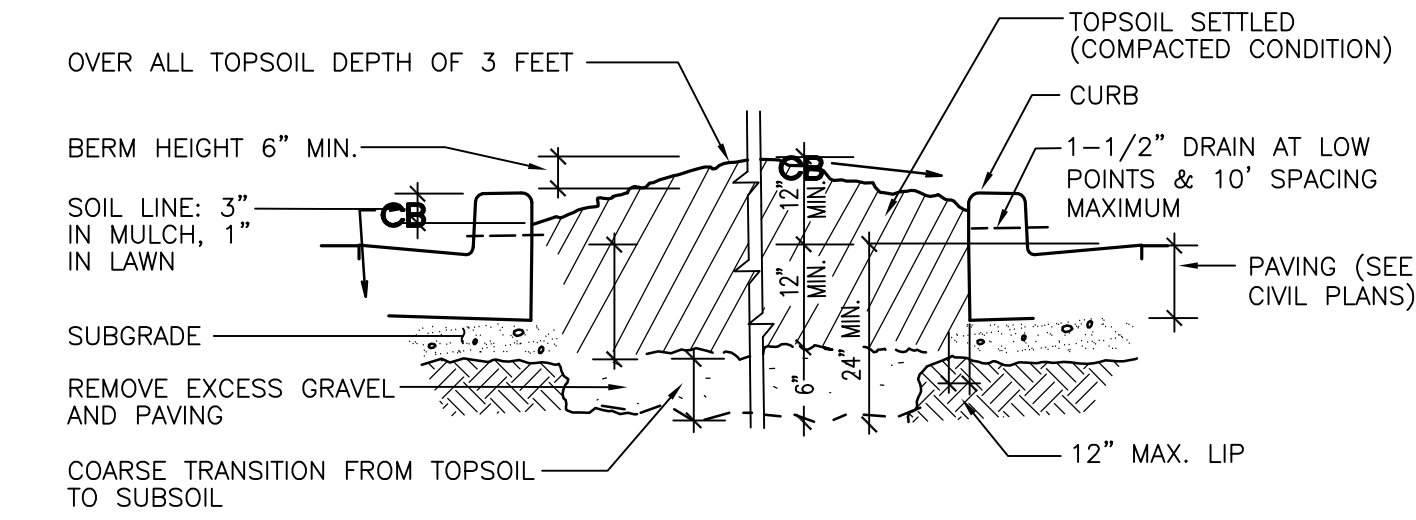
PLANT MATERIAL SPACING DETAIL

NOT TO SCALE



PLANTER SECTION DETAIL

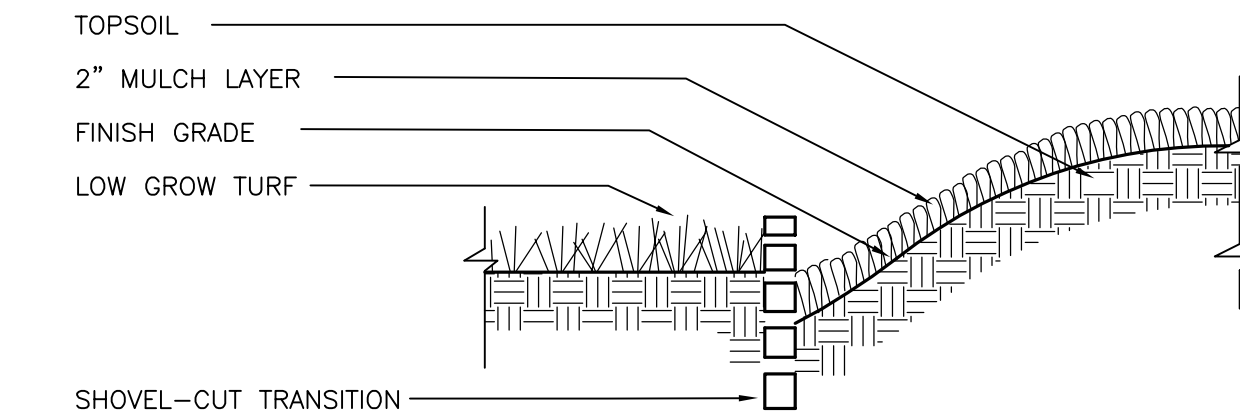
NOT TO SCALE



NOTE:  
OVER EXCAVATE PARKING LOT PLANTERS TO LOOSEN COMPACTED SUBBASE

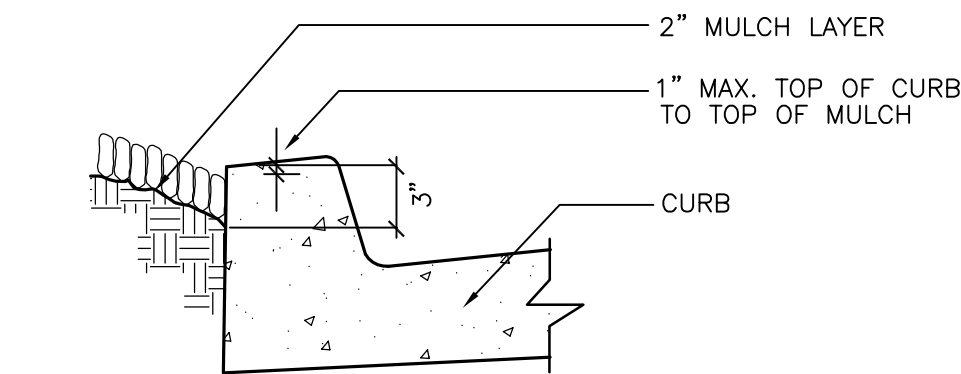
GRADING • PARKING LOT PLANTERS DETAIL

NOT TO SCALE



PLANTING BED ADJACENT TO LAWN DETAIL

NOT TO SCALE



MULCH AT CURB DETAIL

NOT TO SCALE

| REVISIONS |            |                                               |
|-----------|------------|-----------------------------------------------|
| 4         | 10/29/2018 | REVISED PER COMMENTS                          |
| 5         | 4/2/2019   | REVISED PER COMMENTS                          |
| 6         | 9/26/2019  | REVISED WETLAND CREATION AREA                 |
| 7         | 10/16/2019 | PLANT MATERIAL AT TOP OF ROCK WALLS           |
| 8         | 5/22/2020  | REVISED PER COMMENTS                          |
| 9         | 10/21/2020 | REVISED PER COMMENTS                          |
| 10        | 1/21/2021  | REVISED PER CITY REVIEW COMMENTS JANUARY 2021 |
| 11        | 3/11/2021  | REVISED, TREES #416 AND #417                  |



BARGHAUSEN CONSULTING ENGINEERS INC.

18215 72ND AVENUE SOUTH  
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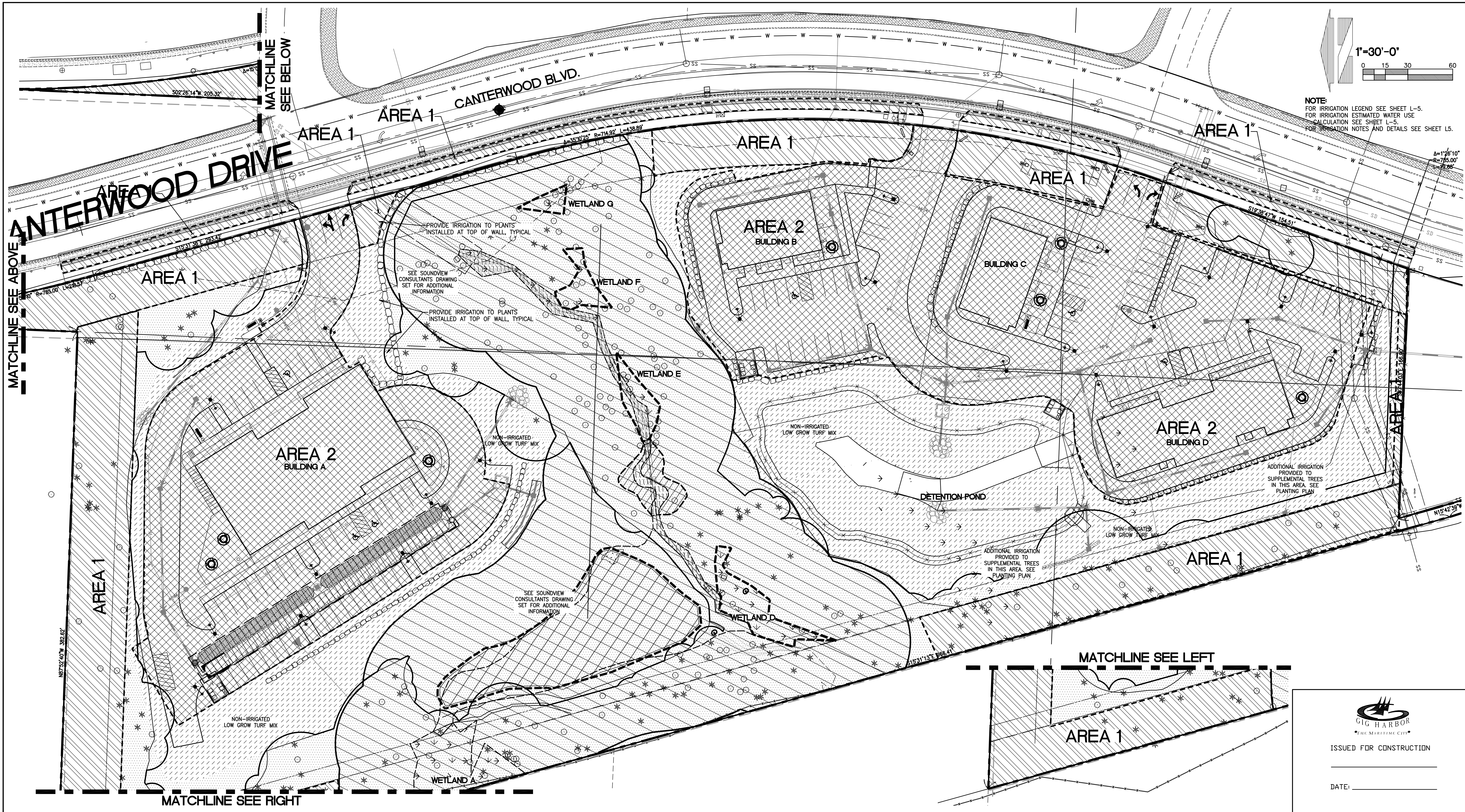
|              |     |
|--------------|-----|
| DESIGNED BY: | JMV |
| DRAWN BY:    | JMV |
| CHECKED BY:  | KEH |
| APPROVED BY: | JGH |
| SCALE:       |     |
| OTHER:       |     |

SWEDE HILL, LLC  
P.O. BOX 1397  
TACOMA, WA 98401

| PRELIMINARY LANDSCAPE NOTES AND DETAILS |  | PERMIT NO.        |
|-----------------------------------------|--|-------------------|
| CANTERWOOD COMMERCIAL CENTER GIG HARBOR |  | DRAWING NO.       |
|                                         |  | SHEET OF<br>L-3 8 |







| REVISIONS |            |                                               |  |
|-----------|------------|-----------------------------------------------|--|
| 4         | 10/29/2018 | REVISED PER COMMENTS                          |  |
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**BARGHAUSEN**  
CONSULTING ENGINEERS, INC.

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DESIGNED BY: JMV  
DRAWN BY: JMV  
CHECKED BY: KEH  
APPROVED BY: JGH  
SCALE:  
OTHER:

**SWEDE HILL, LLC**  
**P.O. BOX 1397**  
**TACOMA, WA 98401**

**PRELIMINARY IRRIGATION PLAN**  
  
**CANTERWOOD COMMERCIAL CENTER**  
**GIG HARBOR**

PERMIT NO.  
DRAWING NO.  
SHEET L-4 OF 8

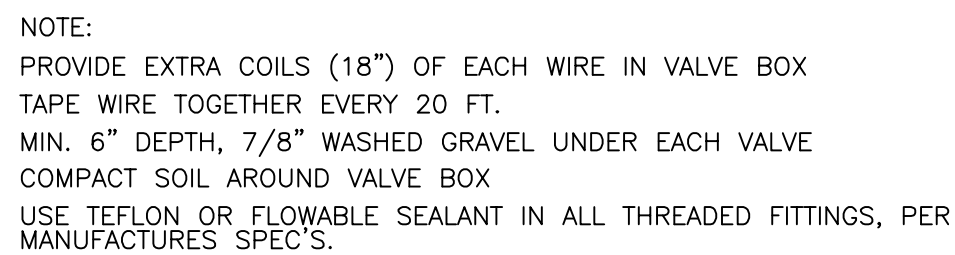
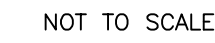
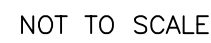


**STATE OF WASHINGTON**  
**JEFF M. VARLEY**  
**PROFESSIONAL ENGINEER**  
**LANDSCAPE ARCHITECT**  
**LICENSE NO. 714 EXP. 12/31/2021**



1. GENERAL CONTRACTOR AND LANDSCAPE CONTRACTOR TO COORDINATE:
  - A. INSTALLATION OF 110V ELECTRICAL SERVICE FROM ELECTRICAL SOURCE TO AUTOMATIC CONTROLLER, INCLUDING WIRE HOOK-UP INTO MOUNTED CONTROLLER. IRRIGATION CONTRACTOR WILL MOUNT CONTROLLER PER DESIGN AND COORDINATE WITH GENERAL CONTRACTOR.
  - B. INSTALLATION OF IRRIGATION/SERVICE METER AND STUB TO IRRIGATION POINT OF CONNECTION, PER UTILITY PLAN(S). PROVIDE STANDARD THREADED STUB-OUT WITH THREADED CAP ON DISCHARGE SIDE OF METER. STUB-OUT TO BE INSTALLED APPROXIMATELY 18 INCHES BELOW FINISHED GRADE.
  - C. VERIFICATION OF STATIC WATER PRESSURE AT POINT-OF-CONNECTION (P.O.C.) CONTRACTOR SHALL NOTIFY OWNER AND BARGHAUSEN CONSULTING ENGINEERS, INC., OF ANY VARIATION IN STATIC PRESSURE OVER 5 PSI GREATER/LESS THAN DESIGN PRESSURE.
  - D. INSTALLATION OF SLEEVING.
2. LANDSCAPE CONTRACTOR TO TEST AVAILABLE WATER PRESSURE FOR PROPOSED IRRIGATION SYSTEM AND PROVIDE WRITTEN TEST RESULTS PRIOR TO BEGINNING ANY WORK.
3. ALL WORK PER LOCAL CODE. INSTALLATION PER MANUFACTURER'S WRITTEN SPECIFICATIONS.
4. ALL VALVES TO BE PLACED IN "CARSON" GRADE LEVEL BOXES WITH BOLT-LOCK LIDS (OR APPROVED EQUIVALENT). SET BOXES 2 INCHES HIGHER THAN FINISH GRADE IN MULCH AREAS AND FLUSH WITH FINISH GRADE IN LAWN AREAS.
5. MAINLINE PIPE TO BE BURIED 18 INCHES AND LATERALS 12 INCHES BELOW FINISH GRADE. NO ROCK OR DEBRIS TO BE BACKFILLED OVER PIPE.
6. HEAD AND LINE POSITIONING IS DIAGRAMMATIC ON PLAN. ADJUST IN FIELD AS NECESSARY FOR ADEQUATE COVERAGE. VALVES TO BE POSITIONED ADJACENT TO PAVEMENT/CURBS, IN SHRUB BEDS WHERE POSSIBLE.
7. PROVIDE OWNER WITH TWO (2) SETS "AS-BUILT" DRAWINGS AND OPERATOR'S MANUAL UPON COMPLETION. INSTRUCT OWNER AS TO PROPER WINTERIZATION OF IRRIGATION SYSTEM (BLOW OUT).
8. FAMILIARIZE OWNERS FACILITY OPERATOR WITH IRRIGATION SYSTEM FUNCTION, CONTROLLER PROGRAMMING, SYSTEM OPERATION AND MAINTENANCE REQUIREMENTS.
9. SPRINKLERS ON RISERS WILL NOT BE ALLOWED UNLESS NOTED ON PLANS.
10. RADIUS REDUCTION TO BE MADE BY USE OF PRESSURE ADJUSTMENT, SCREENS, AND/OR ALTERNATE NOZZLES. IN-NOZZLE ADJUSTMENT IS LIMITED TO 10 PERCENT FOR SPRAY HEADS AND PER MANUFACTURER'S LIMITS FOR OTHER SPRINKLERS. SPRINKLER SPACING NOT EXCEED 60% OF THE DIAMETER OF THE PUBLISHED DATA.
11. ALL CONTROL WIRE SPLICES TO BE MADE AT VALVE BOXES WITH WATER TIGHT ELECTRICAL SPLICES, 3M, SCOTT'S LOCK SEAL TACK 3576-78, OR EQUIVALENT.
12. EACH VALVE BOX TO CONTAIN A MINIMUM OF ONE (1) SPARE ORANGE CONTROL WIRE FOR JACKETED WIRE. ROUTE ONE SPARE WIRE FROM THE CONTROLLER TO THE LAST VALVE OF EACH MAINLINE BRANCH. COMMON WIRE TO BE WHITE. SINGLE STRAND WIRE TO BE A MINIMUM OF 14 GAUGE WITH SPARE WIRE TO BE YELLOW.
13. ALL ELECTRICAL EQUIPMENT TO BE U.L. TESTED AND APPROVED, AND BEAR THE U.L. LABEL.
14. CROSS CONNECTION PROTECTION INSPECTION REQUIRED. THE BACKFLOW DEVICE TO BE TESTED UPON THE ORIGINAL INSTALLATION. THE TESTING TO BE PERFORMED BY A PERSON HOLDING A CURRENT CERTIFICATE AS A BACKFLOW TESTER. THE TEST REPORT TO BE SUBMITTED TO THE LOCAL WATER DISTRICT, OR PURVEYOR, AND OWNER WITH A COPY TO BARGHAUSEN CONSULTING ENGINEERS, INC. CONTRACTOR TO INCLUDE TESTING IN THE SCOPE OF WORK. OWNER IS RESPONSIBLE FOR ANNUAL INSPECTIONS AFTER THE INTIAL INSPECTION.
15. CONTRACTOR TO PROVIDE SYSTEM WINTERIZATION/SPRING SERVICE WHEN INSTALLATION HAS BEEN COMPLETED WITHIN 90 DAYS OF NOVEMBER 1 FOR WINTERIZATION, OR MAY 15 FOR SPRING SERVICE. SERVICE TO BE PERFORMED AS NEAR AS PRACTICAL TO THE ABOVE DATES, OR AS FREEZE/PRECIPIATION CONDITIONS DETERMINE SERVICE NEEDED.
16. IRRIGATION SCHEDULING:

THE IRRIGATION CONTROLLER CONTAINS A WATER BUDGET FEATURE. PERIODIC (WEEKLY) ADJUSTMENT OF THE WATER SCHEDULE IS INTENDED TO BE MADE VIA BUDGET ADJUSTMENT. RE-ADJUST WATERING DAYS AT 100 PERCENT BUDGET WHEN ADJUSTMENT EXCEEDS 30%. SET CONTROLLER FOR HIGHEST ET<sub>0</sub> WATER SCHEDULE, BASED ON PUBLISHED LOCAL EVAPOTRANSPIRATION DATA. SYSTEM HAS BEEN DESIGNED FOR 50 TO 80 PERCENT DISTRIBUTION UNIFORMITY. LAWN ZONES SHOULD BE SCHEDULED FOR 100 PERCENT REPLACEMENT FACTOR ON A TYPICAL MINIMUM 3-DAY CYCLE. SHRUB ZONES SHOULD BE PROGRAMMED AT 40 TO 70 PERCENT OF THE MONTHLY LAWN WATER REQUIREMENT ON A ONCE PER WEEK CYCLE. ALL WATERING IN EXCESS OF THE LOCAL ET<sub>0</sub> ("FIELD RECHARGE") TO BE COMPLETED DURING THE CONSTRUCTION PHASE WHILE THE CONTRACTOR IS ON THE JOB SITE. OVER WATERING OF LANDSCAPE DUE TO CONTROLLER SCHEDULING TO BE GROUNDS FOR CONTRACTOR TO REPAIR ANY RESULTANT DAMAGES AT CONTRACTOR'S OWN EXPENSE.
17. SUBSTITUTION OF IRRIGATION MATERIAL/EQUIPMENT TO BE MADE ONLY UPON WRITTEN APPROVAL OF OWNER'S REPRESENTATIVE.
18. ALL ZONES TO PASS A MINIMUM DISTRIBUTION UNIFORMITY OF 62 PERCENT, AS TESTED THROUGH AN IRRIGATION ASSOCIATION CERTIFIED WATER AUDIT.



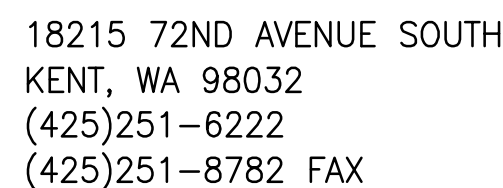
NOT TO SCALE



NON-IRRIGATED NATIVE  
AREAS AND HYDROSEED  
LOW GROW SEED MIX  
(79,200 SF)



| REVISIONS |            |                                               |  |
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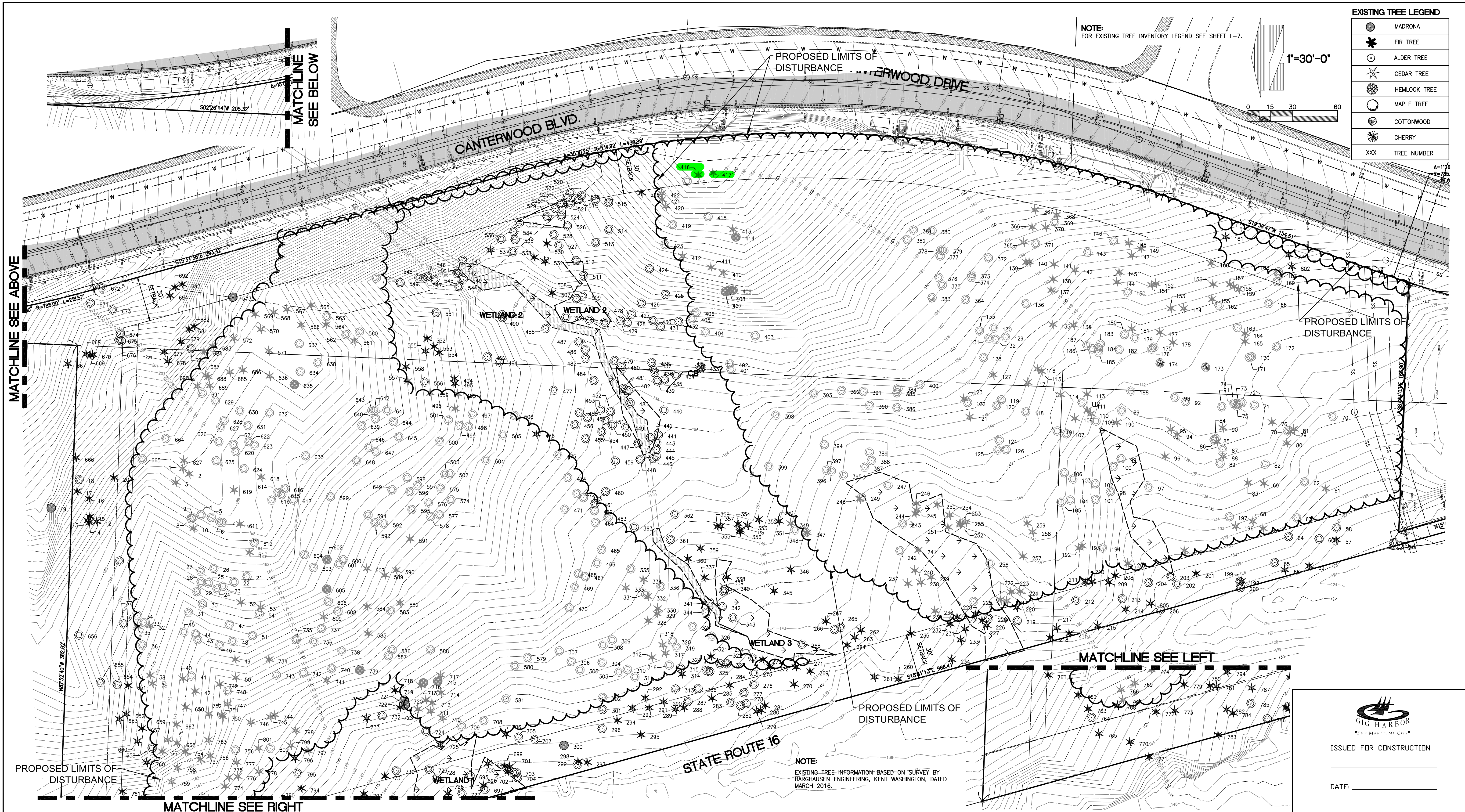
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| OTHER:       |     |

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**P.O. BOX 1397**  
**TACOMA, WA 98401**

|                                                                              |                                  |
|------------------------------------------------------------------------------|----------------------------------|
| <p align="center"><b>PRELIMINARY IRRIGATION<br/>LEGEND</b></p>               | <p>PERMIT NO.</p>                |
|                                                                              | <p>DRAWING NO.</p>               |
| <p align="center"><b>CANTERWOOD COMMERCIAL<br/>CENTER<br/>GIG HARBOR</b></p> | <p>SHEET OF</p>                  |
|                                                                              | <p align="center">L-5      8</p> |







EXISTING TREE LEGEND

- MADRONA
- FIR TREE
- ALDER TREE
- CEDAR TREE
- HEMLOCK TREE
- MAPLE TREE
- COTTONWOOD
- CHERRY
- XXX TREE NUMBER

| REVISIONS |            |                                               |
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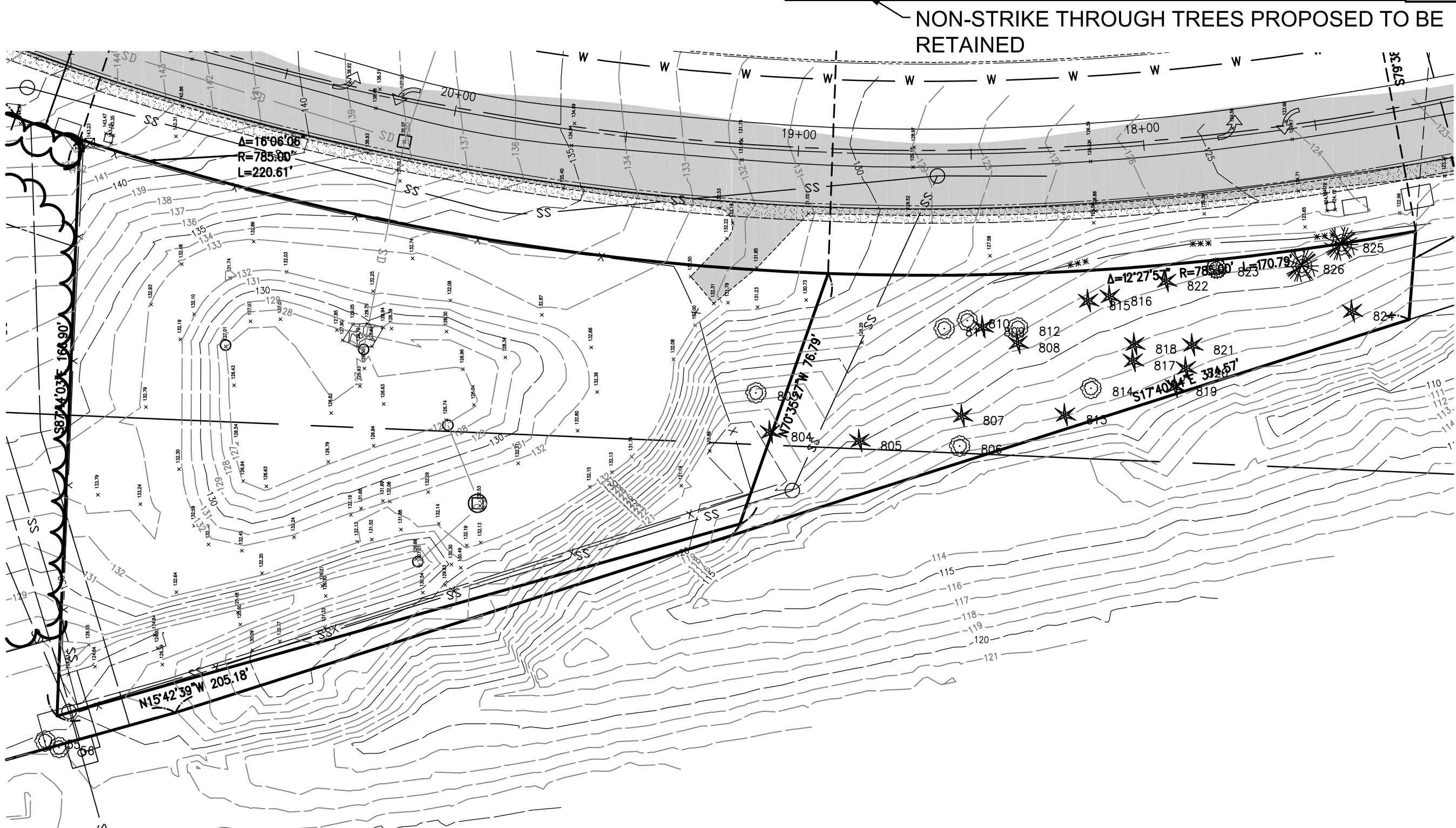
| EXISTING TREE INVENTORY PLAN               |  |
|--------------------------------------------|--|
| CANTERWOOD COMMERCIAL CENTER<br>GIG HARBOR |  |

|             |       |
|-------------|-------|
| PERMIT NO.  |       |
| DRAWING NO. |       |
| SHEET OF    | L-6 8 |





| TREE NUMBER | TYPE    | SIZE<br>(INCHES) | 46 | ALDER   | 10 | 92  | CHERRY  | 8    | 140 | FIR        | 26  | 187 | ALDER   | 9        | 234 | CEDAR   | 11  | 281 | FIR     | 8    | 328 | FIR     | 10 | 375 | ALDER   | 9       | 422 | HEMLOCK | 11     |
|-------------|---------|------------------|----|---------|----|-----|---------|------|-----|------------|-----|-----|---------|----------|-----|---------|-----|-----|---------|------|-----|---------|----|-----|---------|---------|-----|---------|--------|
|             |         |                  | 47 | MAPLE   | 9  | 94  | FIR     | 30   | 141 | FIR        | 18  | 188 | ALDER   | 8        | 235 | CEDAR   | 24  | 282 | ALDER   | 20   | 329 | FIR     | 9  | 376 | ALDER   | 6       | 423 | MAPLE   | 16,6   |
| 1           | CEDAR   | 7                | 48 | ALDER   | 6  | 95  | HEMLOCK | 18   | 142 | CEDAR      | 30  | 189 | MAPLE   | 19       | 236 | FIR     | 50  | 283 | ALDER   | 7    | 330 | FIR     | 9  | 377 | ALDER   | 6       | 424 | MAPLE   | 16     |
| 2           | FIR     | 20               | 49 | FIR     | 14 | 96  | FIR     | 24   | 143 | MAPLE      | 18  | 190 | CEDAR   | 28       | 237 | FIR     | 36  | 284 | FIR     | 17   | 331 | ALDER   | 7  | 378 | ALDER   | 7       | 425 | ALDER   | 7      |
| 3           | FIR     | 24               | 50 | FIR     | 19 | 97  | ALDER   | 9,18 | 144 | CEDAR      | 15  | 191 | MAPLE   | 14       | 238 | CEDAR   | 27  | 285 | FIR     | 15   | 332 | CEDAR   | 12 | 379 | ALDER   | 7       | 426 | MAPLE   | 22     |
| 4           | MAPLE   | 11               | 51 | MAPLE   | 11 | 98  | ALDER   | 9    | 145 | CEDAR      | 20  | 192 | CEDAR   | 12       | 239 | CEDAR   | 11  | 286 | ALDER   | 7    | 333 | CEDAR   | 15 | 380 | ALDER   | 7       | 427 | ALDER   | 9      |
| 5           | MAPLE   | 10               | 52 | HEMLOCK | 22 | 99  | ALDER   | 11   | 146 | MAPLE      | 19  | 193 | CEDAR   | 36       | 240 | CEDAR   | 27  | 287 | ALDER   | 7,7  | 334 | FIR     | 40 | 381 | ALDER   | 6       | 428 | ALDER   | 7      |
| 6           | MAPLE   | 15               | 53 | FIR     | 26 | 100 | ALDER   | 15   | 147 | CEDAR      | 15  | 194 | ALDER   | 6        | 241 | CEDAR   | 24  | 288 | FIR     | 17   | 335 | ALDER   | 11 | 382 | ALDER   | 7       | 429 | ALDER   | 7      |
| 7           | MAPLE   | 11               | 54 | MAPLE   | 15 | 101 | ALDER   | 6    | 148 | FIR        | 12  | 195 | CEDAR   | 24       | 242 | MAPLE   | 15  | 289 | FIR     | 17   | 336 | ALDER   | 7  | 383 | ALDER   | 6       | 430 | ALDER   | 10     |
| 8           | MAPLE   | 15,20            | 55 | ALDER   | 10 | 102 | ALDER   | 6    | 149 | FIR        | 12  | 196 | CEDAR   | 28       | 243 | MAPLE   | 12  | 290 | FIR     | 9    | 337 | FIR     | 24 | 384 | ALDER   | 10      | 431 | ALDER   | 6      |
| 9           | MAPLE   | 6                | 56 | ALDER   | 7  | 103 | ALDER   | 6    | 150 | MAPLE      | 24  | 197 | ALDER   | 12       | 244 | CEDAR   | 19  | 291 | FIR     | 16   | 338 | FIR     | 24 | 385 | ALDER   | 6       | 432 | ALDER   | 6      |
| 10          | FIR     | 24               | 57 | HEMLOCK | 22 | 104 | ALDER   | 13   | 151 | FIR        | 12  | 198 | FIR     | 10       | 245 | CEDAR   | 6   | 292 | FIR     | 13,7 | 339 | ALDER   | 9  | 386 | ALDER   | 7       | 433 | CHERRY  | 11     |
| 11          | ALDER   | 18               | 58 | ALDER   | 20 | 105 | ALDER   | 6    | 152 | FIR        | 23  | 199 | ALDER   | 9        | 246 | CEDAR   | 27  | 293 | FIR     | 15   | 340 | ALDER   | 9  | 387 | ALDER   | 7       | 434 | MAPLE   | 6,7,15 |
| 12          | CEDAR   | 11               | 59 | HEMLOCK | 20 | 106 | ALDER   | 7    | 153 | FIR        | 20  | 200 | ALDER   | 10       | 247 | MAPLE   | 15  | 294 | FIR     | 10   | 341 | ALDER   | 10 | 388 | ALDER   | 6       | 435 | MAPLE   | 12     |
| 13          | CEDAR   | 6                | 60 | MAPLE   | 18 | 107 | MAPLE   | 16   | 154 | FIR        | 19  | 201 | FIR     | 36       | 248 | HEMLOCK | 22  | 295 | FIR     | 20   | 342 | ALDER   | 10 | 389 | ALDER   | 6       | 436 | ALDER   | 9      |
| 14          | CEDAR   | 6                | 61 | FIR     | 30 | 108 | CEDAR   | 22   | 155 | FIR        | 17  | 202 | ALDER   | 6        | 249 | MAPLE   | 11  | 296 | MAPLE   | 10,9 | 343 | ALDER   | 12 | 390 | ALDER   | 7       | 437 | ALDER   | 10     |
| 15          | FIR     | 24               | 62 | ALDER   | 10 | 109 | MAPLE   | 14   | 156 | CEDAR      | 36  | 203 | ALDER   | 11       | 250 | CEDAR   | 48  | 297 | HEMLOCK | 10   | 344 | ALDER   | 10 | 391 | ALDER   | 7       | 438 | ALDER   | 6      |
| 16          | FIR     | 20               | 63 | ALDER   | 7  | 110 | CEDAR   | 15   | 157 | FIR        | 15  | 204 | ALDER   | 11       | 251 | CEDAR   | 26  | 298 | CEDAR   | 12   | 345 | FIR     | 32 | 392 | ALDER   | 8       | 439 | MAPLE   | 5,9,10 |
| 17          | FIR     | 16               | 64 | ALDER   | 9  | 111 | CEDAR   | 28   | 158 | FIR        | 27  | 205 | CEDAR   | 15,6     | 252 | CEDAR   | 6   | 299 | ALDER   | 9    | 346 | FIR     | 34 | 393 | ALDER   | 7       | 440 | MAPLE   | 18     |
| 18          | MAPLE   | 37               | 65 | ALDER   | 17 | 112 | ALDER   | 15   | 159 | CEDAR      | 15  | 206 | ALDER   | 11       | 253 | FIR     | 21  | 300 | MADRONA | 22   | 347 | HEMLOCK | 16 | 394 | ALDER   | 7       | 441 | ALDER   | 7      |
| 19          | MADRONA | 15,18            | 66 | HEMLOCK | 20 | 113 | CEDAR   | 24   | 160 | FIR        | 16  | 207 | HEMLOCK | 24       | 254 | CEDAR   | 17  | 301 | ALDER   | 9    | 348 | ALDER   | 9  | 395 | ALDER   | 7       | 442 | ALDER   | 7      |
| 20          | FIR     | 22               | 67 | FIR     | 30 | 114 | CEDAR   | 6    | 161 | FIR        | 16  | 208 | HEMLOCK | 20       | 255 | CEDAR   | 6   | 302 | ALDER   | 6    | 349 | FIR     | 10 | 396 | ALDER   | 10      | 443 | ALDER   | 8      |
| 21          | MAPLE   | 10,6             | 68 | FIR     | 30 | 115 | CEDAR   | 10   | 162 | ALDER      | 9   | 209 | CEDAR   | 24       | 256 | ALDER   | 6   | 303 | ALDER   | 7    | 350 | HEMLOCK | 10 | 397 | ALDER   | 8       | 444 | ALDER   | 6      |
| 22          | ALDER   | 10               | 69 | HEMLOCK | 16 | 116 | CEDAR   | 30   | 163 | ALDER      | 6   | 210 | CEDAR   | 52       | 257 | CEDAR   | 20  | 304 | ALDER   | 14   | 351 | ALDER   | 11 | 398 | ALDER   | 7       | 445 | ALDER   | 6      |
| 23          | ALDER   | 9                | 70 | ALDER   | 14 | 117 | CEDAR   | 24   | 164 | FIR        | 26  | 211 | FIR     | 27       | 258 | CEDAR   | 32  | 305 | ALDER   | 14   | 352 | FIR     | 15 | 399 | ALDER   | 7       | 446 | ALDER   | 7      |
| 24          | ALDER   | 8                | 71 | ALDER   | 6  | 118 | MAPLE   | 6    | 165 | FIR        | 20  | 212 | ALDER   | 11       | 259 | CEDAR   | 17  | 306 | MAPLE   | 22   | 353 | HEMLOCK | 12 | 400 | ALDER   | 7       | 447 | ALDER   | 7      |
| 25          | ALDER   | 8                | 72 | ALDER   | 6  | 119 | ALDER   | 14   | 166 | ALDER      | 9   | 213 | ALDER   | 12       | 260 | CEDAR   | 36  | 307 | MAPLE   | 27   | 354 | HEMLOCK | 12 | 401 | CHERRY  | 10      | 448 | ALDER   | 7      |
| 26          | ALDER   | 8                | 73 | ALDER   | 7  | 120 | ALDER   | 9    | 167 | ALDER      | 10  | 214 | CEDAR   | 15,15    | 261 | FIR     | 48  | 308 | ALDER   | 7,7  | 355 | CEDAR   | 6  | 402 | ALDER   | 8       | 449 | MAPLE   | 12     |
| 27          | ALDER   | 8                | 74 | ALDER   | 7  | 121 | FIR     | 22   | 168 | ALDER      | 6   | 215 | FIR     | 12       | 262 | HEMLOCK | 16  | 309 | MAPLE   | 14   | 356 | CEDAR   | 14 | 403 | ALDER   | 10      | 450 | ALDER   | 7      |
| 28          | ALDER   | 8                | 75 | ALDER   | 7  | 122 | ALDER   | 6    | 169 | ALDER      | 6   | 216 | FIR     | 27       | 263 | CEDAR   | 9   | 310 | MAPLE   | 9    | 357 | CEDAR   | 12 | 404 | ALDER   | 7       | 451 | ALDER   | 10     |
| 29          | ALDER   | 10               | 76 | CEDAR   | 10 | 123 | FIR     | 24   | 170 | CHERRY     | 8   | 217 | CEDAR   | 19       | 264 | CEDAR   | 6   | 311 | ALDER   | 7    | 358 | FIR     | 26 | 405 | ALDER   | 7       | 452 | MAPLE   | 10,6,6 |
| 30          | ALDER   | 8                | 77 | FIR     | 19 | 124 | ALDER   | 11   | 171 | CHERRY     | 6   | 218 | CEDAR   | 32       | 265 | ALDER   | 10  | 312 | FIR     | 13   | 359 | FIR     | 24 | 406 | ALDER   | 7       | 453 | ALDER   | 10     |
| 31          | ALDER   | 9                | 78 | MAPLE   | 26 | 125 | ALDER   | 11   | 172 | ALDER      | 12  | 219 | ALDER   | 12       | 266 | ALDER   | 10  | 313 | ALDER   | 11   | 360 | CEDAR   | 40 | 407 | MADRONA | 12      | 454 | ALDER   | 9      |
| 32          | FIR     | 21               | 79 | FIR     | 24 | 126 | ALDER   | 7    | 173 | COTTONWOOD | 6   | 220 | CEDAR   | 19       | 267 | CEDAR   | 6   | 314 | FIR     | 15   | 361 | ALDER   | 14 | 408 | MADRONA | 6       | 455 | ALDER   | 7      |
| 33          | ALDER   | 22               | 80 | CEDAR   | 12 | 127 | HEMLOCK | 16   | 174 | COTTONWOOD | 11  | 221 | CEDAR   | 24       | 268 | ALDER   | 7   | 315 | ALDER   | 6    | 362 | ALDER   | 7  | 409 | MADRONA | 7       | 456 | ALDER   | 7      |
| 34          | MAPLE   | 11               | 81 | CEDAR   | 7  | 128 | ALDER   | 6    | 175 | CHERRY     | 6   | 222 | CEDAR   | 15,18,6  | 269 | CEDAR   | 36  | 316 | ALDER   | 8    | 363 | MAPLE   | 17 | 410 | FIR     | 29      | 457 | ALDER   | 6      |
| 35          | HEMLOCK | 9                | 82 | ALDER   | 13 | 129 | ALDER   | 7    | 176 | ALDER      | 6   | 223 | CEDAR   | 19       | 270 | CEDAR   | 10  | 317 | FIR     | 7    | 364 | ALDER   | 7  | 411 | FIR     | 29      | 458 | MAPLE   | 27     |
| 36          | MAPLE   | 22               | 83 | FIR     | 10 | 130 | MAPLE   | 12   | 177 | CEDAR      | 10  | 224 | CEDAR   | 20       | 271 | CEDAR   | 29  | 318 | FIR     | 6    | 365 | FIR     | 19 | 412 | FIR     | 37      | 459 | ALDER   | 6      |
| 37          | MAPLE   | 14               | 84 | ALDER   | 12 | 131 | ALDER   | 6    | 178 | FIR        | 22  | 225 | MAPLE   | 12       | 272 | CEDAR   | 30  | 319 | ALDER   | 8    | 366 | FIR     | 18 | 413 | HEMLOCK | 16      | 460 | ALDER   | 7      |
| 38          | FIR     | 22               | 85 | ALDER   | 8  | 132 | ALDER   | 6    | 179 | ALDER      | 10  | 226 | CEDAR   | 12       | 273 | CEDAR   | 38  | 320 | ALDER   | 7    | 367 | FIR     | 19 | 414 | MADRONA | 7       | 461 | ALDER   | 6      |
| 39          | CEDAR   | 10               | 86 | FIR     | 8  | 133 | ALDER   | 10   | 180 | ALDER      | 6,7 | 227 | CEDAR   | 21       | 274 | ALDER   | 14  | 321 | FIR     | 15   | 368 | HEMLOCK | 22 | 415 | MAPLE   | 9,12,17 | 462 | ALDER   | 6      |
| 40          | FIR     | 15               | 87 | ALDER   | 10 | 134 | CEDAR   | 34   | 181 | FIR        | 23  | 228 | CEDAR   | 24       | 275 | ALDER   | 6,7 | 322 | ALDER   | 8    | 369 | MAPLE   | 18 | 416 | FIR     | 18      | 463 | ALDER   | 7      |
| 41          | MAPLE   | 28               | 88 | FIR     | 8  | 135 | CEDAR   | 8    | 182 | ALDER      | 6   | 229 | ALDER   | 15       | 276 | ALDER   | 8   | 323 | ALDER   | 6    | 370 | FIR     | 7  | 417 | FIR     | 17      | 464 | ALDER   | 8      |
| 42          | CEDAR   | 11               | 89 | ALDER   | 8  | 136 | MAPLE   | 12   | 183 | ALDER      | 6   | 230 | CEDAR   | 14       | 277 | ALDER   | 10  | 324 | ALDER   | 7    | 371 | ALDER   | 10 | 418 | MAPLE   | 9       | 465 | ALDER   | 7      |
| 43          | ALDER   | 9                | 90 | HEMLOCK | 20 | 137 | CEDAR   | 15   | 184 | ALDER      | 6   | 231 | CEDAR   | 19       | 278 | ALDER   | 12  | 325 | ALDER   | 7    | 372 | ALDER   | 6  | 419 | MAPLE   | 36      | 466 | ALDER   | 7      |
| 44          | ALDER   | 7                | 91 | ALDER   | 6  | 138 | FIR     | 26   | 185 | ALDER      | 8   | 232 | CEDAR   | 19       | 279 | FIR     | 18  | 326 | ALDER   | 8    | 373 | ALDER   | 6  | 420 | HEMLOCK | 12      | 467 | ALDER   | 8      |
| 45          | ALDER   | 6                | 92 | ALDER   | 9  | 139 | CEDAR   | 15   | 186 | ALDER      | 7   | 233 | CEDAR   | 16,16,12 | 280 | FIR     | 9   | 327 | ALDER   | 6,6  | 374 | ALDER   | 6  | 421 | CEDAR   | 10      | 468 | ALDER   | 13     |



TREE RETENTION CALCULATIONS

ALDER AND COTTONWOOD TREES ARE NOT CONSIDERED SIGNIFICANT SO ARE NOT INCLUDED IN THE SIGNIFICANT TREE CALCULATIONS.

MINIMUM 25% OF EXISTING SIGNIFICANT TREES REQUIRED TO BE RETAINED  
497 TOTAL EXISTING SIGNIFICANT TREES  
290 TREES PROPOSED TO BE REMOVED  
207 TREES PROPOSED TO BE RETAINED

207 / 497 = 41.6% OF EXISTING TREES PROPOSED TO BE RETAINED



ISSUED FOR CONSTRUCTION

DATE: \_\_\_\_\_



BARGHAUSEN CONSULTING ENGINEERS INC.

18215 72ND AVENUE SOUTH  
KENT, WA 98032  
(425)251-6222  
(425)251-8782 FAX

DESIGNED BY: JMV  
DRAWN BY: JMV  
CHECKED BY: KEH  
APPROVED BY: JGH  
SCALE:  
OTHER:

SWEDE HILL, LLC  
P.O. BOX 1397  
TACOMA, WA 98401

EXISTING TREE INVENTORY  
LEGEND  
  
CANTERWOOD COMMERCIAL  
CENTER  
GIG HARBOR

PERMIT NO.

DRAWING NO.

SHEET OF  
L-7 8



| REVISIONS |            |                                               |
|-----------|------------|-----------------------------------------------|
| 4         | 10/29/2018 | REVISED PER COMMENTS                          |
| 5         | 4/2/2019   | REVISED PER COMMENTS                          |
| 6         | 9/26/2019  | REVISED WETLAND CREATION AREA                 |
| 7         | 10/16/2019 | PLANT MATERIAL AT TOP OF ROCK WALLS           |
| 8         | 5/22/2020  | REVISED PER COMMENTS                          |
| 9         | 10/21/2020 | REVISED PER COMMENTS                          |
| 10        | 1/21/2021  | REVISED PER CITY REVIEW COMMENTS JANUARY 2021 |
| 11        | 3/11/2021  | REVISED, TREES #416 AND #417                  |



|     |        |            |     |         |      |     |         |       |     |         |           |     |         |             |     |         |    |     |         |    |     |            |        |
|-----|--------|------------|-----|---------|------|-----|---------|-------|-----|---------|-----------|-----|---------|-------------|-----|---------|----|-----|---------|----|-----|------------|--------|
| 469 | ALDER  | 8          | 516 | FIR     | 12   | 563 | MAPLE   | 6     | 610 | FIR-    | 26        | 657 | FIR     | 29          | 704 | ALDER   | 11 | 751 | FIR-    | 11 | 798 | FIR-       | 24     |
| 470 | ALDER  | 9          | 517 | MAPLE   | 10   | 564 | FIR-    | 26    | 611 | FIR-    | 25        | 658 | MAPLE   | 15          | 705 | ALDER   | 9  | 752 | CEDAR   | 10 | 799 | FIR-       | 19     |
| 471 | ALDER  | 13         | 518 | ALDER   | 6    | 565 | FIR-    | 20    | 612 | MAPLE   | 6         | 659 | FIR-    | 11          | 706 | CEDAR   | 34 | 753 | FIR-    | 24 | 800 | MAPLE      | 12     |
| 472 | ALDER  | 9          | 519 | ALDER   | 6    | 566 | FIR-    | 16    | 613 | MAPLE   | 6         | 660 | FIR     | 12          | 707 | ALDER   | 6  | 754 | FIR-    | 17 | 801 | FIR-       | 26     |
| 473 | ALDER  | 7          | 520 | ALDER   | 11   | 567 | FIR-    | 19    | 614 | MAPLE   | 8         | 661 | FIR-    | 30          | 708 | MAPLE   | 9  | 755 | FIR-    | 6  | 802 | FIR        | 20     |
| 474 | ALDER  | 7          | 521 | ALDER   | 11   | 568 | HEMLOCK | 13    | 615 | MAPLE   | 7         | 662 | FIR-    | 26          | 709 | ALDER   | 19 | 756 | MAPLE   | 11 | 803 | ALDER      | 18     |
| 475 | ALDER  | 7          | 522 | ALDER   | 12   | 569 | FIR-    | 24    | 616 | CHERRY  | 14        | 663 | FIR-    | 19          | 710 | FIR-    | 22 | 757 | FIR-    | 32 | 804 | FIR        | 21     |
| 476 | CEDAR  | 36         | 523 | ALDER   | 7    | 570 | FIR-    | 16    | 617 | CHERRY  | 6         | 664 | ALDER   | 6           | 711 | FIR-    | 8  | 758 | FIR-    | 26 | 805 | FIR        | 36     |
| 477 | MAPLE  | 22, 9      | 524 | ALDER   | 8    | 571 | FIR-    | 19    | 618 | HEMLOCK | 18        | 665 | MAPLE   | 6, 8, 9, 26 | 712 | FIR-    | 13 | 759 | FIR-    | 6  | 806 | ALDER      | 7, 11  |
| 478 | ALDER  | 7          | 525 | ALDER   | 9    | 572 | CEDAR   | 6     | 619 | FIR-    | 27        | 666 | FIR     | 13          | 713 | FIR-    | 48 | 760 | FIR     | 19 | 807 | FIR        | 21     |
| 479 | ALDER  | 8          | 526 | ALDER   | 7    | 573 | MADRONA | 29    | 620 | MAPLE   | 6         | 667 | HEMLOCK | 7           | 714 | FIR-    | 7  | 761 | FIR     | 20 | 808 | FIR        | 9      |
| 480 | ALDER  | 9          | 527 | ALDER   | 8    | 574 | ALDER   | 6     | 621 | ALDER   | 6         | 668 | CEDAR   | 11          | 715 | MADRONA | 23 | 762 | FIR     | 13 | 809 | FIR        | 11     |
| 481 | ALDER  | 6          | 528 | ALDER   | 11   | 575 | ALDER   | 8     | 622 | ALDER   | 6         | 669 | CEDAR   | 9           | 716 | MADRONA | 16 | 763 | FIR     | 15 | 810 | ALDER      | 6      |
| 482 | ALDER  | 9          | 529 | ALDER   | 7    | 576 | ALDER   | 7     | 623 | ALDER   | 6         | 670 | CEDAR   | 6           | 717 | FIR-    | 26 | 764 | MAPLE   | 9  | 811 | MAPLE      | 13, 9  |
| 483 | ALDER  | 7          | 530 | HEMLOCK | 28   | 577 | ALDER   | 10    | 624 | ALDER   | 6         | 671 | ALDER   | 18          | 718 | FIR-    | 7  | 765 | CEDAR   | 17 | 812 | MAPLE      | 6      |
| 484 | ALDER  | 6          | 531 | HEMLOCK | 9    | 578 | ALDER   | 7     | 625 | ALDER   | 6         | 672 | ALDER   | 10, 11      | 719 | FIR     | 16 | 766 | FIR-    | 26 | 813 | CEDAR      | 17, 18 |
| 485 | ALDER  | 10         | 532 | CEDAR   | 9    | 579 | ALDER   | 24    | 626 | ALDER   | 6         | 673 | ALDER   | 7           | 720 | MADRONA | 15 | 767 | CEDAR   | 11 | 814 | MAPLE      | 24     |
| 486 | ALDER  | 8          | 533 | ALDER   | 12   | 580 | ALDER   | 18    | 627 | ALDER   | 7         | 674 | ALDER   | 6           | 721 | MADRONA | 8  | 768 | HEMLOCK | 13 | 815 | FIR        | 10     |
| 487 | ALDER  | 11         | 534 | ALDER   | 9    | 581 | ALDER   | 17    | 628 | MAPLE   | 6, 6      | 675 | ALDER   | 6           | 722 | FIR     | 6  | 769 | FIR-    | 24 | 816 | FIR        | 7      |
| 488 | ALDER  | 11         | 535 | ALDER   | 9    | 582 | FIR     | 23    | 629 | ALDER   | 7         | 676 | ALDER   | 6           | 723 | FIR-    | 10 | 770 | FIR     | 15 | 817 | FIR        | 6      |
| 489 | MAPLE  | 19         | 536 | ALDER   | 16   | 583 | ALDER   | 8     | 630 | ALDER   | 6         | 677 | CEDAR   | 6           | 724 | ALDER   | 12 | 771 | FIR     | 18 | 818 | CEDAR      | 24     |
| 490 | ALDER  | 6, 6       | 537 | CEDAR   | 36   | 584 | FIR-    | 19    | 631 | ALDER   | 7         | 678 | CEDAR   | 20, 6       | 725 | FIR     | 19 | 772 | FIR     | 12 | 819 | FIR        | 23     |
| 491 | MAPLE  | 19         | 538 | ALDER   | 12   | 585 | CEDAR   | 6     | 632 | CHERRY  | 11        | 679 | CEDAR   | 7           | 726 | CEDAR   | 19 | 773 | FIR     | 19 | 820 | FIR        | 23     |
| 492 | MAPLE  | 12, 13, 18 | 539 | ALDER   | 7    | 586 | ALDER   | 7     | 633 | MAPLE   | 48        | 680 | MAPLE   | 9, 21       | 727 | ALDER   | 15 | 774 | FIR-    | 23 | 821 | FIR        | 6      |
| 493 | FIR    | 24         | 540 | ALDER   | 6    | 587 | ALDER   | 7     | 634 | MAPLE   | 9, 12, 13 | 681 | CEDAR   | 8           | 728 | ALDER   | 14 | 775 | FIR-    | 23 | 822 | CEDAR      | 6      |
| 494 | FIR    | 17         | 541 | ALDER   | 8    | 588 | ALDER   | 8     | 635 | MADRONA | 12        | 682 | CEDAR   | 18          | 729 | ALDER   | 11 | 776 | FIR-    | 11 | 823 | COTTONWOOD | 14     |
| 495 | FIR-   | 15         | 542 | ALDER   | 7    | 589 | FIR-    | 16    | 636 | HEMLOCK | 14        | 683 | CEDAR   | 6           | 730 | ALDER   | 11 | 777 | FIR-    | 19 | 824 | FIR        | 13     |
| 496 | FIR-   | 18         | 543 | ALDER   | 9    | 590 | FIR-    | 23    | 637 | MAPLE   | 8         | 684 | HEMLOCK | 13          | 731 | FIR     | 30 | 778 | FIR-    | 9  | 825 | CHERRY     | 6      |
| 497 | MAPLE  | 6          | 544 | ALDER   | 9    | 591 | FIR-    | 32    | 638 | MAPLE   | 11        | 685 | CEDAR   | 6, 14       | 732 | MAPLE   | 21 | 779 | FIR     | 11 | 826 | CHERRY     | 6      |
| 498 | ALDER  | 8          | 545 | ALDER   | 8, 7 | 592 | MAPLE   | 11    | 639 | ALDER   | 6         | 686 | CEDAR   | 22          | 733 | FIR     | 13 | 780 | FIR     | 8  |     |            |        |
| 499 | MAPLE  | 7          | 546 | ALDER   | 8    | 593 | ALDER   | 11    | 640 | ALDER   | 7         | 687 | CEDAR   | 6           | 734 | FIR-    | 14 | 781 | CEDAR   | 36 |     |            |        |
| 500 | ALDER  | 7          | 547 | ALDER   | 7    | 594 | ALDER   | 10    | 641 | ALDER   | 8         | 688 | CEDAR   | 6           | 735 | ALDER   | 6  | 782 | FIR     | 22 |     |            |        |
| 501 | CHERRY | 6          | 548 | ALDER   | 8    | 595 | ALDER   | 6     | 642 | ALDER   | 7         | 689 | CEDAR   | 8           | 736 | ALDER   | 7  | 783 | FIR     | 36 |     |            |        |
| 502 | ALDER  | 9          | 549 | ALDER   | 10   | 596 | ALDER   | 10    | 643 | ALDER   | 10        | 690 | FIR-    | 14          | 737 | ALDER   | 6  | 784 | FIR     | 8  |     |            |        |
| 503 | ALDER  | 6          | 550 | ALDER   | 6    | 597 | ALDER   | 8     | 644 | ALDER   | 7         | 691 | MAPLE   | 9           | 738 | ALDER   | 8  | 785 | MAPLE   | 7  |     |            |        |
| 504 | MAPLE  | 7, 9       | 551 | ALDER   | 10   | 598 | MAPLE   | 9     | 645 | ALDER   | 6         | 692 | HEMLOCK | 15          | 739 | MADRONA | 19 | 786 | MAPLE   | 15 |     |            |        |
| 505 | MAPLE  | 9          | 552 | FIR     | 24   | 599 | CHERRY  | 10    | 646 | MAPLE   | 7         | 693 | HEMLOCK | 22          | 740 | ALDER   | 8  | 787 | FIR     | 8  |     |            |        |
| 506 | MAPLE  | 6          | 553 | HEMLOCK | 10   | 600 | MAPLE   | 14    | 647 | MAPLE   | 11, 7     | 694 | FIR     | 26          | 741 | FIR-    | 24 | 788 | FIR     | 8  |     |            |        |
| 507 | CEDAR  | 56         | 554 | FIR     | 24   | 601 | MAPLE   | 11, 6 | 648 | MAPLE   | 14        | 695 | ALDER   | 11          | 742 | MAPLE   | 11 | 789 | FIR     | 8  |     |            |        |
| 508 | MAPLE  | 6          | 555 | FIR     | 8    | 602 | MADRONA | 11    | 649 | ALDER   | 8         | 696 | CEDAR   | 29          | 743 | MAPLE   | 19 | 790 | FIR     | 8  |     |            |        |
| 509 | MAPLE  | 17         | 556 | ALDER   | 7    | 603 | MAPLE   | 8, 8  | 650 | CEDAR   | 6         | 697 | ALDER   | 9           | 744 | FIR-    | 14 | 791 | FIR     | 8  |     |            |        |
| 510 | ALDER  | 7          | 557 | FIR-    | 19   | 604 | ALDER   | 7     | 651 | CEDAR   | 14        | 698 | HEMLOCK | 19          | 745 | FIR-    | 32 | 792 | MAPLE   | 19 |     |            |        |
| 511 | MAPLE  | 13         | 558 | FIR     | 19   | 605 | MADRONA | 12, 8 | 652 | FIR     | 21        | 699 | CEDAR   | 13          | 746 | FIR-    | 28 | 793 | FIR     | 32 |     |            |        |
| 512 | ALDER  | 12         | 559 | FIR-    | 20   | 606 | MAPLE   | 6     | 653 | HEMLOCK | 13        | 700 | CEDAR   | 6, 17, 36   | 747 | FIR-    | 11 | 794 | FIR     | 38 |     |            |        |
| 513 | ALDER  | 15         | 560 | MAPLE   | 16   | 607 | FIR-    | 21    | 654 | MAPLE   | 11        | 701 | CEDAR   | 6           | 748 | ALDER   | 8  | 795 | MAPLE   | 14 |     |            |        |
| 514 | MAPLE  | 36, 16     | 561 | FIR-    | 23   | 608 | CHERRY  | 9     | 655 | MAPLE   | 17        | 702 | ALDER   | 11          | 749 | FIR-    | 16 | 796 | FIR     | 10 |     |            |        |
| 515 | ALDER  | 7          | 562 | MAPLE   | 40   | 609 | FIR-    | 22    | 656 | MAPLE   | 30, 15    | 703 | MAPLE   | 48          | 750 | FIR-    | 26 | 797 | FIR-    | 15 |     |            |        |

STRIKE THROUGH TREES PROPOSED  
TO BE REMOVED

NON-STRIKE THROUGH TREES PROPOSED TO BE  
RETAINED

| REVISIONS |            |                                               |
|-----------|------------|-----------------------------------------------|
| 4         | 10/29/2018 | REVISED PER COMMENTS                          |
| 5         | 4/2/2019   | REVISED PER COMMENTS                          |
| 6         | 9/26/2019  | REVISED WETLAND CREATION AREA                 |
| 7         | 10/16/2019 | PLANT MATERIAL AT TOP OF ROCK WALLS           |
| 8         | 5/22/2020  | REVISED PER COMMENTS                          |
| 9         | 10/21/2020 | REVISED PER COMMENTS                          |
| 10        | 1/21/2021  | REVISED PER CITY REVIEW COMMENTS JANUARY 2021 |
| 11        | 3/11/2021  | REVISED, TREES #416 AND #417                  |



BARGHAUSEN CONSULTING  
ENGINEERS INC.

18215 72ND AVENUE SOUTH  
KENT, WA 98032  
(425)251-6222  
(425)251-8782 FAX

|              |     |
|--------------|-----|
| DESIGNED BY: | JMV |
| DRAWN BY:    | JMV |
| CHECKED BY:  | KEH |
| APPROVED BY: | JGH |
| SCALE:       |     |
| OTHER:       |     |

SWEDE HILL, LLC  
P.O. BOX 1397  
TACOMA, WA 98401

| EXISTING TREE INVENTORY<br>LEGEND             |  | PERMIT NO.        |  |
|-----------------------------------------------|--|-------------------|--|
| CANTERWOOD COMMERCIAL<br>CENTER<br>GIG HARBOR |  | DRAWING NO.       |  |
|                                               |  | SHEET OF<br>L-8 8 |  |



STATE OF WASHINGTON  
DEPARTMENT OF ECOLOGY

PO Box 47775 • Olympia, Washington 98504-7775 • (360) 407-6300  
711 for Washington Relay Service • Persons with a speech disability can call 877-833-6341

July 15, 2021

**Canterwood Commercial Center**

PL-SPR-07-0004 et al  
Hearing Examiner

**Exhibit E**

Kimberly Mahoney, Associate Planner  
City of Gig Harbor  
Community Development Department  
Planning Division  
3510 Grandview Street  
Gig Harbor, WA 98335

Dear Kimberly Mahoney:

Thank you for the opportunity to comment on the mitigated determination of nonsignificance for the REVISED Canterwood Commercial Project (PL-SEPA-07-0060) located at 10700 Canterwood Boulevard Northwest as proposed by Barghausen Consulting Engineers Inc. The Department of Ecology (Ecology) reviewed the environmental checklist and has the following comment(s):

**SOLID WASTE MANAGEMENT: Derek Rockett (360) 407-6287**

All grading and filling of land must utilize only clean fill. All other materials may be considered solid waste and permit approval may be required from the local jurisdictional health department prior to filling. All removed debris resulting from this project must be disposed of at an approved site. Contact the local jurisdictional health department for proper management of these materials.

**TOXICS CLEANUP: Eva Barber (360) 407-7094**

If contamination is suspected, discovered, or occurs during the proposed construction of four commercial buildings with associated parking and utilities, testing of the potentially contaminated media must be conducted. If contamination of soil or groundwater is readily apparent, or is revealed by testing, the Department of Ecology must be notified. Contact the Environmental Report Tracking System Coordinator at the Southwest Regional Office at (360) 407-6300. For assistance and information about subsequent cleanup and to identify the type of testing that will be required, contact Eva Barber with the Toxic Cleanup Program at the Southwest Regional Office at (360) 999-9593.

**WATER QUALITY/INDUSTRIAL OPERATIONS UNIT:**

**Honor Carpenter, Senior Industrial Stormwater Permit Facility Manager**  
(360) 407-6273 | [Honor.Carpenter@ecy.wa.gov](mailto:Honor.Carpenter@ecy.wa.gov)

Facilities conducting certain industrial activities that discharge stormwater to a surface waterbody or storm sewer system that drains to a surface waterbody are required to obtain



National Pollutant Discharge Elimination System (NPDES) permit coverage for those industrial stormwater discharges under the Department of Ecology's Industrial Stormwater General Permit (ISGP). More information about the Industrial Stormwater General Permit (ISGP) is available at the link below:

<https://ecology.wa.gov/Regulations-Permits/Permits-certifications/Stormwater-general-permits/Industrial-stormwater-permit>

**WATER QUALITY/WATERSHED RESOURCES UNIT:**  
**Jessica Eakens (360) 407-0246**

Erosion control measures must be in place prior to any clearing, grading, or construction. These control measures must be effective to prevent stormwater runoff from carrying soil and other pollutants into surface water or stormdrains that lead to waters of the state. Sand, silt, clay particles, and soil will damage aquatic habitat and are considered to be pollutants.

Any discharge of sediment-laden runoff or other pollutants to waters of the state is in violation of Chapter 90.48 RCW, Water Pollution Control, and WAC 173-201A, Water Quality Standards for Surface Waters of the State of Washington, and is subject to enforcement action.

Construction Stormwater General Permit:

The following construction activities require coverage under the Construction Stormwater General Permit:

1. Clearing, grading and/or excavation that results in the disturbance of one or more acres **and** discharges stormwater to surface waters of the State; and
2. Clearing, grading and/or excavation on sites smaller than one acre that are part of a larger common plan of development or sale, if the common plan of development or sale will ultimately disturb one acre or more **and** discharge stormwater to surface waters of the State.
  - a) This includes forest practices (including, but not limited to, class IV conversions) that are part of a construction activity that will result in the disturbance of one or more acres, **and** discharge to surface waters of the State; and
3. Any size construction activity discharging stormwater to waters of the State that Ecology:
  - a) Determines to be a significant contributor of pollutants to waters of the State of Washington.
  - b) Reasonably expects to cause a violation of any water quality standard.

If there are known soil/ground water contaminants present on-site, additional information (including, but not limited to: temporary erosion and sediment control plans; stormwater pollution prevention plan; list of known contaminants with concentrations and depths found; a site map depicting the sample location(s); and additional studies/reports regarding contaminant(s)) will be required to be submitted. For additional information on contaminated construction sites, please contact Carol Serdar at [Carol.Serdar@ecy.wa.gov](mailto:Carol.Serdar@ecy.wa.gov), or by phone at (360) 742-9751.

Additionally, sites that discharge to segments of waterbodies listed as impaired by the State of Washington under Section 303(d) of the Clean Water Act for turbidity, fine sediment, high

Kimberly Mahoney

July 15, 2021

Page 3

pH, or phosphorous, or to waterbodies covered by a TMDL may need to meet additional sampling and record keeping requirements. See condition S8 of the Construction Stormwater General Permit for a description of these requirements. To see if your site discharges to a TMDL or 303(d)-listed waterbody, use Ecology's Water Quality Atlas at: <https://fortress.wa.gov/ecy/waterqualityatlas/StartPage.aspx>.

The applicant may apply online or obtain an application from Ecology's website at: [http://www.ecy.wa.gov/programs/wq/stormwater/construction/- Application](http://www.ecy.wa.gov/programs/wq/stormwater/construction/-Application). Construction site operators must apply for a permit at least 60 days prior to discharging stormwater from construction activities and must submit it on or before the date of the first public notice.

Ecology's comments are based upon information provided by the lead agency. As such, they may not constitute an exhaustive list of the various authorizations that must be obtained or legal requirements that must be fulfilled in order to carry out the proposed action.

If you have any questions or would like to respond to these comments, please contact the appropriate reviewing staff listed above.

Department of Ecology  
Southwest Regional Office

(GMP:202103583)

cc: Derek Rockett, SWM  
Eva Barber ,TCP  
Honor Carpenter, WQ  
Jessica Eakens, WQ

**Canterwood Commercial Center**

PL-SPR-07-0004 et al  
Hearing Examiner

**Exhibit F**

**CERTIFICATION OF PUBLIC NOTICE**

**DECLARATION OF MAILING**

I, **Cindy Andrews** (printed name), declare under penalty of perjury under the laws of the State of Washington and the United States of America that the foregoing is true and correct to the best of my knowledge:

On **August 19, 2021** I mailed (**e-mailed**) a true and correct copy of the NOTICE OF PUBLIC HEARING

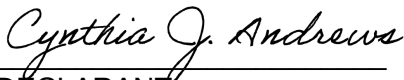
Project Name **CANTERWOOD COMMERCIAL CENTER**

Project Location **10700 Canterwood Blvd**

Permit Number(s): **PL-SPR-07-0004, PL-CUP-13-0002, PL-DRB-07-0013, PL-SEPA-07-0060**

to the individuals/agencies identified on the attached transmittal form by United States Postal Service, inter-office routing, or electronic mail, as specified on the attached.

SIGNED at Gig Harbor, Washington, this 19th day of August

  
DECLARANT (signature)



City of Gig Harbor  
Transmittal Form

Routing for:  
Project:

NOA SEPA **NOPH** NOPM NOD Notice Date: August 19, 2021  
CANTERWOOD COMMERCIAL CENTER  
10700 Canterwood Blvd

PL-SPR-07-0004, PL-CUP-13-0002, PL-DRB-07-0013, PL-  
SEPA-07-0060

Planner: KIM MAHONEY

---

Routed to:  
City Depts.

☐ Public Works–Operations  
☐ Public Works–Engineering

☐ Building and Fire Safety  
☐ Other\_\_\_\_\_

SEPA Agencies:  
(NOA, SEPA)  
Electronic Mail

- ☐ Washington Department of Ecology, SEPA Register
- ☐ Washington Department of Commerce, attn: Review Team
- ☐ Pierce Transit Land Use Review, attn: Kelly Haden, Monica Adams
- ☐ Washington State Department of Fish & Wildlife, attn: SEPA Desk
- ☐ Washington State Department of Natural Resources, attn: SEPA Center
- ☐ Washington State DAHP, attn: Gretchen Kaehler
- ☐ Puyallup Tribe of Indians Historic Preservation, attn: Judy Wright
- ☐ Puyallup Tribe Cultural Resources, attn: Brandon Reynon/Jeffrey Thomas
- ☐ PenMet Parks, attn: Elaine Sorenson
- ☐ Pierce County Fire District Number 5, attn: Eric Watson/Eric Waters
- ☐ Suquamish Tribe, attn: Dennis Lewarch
- ☐ Peninsula School District, attn: Vicki Smith
- ☐ Pierce County Planning and Land Services
- ☐ Washington State Department of Transportation, attn: Dale Severson / SEPA Reviews
- ☐ Squaxin Island Tribe, attn: Rhonda Foster
- ☐ Muckleshoot Tribe, attn: Laura Murphy
- ☐ Washington Department of Corrections, attn: Eric Heinitz
- ☐ Puget Sound Partnership, attn: Marsha Engel

Other Parties:  
1<sup>st</sup> Class Mail

- ☒ Applicant/Owner/Agent (NOA **NOPH** NOPM, SEPA, NOD) MDNS)
- ☐ DRB (NOA for Non-residential, Multi-family, Subdivisions, Public Projects)
- ☐ Parks Commission via Terri Reed (NOA)
- ☒ Property Owners within 300 feet of site: attached list (NOA, SEPA **NOPH** NOPM, NOD for Type II permits only)
- ☒ Parties of Record: attached list **NOPH** NOPM, NOD)
- ☐ Pierce County (NOA for Plats adjacent to City Limits)
- ☐ Pierce County Assessor-Treasurer (NOD)
- ☐ WA Transportation Secretary (NOA for Plats adj. to State ROW, or within 2 miles of Airport—approximately any plats south of Pioneer/Wollochet interchange)





*"THE MARITIME CITY"*

## **CITY OF GIG HARBOR NOTICE OF PUBLIC HEARING**

### **CANTERWOOD COMMERCIAL CENTER**

Permit Number(s): PL-SPR-07-0004, PL-CUP-13-0002, PL-DRB-07-0013, PL-SEPA-07-0060

Date of Notice: August 19, 2021

Applicant: Swede Hill, LLC, P.O. Box 1553 Tacoma, WA 98401

Agent: Carl Halsan, P.O. Box 1447, Gig Harbor, WA 98335

Project Location: 10700 Canterwood Blvd, site is located on the west side of Canterwood Blvd, west of St. Anthony's Hospital, approximately 2,000 feet north of the intersection with Borgen Blvd. Sec 25, Tw 22, R 01, Qtr 42. Assessor's Parcel Number: 0122254090

Project Description: The applicant proposes the construction of four commercial buildings totaling 28,278 square feet and a 9,000 square feet parking garage on a vacant parcel in the B-2 General Business Zoning District. The site is adjacent to Washington State Highway 16 on the west and Canterwood Blvd on the east, within the vicinity of St. Anthony's Hospital. The site contains steep slopes, wetlands and an unnamed stream. The project proposes significant fill to account for the extreme topography of the site and the filling of two category IV wetlands. Mitigation is proposed through the creation of on-site wetlands and the removal of an in-stream culvert. The project provides for two access points from Canterwood Boulevard. A parking garage under the northernmost building is proposed and drive-through facilities on the other three buildings are also proposed. The conditional use permit is required to allow for the site's proposed drive-through facilities.

SEPA Threshold Determination: An MDNS was issued under WAC 197-11-340(2) on July 1, 2021

**PUBLIC HEARING DATE:** Hearing Examiner, **September 2, 2021 at 1:30 pm**, at Gig Harbor Civic Center, Council Chambers, 3510 Grandview Street, Gig Harbor.

**NOTE: This public hearing may be held in an online format subject to the latest public health recommendations.**

Interested persons are invited to attend the public hearing and provide testimony on this proposal. The hearing will be conducted in the manner prescribed by Gig Harbor Municipal Code Chapter 19.05.



Documents pertinent to this application are available for review and inspection online only using the City of Gig Harbor Permit Portal. Please contact Kimberly Mahoney, Senior Planner, for questions regarding access to other documents pertinent to this application. A copy of the staff report on this proposal will be available at least seven days prior to the hearing. A copy of the application, all documents and evidence relied upon by the applicant, and applicable criteria are available for inspection at no cost; copies will be provided at the requestor's cost.

Interested persons may comment on the above stated application or may request a copy of the decision on this application. **Requests for notification, written comments, including any written comments addressing the findings required for a decision, must be submitted to the Planning Division no later than 12:00 noon on September 2, 2021.**

Questions regarding the above stated application should be made to Kimberly Mahoney, Senior Planner, City of Gig Harbor Community Development Department, 3510 Grandview Street, Gig Harbor, WA 98335, or by calling 851-6170. Additional permit information can also be found at [www.cityofgigharbor.net](http://www.cityofgigharbor.net) by clicking "Permit Portal" then clicking "Applications," entering "Hearing Examiner Hearing" and then selecting the Hearing date and clicking on More Details".

---

| TaxParcelNumber    | TaxpayerName                  | Delivery_Address         |
|--------------------|-------------------------------|--------------------------|
| Parcel: 0122254073 | GIG HARBOR NORTH ANNEX LLC    | 6622 WOLLOCHET DR        |
| Parcel: 0122254028 | BURNHAM PROPERTIES LLC        | PO BOX 701               |
| Parcel: 3001140010 | FRANCISCAN HEALTH SYSTEM WEST | 3400 DATA DR             |
| Parcel: 0122254051 | GIG HARBOR NORTH ANNEX LLC    | 6622 WOLLOCHET DR        |
| Parcel: 0122254104 | BURNHAM HOLDINGS LLC          | PO BOX 701               |
| Parcel: 0122258008 | BURNHAM PARTNERS LLC          | 11505 BURNHAM DR STE 206 |
| Parcel: 0122254089 | PURDY INVESTMENTS LLC         | 11505 BURNHAM DR STE 206 |
| Parcel: 0122254065 | PARR GARY R                   | 3573 E L ST              |
| Parcel: 0122254090 | SWEDE HILL LLC                | PO BOX 1693              |
| Parcel: 0122258009 | D & M MORRIS FAMILY LLC       | 11505 BURNHAM DR STE 206 |
| Parcel: 0122254088 | BURNHAM PROPERTIES LLC        | PO BOX 701               |
| Parcel: 0122254062 | BAY HILL TERRACE LLC          | 1830 112TH ST E STE F    |

Parties of Record

Canterwood Commercial

Jaime Keirstad, 12505 58th Ave NW, Gig Harbor WA 98332  
JOHN KRAWCZYK - chickentravel@prontonmail.com



CITY OF GIG HARBOR DESIGN REVIEW BOARD  
 CANTERWOOD COMMERCIAL  
 SIGN IN SHEET  
 June 28<sup>th</sup>, 2018

PLEASE INDICATE YOUR CONTACT INFORMATION TO BE NOTIFIED OF FUTURE MEETINGS OR NOTICES ON THIS PROJECT

| #  | NAME          | ADDRESS                                     | E-MAIL                      | SPEAK<br>Y/N |
|----|---------------|---------------------------------------------|-----------------------------|--------------|
| 1  | PETER POWELL  | 2025 Northrup Way Bellevue, WA 98004        | PowPowell@powelldev.com     | Y            |
| 2  | Mark Walsh    | 5722 Baker Way GH                           | mwals@orminc.com            | N            |
| 3  | Randy Wahab   | 11321 Heather Pl                            | r-f.wahab@gmail.com         | N            |
| 4  | TRAVIS NESS   | 6021 12th St. E Tacoma, WA 98412            | travis@helixdesigngroup.net | Y            |
| 5  | Jason Hubbell | 18215 72 <sup>nd</sup> Ave S Kent, WA 98032 | jhubbell@barghausen.com     | Y            |
| 6  |               |                                             |                             |              |
| 7  |               |                                             |                             |              |
| 8  |               |                                             |                             |              |
| 9  |               |                                             |                             |              |
| 10 |               |                                             |                             |              |
| 11 |               |                                             |                             |              |
| 12 |               |                                             |                             |              |
| 13 |               |                                             |                             |              |
| 14 |               |                                             |                             |              |

City\_State Zipcode

GIG HARBOR, WA 98335-8325

WAUNA, WA 98395-0701

RANCHO CORDOVA, CA 95670

GIG HARBOR, WA 98335-8325

WAUNA, WA 98395-0701

GIG HARBOR, WA 98332

GIG HARBOR, WA 98332

TACOMA, WA 98404-3823

TACOMA, WA 98401-1693

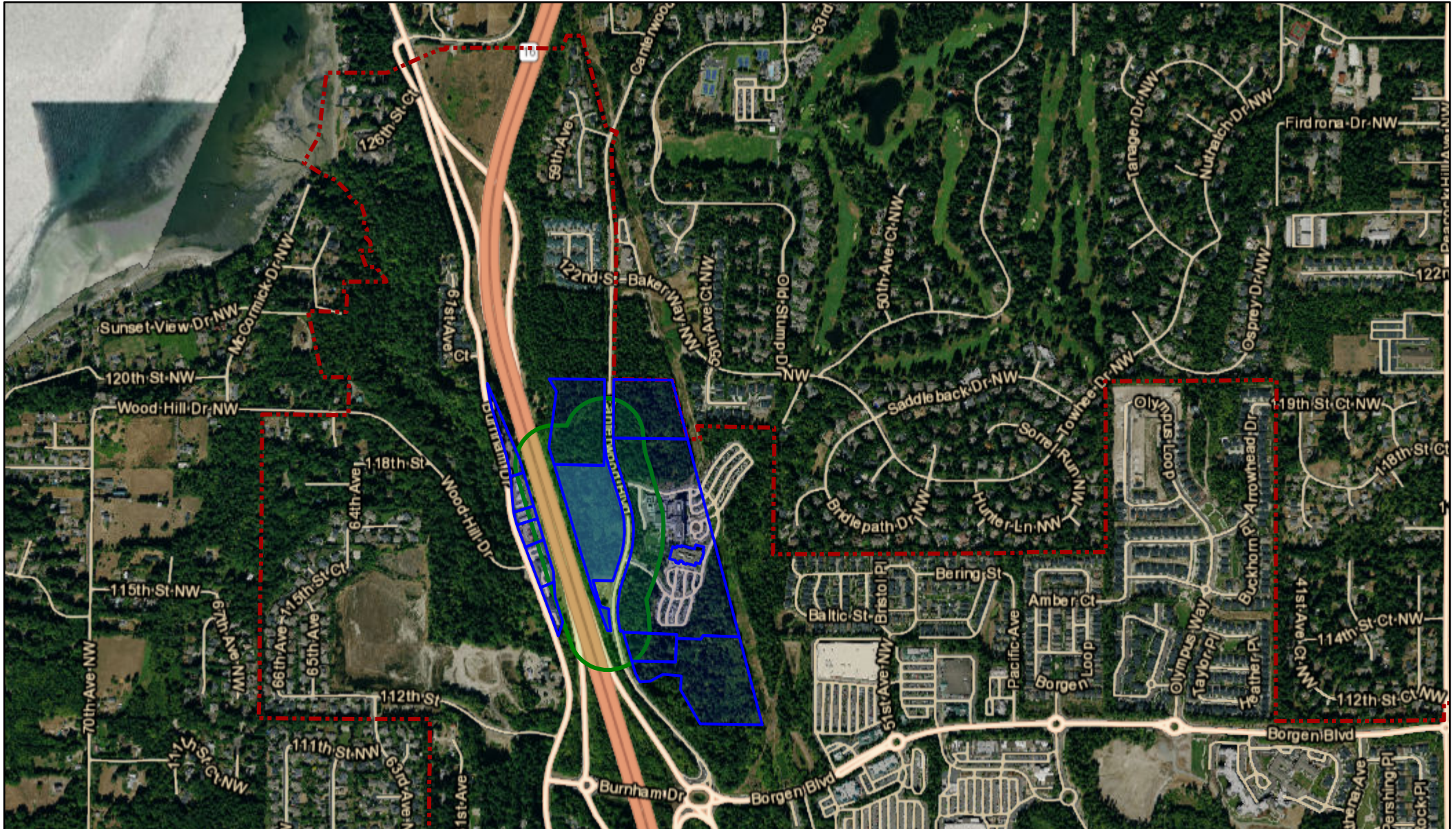
GIG HARBOR, WA 98332

WAUNA, WA 98395-0701

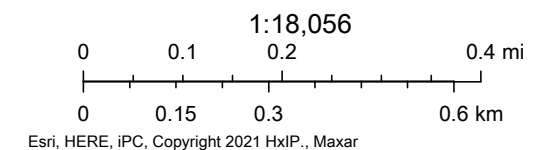
TACOMA, WA 98445-3747



# ArcGIS Web Map



8/3/2021, 10:15:12 AM





## CERTIFICATION OF PUBLIC NOTICE

### DECLARATION OF POSTING

I, CARL HALSON (printed name), declare under penalty of perjury under the laws of the State of Washington and the United States of America that the foregoing is true and correct to the best of my knowledge:

On AUGUST 16<sup>TH</sup>, 2021 I caused to be posted the notice board provided by the

City for the NOTICE OF PUBLIC HEARING on the following:

Project Name: **CANTERWOOD COMMERCIAL CENTER**

Project Location **10700 Canterwood Blvd**

Permit Number(s): PL-SPR-07-0004, PL-CUP-13-0002, PL-DRB-07-0013, PL-SEPA-07-0060

the locations indicated below meeting the requirements of GHMC 19.03.001(A).

- ☒ ON POST ALONG CANTERWOOD BLVD
- ☒ MIDDLE OF FRONTAGE

SIGNED at Gig Harbor, Washington, this 16<sup>TH</sup> day of AUGUST, 2021.

  
DECLARANT (signature)

**City of Gig Harbor  
Transmittal Form**

**Routing for:** NOA SEPA **NOPH** NOPM NOD Notice Date: August 19, 2021  
**Project:** CANTERWOOD COMMERCIAL CENTER  
10700 Canterwood Blvd

**PL-SPR-07-0004, PL-CUP-13-0002, PL-DRB-07-0013, PL-  
SEPA-07-0060**

**Planner: KIM MAHONEY**

---

**Routed to:** ☐ Public Works–Operations ☐ Building and Fire Safety  
**City Depts.** ☐ Public Works–Engineering ☐ Other\_\_\_\_\_

**SEPA Agencies:** ☐ Washington Department of Ecology, SEPA Register  
**(NOA, SEPA)** ☐ Washington Department of Commerce, attn: Review Team  
**Electronic Mail** ☐ Pierce Transit Land Use Review, attn: Kelly Haden, Monica Adams  
☐ Washington State Department of Fish & Wildlife, attn: SEPA Desk  
☐ Washington State Department of Natural Resources, attn: SEPA Center  
☐ Washington State DAHP, attn: Gretchen Kaehler  
☐ Puyallup Tribe of Indians Historic Preservation, attn: Judy Wright  
☐ Puyallup Tribe Cultural Resources, attn: Brandon Reynon/Jeffrey Thomas  
☐ PenMet Parks, attn: Elaine Sorenson  
☐ Pierce County Fire District Number 5, attn: Eric Watson/Eric Waters  
☐ Suquamish Tribe, attn: Dennis Lewarch  
☐ Peninsula School District, attn: Vicki Smith  
☐ Pierce County Planning and Land Services  
☐ Washington State Department of Transportation, attn: Dale Severson / SEPA Reviews  
☐ Squaxin Island Tribe, attn: Rhonda Foster  
☐ Muckleshoot Tribe, attn: Laura Murphy  
☐ Washington Department of Corrections, attn: Eric Heinitz  
☐ Puget Sound Partnership, attn: Marsha Engel

**Other Parties:** ☐ **Applicant/Owner/Agent (NOA, NOPH, NOPM, SEPA, NOD) MDNS)**  
**1<sup>st</sup> Class Mail** ☐ DRB (NOA for Non-residential, Multi-family, Subdivisions, Public Projects)  
☐ Parks Commission via Terri Reed (NOA)  
☐ **Property Owners within 300 feet of site: attached list (NOA, SEPA, NOPH, NOPM, NOD for Type II permits only)**  
☐ Parties of Record: attached list (**NOPH**, NOPM, NOD)  
☐ Pierce County (NOA for Plats adjacent to City Limits)  
☐ Pierce County Assessor-Treasurer (**NOD**)  
☐ WA Transportation Secretary (NOA for Plats adj. to State ROW, or within 2 miles of Airport—approximately any plats south of Pioneer/Wollochet interchange)





## CERTIFICATION OF PUBLIC NOTICE

=====

### DECLARATION OF PUBLISHING

I, **CINDY ANDREWS** (printed name), declare under penalty of perjury under the laws of the State of Washington and the United States of America that the foregoing is true and correct to the best of my knowledge:

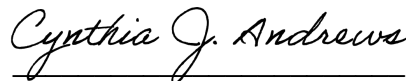
On **MARCH 24, 2021** I sent a true and correct copy of the **NOTICE OF PUBLIC HEARING** for publication In the **AUGUST 19, 2021** edition of the Tacoma News Tribune for the following:

Project Name **CANTERWOOD COMMERCIAL CENTER**

Project Location: **10700 Canterwood Blvd**

Permit Number(s): **PL-SPR-07-0004, PL-CUP-13-0002, PL-DRB-07-0013, PL-SEPA-07-0060**

SIGNED at Gig Harbor, Washington, this **4th** day of **August, 2021**



DECLARANT (signature)

**THANK YOU for your legal submission!**

Your legal has been submitted for publication. Below is a confirmation of your legal placement. You will also receive an email confirmation.

**ORDER DETAILS****Order Number:**

IPL0035876

**Order Status:**

Submitted

**Classification:**

Legals &amp; Public Notices

**Package:**

TAC - Legal Ads

**Final Cost:**

175.68

**Payment Type:**

Account Billed

**User ID:**

IPL0021041

**ACCOUNT INFORMATION**

CITY OF GIG HARBOR IP

3510 GRANDVIEW ST

GIG HARBOR, WA 98335-1214

253-851-8136

noemail@noemail.com

CITY OF GIG HARBOR

**TRANSACTION REPORT****Date**

August 5, 2021 12:37:07 PM EDT

**Amount:**

175.68

**SCHEDULE FOR AD NUMBER IPL00358760**

August 19, 2021

The News Tribune (Tacoma)

**PREVIEW FOR AD NUMBER IPL00358760****CITY OF GIG HARBOR  
NOTICE OF PUBLIC HEARING****CANTERWOOD COMMERCIAL CENTER**

Permit Number(s): PL-SPR-07-0004, PL-CUP-13-0002, PL-DRB-07-0013, PL-SEPA-07-0060

Date of Notice: August 19, 2021

Applicant: Swede Hill, LLC, P.O. Box 1693 Tacoma, WA 98401

Agent: Carl Halsan, P.O. Box 1447, Gig Harbor, WA 98335

Project Location: 10700 Canterwood Blvd, site is located on the west side of Canterwood Blvd, west of St. Anthony's Hospital, approximately 2,000 feet north of the intersection with Borgen Blvd. Sec 25, Tw 22, R 01, Qtr 42. Assessor's Parcel Number: 0122254090

Project Description: The applicant proposes the construction of four commercial buildings totaling 28,278 square feet and a 9,000 square feet parking garage on a vacant parcel in the B-2 General Business Zoning District. The site is adjacent to Washington State Highway 16 on the west and Canterwood Blvd on the east, within the vicinity of St. Anthony's Hospital. The site contains steep slopes, wetlands and an unnamed stream. The project proposes significant fill to account for the extreme topography of the site and the filling of two category IV wetlands. Mitigation is proposed through the creation of on-site wetlands and the removal of an in-stream culvert. The project provides for two access points from Canterwood Boulevard. A parking garage under the northernmost building is proposed and drive-through facilities on the other three buildings are also proposed. The conditional use permit is required to allow for the site's proposed drive-through facilities.

SEPA Threshold Determination: An MDNS was issued under WAC 197-11-340(2) on July 1, 2021

**PUBLIC HEARING DATE:** Hearing Examiner, **September 2, 2021 at 1:30 pm**, at Gig Harbor Civic Center, Council Chambers, 3510 Grandview Street, Gig Harbor. **NOTE: This public hearing may be held in an online format subject to the latest public health recommendations.**

Interested persons are invited to attend the public hearing and provide testimony on this proposal. The hearing will be conducted in the manner prescribed by Gig Harbor Municipal Code Chapter 19.05.

Documents pertinent to this application are available for review and inspection online only using the City of Gig Harbor Permit Portal. Please contact Kimberly Mahoney, Senior Planner, for questions regarding access to other documents pertinent to this application. A copy of the staff report on this proposal will be available at least seven days prior to the hearing. A copy of the application, all documents and evidence relied upon by the applicant, and applicable criteria are available for inspection at no cost; copies will be provided at the requestor's cost.

Interested persons may comment on the above stated application or may request a copy of the decision on this application. **Requests for notification, written comments, including any written comments addressing the findings required for a decision, must be submitted to the Planning Division no later than 12:00 noon on September 2, 2021.**

Questions regarding the above stated application should be made to Kimberly Mahoney, Senior Planner, City of Gig Harbor Community Development Department, 3510 Grandview Street, Gig Harbor, WA 98335, or by calling 851-6170. Additional permit information can also be found at [www.cityofgigharbor.net](http://www.cityofgigharbor.net) by clicking "Permit Portal" then clicking "Applications," entering "Hearing Examiner Hearing" and then selecting the Hearing date and clicking on More Details".

W00000000

Publication Dates

[<< Click here to print a printer friendly version >>](#)

**From:** [bjantzen@mcclatchy.com](mailto:bjantzen@mcclatchy.com) on behalf of [LegalsWest, MCC](#)  
**To:** [Cindy Andrews](#)  
**Subject:** Re: NOPH 09 2021 - CANTERWOOD COMMERCIAL  
**Date:** Thursday, August 5, 2021 9:57:51 AM  
**Attachments:** [IPL0035876.pdf](#)

---

Hello,

I have attached the ad order confirmation. We will need a response no later than 8/18 by noon. If we do not receive a response this ad will automatically run on 8/19 as is. Please let me know if you have any questions.

Bettina Jantzen

817-390-7913

On Wed, Aug 4, 2021 at 5:09 PM Cindy Andrews <[candrews@gigharborwa.gov](mailto:candrews@gigharborwa.gov)> wrote:

Please **REMOVE** the Notice of Public Hearing sent to you earlier today for the Canterwood Commercial Center project and **REPLACE** it with the revised version attached. Please publish in the legal notice section of the Thursday August 19, 2021 edition of the Tacoma News Tribune.

Best Regards

Cindy Andrews

253-853-7625

--

**\*\*\*Due to the recent pandemic our deadlines starting 3/18/2020 will be moved a half hour earlier. We apologize for the inconvenience.\*\*\***



Canterwood Commercial Center

PL-SPR-07-0004 et al  
Hearing Examiner

Exhibit G

AFFIDAVIT OF POSTING

RECEIVED BY  
OCT 15 2014  
CITY OF GIG HARBOR

STATE OF WASHINGTON }  
COUNTY OF PIERCE } SS  
CITY OF GIG HARBOR }

I, JEFF CURRIE  
, being duly sworn, depose and say, that I posted the property described  
below in a conspicuous location on the site as required by Gig Harbor  
Municipal Code section 19.03 on OCTOBER 15  
2014.

Project name: CANTERWOOD COMMERCIAL PROJECT

Address: 10700 XXX CANTERWOOD BLVD. N.W.

Parcel Number: 0122254090

[Signature] 10-15-14  
Signature Date

Mailing Address: 18215 72ND AVE. S. KENT WA 98032

Subscribed and sworn to before me this 15<sup>th</sup> day of October,  
2014.



[Signature]  
Notary Public in and for the  
**STATE OF WASHINGTON**  
residing at Federal Way







# NOTICE OF APPLICATION

**PROJECT DESCRIPTION:** Proposed construction of a commercial building located at 251st St. & 1st Ave. in the City of Gig Harbor. The project includes the construction of a 10,000 sq. ft. building with a parking lot and a loading dock. The project is located in the City of Gig Harbor, WA 98153.

**PERMITS:** The applicant is applying for a Building Permit, a Planning Department Permit, and a City of Gig Harbor Permit.

**LOCATION:** The project is located at 251st St. & 1st Ave. in the City of Gig Harbor, WA 98153.

**APPLICANT:** The applicant is the owner of the property, 251st St. & 1st Ave. in the City of Gig Harbor, WA 98153.

**COMMENT PERIOD:** The comment period for this application is from 10/1/2014 to 10/15/2014.

INTERESTED PARTIES MAY COMMENT ON THE APPLICATION, PLAN, DESIGN, AND/OR ANY OTHER INFORMATION ON A CARD OR THE BACK OF THIS APPLICATION. ALL COMMENT CARDS MUST BE SUBMITTED TO THE PLANNING DEPARTMENT BY NO LATER THAN 10/15/2014. THE COMMENT PERIOD IS 15 DAYS FROM THE DATE OF THE NOTICE OF APPLICATION. IF YOU HAVE QUESTIONS, PLEASE CONTACT THE PLANNING DEPARTMENT AT (253) 861-6170.

DOCUMENTS PERTINENT TO THIS APPLICATION ARE AVAILABLE FOR REVIEW AND INSPECTION AT THE CITY OF GIG HARBOR PLANNING DEPARTMENT, 3515 GRANDVIEW STREET, GIG HARBOR, WA 98153, DURING NORMAL BUSINESS HOURS, MONDAY THROUGH FRIDAY.



# NOTICE OF PUBLIC MEETING

THE CITY OF GIG HARBOR IS HOLDING A PUBLIC MEETING TO DISCUSS THE PROPOSED CONSTRUCTION OF A COMMERCIAL BUILDING LOCATED AT 251ST ST. & 1ST AVE. IN THE CITY OF GIG HARBOR, WA 98153. THE MEETING WILL BE HELD ON MONDAY, OCTOBER 13, 2014, AT 7:00 PM. THE MEETING WILL BE HELD AT THE CITY OF GIG HARBOR PLANNING DEPARTMENT, 3515 GRANDVIEW STREET, GIG HARBOR, WA 98153. THE MEETING IS OPEN TO THE PUBLIC AND ANYONE INTERESTED IN THE PROJECT IS INVITED TO ATTEND. THE MEETING WILL BE HELD IN THE CITY OF GIG HARBOR PLANNING DEPARTMENT, 3515 GRANDVIEW STREET, GIG HARBOR, WA 98153. THE MEETING IS OPEN TO THE PUBLIC AND ANYONE INTERESTED IN THE PROJECT IS INVITED TO ATTEND. THE MEETING WILL BE HELD IN THE CITY OF GIG HARBOR PLANNING DEPARTMENT, 3515 GRANDVIEW STREET, GIG HARBOR, WA 98153. THE MEETING IS OPEN TO THE PUBLIC AND ANYONE INTERESTED IN THE PROJECT IS INVITED TO ATTEND.









**City of Gig Harbor  
Certificate of Transmittal**

Routing for: NOA SEPA NOPH **NOPM** NOD

Notice Date: 10/9/14

Project: Centerwood Commercial Planner: Kristin  
PL-DRB-07-0013 PL-SPR-07-0004

Routed to: ☐ Public Works-Operations ☐ Building and Fire Safety  
City Depts. ☐ Public Works-Engineering ☐ Other \_\_\_\_\_

SEPA Agencies: ☐ Washington Department of Ecology, SEPA Register  
(NOA, SEPA) ☐ Washington Department of Commerce, attn: Review Team  
Electronic Mail ☐ Pierce Transit Land Use Review, attn: Kelly Haden, Monica Adams  
☐ Washington State Department of Fish & Wildlife, attn: SEPA Desk  
☐ Washington State Department of Natural Resources, attn: SEPA Center  
☐ Washington State DAHP, attn: Gretchen Kaehler  
☐ Puyallup Tribe of Indians Historic Preservation, attn: Judy Wright  
☐ Puyallup Tribe Cultural Resources, attn: Brandon Reynon/Jeffrey Thomas  
☐ PenMet Parks, attn: Elaine Sorenson  
☐ Pierce County Fire District Number 5, attn: Eric Watson/Eric Waters  
☐ Suquamish Tribe, attn: Dennis Lewarch  
☐ Peninsula School District, attn: Vicki Smith  
☐ Pierce County Planning and Land Services  
☐ Washington State Department of Transportation, attn: Dale Severson / SEPA Reviews  
☐ Squaxin Island Tribe, attn: Rhonda Foster  
☐ Muckleshoot Tribe, attn: Laura Murphy  
☐ Washington Department of Corrections, attn: Eric Heinitz  
☐ Puget Sound Partnership, attn: Marsha Engel

Other Parties: ☒ Applicant/Owner/Agent (NOA, NOPH, NOPM, SEPA, NOD)  
1<sup>st</sup> Class Mail ☐ DRB (NOA for Non-residential, Multi-family, Subdivisions, Public Projects)  
☐ Parks Commission via Terri Reed (NOA)  
☒ Property Owners within 300 feet of site: attached list (NOA, SEPA, NOPH, NOPM, NOD for Type II permits only)  
☐ Parties of Record: attached list (NOPH, NOPM, NOD)  
☐ Pierce County (NOA for Plats adjacent to City Limits)  
☐ Pierce County Assessor-Treasurer (NOD)  
☐ WA Transportation Secretary (NOA for Plats adj. to State ROW, or within 2 miles of Airport—approximately any plats south of Pioneer/Wollochet interchange)  
☐ Other \_\_\_\_\_

I certify under penalty of perjury under the laws of the State of Washington that on Oct 9th, 2014, I transmitted a copy of NOPM to the individuals identified above by first-class mail, postage-prepaid, inter-office routing or electronic mail, as specified above.

Signed this 9th day of October, 2014 at Gig Harbor, Washington.

Signature Meagan Fabiani  
Printed Name Meagan Fabiani





DEVELOPMENT SERVICES

## CITY OF GIG HARBOR

### NOTICE OF PUBLIC MEETING

#### Canterwood Commercial Project

Permit Number(s): PL-DRB-07-0013

Date of Notice: October 9, 2014

Applicant: Paul Cyr, Barghausen Consulting Engineers INC, 18215 72<sup>ND</sup> Avenue South, Kent WA 98032

Project Location: Located on Canterwood Blvd, across the street from St. Anthony's Hospital at approximately 10700 Canterwood Blvd.

Project Description: The proposal includes construction of 4 commercial buildings totaling 28,120 square feet of floor area and associated parking. Drive-through facilities are proposed on three of the buildings. Project also includes temporary and permanent wetlands and stream impacts with related mitigation.

SEPA Threshold Determination: A threshold determination has not been made at this time.

**PUBLIC MEETING DATE:** Design Review Board, **October 23, 2014, 5:00 pm**, at Gig Harbor Civic Center, Community Rooms, 3510 Grandview Street, Gig Harbor

Interested persons are invited to attend the public meeting and provide comment on this proposal; however, public testimony will not be taken. The meeting will be conducted in the manner prescribed by Gig Harbor Municipal Code Section 17.98.055(C).

Documents pertinent to this application are available for review and inspection at the City of Gig Harbor Planning Department, 3510 Grandview Street, Gig Harbor, WA 98335, during normal business hours, Monday through Friday. A copy of the staff report on this proposal will be available approximately seven days prior to the meeting. A copy of the application, all documents and evidence relied upon by the applicant, and applicable criteria are available for inspection at no cost; copies will be provided at the requestor's cost.

Interested persons may comment on the above stated application or may request a copy of the decision on this application. **Requests for notification, written comments, including any written comments addressing the findings required for a decision, must be submitted to the Planning Department no later than 5:00 PM on October 23, 2014.**

Questions regarding the above stated application should be made to Kristin Moerler, Associate Planner, City of Gig Harbor Planning Department, 3510 Grandview Street, Gig Harbor, WA 98335, or by calling 851-6170. Additional permit information can also be found at [permitportal.cityofgigharbor.net](http://permitportal.cityofgigharbor.net) by entering the above permit numbers.

(1 0122254024 5900)  
PURDY INVESTMENTS LLC  
11515 BURNHAM DR NW STE B  
GIG HARBOR, WA, 98332-8543

(2 0122254025 5900)  
PURDY INVESTMENTS LLC  
11515 BURNHAM DR NW STE B  
GIG HARBOR, WA, 98332-8543

(3 0122254028 6380)  
WORLUND THOMAS J & ALLISON R  
1180 E OLD RANCH RD  
ALLYN, WA, 98524-8754

(4 0122254051 9100)  
GIG HARBOR NORTH ANNEX LLC  
6622 WOLLOCHET DR NW  
GIG HARBOR, WA, 98335-8325

(5 0122254062 9100)  
J SCOTT CONSTRUCTION COMPANY INC  
1830 112TH ST E STE F  
TACOMA, WA, 98445-3747

(6 0122254065 9100)  
PARR GARY R  
3573 E L ST  
TACOMA, WA, 98404-3823

(7 0122254073 9100)  
GIG HARBOR NORTH ANNEX LLC  
6622 WOLLOCHET DR NW  
GIG HARBOR, WA, 98335-8325

(8 0122254088 6380)  
WORLUND THOMAS J & ALLISON R  
1180 E OLD RANCH RD  
ALLYN, WA, 98524-8754

(9 0122254089 9170)  
PURDY INVESTMENTS LLC  
11515 BURNHAM DR NW STE B  
GIG HARBOR, WA, 98332-8543

(10 0122254090 9100)  
SWEDE HILL LLC  
PO BOX 1693  
TACOMA, WA, 98401-1693

(11 0122258007 6199)  
D & M MORRIS FAMILY LLC  
11515 BURNHAM DR NW STE B  
GIG HARBOR, WA, 98332-8543

(12 0122258008 6500)  
BURNHAM PARTNERS LLC  
11515 BURNHAM DR NW STE B  
GIG HARBOR, WA, 98332-8543

(13 3001140010 6510)  
FRANCISCAN HEALTH SYSTEM WEST  
1149 MARKET ST  
TACOMA, WA, 98402-3515

# Canterwood Commercial Properties

## Legend

- Highlighted Tax Parcels
- Tax Parcels
- Base Parcel
- Condominium
- Other
- Roads
- Interstate
- Limited Access State Routes
- Other State Routes
- Ramps
- Major Arterial
- Collector
- Local Access
- Pierce County Basemap
- Unincorporated County
- Tacoma
- Lakewood, Edgewood, Bonney Lake, Buckley, South Prairie
- Stellacoom, Fircrest, Fife, Gig Harbor, Orting, Eatonville, Roy, Carbonado, Wilkeson, Mt Rainier
- University Place, Puyallup, Auburn
- DuPont, Milton, Sumner
- Fort Lewis, McChord, McNeil
- Island
- Water

PL-DRB-07-0013

Printed: 10/9/14 1:33 PM

Scale 1:6,187

0 250 500 ft.

A



The map features are approximate and are intended only to provide an indication of said feature. Additional areas that have not been mapped may be present. This is not a survey. Orthophotos may not align with other data. Pierce County assumes no liability for variations ascertained by actual survey. All data is expressly provided AS IS and WITH ALL FAULTS. Pierce County makes no warranty of fitness for a particular purpose.



**City of Gig Harbor  
Certificate of Transmittal**

**Routing for:**      NOA   SEPA   NOPH   NOPM   NOD

**Notice Date:** Oct 23<sup>rd</sup>, 2014

**Project:** Conterwood Commercial  
DL-DB3-07-0013

**Planner:** Kristin Marder

**Routed to:**  
City Depts.

☐ Public Works-Operations  
☐ Public Works-Engineering

☐ Building and Fire Safety  
☐ Other \_\_\_\_\_

**SEPA Agencies:**  
(NOA, SEPA)  
Electronic Mail

- ☐ Washington Department of Ecology, SEPA Register
- ☐ Washington Department of Commerce, attn: Review Team
- ☐ Pierce Transit Land Use Review, attn: Kelly Haden, Monica Adams
- ☐ Washington State Department of Fish & Wildlife, attn: SEPA Desk
- ☐ Washington State Department of Natural Resources, attn: SEPA Center
- ☐ Washington State DAHP, attn: Gretchen Kaehler
- ☐ Puyallup Tribe of Indians Historic Preservation, attn: Judy Wright
- ☐ Puyallup Tribe Cultural Resources, attn: Brandon Reynon/Jeffrey Thomas
- ☐ PenMet Parks, attn: Elaine Sorenson
- ☐ Pierce County Fire District Number 5, attn: Eric Watson/Eric Waters
- ☐ Suquamish Tribe, attn: Dennis Lewarch
- ☐ Peninsula School District, attn: Vicki Smith
- ☐ Pierce County Planning and Land Services
- ☐ Washington State Department of Transportation, attn: Dale Severson / SEPA Reviews
- ☐ Squaxin Island Tribe, attn: Rhonda Foster
- ☐ Muckleshoot Tribe, attn: Laura Murphy
- ☐ Washington Department of Corrections, attn: Eric Heinitz
- ☐ Puget Sound Partnership, attn: Marsha Engel

**Other Parties:**  
1<sup>st</sup> Class Mail

- ☐ Applicant/Owner/Agent (NOA, NOPH, NOPM, SEPA, NOD)
- ☐ DRB (NOA for Non-residential, Multi-family, Subdivisions, Public Projects)
- ☐ Parks Commission via Terri Reed (NOA)
- ☐ Property Owners within 300 feet of site: attached list (NOA, SEPA, NOPH, NOPM, NOD for Type II permits only)
- ☐ Parties of Record: attached list (NOPH, NOPM, NOD)
- ☐ Pierce County (NOA for Plats adjacent to City Limits)
- ☐ Pierce County Assessor-Treasurer (NOD)
- ☐ WA Transportation Secretary (NOA for Plats adj. to State ROW, or within 2 miles of Airport—approximately any plats south of Pioneer/Wollochet interchange)
- ☒ Other Gateway

Sent to Gateway 10/19/14 for publish 10/15/14

I certify under penalty of perjury under the laws of the State of Washington that on Oct 9<sup>th</sup>, 2014, I transmitted a copy of NOPM to the individuals identified above by first-class mail, postage-prepaid, inter-office routing or electronic mail, as specified above.

Signed this 9<sup>th</sup> day of Oct, 2014 at Gig Harbor, Washington.

Signature

Cynthia S. Andersen

Printed Name

Cynthia S. Andersen



"THE MARITIME CITY"

DEVELOPMENT SERVICES

## CITY OF GIG HARBOR

### NOTICE OF PUBLIC MEETING

#### Canterwood Commercial Project

**Permit Number(s):** PL-DRB-07-0013

**Date of Notice:** October 9, 2014

**Applicant:** Paul Cyr, Barghausen Consulting Engineers INC, 18215 72<sup>ND</sup> Avenue South, Kent WA 98032

**Project Location:** Located on Canterwood Blvd, across the street from St. Anthony's Hospital at approximately 10700 Canterwood Blvd.

**Project Description:** The proposal includes construction of 4 commercial buildings totaling 28,120 square feet of floor area and associated parking. Drive-through facilities are proposed on three of the buildings. Project also includes temporary and permanent wetlands and stream impacts with related mitigation.

**SEPA Threshold Determination:** A threshold determination has not been made at this time.

**PUBLIC MEETING DATE:** Design Review Board, October 23, 2014, 5:00 pm, at Gig Harbor Civic Center, Community Rooms, 3510 Grandview Street, Gig Harbor

Interested persons are invited to attend the public meeting and provide comment on this proposal; however, public testimony will not be taken. The meeting will be conducted in the manner prescribed by Gig Harbor Municipal Code Section 17.98.055(C).

Documents pertinent to this application are available for review and inspection at the City of Gig Harbor Planning Department, 3510 Grandview Street, Gig Harbor, WA 98335, during normal business hours, Monday through Friday. A copy of the staff report on this proposal will be available approximately seven days prior to the meeting. A copy of the application, all documents and evidence relied upon by the applicant, and applicable criteria are available for inspection at no cost; copies will be provided at the requestor's cost.

Interested persons may comment on the above stated application or may request a copy of the decision on this application. Requests for notification, written comments, including any written comments addressing the findings required for a decision, must be submitted to the Planning Department no later than 5:00 PM on October 23, 2014.

Questions regarding the above stated application should be made to Kristin Moerler, Associate Planner, City of Gig Harbor Planning Department, 3510 Grandview Street, Gig Harbor, WA 98335, or by calling 851-6170. Additional permit information can also be found at [permitportal.cityofgigharbor.net](http://permitportal.cityofgigharbor.net) by entering the above permit numbers.

**Andrews, Cindy**

---

**From:** Obits, Tac <[obitlegalads+canned.response@thenewstribune.com](mailto:obitlegalads+canned.response@thenewstribune.com)>  
**Sent:** Thursday, October 09, 2014 2:39 PM  
**To:** Andrews, Cindy  
**Subject:** Re: DRB NOPM for 10-23-14.docx

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Herald obituaries and News Tribune obituaries to run Saturday, Sunday, or Monday deadline at 3pm the prior Friday. Peninsula Gateway obituary notices deadline at noon on Monday.

News Tribune legal notices deadline at noon the day prior to publication. News Tribune legal notices for Sunday or Monday deadline at 2pm the prior Friday.

Herald and Gateway legal notices deadline at noon on Monday.

Notices received after the deadline will be set up for the next available edition.

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**The News Tribune   The Puyallup Herald   The Peninsula Gateway**

**[obitlegalads@thenewstribune.com](mailto:obitlegalads@thenewstribune.com)**

1950 S State Street | Tacoma WA 98405

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Office: 253-597-8605 | Fax: 253-597-8473

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**Customer Account**  
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**Payor Account**  
255175

**Customer Address**  
3510 GRANDVIEW ST, ,  
GIG HARBOR WA 98335-1214 USA

**Payor Address**  
3510 GRANDVIEW ST, ,  
GIG HARBOR WA 98335-1214 USA

**Customer Phone**  
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**Placement/Classification**  
**Run Dates**  
**Run Schedule Invoice Text**

TAC-GW-Gateway:Print: 1 \$104.18  
0300 - Legals Classified  
10/15/2014  
CITY OF GIG HARBOR NOTICE OF PUBLIC MEETING Canterwood

**CITY OF GIG HARBOR**  
**NOTICE OF PUBLIC MEETING**  
**Canterwood Commercial Project**  
Permit Number: PL-DRB-07-0013  
Date of Notice: October 9, 2014  
Applicant: Paul Cyr, Banghausen Consulting Engineers INC, 18215 72ND Avenue South, Kent WA 98032  
Project Location: Located on Canterwood Blvd, across the street from St. Anthony's Hospital at approximately 10700 Canterwood Blvd.  
Project Description: The proposal includes construction of 4 commercial buildings totaling 28,120 square feet of floor area and associated parking. Drive-through facilities are proposed on three of the buildings. Project also includes temporary and permanent wetlands and stream impacts with related mitigation.  
SEPA Threshold Determination: A threshold determination has not been made at this time.  
**PUBLIC MEETING DATE:** Design Review Board, October 23, 2014, 8:00 pm, at Gig Harbor Civic Center, Community Rooms, 3510 Grandview Street, Gig Harbor.

Interested persons are invited to attend the public meeting and provide comment on this proposal; however, public testimony will not be taken. The meeting will be conducted in the manner prescribed by Gig Harbor Municipal Code Section 17.98.055(C). Documents pertinent to this application are available for review and inspection at the City of Gig Harbor Planning Department, 3510 Grandview Street, Gig Harbor, WA 98335, during normal business hours, Monday through Friday. A copy of the staff report on this proposal will be available approximately seven days prior to the meeting. A copy of the application, all documents and evidence relied upon by the applicant, and applicable criteria are available for inspection at no cost; copies will be provided at the requestor's cost. Interested persons may comment on the above stated application or may request a copy of the decision on this application. Requests for notification, written comments, including any written comments addressing the findings required for a decision, must be submitted to the Planning Department no later than 5:00 PM on October 23, 2014. Questions regarding the above stated application should be made to Kristin Moerler, Associate Planner, City of Gig Harbor Planning Department, 3510 Grandview Street, Gig Harbor, WA 98335, or by calling 253-8170. Additional permit information can also be found at [permitsportal.cityofgigharbor.net](http://permitsportal.cityofgigharbor.net) by entering the above permit numbers.

## CERTIFICATION OF PUBLIC NOTICE

### DECLARATION OF MAILING

I, LEAH JOHNSON (printed name), declare under penalty of perjury under the laws of the State of Washington and the United States of America that the foregoing is true and correct to the best of my knowledge:

On NOV 22, 2016 I mailed a true and correct copy of the notice of public meeting for the following:

Project Name: Canterwood Commercial

Project Location: Approx 10700 Canterwood Blvd.

Permit Number(s): PL-PLB-07-0013

to the individuals/agencies identified on the attached transmittal form by United States Postal Service, inter-office routing, or electronic mail, as specified on the attached.

SIGNED at Gig Harbor, Washington, this 22 day of NOV, 2016.

Leah Johnson  
DECLARANT (signature)



City of Gig Harbor  
Transmittal Form

Routing for: NOA SEPA NOPH NOPM NOD

Notice Date: 11/22/16

Project: Canterwood Commercial

Planner: Carl de Smaer

Routed to: ☐ Public Works–Operations ☐ Building and Fire Safety  
City Depts. ☐ Public Works–Engineering ☐ Other \_\_\_\_\_

SEPA Agencies: ☐ Washington Department of Ecology, SEPA Register  
(NOA, SEPA) ☐ Washington Department of Commerce, attn: Review Team  
Electronic Mail ☐ Pierce Transit Land Use Review, attn: Kelly Haden, Monica Adams  
☐ Washington State Department of Fish & Wildlife, attn: SEPA Desk  
☐ Washington State Department of Natural Resources, attn: SEPA Center  
☐ Washington State DAHP, attn: Gretchen Kaehler  
☐ Puyallup Tribe of Indians Historic Preservation, attn: Judy Wright  
☐ Puyallup Tribe Cultural Resources, attn: Brandon Reynon/Jeffrey Thomas  
☐ PenMet Parks, attn: Elaine Sorenson  
☐ Pierce County Fire District Number 5, attn: Eric Watson/Eric Waters  
☐ Suquamish Tribe, attn: Dennis Lewarch  
☐ Peninsula School District, attn: Vicki Smith  
☐ Pierce County Planning and Land Services  
☐ Washington State Department of Transportation, attn: Dale Severson / SEPA Reviews  
☐ Squaxin Island Tribe, attn: Rhonda Foster  
☐ Muckleshoot Tribe, attn: Laura Murphy  
☐ Washington Department of Corrections, attn: Eric Heinritz  
☐ Puget Sound Partnership, attn: Marsha Engel

Other Parties: ☐ Applicant/Owner/Agent (NOA, NOPH, NOPM, SEPA, NOD)  
1<sup>st</sup> Class Mail ☐ DRB (NOA for Non-residential, Multi-family, Subdivisions, Public Projects)  
☐ Parks Commission via Terri Reed (NOA)  
☐ Property Owners within 300 feet of site: attached list (NOA, SEPA, NOPH, NOPM, NOD for Type II permits only)  
☐ Parties of Record: attached list (NOPH, NOPM, NOD)  
☐ Pierce County (NOA for Plats adjacent to City Limits)  
☐ Pierce County Assessor-Treasurer (NOD)  
☐ WA Transportation Secretary (NOA for Plats adj. to State ROW, or within 2 miles of Airport—approximately any plats south of Pioneer/Wollochet interchange)  
☐ Other \_\_\_\_\_



**PLANNING DEPARTMENT**  
**NOTICE OF PUBLIC MEETING**  
**Canterwood Commercial**

**Permit Number(s):** PL-DRB-07-0013

**Date of Notice:** November 24, 2016

**Applicant:** Swede Hill, LLC  
PO Box 1693  
Tacoma, WA 98401

**Agent:** Jason Hubbell, Barghausen Consulting Engineers, Inc.  
18215 72<sup>ND</sup> Avenue South  
Kent WA 98032

**Project Location:** Located on Canterwood Blvd, across the street from St. Anthony's Hospital at approximately 10700 Canterwood Blvd.  
Sec 25, Tw 22, R 01  
TPN: 0122254090

**Project Description:** The proposal includes construction of 4 commercial buildings totaling 28,278 square feet of office/retail space and a 9,000 square foot parking garage. Drive-through facilities are proposed on three of the buildings. Project also includes temporary and permanent wetlands and stream impacts with related mitigation.

**SEPA Threshold Determination:** A threshold determination has not been made at this time.

**PUBLIC MEETING DATE:** Design Review Board, **December 8, 2016, 5:00 pm**, at Gig Harbor Civic Center, Community Rooms A & B, 3510 Grandview Street, Gig Harbor

Interested persons are invited to attend the public meeting and provide comment on this proposal; however, public testimony will not be taken. The meeting will be conducted in the manner prescribed by Gig Harbor Municipal Code Section 17.98.055(C).

Documents pertinent to this application are available for review and inspection at the City of Gig Harbor Planning Department, 3510 Grandview Street, Gig Harbor, WA 98335, during normal business hours, Monday through Friday. A copy of the staff report on this proposal will be available approximately seven days prior to the meeting. A copy of the application, all documents and evidence relied upon by the applicant, and applicable criteria are available for inspection at no cost; copies will be provided at the requestor's cost.

Interested persons may comment on the above stated application or may request a copy of the decision on this application. **Requests for notification, written comments, including any written comments addressing the findings required for a decision, must be submitted to the Planning Department no later than 5:00 PM on December 8, 2016.**

Questions regarding the above stated application should be made to Carl de Simas, Associate Planner, City of Gig Harbor Planning Department, 3510 Grandview Street, Gig Harbor, WA 98335, or by calling 253-851-6170.

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(1 0122254024 5900)  
PURDY INVESTMENTS LLC  
11515 BURNHAM DR NW STE B  
GIG HARBOR, WA, 98332-8543

(2 0122254025 5900)  
PURDY INVESTMENTS LLC  
11515 BURNHAM DR NW STE B  
GIG HARBOR, WA, 98332-8543

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WORLUND THOMAS J & ALLISON R  
1180 E OLD RANCH RD  
ALLYN, WA, 98524-8754

(4 0122254051 9100)  
GIG HARBOR NORTH ANNEX LLC  
6622 WOLLOCHET DR NW  
GIG HARBOR, WA, 98335-8325

(5 0122254062 9100)  
APOGEE CAPITAL LLC  
1830 112TH ST E STE F  
TACOMA, WA, 98445-3747

(6 0122254065 9100)  
PARR GARY R  
3573 E L ST  
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GIG HARBOR NORTH ANNEX LLC  
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(8 0122254088 6380)  
WORLUND THOMAS J & ALLISON R  
1180 E OLD RANCH RD  
ALLYN, WA, 98524-8754

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SWEDE HILL LLC  
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TACOMA, WA, 98401-1693

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D & M MORRIS FAMILY LLC  
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GIG HARBOR, WA, 98332-8543

(12 0122258008 6500)  
BURNHAM PARTNERS LLC  
11515 BURNHAM DR NW STE B  
GIG HARBOR, WA, 98332-8543

(13 3001140010 6510)  
FRANCISCAN HEALTH SYSTEM WEST  
1149 MARKET ST  
TACOMA, WA, 98402-3515

Parties of Record

Canterwood Commercial

Jaime Keirstad, 12505 58th Ave NW, Gig Harbor WA 98332

# Canterwood Commercial

## Legend

### Highlighted Tax Parcels

Tax Parcels

Base Parcel

Condominium

Other

Roads

Interstate

Limited Access State

Routes

Other State Routes

Ramps

Major Arterial

Collector

Local Access

Unknown

Pierce County Basemap

Unincorporated County

Tacoma

Lakewood, Edgewood,

Bonney Lake, Buckley,

South Prairie

Stellacoom, Fircrest, Fife,

Gig Harbor, Orting,

Eatonville, Roy, Carbonado,

Wilkeson, Mt Rainier

University Place, Puyallup,

Auburn

DuPont, Milton, Sumner

Fort Lewis, McChord, McNeil

Island

Water

PL-DR-07-0013

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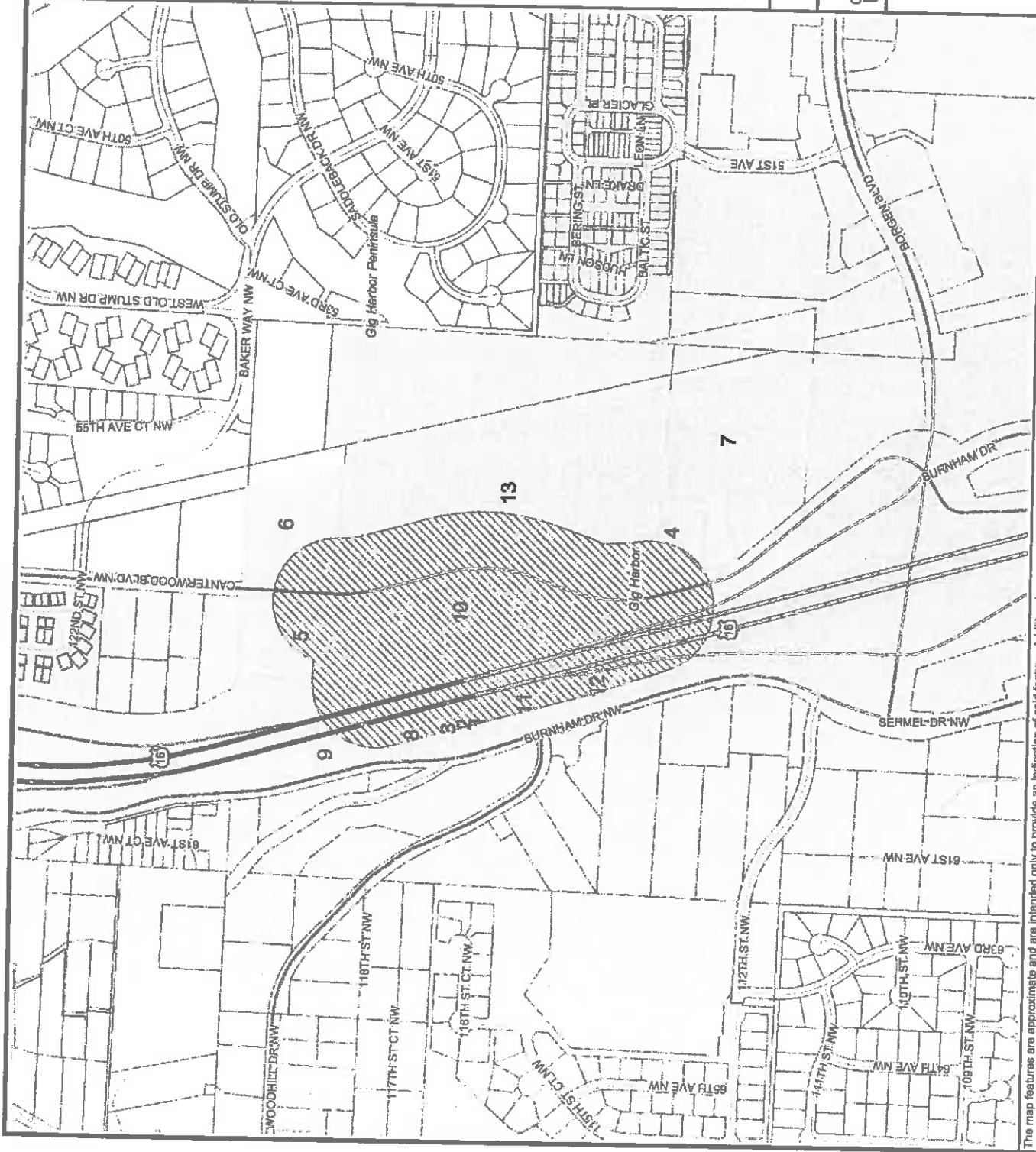
Scale 1:7,997

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"THE MARITIME CITY"



The map features are approximate and are intended only to provide an indication of said feature. Additional areas that have not been mapped may be present. This is not a survey. Orthophotos may not align with other data. Pierce County assumes no liability for variations ascertained by actual survey. All data is expressly provided AS IS and WITH ALL FAULTS. Pierce County makes no warranty of fitness for a particular purpose.



## AFFIDAVIT OF PUBLICATION

| Account # | Ad Number  | Identification                          | PO | Amount   | Cols | Lines |
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Attention: CINDY ANDREWS

CITY OF GIG HARBOR  
3510 GRANDVIEW ST  
GIG HARBOR, WA 983351214

**NOTICE OF PUBLIC MEETING**  
Canterwood Commercial Center  
Permit Number(s): PL-DRB-07-0013, PL-SPR-07-0004, PL-CUP-13-0002, PL-SEPA-07-0008  
Date of Notice: June 14, 2018  
Applicant: Swede Hill, LLC  
PO Box 1693  
Tacoma, WA 98401  
Agent: Jason Hubbell, Barghausen Consulting Engineers, Inc.  
18215 72ND Avenue South  
Kent WA 98032  
Project Location: Located on the west side of Canterwood Blvd, west of St. Anthony's Hospital at approximately 10700 Canterwood Blvd.  
Sec 25, Twp 22, R 01.  
TPN: 0122254090  
Project Description: The applicant is proposing design alternatives for certain specific requirements of the City's Design Manual. The proposed project includes the construction of 4 commercial buildings totaling 28,278 square feet of office/retail space and a 9,000-square foot parking garage. Drive-through facilities are proposed on 3 of the buildings. The project also includes temporary and permanent wetland buffer impacts with related mitigation.  
SEPA Threshold Determination: A threshold determination has not been made to date.  
**PUBLIC MEETING DATE:** Design Review Board, June 28, 2018, 8:00 pm, at Gig Harbor Civic Center, Community Rooms A & B, 3510 Grandview Street, Gig Harbor  
Interested persons are invited to attend the public meeting and provide comment on this proposal; however, public testimony will not be taken. The meeting will be conducted in the manner prescribed by Gig Harbor Municipal Code Section 17.88.035(c).  
Documents pertinent to this application are available for review and inspection at the City of Gig Harbor Planning Department, 3510 Grandview Street, Gig Harbor, WA 98335, during normal business hours, Monday through Friday. A copy of the staff report on this proposal will be available approximately seven days prior to the meeting. A copy of the application, all documents and evidence relied upon by the applicant, and applicable criteria are available for inspection at no cost; copies will be provided at the requestor's cost.  
Interested persons may comment on the above stated application or may request a copy of the decision on this application. Requests for notification, written comments, including any written comments addressing the findings required for a decision, must be submitted to the Planning Department no later than 5:00 PM on June 28, 2018.  
Questions regarding the above stated application should be made to Carl de Simas, Associate Planner, City of Gig Harbor Planning Department, 3510 Grandview Street, Gig Harbor, WA 98335, or by calling 253-851-6170.

SAMANTHA FORSELL, being duly sworn, deposes and says: That he/she is the Principal Clerk of the publication; The Peninsula Gateway, printed and published in Tacoma, Pierce County, State of Washington, and having a general circulation therein, and which said newspaper(s) have been continuously and uninterruptedly published in said County during a period of six months prior to the first publication of the notice, a copy of which is attached hereto: that said notice was published in The Peninsula Gateway, as amended, for:

1

Insertions

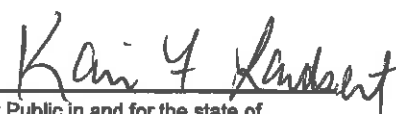
Published On:

June 21, 2018

  
(Principal Clerk)

Subscribed and sworn on this 21st day of June in the year of 2018 before me, a Notary Public, personally appeared before me Samantha Forsell known or identified to me to be the person whose name subscribed to the within instrument, and being by first duly sworn, declared that the statements therein are true, and acknowledged to me that he/she executed the same.



  
Notary Public in and for the state of Washington, residing in Pierce County 1950 S. State St, Tacoma, WA 98405

## CERTIFICATION OF PUBLIC NOTICE

=====

### DECLARATION OF MAILING

I, **MELISSA HARTWIG** (printed name), declare under penalty of perjury under the laws of the State of Washington and the United States of America that the foregoing is true and correct to the best of my knowledge:

On **JUNE 14, 2018** I mailed, a true and correct copy of the **NOTICE OF PUBLIC MEETING** for the following:

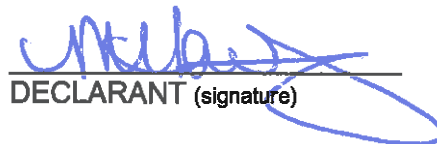
Project Name: **CANTERWOOD COMMERICAL CENTER**

Project Location: **10700 CANTERWOOD BLVD**

Permit Number(s): **PL-DRB-07-0013, PL-SPR-07-0004, PL-CUP-13-0002, PL-SEPA-07-0008**

to the individuals/agencies identified on the attached transmittal form by United States Postal Service, inter-office routing, or electronic mail, as specified on the attached.

SIGNED at **GIG HARBOR, WA**, this **14TH** day of **JUNE**, 2018

  
DECLARANT (signature)

City of Gig Harbor  
Transmittal Form

Routing for: NOA SEPA NOPH NOPM NOD

Notice Date: 6/14/18

Project: Centerwood Commercial

Planner: Carl de Guas

Routed to:  
City Depts.

☐ Public Works–Operations  
☐ Public Works–Engineering

☐ Building and Fire Safety  
☐ Other \_\_\_\_\_

SEPA Agencies:  
(NOA, SEPA)  
Electronic Mail

- ☐ Washington Department of Ecology, SEPA Register
- ☐ Washington Department of Commerce, attn: Review Team
- ☐ Pierce Transit Land Use Review, attn: Kelly Haden, Monica Adams
- ☐ Washington State Department of Fish & Wildlife, attn: SEPA Desk
- ☐ Washington State Department of Natural Resources, attn: SEPA Center
- ☐ Washington State DAHP, attn: Gretchen Kaehler
- ☐ Puyallup Tribe of Indians Historic Preservation, attn: Judy Wright
- ☐ Puyallup Tribe Cultural Resources, attn: Brandon Reynon/Jeffrey Thomas
- ☐ PenMet Parks, attn: Elaine Sorenson
- ☐ Pierce County Fire District Number 5, attn: Eric Watson/Eric Waters
- ☐ Suquamish Tribe, attn: Dennis Lewarch
- ☐ Peninsula School District, attn: Vicki Smith
- ☐ Pierce County Planning and Land Services
- ☐ Washington State Department of Transportation, attn: Dale Severson / SEPA Reviews
- ☐ Squaxin Island Tribe, attn: Rhonda Foster
- ☐ Muckleshoot Tribe, attn: Laura Murphy
- ☐ Washington Department of Corrections, attn: Eric Heinitz
- ☐ Puget Sound Partnership, attn: Marsha Engel

Other Parties:

1<sup>st</sup> Class Mail

- ☒ Applicant/Owner/Agent (NOA, NOPH, NOPM, SEPA, NOD)
- ☐ DRB (NOA for Non-residential, Multi-family, Subdivisions, Public Projects)
- ☐ Parks Commission via Terri Reed (NOA)
- ☒ Property Owners within 300 feet of site: attached list (NOA, SEPA, NOPH, NOPM, NOD for Type II permits only)
- ☒ Parties of Record: attached list (NOPH, NOPM, NOD)
- ☐ Pierce County (NOA for Plats adjacent to City Limits)
- ☐ Pierce County Assessor-Treasurer (NOD)
- ☐ WA Transportation Secretary (NOA for Plats adj. to State ROW, or within 2 miles of Airport—approximately any plats south of Pioneer/Wollochet interchange)
- ☐ Other \_\_\_\_\_





DEVELOPMENT SERVICES  
**NOTICE OF PUBLIC MEETING**

**Canterwood Commercial Center**

**Permit Number(s):** PL-DRB-07-0013, PL-SPR-07-0004, PL-CUP-13-0002, PL-SEPA-07-0008

**Date of Notice:** June 14, 2018

**Applicant:** Swede Hill, LLC  
PO Box 1693  
Tacoma, WA 98401

**Agent:** Jason Hubbell, Barghausen Consulting Engineers, Inc.  
18215 72<sup>ND</sup> Avenue South  
Kent WA 98032

**Project Location:** Located on the west side of Canterwood Blvd, west of St. Anthony's Hospital at approximately 10700 Canterwood Blvd.  
Sec 25, Tw 22, R 01  
TPN: 0122254090

**Project Description:** The applicant is proposing design alternatives for certain specific requirements of the City's Design Manual. The proposed project includes the construction of 4 commercial buildings totaling 28,278 square feet of office/retail space and a 9,000-square foot parking garage. Drive-through facilities are proposed on 3 of the buildings. The project also includes temporary and permanent wetland buffer impacts with related mitigation.

**SEPA Threshold Determination:** A threshold determination has not been made to date.

**PUBLIC MEETING DATE:** Design Review Board, **June 28, 2018, 5:00 pm**, at Gig Harbor Civic Center, Community Rooms A & B, 3510 Grandview Street, Gig Harbor

Interested persons are invited to attend the public meeting and provide comment on this proposal; however, public testimony will not be taken. The meeting will be conducted in the manner prescribed by Gig Harbor Municipal Code Section 17.98.055(C).

Documents pertinent to this application are available for review and inspection at the City of Gig Harbor Planning Department, 3510 Grandview Street, Gig Harbor, WA 98335, during normal business hours, Monday through Friday. A copy of the staff report on this proposal will be available approximately seven days prior to the meeting. A copy of the application, all documents and evidence relied upon by the applicant, and applicable criteria are available for inspection at no cost; copies will be provided at the requestor's cost.

Interested persons may comment on the above stated application or may request a copy of the decision on this application. **Requests for notification, written comments, including any written comments addressing the findings required for a decision, must be submitted to the Planning Department no later than 5:00 PM on June 28, 2018.**

Questions regarding the above stated application should be made to Carl de Simas, Associate Planner, City of Gig Harbor Planning Department, 3510 Grandview Street, Gig Harbor, WA 98335, or by calling 253-851-6170.

# CANTERWOOD COMMERCIAL

## Legend

### Highlighted Tax Parcels

#### Tax Parcels

Base Parcel

Condominium

Other

Roads

Interstate

Limited Access State

Routes

Other State Routes

Ramps

Major Arterial

Collector

Local Access

Unknown

Pierce County Basemap

Unincorporated County

Tacoma

Lakewood, Edgewood,

Bonney Lake, Buckley,

South Prairie

Stellacoom, Fircrest, Fife,

Gig Harbor, Orting,

Eatonville, Roy, Carbonado,

Wilkeson, Mt Rainier

University Place, Puyallup,

Auburn

DuPont, Milton, Sumner

Fort Lewis, McChord, McNell

Island

Water

PL-DRB-07-0013

Printed: 6/14/18 9:19 AM

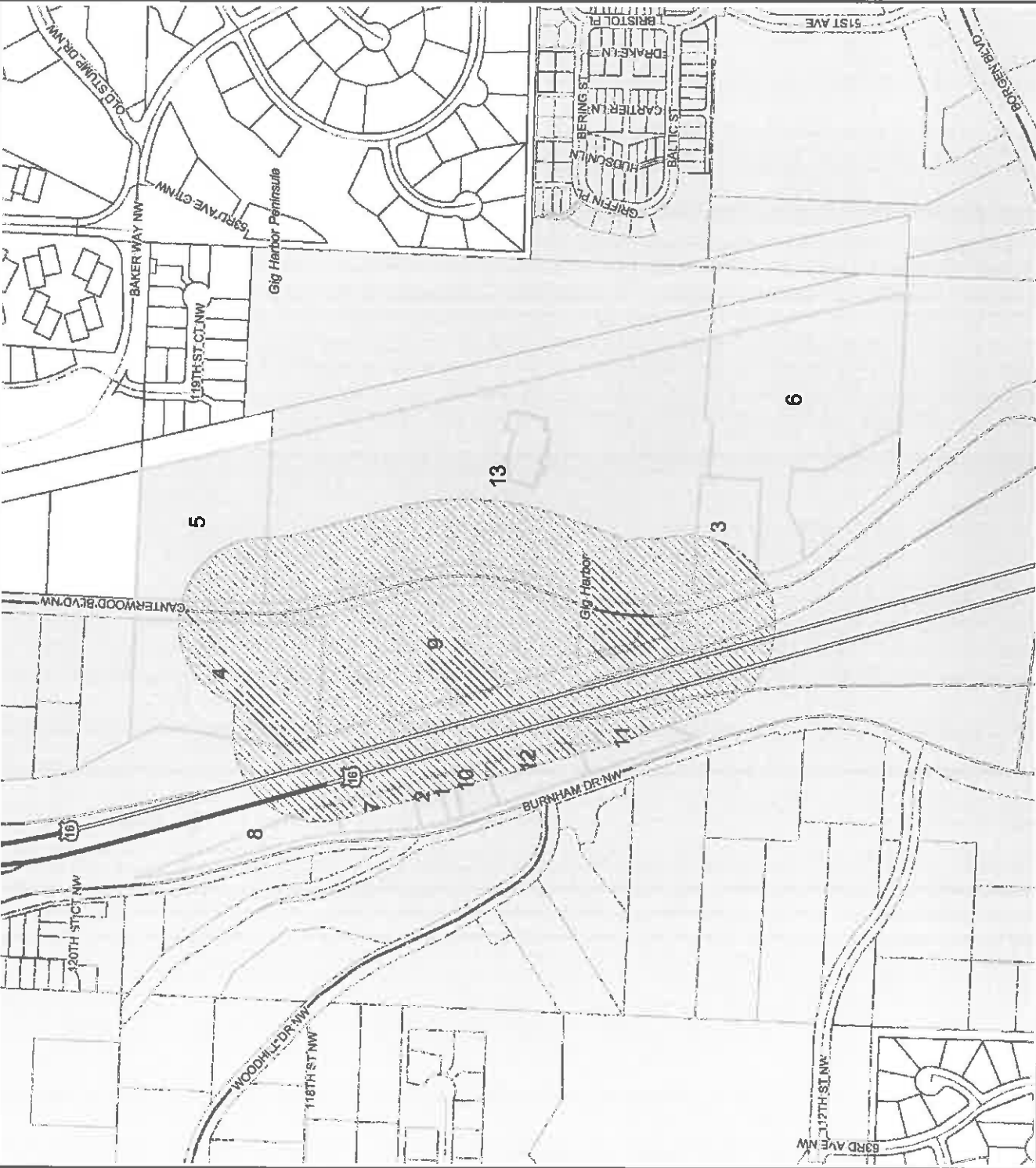
Scale 1:6,045

0 250 500 ft.

A



The map features are approximate and are intended only to provide an indication of said feature. Additional areas that have not been mapped may be present. This is not a survey. Orthophotos may not align with other data. Pierce County assumes no liability for variations ascertained by actual survey. All data is expressly provided AS IS and WITH ALL FAULTS. Pierce County makes no warranty of fitness for a particular purpose.



(1 0122254025 5900)  
BURNHAM HOLDINGS LLC  
PO BOX 701  
WAUNA, WA, 98395-0701

(2 0122254028 6380)  
WORLUND THOMAS J & ALLISON R  
1180 E OLD RANCH RD  
ALLYN, WA, 98524-8754

(3 0122254051 9100)  
GIG HARBOR NORTH ANNEX LLC  
6622 WOLLOCHET DR NW  
GIG HARBOR, WA, 98335-8325

(4 0122254062 9100)  
APOGEE CAPITAL LLC  
1830 112TH ST E STE F  
TACOMA, WA, 98445-3747

(5 0122254065 9100)  
PARR GARY R  
3573 E L ST  
TACOMA, WA, 98404-3823

(6 0122254073 9100)  
GIG HARBOR NORTH ANNEX LLC  
6622 WOLLOCHET DR NW  
GIG HARBOR, WA, 98335-8325

(7 0122254088 6380)  
WORLUND THOMAS J & ALLISON R  
1180 E OLD RANCH RD  
ALLYN, WA, 98524-8754

(8 0122254089 9170)  
PURDY INVESTMENTS LLC  
11515 BURNHAM DR NW STE B  
GIG HARBOR, WA, 98332-8543

(9 0122254090 9100)  
SWEDE HILL LLC  
PO BOX 1693  
TACOMA, WA, 98401-1693

(10 0122254094 5900)  
BURNHAM HOLDINGS LLC  
PO BOX 701  
WAUNA, WA, 98395-0701

(11 0122258008 6500)  
BURNHAM PARTNERS LLC  
11515 BURNHAM DR NW STE B  
GIG HARBOR, WA, 98332-8543

(12 0122258009 6199)  
D & M MORRIS FAMILY LLC  
11515 BURNHAM DR NW STE B  
GIG HARBOR, WA, 98332-8543

(13 3001140010 6510)  
FRANCISCAN HEALTH SYSTEM WEST  
1149 MARKET ST  
TACOMA, WA, 98402-3515





**PLANNING DEPARTMENT  
INTERESTED PARTIES**

**Project Name:** Canterwood Commercial Center

**Location:** Located on the west side of Canterwood Blvd, west of St. Anthony's Hospital at approximately 10700 Canterwood Blvd.  
Sec 25, Tw 22, R 01  
TPN: 0122254090

**Applicant/Agent:** Swede Hill, LLC  
PO Box 1693  
Tacoma, WA 98401  
Barghausen Consulting Engineers  
Attn: Jason Hubbell  
18215 72<sup>nd</sup> Ave S  
Kent, WA 98032

**Associated Permits:** PL-DRB-07-0013, PL-SPR-07-0004, PL-CUP-13-0002, PL-SEPA-07-0008

**Associated Notices:** —

**Parties:**

Jaime Keirstad  
12505 58th Ave NW  
Gig Harbor WA 98332

---

Please refer to Gig Harbor Municipal Code (GHMC), Title 19, for any questions relative to the administration of the development code.

This list should not be considered an exhaustive list of all those parties who may be interested in this project. This list represents only those parties who have commented at some point during the permit project and/or who have explicitly requested that they are included in project related correspondence.

This list does not represent Parties of Record as defined in GHMC 19.06.003, however some may qualify as such.

## CERTIFICATION OF PUBLIC NOTICE

=====

### DECLARATION OF PUBLISHING

I, Cynthia Andersen (printed name), declare under penalty of perjury under the laws of the State of Washington and the United States of America that the foregoing is true and correct to the best of my knowledge:

On June 13<sup>th</sup>, 2018 sent a true and correct copy of the NOTICE OF PUBLIC MEETING for publication

In the June 21<sup>st</sup>, 2018 edition of the Peninsula Gateway for the following:

Project Name: CANTERWOOD COMMERCIAL

Project Location: 10700 CANTERWOOD BLVD.

Permit Number(s): PL-DRB-07-0013

SIGNED at Gig Harbor, Washington, this 13<sup>th</sup> day of June, 2018.

Cynthia Andersen  
DECLARANT (signature)

**City of Gig Harbor  
Transmittal Form**

**Routing for:**      NOA   SEPA   NOPH   NOPM   NOD      **Notice Date:** June # 21<sup>st</sup> 2018  
**Project:** Canterwood Commercial      **Planner:** CAPI  
Pl- DRB-67-6013

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**Routed to:**      ☐ Public Works–Operations      ☐ Building and Fire Safety  
**City Depts.**      ☐ Public Works–Engineering      ☐ Other \_\_\_\_\_

**SEPA Agencies:**      ☐ Washington Department of Ecology, SEPA Register  
(NOA, SEPA)      ☐ Washington Department of Commerce, attn: Review Team  
Electronic Mail      ☐ Pierce Transit Land Use Review, attn: Kelly Haden, Monica Adams  
                                 ☐ Washington State Department of Fish & Wildlife, attn: SEPA Desk  
                                 ☐ Washington State Department of Natural Resources, attn: SEPA Center  
                                 ☐ Washington State DAHP, attn: Gretchen Kaehler  
                                 ☐ Puyallup Tribe of Indians Historic Preservation, attn: Judy Wright  
                                 ☐ Puyallup Tribe Cultural Resources, attn: Brandon Reynon/Jeffrey Thomas  
                                 ☐ PenMet Parks, attn: Elaine Sorenson  
                                 ☐ Pierce County Fire District Number 5, attn: Eric Watson/Eric Waters  
                                 ☐ Suquamish Tribe, attn: Dennis Lewarch  
                                 ☐ Peninsula School District, attn: Vicki Smith  
                                 ☐ Pierce County Planning and Land Services  
                                 ☐ Washington State Department of Transportation, attn: Dale Severson / SEPA  
                                      Reviews  
                                 ☐ Squaxin Island Tribe, attn: Rhonda Foster  
                                 ☐ Muckleshoot Tribe, attn: Laura Murphy  
                                 ☐ Washington Department of Corrections, attn: Eric Heinitz  
                                 ☐ Puget Sound Partnership, attn: Marsha Engel

**Other Parties:**      ☐ Applicant/Owner/Agent (NOA, NOPH, NOPM, SEPA, NOD)  
1<sup>st</sup> Class Mail      ☐ DRB (NOA for Non-residential, Multi-family, Subdivisions, Public Projects)  
                                 ☐ Parks Commission via Terri Reed (NOA)  
                                 ☐ Property Owners within 300 feet of site: attached list (NOA, SEPA, NOPH,  
                                      NOPM, NOD for Type II permits only)  
                                 ☐ Parties of Record: attached list (NOPH, NOPM, NOD)  
                                 ☐ Pierce County (NOA for Plats adjacent to City Limits)  
                                 ☐ Pierce County Assessor-Treasurer (NOD)  
                                 ☐ WA Transportation Secretary (NOA for Plats adj. to State ROW, or within 2  
                                      miles of Airport—approximately any plats south of Pioneer/Wollochet  
                                      interchange)  
                                 ☒ Other Gateways



## NOTICE OF PUBLIC MEETING

### Canterwood Commercial Center

Permit Number(s): PL-DRB-07-0013, PL-SPR-07-0004, PL-CUP-13-0002, PL-SEPA-07-0008

Date of Notice: June 14, 2018

Applicant: Swede Hill, LLC  
PO Box 1693  
Tacoma, WA 98401

Agent: Jason Hubbell, Barghausen Consulting Engineers, Inc.  
18215 72<sup>ND</sup> Avenue South  
Kent WA 98032

Project Location: Located on the west side of Canterwood Blvd, west of St. Anthony's Hospital at approximately 10700 Canterwood Blvd.  
Sec 25, Tw 22, R 01  
TPN: 0122254090

Project Description: The applicant is proposing design alternatives for certain specific requirements of the City's Design Manual. The proposed project includes the construction of 4 commercial buildings totaling 28,278 square feet of office/retail space and a 9,000-square foot parking garage. Drive-through facilities are proposed on 3 of the buildings. The project also includes temporary and permanent wetland buffer impacts with related mitigation.

SEPA Threshold Determination: A threshold determination has not been made to date.

**PUBLIC MEETING DATE:** Design Review Board, **June 28, 2018, 5:00 pm**, at Gig Harbor Civic Center, Community Rooms A & B, 3510 Grandview Street, Gig Harbor

Interested persons are invited to attend the public meeting and provide comment on this proposal; however, public testimony will not be taken. The meeting will be conducted in the manner prescribed by Gig Harbor Municipal Code Section 17.98.055(C).

Documents pertinent to this application are available for review and inspection at the City of Gig Harbor Planning Department, 3510 Grandview Street, Gig Harbor, WA 98335, during normal business hours, Monday through Friday. A copy of the staff report on this proposal will be available approximately seven days prior to the meeting. A copy of the application, all documents and evidence relied upon by the applicant, and applicable criteria are available for inspection at no cost; copies will be provided at the requestor's cost.

Interested persons may comment on the above stated application or may request a copy of the decision on this application. **Requests for notification, written comments, including any written comments addressing the findings required for a decision, must be submitted to the Planning Department no later than 5:00 PM on June 28, 2018.**

Questions regarding the above stated application should be made to Carl de Simas, Associate Planner, City of Gig Harbor Planning Department, 3510 Grandview Street, Gig Harbor, WA 98335, or by calling 253-851-6170.

---

## Cindy Andrews

---

**From:** Obits, Tac <obitlegalads+canned.response@thenewstribune.com>  
**Sent:** Wednesday, June 13, 2018 1:02 PM  
**To:** Cindy Andrews  
**Subject:** Re: Canterwood Commercial\_DRB NOPM\_061418.doc

This is an automated response from the News Tribune, Tacoma, Washington email system to inform you that your email has been received by our server.

All notices submitted for publication are confirmed directly either by telephone or email.  
Charges and payments must be approved and authorized prior to publication of all notices.

Notices will not be published without authorization.

Reach us by phone at (253) 597-8605.

Our normal office hours are 8am – 4pm

Monday through Friday.

The Obituaries and Legals Desk is closed  
on Saturday, Sunday, and all major holidays.

If you have submitted a notice and have not been contacted with a quote and/or a request for payment prior to the deadline during normal office hours, please contact our office right away.

### Deadlines

#### Obituaries

**News Tribune** daily obituaries deadline at 2:30 pm the day prior to publication.

Saturday, Sunday and Monday obituaries deadline at 2:30 pm the prior Friday.

**Herald** obituaries deadline at 2:30 pm on Friday.

**Peninsula Gateway** obituaries deadline at noon on Monday.

## Legal Notices

**News Tribune** daily notices deadline at noon the day prior to publication.

Legal notices for Sunday or Monday deadline at 2pm the prior Friday.

**Herald** and **Gateway** legal notices deadline at noon on Monday.

Notices received after the deadline will be set up for the next available edition.

Thank you for contacting us.

-----

## Obituaries and Legals

**The News Tribune   The Puyallup Herald   The Peninsula Gateway**

[obitlegalads@thenewstribune.com](mailto:obitlegalads@thenewstribune.com)

1950 S State Street | Tacoma WA 98405

[www.thenewstribune.com](http://www.thenewstribune.com)

Office: [253-597-8605](tel:253-597-8605) | Fax: [253-597-8473](tel:253-597-8473)

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## Obituaries and Legals

**The News Tribune   The Puyallup Herald   The Peninsula Gateway**

[obitlegalads@thenewstribune.com](mailto:obitlegalads@thenewstribune.com)

1950 S State Street | Tacoma WA 98405

[www.thenewstribune.com](http://www.thenewstribune.com)





DEVELOPMENT SERVICES  
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**Customer Account**

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 GIG HARBOR WA 983351214 USA

**Customer Phone**

253-851-8136

**Customer Fax**

**Sales Rep**

lbastin@thenewstribune.com

**Payor Customer**

CITY OF GIG HARBOR

**Payor Account**

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**Payor Address**

3510 GRANDVIEW ST  
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**Payor Phone**

253-851-8136

**Customer EMail**

**Order Taker**

lbastin@thenewstribune.com

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|------------------|-----------------------|------------------|--------------------|---------------|-------------------|
|                  | Invoice               |                  | 0                  | 0             | 2                 |

| <u>Net Amount</u> | <u>Tax Amount</u> | <u>Total Amount</u> | <u>Payment Amount</u> | <u>Amount Due</u> |
|-------------------|-------------------|---------------------|-----------------------|-------------------|
| \$113.32          | \$0.00            | \$113.32            | \$0.00                | \$113.32          |

| <u>Ad Order Number</u> | <u>Order Source</u> | <u>Ordered By</u> | <u>Special Pricing</u> |
|------------------------|---------------------|-------------------|------------------------|
| 0003716009             |                     | CINDY ANDREWS     |                        |
| <u>Invoice Text</u>    |                     |                   | <u>Promo Type</u>      |
| <u>Package Buy</u>     |                     |                   | <u>Materials</u>       |

## Ad Order Information

**Ad Number** 0003716009-01  
**Ad Type** TAC-Legal Liner

**Production Method** AdBooker  
**Production Notes**

**External Ad Number**

**Ad Attributes**

**Ad Released**

**Pick Up**

**Ad Size**

1 X 70 li

**Color**

DEVELOPMENT SERVICES

**Product**

TAC-GW-Gateway

**Placement**

0300 - Legals Classified

**Times Run**

1

**Schedule Cost**

\$113.32

**Run Schedule Invoice Text**

NOTICE OF PUBLIC MEETING Canterwood Comm

**Position**

0301 - Legals & Public Notices

**Run Dates**

06/21/2018

### NOTICE OF PUBLIC MEETING

#### Canterwood Commercial Center

Permit Number(s): PL-DRB-07-0013, PL-SPR-07-0004, PL-CUP-13-0002, PL-SEPA-07-0008

Date of Notice: June 14, 2018  
Applicant: Swede Hill, LLC

PO Box 1693  
Tacoma, WA 98401  
Agent: Jason Hubbell, Berghausen Consulting Engineers, Inc.  
18215 72ND Avenue South  
Kent WA 98032

Project Location: Located on the west side of Canterwood Blvd, west of St. Anthony's Hospital at approximately 10700 Canterwood Blvd.  
Sec 25, Twp 22, R 01  
TPN: 0122254090

Project Description: The applicant is proposing design alternatives for certain specific requirements of the City's Design Manual. The proposed project includes the construction of 4 commercial buildings totaling 28,278 square feet of office/retail space and a 9,000-square foot parking garage. Drive-through facilities are proposed on 3 of the buildings. The project also includes temporary and permanent wetland buffer impacts with related mitigation.

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## CERTIFICATION OF PUBLIC NOTICE

=====

### DECLARATION OF MAILING

I, MELISSA HARTWIG (printed name), declare under penalty of perjury under the laws of the State of Washington and the United States of America that the foregoing is true and correct to the best of my knowledge:

On JULY 12, 2018 I mailed, a true and correct copy of the NOPM for the following:

Project Name: CANTERWOOD COMMERCIAL

Project Location: 10700 CANTERWOOD BLVD

Permit Number(s): PL-DRB-07-0013, PL-SPR-07-0004, PL-CUP-13-0002, PL-SEPA-07-0008

to the individuals/agencies identified on the attached transmittal form by United States Postal Service, inter-office routing, or electronic mail, as specified on the attached.

SIGNED at GIG HARBOR, WA, this 12TH day of JULY, 2018

  
DECLARANT (signature)

City of Gig Harbor  
Transmittal Form

Routing for: NOA SEPA NOPH NOPM NOD

Notice Date: July 12, 2018

Project: Canterwood Commercial

Planner: Carl de Sines

Routed to:  
City Depts.

☐ Public Works–Operations  
☐ Public Works–Engineering

☐ Building and Fire Safety  
☐ Other \_\_\_\_\_

SEPA Agencies:  
(NOA, SEPA)  
Electronic Mail

- ☐ Washington Department of Ecology, SEPA Register
- ☐ Washington Department of Commerce, attn: Review Team
- ☐ Pierce Transit Land Use Review, attn: Kelly Haden, Monica Adams
- ☐ Washington State Department of Fish & Wildlife, attn: SEPA Desk
- ☐ Washington State Department of Natural Resources, attn: SEPA Center
- ☐ Washington State DAHP, attn: Gretchen Kaehler
- ☐ Puyallup Tribe of Indians Historic Preservation, attn: Judy Wright
- ☐ Puyallup Tribe Cultural Resources, attn: Brandon Reynon/Jeffrey Thomas
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- ☐ Pierce County Fire District Number 5, attn: Eric Watson/Eric Waters
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- ☐ Peninsula School District, attn: Vicki Smith
- ☐ Pierce County Planning and Land Services
- ☐ Washington State Department of Transportation, attn: Dale Severson / SEPA Reviews
- ☐ Squaxin Island Tribe, attn: Rhonda Foster
- ☐ Muckleshoot Tribe, attn: Laura Murphy
- ☐ Washington Department of Corrections, attn: Eric Heinitz
- ☐ Puget Sound Partnership, attn: Marsha Engel

Other Parties:  
1<sup>st</sup> Class Mail

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- ☐ DRB (NOA for Non-residential, Multi-family, Subdivisions, Public Projects)
- ☐ Parks Commission via Terri Reed (NOA)
- ☐ Property Owners within 300 feet of site: attached list (NOA, SEPA, NOPH, NOPM, NOD for Type II permits only)
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- ☐ WA Transportation Secretary (NOA for Plats adj. to State ROW, or within 2 miles of Airport—approximately any plats south of Pioneer/Wollochet interchange)
- ☐ Other \_\_\_\_\_

AM



"THE MARITIME CITY"

DEVELOPMENT SERVICES

## **NOTICE OF PUBLIC MEETING Canterwood Commercial Center**

**Permit Number(s):** PL-DRB-07-0013, PL-SPR-07-0004, PL-CUP-13-0002, PL-SEPA-07-0008

**Date of Notice:** July 12, 2018

**Applicant:** Swede Hill, LLC  
PO Box 1693  
Tacoma, WA 98401

**Agent:** Jason Hubbell, Barghausen Consulting Engineers, Inc.  
18215 72<sup>ND</sup> Avenue South  
Kent WA 98032

**Project Location:** Located on the west side of Canterwood Blvd, west of St. Anthony's Hospital at approximately 10700 Canterwood Blvd.  
Sec 25, Tw 22, R 01  
TPN: 0122254090

**Project Description:** The applicant is proposing design alternatives for certain specific requirements of the City's Design Manual. The proposed project includes the construction of 4 commercial buildings totaling 28,278 square feet of office/retail space and a 9,000-square foot parking garage. Drive-through facilities are proposed on 3 of the buildings. The project also includes temporary and permanent wetland buffer impacts with related mitigation.

**SEPA Threshold Determination:** A threshold determination has not been made to date.

**PUBLIC MEETING DATE:** Design Review Board, **July 26, 2018, 5:00 pm**, at Gig Harbor Civic Center, Community Rooms A & B, 3510 Grandview Street, Gig Harbor

Interested persons are invited to attend the public meeting and provide comment on this proposal; however, public testimony will not be taken. The meeting will be conducted in the manner prescribed by Gig Harbor Municipal Code Section 17.98.055(C).

Documents pertinent to this application are available for review and inspection at the City of Gig Harbor Planning Department, 3510 Grandview Street, Gig Harbor, WA 98335, during normal business hours, Monday through Friday. A copy of the staff report on this proposal will be available approximately seven days prior to the meeting. A copy of the application, all documents and evidence relied upon by the applicant, and applicable criteria are available for inspection at no cost; copies will be provided at the requestor's cost.

Interested persons may comment on the above stated application or may request a copy of the decision on this application. **Requests for notification, written comments, including any written comments addressing the findings required for a decision, must be submitted to the Planning Department no later than 5:00 PM on July 26, 2018.**

Questions regarding the above stated application should be made to Carl de Simas, Associate Planner, City of Gig Harbor Planning Department, 3510 Grandview Street, Gig Harbor, WA 98335, or by calling 253-851-6170.





**PLANNING DEPARTMENT  
INTERESTED PARTIES**

**Project Name:** Canterwood Commercial Center

**Location:** Located on the west side of Canterwood Blvd, west of St. Anthony's Hospital at approximately 10700 Canterwood Blvd.  
Sec 25, Tw 22, R 01  
TPN: 0122254090

**Applicant/Agent:** Swede Hill, LLC  
PO Box 1693  
Tacoma, WA 98401  
Barghausen Consulting Engineers  
Attn: Jason Hubbell  
18215 72<sup>nd</sup> Ave S  
Kent, WA 98032

**Associated Permits:** PL-DRB-07-0013, PL-SPR-07-0004, PL-CUP-13-0002, PL-SEPA-07-0008

**Associated Notices:** —

**Parties:**

Jaime Keirstad  
12505 58th Ave NW  
Gig Harbor WA 98332

---

Please refer to Gig Harbor Municipal Code (GHMC), Title 19, for any questions relative to the administration of the development code.

This list should not be considered an exhaustive list of all those parties who may be interested in this project. This list represents only those parties who have commented at some point during the permit project and/or who have explicitly requested that they are included in project related correspondence.

This list does not represent Parties of Record as defined in GHMC 19.06.003, however some may qualify as such.

# Canterwood Commercial

## Legend

Highlighted Tax Parcels

Tax Parcels

Base Parcel

Condominium

Other

Roads

Interstate

Limited Access State Routes

Other State Routes

Ramps

Major Arterial

Collector

Local Access

Unknown

Pierce County Basemap

Unincorporated County

Tacoma

Lakewood, Edgewood,

Bonney Lake, Buckley,

South Prairie

Stellacoom, Fircrest, Fife,

Gig Harbor, Orting,

Eatonville, Roy, Carbonado,

Wilkeson, Mt Rainier

University Place, Puyallup,

Auburn

DuPont, Milton, Sumner

Fort Lewis, McChord, McNeil

Island

Water

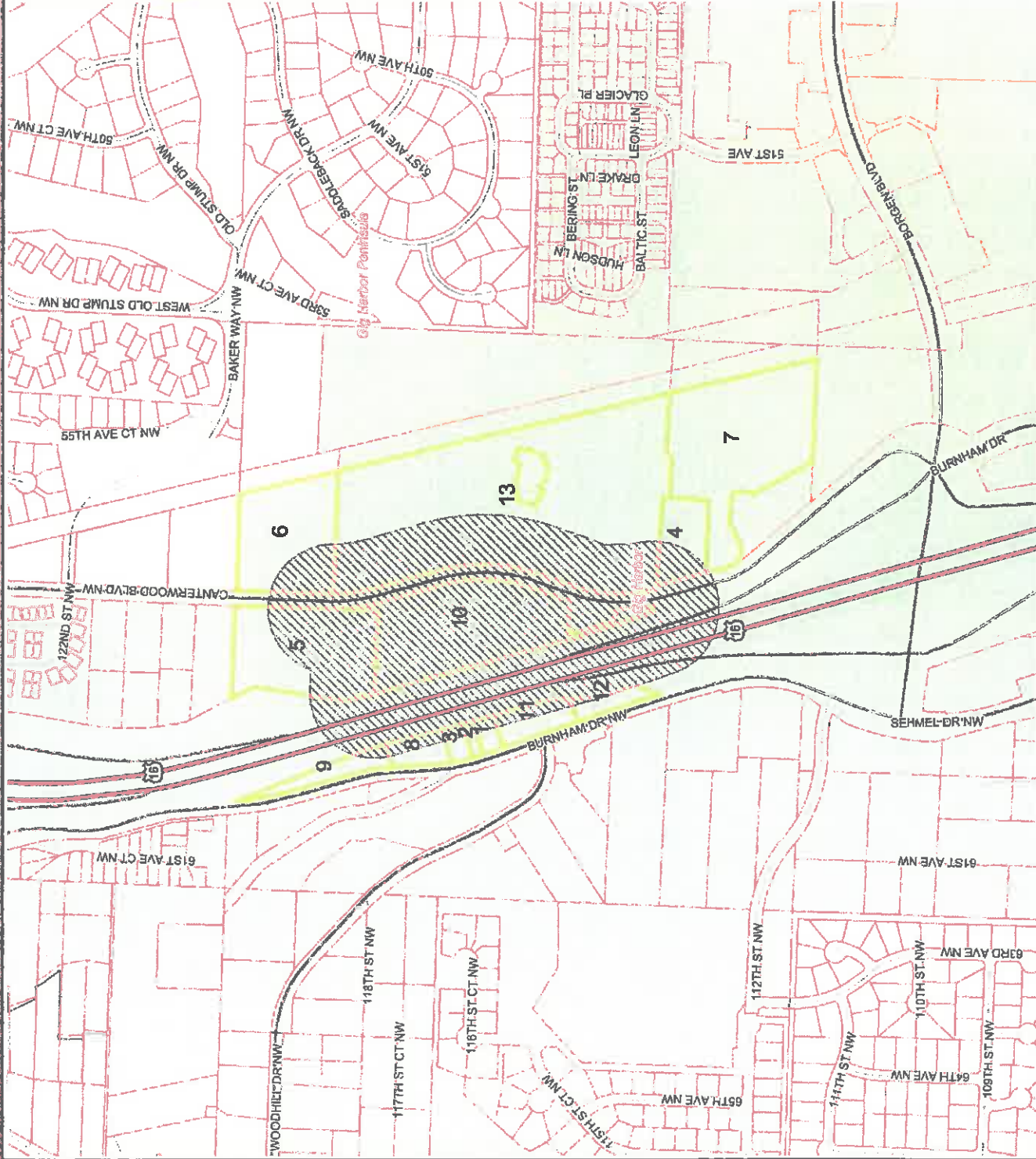
PL-DR-07-0013

Printed: 10/13/16 9:38 AM

Scale 1:7,987

0 325 650 ft.

A



The map features are approximate and are intended only to provide an indication of said feature. Additional areas that have not been mapped may be present. This is not a survey. Orthophotos may not align with other data. Pierce County assumes no liability for variations ascertained by actual survey. All data is expressly provided AS IS and WITH ALL FAULTS. Pierce County makes no warranty of fitness for a particular purpose.

(1 0122254024 5900)  
PURDY INVESTMENTS LLC  
11515 BURNHAM DR NW STE B  
GIG HARBOR, WA, 98332-8543

(2 0122254025 5900)  
PURDY INVESTMENTS LLC  
~~11515 BURNHAM DR NW STE B~~  
GIG HARBOR, WA, 98332-8543

(3 0122254028 6380)  
WORLUND THOMAS J & ALLISON R  
1180 E OLD RANCH RD  
ALLYN, WA, 98524-8754

(4 0122254051 9100)  
GIG HARBOR NORTH ANNEX LLC  
6622 WOLLOCHET DR NW  
GIG HARBOR, WA, 98335-8325

(5 0122254062 9100)  
APOGEE CAPITAL LLC  
1830 112TH ST E STE F  
TACOMA, WA, 98445-3747

(6 0122254065 9100)  
PARR GARY R  
3573 E L ST  
TACOMA, WA, 98404-3823

(7 0122254073 9100)  
GIG HARBOR NORTH ANNEX LLC  
6622 WOLLOCHET DR NW  
GIG HARBOR, WA, 98335-8325

(8 0122254088 6380)  
WORLUND THOMAS J & ALLISON R  
1180 E OLD RANCH RD  
ALLYN, WA, 98524-8754

(9 0122254089 9170)  
~~PURDY INVESTMENTS LLC~~  
~~11515 BURNHAM DR NW STE B~~  
GIG HARBOR, WA, 98332-8543

(10 0122254090 9100)  
SWEDE HILL LLC  
PO BOX 1693  
TACOMA, WA, 98401-1693

(11 0122258007 6199)  
D & M MORRIS FAMILY LLC  
11515 BURNHAM DR NW STE B  
GIG HARBOR, WA, 98332-8543

(12 0122258008 6500)  
BURNHAM PARTNERS LLC  
11515 BURNHAM DR NW STE B  
GIG HARBOR, WA, 98332-8543

(13 3001140010 6510)  
FRANCISCAN HEALTH SYSTEM WEST  
1149 MARKET ST  
TACOMA, WA, 98402-3515



## CERTIFICATION OF PUBLIC NOTICE

### DECLARATION OF POSTING

I, Carl de Sines (printed name), declare under penalty of perjury under the laws of the State of Washington and the United States of America that the foregoing is true and correct to the best of my knowledge:

On July 19, 201~~7~~<sup>8</sup> I caused to be posted the notice board provided by the City for the Notice of Application on the following:

Project Name: Canterwood Commercial

Project Location: 10700 Canterwood Blvd.

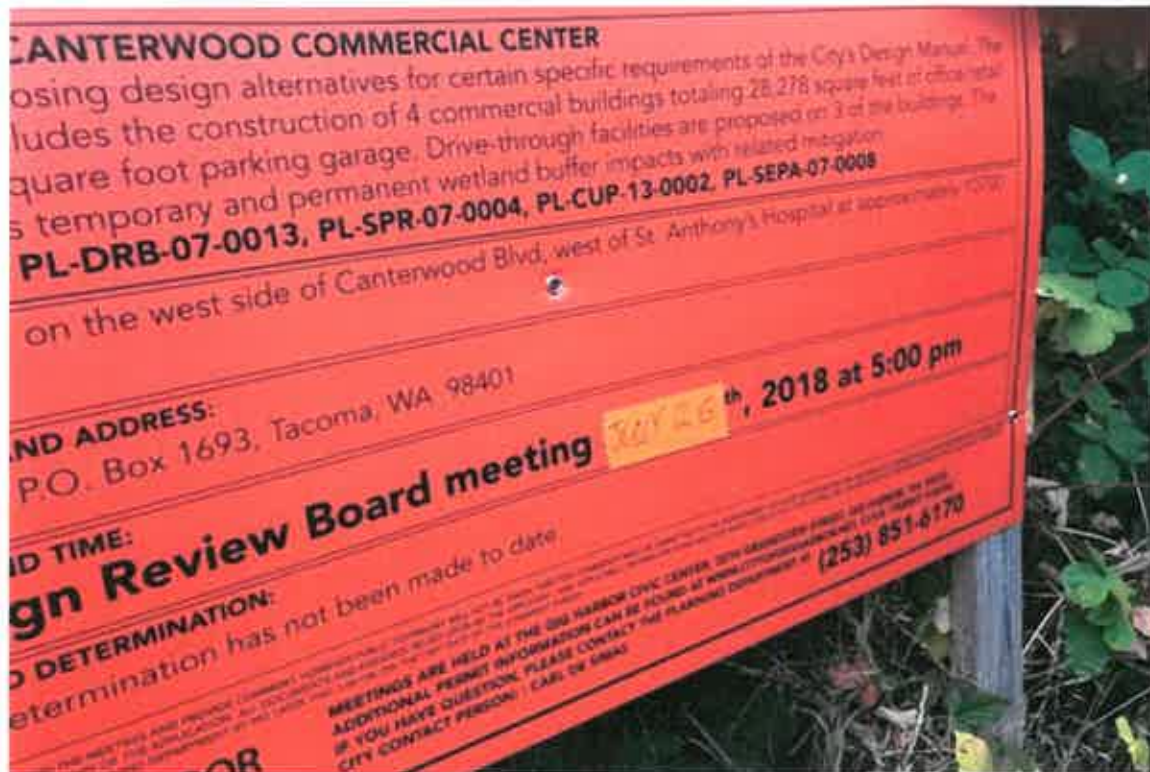
Permit Number(s): PL-SPR-07-0004 PL-CUP-13-0002  
PL-SEPA-07-0008 PL-DRB-07-0013

at the locations indicated below meeting the requirements of GHMC 19.03.001(A).

- ☒ Approx 10700 Canterwood Blvd.
- ☒ \_\_\_\_\_

SIGNED at Gig Harbor, Washington, this 19<sup>th</sup> day of July, ~~2017~~ 2018

  
DECLARANT (signature)



## CERTIFICATION OF PUBLIC NOTICE

=====

### DECLARATION OF PUBLISHING

I, Carl de Sines (printed name), declare under penalty of perjury under the laws of the State of Washington and the United States of America that the foregoing is true and correct to the best of my knowledge:

On July 16<sup>th</sup>, 2018 sent a true and correct copy of the NOTICE OF PUBLIC MEETING for publication

In the July 19th, 2018 edition of the Peninsula Gateway for the following:

Project Name: CANTERWOOD COMMERCIAL CENTER

Project Location: WEST SIDE OF CANTERWOOD BLVD / WEST OF ST ANTHONY'S HOSPITAL.

Permit Number(s): PL-DRB-07-0013 / PL-SPR-07-0004 / PL-SEPA-07-0008

SIGNED at Gig Harbor, Washington, this 16<sup>th</sup> day of July, 2018.

  
DECLARANT (signature)



City of Gig Harbor  
Transmittal Form

Routing for: NOA SEPA NOPH **NOPM** NOD

Notice Date: July 19<sup>th</sup>, 2018

Project: Canterwood Commercial

Planner: Carl Jo-Simon

Routed to:  
City Depts.

☐ Public Works–Operations  
☐ Public Works–Engineering

☐ Building and Fire Safety  
☐ Other \_\_\_\_\_

SEPA Agencies:  
(NOA, SEPA)  
Electronic Mail

- ☐ Washington Department of Ecology, SEPA Register
- ☐ Washington Department of Commerce, attn: Review Team
- ☐ Pierce Transit Land Use Review, attn: Kelly Haden, Monica Adams
- ☐ Washington State Department of Fish & Wildlife, attn: SEPA Desk
- ☐ Washington State Department of Natural Resources, attn: SEPA Center
- ☐ Washington State DAHP, attn: Gretchen Kaehler
- ☐ Puyallup Tribe of Indians Historic Preservation, attn: Judy Wright
- ☐ Puyallup Tribe Cultural Resources, attn: Brandon Reynon/Jeffrey Thomas
- ☐ PenMet Parks, attn: Elaine Sorenson
- ☐ Pierce County Fire District Number 5, attn: Eric Watson/Eric Waters
- ☐ Suquamish Tribe, attn: Dennis Lewarch
- ☐ Peninsula School District, attn: Vicki Smith
- ☐ Pierce County Planning and Land Services
- ☐ Washington State Department of Transportation, attn: Dale Severson / SEPA Reviews
- ☐ Squaxin Island Tribe, attn: Rhonda Foster
- ☐ Muckleshoot Tribe, attn: Laura Murphy
- ☐ Washington Department of Corrections, attn: Eric Heinitz
- ☐ Puget Sound Partnership, attn: Marsha Engel

Other Parties:  
1<sup>st</sup> Class Mail

- ☐ Applicant/Owner/Agent (NOA, NOPH, NOPM, SEPA, NOD)
- ☐ DRB (NOA for Non-residential, Multi-family, Subdivisions, Public Projects)
- ☐ Parks Commission via Terri Reed (NOA)
- ☐ Property Owners within 300 feet of site: attached list (NOA, SEPA, NOPH, NOPM, NOD for Type II permits only)
- ☐ Parties of Record: attached list (NOPH, NOPM, NOD)
- ☐ Pierce County (NOA for Plats adjacent to City Limits)
- ☐ Pierce County Assessor-Treasurer (NOD)
- ☐ WA Transportation Secretary (NOA for Plats adj. to State ROW, or within 2 miles of Airport—approximately any plats south of Pioneer/Wollochet interchange)
- ☐ Other \_\_\_\_\_

## NOTICE OF PUBLIC MEETING

### Canterwood Commercial Center

Permit Number(s): PL-DRB-07-0013, PL-SPR-07-0004, PL-CUP-13-0002, PL-SEPA-07-0008

Date of Notice: July 19, 2018

Applicant: Swede Hill, LLC  
PO Box 1693  
Tacoma, WA 98401

Agent: Jason Hubbell, Barghausen Consulting Engineers, Inc.  
18215 72<sup>ND</sup> Avenue South  
Kent WA 98032

Project Location: Located on the west side of Canterwood Blvd, west of St. Anthony's Hospital at approximately 10700 Canterwood Blvd.  
Sec 25, Tw 22, R 01  
TPN: 0122254090

Project Description: The applicant is proposing design alternatives for certain specific requirements of the City's Design Manual. The proposed project includes the construction of 4 commercial buildings totaling 28,278 square feet of office/retail space and a 9,000-square foot parking garage. Drive-through facilities are proposed on 3 of the buildings. The project also includes temporary and permanent wetland buffer impacts with related mitigation.

SEPA Threshold Determination: A threshold determination has not been made to date.

**PUBLIC MEETING DATE:** Design Review Board, **July 26, 2018, 5:00 pm**, at Gig Harbor Civic Center, Community Rooms A & B, 3510 Grandview Street, Gig Harbor

Interested persons are invited to attend the public meeting and provide comment on this proposal; however, public testimony will not be taken. The meeting will be conducted in the manner prescribed by Gig Harbor Municipal Code Section 17.98.055(C).

Documents pertinent to this application are available for review and inspection at the City of Gig Harbor Planning Department, 3510 Grandview Street, Gig Harbor, WA 98335, during normal business hours, Monday through Friday. A copy of the staff report on this proposal will be available approximately seven days prior to the meeting. A copy of the application, all documents and evidence relied upon by the applicant, and applicable criteria are available for inspection at no cost; copies will be provided at the requestor's cost.

Interested persons may comment on the above stated application or may request a copy of the decision on this application. **Requests for notification, written comments, including any written comments addressing the findings required for a decision, must be submitted to the Planning Department no later than 5:00 PM on July 26, 2018.**

Questions regarding the above stated application should be made to Carl de Simas, Associate Planner, City of Gig Harbor Planning Department, 3510 Grandview Street, Gig Harbor, WA 98335, or by calling 253-851-6170.

---

## Cindy Andrews

---

**From:** Carl Desimas  
**Sent:** Friday, July 20, 2018 4:13 PM  
**To:** Cindy Andrews  
**Subject:** FW: Canterwood Commercial Center Notice of Public Meeting

Here ya go!

--  
Carl de Simas  
Associate Planner  
City of Gig Harbor  
3510 Grandview St.  
Gig Harbor WA 98335  
(253) 851-6170  
(253) 853-7628 (Direct Line)

"Dedicated to public service through teamwork and respect for our community."

**From:** Obits, Tac [mailto:obitlegalads+canned.response@thenewstribune.com]  
**Sent:** Monday, July 16, 2018 10:01 AM  
**To:** Carl Desimas <DesimasC@cityofgigharbor.net>  
**Subject:** Re: Canterwood Commercial Center Notice of Public Meeting

This is an automated response from the News Tribune, Tacoma, Washington email system to inform you that your email has been received by our server.

All notices submitted for publication are confirmed directly either by telephone or email.  
Charges and payments must be approved and authorized prior to publication of all notices.

Notices will not be published without authorization.

Reach us by phone at (253) 597-8605.

Our normal office hours are 8am – 4pm

Monday through Friday.

The Obituaries and Legals Desk is closed  
on Saturday, Sunday, and all major holidays.

If you have submitted a notice and have not been contacted with a quote and/or a request for payment prior to the deadline during normal office hours, please contact our office right away.

## Deadlines

### Obituaries

**News Tribune** daily obituaries deadline at 2:30 pm the day prior to publication.

Saturday, Sunday and Monday obituaries deadline at 2:30 pm the prior Friday.

**Herald** obituaries deadline at 2:30 pm on Friday.

**Peninsula Gateway** obituaries deadline at noon on Monday.

### Legal Notices

**News Tribune** daily notices deadline at noon the day prior to publication.

Legal notices for Sunday or Monday deadline at 2pm the prior Friday.

**Herald** and **Gateway** legal notices deadline at noon on Monday.

Notices received after the deadline will be set up for the next available edition.

Thank you for contacting us.

-----

## Obituaries and Legals

**The News Tribune   The Puyallup Herald   The Peninsula Gateway**

[obitlegalads@thenewstribune.com](mailto:obitlegalads@thenewstribune.com)

1950 S State Street | Tacoma WA 98405

[www.thenewstribune.com](http://www.thenewstribune.com)

Office: [253-597-8605](tel:253-597-8605) | Fax: [253-597-8473](tel:253-597-8473)



## **Obituaries and Legals**

**The News Tribune The Puyallup Herald The Peninsula Gateway**

**[obitlegalads@thenewstribune.com](mailto:obitlegalads@thenewstribune.com)**

1950 S State Street | Tacoma WA 98405

**[www.thenewstribune.com](http://www.thenewstribune.com)**

Office: 253-597-8605 | Fax: 253-597-8473

## Order Confirmation

**Customer**

CITY OF GIG HARBOR

**Customer Account**

255175

**Customer Address**

3510 GRANDVIEW ST  
GIG HARBOR WA 983351214 USA

**Customer Phone**

253-851-8136

**Customer Fax**

**Sales Rep**

lbastin@thenewstribune.com

**Payer Customer**

CITY OF GIG HARBOR

**Payer Account**

255175

**Payer Address**

3510 GRANDVIEW ST  
GIG HARBOR WA 983351214 USA

**Payer Phone**

253-851-8136

**Customer EMail**

**Order Taker**

lbastin@thenewstribune.com

**PO Number**

MTG 7/26 CANTERWOOD COMM Invoice

**Payment Method**

Invoice

**Blind Box**

**Tear Sheets**

0

**Proofs**

0

**Affidavits**

2

**Net Amount**

\$110.88

**Tax Amount**

\$0.00

**Total Amount**

\$110.88

**Payment Amount**

\$0.00

**Amount Due**

\$110.88

**Ad Order Number**

0003763855

**Order Source**

**Ordered By**

CARL DE SIMAS

**Special Pricing**

**Invoice Text**

MTG 7/26 CANTERWOOD COMM'L CTR

**Promo Type**

**Package Buy**

**Materials**

## Ad Order Information

| <u>Ad Number</u> | <u>Ad Type</u>  | <u>Production Method</u> | <u>Production Notes</u> |
|------------------|-----------------|--------------------------|-------------------------|
| 0003763855-01    | TAC-Legal Liner | AdBooker                 |                         |

| <u>External Ad Number</u> | <u>Ad Attributes</u> | <u>Ad Released</u> | <u>Pick Up</u> |
|---------------------------|----------------------|--------------------|----------------|
|                           |                      | No                 |                |

| <u>Ad Size</u> | <u>Color</u> |
|----------------|--------------|
| 1 X 69 li      |              |

| <u>Product</u> | <u>Placement</u>         | <u>Times Run</u> | <u>Schedule Cost</u> |
|----------------|--------------------------|------------------|----------------------|
| TAC-GW-Gateway | 0300 - Legals Classified | 1                | \$110.88             |

| <u>Run Schedule Invoice Text</u>         | <u>Position</u>                |
|------------------------------------------|--------------------------------|
| NOTICE OF PUBLIC MEETING Canterwood Comm | 0301 - Legals & Public Notices |

Run Dates  
07/19/2018

**NOTICE OF PUBLIC MEETING**  
**Canterwood Commercial Center**  
Permit Number(s): PL-DRB-07-0013, PL-SPR-07-0004, PL-CUP-13-0002, PL-SEPA-07-0008  
Date of Notice: July 19, 2018  
Applicant: Swede Hill, LLC  
PO Box 16893  
Tacoma, WA 98401  
Agent: Jason Hubbell, Barghausen Consulting Engineers, Inc.  
18215 72ND Avenue South  
Kent WA 98032  
Project Location: Located on the west side of Canterwood Blvd, west of St. Anthony's Hospital at approximately 10700 Canterwood Blvd.  
Sec 25, Tw 22, R 01  
TPN: 0122254090  
Project Description: The applicant is proposing design alternatives for certain specific requirements of the City's Design Manual. The proposed project includes the construction of 4 commercial buildings totaling 28,278 square feet of office/retail space and a 9,000-square foot parking garage. Drive-through facilities are proposed on 3 of the buildings. The project also includes temporary and permanent wetland buffer impacts with related mitigation.  
SEPA Threshold Determination: A threshold determination has not been made to date.  
**PUBLIC MEETING DATE:** Design Review Board, July 26, 2018, 5:00 pm, at Gig Harbor Civic Center, Community Rooms A & B, 3510 Grandview Street, Gig Harbor

Interested persons are invited to attend the public meeting and provide comment on this proposal; however, public testimony will not be taken. The meeting will be conducted in the manner prescribed by Gig Harbor Municipal Code Section 17.98.055(C).

Documents pertinent to this application are available for review and inspection at the City of Gig Harbor Planning Department, 3510 Grandview Street, Gig Harbor, WA 98335, during normal business hours, Monday through Friday. A copy of the staff report on this proposal will be available approximately seven days prior to the meeting. A copy of the application, all documents and evidence relied upon by the applicant, and applicable criteria are available for inspection at no cost; copies will be provided at the requestor's cost.

Interested persons may comment on the above stated application or may request a copy of the decision on this application. Requests for notification, written comments, including any written comments addressing the findings required for a decision, must be submitted to the Planning Department no later than 5:00 PM on July 26, 2018.

Questions regarding the above stated application should be made to Carl de Simas, Associate Planner, City of Gig Harbor Planning Department, 3510 Grandview Street, Gig Harbor, WA 98335, or by calling 253-851-6170.

## CERTIFICATION OF PUBLIC NOTICE

=====

### DECLARATION OF PUBLISHING

I, Cynthia J Anderson (printed name), declare under penalty of perjury under the laws of the State of Washington and the United States of America that the foregoing is true and correct to the best of my knowledge:

On AUGUST 29TH, 2018 sent a true and correct copy of the NOTICE OF PUBLIC MEETING for publication

In the SEPTEMBER 6TH, 2018 edition of the Peninsula Gateway for the following:

Project Name: CANTERWOOD COMMERCIAL CENTER

Project Location: 10700 CANTERWOOD BLVD

Permit Number(s): PL-DRB-07-0013/PL-SPR-07-0004/PL-CUP-13-0002/PL-SEPA-07-0008

SIGNED at Gig Harbor, Washington, this 29<sup>th</sup> day of August, 2018.

Cynthia J Anderson  
DECLARANT (signature)



City of Gig Harbor  
Transmittal Form

Routing for: NOA SEPA NOPH **NOPM** NOD Notice Date: 9/16/18  
Project: Centerwood Commercial Cntr Planner: Carl de Simas  
PI-DRB-07-0013

Routed to: ☐ Public Works-Operations ☐ Building and Fire Safety  
City Depts. ☐ Public Works-Engineering ☐ Other \_\_\_\_\_

SEPA Agencies: ☐ Washington Department of Ecology, SEPA Register  
(NOA, SEPA) ☐ Washington Department of Commerce, attn: Review Team  
Electronic Mail ☐ Pierce Transit Land Use Review, attn: Kelly Haden, Monica Adams  
☐ Washington State Department of Fish & Wildlife, attn: SEPA Desk  
☐ Washington State Department of Natural Resources, attn: SEPA Center  
☐ Washington State DAHP, attn: Gretchen Kaehler  
☐ Puyallup Tribe of Indians Historic Preservation, attn: Judy Wright  
☐ Puyallup Tribe Cultural Resources, attn: Brandon Reynon/Jeffrey Thomas  
☐ PenMet Parks, attn: Elaine Sorenson  
☐ Pierce County Fire District Number 5, attn: Eric Watson/Eric Waters  
☐ Suquamish Tribe, attn: Dennis Lewarch  
☐ Peninsula School District, attn: Vicki Smith  
☐ Pierce County Planning and Land Services  
☐ Washington State Department of Transportation, attn: Dale Severson / SEPA Reviews  
☐ Squaxin Island Tribe, attn: Rhonda Foster  
☐ Muckleshoot Tribe, attn: Laura Murphy  
☐ Washington Department of Corrections, attn: Eric Heinitz  
☐ Puget Sound Partnership, attn: Marsha Engel

Other Parties: ☐ Applicant/Owner/Agent (NOA, NOPH, NOPM, SEPA, NOD)  
1st Class Mail ☐ DRB (NOA for Non-residential, Multi-family, Subdivisions, Public Projects)  
☐ Parks Commission via Terri Reed (NOA)  
☐ Property Owners within 300 feet of site: attached list (NOA, SEPA, NOPH, NOPM, NOD for Type II permits only)  
☐ Parties of Record: attached list (NOPH, NOPM, NOD)  
☐ Pierce County (NOA for Plats adjacent to City Limits)  
☐ Pierce County Assessor-Treasurer (NOD)  
☐ WA Transportation Secretary (NOA for Plats adj. to State ROW, or within 2 miles of Airport—approximately any plats south of Pioneer/Wollochet interchange)  
☒ Other Gateway

## NOTICE OF PUBLIC MEETING

### Canterwood Commercial Center

Permit Number(s): PL-DRB-07-0013, PL-SPR-07-0004, PL-CUP-13-0002, PL-SEPA-07-0008

Date of Notice: September 6, 2018

Applicant: Swede Hill, LLC  
PO Box 1693  
Tacoma, WA 98401

Agent: Jason Hubbell, Barghausen Consulting Engineers, Inc.  
18215 72<sup>ND</sup> Avenue South  
Kent WA 98032

Project Location: Located on the west side of Canterwood Blvd, west of St. Anthony's Hospital at approximately 10700 Canterwood Blvd.  
Sec 25, Tw 22, R 01  
TPN: 0122254090

Project Description: The applicant is proposing a design alternative to allow for a retaining wall taller than what would otherwise be allowed by the code prescriptively. The overall project proposes the construction of 4 commercial buildings totaling approximately 28,278 square feet of office/retail space and a 9,000-square foot parking garage on an approximately 7.6 acre parcel. Drive-through facilities are proposed on 3 of the buildings. Access to the site will be at three points directly from Canterwood Blvd. The project also includes temporary and permanent wetland and wetland buffer impacts with related mitigation.

SEPA Threshold Determination: A threshold determination has not been made to date.

**PUBLIC MEETING DATE:** Design Review Board, **September 13, 2018, 5:00 pm**, at Gig Harbor Civic Center, Community Rooms A & B, 3510 Grandview Street, Gig Harbor

Interested persons are invited to attend the public meeting and provide comment on this proposal; however, public testimony will not be taken. The meeting will be conducted in the manner prescribed by Gig Harbor Municipal Code Section 17.98.055(C).

Documents pertinent to this application are available for review and inspection at the City of Gig Harbor Planning Department, 3510 Grandview Street, Gig Harbor, WA 98335, during normal business hours, Monday through Friday. A copy of the staff report on this proposal will be available approximately seven days prior to the meeting. A copy of the application, all documents and evidence relied upon by the applicant, and applicable criteria are available for inspection at no cost; copies will be provided at the requestor's cost.

Interested persons may comment on the above stated application or may request a copy of the decision on this application. **Requests for notification, written comments, including any written comments addressing the findings required for a decision, must be submitted to the Planning Department no later than 5:00 PM on September 13, 2018.**

Questions regarding the above stated application should be made to Carl de Simas, Associate Planner, City of Gig Harbor Planning Department, 3510 Grandview Street, Gig Harbor, WA 98335, or by calling 253-851-6170.

---

**Cindy Andrews**

---

**From:** Obits, Tac <obitlegalads@thenewstribune.com>  
**Sent:** Wednesday, August 29, 2018 1:36 PM  
**To:** Cindy Andrews  
**Subject:** EARLY DEADLINES Re: Canterwood Commercial\_DRB NOPM\_083018.doc

**PLEASE NOTE - HOLIDAY CLOSURE AND EARLY DEADLINES:**

**The News Tribune office will be closed Monday, September 3rd, in observance of the holiday.**

**News**

**Tribune obituaries** for Saturday the 1st, Sunday the 2nd, Monday the 3rd, and Tuesday the 4th will all deadline at 2:30pm Friday, August 31st.

**News Tribune legal notices** to run on Sunday, Monday, or Tuesday will deadline at 2 pm on August 31st.

**PENINSULA GATEWAY & PUYALLUP HERALD:** The deadline for the September 5th edition of the Herald and the September 6th edition of the Gateway will be August 30th, 2pm for legal notices, and 2:30pm for obituaries.

Notices received after the deadline will be set up for the next available edition.

Thank you for contacting us.

--

**Obituaries and Legals**

**The News Tribune   The Puyallup Herald   The Peninsula Gateway**

[obitlegalads@thenewstribune.com](mailto:obitlegalads@thenewstribune.com)

1950 S State Street | Tacoma WA 98405

[www.thenewstribune.com](http://www.thenewstribune.com)

Office: 253-597-8605 | Fax: 253-597-8473

## Order Confirmation

**Customer**

CITY OF GIG HARBOR

**Customer Account**

255175

**Customer Address**

3510 GRANDVIEW ST  
GIG HARBOR WA 983351214 USA

**Customer Phone**

253-851-8136

**Customer Fax**

**Sales Rep**

lbastin@thenewstribune.com

**Payor Customer**

CITY OF GIG HARBOR

**Payor Account**

255175

**Payor Address**

3510 GRANDVIEW ST  
GIG HARBOR WA 983351214 USA

**Payor Phone**

253-851-8136

**Customer EMail**

**Order Taker**

lbastin@thenewstribune.com

**PO Number**

MTG 9/13

**Payment Method**

Invoice

**Blind Box**

**Tear Sheets**

0

**Proofs**

0

**Affidavits**

2

**Net Amount**

\$116.98

**Tax Amount**

\$0.00

**Total Amount**

\$116.98

**Payment Amount**

\$0.00

**Amount Due**

\$116.98

**Ad Order Number**

0003832836

**Order Source**

**Ordered By**

CINDY ANDREWS

**Special Pricing**

**Invoice Text**

MTG 9/13

**Promo Type**

**Package Buy**

**Materials**



## **Ad Order Information**

| <b><u>Ad Number</u></b> | <b><u>Ad Type</u></b> | <b><u>Production Method</u></b> | <b><u>Production Notes</u></b> |
|-------------------------|-----------------------|---------------------------------|--------------------------------|
| 0003832836-01           | TAC-Legal Liner       | AdBooker                        |                                |

| <b><u>External Ad Number</u></b> | <b><u>Ad Attributes</u></b> | <b><u>Ad Released</u></b> | <b><u>Pick Up</u></b> |
|----------------------------------|-----------------------------|---------------------------|-----------------------|
|                                  |                             | No                        |                       |

| <b><u>Ad Size</u></b> | <b><u>Color</u></b> |
|-----------------------|---------------------|
| 1 X 73 li             |                     |

| <b><u>Product</u></b> | <b><u>Placement</u></b>  | <b><u>Times Run</u></b> | <b><u>Schedule Cost</u></b> |
|-----------------------|--------------------------|-------------------------|-----------------------------|
| TAC-GW-Gateway        | 0300 - Legals Classified | 1                       | \$116.98                    |

| <b><u>Run Schedule Invoice Text</u></b>  | <b><u>Position</u></b>         |
|------------------------------------------|--------------------------------|
| NOTICE OF PUBLIC MEETING Canterwood Comm | 0301 - Legals & Public Notices |

**Run Dates**  
09/06/2018

**NOTICE OF PUBLIC MEETING**

**Canterwood Commercial Center**

Permit Number(s): PL-DRB-07-0013, PL-SPR-07-0004, PL-CUP-13-0002, PL-SEPA-07-0008

Date of Notice: August 30, 2018

Applicant: Swede Hill, LLC  
PO Box 1683

Agent: Jason Hubbell, Barghausen Consulting Engineers, Inc.  
18215 72ND Avenue South  
Kent WA 98032

Project Location: Located on the west side of Canterwood Blvd, west of St. Anthony's Hospital at approximately 10700 Canterwood Blvd.  
Sec 25, Tw 22, R 01  
TPN: 0122254080

Project Description: The applicant is proposing a design alternative to allow for a retaining wall taller than what would otherwise be allowed by the code prescriptively. The overall project proposes the construction of 4 commercial buildings totaling approximately 28,278 square feet of office/retail space and a 9,000-square foot parking garage on an approximately 7.6-acre parcel. Drive-through facilities are proposed on 3 of the buildings. Access to the site will be at three points directly from Canterwood Blvd. The project also includes temporary and permanent wetland and wetland buffer impacts with related mitigation.

SEPA Threshold Determination: A threshold determination has not been made to date.

**PUBLIC MEETING DATE:** Design Review Board, September 13, 2018, 5:00 pm, at Gig Harbor Civic Center, Community Rooms A & B, 3510 Grandview Street, Gig Harbor

Interested persons are invited to attend the public meeting and provide comment on this proposal; however, public testimony will not be taken. The meeting will be conducted in the manner prescribed by Gig Harbor Municipal Code Section 17.98.055(C).

Documents pertinent to this application are available for review and inspection at the City of Gig Harbor Planning Department, 3510 Grandview Street, Gig Harbor, WA 98335, during normal business hours, Monday through Friday. A copy of the staff report on this proposal will be available approximately seven days prior to the meeting. A copy of the application, all documents and evidence relied upon by the applicant, and applicable criteria are available for inspection at no cost; copies will be provided at the requestor's cost.

Interested persons may comment on the above stated application or may request a copy of the decision on this application. Requests for notification, written comments, including any written comments addressing the findings required for a decision, must be submitted to the Planning Department no later than 5:00 PM on September 13, 2018.

Questions regarding the above stated application should be made to Carl de Simas, Associate Planner, City of Gig Harbor Planning Department, 3510 Grandview Street, Gig Harbor, WA 98335, or by calling 253-851-6170.

## AFFIDAVIT OF PUBLICATION

| Account # | Ad Number  | Identification                          | PO       | Amount   | Cols | Lines |
|-----------|------------|-----------------------------------------|----------|----------|------|-------|
| 255175    | 0003832836 | NOTICE OF PUBLIC MEETING Canterwood Con | MTG 9/13 | \$116.98 | 1    | 74    |

**Attention: CINDY ANDREWS**

**CITY OF GIG HARBOR  
3510 GRANDVIEW ST  
GIG HARBOR, WA 983351214**

**NOTICE OF PUBLIC MEETING**  
**Canterwood Commercial Center**  
Permit Number(s): PL-DRB-07-0013, PL-SPR-07-0004, PL-CUP-13-0002, PL-SEPA-07-0008  
Date of Notice: August 30, 2018  
Applicant: Swede Hill, LLC  
PO Box 1693  
Tacoma, WA 98401  
Agent: Jason Hubbell, Barghausen Consulting Engineers, Inc.  
18215 72ND Avenue South  
Kent WA 98032

**Project Location:** Located on the west side of Canterwood Blvd, west of St. Anthony's Hospital at approximately 10700 Canterwood Blvd.  
Sec 25, T4 22, R 01  
TPN: 0122254090

**Project Description:** The applicant is proposing a design alternative to allow for a retaining wall taller than what would otherwise be allowed by the code prescriptively. The overall project proposes the construction of 4 commercial buildings totalling approximately 28,278 square feet of office/retail space and a 9,000-square foot parking garage on an approximately 7.5-acre parcel. Drive-through facilities are proposed on 3 of the buildings. Access to the site will be at three points directly from Canterwood Blvd. The project also includes temporary and permanent wetland and wetland buffer impacts with related mitigation.

**SEPA Threshold Determination:** A threshold determination has not been made to date.

**PUBLIC MEETING DATE:** Design Review Board, September 13, 2018, 6:00 pm, at Gig Harbor Civic Center, Community Rooms A & B, 3510 Grandview Street, Gig Harbor

Interested persons are invited to attend the public meeting and provide comment on this proposal; however, public testimony will not be taken. The meeting will be conducted in the manner prescribed by Gig Harbor Municipal Code Section 17.98.055(C).

Documents pertinent to this application are available for review and inspection at the City of Gig Harbor Planning Department, 3510 Grandview Street, Gig Harbor, WA 98335, during normal business hours, Monday through Friday. A copy of the staff report on this proposal will be available approximately seven days prior to the meeting. A copy of the application, all documents and evidence relied upon by the applicant, and applicable criteria are available for inspection at no cost; copies will be provided at the requestor's cost.

Interested persons may comment on the above stated application or may request a copy of the decision on this application. Requests for notification, written comments, including any written comments addressing the findings required for a decision, must be submitted to the Planning Department no later than 5:00 PM on September 13, 2018.

Questions regarding the above stated application should be made to Carl de Simas, Associate Planner, City of Gig Harbor Planning Department, 3510 Grandview Street, Gig Harbor, WA 98335, or by calling 253-851-6170.

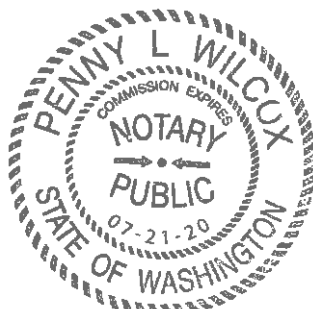
ELIZABETH BROWN, being duly sworn, deposes and says: That he/she is the Principal Clerk of the publication; The Peninsula Gateway, printed and published in Tacoma, Pierce County, State of Washington, and having a general circulation therein, and which said newspaper(s) have been continuously and uninterruptedly published in said County during a period of six months prior to the first publication of the notice, a copy of which is attached hereto: that said notice was published in The Peninsula Gateway, as amended, for:

1 Insertions

**Published On:**  
September 06, 2018

*Elizabeth Brown*  
(Principal Clerk)

Subscribed and sworn on this 6th day of September in the year of 2018 before me, a Notary Public, personally appeared before me Elizabeth Brown known or identified to me to be the person whose name subscribed to the within instrument, and being by first duly sworn, declared that the statements therein are true, and acknowledged to me that he/she executed the same.



*Penny L Wilcox*  
Notary Public in and for the state of Washington, residing in Pierce County 1950 S. State St, Tacoma, WA 98405

## CERTIFICATION OF PUBLIC NOTICE

=====

### DECLARATION OF MAILING

I, MELISSA HARTWIG (printed name), declare under penalty of perjury under the laws of the State of Washington and the United States of America that the foregoing is true and correct to the best of my knowledge:

On AUGUST 30, 2018 I mailed, a true and correct copy of the NOTICE OF PUBLIC MEETING for the following:

Project Name: CANTERWOOD COMMERCIAL CENTER

Project Location: 10700 CANTERWOOD BLVD

Permit Number(s): PL-DRB-07-0013, PL-SPR-07-0004, PL-CUP-13-0002, PL-SEPA-07-0008

to the individuals/agencies identified on the attached transmittal form by United States Postal Service, inter-office routing, or electronic mail, as specified on the attached.

SIGNED at GIG HARBOR, WA, this 30TH day of AUGUST, 2018

  
DECLARANT (signature)



City of Gig Harbor  
Transmittal Form

Routing for: NOA SEPA NOPH NOPM NOD Notice Date: Aug. 30, 2018  
Project: Canterwood Commercial Center Planner: Carl de Lima  
Sept. 6, 2018

Routed to: ☐ Public Works-Operations ☐ Building and Fire Safety  
City Depts. ☐ Public Works-Engineering ☐ Other \_\_\_\_\_

SEPA Agencies: ☐ Washington Department of Ecology, SEPA Register  
(NOA, SEPA) ☐ Washington Department of Commerce, attn: Review Team  
Electronic Mail ☐ Pierce Transit Land Use Review, attn: Kelly Haden, Monica Adams  
☐ Washington State Department of Fish & Wildlife, attn: SEPA Desk  
☐ Washington State Department of Natural Resources, attn: SEPA Center  
☐ Washington State DAHP, attn: Gretchen Kaehler  
☐ Puyallup Tribe of Indians Historic Preservation, attn: Judy Wright  
☐ Puyallup Tribe Cultural Resources, attn: Brandon Reynon/Jeffrey Thomas  
☐ PenMet Parks, attn: Elaine Sorenson  
☐ Pierce County Fire District Number 5, attn: Eric Watson/Eric Waters  
☐ Suquamish Tribe, attn: Dennis Lewarch  
☐ Peninsula School District, attn: Vicki Smith  
☐ Pierce County Planning and Land Services  
☐ Washington State Department of Transportation, attn: Dale Severson / SEPA Reviews  
☐ Squaxin Island Tribe, attn: Rhonda Foster  
☐ Muckleshoot Tribe, attn: Laura Murphy  
☐ Washington Department of Corrections, attn: Eric Heinitz  
☐ Puget Sound Partnership, attn: Marsha Engel

Other Parties: ☒ Applicant/Owner/Agent (NOA, NOPH, NOPM, SEPA, NOD)  
1st Class Mail ☒ DRB (NOA for Non-residential, Multi-family, Subdivisions, Public Projects)  
☐ Parks Commission via Terri Reed (NOA)  
☒ Property Owners within 300 feet of site: attached list (NOA, SEPA, NOPH, NOPM, NOD for Type II permits only) Aug. 30, 2018  
☒ Parties of Record: attached list (NOPH, NOPM, NOD)  
☐ Pierce County (NOA for Plats adjacent to City Limits)  
☐ Pierce County Assessor-Treasurer (NOD)  
☐ WA Transportation Secretary (NOA for Plats adj. to State ROW, or within 2 miles of Airport—approximately any plats south of Pioneer/Wollochet interchange)  
☐ Other \_\_\_\_\_



## DEVELOPMENT SERVICES

### **NOTICE OF PUBLIC MEETING Canterwood Commercial Center**

**Permit Number(s):** PL-DRB-07-0013, PL-SPR-07-0004, PL-CUP-13-0002, PL-SEPA-07-0008

**Date of Notice:** August 30, 2018

**Applicant:** Swede Hill, LLC  
PO Box 1693  
Tacoma, WA 98401

**Agent:** Jason Hubbell, Barghausen Consulting Engineers, Inc.  
18215 72<sup>ND</sup> Avenue South  
Kent WA 98032

**Project Location:** Located on the west side of Canterwood Blvd, west of St. Anthony's Hospital at approximately 10700 Canterwood Blvd.  
Sec 25, Tw 22, R 01  
TPN: 0122254090

**Project Description:** The applicant is proposing a design alternative to allow for a retaining wall taller than what would otherwise be allowed by the code prescriptively. The overall project proposes the construction of 4 commercial buildings totaling approximately 28,278 square feet of office/retail space and a 9,000-square foot parking garage on an approximately 7.6-acre parcel. Drive-through facilities are proposed on 3 of the buildings. Access to the site will be at three points directly from Canterwood Blvd. The project also includes temporary and permanent wetland and wetland buffer impacts with related mitigation.

**SEPA Threshold Determination:** A threshold determination has not been made to date.

**PUBLIC MEETING DATE:** Design Review Board, **September 13, 2018, 5:00 pm**, at Gig Harbor Civic Center, Community Rooms A & B, 3510 Grandview Street, Gig Harbor

Interested persons are invited to attend the public meeting and provide comment on this proposal; however, public testimony will not be taken. The meeting will be conducted in the manner prescribed by Gig Harbor Municipal Code Section 17.98.055(C).

Documents pertinent to this application are available for review and inspection at the City of Gig Harbor Planning Department, 3510 Grandview Street, Gig Harbor, WA 98335, during normal business hours, Monday through Friday. A copy of the staff report on this proposal will be available approximately seven days prior to the meeting. A copy of the application, all documents and evidence relied upon by the applicant, and applicable criteria are available for inspection at no cost; copies will be provided at the requestor's cost.

Interested persons may comment on the above stated application or may request a copy of the decision on this application. **Requests for notification, written comments, including any written comments addressing the findings required for a decision, must be submitted to the Planning Department no later than 5:00 PM on September 13, 2018.**

Questions regarding the above stated application should be made to Carl de Simas, Associate Planner, City of Gig Harbor Planning Department, 3510 Grandview Street, Gig Harbor, WA 98335, or by calling 253-851-6170.

## NOTICE OF PUBLIC MEETING

### Canterwood Commercial Center

Permit Number(s): PL-DRB-07-0013, PL-SPR-07-0004, PL-CUP-13-0002, PL-SEPA-07-0008

Date of Notice: August 30, 2018

Applicant: Swede Hill, LLC  
PO Box 1693  
Tacoma, WA 98401

Agent: Jason Hubbell, Barghausen Consulting Engineers, Inc.  
18215 72<sup>ND</sup> Avenue South  
Kent WA 98032

Project Location: Located on the west side of Canterwood Blvd, west of St. Anthony's Hospital at approximately 10700 Canterwood Blvd.  
Sec 25, Tw 22, R 01  
TPN: 0122254090

Project Description: The applicant is proposing a design alternative to allow for a retaining wall taller than what would otherwise be allowed by the code prescriptively. The overall project proposes the construction of 4 commercial buildings totaling approximately 28,278 square feet of office/retail space and a 9,000-square foot parking garage on an approximately 7.6-acre parcel. Drive-through facilities are proposed on 3 of the buildings. Access to the site will be at three points directly from Canterwood Blvd. The project also includes temporary and permanent wetland and wetland buffer impacts with related mitigation.

SEPA Threshold Determination: A threshold determination has not been made to date.

**PUBLIC MEETING DATE:** Design Review Board, **September 13, 2018, 5:00 pm**, at Gig Harbor Civic Center, Community Rooms A & B, 3510 Grandview Street, Gig Harbor

Interested persons are invited to attend the public meeting and provide comment on this proposal; however, public testimony will not be taken. The meeting will be conducted in the manner prescribed by Gig Harbor Municipal Code Section 17.98.055(C).

Documents pertinent to this application are available for review and inspection at the City of Gig Harbor Planning Department, 3510 Grandview Street, Gig Harbor, WA 98335, during normal business hours, Monday through Friday. A copy of the staff report on this proposal will be available approximately seven days prior to the meeting. A copy of the application, all documents and evidence relied upon by the applicant, and applicable criteria are available for inspection at no cost; copies will be provided at the requestor's cost.

Interested persons may comment on the above stated application or may request a copy of the decision on this application. **Requests for notification, written comments, including any written comments addressing the findings required for a decision, must be submitted to the Planning Department no later than 5:00 PM on September 13, 2018.**

Questions regarding the above stated application should be made to Carl de Simas, Associate Planner, City of Gig Harbor Planning Department, 3510 Grandview Street, Gig Harbor, WA 98335, or by calling 253-851-6170.

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**PLANNING DEPARTMENT  
INTERESTED PARTIES**

**Project Name:** Canterwood Commercial Center

**Location:** Located on the west side of Canterwood Blvd, west of St. Anthony's Hospital at approximately 10700 Canterwood Blvd.  
Sec 25, Tw 22, R 01  
TPN: 0122254090

**Applicant/Agent:** Swede Hill, LLC  
PO Box 1693  
Tacoma, WA 98401  
Barghausen Consulting Engineers  
Attn: Jason Hubbell  
18215 72<sup>nd</sup> Ave S  
Kent, WA 98032

**Associated Permits:** PL-DRB-07-0013, PL-SPR-07-0004, PL-CUP-13-0002, PL-SEPA-07-0008

**Associated Notices:**

- Notice of Public Meeting, DRB, October 9, 2014
- Notice of Public Meeting, DRB, November 24, 2016
- Notice of Public Meeting, DRB, June 14, 2018
- Notice of Public Meeting, DRB, July 19, 2018

**Parties:**

Jaime Keirstad  
12505 58th Ave NW  
Gig Harbor WA 98332

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Please refer to Gig Harbor Municipal Code (GHMC), Title 19, for any questions relative to the administration of the development code.

This list should not be considered an exhaustive list of all those parties who may be interested in this project. This list represents only those parties who have commented at some point during the permit project and/or who have explicitly requested that they are included in project related correspondence.

This list does not represent Parties of Record as defined in GHMC 19.06.003, however some may qualify as such.



**NOPM - Canterwood Commercial**



The map features are approximate and are intended only to provide an indication of field feature. Additional areas that have not been mapped may be present. This is not a survey. Orthophotos may not align with other data. Pierce County assumes no liability for variations ascertained by actual survey. All data is expressly provided AS IS and WITH ALL FAULTS. Pierce County makes no warranty of fitness for a particular purpose.

(1 0122254025 5900)  
BURNHAM HOLDINGS LLC  
PO BOX 701  
WAUNA, WA, 98395-0701

(2 0122254028 6380)  
BURNHAM PROPERTIES LLC  
PO BOX 701  
WAUNA, WA, 98395-0701

(3 0122254051 9100)  
GIG HARBOR NORTH ANNEX LLC  
6622 WOLLOCHET DR NW  
GIG HARBOR, WA, 98335-8325

(4 0122254062 9100)  
APOGEE CAPITAL LLC  
1830 112TH ST E STE F  
TACOMA, WA, 98445-3747

(5 0122254065 9100)  
PARR GARY R  
3573 E L ST  
TACOMA, WA, 98404-3823

(6 0122254073 9100)  
GIG HARBOR NORTH ANNEX LLC  
6622 WOLLOCHET DR NW  
GIG HARBOR, WA, 98335-8325

(7 0122254088 6380)  
BURNHAM PROPERTIES LLC  
PO BOX 701  
WAUNA, WA, 98395-0701

(8 0122254089 9170)  
PURDY INVESTMENTS LLC  
11515 BURNHAM DR NW STE B  
GIG HARBOR, WA, 98332-8543

(9 0122254090 9100)  
SWEDE HILL LLC  
PO BOX 1693  
TACOMA, WA, 98401-1693

(10 0122254094 5900)  
BURNHAM HOLDINGS LLC  
PO BOX 701  
WAUNA, WA, 98395-0701

(11 0122258008 6500)  
BURNHAM PARTNERS LLC  
11515 BURNHAM DR NW STE B  
GIG HARBOR, WA, 98332-8543

(12 0122258009 6199)  
D & M MORRIS FAMILY LLC  
11515 BURNHAM DR NW STE B  
GIG HARBOR, WA, 98332-8543

(13 3001140010 6510)  
FRANCISCAN HEALTH SYSTEM WEST  
1149 MARKET ST  
TACOMA, WA, 98402-3515

RECEIVED BY  
SEP 06 2018  
CITY OF GIG HARBOR

#16657

## CERTIFICATION OF PUBLIC NOTICE

### DECLARATION OF POSTING

I, JEFF CURRIE (printed name), declare under penalty of perjury under the laws of the State of Washington and the United States of America that the foregoing is true and correct to the best of my knowledge:

On SEPT. 6th, 2018 I caused to be posted the notice board provided by the

City for the NOTICE OF PUBLIC MEETING on the following:

Project Name: CANTERWOOD COMMERCIAL CENTER

Project Location: 10700 CANTERWOOD BLVD.

Permit Number(s): PL-DRB-07-0013

the locations indicated below meeting the requirements of GHMC 19.03.001(A).

- ☒ \_\_\_\_\_
- ☒ \_\_\_\_\_

SIGNED at Gig Harbor, Washington, this 6 day of SEPTEMBER, 2018.

  
DECLARANT (signature)

RECEIVED BY  
SEP 06 2018  
CITY OF GIG HARBOR

DOCUMENTS PERTINENT TO THIS APPLICATION ARE AVAILABLE FOR REVIEW AND INSPECTION AT THE CITY OF GIG HARBOR PLANNING DEPARTMENT, 3510 GRANDVIEW STREET, GIG HARBOR, WA 98338, DURING NORMAL BUSINESS HOURS, MONDAY THROUGH FRIDAY. ADDITIONAL PERMIT INFORMATION CAN BE FOUND AT [PERMITPORTAL.CITYOFGIGHARBOR.NET](http://PERMITPORTAL.CITYOFGIGHARBOR.NET). IF YOU HAVE QUESTIONS, PLEASE CONTACT THE PLANNING DEPARTMENT AT (253) 851-6170.

## NOTICE OF PUBLIC MEETING FOR COMMERCIAL CENTER

### PROJECT DESCRIPTION: CANTERWOOD COMMERCIAL CENTER

The applicant is proposing a design alternative to allow for a retaining wall taller than what would otherwise be allowed by the code prescriptively. The overall project proposes the construction of 4 commercial buildings totaling approximately 28,278 square feet of office/retail space and a 9,000 square foot parking garage on an approximately 7.6-acre parcel. Drive-through facilities are proposed on 3 of the buildings. Access to the site will be at three points directly from Canterwood Blvd. The project also includes temporary and permanent wetland and wetland buffer impacts with related mitigation.

**PL-DRB-07-0013, PL-SPR-07-0004, PL-CUP-13-0002, PL-SEPA-07-0008**

### LOCATION:

10700 Canterwood Blvd.

### APPLICANT NAME AND ADDRESS:

Swede HBI LLC, P.O. BOX 1673, Tacoma, WA

### MEETING DATE AND TIME:

**Design Review Board, September 13th, 2018, 5:00 pm**

### SEPA THRESHOLD DETERMINATION:

A SEPA Threshold Determination has not been issued as of this date.

NOTICE: This notice is posted on the project site and on the project website. It is intended to provide information to the public regarding the project and the public meeting. It is not intended to provide a legal opinion or to represent the City of Gig Harbor. The City of Gig Harbor is not responsible for the accuracy or completeness of the information provided in this notice. The City of Gig Harbor is not responsible for the accuracy or completeness of the information provided in this notice. The City of Gig Harbor is not responsible for the accuracy or completeness of the information provided in this notice.



MEETINGS ARE HELD AT THE GIG HARBOR CIVIC CENTER, 3510 GRANDVIEW STREET, GIG HARBOR, WA 98338. ADDITIONAL PERMIT INFORMATION CAN BE FOUND AT [WWW.CITYOFGIGHARBOR.NET](http://WWW.CITYOFGIGHARBOR.NET). CLICK "PERMIT PORTAL". IF YOU HAVE QUESTIONS, PLEASE CONTACT THE PLANNING DEPARTMENT AT CITY CONTACT PERSON: CAROL HANSEN (253) 851-6170



RECEIVED BY  
SEP 06 2018  
CITY OF GIG HARBOR



Routing for: NOA SEPA NOPH **NOPM** NOD Notice Date: MARCH 22, 2021  
Project: CANTERWOOD COMMERCIAL CENTER

**Routed to:** ☐ Public Works–Operations ☐ Building and Fire Safety  
City Depts. ☐ Public Works–Engineering ☐ Other\_\_\_\_\_

**SEPA Agencies:** ☐ Washington Department of Ecology, SEPA Register  
(NOA, **SEPA**) ☐ Washington Department of Commerce, attn: Review Team  
Electronic Mail ☐ Pierce Transit Land Use Review, attn: Kelly Haden, Monica Adams  
☐ Washington State Department of Fish & Wildlife, attn: SEPA Desk  
☐ Washington State Department of Natural Resources, attn: SEPA Center  
☐ Washington State DAHP, attn: Gretchen Kaehler  
☐ Puyallup Tribe of Indians Historic Preservation, attn: Judy Wright  
☐ Puyallup Tribe Cultural Resources, attn: Brandon Reynon/Jeffrey Thomas  
☐ PenMet Parks, attn: Elaine Sorenson  
☐ Pierce County Fire District Number 5, attn: Eric Watson/Eric Waters  
☐ Suquamish Tribe, attn: Dennis Lewarch  
☐ Peninsula School District, attn: Vicki Smith  
☐ Pierce County Planning and Land Services  
☐ Washington State Department of Transportation, attn: Dale Severson / SEPA  
Reviews  
☐ Squaxin Island Tribe, attn: Rhonda Foster  
☐ Muckleshoot Tribe, attn: Laura Murphy  
☐ Washington Department of Corrections, attn: Eric Heinitz  
☐ Puget Sound Partnership, attn: Marsha Engel

**Other Parties:**

1<sup>st</sup> Class Mail

- ☐ **Applicant/Owner/Agent** (NOA, NOPH, **NOPM, SEPA, NOD**)
- ☐ **DRB** (NOA for Non-residential, Multi-family, Subdivisions, Public Projects)
- ☐ **Parks Commission** via Terri Reed (NOA)
- ☐ **Property Owners within 300 feet of site: attached list** (NOA, **SEPA, NOPH, NOPM, NOD** for Type II permits only)
- ☐ **Parties of Record: attached list** (NOPH, NOPM, NOD)
- ☐ **Pierce County** (NOA for Plats adjacent to City Limits)
- ☐ **Pierce County Assessor-Treasurer** (NOD)
- ☐ **WA Transportation Secretary** (NOA for Plats adj. to State ROW, or within 2 miles of Airport—approximately any plats south of Pioneer/Wollochet interchange)

☒ **Other - TACOMA NEWS TRIBUNE**

## CERTIFICATION OF PUBLIC NOTICE

=====

### DECLARATION OF PUBLISHING

I, **CINDY ANDREWS** (printed name), declare under penalty of perjury under the laws of the State of Washington and the United States of America that the foregoing is true and correct to the best of my knowledge:

On **MARCH 22, 2021** I sent a true and correct copy of the **NOTICE OF PUBLIC MEETING** for publication In the **MARCH 30, 2021** edition of the Tacoma News Tribune for the following:

Project Name **CANTERWOOD COMMERCIAL CENTER**

Project Location: **10700 CANTERWOOD BLVD.**

Permit Number(s): PL-DRB-07-0013, PL-SPR-07-0004, PL-CUP-13-0002, PL-SEPA-07-0060

SIGNED at Gig Harbor, Washington, this **22** day of **MARCH, 2021**

DocuSigned by:  
*Cindy Andrews*  
C83422C3F23A404...  
DECLARANT (signature)



*"THE MARITIME CITY"*

DEVELOPMENT SERVICES

## **NOTICE OF PUBLIC MEETING**

### **Canterwood Commercial Center**

Permit Number(s): PL-DRB-07-0013, PL-SPR-07-0004, PL-CUP-13-0002, PL-SEPA-07-0060

Date of Notice: March 25, 2021

Applicant: Swede Hill, LLC  
PO Box 1693  
Tacoma, WA 98401

Agent: Halsan EF & P, LLC  
PO Box 1447  
Gig Harbor, WA 98335

Project Location: Located at 10700 Canterwood Blvd, on the west side of Canterwood Blvd, west of St. Anthony's Hospital, approximately 2,000 feet north of the intersection with Borgen Blvd.  
Sec 25, Tw 22, R 01, Qtr 42  
APN: 0122254090

Project Description: The applicant is proposing a design alternative to allow for removal of two (2) significant fir trees within the Canterwood Boulevard Enhancement Corridor. The overall project proposes the construction of 4 commercial buildings totaling approximately 28,278 square feet of office/retail space and a 9,000-square foot parking garage on an approximately 7.6 acre parcel. Drive-through facilities are proposed on 3 of the buildings. Access to the site will be at two points directly from Canterwood Blvd. The project also includes temporary and permanent wetland and wetland buffer impacts with related mitigation.

SEPA Threshold Determination: A threshold determination has not been made to date.

**PUBLIC MEETING DATE: Design Review Board, April 8, 2021, 5:00 pm, NOTE:**  
**This public meeting will be held in an online format subject to the latest public health recommendations.**

Interested persons are invited to attend the public meeting and provide comment on this proposal; however, public testimony will not be taken. The meeting will be conducted in the manner prescribed by Gig Harbor Municipal Code Section 17.98.055(C).

As of March 16, 2020, at 12 PM noon, our Civic Center will be closed to the general public until further notice.



Therefore, documents pertinent to this application are available for review and inspection online only using the City of Gig Harbor Permit Portal. Please contact Kimberly Mahoney, Associate Planner, for questions regarding access to other documents pertinent to this application.

Interested persons may comment on the above stated application or may request a copy of the decision on this application. **Pursuant to the Governor's Stay Home – Stay Healthy Order, requests for notification, written comments, including any written comments addressing the findings required for a decision, must be submitted to the Community Development Department no later than 5:00 PM on April 7, 2021; one day prior to the scheduled meeting.** Comments received will be read into the record at the meeting.

Questions regarding the above stated application should be made to Kimberly Mahoney, Associate Planner, City of Gig Harbor Planning Division, 3510 Grandview Street, Gig Harbor, WA 98335, or by calling 851-6170. Additional permit information can also be found at [www.cityofgigharbor.net](http://www.cityofgigharbor.net) by clicking "Permit Portal," then clicking "Applications" and entering the above permit numbers.

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Belleville News-Democrat  
Bellingham Herald  
Bradenton Herald  
Centre Daily Times  
Charlotte Observer  
Columbus Ledger-Enquirer  
Fresno Bee

The Herald – Rock Hill  
Herald Sun – Durham  
Idaho Statesman  
Island Packet  
Kansas City Star  
Lexington Herald-Leader  
Merced Sun-Star

Miami Herald/el Nuevo Herald  
Modesto Bee  
Raleigh News & Observer  
The Olympian  
Sacramento Bee  
Fort Worth Star Telegram  
The State - Columbia

Sun Herald – Biloxi  
Sun News – Myrtle Beach  
The News Tribune – Tacoma  
The Telegraph - Macon  
San Luis Obispo Tribune  
Tri-City Herald  
Wichita Eagle

## Order Confirmation

CITY OF GIG HARBOR  
3510 GRANDVIEW ST  
GIG HARBOR WA 983351214

Order Number: 31522  
Order PO:  
Bill-To Account: 23685  
Date: 03/23/21  
Sales Contact: Calandra Daniels  
Sales Contact Phone:

| Dates                   | Order No. | Description                  | Product                                                   | Size        | Times Run | None     |
|-------------------------|-----------|------------------------------|-----------------------------------------------------------|-------------|-----------|----------|
| 04/01/2021 - 04/01/2021 | 31522     | Print Legal Ad<br>IPL0016055 | TAC-News Tribune - Legal   Legals & Public<br>Notices CLS | 2 x 5.81 in | 1         | \$151.46 |

Order Total Cost

\$151.46

## Ad Preview

## NOTICE OF PUBLIC MEETING

### Canterwood Commercial Center

Permit Number(s): PL-DRB-07-0013, PL-SPR-07-0004, PL-CUP-13-0002, PL-SEPA-07-0060

Date of Notice: March 25, 2021

Applicant: Swede Hill, LLC

PO Box 1693

Tacoma, WA 98401

Agent: Halsan EF & P, LLC

PO Box 1447

Gig Harbor, WA 98335

Project Location: Located at 10700 Canterwood Blvd, on the west side of Canterwood Blvd, west of St. Anthony's Hospital, approximately 2,000 feet north of the intersection with Borgen Blvd.

Sec 25, Tw 22, R 01, Qtr 42

APN: 0122254090

Project Description: The applicant is proposing a design alternative to allow for removal of two (2) significant fir trees within the Canterwood Boulevard Enhancement Corridor. The overall project proposes the construction of 4 commercial buildings totaling approximately 28,278 square feet of office/retail space and a 9,000-square foot parking garage on an approximately 7.6 acre parcel. Drive-through facilities are proposed on 3 of the buildings. Access to the site will be at two points directly from Canterwood Blvd. The project also includes temporary and permanent wetland and wetland buffer impacts with related mitigation. SEPA Threshold Determination: A threshold determination has not been made to date.

**PUBLIC MEETING DATE: Design Review Board, April 8, 2021, 5:00 pm, NOTE: This public meeting will be held in an online format subject to the latest public health recommendations.**

Interested persons are invited to attend the public meeting and provide comment on this proposal; however, public testimony will not be taken. The meeting will be conducted in the manner prescribed by Gig Harbor Municipal Code Section 17.98.055(C).

As of March 16, 2020, at 12 PM noon, our Civic Center will be closed to the general public until further notice. Therefore, documents pertinent to this application are available for review and inspection online only using the City of Gig Harbor Permit Portal. Please contact Kimberly Mahoney, Associate Planner, for questions regarding access to other documents pertinent to this application.

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Questions regarding the above stated application should be made to Kimberly Mahoney, Associate Planner, City of Gig Harbor Planning Division, 3510 Grandview Street, Gig Harbor, WA 98335, or by calling 851-6170. Additional permit information can also be found at [www.cityofgigharbor.net](http://www.cityofgigharbor.net) by clicking "Permit Portal," then clicking "Applications" and entering the above permit numbers.

W00000000

Publication Dates



City of Gig Harbor  
Transmittal Form

Routing for: NOA SEPA NOPH **NOPM** NOD Notice Date: MARCH 25, 2021

Project: CANTERWOOD COMMERCIAL CENTER

Permit Number(s): PL-DRB-07-0013, PL-SPR-07,0004, PL-CUP-13,0002, PL-SEPA-07-0060

Planner: KIMBERLY MAHONEY

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Routed to: ☐ Public Works-Operations ☐ Building and Fire Safety  
City Depts. ☐ Public Works-Engineering ☐ Other \_\_\_\_\_

SEPA Agencies: ☐ Washington Department of Ecology, SEPA Register  
(NOA, SEPA) ☐ Washington Department of Commerce, attn: Review Team  
Electronic Mail ☐ Pierce Transit Land Use Review, attn: Kelly Haden, Monica Adams  
☐ Washington State Department of Fish & Wildlife, attn: SEPA Desk  
☐ Washington State Department of Natural Resources, attn: SEPA Center  
☐ Washington State DAHP, attn: Gretchen Kaehler  
☐ Puyallup Tribe of Indians Historic Preservation, attn: Judy Wright  
☐ Puyallup Tribe Cultural Resources, attn: Brandon Reynon/Jeffrey Thomas  
☐ PenMet Parks, attn: Elaine Sorenson  
☐ Pierce County Fire District Number 5, attn: Eric Watson/Eric Waters  
☐ Suquamish Tribe, attn: Dennis Lewarch  
☐ Peninsula School District, attn: Vicki Smith  
☐ Pierce County Planning and Land Services  
☐ Washington State Department of Transportation, attn: Dale Severson / SEPA Reviews  
☐ Squaxin Island Tribe, attn: Rhonda Foster  
☐ Muckleshoot Tribe, attn: Laura Murphy  
☐ Washington Department of Corrections, attn: Eric Heinitz  
☐ Puget Sound Partnership, attn: Marsha Engel

Other Parties: ☒ Applicant/Owner/Agent (NOA, NOPH, **NOPM**, SEPA, NOD)  
1<sup>st</sup> Class Mail ☒ DRB (NOA for Non-residential, Multi-family, Subdivisions, Public Projects)  
☐ Parks Commission via Terri Reed (NOA)  
☒ Property Owners within 300 feet of site: attached list (NOA, SEPA, NOPH, **NOPM**, NOD for Type II permits only)  
☐ Parties of Record: attached list (NOPH, NOPM, NOD)  
☐ Pierce County (NOA for Plats adjacent to City Limits)  
☐ Pierce County Assessor-Treasurer (NOD)  
☐ WA Transportation Secretary (NOA for Plats adj. to State ROW, or within 2 miles of Airport—approximately any plats south of Pioneer/Wollochet interchange)

☐ Other - TACOMA NEWS TRIBUNE

## CERTIFICATION OF PUBLIC NOTICE

=====

### DECLARATION OF MAILING

I, **Cindy Andrews** (printed name), declare under penalty of perjury under the laws of the State of Washington and the United States of America that the foregoing is true and correct to the best of my knowledge:

On **MARCH 25, 2021** I mailed (**e-mailed**) a true and correct copy of the **NOTICE OF PUBLIC MEETING**

Project Name **CANTERWOOD COMMERCIAL CENTER**

Project Location **10700 CANTERWOOD BLVD**

Permit Number(s): **PL-DRB-07-0013, PL-SPR-07,0004, PL-CUP-13-0002, PL-SEPA-07-0060**

to the individuals/agencies identified on the attached transmittal form by United States Postal Service, inter-office routing, or electronic mail, as specified on the attached.

SIGNED at Gig Harbor, Washington, this 25th day of MARCH 2021.

  
DECLARANT (signature)



"THE MARITIME CITY"

DEVELOPMENT SERVICES

## NOTICE OF PUBLIC MEETING

### Canterwood Commercial Center

**Permit Number(s):** PL-DRB-07-0013, PL-SPR-07-0004, PL-CUP-13-0002, PL-SEPA-07-0060

**Date of Notice:** March 25, 2021

**Applicant:** Swede Hill, LLC  
PO Box 1693  
Tacoma, WA 98401

**Agent:** Halsan EF & P, LLC  
PO Box 1447  
Gig Harbor, WA 98335

**Project Location:** Located at 10700 Canterwood Blvd, on the west side of Canterwood Blvd, west of St. Anthony's Hospital, approximately 2,000 feet north of the intersection with Borgen Blvd.  
Sec 25, Tw 22, R 01, Qtr 42  
APN: 0122254090

**Project Description:** The applicant is proposing a design alternative to allow for removal of two (2) significant fir trees within the Canterwood Boulevard Enhancement Corridor. The overall project proposes the construction of 4 commercial buildings totaling approximately 28,278 square feet of office/retail space and a 9,000-square foot parking garage on an approximately 7.6 acre parcel. Drive-through facilities are proposed on 3 of the buildings. Access to the site will be at two points directly from Canterwood Blvd. The project also includes temporary and permanent wetland and wetland buffer impacts with related mitigation.

**SEPA Threshold Determination:** A threshold determination has not been made to date.

**PUBLIC MEETING DATE:** Design Review Board, April 8, 2021, 5:00 pm, **NOTE:**  
**This public meeting will be held in an online format subject to the latest public health recommendations.**

Interested persons are invited to attend the public meeting and provide comment on this proposal; however, public testimony will not be taken. The meeting will be conducted in the manner prescribed by Gig Harbor Municipal Code Section 17.98.055(C).

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| TaxParcelNumber    | TaxpayerName                  | Delivery_Address         | City_State Zipcode        |
|--------------------|-------------------------------|--------------------------|---------------------------|
| Parcel: 0122258009 | D & M MORRIS FAMILY LLC       | 11505 BURNHAM DR STE 206 | GIG HARBOR, WA 98332      |
| Parcel: 0122254090 | SWEDE HILL LLC                | PO BOX 1693              | TACOMA, WA 98401-1693     |
| Parcel: 0122254062 | BAY HILL TERRACE LLC          | 1830 112TH ST E STE F    | TACOMA, WA 98445-3747     |
| Parcel: 0122254088 | BURNHAM PROPERTIES LLC        | PO BOX 701               | WAUNA, WA 98395-0701      |
| Parcel: 3001140010 | FRANCISCAN HEALTH SYSTEM WEST | 3400 DATA DR             | RANCHO CORDOVA, CA 95670  |
| Parcel: 0122258008 | BURNHAM PARTNERS LLC          | 11505 BURNHAM DR STE 206 | GIG HARBOR, WA 98332      |
| Parcel: 0122254028 | BURNHAM PROPERTIES LLC        | PO BOX 701               | WAUNA, WA 98395-0701      |
| Parcel: 0122254073 | GIG HARBOR NORTH ANNEX LLC    | 6622 WOLLOCHET DR        | GIG HARBOR, WA 98335-8325 |
| Parcel: 0122254051 | GIG HARBOR NORTH ANNEX LLC    | 6622 WOLLOCHET DR        | GIG HARBOR, WA 98335-8325 |
| Parcel: 0122254089 | PURDY INVESTMENTS LLC         | 11505 BURNHAM DR STE 206 | GIG HARBOR, WA 98332      |
| Parcel: 0122254104 | BURNHAM HOLDINGS LLC          | PO BOX 701               | WAUNA, WA 98395-0701      |
| Parcel: 0122254065 | PARR GARY R                   | 3573 EL ST               | TACOMA, WA 98404-3823     |

## ArcGIS Web Map



3/30/2021, 2:33:37 PM

1:8,028



LENOVA P&A, GeoEye, Mapbox

The map features are approximate. All data is provided "as-is" and "with all faults." The City assumes no liability for mistakes or omissions not shown by actual survey.

City of Big Harbor

## CERTIFICATION OF PUBLIC NOTICE

### DECLARATION OF POSTING

I, CARL HANSON (printed name), declare under penalty of perjury under the laws of the State of Washington and the United States of America that the foregoing is true and correct to the best of my knowledge:

On APRIL 1<sup>ST</sup>, 2021 I caused to be posted the notice board provided by the City for the **NOTICE OF PUBLIC MEETING** on the following:

Project Name: **CANTERWOOD COMMERCIAL CENTER**

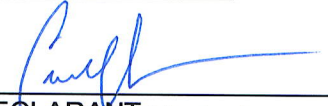
Project Location **10700 Canterwood Blvd**

Permit Number(s): **PL-DRB-07-0013, PL-SPR-07-0004, PL-CUP-13-0002, PL-SEPA-07-0060**

the locations indicated below meeting the requirements of GHMC 19.03.001(A).

- ☒ ON POST AT MID POINT OF LOT
- ☒ ALONG CANTERWOOD BOULEVARD FRONTAGE

SIGNED at Gig Harbor, Washington, this 1<sup>ST</sup> day of APRIL, 2021.

  
DECLARANT (signature)





NOTICE OF PUBLIC MEETING  
DESIGN ALTERNATIVE  
PLACER COUNTY TRANSPORTATION IMPROVEMENT PROJECT  
PUBLIC MEETING DATE: SEPTEMBER 14, 2011, 6:00 PM  
LOCATION: PLACER COUNTY COURTHOUSE, 1000 J STREET, PLACER, CA 95661  
FOR MORE INFORMATION, VISIT THE PROJECT WEBSITE AT: [www.placer.ca.gov/transportation](http://www.placer.ca.gov/transportation)



**Canterwood Commercial Center**

PL-SPR-07-0004 et al  
Hearing Examiner

**Exhibit H**

City of Gig Harbor  
Department of Community Development

Project Name: Suede Hill LLC Date: 2/28/06 Permit Number: Notice of Application  
Project Address: 1070X Canterwood Dr (DRB 05-1158)  
Billing Address: Suede Hill LLC - P.O. Box 871 - Gig Harbor, WA

| Operations and Engineering:            | File/Project # | AR/Fee Cd  | BARS No.          | CR/Code  | Amount (\$) |
|----------------------------------------|----------------|------------|-------------------|----------|-------------|
| Utility Connection - Water             |                | CNST1      | 420-000-379-00-00 | CNSTA2   |             |
| Park Impact Fees                       |                | IMPPK      | 001-000-345-85-00 | PRKIMP   |             |
| Traffic Impact Fees                    |                | IMPTF      | 101-000-345-84-00 | TRNIMP   |             |
| School Impact Fees                     |                | -          | 309-000-237-10-00 | SCHIMP   |             |
| Latecomers Fees - Water                |                | LTCWT      | 420-000-237-50-00 | PYBL9    |             |
| Utility Connection - Sewer             |                | CNST2      | 410-000-379-00-00 | CNSTA1   |             |
| Encroachment Permit                    |                | ENCRO      | 101-000-322-40-00 | ENCRCH   |             |
| Construction Inspection Services       |                | INSP1      | 101-000-343-20-00 | INSFEE   |             |
| Engineering Plan Review                |                | ENGP1      | 101-000-345-83-00 | ENGPIN   |             |
| House Stub Inspection Fee              |                | -          | 402-000-343-20-10 | INSEE3-1 |             |
| As-Built Plans Fee (Refundable)        |                | CNST2      | 410-000-379-00-00 | CNSTA1   |             |
| Latecomers Fees - Sewer                |                | LTCSEW     | 410-000-237-50-00 | PYBL7    |             |
| Performance Bond - Street (Refundable) |                | -          | 101-000-237-11-00 | PYBL10   |             |
| Stormwater Design Manual, Comp Plan    |                | SALS6      | 411-000-341-50-00 | SALPBST  |             |
| Plans & Specs Bid Documents            |                | SALS 2 - 6 | XXX-000-341-50-00 | SALPB    |             |
| Public Works Standards                 |                | SALS 2 - 6 | XXX-000-341-50-00 | SALPB    |             |
| Parks Comp Plan                        |                | SALS2      | 001-000-341-50-00 | SALPB    |             |
| Miscellaneous                          |                |            |                   |          |             |

Sub Total: 35.28

| Planning Department:                      | File/Project # | AR/Fee Cd | BARS No.          | CR/Code | Amount (\$) |
|-------------------------------------------|----------------|-----------|-------------------|---------|-------------|
| Building Permit Fees - Sign Permit        |                | BLDP5     | 001-000-322-14-00 | BPSIGN  |             |
| Refundable Performance Bond               |                | -         | 001-000-237-11-00 | PYBL12  |             |
| Plan Checking Fees                        |                | PCHKG     | 001-000-345-83-00 | INSRW   |             |
| Sales of Publications, copies, maps, etc. |                | SALS2     | 001-000-341-50-00 | SALPB   |             |
| Sales of Zoning Code                      |                | SALZO     | 001-000-341-51-00 | SALZCD  |             |
| Zoning & Subdivsn Fees (VAR,CUP,SUB,SEPA) |                | PZNG      | 001-000-345-81-00 | ZONSUB  |             |
| Y Reimb - Affidavit of Publication        |                | REIMB1    | 001-014-558-60-44 | REIMBFF | 35.28       |
| Miscellaneous                             |                |           |                   |         |             |

Sub Total: 35.28

| Building Department:                      | AR/Fee Cd | BARS No.          | CR/Code | Amount (\$) |
|-------------------------------------------|-----------|-------------------|---------|-------------|
| Permits:                                  |           |                   |         |             |
| Building Code Council (BCC)               | BCC       | 001-000-213-07-00 | PYBL11  |             |
| Building Permit Fees - Basic              | BLDP1     | 001-000-322-10-00 | BPBSC   |             |
| Building Permit Fees - Plan Checking      | BLDP2     | 001-000-322-11-00 | BPPLN   |             |
| Building Permit Fees - Plumbing           | BLDP3     | 001-000-322-12-00 | BPPLUM  |             |
| Building Permit Fees - Mechanical         | BLDP4     | 001-000-322-13-00 | BPMECH  |             |
| Building Permit Fees - Grading            | BLDP6     | 001-000-322-15-00 | BPGRAD  |             |
| Building Permit Fees - Fire               | BLDP7     | 001-000-322-16-00 | BPFIRE  |             |
| Sales of Publications, copies, maps, etc. | SALS2     | 001-000-341-50-00 | SALPB   |             |
| Miscellaneous                             | MISC1     | 001-000-369-90-00 |         |             |

Receipt Info:

Sub Total: 35.28

Please return this to:

Cina / TON PO 2/14/06

Total: \$ 35.28



3555 ERICKSON ST. • P.O. BOX 407 • GIG HARBOR, WA 98335  
(253) 851-9921 • IN KITSAP (360) 895-2410 • FAX (253) 851-3939  
www.gateline.com

THANK YOU FOR  
YOUR BUSINESS!

3555 Erickson St.  
Gig Harbor, WA 98335

| DATE OF INVOICE |                                    | SALES PERSON |       | CUSTOMER NUMBER |      |        | DUE DATE |       |
|-----------------|------------------------------------|--------------|-------|-----------------|------|--------|----------|-------|
| 04/14/06        |                                    | DN           |       | 000000          |      |        | 04/28/06 |       |
| AD#             | TEXT                               | CLASS        | START | STOP            | RUNS | AMOUNT | PREPAID  | DUE   |
| 0414005         | Swedish LLC History of Application |              |       |                 |      | 000000 |          | 05/28 |

PLEASE PAY FROM THIS INVOICE

TOTAL DUE

00.00

Return REMITTANCE COPY with payment.

PLEASE MAKE CHECKS PAYABLE TO:  
**Peninsula Gateway**

# Affidavit of Publication

STATE OF WASHINGTON, } S.S.  
COUNTY OF PIERCE }

Donna Gebo being first duly sworn, an oath deposes and says that he/she is the bookkeeper of *THE PENINSULA GATEWAY*, a weekly newspaper. That said newspaper is a legal newspaper and it is now and has been for more than six months prior to the date of the publication hereinafter referred to, published in the English language continually as a weekly newspaper in Gig Harbor, Pierce County, Washington, and it is now and during all of said time was printed in an office maintained at the aforementioned place of publication of said newspaper.

That the annexed is a true copy of a **Notice of Application Swede Hill LLC** as it was published in regular issues (and not in supplement form) of said newspaper once each week for a period of **One (1)** consecutive weeks, commencing on the **15th day of February, 2006**, and ending on the **15th day of February, 2006**, both dates inclusive, and that such newspaper was regularly distributed to its subscribers during all of said period.

That the amount of the fee charged for the foregoing publication in the sum of **\$35.28** which amount has been paid in full, or billed, at the legal rate according to RCW, 65, 16.090

*Donna Gebo*

Subscribed to and sworn before me this  
16th day of February, 2006

*Donna L. Natucci*  
Notary Public in and for the State of Washington.

Residing at Gig Harbor

## NOTICE OF APPLICATION CITY OF GIG HARBOR

Date of Application:

December 16, 2005

Date of Notice of Completion of Application:

January 26, 2006

Date of Notice:

February 9, 2006

Applicant:

Swede Hill LLC, P.O. Box 871, Gig Harbor WA 98335

Project Location:

1070X Canterwood Dr., Gig Harbor WA

Project Description:

Application for Design Review (DRB 05-1158) of a commercial/retail office development

Project Permits required:

Design Review, Site Plan Review and Building Permit

Type or Environmental Documents Filed:

Environmental Checklist

Documents pertinent to this application are available for review and inspection at the City of Gig Harbor Department of Planning and Building Services, 3510 Grandview Street, Gig Harbor, WA 98335, during normal business hours, Monday through Friday. A copy of the staff report on this project proposal will be available seven days prior to the public hearing.

Interested persons may comment on the above stated application or may request any notice of public hearing or a copy of the decision on this application. Requests for notification or written comments must be submitted to the Department of Planning and Building Services by no later than March 9, 2006. All public comments or requests must be received at the Department of Planning and Building by no later than 5:00pm on the last date of the comment period.

Questions regarding the above stated application should be made to the City of Gig Harbor Planning and Building Services, 3510 Grandview St., Gig Harbor, WA 98335, or by calling 851-6170. GH#1887





COMMUNITY DEVELOPMENT DEPARTMENT

**NOTICE OF APPLICATION**  
**City of Gig Harbor**

|                                              |                                                                                       |
|----------------------------------------------|---------------------------------------------------------------------------------------|
| Date of Application:                         | December 16, 2005                                                                     |
| Date of Notice of Completion of Application: | January 26, 2006                                                                      |
| Date of Notice:                              | February 9, 2006                                                                      |
| Applicant:                                   | Swede Hill LLC, P.O. Box 871, Gig Harbor WA 98335                                     |
| Project Location:                            | 1070X Canterwood Dr., Gig Harbor WA.                                                  |
| Project Description:                         | Application for Design Review (DRB 05-1158) of a commercial/retail office development |
| Project Permits required:                    | Design Review and Fill and Grade Permit                                               |
| Type of Environmental Documents Filed:       | Environmental Checklist                                                               |

Documents pertinent to this application are available for review and inspection at the City of Gig Harbor Department of Planning and Building Services, 3510 Grandview Street, Gig Harbor, WA 98335, during normal business hours, Monday through Friday. A copy of the staff report on this project proposal will be available seven days prior to the public hearing.

Interested persons may comment on the above stated application or may request any notice of public hearing or a copy of the decision on this application. ***Requests for notification or written comments must be submitted to the Department of Planning and Building Services by no later than March 9, 2006.*** All public comments or requests must be received at the Department of Planning and Building by no later than 5:00pm on the last date of the comment period.

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**City of Gig Harbor  
Certificate of Transmittal**

Routing for:

NOA SEPA NOPH NOPM NOD

Notice Date: March 19<sup>th</sup>, 2014

Project:

Canterwood Comm Park  
PI-SPZ-C7-C004

Planner:

Kristin m.

Routed to:

City Depts.

☐ Public Works-Operations

☐ Public Works-Engineering

☐ Building and Fire Safety

☐ Other \_\_\_\_\_

SEPA Agencies:

(NOA, SEPA)

Electronic Mail

☒ Washington Department of Ecology, SEPA Register

☒ Washington Department of Commerce, attn: Review Team

☒ Pierce Transit Land Use Review, attn: Kelly Haden, Monica Adams

☒ Washington State Department of Fish & Wildlife, attn: SEPA Desk

☒ Washington State Department of Natural Resources, attn: SEPA Center

☒ Washington State DAHP, attn: Gretchen Kaehler

☒ Puyallup Tribe of Indians Historic Preservation, attn: Judy Wright

☒ Puyallup Tribe Cultural Resources, attn: Brandon Reynon and Jeffrey Thomas

☒ PenMet Parks, attn: Elaine Sorenson

☒ Pierce County Fire District Number 5, attn: Eric Waters

☒ Suquamish Tribe, attn: Dennis Lewarch

☒ Peninsula School District, attn: Vicki Smith

☒ Pierce County Planning and Land Services, attn: Adonais Clark

☒ Washington State Department of Transportation, attn: Dale Severson / SEPA Reviews

☒ Squaxin Island Tribe, attn: Rhonda Foster

☒ Muckleshoot Tribe, attn: Laura Murphy

☒ Washington Department of Corrections, attn: Eric Heinitz

☒ Puget Sound Partnership, attn: Marsha Engel

Other Parties:

1<sup>st</sup> Class Mail

☐ Applicant/Owner/Agent (NOA, NOPH, NOPM, SEPA, NOD)

☐ DRB (NOA for Non-residential, Multi-family, Subdivisions, Public Projects)

☐ Parks Commission via Terri Reed (NOA)

☐ Property Owners within 300 feet of site: attached list (NOA, SEPA, NOPH, NOPM, NOD for Type II permits only)

☐ Parties of Record: attached list (NOPH, NOPM, NOD)

☐ Pierce County (NOA for Plats adjacent to City Limits)

☐ Pierce County Assessor-Treasurer (NOD)

☐ WA Transportation Secretary (NOA for Plats adj. to State ROW, or within 2 miles of Airport—approximately any plats south of Pioneer/Wollochet interchange)

☐ Other \_\_\_\_\_

I certify under penalty of perjury under the laws of the State of Washington that on March 19, 2014, I transmitted a copy of NOA WISEPA to the individuals identified above by first-class mail, postage-prepaid, inter-office routing or electronic mail, as specified above.

Signed this 20<sup>th</sup> day of March, 2014 at Gig Harbor, Washington.

Signature

Printed Name

Cynthia Sorenson  
Cynthia Sorenson



DEVELOPMENT SERVICES  
**CITY OF GIG HARBOR**

**NOTICE OF APPLICATION**

**March 19, 2014**

**Canterwood Commercial Project  
Type III Permit**

Permit Number(s): PL-SPR-07-0004, PL-CUP-13-0002, PL-DRB-07-0013, and PL-SEPA-07-0060

Date Application was Submitted: December 20, 2013, March 3, 2006

Date of Notice of Complete Application: February 14, 2014

Name of Applicant: Paul Cyr, Barghausen Consulting Engineers INC, 18215 72<sup>ND</sup> Avenue South, Kent WA 98032

Project Location: Located on Canterwood Blvd, across the street from St. Anthony's Hospital at approximately 10700 Canterwood Blvd. Sec 25, Tw 22, R 1.

Description of Proposed Project: The proposal includes construction of 4 commercial buildings totaling 28,120 square feet of floor area and associated parking. Drive-through facilities are proposed on three of the buildings. Project also includes temporary and permanent wetlands and stream impacts with related mitigation.

Project Permits Included with Application: Site Plan Review, Design Review, Conditional Use Permit and SEPA threshold determination.

Further Studies Being Required by Applicable Official: None at this time.

Other Required Permits Not Included in Application: Clearing/Grading approval, NPDES permit, CWA Section 404 and 401, HPA, Civil Permit, and building permits.

Existing Environmental Documents which Evaluate Proposed Project:

SEPA Environmental Checklist, dated December 20, 2013;  
Preliminary Drainage Control Plan, prepared by Karen Harris, Barghausen, dated December 19, 2013; Geotechnical Engineering Report prepared by GeoResources LLC, dated January 31, 2013; Water Hydraulic Report prepared by Karen Harris, Barghausen, dated January 16, 2014, Sewer Hydraulic Report prepared by Karen Harris, Barghausen, dated January 13, 2014; Level 1 Traffic Impact Analysis by Heath

and Associates INC, dated January 2014 and Wetland Delineation and Habitat Assessment report and Conceptual Mitigation Plan prepared by Soundview Consultants, dated December 2013.

Tentative Public Meeting or Public Hearing Date: A hearing date has not been scheduled for this application.

Documents pertinent to this application are available for review and inspection at the City of Gig Harbor Planning Department, 3510 Grandview Street, Gig Harbor, WA 98335, during normal business hours, Monday through Friday. An open record public hearing will be held on this project, at this time the hearing has not been scheduled. A copy of the staff report on this project proposal will be available seven days prior to the public hearing.

Interested persons may comment on the above stated application, or may request any notice of public hearing or a copy of the decision on this application, or participate in any public hearings. Requests for notification or written comments must be submitted to the Planning Department by no later than April 3, 2014. All public comments or requests must be received at the Planning Department by no later than 5:00pm on the last date of the comment period.

Questions regarding the above stated application should be made to Kristin Moerler, Associate Planner, City of Gig Harbor Planning Department, 3510 Grandview St., Gig Harbor, WA 98335, or by calling 851-6170. Additional permit information can also be found at [permitportal.cityofgigharbor.net](http://permitportal.cityofgigharbor.net) by entering the above permit numbers.

## REVISED ENVIRONMENTAL CHECKLIST

1. Proponent (c): Swede Hill LLC (Canterwood Commercial)  
Address: P.O. Box 1397  
Tacoma, WA 98401  
Phone: (253) 627-6179
2. Representative: Barghausen Consulting Engineers, Inc.  
  
Address: 18215 72<sup>nd</sup> Avenue South  
Kent, WA 98032  
Phone: (425) 251-6222
3. Property Address or location (e): \_\_\_\_\_  
10700XXX Canterwood Blvd. N.W.
4. 1/4 S/T/R (f): SE 25/22/1
5. Tax Parcel # (g): 0122254090
6. Total Acres: 7.6± acres
7. Permit Type: CUP, Site Plan, Design Review and Wetland Analysis
8. Zoning: B-2
9. Shoreline Environment: N/A
10. Water Body: Wetlands A through G and an unnamed stream.
11. Brief Description of the proposal and Project Name: \_\_\_\_\_ Canterwood Commercial  
Properties. The intent of this project is to construct 4 commercial buildings in the B-2  
zone. The applicant is proposing to have 3 access driveways with approximately 143 total  
parking spaces. The total impervious area for this project is approximately 86,118 ± SF  
or 26%.
12. Estimated Completion Date: Revised application Fall 2013; construction Summer-Fall  
2015.
13. List of all Permits, Licenses or Government Approvals Required for the Proposal  
(federal, state and local – including rezones): Grading permit, land clearing permit, SEPA,  
wetland mitigation, CWA Section 404 and 401 (USACE & Ecology), a Hydraulic Project  
Approval (WDFW), and local critical areas review.
14. Do you have any plans for future additions, expansion or further activity related to or  
connected with this proposal? If yes, explain: No
15. Do you know of any plans by others which may affect the property covered by your  
proposal? If yes, explain: The Traffic Impact Analysis Report of St. Anthony Hospital for Gig  
Harbor, WA by David Evans and Associates, Inc dated June 2005 specifies this parcel within the  
"pipeline projects" and maps it in the Draft Supplemental EIS in Figure 7 as analysis area "E".
16. Proposed timing or schedule (including phasing, if applicable): Revised SEPA Fall 2013.

RECEIVED BY  
DEC 20 2013  
CITY OF GIG HARBOR

PL-SEPA-07-0060  
Application Revised  
to include  
Conditional Use  
Permit 12/20/13.

Reviewed  
3-20-14 Kim



17. List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal. Wetland Delineation Report and Compensatory Mitigation Plan prepared by Soundview Consultants dated December 2013, Landscape Plan by Barghausen Consulting Engineers dated December 2013, Traffic Impact Analysis by Heath and Associates dated December 2013, Design Review Application and Elevations prepared by Helix Design Group dated December 2013.

## I. EARTH

- A. General description of the site (circle one): flat, rolling, hilly, steep slopes, mountainous; other:  
The site ranges from hilly to steep slopes in areas. The site slopes from east to west away from Canterwood Blvd N.W.
- B. What is the steepest slope on the site (approximate percent slope)?  
The steepest slope on the site is approximately 20%.
- C. What general types of soils are found on the site (for example; clay, sand, gravel, peat, muck)? If you know the classification of agricultural soils, specify them and note any prime farmland.  
16C – Harstine Gravelly Sandy Loam 6-15% slopes; 16D – Harstine Gravelly Sandy Loam 15-30% slopes.
- D. Are there surface indications or history of unstable soils in the immediate vicinity? No. \_\_\_\_\_ If so, describe \_\_\_\_\_
- E. Describe the purpose, type, and approximate quantities of any filling or grading proposed. Indicate source of fill.  
Approximately ±5,500 cubic yards will be cut, and ±40,000 cubic yards will be filled, with a net import of ±34,500 cubic yards.
- F. Could erosion occur as a result of clearing, construction, or use? If so, generally describe.  
Erosion could occur due to the soil type and existing slopes.
- G. About what percent of the site will be covered with impervious surfaces after project construction (for example, asphalt or buildings)?  
Approximately 26% will be impervious area.
- H. Proposed measures to reduce or control erosion, or other impacts to the earth, if any:  
Utilize Best Management Practices for erosion control, including filter fabric fence surrounding the cleared area, temporary drainage with a temporary sediment pond. Upon completion of the project, the site will be hydroseeded to stabilize the soil, and vaults will control storm water runoff.

## II. AIR

- A. What types of emissions to the air would result from the proposal (i.e., dust, automobile, odors, and industrial wood smoke) during construction and when the project is completed? If any, generally describe and give approximate quantities, if known.

During construction, dust will come from clearing and grading of the site. Also, exhaust fumes will be generated by construction equipment.

- B. Are there any off-site sources of emissions or odor that may affect your proposal? None known. If so, generally describe \_\_\_\_\_

- C. Proposed measures to reduce or control emissions or other impacts to air, if any:  
During construction, the project site will be watered, as necessary, to control dust. Construction entrances will be utilized to reduce much of the dust on adjacent streets. Dirt tracked to adjacent roadways will be swept clean.

### III. WATER

#### Surface

- A. Is there any surface water body on or in the immediate vicinity of the site (including year-round and seasonal streams, salt water, lakes, ponds, wetlands)? If yes, describe type and provide names. If appropriate, state the stream or river into which it flows.

Yes, there are several wetlands and one small unnamed stream that have been identified on site. See revised Wetland Delineation and Habitat Assessment Report and Conceptual Mitigation Plan for Canterwood Properties, Gig Harbor, WA dated December 2013 by Soundview Consultants.

- B. Will the project require any work over, in, or adjacent to (within 200 feet) the described waters? If yes, please describe and attach available plans for this work.  
Yes, two small Category IV wetlands will be filled and mitigated through on-site wetland creation, enhancement and preservation actions, and removal of an instream culvert. See Site Plan and Wetland Delineation and Habitat Assessment Report and Conceptual Mitigation Plan for additional details.

- C. Estimate the amount of fill and dredge material that would be placed in, or removed from, surface water or wetlands and indicate the area of the site that would be affected. Indicate the source of fill material and/or the disposal site.  
Approximately 5.525 SF of Wetlands B and C will be filled and mitigation will be provided on site. Total fill placed within the wetlands will be approximately 61 CY below the wetland perimeter elevation. See Delineation and Habitat Assessment Report and Conceptual Mitigation Plan for Canterwood Properties, Gig Harbor, WA dated December 2013 by Soundview Consultants, and the grading plan.

- D. Will the proposal require surface water withdrawals or diversions? Give general description, purpose, and approximate quantities, if known.  
No, however, one culvert will be removed from the stream as a mitigation action.

- E. Does the proposal lie within a 100-year floodplain? If so, note flood-plain location on the site plan.  
According to the FEMA flood maps, the proposal lies in a "C" designation, indicating an area of minimal to no flooding.
- F. Does the proposal involve any discharges of waste materials to surface waters? If so, describe the type of waste and anticipated volume of discharge.  
No, aside from the previously discussed wetland fill and mitigation actions, the proposal does not involve any discharge of waste materials to surface waters.

Ground:

- A. Will groundwater be withdrawn, or will water be discharged to groundwater? Give general description, purpose, and approximate quantities of withdrawals or discharges, if known.  
No groundwater withdrawal or discharge will be necessary.
- B. Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (for example: Domestic sewage; industrial, containing the following chemicals; agricultural; etc.). Describe the general size of the system, the number of such systems, the number of houses to be served (if applicable), or the number of animals or humans the system(s) is/are expected to serve.  
Not applicable.

Runoff (including stormwater):

- A. Describe the source of runoff (including stormwater) and method of collection and disposal, if any (include quantities, if known). Where will this water flow? Will this water flow into other waters? If so, describe.  
Runoff from cleared and graded areas will be controlled and directed to temporary sediment ponds and discharged to forested areas.
- B. Could waste materials enter ground or surface waters?    If so, generally describe.  
Oils and greases from vehicles could enter surface waters.
- C. Proposed measures to reduce or control surface water, groundwater, and runoff impacts, if any:  
Utilize Best Management Practices for erosion control, including filter fabric fence surrounding the cleared area, temporary drainage with a temporary sediment pond. Upon completion of the project, the site will be hydroseeded and landscaped to stabilize the soil. Furthermore, a permanent on-site engineered stormwater collection and detention system will be provided according to City and State standards.

IV. PLANTS

- A. Check types of vegetation found on the site and list specific species:  
  X   Deciduous tree: alder maple aspen; other: Black cottonwood

X evergreen tree: (fir) cedar, pine; other: Red Cedar \_\_\_\_\_

X shrubs \_\_\_\_\_

\_\_\_\_\_ grass \_\_\_\_\_

\_\_\_\_\_ pasture \_\_\_\_\_

\_\_\_\_\_ crop or grain \_\_\_\_\_

X wet soil plants: cattail, buttercup, bulrush, (skunk cabbage) other: Devils club, salmonberry and lady fern

\_\_\_\_\_ water plants: water lily, eelgrass, milfoil; other: \_\_\_\_\_

X other types of vegetation: Salal.

B. What kind and amount of vegetation will be removed or altered?

Adequate space for building pads will be cleared. Clearing limits have been delineated on the plans. See the grading plan. The area of disturbance is 194,456 sf or 4.46 acres, which will remove wooded areas comprised of a mix of Douglas Fir, Western Red Cedar and Red Alder. A portion of the south central portion of the site lacks trees and is dominated by shrub and herbaceous vegetation.

C. List threatened or endangered plant species known to be on or near the site.

None known.

D. Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any:

Hydroseed to stabilize soils. The wetland areas will be left untouched and the vegetation enhanced if deemed necessary by the City of Gig Harbor. Native trees, shrubs, and herbaceous plant species will be installed in wetland enhancement, wetland creation and buffer areas.

## V. ANIMALS

A. Circle any birds or animals that have been observed on or near the site, or that are known to be on or near the site:

Birds: hawk, heron, eagle, (songbirds) other:

Mammals: (deer) bear, elk, beaver; other:

Fish: bass, salmon, trout, herring, shellfish; other:

B. List any threatened or endangered animal species known to be on or near the site.

None known.

C. Is the site part of a migration route? \_\_\_\_\_ If so, explain.

Not to our knowledge.

D. Proposed measures to preserve or enhance wildlife, if any:

Approximately 80,900 SF of the wetland, wetland buffers, and/or natural vegetation areas will be left as open space and preserved in a conservation easement.



## VI. ENERGY AND NATURAL RESOURCES

- A. What kinds of energy (electric, natural gas, oil, wood stove, solar) will be used to meet the completed project's energy needs? Describe whether it will be used for heating, manufacturing, etc.

The buildings will have electricity and gas. The uses of these energy types is unknown at this time.

- B. Would your project affect the potential use of solar energy by adjacent properties? No.

If so, generally describe.

- C. What kinds of energy conservation features are included in the plans of this proposal? List other proposed measures to reduce or control energy impacts, if any:

N/A

## VII. ENVIRONMENTAL HEALTH

- A. Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire, explosion, spill, or hazardous waste that could occur as a result of this proposal? No. There is a potential for construction equipment to leak fluids; however, an SPCC plan will be prepared and kept on site and utilized if necessary.

If so describe.

- B. Describe special emergency services that might be required (for example, chemical spills or explosions).

No special emergency services are likely to be required.

- C. Proposed measures to reduce or control environmental health hazards, if any:

None proposed.

### D. Noise

1. What types of noise exist in the area which may affect your project (for example: traffic, construction, or production equipment)?

None.

2. What types and levels of noise would be created by or associated with the project on a short-term or a long-term basis (for example: traffic, construction, or production equipment)? Indicate the hours that noise would be generated by the site.

Noise associated with construction and development of the property will have a short-term impact during regular working hours.

3. Proposed measures to reduce or control noise impacts, if any:  
No specific measures are proposed.

#### VIII. LAND AND SHORELINE USE

- A. What is the current use of the site and adjacent properties?  
North: Wooded, vacant land  
South: SR-16, vacant land  
East: St. Anthony's Hospital  
West: SR-16, commercial
- B. Has the site been used for agriculture? Is so, describe.  
No.
- C. Describe any structures on the site.  
No structures currently exist on the site.
- D. Will any structures be demolished? No. If so, what?  
\_\_\_\_\_
- E. What is the current zoning classification of the site?  
B-2
- F. What is the comprehensive plan designation of the site?  
Commercial.
- G. If applicable, what is the current shoreline master program designation of the site?  
Not applicable.
- H. Has any part of the site been classified as an "environmentally sensitive" area?  
Yes If so, please specify.  
Several wetlands and a small stream are on the site. See wetland delineation report.
- I. Approximately how many people would reside or work in the completed project?  
N/A
- J. Approximately how many people would the completed project displace?  
Nobody will be displaced by the completed project.
- K. Proposed measures to avoid or reduce displacement impacts, if any:  
None proposed.
- L. Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any:  
Compliance with the Comprehensive Plan, Development Regulations, Subdivision Code and Design Manual Regulations.

## **IX. HOUSING**

- A. Approximately how many units would be provided, if any? -0- Indicate whether it would be high, middle, or low-income housing.  
\_\_\_\_\_
- B. Approximately how many units, if any, would be eliminated? -0- Indicate whether it would be high, middle, or low-income housing.  
\_\_\_\_\_
- C. Proposed measures to reduce or control housing impacts, if any:  
Not applicable.

## **X. AESTHETICS**

- A. What is the tallest height of any proposed structure(s), not including antennas or chimneys?  
The height of the tallest structure will not exceed the zoning regulations.
- B. What views in the immediate vicinity would be altered or obstructed?  
No views in the immediate vicinity will be altered or obstructed.
- C. Proposed measures to reduce or control aesthetic impacts, if any:  
None proposed.

## **XI. LIGHT AND GLARE**

- A. What type of light or glare will the proposal produce? What time of day would it mainly occur?  
Not applicable.
- B. Could light or glare from the finished project be a safety hazard, interfere with views, or affect wildlife?  
No. Light will be directed away from on-site critical areas.
- C. What existing off-site sources of light or glare may affect your proposal?  
None.
- D. Proposed measures to reduce or control light and glare impacts, if any:  
No measures are needed. There is no impacts for light or glare.

## **XII. RECREATION**

- A. What designated and informal recreational opportunities are in the immediate vicinity?

Canterwood Golf Course.

- B. Would the proposed project displace any existing recreational uses? If so, describe.

No.

- C. Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any:

None proposed.

### **XIII. HISTORIC AND CULTURAL PRESERVATION**

- A. Are there any places or objects listed on, proposed for, or eligible for listing in national, state, or local preservation registers on or next to the site? No.

If so generally describe.

- B. Generally describe any landmarks, or evidence of historical, archaeological, scientific, or cultural importance known to be on or next to the site.

None known.

- C. Proposed measures to reduce or control impacts, if any:

None proposed.

### **XIV. TRANSPORTATION**

- A. Identify public streets and highways serving the site, and describe proposed access to the existing street system. Show on site plans, if any.

Canterwood Blvd. N.W. will serve the site.

- B. Is site currently served by public transit? If not, what is the approximate distance to the nearest transit stop?

The site is not currently served by public transit. The nearest stop is at Canterwood and Peacock Hill several miles away.

- C. How many parking spaces would the complete project have? How many would the project eliminate?

The completed project will have approximately 143 parking spaces with 26 +/- garage spaces. The proposed project will not eliminate any parking.

- D. Will the proposal require any new roads or streets, or improvements to existing roads or streets, not including driveways? If so, generally describe (indicate whether public or private).

Only internal roads will be needed to serve the site.

- E. Will the project use (or occur in the immediate vicinity of) water, or air transportation? If so, generally describe.

No.



- F. How many vehicular trips per day would be generated by the completed project?  
If known, indicate when peak volumes would occur.  
Approximately 95 pm peak hour trips will be generated. See Traffic Impact  
Analysis by Heath and Associates Dated March 6, 2006.
- G. Proposed measures to reduce or control transportation impacts, if any:  
Supplemental Traffic information provided by Health & Associates dated  
September 2008.

#### **PUBLIC SERVICES**

- A. Would the project result in an increased need for public services (for example" fire protection, police protection, health care, schools)? If so, generally describe:  
Due to the nature of the project, it is not anticipated that any additional public  
services will be necessary.
- B. Proposed measures to reduce or control direct impacts on public services, if any.  
Due to the nature of the project, it is not anticipated that any additional public  
services will be necessary.

#### **XVI. UTILITIES**

- A. Identify existing utilities by name including: electricity, natural gas, water, refuse service, telephone, sanitary sewer, septic system; other:  
The site is currently unimproved and has no existing utilities.
- B. Describe the utilities that are proposed for the project, the utility providing the service, and the general utility construction activities on the site or in the immediate vicinity which might be needed.  
Water, storm, sanitary sewer, power, gas, and telephone utilities will be needed  
for this project. See plan sheet C2.

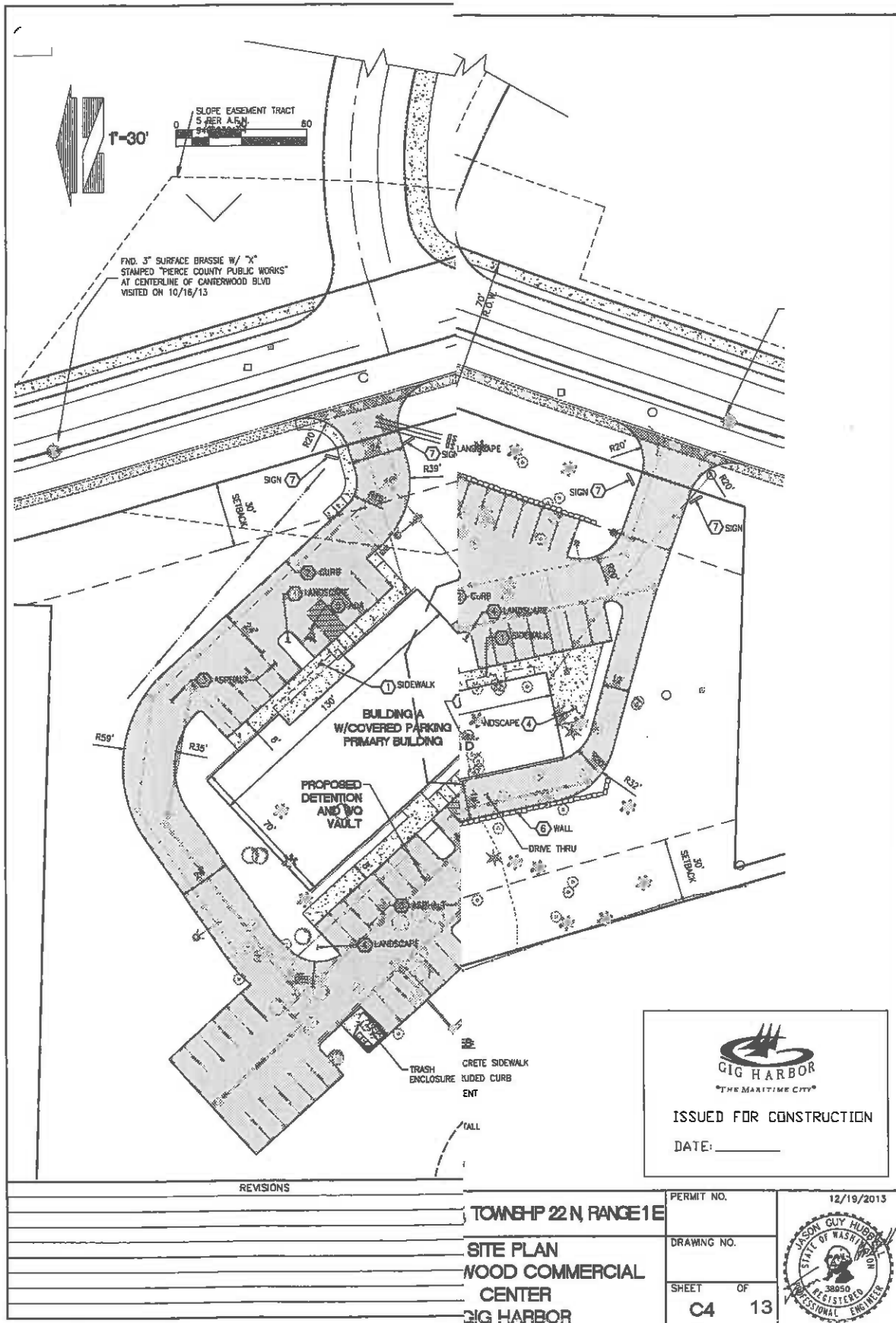
#### **SIGNATURE**

The above answers are true and complete to the best of my knowledge. I understand that the lead agency is relying on them to make its decision.

Signature: Paul Gye, BARRHAUSEN CONSULTING ENGINEERS, INC.

Date Revised Checklist Submitted: 12/20/13

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City of Gig Harbor  
Certificate of Transmittal

Routing for: (NOA) SEPA NOPH NOPM NOD Notice Date: March 19<sup>th</sup>, 2014

Project: Canterwood Commercial Planner: Kristin  
71. SPR 07-0004 / P1-Cwp 13-0002

Routed to: ☐ Public Works-Operations ☐ Building and Fire Safety  
City Depts. ☐ Public Works-Engineering ☐ Other \_\_\_\_\_

SEPA Agencies: ☐ Washington Department of Ecology, SEPA Register  
(NOA, SEPA) ☐ Washington Department of Commerce, attn: Anne Fritzel  
Electronic Mail ☐ Pierce Transit Land Use Review, attn: Kelly Haden, Monica Adams  
☐ Washington State Department of Fish & Wildlife, attn: Leonard Machut  
☐ Washington State Department of Natural Resources, attn: Rochelle Knust  
☐ Washington State Department of Archaeology and Historic Preservation, attn:  
Gretchen Kaehler  
☐ Puyallup Tribe of Indians Historic Preservation, attn: Judy Wright  
☐ Puyallup Tribe Cultural Regulatory Specialist, attn: Brandon Reynon  
☐ PenMet Parks, attn: Elaine Sorenson  
☐ Pierce County Fire District Number 5, attn: Eric Waters  
☐ Suquamish Tribal Council, attn: Dee Williams / Alison O'Sullivan  
☐ Peninsula School District, attn: Vicki Smith  
☐ Pierce County Planning and Land Services, attn: Adonais Clark  
☐ Washington State Department of Transportation, attn: Dale Severson

1<sup>st</sup> Class Mail: ☐ Squaxin Island Indian Tribe  
☐ Puyallup Tribal Fisheries, attn: Jeff Thomas

Other Parties: ☒ Applicant/Owner/Agent (NOA) (NOPH, NOPM, SEPA, NOD)  
1<sup>st</sup> Class Mail ☒ DRB (NOA for Non-residential, Multi-family, Subdivisions, Public Projects)  
☒ Parks Commission via Terri Reed (NOA)  
☒ Property Owners within 300 feet of site: attached list (NOA, SEPA, NOPH, NOPM,  
NOD for Type II permits only)  
☐ Parties of Record: attached list (NOPH, NOPM, NOD)  
☐ Pierce County (NOA for Plats adjacent to City Limits)  
☐ Pierce County Assessor-Treasurer (NOD)  
☐ WA Transportation Secretary (NOA for Plats adj. to State ROW, or within 2 miles of  
Airport—approximately any plats south of Pioneer/Wollochet interchange)  
☐ Other \_\_\_\_\_

I certify under penalty of perjury under the laws of the State of Washington that on March 19,  
20 14, I transmitted a copy of NOA to the individuals identified above by  
first-class mail, postage-prepaid, inter-office routing or electronic mail, as specified above.

Signed this 19<sup>th</sup> day of March, 20 14 at Gig Harbor, Washington.

Signature Meagan Sabiani  
Printed Name Meagan Fabiani

(1 0122254024 5900)  
PURDY INVESTMENTS LLC  
11515 BURNHAM DR NW STE B  
GIG HARBOR, WA, 98332-8543

(2 0122254025 5900)  
PURDY INVESTMENTS LLC  
11515 BURNHAM DR NW STE B  
GIG HARBOR, WA, 98332-8543

(3 0122254028 6380)  
WORLUND THOMAS J & ALLISON R  
1180 E OLD RANCH RD  
ALLYN, WA, 98524-8754

(4 0122254051 9100)  
GIG HARBOR NORTH ANNEX LLC  
6622 WOLLOCHET DR NW  
GIG HARBOR, WA, 98335-8325

(5 0122254062 9100)  
J SCOTT CONSTRUCTION COMPANY INC  
1830 112TH ST E STE F  
TACOMA, WA, 98445-3747

(6 0122254065 9100)  
PARR GARY R  
3573 E L ST  
TACOMA, WA, 98404-3823

(7 0122254073 9100)  
GIG HARBOR NORTH ANNEX LLC  
6622 WOLLOCHET DR NW  
GIG HARBOR, WA, 98335-8325

(8 0122254088 6380)  
WORLUND THOMAS J & ALLISON R  
1180 E OLD RANCH RD  
ALLYN, WA, 98524-8754

(9 0122254089 9170)  
PURDY INVESTMENTS LLC  
11515 BURNHAM DR NW STE B  
GIG HARBOR, WA, 98332-8543

(10 0122254090 9100)  
SWEDE HILL LLC  
PO BOX 1693  
TACOMA, WA, 98401-1693

(11 0122258007 6100)  
D & M MORRIS FAMILY LLC  
11515 BURNHAM DR NW STE B  
GIG HARBOR, WA, 98332-8543

(12 0122258008 6500)  
BURNHAM PARTNERS LLC  
11515 BURNHAM DR NW STE B  
GIG HARBOR, WA, 98332-8543

(13 3001140010 6510)  
FRANCISCAN HEALTH SYSTEM WEST  
1149 MARKET ST  
TACOMA, WA, 98402-3515



# Canterwood Commercial NOA

## Legend

### Highlighted Tax Parcels

#### Tax Parcels

#### Base Parcel

#### Condominium

#### Other

#### Roads

#### Interstate

#### Limited Access State

#### Routes

#### Other State Routes

#### Ramps

#### Major Arterial

#### Collector

#### Local Access

#### Pierce County Basemap

#### Unincorporated County

#### Tacoma

#### Lakewood, Edgewood,

#### Bonney Lake, Buckley,

#### South Prairie

#### Stellacoom, Fircrest, Fife,

#### Gig Harbor, Orting,

#### Eatonville, Roy, Carbonado,

#### Wilkeson, Mt Rainier

#### University Place, Puyallup,

#### Auburn

#### DuPont, Milton, Sumner

#### Fort Lewis, McChord, McNeil

#### Island

#### Water

PL-SPR-07-0004

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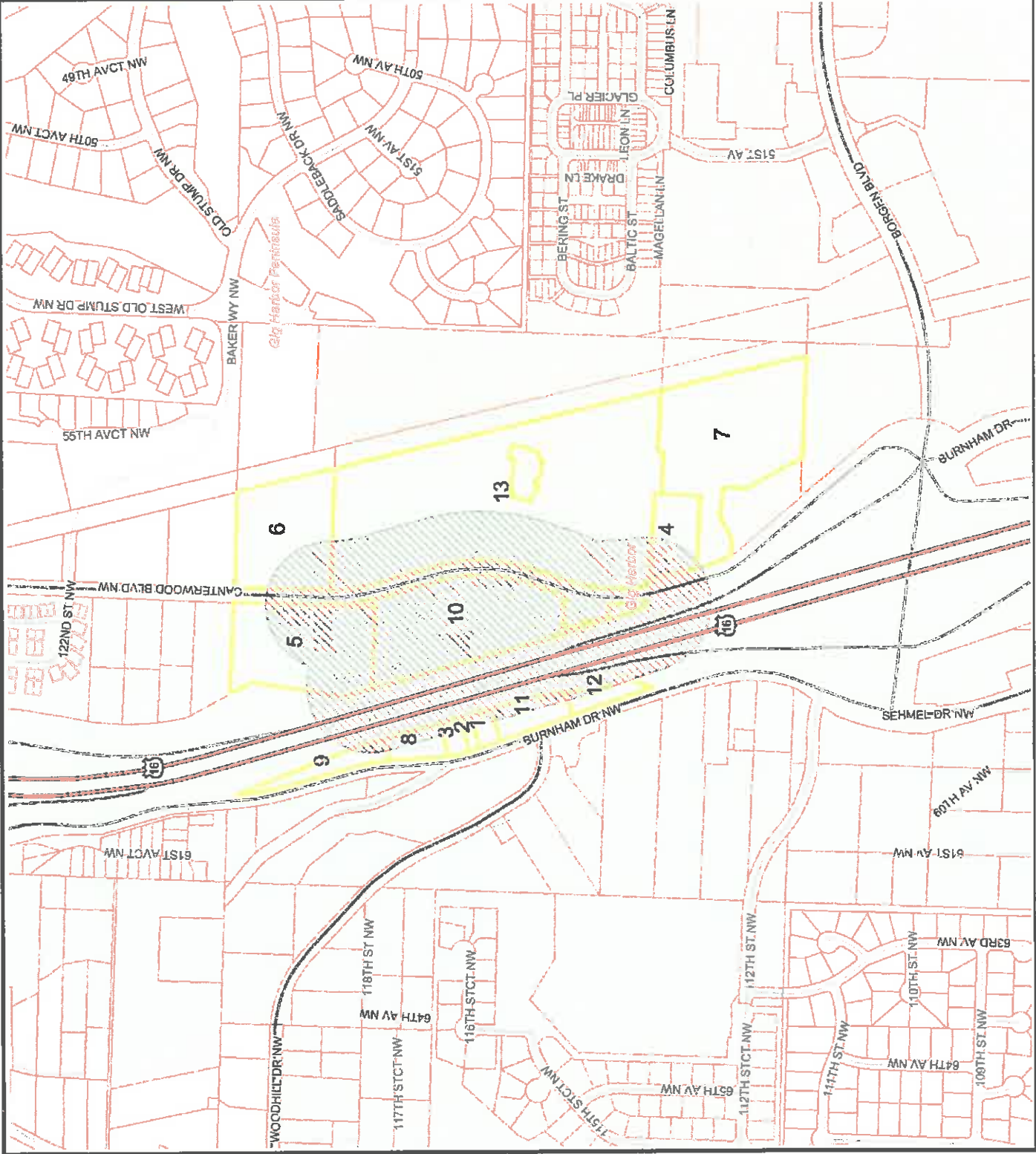
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0 325 650 ft.

A



"THE MARITIME CITY"



The map features are approximate and are intended only to provide an indication of said feature. Additional areas that have not been mapped may be present. This is not a survey. Orthophotos may not align with other data. Pierce County assumes no liability for variations ascertained by actual survey. All data is expressly provided AS IS and WITH ALL FAULTS. Pierce County makes no warranty of fitness for a particular purpose.

**City of Gig Harbor  
Certificate of Transmittal**

Routing for:

(NOA SEPA NOPH NOPM NOD

Notice Date: March 19<sup>th</sup>, 2014

Project: Centerbrook Commercial Planner: Kristin  
PI-SPIZ-07-0004 / PI-LUP-13-0002

Routed to:  
City Depts.

☐ Public Works-Operations  
☐ Public Works-Engineering

☐ Building and Fire Safety  
☐ Other \_\_\_\_\_

SEPA Agencies:  
(NOA, SEPA)  
Electronic Mail

- ☐ Washington Department of Ecology, SEPA Register
- ☐ Washington Department of Commerce, attn: Anne Fritzel
- ☐ Pierce Transit Land Use Review, attn: Kelly Haden, Monica Adams
- ☐ Washington State Department of Fish & Wildlife, attn: Leonard Machut
- ☐ Washington State Department of Natural Resources, attn: Rochelle Knust
- ☐ Washington State Department of Archaeology and Historic Preservation, attn: Gretchen Kaehler
- ☐ Puyallup Tribe of Indians Historic Preservation, attn: Judy Wright
- ☐ Puyallup Tribe Cultural Regulatory Specialist, attn: Brandon Reynon
- ☐ PenMet Parks, attn: Elaine Sorenson
- ☐ Pierce County Fire District Number 5, attn: Eric Waters
- ☐ Suquamish Tribal Council, attn: Dee Williams / Alison O'Sullivan
- ☐ Peninsula School District, attn: Vicki Smith
- ☐ Pierce County Planning and Land Services, attn: Adonais Clark
- ☐ Washington State Department of Transportation, attn: Dale Severson

1<sup>st</sup> Class Mail:

- ☐ Squaxin Island Indian Tribe
- ☐ Puyallup Tribal Fisheries, attn: Jeff Thomas

Other Parties:  
1<sup>st</sup> Class Mail

- ☐ Applicant/Owner/Agent (NOA, NOPH, NOPM, SEPA, NOD)
- ☐ DRB (NOA for Non-residential, Multi-family, Subdivisions, Public Projects)
- ☐ Parks Commission via Terri Reed (NOA)
- ☐ Property Owners within 300 feet of site: attached list (NOA, SEPA, NOPH, NOPM, NOD for Type II permits only)
- ☐ Parties of Record: attached list (NOPH, NOPM, NOD)
- ☐ Pierce County (NOA for Plats adjacent to City Limits)
- ☐ Pierce County Assessor-Treasurer (NOD)
- ☐ WA Transportation Secretary (NOA for Plats adj. to State ROW, or within 2 miles of Airport—approximately any plats south of Pioneer/Wollochet interchange)
- ☒ Other Gateway

Sent to Gateway 3/17/14 for publish on 3/19/14

I certify under penalty of perjury under the laws of the State of Washington that on March 19<sup>th</sup>, 2014, I transmitted a copy of NOD to the individuals identified above by first-class mail, postage-prepaid, inter-office routing or electronic mail, as specified above.

Signed this 17<sup>th</sup> day of March, 2014 at Gig Harbor, Washington.

Signature

Cynthia E. Baker

Printed Name

Cynthia E. Baker

**Andrews, Cindy**

---

**From:** Obits, Tac <obitlegalads+canned.response@thenewstribune.com>  
**Sent:** Monday, March 17, 2014 7:58 AM  
**To:** Andrews, Cindy  
**Subject:** Re: Notices for publication

**This is an automated response from the News Tribune, Tacoma, Washington email system to inform you that your email has been received by our server.**

All notices submitted for publication are confirmed directly either by telephone or email. Charges and payments must be approved and authorized prior to publication of all notices. Notices will not be published without authorization.

Our normal office hours are 8am – 4pm Monday through Friday. If you have not been contacted with a quote and/or a request for payment by 2:30 p.m. or prior to the deadline during normal office hours, please contact our office at (253) 597-8605.

Herald obituaries and News Tribune obituaries to run Saturday, Sunday, or Monday deadline at 3pm the prior Friday. Peninsula Gateway obituary notices deadline at noon on Monday.

News Tribune legal notices deadline at noon the day prior to publication. News Tribune legal notices for Sunday or Monday deadline at 2pm the prior Friday.

**Herald and Gateway legal notices deadline at noon on Monday.**

Notices received after the deadline will be set up for the next available edition.

### **Obituaries and Legals**

**The News Tribune   The Puyallup Herald   The Peninsula Gateway**

**[obitlegalads@thenewstribune.com](mailto:obitlegalads@thenewstribune.com)**

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**[www.thenewstribune.com](http://www.thenewstribune.com)**

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**Payor Account**  
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**Customer Address**  
3510 GRANDVIEW ST,  
GIG HARBOR WA 98335-1214 USA

**Payor Address**  
3510 GRANDVIEW ST,  
GIG HARBOR WA 98335-1214 USA

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2

**Net Amount**  
\$127.04

**Tax Amount**  
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**Total Amount**  
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**Payment Amt**  
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**Amount Due**  
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**Placement/Classification**

**Run Dates**

**Run Schedule Invoice Text**

TAC-GW-Gateway:Print

0300 - Legals Classified

3/19/2014

CITY OF GIG HARBOR NOTICE OF APPLICATION March 19, 2014

1

\$127.04

## CITY OF GIG HARBOR NOTICE OF APPLICATION March 19, 2014

### Canterwood Commercial Project Type III Permit

Permit Number(s): PL-SPR-07-0004, PL-CUP-13-0002, PL-DRB-07-0013, and PL-SEPA-07-0060  
Date Application was Submitted: December 20, 2013, March 3, 2006  
Date of Notice of Complete Application: February 14, 2014

Name of Applicant: Paul Cyr, Barghausen Consulting Engineers INC, 18215 72ND Avenue South, Kent WA 98032

Project Location: Located on Canterwood Blvd, across the street from St. Anthony's Hospital at approximately 10700 Canterwood Blvd. Sec 25, Tw 22, R 1.

Description of Proposed Project: The proposal includes construction of 4 commercial buildings totaling 28,120 square feet of floor area and associated parking. Drive-through facilities are proposed on three of the buildings. Project also includes temporary and permanent wetlands and stream impacts with related mitigation.

Project Permits Included with Application: Site Plan Review, Design Review, Conditional Use Permit and SEPA threshold determination. Further Studies Being Required by Applicable Official: None at this time.

Other Required Permits Not Included in Application: Clearing/Grading approval, NPDES permit, CWA Section 404 and 401, HPA, Civil Permit, and building permits.

Existing Environmental Documents which Evaluate Proposed Project:

SEPA Environmental Checklist, dated December 20, 2013;

Preliminary Drainage Control Plan, prepared by Karen Harris, Barghausen, dated December 19, 2013; Geotechnical Engineering Report prepared by GeoResources LLC, dated January 31, 2013; Water Hydraulic Report prepared by Karen Harris, Barghausen, dated January 18, 2014; Sewer Hydraulic Report prepared by Karen Harris, Barghausen, dated January 13, 2014; Level 1 Traffic Impact Analysis by Heath and Associates INC, dated January 2014 and Wetland Delineation and Habitat Assessment report, and Conceptual Mitigation Plan prepared by Soundview Consultants, dated December 2013.

Tentative Public Meeting or Public Hearing Date: A hearing date has not been scheduled for this application.

Documents pertinent to this application are available for review and inspection at the City of Gig Harbor Planning Department, 3510 Grandview Street, Gig Harbor, WA 98335, during normal business hours, Monday through Friday. An open record public hearing will be held on this project at this time the hearing has not been scheduled. A copy of the staff report on this project proposal will be available seven days prior to the public hearing. Interested persons may comment on the above stated application, or may request any notice of public hearing or a copy of the decision on this application, or participate in any public hearings. Requests for notification or written comments must be submitted to the Planning Department by no later than April 3, 2014. All public comments or requests must be received at the Planning Department by no later than 5:00pm on the last date of the comment period.

Questions regarding the above stated application should be made to Kristin Moerler, Associate Planner, City of Gig Harbor Planning Department, 3510 Grandview St., Gig Harbor, WA 98335, or by calling 851-6170. Additional permit information can also be found at [permitportal.cityofgigharbor.net](http://permitportal.cityofgigharbor.net) by entering the above permit numbers.

AFFIDAVIT OF POSTING

STATE OF WASHINGTON }  
COUNTY OF PIERCE } SS  
CITY OF GIG HARBOR }

RECEIVED BY  
MAR 19 2014  
CITY OF GIG HARBOR

I, Mark Schafer  
, being duly sworn, depose and say, that I posted the property described  
below in a conspicuous location on the site as required by Gig Harbor  
Municipal Code section 19.03 on March 19  
2014.

Project name: SWED HILL, LLC - CANTERWOOD COMMERCIAL

Address: XXX SR16 HWY W + CANTERWOOD BLVD.

Parcel Number: 0122254090

Mark Schafer  
Signature Date 3/19/2014

Mailing  
Address: 18215 72<sup>nd</sup> Ave S.  
Kent, WA 98032

Subscribed and sworn to before me this 19<sup>th</sup> day of March,  
2014.



Nancy L. Scott  
Notary Public in and for the  
STATE OF WASHINGTON  
residing at Kent

RECEIVED BY  
MAR 19 2014  
CITY OF GIG HARBOR







**NOTICE OF APPLICANT'S PLAN**

**Project Description**  
The proposed project is a new residential development consisting of 10 single-family homes. The homes will be built on a 2.5-acre lot located on the east side of the town. The development will include a new road, a new water line, and a new sewer line. The project is expected to be completed by the end of 2023.

**Map**  
A map of the project area is attached to this notice. The map shows the location of the project relative to the surrounding roads and property lines.

**Environmental Assessment**  
An environmental assessment has been conducted for this project. The assessment found that the project is unlikely to have a significant impact on the environment. However, there are some potential impacts that should be monitored during construction and operation.

**Public Hearing**  
A public hearing will be held on the proposed project on [date]. The hearing will be held at the town hall. Anyone who is interested in the project is encouraged to attend the hearing and provide input.





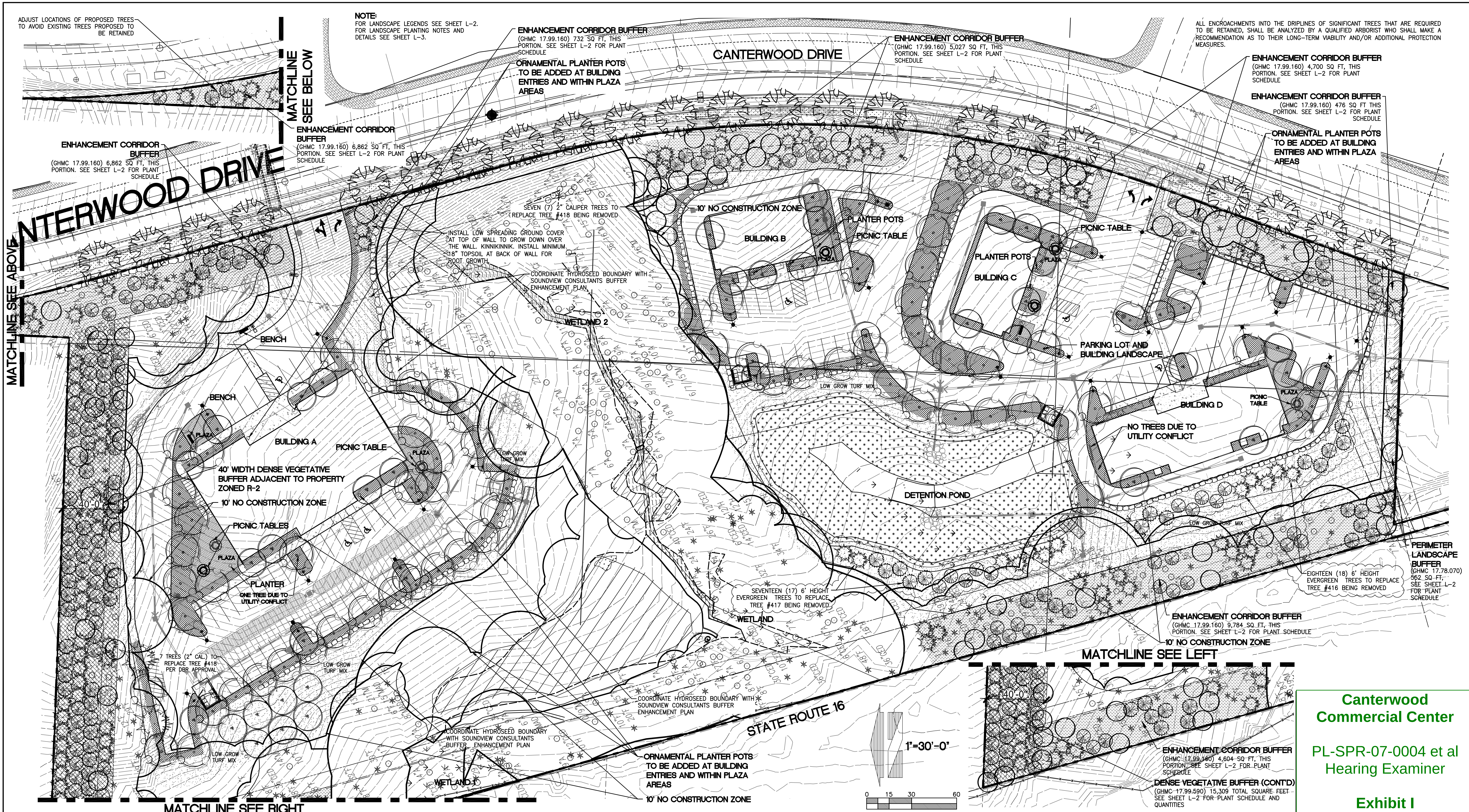












| REVISIONS |            |                                               |  |
|-----------|------------|-----------------------------------------------|--|
| 4         | 10/29/2018 | REVISED PER COMMENTS                          |  |
| 5         | 4/2/2019   | REVISED PER COMMENTS                          |  |
| 6         | 9/26/2019  | REVISED WETLAND CREATION AREA                 |  |
| 7         | 10/16/2019 | PLANT MATERIAL AT TOP OF ROCK WALLS           |  |
| 8         | 5/22/2020  | REVISED PER COMMENTS                          |  |
| 9         | 10/21/2020 | REVISED PER COMMENTS                          |  |
| 10        | 1/21/2021  | REVISED PER CITY REVIEW COMMENTS JANUARY 2021 |  |
| 11        | 3/11/2021  | REVISED, TREES #416 AND #417                  |  |



**BARGHAUSEN CONSULTING ENGINEERS INC.**  
18215 72ND AVENUE SOUTH  
KENT, WA 98032  
(425)251-6222  
(425)251-8782 FAX

DESIGNED BY: JMV  
DRAWN BY: JMV  
CHECKED BY: KEH  
APPROVED BY: JGH  
SCALE:  
OTHER:

**SWEDE HILL, LLC**  
P.O. BOX 1397  
TACOMA, WA 98401

**PRELIMINARY LANDSCAPE PLAN**  
  
**CANTERWOOD COMMERCIAL CENTER**  
**GIG HARBOR**

PERMIT NO.  
DRAWING NO.  
SHEET L-1 OF 8

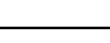


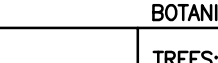
**Canterwood Commercial Center**  
**PL-SPR-07-0004 et al**  
**Hearing Examiner**  
**Exhibit I**



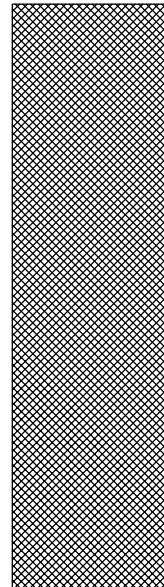
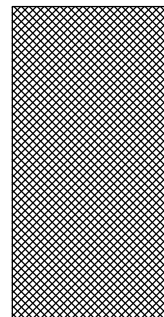
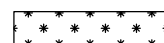
## PARKING LOT AND BUILDING LANDSCAPE PLANT MATERIAL LEGEND

### PLANT SCHEDULE FOR 'ENHANCEMENT CORRIDOR' BUFFER

| SYMBOL                                                                              | BOTANICAL / COMMON NAMES                                                                                                                                                                                                                                                       | SIZE<br>CONDITION | SPACING  | QUANTITY | REMARKS                                                                                    |
|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|----------|----------|--------------------------------------------------------------------------------------------|
|  | <u>PARKING LOT TREES:</u><br><br>ACER RUBRUM 'BOWHALL' /<br>BOWHALL MAPLE<br><br>CORNUS KOUSA /<br>KOUSA DOGWOOD<br><br>CERCIS CANADENSIS 'FOREST PANSY' /<br>FOREST PANSY REDBUD<br><br>CERCIDIPHYLLUM JAPONICUM /<br>KATSURA TREE<br><br>0% OF THE PROPOSED SPECIES ARE FROM | 2" CAL.<br>B & B  | 20' O.C. | 73       | STAKE & GUY ONE GROWING<br>SEASON; NURSERY GROWN<br>FOR STREET TREE USE,<br>BRANCHED AT 6' |

| SYMBOL                                                                              | BOTANICAL / COMMON NAMES                                                                                                                                                                                                                                           | SIZE<br>CONDITION                      | SPACING | QUANTITY                                                                                | REMARKS                                                                                                                                                                                                                                                                                                 |
|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|---------|-----------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <b>TREES:</b><br><br>PICEA SITCHENSIS / SITKA SPRUCE<br>PSEUDOTSUGA MENZIESII / DOUGLAS FIR<br>PINUS CONTORTA / SHORE PINE<br>TREX PLICATA / WESTERN RED CEDAR<br>ACER CIRCONUTUM / VINE MAPLE<br>PRUNUS EMARGINATA / BITTER CHERRY<br>FRAXINUS LUTEA / COMMON ASH | 2" CAL.<br>B & B<br>6"-7" HT.<br>B & B |         | TOTAL 171<br>SEASON FULL AND MATURING;<br>DECIDUOUS<br>TREES TO<br>REPLACE<br>TREE #418 | STAKE & GUY ONE GROWING<br>EVERTHREE TREES TO HAVE<br>SINGLE UN-CUT LEADER. SPACING<br>OF TREES WILL VARY DEPENDING<br>ON THE SPECIES CHOSEN<br><br>PER GHMC 17.78.070:<br>ONE TREE (2" CAL. DECIDUOUS,<br>MT. EVERGREEN) SHALL BE PROVIDED<br>FOR EVERY 200 SQUARE FEET<br>34,254 SF / 200 = 171 TREES |

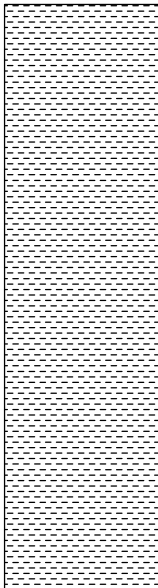
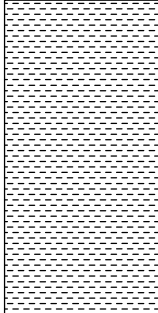
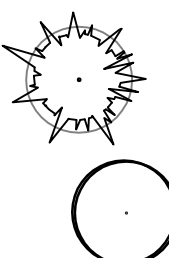
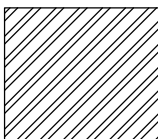
|  |                                             |  |  |  |  |  |  |
|--|---------------------------------------------|--|--|--|--|--|--|
|  | <p><u>SMALL TREES ADJACENT TO BLDG:</u></p> |  |  |  |  |  |  |
|--|---------------------------------------------|--|--|--|--|--|--|

|                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                  |                                                                                                                                                                                                                                                                                                                                               |
|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    | <p>ACER CIRCINATUM /<br/>VINE MAPLE</p> <p>ACER PALMATUM "BLOODGOOD" /<br/>SMALL JAPANESE MAPLE</p> <p>50% OF THE PROPOSED SPECIES ARE FROM<br/>THE "PREFERRED SPECIES LIST"</p> <p><u>PARKING LOT AND BUILDING SHRUBS:</u></p> <p>RHODODENDRON MACROPHYLLUM /<br/>PACIFIC RHODODENDRON</p> <p>HOLDISCUS DISCOLOR /<br/>OCEANSPRAY</p> <p>MAHONIA AQUIFOLIUM /<br/>OREGON GRAPE</p> <p>MYRTICA CALIFORNICA /<br/>PACIFIC WAX MYRTLE</p> <p>MAHONIA NERVOSA /<br/>LOW OREGON GRAPE</p> <p>SYMPHORICARPOS ALBUS /<br/>COMMON SNOWBERRY</p> <p>RIBES SANGUINEUM /<br/>RED FLOWERING CURRENT</p> <p>ROSA NUTKANA /<br/>NOOTKA ROSE</p> <p>VACCINIUM OVATUM /<br/>EVERGREEN HUCKLEBERRY</p> <p>100% OF SPECIES ARE FROM THE "PREFERRED<br/>SPECIES LIST"</p> <p><u>PARKING LOT AND BUILDING GROUNDCOVERS:</u></p> <p>ARTICHOSTAPHYLOS UVA-URSI /<br/>BARBERRY KINNICKINICK</p> <p>FRAGARIA CHILOENSIS /<br/>DUNE STRAWBERRY</p> <p>BLECHNUM SPICANT /<br/>DEER FERN</p> <p>MAHONIA REPENS /<br/>CREEPING MAHONIA</p> <p>POLYSTICHUM MINUTUM /<br/>WESTERN SWORD FERN</p> <p>100% OF SPECIES ARE FROM THE "PREFERRED<br/>SPECIES LIST"</p> <p>DETENTION AND WATER QUALITY POND<br/>STORAGE SLOPE SEED MIX</p> | <p>2" CAL.<br/>B &amp; B</p> <p>20" O.C.</p> <p>MIN. 5 GAL.</p> <p>APPX. 600</p> <p>1 GALLON</p> | <p>FULL AND MATCHING</p> <p>SEE PLANTING PLAN FOR TREES<br/>TO REPLACE TREE #418<br/>(7 VINE MAPLE, 2" CAL.)</p> <p>FULL AND BUSHY; SPACING<br/>WILL VARY BASED ON THE<br/>SPECIES OF SHRUB<br/>SPECIFIED. THE MATURE WIDTH<br/>VARIES</p> <p>FULL AND BUSHY. SPACING<br/>OF GROUND COVER TO COVER<br/>75% OF AREA WITHIN THREE<br/>YEARS</p> |
|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                  |                                                                                                                                                                                                                                                                                                                                               |
|   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                  |                                                                                                                                                                                                                                                                                                                                               |
|  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                  |                                                                                                                                                                                                                                                                                                                                               |

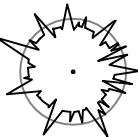
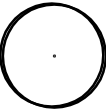
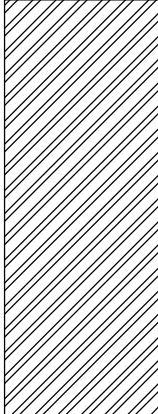
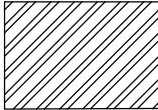
PER GHMC 17.78.080(A)(1), FIVE FEET OF PERIMETER LANDSCAPING IS REQUIRED BETWEEN PARKING LOTS AND BUILDINGS. THE STRIP SHALL ACT AS A VISUAL SCREEN THROUGH THE INSTALLATION OF VEGETATION AT LEAST THREE FEET IN HEIGHT, A FENCE OR WALL COMBINED WITH LOW PLANTINGS AND CLIMBERS, OR A THREE FOOT HIGH BEEM COVERED WITH VEGETATION. THE STRIP SHALL ALSO CONTAIN A CONTINUOUS TREE CANOPY WITH TREES SPACED 20 FEET ON CENTER.

PER GHMC 17.78.080(A)(3), LANDSCAPING SHALL BE ADDED AROUND THE PERIMETER OF THE PARKING LOTS. IN ADDITION TO THE OTHER PROVISIONS OF THIS SECTION, A CONTINUOUS CANOPY OF TREES PLACED 20 FEET ON CENTER SHALL BE PLANTED AROUND THE PERIMETER OF PARKING AREAS.

PER GHMC 17.99.160(F), ALL PROMINENT FACADES ARE REQUIRED TO MEET THE DESIGN CRITERIA PROVISIONS FOR PROMINENT FACADES WITHIN THE ENHANCEMENT CORRIDOR. A PROMINENT FACADE IS DEFINED AS THOSE FACADES THAT CAN BE SEEN FROM PUBLIC RIGHTS-OF-WAY AND WATERWAYS OR THOSE THAT FACE THE ROAD PROVIDING PRIMARY ACCESS TO THE BUILDING.

| SYMBOL                                                                                |  | BOTANICAL / COMMON NAMES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | SIZE<br>CONDITION                                                                             | SPACING | QUANTITY                      | REMARKS                                                                                                                                                                                                                                                               |
|---------------------------------------------------------------------------------------|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|---------|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    |  | <p><u>SHRUBS:</u></p> <p>CORNUS SERICA V. STOLONIFERA /<br/>RED-OSIER DOGWOOD</p> <p>OEMLERIA CERASIFORMIS / INDIAN PLUM</p> <p>RHOODENDRON MACROPHYLLUM /<br/>PACIFIC RHOODENDRON</p> <p>PHYSOCARPUS CAPITATUS / PACIFIC NINEBARK</p> <p>RIBES SANGUINEUM / RED FLOWERING CURRENT</p> <p>ROSA NUTKANA / NOOTKA ROSE</p> <p>RUBUS PARVIFLORUS / THIMBLEBERRY</p> <p>VACCINIUM OVATUM / EVERGREEN HUCKLEBERRY</p> <p>100% OF SPECIES ARE FROM THE 'PREFERRED SPECIES LIST'</p>                                                                                                                                                                                                                                                                                                                                             | MIN 5 GAL.                                                                                    | 5' O.C. | 513                           | <p>FULL AND BUSHY</p> <p>PER GHMC 17.78.070:<br/>THREE SHRUBS WHICH WILL ATTAIN 3.5' WITHIN THREE YEARS SHALL FOR EVERY 200 SQUARE FEET<br/>34,254 SF / 200 = 171 X 3</p>                                                                                             |
|    |  | <p><u>GROUNDCOVERS:</u></p> <p>ARCTOSTAPHYLOS UVA-URSII /<br/>BEARBERRY KIWANINKWICK</p> <p>NOTE: INSTALL AT TOP OF ROCK RETAINING WALLS AS SHOWN. IN AREAS THAT ARE MORE SHADY, INSTALL WILLOWLEAF COTONEASTER</p> <p>MAHONIA REPENS /<br/>CREEPING MAHONIA</p> <p>BLECHNUM SPICANT /<br/>DEER FERN</p> <p>POLYSTICHUM MUNITUM /<br/>WESTERN SWORD FERN</p> <p>100% OF SPECIES ARE FROM THE 'PREFERRED SPECIES LIST'</p> <p>PER GHMC 17.99.160:<br/>1. SEMI-TRANSPARENT SCREENS MUST PROVIDE AT LEAST 70 PERCENT YEAR-ROUND FOLLAGE COVERAGE DISTRIBUTED EVENLY ACROSS THE VIEW ALONG THE SR 16 RIGHT-OF-WAY AND 50 PERCENT COVERAGE ALONG THE CANTERWOOD BLVD RIGHT-OF-WAY. SEMI-TRANSPARENT SCREENS MAY CONSIST OF NEW VEGETATION ONLY IF HEALTHY EXISTING VEGETATION IS NOT ADEQUATE TO FULFILL THIS REQUIREMENT.</p> | 1 GALLON                                                                                      |         |                               | <p>FULL AND BUSHY. SPACING OF GROUND COVER TO COVER 75% OF AREA WITHIN THREE YEARS</p>                                                                                                                                                                                |
| <h2>PLANT SCHEDULE FOR 'PERIMETER LANDSCAPE BUFFER'</h2>                              |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                               |         |                               |                                                                                                                                                                                                                                                                       |
| SYMBOL                                                                                |  | BOTANICAL / COMMON NAMES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | SIZE<br>CONDITION                                                                             | SPACING | QUANTITY                      | REMARKS                                                                                                                                                                                                                                                               |
|  |  | <p><u>TREES:</u></p> <p>TRUAX PLICATA /<br/>WESTERN RED CEDAR</p> <p>FRAXINUS LATIFOLIA /<br/>OREGON ASH</p> <p><u>SHRUBS:</u></p> <p>CORNUS SERICA V. STOLONIFERA /<br/>RED-OSIER DOGWOOD</p> <p>PHYSOCARPUS CAPITATUS /<br/>PACIFIC NINEBARK</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <p>2" CAL.<br/>B &amp; B<br/>6'-7" HT.<br/>B &amp; B</p> <p>1 GALLON<br/>AND<br/>3 GALLON</p> | 5' O.C. | <p>TOTAL 3</p> <p>TOTAL 9</p> | <p>STAKE &amp; GUY ONE GROWING SEASON; FULL AND MATCHING; EVERGREEN TREES TO HAVE SINGLE UN-CUT LEADER. SPACING OF TREES WILL VARY DEPENDENT ON THE SPECIES CHOSEN</p> <p>552 SQUARE FEET OF LANDSCAPE BUFFER SHOWN</p> <p>3 TREES REQUIRED</p> <p>FULL AND BUSHY</p> |
|  |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                               |         |                               |                                                                                                                                                                                                                                                                       |

### PLANT SCHEDULE FOR 'PERIMETER LANDSCAPE BUFFER

| SYMBOL                                                                                | BOTANICAL / COMMON NAMES                                  | SIZE<br>CONDITION                      | SPACING | QUANTITY | REMARKS                                                                                                                                                                    |
|---------------------------------------------------------------------------------------|-----------------------------------------------------------|----------------------------------------|---------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <u>TREES:</u><br><br>THUJA PLICATA /<br>WESTERN RED CEDAR | 2" CAL.<br>B & B<br>6'-7' HT.<br>B & B |         | TOTAL 3  | STAKE & GUY ONE GROWING<br>SEASON; FULL AND WATCHING;<br>EVERGREEN TREES TO HAVE<br>SINGLE UN-CUT LEADER. SPACING<br>OF TREES WILL VARY DEPENDING<br>ON THE SPECIES CHOSEN |
|  | FRAXINUS LATIFOLIA /<br>OREGON ASH                        |                                        |         |          | 552 SQUARE FEET OF LANDSCAPE<br>BUFFER SHOWN<br><br>3 TREES REQUIRED                                                                                                       |
|                                                                                       | <u>SHRUBS:</u>                                            |                                        |         |          |                                                                                                                                                                            |
|  | CORNUS SERICA V. STOLONIFERA /<br>RED-OSIER DOGWOOD       | 1 GALLON<br>AND<br>3 GALLON            | 5' O.C. | TOTAL 9  | FULL AND BUSHY                                                                                                                                                             |
|                                                                                       | PHYSCARPUS CAPITATUS /<br>PACIFIC NINEBARK                |                                        |         |          |                                                                                                                                                                            |
|                                                                                       | RIBES SANGUINEUM /<br>RED FLOWERING CURRENT               |                                        |         |          |                                                                                                                                                                            |
|                                                                                       | ROSA NUTKANA /<br>NOOTKA ROSE                             |                                        |         |          |                                                                                                                                                                            |
|                                                                                       | RUBUS PARVIFLORUS /<br>THIMBLEBERRY                       |                                        |         |          |                                                                                                                                                                            |
|                                                                                       | VACCINIUM OVATUM /<br>EVERGREEN HUCKLEBERRY               |                                        |         |          |                                                                                                                                                                            |
|                                                                                       | 100% OF SPECIES ARE FROM THE 'PREFERRED<br>SPECIES LIST'  |                                        |         |          |                                                                                                                                                                            |
|                                                                                       | <u>GROUNDCOVERS:</u>                                      |                                        |         |          |                                                                                                                                                                            |
|  | MAHONIA REPENS /<br>CREEPING MAHONIA                      | 1 GALLON                               |         |          | FULL AND BUSHY. SPACING<br>OF GROUND COVER TO COVER<br>75% OF AREA WITHIN THREE<br>YEARS                                                                                   |
|                                                                                       | POLYSTICHUM MUNITUM /<br>WESTERN SWORD FERN               |                                        |         |          |                                                                                                                                                                            |
|                                                                                       | 100% OF SPECIES ARE FROM THE 'PREFERRED<br>SPECIES LIST'  |                                        |         |          |                                                                                                                                                                            |

PER GHMC 17.78.070:

1. ONE DECIDUOUS TREE A MINIMUM OF TWO-INCH CALIPER OR ONE SIX-FOOT EVERGREEN TREE SHALL BE PLANTED FOR EVERY 200 SQUARE FEET OF AREA TO BE ENHANCED OR PLANTED. THREE SHRUBS WHICH WILL ATTAIN A HEIGHT OF 3.5' WITHIN THREE YEARS SHALL BE PROVIDED FOR EVERY 200 SQUARE FEET.
2. MINIMUM 40% OF REQUIRED TREES TO BE EVERGREEN TREE MINIMUM 6' HEIGHT

The logo for Barghausen Consulting Engineers Inc. is a circular emblem. The word "BARGHAUSEN" is written in a bold, sans-serif font along the top arc of the circle. The words "CONSULTING ENGINEERS INC." are written along the bottom arc. The center of the logo features a stylized compass rose with eight points, each ending in a small circle. The entire logo is rendered in black and white. To the right of the logo, the company name "BARGHAUSEN CONSULTING ENGINEERS INC." is printed in a large, bold, sans-serif font. Below this, a horizontal line separates the header from the address. The address is listed in a smaller, sans-serif font: "18215 72ND AVENUE SOUTH", "KENT, WA 98032", "(425)251-6222", and "(425)251-8782 FAX".



18215 72ND AVENUE SOUTH  
KENT, WA 98032  
(425)251-6222  
(425)251-8782 FAX

|              |     |
|--------------|-----|
| DESIGNED BY: | JMV |
| DRAWN BY:    | JMV |
| CHECKED BY:  | KEH |
| APPROVED BY: | JGH |
| SCALE:       |     |
| OTHER:       |     |

**SWEDE HILL, LLC**  
**P.O. BOX 1397**  
**TACOMA, WA 98401**

## PRELIMINARY LANDSCAPE LEGENDS

CANTERWOOD COMMERCIAL  
CENTER  
GIG HARBOR

|  |             |
|--|-------------|
|  | PERMIT NO.  |
|  | DRAWING NO. |
|  | SHEET OF    |
|  | L-2 8       |





LANDSCAPE PLANTING NOTES AND MATERIALS

SCOPE OF WORK

FURNISH ALL MATERIALS, LABOR, EQUIPMENT AND RELATED ITEMS NECESSARY TO ACCOMPLISH TOPSOIL, TREATMENT AND PREPARATION OF SOIL, FINISH GRADING, PLACEMENT OF SPECIFIED PLANT MATERIALS, FERTILIZER, STAKING, MULCH, CLEAN-UP, DEBRIS REMOVAL, AND 90-DAY MAINTENANCE.

QUALIFICATIONS:  
LANDSCAPE CONTRACTOR TO BE SKILLED AND KNOWLEDGEABLE IN THE FIELD OF WORK AND HAVE A MINIMUM OF FIVE (5) YEAR'S EXPERIENCE INSTALLING SIMILAR WORK. CONTRACTOR TO BE LICENSED TO PERFORM THE WORK SPECIFIED WITHIN THE PRESIDING JURISDICTION.

JOB CONDITIONS:  
IT IS THE CONTRACTOR'S RESPONSIBILITY TO REVIEW THE SITE AND REPORT ANY DISCREPANCIES TO THE OWNER OR THE OWNER'S REPRESENTATIVES. ALL PLANT MATERIAL AND FINISH GRADES ARE SUBJECT TO APPROVAL BY THE OWNER.

PROTECTION:  
SAVE AND PROTECT ALL EXISTING PLANTINGS SHOWN TO REMAIN. DO NOT PLANT UNTIL OTHER CONSTRUCTION OPERATIONS WHICH CONFLICT HAVE BEEN COMPLETED. IF AN IRRIGATION SYSTEM IS TO BE INSTALLED DO NOT PLANT UNTIL THE SYSTEM HAS BEEN INSTALLED, TESTED, AND APPROVED BY THE OWNER. HANDLE PLANTS WITH CARE - DO NOT DAMAGE OR BREAK ROOT SYSTEM, BARK, OR BRANCHES. REPAIR AND/OR REPLACE ITEMS DAMAGED AS A RESULT OF WORK, OR WORK IN COMPLIANCE WITH PLANS AND SPECIFICATIONS, AS DIRECTED BY OWNER AT NO ADDITIONAL COST TO THE OWNER.

REPAIR OF EXISTING PLANTINGS:  
DURING THE COURSE OF WORK, REPAIR ALL EXISTING PLANTING AREAS BY PRUNING DEAD GROWTH, RE-ESTABLISHING FINISH GRADE AND RE-MULCHING TO SPECIFIED DEPTH.

REPAIR OF IRRIGATION SYSTEM:  
DURING THE COURSE OF WORK, REPAIR ANY DAMAGE TO THE IRRIGATION SYSTEM TO MATCH CONDITIONS PRIOR TO THE DAMAGE.

GUARANTEE:  
GUARANTEE ALL PLANT MATERIAL FOR A PERIOD OF ONE YEAR FROM DATE OF FINAL ACCEPTANCE OF THE JOB BY OWNER.

90-DAY MAINTENANCE:  
CONTRACTOR TO PROVIDE OWNER WITH A SCOPE OF WORK AT TIME OF INITIAL PROJECT BID TO PROVIDE LANDSCAPE AND IRRIGATION MAINTENANCE FOR 90 DAYS FOLLOWING COMPLETION OF PROJECT (ACCEPTANCE) OF FACILITY BY OWNER. WORK TO INCLUDE MAINTENANCE AS DESCRIBED BELOW, IN PLANTING AND IRRIGATION MAINTENANCE.

MATERIALS:

PLANT MATERIALS:  
PLANT MATERIALS TO BE GRADE NO. 1, SIZED IN ACCORDANCE WITH (AAN) AMERICAN STANDARDS FOR NURSERY STOCK (ANSI Z60.1-1996). PRUNE PLANTS RECEIVED FROM THE NURSERY ONLY UPON AUTHORIZATION BY THE LANDSCAPE ARCHITECT. "B & B" INDICATES BALLED AND BURLAPPED; "CONT." INDICATES CONTAINER; "BR" INDICATES BARE ROOT; "CAL" INDICATES CALIPER AT 6" ABOVE SOIL LINE; "GAL" INDICATES GALLON.

- A) SPECIFIED PLANT CANOPY SIZE OR CALIPER IS THE MINIMUM ACCEPTABLE CONTAINER OR BALL SIZE AND ESTABLISHES MINIMUM PLANT CONDITION TO BE PROVIDED.
- B) QUALITY:  
PLANT MATERIAL TO COMPLY WITH STATE AND FEDERAL LAWS FOR DISEASE INSPECTION, PLANTS TO BE FULLY LIVE, VIGOROUS, WELL FORMED, WITH WELL DEVELOPED FIBROUS ROOT SYSTEMS. ROOT BALLS OF PLANTS TO BE SOLID AND FIRMLY HELD TOGETHER, SECURELY CONTAINED AND PROTECTED FROM INJURY AND DESICCATION. PLANTS DETERMINED BY LANDSCAPE ARCHITECT TO HAVE BEEN DAMAGED; HAVE DEFORMITIES OF STEM, BRANCHES, OR ROOTS; LACK SYMMETRY, HAVE MULTIPLE LEADERS OR "Y" CROTCHES LESS THAN 30 DEGREES IN TREES, OR DO NOT MEET SIZE OR ANSI STANDARDS WILL BE REJECTED. PLANT MATERIAL TO BE FROM A SINGLE NURSERY SOURCE FOR EACH SPECIFIED SPECIES/HYBRID. NURSERY SOURCES TO BE THOSE LOCATED IN THE SAME REGION AS THE JOB SITE.
- C) SUBSTITUTION:  
NO SUBSTITUTION OF PLANT MATERIAL, SPECIES OR VARIETY, WILL BE PERMITTED UNLESS WRITTEN EVIDENCE IS SUBMITTED TO THE OWNER FROM TWO QUALIFIED PLANT BROKERAGE OFFICES. SUBSTITUTIONS WHICH ARE PERMITTED TO BE IN WRITING FROM THE OWNER AND LANDSCAPE ARCHITECT. THE SPECIFIED SIZE, SPECIES AND NEAREST VARIETY, AS APPROVED, TO BE FURNISHED. SUBSTITUTIONS MAY REQUIRE SUBMITTAL TO REVISED LANDSCAPE PLAN TO CITY FOR APPROVAL.

SOIL PREPARATION:  
TOPSOIL, AMENDMENT, AND BACKFILL, ARE GENERAL REQUIREMENTS FOR ALL LANDSCAPE AREAS, UNLESS NOTED OTHERWISE ON THE PLANS. SOIL AMENDMENTS AND FERTILIZER NOTED BELOW ARE TO BE USED FOR BID PRICE BASIS ONLY. SPECIFIC AMENDMENTS AND FERTILIZERS WILL BE MADE AFTER SOIL SAMPLES ARE LABORATORY TESTED BY THE CONTRACTOR. PROVIDE CHANGE ORDER FOR ADDITIONAL OR REDUCTION OF MATERIALS REQUIRED OR NOT REQUIRED BY THE SOILS REPORT.

SOIL FERTILITY AND AGRICULTURAL SUITABILITY ANALYSIS:  
AFTER ROUGH GRADING AND PRIOR TO SOIL PREPARATION, CONTRACTOR TO OBTAIN TWO REPRESENTATIVE SOIL SAMPLES, FROM LOCATIONS AS DIRECTED BY THE LANDSCAPE ARCHITECT, TO A SOIL TESTING LABORATORY. SUBMIT RESULTS TO LANDSCAPE ARCHITECT FOR REVIEW. TESTS TO INCLUDE FERTILITY AND SUITABILITY ANALYSIS WITH WRITTEN RECOMMENDATIONS FOR SOIL AMENDMENT, FERTILIZER, CONDITIONERS, APPLICATION RATES, AND POST-CONSTRUCTION MAINTENANCE PROGRAM. TESTS TO BE CONTRACTED WITH AND PAID FOR BY THE CONTRACTOR.

- A) TOPSOIL:  
CONTRACTOR IS RESPONSIBLE FOR SUPPLYING ALL TOPSOIL AND FOR DETERMINING THE VOLUME OF TOPSOIL REQUIRED PER THE INFORMATION ON PLANS AND NOTED HERE-IN. CONTRACTOR IS RESPONSIBLE FOR ANY NECESSARY WEED CONTROL RESULTING FROM CONTAMINATED OFF SITE SOURCES.
- B) TOPSOIL TO CONSIST OF WINTER MIX AS PRODUCED AND REMIXED BY PACIFIC TOPSOILS, INC. WINTER MIX TO CONSIST OF 1/3 BY VOLUME SANDY LOAM, 1/3 BY VOLUME COMPOSTED GARDEN MULCH, AND 1/3 BY VOLUME COARSE WASHED SAND OR EQUIVALENT. AT MINIMUM, TOPSOIL PRODUCTS BROUGHT ON SITE TO CONTAIN AMENDMENTS AS LISTED IN "C".
- C) TOPSOIL TO INCLUDE THE FOLLOWING AMENDMENTS AS NECESSARY:  
THE FOLLOWING AMOUNT PER 1,000 SQUARE FEET:  
1. 6-CUBIC YARDS ORGANIC COMPOST. COMPOST TO BE FREE OR NON-FARM ANIMAL SOURCES, NOR TO BE FROM SOURCES CONTAINING REDWOOD OF CEDAR PRODUCTS.  
2. 30-POUNDS NITROFORM (38-0-0)  
3. 5-POUNDS AMMONIUM SULFATE  
4. 40-POUNDS CALCIUM CARBONATE LESTONE  
5. 40-POUNDS DOLOMITE LESTONE  
6. 5-OUNES BORON (AS BORAX)  
ALL AMENDMENTS TO BE THOROUGHLY MIXED PRIOR TO INCORPORATION INTO TOPSOIL.

- D) PLANTING BACKFILL FOR ALL TREES, SHRUBS, AND GROUNDCOVERS:  
1. 0.6-CUBIC YARDS PER VOLUME TOPSOIL  
2. 0.4-CUBIC YARDS ORGANIC COMPOST.  
3. 3-POUNDS NITROFORM (38-0-0)  
4. 1-POUNDS AMMONIUM SULFATE  
5. 2-POUNDS CALCIUM CARBONATE LESTONE  
6. 2-POUNDS DOLOMITE LESTONE
- E) TOPSOIL PREPARATION AND INSTALLATION:  
1. VERIFY SUBGRADES TO -7 INCHES IN LANDSCAPE AREAS AND -18/24 INCHES IN PARKING LOT ISLANDS BELOW FINISH ELEVATION, OR AS INDICATED ON PLANS. THIS ACCOMMODATES, TOPSOIL, AMENDMENTS, AND MULCH.  
2. ERADICATE ANY SURFACE VEGETATION ROOTED IN THE SUB-GRADE PRIOR TO SUB-GRADE PREPARATION.  
3. THOROUGHLY SCARIFY AND RIP ALL LANDSCAPE SUB-GRADES WHICH HAVE BECOME COMPACTED TO A DEPTH OF 12 INCHES WITH MULTIPLE PASSES, 90 DEGREES TO EACH OTHER. SCARIFY AREAS INACCESSIBLE TO MECHANIZED EQUIPMENT AND AROUND EXISTING PLANTINGS NOTED TO REMAIN WITH HAND TOOLS.  
4. REMOVE SOIL LUMPS, ROCK, VEGETATION AND/OR DEBRIS LARGER THAN 2 INCHES FROM ALL SUB-GRADE PRIOR TO PLACEMENT OF SPECIFIED TOPSOIL.  
5. REMOVE ANY ASPHALT EXTENDING BEYOND 6 INCHES FROM CURBS INTO ADJACENT LANDSCAPE AREAS.  
6. PARKING LOT PLANTER ISLANDS TO BE OVER EXCAVATED BY BACKHOE. REMOVE PAVING WASTE, GRAVEL BASE MATERIAL AND UNDERLYING SUBSOIL TO 18 INCHES BELOW TOP OF PAVING. SCARIFY AND OVER EXCAVATE PLANT PIT BOTTOM 12 INCHES TO MINIMIZE STRUCTURAL COMPACTION.
- F) TOPSOIL PLACEMENT:  
1. PROVIDE A TOTAL FINISH COURSE OF 4 INCHES OF TOPSOIL FOR LANDSCAPE AREAS AND 18/24 INCHES IN PARKING LOT ISLANDS.  
2. IN ALL LANDSCAPE AREAS, PLACE 2 INCHES (6 INCHES IN PARKING LOT ISLANDS) OF TOPSOIL MIX WITH AMENDMENTS OVER THE PREPARED SUB-GRADE AND THOROUGHLY ROTOTILL WITH MULTIPLE PASSES INTO THE TOP 6 INCHES OF SUB-GRADE FOR A TOTAL DEPTH OF 8 INCHES IN LANDSCAPE AREAS (12 INCHES IN PARKING LOT ISLANDS). PLACE AN ADDITIONAL 2 INCH LIFT OF TOPSOIL, IN ALL LANDSCAPE AREAS AND A MINIMUM 12 INCH LIFT IN ALL PARKING LOT ISLANDS, FOR THE FINAL TOPSOIL DEPTH OF 4 INCHES IN LANDSCAPE AREAS AND 18/24 INCHES IN PARKING LOT ISLANDS.  
3. PLACE ADDITIONAL TOPSOIL AND SOIL MIX AS REQUIRED TO MEET FINISH ELEVATIONS.

BARK MULCH (TOPDRESSING):  
ONE-HALF-INCH (1/2") SIZE, TO ONE-QUARTER (1/4"), I.E., "FINE," HEMLOCK/FIR BARK.

STAKES:  
2-INCH DIAMETER BY 8-FOOT MINIMUM LODGEPOLE PINE STAKES.

GUY MATERIAL:  
1-INCH WIDE POLYETHYLENE CHAIN LOCK TYPE TIES; OR, 3/8" DIAMETER RUBBER. NO WIRE.

LOW GROW TRUF AND SORAGE SLOPE MIX:  
COMMERCIAL SEED AS NOTED ON PLAN.

HERBICIDE:  
HERBICIDE IS NOT RECOMMENDED FOR THE FIRST YEAR AFTER INSTALLATION.

ANTI-DESICCANT:  
"WILT-PROOF," 48 HOURS PRIOR TO SHIPMENT TO SITE FROM JUNE 1 THROUGH SEPTEMBER. THOROUGHLY ROOT WATER PLANTS PRIOR TO DELIVERY. PLANT MATERIAL DELIVERED TO SITE TO BE KEPT CONTINUALLY MOIST THROUGH INSTALLATION.

EXECUTION:

FINISH GRADES:  
FINE GRADE AND REMOVE ROCKS AND FOREIGN OBJECTS OVER 2 INCHES DIAMETER FROM TOP SURFACE OF PREPARED LANDSCAPE AREAS. FINISH ELEVATIONS TO BE DEFINED AS 3 INCHES BELOW CURBS, WALKS AND/OR OTHER ADJACENT HARDSCAPE FOR ALL PLANTING BED AREAS AND 1-INCH BELOW CURBS, WALKS AND/OR OTHER ADJACENT HARDSCAPE FOR ALL LAWN AREAS. FINISH GRADE REFER TO GRADES PRIOR TO INSTALLATION OF MULCH OR LAWN. ALL FINISH GRADES TO BE SMOOTH EVEN GRADES, LIGHTLY COMPACTED, AS SHOWN ON THE PLAN AND DETAILED. PROVIDE POSITIVE DRAINAGE AWAY FROM BUILDINGS AND STRUCTURES. SITE CIVIL DRAWINGS IDENTIFY FINAL ELEVATIONS.

TREES AND SHRUBS:  
ARRANGE TREES AND SHRUBS ON SITE IN PROPOSED LOCATIONS PER DRAWINGS. EXCAVATE PIT, PLANT AND STAKE OR GUY, AS CALLED OUT AND DETAILED. ALL TREES, SHRUBS, AND SUPPORTS TO STAND VERTICAL. BACKFILL SHALL BE PIT SPOILS. SETTLE BACKFILL USING WATER ONLY. NO MECHANICAL COMPACTION.

GROUNDCOVERS:  
EXCAVATE PITS TO A MINIMUM OF 3 INCHES BELOW, AND TWICE THE ROOT BALL DIAMETER. WATER THOROUGHLY AND TAKE CARE TO ENSURE THAT ROOT CROWN IS AT PROPER GRADE, AS DETAILED.

MULCH:  
MULCH ALL LANDSCAPE AREAS NOT COVERED BY TURF/SEED. APPLY SUFFICIENT QUANTITY TO PROVIDE A 2-INCH DEPTH.

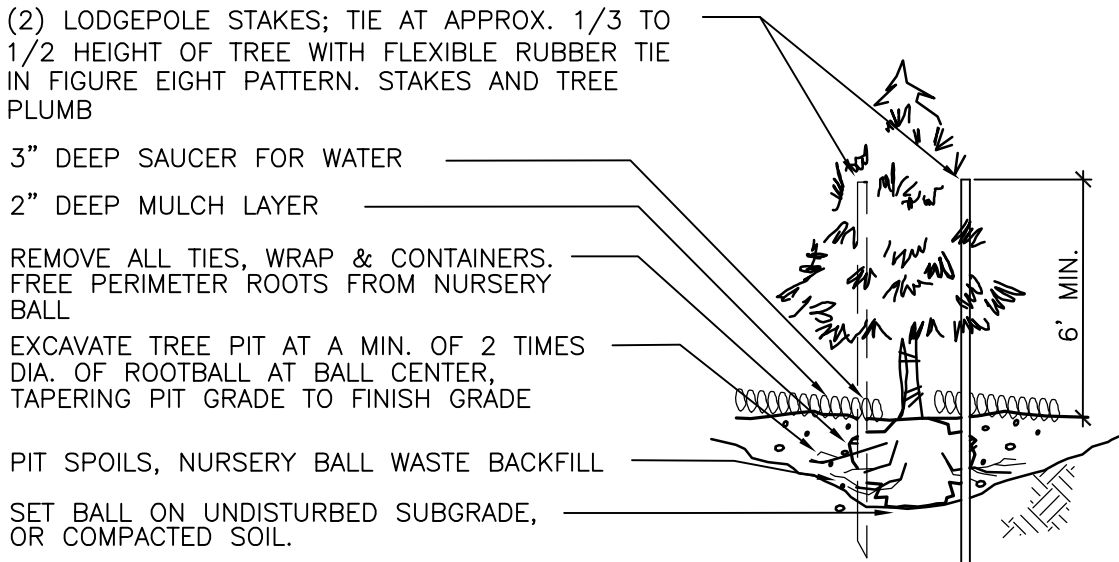
UTILITY CLEARANCES:  
FIELD ADJUST PLANT LOCATIONS FOR 8-FOOT SEPARATION OF TREES/SHRUBS AND 2-FOOT SEPARATION FOR GROUNDCOVER FROM FIRE HYDRANTS AND UTILITY VAULTS.

PLANTING MAINTENANCE:  
CONTRACTOR TO MAINTAIN PLANTINGS THROUGH COMPLETED INSTALLATION, AND UNTIL ACCEPTANCE OF LANDSCAPE INSTALLATION. PLANTING MAINTENANCE TO INCLUDE WATERING, WEEDING, CULTIVATING, TIGHTENING AND REPAIRING OF TREE GUYS, RESETTING PLANTS TO PROPER GRADES OR POSITION, RE-ESTABLISHING SETTLED GRADES; AND MOWING TURF MONTHLY AFTER TURF ESTABLISHMENT. HERBICIDE IS NOT RECOMMENDED FOR ONE YEAR FOLLOWING LANDSCAPE INSTALLATION. INCLUDED IS REPLACEMENT OF DEAD PLANTS AND PLANTS SHOWING LOSS OF 40 PERCENT OR MORE OF CANOPY.

IRRIGATION MAINTENANCE:  
THE IRRIGATION SYSTEM TO BE MAINTAINED INCLUDING ADJUSTMENTS FOR BALANCED WATER DISTRIBUTION AND PRECIPITATION. FAILED OR MALFUNCTIONING IRRIGATION EQUIPMENT SHALL BE REPLACED AND/OR CORRECTED. PLANTING AND IRRIGATION MAINTENANCE TO INCLUDE THOSE OPERATIONS NECESSARY TO THE PROPER GROWTH AND SURVIVAL OF ALL PLANT MATERIALS. CONTRACTOR TO PROVIDE THIS WORK IN ADDITION TO SPECIFIC WARRANTY/GUARANTEES.

- SIGHT DISTANCE TRIANGLE NOTES:  
1. STREET TREES AT INTERSECTIONS WITHIN SIGHT DISTANCE TRIANGLE SHALL BE LIMBED TO A HEIGHT OF 10' ABOVE STREET LEVEL.  
2. TREES (EXCLUDING STREET TREES) SHALL NOT BE PLANTED WITHIN THE SIGHT DISTANCE TRIANGLE.  
3. SHRUBS WITHIN THE SIGHT DISTANCE TRIANGLE SHALL HAVE A MATURE HEIGHT OF LESS THAN 3' TALL.

IN ORDER FOR PROPER TREE REMOVAL TO OCCUR, THE CONTRACTOR SHALL IMPLEMENT THE FOLLOWING STEPS FOR CLEARING ACTIVITIES:  
A. SURVEYOR SHALL STAKE THE CLEARING LIMITS;  
B. A RUBBER-TRACKED BACK-HOE REMOVES THE UNDERSTORY AND BRUSH TO ALLOW VISUAL AND PHYSICAL ACCESS FOR THE REVIEW OF TREES TO BE REMOVED AND/OR TREE PROTECTION ALTERNATIVES BY OWNER AND CITY PLANNING STAFF;  
C. OWNER REPRESENTATIVE, OWNER'S ARBORIST AND CITY PLANNER TO REVIEW TREES SCHEDULED FOR REMOVAL OR PROTECTION WITHIN TREE RETENTION AREAS;  
D. CONTRACTOR SHALL PLACE TREE PROTECTION FENCING AS DIRECTED BY PLANNING STAFF;  
E. PLANNING STAFF SHALL INSPECT FENCE PRIOR TO COMMENCEMENT OF CLEARING ACTIVITY; AND,  
F. PRIOR TO PLANNING DEPARTMENT APPROVAL OF OCCUPANCY PERMITS FOR THE DEVELOPMENT, THE OWNER'S ARBORIST SHALL REVISIT THE SITE TO INSPECT ALL RETAINED TREES TO ASSESS ANY IMPACTS TO THEM FROM THE DEVELOPMENT.



NOTE:  
LIGHT FERTILIZER OVER PLANTING BED AFTER BACKFILL ONLY; NO FERTILIZER IN PLANTING PIT.  
WORK PERIMETER ROOTS FREE OF NURSERY BALL BALL & PIT TO BE COARSELY SCARIFIED.

EVERGREEN TREE PLANTING/STAKING DETAIL

NOT TO SCALE

PRUNE DAMAGED TWIGS AFTER PLANTING

PLACE IN VERT. POSITION: DOUBLE LEADERS WILL BE REJECTED

NOTE:  
KEEP ROOTBALL MOIST AND PROTECTED AT ALL TIMES. HOLD CROWN OF ROOTBALL AT OR JUST ABOVE FINISH GRADE.  
PROTECT TRUNK AND LIMBS FROM INJURY.  
BACKFILL TO BE SETTLED USING WATER ONLY - NO MECHANICAL COMPACTION.  
REMOVE ALL WRAP, TIES & CONTAINERS, REGARDLESS OF MATERIAL.

(2) LODGEPOLE STAKES, PLUMB WITH ELASTIC CHAIN-LOCK TYPE OR RUBBER GUYS TIED IN FIGURE EIGHT; REMOVE AFTER ONE GROWING SEASON

PROTECTIVE WRAPPING DURING SHIPMENT TO SITE AND INSTALLATION REMOVE AT COMPLETION OF PLANTING  
TURF PLANTING; PROVIDE 3'x 8" "NO GRASS" TREE RING AND 3" MULCH LAYER IN WELL. HOLD BACK FROM TRUNK 8" TO 10"  
FINISH GRADE

PREPARE PLANTING BED PER SPEC'S; AT MIN., LOSSEN AND MIX SOIL TO 18" OR DEPTH OF ROOTBALL AND 2 TIMES BALL DIAMETER

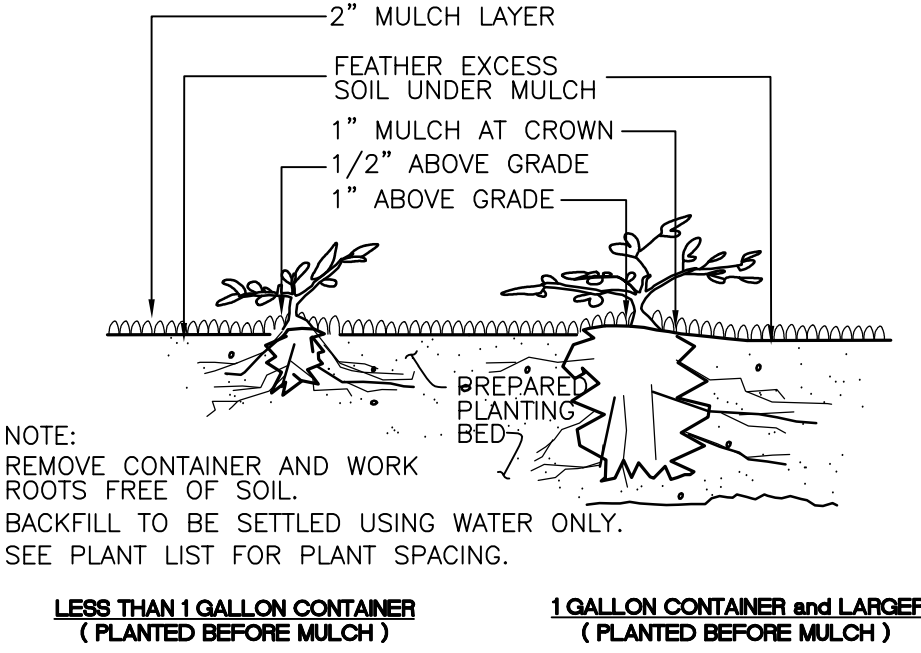
REMOVE ALL WRAP, TIES, AND CONTAINERS  
SCORE ROOTBALL AND WORK NURSERY SOIL AWAY FROM PERIMETER ROOTS

SET BALL ON UNDISTURBED BASE OR COMPACTED MOUND UNDER BALL

PENETRATION TO SUBBASE (+) 24"

DECIDUOUS TREE PLANTING/STAKING DETAIL

NOT TO SCALE

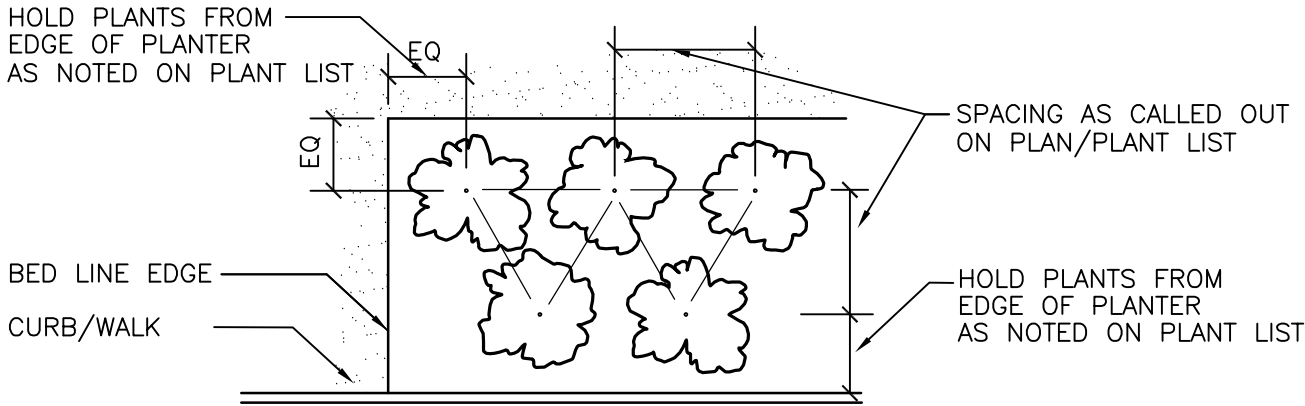


NOTE:  
REMOVE CONTAINER AND WORK ROOTS FREE OF SOIL.  
BACKFILL TO BE SETTLED USING WATER ONLY.  
SEE PLANT LIST FOR PLANT SPACING.

LESS THAN 1 GALLON CONTAINER (PLANTED BEFORE MULCH) 1 GALLON CONTAINER and LARGER (PLANTED BEFORE MULCH)

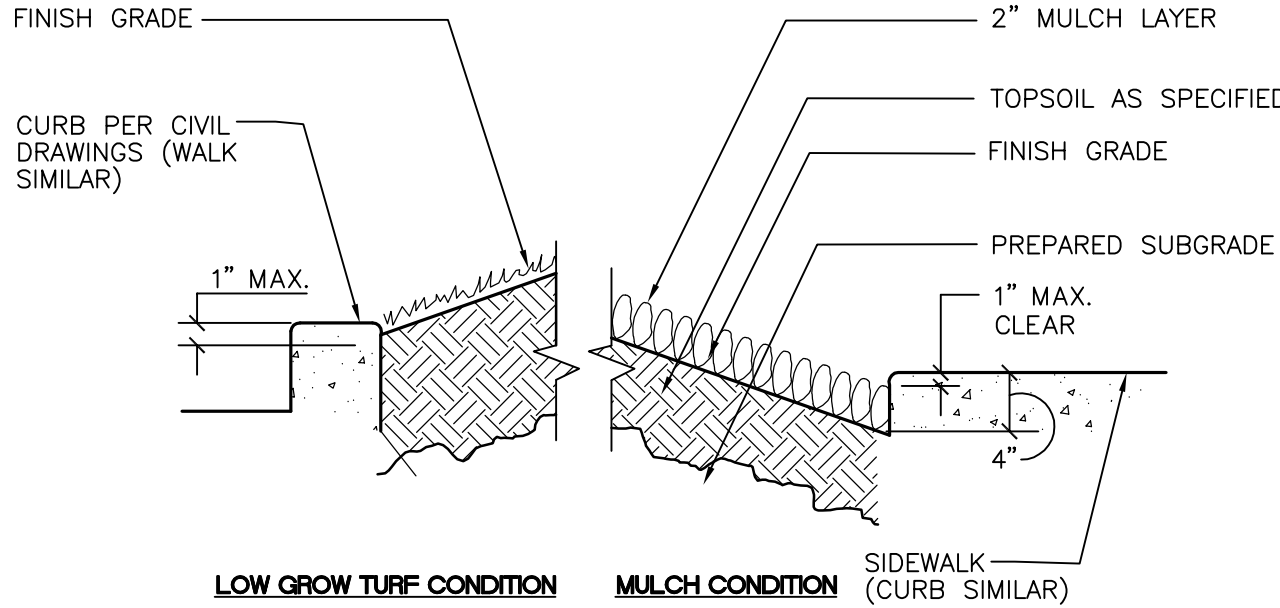
GROUNDCOVER PLANTING DETAIL

NOT TO SCALE



PLANT MATERIAL SPACING DETAIL

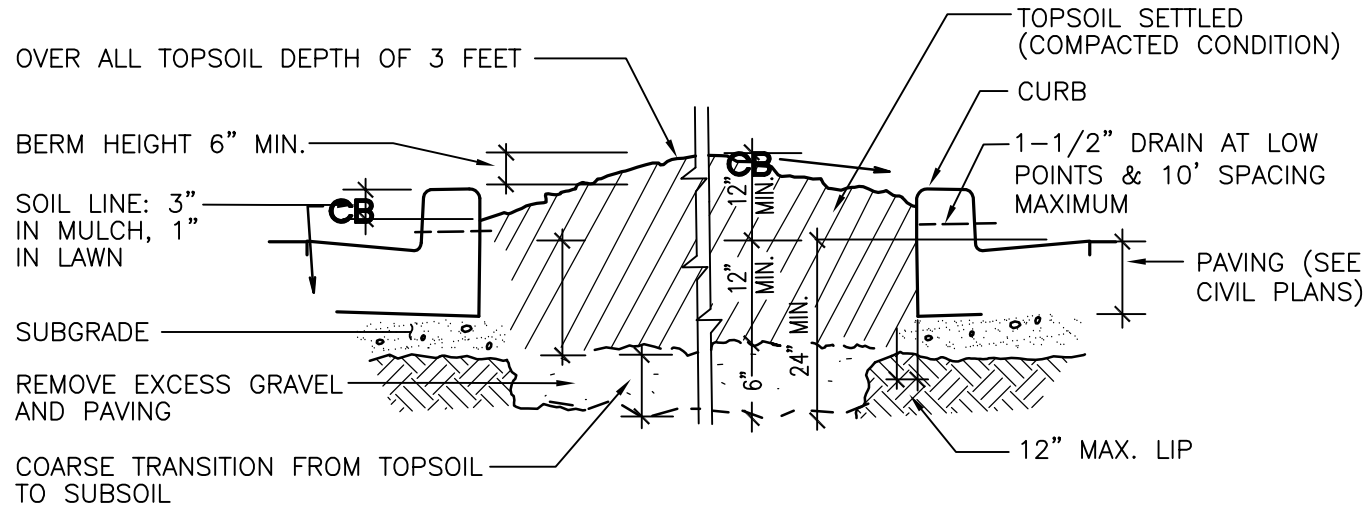
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LOW GROW TURF CONDITION MULCH CONDITION SIDEWALK (CURB SIMILAR)

PLANTER SECTION DETAIL

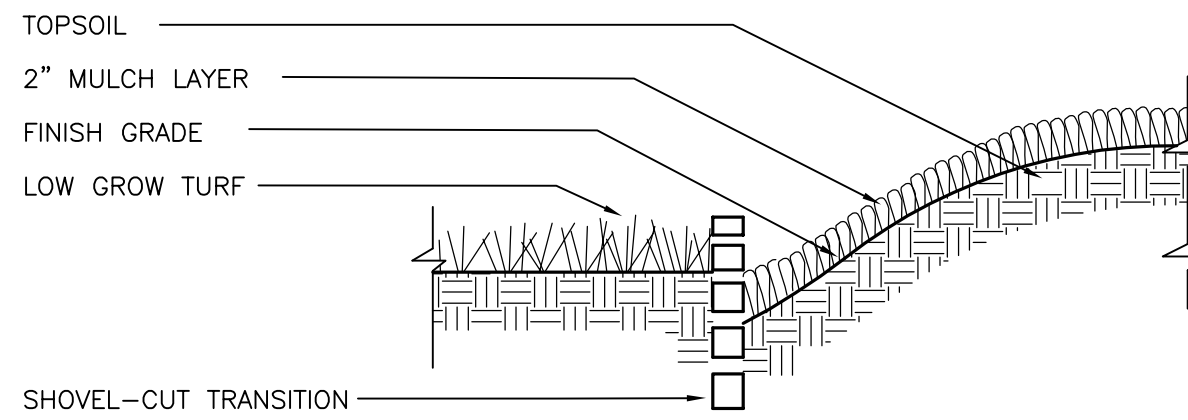
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NOTE:  
OVER EXCAVATE PARKING LOT PLANTERS TO LOOSEN COMPACTED SUBBASE

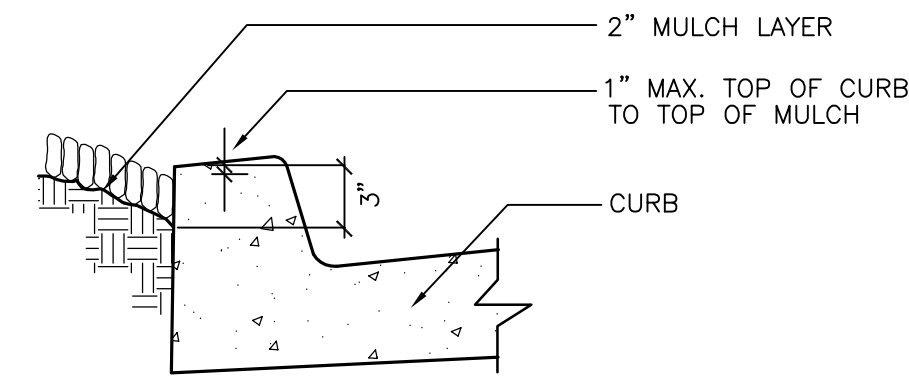
GRADING & PARKING LOT PLANTERS DETAIL

NOT TO SCALE



PLANTING BED ADJACENT TO LAWN DETAIL

NOT TO SCALE



MULCH AT CURB DETAIL

NOT TO SCALE

| REVISIONS |            |                                               |  |
|-----------|------------|-----------------------------------------------|--|
| 4         | 10/29/2018 | REVISED PER COMMENTS                          |  |
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| 7         | 10/16/2019 | PLANT MATERIAL AT TOP OF ROCK WALLS           |  |
| 8         | 5/22/2020  | REVISED PER COMMENTS                          |  |
| 9         | 10/21/2020 | REVISED PER COMMENTS                          |  |
| 10        | 1/21/2021  | REVISED PER CITY REVIEW COMMENTS JANUARY 2021 |  |
| 11        | 3/11/2021  | REVISED, TREES #416 AND #417                  |  |



BARGHAUSEN CONSULTING ENGINEERS INC.

18215 72ND AVENUE SOUTH  
KENT, WA 98032  
(425)251-6222  
(425)251-8782 FAX

|              |     |
|--------------|-----|
| DESIGNED BY: | JMV |
| DRAWN BY:    | JMV |
| CHECKED BY:  | KEH |
| APPROVED BY: | JGH |
| SCALE:       |     |
| OTHER:       |     |

SWEDE HILL, LLC  
P.O. BOX 1397  
TACOMA, WA 98401

PRELIMINARY LANDSCAPE NOTES AND DETAILS

CANTERWOOD COMMERCIAL  
CENTER  
GIG HARBOR

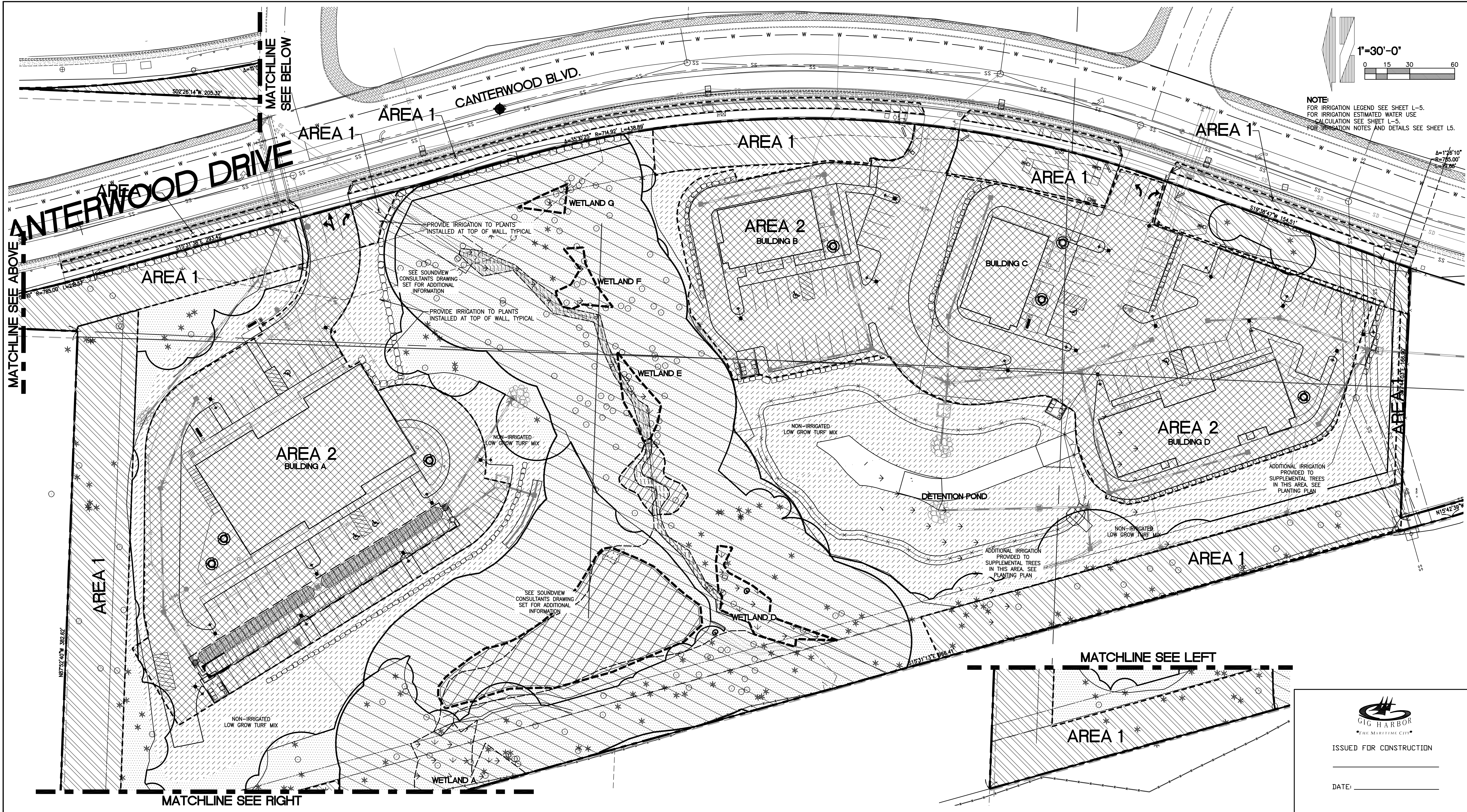
PERMIT NO.

DRAWING NO.

SHEET OF  
L-3 8







| REVISIONS |            |                                               |  |
|-----------|------------|-----------------------------------------------|--|
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**SWEDE HILL, LLC**  
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TACOMA, WA 98401

**PRELIMINARY IRRIGATION PLAN**

**CANTERWOOD COMMERCIAL  
CENTER  
GIG HARBOR**

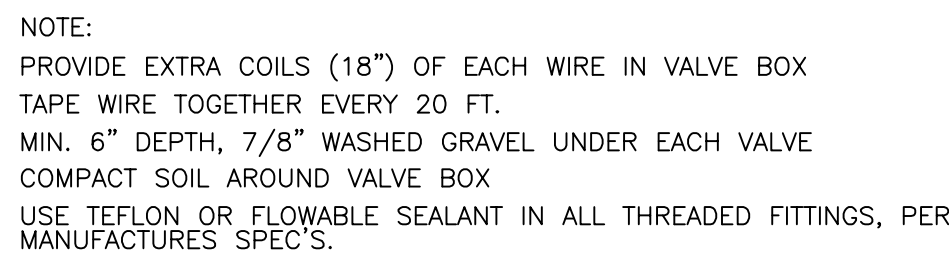
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| SHEET       | OF |
| L-4         | 8  |





1. GENERAL CONTRACTOR AND LANDSCAPE CONTRACTOR TO COORDINATE:
  - A. INSTALLATION OF 110V ELECTRICAL SERVICE FROM ELECTRICAL SOURCE TO AUTOMATIC CONTROLLER, INCLUDING WIRE HOOK-UP INTO MOUNTED CONTROLLER. IRRIGATION CONTRACTOR WILL MOUNT CONTROLLER PER DESIGN AND COORDINATE WITH GENERAL CONTRACTOR.
  - B. INSTALLATION OF IRRIGATION/SERVICE METER AND STUB TO IRRIGATION POINT OF CONNECTION, PER UTILITY PLAN(S). PROVIDE STANDARD THREADED STUB-OUT WITH THREADED CAP ON DISCHARGE SIDE OF METER. STUB-OUT TO BE INSTALLED APPROXIMATELY 18 INCHES BELOW FINISHED GRADE.
  - C. VERIFICATION OF STATIC WATER PRESSURE AT POINT-OF-CONNECTION (P.O.C.) CONTRACTOR SHALL NOTIFY OWNER AND BARGHAUSEN CONSULTING ENGINEERS, INC., OF ANY VARIATION IN STATIC PRESSURE OVER 5 PSI GREATER/LESS THAN DESIGN PRESSURE.
  - D. INSTALLATION OF SLEEVING.
2. LANDSCAPE CONTRACTOR TO TEST AVAILABLE WATER PRESSURE FOR PROPOSED IRRIGATION SYSTEM AND PROVIDE WRITTEN TEST RESULTS PRIOR TO BEGINNING ANY WORK.
3. ALL WORK PER LOCAL CODE. INSTALLATION PER MANUFACTURER'S WRITTEN SPECIFICATIONS.
4. ALL VALVES TO BE PLACED IN "CARSON" GRADE LEVEL BOXES WITH BOLT-LOCK LIDS (OR APPROVED EQUIVALENT). SET BOXES 2 INCHES HIGHER THAN FINISH GRADE IN MULCH AREAS AND FLUSH WITH FINISH GRADE IN LAWN AREAS.
5. MAINLINE PIPE TO BE BURIED 18 INCHES AND LATERALS 12 INCHES BELOW FINISH GRADE. NO ROCK OR DEBRIS TO BE BACKFILLED OVER PIPE.
6. HEAD AND LINE POSITIONING IS DIAGRAMMATIC ON PLAN. ADJUST IN FIELD AS NECESSARY FOR ADEQUATE COVERAGE. VALVES TO BE POSITIONED ADJACENT TO PAVEMENT/CURBS, IN SHRUB BEDS WHERE POSSIBLE.
7. PROVIDE OWNER WITH TWO (2) SETS "AS-BUILT" DRAWINGS AND OPERATOR'S MANUAL UPON COMPLETION. INSTRUCT OWNER AS TO PROPER WINTERIZATION OF IRRIGATION SYSTEM (BLOW OUT).
8. FAMILIARIZE OWNERS FACILITY OPERATOR WITH IRRIGATION SYSTEM FUNCTION, CONTROLLER PROGRAMMING, SYSTEM OPERATION AND MAINTENANCE REQUIREMENTS.
9. SPRINKLERS ON RISERS WILL NOT BE ALLOWED UNLESS NOTED ON PLANS.
10. RADIUS REDUCTION TO BE MADE BY USE OF PRESSURE ADJUSTMENT, SCREENS, AND/OR ALTERNATE NOZZLES. IN-NOZZLE ADJUSTMENT IS LIMITED TO 10 PERCENT FOR SPRAY HEADS AND PER MANUFACTURER'S LIMITS FOR OTHER SPRINKLERS. SPRINKLER SPACING NOT EXCEED 60% OF THE DIAMETER OF THE PUBLISHED DATA.
11. ALL CONTROL WIRE SPLICES TO BE MADE AT VALVE BOXES WITH WATER TIGHT ELECTRICAL SPLICES, 3M, SCOTT'S LOCK SEAL TACK 3576-78, OR EQUIVALENT.
12. EACH VALVE BOX TO CONTAIN A MINIMUM OF ONE (1) SPARE ORANGE CONTROL WIRE FOR JACKETED WIRE. ROUTE ONE SPARE WIRE FROM THE CONTROLLER TO THE LAST VALVE OF EACH MAINLINE BRANCH. COMMON WIRE TO BE WHITE. SINGLE STRAND WIRE TO BE A MINIMUM OF 14 GAUGE WITH SPARE WIRE TO BE YELLOW.
13. ALL ELECTRICAL EQUIPMENT TO BE U.L. TESTED AND APPROVED, AND BEAR THE U.L. LABEL.
14. CROSS CONNECTION PROTECTION INSPECTION REQUIRED. THE BACKFLOW DEVICE TO BE TESTED UPON THE ORIGINAL INSTALLATION. THE TESTING TO BE PERFORMED BY A PERSON HOLDING A CURRENT CERTIFICATE AS A BACKFLOW TESTER. THE TEST REPORT TO BE SUBMITTED TO THE LOCAL WATER DISTRICT, OR PURVEYOR, AND OWNER WITH A COPY TO BARGHAUSEN CONSULTING ENGINEERS, INC. CONTRACTOR TO INCLUDE TESTING IN THE SCOPE OF WORK. OWNER IS RESPONSIBLE FOR ANNUAL INSPECTIONS AFTER THE INTIAL INSPECTION.
15. CONTRACTOR TO PROVIDE SYSTEM WINTERIZATION/SPRING SERVICE WHEN INSTALLATION HAS BEEN COMPLETED WITHIN 90 DAYS OF NOVEMBER 1 FOR WINTERIZATION, OR MAY 15 FOR SPRING SERVICE. SERVICE TO BE PERFORMED AS NEAR AS PRACTICAL TO THE ABOVE DATES, OR AS FREEZE/PRECIPITATION CONDITIONS DETERMINE SERVICE NEEDED.
16. IRRIGATION SCHEDULING:

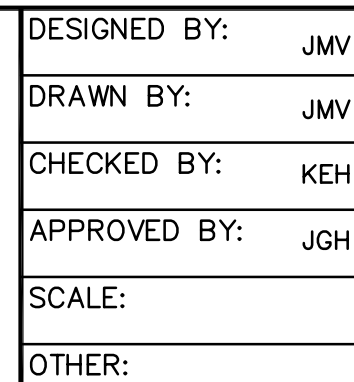
THE IRRIGATION CONTROLLER CONTAINS A WATER BUDGET FEATURE. PERIODIC (WEEKLY) ADJUSTMENT OF THE WATER SCHEDULE IS INTENDED TO BE MADE VIA BUDGET ADJUSTMENT. RE-ADJUST WATERING DAYS AT 100 PERCENT BUDGET WHEN ADJUSTMENT EXCEEDS 30%. SET CONTROLLER FOR HIGHEST ET<sub>0</sub> WATER SCHEDULE, BASED ON PUBLISHED LOCAL EVAPOTRANSPIRATION DATA. SYSTEM HAS BEEN DESIGNED FOR 50 TO 80 PERCENT DISTRIBUTION UNIFORMITY. LAWN ZONES SHOULD BE SCHEDULED FOR 100 PERCENT REPLACEMENT FACTOR ON A TYPICAL MINIMUM 3-DAY CYCLE. SHRUB ZONES SHOULD BE PROGRAMMED AT 40 TO 70 PERCENT OF THE MONTHLY LAWN WATER REQUIREMENT ON A ONCE PER WEEK CYCLE. ALL WATERING IN EXCESS OF THE LOCAL ET<sub>0</sub> ("FIELD RECHARGE") TO BE COMPLETED DURING THE CONSTRUCTION PHASE WHILE THE CONTRACTOR IS ON THE JOB SITE. OVER WATERING OF LANDSCAPE DUE TO CONTROLLER SCHEDULING TO BE GROUNDS FOR CONTRACTOR TO REPAIR ANY RESULTANT DAMAGES AT CONTRACTOR'S OWN EXPENSE.
17. SUBSTITUTION OF IRRIGATION MATERIAL/EQUIPMENT TO BE MADE ONLY UPON WRITTEN APPROVAL OF OWNER'S REPRESENTATIVE.
18. ALL ZONES TO PASS A MINIMUM DISTRIBUTION UNIFORMITY OF 62 PERCENT, AS TESTED THROUGH AN IRRIGATION ASSOCIATION CERTIFIED WATER AUDIT.



NOT TO SCALE

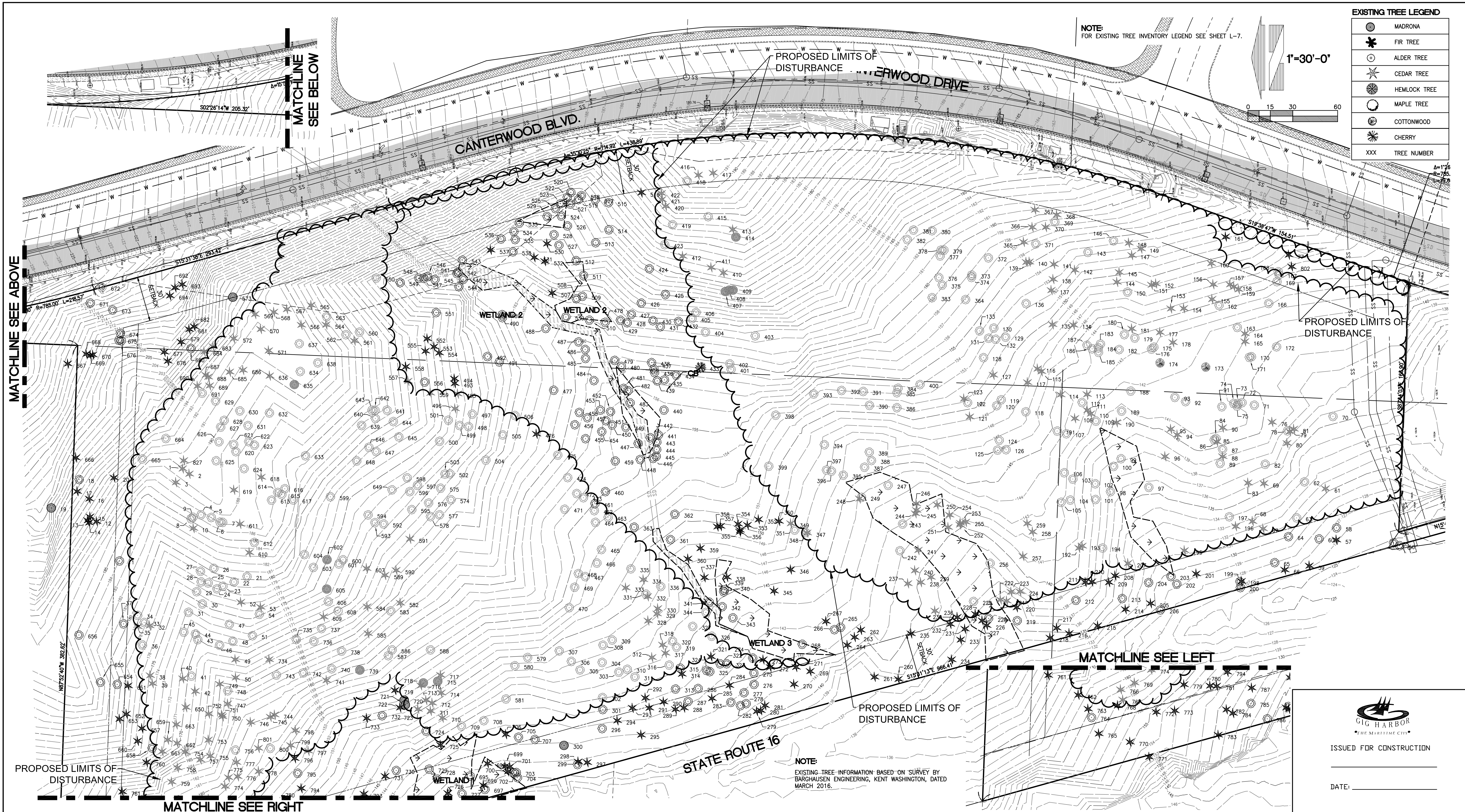


NON-IRRIGATED NATIVE  
AREAS AND HYDROSEED  
LOW GROW SEED MIX  
(79,200 SF)



|       |    |
|-------|----|
| SHEET | OF |
| L-5   | 8  |





| EXISTING TREE LEGEND |              |
|----------------------|--------------|
|                      | MADRONE      |
|                      | FIR TREE     |
|                      | ALDER TREE   |
|                      | CEDAR TREE   |
|                      | HEMLOCK TREE |
|                      | MAPLE TREE   |
|                      | COTTONWOOD   |
|                      | CHERRY       |
| XXX                  | TREE NUMBER  |

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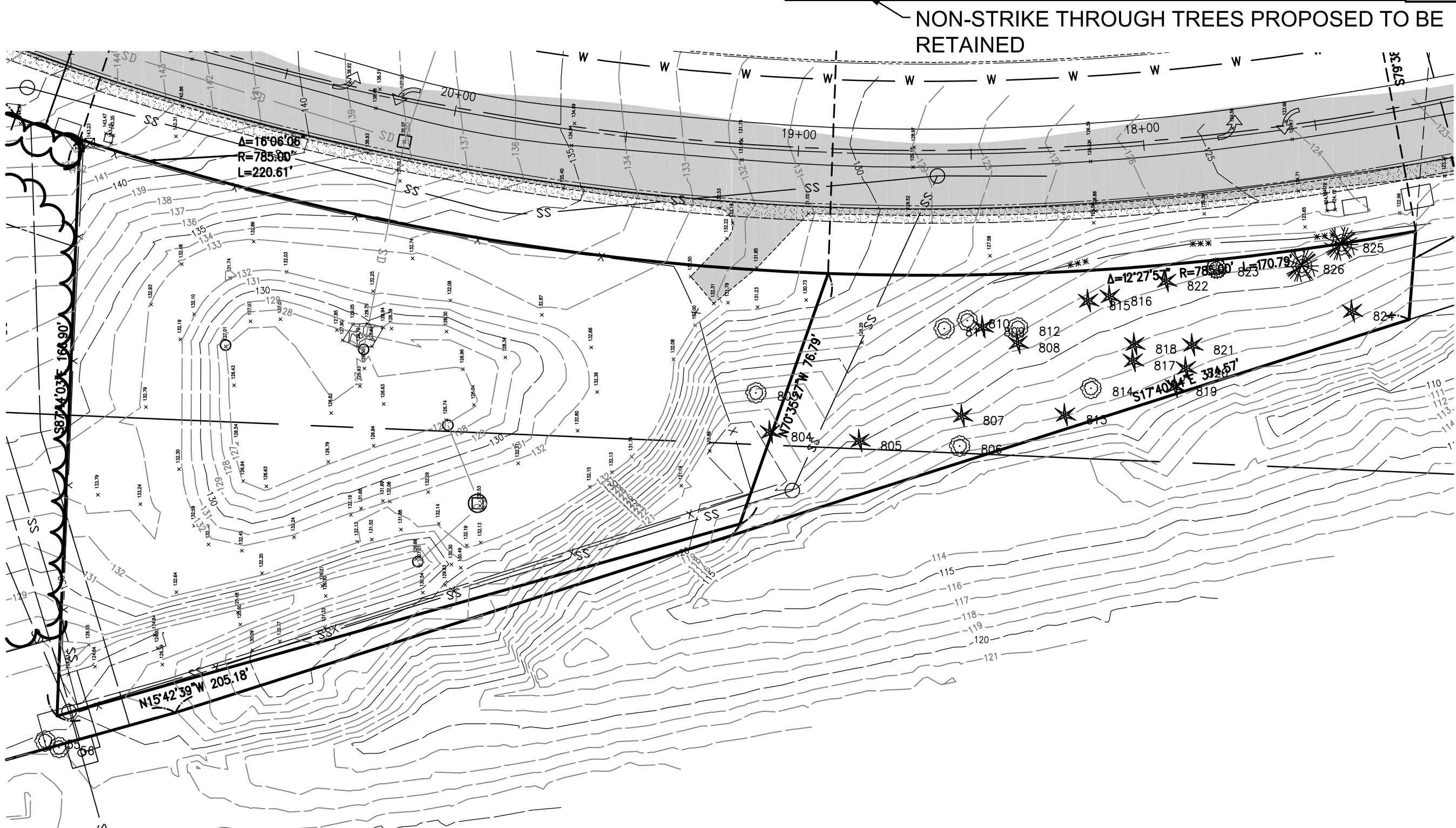
**SWEDE HILL, LLC**  
P.O. BOX 1397  
TACOMA, WA 98401

| EXISTING TREE INVENTORY PLAN               |       |
|--------------------------------------------|-------|
| CANTERWOOD COMMERCIAL CENTER<br>GIG HARBOR |       |
| PERMIT NO.                                 |       |
| DRAWING NO.                                |       |
| SHEET OF                                   | L-6 8 |





| TREE NUMBER | TYPE    | SIZE<br>(INCHES) | 46 | ALDER   | 10 | 92  | CHERRY  | 8    | 140 | FIR        | 26  | 187 | ALDER   | 9        | 234 | CEDAR   | 11  | 281 | FIR     | 8    | 328 | FIR     | 10 | 375 | ALDER   | 9       | 422 | HEMLOCK | 11     |
|-------------|---------|------------------|----|---------|----|-----|---------|------|-----|------------|-----|-----|---------|----------|-----|---------|-----|-----|---------|------|-----|---------|----|-----|---------|---------|-----|---------|--------|
| 1           | CEDAR   | 7                | 47 | MAPLE   | 9  | 94  | FIR     | 30   | 141 | FIR        | 18  | 188 | ALDER   | 8        | 235 | CEDAR   | 24  | 282 | ALDER   | 20   | 329 | FIR     | 9  | 376 | ALDER   | 6       | 423 | MAPLE   | 16,6   |
| 2           | FIR     | 20               | 48 | ALDER   | 6  | 95  | HEMLOCK | 18   | 142 | CEDAR      | 30  | 189 | MAPLE   | 19       | 236 | FIR     | 50  | 283 | ALDER   | 7    | 330 | FIR     | 9  | 377 | ALDER   | 6       | 424 | MAPLE   | 16     |
| 3           | FIR     | 24               | 49 | FIR     | 14 | 96  | FIR     | 24   | 143 | MAPLE      | 18  | 190 | CEDAR   | 28       | 237 | FIR     | 36  | 284 | FIR     | 17   | 331 | ALDER   | 7  | 378 | ALDER   | 7       | 425 | ALDER   | 7      |
| 4           | MAPLE   | 11               | 50 | FIR     | 19 | 97  | ALDER   | 9,18 | 144 | CEDAR      | 15  | 191 | MAPLE   | 14       | 238 | CEDAR   | 27  | 285 | FIR     | 15   | 332 | CEDAR   | 12 | 379 | ALDER   | 7       | 426 | MAPLE   | 22     |
| 5           | MAPLE   | 10               | 51 | MAPLE   | 11 | 98  | ALDER   | 9    | 145 | CEDAR      | 20  | 192 | CEDAR   | 12       | 239 | CEDAR   | 11  | 286 | ALDER   | 7    | 333 | CEDAR   | 15 | 380 | ALDER   | 7       | 427 | ALDER   | 9      |
| 6           | MAPLE   | 15               | 52 | HEMLOCK | 22 | 99  | ALDER   | 11   | 146 | MAPLE      | 19  | 193 | CEDAR   | 36       | 240 | CEDAR   | 27  | 287 | ALDER   | 7,7  | 334 | FIR     | 40 | 381 | ALDER   | 6       | 428 | ALDER   | 7      |
| 7           | MAPLE   | 11               | 53 | FIR     | 26 | 100 | ALDER   | 15   | 147 | CEDAR      | 15  | 194 | ALDER   | 6        | 241 | CEDAR   | 24  | 288 | FIR     | 17   | 335 | ALDER   | 11 | 382 | ALDER   | 7       | 429 | ALDER   | 7      |
| 8           | MAPLE   | 15,20            | 54 | MAPLE   | 15 | 101 | ALDER   | 6    | 148 | FIR        | 12  | 195 | CEDAR   | 24       | 242 | MAPLE   | 15  | 289 | FIR     | 17   | 336 | ALDER   | 7  | 383 | ALDER   | 6       | 430 | ALDER   | 10     |
| 9           | MAPLE   | 6                | 55 | ALDER   | 10 | 102 | ALDER   | 6    | 149 | FIR        | 12  | 196 | CEDAR   | 28       | 243 | MAPLE   | 12  | 290 | FIR     | 9    | 337 | FIR     | 24 | 384 | ALDER   | 10      | 431 | ALDER   | 6      |
| 10          | FIR     | 24               | 56 | ALDER   | 7  | 103 | ALDER   | 6    | 150 | MAPLE      | 24  | 197 | ALDER   | 12       | 244 | CEDAR   | 19  | 291 | FIR     | 16   | 338 | FIR     | 24 | 385 | ALDER   | 6       | 432 | ALDER   | 6      |
| 11          | ALDER   | 18               | 57 | HEMLOCK | 22 | 104 | ALDER   | 13   | 151 | FIR        | 12  | 198 | FIR     | 10       | 245 | CEDAR   | 6   | 292 | FIR     | 13,7 | 339 | ALDER   | 9  | 386 | ALDER   | 7       | 433 | CHERRY  | 11     |
| 12          | CEDAR   | 11               | 58 | ALDER   | 20 | 105 | ALDER   | 6    | 152 | FIR        | 23  | 199 | ALDER   | 9        | 246 | CEDAR   | 27  | 293 | FIR     | 15   | 340 | ALDER   | 9  | 387 | ALDER   | 7       | 434 | MAPLE   | 6,7,15 |
| 13          | CEDAR   | 6                | 59 | HEMLOCK | 20 | 106 | ALDER   | 7    | 153 | FIR        | 20  | 200 | ALDER   | 10       | 247 | MAPLE   | 15  | 294 | FIR     | 10   | 341 | ALDER   | 10 | 388 | ALDER   | 6       | 435 | MAPLE   | 12     |
| 14          | CEDAR   | 6                | 60 | MAPLE   | 18 | 107 | MAPLE   | 16   | 154 | FIR        | 19  | 201 | FIR     | 36       | 248 | HEMLOCK | 22  | 295 | FIR     | 20   | 342 | ALDER   | 10 | 389 | ALDER   | 6       | 436 | ALDER   | 9      |
| 15          | FIR     | 24               | 61 | FIR     | 30 | 108 | CEDAR   | 22   | 155 | FIR        | 17  | 202 | ALDER   | 6        | 249 | MAPLE   | 11  | 296 | MAPLE   | 10,9 | 343 | ALDER   | 12 | 390 | ALDER   | 7       | 437 | ALDER   | 10     |
| 16          | FIR     | 20               | 62 | ALDER   | 10 | 109 | MAPLE   | 14   | 156 | CEDAR      | 36  | 203 | ALDER   | 11       | 250 | CEDAR   | 48  | 297 | HEMLOCK | 10   | 344 | ALDER   | 10 | 391 | ALDER   | 7       | 438 | ALDER   | 6      |
| 17          | FIR     | 16               | 63 | ALDER   | 7  | 110 | CEDAR   | 15   | 157 | FIR        | 15  | 204 | ALDER   | 11       | 251 | CEDAR   | 26  | 298 | CEDAR   | 12   | 345 | FIR     | 32 | 392 | ALDER   | 8       | 439 | MAPLE   | 5,9,10 |
| 18          | MAPLE   | 37               | 64 | ALDER   | 9  | 111 | CEDAR   | 28   | 158 | FIR        | 27  | 205 | CEDAR   | 15,6     | 252 | CEDAR   | 6   | 299 | ALDER   | 9    | 346 | FIR     | 34 | 393 | ALDER   | 7       | 440 | MAPLE   | 18     |
| 19          | MADRONA | 15,18            | 65 | ALDER   | 17 | 112 | ALDER   | 15   | 159 | CEDAR      | 15  | 206 | ALDER   | 11       | 253 | FIR     | 21  | 300 | MADRONA | 22   | 347 | HEMLOCK | 16 | 394 | ALDER   | 7       | 441 | ALDER   | 7      |
| 20          | FIR     | 22               | 66 | HEMLOCK | 20 | 113 | CEDAR   | 24   | 160 | FIR        | 16  | 207 | HEMLOCK | 24       | 254 | CEDAR   | 17  | 301 | ALDER   | 9    | 348 | ALDER   | 9  | 395 | ALDER   | 7       | 442 | ALDER   | 7      |
| 21          | MAPLE   | 10,6             | 67 | FIR     | 30 | 114 | CEDAR   | 6    | 161 | FIR        | 16  | 208 | HEMLOCK | 20       | 255 | CEDAR   | 6   | 302 | ALDER   | 6    | 349 | FIR     | 10 | 396 | ALDER   | 10      | 443 | ALDER   | 8      |
| 22          | ALDER   | 10               | 68 | FIR     | 30 | 115 | CEDAR   | 10   | 162 | ALDER      | 9   | 209 | CEDAR   | 24       | 256 | ALDER   | 6   | 303 | ALDER   | 7    | 350 | HEMLOCK | 10 | 397 | ALDER   | 8       | 444 | ALDER   | 6      |
| 23          | ALDER   | 9                | 69 | HEMLOCK | 16 | 116 | CEDAR   | 30   | 163 | ALDER      | 6   | 210 | CEDAR   | 52       | 257 | CEDAR   | 20  | 304 | ALDER   | 14   | 351 | ALDER   | 11 | 398 | ALDER   | 7       | 445 | ALDER   | 6      |
| 24          | ALDER   | 8                | 70 | ALDER   | 14 | 117 | CEDAR   | 24   | 164 | FIR        | 26  | 211 | FIR     | 27       | 258 | CEDAR   | 32  | 305 | ALDER   | 14   | 352 | FIR     | 15 | 399 | ALDER   | 7       | 446 | ALDER   | 7      |
| 25          | ALDER   | 8                | 71 | ALDER   | 6  | 118 | MAPLE   | 6    | 165 | FIR        | 20  | 212 | ALDER   | 11       | 259 | CEDAR   | 17  | 306 | MAPLE   | 22   | 353 | HEMLOCK | 12 | 400 | ALDER   | 7       | 447 | ALDER   | 7      |
| 26          | ALDER   | 8                | 72 | ALDER   | 6  | 119 | ALDER   | 14   | 166 | ALDER      | 9   | 213 | ALDER   | 12       | 260 | CEDAR   | 36  | 307 | MAPLE   | 27   | 354 | HEMLOCK | 12 | 401 | CHERRY  | 10      | 448 | ALDER   | 7      |
| 27          | ALDER   | 8                | 73 | ALDER   | 7  | 120 | ALDER   | 9    | 167 | ALDER      | 10  | 214 | CEDAR   | 15,15    | 261 | FIR     | 48  | 308 | ALDER   | 7,7  | 355 | CEDAR   | 6  | 402 | ALDER   | 8       | 449 | MAPLE   | 12     |
| 28          | ALDER   | 8                | 74 | ALDER   | 7  | 121 | FIR     | 22   | 168 | ALDER      | 6   | 215 | FIR     | 12       | 262 | HEMLOCK | 16  | 309 | MAPLE   | 14   | 356 | CEDAR   | 14 | 403 | ALDER   | 10      | 450 | ALDER   | 7      |
| 29          | ALDER   | 10               | 75 | ALDER   | 7  | 122 | ALDER   | 6    | 169 | ALDER      | 6   | 216 | FIR     | 27       | 263 | CEDAR   | 9   | 310 | MAPLE   | 9    | 357 | CEDAR   | 12 | 404 | ALDER   | 7       | 451 | ALDER   | 10     |
| 30          | ALDER   | 8                | 76 | CEDAR   | 10 | 123 | FIR     | 24   | 170 | CHERRY     | 8   | 217 | CEDAR   | 19       | 264 | CEDAR   | 6   | 311 | ALDER   | 7    | 358 | FIR     | 26 | 405 | ALDER   | 7       | 452 | MAPLE   | 10,6,6 |
| 31          | ALDER   | 9                | 77 | FIR     | 19 | 124 | ALDER   | 11   | 171 | CHERRY     | 6   | 218 | CEDAR   | 32       | 265 | ALDER   | 10  | 312 | FIR     | 13   | 359 | FIR     | 24 | 406 | ALDER   | 7       | 453 | ALDER   | 10     |
| 32          | ALDER   | 9                | 78 | MAPLE   | 26 | 125 | ALDER   | 11   | 172 | ALDER      | 12  | 219 | ALDER   | 12       | 266 | ALDER   | 10  | 313 | ALDER   | 11   | 360 | CEDAR   | 40 | 407 | MADRONA | 12      | 454 | ALDER   | 9      |
| 33          | FIR     | 21               | 79 | FIR     | 24 | 126 | ALDER   | 7    | 173 | COTTONWOOD | 6   | 220 | CEDAR   | 19       | 267 | CEDAR   | 6   | 314 | FIR     | 15   | 361 | ALDER   | 14 | 408 | MADRONA | 6       | 455 | ALDER   | 7      |
| 34          | ALDER   | 22               | 80 | CEDAR   | 12 | 127 | HEMLOCK | 16   | 174 | COTTONWOOD | 11  | 221 | CEDAR   | 24       | 268 | ALDER   | 7   | 315 | ALDER   | 6    | 362 | ALDER   | 7  | 409 | MADRONA | 7       | 456 | ALDER   | 7      |
| 35          | MAPLE   | 11               | 81 | CEDAR   | 7  | 128 | ALDER   | 6    | 175 | CHERRY     | 6   | 222 | CEDAR   | 15,18,6  | 269 | CEDAR   | 36  | 316 | ALDER   | 8    | 363 | MAPLE   | 17 | 410 | FIR     | 29      | 457 | ALDER   | 6      |
| 36          | HEMLOCK | 9                | 82 | ALDER   | 13 | 129 | ALDER   | 7    | 176 | ALDER      | 6   | 223 | CEDAR   | 19       | 270 | CEDAR   | 10  | 317 | FIR     | 7    | 364 | ALDER   | 7  | 411 | FIR     | 29      | 458 | MAPLE   | 27     |
| 37          | MAPLE   | 22               | 83 | FIR     | 10 | 130 | MAPLE   | 12   | 177 | CEDAR      | 10  | 224 | CEDAR   | 20       | 271 | CEDAR   | 29  | 318 | FIR     | 6    | 365 | FIR     | 19 | 412 | FIR     | 37      | 459 | ALDER   | 6      |
| 38          | MAPLE   | 14               | 84 | ALDER   | 12 | 131 | ALDER   | 6    | 178 | FIR        | 22  | 225 | MAPLE   | 12       | 272 | CEDAR   | 30  | 319 | ALDER   | 8    | 366 | FIR     | 18 | 413 | HEMLOCK | 16      | 460 | ALDER   | 7      |
| 39          | FIR     | 22               | 85 | ALDER   | 8  | 132 | ALDER   | 6    | 179 | ALDER      | 10  | 226 | CEDAR   | 12       | 273 | CEDAR   | 38  | 320 | ALDER   | 7    | 367 | FIR     | 19 | 414 | MADRONA | 7       | 461 | ALDER   | 6      |
| 40          | CEDAR   | 10               | 86 | FIR     | 8  | 133 | ALDER   | 10   | 180 | ALDER      | 6,7 | 227 | CEDAR   | 21       | 274 | ALDER   | 14  | 321 | FIR     | 15   | 368 | HEMLOCK | 22 | 415 | MAPLE   | 9,12,17 | 462 | ALDER   | 6      |
| 41          | FIR     | 15               | 87 | ALDER   | 10 | 134 | CEDAR   | 34   | 181 | FIR        | 23  | 228 | CEDAR   | 24       | 275 | ALDER   | 6,7 | 322 | ALDER   | 8    | 369 | MAPLE   | 18 | 416 | FIR     | 18      | 463 | ALDER   | 7      |
| 42          | MAPLE   | 28               | 88 | FIR     | 8  | 135 | CEDAR   | 8    | 182 | ALDER      | 6   | 229 | ALDER   | 15       | 276 | ALDER   | 8   | 323 | ALDER   | 6    | 370 | FIR     | 7  | 417 | FIR     | 17      | 464 | ALDER   | 8      |
| 43          | CEDAR   | 11               | 89 | ALDER   | 8  | 136 | MAPLE   | 12   | 183 | ALDER      | 6   | 230 | CEDAR   | 14       | 277 | ALDER   | 10  | 324 | ALDER   | 7    | 371 | ALDER   | 10 | 418 | MAPLE   | 9       | 465 | ALDER   | 7      |
| 44          | ALDER   | 9                | 90 | HEMLOCK | 20 | 137 | CEDAR   | 15   | 184 | ALDER      | 6   | 231 | CEDAR   | 19       | 278 | ALDER   | 12  | 325 | ALDER   | 7    | 372 | ALDER   | 6  | 419 | MAPLE   | 36      | 466 | ALDER   | 7      |
| 45          | ALDER   | 7                | 91 | ALDER   | 6  | 138 | FIR     | 26   | 185 | ALDER      | 8   | 232 | CEDAR   | 19       | 279 | FIR     | 18  | 326 | ALDER   | 8    | 373 | ALDER   | 6  | 420 | HEMLOCK | 12      | 467 | ALDER   | 8      |
| 46          | ALDER   | 6                | 92 | ALDER   | 9  | 139 | CEDAR   | 15   | 186 | ALDER      | 7   | 233 | CEDAR   | 16,16,12 | 280 | FIR     | 9   | 327 | ALDER   | 6,6  | 374 | ALDER   | 6  | 421 | CEDAR   | 10      | 468 | ALDER   | 13     |



TREE RETENTION CALCULATIONS

ALDER AND COTTONWOOD TREES ARE NOT CONSIDERED SIGNIFICANT SO ARE NOT INCLUDED IN THE SIGNIFICANT TREE CALCULATIONS.

MINIMUM 25% OF EXISTING SIGNIFICANT TREES REQUIRED TO BE RETAINED  
497 TOTAL EXISTING SIGNIFICANT TREES  
290 TREES PROPOSED TO BE REMOVED  
207 TREES PROPOSED TO BE RETAINED

207 / 497 = 41.6% OF EXISTING TREES PROPOSED TO BE RETAINED



ISSUED FOR CONSTRUCTION

DATE: \_\_\_\_\_



BARGHAUSEN CONSULTING ENGINEERS INC.

18215 72ND AVENUE SOUTH  
KENT, WA 98032  
(425)251-6222  
(425)251-8782 FAX

DESIGNED BY: JMV  
DRAWN BY: JMV  
CHECKED BY: KEH  
APPROVED BY: JGH  
SCALE:  
OTHER:

SWEDE HILL, LLC  
P.O. BOX 1397  
TACOMA, WA 98401

EXISTING TREE INVENTORY  
LEGEND  
  
CANTERWOOD COMMERCIAL  
CENTER  
GIG HARBOR

PERMIT NO.

DRAWING NO.

SHEET OF  
L-7 8



| REVISIONS |            |                                               |
|-----------|------------|-----------------------------------------------|
| 4         | 10/29/2018 | REVISED PER COMMENTS                          |
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| 7         | 10/16/2019 | PLANT MATERIAL AT TOP OF ROCK WALLS           |
| 8         | 5/22/2020  | REVISED PER COMMENTS                          |
| 9         | 10/21/2020 | REVISED PER COMMENTS                          |
| 10        | 1/21/2021  | REVISED PER CITY REVIEW COMMENTS JANUARY 2021 |
| 11        | 3/11/2021  | REVISED, TREES #416 AND #417                  |



|     |        |            |     |         |      |     |         |       |     |         |           |     |         |             |     |         |    |     |         |    |     |            |        |
|-----|--------|------------|-----|---------|------|-----|---------|-------|-----|---------|-----------|-----|---------|-------------|-----|---------|----|-----|---------|----|-----|------------|--------|
| 469 | ALDER  | 8          | 516 | FIR     | 12   | 563 | MAPLE   | 6     | 610 | FIR-    | 26        | 657 | FIR     | 29          | 704 | ALDER   | 11 | 751 | FIR-    | 11 | 798 | FIR-       | 24     |
| 470 | ALDER  | 9          | 517 | MAPLE   | 10   | 564 | FIR-    | 26    | 611 | FIR-    | 25        | 658 | MAPLE   | 15          | 705 | ALDER   | 9  | 752 | CEDAR   | 10 | 799 | FIR-       | 19     |
| 471 | ALDER  | 13         | 518 | ALDER   | 6    | 565 | FIR-    | 20    | 612 | MAPLE   | 6         | 659 | FIR-    | 11          | 706 | CEDAR   | 34 | 753 | FIR-    | 24 | 800 | MAPLE      | 12     |
| 472 | ALDER  | 9          | 519 | ALDER   | 6    | 566 | FIR-    | 16    | 613 | MAPLE   | 6         | 660 | FIR     | 12          | 707 | ALDER   | 6  | 754 | FIR-    | 17 | 801 | FIR-       | 26     |
| 473 | ALDER  | 7          | 520 | ALDER   | 11   | 567 | FIR-    | 19    | 614 | MAPLE   | 8         | 661 | FIR-    | 30          | 708 | MAPLE   | 9  | 755 | FIR-    | 6  | 802 | FIR        | 20     |
| 474 | ALDER  | 7          | 521 | ALDER   | 11   | 568 | HEMLOCK | 13    | 615 | MAPLE   | 7         | 662 | FIR-    | 26          | 709 | ALDER   | 19 | 756 | MAPLE   | 11 | 803 | ALDER      | 18     |
| 475 | ALDER  | 7          | 522 | ALDER   | 12   | 569 | FIR-    | 24    | 616 | CHERRY  | 14        | 663 | FIR-    | 19          | 710 | FIR-    | 22 | 757 | FIR-    | 32 | 804 | FIR        | 21     |
| 476 | CEDAR  | 36         | 523 | ALDER   | 7    | 570 | FIR-    | 16    | 617 | CHERRY  | 6         | 664 | ALDER   | 6           | 711 | FIR-    | 8  | 758 | FIR-    | 26 | 805 | FIR        | 36     |
| 477 | MAPLE  | 22, 9      | 524 | ALDER   | 8    | 571 | FIR-    | 19    | 618 | HEMLOCK | 18        | 665 | MAPLE   | 6, 8, 9, 26 | 712 | FIR-    | 13 | 759 | FIR-    | 6  | 806 | ALDER      | 7, 11  |
| 478 | ALDER  | 7          | 525 | ALDER   | 9    | 572 | CEDAR   | 6     | 619 | FIR-    | 27        | 666 | FIR     | 13          | 713 | FIR-    | 48 | 760 | FIR     | 19 | 807 | FIR        | 21     |
| 479 | ALDER  | 8          | 526 | ALDER   | 7    | 573 | MADRONA | 29    | 620 | MAPLE   | 6         | 667 | HEMLOCK | 7           | 714 | FIR-    | 7  | 761 | FIR     | 20 | 808 | FIR        | 9      |
| 480 | ALDER  | 9          | 527 | ALDER   | 8    | 574 | ALDER   | 6     | 621 | ALDER   | 6         | 668 | CEDAR   | 11          | 715 | MADRONA | 23 | 762 | FIR     | 13 | 809 | FIR        | 11     |
| 481 | ALDER  | 6          | 528 | ALDER   | 11   | 575 | ALDER   | 8     | 622 | ALDER   | 6         | 669 | CEDAR   | 9           | 716 | MADRONA | 16 | 763 | FIR     | 15 | 810 | ALDER      | 6      |
| 482 | ALDER  | 9          | 529 | ALDER   | 7    | 576 | ALDER   | 7     | 623 | ALDER   | 6         | 670 | CEDAR   | 6           | 717 | FIR-    | 26 | 764 | MAPLE   | 9  | 811 | MAPLE      | 13, 9  |
| 483 | ALDER  | 7          | 530 | HEMLOCK | 28   | 577 | ALDER   | 10    | 624 | ALDER   | 6         | 671 | ALDER   | 18          | 718 | FIR-    | 7  | 765 | CEDAR   | 17 | 812 | MAPLE      | 6      |
| 484 | ALDER  | 6          | 531 | HEMLOCK | 9    | 578 | ALDER   | 7     | 625 | ALDER   | 6         | 672 | ALDER   | 10, 11      | 719 | FIR     | 16 | 766 | FIR-    | 26 | 813 | CEDAR      | 17, 18 |
| 485 | ALDER  | 10         | 532 | CEDAR   | 9    | 579 | ALDER   | 24    | 626 | ALDER   | 6         | 673 | ALDER   | 7           | 720 | MADRONA | 15 | 767 | CEDAR   | 11 | 814 | MAPLE      | 24     |
| 486 | ALDER  | 8          | 533 | ALDER   | 12   | 580 | ALDER   | 18    | 627 | ALDER   | 7         | 674 | ALDER   | 6           | 721 | MADRONA | 8  | 768 | HEMLOCK | 13 | 815 | FIR        | 10     |
| 487 | ALDER  | 11         | 534 | ALDER   | 9    | 581 | ALDER   | 17    | 628 | MAPLE   | 6, 6      | 675 | ALDER   | 6           | 722 | FIR     | 6  | 769 | FIR-    | 24 | 816 | FIR        | 7      |
| 488 | ALDER  | 11         | 535 | ALDER   | 9    | 582 | FIR     | 23    | 629 | ALDER   | 7         | 676 | ALDER   | 6           | 723 | FIR-    | 10 | 770 | FIR     | 15 | 817 | FIR        | 6      |
| 489 | MAPLE  | 19         | 536 | ALDER   | 16   | 583 | ALDER   | 8     | 630 | ALDER   | 6         | 677 | CEDAR   | 6           | 724 | ALDER   | 12 | 771 | FIR     | 18 | 818 | CEDAR      | 24     |
| 490 | ALDER  | 6, 6       | 537 | CEDAR   | 36   | 584 | FIR-    | 19    | 631 | ALDER   | 7         | 678 | CEDAR   | 20, 6       | 725 | FIR     | 19 | 772 | FIR     | 12 | 819 | FIR        | 23     |
| 491 | MAPLE  | 19         | 538 | ALDER   | 12   | 585 | CEDAR   | 6     | 632 | CHERRY  | 11        | 679 | CEDAR   | 7           | 726 | CEDAR   | 19 | 773 | FIR     | 19 | 820 | FIR        | 23     |
| 492 | MAPLE  | 12, 13, 18 | 539 | ALDER   | 7    | 586 | ALDER   | 7     | 633 | MAPLE   | 48        | 680 | MAPLE   | 9, 21       | 727 | ALDER   | 15 | 774 | FIR-    | 23 | 821 | FIR        | 6      |
| 493 | FIR    | 24         | 540 | ALDER   | 6    | 587 | ALDER   | 7     | 634 | MAPLE   | 9, 12, 13 | 681 | CEDAR   | 8           | 728 | ALDER   | 14 | 775 | FIR-    | 23 | 822 | CEDAR      | 6      |
| 494 | FIR    | 17         | 541 | ALDER   | 8    | 588 | ALDER   | 8     | 635 | MADRONA | 12        | 682 | CEDAR   | 18          | 729 | ALDER   | 11 | 776 | FIR-    | 11 | 823 | COTTONWOOD | 14     |
| 495 | FIR-   | 15         | 542 | ALDER   | 7    | 589 | FIR-    | 16    | 636 | HEMLOCK | 14        | 683 | CEDAR   | 6           | 730 | ALDER   | 11 | 777 | FIR-    | 19 | 824 | FIR        | 13     |
| 496 | FIR-   | 18         | 543 | ALDER   | 9    | 590 | FIR-    | 23    | 637 | MAPLE   | 8         | 684 | HEMLOCK | 13          | 731 | FIR     | 30 | 778 | FIR-    | 9  | 825 | CHERRY     | 6      |
| 497 | MAPLE  | 6          | 544 | ALDER   | 9    | 591 | FIR-    | 32    | 638 | MAPLE   | 11        | 685 | CEDAR   | 6, 14       | 732 | MAPLE   | 21 | 779 | FIR     | 11 | 826 | CHERRY     | 6      |
| 498 | ALDER  | 8          | 545 | ALDER   | 8, 7 | 592 | MAPLE   | 11    | 639 | ALDER   | 6         | 686 | CEDAR   | 22          | 733 | FIR     | 13 | 780 | FIR     | 8  |     |            |        |
| 499 | MAPLE  | 7          | 546 | ALDER   | 8    | 593 | ALDER   | 11    | 640 | ALDER   | 7         | 687 | CEDAR   | 6           | 734 | FIR-    | 14 | 781 | CEDAR   | 36 |     |            |        |
| 500 | ALDER  | 7          | 547 | ALDER   | 7    | 594 | ALDER   | 10    | 641 | ALDER   | 8         | 688 | CEDAR   | 6           | 735 | ALDER   | 6  | 782 | FIR     | 22 |     |            |        |
| 501 | CHERRY | 6          | 548 | ALDER   | 8    | 595 | ALDER   | 6     | 642 | ALDER   | 7         | 689 | CEDAR   | 8           | 736 | ALDER   | 7  | 783 | FIR     | 36 |     |            |        |
| 502 | ALDER  | 9          | 549 | ALDER   | 10   | 596 | ALDER   | 10    | 643 | ALDER   | 10        | 690 | FIR-    | 14          | 737 | ALDER   | 6  | 784 | FIR     | 8  |     |            |        |
| 503 | ALDER  | 6          | 550 | ALDER   | 6    | 597 | ALDER   | 8     | 644 | ALDER   | 7         | 691 | MAPLE   | 9           | 738 | ALDER   | 8  | 785 | MAPLE   | 7  |     |            |        |
| 504 | MAPLE  | 7, 9       | 551 | ALDER   | 10   | 598 | MAPLE   | 9     | 645 | ALDER   | 6         | 692 | HEMLOCK | 15          | 739 | MADRONA | 19 | 786 | MAPLE   | 15 |     |            |        |
| 505 | MAPLE  | 9          | 552 | FIR     | 24   | 599 | CHERRY  | 10    | 646 | MAPLE   | 7         | 693 | HEMLOCK | 22          | 740 | ALDER   | 8  | 787 | FIR     | 8  |     |            |        |
| 506 | MAPLE  | 6          | 553 | HEMLOCK | 10   | 600 | MAPLE   | 14    | 647 | MAPLE   | 11, 7     | 694 | FIR     | 26          | 741 | FIR-    | 24 | 788 | FIR     | 8  |     |            |        |
| 507 | CEDAR  | 56         | 554 | FIR     | 24   | 601 | MAPLE   | 11, 6 | 648 | MAPLE   | 14        | 695 | ALDER   | 11          | 742 | MAPLE   | 11 | 789 | FIR     | 8  |     |            |        |
| 508 | MAPLE  | 6          | 555 | FIR     | 8    | 602 | MADRONA | 11    | 649 | ALDER   | 8         | 696 | CEDAR   | 29          | 743 | MAPLE   | 19 | 790 | FIR     | 8  |     |            |        |
| 509 | MAPLE  | 17         | 556 | ALDER   | 7    | 603 | MAPLE   | 8, 8  | 650 | CEDAR   | 6         | 697 | ALDER   | 9           | 744 | FIR-    | 14 | 791 | FIR     | 8  |     |            |        |
| 510 | ALDER  | 7          | 557 | FIR-    | 19   | 604 | ALDER   | 7     | 651 | CEDAR   | 14        | 698 | HEMLOCK | 19          | 745 | FIR-    | 32 | 792 | MAPLE   | 19 |     |            |        |
| 511 | MAPLE  | 13         | 558 | FIR     | 19   | 605 | MADRONA | 12, 8 | 652 | FIR     | 21        | 699 | CEDAR   | 13          | 746 | FIR-    | 28 | 793 | FIR     | 32 |     |            |        |
| 512 | ALDER  | 12         | 559 | FIR-    | 20   | 606 | MAPLE   | 6     | 653 | HEMLOCK | 13        | 700 | CEDAR   | 6, 17, 36   | 747 | FIR-    | 11 | 794 | FIR     | 38 |     |            |        |
| 513 | ALDER  | 15         | 560 | MAPLE   | 16   | 607 | FIR-    | 21    | 654 | MAPLE   | 11        | 701 | CEDAR   | 6           | 748 | ALDER   | 8  | 795 | MAPLE   | 14 |     |            |        |
| 514 | MAPLE  | 36, 16     | 561 | FIR-    | 23   | 608 | CHERRY  | 9     | 655 | MAPLE   | 17        | 702 | ALDER   | 11          | 749 | FIR-    | 16 | 796 | FIR     | 10 |     |            |        |
| 515 | ALDER  | 7          | 562 | MAPLE   | 40   | 609 | FIR-    | 22    | 656 | MAPLE   | 30, 15    | 703 | MAPLE   | 48          | 750 | FIR-    | 26 | 797 | FIR-    | 15 |     |            |        |

STRIKE THROUGH TREES PROPOSED  
TO BE REMOVED

NON-STRIKE THROUGH TREES PROPOSED TO BE  
RETAINED

| REVISIONS |            |                                               |
|-----------|------------|-----------------------------------------------|
| 4         | 10/29/2018 | REVISED PER COMMENTS                          |
| 5         | 4/2/2019   | REVISED PER COMMENTS                          |
| 6         | 9/26/2019  | REVISED WETLAND CREATION AREA                 |
| 7         | 10/16/2019 | PLANT MATERIAL AT TOP OF ROCK WALLS           |
| 8         | 5/22/2020  | REVISED PER COMMENTS                          |
| 9         | 10/21/2020 | REVISED PER COMMENTS                          |
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BARGHAUSEN CONSULTING  
ENGINEERS INC.

18215 72ND AVENUE SOUTH  
KENT, WA 98032  
(425)251-6222  
(425)251-8782 FAX

|              |     |
|--------------|-----|
| DESIGNED BY: | JMV |
| DRAWN BY:    | JMV |
| CHECKED BY:  | KEH |
| APPROVED BY: | JGH |
| SCALE:       |     |
| OTHER:       |     |

SWEDE HILL, LLC  
P.O. BOX 1397  
TACOMA, WA 98401

| EXISTING TREE INVENTORY<br>LEGEND             |  |
|-----------------------------------------------|--|
| CANTERWOOD COMMERCIAL<br>CENTER<br>GIG HARBOR |  |

|             |    |
|-------------|----|
| PERMIT NO.  |    |
| DRAWING NO. |    |
| SHEET       | OF |
| L-8         | 8  |



ISSUED FOR CONSTRUCTION

DATE: \_\_\_\_\_



**Canterwood Commercial  
Center**

PL-SPR-07-0004 et al  
Hearing Examiner

**Exhibit J**



GENERAL INFORMATION





# Hello!

When Redi-Rock launched in 2000, the introduction of large, wetcast blocks changed the retaining wall industry. Nineteen years later as we publish our latest version of the Design Resource Manual, we’re aiming to change more than an industry—we’re aiming to reinforce the ways that we, together, are changing the world in concrete ways.

We know that the work you do makes an impact in your community, and we’re honored each time you choose Redi-Rock to solve problems and improve people’s lives. In recognition of that, we’ll continue to strive to be a leader in the industry, providing the design tools and engineering resources you need to do that valuable work.

Within this manual, you’ll see the latest innovation of the Redi-Rock system in Redi-Rock XL Hollow-Core Retaining blocks. Standing 36 inches (914 millimeters) tall and available in 52, 72, and 96-inch (1,320, 1,830, and 2,440-millimeter) widths, Redi-Rock XL blocks integrate with the rest of the proven system—including Magic, Positive Connection, Freestanding, and our standard Gravity blocks—helping you optimize taller walls in tighter spaces.

Also within these pages, you’ll find answers to frequently asked questions, case studies, a detailed library of products, preliminary height guides, detailed design information, specifications, installation instructions, typical details, and much more. The information in this publication is intended to supplement even more information available anytime on our website at [redi-rock.com](https://www.redi-rock.com).

If you’re not finding what you’re looking for or if there is anything we can do for you, please let us know how we can help.

Sincerely,



**Jamie Johnson, PE**  
Director of Engineering and Operations

Redi-Rock International  
[engineering@redi-rock.com](mailto:engineering@redi-rock.com)  
(866) 222-8400 ext. 3010



# Frequently Asked Questions

## WHAT IS REDI-ROCK?

Redi-Rock is a line of precast products made from durable, first-purpose, air-entrained, wet-cast concrete. The most common Redi-Rock products are large retaining wall blocks.

Often referred to as one-ton Lego blocks, Redi-Rock blocks vary in width from 28 inches (710 millimeters) to 96 inches (2.44 meters) and in weight from 1,200 pounds (544 kilograms) to 3,500 pounds (1,588 kilograms). In many instances, the Redi-Rock retaining wall blocks are big enough that they can be simply stacked on top of each other to construct a “gravity” wall. For even taller and/or more heavily loaded retaining walls, the Redi-Rock Positive Connection (PC) System can be used to construct a Mechanically Stabilized Earth (MSE) wall.

However, Redi-Rock is much more than simply large retaining wall blocks. Redi-Rock freestanding blocks have the same great look as the retaining blocks, with texture on two or more sides. These freestanding blocks are perfect for perimeter walls, entrance monuments, or parapet walls. Redi-Rock accessory products

include column blocks, steps, and caps. These accessories are perfect for completing your project. We even have products like Pole Base® concrete foundations for light poles, driveway monuments, and signs.

## WHO MAKES REDI-ROCK PRODUCTS?

Redi-Rock products are produced by over 130 independently-owned manufacturers located all over the globe. Contact information for the Redi-Rock manufacturer in your area is available anytime at [redi-rock.com](http://redi-rock.com).

## WHO DESIGNS REDI-ROCK RETAINING WALLS?

The answer to this question depends on what you are trying to accomplish. If you want to get a good idea of how Redi-Rock products can work for your project, the preliminary height guides in this *Design Resource Manual* are a great place to start. These guides show Redi-Rock wall sections in different assumed soil and loading conditions, and they can quickly help you determine what sections will likely work for your particular project.

When you want to build a wall, there simply is no substitute for

detailed plans prepared by a licensed engineer who routinely designs retaining walls. Licensed professionals have proven themselves with years of study and practice, and they are uniquely qualified to create an optimal design for the specific conditions of your project. In addition, a seal of the calculations and design drawings by a “Design Professional of Responsible Charge” is generally required by the International Building Code (Section 105.2) for all walls over four feet (1,219 millimeters) in height.

## WHO INSTALLS REDI-ROCK RETAINING WALLS?

Redi-Rock walls are typically constructed by earth excavating contractors or landscaping contractors using large pieces of earth-moving equipment. General contractors that have experience building Redi-Rock walls can be excellent resources for your project. Your local Redi-Rock manufacturer will often have close working relationships with the wall installers in your area and can be a great source of information.

Wondering how to install Redi-Rock? We can help there, too. Redi-Rock

has a detailed *Installation Manual* that covers the basic installation steps. We also have several typical construction details showing how to build common things like 90-degree corners, curves, barriers, or other features in your wall. These resources are available in this *Design Resource Manual* and online at [redi-rock.com](http://redi-rock.com).

## HOW MUCH DO REDI-ROCK WALLS COST?

Since every project is different, there is no single price for a Redi-Rock wall. Several things must be accounted for, including material, labor, and shipping costs. Materials include Redi-Rock blocks, drainage aggregates, geotextiles, drain pipes, and possibly even select fill; however, project costs are much more than just the sum of material costs. Although Redi-Rock blocks may have a higher price per unit than smaller, dry-cast retaining wall products or blocks made from inferior materials like return concrete, they provide significant savings due to installation speed and product longevity.

The true cost of a Redi-Rock wall must be evaluated on the cost

per area of wall face (dollars per square foot or square meter) of the completed structure over the full life of the structure. For taller mechanically stabilized earth walls, part of the cost per square unit area of the retaining wall includes the factory cut geogrid strips that are used with the PC blocks. These strips are specifically manufactured and certified for width and strength, providing construction efficiencies and design reliability that add value to your project.

The real value in Redi-Rock retaining walls comes from superior engineering, high-quality products, and unbeatable face textures that lead to extremely robust and attractive structures that will last for a lifetime. It is because of the intricacies and complexities of each unique project that the very best source for pricing is typically from the Redi-Rock manufacturer located closest to your project site. Find the closest manufacturer at [redi-rock.com](http://redi-rock.com).

## WILL REDI-ROCK WORK FOR MY PROJECT?

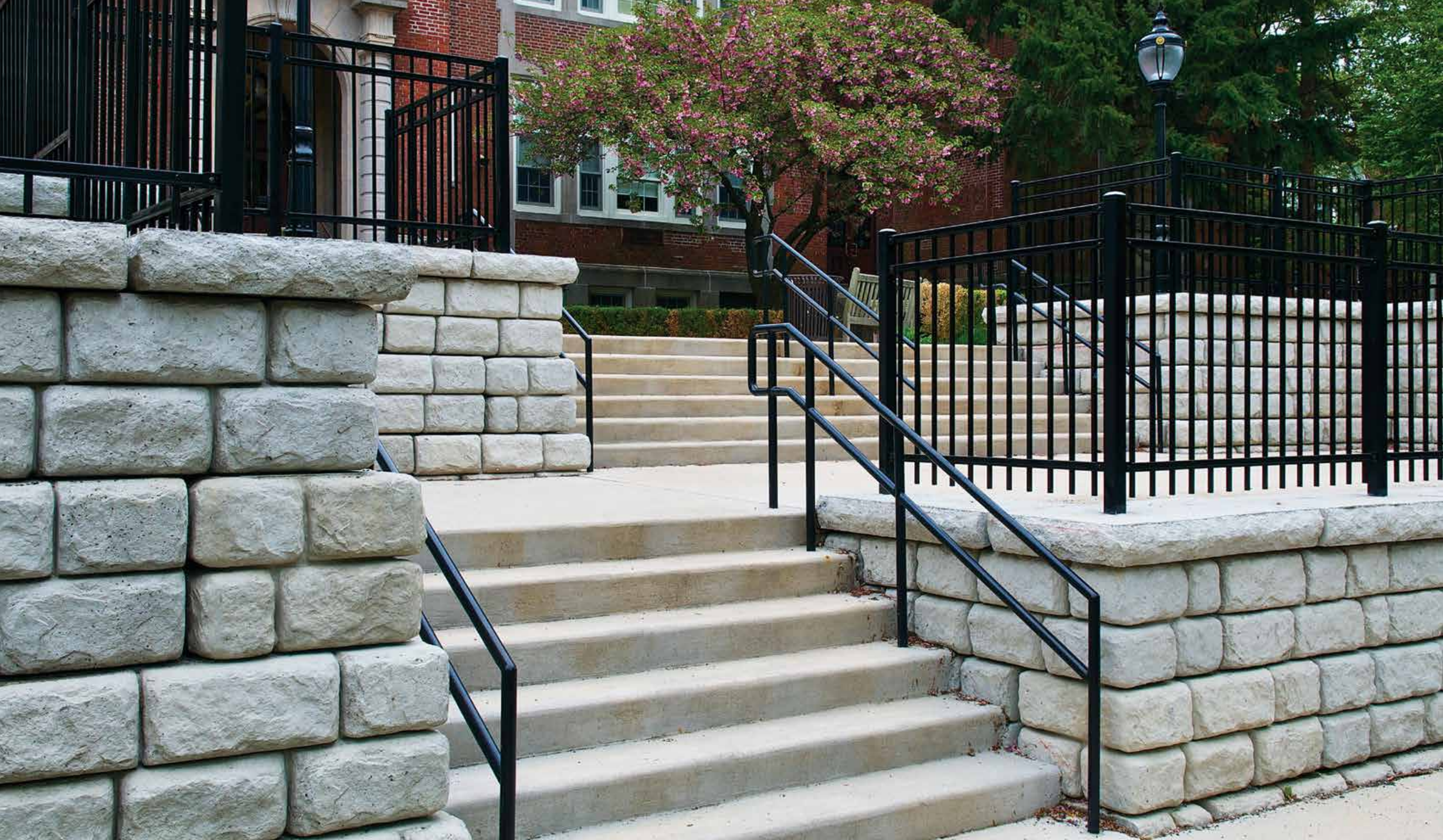
Redi-Rock has been used with outstanding success on a myriad of different retaining wall applications.

Some examples are retaining walls in water applications (seawalls, bank stabilization, channelization, and detention ponds), bridge abutments, parks, residential projects, commercial projects, highway walls, GRS-IBS structures, and even rail applications. Chances are, someone has already figured out a way to use Redi-Rock on a project just like yours. There are hundreds of case studies available at [redi-rock.com](http://redi-rock.com) that will help you visualize how Redi-Rock can be used to make your project a reality.

## I HAVE MORE QUESTIONS... WHAT SHOULD I DO?

Quite simply, ask. Your local Redi-Rock manufacturer is a great place to start. Often they have working relationships with wall design engineers and local installers. You can also contact Redi-Rock International, either through your local manufacturer or directly by calling **(866) 222-8400** or by email at [engineering@redi-rock.com](mailto:engineering@redi-rock.com). We have engineers on staff who can help answer general design questions, provide specific information about our products, and point you in the right direction to successfully design and install your own outstanding Redi-Rock retaining wall.





CASE STUDIES



# Changing the World in Concrete Ways

On the pages to follow, you'll find a few case studies outlining how the Redi-Rock system is used to solve various retaining wall challenges. We hope they, along with the myriad of others found online at [redi-rock.com](https://www.redi-rock.com), provide the confidence and context you need to design and install Redi-Rock.

We also hope they provide a spark of inspiration about how the work you do can change the lives around you. If you have a story to share about how a Redi-Rock project you were involved with is changing the world in concrete ways—like providing a recreational connection for two mountain towns or protecting residents of a seaside community from 100-year storms—we want to hear it.

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Nominate projects that  
are improving lives at  
**[redi-rock.com/nominate](https://www.redi-rock.com/nominate)**.

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WATER APPLICATION:

# Ocean Marina Wall Weathers Massive Storms

## THE CHALLENGE

In the spring of 2012, a massive construction project to transform Rhyl’s riverfront area broke ground. Rhyl, located in North Wales on the Irish Sea at the mouth of the River Clwyd, is part of the Wales Coast Path which follows the entire coast-line of Wales.

The goal of the project was to increase tourism and boost the local economy, as well as deepen the river channel, enlarge the marina, and provide coastal erosion and flood protection. To accomplish this, the site required a retaining wall solution that could meet the complex structural requirements of the site—including significant tidal fluctuations—while providing a scenic park route for pedestrians and cyclists.

## THE SOLUTION

Designers for the project chose Redi-Rock Positive Connection (PC) blocks to create the harbor wall that stands 24.3 feet (7.4 meters) high and stretches 617 feet (188 lineal meters). Produced locally by Redi-Rock manufacturer CPM Group, the Redi-Rock PC walls were able to meet the structural requirements of the site as well as provide an aesthetic Limestone finish at a lower cost than other options.

“The Redi-Rock product is very simple but massively effective,” said Jamie Turner, site agent for general contractor Dawnus Construction. “It is easy to install and the end product looks fantastic, I would definitely use this product again.”

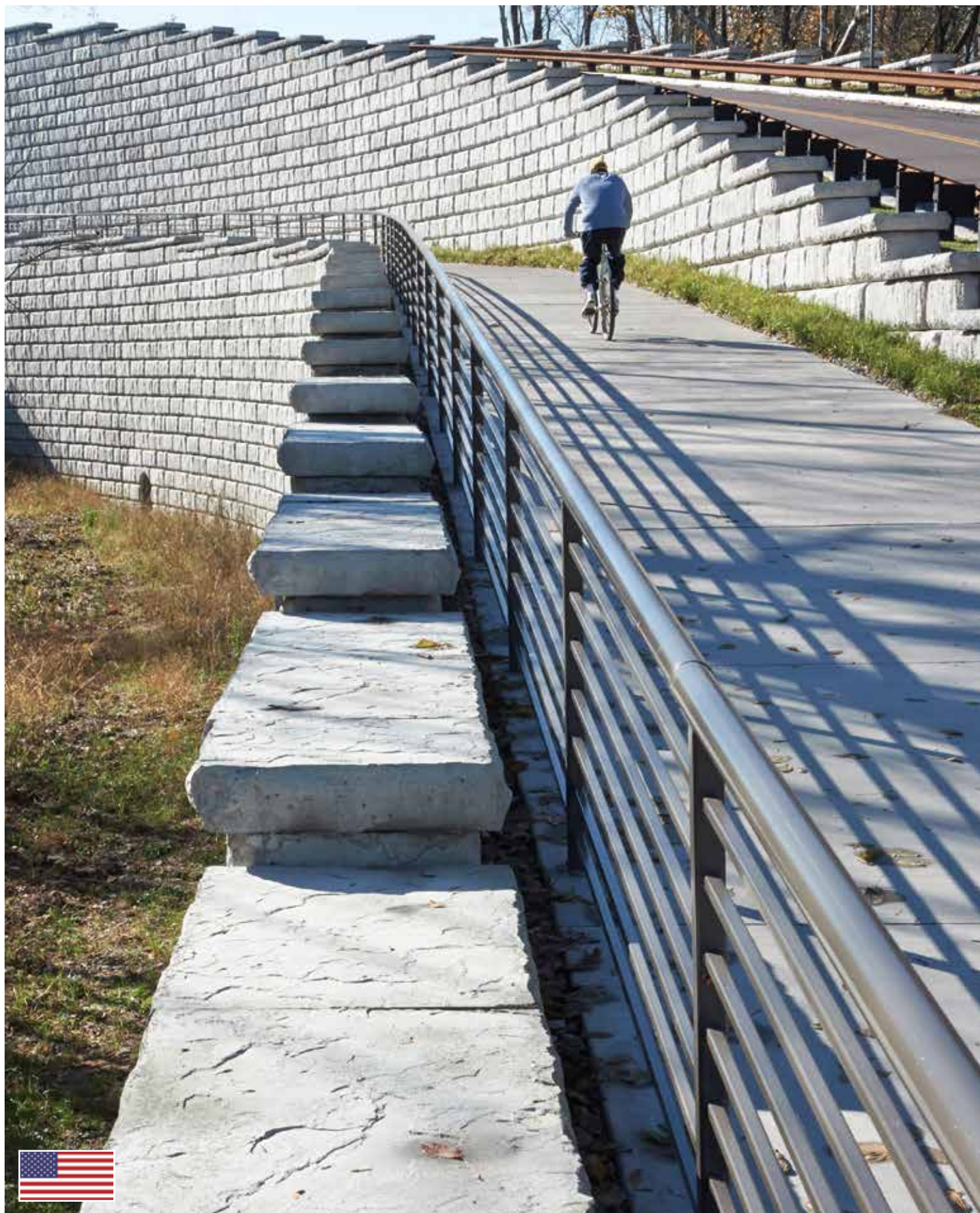
## THE OUTCOME

During the 2013-2014 winter season, the new harbor sea wall was put to the test. For days, a storm battered the United Kingdom and caused a 60-year high tidal surge. January wave heights were close to the 100-year level.

While this massive storm caused damage to many other structures in the area, designers were happy to see that the harbor wall performed exactly as engineered. The city was so impressed with how the Redi-Rock wall performed during the storm, they replaced 3,280 feet (1 kilometer) of other nearby walls with Redi-Rock.







## ROAD APPLICATION:

# Tall Reinforced Walls Make Road Construction Possible for Park

## THE CHALLENGE

Creating a 21-mile (33.8-kilometer) long park system that encompasses more than 3,800 acres (1,538 hectares) is no small task, but it's what 21st Century Parks set out to do by linking four major parks with a park drive and trail network.

Due to the diverse topography of the Louisville, Kentucky, area, 21st Century Parks needed a flexible retaining wall solution that would meet the needs across multiple phases of construction.

## THE SOLUTION

For their solution, they turned to Redi-Rock of K.I.T.

"[Redi-Rock] was chosen for a couple reasons," said Joe Daley, architect and project manager for

21st Century Parks. "One, was the aesthetics—this is a park project, not a highway project. It had to fit in with the stone and other materials being used in the park...Also, the cost and the time frame were big considerations."

The first phase of the project had both gravity and reinforced Positive Connection (PC) walls, and the next phase of the project included creating an overpass for Interstate 64 where a 1,200-square-foot (111-square-meter) gravity headwall was used.

An additional phase of the Parklands project required three separate walls, totaling 21,000 square feet (1,950 square meters) of Redi-Rock to handle the significant grade changes. One of those walls

was a 41-foot (12.5-meter) tall PC wall—the tallest Redi-Rock wall at the time of construction.

"The high efficiency of the PC system really made it possible to design tiered walls with those loads at that height," said design engineer Clint Hines, PE. "It would be hard to make it work with anything else."

## THE OUTCOME

"I think everyone is really happy with the way it looks," Daley said.

The Redi-Rock retaining walls throughout the Parklands fulfilled the technical demands and the aesthetic desire for the project, which garnered accolades from entities like the National Park Service and the American Society of Landscape Architects.



construction





UNIVERSITY APPLICATION:  
Creating Space on Campus with Redi-Rock

THE CHALLENGE

Worcester State University (WSU) started as a teacher training school in 1874, transitioned to a liberal arts and sciences school in 1963, and became a state university in 2010. As the university grew, it acquired more students but struggled to find space for additional housing.

“WSU, along with the rest of Worcester, is nothing but hills,” said Casey Scavone of Redi-Rock Walls of New England.

THE SOLUTION

WSU chose Redi-Rock Walls of New England to help expand the buildable area for a new residence hall, student union, and dining commons overlooking the sports fields.

The site included a moderate slope and global stability issues, so

design engineer Eric Merluzzi, PE, had to incorporate geogrid reinforcement into the lower wall; but, he was able to optimize the design by using the gravity blocks for the top tier of the wall.

The project also incorporated many curving walls, which Merluzzi said were simple to achieve because of the tapered block shape.

“There’s no cutting, no trimming -- the blocks fit nice and neat,” he said. “It works well.”

Aesthetics were also very important to the university. Thousands of students and visitors will view the wall each year, due to its close proximity to Coughlin Field, the main athletic field on campus.

“They wanted something that looked natural and something that would

really stick out, so New England LedgeStone was a great fit,” said Scavone.

THE OUTCOME

Despite New England winter weather conditions, installers from Ernest Guigli & Sons, Inc. were able to install the walls in a three month period. The majority of the 1,200 blocks for the project were retaining blocks, though the wall was topped with freestanding blocks and caps to provide a finished appearance.

“This was a great project for us,” said Scavone. “With all the people that are going to pass this area over the years here at WSU, it’s a fantastic project. The install was beautiful—everything came out perfect.”





## RAIL APPLICATION:

# Back-to-Back Reinforced Walls Elevate CN Rail Line

## THE CHALLENGE

In 2011, the Canadian National (CN) Railway and the Montreal Metro began construction to eliminate an at-grade crossing where the CN Rail line crossed over the Société de Transport de Montréal (STM) light commuter Metro line.

These two lines ran through a narrow corridor with several sections of track overlapping. To completely separate the tracks, plans were made to elevate the CN Rail line on a bridge structure and excavate to relocate the Metro underground. To elevate the CN Rail line, designers needed to build a gradual, walled slope leading up to a massive concrete bridge structure and then down the other side.

## THE SOLUTION

Back-to-back poured-in-place concrete walls were an option for creating the ramps, but when CN Rail geotechnical engineers saw the Redi-Rock Positive Connection (PC) blocks at the Transportation Research Board (TRB) meeting in early 2011, they began incorporating Redi-Rock PC walls from local manufacturer Graymont Materials into the design.

“The PC system is the only block with this type of connection which allowed it to handle the loads,” said David Chartier, junior engineer with V. Fournier & Associés. “When you have massive loads so near the block facing, it’s hard to make a wall that will work. The walls are very high and the load is very close, but the civil engineering of this block made it a good fit.”

To install the geogrid for a PC wall, a 12-inch (305 millimeter) wide strip of geogrid was wrapped through each retaining wall block, tying the Redi-Rock facing blocks to the reinforced soil mass with a weight independent positive connection.

## THE OUTCOME

In total, the project required 7,800 Redi-Rock blocks in the Cobblestone texture—equaling 44,850 square feet (4167 square meters). Trains made their first run on the line in late 2013, and the project has been performing exactly as engineered.

“It’s looking beautiful, that’s for sure. The city is very happy,” said Charles Poulin, ing. of CRT Construction.



construction





MUNICIPAL APPLICATION:

# Recreational Path Connects Two Colorado Mountain Towns

THE CHALLENGE

All great visions have to start somewhere. This one began with over three miles of paved multi-purpose trail winding through scenic Clear Creek Canyon.

This was no easy task, as the terrain includes steep slopes, flooding issues along the river, active landslide problems and limited space. In addition, protecting the natural habitat of endangered species was a must.

Project engineer Matt Andrews from Muller Engineering Co. said, “One of the main objectives of this project was to create a trail and retaining walls that would blend so seamlessly with the canyon that users would think it had always been there.”

THE SOLUTION

The engineers carved out the best route in the narrow canyon to create a 10-foot (3-meter) wide trail, using many miles of Redi-Rock retaining walls above and below the trail line.

“The Redi-Rock gravity system was the perfect solution for the constricted space because it doesn’t require reinforcements,” said Seth Clark from Signature Stone, the local Redi-Rock manufacturer. “In addition, Redi-Rock products allowed the walls to blend beautifully into the landscape because each block is cast in a mold taken from real natural stone—the LedgeStone texture perfectly matched the natural rock in the area.”

THE OUTCOME

“Due to the size of the blocks, along with the LedgeStone texture, we were able to design the wall to follow the grade rather than have steps in the wall,” added Clark. “This concept worked very well, and the subtle changes in the wall profile adds another level of beauty to the project.”

On July 29, 2016, the Clear Creek segment of the trail was ceremoniously opened for people to enjoy this picturesque canyon. From families out for a casual hike or bike ride, to experienced outdoor adventurers, this trail offers something for everyone.







RESIDENTIAL APPLICATION:  
Major Landscape Upgrade for Washington Home

THE CHALLENGE

Mark Hattenburg wanted to add a terrace and pool to the backyard of his home near Spokane, Washington. He knew he would need to do something about the 8-foot (2.4-meter) grade change on the property, and he really wanted something that would look good.

But, he had no design plan and wasn't quite sure where to begin.

THE SOLUTION

While driving down Little Spokane Drive one day, Rick Lindberg from local Redi-Rock manufacturer Wilbert Precast noticed an excavator in the field behind Hattenburg's house. Curious about the project and knowing it would require a retaining wall, he spoke to Hattenburg about his plans.

"He knew he needed a wall, but he just didn't know what he was going

to do," said Lindberg. Lindberg's background is in landscape design, so he offered to help Hattenburg by designing the backyard landscape using Redi-Rock.

Hattenburg owns a construction company called Hattenburg Excavation. Having installed Redi-Rock walls in the past, he knew Redi-Rock would be a good fit on this project, too.

The Hattenburgs were happy with the design which included Redi-Rock gravity retaining and freestanding walls, plus coordinating columns, steps, and caps, all in the Cobblestone texture. A waterfall feature was incorporated into the design to conceal the utilities for the pool.

Because of his professional experience with Redi-Rock, Hattenburg installed the walls himself explaining, "It was pretty

straight forward; we didn't really have a whole lot of challenges once we got the plans set."

THE OUTCOME

Over 500 Redi-Rock blocks were used to complete the beautiful yard and pool area with walls that went up to 10 feet (3 meters) high at the tallest point.

Hattenburg and his family are very pleased with how their backyard turned out.

"They all like it...we're always in the backyard in the pool," Hattenburg said. In fact, they are now using Redi-Rock for more property updates.

"We're working on designing his entry now," said Lindberg.





REDI-ROCK XL APPLICATION

# XL Hollow-Core Retaining Blocks Optimize Gravity Wall at Airport

THE CHALLENGE

When the excavation for a cut wall at John C. Tune Airport in Nashville, Tennessee, unearthed a geotechnical can of worms, it was time to go back to the drawing board to design a taller wall.

Civil Constructors unearthed that an unstable fill material had been used on the development of the adjacent property, which created an issue with the crest slope of the wall. There were also buried boulders instead of solid rock in some locations, and the limestone rock cut wasn't as tall as originally anticipated.

THE SOLUTION

After exploring several alternatives, wall design engineer Clint Hines, P.E., was able to keep the wall a

Redi-Rock gravity wall by using the newest innovation in the Redi-Rock system—Redi-Rock XL Hollow-core Retaining blocks.

“The only way we could get up and down at the heights that were now required was really going to be with the XL units,” said Hines. Three new block sizes round out the Redi-Rock system to help build taller walls in tight spaces while using less concrete.

For this wall in particular, Hines was able to reach a maximum height of 25.5 feet (7.8 meters), using 806 XL blocks of various widths, then transitioning to standard Redi-Rock blocks at the top of the wall to optimize the design.

He worked closely with the project geotechnical engineer to gather

new, accurate data, and then used the Redi-Rock Wall Professional software program to design, analyze, and optimize the wall.

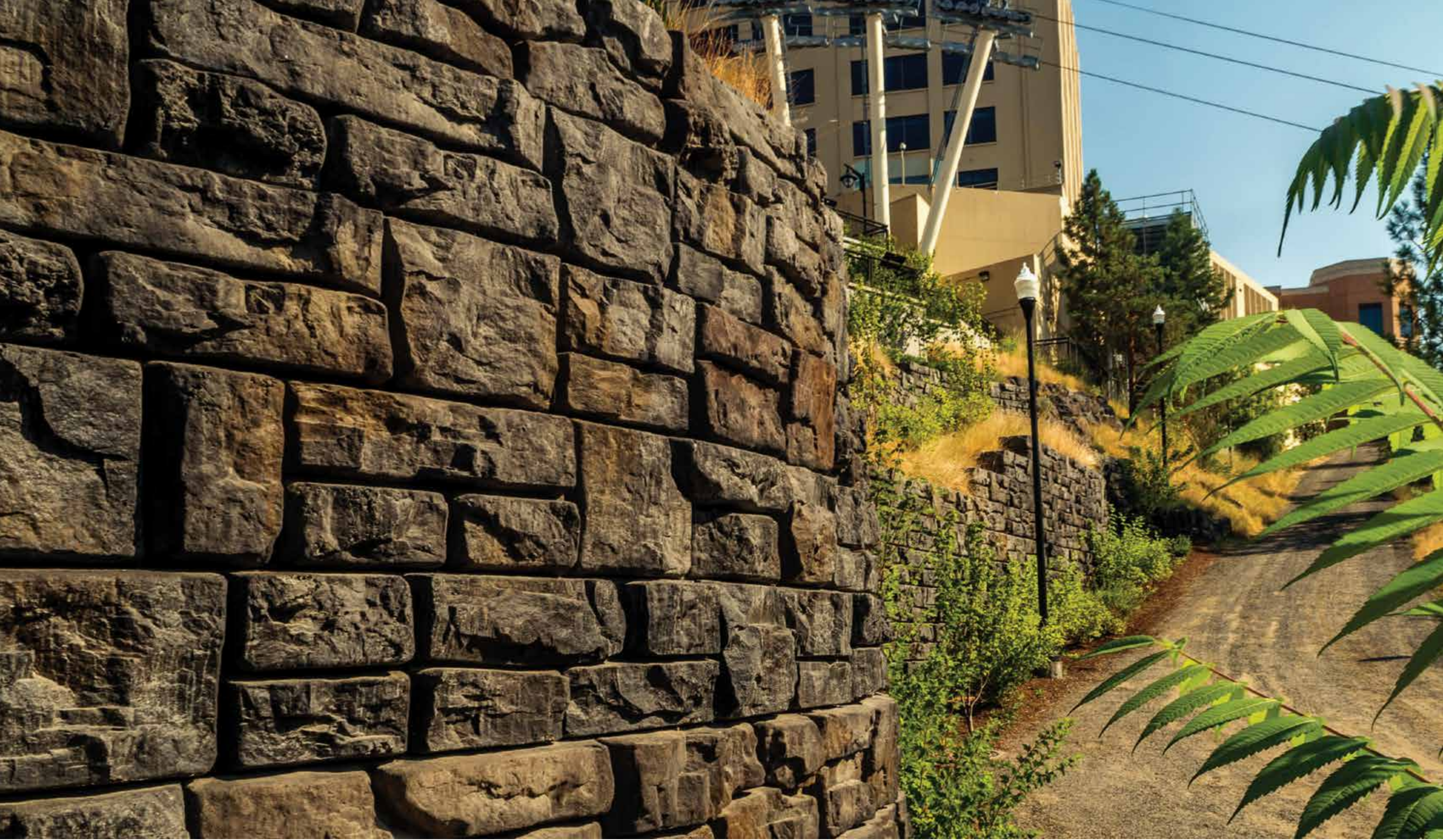
THE OUTCOME

While the hangar isn't slated to finish until 2019, Redi-Rock of K.I.T. manufactured and installed the wall, and Hines attributed the success of the redesign process to two things.

“Having that whole system of products available and then having the Redi-Rock software that you could model such an intricate geotechnical model to make sure that you had everything covered, it was really the marriage of the two—the software and the product,” he said.







BLOCK LIBRARY



# One System, Four Textures, Endless Solutions

The Redi-Rock system is robust, and each of the components can be seamlessly integrated into a cohesive retaining wall design. With the ability to get any block in the Redi-Rock arsenal in four, natural stone textures, it means that technical agility comes with just the right aesthetic touch.

Each local manufacturer produces Redi-Rock in colors that match their natural terrain using molds crafted from real stone and first-use, architectural-grade, precast concrete. That means Redi-Rock walls have detail, durability, and design power—a combination that's hard to come by.

Check out the faces of  
Redi-Rock's endless solutions:  
LEDGESTONE, COBBLESTONE,  
LIMESTONE, AND KINGSTONE.





LEDGESTONE

The rugged relief of Ledgestone blocks give projects a random, stacked stone appearance. With up to 115 square feet (10.5 square meters) of non-repeating texture, it'll be tough to tell all that large block power is behind that pretty face. It's a win-win.



COBBLESTONE

When it comes to classic good looks, Cobblestone is where it's at. Each one-ton block features the appearance of six smaller blocks, creating a timeless aesthetic. Sometimes, the linear appeal of a smaller stacked stone provides the enduring impact you're looking for in a wall.



LIMESTONE

The six square feet (0.5 square meters) of face per Limestone block leaves a large, lasting impression. Crafted from real split limestone, the quarried stone texture means there's no need to sacrifice on style for function—you can get both at a grand scale!



KINGSTONE

Striking a balance between the grandiose scale of Limestone and rugged relief of Ledgestone, Kingstone appears weathered by water and time like the crown of a natural stone outcropping. With each Redi-Rock block looking like a large, quarried stone, Kingstone will transform retaining walls into castle-worthy walls.



Ledgestone



Cobblestone



Limestone



Kingstone



RETAINING BLOCKS  
(FINISHED TEXTURE ON ONE FACE)

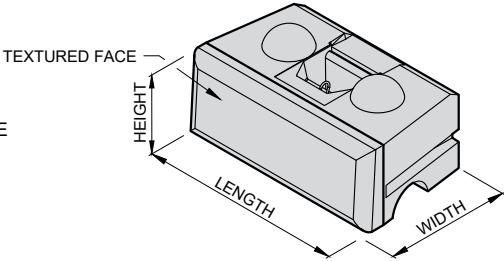
The Redi-Rock Retaining wall blocks come in multiple widths and configurations. The defining characteristic is that Retaining blocks have an aesthetic texture cast into only ONE face, and the textured face is the only side exposed to view in the finished wall. These blocks are machine-placed, wet-cast, precast modular block units manufactured from first purpose, non-reconstituted concrete and intended for constructing dry-stacked modular retaining wall systems. The block units are manufactured from structural-grade concrete mixes in accordance with ASTM C94 or ASTM C685 that produce a finished unit with excellent resistance to freeze-thaw, deicing chemical exposure, and submerged conditions in both fresh water and salt water applications. All Redi-Rock blocks are manufactured and distributed through an international network of individually-owned, licensed precast concrete manufacturers.

CONCRETE MIX PROPERTIES <sup>(1)</sup>

| FREEZE THAW EXPOSURE CLASS <sup>(2)</sup>                                                                               | MINIMUM 28 DAY COMPRESSIVE STRENGTH <sup>(3)</sup> | MAXIMUM WATER CEMENT RATIO | NOMINAL MAXIMUM AGGREGATE SIZE <sup>(10)</sup>             | AGGREGATE CLASS DESIGNATION <sup>(4)</sup> | AIR CONTENT <sup>(5)</sup> |
|-------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|----------------------------|------------------------------------------------------------|--------------------------------------------|----------------------------|
| MODERATE                                                                                                                | 4,000 psi (27.6 MPa)                               | 0.45                       | 1.0 (25)                                                   | 3M                                         | 4.5% ± 1.5%                |
| SEVERE                                                                                                                  | 4,000 psi (27.6 MPa)                               | 0.45                       | 1.0 (25)                                                   | 3S                                         | 6.0% ± 1.5%                |
| VERY SEVERE                                                                                                             | 4,500 psi (30.0 MPa)                               | 0.40                       | 1.0 (25)                                                   | 4S                                         | 6.0% ± 1.5%                |
| MAXIMUM WATER-SOLUBLE CHLORIDE ION (Cl <sup>-</sup> ) CONTENT IN CONCRETE, PERCENT BY WEIGHT OF CEMENT <sup>(6,7)</sup> |                                                    |                            |                                                            |                                            | 0.15                       |
| MAXIMUM CHLORIDE AS Cl <sup>-</sup> CONCENTRATION IN MIXING WATER, PARTS PER MILLION                                    |                                                    |                            |                                                            |                                            | 1000                       |
| MAXIMUM PERCENTAGE OF TOTAL CEMENTITIOUS MATERIALS BY WEIGHT <sup>(8,10)</sup> (VERY SEVERE EXPOSURE CLASS ONLY)        |                                                    |                            |                                                            |                                            |                            |
| FLY ASH OR OTHER POZZOLANS PER ASTM C618                                                                                |                                                    | 25                         | TOTAL ASH, POZZOLANS, SLAG, AND SILICA FUME <sup>(9)</sup> |                                            | 50                         |
| SLAG CONFORMING TO ASTM C989                                                                                            |                                                    | 50                         | TOTAL ASH, POZZOLANS, AND SILICA FUME <sup>(9)</sup>       |                                            | 35                         |
| SILICA FUME CONFORMING TO ASTM C1240                                                                                    |                                                    | 10                         | ALKALI-AGGREGATE REACTIVITY MITIGATION PER ACI 201         |                                            |                            |

REFERENCE DIMENSIONS:

HEIGHT = VERTICAL DIMENSION OF TEXTURED FACE  
LENGTH = HORIZONTAL DIMENSION PARALLEL TO TEXTURED FACE  
WIDTH = HORIZONTAL DIMENSION PERPENDICULAR TO TEXTURED FACE



DIMENSIONAL TOLERANCES <sup>(11) (12)</sup>

|        |                      |                                                                                                |
|--------|----------------------|------------------------------------------------------------------------------------------------|
| HEIGHT | ALL BLOCKS           | 18 ± 3⁄₁₆ (457 ± 5) or 36 ± 3⁄₁₆ (914 ± 5)                                                     |
| LENGTH | FULL BLOCKS          | 46 1⁄₈ ± 1⁄₂ (1172 ± 13)                                                                       |
|        | HALF BLOCKS          | 22 13⁄₁₆ ± 1⁄₂ (579 ± 13)                                                                      |
| WIDTH  | 28" (710) BLOCKS     | 22 5⁄₈ ± 1⁄₂ (575 ± 13) FORM LINE TO BACK OF BLOCK, PLUS APPROXIMATELY 5⁄₈ (136) FACE TEXTURE  |
|        | 41" (1030) BLOCKS    | 35 1⁄₂ ± 1⁄₂ (892 ± 13) FORM LINE TO BACK OF BLOCK, PLUS APPROXIMATELY 5⁄₈ (136) FACE TEXTURE  |
|        | 60" (1520) BLOCKS    | 54 5⁄₈ ± 1⁄₂ (1387 ± 13) FORM LINE TO BACK OF BLOCK, PLUS APPROXIMATELY 5⁄₈ (136) FACE TEXTURE |
|        | 52" (1320) XL BLOCKS | 46 5⁄₈ ± 1⁄₂ (1184 ± 13) FORM LINE TO BACK OF BLOCK, PLUS APPROXIMATELY 5⁄₈ (136) FACE TEXTURE |
|        | 72" (1830) XL BLOCKS | 66 5⁄₈ ± 1⁄₂ (1692 ± 13) FORM LINE TO BACK OF BLOCK, PLUS APPROXIMATELY 5⁄₈ (136) FACE TEXTURE |
|        | 96" (2440) XL BLOCKS | 90 5⁄₈ ± 1⁄₂ (2302 ± 13) FORM LINE TO BACK OF BLOCK, PLUS APPROXIMATELY 5⁄₈ (136) FACE TEXTURE |

<sup>(1)</sup> Concrete mix properties are in general accordance with ACI 318 durability requirements. Research has shown that concrete manufactured to these standards demonstrates good durability and performance. When these requirements are followed, specific freeze-thaw testing of the concrete is typically NOT required.

<sup>(2)</sup> Exposure class is as described in ACI 318.

<sup>(3)</sup> Test method ASTM C39.

<sup>(4)</sup> Defined in ASTM C33 Table 3 *Limits for Deleterious Substances and Physical Property Requirements of Coarse Aggregate for Concrete*.

<sup>(5)</sup> Test method ASTM C231.

<sup>(6)</sup> Test method ASTM C1218 at age between 28 and 42 days.

<sup>(7)</sup> Where used in high sulfate environments or where alkali-silica reactivity is and issue, watesoluble chloride shall be limited to no more than trace amounts (from impurities in concrete-making components, not intended constituents.)

<sup>(8)</sup> The total cementitious material also includes ASTM C150, C595, C845, and C1157 cement. The maximum percentages shall include:

(a) Fly ash or other pozzolans in type IP, blended cement, ASTM C595, or ASTM C1157.

(b) Slag used in the manufacture of an IS blended cement, ASTM C595, or ASTM C1157.

(c) Silica fume, ASTM C1240, present in a blended cement.

<sup>(9)</sup> Fly ash or other pozzolans and silica fume shall constitute no more than 25 and 10 percent, respectively, of the total weight of the cementitious materials.

<sup>(10)</sup> Prescriptive limits shown may be waived for concrete mixes that demonstrate excellent freeze-thaw durability in a detailed and current testing program.

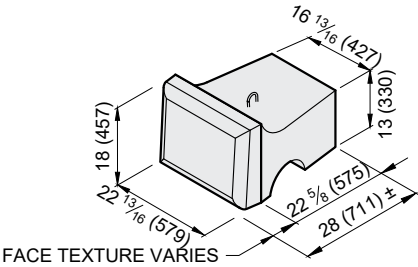
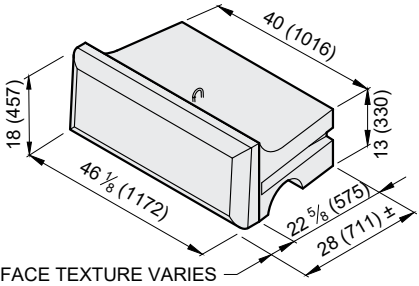
<sup>(11)</sup> All dimensions are shown in units of *inches (mm)*.

<sup>(12)</sup> Permissible defects: Chips smaller than 1.5" (38mm) in its largest dimension and cracks not wider than 0.012" (0.305mm) and not longer than 25% of the nominal height of the block; bug holes in the architectural face smaller than 0.75" (19mm); and bug holes, water marks, and color variation on non-architectural faces.

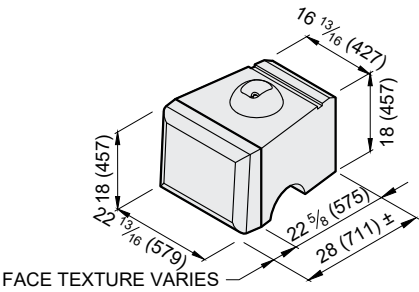
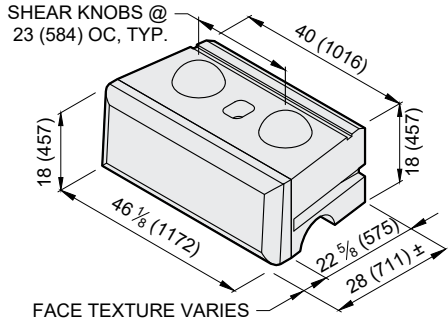
RETAINING BLOCKS

Block Library

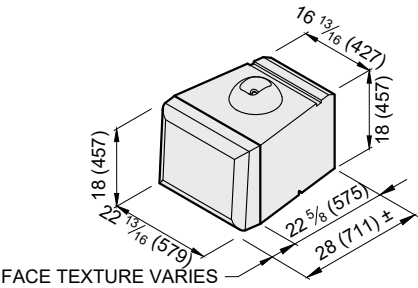
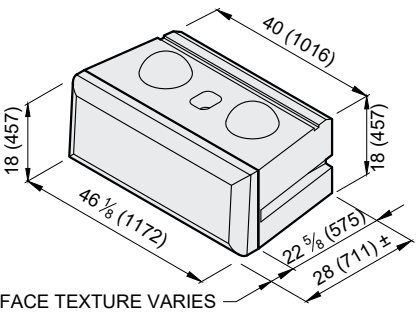
| R-28T 28" (710mm) TOP                                   | R-28HT 28" (710mm) HALF TOP                             |
|---------------------------------------------------------|---------------------------------------------------------|
| Face Texture: Cobble / Limestone Kingstone / Ledgestone | Face Texture: Cobble / Limestone Kingstone / Ledgestone |
| Block Weight: 1230 lb (557 kg) 1160 lb (530 kg)         | Block Weight: 570 lb (260 kg) 540 lb (240 kg)           |
| Block Volume: 8.57 ft³ (0.243 m³) 8.07 ft³ (0.229 m³)   | Block Volume: 4.01 ft³ (0.113 m³) 3.76 ft³ (0.106 m³)   |
| Center of Gravity: 14.9" (378mm) 14.2" (362mm)          | Center of Gravity: 15.3" (389 mm) 14.7" (373 mm)        |



| R-28M 28" (710mm) MIDDLE                                | R-28HM 28" (710mm) HALF MIDDLE                          |
|---------------------------------------------------------|---------------------------------------------------------|
| Face Texture: Cobble / Limestone Kingstone / Ledgestone | Face Texture: Cobble / Limestone Kingstone / Ledgestone |
| Block Weight: 1610 lb (730 kg) 1540 lb (700 kg)         | Block Weight: 750 lb (340 kg) 710 lb (320 kg)           |
| Block Volume: 11.28 ft³ (0.319 m³) 10.78 ft³ (0.305 m³) | Block Volume: 5.23 ft³ (0.148 m³) 4.98 ft³ (0.141 m³)   |
| Center of Gravity: 13.9" (354 mm) 13.4" (340 mm)        | Center of Gravity: 14.3" (364 mm) 13.8" (350 mm)        |



| R-28B 28" (710mm) BOTTOM                                | R-28HB 28" (710mm) HALF BOTTOM                          |
|---------------------------------------------------------|---------------------------------------------------------|
| Face Texture: Cobble / Limestone Kingstone / Ledgestone | Face Texture: Cobble / Limestone Kingstone / Ledgestone |
| Block Weight: 1740 lb (790 kg) 1670 lb (760 kg)         | Block Weight: 810 lb (370 kg) 770 lb (350 kg)           |
| Block Volume: 12.19 ft³ (0.345 m³) 11.70 ft³ (0.331 m³) | Block Volume: 5.66 ft³ (0.160 m³) 5.41 ft³ (0.153 m³)   |
| Center of Gravity: 14.0" (355 mm) 13.5" (343 mm)        | Center of Gravity: 14.3" (364 mm) 13.8" (352 mm)        |



1. Units for dimensions are inches (mm), typical unless noted otherwise.

2. Block production varies with each licensed Redi-Rock manufacturer. Confirm availability before Specifying or Ordering.

3. Center of Gravity is measured from the back of block.

4. Actual block volumes and weights may vary.
5. Weights are based upon a concrete density of 143 lb/ft³ (2291kg/m³).

6. Half blocks contain a fork slot on only one side of the block.

7. Interface Shear knobs are typically 10" (254mm) diameter by 4" (102mm) tall. Smaller knob diameters are available.

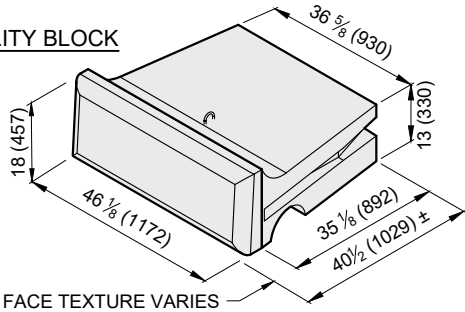


RETAINING BLOCKS

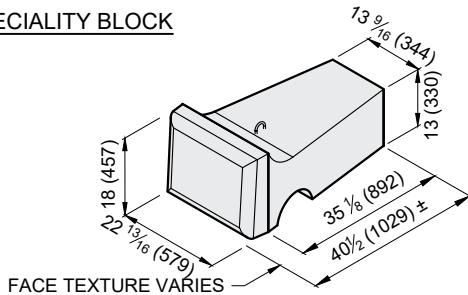
Block Library

| R-41T 41" (1030mm) TOP * |                      |                        | R-41HT 41" (1030mm) HALF TOP * |                    |                        |
|--------------------------|----------------------|------------------------|--------------------------------|--------------------|------------------------|
| Face Texture:            | Cobble / Limestone   | Kingstone / Ledgestone | Face Texture:                  | Cobble / Limestone | Kingstone / Ledgestone |
| Block Weight:            | 1750 lb (790 kg)     | 1680 lb (760 kg)       | Block Weight:                  | 770 lb (350 kg)    | 740 lb (330 kg)        |
| Block Volume:            | 12.22 ft³ (0.346 m³) | 11.73 ft³ (0.332 m³)   | Block Volume:                  | 5.38 ft³ (0.15 m³) | 5.14 ft³ (0.15 m³)     |
| Center of Gravity:       | 21.3" (540 mm)       | 20.6" (522 mm)         | Center of Gravity:             | 22.4" (568 mm)     | 21.6" (550 mm)         |

SPECIALITY BLOCK

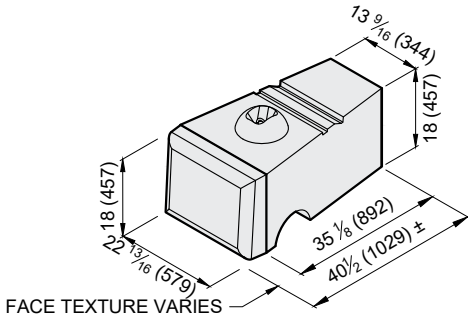
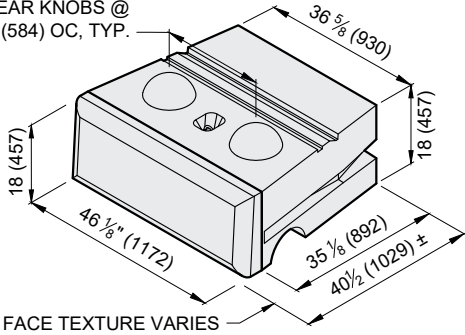


SPECIALITY BLOCK

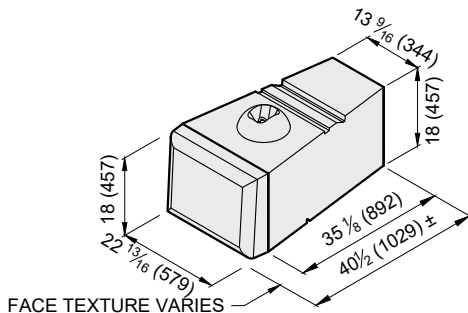
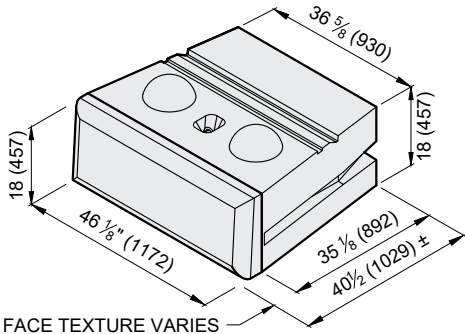


| R-41M 41" (1030mm) MIDDLE |                      |                        | R-41HM 41" (1030mm) HALF MIDDLE |                    |                        |
|---------------------------|----------------------|------------------------|---------------------------------|--------------------|------------------------|
| Face Texture:             | Cobble / Limestone   | Kingstone / Ledgestone | Face Texture:                   | Cobble / Limestone | Kingstone / Ledgestone |
| Block Weight:             | 2310 lb (1050 kg)    | 2240 lb (1020 kg)      | Block Weight:                   | 1020 lb (460 kg)   | 990 lb (450 kg)        |
| Block Volume:             | 16.14 ft³ (0.457 m³) | 15.65 ft³ (0.443 m³)   | Block Volume:                   | 7.14 ft³ (0.20 m³) | 6.90 ft³ (0.20 m³)     |
| Center of Gravity:        | 20.4" (518 mm)       | 19.8" (504 mm)         | Center of Gravity:              | 21.4" (543 mm)     | 20.8" (528 mm)         |

SHEAR KNOBS @ 23 (584) OC, TYP.



| R-41B 41" (1030mm) BOTTOM |                      |                        | R-41HB 41" (1030mm) HALF BOTTOM |                    |                        |
|---------------------------|----------------------|------------------------|---------------------------------|--------------------|------------------------|
| Face Texture:             | Cobble / Limestone   | Kingstone / Ledgestone | Face Texture:                   | Cobble / Limestone | Kingstone / Ledgestone |
| Block Weight:             | 2440 lb (1110 kg)    | 2370 lb (1070 kg)      | Block Weight:                   | 1080 lb (490 kg)   | 1050 lb (480 kg)       |
| Block Volume:             | 17.06 ft³ (0.483 m³) | 16.56 ft³ (0.469 m³)   | Block Volume:                   | 7.58 ft³ (0.21 m³) | 7.33 ft³ (0.21 m³)     |
| Center of Gravity:        | 20.7" (527 mm)       | 20.2" (514 mm)         | Center of Gravity:              | 21.7" (551 mm)     | 21.2" (538 mm)         |



1. Units for dimensions are inches (mm), typical unless noted otherwise.
2. Block production varies with each licensed Redi-Rock manufacturer. Confirm availability before Specifying or Ordering.
3. Center of Gravity is measured from the back of block.
4. Actual block volumes and weights may vary.

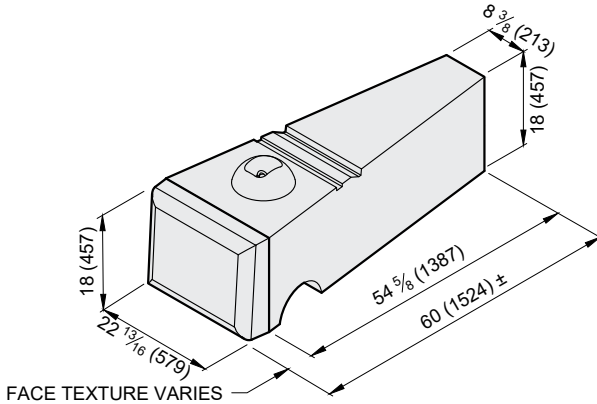
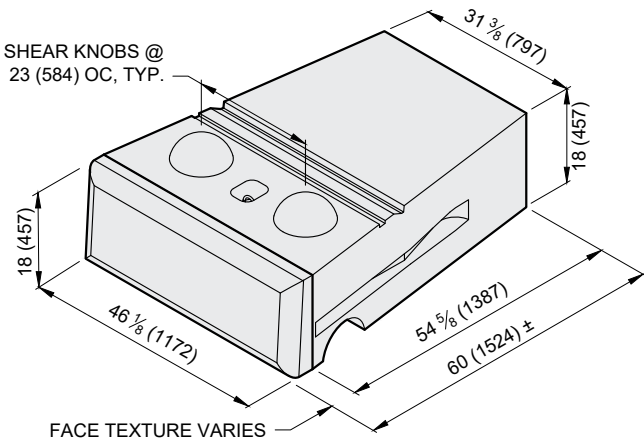
5. Weights are based upon a concrete density of 143 lb/ft³ (2291kg/m³).
6. Half blocks contain a fork slot on only one side of the block.
7. Interface Shear knobs are typically 10" (254mm) diameter by 4" (102mm) tall. Smaller knob diameters are available.
8. \* 41" (1030mm) Top blocks are not typical and used in limited applications.

RETAINING BLOCKS

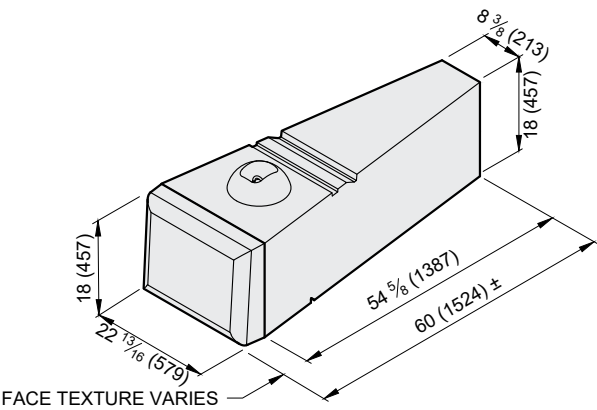
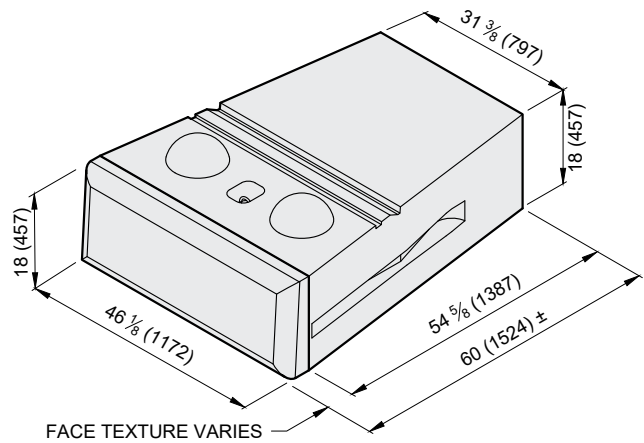
Block Library

| R-60M 60" (1520mm) MIDDLE |                      |                        | R-60HM 60" (1520mm) HALF MIDDLE |                     |                        |
|---------------------------|----------------------|------------------------|---------------------------------|---------------------|------------------------|
| Face Texture:             | Cobble / Limestone   | Kingstone / Ledgestone | Face Texture:                   | Cobble / Limestone  | Kingstone / Ledgestone |
| Block Weight:             | 3290 lb (1490 kg)    | 3220 lb (1460 kg)      | Block Weight:                   | 1340 lb (610 kg)    | 1300 lb (590 kg)       |
| Block Volume:             | 23.00 ft³ (0.651 m³) | 22.49 ft³ (0.637 m³)   | Block Volume:                   | 9.34 ft³ (0.264 m³) | 9.09 ft³ (0.258 m³)    |
| Center of Gravity:        | 31.0" (786 mm)       | 30.4" (772 mm)         | Center of Gravity:              | 33.7" (856 mm)      | 33.1" (840 mm)         |

SHEAR KNOBS @ 23 (584) OC, TYP.



| R-60B 60" (1520mm) BOTTOM |                      |                        | R-60HB 60" (1520mm) HALF BOTTOM |                     |                        |
|---------------------------|----------------------|------------------------|---------------------------------|---------------------|------------------------|
| Face Texture:             | Cobble / Limestone   | Kingstone / Ledgestone | Face Texture:                   | Cobble / Limestone  | Kingstone / Ledgestone |
| Block Weight:             | 3420 lb (1550 kg)    | 3350 lb (1520 kg)      | Block Weight:                   | 1400 lb (630 kg)    | 1360 lb (620 kg)       |
| Block Volume:             | 23.90 ft³ (0.677 m³) | 23.40 ft³ (0.663 m³)   | Block Volume:                   | 9.77 ft³ (0.277 m³) | 9.52 ft³ (0.270 m³)    |
| Center of Gravity:        | 31.6" (802 mm)       | 31.0" (788 mm)         | Center of Gravity:              | 34.3" (871 mm)      | 33.7" (856 mm)         |



1. Units for dimensions are inches (mm), typical unless noted otherwise.
2. Block production varies with each licensed Redi-Rock manufacturer. Confirm availability before Specifying or Ordering.
3. Center of Gravity is measured from the back of block.
4. Actual block volumes and weights may vary.

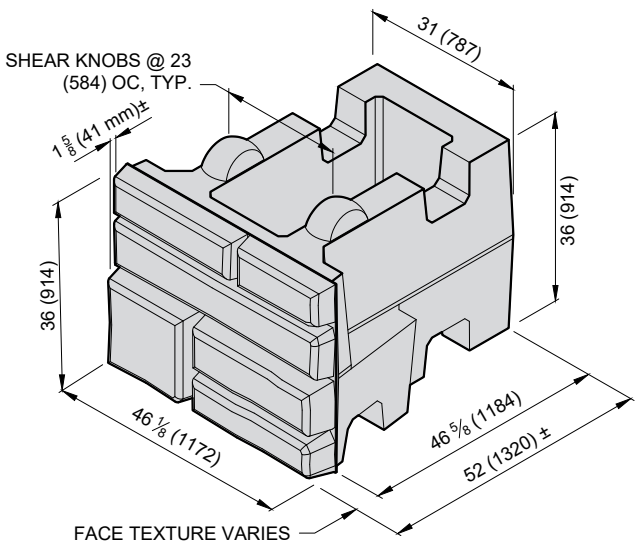
5. Weights are based upon a concrete density of 143 lb/ft³ (2291kg/m³).
6. 60" (1520 mm) are typically used at the bottom of taller walls.
7. Half blocks contain a fork slot on only one side of the block.
8. Interface Shear knobs are typically 10" (254mm) diameter by 4" (102mm) tall. Smaller knob diameters are available.

RETAINING BLOCKS

Block Library

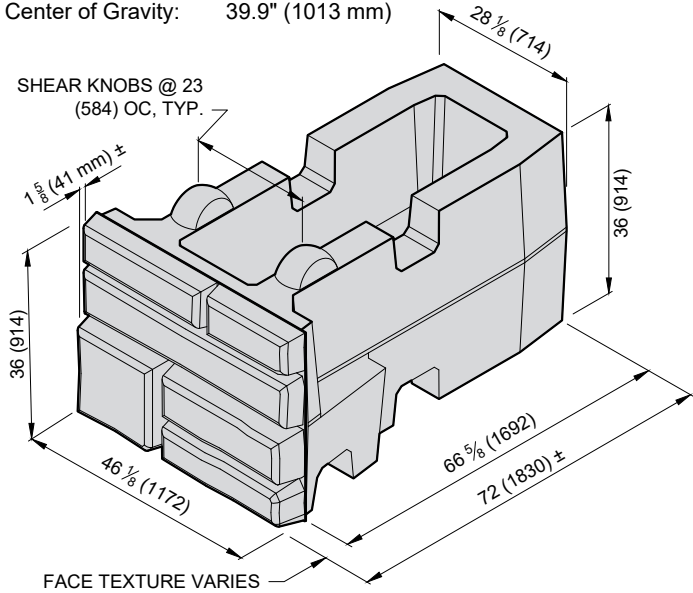
R-5236HC 52" (1320 mm) XL Hollow-Core

|                    |                      |
|--------------------|----------------------|
| Face Texture:      | Ledgestone           |
| Block Weight:      | 3330 lb (1510 kg)    |
| Block Volume:      | 23.29 ft³ (0.660 m³) |
| Infill Volume:     | 22.88 ft³ (0.648 m³) |
| Center of Gravity: | 29.0" (737 mm)       |



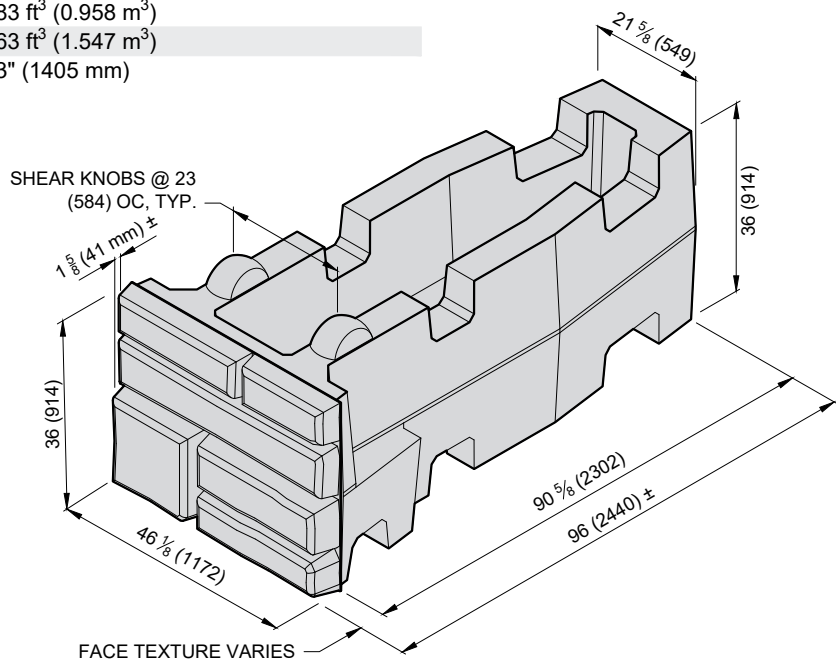
R-7236HC 72" (1830 mm) XL Hollow-Core

|                    |                      |
|--------------------|----------------------|
| Face Texture:      | Ledgestone           |
| Block Weight:      | 4160 lb (1890 kg)    |
| Block Volume:      | 29.10 ft³ (0.824 m³) |
| Infill Volume:     | 36.29 ft³ (1.028 m³) |
| Center of Gravity: | 39.9" (1013 mm)      |



R-9636HC 96" (2440 mm) XL Hollow-Core

|                    |                      |
|--------------------|----------------------|
| Face Texture:      | Ledgestone           |
| Block Weight:      | 4840 lb (2190 kg)    |
| Block Volume:      | 33.83 ft³ (0.958 m³) |
| Infill Volume:     | 54.63 ft³ (1.547 m³) |
| Center of Gravity: | 55.3" (1405 mm)      |



1. Units for dimensions are inches (mm), typical unless noted otherwise.
2. Block production varies with each licensed Redi-Rock manufacturer. Confirm availability before Specifying or Ordering.
3. Center of Gravity is measured from the back of block, excluding stone infill.

4. Actual block volumes and weights may vary.
5. Weights are based upon a concrete density of 143 lb/ft³ (2291kg/m³).
6. Interface Shear knobs are nominally 10" (254mm) diameter by 4" (102 mm) tall.

RETAINING BLOCKS

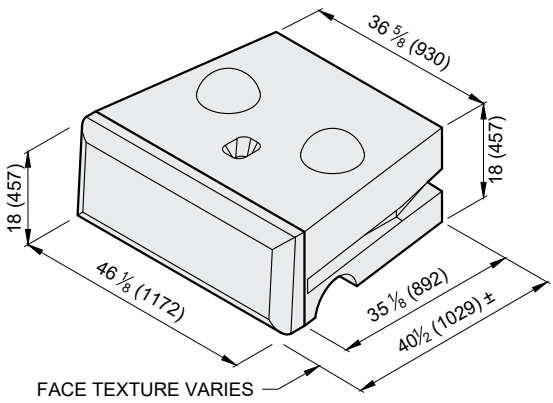
Block Library

R-419M

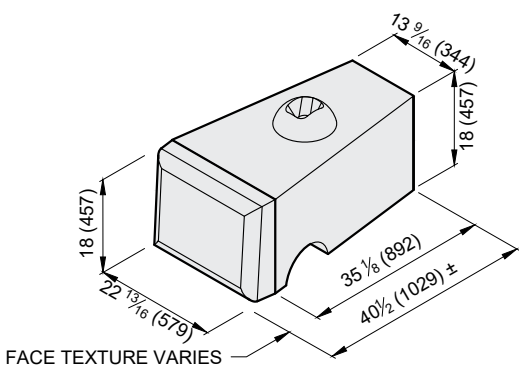
41" (1030mm) MIDDLE 9" (230mm) SETBACK

R-419HM

|                    |                     |                        |                    |                    |                        |
|--------------------|---------------------|------------------------|--------------------|--------------------|------------------------|
| Face Texture:      | Cobble / Limestone  | Kingstone / Ledgestone | Face Texture:      | Cobble / Limestone | Kingstone / Ledgestone |
| Block Weight:      | 2320 lb (1050 kg)   | 2250 lb (1020 kg)      | Block Weight:      | 1030 lb (470 kg)   | 1000 lb (450 kg)       |
| Block Volume:      | 16.21 ft³ (0.46 m³) | 15.72 ft³ (0.44 m³)    | Block Volume:      | 7.20 ft³ (0.20 m³) | 6.96 ft³ (0.20 m³)     |
| Center of Gravity: | 20.2" (514 mm)      | 19.7" (500 mm)         | Center of Gravity: | 21.3" (540 mm)     | 20.7" (525 mm)         |



FULL MIDDLE



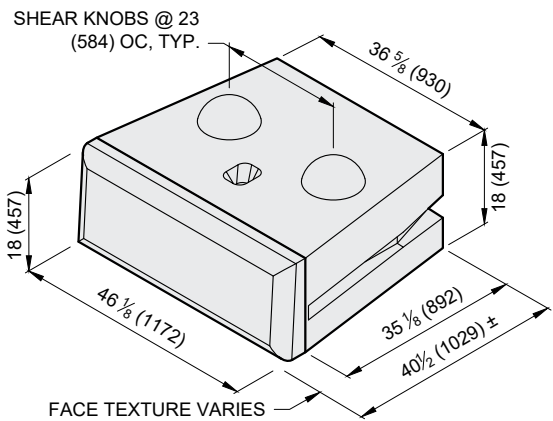
HALF MIDDLE

R-419B

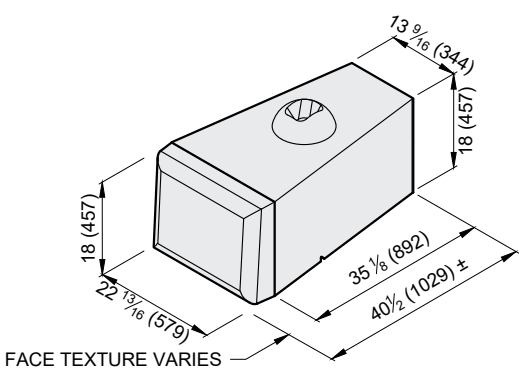
41" (1030mm) BOTTOM 9" (230mm) SETBACK

R-419HB

|                    |                     |                        |                    |                    |                        |
|--------------------|---------------------|------------------------|--------------------|--------------------|------------------------|
| Face Texture:      | Cobble / Limestone  | Kingstone / Ledgestone | Face Texture:      | Cobble / Limestone | Kingstone / Ledgestone |
| Block Weight:      | 2450 lb (1110 kg)   | 2380 lb (1080 kg)      | Block Weight:      | 1090 lb (500 kg)   | 1060 lb (480 kg)       |
| Block Volume:      | 17.13 ft³ (0.48 m³) | 16.63 ft³ (0.47 m³)    | Block Volume:      | 7.63 ft³ (0.22 m³) | 7.39 ft³ (0.21 m³)     |
| Center of Gravity: | 20.6" (523 mm)      | 20.1" (510 mm)         | Center of Gravity: | 21.6" (548 mm)     | 21.0" (534 mm)         |



FULL BOTTOM



HALF BOTTOM

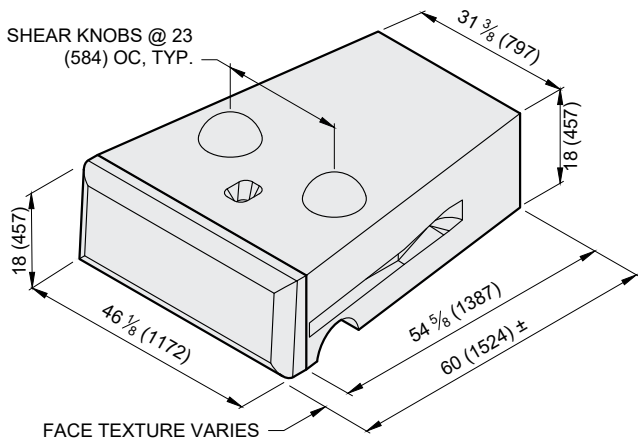
1. Units for dimensions are inches (mm), typical unless noted otherwise.
2. Block production varies with each licensed Redi-Rock manufacturer. Confirm availability before Specifying or Ordering.
3. Center of Gravity is measured from the back of block.
4. Actual block volumes and weights may vary.

5. Weights are based upon a concrete density of 143 lb/ft³ (2291kg/m³).
6. Half blocks contain a fork slot on only one side of the block.
7. Interface Shear knobs are typically 10" (254mm) diameter by 4" (102 mm) tall.

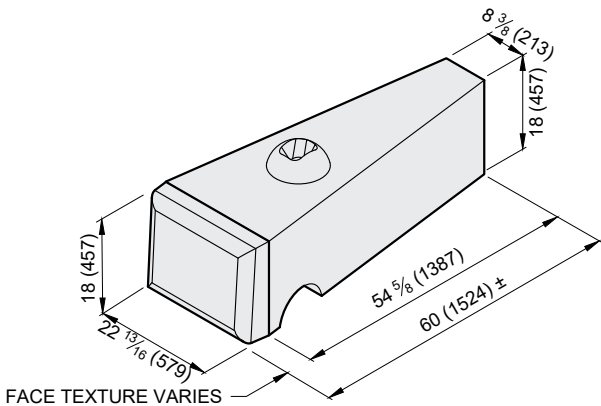
RETAINING BLOCKS

Block Library

| R-609M 60" (1520mm) MIDDLE 9" (230mm) SETBACK |                     |                        | R-609HM            |                    |                        |
|-----------------------------------------------|---------------------|------------------------|--------------------|--------------------|------------------------|
| Face Texture:                                 | Cobble / Limestone  | Kingstone / Ledgestone | Face Texture:      | Cobble / Limestone | Kingstone / Ledgestone |
| Block Weight:                                 | 3300 lb (1500 kg)   | 3230 lb (1460 kg)      | Block Weight:      | 1340 lb (610 kg)   | 1310 lb (590 kg)       |
| Block Volume:                                 | 23.06 ft³ (0.65 m³) | 22.56 ft³ (0.64 m³)    | Block Volume:      | 9.37 ft³ (0.26 m³) | 9.12 ft³ (0.26 m³)     |
| Center of Gravity:                            | 30.9" (785 mm)      | 30.3" (770 mm)         | Center of Gravity: | 33.6" (855 mm)     | 33.0" (839 mm)         |

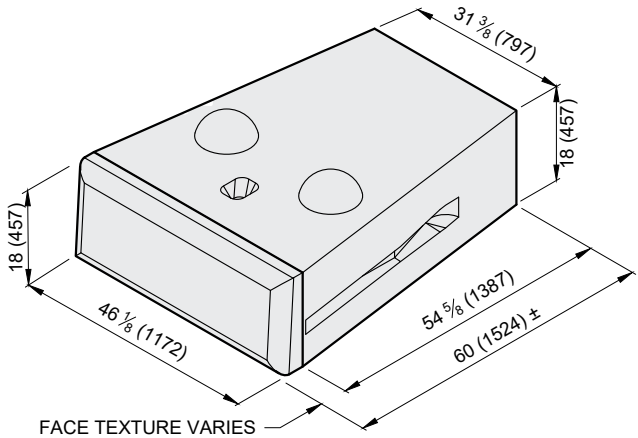


FULL MIDDLE

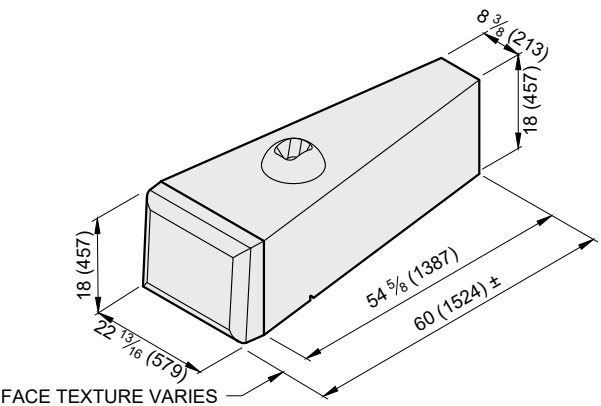


HALF MIDDLE

| R-609B 60" (1520mm) BOTTOM 9" (230mm) SETBACK |                     |                        | R-609HB            |                    |                        |
|-----------------------------------------------|---------------------|------------------------|--------------------|--------------------|------------------------|
| Face Texture:                                 | Cobble / Limestone  | Kingstone / Ledgestone | Face Texture:      | Cobble / Limestone | Kingstone / Ledgestone |
| Block Weight:                                 | 3430 lb (1550 kg)   | 3360 lb (1520 kg)      | Block Weight:      | 1400 lb (640 kg)   | 1370 lb (620 kg)       |
| Block Volume:                                 | 23.97 ft³ (0.68 m³) | 23.47 ft³ (0.66 m³)    | Block Volume:      | 9.80 ft³ (0.28 m³) | 9.55 ft³ (0.27 m³)     |
| Center of Gravity:                            | 31.5" (800 mm)      | 30.9" (786 mm)         | Center of Gravity: | 34.2" (869 mm)     | 33.6" (854 mm)         |



FULL BOTTOM



HALF BOTTOM

1. Units for dimensions are inches (mm), typical unless noted otherwise.

2. Block production varies with each licensed Redi-Rock manufacturer. Confirm availability before Specifying or Ordering.

3. Center of Gravity is measured from the back of block.

4. Actual block volumes and weights may vary.
5. Weights are based upon a concrete density of 143 lb/ft³ (2291kg/m³).

6. Half blocks contain a fork slot on only one side of the block.

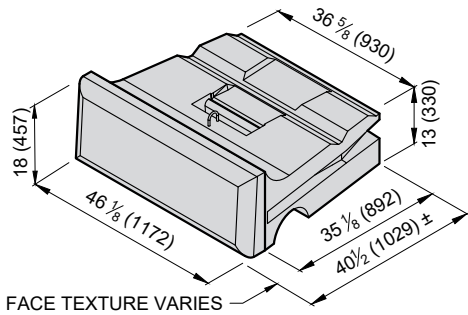
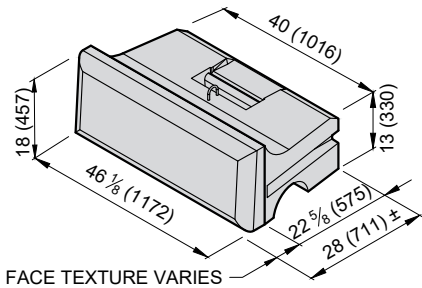
7. Interface Shear knobs are typically 10" (254mm) diameter by 4" (102 mm) tall.

8. 60" (1520 mm) Blocks are typically used at the bottom of taller walls.

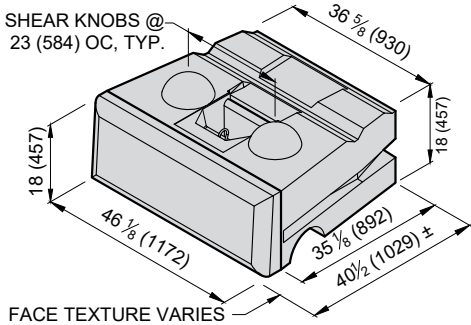
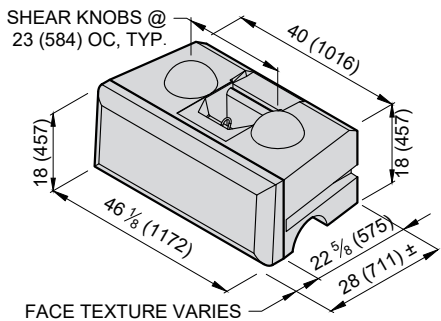
RETAINING BLOCKS

Block Library

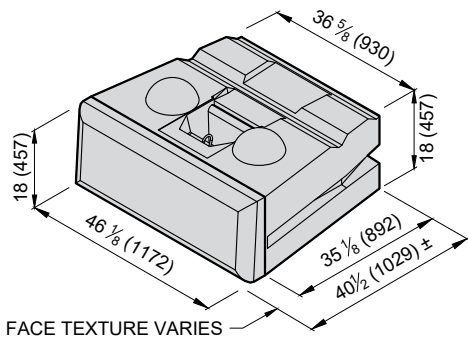
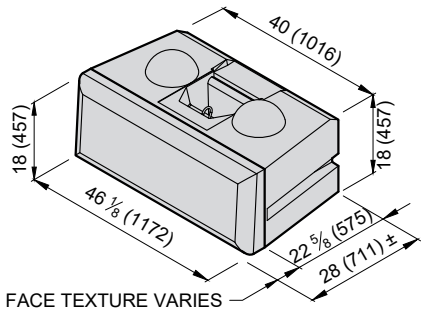
| R-28PCT 28" (710mm) PC TOP |                     |                        | R-41PCT 41" (1030mm) PC TOP |                     |                        |
|----------------------------|---------------------|------------------------|-----------------------------|---------------------|------------------------|
| Face Texture:              | Cobble / Limestone  | Kingstone / Ledgestone | Face Texture:               | Cobble / Limestone  | Kingstone / Ledgestone |
| Block Weight:              | 1170 lb (530 kg)    | 1100 lb (500 kg)       | Block Weight:               | 1630 lb (740 kg)    | 1560 lb (710 kg)       |
| Block Volume:              | 8.16 ft³ (0.231 m³) | 7.66 ft³ (0.217 m³)    | Block Volume:               | 11.38 ft³ (0.32 m³) | 10.88 ft³ (0.31 m³)    |
| Center of Gravity:         | 15.3" (388 mm)      | 14.6" (372 mm)         | Center of Gravity:          | 21.8" (554 mm)      | 21.1" (536 mm)         |



| R-28PCM 28" (710mm) PC MIDDLE |                      |                        | R-41PCM 41" (1030mm) PC MIDDLE |                    |                        |
|-------------------------------|----------------------|------------------------|--------------------------------|--------------------|------------------------|
| Face Texture:                 | Cobble / Limestone   | Kingstone / Ledgestone | Face Texture:                  | Cobble / Limestone | Kingstone / Ledgestone |
| Block Weight:                 | 1520 lb (690 kg)     | 1450 lb (660 kg)       | Block Weight:                  | 2170 lb (990 kg)   | 2100 lb (950 kg)       |
| Block Volume:                 | 10.62 ft³ (0.301 m³) | 10.12 ft³ (0.287 m³)   | Block Volume:                  | 15.2 ft³ (0.43 m³) | 14.69 ft³ (0.42 m³)    |
| Center of Gravity:            | 14.2" (360 mm)       | 13.6" (346 mm)         | Center of Gravity:             | 20.6" (522 mm)     | 20.0" (508 mm)         |



| R-28PCB 28" (710mm) PC BOTTOM |                      |                        | R-41PCB 41" (1030mm) PC BOTTOM |                     |                        |
|-------------------------------|----------------------|------------------------|--------------------------------|---------------------|------------------------|
| Face Texture:                 | Cobble / Limestone   | Kingstone / Ledgestone | Face Texture:                  | Cobble / Limestone  | Kingstone / Ledgestone |
| Block Weight:                 | 1620 lb (740 kg)     | 1550 lb (700 kg)       | Block Weight:                  | 2280 lb (1030 kg)   | 2210 lb (1000 kg)      |
| Block Volume:                 | 11.34 ft³ (0.321 m³) | 10.85 ft³ (0.307 m³)   | Block Volume:                  | 15.92 ft³ (0.45 m³) | 15.42 ft³ (0.44 m³)    |
| Center of Gravity:            | 14.2" (362 mm)       | 13.7" (349 mm)         | Center of Gravity:             | 20.2" (514mm)       | 19.7" (501mm)          |



1. Units for dimensions are inches (mm), typical unless noted otherwise.

2. Block production varies with each licensed Redi-Rock manufacturer. Confirm availability before Specifying or Ordering.

3. Center of Gravity is measured from the back of block.

4. Actual block volumes and weights may vary.
5. Weights are based upon a concrete density of 143 lb/ft³ (2291kg/m³).

6. Blocks contain a vertical slot for a 12" (300 mm) strip of geogrid soil reinforcement.

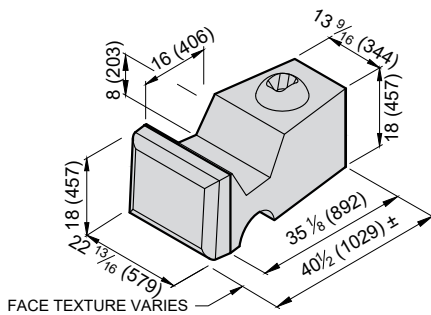
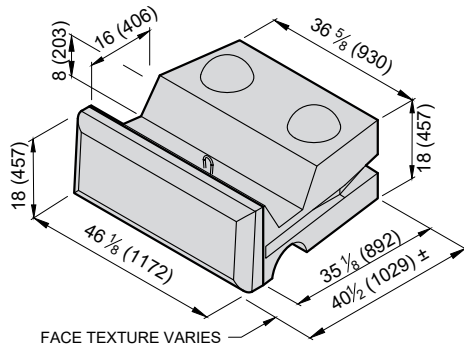
7. Interface Shear knobs are typically 10" (254mm) diameter by 4" (102 mm) tall. Smaller knob diameters are available.



RETAINING BLOCKS

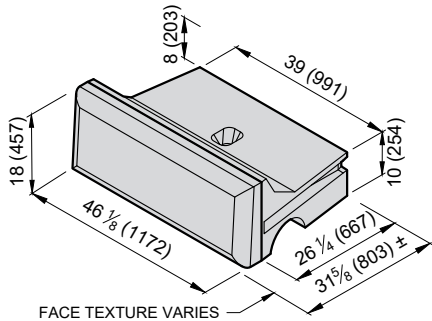
Block Library

| R-41PL 41" (1030mm) PLANTER |                     |                        | R-41HPL 41" (1030mm) HALF PLANTER |                    |                        |
|-----------------------------|---------------------|------------------------|-----------------------------------|--------------------|------------------------|
| Face Texture:               | Cobble / Limestone  | Kingstone / Ledgestone | Face Texture:                     | Cobble / Limestone | Kingstone / Ledgestone |
| Block Weight:               | 2010 lb (910 kg)    | 1930 lb (880 kg)       | Block Weight:                     | 880 lb (400 kg)    | 840 lb (380 kg)        |
| Block Volume:               | 14.02 ft³ (0.40 m³) | 13.53 ft³ (0.38 m³)    | Block Volume:                     | 6.14 ft³ (0.17 m³) | 5.89 ft³ (0.17 m³)     |
| Center of Gravity:          | 19.1" (485 mm)      | 18.4" (468 mm)         | Center of Gravity:                | 20.2" (513 mm)     | 19.5" (495 mm)         |

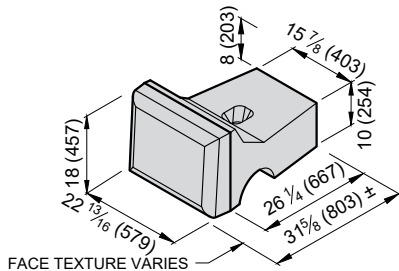


| R-MT MODIFIED TOP  |                    |                        | R-MHT MODIFIED HALF TOP |                    |                        |
|--------------------|--------------------|------------------------|-------------------------|--------------------|------------------------|
| Face Texture:      | Cobble / Limestone | Kingstone / Ledgestone | Face Texture:           | Cobble / Limestone | Kingstone / Ledgestone |
| Block Weight:      | 1200 lb (540 kg)   | 1130 lb (510 kg)       | Block Weight:           | 710 lb (320 kg)    | 640 lb (290 kg)        |
| Block Volume:      | 8.38 ft³ (0.24 m³) | 7.88 ft³ (0.22 m³)     | Block Volume:           | 4.95 ft³ (0.14 m³) | 4.45 ft³ (0.13 m³)     |
| Center of Gravity: | 17.9" (455 mm)     | 17.2" (438 mm)         | Center of Gravity:      | 20.7" (527 mm)     | 19.8" (504 mm)         |

SPECIALITY BLOCK



SPECIALITY BLOCK



1. Units for dimensions are inches (mm), typical unless noted otherwise.

2. Block production varies with each licensed Redi-Rock manufacturer. Confirm availability before Specifying or Ordering.

3. Center of Gravity is measured from the back of block.

4. Actual block volumes and weights may vary.
5. Weights are based upon a concrete density of 143 lb/ft³ (2291kg/m³).

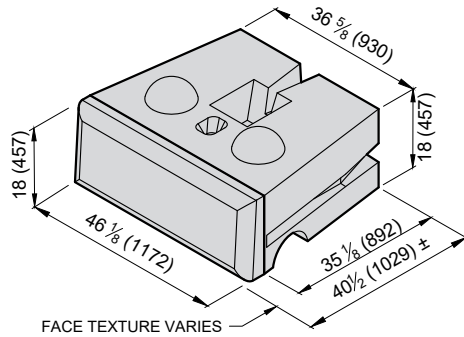
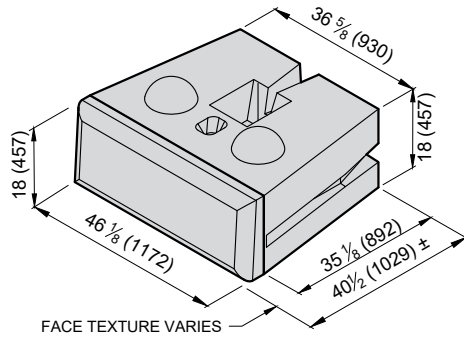
6. Half blocks contain a fork slot on only one side of the block.

7. Interface Shear knobs are typically 10" (254 mm) diameter by 4" (102 mm) tall.

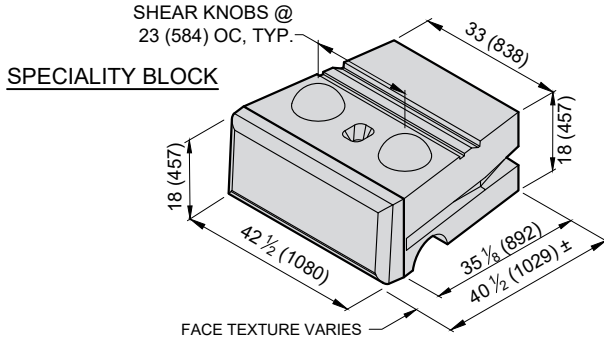
RETAINING BLOCKS

Block Library

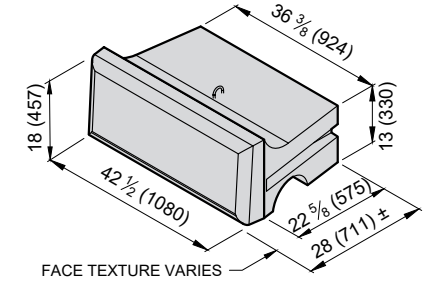
| R-AB ANCHOR BOTTOM |                     |                        | R-AM ANCHOR MIDDLE |                     |                        |
|--------------------|---------------------|------------------------|--------------------|---------------------|------------------------|
| Face Texture:      | Cobble / Limestone  | Kingstone / Ledgestone | Face Texture:      | Cobble / Limestone  | Kingstone / Ledgestone |
| Block Weight:      | 2370 lb (1070 kg)   | 2290 lb (1040 kg)      | Block Weight:      | 2240 lb (1010 kg)   | 2160 lb (980 kg)       |
| Block Volume:      | 16.54 ft³ (0.47 m³) | 16.04 ft³ (0.45 m³)    | Block Volume:      | 15.63 ft³ (0.44 m³) | 15.13 ft³ (0.43 m³)    |
| Center of Gravity: | 21.0" (533 mm)      | 20.4" (519 mm)         | Center of Gravity: | 20.6" (523 mm)      | 20.0" (509 mm)         |



| R-SM SHORT MIDDLE  |                     |                        | R-ST SHORT TOP     |                    |                        |
|--------------------|---------------------|------------------------|--------------------|--------------------|------------------------|
| Face Texture:      | Cobble / Limestone  | Kingstone / Ledgestone | Face Texture:      | Cobble / Limestone | Kingstone / Ledgestone |
| Block Weight:      | 2140 lb (970 kg)    | 2080 lb (940 kg)       | Block Weight:      | 1110 lb (500 kg)   | 1050 lb (480 kg)       |
| Block Volume:      | 14.95 ft³ (0.42 m³) | 14.51 ft³ (0.41 m³)    | Block Volume:      | 7.77 ft³ (0.22 m³) | 7.33 ft³ (0.21 m³)     |
| Center of Gravity: | 19.7" (499mm)       | 19.2" (487mm)          | Center of Gravity: | 13.7" (349mm)      | 13.2" (336mm)          |

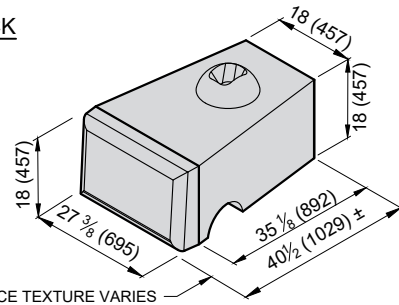


SPECIALITY BLOCK

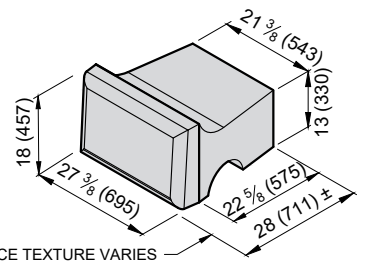


| R-419SM 9" (230mm) SETBACK SHORT MID |                    |                        | R-419ST 9" (230mm) SETBACK SHORT TOP |                    |                        |
|--------------------------------------|--------------------|------------------------|--------------------------------------|--------------------|------------------------|
| Face Texture:                        | Cobble / Limestone | Kingstone / Ledgestone | Face Texture:                        | Cobble / Limestone | Kingstone / Ledgestone |
| Block Weight:                        | 1280 lb (580 kg)   | 1240 lb (560 kg)       | Block Weight:                        | 710 lb (320 kg)    | 660 lb (300 kg)        |
| Block Volume:                        | 8.96 ft³ (0.25 m³) | 8.66 ft³ (0.24 m³)     | Block Volume:                        | 4.94 ft³ (0.14 m³) | 4.64 ft³ (0.13 m³)     |
| Center of Gravity:                   | 20.0" (507mm)      | 19.5" (494mm)          | Center of Gravity:                   | 13.9" (352mm)      | 13.3" (339mm)          |

SPECIALITY BLOCK



SPECIALITY BLOCK



1. Units for dimensions are inches (mm), typical unless noted otherwise.

2. Block production varies with each licensed Redi-Rock manufacturer. Confirm availability before Specifying or Ordering.

3. Center of Gravity is measured from the back of block.

4. Actual block volumes and weights may vary.
5. Weights are based upon a concrete density of 143 lb/ft³ (2291kg/m³).

6. 27" (695) wide blocks contain a fork slot on only one side of the block. These are speciality blocks and may have limited availability and is only used in double 90 degree corner applications.

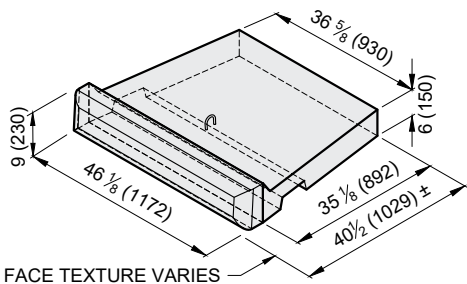
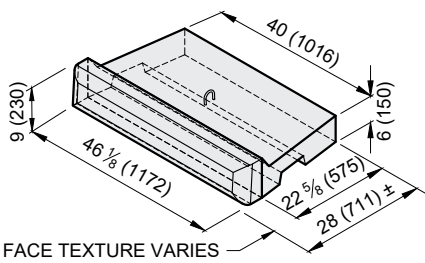
7. Interface Shear knobs are typically 10" (254mm) diameter by 4" (102 mm) tall. Smaller knob diameters are available.



FREESTANDING BLOCKS

Block Library

| R-28SDT       |                    |                        | 9" (230 mm) STEPDOWN TOP |                    |                        | R-41SDT       |                    |                        |
|---------------|--------------------|------------------------|--------------------------|--------------------|------------------------|---------------|--------------------|------------------------|
| Face Texture: | Cobble / Limestone | Kingstone / Ledgestone | Face Texture:            | Cobble / Limestone | Kingstone / Ledgestone | Face Texture: | Cobble / Limestone | Kingstone / Ledgestone |
| Block Weight: | 600 lb (270 kg)    | 500 lb (230 kg)        | Block Weight:            | 840 lb (380 kg)    | 740 lb (340 kg)        | Block Weight: | 840 lb (380 kg)    | 740 lb (340 kg)        |
| Block Volume: | 4.2 ft³ (0.12 m³)  | 3.4 ft³ (0.10 m³)      | Block Volume:            | 5.9 ft³ (0.17 m³)  | 5.1 ft³ (0.14 m³)      | Block Volume: | 5.9 ft³ (0.17 m³)  | 5.1 ft³ (0.14 m³)      |



1. Units for dimensions are inches (mm), typical unless noted otherwise.

2. Block production varies with each licensed Redi-Rock manufacturer. Confirm availability before Specifying or Ordering.
3. Architectural faces on the blocks have varying texture.

4. Actual block volumes and weights may vary.

5. Weights are based upon a concrete density of 143 lb/ft³ (2291 kg/m³).





FREESTANDING BLOCKS  
(FINISHED TEXTURE ON MORE THAN ONE FACE)

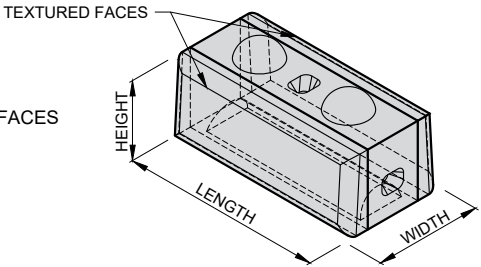
The Redi-Rock Freestanding blocks come in one width and stack in a vertical manner. The defining characteristic is that freestanding blocks have an aesthetic texture cast into multiple faces; the textured face is on at least the two longitudinal vertical faces, and also as required on one end or the top of the blocks. These blocks are machine-placed, wet-cast, precast modular block units manufactured from first purpose, non-reconstituted concrete and intended for constructing dry-stacked modular retaining wall systems. The block units are manufactured from structural-grade concrete mixes in accordance with ASTM C94 or ASTM C685 that produce a finished unit with excellent resistance to freeze-thaw, deicing chemical exposure, and submerged conditions in both fresh water and salt water applications. All Redi-Rock blocks are manufactured and distributed through an international network of individually-owned, licensed precast concrete manufacturers.

CONCRETE MIX PROPERTIES <sup>(1)</sup>

| FREEZE THAW EXPOSURE CLASS <sup>(2)</sup>                                                                               | MINIMUM 28 DAY COMPRESSIVE STRENGTH <sup>(3)</sup> | MAXIMUM WATER CEMENT RATIO | NOMINAL MAXIMUM AGGREGATE SIZE <sup>(10)</sup>             | AGGREGATE CLASS DESIGNATION <sup>(4)</sup> | AIR CONTENT <sup>(5)</sup> |
|-------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|----------------------------|------------------------------------------------------------|--------------------------------------------|----------------------------|
| MODERATE                                                                                                                | 4,000 psi (27.6 MPa)                               | 0.45                       | 1.0 (25)                                                   | 3M                                         | 4.5% ± 1.5%                |
| SEVERE                                                                                                                  | 4,000 psi (27.6 MPa)                               | 0.45                       | 1.0 (25)                                                   | 3S                                         | 6.0% ± 1.5%                |
| VERY SEVERE                                                                                                             | 4,500 psi (30.0 MPa)                               | 0.40                       | 1.0 (25)                                                   | 4S                                         | 6.0% ± 1.5%                |
| MAXIMUM WATER-SOLUBLE CHLORIDE ION (Cl <sup>-</sup> ) CONTENT IN CONCRETE, PERCENT BY WEIGHT OF CEMENT <sup>(6,7)</sup> |                                                    |                            |                                                            |                                            | 0.15                       |
| MAXIMUM CHLORIDE AS Cl <sup>-</sup> CONCENTRATION IN MIXING WATER, PARTS PER MILLION                                    |                                                    |                            |                                                            |                                            | 1000                       |
| MAXIMUM PERCENTAGE OF TOTAL CEMENTITIOUS MATERIALS BY WEIGHT <sup>(8,10)</sup> (VERY SEVERE EXPOSURE CLASS ONLY)        |                                                    |                            |                                                            |                                            |                            |
| FLY ASH OR OTHER POZZOLANS PER ASTM C618                                                                                |                                                    | 25                         | TOTAL ASH, POZZOLANS, SLAG, AND SILICA FUME <sup>(9)</sup> |                                            | 50                         |
| SLAG CONFORMING TO ASTM C989                                                                                            |                                                    | 50                         | TOTAL ASH, POZZOLANS, AND SILICA FUME <sup>(9)</sup>       |                                            | 35                         |
| SILICA FUME CONFORMING TO ASTM C1240                                                                                    |                                                    | 10                         | ALKALI-AGGREGATE REACTIVITY MITIGATION PER ACI 201         |                                            |                            |

REFERENCE DIMENSIONS:

HEIGHT = VERTICAL DIMENSION OF TEXTURED FACE  
LENGTH = LONGER HORIZONTAL DIMENSION PARALLEL TO TEXTURED FACES  
WIDTH = HORIZONTAL DIMENSION PERPENDICULAR TO LONGER TEXTURED FACES



DIMENSIONAL TOLERANCES <sup>(11) (12)</sup>

|        |                  |                                                                                               |
|--------|------------------|-----------------------------------------------------------------------------------------------|
| HEIGHT | ALL BLOCKS       | 18 ± 3⁄16 (457 ± 5)                                                                           |
| LENGTH | FULL BLOCKS      | 46 7⁄8 ± 1⁄2 (1172 ± 13)                                                                      |
|        | HALF BLOCKS      | 22 3⁄16 ± 1⁄2 (579 ± 13)                                                                      |
| WIDTH  | 23 -24 (584-610) | 13 ± 1⁄2 (330 ± 13) FORM LINE TO FORM LINE, PLUS APPROX. 5⁄8 (136) FACE TEXTURE ON LONG SIDES |

<sup>(1)</sup> Concrete mix properties are in general accordance with ACI 318 durability requirements. Research has shown that concrete manufactured to these standards demonstrates good durability and performance. When these requirements are followed, specific freeze-thaw testing of the concrete is typically NOT required.

<sup>(2)</sup> Exposure class is as described in ACI 318.

<sup>(3)</sup> Test method ASTM C39.

<sup>(4)</sup> Defined in ASTM C33 Table 3 *Limits for Deleterious Substances and Physical Property Requirements of Coarse Aggregate for Concrete*.

<sup>(5)</sup> Test method ASTM C231.

<sup>(6)</sup> Test method ASTM C1218 at age between 28 and 42 days.

<sup>(7)</sup> Where used in high sulfate environments or where alkali-silica reactivity is and issue, watesoluble chloride shall be limited to no more than trace amounts (from impurities in concrete-making components, not intended constituents.)

<sup>(8)</sup> The total cementitious material also includes ASTM C150, C595, C845, and C1157 cement. The maximum percentages shall include:

(a) Fly ash or other pozzolans in type IP, blended cement, ASTM C595, or ASTM C1157.

(b) Slag used in the manufacture of an IS blended cement, ASTM C595, or ASTM C1157.

(c) Silica fume, ASTM C1240, present in a blended cement.

<sup>(9)</sup> Fly ash or other pozzolans and silica fume shall constitute no more than 25 and 10 percent, respectively, of the total weight of the cementitious materials.

<sup>(10)</sup> Prescriptive limits shown may be waived for concrete mixes that demonstrate excellent freeze-thaw durability in a detailed and current testing program.

<sup>(11)</sup> All dimensions are shown in units of *inches (mm)*.

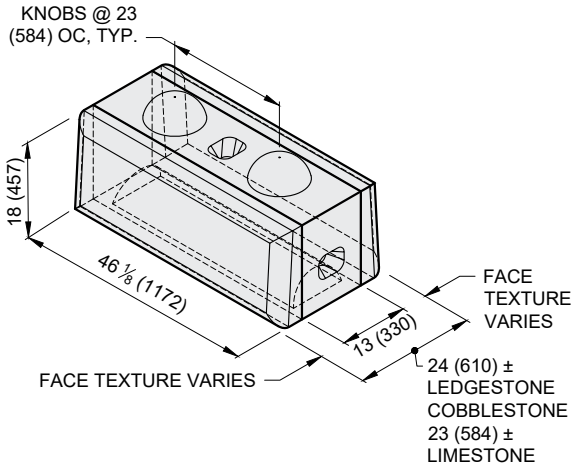
<sup>(12)</sup> Permissible defects: Chips smaller than 1.5 (38) in its largest dimension and cracks not wider than 0.012 (0.305) and not longer than 25% of the nominal height of the block; bug holes in the architectural face smaller than 0.75 (19); and bug holes, water marks, and color variation on non-architectural faces.

FREESTANDING BLOCKS

Block Library

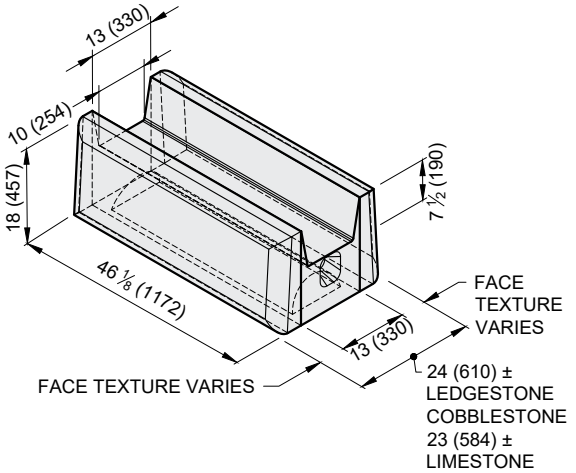
F-SM STRAIGHT MIDDLE

|               |                     |                        |
|---------------|---------------------|------------------------|
| Face Texture: | Cobble / Limestone  | Kingstone / Ledgestone |
| Block Weight: | 1410 lb (640 kg)    | 1260 lb (570 kg)       |
| Block Volume: | 9.84 ft³ (0.279 m³) | 8.84 ft³ (0.250 m³)    |



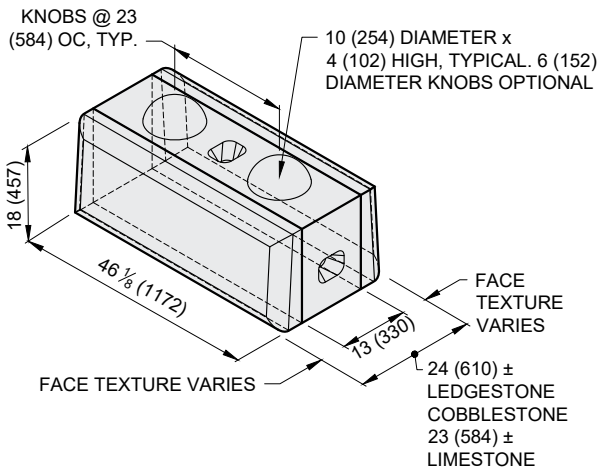
F-SG STRAIGHT GARDEN TOP

|               |                     |                        |
|---------------|---------------------|------------------------|
| Face Texture: | Cobble / Limestone  | Kingstone / Ledgestone |
| Block Weight: | 1050 lb (480 kg)    | 910 lb (410 kg)        |
| Block Volume: | 7.35 ft³ (0.208 m³) | 6.35 ft³ (0.180 m³)    |



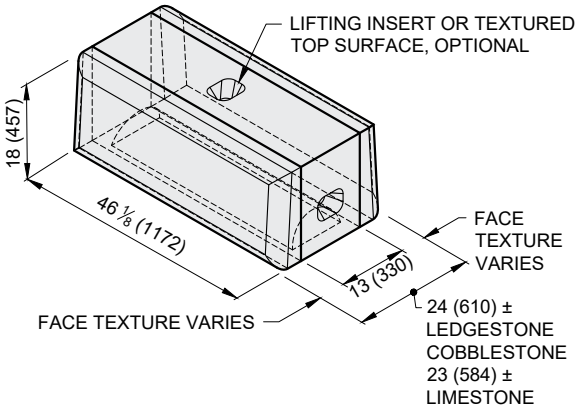
F-SB STRAIGHT BOTTOM

|               |                      |                        |
|---------------|----------------------|------------------------|
| Face Texture: | Cobble / Limestone   | Kingstone / Ledgestone |
| Block Weight: | 1520 lb (690 kg)     | 1380 lb (630 kg)       |
| Block Volume: | 10.65 ft³ (0.302 m³) | 9.66 ft³ (0.273 m³)    |



F-ST STRAIGHT TOP

|               |                     |                        |
|---------------|---------------------|------------------------|
| Face Texture: | Cobble / Limestone  | Kingstone / Ledgestone |
| Block Weight: | 1380 lb (620 kg)    | 1230 lb (560 kg)       |
| Block Volume: | 9.61 ft³ (0.272 m³) | 8.62 ft³ (0.244 m³)    |



1. Units for dimensions are inches (mm), typical unless noted otherwise.

2. Block production varies with each licensed Redi-Rock manufacturer. Confirm availability before Specifying or Ordering.

3. Architectural faces on the blocks have varying texture.

4. Actual block volumes and weights may vary.
5. Weights are based upon a concrete density of 143 lb/ft³ (2291 kg/m³).

6. 6" (152 mm) diameter vertical semi-cylindrical voids at the ends of the block for mechanical tie-down are available, refer to Force Protection blocks for additional information.

7. Knobs are typically 10" (254mm) diameter by 4" (102 mm) tall. Smaller knobs are available.

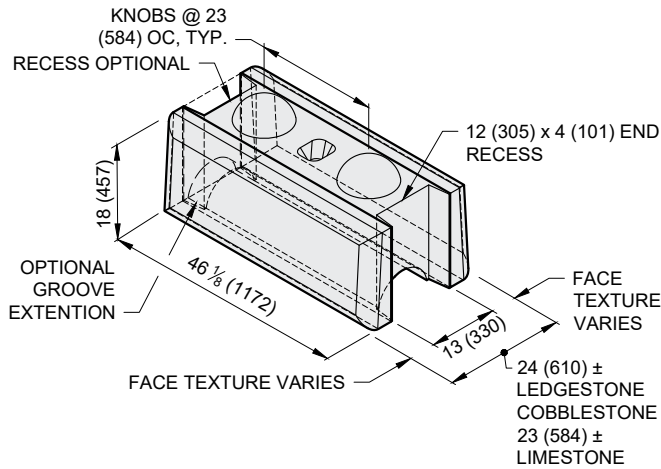


FREESTANDING BLOCKS

Block Library

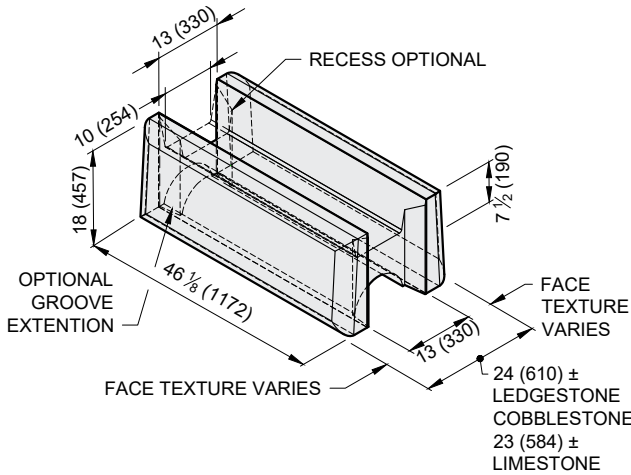
F-VM VARIABLE RADIUS MIDDLE

|               |                     |                        |
|---------------|---------------------|------------------------|
| Face Texture: | Cobble / Limestone  | Kingstone / Ledgestone |
| Block Weight: | 1270 lb (570 kg)    | 1120 lb (510 kg)       |
| Block Volume: | 8.86 ft³ (0.251 m³) | 7.86 ft³ (0.223 m³)    |



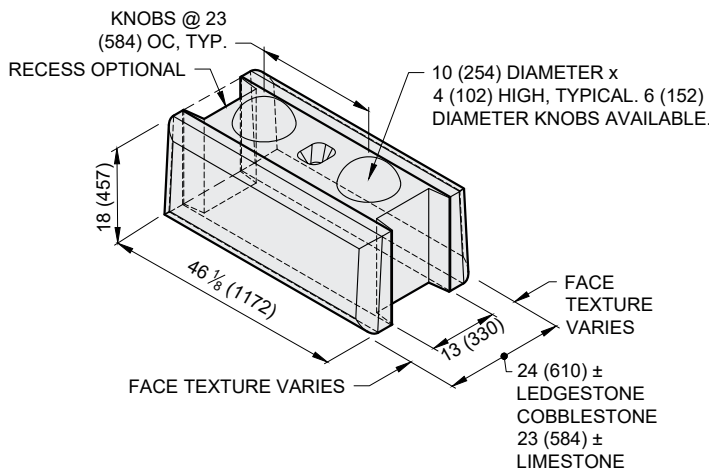
F-VG VARIABLE RADIUS GARDEN TOP

|               |                     |                        |
|---------------|---------------------|------------------------|
| Face Texture: | Cobble / Limestone  | Kingstone / Ledgestone |
| Block Weight: | 970 lb (440 kg)     | 820 lb (370 kg)        |
| Block Volume: | 6.76 ft³ (0.191 m³) | 5.76 ft³ (0.163 m³)    |



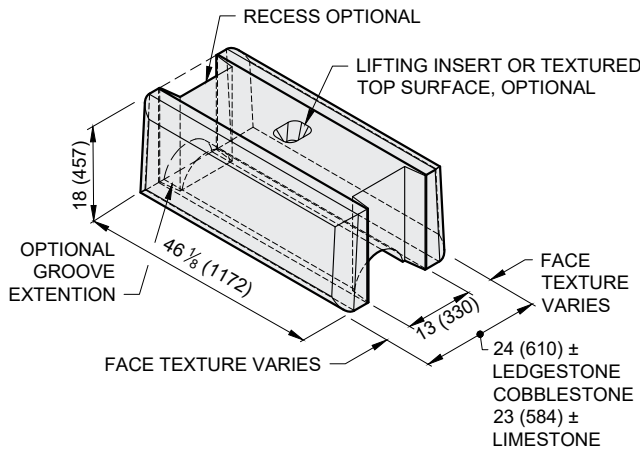
F-VB VARIABLE RADIUS BOTTOM

|               |                     |                        |
|---------------|---------------------|------------------------|
| Face Texture: | Cobble / Limestone  | Kingstone / Ledgestone |
| Block Weight: | 1380 lb (630 kg)    | 1240 lb (560 kg)       |
| Block Volume: | 9.65 ft³ (0.273 m³) | 8.66 ft³ (0.245 m³)    |



F-VT VARIABLE RADIUS TOP

|               |                     |                        |
|---------------|---------------------|------------------------|
| Face Texture: | Cobble / Limestone  | Kingstone / Ledgestone |
| Block Weight: | 1240 lb (560 kg)    | 1090 lb (500 kg)       |
| Block Volume: | 8.63 ft³ (0.244 m³) | 7.64 ft³ (0.216 m³)    |



1. Units for dimensions are inches (mm), typical unless noted otherwise.
2. Block production varies with each licensed Redi-Rock manufacturer. Confirm availability before Specifying or Ordering.
3. Variable radius feature can be cast on only one end, coordinate.

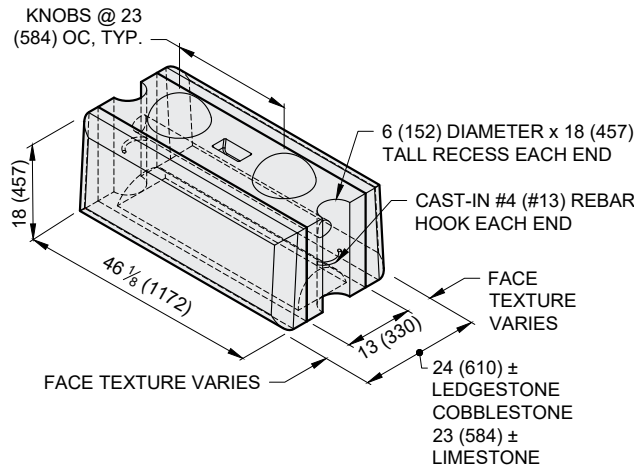
4. Architectural faces on the blocks have varying texture.
5. Actual block volumes and weights may vary.
6. Weights are based upon a concrete density of 143 lb/ft³ (2291 kg/m³).
7. Knobs are typically 10" (254 mm) diameter by 4" (102 mm) tall. Smaller knobs are available.

FREESTANDING BLOCKS

Block Library

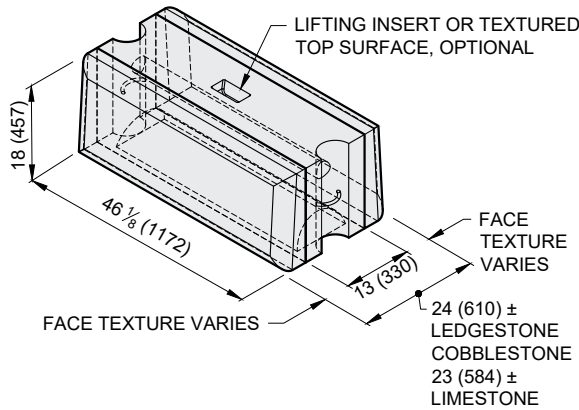
F-FM FORCE PROTECTION MIDDLE

|               |                     |                        |
|---------------|---------------------|------------------------|
| Face Texture: | Cobble / Limestone  | Kingstone / Ledgestone |
| Block Weight: | 1350 lb (610 kg)    | 1200 lb (550 kg)       |
| Block Volume: | 9.41 ft³ (0.267 m³) | 8.42 ft³ (0.238 m³)    |



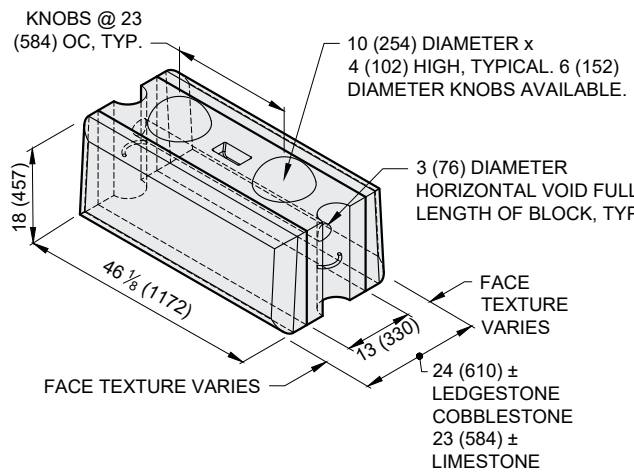
F-FT FORCE PROTECTION TOP

|               |                     |                        |
|---------------|---------------------|------------------------|
| Face Texture: | Cobble / Limestone  | Kingstone / Ledgestone |
| Block Weight: | 1310 lb (600 kg)    | 1170 lb (530 kg)       |
| Block Volume: | 9.19 ft³ (0.260 m³) | 8.19 ft³ (0.232 m³)    |



F-FB FORCE PROTECTION BOTTOM

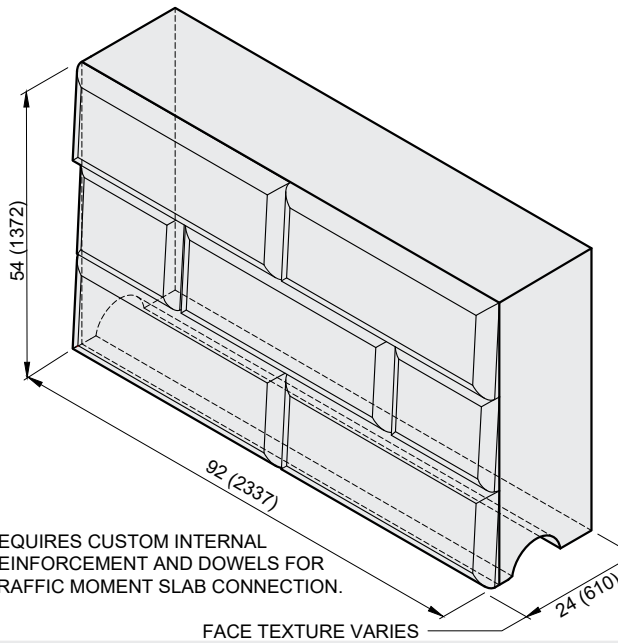
|               |                      |                        |
|---------------|----------------------|------------------------|
| Face Texture: | Cobble / Limestone   | Kingstone / Ledgestone |
| Block Weight: | 1460 lb (660 kg)     | 1320 lb (600 kg)       |
| Block Volume: | 10.23 ft³ (0.290 m³) | 9.23 ft³ (0.261 m³)    |



1. Units for dimensions are inches (mm), typical unless noted otherwise.
2. Block production varies with each licensed Redi-Rock manufacturer. Confirm availability before Specifying or Ordering.
3. Architectural faces on the blocks have varying texture.

F-BB BARRIER BLOCK

|               |                     |
|---------------|---------------------|
| Block Weight: | 9,350 lb (4,240 kg) |
| Block Volume: | 65.4 ft³ (1.85 m³)  |



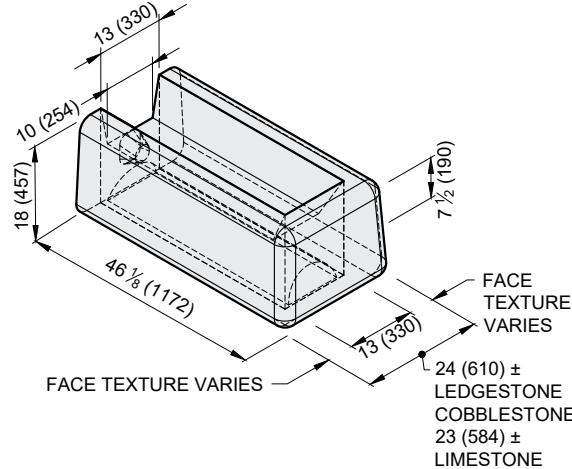
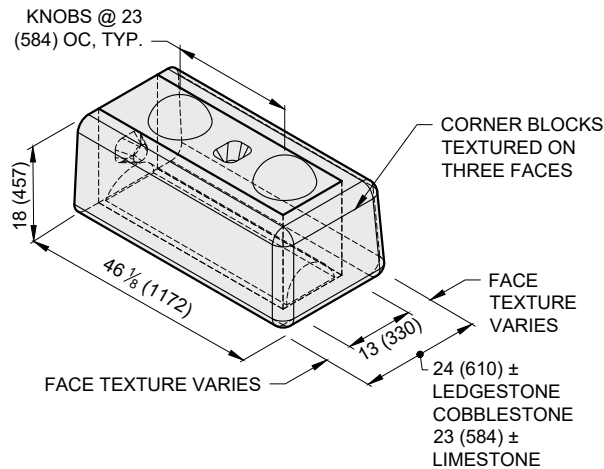
4. Actual block volumes and weights may vary.
5. Weights are based upon a concrete density of 143 lb/ft³ (2291 kg/m³).
6. Knobs are typically 10" (254 mm) diameter by 4" (102 mm) tall. Smaller knobs are available.

FREESTANDING BLOCKS

# Block Library

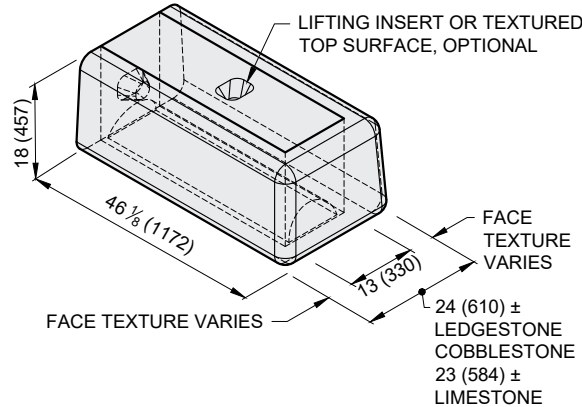
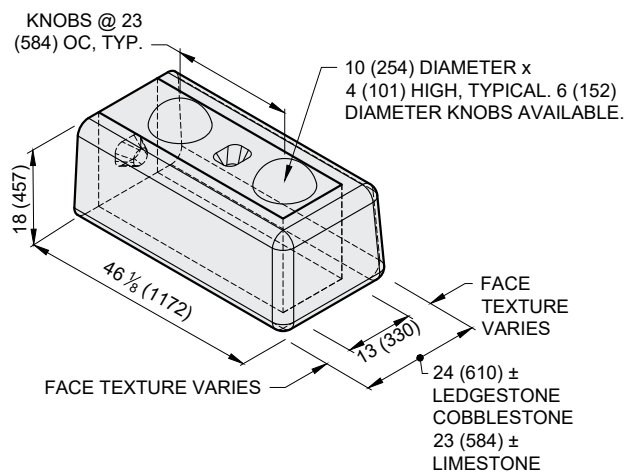
| F-CM CORNER MIDDLE |                                           |                                           |
|--------------------|-------------------------------------------|-------------------------------------------|
| Face Texture:      | Cobble / Limestone                        | Kingstone / Ledgestone                    |
| Block Weight:      | 1370 lb (620 kg)                          | 1360 lb (620 kg)                          |
| Block Volume:      | 9.6 ft <sup>3</sup> (0.27m <sup>3</sup> ) | 9.5 ft <sup>3</sup> (0.27m <sup>3</sup> ) |

| F-CG CORNER GARDEN TOP |                                           |                                           |
|------------------------|-------------------------------------------|-------------------------------------------|
| Face Texture:          | Cobble / Limestone                        | Kingstone / Ledgestone                    |
| Block Weight:          | 1070 lb (480 kg)                          | 1060 lb (480 kg)                          |
| Block Volume:          | 7.5 ft <sup>3</sup> (0.21m <sup>3</sup> ) | 7.4 ft <sup>3</sup> (0.21m <sup>3</sup> ) |



| F-CB CORNER BOTTOM |                                            |                                            |
|--------------------|--------------------------------------------|--------------------------------------------|
| Face Texture:      | Cobble / Limestone                         | Kingstone / Ledgestone                     |
| Block Weight:      | 1490 lb (680 kg)                           | 1480 lb (670 kg)                           |
| Block Volume:      | 10.4 ft <sup>3</sup> (0.30m <sup>3</sup> ) | 10.3 ft <sup>3</sup> (0.29m <sup>3</sup> ) |

| F-CT CORNER TOP |                                           |                                           |
|-----------------|-------------------------------------------|-------------------------------------------|
| Face Texture:   | Cobble / Limestone                        | Kingstone / Ledgestone                    |
| Block Weight:   | 1340 lb (610 kg)                          | 1330 lb (600 kg)                          |
| Block Volume:   | 9.4 ft <sup>3</sup> (0.26m <sup>3</sup> ) | 9.3 ft <sup>3</sup> (0.26m <sup>3</sup> ) |



1. Units for dimensions are inches (mm), typical unless noted otherwise.
2. Block production varies with each licensed Redi-Rock manufacturer. Confirm availability before Specifying or Ordering.
3. Architectural faces on the blocks have varying texture.

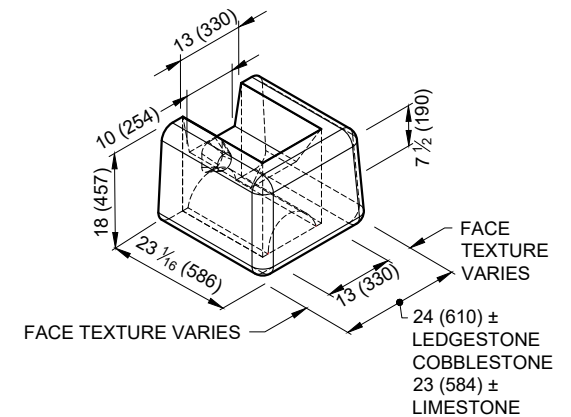
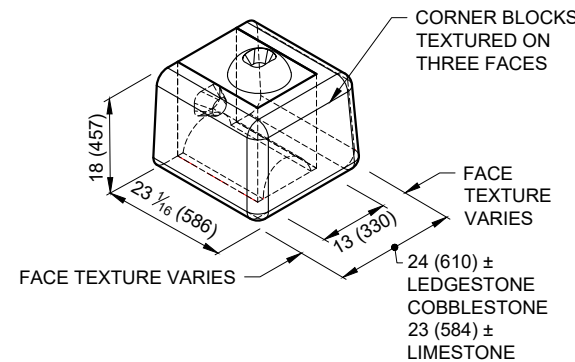
4. Actual block volumes and weights may vary.
5. Weights are based upon a concrete density of 143 lb/ft<sup>3</sup> (2291 kg/m<sup>3</sup>).
6. Knobs are typically 10" (254mm) diameter by 4" (102 mm) tall. Smaller knobs are available.

FREESTANDING BLOCKS

# Block Library

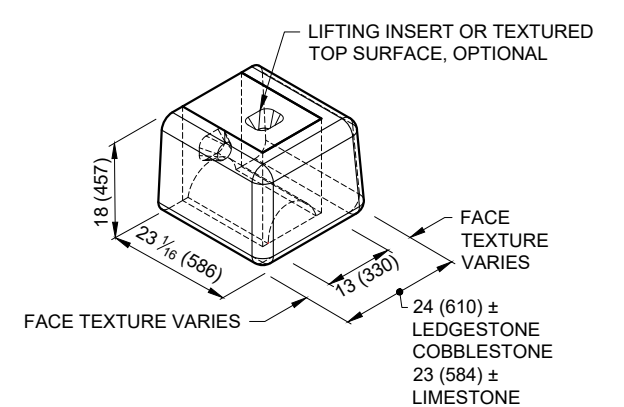
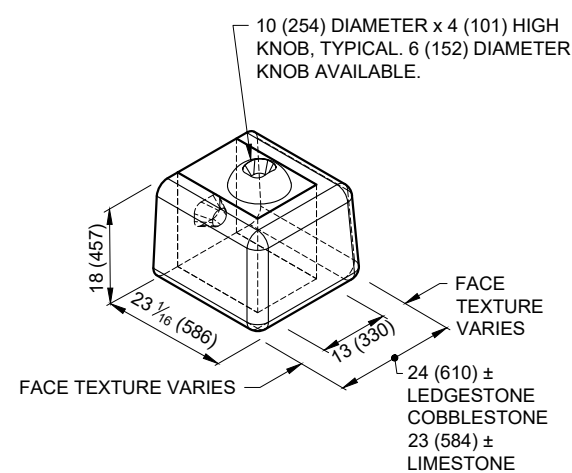
| F-HCM HALF CORNER MIDDLE |                                           |                                           |
|--------------------------|-------------------------------------------|-------------------------------------------|
| Face Texture:            | Cobble / Limestone                        | Kingstone / Ledgestone                    |
| Block Weight:            | 660 lb (300 kg)                           | 650 lb (300 kg)                           |
| Block Volume:            | 4.6 ft <sup>3</sup> (0.13m <sup>3</sup> ) | 4.6 ft <sup>3</sup> (0.13m <sup>3</sup> ) |

| F-HCG HALF CORNER GARDEN TOP |                                           |                                           |
|------------------------------|-------------------------------------------|-------------------------------------------|
| Face Texture:                | Cobble / Limestone                        | Kingstone / Ledgestone                    |
| Block Weight:                | 530 lb (240 kg)                           | 530 lb (240 kg)                           |
| Block Volume:                | 3.7 ft <sup>3</sup> (0.11m <sup>3</sup> ) | 3.7 ft <sup>3</sup> (0.10m <sup>3</sup> ) |



| F-HCB HALF CORNER BOTTOM |                                           |                                           |
|--------------------------|-------------------------------------------|-------------------------------------------|
| Face Texture:            | Cobble / Limestone                        | Kingstone / Ledgestone                    |
| Block Weight:            | 710 lb (320 kg)                           | 700 lb (320 kg)                           |
| Block Volume:            | 5.0 ft <sup>3</sup> (0.14m <sup>3</sup> ) | 4.9 ft <sup>3</sup> (0.14m <sup>3</sup> ) |

| F-HCT HALF CORNER TOP |                                           |                                           |
|-----------------------|-------------------------------------------|-------------------------------------------|
| Face Texture:         | Cobble / Limestone                        | Kingstone / Ledgestone                    |
| Block Weight:         | 640 lb (290 kg)                           | 630 lb (290 kg)                           |
| Block Volume:         | 4.5 ft <sup>3</sup> (0.13m <sup>3</sup> ) | 4.4 ft <sup>3</sup> (0.13m <sup>3</sup> ) |



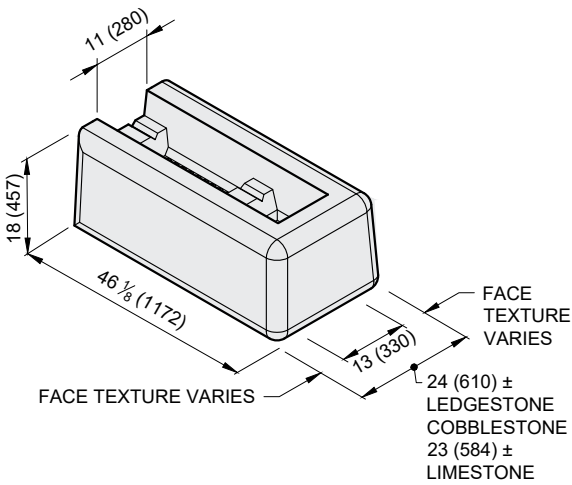
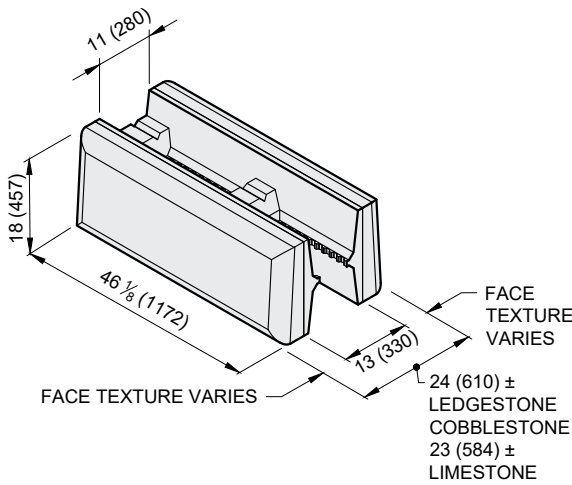
1. Units for dimensions are inches (mm), typical unless noted otherwise.
2. Block production varies with each licensed Redi-Rock manufacturer. Confirm availability before Specifying or Ordering.
3. Architectural faces on the blocks have varying texture.

4. Actual block volumes and weights may vary.
5. Weights are based upon a concrete density of 143 lb/ft<sup>3</sup> (2291 kg/m<sup>3</sup>).
6. Knobs are typically 10" (254mm) diameter by 4" (102 mm) tall. Smaller knobs are available.

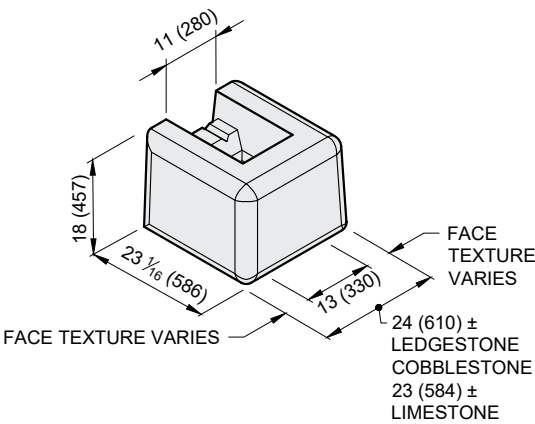
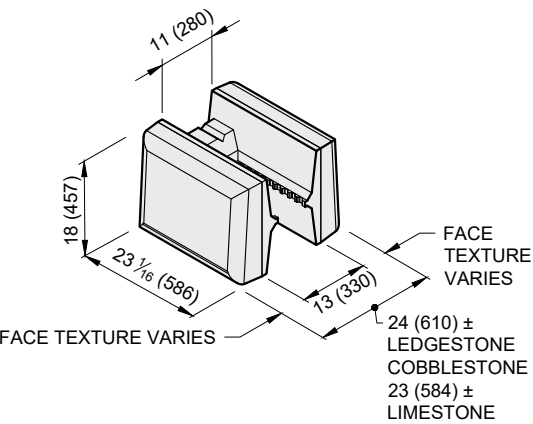
FREESTANDING BLOCKS

Block Library

| F-HC HOLLOW-CORE |                     |                        | F-CHC CORNER HOLLOW-CORE |                     |                        |
|------------------|---------------------|------------------------|--------------------------|---------------------|------------------------|
| Face Texture:    | Cobble / Limestone  | Kingstone / Ledgestone | Face Texture:            | Cobble / Limestone  | Kingstone / Ledgestone |
| Block Weight:    | 910 lb (410 kg)     | 770 lb (350 kg)        | Block Weight:            | 1000 lb (460 kg)    | 970 lb (440 kg)        |
| Block Volume:    | 6.38 ft³ (0.181 m³) | 5.38 ft³ (0.152 m³)    | Block Volume:            | 7.01 ft³ (0.198 m³) | 6.80 ft³ (0.192 m³)    |
| Infill Volume:   | 4.09 ft³ (0.116 m³) |                        | Infill Volume:           | 3.37 ft³ (0.095 m³) |                        |



| F-HHC HALF HOLLOW-CORE |                     |                        | F-HCHC HALF CORNER HOLLOW-CORE |                     |                        |
|------------------------|---------------------|------------------------|--------------------------------|---------------------|------------------------|
| Face Texture:          | Cobble / Limestone  | Kingstone / Ledgestone | Face Texture:                  | Cobble / Limestone  | Kingstone / Ledgestone |
| Block Weight:          | 460 lb (210 kg)     | 390 lb (180 kg)        | Block Weight:                  | 550 lb (250 kg)     | 510 lb (230 kg)        |
| Block Volume:          | 3.19 ft³ (0.090 m³) | 2.69 ft³ (0.076 m³)    | Block Volume:                  | 3.81 ft³ (0.108 m³) | 3.53 ft³ (0.100 m³)    |
| Infill Volume:         | 2.04 ft³ (0.058 m³) |                        | Infill Volume:                 | 1.31 ft³ (0.037 m³) |                        |

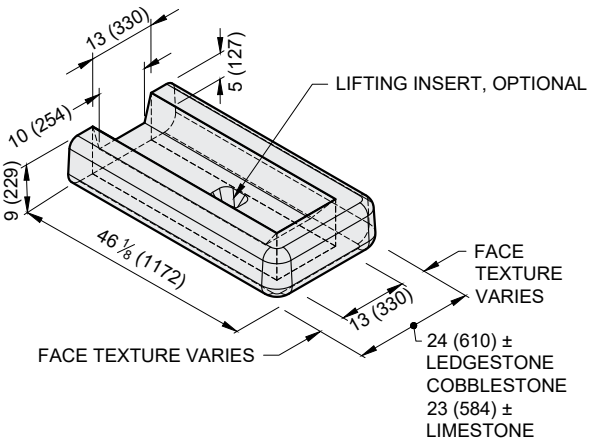
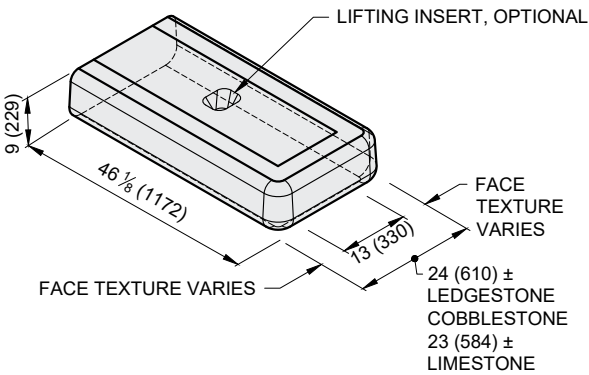


1. Units for dimensions are inches (mm), typical unless noted otherwise.
2. Confirm block production with licensed Redi-Rock manufacturer.
3. Architectural faces on the blocks have varying texture.
4. Average block weights shown. Actual block volumes and weights may vary.
5. Weights are based upon a concrete density of 143 lb/ft³ (2291 kg/m³).

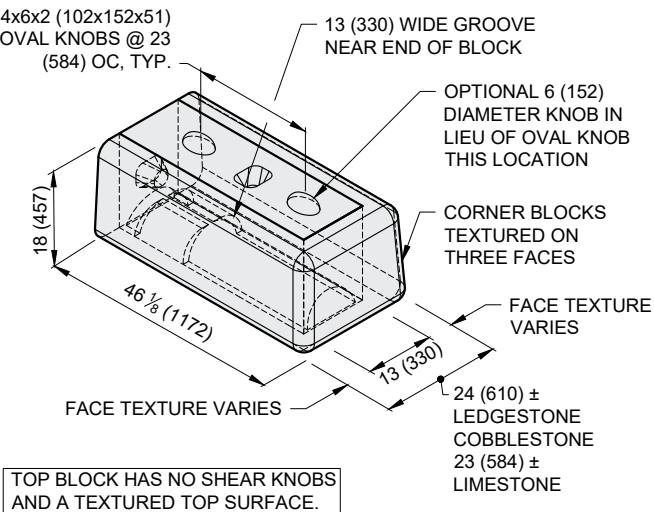
FREESTANDING BLOCKS

Block Library

| F-9SC 9" (230) STEPDOWN CORNER |                     |                        | F-9SG 9" (230) STEPDOWN GARDEN |                     |                        |
|--------------------------------|---------------------|------------------------|--------------------------------|---------------------|------------------------|
| Face Texture:                  | Cobble / Limestone  | Kingstone / Ledgestone | Face Texture:                  | Cobble / Limestone  | Kingstone / Ledgestone |
| Block Weight:                  | 740 lb (340 kg)     | 660 lb (300 kg)        | Block Weight:                  | 550 lb (250 kg)     | 470 lb (210 kg)        |
| Block Volume:                  | 5.17 ft³ (0.146 m³) | 4.60 ft³ (0.130 m³)    | Block Volume:                  | 3.86 ft³ (0.109 m³) | 3.30 ft³ (0.093 m³)    |



| F-90C 90 DEGREE CORNER |                    |                        |
|------------------------|--------------------|------------------------|
| Face Texture:          | Cobble / Limestone | Kingstone / Ledgestone |
| Block Weight:          | 1330 lb (600 kg)   | 1320 lb (600 kg)       |
| Block Volume:          | 9.3 ft³ (0.26m³)   | 9.2 ft³ (0.26m³)       |



1. Units for dimensions are inches (mm), typical unless noted otherwise.
2. Block production varies with each licensed Redi-Rock manufacturer. Confirm availability before Specifying or Ordering.
3. Architectural faces on the blocks have varying texture.
4. Actual block volumes and weights may vary.
5. Weights are based upon a concrete density of 143 lb/ft³ (2291 kg/m³).





ACCESSORY BLOCKS  
(COLUMNS, STEPS, AND CAPS)

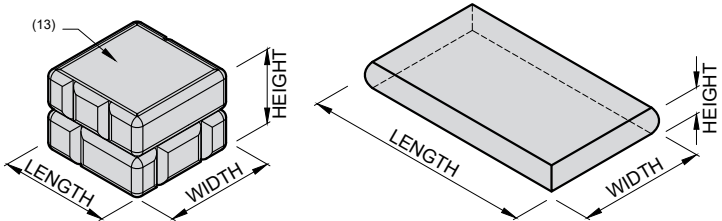
The Redi-Rock Column and Accessory blocks come in multiple widths and configurations. The defining characteristic is that these blocks have an aesthetic texture cast into two or more faces, and create columns, caps, and steps that complement both Retaining and Freestanding blocks. These blocks are machine-placed, wet-cast, precast modular block units manufactured from first purpose, non-reconstituted concrete and intended for constructing dry-stacked modular features that coordinate with retaining walls. The block units are manufactured from structural-grade concrete mixes in accordance with ASTM C94 or ASTM C685 that produce a finished unit with excellent resistance to freeze-thaw, deicing chemical exposure, and submerged conditions in both fresh water and salt water applications. All Redi-Rock blocks are manufactured and distributed through an international network of individually-owned, licensed precast concrete manufacturers.

CONCRETE MIX PROPERTIES <sup>(1)</sup>

| FREEZE THAW EXPOSURE CLASS <sup>(2)</sup>                                                                               | MINIMUM 28 DAY COMPRESSIVE STRENGTH <sup>(3)</sup> | MAXIMUM WATER CEMENT RATIO | NOMINAL MAXIMUM AGGREGATE SIZE <sup>(10)</sup>             | AGGREGATE CLASS DESIGNATION <sup>(4)</sup> | AIR CONTENT <sup>(5)</sup> |
|-------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|----------------------------|------------------------------------------------------------|--------------------------------------------|----------------------------|
| MODERATE                                                                                                                | 4,000 psi (27.6 MPa)                               | 0.45                       | 1.0 (25)                                                   | 3M                                         | 4.5% ± 1.5%                |
| SEVERE                                                                                                                  | 4,000 psi (27.6 MPa)                               | 0.45                       | 1.0 (25)                                                   | 3S                                         | 6.0% ± 1.5%                |
| VERY SEVERE                                                                                                             | 4,500 psi (30.0 MPa)                               | 0.40                       | 1.0 (25)                                                   | 4S                                         | 6.0% ± 1.5%                |
| MAXIMUM WATER-SOLUBLE CHLORIDE ION (Cl <sup>-</sup> ) CONTENT IN CONCRETE, PERCENT BY WEIGHT OF CEMENT <sup>(6,7)</sup> |                                                    |                            |                                                            |                                            | 0.15                       |
| MAXIMUM CHLORIDE AS Cl <sup>-</sup> CONCENTRATION IN MIXING WATER, PARTS PER MILLION                                    |                                                    |                            |                                                            |                                            | 1000                       |
| MAXIMUM PERCENTAGE OF TOTAL CEMENTITIOUS MATERIALS BY WEIGHT <sup>(8,10)</sup> (VERY SEVERE EXPOSURE CLASS ONLY)        |                                                    |                            |                                                            |                                            |                            |
| FLY ASH OR OTHER POZZOLANS PER ASTM C618                                                                                |                                                    | 25                         | TOTAL ASH, POZZOLANS, SLAG, AND SILICA FUME <sup>(9)</sup> |                                            | 50                         |
| SLAG CONFORMING TO ASTM C989                                                                                            |                                                    | 50                         | TOTAL ASH, POZZOLANS, AND SILICA FUME <sup>(9)</sup>       |                                            | 35                         |
| SILICA FUME CONFORMING TO ASTM C1240                                                                                    |                                                    | 10                         | ALKALI-AGGREGATE REACTIVITY MITIGATION PER ACI 201         |                                            |                            |

REFERENCE DIMENSIONS:

HEIGHT = VERTICAL DIMENSION OF TEXTURED FACE  
LENGTH = LONGER HORIZONTAL DIMENSION OF TEXTURED FACE  
WIDTH = SHORTER HORIZONTAL DIMENSION



COLUMN BLOCK

CAP/ STEP BLOCK

DIMENSIONAL TOLERANCES <sup>(11)(12)</sup>

|        | COLUMN BLOCKS       | CAP/ STEP BLOCKS           |
|--------|---------------------|----------------------------|
| HEIGHT | 18 ± 3/16 (457 ± 5) | 6 ± 3/16 (152 ± 5)         |
| LENGTH | 24 ± 1/2 (610 ± 13) | VARIES ± 1/2 (VARIES ± 13) |
| WIDTH  | 24 ± 1/2 (610 ± 13) | 28 1/2 ± 1/2 (724 ± 13)    |

<sup>(1)</sup> Concrete mix properties are in general accordance with ACI 318 durability requirements. Research has shown that concrete manufactured to these standards demonstrates good durability and performance. When these requirements are followed, specific freeze-thaw testing of the concrete is typically NOT required.

<sup>(2)</sup> Exposure class is as described in ACI 318.

<sup>(3)</sup> Test method ASTM C39.

<sup>(4)</sup> Defined in ASTM C33 Table 3 *Limits for Deleterious Substances and Physical Property Requirements of Coarse Aggregate for Concrete*.

<sup>(5)</sup> Test method ASTM C231.

<sup>(6)</sup> Test method ASTM C1218 at age between 28 and 42 days.

<sup>(7)</sup> Where used in high sulfate environments or where alkali-silica reactivity is and issue, watesoluble chloride shall be limited to no more than trace amounts (from impurities in concrete-making components, not intended constituents.)

<sup>(8)</sup> The total cementitious material also includes ASTM C150, C595, C845, and C1157 cement. The maximum percentages shall include:

(a) Fly ash or other pozzolans in type IP, blended cement, ASTM C595, or ASTM C1157.

(b) Slag used in the manufacture of an IS blended cement, ASTM C595, or ASTM C1157.

(c) Silica fume, ASTM C1240, present in a blended cement.

<sup>(9)</sup> Fly ash or other pozzolans and silica fume shall constitute no more than 25 and 10 percent, respectively, of the total weight of the cementitious materials.

<sup>(10)</sup> Prescriptive limits shown may be waived for concrete mixes that demonstrate excellent freeze-thaw durability in a detailed and current testing program.

<sup>(11)</sup> All dimensions are shown in units of *inches (mm)*.

<sup>(12)</sup> Permissible defects: Chips smaller than 1.5" (38mm) in its largest dimension and cracks not wider than 0.012" (0.305mm) and not longer than 25% of the nominal height of the block; bug holes in the architectural face smaller than 0.75" (19mm); and bug holes, water marks, and color variation on non-architectural faces.

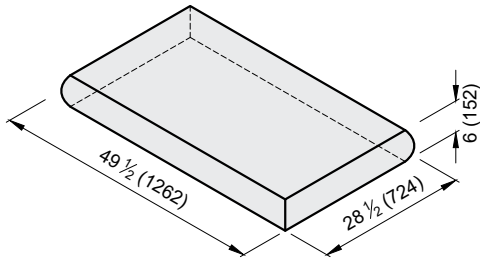
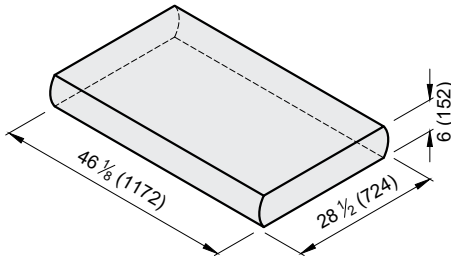
<sup>(13)</sup> Column blocks have a smooth troweled finish on horizontal faces.



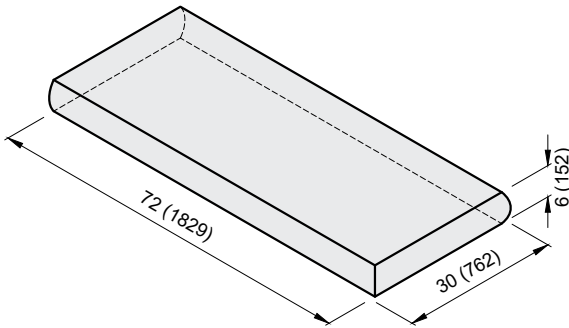
ACCESSORIES (CAP AND STEP BLOCKS)

Block Library

| A-2SC TWO-SIDED                   | A-4SC FOUR-SIDED                  |
|-----------------------------------|-----------------------------------|
| Block Weight: 630 lb (290 kg)     | Block Weight: 670 lb (300 kg)     |
| Block Volume: 4.42 ft³ (0.125 m³) | Block Volume: 4.65 ft³ (0.132 m³) |



| A-3SC72 THREE-SIDED 72"         |
|---------------------------------|
| Block Weight: 1040 lb (470 kg)  |
| Block Volume: 7.3 ft³ (0.21 m³) |



1. Units for dimensions are inches (mm), typical unless noted otherwise.

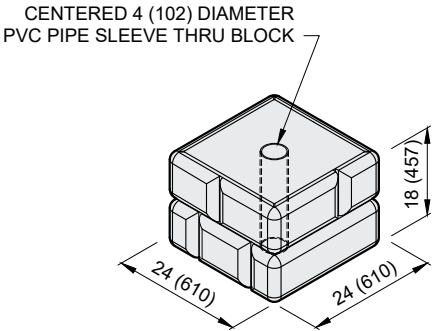
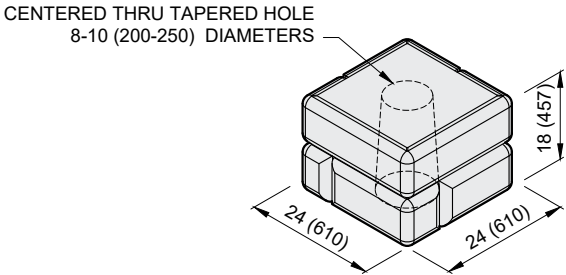
2. Block production varies with each licensed Redi-Rock manufacturer. Confirm availability before Specifying or Ordering.
3. Actual block volumes and weights may vary.

4. Weights are based upon a concrete density of 143 lb/ft³ (2291 kg/m³).

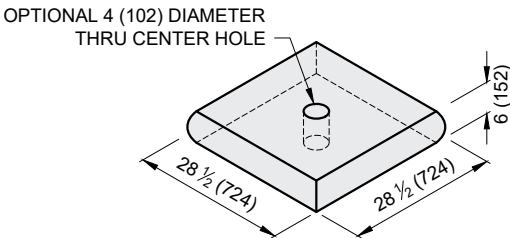
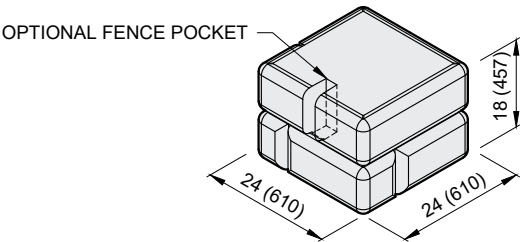
ACCESSORIES (COLUMN BLOCKS)

Block Library

| A-COL8 COLUMN - 8" (203mm) CORE | A-COL4 COLUMN - 4" (102mm) CORE |
|---------------------------------|---------------------------------|
| Block Weight: 730 lb (330 kg)   | Block Weight: 810 lb (370 kg)   |
| Block Volume: 5.1 ft³ (0.14 m³) | Block Volume: 5.6 ft³ (0.16 m³) |



| A-COLS COLUMN - SOLID CORE      | A-CC COLUMN CAP                 |
|---------------------------------|---------------------------------|
| Block Weight: 830 lb (380 kg)   | Block Weight: 390 lb (180 kg)   |
| Block Volume: 5.8 ft³ (0.16 m³) | Block Volume: 2.7 ft³ (0.08 m³) |



1. Units for dimensions are inches (mm), typical unless noted otherwise.

2. Block production varies with each licensed Redi-Rock manufacturer. Confirm availability before Specifying or Ordering.

3. Actual block volumes and weights may vary.
4. Weights are based upon a concrete density of 143 lb/ft³ (2291 kg/m³).

5. Weight and volume ranges represents the blocks with the maximum hole size shown and with no hole.

6. Optional fence rail pockets available upon request. Typical pocket size is: 2 (50) wide x 5 (130) deep x 9 (230) tall.

**Canterwood Commercial Center**PL-SPR-07-0004 et al  
Hearing Examiner**Exhibit K**

OFFICE USE ONLY

SUBMITTED: \_\_\_\_\_

CASE NO.: \_\_\_\_\_

**MASTER PLANNING PERMIT APPLICATION**

Check all permits you are applying for in the boxes provided. Submit this application form, the applicable materials listed in the corresponding checklist and fee.

|                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> Major Site Plan Review<br><input type="checkbox"/> Minor Site Plan Review<br><input checked="" type="checkbox"/> Administrative Design Review<br><input type="checkbox"/> Alternative Design Review<br><input type="checkbox"/> Alternative Landscape Plan<br><input type="checkbox"/> Binding Site Plan<br><input type="checkbox"/> Variance<br><input type="checkbox"/> Conditional Use Permit<br><input type="checkbox"/> SEPA | <input type="checkbox"/> Preliminary Short Plat<br><input type="checkbox"/> Final Short Plat<br><input type="checkbox"/> Preliminary Plat<br><input type="checkbox"/> Preliminary Plat Revision<br><input type="checkbox"/> Final Plat<br><input type="checkbox"/> Plat Alterations/Vacation<br><input type="checkbox"/> Preliminary PRD/PUD<br><input type="checkbox"/> Final PRD/PUD<br><input type="checkbox"/> Final PRD/PUD Amendment<br><input type="checkbox"/> Boundary Line Adjustment | <input type="checkbox"/> Shoreline Substantial Development Permit<br><input type="checkbox"/> Shoreline Variance<br><input type="checkbox"/> Shoreline Conditional Use Permit<br><input type="checkbox"/> Shoreline Exemption<br><input type="checkbox"/> Shoreline Revision<br><input type="checkbox"/> Flood Hazard<br><input type="checkbox"/> Critical Area Variance<br><input type="checkbox"/> Reasonable Use Exception<br><input type="checkbox"/> Critical Area Review | <input type="checkbox"/> Land Clearing<br><input type="checkbox"/> Nonconforming Review<br><input type="checkbox"/> Perf. Based Height Exception<br><input type="checkbox"/> Temporary Trailer<br><input type="checkbox"/> Administrative Interpretation<br><input type="checkbox"/> Rezone<br><input type="checkbox"/> Height Restriction Area Amendment<br><input type="checkbox"/> Comp. Plan Amendment<br><input type="checkbox"/> Zoning Text Amendment |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                                                                                       |                              |
|---------------------------------------------------------------------------------------|------------------------------|
| <b>Project Name:</b>                                                                  | Canterwood Commercial Center |
| <b>Project Address:</b>                                                               | 10700 Canterwood Blvd        |
| <b>Tax Assessor Parcel Number(s):</b><br><small>Attach full legal description</small> | 0122254090                   |

|                                                                                            |                                     |               |                         |
|--------------------------------------------------------------------------------------------|-------------------------------------|---------------|-------------------------|
| <b>APPLICANT/AGENT</b> <input checked="" type="checkbox"/> Primary Contact for Application |                                     |               |                         |
| <b>Name:</b>                                                                               | Jason Hubbell, Barghausen Engineers | <b>Phone:</b> | (425) 251-6222          |
| <b>Street:</b>                                                                             | 18215 72nd Avenue South             | <b>Fax:</b>   | (425) 251-8782          |
| <b>City/State/Zip:</b>                                                                     | Kent, WA 98032                      | <b>Email:</b> | jhubbell@barghausen.com |

|                                                                                                                                  |                                    |               |                  |
|----------------------------------------------------------------------------------------------------------------------------------|------------------------------------|---------------|------------------|
| <b>PROPERTY OWNER(S)</b> <input checked="" type="checkbox"/> Applicant <input type="checkbox"/> Primary Contract for Application |                                    |               |                  |
| <b>Name:</b>                                                                                                                     | John Xitco, Swede Hill LLC         | <b>Phone:</b> | (253) 627-6179   |
| <b>Street:</b>                                                                                                                   | 2320 Milwaukee Way / P.O. Box 1397 | <b>Fax:</b>   |                  |
| <b>City/State/Zip</b>                                                                                                            | Tacoma, WA 98401                   | <b>Email:</b> | jxitco@gmail.com |

**Property Owner(s)**

I do hereby affirm and certify, under penalty of perjury, that I am one (or more) of the owners or owner under contract of the herein described property and that the foregoing statements and answers are in all respects true and correct on my information and belief as to those matters, I believe it to be true.

Signature by Property Owner: \_\_\_\_\_ Date: 10/15/19



**PROJECT DESCRIPTION (PROVIDE DETAILED SUMMARY)**

This is a formal application for a design exception to allow wall heights over 6-feet for this site.

This project proposes to construct four retail and office-use buildings with associated parking, landscaping and utilities. There is also wetland mitigation and road improvements that are part of this project. Please refer to the historical records for PL-SPR-07-0004, PL-DRB-07-0013, PL-SEPA-07-0008, PL-SEPA-07-0060 and CUP Application October 2008.

**UTILITIES****Water Supply (name of utility provider):**

City of Gig Harbor

**Sewage Disposal (name of utility provider):**

City of Gig Harbor

**Access** (Name of road or street from which access is or will be gained):

Canterwood Boulevard

**CRITICAL AREA INFORMATION****Wetlands on site** ☒ Yes ☐ No**Slopes exceeding 15%** ☒ Yes ☐ No**Streams** ☒ Yes ☐ No

**Existing Land Use:** Describe (or illustrate separately) all existing use structures and all critical areas within 300 feet of property lines.

Existing site is vacant. There are no structures on site. There is a stream and several wetlands are on site.

**Fee Deposits:**

"I acknowledge that I have applied for a permit which requires a deposit for future services to be rendered, as required by section F of the City's adopted Fee Schedule. I understand that, as the applicant, I (we) shall bear all of the costs of these services and will be billed the act costs in excess of the deposit. If the actual costs are below the deposit, I will be refunded the difference."  (Initials)

**Consolidated Permit Processing:**

"As the applicant, I (we) elect to have all planning permits submitted concurrently and associated with our project processed collectively under the highest numbered permit procedure per **GHMC 19.01.002(B)**."  (Initials)



October 15, 2019  
ELECTRONIC SUBMITTAL

Peter Katich  
Principal Planner  
City of Gig Harbor  
Planning Department  
3510 Grandview Street  
Gig Harbor, WA 98335

RE: Design Review Resubmittal – Design Exception  
Canterwood Commercial Center  
Permit Nos. PL-SPR-07-0004, PL-CUP-13-0002, PL-DRB-07-0013,  
PL-SEPA-07-0060  
Our Job No. 16657

Dear Peter:

In response to the October 29, 2018 letter requesting a design exception rather than a design alternate, attached are the requested documents, as well as the narrative for criteria approval.

The following documents are enclosed for your review and approval:

1. Completed Master Planning Permit Application
2. Current Site Grading Plan showing the proposed wall locations and grading
3. Revised Landscaping Plan that includes planting that will drape over the top of the walls
4. Wetland Planting Plan showing planting at the base of the walls
5. Wall Material submittal

The site grading plan has been included as reference. No changes have been made to the wall configuration since the October 29, 2018 review letter.

A design exception is being requested to allow walls over 6 feet in height in order to meet the difficult design considerations of this project site.

The following provides responses to the design exception criteria:

1. **Special conditions and circumstances exist which render a specific requirement of Chapter [17.99](#) GHMC, Design Manual, unnecessary, given the location and intended use of the proposed development.**

**Response:** There are special conditions that require a design exception to the Design Manual for the maximum wall heights. The first condition is grade differential. The proposed project site is steeply sloped from Canterwood Boulevard on the east down to SR-16 on the west. The grade difference between the existing road and the wetland buffer is approximately 28 feet for the north wall. The site layout is designed so that the driveway is as far south as possible to reduce the grade differential. For the south wall, the grade difference between Canterwood Boulevard and

the wetland buffer is approximately 26 feet. By locating the driveway for Building B to the south, the grade difference is approximately 10 feet, which is the approximate height of the wall.

The second condition is driveway alignment. City requirements dictate that new driveways match existing driveway locations across the street as much as possible. There is an existing driveway on the east side of Canterwood Drive that the Building A driveway was located to match. This causes the proposed driveway to be very close to the wetland and stream buffer that bisects the site. Moving the driveway north to allow more room for grading, causes an even larger grade differential as Canterwood Boulevard is increasing in elevation to the north. For Building B, the proposed driveway is located as far south as possible to limit the grade differences with Canterwood Boulevard and the project area to the south.

Finally, there is the 50-foot stream and wetland buffer. In order to comply with Gig Harbor Municipal Code, the stream buffer must be undisturbed which means grading cannot occur in the buffer. The wall placement and heights are necessary to allow reasonable site development while also preserving the full 50-foot stream buffer in an existing condition.

The large grade differences, the existing driveway location, and the elevations of the wetland buffer all combine to create special conditions that require a wall height greater than 6 feet in isolated areas.

**2. The special conditions and circumstances are characteristic of the proposed general use of a site and not of a specific tenant.**

**Response:** Tenants for the site have not been determined. This circumstance is required to develop the property with retail and office-type uses and is not required for specific tenants.

**3. The special conditions and circumstances are not representative of typical retail, professional office or residential type development which may be allowed within the zoning district.**

**Response:** Special conditions and circumstances are associated with this site that are not typical of most development sites. This site is very steeply sloped from Canterwood Boulevard to SR-16. There is approximately 50 to 60 feet of grade difference over approximately 400 feet or about 12% to 15% average grade. The site is bisected by a stream channel and has wetland and buffer impacts, which limit the amount of developable site. There are 30-foot setbacks from both Canterwood Boulevard and SR-16 and a 40-foot setback from the north property line for buffering adjacent to residential property, which also reduce the amount of land that can be developed with this project. Possibly having one of these constraints on a project site may be typical of retail or an office development, but what makes this a special condition or circumstance is that this site has numerous site constraints on the development that require an allowance for wall heights over 6 feet.

**4. The requested exception is based upon functional consideration rather than economic hardship, personal convenience or personal design preferences.**

**Response:** The proposed walls over 6 feet in height are the best solution to meet the majority of the Design Manual requirements. The taller walls will be costly and are not a result of economic hardship, convenience, or design preferences. The taller wall is considered the least deviation



from the Design Manual so that the other requirements concerning driveway placement and undisturbed stream buffer can be maintained.

5. **Architectural changes in the project design as a result of the exception have been sufficiently compensated by other architectural embellishments, and site plan changes as a result of the exception have been sufficiently compensated by other site amenities.**

**Response:** No architectural changes are required for this exception. Per the October 29, 2018 review letter, the Design Review Board (DRB) asked that the plans be revised to include additional plantings at the top of the wall that would drape over the wall, as well as additional plantings at the bottom of the wall. The DRB also requires a wall utilizing natural materials that will be consistent with other walls on the project site. The included landscape and wetland mitigation plans have been revised to show the additional plantings. Wall literature has been included with this submittal to illustrate the type of wall that will be proposed on the project. The wall heights are too tall to allow a rockery type wall constructed of stacked rocks. The walls will require to be engineered with blocks and possibly a geogrid. The wall type proposed is locally available and imitates a natural stone look.

6. **The requested exception will not result in a project which is inconsistent with the intent and general scope of the standards of Chapter [17.99](#) GHMC, Design Manual. (Ord. 1197 § 78, 2010; Ord. 1093 § 12, 2007; Ord. 975 § 15, 2004).**

**Response:** The site has been designed to match the existing topography as much as possible while still allowing a commercial development. The increased wall height means matching the driveway location across Canterwood Boulevard and preserving the stream and wetland buffer in the existing condition. The exception granted for wall height protects more existing vegetation and topography to meet the intent and general scope of the requirements.

We believe that the above responses, together with the enclosed plans meet the requirements as necessary to approve an exception and allow the Planning Department to make a process determination post-motion. Please review and schedule the meeting at your earliest convenience. If you have questions or need additional information, please contact me at this office. Thank you.

Sincerely,



Jason Hubbell, P.E.  
Senior Project Engineer

JH/ca  
16657c.015.doc  
enc: As Noted  
cc: John M. Xitco, Swede Hill, LLC (w/enc via efile)  
Bruce McKean, Helix Design Group, Inc. (w/enc via efile)  
Karen E. Harris, Barghausen Consulting Engineers, Inc.  
Jeff M. Varley, Barghausen Consulting Engineers, Inc.

**Canterwood Commercial Center**

PL-SPR-07-0004 et al  
Hearing Examiner

**Exhibit L**



*"THE MARITIME CITY"*

COMMUNITY DEVELOPMENT DEPARTMENT  
PLANNING DIVISION

**Mitigated Determination of Nonsignificance (MDNS)  
W.A.C. 197-11-970**

**Environmental Review Application No.:** PL-SEPA-07-0060

**Parcel Number:** 0122254090

**Action:** Canterwood Commercial Center – Site Plan Review, Conditional Use Permit, and Design Review (PL-SPR-07-0004, PL-CUP-13-0002, PL-DRB-07-0013)

**Proposal:** The proposal includes the construction of four commercial buildings totaling 28,278 square feet and a 9,000 square feet parking garage on a vacant parcel in the B-2 General Business Zoning District. The site is adjacent to Washington State Highway 16 on the west and Canterwood Blvd on the east, within the vicinity of St. Anthony's Hospital. The site contains steep slopes, wetlands and an unnamed stream. The project proposes significant fill to account for the extreme topography of the site and the filling of two Category IV wetlands. Mitigation is proposed through the creation of on-site wetlands and the removal of two in-stream culverts. The project provides for two access points from Canterwood Boulevard. A parking garage under the northernmost building is proposed and drive-through facilities on the other three buildings are also proposed. The conditional use permit is required to allow for the site's proposed drive-through facilities.

**Location:** 10700 Canterwood Blvd, Gig Harbor, WA.

**Proponent:** Swede Hill, LLC, PO Box 1397, Tacoma, WA 98401.

**I. INCORPORATION BY REFERENCE:**

The following documents contain information, studies and analysis that have been used in the review of this proposal and are hereby incorporated into this threshold determination by reference:

1. SEPA Environmental Checklist prepared by Jason Hubbell, dated June 24, 2020;

2. Wetland Delineation and Habitat Assessment Report and Detailed Mitigation Plan, prepared by Soundview Consultants, LLC, revised August 12, 2020;
3. Technical Memorandum prepared by Grette Associates, LLC, dated July 31, 2020, together with referenced correspondence among City of Gig Harbor, Grette Associates, LLC, and Soundview Consultants, LLC (multiple dates);
4. Recommended SEPA Mitigation and Conditions, prepared by Aaron Hulst, P.E., Senior Engineer, Public Works Department, Engineering Division, dated June 25, 2021;
5. Technical Memorandum prepared by Grette Associates, LLC, dated March 5, 2018; Administrative Interpretation prepared by the City of Gig Harbor Planning Director for file no. PL-ADMIN-13-0001, dated September 17, 2013, and; Technical Memorandum prepared by Grette Associates, LLC, dated March 14, 2014;
6. Cultural Resources Assessment of the Canterwood Commercial Project, prepared by Cultural Resource Consultants, Inc., dated June 10, 2015;
7. Section 39 Permit, United States Army Corps of Engineers (NWS-2014-954) dated November 5, 2018;
8. State 401 Water Quality Certification and Coastal Zone Management Act Consistency, Department of Ecology, dated January 23, 2019, and;
9. City of Gig Harbor Client Assistance Memo, Critical Area Sign Installation Detail, and;
10. Geotechnical Consultation, Building A Dispersion Trench Recommendation, prepared by GeoResources, LLC, dated May 10, 2021, together with Geotechnical Engineering Report, prepared by GeoResources, LLC, dated May 28, 2020.

## **II. ANALYSIS:**

**Plants, Animals & Cultural Resources:** The subject site is a vacant, heavily forested 7.6-acre parcel in the B-2 General Business zoning district immediately west of the State Route 16 corridor. The site ranges from hilly to steep slopes with the steepest being approximately 70%. Total topographic relief across the site is approximately 140-feet. Seven regulated Category IV wetlands and one regulated unnamed Type 3 stream have been identified on site.

Per the applicant's Wetland Delineation, Habitat Assessment, & Detailed Mitigation Plan ("Habitat Assessment") revised on August 12, 2020 (Reference No. 2), the



wetlands on-site have been categorized as Category IV wetlands covering approximately 11,012 square feet of the subject site; these wetlands have been identified as Wetlands A-G. The wetlands are palustrine forested, saturated wetlands dominated by deer fern, lady fern, slough sedge, salmonberry, red alder, western red cedar, and Douglas fir vegetation species. The unnamed stream channel is rated as a Type 3 stream and traverses the site for approximately 1,265 linear feet. The stream is a non-salmon bearing tributary which eventually connects with McCormick Creek and is associated with Wetlands D, E, and F on the subject parcel. The Type 3 stream and all seven Category IV wetlands have all been assigned a 50-buffer that applies to each individual critical area. In totality, approximately one-half of the subject parcel is encumbered by regulated critical areas and their associated buffers. Critical fish and wildlife species are not associated with the site.

Impacts to the above-mentioned critical areas include filling one wetland (Wetland B) to facilitate development of the proposed commercial center and converting another wetland (Wetland C) for use as a stormwater pond. Compensatory mitigation for these impacts is proposed by the applicant; specifically, the applicant proposes to create a new wetland to mitigate for its wetland impacts in a manner consistent with GHMC 18.08.170(B). To this end, the applicant has proposed to create a new on-site wetland at a replacement ratio of 1.5:1, effectively creating 50% more wetland area than is being impacted through the site's proposed development. Table 12 included in Reference No. 2 outlines the impacted wetland area at 5,525 square feet and further outlines the area of the created wetland resultant of the site's compensatory mitigation at 8,288 square feet. The applicant further proposes out-of-kind compensatory mitigation by removing 48 linear feet of culvert associated with the on-site Type 3 tributary stream and providing subsequent stream restoration efforts to improve the overall hydrologic and water quality functions of the stream by improving runoff storage and conveyance capacity, retention of sediments, pollution assimilation, and groundwater recharge functions.

The Habitat Assessment was reviewed by the City's third-party environmental consultant, Grette Associates, LLC ("Grette"), for concurrence with the findings and proposed mitigation introduced by the applicant. In its Technical Memorandum dated October 21, 2019 (Reference No. 3), Grette confirmed that its previous written comments and the concerns discussed among staff, Grette, and the applicant (see Reference Nos. 3 and 5) had been sufficiently addressed by the applicant's revised Habitat Assessment and revised site plans.

Lastly, the applicant contracted with Cultural Resource Consultants, Inc. to conduct a cultural resources survey of the subject site. The results of the survey are included as Reference No. 6 to this MDNS; the survey identified no cultural resources on the site, but prepared a "Plan and Procedures for the Unanticipated Discovery of Cultural Resources and Human Skeletal Remains" (also known as an "Inadvertent Discovery Plan," or "IDP") for the proponent's application if archeological materials or human remains are discovered during the preparation and development of the

site. Mitigation Measure No. 3 addresses the need to apply this IDP, as needed.

**Transportation & Circulation:** The Public Works Recommended SEPA Mitigation and Conditions Memorandum (“the memo”) dated June 25, 2021 (Reference No. 4) addresses the review of the wastewater, transportation, stormwater, and utility infrastructure impacts associated with the proposed action. No mitigation measures are required to meet the city’s adopted goals, provided the applicant develops the site as has been set forth in the memo’s adopted reference materials.

Using the substantive SEPA authority provided by GHMC Subsection 18.04.210.D.3.q, the city adopts by reference the critical area requirements of the Critical Areas Ordinance set forth in GHMC Chapter 18.08 and requires the following mitigation measures to address the project’s impact to the critical areas located on the subject site:

1. The applicant shall implement its Mitigation Plan and Regulatory Considerations set forth in Chapter 5 of the Habitat Assessment (Reference No. 2) consistent with all prepared representations and performance standards. This includes, but is not limited to, wetland and stream mitigation implementation and performance standards, plant materials, maintenance and monitoring plan, reporting, contingency plan, performance bonding, and the establishment of a conservation easement.
2. The applicant shall develop and operate the site consistent with the reference documents considered by the Public Works Department in its analysis of infrastructure impacts and resultant mitigation for such impacts; please see the reference documents collectively included with the SEPA memorandum prepared by the Public Works Department set forth in Reference No. 4 to this MDNS.
3. The applicant shall apply the Inadvertent Discovery Plan (“Plan and Procedures for the Unanticipated Discovery of Cultural Resources and Human Skeletal Remains”) included as Attachment B to Reference No. 6 if archeological materials or human remains are discovered during the preparation and development of the site.
4. The applicant shall adhere to the parameters and conditions of the Section 39 Permit issued by the United States Army Corps of Engineers (Reference No. 7).
5. The applicant shall install critical area signage at 50-foot intervals along a split-rail wood fence no more than 3-feet in height installed along the extent of the perimeter of buffers associated with all wetlands and streams identified on the site. The signage shall be consistent with the Critical Area Signage Installation Client Assistance Memo included as Reference No. 9 to this MDNS.
6. The applicant shall prepare and submit a Detailed Phase Mitigation Plan consistent with GHMC 18.08.150(B) for review and acceptance by the City in

advance of issuance of civil permits for the proposed site development, as has been recommended by Grette in its October 21, 2019 Technical Memorandum (Reference No. 3).

7. The applicant shall develop the site consistent with all recommendations set forth in the geotechnical engineering report included with this MDNS as Reference No. 10.

#### **IV. THRESHOLD DETERMINATION:**

##### **Lead Agency: City of Gig Harbor**

The lead agency for this proposal has determined that it does not have a probable significant adverse impact on the environment, provided the mitigation measures specified above are imposed. An environmental impact statement (EIS) is not required under RCW 43.21C.030(2)(c). This decision was made after review of a completed environmental checklist and other information on file with the lead agency. This information is available to the public upon request.

- ☒ This MDNS is issued under WAC 197-11-340(2); the lead agency will not act on this proposal for 14 days from the date of this document. **Comments must be submitted by July 15, 2021.**

Any interested person may appeal the adequacy of this SEPA Threshold Determination to the City of Gig Harbor Hearing Examiner pursuant to the procedures set forth under Chapter 18.04 of the Gig Harbor Municipal Code if a written request for appeal is received within 21-days after the issuance of this MDNS, or **July 22, 2021**, whichever is later. The written appeal must be submitted with a filing fee of three hundred and twelve dollars (\$312.00).

Contact Person: Kimberly Mahoney, Associate Planner; Phone: (253) 851-6170

Responsible Official: Katrina Knutson, AICP

Position Title: Community Development Director Phone: (253) 851-6170

Address: City of Gig Harbor  
3510 Grandview Street  
Gig Harbor, WA 98335

Signature \_\_\_\_\_



Date: July 1, 2021



**REVISED ENVIRONMENTAL CHECKLIST**

1. Proponent (c): Swede Hill LLC (Canterwood Commercial)  
Address: P.O. Box 1397  
Tacoma, WA 98401  
Phone: (253) 627-6179
2. Representative: Barghausen Consulting Engineers, Inc.  
  
Address: 18215 72<sup>nd</sup> Avenue South  
Kent, WA 98032  
Phone: (425) 251-6222
3. Property Address or location (e):   
10700 Canterwood Blvd. N.W.
4. 1/4 S/T/R (f): SE 25/22/1
5. Tax Parcel # (g): 0122254090
6. Total Acres: 7.6± acres
7. Permit Type: CUP, Site Plan, Design Review and Wetland Analysis
8. Zoning: B-2
9. Shoreline Environment: N/A
10. Water Body: Wetlands A through G and an unnamed stream.
11. Brief Description of the proposal and Project Name: Canterwood Commercial  
Properties. The intent of this project is to construct 4 commercial buildings in the B-2  
zone. The applicant is proposing to have 3 access driveways with approximately 135  
total parking spaces. The total impervious area for this project is approximately 90,823  
+/- 91,564 +/- SF or - 27.5% 27.7%.
12. Estimated Completion Date: Revised application Spring 2016 Summer 2017;  
construction Summer-Fall 2017 2018.
13. List of all Permits, Licenses or Government Approvals Required for the Proposal  
(federal, state and local – including rezones): Grading permit, land clearing permit, SEPA,  
wetland mitigation, CWA Section 404 and 401 (USACE & Ecology) Army Corps of Engineers  
permit obtained, a Hydraulic Project Approval (WDFW), and local critical areas review.
14. Do you have any plans for future additions, expansion or further activity related to or  
connected with this proposal? If yes, explain: No
15. Do you know of any plans by others which may affect the property covered by your  
proposal? If yes, explain: The Traffic Impact Analysis Report of St. Anthony Hospital for Gig  
Harbor, WA by David Evans and Associates, Inc dated June 2005 specifies this parcel within the  
“pipeline projects” and maps it in the Draft Supplemental EIS in Figure 7 as analysis area “E”.

16. Proposed timing or schedule (including phasing, if applicable): Revised SEPA ~~Spring 2016~~ Summer 2017.

17. List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal. Wetland Delineation Report and Compensatory Mitigation Plan prepared by Soundview Consultants dated December 2013 and response to comments dated April 24, 2014, and updated June 30, 2017. Landscape Plan by Barghausen Consulting Engineers dated June 2017, Traffic Impact Analysis by Heath and Associates dated December 2013, Design Review Application and Elevations prepared by Helix Design Group dated April 2016. Cultural Resources Assessment by Cultural Resources Consultants, Inc. dated June 10, 2015. Preliminary Drainage Report by Barghausen Consulting Engineers, Inc. dated April 2016 June 2017, Geotechnical Report by GeoResources dated January 31, 2014.

## **I. EARTH**

- A. General description of the site (circle one): flat, rolling, hilly, steep slopes, mountainous; other:  
The site ranges from hilly to steep slopes in areas. The site slopes from east to west away from Canterwood Blvd N.W.
- B. What is the steepest slope on the site (approximate percent slope)?  
The steepest slope on the site is approximately 20%.
- C. What general types of soils are found on the site (for example; clay, sand, gravel, peat, muck)? If you know the classification of agricultural soils, specify them and note any prime farmland.  
16C – Harstine Gravelly Sandy Loam 6-15% slopes; 16D – Harstine Gravelly Sandy Loam 15-30% slopes.
- D. Are there surface indications or history of unstable soils in the immediate vicinity? No. If so, describe \_\_\_\_\_
- E. Describe the purpose, type, and approximate quantities of any filling or grading proposed. Indicate source of fill.  
Approximately ~~12,500~~ 14,600 cubic yards will be cut, and ~~30,500~~ 38,300 cubic yards will be filled, with a net import of ~~20,000~~ 23,700 cubic yards.
- F. Could erosion occur as a result of clearing, construction, or use? If so, generally describe.  
Erosion could occur due to the soil type and existing slopes.
- G. About what percent of the site will be covered with impervious surfaces after project construction (for example, asphalt or buildings)?  
Approximately ~~27.5%~~ 27.7% will be impervious area.

- H. Proposed measures to reduce or control erosion, or other impacts to the earth, if any:  
Utilize Best Management Practices for erosion control, including filter fabric fence surrounding the cleared area, temporary drainage with a temporary sediment pond. Upon completion of the project, the site will be hydroseeded to stabilize the soil, and vaults will control storm water runoff.

## II. **AIR**

- A. What types of emissions to the air would result from the proposal (i.e., dust, automobile, odors, and industrial wood smoke) during construction and when the project is completed? If any, generally describe and give approximate quantities, if known.  
During construction, dust will come from clearing and grading of the site. Also, exhaust fumes will be generated by construction equipment.
- B. Are there any off-site sources of emissions or odor that may affect your proposal? None known. If so, generally describe \_\_\_\_\_
- C. Proposed measures to reduce or control emissions or other impacts to air, if any:  
During construction, the project site will be watered, as necessary, to control dust. Construction entrances will be utilized to reduce much of the dust on adjacent streets. Dirt tracked to adjacent roadways will be swept clean.

## III. **WATER**

### Surface

- A. Is there any surface water body on or in the immediate vicinity of the site (including year-round and seasonal streams, salt water, lakes, ponds, wetlands)? If yes, describe type and provide names. If appropriate, state the stream or river into which it flows.  
Yes, there are several wetlands and one small unnamed stream that have been identified on site. See revised Wetland Delineation and Habitat Assessment Report and Conceptual Mitigation Plan for Canterwood Properties, Gig Harbor, WA dated December 2013 by Soundview Consultants, and updated June 30, 2017.
- B. Will the project require any work over, in, or adjacent to (within 200 feet) the described waters? If yes, please describe and attach available plans for this work.  
Yes, two small Category IV wetlands will be filled and mitigated through on-site wetland creation, enhancement and preservation actions, and removal of an instream culvert. See Site Plan and Wetland Delineation and Habitat Assessment Report and Conceptual Mitigation Plan for additional details.
- C. Estimate the amount of fill and dredge material that would be placed in, or removed from, surface water or wetlands and indicate the area of the site that would be affected. Indicate the source of fill material and/or the disposal site.  
Approximately 5,525 SF of Wetlands B and C will be filled and mitigation will be provided on site. Total fill placed within the wetlands will be approximately



61 CY below the wetland perimeter elevation. See Delineation and Habitat Assessment Report and Conceptual Mitigation Plan for Canterwood Properties, Gig Harbor, WA dated December 2013 and updated June 30, 2017 by Soundview Consultants, and the grading plan.

- D. Will the proposal require surface water withdrawals or diversions? Give general description, purpose, and approximate quantities, if known.  
No, however, one culvert will be removed from the stream as a mitigation action.
- E. Does the proposal lie within a 100-year floodplain? If so, note flood-plain location on the site plan.  
According to the FEMA flood maps, the proposal lies in a "C" designation, indicating an area of minimal to no flooding.
- F. Does the proposal involve any discharges of waste materials to surface waters? If so, describe the type of waste and anticipated volume of discharge.  
No, aside from the previously discussed wetland fill and mitigation actions, the proposal does not involve any discharge of waste materials to surface waters.

Ground:

- A. Will groundwater be withdrawn, or will water be discharged to groundwater? Give general description, purpose, and approximate quantities of withdrawals or discharges, if known.  
No groundwater withdrawal or discharge will be necessary.
- B. Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (for example: Domestic sewage; industrial, containing the following chemicals; agricultural; etc.). Describe the general size of the system, the number of such systems, the number of houses to be served (if applicable), or the number of animals or humans the system(s) is/are expected to serve.  
Not applicable.

Runoff (including stormwater):

- A. Describe the source of runoff (including stormwater) and method of collection and disposal, if any (include quantities, if known). Where will this water flow? Will this water flow into other waters? If so, describe.  
Runoff from cleared and graded areas will be controlled and directed to temporary sediment ponds and discharged to forested areas.
- B. Could waste materials enter ground or surface waters? ☐ If so, generally describe.  
Oils and greases from vehicles could enter surface waters.
- C. Proposed measures to reduce or control surface water, groundwater, and runoff impacts, if any:  
Utilize Best Management Practices for erosion control, including filter fabric fence surrounding the cleared area, temporary drainage with a temporary sediment pond. Upon completion of the project, the site will be hydroseeded and landscaped to stabilize the soil. Furthermore, a permanent on-site engineered

stormwater collection and detention system will be provided according to City and State standards.

#### IV. PLANTS

- A. Check types of vegetation found on the site and list specific species:

X Deciduous tree: alder, maple, aspen; other: Black cottonwood \_\_\_\_\_

X evergreen tree: fir, cedar, pine; other: Red Cedar, Madrona

X shrubs

\_\_\_\_\_ grass

\_\_\_\_\_ pasture

\_\_\_\_\_ crop or grain

X wet soil plants: cattail, buttercup, bulrush, skunk cabbage, other: Devils club, salmonberry and lady fern

\_\_\_\_\_ water plants: water lily, eelgrass, milfoil; other: \_\_\_\_\_

X other types of vegetation: Salal.

- B. What kind and amount of vegetation will be removed or altered?

Adequate space for building pads will be cleared. Clearing limits have been delineated on the plans. See the grading plan. The area of disturbance is 194,456 sf or 4.46 acres, which will remove wooded areas comprised of a mix of Douglas Fir, Western Red Cedar, Maple, and Red Alder.

- C. List threatened or endangered plant species known to be on or near the site.

None known.

- D. Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any:

Hydroseed to stabilize soils. The wetland areas will be left untouched and the vegetation enhanced if deemed necessary by the City of Gig Harbor. Native trees, shrubs, and herbaceous plant species will be installed in wetland enhancement, wetland creation and buffer areas.

#### V. ANIMALS

- A. Circle any birds or animals that have been observed on or near the site, or that are known to be on or near the site:

Birds: hawk, heron, eagle, songbirds, other:

Mammals: deer, bear, elk, beaver; other:

Fish: bass, salmon, trout, herring, shellfish; other:

- B. List any threatened or endangered animal species known to be on or near the site.

None known.

- C. Is the site part of a migration route? \_\_\_\_ If so, explain.

Not to our knowledge.

- D. Proposed measures to preserve or enhance wildlife, if any:

Approximately 80,900 SF of the wetland, wetland buffers, and/or natural vegetation areas will be left as open space and preserved in a conservation easement.

## VI. ENERGY AND NATURAL RESOURCES

- A. What kinds of energy (electric, natural gas, oil, wood stove, solar) will be used to meet the completed project's energy needs? Describe whether it will be used for heating, manufacturing, etc.

The buildings will have electricity and gas. The uses of these energy types is unknown at this time.

- B. Would your project affect the potential use of solar energy by adjacent properties? No.

If so, generally describe.

- C. What kinds of energy conservation features are included in the plans of this proposal? List other proposed measures to reduce or control energy impacts, if any:

N/A

## VII. ENVIRONMENTAL HEALTH

- A. Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire, explosion, spill, or hazardous waste that could occur as a result of this proposal? No. There is a potential for construction equipment to leak fluids; however, an SPCC plan will be prepared and kept on site and utilized if necessary.

If so describe.

- B. Describe special emergency services that might be required (for example, chemical spills or explosions).

No special emergency services are likely to be required.

- C. Proposed measures to reduce or control environmental health hazards, if any:

None proposed.

- D. Noise

1. What types of noise exist in the area which may affect your project (for example: traffic, construction, or production equipment)?



None.

2. What types and levels of noise would be created by or associated with the project on a short-term or a long-term basis (for example: traffic, construction, or production equipment)? Indicate the hours that noise would be generated by the site.

Noise associated with construction and development of the property will have a short-term impact during regular working hours.

3. Proposed measures to reduce or control noise impacts, if any:

No specific measures are proposed.

### VIII. **LAND AND SHORELINE USE**

- A. What is the current use of the site and adjacent properties?

North: Wooded, vacant land (R-2 zoning)

South: SR-16, vacant land, existing detention pond

East: St. Anthony's Hospital

West: SR-16, commercial

- B. Has the site been used for agriculture? Is so, describe.

No.

- C. Describe any structures on the site.

No structures currently exist on the site.

- D. Will any structures be demolished? No. If so, what?

- E. What is the current zoning classification of the site?

B-2

- F. What is the comprehensive plan designation of the site?

Commercial.

- G. If applicable, what is the current shoreline master program designation of the site?

Not applicable.

- H. Has any part of the site been classified as an "environmentally sensitive" area?

Yes If so, please specify.

Several wetlands and a small stream are on the site. See wetland delineation report.

- I. Approximately how many people would reside or work in the completed project?

Unknown at this time.

- J. Approximately how many people would the completed project displace?

Nobody will be displaced by the completed project.

- K. Proposed measures to avoid or reduce displacement impacts, if any:  
None proposed.
- L. Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any:  
Compliance with the Comprehensive Plan, Development Regulations, Subdivision Code and Design Manual Regulations.

IX. **HOUSING**

- A. Approximately how many units would be provided, if any? -0- Indicate whether it would be high, middle, or low-income housing.  
\_\_\_\_\_
- B. Approximately how many units, if any, would be eliminated? -0- Indicate whether it would be high, middle, or low-income housing.  
\_\_\_\_\_
- C. Proposed measures to reduce or control housing impacts, if any:  
Not applicable.

X. **AESTHETICS**

- A. What is the tallest height of any proposed structure(s), not including antennas or chimneys?  
The height of the tallest structure will not exceed the zoning regulations.
- B. What views in the immediate vicinity would be altered or obstructed?  
No views in the immediate vicinity will be altered or obstructed.
- C. Proposed measures to reduce or control aesthetic impacts, if any:  
Buildings are designed with prominent facades and landscape screening will be installed.

XI. **LIGHT AND GLARE**

- A. What type of light or glare will the proposal produce? What time of day would it mainly occur?  
Standard building and parking lot lighting will be used. Lighting will be directed down to limit the lighting to on-site only.
- B. Could light or glare from the finished project be a safety hazard, interfere with views, or affect wildlife?  
No. Light will be directed away from on-site critical areas.
- C. What existing off-site sources of light or glare may affect your proposal?  
None.

- D. Proposed measures to reduce or control light and glare impacts, if any:  
No measures are needed. There is no impacts for light or glare.

## **XII. RECREATION**

- A. What designated and informal recreational opportunities are in the immediate vicinity?  
Canterwood Golf Course.
- B. Would the proposed project displace any existing recreational uses? If so, describe.  
No.
- C. Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any:  
None proposed.

## **XIII. HISTORIC AND CULTURAL PRESERVATION**

- A. Are there any places or objects listed on, proposed for, or eligible for listing in national, state, or local preservation registers on or next to the site? No.  
If so generally describe.
- B. Generally describe any landmarks, or evidence of historical, archaeological, scientific, or cultural importance known to be on or next to the site.  
None known.
- C. Proposed measures to reduce or control impacts, if any:  
None proposed.

## **XIV. TRANSPORTATION**

- A. Identify public streets and highways serving the site, and describe proposed access to the existing street system. Show on site plans, if any.  
Canterwood Blvd. N.W. will serve the site.
- B. Is site currently served by public transit? If not, what is the approximate distance to the nearest transit stop?  
The site is not currently served by public transit. The nearest stop is at Canterwood and Peacock Hill several miles away.
- C. How many parking spaces would the complete project have? How many would the project eliminate?  
The completed project will have approximately 135 parking spaces with 19 garage spaces. The proposed project will not eliminate any parking.



- D. Will the proposal require any new roads or streets, or improvements to existing roads or streets, not including driveways? If so, generally describe (indicate whether public or private).  
Only internal roads will be needed to serve the site.
- E. Will the project use (or occur in the immediate vicinity of) water, or air transportation? If so, generally describe.  
No.
- F. How many vehicular trips per day would be generated by the completed project? If known, indicate when peak volumes would occur.  
Approximately 95 pm peak hour trips will be generated. See Traffic Impact Analysis by Heath and Associates Dated March 6, 2006.
- G. Proposed measures to reduce or control transportation impacts, if any:  
Supplemental Traffic information provided by Health & Associates dated September 2008.

#### **PUBLIC SERVICES**

- A. Would the project result in an increased need for public services (for example" fire protection, police protection, health care, schools)? If so, generally describe:  
Due to the nature of the project, it is not anticipated that any additional public services will be necessary.
- B. Proposed measures to reduce or control direct impacts on public services, if any.  
Due to the nature of the project, it is not anticipated that any additional public services will be necessary.

#### **XVI. UTILITIES**

- A. Identify existing utilities by name including: electricity, natural gas, water, refuse service, telephone, sanitary sewer, septic system; other:  
The site is currently unimproved and has no existing utilities.
- B. Describe the utilities that are proposed for the project, the utility providing the service, and the general utility construction activities on the site or in the immediate vicinity which might be needed.  
Water, storm, sanitary sewer, power, gas, and telephone utilities will be needed for this project. See plan sheet C5.

#### **SIGNATURE**

The above answers are true and complete to the best of my knowledge. I understand that the lead agency is relying on them to make its decision.

Signature: 

Date Revised Checklist Submitted: June 24, 2020



# WETLAND DELINEATION AND HABITAT ASSESSMENT REPORT AND DETAILED MITIGATION PLAN

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## CANTERWOOD COMMERCIAL

NOVEMBER 2015

REVISED JANUARY 2018

REVISED SEPTEMBER 2019

REVISED AUGUST 2020

**Mitigated Determination of  
Nonsignificance (MDNS)**

PL-SEPA-07-0060

Reference No. 2



**Soundview  
Consultants**

Environmental Assessment  
Planning + Land Use Solutions



# **WETLAND DELINEATION AND HABITAT ASSESSMENT REPORT AND DETAILED MITIGATION PLAN**

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## **CANTERWOOD COMMERCIAL**

**NOVEMBER 2, 2015**

**REVISED JANUARY 16, 2018**

**REVISED SEPTEMBER 24, 2019**

**REVISED AUGUST 12, 2020**

### **PROJECT LOCATION**

APPROXIMATELY

10700 CANTERWOOD BOULEVARD NORTHWEST  
GIG HARBOR, WASHINGTON 98335

### **PREPARED FOR**

**JOHN M. XITCO**

SWEDE HILL LLC

P.O. Box 1693

TACOMA, WASHINGTON 98401

### **PREPARED BY**

**SOUNDVIEW CONSULTANTS LLC**

2907 HARBORVIEW DRIVE, SUITE D

GIG HARBOR, WASHINGTON 98335

(253) 514-8952



**Soundview  
Consultants**  
Environmental Assessment  
Planning + Land Use Solutions

## Executive Summary

Swede Hill LLC (Applicant) is proposing to construct four new buildings, parking, and associated infrastructure on an approximately 7.6-acre parcel located at approximately 10700 Canterwood Boulevard Northwest just west of State Route 16 (SR-16) in the City of Gig Harbor, Washington. The project is situated in the Southeast ¼ of Section 25, Township 22 North, Range 1 East W.M., within the City of Gig Harbor, Washington (Pierce County Tax Parcel Number 0122254090). This project was previously submitted and approved by the city of Gig Harbor's third-party reviewer, Grette Associates (Grette), on March 14, 2014 and the U.S. Army Corps of Engineers (USACE) on February 12, 2016; however, because of delay the project was resubmitted under new application to the USACE, Washington State Department of Ecology (WSDOE) and the City of Gig Harbor (City) to include minor revisions to the report as a result of the updated wetland rating methodology which resulted in no substantial changes to wetland status. Subsequent City review, as outlined in their June 27 and July 12, 2019 letters, and meetings with the City, Grette, SVC, and the Project Engineer regarding stormwater outfall design and hydrology sources for the proposed wetland creation area have necessitated refinements to site grading and wetland mitigation strategy and design. This revised report and mitigation plan addresses the concerns raised by the City and Grette in their 2019 letters.

The subject property was investigated for the presence of wetlands, fish and wildlife habitat, and/or priority species between September 19 and September 23, 2013. Follow up investigations were performed in May of 2018 to confirm findings. The site investigations identified a total of seven (7) wetlands covering approximately 11,012 square feet and one (1) perennial stream channel of approximately 1,265 linear feet. The wetlands are identified as Wetlands A through G and the stream is an unnamed tributary of McCormick Creek, which is associated with Wetlands D, E, and F. The identified wetlands and stream are regulated by the USACE, WSDOE, and the City.

In general, the property is undisturbed forested land, and the wetlands identified are predominately Palustrine Forested, Saturated wetlands and rated as Category IV slope wetlands under both the new and old methodology. These wetlands are dominated by deer fern, lady fern, slough sedge, and salmonberry with an over-story of red alder, western red cedar, and Douglas fir. The on-site tributary flows southward under Canterwood Boulevard Northwest, bisecting the property, into a westerly ditch approximately 0.2 mile along the east side of SR-16, then southward under SR-16 and into McCormick Creek, a Type F, or fish-bearing, stream. The Washington Department of Fish and Wildlife (WDFW) SalmonScape website shows a total fish barrier on McCormick Creek downstream of where the tributary enters. In addition, on-site and reaches immediately downstream of the tributary to do not contain viable salmon habitat; therefore, the tributary on the subject property is not salmon-bearing. In addition, NOAA Fisheries has confirmed that salmonids do not use McCormick Creek. Vegetated buffers are relatively undisturbed riparian forest, except where the property abuts the SR-16 right-of-way (ROW). Based on field observations and background research, no sensitive plant, fish, or wildlife species occur on or near the site.

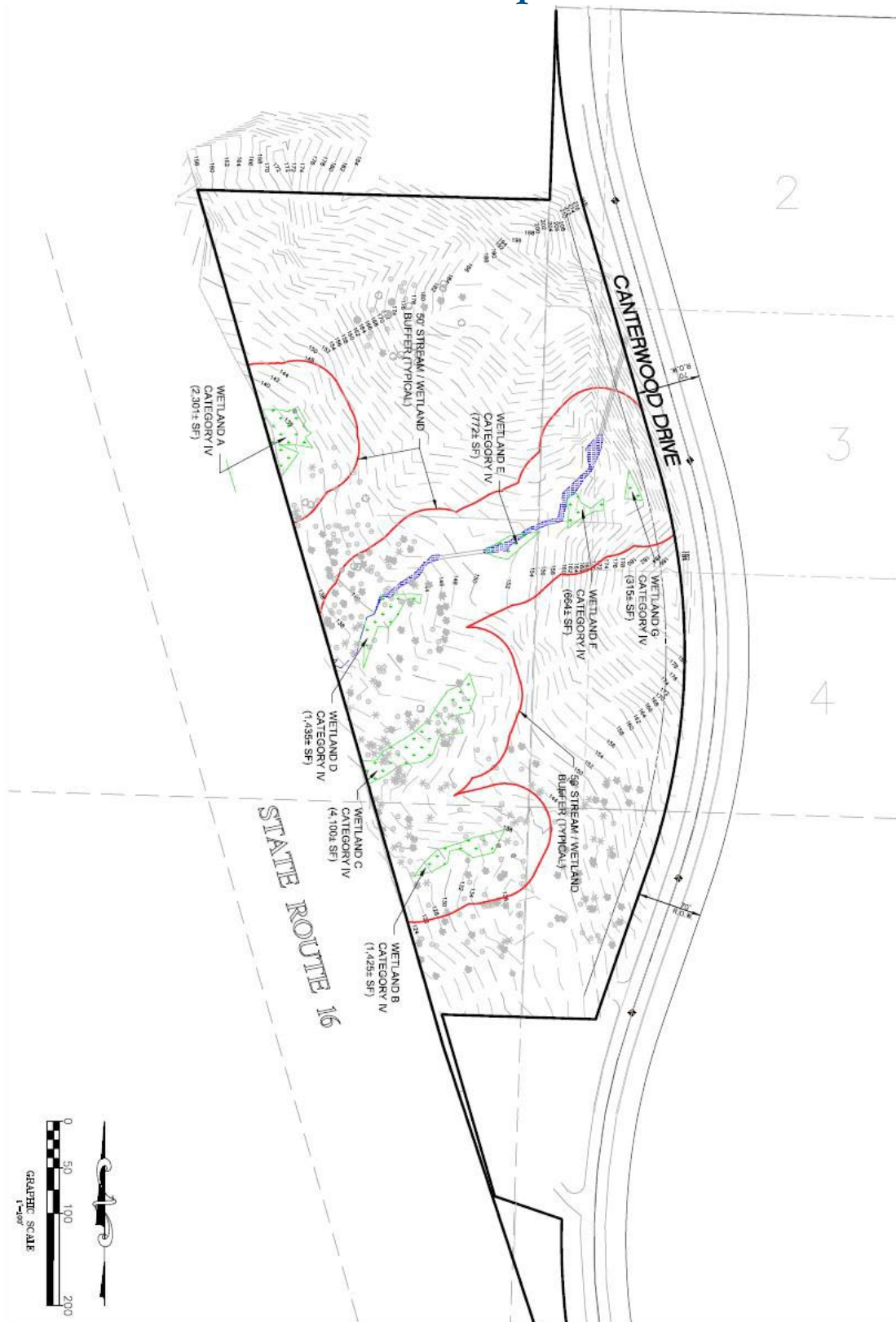
While the site plan has been modified slightly from the previously approved layout, the revised layout is similar including the construction of four buildings and associated parking and utilities, with a series of retaining walls and a stormwater quality and detention system designed to treat stormwater for suspended solids and dissolved pollutants and control stormwater release rates to match forested conditions. The site is bisected by the stream, and the western half of the site is substantially encumbered by wetlands and associated buffers, leaving little space for development. Therefore, fill of one (1) wetland and conversion of one (1) wetland to a stormwater pond is necessary for

construction of the four buildings, associated infrastructure, and reasonable use of the site. Compensatory mitigation for wetland impacts will be provided on-site. A Mitigation Plan in accordance with Gig Harbor Municipal Code (GHMC) Title 18.08.150.A is provided in Chapter 5 of this report.

| <b>Feature Name</b> | <b>Size<sup>A</sup><br/>(on-site)</b> | <b>Category<br/>/ Type</b> | <b>Regulated Under<br/>GHMC (Chapter<br/>18.08)</b> | <b>Regulated Under<br/>RCW 90.48</b> | <b>Regulated Under<br/>Section 404 of the<br/>Clean Water Act</b> |
|---------------------|---------------------------------------|----------------------------|-----------------------------------------------------|--------------------------------------|-------------------------------------------------------------------|
| <b>Wetland A</b>    | 2,301 sf                              | IV/Slope                   | <b>Yes</b>                                          | <b>Yes</b>                           | <b>Yes</b>                                                        |
| <b>Wetland B</b>    | 1,425 sf                              | IV/Slope                   | <b>Yes</b>                                          | <b>Yes</b>                           | <b>Likely</b>                                                     |
| <b>Wetland C</b>    | 4,100 sf                              | IV/Slope                   | <b>Yes</b>                                          | <b>Yes</b>                           | <b>Yes</b>                                                        |
| <b>Wetland D</b>    | 1,435 sf                              | IV/Slope                   | <b>Yes</b>                                          | <b>Yes</b>                           | <b>Yes</b>                                                        |
| <b>Wetland E</b>    | 772 sf                                | IV/Slope                   | <b>Yes</b>                                          | <b>Yes</b>                           | <b>Yes</b>                                                        |
| <b>Wetland F</b>    | 664 sf                                | IV/Slope                   | <b>Yes</b>                                          | <b>Yes</b>                           | <b>Yes</b>                                                        |
| <b>Wetland G</b>    | 315 sf                                | IV/Slope                   | <b>Yes</b>                                          | <b>Yes</b>                           | <b>Likely</b>                                                     |
| <b>Tributary</b>    | 1,265 lf                              | Type 3                     | <b>Yes</b>                                          | <b>Yes</b>                           | <b>Yes</b>                                                        |



# Site Map



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# Chapter 1. Introduction

---

Swede Hill LLC (Applicant) is proposing to construct four new buildings, parking, and associated infrastructure on an approximately 7.6-acre parcel located at approximately 10700 Canterwood Boulevard Northwest just west of State Route 16 (SR-16) in the City of Gig Harbor, Washington. The project is situated in the Southeast  $\frac{1}{4}$  of Section 25, Township 22 North, Range 1 East W.M., within the City of Gig Harbor, Washington (Pierce County Tax Parcel Number 0122254090). This project was previously submitted and approved by the U.S. Army Corps of Engineers (USACE) on February 12, 2016; however, because of delay the project will need to be resubmitted under new application to the USACE, Washington State Department of Ecology (WSDOE) and the City of Gig Harbor (City) to include minor revisions to the report as a result of the updated wetland rating methodology which resulted in no substantial changes to wetland status. Subsequent City review, as outlined in their June 27 and July 12, 2019 letters, and meetings with the City, Grette, SVC, and the Project Engineer regarding stormwater outfall design and hydrology sources for the proposed wetland creation area have necessitated refinements to site grading and wetland mitigation strategy and design. This revised report and mitigation plan addresses the concerns raised by the City and Grette in their 2019 letters.

Development of the site is substantially limited by several regulated wetlands, a perennial stream, and associated buffers. Essentially, the site is divided into north and south portions by the stream, and the western half of the site is significantly encumbered by wetlands and associated buffers. However, through careful site assessment and planning efforts, extensive wetland impacts are avoided by limiting the number of buildings and the extent of construction. The four buildings and associated infrastructure are proposed on the eastern portion of the site in order to avoid most wetlands. Access will be provided via Canterwood Boulevard Northwest. One building will be separated from the rest in order to fully protect the stream corridor and avoid the need for a road crossing. The site layout has been specifically designed to avoid the stream corridor and most of the wetlands; stream restoration, wetland preservation, enhancement, and creation actions will be utilized to improve overall wetland function and provide compensatory mitigation on-site. Some temporary buffer impacts will occur as a result of the proposed project; therefore, buffer protection and enhancement actions will also be provided. As a result, the project will require fill of only one wetland and the conversion of another wetland to a stormwater pond.

The purpose of this wetland delineation and habitat assessment and mitigation plan is to identify the presence of wetlands, potentially regulated fish and wildlife habitat, and/or priority species on or near the subject property, and to reassess potential impacts to the critical areas from the proposed project based on the current ration methodology and current site layout and provide mitigation recommendations to offset any loss of wetland functions. A mitigation plan for the project is included in Chapter 5 of this document that includes a general description of the proposed development and a more detailed discussion of the proposed mitigation plan that has been developed according to guidance and requirements provided in the Gig Harbor Municipal Code (GHMC) as well as State and Federal guidance. This mitigation plan has been refined based on review comments from Grette following the resubmittal of the project in 2018. The proposed mitigation actions are intended to provide compensation for wetland and buffer impacts associated with the proposed project.

This report includes conclusions and recommendations regarding:

- Site description, project description, and area of assessment;
- Background research and identification of regulated wetland areas and fish and wildlife habitat within the vicinity of the project;
- Identification and assessment of regulated wetlands and fish and wildlife habitat and/or priority species located on or near the subject property;
- Standard buffer recommendations, building setbacks, and development limitations;
- Existing conditions site map detailing identified critical areas and standard buffers;
- Site plan with proposed building, site parking areas, and drive aisles;
- Documentation of proposed wetland avoidance, minimization, and mitigation measures;
- Proposed compensatory and non-compensatory wetland mitigation actions, and
- Supplementary information necessary for Federal, State, and Local regulatory review.

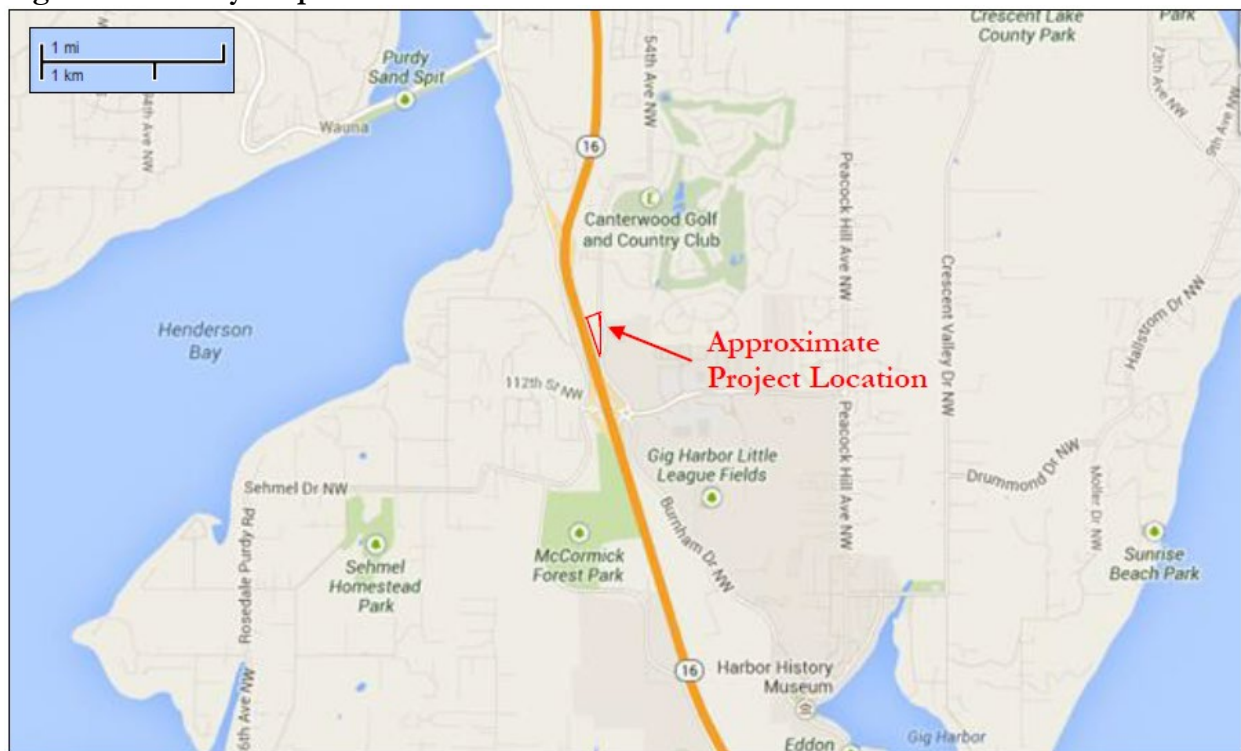
## Chapter 2. Proposed Project

### 2.1 Location

The proposed project is located immediately west of St. Anthony Hospital in the City of Gig Harbor, Washington. The proposed project is situated in the Southeast  $\frac{1}{4}$  of Section 25, Township 22 North, Range 1 East W.M., within the City of Gig Harbor, Washington (Pierce County Parcel Number 0122254090).

To access the site from SR-16, travel west from Gig Harbor, exit onto Burnham Drive exit, circle around the round-about taking the northern-most road (Canterwood Boulevard Northwest) and proceed 0.4 mile. The property is situated on the west side of Canterwood Boulevard Northwest and between the two driveways associated with St. Anthony Hospital.

Figure 1. Vicinity Map.



Source: Google Maps



## 2.2 Project Description

The project includes the construction of four buildings and associated parking and utilities, with a series of retaining walls and a stormwater quality and detention systems designed to treat stormwater for suspended solids and dissolved pollutants and control stormwater release rates to match forested conditions. The site is bisected by the stream, and the western half of the site is substantially encumbered by wetlands and associated buffers, leaving little space for development. Fill of one (1) wetland and conversion of one (1) wetland to a stormwater pond is necessary for construction of the four buildings, associated infrastructure, and reasonable use of the site. Compensatory mitigation for wetland impacts will be provided on-site.

## Chapter 3. Methods

---

The methods used to comply with Federal, State, and local assessment requirements are detailed below. Please see Appendix A for further details of methods and tools used to prepare the report. Wetlands, streams, and other potentially-regulated fish and wildlife habitat within the proposed project area and/or publicly accessible areas within 315 feet of the project boundaries were inspected and delineated or assessed by qualified Soundview Consultants LLC staff in September, 2013 and confirmed in May 2018. All wetland and ordinary high water (OHW) determinations were made using observable vegetation, indicators of hydrology, and determinations of hydric soils in conjunction with data from National Oceanic and Atmospheric Administration (NOAA), Pierce County Geographic Information Services, maps of the U.S. Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI), the Soil Survey of Pierce County (Zulauf, 1979), and aerial photographs. Maps detailing background data such as site topography, soils, and critical areas inventories are provided in Appendix B.

Wetland boundaries were determined using the routine approach described in the Washington State Wetlands Identification and Delineation Manual (Ecology, 1997) and U.S. Army Corps of Engineers' Wetlands Delineation Manual (USACE, 1987) and modified according to the guidelines established in the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region, Version 2.0 (USACE, 2010). Completed wetland data sheets used in the assessment are provided in Appendix D. OHW of the unnamed tributary to McCormick Creek was determined using the definitions described in Ecology's most current method as detailed in Determining the Ordinary High Water Mark on Streams in Washington State (Olson, 2008). The centerline of the tributary was marked where the width of the tributary became less than three (3) feet.

Wetlands were classified using both the hydrogeomorphic (Brinson, 1993) and Cowardin (Cowardin, 1979) classification systems, and assessed using the Wetland Functions Characterization Tool for Linear Projects (WSDOT, 2000). Following classification and assessment, all wetlands were rated and categorized using the Washington State Wetlands Rating System for Western Washington – Revised (Hruby, 2004) and re-rated using the 2014 update to the system (Hruby, 2014) and guidelines established in the GHMC Chapter 18.08 Section 08.040. Completed wetland ratings sheets used in this assessment are provided in Appendix E.

The fish and wildlife habitat assessment was conducted by a qualified fisheries biologist during the same site visits. Publicly available background data was queried for documented wildlife observations and/or the presence of potentially regulated fish and wildlife habitat on or near the site as well as probable fish barriers through the Washington Department of Fish and Wildlife (WDFW) SalmonScape website. In addition, high-resolution aerial photography of the surrounding area was carefully examined. Visual observations using stationary and walking survey methods were utilized for both aquatic and upland habitats. Any special habitat features or signs of wildlife activity were noted for further examination.

In addition to the site inspections, all publicly accessible areas near the confluence of the tributary with McCormick Creek to the project area were investigated for the potential presence of protected species. Stream channels, culverts, and other features were inspected at all publicly accessible road crossings for habitat quality and potential fish barriers.

Site features including wetland boundaries and the centerline and/or OHW of the unnamed tributary were surveyed following the site investigations and delineations. The survey was conducted according to routine survey methods by Barghausen Consulting Engineers, providing an accuracy of +/- 0.1 feet for feature locations on-site maps used in this document. To mark the boundary between wetlands and uplands, orange surveyor's flagging was alpha-numerically labeled and tied to vegetation or wood lath along the wetland boundary. To mark the points where data was collected, pink surveyor's flagging was alpha-numerically labeled and tied at each sampling location. To mark the OHW or centerline of streams, blue surveyor's flagging was alpha-numerically labeled and tied to vegetation along the OHW, or on the centerline of the stream where the channel was less than three feet wide. The locations and features of the wetlands and streams are described in Chapter 4, and shown on-site maps and plan sheets in Appendix C.



## Chapter 4. Existing Conditions and Results

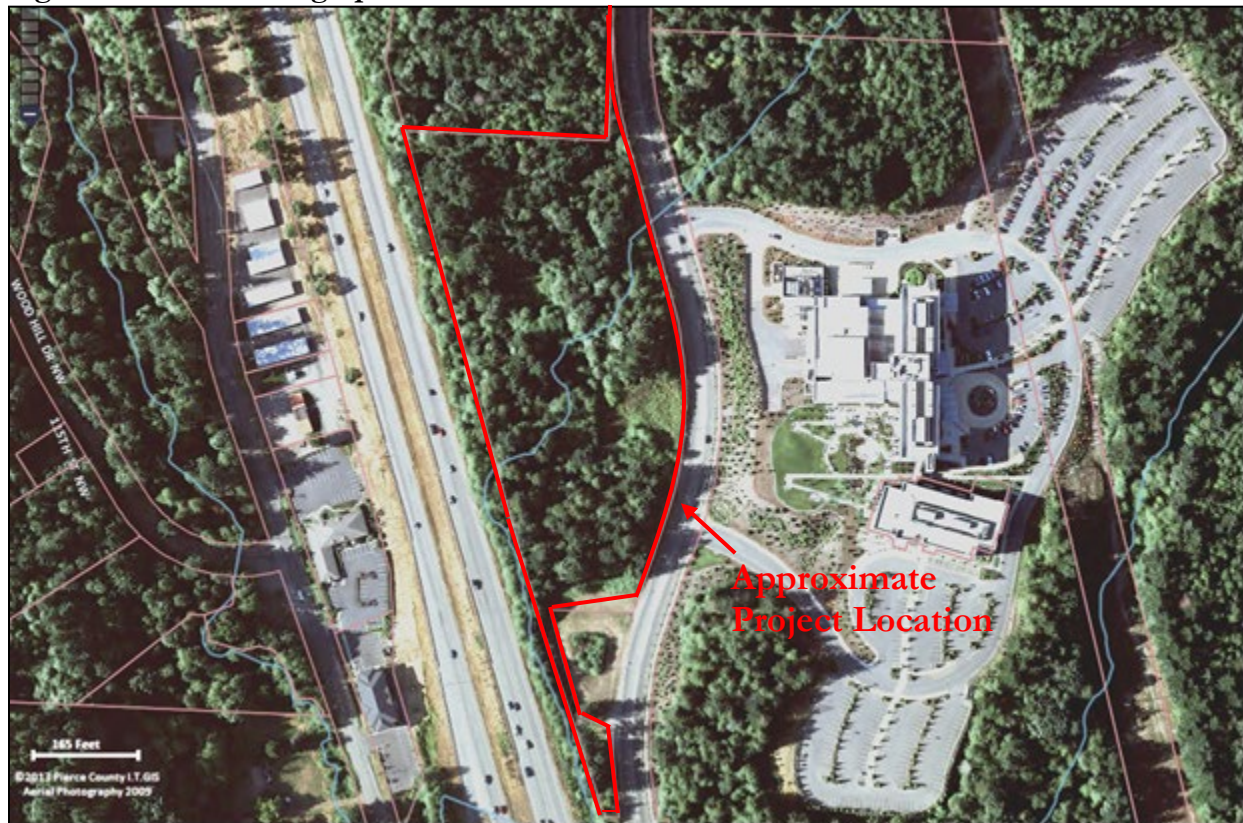
### 4.1 Landscape Setting

The subject property is predominately forested by coniferous and deciduous trees with an understory dominated by a mix of deciduous and evergreen shrubs and herbaceous species. The area to the north is undeveloped forested land, similar to the subject property. Canterwood Boulevard Northwest abuts the eastern property boundary, a stormwater detention pond is located along the south property boundary, and the right-of-way (ROW) for SR-16 abuts the western property boundary (Figure 2).

The topography of the site consists of an undulating sloped parcel that descends generally to the west with an identified stream bisecting the property in a northeast to southwest direction and several wetlands located along the stream channel and along the southwestern property boundary.

Upland vegetation is generally dominated by Douglas fir, big leaf maple, red alder, and western red cedar of variable maturity over salal, sword fern, deer fern, red huckleberry, evergreen huckleberry, Oregon grape, and salmonberry.

**Figure 2. Aerial Photograph**



Source: Pierce County Public GIS

### 4.2 Background Information

Background data was obtained from various Federal, State, and local agencies and private resources prior to conducting the site investigation. Data collected and reviewed prior to the site investigation included, but was not limited to, national and local wetland and other critical areas inventory maps,

site topography and drainage basin data, Natural Resources Conservation Services (NRCS) soils data, WDFW Priority Habitat and Species (PHS) database, precipitation data, orthrophotographic information, and other relevant reports. A preliminary inventory of potential critical areas was made during review of the background documents and research.

## Precipitation

Precipitation data has been obtained from the Weather Underground weather station in Bremerton, Washington and the National Oceanic and Atmospheric Administration (NOAA) weather station at SeaTac Airport. The precipitation data shows over an inch of rain fell within the two weeks prior to the site visit and that precipitation levels were slightly above normal, being approximately 118 percent normal at SeaTac Airport (Table 1).

**Table 1. Precipitation Summary.**

| Date of Investigation | Day Of | Day Before <sup>1</sup> | 1 Week Prior <sup>1</sup> | 2 Week Prior <sup>1</sup> | Normal Water Year <sup>2</sup> | Observed Water Year <sup>2</sup> | Percent of Normal for Water Year <sup>2</sup> |
|-----------------------|--------|-------------------------|---------------------------|---------------------------|--------------------------------|----------------------------------|-----------------------------------------------|
| 9/19/2013             | 0.00   | 0.10                    | 0.48                      | 1.67                      | 37.16                          | 43.41                            | 117                                           |
| 9/20/2013             | 0.07   | 0.00                    | 0.55                      | 1.57                      | 37.30                          | 43.55                            | 117                                           |
| 9/23/2013             | 0.03   | 0.84                    | 1.37                      | 1.39                      | 37.94                          | 44.19                            | 116                                           |
| 6/27/2017             | 0.00   | 0.00                    | 0.00                      | 1.21                      | 52.76                          | 71.67                            | 136                                           |

1. Weather Underground Station, Bremerton, WA

[http://www.wunderground.com/history/airport/KPWT/2013/9/20/MonthlyHistory.html?req\\_city=NA&req\\_state=NA&req\\_statename=NA](http://www.wunderground.com/history/airport/KPWT/2013/9/20/MonthlyHistory.html?req_city=NA&req_state=NA&req_statename=NA)

2. Water year (October 1 to day of site visit). Precipitation levels in inches and data obtained from the SeaTac weather station and recovered from the National Oceanic and Atmospheric Administration website: (<http://www.weather.gov/climate/index.php?wfo=sew>)

## Topography

The topography of the site shows an undulating landform with a general seventeen (17) percent slope from east to west toward SR-16.

## Soils

According to the NRCS Web Soil Survey, there are two mapped soil units on the subject property: Harstine gravelly sandy loam with 6 to 15 percent slopes (16C) and 15 to 30 percent slopes (16D) (NRCS, 2013). According to the *Soil Survey of Pierce County Area Washington* (Zulauf, 1979), the Harstine gravelly sandy loam series is a moderately well-drained soil formed in sandy glacial till under conifers. A typical pedon for the Harstine series from 0 to 5 inches is composed of a dark yellowish brown (10YR 3/4) gravelly sandy loam; 5 to 13 inches is a dark brown (7.5YR 3/4) gravelly sandy loam; 13 to 21 inches is a brown (10YR 4/3) gravelly sandy loam; 21 to 31 inches is a dark yellowish brown (10YR 4/4) gravelly sandy loam; and 31 to 60 inches is a grayish brown (2.5Y 5/2) gravelly loamy sand. Harstine gravelly sandy loam is not listed as a hydric soil on the Pierce County Hydric Soils List (NRCS, 2001). The NRCS Soil Survey Map is located in Appendix B1.

## National Wetland Inventory

The U.S. Fish and Wildlife Service National Wetland Inventory map shows no wetlands on or adjacent to the subject property (Appendix B2).

## Local Hydric Soil and Wetland Inventory

Pierce County hydric soil and wetland inventory maps show the tributary to McCormick Creek, but they do not indicate presence of any hydric soils, wetlands, or potential fish and wildlife habitat on the subject property (Appendix B3).

## Priority Habitat and Species

WDFW's PHS database shows no priority habitat or species in the vicinity of the subject property. (Appendix B4).

## 4.3 Wetlands

The site investigation identified a total of seven (7) wetlands within the project boundary (Appendix C). The wetlands contained indicators of wetland hydrology, hydric soils, and a predominance of hydrophytic vegetation which satisfied the jurisdictional criteria set forth in Chapter 3 of this report. A general description of these wetlands is provided below, and a summary of wetlands is provided in Table 2. Individual wetlands summaries are provided in Tables 3 through 9.

Wetland A is approximately 2,301 square feet (0.05 acre) in size and located on the northwestern portion of the property adjacent to the SR-16 ROW. Wetland A merges with an off-site drainage associated with SR-16. The wetland canopy is sparse and consists primarily of red alder. The understory is dominated by devil's club and salmonberry over a dense herbaceous stratum dominated deer fern, lady fern, and skunk cabbage. Western hemlock (*Tsuga heterophylla*, FAC), salal (*Gaultheria shallon*, FACU), and deer fern dominates the immediate upland (buffer) area. Wetland A is characterized as a slope wetland and rated as a Category IV wetland which is likely subject to a standard 50-foot wide buffer. Table 3 provides a detailed summary of Wetland A. Due to general wetland characteristics observed, plant growth, landscape position, and saturated water regime, Wetland A has been classified as a Palustrine Forested, Continually Saturated (PFOD) wetland.

Wetland B is approximately 1,425 square feet (0.03 acre) in size and is located on the southwestern portion of the property and upslope from the SR-16 ROW. Wetland B is dominated by devil's club (*Oplopanax horridus*, FAC) and slough sedge (*Carex obnupta*, OBL) with Douglas fir (*Pseudotsuga menziesii*, FACU), sword fern (*Polystichum munitum*, FACU), and western hemlock dominating the immediate upland (buffer) area. Wetland B is characterized as a slope wetland and rated as a Category IV wetland that is likely subject to a standard 50-foot wide buffer. Table 4 provides a detailed summary of Wetland B. Due to general wetland characteristics observed, plant growth, landscape position, and saturated water regime, Wetland B has been classified as a Palustrine Forested, Continually Saturated (PFOD) wetland.

Wetland C is approximately 4,100 square feet (0.09 acre) in size and is located on the southwestern portion of the property and adjacent to the SR-16 ROW. Wetland C is dominated by western red cedar and red alder (*Alnus rubra*, FAC) over young beaked hazelnut (*Corylus cornuta*, FACU), skunk cabbage (*Lysichiton americanus*, OBL), and lady fern. The upland area adjacent to Wetland C is dominated by sword fern and western red cedar. Wetland C is characterized as a slope wetland and rated as a Category IV wetland that is likely subject to a standard 50-foot wide buffer. Table 5 provides a detailed summary of Wetland C. Due to general wetland characteristics observed, plant growth, and saturated water regime, Wetland C has been classified as a Palustrine Forested, Continually Saturated (PFOD) wetland.

Wetland D is approximately 1,435 square feet (0.03 acre) in size and is located near the western property boundary, adjacent to the stream channel. Wetland D is dominated by salmonberry with a groundcover dominated by tall mannagrass (*Glyceria elata*, FACW), lady fern, deer fern, and skunk cabbage. The upland area adjacent to Wetland D is dominated by California blackberry (*Rubus ursinus*, FACU) and sword fern. Wetland D is characterized as a slope wetland and rated as a Category IV



wetland that is likely subject to a standard 50-foot wide buffer. Table 6 provides a detailed summary of Wetland D. Due to general wetland characteristics observed, plant growth, and seasonally-saturated water regime, Wetland D has been classified as a Palustrine Forested, Continually Saturated (PFOD) wetland.

Wetland E is approximately 772 square feet (0.02 acre) in size and is located near the center of the property and adjacent to the stream channel. Wetland E is dominated by red alder over a sparse understory of salmonberry, piggyback plant (*Tolmiea menziesii*, FAC), and tall mannagrass. The upland area adjacent to Wetland E is dominated by red alder, big leaf maple (*Acer macrophyllum*, FACU), salmonberry (*Rubus spectabilis*, FAC), and sword fern. Wetland E is characterized as a slope wetland and rated as a Category IV wetland that is likely subject to a standard 50-foot wide buffer. Table 7 provides a detailed summary of Wetland E. Due to general wetland characteristics observed, plant growth, and seasonally-saturated water regime, Wetland E has been classified as a Palustrine Forested, Continually Saturated (PFOD) wetland.

Wetland F is approximately 664 square feet (0.01 acre) in on-site portion of the wetland that is located near the eastern portion of the property and adjacent to the stream channel. Wetland F has dense canopy of red alder over a sparse understory of salmonberry, sword fern, lady fern, deer fern, Himalayan blackberry, and skunk cabbage. The upland area adjacent to Wetland F is dominated by, big leaf maple, salmonberry, and sword fern. Wetland F is characterized as a slope wetland and rated as a Category IV wetland that is likely subject to a standard 50-foot wide buffer. Table 8 provides a detailed summary of Wetland F. Due to general wetland characteristics observed, plant growth, and saturated water regime Wetland F has been classified as a Palustrine Forested, Continually Saturated (PFOD) wetland.

Wetland G is approximately 315 square feet (0.01 acre) in on-site portion of the wetland that is located near the eastern portion of the property and south and upslope of the stream channel. Wetland G is dominated by red alder with a groundcover of salmonberry, devil's club, lady fern, and skunk cabbage. The upland area adjacent to Wetland G is dominated by red alder, big leaf maple, beaked hazelnut, vine maple (*Acer circinatum*, FAC) and sword fern. Wetland G is characterized as a slope wetland and rated as a Category IV wetland that is likely subject to a standard 50-foot wide buffer. Table 9 provides a detailed summary of Wetland G. Due to general wetland characteristics observed, plant growth, and saturated water regime, Wetland G has been classified as a Palustrine Forested, Continually Saturated (PFOD) wetland.

**Table 2. Wetlands Within the Project Area.**

| Wetland      | Predominant Wetland Classification / Rating |                  |                      |                            | Wetland Size<br>on-site square<br>feet (acres) | Buffer Width<br>(feet) <sup>E</sup> |
|--------------|---------------------------------------------|------------------|----------------------|----------------------------|------------------------------------------------|-------------------------------------|
|              | Cowardin <sup>A</sup>                       | HGM <sup>B</sup> | Ecology <sup>C</sup> | Gig<br>Harbor <sup>D</sup> |                                                |                                     |
| <b>A</b>     | PFOD                                        | slope            | IV                   | IV                         | 2,301 (0.05)                                   | 50                                  |
| <b>B</b>     | PFOD                                        | slope            | IV                   | IV                         | 1,425 (0.03)                                   | 50                                  |
| <b>C</b>     | PFOD                                        | slope            | IV                   | IV                         | 4,100 (0.09)                                   | 50                                  |
| <b>D</b>     | PFOD                                        | slope            | IV                   | IV                         | 1,435 (0.03)                                   | 50                                  |
| <b>E</b>     | PFOD                                        | slope            | IV                   | IV                         | 772 (0.02)                                     | 50                                  |
| <b>F</b>     | PFOD                                        | slope            | IV                   | IV                         | 664 (0.01)                                     | 50                                  |
| <b>G</b>     | PFOD                                        | slope            | IV                   | IV                         | 315 (0.01)                                     | 50                                  |
| <b>Total</b> |                                             |                  |                      |                            | <b>11,012 (0.25)</b>                           |                                     |

Notes:

A. Cowardin et al. (1979) or National Wetland Inventory (NWI) Class based on vegetation: PEM = Palustrine Emergent; PSS = Palustrine Scrub-Shrub; PFO = Palustrine Forested; Modifiers (-C, -E, -H, -x, et cetera) = Water Regime or Special Situations

B. Brinson, M. M. (1993).

C. WSDOE rating according to Washington State wetland rating system for Western Washington – Revised Hruby (2004).

D. Gig Harbor Municipal Code Title 18.08.040.

E. Recommended wetland buffer width according to Gig Harbor Municipal Code Title 18.08.100

**Table 3. Wetland A Summary.**

| WETLAND A – INFORMATION SUMMARY                                                   |                                                                                                                                                                                                                                                                                                                                                    |                   |
|-----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| Location:                                                                         | On-site portion is located near the northwestern property boundary near SR-16                                                                                                                                                                                                                                                                      |                   |
|  | Local Jurisdiction                                                                                                                                                                                                                                                                                                                                 | Gig Harbor        |
|                                                                                   | WRIA                                                                                                                                                                                                                                                                                                                                               | 15                |
|                                                                                   | WSDOE Rating (Hruby, 2014)                                                                                                                                                                                                                                                                                                                         | IV                |
|                                                                                   | Gig Harbor Rating                                                                                                                                                                                                                                                                                                                                  | IV                |
|                                                                                   | Gig Harbor Buffer Width (High Impact)                                                                                                                                                                                                                                                                                                              | 50 feet           |
|                                                                                   | Wetland Size                                                                                                                                                                                                                                                                                                                                       | 2,301 square feet |
|                                                                                   | Cowardin Classification                                                                                                                                                                                                                                                                                                                            | PFOD              |
|                                                                                   | HGM Classification                                                                                                                                                                                                                                                                                                                                 | Slope             |
|                                                                                   | Wetland Data Sheet(s)                                                                                                                                                                                                                                                                                                                              | DP-9W (DP A-1)    |
|                                                                                   | Upland Data Sheet (s)                                                                                                                                                                                                                                                                                                                              | DP-10U (DP A-2)   |
|                                                                                   | Boundary Flag color                                                                                                                                                                                                                                                                                                                                | Orange            |
| Dominant Vegetation                                                               | The wetland canopy is sparse and consists primarily of red alder. The understory is dominated by devil’s club and salmonberry over a dense herbaceous stratum dominated deer fern, lady fern, and skunk cabbage.                                                                                                                                   |                   |
| Soils                                                                             | Harstine gravelly sandy loam with 15 percent to 30 percent slope.                                                                                                                                                                                                                                                                                  |                   |
| Hydrology                                                                         | Seasonally saturated seep area that merges with an off-site roadside ditch associated with SR-16.                                                                                                                                                                                                                                                  |                   |
| Rationale for Delineation                                                         | The wetland boundary generally follows a distinct topographic break and a change to more upland vegetation.                                                                                                                                                                                                                                        |                   |
| Rationale for Local Rating                                                        | Local rating is based upon WSDOE current rating system.                                                                                                                                                                                                                                                                                            |                   |
| Wetland Functions Summary                                                         |                                                                                                                                                                                                                                                                                                                                                    |                   |
| Water Quality                                                                     | Wetland A has limited potential to retain sediments because of its small size, steep slope, and associated seep. Wetland A scored low (4 points) for water quality function using the 2014 WSDOE rating system.                                                                                                                                    |                   |
| Hydrologic                                                                        | This wetland is a seep that merges with an off-site drainage ditch associated with SR-16. Water does not appear to be retained within the wetland for any significant time period. Wetland A scored low (4 points) for hydrologic function using the 2014 WSDOE rating system.                                                                     |                   |
| Habitat                                                                           | Wildlife habitat functions provided by the wetland may include potential habitat for large and small mammal forage and cover, and small bird foraging and nesting. Because of its close proximity to a potentially non-salmonid fish-bearing stream, Wetland A scored moderate (5 points) for habitat function using the 2014 WSDOE rating system. |                   |
| Buffer Condition                                                                  | The buffer of Wetland A is dominated by natural vegetation associated with the surrounding forested community.                                                                                                                                                                                                                                     |                   |



Table 4. Wetland B Summary.

| WETLAND B – INFORMATION SUMMARY                                                    |                                                                                                                                                                                                                                                                                                                                                    |                   |
|------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| Location:                                                                          | Located on the southwest portion of the site                                                                                                                                                                                                                                                                                                       |                   |
|  | Local Jurisdiction                                                                                                                                                                                                                                                                                                                                 | Gig Harbor        |
|                                                                                    | WRIA                                                                                                                                                                                                                                                                                                                                               | 15                |
|                                                                                    | WSDOE Rating (Hruby, 2014)                                                                                                                                                                                                                                                                                                                         | IV                |
|                                                                                    | Gig Harbor Rating                                                                                                                                                                                                                                                                                                                                  | IV                |
|                                                                                    | Gig Harbor Buffer Width (High Impact)                                                                                                                                                                                                                                                                                                              | 50 feet           |
|                                                                                    | Wetland Size                                                                                                                                                                                                                                                                                                                                       | 1,425 square feet |
|                                                                                    | Cowardin Classification                                                                                                                                                                                                                                                                                                                            | PFOD              |
|                                                                                    | HGM Classification                                                                                                                                                                                                                                                                                                                                 | Slope             |
|                                                                                    | Wetland Data Sheet(s)                                                                                                                                                                                                                                                                                                                              | DP-2W (DP B-1)    |
|                                                                                    | Upland Data Sheet (s)                                                                                                                                                                                                                                                                                                                              | DP-1U (DP B-2)    |
|                                                                                    | Boundary Flag color                                                                                                                                                                                                                                                                                                                                | Orange            |
| Dominant Vegetation                                                                | Wetland B is dominated by devil’s club ( <i>Oplopanax horridus</i> , FAC) and slough sedge ( <i>Carex obnupta</i> , OBL) with Douglas fir ( <i>Pseudotsuga menziesii</i> , FACU), sword fern ( <i>Polystichum munitum</i> , FACU), and western hemlock dominating the immediate upland (buffer) area.                                              |                   |
| Soils                                                                              | Harstine gravelly sandy loam with 6 percent to 15 percent slope.                                                                                                                                                                                                                                                                                   |                   |
| Hydrology                                                                          | Seasonally saturated seep area that merges with an off-site roadside ditch associated with SR-16.                                                                                                                                                                                                                                                  |                   |
| Rationale for Delineation                                                          | The wetland boundary generally follows a distinct topographic break and a change to more upland vegetation.                                                                                                                                                                                                                                        |                   |
| Rationale for Local Rating                                                         | Local rating is based upon WSDOE’s current rating system.                                                                                                                                                                                                                                                                                          |                   |
| Wetland Functions Summary                                                          |                                                                                                                                                                                                                                                                                                                                                    |                   |
| Water Quality                                                                      | Wetland B has limited potential to retain sediments because of its small size, slope, and association with a seep. Wetland B scored low (4 points) for water quality function using the 2014 WSDOE rating system.                                                                                                                                  |                   |
| Hydrologic                                                                         | Wetland B is a seep, water does not appear to be retained within the wetland for any significant time period. Wetland B scored low (4 points) for hydrologic function using the 2014 WSDOE rating system.                                                                                                                                          |                   |
| Habitat                                                                            | Wildlife habitat functions provided by the wetland may include potential habitat for large and small mammal forage and cover, and small bird foraging and nesting. Because of its close proximity to a potentially non-salmonid fish-bearing stream, Wetland B scored moderate (5 points) for habitat function using the 2014 WSDOE rating system. |                   |
| Buffer Condition                                                                   | The buffer of Wetland B is dominated by natural vegetation associated with the surrounding forested community.                                                                                                                                                                                                                                     |                   |

Table 5. Wetland C Summary.

| WETLAND C – INFORMATION SUMMARY                                                    |                                       |                                                                                                                                                                                                                                                                                                                                                    |                 |
|------------------------------------------------------------------------------------|---------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| Location:                                                                          |                                       | Extending northeast to southwest on the western portion of the site near SR-16 and south of the stream.                                                                                                                                                                                                                                            |                 |
|  | Local Jurisdiction                    |                                                                                                                                                                                                                                                                                                                                                    | Gig Harbor      |
|                                                                                    | WRIA                                  |                                                                                                                                                                                                                                                                                                                                                    | 15              |
|                                                                                    | WSDOE Rating (Hruby, 2014)            |                                                                                                                                                                                                                                                                                                                                                    | IV              |
|                                                                                    | Gig Harbor Rating                     |                                                                                                                                                                                                                                                                                                                                                    | IV              |
|                                                                                    | Gig Harbor Buffer Width (High Impact) |                                                                                                                                                                                                                                                                                                                                                    | 50 feet         |
|                                                                                    | Wetland Size                          |                                                                                                                                                                                                                                                                                                                                                    | 4,100 sf        |
|                                                                                    | Cowardin Classification               |                                                                                                                                                                                                                                                                                                                                                    | PFOD            |
|                                                                                    | HGM Classification                    |                                                                                                                                                                                                                                                                                                                                                    | Slope           |
|                                                                                    | Wetland Data Sheet(s)                 |                                                                                                                                                                                                                                                                                                                                                    | DP-2Wa (DP C-1) |
|                                                                                    | Upland Data Sheet (s)                 |                                                                                                                                                                                                                                                                                                                                                    | DP-3U (DP C-2)  |
|                                                                                    | Boundary Flag color                   |                                                                                                                                                                                                                                                                                                                                                    | Orange          |
| Dominant Vegetation                                                                |                                       | Wetland C is dominated by western red cedar and red alder over hazelnut, skunk cabbage, and lady fern.                                                                                                                                                                                                                                             |                 |
| Soils                                                                              |                                       | Harstine gravelly sandy loam with 15 percent to 30 percent slope.                                                                                                                                                                                                                                                                                  |                 |
| Hydrology                                                                          |                                       | Seasonally saturated seep area that merges with an off-site roadside ditch associated with SR-16.                                                                                                                                                                                                                                                  |                 |
| Rationale for Delineation                                                          |                                       | The wetland boundary generally follows a distinct topographic break and a change to more upland vegetation.                                                                                                                                                                                                                                        |                 |
| Rationale for Local Rating                                                         |                                       | Local rating is based upon WSDOE’s current rating system.                                                                                                                                                                                                                                                                                          |                 |
| Wetland Functions Summary                                                          |                                       |                                                                                                                                                                                                                                                                                                                                                    |                 |
| Water Quality                                                                      |                                       | Wetland C has limited potential to provide water quality because of its small size, seep and a lack of dense vegetation. Wetland C scored low (4 points) for water quality function using the 2014 WSDOE rating system.                                                                                                                            |                 |
| Hydrologic                                                                         |                                       | This wetland is a seep that merges with an off-site drainage ditch associated with SR-16. Water does not appear to be retained within the wetland for any significant time period. Wetland C scored low (4 points) for hydrologic function using the 2014 WSDOE rating system.                                                                     |                 |
| Habitat                                                                            |                                       | Wildlife habitat functions provided by the wetland may include potential habitat for small and large mammal forage and cover, and small bird foraging and nesting. Because of its close proximity to a potentially non-salmonid fish-bearing stream, Wetland C scored moderate (5 points) for habitat function using the 2014 WSDOE rating system. |                 |
| Buffer Condition                                                                   |                                       | The buffer of Wetland C is dominated by natural vegetation associated with the surrounding forested community.                                                                                                                                                                                                                                     |                 |

Table 6. Wetland D Summary.

| WETLAND D – INFORMATION SUMMARY                                                   |                                                                                                                                                                                                                                                                                                                                                    |                   |
|-----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| Location:                                                                         | Adjacent to the south side of the onsite drainage channel near SR-16 at the western edge of the parcel.                                                                                                                                                                                                                                            |                   |
|  | Local Jurisdiction                                                                                                                                                                                                                                                                                                                                 | Gig Harbor        |
|                                                                                   | WRIA                                                                                                                                                                                                                                                                                                                                               | 15                |
|                                                                                   | WSDOE Rating (Hruby, 2014)                                                                                                                                                                                                                                                                                                                         | IV                |
|                                                                                   | Gig Harbor Rating                                                                                                                                                                                                                                                                                                                                  | IV                |
|                                                                                   | Gig Harbor Buffer Width (High Impact)                                                                                                                                                                                                                                                                                                              | 50 feet           |
|                                                                                   | Wetland Size                                                                                                                                                                                                                                                                                                                                       | 1,435 square feet |
|                                                                                   | Cowardin Classification                                                                                                                                                                                                                                                                                                                            | PFOD              |
|                                                                                   | HGM Classification                                                                                                                                                                                                                                                                                                                                 | Slope             |
|                                                                                   | Wetland Data Sheet(s)                                                                                                                                                                                                                                                                                                                              | DP-7W (DP D-1)    |
|                                                                                   | Upland Data Sheet (s)                                                                                                                                                                                                                                                                                                                              | DP-6W (DP D-2)    |
|                                                                                   | Boundary Flag color                                                                                                                                                                                                                                                                                                                                | Orange            |
| Dominant Vegetation                                                               | Wetland D is dominated by young salmonberry over tall mannagrass, lady fern, deer fern and skunk cabbage.                                                                                                                                                                                                                                          |                   |
| Soils                                                                             | Harstine gravelly sandy loam with 15 percent to 30 percent slope.                                                                                                                                                                                                                                                                                  |                   |
| Hydrology                                                                         | Seasonally saturated seep area that merges with the on-site stream.                                                                                                                                                                                                                                                                                |                   |
| Rationale for Delineation                                                         | The wetland boundary generally follows a distinct topographic break and a change to more upland vegetation.                                                                                                                                                                                                                                        |                   |
| Rationale for Local Rating                                                        | Local rating is based upon WSDOE’s current rating system.                                                                                                                                                                                                                                                                                          |                   |
| Wetland Functions Summary                                                         |                                                                                                                                                                                                                                                                                                                                                    |                   |
| Water Quality                                                                     | Wetland D has limited potential to retain sediments because of its small size and associated with a seep. Wetland <u>D</u> scored low (4 points) for water quality function using the 2014 WSDOE rating system.                                                                                                                                    |                   |
| Hydrologic                                                                        | This wetland is a seep that merges with the stream. Water does not appear to be retained within the wetland for any significant time period. Wetland D scored low (4 points) for hydrologic function using the 2014 WSDOE rating system.                                                                                                           |                   |
| Habitat                                                                           | Wildlife habitat functions provided by the wetland may include potential habitat for large and small mammal forage and cover, and small bird foraging and nesting. Because of its close proximity to a potentially non-salmonid fish-bearing stream, Wetland D scored moderate (5 points) for habitat function using the 2014 WSDOE rating system. |                   |
| Buffer Condition                                                                  | The buffer of Wetland D is dominated by natural vegetation associated with the surrounding forested community.                                                                                                                                                                                                                                     |                   |



Table 7. Wetland E Summary.

| WETLAND E – INFORMATION SUMMARY                                                   |                                                                                                                                                                                                                                                                                                                                                    |                 |
|-----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| Location:                                                                         | Adjacent to the drainage channel near the midpoint of the property.                                                                                                                                                                                                                                                                                |                 |
|  | Local Jurisdiction                                                                                                                                                                                                                                                                                                                                 | Gig Harbor      |
|                                                                                   | WRIA                                                                                                                                                                                                                                                                                                                                               | 15              |
|                                                                                   | WSDOE Rating (Hruby, 2014)                                                                                                                                                                                                                                                                                                                         | IV              |
|                                                                                   | Gig Harbor Rating                                                                                                                                                                                                                                                                                                                                  | IV              |
|                                                                                   | Gig Harbor Buffer Width (High Impact)                                                                                                                                                                                                                                                                                                              | 50 feet         |
|                                                                                   | Wetland Size                                                                                                                                                                                                                                                                                                                                       | 772 square feet |
|                                                                                   | Cowardin Classification                                                                                                                                                                                                                                                                                                                            | PFOD            |
|                                                                                   | HGM Classification                                                                                                                                                                                                                                                                                                                                 | Slope           |
|                                                                                   | Wetland Data Sheet(s)                                                                                                                                                                                                                                                                                                                              | DP-11W (DP E-1) |
|                                                                                   | Upland Data Sheet (s)                                                                                                                                                                                                                                                                                                                              | DP 12U (DP E-2) |
|                                                                                   | Boundary Flag color                                                                                                                                                                                                                                                                                                                                | Orange          |
| Dominant Vegetation                                                               | Wetland E has a dense canopy of red alder over a sparse understory of salmonberry, piggyback plant, and tall mannagrass.                                                                                                                                                                                                                           |                 |
| Soils                                                                             | Harstine gravelly sandy loam with 15 percent to 30 percent slope.                                                                                                                                                                                                                                                                                  |                 |
| Hydrology                                                                         | Associated with high groundwater and the on-site stream.                                                                                                                                                                                                                                                                                           |                 |
| Rationale for Delineation                                                         | The wetland boundary generally follows a distinct topographic break and a change to more upland vegetation.                                                                                                                                                                                                                                        |                 |
| Rationale for Local Rating                                                        | Local rating is based upon WSDOE’s current rating system.                                                                                                                                                                                                                                                                                          |                 |
| Wetland Functions Summary                                                         |                                                                                                                                                                                                                                                                                                                                                    |                 |
| Water Quality                                                                     | Wetland E has limited potential to retain sediments because of its small size and lack of dense vegetation. Wetland <u>E</u> scored low (4 points) for water quality function using the 2014 WSDOE rating system.                                                                                                                                  |                 |
| Hydrologic                                                                        | Wetland E is on a slope. Water does not appear to be retained within the wetland for any significant time period. Wetland E scored low (4 points) for hydrologic function using the 2014 WSDOE rating system.                                                                                                                                      |                 |
| Habitat                                                                           | Wildlife habitat functions provided by the wetland may include potential habitat for large and small mammal forage and cover, and small bird foraging and nesting. Because of its close proximity to a potentially non-salmonid fish-bearing stream, Wetland E scored moderate (5 points) for habitat function using the 2014 WSDOE rating system. |                 |
| Buffer Condition                                                                  | The buffer of Wetland E is dominated by natural vegetation associated with the surrounding forested community.                                                                                                                                                                                                                                     |                 |

**Table 8. Wetland F Summary.**

| WETLAND F – INFORMATION SUMMARY                                                   |                                       |                                                                                                                                                                                                                                                                                                                                                    |                 |
|-----------------------------------------------------------------------------------|---------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| Location:                                                                         |                                       | Adjacent to the southern portion of the drainage channel near the western portion of the site.                                                                                                                                                                                                                                                     |                 |
|  | Local Jurisdiction                    |                                                                                                                                                                                                                                                                                                                                                    | Gig Harbor      |
|                                                                                   | WRIA                                  |                                                                                                                                                                                                                                                                                                                                                    | 15              |
|                                                                                   | WSDOE Rating (Hruby, 2014)            |                                                                                                                                                                                                                                                                                                                                                    | IV              |
|                                                                                   | Gig Harbor Rating                     |                                                                                                                                                                                                                                                                                                                                                    | IV              |
|                                                                                   | Gig Harbor Buffer Width (High Impact) |                                                                                                                                                                                                                                                                                                                                                    | 50 feet         |
|                                                                                   | Wetland Size                          |                                                                                                                                                                                                                                                                                                                                                    | 664 square feet |
|                                                                                   | Cowardin Classification               |                                                                                                                                                                                                                                                                                                                                                    | PEMB            |
|                                                                                   | HGM Classification                    |                                                                                                                                                                                                                                                                                                                                                    | Slope           |
|                                                                                   | Wetland Data Sheet(s)                 |                                                                                                                                                                                                                                                                                                                                                    | DP-15W (DP F-1) |
|                                                                                   | Upland Data Sheet (s)                 |                                                                                                                                                                                                                                                                                                                                                    | DP-16U (DP F-2) |
| Boundary Flag color                                                               |                                       | Orange                                                                                                                                                                                                                                                                                                                                             |                 |
| Dominant Vegetation                                                               |                                       | Wetland F has a dense canopy of red alder over a sparse understory of salmonberry, sword fern, lady fern, deer fern, blackberry, and skunk cabbage.                                                                                                                                                                                                |                 |
| Soils                                                                             |                                       | Harstine gravelly sandy loam with 15 percent to 30 percent slope.                                                                                                                                                                                                                                                                                  |                 |
| Hydrology                                                                         |                                       | Associated with high groundwater and the on-site stream.                                                                                                                                                                                                                                                                                           |                 |
| Rationale for Delineation                                                         |                                       | The wetland boundary generally follows a distinct topographic break and a change to more upland vegetation.                                                                                                                                                                                                                                        |                 |
| Rationale for Local Rating                                                        |                                       | Local rating is based upon WSDOE’s current rating system.                                                                                                                                                                                                                                                                                          |                 |
| Wetland Functions Summary                                                         |                                       |                                                                                                                                                                                                                                                                                                                                                    |                 |
| Water Quality                                                                     |                                       | Wetland F has limited potential to retain sediments because of its small size and a lack of dense vegetation. Because of its close proximity to the road, Wetland <u>F</u> scored moderate (5 points) for water quality function using the 2014 WSDOE rating system.                                                                               |                 |
| Hydrologic                                                                        |                                       | This wetland is on a slope. Water does not appear to be retained within the wetland for any significant time period. Wetland F scored low (4 points) for hydrologic function using the 2014 WSDOE rating system.                                                                                                                                   |                 |
| Habitat                                                                           |                                       | Wildlife habitat functions provided by the wetland may include potential habitat for large and small mammal forage and cover, and small bird foraging and nesting. Because of its close proximity to a potentially non-salmonid fish-bearing stream, Wetland F scored moderate (5 points) for habitat function using the 2014 WSDOE rating system. |                 |
| Buffer Condition                                                                  |                                       | The buffer of Wetland F is dominated by natural vegetation associated with the surrounding forested community.                                                                                                                                                                                                                                     |                 |

Table 9. Wetland G Summary.

| WETLAND G – INFORMATION SUMMARY                                                   |                                                                                                                                                                                                                                                                                                                                                    |                 |
|-----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| Location:                                                                         | Southeast of the drainage channel and near the western portion of the site.                                                                                                                                                                                                                                                                        |                 |
|  | Local Jurisdiction                                                                                                                                                                                                                                                                                                                                 | Gig Harbor      |
|                                                                                   | WRIA                                                                                                                                                                                                                                                                                                                                               | 15              |
|                                                                                   | WSDOE Rating (Hruby, 2014)                                                                                                                                                                                                                                                                                                                         | IV              |
|                                                                                   | Gig Harbor Rating                                                                                                                                                                                                                                                                                                                                  | IV              |
|                                                                                   | Gig Harbor Buffer Width (High Impact)                                                                                                                                                                                                                                                                                                              | 50 feet         |
|                                                                                   | Wetland Size                                                                                                                                                                                                                                                                                                                                       | 315 square feet |
|                                                                                   | Cowardin Classification                                                                                                                                                                                                                                                                                                                            | PSS/EMB         |
|                                                                                   | HGM Classification                                                                                                                                                                                                                                                                                                                                 | Slope           |
|                                                                                   | Wetland Data Sheet(s)                                                                                                                                                                                                                                                                                                                              | DP-18W (DP G-1) |
|                                                                                   | Upland Data Sheet (s)                                                                                                                                                                                                                                                                                                                              | DP-19U (DP G-2) |
|                                                                                   | Boundary Flag color                                                                                                                                                                                                                                                                                                                                | Orange          |
| Dominant Vegetation                                                               | Wetland G is dominated by red alder and western red cedar over devil’s club, salmonberry, lady fern, and skunk cabbage.                                                                                                                                                                                                                            |                 |
| Soils                                                                             | Harstine gravelly sandy loam with 15 percent to 30 percent slope.                                                                                                                                                                                                                                                                                  |                 |
| Hydrology                                                                         | Hydrology is provided by high groundwater and precipitation.                                                                                                                                                                                                                                                                                       |                 |
| Rationale for Delineation                                                         | The wetland boundary generally follows a distinct topographic break and a change to more upland vegetation.                                                                                                                                                                                                                                        |                 |
| Rationale for Local Rating                                                        | Local rating is based upon WSDOE’s current rating system.                                                                                                                                                                                                                                                                                          |                 |
| Wetland Functions Summary                                                         |                                                                                                                                                                                                                                                                                                                                                    |                 |
| Water Quality                                                                     | Wetland G has limited potential to retain sediments because of its small size. Because of its close proximity to the road, Wetland <u>G</u> scored moderate (5 points) for water quality function using the 2014 WSDOE rating system.                                                                                                              |                 |
| Hydrologic                                                                        | Wetland G has limited potential to retain water because of its small size. Because of its close proximity to the road and neighboring lawn, Wetland <u>E</u> scored moderate (5 points) for water hydrologic function using the 2014 WSDOE rating system.                                                                                          |                 |
| Habitat                                                                           | Wildlife habitat functions provided by the wetland may include potential habitat for large and small mammal forage and cover, and small bird foraging and nesting. Because of its close proximity to a potentially non-salmonid fish-bearing stream, Wetland G scored moderate (5 points) for habitat function using the 2014 WSDOE rating system. |                 |
| Buffer Condition                                                                  | The buffer of Wetland G is dominated by natural vegetation associated with the surrounding forested community.                                                                                                                                                                                                                                     |                 |



### 4.3.1 Wetland Functions

Because of the small size of the wetlands and slopes on the subject property, functions provide by the wetlands appear to be limited. Table 10 provides a summary of existing functions and values associated with each wetland.

**Table 10. Functions and Values of Existing Wetlands.**

| Function / Value <sup>A</sup>             | Wetland |   |   |   |   |   |   |
|-------------------------------------------|---------|---|---|---|---|---|---|
|                                           | A       | B | C | D | E | F | G |
| <b>Water Quality Functions</b>            |         |   |   |   |   |   |   |
| Sediment Removal                          | x       | x | x | x | x | x | x |
| Nutrient and Toxicant Removal             | x       | x | x | x | x | x | x |
| <b>Hydrologic Functions</b>               |         |   |   |   |   |   |   |
| Flood Flow Alteration                     | x       | x | - | x | x | x | - |
| Erosion Control & Shoreline Stabilization | -       | - | - | - | - | - | - |
| <b>Habitat Functions</b>                  |         |   |   |   |   |   |   |
| Production & Export of Organic Matter     | x       | x | x | x | x | x | - |
| General Habitat Suitability               | x       | x | x | x | x | x | x |
| Habitat for Aquatic Invertebrates         | -       | - | - | x | x | - | - |
| Habitat for Amphibians                    | -       | - | - | - | - | - | - |
| Habitat for Wetland-Associated Mammals    | x       | x | x | x | x | x | x |
| Habitat for Wetland-Associated Birds      | x       | x | x | x | x | x | x |
| General Fish Habitat                      | -       | - | - | - | - | - | - |
| Native Plant Richness                     | x       | x | x | x | x | x | x |
| <b>Special Characteristics</b>            |         |   |   |   |   |   |   |
| Educational or Scientific Value           | -       | - | - | - | - | - | - |
| Uniqueness and Heritage                   | -       | - | - | - | - | - | - |

A: "-" means that the function is not present; "x" means that the function is present is of lower quality; and "+" means the function is present and is of higher quality.

### 4.3.2 Wetland Buffers

Based on the wetland classification guidelines in the GHMC Title 18.08.040 and WSDOE wetland rating system, the proposed project area contains seven (7) Category IV slope wetlands, which require a minimum 25-foot wide buffer. However, the buffer may be increased depending on the proposed land use and in accordance with the impacts of land use (GHMC 18.08.100.B). The proposed land use would be considered High Intensity and the buffer would be increased to 50 feet (GHMC 18.08.100.G).

## 4.4 Streams

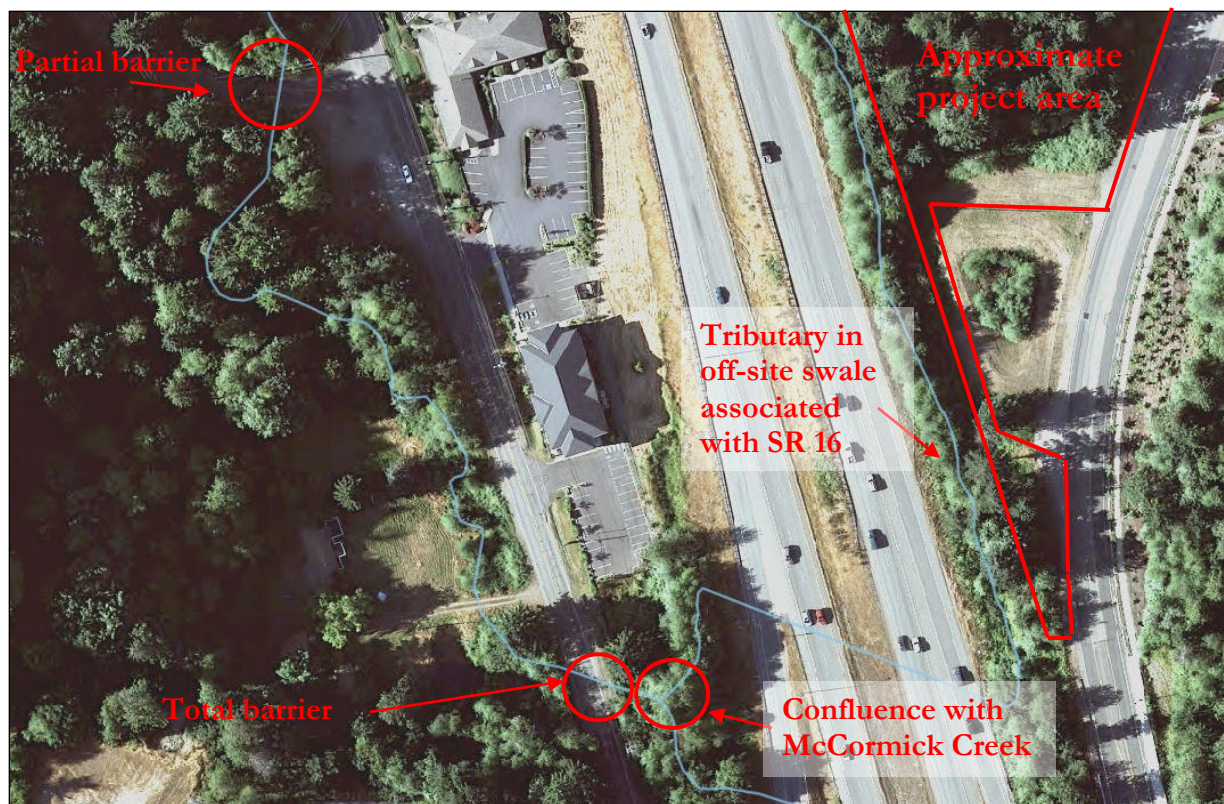
The site investigation identified one perennial stream that is a tributary to McCormick Creek. This stream bisects the property in an east to west direction, flowing off-site and southward in a roadside ditch along the northeastern side of SR-16 then merging with McCormick Creek on the western side of SR-16. Table 11 summarizes details of the stream identified on the subject property.

#### 4.4.1 Tributary to McCormick Creek

The on-site tributary to McCormick Creek originates off-site in forested and residential areas to the northeast of the subject property and discharges onto the subject property through a long culvert under Canterwood Boulevard Northwest. The tributary flows southwesterly approximately halfway across the property in an incised channel, through two 24-inch diameter culverts, then continues southwesterly in an incised channel and off-site into a roadside swale associated with SR-16. Water within the swale flows south and west under SR-16 and merges with McCormick Creek (Appendix C). Although we do not have any flow data for this tributary of McCormick Creek, the stream appears to be perennial, having observed water flows in September.

Per GHMC 18.08.182 the on-site tributary is a Type 3 water (natural stream with perennial flow and used by fish other than salmonids) that is connected to McCormick Creek, a Type 2 water per GHMC 18.08.182, and Henderson Bay, a Type S water, per Pierce County Code (PCC) 18E.40.060. In addition, NOAA Fisheries has confirmed that salmonids do not utilize McCormick Creek. The WDFW SalmonScape website shows a total fish barrier on McCormick Creek downstream of where the tributary enters McCormick Creek, according to Pierce County Public GIS (Figure 3). In addition, the two culverts located on the property are raised approximately one foot on the downstream end and would also likely present a significant barrier to fish migration upstream. The presence of a fish barrier and lack of viable salmonid habitat on-site indicates the tributary would be Type 3 (natural stream with perennial flow and used by fish other than salmonids) or Type 4 (natural streams with perennial or intermittent flow that are not used by fish). As the presence/absence of non-salmonid fish is unknown, the tributary will be treated as a Type 3 stream for the purpose of this project.

Figure 3. Fish Barriers <sup>A</sup>



<sup>A</sup> Aerial photo and stream path from Pierce County GIS with locations of fish barriers based on WDFW data presented in SalmonScape.

**Table 11. Stream Information Summary.**

| STREAM INFORMATION SUMMARY – Tributary to McCormick                               |                                                                                                                                                                                                                                                                                                                  |                                      |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|
|  | <b>Stream Name</b>                                                                                                                                                                                                                                                                                               | Unnamed tributary to McCormick Creek |
|                                                                                   | <b>WRIA</b>                                                                                                                                                                                                                                                                                                      | 15                                   |
|                                                                                   | <b>WA Stream Catalog #</b>                                                                                                                                                                                                                                                                                       | N/A                                  |
|                                                                                   | <b>Local Jurisdiction</b>                                                                                                                                                                                                                                                                                        | Gig Harbor                           |
|                                                                                   | <b>DNR Stream Type</b>                                                                                                                                                                                                                                                                                           | Np                                   |
|                                                                                   | <b>Local Stream Rating</b>                                                                                                                                                                                                                                                                                       | Type 3                               |
|                                                                                   | <b>Buffer Width</b>                                                                                                                                                                                                                                                                                              | 50 feet                              |
|                                                                                   | <b>Documented Fish Use</b>                                                                                                                                                                                                                                                                                       | None                                 |
|                                                                                   | <b>Flag color</b>                                                                                                                                                                                                                                                                                                | Blue                                 |
| <b>Location of Stream Relative to Project</b>                                     | This tributary bisects the property flowing southwesterly from Canterwood Boulevard Northwest to a roadside swale associated with the ROW for SR-16.                                                                                                                                                             |                                      |
| <b>Connectivity (where stream flows from/to)</b>                                  | This tributary originates off-site to the northeast of the property and flows southwesterly across the property within an incised channel to a swale associated with SR-16. Water then flows southward to a culvert, then westerly under SR-16 for approximately 400 feet, where it merges with McCormick Creek. |                                      |
| <b>Riparian/Buffer Condition</b>                                                  | Disturbed on-site areas include previous installation of two 24-inch diameter culverts near the midpoint of the stream channel. The condition of the remainder of the on-site riparian and buffer areas is undisturbed.                                                                                          |                                      |

#### 4.4.2 Stream Buffers

The on-site stream buffer is mostly undisturbed mixed forest dominated by red alder, big leaf maple, western hemlock, and western red cedar with an understory dominated by vine maple, salmonberry, and sword fern.

Based on the definitions contained within the GHMC Chapter 18.08.182 and stream classification guidelines in Chapter 18.08.184, the proposed project area contains a Type 3 water which requires a 50-foot protective buffer from OHW.



## Chapter 5. Mitigation Plan & Regulatory Considerations

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This document presents the Mitigation Plan details for the Canterwood Commercial project. This mitigation plan is essentially the same plan with minor modifications as the previous plan reviewed and approved by the USACE in February 2016 under Nationwide Permit (NWP) application number NWS-2014-954 which expired February 12, 2017 and the City's third party reviewer, Grette and Associates, in March 2014 (see Appendix F). The proposed wetland impacts and compensatory mitigation actions attempt to closely adhere to local Critical Areas Regulations specified in GHMC 18.08 and National and Regional Conditions for State and Federal authorization of fill under the 2017 NWP 39 (Commercial and Institutional Development), as required under Sections 401 and 404 of the Clean Water Act (CWA). Although this mitigation plan is being drafted to comply with the 2017 NWP 39, the conditions of approval for the current NWP 39 are largely consistent with the 2012 NWP 39 that the mitigation plan was approved under previously. In addition, Joint Federal and State agency guidance have not substantially changed since the previous submittal. This Mitigation Plan meets reporting requirements under GHMC 18.08.150.A.

Potential compensatory wetland mitigation actions were examined in the context of mitigation sequencing and watershed-level processes as required by Federal compensatory mitigation rules (USACE 33 CFR Parts 325 & 332, EPA 40 CFR Part 230), State and Federal interagency wetland mitigation guidance (WSDOE, 2006 and Hruby, 2009), and RCW 90.48, and locally under standards set forth in GHMC 18.08. However, due to certain disparities between these various guidance documents and codes, some mitigation issues were not easily resolved; therefore, the mitigation actions attempt to strike a balance and achieve a positive result for the McCormick Creek Basin and replace functions lost by wetland fill and conversion as a result of the proposed project. Pursuant to GHMC 18.08.160B, compensatory mitigation shall be on-site unless not scientifically feasible. In general, compensatory wetland mitigation should be located within the same watershed as the impact site, and should be located where it is most likely to successfully replace lost functions and services that best benefit the impacted watershed. This mitigation plan addresses issues as they relate to the proposed project including potential reductions in surface water quality, water retention, and groundwater recharge rates. Previous sections of this report will be referenced in the mitigation plan regarding pertinent background information.

### 5.1 Mitigation Sequencing

Approximately one-half of the subject site is encumbered by regulated wetlands, streams, and respective buffers. Access and services for commercial development of the site will be provided via Canterwood Boulevard Northwest to the east. Careful planning efforts are necessary to ensure the proposed development minimizes wetland and stream impacts by limiting the extent of development to the easternmost portion of the site along Canterwood Boulevard Northwest.

Through careful planning efforts, the proposed site layout avoids extensive wetland and stream impacts by limiting the majority of proposed development to the southernmost portion of the site where connectivity and functionality of the wetlands are lower. However, the site is divided into north and south portions by the unnamed tributary and the western half of the site is extensively encumbered by wetlands and associated buffers, leaving little space for development; therefore, development of this site will require the fill of Wetland B and the conversion of Wetland C to a stormwater pond. To avoid further wetland impacts, the number of buildings and extent of development has been limited

and specifically designed to avoid the stream corridor, most wetlands, and associated buffers. One building will be separated from the rest in order to fully protect the stream corridor and avoid the need for a new culvert across the tributary.

The unavoidable impacts to Wetlands B and C will result in the loss of 0.12 acre of wetland. However, compensatory wetland mitigation is being provided for the combined loss of regulated wetland area. Joint Federal and State agency guidance (WSDOE, 2006) outlines recommended compensatory wetland mitigation standards and ratios. These guidance standards for mitigation actions vary from those outlined in GHMC 18.08.170; therefore, the compensatory wetland mitigation plan has been designed to achieve the higher guidance standards where different. Additionally, more recent joint USACE and EPA rules (USACE, 2008a) and interagency guidance (Hruby, 2009) have been established that require more careful mitigation planning efforts utilizing a watershed approach in site selection, establishment of enforceable performance standards, and preference for use of mitigation banks or in-lieu fees wherever possible. The subject property is not located within the service area of an approved mitigation bank or in-lieu fee program; therefore, a viable on-site mitigation action was identified within the McCormick Creek Basin that will improve water quality and hydrologic functions within the small wetlands. This mitigation will be able to fully compensate for the loss of wetland functions and values directly related to the proposed wetland impacts and provide measurable improvements to the watershed.

The McCormick Creek Basin is located within the Kitsap Watershed Resource Inventory Area (WRIA) Number 15, within Pierce County. The McCormick Creek Basin drains approximately 1,560 acres and flows generally northward from the City of Gig Harbor to Henderson Bay. It is urbanized and drains areas containing single-family and multi-family neighborhoods, schools, businesses, offices, hospital, and shopping centers (Gig Harbor Stormwater Comprehensive Plan, 2009). Per communication with NOAA Fisheries, McCormick Creek is not a salmon-bearing stream and is categorized as Type 2 by WDFW. McCormick Creek has a fish barrier downstream of the confluence of the on-site tributary with the creek; therefore, the tributary has been classified as Type 3 water (perennial stream used by fish other than salmonids) per GHMC 18.08.182. Field assessments on the subject property identified potential mitigation areas along the stream corridor between Wetlands D and E that will likely improve the overall hydrologic and water quality functions by improving runoff storage and conveyance capacity, retention of sediments, pollution assimilation, and groundwater recharge functions. Additional upland areas within the vicinity of Wetlands A and D were identified with shallow groundwater and favorable soil conditions that may be converted to wetlands. To achieve successful wetland creation within this area, the proposed design lowers the existing grade to the elevation groundwater was encountered within the vicinity to create a depressional wetland. Considering the needs of the McCormick Creek Basin, such mitigation actions would likely be able to provide a no net loss of functionality for the basin and improve water quality and hydrologic conditions within the tributary. In addition, the planting design for the proposed creation area and its associated buffer will increase habitat function.

## 5.2 Description of Impacts

In order to allow reasonable development of the site while maintaining wetland and stream functions, construction of the proposed buildings and associated structures will require filling of one slope wetland (Wetland B) and conversion of one slope wetland (Wetland C) to a stormwater pond. The site layout has been designed specifically to avoid the stream corridor and additional wetland impacts; and wetland preservation, enhancement, and creation actions will be utilized to improve overall wetland function and provide on-site compensatory mitigation. Further, two 24-inch diameter

culverts which currently interrupt the stream corridor and act as a potential barrier to fish passage may be removed as part of the project, which will improve potential stream habitat.

With these impacts, the proposed development will result in the net loss of approximately 5,225 square feet (0.12 acre) of Category IV wetland area. No buffer impacts are anticipated aside from temporal impacts as a result of mitigation actions and adjacent grading to achieve buildable site areas and provide transition to the proposed wetland creation area. The remaining wetlands, drainages, buffer zones, and additional open space areas outside of the proposed grading limits will remain unaltered and should not be negatively affected by the proposed design.

The proposed project will also involve upland work including: installation of temporary erosion and sediment control measures, grade and fill activities, installation of utilities, construction of public access, construction of commercial buildings and office spaces, and installation of stormwater collection and treatment systems designed in accordance with the City of Gig Harbor approved stormwater design standards (GHMC Chapter 14.20). Due to the steep slopes and substantial topographic variation on-site, extensive grading will be necessary for development. As a result, some grading will take place in the wetland and buffers, and the temporarily impacted areas will be fully restored through buffer enhancement actions. The proposed site plan, including proposed site topography and impacts to critical areas and associated buffers, is provided in Appendix C in accordance with GHMC 18.08.150.A.3.

### **5.3 Wetland Mitigation Site Selection**

According to Federal and State rules and guidelines, selection of an appropriate compensatory mitigation site must consider watershed-level processes in relation to a proposed impact, and the goals of the proposed mitigation actions are to preserve or restore these processes and functions being lost or impacted within the watershed (USACE, 2008a, WSDOE, 2006, and WSDOE, 2009). Additionally, GHMC 18.08.160.B.1, establishes preference for on-site mitigation. The goals and requirements of each agency can be difficult to reconcile within one mitigation action; therefore, careful consideration of potential on-site mitigation actions was explored within the framework of the Federal and State mitigation rules and guidelines.

The on-site location and compensatory mitigation actions were found to satisfy both watershed-level and local on-site mitigation requirements. By retaining, creating, and enhancing wetlands adjacent to the on-site creek, the habitat complexity of the area is improved. In general, having multiple types of habitats within an area is more ecologically beneficial than isolating habitats or having only one type of habitat. By retaining, creating, and enhancing the on-site wetlands, the hydrologic functions and connectivity of the stream can be preserved. The proposed wetland creation area will connect and potentially discharge to the existing stream during the wet season. As the region is fairly developed, it is advantageous to cluster habitat types and functions in one protected area.

Two principal areas for compensatory mitigation have been identified. One area, located in the stream corridor between Wetlands E and D, will be targeted for culvert removal, stream and riparian buffer restoration, and wetland creation. A second area, located in the eastern portion of the property where the slopes consist of a gentler grade within the vicinity of Wetlands A and D, will be targeted for wetland creation. These mitigation sites are located in a landscape conducive to establishment or improvement of wetland conditions. Hydrology was found to be available that can be permanently manipulated without need for long-term maintenance by creating a depressional area at the same proposed elevation as groundwater was encountered within the area. In addition, depressional wetlands typically have greater water quality, hydrologic, and habitat function than the slope wetlands



to be filled. The stream corridor throughout the property is highly-functional except where it is confined to two 24-inch diameter culverts near the midpoint of the stream channel, which will be removed as part of the mitigation actions.

In addition to these areas of wetland creation, various preservation and enhancement actions will be provided throughout the site. The site layout has been modified to provide preservation of Wetlands D, E, F, and G. Wetland enhancement will be provided for Wetland A, and buffer enhancement and protection will be provided throughout the site. No permanent impacts to buffers will result from the proposed project, and temporary buffer impacts will be limited to grading in the buffers of Wetlands E and G, the compensatory wetland mitigation actions and transitional grading within the buffer to the wetland creation area. All impacts to the buffer are in compliance with GHMC 18.08.110.D. Alterations to the buffer will be temporary and will not reduce functions and values of the wetland, and any buffer area with impacts will be fully restored. In accordance with GHMC 18.08.150.A.4, locations of the proposed mitigation areas are shown on the site plans in Appendix C.

As the site of the proposed project is located within the McCormick Creek Basin, mitigation actions for the project were designed to address issues within the watershed. The McCormick Creek Basin currently does not have identified limiting factors in regard to flow volumes or water quality; however, the City of Gig Harbor is concerned with the significant impacts of anticipated development of the area (Gig Harbor Stormwater Comprehensive Plan, 2009). Problems associated with development likely will be related to flooding, erosion, and sedimentation issues that result from inadequate retention of high winter storm flows and runoff from anthropogenic activities. Fish production in McCormick Creek Basin is already limited by sedimentation in the stream channels as a result of poor timber harvesting and agricultural practices. These problems are likely to escalate with the increase in impervious surfaces and surrounding land uses introducing foreign chemicals and matter into the water. Culvert removal and stream restoration in combination with enhanced and protected buffers and wetland creation actions will replace functions lost by impacts to Wetlands B and C as well as address and help resolve problems identified within the McCormick Creek Basin by creating a relatively large depressional wetland area which is capable of greater sediment and runoff retention than the slope wetlands to be filled.

## **5.4 Mitigation Strategy**

In accordance with GHMC 18.08.150.A.1, the overall goal of the compensatory mitigation plan is a no net loss of function or acreage and a net resource gain in wetlands over present conditions. To achieve this, the objectives of the mitigation actions are to remove existing anthropogenic impacts along the tributary to improve the McCormick Creek Basin and to restore and enhance diminished water quality and habitat function resulting from fill placement in Wetlands B and C by preserving, enhancing, and creating wetland areas on-site. Therefore, the Mitigation Plan will incorporate both in-kind and out-of-kind mitigation in order to meet Federal, State, and local requirements that are most appropriate for the wetlands. In accordance with GHMC 18.08.150.A.6, the nature of the wetland compensation is described below.

On-site, in-kind mitigation actions to compensate for the filling of Wetlands B and C will include the creation of wetland area in the vicinity of existing Wetlands A and D; preservation of Wetlands D, E, F, and G; and enhancement of Wetland A. These areas are identified as having hydrologic connectivity and soil conditions conducive to wetland creation and/or enhancement. All disturbed areas will be restored with native species using a planting design which will create a multi-layered forest canopy within the buffer areas using tree species with a variety of shade tolerance and incorporating an

irregular edge at the wetland boundary to provide for a high degree of vertical and horizontal canopy structure as the enhancement and restoration plantings mature. The creation is designed to contain topographic low points within its center below the elevation at which seasonal groundwater was encountered within the adjacent wetlands. This design will potentially create a seasonally ponded hydrogeomorphic class. Emergent wetland species will be planted in these lower areas to promote an emergent Cowardin class surrounded by areas transitioning from shrub/scrub to forested classes towards the boundary of the creation area (Appendix C). The anticipated outcome will be a wetland creation area with greater interspersed habitat than the existing sloped wetlands to be filled with a complex vegetative edge at the wetland/buffer interface. Water quality and hydrologic functions will be provided and increased through greater storage and sediment trapping capacity within the depressional wetland creation area. The created wetlands will have a minimum 50-foot protected buffer.

On-site, out-of-kind mitigation actions will also be provided to compensate for the filling of Wetlands B and C and will include the removal of two 24-inch diameter culverts near the midpoint of the stream channel and restoration of the stream channel and enhancement and protection of the associated buffer. In addition to the culvert removal, restoration actions will include excavation of a historic road where the culverts are located and replanting with appropriate native species while also adding large woody debris (LWD) within the stream and wetland buffer areas. The addition of LWD will encourage the formation of pools and riffles within the stream channel to enhance hydrologic functions. These actions are capable of improving water quality and hydrologic functions and providing a higher level of habitat function for stream-associated wildlife, consistent with the remainder of the stream corridor on-site. These improvements in function are in accordance with the needs of the basin and the functions lost through impacts to Wetlands B and C.

Additional on-site, out-of-kind mitigation actions include placement of large woody debris anchored within the streambank and boulders within the stream restoration area. The large woody debris should assist in the stabilization of the buffer and stream restoration efforts located on-site.

Out-of-kind mitigation is allowed for this project under GHMC 18.08.170.F.3:

*F. In-kind compensation shall be provided except where the applicant can demonstrate to the satisfaction of the department that:*

- 3. Out-of-kind replacement will best meet identified regional goals (e.g., replacement of historically diminished wetland types);*

In the case of this project, out-of-kind compensation will better meet the needs of the basin and will better compensate for proposed impacts to Wetlands B and C. As the impacted wetlands are low-rated slope wetlands, loss of functions primarily includes very limited habitat, water quality, and hydrologic functions. Particularly limited functions of the wetlands to be filled are water quality function through sediment filtration and hydrologic function through reduced velocity of runoff as the forested slope wetlands contain little dense rigid or woody plants to provide for these functions. The area on-site with the most anthropogenic disturbance is the section of tributary that is culverted. Rather than create wetlands in areas that are primarily undisturbed, mitigation would be targeted towards the lowest functioning areas on-site, indicating that restoration of this area would improve on-site functions more effectively than wetland creation alone. In addition, the City of Gig Harbor is concerned with the significant impacts of anticipated development of the area on the McCormick Creek Basin. Problems associated with development likely will be related to flooding, erosion, and sedimentation issues that result from inadequate retention of high winter storm flows and runoff from

anthropogenic activities. Stream restoration is anticipated to improve the overall hydrologic and water quality functions within the tributary by improving runoff storage and conveyance capacity, retention of sediments, pollution assimilation, and groundwater recharge functions. In this way, culvert removal and stream restoration can more effectively address problems associated with the McCormick Creek Basin.

Overall, approximately 8,298 square feet of uplands have been targeted for wetland creation; 2,301 square feet of existing wetlands have been targeted for enhancement; 5,487 square feet of existing wetlands have been targeted for preservation; and 48 linear feet of the tributary has been targeted for culvert removal and stream restoration. Establishing approximately 7,420 square feet of new wetland area satisfies Federal, State, and local mitigation requirements. It is anticipated there will be a net gain in all three wetland functions associated with the proposed depressional wetland created over the existing low-functioning slope wetlands to be filled.

Soundview Consultants LLC has been very successfully overseeing design, installation, and monitoring of similar highly-successful mitigation actions in the past. Some examples of similar projects include mitigation created within the City of Des Moines for the Des Moines Kingdom Hall (Downs, 2012); within the City of Mill Creek for the Embella project (Downs, 2013).

**Table 12. Required Mitigation Summary.**

| Wetland      | Size On-site (sq ft) | Cowardin Class | Rating | Impact (sq ft) | Compensation (sq ft)        |                    |
|--------------|----------------------|----------------|--------|----------------|-----------------------------|--------------------|
|              |                      |                |        |                | Reestablishment or Creation |                    |
|              |                      |                |        |                | Area                        | Ratio <sup>A</sup> |
| <b>A</b>     | 2,301                | PFOD           | IV     | -              | -                           | -                  |
| <b>B</b>     | 1,425                | PFOD           | IV     | 1,425          | 2,138                       | 1:1.5              |
| <b>C</b>     | 4,100                | PFOD           | IV     | 4,100          | 6,150                       | 1:1.5              |
| <b>D</b>     | 1,435                | PFOD           | IV     | -              | -                           | -                  |
| <b>E</b>     | 772                  | PFOD           | IV     | -              | -                           | -                  |
| <b>F</b>     | 664                  | PFOD           | IV     | -              | -                           | -                  |
| <b>G</b>     | 315                  | PFOD           | IV     | -              | -                           | -                  |
| <b>Total</b> | <b>11,012</b>        |                |        | <b>5,525</b>   | <b>8,288</b>                | <b>1:1.5</b>       |

<sup>A</sup>: Per WSDOE 2006 and GHMC 18.08.170.B

**Table 13. Proposed Mitigation Summary.**

| Mitigation Type | Ratio | Area Proposed                |
|-----------------|-------|------------------------------|
| Creation        | 1:1.5 | minimum of 8,288 square feet |
| Enhancement     | 1:1.5 | 2,301 square feet            |
| Out-of-kind     | N/A   | 48 linear feet of culvert    |

## 5.5 Mitigation Goals, Objectives, and Performance Standards

Goals and objectives for the mitigation actions are based on compensating for lost functions, providing additional functions according to the needs of the McCormick Creek Basin, and creating an overall improvement in the quality of on-site habitat. These mitigation actions are capable of



improving water quality and hydrologic functions as well as providing a moderate to high level of habitat function for wildlife. The goals and objectives of the mitigation actions are as follows:

**Goal 1** – Compensate for the loss of 5,525 square feet (0.12 acre) of wetland by creating a minimum of 8,288 square feet (0.19 acre) of depressional wetland that provides a moderate level of water quality, hydrologic, and habitat functions.

**Objective 1** – Establish wetland hydrology by excavating areas to reach the high groundwater between Wetland A and Wetland D and supplementing hydrology to the creation area by routing stormwater water to wetland creation areas.

**Performance Standard 1** – The wetland creation area will have saturated soils within 12 inches of the surface for a minimum of 5 consecutive months per year in years with normal precipitation levels.

**Objective 2** – Provide 8,288 square feet (0.19 acre) of new wetland area between Wetland A and Wetland D.

**Performance Standard 2** – The total wetland creation area will measure at least 8,288 square feet (0.19 acre) in size as demonstrated by wetland delineations in Years 5 and 10 of the monitoring period based upon the presence of hydrophytic vegetation and indicators of wetland hydrology.

**Objective 3** – Create/re-establish wetland habitat with diverse horizontal and vertical vegetation structure and high species richness to provide habitat for wetland-associated wildlife.

**Performance Standard 3** – By the end of Year 5, the wetland creation area will have at least 5 species of woody vegetation; native volunteer species will be included in the count. To be considered, the native species must make up at least 5 percent of the vegetation class.

**Performance Standard 4** – There will be an aerial percent coverage of native woody vegetation of approximately 10 percent in Year 3, 15 percent in Year 5, 20 percent in Year 7, and 30 percent in Year 10.

**Performance Standard 5** – There will be an aerial percent coverage of emergent vegetation of approximately 10 percent in Year 3, 15 percent in Year 5, 20 percent in Year 7, and 25 percent in Year 10.

**Goal 2** – Additionally, compensate for the loss of wetland hydrologic and water quality functions by enhancing 2,301 square feet (0.05 acre) of slope wetland (Wetland A) within the McCormick Creek Basin.

**Objective 4** – Reduce the amount of non-native invasive plant species and increase on-site native vegetation.

**Performance Standard 6** – There will be an aerial percent coverage of native woody vegetation of approximately 25 percent in Year 3, 30 percent in Year 5, 50 percent in Year 7, and 80 percent in Year 10.

**Performance Standard 7** – By the end of Year 1 there will be 100 percent plant survival.

**Performance Standard 8** – By the end of Year 1 and every monitoring year thereafter, the wetland enhancement area will have at least 5 native shrub and emergent species present.

**Goal 3** – Improve habitat functions within the McCormick Creek Basin by reducing presence of invasive species within wetlands, stream, and associated buffer areas.

**Objective 5** – Effectively control and/or eliminate invasive species from the wetland, stream, and buffer enhancement areas.

**Performance Standard 9** – Non-native invasive plants will not make up more than 10 percent total cover in any growing season following Year 1.

**Performance Standard 10** – All non-native invasive knotweed found within the mitigation areas, including buffers, shall be eliminated.

**Goal 4** – Additionally, compensate for the loss of wetland buffer functions associated with temporary impact areas by restoring temporary impacted buffer areas.

**Objective 6** – Restore and increase on-site native vegetation within the temporary impact areas.

**Performance Standard 10** – There will be an aerial percent coverage of native woody vegetation of approximately 20 percent in Year 3, 25 percent in Year 5, 30 percent in Year 7, and 50 percent in Year 10.

**Performance Standard 11** – By the end of Year 1 there will be 100 percent plant survival.

**Performance Standard 12** – By the end of Year 1 the temporary restoration area will have at least 5 native shrub and emergent species present.

**Performance Standard 13** – All non-native invasive knotweed found within the temporary restoration area shall be eliminated.

## 5.6 Mitigation Implementation

The previously-described compensatory mitigation actions will be completed concurrent with development activities included in this project. In general, project sequencing as required by GHMC 18.08.150.A.6 will be as follows: establishment of Temporary Erosion and Sediment Control (TESC) and Stormwater Pollution Prevention Plan (SWPPP) measures, site clearing, full grading of development areas, and fill of Wetlands B and C followed by construction of site infrastructure,

buildings, stormwater facilities, and final site improvements. Restoration will follow wetland impacts as closely as possible and will be complete concurrently with site development actions. All wetland, stream, and buffer areas adjacent to the planned development areas will be protected by installation of high visibility fencing and/or silt fencing during construction and split-rail fencing (2-3 plank wooden fence) and critical areas signage upon completion to discourage intrusion and improper use of these areas.

General hydrologic patterns on the site following construction are described below per GHMC 18.08.150.A.5. Treated, flow controlled stormwater will be diverted and distributed to the wetland creation area between Wetlands A and D via dispersion trenches, directing water from Building A and Building B, located at the top of the proposed 50-foot wetland buffer associated with the creation area. Diversion of such water to the wetland creation areas along with careful hydrologic design and grade control will help establish appropriate wetland hydrology in the mitigation area and facilitate success of the mitigation actions. The outlet of the stormwater pond will be constructed so water will flow to the buffer area above Wetland D. Full hydrology calculations to ensure wetland hydrology in appropriate areas will be conducted in the Final Mitigation Plan.

### **5.6.1 On-site Wetland Creation Actions**

All wetland creation actions will occur in the buffer areas between and adjacent to Wetlands A and D. These upland areas occur near undulations of Wetland A which have been identified as having hydrologic conditions and plant communities conducive to wetland creation efforts. Wetland conditions can be established in this location through the removal of some over-stocked alder stands and areas of non-native invasive plant species. Approximately 8,288 square feet (0.19 acre) of communities dominated by upland vegetation in these areas will be carefully excavated and converted to depressional wetlands. In the proposed buffer for the wetland creation where grading is required, the area will be restored with native tree, shrub and herbaceous species. Water quality and hydrologic functions will be provided through an increase in sediment trapping and storage capacity within the depressional wetland creation area.

The wetland creation area was chosen due to proximity to other wetlands, aptitude of plant species for conversion to wetland, and lack of special upland habitat. The upland area to be created into wetlands contains a mixture of upland and facultative plant species. The overstory is comprised of western red cedar, red alder, and western hemlock over a relatively open understory. Western red cedar and red alder are conducive to wetland creation. The mid-canopy level contains scattered shrubs such as oso-berry, English holly, and red and evergreen huckleberry. Groundcover species are primarily composed of deer fern, sword fern, and salal and also include species such as lady fern, horsetail, bracken fern, trailing blackberry, and bleeding heart. Following grading, the existing vegetation will be replaced with hydrophytic vegetation within the wetland creation area that will provide a greater value of habitat function. The identified wetland creation area contains no special habitat that cannot be found in other areas of the site, and no significant upland habitat loss will result from wetland creation in this area. The proposed planting design will promote a multi-layered forest canopy within the buffer areas using tree species with a variety of shade tolerance and incorporating an irregular edge at the wetland boundary to provide for a high degree of vertical and horizontal canopy structure as the enhancement and restoration plantings mature. The outcome will be a wetland creation area with greater interspersed habitat than the existing sloped wetlands to be filled with a complex vegetative edge at the wetland boundary.



## **5.7 Plant Materials and Installation.**

### **5.7.1 Plant Materials**

All plant materials to be used for mitigation actions will be nursery-grown stock from a reputable, local source. Only native species are to be used; no hybrids or cultivars will be allowed. Plant material provided will be typical of their species or variety; if not cuttings they will exhibit normal, densely-developed branches and vigorous, fibrous root systems. Plants will be sound, healthy, vigorous plants free from defects, and all forms of disease and infestation.

Container stock shall have been grown in its delivery container for not less than six (6) months but not more than two (2) years. Plants shall not exhibit rootbound conditions. Under no circumstances shall container stock be handled by their trunks, stems, or tops. Bare root plants may be substituted for container stock at the discretion of the Wetland Scientist. Seed mixture used for hand or hydroseeding shall contain fresh, clean, and new crop seed mixed by an approved method. The mixture is specified in Table 15 below.

All plant material shall be inspected by the Wetland Scientist upon delivery. Plant material not conforming to the specifications below will be rejected and replaced by the planting contractor. Rejected plant materials shall be immediately removed from the site.

The planting contractor shall provide the Wetland Scientist with documentation of plant material that includes the supplying nursery contact information, plant species, plant quantities, and plant sizes.

Fertilizer will be in the form of Agroform plant tabs or an approved like form. Mulch will consist of sterile wheat straw or clean recycled wood chips approximately 1/2-inch to 1-inch in size and 1/2-inch thick. If free of invasive plant species, the mulch material may be sourced from woody materials salvaged from the land clearing activities.

### **5.7.2 Plant Scheduling, Species, Density, and Location**

Plant installation should occur as close to conclusion of clearing and grading activities as possible to limit erosion and limit the temporal loss of function provided by the wetland and buffer. All planting should occur between September 1 and May 1 to ensure plants do not dry out after installation, or temporary irrigation measures may be necessary. All planting will be installed according to the procedures detailed in the following subsections using the species and densities shown on the mitigation plans in Appendix C.

### **5.7.3 Product Handling, Delivery, and Storage**

All seed and fertilizer should be delivered in original, unopened, and undamaged containers showing weight, analysis, and name of manufacturer. This material should be stored in a manner to prevent wetting and deterioration. All precautions customary in good trade practice shall be taken in preparing plants for moving. Workmanship that fails to meet industry standards will be rejected. Plants will be packed, transported, and handled with care to ensure protection against injury and from drying out. If plants cannot be planted immediately upon delivery they should be protected with soil, wet peat moss, or in a manner acceptable to the Wetland Scientist. Plants, fertilizer, and mulch not installed immediately upon delivery shall be secured on the site to prevent theft or tampering. No plant shall be bound with rope or wire in a manner that could damage or break the branches. Plants transported on open vehicles should be secured with a protective covering to prevent windburn.

### **5.7.4 Preparation and Installation of Plant Materials**

The planting contractor shall verify the location of all elements of the mitigation plan with the Wetland Scientist prior to installation. The responsible Wetland Scientist reserves the right to adjust the locations of landscape elements during the installation period as appropriate to the mitigation actions outlined above. If obstructions are encountered that are not shown on the drawings, planting operations will cease until alternate plant locations have been selected by and/or approved by the Wetland Scientist.

Circular plant pits with vertical sides will be excavated for all container stock. The pits should be at least twelve (12) inches in diameter, and the depth of the pit should accommodate the entire root system. The bottom of each pit will be scarified to a depth of four (4) inches.

Broken roots should be pruned with a sharp instrument and rootballs should be thoroughly soaked prior to installation. Set plant material upright in the planting pit to proper grade and alignment. Water the plants thoroughly midway through backfilling and add Agroform tablets. Water the pits again upon completion of backfilling. No filling should occur around trunks or stems. Do not use frozen or muddy mixtures for backfilling. Form a ring of soil around the edge of each planting pit to retain water, and install a 4 to 6-inch layer of mulch around the base of each container plant.

### **5.7.5 Temporary Irrigation Specifications**

While the native species selected for mitigation are hardy and typically thrive in northwest conditions, and the mitigation actions are planned in areas with sufficient hydroperiods for the species selected, some individual plants might perish due to dry conditions. Therefore, irrigation or regular watering will be provided as necessary for the duration of the first two (2) growing seasons while the native plantings become established.

### **5.7.6 Non-Native Invasive Plant Control and Removal**

Invasive species to be removed include Himalayan and cutleaf blackberry, Scotch broom, reed canarygrass, and all listed noxious weeds. These species can also be found in nearby areas; therefore, to ensure these species do not expand following the mitigation actions, any invasive shrubs within the mitigation area will be pretreated with a root-killing herbicide approved for use in aquatic sites (i.e. Rodeo) approximately thirty (30) days prior to being cleared and grubbed from the entire preserved wetland and associated buffer areas. The pre-treatment with herbicide should occur prior to all planned mitigation actions, and spot treatment of any surviving other invasive vegetation should be performed again each fall prior to leaf senescence for a minimum of three (3) years.

## **5.8 Maintenance and Monitoring Plan**

Maintenance and monitoring actions are described below and have been designed in accordance with the Mitigation Monitoring Report Format (USACE, 2008b) and also GHMC 18.08.150.A.7 and 8. The Applicant is committed to compliance with the mitigation plan and overall success of the project. As such, the Applicant will continue to maintain the project, keeping the site free from of non-native invasive vegetation, trash, and yard waste.

While the stream restoration and wetland creation actions rely primarily on mechanical manipulations, the establishment of herbaceous groundcover within the wetland, restoration actions within the buffer, and invasive species control in both the wetland and buffer will require some continued monitoring and maintenance. Therefore, the mitigation site will be monitored for a period of ten (10) years with formal inspections by a qualified Wetland Scientist. Monitoring events will be scheduled at the time of construction, thirty (30) days after planting, early in the growing season and the end of

the growing season for Year 1, twice during Year 2, and annually in Years 3, 5, 7, and 10. Closeout wetland delineation will also be conducted by a qualified Wetland Scientist in Years 5 and 10 to ensure the adequate compensatory mitigation area was established.

Monitoring will consist of percent cover measurements at permanent monitoring stations, walk-through surveys to identify invasive species presence and dead or dying restoration plantings, photographs taken at fixed photo points, wildlife observations, and general qualitative habitat and wetland function observations.

To determine percent cover, observed vegetation will be identified and recorded by species and an estimate of areal cover of dominant species within each sampling plots. Circular sample plots, approximately thirty (30) feet in diameter (706 square feet), are centered at each monitoring station. The sample plots encompass the specified wetland areas and terminate at the observed wetland boundary. Trees and shrubs within each 30-foot diameter monitoring plot are then recorded to species and areal cover. Herbaceous vegetation is sampled from a 10-foot diameter (78.5 square feet) within each monitoring plot, established at the same location as the center of each tree and shrub sample plot. Herbaceous vegetation within each monitoring plot is then recorded to species and includes an estimate of percent areal cover. A list of observed tree, shrub, and herbaceous species including percent areal cover of each species and wetland status is included within the monitoring report.

To determine wetland hydrology and delineate the wetland in Year 10, the wetland hydrology and wetland boundaries will be determined using the routine approach described in the Washington State Wetlands Identification and Delineation Manual (Ecology, 1997) and U.S. Army Corps of Engineers' Wetlands Delineation Manual (USACE, 1987) modified according to the guidelines established in the Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0) (USACE, 2010).

## **5.9 Reporting**

Following each monitoring event, a brief monitoring report detailing the current ecological status of the mitigation actions, measurement of performance standards, and management recommendations will be prepared and submitted to the City of Gig Harbor and USACE within ninety (90) days of each monitoring event to ensure full compliance with the mitigation plan, performance standards, and regulatory conditions of approval.

## **5.10 Contingency Plan and Long-Term Management**

If monitoring results indicate that performance standards are not being met, it may be necessary to implement all or part of the contingency plan. Particular care should be applied within the first three years to ensure that actions are taken quickly and effectively. Careful attention to maintenance is essential in ensuring that problems do not arise. Should any portion of the site fail to meet the success criteria, a contingency plan will be developed and implemented with City of Gig Harbor and approval from USACE. Such plans are adaptive and should be prepared on a case-by-case basis to reflect the failed mitigation characteristics. Contingency plans can include additional plant installation, erosion control, and plant substitutions including type, size, and location. In addition, in compliance with 33 CFR 332.7(d)(2) and to ensure long-term success of the mitigation site, the landowner will be responsible for implementing long-term maintenance. The Contingency measures outlined below can also be utilized in perpetuity to maintain the wetland and buffers associated with the proposed mitigation site.



Mitigation area maintenance is anticipated to cost up to \$1,500 annually and primarily will be used for potential invasive plant species treatment and any potential reoccurring debris removal. By Year 10, with the support of the contingency plan (if necessary), the plants will be well established; therefore, no budget will be necessary for watering and/or plant replacement. Revenue generated from leasing the site to commercial business will be utilized for funding long-term management.

This project proposes 10 years of monitoring in compliance with the goals and performance standards outlined in Section 5.5 of the report. However, USACE may request additional years of monitoring and formal reporting if the site has not met the goals and performance standards by Year 10. In compliance with 33 CFR 332.7(d)(2), the mitigation areas on the project site will be maintained in perpetuity by the landowner. In addition, a notice on title will be added to the property to ensure recognition of the wetland mitigation areas into the future. No additional reporting beyond the Year 10 As-Built is proposed at this time. The Contingency Plan is presented below in accordance with GHMC 18.08.150.A.8:

*Contingency/ maintenance activities may include, but are not limited to:*

1. Using plugs instead of seed for emergent vegetation coverage where seeded material does not become well-established;
2. Replacing plants lost to vandalism, drought, or disease, as necessary;
3. Replacing any plant species with a 20 percent or greater mortality rate after 2 growing seasons with the same species or native species of similar form and function;
4. Irrigating the mitigation areas only as necessary during dry weather if plants appear to be too dry, with a minimal quantity of water;
5. Reseeding and/or repair of wetland and buffer areas as necessary if erosion or sedimentation occurs;
6. Spot treat non-native invasive plant species;
7. Removing all trash or undesirable debris from the wetland and buffer areas as necessary, and
8. Removing additional shrub species or girdling additional trees to ensure better light penetration to herbaceous groundcover.

## **5.11 Performance Bonding**

Under GHMC 18.08.208, a performance bond or other form of security is required to assure that all actions described here within are satisfactorily completed in accordance with the mitigation plan, performance standards, and regulatory conditions of approval. The proposed compensatory wetland and wetland buffer mitigation actions will be completed concurrent with development activities included in the proposed project. As most mitigation actions are mechanical in nature they will be easily verifiable shortly after installation. The bond quantity will be determined in coordination with City of Gig Harbor staff.

## **5.12 Conservation Easement**

Long-term protection of the mitigation site shall be provided by the recording of a conservation easement on which development is prohibited and the easement is dedicated to the City of Gig Harbor, a conservation organization, land trust, or similarly preserved through a permanent protective mechanism acceptable to the City and the United States Army Corps of Engineers. The location and limitations associated with the wetlands, stream and their buffers shall be shown on the face of the

deed applicable to the property and shall be recorded with the Pierce County Auditor upon completion of construction of the created wetland.

## Chapter 6. References

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# Appendix A — Methods and Tools

**Table A-1. Methods and tools used to prepare the report.**

| Parameter                | Method or Tool                                                           | Website                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Reference                                                                                                                                                                                                                                                                                                                   |
|--------------------------|--------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Wetland Delineation      | USACE 1987 Wetland Delineation Manual                                    | <a href="http://el.erdc.usace.army.mil/elpubs/pdf/wlman87.pdf">http://el.erdc.usace.army.mil/elpubs/pdf/wlman87.pdf</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>Environmental Laboratory.</b> 1987. Corps of Engineers Wetlands Delineation Manual. Technical Report Y-87-1, US Army Engineer Waterways Experiment Station, Vicksburg, Mississippi.                                                                                                                                      |
|                          | Western Mountains, Valleys, and Coast Region Interim Regional Supplement | <a href="http://www.nws.usace.army.mil/PublicMenu/documents/REG/WMV_C_Version_2-0.pdf">http://www.nws.usace.army.mil/PublicMenu/documents/REG/WMV_C_Version_2-0.pdf</a>                                                                                                                                                                                                                                                                                                                                                                                                    | <b>U.S. Army Corps of Engineers.</b> 2010. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region, ed. J. S. Wakeley, R. W. Lichvar, and C. V. Noble. ERDC/EL TR-10-3. Vicksburg, MS: U.S. Army Engineer Research and Development Center.                   |
| Wetland Classification   | USFWS / Cowardin Classification System                                   | <a href="http://www.fws.gov/nwi/Pubs/Reports/Class_Manual/class_titlepgg.htm">http://www.fws.gov/nwi/Pubs/Reports/Class_Manual/class_titlepgg.htm</a>                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>Cowardin, L. M., V. Carter, F. C. Golet, E. T. LaRoe.</b> 1979. Classification of wetlands and deepwater habitats of the United States. Government Printing Office, Washington, D.C.                                                                                                                                     |
|                          | Hydrogeomorphic Classification (HGM) System                              | <a href="http://el.erdc.usace.army.mil/wetlands/pdfs/wrpde4.pdf">http://el.erdc.usace.army.mil/wetlands/pdfs/wrpde4.pdf</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>Brinson, M. M.</b> (1993). "A hydrogeomorphic classification for wetlands," Technical Report WRP-DE-4, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.                                                                                                                                                   |
|                          | Wetland Functions Characterization Tool for Linear Projects              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>WSDOT.</b> 2000. Wetland Functions Characterization Tool for Linear Projects.                                                                                                                                                                                                                                            |
| Wetland Rating           | Washington State Wetland Rating System                                   | <a href="http://www.ecy.wa.gov/biblio/0406025.html">http://www.ecy.wa.gov/biblio/0406025.html</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>Hruby.</b> 2014. Washington State wetland rating system for western Washington –Revised. Publication # 04-06-025.                                                                                                                                                                                                        |
|                          | Gig Harbor Code                                                          | <a href="http://www.mrsc.org/codes.aspx">http://www.mrsc.org/codes.aspx</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Gig Harbor Code, Title 18.08                                                                                                                                                                                                                                                                                                |
| Stream Delineation       | Federal Ordinary High Water Mark Definition                              | <a href="http://www.gpo.gov/fdsys/pkg/CFR-2011-title33-vol3/pdf/CFR-2011-title33-vol3-sec328-3.pdf">http://www.gpo.gov/fdsys/pkg/CFR-2011-title33-vol3/pdf/CFR-2011-title33-vol3-sec328-3.pdf</a>                                                                                                                                                                                                                                                                                                                                                                          | Congressional Federal Register 33 Part 328.3 Definition of Waters of the United States.                                                                                                                                                                                                                                     |
|                          | Second Review Draft State Ordinary High Water Mark Protocol              | <a href="http://www.ecy.wa.gov/pubs/0806001.pdf">http://www.ecy.wa.gov/pubs/0806001.pdf</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>Olson, P.</b> and E. Stockdale. 2010. Determining the Ordinary High Water Mark on Streams in Washington State. Second Review Draft. Washington State Department of Ecology, Shorelands & Environmental Assistance Program, Lacey, WA. Ecology Publication # 08-06-001.                                                   |
| Stream Classification    | Department of Natural Resources (DNR) Water Typing System                | <b>Forest Practices Water Typing:</b><br><a href="http://www.dnr.wa.gov/BusinessPermits/Topics/ForestPractices/Applications/Pages/fp_watertyping.aspx">http://www.dnr.wa.gov/BusinessPermits/Topics/ForestPractices/Applications/Pages/fp_watertyping.aspx</a><br><b>WAC 222-16-030:</b><br><a href="http://apps.leg.wa.gov/WAC/default.aspx?cite=222-16-030">http://apps.leg.wa.gov/WAC/default.aspx?cite=222-16-030</a><br><b>Water Type Mapping:</b><br><a href="http://fortress.wa.gov/dnr/app1/fpars/viewer.htm">http://fortress.wa.gov/dnr/app1/fpars/viewer.htm</a> | <b>Washington Administrative Code (WAC)</b> 222-16-030. DNR Water typing system.                                                                                                                                                                                                                                            |
|                          | Gig Harbor Code                                                          | <a href="http://www.mrsc.org/codes.aspx">http://www.mrsc.org/codes.aspx</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Gig Harbor Code, Title 18.08                                                                                                                                                                                                                                                                                                |
| Wetland Indicator Status | 2013 National Wetland Plant List                                         | <a href="http://wetland_plants.usace.army.mil/">http://wetland_plants.usace.army.mil/</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>Lichvar, R.W.</b> 2013. <i>The National Wetland Plant List</i> . 2013 wetland ratings. Phytoneuron 2013-49: 1-241.                                                                                                                                                                                                       |
| Plant Names              | USDA Plant Database                                                      | <a href="http://plants.usda.gov/">http://plants.usda.gov/</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Website (see Appendix A)                                                                                                                                                                                                                                                                                                    |
| Soils Data               | NRCS Soil Survey                                                         | <a href="http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx">http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx</a>                                                                                                                                                                                                                                                                                                                                                                                                                                          | Website GIS data based upon:<br><b>Zulauf, A.S.</b> 1979. Soil Survey of Pierce County, Washington. United States Department of Agriculture, Soil Conservation Service in cooperation with Washington State Department of Natural Resources, and Washington State University, Agriculture Research Center. Washington, D.C. |



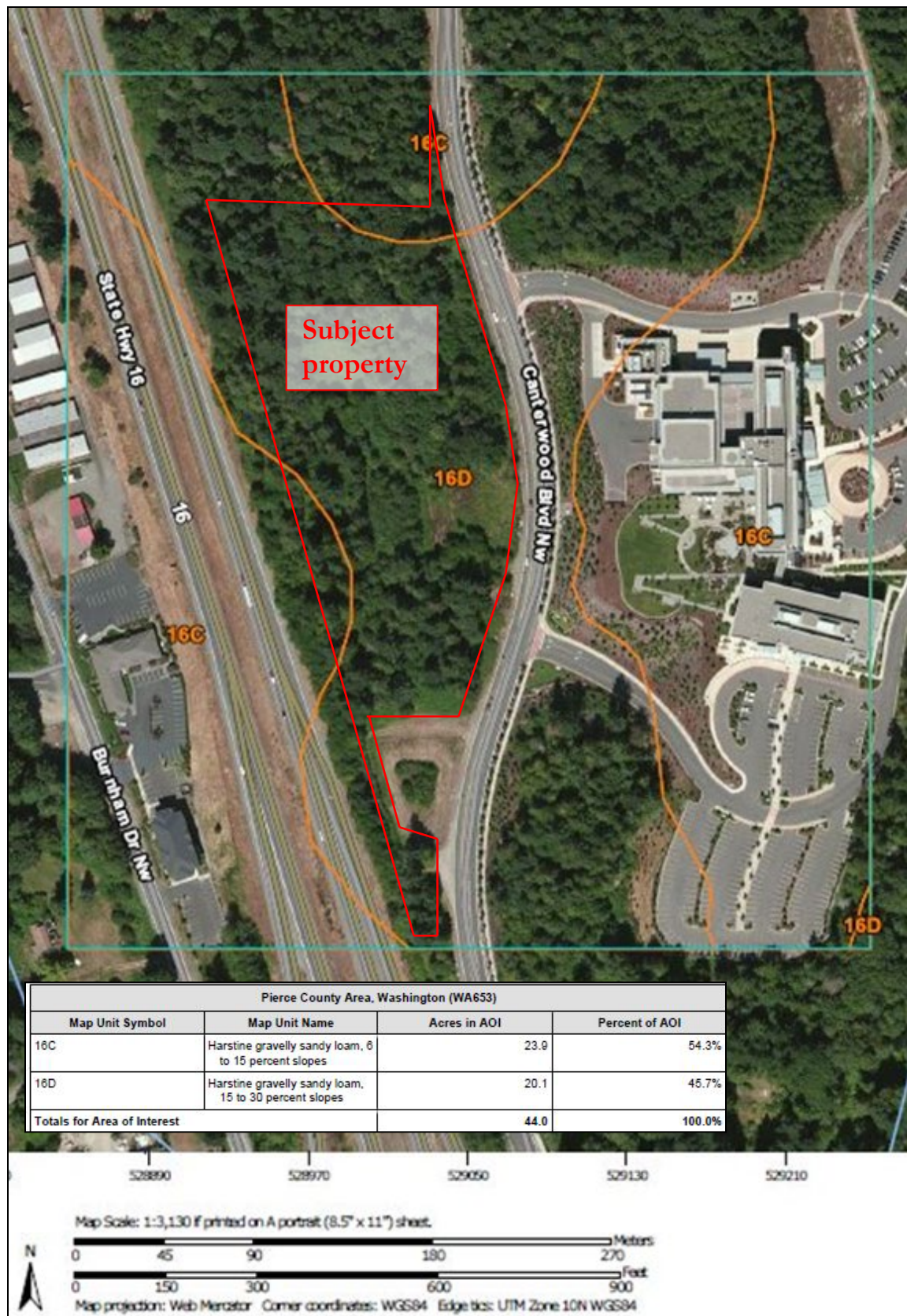
| Parameter                         | Method or Tool                           | Website                                                                                                                                                                                                                                                           | Reference                                                                                                                                                                                                                            |
|-----------------------------------|------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Hydric Soils Data                 | Pierce County Hydric Soils List          | <a href="http://www.wa.nrcs.usda.gov/technical/soils/hydric_lists/hydsoil-wa-653.pdf">http://www.wa.nrcs.usda.gov/technical/soils/hydric_lists/hydsoil-wa-653.pdf</a>                                                                                             | <b>Natural Resources Conservation Service.</b> 2001. Hydric Soils List: Pierce County, Washington. U.S. Department of Agriculture. Washington D.C.                                                                                   |
| Threatened and Endangered Species | Washington Natural Heritage Program      | <a href="http://www.dnr.wa.gov/Pages/default.aspx">http://www.dnr.wa.gov/Pages/default.aspx</a><br>and<br><a href="http://www1.dnr.wa.gov/nhp/refdesk/datasetsearch/wnhpwetlands.pdf">http://www1.dnr.wa.gov/nhp/refdesk/datasetsearch/wnhpwetlands.pdf</a>       | <b>Washington Natural Heritage Program</b> (Data published 11/04/11). Endangered, threatened, and sensitive plants of Washington. Washington State Department of Natural Resources, Washington Natural Heritage Program, Olympia, WA |
|                                   | Washington Priority Habitats and Species | <a href="http://wdfw.wa.gov/conservation/phs/maps_data/">http://wdfw.wa.gov/conservation/phs/maps_data/</a>                                                                                                                                                       | <b>Priority Habitats and Species (PHS) Program</b> (Data produced 08/13/09). Map of priority habitats and species in project vicinity. Washington Department of Fish and Wildlife (WDFW).                                            |
|                                   | NOAA fisheries species list and maps     | <a href="http://www.nwr.noaa.gov/ESA-Salmon-Listings/Salmon-Populations/Index.cfm">http://www.nwr.noaa.gov/ESA-Salmon-Listings/Salmon-Populations/Index.cfm</a><br>and<br><a href="http://www.nmfs.noaa.gov/pr/species/">http://www.nmfs.noaa.gov/pr/species/</a> | Website                                                                                                                                                                                                                              |
|                                   | USFWS species lists by County            | <a href="http://www.fws.gov/endangered/?s8fid=112761032793&amp;s8fid=112762573903&amp;countyName=Pierce+County">http://www.fws.gov/endangered/?s8fid=112761032793&amp;s8fid=112762573903&amp;countyName=Pierce+County</a>                                         | Website                                                                                                                                                                                                                              |
| Species of Local Importance       | WDFW GIS Data                            | <a href="http://wdfw.wa.gov/conservation/phs/maps_data/">http://wdfw.wa.gov/conservation/phs/maps_data/</a>                                                                                                                                                       | Website                                                                                                                                                                                                                              |
| Report Preparation                | Gig Harbor Code                          | <a href="http://www.mrsc.org/codes.aspx">http://www.mrsc.org/codes.aspx</a>                                                                                                                                                                                       | Gig Harbor Code, Title 18.08                                                                                                                                                                                                         |

## Appendix B — Background Information

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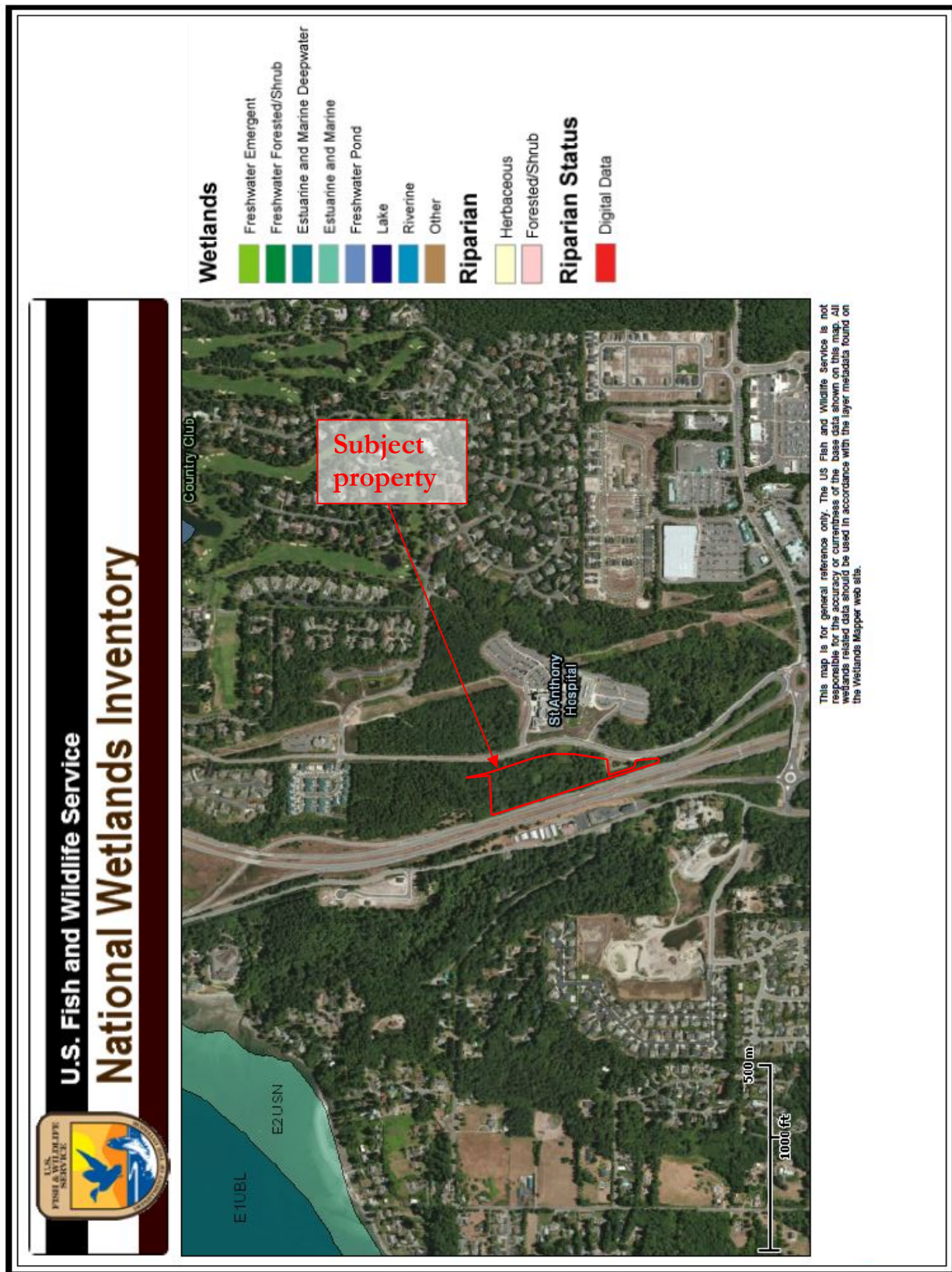
This Appendix includes an NRCS Soil Survey Map (B1), a USFWS National Wetlands Inventory Map (B2), Pierce County Hydric Soil and Wetland Inventory (B3), a WDFW Priority Habitat Species Database Map (B4), a WDFW SalmonScape map for Fall Chinook (B5), and a WDFW SalmonScape map for Winter Steelhead (B6).

## Appendix B1. NRCS Soil Survey Map

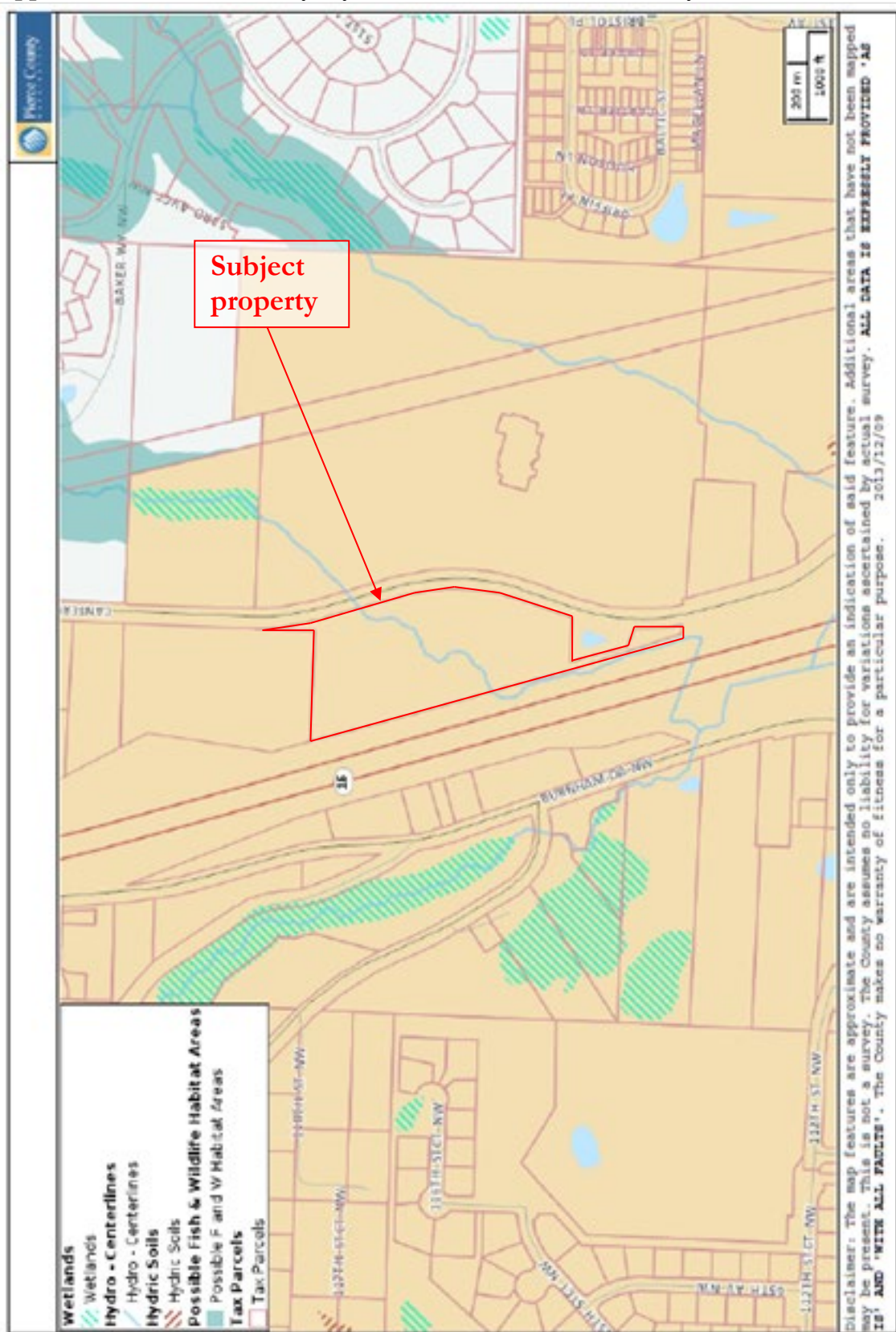




## Appendix B2. USFWS National Wetlands Inventory Map



## Appendix B3. Pierce County Hydric Soil and Wetland Inventory



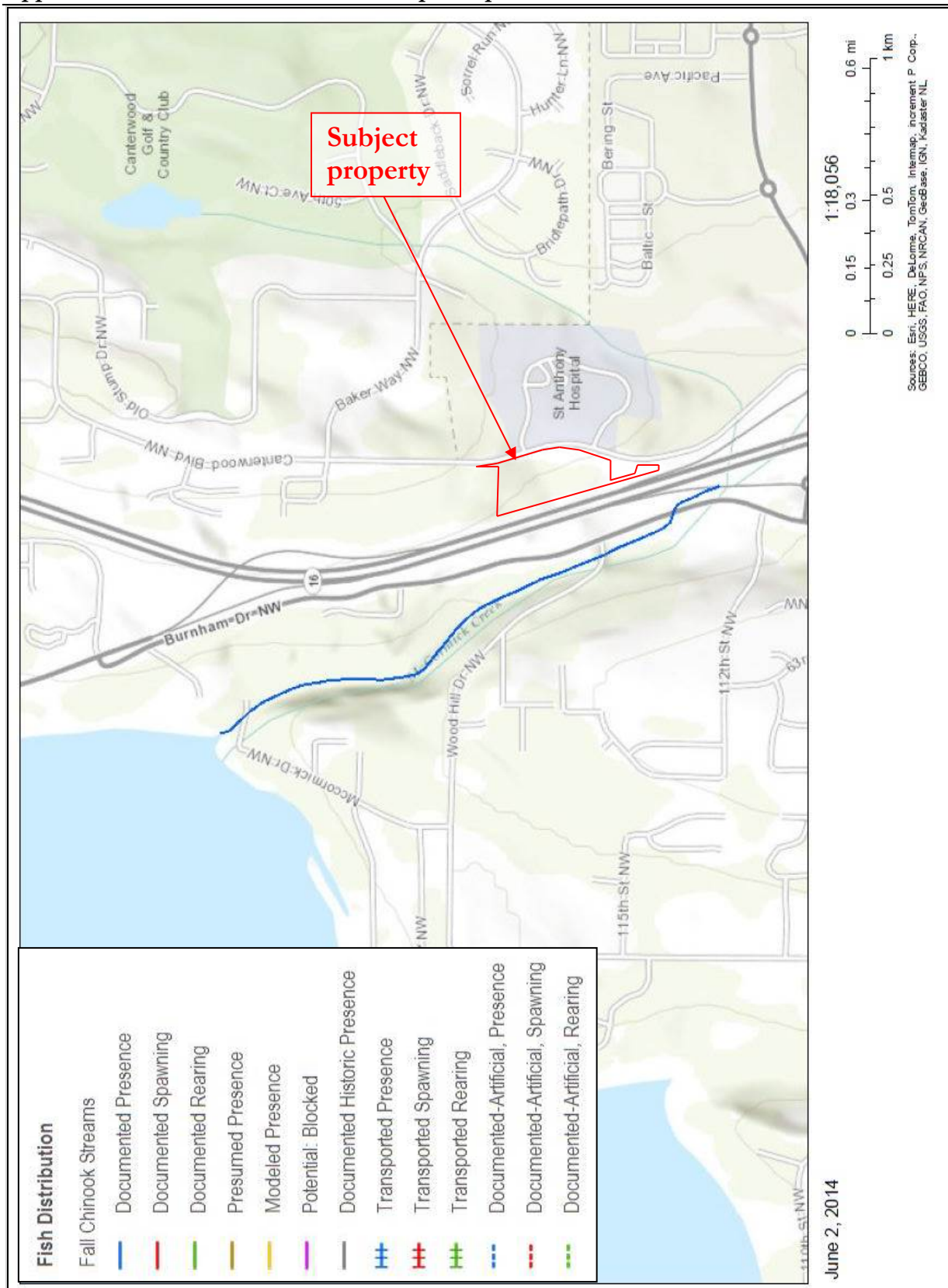


## Appendix B4. WDFW Priority Habitats and Species Map

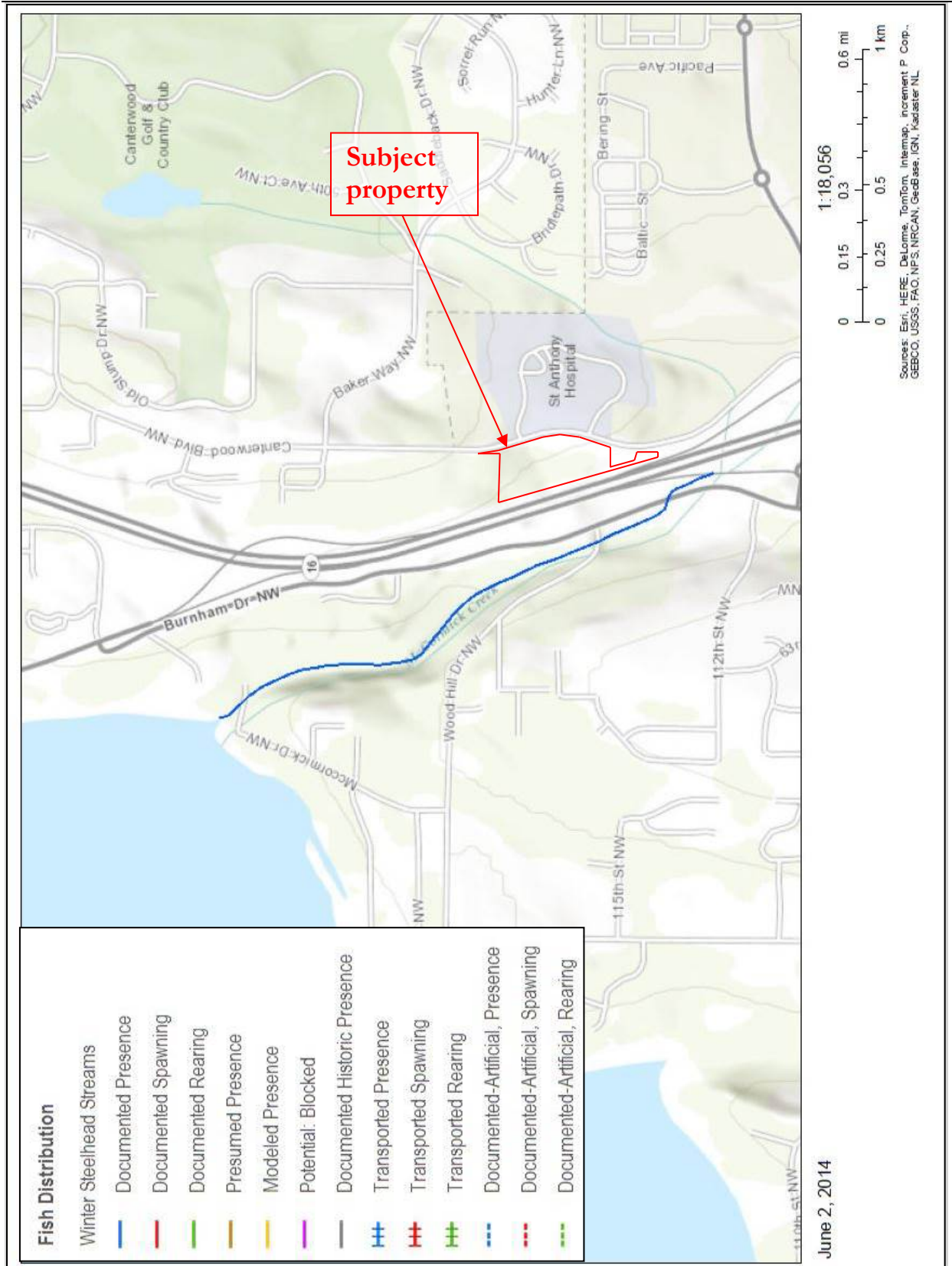




## Appendix B5. Fall Chinook SalmonScape Map



## Appendix B6. Winter Steelhead SalmonScape Map

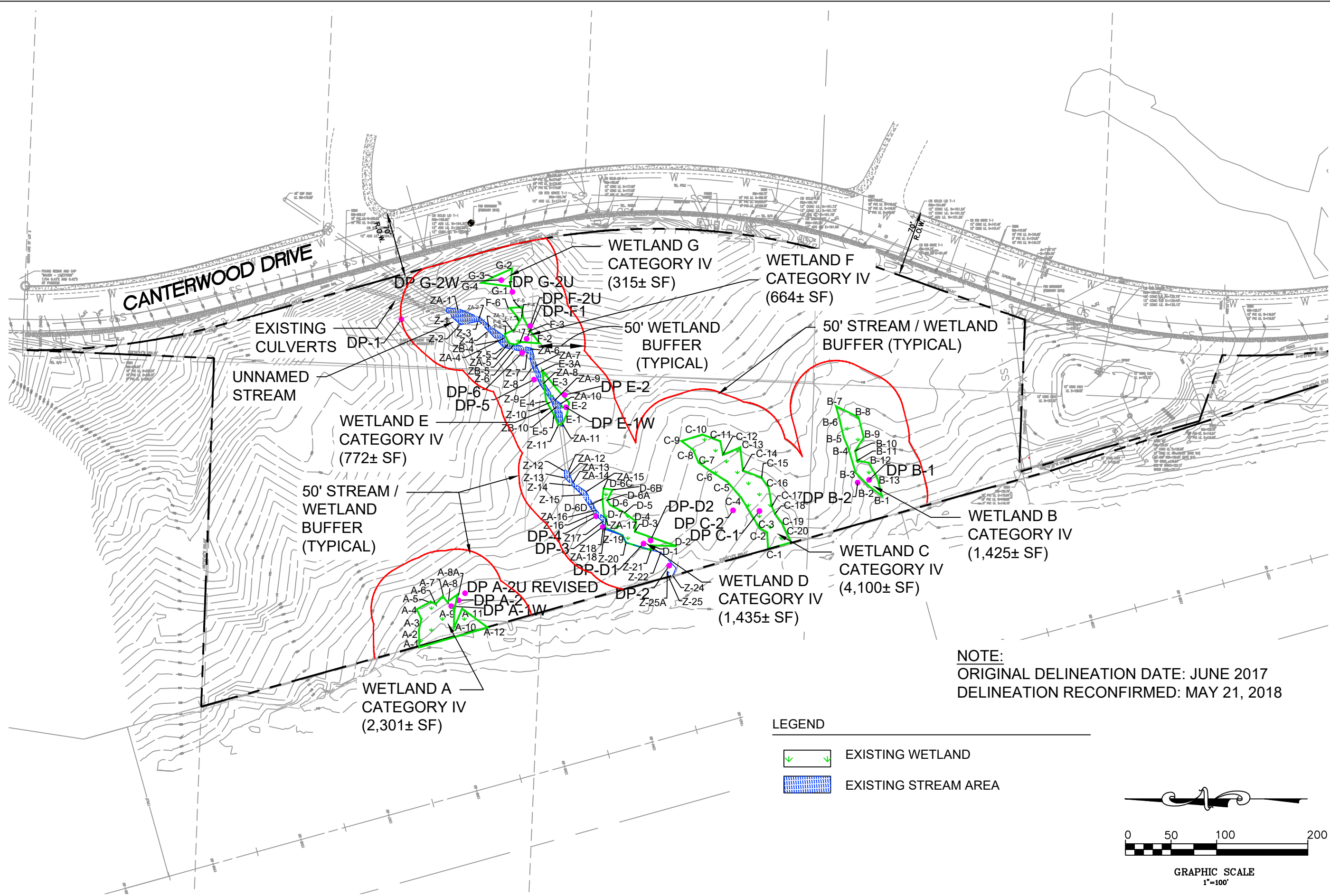


## Appendix C — Site Plans

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CANTERWOOD COMMERCIAL - SITE CONDITIONS



NOTE:  
ORIGINAL DELINEATION DATE: JUNE 2017  
DELINEATION RECONFIRMED: MAY 21, 2018

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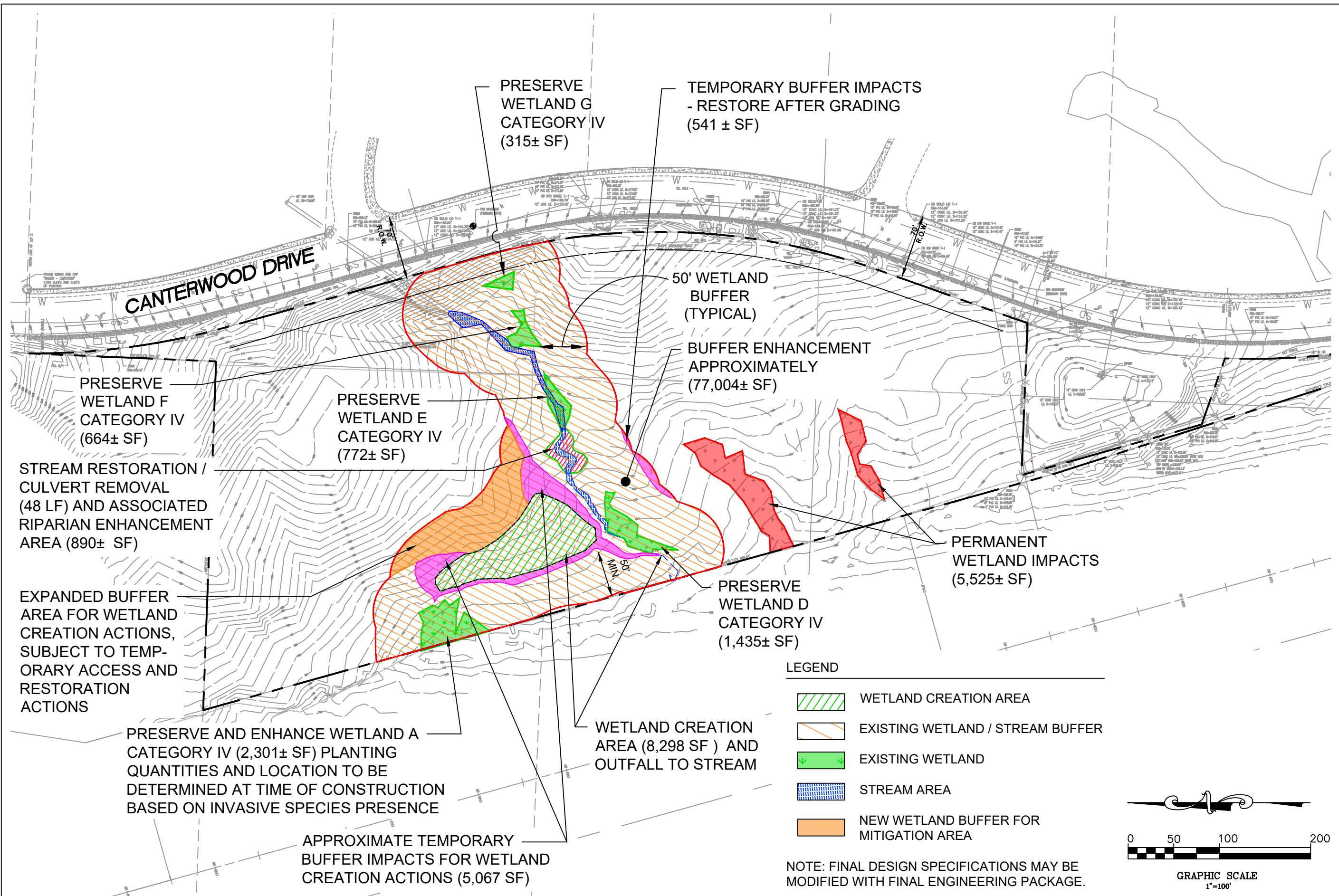
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GIG HARBOR, WASHINGTON 98335  
P: 253.514.8952  
F: 253.514.8954  
WWW.SOUNDVIEWCONSULTANTS.COM

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PORTIONS OF THE SE 1/4 OF SECTION 25,  
TOWNSHIP 22N, RANGE 01E, W.M.

DATE: 9/24/2019  
JOB: 1193.0001  
BY: JR/DS/DB  
SCALE: 1" = 100'  
SHEET 1 OF 6



# CANTERWOOD COMMERCIAL - MITIGATION/IMPACT OVERLAY



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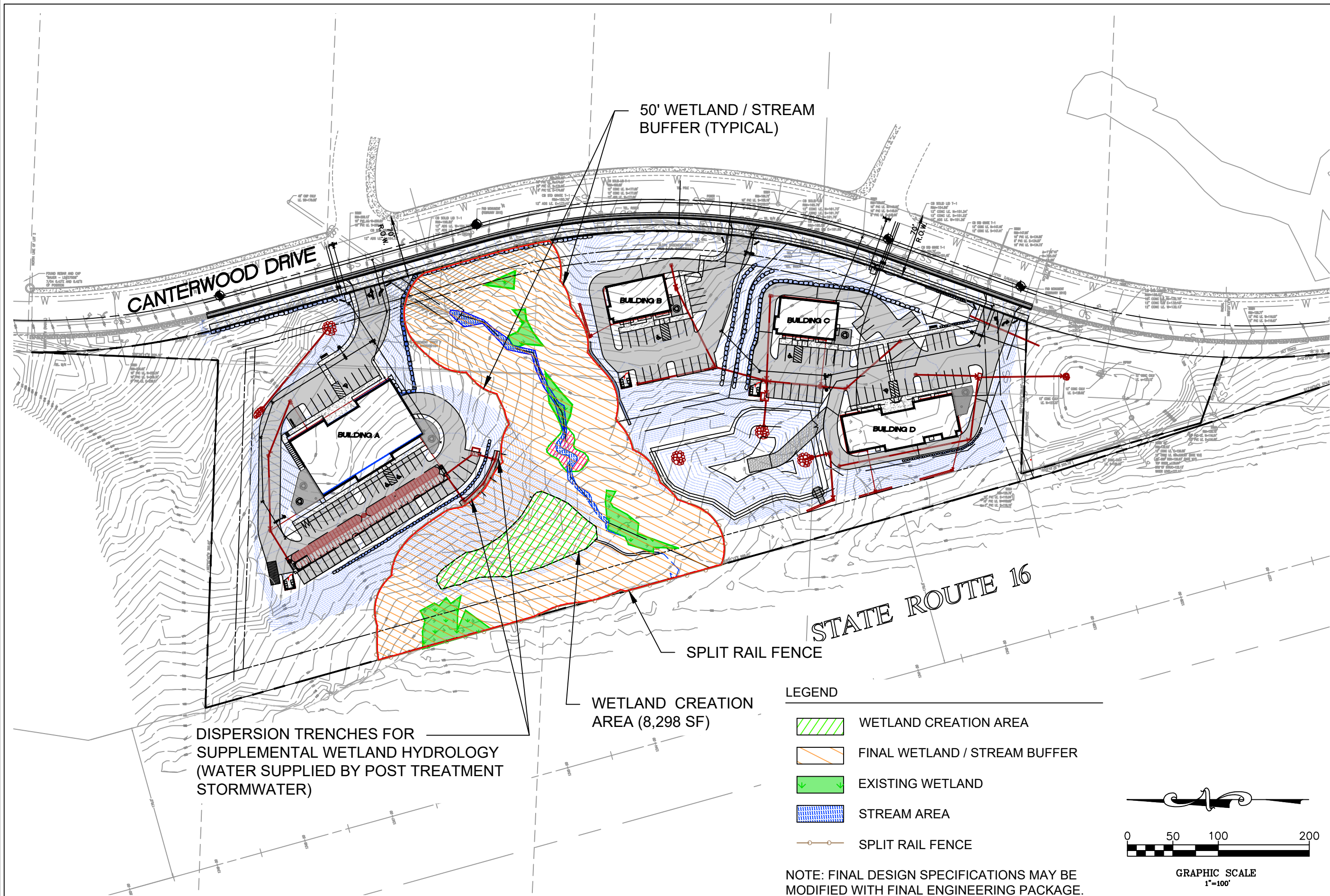
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SCALE: 1" = 100'  
SHEET 2 OF 6



CANTERWOOD COMMERCIAL - PROPOSED PLAN



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BY: KM/JR/DS

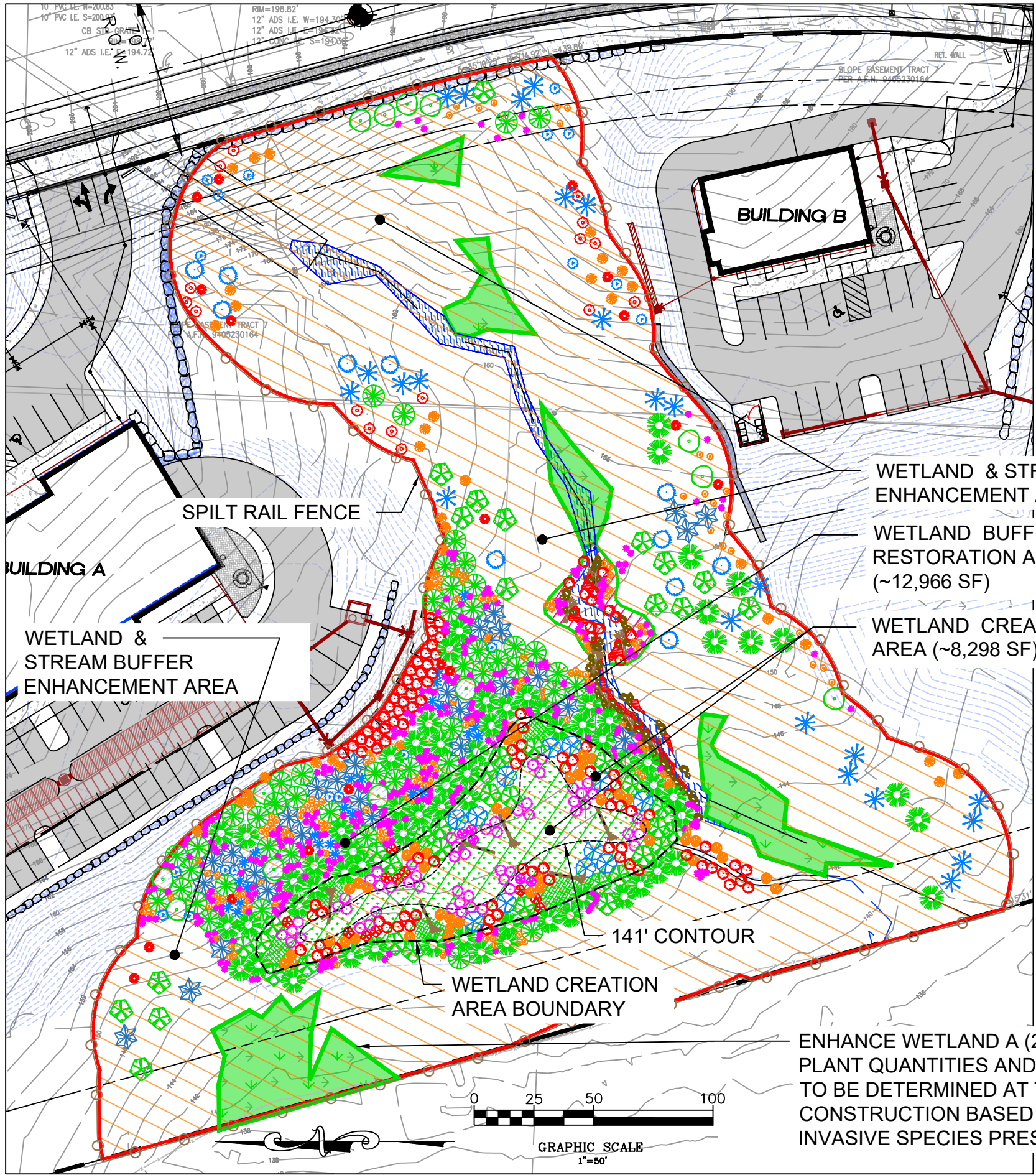
SCALE: 1" = 100'

SHEET 3 OF 6

GRAPHIC SCALE  
1"=100'



CANTERWOOD COMMERCIAL - CONCEPTUAL PLANTING PLAN



- NATIVE PLANT SYMBOL LEGEND**
- TREES**
- ACER MACROPHYLLUM / BIG LEAF MAPLE
  - PICEA SITCHENSIS / SITKA SPRUCE
  - PRUNUS EMARGINATA / BITTER CHERRY
  - PSEUDOTSUGA MENZIESII / DOUGLAS FIR
  - SALIX LUCIDA / PACIFIC WILLOW
  - THUJA PLICATA / WESTERN RED CEDAR
  - TSUGA HETEROPHYLLA / WESTERN HEMLOCK
- SHRUBS**
- ACER CIRCINATUM / VINE MAPLE
  - CORNUS SERICEA / RED-OSIER DOGWOOD
  - CORYLUS CORNUTA / WESTERN HAZELNUT
  - GAULTHERIA SHALLON / SALAL
  - MALUS FUSCA / PACIFIC CRABAPPLE
  - OEMLARIA CERASIFORMIS / INDIAN PLUM
  - PHYSOCARPUS CAPITATUS / PACIFIC NINEBARK
  - POLYSTICHUM MUNITUM / WESTERN SWORD FERN
  - RIBES SANGUINEUM / RED FLOWERING CURRANT
  - ROSA NUTKANA / NOOTKA ROSE
  - SALIX SITCHENSIS / SITKA WILLOW
  - SPIREA DOUGLASII / DOUGLAS SPIREA
- HERBACEOUS**
- ATHYRIUM FILIX-FEMINA / LADY FERN
  - MIX OF: CAREX OBNUPTA / SLOUGH SEDGE - AND - SCIRPUS MICROCARPUS / SMALL-FRUITED BULRUSH

**NOTES:**  
BUFFER SEED MIX TO BE APPLIED IN ENTIRE BUFFER RESTORATION AREA, AND IN ALL DISTURBED BUFFER AREAS.

WETLAND SEED MIX TO BE APPLIED IN WETLAND CREATION AREA OUTSIDE THE 141' CONTOUR, PLUGS TO BE PLANTED WITHIN THE 141' CONTOUR AREA.

ALL PLANT LOCATIONS ARE ILLUSTRATIVE AND INTENDED TO BE TYPICAL FOR THE SITE. ALL SPECIES TO BE FIELD LOCATED AND FINAL QUANTITIES TO BE DETERMINED IN COORDINATION WITH PROJECT WETLAND SCIENTIST PRIOR TO INSTALLATION.

FINAL DESIGN SPECIFICATIONS MAY BE MODIFIED WITH FINAL ENGINEERING PACKAGE.

- LEGEND:**
- PARTIALLY BURIED LARGE WOODY DEBRIS
  - BOULDERS
  - STORMWATER DISPERSION TRENCH
  - SPLIT RAIL FENCE
  - WETLAND / STREAM BUFFER
  - EXISTING WETLAND
  - STREAM AREA

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(425)251-8782

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DATE: 9/24/2019

JOB: 1193.0001

BY: JR/DS/DB

SCALE: AS NOTED

SHEET 4 OF 6



CANTERWOOD COMMERCIAL - NATIVE PLANT SCHEDULE

NATIVE PLANT SCHEDULE

| Plant Name                                                                                                                                 |                       |              | Planting Area           |                                   |                                                     | Total             | Spacing    | Size                                                   | Condition | Planting Conditions |
|--------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|--------------|-------------------------|-----------------------------------|-----------------------------------------------------|-------------------|------------|--------------------------------------------------------|-----------|---------------------|
| Scientific                                                                                                                                 | Common                | Plant Status | Wetland Creation Area A | Wetland Buffer Restoration Area B | Wetland Buffer and Stream Buffer Enhancement Area C |                   |            |                                                        |           |                     |
| Tree                                                                                                                                       |                       | SF:          | 8,298                   | 12,966                            | 65,315                                              | 86,579            |            |                                                        |           |                     |
| Acer macrophyllum                                                                                                                          | Big leaf maple        | FACU         | 0                       | 6                                 | 7                                                   | 13                | 10 - 12 ft | 3 - 4 ft                                               | Bare root | Dry                 |
| Picea sitchensis                                                                                                                           | Sitka spruce          | FAC          | 21                      | 7                                 | 16                                                  | 44                | 12 - 15 ft | 3 - 4 ft                                               | Bare root | Moist               |
| Prunus emarginata                                                                                                                          | Bitter cherry         | FACU         | 0                       | 0                                 | 11                                                  | 11                | 10 - 12 ft | 3 - 4 ft                                               | Bare root | Dry                 |
| Pseudotsuga menziesii                                                                                                                      | Douglas fir           | FACU         | 0                       | 44                                | 4                                                   | 48                | 10 - 12 ft | 3 - 4 ft                                               | Bare root | Dry                 |
| Salix lucida (lasianдра)                                                                                                                   | Pacific willow        | FACW         | 12                      | 0                                 | 0                                                   | 12                | 8 - 10 ft  | 3 - 4 ft                                               | Stakes    | Wet                 |
| Thuja plicata                                                                                                                              | Western red cedar     | FAC          | 0                       | 58                                | 11                                                  | 69                | 10 - 12 ft | 3 - 4 ft                                               | Bare root | Moist               |
| Tsuga heterophylla                                                                                                                         | Western hemlock       | FACU         | 0                       | 23                                | 5                                                   | 28                | 10 - 12 ft | 3 - 4 ft                                               | Bare root | Moist               |
| Total                                                                                                                                      |                       |              | 33                      | 138                               | 54                                                  | 225               |            |                                                        |           |                     |
| Shrubs                                                                                                                                     |                       |              |                         |                                   |                                                     |                   |            |                                                        |           |                     |
| Acer circinatum                                                                                                                            | Vine maple            | FAC          | 0                       | 25                                | 24                                                  | 49                | 4 - 5 ft   | 2 - 4 ft                                               | Bare root | Dry/Moist           |
| Cornus sericea                                                                                                                             | Red-twig dogwood      | FACW         | 46                      | 48                                | 13                                                  | 107               | 4 - 5 ft   | 2 - 4 ft                                               | Bare root | Moist/Wet           |
| Corylus cornuta                                                                                                                            | Beaked hazelnut       | FACU         | 0                       | 15                                | 22                                                  | 37                | 4 - 5 ft   | 2 - 4 ft                                               | Bare root | Moist/Wet           |
| Gaultheria shallon                                                                                                                         | Salal                 | FACU         | 0                       | 108                               | 39                                                  | 147               | 4 - 5 ft   | 2 - 4 ft                                               | Bare root | Dry                 |
| Malus fusca                                                                                                                                | Pacific crabapple     | FACW         | 10                      | 1                                 | 0                                                   | 11                | 8 - 10 ft  | 3 - 4 ft                                               | Bare root | Wet                 |
| Oemleria cerasiformis                                                                                                                      | Indian plum           | FACU         | 0                       | 9                                 | 10                                                  | 19                | 4 - 5 ft   | 2 - 4 ft                                               | Bare root | Dry                 |
| Physocarpus capitatus                                                                                                                      | Pacific ninebark      | FACW         | 5                       | 0                                 | 0                                                   | 5                 | 4 - 5 ft   | 2 - 4 ft                                               | Bare root | Moist/Wet           |
| Polystichum munitum                                                                                                                        | Western swordfern     | FACU         | 0                       | 281                               | 44                                                  | 325               | 4 - 5 ft   | 2 - 4 ft                                               | Bare root | Dry/Moist           |
| Ribes sanguineum                                                                                                                           | Red-flowering currant | FACU         | 0                       | 5                                 | 12                                                  | 17                | 4 - 5 ft   | 2 - 4 ft                                               | Bare root | Dry/Moist           |
| Rosa nutkana                                                                                                                               | Nootka rose           | FAC          | 0                       | 0                                 | 16                                                  | 16                | 4 - 5 ft   | 2 - 4 ft                                               | Bare root | Dry                 |
| Salix sitchensis                                                                                                                           | Sitka willow          | FACW         | 37                      | 7                                 | 50                                                  | 94                | 4 - 5 ft   | 2 - 4 ft                                               | Stakes    | Moist/Wet           |
| Spirea douglasii                                                                                                                           | Douglas Spirea        | FACW         | 54                      | 0                                 | 0                                                   | 54                | 4 - 5 ft   | 2 - 4 ft                                               | Bare root | Moist/Wet           |
| Total                                                                                                                                      |                       |              | 152                     | 499                               | 230                                                 | 881               |            |                                                        |           |                     |
| Herbaceous                                                                                                                                 |                       |              |                         |                                   |                                                     |                   |            |                                                        |           |                     |
| Athyrium filix-femina                                                                                                                      | Lady fern             | FAC          | 134                     | 0                                 | 0                                                   | 134               | 24" o.c.   | 4"                                                     | Plugs     | Dry/Moist           |
| Carex obnupta                                                                                                                              | Slough sedge          | OBL          | 366                     | 0                                 | 0                                                   | 366               | 24" o.c.   | 4"                                                     | Plugs     | Moist/Wet           |
| Scirpus microcarpus                                                                                                                        | Small-fruited bulrush | OBL          | 366                     | 0                                 | 0                                                   | 366               | 24" o.c.   | 4"                                                     | Plugs     | Moist/Wet           |
| Total                                                                                                                                      |                       |              | 866                     | 0                                 | 0                                                   | 866               |            |                                                        |           |                     |
| Habitat Structures                                                                                                                         |                       |              |                         |                                   |                                                     |                   |            |                                                        |           |                     |
| Large Woody Debris                                                                                                                         |                       | Quan.        | 6                       | 0                                 | 0                                                   | 6                 | Clean      | 16' - 20' long, 8" min. at top, with root wad attached |           |                     |
| Large Woody Debris                                                                                                                         |                       | Quan.        | 0                       | 0                                 | 7                                                   | 7                 | Clean      | 8' - 12' long, 8" min. at top, with root wad attached  |           |                     |
| Seed Mix                                                                                                                                   |                       |              |                         |                                   |                                                     |                   |            |                                                        |           |                     |
| Wetland Seed Mix @ 30 lbs/acre                                                                                                             |                       |              | % by wt.                |                                   | Buffer Seed Mix @ 30 lbs/acre                       |                   |            |                                                        |           |                     |
| Carex obnupta                                                                                                                              | Slough sedge          | OBL          | 10                      |                                   | Agrostis exarata                                    | Spike bentgrass   |            | FACW                                                   | 10        |                     |
| Festuca rubra                                                                                                                              | Red Fescue            | FAC          | 5                       |                                   | Deschampsia cespitosa                               | Tufted hairgrass  |            | FACW                                                   | 10        |                     |
| Glyceria borealis                                                                                                                          | Northern mannagrass   | OBL          | 15                      |                                   | Deschampsia dantbonioides                           | Annual hairgrass  |            | FACW                                                   | 10        |                     |
| Hordeum brachyantherum                                                                                                                     | Meadow barley         | FACW         | 10                      |                                   | Deschampsia elongata                                | Slender hairgrass |            | FAC                                                    | 10        |                     |
| Juncus tenuis                                                                                                                              | Slender rush          | FAC          | 40                      |                                   | Elymus glaucus                                      | Blue wildrye      |            | FACU                                                   | 25        |                     |
| Trifolium wormskioldii                                                                                                                     | Springbank clover     | FACW         | 5                       |                                   | Hordeum brachyantherum                              | Meadow barley     |            | FACW                                                   | 25        |                     |
| Scirpus microcarpus                                                                                                                        | Small tufted bulrush  | OBL          | 5                       |                                   | Lupinus polyphyllus                                 | Streamside lupine |            | FAC                                                    | 10        |                     |
|                                                                                                                                            |                       | Total        | 90                      |                                   |                                                     |                   |            | Total                                                  | 100       |                     |
| 1 - Scientific names and species identification taken from Flora of the Pacific Northwest (Hitchcock and Cronquist, 1973 and Cooke, 1997). |                       |              |                         |                                   |                                                     |                   |            |                                                        |           |                     |
| 2 - Over-sized and/or container plants are suitable for replacement pending project biologist's approval.                                  |                       |              |                         |                                   |                                                     |                   |            |                                                        |           |                     |
| 3 - All plans and schedules are subject to regulatory review and impact analysis.                                                          |                       |              |                         |                                   |                                                     |                   |            |                                                        |           |                     |
| 4 - Plant quantities may need to be adjusted based on the number of plants required for Wetland A enhancement.                             |                       |              |                         |                                   |                                                     |                   |            |                                                        |           |                     |

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KENT, WA 98032  
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PORTIONS OF THE SE ¼ OF SECTION 25,  
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DATE: 9/24/2019

JOB: 1193.0001

BY: JR/DS

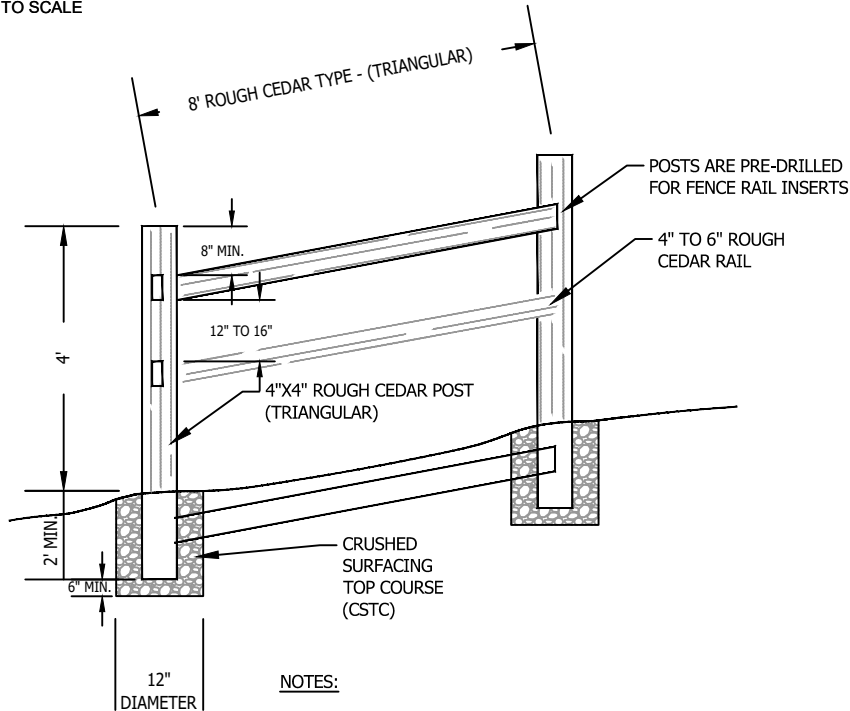
SCALE: AS NOTED

SHEET 5 OF 6

# CANTERWOOD COMMERCIAL - NATIVE PLANT DETAILS

## SPLIT RAIL FENCE DETAIL

NOT TO SCALE



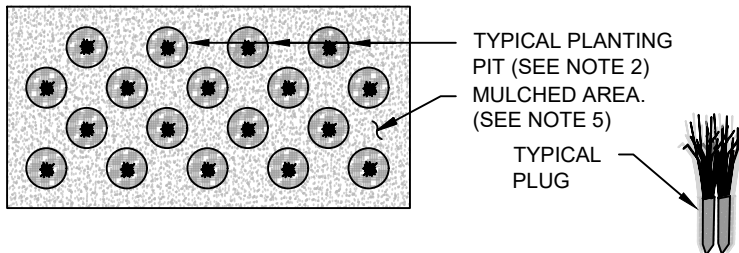
### PLUG PLANTING DETAIL (TYPICAL)

NOT TO SCALE

NOTES:

1. PLANT HERBACEOUS PLUGS STAGGERED 2'-0" O.C.
2. EXCAVATE PLANTING PIT TO 6" DIA. AND ADEQUATE DEPTH.
3. FORM A RING OF SOIL AROUND THE EDGE OF EACH PLANTING PIT.
4. WATER IMMEDIATELY AFTER INSTALLATION.
5. AFTER PLANTING IS COMPLETE PLACE 3 TO 4 INCHES OF MULCH IN BUFFER ESTABLISHMENT AREA.

### PLAN VIEW OF TYPICAL PLUG INSTALLATION



## TREE AND SHRUB PLANTING DETAIL (TYPICAL)

NOT TO SCALE

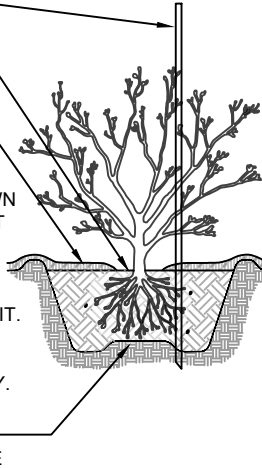
LOCATOR LATH (IF SPECIFIED)

SET TOP OF ROOT MASS / ROOT BALL FLUSH  
WITH FINISH GRADE OR SLIGHTLY ABOVE

3 to 4 INCH LAYER OF MULCH - KEEP MULCH  
MIN. 3" AWAY FROM TRUNK OF SHRUB

NOTES:

1. PLANT SHRUBS OF THE SAME SPECIES IN GROUPS OF 3 to 9 as APPROPRIATE, OR AS SHOWN ON PLAN. AVOID INSTALLING PLANTS IN STRAIGHT LINES TO ACHIEVE A NATURAL-LOOKING LAYOUT.
2. EXCAVATE PIT TO FULL DEPTH OF ROOT MASS AND 2 X ROOT MASS DIAMETER. SPREAD ROOTS TO FULL WIDTH OF CANOPY. SCARIFY SIDES OF PIT.
3. MIDWAY THROUGH PLANTING ADD AGROFORM TABLET AND WATER THOROUGHLY.
4. BACKFILL TO BE COMPACTED USING WATER ONLY.
5. WATER IMMEDIATELY AFTER INSTALLATION.



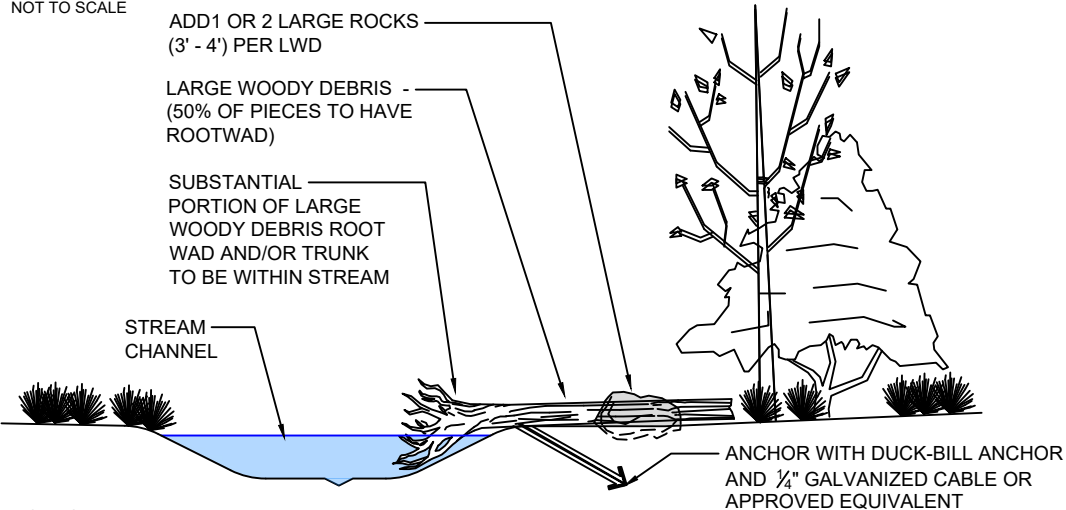
## LARGE WOODY DEBRIS DETAIL

NOT TO SCALE

ADD 1 OR 2 LARGE ROCKS  
(3' - 4') PER LWD

LARGE WOODY DEBRIS -  
(50% OF PIECES TO HAVE  
ROOTWAD)

SUBSTANTIAL \_\_\_\_\_  
PORTION OF LARGE  
WOODY DEBRIS ROOT  
WAD AND/OR TRUNK  
TO BE WITHIN STREAM



NOTES:

1. ALL IN-STREAM LARGE WOODY DEBRIS SHALL CONSIST OF CEDAR OR FIR WITH MINIMAL EVIDENCE OF DECAY. SIZES SHALL BE AS INDICATED IN THE PLANT SCHEDULE.
2. ROOTWADS SHALL HAVE A RELATIVELY EVEN SPREAD OF ROOTS WITH A MINIMUM ROOTBALL DIAMETER OF THREE (3) FEET. ROOTWADS SHALL BE CLEANED PRIOR TO PLACEMENT IN THE CHANNEL.

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KENT, WA 98032  
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DATE: 9/24/2019

JOB: 1193.0001

BY: JR/DS

SCALE: AS NOTED

SHEET 6 OF 6



## Appendix D — Wetland Data Forms

---

Project/Site: 1193.0002 - Canterwood Phase II City/County: Gig Harbor / Pierce Sampling Date: 05/29/2018  
Applicant/Owner: Swede Hill LLC State: WA Sampling Point: DP-1U  
Investigator(s): Erin Harker Section, Township, Range: 25, 22N, 01E  
Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 10  
Subregion (LRR): A2 Lat: 47.3629429 Long: -122.6141655 Datum: C  
Soil Map Unit Name: Harstine gravelly ashy sandy loam NWI classification: N/A

Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ naturally problematic? (If needed, explain any answers in Remarks.)

|                                                                                                                          |                                                                     |                                                  |                                                          |
|--------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|--------------------------------------------------|----------------------------------------------------------|
| Hydrophytic Vegetation Present?                                                                                          | Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> | <b>Is the Sampled Area<br/>within a Wetland?</b> | Yes <input type="checkbox"/> No <input type="checkbox"/> |
| Hydric Soil Present?                                                                                                     | Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> |                                                  |                                                          |
| Wetland Hydrology Present?                                                                                               | Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> |                                                  |                                                          |
| Remarks:<br><b>Not all three wetland criteria were observed. Associated with DP-B2 from the 2015 site investigation.</b> |                                                                     |                                                  |                                                          |

| Tree Stratum (Plot size: 30 ft)                                                   |                  |                   |                  | Dominance Test worksheet:                                                                                                   |  |
|-----------------------------------------------------------------------------------|------------------|-------------------|------------------|-----------------------------------------------------------------------------------------------------------------------------|--|
|                                                                                   | Absolute % Cover | Dominant Species? | Indicator Status |                                                                                                                             |  |
| 1. Thuja plicata                                                                  | 100              | Yes               | FAC              | Number of Dominant Species That Are OBL, FACW, or FAC: <u>2</u> (A)                                                         |  |
| 2. _____                                                                          | _____            | _____             | _____            | Total Number of Dominant Species Across All Strata: <u>3</u> (B)                                                            |  |
| 3. _____                                                                          | _____            | _____             | _____            | Percent of Dominant Species That Are OBL, FACW, or FAC: <u>67%</u> (A/B)                                                    |  |
| 4. _____                                                                          | _____            | _____             | _____            |                                                                                                                             |  |
|                                                                                   |                  |                   |                  | <b>Prevalence Index worksheet:</b>                                                                                          |  |
| Sapling/Shrub Stratum (Plot size: 15 ft)                                          |                  |                   |                  | Total % Cover of: _____ Multiply by: _____                                                                                  |  |
| 1. Thuja plicata                                                                  | 25               | Yes               | FAC              | OBL species <u>0</u> x 1 = <u>0</u>                                                                                         |  |
| 2. _____                                                                          | _____            | _____             | _____            | FACW species <u>0</u> x 2 = <u>0</u>                                                                                        |  |
| 3. _____                                                                          | _____            | _____             | _____            | FAC species <u>125</u> x 3 = <u>375</u>                                                                                     |  |
| 4. _____                                                                          | _____            | _____             | _____            | FACU species <u>75</u> x 4 = <u>300</u>                                                                                     |  |
| 5. _____                                                                          | _____            | _____             | _____            | UPL species <u>5</u> x 5 = <u>25</u>                                                                                        |  |
|                                                                                   |                  |                   |                  | Column Totals: <u>205</u> (A) <u>700</u> (B)                                                                                |  |
| Herb Stratum (Plot size: 5 ft)                                                    |                  |                   |                  | Prevalence Index = B/A = <u>3.41</u>                                                                                        |  |
| 1. Polystichum munitum                                                            | 70               | Yes               | FACU             | <b>Hydrophytic Vegetation Indicators:</b>                                                                                   |  |
| 2. Rubus ursinus                                                                  | 5                | No                | FACU             | <input type="checkbox"/> Rapid Test for Hydrophytic Vegetation                                                              |  |
| 3. Mahonia repens                                                                 | 5                | No                | UPL              | <input checked="" type="checkbox"/> Dominance Test is >50%                                                                  |  |
| 4. _____                                                                          | _____            | _____             | _____            | <input type="checkbox"/> Prevalence Index is ≤3.0 <sup>1</sup>                                                              |  |
| 5. _____                                                                          | _____            | _____             | _____            | <input type="checkbox"/> Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet) |  |
| 6. _____                                                                          | _____            | _____             | _____            | <input type="checkbox"/> Wetland Non-Vascular Plants <sup>1</sup>                                                           |  |
| 7. _____                                                                          | _____            | _____             | _____            | <input type="checkbox"/> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)                                          |  |
| 8. _____                                                                          | _____            | _____             | _____            | <sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.              |  |
| 9. _____                                                                          | _____            | _____             | _____            |                                                                                                                             |  |
| 10. _____                                                                         | _____            | _____             | _____            |                                                                                                                             |  |
| 11. _____                                                                         | _____            | _____             | _____            |                                                                                                                             |  |
| Woody Vine Stratum (Plot size: 30 ft)                                             |                  |                   |                  | <b>Hydrophytic Vegetation Present?</b> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>                  |  |
| 1. _____                                                                          | _____            | _____             | _____            |                                                                                                                             |  |
| 2. _____                                                                          | _____            | _____             | _____            |                                                                                                                             |  |
| % Bare Ground in Herb Stratum <u>20</u>                                           |                  |                   |                  |                                                                                                                             |  |
| Remarks: Hydrophytic vegetation criteria was observed through the dominance test. |                  |                   |                  |                                                                                                                             |  |

## SOIL

Sampling Point: DP-1U

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth<br>(inches) | Matrix        |     | Redox Features |   |                   | Loc <sup>2</sup> | Texture | Remarks    |
|-------------------|---------------|-----|----------------|---|-------------------|------------------|---------|------------|
|                   | Color (moist) | %   | Color (moist)  | % | Type <sup>1</sup> |                  |         |            |
| 0 - 2             | Duff          | 100 | -              | - | -                 | -                | Duff    |            |
| 2 - 16            | 7.5YR 2.5/2   | 100 | -              | - | -                 | -                | LoSa    | Loamy Sand |
|                   |               |     |                |   |                   |                  |         |            |
|                   |               |     |                |   |                   |                  |         |            |
|                   |               |     |                |   |                   |                  |         |            |
|                   |               |     |                |   |                   |                  |         |            |
|                   |               |     |                |   |                   |                  |         |            |
|                   |               |     |                |   |                   |                  |         |            |
|                   |               |     |                |   |                   |                  |         |            |

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.

<sup>2</sup>Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- |                                                            |                                                                            |
|------------------------------------------------------------|----------------------------------------------------------------------------|
| <input type="checkbox"/> Histosol (A1)                     | <input type="checkbox"/> Sandy Redox (S5)                                  |
| <input type="checkbox"/> Histic Epipedon (A2)              | <input type="checkbox"/> Stripped Matrix (S6)                              |
| <input type="checkbox"/> Black Histic (A3)                 | <input type="checkbox"/> Loamy Mucky Mineral (F1) ( <b>except MLRA 1</b> ) |
| <input type="checkbox"/> Hydrogen Sulfide (A4)             | <input type="checkbox"/> Loamy Gleyed Matrix (F2)                          |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Depleted Matrix (F3)                              |
| <input type="checkbox"/> Thick Dark Surface (A12)          | <input type="checkbox"/> Redox Dark Surface (F6)                           |
| <input type="checkbox"/> Sandy Mucky Mineral (S1)          | <input type="checkbox"/> Depleted Dark Surface (F7)                        |
| <input type="checkbox"/> Sandy Gleyed Matrix (S4)          | <input type="checkbox"/> Redox Depressions (F8)                            |

**Indicators for Problematic Hydric Soils<sup>3</sup>:**

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if present):**

Type: \_\_\_\_\_

Depth (inches): \_\_\_\_\_

**Hydric Soil Present? Yes ☐ No ☒**

Remarks:

No hydric soil indicators observed.

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one required; check all that apply)

- |                                                                    |                                                                                            |
|--------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
| <input type="checkbox"/> Surface Water (A1)                        | <input type="checkbox"/> Water-Stained Leaves (B9) ( <b>except MLRA 1, 2, 4A, and 4B</b> ) |
| <input type="checkbox"/> High Water Table (A2)                     | <input type="checkbox"/> Salt Crust (B11)                                                  |
| <input type="checkbox"/> Saturation (A3)                           | <input type="checkbox"/> Aquatic Invertebrates (B13)                                       |
| <input type="checkbox"/> Water Marks (B1)                          | <input type="checkbox"/> Hydrogen Sulfide Odor (C1)                                        |
| <input type="checkbox"/> Sediment Deposits (B2)                    | <input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)                     |
| <input type="checkbox"/> Drift Deposits (B3)                       | <input type="checkbox"/> Presence of Reduced Iron (C4)                                     |
| <input type="checkbox"/> Algal Mat or Crust (B4)                   | <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)                        |
| <input type="checkbox"/> Iron Deposits (B5)                        | <input type="checkbox"/> Stunted or Stressed Plants (D1) ( <b>LRR A</b> )                  |
| <input type="checkbox"/> Surface Soil Cracks (B6)                  | <input type="checkbox"/> Other (Explain in Remarks)                                        |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) |                                                                                            |
| <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)   |                                                                                            |

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (**LRR A**)
- ☐ Frost-Heave Hummocks (D7)

**Field Observations:**

Surface Water Present? Yes ☐ No ☒ Depth (inches): \_\_\_\_\_

Water Table Present? Yes ☐ No ☒ Depth (inches): \_\_\_\_\_

Saturation Present? Yes ☐ No ☒ Depth (inches): \_\_\_\_\_  
(includes capillary fringe)

**Wetland Hydrology Present? Yes ☐ No ☒**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No primary or secondary hydrologic indicators observed.



# WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: 1193.0002 - Canterwood Phase II City/County: Gig Harbor / Pierce Sampling Date: 05/21/2018  
 Applicant/Owner: Swede Hill LLC State: WA Sampling Point: DP-2W  
 Investigator(s): Richard Peel Section, Township, Range: 25, 22N, 01E  
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 5  
 Subregion (LRR): A2 Lat: 47.3634182456667 Long: -122.616046031333 Datum: WGS 84  
 Soil Map Unit Name: Harstine gravelly ashy sandy loam NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation       , Soil       , or Hydrology        significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation       , Soil       , or Hydrology        naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

|                                                                                                                  |                                                                                                           |
|------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|
| Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>              | Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> |
| Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>                         |                                                                                                           |
| Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>                   |                                                                                                           |
| Remarks:<br><b>All three wetland criteria observed. Associated with DP-B-1 from the 2015 site investigation.</b> |                                                                                                           |

## VEGETATION – Use scientific names of plants.

| Tree Stratum (Plot size: 30 ft)                                                                       | Absolute % Cover | Dominant Species? | Indicator Status | Dominance Test worksheet:<br>Number of Dominant Species That Are OBL, FACW, or FAC: <u>4</u> (A)<br><br>Total Number of Dominant Species Across All Strata: <u>4</u> (B)<br><br>Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100%</u> (A/B)                                                                                                                                                                                                                                                                                                                                                                                                   |
|-------------------------------------------------------------------------------------------------------|------------------|-------------------|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. <u>Thuja plicata</u>                                                                               | <u>80</u>        | <u>Yes</u>        | <u>FAC</u>       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 2. <u>      </u>                                                                                      | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 3. <u>      </u>                                                                                      | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 4. <u>      </u>                                                                                      | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <u>80</u> = Total Cover                                                                               |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Sapling/Shrub Stratum (Plot size: 15 ft)                                                              | Absolute % Cover | Dominant Species? | Indicator Status | Prevalence Index worksheet:<br>Total % Cover of: Multiply by:<br>OBL species <u>0</u> x 1 = <u>0</u><br>FACW species <u>0</u> x 2 = <u>0</u><br>FAC species <u>180</u> x 3 = <u>540</u><br>FACU species <u>0</u> x 4 = <u>0</u><br>UPL species <u>0</u> x 5 = <u>0</u><br>Column Totals: <u>180</u> (A) <u>540</u> (B)<br><br>Prevalence Index = B/A = <u>3</u>                                                                                                                                                                                                                                                                                             |
| 1. <u>Thuja plicata</u>                                                                               | <u>30</u>        | <u>Yes</u>        | <u>FAC</u>       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 2. <u>Oplopanax horridus</u>                                                                          | <u>10</u>        | <u>Yes</u>        | <u>FAC</u>       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 3. <u>      </u>                                                                                      | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 4. <u>      </u>                                                                                      | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 5. <u>      </u>                                                                                      | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <u>40</u> = Total Cover                                                                               |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Herb Stratum (Plot size: 5 ft)                                                                        | Absolute % Cover | Dominant Species? | Indicator Status | Hydrophytic Vegetation Indicators:<br><input type="checkbox"/> Rapid Test for Hydrophytic Vegetation<br><input checked="" type="checkbox"/> Dominance Test is >50%<br><input checked="" type="checkbox"/> Prevalence Index is ≤3.0 <sup>1</sup><br><input type="checkbox"/> Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)<br><input type="checkbox"/> Wetland Non-Vascular Plants <sup>1</sup><br><input type="checkbox"/> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)<br><sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic. |
| 1. <u>Athyrium cyclosorum</u>                                                                         | <u>60</u>        | <u>Yes</u>        | <u>FAC</u>       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 2. <u>      </u>                                                                                      | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 3. <u>      </u>                                                                                      | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 4. <u>      </u>                                                                                      | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 5. <u>      </u>                                                                                      | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 6. <u>      </u>                                                                                      | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 7. <u>      </u>                                                                                      | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 8. <u>      </u>                                                                                      | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 9. <u>      </u>                                                                                      | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 10. <u>      </u>                                                                                     | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 11. <u>      </u>                                                                                     | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <u>60</u> = Total Cover                                                                               |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Woody Vine Stratum (Plot size: 30 ft)                                                                 | Absolute % Cover | Dominant Species? | Indicator Status | Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 1. <u>      </u>                                                                                      | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 2. <u>      </u>                                                                                      | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <u>0</u> = Total Cover                                                                                |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| % Bare Ground in Herb Stratum <u>40</u>                                                               |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Remarks: <b>Hydrophytic vegetation criteria observed through dominance test and prevalence index.</b> |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

# SOIL

Sampling Point: DP-2W

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth<br>(inches) | Matrix        |     | Redox Features |   |                   | Loc <sup>2</sup> | Texture | Remarks    |
|-------------------|---------------|-----|----------------|---|-------------------|------------------|---------|------------|
|                   | Color (moist) | %   | Color (moist)  | % | Type <sup>1</sup> |                  |         |            |
| 0 - 16            | 10YR 3/2      | 100 | -              | - | -                 | -                | SaLo    | Sandy loam |
|                   |               |     |                |   |                   |                  |         |            |
|                   |               |     |                |   |                   |                  |         |            |
|                   |               |     |                |   |                   |                  |         |            |
|                   |               |     |                |   |                   |                  |         |            |
|                   |               |     |                |   |                   |                  |         |            |
|                   |               |     |                |   |                   |                  |         |            |
|                   |               |     |                |   |                   |                  |         |            |
|                   |               |     |                |   |                   |                  |         |            |

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.

<sup>2</sup>Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- |                                                            |                                                                            |
|------------------------------------------------------------|----------------------------------------------------------------------------|
| <input type="checkbox"/> Histosol (A1)                     | <input type="checkbox"/> Sandy Redox (S5)                                  |
| <input type="checkbox"/> Histic Epipedon (A2)              | <input type="checkbox"/> Stripped Matrix (S6)                              |
| <input type="checkbox"/> Black Histic (A3)                 | <input type="checkbox"/> Loamy Mucky Mineral (F1) ( <b>except MLRA 1</b> ) |
| <input checked="" type="checkbox"/> Hydrogen Sulfide (A4)  | <input type="checkbox"/> Loamy Gleyed Matrix (F2)                          |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Depleted Matrix (F3)                              |
| <input type="checkbox"/> Thick Dark Surface (A12)          | <input type="checkbox"/> Redox Dark Surface (F6)                           |
| <input type="checkbox"/> Sandy Mucky Mineral (S1)          | <input type="checkbox"/> Depleted Dark Surface (F7)                        |
| <input type="checkbox"/> Sandy Gleyed Matrix (S4)          | <input type="checkbox"/> Redox Depressions (F8)                            |

**Indicators for Problematic Hydric Soils<sup>3</sup>:**

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if present):**

Type: \_\_\_\_\_

Depth (inches): \_\_\_\_\_

**Hydric Soil Present? Yes ☒ No ☐**

Remarks:

Hydric soil criteria observed through indicator A4.

# HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one required; check all that apply)

- |                                                                    |                                                                                            |
|--------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
| <input type="checkbox"/> Surface Water (A1)                        | <input type="checkbox"/> Water-Stained Leaves (B9) ( <b>except MLRA 1, 2, 4A, and 4B</b> ) |
| <input type="checkbox"/> High Water Table (A2)                     | <input type="checkbox"/> Salt Crust (B11)                                                  |
| <input checked="" type="checkbox"/> Saturation (A3)                | <input type="checkbox"/> Aquatic Invertebrates (B13)                                       |
| <input type="checkbox"/> Water Marks (B1)                          | <input checked="" type="checkbox"/> Hydrogen Sulfide Odor (C1)                             |
| <input type="checkbox"/> Sediment Deposits (B2)                    | <input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)                     |
| <input type="checkbox"/> Drift Deposits (B3)                       | <input type="checkbox"/> Presence of Reduced Iron (C4)                                     |
| <input type="checkbox"/> Algal Mat or Crust (B4)                   | <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)                        |
| <input type="checkbox"/> Iron Deposits (B5)                        | <input type="checkbox"/> Stunted or Stressed Plants (D1) ( <b>LRR A</b> )                  |
| <input type="checkbox"/> Surface Soil Cracks (B6)                  | <input type="checkbox"/> Other (Explain in Remarks)                                        |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) |                                                                                            |
| <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)   |                                                                                            |

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (**LRR A**)
- ☐ Frost-Heave Hummocks (D7)

**Field Observations:**

Surface Water Present? Yes ☐ No ☒ Depth (inches): \_\_\_\_\_

Water Table Present? Yes ☐ No ☒ Depth (inches): \_\_\_\_\_

Saturation Present? Yes ☒ No ☐ Depth (inches): 0  
(includes capillary fringe)

**Wetland Hydrology Present? Yes ☒ No ☐**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Hydrologic criteria observed through primary indicators A3 and C1.

# WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: 1193.0002 - Canterwood Phase II City/County: Gig Harbor / Pierce Sampling Date: 05/29/2018  
 Applicant/Owner: Swede Hill LLC State: WA Sampling Point: DP-2Wa  
 Investigator(s): Erin Harker Section, Township, Range: 25, 22N, 01E  
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 5  
 Subregion (LRR): A2 Lat: 47.3643968 Long: -122.6160325 Datum: WGS 84  
 Soil Map Unit Name: Harstine gravelly ashy sandy loam NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☐ No ☐ (If no, explain in Remarks.)

Are Vegetation       , Soil       , or Hydrology        significantly disturbed? Are "Normal Circumstances" present? Yes ☐ No ☐

Are Vegetation       , Soil       , or Hydrology        naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

|                                                                                                                           |                                                                                                   |
|---------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|
| Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>                       | Is the Sampled Area<br>within a Wetland? Yes <input type="checkbox"/> No <input type="checkbox"/> |
| Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>                                  |                                                                                                   |
| Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>                            |                                                                                                   |
| Remarks:<br><b>Not all three wetland criteria were observed. Associated with DP-C-1 from the 2015 site investigation.</b> |                                                                                                   |

## VEGETATION – Use scientific names of plants.

| Tree Stratum (Plot size: 30 ft)                                                                       | Absolute % Cover | Dominant Species? | Indicator Status | <b>Dominance Test worksheet:</b><br>Number of Dominant Species That Are OBL, FACW, or FAC: <u>5</u> (A)<br><br>Total Number of Dominant Species Across All Strata: <u>5</u> (B)<br><br>Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100%</u> (A/B)                                                                                                                                                                                                                                                                                                                                                                                                   |
|-------------------------------------------------------------------------------------------------------|------------------|-------------------|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. <u>Thuja plicata</u>                                                                               | <u>60</u>        | <u>Yes</u>        | <u>FAC</u>       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 2. <u>Alnus rubra</u>                                                                                 | <u>40</u>        | <u>Yes</u>        | <u>FAC</u>       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 3. <u>      </u>                                                                                      | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 4. <u>      </u>                                                                                      | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <u>100</u> = Total Cover                                                                              |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Sapling/Shrub Stratum (Plot size: 15 ft)</b>                                                       |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 1. <u>Thuja plicata</u>                                                                               | <u>10</u>        | <u>Yes</u>        | <u>FAC</u>       | <b>Prevalence Index worksheet:</b><br>Total % Cover of: <u>5</u> Multiply by:<br>OBL species <u>5</u> x 1 = <u>5</u><br>FACW species <u>0</u> x 2 = <u>0</u><br>FAC species <u>205</u> x 3 = <u>615</u><br>FACU species <u>0</u> x 4 = <u>0</u><br>UPL species <u>0</u> x 5 = <u>0</u><br>Column Totals: <u>210</u> (A) <u>620</u> (B)<br><br>Prevalence Index = B/A = <u>2.95</u>                                                                                                                                                                                                                                                                                 |
| 2. <u>Alnus rubra</u>                                                                                 | <u>10</u>        | <u>Yes</u>        | <u>FAC</u>       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 3. <u>      </u>                                                                                      | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 4. <u>      </u>                                                                                      | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 5. <u>      </u>                                                                                      | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <u>20</u> = Total Cover                                                                               |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Herb Stratum (Plot size: 5 ft)</b>                                                                 |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 1. <u>Athyrium cyclosorum</u>                                                                         | <u>70</u>        | <u>Yes</u>        | <u>FAC</u>       | <b>Hydrophytic Vegetation Indicators:</b><br><input type="checkbox"/> Rapid Test for Hydrophytic Vegetation<br><input checked="" type="checkbox"/> Dominance Test is >50%<br><input checked="" type="checkbox"/> Prevalence Index is ≤3.0 <sup>1</sup><br><input type="checkbox"/> Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)<br><input type="checkbox"/> Wetland Non-Vascular Plants <sup>1</sup><br><input type="checkbox"/> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)<br><sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic. |
| 2. <u>broadleaf something</u>                                                                         | <u>10</u>        | <u>No</u>         | <u>FAC</u>       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 3. <u>Carex obnupta</u>                                                                               | <u>5</u>         | <u>No</u>         | <u>OBL</u>       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 4. <u>Rubus spectabilis</u>                                                                           | <u>5</u>         | <u>No</u>         | <u>FAC</u>       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 5. <u>      </u>                                                                                      | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 6. <u>      </u>                                                                                      | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 7. <u>      </u>                                                                                      | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 8. <u>      </u>                                                                                      | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 9. <u>      </u>                                                                                      | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 10. <u>      </u>                                                                                     | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 11. <u>      </u>                                                                                     | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <u>90</u> = Total Cover                                                                               |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Woody Vine Stratum (Plot size: 30 ft)</b>                                                          |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 1. <u>      </u>                                                                                      | <u>      </u>    | <u>      </u>     | <u>      </u>    | <b>Hydrophytic Vegetation Present?</b> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 2. <u>      </u>                                                                                      | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <u>0</u> = Total Cover                                                                                |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| % Bare Ground in Herb Stratum <u>10</u>                                                               |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Remarks: <b>Hydrophytic vegetation criteria observed through dominance test and prevalence index.</b> |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |



# SOIL

Sampling Point: DP-2Wa

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth<br>(inches) | Matrix        |     | Redox Features |   |                   | Loc <sup>2</sup> | Texture | Remarks |
|-------------------|---------------|-----|----------------|---|-------------------|------------------|---------|---------|
|                   | Color (moist) | %   | Color (moist)  | % | Type <sup>1</sup> |                  |         |         |
| 0 - 16            | 10YR 2/1      | 100 | -              | - | -                 | -                | Organic |         |
|                   |               |     |                |   |                   |                  |         |         |
|                   |               |     |                |   |                   |                  |         |         |
|                   |               |     |                |   |                   |                  |         |         |
|                   |               |     |                |   |                   |                  |         |         |
|                   |               |     |                |   |                   |                  |         |         |
|                   |               |     |                |   |                   |                  |         |         |
|                   |               |     |                |   |                   |                  |         |         |
|                   |               |     |                |   |                   |                  |         |         |

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.

<sup>2</sup>Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- |                                                            |                                                                            |
|------------------------------------------------------------|----------------------------------------------------------------------------|
| <input checked="" type="checkbox"/> Histosol (A1)          | <input type="checkbox"/> Sandy Redox (S5)                                  |
| <input type="checkbox"/> Histic Epipedon (A2)              | <input type="checkbox"/> Stripped Matrix (S6)                              |
| <input type="checkbox"/> Black Histic (A3)                 | <input type="checkbox"/> Loamy Mucky Mineral (F1) ( <b>except MLRA 1</b> ) |
| <input checked="" type="checkbox"/> Hydrogen Sulfide (A4)  | <input type="checkbox"/> Loamy Gleyed Matrix (F2)                          |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Depleted Matrix (F3)                              |
| <input type="checkbox"/> Thick Dark Surface (A12)          | <input type="checkbox"/> Redox Dark Surface (F6)                           |
| <input type="checkbox"/> Sandy Mucky Mineral (S1)          | <input type="checkbox"/> Depleted Dark Surface (F7)                        |
| <input type="checkbox"/> Sandy Gleyed Matrix (S4)          | <input type="checkbox"/> Redox Depressions (F8)                            |

**Indicators for Problematic Hydric Soils<sup>3</sup>:**

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if present):**

Type: \_\_\_\_\_

Depth (inches): \_\_\_\_\_

**Hydric Soil Present? Yes ☒ No ☐**

Remarks:

Hydric soil criteria observed through indicator A4.

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one required; check all that apply)

- |                                                                    |                                                                                            |
|--------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
| <input type="checkbox"/> Surface Water (A1)                        | <input type="checkbox"/> Water-Stained Leaves (B9) ( <b>except MLRA 1, 2, 4A, and 4B</b> ) |
| <input type="checkbox"/> High Water Table (A2)                     | <input type="checkbox"/> Salt Crust (B11)                                                  |
| <input checked="" type="checkbox"/> Saturation (A3)                | <input type="checkbox"/> Aquatic Invertebrates (B13)                                       |
| <input type="checkbox"/> Water Marks (B1)                          | <input checked="" type="checkbox"/> Hydrogen Sulfide Odor (C1)                             |
| <input type="checkbox"/> Sediment Deposits (B2)                    | <input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)                     |
| <input type="checkbox"/> Drift Deposits (B3)                       | <input type="checkbox"/> Presence of Reduced Iron (C4)                                     |
| <input type="checkbox"/> Algal Mat or Crust (B4)                   | <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)                        |
| <input type="checkbox"/> Iron Deposits (B5)                        | <input type="checkbox"/> Stunted or Stressed Plants (D1) ( <b>LRR A</b> )                  |
| <input type="checkbox"/> Surface Soil Cracks (B6)                  | <input type="checkbox"/> Other (Explain in Remarks)                                        |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) |                                                                                            |
| <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)   |                                                                                            |

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (**LRR A**)
- ☐ Frost-Heave Hummocks (D7)

**Field Observations:**

Surface Water Present? Yes ☐ No ☒ Depth (inches): \_\_\_\_\_

Water Table Present? Yes ☒ No ☐ Depth (inches): 14

Saturation Present? Yes ☒ No ☐ Depth (inches): 8  
(includes capillary fringe)

**Wetland Hydrology Present? Yes ☒ No ☐**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Hydrologic criteria observed through primary indicators A3 and C1.

# WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: 1193.0002 - Canterwood Phase II City/County: Gig Harbor / Pierce Sampling Date: 05/29/2018  
 Applicant/Owner: Swede Hill LLC State: WA Sampling Point: DP-3U  
 Investigator(s): Erin Harker Section, Township, Range: 25, 22N, 01E  
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 10  
 Subregion (LRR): A2 Lat: 47.3598754 Long: -122.6120049 Datum: WGS 84  
 Soil Map Unit Name: Harstine gravelly ashy sandy loam NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation       , Soil       , or Hydrology        significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation       , Soil       , or Hydrology        naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

|                                                                                                                |                                                                                                           |
|----------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|
| Hydrophytic Vegetation Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>            | Is the Sampled Area within a Wetland? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> |
| Hydric Soil Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>                       |                                                                                                           |
| Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>                 |                                                                                                           |
| Remarks:<br><b>No wetland criteria were observed. Associated with DP-C-2 from the 2015 site investigation.</b> |                                                                                                           |

## VEGETATION – Use scientific names of plants.

| Tree Stratum (Plot size: 30 ft)                        | Absolute % Cover | Dominant Species? | Indicator Status | <b>Dominance Test worksheet:</b><br>Number of Dominant Species That Are OBL, FACW, or FAC: <u>2</u> (A)<br><br>Total Number of Dominant Species Across All Strata: <u>4</u> (B)<br><br>Percent of Dominant Species That Are OBL, FACW, or FAC: <u>50%</u> (A/B)                                                                                                                                                                                                                                                                                                                                                                              |
|--------------------------------------------------------|------------------|-------------------|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. <u>Pseudotsuga menziesii</u>                        | <u>75</u>        | <u>Yes</u>        | <u>FACU</u>      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 2. <u>Thuja plicata</u>                                | <u>25</u>        | <u>Yes</u>        | <u>FAC</u>       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 3. <u>      </u>                                       | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 4. <u>      </u>                                       | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <u>100</u> = Total Cover                               |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Sapling/Shrub Stratum (Plot size: 15 ft)               | Absolute % Cover | Dominant Species? | Indicator Status | <b>Prevalence Index worksheet:</b><br>Total % Cover of: <u>      </u> Multiply by:<br>OBL species <u>0</u> x 1 = <u>0</u><br>FACW species <u>0</u> x 2 = <u>0</u><br>FAC species <u>35</u> x 3 = <u>105</u><br>FACU species <u>85</u> x 4 = <u>340</u><br>UPL species <u>0</u> x 5 = <u>0</u><br>Column Totals: <u>120</u> (A) <u>445</u> (B)<br><br>Prevalence Index = B/A = <u>3.71</u>                                                                                                                                                                                                                                                    |
| 1. <u>Alnus rubra</u>                                  | <u>10</u>        | <u>Yes</u>        | <u>FAC</u>       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 2. <u>      </u>                                       | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 3. <u>      </u>                                       | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 4. <u>      </u>                                       | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 5. <u>      </u>                                       | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <u>10</u> = Total Cover                                |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Herb Stratum (Plot size: 5 ft)                         | Absolute % Cover | Dominant Species? | Indicator Status | <b>Hydrophytic Vegetation Indicators:</b><br><input type="checkbox"/> Rapid Test for Hydrophytic Vegetation<br><input type="checkbox"/> Dominance Test is >50%<br><input type="checkbox"/> Prevalence Index is ≤3.0 <sup>1</sup><br><input type="checkbox"/> Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)<br><input type="checkbox"/> Wetland Non-Vascular Plants <sup>1</sup><br><input type="checkbox"/> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)<br><sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic. |
| 1. <u>Rubus ursinus</u>                                | <u>10</u>        | <u>Yes</u>        | <u>FACU</u>      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 2. <u>      </u>                                       | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 3. <u>      </u>                                       | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 4. <u>      </u>                                       | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 5. <u>      </u>                                       | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 6. <u>      </u>                                       | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 7. <u>      </u>                                       | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 8. <u>      </u>                                       | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 9. <u>      </u>                                       | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 10. <u>      </u>                                      | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 11. <u>      </u>                                      | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <u>10</u> = Total Cover                                |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Woody Vine Stratum (Plot size: 30 ft)                  | Absolute % Cover | Dominant Species? | Indicator Status | <b>Hydrophytic Vegetation Present?</b> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 1. <u>      </u>                                       | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 2. <u>      </u>                                       | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <u>0</u> = Total Cover                                 |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| % Bare Ground in Herb Stratum <u>90</u>                |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Remarks: <b>No hydrophytic criteria were observed.</b> |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

# SOIL

Sampling Point: DP-3U

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth<br>(inches) | Matrix        |     | Redox Features |   |                   | Loc <sup>2</sup> | Texture | Remarks                  |
|-------------------|---------------|-----|----------------|---|-------------------|------------------|---------|--------------------------|
|                   | Color (moist) | %   | Color (moist)  | % | Type <sup>1</sup> |                  |         |                          |
| 0 - 4             | Duff          | -   | -              | - | -                 | -                | Duff    |                          |
| 4 - 6             | 7.5YR 2.5/2   | 100 | -              | - | -                 | -                | LoSa    | Loamy Sand               |
| 6 - 16            | 7.5YR 3/1     | 99  | 10YR 4/6       | 1 | C                 | M                | SaClLo  | Gravelly Sandy Clay Loam |
|                   |               |     |                |   |                   |                  |         |                          |
|                   |               |     |                |   |                   |                  |         |                          |
|                   |               |     |                |   |                   |                  |         |                          |
|                   |               |     |                |   |                   |                  |         |                          |
|                   |               |     |                |   |                   |                  |         |                          |

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.

<sup>2</sup>Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- |                                                            |                                                                            |
|------------------------------------------------------------|----------------------------------------------------------------------------|
| <input type="checkbox"/> Histosol (A1)                     | <input type="checkbox"/> Sandy Redox (S5)                                  |
| <input type="checkbox"/> Histic Epipedon (A2)              | <input type="checkbox"/> Stripped Matrix (S6)                              |
| <input type="checkbox"/> Black Histic (A3)                 | <input type="checkbox"/> Loamy Mucky Mineral (F1) ( <b>except MLRA 1</b> ) |
| <input type="checkbox"/> Hydrogen Sulfide (A4)             | <input type="checkbox"/> Loamy Gleyed Matrix (F2)                          |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Depleted Matrix (F3)                              |
| <input type="checkbox"/> Thick Dark Surface (A12)          | <input type="checkbox"/> Redox Dark Surface (F6)                           |
| <input type="checkbox"/> Sandy Mucky Mineral (S1)          | <input type="checkbox"/> Depleted Dark Surface (F7)                        |
| <input type="checkbox"/> Sandy Gleyed Matrix (S4)          | <input type="checkbox"/> Redox Depressions (F8)                            |

**Indicators for Problematic Hydric Soils<sup>3</sup>:**

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if present):**

Type: \_\_\_\_\_

Depth (inches): \_\_\_\_\_

**Hydric Soil Present? Yes ☐ No ☒**

Remarks:

No hydric soil criteria were observed. Redox observed in 6-16 inches consists of hard concretions with distinct edges and are relic features.

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one required; check all that apply)

- |                                                                    |                                                                                            |
|--------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
| <input type="checkbox"/> Surface Water (A1)                        | <input type="checkbox"/> Water-Stained Leaves (B9) ( <b>except MLRA 1, 2, 4A, and 4B</b> ) |
| <input type="checkbox"/> High Water Table (A2)                     | <input type="checkbox"/> Salt Crust (B11)                                                  |
| <input type="checkbox"/> Saturation (A3)                           | <input type="checkbox"/> Aquatic Invertebrates (B13)                                       |
| <input type="checkbox"/> Water Marks (B1)                          | <input type="checkbox"/> Hydrogen Sulfide Odor (C1)                                        |
| <input type="checkbox"/> Sediment Deposits (B2)                    | <input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)                     |
| <input type="checkbox"/> Drift Deposits (B3)                       | <input type="checkbox"/> Presence of Reduced Iron (C4)                                     |
| <input type="checkbox"/> Algal Mat or Crust (B4)                   | <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)                        |
| <input type="checkbox"/> Iron Deposits (B5)                        | <input type="checkbox"/> Stunted or Stressed Plants (D1) ( <b>LRR A</b> )                  |
| <input type="checkbox"/> Surface Soil Cracks (B6)                  | <input type="checkbox"/> Other (Explain in Remarks)                                        |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) |                                                                                            |
| <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)   |                                                                                            |

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (**LRR A**)
- ☐ Frost-Heave Hummocks (D7)

**Field Observations:**

Surface Water Present? Yes ☐ No ☒ Depth (inches): \_\_\_\_\_

Water Table Present? Yes ☐ No ☒ Depth (inches): \_\_\_\_\_

Saturation Present? Yes ☐ No ☒ Depth (inches): \_\_\_\_\_  
(includes capillary fringe)

**Wetland Hydrology Present? Yes ☐ No ☒**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No primary or secondary indicators observed.



Project/Site: 1193.0002 - Canterwood Phase II City/County: Gig Harbor / Pierce Sampling Date: 05/29/2018  
Applicant/Owner: Swede Hill LLC State: WA Sampling Point: DP-4U  
Investigator(s): Erin Harker Section, Township, Range: 25, 22N, 01E  
Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 1  
Subregion (LRR): A2 Lat: 47.3598754 Long: -122.6120049 Datum: WGS 84  
Soil Map Unit Name: Harstine gravelly ashy sandy loam NWI classification: N/A

Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ naturally problematic? (If needed, explain any answers in Remarks.)

|                                                                                                              |                                                                     |                                                                                                                      |
|--------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|
| Hydrophytic Vegetation Present?                                                                              | Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> | <b>Is the Sampled Area<br/>within a Wetland?</b> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> |
| Hydric Soil Present?                                                                                         | Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> |                                                                                                                      |
| Wetland Hydrology Present?                                                                                   | Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> |                                                                                                                      |
| Remarks:<br><b>No wetland criteria were observed. Associated with DP-4 from the 2015 site investigation.</b> |                                                                     |                                                                                                                      |

| Tree Stratum (Plot size: 30 ft)                    |                  |                   |                  | Dominance Test worksheet:                                                                                                   |  |
|----------------------------------------------------|------------------|-------------------|------------------|-----------------------------------------------------------------------------------------------------------------------------|--|
|                                                    | Absolute % Cover | Dominant Species? | Indicator Status |                                                                                                                             |  |
| 1. <u>Alnus rubra</u>                              | <u>100</u>       | <u>Yes</u>        | <u>FAC</u>       | Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A)                                                         |  |
| 2. _____                                           | _____            | _____             | _____            | Total Number of Dominant Species Across All Strata: <u>5</u> (B)                                                            |  |
| 3. _____                                           | _____            | _____             | _____            | Percent of Dominant Species That Are OBL, FACW, or FAC: <u>20%</u> (A/B)                                                    |  |
| 4. _____                                           | <u>100</u>       | _____             | _____            |                                                                                                                             |  |
|                                                    |                  |                   |                  | <b>Prevalence Index worksheet:</b>                                                                                          |  |
| <u>Sapling/Shrub Stratum</u> (Plot size: 15 ft)    |                  |                   |                  | Total % Cover of: _____ Multiply by: _____                                                                                  |  |
| 1. <u>Oemleria cerasiformis</u>                    | <u>40</u>        | <u>Yes</u>        | <u>FACU</u>      | OBL species <u>0</u> x 1 = <u>0</u>                                                                                         |  |
| 2. <u>Gaultheria shallon</u>                       | <u>20</u>        | <u>Yes</u>        | <u>FACU</u>      | FACW species <u>0</u> x 2 = <u>0</u>                                                                                        |  |
| 3. <u>Ilex aquifolium</u>                          | <u>5</u>         | <u>No</u>         | <u>FACU</u>      | FAC species <u>100</u> x 3 = <u>300</u>                                                                                     |  |
| 4. _____                                           | _____            | _____             | _____            | FACU species <u>90</u> x 4 = <u>360</u>                                                                                     |  |
| 5. _____                                           | _____            | _____             | _____            | UPL species <u>0</u> x 5 = <u>0</u>                                                                                         |  |
|                                                    |                  |                   |                  | Column Totals: <u>190</u> (A) <u>660</u> (B)                                                                                |  |
| <u>Herb Stratum</u> (Plot size: 5 ft)              |                  |                   |                  | Prevalence Index = B/A = <u>3.47</u>                                                                                        |  |
| 1. <u>Rubus ursinus</u>                            | <u>15</u>        | <u>Yes</u>        | <u>FACU</u>      | <b>Hydrophytic Vegetation Indicators:</b>                                                                                   |  |
| 2. <u>Polystichum munitum</u>                      | <u>10</u>        | <u>Yes</u>        | <u>FACU</u>      | <input type="checkbox"/> Rapid Test for Hydrophytic Vegetation                                                              |  |
| 3. _____                                           | _____            | _____             | _____            | <input type="checkbox"/> Dominance Test is >50%                                                                             |  |
| 4. _____                                           | _____            | _____             | _____            | <input type="checkbox"/> Prevalence Index is ≤3.0 <sup>1</sup>                                                              |  |
| 5. _____                                           | _____            | _____             | _____            | <input type="checkbox"/> Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet) |  |
| 6. _____                                           | _____            | _____             | _____            | <input type="checkbox"/> Wetland Non-Vascular Plants <sup>1</sup>                                                           |  |
| 7. _____                                           | _____            | _____             | _____            | <input type="checkbox"/> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)                                          |  |
| 8. _____                                           | _____            | _____             | _____            | <sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.              |  |
| 9. _____                                           | _____            | _____             | _____            |                                                                                                                             |  |
| 10. _____                                          | _____            | _____             | _____            |                                                                                                                             |  |
| 11. _____                                          | <u>25</u>        | _____             | _____            |                                                                                                                             |  |
|                                                    |                  |                   |                  | <b>Hydrophytic Vegetation Present?</b> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>                  |  |
| <u>Woody Vine Stratum</u> (Plot size: 30 ft)       |                  |                   |                  |                                                                                                                             |  |
| 1. _____                                           | _____            | _____             | _____            |                                                                                                                             |  |
| 2. _____                                           | _____            | _____             | _____            |                                                                                                                             |  |
|                                                    |                  |                   |                  |                                                                                                                             |  |
| <u>% Bare Ground in Herb Stratum</u> <u>75</u>     |                  |                   |                  |                                                                                                                             |  |
| Remarks: No hydrophytic wetland criteria observed. |                  |                   |                  |                                                                                                                             |  |

## SOIL

Sampling Point: DP-4U

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth<br>(inches) | Matrix        |     | Redox Features |   |                   | Loc <sup>2</sup> | Texture | Remarks              |
|-------------------|---------------|-----|----------------|---|-------------------|------------------|---------|----------------------|
|                   | Color (moist) | %   | Color (moist)  | % | Type <sup>1</sup> |                  |         |                      |
| 0 - 2             | Duff          | -   | -              | - | -                 | -                | Duff    |                      |
| 2 - 16            | 10YR 3/3      | 100 | -              | - | -                 | -                | LoSa    | Very fine Loamy Sand |
|                   |               |     |                |   |                   |                  |         |                      |
|                   |               |     |                |   |                   |                  |         |                      |
|                   |               |     |                |   |                   |                  |         |                      |
|                   |               |     |                |   |                   |                  |         |                      |
|                   |               |     |                |   |                   |                  |         |                      |
|                   |               |     |                |   |                   |                  |         |                      |
|                   |               |     |                |   |                   |                  |         |                      |

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.

<sup>2</sup>Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- |                                                            |                                                                            |
|------------------------------------------------------------|----------------------------------------------------------------------------|
| <input type="checkbox"/> Histosol (A1)                     | <input type="checkbox"/> Sandy Redox (S5)                                  |
| <input type="checkbox"/> Histic Epipedon (A2)              | <input type="checkbox"/> Stripped Matrix (S6)                              |
| <input type="checkbox"/> Black Histic (A3)                 | <input type="checkbox"/> Loamy Mucky Mineral (F1) ( <b>except MLRA 1</b> ) |
| <input type="checkbox"/> Hydrogen Sulfide (A4)             | <input type="checkbox"/> Loamy Gleyed Matrix (F2)                          |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Depleted Matrix (F3)                              |
| <input type="checkbox"/> Thick Dark Surface (A12)          | <input type="checkbox"/> Redox Dark Surface (F6)                           |
| <input type="checkbox"/> Sandy Mucky Mineral (S1)          | <input type="checkbox"/> Depleted Dark Surface (F7)                        |
| <input type="checkbox"/> Sandy Gleyed Matrix (S4)          | <input type="checkbox"/> Redox Depressions (F8)                            |

**Indicators for Problematic Hydric Soils<sup>3</sup>:**

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if present):**

Type: \_\_\_\_\_

Depth (inches): \_\_\_\_\_

**Hydric Soil Present? Yes ☐ No ☒**

Remarks:

No hydric soil criteria observed.

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one required; check all that apply)

- |                                                                    |                                                                                            |
|--------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
| <input type="checkbox"/> Surface Water (A1)                        | <input type="checkbox"/> Water-Stained Leaves (B9) ( <b>except MLRA 1, 2, 4A, and 4B</b> ) |
| <input type="checkbox"/> High Water Table (A2)                     | <input type="checkbox"/> Salt Crust (B11)                                                  |
| <input type="checkbox"/> Saturation (A3)                           | <input type="checkbox"/> Aquatic Invertebrates (B13)                                       |
| <input type="checkbox"/> Water Marks (B1)                          | <input type="checkbox"/> Hydrogen Sulfide Odor (C1)                                        |
| <input type="checkbox"/> Sediment Deposits (B2)                    | <input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)                     |
| <input type="checkbox"/> Drift Deposits (B3)                       | <input type="checkbox"/> Presence of Reduced Iron (C4)                                     |
| <input type="checkbox"/> Algal Mat or Crust (B4)                   | <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)                        |
| <input type="checkbox"/> Iron Deposits (B5)                        | <input type="checkbox"/> Stunted or Stressed Plants (D1) ( <b>LRR A</b> )                  |
| <input type="checkbox"/> Surface Soil Cracks (B6)                  | <input type="checkbox"/> Other (Explain in Remarks)                                        |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) |                                                                                            |
| <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)   |                                                                                            |

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (**LRR A**)
- ☐ Frost-Heave Hummocks (D7)

**Field Observations:**

Surface Water Present? Yes ☐ No ☒ Depth (inches): \_\_\_\_\_

Water Table Present? Yes ☐ No ☒ Depth (inches): \_\_\_\_\_

Saturation Present? Yes ☐ No ☒ Depth (inches): \_\_\_\_\_  
(includes capillary fringe)

**Wetland Hydrology Present? Yes ☐ No ☒**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No primary or secondary indicators observed.

# WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: 1193.0002 - Canterwood Phase II City/County: Gig Harbor / Pierce Sampling Date: 05/30/2018  
 Applicant/Owner: Swede Hill LLC State: WA Sampling Point: DP-5U  
 Investigator(s): Erin Harker Section, Township, Range: 25, 22N, 01E  
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 5  
 Subregion (LRR): A2 Lat: 47.3598754 Long: -122.6120049 Datum: WGS 84  
 Soil Map Unit Name: Harstine gravelly ashy sandy loam NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation       , Soil       , or Hydrology        significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation       , Soil       , or Hydrology        naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

|                                                                                                              |                                                                                                              |
|--------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
| Hydrophytic Vegetation Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>          | Is the Sampled Area<br>within a Wetland? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> |
| Hydric Soil Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>                     |                                                                                                              |
| Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>               |                                                                                                              |
| Remarks:<br><b>No wetland criteria were observed. Associated with DP-2 from the 2015 site investigation.</b> |                                                                                                              |

## VEGETATION – Use scientific names of plants.

| Tree Stratum (Plot size: 30 ft)                           | Absolute % Cover | Dominant Species? | Indicator Status | <b>Dominance Test worksheet:</b><br>Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A)<br><br>Total Number of Dominant Species Across All Strata: <u>3</u> (B)<br><br>Percent of Dominant Species That Are OBL, FACW, or FAC: <u>33%</u> (A/B)                                                                                                                                                                                                                                                                                                                                                                              |
|-----------------------------------------------------------|------------------|-------------------|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. <u>Thuja plicata</u>                                   | <u>90</u>        | <u>Yes</u>        | <u>FAC</u>       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 2. <u>Alnus rubra</u>                                     | <u>10</u>        | <u>No</u>         | <u>FAC</u>       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 3. <u>      </u>                                          | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 4. <u>      </u>                                          | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <u>100</u> = Total Cover                                  |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Sapling/Shrub Stratum (Plot size: 15 ft)                  | Absolute % Cover | Dominant Species? | Indicator Status | <b>Prevalence Index worksheet:</b><br>Total % Cover of: <u>      </u> Multiply by:<br>OBL species <u>0</u> x 1 = <u>0</u><br>FACW species <u>0</u> x 2 = <u>0</u><br>FAC species <u>115</u> x 3 = <u>345</u><br>FACU species <u>65</u> x 4 = <u>260</u><br>UPL species <u>0</u> x 5 = <u>0</u><br>Column Totals: <u>180</u> (A) <u>605</u> (B)<br><br>Prevalence Index = B/A = <u>3.36</u>                                                                                                                                                                                                                                                   |
| 1. <u>Oemleria cerasiformis</u>                           | <u>20</u>        | <u>Yes</u>        | <u>FACU</u>      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 2. <u>      </u>                                          | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 3. <u>      </u>                                          | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 4. <u>      </u>                                          | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 5. <u>      </u>                                          | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <u>20</u> = Total Cover                                   |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Herb Stratum (Plot size: 5 ft)                            | Absolute % Cover | Dominant Species? | Indicator Status | <b>Hydrophytic Vegetation Indicators:</b><br><input type="checkbox"/> Rapid Test for Hydrophytic Vegetation<br><input type="checkbox"/> Dominance Test is >50%<br><input type="checkbox"/> Prevalence Index is ≤3.0 <sup>1</sup><br><input type="checkbox"/> Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)<br><input type="checkbox"/> Wetland Non-Vascular Plants <sup>1</sup><br><input type="checkbox"/> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)<br><sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic. |
| 1. <u>Hedera helix</u>                                    | <u>40</u>        | <u>Yes</u>        | <u>FACU</u>      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 2. <u>Polystichum munitum</u>                             | <u>5</u>         | <u>No</u>         | <u>FACU</u>      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 3. <u>Equisetum arvense</u>                               | <u>5</u>         | <u>No</u>         | <u>FAC</u>       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 4. <u>Rubus spectabilis</u>                               | <u>5</u>         | <u>No</u>         | <u>FAC</u>       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 5. <u>Athyrium cyclosorum</u>                             | <u>5</u>         | <u>No</u>         | <u>FAC</u>       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 6. <u>      </u>                                          | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 7. <u>      </u>                                          | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 8. <u>      </u>                                          | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 9. <u>      </u>                                          | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 10. <u>      </u>                                         | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 11. <u>      </u>                                         | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <u>60</u> = Total Cover                                   |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Woody Vine Stratum (Plot size: 30 ft)                     | Absolute % Cover | Dominant Species? | Indicator Status | <b>Hydrophytic Vegetation Present?</b> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 1. <u>      </u>                                          | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 2. <u>      </u>                                          | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <u>0</u> = Total Cover                                    |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| % Bare Ground in Herb Stratum <u>40</u>                   |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Remarks: <b>No hydrophytic wetland criteria observed.</b> |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |



## SOIL

Sampling Point: DP-5U

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth<br>(inches) | Matrix        |     | Redox Features |   |                   | Loc <sup>2</sup> | Texture | Remarks             |
|-------------------|---------------|-----|----------------|---|-------------------|------------------|---------|---------------------|
|                   | Color (moist) | %   | Color (moist)  | % | Type <sup>1</sup> |                  |         |                     |
| 0 - 3             | Duff          | -   | -              | - | -                 | -                | Duff    |                     |
| 2 - 16            | 10YR 2/2      | 100 | -              | - | -                 | -                | SaLo    | Gravelly Sandy Loam |
|                   |               |     |                |   |                   |                  |         |                     |
|                   |               |     |                |   |                   |                  |         |                     |
|                   |               |     |                |   |                   |                  |         |                     |
|                   |               |     |                |   |                   |                  |         |                     |
|                   |               |     |                |   |                   |                  |         |                     |
|                   |               |     |                |   |                   |                  |         |                     |
|                   |               |     |                |   |                   |                  |         |                     |

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.

<sup>2</sup>Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- |                                                            |                                                                            |
|------------------------------------------------------------|----------------------------------------------------------------------------|
| <input type="checkbox"/> Histosol (A1)                     | <input type="checkbox"/> Sandy Redox (S5)                                  |
| <input type="checkbox"/> Histic Epipedon (A2)              | <input type="checkbox"/> Stripped Matrix (S6)                              |
| <input type="checkbox"/> Black Histic (A3)                 | <input type="checkbox"/> Loamy Mucky Mineral (F1) ( <b>except MLRA 1</b> ) |
| <input type="checkbox"/> Hydrogen Sulfide (A4)             | <input type="checkbox"/> Loamy Gleyed Matrix (F2)                          |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Depleted Matrix (F3)                              |
| <input type="checkbox"/> Thick Dark Surface (A12)          | <input type="checkbox"/> Redox Dark Surface (F6)                           |
| <input type="checkbox"/> Sandy Mucky Mineral (S1)          | <input type="checkbox"/> Depleted Dark Surface (F7)                        |
| <input type="checkbox"/> Sandy Gleyed Matrix (S4)          | <input type="checkbox"/> Redox Depressions (F8)                            |

**Indicators for Problematic Hydric Soils<sup>3</sup>:**

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if present):**

Type: \_\_\_\_\_

Depth (inches): \_\_\_\_\_

**Hydric Soil Present? Yes ☐ No ☒**

Remarks:

No hydric soil criteria observed.

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one required; check all that apply)

- |                                                                    |                                                                                            |
|--------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
| <input type="checkbox"/> Surface Water (A1)                        | <input type="checkbox"/> Water-Stained Leaves (B9) ( <b>except MLRA 1, 2, 4A, and 4B</b> ) |
| <input type="checkbox"/> High Water Table (A2)                     | <input type="checkbox"/> Salt Crust (B11)                                                  |
| <input type="checkbox"/> Saturation (A3)                           | <input type="checkbox"/> Aquatic Invertebrates (B13)                                       |
| <input type="checkbox"/> Water Marks (B1)                          | <input type="checkbox"/> Hydrogen Sulfide Odor (C1)                                        |
| <input type="checkbox"/> Sediment Deposits (B2)                    | <input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)                     |
| <input type="checkbox"/> Drift Deposits (B3)                       | <input type="checkbox"/> Presence of Reduced Iron (C4)                                     |
| <input type="checkbox"/> Algal Mat or Crust (B4)                   | <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)                        |
| <input type="checkbox"/> Iron Deposits (B5)                        | <input type="checkbox"/> Stunted or Stressed Plants (D1) ( <b>LRR A</b> )                  |
| <input type="checkbox"/> Surface Soil Cracks (B6)                  | <input type="checkbox"/> Other (Explain in Remarks)                                        |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) |                                                                                            |
| <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)   |                                                                                            |

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (**LRR A**)
- ☐ Frost-Heave Hummocks (D7)

**Field Observations:**

Surface Water Present? Yes ☐ No ☒ Depth (inches): \_\_\_\_\_

Water Table Present? Yes ☐ No ☒ Depth (inches): \_\_\_\_\_

Saturation Present? Yes ☒ No ☐ Depth (inches): 13  
(includes capillary fringe)

**Wetland Hydrology Present? Yes ☐ No ☒**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No primary or secondary indicators observed.

# WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: 1193.0002 - Canterwood Phase II City/County: Gig Harbor / Pierce Sampling Date: 05/30/2018  
 Applicant/Owner: Swede Hill LLC State: WA Sampling Point: DP-6W  
 Investigator(s): Erin Harker Section, Township, Range: 25, 22N, 01E  
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 10  
 Subregion (LRR): A2 Lat: 47.3598754 Long: -122.6120049 Datum: WGS 84  
 Soil Map Unit Name: Harstine gravelly ashy sandy loam NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation       , Soil       , or Hydrology        significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation       , Soil       , or Hydrology        naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

|                                                                                                                                                                                                                                                                                                   |                                                                                                          |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|
| Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/><br>Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/><br>Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> | <b>Is the Sampled Area within a Wetland?</b><br>Yes <input type="checkbox"/> No <input type="checkbox"/> |
| Remarks:<br><div style="border: 1px solid black; padding: 5px; text-align: center;"> <b>All three wetland criteria observed. Associated with DP-D2 from the 2015 site investigation.</b> </div>                                                                                                   |                                                                                                          |

## VEGETATION – Use scientific names of plants.

| Stratum                                                                                                                                          | Absolute % Cover | Dominant Species?    | Indicator Status |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                   |              |                      |                |                       |                |                        |                  |                       |                |                      |                |                               |                |
|--------------------------------------------------------------------------------------------------------------------------------------------------|------------------|----------------------|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|--------------|----------------------|----------------|-----------------------|----------------|------------------------|------------------|-----------------------|----------------|----------------------|----------------|-------------------------------|----------------|
| <b>Tree Stratum</b> (Plot size: <u>30 ft</u> )                                                                                                   |                  |                      |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                   |              |                      |                |                       |                |                        |                  |                       |                |                      |                |                               |                |
| 1. <u>Thuja plicata</u>                                                                                                                          | <u>100</u>       | <u>Yes</u>           | <u>FAC</u>       | <b>Dominance Test worksheet:</b><br>Number of Dominant Species That Are OBL, FACW, or FAC: <u>4</u> (A)<br><br>Total Number of Dominant Species Across All Strata: <u>4</u> (B)<br><br>Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100%</u> (A/B)                                                                                                                                                                                                                                                                                                                                                                                                   |                   |              |                      |                |                       |                |                        |                  |                       |                |                      |                |                               |                |
| 2. <u>      </u>                                                                                                                                 | <u>      </u>    | <u>      </u>        | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                   |              |                      |                |                       |                |                        |                  |                       |                |                      |                |                               |                |
| 3. <u>      </u>                                                                                                                                 | <u>      </u>    | <u>      </u>        | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                   |              |                      |                |                       |                |                        |                  |                       |                |                      |                |                               |                |
| 4. <u>      </u>                                                                                                                                 | <u>      </u>    | <u>      </u>        | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                   |              |                      |                |                       |                |                        |                  |                       |                |                      |                |                               |                |
|                                                                                                                                                  | <u>100</u>       | <u>= Total Cover</u> |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                   |              |                      |                |                       |                |                        |                  |                       |                |                      |                |                               |                |
| <b>Sapling/Shrub Stratum</b> (Plot size: <u>15 ft</u> )                                                                                          |                  |                      |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                   |              |                      |                |                       |                |                        |                  |                       |                |                      |                |                               |                |
| 1. <u>Rubus spectabilis</u>                                                                                                                      | <u>30</u>        | <u>Yes</u>           | <u>FAC</u>       | <b>Prevalence Index worksheet:</b><br><table style="width: 100%;"> <tr> <th>Total % Cover of:</th> <th>Multiply by:</th> </tr> <tr> <td>OBL species <u>0</u></td> <td>x 1 = <u>0</u></td> </tr> <tr> <td>FACW species <u>0</u></td> <td>x 2 = <u>0</u></td> </tr> <tr> <td>FAC species <u>215</u></td> <td>x 3 = <u>645</u></td> </tr> <tr> <td>FACU species <u>1</u></td> <td>x 4 = <u>4</u></td> </tr> <tr> <td>UPL species <u>0</u></td> <td>x 5 = <u>0</u></td> </tr> <tr> <td>Column Totals: <u>216</u> (A)</td> <td><u>649</u> (B)</td> </tr> </table><br>Prevalence Index = B/A = <u>3</u>                                                                  | Total % Cover of: | Multiply by: | OBL species <u>0</u> | x 1 = <u>0</u> | FACW species <u>0</u> | x 2 = <u>0</u> | FAC species <u>215</u> | x 3 = <u>645</u> | FACU species <u>1</u> | x 4 = <u>4</u> | UPL species <u>0</u> | x 5 = <u>0</u> | Column Totals: <u>216</u> (A) | <u>649</u> (B) |
| Total % Cover of:                                                                                                                                | Multiply by:     |                      |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                   |              |                      |                |                       |                |                        |                  |                       |                |                      |                |                               |                |
| OBL species <u>0</u>                                                                                                                             | x 1 = <u>0</u>   |                      |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                   |              |                      |                |                       |                |                        |                  |                       |                |                      |                |                               |                |
| FACW species <u>0</u>                                                                                                                            | x 2 = <u>0</u>   |                      |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                   |              |                      |                |                       |                |                        |                  |                       |                |                      |                |                               |                |
| FAC species <u>215</u>                                                                                                                           | x 3 = <u>645</u> |                      |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                   |              |                      |                |                       |                |                        |                  |                       |                |                      |                |                               |                |
| FACU species <u>1</u>                                                                                                                            | x 4 = <u>4</u>   |                      |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                   |              |                      |                |                       |                |                        |                  |                       |                |                      |                |                               |                |
| UPL species <u>0</u>                                                                                                                             | x 5 = <u>0</u>   |                      |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                   |              |                      |                |                       |                |                        |                  |                       |                |                      |                |                               |                |
| Column Totals: <u>216</u> (A)                                                                                                                    | <u>649</u> (B)   |                      |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                   |              |                      |                |                       |                |                        |                  |                       |                |                      |                |                               |                |
| 2. <u>Acer macrophyllum</u>                                                                                                                      | <u>1</u>         | <u>No</u>            | <u>FACU</u>      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                   |              |                      |                |                       |                |                        |                  |                       |                |                      |                |                               |                |
| 3. <u>      </u>                                                                                                                                 | <u>      </u>    | <u>      </u>        | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                   |              |                      |                |                       |                |                        |                  |                       |                |                      |                |                               |                |
| 4. <u>      </u>                                                                                                                                 | <u>      </u>    | <u>      </u>        | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                   |              |                      |                |                       |                |                        |                  |                       |                |                      |                |                               |                |
| 5. <u>      </u>                                                                                                                                 | <u>      </u>    | <u>      </u>        | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                   |              |                      |                |                       |                |                        |                  |                       |                |                      |                |                               |                |
|                                                                                                                                                  | <u>31</u>        | <u>= Total Cover</u> |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                   |              |                      |                |                       |                |                        |                  |                       |                |                      |                |                               |                |
| <b>Herb Stratum</b> (Plot size: <u>5 ft</u> )                                                                                                    |                  |                      |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                   |              |                      |                |                       |                |                        |                  |                       |                |                      |                |                               |                |
| 1. <u>Athyrium cyclosorum</u>                                                                                                                    | <u>60</u>        | <u>Yes</u>           | <u>FAC</u>       | <b>Hydrophytic Vegetation Indicators:</b><br><input type="checkbox"/> Rapid Test for Hydrophytic Vegetation<br><input checked="" type="checkbox"/> Dominance Test is >50%<br><input checked="" type="checkbox"/> Prevalence Index is ≤3.0 <sup>1</sup><br><input type="checkbox"/> Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)<br><input type="checkbox"/> Wetland Non-Vascular Plants <sup>1</sup><br><input type="checkbox"/> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)<br><sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic. |                   |              |                      |                |                       |                |                        |                  |                       |                |                      |                |                               |                |
| 2. <u>Blechnum spicant</u>                                                                                                                       | <u>20</u>        | <u>Yes</u>           | <u>FAC</u>       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                   |              |                      |                |                       |                |                        |                  |                       |                |                      |                |                               |                |
| 3. <u>Equisetum arvense</u>                                                                                                                      | <u>5</u>         | <u>No</u>            | <u>FAC</u>       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                   |              |                      |                |                       |                |                        |                  |                       |                |                      |                |                               |                |
| 4. <u>      </u>                                                                                                                                 | <u>      </u>    | <u>      </u>        | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                   |              |                      |                |                       |                |                        |                  |                       |                |                      |                |                               |                |
| 5. <u>      </u>                                                                                                                                 | <u>      </u>    | <u>      </u>        | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                   |              |                      |                |                       |                |                        |                  |                       |                |                      |                |                               |                |
| 6. <u>      </u>                                                                                                                                 | <u>      </u>    | <u>      </u>        | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                   |              |                      |                |                       |                |                        |                  |                       |                |                      |                |                               |                |
| 7. <u>      </u>                                                                                                                                 | <u>      </u>    | <u>      </u>        | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                   |              |                      |                |                       |                |                        |                  |                       |                |                      |                |                               |                |
| 8. <u>      </u>                                                                                                                                 | <u>      </u>    | <u>      </u>        | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                   |              |                      |                |                       |                |                        |                  |                       |                |                      |                |                               |                |
| 9. <u>      </u>                                                                                                                                 | <u>      </u>    | <u>      </u>        | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                   |              |                      |                |                       |                |                        |                  |                       |                |                      |                |                               |                |
| 10. <u>      </u>                                                                                                                                | <u>      </u>    | <u>      </u>        | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                   |              |                      |                |                       |                |                        |                  |                       |                |                      |                |                               |                |
| 11. <u>      </u>                                                                                                                                | <u>      </u>    | <u>      </u>        | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                   |              |                      |                |                       |                |                        |                  |                       |                |                      |                |                               |                |
|                                                                                                                                                  | <u>85</u>        | <u>= Total Cover</u> |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                   |              |                      |                |                       |                |                        |                  |                       |                |                      |                |                               |                |
| <b>Woody Vine Stratum</b> (Plot size: <u>30 ft</u> )                                                                                             |                  |                      |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                   |              |                      |                |                       |                |                        |                  |                       |                |                      |                |                               |                |
| 1. <u>      </u>                                                                                                                                 | <u>      </u>    | <u>      </u>        | <u>      </u>    | <b>Hydrophytic Vegetation Present?</b> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                   |              |                      |                |                       |                |                        |                  |                       |                |                      |                |                               |                |
| 2. <u>      </u>                                                                                                                                 | <u>      </u>    | <u>      </u>        | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                   |              |                      |                |                       |                |                        |                  |                       |                |                      |                |                               |                |
|                                                                                                                                                  | <u>0</u>         | <u>= Total Cover</u> |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                   |              |                      |                |                       |                |                        |                  |                       |                |                      |                |                               |                |
| % Bare Ground in Herb Stratum <u>15</u><br>Remarks: <u>Hydrophytic vegetation criteria observed through dominance test and prevalence index.</u> |                  |                      |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                   |              |                      |                |                       |                |                        |                  |                       |                |                      |                |                               |                |

## SOIL

Sampling Point: DP-6W

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth<br>(inches) | Matrix        |     | Redox Features |   |                   | Loc <sup>2</sup> | Texture | Remarks    |
|-------------------|---------------|-----|----------------|---|-------------------|------------------|---------|------------|
|                   | Color (moist) | %   | Color (moist)  | % | Type <sup>1</sup> |                  |         |            |
| 0 - 7             | 10YR 2/2      | 100 | -              | - | -                 | -                | LoSa    | Loamy Sand |
| 7 - 16            | 10YR 2/2      | 100 | -              | - | -                 | -                | SaLo    | Sandy Loam |
|                   |               |     |                |   |                   |                  |         |            |
|                   |               |     |                |   |                   |                  |         |            |
|                   |               |     |                |   |                   |                  |         |            |
|                   |               |     |                |   |                   |                  |         |            |
|                   |               |     |                |   |                   |                  |         |            |
|                   |               |     |                |   |                   |                  |         |            |
|                   |               |     |                |   |                   |                  |         |            |

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.

<sup>2</sup>Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- |                                                            |                                                                            |
|------------------------------------------------------------|----------------------------------------------------------------------------|
| <input type="checkbox"/> Histosol (A1)                     | <input type="checkbox"/> Sandy Redox (S5)                                  |
| <input type="checkbox"/> Histic Epipedon (A2)              | <input type="checkbox"/> Stripped Matrix (S6)                              |
| <input type="checkbox"/> Black Histic (A3)                 | <input type="checkbox"/> Loamy Mucky Mineral (F1) ( <b>except MLRA 1</b> ) |
| <input checked="" type="checkbox"/> Hydrogen Sulfide (A4)  | <input type="checkbox"/> Loamy Gleyed Matrix (F2)                          |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Depleted Matrix (F3)                              |
| <input type="checkbox"/> Thick Dark Surface (A12)          | <input type="checkbox"/> Redox Dark Surface (F6)                           |
| <input type="checkbox"/> Sandy Mucky Mineral (S1)          | <input type="checkbox"/> Depleted Dark Surface (F7)                        |
| <input type="checkbox"/> Sandy Gleyed Matrix (S4)          | <input type="checkbox"/> Redox Depressions (F8)                            |

**Indicators for Problematic Hydric Soils<sup>3</sup>:**

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if present):**

Type: \_\_\_\_\_

Depth (inches): \_\_\_\_\_

**Hydric Soil Present? Yes ☒ No ☐**

Remarks:

Hydric criteria observed through indicator A4.

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one required; check all that apply)

- |                                                                    |                                                                                            |
|--------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
| <input type="checkbox"/> Surface Water (A1)                        | <input type="checkbox"/> Water-Stained Leaves (B9) ( <b>except MLRA 1, 2, 4A, and 4B</b> ) |
| <input type="checkbox"/> High Water Table (A2)                     | <input type="checkbox"/> Salt Crust (B11)                                                  |
| <input checked="" type="checkbox"/> Saturation (A3)                | <input type="checkbox"/> Aquatic Invertebrates (B13)                                       |
| <input type="checkbox"/> Water Marks (B1)                          | <input checked="" type="checkbox"/> Hydrogen Sulfide Odor (C1)                             |
| <input type="checkbox"/> Sediment Deposits (B2)                    | <input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)                     |
| <input type="checkbox"/> Drift Deposits (B3)                       | <input type="checkbox"/> Presence of Reduced Iron (C4)                                     |
| <input type="checkbox"/> Algal Mat or Crust (B4)                   | <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)                        |
| <input type="checkbox"/> Iron Deposits (B5)                        | <input type="checkbox"/> Stunted or Stressed Plants (D1) ( <b>LRR A</b> )                  |
| <input type="checkbox"/> Surface Soil Cracks (B6)                  | <input type="checkbox"/> Other (Explain in Remarks)                                        |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) |                                                                                            |
| <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)   |                                                                                            |

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (**LRR A**)
- ☐ Frost-Heave Hummocks (D7)

**Field Observations:**

Surface Water Present? Yes ☐ No ☒ Depth (inches): \_\_\_\_\_

Water Table Present? Yes ☐ No ☒ Depth (inches): \_\_\_\_\_

Saturation Present? Yes ☒ No ☐ Depth (inches): 8  
(includes capillary fringe)

**Wetland Hydrology Present? Yes ☒ No ☐**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Hydrologic criteria observed through primary indicators A3 and C1.



# WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: 1193.0002 - Canterwood Phase II City/County: Gig Harbor / Pierce Sampling Date: 05/30/2018  
 Applicant/Owner: Swede Hill LLC State: WA Sampling Point: DP-7W  
 Investigator(s): Erin Harker Section, Township, Range: 25, 22N, 01E  
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 10  
 Subregion (LRR): A2 Lat: 47.36396188 Long: -122.61633913 Datum: WGS 84  
 Soil Map Unit Name: Harstine gravelly ashy sandy loam NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation       , Soil       , or Hydrology        significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation       , Soil       , or Hydrology        naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

|                                                                                                                 |                                                                                                              |
|-----------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
| Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>             | Is the Sampled Area<br>within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> |
| Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>                        |                                                                                                              |
| Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>                  |                                                                                                              |
| Remarks:<br><b>All three wetland criteria observed. Associated with DP-D1 from the 2015 site investigation.</b> |                                                                                                              |

## VEGETATION – Use scientific names of plants.

| Tree Stratum (Plot size: 30 ft)                                                                       | Absolute % Cover  | Dominant Species? | Indicator Status  | Dominance Test worksheet:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-------------------------------------------------------------------------------------------------------|-------------------|-------------------|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. <u>Thuja plicata</u>                                                                               | <u>100</u>        | <u>Yes</u>        | <u>FAC</u>        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 2. <u>                    </u>                                                                        | <u>          </u> | <u>          </u> | <u>          </u> | Total Number of Dominant Species Across All Strata: <u>4</u> (B)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 3. <u>                    </u>                                                                        | <u>          </u> | <u>          </u> | <u>          </u> | Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100%</u> (A/B)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 4. <u>                    </u>                                                                        | <u>          </u> | <u>          </u> | <u>          </u> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <u>100</u> = Total Cover                                                                              |                   |                   |                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Sapling/Shrub Stratum (Plot size: 15 ft)                                                              | Absolute % Cover  | Dominant Species? | Indicator Status  | Prevalence Index worksheet:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 1. <u>Thuja plicata</u>                                                                               | <u>30</u>         | <u>Yes</u>        | <u>FAC</u>        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 2. <u>Acer macrophyllum</u>                                                                           | <u>1</u>          | <u>No</u>         | <u>FACU</u>       | OBL species <u>0</u> x 1 = <u>0</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 3. <u>                    </u>                                                                        | <u>          </u> | <u>          </u> | <u>          </u> | FACW species <u>0</u> x 2 = <u>0</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 4. <u>                    </u>                                                                        | <u>          </u> | <u>          </u> | <u>          </u> | FAC species <u>205</u> x 3 = <u>615</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 5. <u>                    </u>                                                                        | <u>          </u> | <u>          </u> | <u>          </u> | FACU species <u>1</u> x 4 = <u>4</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <u>31</u> = Total Cover                                                                               |                   |                   |                   | UPL species <u>0</u> x 5 = <u>0</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Herb Stratum (Plot size: 5 ft)                                                                        | Absolute % Cover  | Dominant Species? | Indicator Status  | Column Totals: <u>206</u> (A) <u>619</u> (B)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 1. <u>Athyrium cyclosorum</u>                                                                         | <u>50</u>         | <u>Yes</u>        | <u>FAC</u>        | Prevalence Index = B/A = <u>3</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 2. <u>Rubus spectabilis</u>                                                                           | <u>15</u>         | <u>Yes</u>        | <u>FAC</u>        | <b>Hydrophytic Vegetation Indicators:</b><br><input type="checkbox"/> Rapid Test for Hydrophytic Vegetation<br><input checked="" type="checkbox"/> Dominance Test is >50%<br><input checked="" type="checkbox"/> Prevalence Index is ≤3.0 <sup>1</sup><br><input type="checkbox"/> Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)<br><input type="checkbox"/> Wetland Non-Vascular Plants <sup>1</sup><br><input type="checkbox"/> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)<br><sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic. |
| 3. <u>Blechnum spicant</u>                                                                            | <u>5</u>          | <u>No</u>         | <u>FAC</u>        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 4. <u>Equisetum arvense</u>                                                                           | <u>5</u>          | <u>No</u>         | <u>FAC</u>        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 5. <u>                    </u>                                                                        | <u>          </u> | <u>          </u> | <u>          </u> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 6. <u>                    </u>                                                                        | <u>          </u> | <u>          </u> | <u>          </u> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 7. <u>                    </u>                                                                        | <u>          </u> | <u>          </u> | <u>          </u> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 8. <u>                    </u>                                                                        | <u>          </u> | <u>          </u> | <u>          </u> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 9. <u>                    </u>                                                                        | <u>          </u> | <u>          </u> | <u>          </u> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 10. <u>                  </u>                                                                         | <u>          </u> | <u>          </u> | <u>          </u> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 11. <u>                  </u>                                                                         | <u>          </u> | <u>          </u> | <u>          </u> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <u>75</u> = Total Cover                                                                               |                   |                   |                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Woody Vine Stratum (Plot size: 30 ft)                                                                 | Absolute % Cover  | Dominant Species? | Indicator Status  | <b>Hydrophytic Vegetation Present?</b> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 1. <u>                    </u>                                                                        | <u>          </u> | <u>          </u> | <u>          </u> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 2. <u>                    </u>                                                                        | <u>          </u> | <u>          </u> | <u>          </u> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <u>0</u> = Total Cover                                                                                |                   |                   |                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| % Bare Ground in Herb Stratum <u>25</u>                                                               |                   |                   |                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Remarks: <b>Hydrophytic vegetation criteria observed through dominance test and prevalence index.</b> |                   |                   |                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

## SOIL

Sampling Point: DP-7W

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth<br>(inches) | Matrix        |     | Redox Features |   |                   | Loc <sup>2</sup> | Texture | Remarks    |
|-------------------|---------------|-----|----------------|---|-------------------|------------------|---------|------------|
|                   | Color (moist) | %   | Color (moist)  | % | Type <sup>1</sup> |                  |         |            |
| 0-7               | 10YR 2/2      | 100 | -              | - | -                 | -                | LoSa    | Loamy Sand |
| 7-16              | 10YR 2/2      | 100 | -              | - | -                 | -                | SaLo    | Sandy Loam |
|                   |               |     |                |   |                   |                  |         |            |
|                   |               |     |                |   |                   |                  |         |            |
|                   |               |     |                |   |                   |                  |         |            |
|                   |               |     |                |   |                   |                  |         |            |
|                   |               |     |                |   |                   |                  |         |            |
|                   |               |     |                |   |                   |                  |         |            |
|                   |               |     |                |   |                   |                  |         |            |

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.

<sup>2</sup>Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- |                                                            |                                                                            |
|------------------------------------------------------------|----------------------------------------------------------------------------|
| <input type="checkbox"/> Histosol (A1)                     | <input type="checkbox"/> Sandy Redox (S5)                                  |
| <input type="checkbox"/> Histic Epipedon (A2)              | <input type="checkbox"/> Stripped Matrix (S6)                              |
| <input type="checkbox"/> Black Histic (A3)                 | <input type="checkbox"/> Loamy Mucky Mineral (F1) ( <b>except MLRA 1</b> ) |
| <input checked="" type="checkbox"/> Hydrogen Sulfide (A4)  | <input type="checkbox"/> Loamy Gleyed Matrix (F2)                          |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Depleted Matrix (F3)                              |
| <input type="checkbox"/> Thick Dark Surface (A12)          | <input type="checkbox"/> Redox Dark Surface (F6)                           |
| <input type="checkbox"/> Sandy Mucky Mineral (S1)          | <input type="checkbox"/> Depleted Dark Surface (F7)                        |
| <input type="checkbox"/> Sandy Gleyed Matrix (S4)          | <input type="checkbox"/> Redox Depressions (F8)                            |

**Indicators for Problematic Hydric Soils<sup>3</sup>:**

- ☐ 2 cm Muck (A10)  
☐ Red Parent Material (TF2)  
☐ Very Shallow Dark Surface (TF12)  
☐ Other (Explain in Remarks)

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if present):**

Type: \_\_\_\_\_  
Depth (inches): \_\_\_\_\_

**Hydric Soil Present? Yes ☒ No ☐**

Remarks:

Hydric criteria observed through indicator A4.

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one required; check all that apply)

- |                                                                    |                                                                                            |
|--------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
| <input type="checkbox"/> Surface Water (A1)                        | <input type="checkbox"/> Water-Stained Leaves (B9) ( <b>except MLRA 1, 2, 4A, and 4B</b> ) |
| <input type="checkbox"/> High Water Table (A2)                     | <input type="checkbox"/> Salt Crust (B11)                                                  |
| <input checked="" type="checkbox"/> Saturation (A3)                | <input type="checkbox"/> Aquatic Invertebrates (B13)                                       |
| <input type="checkbox"/> Water Marks (B1)                          | <input checked="" type="checkbox"/> Hydrogen Sulfide Odor (C1)                             |
| <input type="checkbox"/> Sediment Deposits (B2)                    | <input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)                     |
| <input type="checkbox"/> Drift Deposits (B3)                       | <input type="checkbox"/> Presence of Reduced Iron (C4)                                     |
| <input type="checkbox"/> Algal Mat or Crust (B4)                   | <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)                        |
| <input type="checkbox"/> Iron Deposits (B5)                        | <input type="checkbox"/> Stunted or Stressed Plants (D1) ( <b>LRR A</b> )                  |
| <input type="checkbox"/> Surface Soil Cracks (B6)                  | <input type="checkbox"/> Other (Explain in Remarks)                                        |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) |                                                                                            |
| <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)   |                                                                                            |

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)  
☐ Drainage Patterns (B10)  
☐ Dry-Season Water Table (C2)  
☐ Saturation Visible on Aerial Imagery (C9)  
☐ Geomorphic Position (D2)  
☐ Shallow Aquitard (D3)  
☐ FAC-Neutral Test (D5)  
☐ Raised Ant Mounds (D6) (**LRR A**)  
☐ Frost-Heave Hummocks (D7)

**Field Observations:**

Surface Water Present? Yes ☐ No ☒ Depth (inches): \_\_\_\_\_  
 Water Table Present? Yes ☐ No ☒ Depth (inches): \_\_\_\_\_  
 Saturation Present? Yes ☒ No ☐ Depth (inches): 8  
 (includes capillary fringe)

**Wetland Hydrology Present? Yes ☒ No ☐**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Hydrologic criteria observed through primary indicators A3 and C1.

# WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: 1193.0002 - Canterwood Phase II City/County: Gig Harbor / Pierce Sampling Date: 05/30/2018  
 Applicant/Owner: Swede Hill LLC State: WA Sampling Point: DP-8U  
 Investigator(s): Erin Harker Section, Township, Range: 25, 22N, 01E  
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 1  
 Subregion (LRR): A2 Lat: 47.3643968 Long: -122.6160325 Datum: WGS 84  
 Soil Map Unit Name: Harstine gravelly ashy sandy loam NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation       , Soil       , or Hydrology        significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation       , Soil       , or Hydrology        naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

|                                                                                                                         |                                                                                                              |
|-------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
| Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>                     | Is the Sampled Area<br>within a Wetland? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> |
| Hydric Soil Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>                                |                                                                                                              |
| Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>                          |                                                                                                              |
| Remarks:<br><b>Not all three wetland criteria were observed. Associated with DP-3 from the 2015 site investigation.</b> |                                                                                                              |

## VEGETATION – Use scientific names of plants.

| Tree Stratum (Plot size: 30 ft)                                                  | Absolute % Cover  | Dominant Species? | Indicator Status  | <b>Dominance Test worksheet:</b><br>Number of Dominant Species That Are OBL, FACW, or FAC: <u>3</u> (A)<br><br>Total Number of Dominant Species Across All Strata: <u>5</u> (B)<br><br>Percent of Dominant Species That Are OBL, FACW, or FAC: <u>60%</u> (A/B)                                                                                                                                                                                                                                                                                                                                                                                         |
|----------------------------------------------------------------------------------|-------------------|-------------------|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. <u>Alnus rubra</u>                                                            | <u>100</u>        | <u>Yes</u>        | <u>FAC</u>        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 2. <u>                    </u>                                                   | <u>          </u> | <u>          </u> | <u>          </u> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 3. <u>                    </u>                                                   | <u>          </u> | <u>          </u> | <u>          </u> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 4. <u>                    </u>                                                   | <u>          </u> | <u>          </u> | <u>          </u> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <u>100</u> = Total Cover                                                         |                   |                   |                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Sapling/Shrub Stratum (Plot size: 15 ft)</b>                                  |                   |                   |                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 1. <u>Gaultheria shallon</u>                                                     | <u>30</u>         | <u>Yes</u>        | <u>FACU</u>       | <b>Prevalence Index worksheet:</b><br>Total % Cover of: <u>0</u> Multiply by:<br>OBL species <u>0</u> x 1 = <u>0</u><br>FACW species <u>0</u> x 2 = <u>0</u><br>FAC species <u>130</u> x 3 = <u>390</u><br>FACU species <u>60</u> x 4 = <u>240</u><br>UPL species <u>0</u> x 5 = <u>0</u><br>Column Totals: <u>190</u> (A) <u>630</u> (B)<br><br>Prevalence Index = B/A = <u>3.32</u>                                                                                                                                                                                                                                                                   |
| 2. <u>Rubus spectabilis</u>                                                      | <u>15</u>         | <u>Yes</u>        | <u>FAC</u>        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 3. <u>                    </u>                                                   | <u>          </u> | <u>          </u> | <u>          </u> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 4. <u>                    </u>                                                   | <u>          </u> | <u>          </u> | <u>          </u> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 5. <u>                    </u>                                                   | <u>          </u> | <u>          </u> | <u>          </u> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <u>45</u> = Total Cover                                                          |                   |                   |                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Herb Stratum (Plot size: 5 ft)</b>                                            |                   |                   |                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 1. <u>Polystichum munitum</u>                                                    | <u>25</u>         | <u>Yes</u>        | <u>FACU</u>       | <b>Hydrophytic Vegetation Indicators:</b><br><input type="checkbox"/> Rapid Test for Hydrophytic Vegetation<br><input checked="" type="checkbox"/> Dominance Test is >50%<br><input type="checkbox"/> Prevalence Index is ≤3.0 <sup>1</sup><br><input type="checkbox"/> Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)<br><input type="checkbox"/> Wetland Non-Vascular Plants <sup>1</sup><br><input type="checkbox"/> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)<br><sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic. |
| 2. <u>Athyrium cyclosorum</u>                                                    | <u>15</u>         | <u>Yes</u>        | <u>FAC</u>        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 3. <u>Ilex aquifolium</u>                                                        | <u>5</u>          | <u>No</u>         | <u>FACU</u>       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 4. <u>                    </u>                                                   | <u>          </u> | <u>          </u> | <u>          </u> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 5. <u>                    </u>                                                   | <u>          </u> | <u>          </u> | <u>          </u> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 6. <u>                    </u>                                                   | <u>          </u> | <u>          </u> | <u>          </u> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 7. <u>                    </u>                                                   | <u>          </u> | <u>          </u> | <u>          </u> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 8. <u>                    </u>                                                   | <u>          </u> | <u>          </u> | <u>          </u> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 9. <u>                    </u>                                                   | <u>          </u> | <u>          </u> | <u>          </u> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 10. <u>                  </u>                                                    | <u>          </u> | <u>          </u> | <u>          </u> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 11. <u>                  </u>                                                    | <u>          </u> | <u>          </u> | <u>          </u> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <u>45</u> = Total Cover                                                          |                   |                   |                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Woody Vine Stratum (Plot size: 30 ft)</b>                                     |                   |                   |                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 1. <u>                    </u>                                                   | <u>          </u> | <u>          </u> | <u>          </u> | <b>Hydrophytic Vegetation Present?</b> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 2. <u>                    </u>                                                   | <u>          </u> | <u>          </u> | <u>          </u> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <u>0</u> = Total Cover                                                           |                   |                   |                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| % Bare Ground in Herb Stratum <u>55</u>                                          |                   |                   |                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Remarks: <b>Hydrophytic vegetation criteria observed through dominance test.</b> |                   |                   |                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |



## SOIL

Sampling Point: DP-8U

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth<br>(inches) | Matrix        |     | Redox Features |   |                   | Loc <sup>2</sup> | Texture | Remarks    |
|-------------------|---------------|-----|----------------|---|-------------------|------------------|---------|------------|
|                   | Color (moist) | %   | Color (moist)  | % | Type <sup>1</sup> |                  |         |            |
| 0 - 2             | Duff          | -   | -              | - | -                 | -                | Duff    |            |
| 2 - 16            | 10YR 3/3      | 100 | -              | - | -                 | -                | SaLo    | Sandy Loam |
|                   |               |     |                |   |                   |                  |         |            |
|                   |               |     |                |   |                   |                  |         |            |
|                   |               |     |                |   |                   |                  |         |            |
|                   |               |     |                |   |                   |                  |         |            |
|                   |               |     |                |   |                   |                  |         |            |
|                   |               |     |                |   |                   |                  |         |            |
|                   |               |     |                |   |                   |                  |         |            |

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.

<sup>2</sup>Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- |                                                            |                                                                            |
|------------------------------------------------------------|----------------------------------------------------------------------------|
| <input type="checkbox"/> Histosol (A1)                     | <input type="checkbox"/> Sandy Redox (S5)                                  |
| <input type="checkbox"/> Histic Epipedon (A2)              | <input type="checkbox"/> Stripped Matrix (S6)                              |
| <input type="checkbox"/> Black Histic (A3)                 | <input type="checkbox"/> Loamy Mucky Mineral (F1) ( <b>except MLRA 1</b> ) |
| <input type="checkbox"/> Hydrogen Sulfide (A4)             | <input type="checkbox"/> Loamy Gleyed Matrix (F2)                          |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Depleted Matrix (F3)                              |
| <input type="checkbox"/> Thick Dark Surface (A12)          | <input type="checkbox"/> Redox Dark Surface (F6)                           |
| <input type="checkbox"/> Sandy Mucky Mineral (S1)          | <input type="checkbox"/> Depleted Dark Surface (F7)                        |
| <input type="checkbox"/> Sandy Gleyed Matrix (S4)          | <input type="checkbox"/> Redox Depressions (F8)                            |

**Indicators for Problematic Hydric Soils<sup>3</sup>:**

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if present):**

Type: \_\_\_\_\_

Depth (inches): \_\_\_\_\_

**Hydric Soil Present? Yes ☐ No ☒**

Remarks:

No hydric soil criteria observed.

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one required; check all that apply)

- |                                                                    |                                                                                            |
|--------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
| <input type="checkbox"/> Surface Water (A1)                        | <input type="checkbox"/> Water-Stained Leaves (B9) ( <b>except MLRA 1, 2, 4A, and 4B</b> ) |
| <input type="checkbox"/> High Water Table (A2)                     | <input type="checkbox"/> Salt Crust (B11)                                                  |
| <input type="checkbox"/> Saturation (A3)                           | <input type="checkbox"/> Aquatic Invertebrates (B13)                                       |
| <input type="checkbox"/> Water Marks (B1)                          | <input type="checkbox"/> Hydrogen Sulfide Odor (C1)                                        |
| <input type="checkbox"/> Sediment Deposits (B2)                    | <input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)                     |
| <input type="checkbox"/> Drift Deposits (B3)                       | <input type="checkbox"/> Presence of Reduced Iron (C4)                                     |
| <input type="checkbox"/> Algal Mat or Crust (B4)                   | <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)                        |
| <input type="checkbox"/> Iron Deposits (B5)                        | <input type="checkbox"/> Stunted or Stressed Plants (D1) ( <b>LRR A</b> )                  |
| <input type="checkbox"/> Surface Soil Cracks (B6)                  | <input type="checkbox"/> Other (Explain in Remarks)                                        |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) |                                                                                            |
| <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)   |                                                                                            |

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (**LRR A**)
- ☐ Frost-Heave Hummocks (D7)

**Field Observations:**

Surface Water Present? Yes ☐ No ☒ Depth (inches): \_\_\_\_\_

Water Table Present? Yes ☐ No ☒ Depth (inches): \_\_\_\_\_

Saturation Present? Yes ☐ No ☒ Depth (inches): \_\_\_\_\_  
(includes capillary fringe)

**Wetland Hydrology Present? Yes ☐ No ☒**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No primary or secondary hydrologic indicators observed.

# WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: 1193.0002 - Canterwood Phase II City/County: Gig Harbor / Pierce Sampling Date: 05/30/2018  
 Applicant/Owner: Swede Hill LLC State: WA Sampling Point: DP-9W  
 Investigator(s): Erin Harker Section, Township, Range: 25, 22N, 01E  
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 5  
 Subregion (LRR): A2 Lat: 47.3598754 Long: -122.6120049 Datum: WGS 84  
 Soil Map Unit Name: Harstine gravelly ashy sandy loam NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation       , Soil       , or Hydrology        significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation       , Soil       , or Hydrology        naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

|                                                                                                                                                                                                                                                                                                   |                                                                                                                  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|
| Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/><br>Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/><br>Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> | <b>Is the Sampled Area within a Wetland?</b> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> |
| Remarks:<br><div style="border: 1px solid black; padding: 5px; text-align: center;"> <b>All three wetland criteria observed. Associated with DP-A-1W from the 2015 site investigation.</b> </div>                                                                                                 |                                                                                                                  |

## VEGETATION – Use scientific names of plants.

| <p><u>Tree Stratum</u> (Plot size: <u>30 ft</u>)</p> <table style="width: 100%;"> <thead> <tr> <th></th> <th style="text-align: center;">Absolute % Cover</th> <th style="text-align: center;">Dominant Species?</th> <th style="text-align: center;">Indicator Status</th> </tr> </thead> <tbody> <tr> <td>1. <u>Alnus rubra</u></td> <td style="text-align: center;">100</td> <td style="text-align: center;">Yes</td> <td style="text-align: center;">FAC</td> </tr> <tr><td>2. <u>                    </u></td><td></td><td></td><td></td></tr> <tr><td>3. <u>                    </u></td><td></td><td></td><td></td></tr> <tr><td>4. <u>                    </u></td><td></td><td></td><td></td></tr> <tr> <td></td> <td style="text-align: center;">100</td> <td colspan="2" style="text-align: center;">= Total Cover</td> </tr> </tbody> </table> <p><u>Sapling/Shrub Stratum</u> (Plot size: <u>15 ft</u>)</p> <table style="width: 100%;"> <thead> <tr> <th></th> <th style="text-align: center;">Absolute % Cover</th> <th style="text-align: center;">Dominant Species?</th> <th style="text-align: center;">Indicator Status</th> </tr> </thead> <tbody> <tr> <td>1. <u>Thuja plicata</u></td> <td style="text-align: center;">100</td> <td style="text-align: center;">Yes</td> <td style="text-align: center;">FAC</td> </tr> <tr><td>2. <u>                    </u></td><td></td><td></td><td></td></tr> <tr><td>3. <u>                    </u></td><td></td><td></td><td></td></tr> <tr><td>4. <u>                    </u></td><td></td><td></td><td></td></tr> <tr><td>5. <u>                    </u></td><td></td><td></td><td></td></tr> <tr> <td></td> <td style="text-align: center;">100</td> <td colspan="2" style="text-align: center;">= Total Cover</td> </tr> </tbody> </table> <p><u>Herb Stratum</u> (Plot size: <u>5 ft</u>)</p> <table style="width: 100%;"> <thead> <tr> <th></th> <th style="text-align: center;">Absolute % Cover</th> <th style="text-align: center;">Dominant Species?</th> <th style="text-align: center;">Indicator Status</th> </tr> </thead> <tbody> <tr> <td>1. <u>Athyrium cyclosorum</u></td> <td style="text-align: center;">40</td> <td style="text-align: center;">Yes</td> <td style="text-align: center;">FAC</td> </tr> <tr> <td>2. <u>Lysichiton americanus</u></td> <td style="text-align: center;">10</td> <td style="text-align: center;">No</td> <td style="text-align: center;">FACW</td> </tr> <tr> <td>3. <u>Rubus spectabilis</u></td> <td style="text-align: center;">10</td> <td style="text-align: center;">No</td> <td style="text-align: center;">FAC</td> </tr> <tr> <td>4. <u>Equisetum arvense</u></td> <td style="text-align: center;">5</td> <td style="text-align: center;">No</td> <td style="text-align: center;">FAC</td> </tr> <tr><td>5. <u>                    </u></td><td></td><td></td><td></td></tr> <tr><td>6. <u>                    </u></td><td></td><td></td><td></td></tr> <tr><td>7. <u>                    </u></td><td></td><td></td><td></td></tr> <tr><td>8. <u>                    </u></td><td></td><td></td><td></td></tr> <tr><td>9. <u>                    </u></td><td></td><td></td><td></td></tr> <tr><td>10. <u>                  </u></td><td></td><td></td><td></td></tr> <tr><td>11. <u>                  </u></td><td></td><td></td><td></td></tr> <tr> <td></td> <td style="text-align: center;">65</td> <td colspan="2" style="text-align: center;">= Total Cover</td> </tr> </tbody> </table> <p><u>Woody Vine Stratum</u> (Plot size: <u>30 ft</u>)</p> <table style="width: 100%;"> <thead> <tr> <th></th> <th style="text-align: center;">Absolute % Cover</th> <th style="text-align: center;">Dominant Species?</th> <th style="text-align: center;">Indicator Status</th> </tr> </thead> <tbody> <tr><td>1. <u>                    </u></td><td></td><td></td><td></td></tr> <tr><td>2. <u>                    </u></td><td></td><td></td><td></td></tr> <tr> <td></td> <td style="text-align: center;">0</td> <td colspan="2" style="text-align: center;">= Total Cover</td> </tr> </tbody> </table> <p>% Bare Ground in Herb Stratum <u>35</u></p> |                  | Absolute % Cover  | Dominant Species? | Indicator Status | 1. <u>Alnus rubra</u> | 100 | Yes | FAC | 2. <u>                    </u> |  |  |  | 3. <u>                    </u> |  |  |  | 4. <u>                    </u> |  |  |  |  | 100 | = Total Cover |  |  | Absolute % Cover | Dominant Species? | Indicator Status | 1. <u>Thuja plicata</u> | 100 | Yes | FAC | 2. <u>                    </u> |  |  |  | 3. <u>                    </u> |  |  |  | 4. <u>                    </u> |  |  |  | 5. <u>                    </u> |  |  |  |  | 100 | = Total Cover |  |  | Absolute % Cover | Dominant Species? | Indicator Status | 1. <u>Athyrium cyclosorum</u> | 40 | Yes | FAC | 2. <u>Lysichiton americanus</u> | 10 | No | FACW | 3. <u>Rubus spectabilis</u> | 10 | No | FAC | 4. <u>Equisetum arvense</u> | 5 | No | FAC | 5. <u>                    </u> |  |  |  | 6. <u>                    </u> |  |  |  | 7. <u>                    </u> |  |  |  | 8. <u>                    </u> |  |  |  | 9. <u>                    </u> |  |  |  | 10. <u>                  </u> |  |  |  | 11. <u>                  </u> |  |  |  |  | 65 | = Total Cover |  |  | Absolute % Cover | Dominant Species? | Indicator Status | 1. <u>                    </u> |  |  |  | 2. <u>                    </u> |  |  |  |  | 0 | = Total Cover |  | <p><b>Dominance Test worksheet:</b></p> <p>Number of Dominant Species That Are OBL, FACW, or FAC: <u>3</u> (A)</p> <p>Total Number of Dominant Species Across All Strata: <u>3</u> (B)</p> <p>Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100%</u> (A/B)</p> <p><b>Prevalence Index worksheet:</b></p> <table style="width: 100%;"> <thead> <tr> <th style="text-align: left;">Total % Cover of:</th> <th style="text-align: left;">Multiply by:</th> </tr> </thead> <tbody> <tr> <td>OBL species <u>0</u></td> <td>x 1 = <u>0</u></td> </tr> <tr> <td>FACW species <u>10</u></td> <td>x 2 = <u>20</u></td> </tr> <tr> <td>FAC species <u>255</u></td> <td>x 3 = <u>765</u></td> </tr> <tr> <td>FACU species <u>0</u></td> <td>x 4 = <u>0</u></td> </tr> <tr> <td>UPL species <u>0</u></td> <td>x 5 = <u>0</u></td> </tr> <tr> <td>Column Totals: <u>265</u> (A)</td> <td><u>785</u> (B)</td> </tr> </tbody> </table> <p style="text-align: center;">Prevalence Index = B/A = <u>2.96</u></p> <p><b>Hydrophytic Vegetation Indicators:</b></p> <p><input type="checkbox"/> Rapid Test for Hydrophytic Vegetation</p> <p><input checked="" type="checkbox"/> Dominance Test is &gt;50%</p> <p><input checked="" type="checkbox"/> Prevalence Index is ≤3.0<sup>1</sup></p> <p><input type="checkbox"/> Morphological Adaptations<sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)</p> <p><input type="checkbox"/> Wetland Non-Vascular Plants<sup>1</sup></p> <p><input type="checkbox"/> Problematic Hydrophytic Vegetation<sup>1</sup> (Explain)</p> <p><sup>1</sup>Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.</p> <p><b>Hydrophytic Vegetation Present?</b> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/></p> | Total % Cover of: | Multiply by: | OBL species <u>0</u> | x 1 = <u>0</u> | FACW species <u>10</u> | x 2 = <u>20</u> | FAC species <u>255</u> | x 3 = <u>765</u> | FACU species <u>0</u> | x 4 = <u>0</u> | UPL species <u>0</u> | x 5 = <u>0</u> | Column Totals: <u>265</u> (A) | <u>785</u> (B) |
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-----------|--|--|--|--------------------------------|--|--|--|-------------------------------|--|--|--|-------------------------------|--|--|--|--|----|---------------|--|--|------------------|-------------------|------------------|--------------------------------|--|--|--|--------------------------------|--|--|--|--|---|---------------|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|--------------|----------------------|----------------|------------------------|-----------------|------------------------|------------------|-----------------------|----------------|----------------------|----------------|-------------------------------|----------------|
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| Indicator Status  |                  |                       |     |     |     |                                |  |  |  |                                |  |  |  |                                |  |  |  |  |     |               |  |  |                  |                   |                  |                         |     |     |     |                                |  |  |  |                                |  |  |  |                                |  |  |  |                                |  |  |  |  |     |               |  |  |                  |                   |                  |                               |    |     |     |                                 |    |    |      |                             |    |    |     |                             |   |    |     |                                |  |  |  |                                |  |  |  |                                |  |  |  |                                |  |  |  |                                |  |  |  |                               |  |  |  |                               |  |  |  |  |    |               |  |  |                  |                   |                  |                                |  |  |  |                                |  |  |  |  |   |               |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                   |              |                      |                |                        |                 |                        |                  |                       |                |                      |                |                               |                |
| 1. <u>Alnus rubra</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 100              | Yes               | FAC               |                  |                       |     |     |     |                                |  |  |  |                                |  |  |  |                                |  |  |  |  |     |               |  |  |                  |                   |                  |                         |     |     |     |                                |  |  |  |                                |  |  |  |                                |  |  |  |                                |  |  |  |  |     |               |  |  |                  |                   |                  |                               |    |     |     |                                 |    |    |      |                             |    |    |     |                             |   |    |     |                                |  |  |  |                                |  |  |  |                                |  |  |  |                          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| 2. <u>                    </u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         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| 3. <u>                    </u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         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| 1. <u>Thuja plicata</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                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| 1. <u>Athyrium cyclosorum</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          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| 2. <u>Lysichiton americanus</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        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| 3. <u>Rubus spectabilis</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            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| 4. <u>Equisetum arvense</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            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                     | x 2 = <u>20</u>  |                   |                   |                  |                       |     |     |     |                                |  |  |  |                                |  |  |  |                                |  |  |  |  |     |               |  |  |                  |                   |                  |                         |     |     |     |                                |  |  |  |                                |  |  |  |                                |  |  |  |                                |  |  |  |  |     |               |  |  |                  |                   |                  |                               |    |     |     |                                 |    |    |      |                             |    |    |     |                             |   |    |     |                                |  |  |  |                                |  |  |  |                                |  |  |  |                          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                                                                                                    |                   |              |                      |                |                        |                 |                        |                  |                       |                |                      |                |                               |                |
| FAC species <u>255</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | x 3 = <u>765</u> |                   |                   |                  |                       |     |     |     |                                |  |  |  |                                |  |  |  |                                |  |  |  |  |     |               |  |  |                  |                   |                  |                         |     |     |     |                                |  |  |  |                                |  |  |  |                                |  |  |  |                                |  |  |  |  |     |               |  |  |                  |                   |                  |                               |    |     |     |                                 |    |    |      |                             |    |    |     |                             |   |    |     |                                |  |  |  |                                |  |  |  |                                |  |  |  |                          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                                                                                                    |                   |              |                      |                |                        |                 |                        |                  |                       |                |                      |                |                               |                |
| FACU species <u>0</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | x 4 = <u>0</u>   |                   |                   |                  |                       |     |     |     |                                |  |  |  |                                |  |  |  |                                |  |  |  |  |     |               |  |  |                  |                   |                  |                         |     |     |     |                                |  |  |  |                                |  |  |  |                                |  |  |  |                                |  |  |  |  |     |               |  |  |                  |                   |                  |                               |    |     |     |                                 |    |    |      |                             |    |    |     |                             |   |    |     |                                |  |  |  |                                |  |  |  |                                |  |  |  |                          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                                                                                                    |                   |              |                      |                |                        |                 |                        |                  |                       |                |                      |                |                               |                |
| UPL species <u>0</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | x 5 = <u>0</u>   |                   |                   |                  |                       |     |     |     |                                |  |  |  |                                |  |  |  |                                |  |  |  |  |     |               |  |  |                  |                   |                  |                         |     |     |     |                                |  |  |  |                                |  |  |  |                                |  |  |  |                                |  |  |  |  |     |               |  |  |                  |                   |                  |                               |    |     |     |                                 |    |    |      |                             |    |    |     |                             |   |    |     |                                |  |  |  |                                |  |  |  |                                |  |  |  |                          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                                                                                                    |                   |              |                      |                |                        |                 |                        |                  |                       |                |                      |                |                               |                |
| Column Totals: <u>265</u> (A)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <u>785</u> (B)   |                   |                   |                  |                       |     |     |     |                                |  |  |  |                                |  |  |  |                                |  |  |  |  |     |               |  |  |                  |                   |                  |                         |     |     |     |                                |  |  |  |                                |  |  |  |                                |  |  |  |                                |  |  |  |  |     |               |  |  |                  |                   |                  |                               |    |     |     |                                 |    |    |      |                             |    |    |     |                             |   |    |     |                                |  |  |  |                                |  |  |  |                                |  |  |  |                          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                                                                                                    |                   |              |                      |                |                        |                 |                        |                  |                       |                |                      |                |                               |                |
| Remarks:<br>Hydrophytic vegetation criteria observed through dominance test and prevalence index.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  |                   |                   |                  |                       |     |     |     |                                |  |  |  |                                |  |  |  |                                |  |  |  |  |     |               |  |  |                  |                   |                  |                         |     |     |     |                                |  |  |  |                                |  |  |  |                                |  |  |  |                                |  |  |  |  |     |               |  |  |                  |                   |                  |                               |    |     |     |                                 |    |    |      |                             |    |    |     |                             |   |    |     |                                |  |  |  |                                |  |  |  |                                |  |  |  |                          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                                                                                                    |                   |              |                      |                |                        |                 |                        |                  |                       |                |                      |                |                               |                |

# SOIL

Sampling Point: DP-9W

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth<br>(inches) | Matrix        |     | Redox Features |   |                   | Loc <sup>2</sup> | Texture | Remarks |
|-------------------|---------------|-----|----------------|---|-------------------|------------------|---------|---------|
|                   | Color (moist) | %   | Color (moist)  | % | Type <sup>1</sup> |                  |         |         |
| 0 - 16            | 10YR 2/1      | 100 | -              | - | -                 | -                | Organic |         |
|                   |               |     |                |   |                   |                  |         |         |
|                   |               |     |                |   |                   |                  |         |         |
|                   |               |     |                |   |                   |                  |         |         |
|                   |               |     |                |   |                   |                  |         |         |
|                   |               |     |                |   |                   |                  |         |         |
|                   |               |     |                |   |                   |                  |         |         |
|                   |               |     |                |   |                   |                  |         |         |

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.

<sup>2</sup>Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- |                                                            |                                                                            |
|------------------------------------------------------------|----------------------------------------------------------------------------|
| <input checked="" type="checkbox"/> Histosol (A1)          | <input type="checkbox"/> Sandy Redox (S5)                                  |
| <input type="checkbox"/> Histic Epipedon (A2)              | <input type="checkbox"/> Stripped Matrix (S6)                              |
| <input type="checkbox"/> Black Histic (A3)                 | <input type="checkbox"/> Loamy Mucky Mineral (F1) ( <b>except MLRA 1</b> ) |
| <input checked="" type="checkbox"/> Hydrogen Sulfide (A4)  | <input type="checkbox"/> Loamy Gleyed Matrix (F2)                          |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Depleted Matrix (F3)                              |
| <input type="checkbox"/> Thick Dark Surface (A12)          | <input type="checkbox"/> Redox Dark Surface (F6)                           |
| <input type="checkbox"/> Sandy Mucky Mineral (S1)          | <input type="checkbox"/> Depleted Dark Surface (F7)                        |
| <input type="checkbox"/> Sandy Gleyed Matrix (S4)          | <input type="checkbox"/> Redox Depressions (F8)                            |

**Indicators for Problematic Hydric Soils<sup>3</sup>:**

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if present):**

Type: \_\_\_\_\_

Depth (inches): \_\_\_\_\_

**Hydric Soil Present? Yes ☒ No ☐**

Remarks:

Hydric soil criteria observed through indicators A1 and A4.

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one required; check all that apply)

- |                                                                    |                                                                                            |
|--------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
| <input type="checkbox"/> Surface Water (A1)                        | <input type="checkbox"/> Water-Stained Leaves (B9) ( <b>except MLRA 1, 2, 4A, and 4B</b> ) |
| <input type="checkbox"/> High Water Table (A2)                     | <input type="checkbox"/> Salt Crust (B11)                                                  |
| <input checked="" type="checkbox"/> Saturation (A3)                | <input type="checkbox"/> Aquatic Invertebrates (B13)                                       |
| <input type="checkbox"/> Water Marks (B1)                          | <input checked="" type="checkbox"/> Hydrogen Sulfide Odor (C1)                             |
| <input type="checkbox"/> Sediment Deposits (B2)                    | <input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)                     |
| <input type="checkbox"/> Drift Deposits (B3)                       | <input type="checkbox"/> Presence of Reduced Iron (C4)                                     |
| <input type="checkbox"/> Algal Mat or Crust (B4)                   | <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)                        |
| <input type="checkbox"/> Iron Deposits (B5)                        | <input type="checkbox"/> Stunted or Stressed Plants (D1) ( <b>LRR A</b> )                  |
| <input type="checkbox"/> Surface Soil Cracks (B6)                  | <input type="checkbox"/> Other (Explain in Remarks)                                        |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) |                                                                                            |
| <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)   |                                                                                            |

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (**LRR A**)
- ☐ Frost-Heave Hummocks (D7)

**Field Observations:**

Surface Water Present? Yes ☐ No ☒ Depth (inches): \_\_\_\_\_

Water Table Present? Yes ☒ No ☐ Depth (inches): 14

Saturation Present? Yes ☒ No ☐ Depth (inches): 0  
(includes capillary fringe)

**Wetland Hydrology Present? Yes ☒ No ☐**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Hydrologic criteria observed through primary indicators A3 and C1.



Project/Site: 1193.0002 - Canterwood Phase II City/County: Gig Harbor / Pierce Sampling Date: 05/30/2018  
Applicant/Owner: Swede Hill LLC State: WA Sampling Point: DP-10U  
Investigator(s): Erin Harker Section, Township, Range: 25, 22N, 01E  
Landform (hillslope, terrace, etc.): Valley Floor Local relief (concave, convex, none): None Slope (%): 0  
Subregion (LRR): A2 Lat: 47.364654 Long: -122.61663437 Datum: WGS 84  
Soil Map Unit Name: Harstine gravelly ashy sandy loam NWI classification: N/A

Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ naturally problematic? (If needed, explain any answers in Remarks.)

|                                                                                                                           |                                                                     |                                                  |                                                                     |
|---------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|--------------------------------------------------|---------------------------------------------------------------------|
| Hydrophytic Vegetation Present?                                                                                           | Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> | <b>Is the Sampled Area<br/>within a Wetland?</b> | Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> |
| Hydric Soil Present?                                                                                                      | Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> |                                                  |                                                                     |
| Wetland Hydrology Present?                                                                                                | Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> |                                                  |                                                                     |
| Remarks:<br><b>No wetland criteria were observed. Associated with DP-A-2U (revised) from the 2015 site investigation.</b> |                                                                     |                                                  |                                                                     |

| <u>Tree Stratum</u>                                    | (Plot size: <u>30 ft</u> )              | Absolute<br>% Cover | Dominant<br>Species? | Indicator<br>Status |
|--------------------------------------------------------|-----------------------------------------|---------------------|----------------------|---------------------|
| 1.                                                     | <u>Tsuga heterophylla</u>               | <u>90</u>           | <u>Yes</u>           | <u>FACU</u>         |
| 2.                                                     | <u>                                </u> | <u>            </u> | <u>            </u>  | <u>            </u> |
| 3.                                                     | <u>                                </u> | <u>            </u> | <u>            </u>  | <u>            </u> |
| 4.                                                     | <u>                                </u> | <u>            </u> | <u>            </u>  | <u>            </u> |
|                                                        |                                         | <u>90</u>           | <u>= Total Cover</u> |                     |
| <u>Sapling/Shrub Stratum</u>                           | (Plot size: <u>15 ft</u> )              |                     |                      |                     |
| 1.                                                     | <u>Gaultheria shallon</u>               | <u>25</u>           | <u>Yes</u>           | <u>FACU</u>         |
| 2.                                                     | <u>Vaccinium ovatum</u>                 | <u>15</u>           | <u>Yes</u>           | <u>FACU</u>         |
| 3.                                                     | <u>                                </u> | <u>            </u> | <u>            </u>  | <u>            </u> |
| 4.                                                     | <u>                                </u> | <u>            </u> | <u>            </u>  | <u>            </u> |
| 5.                                                     | <u>                                </u> | <u>            </u> | <u>            </u>  | <u>            </u> |
|                                                        |                                         | <u>40</u>           | <u>= Total Cover</u> |                     |
| <u>Herb Stratum</u>                                    | (Plot size: <u>5 ft</u> )               |                     |                      |                     |
| 1.                                                     | <u>Blechnum spicant</u>                 | <u>75</u>           | <u>Yes</u>           | <u>FAC</u>          |
| 2.                                                     | <u>Athyrium cyclosorum</u>              | <u>10</u>           | <u>No</u>            | <u>FAC</u>          |
| 3.                                                     | <u>                                </u> | <u>            </u> | <u>            </u>  | <u>            </u> |
| 4.                                                     | <u>                                </u> | <u>            </u> | <u>            </u>  | <u>            </u> |
| 5.                                                     | <u>                                </u> | <u>            </u> | <u>            </u>  | <u>            </u> |
| 6.                                                     | <u>                                </u> | <u>            </u> | <u>            </u>  | <u>            </u> |
| 7.                                                     | <u>                                </u> | <u>            </u> | <u>            </u>  | <u>            </u> |
| 8.                                                     | <u>                                </u> | <u>            </u> | <u>            </u>  | <u>            </u> |
| 9.                                                     | <u>                                </u> | <u>            </u> | <u>            </u>  | <u>            </u> |
| 10.                                                    | <u>                                </u> | <u>            </u> | <u>            </u>  | <u>            </u> |
| 11.                                                    | <u>                                </u> | <u>            </u> | <u>            </u>  | <u>            </u> |
|                                                        |                                         | <u>85</u>           | <u>= Total Cover</u> |                     |
| <u>Woody Vine Stratum</u>                              | (Plot size: <u>30 ft</u> )              |                     |                      |                     |
| 1.                                                     | <u>                                </u> | <u>            </u> | <u>            </u>  | <u>            </u> |
| 2.                                                     | <u>                                </u> | <u>            </u> | <u>            </u>  | <u>            </u> |
|                                                        |                                         | <u>0</u>            | <u>= Total Cover</u> |                     |
| % Bare Ground in Herb Stratum <u>15</u>                |                                         |                     |                      |                     |
| Remarks: <u>No hydrophytic criteria were observed.</u> |                                         |                     |                      |                     |

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 25% (A/B)

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**Prevalence Index worksheet:**

| Total % Cover of:         | Multiply by:       |
|---------------------------|--------------------|
| OBL species <u>0</u>      | x 1 = <u>0</u>     |
| FACW species <u>0</u>     | x 2 = <u>0</u>     |
| FAC species <u>85</u>     | x 3 = <u>255</u>   |
| FACU species <u>130</u>   | x 4 = <u>520</u>   |
| UPL species <u>0</u>      | x 5 = <u>0</u>     |
| Column Totals: <u>215</u> | (A) <u>775</u> (B) |

Prevalence Index = B/A = 3.6

---

**Hydrophytic Vegetation Indicators:**

- ☐ Rapid Test for Hydrophytic Vegetation
- ☐ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0<sup>1</sup>
- ☐ Morphological Adaptations<sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants<sup>1</sup>
- ☐ Problematic Hydrophytic Vegetation<sup>1</sup> (Explain)

<sup>1</sup>Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

---

**Hydrophytic Vegetation Present?**      Yes ☐    No ☒

## SOIL

Sampling Point: DP-10U

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth<br>(inches) | Matrix        |     | Redox Features |   |                   | Loc <sup>2</sup> | Texture | Remarks                |
|-------------------|---------------|-----|----------------|---|-------------------|------------------|---------|------------------------|
|                   | Color (moist) | %   | Color (moist)  | % | Type <sup>1</sup> |                  |         |                        |
| 0 - 8             | Duff          | -   | -              | - | -                 | -                | Duff    |                        |
| 8 - 16            | 7.5YR 2.5/1   | 100 | -              | - | -                 | -                | SiLo    | Silty Loam w/ organics |
|                   |               |     |                |   |                   |                  |         |                        |
|                   |               |     |                |   |                   |                  |         |                        |
|                   |               |     |                |   |                   |                  |         |                        |
|                   |               |     |                |   |                   |                  |         |                        |
|                   |               |     |                |   |                   |                  |         |                        |
|                   |               |     |                |   |                   |                  |         |                        |
|                   |               |     |                |   |                   |                  |         |                        |

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.

<sup>2</sup>Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- |                                                            |                                                                            |
|------------------------------------------------------------|----------------------------------------------------------------------------|
| <input type="checkbox"/> Histosol (A1)                     | <input type="checkbox"/> Sandy Redox (S5)                                  |
| <input type="checkbox"/> Histic Epipedon (A2)              | <input type="checkbox"/> Stripped Matrix (S6)                              |
| <input type="checkbox"/> Black Histic (A3)                 | <input type="checkbox"/> Loamy Mucky Mineral (F1) ( <b>except MLRA 1</b> ) |
| <input type="checkbox"/> Hydrogen Sulfide (A4)             | <input type="checkbox"/> Loamy Gleyed Matrix (F2)                          |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Depleted Matrix (F3)                              |
| <input type="checkbox"/> Thick Dark Surface (A12)          | <input type="checkbox"/> Redox Dark Surface (F6)                           |
| <input type="checkbox"/> Sandy Mucky Mineral (S1)          | <input type="checkbox"/> Depleted Dark Surface (F7)                        |
| <input type="checkbox"/> Sandy Gleyed Matrix (S4)          | <input type="checkbox"/> Redox Depressions (F8)                            |

**Indicators for Problematic Hydric Soils<sup>3</sup>:**

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if present):**

Type: \_\_\_\_\_

Depth (inches): \_\_\_\_\_

**Hydric Soil Present? Yes ☐ No ☒**

Remarks:

No hydric soil criteria were observed.

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one required; check all that apply)

- |                                                                    |                                                                                            |
|--------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
| <input type="checkbox"/> Surface Water (A1)                        | <input type="checkbox"/> Water-Stained Leaves (B9) ( <b>except MLRA 1, 2, 4A, and 4B</b> ) |
| <input type="checkbox"/> High Water Table (A2)                     | <input type="checkbox"/> Salt Crust (B11)                                                  |
| <input type="checkbox"/> Saturation (A3)                           | <input type="checkbox"/> Aquatic Invertebrates (B13)                                       |
| <input type="checkbox"/> Water Marks (B1)                          | <input type="checkbox"/> Hydrogen Sulfide Odor (C1)                                        |
| <input type="checkbox"/> Sediment Deposits (B2)                    | <input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)                     |
| <input type="checkbox"/> Drift Deposits (B3)                       | <input type="checkbox"/> Presence of Reduced Iron (C4)                                     |
| <input type="checkbox"/> Algal Mat or Crust (B4)                   | <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)                        |
| <input type="checkbox"/> Iron Deposits (B5)                        | <input type="checkbox"/> Stunted or Stressed Plants (D1) ( <b>LRR A</b> )                  |
| <input type="checkbox"/> Surface Soil Cracks (B6)                  | <input type="checkbox"/> Other (Explain in Remarks)                                        |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) |                                                                                            |
| <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)   |                                                                                            |

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (**LRR A**)
- ☐ Frost-Heave Hummocks (D7)

**Field Observations:**

Surface Water Present? Yes ☐ No ☒ Depth (inches): \_\_\_\_\_

Water Table Present? Yes ☐ No ☒ Depth (inches): \_\_\_\_\_

Saturation Present? Yes ☐ No ☒ Depth (inches): \_\_\_\_\_  
(includes capillary fringe)

**Wetland Hydrology Present? Yes ☐ No ☒**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No primary or secondary hydrologic indicators observed.

# WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: 1193.0002 - Canterwood Phase II City/County: Gig Harbor / Pierce Sampling Date: 05/30/2018  
 Applicant/Owner: Swede Hill LLC State: WA Sampling Point: DP-11W  
 Investigator(s): Erin Harker Section, Township, Range: 25, 22N, 01E  
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 1  
 Subregion (LRR): A2 Lat: 47.364398 Long: -122.61574602 Datum: WGS 84  
 Soil Map Unit Name: Harstine gravelly ashy sandy loam NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation       , Soil       , or Hydrology        significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation       , Soil       , or Hydrology        naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

|                                                                                                                       |                                                                                                              |
|-----------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
| Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>                   | Is the Sampled Area<br>within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> |
| Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>                              |                                                                                                              |
| Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>                        |                                                                                                              |
| Remarks:<br><b>All three wetland criteria were observed. Associated with DP-E1W from the 2015 site investigation.</b> |                                                                                                              |

## VEGETATION – Use scientific names of plants.

| Tree Stratum (Plot size: 30 ft)                                       | Absolute % Cover | Dominant Species? | Indicator Status | Dominance Test worksheet:                                                                                                   |
|-----------------------------------------------------------------------|------------------|-------------------|------------------|-----------------------------------------------------------------------------------------------------------------------------|
| 1. <u>Alnus rubra</u>                                                 | <u>100</u>       | <u>Yes</u>        | <u>FAC</u>       |                                                                                                                             |
| 2. <u>      </u>                                                      | <u>      </u>    | <u>      </u>     | <u>      </u>    | Total Number of Dominant Species Across All Strata: <u>4</u> (B)                                                            |
| 3. <u>      </u>                                                      | <u>      </u>    | <u>      </u>     | <u>      </u>    | Percent of Dominant Species That Are OBL, FACW, or FAC: <u>75%</u> (A/B)                                                    |
| 4. <u>      </u>                                                      | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                             |
| <u>100</u> = Total Cover                                              |                  |                   |                  |                                                                                                                             |
| Sapling/Shrub Stratum (Plot size: 15 ft)                              | Absolute % Cover | Dominant Species? | Indicator Status | Prevalence Index worksheet:                                                                                                 |
| 1. <u>Rubus spectabilis</u>                                           | <u>60</u>        | <u>Yes</u>        | <u>FAC</u>       |                                                                                                                             |
| 2. <u>      </u>                                                      | <u>      </u>    | <u>      </u>     | <u>      </u>    | OBL species <u>0</u> x 1 = <u>0</u>                                                                                         |
| 3. <u>      </u>                                                      | <u>      </u>    | <u>      </u>     | <u>      </u>    | FACW species <u>0</u> x 2 = <u>0</u>                                                                                        |
| 4. <u>      </u>                                                      | <u>      </u>    | <u>      </u>     | <u>      </u>    | FAC species <u>175</u> x 3 = <u>525</u>                                                                                     |
| 5. <u>      </u>                                                      | <u>      </u>    | <u>      </u>     | <u>      </u>    | FACU species <u>35</u> x 4 = <u>140</u>                                                                                     |
| <u>60</u> = Total Cover                                               |                  |                   |                  | UPL species <u>0</u> x 5 = <u>0</u>                                                                                         |
|                                                                       |                  |                   |                  | Column Totals: <u>210</u> (A) <u>665</u> (B)                                                                                |
|                                                                       |                  |                   |                  | Prevalence Index = B/A = <u>3.17</u>                                                                                        |
| Herb Stratum (Plot size: 5 ft)                                        | Absolute % Cover | Dominant Species? | Indicator Status | Hydrophytic Vegetation Indicators:                                                                                          |
| 1. <u>Tellima grandiflora</u>                                         | <u>35</u>        | <u>Yes</u>        | <u>FACU</u>      |                                                                                                                             |
| 2. <u>Athyrium cyclosorum</u>                                         | <u>15</u>        | <u>Yes</u>        | <u>FAC</u>       | <input checked="" type="checkbox"/> Dominance Test is >50%                                                                  |
| 3. <u>      </u>                                                      | <u>      </u>    | <u>      </u>     | <u>      </u>    | <input type="checkbox"/> Prevalence Index is ≤3.0 <sup>1</sup>                                                              |
| 4. <u>      </u>                                                      | <u>      </u>    | <u>      </u>     | <u>      </u>    | <input type="checkbox"/> Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet) |
| 5. <u>      </u>                                                      | <u>      </u>    | <u>      </u>     | <u>      </u>    | <input type="checkbox"/> Wetland Non-Vascular Plants <sup>1</sup>                                                           |
| 6. <u>      </u>                                                      | <u>      </u>    | <u>      </u>     | <u>      </u>    | <input type="checkbox"/> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)                                          |
| 7. <u>      </u>                                                      | <u>      </u>    | <u>      </u>     | <u>      </u>    | <sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.              |
| 8. <u>      </u>                                                      | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                             |
| 9. <u>      </u>                                                      | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                             |
| 10. <u>      </u>                                                     | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                             |
| 11. <u>      </u>                                                     | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                             |
| <u>50</u> = Total Cover                                               |                  |                   |                  |                                                                                                                             |
| Woody Vine Stratum (Plot size: 30 ft)                                 | Absolute % Cover | Dominant Species? | Indicator Status | Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>                         |
| 1. <u>      </u>                                                      | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                             |
| 2. <u>      </u>                                                      | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                             |
| <u>0</u> = Total Cover                                                |                  |                   |                  |                                                                                                                             |
| % Bare Ground in Herb Stratum <u>50</u>                               |                  |                   |                  |                                                                                                                             |
| Remarks: <u>Hydrophytic criteria observed through dominance test.</u> |                  |                   |                  |                                                                                                                             |



## SOIL

Sampling Point: DP-11W

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth<br>(inches) | Matrix        |     | Redox Features |   |                   | Loc <sup>2</sup> | Texture | Remarks   |
|-------------------|---------------|-----|----------------|---|-------------------|------------------|---------|-----------|
|                   | Color (moist) | %   | Color (moist)  | % | Type <sup>1</sup> |                  |         |           |
| 0 - 14            | 10YR 2/1      | 100 | -              | - | -                 | -                | Organic |           |
| 14-16             | 10YR 2/1      | 100 | -              | - | -                 | -                | Organic | with sand |
|                   |               |     |                |   |                   |                  |         |           |
|                   |               |     |                |   |                   |                  |         |           |
|                   |               |     |                |   |                   |                  |         |           |
|                   |               |     |                |   |                   |                  |         |           |
|                   |               |     |                |   |                   |                  |         |           |
|                   |               |     |                |   |                   |                  |         |           |
|                   |               |     |                |   |                   |                  |         |           |

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.

<sup>2</sup>Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- |                                                            |                                                                            |
|------------------------------------------------------------|----------------------------------------------------------------------------|
| <input checked="" type="checkbox"/> Histosol (A1)          | <input type="checkbox"/> Sandy Redox (S5)                                  |
| <input type="checkbox"/> Histic Epipedon (A2)              | <input type="checkbox"/> Stripped Matrix (S6)                              |
| <input type="checkbox"/> Black Histic (A3)                 | <input type="checkbox"/> Loamy Mucky Mineral (F1) ( <b>except MLRA 1</b> ) |
| <input type="checkbox"/> Hydrogen Sulfide (A4)             | <input type="checkbox"/> Loamy Gleyed Matrix (F2)                          |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Depleted Matrix (F3)                              |
| <input type="checkbox"/> Thick Dark Surface (A12)          | <input type="checkbox"/> Redox Dark Surface (F6)                           |
| <input type="checkbox"/> Sandy Mucky Mineral (S1)          | <input type="checkbox"/> Depleted Dark Surface (F7)                        |
| <input type="checkbox"/> Sandy Gleyed Matrix (S4)          | <input type="checkbox"/> Redox Depressions (F8)                            |

**Indicators for Problematic Hydric Soils<sup>3</sup>:**

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if present):**

Type: \_\_\_\_\_

Depth (inches): \_\_\_\_\_

**Hydric Soil Present? Yes ☒ No ☐**

Remarks:

Hydric soil criteria observed through indicator A1.

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one required; check all that apply)

- |                                                                    |                                                                                            |
|--------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
| <input type="checkbox"/> Surface Water (A1)                        | <input type="checkbox"/> Water-Stained Leaves (B9) ( <b>except MLRA 1, 2, 4A, and 4B</b> ) |
| <input type="checkbox"/> High Water Table (A2)                     | <input type="checkbox"/> Salt Crust (B11)                                                  |
| <input checked="" type="checkbox"/> Saturation (A3)                | <input type="checkbox"/> Aquatic Invertebrates (B13)                                       |
| <input type="checkbox"/> Water Marks (B1)                          | <input type="checkbox"/> Hydrogen Sulfide Odor (C1)                                        |
| <input type="checkbox"/> Sediment Deposits (B2)                    | <input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)                     |
| <input type="checkbox"/> Drift Deposits (B3)                       | <input type="checkbox"/> Presence of Reduced Iron (C4)                                     |
| <input type="checkbox"/> Algal Mat or Crust (B4)                   | <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)                        |
| <input type="checkbox"/> Iron Deposits (B5)                        | <input type="checkbox"/> Stunted or Stressed Plants (D1) ( <b>LRR A</b> )                  |
| <input type="checkbox"/> Surface Soil Cracks (B6)                  | <input type="checkbox"/> Other (Explain in Remarks)                                        |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) |                                                                                            |
| <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)   |                                                                                            |

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (**LRR A**)
- ☐ Frost-Heave Hummocks (D7)

**Field Observations:**

Surface Water Present? Yes ☐ No ☒ Depth (inches): \_\_\_\_\_

Water Table Present? Yes ☒ No ☐ Depth (inches): 16

Saturation Present? Yes ☒ No ☐ Depth (inches): 0  
(includes capillary fringe)

**Wetland Hydrology Present? Yes ☒ No ☐**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Hydrologic indicators observed through indicator A3.

# WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: 1193.0002 - Canterwood Phase II City/County: Gig Harbor / Pierce Sampling Date: 05/30/2018  
 Applicant/Owner: Swede Hill LLC State: WA Sampling Point: DP-12U  
 Investigator(s): Erin Harker Section, Township, Range: 25, 22N, 01E  
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 5  
 Subregion (LRR): A2 Lat: 47.364385 Long: -122.61568759 Datum: WGS 84  
 Soil Map Unit Name: Harstine gravelly ashy sandy loam NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation       , Soil       , or Hydrology        significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation       , Soil       , or Hydrology        naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

|                                                                                                                |                                                                                                              |
|----------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
| Hydrophytic Vegetation Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>            | Is the Sampled Area<br>within a Wetland? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> |
| Hydric Soil Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>                       |                                                                                                              |
| Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>                 |                                                                                                              |
| Remarks:<br><b>No wetland criteria were observed. Associated with DP-E-2 from the 2015 site investigation.</b> |                                                                                                              |

## VEGETATION – Use scientific names of plants.

| Tree Stratum (Plot size: 30 ft)                        | Absolute % Cover | Dominant Species? | Indicator Status | <b>Dominance Test worksheet:</b><br>Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A)<br><br>Total Number of Dominant Species Across All Strata: <u>5</u> (B)<br><br>Percent of Dominant Species That Are OBL, FACW, or FAC: <u>20%</u> (A/B)                                                                                                                                                                                                                                                                                                                                                                              |
|--------------------------------------------------------|------------------|-------------------|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. <u>Acer macrophyllum</u>                            | <u>90</u>        | <u>Yes</u>        | <u>FACU</u>      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 2. <u>Alnus rubra</u>                                  | <u>10</u>        | <u>No</u>         | <u>FAC</u>       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 3. <u>      </u>                                       | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 4. <u>      </u>                                       | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <u>100</u> = Total Cover                               |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Sapling/Shrub Stratum (Plot size: 15 ft)</b>        |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 1. <u>Rubus spectabilis</u>                            | <u>30</u>        | <u>Yes</u>        | <u>FAC</u>       | <b>Prevalence Index worksheet:</b><br>Total % Cover of: Multiply by:<br>OBL species <u>0</u> x 1 = <u>0</u><br>FACW species <u>0</u> x 2 = <u>0</u><br>FAC species <u>40</u> x 3 = <u>120</u><br>FACU species <u>170</u> x 4 = <u>680</u><br>UPL species <u>0</u> x 5 = <u>0</u><br>Column Totals: <u>210</u> (A) <u>800</u> (B)<br><br>Prevalence Index = B/A = <u>3.81</u>                                                                                                                                                                                                                                                                 |
| 2. <u>Tsuga heterophylla</u>                           | <u>25</u>        | <u>Yes</u>        | <u>FACU</u>      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 3. <u>Symphoricarpos albus</u>                         | <u>10</u>        | <u>No</u>         | <u>FACU</u>      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 4. <u>      </u>                                       | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 5. <u>      </u>                                       | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <u>65</u> = Total Cover                                |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Herb Stratum (Plot size: 5 ft)</b>                  |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 1. <u>Polystichum munitum</u>                          | <u>35</u>        | <u>Yes</u>        | <u>FACU</u>      | <b>Hydrophytic Vegetation Indicators:</b><br><input type="checkbox"/> Rapid Test for Hydrophytic Vegetation<br><input type="checkbox"/> Dominance Test is >50%<br><input type="checkbox"/> Prevalence Index is ≤3.0 <sup>1</sup><br><input type="checkbox"/> Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)<br><input type="checkbox"/> Wetland Non-Vascular Plants <sup>1</sup><br><input type="checkbox"/> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)<br><sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic. |
| 2. <u>Rubus spectabilis</u>                            | <u>10</u>        | <u>Yes</u>        | <u>FACU</u>      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 3. <u>      </u>                                       | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 4. <u>      </u>                                       | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 5. <u>      </u>                                       | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 6. <u>      </u>                                       | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 7. <u>      </u>                                       | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 8. <u>      </u>                                       | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 9. <u>      </u>                                       | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 10. <u>      </u>                                      | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 11. <u>      </u>                                      | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <u>45</u> = Total Cover                                |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Woody Vine Stratum (Plot size: 30 ft)</b>           |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 1. <u>      </u>                                       | <u>      </u>    | <u>      </u>     | <u>      </u>    | <b>Hydrophytic Vegetation Present?</b> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 2. <u>      </u>                                       | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <u>0</u> = Total Cover                                 |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| % Bare Ground in Herb Stratum <u>55</u>                |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Remarks: <b>No hydrophytic criteria were observed.</b> |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

## SOIL

Sampling Point: DP-12U

[illegible]

## HYDROLOGY

| Wetland Indicators                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Primary Indicators (minimum of one required; check all that apply)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Secondary Indicators (2 or more required)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <input type="checkbox"/> Surface Water (A1)<br><input type="checkbox"/> High Water Table (A2)<br><input type="checkbox"/> Saturation (A3)<br><input type="checkbox"/> Water Marks (B1)<br><input type="checkbox"/> Sediment Deposits (B2)<br><input type="checkbox"/> Drift Deposits (B3)<br><input type="checkbox"/> Algal Mat or Crust (B4)<br><input type="checkbox"/> Iron Deposits (B5)<br><input type="checkbox"/> Surface Soil Cracks (B6)<br><input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)<br><input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) | <input type="checkbox"/> Water-Stained Leaves (B9) ( <b>except MLRA 1, 2, 4A, and 4B</b> )<br><input type="checkbox"/> Salt Crust (B11)<br><input type="checkbox"/> Aquatic Invertebrates (B13)<br><input type="checkbox"/> Hydrogen Sulfide Odor (C1)<br><input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)<br><input type="checkbox"/> Presence of Reduced Iron (C4)<br><input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)<br><input type="checkbox"/> Stunted or Stressed Plants (D1) ( <b>LRR A</b> )<br><input type="checkbox"/> Other (Explain in Remarks) | <input type="checkbox"/> Water-Stained Leaves (B9) ( <b>MLRA 1, 2, 4A, and 4B</b> )<br><input type="checkbox"/> Drainage Patterns (B10)<br><input type="checkbox"/> Dry-Season Water Table (C2)<br><input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)<br><input type="checkbox"/> Geomorphic Position (D2)<br><input type="checkbox"/> Shallow Aquitard (D3)<br><input type="checkbox"/> FAC-Neutral Test (D5)<br><input type="checkbox"/> Raised Ant Mounds (D6) ( <b>LRR A</b> )<br><input type="checkbox"/> Frost-Heave Hummocks (D7) |
| <b>Field Observations:</b><br>Surface Water Present?    Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): _____<br>Water Table Present?    Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): _____<br>Saturation Present?    Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): _____<br>(includes capillary fringe)                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>Wetland Hydrology Present?</b> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Remarks:<br>No primary or secondary hydrologic indicators observed.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |



# WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: 1193.0002 - Canterwood Phase II City/County: Gig Harbor / Pierce Sampling Date: 05/30/2018  
 Applicant/Owner: Swede Hill LLC State: WA Sampling Point: DP-13U  
 Investigator(s): Erin Harker Section, Township, Range: 25, 22N, 01E  
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 10  
 Subregion (LRR): A2 Lat: 47.364455 Long: -122.61564891 Datum: WGS 84  
 Soil Map Unit Name: Harstine gravelly ashy sandy loam NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation       , Soil       , or Hydrology        significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation       , Soil       , or Hydrology        naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

|                                                                                                                         |                                                                                                              |
|-------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
| Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>                     | Is the Sampled Area<br>within a Wetland? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> |
| Hydric Soil Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>                                |                                                                                                              |
| Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>                          |                                                                                                              |
| Remarks:<br><b>Not all three wetland criteria were observed. Associated with DP-5 from the 2015 site investigation.</b> |                                                                                                              |

## VEGETATION – Use scientific names of plants.

| Tree Stratum (Plot size: 30 ft)                                       | Absolute % Cover | Dominant Species? | Indicator Status | <b>Dominance Test worksheet:</b><br>Number of Dominant Species That Are OBL, FACW, or FAC: <u>4</u> (A)<br><br>Total Number of Dominant Species Across All Strata: <u>6</u> (B)<br><br>Percent of Dominant Species That Are OBL, FACW, or FAC: <u>67%</u> (A/B)                                                                                                                                                                                                                                                                                                                                                                                         |
|-----------------------------------------------------------------------|------------------|-------------------|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. <u>Alnus rubra</u>                                                 | <u>60</u>        | <u>Yes</u>        | <u>FAC</u>       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 2. <u>Acer macrophyllum</u>                                           | <u>40</u>        | <u>Yes</u>        | <u>FACU</u>      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 3. <u>      </u>                                                      | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 4. <u>      </u>                                                      | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <u>100</u> = Total Cover                                              |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Sapling/Shrub Stratum (Plot size: 15 ft)</b>                       |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 1. <u>Rubus spectabilis</u>                                           | <u>60</u>        | <u>Yes</u>        | <u>FAC</u>       | <b>Prevalence Index worksheet:</b><br>Total % Cover of: <u>0</u> Multiply by:<br>OBL species <u>0</u> x 1 = <u>0</u><br>FACW species <u>0</u> x 2 = <u>0</u><br>FAC species <u>155</u> x 3 = <u>465</u><br>FACU species <u>50</u> x 4 = <u>200</u><br>UPL species <u>0</u> x 5 = <u>0</u><br>Column Totals: <u>205</u> (A) <u>665</u> (B)<br><br>Prevalence Index = B/A = <u>3.24</u>                                                                                                                                                                                                                                                                   |
| 2. <u>Pteridium aquilinum</u>                                         | <u>10</u>        | <u>No</u>         | <u>FACU</u>      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 3. <u>      </u>                                                      | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 4. <u>      </u>                                                      | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 5. <u>      </u>                                                      | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <u>70</u> = Total Cover                                               |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Herb Stratum (Plot size: 5 ft)</b>                                 |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 1. <u>Blechnum spicant</u>                                            | <u>20</u>        | <u>Yes</u>        | <u>FAC</u>       | <b>Hydrophytic Vegetation Indicators:</b><br><input type="checkbox"/> Rapid Test for Hydrophytic Vegetation<br><input checked="" type="checkbox"/> Dominance Test is >50%<br><input type="checkbox"/> Prevalence Index is ≤3.0 <sup>1</sup><br><input type="checkbox"/> Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)<br><input type="checkbox"/> Wetland Non-Vascular Plants <sup>1</sup><br><input type="checkbox"/> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)<br><sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic. |
| 2. <u>Polystichum munitum</u>                                         | <u>20</u>        | <u>Yes</u>        | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 3. <u>Renunculus acris</u>                                            | <u>15</u>        | <u>Yes</u>        | <u>FAC</u>       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 4. <u>      </u>                                                      | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 5. <u>      </u>                                                      | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 6. <u>      </u>                                                      | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 7. <u>      </u>                                                      | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 8. <u>      </u>                                                      | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 9. <u>      </u>                                                      | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 10. <u>      </u>                                                     | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 11. <u>      </u>                                                     | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <u>55</u> = Total Cover                                               |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Woody Vine Stratum (Plot size: 30 ft)</b>                          |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 1. <u>      </u>                                                      | <u>      </u>    | <u>      </u>     | <u>      </u>    | <b>Hydrophytic Vegetation Present?</b> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 2. <u>      </u>                                                      | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <u>0</u> = Total Cover                                                |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| % Bare Ground in Herb Stratum <u>45</u>                               |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Remarks: <u>Hydrophytic criteria observed through dominance test.</u> |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

# SOIL

Sampling Point: DP-13U

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth<br>(inches) | Matrix        |     | Redox Features |   |                   | Loc <sup>2</sup> | Texture | Remarks              |
|-------------------|---------------|-----|----------------|---|-------------------|------------------|---------|----------------------|
|                   | Color (moist) | %   | Color (moist)  | % | Type <sup>1</sup> |                  |         |                      |
| 0 - 6             | 10YR 3/3      | 100 | -              | - | -                 | -                | SaLo    | Very Fine Sandy Loam |
| 6 - 14            | 10YR 3/6      | 100 | -              | - | -                 | -                | SaLo    |                      |
|                   |               |     |                |   |                   |                  |         |                      |
|                   |               |     |                |   |                   |                  |         |                      |
|                   |               |     |                |   |                   |                  |         |                      |
|                   |               |     |                |   |                   |                  |         |                      |
|                   |               |     |                |   |                   |                  |         |                      |
|                   |               |     |                |   |                   |                  |         |                      |

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.

<sup>2</sup>Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- |                                                            |                                                                            |
|------------------------------------------------------------|----------------------------------------------------------------------------|
| <input type="checkbox"/> Histosol (A1)                     | <input type="checkbox"/> Sandy Redox (S5)                                  |
| <input type="checkbox"/> Histic Epipedon (A2)              | <input type="checkbox"/> Stripped Matrix (S6)                              |
| <input type="checkbox"/> Black Histic (A3)                 | <input type="checkbox"/> Loamy Mucky Mineral (F1) ( <b>except MLRA 1</b> ) |
| <input type="checkbox"/> Hydrogen Sulfide (A4)             | <input type="checkbox"/> Loamy Gleyed Matrix (F2)                          |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Depleted Matrix (F3)                              |
| <input type="checkbox"/> Thick Dark Surface (A12)          | <input type="checkbox"/> Redox Dark Surface (F6)                           |
| <input type="checkbox"/> Sandy Mucky Mineral (S1)          | <input type="checkbox"/> Depleted Dark Surface (F7)                        |
| <input type="checkbox"/> Sandy Gleyed Matrix (S4)          | <input type="checkbox"/> Redox Depressions (F8)                            |

**Indicators for Problematic Hydric Soils<sup>3</sup>:**

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if present):**

Type: Large Root

Depth (inches): 14 inches

**Hydric Soil Present?** Yes ☐ No ☒

Remarks:

No hydric soil criteria were observed.

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one required; check all that apply)

- |                                                                    |                                                                                            |
|--------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
| <input type="checkbox"/> Surface Water (A1)                        | <input type="checkbox"/> Water-Stained Leaves (B9) ( <b>except MLRA 1, 2, 4A, and 4B</b> ) |
| <input type="checkbox"/> High Water Table (A2)                     | <input type="checkbox"/> Salt Crust (B11)                                                  |
| <input type="checkbox"/> Saturation (A3)                           | <input type="checkbox"/> Aquatic Invertebrates (B13)                                       |
| <input type="checkbox"/> Water Marks (B1)                          | <input type="checkbox"/> Hydrogen Sulfide Odor (C1)                                        |
| <input type="checkbox"/> Sediment Deposits (B2)                    | <input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)                     |
| <input type="checkbox"/> Drift Deposits (B3)                       | <input type="checkbox"/> Presence of Reduced Iron (C4)                                     |
| <input type="checkbox"/> Algal Mat or Crust (B4)                   | <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)                        |
| <input type="checkbox"/> Iron Deposits (B5)                        | <input type="checkbox"/> Stunted or Stressed Plants (D1) ( <b>LRR A</b> )                  |
| <input type="checkbox"/> Surface Soil Cracks (B6)                  | <input type="checkbox"/> Other (Explain in Remarks)                                        |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) |                                                                                            |
| <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)   |                                                                                            |

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (**LRR A**)
- ☐ Frost-Heave Hummocks (D7)

**Field Observations:**

Surface Water Present? Yes ☐ No ☒ Depth (inches): \_\_\_\_\_

Water Table Present? Yes ☐ No ☒ Depth (inches): \_\_\_\_\_

Saturation Present? Yes ☐ No ☒ Depth (inches): \_\_\_\_\_  
(includes capillary fringe)

**Wetland Hydrology Present?** Yes ☐ No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No primary or secondary hydrologic indicators observed.

Project/Site: 1193.0002 - Canterwood Phase II City/County: Gig Harbor / Pierce Sampling Date: 05/30/2018  
Applicant/Owner: Swede Hill LLC State: WA Sampling Point: DP-14U  
Investigator(s): Erin Harker Section, Township, Range: 25, 22N, 01E  
Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 5  
Subregion (LRR): A2 Lat: 47.364486 Long: -122.61552659 Datum: WGS 84  
Soil Map Unit Name: Harstine gravelly ashy sandy loam NWI classification: N/A

Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ naturally problematic? (If needed, explain any answers in Remarks.)

|                                                                                                              |                                                                     |                                                                                                                      |
|--------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|
| Hydrophytic Vegetation Present?                                                                              | Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> | <b>Is the Sampled Area<br/>within a Wetland?</b> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> |
| Hydric Soil Present?                                                                                         | Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> |                                                                                                                      |
| Wetland Hydrology Present?                                                                                   | Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> |                                                                                                                      |
| Remarks:<br><b>No wetland criteria were observed. Associated with DP-6 from the 2015 site investigation.</b> |                                                                     |                                                                                                                      |

| Tree Stratum (Plot size: 30 ft)                 |                     |  |  | Absolute<br>% Cover | Dominant<br>Species? | Indicator<br>Status |
|-------------------------------------------------|---------------------|--|--|---------------------|----------------------|---------------------|
| 1.                                              | Acer macrophyllum   |  |  | 100                 | Yes                  | FACU                |
| 2.                                              |                     |  |  |                     |                      |                     |
| 3.                                              |                     |  |  |                     |                      |                     |
| 4.                                              |                     |  |  |                     |                      |                     |
|                                                 |                     |  |  | 100                 | = Total Cover        |                     |
| Sapling/Shrub Stratum (Plot size: 15 ft)        |                     |  |  |                     |                      |                     |
| 1.                                              | Pteridium aquilinum |  |  | 10                  | Yes                  | FACU                |
| 2.                                              |                     |  |  |                     |                      |                     |
| 3.                                              |                     |  |  |                     |                      |                     |
| 4.                                              |                     |  |  |                     |                      |                     |
| 5.                                              |                     |  |  |                     |                      |                     |
|                                                 |                     |  |  | 10                  | = Total Cover        |                     |
| Herb Stratum (Plot size: 5 ft)                  |                     |  |  |                     |                      |                     |
| 1.                                              | Polystichum munitum |  |  | 95                  | Yes                  | FACU                |
| 2.                                              | Rubus spectabilis   |  |  | 5                   | No                   | FAC                 |
| 3.                                              |                     |  |  |                     |                      |                     |
| 4.                                              |                     |  |  |                     |                      |                     |
| 5.                                              |                     |  |  |                     |                      |                     |
| 6.                                              |                     |  |  |                     |                      |                     |
| 7.                                              |                     |  |  |                     |                      |                     |
| 8.                                              |                     |  |  |                     |                      |                     |
| 9.                                              |                     |  |  |                     |                      |                     |
| 10.                                             |                     |  |  |                     |                      |                     |
| 11.                                             |                     |  |  |                     |                      |                     |
|                                                 |                     |  |  | 100                 | = Total Cover        |                     |
| Woody Vine Stratum (Plot size: 30 ft)           |                     |  |  |                     |                      |                     |
| 1.                                              |                     |  |  |                     |                      |                     |
| 2.                                              |                     |  |  |                     |                      |                     |
|                                                 |                     |  |  | 0                   | = Total Cover        |                     |
| % Bare Ground in Herb Stratum                   |                     |  |  | 0                   |                      |                     |
| Remarks: No hydrophytic criteria were observed. |                     |  |  |                     |                      |                     |

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

**Prevalence Index worksheet:**

| Total % Cover of:      | Multiply by: |
|------------------------|--------------|
| OBL species 0          | x 1 = 0      |
| FACW species 0         | x 2 = 0      |
| FAC species 5          | x 3 = 15     |
| FACU species 205       | x 4 = 820    |
| UPL species 0          | x 5 = 0      |
| Column Totals: 210 (A) | 835 (B)      |

Prevalence Index = B/A = 3.98

**Hydrophytic Vegetation Indicators:**

☐ Rapid Test for Hydrophytic Vegetation

☐ Dominance Test is >50%

☐ Prevalence Index is ≤3.0<sup>1</sup>

☐ Morphological Adaptations<sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)

☐ Wetland Non-Vascular Plants<sup>1</sup>

☐ Problematic Hydrophytic Vegetation<sup>1</sup> (Explain)

<sup>1</sup>Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Hydrophytic Vegetation Present?** Yes ☐ No ☒



# SOIL

Sampling Point: DP-14U

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth<br>(inches) | Matrix        |     | Redox Features |   |                   | Loc <sup>2</sup> | Texture | Remarks              |
|-------------------|---------------|-----|----------------|---|-------------------|------------------|---------|----------------------|
|                   | Color (moist) | %   | Color (moist)  | % | Type <sup>1</sup> |                  |         |                      |
| 0 - 1             | Duff          | -   | -              | - | -                 | -                | Duff    |                      |
| 1 - 16            | 10YR 3/3      | 100 | -              | - | -                 | -                | SaLo    | Very Fine Sandy Loam |
|                   |               |     |                |   |                   |                  |         |                      |
|                   |               |     |                |   |                   |                  |         |                      |
|                   |               |     |                |   |                   |                  |         |                      |
|                   |               |     |                |   |                   |                  |         |                      |
|                   |               |     |                |   |                   |                  |         |                      |
|                   |               |     |                |   |                   |                  |         |                      |
|                   |               |     |                |   |                   |                  |         |                      |

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.

<sup>2</sup>Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- |                                                            |                                                                            |
|------------------------------------------------------------|----------------------------------------------------------------------------|
| <input type="checkbox"/> Histosol (A1)                     | <input type="checkbox"/> Sandy Redox (S5)                                  |
| <input type="checkbox"/> Histic Epipedon (A2)              | <input type="checkbox"/> Stripped Matrix (S6)                              |
| <input type="checkbox"/> Black Histic (A3)                 | <input type="checkbox"/> Loamy Mucky Mineral (F1) ( <b>except MLRA 1</b> ) |
| <input type="checkbox"/> Hydrogen Sulfide (A4)             | <input type="checkbox"/> Loamy Gleyed Matrix (F2)                          |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Depleted Matrix (F3)                              |
| <input type="checkbox"/> Thick Dark Surface (A12)          | <input type="checkbox"/> Redox Dark Surface (F6)                           |
| <input type="checkbox"/> Sandy Mucky Mineral (S1)          | <input type="checkbox"/> Depleted Dark Surface (F7)                        |
| <input type="checkbox"/> Sandy Gleyed Matrix (S4)          | <input type="checkbox"/> Redox Depressions (F8)                            |

**Indicators for Problematic Hydric Soils<sup>3</sup>:**

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if present):**

Type: \_\_\_\_\_

Depth (inches): \_\_\_\_\_

**Hydric Soil Present? Yes ☐ No ☒**

Remarks:

No hydric soil criteria were observed.

# HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one required; check all that apply)

- |                                                                    |                                                                                            |
|--------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
| <input type="checkbox"/> Surface Water (A1)                        | <input type="checkbox"/> Water-Stained Leaves (B9) ( <b>except MLRA 1, 2, 4A, and 4B</b> ) |
| <input type="checkbox"/> High Water Table (A2)                     | <input type="checkbox"/> Salt Crust (B11)                                                  |
| <input type="checkbox"/> Saturation (A3)                           | <input type="checkbox"/> Aquatic Invertebrates (B13)                                       |
| <input type="checkbox"/> Water Marks (B1)                          | <input type="checkbox"/> Hydrogen Sulfide Odor (C1)                                        |
| <input type="checkbox"/> Sediment Deposits (B2)                    | <input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)                     |
| <input type="checkbox"/> Drift Deposits (B3)                       | <input type="checkbox"/> Presence of Reduced Iron (C4)                                     |
| <input type="checkbox"/> Algal Mat or Crust (B4)                   | <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)                        |
| <input type="checkbox"/> Iron Deposits (B5)                        | <input type="checkbox"/> Stunted or Stressed Plants (D1) ( <b>LRR A</b> )                  |
| <input type="checkbox"/> Surface Soil Cracks (B6)                  | <input type="checkbox"/> Other (Explain in Remarks)                                        |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) |                                                                                            |
| <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)   |                                                                                            |

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (**LRR A**)
- ☐ Frost-Heave Hummocks (D7)

**Field Observations:**

Surface Water Present? Yes ☐ No ☒ Depth (inches): \_\_\_\_\_

Water Table Present? Yes ☐ No ☒ Depth (inches): \_\_\_\_\_

Saturation Present? Yes ☐ No ☒ Depth (inches): \_\_\_\_\_  
(includes capillary fringe)

**Wetland Hydrology Present? Yes ☐ No ☒**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No primary or secondary hydrologic indicators observed.

# WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: 1193.0002 - Canterwood Phase II City/County: Gig Harbor / Pierce Sampling Date: 05/30/2018  
 Applicant/Owner: Swede Hill LLC State: WA Sampling Point: DP-15W  
 Investigator(s): Erin Harker Section, Township, Range: 25, 22N, 01E  
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 5  
 Subregion (LRR): A2 Lat: 47.364509 Long: -122.61545957 Datum: WGS 84  
 Soil Map Unit Name: Harstine gravelly ashy sandy loam NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation       , Soil       , or Hydrology        significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation       , Soil       , or Hydrology        naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

|                                                                                                                       |                                                                                                              |
|-----------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
| Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>                   | Is the Sampled Area<br>within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> |
| Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>                              |                                                                                                              |
| Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>                        |                                                                                                              |
| Remarks:<br><b>All three wetland criteria were observed. Associated with DP-F-1 from the 2015 site investigation.</b> |                                                                                                              |

## VEGETATION – Use scientific names of plants.

| Tree Stratum (Plot size: 30 ft)                                                                                              | Absolute % Cover | Dominant Species? | Indicator Status | Dominance Test worksheet:<br>Number of Dominant Species That Are OBL, FACW, or FAC: <u>2</u> (A)<br><br>Total Number of Dominant Species Across All Strata: <u>3</u> (B)<br><br>Percent of Dominant Species That Are OBL, FACW, or FAC: <u>67%</u> (A/B)                                                                                                                                                                                                                                                                                                                                                                                         |
|------------------------------------------------------------------------------------------------------------------------------|------------------|-------------------|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. <u>Alnus rubra</u>                                                                                                        | <u>60</u>        | <u>Yes</u>        | <u>FACU</u>      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 2. <u>      </u>                                                                                                             | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 3. <u>      </u>                                                                                                             | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 4. <u>      </u>                                                                                                             | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <u>60</u> = Total Cover                                                                                                      |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Sapling/Shrub Stratum (Plot size: 15 ft)                                                                                     | Absolute % Cover | Dominant Species? | Indicator Status | Prevalence Index worksheet:<br>Total % Cover of: <u>0</u> Multiply by:<br>OBL species <u>0</u> x 1 = <u>0</u><br>FACW species <u>0</u> x 2 = <u>0</u><br>FAC species <u>110</u> x 3 = <u>330</u><br>FACU species <u>70</u> x 4 = <u>280</u><br>UPL species <u>0</u> x 5 = <u>0</u><br>Column Totals: <u>180</u> (A) <u>610</u> (B)<br><br>Prevalence Index = B/A = <u>3.39</u>                                                                                                                                                                                                                                                                   |
| 1. <u>Rubus spectabilis</u>                                                                                                  | <u>40</u>        | <u>Yes</u>        | <u>FAC</u>       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 2. <u>      </u>                                                                                                             | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 3. <u>      </u>                                                                                                             | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 4. <u>      </u>                                                                                                             | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 5. <u>      </u>                                                                                                             | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <u>40</u> = Total Cover                                                                                                      |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Herb Stratum (Plot size: 5 ft)                                                                                               | Absolute % Cover | Dominant Species? | Indicator Status | Hydrophytic Vegetation Indicators:<br><input type="checkbox"/> Rapid Test for Hydrophytic Vegetation<br><input checked="" type="checkbox"/> Dominance Test is >50%<br><input type="checkbox"/> Prevalence Index is ≤3.0 <sup>1</sup><br><input type="checkbox"/> Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)<br><input type="checkbox"/> Wetland Non-Vascular Plants <sup>1</sup><br><input type="checkbox"/> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)<br><sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic. |
| 1. <u>Athyrium cyclosorum</u>                                                                                                | <u>70</u>        | <u>Yes</u>        | <u>FAC</u>       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 2. <u>Tellima graniflora</u>                                                                                                 | <u>10</u>        | <u>No</u>         | <u>FACU</u>      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 3. <u>      </u>                                                                                                             | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 4. <u>      </u>                                                                                                             | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 5. <u>      </u>                                                                                                             | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 6. <u>      </u>                                                                                                             | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 7. <u>      </u>                                                                                                             | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 8. <u>      </u>                                                                                                             | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 9. <u>      </u>                                                                                                             | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 10. <u>      </u>                                                                                                            | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 11. <u>      </u>                                                                                                            | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <u>80</u> = Total Cover                                                                                                      |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Woody Vine Stratum (Plot size: 30 ft)                                                                                        | Absolute % Cover | Dominant Species? | Indicator Status | Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 1. <u>      </u>                                                                                                             | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 2. <u>      </u>                                                                                                             | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <u>0</u> = Total Cover                                                                                                       |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| % Bare Ground in Herb Stratum <u>20</u>                                                                                      |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Remarks: <b>Hydrophytic criteria observed through dominance test. Acer macrophyllum located outside plot on upland area.</b> |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

# SOIL

Sampling Point: DP-15W

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth<br>(inches) | Matrix        |     | Redox Features |   |                   | Loc <sup>2</sup> | Texture | Remarks                     |
|-------------------|---------------|-----|----------------|---|-------------------|------------------|---------|-----------------------------|
|                   | Color (moist) | %   | Color (moist)  | % | Type <sup>1</sup> |                  |         |                             |
| 0 - 9             | 10YR 2/2      | 100 | -              | - | -                 | -                | LoSa    | Loamy Sand w/ organics      |
| 9 - 16            | 6/5GY         | 95  | 10YR 4/6       | 5 | C                 | M                | SaClLo  | Sandy Clay Loam w/ organics |
|                   |               |     |                |   |                   |                  |         |                             |
|                   |               |     |                |   |                   |                  |         |                             |
|                   |               |     |                |   |                   |                  |         |                             |
|                   |               |     |                |   |                   |                  |         |                             |
|                   |               |     |                |   |                   |                  |         |                             |
|                   |               |     |                |   |                   |                  |         |                             |

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.

<sup>2</sup>Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- |                                                            |                                                                            |
|------------------------------------------------------------|----------------------------------------------------------------------------|
| <input type="checkbox"/> Histosol (A1)                     | <input type="checkbox"/> Sandy Redox (S5)                                  |
| <input type="checkbox"/> Histic Epipedon (A2)              | <input type="checkbox"/> Stripped Matrix (S6)                              |
| <input type="checkbox"/> Black Histic (A3)                 | <input type="checkbox"/> Loamy Mucky Mineral (F1) ( <b>except MLRA 1</b> ) |
| <input checked="" type="checkbox"/> Hydrogen Sulfide (A4)  | <input type="checkbox"/> Loamy Gleyed Matrix (F2)                          |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Depleted Matrix (F3)                              |
| <input type="checkbox"/> Thick Dark Surface (A12)          | <input type="checkbox"/> Redox Dark Surface (F6)                           |
| <input type="checkbox"/> Sandy Mucky Mineral (S1)          | <input type="checkbox"/> Depleted Dark Surface (F7)                        |
| <input type="checkbox"/> Sandy Gleyed Matrix (S4)          | <input type="checkbox"/> Redox Depressions (F8)                            |

**Indicators for Problematic Hydric Soils<sup>3</sup>:**

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if present):**

Type: \_\_\_\_\_

Depth (inches): \_\_\_\_\_

**Hydric Soil Present? Yes ☒ No ☐**

Remarks:

Hydric soil criteria observed indicator A4.

# HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one required; check all that apply)

- |                                                                    |                                                                                            |
|--------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
| <input type="checkbox"/> Surface Water (A1)                        | <input type="checkbox"/> Water-Stained Leaves (B9) ( <b>except MLRA 1, 2, 4A, and 4B</b> ) |
| <input checked="" type="checkbox"/> High Water Table (A2)          | <input type="checkbox"/> Salt Crust (B11)                                                  |
| <input checked="" type="checkbox"/> Saturation (A3)                | <input type="checkbox"/> Aquatic Invertebrates (B13)                                       |
| <input type="checkbox"/> Water Marks (B1)                          | <input checked="" type="checkbox"/> Hydrogen Sulfide Odor (C1)                             |
| <input type="checkbox"/> Sediment Deposits (B2)                    | <input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)                     |
| <input type="checkbox"/> Drift Deposits (B3)                       | <input type="checkbox"/> Presence of Reduced Iron (C4)                                     |
| <input type="checkbox"/> Algal Mat or Crust (B4)                   | <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)                        |
| <input type="checkbox"/> Iron Deposits (B5)                        | <input type="checkbox"/> Stunted or Stressed Plants (D1) ( <b>LRR A</b> )                  |
| <input type="checkbox"/> Surface Soil Cracks (B6)                  | <input type="checkbox"/> Other (Explain in Remarks)                                        |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) |                                                                                            |
| <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)   |                                                                                            |

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (**LRR A**)
- ☐ Frost-Heave Hummocks (D7)

**Field Observations:**

Surface Water Present? Yes ☐ No ☒ Depth (inches): \_\_\_\_\_

Water Table Present? Yes ☒ No ☐ Depth (inches): 10"

Saturation Present? Yes ☒ No ☐ Depth (inches): 0"  
(includes capillary fringe)

**Wetland Hydrology Present? Yes ☒ No ☐**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Hydrologic criteria observed through primary indicators A2, A3, and C1.



# WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: 1193.0002 - Canterwood Phase II City/County: Gig Harbor / Pierce Sampling Date: 05/30/2018  
 Applicant/Owner: Swede Hill LLC State: WA Sampling Point: DP-16U  
 Investigator(s): Erin Harker Section, Township, Range: 25, 22N, 01E  
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 5  
 Subregion (LRR): A2 Lat: 47.364535 Long: -122.61537613 Datum: WGS 84  
 Soil Map Unit Name: Harstine gravelly ashy sandy loam NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation       , Soil       , or Hydrology        significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation       , Soil       , or Hydrology        naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

|                                                                                                                            |                                                                                                              |
|----------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
| Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>                        | Is the Sampled Area<br>within a Wetland? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> |
| Hydric Soil Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>                                   |                                                                                                              |
| Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>                             |                                                                                                              |
| Remarks:<br><b>Not all three wetland criteria were observed. Associated with DP-F-2U from the 2015 site investigation.</b> |                                                                                                              |

## VEGETATION – Use scientific names of plants.

| Tree Stratum (Plot size: 30 ft)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Absolute % Cover | Dominant Species? | Indicator Status | <b>Dominance Test worksheet:</b><br>Number of Dominant Species That Are OBL, FACW, or FAC: <u>3</u> (A)<br><br>Total Number of Dominant Species Across All Strata: <u>4</u> (B)<br><br>Percent of Dominant Species That Are OBL, FACW, or FAC: <u>75%</u> (A/B)                                                                                                                                                                                                                                                                                                                                                                                         |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|-------------------|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. <u>Tsuga heterophylla</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <u>50</u>        | <u>Yes</u>        | <u>FACU</u>      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 2. <u>Alnus rubra</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <u>30</u>        | <u>Yes</u>        | <u>FAC</u>       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 3. <u>Thuja plicata</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <u>25</u>        | <u>Yes</u>        | <u>FAC</u>       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 4. <u>      </u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <u>      </u>    | <u>      </u>     | <u>      </u>    | <b>Prevalence Index worksheet:</b><br>Total % Cover of: <u>105</u> = Total Cover<br>Multiply by:<br>OBL species <u>0</u> x 1 = <u>0</u><br>FACW species <u>0</u> x 2 = <u>0</u><br>FAC species <u>155</u> x 3 = <u>465</u><br>FACU species <u>50</u> x 4 = <u>200</u><br>UPL species <u>0</u> x 5 = <u>0</u><br>Column Totals: <u>205</u> (A) <u>665</u> (B)<br><br>Prevalence Index = B/A = <u>3.24</u>                                                                                                                                                                                                                                                |
| <b>Sapling/Shrub Stratum (Plot size: 15 ft)</b><br>1. <u>Thuja plicata</u> <u>100</u> <u>Yes</u> <u>FAC</u><br>2. <u>      </u> <u>      </u> <u>      </u> <u>      </u><br>3. <u>      </u> <u>      </u> <u>      </u> <u>      </u><br>4. <u>      </u> <u>      </u> <u>      </u> <u>      </u><br>5. <u>      </u> <u>      </u> <u>      </u> <u>      </u>                                                                                                                                                                                                                                                                                                                                                                               |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Herb Stratum (Plot size: 5 ft)</b><br>1. <u>      </u> <u>      </u> <u>      </u> <u>      </u><br>2. <u>      </u> <u>      </u> <u>      </u> <u>      </u><br>3. <u>      </u> <u>      </u> <u>      </u> <u>      </u><br>4. <u>      </u> <u>      </u> <u>      </u> <u>      </u><br>5. <u>      </u> <u>      </u> <u>      </u> <u>      </u><br>6. <u>      </u> <u>      </u> <u>      </u> <u>      </u><br>7. <u>      </u> <u>      </u> <u>      </u> <u>      </u><br>8. <u>      </u> <u>      </u> <u>      </u> <u>      </u><br>9. <u>      </u> <u>      </u> <u>      </u> <u>      </u><br>10. <u>      </u> <u>      </u> <u>      </u> <u>      </u><br>11. <u>      </u> <u>      </u> <u>      </u> <u>      </u> |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Woody Vine Stratum (Plot size: 30 ft)</b><br>1. <u>      </u> <u>      </u> <u>      </u> <u>      </u><br>2. <u>      </u> <u>      </u> <u>      </u> <u>      </u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>% Bare Ground in Herb Stratum</b> <u>100</u> <u>0</u> = Total Cover                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                  |                   |                  | <b>Hydrophytic Vegetation Indicators:</b><br><input type="checkbox"/> Rapid Test for Hydrophytic Vegetation<br><input checked="" type="checkbox"/> Dominance Test is >50%<br><input type="checkbox"/> Prevalence Index is ≤3.0 <sup>1</sup><br><input type="checkbox"/> Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)<br><input type="checkbox"/> Wetland Non-Vascular Plants <sup>1</sup><br><input type="checkbox"/> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)<br><sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic. |
| <b>Remarks:</b> <u>Hydrophytic criteria observed through dominance test.</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

# SOIL

Sampling Point: DP-16U

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth<br>(inches) | Matrix        |     | Redox Features |   |                   | Loc <sup>2</sup> | Texture | Remarks                 |
|-------------------|---------------|-----|----------------|---|-------------------|------------------|---------|-------------------------|
|                   | Color (moist) | %   | Color (moist)  | % | Type <sup>1</sup> |                  |         |                         |
| 0 - 2             | Duff          | -   | -              | - | -                 | -                | Duff    |                         |
| 2 - 16            | 5YR 2.5/1     | 100 | -              | - | -                 | -                | MeLo    | Medium Loam w/ organics |
|                   |               |     |                |   |                   |                  |         |                         |
|                   |               |     |                |   |                   |                  |         |                         |
|                   |               |     |                |   |                   |                  |         |                         |
|                   |               |     |                |   |                   |                  |         |                         |
|                   |               |     |                |   |                   |                  |         |                         |
|                   |               |     |                |   |                   |                  |         |                         |

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.

<sup>2</sup>Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- |                                                            |                                                                            |
|------------------------------------------------------------|----------------------------------------------------------------------------|
| <input type="checkbox"/> Histosol (A1)                     | <input type="checkbox"/> Sandy Redox (S5)                                  |
| <input type="checkbox"/> Histic Epipedon (A2)              | <input type="checkbox"/> Stripped Matrix (S6)                              |
| <input type="checkbox"/> Black Histic (A3)                 | <input type="checkbox"/> Loamy Mucky Mineral (F1) ( <b>except MLRA 1</b> ) |
| <input type="checkbox"/> Hydrogen Sulfide (A4)             | <input type="checkbox"/> Loamy Gleyed Matrix (F2)                          |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Depleted Matrix (F3)                              |
| <input type="checkbox"/> Thick Dark Surface (A12)          | <input type="checkbox"/> Redox Dark Surface (F6)                           |
| <input type="checkbox"/> Sandy Mucky Mineral (S1)          | <input type="checkbox"/> Depleted Dark Surface (F7)                        |
| <input type="checkbox"/> Sandy Gleyed Matrix (S4)          | <input type="checkbox"/> Redox Depressions (F8)                            |

**Indicators for Problematic Hydric Soils<sup>3</sup>:**

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if present):**

Type: \_\_\_\_\_

Depth (inches): \_\_\_\_\_

**Hydric Soil Present? Yes ☐ No ☒**

Remarks:

No hydric soil criteria were observed.

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one required; check all that apply)

- |                                                                    |                                                                                            |
|--------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
| <input type="checkbox"/> Surface Water (A1)                        | <input type="checkbox"/> Water-Stained Leaves (B9) ( <b>except MLRA 1, 2, 4A, and 4B</b> ) |
| <input type="checkbox"/> High Water Table (A2)                     | <input type="checkbox"/> Salt Crust (B11)                                                  |
| <input type="checkbox"/> Saturation (A3)                           | <input type="checkbox"/> Aquatic Invertebrates (B13)                                       |
| <input type="checkbox"/> Water Marks (B1)                          | <input type="checkbox"/> Hydrogen Sulfide Odor (C1)                                        |
| <input type="checkbox"/> Sediment Deposits (B2)                    | <input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)                     |
| <input type="checkbox"/> Drift Deposits (B3)                       | <input type="checkbox"/> Presence of Reduced Iron (C4)                                     |
| <input type="checkbox"/> Algal Mat or Crust (B4)                   | <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)                        |
| <input type="checkbox"/> Iron Deposits (B5)                        | <input type="checkbox"/> Stunted or Stressed Plants (D1) ( <b>LRR A</b> )                  |
| <input type="checkbox"/> Surface Soil Cracks (B6)                  | <input type="checkbox"/> Other (Explain in Remarks)                                        |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) |                                                                                            |
| <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)   |                                                                                            |

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (**LRR A**)
- ☐ Frost-Heave Hummocks (D7)

**Field Observations:**

Surface Water Present? Yes ☐ No ☒ Depth (inches): \_\_\_\_\_

Water Table Present? Yes ☐ No ☒ Depth (inches): \_\_\_\_\_

Saturation Present? Yes ☒ No ☐ Depth (inches): 15"  
(includes capillary fringe)

**Wetland Hydrology Present? Yes ☐ No ☒**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No primary or secondary hydrologic indicators observed.

# WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: 1193.0002 - Canterwood Phase II City/County: Gig Harbor / Pierce Sampling Date: 05/30/2018  
 Applicant/Owner: Swede Hill LLC State: WA Sampling Point: DP-17U  
 Investigator(s): Erin Harker Section, Township, Range: 25, 22N, 01E  
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 30  
 Subregion (LRR): A2 Lat: 47.364575 Long: -122.61515052 Datum: WGS 84  
 Soil Map Unit Name: Harstine gravelly ashy sandy loam NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation       , Soil       , or Hydrology        significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation       , Soil       , or Hydrology        naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

|                                                                                                     |                                                                                                              |
|-----------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
| Hydrophytic Vegetation Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> | Is the Sampled Area<br>within a Wetland? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> |
| Hydric Soil Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>            |                                                                                                              |
| Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>      |                                                                                                              |
| Remarks:<br><b>No wetland criteria were observed.</b>                                               |                                                                                                              |

## VEGETATION – Use scientific names of plants.

| Tree Stratum (Plot size: 30 ft)                        | Absolute % Cover  | Dominant Species? | Indicator Status  | <b>Dominance Test worksheet:</b><br>Number of Dominant Species That Are OBL, FACW, or FAC: <u>2</u> (A)<br><br>Total Number of Dominant Species Across All Strata: <u>4</u> (B)<br><br>Percent of Dominant Species That Are OBL, FACW, or FAC: <u>50%</u> (A/B)                                                                                                                                                                                                                                                                                                                                                                              |
|--------------------------------------------------------|-------------------|-------------------|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. <u>Alnus rubra</u>                                  | <u>100</u>        | <u>Yes</u>        | <u>FAC</u>        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 2. <u>                    </u>                         | <u>          </u> | <u>          </u> | <u>          </u> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 3. <u>                    </u>                         | <u>          </u> | <u>          </u> | <u>          </u> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 4. <u>                    </u>                         | <u>          </u> | <u>          </u> | <u>          </u> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <u>100</u> = Total Cover                               |                   |                   |                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Sapling/Shrub Stratum (Plot size: 15 ft)</b>        |                   |                   |                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 1. <u>Acer macrophyllum</u>                            | <u>60</u>         | <u>Yes</u>        | <u>FACU</u>       | <b>Prevalence Index worksheet:</b><br>Total % Cover of: Multiply by:<br>OBL species <u>0</u> x 1 = <u>0</u><br>FACW species <u>0</u> x 2 = <u>0</u><br>FAC species <u>140</u> x 3 = <u>420</u><br>FACU species <u>100</u> x 4 = <u>400</u><br>UPL species <u>0</u> x 5 = <u>0</u><br>Column Totals: <u>240</u> (A) <u>820</u> (B)<br><br>Prevalence Index = B/A = <u>3.42</u>                                                                                                                                                                                                                                                                |
| 2. <u>Rubus armeniacus</u>                             | <u>40</u>         | <u>Yes</u>        | <u>FAC</u>        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 3. <u>                    </u>                         | <u>          </u> | <u>          </u> | <u>          </u> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 4. <u>                    </u>                         | <u>          </u> | <u>          </u> | <u>          </u> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 5. <u>                    </u>                         | <u>          </u> | <u>          </u> | <u>          </u> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <u>100</u> = Total Cover                               |                   |                   |                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Herb Stratum (Plot size: 5 ft)</b>                  |                   |                   |                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 1. <u>Polystichum munitum</u>                          | <u>40</u>         | <u>Yes</u>        | <u>FACU</u>       | <b>Hydrophytic Vegetation Indicators:</b><br><input type="checkbox"/> Rapid Test for Hydrophytic Vegetation<br><input type="checkbox"/> Dominance Test is >50%<br><input type="checkbox"/> Prevalence Index is ≤3.0 <sup>1</sup><br><input type="checkbox"/> Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)<br><input type="checkbox"/> Wetland Non-Vascular Plants <sup>1</sup><br><input type="checkbox"/> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)<br><sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic. |
| 2. <u>                    </u>                         | <u>          </u> | <u>          </u> | <u>          </u> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 3. <u>                    </u>                         | <u>          </u> | <u>          </u> | <u>          </u> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 4. <u>                    </u>                         | <u>          </u> | <u>          </u> | <u>          </u> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 5. <u>                    </u>                         | <u>          </u> | <u>          </u> | <u>          </u> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 6. <u>                    </u>                         | <u>          </u> | <u>          </u> | <u>          </u> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 7. <u>                    </u>                         | <u>          </u> | <u>          </u> | <u>          </u> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 8. <u>                    </u>                         | <u>          </u> | <u>          </u> | <u>          </u> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 9. <u>                    </u>                         | <u>          </u> | <u>          </u> | <u>          </u> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 10. <u>                   </u>                         | <u>          </u> | <u>          </u> | <u>          </u> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 11. <u>                   </u>                         | <u>          </u> | <u>          </u> | <u>          </u> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <u>40</u> = Total Cover                                |                   |                   |                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Woody Vine Stratum (Plot size: 30 ft)</b>           |                   |                   |                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 1. <u>                    </u>                         | <u>          </u> | <u>          </u> | <u>          </u> | <b>Hydrophytic Vegetation Present?</b> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 2. <u>                    </u>                         | <u>          </u> | <u>          </u> | <u>          </u> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <u>0</u> = Total Cover                                 |                   |                   |                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| % Bare Ground in Herb Stratum <u>60</u>                |                   |                   |                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Remarks: <b>No hydrophytic criteria were observed.</b> |                   |                   |                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |



# SOIL

Sampling Point: DP-17U

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth<br>(inches) | Matrix        |     | Redox Features |   |                   | Loc <sup>2</sup> | Texture | Remarks              |
|-------------------|---------------|-----|----------------|---|-------------------|------------------|---------|----------------------|
|                   | Color (moist) | %   | Color (moist)  | % | Type <sup>1</sup> |                  |         |                      |
| 0 - 2             | Duff          | -   | -              | - | -                 | -                | Duff    |                      |
| 2 - 16            | 2.5YR 5/4     | 100 | -              | - | -                 | -                | SaLo    | Very Fine Sandy Loam |
|                   |               |     |                |   |                   |                  |         |                      |
|                   |               |     |                |   |                   |                  |         |                      |
|                   |               |     |                |   |                   |                  |         |                      |
|                   |               |     |                |   |                   |                  |         |                      |
|                   |               |     |                |   |                   |                  |         |                      |
|                   |               |     |                |   |                   |                  |         |                      |

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.

<sup>2</sup>Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- |                                                            |                                                                            |
|------------------------------------------------------------|----------------------------------------------------------------------------|
| <input type="checkbox"/> Histosol (A1)                     | <input type="checkbox"/> Sandy Redox (S5)                                  |
| <input type="checkbox"/> Histic Epipedon (A2)              | <input type="checkbox"/> Stripped Matrix (S6)                              |
| <input type="checkbox"/> Black Histic (A3)                 | <input type="checkbox"/> Loamy Mucky Mineral (F1) ( <b>except MLRA 1</b> ) |
| <input type="checkbox"/> Hydrogen Sulfide (A4)             | <input type="checkbox"/> Loamy Gleyed Matrix (F2)                          |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Depleted Matrix (F3)                              |
| <input type="checkbox"/> Thick Dark Surface (A12)          | <input type="checkbox"/> Redox Dark Surface (F6)                           |
| <input type="checkbox"/> Sandy Mucky Mineral (S1)          | <input type="checkbox"/> Depleted Dark Surface (F7)                        |
| <input type="checkbox"/> Sandy Gleyed Matrix (S4)          | <input type="checkbox"/> Redox Depressions (F8)                            |

**Indicators for Problematic Hydric Soils<sup>3</sup>:**

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if present):**

Type: \_\_\_\_\_

Depth (inches): \_\_\_\_\_

**Hydric Soil Present? Yes ☐ No ☒**

Remarks:

No hydric soil criteria were observed.

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one required; check all that apply)

- |                                                                    |                                                                                            |
|--------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
| <input type="checkbox"/> Surface Water (A1)                        | <input type="checkbox"/> Water-Stained Leaves (B9) ( <b>except MLRA 1, 2, 4A, and 4B</b> ) |
| <input type="checkbox"/> High Water Table (A2)                     | <input type="checkbox"/> Salt Crust (B11)                                                  |
| <input type="checkbox"/> Saturation (A3)                           | <input type="checkbox"/> Aquatic Invertebrates (B13)                                       |
| <input type="checkbox"/> Water Marks (B1)                          | <input type="checkbox"/> Hydrogen Sulfide Odor (C1)                                        |
| <input type="checkbox"/> Sediment Deposits (B2)                    | <input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)                     |
| <input type="checkbox"/> Drift Deposits (B3)                       | <input type="checkbox"/> Presence of Reduced Iron (C4)                                     |
| <input type="checkbox"/> Algal Mat or Crust (B4)                   | <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)                        |
| <input type="checkbox"/> Iron Deposits (B5)                        | <input type="checkbox"/> Stunted or Stressed Plants (D1) ( <b>LRR A</b> )                  |
| <input type="checkbox"/> Surface Soil Cracks (B6)                  | <input type="checkbox"/> Other (Explain in Remarks)                                        |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) |                                                                                            |
| <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)   |                                                                                            |

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (**LRR A**)
- ☐ Frost-Heave Hummocks (D7)

**Field Observations:**

Surface Water Present? Yes ☐ No ☒ Depth (inches): \_\_\_\_\_

Water Table Present? Yes ☐ No ☒ Depth (inches): \_\_\_\_\_

Saturation Present? Yes ☐ No ☒ Depth (inches): \_\_\_\_\_  
(includes capillary fringe)

**Wetland Hydrology Present? Yes ☐ No ☒**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No primary or secondary hydrologic indicators observed.

# WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: 1193.0002 - Canterwood Phase II City/County: Gig Harbor / Pierce Sampling Date: 05/30/2018  
 Applicant/Owner: Swede Hill LLC State: WA Sampling Point: DP-18W  
 Investigator(s): Erin Harker Section, Township, Range: 25, 22N, 01E  
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 10  
 Subregion (LRR): A2 Lat: 47.364584 Long: -122.61519525 Datum: WGS 84  
 Soil Map Unit Name: Harstine gravelly ashy sandy loam NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation       , Soil       , or Hydrology        significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation       , Soil       , or Hydrology        naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

|                                                                                                                        |                                                                                                              |
|------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
| Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>                    | Is the Sampled Area<br>within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> |
| Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>                               |                                                                                                              |
| Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>                         |                                                                                                              |
| Remarks:<br><b>All three wetland criteria were observed. Associated with DP-G-1W from the 2015 site investigation.</b> |                                                                                                              |

## VEGETATION – Use scientific names of plants.

| Tree Stratum (Plot size: 30 ft)                                       | Absolute % Cover | Dominant Species? | Indicator Status | <b>Dominance Test worksheet:</b><br>Number of Dominant Species That Are OBL, FACW, or FAC: <u>4</u> (A)<br><br>Total Number of Dominant Species Across All Strata: <u>6</u> (B)<br><br>Percent of Dominant Species That Are OBL, FACW, or FAC: <u>67%</u> (A/B)                                                                                                                                                                                                                                                                                                                                                                                         |
|-----------------------------------------------------------------------|------------------|-------------------|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. <u>Alnus rubra</u>                                                 | <u>70</u>        | <u>Yes</u>        | <u>FAC</u>       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 2. <u>Tsuga heterophylla</u>                                          | <u>30</u>        | <u>Yes</u>        | <u>FACU</u>      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 3. <u>      </u>                                                      | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 4. <u>      </u>                                                      | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <u>100</u> = Total Cover                                              |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Sapling/Shrub Stratum (Plot size: 15 ft)                              | Absolute % Cover | Dominant Species? | Indicator Status | <b>Prevalence Index worksheet:</b><br>Total % Cover of: <u>      </u> Multiply by:<br>OBL species <u>0</u> x 1 = <u>0</u><br>FACW species <u>25</u> x 2 = <u>50</u><br>FAC species <u>185</u> x 3 = <u>555</u><br>FACU species <u>55</u> x 4 = <u>220</u><br>UPL species <u>0</u> x 5 = <u>0</u><br>Column Totals: <u>265</u> (A) <u>825</u> (B)<br><br>Prevalence Index = B/A = <u>3.11</u>                                                                                                                                                                                                                                                            |
| 1. <u>Rubus spectabilis</u>                                           | <u>75</u>        | <u>Yes</u>        | <u>FAC</u>       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 2. <u>      </u>                                                      | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 3. <u>      </u>                                                      | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 4. <u>      </u>                                                      | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 5. <u>      </u>                                                      | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <u>75</u> = Total Cover                                               |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Herb Stratum (Plot size: 5 ft)                                        | Absolute % Cover | Dominant Species? | Indicator Status | <b>Hydrophytic Vegetation Indicators:</b><br><input type="checkbox"/> Rapid Test for Hydrophytic Vegetation<br><input checked="" type="checkbox"/> Dominance Test is >50%<br><input type="checkbox"/> Prevalence Index is ≤3.0 <sup>1</sup><br><input type="checkbox"/> Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)<br><input type="checkbox"/> Wetland Non-Vascular Plants <sup>1</sup><br><input type="checkbox"/> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)<br><sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic. |
| 1. <u>Athyrium cyclosorum</u>                                         | <u>40</u>        | <u>Yes</u>        | <u>FAC</u>       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 2. <u>Polystichum munitum</u>                                         | <u>25</u>        | <u>Yes</u>        | <u>FACU</u>      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 3. <u>Lysichiton americanus</u>                                       | <u>25</u>        | <u>Yes</u>        | <u>FACW</u>      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 4. <u>      </u>                                                      | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 5. <u>      </u>                                                      | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 6. <u>      </u>                                                      | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 7. <u>      </u>                                                      | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 8. <u>      </u>                                                      | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 9. <u>      </u>                                                      | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 10. <u>      </u>                                                     | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 11. <u>      </u>                                                     | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <u>90</u> = Total Cover                                               |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Woody Vine Stratum (Plot size: 30 ft)                                 | Absolute % Cover | Dominant Species? | Indicator Status | <b>Hydrophytic Vegetation Present?</b> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 1. <u>      </u>                                                      | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 2. <u>      </u>                                                      | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <u>0</u> = Total Cover                                                |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| % Bare Ground in Herb Stratum <u>10</u>                               |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Remarks: <u>Hydrophytic criteria observed through dominance test.</u> |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

## SOIL

Sampling Point: DP-18W

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth<br>(inches) | Matrix        |     | Redox Features |   |                   | Loc <sup>2</sup> | Texture | Remarks             |
|-------------------|---------------|-----|----------------|---|-------------------|------------------|---------|---------------------|
|                   | Color (moist) | %   | Color (moist)  | % | Type <sup>1</sup> |                  |         |                     |
| 0 - 1             | Duff          | -   | -              | - | -                 | -                | Duff    |                     |
| 1 - 16            | 10YR 2/1      | 100 | -              | - | -                 | -                | GrSaLo  | Gravelly Sandy Loam |
|                   |               |     |                |   |                   |                  |         |                     |
|                   |               |     |                |   |                   |                  |         |                     |
|                   |               |     |                |   |                   |                  |         |                     |
|                   |               |     |                |   |                   |                  |         |                     |
|                   |               |     |                |   |                   |                  |         |                     |
|                   |               |     |                |   |                   |                  |         |                     |
|                   |               |     |                |   |                   |                  |         |                     |

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.

<sup>2</sup>Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- |                                                            |                                                                            |
|------------------------------------------------------------|----------------------------------------------------------------------------|
| <input type="checkbox"/> Histosol (A1)                     | <input type="checkbox"/> Sandy Redox (S5)                                  |
| <input type="checkbox"/> Histic Epipedon (A2)              | <input type="checkbox"/> Stripped Matrix (S6)                              |
| <input type="checkbox"/> Black Histic (A3)                 | <input type="checkbox"/> Loamy Mucky Mineral (F1) ( <b>except MLRA 1</b> ) |
| <input checked="" type="checkbox"/> Hydrogen Sulfide (A4)  | <input type="checkbox"/> Loamy Gleyed Matrix (F2)                          |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Depleted Matrix (F3)                              |
| <input type="checkbox"/> Thick Dark Surface (A12)          | <input type="checkbox"/> Redox Dark Surface (F6)                           |
| <input type="checkbox"/> Sandy Mucky Mineral (S1)          | <input type="checkbox"/> Depleted Dark Surface (F7)                        |
| <input type="checkbox"/> Sandy Gleyed Matrix (S4)          | <input type="checkbox"/> Redox Depressions (F8)                            |

**Indicators for Problematic Hydric Soils<sup>3</sup>:**

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if present):**

Type: \_\_\_\_\_

Depth (inches): \_\_\_\_\_

**Hydric Soil Present? Yes ☒ No ☐**

Remarks:

Hydric soil criteria observed through indicator A4.

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one required; check all that apply)

- |                                                                    |                                                                                            |
|--------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
| <input type="checkbox"/> Surface Water (A1)                        | <input type="checkbox"/> Water-Stained Leaves (B9) ( <b>except MLRA 1, 2, 4A, and 4B</b> ) |
| <input checked="" type="checkbox"/> High Water Table (A2)          | <input type="checkbox"/> Salt Crust (B11)                                                  |
| <input checked="" type="checkbox"/> Saturation (A3)                | <input type="checkbox"/> Aquatic Invertebrates (B13)                                       |
| <input type="checkbox"/> Water Marks (B1)                          | <input checked="" type="checkbox"/> Hydrogen Sulfide Odor (C1)                             |
| <input type="checkbox"/> Sediment Deposits (B2)                    | <input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)                     |
| <input type="checkbox"/> Drift Deposits (B3)                       | <input type="checkbox"/> Presence of Reduced Iron (C4)                                     |
| <input type="checkbox"/> Algal Mat or Crust (B4)                   | <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)                        |
| <input type="checkbox"/> Iron Deposits (B5)                        | <input type="checkbox"/> Stunted or Stressed Plants (D1) ( <b>LRR A</b> )                  |
| <input type="checkbox"/> Surface Soil Cracks (B6)                  | <input type="checkbox"/> Other (Explain in Remarks)                                        |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) |                                                                                            |
| <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)   |                                                                                            |

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (**LRR A**)
- ☐ Frost-Heave Hummocks (D7)

**Field Observations:**

Surface Water Present? Yes ☐ No ☒ Depth (inches): \_\_\_\_\_

Water Table Present? Yes ☒ No ☐ Depth (inches): 10

Saturation Present? Yes ☒ No ☐ Depth (inches): 8  
(includes capillary fringe)

**Wetland Hydrology Present? Yes ☒ No ☐**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Hydrologic criteria observed through primary indicators A2, A3, and C1.



# WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: 1193.0002 - Canterwood Phase II City/County: Gig Harbor / Pierce Sampling Date: 05/30/2018  
 Applicant/Owner: Swede Hill LLC State: WA Sampling Point: DP-19U  
 Investigator(s): Erin Harker Section, Township, Range: 25, 22N, 01E  
 Landform (hillslope, terrace, etc.): Valley Floor Local relief (concave, convex, none): None Slope (%): 0  
 Subregion (LRR): A2 Lat: 47.364587 Long: -122.61523707 Datum: WGS 84  
 Soil Map Unit Name: Harstine gravelly ashy sandy loam NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation       , Soil       , or Hydrology        significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation       , Soil       , or Hydrology        naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

|                                                                                                                            |                                                                                                              |
|----------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
| Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>                        | Is the Sampled Area<br>within a Wetland? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> |
| Hydric Soil Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>                                   |                                                                                                              |
| Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>                             |                                                                                                              |
| Remarks:<br><b>Not all three wetland criteria were observed. Associated with DP-G-2U from the 2015 site investigation.</b> |                                                                                                              |

## VEGETATION – Use scientific names of plants.

| Tree Stratum (Plot size: 30 ft)                                      | Absolute % Cover | Dominant Species? | Indicator Status | <b>Dominance Test worksheet:</b><br>Number of Dominant Species That Are OBL, FACW, or FAC: <u>4</u> (A)<br><br>Total Number of Dominant Species Across All Strata: <u>6</u> (B)<br><br>Percent of Dominant Species That Are OBL, FACW, or FAC: <u>67%</u> (A/B)                                                                                                                                                                                                                                                                                                                                                                                         |
|----------------------------------------------------------------------|------------------|-------------------|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. <u>Alnus rubra</u>                                                | <u>70</u>        | <u>Yes</u>        | <u>FAC</u>       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 2. <u>Tsuga heterophylla</u>                                         | <u>20</u>        | <u>Yes</u>        | <u>FACU</u>      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 3. <u>      </u>                                                     | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 4. <u>      </u>                                                     | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <u>90</u> = Total Cover                                              |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Sapling/Shrub Stratum (Plot size: 15 ft)</b>                      |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 1. <u>Rubus spectabilis</u>                                          | <u>10</u>        | <u>Yes</u>        | <u>FAC</u>       | <b>Prevalence Index worksheet:</b><br>Total % Cover of: <u>0</u> Multiply by:<br>OBL species <u>0</u> x 1 = <u>0</u><br>FACW species <u>0</u> x 2 = <u>0</u><br>FAC species <u>108</u> x 3 = <u>324</u><br>FACU species <u>81</u> x 4 = <u>324</u><br>UPL species <u>0</u> x 5 = <u>0</u><br>Column Totals: <u>189</u> (A) <u>648</u> (B)<br><br>Prevalence Index = B/A = <u>3.43</u>                                                                                                                                                                                                                                                                   |
| 2. <u>Oplopanax horridus</u>                                         | <u>3</u>         | <u>Yes</u>        | <u>FAC</u>       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 3. <u>      </u>                                                     | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 4. <u>      </u>                                                     | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 5. <u>      </u>                                                     | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <u>13</u> = Total Cover                                              |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Herb Stratum (Plot size: 5 ft)</b>                                |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 1. <u>Polystichum munitum</u>                                        | <u>60</u>        | <u>Yes</u>        | <u>FACU</u>      | <b>Hydrophytic Vegetation Indicators:</b><br><input type="checkbox"/> Rapid Test for Hydrophytic Vegetation<br><input checked="" type="checkbox"/> Dominance Test is >50%<br><input type="checkbox"/> Prevalence Index is ≤3.0 <sup>1</sup><br><input type="checkbox"/> Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)<br><input type="checkbox"/> Wetland Non-Vascular Plants <sup>1</sup><br><input type="checkbox"/> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)<br><sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic. |
| 2. <u>Blechnum spicant</u>                                           | <u>25</u>        | <u>Yes</u>        | <u>FAC</u>       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 3. <u>Trillium ovatum</u>                                            | <u>1</u>         | <u>No</u>         | <u>FACU</u>      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 4. <u>      </u>                                                     | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 5. <u>      </u>                                                     | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 6. <u>      </u>                                                     | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 7. <u>      </u>                                                     | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 8. <u>      </u>                                                     | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 9. <u>      </u>                                                     | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 10. <u>      </u>                                                    | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 11. <u>      </u>                                                    | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <u>86</u> = Total Cover                                              |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Woody Vine Stratum (Plot size: 30 ft)</b>                         |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 1. <u>      </u>                                                     | <u>      </u>    | <u>      </u>     | <u>      </u>    | <b>Hydrophytic Vegetation Present?</b> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 2. <u>      </u>                                                     | <u>      </u>    | <u>      </u>     | <u>      </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <u>0</u> = Total Cover                                               |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| % Bare Ground in Herb Stratum <u>14</u>                              |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Remarks: <u>Hydrophytic criteria observed through dominance test</u> |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

## SOIL

Sampling Point: DP-19U**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth<br>(inches) | Matrix        |     | Redox Features |   |                   | Loc <sup>2</sup> | Texture | Remarks                 |
|-------------------|---------------|-----|----------------|---|-------------------|------------------|---------|-------------------------|
|                   | Color (moist) | %   | Color (moist)  | % | Type <sup>1</sup> |                  |         |                         |
| 0 - 2             | Duff          | -   | -              | - | -                 | -                | Duff    |                         |
| 2 - 16            | 5YR 2.5/2     | 100 | -              | - | -                 | -                | MeLo    | Medium Loam w/ organics |
|                   |               |     |                |   |                   |                  |         |                         |
|                   |               |     |                |   |                   |                  |         |                         |
|                   |               |     |                |   |                   |                  |         |                         |
|                   |               |     |                |   |                   |                  |         |                         |
|                   |               |     |                |   |                   |                  |         |                         |
|                   |               |     |                |   |                   |                  |         |                         |

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.<sup>2</sup>Location: PL=Pore Lining, M=Matrix.**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- |                                                            |                                                                            |
|------------------------------------------------------------|----------------------------------------------------------------------------|
| <input type="checkbox"/> Histosol (A1)                     | <input type="checkbox"/> Sandy Redox (S5)                                  |
| <input type="checkbox"/> Histic Epipedon (A2)              | <input type="checkbox"/> Stripped Matrix (S6)                              |
| <input type="checkbox"/> Black Histic (A3)                 | <input type="checkbox"/> Loamy Mucky Mineral (F1) ( <b>except MLRA 1</b> ) |
| <input type="checkbox"/> Hydrogen Sulfide (A4)             | <input type="checkbox"/> Loamy Gleyed Matrix (F2)                          |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Depleted Matrix (F3)                              |
| <input type="checkbox"/> Thick Dark Surface (A12)          | <input type="checkbox"/> Redox Dark Surface (F6)                           |
| <input type="checkbox"/> Sandy Mucky Mineral (S1)          | <input type="checkbox"/> Depleted Dark Surface (F7)                        |
| <input type="checkbox"/> Sandy Gleyed Matrix (S4)          | <input type="checkbox"/> Redox Depressions (F8)                            |

**Indicators for Problematic Hydric Soils<sup>3</sup>:**

- ☐ 2 cm Muck (A10)  
☐ Red Parent Material (TF2)  
☐ Very Shallow Dark Surface (TF12)  
☐ Other (Explain in Remarks)

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if present):**

Type: \_\_\_\_\_  
 Depth (inches): \_\_\_\_\_

**Hydric Soil Present?** Yes ☐ No ☒

Remarks:

No hydric soil criteria were observed.

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one required; check all that apply)

- |                                                                    |                                                                                            |
|--------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
| <input type="checkbox"/> Surface Water (A1)                        | <input type="checkbox"/> Water-Stained Leaves (B9) ( <b>except MLRA 1, 2, 4A, and 4B</b> ) |
| <input type="checkbox"/> High Water Table (A2)                     | <input type="checkbox"/> Salt Crust (B11)                                                  |
| <input type="checkbox"/> Saturation (A3)                           | <input type="checkbox"/> Aquatic Invertebrates (B13)                                       |
| <input type="checkbox"/> Water Marks (B1)                          | <input type="checkbox"/> Hydrogen Sulfide Odor (C1)                                        |
| <input type="checkbox"/> Sediment Deposits (B2)                    | <input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)                     |
| <input type="checkbox"/> Drift Deposits (B3)                       | <input type="checkbox"/> Presence of Reduced Iron (C4)                                     |
| <input type="checkbox"/> Algal Mat or Crust (B4)                   | <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)                        |
| <input type="checkbox"/> Iron Deposits (B5)                        | <input type="checkbox"/> Stunted or Stressed Plants (D1) ( <b>LRR A</b> )                  |
| <input type="checkbox"/> Surface Soil Cracks (B6)                  | <input type="checkbox"/> Other (Explain in Remarks)                                        |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) |                                                                                            |
| <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)   |                                                                                            |

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)  
☐ Drainage Patterns (B10)  
☐ Dry-Season Water Table (C2)  
☐ Saturation Visible on Aerial Imagery (C9)  
☐ Geomorphic Position (D2)  
☐ Shallow Aquitard (D3)  
☐ FAC-Neutral Test (D5)  
☐ Raised Ant Mounds (D6) (**LRR A**)  
☐ Frost-Heave Hummocks (D7)

**Field Observations:**

Surface Water Present? Yes ☐ No ☒ Depth (inches): \_\_\_\_\_  
 Water Table Present? Yes ☐ No ☒ Depth (inches): \_\_\_\_\_  
 Saturation Present? Yes ☐ No ☒ Depth (inches): \_\_\_\_\_  
 (includes capillary fringe)

**Wetland Hydrology Present?** Yes ☐ No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

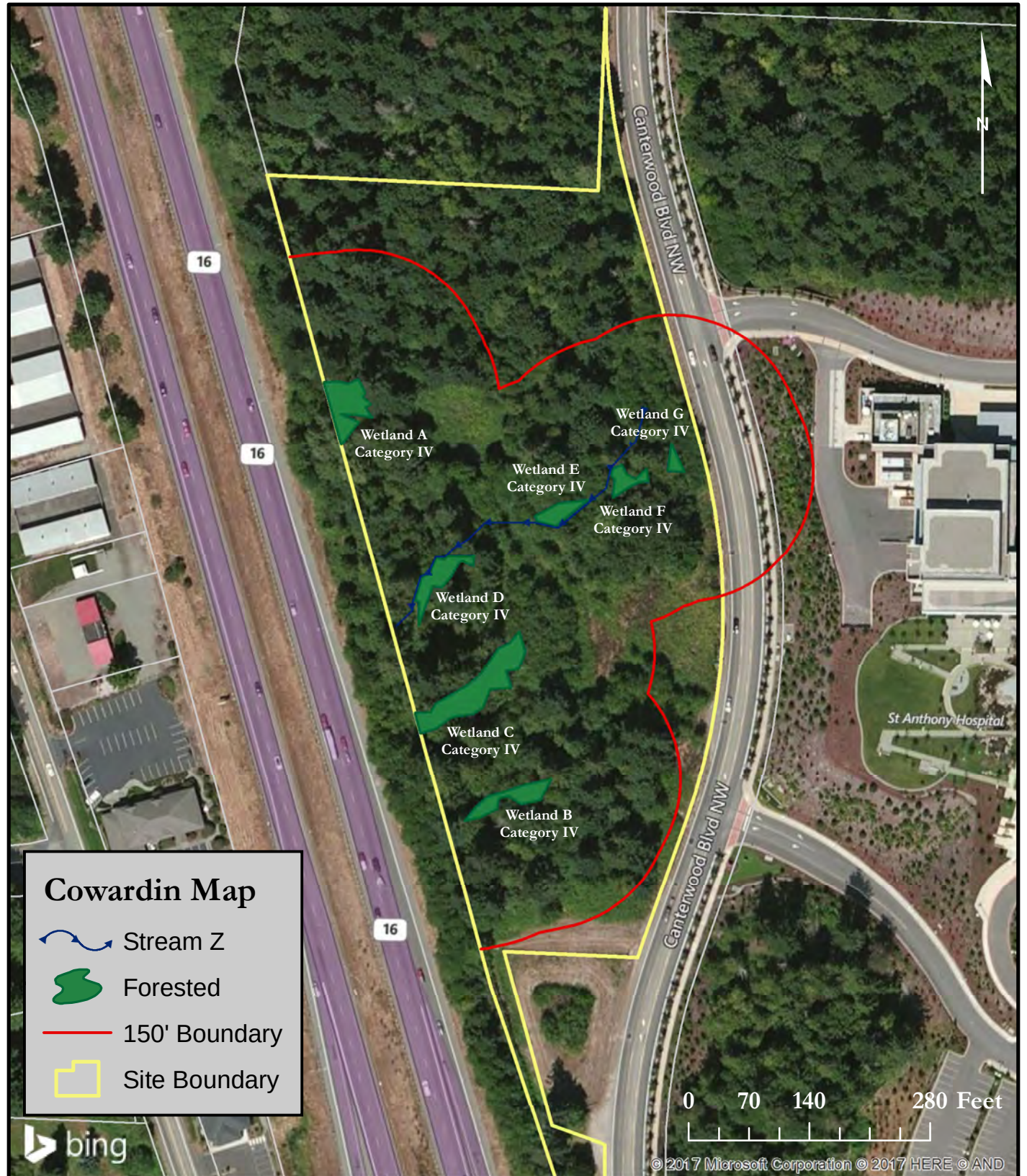
No primary or secondary hydrologic indicators observed.

## Appendix E — Wetland Rating Forms

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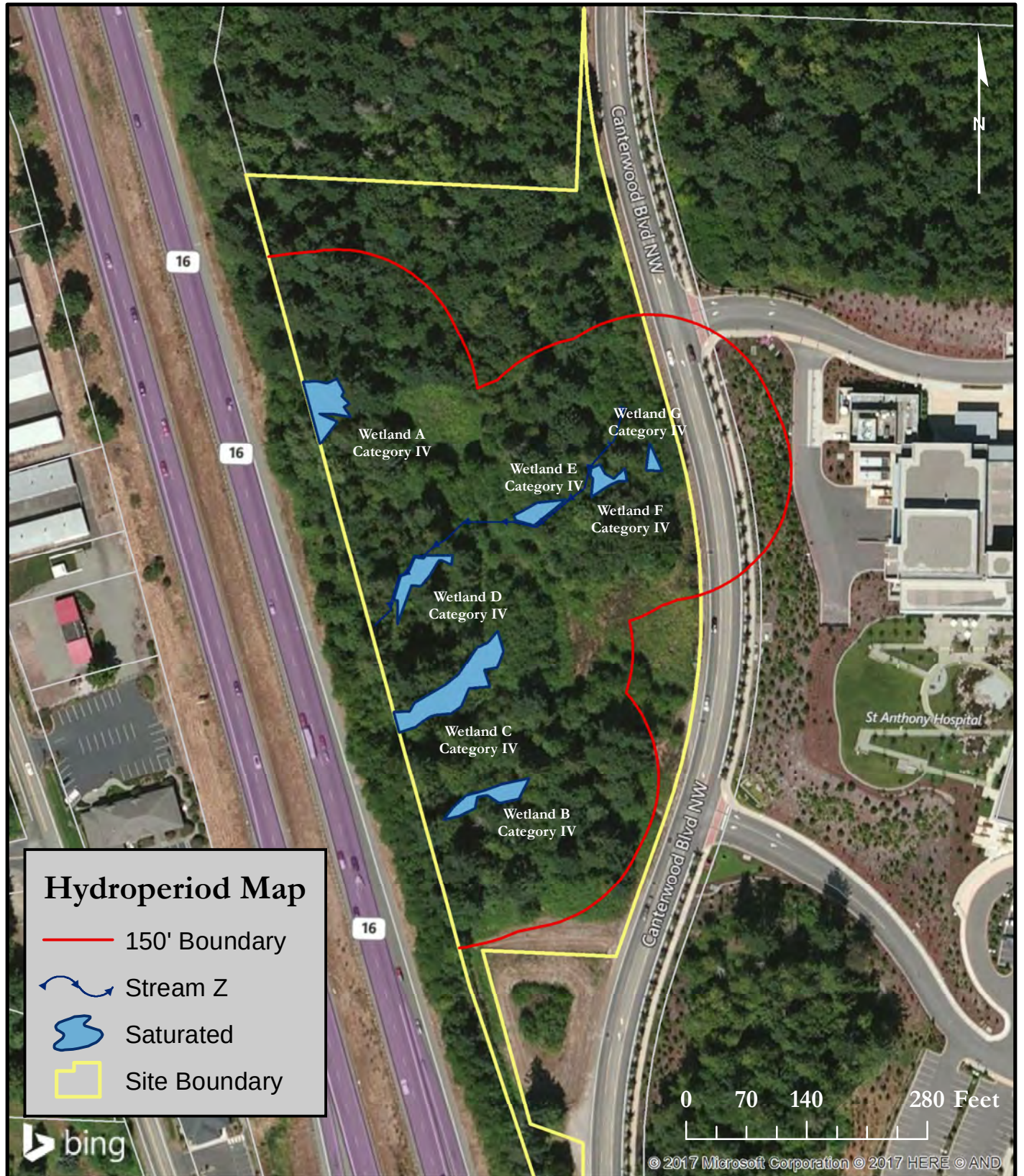


# CANTERWOOD PHASE II- WETLAND RATING MAP



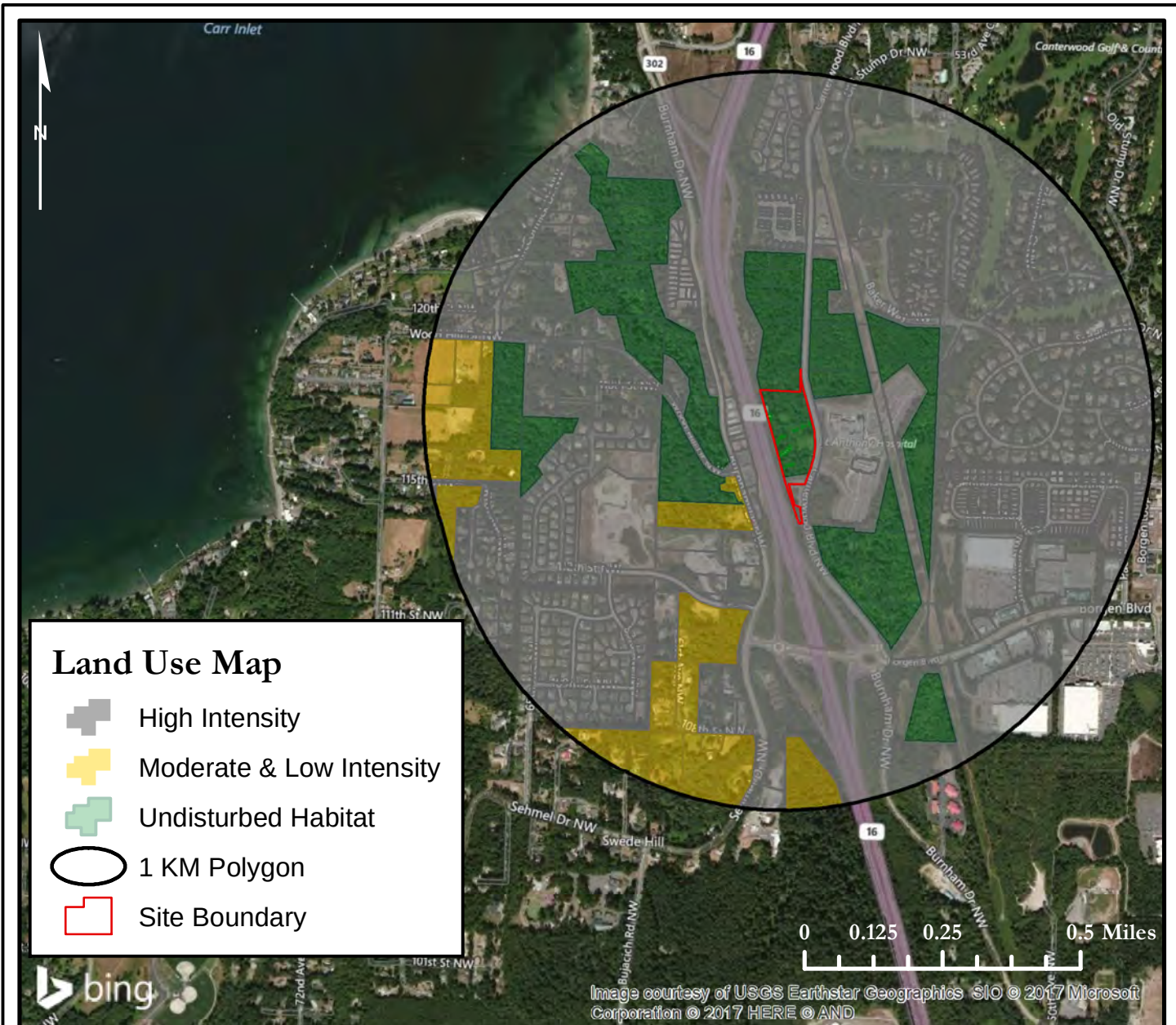


# CANTERWOOD PHASE II- WETLAND RATING MAP





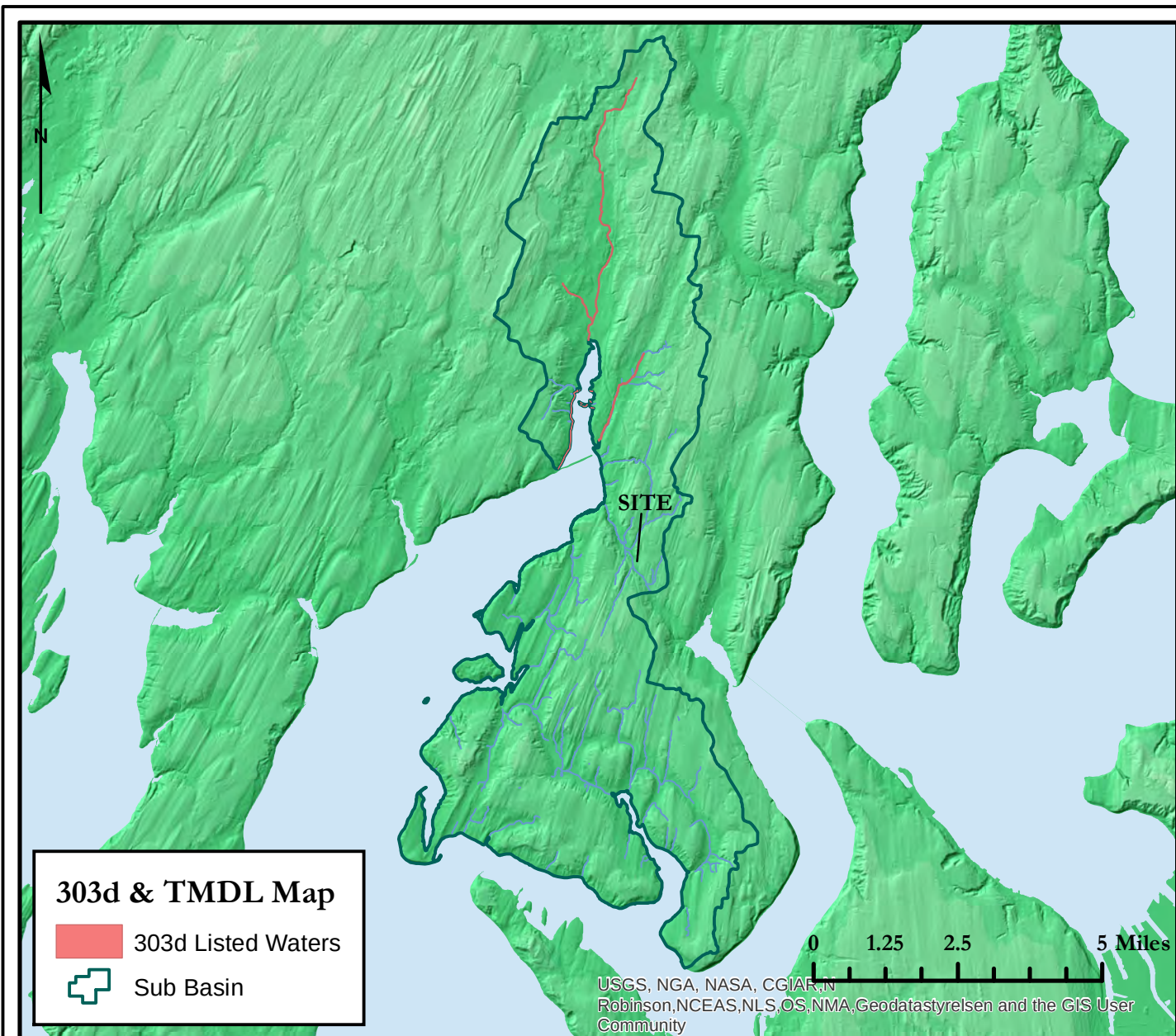
# CANTERWOOD PHASE II- WETLAND RATING MAP



| H.2.0 Wetlands A-G |                                                |               |
|--------------------|------------------------------------------------|---------------|
| H.2.1              |                                                |               |
|                    | Abutting Undisturbed Habitat                   | 2.43%         |
|                    | Abutting Moderate & Low Intensity Land Uses    | 0.00%         |
|                    | <b>Accessible Habitat</b>                      | <b>2.43%</b>  |
| H.2.2              |                                                |               |
|                    | Undisturbed Habitat                            | 14.54%        |
|                    | Moderate & Low Intensity Land Uses             | 7.89%         |
|                    | <b>Undisturbed Habitat in 1 KM Polygon</b>     | <b>18.49%</b> |
| H.2.3              |                                                |               |
|                    | <b>High Intensity Land Use in 1 KM Polygon</b> | <b>77.57%</b> |



# CANTERWOOD PHASE II- WETLAND RATING MAP



| Listing ID | Category | Parameters       | MEDIA | Waterbody     | Waterbody Type      |
|------------|----------|------------------|-------|---------------|---------------------|
| 53150      | 5        | Bacteria         | Water | HENDERSON BAY | Marine (Full Grids) |
| 53187      | 5        | Bacteria         | Water | HENDERSON BAY | Marine (Full Grids) |
| 53188      | 5        | Bacteria         | Water | HENDERSON BAY | Marine (Full Grids) |
| 38843      | 5        | Dissolved Oxygen | Water | PURDY CREEK   | Rivers/Streams      |
| 38471      | 5        | Dissolved Oxygen | Water | BURLEY CREEK  | Rivers/Streams      |
| 38475      | 5        | Dissolved Oxygen | Water | BURLEY CREEK  | Rivers/Streams      |
| 10387      | 5        | Bacteria         | Water | PURDY CREEK   | Rivers/Streams      |
| 38420      | 5        | Dissolved Oxygen | Water | BEAR CREEK    | Rivers/Streams      |


**Soundview Consultants LLC**  
 Environmental Assessment • Planning • Land Use Solutions  
 2907 HARBORVIEW DRIVE, SUITE D P. 253.514.8952  
 GIG HARBOR, WASHINGTON 98335 F. 253.514.8954  
[WWW.SOUNDVIEWCONSULTANTS.COM](http://WWW.SOUNDVIEWCONSULTANTS.COM)

## Canterwood Phase II

SR16 HWY W  
Gig Harbor, WA

PIERCE COUNTY PARCEL NUMBERS:  
0122254090

DATE: 6/29/2017

JOB: 1193.0002

BY: DLS

SCALE: 1" = 14,500'

FIGURE NO. 4

## Appendix F — Qualifications

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All field inspections, jurisdictional wetland boundary delineations, OHWM determinations, habitat assessments, and supporting documentation, including this *Wetland Delineation and Habitat Assessment and Mitigation Plan* prepared for the *Swede Hill LLC* were prepared by, or under the direction of, Jeremy Downs of Soundview Consultants LLC.

### Jeremy Downs

Principal Scientist and Environmental Planner

Professional experience: 30 years

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Jeremy Downs is a Principal Scientist and Environmental Planner with professional training and extensive experience in land use, site planning and design, project coordination, permitting and management, marine and wetland ecology, habitat restoration, wetland, stream, and benthic delineations and assessments, stream assessments, underwater and terrestrial monitoring programs, and mitigation planning and design since 1987.

Jeremy earned a Bachelor's of Science degree in Biology from the University of California, Davis. In addition, he studied under the Environmental Risk and Recovery program at the Australian Institute of Marine Science. He also holds graduate-level professional certifications in various advanced wetland science and management programs from both Portland State University and San Francisco State University, and he has received professional training in Salmonid Biology from the University of California Extension.

Jeremy is a certified wetlands delineator under US Army Corps of Engineers guidelines. He has been formally trained in the use of the Washington State Wetland Rating System, Determination of Ordinary High Water Mark, Designing Compensatory Mitigation and Restoration Projects, and Reviewing Wetland Mitigation and Monitoring Plans from the US Army Corps of Engineers and Washington State Department of Ecology, and in conducting Biological Assessments from the Washington Department of Transportation. He is also a Kitsap County Qualified Wetland Specialist and Fisheries Biologist, and he holds similar qualifications from other jurisdictions.

### Don Babineau

Environmental Planner/Project Manager

Professional Experience: >15 years

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Don Babineau is an Environmental Planner and Project Manager with a diverse background in urban and commercial forestry, land planning, landscape architecture, stormwater monitoring and civil engineering. Don has experience as a Forester with Washington State Department of Natural Resources stream typing and delineating stream protection zones, as well as implementing Washington State's Habitat Conservation Plan to foster the creation of old-growth forest characteristics on state trust lands. Don currently provides permitting and regulatory compliance assistance for land use projects from their planning stages through review, approval, and construction. Don performs wetland and Ordinary High Water delineations; provides land use planning assistance for residential, commercial, and industrial projects; conducts code and regulation analysis; prepares reports and permit applications; and prepares restoration and mitigation plans. Don earned a Bachelor of Science degree in Forest Ecosystems Management and a Bachelor of Landscape Architecture degree, both from the University of Idaho.

Don has received 40-hour wetland delineation training (Western Mtns, Valleys, & Coast and Arid West Regional Supplement) and has been formally trained by the Washington State Department of Ecology in the use of the Washington State Wetland Rating System and How to Determine the Ordinary High Water Mark. In addition, he has experience as certified erosion and sediment control lead (CESCL). He is also a Pierce County qualified Professional Forester.

## **Richard Peel**

Wetland Scientist

Professional Experience: 5 years

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Richard Peel is a Wetland Scientist with diverse professional experience in wetland ecology, monitoring, and delineation throughout Washington and Oregon. Richard is Washington State trained in conducting wetland delineations, assessing wetland systems, mitigation planning and design, implementation of monitoring programs, mitigation monitoring and reporting. He also has extensive experience in an analytical laboratory using state-of-the-art equipment in bacteriological and chemical analysis of soil and water samples.

Richard is a graduate of The Evergreen State College, with dual degrees in Ecology and Economics. He has focused his academic career on ecology, disturbance ecology, chemistry, and the economic impacts of current environmental management. Richard has extensive training and field experience in wetland related disciplines, and has experience in wetland both east and west of The Cascades. He has been trained by The Washington State Department of Transportation's (WSDOT) Wetland Ecology and Monitoring team in the use of the wetland delineation, mitigation, monitoring, and restoration techniques. In addition, he was directed by WSDOT's Wetland Protection and Preservation Policy to ensure wetlands are preserved and protected whenever possible. This direction ensures no net loss in the quantity or quality of wetlands in the future and minimization of impacts to wetlands in the present.



## TECHNICAL MEMORANDUM

Prepared by: Grette Associates<sup>LLC</sup>  
2102 North 30<sup>th</sup> Street, Ste A  
Tacoma, WA 98403

October 21, 2019

Prepared for: City of Gig Harbor  
Attention: Kim Mahoney  
3510 Grandview Street  
Gig Harbor, WA 98335

File No.: 250.001.2046

Re: Canterwood Commercial: Wetland Delineation and Habitat Assessment Report and  
Mitigation Plan -Third Party Review

Grette Associates is under contract with the City of Gig Harbor (City) to assist in the review of the Wetland Delineation and Habitat Assessment Report and Mitigation Plan (the “Plan”, dated January 2018) prepared by Soundview Consultants (Soundview). Grette Associates reviewed and provided comments on the Plan on March 5, 2018. In summary of Grette Associates’ review, the Plan was largely compliant with Chapter 18.08 of the Gig Harbor Municipal Code (GHMC); however, two deficiencies from the requirements defined in Chapter 18.08 of the GHMC were identified.

In response to Grette Associates’ 2018 review, Soundview submitted a revised Plan and technical memorandum (September 12, 2018) to the City on January 30, 2019. Provided below is a summary of the deficiencies identified in the 2018 review (*italic*) followed by Grette Associates’ response upon review of the submitted documents.

- *Per Chapter 18.08 of the GHMC, structures associated with development are not allowed within buffers unless those structures meet the requirements defined in GHMC 18.08.120 or 18.08.184. According to GHMC 18.08.110, buffer alteration (reduction/averaging) may be approved if the applicant meets the requirements defined in GHMC 18.08.110. The Report does not propose any buffer modifications to facilitate the construction of the retaining walls. Similarly, the Report does not provide any analysis to demonstrate that the placement of the retaining walls within the stream/wetland buffers will not have an adverse effect or that any adverse effects shall be mitigated and result in equivalent functions and values. Grette Associates recommends that the Report be revised to address the structures proposed within the wetland and stream buffer areas.*

Soundview’s September 2018 technical memorandum summarizes that the proposed project was revised to remove the retaining walls from the critical area buffers and that the site plans were revised accordingly. Grette Associates has reviewed the revised materials and verified that these changes were made. Therefore, the revised Plan has adequately addressed this comment.

- *Per GHMC 18.08.120.C, the placement of stormwater management features shall be placed at a distance from the wetland edge no less than 75 percent of the buffer width. Therefore, the dispersion trench needs to be repositioned to the outer 25 percent of the wetland buffer to comply with GHMC 18.08.120.C.*

Soundview's September 2018 technical memorandum states that the Plan was not revised to comply with the design standards defined in GHMC 18.08.120.C because moving the dispersion trenches to the outer 25 percent of the wetland would create potential erosion concerns. In addition, the tech memo states that the dispersion trenches need to be situated in the proposed location to provide primary hydrology to the proposed wetland creation areas.

Upon receipt of the materials submitted to the City on January 30, 2019, the City received another revised set of site plans and additional information summarizing that the plans were revised to reposition the dispersion trenches to the outer 25 percent of the wetland buffer. In response, the City prepared a letter (City of Gig Harbor 2019a) summarizing that the revised site plans, while now compliant with GHMC 18.08.120.C, contradicts Soundview's stance that positioning the dispersion trenches to the outer 25 percent of the wetland buffer would create potential erosion issues and remove the primary source of hydrology necessary to create wetland hydrology within the proposed wetland creation area. Based on this information, the City required additional information to address this issue.

Prior to submitting revised materials to the City, Barghausen Consulting Engineers (Barghausen) requested a meeting with the City, Grette Associates, Soundview, and Barghausen regarding the stormwater features and the wetland creation area (City of Gig Harbor 2019b). In summary of the July 11, 2019 meeting, stormwater conveyance features, including the proposed dispersion trenches, are restricted to the outer 25 percent of the wetland buffer. Any stormwater conveyance feature proposed within the inner 75 percent of the wetland buffer would require a variance from the design standards defined in Chapter 18.08 of the GHMC. Furthermore, the City and Grette Associates expressed concern regarding Soundview's position that the success of the proposed wetland creation area was dependent on the dispersion trenches and that their proposed location was crucial for the success of establishing wetland conditions. Per the guidance from *Wetland Mitigation in Washington State* (the "Joint Guidance"; Ecology, Corps, and EPA 2006), a mitigation site must have a natural source of water sufficient to support the wetland and targeted functions. Therefore, the City required that the Plan be revised to demonstrate that the proposed mitigation plan will be designed to incorporate a natural water source to sufficiently support the wetland creation area without the need of an artificial source (i.e., stormwater).

In response to the City's and Grette Associates' comments, a Revised Plan (September 24, 2019) was submitted to the City. In summary, the Revised Plan was redesigned to reposition the dispersion trenches completely out of the wetland buffer and notes that trenches are to provide supplemental wetland hydrology. Furthermore, the Revised Plan states that the creation area was selected because this area is conducive to the establishment of wetland conditions. Per Section 5.3 of the Revised Plan, the creation area will consist of a depressional area that will be constructed to the elevation of groundwater that was encountered in the area during Soundview's previous site assessments. Based on the information provided, the Revised Plan has resolved the dispersion trench discrepancy identified in Grette Associates' 2018 review and has adequately demonstrated that the proposed mitigation plan will utilize a natural water source to support the

wetland creation area and satisfying the conceptual mitigation requirements defined in GHMC 18.08.150.A.

As noted above, previous submittal materials state that the placement of the dispersion trench along the top of the constructed slope would create potential erosion hazards. The City has expressed concerns regarding the location of the dispersion trench based on information provided in a 2014 geotech report which states that the dispersion trench should not be installed on the constructed fill slope below Building A. Grette Associates recommends that the City request that the revised site plans be reviewed by the project's geotechnical engineer to ensure that the proposed location of the dispersion trenches would not jeopardize the structural integrity of the constructed slope.

Soundview submitted a technical memorandum (October 9, 2019) to address their previous statement that locating the dispersion trench would create potential erosion issues. With respect to wetland, streams, and buffer concerns, Grette Associates concurs with Soundview's proposed actions to reduce any erosion issues. According to the revised planting plan, to further dissipate flows from the dispersion trench the wetland buffer area immediately downslope of the dispersion trench will be densely planted with red-twig dogwood (*Cornus sericea*). Additionally, the wetland buffer along the constructed slope will be planted with an assortment of native shrubs and trees and then seeded with a suitable buffer seed mix. Per the planting plan sheets attached to the Revised Plan, all shrubs and trees planted will consist of bare root stock and will range in size from two to four feet in height. Based on the proposed planting plan and constructed function of the dispersion trench, it is Grette Associates' professional opinion that, with respect to function, the placement of the dispersion trench at the top of the constructed slope will likely not have an adverse impact to the wetlands, stream, or their buffers.

In conclusion, the Revised Plan has adequately addressed Grette Associates' 2018 comments and the comments and/or concerns from the July 11, 2019 meeting (City of Gig Harbor 2019b). Based on this information, the Revised Plan is compliant with the *Conceptual Phase* mitigation plan submittal requirements defined in GHMC 18.08.150.A. Please note that upon acceptance by the City the proposed project will be required to prepare and submit a *Detailed Phase* mitigation plan that shall be consistent with the requirements defined in GHMC 18.08.150B.

The review of the Revised Plan was conducted using the best available scientific information and best professional judgment of Grette Associates staff wetland biologists. Final acceptance and approval of the report is at the discretion of City staff.

If you have any questions on the document review, please contact me at (253) 573-9300, or by email at [chadw@gretteassociates.com](mailto:chadw@gretteassociates.com).

Regards,



Chad Wallin  
Biologist  
GRETTIE ASSOCIATES<sup>LLC</sup>



**References:**

- City of Gig Harbor. 2019a. Technical Memorandum: Memorandum, Canterwood Commercial Center Stormwater Design Relative to Created Wetland Buffer. Addressed to Mr. Hubbell (Barghausen) and Mr. Babineau (Soundview). June 27, 2019.
- City of Gig Harbor. 2019b. Technical Memorandum: Memorandum, Canterwood Commercial Center Stormwater Design Relative to Created Wetland Buffer. Addressed to Mr. Hubbell (Barghausen) and Mr. Babineau (Soundview). July 12, 2019.
- Soundview Consultants, LLC. 2018. Technical Memorandum: PL-SPR-07-0004, PL-CUP-13-0002, PL-DRB-07-0013, PL-SEPA-07-0060 for Canterwood Commercial. Addressed to Ms. Kimberly Mahoney, City of Gig Harbor. October 9, 2019.
- Soundview Consultants, LLC. 2019. Technical Memorandum: PL-SPR-07-0004, PL-CUP-13-0002, PL-DRB-07-0013, PL-SEPA-07-0060 for Canterwood Commercial. Addressed to Mr. Carl de Simas, City of Gig Harbor. September 12, 2018.
- Washington State Department of Ecology, U.S. Army Corps of Engineers Seattle District, and U.S. Environmental Protection Agency Region 10. March 2006. Wetland Mitigation in Washington State – Part 1: Agency Policies and Guidance (Version 1). Washington State Department of Ecology Publication #06-06-011a. Olympia, WA.
- Washington State Department of Ecology, U.S. Army Corps of Engineers Seattle District, and U.S. Environmental Protection Agency Region 10. March 2006. Wetland Mitigation in Washington State – Part 2: Developing Mitigation Plans (Version 1). Washington State Department of Ecology Publication #06-06-011b. Olympia, WA.



June 27, 2019

**Re: Memorandum, Canterwood Commercial Center Stormwater Design  
Relative to Created Wetland Buffer**

Dear Mr. Hubbell and Mr. Babineau,

This memorandum intends to capture the City of Gig Harbor's ("the City") response to recent submittals and discussions related to the proposed stormwater design at the proposed Canterwood Commercial Center, PL-SPR-07-0004, PL-SEPA-07-0060, PL-DRB-07-0013, PL-CUP-13-0002.

**Background**

On September 12, 2018, the City received a technical memorandum from Soundview Consultants, LLC ("Soundview") responding to a technical memorandum dated March 5, 2018 submitted by Grette Associates, LLC ("Grette"). Having analyzed this project's Wetland Delineation and Habitat Assessment Report and Mitigation Plan prepared by Soundview, Grette provided a recommendation that the proposed stormwater management feature shall be placed at a distance from the wetland edge no less than 75 percent of the buffer width, in accordance with (IAW) Gig Harbor Municipal Code (GHMC) 18.08.120(C). In its September 12, 2018 response to this recommendation, Soundview recognized that its revised plans do not adopt Grette's recommendation, stating "to move the trenches to the outer 25 percent of the wetland buffer would locate them at the top of a newly constructed slope which would create a potential erosion hazard. Second, the locating the dispersion trenches closer to the wetland creation area is a part of the mitigation plan providing hydrology to the wetland creation areas. Moving the trenches to the top of the buffer would not be effective in providing hydrology to the wetland creation areas."

The City received revised plans on April 2, 2019 from Barghausen Consulting Engineers, Inc ("Barghausen"). On April 12, 2019, the City contacted Barghausen via email regarding the location of the stormwater management feature in relation to the created wetland and its buffer. The email noted that because the revised plans still showed the north side stormwater feature extending into the wetland

buffer, the plans were still out of compliance with GHMC 18.08.120(C), and the City was therefore unable to start review of the resubmittal.

In response to this email, the City received a technical memorandum on April 24, 2019 from Soundview expressing that the Project Engineer has revised the plans to locate the proposed stormwater outfall outside of the inner 75 percent buffer area.

### **Current Position**

The most recent plans submitted to the City dated April 2, 2019 propose to locate the north side stormwater management feature in a manner largely compliant with both the provisions set forth in GHMC 18.08.120(C) and the functional design outlined in Soundview's Wetland Delineation and Habitat Assessment Report and Mitigation Plan, which limits the proposed stormwater feature to serve as a supplementary source of hydrology for the created wetland, using natural "hydrologic connectivity" on site to charge the wetland.

However, the proposed plans contradict the position Soundview has taken, both in writing in its September 12, 2018 technical memo and verbally in a meeting with City staff on June 24, 2019, that the currently proposed location of the stormwater feature lends itself to erosion hazards and effectively removes a primary source of hydrology necessary to charge the created wetland. The City is left to question the effectiveness of the plans as currently proposed, despite their conformance with the GHMC, due to the project proponent(s) speaking against the current design's structural stability and its ability to assist in charging the created wetland. Therefore, **the City is unable to review the most recent plans** until the items listed below are addressed.

### **Steps Forward**

For the City to start review of the resubmitted plans, the applicant is required to address the following:

- If the applicant wishes to proceed with the project as it is currently designed, the applicant shall submit revised plans that include dimensions of the rockeries proposed in the stormwater features. Additionally, the applicant shall submit a revised geotechnical report that addresses the soil stability and the potential for erosion hazard associated with the stormwater feature as it is currently designed and located on the site.
- During a meeting between Soundview and the City on June 24, 2019, Soundview presented a conceptual plan to navigate water from the stormwater feature to the wetland via a swale which extends into the inner 75 percent of the wetland buffer. This preliminary plan was further discussed during a phone call between the City and Barghausen on June 25, 2019, identifying swales that are potentially lined with grass to direct the flow of water from the stormwater feature to the wetland.



- IAW GHMC 18.08.120(C), "the placement of...grass-lined swales and detention/retention facilities for water treated by biofiltration or other processes prior to discharge, provided the minimum distance from the wetland edge is not less than 75 percent of the buffer widths" is permitted.
- If the applicant wishes to revise the project to include swales in the stormwater feature, the swales may not extend to the inner 75 percent of the wetland buffer. If the plans exhibit swales encroaching on the inner 75 percent of the wetland buffer, the proposal will necessitate a variance application. A variance application for this project will require the applicant to overcome the contradictions described in this memo.
- Both during the June 24, 2019 meeting with Soundview and the June 25, 2019 phone call with Barghausen, the City was asked if the provisions of GHMC 18.08.120 apply to the permitted activities within the buffer of a created wetland. Excluding the provisions of the GHMC to allow development or activity that would otherwise be prohibited effectively creates a non-conformity. Therefore, the provisions of the GHMC shall apply to the proposed wetland and its buffer.

If you have additional questions, please do not hesitate to contact me. Until then, I look forward to receiving your corrected submittal. When you are ready to submit your revision package, please contact me so that we can schedule a resubmittal appointment.

Sincerely,



Kim Mahoney  
Associate Planner  
253-853-7615

Cc: planning file



July 12, 2019

**Re: Memorandum, Canterwood Commercial Center Stormwater Design  
Relative to Created Wetland Buffer**

Dear Mr. Hubbell and Mr. Babineau,

This memorandum intends to capture the key conversation points as understood by the City of Gig Harbor ("the City") and Grette Associates, LLC ("Grette") at a meeting held on July 11, 2019 between the City, Grette, Soundview Consultants, LLC ("Soundview"), and Barghausen Consulting Engineers, Inc ("Barghausen"). The meeting was held at the request of Mr. Hubbell in regard to the proposed created wetland and stormwater conveyance at the proposed Canterwood Commercial Center, PL-SPR-07-0004, PL-SEPA-07-0060, PL-DRB-07-0013, PL-CUP-13-0002. As its basis for conversation, this meeting referenced a conceptual mitigation exhibit submitted by Soundview to the City and Grette dated July 9, 2019. This exhibit was drafted for discussion purposes only and is not an official submittal for the City and Grette to consider and apply to the proposed development.

**Application of Wetland and Wetland Buffer Provisions**

Barghausen and Soundview questioned the applicability of the Gig Harbor Municipal Code (GHMC) provisions related to wetlands and their associated buffers on their proposal. The City referenced GHMC 18.08.030 which defines wetlands as follows: "Wetland or wetlands means areas that are inundated or saturated by surface water or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions... Wetlands include those artificial wetlands intentionally created from nonwetland areas created to mitigate conversion of wetlands." The proposed created wetland is a wetland constructed to mitigate the impact of converting two on-site existing wetlands; as such, the proposed created wetland meets the definition of a "wetland" and the related provisions set forth in the GHMC shall apply.

## **Stormwater Conveyance**

The most recent mitigation exhibit prepared for discussion by Soundview indicates drainage courses from the stormwater utility through the entire wetland buffer. Regarding permitted uses within a wetland buffer area, GHMC 18.08.120(C) allows for “the placement of underground utility lines...provided the minimum distance from the wetland edge is not less than 75 percent of the buffer widths.” It is the City’s position that the proposed drainage course is a component of the stormwater utility and is therefore restricted to the outer 25 percent of the wetland buffer. Advocating that the provisions of GHMC 18.08.120(C) do not apply to the drainage courses, Soundview and Barghausen took the position that the proposed drainage courses are a component of the wetland mitigation and serve a necessary function as the primary source of hydrology to the created wetland. The position that the success of the proposed created wetland is dependent on an artificial (non-natural) source of hydrology introduces concerns expressed by the City and Grette which are explained in detail below.

## **Hydrology**

Grette expressed concern about the success of the creation area if stormwater was the only primary source of hydrology and recommended that there should be a natural primary source (i.e. groundwater) in addition to stormwater input. Grette also pointed out that Soundview’s mitigation plan (dated January 2018) describes that the location of the creation area was chosen because the location “is in a landscape conducive to establishing wetland conditions and these areas are identified as having hydrologic connectivity and soil conditions conducive to wetland creation.” These statements within the plan suggest that the creation area, with some minor manipulation (grading, excavation, etc.), would be constructed to establish a natural primary source of hydrology to support wetland conditions. Soundview and Barghausen commented that Grette’s and the City’s interpretation of the referenced language in the plan is inaccurate. In response, Grette commented that the only reference to the dispersion trench in the plan is stating that the trench “will disperse stormwater to assist with on-site water quality enhancement” and that the plan does not provide any statement that suggests, even at a conceptual level, that the intent of said feature is to provide primary hydrology to the creation area.

Grette has since conferred with the *Wetland Mitigation in Washington State* (2006) drafted jointly by the Department of Ecology, the Environmental Protection Agency and the US Army Corps of Engineers. This joint guidance is consistent with the City’s “best available science” provision detailed in GHMC 18.08.032, which reads: “Critical area reports and decisions to alter critical areas shall rely on the best available science to protect the functions and values of critical areas. The best available science is that scientific information applicable to the critical area prepared by local, state or federal natural resource agencies, qualified scientific professional or team of qualified scientific professionals that is



consistent with criteria established in WAC 365-195-900 through 365-195-925.” As such, the conclusions found in the joint guidance are used in development regulations to protect the functions and values of critical areas, which include wetlands. With regard to hydrological sources in proposed mitigation plans, the joint guidance states that a mitigation site must have a natural source of water sufficient to support the wetland and targeted functions. Even at the conceptual level, a mitigation plan must demonstrate that the creation area will be supported by a natural water source without the need of an artificial source (i.e. stormwater). The guidance further poses that mitigation sites primarily supported by artificial sources are not self-sustaining. Therefore, **the proposed mitigation plan for this project must be designed to reflect the incorporation of a natural water source sufficient to exclusively support the created wetland;** an artificial source of hydrology may be incorporated into the mitigation plan (such as the currently proposed drainage courses) but the mitigation plan cannot be designed to rely on a proposed artificial hydrology source.

### **Noteworthy Items**

While it is not required to be shown in the conceptual plans, City staff note that the most recent exhibit does not incorporate vegetation within the proposed wetland buffer. In accordance with GHMC 18.08.100, “Except as otherwise permitted by this chapter, wetland buffers shall consist of a relatively intact native vegetation community adequate to protect the wetland functions and values at the time of proposed activity. If the vegetation is inadequate then the buffer width shall be planted to maintain the buffer width.” The proposed mitigation plan for the proposed Canterwood Commercial site shall incorporate plantings in the buffer area which comply with the provisions outlined in GHMC 18.08.100.

The City provided information to Barghausen and Soundview at the July 11, 2019 meeting related to a variance application and an administrative interpretation application, should the applicant decide their proposed mitigation plan would be best supported by either of these applications.

If you have any questions, please do not hesitate to contact me. Until then, I look forward to receiving your revised plans and associated revised reports. When you are ready to submit your revision package, please contact me so that we can schedule a resubmittal appointment.

Sincerely,



Kim Mahoney  
Associate Planner  
253-853-7615

Cc: planning file

## Technical Memorandum

**To:** Carl de Simas, City of Gig Harbor **File Number:** 1193.0002  
**From:** Don Babineau, Soundview Consultants LLC **Date:** September 12, 2018  
**Re:** PL-SPR-07-0004, PL-CUP-13-0002, PL-DRB-07-0013, PL-SEPA-07-0060 for  
Canterwood Commercial

Dear Mr. de Simas,

Thank you for your attention to this project. This memorandum is in response to the technical memorandum prepared by the City of Gig Harbor third party reviewer, Grette Associates LLC (Grette), dated March 5, 2018. The Grette memorandum recommends that two discrepancies associated with the project's layout configuration be addressed.

First, the review memorandum recommends that the retaining walls proposed within wetland and stream buffers in the February 2, 2018 project submittal be addressed to provide analysis of the potential impacts to buffer function and provide mitigation where allowed for the retaining walls within the buffers. The site plans have been revised to remove the walls from the wetland and stream buffers (see Attachment A). Any temporary impacts to wetland or stream buffers occurring during the construction of the relocated walls adjacent to those buffers will be mitigated for using appropriate soil and vegetation restoration to the impacted buffer areas.

Second, the Grette review recommends that the proposed stormwater dispersion trenches should be relocated to the outer 25 percent of the wetland buffer. The revised plans do not include the relocation of the dispersion trenches as recommended for two reasons. First, to move the trenches to the outer 25 percent of the wetland buffer would locate them at the top of a newly constructed slope which would create a potential erosion hazard. Second, the locating the dispersion trenches closer to the wetland creation area is a part of the mitigation plan providing hydrology to the wetland creation areas. Moving the trenches to the top of the buffer would not be effective in providing hydrology to the wetland creation areas.

Please review the attached revised plans and contact me if you have any questions or concerns.

Sincerely,



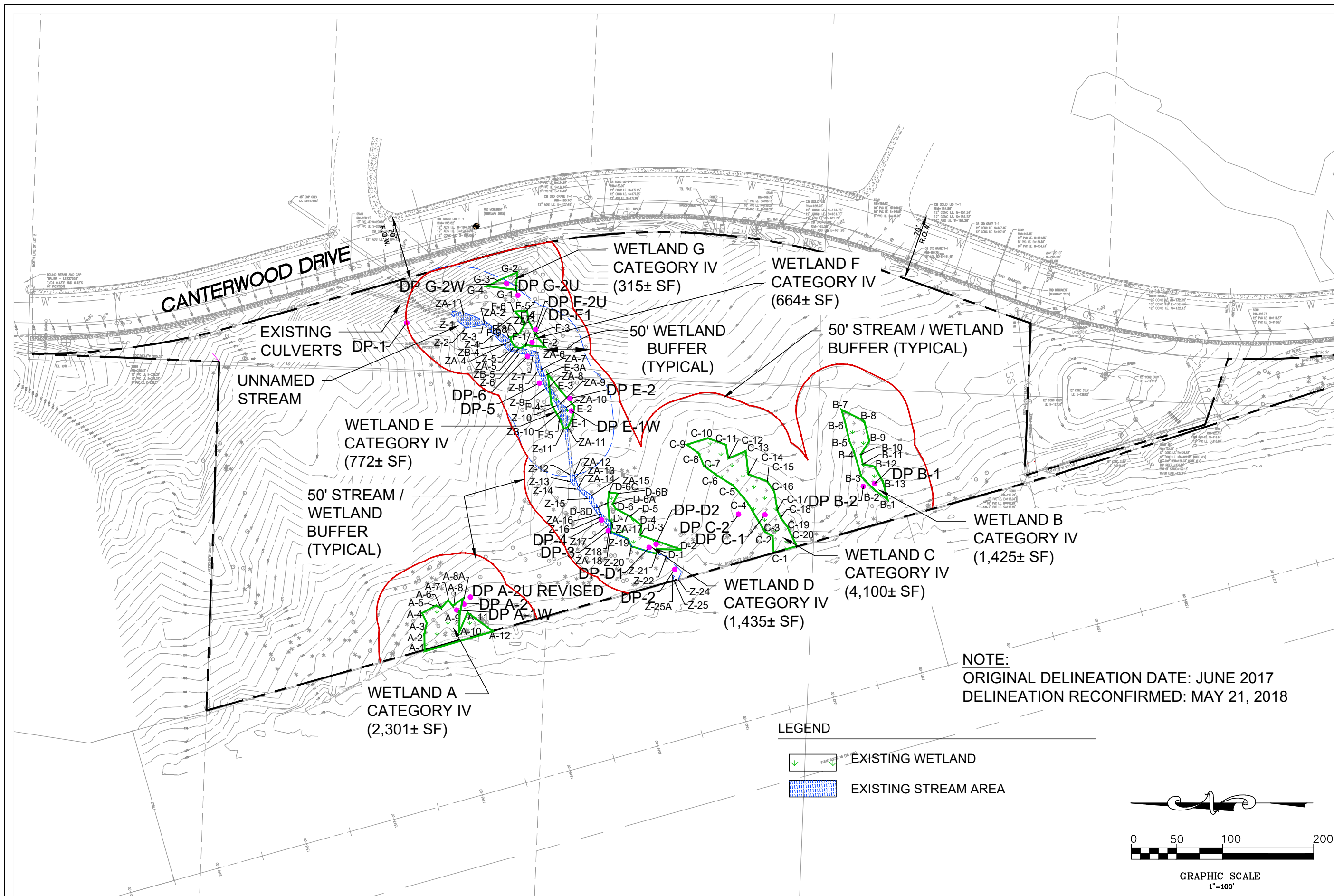
Don Babineau  
Environmental Planner/Project Manager  
(253) 514-8952  
[don@soundviewconsultants.com](mailto:don@soundviewconsultants.com)

## ATTACHMENT A – REVISED SITE PLANS

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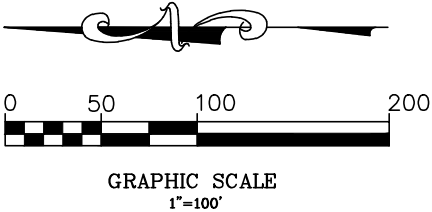


CANTERWOOD COMMERCIAL - SITE CONDITIONS



NOTE:  
ORIGINAL DELINEATION DATE: JUNE 2017  
DELINEATION RECONFIRMED: MAY 21, 2018

- LEGEND
- EXISTING WETLAND
  - EXISTING STREAM AREA



18215 72ND AVENUE SOUTH  
KENT, WA 98032  
(425)251-6222  
(425)251-8782 FAX  
CIVIL ENGINEERING, LAND PLANNING,  
SURVEYING, ENVIRONMENTAL SERVICES



Soundview Consultants LLC  
Environmental Assessment • Planning • Land Use Solutions  
2907 HARBORVIEW DRIVE, SUITE D  
GIG HARBOR, WASHINGTON 98335  
P. 253.514.8952  
F. 253.514.8954  
WWW.SOUNDVIEWCONSULTANTS.COM

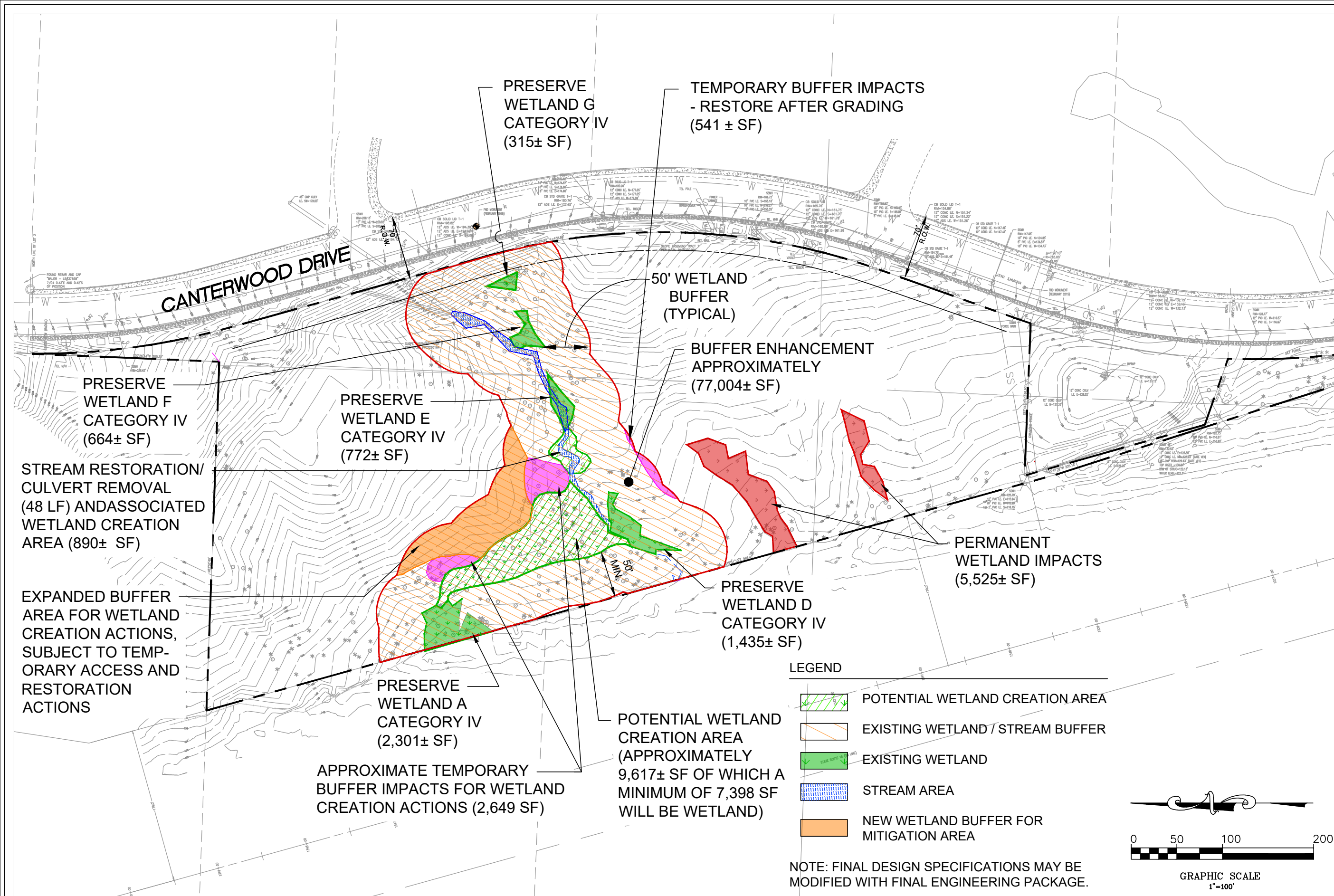
CANTERWOOD COMMERCIAL  
GIG HARBOR, WASHINGTON  
PORTIONS OF THE SE 1/4 OF SECTION 25,  
TOWNSHIP 22N, RANGE 01E, W.M.

|                  |
|------------------|
| DATE: 9/11/2018  |
| JOB: 1193.0001   |
| BY: KM/JR/DS     |
| SCALE: 1" = 100' |
| SHEET 1 OF 5     |

DRAFT FOR REVIEW



CANTERWOOD COMMERCIAL - MITIGATION/IMPACT OVERLAY



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KENT, WA 98032  
(425)251-6222  
(425)251-8782 FAX  
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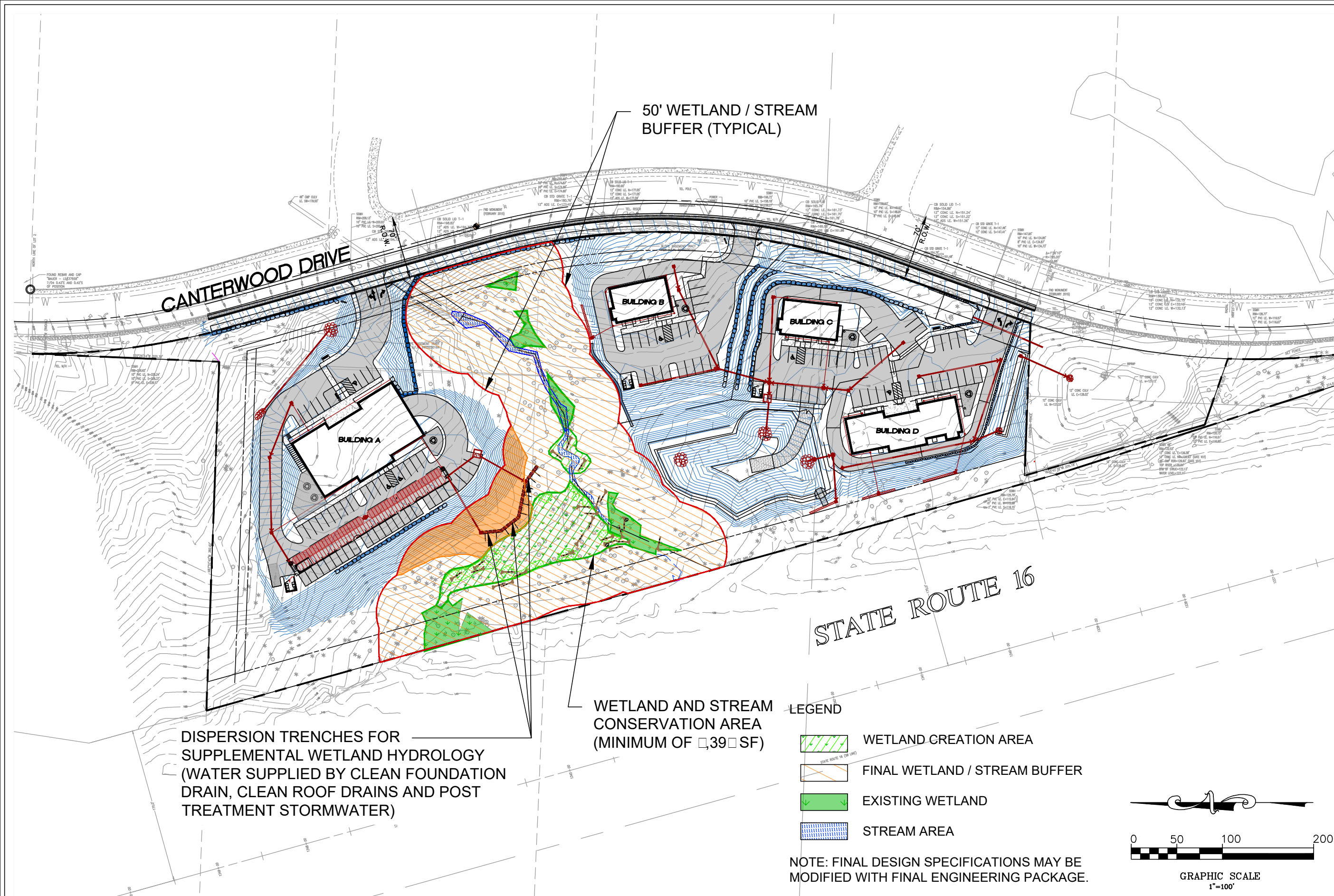
**CANTERWOOD COMMERCIAL**  
GIG HARBOR, WASHINGTON  
PORTIONS OF THE SE 1/4 OF SECTION 25,  
TOWNSHIP 22N, RANGE 01E, W.M.

|                  |
|------------------|
| DATE: 9/11/2018  |
| JOB: 1193.0001   |
| BY: KM/JR/DS     |
| SCALE: 1" = 100' |
| SHEET 2 OF 5     |

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CANTERWOOD COMMERCIAL - PROPOSED PLAN



18215 72ND AVENUE SOUTH  
KENT, WA 98032  
(425)251-6222  
(425)251-8782 FAX  
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SURVEYING, ENVIRONMENTAL SERVICES



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2907 HARBORVIEW DRIVE, SUITE D  
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F. 253.514.8954  
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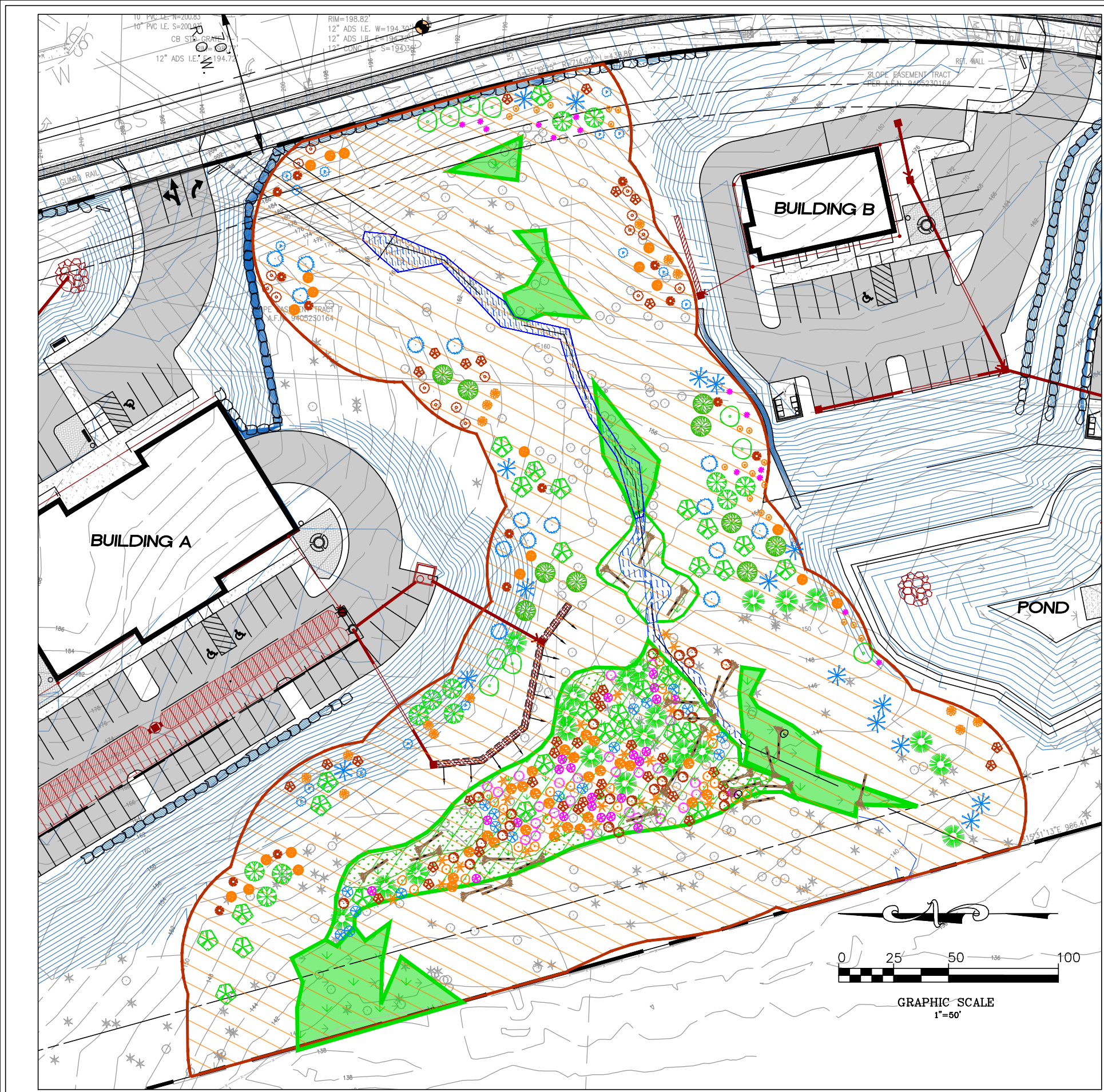
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PORTIONS OF THE SE 1/4 OF SECTION 25,  
TOWNSHIP 22N, RANGE 01E, W.M.

DATE: 9/11/2018  
JOB: 1193.0001  
BY: KM/JR/DS  
SCALE: 1" = 100'  
SHEET 3 OF 5

DRAFT FOR REVIEW



CANTERWOOD COMMERCIAL - APPROXIMATE PLANTING AND HYDROLOGY PLAN



| TREES      |                       | LOCATION         |
|------------|-----------------------|------------------|
|            | BIGLEAF MAPLE         | BUFFER           |
|            | BITTER CHERRY         | BUFFER           |
|            | DOUGLAS FIR           | BUFFER           |
|            | GRAND FIR             | BUFFER           |
|            | PACIFIC WILLOW        | WETLAND          |
|            | SITKA SPRUCE          | WETLAND / BUFFER |
|            | WESTERN RED CEDAR     | WETLAND / BUFFER |
| SHRUBS     |                       | LOCATION         |
|            | BEAKED HAZELNUT       | BUFFER           |
|            | COMMON SWORD-FERN     | BUFFER           |
|            | EVERGREEN HUCKLEBERRY | BUFFER           |
|            | HOOKE'S WILLOW        | WETLAND          |
|            | INDIAN PLUM           | BUFFER           |
|            | NOOTKA ROSE           | BUFFER           |
|            | PACIFIC CRABAPPLE     | WETLAND / BUFFER |
|            | PACIFIC NINEBARK      | WETLAND          |
|            | RED-FLOWERING CURRANT | BUFFER           |
|            | SALAL                 | BUFFER           |
|            | STINK CURRANT         | WETLAND          |
|            | SWAMP GOOSEBERRY      | WETLAND          |
|            | SWAMP ROSE            | WETLAND          |
|            | TWINBERRY             | WETLAND          |
|            | VINE MAPLE            | BUFFER           |
| HERBACEOUS |                       | LOCATION         |
|            | LADY FERN             | WETLAND          |
|            | SLOUGH SEDGE          | WETLAND          |
|            | SMALL-FRUITED BULRUSH | WETLAND          |

NOTES:  
ALL PLANT LOCATIONS AND PLANT SPECIES ARE ILLUSTRATIVE AND INTENDED TO BE TYPICAL FOR THE SITE. ALL SPECIES LOCATED AND QUANTITIES TO BE FIELD LOCATED AND COORDINATED WITH PROTECT WETLAND SCIENTIST PRIOR TO INSTALLATION.

FINAL DESIGN SPECIFICATIONS MAY BE MODIFIED WITH FINAL ENGINEERING PACKAGE.

- LEGEND
- EXISTING TREES TO BE RETAINED
  - PARTIALLY BURIED LARGE WOODY DEBRIS
  - STORMWATER DISPERSION TRENCH
  - WETLAND / STREAM BUFFER
  - EXISTING WETLAND
  - STREAM AREA
  - WETLAND CREATION AREA

NOTE: FINAL DESIGN SPECIFICATIONS MAY BE MODIFIED WITH FINAL ENGINEERING PACKAGE.

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PORTIONS OF THE SE 1/4 OF SECTION 25,  
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|                 |
|-----------------|
| DATE: 9/11/2018 |
| JOB: 1193.0001  |
| BY: JR/DS       |
| SCALE: AS NOTED |
| SHEET 4 OF 5    |

DRAFT FOR REVIEW



CANTERWOOD COMMERCIAL - PLANT LIST / DETAILS

| WETLAND PLANT SPECIES |                              |            |                         |          |
|-----------------------|------------------------------|------------|-------------------------|----------|
| COMMON NAME           | SPECIES NAME                 | SIZE (GAL) | TYPICAL SPACING (FT OC) | QUANTITY |
| TREES                 |                              |            |                         |          |
| PACIFIC WILLOW        | <i>SALIX LASIANDRA</i>       | 1          | 5                       | 18       |
| SITKA SPRUCE          | <i>PICEA SITCHENSIS</i>      | 3          | 10                      | 12       |
| WESTERN RED CEDAR     | <i>THUJA PLICATA</i>         | 3          | 10                      | 13       |
| SHRUBS                |                              |            |                         |          |
| HOOKE'S WILLOW        | <i>SALIX HOOKERIANA</i>      | 1          | 5                       | 25       |
| PACIFIC CRABAPPLE     | <i>MALUS FUSCA</i>           | 1          | 5                       | 25       |
| PACIFIC NINEBARK      | <i>PHYSOCARPUS CAPITATUS</i> | 1          | 5                       | 23       |
| STINK CURRANT         | <i>RIBES BRACTEOSUM</i>      | 1          | 5                       | 22       |
| SWAMP GOOSEBERRY      | <i>RIBES LACUSTRE</i>        | 1          | 5                       | 25       |
| SWAMP ROSE            | <i>ROSA PISOCARPA</i>        | 1          | 5                       | 25       |
| TWINBERRY             | <i>LONICERA INVOLUCRATA</i>  | 1          | 5                       | 26       |
| HERBACEOUS            |                              |            |                         |          |
| LADY FERN             | <i>ATHYRIUM ANGUSTUM</i>     | PLUGS      | 3                       | 210      |
| SLOUGH SEDGE          | <i>CAREX OBNUPTA</i>         | PLUGS      | 3                       | 210      |
| SMALL-FRUITED BULRUSH | <i>SCIRPUS MICROCARPUS</i>   | PLUGS      | 3                       | 210      |

| BUFFER PLANT SPECIES  |                                                  |            |                 |          |
|-----------------------|--------------------------------------------------|------------|-----------------|----------|
| COMMON NAME           | SPECIES NAME                                     | SIZE (GAL) | TYPICAL SPACING | QUANTITY |
| TREES                 |                                                  |            |                 |          |
| BIGLEAF MAPLE         | <i>ACER MACROPHYLLUM</i>                         | 3          | 10              | 9        |
| BITTER CHERRY         | <i>PRUNUS EMARGINATA</i> VAR. <i>MOLLIS</i>      | 1          | 8               | 15       |
| DOUGLAS FIR           | <i>PSEUDOTSUGA MENZIESII</i>                     | 3          | 10              | 10       |
| GRAND FIR             | <i>ABIES GRANDIS</i>                             | 3          | 10              | 12       |
| SITKA SPRUCE          | <i>PICEA SITCHENSIS</i>                          | 3          | 10              | 17       |
| WESTERN RED CEDAR     | <i>THUJA PLICATA</i>                             | 3          | 10              | 9        |
| SHRUBS                |                                                  |            |                 |          |
| BEAKED HAZELNUT       | <i>CORYLUS CORNUTA</i> , VAR. <i>CALIFORNICA</i> | 1          | 5               | 15       |
| COMMON SWORD-FERN     | <i>POLYSTICHUM MUNITUM</i>                       | 1          | 3               | 19       |
| EVERGREEN HUCKLEBERRY | <i>VACCINIUM OVATUM</i>                          | 1          | 5               | 20       |
| INDIAN PLUM           | <i>OEMLERIA CERASIFORMIS</i>                     | 1          | 5               | 15       |
| NOOTKA ROSE           | <i>ROSA NUTKANA</i>                              | 1          | 5               | 16       |
| PACIFIC CRABAPPLE     | <i>MALUS FUSCA</i>                               | 1          | 5               | 14       |
| RED-FLOWERING CURRANT | <i>RIBES SANGUINEUM</i>                          | 1          | 5               | 15       |
| SALAL                 | <i>GAULTHERIA SHALLON</i>                        | 1          | 3               | 18       |
| VINE MAPLE            | <i>ACER CIRCINATUM</i>                           | 1          | 8               | 16       |

| WETLAND SEED MIX (0.34 ACRES) |                       |               |                                            |
|-------------------------------|-----------------------|---------------|--------------------------------------------|
| SPECIES NAME                  | COMMON NAME           | % (BY WEIGHT) | QUANTITY                                   |
| <i>CAREX OBNUPTA</i>          | SLOUGH SEDGE          | 10 PERCENT    | 10 LBS<br>AT 30 LBS /<br>ACRE<br>(APPROX.) |
| <i>GLYCERIA BOREALIS</i>      | NORTHERN MANNAGRASS   | 30 PERCENT    |                                            |
| <i>SCIRPUS MICROCARPUS</i>    | SMALL-FRUITED BULRUSH | 10 PERCENT    |                                            |
| <i>HORDEUM BRACHYANTHERUM</i> | MEADOW BARLEY         | 50 PERCENT    |                                            |

| BUFFER SEED MIX (0.39 ACRES)     |                   |               |                                            |
|----------------------------------|-------------------|---------------|--------------------------------------------|
| SPECIES NAME                     | COMMON NAME       | % (BY WEIGHT) | QUANTITY                                   |
| <i>AGROSTIS EXERATA</i>          | SPIKE BENTGRASS   | 10 PERCENT    | 12 LBS<br>AT 30 LBS<br>/ ACRE<br>(APPROX.) |
| <i>DESCHAMPSIA CESPITOSA</i>     | TUFTED HAIRGRASS  | 10 PERCENT    |                                            |
| <i>DESCHAMPSIA DANTHONIOIDES</i> | ANNUAL HAIRGRASS  | 10 PERCENT    |                                            |
| <i>DESCHAMPSIA ELONGATA</i>      | SLENDER HAIRGRASS | 10 PERCENT    |                                            |
| <i>ELYMUS GLAUCUS</i>            | BLUE WILDRYE      | 25 PERCENT    |                                            |
| <i>HORDEUM BRACHYANTHERUM</i>    | MEADOW BARLEY     | 25 PERCENT    |                                            |
| <i>LUPINUS POLYPHYLLUS</i>       | STREAMSIDE LUPINE | 10 PERCENT    |                                            |

TREE AND SHRUB PLANTING DETAIL (TYPICAL)

NOT TO SCALE

LOCATOR LATH (IF SPECIFIED)

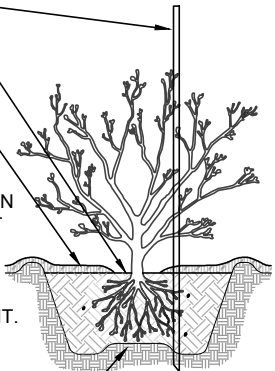
SET TOP OF ROOT MASS / ROOT BALL FLUSH WITH FINISH GRADE OR SLIGHTLY ABOVE

3 to 4 INCH LAYER OF MULCH - KEEP MULCH MIN. 3" AWAY FROM TRUNK OF SHRUB

NOTES:

1. PLANT SHRUBS OF THE SAME SPECIES IN GROUPS OF 3 to 9 AS APPROPRIATE, OR AS SHOWN ON PLAN. AVOID INSTALLING PLANTS IN STRAIGHT LINES TO ACHIEVE A NATURAL-LOOKING LAYOUT.
2. EXCAVATE PIT TO FULL DEPTH OF ROOT MASS AND 2 X ROOT MASS DIAMETER. SPREAD ROOTS TO FULL WIDTH OF CANOPY. SCARIFY SIDES OF PIT.
3. MIDWAY THROUGH PLANTING ADD AGROFORM TABLET AND WATER THOROUGHLY.
4. BACKFILL TO BE COMPACTED USING WATER ONLY.
5. WATER IMMEDIATELY AFTER INSTALLATION.

UNDISTURBED OR  
COMPACTED SUBGRADE



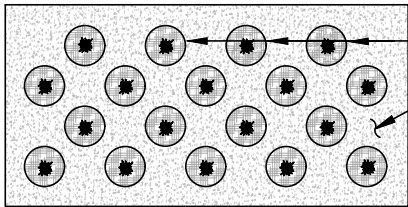
PLUG PLANTING DETAIL (TYPICAL)

NOT TO SCALE

NOTES:

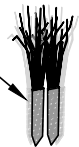
1. PLANT HERBACEOUS PLUGS STAGGERED 2'-0" O.C.
2. EXCAVATE PLANTING PIT TO 6" DIA. AND ADEQUATE DEPTH.
3. FORM A RING OF SOIL AROUND THE EDGE OF EACH PLANTING PIT.
4. WATER IMMEDIATELY AFTER INSTALLATION.
5. AFTER PLANTING IS COMPLETE PLACE 3 to 4 INCHES OF MULCH IN BUFFER ESTABLISHMENT AREA.

PLAN VIEW OF TYPICAL PLUG INSTALLATION



TYPICAL PLANTING  
PIT (SEE NOTE 2)  
MULCHED AREA.  
(SEE NOTE 5)

TYPICAL  
PLUG



LARGE WOODY DEBRIS DETAIL

NOT TO SCALE

ADD1 OR 2 LARGE ROCKS  
(3' - 4') PER LWD

LARGE WOODY DEBRIS -  
(50% OF PIECES TO HAVE  
ROOTWAD)

SUBSTANTIAL  
PORTION OF LARGE  
WOODY DEBRIS ROOT  
WAD AND/OR TRUNK  
TO BE WITHIN STREAM

STREAM  
CHANNEL



ANCHOR WITH DUCK-BILL ANCHOR  
AND 1/4" GALVANIZED CABLE OR  
APPROVED EQUIVALENT

NOTES:

1. ALL IN-STREAM LARGE WOODY DEBRIS SHALL CONSIST OF CEDAR OR FIR WITH MINIMAL EVIDENCE OF DECAY. SIZES SHALL BE AS INDICATED IN THE PLANT SCHEDULE.
2. ROOTWADS SHALL HAVE A RELATIVELY EVEN SPREAD OF ROOTS WITH A MINIMUM ROOTBALL DIAMETER OF THREE (3) FEET. ROOTWADS SHALL BE CLEANED PRIOR TO PLACEMENT IN THE CHANNEL.

18215 72ND AVENUE SOUTH  
KENT, WA 98032  
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(425)251-8782 FAX



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CANTERWOOD COMMERCIAL  
GIG HARBOR, WASHINGTON  
PORTIONS OF THE SE 1/4 OF SECTION 25,  
TOWNSHIP 22N, RANGE 01E, W.M.

DATE: 9/11/2018

JOB: 1193.0001

BY: JR/DS

SCALE: AS NOTED

SHEET 5 OF 5

DRAFT FOR REVIEW

## Technical Memorandum

**To:** Kimberly Mahoney, City of Gig Harbor

**File Number:** 1193.0002

**From:** Don Babineau, Soundview Consultants LLC

**Date:** October 9, 2019

**Re:** PL-SPR-07-0004, PL-CUP-13-0002, PL-DRB-07-0013, PL-SEPA-07-0060 for  
Canterwood Commercial

Dear Ms. Mahoney,

This memo is in response to the concerns we raised in our previous technical memorandum to the city, dated September 9, 2018, regarding potential erosion hazards associated with locating the project's dispersion trench at the top of the constructed slope. With the revised stormwater plan to locate the trench at the top of the slope, the latest buffer planting plan submitted with the revised report, dated September 24, 2019, has been designed to specifically address the previous concerns we had raised. The revised planting plan has been adapted to include an area of densely-planted red twig dogwood adjacent to the downslope side of the dispersion trench which should further dissipate flow and provide a dense root system to maintain slope stability within the buffer adjacent to the outfall location. In addition, all disturbed areas within the buffer will be densely planted with native species adapted to the local environment and hydroseeded with a native groundcover seed mix to prevent erosion further downslope and across the rest of the graded buffer area.

Sincerely,



Don Babineau  
Environmental Planner/Project Manager  
(253) 514-8952  
[don@soundviewconsultants.com](mailto:don@soundviewconsultants.com)



**MEMORANDUM**

DATE: June 25, 2021  
TO: Kim Mahoney, Associate Planner  
FROM: Aaron Hulst, P.E., Senior Engineer *ah*  
SUBJECT: **Canterwood Commercial Center** (PL-SPR-07-0004)  
Recommended SEPA Mitigation and Conditions

Reference:

- Preliminary Plan set stamped received dated May 10, 2021
- Sewer Capacity Reservation Certificate dated approved on 1/9/2019.
- Sewer Hydraulic Report dated received on 10/23/20.
- Water Capacity Reservation Certificate dated approved on 1/3/2019.
- Water Hydraulic Report dated received on 10/23/20.
- Preliminary Drainage Report, dated received on 10/23/20.
- Traffic Impact Analysis (TIA) prepared by Heath & Associates, Inc., dated received 1/8/14
- Traffic Impact Analysis (TIA) prepared by Heath & Associates, Inc., dated 10/5/18
- Traffic Impact Analysis (TIA) prepared by Heath & Associates, Inc., dated 1/25/21
- Concurrency Report prepared by DEA, Inc., dated 4/2/14.
- Transportation Concurrency Reservation Certificate dated 1/8/14.
- Transportation Concurrency Reservation Certificate dated 1/4/19. (this TCRC amended 2014 TCRC)

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Based on the submitted project documents and the identified impacts from the proposed development, the Public Works Department has the following "Recommended Mitigation and Conditions" described below. Unless otherwise noted, all mitigation items shall meet the City of Gig Harbor Public Works Standards and be completed prior to any certificates of occupancy being issued for structures on the proposed development.

**BACKGROUND**

The proposed project intends to redevelop a residential site to build 4 new duplexes (8 total units).

Access to the site will be from a proposed full access driveway located along Pioneer Way, a public roadway. The site also requires connections to the City's water system, wastewater system and provisions for compliance with stormwater regulations.

**REVIEW and ANALYSIS**

**Water Infrastructure:** The impacts to the City's water infrastructure from the proposed development have been reviewed in accordance with the following:

- Gig Harbor Municipal Code (GHMC), Chapter 19.10, Concurrency Management
- City of Gig Harbor Water System Comprehensive Plan (Water Plan).

Review under concurrency management has been determined based on information contained in the above referenced water concurrency reservation certificate (WCRC) application and the above referenced Water Hydraulic Report. The applicant requested 17.7 ERU's for this development based on design information in the Water Hydraulic Report. **The City has reserved water capacity in the amount of 17.7 ERU's for this development.** If future information is submitted indicating that the development requires a different amount of water capacity, the applicant shall submit a revised WCRC application and shall not receive approval of the final engineered plans until the reserved capacity has been revised and approved by the City.

The applicant proposes to connect to the City's existing water main within Canterwood Boulevard to serve their development. Building A will be served by one 1.5" domestic meter connection as well as a separate 1" irrigation meter and tap. Building B will be served by a 2" domestic meter and separate tap. Building C and D will be served by two 2" domestic meters and taps as well as a separate 1" irrigation meter.

Appropriate provisions for potable water supplies and adequate means of water supply can be obtained by compliance with the City of Gig Harbor's development regulations, comprehensive plan and other applicable local, state and federal laws. No further mitigation is required under SEPA as any impacts will be addressed by compliance with the City of Gig Harbor's development regulations, comprehensive plan and other applicable local, state and federal laws consistent with WAC 197-11-158.

**Wastewater Infrastructure:** The impacts to the City's sewer infrastructure from the proposed development have been reviewed in accordance with the following:

- Gig Harbor Municipal Code (GHMC), Chapter 19.10, Concurrency Management
- City of Gig Harbor Wastewater System Comprehensive Plan (Wastewater Plan).
- City of Gig Harbor Comprehensive Plan (Plan)

The findings and conclusions from review of the concurrency ordinance have been determined based on the referenced Sewer Hydraulics Report and the Sewer CRC. Based on the referenced documents, **the City has reserved 7 sewer ERU's for the development.**

The applicant proposes to connect to the City's existing sewer collection and conveyance system via three separate services. Building A proposes a 1.5" force main with connection to a private manhole that will gravity feed into an existing sanitary manhole in Canterwood Boulevard. Buildings B, C, and D will be served by two total 6" sanitary laterals, respectively. Each lateral will connect into an existing sanitary manhole within Canterwood Boulevard. The proposed existing connection point is in accordance with the City's Wastewater System Comprehensive Plan. All sewer lines constructed by the applicant and will remain privately owned, operated and maintained.

Based on the documentation described above, the developer has made appropriate provisions for sanitary wastes.

**Stormwater Infrastructure:** The City has reviewed the storm water impacts for the proposed development based on the documents provided by the applicant. The City of Gig Harbor Stormwater Management and Site Development Manual requires consideration of both quantity and quality control of storm water run-off from the proposed development. The impacts to the City's stormwater infrastructure from the proposed development have been reviewed in accordance with the following:

- Gig Harbor Municipal Code (GHMC), Chapter 14.20.
- City of Gig Harbor Stormwater Comprehensive Plan (Stormwater Plan).

The applicant has prepared a Preliminary Stormwater Report, in accordance with the COGH 2016 Stormwater Management and Site Development Manual, along with a proposed storm system layout in the referenced plans to document the preliminary engineering design. Currently, the development is required to meet both flow control and water quality restrictions in accordance with the Storm Manual. The existing site sheet flows into the western portion of the site. The proposed site will have multiple points of discharge and utilize a wetland creation area, a new water quality facility, and an existing water quality facility. The proposed design will include dispersal trenches, underground detention chambers, as well as modular enhanced wetlands for mechanical water quality. Downstream conveyance calculations are provided in the above referenced storm report that demonstrate downstream capacity is available for the project stormwater.

Review of the referenced documents indicates that the applicant proposes to meet the design requirements under the 2016 Stormwater Management and Site Development Manual.

Appropriate provisions for drainage ways can be obtained by implementing the proposed storm water system improvements and by compliance with requirements contained in the City of Gig Harbor Municipal Code, current Stormwater Design Manual and Public Works Standards. No further mitigation is required under SEPA as the impacts will be addressed by compliance with State and local regulations consistent with WAC 197-11-158.

**Transportation Infrastructure:** The impacts to the City's transportation infrastructure from the proposed development have been reviewed in accordance with the following:

- Gig Harbor Municipal Code (GHMC), Chapter 19.10, Concurrency Management
- City of Gig Harbor Comprehensive Plan (Plan).

The findings and conclusions from review of the concurrency ordinance have been determined based on the information submitted by the developer in the 2021 TIA prepared by Heath & Associates, Inc., and the



Concurrency Report prepared by David Evans and Associates, Inc. The result of this review concludes that capacity can be provided for the proposed development and **the City has reserved 139 pm peak hour trips for the development.**

It should be noted that the applicant submitted a TIA, Concurrency application, and Concurrency Report in 2014 identifying a proposed project impact of 174 PM peak hour trips. These documents were accepted and approved under a previous design and the City issued a TCRC approving the 174 trips. The 2014 project proposed a different breakdown of square footage per Land Use Description than in 2021. A shift in square footage away from office and retail space towards more fast-food space caused a deduction of 35 PM peak hour trips from the 2014 documents. In 2018 the applicant submitted a revised TIA and TCRC application that proposed 139 trips, a reduction of 35 trips from what was approved in 2014. The City issued an approved TCRC for the 139 trips in 2019, however, a new concurrency report was not generated since the trip count did not increase and was previously reserved.

The applicant proposes to connect to the City's transportation system via two full access driveways and one restricted driveway at Canterwood Boulevard. Sight distance certification will be finalized by a licensed professional engineer at the time of civil construction drawing submittal.

Appropriate provisions for streets or roads can be obtained by construction of the transportation improvements proposed by the applicant and compliance with requirements contained in the City of Gig Harbor Municipal Code and Public Works Standards. No further transportation infrastructure mitigation is required under SEPA as the impacts will be addressed by compliance with State and local regulations consistent with WAC 197-11-158.

#### **Recommended Mitigations and Conditions**

None. See the Transportation Infrastructure section for further discussion regarding the history of reserved trips for this project.

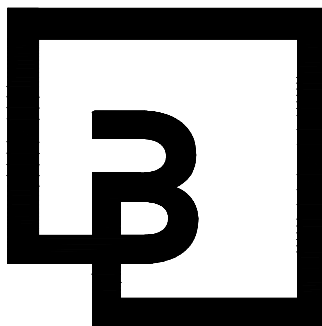
SECTION 25, TOWNSHIP 22, RANGE 1 EAST

CANTERWOOD COMMERCIAL  
CENTER  
PROJECT

PROJECT No. PL-SPR-07-0004  
Firm's PROJECT No. 16657

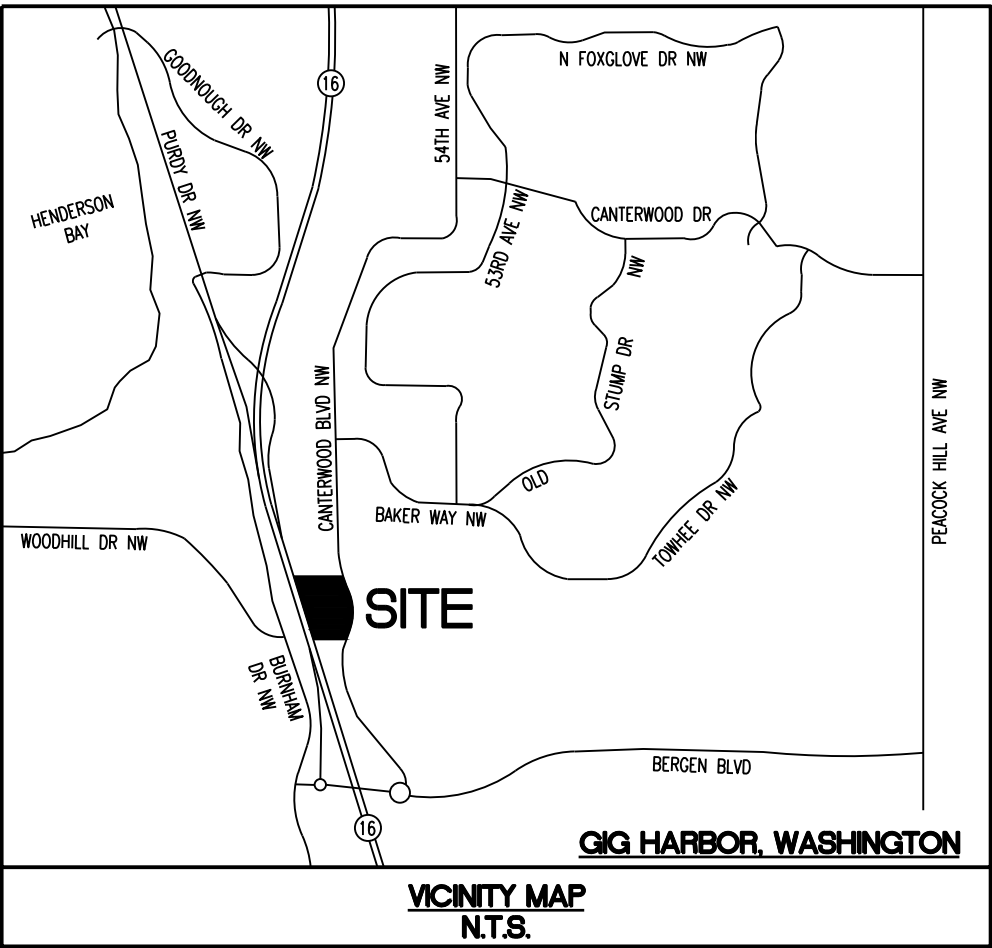
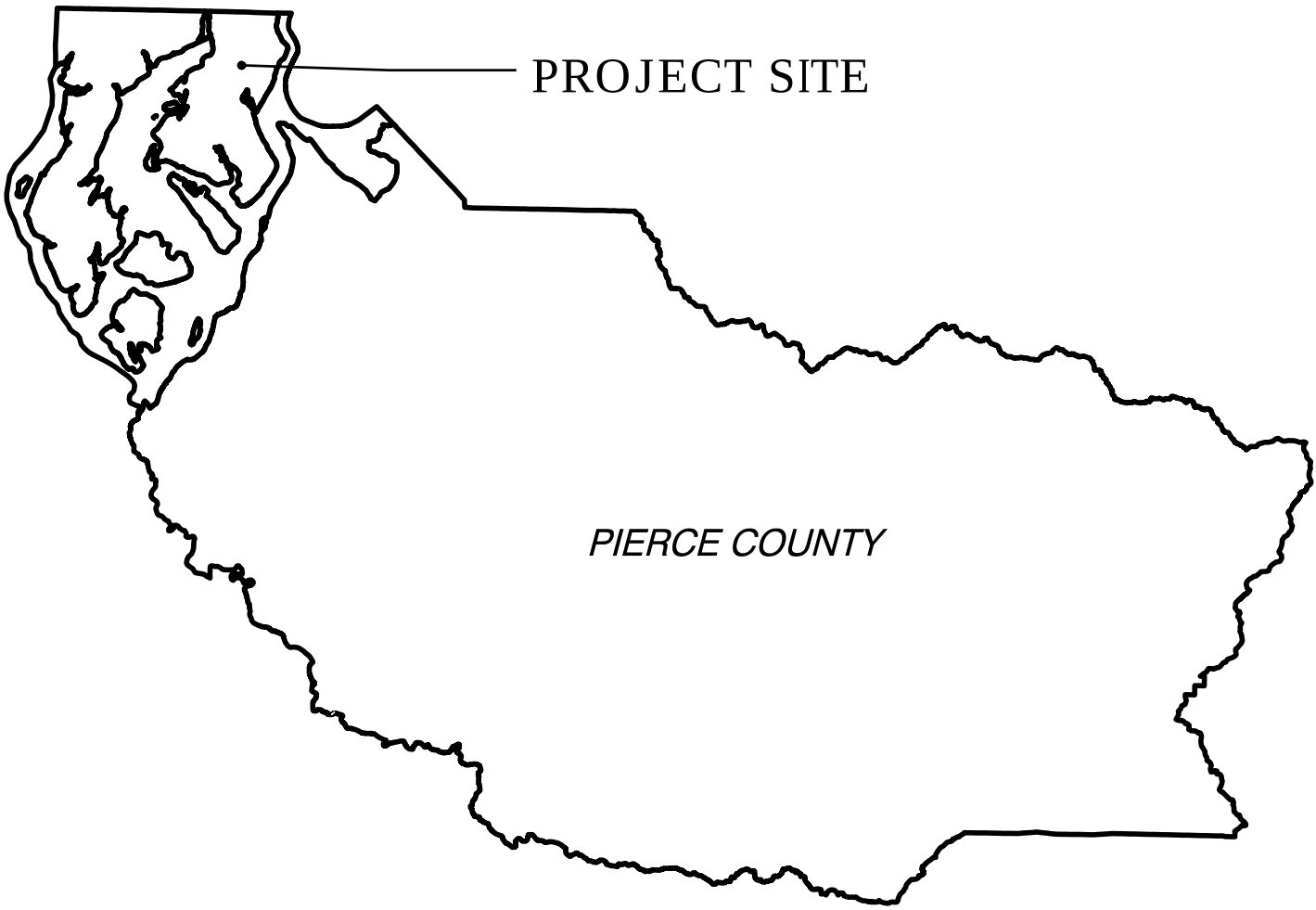
THESE PLANS ARE A REVISION TO PREVIOUSLY SUBMITTED PRELIMINARY PLANS FOR:

SITE PLAN REVIEW FILE NO. PL-SPR-07-0004  
DESIGN REVIEW BOARD FILE NO. PL-DRB-07-0013  
SEPA FILE NO'S. PL-SEPA-07-0008  
PL-SEPA-07-0060  
CUP APPLICATION OCT 2008



**Barghausen  
Consulting Engineers, Inc.**  
18215 72nd Avenue South  
Kent, WA 98032  
425.251.6222 **barghausen.com**

VICINITY MAP  
SCALE: N.T.S.



SHEET INDEX

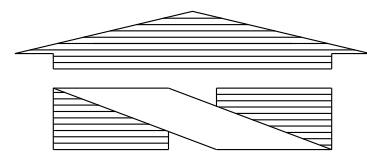
|           |                                        |
|-----------|----------------------------------------|
| SHEET C1  | COVER SHEET                            |
| SHEET C2  | OVERALL SITE PLAN                      |
| SHEET C3  | EXISTING CONDITIONS MAP                |
| SHEET C4  | EXISTING CONDITIONS MAP                |
| SHEET C5  | SITE PLAN                              |
| SHEET C6  | SITE PLAN DETAILS                      |
| SHEET C7  | VEHICLE MANEUVERING AND SIGHT DISTANCE |
| SHEET C8  | VEHICLE MANEUVERING AND SIGHT DISTANCE |
| SHEET C9  | CROSSWALK SIGHT DISTANCE               |
| SHEET C10 | TRASH VEHICLE MANEUVERING              |
| SHEET C11 | TRASH VEHICLE MANEUVERING              |
| SHEET C12 | UTILITY SYSTEMS MAP                    |
| SHEET C13 | GRADING AND STORM DRAINAGE PLAN        |
| SHEET C14 | GRADING AND STORM DRAINAGE PLAN        |
| SHEET C15 | SITE SECTION - A                       |
| SHEET C16 | SITE SECTION - B                       |
| SHEET C17 | SITE SECTION - C                       |
| SHEET C18 | SITE SECTION - D                       |
| SHEET C19 | SITE SECTION - E                       |
| SHEET C20 | WATER MAIN PLAN                        |
| SHEET C21 | SANITARY SEWER PLAN                    |
| SHEET C22 | SIGHT LINE SECTIONS                    |
| SHEET C23 | SIGHT LINE SECTIONS                    |



ISSUED FOR CONSTRUCTION FOR THE CITY OF GIG HARBOR  
DATE: \_\_\_\_\_



File:P:\16000s\16657\preliminary\16657-PO.dwg Date/Time:1/18/2021 2:25 PM Scale:1" = 1' Xref: ----- KHARRIS



1"=100'



Know what's below.  
Call before you dig.

#### NOTES:

- NO WELLS ARE KNOWN TO BE ONSITE. IF A WELL IS ENCOUNTERED DURING CONSTRUCTION IT SHALL BE ABANDONED IN PLACE PER TACOMA PIERCE COUNTY HEALTH DEPARTMENT STANDARDS.
- NO SEPTIC SYSTEMS ARE KNOWN TO BE ON THIS SITE. IF A SEPTIC SYSTEM IS DISCOVERED DURING CONSTRUCTION IT SHALL BE REMOVED AND DISPOSED OF PER TACOMA PIERCE COUNTY HEALTH DEPARTMENT STANDARDS.

#### SITE DATA

SITE AREA: 330,839± (7.60± ACRES)  
PARCEL NUMBER: 012225-4-090  
ZONING: B-2  
BUILDING FOOTPRINTS: A= 27,000 SF (18,000 SF OFFICES AND 9,000 SF GARAGE)  
B= 2,609 SF FAST FOOD WITH DRIVE-THRU  
C= 2,609 SF FAST FOOD WITH DRIVE-THRU  
D= 5,060 SF FAST FOOD WITH DRIVE-THRU (1400 SF) AND RETAIL (3660 SF)  
PARKING REQUIRED: 123-136 (122-135 WITH COMMON AREA REDUCTION)  
PARKING PROVIDED: 116 OPEN SPACES AND 19± GARAGED= 135 SPACES, INCLUDES 6 A.D.A. OPEN SPACES AND 2 ADA IN GARAGE (TOTAL DOES NOT INCLUDE DRIVE-THRU).

COMMON AREA:  
BUILDING A - 1800 SF REQUIRED, 1818 SF PROVIDED  
BUILDING B - 261 SF REQUIRED, 264 SF PROVIDED  
BUILDING C - 261 SF REQUIRED, 466 SF PROVIDED (205 SF MORE THAN REQUIRED)  
BUILDING D - 506 SF REQUIRED, 644 SF PROVIDED

PER GHMC 17.99.280(F)(1) ONE PARKING STALL MAY BE REDUCED FOR PROVIDING 200 SF MORE COMMON AREA THAN REQUIRED.

TOTAL IMPERVIOUS COVERAGE SHOWN: 93,546± SF (28.3%)  
BUILDINGS=19,561 SF (5.9%)  
AISLES, PARKING DUMPSTERS=64,601 SF (19.5%)  
SIDEWALKS, PATIOS, ETC.= 9,601± SF (2.9%)

BOUNDARY AND TOPOGRAPHY: BY APEX ENGINEERING, PLLC AND BCE

PROJECT ADDRESS: 10700 CANTERWOOD BLVD NW

PARCEL NO. 0122254062  
XXX CANTERWOOD BLVD NW  
J. SCOTT CONSTRUCTION CO. INC.

R2  
ZONING

S2°26'14"W 205.32'

L=218.566, R=785.000  
Δ=15.9528

N87°52'40"W 382.62'

S15°31'38"E 293.42'

PCD-RMD  
ZONING

WETLAND A

WETLAND F

WETLAND E

WETLAND D

WETLAND G

L=438.886, R=714.920  
Δ=35.1736

PCD-BP  
ZONING

PARCEL NO. 3001140010  
11567 CANTERWOOD BLVD NW  
FRANCISCAN HEALTH SYSTEM WEST

S2°44'03"E 166.90'

L=19.677, R=785.000  
Δ=1.4362

N15°42'39"W 205.38'

S17°40'04"E 374.57'

N70°35'27"W 76.79'

L=170.791, R=785.000  
Δ=12.4657

S85°36'27"E 25.68'

## SURVEY INFORMATION

### HORIZONTAL DATUM:

HORIZONTAL DATUM IS NAD 1983(2011) PER WSDOT. WSDOT CONTROL POINT NO. GP27016-69 WAS HELD FOR POSITION AND A LINE BETWEEN CONTROL POINT NO. GP27016-69 AND CONTROL POINT NO. GP27016-137 WAS HELD FOR ROTATION, BEING S16°52'07"E.

### VERTICAL DATUM:

VERTICAL DATUM FOR THIS SITE IS NAVD 1988 PER WSDOT. WSDOT CONTROL POINT NO. GP27016-69 WAS HELD FOR ELEVATION, BEING 163.474 FEET(NAVD88). NAVD88 = NGVD29 + 3.458

### DATE:

THIS SURVEY WAS PERFORMED IN FEBRUARY 2015. ALL TOPOGRAPHIC INFORMATION AND MONUMENTS SHOWN HEREON WERE TIED AT THAT TIME.

### NARRATIVE:

A FIELD TRAVERSE USING A SPECTRA FOCUS 30 AND A TOPCON GR-5 SUPPLEMENTED WITH FIELD NOTES, WAS PERFORMED, ESTABLISHING THE ANGULAR, VERTICAL AND DISTANCE RELATIONSHIPS BETWEEN THE MONUMENTS, PROPERTY LINES, AND IMPROVEMENTS. THE RESULTING DATA MEETS OR EXCEEDS THE STANDARDS FOR LAND BOUNDARY SURVEYS AS SET FORTH IN WAC 332-130-090.

### NOTE:

- BOUNDARY SHOWN HEREON IS BY OTHERS.
- SITE CONTOURS ARE PER APEX SURVEY AND PIERCE COUNTY LIDAR SOURCES. ROAD AND POND ARE PER BARGHAUSEN SURVEY FROM FEBRUARY 2015.

## LEGAL DESCRIPTION:

A PARCEL OF LAND LYING WITHIN THE SOUTHEAST QUARTER OF SECTION 25, TOWNSHIP 22 NORTH, RANGE 1 EAST OF THE WILLAMETTE MERIDIAN, CITY OF GIG HARBOR, PIERCE COUNTY, WASHINGTON, AND MORE SPECIFICALLY DESCRIBED AS FOLLOWS:

COMMENCING AT THE NORTHWEST CORNER OF LOT 2 OF PIERCE COUNTY LARGE LOT NO. 2970, ACCORDING TO THE PLAT THEREOF RECORDED IN VOLUME 30 OF LARGE LOT SURVEYS AT PAGE 70, RECORDS OF PIERCE COUNTY, WASHINGTON;  
THENCE SOUTH 01°56'31" WEST ALONG THE WEST LINE THEREOF 5.10 FEET TO THE INTERSECTION OF THE WESTERLY MARGIN OF CANTERWOOD DRIVE AND THE WEST LINE OF THE AFOREMENTIONED LOT 2;  
THENCE CONTINUE SOUTH 01°56'31" WEST 305.32 FEET;  
THENCE NORTH 88°22'23" WEST 382.62 FEET TO THE EASTERLY MARGIN OF STATE ROUTE 16 (SB LINE) AS SHOWN ON THE WSDOT RIGHT-OF-WAY AND LIMITED ACCESS MAP MP 8.34 TO MP 18.87, SHEET 14 OF 52, DATED MARCH 19, 1970;  
THENCE SOUTH 16°00'56" EAST ALONG SAID RIGHT-OF-WAY LINE 996.41 FEET;  
THENCE CONTINUE ALONG SAID RIGHT-OF-WAY LINE SOUTH 18°08'47" EAST 374.57 FEET;  
THENCE SOUTH 86°06'11" EAST 25.68 FEET TO THE WESTERLY MARGIN OF CANTERWOOD DRIVE AND A POINT ON A NON-TANGENT CURVE CONCAVE EASTERLY, HAVING A RADIUS OF 785.00 FEET, AND TO WHICH POINT A RADIAL BEARS SOUTH 79°08'51" WEST;  
THENCE ALONG SAID WESTERLY MARGIN NORTHERLY AND CLOCKWISE ALONG THE ARC OF SAID CURVE THROUGH A CENTRAL ANGLE OF 12°27'57" A DISTANCE OF 170.79 FEET;  
THENCE NORTH 71°05'10" WEST ALONG SAID MARGIN 76.79 FEET;  
THENCE NORTH 16°12'22" WEST ALONG SAID MARGIN 205.18 FEET;  
THENCE SOUTH 88°13'46" EAST ALONG SAID MARGIN 166.90 FEET TO A POINT ON A NON-TANGENT CURVE CONCAVE SOUTHEASTERLY, HAVING A RADIUS OF 785.00 FEET, AND TO WHICH POINT A RADIAL BEARS NORTH 72°17'07" WEST;  
THENCE NORTHERLY AND CLOCKWISE ALONG SAID MARGIN AND THE ARC OF SAID CURVE THROUGH A CENTRAL ANGLE OF 01°26'10" A DISTANCE OF 19.68 FEET;  
THENCE NORTH 19°09'04" EAST ALONG SAID MARGIN 154.51 FEET TO THE BEGINNING OF A CURVE CONCAVE WESTERLY AND HAVING A RADIUS OF 714.92 FEET;  
THENCE ALONG THE ARC OF SAID CURVE AND SAID MARGIN THROUGH A CENTRAL ANGLE OF 35°10'25" A DISTANCE OF 438.89 FEET;  
THENCE NORTH 16°01'21" WEST ALONG SAID MARGIN 293.42 FEET TO THE BEGINNING OF A CURVE CONCAVE EASTERLY AND HAVING A RADIUS OF 785.00 FEET;  
THENCE ALONG THE ARC OF SAID CURVE AND SAID MARGIN THROUGH A CENTRAL ANGLE OF 15°57'10" A DISTANCE OF 218.57 FEET, TO THE POINT OF BEGINNING.

## UTILITY CONTACT LIST:

SANITARY SEWER:  
CITY OF GIG HARBOR PUBLIC WORKS  
3510 GRANVIEW STREET  
GIG HARBOR, WA 98335  
PHONE: (253)851-8145

POWER: PENNSULA LIGHT  
P.O. BOX 78  
GIG HARBOR, WA 98335  
PHONE: (253)857-5950

WATER COMPANY:  
CITY OF GIG HARBOR PUBLIC WORKS  
3510 GRANVIEW STREET  
GIG HARBOR, WA 98335  
PHONE: (253)851-8145

GAS COMPANY:  
PUGET SOUND ENERGY  
3130 S 38TH STREET  
TACOMA, WA 98409  
PHONE:(253)476-6410

TELEPHONE:  
CENTURYTEL  
8102 SKANSIE AVENUE  
GIG HARBOR, WA 98332  
PHONE: (253)851-8118

## CLIENT

SWEDE HILL, LLC  
2320 MILWAUKEE WAY  
(P.O. BOX 1397)  
TACOMA, WA 98401  
PHONE: (253)627-6179  
JOHN M. XITCO

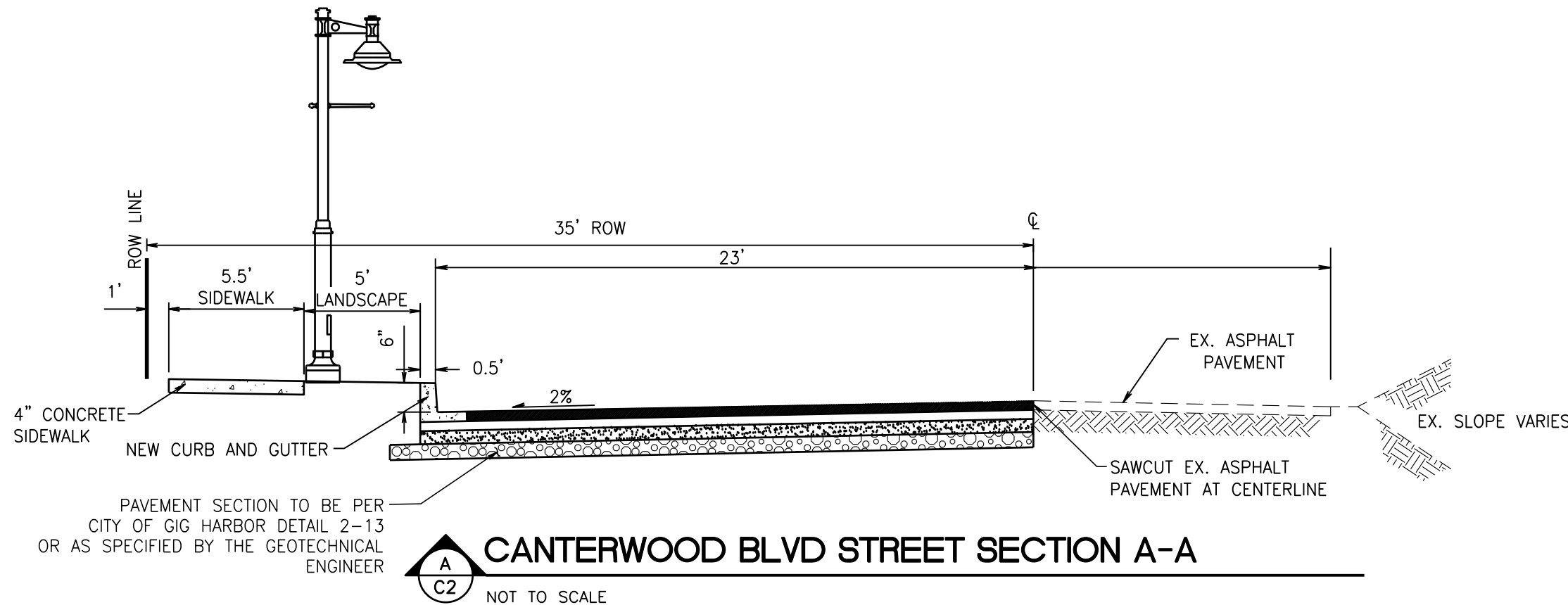
## ENGINEER

BARGHAUSEN CONSULTING ENGINEERS  
18215 72ND AVE S  
KENT, WA 98063  
(253)251-6222  
JASON HUBBELL P.E.

## SURVEYORS

WETLAND/ CANTERWOOD BLVD:  
BARGHAUSEN CONSULTING ENGINEERS  
18215 72ND AVE S  
KENT, WA 98063  
(253)251-6222  
DENNIS SALTYS

BOUNDARY/TOPO:  
APEX ENGINEERING PLLC  
2601 SOUTH 35TH, STE 200  
TACOMA, WA 98409  
PHONE:(253)473-4494



## LEGEND

|  |                                  |  |                              |
|--|----------------------------------|--|------------------------------|
|  | EXISTING CONCRETE                |  | PROPOSED ASPHALT             |
|  | EXISTING CURB                    |  | PROPOSED ASPHALT OVERLAY     |
|  | EXISTING EASEMENT                |  | PROPOSED CONCRETE            |
|  | WETLAND LINE                     |  | PROPOSED CURB                |
|  | WETLAND BUFFER LINE              |  | FLOW PATH                    |
|  | PROPERTY LINE                    |  | PROPOSED SPOT GRADE          |
|  | EXISTING EDGE OF PAVEMENT        |  | MATCH EXISTING               |
|  | EXISTING STORM PIPE              |  | TOP OF WALL ELEVATION        |
|  | EXISTING STORM DRAIN MANHOLE     |  | BOTTOM OF WALL ELEVATION     |
|  | EXISTING STORM DRAIN CATCH BASIN |  | RIDGE LINE                   |
|  | EXISTING WETLAND                 |  | NEW FINISHED GRADE CONTOUR   |
|  | EXISTING STREAM                  |  | NEW 20-FOOT SITE LIGHT       |
|  | EXISTING GRADE CONTOUR           |  | NEW 12-FOOT SITE LIGHT       |
|  | EXISTING SANITARY SEWER MANHOLE  |  | NEW CLEANOUT                 |
|  | EXISTING SEWER PIPE              |  | NEW TYPE 1 CATCH BASIN       |
|  | EXISTING WATER PIPE              |  | NEW TYPE 2 CATCH BASIN       |
|  | EXISTING TELEPHONE RISER         |  | NEW STORM DRAIN PIPE         |
|  | EXISTING GRAVEL HATCH            |  | NEW STORM DRAIN PIPE         |
|  | EXISTING POWER VAULT             |  | PROPOSED FIRE HYDRANT        |
|  | EXISTING TELEPHONE POLE          |  | PROPOSED WATER METER         |
|  | TREE DRIP LINE ENCROACHMENT      |  | PROPOSED SIGN                |
|  | PROPOSED STREET LIGHT            |  | EXISTING SIGN                |
|  |                                  |  | PROPOSED WATER LINE          |
|  |                                  |  | EX. TREE'S                   |
|  |                                  |  | BUILDING SETBACK LINE        |
|  |                                  |  | PROPOSED RETAINING WALL      |
|  |                                  |  | PROPOSED RIPRAP              |
|  |                                  |  | GRAVEL DISPERSAL TRENCH      |
|  |                                  |  | FOUND MONUMENT               |
|  |                                  |  | EXISTING GUARD RAIL          |
|  |                                  |  | SECTION LINE                 |
|  |                                  |  | PROPOSED FENCE               |
|  |                                  |  | PROPOSED WETLAND LINE        |
|  |                                  |  | PROPOSED WETLAND BUFFER LINE |
|  |                                  |  | WATER QUALITY                |
|  |                                  |  | ADA PARKING SYMBOL           |

## ARCHITECT

HELIX DESIGN GROUP  
6021 12TH ST E, STE 201  
TACOMA, WA 98424  
PHONE:(253)922-9037  
BRUCE McKEAN

## LANDSCAPE ACHITECT

BARGHAUSEN CONSULTING ENGINEERS  
18215 72ND AVE S  
KENT, WA 98063  
(253)251-6222  
JEFF VARLEY

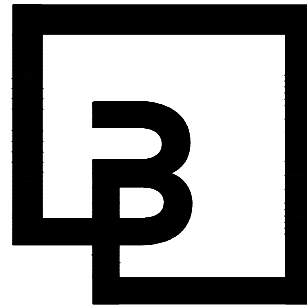


ISSUED FOR CONSTRUCTION

DATE: \_\_\_\_\_

#### REVISIONS

| NO | DATE       | REVISION                                      |
|----|------------|-----------------------------------------------|
| 10 | 11/01/2018 | REVISED PER CITY DRB COMMENTS 5/25/2018       |
| 11 | 04/02/2019 | REVISED PER CITY COMMENTS 1/25/2019           |
| 12 | 08/20/2019 | REVISED NORTH STORM OUTFALL                   |
| 13 | 09/26/2019 | REVISED WETLAND CREATION AREA                 |
| 14 | 05/13/2020 | REVISED SOUTH LAYOUT                          |
| 15 | 06/24/2020 | REVISED PER CITY REVIEW COMMENTS OCTOBER 2019 |
| 16 | 10/22/2020 | REVISED PER CITY REVIEW COMMENTS AUGUST 2020  |
| 17 | 05/05/2021 | REVISED PER CITY REVIEW COMMENTS JANUARY 2021 |



**Barghausen  
Consulting Engineers, Inc.**

18215 72nd Avenue South  
Kent, WA 98032  
425.251.6222 **barghausen.com**

DESIGNED BY: KEH

DRAWN BY: RDC

CHECKED BY: KEH

APPROVED BY: JGH

SCALE: 1"=100'

OTHER:

**SWEDE HILL, LLC**  
P.O. BOX 1397  
TACOMA, WA 98401

**SECTION 25, TOWNSHIP 22 N, RANGE 1 E**

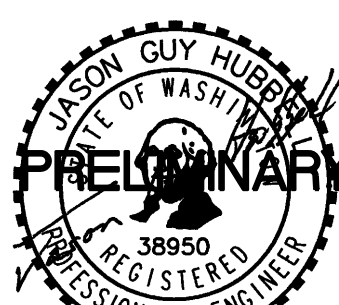
**OVERALL SITE PLAN  
/SIGHT DISTANCE TRIANGLES  
CANTERWOOD COMMERCIAL  
CENTER**

PERMIT NO.

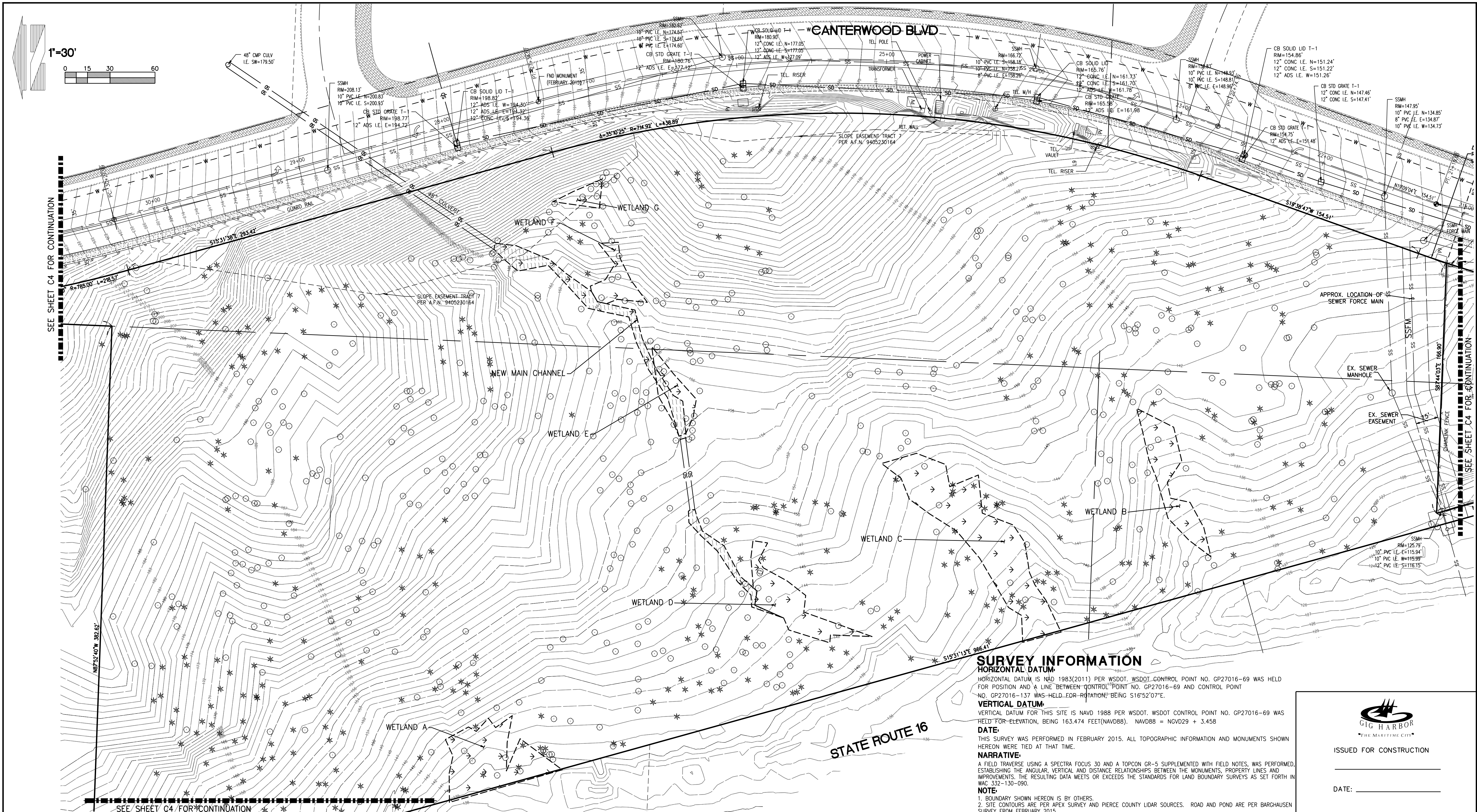
DRAWING NO.

SHEET OF  
**C2 23**

05/05/2021







**SURVEY INFORMATION**

**HORIZONTAL DATUM:**  
HORIZONTAL DATUM IS NAD 1983(2011) PER WSDOT. WSDOT CONTROL POINT NO. GP27016-69 WAS HELD FOR POSITION AND A LINE BETWEEN CONTROL POINT NO. GP27016-69 AND CONTROL POINT NO. GP27016-137 WAS HELD FOR ROTATION. BEING S16°52'07"E.

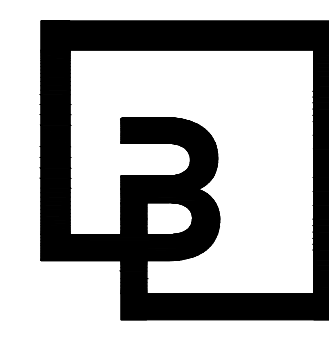
**VERTICAL DATUM:**  
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| REVISIONS |            |                                               |  |
|-----------|------------|-----------------------------------------------|--|
| 10        | 11/01/2018 | REVISED PER CITY DRB COMMENTS 5/25/2018       |  |
| 11        | 04/02/2019 | REVISED PER CITY COMMENTS 1/25/2019           |  |
| 12        | 08/20/2019 | REVISED NORTH STORM OUTFALL                   |  |
| 13        | 09/26/2019 | REVISED WETLAND CREATION AREA                 |  |
| 14        | 05/13/2020 | REVISED SOUTH LAYOUT                          |  |
| 15        | 06/24/2020 | REVISED PER CITY REVIEW COMMENTS OCTOBER 2019 |  |
| 16        | 10/22/2020 | REVISED PER CITY REVIEW COMMENTS AUGUST 2020  |  |
| 17        | 05/05/2021 | REVISED PER CITY REVIEW COMMENTS JANUARY 2021 |  |



**Barghausen Consulting Engineers, Inc.**  
18215 72nd Avenue South  
Kent, WA 98032  
425.251.6222 [barghausen.com](http://barghausen.com)

|              |        |
|--------------|--------|
| DESIGNED BY: | KEH    |
| DRAWN BY:    | RDC    |
| CHECKED BY:  | KEH    |
| APPROVED BY: | JGH    |
| SCALE:       | 1"=30' |
| OTHER:       |        |

**SWEDE HILL, LLC**  
P.O. BOX 1397  
TACOMA, WA 98401

**SECTION 25, TOWNSHIP 22 N, RANGE 1 E**

**EXISTING CONDITIONS MAP**

**CANTERWOOD COMMERCIAL CENTER**

PERMIT NO. \_\_\_\_\_

DRAWING NO. \_\_\_\_\_

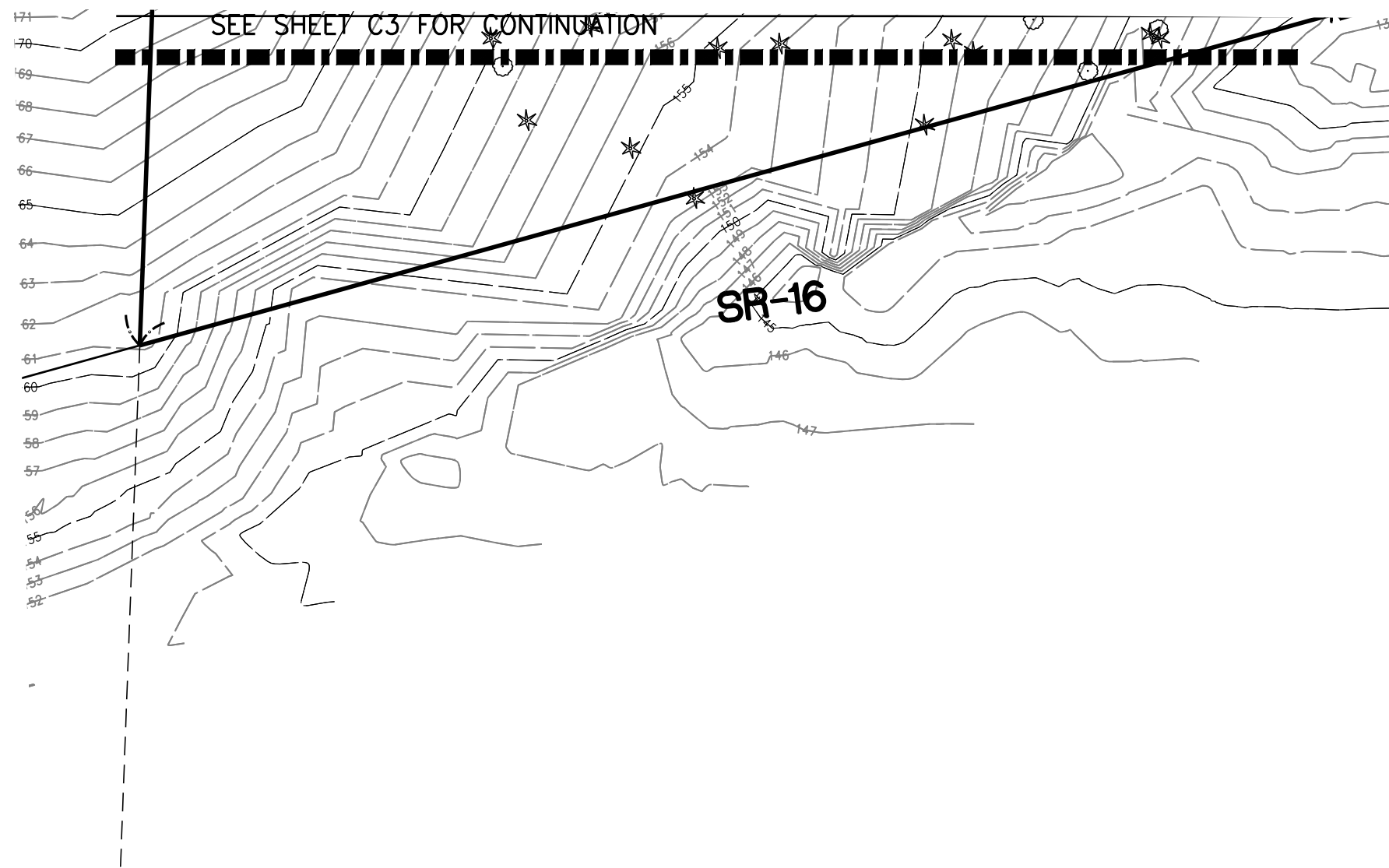
SHEET **C3** OF **23**

05/05/2021

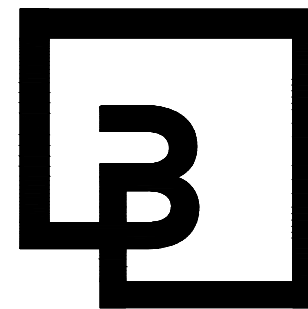
**PRELIMINARY**

**PROFESSIONAL ENGINEER**





| REVISIONS |            |         |          |          |           |              |
|-----------|------------|---------|----------|----------|-----------|--------------|
| 10        | 11/01/2018 | REVISED | PER CITY | DRB      | COMMENTS  | 5/25/2018    |
| 11        | 04/02/2019 | REVISED | PER CITY | COMMENTS | 1/25/2019 |              |
| 12        | 08/20/2019 | REVISED | NORTH    | STORM    | OUTFALL   |              |
| 13        | 09/26/2019 | REVISED | WETLAND  | CREATION | AREA      |              |
| 14        | 05/13/2020 | REVISED | SOUTH    | LAYOUT   |           |              |
| 15        | 06/24/2020 | REVISED | PER CITY | REVIEW   | COMMENTS  | OCTOBER 2019 |
| 16        | 10/22/2020 | REVISED | PER CITY | REVIEW   | COMMENTS  | AUGUST 2020  |
| 17        | 05/05/2021 | REVISED | PER CITY | REVIEW   | COMMENTS  | JANUARY 2021 |



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|--------------|--------|
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| CHECKED BY:  | KEH    |
| APPROVED BY: | JGH    |
| SCALE:       | 1"=30' |
| OTHER:       |        |

**SWEDE HILL, LLC  
P.O. BOX 1397  
TACOMA, WA 98401**

|                                      |
|--------------------------------------|
| SECTION 25, TOWNSHIP 22 N, RANGE 1 E |
| EXISTING CONDITIONS MAP              |
| CANTERWOOD COMMERCIAL<br>CENTER      |

PERMIT NO.

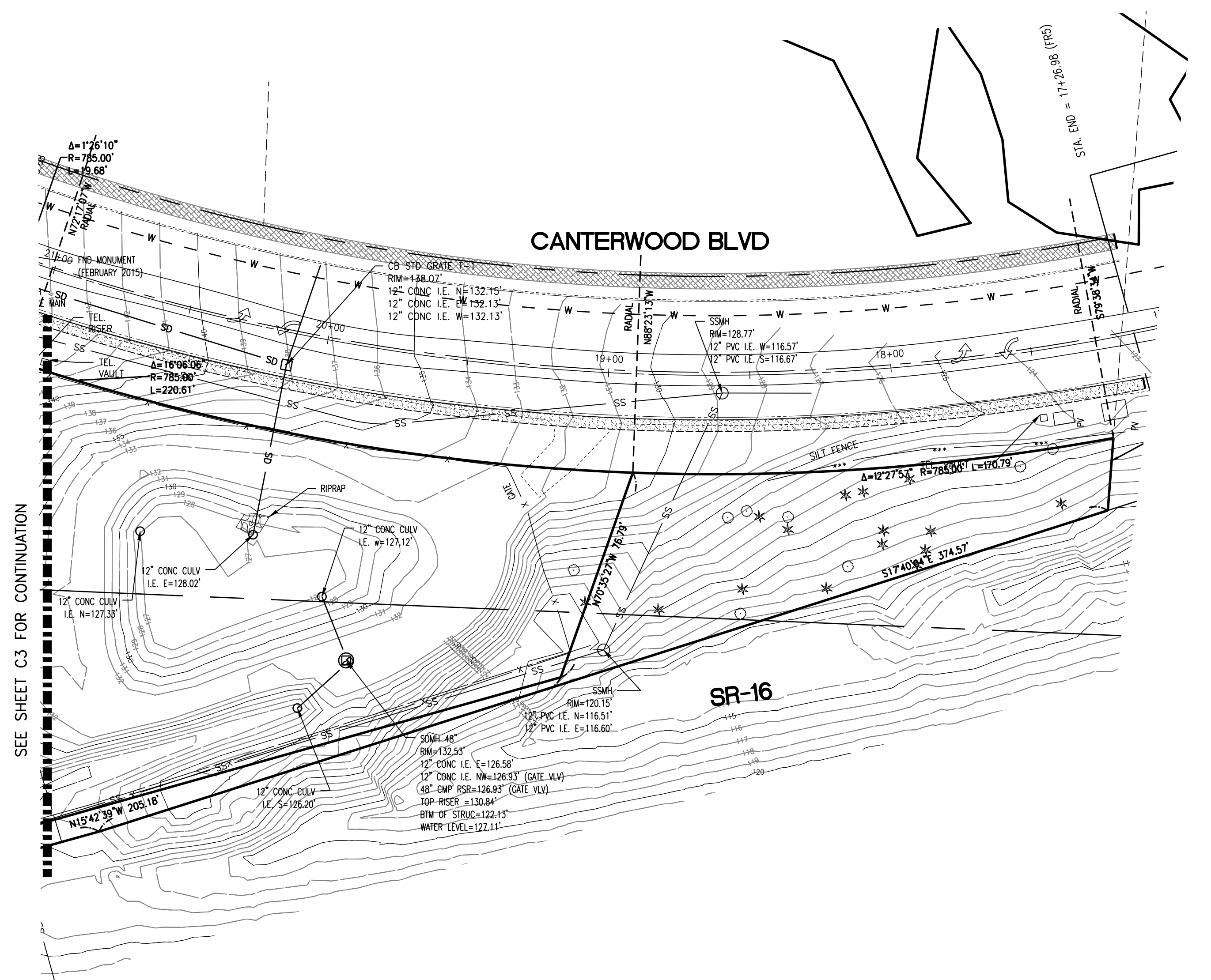
DRAWING NO.

SHEET OF  
C4 23

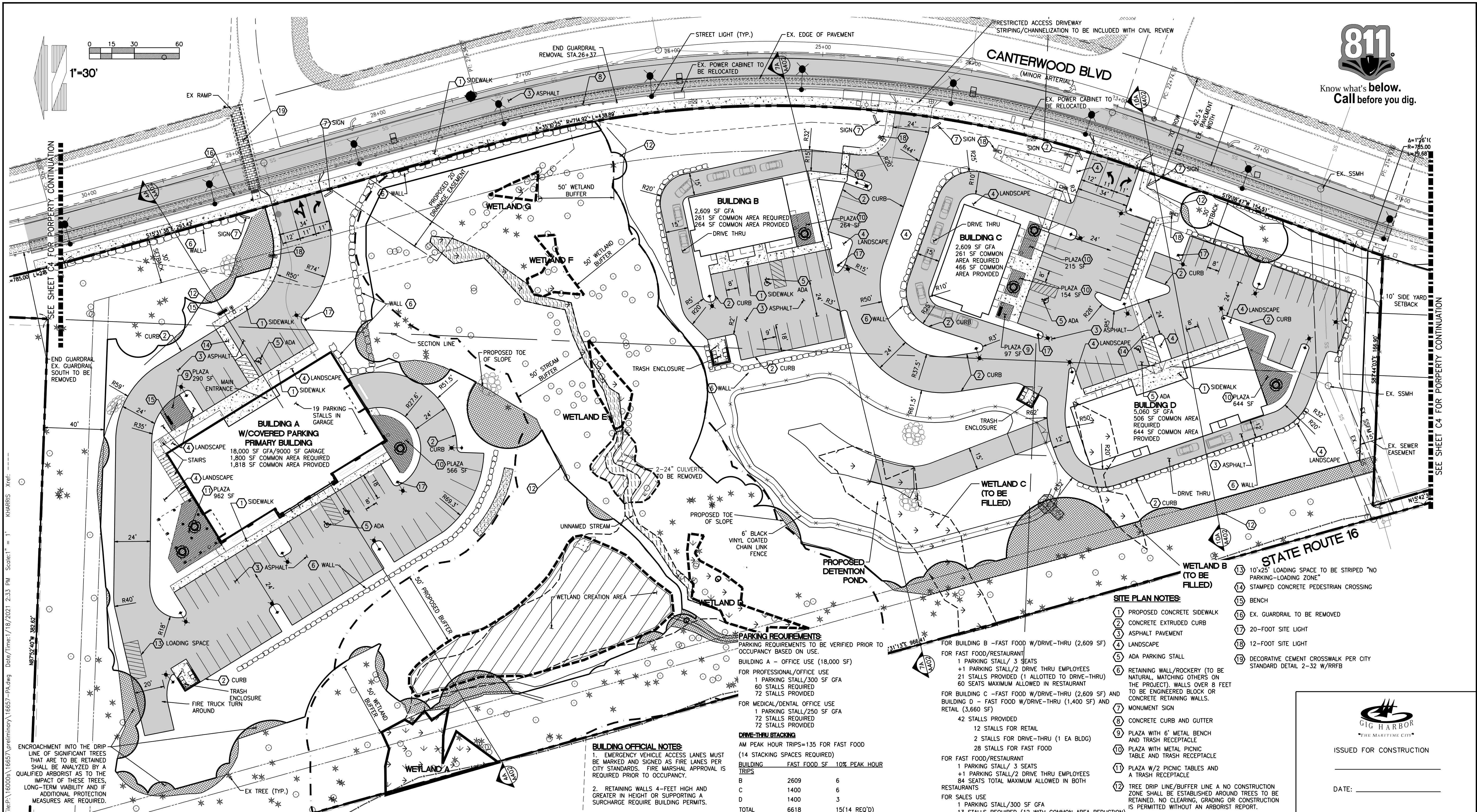
05/05/2021



1. BOUNDARY SHOWN HEREON IS BY OTHERS.  
2. SITE CONTOURS ARE PER APEX SURVEY AND PIERCE COUNTY LIDAR SOURCES. ROAD AND POND ARE PER BARGHAUSEN SURVEY FROM FEBRUARY 2015.







**SITE PLAN NOTES:**

- 1 PROPOSED CONCRETE SIDEWALK
- 2 CONCRETE EXTRUDED CURB
- 3 ASPHALT PAVEMENT
- 4 LANDSCAPE
- 5 ADA PARKING STALL
- 6 RETAINING WALL/ROCKERY (TO BE NATURAL, MATCHING OTHERS ON THE PROJECT). WALLS OVER 8 FEET TO BE ENGINEERED BLOCK OR CONCRETE RETAINING WALLS.
- 7 MONUMENT SIGN
- 8 CONCRETE CURB AND GUTTER
- 9 PLAZA WITH 6" METAL BENCH AND TRASH RECEPTACLE
- 10 PLAZA WITH METAL PICNIC TABLE AND TRASH RECEPTACLE
- 11 PLAZA W/2 PICNIC TABLES AND A TRASH RECEPTACLE
- 12 TREE DRIP LINE/BUFFER LINE A NO CONSTRUCTION ZONE SHALL BE ESTABLISHED AROUND TREES TO BE RETAINED. NO CLEARING, GRADING OR CONSTRUCTION IS PERMITTED WITHOUT AN ARBORIST REPORT.

- 13 10'x25' LOADING SPACE TO BE STRIPED "NO PARKING-LOADING ZONE"
- 14 STAMPED CONCRETE PEDESTRIAN CROSSING
- 15 BENCH
- 16 EX. GUARDRAIL TO BE REMOVED
- 17 20-FOOT SITE LIGHT
- 18 12-FOOT SITE LIGHT
- 19 DECORATIVE CEMENT CROSSWALK PER CITY STANDARD DETAIL 2-32 W/RRFB

**PARKING REQUIREMENTS:**

PARKING REQUIREMENTS TO BE VERIFIED PRIOR TO OCCUPANCY BASED ON USE.  
BUILDING A - OFFICE USE (18,000 SF)  
FOR PROFESSIONAL/OFFICE USE  
1 PARKING STALL/300 SF GFA  
60 STALLS REQUIRED  
72 STALLS PROVIDED  
FOR MEDICAL/DENTAL OFFICE USE  
1 PARKING STALL/250 SF GFA  
72 STALLS REQUIRED  
72 STALLS PROVIDED

**DRIVE-THRU STACKING**

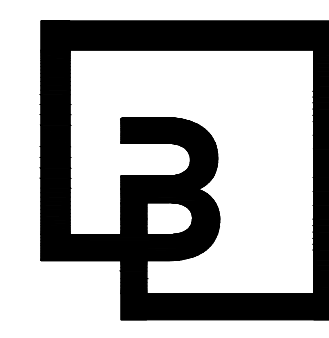
AM PEAK HOUR TRIPS=135 FOR FAST FOOD (14 STACKING SPACES REQUIRED)

| BUILDING | FAST FOOD SF | 10% PEAK HOUR TRIPS |
|----------|--------------|---------------------|
| B        | 2609         | 6                   |
| C        | 1400         | 6                   |
| D        | 1400         | 3                   |
| TOTAL    | 6618         | 15(14 REQ'D)        |

**BUILDING OFFICIAL NOTES:**

- 1. EMERGENCY VEHICLE ACCESS LANES MUST BE MARKED AND SIGNED AS FIRE LANES PER CITY STANDARDS. FIRE MARSHAL APPROVAL IS REQUIRED PRIOR TO OCCUPANCY.
- 2. RETAINING WALLS 4- FEET HIGH AND GREATER IN HEIGHT OR SUPPORTING A SURCHARGE REQUIRE BUILDING PERMITS.

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DESIGNED BY: KEH  
DRAWN BY: RDC  
CHECKED BY: KEH  
APPROVED BY: JGH  
SCALE: 1"=30'  
OTHER:

**SWEDE HILL, LLC**  
P.O. BOX 1397  
TACOMA, WA 98401

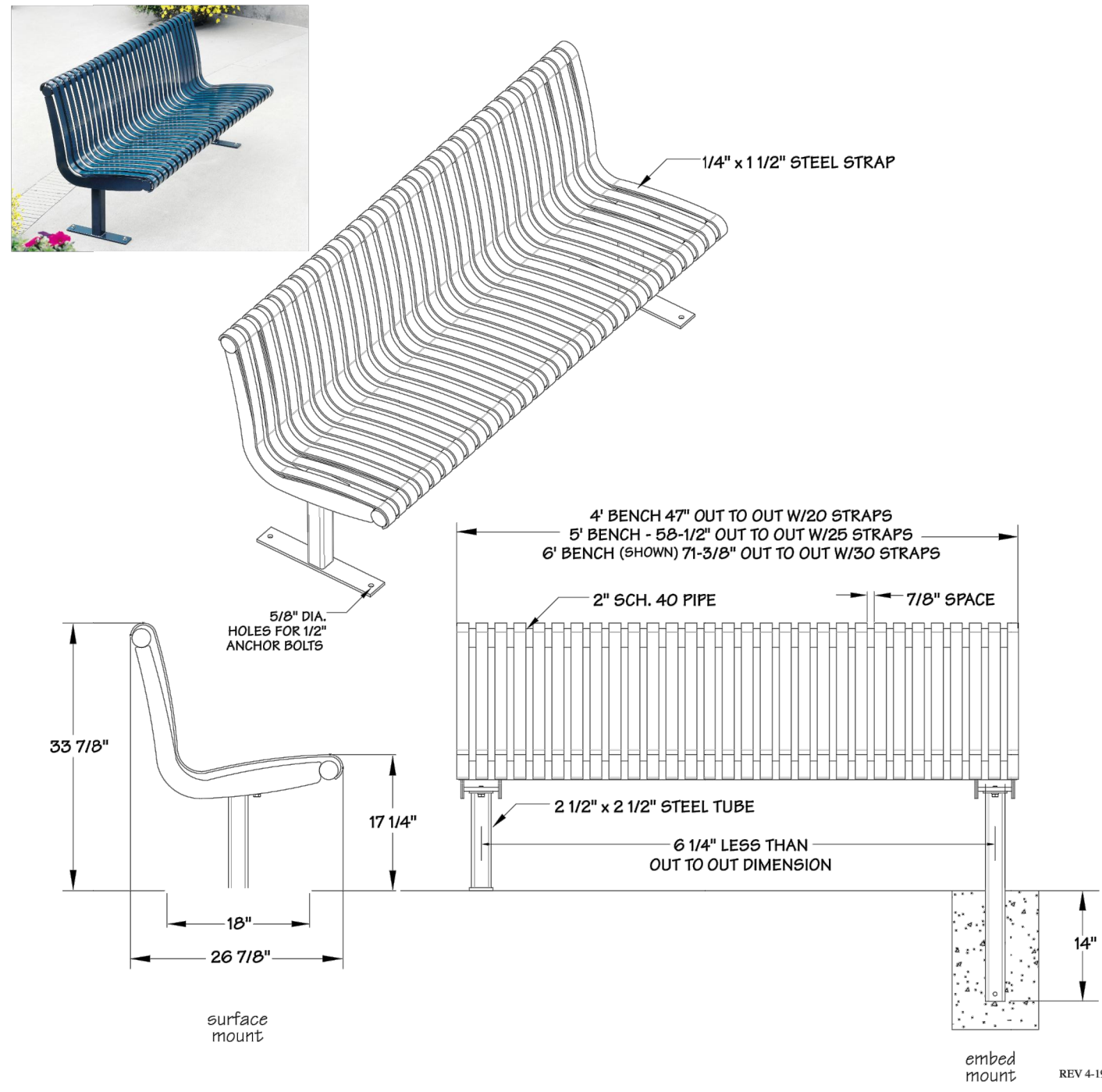
**SECTION 25, TOWNSHIP 22 N, RANGE 1 E**  
**SITE PLAN**  
**CANTERWOOD COMMERCIAL CENTER**

|             |            |
|-------------|------------|
| PERMIT NO.  | 05/05/2021 |
| DRAWING NO. |            |
| SHEET C5    | OF 23      |

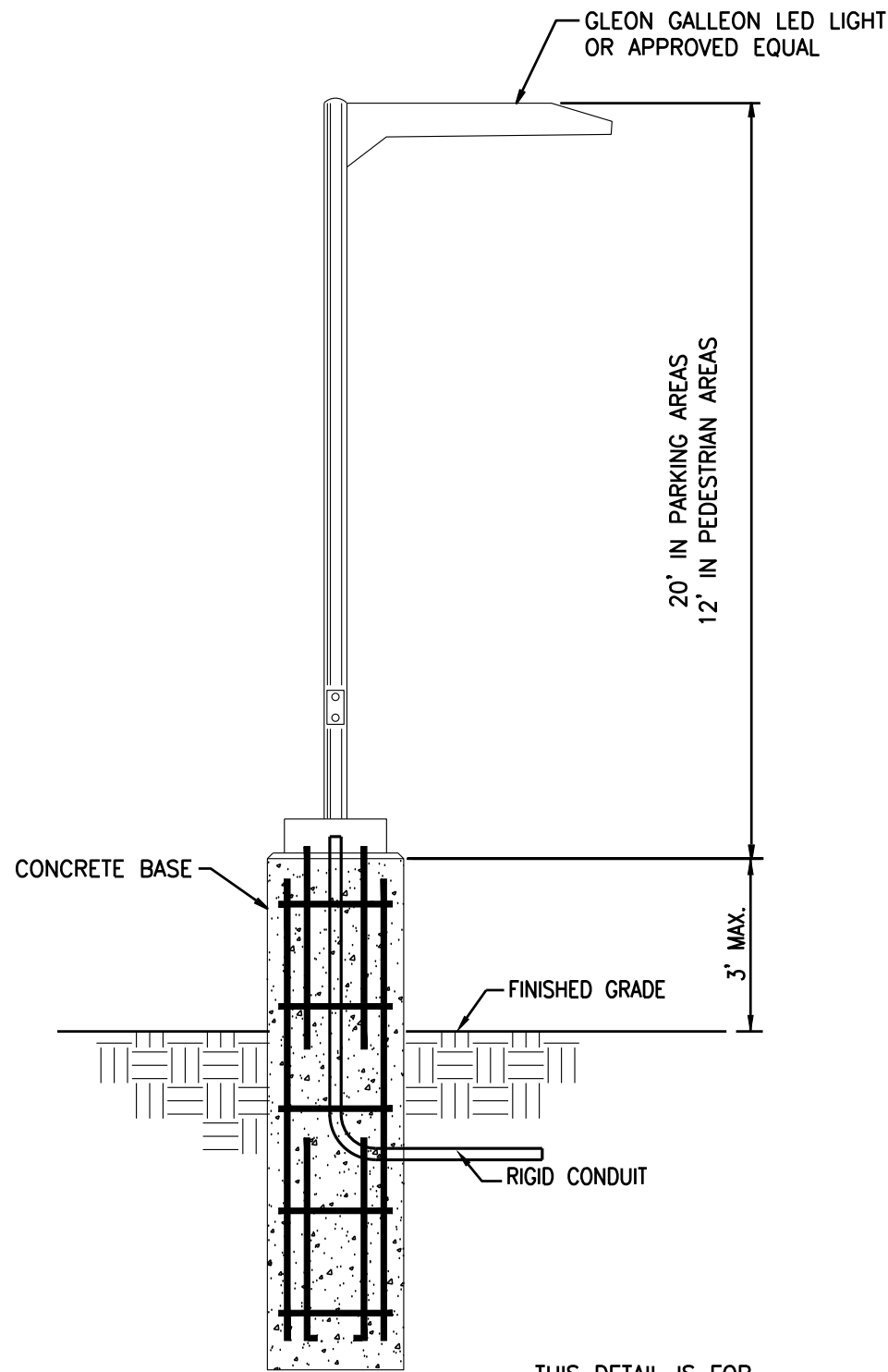
**PRELIMINARY**



File:P:\160000\16657\preliminary\16657-PA.dwg Date/Time:1/18/2021 2:33 PM Scale:1" = 1' K:HARRIS Xref: -----



## Plaza Series, Model PL-2 Bench



### LIGHTING DETAIL

NOT TO SCALE

## SPECIFICATIONS

### MATERIAL

The Plaza PL-2 bench is constructed of mild steel in 3 sections: 2 support legs and 1 seat section. All parts are drilled and precisely formed for quick assembly. Seat sections shall be fabricated with 2" sch. 40 pipe and 1/4" x 1-1/2" mild steel strap. Support legs shall be fabricated with 2-1/2" square steel tube and 3/8" x 3" steel strap. Steel shall conform to ASTM A36 hot rolled steel. All steel shall be wheelabrated prior to fabrication.

### HARDWARE

Legs shall be attached to seat with 1/2" x 1" stainless steel bolts and washers provided. For surface mount: Anchor bolts by others

### PROTECTIVE COATINGS

**Powder Coating:** All steel, following fabrication shall be cleaned and treated with an iron phosphate process prior to the coating application. This process shall include a non-chromated alkaline cleaner and an iron phosphate treatment followed with an acidic sealer for maximum adhesion. The protective coatings shall be either polyester or polyester TGIC powder. Following application the parts shall be baked until properly cured. The coating shall be a minimum of 4 mils thick on all surfaces. **Options for finish:** Corrosion resistant undercoat, strongly recommended

### Please Note: Embed Mounting

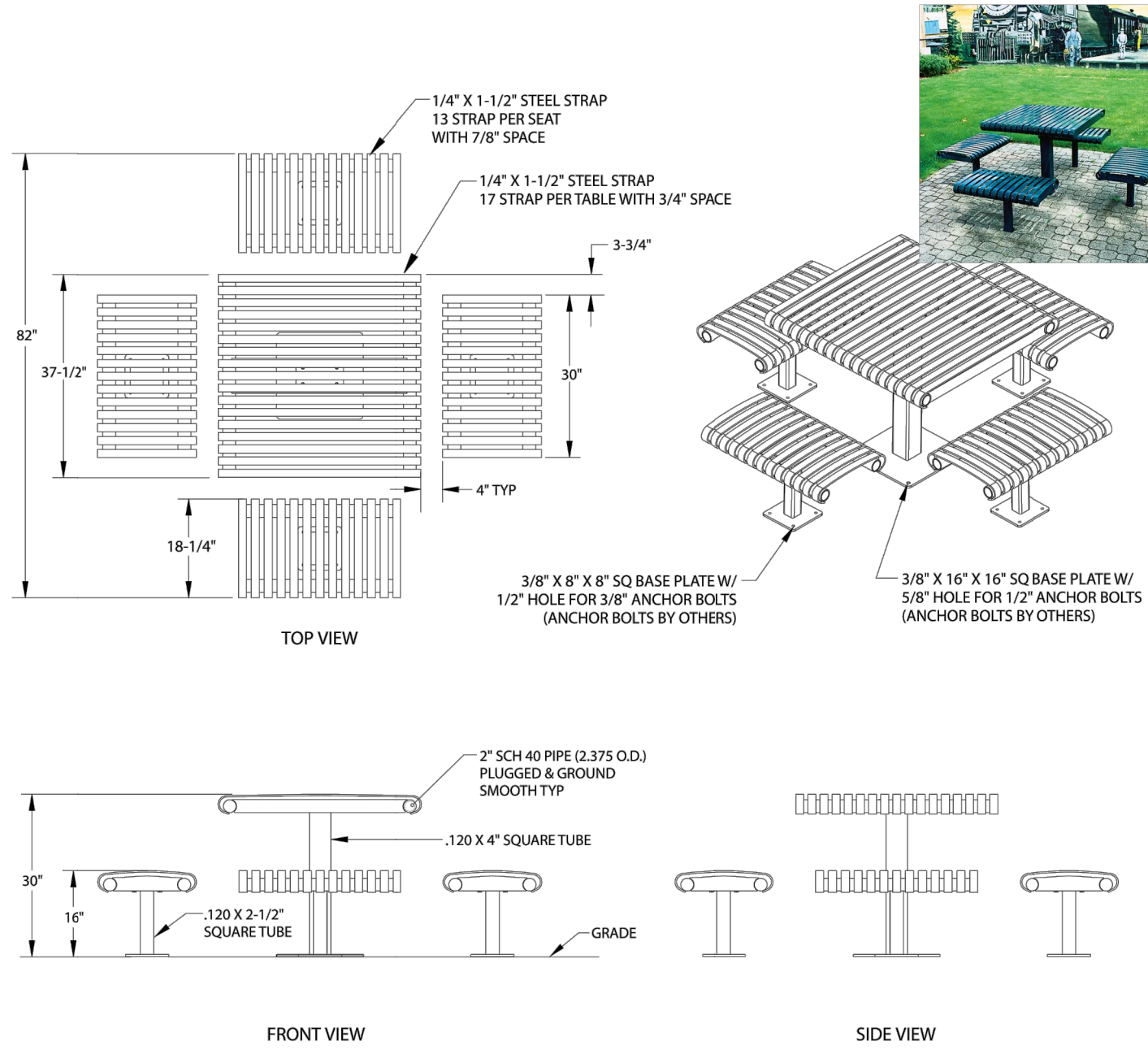
Depth and diameter of installation hole may vary with soil conditions. Consult project engineer for correct dimensions.

### OPTIONS

Length: 4, 5, 6, 8 ft. standard, other lengths available  
Mounting: embed or surface mount  
Arms

## FairWeather Site Furnishings

360-895-2626 or Toll Free 800-323-1798  
Port Orchard, Washington  
©1999-2013 Leader International Corporation, FairWeather Site Furnishings division  
Notice: These products are proprietary. Numerous designs are patented or patent pending under Leader Manufacturing, Inc.



## Model F-7 Picnic Table with 4 Seats, Surface Mount

## SPECIFICATIONS

### MATERIAL

The F-7 table top and each seat shall be fabricated with 1/4" x 1-1/2" mild steel strap fully welded to 2" sch. 40 steel pipe. The pedestal for the table shall be fabricated with 120 x 4" square tube. Pedestals for the seats shall be fabricated with 120 x 2-1/2" square tube. Surface Mount: Table base is 16" square, 3/8" thick plate fully welded to 4" square tube, seat bases are 8" square, 3/8" thick plate fully welded to 2-1/2" square tube. All steel shall conform to ASTM A36 hot rolled steel, ASTM A53 pipe or ASTM A500 square tube and shall be wheelabrated prior to fabrication.

### HARDWARE

Pedestals shall be attached to table and seat tops with 1/2 x 1" stainless steel bolts and washers provided.

**SURFACE MOUNT:** Anchor bolts by others

### PROTECTIVE COATINGS

**Powder Coating:** All steel, Following fabrication shall be cleaned and treated with an iron phosphate process prior to the coating application. This process shall include a non-chromated alkaline cleaner and an iron phosphate treatment followed with an acidic sealer for maximum adhesion. The protective coatings shall be either polyester or polyester TGIC powder. Following application the parts shall be baked until properly cured. The coating shall be a minimum of 4 mils thick on all surfaces. **Options for finish:** Corrosion resistant undercoat, strongly recommended

**Note:** Unless otherwise specified, steel shall be powder coated a standard FairWeather color.

### OPTIONS

**Mounting:** surface mount or permanent embed  
**ADA Access (1, 2 or 3 seat)**  
**Game Board, Umbrella Hole** (removable cap and umbrella by others)

## FairWeather Site Furnishings

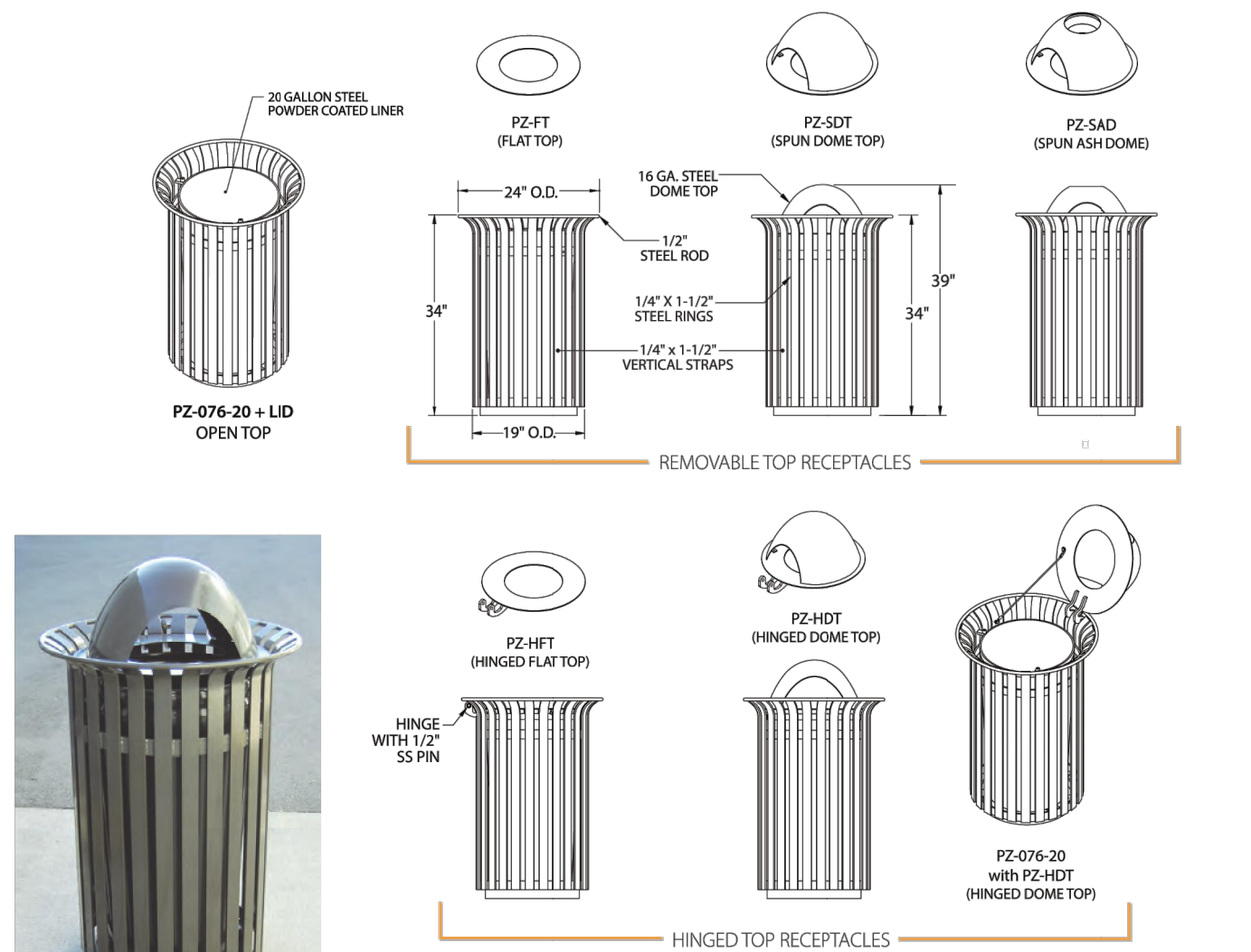
360-895-2626 or Toll Free 800-323-1798  
Port Orchard, Washington  
©1999-2012 Leader International Corporation, FairWeather Site Furnishings division  
Notice: These products are proprietary. Numerous designs are patented or patent pending under Leader Manufacturing, Inc.

## Plaza Collection Receptacles - PZ-075 and PZ-075D

### Options

| Part No.          | Description                                                                                                  | Size            | Weight Lbs. |
|-------------------|--------------------------------------------------------------------------------------------------------------|-----------------|-------------|
| PZ-076-20         | Plaza Collection Steel Strap Flared Receptacle w/20 Gal. Black Polyethylene Liner, <b>Open Top</b> (TR-1224) | 25" Dia x 32" H | 144         |
| <b>Lid Option</b> |                                                                                                              |                 |             |
| PZ-FT             | Flat Top for PZ-076-20 Plaza Collection Receptacle, includes trim lock and tab for security leash            |                 | 151         |
| PZ-SDT            | Spun Dome Top for Plaza Round Collection Receptacle                                                          |                 | 155         |
| PZ-SAD            | Spun Ash Dome Top for Plaza Round Receptacle                                                                 |                 | 156         |
| PZ-HFT            | Hinged Flat Top for Plaza Round Receptacle                                                                   |                 | 156         |
| PZ-HDT            | Hinged Top w/Dome for Plaza Round Receptacle                                                                 |                 | 151         |

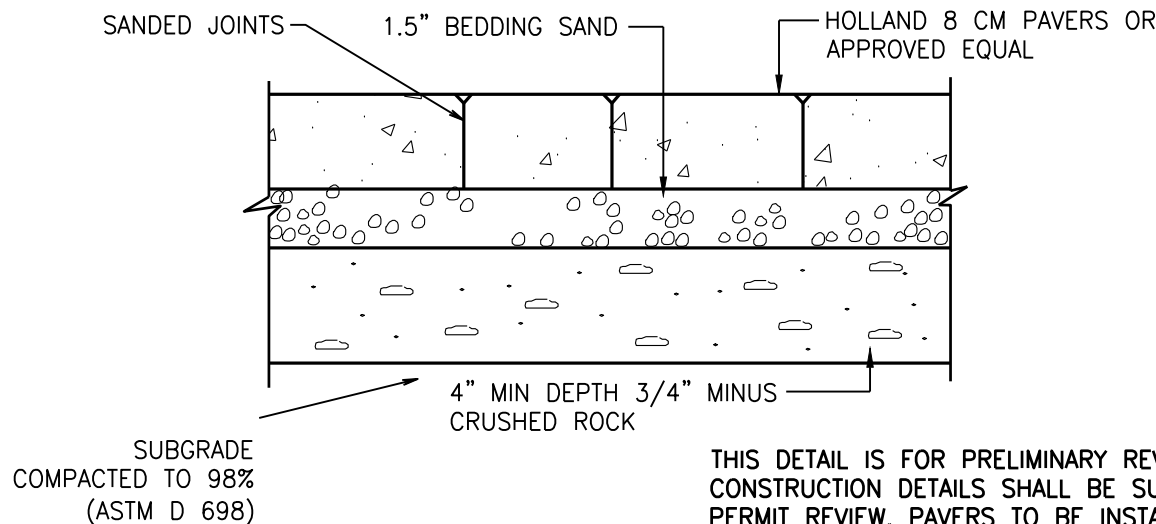
**Note:** All Plaza Collection receptacles are listed without tops. Choose from removable tops, hinged tops and side opening styles. Lid option weights are for 30 gal units. All Plaza Collection Receptacles ship fully assembled, except units with dome tops will require dome assembly.



PZ-076-20 with PZ-HDT

7

**Tournesol SITEWORKS**  
Successful sites start here™



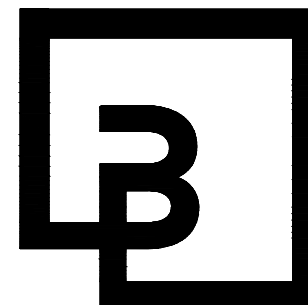
## PLAZA PAVERS

NOT TO SCALE

## FENCE DETAIL

NOT TO SCALE

- ALL FASTENERS TO BE GALV. STEEL.
- ALL GATES SHALL BE DESIGN/BUILD BY CONTRACTOR. POSTS AND RAILS MUST BE WOOD PER CITY REQUIREMENTS.



**Barghausen Consulting Engineers, Inc.**

18215 72nd Avenue South  
Kent, WA 98032  
425.251.6222 **barghausen.com**

DESIGNED BY: KEH  
DRAWN BY: RDC  
CHECKED BY: KEH  
APPROVED BY: JGH  
SCALE: NA  
OTHER:

**SWEDE HILL, LLC**  
P.O. BOX 1397  
TACOMA, WA 98401

**SECTION 25, TOWNSHIP 22 N, RANGE 1 E**

**SITE PLAN DETAILS**

**CANTERWOOD COMMERCIAL CENTER**

PERMIT NO.

DRAWING NO.

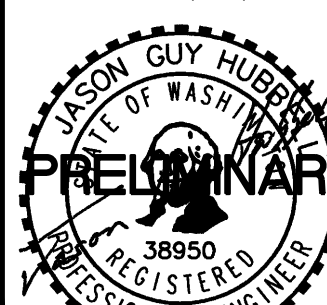
SHEET C6 OF 23



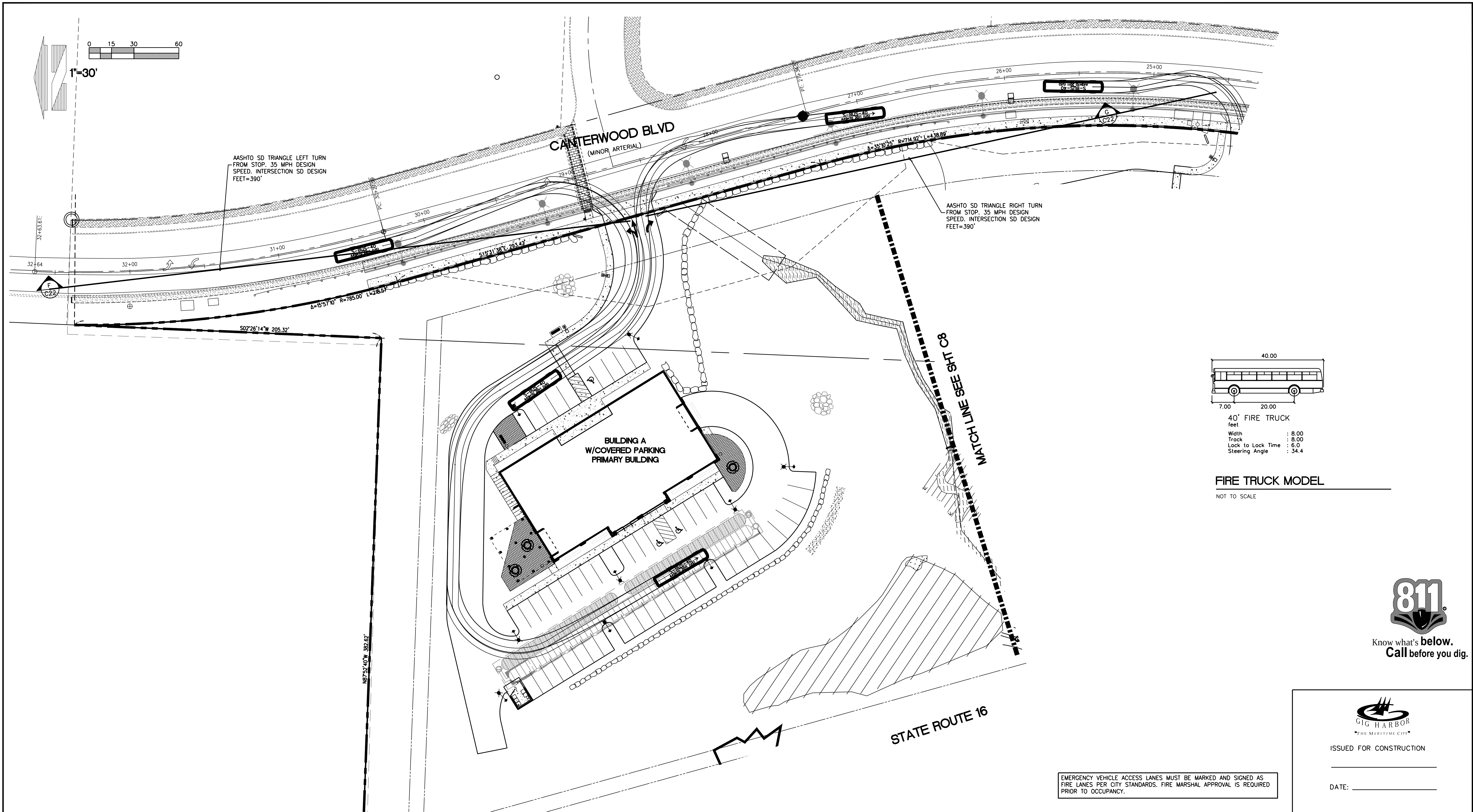
ISSUED FOR CONSTRUCTION

DATE: \_\_\_\_\_

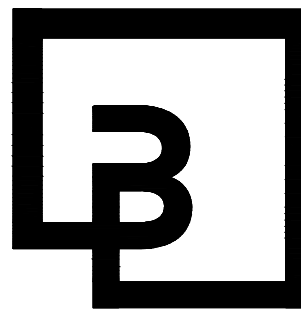
05/05/2021







| REVISIONS |            |                                               |  |
|-----------|------------|-----------------------------------------------|--|
| 10        | 11/01/2018 | REVISED PER CITY DRB COMMENTS 5/25/2018       |  |
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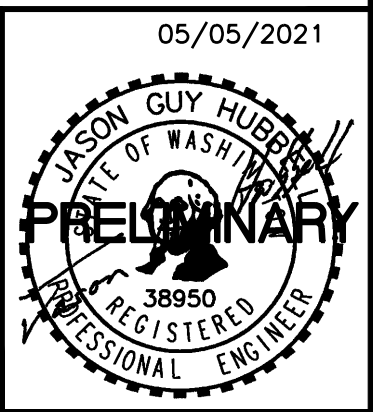
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| APPROVED BY: | JGH    |
| SCALE:       | 1"=30' |
| OTHER:       |        |

**SWEDE HILL, LLC**  
P.O. BOX 1397  
TACOMA, WA 98401

**SECTION 25, TOWNSHIP 22 N, RANGE 1 E**  
**VEHICLE MANUVERING  
AND SIGHT DISTANCE PLAN  
CANTERWOOD COMMERCIAL  
CENTER**

|             |           |
|-------------|-----------|
| PERMIT NO.  |           |
| DRAWING NO. |           |
| SHEET       | OF        |
| <b>C7</b>   | <b>23</b> |



Know what's below.  
Call before you dig.



ISSUED FOR CONSTRUCTION

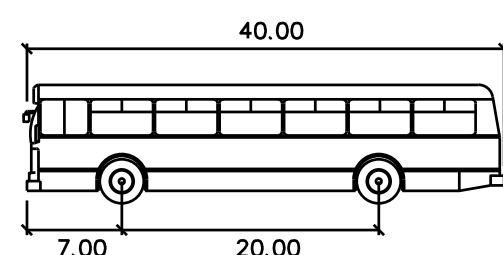
DATE: \_\_\_\_\_

EMERGENCY VEHICLE ACCESS LANES MUST BE MARKED AND SIGNED AS FIRE LANES PER CITY STANDARDS. FIRE MARSHAL APPROVAL IS REQUIRED PRIOR TO OCCUPANCY.



| Category                      | Number of Students |
|-------------------------------|--------------------|
| Category 1 (Diagonal lines)   | 15                 |
| Category 2 (Horizontal lines) | 30                 |
| Category 3 (Solid black)      | 10                 |
| Category 4 (White)            | 5                  |

MATCH LINE SEE SHT C7



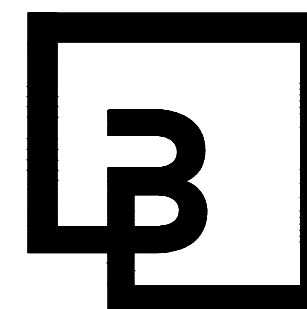
40' FIRE TRUCK  
feet

|                   |        |
|-------------------|--------|
| Width             | : 8.00 |
| Track             | : 8.00 |
| Lock to Lock Time | : 6.0  |
| Steering Angle    | : 34.4 |

NOT TO SCALE

## REVISIONS

|    |            |                                               |
|----|------------|-----------------------------------------------|
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|              |          |
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| DESIGNED BY: | KEH      |
| DRAWN BY:    | RDC      |
| CHECKED BY:  | KEH      |
| APPROVED BY: | JGH      |
| SCALE:       | 1" = 30' |
| OTHER:       |          |

**SWEDE HILL, LLC  
P.O. BOX 1397  
TACOMA, WA 98401**

SECTION 25, TOWNSHIP 22 N, RANGE 1 E

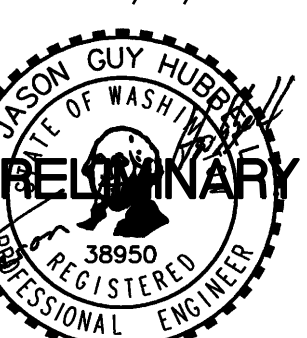
**VEHICLE MANEUVERING  
AND SIGHT DISTANCE PLAN  
CANTERWOOD COMMERCIAL  
CENTER**

PERMIT NO.

DRAWING NO.

|       |    |
|-------|----|
| SHEET | OF |
| C8    | 23 |

05/2021



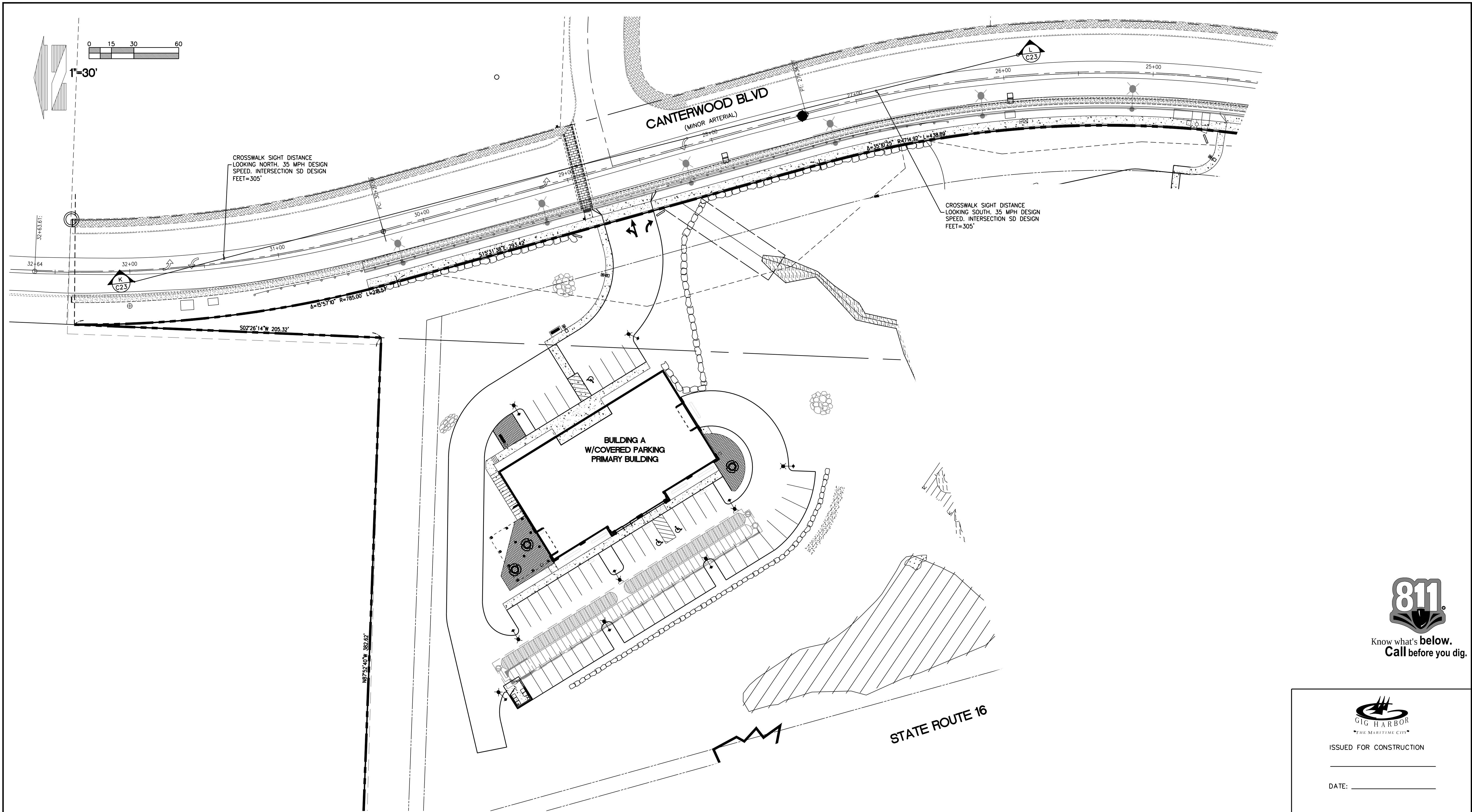
Know what's **below**.  
**Call** before you dig.



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DATE: \_\_\_\_\_





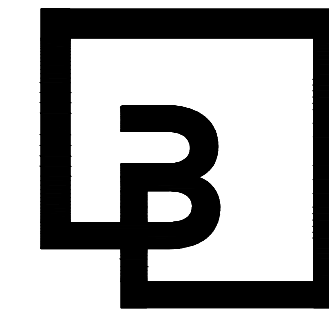
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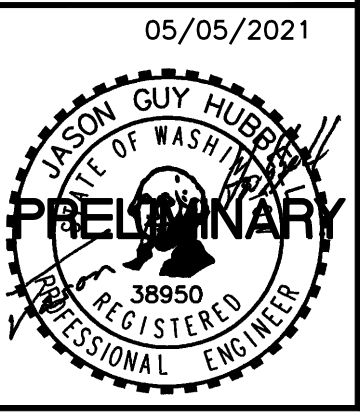
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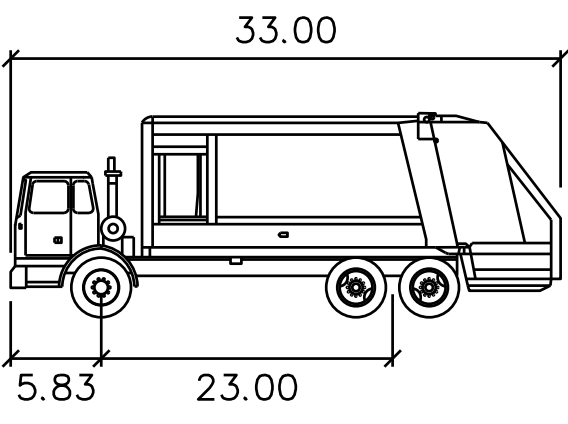
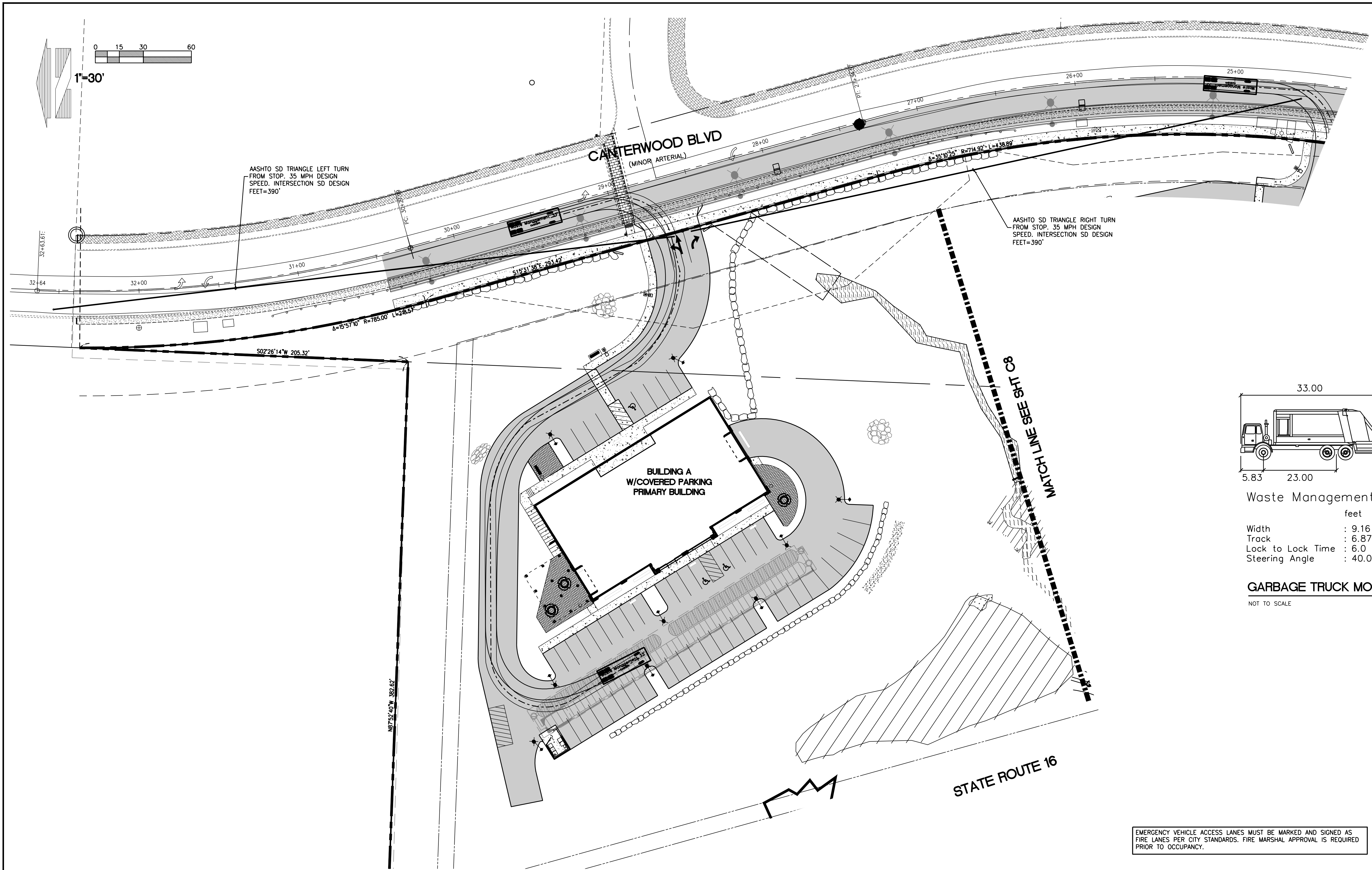
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P.O. BOX 1397  
TACOMA, WA 98401

**SECTION 25, TOWNSHIP 22 N, RANGE 1 E**  
**CROSSWALK  
SIGHT DISTANCE PLAN  
CANTERWOOD COMMERCIAL  
CENTER**

|             |    |
|-------------|----|
| PERMIT NO.  |    |
| DRAWING NO. |    |
| SHEET       | OF |
| C9          | 23 |







Waste Management 33'

feet

Width : 9.16

Track : 6.87

Lock to Lock Time : 6.0

Steering Angle : 40.0

**GARBAGE TRUCK MODEL**

NOT TO SCALE

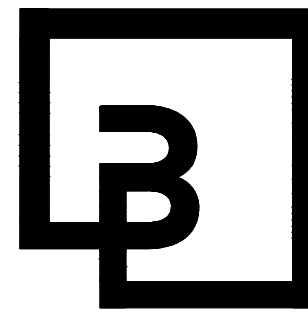


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**Barghausen Consulting Engineers, Inc.**

18215 72nd Avenue South  
Kent, WA 98032  
425.251.6222    [barghausen.com](http://barghausen.com)

DESIGNED BY: KEH

DRAWN BY: RDC

CHECKED BY: KEH

APPROVED BY: JGH

SCALE: 1"=30'

OTHER:

**SWEDE HILL, LLC**  
P.O. BOX 1397  
TACOMA, WA 98401

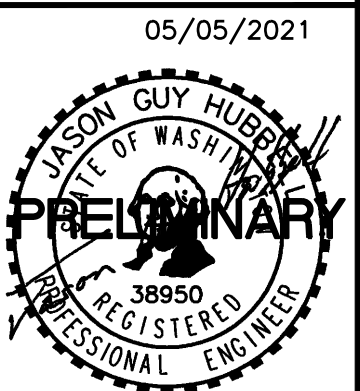
**SECTION 25, TOWNSHIP 22 N, RANGE 1 E**

**TRASH VEHICLE MANEUVERING**  
**CANTERWOOD COMMERCIAL CENTER**

PERMIT NO. \_\_\_\_\_

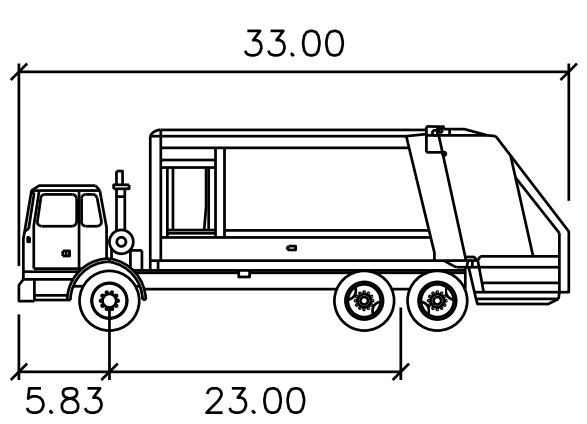
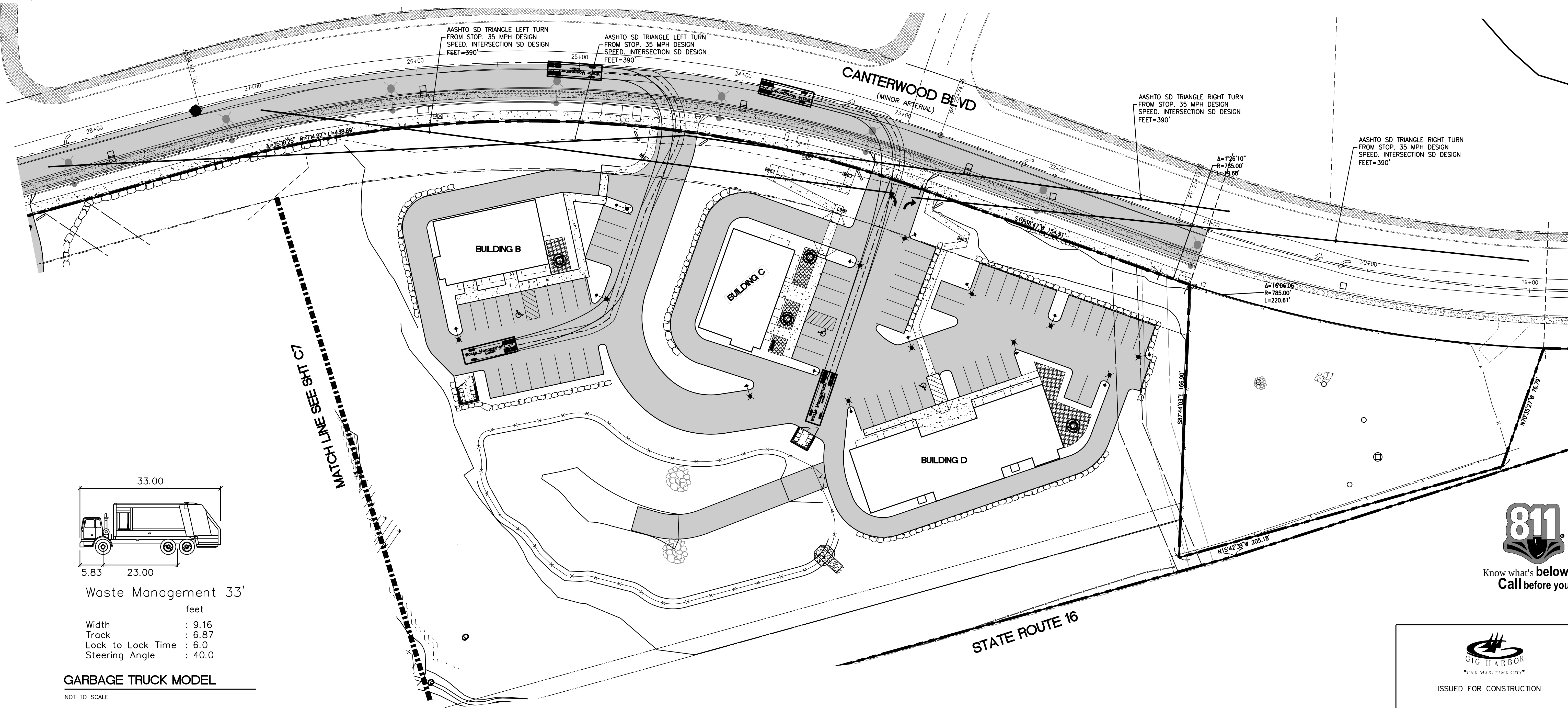
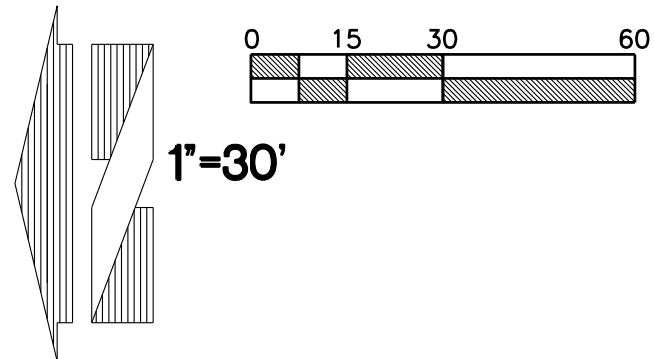
DRAWING NO. \_\_\_\_\_

SHEET **C10** OF **23**





EMERGENCY VEHICLE ACCESS LANES MUST BE MARKED AND SIGNED AS FIRE LANES PER CITY STANDARDS. FIRE MARSHAL APPROVAL IS REQUIRED PRIOR TO OCCUPANCY.



Waste Management 33'  
feet  
Width : 9.16  
Track : 6.87  
Lock to Lock Time : 6.0  
Steering Angle : 40.0

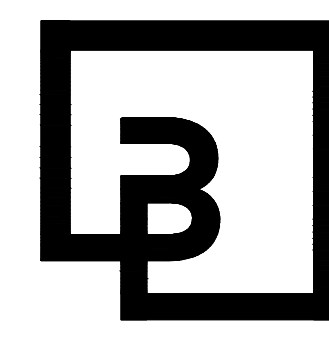
GARBAGE TRUCK MODEL  
NOT TO SCALE



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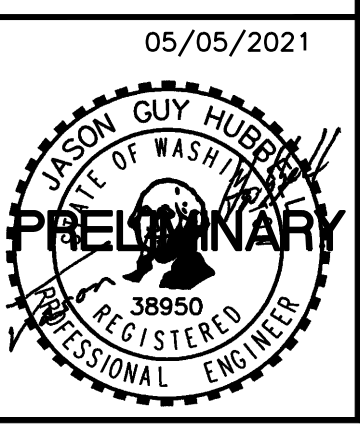
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Kent, WA 98032  
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| DESIGNED BY: | KEH    |
| DRAWN BY:    | RDC    |
| CHECKED BY:  | KEH    |
| APPROVED BY: | JGH    |
| SCALE:       | 1"=30' |
| OTHER:       |        |

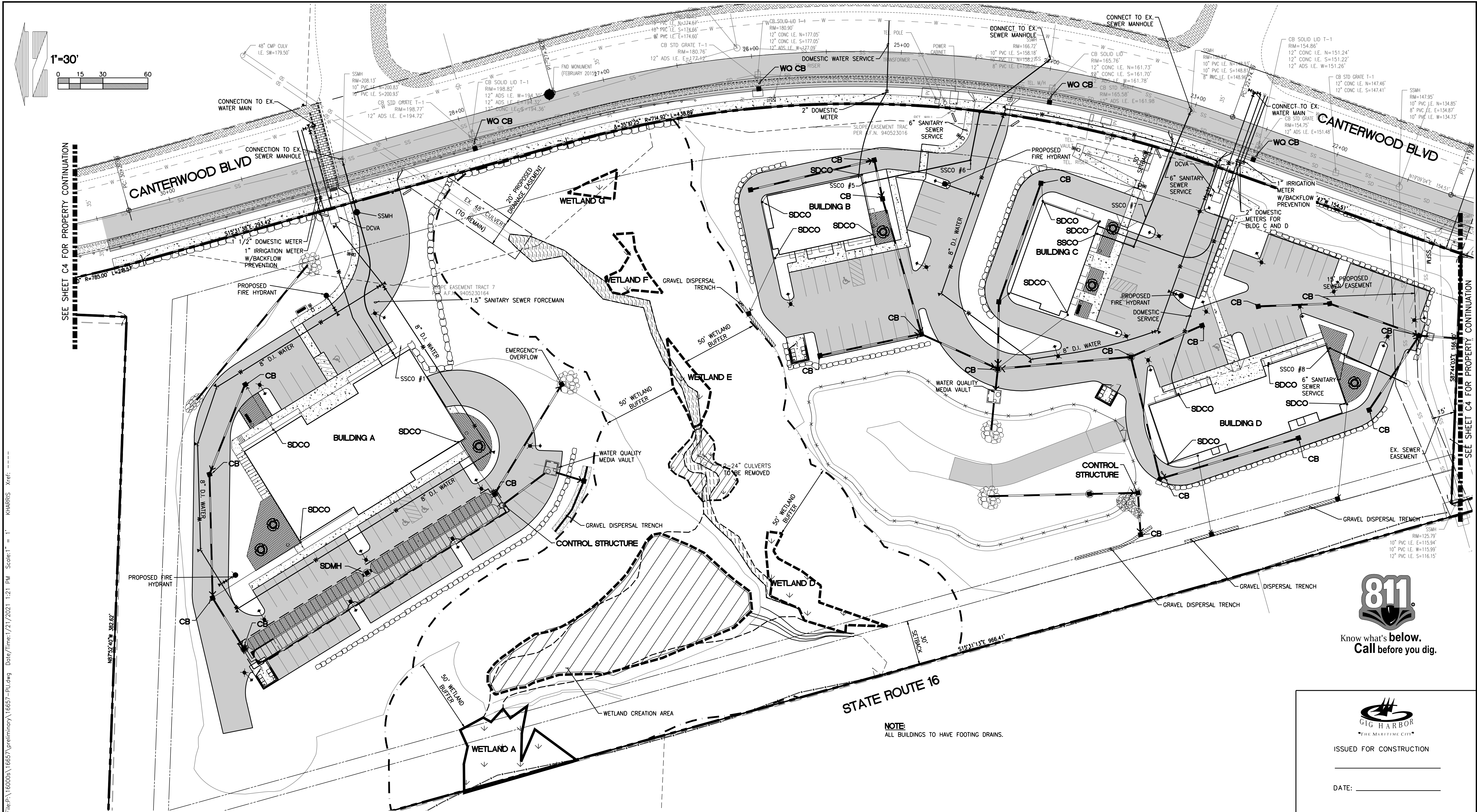
**SWEDE HILL, LLC**  
P.O. BOX 1397  
TACOMA, WA 98401

**SECTION 25, TOWNSHIP 22 N, RANGE 1 E**  
**TRASH VEHICLE  
MANUEVERING  
CANTERWOOD COMMERCIAL  
CENTER**

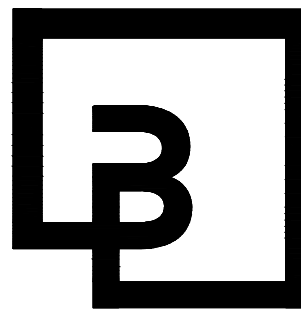
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| C11         | 23 |







| REVISIONS |            |                                               |  |
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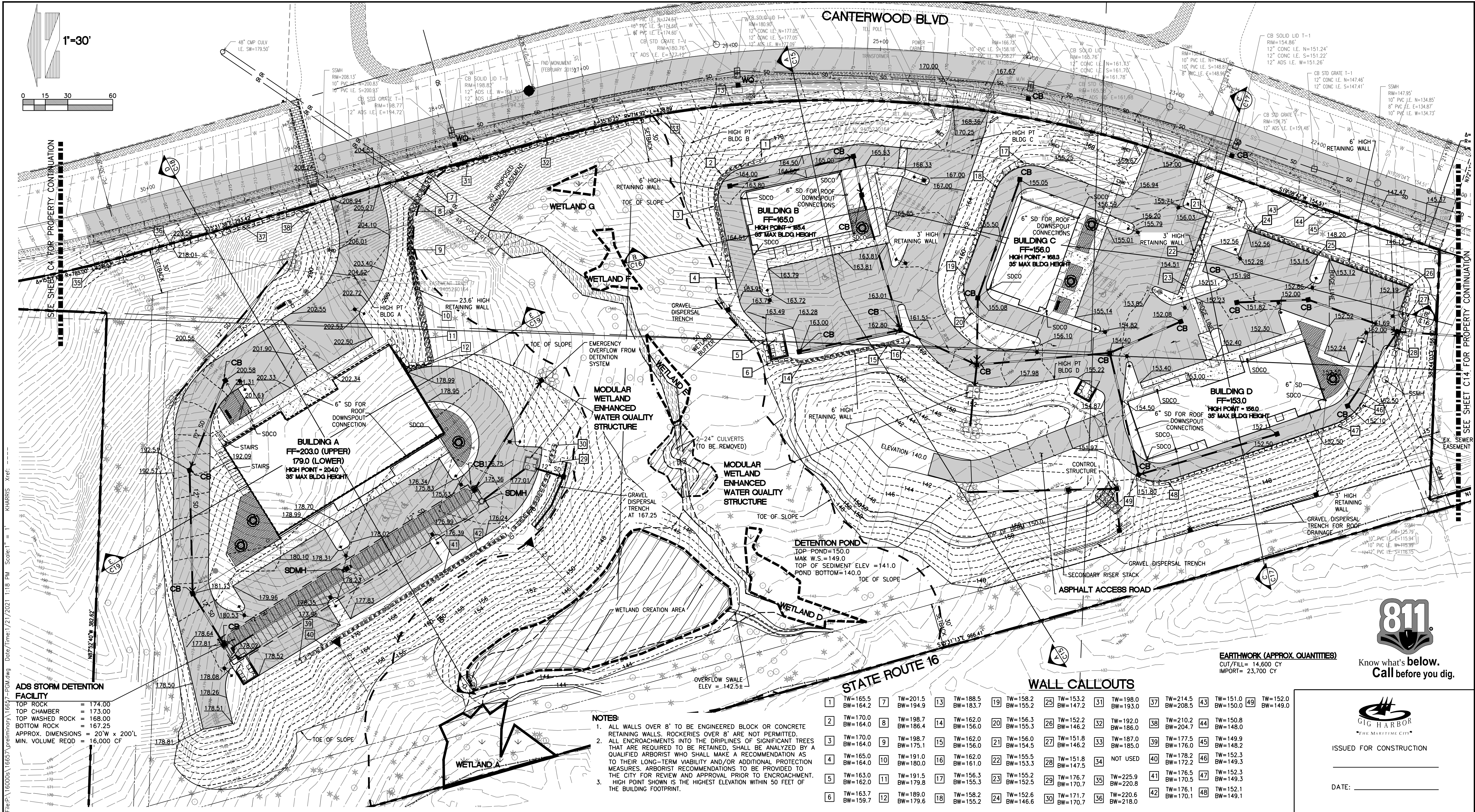
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| OTHER:       |        |

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**SECTION 25, TOWNSHIP 22 N, RANGE 1 E**  
**UTILITY SYSTEM MAP**  
**CANTERWOOD COMMERCIAL  
CENTER**

|             |            |
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| PERMIT NO.  | 05/05/2021 |
| DRAWING NO. |            |
| SHEET OF    |            |
| C12 23      |            |





**ADS STORM DETENTION FACILITY**  
TOP ROCK = 174.00  
TOP CHAMBER = 173.00  
TOP WASHED ROCK = 168.00  
BOTTOM ROCK = 167.25  
APPROX. DIMENSIONS = 20'W x 200'L  
MIN. VOLUME REQD = 16,000 CF

- NOTES:**
1. ALL WALLS OVER 8' TO BE ENGINEERED BLOCK OR CONCRETE RETAINING WALLS. ROCKERIES OVER 8' ARE NOT PERMITTED.
  2. ALL ENCROACHMENTS INTO THE DRILLPILES OF SIGNIFICANT TREES THAT ARE REQUIRED TO BE RETAINED, SHALL BE ANALYZED BY A QUALIFIED ARBORIST WHO SHALL MAKE A RECOMMENDATION AS TO THEIR LONG-TERM VIABILITY AND/OR ADDITIONAL PROTECTION MEASURES. ARBORIST RECOMMENDATIONS TO BE PROVIDED TO THE CITY FOR REVIEW AND APPROVAL PRIOR TO ENCROACHMENT.
  3. HIGH POINT SHOWN IS THE HIGHEST ELEVATION WITHIN 50 FEET OF THE BUILDING FOOTPRINT.

|   |                      |    |                      |    |                      |    |                      |    |                      |    |                      |    |                      |    |                      |    |                      |
|---|----------------------|----|----------------------|----|----------------------|----|----------------------|----|----------------------|----|----------------------|----|----------------------|----|----------------------|----|----------------------|
| 1 | TW=165.5<br>BW=164.2 | 7  | TW=201.5<br>BW=194.9 | 13 | TW=188.5<br>BW=183.7 | 19 | TW=158.2<br>BW=155.2 | 25 | TW=153.2<br>BW=147.2 | 31 | TW=198.0<br>BW=193.0 | 37 | TW=214.5<br>BW=208.5 | 43 | TW=151.0<br>BW=150.0 | 49 | TW=152.0<br>BW=149.0 |
| 2 | TW=170.0<br>BW=164.0 | 8  | TW=198.7<br>BW=186.4 | 14 | TW=162.0<br>BW=156.0 | 20 | TW=156.3<br>BW=155.3 | 26 | TW=152.2<br>BW=146.2 | 32 | TW=192.0<br>BW=186.0 | 38 | TW=210.2<br>BW=204.7 | 44 | TW=150.8<br>BW=148.0 |    |                      |
| 3 | TW=170.0<br>BW=164.0 | 9  | TW=198.7<br>BW=175.1 | 15 | TW=162.0<br>BW=156.0 | 21 | TW=156.0<br>BW=154.5 | 27 | TW=151.8<br>BW=146.2 | 33 | TW=187.0<br>BW=185.0 | 39 | TW=177.5<br>BW=176.0 | 45 | TW=149.9<br>BW=148.2 |    |                      |
| 4 | TW=165.0<br>BW=164.0 | 10 | TW=191.0<br>BW=180.0 | 16 | TW=162.0<br>BW=161.0 | 22 | TW=155.5<br>BW=153.3 | 28 | TW=151.8<br>BW=147.5 | 34 | NOT USED             | 40 | TW=178.2<br>BW=172.2 | 46 | TW=152.3<br>BW=149.3 |    |                      |
| 5 | TW=163.0<br>BW=162.0 | 11 | TW=191.5<br>BW=179.8 | 17 | TW=156.3<br>BW=155.3 | 23 | TW=155.2<br>BW=152.5 | 29 | TW=176.7<br>BW=170.7 | 35 | TW=225.9<br>BW=220.8 | 41 | TW=176.5<br>BW=170.5 | 47 | TW=152.3<br>BW=149.3 |    |                      |
| 6 | TW=163.7<br>BW=159.7 | 12 | TW=189.0<br>BW=179.6 | 18 | TW=158.2<br>BW=155.2 | 24 | TW=152.6<br>BW=146.6 | 30 | TW=171.7<br>BW=170.7 | 36 | TW=220.6<br>BW=218.0 | 42 | TW=176.1<br>BW=170.1 | 48 | TW=152.1<br>BW=149.1 |    |                      |

**EARTHWORK (APPROX. QUANTITIES)**  
CUT/FILL = 14,600 CY  
IMPORT = 23,700 CY



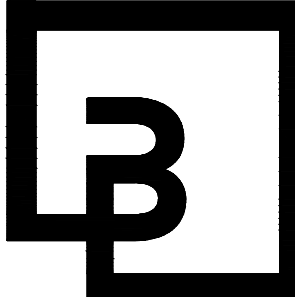
Know what's below.  
Call before you dig.



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|--------------|--------|
| DESIGNED BY: | KEH    |
| DRAWN BY:    | RDC    |
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| SCALE:       | 1"=30' |
| OTHER:       |        |

**SWEDE HILL, LLC**  
P.O. BOX 1397  
TACOMA, WA 98401

**SECTION 25, TOWNSHIP 22 N, RANGE 1 E**

**GRADING AND STORM DRAINAGE PLAN**

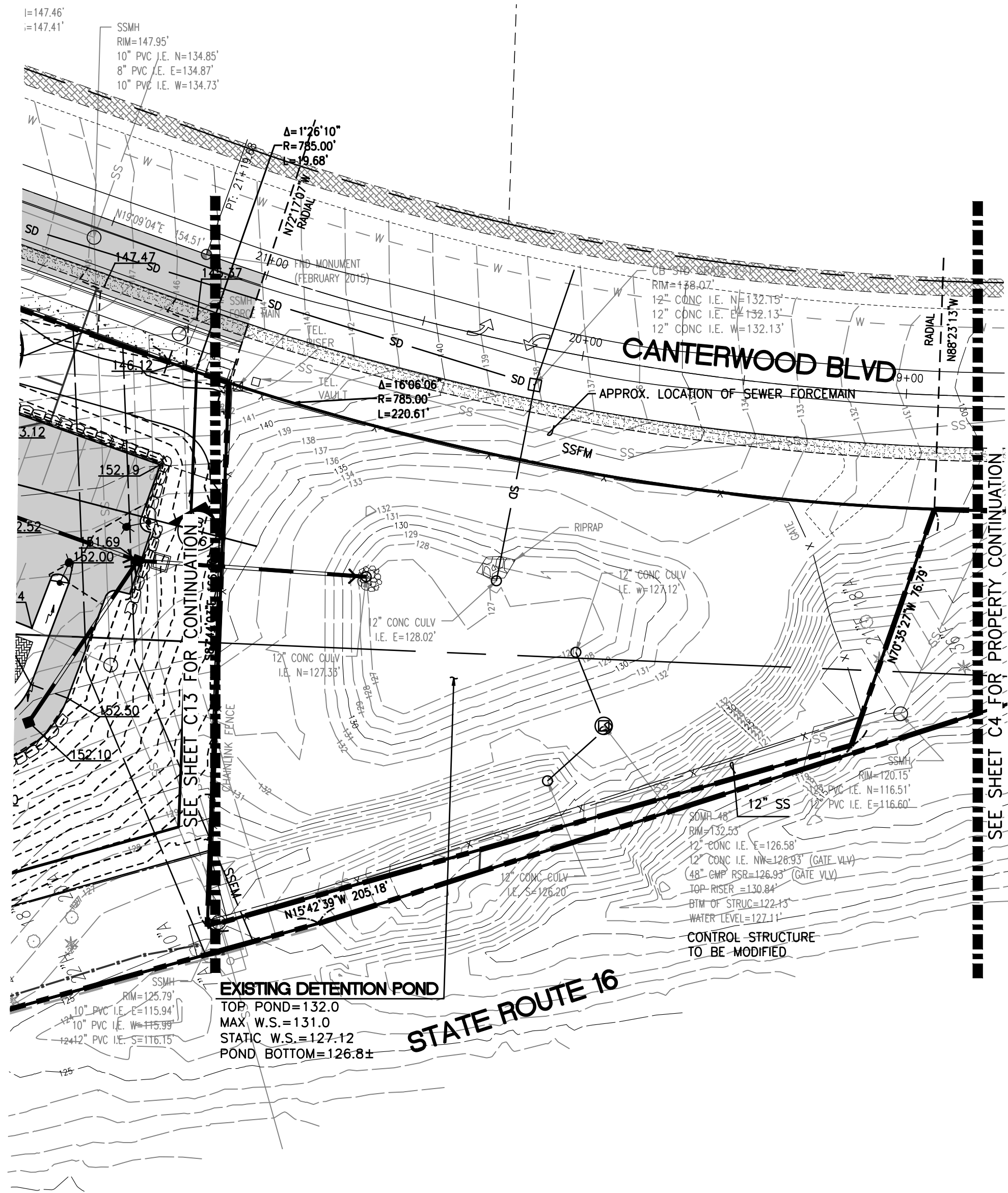
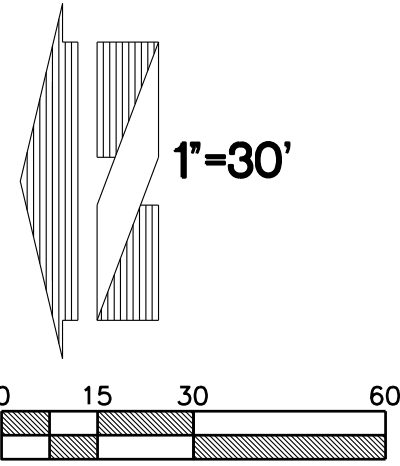
**CANTERWOOD COMMERCIAL CENTER**

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| PERMIT NO.  | 05/05/2021 |
| DRAWING NO. |            |
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| C13         | 23         |



PRELIMINARY





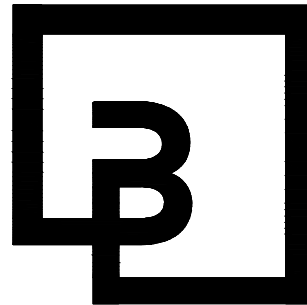
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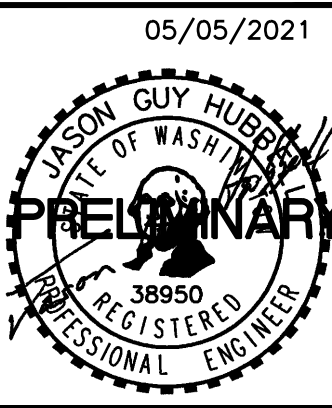
**Barghausen  
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Kent, WA 98032  
425.251.6222    [barghausen.com](http://barghausen.com)

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TACOMA, WA 98401

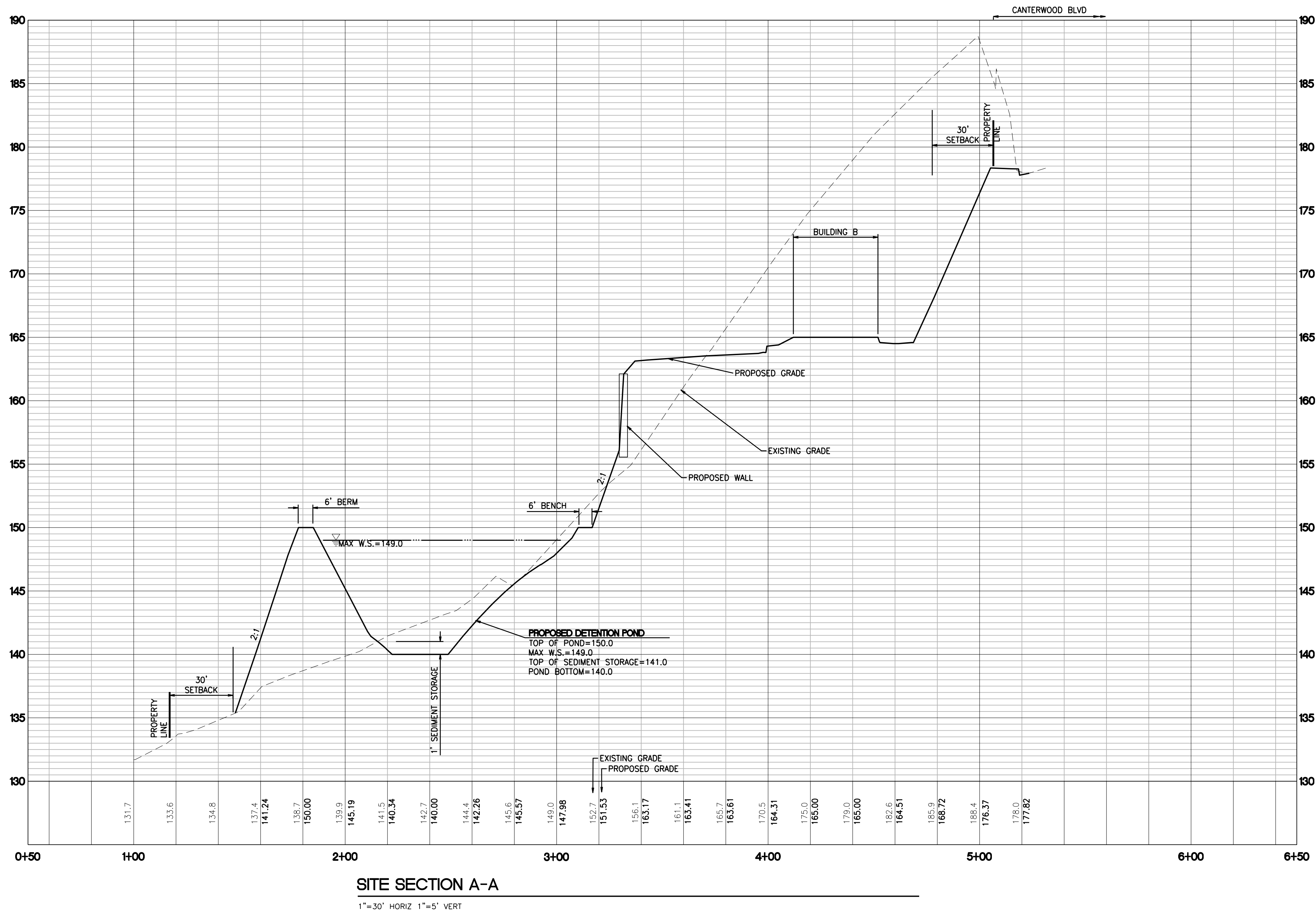
**SECTION 25, TOWNSHIP 22 N, RANGE 1 E**  
**GRADING AND STORM DRAINAGE PLAN**  
**CANTERWOOD COMMERCIAL  
CENTER**

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| PERMIT NO.          |                 |
| DRAWING NO.         |                 |
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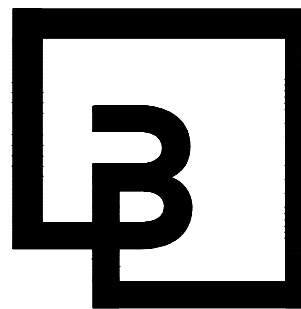


  
GIG HARBOR  
"THE MARITIME CITY"

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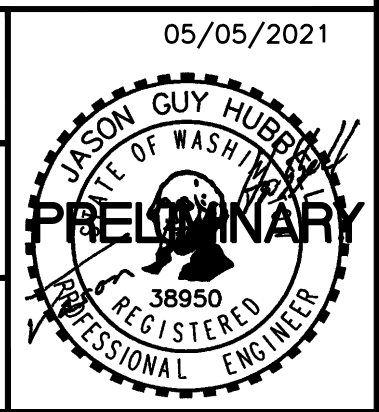
**SWEDE HILL, LLC**  
P.O. BOX 1397  
TACOMA, WA 98401

**SECTION 25, TOWNSHIP 22 N, RANGE 1 E**

**SITE SECTION-A**

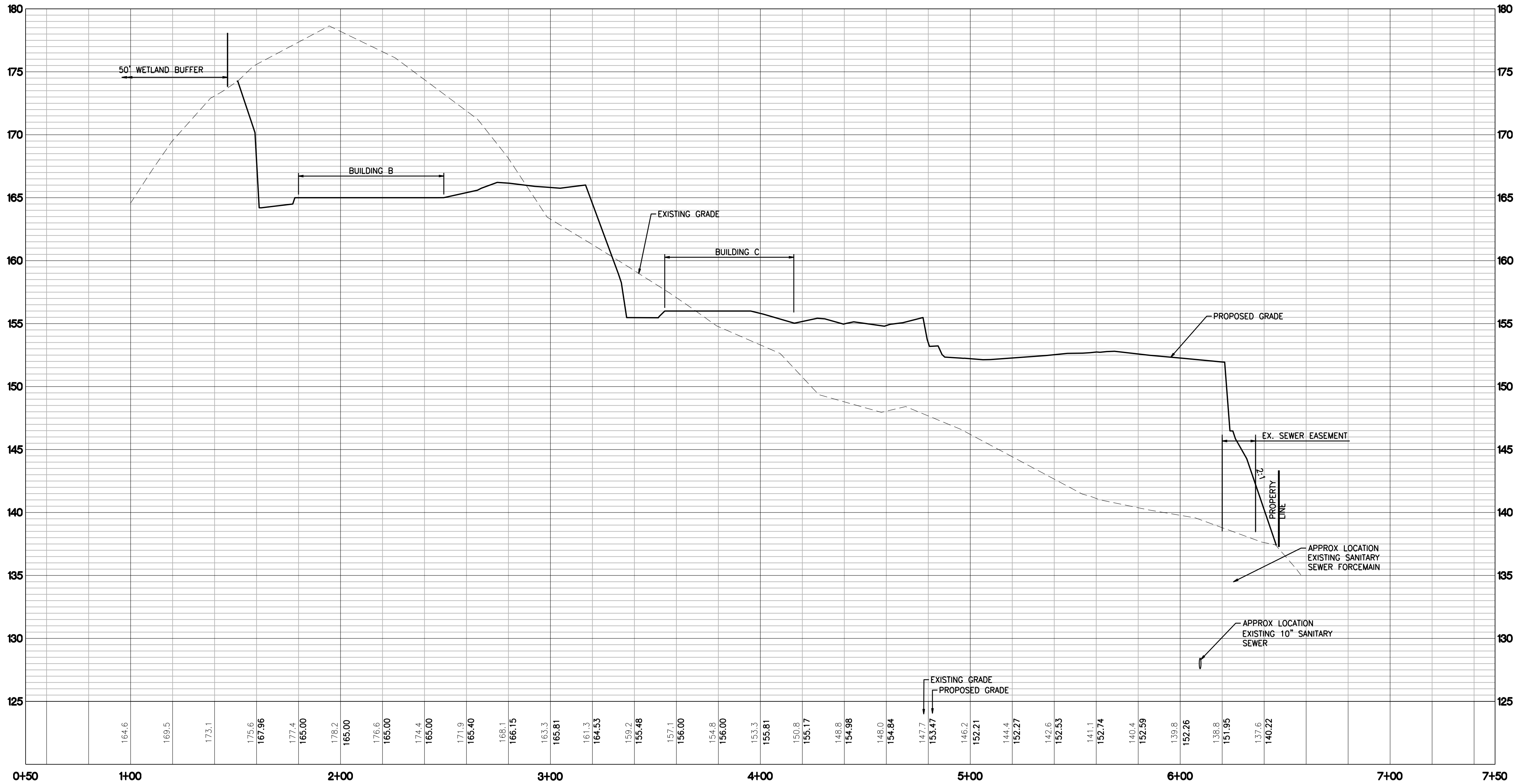
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SITE SECTION B-B

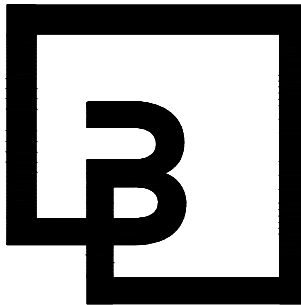
1"=30' HORIZ 1"=5' VERT



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TACOMA, WA 98401

SECTION 25, TOWNSHIP 22 N, RANGE 1 E

SITE SECTION-B

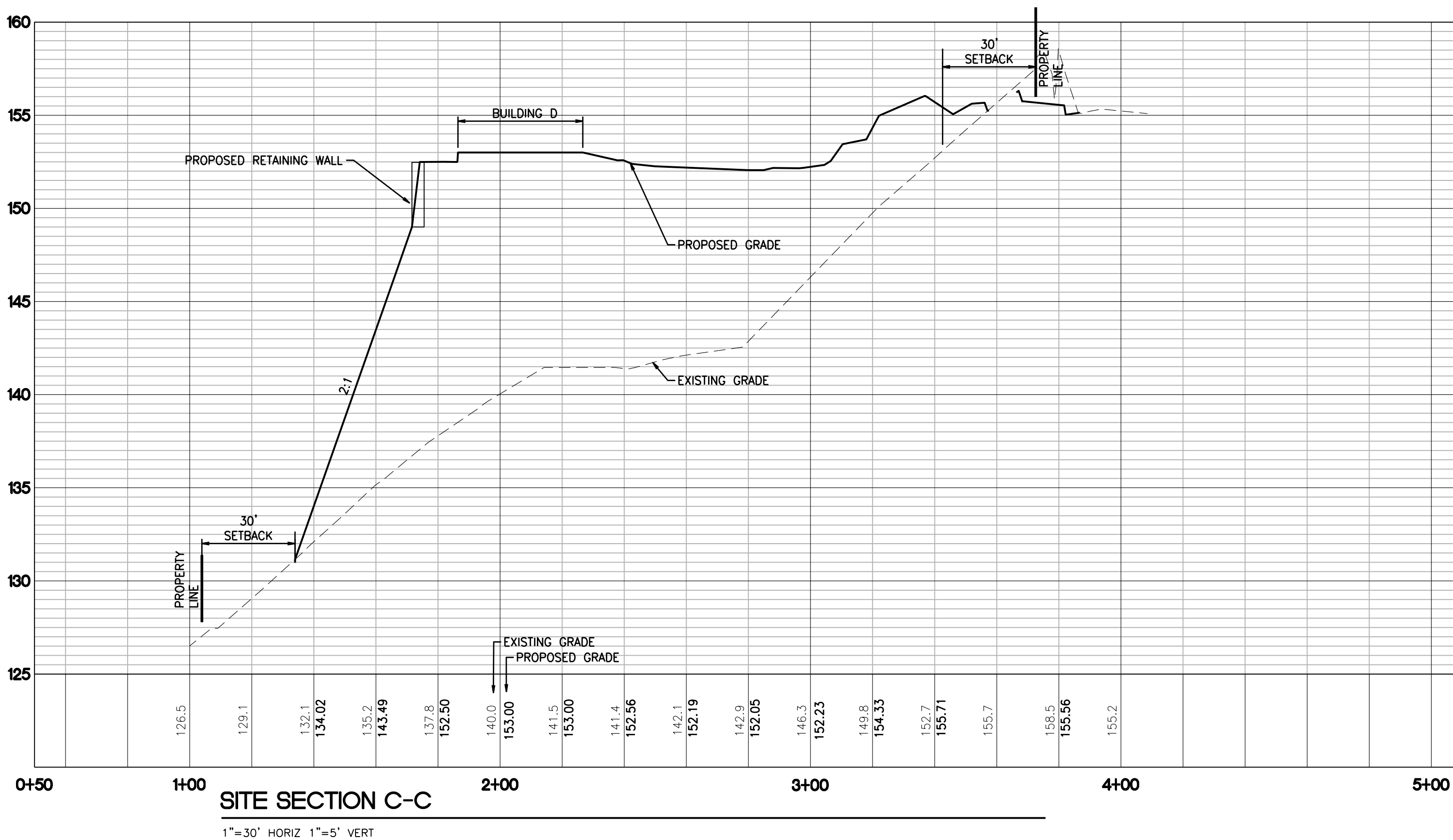
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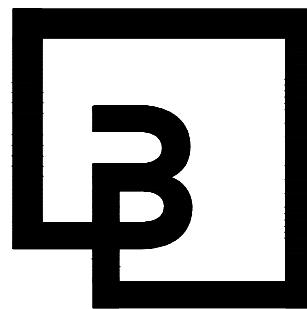




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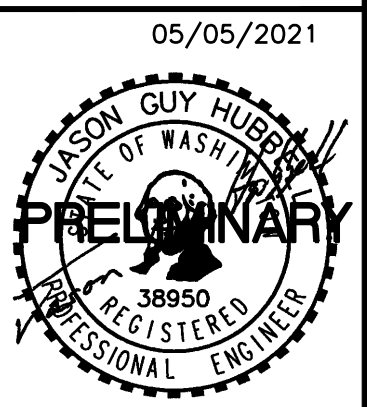
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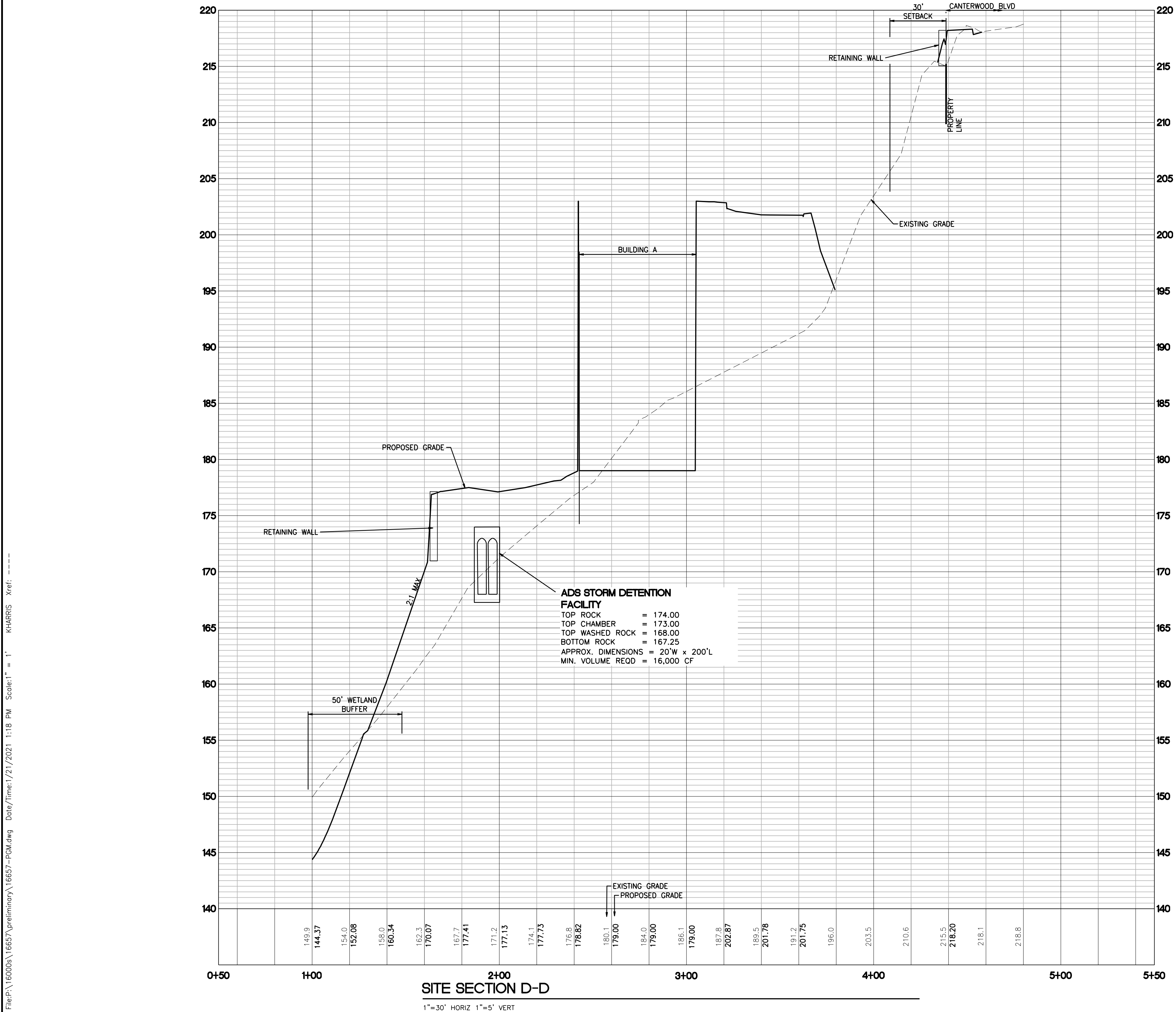
**SWEDE HILL, LLC**  
P.O. BOX 1397  
TACOMA, WA 98401

**SECTION 25, TOWNSHIP 22 N, RANGE 1 E**  
**SITE SECTION-C**  
**CANTERWOOD COMMERCIAL  
CENTER**

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| PERMIT NO.  |    |
| DRAWING NO. |    |
| SHEET       | OF |
| C17         | 23 |

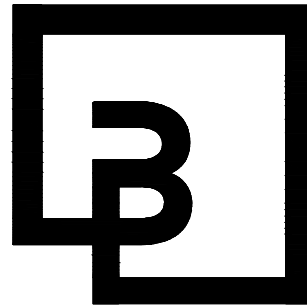






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| DESIGNED BY: | KEH    |
| DRAWN BY:    | RDC    |
| CHECKED BY:  | KEH    |
| APPROVED BY: | JGH    |
| SCALE:       | 1"=20' |
| OTHER:       |        |

**SWEDE HILL, LLC**  
P.O. BOX 1397  
TACOMA, WA 98401

**SECTION 25, TOWNSHIP 22 N, RANGE 1 E**  
**SITE SECTION-D**  
**CANTERWOOD COMMERCIAL  
CENTER**

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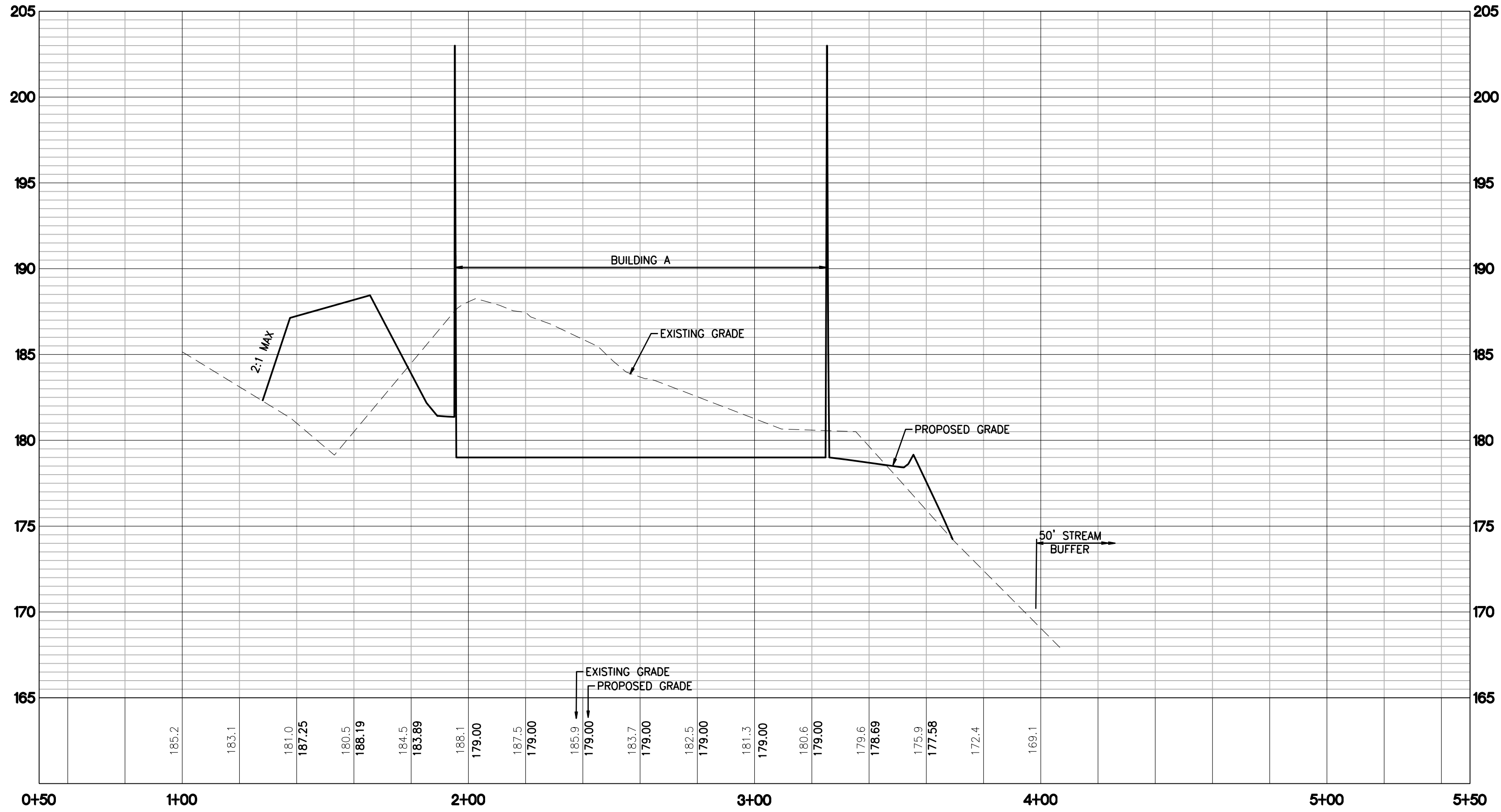
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THE MARITIME CITY

ISSUED FOR CONSTRUCTION

DATE: \_\_\_\_\_



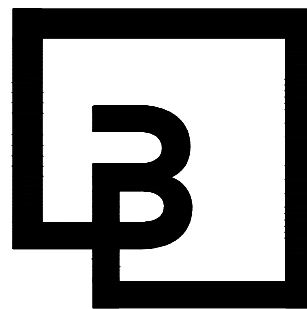
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SITE SECTION E-E

1"=30' HORIZ 1"=5' VERT

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| 11        | 04/02/2019 | REVISED PER CITY COMMENTS 1/25/2019           |  |
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| 14        | 05/13/2020 | REVISED SOUTH LAYOUT                          |  |
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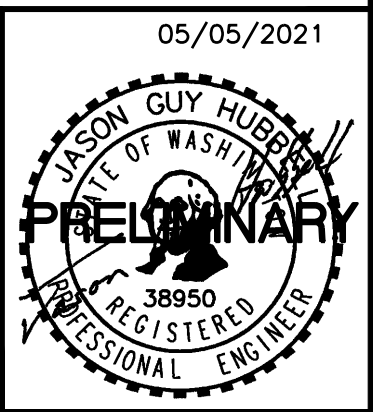
**Barghausen**  
**Consulting Engineers, Inc.**  
18215 72nd Avenue South  
Kent, WA 98032  
425.251.6222 [barghausen.com](http://barghausen.com)

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| DESIGNED BY: | KEH    |
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| CHECKED BY:  | KEH    |
| APPROVED BY: | JGH    |
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**SWEDE HILL, LLC**  
**P.O. BOX 1397**  
**TACOMA, WA 98401**

**SECTION 25, TOWNSHIP 22 N, RANGE 1 E**  
**SITE SECTION-E**  
**CANTERWOOD COMMERCIAL CENTER**

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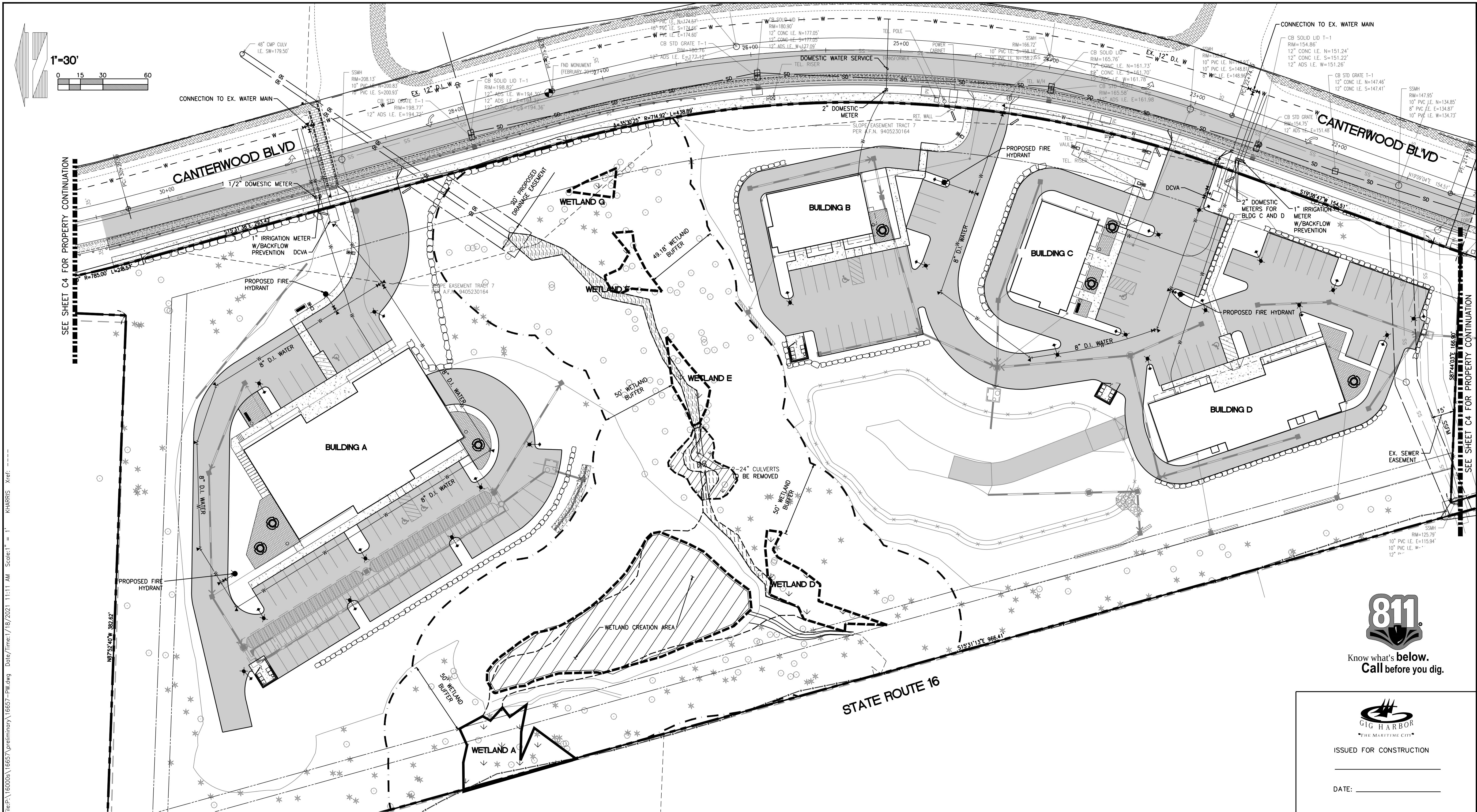


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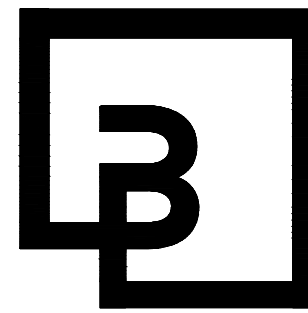
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**SWEDE HILL, LLC**  
P.O. BOX 1397  
TACOMA, WA 98401

**SECTION 25, TOWNSHIP 22 N, RANGE 1 E**  
**WATER MAIN PLAN**  
**CANTERWOOD COMMERCIAL  
CENTER**

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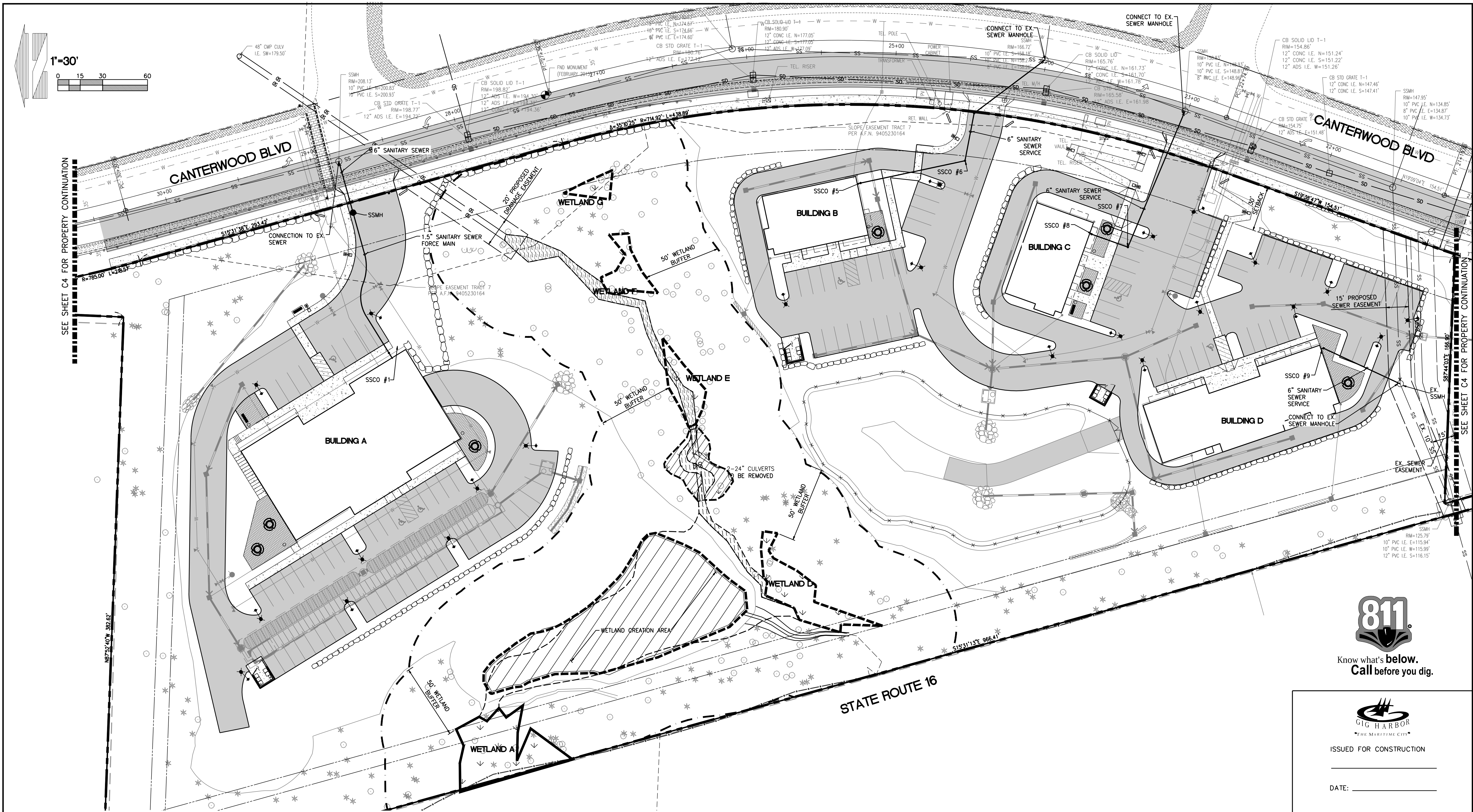
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Call before you dig.



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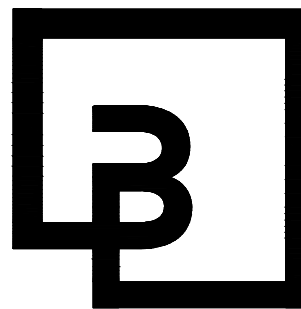
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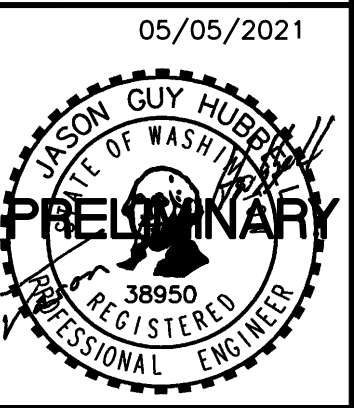
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18215 72nd Avenue South  
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425.251.6222 [barghausen.com](http://barghausen.com)

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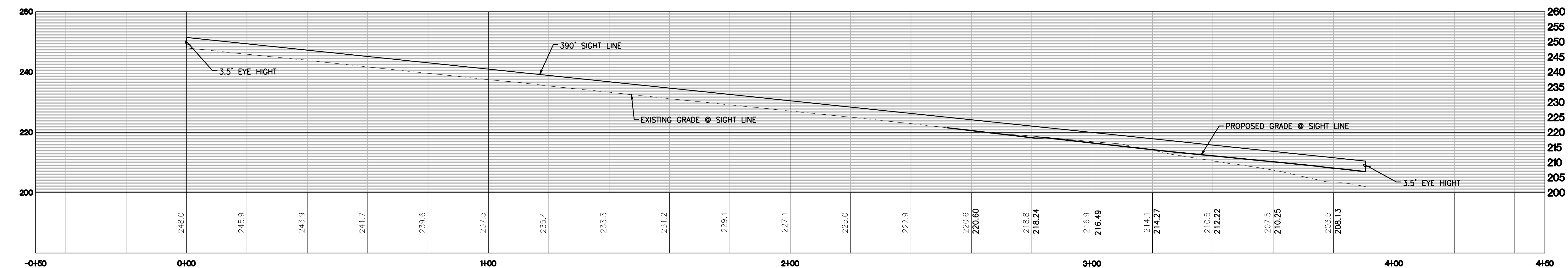
**SWEDE HILL, LLC**  
P.O. BOX 1397  
TACOMA, WA 98401

**SECTION 25, TOWNSHIP 22 N, RANGE 1 E**  
**SANITARY SEWER PLAN**  
**CANTERWOOD COMMERCIAL  
CENTER**

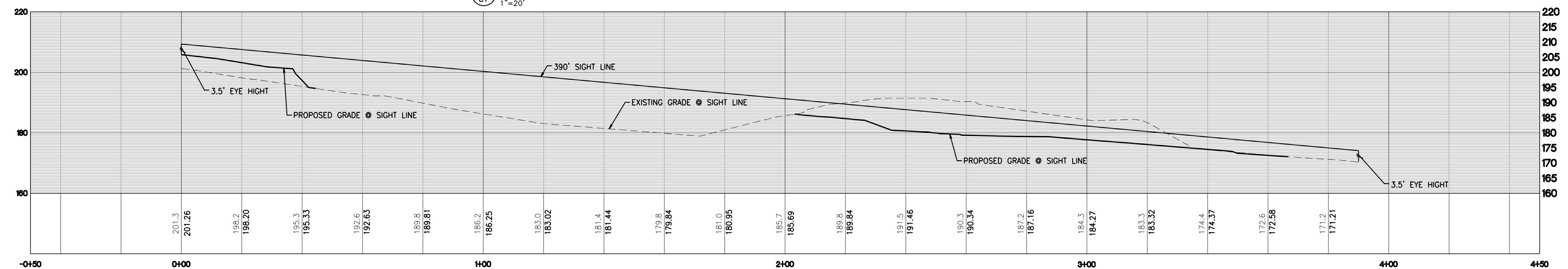
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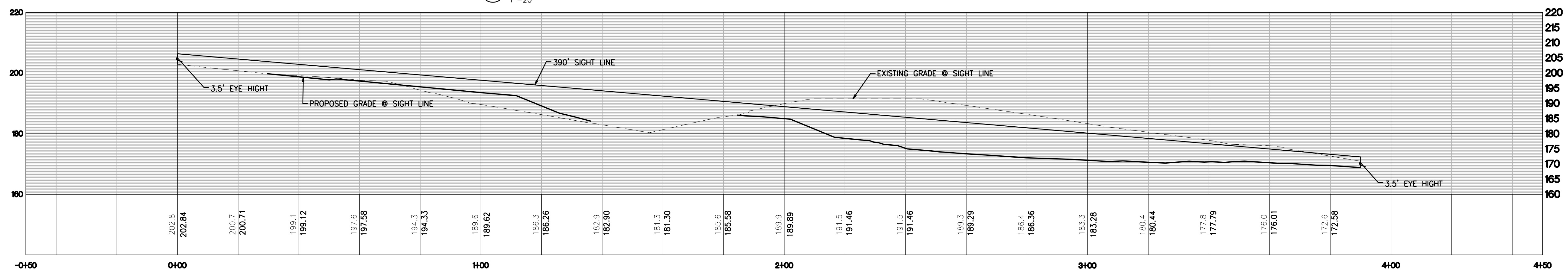




NORTH DRIVEWAY  
RIGHT TURN  
F  
C7  
1"=20'



NORTH DRIVEWAY  
LEFT TURN  
G  
C7  
1"=20'



CENTER DRIVEWAY  
RIGHT TURN  
H  
C8  
1"=20'

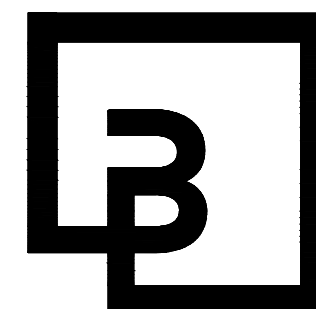


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Kent, WA 98032  
425.251.6222 [barghausen.com](http://barghausen.com)

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APPROVED BY: JGH  
SCALE: 1"=20'  
OTHER:

**SWEDE HILL, LLC**  
P.O. BOX 1397  
TACOMA, WA 98401

**SECTION 25, TOWNSHIP 22 N, RANGE 1 E**

**SIGHT LINE SECTIONS**

**CANTERWOOD COMMERCIAL  
CENTER**

PERMIT NO.

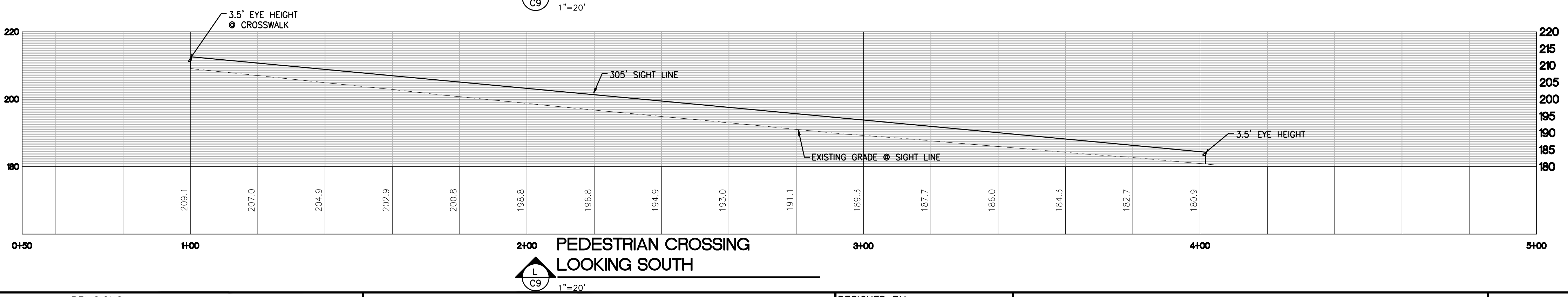
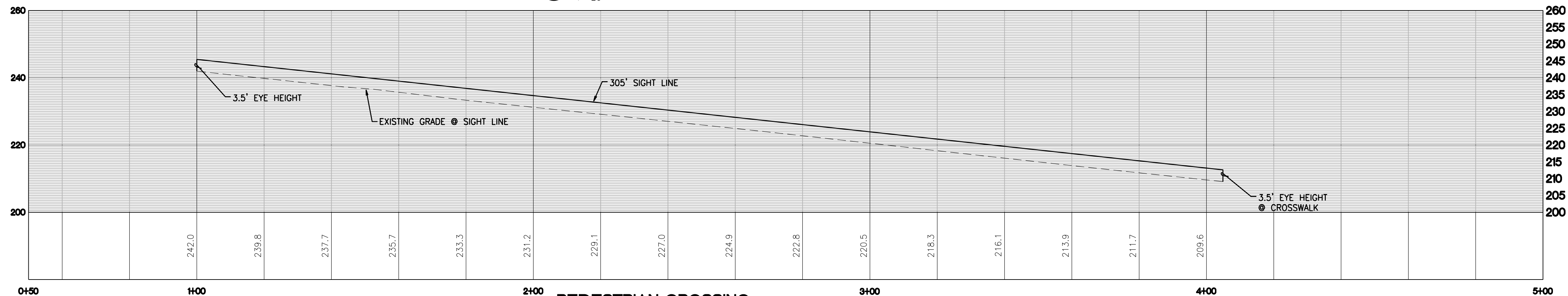
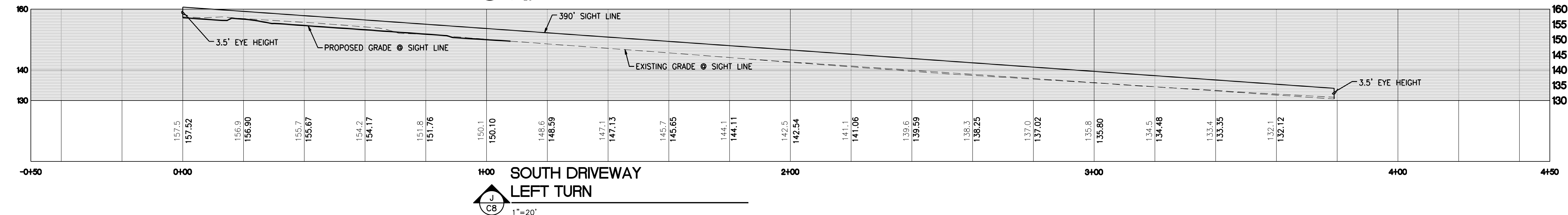
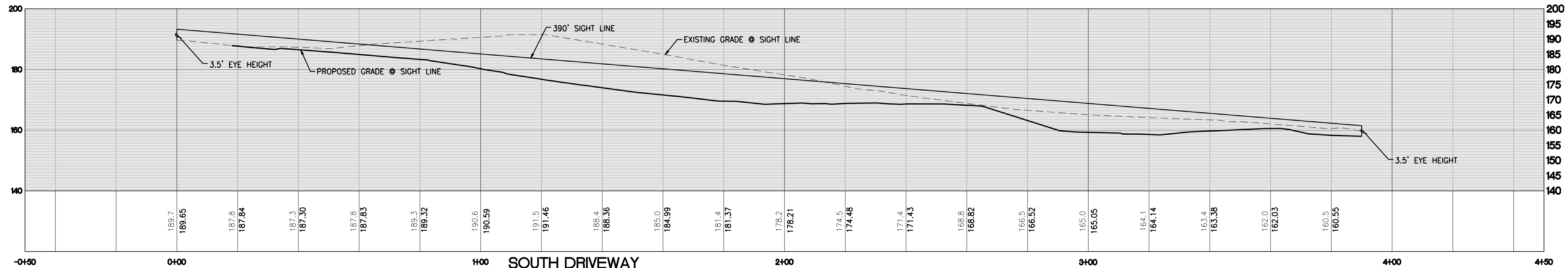
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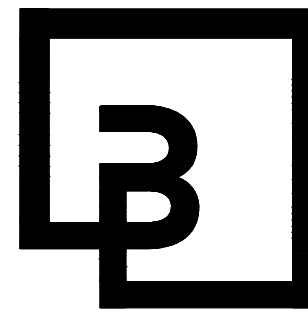
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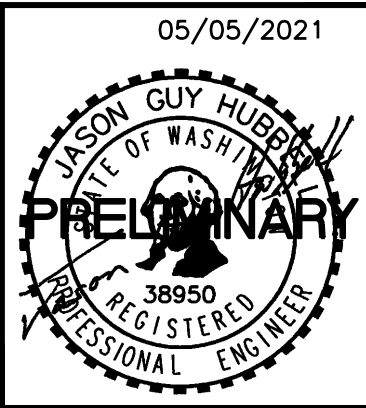
**Barghausen**  
**Consulting Engineers, Inc.**  
18215 72nd Avenue South  
Kent, WA 98032  
425.251.6222 [barghausen.com](http://barghausen.com)

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| OTHER:       |        |

**SWEDE HILL, LLC**  
P.O. BOX 1397  
TACOMA, WA 98401

**SECTION 25, TOWNSHIP 22 N, RANGE 1 E**  
**SIGHT LINE SECTIONS**  
**CANTERWOOD COMMERCIAL CENTER**

|             |    |
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| PERMIT NO.  |    |
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ISSUED FOR CONSTRUCTION

DATE: \_\_\_\_\_





**CITY OF GIG HARBOR**  
**SEWER CONCURRENCY MANAGEMENT PROGRAM**  
**CAPACITY RESERVATION CERTIFICATE (CRC)**

| APPLICANT INFORMATION                                                                                                                                                                                                                                                                                                                                                                                                                                          |           | \$90.00 (Non-SFR only)                                                                                                                                                                                                                                              |                  | PAID  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|-------|
| APPLICANT (Developer or Owner) Please circle one                                                                                                                                                                                                                                                                                                                                                                                                               |           | PROPERTY OWNER (if different than applicant)                                                                                                                                                                                                                        |                  |       |
| John                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Xitco     | John                                                                                                                                                                                                                                                                | Xitco            |       |
| FIRST NAME                                                                                                                                                                                                                                                                                                                                                                                                                                                     | LAST NAME | FIRST NAME                                                                                                                                                                                                                                                          | LAST NAME        |       |
| Swede Hill, LLC - Canterwood Commercial                                                                                                                                                                                                                                                                                                                                                                                                                        |           | Swede Hill, LLC - Canterwood Commercial                                                                                                                                                                                                                             |                  |       |
| COMPANY NAME                                                                                                                                                                                                                                                                                                                                                                                                                                                   |           | COMPANY NAME                                                                                                                                                                                                                                                        |                  |       |
| 2320 Milwaukee Way / P.O. Box 1397                                                                                                                                                                                                                                                                                                                                                                                                                             |           | 2320 Milwaukee Way / P.O. Box 1397                                                                                                                                                                                                                                  |                  |       |
| MAILING ADDRESS                                                                                                                                                                                                                                                                                                                                                                                                                                                |           | MAILING ADDRESS                                                                                                                                                                                                                                                     |                  |       |
| Tacoma, WA 98401                                                                                                                                                                                                                                                                                                                                                                                                                                               |           | Tacoma, WA 98401                                                                                                                                                                                                                                                    |                  |       |
| CITY                                                                                                                                                                                                                                                                                                                                                                                                                                                           | STATE     | ZIP                                                                                                                                                                                                                                                                 | CITY             | STATE |
| ( 253 ) 627-6179                                                                                                                                                                                                                                                                                                                                                                                                                                               | ( )       |                                                                                                                                                                                                                                                                     | ( 253 ) 627-6179 | ( )   |
| PHONE                                                                                                                                                                                                                                                                                                                                                                                                                                                          | FAX       |                                                                                                                                                                                                                                                                     | PHONE            | FAX   |
| EMAIL ADDRESS: jxitco@gmail.com                                                                                                                                                                                                                                                                                                                                                                                                                                |           | EMAIL ADDRESS: jxitco@gmail.com                                                                                                                                                                                                                                     |                  |       |
| <b>PROJECT INFORMATION</b>                                                                                                                                                                                                                                                                                                                                                                                                                                     |           |                                                                                                                                                                                                                                                                     |                  |       |
| PROJECT NAME: Canterwood Commercial Center                                                                                                                                                                                                                                                                                                                                                                                                                     |           | TAX PARCEL #: 0122254090                                                                                                                                                                                                                                            |                  |       |
| PROJECT ADDRESS: 10700X Canterwood Blvd.                                                                                                                                                                                                                                                                                                                                                                                                                       |           | TOTAL ACREAGE: 7.6 acres                                                                                                                                                                                                                                            |                  |       |
| PROPERTY LEGAL DESCRIPTION: (may be submitted on a separate 8 1/2" x 11" sheet)                                                                                                                                                                                                                                                                                                                                                                                |           |                                                                                                                                                                                                                                                                     |                  |       |
| See attached.                                                                                                                                                                                                                                                                                                                                                                                                                                                  |           |                                                                                                                                                                                                                                                                     |                  |       |
| PROPERTY DESCRIPTION: (Check one)<br>Note: Applicants are responsible for accurate land designations. The issuance of a Sewer Capacity Reservation Certificate does not constitute land use or development approval.                                                                                                                                                                                                                                           |           |                                                                                                                                                                                                                                                                     |                  |       |
| <input type="checkbox"/> SHORT PLAT <input checked="" type="checkbox"/> COMM/INDUSTRIAL <input type="checkbox"/> SINGLE FAMILY <input type="checkbox"/> SUB-DIVISION <input type="checkbox"/> MULTI-FAMILY (3+ units)                                                                                                                                                                                                                                          |           |                                                                                                                                                                                                                                                                     |                  |       |
| # OF NEW DWELLING UNITS:                                                                                                                                                                                                                                                                                                                                                                                                                                       |           | COMMERCIAL BUILDING AREA: (square feet) 37,278 sf <u>20,278</u> SF ADL 1/3/19                                                                                                                                                                                       |                  |       |
| PROPOSED SEWER USE (IN ERUs): A sewer hydraulic report must be submitted with this application in accordance with Section 19.10.011 GHMC.                                                                                                                                                                                                                                                                                                                      |           |                                                                                                                                                                                                                                                                     |                  |       |
| SINGLE FAMILY: _____<br>(1 ERU = 150 gpd)                                                                                                                                                                                                                                                                                                                                                                                                                      |           | COMM/INDUSTRIAL/OTHER: <u>17.7</u> <u>17.7</u><br>(See Municipal Code 13.32.060-attached)                                                                                                                                                                           |                  |       |
| If Comm/Industrial, has interceptor checklist been completed: Yes <input type="checkbox"/> No <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                         |           |                                                                                                                                                                                                                                                                     |                  |       |
| EXISTING USE OF PROPERTY: Vacant                                                                                                                                                                                                                                                                                                                                                                                                                               |           |                                                                                                                                                                                                                                                                     |                  |       |
| PROPOSED PROPERTY USE: (if applicable) Office and retail                                                                                                                                                                                                                                                                                                                                                                                                       |           |                                                                                                                                                                                                                                                                     |                  |       |
| <p>The applicant acknowledges that a Sewer Capacity Reservation Certificate (CRC) is not a guarantee that sewer capacity will be available to serve the proposed project at the time of development.</p> <p>Ordinance 1044 establishes that concurrency for sewer shall be valid for the duration of the underlying development permit or as otherwise provided in GHMC 19.10.020, or as set forth in the outside City limits utility extension agreement.</p> |           |                                                                                                                                                                                                                                                                     |                  |       |
| <b>Submit completed application to:</b><br>City of Gig Harbor<br>Public Works - Engineering Department<br>3510 Grandview Street<br>Gig Harbor, WA 98335<br>(253) 851-6170 Fax: (253) 853-7597                                                                                                                                                                                                                                                                  |           | <p>Property Owner Signature <u>Mun</u> Date <u>1-10-18</u></p> <p><input type="checkbox"/> I, the property owner, authorize my agent to receive all original correspondence (initial) _____</p> <p>Authorized Agent Name: Barghausen Consulting Engineers, Inc.</p> |                  |       |
| Please call (253) 851-6170, if you have any questions about the Sewer Concurrency Management Program.                                                                                                                                                                                                                                                                                                                                                          |           |                                                                                                                                                                                                                                                                     |                  |       |

**FOR CITY USE ONLY**

Approval: [Signature]  
Date: 01/09/2019

Approved Reservation Capacity: 17.7 ERUs  
Development Application #: PL-SPR-07-0004

## CANTERWOOD COMMERCIAL PROPERTY

### LEGAL DESCRIPTION

A PARCEL OF LAND LYING WITHIN THE SOUTHEAST QUARTER OF SECTION 25, TOWNSHIP 22 NORTH, RANGE 1 EAST OF THE WILLAMETTE MERIDIAN, CITY OF GIG HARBOR, PIERCE COUNTY, WASHINGTON, AND MORE SPECIFICALLY DESCRIBED AS FOLLOWS:

COMMENCING AT THE NORTHWEST CORNER OF LOT 2 OF PIERCE COUNTY LARGE LOT NO. 2970, ACCORDING TO THE PLAT THEREOF RECORDED IN VOLUME 30 OF LARGE LOT SURVEYS AT PAGE 70, RECORDS OF PIERCE COUNTY, WASHINGTON; THENCE SOUTH 01°56'31" WEST ALONG THE WEST LINE THEREOF 5.10 FEET TO THE INTERSECTION OF THE WESTERLY MARGIN OF CANTERWOOD DRIVE AND THE WEST LINE OF THE AFOREMENTIONED LOT 2; THENCE CONTINUE SOUTH 01°56'31" WEST 205.32 FEET; THENCE NORTH 88°22'23" WEST 382.62 FEET TO THE EASTERLY MARGIN OF STATE ROUTE 16 (SB LINE) AS SHOWN ON THE WSDOT RIGHT-OF-WAY AND LIMITED ACCESS MAP MP 8.34 TO MP 18.87, SHEET 14 OF 52, DATED MARCH 19, 1970; THENCE SOUTH 16°00'56" EAST ALONG SAID RIGHT-OF-WAY LINE 996.41 FEET; THENCE CONTINUE ALONG SAID RIGHT-OF-WAY LINE SOUTH 18°09'47" EAST 374.57 FEET; THENCE SOUTH 86°06'11" EAST 25.68 FEET TO THE WESTERLY MARGIN OF CANTERWOOD DRIVE AND A POINT ON A NON-TANGENT CURVE CONCAVE EASTERLY, HAVING A RADIUS OF 785.00 FEET, AND TO WHICH POINT A RADIAL BEARS SOUTH 79°08'51" WEST; THENCE ALONG SAID WESTERLY MARGIN NORTHERLY AND CLOCKWISE ALONG THE ARC OF SAID CURVE THROUGH A CENTRAL ANGLE OF 12°27'57" A DISTANCE OF 170.79 FEET; THENCE NORTH 71°05'10" WEST ALONG SAID MARGIN 76.79 FEET; THENCE NORTH 16°12'22" WEST ALONG SAID MARGIN 205.18 FEET; THENCE SOUTH 88°13'46" EAST ALONG SAID MARGIN 166.90 FEET TO A POINT ON A NON-TANGENT CURVE CONCAVE SOUTHEASTERLY, HAVING A RADIUS OF 785.00 FEET, AND TO WHICH POINT A RADIAL BEARS NORTH 72°17'07" WEST; THENCE NORTHERLY AND CLOCKWISE ALONG SAID MARGIN AND THE ARC OF SAID CURVE THROUGH A CENTRAL ANGLE OF 01°26'10" A DISTANCE OF 19.68 FEET; THENCE NORTH 19°09'04" EAST ALONG SAID MARGIN 154.51 FEET TO THE BEGINNING OF A CURVE CONCAVE WESTERLY AND HAVING A RADIUS OF 714.92 FEET; THENCE ALONG THE ARC OF SAID CURVE AND SAID MARGIN THROUGH A CENTRAL ANGLE OF 35°10'25" A DISTANCE OF 438.89 FEET; THENCE NORTH 16°01'21" WEST ALONG SAID MARGIN 293.42 FEET TO THE BEGINNING OF A CURVE CONCAVE EASTERLY AND HAVING A RADIUS OF 785.00 FEET; THENCE ALONG THE ARC OF SAID CURVE AND SAID MARGIN THROUGH A CENTRAL ANGLE OF 15°57'10" A DISTANCE OF 218.57 FEET, TO THE POINT OF BEGINNING.



**BARGHAUSEN**

**RECEIVED**

By C. Andrews at 1:52 pm, Oct 23, 2020

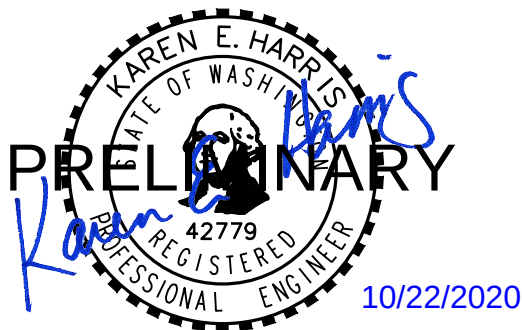
# **SANITARY SEWER HYDRAULIC REPORT**

---

## **Canterwood Commercial Center**

Between SR-16 and Canterwood Boulevard,  
North of Borgen Boulevard  
Gig Harbor, Washington

Prepared for:  
Swede Hill LLC  
John Xitco  
P.O. Box 1397  
Tacoma, WA 98401  
(253) 627-6179



Revised October 22, 2020  
Revised June 24, 2020  
January 13, 2014

Our Job No. 16657

---

**BARGHAUSEN CONSULTING ENGINEERS, INC.**

18215 72ND AVENUE SOUTH KENT, WA 98032 P) 425-251-6222 F) 425-251-8782  
BRANCH OFFICES: TUMWATER, WA KLAMATH FALLS, OR LONG BEACH, CA ROSEVILLE, CA  
[barghausen.com](http://barghausen.com)



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### **1.0 INTRODUCTION AND SUMMARY**

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Figure 2 – Sanitary Sewer Plan

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Figure 3 – Existing Conditions

### **4.0 PROPOSED DESIGN**

## **APPENDICES**

APPENDIX A      HYDRAULIC CALCULATIONS

APPENDIX B      REFERENCES

Tab 1.0



## 1.0 INTRODUCTION AND SUMMARY

This report has been prepared to summarize the existing conditions on the project site and provide preliminary sewer design for the proposed sewer system. This project will have an ejector pump to serve Building A and will include gravity sewers to serve proposed Buildings B through D. The ejector pump will pump sanitary sewer flows up to the existing sanitary sewer manhole located in Canterwood Boulevard at the proposed Building A driveway entrance. Building A needs an ejector pump because the lowest floor elevation is well below the proposed sanitary sewer inverts adjacent to the site. The gravity sewer will flow to the south where it will connect to an existing sanitary sewer main onsite.

The existing sanitary sewer in Canterwood Boulevard and on the south side of the property is 12" reinforced concrete per the design plans for St Anthony's Hospital which is across the street from this site.

For sanitary sewer flow calculations it was assumed that building water and sewer uses would be per City of Gig Harbor code and that each sewer ERU represented 150 gallons. Hours of operation per business was estimated based on similar retail establishments. A peaking factor of 4 was used because of the small population size associated with this site.

| Sewer Flow Summary |                    |                         |
|--------------------|--------------------|-------------------------|
|                    | Building Area (sf) | Anticipated Sewer Flows |
| Building A         | 18,000             | 0.03 cfs                |
| Building B         | 2609               | 0.01 cfs                |
| Building C         | 2609               | 0.01 cfs                |
| Building D         | 5060               | 0.01 cfs                |
|                    | <b>Total</b>       | <b>0.06 cfs</b>         |



Tab 2.0



## **2.0 PROPOSED DEVELOPMENT**

The proposed Canterwood Commercial Center site is approximately 7.6 acres in size and it comprises a portion of Section 25, Township 22 North, Range 1 East, Willamette Meridian, City of Gig Harbor, Pierce County, Washington. The site is parcel number 012225-4-090. The address of the site is XXX Canterwood Boulevard, Gig Harbor, WA. The site is located north of Borgen Boulevard, between SR-16 and Canterwood Boulevard N.W. The site is bound to the south by an existing stormwater pond for Canterwood Boulevard N.W., SR-16 is to the west and Canterwood Boulevard is to the east. An existing undeveloped parcel is to the north. Refer to the attached Vicinity Map for the project location.

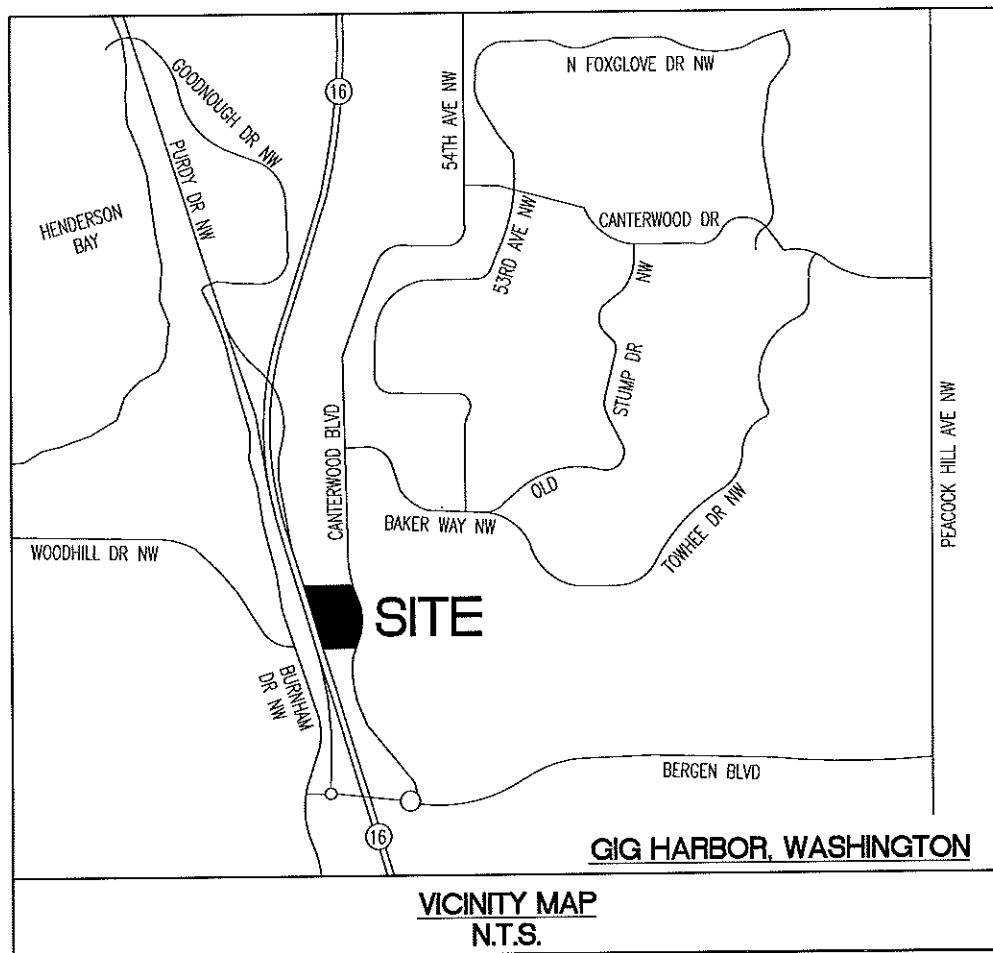
The proposed development includes 4 new buildings for office, retail and fast food uses. The furthest north building (Building A) would be multistoried and have covered parking on the lower level of the building. The three southern buildings would each be one story with a drive thru to accommodate possible fast food or bank tenants. Each building will be served by public sewer.

# Figure 1

## Vicinity Map



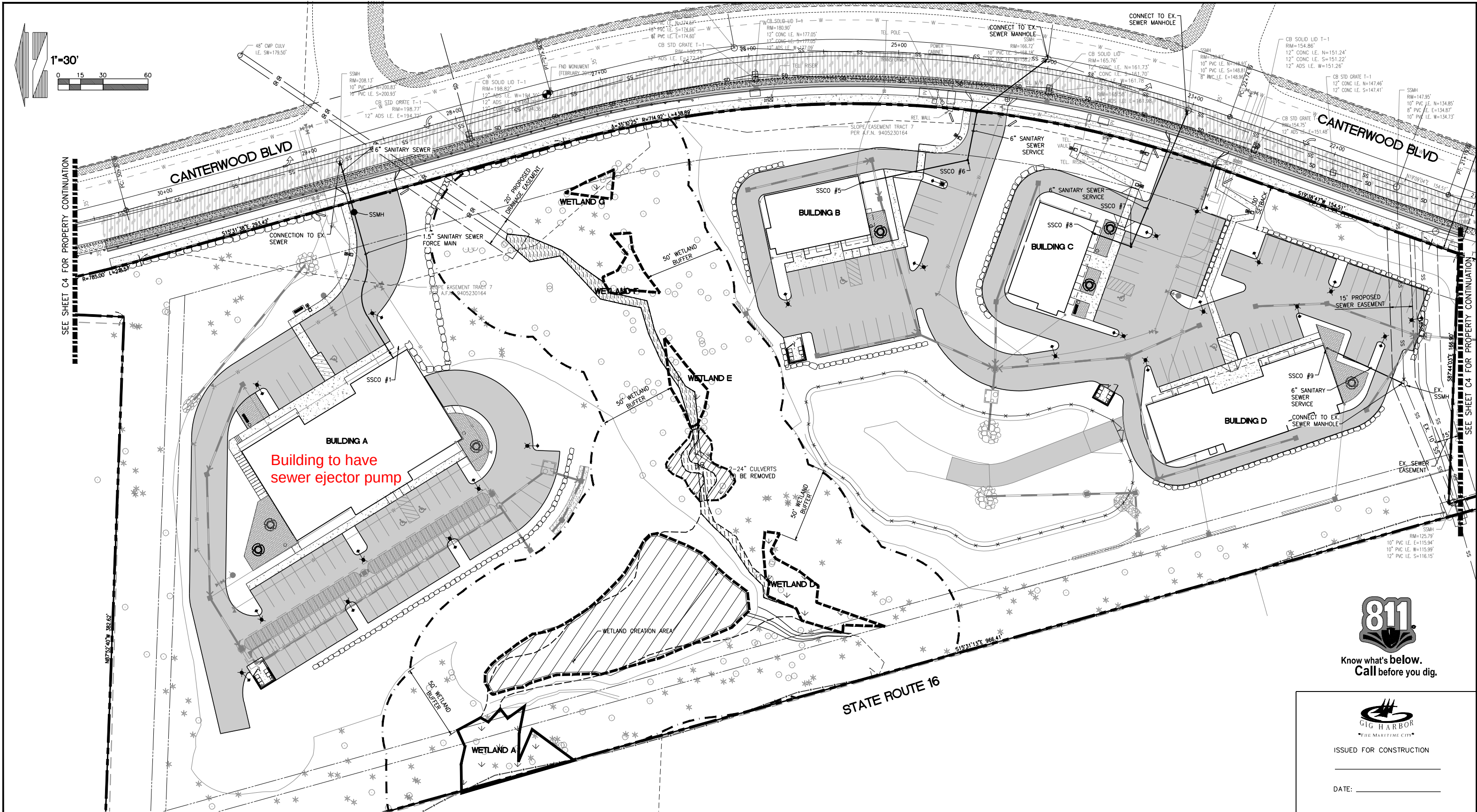




## Figure 2

### Sanitary Sewer Plan





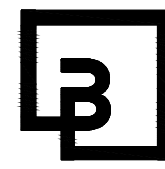
Know what's below.  
Call before you dig.



ISSUED FOR CONSTRUCTION

DATE: \_\_\_\_\_

| REVISIONS |            |                                               |
|-----------|------------|-----------------------------------------------|
| 9         | 09/07/2018 | REVISED SECTIONS                              |
| 10        | 11/01/2018 | REVISED PER CITY DRB COMMENTS 5/25/2018       |
| 11        | 04/02/2019 | REVISED PER CITY COMMENTS 1/25/2019           |
| 12        | 08/20/2019 | REVISED NORTH STORM OUTFALL                   |
| 13        | 09/26/2019 | REVISED WETLAND CREATION AREA                 |
| 14        | 05/13/2020 | REVISED SOUTH LAYOUT                          |
| 15        | 06/24/2020 | REVISED PER CITY REVIEW COMMENTS OCTOBER 2019 |
| 16        | 10/22/2020 | REVISED PER CITY REVIEW COMMENTS AUGUST 2020  |



**Barghausen  
Consulting Engineers, Inc.**  
18215 72nd Avenue South  
Kent, WA 98032  
425.251.6222 [barghausen.com](http://barghausen.com)

|              |        |
|--------------|--------|
| DESIGNED BY: | KEH    |
| DRAWN BY:    | RDC    |
| CHECKED BY:  | KEH    |
| APPROVED BY: | JGH    |
| SCALE:       | 1"=30' |
| OTHER:       |        |

**SWEDE HILL, LLC**  
P.O. BOX 1397  
TACOMA, WA 98401

**SECTION 25, TOWNSHIP 22 N, RANGE 1 E**  
**SANITARY SEWER PLAN**  
**CANTERWOOD COMMERCIAL  
CENTER**

|             |            |
|-------------|------------|
| PERMIT NO.  | 10/22/2020 |
| DRAWING NO. |            |
| SHEET OF    | C20 22     |



Tab 3.0



### **3.0 EXISTING CONDITIONS**

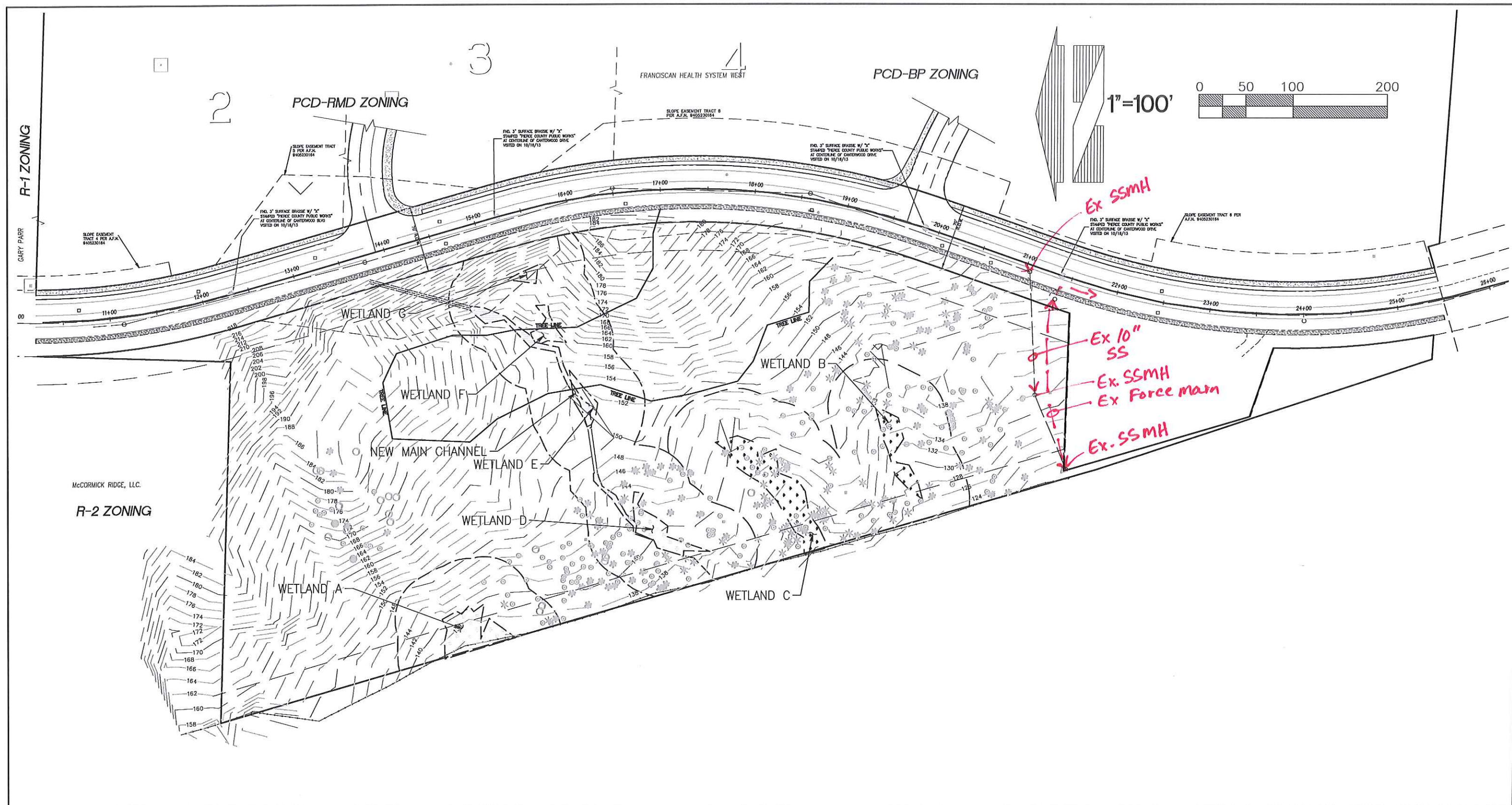
Currently, the site is undeveloped and vegetated with trees and shrubs. The existing trees cover most of the site. This vegetated area also includes the seven existing wetlands and the perennial stream that flows across the property. There is an existing 12" sanitary sewer pipe that is in Canterwood Boulevard N.W. that flows to the south. The pipe turns west at the south end of the property, parallel to the south property line. From the City Sewer Map, flow continues west under SR-16 to Lift Station #12. The force main from Lift Station #12 is to the south of the gravity line, also onsite and then continues south in Canterwood Boulevard N.W.

# Figure 3

## Existing Conditions







|                      |            |                                                                                     |                                                                                                                                                               |      |                                                      |                                 |            |
|----------------------|------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------------------------------------------------------|---------------------------------|------------|
| Designed <u>KEH</u>  | Scale:     |  | 18215 72ND AVENUE SOUTH<br>KENT, WA 98032<br>(425)251-6222<br>(425)251-8782 FAX<br><br>CIVIL ENGINEERING, LAND PLANNING,<br>SURVEYING, ENVIRONMENTAL SERVICES | For: | SWEDE HILL, LLC<br>P.O. BOX 1693<br>TACOMA, WA 98401 | Title: EXISTING CONDITIONS PLAN | Job Number |
| Drawn <u>RDC</u>     | Horizontal |                                                                                     |                                                                                                                                                               |      |                                                      |                                 | 16657      |
| Checked <u>KEH</u>   | 1"=100'    |                                                                                     |                                                                                                                                                               |      |                                                      |                                 | Sheet      |
| Approved <u>JGH</u>  | Vertical   |                                                                                     |                                                                                                                                                               |      |                                                      |                                 | 1 of 1     |
| Date <u>12/15/13</u> | NA         |                                                                                     |                                                                                                                                                               |      |                                                      |                                 |            |

Tab 4.0



#### **4.0 PROPOSED DESIGN**

Development will include the construction of four commercial buildings. The proposal for this project is to construct approximately 28,120 square feet of retail buildings, associated parking, storm drainage, utilities, curb and gutter, sidewalk, landscaping, retaining walls, and access. The total site is comprised of 7.6 acres. A majority of the site that is not encumbered with wetlands or enhanced corridor setbacks will be developed.

The sewer flows for the proposed development were sized using the City of Gig Harbor code requirements for sanitary sewer ERU's. The peak flow rate was determined using the anticipated store hours and a peaking factor of 4, based on the recommendation in the 1998 Washington State Department of Ecology Criteria for Sewage Works Design, Figure C1-1. The attached spreadsheet outlines each proposed building and the anticipated flows. Grease interceptors will be included as necessary during final design.

The flows in the proposed 6" sanitary sewer service pipes were checked using Haestad Methods FlowMaster that calculates flows using Manning's Equation. Refer to the attached spreadsheet and the FlowMaster outputs for the proposed sewer flows in the proposed pipes.

A sewer ejector pump and force main size will be specified by the mechanical engineer when the Building A is designed.



# Appendices

# Appendix A

## Hydraulic Calculations



### SANITARY SEWER ANALYSIS

| Pipe ID             | Pipe Size and Slope | Q (Peak Flow)<br>(cfs) | Design Velocity<br>(ft/s) |
|---------------------|---------------------|------------------------|---------------------------|
| <b>P-Building B</b> | 6-inch SS @ 2.0%    | <b>0.01</b>            | <b>0.95</b>               |
| <b>P-Building C</b> | 6-inch SS @ 2.0%    | <b>0.01</b>            | <b>0.95</b>               |
| <b>P-Building D</b> | 6-inch SS @ 2.0%    | <b>0.01</b>            | <b>0.95</b>               |

- Waste water flow rates obtained from City of Gig Harbor Municipal code.
- Assumed 150 gallons per ERU
- Peaking factor = 4.0 (per attached Figure C1-1 from Washington State Department of Ecology Criteria for Sewage Works Design (Orange Book)).
- Pipe calculations using Haestad Methods, Inc., FlowMaster program are attached.



Estimated Sewer Use - Flows

|                     |                 |                            |                         | City of Gig Harbor Code                   |                |                              |                    |            |                 |
|---------------------|-----------------|----------------------------|-------------------------|-------------------------------------------|----------------|------------------------------|--------------------|------------|-----------------|
| Building Type/Use   | Anticipated Use | Building SF <sup>4,7</sup> | # of seats <sup>1</sup> | ERU Assignment                            | Equivalent ERU | Volume (150 gal per ERU) gpd | Hours of Operation | Flow (cfs) | Peak flow (cfs) |
| Building A          | Office          | 18000                      |                         | 1 ERU per 1600 sf of interior floor space | 11.25          | 1687.50                      | 9.00               | 0.006963   | 0.02785205      |
| Building B          | Fast Food       | 2609                       | 77                      | 1 ERU per 9 seats                         | 8.56           | 1283.33                      | 16.00              | 0.002979   | 0.011914488     |
| Building C          | Fast Food       | 2609                       | 77                      | 1 ERU per 9 seats                         | 8.56           | 1283.33                      | 16.00              | 0.002979   | 0.011914488     |
| Building D - retail | Commercial      | 3660                       |                         | 1 ERU per 1600 sf of interior floor space | 2.29           | 343.13                       | 12.00              | 0.001062   | 0.004247438     |
| Building D - food   | Fast Food       | 1400                       | 42                      | 1 ERU per 9 seats                         | 4.67           | 700.00                       | 16.00              | 0.001625   | 0.006498812     |
|                     | Total           | 28278                      |                         |                                           | 35.32          |                              |                    | Total      | 0.062427275     |

**Assumptions:**  
<sup>1</sup>Seat count for restaurants is estimated based on building footprint size  
Sewer volume is 75% of water volume.

## 6" Sanitary Sewer Pipe

### Project Description

|                 |                 |
|-----------------|-----------------|
| Friction Method | Manning Formula |
| Solve For       | Normal Depth    |

### Input Data

|                       |         |                    |
|-----------------------|---------|--------------------|
| Roughness Coefficient | 0.013   |                    |
| Channel Slope         | 0.02000 | ft/ft              |
| Diameter              | 6.00    | ft                 |
| Discharge             | 0.01    | ft <sup>3</sup> /s |

### Results

|                   |               |                    |
|-------------------|---------------|--------------------|
| Normal Depth      | 0.02          | ft                 |
| Flow Area         | 0.01          | ft <sup>2</sup>    |
| Wetted Perimeter  | 0.72          | ft                 |
| Hydraulic Radius  | 0.01          | ft                 |
| Top Width         | 0.72          | ft                 |
| Critical Depth    | 0.03          | ft                 |
| Percent Full      | 0.4           | %                  |
| Critical Slope    | 0.00962       | ft/ft              |
| Velocity          | 0.95          | ft/s               |
| Velocity Head     | 0.01          | ft                 |
| Specific Energy   | 0.04          | ft                 |
| Froude Number     | 1.39          |                    |
| Maximum Discharge | 644.24        | ft <sup>3</sup> /s |
| Discharge Full    | 598.90        | ft <sup>3</sup> /s |
| Slope Full        | 0.00000       | ft/ft              |
| Flow Type         | SuperCritical |                    |

← Velocity

### GVF Input Data

|                  |      |    |
|------------------|------|----|
| Downstream Depth | 0.00 | ft |
| Length           | 0.00 | ft |
| Number Of Steps  | 0    |    |

### GVF Output Data

|                             |          |      |
|-----------------------------|----------|------|
| Upstream Depth              | 0.00     | ft   |
| Profile Description         |          |      |
| Profile Headloss            | 0.00     | ft   |
| Average End Depth Over Rise | 0.00     | %    |
| Normal Depth Over Rise      | 0.36     | %    |
| Downstream Velocity         | Infinity | ft/s |

---

## 6" Sanitary Sewer Pipe

---

### GVF Output Data

|                   |          |       |
|-------------------|----------|-------|
| Upstream Velocity | Infinity | ft/s  |
| Normal Depth      | 0.02     | ft    |
| Critical Depth    | 0.03     | ft    |
| Channel Slope     | 0.02000  | ft/ft |
| Critical Slope    | 0.00962  | ft/ft |



# Appendix B

## References



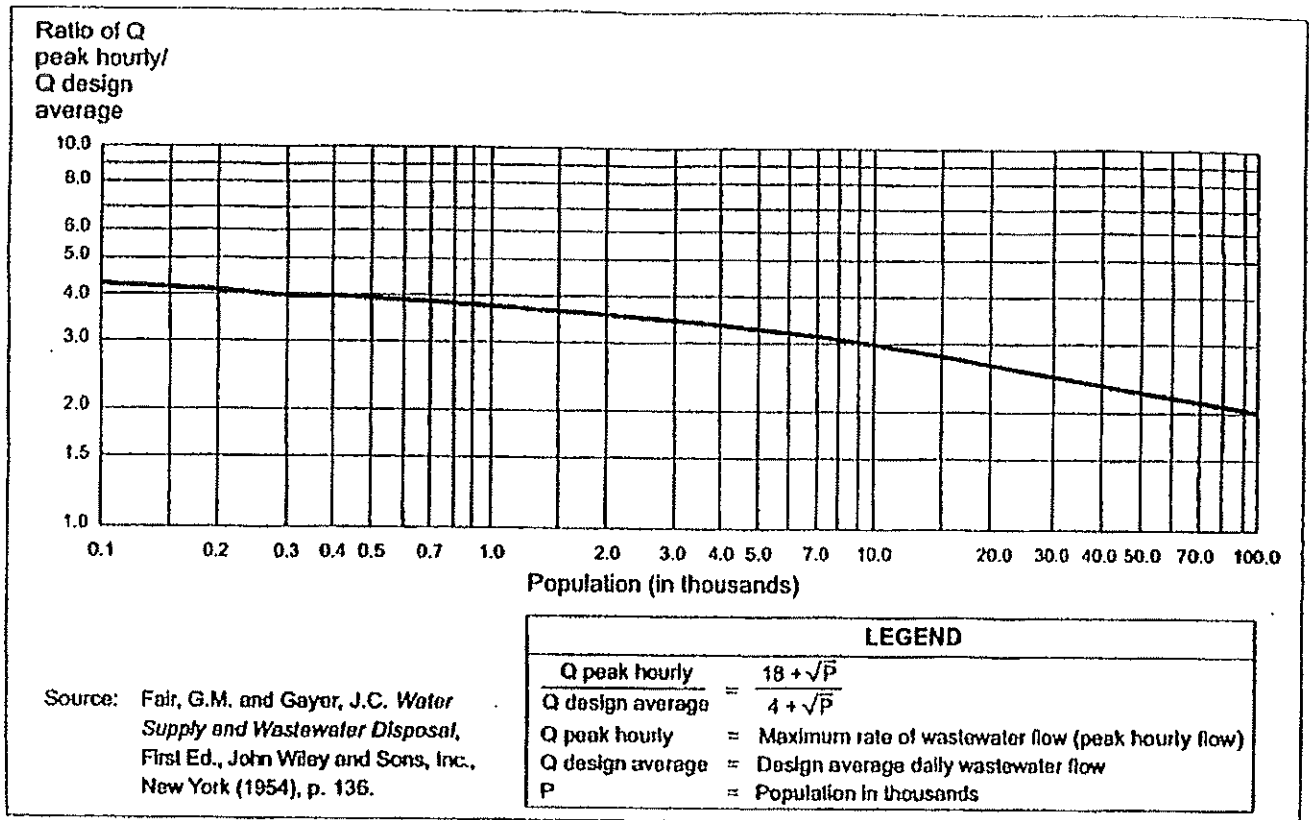


Figure C1-1. Ratio of Peak Hourly Flow to Design Average Flow

#### C1-3.3.3 Infiltration/Inflow

Use of the per capita flows (see Table G2-1) and the peaking factor (see C1-3.3.2) is intended to cover normal I/I for systems built with modern construction techniques. However, an additional allowance should be made for I/I with existing conditions such as high ground water, older systems, or a number of illicit connections. I/I allowances for existing systems should be made from actual flow data to the greatest extent possible.

#### C1-3.4 Design Factors

The design engineer shall utilize current design criteria. At a minimum, the design of gravity sanitary sewers will include the following:

- Peak sewage flows from residential, commercial, institutional, and industrial sources.
- I/I.
- Topography and depth of excavation.
- Treatment plant location.
- Soils conditions.
- Flow impacts from upstream pump stations, if applicable.



**CITY OF GIG HARBOR**  
**WATER CONCURRENCY MANAGEMENT PROGRAM**  
**CAPACITY RESERVATION CERTIFICATE (CRC)**

| <b>APPLICANT INFORMATION</b>                                   |                           | <b>\$90.00 (Non-SFR only)</b>                                  |                           | <b>PAID</b> |
|----------------------------------------------------------------|---------------------------|----------------------------------------------------------------|---------------------------|-------------|
| <b>APPLICANT</b> (Developer or Owner) Please circle one        |                           | <b>PROPERTY OWNER</b> (if different than applicant)            |                           |             |
| John<br><b>FIRST NAME</b>                                      | Xitco<br><b>LAST NAME</b> | John<br><b>FIRST NAME</b>                                      | Xitco<br><b>LAST NAME</b> |             |
| Swede Hill, LLC - Canterwood Commercial<br><b>COMPANY NAME</b> |                           | Swede Hill, LLC - Canterwood Commercial<br><b>COMPANY NAME</b> |                           |             |
| 2320 Milwaukee Way / P.O. Box 1397<br><b>MAILING ADDRESS</b>   |                           | 2320 Milwaukee Way / P.O. Box 1397<br><b>MAILING ADDRESS</b>   |                           |             |
| Tacoma, WA 98401<br><b>CITY</b>                                | <b>STATE</b>              | Tacoma, WA 98401<br><b>CITY</b>                                | <b>STATE</b>              | <b>ZIP</b>  |
| ( 253 ) 627-6179<br><b>PHONE</b>                               | ( )<br><b>FAX</b>         | ( 253 ) 627-6179<br><b>PHONE</b>                               | ( )<br><b>FAX</b>         |             |
| <b>EMAIL ADDRESS:</b> jxitco@gmail.com                         |                           | <b>EMAIL ADDRESS:</b> jxitco@gmail.com                         |                           |             |

| <b>PROJECT INFORMATION</b>                                                                                                                                                                                                  |                                                                                      |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| <b>PROJECT NAME:</b> Canterwood Commercial Center                                                                                                                                                                           | <b>TAX PARCEL #:</b> 0122254090                                                      |
| <b>PROJECT ADDRESS:</b> 10700X Canterwood Blvd.                                                                                                                                                                             | <b>TOTAL ACREAGE:</b> 7.6 acres                                                      |
| <b>PROPERTY LEGAL DESCRIPTION:</b> (may be submitted on a separate 8½" x 11" sheet)<br>A water hydraulic report must be submitted with this application in accordance with Section 19.10.011 GHMC.<br>See attached.         |                                                                                      |
| <b>PROPERTY DESCRIPTION:</b> (Check one)<br>Note: Applicants are responsible for accurate land designations. The issuance of a Water Capacity Reservation Certificate does not constitute land use or development approval. |                                                                                      |
| <input type="checkbox"/> SHORT PLAT <input checked="" type="checkbox"/> COMM/INDUSTRIAL <input type="checkbox"/> SINGLE FAMILY <input type="checkbox"/> SUB-DIVISION <input type="checkbox"/> MULTI-FAMILY (3+ units)       |                                                                                      |
| <b># OF NEW DWELLING UNITS:</b> NA                                                                                                                                                                                          | <b>COMMERCIAL BUILDING AREA:</b> (square feet) 37,278 sf <b>28,278 SF ADL 1/3/19</b> |
| <b>PROPOSED WATER USE (IN ERUs):</b> (Including irrigation)                                                                                                                                                                 |                                                                                      |
| <b>SINGLE FAMILY</b> (1 ERU = 200 gpd):                                                                                                                                                                                     | <b>COMM/INDUSTRIAL/OTHER:</b> <b>17.7 17.7</b>                                       |
| <b># OF METERS REQUESTED:</b> 4                                                                                                                                                                                             | <b>SIZE OF EACH METER:</b>                                                           |
| <b>EXISTING USE OF PROPERTY:</b> Vacant                                                                                                                                                                                     |                                                                                      |
| <b>PROPOSED PROPERTY USE:</b> (if applicable) Office and retail                                                                                                                                                             |                                                                                      |

The applicant acknowledges that a Water Capacity Reservation Certificate (CRC) is not a guarantee that water capacity will be available to serve the proposed project at the time of development.

Ordinance 1044 establishes that concurrency for water shall be valid for the duration of the underlying development permit or as otherwise provided in GHMC 19.10.020, or as set forth in the outside City limits utility extension agreement.

**Submit completed application to:**  
City of Gig Harbor  
Public Works - Engineering Department  
3510 Grandview Street  
Gig Harbor, WA 98335  
(253) 851-6170 Fax: (253) 853-7597

**Property Owner Signature** mn.

**Date** 1-10-18

☐ I, the property owner, authorize my agent to receive all original correspondence (initial) \_\_\_\_\_

**Authorized Agent Name:** Barghausen Consulting Engineers, Inc.

Please call (253) 851-6170, if you have any questions about the Water Concurrency Management Program.

**FOR CITY USE ONLY**

**Approval:** [Signature]

**Date:** 1/3/19

**Approved Reservation Capacity:** 17.7 ERUs

**Attached to Permit #:** PL-SPR-07-0004



## CANTERWOOD COMMERCIAL PROPERTY

### LEGAL DESCRIPTION

A PARCEL OF LAND LYING WITHIN THE SOUTHEAST QUARTER OF SECTION 25, TOWNSHIP 22 NORTH, RANGE 1 EAST OF THE WILLAMETTE MERIDIAN, CITY OF GIG HARBOR, PIERCE COUNTY, WASHINGTON, AND MORE SPECIFICALLY DESCRIBED AS FOLLOWS:

COMMENCING AT THE NORTHWEST CORNER OF LOT 2 OF PIERCE COUNTY LARGE LOT NO. 2970, ACCORDING TO THE PLAT THEREOF RECORDED IN VOLUME 30 OF LARGE LOT SURVEYS AT PAGE 70, RECORDS OF PIERCE COUNTY, WASHINGTON; THENCE SOUTH  $01^{\circ}56'31''$  WEST ALONG THE WEST LINE THEREOF 5.10 FEET TO THE INTERSECTION OF THE WESTERLY MARGIN OF CANTERWOOD DRIVE AND THE WEST LINE OF THE AFOREMENTIONED LOT 2; THENCE CONTINUE SOUTH  $01^{\circ}56'31''$  WEST 205.32 FEET; THENCE NORTH  $88^{\circ}22'23''$  WEST 382.62 FEET TO THE EASTERLY MARGIN OF STATE ROUTE 16 (SB LINE) AS SHOWN ON THE WSDOT RIGHT-OF-WAY AND LIMITED ACCESS MAP MP 8.34 TO MP 18.87, SHEET 14 OF 52, DATED MARCH 19, 1970; THENCE SOUTH  $16^{\circ}00'56''$  EAST ALONG SAID RIGHT-OF-WAY LINE 996.41 FEET; THENCE CONTINUE ALONG SAID RIGHT-OF-WAY LINE SOUTH  $18^{\circ}09'47''$  EAST 374.57 FEET; THENCE SOUTH  $86^{\circ}06'11''$  EAST 25.68 FEET TO THE WESTERLY MARGIN OF CANTERWOOD DRIVE AND A POINT ON A NON-TANGENT CURVE CONCAVE EASTERLY, HAVING A RADIUS OF 785.00 FEET, AND TO WHICH POINT A RADIAL BEARS SOUTH  $79^{\circ}08'51''$  WEST; THENCE ALONG SAID WESTERLY MARGIN NORTHERLY AND CLOCKWISE ALONG THE ARC OF SAID CURVE THROUGH A CENTRAL ANGLE OF  $12^{\circ}27'57''$  A DISTANCE OF 170.79 FEET; THENCE NORTH  $71^{\circ}05'10''$  WEST ALONG SAID MARGIN 76.79 FEET; THENCE NORTH  $16^{\circ}12'22''$  WEST ALONG SAID MARGIN 205.18 FEET; THENCE SOUTH  $88^{\circ}13'46''$  EAST ALONG SAID MARGIN 166.90 FEET TO A POINT ON A NON-TANGENT CURVE CONCAVE SOUTHEASTERLY, HAVING A RADIUS OF 785.00 FEET, AND TO WHICH POINT A RADIAL BEARS NORTH  $72^{\circ}17'07''$  WEST; THENCE NORTHERLY AND CLOCKWISE ALONG SAID MARGIN AND THE ARC OF SAID CURVE THROUGH A CENTRAL ANGLE OF  $01^{\circ}26'10''$  A DISTANCE OF 19.68 FEET; THENCE NORTH  $19^{\circ}09'04''$  EAST ALONG SAID MARGIN 154.51 FEET TO THE BEGINNING OF A CURVE CONCAVE WESTERLY AND HAVING A RADIUS OF 714.92 FEET; THENCE ALONG THE ARC OF SAID CURVE AND SAID MARGIN THROUGH A CENTRAL ANGLE OF  $35^{\circ}10'25''$  A DISTANCE OF 438.89 FEET; THENCE NORTH  $16^{\circ}01'21''$  WEST ALONG SAID MARGIN 293.42 FEET TO THE BEGINNING OF A CURVE CONCAVE EASTERLY AND HAVING A RADIUS OF 785.00 FEET; THENCE ALONG THE ARC OF SAID CURVE AND SAID MARGIN THROUGH A CENTRAL ANGLE OF  $15^{\circ}57'10''$  A DISTANCE OF 218.57 FEET, TO THE POINT OF BEGINNING.



BARGHAUSEN

RECEIVED  
By C. Andrews at 1:55 pm, Oct 23, 2020

# WATER HYDRAULIC REPORT

---

## Canterwood Commercial Center

Between SR-16 and Canterwood Boulevard,  
North of Borgen Boulevard  
Gig Harbor, Washington

Prepared for:  
Swede Hill LLC  
John Xitco  
P.O. Box 1397  
Tacoma, WA 98401  
(253) 627-6179



Revised October 22, 2020  
Revised June 24, 2020  
January 16, 2014

Our Job No. 16657

---

BARGHAUSEN CONSULTING ENGINEERS, INC.

18215 72ND AVENUE SOUTH KENT, WA 98032 P) 425-251-6222 F) 425-251-8782  
BRANCH OFFICES: TUMWATER, WA KLAMATH FALLS, OR LONG BEACH, CA ROSEVILLE, CA  
barghausen.com

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### **2.0 PROPOSED DEVELOPMENT**

Figure 1 – Vicinity Map

Figure 2 – Water Plan

### **3.0 EXISTING CONDITIONS**

Figure 3 – Existing Conditions

### **4.0 PROPOSED DESIGN**

## **APPENDICES**

APPENDIX A      HYDRAULIC CALCULATIONS

APPENDIX B      REFERENCES



Tab 1.0

## 1.0 INTRODUCTION AND SUMMARY

This report has been prepared to summarize the existing conditions on the Canterwood Commercial project site and provide preliminary water design for the proposed water service system. The existing site is bisected by a drainage ditch and wetlands so a two separate water main systems are proposed, one for Building A on the north side of the site and another for the remaining three proposed buildings on the south side of the site. Each system will use 8" ductile iron pipe and will be looped. Two new fire hydrants are proposed for the north portion and two for the south portion of the site.

The existing water main in Canterwood Boulevard is located within the eastern portion of the road and is a 12" ductile iron pipe per the design plans for St Anthony's Hospital which is across the street from this site.

For water flow calculations it was assumed that building water and sewer uses would be per City of Gig Harbor code and each water ERU represented 200 gallons. Hours of operation per business was estimated based on similar retail establishments. A peaking factor of 4 was used because of the small population size associated with this site.

| Sewer Flow Summary |                    |                         |
|--------------------|--------------------|-------------------------|
|                    | Building Area (sf) | Anticipated Water Flows |
| Building A         | 18,000             | 0.037 cfs               |
| Building B         | 2609               | 0.016 cfs               |
| Building C         | 2609               | 0.016 cfs               |
| Building D         | 5060               | 0.014 cfs               |
|                    | <b>Total</b>       | <b>0.083 cfs</b>        |

# Tab 2.0



## **2.0 PROPOSED DEVELOPMENT**

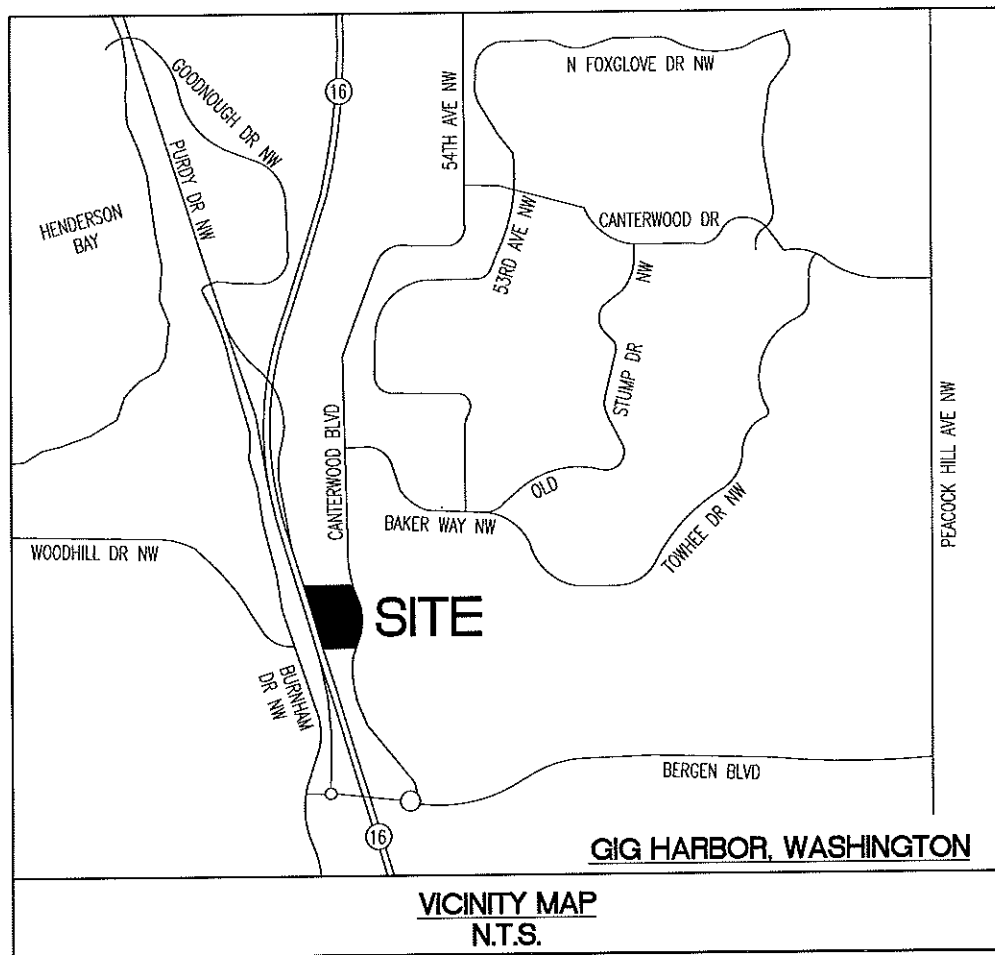
The proposed Canterwood Commercial Center site is approximately 7.6 acres in size and it comprises a portion of Section 25, Township 22 North, Range 1 East, Willamette Meridian, City of Gig Harbor, Pierce County, Washington. The site is parcel number 012225-4-090. The address of the site is XXX Canterwood Boulevard, Gig Harbor, WA. The site is located north of Borgen Boulevard, between SR-16 and Canterwood Boulevard N.W. The site is bound to the south by an existing stormwater pond for Canterwood Boulevard N.W., SR-16 is to the west and Canterwood Boulevard is to the east. An existing undeveloped parcel is to the north. Refer to the attached Vicinity Map for the project location.

The proposed development includes 4 new buildings for office, retail and fast food uses. The furthest north building (Building A) would be multistoried and have covered parking on the lower level of the building. The three southern buildings would each be one story with a drive thru to accommodate possible fast food or bank tenants. Each building will be served by City of Gig Harbor water.

# Figure 1

## Vicinity Map



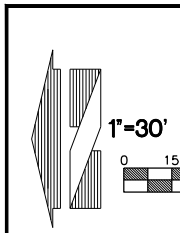
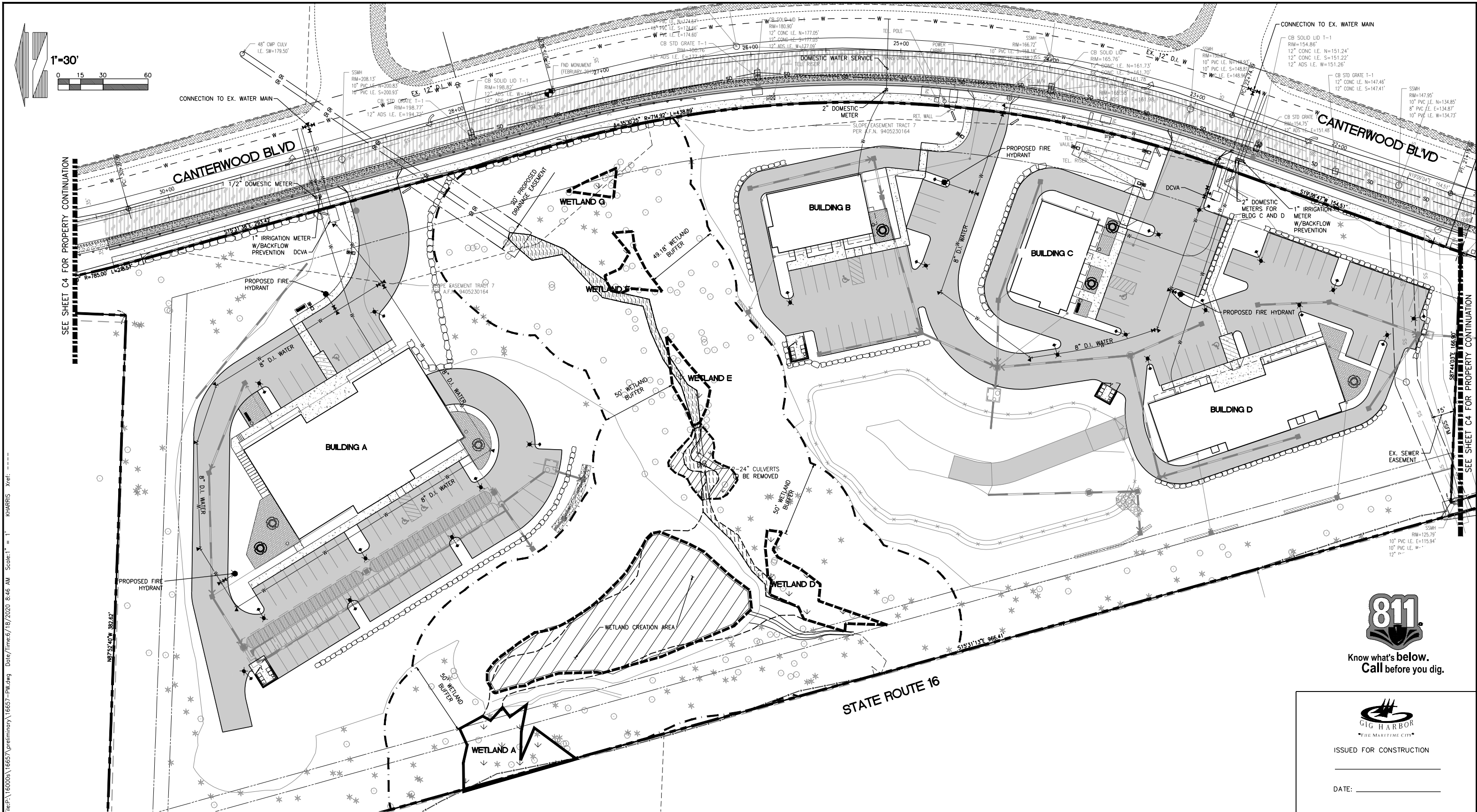




## Figure 2

### Water Plan





SEE SHEET C4 FOR PROPERTY CONTINUATION

SEE SHEET C4 FOR PROPERTY CONTINUATION



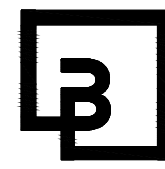
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DATE: \_\_\_\_\_

| REVISIONS |            |                                               |
|-----------|------------|-----------------------------------------------|
| 9         | 9/07/2018  | REVISED SECTIONS                              |
| 10        | 11/01/2018 | REVISED PER CITY DRB COMMENTS 5/25/2018       |
| 11        | 04/02/2019 | REVISED PER CITY COMMENTS 1/25/2019           |
| 12        | 08/20/2019 | REVISED NORTH STORM OUTFALL                   |
| 13        | 09/26/2019 | REVISED WETLAND CREATION AREA                 |
| 14        | 05/13/2020 | REVISED SOUTH LAYOUT                          |
| 15        | 06/24/2020 | REVISED PER CITY REVIEW COMMENTS OCTOBER 2019 |
| 16        | 10/22/2020 | REVISED PER CITY REVIEW COMMENTS AUGUST 2020  |



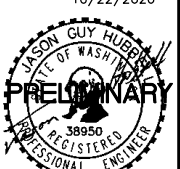
**Barghausen  
Consulting Engineers, Inc.**  
18215 72nd Avenue South  
Kent, WA 98032  
425.251.6222 [barghausen.com](http://barghausen.com)

|              |        |
|--------------|--------|
| DESIGNED BY: | KEH    |
| DRAWN BY:    | RDC    |
| CHECKED BY:  | KEH    |
| APPROVED BY: | JGH    |
| SCALE:       | 1"=30' |
| OTHER:       |        |

**SWEDE HILL, LLC**  
P.O. BOX 1397  
TACOMA, WA 98401

**SECTION 25, TOWNSHIP 22 N, RANGE 1 E**  
**WATER MAIN PLAN**  
**CANTERWOOD COMMERCIAL  
CENTER**

|             |            |
|-------------|------------|
| PERMIT NO.  | 10/22/2020 |
| DRAWING NO. |            |
| SHEET       | OF         |
| C19         | 22         |



Tab 3.0





### **3.0 EXISTING CONDITIONS**

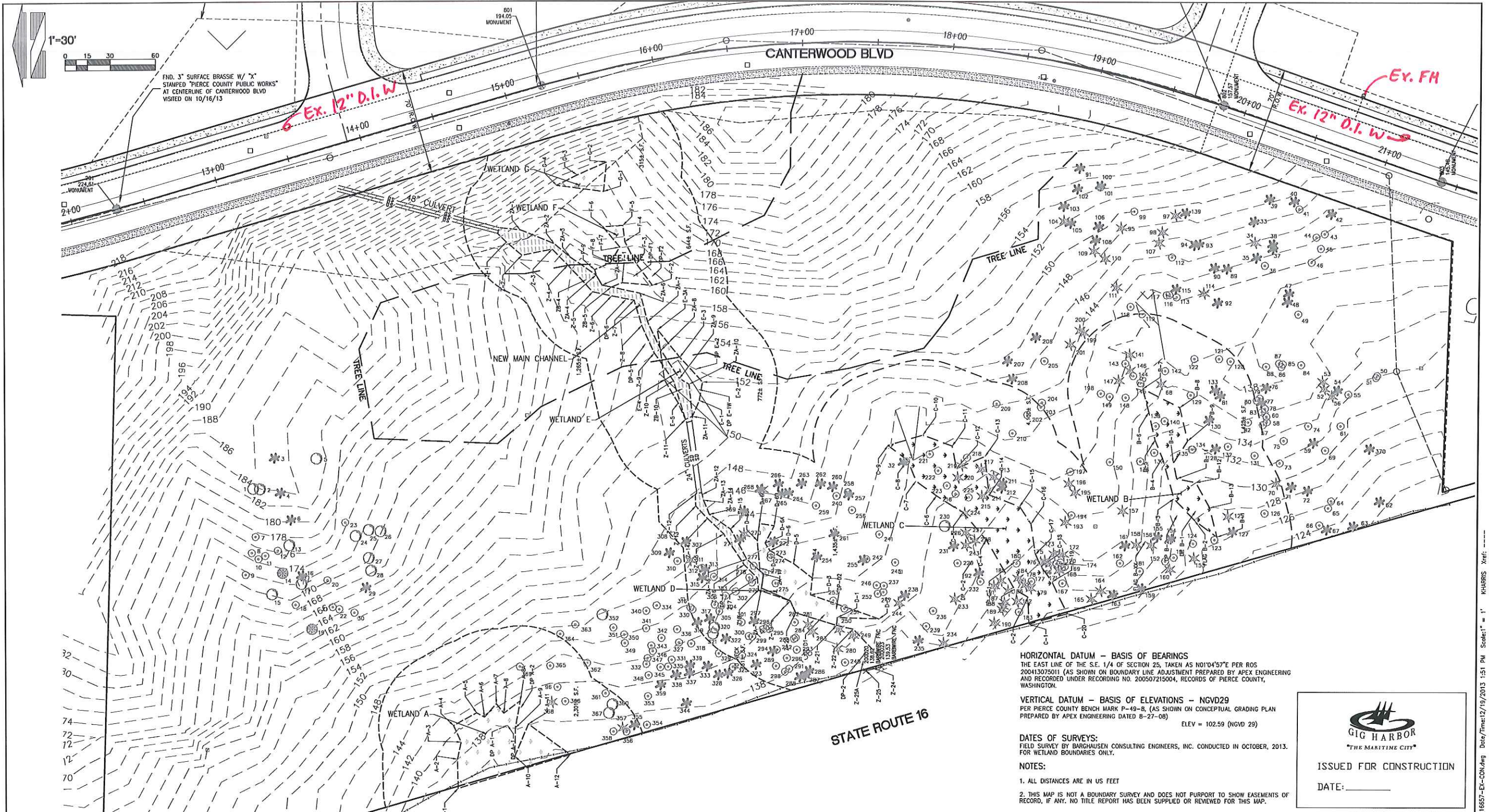
Currently, the site is undeveloped and vegetated with trees and shrubs. The existing trees cover most of the site. This vegetated area also includes the seven existing wetlands and the perennial stream that flows across the property. There is an existing 12" water pipe that is in Canterwood Boulevard N.W., located within the east side of the street along the entire frontage of this property. There is an existing pipe stub that crosses to this project near the southern entrance to the hospital across the street. There is also an existing fire hydrant on the east side of Canterwood Boulevard at the south end of this project.

# Figure 3

## Existing Conditions







|                                  |                                                                                                                                                                                                                          |                  |                                                             |                                                                                                                                                         |             |                                                                                       |
|----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|-------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|---------------------------------------------------------------------------------------|
| <b>REVISIONS</b><br><br><br><br> |  <b>BARGHAUSEN CONSULTING ENGINEERS, INC.</b><br><br>18215 72ND AVENUE SOUTH<br>KENT, WA 98032<br>(425)251-6222<br>(425)251-8782 FAX | DESIGNED BY: KEH | <b>SWEDE HILL, LLC</b><br>P.O. BOX 1397<br>TACOMA, WA 98401 | <b>SECTION 25, TOWNSHIP 22 N, RANGE 1 E</b><br><br><b>EXISTING CONDITIONS MAP</b><br><b>CANTERWOOD COMMERCIAL</b><br><b>CENTER</b><br><b>GIG HARBOR</b> | PERMIT NO.  |  |
|                                  |                                                                                                                                                                                                                          | DRAWN BY: RDC    |                                                             |                                                                                                                                                         | DRAWING NO. |                                                                                       |
|                                  |                                                                                                                                                                                                                          | CHECKED BY: KEH  |                                                             |                                                                                                                                                         | SHEET OF    |                                                                                       |
|                                  |                                                                                                                                                                                                                          | APPROVED BY: JGH |                                                             |                                                                                                                                                         | C3 13       |                                                                                       |
|                                  |                                                                                                                                                                                                                          | SCALE: 1"=30'    |                                                             |                                                                                                                                                         |             |                                                                                       |
| OTHER:                           |                                                                                                                                                                                                                          |                  |                                                             |                                                                                                                                                         |             |                                                                                       |

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Tab 4.0



#### **4.0 PROPOSED DESIGN**

Development will include the construction of four commercial buildings. The proposal for this project is to construct approximately 28,278 square feet of retail buildings, associated parking, storm drainage, utilities, curb and gutter, sidewalk, landscaping, retaining walls, and access. The total site is comprised of 7.6 acres. A majority of the site that is not encumbered with wetlands or enhanced corridor setbacks will be developed.

The water flows for the proposed development were sized using the City of Gig Harbor code requirements for sanitary sewer ERU's and then each ERU had a 200 gallon equivalent. The peak flow rate was determined using the anticipated store hours and a peaking factor of 4, based on the recommendation in the 1998 Washington State Department of Ecology Criteria for Sewage Works Design, Figure C1-1. The attached spreadsheet outlines each proposed building and the anticipated flows. Backflow preventers will be included as necessary during final design.

A looped water main around Building A in the north end of the site is proposed. This will be an 8" water main with two fire hydrants and will connect to the existing 12" main within Canterwood Boulevard to the east. The building will be served by a domestic and irrigation meter and a fire service line as required by the City of Gig Harbor. The fire service line will be located and designed during final civil design.

A looped water system around the three southern buildings is also proposed. The southern system will include two proposed fire hydrants. Each building will be served by a domestic meter and then there will be one irrigation meter for the southern site landscaping.

# Appendices



# Appendix A

## Hydraulic Calculations



Estimated Water Use - Flows

|                     |                 |                            |                         | City of Gig Harbor Code                   |                |                              |                    |            |                 |
|---------------------|-----------------|----------------------------|-------------------------|-------------------------------------------|----------------|------------------------------|--------------------|------------|-----------------|
| Building Type/Use   | Anticipated Use | Building SF <sup>4,7</sup> | # of seats <sup>1</sup> | ERU Assignment                            | Equivalent ERU | Volume (200 gal per ERU) gpd | Hours of Operation | Flow (cfs) | Peak flow (cfs) |
| Building A          | Office          | 18000                      |                         | 1 ERU per 1600 sf of interior floor space | 11.25          | 2250.00                      | 9.00               | 0.009284   | 0.037136067     |
| Building B          | Fast Food       | 2609                       | 77                      | 1 ERU per 9 seats                         | 8.56           | 1711.11                      | 16.00              | 0.003971   | 0.015885984     |
| Building C          | Fast Food       | 2609                       | 77                      | 1 ERU per 9 seats                         | 8.56           | 1711.11                      | 16.00              | 0.003971   | 0.015885984     |
| Building D - retail | Commercial      | 3660                       |                         | 1 ERU per 1600 sf of interior floor space | 2.29           | 457.50                       | 12.00              | 0.001416   | 0.00566325      |
| Building D - food   | Fast Food       | 1400                       | 42                      | 1 ERU per 9 seats                         | 4.67           | 933.33                       | 16.00              | 0.002166   | 0.008665082     |
|                     | Total           | 28278                      |                         |                                           | 35.32          |                              |                    | Total      | 0.083236367     |

Assumptions:

<sup>1</sup>Seat count for restaurants is estimated based on building footprint size

# Appendix B

## References





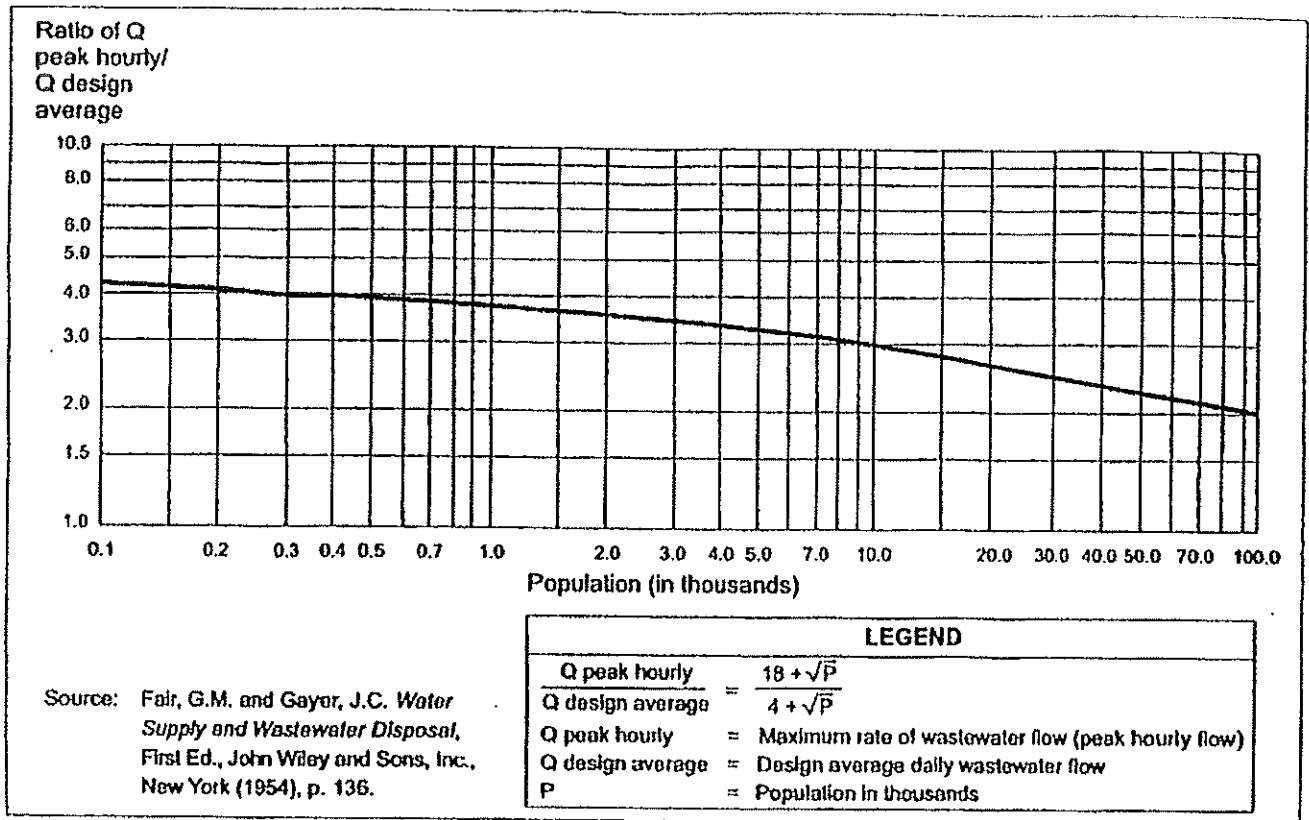


Figure C1-1. Ratio of Peak Hourly Flow to Design Average Flow

#### C1-3.3.3 Infiltration/Inflow

Use of the per capita flows (see Table G2-1) and the peaking factor (see C1-3.3.2) is intended to cover normal I/I for systems built with modern construction techniques. However, an additional allowance should be made for I/I with existing conditions such as high ground water, older systems, or a number of illicit connections. I/I allowances for existing systems should be made from actual flow data to the greatest extent possible.

#### C1-3.4 Design Factors

The design engineer shall utilize current design criteria. At a minimum, the design of gravity sanitary sewers will include the following:

- Peak sewage flows from residential, commercial, institutional, and industrial sources.
- I/I.
- Topography and depth of excavation.
- Treatment plant location.
- Soils conditions.
- Flow impacts from upstream pump stations, if applicable.



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By C. Andrews at 1:54 pm, Oct 23, 2020

# PRELIMINARY STORM DRAINAGE REPORT

---

## Canterwood Commercial Center

10700 Canterwood Boulevard NW  
Gig Harbor, Washington

### Applicant:

Swede Hill LLC  
John Xitco  
P.O. BOX 1397  
Tacoma, WA 98401  
(253) 627-6179  
[xitco@me.com](mailto:xitco@me.com)

### Prepared by:

Barghausen Consulting Engineers, Inc.  
Karen Harris, P.E.  
18215 72nd Avenue South  
Kent, WA 98032  
(425) 251-6222  
[kharris@barghausen.com](mailto:kharris@barghausen.com)

### Contractor:

TBD



Revised October 22, 2020

Revised June 24, 2020  
Revised March 28, 2019  
Revised January 10, 2018  
Revised June 30, 2017  
Revised April 26, 2016  
Revised April 24, 2015  
December 19, 2013

Our Job No. 16657

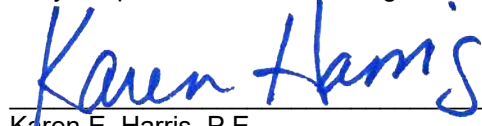
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BARGHAUSEN CONSULTING ENGINEERS, INC.

18215 72ND AVENUE SOUTH KENT, WA 98032 P) 425-251-6222 F) 425-251-8782  
BRANCH OFFICES: TUMWATER, WA KLAMATH FALLS, OR LONG BEACH, CA ROSEVILLE, CA  
[barghausen.com](http://barghausen.com)

### PROJECT ENGINEER'S CERTIFICATION

I hereby state that this Preliminary Storm Drainage Report for **Canterwood Commercial Center** has been prepared by me or under my supervision and meets the standard of care and expertise which is usual and customary in this community for professional engineers. I understand that Gig Harbor does not and will not assume liability for the sufficiency, suitability, or performance of drainage facilities prepared by me.



---

Karen E. Harris, P.E.  
Project Engineer



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Tab 1.0





## **1.0 PROPOSED PROJECT DESCRIPTION**

This drainage report is being prepared in conjunction with revised applications for Site Plan Review (PL-SPR-07-004), Design Review Board (PL-DRB-07-0013), SEPA (PL-SEPA-07-0008 and PL-SEPA-07-0060) for a future commercial development.

The proposed Canterwood Commercial Center site is approximately 7.6 acres in size and it comprises a portion of Section 25, Township 22 North, Range 1 East, Willamette Meridian, City of Gig Harbor, Pierce County, Washington. The project is located in Zone B-2 of the City of Gig Harbor Zoning Map. The site is parcel number 012225-4-090. The address of the site is 10700 Canterwood Boulevard Northwest, Gig Harbor, WA. The site is located north of Borgen Boulevard, between SR-16 and Canterwood Boulevard N.W. The site is bound to the south by an existing stormwater pond for Canterwood Boulevard N.W., SR16 is to the west and Canterwood Boulevard is to the east. An existing undeveloped parcel is to the north. Refer to the attached Figure 1 - Vicinity Map for the project location.

The site is currently undeveloped and forested and has seven existing wetlands and a perennial stream bisecting the property.

The proposed development includes 4 new buildings for office, restaurant and retail uses. The project also includes pedestrian amenities, maintaining some existing forested areas, utilities, parking and landscaping. Part of this development would include filling the two southern wetlands in order to fill the site for development and provide a storm water pond. Wetland mitigation would be included to offset the impacts of filling the existing wetlands.

Development will include the construction of four commercial buildings. The furthest north building would be multistoried and have covered parking on the lower level of the building. The three southern buildings would each be one story with a drive thru to accommodate possible fast food or bank tenants. There would be associated parking, storm drainage, utilities, curb and gutter, sidewalk, landscaping, retaining walls, and access. The developed basin map (Figure 8) shows the extent of the planned improvements.

Storm drainage for the north portion of the project will include an underground chamber detention system and a modular wetland unit for water quality treatment. The north system will discharge south into the stream buffer with a gravel dispersal trench. A pond will be constructed on the south portion of the project to handle the runoff from the southern portion of the project site. The pond will discharge west into the setback along SR-16 and then into the existing swale/stream adjacent to the highway. Approximately 0.65 acres, including the road improvements and the southern portion of the development will be sent to an existing offsite pond that was designed to accept drainage from this site (Refer to Appendix D). The development has been designed to meet the 2016 City of Gig Harbor storm standards.

This project will require City of Gig Harbor site plan review approval, design review board approval, conditional use approval, construction plan approval, clearing and grading permit, NPDES (Construction Stormwater General Permit from the State of Washington Department of Ecology), and a right-of-way use permit. Additionally a wetland permit will be required as well as a possible Hydraulic Project Approval for work within the perennial stream and wetlands.

### **1.1 DISCUSSION OF MINIMUM REQUIREMENTS**

This project proposes to add more than 5000 square feet of new impervious area, which requires that all Minimum Requirements be applied to the new and replaced hard surfaces and the converted vegetation areas.

### **Minimum Requirement #1: Preparation of a Stormwater Site Plan**

A Stormwater Site Plan has been prepared in accordance with the 2016 City of Gig Harbor Stormwater Management and Site Development Manual.

### **Minimum Requirement #2: Construction Stormwater Pollution Prevention (SWPPP)**

A SWPPP will be prepared for this project in accordance with the 2016 City of Gig Harbor Stormwater Management and Site Development Manual. This will be prepared as part of the construction documents.

The SWPPP will be submitted as a separate document.

### **Minimum Requirement #3: Source Control of Pollution**

Source Control of Pollution during the clearing and grading portion of this project will be included in the SWPPP for the site. Additional source control for the site will be storage of materials under cover, regular maintenance of the site including trash clean up and parking lot sweeping. Trash enclosures will be designed to current City of Gig Harbor standards.

### **Minimum Requirement #4: Preservation of Natural Drainage Systems**

The existing site sheet drains to the west and south. There is an existing swale/stream that bisects the property, flowing west. The northern basin will discharge into this swale/stream. The southern basin will discharge west into the 30' setback from SR-16, using gravel dispersal trenches. Buildings B and D will use dispersal trenches to discharge runoff into the wetland buffer or road setback area. A portion of the project will be directed to the existing pond to the south which was designed to accept drainage from this site. The existing pond discharge is also to the west to SR-16. These discharge points have been located and designed to preserve the natural drainage systems onsite and to mimic existing conditions to the extent practical.

### **Minimum Requirement #5: On-Site Stormwater Management**

To meet the requirements of Onsite Stormwater Management requirements, this project will consider each BMP from List #2 to determine if it is feasible for this site.

#### **Lawn and Landscaped Areas:**

1. Soil preservation and amendment BMP in Volume III, Section 3.1.

**Response:** This BMP will be used onsite. See Figure 6.

#### **Roofs:**

1. 65/10 dispersion BMP in Volume III, Section 3.2.2 or downspout infiltration BMP in Volume III, Section 3.8.3.

**Response:** The site will not retain 65% of the existing site in a forested condition. Site soils are such that infiltration is not possible. This BMP is infeasible for this project.

2. Bioretention BMP in Volume III, Section 3.3 that have a minimum horizontally projected surface area below the overflow which is at least 5 percent of the total surface area draining to it; or ONLY for sites that are underlain by Spanaway soils<sup>3</sup>, downspout dispersion BMP in Volume III, Section 3.8.4. The downspout dispersion BMP must have a slope of 10 percent or less.

**Response:** The site is located in a very steep area. Bioretention cannot be sited in areas that have slopes of 8% or less and site is not underlain by Spanaway soils.

3. Downspout dispersion systems in Volume III, Section 3.8.4.

**Response:** Downspout dispersion will be used for building B. The existing soil in the stream/wetland buffer will remain undisturbed and protected with high visibility fencing during construction. A gravel trench will be used to spread the runoff from the roof area. The roof area will be considered bypass as it will not enter the detention system. Because the flow path will be greater than 50 feet, the roof will be modeled as lawn.

Downspout dispersion will also be used for Building D. This will require two gravel trenches to disperse the entire roof area. The roof area will be considered bypass as it will not enter the detention system. Because the flow path is approximately 30 feet, the roof will be modeled as 50% lawn and 50% impervious.

4. Perforated Stub-out Connections in Volume III, Section 3.8.5

**Response:** Infiltration is not feasible for this site and the roof areas not being dispersed will be sent to a detention pond which makes this BMP infeasible.

#### **Other Hard Surfaces:**

1. 65/10 dispersion BMP in Volume III, Section 3.2.2.

**Response:** The site will not retain 65% of the existing site in a forested condition. Site soils are such that infiltration is not possible. This BMP is infeasible for this project.

2. Permeable pavement BMP in Volume III, Section 3.4.

**Response:** Site soils are such that infiltration is not possible. This BMP is infeasible for this project.

3. Bioretention BMP in Volume III, Section 3.3 that have a minimum horizontally projected surface area below the overflow which is at least 5 percent of the total surface area draining to it.

**Response:** The site is located in a very steep area. Bioretention cannot be sited in areas that have slopes of 8% or less and site is not underlain by Spanaway soils.

4. Sheet flow dispersion BMP in Volume III, Section 3.2.3, or concentrated flow dispersion BMP in Volume III, Section 3.2.4.



**Response:** The site is located in a very steep area. Dispersion cannot be sited 50 feet or more from a steep slope, therefore this BMP is infeasible.

**Minimum Requirement #6: Runoff Treatment**

Enhanced treatment will be provided for the onsite commercial areas. All three onsite basins will utilize modular wetland units which has GULD DOE status for enhanced treatment.

Contech Stormfilter units will provide basic treatment of right of way runoff.

**Minimum Requirement #7: Flow Control**

Flow control meeting the 2016 City of Gig Harbor Stormwater Management and Site Development Manual is proposed for all basins.

**Minimum Requirement #8: Wetland Protection**

The north basin mainly drains to Wetlands A, D and E. This flow path will be retained in the developed condition by including multiple points of discharge. Flow dispersion from landscaped areas and some building roof areas will provide sheet flow to wetlands A and E. The discharge from the detention systems will direct runoff to wetland D and the stream. Additionally a mitigation plan is being prepared by the wetland consultant to protect and enhance the onsite wetlands that will remain as part of the development.

**Minimum Requirement #9: Operation and Maintenance**

Operation and maintenance of the proposed facilities will be identified within the Operations and Maintenance Manual included in Appendix C. This document will be prepared with the final construction plans.

**Minimum Requirement #10: Financial Liability**

The appropriate performance bonding will be done for this project.

## 1.2 Site Summary

### Current and Proposed Hard Surfaces

|                                          | Existing (SF) | Proposed (SF) |
|------------------------------------------|---------------|---------------|
| Pollution Generating Impervious Surfaces | 0             | 64,601        |
| Roof                                     | 0             | 19,561        |
| Non-pollution generating impervious      | 0             | 9,601         |
| Total                                    | 0             | 93,546        |

### Current and Proposed Pervious Surfaces

|                                        | Existing (SF) | Proposed (SF) |
|----------------------------------------|---------------|---------------|
| Pollution Generating Pervious Surfaces | 0             | 116,446       |
| Converted vegetation area              | 0             | 209,992       |
| Undisturbed areas                      | 330,839       | 120,847       |

## 1.3 Detention System Summary

The onsite area is divided into three basins. Runoff from the site will be collected in catch basins and underground pipes and routed to a detention facility. All basins will utilize detention for flow control and each will provide water quality treatment.

The north basin (north of the stream/swale that bisects the site) will be detained onsite in an underground chamber detention system. After detention, runoff will be treated with a modular wetland unit, capable of enhanced water quality treatment. Discharge will be to the adjacent wetland buffer.

The south basin (most of the site south of the stream/swale) will be treated with a modular wetland unit, capable of enhanced water quality treatment and then sent to the pond. The proposed open detention pond will provide flow control and discharge will be to the west using a gravel dispersal trench to mimic sheet flow. The runoff will flow west into the SR-16 right-of-way and to the south. Building B roof drainage will utilize roof dispersion and will discharge to the north. This runoff is considered bypass and is modeled as lawn since the flow path is greater than 50 feet. Building D roof drainage will

also use dispersion to the west. The flow path is shorter so the building is modeled as 50% impervious and 50% lawn and bypasses the pond.

The remainder of the site and the equivalent road improvement basin drain to the existing offsite pond. Treatment for the equivalent road area basins will be done using stormfilter catch basins and a modular wetland unit will be used for the onsite drainage that will be directed to the offsite pond. Runoff directed to the offsite pond will be detained in the offsite pond and released through the existing control structure to the SR-16 right-of-way as well.

The detained release from the detention pond and underground chamber system will match pre-developed durations from 50 percent of the 2-year peak flow up to the full 50-year peak flow as required in the 2016 storm standards.

The control structure in the offsite pond will be modified to utilize the additional storage volume available.

#### North Basin

|            | Pre-Developed | Developed  | After Detention |
|------------|---------------|------------|-----------------|
| Basin Area | 1.02 acres    | 1.02 acres |                 |
| Forested   | 1.02 acres    | 0          |                 |
| Impervious | 0             | 0.91 acres |                 |
| Landscape  | 0             | 0.11 acres |                 |
| Q2         | 0.0323 cfs    | 0.3237 cfs | 0.0187 cfs      |
| Q10        | 0.0615 cfs    | 0.5183 cfs | 0.0424 cfs      |
| Q25        | 0.0751 cfs    | 0.6309 cfs | 0.0616 cfs      |
| Q50        | 0.0846 cfs    | 0.7214 cfs | 0.0802 cfs      |
| Q100       | 0.0936 cfs    | 0.8179 cfs | 0.1032 cfs      |

#### South Basin

|            | Pre-Developed | Developed  | After Detention |
|------------|---------------|------------|-----------------|
| Basin Area | 1.93 acres    | 1.93 acres |                 |
| Forested   | 1.93 acres    | 0          |                 |
| Impervious | 0             | 1.40 acres |                 |
| Landscape  | 0             | 0.53 acres |                 |
| Q2         | 0.0611 cfs    | 0.4573 cfs | 0.0425 cfs      |
| Q10        | 0.1164 cfs    | 0.7520 cfs | 0.0784 cfs      |
| Q25        | 0.1422 cfs    | 0.9256 cfs | 0.1003 cfs      |
| Q50        | 0.1602 cfs    | 1.0665 cfs | 0.1187 cfs      |
| Q100       | 0.1772 cfs    | 1.2178 cfs | 0.1388 cfs      |

#### Offsite Basin

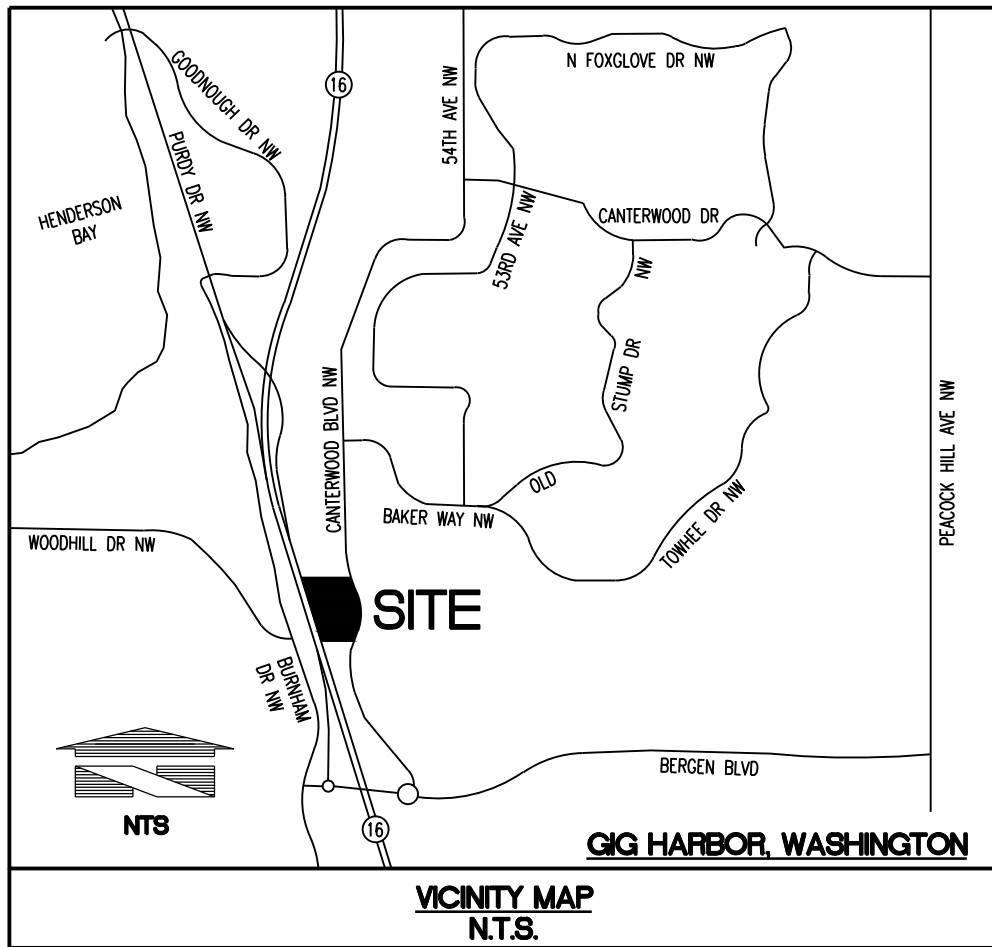
|            | Pre-Developed | Developed  | After Detention |
|------------|---------------|------------|-----------------|
| Basin Area | 0.65 acres    | 0.65 acres |                 |
| Forested   | 0.65 acres    | 0          |                 |
| Impervious | 0             | 0.53 acres |                 |
| Landscape  | 0             | 0.12 acres |                 |
| Q2         | 0.0206 cfs    | 0.2012 cfs | 0.0133 cfs      |
| Q10        | 0.0392 cfs    | 0.3272 cfs | 0.0305 cfs      |
| Q25        | 0.0479 cfs    | 0.4009 cfs | 0.0445 cfs      |
| Q50        | 0.0539 cfs    | 0.4605 cfs | 0.0582 cfs      |
| Q100       | 0.0597 cfs    | 0.5243 cfs | 0.0751 cfs      |

This runoff will be routed to the offsite pond and will utilize the existing 8,190 CF in the pond available for this site based on as-built pond conditions. Please refer to Appendix A for the hydrology calculations.



# Figure 1

## Vicinity Map



# Tab 2.0

## **2.0 EXISTING CONDITIONS**

Currently, the site is undeveloped and heavily vegetated with trees and shrubs. The existing trees cover most of the site. This vegetated area also includes the seven existing wetlands and the perennial stream that flows across the property. There appears to be a sanitary sewer pipe that is on the property, parallel to the south property line, and then some existing utilities adjacent to Canterwood Boulevard N.W. The site slopes steeply to the west to the SR-16 right-of-way. There is an existing perennial stream that bisects the site, flowing west from a 48" culvert under Canterwood Boulevard N.W. to the SR-16 right-of-way. The soils on site consist of Hartsine gravelly sandy loam, which is defined by the SCS Soils Guide as Type "C" soil.

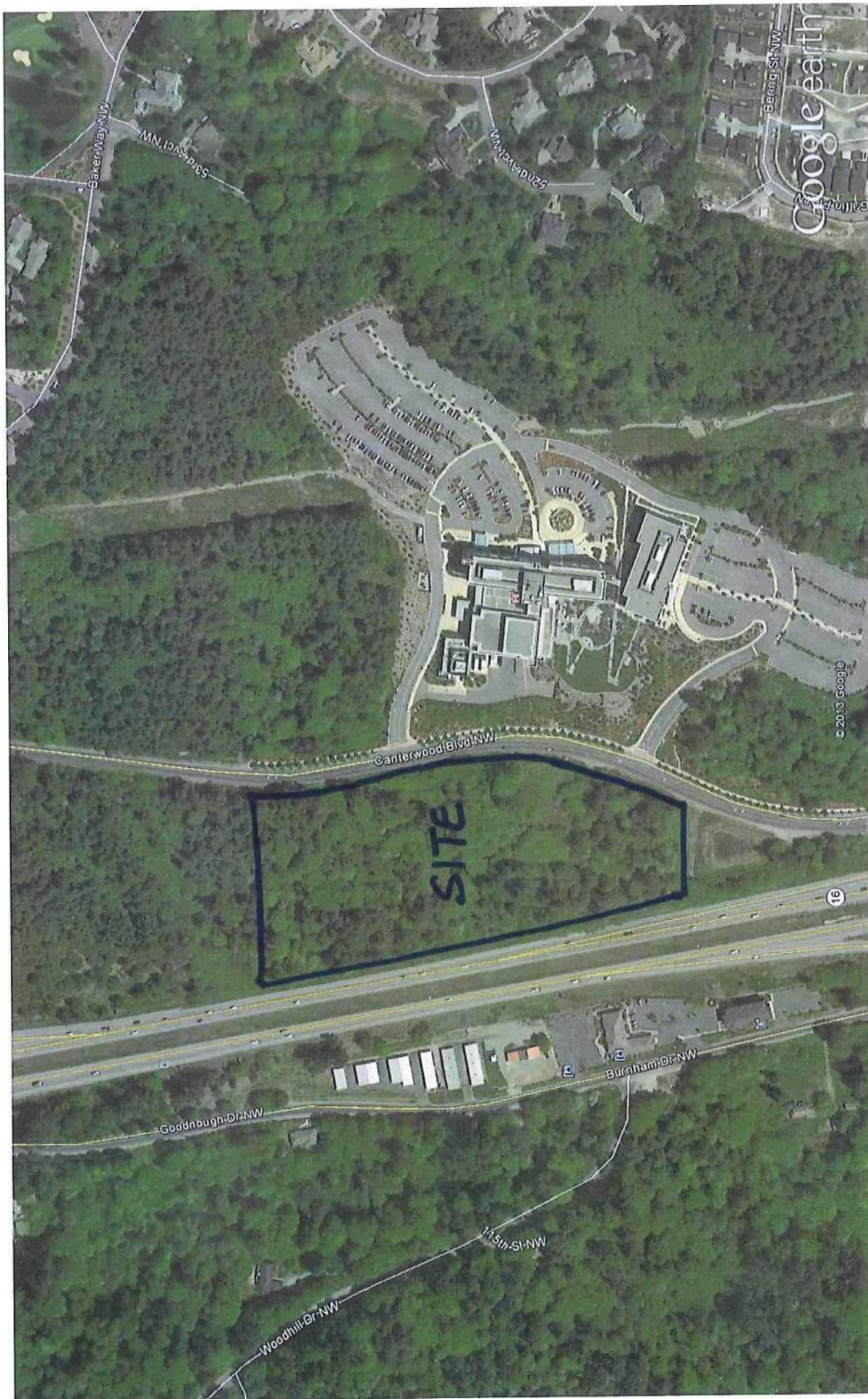
There is an off-site basin north of the north property line that currently drains to the site and is collected in a shallow swale on the north end and conveyed west to the north edge of Wetland A. The proposed development doesn't change the drainage pattern of this offsite basin. There is a perennial stream that bisects the property. Flow travels under Canterwood Boulevard in an existing 48" culvert and feeds many of the existing wetlands onsite. This existing culvert will remain with the proposed development.

There is an existing detention pond just south of this project. Per the 58th Avenue NW drainage report prepared for that pond in 1992, the detention capacity was designed at 17,642 CF. This included 6,945 CF of detention for the road improvements (Canterwood Blvd) and 10,697 CF of detention available for future development on this project site. According to an as-built survey of the existing pond, there is 14,231 CF of detention available in the existing pond to the top of the existing riser at elevation 130.84. This only leaves 7286 CF available for this site. During development, the control riser will be modified to elevation 131, increasing the overall detention storage in the pond to 15,135 CF. This allows 8,190 CF to be available for this site and the proposed 0.65 acres draining to it.

The site is not located within a floodplain as shown on the attached Figure 3 - FEMA Map, Panel No. 5301380150 C. There are seven wetlands onsite and a perennial stream that are all sensitive areas and require appropriate setbacks. These setbacks are shown on the design drawings. Both SR-16 and Canterwood Boulevard N.W. are considered enhancement corridors, therefore each have a 30' setback from the right-of-way.



Figure 2  
Existing Conditions  
Aerial Photograph

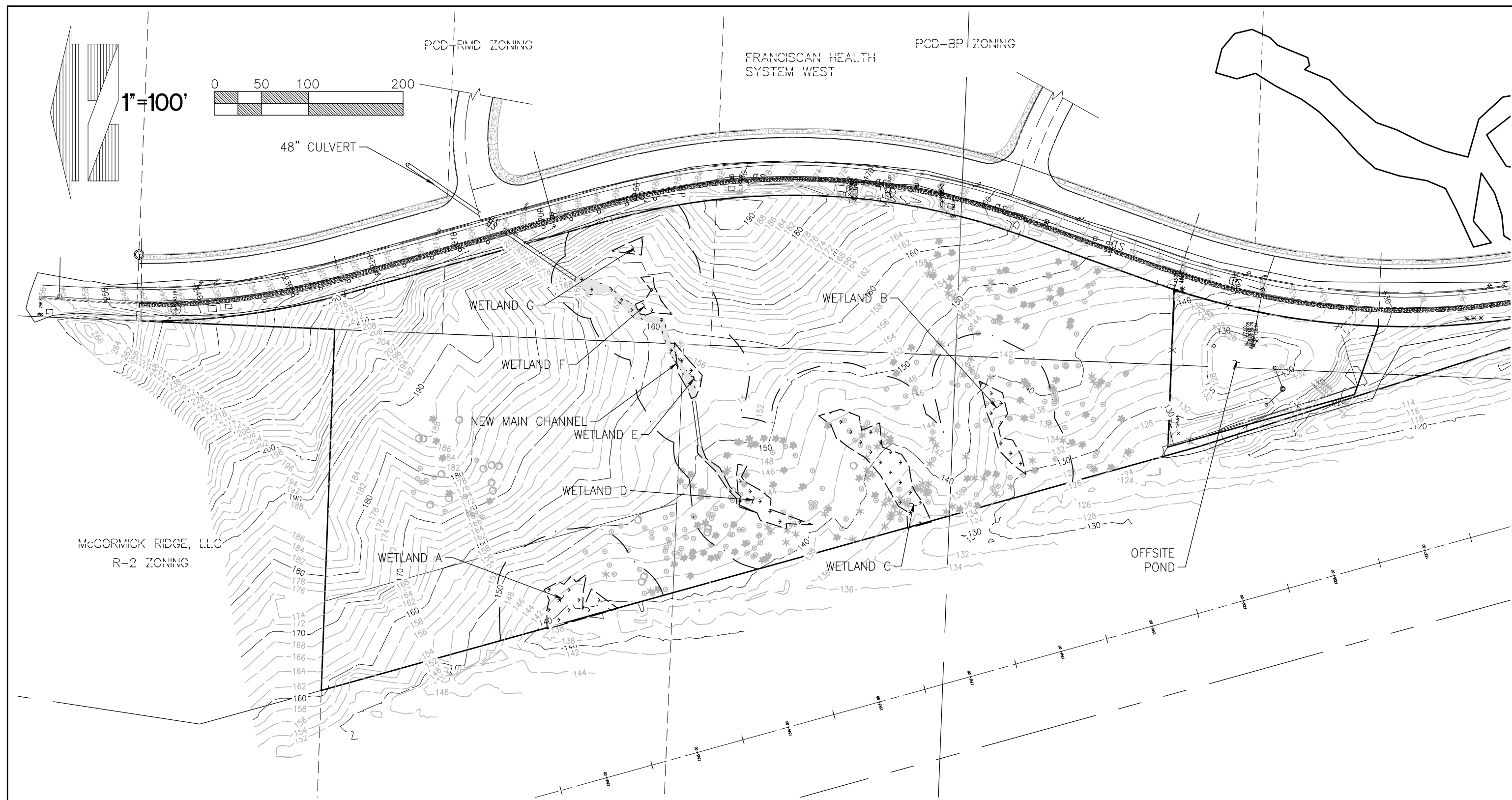


Google earth

Figure 2  
Ex. Conditions  
Aerial  
Photo

# Figure 3 Existing Conditions Exhibit





|                      |            |                                                                                     |                                                                                                                                                               |                                                                  |                                 |            |
|----------------------|------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|---------------------------------|------------|
| Designed <u>KEH</u>  | Scale:     |  | 18215 72ND AVENUE SOUTH<br>KENT, WA 98032<br>(425)251-6222<br>(425)251-8782 FAX<br><br>CIVIL ENGINEERING, LAND PLANNING,<br>SURVEYING, ENVIRONMENTAL SERVICES | For:<br><br>SWEDE HILL, LLC<br>P.O. BOX 1693<br>TACOMA, WA 98401 | Title: EXISTING CONDITIONS PLAN | Job Number |
| Drawn <u>RDC</u>     | Horizontal |                                                                                     |                                                                                                                                                               |                                                                  |                                 | 16657      |
| Checked <u>KEH</u>   | 1"=100'    |                                                                                     |                                                                                                                                                               |                                                                  |                                 | Sheet      |
| Approved <u>JGH</u>  | Vertical   |                                                                                     |                                                                                                                                                               |                                                                  |                                 | 1 of 1     |
| Date <u>12/15/13</u> | NA         |                                                                                     |                                                                                                                                                               |                                                                  |                                 |            |



# Tab 3.0

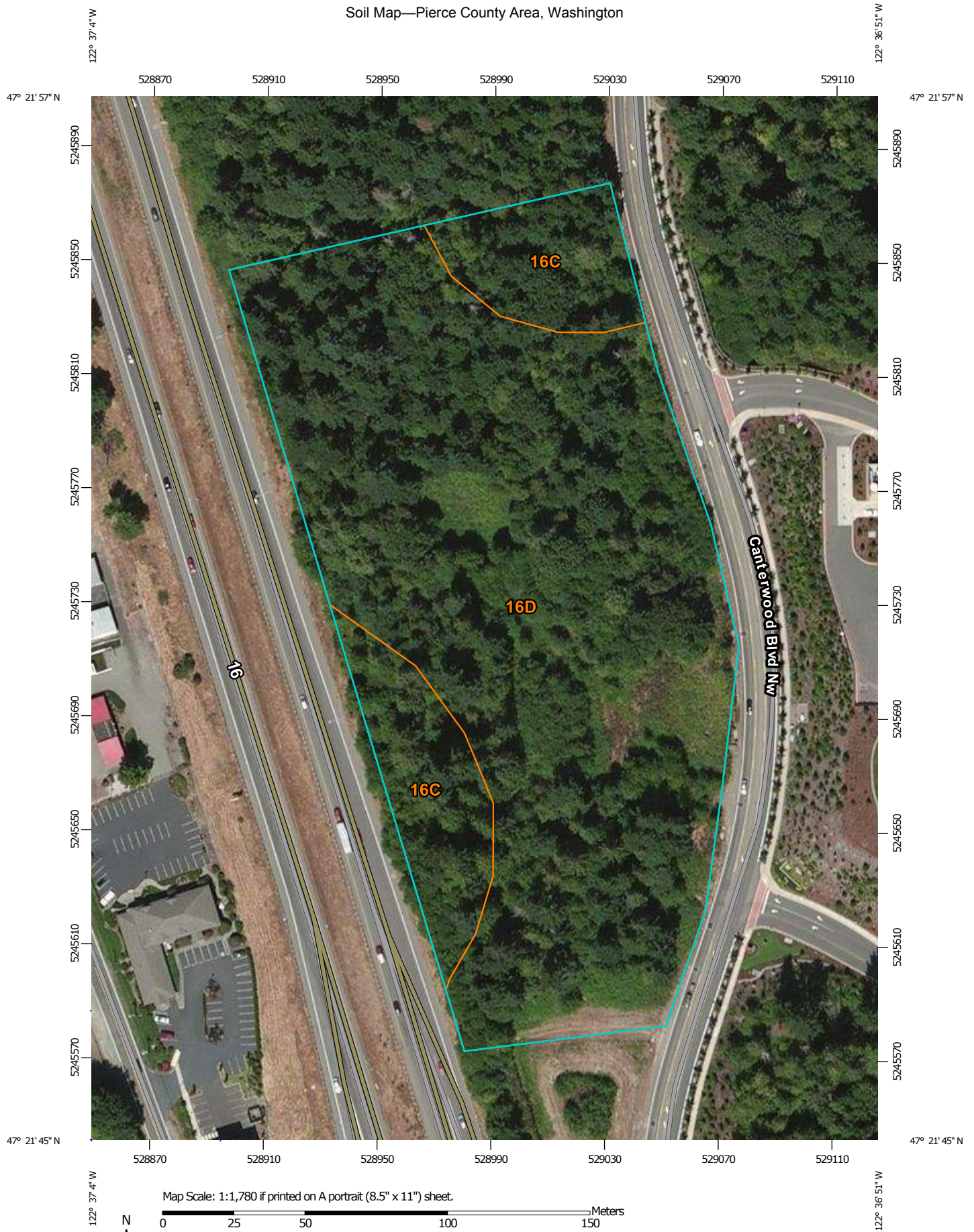
### **3.0 INFILTRATION RATES/SOILS REPORTS**

The soils on site consist of Hartsine gravelly sandy loam, which is defined by the SCS Soils Guide as Type "C" soil. Please refer to the attached soil map from the Natural Resources Conservation Service, included as Figure 4.

A geotechnical report has been prepared for this site (refer to Appendix F) and confirms the presence of till soils onsite. Groundwater was encountered at two test pit locations, between 6 and 7 feet below ground surface. Groundwater was not encountered in the test pits in the proposed pond area.

## Figure 4 Soils Map

# Soil Map—Pierce County Area, Washington



**Natural Resources  
Conservation Service**

Web Soil Survey  
National Cooperative Soil Survey

12/18/2013  
Page 1 of 3



## MAP LEGEND

### Area of Interest (AOI)

Area of Interest (AOI)

### Soils

-  Soil Map Unit Polygons
-  Soil Map Unit Lines
-  Soil Map Unit Points

### Special Point Features

-  Blowout
-  Borrow Pit
-  Clay Spot
-  Closed Depression
-  Gravel Pit
-  Gravelly Spot
-  Landfill
-  Lava Flow
-  Marsh or swamp
-  Mine or Quarry
-  Miscellaneous Water
-  Perennial Water
-  Rock Outcrop
-  Saline Spot
-  Sandy Spot
-  Severely Eroded Spot
-  Sinkhole
-  Slide or Slip
-  Sodic Spot

-  Spoil Area
-  Stony Spot
-  Very Stony Spot
-  Wet Spot
-  Other
-  Special Line Features

### Water Features

-  Streams and Canals

### Transportation

-  Rails
-  Interstate Highways
-  US Routes
-  Major Roads
-  Local Roads

### Background

-  Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service  
Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>  
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Pierce County Area, Washington  
Survey Area Data: Version 7, Jul 19, 2012

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 9, 2010—Aug 20, 2011

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

## Map Unit Legend

| Pierce County Area, Washington (WA653) |                                                       |              |                |
|----------------------------------------|-------------------------------------------------------|--------------|----------------|
| Map Unit Symbol                        | Map Unit Name                                         | Acres in AOI | Percent of AOI |
| 16C                                    | Harstine gravelly sandy loam, 6 to 15 percent slopes  | 1.5          | 16.7%          |
| 16D                                    | Harstine gravelly sandy loam, 15 to 30 percent slopes | 7.4          | 83.3%          |
| <b>Totals for Area of Interest</b>     |                                                       | <b>8.9</b>   | <b>100.0%</b>  |

# Tab 4.0

#### **4.0 WELLS AND SEPTIC SYSTEMS**

There are no known wells or septic systems on the site. The property north of the site is undeveloped. The proposed detention system is approximately 87 feet from the north property line. Additional research for this site will be done during final design to ensure the 100-foot setback from community septic drainfields (or reserves) or wells is maintained. The proposed pond is approximately 55 feet from the maximum water surface to the west property line. This site abuts SR-16 right-of-way to the west.

Additional research will be performed during final design to ensure a well or septic system is not within the required setbacks.



# Tab 5.0

## **5.0 FUEL TANKS**

There are no fuel tanks to be known on site. If any are located during construction they will be removed per Tacoma-Pierce County Health Department standards.

# Tab 6.0

## **6.0 SUBBASIN DESCRIPTION**

There is some off-site runoff directed to the project site. A small area north of the site drains south into a small drainage swale. This drainage area will remain and continue to drain to the small drainage swale at the north end of the project. The development will maintain this drainage pattern.

There is a perennial stream that bisects the property. Flow comes under Canterwood Boulevard in an existing 48" culvert and feeds many of the existing wetlands onsite. This existing culvert will remain with the proposed development. Wetland mitigation is proposed in the stream channel, including the removal of two existing culverts near the center of the site. Refer to Figure 8 - Upstream Basin Map.

The proposed site drains to the McCormick Creek Basin. The basin is 1560 acres per the 2009 Gig Harbor Stormwater Comprehensive Plan by Pace Engineers. The proposed Canterwood Commercial Center plat is located near the northwest corner of the basin. The proposed plat site receives runoff from the developments to the northeast through a 48-inch culvert that crosses Canterwood Blvd and continues in an intermittent stream and wetlands that flow south and west toward SR-16. (Refer to the previously prepared Level 1 Offsite Drainage Analysis prepared for this project). This stream continues offsite, traveling south from the project approximately 300 ft where it then travels 400 feet westerly under SR-16 in a culvert (size unknown due to inaccessibility) and joins with McCormick Creek. From here McCormick Creek travels west under Burnham Drive NW via a 10 foot box culvert. Then north about 185 feet to a 2.5 foot CMP pipe under a private driveway. From there McCormick Creek travels northerly another 575 feet to where it crosses Woodhill Drive NW in a 5 foot concrete pipe. From here McCormick Creek continues north and eventually reaches Henderson Bay.

The area upstream of the development includes a residential development and undeveloped land to the northeast of the site. The undeveloped areas are densely forested. The majority of McCormick Creek is considered a good riparian corridor; however the corridor adjacent to SR-16 was identified as poor due to culvert crossings and a lack of vegetation.

Runoff from the proposed pond south of the plat will discharge to densely vegetated land on the west side of SR-16 and eventually join the stream running along the east side of SR-16.



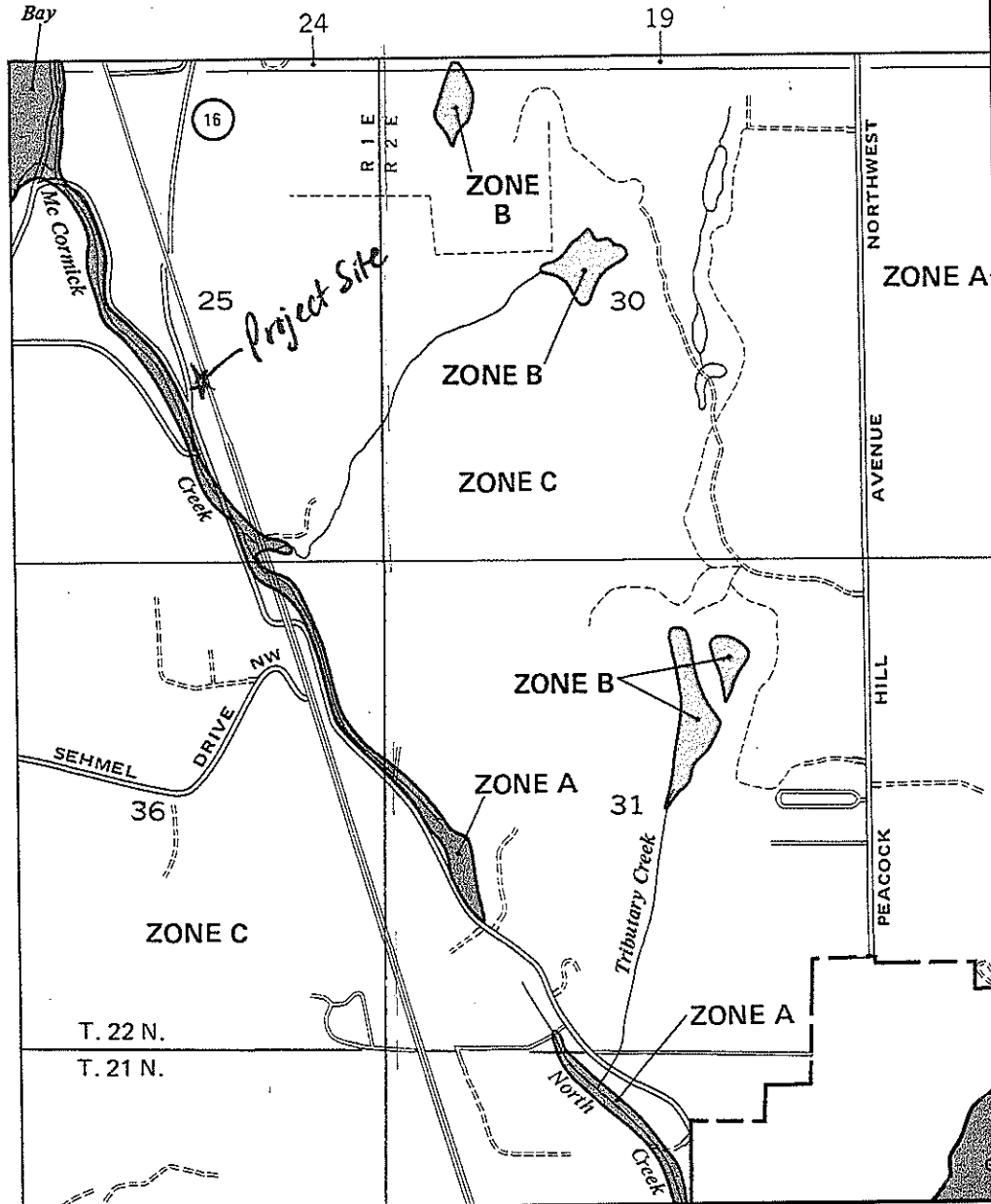
# Tab 7.0

## **7.0 FLOODPLAIN ANALYSIS**

The site is not located within a floodplain as shown on the attached Figure 3 - FEMA Map, Panel No. 5301380150 C. There are seven wetlands onsite, two of which will be filled as part of this development. There is also a perennial stream that bisects the property. This channel will remain with the development and a culvert crossing will be removed as part of the wetland mitigation measures. There are no known drainage problems on site.

# Figure 5 FEMA Map

Henderson Bay



APPROXIMATE SCALE

2000 0 2000 FEET

NATIONAL FLOOD INSURANCE PROGRAM

**FIRM**  
FLOOD INSURANCE RATE MAP

**PIERCE COUNTY,  
WASHINGTON**  
(UNINCORPORATED AREAS)

**PANEL 150 OF 1375**  
(SEE MAP INDEX FOR PANELS NOT PRINTED)

**COMMUNITY-PANEL NUMBER**  
**530138 0150 C**

**EFFECTIVE DATE:**  
**AUGUST 19, 1987**



Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at [www.msc.fema.gov](http://www.msc.fema.gov)



# Tab 8.0

## **8.0 AESTHETIC CONSIDERATIONS FOR FACILITIES**

The stormwater detention and water quality pond for the buildings will be fenced for safety. Pond perimeter landscaping will be per City of Gig Harbor requirements to provide a visually appealing development.

# Tab 9.0

## **9.0 FACILITY SIZING AND DOWNSTREAM ANALYSIS**

### **9.1 Facility Sizing**

The proposal for this project is to construct approximately 20,500 square feet of retail buildings in 4 separate buildings, associated parking, storm drainage, utilities, curb and gutter, sidewalk, landscaping, retaining walls, and access. The total site is comprised of 7.6 acres. A portion of the site will be developed, the remainder will remain undeveloped forested and wetland areas. Refer to the developed basin map for the developed conditions on site. No offsite basins are included in the hydrology calculations; the offsite flows will not enter the developed portion of the site.

The site is separated into three basins. All basins are sized for flow control and water quality per the 2016 City of Gig Harbor Stormwater Management and Site Development Manual.

#### **North Basin**

The parking lots will be graded to catch basins that will collect runoff and direct it to an underground detention system and then to a modular wetland for water quality treatment. Roof drainage will be collected in downspouts and routed in underground pipes to catch basins and then to the storm facility. Discharge from the detention and water quality system is to a gravel dispersal trench adjacent to the wetland buffer.

#### **South Basin**

The parking lots will be graded to catch basins that will collect runoff and direct it to a modular wetland for water quality treatment and then to the onsite pond for flow control. Roof drainage from Building B will be dispersed to the north. The flow path is greater than 50 feet, therefore the roof area was modeled as lawn and considered bypass to the storm pond. Roof drainage from Building D will be dispersed to the west. The flow path is approximately 30 feet therefore the roof area was modeled as 50% impervious and 50% lawn and this area was also considered bypass to the onsite pond. Roof runoff from Building C will be collected in downspouts and routed in underground pipes to catch basins and then to the storm facility.

At the time of permit submittal, an exemption will be requested to eliminate the need for a pond perimeter road. The proposed pond is very small and will empty between storm events, allowing regular mowing of the pond banks. This lawn care maintenance can be accomplished from the access ramp and a pond perimeter road is not necessary for routine maintenance.

#### **Offsite Basin**

The proposed road improvements to Canterwood Boulevard and a small basin at the south end of the project will be routed to the existing pond to the south.

There is an existing detention pond just south of this project. Per the 58th Avenue NW drainage report prepared for that pond in 1992, the detention capacity was designed at 17,642 CF. This included 6,945 CF of detention for the road improvements (Canterwood Blvd) and 10,697 CF of detention available for future development on this project site. According to an as-built survey of the existing pond, there is 14,231 CF of detention available in the existing pond to the top of the existing riser at elevation 130.84. This only leaves 7286 CF available for this site. During development, the control riser will be



modified to elevation 131, increasing the overall detention storage in the pond to 15,135 CF. This allows 8,190 CF to be available for this site and the proposed 0.65 acres draining to it.

Runoff from the frontage improvements will be treated in stormfilter manholes at the north end. An equivalent area of the right-of-way will be treated and detained to match the proposed right-of-way widening proposed with this project. An underground water quality vault capable of enhanced water quality treatment is proposed to treat the site runoff before being directed offsite. The discharge swale from the existing pond is densely vegetated and the additional pond discharge from the 0.65-acre is not expected to require additional mitigation. A maintenance agreement will be required between this property and the City for pond maintenance which would cover any damage during an emergency event and maintain the existing pond in working order so an overflow event is less likely.

The size of the water quality and detention portions was determined using the 2016 City of Gig Harbor Stormwater Management and Site Development Manual. WWHM2012 was used to match flow durations and peaks from 50% of the 2-year through the 50-year storm events.

Sizing for storm water improvements are provided in Appendix A of this report.

## **9.2 Water Quality Facility**

Enhanced water quality will be provided for the onsite commercial areas.

Modular wetlands or OldCastle BioPods will be used for the onsite basins. These emerging technology units have DOE GULD rating for enhanced treatment.

Road runoff will be treated in a Contech Stormfilter unit for basic water quality treatment prior to being discharged into the existing storm pond south of the site.

## **9.3 Conveyance Sizing**

Conveyance sizing will be done with the construction drawings and final storm report for this site.

Conveyance sizing will be performed for this site using the 25-year and 100-year design storms and using the rational method. Per Table 4.2 of the 2016 City of Gig Harbor Stormwater Design Manual the Manning's roughness coefficient for CPEP (smooth wall) and ductile iron pipe is 0.014.

Please refer to the conveyance calculations and map to be provided in Appendix B.

## **9.4 Downstream Analysis**

A Level 1 Downstream Analysis was performed by Barghausen Consulting Engineers and is submitted as a separate document.

The site is bound on the east by Canterwood Boulevard N.W., on the west by SR-16 and the south by an existing detention pond. There is a small amount of area north of the property lines that drain to this site. Canterwood Boulevard N.W. has its own collection system and does not drain to this site.

Discharge locations from the development will be protected by using gravel dispersal trenches to mimic sheet flow or with riprap pads to control discharge velocities.

There is an emergency overflow spillway shown on the preliminary plans to protect the pond bank in an emergency overflow situation. The 30' setback is also heavily vegetated between the pond spillway and the property line. This dense vegetation will greatly reduce flow velocities if the pond were to overflow. Regular pond maintenance will also be performed so the pond is in working condition and the chance of an overflow situation is reduced.

Overflows from the existing pond are directed to a heavily vegetated swale approximately 20' from the property line at the same location the pond outfall is located. This dense vegetation will greatly reduce flow velocities if the pond were to overflow.

Runoff from the Canterwood Commercial Center development generally flows west and then south. There is an existing perennial stream that bisects the site, conveying runoff from areas east of Canterwood Boulevard N.W. to the SR-16 right-of-way. The drainage pattern of this site will be maintained with the development. The existing perennial stream through the site will remain and discharges from the detention system will be to the west. Refer to Figure 9 - Upstream Basin Map.

The existing perennial stream and this site drain west to the SR-16 right-of-way. The perennial stream flows south along the east side of SR-16 and crosses SR-16 to the west near the Borgen Boulevard intersection. This channel converges with McCormick Creek on the west side of SR-16 and eventually discharges into Henderson Bay.

Because this project is proposing to limit the developed runoff to less than pre-developed conditions, there will be no detrimental effect on the downstream drainage course. Because flows will be restricted, peak flow rates in the channel should be reduced and the channel will continue to operate as it currently does.

# Figure 6

## Soil Amendment Map



**Soil Amendment Map**

**Amended Soil**

**Undisturbed**

**NOTES:**

- ALL WALLS OVER 8' TO BE ENGINEERED BLOCK OR CONCRETE RETAINING WALLS. ROCKERIES OVER 8' ARE NOT PERMITTED.
- ALL ENCROACHMENTS INTO THE DRIP LINES OF SIGNIFICANT TREES THAT ARE REQUIRED TO BE RETAINED, SHALL BE ANALYZED BY A QUALIFIED ARBORIST WHO SHALL MAKE A RECOMMENDATION AS TO THEIR LONG-TERM VIABILITY AND/OR ADDITIONAL PROTECTION MEASURES. ARBORIST RECOMMENDATIONS TO BE PROVIDED TO THE CITY FOR REVIEW AND APPROVAL PRIOR TO ENCROACHMENT.
- HIGH POINT SHOWN IS THE HIGHEST ELEVATION WITHIN 50 FEET OF THE BUILDING FOOTPRINT.

**EARTHWORK (APPROX. QUANTITIES)**

CUT/FILL = 14,600 CY  
IMPORT = 23,700 CY

**REVISIONS**

| NO. | DATE       | REVISION                                      |
|-----|------------|-----------------------------------------------|
| 9   | 09/07/2018 | REVISED SECTIONS                              |
| 10  | 11/01/2018 | REVISED PER CITY DRB COMMENTS 5/25/2018       |
| 11  | 04/02/2019 | REVISED PER CITY COMMENTS 1/25/2019           |
| 12  | 08/20/2019 | REVISED NORTH STORM OUTFALL                   |
| 13  | 09/26/2019 | REVISED WETLAND CREATION AREA                 |
| 14  | 05/13/2020 | REVISED SOUTH LAYOUT                          |
| 15  | 06/24/2020 | REVISED PER CITY REVIEW COMMENTS OCTOBER 2019 |
| 16  | 10/22/2020 | REVISED PER CITY REVIEW COMMENTS AUGUST 2020  |

**DESIGNED BY:** KEH  
**DRAWN BY:** RDC  
**CHECKED BY:** KEH  
**APPROVED BY:** JGH  
**SCALE:** 1"=30'  
**OTHER:**

**SWEDE HILL, LLC**  
P.O. BOX 1397  
TACOMA, WA 98401

**SECTION 25, TOWNSHIP 22 N, RANGE 1 E**  
**GRADING AND STORM DRAINAGE PLAN**  
**CANTERWOOD COMMERCIAL CENTER**

**PERMIT NO.** 10/22/2020  
**DRAWING NO.** PRELIMINARY  
**SHEET** C12 **OF** 22  
**REGISTERED PROFESSIONAL ENGINEER**

## Amended Soil

# Undisturbed

Know what's **below**.  
**Call** before you dig.

ISSUED FOR CONSTRUCTION

DATE: \_\_\_\_\_

PERMIT NO.

0 / 22 / 2020

SECTION 25, TOWNSHIP 22 N, RANGE 1 E

## GRADING AND STORM DRAINAGE PLAN

|                                 |    |
|---------------------------------|----|
| CANTERWOOD COMMERCIAL<br>CENTER | Sh |
|---------------------------------|----|

PERMIT NO.

DRAWING NO.

SHEET OF

C12

|              |        |
|--------------|--------|
| DESIGNED BY: | KEH    |
| DRAWN BY:    | RDC    |
| CHECKED BY:  | KEH    |
| APPROVED BY: | JGH    |
| SCALE:       | 1"=30' |
| OTHER:       |        |

SWEDE HILL, LLC  
P.O. BOX 1397  
TACOMA, WA 98401



**Barghausen  
Consulting Engineers, Inc.**  
18215 72nd Avenue South  
Kent, WA 98032  
425.251.6222 [barghausen.com](http://barghausen.com)

7-PCGM  
ADS STORM DETENTION  
FACILITY

|                    |   |        |
|--------------------|---|--------|
| TOP ROCK           | = | 74.0   |
| TOP CHAMBER        | = | 73.0   |
| TOP WASHED ROCK    | = | 68.0   |
| BOTTOM ROCK        | = | 67.2   |
| APPROX. DIMENSIONS | = | 20'x   |
| MIN. VOLUME REQD   | = | 16,000 |

**NOTES:**

1. ALL WALLS OVER 8' TO BE ENGINEERED BLOCK OR CONCRETE RETAINING WALLS. ROCKERIES OVER 8' ARE NOT PERMITTED.
2. ALL ENCROACHMENTS INTO THE DRIPLINES OF SIGNIFICANT TREES THAT ARE REQUIRED TO BE RETAINED, SHALL BE ANALYZED BY A QUALIFIED ARBORIST WHO SHALL MAKE A RECOMMENDATION AS TO THEIR LONG TERM VIABILITY AND/OR ADDITIONAL PROTECTION MEASURES. ARBORIST RECOMMENDATIONS TO BE PROVIDED TO THE CITY FOR REVIEW AND APPROVAL PRIOR TO ENCROACHMENT.
3. HIGH POINT SHOWN IS THE HIGHEST ELEVATION WITHIN 50 FEET OF THE BUILDING FOOTPRINT.

|   |                      |    |                      |    |                      |
|---|----------------------|----|----------------------|----|----------------------|
| 1 | TW=165.5<br>BW=164.2 | 7  | TW=201.5<br>BW=194.9 | 13 | TW=198.7<br>BW=186.4 |
| 2 | TW=170.0<br>BW=164.0 | 8  | TW=198.7<br>BW=186.4 | 14 | TW=198.7<br>BW=175.1 |
| 3 | TW=170.0<br>BW=164.0 | 9  | TW=198.7<br>BW=175.1 | 15 | TW=191.0<br>BW=180.0 |
| 4 | TW=165.0<br>BW=164.0 | 10 | TW=191.0<br>BW=180.0 | 16 | TW=191.5<br>BW=179.8 |
| 5 | TW=163.0<br>BW=162.0 | 11 | TW=191.5<br>BW=179.8 | 17 | TW=189.0<br>BW=179.6 |
| 6 | TW=163.7<br>BW=159.7 | 12 | TW=189.0<br>BW=179.6 | 18 |                      |

|       |    |            |    |            |    |
|-------|----|------------|----|------------|----|
| 156.0 | 21 | BW = 155.3 | 27 | BW = 154.5 | 33 |
| 162.0 | 22 | BW = 155.5 | 28 | BW = 151.8 | 34 |
| 156.0 | 23 | BW = 153.3 | 29 | BW = 146.2 | 35 |
| 162.0 | 24 | BW = 155.2 | 30 | BW = 176.7 | 36 |
| 161.0 |    | BW = 146.6 |    | BW = 170.7 |    |

|                                                                                |                                                                                |                                                                                |
|--------------------------------------------------------------------------------|--------------------------------------------------------------------------------|--------------------------------------------------------------------------------|
| <p> <b>37</b> </p> <p>           TW=214.5<br/>           BW=208.5         </p> | <p> <b>43</b> </p> <p>           TW=151.0<br/>           BW=150.0         </p> | <p> <b>49</b> </p> <p>           TW=152.0<br/>           BW=149.0         </p> |
| <p> <b>38</b> </p> <p>           TW=210.2<br/>           BW=204.4         </p> | <p> <b>44</b> </p> <p>           TW=150.8<br/>           BW=148.0         </p> |                                                                                |
| <p> <b>39</b> </p> <p>           TW=177.5<br/>           BW=176.0         </p> | <p> <b>45</b> </p> <p>           TW=149.9<br/>           BW=148.2         </p> |                                                                                |
| <p> <b>40</b> </p> <p>           TW=178.2<br/>           BW=172.2         </p> | <p> <b>46</b> </p> <p>           TW=152.3<br/>           BW=149.3         </p> |                                                                                |
| <p> <b>41</b> </p> <p>           TW=176.5<br/>           BW=170.5         </p> | <p> <b>47</b> </p> <p>           TW=152.3<br/>           BW=149.3         </p> |                                                                                |
| <p> <b>42</b> </p> <p>           TW=176.1<br/>           BW=170.7         </p> | <p> <b>48</b> </p> <p>           TW=152.1<br/>           BW=149.1         </p> |                                                                                |

**EARTHWORK (APPROX. QUANTITIES)**  
CUT/FILL= 14,600 CY  
IMPORT= 23,700 CY

| REVISIONS |            |                                               |
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| 16        | 10/22/2020 | REVISED PER CITY REVIEW COMMENTS AUGUST 2020  |



# Figure 7

## Conveyance Map

Conveyance calculations will be included during final site development.

## Figure 8 Schedule of Structures

A schedule of structures will be included during final site development.

# Schedule of Structures

## Canterwood Commercial

BCE #16657

All stationing based on centerline of Canterwood Boulevard

### North Basin

Washington State Plane  
Coordinate System

| CB ID | Station | Northing | Easting | Type and Size | Pipe Size In | IE In | Pipe Size In | IE In | Pipe Size Out | IE Out |
|-------|---------|----------|---------|---------------|--------------|-------|--------------|-------|---------------|--------|
|       |         |          |         |               |              |       |              |       |               |        |
|       |         |          |         |               |              |       |              |       |               |        |
|       |         |          |         |               |              |       |              |       |               |        |
|       |         |          |         |               |              |       |              |       |               |        |

### South Basin

Washington State Plane  
Coordinate System

| CB ID | Station | Northing | Easting | Type and Size | Pipe Size In | IE In | Pipe Size In | IE In | Pipe Size Out | IE Out |
|-------|---------|----------|---------|---------------|--------------|-------|--------------|-------|---------------|--------|
|       |         |          |         |               |              |       |              |       |               |        |
|       |         |          |         |               |              |       |              |       |               |        |
|       |         |          |         |               |              |       |              |       |               |        |
|       |         |          |         |               |              |       |              |       |               |        |

### Routed to Offsite

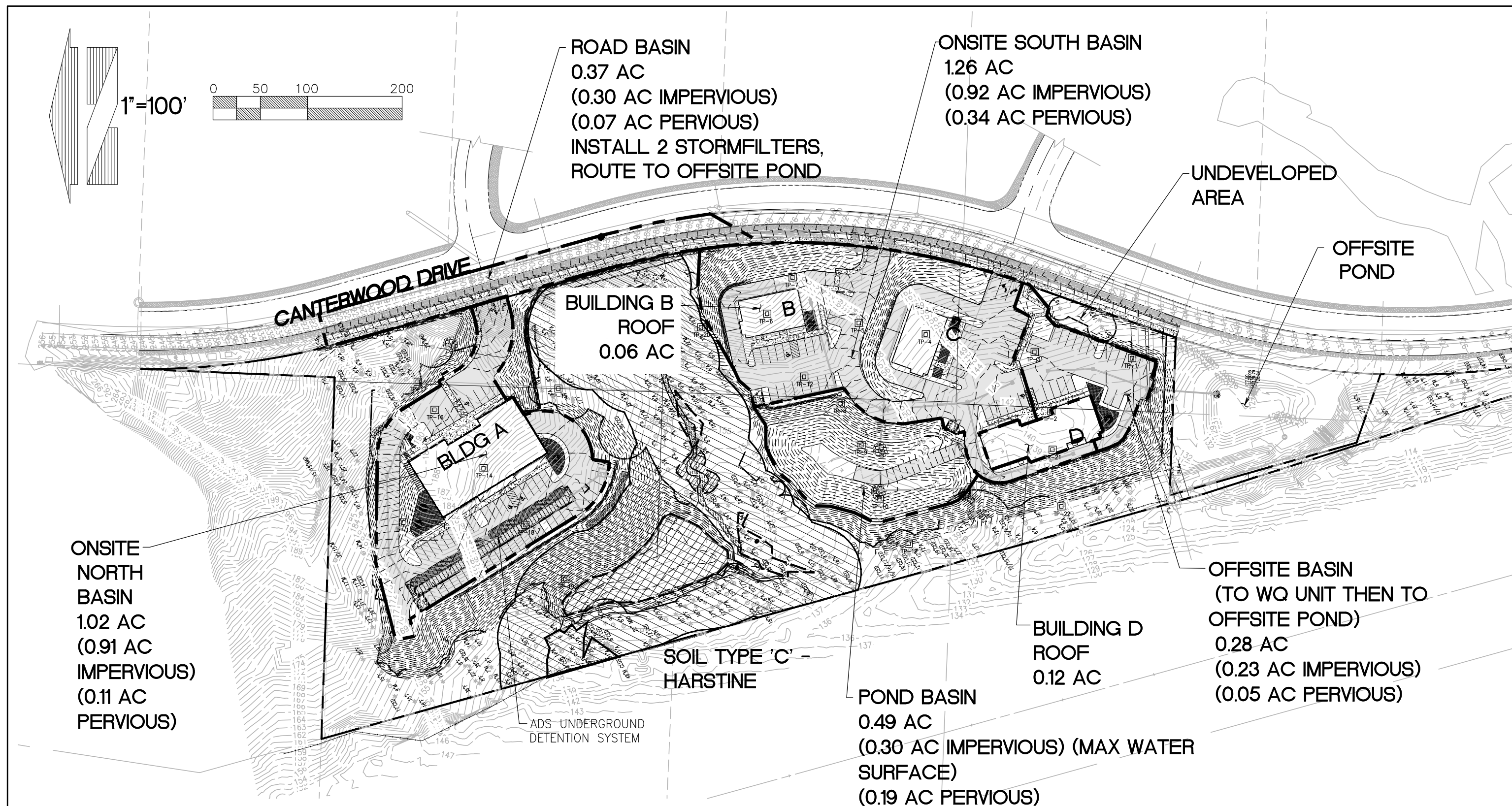
Washington State Plane  
Coordinate System

| CB ID | Station | Northing | Easting | Type and Size | Pipe Size In | IE In | Pipe Size In | IE In | Pipe Size Out | IE Out |
|-------|---------|----------|---------|---------------|--------------|-------|--------------|-------|---------------|--------|
|       |         |          |         |               |              |       |              |       |               |        |
|       |         |          |         |               |              |       |              |       |               |        |
|       |         |          |         |               |              |       |              |       |               |        |
|       |         |          |         |               |              |       |              |       |               |        |

# Figure 9

## Developed Basin Map





|                      |            |                                                                                                                                                                                                                                                              |      |                                                             |                                         |                      |
|----------------------|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-------------------------------------------------------------|-----------------------------------------|----------------------|
| Designed <u>KEH</u>  | Scale:     |  <p>18215 72ND AVENUE SOUTH<br/>KENT, WA 98032<br/>(425)251-6222<br/>(425)251-8782 FAX</p> <p>CIVIL ENGINEERING, LAND PLANNING,<br/>SURVEYING, ENVIRONMENTAL SERVICES</p> | For: | <b>SWEDE HILL, LLC</b><br>P.O. BOX 1693<br>TACOMA, WA 98401 | Title: <b>DEVELOPED CONDITIONS PLAN</b> | Job Number           |
| Drawn <u>RDC</u>     | Horizontal |                                                                                                                                                                                                                                                              |      |                                                             |                                         | <b>16657</b>         |
| Checked <u>KEH</u>   | 1"=100'    |                                                                                                                                                                                                                                                              |      |                                                             |                                         | Sheet                |
| Approved <u>JGH</u>  | Vertical   |                                                                                                                                                                                                                                                              |      |                                                             |                                         | <b>1</b> of <b>1</b> |
| Date <u>12/15/13</u> | NA         |                                                                                                                                                                                                                                                              |      |                                                             |                                         |                      |

# Figure 10

## Downstream Drainage Map



Tax Parcels  
Tax Parcels

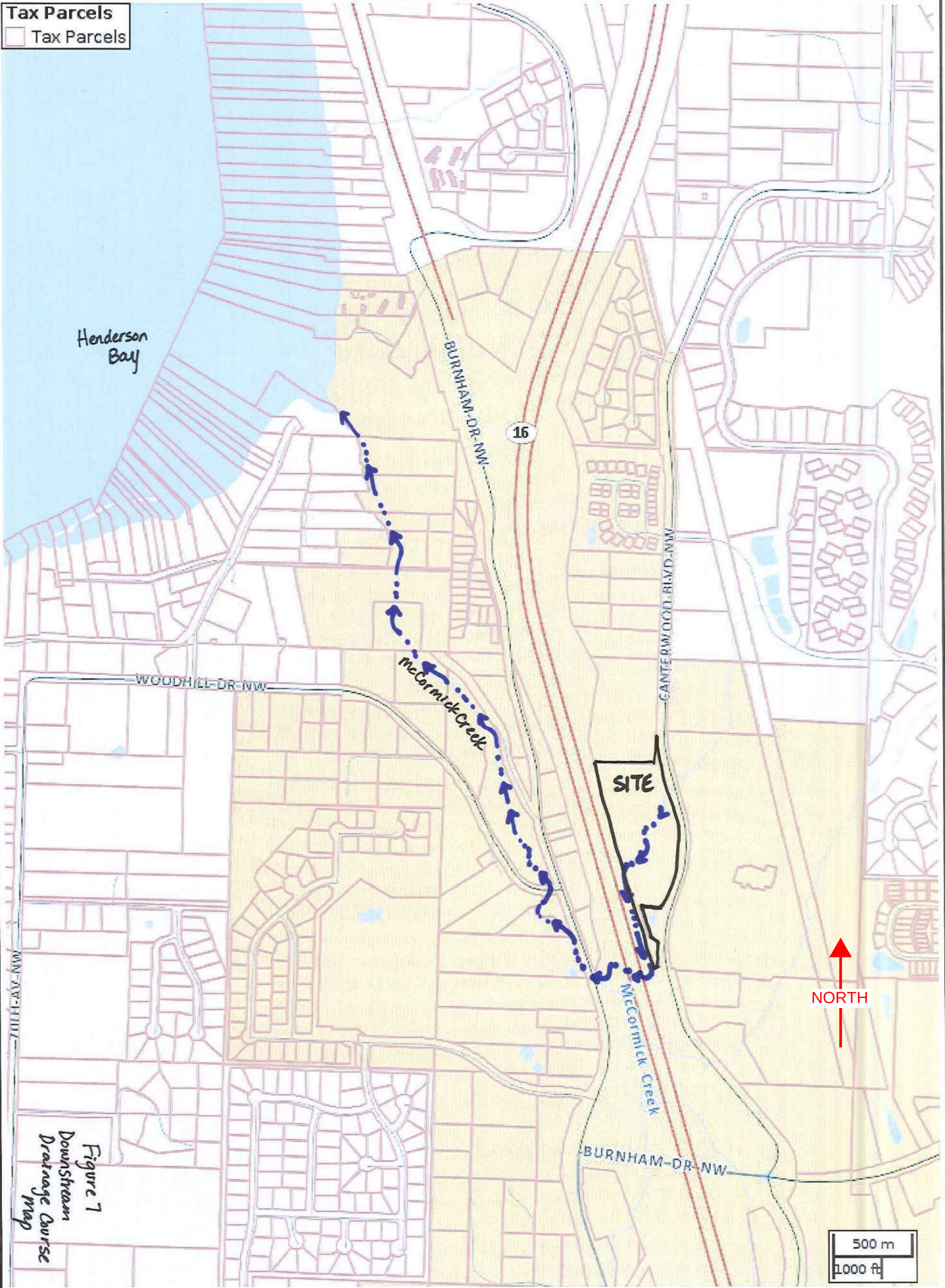


Figure 7  
Downstream  
Drainage Course  
map

Disclaimer: The map features are approximate and are intended only to provide an indication of said feature. Additional areas that have not been mapped may be present. This is not a survey. The County assumes no liability for variations ascertained by actual survey. ALL DATA IS EXPRESSLY PROVIDED 'AS IS' AND 'WITH ALL FAULTS'. The County makes no warranty of fitness for a particular purpose. 2013/12/19



# Figure 11

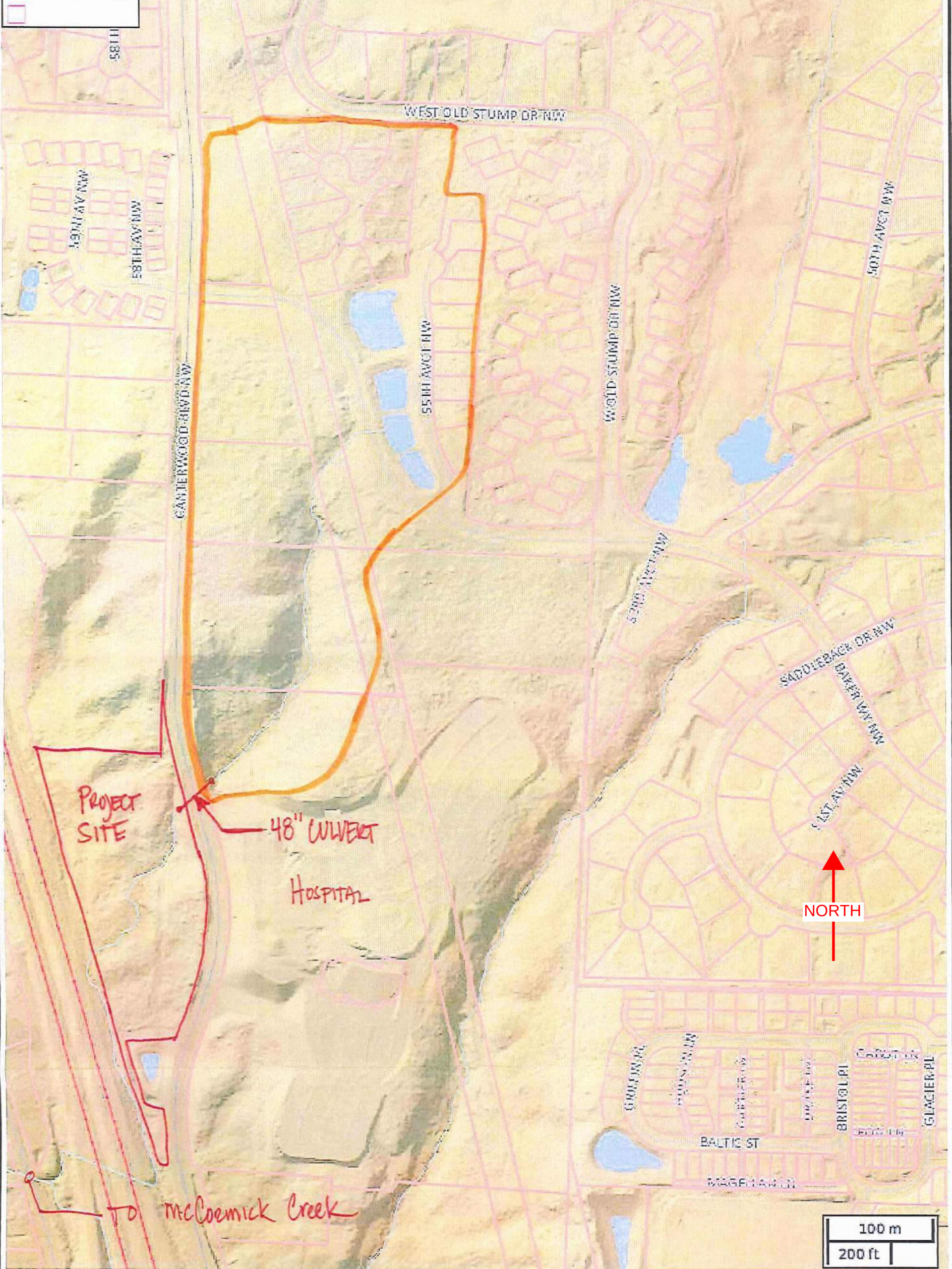
## Upstream Basin Map



# 48" CULVERT BASIN



## Tax Parcels



Disclaimer: The map features are approximate and are intended only to provide an indication of said feature. Additional areas that have not been mapped may be present. This is not a survey. The County assumes no liability for variations ascertained by actual survey. **ALL DATA IS EXPRESSLY PROVIDED 'AS IS' AND 'WITH ALL FAULTS'.** The County makes no warranty of fitness for a particular purpose. 2015/04/21



# Tab 10.0

## **10.0 UTILITIES**

The site utilities will be designed to allow the storm system to operate without conflicts and ensure there is adequate separation between utilities, both vertically and horizontally.

# Tab 11.0



## **11.0 COVENANTS, DEDICATIONS, EASEMENTS**

An existing perennial stream currently runs across the site from Canterwood Boulevard to SR-16 conveying runoff from the northwest through the site. This stream shall remain with the development. A 20' drainage easement to the City of Gig Harbor will be given for the conveyance of offsite runoff and for access and maintenance of this perennial stream.

# Tab 12.0

**12.0 PROPERTY OWNER'S ASSOCIATION ARTICLES OF INCORPORATION**

Not applicable.

# Tab 13.0



### **13.0 OTHER PERMITS OR CONDITIONS PLACED ON THE PROJECT**

This project will also require a Wetlands Permit and a Hydraulic Project Approval. The HPA would be for the remediation work within the site wetlands, including removal of the two 24" culverts between wetlands E and D and wetland mitigation. An Army Corps of Engineers permit was issued on 2-12-2016 for the wetland work and mitigation (NWS-2014-954 Swede Hill LLC).

As this site is over 1.0 acre, a Construction Stormwater General Permit and Stormwater Pollution Prevention Plan will be required. A Notice of Intent will be submitted to the Washington State Department of Ecology to obtain the permit prior to beginning construction.

# Appendix A

## Hydrology Calculations

# North Basin



Basin Help

Schematic

## SCENARIOS



Run Scenario

## Basic Elements



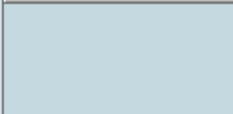
## Pro Elements



## LID Toolbox



## Commercial Toolbox



## Move Elements



Save x,y Load x,y

X 10  
Y 60

Basin 1 Predeveloped

Subbasin Name: Basin 1

Flows To : Surface Interflow Groundwater

## Area in Basin

☐ Show Only Selected

| Available Pervious                                   | Acres |
|------------------------------------------------------|-------|
| <input type="checkbox"/> A/B, Forest, Flat           | 0     |
| <input type="checkbox"/> A/B, Forest, Mod            | 0     |
| <input type="checkbox"/> A/B, Forest, Steep          | 0     |
| <input type="checkbox"/> A/B, Pasture, Flat          | 0     |
| <input type="checkbox"/> A/B, Pasture, Mod           | 0     |
| <input type="checkbox"/> A/B, Pasture, Steep         | 0     |
| <input type="checkbox"/> A/B, Lawn, Flat             | 0     |
| <input type="checkbox"/> A/B, Lawn, Mod              | 0     |
| <input type="checkbox"/> A/B, Lawn, Steep            | 0     |
| <input type="checkbox"/> C, Forest, Flat             | 0     |
| <input type="checkbox"/> C, Forest, Mod              | 0     |
| <input checked="" type="checkbox"/> C, Forest, Steep | 1.02  |
| <input type="checkbox"/> C, Pasture, Flat            | 0     |
| <input type="checkbox"/> C, Pasture, Mod             | 0     |
| <input type="checkbox"/> C, Pasture, Steep           | 0     |
| <input checked="" type="checkbox"/> C, Lawn, Flat    | 0     |
| <input checked="" type="checkbox"/> C, Lawn, Mod     | 0     |
| <input type="checkbox"/> C, Lawn, Steep              | 0     |
| <input type="checkbox"/> SAT, Forest, Flat           | 0     |
| <input type="checkbox"/> SAT, Forest, Mod            | 0     |
| <input type="checkbox"/> SAT, Forest, Steep          | 0     |

| Available Impervious                             | Acres |
|--------------------------------------------------|-------|
| <input type="checkbox"/> ROADS/FLAT              | 0     |
| <input checked="" type="checkbox"/> ROADS/MOD    | 0     |
| <input type="checkbox"/> ROADS/STEEP             | 0     |
| <input type="checkbox"/> ROOF TOPS/FLAT          | 0     |
| <input type="checkbox"/> DRIVEWAYS/FLAT          | 0     |
| <input type="checkbox"/> DRIVEWAYS/MOD           | 0     |
| <input type="checkbox"/> DRIVEWAYS/STEEP         | 0     |
| <input type="checkbox"/> SIDEWALKS/FLAT          | 0     |
| <input type="checkbox"/> SIDEWALKS/MOD           | 0     |
| <input type="checkbox"/> SIDEWALKS/STEEP         | 0     |
| <input checked="" type="checkbox"/> PARKING/FLAT | 0     |
| <input type="checkbox"/> PARKING/MOD             | 0     |
| <input type="checkbox"/> PARKING/STEEP           | 0     |
| <input type="checkbox"/> POND                    | 0     |
| <input type="checkbox"/> Porous Pavement         | 0     |

Pervious Total 1.02 Acres  
 Impervious Total 0 Acres  
 Basin Total 1.02 Acres

Precipitation Gauge

2 - &lt;UNK&gt; | 158 YR PRECIP TIMESERIES, 38 IN CEN

Auto Assign Gages

Deselect Zero

Select By:

GO





Basin Help

**Schematic**

**SCENARIOS**

☐ Predeveloped

☒ Mitigated

Run Scenario

Basic Elements

Pro Elements

LID Toolbox

Commercial Toolbox

Move Elements

Save x,y Load x,y

X 40 Y 54

#

**Basin 1 Mitigated**

Subbasin Name:  ☐ Designate as Bypass for POC:

Flows To :

☐ Show Only Selected

| Area in Basin                                        |       | Available Impervious                             |       |
|------------------------------------------------------|-------|--------------------------------------------------|-------|
|                                                      | Acres |                                                  | Acres |
| <input type="checkbox"/> A/B, Forest, Flat           | 0     | <input type="checkbox"/> ROADS/FLAT              | 0     |
| <input type="checkbox"/> A/B, Forest, Mod            | 0     | <input checked="" type="checkbox"/> ROADS/MOD    | 0     |
| <input type="checkbox"/> A/B, Forest, Steep          | 0     | <input type="checkbox"/> ROADS/STEEP             | 0     |
| <input type="checkbox"/> A/B, Pasture, Flat          | 0     | <input type="checkbox"/> ROOF TOPS/FLAT          | 0     |
| <input type="checkbox"/> A/B, Pasture, Mod           | 0     | <input type="checkbox"/> DRIVEWAYS/FLAT          | 0     |
| <input type="checkbox"/> A/B, Pasture, Steep         | 0     | <input type="checkbox"/> DRIVEWAYS/MOD           | 0     |
| <input type="checkbox"/> A/B, Lawn, Flat             | 0     | <input type="checkbox"/> DRIVEWAYS/STEEP         | 0     |
| <input type="checkbox"/> A/B, Lawn, Mod              | 0     | <input type="checkbox"/> SIDEWALKS/FLAT          | 0     |
| <input type="checkbox"/> A/B, Lawn, Steep            | 0     | <input type="checkbox"/> SIDEWALKS/MOD           | 0     |
| <input type="checkbox"/> C, Forest, Flat             | 0     | <input type="checkbox"/> SIDEWALKS/STEEP         | 0     |
| <input type="checkbox"/> C, Forest, Mod              | 0     | <input checked="" type="checkbox"/> PARKING/FLAT | .91   |
| <input checked="" type="checkbox"/> C, Forest, Steep | 0     | <input type="checkbox"/> PARKING/MOD             | 0     |
| <input type="checkbox"/> C, Pasture, Flat            | 0     | <input type="checkbox"/> PARKING/STEEP           | 0     |
| <input type="checkbox"/> C, Pasture, Mod             | 0     | <input type="checkbox"/> POND                    | 0     |
| <input type="checkbox"/> C, Pasture, Steep           | 0     | <input type="checkbox"/> Porous Pavement         | 0     |
| <input checked="" type="checkbox"/> C, Lawn, Flat    | .05   |                                                  |       |
| <input checked="" type="checkbox"/> C, Lawn, Mod     | .06   |                                                  |       |
| <input type="checkbox"/> C, Lawn, Steep              | 0     |                                                  |       |
| <input type="checkbox"/> SAT, Forest, Flat           | 0     |                                                  |       |
| <input type="checkbox"/> SAT, Forest, Mod            | 0     |                                                  |       |
| <input type="checkbox"/> SAT, Forest, Steep          | 0     |                                                  |       |

Pervious Total  Acres

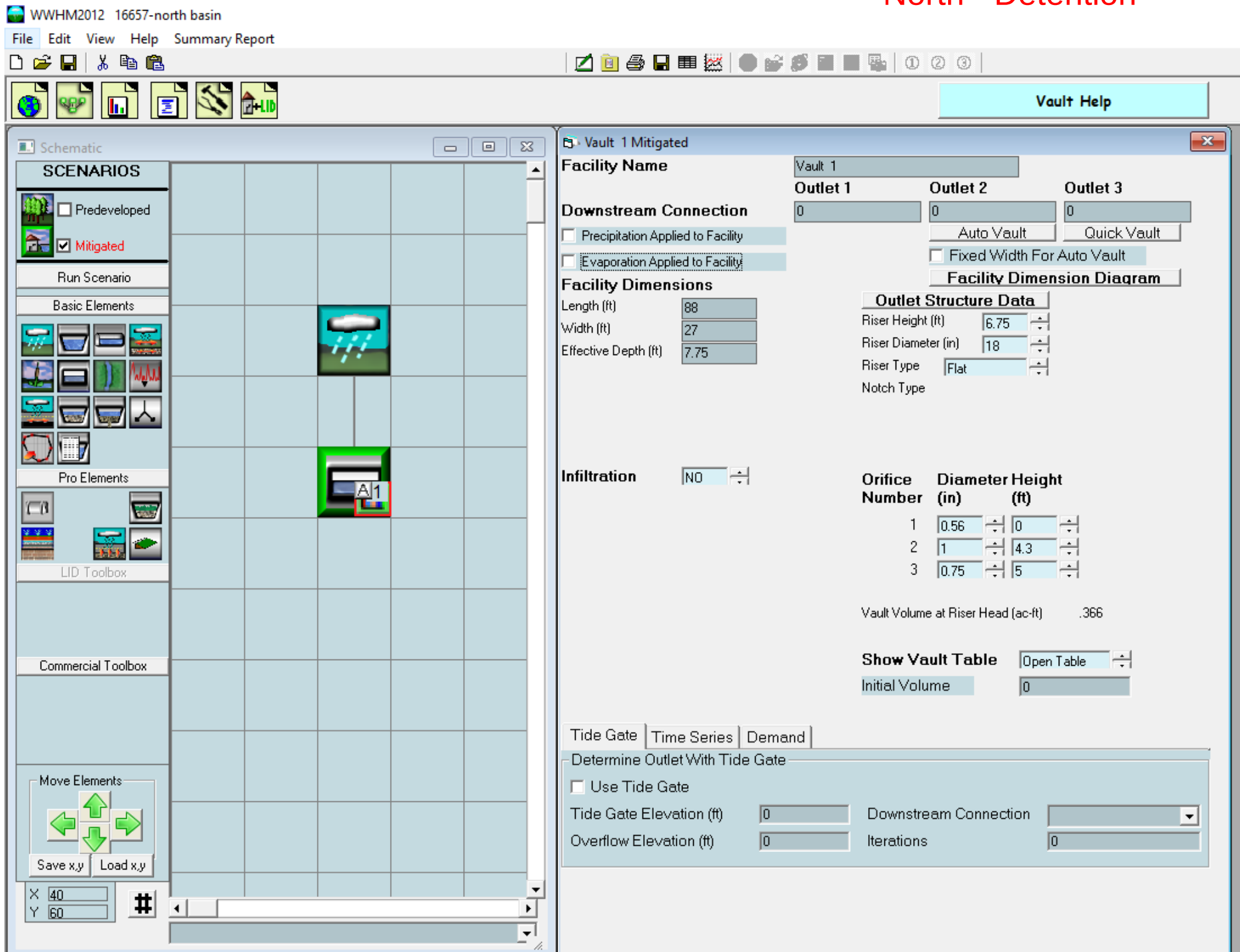
Impervious Total  Acres

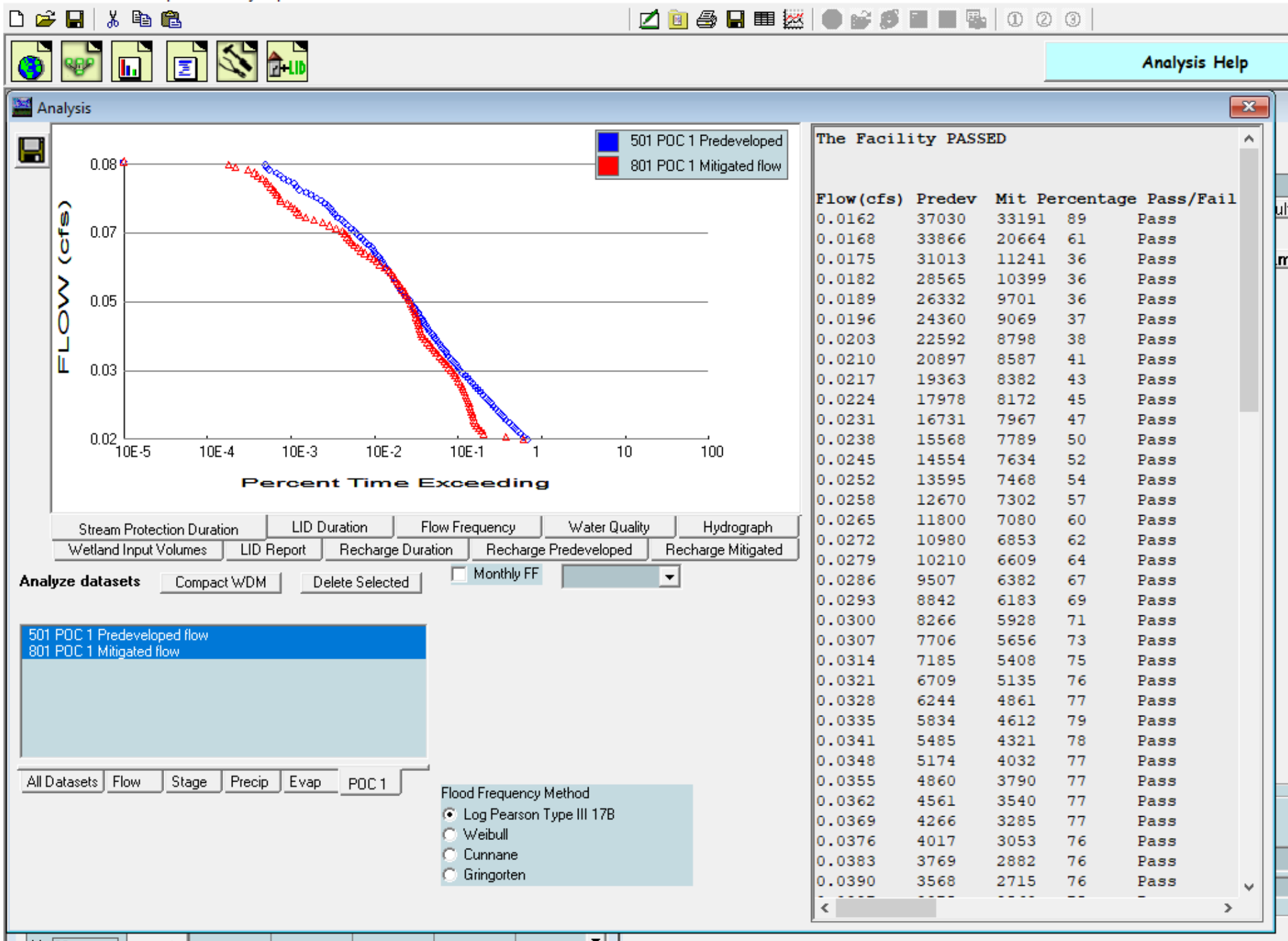
Basin Total  Acres

Precipitation Gauge  Auto Assign Gages

Deselect Zero Select By:  GO

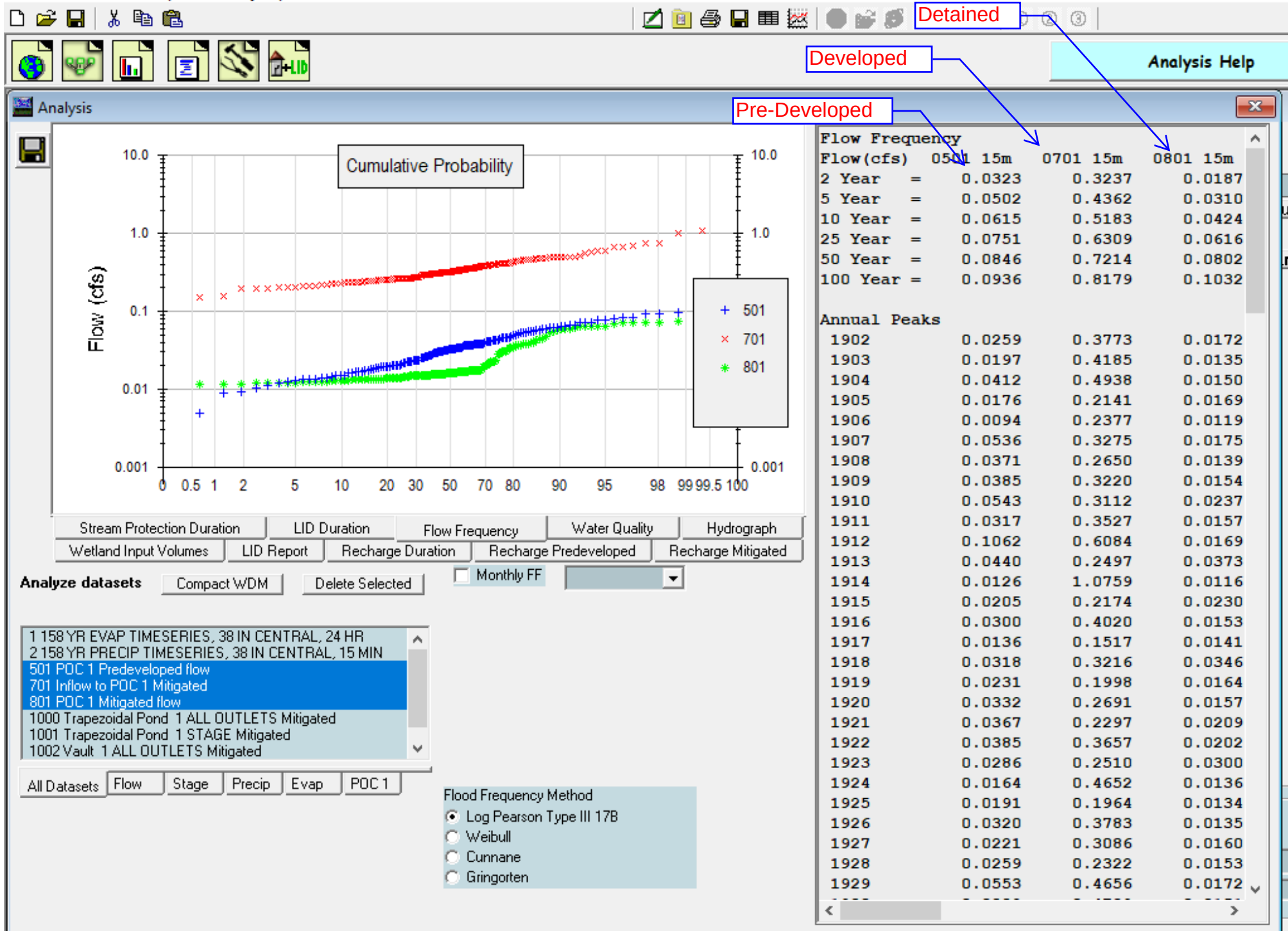
## North - Detention





# North - Flows

WWHM2012 16657-north basin  
File Edit View Help Summary Report

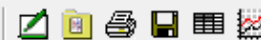




# North - Stage

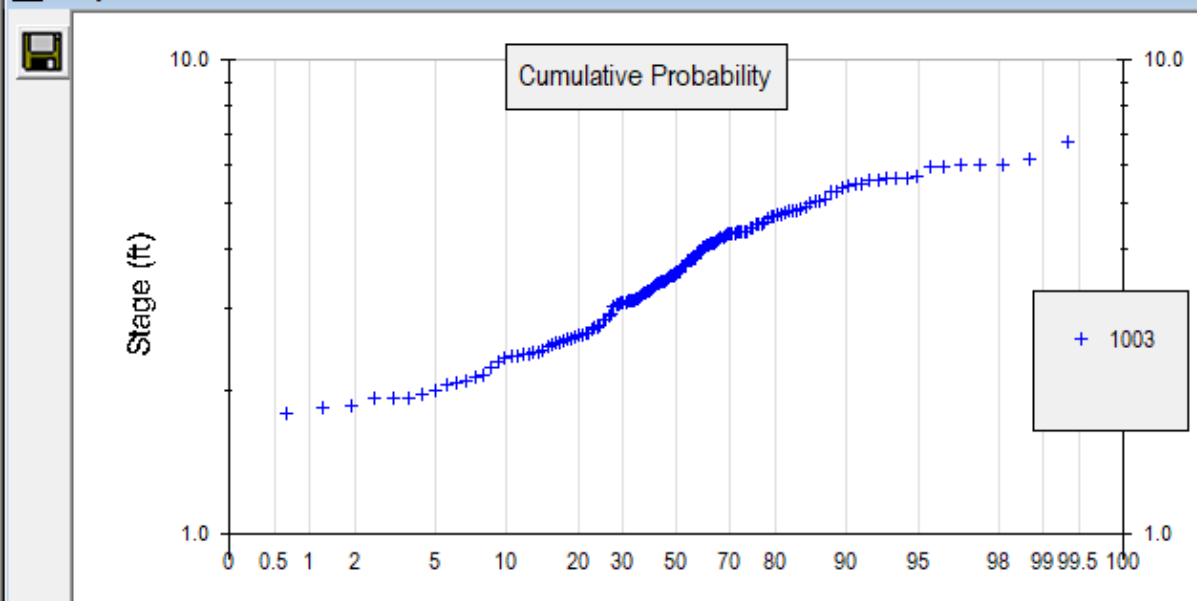
WWHM2012 16657-north basin

File Edit View Help Summary Report



Analysis Help

Analysis



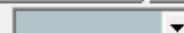
Stream Protection Duration LID Duration Flow Frequency Water Quality Hydrograph  
Wetland Input Volumes LID Report Recharge Duration Recharge Predeveloped Recharge Mitigated

Analyze datasets

Compact WDM

Delete Selected

☐ Monthly FF



1001 Trapezoidal Pond 1 STAGE Mitigated  
1003 Vault 1 STAGE Mitigated

All Datasets Flow Stage Precip Evap POC 1

Flood Frequency Method

- ☒ Log Pearson Type III 17B
- ☐ Weibull
- ☐ Cunnane
- ☐ Gringorten

Stage Frequency

(feet) 1003 15m  
2 Year = 3.5572  
5 Year = 4.5957  
10 Year = 5.2238  
25 Year = 5.9627  
50 Year = 6.4795  
100 Year = 6.9716

Annual Peaks

|      |        |
|------|--------|
| 1902 | 4.0717 |
| 1903 | 2.5314 |
| 1904 | 3.1151 |
| 1905 | 3.9369 |
| 1906 | 1.9665 |
| 1907 | 4.2205 |
| 1908 | 2.6503 |
| 1909 | 3.2698 |
| 1910 | 4.3604 |
| 1911 | 3.3943 |
| 1912 | 3.9404 |
| 1913 | 4.7766 |
| 1914 | 1.8473 |
| 1915 | 4.3500 |
| 1916 | 3.2383 |
| 1917 | 2.7526 |
| 1918 | 4.6602 |
| 1919 | 3.7223 |
| 1920 | 3.4068 |
| 1921 | 4.3225 |
| 1922 | 4.3132 |
| 1923 | 4.4950 |
| 1924 | 2.5639 |
| 1925 | 2.4966 |
| 1926 | 2.5229 |
| 1927 | 3.5268 |
| 1928 | 3.2515 |
| 1929 | 4.0930 |



# Canterwood

## Gig Harbor, Washington

### STORMTECH CHAMBER SPECIFICATIONS

1. CHAMBERS SHALL BE STORMTECH MC-4500 OR APPROVED EQUAL.
2. CHAMBERS SHALL BE MANUFACTURED FROM VIRGIN, IMPACT-MODIFIED POLYPROPYLENE COPOLYMERS.
3. CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORT PANELS THAT WOULD IMPEDE FLOW OR LIMIT ACCESS FOR INSPECTION.
4. THE STRUCTURAL DESIGN OF THE CHAMBERS, THE STRUCTURAL BACKFILL, AND THE INSTALLATION REQUIREMENTS SHALL ENSURE THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET FOR: 1) LONG-DURATION DEAD LOADS AND 2) SHORT-DURATION LIVE LOADS, BASED ON THE AASHTO DESIGN TRUCK WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.
5. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
6. CHAMBERS SHALL BE DESIGNED AND ALLOWABLE LOADS DETERMINED IN ACCORDANCE WITH ASTM F2787, "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
7. ONLY CHAMBERS THAT ARE APPROVED BY THE SITE DESIGN ENGINEER WILL BE ALLOWED. THE CHAMBER MANUFACTURER SHALL SUBMIT THE FOLLOWING UPON REQUEST TO THE SITE DESIGN ENGINEER FOR APPROVAL BEFORE DELIVERING CHAMBERS TO THE PROJECT SITE:
  - a. A STRUCTURAL EVALUATION SEALED BY A REGISTERED PROFESSIONAL ENGINEER THAT DEMONSTRATES THAT THE SAFETY FACTORS ARE GREATER THAN OR EQUAL TO 1.95 FOR DEAD LOAD AND 1.75 FOR LIVE LOAD, THE MINIMUM REQUIRED BY ASTM F2787 AND BY AASHTO FOR THERMOPLASTIC PIPE.
  - b. A STRUCTURAL EVALUATION SEALED BY A REGISTERED PROFESSIONAL ENGINEER THAT DEMONSTRATES THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET. THE 50 YEAR CREEP MODULUS DATA SPECIFIED IN ASTM F2418 MUST BE USED AS PART OF THE AASHTO STRUCTURAL EVALUATION TO VERIFY LONG-TERM PERFORMANCE.
  - c. STRUCTURAL CROSS SECTION DETAIL ON WHICH THE STRUCTURAL EVALUATION IS BASED.
8. CHAMBERS AND END CAPS SHALL BE PRODUCED AT AN ISO 9001 CERTIFIED MANUFACTURING FACILITY.

### IMPORTANT - NOTES FOR THE BIDDING AND INSTALLATION OF MC-4500 CHAMBER SYSTEM

1. STORMTECH MC-4500 CHAMBERS SHALL NOT BE INSTALLED UNTIL THE MANUFACTURER'S REPRESENTATIVE HAS COMPLETED A PRE-CONSTRUCTION MEETING WITH THE INSTALLERS.
2. STORMTECH MC-4500 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
3. CHAMBERS ARE NOT TO BE BACKFILLED WITH A DOZER OR EXCAVATOR SITUATED OVER THE CHAMBERS.  
  
STORMTECH RECOMMENDS 3 BACKFILL METHODS:
  - STONESHOOTER LOCATED OFF THE CHAMBER BED.
  - BACKFILL AS ROWS ARE BUILT USING AN EXCAVATOR ON THE FOUNDATION STONE OR SUBGRADE.
  - BACKFILL FROM OUTSIDE THE EXCAVATION USING A LONG BOOM HOE OR EXCAVATOR.
4. THE FOUNDATION STONE SHALL BE LEVELED AND COMPACTED PRIOR TO PLACING CHAMBERS.
5. JOINTS BETWEEN CHAMBERS SHALL BE PROPERLY SEATED PRIOR TO PLACING STONE.
6. MAINTAIN MINIMUM - 9" (230 mm) SPACING BETWEEN THE CHAMBER ROWS.
7. INLET AND OUTLET MANIFOLDS MUST BE INSERTED A MINIMUM OF 12" (300 mm) INTO CHAMBER END CAPS.
8. EMBEDMENT STONE SURROUNDING CHAMBERS MUST BE A CLEAN, CRUSHED, ANGULAR STONE 3/4-2" (20-50 mm) MEETING THE AASHTO M43 DESIGNATION OF #3 OR #4.
9. STONE SHALL BE BROUGHT UP EVENLY AROUND CHAMBERS SO AS NOT TO DISTORT THE CHAMBER SHAPE. STONE DEPTHS SHOULD NEVER DIFFER BY MORE THAN 12" (300 mm) BETWEEN ADJACENT CHAMBER ROWS.
10. STONE MUST BE PLACED ON THE TOP CENTER OF THE CHAMBER TO ANCHOR THE CHAMBERS IN PLACE AND PRESERVE ROW SPACING.
11. ADS RECOMMENDS THE USE OF "FLEXSTORM CATCH IT" INSERTS DURING CONSTRUCTION FOR ALL INLETS TO PROTECT THE SUBSURFACE STORMWATER MANAGEMENT SYSTEM FROM CONSTRUCTION SITE RUNOFF.

### NOTES FOR CONSTRUCTION EQUIPMENT

1. STORMTECH MC-4500 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
2. THE USE OF EQUIPMENT OVER MC-4500 CHAMBERS IS LIMITED:
  - NO EQUIPMENT IS ALLOWED ON BARE CHAMBERS.
  - NO RUBBER TIRED LOADER, DUMP TRUCK, OR EXCAVATORS ARE ALLOWED UNTIL PROPER FILL DEPTHS ARE REACHED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
  - WEIGHT LIMITS FOR CONSRUCTION EQUIPMENT CAN BE FOUND IN THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
3. FULL 36" (900 mm) OF STABILIZED COVER MATERIALS OVER THE CHAMBERS IS REQUIRED FOR DUMP TRUCK TRAVEL OR DUMPING.

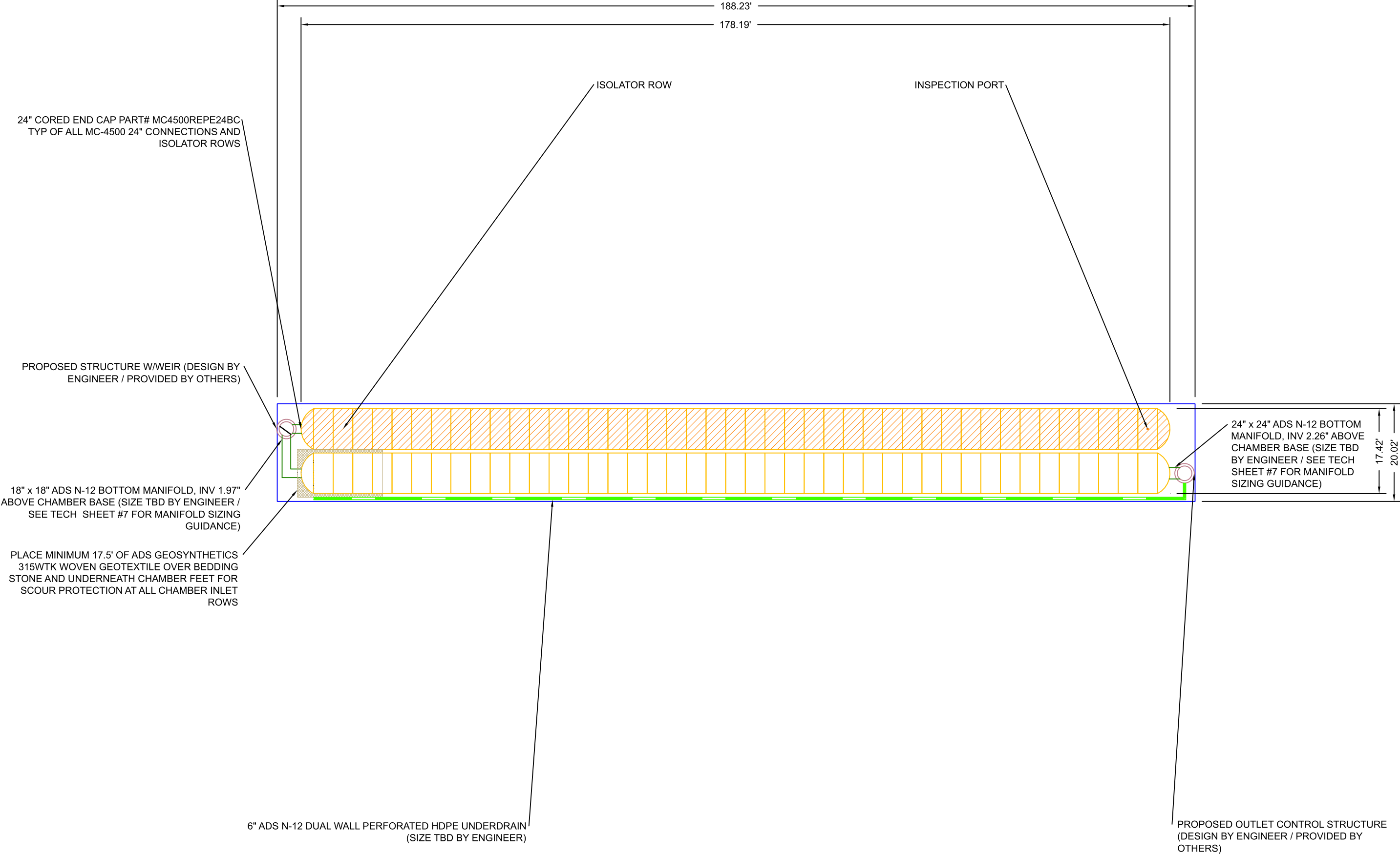
**USE OF A DOZER TO PUSH EMBEDMENT STONE BETWEEN THE ROWS OF CHAMBERS MAY CAUSE DAMAGE TO CHAMBERS AND IS NOT AN ACCEPTABLE BACKFILL METHOD. ANY CHAMBERS DAMAGED BY USING THE "DUMP AND PUSH" METHOD ARE NOT COVERED UNDER THE STORMTECH STANDARD WARRANTY.**

CONTACT STORMTECH AT 1-888-892-2694 WITH ANY QUESTIONS ON INSTALLATION REQUIREMENTS OR WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT.

CONCEPTUAL LAYOUT

(86) STORMTECH MC-4500 CHAMBERS  
(4) STORMTECH MC-4500 END CAPS  
INSTALLED WITH 12 " COVER STONE, 12 " BASE STONE, 40% STONE VOID  
**INSTALLED SYSTEM VOLUME: 16131 CF**  
AREA OF SYSTEM: 3768 FT²  
PERIMETER OF SYSTEM: 417 FT

COMPUTER GENERATED CONCEPTUAL LAYOUT - NOT FOR CONSTRUCTION



|                                                                                                                                                                                              |  |                                                           |  |              |     |       |                  |           |                 |              |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-----------------------------------------------------------|--|--------------|-----|-------|------------------|-----------|-----------------|--------------|
| Canterwood<br>Gig Harbor, Washington                                                                                                                                                         |  | DESCRIPTION                                               |  | REV          | DRW | CHK   | DATE: 01/16/2018 | DRAWN: KH | PROJECT #: Tool | CHECKED: --- |
|                                                                                                                                                                                              |  |                                                           |  |              |     |       |                  |           |                 |              |
| <br>70 NWWOOD ROAD, SUITE 3   ROCKY HILL, CT   06067<br>860-529-8188   888-802-2694   WWW.STORMTECH.COM |  | 4640 TRUEMAN BLVD<br>HILLIARD, OH 43026<br>1-800-733-7473 |  | NOT TO SCALE |     | SHEET |                  | 2 OF 6    |                 |              |
|                                                                                                                                                                                              |  |                                                           |  |              |     |       |                  |           |                 |              |

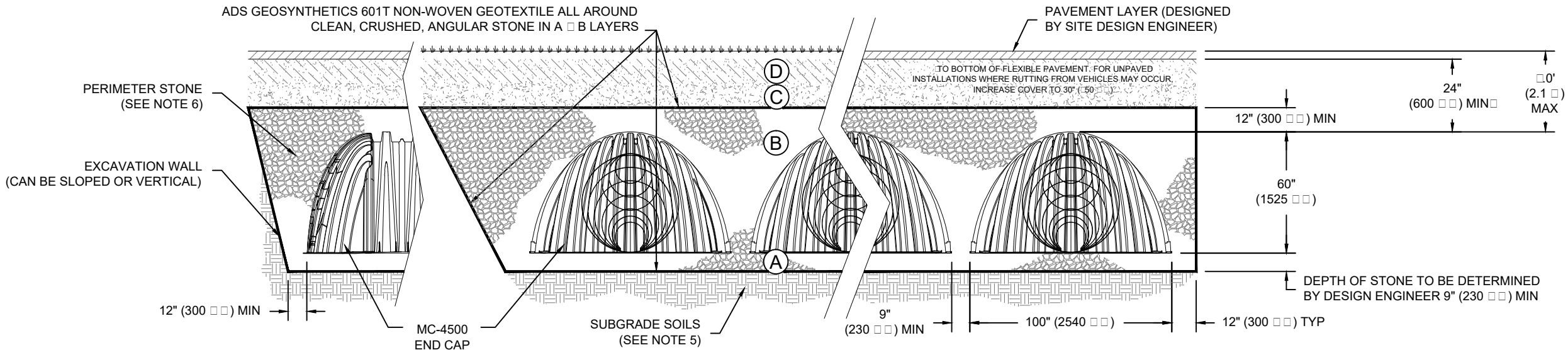
THIS DRAWING HAS BEEN PREPARED BASED ON INFORMATION PROVIDED TO ADS UNDER THE DIRECTION OF THE SITE DESIGN ENGINEER OR OTHER PROJECT REPRESENTATIVE. THE SITE DESIGN ENGINEER SHALL REVIEW THIS DRAWING PRIOR TO CONSTRUCTION. IT IS THE ULTIMATE RESPONSIBILITY OF THE SITE DESIGN ENGINEER TO ENSURE THAT THE PRODUCT(S) DEPICTED AND ALL ASSOCIATED DETAILS MEET ALL APPLICABLE LAWS, REGULATIONS, AND PROJECT REQUIREMENTS.

**ACCEPTABLE FILL MATERIALS** STORMTEC MC C/CAMER SYSTEMS

| MATERIAL LOCATION |                                                                                                                                                                                                                  | DESCRIPTION                                                                                                                                                | AASHTO MATERIAL CLASSIFICATIONS                                                                                                            | COMPACTION / DENSITY REQUIREMENT                                                                                                                                                                                                                      |
|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| D                 | <b>FINAL FILL</b> —FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER  | ANY SOIL/ROCK MATERIALS, NATIVE SOILS, OR PER ENGINEER'S PLANS. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.                                            | N/A                                                                                                                                        | PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.                                                                                                                               |
| C                 | <b>INITIAL FILL</b> —FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 24" (600 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER. | GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, ≤35% FINES OR PROCESSED AGGREGATE.<br><br>MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER. | AASHTO M145 <sup>1</sup><br>A-1, A-2-4, A-3<br><br>OR<br><br>AASHTO M43 <sup>1</sup><br>3, 35, 4, 46, 5, 56, 5, 6, 6, 6, 6, 6, 6, 9, 9, 10 | BEGIN COMPACTIONS AFTER 24" (600 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 12" (300 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS. |
| B                 | <b>EMBEDMENT STONE</b> —FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.                                                                                              | CLEAN, CRUSHED, ANGULAR STONE, NOMINAL SIZE DISTRIBUTION BETWEEN 3/4-2 INCH (20-50 mm)                                                                     | AASHTO M43 <sup>1</sup><br>3, 4                                                                                                            | NO COMPACTION REQUIRED.                                                                                                                                                                                                                               |
| A                 | <b>FOUNDATION STONE</b> —FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.                                                                                                           | CLEAN, CRUSHED, ANGULAR STONE, NOMINAL SIZE DISTRIBUTION BETWEEN 3/4-2 INCH (20-50 mm)                                                                     | AASHTO M43 <sup>1</sup><br>3, 4                                                                                                            | PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE. <sup>2 3</sup>                                                                                                                                                                                       |

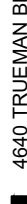
PLEASE NOTE:

1. THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR 1/4" STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".
2. STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 9" (230 mm) (MAX) LIFTS USING TWO FULL COVERAGES WITH A VIBRATORY COMPACTOR.
3. WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS.

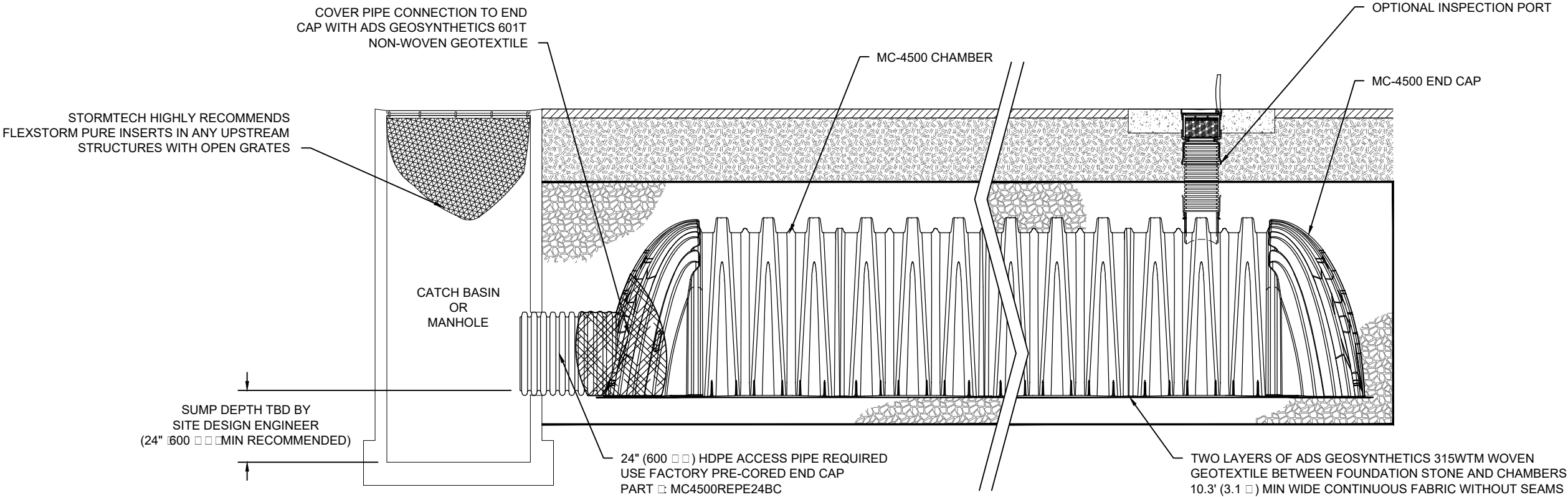


## NOTES

1. MC-4500 CHAMBERS SHALL CONFORM TO THE REQUIREMENTS OF ASTM F2412 "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
  2. MC-4500 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2321 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
  3. "ACCEPTABLE FILL MATERIALS" TABLE ABOVE PROVIDES MATERIAL LOCATIONS, DESCRIPTIONS, GRADATIONS, AND COMPACTION REQUIREMENTS FOR FOUNDATION, EMBEDMENT, AND FILL MATERIALS.
  4. THE "SITE DESIGN ENGINEER" REFERS TO THE ENGINEER RESPONSIBLE FOR THE DESIGN AND LAYOUT OF THE STORMTECH CHAMBERS FOR THIS PROJECT.
  5. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS.
  6. PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
- ONCE LAYER 'C' IS PLACED, ANY SOIL/MATERIAL CAN BE PLACED IN LAYER 'D' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS OF LAYER 'C' OR 'D' AT THE SITE DESIGN ENGINEER'S DISCRETION.

|                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                           |                                                                                                                                                                                                                                                                     |            |          |     |     |     |             |                                      |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|----------|-----|-----|-----|-------------|--------------------------------------|
| <br><b>VDS</b><br><small>ADVANCED DRAINAGE SYSTEMS, INC.</small>                                                                                                                                                                                                                                                                           | 4640 TRUEMAN BLVD<br>HILLIARD, OH 43026<br>1-800-333-7433 | <br><b>StormTech</b><br><small>Detention/Retention/Water Quality</small><br>70 INWOOD ROAD, SUITE 3   ROCKY HILL, CT   06067<br>860-529-7100   860-392-2694   WWW.STORMTECH.COM |            |          | REV | DRW | CHK | DESCRIPTION | Canterbury<br>Gig Harbor, Washington |
|                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                           |                                                                                                                                                                                                                                                                     |            |          |     |     |     |             |                                      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                           |                                                                                                                                                                                                                                                                     |            |          |     |     |     |             |                                      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                           |                                                                                                                                                                                                                                                                     |            |          |     |     |     |             |                                      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                           |                                                                                                                                                                                                                                                                     |            |          |     |     |     |             |                                      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                           | DATE:                                                                                                                                                                                                                                                               | 01/16/2018 | DRAWN:   | KH  |     |     |             |                                      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                           | PROJECT                                                                                                                                                                                                                                                             | Too        | CHECKED: | --- |     |     |             |                                      |
| THIS DRAWING HAS BEEN PREPARED BASED ON INFORMATION PROVIDED TO ADS UNDER THE DIRECTION OF THE SITE DESIGN ENGINEER OR OTHER PROJECT REPRESENTATIVE. THE SITE DESIGN ENGINEER SHALL REVIEW THIS DRAWING PRIOR TO CONSTRUCTION. IT IS THE ULTIMATE RESPONSIBILITY OF THE SITE DESIGN ENGINEER TO ENSURE THAT THE PRODUCT(S) DEPICTED AND ALL ASSOCIATED DETAILS MEET ALL APPLICABLE LAWS, REGULATIONS, AND PROJECT REQUIREMENTS. |                                                           |                                                                                                                                                                                                                                                                     |            |          |     |     |     |             |                                      |





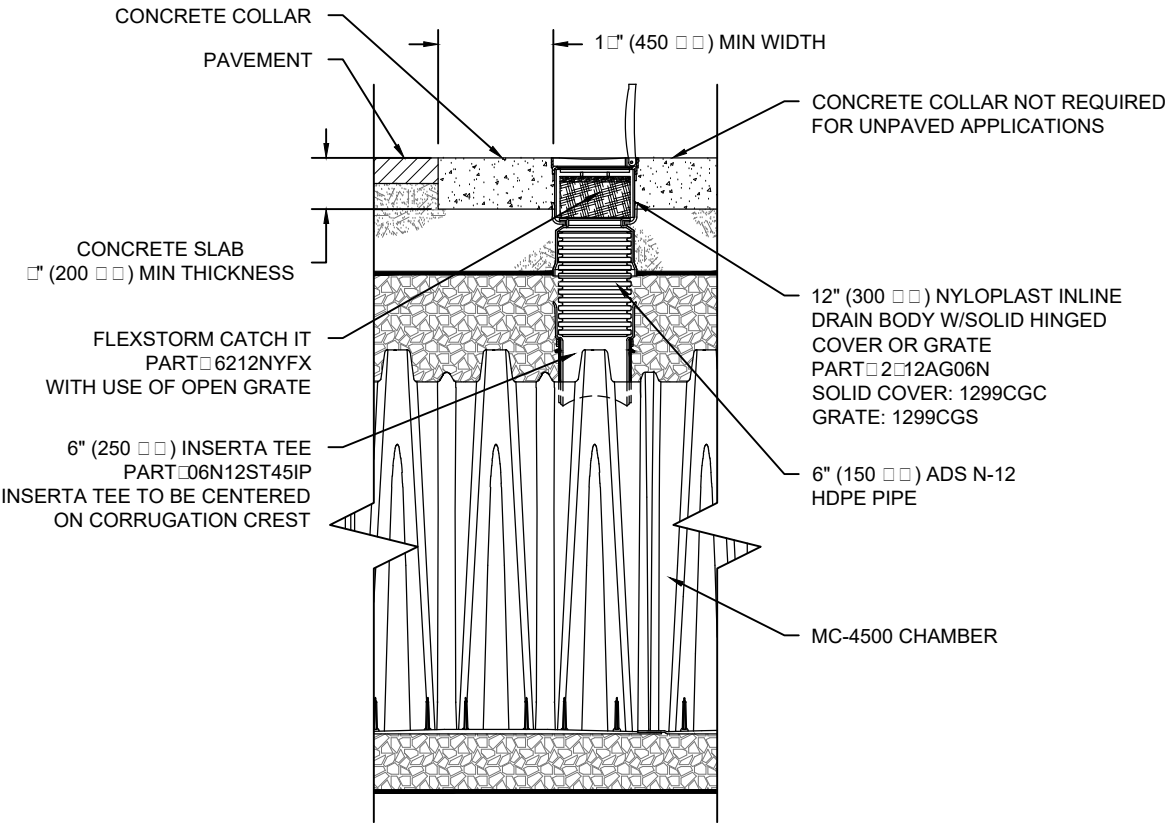
MC Isolator Row Detail  
NTS

INSPECTION & MAINTENANCE

- STEP 1) INSPECT ISOLATOR ROW FOR SEDIMENT
- A. INSPECTION PORTS (IF PRESENT)
    - A.1. REMOVE/OPEN LID ON NYLOPLAST INLINE DRAIN
    - A.2. REMOVE AND CLEAN FLEXSTORM FILTER IF INSTALLED
    - A.3. USING A FLASHLIGHT AND STADIA ROD, MEASURE DEPTH OF SEDIMENT AND RECORD ON MAINTENANCE LOG
    - A.4. LOWER A CAMERA INTO ISOLATOR ROW FOR VISUAL INSPECTION OF SEDIMENT LEVELS (OPTIONAL)
    - A.5. IF SEDIMENT IS AT, OR ABOVE, 3" (75 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.
  - B. ALL ISOLATOR ROWS
    - B.1. REMOVE COVER FROM STRUCTURE AT UPSTREAM END OF ISOLATOR ROW
    - B.2. USING A FLASHLIGHT, INSPECT DOWN THE ISOLATOR ROW THROUGH OUTLET PIPE
      - MIRRORS ON POLES OR CAMERAS MAY BE USED TO AVOID A CONFINED SPACE ENTRY
      - FOLLOW OSHA REGULATIONS FOR CONFINED SPACE ENTRY IF ENTERING MANHOLE
    - B.3. IF SEDIMENT IS AT, OR ABOVE, 3" (75 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.
- STEP 2) CLEAN OUT ISOLATOR ROW USING THE ETVAC PROCESS
- A. A FIXED CULVERT CLEANING NOZZLE WITH REAR FACING SPREAD OF 45" (1.1 m) OR MORE IS PREFERRED
  - B. APPLY MULTIPLE PASSES OF ETVAC UNTIL BACKFLUSH WATER IS CLEAN
  - C. VACUUM STRUCTURE SUMP AS REQUIRED
- STEP 3) REPLACE ALL COVERS, GRATES, FILTERS, AND LIDS. RECORD OBSERVATIONS AND ACTIONS.
- STEP 4) INSPECT AND CLEAN BASINS AND MANHOLES UPSTREAM OF THE STORMTECH SYSTEM.

NOTES

- INSPECT EVERY 6 MONTHS DURING THE FIRST YEAR OF OPERATION. ADJUST THE INSPECTION INTERVAL BASED ON PREVIOUS OBSERVATIONS OF SEDIMENT ACCUMULATION AND HIGH WATER ELEVATIONS.
- CONDUCT SETTING AND VACTORING ANNUALLY OR WHEN INSPECTION SHOWS THAT MAINTENANCE IS NECESSARY.



MC 6" Inspection Port Detail  
NTS



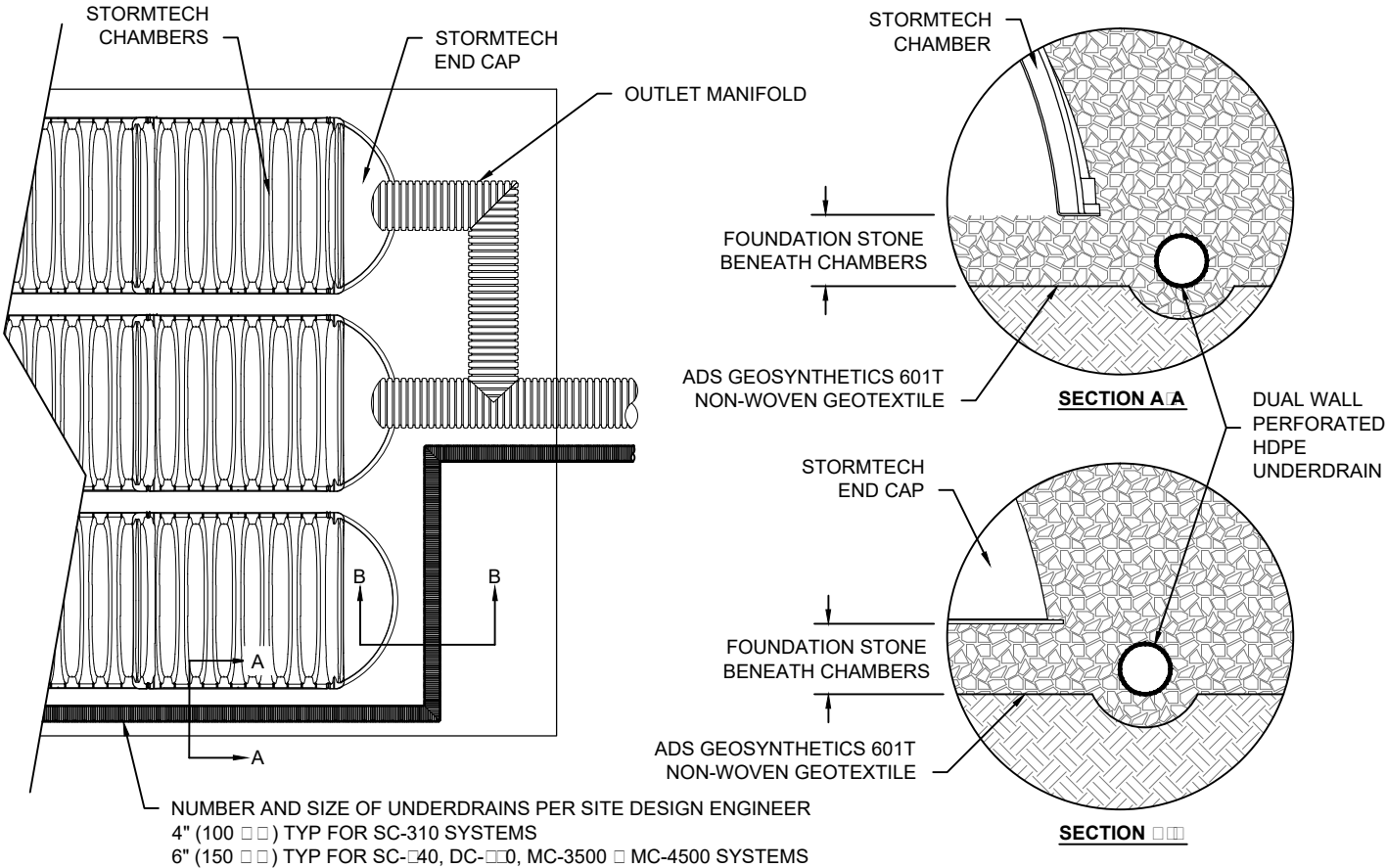
4640 TRUEJMAN BLVD  
HILLIARD, OH 43026  
1-800-33-7473  
ADVANCED DRAINAGE SYSTEMS, INC.

| REV | DRW | CHK | DESCRIPTION |
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|                                      |  |                                                                                                                                                                                                                                                                                                                                                                                                                                 |           |             |
|--------------------------------------|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-------------|
| Canterwood<br>Gig Harbor, Washington |  | DATE: 01/16/2018                                                                                                                                                                                                                                                                                                                                                                                                                | DRAWN: KH | CHECKED: -- |
| PROJECT: Too                         |  | THIS DRAWING HAS BEEN PREPARED BASED ON INFORMATION PROVIDED TO ADS UNDER THE DIRECTION OF THE SITE DESIGN ENGINEER OR OTHER PROJECT REPRESENTATIVE. THE SITE DESIGN ENGINEER SHALL REVIEW THIS DRAWING PRIOR TO CONSTRUCTION. IT IS THE ULTIMATE RESPONSIBILITY OF THE SITE DESIGN ENGINEER TO ENSURE THAT THE PRODUCT(S) DEPICTED AND ALL ASSOCIATED DETAILS MEET ALL APPLICABLE LAWS, REGULATIONS, AND PROJECT REQUIREMENTS. |           |             |

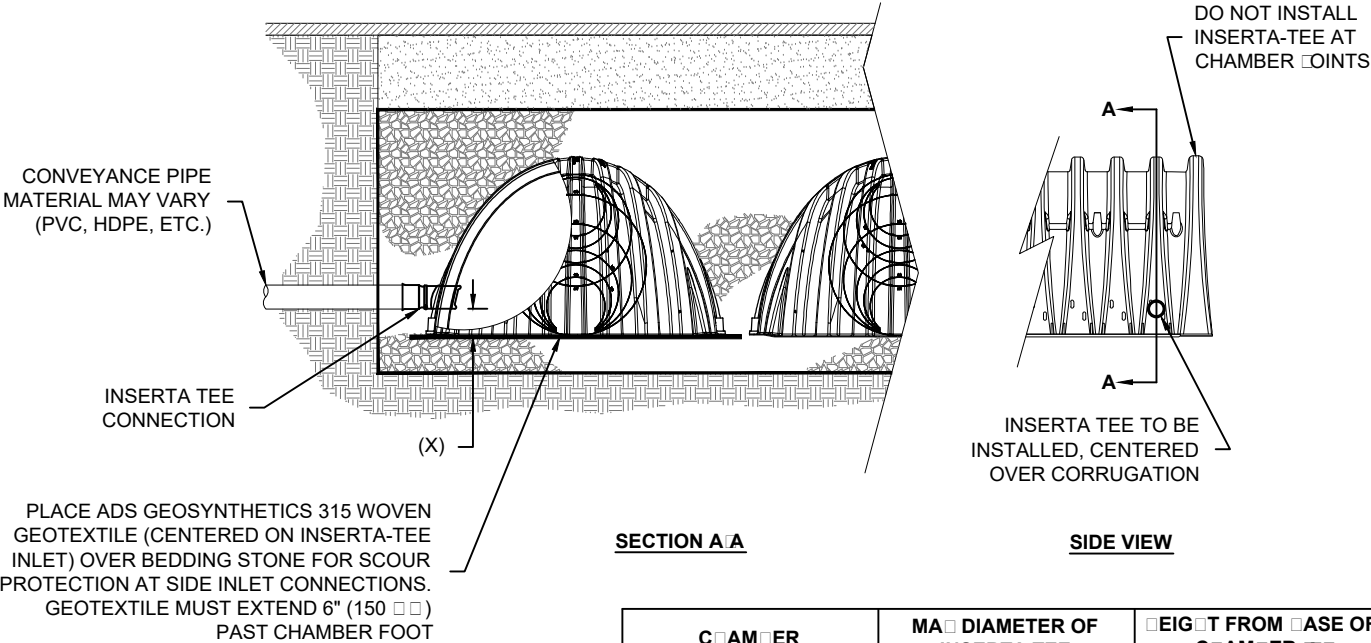
UNDERDRAIN DETAIL

NTS



INSERTA TEE DETAIL

NTS



SECTION A-A

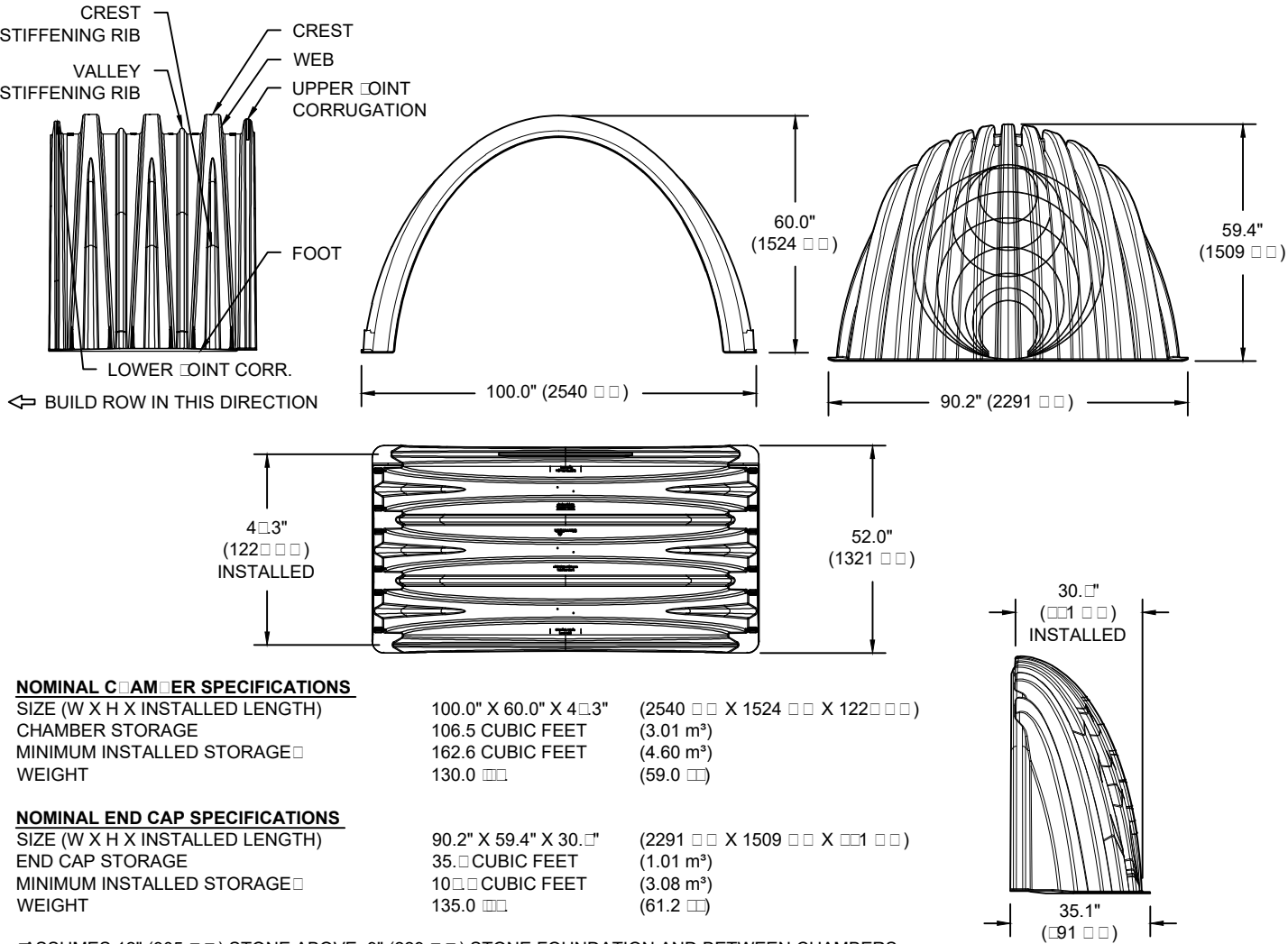
SIDE VIEW

| CHAMBER                                                                                                                       | MANHOLE DIAMETER OF INSERTA TEE | EIGHT FROM BASE OF CHAMBER |
|-------------------------------------------------------------------------------------------------------------------------------|---------------------------------|----------------------------|
| SC-310                                                                                                                        | 6" (150 sq ft)                  | 4" (100 sq ft)             |
| SC-40                                                                                                                         | 10" (250 sq ft)                 | 4" (100 sq ft)             |
| DC-40                                                                                                                         | 10" (250 sq ft)                 | 4" (100 sq ft)             |
| MC-3500                                                                                                                       | 12" (300 sq ft)                 | 6" (150 sq ft)             |
| MC-4500                                                                                                                       | 12" (300 sq ft)                 | 8" (200 sq ft)             |
| INSERTA TEE FITTINGS AVAILABLE FOR SDR 26, SDR 35, SCH 40 IPS GASKETED OR SOLVENT WELD, N-12, HP STORM, C-900 OR DUCTILE IRON |                                 |                            |

**NOTE**  
PART NUMBERS WILL VARY BASED ON INLET PIPE MATERIALS. CONTACT STORMTECH FOR MORE INFORMATION.

MC TECHNICAL SPECIFICATION

NTS



NOMINAL CHAMBER SPECIFICATIONS

|                                 |                       |                                       |
|---------------------------------|-----------------------|---------------------------------------|
| SIZE (W X H X INSTALLED LENGTH) | 100.0" X 60.0" X 4.3" | (2540 sq ft X 1524 sq ft X 122 sq ft) |
| CHAMBER STORAGE                 | 106.5 CUBIC FEET      | (3.01 m³)                             |
| MINIMUM INSTALLED STORAGE       | 162.6 CUBIC FEET      | (4.60 m³)                             |
| WEIGHT                          | 130.0 lbs             | (59.0 kg)                             |

NOMINAL END CAP SPECIFICATIONS

|                                 |                       |                                       |
|---------------------------------|-----------------------|---------------------------------------|
| SIZE (W X H X INSTALLED LENGTH) | 90.2" X 59.4" X 30.1" | (2291 sq ft X 1509 sq ft X 761 sq ft) |
| END CAP STORAGE                 | 35.1 CUBIC FEET       | (1.01 m³)                             |
| MINIMUM INSTALLED STORAGE       | 10.0 CUBIC FEET       | (3.08 m³)                             |
| WEIGHT                          | 135.0 lbs             | (61.2 kg)                             |

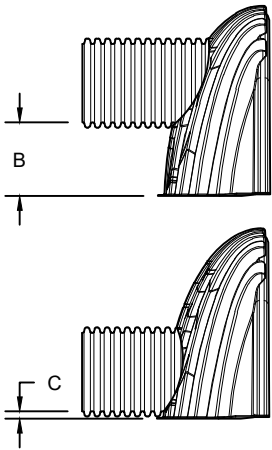
ASSUMES 12" (305 sq ft) STONE ABOVE, 9" (229 sq ft) STONE FOUNDATION AND BETWEEN CHAMBERS, 12" (305 sq ft) STONE PERIMETER IN FRONT OF END CAPS AND 40% STONE POROSITY.

STUBS AT BOTTOM OF END CAP FOR PART NUMBERS ENDING WITH "B"  
STUBS AT TOP OF END CAP FOR PART NUMBERS ENDING WITH "T"

| PART           | STUB             | STUB               | C                |
|----------------|------------------|--------------------|------------------|
| MC4500REPE06T  | 6" (150 sq ft)   | 42.54" (1.071 m)   | ---              |
| MC4500REPE06B  | ---              | ---                | 0.16" (22 sq ft) |
| MC4500REPE08T  | 8" (200 sq ft)   | 40.50" (1.029 m)   | ---              |
| MC4500REPE08B  | ---              | ---                | 1.01" (26 sq ft) |
| MC4500REPE10T  | 10" (250 sq ft)  | 38.3" (9.5 sq ft)  | ---              |
| MC4500REPE10B  | ---              | ---                | 1.33" (34 sq ft) |
| MC4500REPE12T  | 12" (300 sq ft)  | 35.69" (90 sq ft)  | ---              |
| MC4500REPE12B  | ---              | ---                | 1.55" (39 sq ft) |
| MC4500REPE15T  | 15" (375 sq ft)  | 32.12" (831 sq ft) | ---              |
| MC4500REPE15B  | ---              | ---                | 1.10" (43 sq ft) |
| MC4500REPE18TC | 18" (450 sq ft)  | 29.36" (746 sq ft) | ---              |
| MC4500REPE18BC | ---              | ---                | 1.9" (50 sq ft)  |
| MC4500REPE24TC | 24" (600 sq ft)  | 23.05" (585 sq ft) | ---              |
| MC4500REPE24BC | ---              | ---                | 2.26" (58 sq ft) |
| MC4500REPE30BC | 30" (750 sq ft)  | ---                | 2.95" (75 sq ft) |
| MC4500REPE36BC | 36" (900 sq ft)  | ---                | 3.25" (83 sq ft) |
| MC4500REPE42BC | 42" (1050 sq ft) | ---                | 3.55" (90 sq ft) |

NOTE: ALL DIMENSIONS ARE NOMINAL

CUSTOM PRECURED INVERTS ARE AVAILABLE UPON REQUEST. INVENTORIED MANIFOLDS INCLUDE 12-24" (300-600 sq ft) SIZE ON SIZE AND 15-4" (375-1200 sq ft) ECCENTRIC MANIFOLDS. CUSTOM INVERT LOCATIONS ON THE MC-4500 END CAP CUT IN THE FIELD ARE NOT RECOMMENDED FOR PIPE SIZES GREATER THAN 10" (250 sq ft). THE INVERT LOCATION IN COLUMN 'B' ARE THE HIGHEST POSSIBLE FOR THE PIPE SIZE.



4640 TRUEJMAN BLVD  
HILLIARD, OH 43026  
1-800-33-7473  
ADVANCED DRAINAGE SYSTEMS, INC.

Canterwood  
Gig Harbor, Washington

DESCRIPTION

CHK

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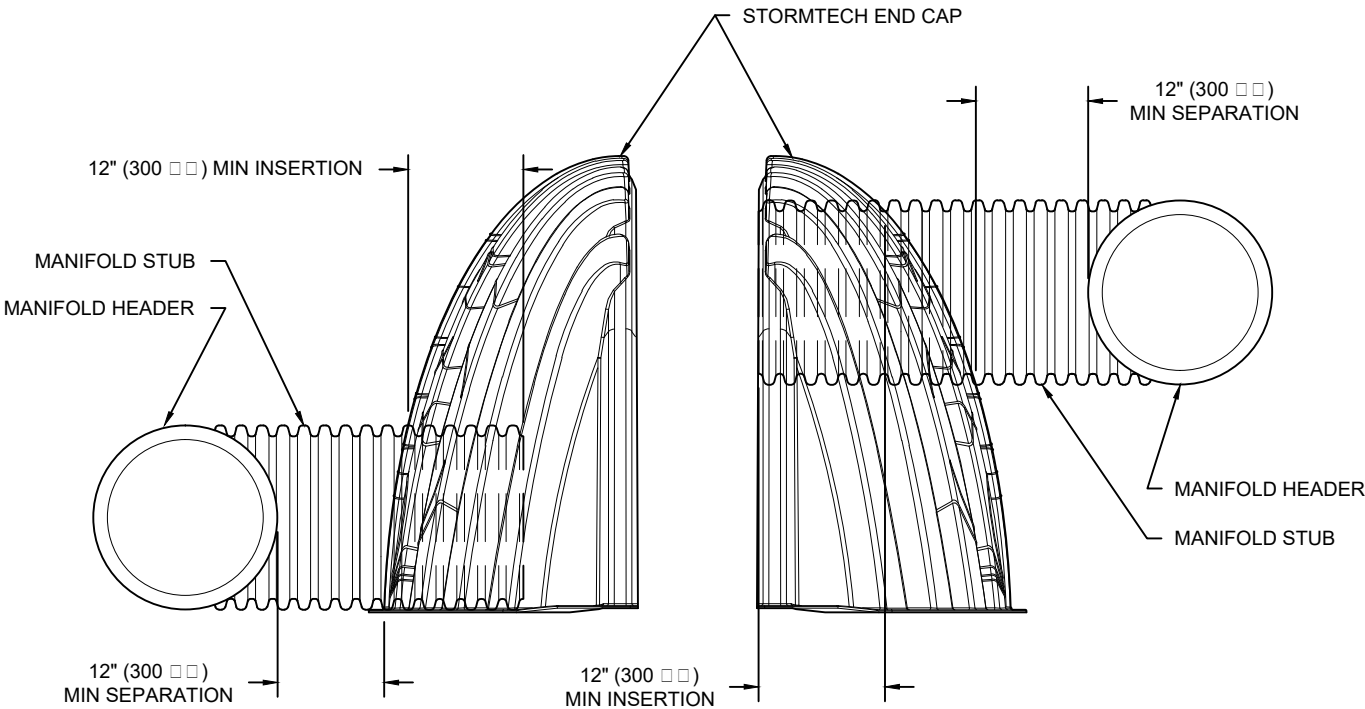
PROJECT

TOO

DATE:

MC SERIES END CAP INSERTION DETAIL

NTS



NOTE: MANIFOLD STUB MUST BE LAID HORIZONTAL FOR A PROPER FIT IN END CAP OPENING.

**ADS**  
ADVANCED DRAINAGE SYSTEMS, INC.  
4640 TRUEJMAN BLVD  
HILLIARD, OH 43026  
1-800-33-43



**StormTech**  
Detention • Retention • Water Quality  
70 INWOOD ROAD, SUITE 3 | ROCKY HILL | CT | 06067  
(860) 529-1111 | (860) 92-2684 | WWW.STORMTECH.COM

| REV | DRW | CHK | DESCRIPTION |
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Canterwood  
Gig Harbor, Washington

DATE: 01/16/2018  
DRAWN: KH  
PROJECT: Too  
CHECKED: ---

THIS DRAWING HAS BEEN PREPARED BASED ON INFORMATION PROVIDED TO ADS UNDER THE DIRECTION OF THE SITE DESIGN ENGINEER OR OTHER PROJECT REPRESENTATIVE. THE SITE DESIGN ENGINEER SHALL REVIEW THIS DRAWING PRIOR TO CONSTRUCTION. IT IS THE ULTIMATE RESPONSIBILITY OF THE SITE DESIGN ENGINEER TO ENSURE THAT THE PRODUCT(S) DEPICTED AND ALL ASSOCIATED DETAILS MEET ALL APPLICABLE LAWS, REGULATIONS, AND PROJECT REQUIREMENTS.

# South Basin





Basin Help

Schematic

## SCENARIOS



Run Scenario

## Basic Elements



## Pro Elements



## LID Toolbox

## Commercial Toolbox

## Move Elements



Save x,y Load x,y

X 40  
Y 36

Basin 1 Predeveloped

Subbasin Name: Basin 1

Surface

Interflow

Groundwater

Flows To :

## Area in Basin

☐ Show Only Selected

## Available Pervious Acres

|                                     |                     |      |
|-------------------------------------|---------------------|------|
| <input type="checkbox"/>            | A/B, Forest, Flat   | 0    |
| <input type="checkbox"/>            | A/B, Forest, Mod    | 0    |
| <input type="checkbox"/>            | A/B, Forest, Steep  | 0    |
| <input type="checkbox"/>            | A/B, Pasture, Flat  | 0    |
| <input type="checkbox"/>            | A/B, Pasture, Mod   | 0    |
| <input type="checkbox"/>            | A/B, Pasture, Steep | 0    |
| <input type="checkbox"/>            | A/B, Lawn, Flat     | 0    |
| <input type="checkbox"/>            | A/B, Lawn, Mod      | 0    |
| <input type="checkbox"/>            | A/B, Lawn, Steep    | 0    |
| <input type="checkbox"/>            | C, Forest, Flat     | 0    |
| <input type="checkbox"/>            | C, Forest, Mod      | 0    |
| <input checked="" type="checkbox"/> | C, Forest, Steep    | 1.93 |
| <input type="checkbox"/>            | C, Pasture, Flat    | 0    |
| <input type="checkbox"/>            | C, Pasture, Mod     | 0    |
| <input type="checkbox"/>            | C, Pasture, Steep   | 0    |
| <input checked="" type="checkbox"/> | C, Lawn, Flat       | 0    |
| <input checked="" type="checkbox"/> | C, Lawn, Mod        | 0    |
| <input checked="" type="checkbox"/> | C, Lawn, Steep      | 0    |
| <input type="checkbox"/>            | SAT, Forest, Flat   | 0    |
| <input type="checkbox"/>            | SAT, Forest, Mod    | 0    |
| <input type="checkbox"/>            | SAT, Forest, Steep  | 0    |

## Available Impervious Acres

|                                     |                 |   |
|-------------------------------------|-----------------|---|
| <input type="checkbox"/>            | ROADS/FLAT      | 0 |
| <input checked="" type="checkbox"/> | ROADS/MOD       | 0 |
| <input type="checkbox"/>            | ROADS/STEEP     | 0 |
| <input checked="" type="checkbox"/> | ROOF TOPS/FLAT  | 0 |
| <input type="checkbox"/>            | DRIVEWAYS/FLAT  | 0 |
| <input type="checkbox"/>            | DRIVEWAYS/MOD   | 0 |
| <input type="checkbox"/>            | DRIVEWAYS/STEEP | 0 |
| <input type="checkbox"/>            | SIDEWALKS/FLAT  | 0 |
| <input type="checkbox"/>            | SIDEWALKS/MOD   | 0 |
| <input type="checkbox"/>            | SIDEWALKS/STEEP | 0 |
| <input checked="" type="checkbox"/> | PARKING/FLAT    | 0 |
| <input type="checkbox"/>            | PARKING/MOD     | 0 |
| <input type="checkbox"/>            | PARKING/STEEP   | 0 |
| <input checked="" type="checkbox"/> | POND            | 0 |
| <input type="checkbox"/>            | Porous Pavement | 0 |

Pervious Total 1.93 Acres

Impervious Total 0 Acres

Basin Total 1.93 Acres

Precipitation Gage 2 - &lt;UNK&gt; | 158 YR PRECIP TIMESERIES, 38 IN CEN

Auto Assign Gages

Deselect Zero

Select By:

GO

**Schematic**

**SCENARIOS**

☐ Predeveloped

☒ **Mitigated**

Run Scenario

Basic Elements

Pro Elements

LID Toolbox

Commercial Toolbox

Move Elements

Save x,y Load x,y

X 30 Y 60 #

**Building B Roof Mitigated**

Subbasin Name: Building B Roof ☒ Designate as Bypass for POC:

Flows To : Surface Interflow Groundwater

☐ Show Only Selected

**Area in Basin**

| Available Pervious                                   | Acres |
|------------------------------------------------------|-------|
| <input type="checkbox"/> A/B, Forest, Flat           | 0     |
| <input type="checkbox"/> A/B, Forest, Mod            | 0     |
| <input type="checkbox"/> A/B, Forest, Steep          | 0     |
| <input type="checkbox"/> A/B, Pasture, Flat          | 0     |
| <input type="checkbox"/> A/B, Pasture, Mod           | 0     |
| <input type="checkbox"/> A/B, Pasture, Steep         | 0     |
| <input type="checkbox"/> A/B, Lawn, Flat             | 0     |
| <input type="checkbox"/> A/B, Lawn, Mod              | 0     |
| <input type="checkbox"/> A/B, Lawn, Steep            | 0     |
| <input type="checkbox"/> C, Forest, Flat             | 0     |
| <input type="checkbox"/> C, Forest, Mod              | 0     |
| <input checked="" type="checkbox"/> C, Forest, Steep | 0     |
| <input type="checkbox"/> C, Pasture, Flat            | 0     |
| <input type="checkbox"/> C, Pasture, Mod             | 0     |
| <input type="checkbox"/> C, Pasture, Steep           | 0     |
| <input checked="" type="checkbox"/> C, Lawn, Flat    | .06   |
| <input checked="" type="checkbox"/> C, Lawn, Mod     | 0     |
| <input checked="" type="checkbox"/> C, Lawn, Steep   | 0     |
| <input type="checkbox"/> SAT, Forest, Flat           | 0     |
| <input type="checkbox"/> SAT, Forest, Mod            | 0     |
| <input type="checkbox"/> SAT, Forest, Steep          | 0     |

**Available Impervious**

| Available Impervious                               | Acres |
|----------------------------------------------------|-------|
| <input type="checkbox"/> ROADS/FLAT                | 0     |
| <input checked="" type="checkbox"/> ROADS/MOD      | 0     |
| <input type="checkbox"/> ROADS/STEEP               | 0     |
| <input checked="" type="checkbox"/> ROOF TOPS/FLAT | 0     |
| <input type="checkbox"/> DRIVEWAYS/FLAT            | 0     |
| <input type="checkbox"/> DRIVEWAYS/MOD             | 0     |
| <input type="checkbox"/> DRIVEWAYS/STEEP           | 0     |
| <input type="checkbox"/> SIDEWALKS/FLAT            | 0     |
| <input type="checkbox"/> SIDEWALKS/MOD             | 0     |
| <input type="checkbox"/> SIDEWALKS/STEEP           | 0     |
| <input checked="" type="checkbox"/> PARKING/FLAT   | 0     |
| <input type="checkbox"/> PARKING/MOD               | 0     |
| <input type="checkbox"/> PARKING/STEEP             | 0     |
| <input checked="" type="checkbox"/> POND           | 0     |
| <input type="checkbox"/> Porous Pavement           | 0     |

Pervious Total 0.06 Acres

Impervious Total 0 Acres

Basin Total 0.06 Acres

Precipitation Gage 2 - <UNK> 1158 YR PRECIP TIMESERIES, 38 IN CEN Auto Assign Gages

Deselect Zero Select By:  GO

WWHM2012 16657-south basin

File Edit View Help Summary Report



Basin Help

Schematic

SCENARIOS

☐ Predeveloped

☒ Mitigated

Run Scenario

Basic Elements

Pro Elements

LID Toolbox

Commercial Toolbox

Move Elements

Save x,y Load x,y

X 50 Y 60

South Basin Mitigated

Subbasin Name: South Basin ☐ Designate as Bypass for POC

Flows To : Surface Trapezoidal Pond 1 Interflow Trapezoidal Pond 1 Groundwater

Area in Basin ☐ Show Only Selected

| Available Pervious                                   | Acres | Available Impervious                               | Acres |
|------------------------------------------------------|-------|----------------------------------------------------|-------|
| <input type="checkbox"/> A/B, Forest, Flat           | 0     | <input type="checkbox"/> ROADS/FLAT                | 0     |
| <input type="checkbox"/> A/B, Forest, Mod            | 0     | <input checked="" type="checkbox"/> ROADS/MOD      | 0     |
| <input type="checkbox"/> A/B, Forest, Steep          | 0     | <input type="checkbox"/> ROADS/STEEP               | 0     |
| <input type="checkbox"/> A/B, Pasture, Flat          | 0     | <input checked="" type="checkbox"/> ROOF TOPS/FLAT | 0     |
| <input type="checkbox"/> A/B, Pasture, Mod           | 0     | <input type="checkbox"/> DRIVEWAYS/FLAT            | 0     |
| <input type="checkbox"/> A/B, Pasture, Steep         | 0     | <input type="checkbox"/> DRIVEWAYS/MOD             | 0     |
| <input type="checkbox"/> A/B, Lawn, Flat             | 0     | <input type="checkbox"/> DRIVEWAYS/STEEP           | 0     |
| <input type="checkbox"/> A/B, Lawn, Mod              | 0     | <input type="checkbox"/> SIDEWALKS/FLAT            | 0     |
| <input type="checkbox"/> A/B, Lawn, Steep            | 0     | <input type="checkbox"/> SIDEWALKS/MOD             | 0     |
| <input type="checkbox"/> C, Forest, Flat             | 0     | <input type="checkbox"/> SIDEWALKS/STEEP           | 0     |
| <input type="checkbox"/> C, Forest, Mod              | 0     | <input checked="" type="checkbox"/> PARKING/FLAT   | .92   |
| <input checked="" type="checkbox"/> C, Forest, Steep | 0     | <input type="checkbox"/> PARKING/MOD               | 0     |
| <input type="checkbox"/> C, Pasture, Flat            | 0     | <input type="checkbox"/> PARKING/STEEP             | 0     |
| <input type="checkbox"/> C, Pasture, Mod             | 0     | <input checked="" type="checkbox"/> POND           | 0     |
| <input type="checkbox"/> C, Pasture, Steep           | 0     | <input type="checkbox"/> Porous Pavement           | 0     |
| <input checked="" type="checkbox"/> C, Lawn, Flat    | .14   |                                                    |       |
| <input checked="" type="checkbox"/> C, Lawn, Mod     | 0     |                                                    |       |
| <input checked="" type="checkbox"/> C, Lawn, Steep   | .2    |                                                    |       |
| <input type="checkbox"/> SAT, Forest, Flat           | 0     |                                                    |       |
| <input type="checkbox"/> SAT, Forest, Mod            | 0     |                                                    |       |
| <input type="checkbox"/> SAT, Forest, Steep          | 0     |                                                    |       |

Pervious Total 0.34 Acres

Impervious Total 0.92 Acres

Basin Total 1.26 Acres

Precipitation Gage 2 - <UNK> | 158 YR PRECIP TIMESERIES, 38 IN CEN Auto Assign Gages

Deselect Zero Select By: GO

# South - Pond Area

WWHM2012 16657-south basin

File Edit View Help Summary Report

Basin Help

Schematic

SCENARIOS

☐ Predeveloped

☒ Mitigated

Run Scenario

Basic Elements

Pro Elements

LID Toolbox

Commercial Toolbox

Move Elements

Save x,y Load x,y

X 40 Y 60

Pond Basin Mitigated

Subbasin Name: Pond Basin ☐ Designate as Bypass for POC:

Flows To : Surface Trapezoidal Pond 1 Interflow Trapezoidal Pond 1 Groundwater

Area in Basin

Available Pervious Acres

|                                                      |     |
|------------------------------------------------------|-----|
| <input type="checkbox"/> A/B, Forest, Flat           | 0   |
| <input type="checkbox"/> A/B, Forest, Mod            | 0   |
| <input type="checkbox"/> A/B, Forest, Steep          | 0   |
| <input type="checkbox"/> A/B, Pasture, Flat          | 0   |
| <input type="checkbox"/> A/B, Pasture, Mod           | 0   |
| <input type="checkbox"/> A/B, Pasture, Steep         | 0   |
| <input type="checkbox"/> A/B, Lawn, Flat             | 0   |
| <input type="checkbox"/> A/B, Lawn, Mod              | 0   |
| <input type="checkbox"/> A/B, Lawn, Steep            | 0   |
| <input type="checkbox"/> C, Forest, Flat             | 0   |
| <input type="checkbox"/> C, Forest, Mod              | 0   |
| <input checked="" type="checkbox"/> C, Forest, Steep | 0   |
| <input type="checkbox"/> C, Pasture, Flat            | 0   |
| <input type="checkbox"/> C, Pasture, Mod             | 0   |
| <input type="checkbox"/> C, Pasture, Steep           | 0   |
| <input checked="" type="checkbox"/> C, Lawn, Flat    | 0   |
| <input checked="" type="checkbox"/> C, Lawn, Mod     | 0   |
| <input checked="" type="checkbox"/> C, Lawn, Steep   | .19 |
| <input type="checkbox"/> SAT, Forest, Flat           | 0   |
| <input type="checkbox"/> SAT, Forest, Mod            | 0   |
| <input type="checkbox"/> SAT, Forest, Steep          | 0   |

Available Impervious Acres

|                                                    |    |
|----------------------------------------------------|----|
| <input type="checkbox"/> ROADS/FLAT                | 0  |
| <input checked="" type="checkbox"/> ROADS/MOD      | 0  |
| <input type="checkbox"/> ROADS/STEEP               | 0  |
| <input checked="" type="checkbox"/> ROOF TOPS/FLAT | 0  |
| <input type="checkbox"/> DRIVEWAYS/FLAT            | 0  |
| <input type="checkbox"/> DRIVEWAYS/MOD             | 0  |
| <input type="checkbox"/> DRIVEWAYS/STEEP           | 0  |
| <input type="checkbox"/> SIDEWALKS/FLAT            | 0  |
| <input type="checkbox"/> SIDEWALKS/MOD             | 0  |
| <input type="checkbox"/> SIDEWALKS/STEEP           | 0  |
| <input checked="" type="checkbox"/> PARKING/FLAT   | 0  |
| <input type="checkbox"/> PARKING/MOD               | 0  |
| <input type="checkbox"/> PARKING/STEEP             | 0  |
| <input checked="" type="checkbox"/> POND           | .3 |
| <input type="checkbox"/> Porous Pavement           | 0  |

Pervious Total 0.19 Acres

Impervious Total 0.3 Acres

Basin Total 0.49 Acres

Precipitation Gage 2 - <UNK> | 158 YR PRECIP TIMESERIES, 38 IN CEN Auto Assign Gages

Deselect Zero Select By: GO



WWHM2012 16657-south basin

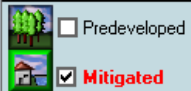
File Edit View Help Summary Report



Basin Help

Schematic

SCENARIOS



Run Scenario

Basic Elements



Pro Elements



LID Toolbox

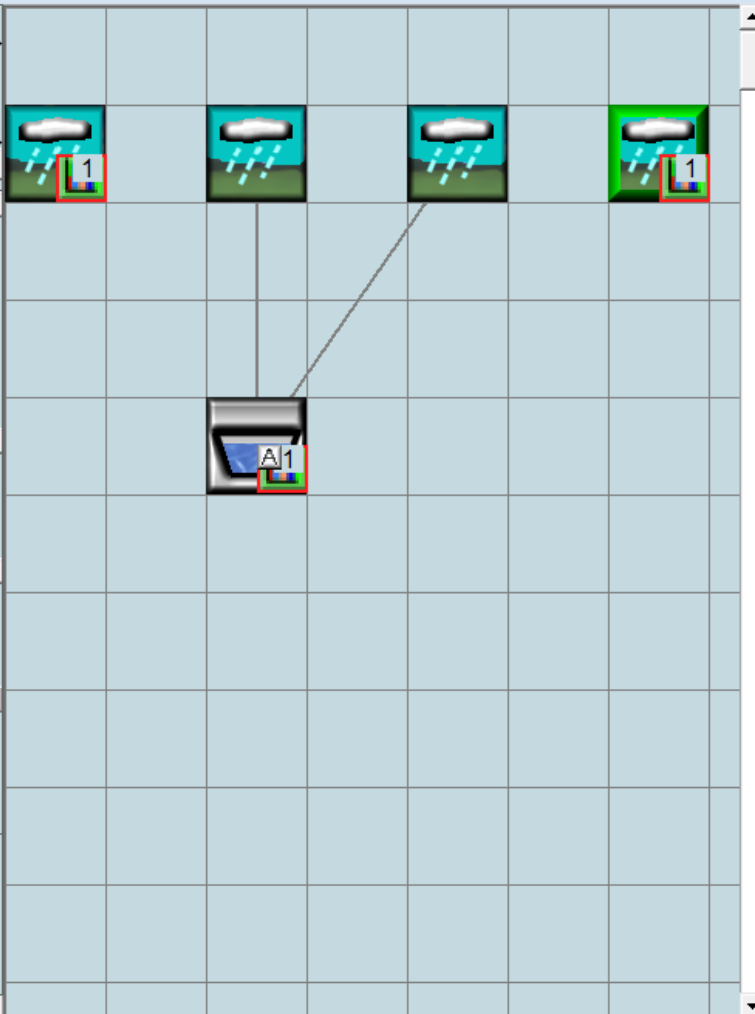
Commercial Toolbox

Move Elements



Save x,y Load x,y

X 40  
Y 60



Roof D Mitigated

Subbasin Name: **Roof D** ☒ Designate as Bypass for POC:

Flows To : **Surface** **Interflow** **Groundwater**

Area in Basin

Available Pervious Acres

|                                     |                     |     |
|-------------------------------------|---------------------|-----|
| <input type="checkbox"/>            | A/B, Forest, Flat   | 0   |
| <input type="checkbox"/>            | A/B, Forest, Mod    | 0   |
| <input type="checkbox"/>            | A/B, Forest, Steep  | 0   |
| <input type="checkbox"/>            | A/B, Pasture, Flat  | 0   |
| <input type="checkbox"/>            | A/B, Pasture, Mod   | 0   |
| <input type="checkbox"/>            | A/B, Pasture, Steep | 0   |
| <input type="checkbox"/>            | A/B, Lawn, Flat     | 0   |
| <input type="checkbox"/>            | A/B, Lawn, Mod      | 0   |
| <input type="checkbox"/>            | A/B, Lawn, Steep    | 0   |
| <input type="checkbox"/>            | C, Forest, Flat     | 0   |
| <input type="checkbox"/>            | C, Forest, Mod      | 0   |
| <input checked="" type="checkbox"/> | C, Forest, Steep    | 0   |
| <input type="checkbox"/>            | C, Pasture, Flat    | 0   |
| <input type="checkbox"/>            | C, Pasture, Mod     | 0   |
| <input type="checkbox"/>            | C, Pasture, Steep   | 0   |
| <input checked="" type="checkbox"/> | C, Lawn, Flat       | .06 |
| <input checked="" type="checkbox"/> | C, Lawn, Mod        | 0   |
| <input checked="" type="checkbox"/> | C, Lawn, Steep      | 0   |
| <input type="checkbox"/>            | SAT, Forest, Flat   | 0   |
| <input type="checkbox"/>            | SAT, Forest, Mod    | 0   |
| <input type="checkbox"/>            | SAT, Forest, Steep  | 0   |

☐ Show Only Selected

Available Impervious Acres

|                                     |                 |     |
|-------------------------------------|-----------------|-----|
| <input type="checkbox"/>            | ROADS/FLAT      | 0   |
| <input checked="" type="checkbox"/> | ROADS/MOD       | 0   |
| <input type="checkbox"/>            | ROADS/STEEP     | 0   |
| <input checked="" type="checkbox"/> | ROOF TOPS/FLAT  | .06 |
| <input type="checkbox"/>            | DRIVEWAYS/FLAT  | 0   |
| <input type="checkbox"/>            | DRIVEWAYS/MOD   | 0   |
| <input type="checkbox"/>            | DRIVEWAYS/STEEP | 0   |
| <input type="checkbox"/>            | SIDEWALKS/FLAT  | 0   |
| <input type="checkbox"/>            | SIDEWALKS/MOD   | 0   |
| <input type="checkbox"/>            | SIDEWALKS/STEEP | 0   |
| <input checked="" type="checkbox"/> | PARKING/FLAT    | 0   |
| <input type="checkbox"/>            | PARKING/MOD     | 0   |
| <input type="checkbox"/>            | PARKING/STEEP   | 0   |
| <input checked="" type="checkbox"/> | POND            | 0   |
| <input type="checkbox"/>            | Porous Pavement | 0   |

Pervious Total 0.06 Acres  
Impervious Total 0.06 Acres  
Basin Total 0.12 Acres

Deselect Zero

Select By:

GO

WWHM2012 16657-south basin

File Edit View Help Summary Report

Trapezoidal Pond Help

Schematic

**SCENARIOS**

☐ Predeveloped

☒ **Mitigated**

Run Scenario

**Basic Elements**

**Pro Elements**

**LID Toolbox**

**Commercial Toolbox**

**Move Elements**

Save x,y Load x,y

X 50 Y 60

**Trapezoidal Pond 1 Mitigated**

**Facility Name** Trapezoidal Pond 1 **Facility Type**

**Downstream Connections**

Outlet 1 0 Outlet 2 0 Outlet 3 0

☐ Precipitation Applied to Facility

☐ Evaporation Applied to Facility

**Facility Dimensions**

Facility Bottom Elevation (ft) 0

Bottom Length (ft) 90

Bottom Width (ft) 29

Effective Depth (ft) 9

Left Side Slope (H/V) 3

Bottom Side Slope (H/V) 3

Right Side Slope (H/V) 3

Top Side Slope (H/V) 3

**Infiltration** NO

**Facility Dimension Diagram**

**Outlet Structure Data**

Riser Height (ft) 8

Riser Diameter (in) 12

Riser Type Flat

Notch Type

**Orifice Diameter Height**

| Orifice Number | Diameter (in) | Height (ft) |
|----------------|---------------|-------------|
| 1              | 0.5           | 0           |
| 2              | 1.5           | 5           |
| 3              | 0             | 0           |

Pond Volume at Riser Head (ac-ft) 1.169

**Show Pond Table** Open Table

Initial 0

**Tide Gate Time Series Demand**

**Determine Outlet With Tide Gate**

☐ Use Tide Gate

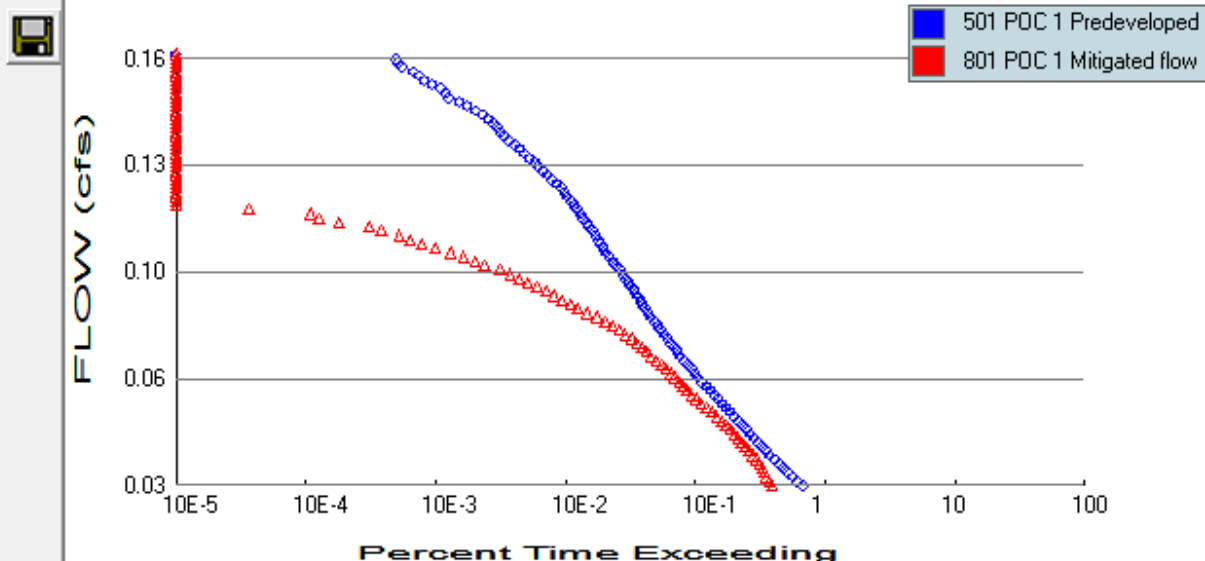
Tide Gate Elevation (ft) 0 Downstream Connection

Overflow Elevation (ft) 0 Iterations 0



Analysis Help

Analysis



The Facility PASSED

| Flow(cfs) | Predev | Mit   | Percentage | Pass/Fail |
|-----------|--------|-------|------------|-----------|
| 0.0306    | 36997  | 21562 | 58         | Pass      |
| 0.0319    | 33828  | 20565 | 60         | Pass      |
| 0.0332    | 31013  | 19628 | 63         | Pass      |
| 0.0345    | 28553  | 18814 | 65         | Pass      |
| 0.0358    | 26332  | 18055 | 68         | Pass      |
| 0.0371    | 24349  | 17257 | 70         | Pass      |
| 0.0384    | 22576  | 16293 | 72         | Pass      |
| 0.0397    | 20903  | 15224 | 72         | Pass      |
| 0.0410    | 19363  | 14205 | 73         | Pass      |
| 0.0424    | 17978  | 13379 | 74         | Pass      |
| 0.0437    | 16725  | 12554 | 75         | Pass      |
| 0.0450    | 15556  | 11789 | 75         | Pass      |
| 0.0463    | 14543  | 11014 | 75         | Pass      |
| 0.0476    | 13606  | 10282 | 75         | Pass      |
| 0.0489    | 12676  | 9479  | 74         | Pass      |
| 0.0502    | 11800  | 8737  | 74         | Pass      |
| 0.0515    | 10980  | 8066  | 73         | Pass      |
| 0.0528    | 10199  | 7379  | 72         | Pass      |
| 0.0541    | 9507   | 6715  | 70         | Pass      |
| 0.0554    | 8842   | 6149  | 69         | Pass      |
| 0.0568    | 8260   | 5618  | 68         | Pass      |
| 0.0581    | 7706   | 5200  | 67         | Pass      |
| 0.0594    | 7185   | 4795  | 66         | Pass      |
| 0.0607    | 6703   | 4471  | 66         | Pass      |
| 0.0620    | 6244   | 4182  | 66         | Pass      |
| 0.0633    | 5834   | 3898  | 66         | Pass      |
| 0.0646    | 5485   | 3583  | 65         | Pass      |
| 0.0659    | 5172   | 3311  | 64         | Pass      |
| 0.0672    | 4856   | 3042  | 62         | Pass      |
| 0.0685    | 4559   | 2788  | 61         | Pass      |
| 0.0698    | 4266   | 2515  | 58         | Pass      |
| 0.0712    | 4016   | 2324  | 57         | Pass      |
| 0.0725    | 3770   | 2129  | 56         | Pass      |
| 0.0738    | 3567   | 1974  | 55         | Pass      |

Stream Protection Duration LID Duration Flow Frequency Water Quality Hydrograph  
Wetland Input Volumes LID Report Recharge Duration Recharge Predeveloped Recharge Mitigated

Analyze datasets

Compact WDM

Delete Selected

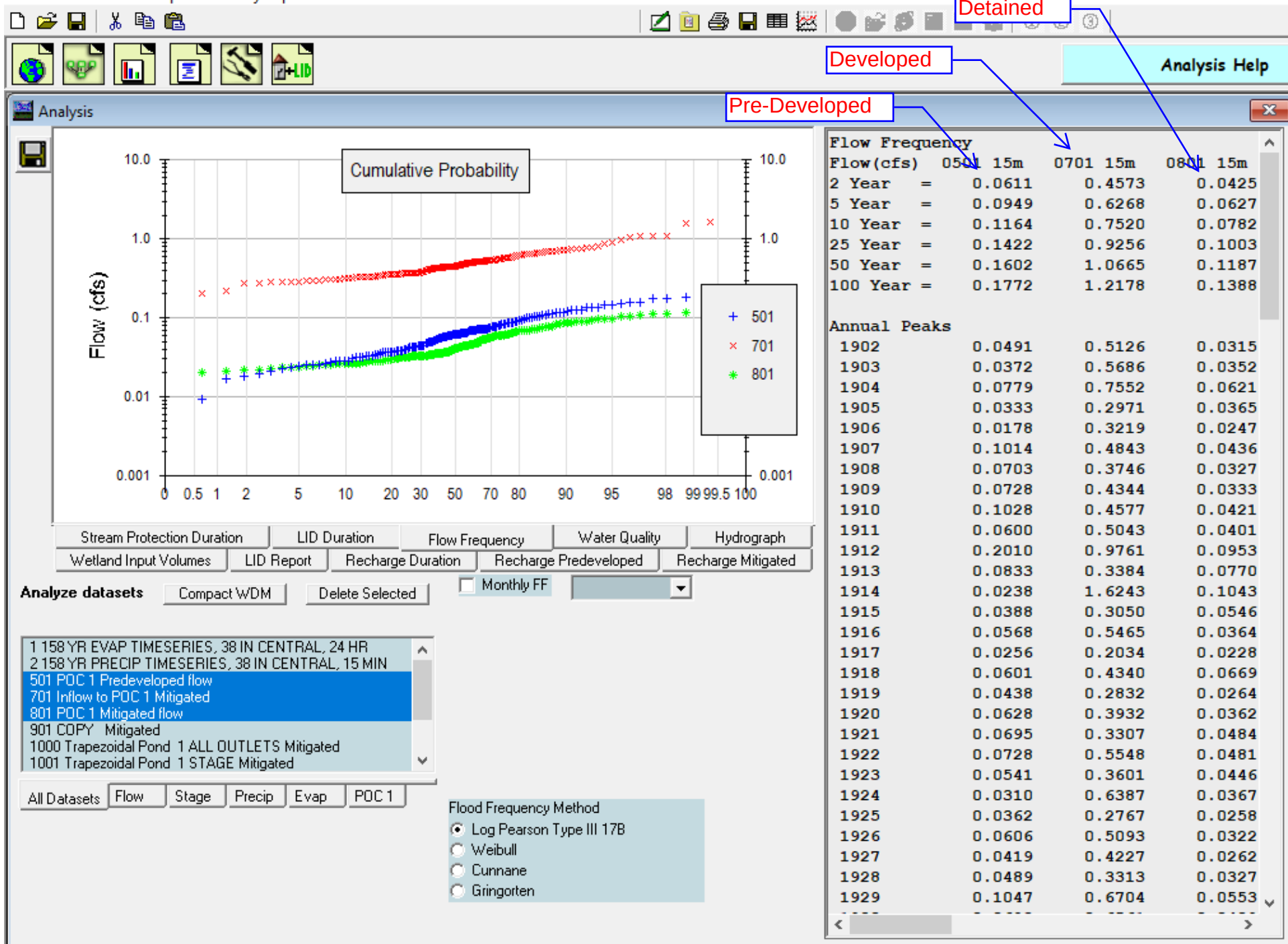
☐ Monthly FF

501 POC 1 Predeveloped flow  
801 POC 1 Mitigated flow

All Datasets Flow Stage Precip Evap POC 1

Flood Frequency Method

- ☒ Log Pearson Type III 17B  
☐ Weibull  
☐ Cunnane  
☐ Gringorten

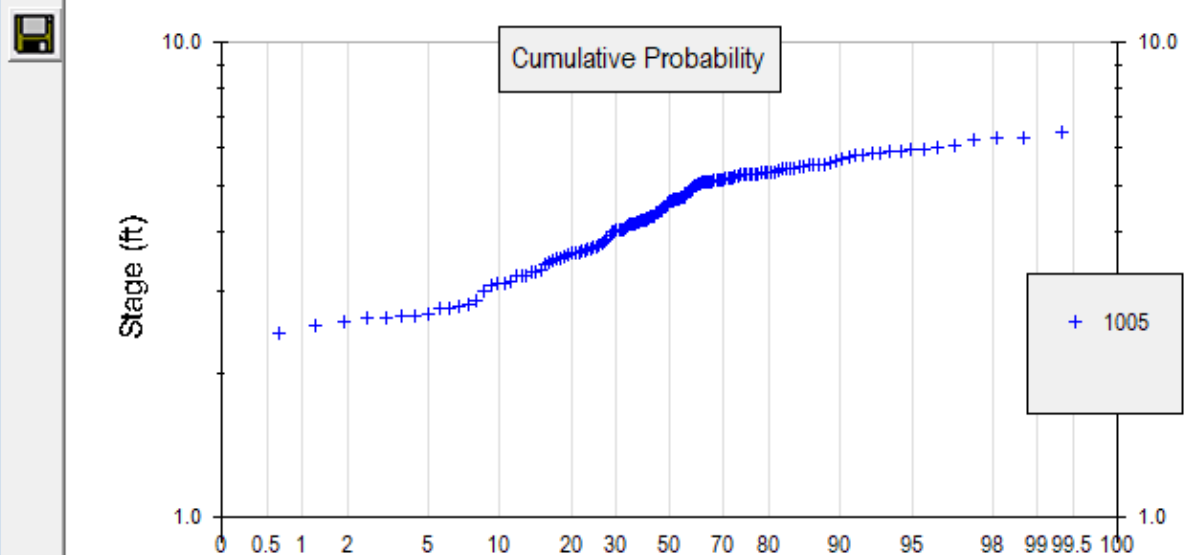






Analysis Help

Analysis

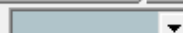


Stream Protection Duration LID Duration Flow Frequency Water Quality Hydrograph  
 Wetland Input Volumes LID Report Recharge Duration Recharge Predeveloped Recharge Mitigated

Analyze datasets

Compact WDM

Delete Selected

☐ Monthly FF

1001 Trapezoidal Pond 1 STAGE Mitigated  
 1003 Vault 1 STAGE Mitigated  
 1005 Trapezoidal Pond 1 STAGE Mitigated

All Datasets Flow Stage Precip Evap POC 1

Flood Frequency Method

☒ Log Pearson Type III 17B☐ Weibull☐ Cunnane☐ Gringorten

Stage Frequency

| (feet)   | 1005 | 15m    |
|----------|------|--------|
| 2 Year   | =    | 4.4804 |
| 5 Year   | =    | 5.3545 |
| 10 Year  | =    | 5.7917 |
| 25 Year  | =    | 6.2324 |
| 50 Year  | =    | 6.4998 |
| 100 Year | =    | 6.7271 |

Annual Peaks

|      |        |
|------|--------|
| 1902 | 4.5039 |
| 1903 | 3.1088 |
| 1904 | 4.2404 |
| 1905 | 5.0911 |
| 1906 | 2.4441 |
| 1907 | 4.2438 |
| 1908 | 3.6471 |
| 1909 | 4.7432 |
| 1910 | 4.2320 |
| 1911 | 4.3196 |
| 1912 | 5.2925 |
| 1913 | 5.6627 |
| 1914 | 2.5339 |
| 1915 | 5.2509 |
| 1916 | 4.1553 |
| 1917 | 3.3983 |
| 1918 | 5.5200 |
| 1919 | 4.0396 |
| 1920 | 4.1623 |
| 1921 | 5.1883 |
| 1922 | 4.3643 |
| 1923 | 5.1618 |
| 1924 | 3.6713 |
| 1925 | 3.5682 |
| 1926 | 4.0416 |
| 1927 | 4.1754 |
| 1928 | 5.0319 |
| 1929 | 5.3115 |

5/21/2020

| South Pond Volumes |           |             |                 |          |           |
|--------------------|-----------|-------------|-----------------|----------|-----------|
|                    |           |             |                 |          |           |
| <b>Detention</b>   |           |             |                 |          |           |
| Stage              | Area (sf) | Volume (cf) | Sum Volume (cf) |          | Elevation |
| 0                  | 2353      | 0           | 0               | 0        | 141       |
| 1                  | 3279      | 2816        | 2816            | 0.064646 | 142       |
| 2                  | 4549      | 3914        | 6730            | 0.1545   | 143       |
| 3                  | 5680      | 5114.5      | 11844.5         | 0.271912 | 144       |
| 4                  | 7104      | 6392        | 18236.5         | 0.418652 | 145       |
| 5                  | 8466      | 7785        | 26021.5         | 0.597371 | 146       |
| 6                  | 9921      | 9193.5      | 35215           | 0.808425 | 147       |
| 7                  | 11459     | 10690       | 45905           | 1.053834 | 148       |
| 8                  | 13086     | 12272.5     | 58177.5         | 1.335572 | 149       |
| 9                  | 14802     | 13944       | 72121.5         | 1.655682 | 150       |
|                    |           |             |                 |          |           |
|                    |           |             |                 |          |           |

# Offsite Pond

WWHM2012 16657-offsite basin

File Edit View Help Summary Report

Basin Help

Schematic

SCENARIOS

☒ Predeveloped

☐ Mitigated

Run Scenario

Basic Elements

Pro Elements

LID Toolbox

Commercial Toolbox

Move Elements

Save x,y Load x,y

X 0 Y 0 #

Basin 1 Predeveloped

Subbasin Name: Basin 1

Flows To : Surface Interflow Groundwater

Area in Basin

☐ Show Only Selected

| Available Pervious                                   | Acres | Available Impervious                             | Acres |
|------------------------------------------------------|-------|--------------------------------------------------|-------|
| <input type="checkbox"/> A/B, Forest, Flat           | 0     | <input type="checkbox"/> ROADS/FLAT              | 0     |
| <input type="checkbox"/> A/B, Forest, Mod            | 0     | <input checked="" type="checkbox"/> ROADS/MOD    | 0     |
| <input type="checkbox"/> A/B, Forest, Steep          | 0     | <input type="checkbox"/> ROADS/STEEP             | 0     |
| <input type="checkbox"/> A/B, Pasture, Flat          | 0     | <input type="checkbox"/> ROOF TOPS/FLAT          | 0     |
| <input type="checkbox"/> A/B, Pasture, Mod           | 0     | <input type="checkbox"/> DRIVEWAYS/FLAT          | 0     |
| <input type="checkbox"/> A/B, Pasture, Steep         | 0     | <input type="checkbox"/> DRIVEWAYS/MOD           | 0     |
| <input type="checkbox"/> A/B, Lawn, Flat             | 0     | <input type="checkbox"/> DRIVEWAYS/STEEP         | 0     |
| <input type="checkbox"/> A/B, Lawn, Mod              | 0     | <input type="checkbox"/> SIDEWALKS/FLAT          | 0     |
| <input type="checkbox"/> A/B, Lawn, Steep            | 0     | <input type="checkbox"/> SIDEWALKS/MOD           | 0     |
| <input type="checkbox"/> C, Forest, Flat             | 0     | <input type="checkbox"/> SIDEWALKS/STEEP         | 0     |
| <input type="checkbox"/> C, Forest, Mod              | 0     | <input checked="" type="checkbox"/> PARKING/FLAT | 0     |
| <input checked="" type="checkbox"/> C, Forest, Steep | 0.65  | <input type="checkbox"/> PARKING/MOD             | 0     |
| <input type="checkbox"/> C, Pasture, Flat            | 0     | <input type="checkbox"/> PARKING/STEEP           | 0     |
| <input type="checkbox"/> C, Pasture, Mod             | 0     | <input type="checkbox"/> POND                    | 0     |
| <input type="checkbox"/> C, Pasture, Steep           | 0     | <input type="checkbox"/> Porous Pavement         | 0     |
| <input checked="" type="checkbox"/> C, Lawn, Flat    | 0     |                                                  |       |
| <input checked="" type="checkbox"/> C, Lawn, Mod     | 0     |                                                  |       |
| <input type="checkbox"/> C, Lawn, Steep              | 0     |                                                  |       |
| <input type="checkbox"/> SAT, Forest, Flat           | 0     |                                                  |       |
| <input type="checkbox"/> SAT, Forest, Mod            | 0     |                                                  |       |
| <input type="checkbox"/> SAT, Forest, Steep          | 0     |                                                  |       |

Pervious Total 0.65 Acres

Impervious Total 0 Acres

Basin Total 0.65 Acres

Deselect Zero Select By: GO



WWHM2012 16657-offsite basin

File Edit View Help Summary Report

Basin Help

**Schematic**

**SCENARIOS**

☐ Predeveloped

☒ Mitigated

Run Scenario

Basic Elements

Pro Elements

LID Toolbox

Commercial Toolbox

Move Elements

Save x,y Load x,y

X 30 Y 60 #

**Basin 1 Mitigated**

Subbasin Name:  ☐ Designate as Bypass for POC:

Flows To :

Area in Basin ☐ Show Only Selected

| Available Pervious                  |                     | Acres | Available Impervious                |                 | Acres |
|-------------------------------------|---------------------|-------|-------------------------------------|-----------------|-------|
| <input type="checkbox"/>            | A/B, Forest, Flat   | 0     | <input type="checkbox"/>            | ROADS/FLAT      | 0     |
| <input type="checkbox"/>            | A/B, Forest, Mod    | 0     | <input checked="" type="checkbox"/> | ROADS/MOD       | .3    |
| <input type="checkbox"/>            | A/B, Forest, Steep  | 0     | <input type="checkbox"/>            | ROADS/STEEP     | 0     |
| <input type="checkbox"/>            | A/B, Pasture, Flat  | 0     | <input type="checkbox"/>            | ROOF TOPS/FLAT  | 0     |
| <input type="checkbox"/>            | A/B, Pasture, Mod   | 0     | <input type="checkbox"/>            | DRIVEWAYS/FLAT  | 0     |
| <input type="checkbox"/>            | A/B, Pasture, Steep | 0     | <input type="checkbox"/>            | DRIVEWAYS/MOD   | 0     |
| <input type="checkbox"/>            | A/B, Lawn, Flat     | 0     | <input type="checkbox"/>            | DRIVEWAYS/STEEP | 0     |
| <input type="checkbox"/>            | A/B, Lawn, Mod      | 0     | <input type="checkbox"/>            | SIDEWALKS/FLAT  | 0     |
| <input type="checkbox"/>            | A/B, Lawn, Steep    | 0     | <input type="checkbox"/>            | SIDEWALKS/MOD   | 0     |
| <input type="checkbox"/>            | C, Forest, Flat     | 0     | <input type="checkbox"/>            | SIDEWALKS/STEEP | 0     |
| <input type="checkbox"/>            | C, Forest, Mod      | 0     | <input checked="" type="checkbox"/> | PARKING/FLAT    | .23   |
| <input checked="" type="checkbox"/> | C, Forest, Steep    | 0     | <input type="checkbox"/>            | PARKING/MOD     | 0     |
| <input type="checkbox"/>            | C, Pasture, Flat    | 0     | <input type="checkbox"/>            | PARKING/STEEP   | 0     |
| <input type="checkbox"/>            | C, Pasture, Mod     | 0     | <input type="checkbox"/>            | POND            | 0     |
| <input type="checkbox"/>            | C, Pasture, Steep   | 0     | <input type="checkbox"/>            | Porous Pavement | 0     |
| <input checked="" type="checkbox"/> | C, Lawn, Flat       | .05   |                                     |                 |       |
| <input checked="" type="checkbox"/> | C, Lawn, Mod        | .07   |                                     |                 |       |
| <input type="checkbox"/>            | C, Lawn, Steep      | 0     |                                     |                 |       |
| <input type="checkbox"/>            | SAT, Forest, Flat   | 0     |                                     |                 |       |
| <input type="checkbox"/>            | SAT, Forest, Mod    | 0     |                                     |                 |       |
| <input type="checkbox"/>            | SAT, Forest, Steep  | 0     |                                     |                 |       |

Pervious Total  Acres

Impervious Total  Acres

Basin Total  Acres

Deselect Zero Select By:  GO

Offsite - Pond  
Available volume  
= 8190 CF

WWHM2012 16657-offsite basin

File Edit View Help Summary Report

Trapezoidal Pond Help

**Schematic**

**SCENARIOS**

☐ Predeveloped

☒ Mitigated

Run Scenario

**Basic Elements**

**Pro Elements**

**LID Toolbox**

**Commercial Toolbox**

**Move Elements**

Save x,y Load x,y

X 20 Y 60 #

**Trapezoidal Pond 1 Mitigated**

**Facility Name** Trapezoidal Pond 1 **Facility Type** Trapezoidal Pond

**Outlet 1** **Outlet 2** **Outlet 3**

**Downstream Connections** 0 0 0

☐ Precipitation Applied to Facility

☐ Evaporation Applied to Facility

**Facility Dimensions**

Facility Bottom Elevation (ft) 0

Bottom Length (ft) 54

Bottom Width (ft) 17.6

Effective Depth (ft) 5

Left Side Slope (H/V) 3

Bottom Side Slope (H/V) 3

Right Side Slope (H/V) 3

Top Side Slope (H/V) 3

**Infiltration** NO

**Facility Dimension Diagram**

**Outlet Structure Data**

| Orifice Number | Diameter (in) | Height (ft) |
|----------------|---------------|-------------|
| 1              | 0.48          | 0           |
| 2              | 0             | 0           |
| 3              | 0             | 0           |

Pond Volume at Riser Head (ac-ft) .188

**Show Pond Table** Open Table

Initial Stage (ft)

**Tide Gate** **Time Series** **Demand**

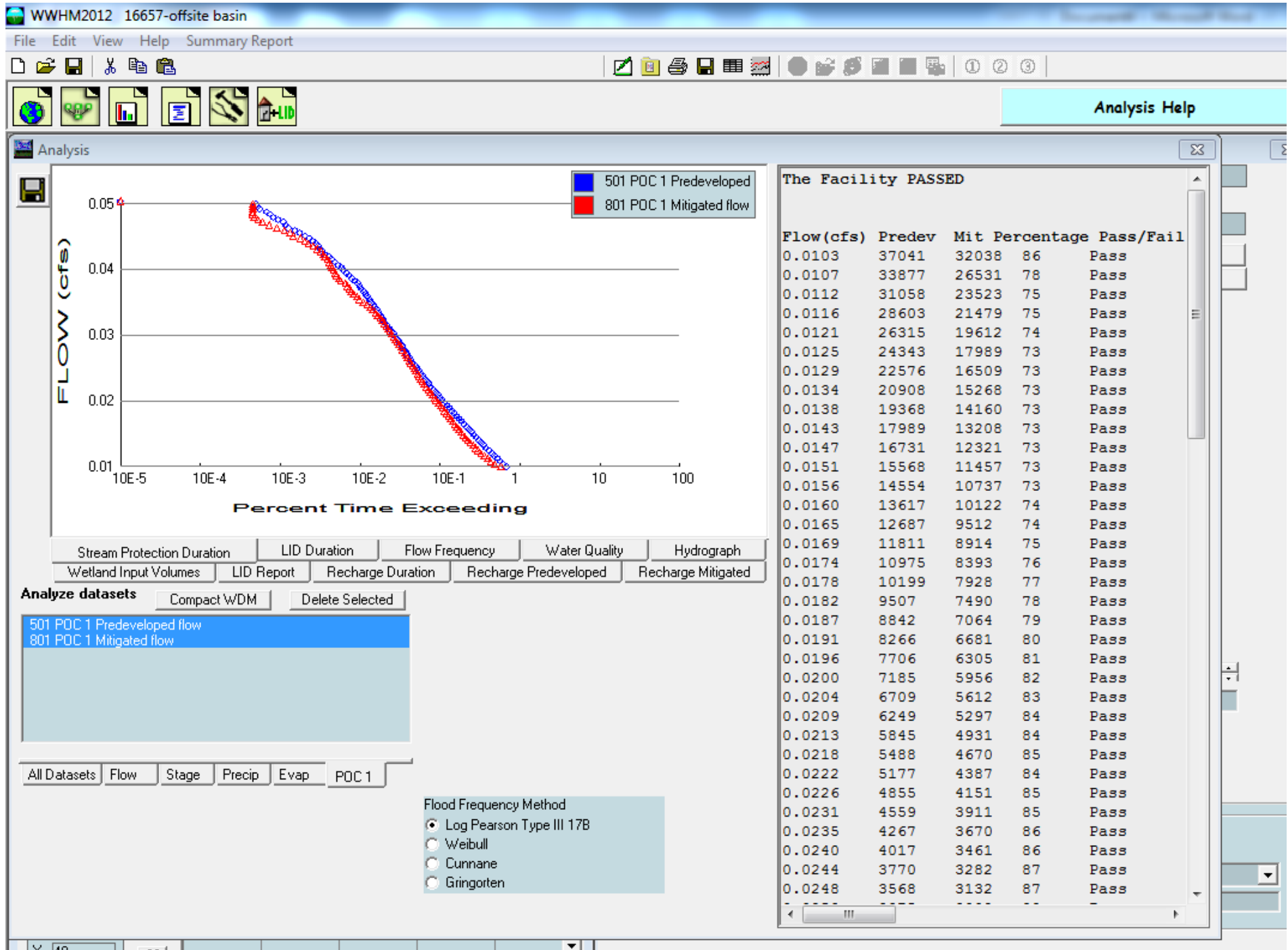
☐ Determine Outlet With Tide Gate

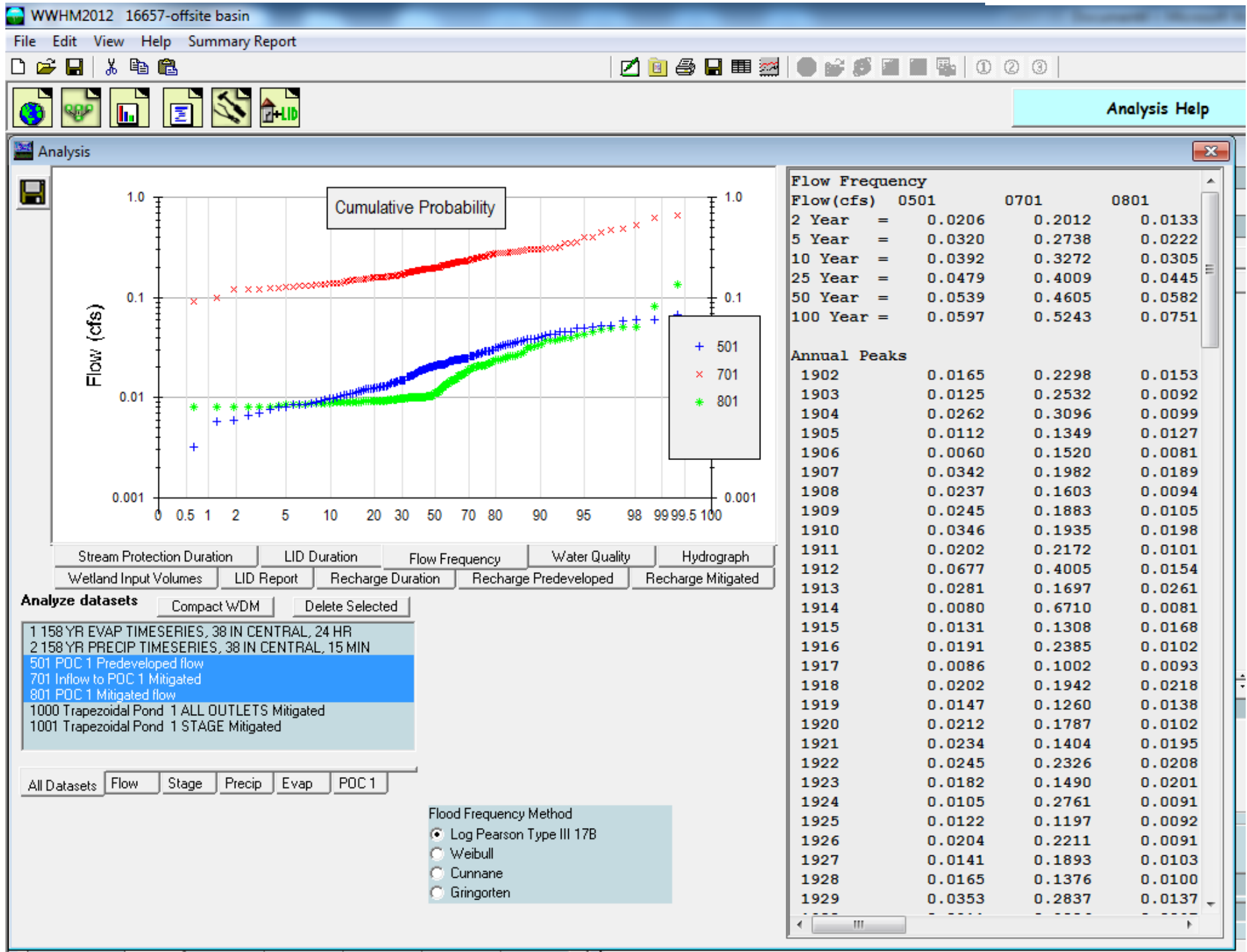
☐ Use Tide Gate

Tide Gate Elevation (ft) 0 Downstream Connection

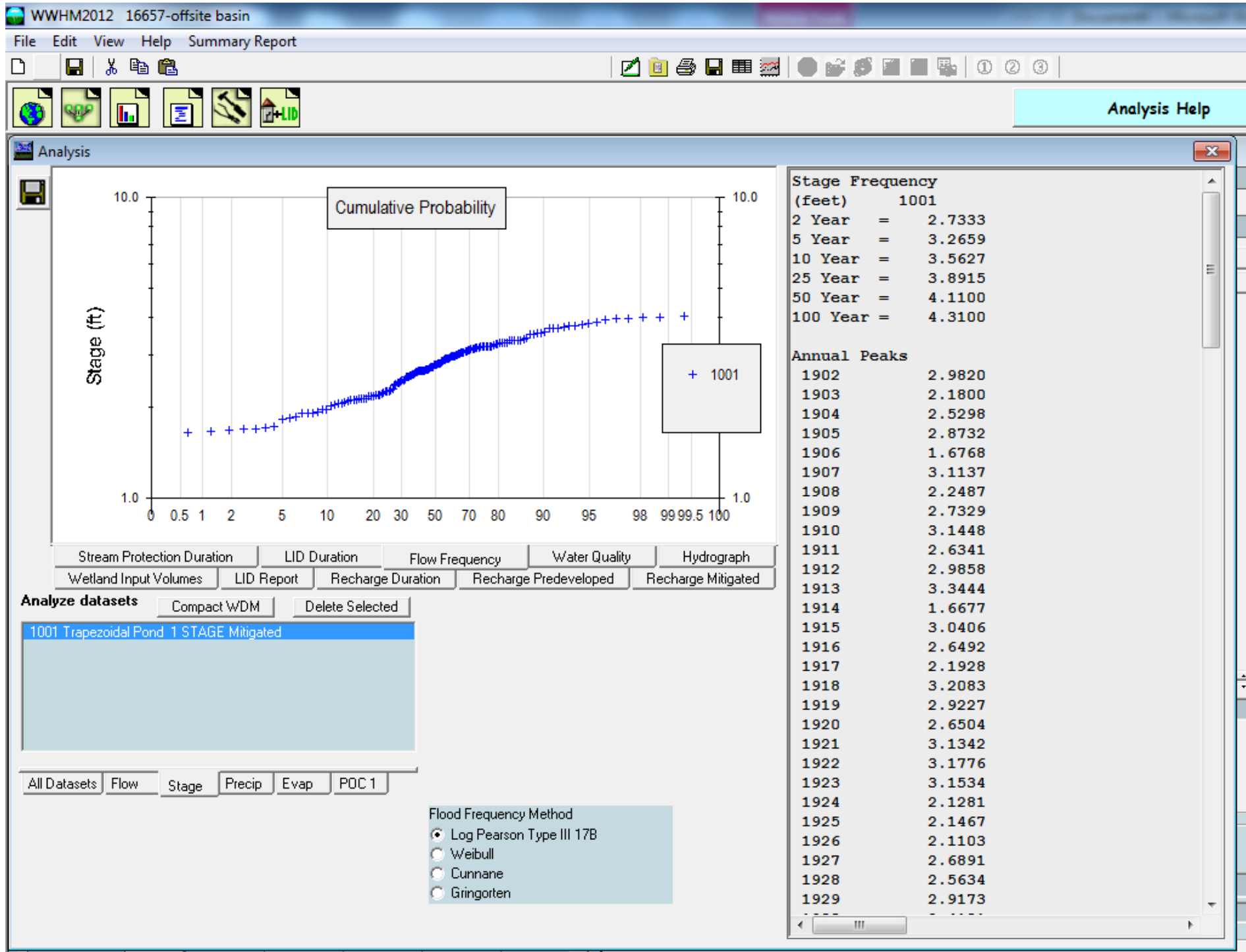
Overflow Elevation (ft) 0 Iterations 0

This control structure is just to model the amount of volume available in the existing pond. No changes to the existing outlet structure are proposed.









|                                                       |      |          |            |  |                                                                             |
|-------------------------------------------------------|------|----------|------------|--|-----------------------------------------------------------------------------|
| 16657 - OFFSITE POND VOLUME                           |      |          |            |  |                                                                             |
|                                                       |      |          |            |  |                                                                             |
| Asbuilt existing pond volumes                         |      |          |            |  |                                                                             |
| elev                                                  | area | volume   | sum volume |  |                                                                             |
| 127.11                                                | 2248 | 0        | 0          |  |                                                                             |
| 128                                                   | 3041 | 2353.605 | 2353.605   |  |                                                                             |
| 129                                                   | 3812 | 3426.5   | 5780.105   |  |                                                                             |
| 130                                                   | 4649 | 4230.5   | 10010.61   |  |                                                                             |
| 130.84                                                | 5401 | 4221     | 14231.61   |  |                                                                             |
|                                                       |      |          |            |  |                                                                             |
| pond volume w/ riser modifications to elevation 131.0 |      |          |            |  |                                                                             |
|                                                       |      |          |            |  |                                                                             |
| elev                                                  | area | volume   | sum volume |  |                                                                             |
| 127.11                                                | 2248 | 0        | 0          |  | Volume req'd for road drainage = 6,945 cf<br>(from offsite drainage report) |
| 128                                                   | 3041 | 2353.605 | 2353.605   |  |                                                                             |
| 129                                                   | 3812 | 3426.5   | 5780.105   |  | Volume req'd for 1 ac basin from proposed<br>development = 8,034 cf         |
| 130                                                   | 4649 | 4230.5   | 10010.61   |  |                                                                             |
| 131                                                   | 5600 | 5124.5   | 15135.11   |  | Total Volume reqd = 14,979 cf so OK                                         |

WWHM2012 16657-offsite basin

FileEditViewHelpSummary Report







Analysis



Run Analysis

Water Quality

On-Line BMP

Off-Line BMP

24 hour Volume (ac-ft)0.0601

Standard Flow Rate (cfs)0.0803

Standard Flow Rate (cfs)0.0462

Stream Protection Duration

LID Duration

Flow Frequency

Water Quality

Hydrograph

Wetland Input Volumes

LID Report

Recharge Duration

Recharge Predeveloped

Recharge Mitigated

Analyze datasets

Compact WDM

Delete Selected

1 158 YR EVAP TIMESERIES, 38 IN CENTRAL, 24 HR

2 158 YR PRECIP TIMESERIES, 38 IN CENTRAL, 15 MIN

501 POC 1 Predeveloped flow

701 Inflow to POC 1 Mitigated

801 POC 1 Mitigated flow

1000 Trapezoidal Pond 1 ALL OUTLETS Mitigated

1001 Trapezoidal Pond 1 STAGE Mitigated

All Datasets

Flow

Stage

Precip

Evap

POC 1

Flood Frequency Method

☒ Log Pearson Type III 17B

☐ Weibull

☐ Cunnane

☐ Gringorten

90

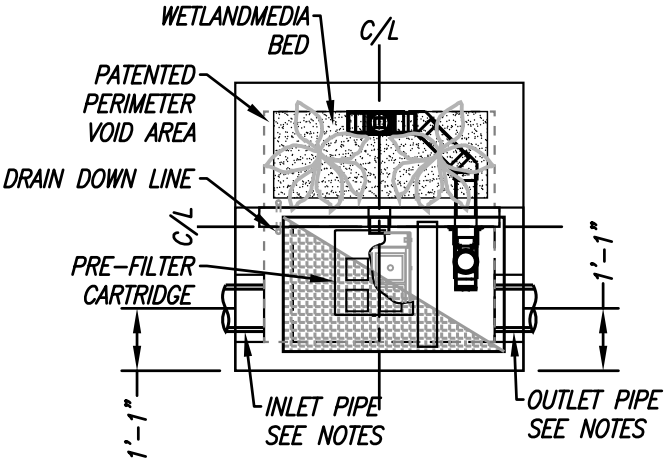
| SITE SPECIFIC DATA                         |              |                  |            |
|--------------------------------------------|--------------|------------------|------------|
| PROJECT NUMBER                             |              |                  |            |
| ORDER NUMBER                               |              |                  |            |
| PROJECT NAME                               |              |                  |            |
| PROJECT LOCATION                           |              |                  |            |
| STRUCTURE ID                               |              |                  |            |
| TREATMENT REQUIRED                         |              |                  |            |
| VOLUME BASED (CF)                          |              | FLOW BASED (CFS) |            |
|                                            |              |                  |            |
| TREATMENT HGL AVAILABLE (FT)               |              |                  |            |
| PEAK BYPASS REQUIRED (CFS) – IF APPLICABLE |              |                  |            |
| PIPE DATA                                  | I.E.         | MATERIAL         | DIAMETER   |
| INLET PIPE 1                               |              |                  |            |
| INLET PIPE 2                               |              |                  |            |
| OUTLET PIPE                                |              |                  |            |
|                                            | PRETREATMENT | BIOFILTRATION    | DISCHARGE  |
| RIM ELEVATION                              |              |                  |            |
| SURFACE LOAD                               | PEDESTRIAN   | OPEN PLANTER     | PEDESTRIAN |
| FRAME & COVER                              | 24" X 42"    | N/A              | N/A        |
| WETLANDMEDIA VOLUME (CY)                   |              |                  | TBD        |
| ORIFICE SIZE (DIA. INCHES)                 |              |                  | TBD        |
| NOTES: PRELIMINARY NOT FOR CONSTRUCTION.   |              |                  |            |

INSTALLATION NOTES

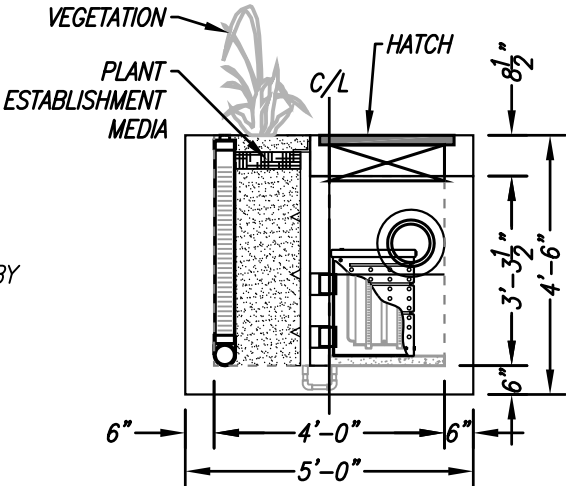
1. CONTRACTOR TO PROVIDE ALL LABOR, EQUIPMENT, MATERIALS AND INCIDENTALS REQUIRED TO OFFLOAD AND INSTALL THE SYSTEM AND APPURTENANCES IN ACCORDANCE WITH THIS DRAWING AND THE MANUFACTURERS SPECIFICATIONS, UNLESS OTHERWISE STATED IN MANUFACTURERS CONTRACT.
2. UNIT MUST BE INSTALLED ON LEVEL BASE. MANUFACTURER RECOMMENDS A MINIMUM 6" LEVEL ROCK BASE UNLESS SPECIFIED BY THE PROJECT ENGINEER. CONTRACTOR IS RESPONSIBLE TO VERIFY PROJECT ENGINEERS RECOMMENDED BASE SPECIFICATIONS.
4. CONTRACTOR TO SUPPLY AND INSTALL ALL EXTERNAL CONNECTING PIPES. ALL PIPES MUST BE FLUSH WITH INSIDE SURFACE OF CONCRETE. (PIPES CANNOT INTRUDE BEYOND FLUSH). INVERT OF OUTFLOW PIPE MUST BE FLUSH WITH DISCHARGE CHAMBER FLOOR. ALL PIPES SHALL BE SEALED WATER TIGHT PER MANUFACTURERS STANDARD CONNECTION DETAIL.
5. CONTRACTOR RESPONSIBLE FOR INSTALLATION OF ALL RISERS, MANHOLES, AND HATCHES. CONTRACTOR TO GROUT ALL MANHOLES AND HATCHES TO MATCH FINISHED SURFACE UNLESS SPECIFIED OTHERWISE.
6. VEGETATION SUPPLIED AND INSTALLED BY OTHERS. ALL UNITS WITH VEGETATION MUST HAVE DRIP OR SPRAY IRRIGATION SUPPLIED AND INSTALLED BY OTHERS.
7. CONTRACTOR RESPONSIBLE FOR CONTACTING BIO CLEAN FOR ACTIVATION OF UNIT. MANUFACTURERS WARRANTY IS VOID WITH OUT PROPER ACTIVATION BY A BIO CLEAN REPRESENTATIVE.

GENERAL NOTES

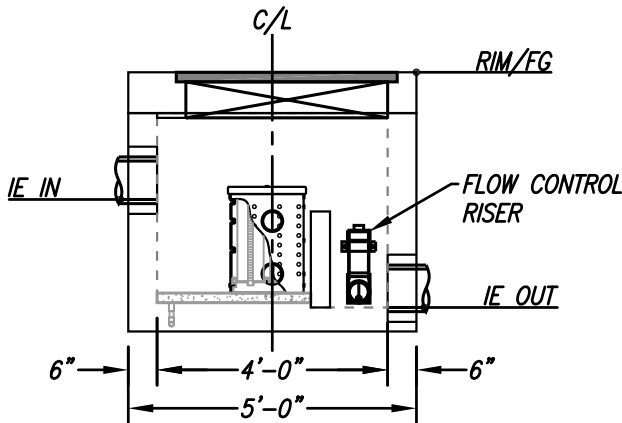
1. MANUFACTURER TO PROVIDE ALL MATERIALS UNLESS OTHERWISE NOTED.
2. ALL DIMENSIONS, ELEVATIONS, SPECIFICATIONS AND CAPACITIES ARE SUBJECT TO CHANGE. FOR PROJECT SPECIFIC DRAWINGS DETAILING EXACT DIMENSIONS, WEIGHTS AND ACCESSORIES PLEASE CONTACT BIO CLEAN.



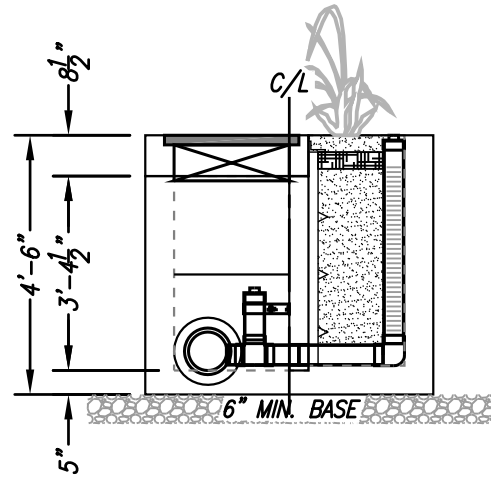
PLAN VIEW



LEFT END VIEW



ELEVATION VIEW



RIGHT END VIEW

|                                     |       |
|-------------------------------------|-------|
| TREATMENT FLOW (CFS)                | 0.052 |
| OPERATING HEAD (FT)                 | 3.4   |
| PRETREATMENT LOADING RATE (GPM/SF)  | 0.9   |
| WETLAND MEDIA LOADING RATE (GPM/SF) | 1.0   |



PROPRIETARY AND CONFIDENTIAL:  
THE INFORMATION CONTAINED IN THIS DOCUMENT IS THE SOLE PROPERTY OF FORTERRA AND ITS COMPANIES. THIS DOCUMENT, NOR ANY PART THEREOF, MAY BE USED, REPRODUCED OR MODIFIED IN ANY MANNER WITH OUT THE WRITTEN CONSENT OF FORTERRA.



**MWS-L-4-4-V**  
**STORMWATER BIOFILTRATION SYSTEM**  
**STANDARD DETAIL**



# Appendix B

## Conveyance Calculations

Conveyance calculations will be included during final site development.

# Appendix C

## Maintenance Plan

The maintenance manual will be included during final site development.

# Appendix D

## Offsite Pond Drainage Report and Correspondence with Gig Harbor

# Correspondence with Gig Harbor





# REQUEST FOR COMMENTS

City of Gig Harbor  
3510 Grandview Street - Gig Harbor, Washington 98335  
(253) 851-6170

ROUTED TO: STORMWATER REVIEW

DATE: 08/19/2014

APPLICANT: SWEDE HILL LLC  
PO BOX 1693  
TACOMA, WA

AGENT:

PROJECT NAME: CANTERWOOD COMMERCIAL PROPERTIES

PROPOSED ACTION: Commercial retail development on 7.60 acres (SR)

PROJECT LOCATION: 13136XXX SR16 HWY W  
GIG HARBOR

FILE NUMBER: PL-SPR-07-0004

ENCLOSURES: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Please review the attached application and supporting documentation and **RETURN THIS FORM** with your comments, including the applicable regulations, to project lead or permit coordinator by

~~03/11/2015~~ 9/02/14

Circle whether your review comments are permit conditions. If your comments/conditions are attached, please indicate by checking the box below.

**COMMENTS / CONDITIONS:**

☒ MEMO ATTACHED

**PROJECT:** ☐ APPROVED ☒ APPROVED AS NOTED ☐ NOT APPROVED

COMPLETED BY:

Wayne Matthews  
Reviewer

Engineering Technician  
Title

Date: 10/7/2014



"THE MARITIME CITY"

## REVISION/CORRECTION SUBMITTAL FORM

Development Services  
3510 Grandview St  
Gig Harbor WA 98335  
253-851-6170

**Please Note:** Additional or revised plans or documents for an active project will not be accepted unless accompanied by this completed form. Mailed re-submittals that do not include this form or that do not contain the correct number of copies will not be processed.

### Submittal Requirements:

All revisions / correction submittals **MUST** contain the following:

- ☒ A completed City of Gig Harbor Revision/Correction submittal form
- ☒ Always submit the same number of copies as required for your initial application.
- ☐ Revised structural calculations and/or technical reports, if applicable (must be stamped by the engineer of record)
- ☐ Revised civil plans, if applicable (must be stamped by engineer)
- ☐ A written letter to the City that shows an itemized summary of your submittal and description of each change or revision in detail (must include sheet and detail numbers)
- ☐ All changes **MUST BE CLOUDED** or **HIGHLIGHTED** on each plan set
- ☐ Fees for 3<sup>rd</sup> Submittal - Engineering

Date: 8-5-14

Permit #: PL-SPR-07-0004

Property Address: 10700 CENTERWOOD BLVD.

Project Name: CENTERWOOD Commercial Project

Contact Person: JOHN CYR

Phone: 425-656-7405

Email: JOHN@BARGTHOUSEN.COM

### TYPE OF SUBMITTAL:

- ☒ **REVISION:** A change the Request applicant has made to a plan that is either:
1. An approved plan already issued by the City for Building, Fire or Engineering only or
  2. A project under current plan review

☐ **CORRECTION:** An applicant response to a correction letter written by the City to the applicant

Has a permit already been issued? ☐ Yes ☒ No

Please describe revision/correction submittal: List affected sheets. \*\*

Request for Review of ADJACENT Storm Pond for CAPACITY OF  
Storm Collection FOR A PORTION OF CENTERWOOD Commercial Project  
Development.

\*\*Re-submittal of plans to the planning department must be complete plan sets.

\*\*When more than two (2) sheets will be changed for any other department, please submit the required number of new full plan sets or make an appointment to "slip sheet" the revised/corrected pages.

| Staff Use Only  |  |
|-----------------|--|
| Received by:    |  |
| Date Submitted: |  |



**PUBLIC WORKS DEPARTMENT**

**MEMORANDUM**

October 7, 2014

To: Kristin Moerler, Associate Planner  
From: Wayne Matthews, Engineering Technician *WM*  
Re: Canterwood Commercial Center (PL-SPR-07-0004, D-0617)  
Ref: Review Request Letter - Dated August 4, 2014  
Site Plan Redline - Dated August 4, 2014  
58th Avenue N.W. Drainage Report -- Dated November 24, 1992

---

The City of Gig Harbor Engineering Division has reviewed the above referenced items for stormwater design for the proposed Canterwood Commercial Center project.

1. The City determined that the adjacent existing pond volume up to 10,697 cubic feet is available for the Canterwood Commercial Center project.
2. The project shall meet the stormwater quantity control requirements provided in the Gig Harbor Stormwater Design Manual Revised July 2006 (Manual). The adjacent existing pond was designed following Pierce County Drainage Standards which has a 25-year event design storm.
3. Project stormwater calculations, including revisions to the existing pond control structure as well as any additional features to comply with the Manual shall be required.
4. The existing pond shall be surveyed to verify the detention capacity.

Please be aware, further issues may be addressed as discovered or as changes are made. If you have any questions regarding any of these comments please contact me.



August 4, 2014  
HAND DELIVERY

Amy Londgren  
Engineering Technician  
City of Gig Harbor  
Public Works Department  
3510 Grandview Street  
Gig Harbor, WA 98335

RE: Canterwood Commercial – Adjacent Stormwater Facility  
Site Plan Review File No. PL-SPR-07-004  
Design Review Board File No. PL-DRB-07-0013  
SEPA File Nos. PL-SEPA-07-0008 and PL-SEPA-07-0060  
Our Job No. 16657

Dear Amy:

Adjacent to the proposed Canterwood Commercial project is an existing detention pond that was created for Canterwood Boulevard (formerly 58th Avenue N.W.). We are providing you with historical documentation indicating that a part of this proposed project was accounted for in the original pond design. We would like to propose to utilize that off-site detention storage for this project.

The 58th Avenue N.W. Drainage Report prepared by DOWL Engineers, dated November 1992 is included for your review.

Detention calculations for this area were based on Pierce County Drainage Standards as applicable in 1991-1992. In the report it states, that approximately 5 acres from our proposed project (Tucci & Sons) could be gravity fed to the pond with 10,697 cubic feet of storage available (17,642 cubic is the total detention volume of the pond). It also states that this volume of the pond is set aside for this property in exchange for the land area that the pond is located on. Please refer to page 3 of the drainage report under the section titled Detention Pond Calculations. Per the report, if additional drainage is directed to this pond the control structure orifice would be modified as necessary.

We believe that the southern 5 acres of this site are subject to the storm requirements at the time the pond was constructed and that approximately 5 acres of the developed site could be routed to this pond. These 5 acres would be subject to the same storm requirements as the original pond design.

Our proposed design would route approximately 2.5 acres of development to the existing pond per the existing pond design. The 1.3 acres north of the ravine would be handled separately. See attached map for proposed basins.

Please let me know if you concur with our reasoning or if you have any questions or need further clarification.

Sincerely,

  
Jason Hubbell, P.E.  
Senior Project Engineer

PC/kb/ca [16657c.004.doc]

enc: As Noted

cc: John M. Xitco, Swede Hill, LLC

Daniel B. Goalwin, Barghausen Consulting Engineers, Inc.

Paul Cyr, Barghausen Consulting Engineers, Inc.

Karen Harris, Barghausen Consulting Engineers, Inc.

18215 72ND AVENUE SOUTH KENT, WA 98032 (425) 251-6222 (425) 251-8782 FAX  
BRANCH OFFICES • TUMWATER, WA • LONG BEACH, CA • ROSEVILLE, CA • SAN DIEGO, CA  
www.barghausen.com



## Matthews, Wayne

---

**From:** Angela G. Summerfield <asummerfield@omwlaw.com>  
**Sent:** Tuesday, October 07, 2014 1:20 PM  
**To:** Matthews, Wayne  
**Cc:** Misiurak, Steve  
**Subject:** RE: CONFIDENTIAL ATTORNEY CLIENT RE: Statutory Warranty Deed - Review Request

Thanks, Wayne. Sounds like you are on top of it and all set. If you need anything else, please let me know.  
--Angela

-----Original Message-----

**From:** Matthews, Wayne [mailto:matthewsw@cityofgigharbor.net]  
**Sent:** Tuesday, October 07, 2014 1:19 PM  
**To:** Angela G. Summerfield  
**Cc:** Misiurak, Steve  
**Subject:** FW: CONFIDENTIAL ATTORNEY CLIENT RE: Statutory Warranty Deed - Review Request

Angela,

The amount that can be discharged is limited by the available of 10,697 cubic feet of storage which is documented in the Stormwater report. The property with the right to develop is not developed, they are moving forward with the Engineering Permit for Canterwood Commercial Center. The project is vested through the Land Use permit to the Gig Harbor stormwater Design Manual revised July 2006. The project will be required to design to the 100-yr storm, modify the pond to meet all requirements and will be required to have additional detention facilities.

Thank you,  
Wayne Matthews  
Engineering Technician  
City of Gig Harbor  
Phone: (253) 853-2646

-----Original Message-----

**From:** Angela G. Summerfield [mailto:asummerfield@omwlaw.com]  
**Sent:** Tuesday, October 07, 2014 11:41 AM  
**To:** Matthews, Wayne  
**Subject:** CONFIDENTIAL ATTORNEY CLIENT RE: Statutory Warranty Deed - Review Request

Thanks, Wayne. Short answer is yes, they have the right to discharge a limited amount to the pond from the lots identified; the question is how much.

Is the property with right to discharge already developed? If undeveloped, they must meet the stormwater requirements applicable to their project, regardless of the language in the deed. From their letter it appears they think they can discharge the amount reserved in the deed regardless of whether that would be allowed by current regulations. Let me know what you see going on here.

As for maintenance, if the City owns the pond parcel now (was there an annexation?) the City is responsible for maintenance of the pond.

Hope that helps. Let me know if you have any other questions.

--Angela

-----Original Message-----

From: Matthews, Wayne [mailto:matthewsw@cityofgigharbor.net]

Sent: Tuesday, October 07, 2014 8:48 AM

To: Angela G. Summerfield

Subject: FW: Statutory Warranty Deed - Review Request

Can you confirm that the pond property was in fact included in the statutory deed?

If you open the SE25 15 file attached, and zoom in on the pond property, the zoom in on the pond property has the AFN 9401110665 which is the statutory deed number. So my answer is yes.

The configuration makes it look like the pond property was part of Parcel E.

The following docs show the site in chronological order from earliest to current.

25 41.pdf (attached)

Sheet 2 of 3 of the Boundary Line Adjustment "Existing Property Configuration" (sent earlier) Sheet 3 of 3 of the Boundary Line Adjustment "Proposed Property Configuration" (sent earlier) which and SE25 15 (attached) are the current configuration.

In referring to SE25 41 and reading the page 3 Of 4 of the statutory deed I see the pond property was part of parcel 0122254054.

Thank you,

Wayne Matthews

Engineering Technician

City of Gig Harbor

Phone: (253) 853-2646

-----Original Message-----

From: Angela G. Summerfield [mailto:asummerfield@omwlaw.com]

Sent: Monday, October 06, 2014 11:47 AM

To: Matthews, Wayne

Subject: Re: Statutory Warranty Deed - Review Request

Wayne, can you confirm that the pond property was in fact included in the statutory deed? The configuration makes it look like it was part of Parcel E, but I could be wrong. Just want to make sure. Thanks

> On Oct 3, 2014, at 10:04 AM, Matthews, Wayne <matthewsw@cityofgigharbor.net> wrote:

>

> Angela,

>

> I am reviewing a private development Canterwood Commercial Center for stormwater design compliance. This unusual in that the Swede Hill LLC (developer) is requesting to use capacity in an existing City owned stormwater pond facility (Pond) for their development.

>

> \* The Pond was permitted and constructed through Pierce County. The pond was designed to serve the new county road project 58th Avenue N.W. (aka Canterwood Boulevard) plus a portion of the developer's private property

(the site of Canterwood Commercial Center). The Drainage report speaks to this on page 3 bottom paragraph, see "Drainage Report" attached.

>

> \* The developer also provide a Statutory Warranty Deed 9401.110665 (Deed). The Deed on page 3 speaks to the right to discharge storm water to the pond, and who does maintenance. The Deed on page 3 refers to parcels 0122254-053 and -059, plus that portion of the parcels 0122254-054, -066, -067 and -068 west of Canterwood Boulevard. See attached "Deed".

>

> \* I found that those 6 parcels were combined to the one parcel that is the developer's private property (the site of Canterwood Commercial Center). See attached "Boundary Line Adjustment".

>

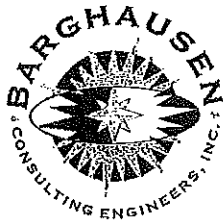
> With these attached documents can you determine- Does the developer  
> have the legal right to use the Pond as described in the above documents?  
> Who is to maintain the Pond?

>

> Thank you,  
> Wayne Matthews  
> Engineering Technician  
> City of Gig Harbor  
> Phone: (253) 853-2646

>

> <Drainage Report.pdf>  
> <Deed.pdf>  
> <Boundary Line Adjustment.pdf>



August 4, 2014  
HAND DELIVERY

Amy Londgren  
Engineering Technician  
City of Gig Harbor  
Public Works Department  
3510 Grandview Street  
Gig Harbor, WA 98335

RE: Canterwood Commercial – Adjacent Stormwater Facility  
Site Plan Review File No. PL-SPR-07-004  
Design Review Board File No. PL-DRB-07-0013  
SEPA File Nos. PL-SEPA-07-0008 and PL-SEPA-07-0060  
Our Job No. 16657

Dear Amy:

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The 58th Avenue N.W. Drainage Report prepared by DOWL Engineers, dated November 1992 is included for your review.

Detention calculations for this area were based on Pierce County Drainage Standards as applicable in 1991-1992. In the report it states, that approximately 5 acres from our proposed project (Tucci & Sons) could be gravity fed to the pond with 10,697 cubic feet of storage available (17,642 cubic is the total detention volume of the pond). It also states that this volume of the pond is set aside for this property in exchange for the land area that the pond is located on. Please refer to page 3 of the drainage report under the section titled Detention Pond Calculations. Per the report, if additional drainage is directed to this pond the control structure orifice would be modified as necessary.

We believe that the southern 5 acres of this site are subject to the storm requirements at the time the pond was constructed and that approximately 5 acres of the developed site could be routed to this pond. These 5 acres would be subject to the same storm requirements as the original pond design.

Our proposed design would route approximately 2.5 acres of development to the existing pond per the existing pond design. The 1.3 acres north of the ravine would be handled separately. See attached map for proposed basins.

Please let me know if you concur with our reasoning or if you have any questions or need further clarification.

Sincerely,

  
Jason Hubbell, P.E.  
Senior Project Engineer

PC/kb/ca [16657c.004.doc]

enc: As Noted

cc: John M. Xitco, Swede Hill, LLC

Daniel B. Goalwin, Barghausen Consulting Engineers, Inc.

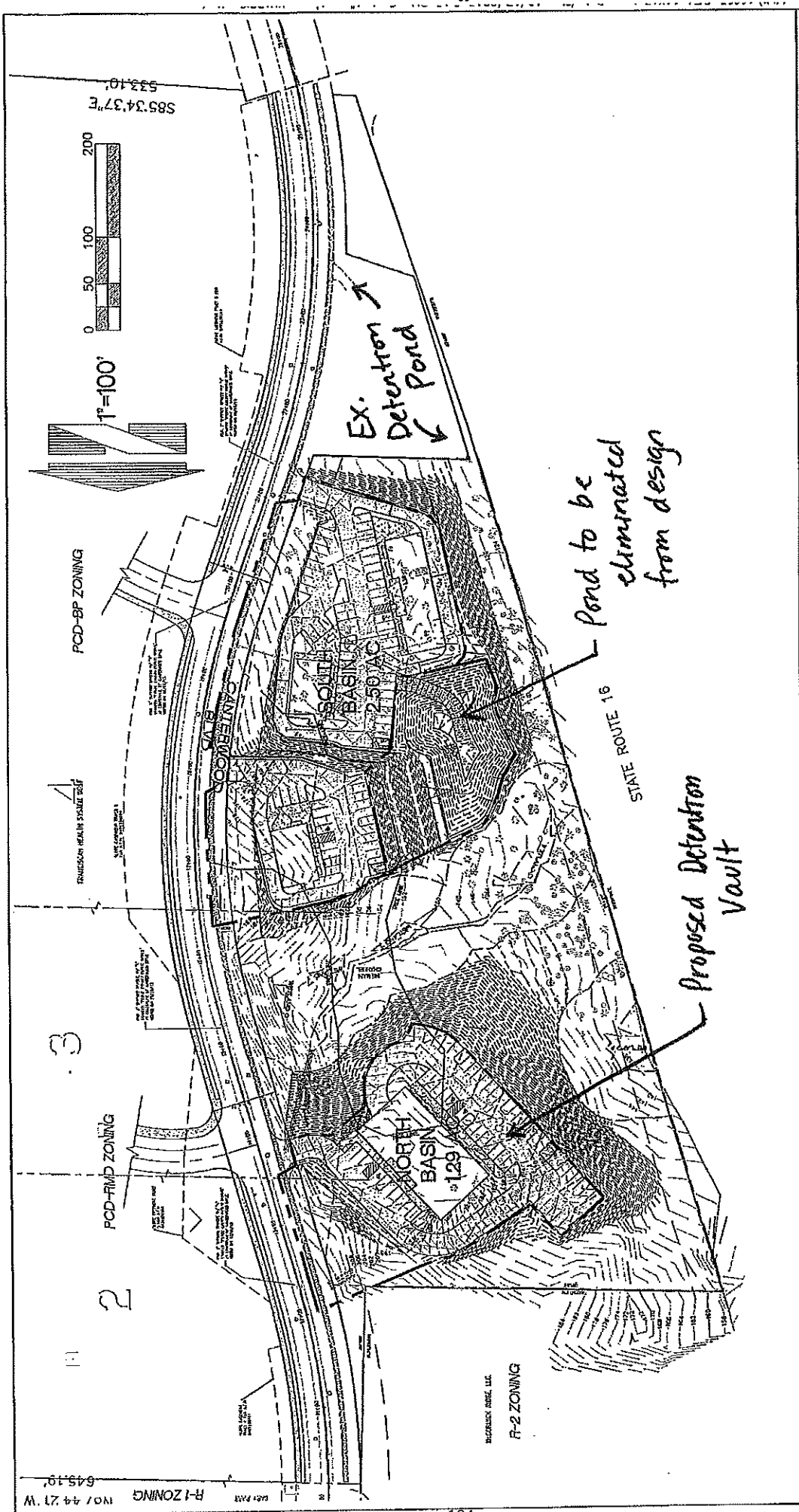
Paul Cyr, Barghausen Consulting Engineers, Inc.

Karen Harris, Barghausen Consulting Engineers, Inc.

18215 72ND AVENUE SOUTH KENT, WA 98032 (425) 251-6222 (425) 251-8782 FAX  
BRANCH OFFICES • TUMWATER, WA • LONG BEACH, CA • ROSEVILLE, CA • SAN DIEGO, CA

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|                                                                                                       |                                             |                                                                                                                                                                                                                                                    |                                                              |                                              |                                  |
|-------------------------------------------------------------------------------------------------------|---------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|----------------------------------------------|----------------------------------|
| Designed <u>SEL</u><br>Drawn <u>ROC</u><br>Checked <u>SEL</u><br>Approved <u>SEL</u><br>Date 12/15/13 | Scale:<br>Horizontal 1"=100'<br>Vertical NA | <br>18215 72ND AVENUE SOUTH<br>KENT, WA 98032<br>(425)251-6222<br>(425)251-8782 FAX<br>CIVIL ENGINEERING, LAND PLANNING,<br>SURVEYING, ENVIRONMENTAL SERVICES | For:<br>SWEDE HILL, LLC<br>P.O. BOX 1693<br>TACOMA, WA 98401 | Title: DEVELOPED CONDITIONS PLAN<br>Figure 6 | Job Number 16657<br>Sheet 1 of 1 |
|-------------------------------------------------------------------------------------------------------|---------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|----------------------------------------------|----------------------------------|

## Karen Harris

---

**From:** Matthews, Wayne <matthewsw@cityofgigharbor.net>  
**Sent:** Monday, December 29, 2014 1:17 PM  
**To:** Jason Hubbell  
**Cc:** Karen Harris  
**Subject:** RE: Canterwood Commercial Center (PL-SPR-07-0004) ADJACENT EXISTING POND BCE #16657

**Follow Up Flag:** Flag for follow up  
**Flag Status:** Flagged

Karen and Jason,

I appreciate the proposal, it does appear to meet the intent of the City of Gig Harbor 2006 drainage standards with use of the ratio method as stated in step one. As I understand the proposal the project will -

- provide a new pipe that directs flows from the basin area, as determined in step one, to the existing pond.
- provide a revised existing pond control structure orifice for the additional flow as described in step three.
- provide discharge point(s), that are separate from the existing pond, for the south on site pond.
- provide a stormwater detention facility for the north portion of the project.
- provide a survey of the existing pond that will be essential to verify the storage that is available for future development.

If you concur with my statements above, then you may proceed with your design.

Sincerely,  
**Wayne Matthews**  
Engineering Technician  
City of Gig Harbor  
Phone: (253) 853-2646

---

**From:** Jason Hubbell [mailto:jhubbell@barghausen.com]  
**Sent:** Tuesday, December 23, 2014 8:02 AM  
**To:** Matthews, Wayne  
**Cc:** Karen Harris  
**Subject:** RE: Canterwood Commercial Center (PL-SPR-07-0004) ADJACENT EXISTING POND BCE #16657

Following up Wayne

---

**From:** Karen Harris  
**Sent:** Thursday, December 18, 2014 11:24 AM  
**To:** Matthews, Wayne  
**Cc:** Jason Hubbell  
**Subject:** RE: Canterwood Commercial Center (PL-SPR-07-0004) ADJACENT EXISTING POND BCE #16657

Wayne-

Thanks for discussing the Canterwood project with us this morning, please see below for our proposal for meeting the intent of the City of Gig Harbor standards while still being able to utilize the available storage volume in the offsite pond.

- 1) We will size a drainage pond for the entire onsite basin to meet the City of Gig Harbor 2006 drainage standards. From this calculation we will obtain the required pond volume per acre of area that is directed to the pond. Using that ratio, we can determine the amount of area of the site that can be sent to the offsite pond to utilize the available 10,697 cubic feet of detention. We will then show that equivalent area being routed to the offsite pond to the south.
- 2) We will then size the onsite pond with the remainder of the onsite basin area per City of Gig Harbor 2006 drainage standards.
- 3) To finalize the design we will route the onsite basin obtained in step 1 to the offsite pond and revise the orifice of the existing pond outlet structure to take into account this additional drainage. This pond sizing calculation would use the same Pierce County standards that were used for the offsite pond (25-yr storm event, etc.). This is the only physical change that will be made to the existing pond.

Please let us know if you agree with this methodology and we will proceed in this manner.

Thanks,  
Karen

---

**From:** Matthews, Wayne [<mailto:matthewsw@cityofgigharbor.net>]  
**Sent:** Tuesday, December 02, 2014 6:06 PM  
**To:** Karen Harris  
**Cc:** Jason Hubbell  
**Subject:** RE: Canterwood Commercial Center (PL-SPR-07-0004) ADJACENT EXISTING POND BCE #16657

Karen,

Hi. For the stormwater design of the proposed Canterwood Commercial Center project.

1. The City determined that the adjacent existing pond volume up to **10,697 cubic feet** is available for the Canterwood Commercial Center project.
2. The project (both the south and north portions) shall meet the stormwater quantity control requirements and water quality requirements provided in the Gig Harbor Stormwater Design Manual Revised July 2006 (Manual).
3. Project stormwater detention calculations, that includes any revisions to the existing pond control structure as well as any additional features to comply with the Gig Harbor Stormwater Design Manual Revised July 2006 Manual shall be required.
4. The existing pond shall be surveyed to verify the detention capacity.

Note that the adjacent existing pond was designed following Pierce County Drainage Standards which has a 25-year event design storm.

Do not hesitate to contact me to request clarification or if questions.

Sincerely,  
**Wayne Matthews**  
Engineering Technician  
City of Gig Harbor  
Phone: (253) 853-2646



---

**From:** Karen Harris [<mailto:kharris@barghausen.com>]

**Sent:** Tuesday, December 02, 2014 8:55 AM

**To:** Matthews, Wayne

**Cc:** Jason Hubbell

**Subject:** RE: Canterwood Commercial Center (PL-SPR-07-0004) ADJACENT EXISTING POND BCE #16657

Hi Wayne-

We would like to move forward on the storm design of this development and I really need your input. Let me know a good time and I can give you a call.

Thanks,  
Karen

---

**From:** Karen Harris

**Sent:** Monday, December 01, 2014 11:11 AM

**To:** 'Wayne Matthews ([matthewsw@cityofgigharbor.net](mailto:matthewsw@cityofgigharbor.net))'

**Subject:** Canterwood Commercial Center (PL-SPR-07-0004) ADJACENT EXISTING POND

Wayne –

If you could call me today that would be great, I read your memo and want to verify what calculations we need to use to send stormwater to the existing pond. Are we using old Pierce County standards for the onsite area going to the existing pond and then 2006 Gig Harbor for the remainder of the site?

Thanks,  
Karen

---

Karen E. Harris, P.E., LEED Green Associate  
Project Engineer

Barghausen Consulting Engineers, Inc.  
18215 72nd Avenue South  
Kent, WA 98032

(425) 251-6222 - Phone  
(425) 251-8782 - Kent Office Fax

<http://www.barghausen.com>

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# Offsite Pond Drainage Report

# **58th AVENUE N.W. DRAINAGE REPORT**

Prepared for:

**PIERCE COUNTY**  
2401 South 35th Street  
Tacoma, Washington 98409

**RECEIVED**  
**PIERCE COUNTY**  
**PUBLIC WORKS**

NOV 25 1992

AM PM  
7 8 9 10 11 12 1 2 3 4 5 6



Prepared by:

**DOWL ENGINEERS**  
8320 154th Avenue NE  
Redmond, Washington 98052

November 1992

W.O. #S11332-01

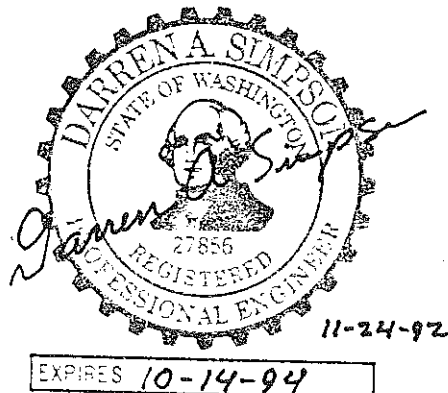
# 58th AVENUE N.W. DRAINAGE REPORT

November 1992

Prepared by:

**DOWL ENGINEERS**  
Darren A. Simpson, P.E.

This report has been prepared by the staff of DOWL Engineers under the direction of the undersigned professional engineer whose seal and signature appear hereon.



Darren A. Simpson, P.E

## INTRODUCTION

58th Avenue N.W. is located in north of Gig Harbor, east of State Route 16 (SR-16), and in the SE 4, Section 25, Township 22 North, Range 1 East, Willamette Meridian. The proposed alignment generally follows a ridge line to connect 57th Avenue N.W. to Burnham Drive N.W. This new two-lane rural road is classified as a secondary arterial with a design speed of 45 mph.

The project consists of 3,820 lineal feet of new pavement with shoulder, detention pond, drainage piping and appurtenances. The cross-section typically consists of 27 feet of pavement with 6-foot gravel shoulders. Shoulders are widened to 8 feet where embankment exceeds 10 feet in height. The south end of this road connecting to Burnham Drive N.W. is at an elevation of approximately 111 feet. The high point on this project is at an elevation of approximately 307 feet. The maximum grade along the vertical alignment is 10.65%.

This project was initially approved on June 4, 1991 for construction by the Pierce County Development Section. Construction under a private development contract commenced immediately following this approval and continued through September of the same year. Completion of the project is now to be funded under the Road Improvement District 1-92. To date, construction has consisted of establishing erosion control measures, clearing and grubbing within the right-of-way and some grading activities, particularly on the north end of this project.

During June 1992 the alignment was surveyed again for cross-sections at 50-foot stations. This topographic information has been incorporated into the design. Other revisions to the previously approved plan set include adjustment of vertical alignment, removal of spiral curves from the horizontal alignment, and revisions to the horizontal and vertical alignment of the storm drainage system. Additionally, this project was re-drafted from a 1"=50' plan set to a 1"=20' plan set and stationing was revised to increase to the north.

This report will address drainage pipe calculations and detention pond calculations. Documentation of the down stream conveyance system has been previously submitted for this project and will not be addressed as part of this narrative. However, correspondence and information pertaining to the down stream capacity analysis will be included as appendix "B".



## EXISTING CONDITIONS

The existing drainage patterns from 58th Avenue have been somewhat disrupted by the initial clearing, grubbing and grading activities during the summer of 1991; however, erosion control measures are in place and are functioning as intended. Prior to these activities this land was dense forest and very hilly. There are existing dead-end roads at both the north and south ends of the project. Drainage patterns along these existing roads consist of sheet flow off the road and shoulders to ditches on the east side or sheet flow on the west side of the roads. Culverts both on the north and south ends convey drainage from the ditch lines to the west. There is a large ravine in the center of the project with an up-stream basin of 65 acres. The west portion of Canterwood is within the up-stream basin and comprehensive drainage improvements have been proposed to control peak flows to the ravine.

## DESIGN

The drainage from this project will point discharge at two locations. The southern portion of this project from the high point at station 31+83 south to station 7+06 will be intercepted and conveyed to a proposed detention pond located immediately west of station 7+06. The remanding 546 lineal feet of road from between station 7+06 and the beginning of construction at station 1+60 will sheet flow off the road in the same manor as the existing drainage pattern. Drainage north of station 31+83 to station 38+17 will be intercepted and conveyed to an existing ditch on the east side of the existing road. Detention on the north and south ends of this road is not required as a result of a meeting with Phil Pinard, Pierce County Public Works on March 29th, 1991.

## STORM DRAINAGE PIPING CALCULATIONS.

This project will construct two lanes of 12.5 feet of asphalt pavement with 1 foot of thickened asphalt edge for a total pavement width of 27 feet. Center of catch basin structures are 12.00 feet from the centerline of the road. This location will require warping of the thickened edge around catch basin inlets because the grates intrude 4 inches into the thickened edge. Vane grates will be used where longitudinal slopes of the road exceed 6%. Catch basin longitudinal spacing design is

in conformance with maximum surface runs for storm drain on paved roadway surfaces as required by of the Pierce County Road Standards.

Because the proposed alignment follows a ridge line, almost all of the areas of contribution to the catch basins occur from pavement, shoulder, or cut slopes. Catchment areas for each storm drain catch basin were computed with an AutoCAD. drawing and are shown on Exhibit A. The coefficients of runoff used for pavement, shoulder and cut slope are 0.90, 0.60, and 0.60, respectively. The weighted average run-off coefficients for each catchment are also shown on Exhibit A. An Excel spread sheet was utilized for calculations based upon the rational method. The design storm was the 25-year event for Pierce County, Zone 2. The full flow velocities calculated by the spread sheet were adjusted to the actual depth of flow in the pipe using the WSDOT partial flow curves. Maximum velocity does not exceed 15 feet per second and flow do not exceed 41% of full flow capacity.

#### DETENTION POND CALCULATIONS

The detention pond design is based upon a 2-year pre-development release rate. The design storm is the 25-year event. The coefficient of run-off used for pre-developed conditions was assumed to be 0.15. This value is recommended by the WSDOT Hydraulic Design Manual page for woodland and forests, rolling at 2% to 10%. The pre-development time of concentration was established by defining a flow path as shown on Exhibit A. The time of concentration is 42.4 minutes, calculated by the SCS overland flow equation. The total basin area for the detention pond is 2.94 acres. The average run-off coefficient for the developed area is 0.76. The 2-year pre-development release rate is 0.22 cubic feet per second; required detention volume for the 25-year developed condition storm is 6,945 cubic feet.

The detention pond, as designed, has the capacity to detain 17,642 cubic feet. Tucci & Sons owns approximately 8 acres of land west of 58th Avenue N.W. Of this 8 acres, approximately 5 acres could be connected by gravity flow to the detention pond. Given the required storage of 6,945 cubic feet the remaining 10,697 cubic feet of storage is available for future development. It is our understanding that this volume of storage will be made available to Tucci & Sons in consideration of their dedication of the pond tract to Pierce County.

The total storage in this detention pond is 4 feet. The lower 2 feet will be sufficient for 58th Avenue. The orifice was sized at 2-3/8 inch diameter for contribution from 58th Avenue only. When future connection is made to this detention pond the orifice may be adjusted to adjust the discharge rate.

#### 48-INCH CULVERT

The upstream basin for this 48-inch culvert is 65 acres. Canterwood, Division 11 comprises 52 acres and the remaining 13 acres is a forested ravine drainage area down stream of Canterwood. Currently the report by DOWL Engineers for Division 11 is in review with the Pierce County, Development Section. The 100-year storm pre-developed runoff rate is 19.52 cfs and the 100-year developed run-off rate is 25.14 cfs. The design release rate proposed detention pond is 15.81 cfs. The additional contribution for the 13 acres downstream from Canterwood, was estimated at 2 cfs. Ignoring the proposed detention facility in Canterwood, the 100-year developed condition flow to the culvert is approximately 27 cfs.

The proposed culvert is 188 lineal feet of 48-inch diameter reinforced concrete pipe, class IV at a 9.0% slope. The existing ditch immediately upstream and downstream of the proposed culverts is at 12.0% slope. The existing channel is vegetated and there is no evidence of scouring. The capacity, based upon an inlet-control system and 1.25 HW/d ratio (WSDOT recommended design value), is 85 cfs which exceeds the required 27 cfs. The depth necessary to pass 27 cfs is actually 2.2 feet. The grades involved in the channel and pipe warrant use of a flared inlet on the upstream end and rip-rap on the downstream end.

**Appendix A**  
**PIPE CALCULATIONS, BASIN DESIGN & CULVERT ANALYSIS**



Project Name  
58TH AVENUE NW

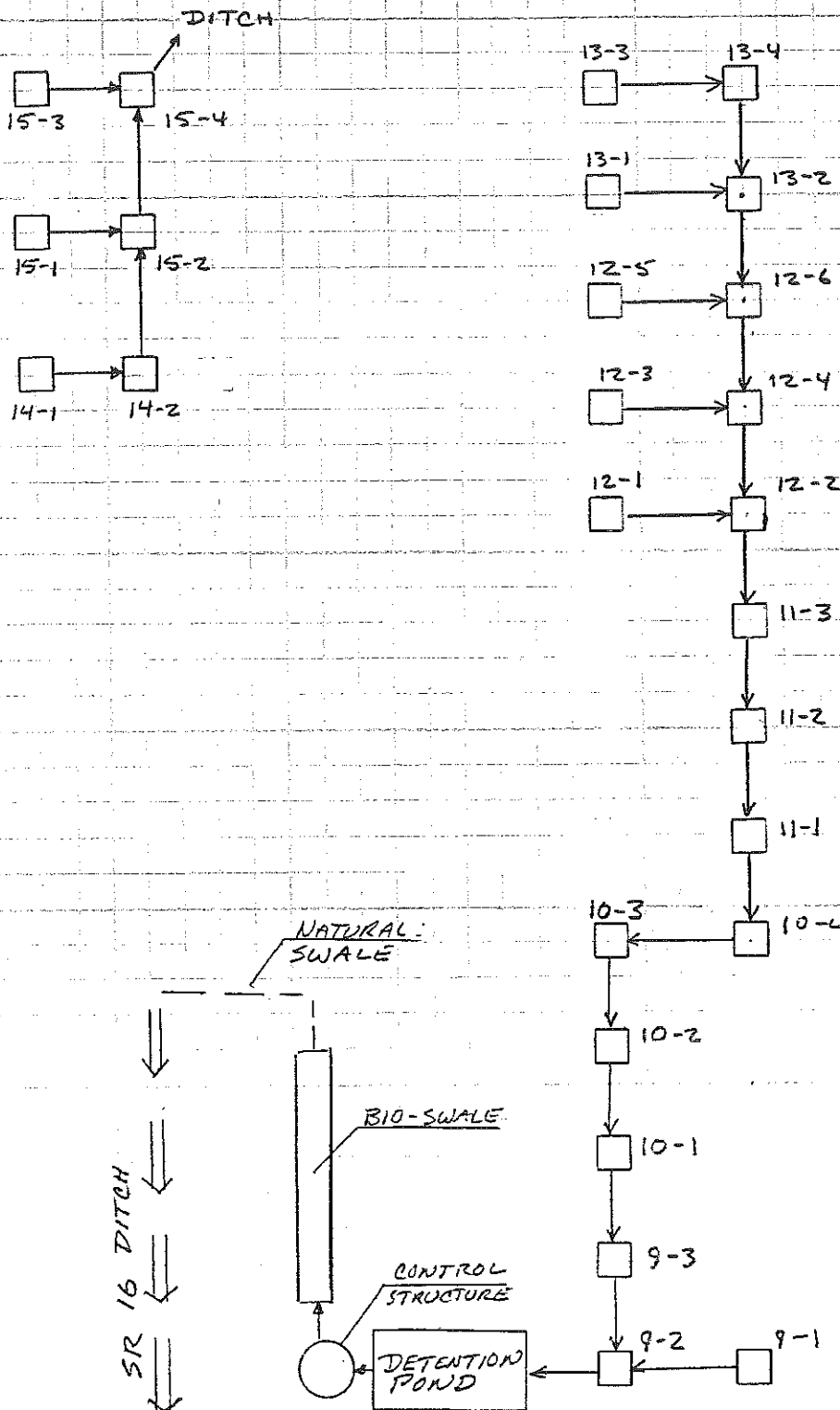
Client Name  
PIERCE COUNTY

Sheet \_\_\_\_ of \_\_\_\_

Prepared by: D. SIMPSON Date 11-12-92

Checked by: Date

### SCHEMATIC OF PIPING SYSTEM



| PROJ: 58TH AVENUE NW - STREET IMPROVEMENTS |         |        |       |        |        |        |       |         |          |     |
|--------------------------------------------|---------|--------|-------|--------|--------|--------|-------|---------|----------|-----|
| DATE: NOV 9, 1992                          |         |        |       |        |        |        |       |         |          |     |
| Storm Drainage                             |         |        |       |        |        |        |       |         |          |     |
|                                            |         |        |       |        |        |        |       |         |          |     |
| Str-No                                     | STA     | CL EL  | SLOPE | GRATE  | INV    | LENGTH | SLOPE | STR EX  | STR EX   | TOT |
|                                            |         |        |       |        |        |        |       | CB (CY) | PIPE(CY) |     |
| 9-2                                        | 706.11  | 134.24 | 4     | 134.74 | 130.24 |        |       | 13.20   |          |     |
| 9-2                                        |         |        |       |        |        | 183.94 | 7.74  |         | 94.24    | 107 |
| 9-3                                        | 890.05  | 147.98 | 0     | 147.98 | 144.48 |        |       | 4.83    |          |     |
| 9-3                                        |         |        |       |        |        | 199.95 | 7.31  |         | 90.38    | 95  |
| 10-1                                       | 1090    | 163.09 | -4    | 162.59 | 159.09 |        |       | 4.83    |          |     |
| 10-1                                       |         |        |       |        |        | 200.00 | 7.60  |         | 90.41    | 95  |
| 10-2                                       | 1290    | 178.28 | -4    | 177.78 | 174.28 |        |       | 4.83    |          |     |
| 10-2                                       |         |        |       |        |        | 197.63 | 8.60  |         | 101.41   | 106 |
| 10-3                                       | 1487.63 | 196.03 | -2    | 195.78 | 191.28 |        |       | 5.64    |          |     |
| 10-3                                       |         |        |       |        |        | 24.00  | 7.29  |         | 9.85     | 15  |
| 10-4                                       | 1487.63 | 196.03 | 0     | 196.03 | 193.03 |        |       | 4.43    |          |     |
| 10-4                                       |         |        |       |        |        | 137.37 | 9.96  |         | 57.35    | 62  |
| 11-1                                       | 1625    | 210.46 | -2    | 210.21 | 206.71 |        |       | 4.83    |          |     |
| 11-1                                       |         |        |       |        |        | 130.00 | 10.46 |         | 58.12    | 63  |
| 11-2                                       | 1755    | 224.31 | -4    | 223.81 | 220.31 |        |       | 4.83    |          |     |
| 11-2                                       |         |        |       |        |        | 130.00 | 10.65 |         | 58.12    | 63  |
| 11-3                                       | 1885    | 238.15 | -4    | 237.65 | 234.15 |        |       | 4.83    |          |     |
| 11-3                                       |         |        |       |        |        | 131.17 | 10.18 |         | 58.66    | 63  |
| 12-2                                       | 2016.17 | 251.25 | -2    | 251    | 247.5  |        |       | 4.83    |          |     |
| 12-2                                       |         |        |       |        |        | 143.83 | 8.86  |         | 64.50    | 69  |
| 12-4                                       | 2160    | 263.99 | -2    | 263.74 | 260.24 |        |       | 4.83    |          |     |
| 12-4                                       |         |        |       |        |        | 240.00 | 7.40  |         | 108.86   | 114 |
| 12-6                                       | 2400    | 281.76 | -2    | 281.51 | 278.01 |        |       | 4.83    |          |     |
| 12-6                                       |         |        |       |        |        | 250.00 | 5.48  |         | 113.47   | 118 |
| 13-2                                       | 2650    | 295.47 | -2    | 295.22 | 291.72 |        |       | 4.83    |          |     |
| 13-2                                       |         |        |       |        |        | 250.00 | 3.40  |         | 113.47   | 118 |
| 13-4                                       | 2900    | 303.97 | -2    | 303.72 | 300.22 |        |       | 4.83    |          |     |
|                                            |         |        |       |        |        | 0.00   |       |         |          | 5   |
| 9-1                                        | 706.11  | 134.24 | -4    | 133.74 | 130.72 |        |       | 4.44    |          |     |
|                                            |         |        |       |        |        | 24.00  | 2.00  |         | 9.61     | 14  |
| 12-1                                       | 2016.17 | 251.25 | 0     | 251.25 | 247.98 |        |       | 4.65    |          |     |
|                                            |         |        |       |        |        | 24.00  | 2.00  |         | 10.31    | 15  |
| 12-3                                       | 2160    | 263.99 | -2    | 263.74 | 260.72 |        |       | 4.44    |          |     |
|                                            |         |        |       |        |        | 24.00  | 2.00  |         | 9.61     | 14  |
| 12-5                                       | 2400    | 281.76 | -2    | 281.51 | 278.49 |        |       | 4.44    |          |     |
|                                            |         |        |       |        |        | 24.00  | 2.00  |         | 9.61     | 14  |
| 13-1                                       | 2650    | 295.47 | -2    | 295.22 | 292.2  |        |       | 4.44    |          |     |
|                                            |         |        |       |        |        | 24.00  | 2.00  |         | 9.61     | 14  |
| 13-3                                       | 2900    | 303.97 | -2    | 303.72 | 300.7  |        |       | 4.44    |          |     |
|                                            |         |        |       |        |        | 24.00  | 2.00  |         | 9.61     | 14  |
| 14-2                                       | 3386.36 | 305.62 | 0     | 305.62 | 302.12 |        |       | 4.83    |          |     |
|                                            |         |        |       |        |        | 293.64 | -2.72 |         | 133.60   | 138 |
| 15-2                                       | 3680    | 297.89 | -2    | 297.64 | 294.14 |        |       | 4.83    |          |     |
|                                            |         |        |       |        |        | 137.69 | -3.31 |         | 50.72    | 56  |
| 15-4                                       | 3817.69 | 292.02 | -2    | 291.77 | 289.58 |        |       | 3.78    |          |     |
|                                            |         |        |       |        |        | 12.00  | 2.00  |         | 2.92     | 7   |
| 14-1                                       | 3386.36 | 305.62 | -2    | 305.37 | 302.6  |        |       | 4.24    |          |     |
|                                            |         |        |       |        |        | 25.00  | 2.00  |         | 9.36     | 14  |
| 15-1                                       | 3680    | 297.89 | -2    | 297.64 | 294.62 |        |       | 4.44    |          |     |
|                                            |         |        |       |        |        | 25.00  | 2.00  |         | 10.09    | 15  |
| 15-3                                       | 3817.69 | 292.02 | 0     | 292.02 | 290.06 |        |       | 3.59    |          |     |
|                                            |         |        |       |        |        | 25.00  | 2.00  |         | 7.00     | 11  |

PROJ: 58TH AVENUE N.W. - Street Improvements

FILE: S110731 511332

DATE: Nov 12, 1992

PIPE SIZING TABLE  
(Runoff by Rational Method)  
(Pipe Capacity by Manning's Eqn.)

DOWL ENGINEERS  
8320 154TH AVENUE NE  
Redmond, WA 98052  
(206) 869-2670 (work)  
(206) 869-2679 (fax)

Storm: Gig Harbor 25 year

| Location |       | Inc.  | AREA  |       | Sum   | Time of | Rain    | Runoff | n     | Diam  | Slope | Length | Pipe  | %     | Veloc    | Flow  | Actual      |
|----------|-------|-------|-------|-------|-------|---------|---------|--------|-------|-------|-------|--------|-------|-------|----------|-------|-------------|
| From     | To    | Area  | unoff | A*C   | A*C   | Concen. | Intens  | (cfs)  | Value | (in.) | (%)   | (ft)   | (cfs) | Capac | Full     | Time  | Flow        |
|          |       |       | Coef. |       |       | (min.)  | (in/hr) |        |       |       |       |        |       | Used  | (ft/sec) | (min) | ft/sec)     |
| 14-1     | 14-2  | 0.121 | 0.75  | 0.091 | 0.091 | 6.83*   | 2.53    | 0.23   | 0.012 | 12    | 2.00  | 24.00  | 5.46  | 4     | 6.95     | 0.06  | 3.34        |
| 14-2     | 15-2  | 0.119 | 0.76  | 0.090 | 0.181 | 6.89    | 2.52    | 0.46   | 0.012 | 12    | 2.72  | 293.64 | 6.37  | 7     | 8.11     | 0.60  | 4.78        |
|          |       |       |       |       | 0.181 | 7.49    |         |        |       |       |       |        |       |       |          |       |             |
| 15-1     | 15-2  | 0.302 | 0.77  | 0.233 | 0.233 | 6.00*** | 2.65    | 0.62   | 0.012 | 12    | 2.00  | 24.00  | 5.46  | 11    | 6.95     | 0.06  | 4.52        |
|          |       |       |       |       |       | 6.06    |         |        |       |       |       |        |       |       |          |       |             |
| 15-2     | 15-4  | 0.018 | 0.81  | 0.015 | 0.428 | 7.49    | 2.43    | 1.04   | 0.012 | 12    | 3.31  | 137.69 | 7.02  | 15    | 8.94     | 0.26  | 6.62        |
|          |       |       |       |       | 0.428 | 7.75    |         |        |       |       |       |        |       |       |          |       | Junct.@ 5-2 |
| 15-3     | 15-4  | 0.069 | 0.79  | 0.055 | 0.055 | 6.00*** | 2.65    | 0.14   | 0.012 | 12    | 2.00  | 24.00  | 5.46  | 3     | 6.95     | 0.06  | 3.06        |
|          |       |       |       |       |       | 6.06    |         |        |       |       |       |        |       |       |          |       |             |
| 15-4     | Ditch | 0.073 | 0.78  | 0.057 | 0.540 | 7.75    | 2.39    | 1.29   | 0.012 | 12    | 2.00  | 12.00  | 5.46  | 24    | 6.95     | 0.03  | 5.84        |
|          |       |       |       |       | 0.540 | 7.78    |         |        |       |       |       |        |       |       |          |       | Junct.@ 5-4 |

PROJ: 58TH AVENUE N.W. - Street Improvements

FILE: ~~S11073~~ S11332

DATE: Nov 12, 1992

PIPE SIZING TABLE  
(Runoff by Rational Method)  
(Pipe Capacity by Manning's Eqn.)

DOWL ENGINEERS  
8320 154TH AVENUE NE  
Redmond, WA 98052  
(206) 869-2670 (work)  
(206) 869-2679 (fax)

Storm: Gig Harbor 25 year

| Location |      | AREA "A"     |                | Sum<br>A*C | Time of<br>Concen.<br>(min.) | Rain<br>Intens<br>(in/hr) | Runoff<br>(cfs) | n<br>Value | Diam<br>(in.) | Slope<br>(%) | Length<br>(ft) | Pipe<br>Capac<br>(cfs) | %<br>Capac<br>Used | Veloc<br>Full<br>(ft/sec) | Flow<br>Time<br>(min) | Actual***<br>Flow<br>ft/sec |
|----------|------|--------------|----------------|------------|------------------------------|---------------------------|-----------------|------------|---------------|--------------|----------------|------------------------|--------------------|---------------------------|-----------------------|-----------------------------|
| From     | To   | Inc.<br>Area | unoff<br>Coef. |            |                              |                           |                 |            |               |              |                |                        |                    |                           |                       |                             |
| 13-3     | 13-4 | 0.166        | 0.75           | 0.125      | 7.18*                        | 2.47                      | 0.31            | 0.012      | 12            | 2.00         | 24.00          | 5.46                   | 6                  | 6.95                      | 0.06                  | 3.82                        |
| 13-4     | 13-2 | 0.168        | 0.75           | 0.126      | 7.24                         | 2.46                      | 0.62            | 0.012      | 12            | 3.40         | 250.00         | 7.12                   | 9                  | 9.06                      | 0.46                  | 5.53                        |
| 13-1     | 13-2 | 0.137        | 0.77           | 0.105      | 7.70                         | 2.65                      | 0.28            | 0.012      | 12            | 2.00         | 24.00          | 5.46                   | 5                  | 6.95                      | 0.06                  | 3.54                        |
| 13-2     | 12-6 | 0.143        | 0.76           | 0.109      | 6.00**                       | 2.40                      | 1.11            | 0.012      | 12            | 5.48         | 250.00         | 9.04                   | 12                 | 11.50                     | 0.36                  | 7.82                        |
| 12-5     | 12-6 | 0.134        | 0.77           | 0.103      | 6.06                         | 2.65                      | 0.27            | 0.012      | 12            | 2.00         | 24.00          | 5.46                   | 5                  | 6.95                      | 0.06                  | 3.54                        |
| 12-6     | 12-4 | 0.134        | 0.77           | 0.103      | 8.06                         | 2.34                      | 1.57            | 0.012      | 12            | 7.40         | 240.00         | 10.50                  | 15                 | 13.37                     | 0.30                  | 9.76                        |
| 12-3     | 12-4 | 0.118        | 0.79           | 0.093      | 6.00**                       | 2.65                      | 0.25            | 0.012      | 12            | 2.00         | 24.00          | 5.46                   | 5                  | 6.95                      | 0.06                  | 3.54                        |
| 12-4     | 12-2 | 0.110        | 0.80           | 0.088      | 8.36                         | 2.31                      | 1.97            | 0.012      | 12            | 8.86         | 143.83         | 11.49                  | 17                 | 14.63                     | 0.16                  | 10.97                       |
| 12-1     | 12-2 | 0.071        | 0.79           | 0.056      | 6.00**                       | 2.65                      | 0.15            | 0.012      | 12            | 2.00         | 24.00          | 5.46                   | 3                  | 6.95                      | 0.06                  | 3.13                        |
| 12-2     | 11-3 | 0.078        | 0.77           | 0.060      | 8.52                         | 2.29                      | 2.22            | 0.012      | 12            | 10.18        | 131.17         | 12.32                  | 18                 | 15.68                     | 0.14                  | 12.07                       |
| 11-3     | 11-2 | 0.176        | 0.73           | 0.128      | 8.66                         | 2.27                      | 2.49            | 0.012      | 12            | 10.65        | 130.00         | 12.60                  | 20                 | 16.04                     | 0.14                  | 12.67                       |
| 11-2     | 11-1 | 0.174        | 0.74           | 0.129      | 8.80                         | 2.26                      | 2.77            | 0.012      | 12            | 10.46        | 130.00         | 12.48                  | 22                 | 15.89                     | 0.14                  | 13.03                       |
| 11-1     | 10-4 | 0.132        | 0.77           | 0.102      | 8.93                         | 2.24                      | 2.98            | 0.012      | 12            | 9.96         | 137.37         | 12.18                  | 24                 | 15.51                     | 0.15                  | 13.03                       |
| 10-4     | 10-3 | 0.067        | 0.79           | 0.053      | 9.08                         | 2.23                      | 3.07            | 0.012      | 12            | 7.29         | 24.00          | 10.42                  | 29                 | 13.27                     | 0.03                  | 11.68                       |
| 10-3     | 10-2 | 0.081        | 0.80           | 0.065      | 9.11                         | 2.22                      | 3.21            | 0.012      | 12            | 8.60         | 197.63         | 11.32                  | 28                 | 14.41                     | 0.23                  | 12.54                       |
| 10-2     | 10-1 | 0.288        | 0.76           | 0.219      | 9.34                         | 2.20                      | 3.65            | 0.012      | 12            | 7.60         | 200.00         | 10.64                  | 34                 | 13.55                     | 0.25                  | 12.46                       |
| 10-1     | 9-3  | 0.309        | 0.72           | 0.222      | 9.59                         | 2.17                      | 4.09            | 0.012      | 12            | 7.31         | 199.95         | 10.44                  | 39                 | 13.29                     | 0.25                  | 12.76                       |
| 9-3      | 9-2  | 0.261        | 0.74           | 0.193      | 9.84                         | 2.14                      | 4.45            | 0.012      | 12            | 7.74         | 183.94         | 10.74                  | 41                 | 13.67                     | 0.22                  | 13.26                       |
| 9-1      | 9-2  | 0.192        | 0.77           | 0.148      | 10.06                        | 2.65                      | 0.39            | 0.012      | 12            | 2.00         | 24.00          | 5.46                   | 7                  | 6.95                      | 0.06                  | 3.96                        |
| 9-2      | POND | 0.000        |                | 0.000      | 10.06                        | 2.11                      | 4.71            | 0.012      | 12            | 9.26         | 54.00          | 11.75                  | 40                 | 14.95                     | 0.06                  | 14.51                       |

TOTAL 2.94

NOTES: \* INITIAL TIME OF CONCENTRATION  
IS CALCULATED FROM 5 MINUTES +  
GUTTER FLOW TIME

\*\* ASSUMED  $T_c = 600$  MINUTES

\*\*\* ACTUAL FLOW VELOCITY FROM  
USDOT DM 23-02 FIG 3-6.17  
Page 3-34



Project Name  
**58TH AVENUE**

Client Name  
**PIERCE COUNTY**

Sheet 1 of 1

Prepared by:  
**D. SIMPSON**

Date  
**11-2-92**

Checked by: \_\_\_\_\_ Date \_\_\_\_\_

**DETERMINE: TIME OF CONCENTRATION  
FOR CATCHMENT UPSTREAM  
OF CB 13-3 AND 14-1**

**13-3 SLOPE @  $Q \approx$  SLOPE @ GUTTER LINE**

STA. 31+83.87       $Q = 307.33$   
STA. 29+00.00       $Q = 303.97$ 
 $\Delta$       283.87 FT      3.36 FT

$$S = 3.36 / 283.87 = 0.0118 \text{ FT/FT}$$

**14-1 SLOPE @  $Q \approx$  SLOPE @ GUTTER LINE**

STA. 31+83.87       $Q = 307.33$   
STA. 33+86.36       $Q = 305.61$ 
 $\Delta$       202.49      1.72

$$S = 1.72 / 202.49 = 0.0085$$

**TIME OF CONCENTRATION = 5 MINUTES + OVERLAND TIME**

$$T_c = 5 + \frac{\Delta L}{K \sqrt{S}}$$

WHERE  $K = 1200$  PAVEMENT

SEE: Pg 2-6 & 2-7 WSDOT  
Hydraulics Manual M23-03

**13-3**

$$T_c = 5 + \frac{283.87}{1200 \sqrt{0.0118}} = 7.18 \text{ MINUTES}$$

**14-1**

$$T_c = 5 + \frac{202.49}{1200 \sqrt{0.0085}} = 6.83 \text{ MINUTES}$$

RATIO OF DEPTH OF FLOW TO DIAMETER OF PIPE

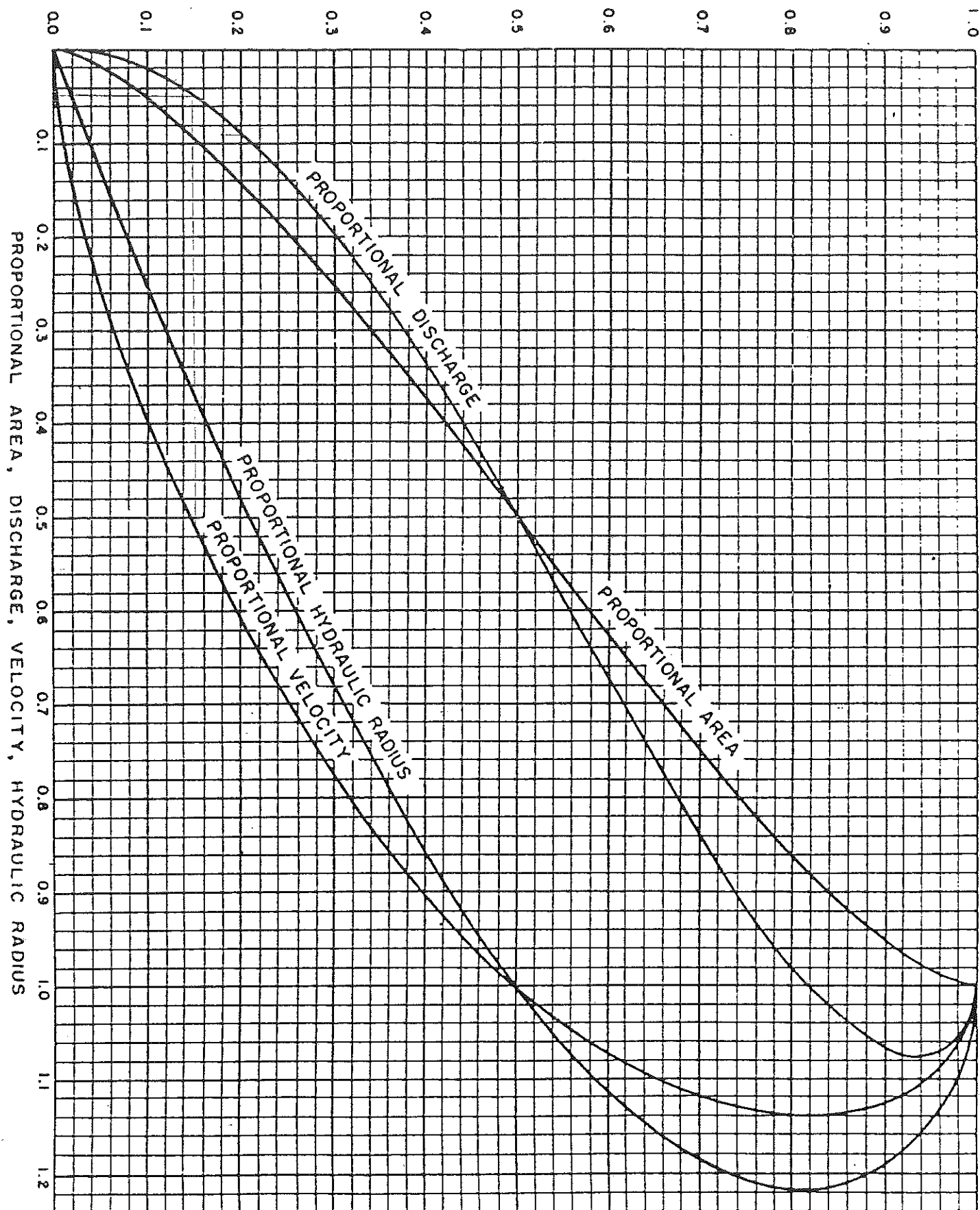


FIGURE 3-6.1T  
PARTIAL FLOW CURVES

### 2-3.2 Runoff Coefficients

The "runoff coefficient" represents the ratio of runoff to rainfall. The rational method implies that this ratio is fixed for a given drainage basin. In reality, the coefficient may vary with respect to prior wetting and seasonal conditions. The use of an average coefficient for various surface types is quite common and it is assumed to stay constant through the duration of the rain storm.

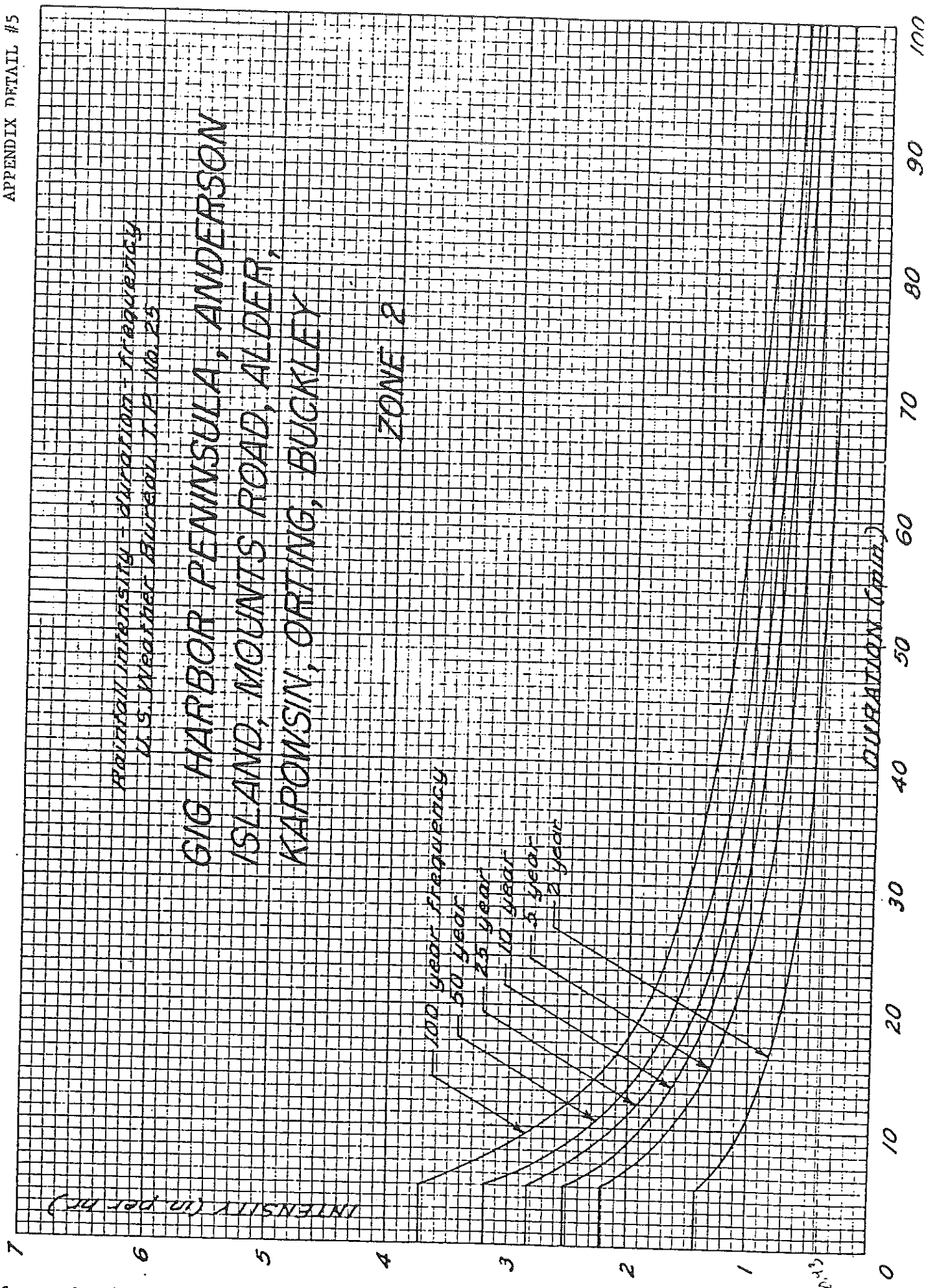
Frozen ground can cause a dramatic increase in the runoff coefficient. When this condition is coupled with heavy rainfall and, perhaps, melting snow, the runoff can be much greater than the rational formula may indicate. This is a common condition for drainage basins that are larger than several square miles and this would be reflected in the regression formulas in section 2-4.

In a high growth rate area, runoff factors should be projected that will be characteristic of developed conditions 20 years hence. Even though local storm water practices (where they exist) may reduce potential increases in runoff, prudent engineering should still make allowances for predictable growth patterns.

The coefficients in the following tabulation are applicable for peak storms of ten-year frequency. Less frequent, higher intensity storms will require the use of higher coefficients because infiltration and other losses have a proportionally smaller effect on runoff. Conversely, long duration storms with low average intensities would require the use of lower coefficients. Variations in runoff coefficients occur when using the rational method to size storage ponds for stormwater detention and groundwater infiltration of stormwater disposal systems.

**TABLE 2-3.2**  
**Runoff Coefficients for the Rational Method for Determining Peak Discharge**

| Type of Cover                    | Flat | Rolling<br>2%-10% | Hilly<br>Over 10% |
|----------------------------------|------|-------------------|-------------------|
| Pavement and Roofs               | 0.90 | 0.90              | 0.90              |
| Earth Shoulders                  | 0.50 | 0.50              | 0.50              |
| Drives and Walks                 | 0.75 | 0.80              | 0.85              |
| Gravel Pavement                  | 0.50 | 0.55              | 0.60              |
| City Business Areas              | 0.80 | 0.85              | 0.85              |
| Suburban Residential             | 0.25 | 0.35              | 0.40              |
| Single Family Residential        | 0.30 | 0.40              | 0.50              |
| Multi Units, Detached            | 0.40 | 0.50              | 0.60              |
| Multi Units, Attached            | 0.60 | 0.65              | 0.70              |
| Lawns, Very Sandy Soil           | 0.05 | 0.07              | 0.10              |
| Lawns, Sandy Soil                | 0.10 | 0.15              | 0.20              |
| Lawns, Heavy Soil                | 0.17 | 0.22              | 0.35              |
| Grass Shoulders                  | 0.25 | 0.25              | 0.25              |
| Side Slopes, Earth               | 0.60 | 0.60              | 0.60              |
| Side Slopes, Turf                | 0.30 | 0.30              | 0.30              |
| Median Areas, Turf               | 0.25 | 0.30              | 0.30              |
| Cultivated Land, Clay and Loam   | 0.50 | 0.55              | 0.60              |
| Cultivated Land, Sand and Gravel | 0.25 | 0.30              | 0.35              |
| Industrial Areas, Light          | 0.50 | 0.70              | 0.80              |
| Industrial Areas, Heavy          | 0.60 | 0.80              | 0.90              |
| Parks and Cemeteries             | 0.10 | 0.15              | 0.25              |
| Playgrounds                      | 0.20 | 0.25              | 0.30              |
| Woodland and Forests             | 0.10 | 0.15              | 0.20              |
| Meadows and Pasture Land         | 0.25 | 0.30              | 0.35              |
| Pasture with Frozen Ground       | 0.40 | 0.45              | 0.50              |
| Unimproved Areas                 | 0.10 | 0.20              | 0.30              |





Project Name

**58TH AVENUE**

Client Name

**PIERCE COUNTY**

Sheet **1** of **4**

Prepared by:

**D. SIMPSON**

Date

**11-12-92**

Checked by:

Date

**OBJECTIVE : DETERMINE SIZE REQUIRED FOR  
58TH AVENUE DETENTION POND**

**REQUIREMENTS : 25-YEAR STORAGE  
2-YEAR PRE-DEVELOPED RELEASE**

**TIME OF CONCENTRATION**

**FOR FOREST ON ROLLING TERRAIN 2%-10%**

$$C = 0.15$$

**ASSUMED DRAINAGE PATH FROM 200-SCALE  
STORM DRAIN IS AS FOLLOWS**

**$TC_1$  900 LF OVERLAND FOREST @ 5.6%**

**$TC_2$  700 LF VEGETATED DRAINAGE COURSE @ 18.6%**

**$TC_3$  800 LF GRASS DITCH @ 2.5%**

$$TC_{EXISTING} = 10 \text{ MINUTES} + TC_1 + TC_2 + TC_3$$

**GROUND COVER COEF. Pg 2-7 WSDOT**

**$TC_1$   $K = 150$  (FOREST)**

**$TC_2$   $K = 900$  (GRASS WATERWAY)**

**$TC_3$   $K = 900$  ( SAME )**

$$TC = \frac{AL}{K\sqrt{S}}$$

**L = LENGTH**

**K = GROUND COVER COEF.**

**S = SLOPE FT/FT**

Project Name  
58TH AVE NW

Client Name  
PIERCE COUNTY

Sheet 2 of 4

Prepared by:  
D. SIMPSON

Date  
11-12-92

Checked by: \_\_\_\_\_ Date \_\_\_\_\_

$$T_{C1} = \frac{900}{150 \sqrt{0.056}} = 25 \text{ MINUTES}$$

$$T_{C2} = \frac{700}{900 \sqrt{.186}} = 1.8 \text{ MINUTES}$$

$$T_{C3} = \frac{800}{900 \sqrt{.025}} = 5.6 \text{ MINUTES}$$

$$T_C = 10 \text{ MIN.} + 25 \text{ MIN.} + 1.8 \text{ MIN.} + 5.6 \text{ MIN.}$$

$$T_C = 42.4 \text{ MINUTES}$$

**ALLOWABLE DISCHARGE  $Q_e$** 

FROM PIERCE COUNTY STORM DRAINAGE  
ORDINANCE - APPENDIX DETAIL B - ZONE 2

$$I = 0.5 \text{ IN/HR}$$

$$Q_e = C I A = 0.15 (0.5) (2.94 \text{ AC})$$

$$Q_e = 0.2205 \text{ CFS}$$

$$Q_o = \frac{Q_e}{A C_D}$$

 $A C_D = 2.227$  FROM PIPE  
CALCULATIONS

$$Q_o = \frac{0.2205}{2.227} = 0.0990$$

NOTE: DISCHARGE < 1.0 CFS  $\therefore$  USE SINGLE  
ORIFICE

Project Name  
**58TH AVENUE NW**

Client Name  
**PIERCE COUNTY**

Sheet **3** of **4**

Prepared by: **D. SIMPSON** Date **11-12-92**

Checked by: \_\_\_\_\_ Date \_\_\_\_\_

### STORAGE - 25-YEAR ORIFICE EQUATIONS

$$T = 25 + \sqrt{\frac{2706}{Q_0}} = 25 + \sqrt{\frac{2706}{0.0990}} = 140 \text{ MINUTES}$$

$$V_s = \frac{4329 T}{T + 25} - 40 Q_0 T = \frac{4329(140)}{165} - 40(0.0990)(140)$$

$$V_s = 3119$$

$$V_{REQ} = V_s C_D A = 3119 (2.227) = 6945 \text{ SF}$$

THE DETENTION POND AS DESIGNED CAN STORE 17,642 FT<sup>3</sup>. THIS IS BASED UPON AN ACTIVE STORAGE FROM 124 FT TO 128 FT ← MAX. WATER ELEVATION. AREAS OF CONTOURS X DEPTH = VOLUME. NO ADJUST- FOR PRISMODIAL AREA WAS MADE

### CALCULATION

| ELEV | AREA | Δh   | AREA  | VOL                   |
|------|------|------|-------|-----------------------|
| 124  | 2732 |      |       |                       |
|      |      | 2 FT | 3528  | 7056                  |
| 126  | 4325 |      |       |                       |
|      |      | 2 FT | 5293  | 10586                 |
| 128  | 6260 |      |       |                       |
|      |      |      | TOTAL | 17642 FT <sup>3</sup> |

Project Name  
58TH AVE. NW

Client Name  
PIERCE COUNTY

Sheet 4 of 4

Prepared by: D. SIMPSON Date 11-12-92

Checked by: \_\_\_\_\_ Date \_\_\_\_\_

# ORIFICE DESIGN

$$A = \frac{Q_e}{K_o \sqrt{2gh}}$$

WHERE  $K_o = 0.62$  SHARP EDGE

$$h = 2 \text{ FT}$$

$$A = \frac{0.2205}{0.62 \sqrt{2(32.2)(2)}} = 0.0313 \text{ FT}^2$$

$$\text{Diam} = \sqrt{\frac{4A}{\pi}} (12 \text{ IN/FT})$$

$$\text{Diam} = \sqrt{\frac{4(0.0313)}{\pi}} (12) = 2.4$$

ASSUMING  $\frac{1}{8}$ " INCREMENTS

USE  $2 \frac{3}{8}$ " ORIFICE.





Project Name

Client Name

PIERCE COUNTY

Sheet 1 of 3

58TH AVENUE

Prepared by:

D. SIMPSON

Date

11-17-92

Checked by:

Date

48" CULVERT CAPACITY CHECK

## NARRATIVE :

AN EXISTING 18" CULVERT LOCATED APPROX. 200-FT DOWN STREAM OF THIS PROPOSED CROSSING SHOWS NO SIGN OF OVERTOPING THE EXISTING ACCESS AREA. DOWL ORIGINALLY PROPOSED DOUBLING THE SIZE TO 36". PIERCE COUNTY DEVELOPMENT SECTION AGREED WITH THIS. HOWEVER UNDER THE ORIGINAL HPA AN ARCH PIPE WAS REQUESTED. THE EQUIVALENT ARCH PIPE WAS SIZED BUT THERE WAS NO ARCH PIPE AVAILABLE THAT MET STRUCTURAL REQUIREMENTS FOR 35-FT OF FILL. THERE FOR A 48" PIPE WAS USED AS A COMPROMISE

THE UPSTREAM BASIN FOR THIS IS 65 ACRES. OF THIS 52 ACRES IS WITHIN PROPOSED DEVELOPMENT OF CANTERWOOD DIVISION II. THE REMAINING 13 ACRES IS THE RAVIDE DOWN STREAM OF CANTERWOOD AND IS FORESTED LAND AND IS EXPECTED TO

Project Name

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Sheet 2 of 3

Prepared by:

D. SIMPSON

Date

11-17-92

Checked by:

Date

REMAIN FORESTED.

THE FLOWS ASSOCIATED WITH DIV. II

ARE:

Only 29% increase?  
Probably more  
like 200%+

100-YR PRE-DEV. 19.52 CFS

100-YR POST-DEV. 25.14 CFS

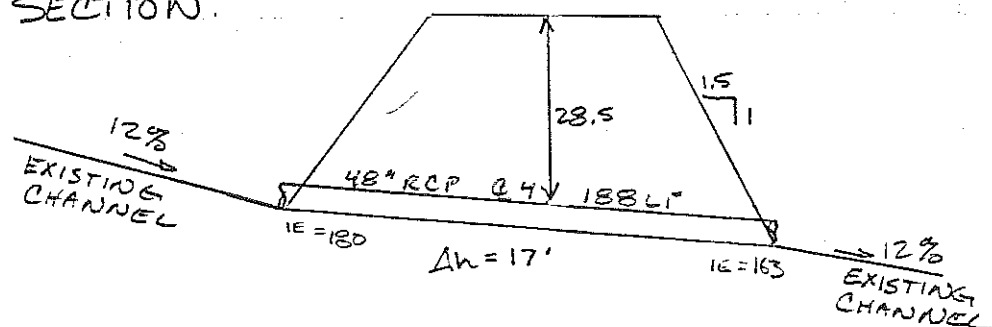
100-YR RELEASE  
FROM DET. 15.81 CFS

POST DEV. RELEASE RATE MIGHT OCCURE  
IF TWO 100-YR EVENTS BACK-TO-BACK  
OCCURE. TC FOR CANTERWOOD UNDEVELOPED  
= 60 MINUTES.  $I_{100-YR} = 1.1$  IN/HR ASSUMING  
 $C = 0.15$

$$Q = CIA = 0.15(1.1)(13) = 2.15 \text{ CFS}$$

USE 25 CFS + 2 CFS = 27 CFS  
FOR CAPACITY/VELOCITY CHECK.

SECTION.



Project Name

Client Name

PIERCE COUNTY

Sheet 3 of 3

Prepared by:

D. SIMPSON

Date

11-17-98

Checked by:

Date

BY INSPECTION CULVERT IS INLET  
CONTROLLED. WSDOT ALLOWS  $HW/D = 1.25$   
FOR DESIGN FROM NOMOGRAPH

$$Q_{max} = 85 \text{ CFS} > 27 \text{ CFS REQ. } \therefore \underline{\underline{OK}}$$

VELOCITY IN PIPE @ 27 CFS = 20.22 FPS

THIS IS HIGH HOWEVER NUMBER USED  
FOR CAPACITY CHECK HAS A VERY LOW

$$\begin{aligned} \text{PROBABILITY OF OCCURRING } \therefore P \times P &= 0.01 \times 0.01 \\ &= 0.0001 \\ T &= 1/P = 10,000 \text{ YR.} \end{aligned}$$

THE EXISTING CHANNEL IS ORGANIC  
AND UPSTREAM DEVELOPMENT WILL RELEASE  
AT LESS THAN PRE-DEVELOPED RATES.

NO ABRASIVE MATERIAL IS EXPECTED  
TO BE TRANSPORTED.  $\therefore$  NO SCOURING.

### ENERGY DISSIPATION

FRM PG 3-40 WSDOT HD  $W = 3d$

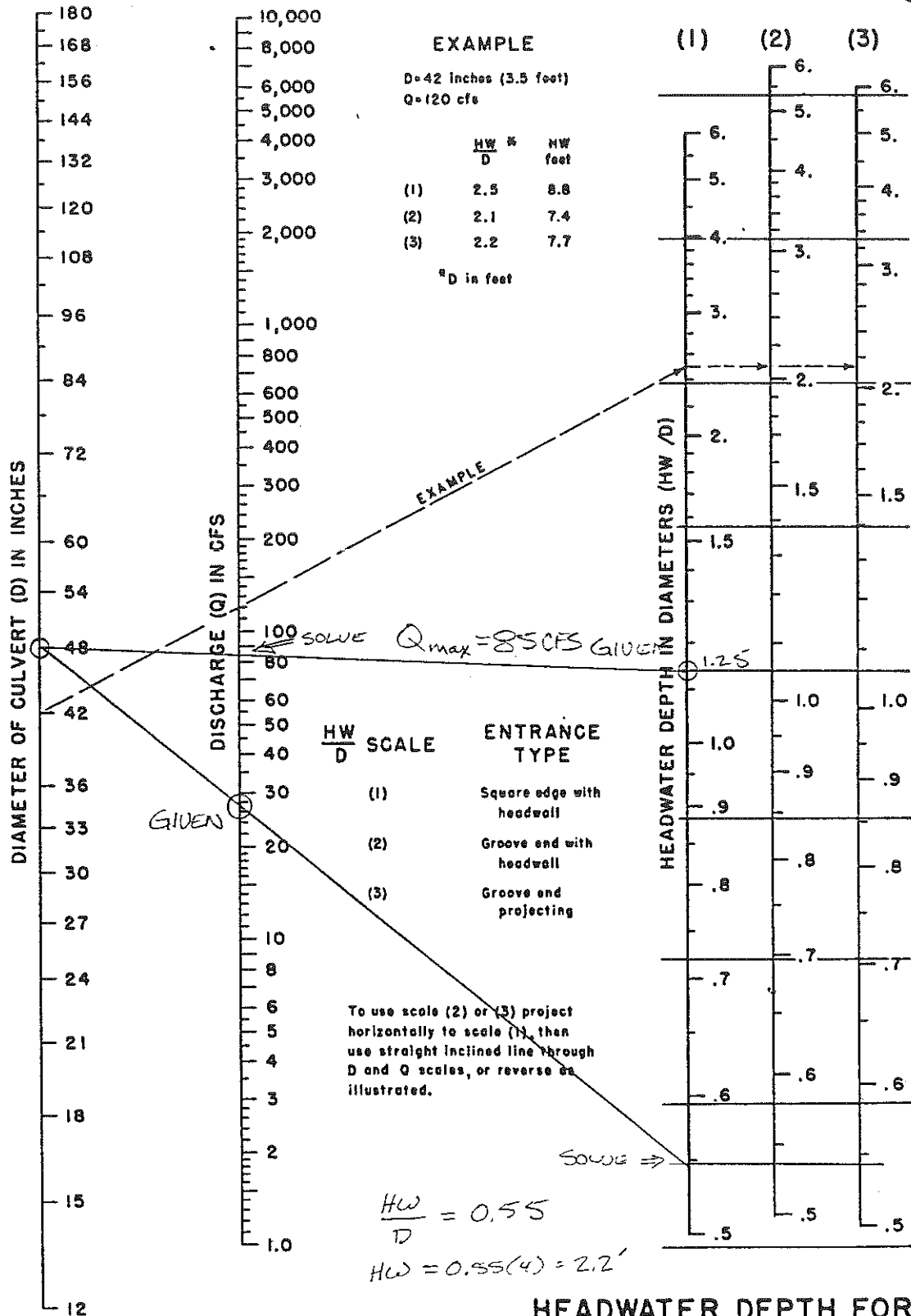
USE LIGHT LOOSE RIPRAP  $W = 12' \quad L = 16'$

$D_{50}$  LIGHT LOOSE RIPRAP = 1.06

$$2 \times D_{50} = 2.12 \quad \therefore \text{USE } d = 2.5'$$

$$2 \times D_{50} = 2.12 \text{ USE}$$

# 3-4.1 Concrete Pipe (Inlet Control Nomograph)



## HEADWATER DEPTH FOR CONCRETE PIPE CULVERTS WITH INLET CONTROL

HEADWATER SCALES 2 & 3  
 REVISED MAY 1964

BUREAU OF PUBLIC ROADS JAN. 1963



Circular Channel Analysis & Design  
Solved with Manning's Equation

Open Channel - Uniform flow

Worksheet Name: 58th avenue

Comment: 48-INCH RCP CLASS IV

Solve For Actual Depth

Given Input Data:

|                  |                                    |
|------------------|------------------------------------|
| Diameter.....    | 4.00 ft                            |
| Slope.....       | 0.0900 ft/ft                       |
| Manning's n..... | 0.012                              |
| Discharge.....   | 27.00 cfs <del>←</del> ASSUMED FOR |

100-YR BACK-TO-BACK

Computed Results:

|                    |                              |
|--------------------|------------------------------|
| Depth.....         | 0.65 ft                      |
| Velocity.....      | 20.22 fps                    |
| Flow Area.....     | 1.34 sf                      |
| Critical Depth.... | 1.54 ft                      |
| Critical Slope.... | 0.0031 ft/ft                 |
| Percent Full.....  | 16.32 %                      |
| Full Capacity..... | 466.84 cfs                   |
| QMAX @.94D.....    | 502.18 cfs                   |
| Froude Number..... | 5.30 (flow is Supercritical) |

Open Channel Flow Module, Version 3.41 (c) 1991  
Haestad Methods, Inc. \* 37 Brookside Rd \* Waterbury, Ct 06708

Circular Channel Analysis & Design  
Solved with Manning's Equation

Open Channel - Uniform flow

Worksheet Name: 58th avenue

Comment: 48-INCH RCP CLASS IV

Solve For Actual Depth

Given Input Data:

|                  |              |
|------------------|--------------|
| Diameter.....    | 4.00 ft      |
| Slope.....       | 0.0900 ft/ft |
| Manning's n..... | 0.012        |
| Discharge.....   | 15.18 cfs    |

Computed Results:

|                    |                              |
|--------------------|------------------------------|
| Depth.....         | 0.49 ft                      |
| Velocity.....      | 17.03 fps ✓                  |
| Flow Area.....     | 0.89 sf                      |
| Critical Depth.... | 1.14 ft                      |
| Critical Slope.... | 0.0030 ft/ft                 |
| Percent Full.....  | 12.36 %                      |
| Full Capacity..... | 466.84 cfs                   |
| QMAX @.94D.....    | 502.18 cfs                   |
| Froude Number..... | 5.16 (flow is Supercritical) |

Open Channel Flow Module, Version 3.41 (c) 1991  
Haestad Methods, Inc. \* 37 Brookside Rd \* Waterbury, Ct 06708

**Appendix B**  
**DOWNSTREAM DOCUMENTATION**

**58TH AVENUE N.W.**  
**1990 ROAD IMPROVEMENT PROJECT**  
**DOWNSTREAM DRAINAGE REVIEW**

**GENERAL**

This project proposes to discharge surface drainage directly to the natural drainage courses without routing through drainage detention facilities. Drainage in this area is part of the nearby McCormick Creek drainage system and flows are carried directly to Henderson Bay in well defined channels some of which are in pronounced ravines. It is not believed there are any properties adjacent to the McCormick Creek system that would be threatened by high drainage flows either in it's current condition or after the addition of the drainage from approximately 3,300 feet of newly constructed 58th Ave. N.W.

The following map and photo descriptions show the drainage course at key points downstream from the proposed road project. The photographs were taken on May 29, 1990 after about three days of rain and reflect flow conditions under moderately wet conditions. It was raining lightly at the time of this site visit.

**PHOTO 1**

The southern approx. 1,000 feet of road drains to this point. Over the last 600 feet drainage is in a road-side ditch. At the time of the photo there was about a 1" deep flow in a 12" CMP. There were no signs of debris or high water marks suggesting overflow at any time in the past.

**PHOTO 2**

Entrance to the next 12" CMP downstream. There was 1" to 2" of flow in a 12" CMP.

**PHOTO 3**

Looking north along SR 16 viewing the ditch on the east side of the highway. Drainage from the highway flows to the culvert in photo 2. There is a total of about 1.3 miles of SR 16 that drains to this McCormick Creek drainage course.

**PHOTO 4**

At SR 16 McCormick Creek intersects with the 12" culverts to the east. From this point the drainage is accommodated in a much larger culverts. This photo shows the upstream end of two 36" culverts across Burnham Drive. The flow was almost entirely through the north culvert at a depth of about 6".



**PHOTO 5**

Downstream end of culverts shown on photo 4.

**PHOTO 6**

View of the upstream end of the channel where it enters two 24" CMP's across the driveway to a private residence adjacent to Burnham Drive N.W. Flow was approximately 4" deep in both culverts. This residence is the nearest structure to the McCormick Creek channel.

**PHOTO 7**

View of the downstream end of the culvert crossing shown in photo 5.

**PHOTO 8**

Upstream end of a 60" culvert across Woodhill Drive N.W. Flow was approximately 8" deep. The creek channel at this point is about 12 feet below the road level.

**PHOTO 9**

Downstream end of the culvert in photo 7. Flow enters a very pronounced ravine from this point to Henderson Bay.

**PHOTO 10**

View of the McCormick Creek outfall at Henderson Bay. Flow enters Henderson Bay through a pronounced ravine. There are no structures in the vicinity of the mouth of the creek.



PHOTO # 1



PHOTO # 2

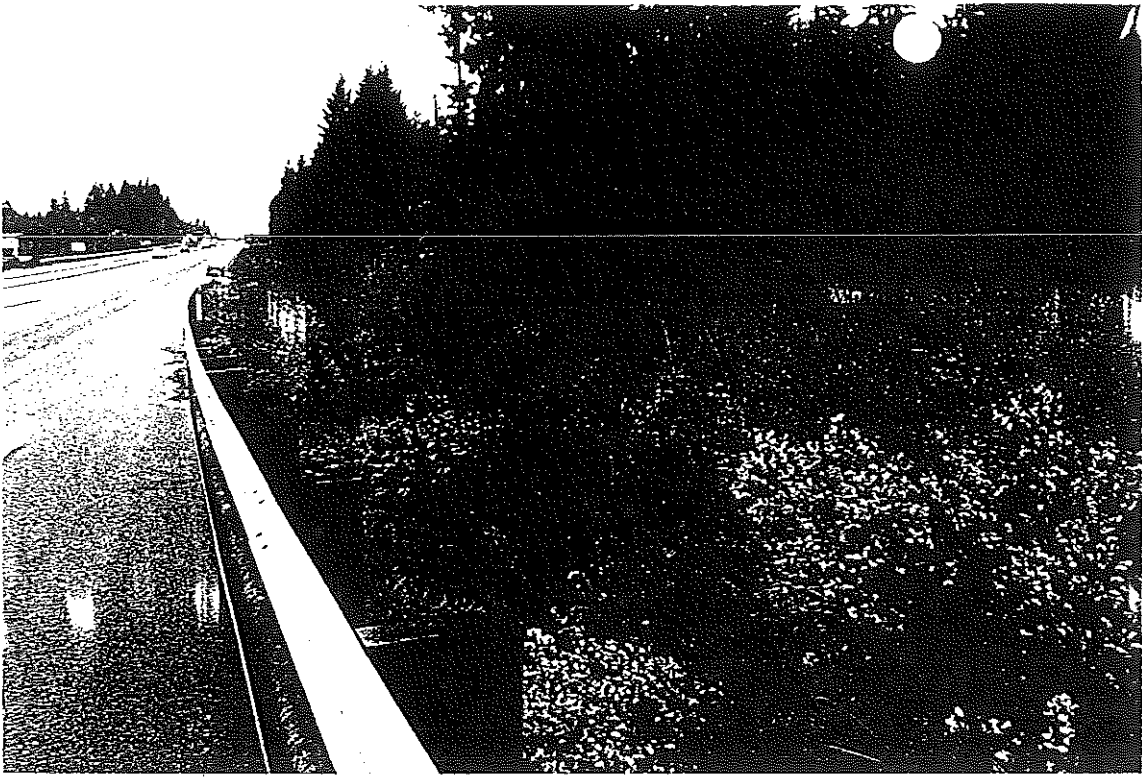


PHOTO # 3

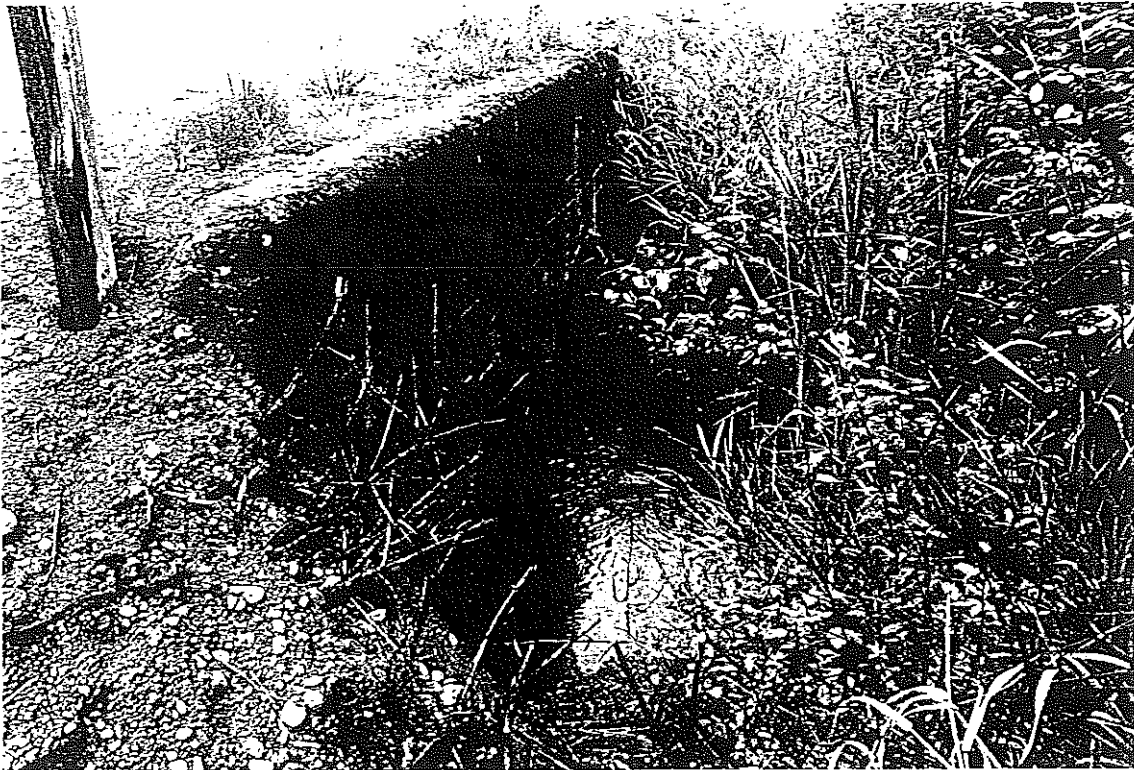


PHOTO # 4



PHOTO # 5



PHOTO # 6



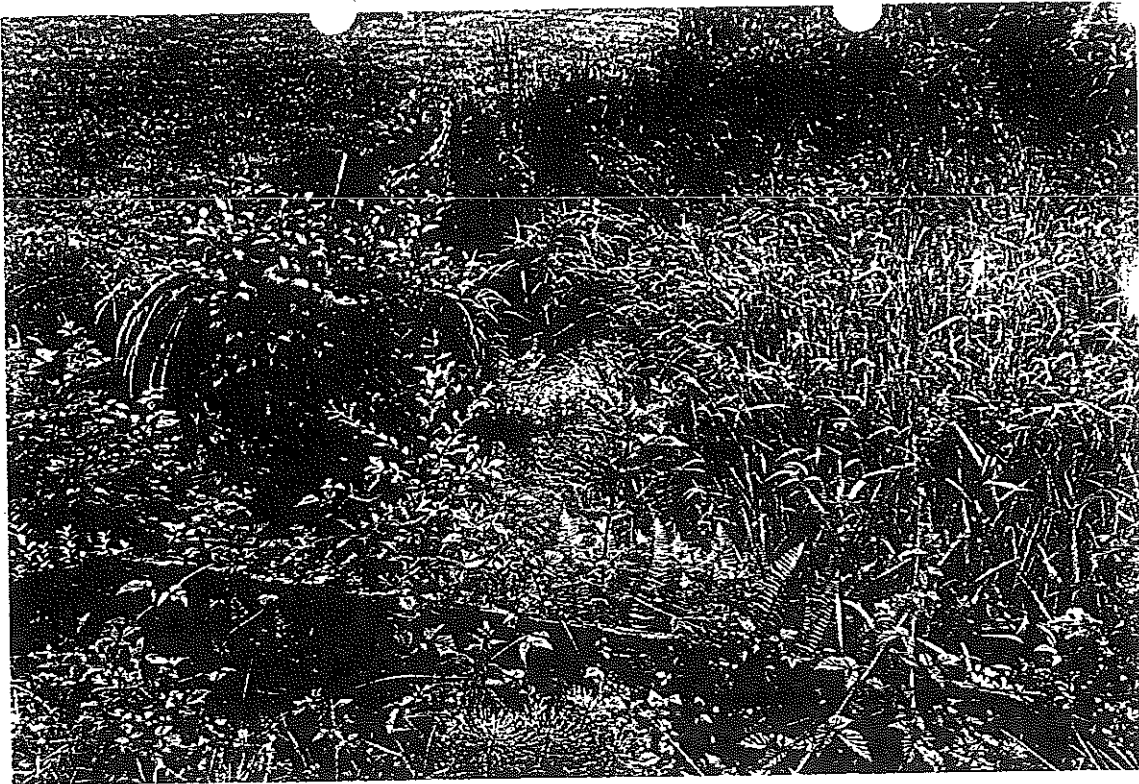


PHOTO # 7

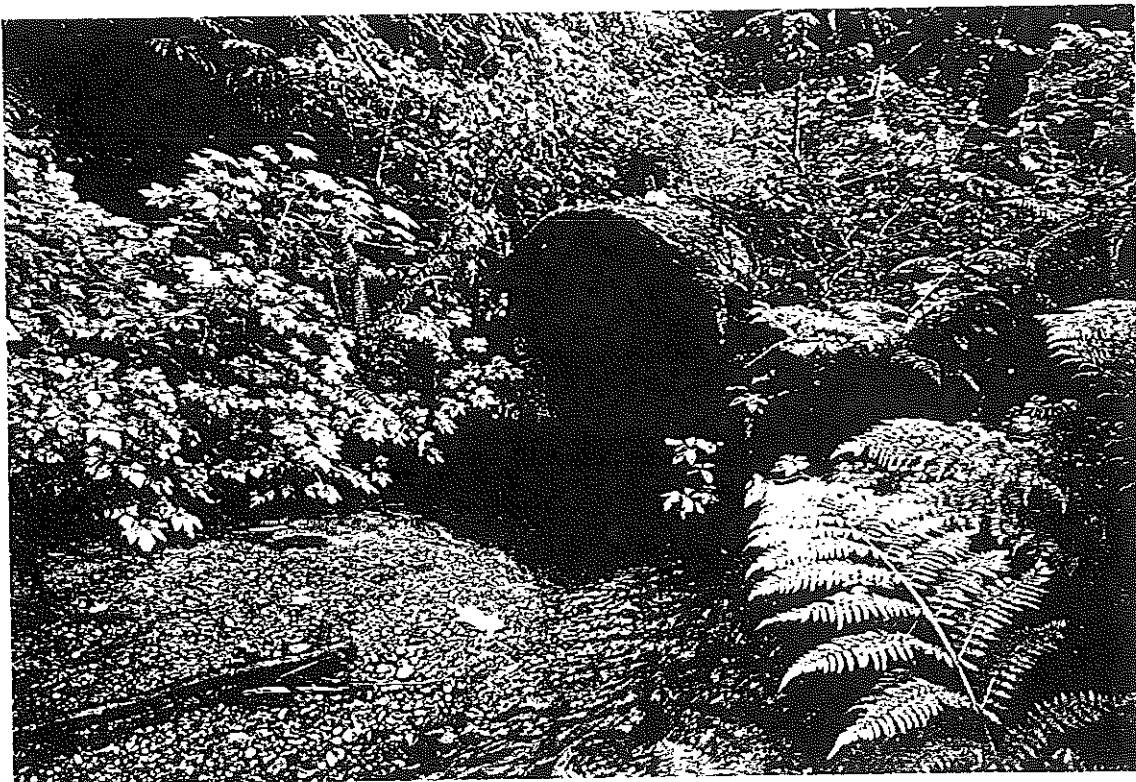


PHOTO # 8

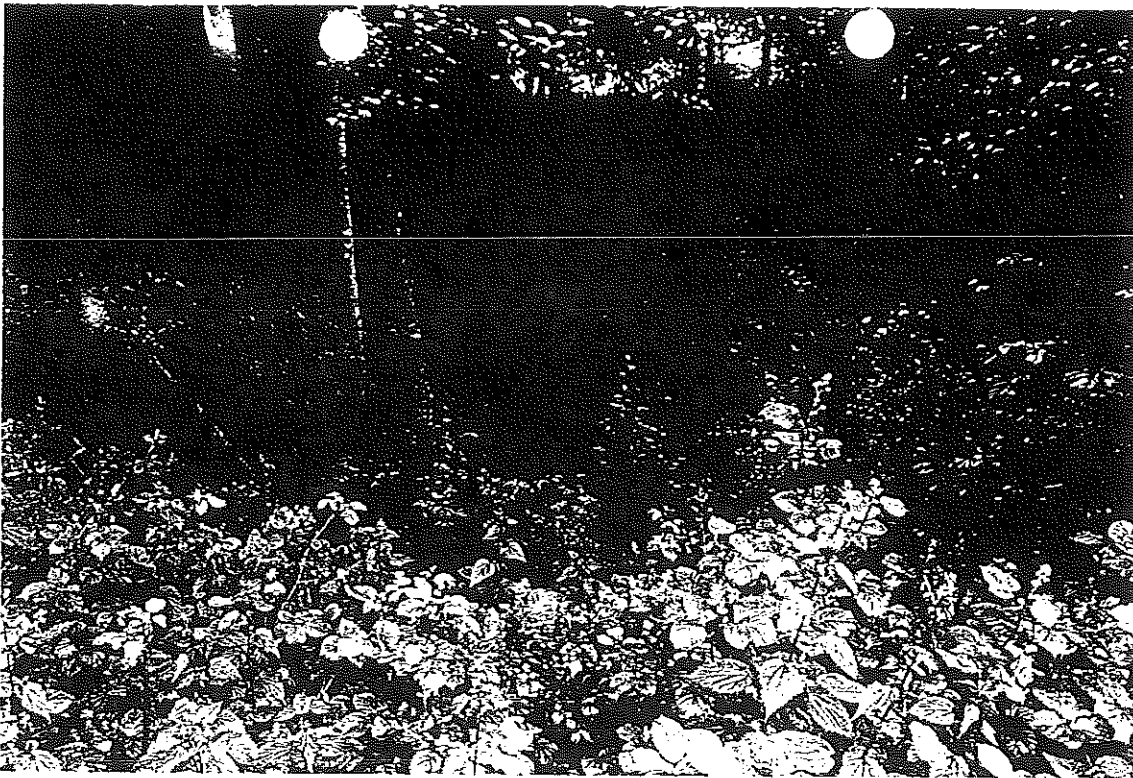


PHOTO # 9



PHOTO # 10

# GIG HARBOR CULVERT CAPACITIES

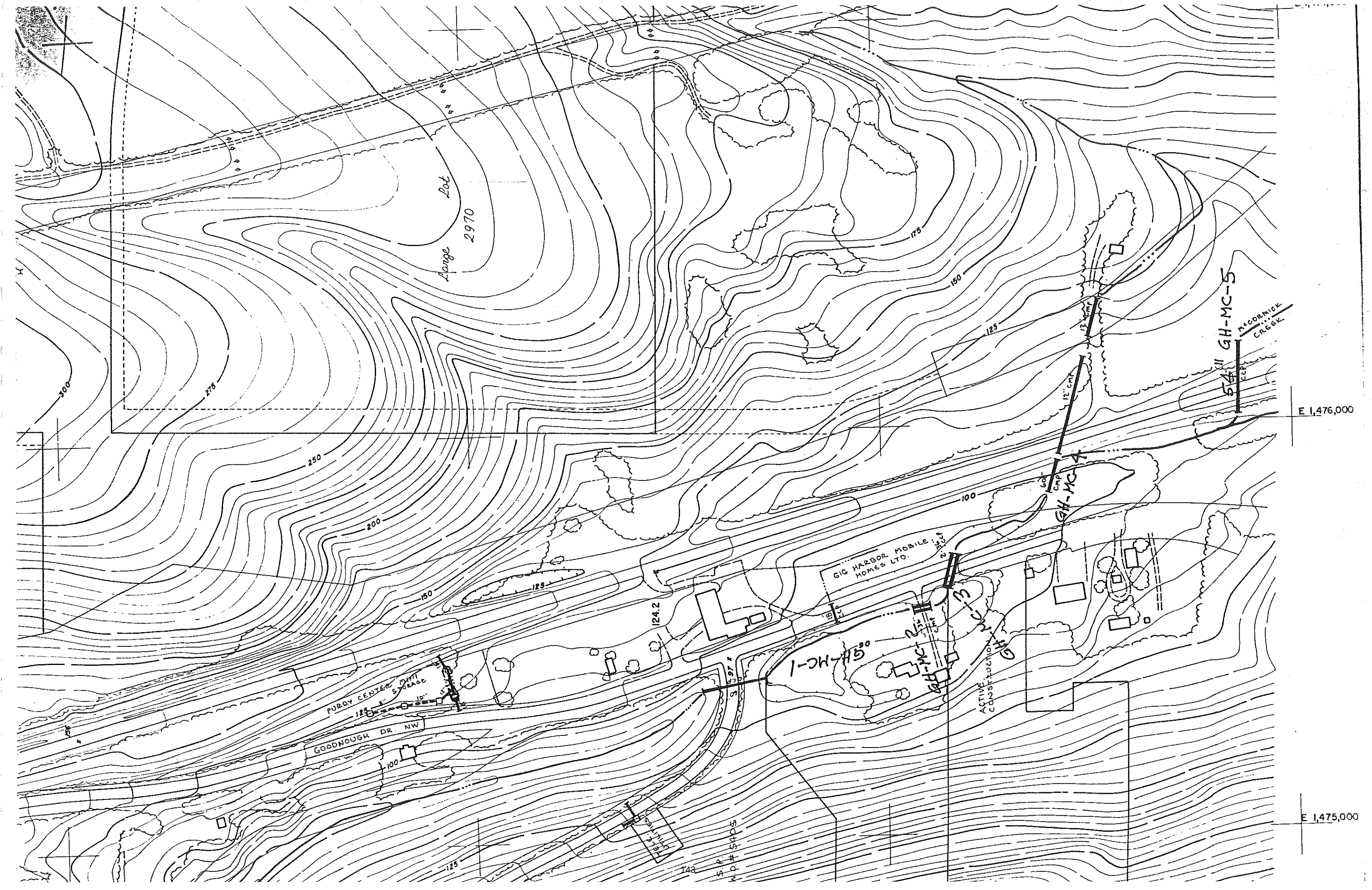
2/22/90

Note:

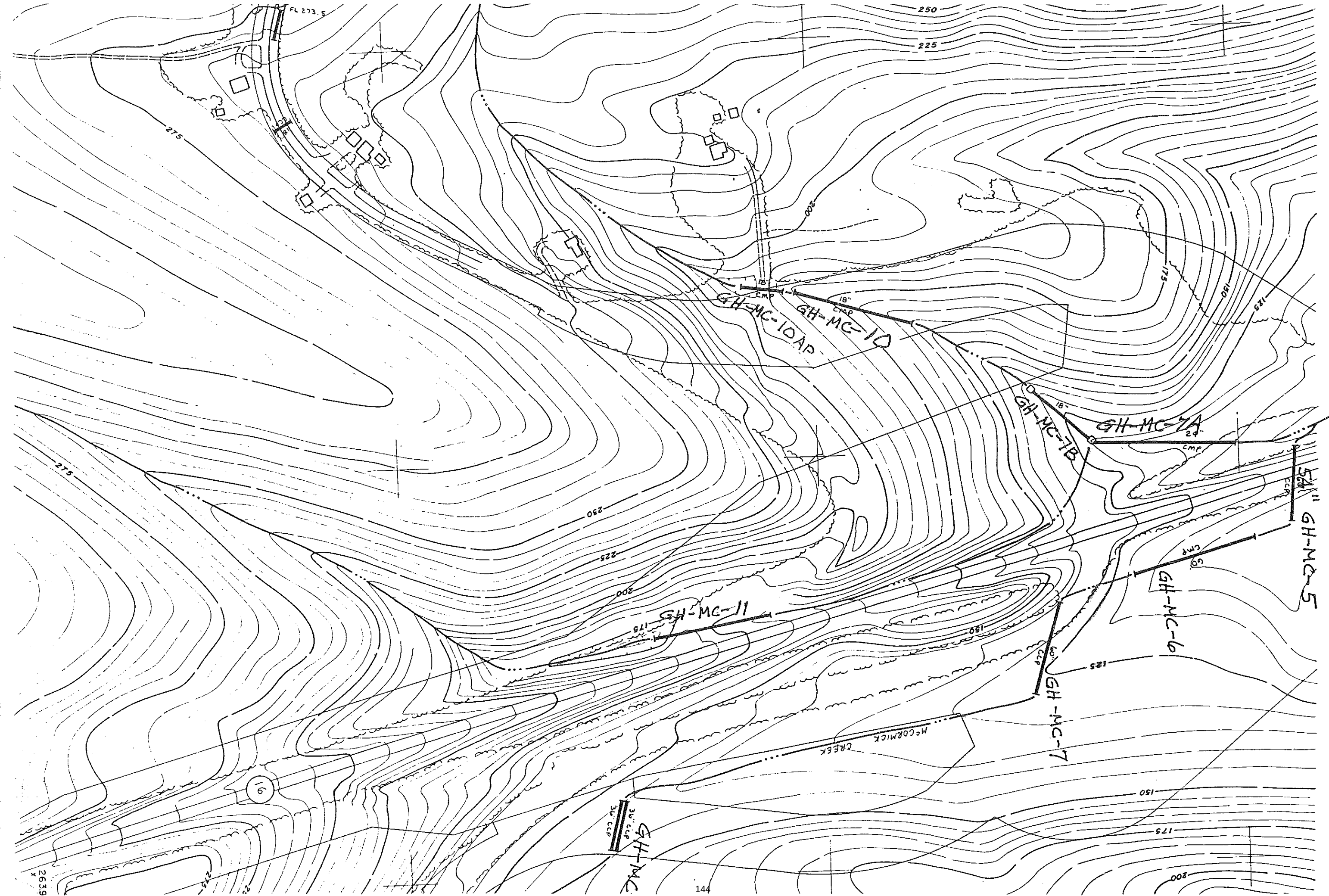
All flow values are after detention is considered

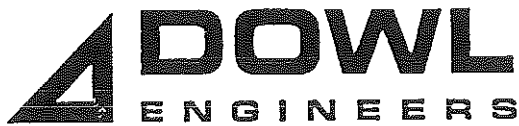
Table A1

| Facility ID     |    | PR  | Design Q | Q-25 cfs | Design Q-25 | Max Q | Max Q-25 | Max Height | Proposed Culv. Size |   | # CULV   | Cost                                                      | General Comments |
|-----------------|----|-----|----------|----------|-------------|-------|----------|------------|---------------------|---|----------|-----------------------------------------------------------|------------------|
|                 |    |     |          |          |             |       |          |            |                     |   |          |                                                           |                  |
| Garr Creek      |    |     |          |          |             |       |          |            |                     |   |          |                                                           |                  |
| GH-GR-5         | L  | 9   | 35       | 0.26     | 24          | 0.69  | 8.5',20' | 57         | 38                  | 1 | \$35,443 | Plugged 18" equiv=15"                                     |                  |
| GH-GR-6         | N  | 20  | 35       | 0.57     | 50          | 1.43  | 9',12'   | 57         | 38                  | 0 | \$0      |                                                           |                  |
| GH-GR-7         | N  | 7   | 18       | 0.39     | 18          | 1.00  | 7.5',11' | 42         | 29                  | 0 | \$0      |                                                           |                  |
| GH-GR-8         | L  | 11  | 27       | 0.41     | 22          | 0.81  | 6'       | 49         | 33                  | 1 | \$18,025 |                                                           |                  |
| GH-GR-9         | M  | 10  | 35       | 0.29     | 25          | 0.71  | 9',11'   | 57         | 38                  | 1 | \$25,867 | Consider 4 AC upstream det<br>Consider 4 AC upstream det  |                  |
| GH-GR-10        | N  | 11  | 20       | 0.55     | 22          | 1.10  | 6'       | 42         | 29                  | 0 | \$0      |                                                           |                  |
| GH-GR-11        | L  | 22  | 60       | 0.37     | 36          | 0.60  | 4'       | 64         | 43                  | 1 | \$20,789 |                                                           |                  |
| GH-GR-12        | L  | 11  | 83       | 0.13     | 14          | 0.17  | 3'       | 49         | 33                  | 2 | \$31,468 |                                                           |                  |
| GH-GR-13        | N  | 22  | 13       | 1.69     | 30          | 2.31  | 4.5'     |            |                     | 0 | \$0      |                                                           |                  |
| Hale Passage    |    |     |          |          |             |       |          |            |                     |   |          |                                                           |                  |
| GH-HP-2         | L  | 18  | 40       | 0.45     | 32          | 0.80  | 7'       | 57         | 38                  | 1 | \$21,777 | Est Q from Sullivan Gulch                                 |                  |
| Lay Creek       |    |     |          |          |             |       |          |            |                     |   |          |                                                           |                  |
| GH-LY-1         | B  | 0   | 105      | 0.00     |             | 0.00  | 4.5'     | 73         | 55                  | 0 | \$0      | Bridge                                                    |                  |
| GH-LY-2         | L  | 61  | 95       | 0.64     | 61          | 0.64  | 10'      |            |                     | 1 | \$28,251 |                                                           |                  |
| GH-LY-3         | N  | 32  | 35       | 0.91     | 60          | 1.71  |          |            |                     | 0 | \$0      |                                                           |                  |
| McCormick Creek |    |     |          |          |             |       |          |            |                     |   |          |                                                           |                  |
| GH-MC-1         | N  | 220 | 210      | 1.05     | 370         | 1.76  | 15',30'  | 114        | 77                  | 0 | \$0      | Three needed<br>State<br>State<br>State<br>State<br>State |                  |
| GH-MC-3         | L  | 122 | 200      | 0.61     | 162         | 0.81  | 6.5'     | 71         | 47                  | 3 | \$80,851 |                                                           |                  |
| GH-MC-4         | st | 176 | 198      | 1.80     | 282         | 2.88  | 15'      |            |                     | 0 | \$0      |                                                           |                  |
| GH-MC-5         | st | 75  | 107      | 0.70     | 160         | 1.50  | 8'       |            |                     | 0 | \$0      |                                                           |                  |
| GH-MC-6         | st | 32  | 107      | 0.30     | 75          | 0.70  | 15',25'  |            |                     | 0 | \$0      |                                                           |                  |
| GH-MC-7         | st | 156 | 80       | 1.95     | 290         | 3.63  | 15',30'  |            |                     | 0 | \$0      |                                                           |                  |
| GH-MC-7A        | st | 20  | 22       | 0.91     | 50          | 2.27  | 12',60'  |            |                     | 0 | \$0      |                                                           |                  |
| GH-MC-8         | N  | 60  | 80       | 0.75     | 108         | 1.35  | 7.5'     | 71         | 47                  | 0 | \$0      |                                                           |                  |
| Ray Nash Creek  |    |     |          |          |             |       |          |            |                     |   |          |                                                           |                  |
| GH-MD-1         | B  | 0   | 128      | 0.00     |             | 0.00  |          |            |                     | 0 | \$0      | Bridge                                                    |                  |
| GH-MD-2         | N  | 22  | 20       | 1.10     | 33          | 1.65  | 5'       |            |                     | 0 | \$0      |                                                           |                  |
| Murphy Creek    |    |     |          |          |             |       |          |            |                     |   |          |                                                           |                  |
| GH-MY-1         | L  | 25  | 70       | 0.36     | 62          | 0.89  | 12.5',?  | 64         | 43                  | 1 | \$30,635 | Flow est from Sullivan Gulch1                             |                  |
| North Creek     |    |     |          |          |             |       |          |            |                     |   |          |                                                           |                  |
| GH-NC-2         | st | 22  | 12       | 1.83     | 56          | 4.67  | 12',32'  |            |                     | 0 | \$0      | State<br>City. No data<br>30" CMP projecting              |                  |
| GH-NC-3         | C  | 0   | 57       | 0.00     |             | 0.00  |          |            |                     | 0 | \$0      |                                                           |                  |
| GH-NC-5         | N  | 32  | 18       | 1.78     | 49          | 2.72  | 7'       |            |                     | 0 | \$0      |                                                           |                  |









A Division of DOWL, Incorporated

August 21, 1990  
W.O. #S11073

Mr. Phil Pinnard  
Pierce County Public Works  
2401 South 35th Street  
Tacoma, WA 98409

Subject: 58th Avenue Road Project

Dear Phil:

This is in reply to the July 6, 1990 Public Works Department Plan Review comments regarding 58th Avenue. This provides you additional information regarding the drainage runoff from the new road and its impact on the downstream McCormick Creek drainage system.

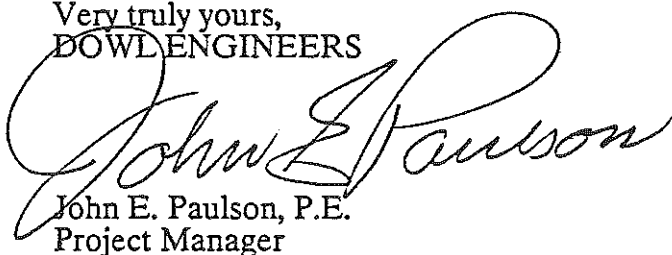
All of the drainage from the 3,760 lineal feet of new two-lane road is directed to the McCormick Creek drainage system and discharges to Henderson Bay. Drainage is carried away from the roadway in 3 different segments as described by the attached report. Drainage estimates from the new roadway were based on the rational method and 25-year rainfall data. The capacities in the McCormick Creek system downstream from this road project were also based on 25-year data and were taken from the preliminary results of the James & Montgomery drainage system study being prepared for Pierce County.

The major part of the drainage from this new roadway is generated from the area we designated as Basin "B". This is approximately 2% of the existing 25-year storm capacity in McCormick Creek per the Montgomery calculations. This does not allow for the fact that this drainage passes through a significant length of ditch along SR 16 before it enters the first culvert leading to the McCormick Creek drainage system. Considering there will be infiltration into the soil along this route the actual impact in McCormick Creek should be significantly less than 2% of the existing capacity. Based on previous downstream review of the McCormick Creek stream channel and culvert facilities (which was previously provided to the County) and information attached to this letter, it doesn't appear that direct drainage discharge from this new roadway will have a significant impact on McCormick Creek. Based on this information, we request your approval of the drainage system for this road project.

Mr. Phil Pinnard  
Page 2  
August 21, 1990

It's our understanding from the previous July 6, 1990 Public Works letter that there are no other outstanding engineering review design issues on this project. I'd like to have your approval to bring the plans in for signing by the Department. Thank you.

Very truly yours,  
DOWLE ENGINEERS

A large, stylized handwritten signature in cursive script, reading "John E. Paulson". The signature is written in black ink and is positioned over the typed name and title.

John E. Paulson, P.E.  
Project Manager

JEP/pra

CC: John Morrison  
Tom Tucci

# 58 AVENUE DRAINAGE - THE RATIONAL METHOD

## INTRODUCTION

THE 58TH AVENUE PROJECT CONSISTS OF 3760 LINEAL FEET OF TWO LANE ROAD. THE TYPICAL CROSS SECTION INCLUDES TWO 14 FOOT LANES AND TWO 5 FOOT SIDEWALKS, FOR A TOTAL OF 38 FEET OF IMPERVIOUS SURFACE. DRAINAGE FROM THIS ROAD IS CONFINED TO THREE SEPERATE SYSTEMS. AREA "A" DRAINS THE BEGINNING OF THE PROJECT, STA. 7+90, TO A HIGH POINT AT STA. 15+47. AREA "B" DRAINS STA. 15+47 TO STA 33+00. AND AREA "C" DRAINS STA 33+00 TO THE END OF THE PROJECT AT STA 45+50.

## METHOD OF ANALYSIS

THE STORM DRAINAGE ANALYSIS UTILIZED THE PIERCE COUNTY 25 YEAR RAINFALL DATA FOR THE BIG HARBOR AREA. AREAS MEASURED INCLUDED ANY EMBANKMENT REQUIRED AND THE COEFFICIENTS OF RUNOFF WERE ADJUSTED TO REFLECT A COMBINED PAVED AND GRASS AREA. A 5 MINUTE TIME OF CONCENTRATION FACTOR WAS ADDED TO THE FIRST RUN IN EACH BASIN. THE ACTUAL COMPUTATIONS WERE PERFORMED BY A LOTUS SPREAD SHEET AND THE RESULTS ARE ATTACHED TO THIS REPORT.

|         |                      |         |                            |
|---------|----------------------|---------|----------------------------|
| Project | <u>58th AVE</u>      | Job No. | _____                      |
| Subject | <u>DRAINAGE</u>      | Comp    | <u>DS</u> Date <u>5-15</u> |
| Sheet   | <u>1</u> of <u>3</u> | Chkd.   | _____ Date _____           |



## SUMMARY OF RESULTS

EASIN "A"'S MAXIMUM RUNOFF RATE WAS CALCULATED TO BE 0.83 CFS. THIS WATER IS DISCHARGED TO A DITCH LINE EAST OF 58<sup>TH</sup> AVENUE. THE WATER PASSES THROUGH AN EXISTING 65 LINEAL FEET OF 18 INCH CMP AT AN 11.3% SLOPE, THE FULL FLOW CAPACITY OF THIS PIPE IS APPROXIMATELY 18 CFS.

BASIN "B"'S MAXIMUM RUNOFF RATE WAS CALCULATED TO BE 3.22 CFS. THIS WATER IS DISCHARGED WEST OF 58<sup>TH</sup> AVENUE INTO AN EXISTING DRAINAGE CHANNEL. WATER THEN RUNS ALONG HIGHWAY 16 APPROXIMATELY 1800 LINEAL FEET CROSSING THE HIGHWAY THROUGH AN EXISTING 12 INCH CMP, THIS PIPE DISCHARGES INTO MC CORMICK CREEK. LOCATED APPROXIMATELY 350 FEET DOWN STREAM IS CULVERTS GH-MC-3 AS IDENTIFIED BY CONSULTANT JAMES MONTGOMERY AS PART OF WORK PERFORMED UNDER THE "STORM AND SURFACE WATER MANAGEMENT PLAN" FOR PIERCE COUNTY. THIS CULVERT WAS IDENTIFIED IN THIS REPORT AS BEING UNDERSIZED. AN ESTIMATED MAXIMUM CAPACITY OF 162<sup>CFS</sup> EXISTS AND THE 25 YEAR DESIGN FLOW IS CALCULATED TO BE 200 CFS. NEGLECTING INFILTRATION ALONG

Project \_\_\_\_\_ Job No. \_\_\_\_\_  
Subject \_\_\_\_\_ Comp. DS Date 8-16-97  
Sheet 2 of 3 Chkd. \_\_\_\_\_ Date \_\_\_\_\_

2150 LINEAL FOOT RUN FROM THE DISCHARGE POINT AT 58<sup>TH</sup> AVENUE, 58<sup>TH</sup> AVENUE DRAINAGE WILL USE UP APPROXIMATELY 2 PERCENT OF THE EXISTING CAPACITY. IN ADDITION THE TIME OF CONCENTRATION TO THE 58<sup>TH</sup> AVENUE CUTFALL IS 9 MINUTES. ALLOWING FOR TRAVEL TIME FROM THE CUTFALL TO MCCORMICK CREEK IT IS REASONABLE TO EXPECT PEAK DISCHARGE OF 58<sup>TH</sup> AVENUE TO PASS THROUGH THIS CULVERT WELL IN ADVANCE OF THE MCCORMICK CREEK BASIN'S PEAK.

BASIN "C"'S MAXIMUM RUNOFF RATE WAS CALCULATED TO BE 0.76 CFS. THIS WATER IS DISCHARGED TO A DITCH LINE EAST OF 58<sup>TH</sup> AVENUE THE FLOW PASSES THROUGH AN EXISTING 46 LINEAL FEET OF 18" CMP AT A 2.4% SLOPE. FULL FLOW CAPACITY OF THIS CULVERT IS APPROXIMATELY 8.5 CFS.

Project 58<sup>TH</sup> AVE. Job No. \_\_\_\_\_  
Subject DRAINAGE Comp. RS Date 2-16  
Sheet 2 of 3 Chkd. \_\_\_\_\_ Date \_\_\_\_\_

storm table #: 3

PROJ: 58TH AVENUE N.W. - Street Improvements  
 WO:  
 FILE:  
 DATE: Aug-90

PIPE SIZING TABLE  
 (Runoff by Rational Method)  
 (Pipe Capacity by Manning's Eqn.)

DOWL ENGINEERS  
 15263 N.E. 90th Street  
 Federal Way, WA 98003  
 (206) 869-2670 (work)  
 (206) 838-8516 (fax)

Storm: Gig Harbor 25 year

| Location   |      | AREA "A"  |              |      | Time of Rain |                |                |              | Pipe    |            | %         | Veloc       | Flow        | Remarks | CAPACITY<br>CHECK | VELOC<br>CHECK | SLOPE<br>CHECK |            |               |            |
|------------|------|-----------|--------------|------|--------------|----------------|----------------|--------------|---------|------------|-----------|-------------|-------------|---------|-------------------|----------------|----------------|------------|---------------|------------|
| From       | To   | Inc. Area | Runoff Coef. | A*C  | Sum A*C      | Concen. (min.) | Intens (in/hr) | Runoff (cfs) | n Value | Diam (in.) | Slope (%) | Length (ft) | Capac (cfs) |         |                   |                |                | Capac Used | Full (ft/sec) | Time (min) |
|            |      |           |              |      |              |                |                |              |         |            |           |             |             |         |                   |                |                |            |               |            |
| HIGH POINT | CB 2 | 0.40      | 0.70         | 0.28 | 0.28         | 6.70           | 2.55           | 0.71         | 0.012   | 12         | 3.62      | 200.0       | 7.34        | 10      | 9.35              | 0.36           |                |            |               |            |
| CB 2       | CB 1 | 0.25      | 0.76         | 0.19 | 0.47         | 7.06           | 2.49           | 1.17         | 0.012   | 12         | 2.00      | 75.0        | 5.46        | 22      | 6.95              | 0.18           |                |            |               |            |
| CB2        | CB 1 | 0.18      | 0.76         | 0.14 | 0.61         | 7.24           | 2.46           | <u>1.50</u>  | 0.170   | 99         | 5.00      | 300.0       | 169.30      | 1       | 3.17              | 1.58           |                |            |               |            |
|            |      | Σ 0.83    |              |      |              |                |                |              |         |            |           |             |             |         |                   |                |                |            |               | LOW        |

LOW

| Location   |       | AREA "B" |        |      | Time of Rain |         |         |             | Pipe  |       |       |        | %     | Veloc | Flow     |       |         |  |
|------------|-------|----------|--------|------|--------------|---------|---------|-------------|-------|-------|-------|--------|-------|-------|----------|-------|---------|--|
|            |       | Inc.     | Runoff |      | Sum          | Concen. | Intens  | Runoff      | n     | Diam  | Slope | Length | Capac | Capac | Full     | Time  |         |  |
| From       | To    | Area     | Coef.  | A*C  | A*C          | (min.)  | (in/hr) | (cfs)       | Value | (in.) | (%)   | (ft)   | (cfs) | Used  | (ft/sec) | (min) |         |  |
| HIGH POINT | CB 3  | 0.41     | 0.70   | 0.28 | 0.28         | 6.69    | 2.55    | 0.73        | 0.012 | 12    | 3.73  | 250.0  | 7.45  | 10    | 9.49     | 0.44  |         |  |
|            | CB 4  | 0.34     | 0.75   | 0.00 | 0.28         | 7.13    | 2.48    | 0.71        | 0.012 | 12    | 6.20  | 250.0  | 9.61  | 7     | 12.24    | 0.34  |         |  |
|            | CB 5  | 0.25     | 0.85   | 0.22 | 0.50         | 7.47    | 2.43    | 1.21        | 0.012 | 12    | 7.72  | 250.0  | 10.72 | 11    | 13.65    | 0.31  |         |  |
|            | CB 6  | 0.22     | 0.90   | 0.20 | 0.70         | 7.77    | 2.38    | 1.66        | 0.012 | 12    | 8.97  | 150.0  | 11.56 | 14    | 14.72    | 0.17  |         |  |
|            | CB 7  | 0.24     | 0.72   | 0.17 | 0.37         | 7.94    | 2.36    | 2.05        | 0.012 | 12    | 10.90 | 147.0  | 12.74 | 16    | 16.23    | 0.15  |         |  |
|            | CB 8  | 0.27     | 0.69   | 0.19 | 1.06         | 8.10    | 2.34    | 2.47        | 0.012 | 12    | 10.90 | 147.0  | 12.74 | 19    | 16.23    | 0.15  |         |  |
|            | CB 9  | 0.13     | 0.90   | 0.12 | 1.17         | 8.25    | 2.32    | 2.73        | 0.012 | 12    | 10.61 | 150.0  | 12.57 | 22    | 16.01    | 0.16  | ANCHOR? |  |
|            | CB 10 | 0.13     | 0.90   | 0.12 | 1.29         | 8.40    | 2.30    | 2.98        | 0.012 | 12    | 8.93  | 150.0  | 11.53 | 26    | 14.69    | 0.17  | ANCHOR? |  |
|            | CB 11 | 0.13     | 0.90   | 0.12 | 1.41         | 8.57    | 2.28    | <u>3.22</u> | 0.012 | 12    | 15.23 | 107.0  | 15.06 | 21    | 19.10    | 0.09  | ANCHOR? |  |
|            | Σ     |          | 2.12   |      |              |         |         |             |       |       |       |        |       |       |          |       |         |  |

ANCHOR?  
 ANCHOR?  
 ANCHOR?

ANCHOR?

LOW  
 LOW  
 LOW  
 LOW

| Location |          | AREA "C" |        |      | Time of Rain |         |         |             |       | Pipe  |       |        | %      | Veloc | Flow     |       |
|----------|----------|----------|--------|------|--------------|---------|---------|-------------|-------|-------|-------|--------|--------|-------|----------|-------|
|          |          | Inc.     | Runoff |      | Sum          | Concen. | Intens  | Runoff      | n     | Diam  | Slope | Length | Capac  | Capac | Full     | Time  |
| From     | To       | Area     | Coef.  | A*C  | A*C          | (min.)  | (in/hr) | (cfs)       | Value | (in.) | (%)   | (ft)   | (cfs)  | Used  | (ft/sec) | (min) |
|          | CB 13    | 0.41     | 0.67   | 0.27 | 1.68         | 6.69    | 2.55    | 4.28        | 0.012 | 12    | 6.05  | 146.0  | 9.49   | 45    | 12.09    | 0.20  |
|          | CB 14    | 0.21     | 0.75   | 0.16 | 0.16         | 6.69    | 2.55    | 0.40        | 0.012 | 12    | 7.07  | 167.0  | 10.26  | 4     | 13.07    | 0.21  |
|          | CB 15    | 0.07     | 0.90   | 0.06 | 0.06         | 6.69    | 2.55    | 0.17        | 0.012 | 12    | 8.54  | 182.0  | 11.28  | 1     | 14.36    | 0.21  |
|          | CB 16    | 0.15     | 0.69   | 0.10 | 0.10         | 6.69    | 2.55    | 0.27        | 0.012 | 12    | 2.00  | 25.0   | 5.46   | 5     | 6.95     | 0.06  |
|          | CB 17    | 0.21     | 0.80   | 0.17 | 0.17         | 6.69    | 2.55    | 0.43        | 0.012 | 12    | 8.54  | 182.0  | 11.28  | 4     | 14.36    | 0.21  |
|          | OUTFALL  | 0.40     | 0.75   | 0.30 | 0.30         | 6.69    | 2.55    | <u>0.76</u> | 0.160 | 99    | 4.00  | 550.0  | 160.89 | 0     | 3.01     | 3.05  |
|          | $\Sigma$ | 1.45     |        |      |              |         |         |             |       |       |       |        |        |       |          |       |

58<sup>th</sup> AVENUE - GIG HARBOR - 25 YEAR STORM

BASIN A

CB # 2 & 2A

248 LF @ 70' WIDTH  $\Rightarrow$  17360 SF  $\Rightarrow$  0.399 A

SLOPE = 1.5%  $V = 2.5' / \text{SEC}$

$$T_c = \frac{248}{2.5(60)} + 5'' = 6.65 \text{ MIN}$$

ADJ. COEF RUNOFF 0.70

CB # 1 & 1A

200 LF @ 55'  $\Rightarrow$  11,000 SF  $\Rightarrow$  0.253 A

36 @ 6.9' > 0.76 (Adj. Coef.)  
19 @ 0.5

$T_c$  = Not Required by inspection

REMAINDER TO  
EXISTING 18" CMP.

310 @ 25'  $\Rightarrow$  7750 SF  $\Rightarrow$  0.178 A

ADJ. COEF RUNOFF 0.70

$S = 5\%$  ditch line assume grass

$$V = 3.25$$

$$T_c = \frac{310}{60(3.25)} = 1.59 \text{ min.}$$

Adjust:  $N$  value to get flood time  
at 1.6 minutes.

FROM SPREAD SHEET  $Q = 1.5 \text{ CFS}$

BASIN B

CB # 3 & 3A

253 LF @ 70' WIDTH  $\Rightarrow$  17,710 SF  $\Rightarrow$  0.407 A

SLOPE = 1.5%  $V = 2.5' / \text{SEC}$

$$T_c = \frac{253}{2.5(60)} + 5 \text{ min.} = 6.69 \text{ min.}$$

ADJ. COEF RUNOFF 0.70

PIPE 250 LF @ 3.73%

Project SB AVE. Job No. \_\_\_\_\_  
Subject TRAILHEAD Comp. IS Date \_\_\_\_\_  
Sheet 1 of \_\_\_\_\_ Chkd. \_\_\_\_\_ Date \_\_\_\_\_



CB # 4 & 4A

250 LF @ 60'  $\Rightarrow$  15000 SF  $\Rightarrow$  0.344 A

$S = 6.29\%$   $V = 5$  FT/SEC

COEF:  $38' @ 0.9$   $C = 0.75$   
 $22' @ 0.5$

PIPE 250 LF @ 6.29%

CB # 5 & 5A

250 LF @ 38' 9500  
+ 1500 SF (PARK)  $\frac{1500}{11,000} \Rightarrow 0.253$  A  
 $S = 7.68\%$

COEF  $0.9(95)$   $C = 0.85$   
 $0.5(15)$

PIPE 250 LF 7.72%

CB # 6 & 6A

250 LF @ 38 9500 SF  $\Rightarrow$  0.218 A

$S = 9\%$

COEF:  $C = 0.90$

PIPE 150 LF @ 8.97%

CB # 7 & 7A

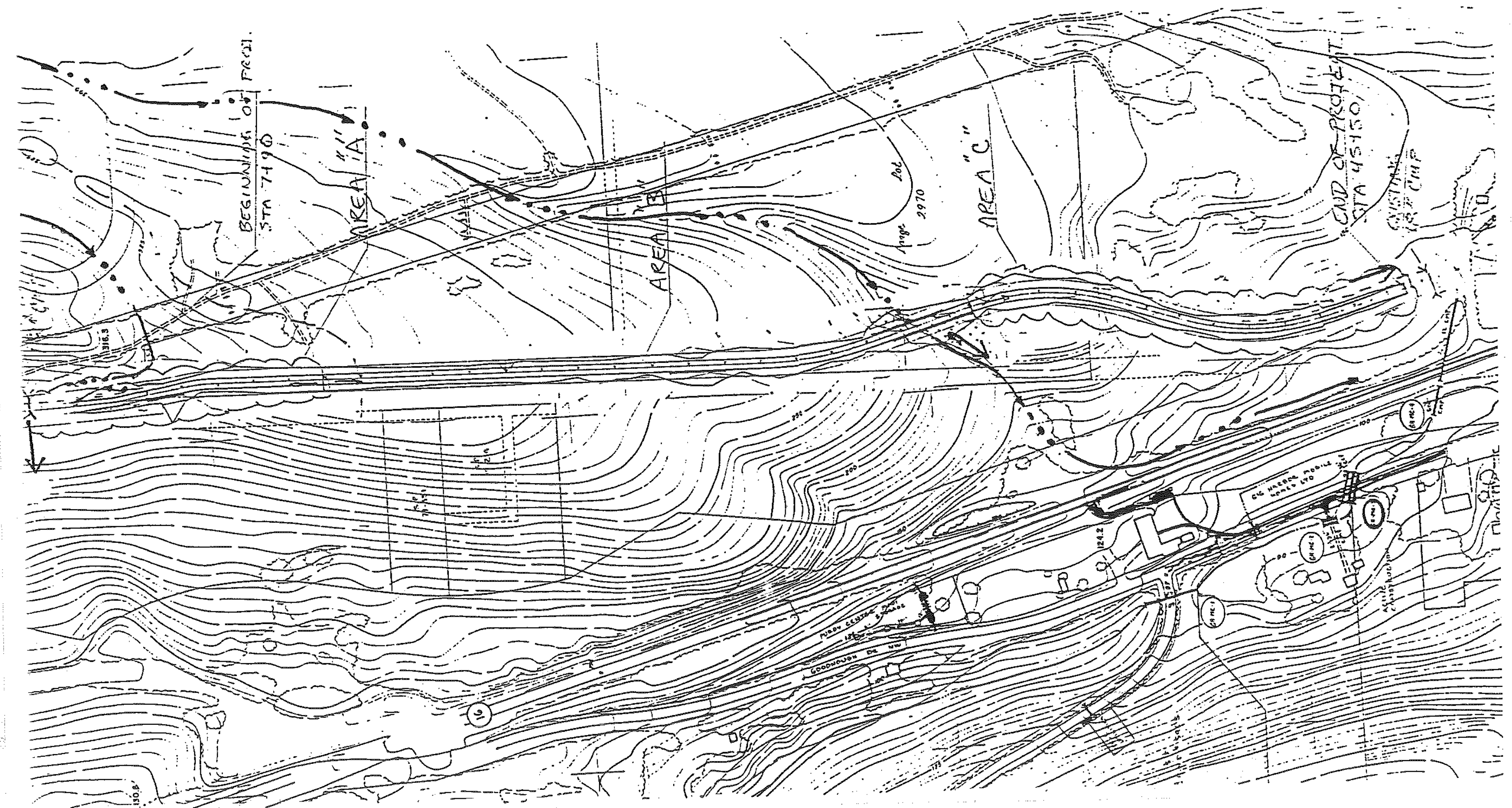
150 @ 70'  $\Rightarrow$  10,500  $\Rightarrow$  0.241 A

$S = 10.77\%$

COEF  $38(0.9)$   $C = 0.72$   
 $32(0.5)$

PIPE 147 LF @ 10.9%

Project SB AVE Job No. \_\_\_\_\_  
Subject DRAINAGE Comp. 2 Date \_\_\_\_\_  
Sheet 2 of \_\_\_\_\_ Chkd. \_\_\_\_\_ Date \_\_\_\_\_



CB # 8 & 8A

147 LF @ 80 FT.  $\Rightarrow$  11,760 SF  $\Rightarrow$  0.270 A

S = 10.77%

COEF  $\begin{matrix} 32 (0.7) \\ 42 (0.5) \end{matrix} > C = 0.69$

PIPE 147 @ 10.90%

CB # 9 & 9A

147 LF @ 38 FT  $\Rightarrow$  5700 SF  $\Rightarrow$  0.131 A

S = 10.77%

COEF C = 0.90

PIPE 150 LF @ 10.61%

CB # 10

150 LF @ 38 FT  $\Rightarrow$  5700 SF  $\Rightarrow$  0.131 A

S = 10.77%

C = 0.90

PIPE = 150 LF @ 8.53%

CB # 11

150 LF @ 38 FT  $\Rightarrow$  5700 SF  $\Rightarrow$  0.131 A

S = 10.77

C = 0.90

PIPE 107 LF @ 15.23%

### BASIN C

CB # 13

200 LF @ 90'  $\Rightarrow$  18,000

S = 7% V = 5'/SEC  $\Rightarrow$  0.413 A.

$T_c = \frac{200}{5(60)} + S \Rightarrow 5.67 \text{ MIN}$

COEF  $\begin{matrix} 38 @ 0.9 \\ 52 @ 0.5 \end{matrix} > C = 0.67$

PIPE = 146 LF @ 6.05%

Project 53 AVE Job No. \_\_\_\_\_  
Subject DRAINAGE Comp. D.S. Date \_\_\_\_\_  
Sheet 2 of \_\_\_\_\_ Chkd. \_\_\_\_\_ Date \_\_\_\_\_

CB #14 150 LF @ 60' = 9000 SF  $\Rightarrow$  0.207 A  
S = 6.11

COEF: 38' @ 0.9 > C = 0.75  
22 @ 0.5

PIPE 167 LF @ 7.07%

CB #15 166 FT @ 19'  $\Rightarrow$  3154 SF  $\Rightarrow$  0.072 A

S = 6.11%

COEF C = 0.90

PIPE = 182 LF @ 8.54%

CB #16 166 FT @ 40'  $\Rightarrow$  6640 SF  $\Rightarrow$  0.152 A

S = 6.11%

COEF 19 0.9 > 0.69  
21 0.5

PIPE 25 LF @ 2.00%

CB #17 184 LF @ 50'  $\Rightarrow$  9200 SF  $\Rightarrow$  0.211

S = 8.74%

COEF 38 .9 > 0.80  
12 .5

PIPE 182 LF @ 8.54%

OUTFALL

SSO @ 30'  $\Rightarrow$  16,500  $\Rightarrow$  0.379

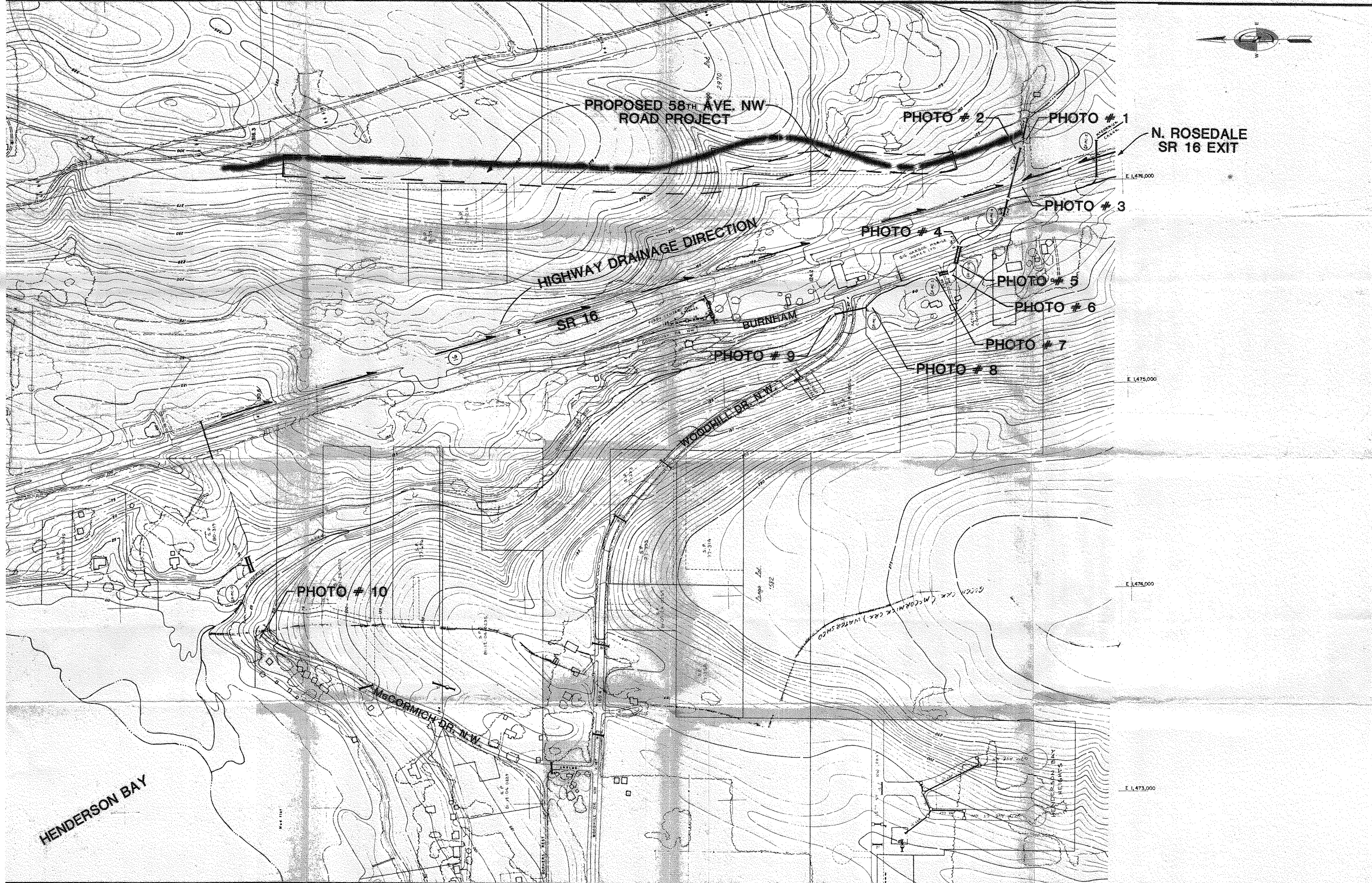
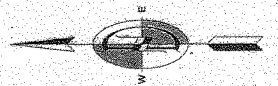
S = 4% < DITCH V = 3 1/2

COEF < 19 0.9 C = 0.75  
11 0.5

Travel time SSO = 3.0 MINUTES

Project \_\_\_\_\_ Job No. \_\_\_\_\_  
Subject \_\_\_\_\_ Comp. \_\_\_\_\_ Date \_\_\_\_\_  
Sheet 4 of \_\_\_\_\_ Chkd. \_\_\_\_\_ Date \_\_\_\_\_





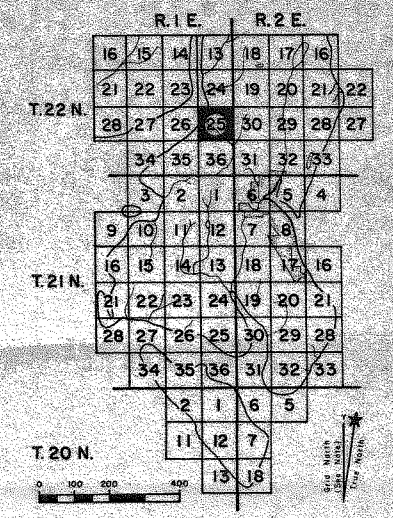
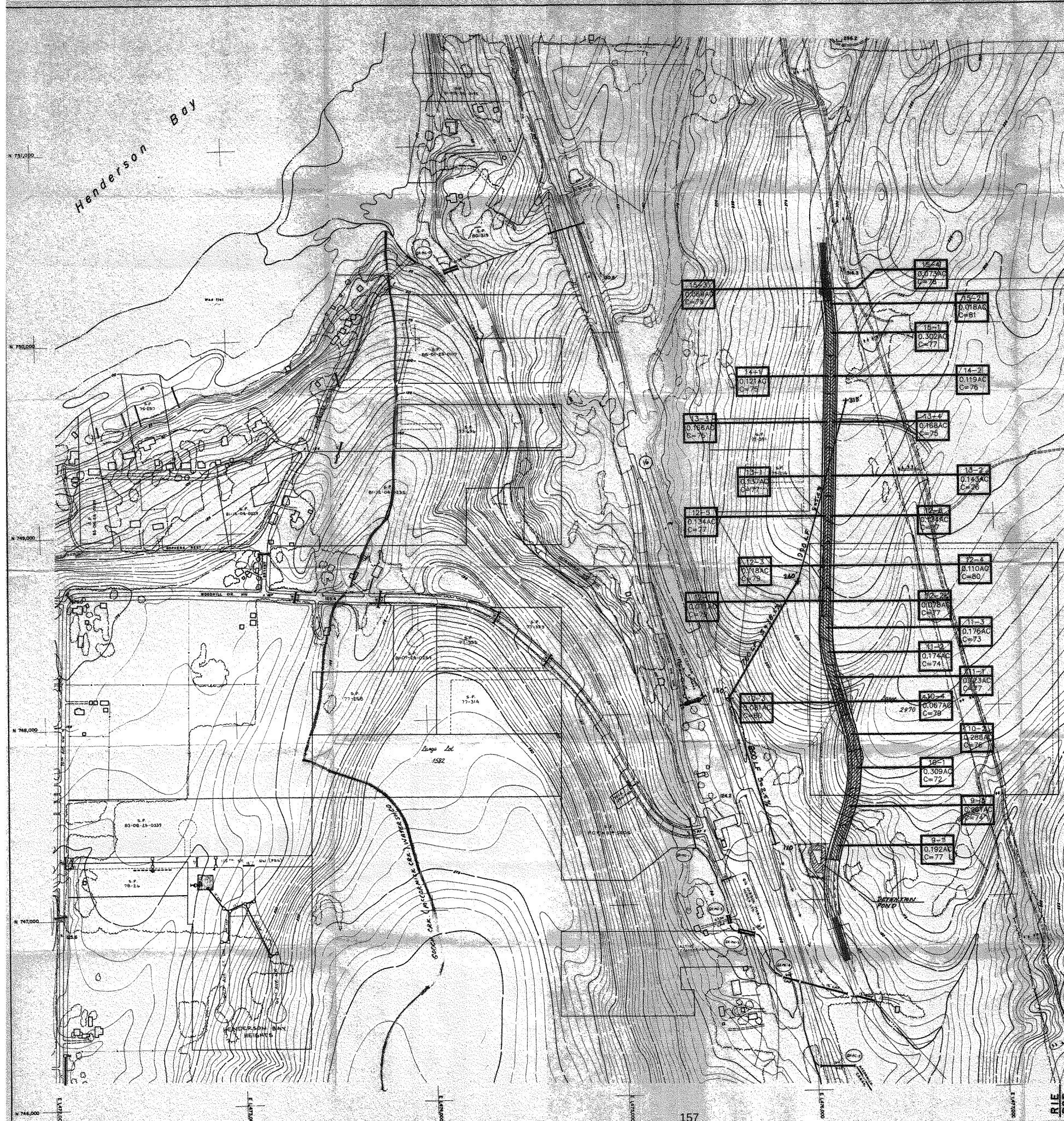
HENDERSON BAY

**DOWL**  
ENGINEERS  
18770 N.E. 79th Street, Suite 202, Redmond, WA 98073-1475 (509) 881-2370

| REVISION | DATE | BY | DATA               | DATE | BY                | SCALE     |
|----------|------|----|--------------------|------|-------------------|-----------|
|          |      |    | San. Sewer         |      | DESIGNED JEP      | 1" = 200' |
|          |      |    | Storm Sewer        |      | DRAWN 6/28/90 DEM |           |
|          |      |    | Water              |      | CHECKED JEP       |           |
|          |      |    | Gas                |      | APPROVED          |           |
|          |      |    | Telephone          |      | FIELD CHK'D       |           |
|          |      |    | Electric           |      | APPROVALS         |           |
|          |      |    | Exemptions         |      | GRID              |           |
|          |      |    | Existing Elevation |      |                   |           |
|          |      |    | Survey Data        |      |                   |           |

58TH AVE. N. W.  
1990 ROAD IMPROVEMENTS  
DOWNSTREAM DRAINAGE REVIEW





SCALE: 1"=200' CONTOUR INT. 5'

- Legend of map symbols used**
- |   |                                                         |          |                                                               |
|---|---------------------------------------------------------|----------|---------------------------------------------------------------|
| — | Culvert or Cross Pipe (Location of Both Ends Known)     | C.C.P.   | Concrete Cylinder Pipe                                        |
| — | Culvert or Cross Pipe (Location of One End Unknown)     | R.C.P.   | Reinforced Concrete Pipe                                      |
| — | Subsurface Drain (Decorated Pipe)                       | C.M.P.   | Corrugated Metal Pipe                                         |
| — | Trough & Half-Pipe                                      | C.M.P.A. | Corrugated Metal Pipe Arch                                    |
| — | Box Culvert                                             | C.S.P.   | Corrugated Steel Pipe                                         |
| — | Bridge                                                  | C.A.P.   | Corrugated Aluminum Pipe                                      |
| — | Catch Basin                                             | Con.     | Concrete Material                                             |
| — | Manhole                                                 | Fl.      | Flow Line Elevation at Bottom of Pipe or Channel Insert Elev. |
| — | Control Manhole with Flow Indicator                     | BM       | Benchmark                                                     |
| — | Dry Well                                                | U.P.     | Utility Pole                                                  |
| — | Open Channel (Ditch, Creek, or Stream)                  | Priv.    | Private                                                       |
| — | Swamp Without Definite Boundaries                       | Com.     | Commercial                                                    |
| — | Swamp With Definite Boundaries (Seasonal or Year Round) | Dr. Sw.  | Drainage Swampland                                            |
| — | Pool (Seasonal or Year Around)                          | S.O.R.   | Slope of Pipe (When Shown on Plans)                           |
| — | Low Area for "Seasonal/Intermittent"                    |          |                                                               |

- Notes:**
- The Pierce County Public Works Department has prepared these "Comprehensive Drainage Program" maps to aid the public in locating water surface, storm drainage systems. Pierce County assumes no responsibility for the information contained on these maps in regard to either accuracy or completeness. Reliance on the information contained on these maps is done at the user's own risk. All data taken from these maps should be field checked by a professional engineer before use is made of the information.
  - If errors or omissions are discovered on these maps, please contact the Pierce County Public Works Department, 591-7250.
  - Base map is the Gig Harbor Peninsula aerial topographic map by Miller & Wolford, from aerial photographs taken September 2, 1966. Topographic map date, January, 1966.
  - Datum: Horizontal: Lambert Projection, South Washington Zone Vertical: 1929 MSL + 40.00
  - Twisted contours in heavily timbered areas indicate lesser accuracy.
  - See the "Comprehensive Drainage Program Data Summary" notebook for a detailed report on the sources of data which were used to plot the drainage information shown on this map sheet.
  - Aerial topographic map symbols conform to standard specifications for photogrammetry, Washington State Department of Highways, 1961. For drainage program map symbols see legend above.
  - The grid north angle from true north can be found on the topographic base maps.

**EXHIBIT "A"**

|     |           |                                           |        |
|-----|-----------|-------------------------------------------|--------|
| 15  |           |                                           |        |
| 14  |           |                                           |        |
| 13  |           |                                           |        |
| 12  |           |                                           |        |
| 11  |           |                                           |        |
| 10  |           |                                           |        |
| 9   |           |                                           |        |
| 8   |           |                                           |        |
| 7   |           |                                           |        |
| 6   |           |                                           |        |
| 5   |           |                                           |        |
| 4   |           |                                           |        |
| 3   |           |                                           |        |
| 2   | D. MILLER | FIELD CHECK                               | 1-7-81 |
| 1   | D. MILLER | PLATS, SPOT PLATS, LARGE LOTS, COMPARISON | 1-7-81 |
| NO. | NAME      | REVISION/UPDATE                           | DATE   |

**PIERCE COUNTY  
PUBLIC WORKS  
Comprehensive Drainage  
Program Map**

SEC. 25, T. 22N, R. 1 E., W.M.

# Appendix E

## Geotechnical Report

May 28, 2020

Swede Hill, LLC.  
PO Box 1397  
Tacoma, Washington 98401

c/o Barghausen Consulting Engineers, Inc.  
18215 – 72<sup>nd</sup> Avenue South  
Kent, Washington 98032

Updated Geotechnical Engineering  
Report  
Proposed Commercial Development  
Canterwood Commercial Center  
Gig Harbor, Washington  
Doc ID: SwedeHill.Canterwood.RGu

## INTRODUCTION

This updated report presents the results of our geotechnical engineering studies for the proposed Canterwood Commercial Center (CCC) to be constructed in Gig Harbor, Washington. The location of the project is shown in the attached Site Location Map, Figure 1. The site is in the Gig Harbor North neighborhood, and is situated between Canterwood Boulevard and Highway 16, immediately west of St. Anthony's Hospital, as shown on the Site Vicinity Map, Figure 2. We previously prepared a *Geotechnical Engineering Report* for this site dated January 2014.

The proposed CCC project will consist of four new commercial/office buildings. According to the provided site plans, Building A in the north central portion of the site, will consist of a three-story building with the lowest level being a daylight parking level and two levels of interior office space above. Buildings B, C, and D will be one to two-story on-grade structures situated in the east and south-central portion of the site. Proposed site grading will be extensive, resulting in fill slopes as tall as 35 feet, most of the retaining walls that vary in height up to 6 feet, with 5 of the proposed walls being taller. A new stormwater detention pond will be situated in the lower, western portion of the site below buildings B, C, and D. Several new stormwater dispersion trenches are also proposed around the site. Access to site will be via three new driveway approaches that extend west into the development from Canterwood Boulevard. The project site and the proposed development are shown on the updated Site and Exploration Plan, Figure 3.

Our assumptions and understanding of the proposed grading of the project is based on our conversations and email correspondence with Mr. Carl Halsan and Mr. Jason Hubbell of Barghausen Consulting Engineers Inc and the provided update civil drawings sheets C6 and C7 dated May 13, 2020.

## SCOPE

The purpose of our original services was to evaluate the surface and subsurface conditions across the site as a basis for providing geotechnical recommendations and design criteria for the proposed development. Specifically, the scope of services for this project included the following:



1. Geologic description of the site and project location;
2. Site plan showing approximate exploration locations on a base site plan supplied to us by Barghausen Consulting Engineers;
3. Descriptive logs of our subsurface explorations;
4. Results of our field and laboratory tests;
5. Description of surface, soil, groundwater (measured and seasonal fluctuations), and seismic conditions;
6. Review of the City of Gig Harbor Critical Areas Ordinance, including steep slopes, landslides, erosion and seismic;
7. Recommended setbacks and buffers, per the City of Gig Harbor Critical Areas Ordinance, including recommendations for buffer reduction, if required;
8. Recommended seismic design parameters, including 2015 IBC site class;
9. Recommendations for site preparation;
10. Recommendations concerning excavations, including temporary slope inclinations;
11. Design criteria for shallow footings, including allowable bearing pressures;
12. Estimated total and differential settlements of foundations;
13. Recommendations concerning slab-on-grade floors;
14. Recommendations concerning temporary and permanent drainage systems;
15. Recommendations concerning structural fill and the reuse of onsite soils as structural fill;
16. Recommendations for stormwater management, including onsite infiltration if feasible;
17. Recommendations concerning permanent slopes, including maximum inclinations, keying and benching, and construction methods;
18. Recommendations for temporary and permanent erosion control
19. Recommendations for additional studies, if required; and
20. Explanation of report limitations.

Our work was completed in general accordance with our *Proposal for Geotechnical Engineering Report* dated January 3, 2013. Authorization to proceed with the original scope of services was provided by Mr. Luke Xitco, of Swede Hill LLC, on January 7, 2013.

This updated report is based on the current proposed civil design sheets C6 and C7 (May 13, 2020), review comments from the City of Gig Harbor provided to us on April 29, 2020, and follow-up conversations and correspondences with you permitting agent, Mr. Carl Halsan; Mr. Jason Hubbell of Barghausen Consulting Engineers, Inc, and Mr. Don Babineau of Soundview Consultants. We were directed to provide this updated report on April 29, 2020 by Mr. Halsan. No additional subsurface explorations were completed as part of this scope of work, but we did visit the site and perform an updated site reconnaissance on May 15, 2020.

## **SITE CONDITIONS**

### **Surface Conditions**

The site consists of a single tax parcel located west of St. Anthony's Hospital in Gig Harbor, Washington. The site is situated between Canterwood Boulevard on the east and State Route 16 on the west, an undeveloped tract to the north, and a City of Gig Harbor storm pond to south. The parcel is irregular in shape and encompasses approximately 7.6 acres. Portions of the site appear to have been logged in the past. The ground surface on the site slopes down from Canterwood



Boulevard to the west towards Highway 16. The site encompasses an old drainage with a stream that was covered by the Canterwood Boulevard roadway embankment. The lower reaches of the stream bisect the site and has been mapped for wetlands by Soundview Consultants. Slopes range from 40 to 70 percent on the east portion of the site, 10 to 25 percent on the center of the site, and 10 to 35 percent on the lower third of the site. The upper steeper sloping portions of site consists of the lower portion of the Canterwood Boulevard Road embankment. Total topographic relief across the site is on the order of 140 feet.

### Site Soils

The USDA Natural Resource Conservation Service (NRCS) Web Soil Survey for Pierce County maps the soils in the area of the site as Harstine gravelly sandy loam (type 16) soils. The Harstine soils are derived from sandy glacial till that form on 6 to 15 percent (16C) and 15 to 30 percent (16D). The soils are listed as having a “moderate” or “moderate to severe” erosion hazard when exposed. The Harstine soils are listed in hydrologic soils group C. Because the Harstine soils are underlain by indurated (cemented) soils at relatively shallow depths, the ability of the Harstine soils to support onsite infiltration of collected stormwater is limited. A copy of the NRCS map for the site vicinity is attached as Figure 4. We observed no evidence of surficial erosion at the site during our reconnaissance.

### Site Geology

Our knowledge of the geologic conditions in the project area is based on our subsurface explorations, a published draft *Geological Map of the Gig Harbor 7.5 minute Quadrangle, Washington* (Troost, K.G., Booth, D.B., and Wells, R.E.) and our experience in the area. The map indicates the site is underlain by a sequence of glacial till (Qvt) and advance outwash (Qva) that was deposited during the most recent Vashon Stade of the Fraser Glaciation, approximately 12,000 to 15,000 years ago. The glacial till consists of a heterogeneous mixture of clay, silt, sand, and gravel that was deposited at the base of the prehistoric continental glacial ice mass and was subsequently over-ridden. Typically, the glacial till is underlain by advance outwash. Advance outwash consists of poorly stratified sand and gravel that was deposited by meltwater streams and rivers emanating from the advancing glacial ice mass. Both the glacial till, and advance outwash, are considered over-consolidated and exhibit high strength and low compressibility characteristics, whereas recessional outwash and alluvial deposits are considered normally consolidated. An excerpt from the referenced map is included as Figure 5.

We also reviewed the Washington State Department of Ecology Atlas with regards to the mapped slope stability for the site area. The Coastal Zone does extend across the entire site, but the slopes below Canterwood Boulevard north of the site are generally mapped as stable, with no areas of recent or historic landslide activity. A copy of the Washington DNR Landslide Inventory Map is included as Figure 6.

The Washington Department of Natural Resources Landslide Inventory map indicates the steeply sloping portion of the site to as having a “moderate” to “high” shallow landslide susceptibility, with a “moderate” deep landslide susceptibility. No areas of active or historic landslides are mapped on or within 300 feet of the site from the DNR susceptibility map. A copy of the Washington DNR Landslide Inventory Map is included as Figure 7.

## Subsurface Explorations

On January 16, 2014 a representative from GeoResources, LLC (GeoResources) visited the site and monitored the excavation of 22 test pits to depths of 3.5 to 9 feet below the existing ground surface, logged the subsurface conditions encountered in each test pit, and obtained representative soil samples. The test pits were excavated by a small sized track-mounted excavator operated by a contractor working under subcontract to us. Table 1 summarizes the approximate functional locations, surface elevations, and termination depths of our test pits explorations.

**TABLE 1:**  
**APPROXIMATE LOCATIONS, ELEVATIONS, AND DEPTHS OF EXPLORATIONS**

| Test Pit Number                                                                                                                              | Functional Location                      | Surface Elevation <sup>1</sup> (feet) | Termination Depth (feet) | Termination Elevation <sup>1</sup> (feet) |
|----------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|---------------------------------------|--------------------------|-------------------------------------------|
| TP-1                                                                                                                                         | Driveway to Building D                   | 137                                   | 7                        | 130                                       |
| TP-2                                                                                                                                         | Parking above Building D                 | 138                                   | 7.5                      | 130.5                                     |
| TP-3                                                                                                                                         | Driveway to Building C                   | 145                                   | 7.5                      | 137.5                                     |
| TP-4                                                                                                                                         | Building Pad C                           | 152                                   | 8                        | 144                                       |
| TP-5                                                                                                                                         | Retaining walls between Building C/B     | 158                                   | 6                        | 152                                       |
| TP-6                                                                                                                                         | Building Pad B                           | 173                                   | 8                        | 165                                       |
| TP-7                                                                                                                                         | Wall above Building B                    | 180                                   | 9                        | 171                                       |
| TP-8                                                                                                                                         | Fill slope below Building B parking lot  | 150                                   | 9                        | 141                                       |
| TP-9                                                                                                                                         | West (upslope) edge of storm pond berm   | 140                                   | 8                        | 132                                       |
| TP-10                                                                                                                                        | Center of storm pond berm                | 138                                   | 8                        | 130                                       |
| TP-11                                                                                                                                        | East (downslope) edge of storm pond berm | 135                                   | 7.5                      | 127.5                                     |
| TP-12                                                                                                                                        | Parking area below Building B            | 152                                   | 6                        | 146                                       |
| TP-13                                                                                                                                        | Driveway north of Building A             | 176                                   | 9                        | 167                                       |
| TP-14                                                                                                                                        | Building Pad A                           | 180                                   | 3.5                      | 176.5                                     |
| TP-15                                                                                                                                        | Driveway south of Building A             | 173                                   | 9                        | 164                                       |
| TP-16                                                                                                                                        | Parking lot above Building A             | 189                                   | 6                        | 183                                       |
| TP-17                                                                                                                                        | Cut slope above Building A parking lot   | 206                                   | 7                        | 199                                       |
| TP-18                                                                                                                                        | Parking lot below Building A             | 175                                   | 7.5                      | 167.5                                     |
| TP-19                                                                                                                                        | Fill slope below Building A parking lot  | 152                                   | 9                        | 143                                       |
| TP-20                                                                                                                                        | Driveway north of Building B             | 172                                   | 7                        | 165                                       |
| TP-21                                                                                                                                        | Building Pad D                           | 136                                   | 8.5                      | 127.5                                     |
| TP-22                                                                                                                                        | Fill slope below Building D              | 128                                   | 9                        | 119                                       |
| <b>Notes:</b><br><sup>1</sup> = Surface elevations estimated from Barghausen Consulting Engineers Inc site plan dated May 13, 2020 (NAVD 88) |                                          |                                       |                          |                                           |

The specific number, locations, and depths of our explorations were selected based on the configuration of the proposed development, and were adjusted in the field based on consideration for underground utilities, existing site conditions, site access limitations and encountered stratigraphy. The densities presented in the logs were determined by the difficulty of excavation and our experience. Representative soil samples obtained from the test pits were placed in sealed



plastic bags and then taken to a laboratory for further examination and testing as deemed necessary. The test pits were then backfilled with the excavated soils and bucket tamped, but not otherwise compacted.

The subsurface explorations excavated as part of this evaluation indicate the subsurface conditions at specific locations only, as actual subsurface conditions can vary across the site. Furthermore, the nature and extent of such variation would not become evident until additional explorations are performed or until construction activities have begun.

The approximate locations and numbers of our test pits are shown on the attached Site and Exploration Plan, Figure 3. The locations shown on Figure 3 were determined by pacing or taping from existing site features and reference points. As such, the locations should only be considered accurate to the degree implied by our measuring methods. The soils encountered were visually classified in accordance with the Unified Soil Classification System (USCS) and ASTM D: 2488. The USCS is included in Appendix A as Figure A-1, while the descriptive logs of our test pits are included as Figures A-2 and A-9.

### **Subsurface Conditions**

Our test pits encountered slightly variable subsurface conditions that generally confirmed the mapped stratigraphy. The subsurface conditions encountered in each test pit are included below in Table 2 and description of the various soil types encountered across the site are summarized in the following sections.

#### Surficial Organic Soils

The site is typically covered by 3 to 12 inches of forest duff and topsoil. We anticipate that deeper areas of topsoil and forest duff will be encountered in areas of larger trees and in localized depressions across the site, similar to those encountered in test pit TP-19.

#### Undocumented Fill Soils

Fill soils likely associated with the old logging roads crossing the site were encountered in five of our test pits, including TP-5, TP-6, TP-12, TP-15, and TP-18. The fill consisted of black gravel with silt, organic debris, and woody pieces. The fill in test pit TP-5 was underlain by a geotextile separation fabric. Given the higher fines content and organics, the fill soils are likely highly compressible and had a high moisture content, making it susceptible to decomposition over time.

#### Upper Silty Sand

Below the surficial forest duff, our test pits typically encountered loose to medium dense silty fine to medium sand with varying amounts of gravel and minor amounts of roots. We interpret these shallow soils to be a subsoil horizon between the topsoil and the deeper weathered till.

In the lower portion of the site, near the wetland area and stream channel, several of our test pits TP-8, TP-9, TP-10, TP-11, TP-18, TP-19, and TP-22 encountered a medium stiff to stiff silt with some sand. The silt had elevated moisture contents. Laboratory tests indicate that the silt is non-plastic. We interpret these cohesive soils to be alluvium on the lower, flatter, western portion of the site. The silt was typically underlain by loose to medium dense sand with minor amounts of silt and variable amounts of gravel that we also interpret to be alluvium.



### Glacially Consolidated Soils

Underlying the surficial forest duff and upper weathered soils, our test pits encountered a dense to very dense glacial till. In the test pits excavated across the upper portions of the site (TP-5, TP-6, TP-7, TP-12, TP-14, and TP-16) consisted of a light gray silty fine to medium sand with varying amounts of gravel. The glacial till in the lower portions of the site, such as in test pits TP-1, TP-2, TP-3, TP-20, 21) consisted more of a gravelly sand with varying amounts of silt (some silt to silty). Test Pit TP-13 encountered in the north central portion of the site encountered a dense to very dense sandy gravel with cobbles and minor amounts of silt that we interpret to be more representative of advance outwash.

**TABLE 2:**  
**APPROXIMATE THICKNESS, DEPTHS, AND ELEVATION OF SOIL TYPES ENCOUNTERED IN EXPLORATIONS**

| Test Pit Number | Thickness of Topsoil (feet) | Thickness of Loamy Sand (feet) | Thickness of Weathered Till/ Outwash (feet) | Depth to Glacial Till (feet) | Elevation <sup>1</sup> of Top of Glacial Till (feet) |
|-----------------|-----------------------------|--------------------------------|---------------------------------------------|------------------------------|------------------------------------------------------|
| TP-1            | 0.5                         | 1                              | 2.5                                         | 4                            | 133                                                  |
| TP-2            | 0.3                         | 1.7                            | 3                                           | 5                            | 133                                                  |
| TP-3            | 0.7                         | 1.3                            | 3.5                                         | 5.5                          | 139.5                                                |
| TP-4            | 0.5                         | 1                              | 2.5                                         | 4                            | 148                                                  |
| TP-5            | 0.2                         | 1.3 <sup>2</sup>               | 3                                           | 4.5                          | 153.5                                                |
| TP-6            | 0.5                         | 2 <sup>2</sup>                 | 2.5                                         | 5                            | 168                                                  |
| TP-7            | 0.3                         | 2.2                            | 2.5                                         | 5                            | 175                                                  |
| TP-8            | 0.5                         | 2                              | 6.5 <sup>3</sup>                            | N/E                          | N/E                                                  |
| TP-9            | 0.5                         | 1                              | 6.5 <sup>3</sup>                            | N/E                          | N/E                                                  |
| TP-10           | 0.5                         | 1.5                            | 6 <sup>3</sup>                              | N/E                          | N/E                                                  |
| TP-11           | 0.7                         | 1.8                            | 5+ <sup>3</sup>                             | N/E                          | N/E                                                  |
| TP-12           | 0.3                         | 3.2 <sup>2</sup>               | 0                                           | 3.5                          | 148.5                                                |
| TP-13           | 0.5                         | 0                              | 1.5                                         | 1.5                          | 174.5                                                |
| TP-14           | 0.3                         | 0                              | 1                                           | 1.3                          | 178.7                                                |
| TP-15           | 0.2                         | 4.3 <sup>2</sup>               | 3.5                                         | 7                            | 166                                                  |
| TP-16           | 0.8                         | 1.7                            | 1.5                                         | 4                            | 185                                                  |
| TP-17           | 1.0                         | 0                              | 4                                           | 5                            | 201                                                  |
| TP-18           | 0.2                         | 2.3 <sup>2</sup>               | 5+ <sup>3</sup>                             | N/E                          | N/E                                                  |
| TP-19           | 2.0                         | 5                              | 2+ <sup>3</sup>                             | N/E                          | N/E                                                  |
| TP-20           | 0.5                         | 1.5                            | 4.5                                         | 6                            | 166                                                  |
| TP-21           | 1.0                         | 2                              | 1                                           | 4                            | 132                                                  |
| TP-22           | 1.0                         | 2                              | 3 <sup>3</sup>                              | N/E                          | N/E                                                  |

**Notes:**  
<sup>1</sup> Surface elevations estimated from Barghausen Consulting Engineers Inc site plan dated December 19, 2013 (NAVD 88)  
<sup>2</sup> Old Fill, <sup>3</sup> Alluvium, N/E = Not Encountered

As stated on our test pit logs, several of our test pits encountered cobbles within the explored depths. A larger boulder (glacial erratic) was also observed on the ground surface near test pit TP-4. These larger cobbles and boulders can make excavations and construction very difficult and should be anticipated by the contractor for subgrade construction.

### Laboratory Testing

Geotechnical laboratory tests were performed on select samples retrieved from the test pits to determine soil index and engineering properties encountered. Laboratory testing included visual soil classification, moisture content determinations, Atterberg Limit tests, and grain size analysis. Geotechnical laboratory testing was performed in the GeoResources, LLC laboratory in Fife, Washington. Testing was performed in general accordance with the ASTM International (ASTM) standard procedures (ASTM, 2007). Brief descriptions of the laboratory test procedures and the test results are presented in Appendix B.

### Groundwater Conditions

Groundwater conditions were evaluated by observations made at the time our test pits were excavated. Groundwater seepage was observed in two of our test pits at the time of digging. Table 3 summarizes our depth to, and elevation of groundwater encountered in our test pits.

**TABLE 3:**  
**APPROXIMATE DEPTHS AND ELEVATIONS OF GROUNDWATER ENCOUNTERED IN EXPLORATIONS**

| Test Pit Number                                                                                                                              | Depth to Groundwater (feet) | Elevation of Groundwater <sup>1</sup> (feet) | Date Observed                        |
|----------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|----------------------------------------------|--------------------------------------|
| TP-8                                                                                                                                         | 6                           | 144                                          | January 16, 2014 (ATD <sup>2</sup> ) |
| TP-15                                                                                                                                        | 7                           | 167                                          | January 16, 2014 (ATD <sup>2</sup> ) |
| <b>Notes:</b> <sup>1</sup> Surface elevations estimated from Barghausen Consulting Engineers Inc site plan dated December 19, 2013 (NAVD 88) |                             |                                              |                                      |
| <sup>2</sup> ATD = At time of digging                                                                                                        |                             |                                              |                                      |

Since our test pits were excavated during the wetter winter months, we anticipate that these depths represent the seasonally average to high groundwater levels. We expect the water to be shallower in the wetter, winter months. Changes in local groundwater levels will also occur in response to off-site construction activities and site utilization. Analysis or modeling of anticipated groundwater levels during construction is beyond the scope of this report.

### ENGINEERING CONCLUSIONS AND RECOMMENDATIONS

Based on our current understanding of the proposed project and on the results of our geotechnical studies, we have updated the geotechnical recommendations for design and construction of the proposed CCC Project to reflect changes to the proposed site plan, City ordinances, and building codes since our original report was prepared. Based on our recent site reconnaissance, the site conditions appeared unchanged, and the findings of our original report are



still applicable. The following sections provide recommendations for seismic design considerations, foundation design, permanent building walls, floor slabs, drainage, pavements, and other pertinent geotechnical design and construction issues.

## Seismic Design

The site is located in the Puget Sound region of western Washington, which is seismically active. Seismicity in this region is attributed primarily to the interaction between the Pacific, Juan de Fuca, and North American plates. The Juan de Fuca plate is subducting beneath the North American plate at the Cascadia Subduction Zone (CSZ). This produces both intercrustal (between plates) and intracrustal (within a plate) earthquakes. In the following sections we discuss the design criteria and potential hazards associated with the regional seismicity.

### Seismic Site Class

Based on our explorations and the subsurface units mapped at the site, we interpret the structural site conditions to correspond to a seismic Site Class “D” in accordance with the 2015 IBC documents and American Society of Civil Engineers (ASCE) standard 7-10 Chapter 20 Table 20.3-1. This is based on inferred SPT blow counts for the soils encountered in our test pit explorations. These conditions are assumed to be representative for the subsurface across the site.

### Design parameters

The U.S. Geological Survey (USGS) completed probabilistic seismic hazard analyses (PSHA) for the entire country in November 1996, which were updated and republished in 2002 and 2008. We used the *ATC Hazard by Location* website to estimate seismic design parameters at the site. Table 4, below, summarizes the recommended design parameters.

**TABLE 4:**  
**2015 IBC PARAMETERS FOR DESIGN OF SEISMIC STRUCTURES**

| Spectral Response Acceleration (SRA) and Site Coefficients for Existing Conditions | Short Period     | 1 Second Period  |
|------------------------------------------------------------------------------------|------------------|------------------|
| Mapped SRA                                                                         | $S_s = 1.370$    | $S_1 = 0.538$    |
| Site Coefficients (Site Class D)                                                   | $F_a = 1.000$    | $F_v = 1.500$    |
| Maximum Considered Earthquake SRA                                                  | $S_{MS} = 1.370$ | $S_{M1} = 0.808$ |
| Design SRA                                                                         | $S_{DS} = 0.913$ | $S_{D1} = 0.538$ |

### Peak Ground Acceleration

The mapped peak ground acceleration (PGA) for this site is 0.563g. To account for site class, the PGA is multiplied by a site amplification factor ( $F_{PGA}$ ) of 1.0.

### Seismic Hazards

Earthquake-induced geologic hazards may include liquefaction, lateral spreading, slope instability, and ground surface fault rupture. Liquefaction is a phenomenon where there is a reduction or complete loss of soil strength due to an increase in pore water pressure in soils. The

increase in pore water pressure is induced by seismic vibrations. Liquefaction primarily affects geologically recent deposits of loose, uniformly graded, fine-grained sands and granular silts that are below the groundwater table. In our opinion, the potential for liquefaction and lateral spreading is not significant because of the dense nature of the on-site soils and the groundwater depth. This coincides with the conditions observed in the explorations performed at the site. Because of the relatively low susceptibility of site soils to liquefaction, it is our opinion that the likelihood of lateral spreading is also relatively low.

Based on our review of the Department of Natural Resources Geologic Hazards Map (Geologic Information Portal), the site is located about 0.17 miles south and 0.91 miles north of the Tacoma Fault Zone (Figure 8). No evidence of ground fault rupture was observed in the subsurface explorations or our site reconnaissance. Therefore, in our opinion, the proposed structure should have no greater risk for ground fault rupture than other structures located in the area.

### **Recommended Setback from Steep Slopes**

The 2015 International Building Code (IBC), Section 1808.7 requires a building setback from slopes that are steeper than 3H:1V (Horizontal: Vertical) or 33 percent with greater than 10 feet in vertical height, unless evaluated and reduced and/or a structural setback is provided by a licensed geotechnical engineer. The setback distance is calculated based on the vertical height of the slope. The typical 2015 IBC setback from the top of the slope equals one third the height of the slope or 40 feet, whichever is less, while a setback from the toe of the slope equals one half the height of the slope or 15 feet, whichever is less. It appears that the four building locations generally meet the IBC guidelines for setbacks.

### **Foundation Support**

Based on the subsurface conditions encountered in the field explorations, glacially consolidated soils are present approximately 1 to 5-feet below ground surface (bgs) at most locations across the upland portion of the site where the buildings are proposed, but may be locally as deep as 7-feet or more. Conventional spread and continuous footings that bear directly on the glacial soils or on properly placed and compacted structural fill that extends down to the glacial soils, should be applicable, depending on loading conditions. The following sections present our recommendations.

#### **Shallow Foundations**

Conventional spread and continuous footings that bear directly on the glacial soils or on properly placed and compacted structural fill that extends down to the glacial soils, should be appropriate, depending on loading conditions.

The soil at the base of the excavations should be disturbed as little as possible. All loose, soft, or unsuitable material should be removed or recompacted, as appropriate. A representative from our firm should observe the foundation excavations to determine if suitable bearing surfaces have been prepared, particularly in the areas where the foundation will be situated on fill material.

We recommend that spread or continuous be founded on the native glacially consolidated soils or on structural fill that extends to suitable native soils, which may require that the soils beneath the proposed footings to be over excavated and replaced with properly compacted structure fill or with CDF. Over excavation should extend laterally out from the footing 1 foot for every vertical foot of excavation. The native soil at the base of the excavations should be disturbed





as little as possible. All loose, soft, or unsuitable material, such as the upper undocumented fill material encountered in all of our subsurface explorations, should be removed or recompacted, as appropriate. The following sections present our recommendations.

#### *Bearing Capacity and Footing Size*

Based on our recent field explorations, we recommend an allowable bearing capacity of 2,500 pounds per square foot (psf) for footings that bear on undisturbed, medium dense weathered till, or on properly placed and compacted structural fill. Foundations that extend down to the very dense native glacial till or advance outwash may be designed for a maximum allowable bearing capacity of 3,500 psf. Please note that areas of thicker, soft/loose material and fill may exist between test pits. If softer/looser material is found at a footing base, the unsuitable material must be overexcavated and replaced with structural fill. These allowable values may be increased by up to one-third to account for wind, seismic, or other short-term loads. The allowable bearing capacity values include a factor of safety (FS) of 3.0.

Continuous footings should have a minimum width determined in accordance with the 2015 IBC section 1809.7. The base of all footings should be located at least 18 inches below the lowest adjacent grade for frost protection.

We recommend that exposed footing subgrades be evaluated by a representative from GeoResources, LLC to confirm soil conditions and provide recommendations where unanticipated conditions are found. Native soils that are disturbed during footing excavation should be removed prior to the placement of the concrete forms and reinforcement.

#### *Estimated Settlement*

We estimate that spread footing foundations founded as described above would undergo a total settlement of approximately 1-inch or less. Differential settlements between adjacent column footings or over a 50-foot span of continuous footing are estimated to be approximately one-half the total settlement between columns. A more precise estimate of settlement can be provided once the actual loads are provided.

#### *Lateral Resistance of Shallow Foundations*

For portions of the structure founded on footings, lateral loads may be resisted by a combination of base friction and passive pressure against the footings and buried portions of the wall. In our opinion, passive earth pressures developed from the very dense, undisturbed native soils could be based on an allowable equivalent fluid density of 350 pounds per cubic foot (pcf) or 250 pcf for fill soil. This passive resistance value assumes that the footings extend at least 24 inches below the lowest adjacent grade and that the ground surface is horizontal for a minimum distance of  $1\frac{1}{2}$  times the embedment depth. The above passive earth pressure includes an FS of 1.5 to limit lateral deflections. We recommend a coefficient of friction of 0.32 be used between cast-in-place concrete and undisturbed, native, silty, gravelly sand for calculating the resistance to sliding at the base of the footings. This friction factor also includes an FS of 1.5.

We recommend that all foundations be provided with footing drains constructed in accordance with the 2015 IBC Section 1805.4.2.



## Floor Slab Support

Slab-on-grade floors, where constructed, should be supported on the Dense, native soils or compacted structural fill would provide a suitable subgrade for floor slabs constructed on grade. We recommend that a vertical modulus of subgrade reaction equal to 300 pounds per cubic inch (pci) be used in the design of the floor slab-on-grade on dense, glacially overridden soil or on compacted, structural fill.

To provide firm bedding for floor slabs, we recommend areas be prepared as described in construction considerations section. The exposed soils should be compacted to at least 95 percent of the Modified Proctor (ASTM D 1557) maximum dry density and to a dense and unyielding condition. All fill under slab-on-grade floors, including backfill for footing excavations, overexcavated areas, utilities, etc., should consist of compacted structural fill. Structural fill requirements are discussed in a later section of this report.

Assuming the below-grade building areas are constructed with long-term drainage, a capillary break should be installed. At-grade structures should also have a capillary break. For a capillary break, we recommend that a minimum 4-inch-thick layer of washed pea gravel ( $\frac{3}{8}$  inch to No. 8 sieve size) or clean, 5/8-inch minus crushed rock (less than 2 percent passing the No. 200 sieve) and a vapor retarder consisting of plastic sheeting be placed beneath floor slabs, as shown in Figure 9. If pea gravel is used, a 2-inch layer of clean crushed rock can be placed over a 4-inch minimum layer of washed pea gravel to provide a firmer working surface on which to place the reinforcement. The vapor retarder should be placed on top of the capillary break material where floors are covered with carpet, linoleum, or other floor covers and the space is heated.

Prior to placing pea gravel and/or crushed rock for a working surface or capillary break, the exposed subgrade surface should be evaluated by a representative of our firm and compacted as needed to achieve a dense, unyielding condition. If used, the crushed rock should be compacted to 95 percent of the MDD.

If a subgrade modulus of 300 is used for floor slab design, we estimate that settlement of the floor slabs designed and constructed as recommended, will be  $\frac{1}{2}$ -inch or less over a span of 50 feet.

## Subgrade/Basement Walls

The lateral pressures against permanent below-grade walls are dependent upon many factors, including groundwater conditions, method of backfill placement and degree of compaction (if applicable), backslope, surcharges, the type of backfill soil and/or adjacent native soils, drainage provisions, and wall flexibility. If the wall is free to yield at the top an amount equal to approximately 0.001 times the height of the wall, then active earth pressures should be mobilized. If movement is not allowed because of stiffness or resistance of the wall, the wall should be designed for at-rest earth pressures. Wall restraint may occur if a rigid structural network is constructed prior to backfilling. However, if temporary shoring is allowed to yield and the buried permanent walls are cast against the shoring, the soil adjacent to the walls would be in an active earth pressure condition.

Building A is the only building currently proposed to have a subgrade wall. We recommend allowable equivalent fluid pressures of 35 pcf be used for the active condition and 60 pcf for the at rest condition. The equivalent fluid weights given are based on the assumptions that the ground surface behind the wall is level. The pressures assume that structural fill is used as wall backfill and properly compacted.



We understand that permanent drainage is planned for the below-grade walls to prevent build-up of hydrostatic pressures. Permanent drainage should consist of either a 1-foot-thick (minimum) layer of clean, drainage gravel placed against the wall or a geocomposite drain mat attached to the basement wall face. For either drainage method, the water should be collected in a perforated, footing drain at the base of the wall. Typical wall backfill and subdrainage recommendations are shown in Figure 9. Backfill should not be placed and compacted behind a wall until the wall is capable of supporting lateral pressures. Compaction criteria for areas behind walls are also presented in Figure 9.

The total active earth pressure should be analyzed for seismic loading conditions using a dynamic load surcharge of 14H. This increment should be applied as a uniform load to the wall and is consistent with a pseudostatic analysis using the Mononobe-Okabe equation for lateral earth pressures for a horizontal seismic coefficient of 0.27g. The horizontal seismic coefficient is not necessarily equivalent to the design peak ground acceleration at the site. The magnitude of this coefficient accounts for the fact that the peak ground acceleration is experienced only a few times within the record of earthquake shaking, and that the actual earthquake ground motion is cyclic in nature, as opposed to a static force. Values of the horizontal seismic coefficient are typically one-third to one-half the value of design peak ground acceleration of 0.563g that may be experienced at the site. Those pressures assume drained conditions behind the wall and a horizontal backfill surface.

Lateral pressures due to surcharge should be added to the recommended lateral earth pressures when appropriate. Other lateral pressures due to surcharge loads may be determined as required. Traffic surcharges should also be included as appropriate. For other surcharge loads, each case should be analyzed individually; we can provide recommendations as needed.

### Site Drainage

All ground surfaces, pavements and sidewalks at the site should be sloped away from the structures. Surface water runoff should be controlled by a system of curbs, berms, drainage swales, and or catch basins, and conveyed to an appropriate discharge point.

We recommend that footing drains are installed for the each building in accordance with the 2015 IBC, Section 1805.4.2, and basement walls (if utilized) have a wall drain as describe above. The roof drain should not be connected to the footing drain. We recommend material used for footing drains be of approximately the same quality as *"Gravel Backfill for Drains"* (WSDOT Standard Specifications Section 9-03.12(4)). A geotextile separation fabric should be placed between the drainage material and native/structural fill soils. Recommendations for a footing or wall drain system are presented in Figure 9. For permanent drainage of below-grade walls, the groundwater level should be maintained 2 feet below the basement finished floor.

### Retaining Walls

Several retaining walls are currently proposed across the site, original wall configurations included walls up to 10 feet in height and tiered retaining walls. Based on the updated plans, all the walls appear to be single walls up to a maximum exposed face height of 6 feet. Rockeries may be suitable for the walls in front of stable cut slopes, while mechanically stabilized earth (MSE) walls with modular concrete blocks are more appropriate for walls in front of constructed fills. Large pre-cast concrete blocks may also be appropriate for both the cut and fill configurations.



### Rockerries

We recommend that rockeries be constructed against stable native cut banks or in front of properly placed and compacted structural fills of 4 feet or less. In all cases, the backslope and foreslope should be as close to level as possible. All rockeries should be constructed per ARC guidelines.

Rockery wall should be constructed of hard, dense, sound, and durable rock, free from seams, cracks, and other defects in accordance with WSDOT Standard Specification 9-13.7(1). Backfill materials for rockery walls should consist of quarry spalls or shot rock of the same quality.

As shown on the attached details, the bottom course of all rocks should be founded in firm, unyielding soils at least 18 inches below the adjacent ground surface for frost and erosion protection, as well as sliding resistance. The subgrade soil for the bottom course of rocks should be excavated, as necessary, to ensure full contact between the rock and soil surfaces.

Rockery boulders should be placed in uniformly decreasing sizes from the bottom of the rockery to the top, with a battered face of at least 1H:6V from vertical towards the cut face. All rocks should be placed in running bond construction, with no continuous joint planes in vertical or lateral directions, and each rock should maintain at least two points of contact with adjacent rocks so that they are keyed together. The maximum void between adjacent rocks should be less than 6 inches as measured at the largest dimension of the void; voids larger than 6 inches should be keyed with chinking rocks to fill the void.

To prevent the build-up of hydrostatic pressures, a free draining backfill material should be provided behind the entire rockery. We recommend the use of ballast rock (1- to 2-inch quarry spalls) for this purpose. This backfill should be placed behind each boulder course and should extend at least 12 inches behind the rockery. Also, a perforated drainpipe should be placed along the heel of the rockery and be embedded in pea gravel or washed rock. This drainpipe should be tightlined to a catch basin or other suitable discharge point.

### Gravity Walls

For a gravity type retaining wall, we recommend using the Ultra Block, Redi-Rock, or Kelly Block segmental concrete blocks. The Ultra Blocks consist of 2½-foot by 2½-foot by 5-foot concrete blocks that have cruciform interlocking shear keys on the top and bottom. The Redi-Rock system uses blocks that are 18-inches tall, 40-inches wide, and range in depth from 28, 41, and 60 inches. Redi-Rock has round nobs on top that interlock into keyways of the bottom of each block and are tapered towards the back to allow for some minor curvature of the wall. In contrast, Kelly-Blocks are proprietary pre-cast concrete modules that measure 2 feet by 2 feet by 4 feet that have two hollow-cores that align with subsequent blocks and allow for concrete to be poured down the entire height of the wall, locking the blocks together.

These walls should bear on firm and unyielding native soils or on structural fill soils placed over such native soils. In our opinion, the native soils underlying the proposed wall alignment will provide adequate support, although a 6-inch leveling course of crushed rock is commonly placed beneath the wall. We recommend that any localized zones of soft, yielding, or organic soils exposed in the subgrade areas be overexcavated and or replaced with compacted structural fill.

For frost and erosion protection, all gravity walls should be embedded at least 18 inches below the adjacent ground surface. Greater depths might be required in certain locations to develop adequate sliding resistance or passive pressure.





These large block systems can include reinforcing grid to make them act as an MSE wall. Inclusion of the reinforcing grid will eliminate the need for a double row or deeper blocks on the lower tiers. Regardless of height, the wall face should be battered into the slope at an angle no steeper than 12 degrees.

Effective drainage behind gravity walls is critical to prevent a buildup of hydrostatic pressure. Consequently, we recommend that a curtain drain be placed behind the entire wall, with a 4-inch-diameter perforated pipe at the base. The drainpipe should be bedded in pea gravel or washed rock and be wrapped with filter fabric.

### MSE Walls

Reinforced soil walls consist of structural fill lifts with reinforcing grids or strips and supported at the face by a reinforcing material or segmental (modular) concrete façade, such as those proprietary systems produced by Allan Block, Keystone, Basallite and others. If appearance is not a criterion, the Hilfiker or Sierra Scape grid-face system, which utilizes welded-wire mesh for the horizontal and facing reinforcement materials, may be suitable.

The entire area beneath the new reinforced soil zone should be stripped of all vegetation and organic soils, as per the “**Site Preparation and Grading**” section of this report. All subgrade soils should then be compacted to a firm, unyielding condition. We also recommend that the face of the existing roadway embankment be benched prior to new fill placement.

Reinforced soil walls with proprietary facades (either segmental concrete or welded-wire mesh) are typically designed by the wall supplier or a specialty consultant, using design values provided by the geotechnical engineer. These design values include soil density, internal friction angle, cohesion, and allowable bearing capacities, as well as seismic acceleration. Table 5 summarizes our recommended design values for the various soils involved in the wall construction, based on our explorations and subsequent interpretations. We also recommend using the seismic acceleration provided previously in this report.

Based on subsurface conditions encountered in our test pits, the proposed retaining wall will likely be founded on dense glacially consolidated native soils. If at the time of excavation, relict topsoil or soft soils are encountered, it may be necessary to overexcavate the unsuitable soils and create a bearing pad of quarry spalls or other free draining material.

All fill soils located within the reinforced backfill and retained backfill zones would consist of clean, well-graded sand and gravel, such as “*Gravel Borrow*” or “*Ballast*” per WSDOT Standard Specifications 9-03.14(1) and 9-03.9(1), respectively. However, the excavated embankment fill soils and/or native soils could be reused as backfill if they are free of organic matter, are at or near optimum moisture content at the time of placement, and are not used for structural fill during the wetter winter months. Existing organic matter, sod, or topsoil stripped from the wall subgrade would not be suitable for this purpose under any circumstances.

**TABLE 5:**  
**RECOMMENDED DESIGN VALUES FOR REINFORCED SOIL WALLS**

| Soil Type                                | Density (pcf) | Internal Friction Angle (degrees) | Cohesion (psf) | Allowable Bearing Capacity (psf) |
|------------------------------------------|---------------|-----------------------------------|----------------|----------------------------------|
| Reinforced Soil (imported granular fill) | 130           | 35                                | 0              | N/A                              |
| Retained Soil (embankment fill)          | 125           | 30                                | 0              | N/A                              |
| Subgrade Soil (weathered till)           | 135           | 34                                | 0              | 2,500                            |
| Subgrade Soil (glacial till)             | 135           | 36                                | 0              | 3,500                            |
| Bearing Pad Soil (quarry spalls)         | 125           | 40                                | 0              | N/A                              |

Soils located within the reinforced backfill and retained backfill zones should be placed and compacted in accordance with our recommendations given in the “**Structural Fill**” section of this report. Specifically, we recommend that fill be compacted to a uniform density of at least 95 percent (based on ASTM:D-1557).

As the wall facing has not been determined, to our knowledge, the strength properties of the mechanical reinforcement have not been determined. This should be done after a wall system has been selected. Typical reinforcement lengths vary from 0.9H to 1.2H (where H is the total height of the wall) but may differ depending on the height and steepness of surcharging slopes.

#### Additional Services

Once the site grading plan is completed, GeoResources should review the proposed wall types and location and provide site specific designs and plan review, as appropriate.

#### **Temporary Excavations**

All job site safety issues and precautions are the responsibility of the contractor providing services/work. The following temporary cut/fill slope guidelines are provided for planning purposes only. Temporary cut slopes will likely be necessary during grading operations or utility installation. Un-shored, temporary excavation slopes may be used where planned excavation limits will not undermine Canterwood Boulevard to the east, associated utilities, interfere with other construction, or extend beyond the approved construction limits. Where there is not enough area for sloped excavations, temporary shoring should be provided. If shallow temporary shoring is required, we recommend that it be designed to withstand the lateral earth pressures provided in the basement wall section of this report.

All excavations at the site associated with confined spaces, such as utility trenches and retaining walls, must be completed in accordance with local, state, or federal requirements including the Washington Administrative Code (WAC) and Washington Industrial Safety and Health



Administration (WISHA). Excavation, trenching, and shoring is covered under the WAC 296-155 Part N.

Based on the WAC 296-155-66401, it is our opinion that the upper weathered soils at the site would be classified as Type C soils, while the lower glacially consolidated soils would be classified as Type A soils. According to WAC 296-155-66403, for temporary excavations of less than 20 feet in depth, the side slopes in Type C soils should be sloped at a maximum inclination of 1½H:1V or flatter from the toe to top of the slope, and Type A soils should be laid back at a slope inclination of 0.75H:1V or flatter. All exposed slope faces should be covered with a durable reinforced plastic membrane during construction to prevent slope raveling and rutting during periods of precipitation. These guidelines assume that all surface loads are kept at a minimum distance of at least one half the depth of the cut away from the top of the slope and that significant seepage is not present on the slope face. Flatter cut slopes will be necessary where significant raveling or seepage occurs, or if construction materials will be stockpiled along the slope crest.

Where it is not feasible to slope the site soils back at these inclinations, a retaining structure should be considered. Retaining structures greater than 4-feet in height (bottom of footing to top of structure) or that have slopes of greater than 15 percent above them, should be engineered per Washington Administrative Code (WAC 51-16-080 item 5). This information is provided solely for the benefit of the owner and other design consultants and should not be construed to imply that GeoResources assumes responsibility for job site safety. It is understood that job site safety is the sole responsibility of the project contractor.

### **Permanent Cut and Fill Slopes**

Permanent slopes in soil should be no steeper than 2H:1V. Fill slopes constructed on grades that are steeper than 5H:1V should be constructed in accordance with Appendix J, Section J107 of the 2015 IBC and should utilize proper keying and benching methods. Fill should be "keyed" into the undisturbed native soils by cutting a series of horizontal benches. The benches should be 1½ times the width of the equipment used for grading and be a maximum of 3 feet in height. Subsurface drainage may be required in areas where significant seepage is encountered during grading. Collected drainage should be directed to an appropriate discharge point. Surface drainage should be directed away from all slope faces.

All slopes should be protected from erosion. Typical erosion control BMPs as adopted by the City of Gig Harbor Stormwater Management and Site Development Manual should be sufficient for proposed site grading activities. Additionally, permanent slopes should be planted with a mulch, hardy vegetative groundcover or armored with quarry spalls as soon as feasible after grading is completed. A typical detail of the Appendix J guidelines is attached as Figure 10.

### **Pavement Section**

Our original scope of work did not include pavement sections. As currently proposed, we understand the offsite improvements to Canterwood Boulevard will include widening the existing roadway to accommodate new turning lanes, curbs, gutters, and sidewalks. Since we have not performed a site-specific pavement design for the new asphalt along Canterwood Boulevard should conform to the Pavement Design Standards (Detail 2-13) of the 2018 City of Gig Harbor Public Works Standards Chapter 2 – Transportation Drawings.

For onsite paving, we have not been provided with proposed traffic counts, but anticipate that the traffic loading will primarily consist of passenger vehicles and lighter delivery and utility



trucks. A similar section to the standard from the City could be used or we could perform pavement section analysis prior to paving to confirm that the section is appropriate for the actual traffic and soil conditions. A site specific section could be thinner and more cost effective.

### **Stormwater Management**

Groundwater seepage was only encountered in two of our test pits at the time of digging. However, we expect that the site is prone to a “perched” groundwater conditions. Perched groundwater develops when the infiltration of water through a shallow, more permeable soil is slowed at depth by a deeper, less permeable soil type, such as the deeper, dense to very dense glacial till.

According to the Grading and Storm Drainage Plan, sheets C6 and C7 (Barghausen, May 13, 2020), collected stormwater from the Buildings B, C, and D) will be collected and conveyed to the proposed pond, 4 dispersion trenches, and the existing pond south of the parcel, while runoff from the area around Building A will be collected and conveyed to a stormwater detention facility between Building A and the top of the constructed fill slope. The water from the detention facility is proposed to be released through a control device to dispersion trench at the top of the constructed fill slope.

The original drainage plan showed the dispersion trench on the face of the constructed slope below Building A while our report recommended that the dispersion trench not be installed on the constructed fill slope below Building A. Instead, we recommended the dispersion trench be installed on the toe of the slope and outside of the wetland buffer. Based on the changes to the grading the plan, the constructed slope below the dispersion below building A will be about 8 to 14 feet of fill with the remainder being a cut.

The City of Gig Harbor does not allow for dispersion trenches to be installed within wetland buffers. If the dispersion trench was relocated to the toe of the slope, it would need to be further to the north and would not have sufficient room to meet minimum vegetated flow path lengths before the property line, nor would it provide water to the constructed wetland.

Since it will be necessary to keep the dispersion trench in its current location, we recommend that the fill slope below the dispersion trench be constructed as a Reinforced Soil Slope (RSS) and that the entire face of the slope be protected against scouring by including a robust cellular confinement system such as GeoWeb in addition to the planting plan provided by Soundview Consultants (wetland consultant). The City may require a global stability analysis of the slope and dispersion trench, which was not in our current scope work, but could be completed as part of the final design drawings, under a separate scope.

## **EARTHWORK RECOMMENDATIONS**

### **Site Preparation**

We recommend that the site be cleared of all vegetation, including roots, stumps, forest duff, topsoil, previously placed fill and any construction debris be removed from beneath the site where buildings, parking lots, driveways, retaining walls, and structural fill will be placed. Organic topsoil is not suitable for use as structural fill but may be used for limited depths in non-structural areas. Stripping depths ranging from 6 to 24 inches should be expected to remove these unsuitable soils. Areas of thicker topsoil or organic debris may be encountered in areas of heavy vegetation or depressions.





In areas to be filled, the exposed soil surface (after clearing and stripping and prior to any fill placement or foundation construction) should be compacted using a vibratory roller. The subgrade soils should be proof-rolled and, if necessary, compacted to achieve at least 95 percent of the Modified Proctor maximum dry density. The proof-rolling operations should consist of several passes of a heavy (10-ton or heavier static weight) vibratory roller to compact the surface to a dense, unyielding condition. The density of the subgrade should be evaluated by an experienced field representative from our firm by probing with a steel T-probe. Areas that are wet, soft, loose, or yielding under the compaction process should be further compacted, removed, and reconditioned, or replaced with compacted structural fill so that a dense and unyielding condition is achieved.

The old fill encountered in test pits TP-5, TP-6, TP-12, TP-15, and TP-18 was observed to be in a loose to medium dense condition, and to contain a moderate amount of organic and topsoil type material. We do not have documentation about the placement of the fill and there is a risk that areas were not placed and compacted per current industry standards. This could result in settlement from the placement of the proposed new fill, particularly if there are pockets of loose fill or thicker organics than was observed in our subsurface explorations, as such, the fill should also be removed and replaced with structural fill.

### Structural Fill

According to the provided site Grading and Storm Drainage Plan and accompanying cross sections, there will be considerable amount of cutting and filling required to achieve design grades. Cuts will on the order of 2 to 10 feet, while constructed fill pads and slopes will be on the order of 5 to 17 feet. Some of the larger fills will be constructed on slopes that are steeper than 5H:1V. All structural fills constructed on slopes should be constructed in accordance with Appendix J or the 2015 IBC for proper keying and benching. A typical detail of the Appendix J guidelines is attached as Figure 10.

All fill material placed beneath structures, such as non-structural floor slabs, pavements, sidewalks, and around shaft caps and footings, or other areas where settlements are to be reduced, should consist of structural fill. Structural fill soil should consist of a well-graded mixture of sand and gravel, free of organics, debris, and rubbish. If imported structural fill is used, it should contain no more than 15 percent fines (material passing the US No. 200 sieve, based on the minus ¾-inch fraction). The gravel content should range between 25 and 50 percent retained on a No. 4 sieve. Structural fill should have a maximum particle size of 3 inches. As an alternative, "*Select Borrow*" (WSDOT Section 9-03.14(2)) or an approved substitute could be used; the maximum particle size should be limited to 3 inches.

If earthwork takes place in wet weather or wet conditions, no matter what time of the year, the structural fill material should contain no more than 5 percent fines passing the No. 200 sieve. Fines should be non-plastic.

**TABLE 6:**  
**RECOMMENDATIONS FOR FILL COMPACTION**

| Location of Fill                                                                                            | Recommended Minimum Percentage of Modified Proctor Maximum Dry Density <sup>1</sup> |
|-------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Beneath Pavement Areas Within 2 Feet of Pavement Subgrade                                                   | 95                                                                                  |
| Landscaped Areas/General Fill                                                                               | 90                                                                                  |
| <b>Note:</b> <sup>1</sup> As determined by ASTM International (ASTM) Designation: D 1557-70, Method C or D. |                                                                                     |

We recommend that fill placement and compaction be observed and tested by qualified geotechnical personnel.

### Utility Trench Backfill

All utility trenches should be backfilled with clean granular material, such as sand, sand and gravel, or crushed rock with a maximum 2-inch-diameter, and with not more than 5 percent passing the No. 200 sieve (wet-sieve analysis, ASTM D 1140). We recommend "*Gravel Backfill for Pipe Zone Bedding*", WSDOT Section 9-03.12(3) within the pipe zone bedding, and "*Gravel Borrow*", WSDOT Section 9-03.14(1) or an approved substitution for the subsequent trench backfill. Fines should be non-plastic.

The backfill should be placed in lifts not exceeding 6-inches if compacted with hand-operated equipment, or 12-inches if compacted with heavy equipment. Each lift should be compacted to a dense, unyielding condition and to the recommended densities in Table 6 above. We recommend following the manufacturer's recommendations for the minimum depth of fill over the pipe prior to compaction. The pipe zone bedding above the middle two-thirds of the pipe should not be compacted with heavy vibratory equipment or rollers that could cause damage to the pipe. We recommend a minimum cover over utilities of 2 feet from the crown of the pipes or conduits to the top of the pavement subgrade. Catch basins, utility vaults, and other structures installed flush with the pavement should be designed and constructed to transfer wheel loads to the base of the structure.

### Suitability of On-Site Materials as Fill

Based on our visual classification and results of the grain size analysis performed (see Appendix B), the on-site soil would not satisfy the structural fill gradation recommendations for use during wet weather or in wet conditions. In general, the potential to reuse the encountered site soils is described below.

- Surficial Organic Soils: The forest duff, topsoil, and organic-rich soils mantling most of the site are not suitable for use as structural fill under any circumstances, due to their high organic content. Consequently, these materials can be used only for non-structural purposes, such as in landscaping areas.
- Upper Silty Sands and Sandy Silts: The silty sands and sandy silts underlying the surficial organic soils do appear suitable for reuse as structural fill at their present moisture contents.

However, these soils will be difficult or impossible to reuse during wet weather, due to their moderately high silt contents.

- Glacial Till: The glacial till soils underlying most of the site appear suitable for reuse as structural fill at their present moisture contents. However, these soils will be difficult or impossible to reuse during wet weather, due to their moderately high silt contents.
- Alluvium: The alluvium encountered in the lower, western portion of the site will likely be not used as structural as only the stormwater pond excavation will occur in this area. The upper silty alluvium would not be feasible to reuse as structural fill in its current moisture condition. Given the higher fines content, these soils will be extremely difficult, if not impossible, to reuse during extended periods of wet weather.

The upper silt sand/sandy silt, glacial till, and alluvium should be suitable for use as structural fill provided the moisture content is maintained within 2 percent of the optimum moisture level. We recommend that completed graded areas be restricted from traffic or protected prior to wet weather conditions. The graded areas may be protected by paving, placing asphalt-treated base, a layer of free-draining material such as pit run sand and gravel or clean crushed rock material containing less than 5 percent fines, or some combination of the above.

### Dewatering Considerations

Except as otherwise designed and/or specifically covered in the contract, the Contractor should be made responsible for control of all surface and groundwater encountered during construction. In this regard, sloping, slope protection, ditching, sumps, trench drains, dewatering, and other measures should be employed as necessary to permit proper completion of work. The Contractor should anticipate the need to provide dewatering, trenches, and sump pumps to control perched groundwater encountered during excavation.

### Erosion Control

Weathering, erosion and the resulting surficial sloughing and shallow land sliding are natural processes. To manage and reduce the potential for these natural processes, we recommend erosion hazards be mitigated by applying Best Management Practices (BMPs), as outlined in the City of Gig Harbor Stormwater Management and Site Development Manual. Temporary erosion control BMPs should be installed at the site prior to the beginning of clearing, grading, or other construction activities, and should be updated and maintained throughout construction until final site stabilization is established. Temporary erosion control BMPs may include, but are not limited to:

- Silt fencing and appropriate soil stockpiling techniques to prevent silty stormwater from leaving the site,
- Jute matting, hydroseeding, or plastic covering to protect exposed soils,
- Straw wattles, quarry spall armoring, check dams, or other energy attenuation BMPs to slow the flow of stormwater over slopes and within drainage channels, and,
- Swales and berms to convey construction stormwater away from the slope.



Where native vegetated is removed because of clearing and grading activities, a dense vegetative groundcover, grass lawn, or native vegetation should be reestablished as soon as feasible. Permanent erosion control, such as mulched landscaping areas, groundcovers, hardscaping, or grass lawns, should be established as soon as feasible once final grades have been completed. All permanent erosion control methods should be maintained after construction activities have been completed.

We recommend earthwork activities be completed during the dry season (May 1 through September 30), and that any exposed soil areas be stabilized during the wet season (October 1 through April 30).

### **Wet Weather and Wet Condition Considerations**

In the Puget Sound area, the Washington State Department of Ecology generally defines the wet season as beginning October 1<sup>st</sup> and continuing through about April 30<sup>th</sup>, although rainy periods could occur at any time of year. Therefore, it is strongly encouraged that earthwork be scheduled during the dry weather months. Most of the soil at the site have a high fines content and are highly susceptible to changes in water content and tends to become unstable and impossible to proof-roll and compact if the moisture content exceeds the optimum.

In addition, during wet weather months, the groundwater levels could increase, resulting in seepage into site excavations. Performing earthwork during dry weather would reduce these problems and costs associated with rainwater, construction traffic, and handling of wet soil. However, should wet weather/wet condition earthwork be unavoidable, the following recommendations are provided:

- The ground surface in and surrounding the construction area should be sloped as much as possible to promote runoff of precipitation away from work areas and to prevent ponding of water.
- Work areas or slopes should be covered with plastic, when not being worked. The use of sloping, ditching, sumps, dewatering, and other measures should be employed as necessary to permit proper completion of the work.
- Earthwork should be accomplished in small sections to minimize exposure to wet conditions. That is, each section should be small enough so that the removal of unsuitable soils and placement and compaction of clean structural fill could be accomplished on the same day. The size of construction equipment may have to be limited to prevent soil disturbance. It may be necessary to excavate soils with a backhoe, or equivalent, and locate them so that equipment does not pass over the excavated area. Thus, subgrade disturbance caused by equipment traffic would be minimized.
- Fill material should consist of clean, well-graded, sand and gravel, such as *Gravel Backfill for Walls* (WSDOT Standard Specification 9-03.12(2)).
- No exposed soil should be left uncompacted and exposed to moisture. A smooth-drum vibratory roller, or equivalent, should roll the surface to seal out as much water as possible.
- In-place soil or fill soil that becomes wet and unstable and/or too wet to suitably compact should be removed and replaced with clean, granular soil (see gradation requirements above).



- Excavation and placement of structural fill material should be observed on a full-time basis by a geotechnical engineer (or representative) experienced in wet weather/wet condition earthwork to determine that all work is being accomplished in accordance with the project specifications and our recommendations.
- Grading and earthwork should not be accomplished during periods of heavy, continuous rainfall.

We recommend that the above requirements for wet weather/wet condition earthwork be incorporated into the contract specification.

### **Additional Services and Construction Observation**

We recommend that GeoResources, LLC be retained to review those portions of the plans and specifications pertaining to the foundations, shoring, and earthwork to evaluate if they are in accordance with the recommendations presented in this report.

Additionally, we recommend GeoResources be retained to observe the geotechnical aspects of construction, particularly the fill placement and compaction, drainage systems, and retaining wall construction. This observation would allow us to verify the subsurface conditions as they are exposed during construction and to determine that work is accomplished in accordance with our recommendations contained herein. If conditions encountered during construction differ from those anticipated, we can provide recommendations for the conditions encountered.

### **LIMITATIONS**

We have prepared this report for use by Swede Hill, LLC, Barghausen, and other members of the design team, for use in the design of a portion of this project. The data used in preparing this report and this report should be provided to prospective contractors for their bidding or estimating purposes only. Our report, conclusions and interpretations are based on our subsurface explorations, data from others and limited site reconnaissance, and should not be construed as a warranty of the subsurface conditions.

Variations in subsurface conditions are possible between the explorations and may also occur with time. A contingency for unanticipated conditions should be included in the budget and schedule. Sufficient monitoring, testing and consultation should be provided by our firm during construction to confirm that the conditions encountered are consistent with those indicated by the explorations, to provide recommendations for design changes should the conditions revealed during the work differ from those anticipated, and to evaluate whether earthwork and foundation installation activities comply with contract plans and specifications.

The scope of our services does not include services related to environmental remediation and construction safety precautions. Our recommendations are not intended to direct the contractor's methods, techniques, sequences, or procedures, except as specifically described in our report for consideration in design.

If there are any changes in the loads, grades, locations, configurations or type of facilities to be constructed, the conclusions and recommendations presented in this report may not be fully applicable. If such changes are made, we should be given the opportunity to review our recommendations and provide written modifications or verifications, as appropriate.

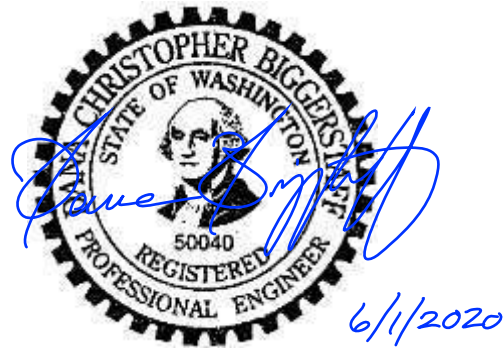


We have appreciated the opportunity to be of service to you on this project. If you have any questions or comments, please do not hesitate to call at your earliest convenience.

Respectfully submitted,  
GeoResources, LLC



Keith S. Schembs, LEG  
Principal



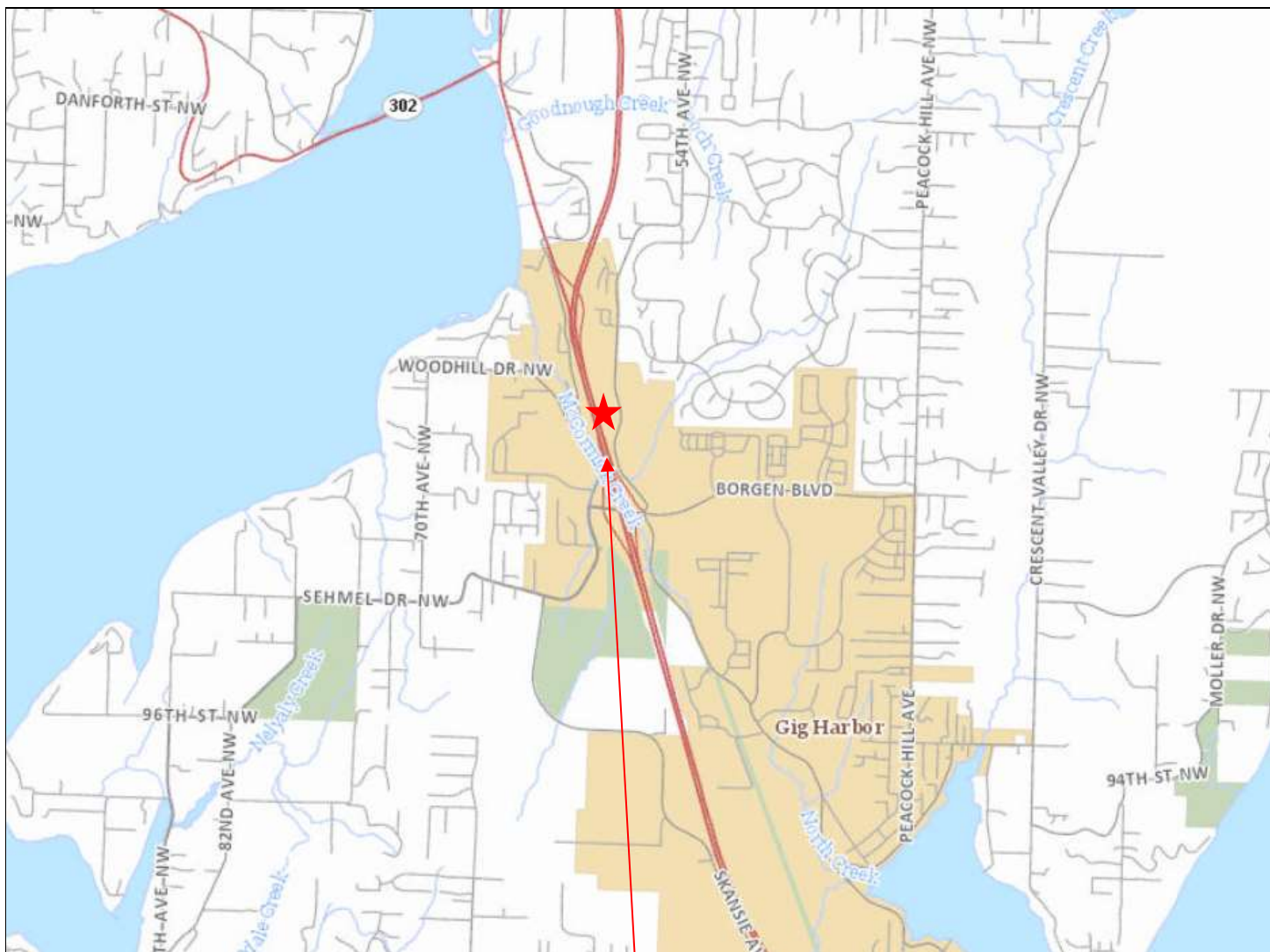
Dana C. Biggerstaff, PE  
Senior Geotechnical Engineer

KSS:DCB/kss

DocID: SwedeHill.Canterwood.RGu

Attachments:

- Figure 1: Site Location Map
- Figure 2: Site Vicinity Map
- Figure 3: Site & Exploration Plan
- Figure 4: NRCS Soils Map
- Figure 5: Geological Map
- Figure 6: Coastal Atlas Map
- Figure 7: Landslide Susceptibility Map
- Figure 8: Fault Hazard Map
- Figure 9: Typical Drainage and Backfilling Detail
- Figure 10: IBC Appendix J – Keyed and Bench Fill Slope Detail
- Appendix A - Subsurface Explorations
- Appendix B - Laboratory Test Results



### Approximate Site Location

Map created from Pierce County Public GIS (<http://matterhornwab.co.pierce.wa.us/publicgis/>)

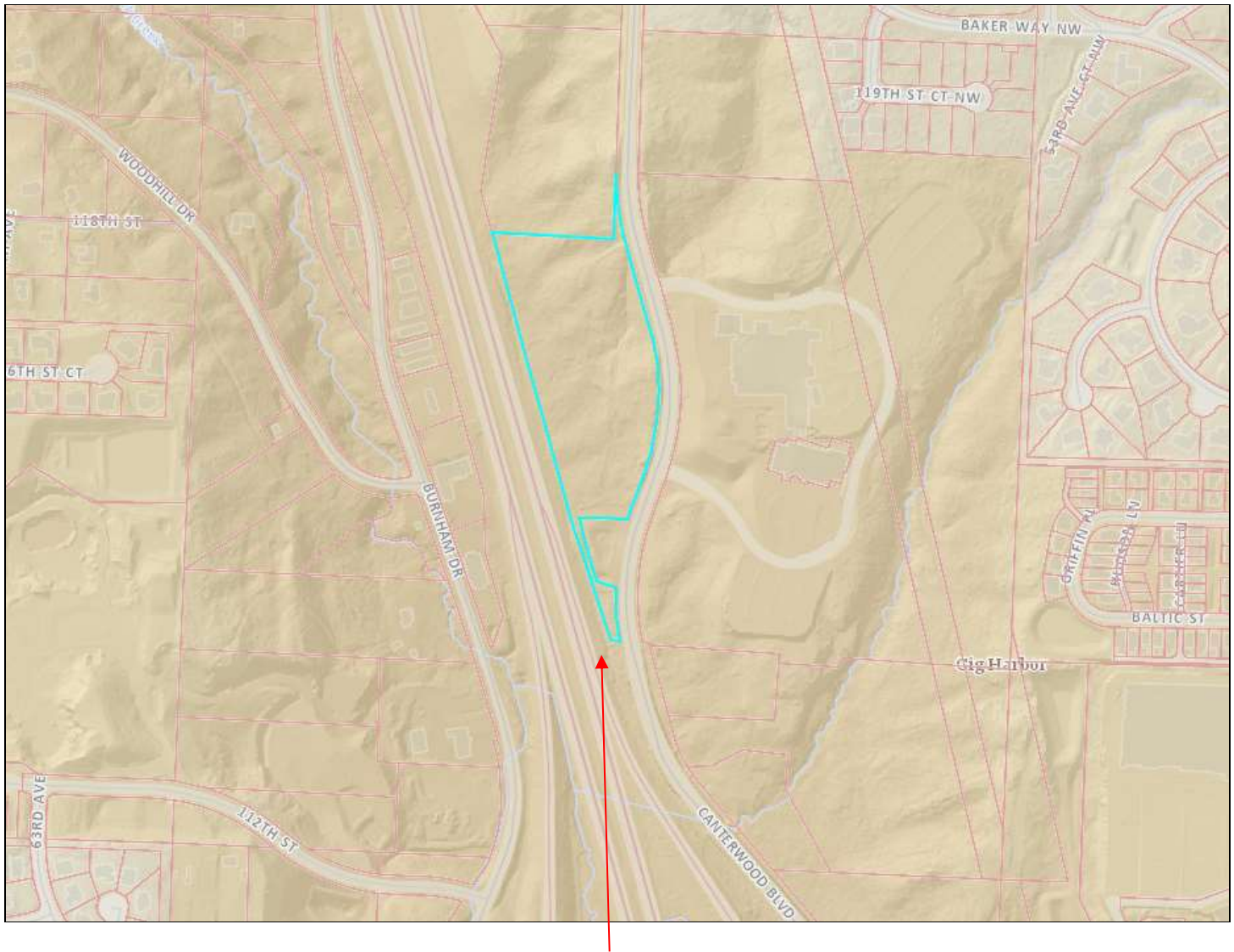


Not to Scale



### Site Location Map

Canterwood Commercial Center  
xxx – Canterwood Blvd  
Gig Harbor, Washington  
PN: 0122254090



### Approximate Site Location

Map created from Pierce County Public GIS (<http://matterhornwab.co.pierce.wa.us/publicgis/>)



Not to Scale



### Site Vicinity Map

Canterwood Commercial Center  
xxx - Canterwood Blvd  
Gig Harbor, Washington  
PN: 0122254090









### Approximate Site Location

Map created from Web Soil Survey (<http://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx>)

| Soil Type | Soil Name                        | Parent Material                               | Slopes   | Erosion Hazard | Hydrologic Soils Group |
|-----------|----------------------------------|-----------------------------------------------|----------|----------------|------------------------|
| 13C       | Everett very gravelly sandy loam | Sandy and gravelly glacial outwash            | 8 to 15  | Slight         | A                      |
| 47F       | Xerochrepts                      | Sand and gravelly outwash and/or glacial till | 45 to 70 | Very Severe    | A                      |



Not to Scale



### NRCS Soils Map

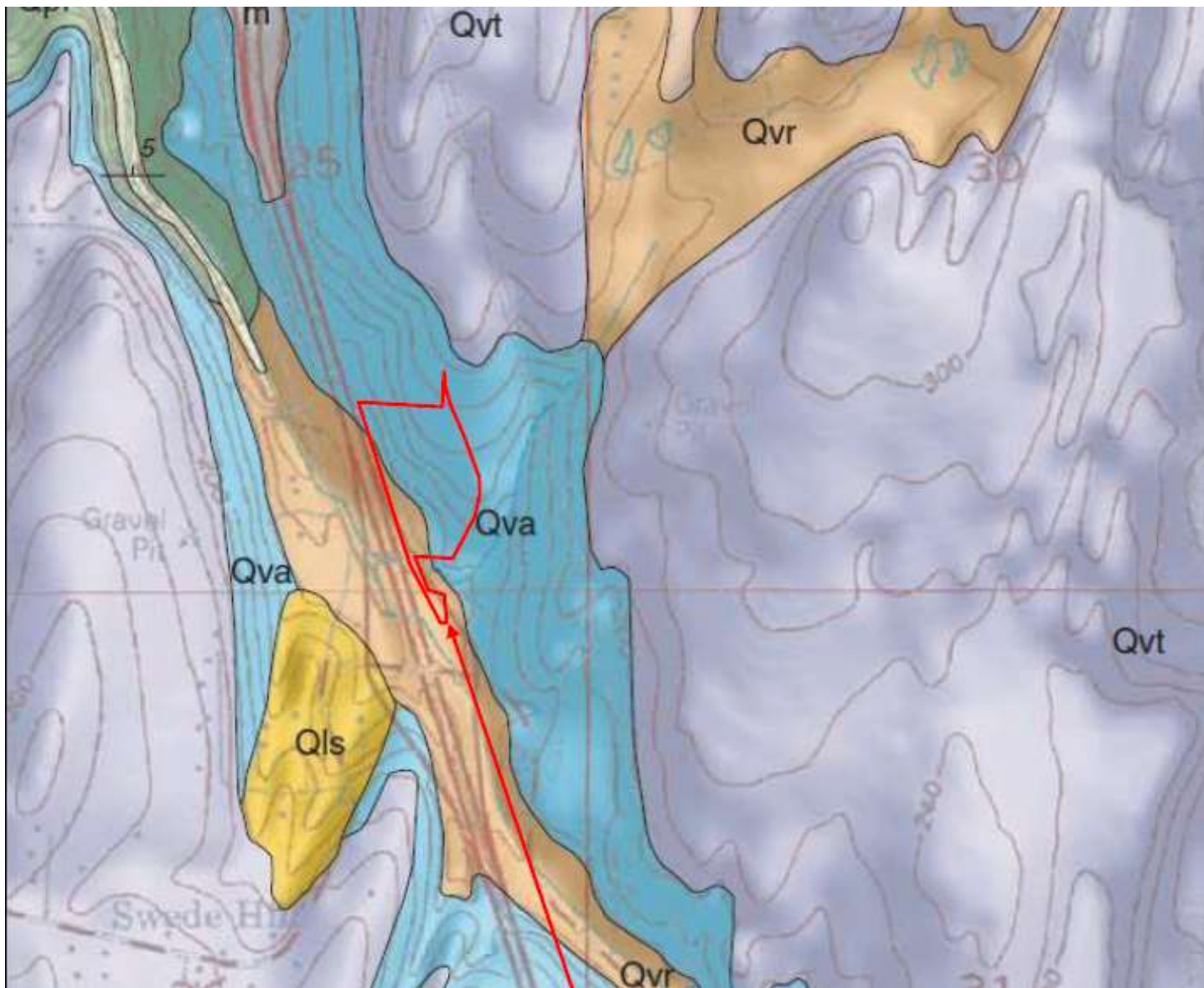
Canterwood Commercial Center  
xxx - Canterwood Blvd  
Gig Harbor, Washington  
PN: 0122254090

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May 2020

Figure 4





### Approximate Site Location

An excerpt from the draft *Geologic Map of the Gig Harbor 7.5-minute Quadrangle, Pierce County, Washington*

|     |                              |
|-----|------------------------------|
| Qvr | Recessional outwash deposits |
| Qva | Advance outwash deposits     |

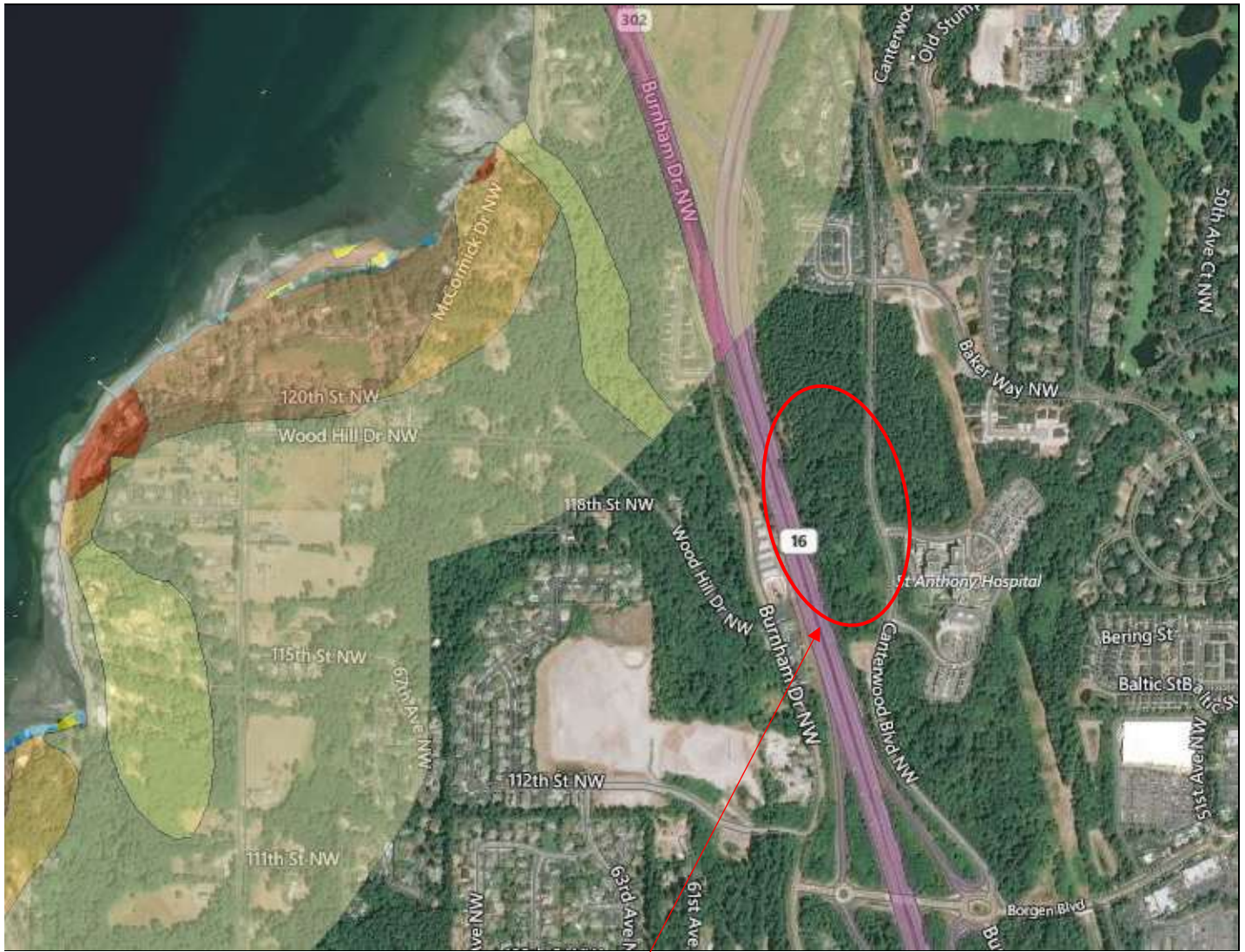


Not to Scale



### Geologic Map

Canterwood Commercial Center  
xxx – Canterwood Blvd  
Gig Harbor, Washington  
PN: 0122254090



### Approximate Site Location

Map created from the Washington State Department of Ecology Coastal Atlas  
(<http://geologyportal.dnr.wa.gov/>)



Not to Scale



**Coastal Atlas Map**  
Canterwood Commercial Center  
xxx – Canterwood Blvd  
Gig Harbor, Washington  
PN: 0122254090

Doc ID: SwedeHillLLC.CanterwoodBlvd.Fu

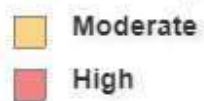
May 2020

Figure 6





#### Shallow Susceptibility



#### Deep Susceptibility



### Approximate Site Location

Map created from the Washington State Department of Natural Resources (Information Portal <https://geologyportal.dnr.wa.gov/>)



Not to Scale



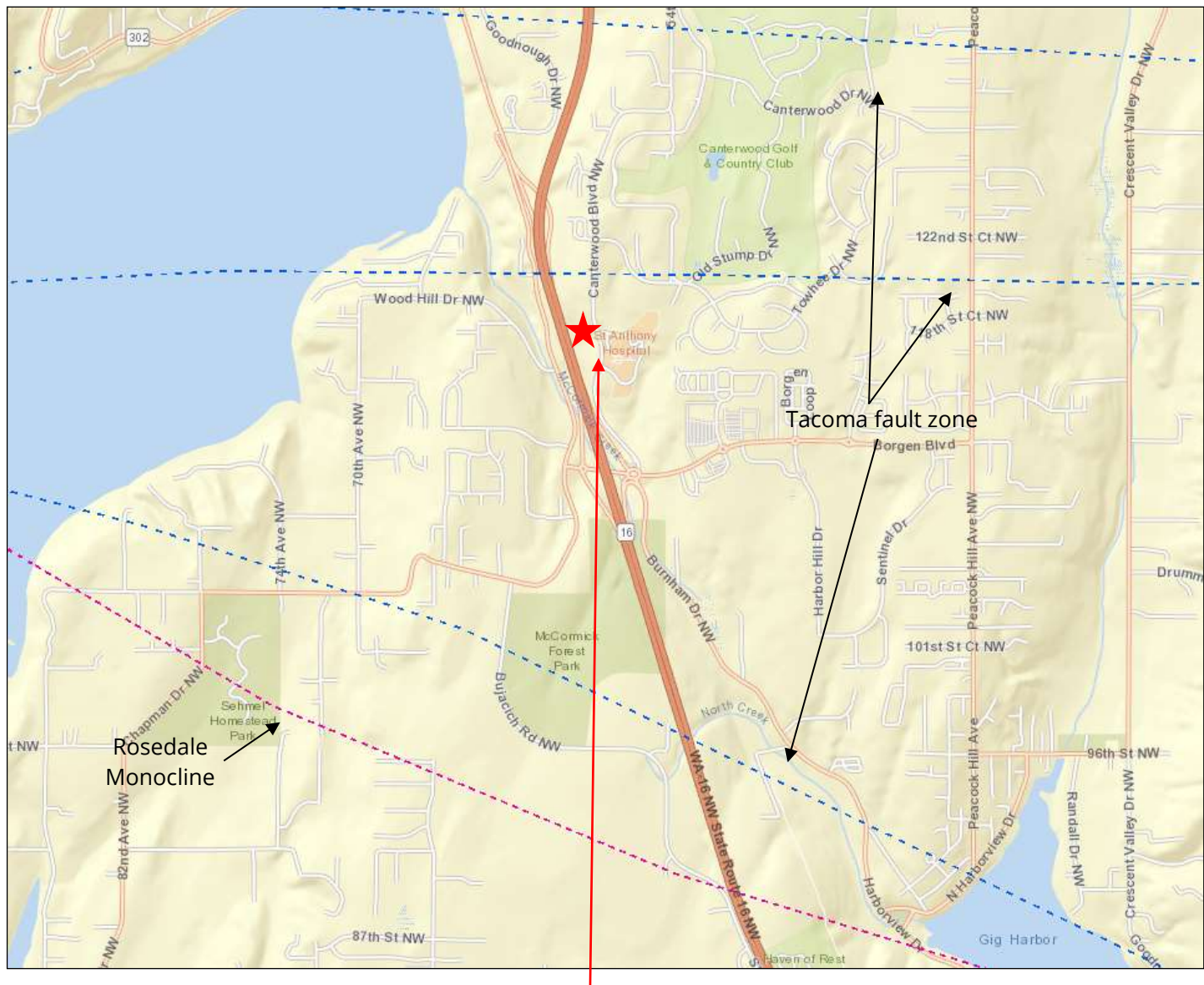
### Landslide Susceptibility Map

Canterwood Commercial Center  
xxx – Canterwood Blvd  
Gig Harbor, Washington  
PN: 0122254090

Doc ID: SwedeHillLLC.CanterwoodBlvd.Fu

May 2020

Figure 7



### Approximate Site Location

Map created from Washington DNR Geologic Information Portal  
<http://fortress.wa.gov/dnr/protectiongis/geology/?Theme=wigm>



Not to Scale



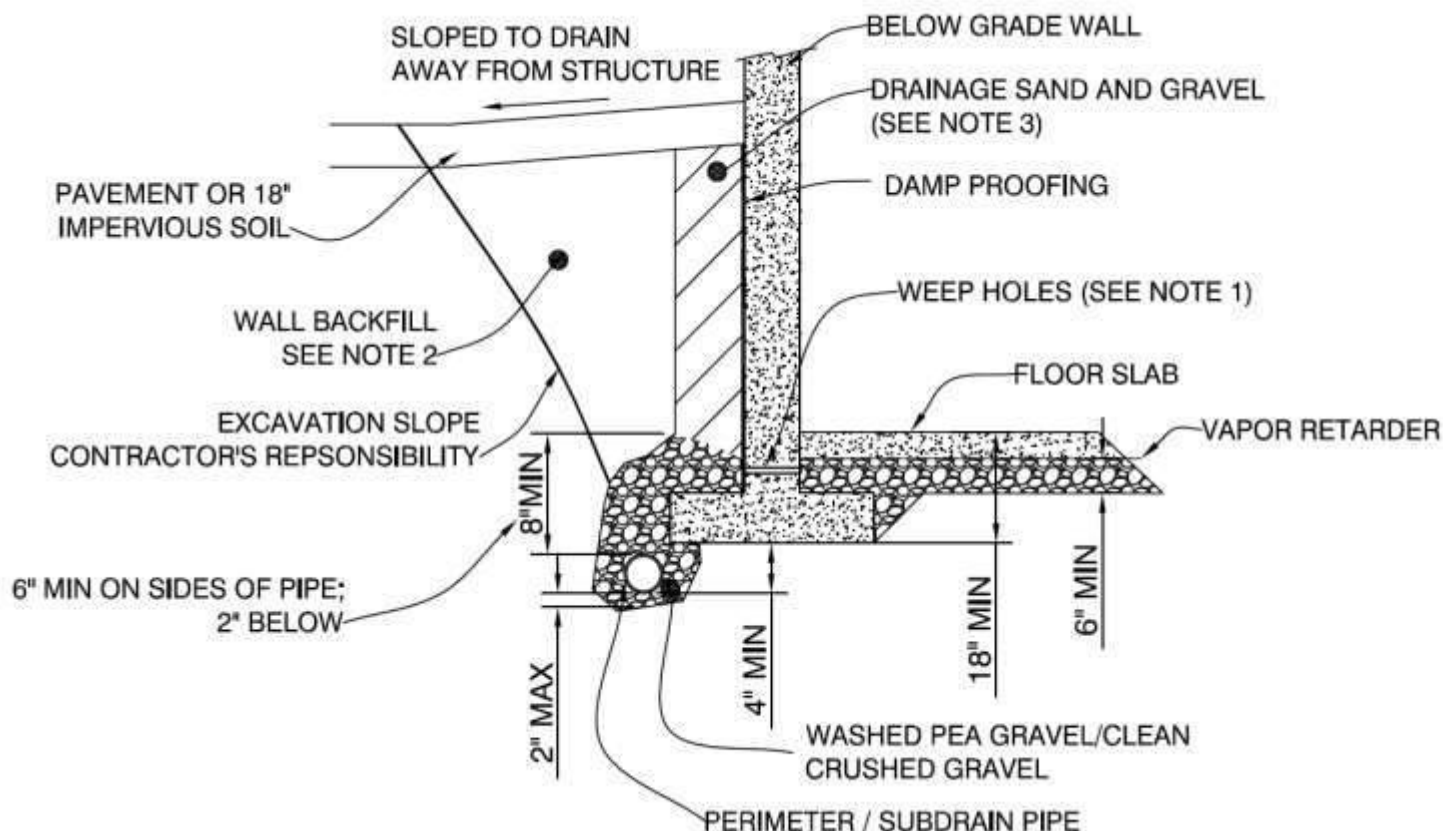
### Fault Hazards Map

Canterwood Commercial Center  
 xxx – Canterwood Blvd  
 Gig Harbor, Washington  
 PN: 0122254090

Doc ID: SwedeHillLLC.CanterwoodBlvd.Fu

May 2020

Figure 8



## Notes

1. Washed pea gravel/crushed rock beneath floor slab could be hydraulically connected to perimeter/subdrain pipe. Use of 1" diameter weep holes as shown is one applicable method. Crushed gravel should consist of 3/4" minus. Washed pea gravel should consist of 3/8" to No. 8 standard sieve.
2. Wall backfill should meet WSDOT Gravel Backfill for Walls Specification 9-03-12(2).
3. Drainage sand and gravel backfill within 18" of wall should be compacted with hand-operated equipment. Heavy equipment should not be used for backfill, as such equipment operated near the wall could increase lateral earth pressures and possibly damage the wall. The table below presents the drainage sand and gravel gradation.
4. All wall back fill should be placed in layers not exceeding 4" loose thickness for light equipment and 8" for heavy equipment and should be densely compacted. Beneath paved or sidewalk areas, compact to at least 95% Modified Proctor maximum density (ASTM: 01557-70 Method C). In landscaping areas, compact to 90% minimum.
5. Drainage sand and gravel may be replaced with a geocomposite core sheet drain placed against the wall and connected to the subdrain pipe. The geocomposite core sheet should have a minimum transmissivity of 3.0 gallons/minute/foot when tested under a gradient of 1.0 according to ASTM 04716.
6. The subdrain should consist of 4" diameter (minimum), slotted or perforated plastic pipe meeting the requirements of AASHTO M 304; 1/8-inch maximum slot width; 3/16- to 3/8-inch perforated pipe holes in the lower half of pipe, with lower third segment unperforated for water flow; tight joints; sloped at a minimum of 6"/100' to drain; cleanouts to be provided at regular intervals.
7. Surround subdrain pipe with 8 inches (minimum) of washed pea gravel (2" below pipe" or 5/8" minus clean crushed gravel. Washed pea gravel to be graded from 3/8-inch to No.8 standard sieve.
8. See text for floor slab subgrade preparation.

## Materials

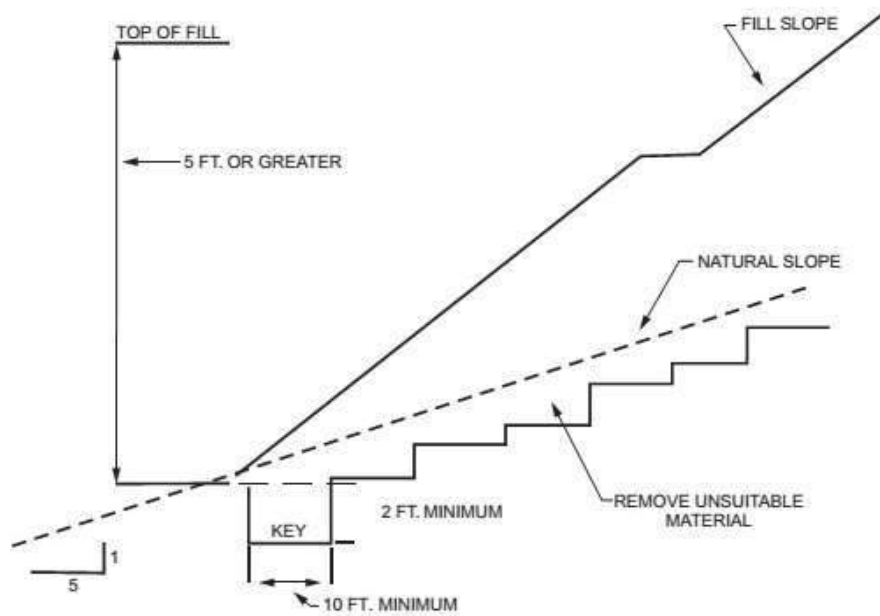
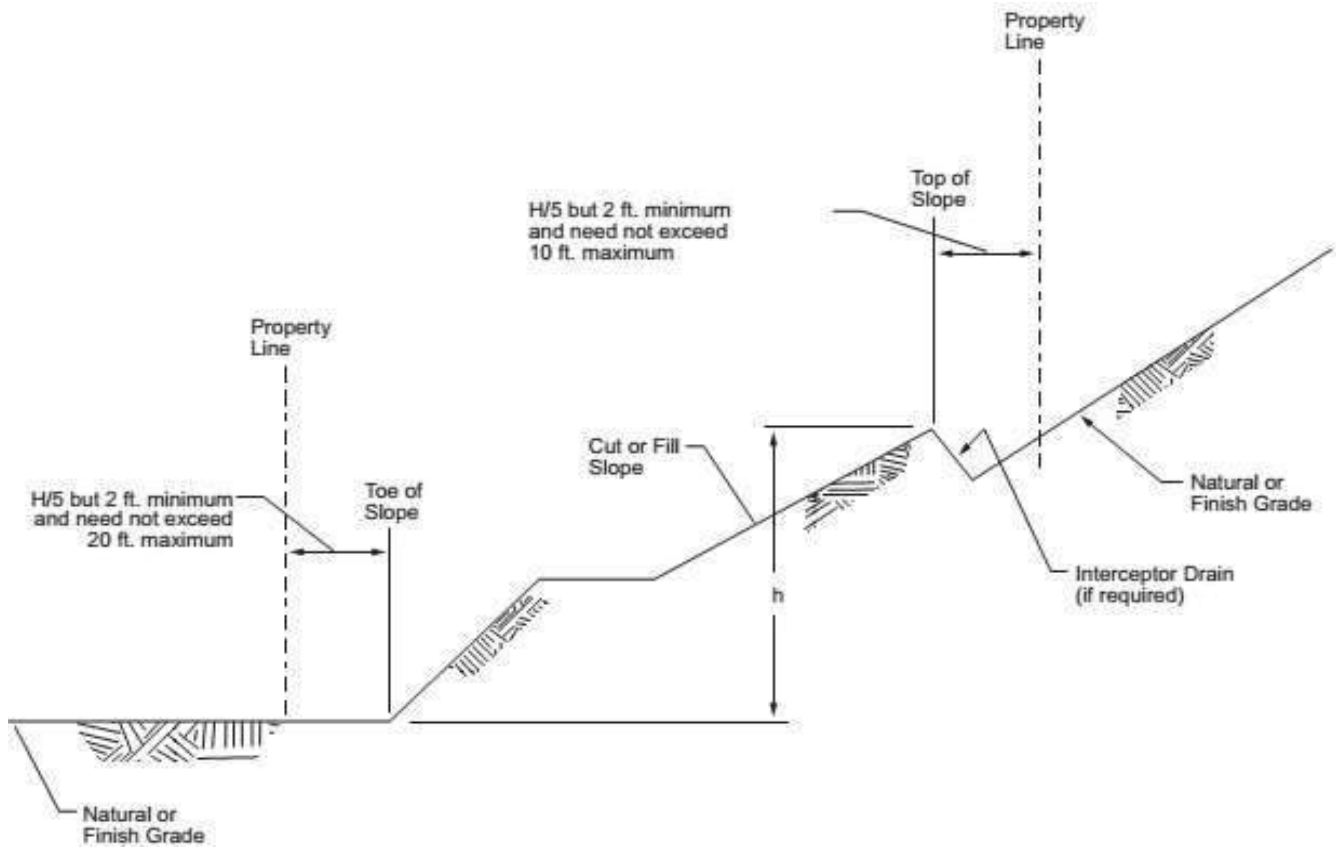
| Drainage Sand and Gravel |                     | 3/4" Minus Crushed Gravel |                     |
|--------------------------|---------------------|---------------------------|---------------------|
| Sieve Size               | % Passing by Weight | Sieve Size                | % Passing by Weight |
| 3/4"                     | 100                 | 3/4"                      | 100                 |
| No 4                     | 28-56               | 1/2"                      | 75 - 100            |
| No 8                     | 20-50               | 1/4"                      | 0 - 25              |
| No 50                    | 3-12                | No 100                    | 0 - 2               |
| No 100                   | 0-2                 | (by wet sieving)          | (non-plastic)       |



## Typical Drainage and Backfilling

Proposed Commercial Development  
11854 SW Lake Flora Road  
Kitsap County, Washington  
PN: 222301-2-015-1003





**Preliminary – Not for Construction**



**IBC APPENDIX J DETAIL**

Canterwood Commercial Center  
xxx – Canterwood Blvd  
Gig Harbor, Washington  
PN: 0122254090



## **Appendix A**

### Subsurface Explorations

# SOIL CLASSIFICATION SYSTEM

| MAJOR DIVISIONS                                                     |                                                                        |                   | GROUP SYMBOL | GROUP NAME                                |
|---------------------------------------------------------------------|------------------------------------------------------------------------|-------------------|--------------|-------------------------------------------|
| COARSE GRAINED SOILS<br><br>More than 50% Retained on No. 200 Sieve | GRAVEL<br><br>More than 50% Of Coarse Fraction Retained on No. 4 Sieve | CLEAN GRAVEL      | GW           | WELL-GRADED GRAVEL, FINE TO COARSE GRAVEL |
|                                                                     |                                                                        |                   | GP           | POORLY-GRADED GRAVEL                      |
|                                                                     |                                                                        | GRAVEL WITH FINES | GM           | SILTY GRAVEL                              |
|                                                                     |                                                                        |                   | GC           | CLAYEY GRAVEL                             |
|                                                                     | SAND<br><br>More than 50% Of Coarse Fraction Passes No. 4 Sieve        | CLEAN SAND        | SW           | WELL-GRADED SAND, FINE TO COARSE SAND     |
|                                                                     |                                                                        |                   | SP           | POORLY-GRADED SAND                        |
|                                                                     |                                                                        | SAND WITH FINES   | SM           | SILTY SAND                                |
|                                                                     |                                                                        |                   | SC           | CLAYEY SAND                               |
| FINE GRAINED SOILS<br><br>More than 50% Passes No. 200 Sieve        | SILT AND CLAY<br><br>Liquid Limit Less than 50                         | INORGANIC         | ML           | SILT                                      |
|                                                                     |                                                                        |                   | CL           | CLAY                                      |
|                                                                     |                                                                        | ORGANIC           | OL           | ORGANIC SILT, ORGANIC CLAY                |
|                                                                     | SILT AND CLAY<br><br>Liquid Limit 50 or more                           | INORGANIC         | MH           | SILT OF HIGH PLASTICITY, ELASTIC SILT     |
|                                                                     |                                                                        |                   | CH           | CLAY OF HIGH PLASTICITY, FAT CLAY         |
|                                                                     |                                                                        | ORGANIC           | OH           | ORGANIC CLAY, ORGANIC SILT                |
| HIGHLY ORGANIC SOILS                                                |                                                                        |                   | PT           | PEAT                                      |

## NOTES:

- Field classification is based on visual examination of soil in general accordance with ASTM D2488-90.
- Soil classification using laboratory tests is based on ASTM D2487-90.
- Description of soil density or consistency are based on interpretation of blow count data, visual appearance of soils, and or test data.

## SOIL MOISTURE MODIFIERS:

- Dry- Absence of moisture, dry to the touch
- Moist- Damp, but no visible water
- Wet- Visible free water or saturated, usually soil is obtained from below water table



## Unified Soils Classification System

Canterwood Commercial Center

xxx Canterwood Boulevard

Gig Harbor, Washington

PN: 012225-4062, -1032, -5002, -5003, -5004

Doc ID: SwedeHillLLC.CanterwoodBlvd.Fu

May 2020

Figure A-1

### Test Pit TP- 1

Location: Driveway to Building D  
Approximate Elevation: 137 feet

| Depth (feet) | Soil Type | Soil Description                                                                                                            |
|--------------|-----------|-----------------------------------------------------------------------------------------------------------------------------|
| 0.0 - 0.5    |           | Duff/Topsoil                                                                                                                |
| 0.5 - 1.5    | SM        | Brown silty (loamy) gravelly SAND/sandy gravelly SILT with some gravel, roots (loose, moist)                                |
| 1.5 - 4.0    | SM        | Orange brown silty SAND, with some gravel, cobbles (loose to medium dense, moist)                                           |
| 4.0 - 7.0    | SW        | Gray with some orange mottling gravelly SAND with some silt to silty, occasional cobbles (dense, moist)(SANDY GLACIAL TILL) |

Terminated at 7 feet below ground surface.  
No caving observed.  
No groundwater seepage observed.

### Test Pit TP- 2

Location: Parking above Building D  
Approximate Elevation: 138 feet

| Depth (feet) | Soil Type | Soil Description                                                                                                   |
|--------------|-----------|--------------------------------------------------------------------------------------------------------------------|
| 0.0 - 0.3    |           | Duff/Topsoil                                                                                                       |
| 0.3 - 2.0    | SM        | Light orange-brown silty (loamy) SAND with some, roots (loose, moist)                                              |
| 2.0 - 5.0    | SM        | Gray with some orange mottling silty fine to medium SAND with trace to some gravel (loosed to medium dense, moist) |
| 5.0 - 7.5    | SM        | Gray silty fine to medium SAND, with a trace gravel, lightly cemented (medium dense, moist) (SANDY GLACIAL TILL)   |

Terminated at 7.5 feet below ground surface.  
No caving observed.  
No groundwater seepage observed.

### Test Pit TP- 3

Location: Driveway to Building C  
Approximate Elevation: 145 feet

| Depth (feet) | Soil Type | Soil Description                                                                                     |
|--------------|-----------|------------------------------------------------------------------------------------------------------|
| 0.0 - 0.7    |           | Duff/Topsoil                                                                                         |
| 0.7 - 2.0    |           | Light orange brown silty (loamy) fine SAND, with roots                                               |
| 2.0 - 5.5    | SP        | Tan/gray with orange mottling medium to fine SAND with some silt, trace gravel (medium dense, moist) |
| 5.5 - 7.5    | SW        | Yellow-gray gravelly medium to coarse SAND with some silt (medium dense, moist) (SANDY GLACIAL TILL) |

Terminated at 7.5 feet below ground surface.  
No caving observed.  
No groundwater seepage observed.

Logged by: KSS

Excavated on: January 16, 2014



### Test Pit Logs

Canterwood Commercial Center  
xxx Canterwood Boulevard  
Gig Harbor, Washington  
PN: 012225-4062, -1032, -5002, -5003, -5004

Doc ID: SwedeHillLLC.CanterwoodBlvd.Fu

May 2020

Figure A-2a

### Test Pit TP- 4

Location: Building Pad C  
Approximate Elevation: 152 feet

| Depth (feet) | Soil Type | Soil Description                                                                                     |
|--------------|-----------|------------------------------------------------------------------------------------------------------|
| 0.0 - 0.5    |           | Duff/Topsoil                                                                                         |
| 0.5 - 1.5    |           | Light orange brown silty (loamy) fine SAND, with roots                                               |
| 1.5 - 4.0    | SP        | Tan/gray with orange mottling gravelly medium to coarse SAND with some silt (medium dense, moist)    |
| 4.0 - 8.0    | SW        | Yellow-gray gravelly medium to coarse SAND with some silt (medium dense, moist) (SANDY GLACIAL TILL) |

Terminated at 8 feet below ground surface.  
No caving observed.  
No groundwater seepage observed.

### Test Pit TP- 5

Location: Retaining walls between Building C/B  
Approximate Elevation: 158 feet

| Depth (feet) | Soil Type | Soil Description                                                                                                                 |
|--------------|-----------|----------------------------------------------------------------------------------------------------------------------------------|
| 0.0 - 0.2    | -         | Topsoil                                                                                                                          |
| 0.2 - 1.5    |           | Old Road Fill (black silty sandy GRAVEL with a separation fabric)                                                                |
| 1.5 - 4.5    | SP        | Tan/gray with some orange mottling, fine to medium SAND, some silt to silty, trace gravel (medium dense, moist) (WEATHERED TILL) |
| 4.5 - 6.0    | SM        | Tan/gray silty SAND with some gravel, occasional cobble (dense, moist) (GLACIAL TILL)                                            |

Terminated at 6 feet below ground surface.  
No caving observed.  
No groundwater seepage observed.

### Test Pit TP- 6

Location: Building Pad B  
Approximate Elevation: 173 feet

| Depth (feet) | Soil Type | Soil Description                                                                                                                 |
|--------------|-----------|----------------------------------------------------------------------------------------------------------------------------------|
| 0.0 - 0.5    |           | Duff/Topsoil                                                                                                                     |
| 0.5 - 2.5    |           | Old Road Fill (black silty sandy GRAVEL)                                                                                         |
| 2.5 - 5.0    | SM        | Tan/gray with some orange mottling, fine to medium SAND, some silt to silty, trace gravel (medium dense, moist) (WEATHERED TILL) |
| 5.0 - 8.0    | SM        | Tan/gray silty fine SAND with some gravel, occasional cobble (dense, moist) (GLACIAL TILL)                                       |

Terminated at 8 feet below ground surface.  
No caving observed.  
No groundwater seepage observed.

Logged by: KSS

Excavated on: January 16, 2014



### Test Pit Logs

Canterwood Commercial Center  
xxx Canterwood Boulevard  
Gig Harbor, Washington

PN: 012225-4062, -1032, -5002, -5003, -5004

Doc ID: SwedeHillLLC.CanterwoodBlvd.Fu

May 2020

Figure A-2b



### Test Pit TP- 7

Location: Wall above Building B

Approximate Elevation: 180 feet

| Depth (feet) | Soil Type | Soil Description                                                                                                                 |
|--------------|-----------|----------------------------------------------------------------------------------------------------------------------------------|
| 0.0 - 0.3    |           | Duff/Topsoil                                                                                                                     |
| 0.3 - 2.5    |           | Orange brown silty (loamy) SAND, with some gravel and roots (loose to medium dense, moist)                                       |
| 2.5 - 5.0    | SP        | Tan/gray with some orange mottling, fine to medium SAND, some silt to silty, trace gravel (medium dense, moist) (WEATHERED TILL) |
| 5.0 - 9.0    | SM        | Tan/gray silty fine SAND with some gravel, occasional cobble (dense, moist) (GLACIAL TILL)                                       |

Terminated at 9 feet below ground surface.

No caving observed.

No groundwater seepage observed.

### Test Pit TP- 8

Location: Fill slope below Building B parking lot

Approximate Elevation: 150 feet

| Depth (feet) | Soil Type | Soil Description                                                                                            |
|--------------|-----------|-------------------------------------------------------------------------------------------------------------|
| 0.0 - 0.5    |           | Duff/Topsoil                                                                                                |
| 0.5 - 2.5    | SM        | Gray with orange/tan mottling, fine sandy SILT, trace rootlets. (soft to medium stiff, wet)                 |
| 2.5 - 5.0    | ML        | Tan/buff with some orange mottling, SILT with some fine and roots (medium stiff to stiff, moist) (ALLUVIUM) |
| 5.0 - 9.0    | SW        | Gray/tan fine to medium SAND, with trace silt, gravel (medium dense to dense, wet) (ALLUVIUM)               |

Terminated at 9 feet below ground surface.

No caving observed.

Slow groundwater seepage observed at 6 feet.

### Test Pit TP- 9

Location: West (upslope) edge of storm pond berm

Approximate Elevation: 140 feet

| Depth (feet) | Soil Type | Soil Description                                                                                                      |
|--------------|-----------|-----------------------------------------------------------------------------------------------------------------------|
| 0.0 - 0.5    |           | Duff/Topsoil                                                                                                          |
| 0.5 - 1.5    | SM        | Gray with orange/tan mottling, fine sandy SILT, trace rootlets. (soft to medium stiff, wet)                           |
| 1.5 - 3.5    | ML        | Tan/buff with some orange mottling, SILT with some fine and roots (medium stiff to stiff, moist) (ALLUVIUM)           |
| 3.5 - 5.5    | ML        | Gray with some orange mottling, non-plastic SILT with some fine sand, roots (medium stiff to stiff, moist) (ALLUVIUM) |
| 5.5 - 8.0    | SM        | Gray/tan silty fine SAND, with gravel (medium dense to dense, wet) (ALLUVIUM)                                         |

Terminated at 8 feet below ground surface.

No caving observed.

Logged by: KSS

Excavated on: January 16, 2014



### Test Pit Logs

Canterwood Commercial Center

xxx Canterwood Boulevard

Gig Harbor, Washington

PN: 012225-4062, -1032, -5002, -5003, -5004

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May 2020

Figure A-2c

### Test Pit TP- 10

Location: Center of storm pond berm

Approximate Elevation: 138 feet

| Depth (feet) | Soil Type | Soil Description                                                                                                  |
|--------------|-----------|-------------------------------------------------------------------------------------------------------------------|
| 0.0 - 0.5    |           | Duff/Topsoil                                                                                                      |
| 0.5 - 2.0    | SM        | Dark orange brown fine sandy SILT/silty fine SAND, with trace gravel and roots (loose to medium dense) (ALLUVIUM) |
| 2.0 - 4.5    | SM        | Tan with orange mottling silty fine to medium SAND (loose to medium dense, moist) (ALLUVIUM)                      |
| 4.5 - 8.0    | SM        | Yellow gray silty fine to medium SAND with some gravel, cobbles (medium dense, moist to wet) (ALLUVIUM)           |

Terminated at 8 feet below ground surface.

No caving observed.

No groundwater seepage observed.

### Test Pit TP- 11

Location: East (down slope) edge of storm pond berm

Approximate Elevation: 135 feet

| Depth (feet) | Soil Type | Soil Description                                                                                |
|--------------|-----------|-------------------------------------------------------------------------------------------------|
| 0.0 - 0.7    |           | Duff/Topsoil                                                                                    |
| 0.7 - 2.5    | SM        | Dark orange brown fine silty fine SAND, with trace gravel and roots (loose to medium dense)     |
| 2.5 - 7.5    | SM        | Yellow gray gravelly fine to medium SAND with some silt (medium dense, moist to wet) (ALLUVIUM) |

Terminated at 7.5 feet below ground surface.

No caving observed.

No groundwater seepage observed.

### Test Pit TP- 12

Location: Parking area below Building B

Approximate Elevation: 152feet

| Depth (feet) | Soil Type | Soil Description                                                         |
|--------------|-----------|--------------------------------------------------------------------------|
| 0.0 - 0.3    |           | Duff/Topsoil                                                             |
| 0.3 - 3.5    |           | Brown silty SAND with gravel, organics (loose, moist)(OLD FILL)          |
| 3.5 - 6.0    | SM        | Tan/gray silty gravelly SAND (dense to very dense, moist) (GLACIAL TILL) |

Terminated at 6 feet below ground surface.

No caving observed.

No groundwater seepage observed.

Logged by: KSS

Excavated on: January 16, 2014



### Test Pit Logs

Canterwood Commercial Center

xxx Canterwood Boulevard

Gig Harbor, Washington

PN: 012225-4062, -1032, -5002, -5003, -5004

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May 2020

Figure A-2d

### Test Pit TP- 13

Location: Driveway north of Building A  
Approximate Elevation: 176 feet

| Depth (feet) | Soil Type | Soil Description                                                                                              |
|--------------|-----------|---------------------------------------------------------------------------------------------------------------|
| 0.0 - 0.5    |           | Duff/Topsoil                                                                                                  |
| 0.5 - 1.5    | SM        | Orange-brown silty (loamy) fine to medium SAND with some gravel, roots (medium dense, moist) (WEATHERED TILL) |
| 1.5 - 9.0    | SM        | Tan/gray silty fine SAND with some gravel, occasional cobble (dense, moist) (GLACIAL TILL)                    |

Terminated at 9 feet below ground surface.  
No caving observed.  
No groundwater seepage observed.

### Test Pit TP- 14

Location: Building Pad A  
Approximate Elevation: 180 feet

| Depth (feet) | Soil Type | Soil Description                                                                                                     |
|--------------|-----------|----------------------------------------------------------------------------------------------------------------------|
| 0.0 - 0.3    |           | Duff/Topsoil                                                                                                         |
| 0.3 - 1.3    | SM        | Orange-brown silty (loamy) SAND, with some gravel, rootlets (medium dense, moist)                                    |
| 1.3 - 3.5    | SM        | Yellow brown sandy GRAVEL/gravelly SAND with some cobbles, trace silt (dense to very dense, moist) (ADVANCE OUTWASH) |

Terminated at 3.5 feet below ground surface.  
No caving observed.  
No groundwater seepage observed.

### Test Pit TP- 15

Location: Driveway south of Building A  
Approximate Elevation: 173 feet

| Depth (feet) | Soil Type | Soil Description                                                                                                                     |
|--------------|-----------|--------------------------------------------------------------------------------------------------------------------------------------|
| 0.0 - 0.2    |           | Duff/Topsoil                                                                                                                         |
| 0.2 - 4.5    |           | Brown silty SAND with gravel, significant woody debris (logs, stumps) (loose to medium dense, moist) (Regraded Native soils as Fill) |
| 4.5 - 7.0    | SM        | Relic topsoil over brown silty SAND (loose, moist to wet at depth) (WEATHERED TILL)                                                  |
| 7.0 - 9.0    | SM        | Gray silty SAND with gravel (dense, moist) (GLACIAL TILL)                                                                            |

Terminated at 9 feet below ground surface.  
Moderate caving observed from surface to depth of 7 feet.  
Slow groundwater seepage observed at 7 feet depth.

Logged by: KSS/RMP

Excavated on: January 16, 2014



### Test Pit Logs

Canterwood Commercial Center  
xxx Canterwood Boulevard  
Gig Harbor, Washington

PN: 012225-4062, -1032, -5002, -5003, -5004

Doc ID: SwedeHillLLC.CanterwoodBlvd.Fu

May 2020

Figure A-2e

### Test Pit TP- 16

Location: Parking lot above Building A

Approximate Elevation: 189 feet

| Depth (feet) | Soil Type | Soil Description                                                           |
|--------------|-----------|----------------------------------------------------------------------------|
| 0.0 - 0.8    | -         | Topsoil/Forest Duff                                                        |
| 0.8 - 2.5    | SM        | Brown silty (loamy) SAND with fibrous roots (loose to medium dense, moist) |
| 2.5 - 4.0    | SM        | Brown to tan mottled silty SAND (medium dense, moist) (WEATHERED TILL)     |
| 4.0 - 6.0    | SM        | Gray silty SAND with gravel (dense to very dense, moist) (GLACIAL TILL)    |

Terminated at 6 feet below ground surface.

Slight caving observed from surface to 3 feet.

No groundwater seepage observed. Mottling observed above 4 feet depth.

### Test Pit TP- 17

Location: Cut slope above Building A parking lot

Approximate Elevation: 206 feet

| Depth (feet) | Soil Type | Soil Description                                                           |
|--------------|-----------|----------------------------------------------------------------------------|
| 0.0 - 1.0    | -         | Topsoil/Forest Duff                                                        |
| 1.0 - 5.0    | SM        | Brown silty (loamy) SAND with fibrous roots (loose to medium dense, moist) |
| 5.0 - 7.0    | SM        | Light gray fine sandy SILT, with some gravel (dense, moist) (GLACIAL TILL) |

Terminated at 7 feet below ground surface.

Slight caving observed from surface to 5 feet deep.

No groundwater seepage observed.

### Test Pit TP- 18

Location: Parking lot below Building A

Approximate Elevation: 175 feet

| Depth (feet) | Soil Type | Soil Description                                                                            |
|--------------|-----------|---------------------------------------------------------------------------------------------|
| 0.0 - 0.2    | -         | Duff                                                                                        |
| 0.2 - 2.5    | -         | Topsoil strippings with debris (silt fence material, plastic sheeting) (loose, moist)(FILL) |
| 2.5 - 6.3    | SM        | Brown silty SAND (loose to medium dense, moist) (ALLUVIUM)                                  |
| 6.3 - 7.5    | ML        | Light gray fine sandy SILT (stiff, moist) (ALLUVIUM)                                        |

Terminated at 7½ feet below ground surface.

Slight caving observed from surface to depth of 4 feet.

No groundwater seepage observed, but increased moisture content observed at and above at 6¼ feet.

Logged by: RMP

Excavated on: January 16, 2014



### Test Pit Logs

Canterwood Commercial Center

xxx Canterwood Boulevard

Gig Harbor, Washington

PN: 012225-4062, -1032, -5002, -5003, -5004

Doc ID: SwedeHillLLC.CanterwoodBlvd.Fu

May 2020

Figure A-2f



### Test Pit TP- 19

Location: Fill slope below Building A parking lot  
Approximate Elevation: 152 feet

| Depth (feet) | Soil Type | Soil Description                                                                           |
|--------------|-----------|--------------------------------------------------------------------------------------------|
| 0.0 - 2.0    | -         | Duff/Topsoil with woody debris/roots                                                       |
| 2.0 - 7.0    | SM/ML     | Gray/tan SILT/SAND with cobbles, boulders (medium dense, moist to wet at depth) (ALLUVIUM) |
| 7.0 - 9.0    | ML        | Gray sandy SILT (stiff, moist) (ALLUVIUM)                                                  |

Terminated at 9 feet below ground surface.  
No caving observed.  
Slow groundwater seepage observed at 7 feet.

### Test Pit TP- 20

Location: Driveway north of Building B  
Approximate Elevation: 172 feet

| Depth (feet) | Soil Type | Soil Description                                                                           |
|--------------|-----------|--------------------------------------------------------------------------------------------|
| 0.0 - 0.5    |           | Duff/Topsoil                                                                               |
| 0.5 - 1.5    |           | Orange brown silty (loamy) SAND, with some gravel and roots (loose to medium dense, moist) |
| 1.5 - 6.0    | SM        | Brown silty SAND (loose to medium dense, moist)                                            |
| 6.0 - 7.0    | SM        | Gray silty SAND with gravel (dense, moist) (sandy GLACIAL TILL)                            |

Terminated at 7 feet below ground surface.  
Slight caving observed from surface to 4 feet.  
No groundwater seepage observed.

### Test Pit TP- 21

Location: Building Pad D  
Approximate Elevation: 136 feet

| Depth (feet) | Soil Type | Soil Description                                                                          |
|--------------|-----------|-------------------------------------------------------------------------------------------|
| 0.0 - 1.0    | -         | Topsoil                                                                                   |
| 1.0 - 3.0    | SM        | Brown silty SAND with trace gravel (loose to medium dense, moist)                         |
| 3.0 - 4.0    | SM        | Brown mottled silty SAND with trace gravel (medium dense, moist) (WEATHERED GLACIAL TILL) |
| 4.0 - 8.5    | SM        | Gray silty SAND with gravel (dense, moist) (SANDY GLACIAL TILL)                           |

Terminated at 8½ feet below ground surface.  
Slight caving observed from surface to 3 feet.  
No groundwater seepage observed, but mottling observed from 3 to 4 feet below the ground surface. .

Logged by: RMP

Excavated on: January 16, 2014



### Test Pit Logs

Canterwood Commercial Center  
xxx Canterwood Boulevard  
Gig Harbor, Washington

PN: 012225-4062, -1032, -5002, -5003, -5004

Job: SwedeHillLLC.CanterwoodBlvd.F

January 2014

Figure A-2g

## Test Pit TP- 22

Location: Fill slope below Building D

Approximate Elevation: 128 feet

| Depth (feet) | Soil Type | Soil Description                                           |
|--------------|-----------|------------------------------------------------------------|
| 0.0 - 1.0    | -         | Duff/Topsoil                                               |
| 1.0 - 3.0    | ML        | Olive gray mottled sandy SILT (medium stiff, moist to wet) |
| 3.0 - 9.0    | ML        | Olive gray mottled sandy SILT (stiff, moist)(ALLUVIUM)     |

Terminated at 9 feet below ground surface.

No caving observed.

Mottling observed to full depth explored.

Logged by: RMP

Excavated on: January 16, 2014



### Test Pit Logs

Canterwood Commercial Center

xxx Canterwood Boulevard

Gig Harbor, Washington

PN: 012225-4062, -1032, -5002, -5003, -5004

Doc ID: SwedeHillLLC.CanterwoodBlvd.Fu

May 2020

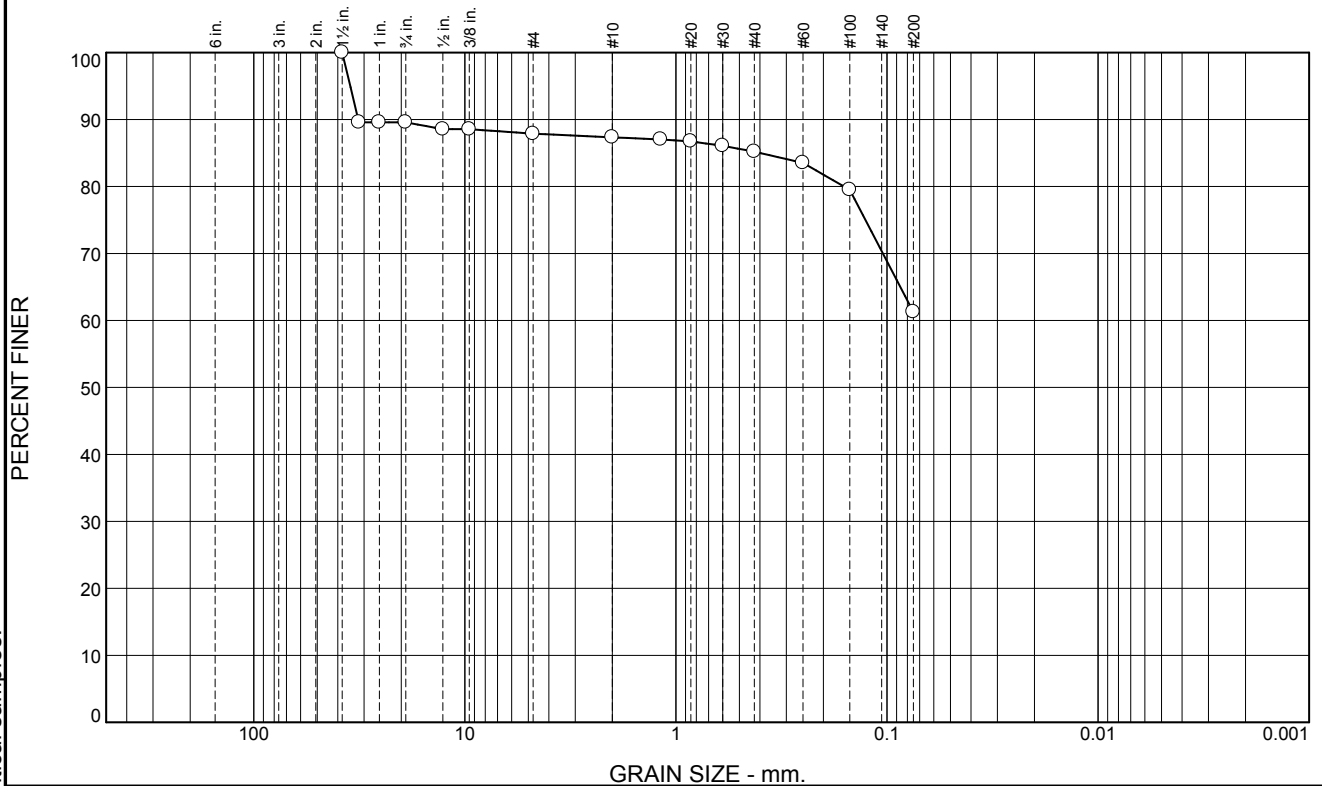
Figure A-2h

## **Appendix B**

### Laboratory Test Results

These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicative of apparently identical samples.

## Particle Size Distribution Report



| % +3" | % Gravel |      | % Sand |        |      | % Fines |      |
|-------|----------|------|--------|--------|------|---------|------|
|       | Coarse   | Fine | Coarse | Medium | Fine | Silt    | Clay |
| 0     | 10       | 2    | 1      | 2      | 24   | 61      |      |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|------------|---------------|----------------|--------------|
| 1.5        | 100           |                |              |
| 1.25       | 90            |                |              |
| 1.0        | 90            |                |              |
| 3/4        | 90            |                |              |
| 1/2        | 89            |                |              |
| 3/8        | 89            |                |              |
| #4         | 88            |                |              |
| #10        | 87            |                |              |
| #16        | 87            |                |              |
| #20        | 87            |                |              |
| #30        | 86            |                |              |
| #40        | 85            |                |              |
| #60        | 84            |                |              |
| #100       | 79            |                |              |
| #200       | 61            |                |              |

\* (no specification provided)

**Material Description**

Grey Fine Silty Sand  
Natural Moisture = 13.59%

**Atterberg Limits**

PL=                      LL=                      PI=

**Coefficients**

D<sub>90</sub>= 31.9862                      D<sub>85</sub>= 0.3989                      D<sub>60</sub>=  
D<sub>50</sub>=                      D<sub>30</sub>=                      D<sub>15</sub>=  
D<sub>10</sub>=                      C<sub>u</sub>=                      C<sub>c</sub>=

**Classification**

USCS=                      AASHTO=

**Remarks**

**Location:** TP-17 S-1  
**Sample Number:** 090764      **Depth:** 5'-7.5'

**Date:** 1/22/2014

**GeoResources, LLC**

**Client:** Swede Hill LLC.  
**Project:** Canterwood Commercial Center

**Fife, WA**

**Project No:** SwedeHillLLC.Canterwood

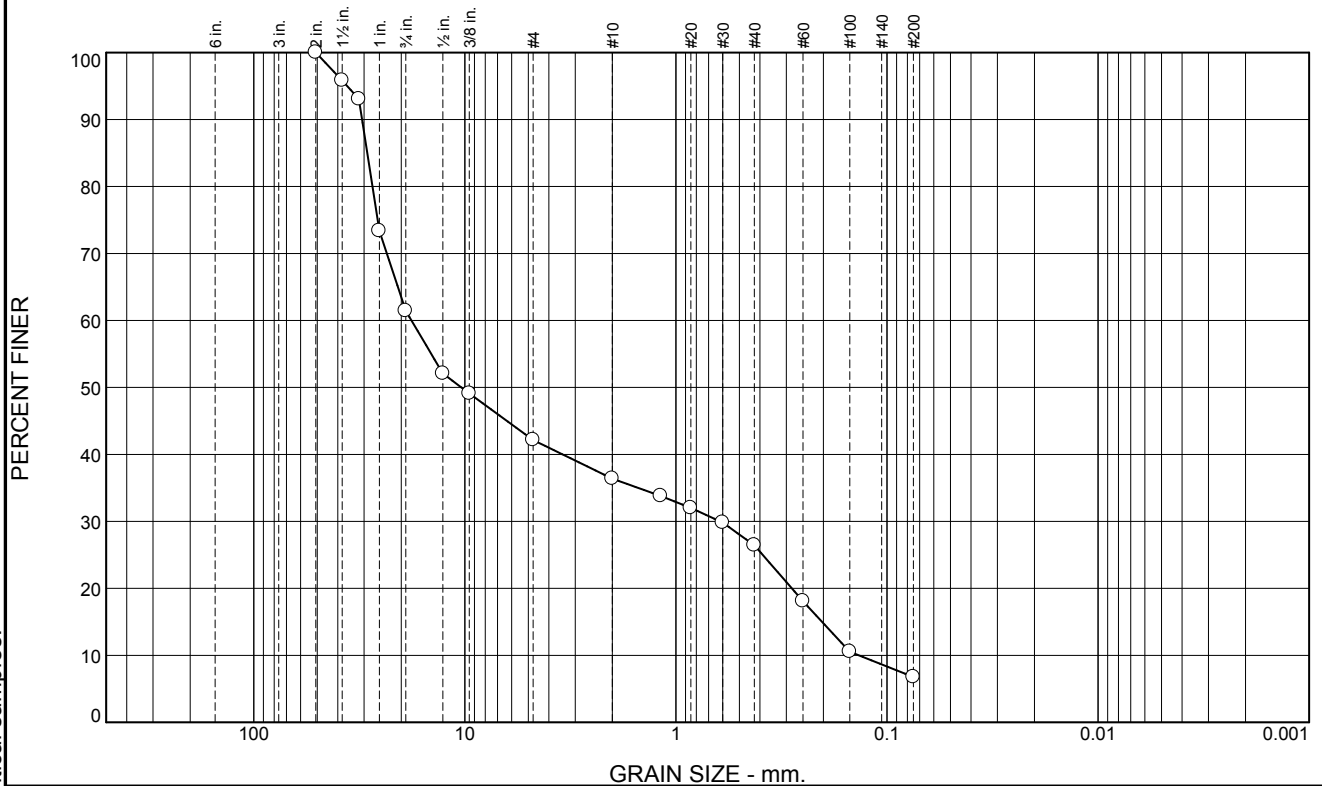
**Figure** B-9

**Tested By:** Timothy Bergstrom      **Checked By:** Keith Schembs



These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicative of apparently identical samples.

## Particle Size Distribution Report



| % +3" | % Gravel |      | % Sand |        |      | % Fines |      |
|-------|----------|------|--------|--------|------|---------|------|
|       | Coarse   | Fine | Coarse | Medium | Fine | Silt    | Clay |
| 0     | 39       | 19   | 6      | 10     | 19   | 7       |      |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|------------|---------------|----------------|--------------|
| 2.0        | 100           |                |              |
| 1.5        | 96            |                |              |
| 1.25       | 93            |                |              |
| 1.0        | 73            |                |              |
| 3/4        | 61            |                |              |
| 1/2        | 52            |                |              |
| 3/8        | 49            |                |              |
| #4         | 42            |                |              |
| #10        | 36            |                |              |
| #16        | 34            |                |              |
| #20        | 32            |                |              |
| #30        | 30            |                |              |
| #40        | 26            |                |              |
| #60        | 18            |                |              |
| #100       | 11            |                |              |
| #200       | 6.8           |                |              |

\* (no specification provided)

**Material Description**

Sandy Gravel  
Natural Moisture = 4.18%

**Atterberg Limits**

PL=                      LL=                      PI=

**Coefficients**

D<sub>90</sub>= 30.6742      D<sub>85</sub>= 28.9835      D<sub>60</sub>= 17.9034  
D<sub>50</sub>= 10.3836      D<sub>30</sub>= 0.6173      D<sub>15</sub>= 0.2028  
D<sub>10</sub>= 0.1359      C<sub>u</sub>= 131.70      C<sub>c</sub>= 0.16

**Classification**

USCS=                      AASHTO=

**Remarks**

**Location:** TP-14 S-1  
**Sample Number:** 090763      **Depth:** 2'-3.5'

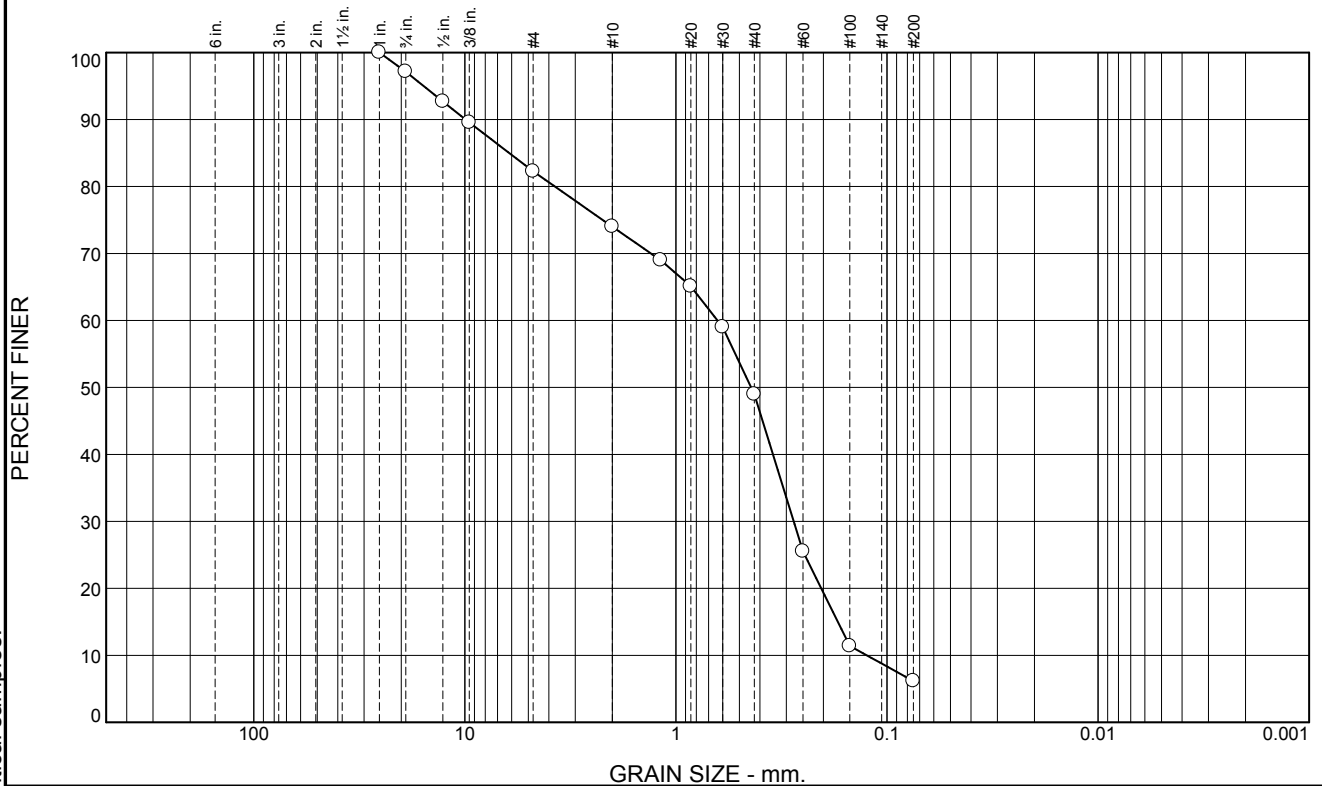
**Date:** 1/22/2014

|                                                 |                                                                                                                                  |                   |
|-------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|-------------------|
| <b>GeoResources, LLC</b><br><br><b>Fife, WA</b> | <b>Client:</b> Swede Hill LLC.<br><b>Project:</b> Canterwood Commercial Center<br><br><b>Project No:</b> SwedeHillLLC.Canterwood | <b>Figure</b> B-8 |
|-------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|-------------------|

**Tested By:** Timothy Bergstrom      **Checked By:** Keith Schembs

These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicative of apparently identical samples.

## Particle Size Distribution Report



| % +3" | % Gravel |      | % Sand |        |      | % Fines |      |
|-------|----------|------|--------|--------|------|---------|------|
|       | Coarse   | Fine | Coarse | Medium | Fine | Silt    | Clay |
| 0     | 3        | 15   | 8      | 25     | 43   | 6       |      |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|------------|---------------|----------------|--------------|
| 1.0        | 100           |                |              |
| 3/4        | 97            |                |              |
| 1/2        | 93            |                |              |
| 3/8        | 90            |                |              |
| #4         | 82            |                |              |
| #10        | 74            |                |              |
| #16        | 69            |                |              |
| #20        | 65            |                |              |
| #30        | 59            |                |              |
| #40        | 49            |                |              |
| #60        | 26            |                |              |
| #100       | 11            |                |              |
| #200       | 6.2           |                |              |

\* (no specification provided)

**Material Description**

Brown Gravelly Sand  
Natural Moisture = 9.25%

**Atterberg Limits**

PL=                      LL=                      PI=

**Coefficients**

D<sub>90</sub>= 9.9202                      D<sub>85</sub>= 6.1633                      D<sub>60</sub>= 0.6353  
D<sub>50</sub>= 0.4401                      D<sub>30</sub>= 0.2766                      D<sub>15</sub>= 0.1709  
D<sub>10</sub>= 0.1247                      C<sub>u</sub>= 5.10                      C<sub>c</sub>= 0.97

**Classification**

USCS=                      AASHTO=

**Remarks**

**Location:** TP-11 S-1  
**Sample Number:** 090762      **Depth:** 4'-6'

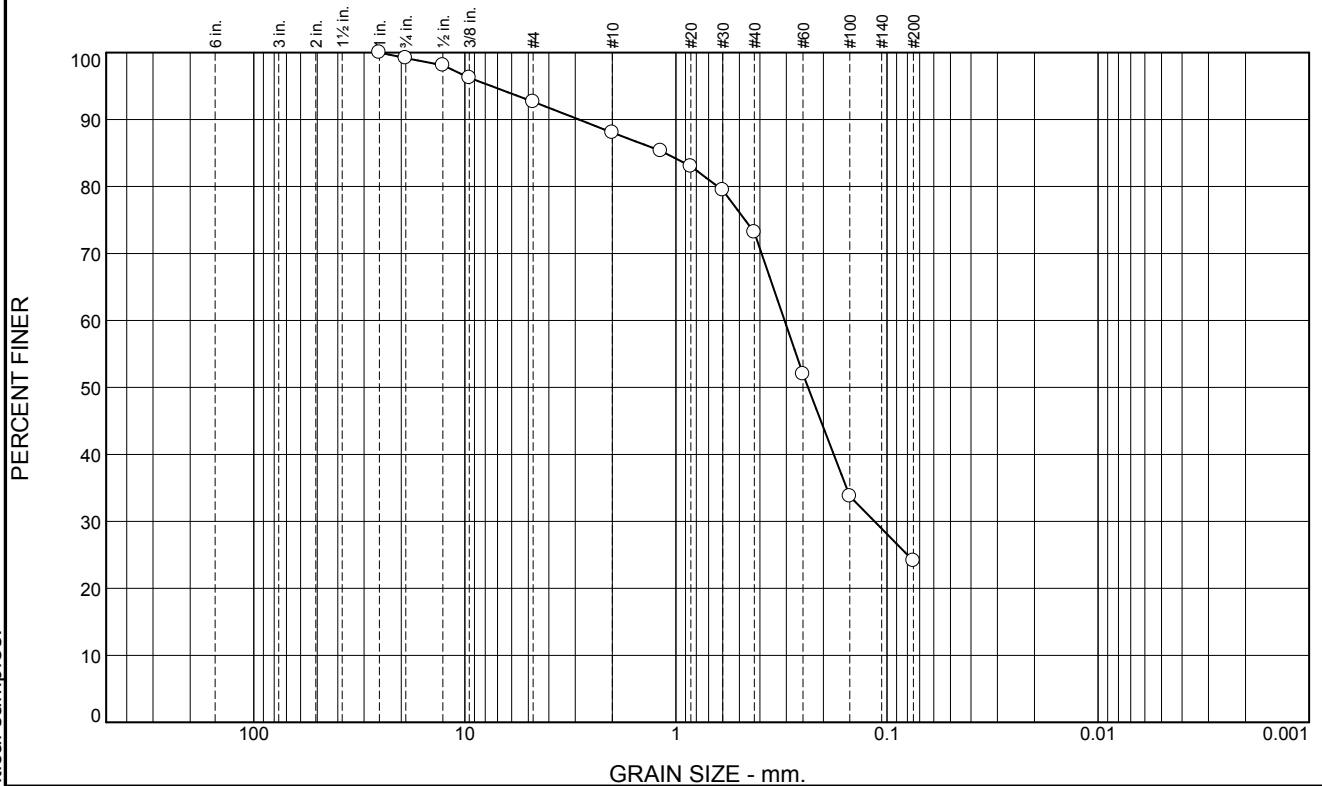
**Date:** 1/22/2014

|                                                 |                                                                                                                                  |                   |
|-------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|-------------------|
| <b>GeoResources, LLC</b><br><br><b>Fife, WA</b> | <b>Client:</b> Swede Hill LLC.<br><b>Project:</b> Canterwood Commercial Center<br><br><b>Project No:</b> SwedeHillLLC.Canterwood | <b>Figure</b> B-7 |
|-------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|-------------------|

**Tested By:** Timothy Bergstrom      **Checked By:** Keith Schembs

These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicative of apparently identical samples.

## Particle Size Distribution Report



| % +3" | % Gravel |      | % Sand |        |      | % Fines |      |
|-------|----------|------|--------|--------|------|---------|------|
|       | Coarse   | Fine | Coarse | Medium | Fine | Silt    | Clay |
| 0     | 1        | 6    | 5      | 15     | 49   | 24      |      |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|------------|---------------|----------------|--------------|
| 1.0        | 100           |                |              |
| 3/4        | 99            |                |              |
| 1/2        | 98            |                |              |
| 3/8        | 96            |                |              |
| #4         | 93            |                |              |
| #10        | 88            |                |              |
| #16        | 85            |                |              |
| #20        | 83            |                |              |
| #30        | 79            |                |              |
| #40        | 73            |                |              |
| #60        | 52            |                |              |
| #100       | 34            |                |              |
| #200       | 24            |                |              |

\* (no specification provided)

**Material Description**

Brown Silty Sand with Gravel  
Natural Moisture = 14.47%

**Atterberg Limits**

PL=                      LL=                      PI=

**Coefficients**

D<sub>90</sub>= 2.8840                      D<sub>85</sub>= 1.1265                      D<sub>60</sub>= 0.3055  
D<sub>50</sub>= 0.2364                      D<sub>30</sub>= 0.1145                      D<sub>15</sub>=  
D<sub>10</sub>=                                  C<sub>u</sub>=                                  C<sub>c</sub>=

**Classification**

USCS=                      AASHTO=

**Remarks**

**Location:** TP-10 S-2  
**Sample Number:** 090761      **Depth:** 6'-8'

**Date:** 1/23/2014

**GeoResources, LLC**

**Client:** Swede Hill LLC.  
**Project:** Canterwood Commercial Center

**Fife, WA**

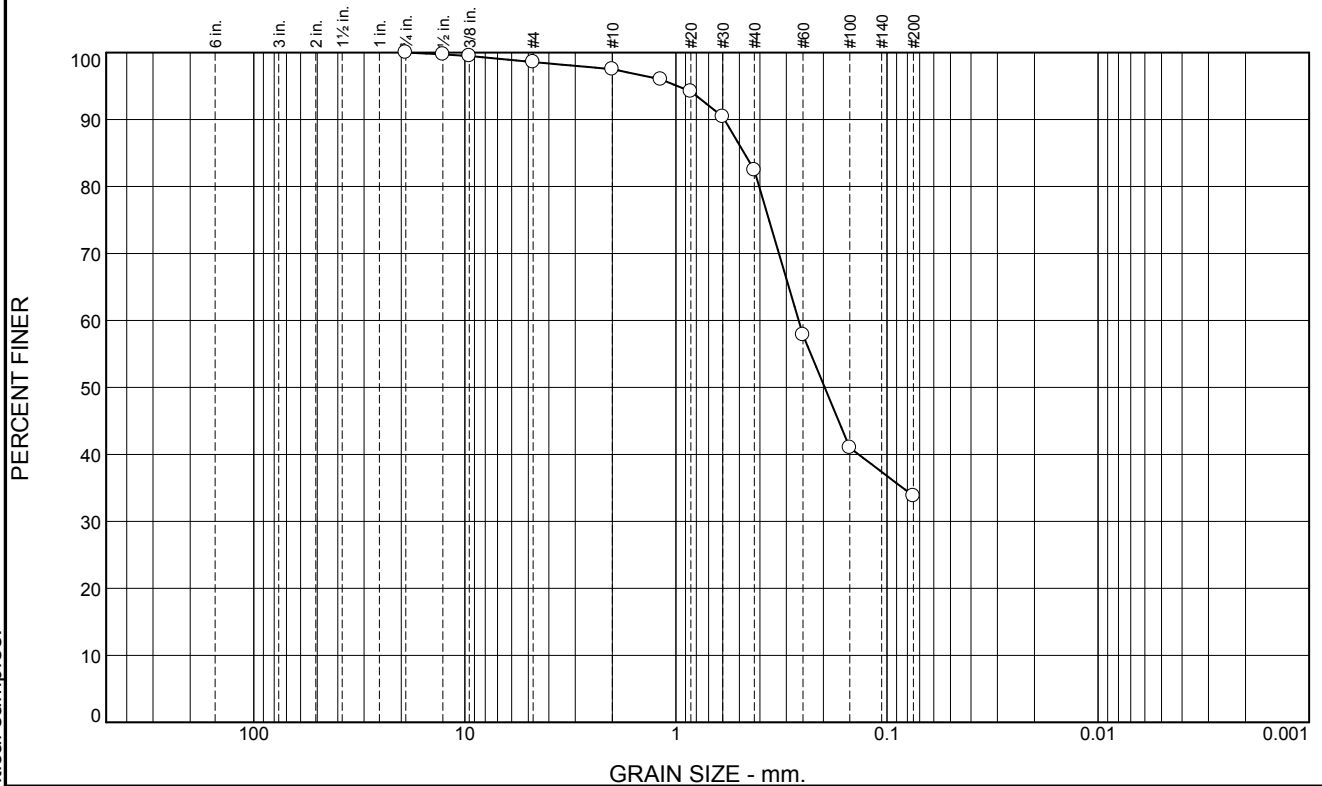
**Project No:** SwedeHillLLC.Canterwood

**Figure** B-6

**Tested By:** Timothy Bergstrom      **Checked By:** Keith Schembs

These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicative of apparently identical samples.

## Particle Size Distribution Report



| % +3" | % Gravel |      | % Sand |        |      | % Fines |      |
|-------|----------|------|--------|--------|------|---------|------|
|       | Coarse   | Fine | Coarse | Medium | Fine | Silt    | Clay |
| 0     | 0        | 1    | 1      | 16     | 48   | 34      |      |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|------------|---------------|----------------|--------------|
| 3/4        | 100           |                |              |
| 1/2        | 100           |                |              |
| 3/8        | 99            |                |              |
| #4         | 99            |                |              |
| #10        | 98            |                |              |
| #16        | 96            |                |              |
| #20        | 94            |                |              |
| #30        | 90            |                |              |
| #40        | 82            |                |              |
| #60        | 58            |                |              |
| #100       | 41            |                |              |
| #200       | 34            |                |              |

\* (no specification provided)

### Material Description

Tan Silty Sand  
Natural Moisture = 36.3%

### Atterberg Limits

PL=      LL=      PI=

D<sub>90</sub>= 0.5891      D<sub>85</sub>= 0.4746      D<sub>60</sub>= 0.2620  
D<sub>50</sub>= 0.1971      D<sub>30</sub>=      D<sub>15</sub>=  
D<sub>10</sub>=      C<sub>u</sub>=      C<sub>c</sub>=

### Classification

USCS=      AASHTO=

### Remarks

Location: TP-9 S-2

Sample Number: 090760

Depth: 6'-8"

Date: 1/22/2014

**GeoResources, LLC**

**Fife, WA**

Client: Swede Hill LLC.

Project: Canterwood Commercial Center

Project No: SwedeHillLLC.Canterwood

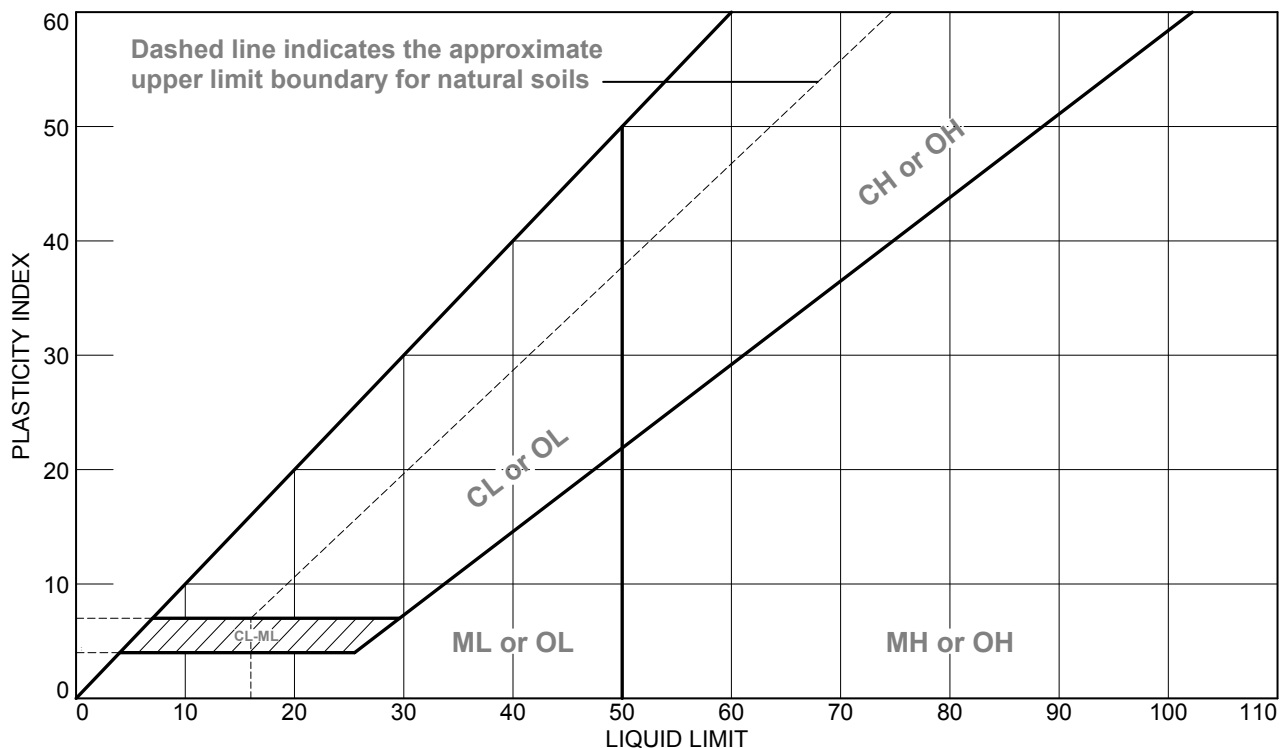
Figure B-5

Tested By: Timothy Bergstrom

Checked By: Keith Schembs



## LIQUID AND PLASTIC LIMITS TEST REPORT



| SOIL DATA |        |            |         |                           |                   |                  |                      |      |
|-----------|--------|------------|---------|---------------------------|-------------------|------------------|----------------------|------|
|           | SOURCE | SAMPLE NO. | DEPTH   | NATURAL WATER CONTENT (%) | PLASTIC LIMIT (%) | LIQUID LIMIT (%) | PLASTICITY INDEX (%) | USCS |
| ●         |        | 090759     | 3.5'-5' |                           | NP                | NV               | NP                   |      |

**GeoResources, LLC**

**Fife, WA**

**Client:** Swede Hill LLC.

**Project:** Canterwood Commercial Center

**Project No.:** SwedeHillLLC.Canterwood

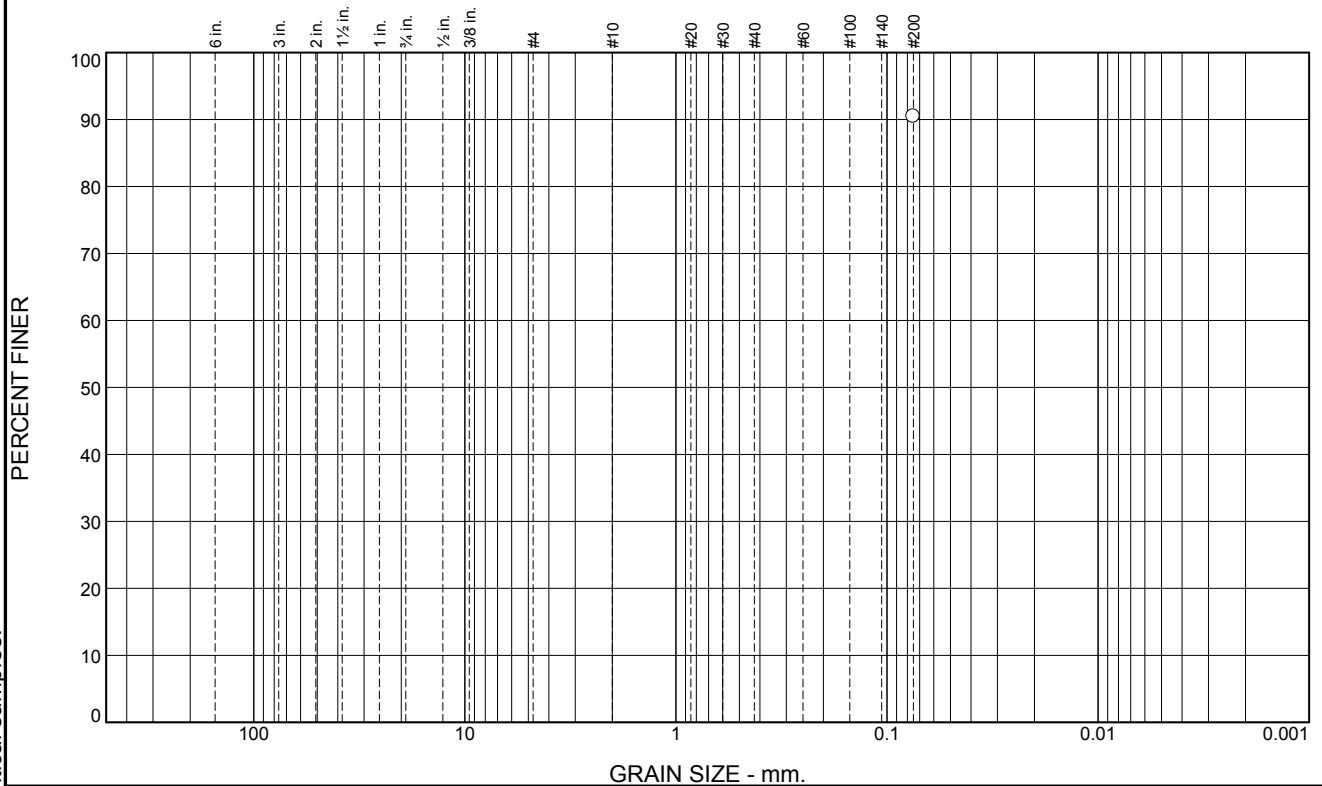
**Figure** B-4

**Tested By:** Timothy Bergstrom

**Checked By:** Keith Schembs

These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicative of apparently identical samples.

## Particle Size Distribution Report



| % +3" | % Gravel |      | % Sand |        |      | % Fines |      |
|-------|----------|------|--------|--------|------|---------|------|
|       | Coarse   | Fine | Coarse | Medium | Fine | Silt    | Clay |
|       |          |      |        |        |      | 90      |      |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|------------|---------------|----------------|--------------|
| #200       | 90            |                |              |

\* (no specification provided)

|                                                    |                   |                   |
|----------------------------------------------------|-------------------|-------------------|
| <b>Material Description</b>                        |                   |                   |
| Grey/Brown Silty Clay<br>Natural Moisture = 25.57% |                   |                   |
| <b>Atterberg Limits</b>                            |                   |                   |
| PL= NP                                             | LL= NV            | PI= NP            |
| <b>Coefficients</b>                                |                   |                   |
| D <sub>90</sub> =                                  | D <sub>85</sub> = | D <sub>60</sub> = |
| D <sub>50</sub> =                                  | D <sub>30</sub> = | D <sub>15</sub> = |
| D <sub>10</sub> =                                  | C <sub>u</sub> =  | C <sub>c</sub> =  |
| <b>Classification</b>                              |                   |                   |
| USCS=                                              | AASHTO=           |                   |
| <b>Remarks</b>                                     |                   |                   |
| 200 Wash Only                                      |                   |                   |

Location: TP-9 S-1

Sample Number: 090759

Depth: 3.5'-5'

Date: 1/23/2014

**GeoResources, LLC**

**Fife, WA**

Client: Swede Hill LLC.

Project: Canterwood Commercial Center

Project No: SwedeHillLLC.Canterwood

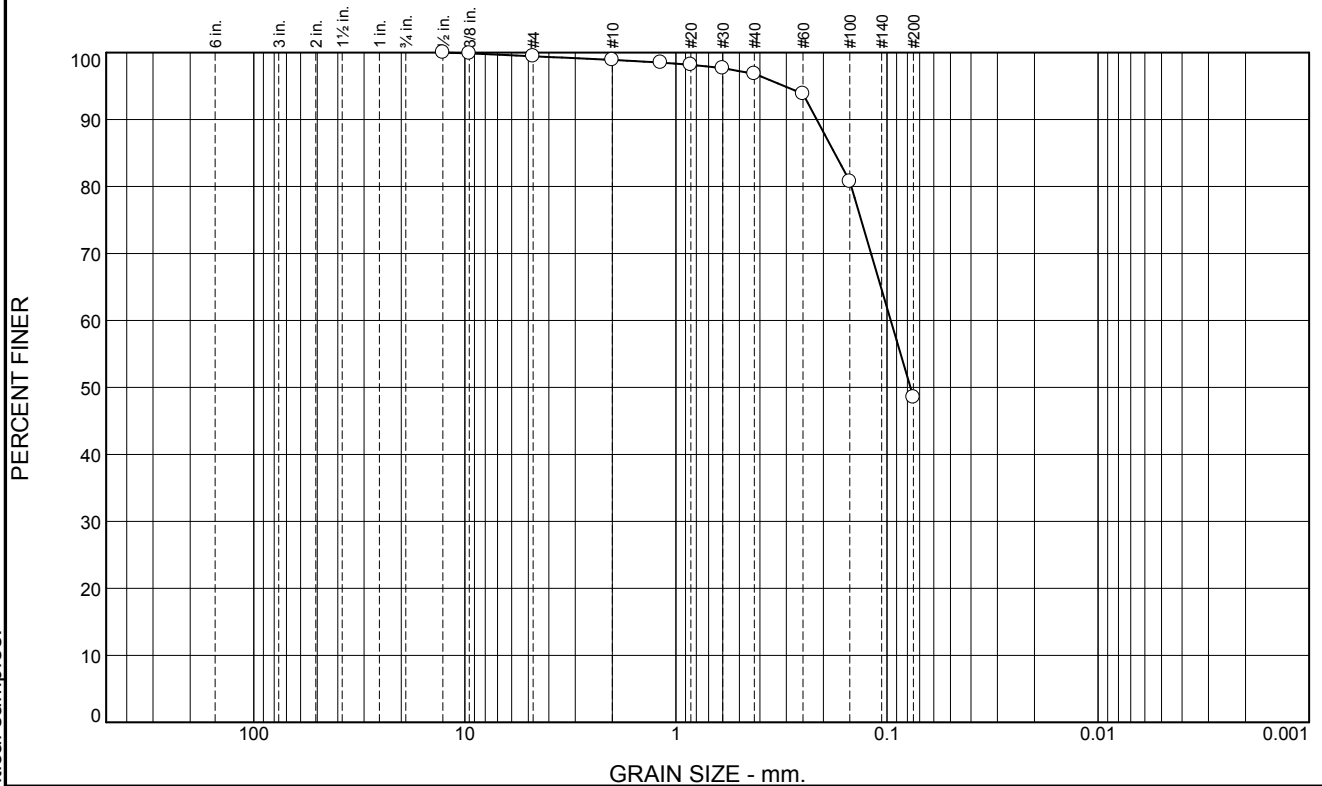
Figure B-3

Tested By: Timothy Bergstrom

Checked By: Keith Schembs

These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicative of apparently identical samples.

## Particle Size Distribution Report



| % +3" | % Gravel |      | % Sand |        |      | % Fines |      |
|-------|----------|------|--------|--------|------|---------|------|
|       | Coarse   | Fine | Coarse | Medium | Fine | Silt    | Clay |
| 0     | 0        | 1    | 0      | 2      | 48   | 49      |      |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|------------|---------------|----------------|--------------|
| 1/2        | 100           |                |              |
| 3/8        | 100           |                |              |
| #4         | 99            |                |              |
| #10        | 99            |                |              |
| #16        | 99            |                |              |
| #20        | 98            |                |              |
| #30        | 98            |                |              |
| #40        | 97            |                |              |
| #60        | 94            |                |              |
| #100       | 81            |                |              |
| #200       | 49            |                |              |

\* (no specification provided)

**Material Description**

Fine Grey Silty Sand with Trace Gravel  
Natural Moisture = 15.26%

**Atterberg Limits**

PL=                      LL=                      PI=

**Coefficients**

D<sub>90</sub>= 0.2152                      D<sub>85</sub>= 0.1770                      D<sub>60</sub>= 0.0960  
D<sub>50</sub>= 0.0774                      D<sub>30</sub>=                      D<sub>15</sub>=  
D<sub>10</sub>=                      C<sub>u</sub>=                      C<sub>c</sub>=

**Classification**

USCS=                      AASHTO=

**Remarks**

**Location:** TP-7  
**Sample Number:** 090758      **Depth:** 5'-8'

**Date:**

**GeoResources, LLC**

**Client:** Swede Hill LLC.  
**Project:** Canterwood Commercial Center

**Fife, WA**

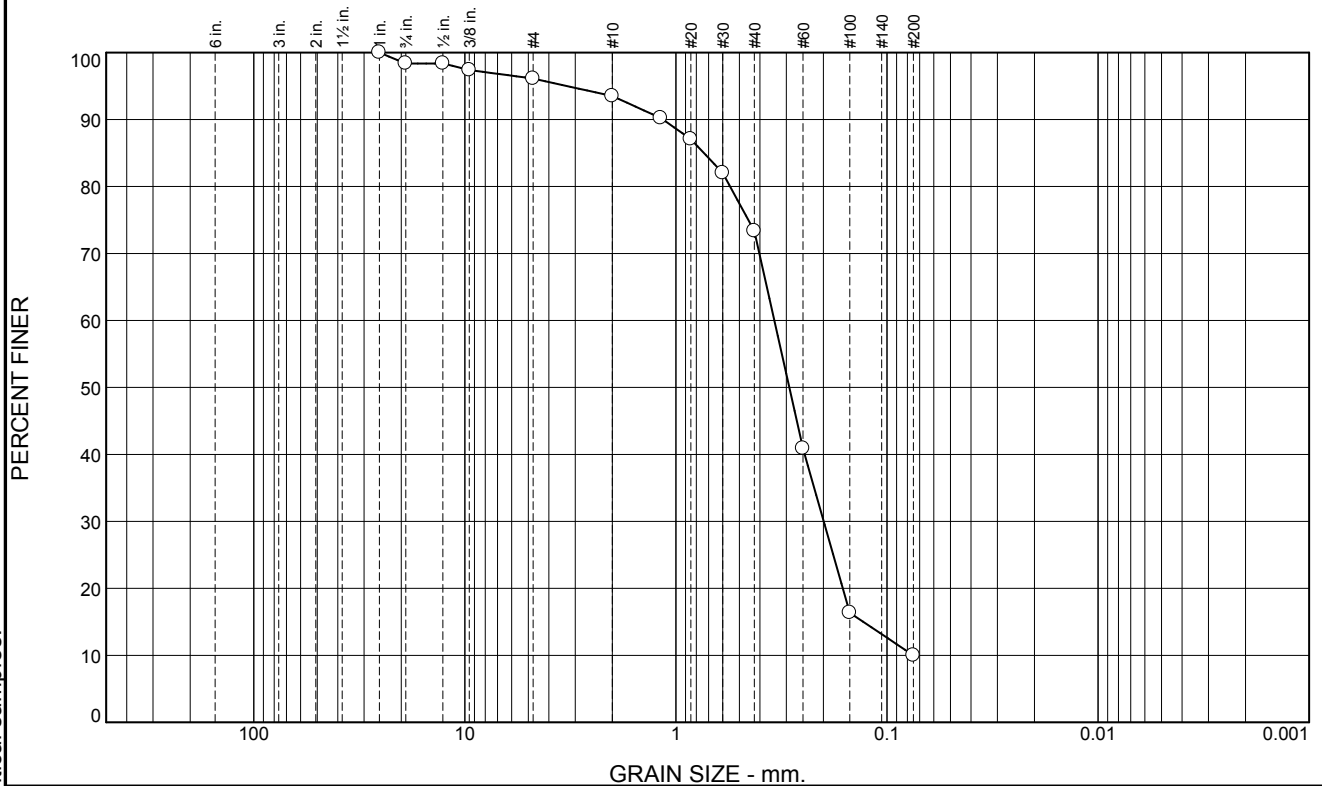
**Project No:** SwedeHillLLC.Canterwood

**Figure** B-2

**Tested By:** Timothy Bergstrom      **Checked By:** Keith Schembs

These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicative of apparently identical samples.

## Particle Size Distribution Report



| % +3" | % Gravel |      | % Sand |        |      | % Fines |      |
|-------|----------|------|--------|--------|------|---------|------|
|       | Coarse   | Fine | Coarse | Medium | Fine | Silt    | Clay |
| 0     | 2        | 2    | 2      | 21     | 63   | 10      |      |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|------------|---------------|----------------|--------------|
| 1.0        | 100           |                |              |
| 3/4        | 98            |                |              |
| 1/2        | 98            |                |              |
| 3/8        | 97            |                |              |
| #4         | 96            |                |              |
| #10        | 94            |                |              |
| #16        | 90            |                |              |
| #20        | 87            |                |              |
| #30        | 82            |                |              |
| #40        | 73            |                |              |
| #60        | 41            |                |              |
| #100       | 16            |                |              |
| #200       | 10.0          |                |              |

\* (no specification provided)

**Material Description**

Fine to Medium Grey Sand with Trace Gravel  
Natural Moisture = 11.22%

**Atterberg Limits**

PL=                      LL=                      PI=

**Coefficients**

D<sub>90</sub>= 1.1525                      D<sub>85</sub>= 0.7367                      D<sub>60</sub>= 0.3416  
D<sub>50</sub>= 0.2901                      D<sub>30</sub>= 0.1993                      D<sub>15</sub>= 0.1295  
D<sub>10</sub>= 0.0751                      C<sub>u</sub>= 4.55                      C<sub>c</sub>= 1.55

**Classification**

USCS=                      AASHTO=

**Remarks**

**Location:** TP-3 S-1  
**Sample Number:** 090757      **Depth:** 3'-5'

**Date:** 1/22/2014

**GeoResources, LLC**

**Client:** Swede Hill LLC.  
**Project:** Canterwood Commercial Center

**Fife, WA**

**Project No:** SwedeHillLLC.Canterwood

**Figure** B-1

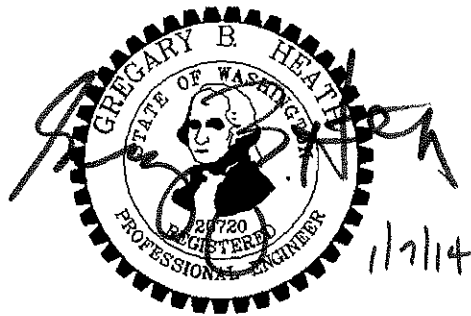
**Tested By:** Timothy Bergstrom      **Checked By:** Keith Schembs





**CANTERWOOD COMMERCIAL CENTER  
LEVEL 1 TRAFFIC IMPACT ANALYSIS**

*CITY OF GIG HARBOR, WA*



Prepared for: Paul Cyr  
Barghausen Consulting Engineers  
18215 72nd Avenue S  
Kent, WA 98032

JANUARY 2014

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**CITY OF GIG HARBOR  
ENGINEERING**

CANTERWOOD COMMERCIAL CENTER  
LEVEL 1 TRAFFIC IMPACT ANALYSIS

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# CANTERWOOD COMMERCIAL CENTER LEVEL 1 TRAFFIC IMPACT ANALYSIS

## *I. INTRODUCTION*

This study serves to examine traffic impacts related to the proposed Canterwood Commercial Center project. The main goals of this assessment focus on the forecast of newly generated project traffic and distribution of the traffic as required by the city of Gig Harbor for a Level 1 Assessment. After review of the Level 1, additional analysis might be required by the city. The first task includes the collection of general roadway information, road improvement information, entering sight distance data, and peak hour traffic counts near the proposed entrances. Based on this information, forecasts of future traffic and dispersion patterns on the street system are determined using established trip generation and trip distribution techniques.

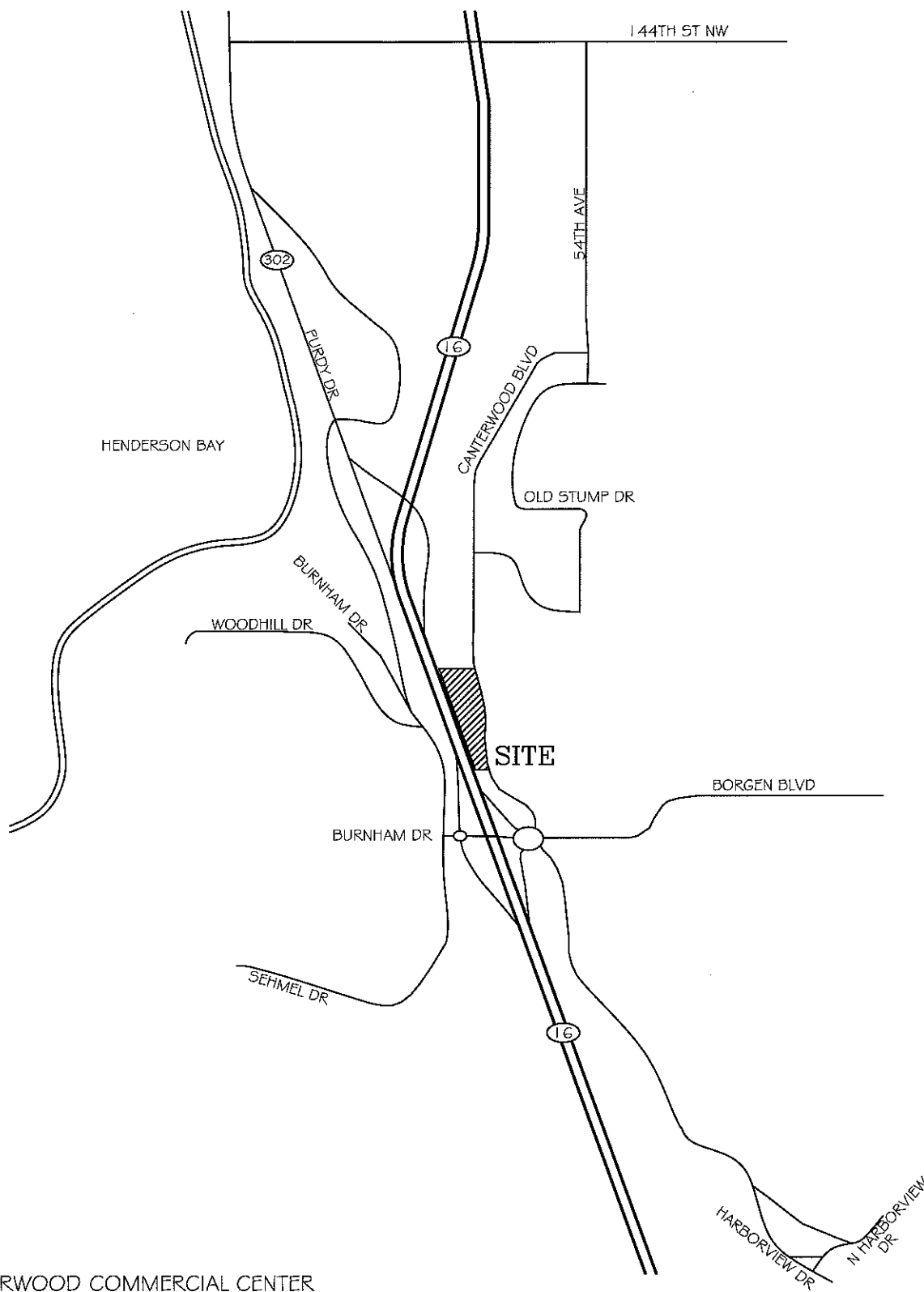
## *II. PROJECT DESCRIPTION*

The proposed project is to be composed of four buildings and five uses on a site located north of Borgen Boulevard. The following uses are proposed for the full buildout of the site.

|            |                                                                            |
|------------|----------------------------------------------------------------------------|
| Building A | 18,300 square feet of General Office                                       |
| Building B | 2,570 square feet of Fast Food with Drive-Thru                             |
| Building C | 2,570 square feet of Fast Food with Drive-Thru                             |
| Building D | 1,280 square feet of Coffee Shop and 3,400 square feet of Specialty Retail |

The site is located on the west side of Canterwood Boulevard NW across from the proposed hospital site. Access for the project is proposed using three new driveways to Canterwood Boulevard. Completion of this development is assumed to be 2016. Figure 1 on the following page shows the general site location and surrounding arterial network.

A site plan outlining the overall lot configuration and internal private roadway is shown in Figure 2.



CANTERWOOD COMMERCIAL CENTER

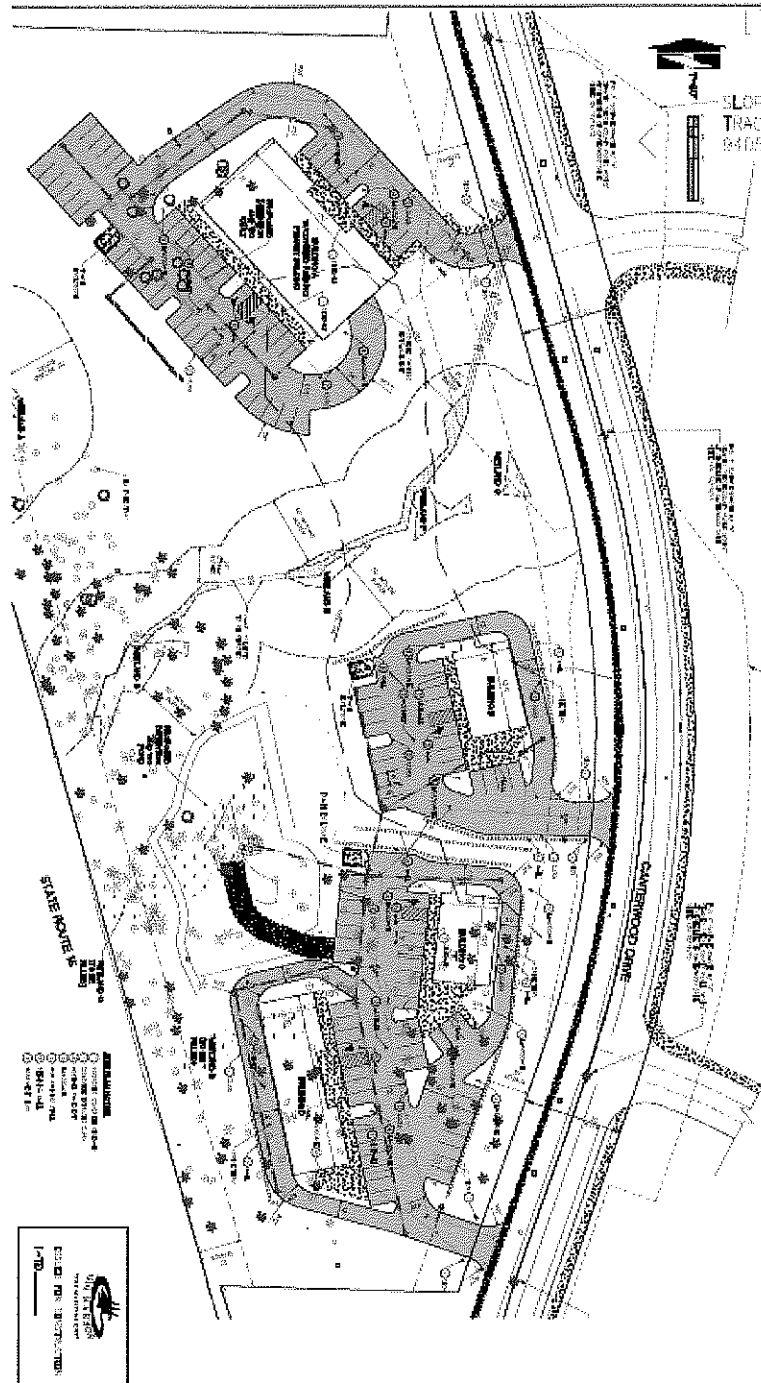


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Transportation and Civil Engineering

VICINITY MAP & ROADWAY SYSTEM

FIGURE 1





# CANTERWOOD COMMERCIAL CENTER

 **HEATH & ASSOCIATES, INC**  
Transportation and Civil Engineering

SITE PLAN

FIGURE 2

### III. EXISTING CONDITIONS

#### A. Surrounding Roadway System

Roadways serving the proposed site consist of two-lane arterials and collector roads which vary in width, terrain, and posted speeds. As indicated by their specific arterial designations, these roadways also vary in their overall function as part of the general network. The nearest regional trunk-line (SR-16) is located just west of the site providing access to Bremerton and Tacoma. The key streets near the site are described below.

*Canterwood Boulevard* is a three-lane roadway which borders the east edge of the site and consists of two lanes southbound and one lane northbound transitioning into a three lane section which includes a two way left turn lane across the project frontage. The posted speed limit is 35 mph. Road surfacing is composed of asphalt concrete while lane widths are 11 to 12 feet. Shoulders and/or bike lanes are 3 to 5 feet wide and are composed of asphalt. Grades are moderately rolling with slopes generally between 0 and 6 percent.

*Borgen Boulevard NW* is an east-west, multi-lane roadway that connects to a roundabout intersection which incorporates the ramps to SR-16. The speed limit is 35 mph and road surfacing is composed of asphalt. Lanes are 11 feet wide, and turn lanes or roundabouts are provided at the shopping center entrances which lie to the east of SR-16. Additionally, a bike lane and/or widened shoulders are provided along the roadway along with a sidewalk on the east side. Grades are rolling with slopes of 0 to 8 percent estimated.

*SR-16* is a designated state highway which lies west of the project. The on-ramps connecting to Burnham Drive provide access to the site from this regional corridor. Pavement surfacing for the ramps consists of asphalt with lane widths of 12 to 13 feet. Shoulders are 4 to 5 feet wide and are composed of asphalt. Roundabouts serve the ramp and Burnham intersections.

#### B. Pedestrian and Bicycle Traffic

Observations for pedestrian and bicycle activity were made along the nearby roadway segments over the course of numerous visits to the area. During the evening peak hour, negligible pedestrian and bicycle activity was noted in the area. As the area builds up the possibility of pedestrians and bicyclists could increase.

#### C. Public Transit

A review of the Pierce Transit regional bus schedule indicates that transit service is not available on *Canterwood Boulevard* with the nearest bus service located on *Borgen* easterly of the project. The uses proposed aside from the office building would not be normally conducive to transit usage. With more activity along *Canterwood* including

activity associated with St. Anthony's Hospital, it can be assumed that a need for transit to this area will increase.

#### D. Sight Distance at Access Driveways

Preliminary examinations of the three proposed project driveways onto Canterwood Boulevard were made to determine whether or not adequate entering and stopping sight distance can be provided for inbound and outbound traffic. Given proper location it appears the entrance sight distance can be achieved. In accordance with established local standards, a minimum entering sight distance (ESD) of 415 feet is typically required for a 35 mph speed limit. A stopping sight distance (SSD) of 325 feet should be available on the roadway as well. Project proponents must verify sight distance and ensure Gig Harbor standards are met for the project entrances once final locations are established based on actual tenants.

### IV. FUTURE TRAFFIC DEMAND

#### A. Trip Generation

Trip generation is used to determine the magnitude of project impacts on the surrounding street system. This is usually denoted by the quantity or specific number of new trips that enter and exit a project during a designated time period, such as a specific peak hour or an entire day. Data presented in this report was taken from the Institute of Transportation Engineers publication, *Trip Generation*, Ninth Edition. The coffee shop information was derived from a study performed by Transportation Planning and Engineering (TP&E). Table 1 below shows the trip generation values used for this study.

A significant amount of the traffic volume associated with fast food and coffee shops are in the form of pass-by trips and diverted trips with only a portion of the project volume defined as new trips to the roadway system. A pass-by trip is defined as a trip made as an intermediate stop on the way to a primary destination. Such a trip is attracted from traffic "passing by" a site on an adjacent street which contains direct access to the generator. In this case the trip to and from the fast food and coffee shops are in some sense "spur of the moment" and convenience based. Pass-by trips are transparent to the roadway system beyond the accesses to the site. According to the ITE Trip Generation Handbook, approximately 50 percent of fast food trips are pass-by and 60 percent or more trips to coffee shops are pass-by. This does not take into account the trips that might be diverted from nearby Borgen Boulevard which results in a further reduction in new trips to the overall street system.

The rates that were used for the analysis in light of the above discussion are shown in Table 1. Included are the PM peak hour generation volumes for the project.

**TABLE 1**  
 Trip Generation - New Trips Only  
 (See Appendix for Total Trip Information)

| <i>Time Period</i> | <i>18.3 ksf<br/>Office</i> | <i>5.14 ksf<br/>Fast Fd</i> | <i>3.4 ksf<br/>Sp. Ret.</i> | <i>1.28 ksf<br/>Coffee</i> |
|--------------------|----------------------------|-----------------------------|-----------------------------|----------------------------|
| PM Peak Inbound    | 5 vph                      | 43 vph                      | 4 vph                       | 27 vph                     |
| PM Peak Outbound   | 22 vph                     | 40 vph                      | 5 vph                       | 28 vph                     |
| PM Peak Total      | 27 vph                     | 83 vph                      | 9 vph                       | 55 vph                     |

The above trips can be further reduced by assuming a some internal trips and to verify the pass-by rate associated with coffee shops. Further analysis can be provided once the final configurations are identified once users have been established.

#### B. Trip Distribution

Trip distribution describes the process by which project generated trips are dispersed on the street network surrounding the site. Site generated trips are expected to follow the trip pattern shown in Figure 3. This figure reflects probable patron trips and employee based trips taken by project traffic during the PM peak hour. Distribution percentages are derived based on the roadway network configuration, routes to SR-16, and the location of nearby residential areas.

#### V. CONCLUSIONS AND MITIGATION

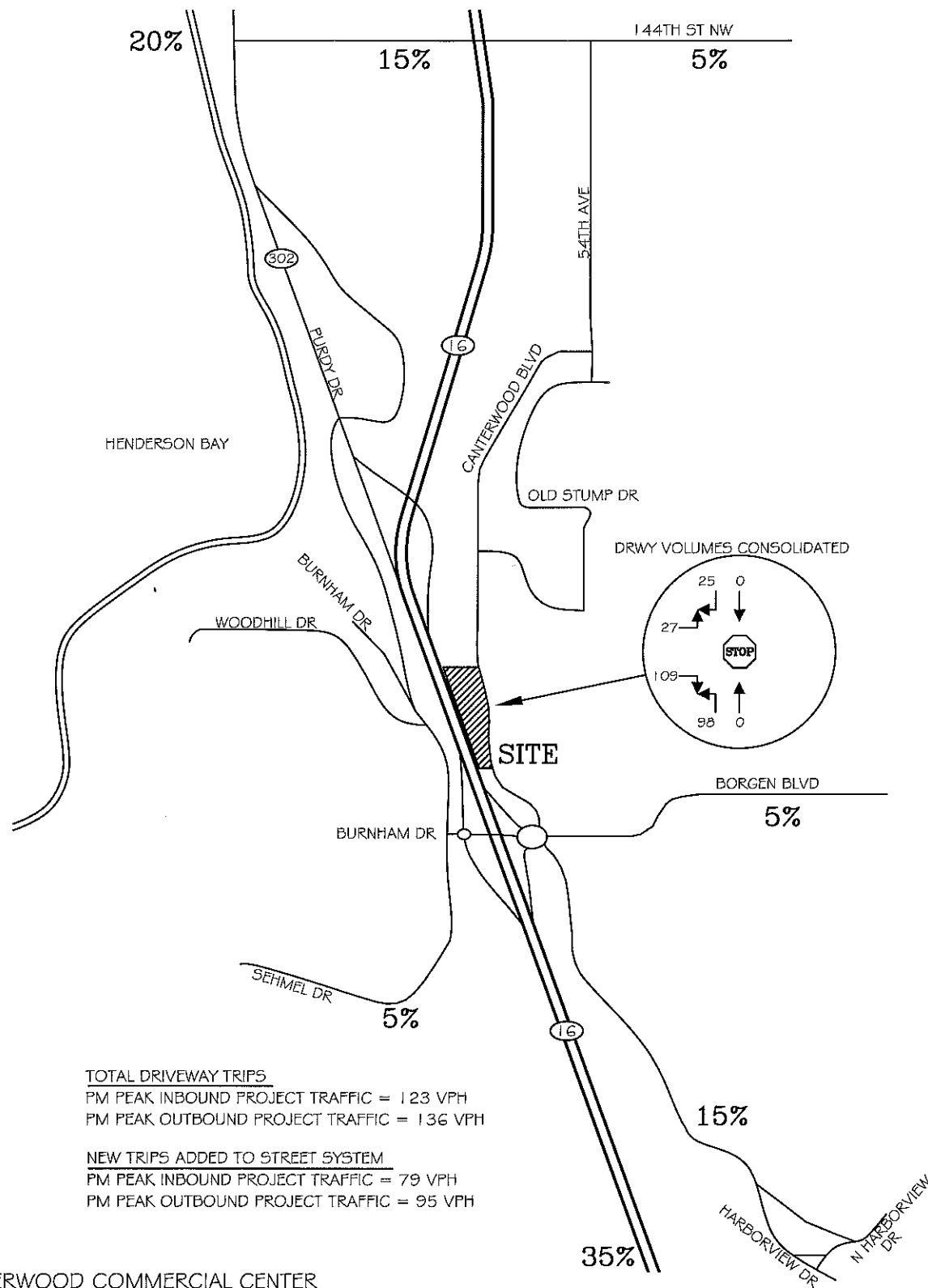
Canterwood Properties project consists of four buildings containing a total of 28,120 square feet. The various uses include general office, fast food with drive thru, specialty retail and coffee shop. Access for the project is proposed via three accesses directly to Canterwood Boulevard. The uses proposed have a large element of pass-by and diverted traffic. New traffic due to the project uses are shown in Table 1. The appendix contains additional information in terms of pass-by for the fast food uses.

The total number of new trips for all four buildings is estimated at 174 PM peak trips with a further reduction due to coffee shop pass-by and some internal trip reduction that is due to the multiple uses. As the appendix material shows this is estimated at 10 PM peak trips but has not been subtracted from the net new trips shown in Table 1.

The following mitigation is proposed.

1. The developer shall construct the frontage improvements along Canterwood Boulevard as determined in concert with the city of Gig Harbor.
2. Pay the applicable mitigation fees as determined by the City of Gig Harbor once final users are defined.





TOTAL DRIVEWAY TRIPS  
PM PEAK INBOUND PROJECT TRAFFIC = 123 VPH  
PM PEAK OUTBOUND PROJECT TRAFFIC = 136 VPH

NEW TRIPS ADDED TO STREET SYSTEM  
PM PEAK INBOUND PROJECT TRAFFIC = 79 VPH  
PM PEAK OUTBOUND PROJECT TRAFFIC = 95 VPH

CANTERWOOD COMMERCIAL CENTER



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TRIP DISTRIBUTION - PROJECT TRAFFIC

FIGURE 3

**CANTERWOOD PROPERTIES  
TRAFFIC ASSESSMENT**

**APPENDIX**

Final Results of Multi-Use Trip Generation  
Average Weekday Driveway Volumes

Project: Canterwood Commercial  
Phase:

Open Date:  
Analysis Date:

Description:

| ITE:Land Use                                                         | 24 Hour<br>Two-Way<br>Volume | AM Pk Hour |      | PM Pk Hour       |                  |
|----------------------------------------------------------------------|------------------------------|------------|------|------------------|------------------|
|                                                                      |                              | Enter      | Exit | Enter            | Exit             |
| 937 : Coffee/Donut Shop with Drive-Thru<br>1.28 Th.Sq.Ft. GFA [R]    | 1048                         | 66         | 63   | 27               | 28               |
| 710 : General Office Building<br>18.3 Th.Sq.Ft. GFA [R]              | 202                          | 25         | 4    | 5                | 22               |
| 934 : Fast-Food Restaurant with Drive-Thru<br>5.14 Th.Sq.Ft. GFA [R] | 2550                         | 119        | 114  | 87               | 81               |
| 826 : Specialty Retail Center<br>3.4 Th.Sq.Ft. GFA [R]               | 151                          | 0          | 0    | 4                | 5                |
| Unadjusted Total Driveway Volume                                     | 3951                         | 210        | 181  | 123              | 136 <--          |
| Unadjusted Peak Hour Pass-By Trips                                   |                              | 58         | 56   | 44               | 41 <-- Minus     |
| Total Peak Hour Internal Vehicle Trips                               |                              | 7          | 7    | 5                | 5                |
| Total Peak Hour Driveway Volume                                      |                              | 203        | 174  | 118              | 131              |
| Total Peak Hour Pass-By Trips                                        |                              | 56         | 54   | 42               | 39               |
| Total Peak Hour Vol. Added to Adjacent Streets                       |                              | 147        | 120  | 79 <del>xx</del> | <del>xx</del> 95 |

Total AM Peak Hour Internal Capture = 4 Percent

Total PM Peak Hour Internal Capture = 4 Percent

Note: A zero indicates no data available.

Source: Institute of Transportation Engineers  
Trip Generation Manual, 9th Edition, 2012  
Transportation Research Board - NCHRP Report 684, 2011

TRIP GENERATION 2013, TRAFFICWARE, LLC

Detailed Average Rate Trip Calculations  
For 18.3 Th.Sq.Ft. GFA of General Office Building(710) - [R]

Project: Canterwood Commercial  
Phase:

Open Date:  
Analysis Date:

Description:

|                            | Average<br>Rate | Standard<br>Deviation | Adjustment<br>Factor | Driveway<br>Volume |
|----------------------------|-----------------|-----------------------|----------------------|--------------------|
| Avg. Weekday 2-Way Volume  | 11.03           | 6.15                  | 1.00                 | 202                |
| 7-9 AM Peak Hour Enter     | 1.37            | 0.00                  | 1.00                 | 25                 |
| 7-9 AM Peak Hour Exit      | 0.19            | 0.00                  | 1.00                 | 4                  |
| 7-9 AM Peak Hour Total     | 1.56            | 1.40                  | 1.00                 | 29                 |
| 4-6 PM Peak Hour Enter     | 0.25            | 0.00                  | 1.00                 | 5                  |
| 4-6 PM Peak Hour Exit      | 1.24            | 0.00                  | 1.00                 | 22                 |
| 4-6 PM Peak Hour Total     | 1.49            | 1.37                  | 1.00                 | 27                 |
| AM Pk Hr, Generator, Enter | 1.37            | 0.00                  | 1.00                 | 25                 |
| AM Pk Hr, Generator, Exit  | 0.19            | 0.00                  | 1.00                 | 4                  |
| AM Pk Hr, Generator, Total | 1.56            | 1.40                  | 1.00                 | 29                 |
| PM Pk Hr, Generator, Enter | 0.25            | 0.00                  | 1.00                 | 5                  |
| PM Pk Hr, Generator, Exit  | 1.24            | 0.00                  | 1.00                 | 22                 |
| PM Pk Hr, Generator, Total | 1.49            | 1.37                  | 1.00                 | 27                 |
| Saturday 2-Way Volume      | 2.46            | 2.21                  | 1.00                 | 45                 |
| Saturday Peak Hour Enter   | 0.23            | 0.00                  | 1.00                 | 4                  |
| Saturday Peak Hour Exit    | 0.20            | 0.00                  | 1.00                 | 4                  |
| Saturday Peak Hour Total   | 0.43            | 0.72                  | 1.00                 | 8                  |
| Sunday 2-Way Volume        | 1.05            | 1.43                  | 1.00                 | 19                 |
| Sunday Peak Hour Enter     | 0.09            | 0.00                  | 1.00                 | 2                  |
| Sunday Peak Hour Exit      | 0.07            | 0.00                  | 1.00                 | 1                  |
| Sunday Peak Hour Total     | 0.16            | 0.44                  | 1.00                 | 3                  |

Note: A zero indicates no data available.

Source: Institute of Transportation Engineers  
Trip Generation Manual, 9th Edition, 2012

TRIP GENERATION 2013, TRAFFICWARE, LLC



Detailed Average Rate Trip Calculations  
For 5.14 Th.Sq.Ft. GFA of Fast-Food Restaurant with Drive-Thru(934) - [R]

Project: Canterwood Commercial  
Phase:

Open Date:  
Analysis Date:

Description:

|                            | Average<br>Rate | Standard<br>Deviation | Adjustment<br>Factor | Driveway<br>Volume |
|----------------------------|-----------------|-----------------------|----------------------|--------------------|
| Avg. Weekday 2-Way Volume  | 496.12          | 242.52                | 1.00                 | 2550               |
| 7-9 AM Peak Hour Enter     | 23.16           | 0.00                  | 1.00                 | 119                |
| 7-9 AM Peak Hour Exit      | 22.26           | 0.00                  | 1.00                 | 114                |
| 7-9 AM Peak Hour Total     | 45.42           | 28.63                 | 1.00                 | 233                |
| 4-6 PM Peak Hour Enter     | 16.98           | 0.00                  | 1.00                 | 87                 |
| 4-6 PM Peak Hour Exit      | 15.67           | 0.00                  | 1.00                 | 81                 |
| 4-6 PM Peak Hour Total     | 32.65           | 19.73                 | 1.00                 | 168                |
| AM Pk Hr, Generator, Enter | 27.34           | 0.00                  | 1.00                 | 141                |
| AM Pk Hr, Generator, Exit  | 26.27           | 0.00                  | 1.00                 | 135                |
| AM Pk Hr, Generator, Total | 53.61           | 26.27                 | 1.00                 | 276                |
| PM Pk Hr, Generator, Enter | 24.60           | 0.00                  | 1.00                 | 126                |
| PM Pk Hr, Generator, Exit  | 22.70           | 0.00                  | 1.00                 | 117                |
| PM Pk Hr, Generator, Total | 47.30           | 25.52                 | 1.00                 | 243                |
| Saturday 2-Way Volume      | 722.03          | 295.62                | 1.00                 | 3711               |
| Saturday Peak Hour Enter   | 30.09           | 0.00                  | 1.00                 | 155                |
| Saturday Peak Hour Exit    | 28.91           | 0.00                  | 1.00                 | 148                |
| Saturday Peak Hour Total   | 59.00           | 22.89                 | 1.00                 | 303                |
| Sunday 2-Way Volume        | 542.72          | 206.86                | 1.00                 | 2790               |
| Sunday Peak Hour Enter     | 34.92           | 0.00                  | 1.00                 | 179                |
| Sunday Peak Hour Exit      | 37.82           | 0.00                  | 1.00                 | 195                |
| Sunday Peak Hour Total     | 72.74           | 11.95                 | 1.00                 | 374                |

Note: A zero indicates no data available.  
Source: Institute of Transportation Engineers  
Trip Generation Manual, 9th Edition, 2012

TRIP GENERATION 2013, TRAFFICWARE, LLC

Summary of Pass-By Trips  
For 5.14 Th.Sq.Ft. GFA of Fast-Food Restaurant with Drive-Thru(934) - [R]

Project: Canterwood Commercial  
Phase:

Open Date:  
Analysis Date:

Description:

---

|                          | Driveway<br>Volume | Pass-By<br>Trips | Volume Added to<br>Adjacent Streets |
|--------------------------|--------------------|------------------|-------------------------------------|
| <hr/>                    |                    |                  |                                     |
| Average Weekday          |                    |                  |                                     |
| 7-9 AM Peak Hour Enter   | 119                | 58               | 61                                  |
| 7-9 AM Peak Hour Exit    | 114                | 56               | 58                                  |
| 7-9 AM Peak Hour Total   | 233                | 114              | 119                                 |
|                          |                    |                  |                                     |
| 4-6 PM Peak Hour Enter   | 87                 | 44               | 43                                  |
| 4-6 PM Peak Hour Exit    | 81                 | 41               | 40                                  |
| 4-6 PM Peak Hour Total   | 168                | 84               | 84                                  |
|                          |                    |                  |                                     |
| Saturday                 |                    |                  |                                     |
| Saturday Peak Hour Enter | 155                | 0                | 155                                 |
| Saturday Peak Hour Exit  | 148                | 0                | 148                                 |
| Saturday Peak Hour Total | 303                | 0                | 303                                 |

---

Pass-By Trips were calculated on the basis of the following:

Weekday A.M. Peak Period Average Pass-By Trip Percentage = 49  
Weekday P.M. Peak Period Average Pass-By Trip Percentage = 50  
Saturday Midday Pk. Pd. Average Pass-By Trip Percentage = 0

Number of Pass-By Studies: 6 for Weekday AM PK PD and 18 for PM PK PD.

---

Note: A zero indicates no data available.

Source: Institute of Transportation Engineers  
Trip Generation Manual, 9th Edition, 2012

TRIP GENERATION 2013, TRAFFICWARE, LLC

Detailed Average Rate Trip Calculations  
For 3.4 Th.Sq.Ft. GFA of Specialty Retail Center(826) - [R]

Project: Canterwood Commercial  
Phase:

Open Date:  
Analysis Date:

Description:

|                            | Average<br>Rate | Standard<br>Deviation | Adjustment<br>Factor | Driveway<br>Volume |
|----------------------------|-----------------|-----------------------|----------------------|--------------------|
| Avg. Weekday 2-Way Volume  | 44.32           | 15.52                 | 1.00                 | 151                |
| 7-9 AM Peak Hour Enter     | 0.00            | 0.00                  | 1.00                 | 0                  |
| 7-9 AM Peak Hour Exit      | 0.00            | 0.00                  | 1.00                 | 0                  |
| 7-9 AM Peak Hour Total     | 0.00            | 0.00                  | 1.00                 | 0                  |
| 4-6 PM Peak Hour Enter     | 1.19            | 0.00                  | 1.00                 | 4                  |
| 4-6 PM Peak Hour Exit      | 1.52            | 0.00                  | 1.00                 | 5                  |
| 4-6 PM Peak Hour Total     | 2.71            | 1.83                  | 1.00                 | 9                  |
| AM Pk Hr, Generator, Enter | 3.28            | 0.00                  | 1.00                 | 11                 |
| AM Pk Hr, Generator, Exit  | 3.56            | 0.00                  | 1.00                 | 12                 |
| AM Pk Hr, Generator, Total | 6.84            | 3.55                  | 1.00                 | 23                 |
| PM Pk Hr, Generator, Enter | 2.81            | 0.00                  | 1.00                 | 10                 |
| PM Pk Hr, Generator, Exit  | 2.21            | 0.00                  | 1.00                 | 7                  |
| PM Pk Hr, Generator, Total | 5.02            | 2.31                  | 1.00                 | 17                 |
| Saturday 2-Way Volume      | 42.04           | 13.97                 | 1.00                 | 143                |
| Saturday Peak Hour Enter   | 0.00            | 0.00                  | 1.00                 | 0                  |
| Saturday Peak Hour Exit    | 0.00            | 0.00                  | 1.00                 | 0                  |
| Saturday Peak Hour Total   | 0.00            | 0.00                  | 1.00                 | 0                  |
| Sunday 2-Way Volume        | 20.43           | 10.27                 | 1.00                 | 69                 |
| Sunday Peak Hour Enter     | 0.00            | 0.00                  | 1.00                 | 0                  |
| Sunday Peak Hour Exit      | 0.00            | 0.00                  | 1.00                 | 0                  |
| Sunday Peak Hour Total     | 0.00            | 0.00                  | 1.00                 | 0                  |

Note: A zero indicates no data available.

Source: Institute of Transportation Engineers  
Trip Generation Manual, 9th Edition, 2012

TRIP GENERATION 2013, TRAFFICWARE, LLC

Detailed Average Rate Trip Calculations  
For 1.28 Th.Sq.Ft. GFA of Coffee/Donut Shop with Drive-Thru(937) - [R]

Project: Canterwood Commercial  
Phase:

Open Date:  
Analysis Date:

Description:

|                            | Average<br>Rate | Standard<br>Deviation | Adjustment<br>Factor | Driveway<br>Volume |
|----------------------------|-----------------|-----------------------|----------------------|--------------------|
| Avg. Weekday 2-Way Volume  | 818.58          | 0.00                  | 1.00                 | 1048               |
| 7-9 AM Peak Hour Enter     | 51.30           | 0.00                  | 1.00                 | 66                 |
| 7-9 AM Peak Hour Exit      | 49.28           | 0.00                  | 1.00                 | 63                 |
| 7-9 AM Peak Hour Total     | 100.58          | 49.38                 | 1.00                 | 129                |
| 4-6 PM Peak Hour Enter     | 21.40           | 0.00                  | 1.00                 | 27                 |
| 4-6 PM Peak Hour Exit      | 21.40           | 0.00                  | 1.00                 | 28                 |
| 4-6 PM Peak Hour Total     | 42.80           | 18.06                 | 1.00                 | 55                 |
| AM Pk Hr, Generator, Enter | 49.69           | 0.00                  | 1.00                 | 64                 |
| AM Pk Hr, Generator, Exit  | 51.71           | 0.00                  | 1.00                 | 66                 |
| AM Pk Hr, Generator, Total | 101.40          | 45.90                 | 1.00                 | 130                |
| PM Pk Hr, Generator, Enter | 18.44           | 0.00                  | 1.00                 | 24                 |
| PM Pk Hr, Generator, Exit  | 17.72           | 0.00                  | 1.00                 | 22                 |
| PM Pk Hr, Generator, Total | 36.16           | 19.50                 | 1.00                 | 46                 |
| Saturday 2-Way Volume      | 0.00            | 0.00                  | 1.00                 | 0                  |
| Saturday Peak Hour Enter   | 42.26           | 0.00                  | 1.00                 | 54                 |
| Saturday Peak Hour Exit    | 42.26           | 0.00                  | 1.00                 | 54                 |
| Saturday Peak Hour Total   | 84.52           | 33.38                 | 1.00                 | 108                |
| Sunday 2-Way Volume        | 0.00            | 0.00                  | 1.00                 | 0                  |
| Sunday Peak Hour Enter     | 0.00            | 0.00                  | 1.00                 | 0                  |
| Sunday Peak Hour Exit      | 0.00            | 0.00                  | 1.00                 | 0                  |
| Sunday Peak Hour Total     | 0.00            | 0.00                  | 1.00                 | 0                  |

Note: A zero indicates no data available.

Source: Institute of Transportation Engineers  
Trip Generation Manual, 9th Edition, 2012

TRIP GENERATION 2013, TRAFFICWARE, LLC

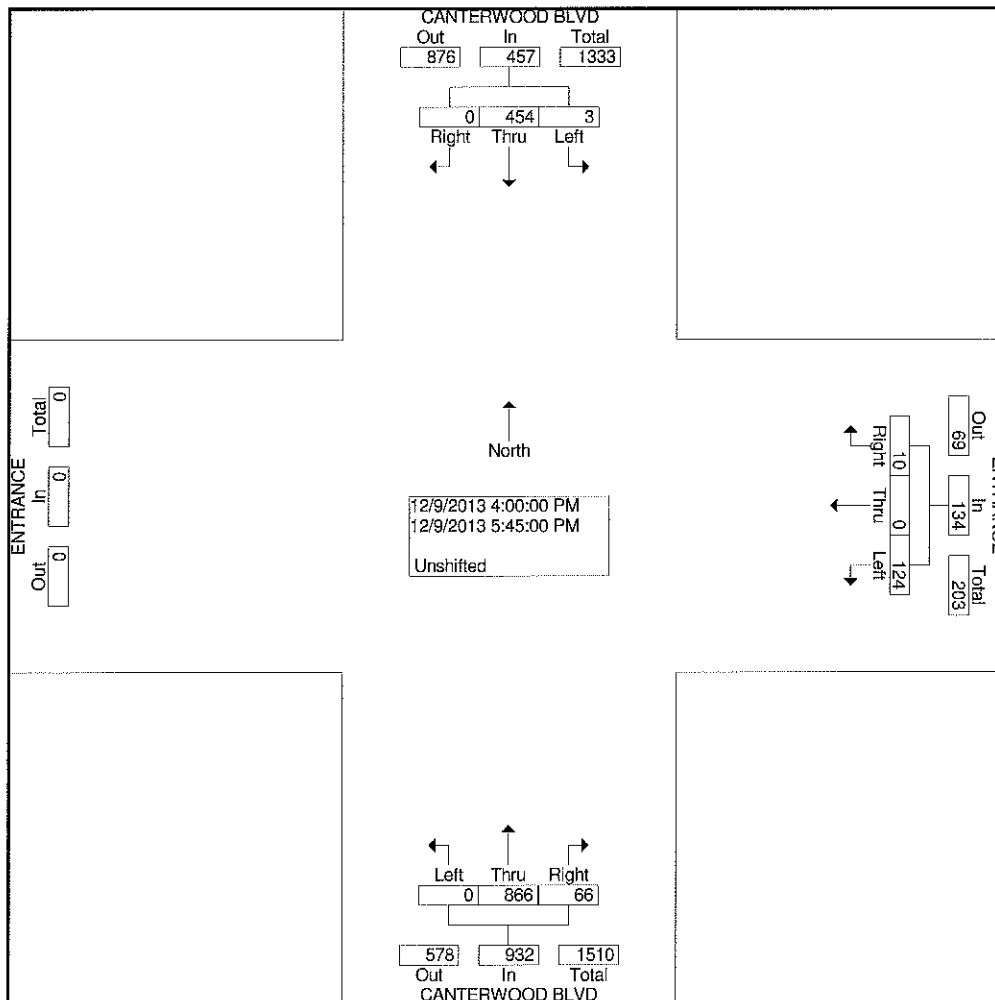


Heath & Associates, Inc.  
2214 Tacoma Road  
Puyallup, WA 98371

File Name : 3467a  
Site Code : 00003467  
Start Date : 12/9/2013  
Page No : 1

Groups Printed- Unshifted

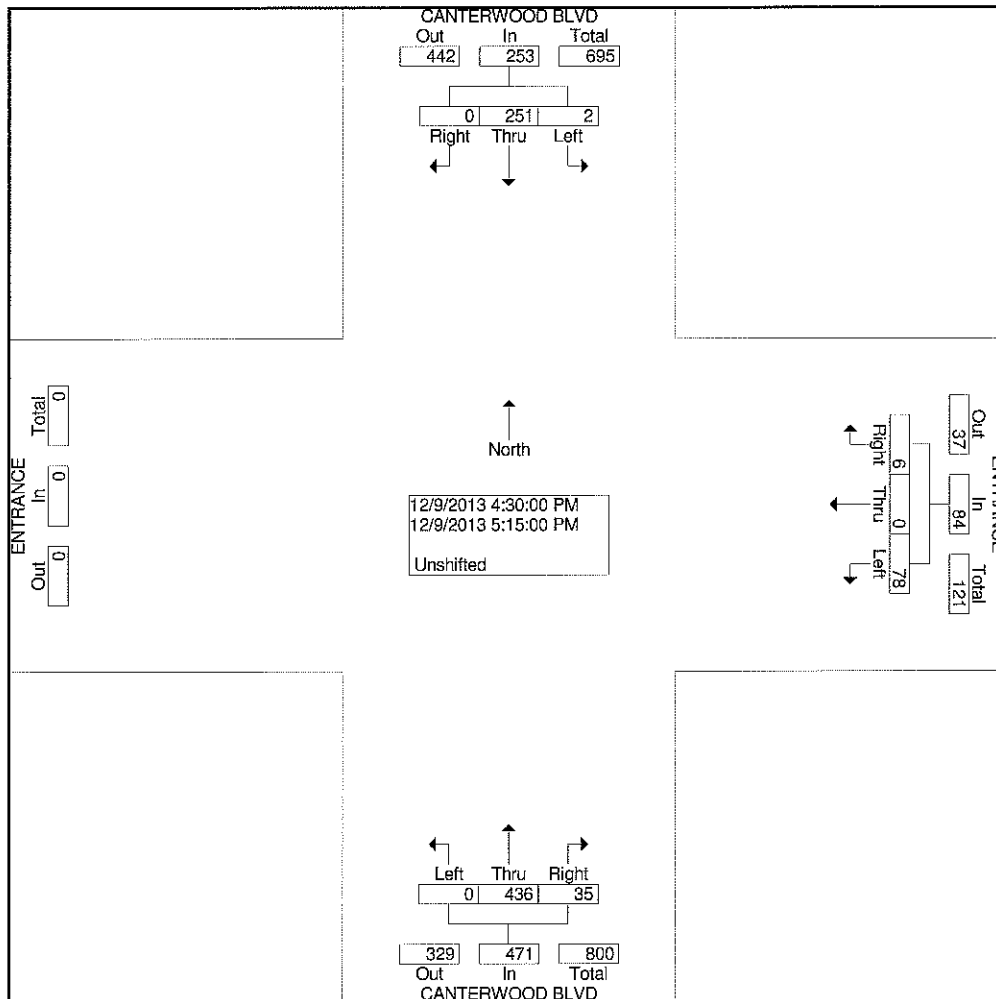
|             | CANTERWOOD BLVD<br>Southbound |      |      | ENTRANCE<br>Westbound |      |      | CANTERWOOD BLVD<br>Northbound |      |      |            |
|-------------|-------------------------------|------|------|-----------------------|------|------|-------------------------------|------|------|------------|
| Start Time  | Right                         | Thru | Left | Right                 | Thru | Left | Right                         | Thru | Left | Int. Total |
| Factor      | 1.0                           | 1.0  | 1.0  | 1.0                   | 1.0  | 1.0  | 1.0                           | 1.0  | 1.0  |            |
| 04:00 PM    | 0                             | 56   | 0    | 1                     | 0    | 18   | 7                             | 104  | 0    | 186        |
| 04:15 PM    | 0                             | 64   | 0    | 1                     | 0    | 10   | 11                            | 103  | 0    | 189        |
| 04:30 PM    | 0                             | 62   | 0    | 2                     | 0    | 27   | 11                            | 101  | 0    | 203        |
| 04:45 PM    | 0                             | 76   | 1    | 1                     | 0    | 21   | 12                            | 115  | 0    | 226        |
| Total       | 0                             | 258  | 1    | 5                     | 0    | 76   | 41                            | 423  | 0    | 804        |
| 05:00 PM    | 0                             | 56   | 0    | 0                     | 0    | 12   | 4                             | 115  | 0    | 187        |
| 05:15 PM    | 0                             | 57   | 1    | 3                     | 0    | 18   | 8                             | 105  | 0    | 192        |
| 05:30 PM    | 0                             | 41   | 1    | 0                     | 0    | 9    | 4                             | 108  | 0    | 163        |
| 05:45 PM    | 0                             | 42   | 0    | 2                     | 0    | 9    | 9                             | 115  | 0    | 177        |
| Total       | 0                             | 196  | 2    | 5                     | 0    | 48   | 25                            | 443  | 0    | 719        |
| Grand Total | 0                             | 454  | 3    | 10                    | 0    | 124  | 66                            | 866  | 0    | 1523       |
| Apprch %    | 0.0                           | 99.3 | 0.7  | 7.5                   | 0.0  | 92.5 | 7.1                           | 92.9 | 0.0  |            |
| Total %     | 0.0                           | 29.8 | 0.2  | 0.7                   | 0.0  | 8.1  | 4.3                           | 56.9 | 0.0  |            |



Heath & Associates, Inc.  
2214 Tacoma Road  
Puyallup, WA 98371

File Name : 3467a  
Site Code : 00003467  
Start Date : 12/9/2013  
Page No : 2

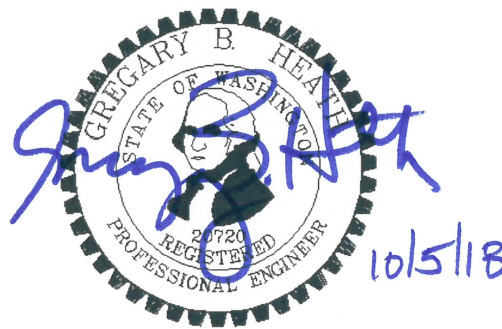
|                                                   | CANTERWOOD BLVD<br>Southbound |      |      |               | ENTRANCE<br>Westbound |      |      |               | CANTERWOOD BLVD<br>Northbound |      |      |               |            |
|---------------------------------------------------|-------------------------------|------|------|---------------|-----------------------|------|------|---------------|-------------------------------|------|------|---------------|------------|
| Start Time                                        | Right                         | Thru | Left | App.<br>Total | Right                 | Thru | Left | App.<br>Total | Right                         | Thru | Left | App.<br>Total | Int. Total |
| Peak Hour From 04:00 PM to 05:45 PM - Peak 1 of 1 |                               |      |      |               |                       |      |      |               |                               |      |      |               |            |
| Intersection                                      | 04:30 PM                      |      |      |               |                       |      |      |               |                               |      |      |               |            |
| Volume                                            | 0                             | 251  | 2    | 253           | 6                     | 0    | 78   | 84            | 35                            | 436  | 0    | 471           | 808        |
| Percent                                           | 0.0                           | 99.2 | 0.8  |               | 7.1                   | 0.0  | 92.9 |               | 7.4                           | 92.6 | 0.0  |               |            |
| 04:45 Volume                                      | 0                             | 76   | 1    | 77            | 1                     | 0    | 21   | 22            | 12                            | 115  | 0    | 127           | 226        |
| Peak Factor                                       |                               |      |      |               |                       |      |      |               |                               |      |      |               | 0.894      |
| High Int.                                         | 04:45 PM                      |      |      |               | 04:30 PM              |      |      |               | 04:45 PM                      |      |      |               |            |
| Volume                                            | 0                             | 76   | 1    | 77            | 2                     | 0    | 27   | 29            | 12                            | 115  | 0    | 127           |            |
| Peak Factor                                       | 0.821                         |      |      |               |                       |      |      |               | 0.927                         |      |      |               |            |





CANTERWOOD COMMERCIAL UPDATE  
TRIP GENERATION ASSESSMENT

*City of Gig Harbor, WA*



Prepared for: Mr. Jason Hubbell  
Barghausen Engineers  
18215 72nd Ave S  
Kent, WA 98032

October 2018

CANTERWOOD COMMERCIAL UPDATE  
TRIP GENERATION ASSESSMENT

## 1. PROJECT DESCRIPTION

This assessment is intended to analyze the net trip difference with respect to the original “Canterwood Commercial Center” Level 1 Traffic Impact Analysis dated January of 2014. The scope of the project has changed in terms of use and size configurations. An analysis using the most recent ITE trip generation data will be used for trip comparisons.

The project proposes to remain at the subject property located on the west side of Canterwood Boulevard NW and across from the hospital. The original and revised scope of the project is summarized in the table below.

**Table 1**  
Project Summary Comparison

| Previous |                           |                       | Proposed |                               |                       |
|----------|---------------------------|-----------------------|----------|-------------------------------|-----------------------|
| Building | Use                       | Size<br>(square feet) | Building | Use                           | Size<br>(square feet) |
| A        | Office                    | 18,300                | A        | Office                        | 18,000                |
| B        | Fast Food w/<br>DT        | 2,570                 | B        | Fast Food w/<br>DT            | 2,609                 |
| C        | Fast Food w/<br>DT        | 2,570                 | C        | Fast Food w/<br>DT            | 2,609                 |
| D        | Coffee Shop<br>and Retail | 1,280 &<br>3,400      | D        | Fast Food w/<br>DT and Retail | 1,400 &<br>3,660      |

Changes include minor adjustments to square footages and the exclusions of the coffee shop. Estimated previous and new site generated traffic is summarized below.

## 2. TRIP GENERATION

Trip generation is defined by the number of vehicle movements that enter or exit a site for a specific time period. This assessment focuses on the critical PM peak hour of the day. Table 2 on the following page illustrates the net comparison with respect to the previous 2014 proposal to the new proposal. With the recent publishing, data presented in this report was taken from the Institute of Transportation Engineer's publication *Trip Generation*, 10th Edition with the exception of Specialty Retail as there is no similar land use code in the newest manual. All previous rates were derived from *Trip Generation*, 9th Edition. Refer to the appendix for trip generation output.



**Table 2**  
Project Trip Generation – Difference

| Land Use              | Size<br>(square feet) | PM Peak-Hour Trips |            |            |
|-----------------------|-----------------------|--------------------|------------|------------|
|                       |                       | In                 | Out        | Total      |
| <u>Previous</u>       |                       |                    |            |            |
| Office                | 18,300                | 5                  | 22         | <b>27</b>  |
| Fast Food             | 5,140                 | 43                 | 40         | <b>83</b>  |
| Retail                | 3,400                 | 4                  | 5          | <b>9</b>   |
| Coffee                | 1,280                 | 27                 | 28         | <b>55</b>  |
| Total Previous Trips  |                       | 79                 | 95         | <b>174</b> |
| <u>Proposed</u>       |                       |                    |            |            |
| Office                | 18,000                | 3                  | 18         | <b>21</b>  |
| Fast Food             | 6,618                 | 56                 | 52         | <b>108</b> |
| Retail                | 3,600                 | 4                  | 6          | <b>10</b>  |
| Total Proposed Trips  |                       | 63                 | 76         | <b>139</b> |
| <b>Net Difference</b> |                       | <b>-16</b>         | <b>-19</b> | <b>-35</b> |

As shown in Table 2, a net reduction in overall site traffic is anticipated. Coffee stands are high generators of traffic and thus, primarily account for the calculated reduction of traffic. Consistent with the previous TIA, a 50 percent reduction for pass-by trips were calculated into the fast food rates.

### 3. SUMMARY

Canterwood Commercial Update proposes for the construction of four new buildings comprised of uses as summarized in Table 1. A trip generation summary was conducted due to the revised site configuration. Accounting for the new square footages and elimination of the coffee stand, an overall **net reduction** of 35 pm peak hour trips in site traffic is calculated. In addition, new trip rates were derived from the most recent ITE trip generation manual, 10th Edition. No net new impact is anticipated with the proposed project.

CANTERWOOD COMMERCIAL UPDATE  
TRIP GENERATION ASSESSMENT

*APPENDIX*

## General Office Building (710)

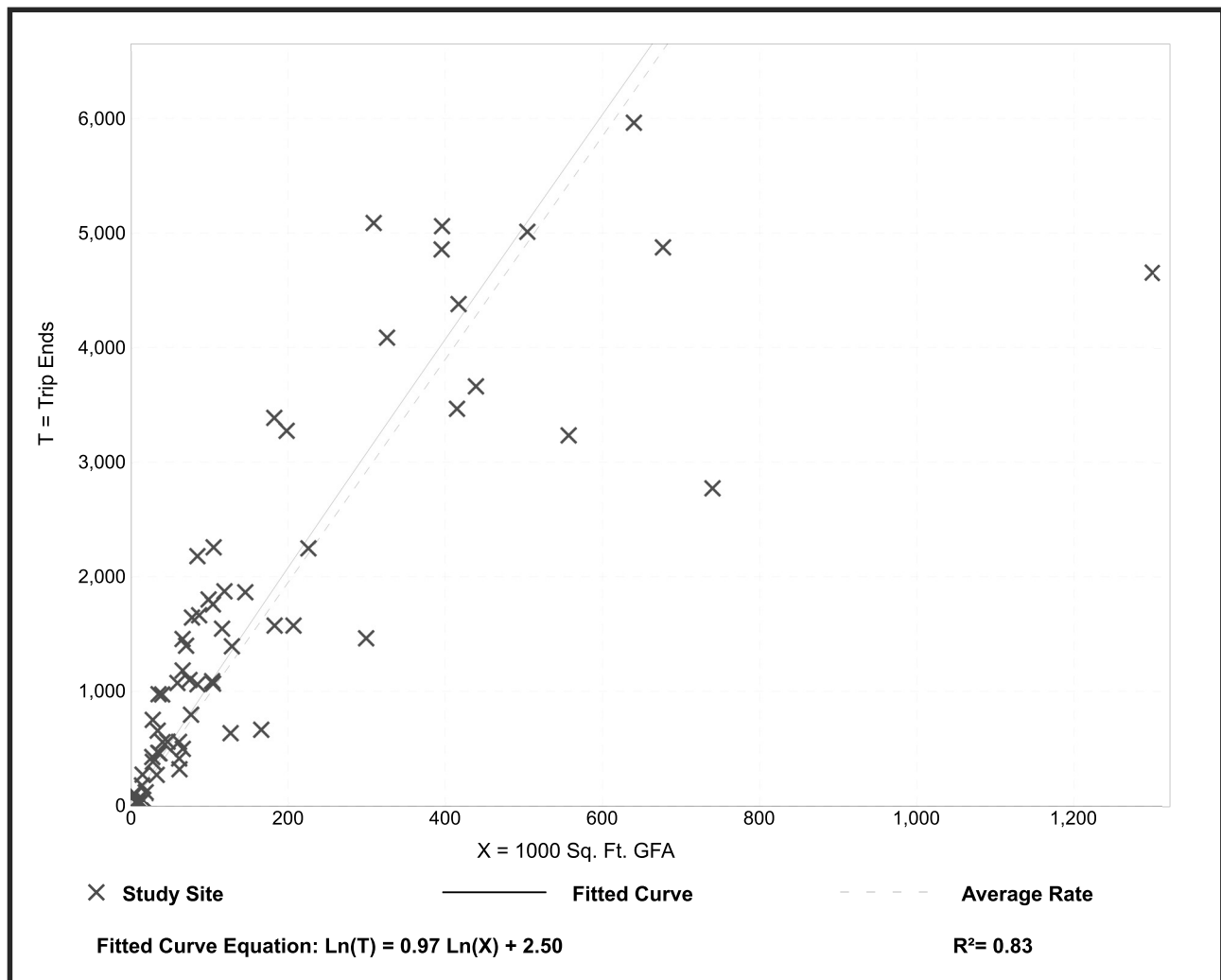
Vehicle Trip Ends vs: 1000 Sq. Ft. GFA  
On a: Weekday

Setting/Location: General Urban/Suburban  
Number of Studies: 66  
Avg. 1000 Sq. Ft. GFA: 171  
Directional Distribution: 50% entering, 50% exiting

### Vehicle Trip Generation per 1000 Sq. Ft. GFA

| Average Rate | Range of Rates | Standard Deviation |
|--------------|----------------|--------------------|
| 9.74         | 2.71 - 27.56   | 5.15               |

### Data Plot and Equation



Trip Generation Manual, 10th Edition • Institute of Transportation Engineers

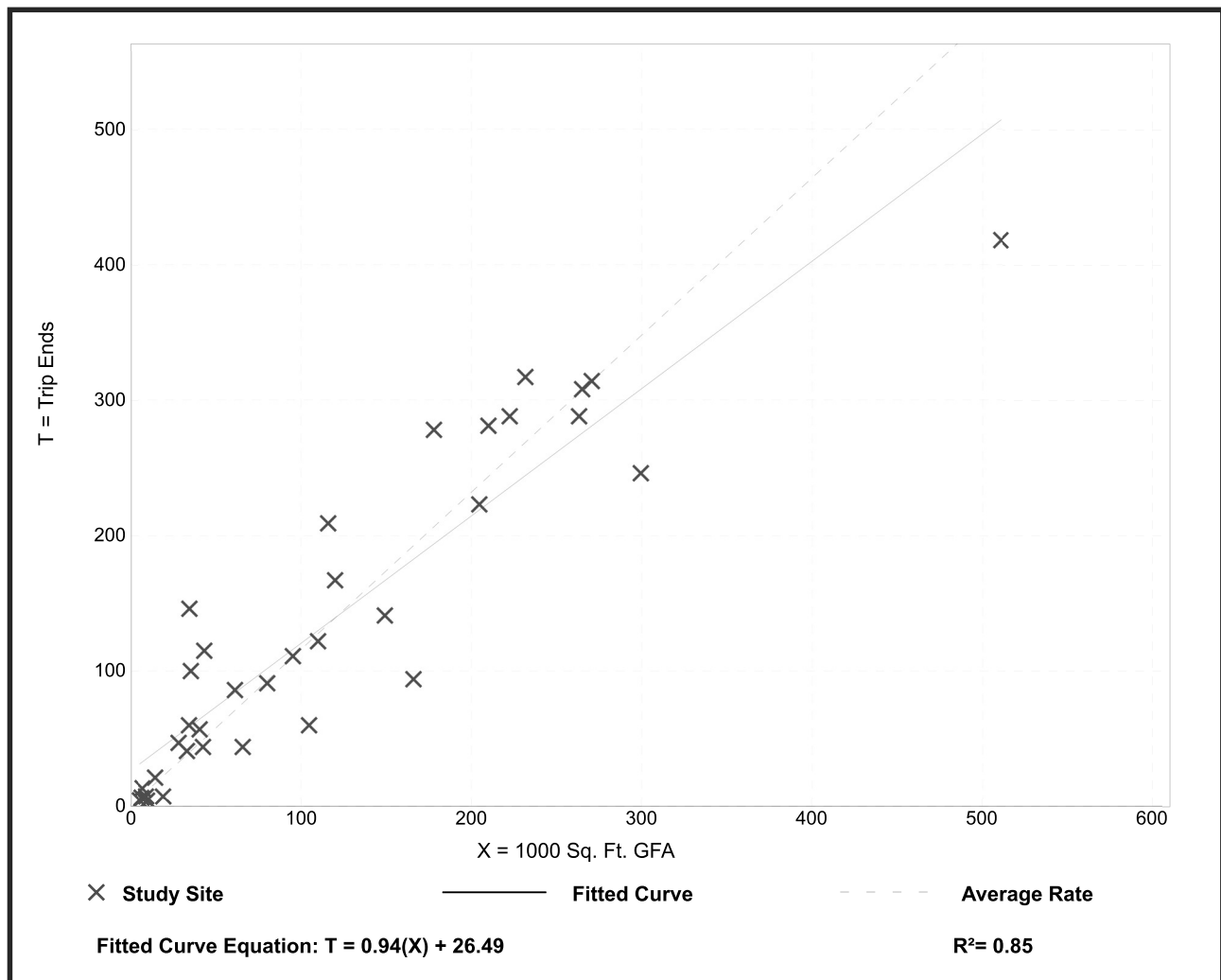
## General Office Building (710)

**Vehicle Trip Ends vs: 1000 Sq. Ft. GFA**  
**On a: Weekday,**  
**Peak Hour of Adjacent Street Traffic,**  
**One Hour Between 7 and 9 a.m.**  
**Setting/Location: General Urban/Suburban**  
 Number of Studies: 35  
 Avg. 1000 Sq. Ft. GFA: 117  
 Directional Distribution: 86% entering, 14% exiting

### Vehicle Trip Generation per 1000 Sq. Ft. GFA

| Average Rate | Range of Rates | Standard Deviation |
|--------------|----------------|--------------------|
| 1.16         | 0.37 - 4.23    | 0.47               |

### Data Plot and Equation



Trip Generation Manual, 10th Edition • Institute of Transportation Engineers



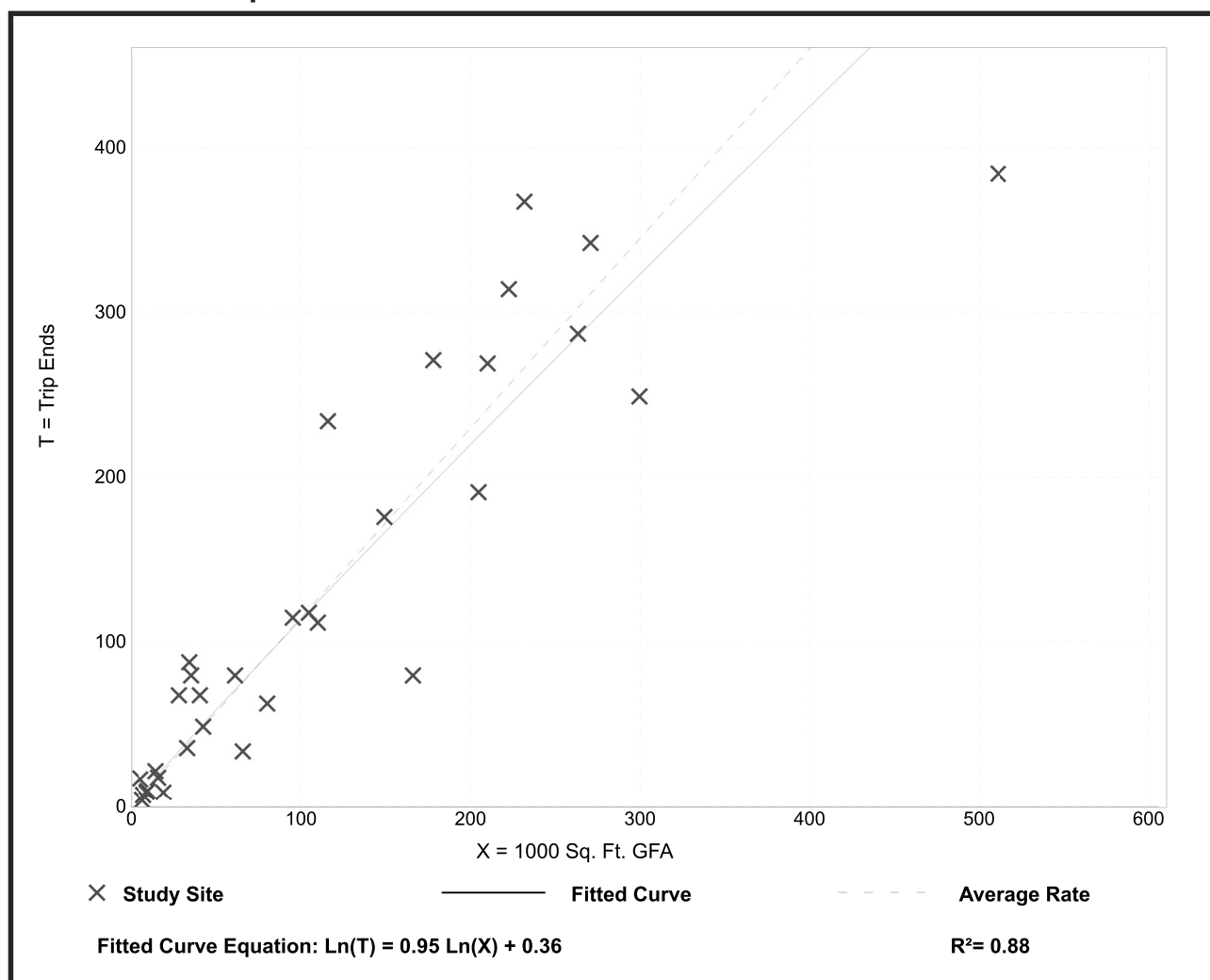
## General Office Building (710)

**Vehicle Trip Ends vs: 1000 Sq. Ft. GFA**  
**On a: Weekday,**  
**Peak Hour of Adjacent Street Traffic,**  
**One Hour Between 4 and 6 p.m.**  
**Setting/Location: General Urban/Suburban**  
 Number of Studies: 32  
 Avg. 1000 Sq. Ft. GFA: 114  
 Directional Distribution: 16% entering, 84% exiting

### Vehicle Trip Generation per 1000 Sq. Ft. GFA

| Average Rate | Range of Rates | Standard Deviation |
|--------------|----------------|--------------------|
| 1.15         | 0.47 - 3.23    | 0.42               |

### Data Plot and Equation



Trip Generation Manual, 10th Edition • Institute of Transportation Engineers

## Fast-Food Restaurant with Drive-Through Window (934)

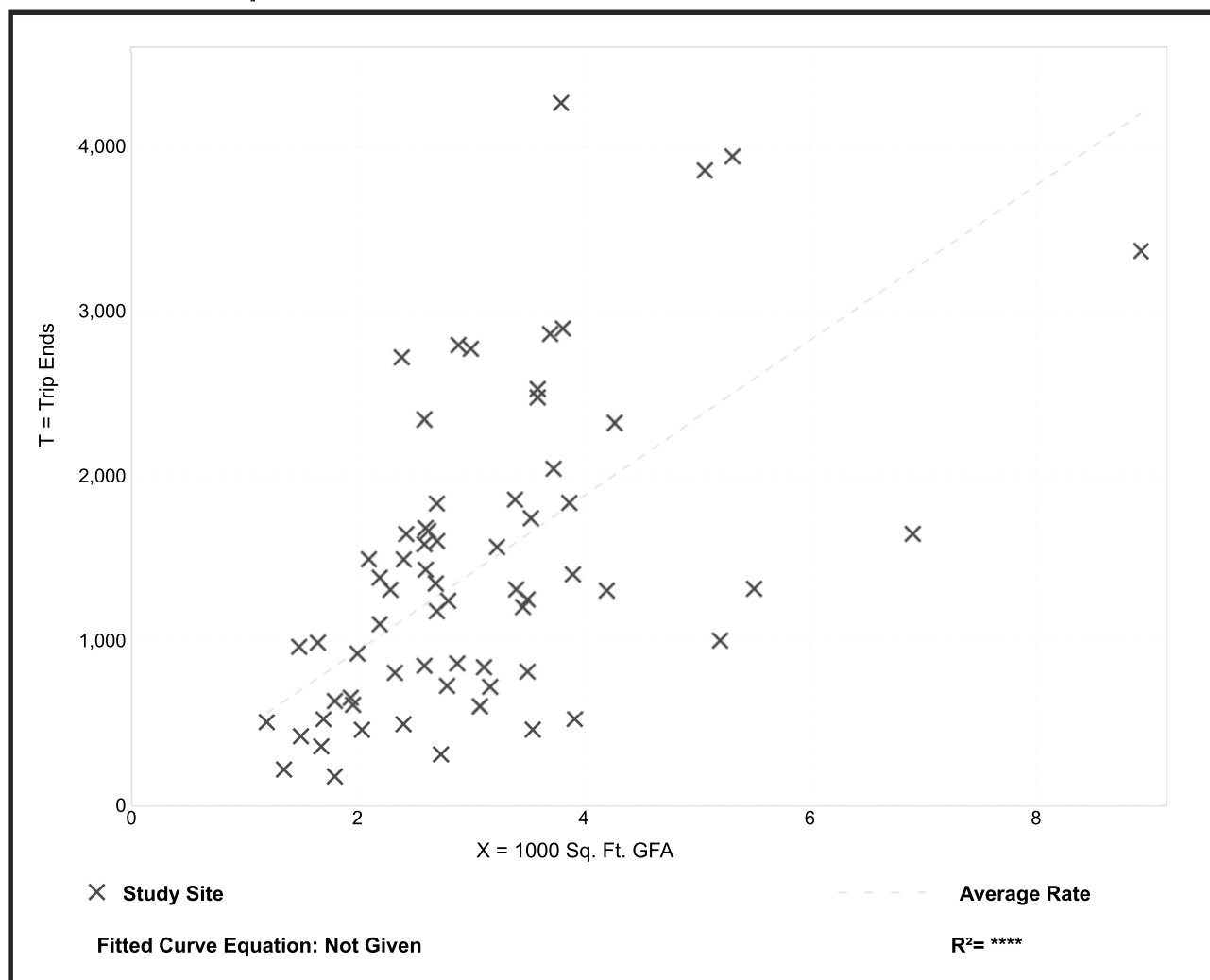
Vehicle Trip Ends vs: 1000 Sq. Ft. GFA  
On a: Weekday

Setting/Location: General Urban/Suburban  
Number of Studies: 67  
Avg. 1000 Sq. Ft. GFA: 3  
Directional Distribution: 50% entering, 50% exiting

### Vehicle Trip Generation per 1000 Sq. Ft. GFA

| Average Rate | Range of Rates  | Standard Deviation |
|--------------|-----------------|--------------------|
| 470.95       | 98.89 - 1137.66 | 244.44             |

### Data Plot and Equation



Trip Generation Manual, 10th Edition • Institute of Transportation Engineers

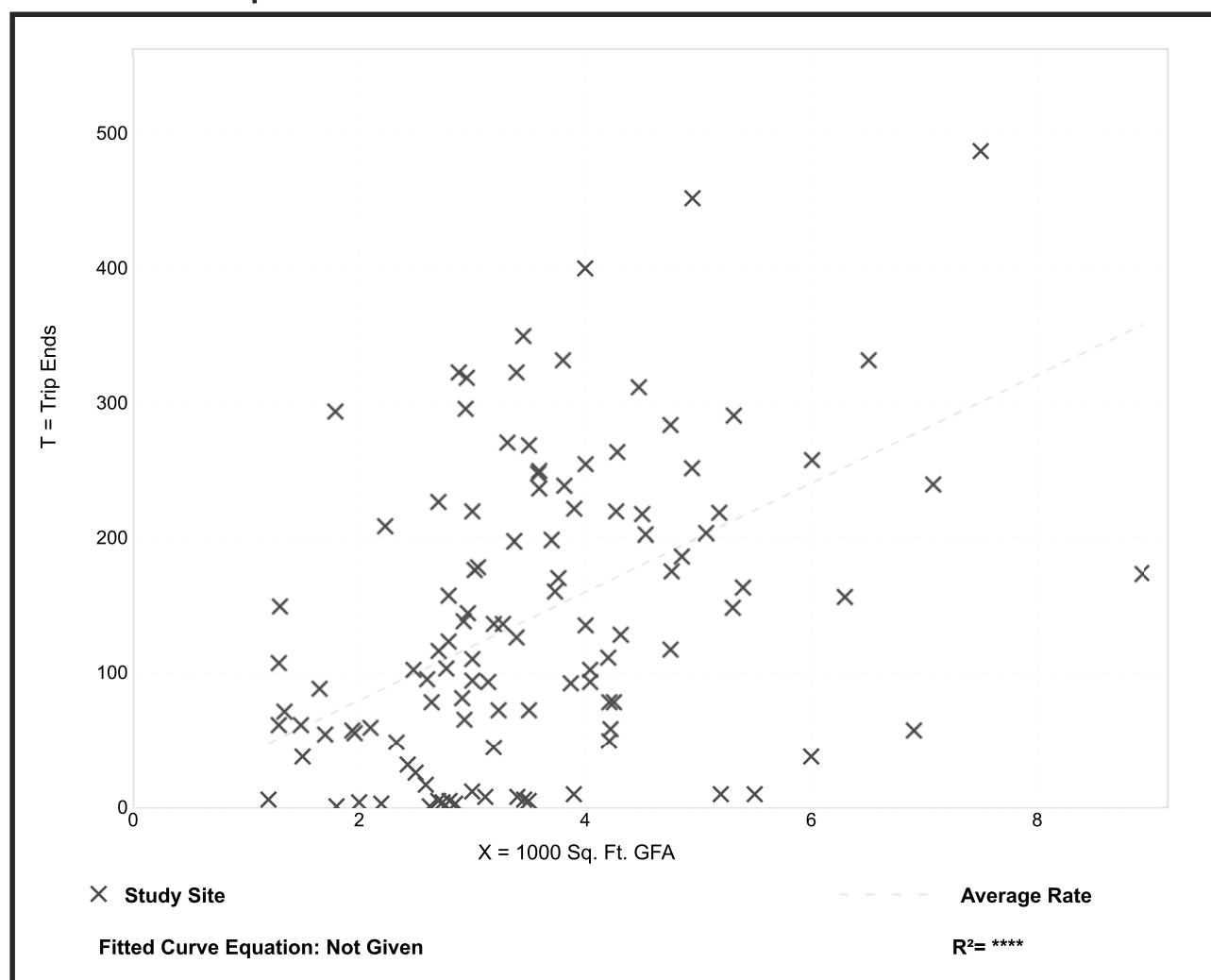
## Fast-Food Restaurant with Drive-Through Window (934)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA  
 On a: Weekday,  
 Peak Hour of Adjacent Street Traffic,  
 One Hour Between 7 and 9 a.m.  
 Setting/Location: General Urban/Suburban  
 Number of Studies: 111  
 Avg. 1000 Sq. Ft. GFA: 4  
 Directional Distribution: 51% entering, 49% exiting

### Vehicle Trip Generation per 1000 Sq. Ft. GFA

| Average Rate | Range of Rates | Standard Deviation |
|--------------|----------------|--------------------|
| 40.19        | 0.38 - 164.25  | 28.78              |

### Data Plot and Equation



Trip Generation Manual, 10th Edition • Institute of Transportation Engineers

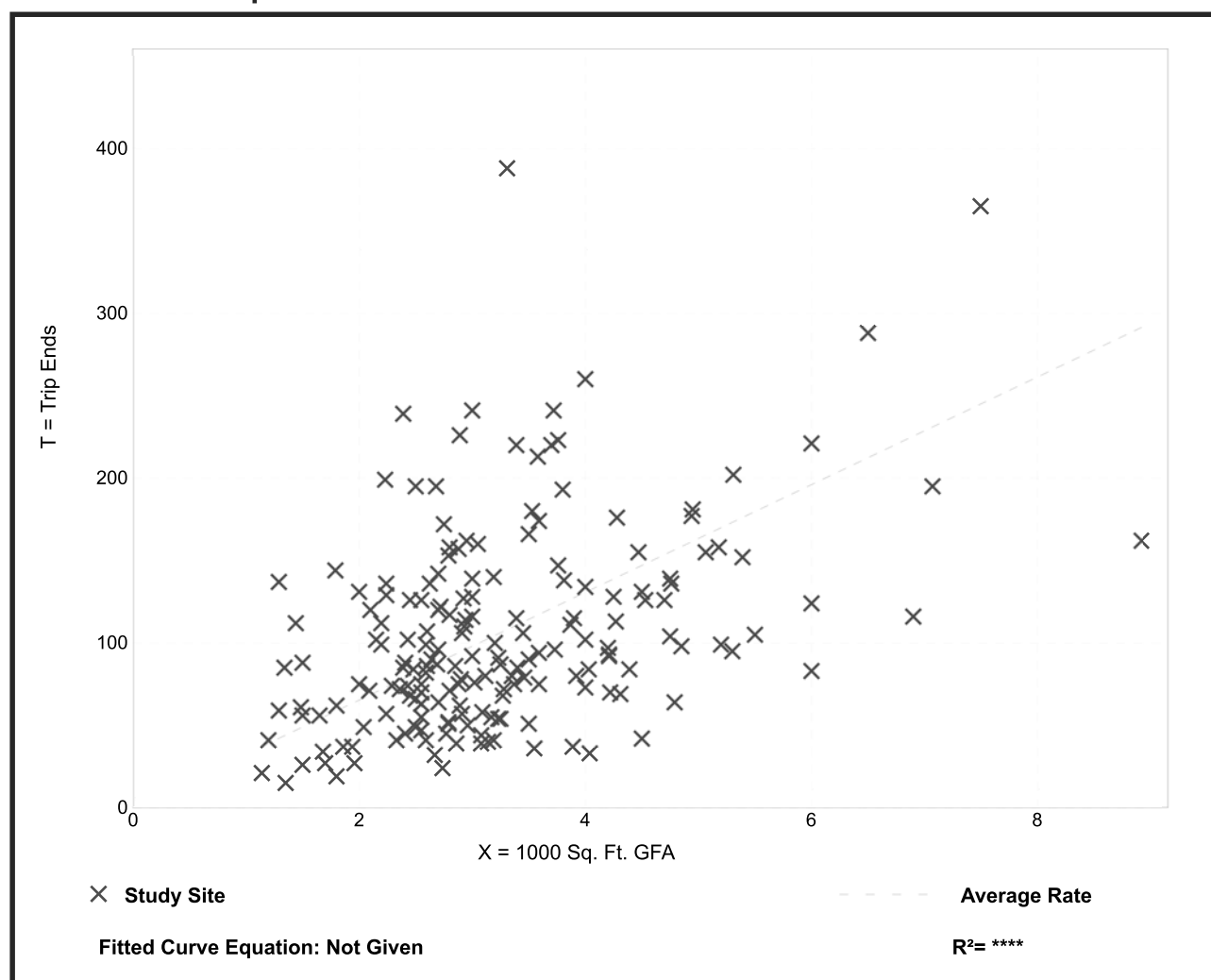
## Fast-Food Restaurant with Drive-Through Window (934)

**Vehicle Trip Ends vs:** 1000 Sq. Ft. GFA  
**On a:** Weekday,  
 Peak Hour of Adjacent Street Traffic,  
 One Hour Between 4 and 6 p.m.  
**Setting/Location:** General Urban/Suburban  
 Number of Studies: 185  
 Avg. 1000 Sq. Ft. GFA: 3  
 Directional Distribution: 52% entering, 48% exiting

### Vehicle Trip Generation per 1000 Sq. Ft. GFA

| Average Rate | Range of Rates | Standard Deviation |
|--------------|----------------|--------------------|
| 32.67        | 8.17 - 117.22  | 17.87              |

### Data Plot and Equation



*Trip Generation Manual*, 10th Edition • Institute of Transportation Engineers



# Specialty Retail Center (826)

Average Vehicle Trip Ends vs: 1000 Sq. Feet Gross Leasable Area  
On a: Weekday

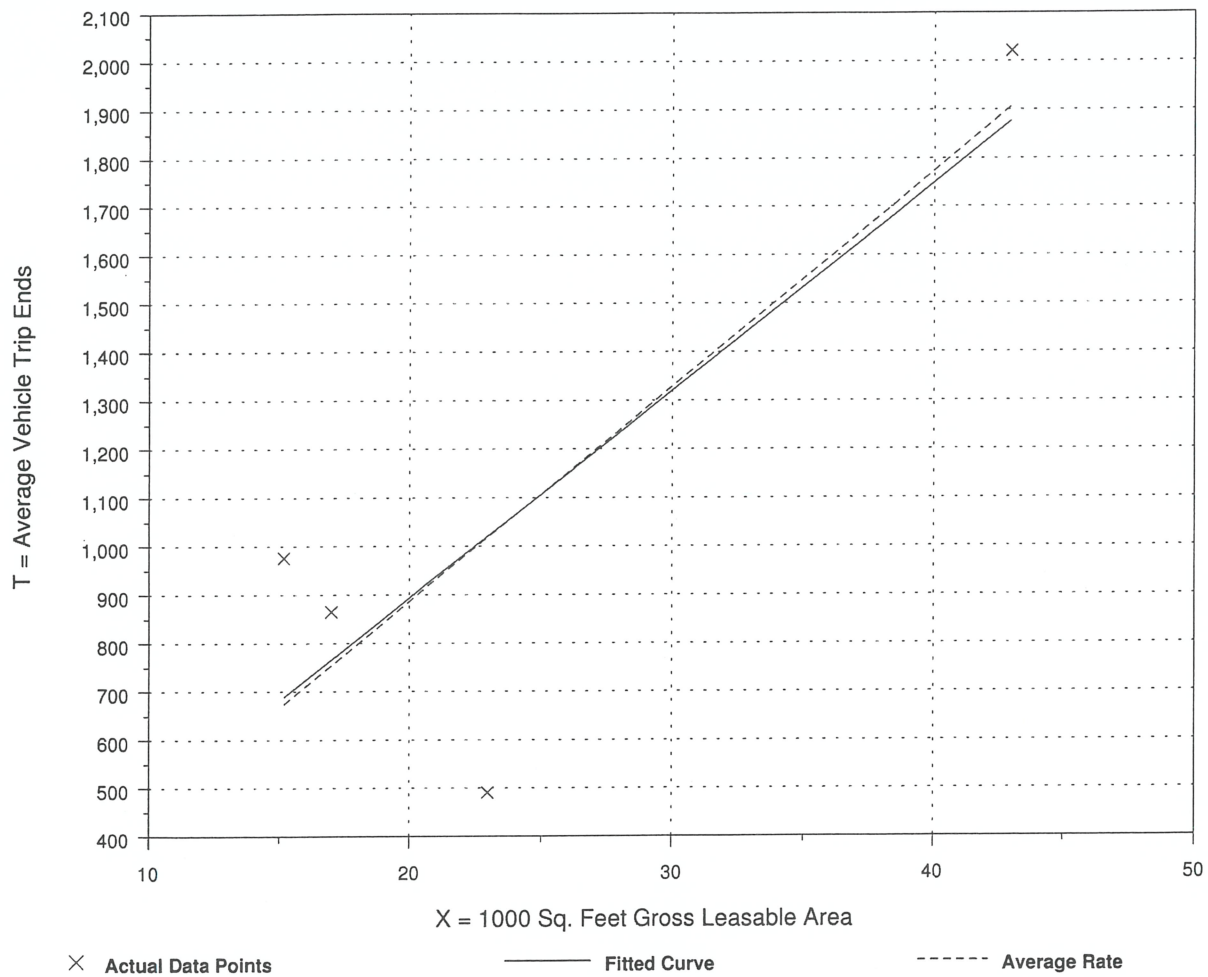
Number of Studies: 4  
Average 1000 Sq. Feet GLA: 25  
Directional Distribution: 50% entering, 50% exiting

## Trip Generation per 1000 Sq. Feet Gross Leasable Area

| Average Rate | Range of Rates | Standard Deviation |
|--------------|----------------|--------------------|
| 44.32        | 21.30 - 64.21  | 15.52              |

## Data Plot and Equation

*Caution - Use Carefully - Small Sample Size*



Fitted Curve Equation:  $T = 42.78(X) + 37.66$

$R^2 = 0.69$

# Specialty Retail Center (826)

**Average Vehicle Trip Ends vs: 1000 Sq. Feet Gross Leasable Area**  
**On a: Weekday,**  
**Peak Hour of Adjacent Street Traffic,**  
**One Hour Between 4 and 6 p.m.**

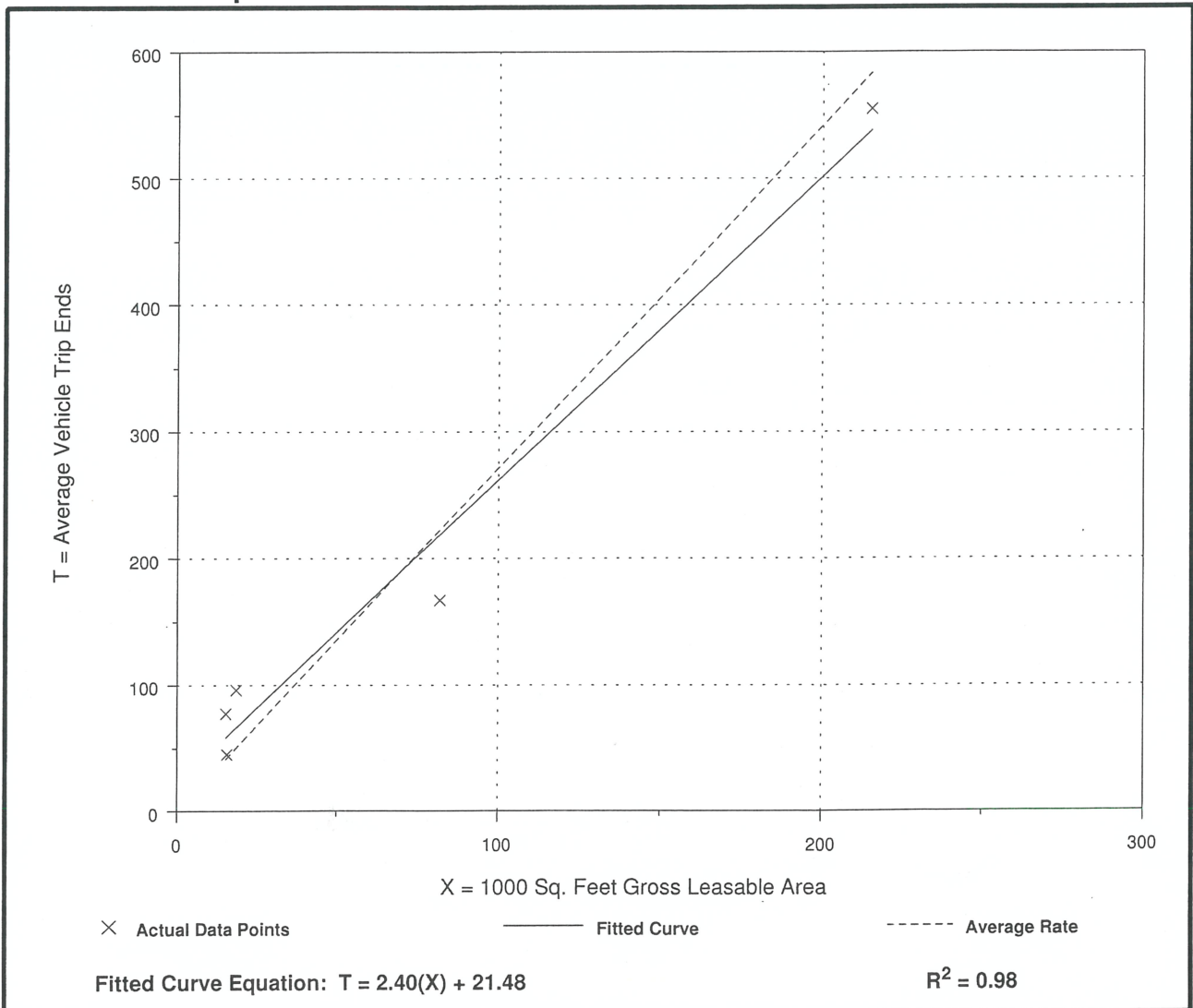
Number of Studies: 5  
Average 1000 Sq. Feet GLA: 69  
Directional Distribution: 44% entering, 56% exiting

## Trip Generation per 1000 Sq. Feet Gross Leasable Area

| Average Rate | Range of Rates | Standard Deviation |
|--------------|----------------|--------------------|
| 2.71         | 2.03 - 5.16    | 1.83               |

## Data Plot and Equation

*Caution - Use Carefully - Small Sample Size*



**TABLE 1**  
Trip Generation - New Trips Only  
(See Appendix for Total Trip Information)

| <i>Time Period</i> | <i>18.3 ksf<br/>Office</i> | <i>5.14 ksf<br/>Fast Fd</i> | <i>3.4 ksf<br/>Sp. Ret.</i> | <i>1.28 ksf<br/>Coffee</i> |
|--------------------|----------------------------|-----------------------------|-----------------------------|----------------------------|
| PM Peak Inbound    | 5 vph                      | 43 vph                      | 4 vph                       | 27 vph                     |
| PM Peak Outbound   | 22 vph                     | 40 vph                      | 5 vph                       | 28 vph                     |
| PM Peak Total      | 27 vph                     | 83 vph                      | 9 vph                       | 55 vph                     |

The above trips can be further reduced by assuming a some internal trips and to verify the pass-by rate associated with coffee shops. Further analysis can be provided once the final configurations are identified once users have been established.

#### B. Trip Distribution

Trip distribution describes the process by which project generated trips are dispersed on the street network surrounding the site. Site generated trips are expected to follow the trip pattern shown in Figure 3. This figure reflects probable patron trips and employee based trips taken by project traffic during the PM peak hour. Distribution percentages are derived based on the roadway network configuration, routes to SR-16, and the location of nearby residential areas.

#### V. CONCLUSIONS AND MITIGATION

Canterwood Properties project consists of four buildings containing a total of 28,120 square feet. The various uses include general office, fast food with drive thru, specialty retail and coffee shop. Access for the project is proposed via three accesses directly to Canterwood Boulevard. The uses proposed have a large element of pass-by and diverted traffic. New traffic due to the project uses are shown in Table 1. The appendix contains additional information in terms of pass-by for the fast food uses.

The total number of new trips for all four buildings is estimated at 174 PM peak trips with a further reduction due to coffee shop pass-by and some internal trip reduction that is due to the multiple uses. As the appendix material shows this is estimated at 10 PM peak trips but has not been subtracted from the net new trips shown in Table 1.

The following mitigation is proposed.

1. The developer shall construct the frontage improvements along Canterwood Boulevard as determined in concert with the city of Gig Harbor.
2. Pay the applicable mitigation fees as determined by the City of Gig Harbor once final users are defined.



CANTERWOOD COMMERCIAL  
TRAFFIC IMPACT ANALYSIS

*City of Gig Harbor, WA*



Prepared for: Mr. Jason Hubbell  
Barghausen Engineers  
18215 72nd Ave S  
Kent, WA 98032

*Revised*  
January 2021





January 25, 2021

Aaron Hulst, P.E.  
City Engineer  
City of Gig Harbor

Subject: Canterwood Commercial TIA Update

The Canterwood Commercial Transportation Impact Analysis (TIA) has been revised per your November 2020 review comments. Intersection data using the City's 2017 counts were included for both roundabouts along Borgen Blvd. Numbers were adjusted via a one percent compound annual growth rate through 2021 to reflect baseline traffic conditions. This growth rate was aligned with the City's Transportation Plan in the general Borgen Blvd area.

The intersection of Borgen Blvd/Burnham Dr & Canterwood Blvd/SR 16 WB Ramp is shown to operate at LOS D with or without project based on the forecast 2023 PM peak hour. All intersections are shown to meet City LOS standards.

Other miscellaneous comments regarding the trip generation have been addressed in the report.

Please feel free to contact me should you have any questions.

Thank you,

Gregary B Heath, P.E., PTOE

# CANTERWOOD COMMERCIAL TRAFFIC IMPACT ANALYSIS

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# CANTERWOOD COMMERCIAL TRAFFIC IMPACT ANALYSIS

## 1. INTRODUCTION

The main goals of this study focus on the assessment of existing roadway conditions and forecasts of newly generated project traffic. The first task includes the collection of general roadway information, public transportation information, and entering sight distance data. Forecasts of future traffic and dispersion patterns on the street system are then determined using established trip generation and distribution techniques. As a final step, appropriate conclusions and mitigation measures are defined if needed.

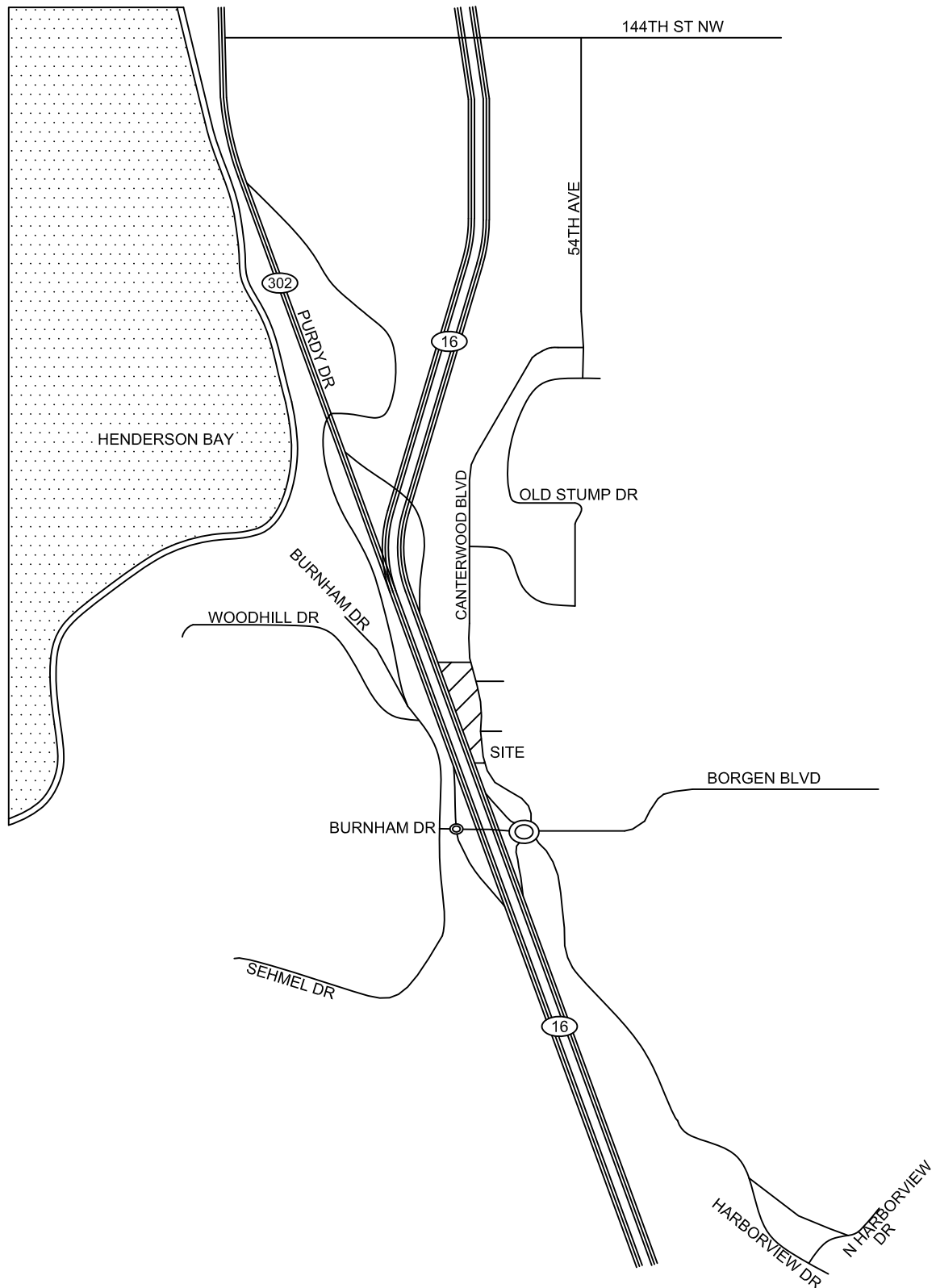
## 2. PROJECT DESCRIPTION

The Canterwood Commercial project proposes to construct four new buildings encompassing 3 land uses located in the city of Gig Harbor. The subject site is located on an undeveloped 7.60-acres within tax parcel #: 0122254090. A breakdown of the proposed land uses per building upon full buildout is provided below.

**Table 1: Land Use Summary**

| <b>Building</b> | <b>Use</b>                 | <b>Size</b><br>(square feet) |
|-----------------|----------------------------|------------------------------|
| A               | Office                     | 18,000                       |
| B               | Fast Food w/ DT            | 2,609                        |
| C               | Fast Food w/ DT            | 2,609                        |
| D               | Fast Food w/ DT and Retail | 1,400 & 3,660                |

The subject site is bordered to the east by Canterwood Boulevard, located opposite the St. Anthony Hospital. Access to the site is proposed via three driveways extending west from Canterwood Boulevard. Two of these driveways are aligned with the existing hospital driveways, while the third is to be located in between them. The northern driveway will serve the office land use (Building A), while the two southern-most driveways will serve Buildings B, C and D. Figure 1 on the following page shows the general site location and roadway network serving the site. A site plan illustrating the overall configuration of the project is given on Figure 2.



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**CANTERWOOD COMMERCIAL**  
VICINITY MAP & ROADWAY SYSTEM  
FIGURE 1





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SITE PLAN  
FIGURE 2

### 3. EXISTING CONDITIONS

#### 3.1 Existing Roadway Characteristics

The development is primarily served by *Canterwood Boulevard*, a north-south minor arterial bordering the east side of the project site. Adjacent the subject site, the road cross-section consists of one 11- to 12-foot travel lane in each direction and a two-way left-turn lane. Shoulders consist of narrow paved segments along the west side of the roadway. Along the east side of the roadway, shoulders consist of a 5.5-foot wide paved bike lane, curb, gutter and sidewalk. The roadway has a posted speed limit of 35 mph.

#### 3.2 Non-Motorist Traffic

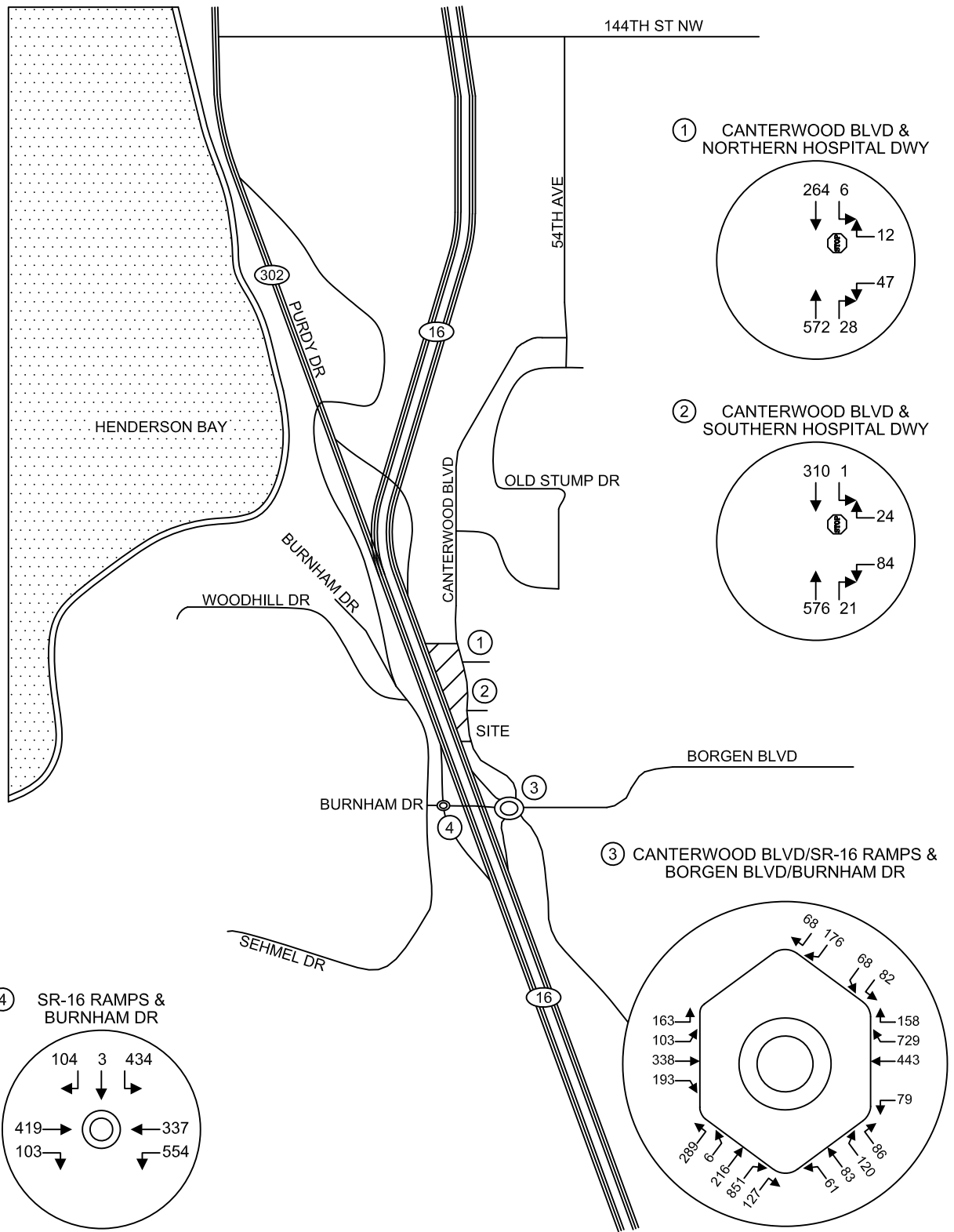
Observations for pedestrian and bicycle activity were made at the project frontage along Canterwood Boulevard. During the PM peak hour, 6 pedestrians and 5 bicyclists were observed. Sidewalks and bike lanes are provided along the eastern side of Canterwood Boulevard. Canterwood Commercial plans to construct frontage improvements to match those in the vicinity, providing safe mobility for non-motorist passer-by traffic along the project frontage.

#### 3.3 Existing Peak Hour Volumes and Travel Patterns

Per City of Gig Harbor's request, baseline intersection volumes were derived from the City's 2017 traffic counts. Furthermore, current counts were collected at the hospital's north and south driveways to obtain turning movements. Listed below are the study intersections.

- Canterwood Blvd & Northern Hospital Entrance (Heath, 2020)
- Canterwood Blvd & Southern Hospital Entrance (Heath, 2020)
- Canterwood Blvd/Burnham Dr & SR-16 WB Ramps/Borgen Blvd (City, 2017)
- Burnham Dr & SR-16 EB Ramps (City, 2017)

Counts were collected and/or administered between the 4:00-6:00 PM timeframe to evaluate peak roadway conditions. As mentioned, historic City counts were used given the current COVID-19 pandemic which has been shown to affect normal traffic patterns. The City's 2017 counts have been increased via a one percent annual growth rate through 2021 to reflect current baseline conditions. This growth rate is higher than what is listed in the City's Transportation Plan which indicates less than one percent growth forecasted in the general Borgen Blvd area between 2017-2030. Baseline 2021 PM peak hour volumes are presented in Figure 3. Through volumes at the hospital entrances were derived from the City's adjusted volumes. Full-count sheets are provided in the appendix.



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**CANTERWOOD COMMERCIAL**  
BASELINE 2021 PM PEAK HOUR VOLUMES  
FIGURE 3

### 3.4 Roadway Improvements

A review of the current City of Gig Harbor Six-Year Transportation Improvement Program (2021-2026) indicates that the following projects are planned in the project's vicinity.

Descriptions of the nearest projects are provided in Table 2 below.

**Table 2: Transportation Improvement Projects**

| <b>Name</b>                                               | <b>Location</b>                        | <b>Improvement</b>                                                                                                 | <b>Cost</b> |
|-----------------------------------------------------------|----------------------------------------|--------------------------------------------------------------------------------------------------------------------|-------------|
| Metering Roundabout at SR16/Burnham Interchange (P.N.: 5) | Intersection                           | Install metering at the eastbound approach of the roundabout located at westbound SR-16/Burnham Interchange        | \$700,000   |
| Burnham Drive: Phases I & II (P.N.: 6 & 19)               | N Harborview Dr to SR-16 Interchange   | Reconstruction, minor widening, turn lanes, curb, gutter, sidewalk, etc.                                           | \$3,630,000 |
| Burnham Drive Bridge - Restripe to 4 lanes (P.N.: 18)     | SR-16 EB Off-Ramp to SR-16 WB Off-Ramp | Restripe the Burnham Drive bridge between the roundabouts so there are 4 through-lanes (2 per direction)           | \$400,000   |
| Pedestrian Bridge over SR-16 (P.N.: 20)                   | Near Burnham Dr bridge                 | Construct a pedestrian bridge over SR-16 in the vicinity of the Burnham Dr Interchange in conjunction with P.N. 19 | \$750,000   |
| Cushman Trail Phase 5 Design (P.N.: 28)                   | Borgen trailhead to Kitsap County line | Design Phase 5 of the Cushman Trail from the existing Borgen trailhead to the Pierce/Kitsap county line            | \$400,000   |

### 3.5 Transit Service

A review of the Pierce Transit regional bus schedule shows that Route 101 – Gig Harbor Trolley would typically provide summer service in the vicinity of the proposed development. The nearest stop is provided at the intersection of Borgen Boulevard & 51st Avenue. Route 101 provides convenient service between the historic downtown Gig Harbor waterfront district, Harbor Hill and the Uptown shopping district. Trolleys run daily every 30 minutes in the summer months. Trolleys also connect with other routes at the Kimball Drive Park & Ride. Due to the COVID-19 pandemic, no service appears to be provided at this time, as it cannot begin until Phase IV is reached. Service is planned to return Summer 2021. Refer to the Pierce Transit regional bus schedule for further information.



### 3.6 Sight Distance at Access Driveways

Assessments of the proposed access driveways were made to determine whether or not adequate entering sight distance (ESD) can be provided for project traffic. Sight distance requirements were obtained from the *American Association of State Highway and Transportation Officials* (AASHTO) standards for left- and right-turn movements. Based on a 35-mph speed limit, requirements of 390 of unobstructed view is needed for outbound movements to safely enter the roadway. With proper frontage improvements made along the west side of Canterwood Boulevard, no sight deficiencies are identified based on a preliminary view of the proposed access locations. A final survey may be provided to ensure visibility requirements are met.

## 4. FUTURE TRAFFIC CONDITIONS

### 4.1 Trip Generation

Trip generation is used to determine the magnitude of project impacts on the surrounding street system. This is usually denoted by the quantity or specific number of new trips that enter and exit a project during a designated time period, such as a specific peak hour (AM or PM) or an entire day. Data presented in this report was primarily taken from the Institute of Transportation Engineer's publication *Trip Generation*, 10th Edition with the exception of Specialty Retail as there is no similar land use code in the newest manual. The designated land use for this project is defined as General Office Building (LUC 710), Fast Food with Drive-Through Window (LUC 934) and Specialty Retail (LUC 826)<sup>1</sup>. Included are the average weekday daily traffic (AWDT) and the AM and PM peak hours for each respective use. Additionally, the table specifies which uses will utilize which proposed access (northern vs. consolidated southern access). Trip generation is summarized in Table 3.

**Table 3: Project Trip Generation**

| Land Use                  | Size     | AWDT | AM Peak-Hour Trips |     |       | PM Peak-Hour Trips |     |       |
|---------------------------|----------|------|--------------------|-----|-------|--------------------|-----|-------|
|                           |          |      | In                 | Out | Total | In                 | Out | Total |
| <u>Northern Access</u>    |          |      |                    |     |       |                    |     |       |
| General Office            | 18.0 ksf | 175  | 18                 | 3   | 21    | 3                  | 18  | 21    |
| <u>Southern Access</u>    |          |      |                    |     |       |                    |     |       |
| Fast Food w/ DT           | 6.62 ksf | 1575 | 69                 | 66  | 135   | 56                 | 52  | 108   |
| Pass-by <sup>e</sup>      |          | 1543 | 67                 | 64  | 131   | 56                 | 52  | 108   |
| Retail                    | 3.66 ksf | 162  | 0                  | 0   | 0     | 4                  | 6   | 10    |
| Total Site Driveway Trips |          | 3455 | 154                | 133 | 287   | 119                | 128 | 247   |
| Total New Trips           |          | 1912 | 87                 | 69  | 156   | 63                 | 76  | 139   |

<sup>1</sup> Institute of Transportation Engineer's publication *Trip Generation*, 9th Edition

<sup>2</sup> Institute of Transportation Engineers, *Trip Generation Handbook* 4th Edition (2017) – AM Rate for LUC 934: 49%; PM Rate for LUC 934: 50%. As no data is available for AWDT, the average of the AM and PM was utilized.

Based on the estimated trip generation, the project is anticipated to generate a site total of 287 AM and 247 PM peak hour trips. As shown, a number of these trips are expected to be in the form of pass-by. Pass-by trips are defined as vehicles already captured on the adjacent roadway and are subsequently attracted to the site for a convenience-based stop. These trips are not considered as new trips but will impact the site's access point. Fast food restaurants are largely influenced by location and spur of the moment stops. With Canterwood Boulevard supporting a moderate amount of vehicular volumes already passing the site, a number of trips are assumed to use the proposed services.

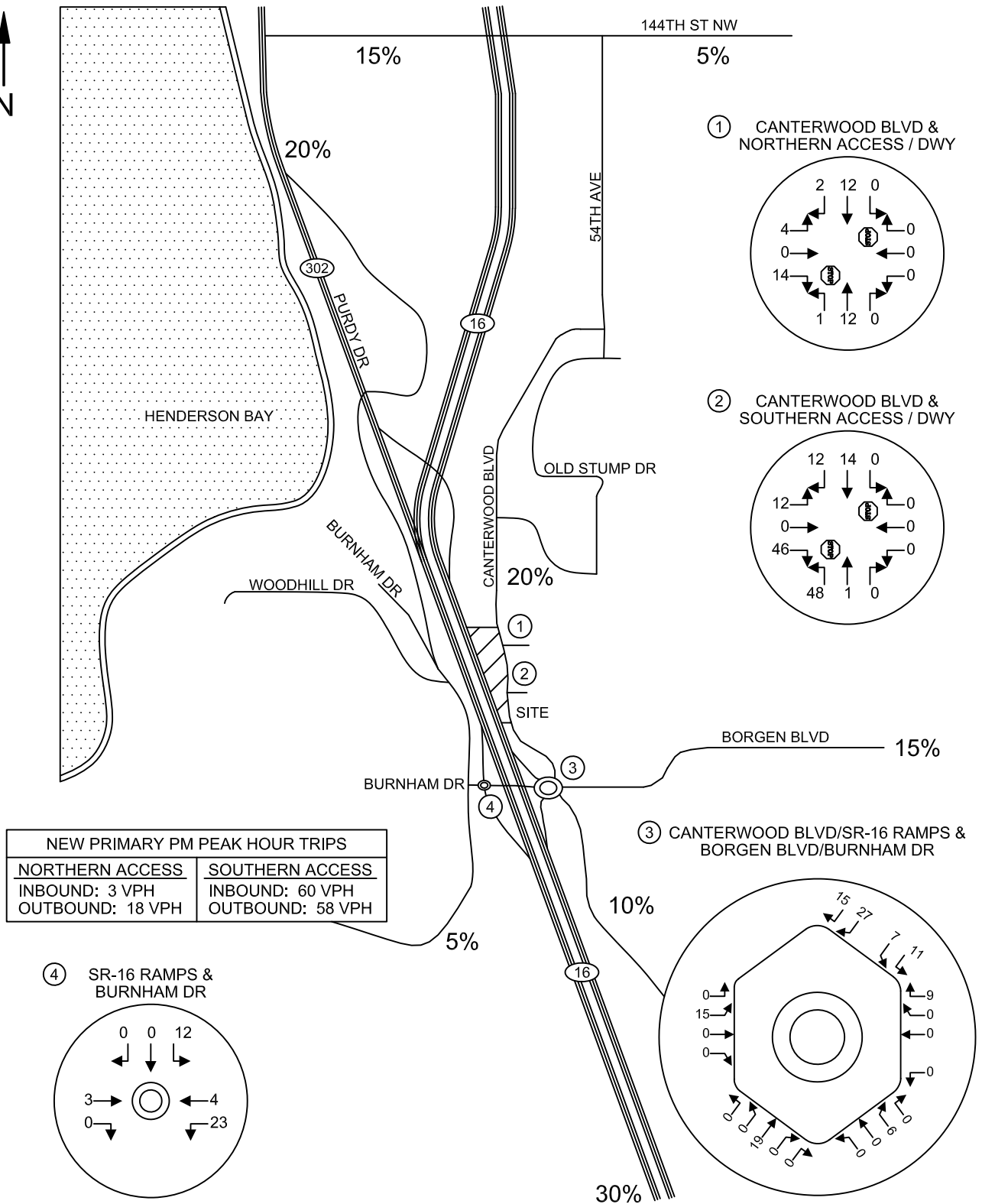
Net new trips to and from the site (excludes pass-by) are estimated with 156 AM and 139 PM peak hour trips.

#### 4.2 Trip Distribution and Assignment

Trip distribution describes the process by which project generated trips are dispersed on the street network surrounding the site. The specific destinations and origins of the generated traffic primarily influences the key intersections, which will effectively receive the bulk of project impacts. As shown in Figure 2, the northern access is proposed to support the office land use, while the two southern accesses are proposed to support the fast-food/retail component of the subject site. To remain conservative in analysis, all trips generated from the fast-food/retail land uses were consolidated to a single access opposite the southern St. Anthony Hospital access. Primary PM peak hour trips generated by the project are expected to follow the general trip pattern as shown in Figure 4A on the following page. Pass-by PM peak hour trips associated with the fast-food land use are shown in Figure 4B. Percentages are generally based on the nearby roadway network and similar projects completed in the past.

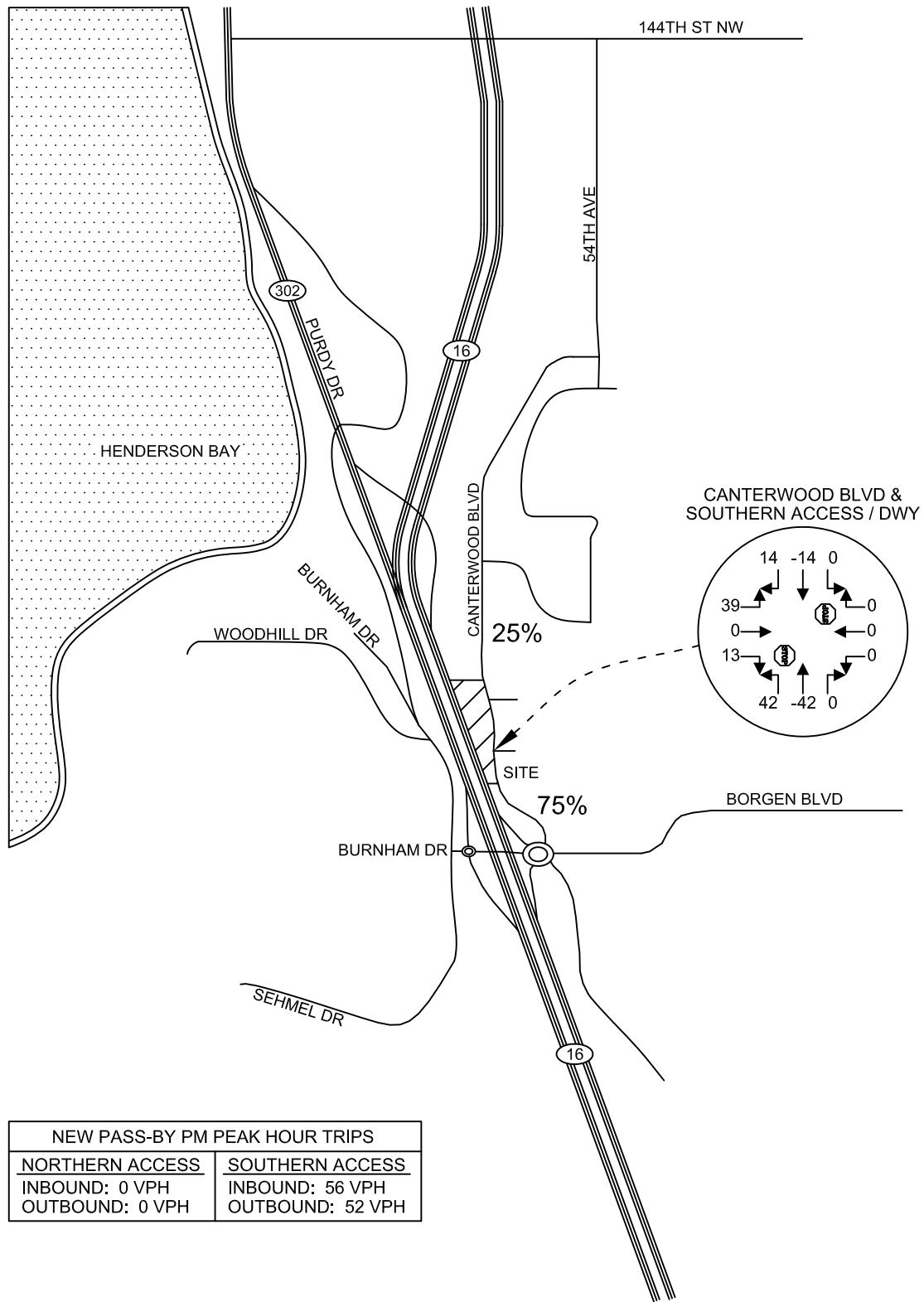
#### 4.3 Future Peak Hour Volumes

A buildout horizon year of 2023 was used for future traffic delay analysis. Forecast background volumes were derived by again applying a 1.0 percent compound annual growth rate to the baseline 2021 volumes. Forecast 2023 background volumes are portrayed in Figure 5. Forecast 2023 PM peak hour volumes with project are shown in Figure 6.



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**CANTERWOOD COMMERCIAL**  
PM PEAK HOUR PRIMARY TRIP DISTRIBUTION & ASSIGNMENT  
FIGURE 4A

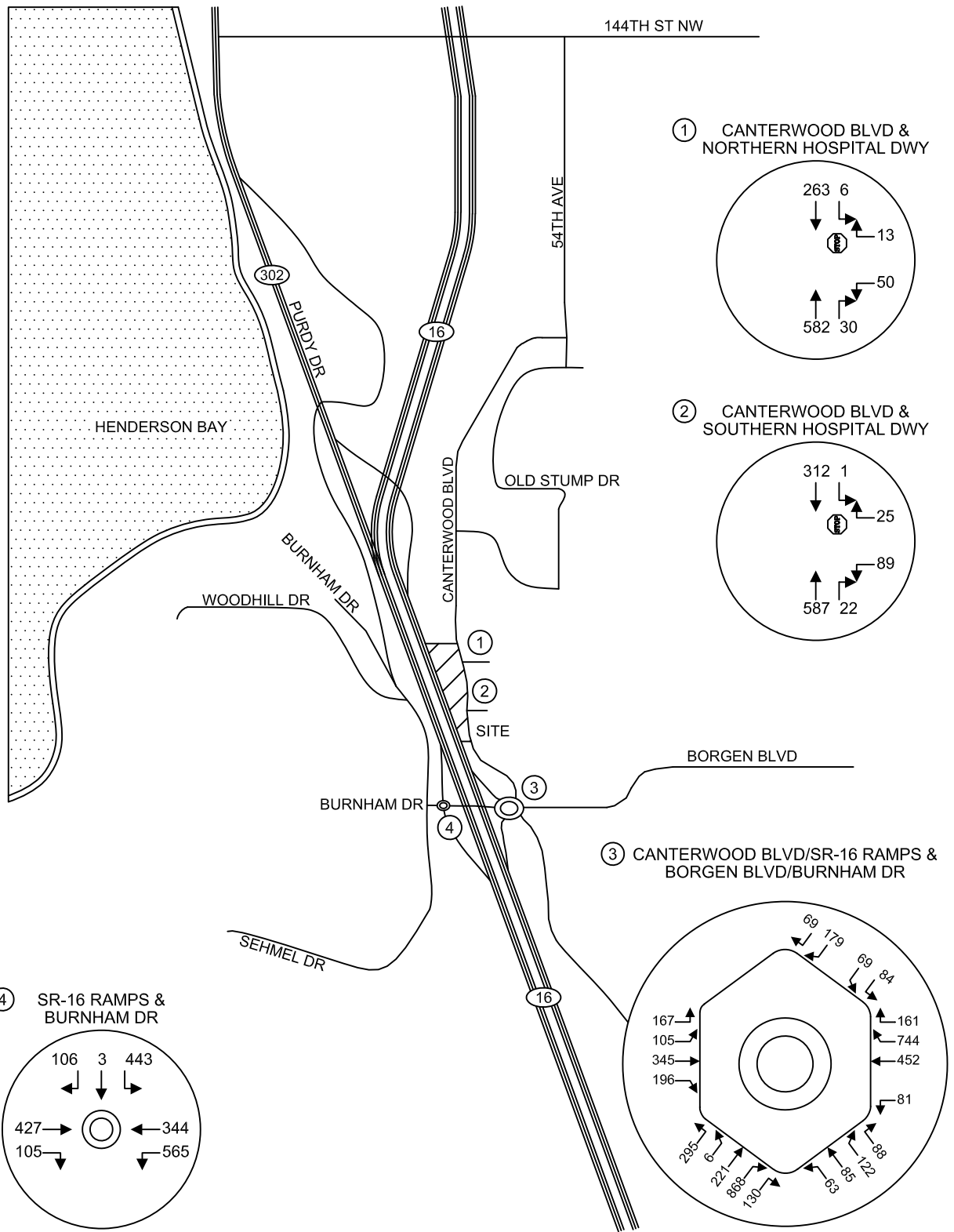


| NEW PASS-BY PM PEAK HOUR TRIPS |                  |
|--------------------------------|------------------|
| NORTHERN ACCESS                | SOUTHERN ACCESS  |
| INBOUND: 0 VPH                 | INBOUND: 56 VPH  |
| OUTBOUND: 0 VPH                | OUTBOUND: 52 VPH |

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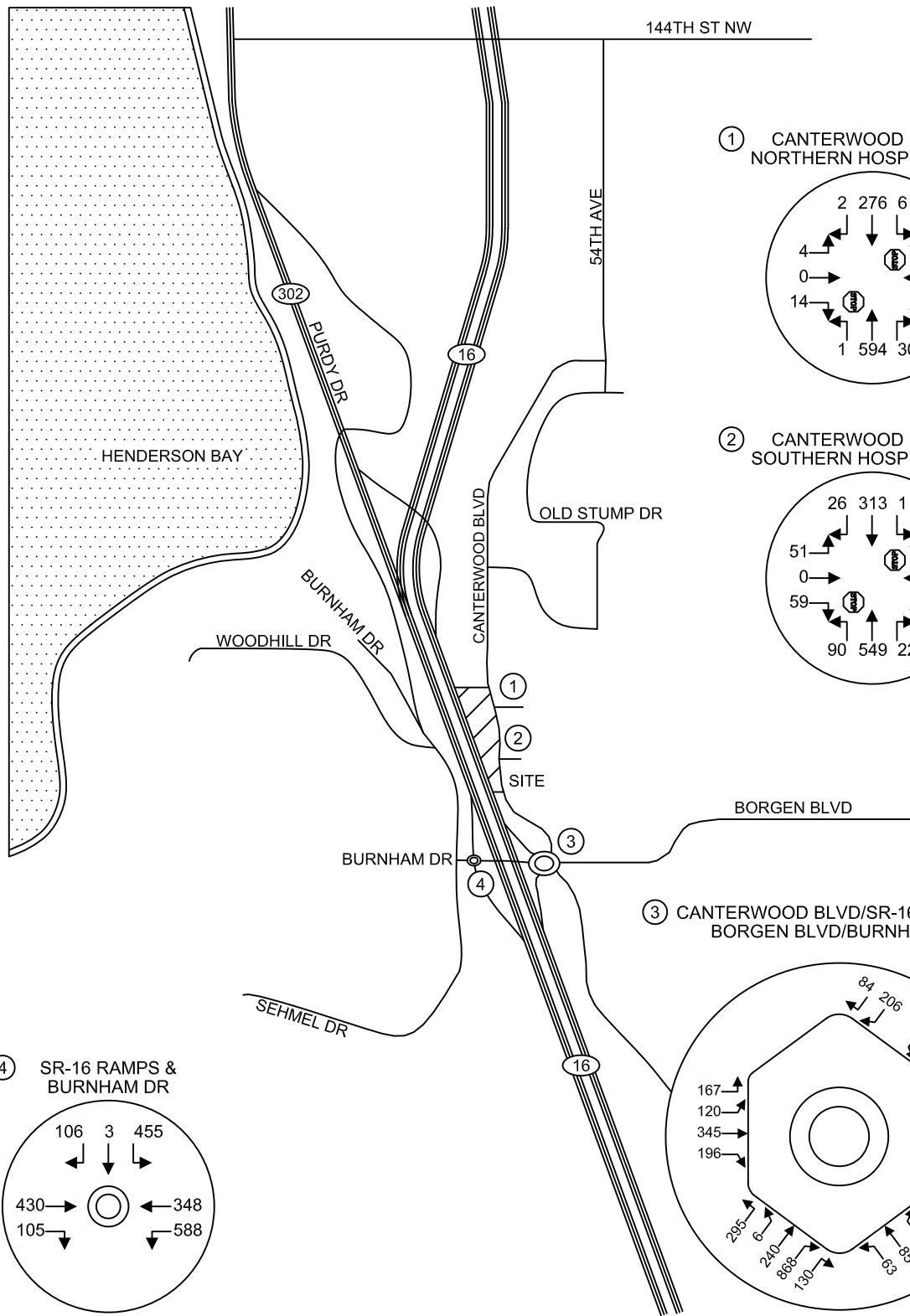
**CANTERWOOD COMMERCIAL**  
PASS-BY PM PEAK HOUR TRIP DISTRIBUTION & ASSIGNMENT  
FIGURE 4B



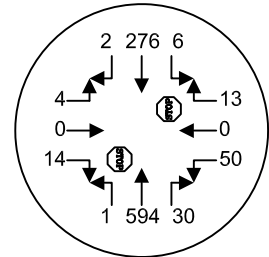


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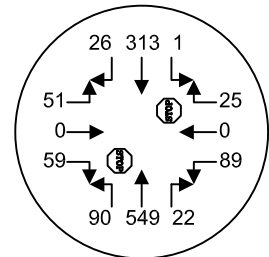
**CANTERWOOD COMMERCIAL**  
FORECAST 2023 PM PEAK HOUR BACKGROUND VOLUMES  
FIGURE 5



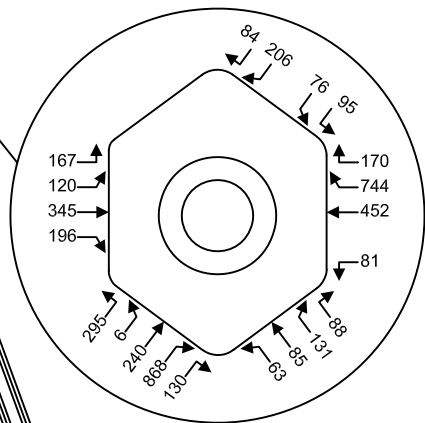
① CANTERWOOD BLVD & NORTHERN HOSPITAL DWY



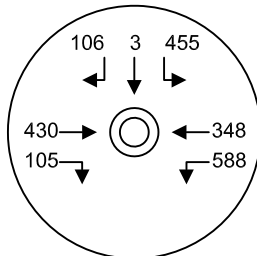
② CANTERWOOD BLVD & SOUTHERN HOSPITAL DWY



③ CANTERWOOD BLVD/SR-16 RAMPS & BORGEN BLVD/BURNHAM DR



④ SR-16 RAMPS & BURNHAM DR



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**CANTERWOOD COMMERCIAL**  
FORECAST 2023 PM PEAK HOUR VOLUMES WITH PROJECT  
FIGURE 6

#### 4.4 Future Level of Service

Peak hour delays were determined through the use of the *Highway Capacity Manual* 6th Edition. Capacity analysis is used to determine Level of Service (LOS) which is an established measure of congestion for transportation facilities. The range<sup>3</sup> for intersection level of service is LOS A to LOS F with the former indicating the best operating conditions with low control delays and the latter indicating the worst conditions with heavy control delays. Detailed descriptions of intersection LOS are given in the 2016 Highway Capacity Manual. Level of service calculations were evaluated utilizing *Synchro 10* analysis software for stop-controlled intersection and *SIDRA* for roundabout analysis. Delays presented represent overall weighted average delays for roundabout control. For side-street stop-controlled intersections, LOS is determined by the approach with the highest delay. Table 4 below summarizes forecast 2023 LOS for the key intersections of study.

**Table 4: PM Peak Hour Level of Service**

*Delays given in Seconds Per Vehicle*

| Intersection                                               | Control | Forecast 2023 Conditions |       |                 |       |              |       |
|------------------------------------------------------------|---------|--------------------------|-------|-----------------|-------|--------------|-------|
|                                                            |         | Baseline 2021            |       | Without Project |       | With Project |       |
|                                                            |         | LOS                      | Delay | LOS             | Delay | LOS          | Delay |
| Canterwood Blvd & Northern Access                          | TWSC    | C                        | 16.3  | C               | 16.5  | C            | 19.2  |
| Canterwood Blvd & Southern Access                          | TWSC    | C                        | 17.0  | C               | 17.5  | D            | 29.3  |
| Canterwood Blvd NW/Burnham Dr & SR-16 WB Ramps/Borgen Blvd | RAB     | C                        | 31.8  | D               | 37.9  | D            | 47.4  |
| Burnham Dr & SR-16 EB Ramps                                | RAB     | B                        | 12.3  | B               | 12.9  | B            | 13.8  |

TWSC: Two-Way Stop Control

RAB: Roundabout

As shown in the table above, forecast 2023 delays with the project are anticipated to operate at LOS D or better during the critical PM peak hour indicating moderate traffic delays. This forecast delay analysis also meets the city of Gig Harbor's LOS standard of LOS D or better. No adverse impacts from the proposed development with respect to roadway congestion and safety are anticipated.

<sup>3</sup> *Signalized/RAB Intersections - Level of Service*

| Level of Service | Control Delay per Vehicle (sec) |
|------------------|---------------------------------|
| A                | ≤ 10                            |
| B                | > 10 and ≤ 20                   |
| C                | > 20 and ≤ 35                   |
| D                | > 35 and ≤ 55                   |
| E                | > 55 and ≤ 80                   |
| F                | > 80                            |

Highway Capacity Manual, 6th Edition

*Stop Controlled Intersections – Level of Service*

| Level of Service | Control Delay per Vehicle (sec) |
|------------------|---------------------------------|
| A                | ≤ 10                            |
| B                | > 10 and ≤ 15                   |
| C                | > 15 and ≤ 25                   |
| D                | > 25 and ≤ 35                   |
| E                | > 35 and ≤ 50                   |
| F                | > 50                            |

## 5. SUMMARY

The Canterwood Commercial project would construct four new buildings on undeveloped tax parcel #: 0221082049 in the city of Gig Harbor. The project consists of a total of 18,000 square feet of general office space, 6,618 square feet of fast food restaurant with drive-through and 3,660 square feet of specialty retail. The project is bordered to the east by Canterwood Boulevard and access to the site will be available via three new driveways extending west from Canterwood Boulevard.

The project will be a significant generator of traffic with an estimated 287 AM peak hour driveway trips and 247 PM peak hour driveway trips based on ITE data. A portion of these trips are considered pass-by (131 AM / 108 PM). Field counts were conducted at the proposed accesses and adjacent study intersections of Canterwood Boulevard/Burnham Drive & SR-16 WB Ramps/Borgen Boulevard and Burnham Drive & SR-16 EB Ramps. Table 4 outlines projected delays without and with project generated traffic. Delays at the access and study intersections are anticipated to be moderate at LOS D or better meeting the City standard of LOS D or better. Project traffic is not expected to have a significant impact on local traffic conditions.

Based on the above analysis, Canterwood Commercial would be subject to the payment of Traffic Impact Fees (TIF) as required by the City of Gig Harbor. TIF fees are based on the number of new PM peak hour trip ends with a cost of \$5,071/trip. The total estimated fee for the proposed development is therefore calculated as follows:

247 Unadjusted PM Peak Hour Trips – 108 Pass-by Trips = 139 New PM Peak Hour Trips.

139 PM Peak Hour Trips x \$5,071/PM Peak Hour Trip = **\$704,869.00**

Exact fees and calculations will be determined by the City. No other mitigation is identified at this time.



CANTERWOOD COMMERCIAL  
TRAFFIC IMPACT ANALYSIS

*APPENDIX*

INTERSECTION COUNT SHEETS

# Heath & Associates

2214 Tacoma Rd E  
Puyallup, WA, 98371

File Name : 4199b  
Site Code : 00004199  
Start Date : 8/11/2020  
Page No : 1

Groups Printed- Cars + - Trucks

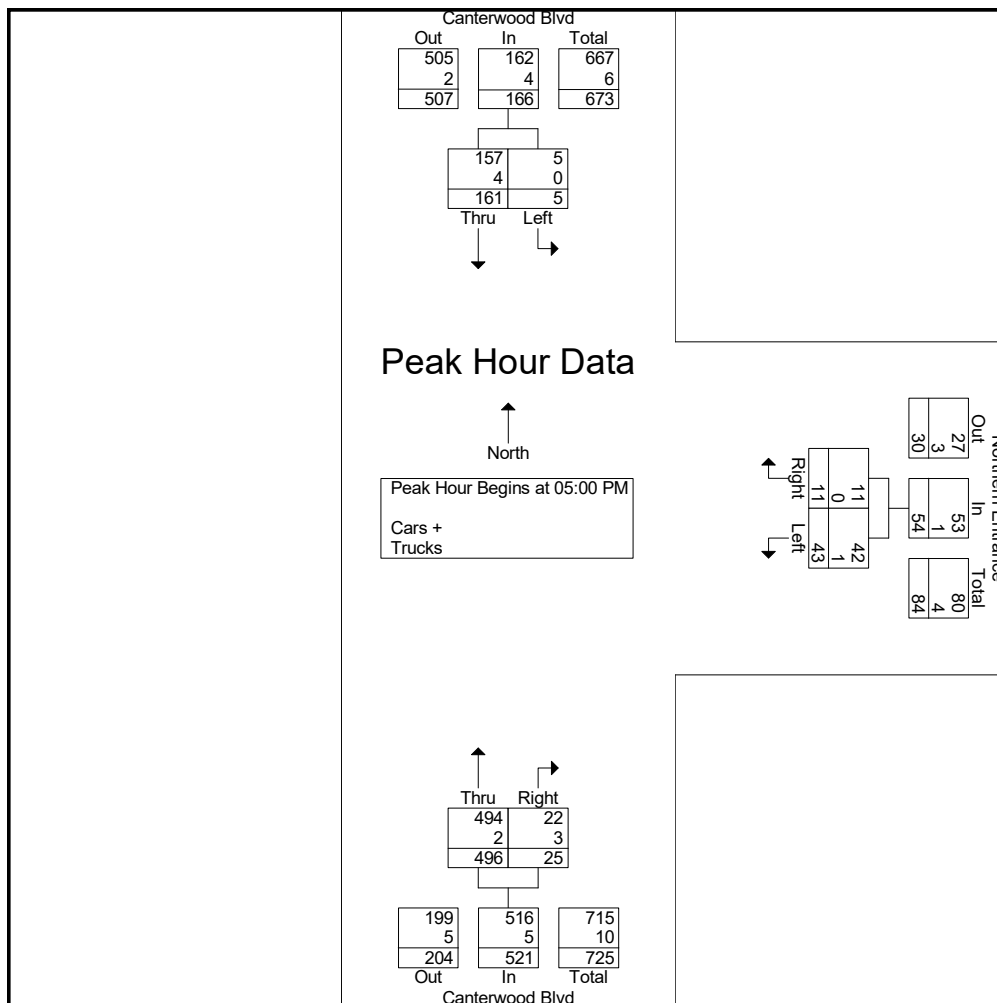
| Start Time  | Canterwood Blvd<br>Southbound |      |            | Northern Entrance<br>Westbound |      |            | Canterwood Blvd<br>Northbound |      |            | Int. Total |
|-------------|-------------------------------|------|------------|--------------------------------|------|------------|-------------------------------|------|------------|------------|
|             | Thru                          | Left | App. Total | Right                          | Left | App. Total | Right                         | Thru | App. Total |            |
| 04:00 PM    | 54                            | 0    | 54         | 2                              | 13   | 15         | 4                             | 101  | 105        | 174        |
| 04:15 PM    | 70                            | 1    | 71         | 2                              | 12   | 14         | 2                             | 103  | 105        | 190        |
| 04:30 PM    | 48                            | 2    | 50         | 5                              | 15   | 20         | 6                             | 96   | 102        | 172        |
| 04:45 PM    | 54                            | 0    | 54         | 3                              | 16   | 19         | 4                             | 109  | 113        | 186        |
| Total       | 226                           | 3    | 229        | 12                             | 56   | 68         | 16                            | 409  | 425        | 722        |
| 05:00 PM    | 53                            | 2    | 55         | 4                              | 12   | 16         | 6                             | 95   | 101        | 172        |
| 05:15 PM    | 39                            | 1    | 40         | 2                              | 9    | 11         | 4                             | 95   | 99         | 150        |
| 05:30 PM    | 35                            | 1    | 36         | 3                              | 14   | 17         | 7                             | 126  | 133        | 186        |
| 05:45 PM    | 34                            | 1    | 35         | 2                              | 8    | 10         | 8                             | 180  | 188        | 233        |
| Total       | 161                           | 5    | 166        | 11                             | 43   | 54         | 25                            | 496  | 521        | 741        |
| Grand Total | 387                           | 8    | 395        | 23                             | 99   | 122        | 41                            | 905  | 946        | 1463       |
| Apprch %    | 98                            | 2    |            | 18.9                           | 81.1 |            | 4.3                           | 95.7 |            |            |
| Total %     | 26.5                          | 0.5  | 27         | 1.6                            | 6.8  | 8.3        | 2.8                           | 61.9 | 64.7       |            |
| Cars +      | 381                           | 8    | 389        | 23                             | 97   | 120        | 36                            | 897  | 933        | 1442       |
| % Cars +    | 98.4                          | 100  | 98.5       | 100                            | 98   | 98.4       | 87.8                          | 99.1 | 98.6       | 98.6       |
| Trucks      | 6                             | 0    | 6          | 0                              | 2    | 2          | 5                             | 8    | 13         | 21         |
| % Trucks    | 1.6                           | 0    | 1.5        | 0                              | 2    | 1.6        | 12.2                          | 0.9  | 1.4        | 1.4        |

# Heath & Associates

2214 Tacoma Rd E  
Puyallup, WA, 98371

File Name : 4199b  
Site Code : 00004199  
Start Date : 8/11/2020  
Page No : 2

|                                                            | Canterwood Blvd<br>Southbound |      |            | Northern Entrance<br>Westbound |      |            | Canterwood Blvd<br>Northbound |      |            |            |
|------------------------------------------------------------|-------------------------------|------|------------|--------------------------------|------|------------|-------------------------------|------|------------|------------|
| Start Time                                                 | Thru                          | Left | App. Total | Right                          | Left | App. Total | Right                         | Thru | App. Total | Int. Total |
| Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1 |                               |      |            |                                |      |            |                               |      |            |            |
| Peak Hour for Entire Intersection Begins at 05:00 PM       |                               |      |            |                                |      |            |                               |      |            |            |
| 05:00 PM                                                   | 53                            | 2    | 55         | 4                              | 12   | 16         | 6                             | 95   | 101        | 172        |
| 05:15 PM                                                   | 39                            | 1    | 40         | 2                              | 9    | 11         | 4                             | 95   | 99         | 150        |
| 05:30 PM                                                   | 35                            | 1    | 36         | 3                              | 14   | 17         | 7                             | 126  | 133        | 186        |
| 05:45 PM                                                   | 34                            | 1    | 35         | 2                              | 8    | 10         | 8                             | 180  | 188        | 233        |
| Total Volume                                               | 161                           | 5    | 166        | 11                             | 43   | 54         | 25                            | 496  | 521        | 741        |
| % App. Total                                               | 97                            | 3    |            | 20.4                           | 79.6 |            | 4.8                           | 95.2 |            |            |
| PHF                                                        | .759                          | .625 | .755       | .688                           | .768 | .794       | .781                          | .689 | .693       | .795       |
| Cars +                                                     | 157                           | 5    | 162        | 11                             | 42   | 53         | 22                            | 494  | 516        | 731        |
| % Cars +                                                   | 97.5                          | 100  | 97.6       | 100                            | 97.7 | 98.1       | 88.0                          | 99.6 | 99.0       | 98.7       |
| Trucks                                                     | 4                             | 0    | 4          | 0                              | 1    | 1          | 3                             | 2    | 5          | 10         |
| % Trucks                                                   | 2.5                           | 0    | 2.4        | 0                              | 2.3  | 1.9        | 12.0                          | 0.4  | 1.0        | 1.3        |



# Heath & Associates

2214 Tacoma Rd E  
Puyallup, WA, 98371

File Name : 4199a  
Site Code : 00004199  
Start Date : 8/11/2020  
Page No : 1

## Groups Printed- Cars + - Trucks

|             | Canterwood Blvd<br>Southbound |      |            | Southern Entrance<br>Westbound |      |            | Canterwood Blvd<br>Northbound |      |            |            |
|-------------|-------------------------------|------|------------|--------------------------------|------|------------|-------------------------------|------|------------|------------|
| Start Time  | Thru                          | Left | App. Total | Right                          | Left | App. Total | Right                         | Thru | App. Total | Int. Total |
| 04:00 PM    | 66                            | 1    | 67         | 2                              | 18   | 20         | 7                             | 103  | 110        | 197        |
| 04:15 PM    | 81                            | 1    | 82         | 2                              | 18   | 20         | 13                            | 103  | 116        | 218        |
| 04:30 PM    | 63                            | 0    | 63         | 4                              | 22   | 26         | 4                             | 98   | 102        | 191        |
| 04:45 PM    | 69                            | 1    | 70         | 2                              | 19   | 21         | 7                             | 111  | 118        | 209        |
| Total       | 279                           | 3    | 282        | 10                             | 77   | 87         | 31                            | 415  | 446        | 815        |
| 05:00 PM    | 65                            | 0    | 65         | 5                              | 28   | 33         | 7                             | 96   | 103        | 201        |
| 05:15 PM    | 47                            | 1    | 48         | 5                              | 12   | 17         | 4                             | 94   | 98         | 163        |
| 05:30 PM    | 49                            | 0    | 49         | 8                              | 25   | 33         | 7                             | 125  | 132        | 214        |
| 05:45 PM    | 42                            | 0    | 42         | 4                              | 11   | 15         | 1                             | 184  | 185        | 242        |
| Total       | 203                           | 1    | 204        | 22                             | 76   | 98         | 19                            | 499  | 518        | 820        |
| Grand Total | 482                           | 4    | 486        | 32                             | 153  | 185        | 50                            | 914  | 964        | 1635       |
| Apprch %    | 99.2                          | 0.8  |            | 17.3                           | 82.7 |            | 5.2                           | 94.8 |            |            |
| Total %     | 29.5                          | 0.2  | 29.7       | 2                              | 9.4  | 11.3       | 3.1                           | 55.9 | 59         |            |
| Cars +      | 474                           | 4    | 478        | 32                             | 153  | 185        | 50                            | 901  | 951        | 1614       |
| % Cars +    | 98.3                          | 100  | 98.4       | 100                            | 100  | 100        | 100                           | 98.6 | 98.7       | 98.7       |
| Trucks      | 8                             | 0    | 8          | 0                              | 0    | 0          | 0                             | 13   | 13         | 21         |
| % Trucks    | 1.7                           | 0    | 1.6        | 0                              | 0    | 0          | 0                             | 1.4  | 1.3        | 1.3        |

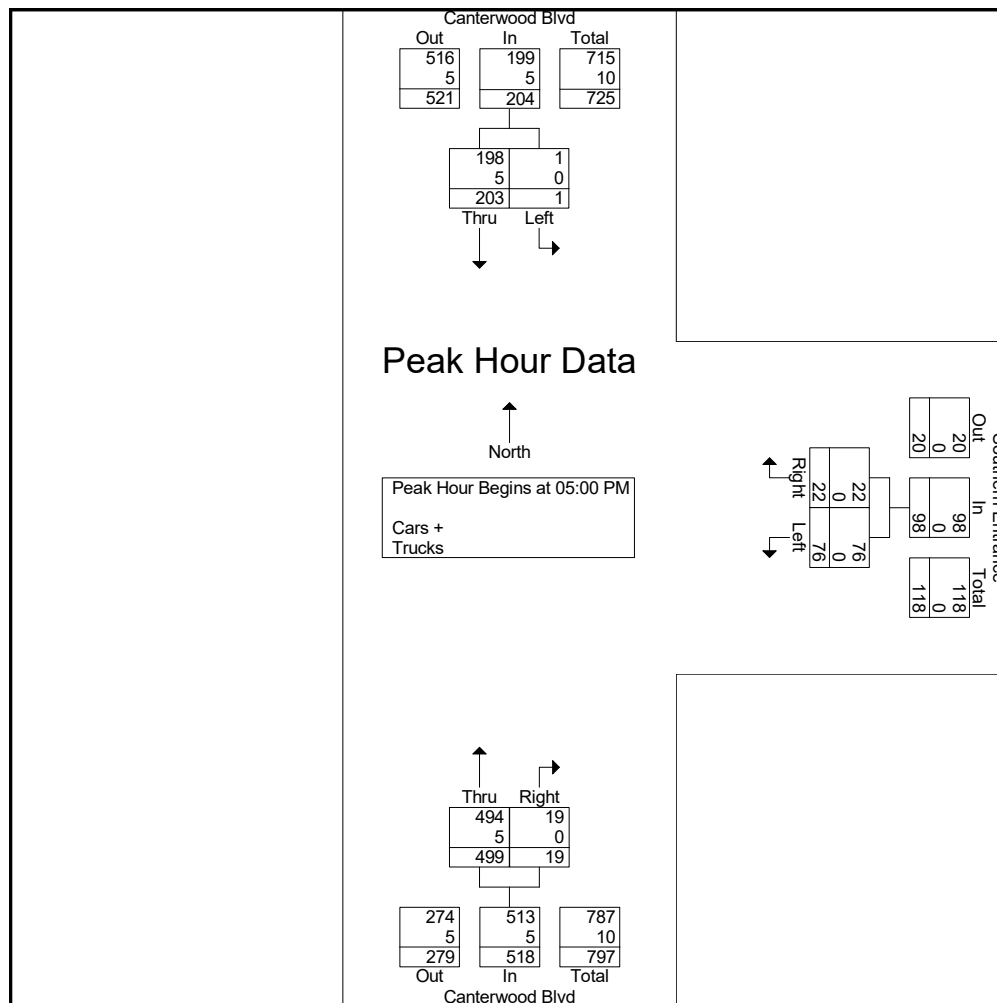


# Heath & Associates

2214 Tacoma Rd E  
Puyallup, WA, 98371

File Name : 4199a  
Site Code : 00004199  
Start Date : 8/11/2020  
Page No : 2

|                                                            | Canterwood Blvd<br>Southbound |      |            | Southern Entrance<br>Westbound |      |            | Canterwood Blvd<br>Northbound |      |            |            |
|------------------------------------------------------------|-------------------------------|------|------------|--------------------------------|------|------------|-------------------------------|------|------------|------------|
| Start Time                                                 | Thru                          | Left | App. Total | Right                          | Left | App. Total | Right                         | Thru | App. Total | Int. Total |
| Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1 |                               |      |            |                                |      |            |                               |      |            |            |
| Peak Hour for Entire Intersection Begins at 05:00 PM       |                               |      |            |                                |      |            |                               |      |            |            |
| 05:00 PM                                                   | 65                            | 0    | 65         | 5                              | 28   | 33         | 7                             | 96   | 103        | 201        |
| 05:15 PM                                                   | 47                            | 1    | 48         | 5                              | 12   | 17         | 4                             | 94   | 98         | 163        |
| 05:30 PM                                                   | 49                            | 0    | 49         | 8                              | 25   | 33         | 7                             | 125  | 132        | 214        |
| 05:45 PM                                                   | 42                            | 0    | 42         | 4                              | 11   | 15         | 1                             | 184  | 185        | 242        |
| Total Volume                                               | 203                           | 1    | 204        | 22                             | 76   | 98         | 19                            | 499  | 518        | 820        |
| % App. Total                                               | 99.5                          | 0.5  |            | 22.4                           | 77.6 |            | 3.7                           | 96.3 |            |            |
| PHF                                                        | .781                          | .250 | .785       | .688                           | .679 | .742       | .679                          | .678 | .700       | .847       |
| Cars +                                                     | 198                           | 1    | 199        | 22                             | 76   | 98         | 19                            | 494  | 513        | 810        |
| % Cars +                                                   | 97.5                          | 100  | 97.5       | 100                            | 100  | 100        | 100                           | 99.0 | 99.0       | 98.8       |
| Trucks                                                     | 5                             | 0    | 5          | 0                              | 0    | 0          | 0                             | 5    | 5          | 10         |
| % Trucks                                                   | 2.5                           | 0    | 2.5        | 0                              | 0    | 0          | 0                             | 1.0  | 1.0        | 1.2        |





Prepared for:

**CH2M HILL****Traffic Count Consultants, Inc.**

Phone: (253) 926-6009 FAX: (253) 922-7211 E-Mail: Team@TC2inc.com

WBE/DBE

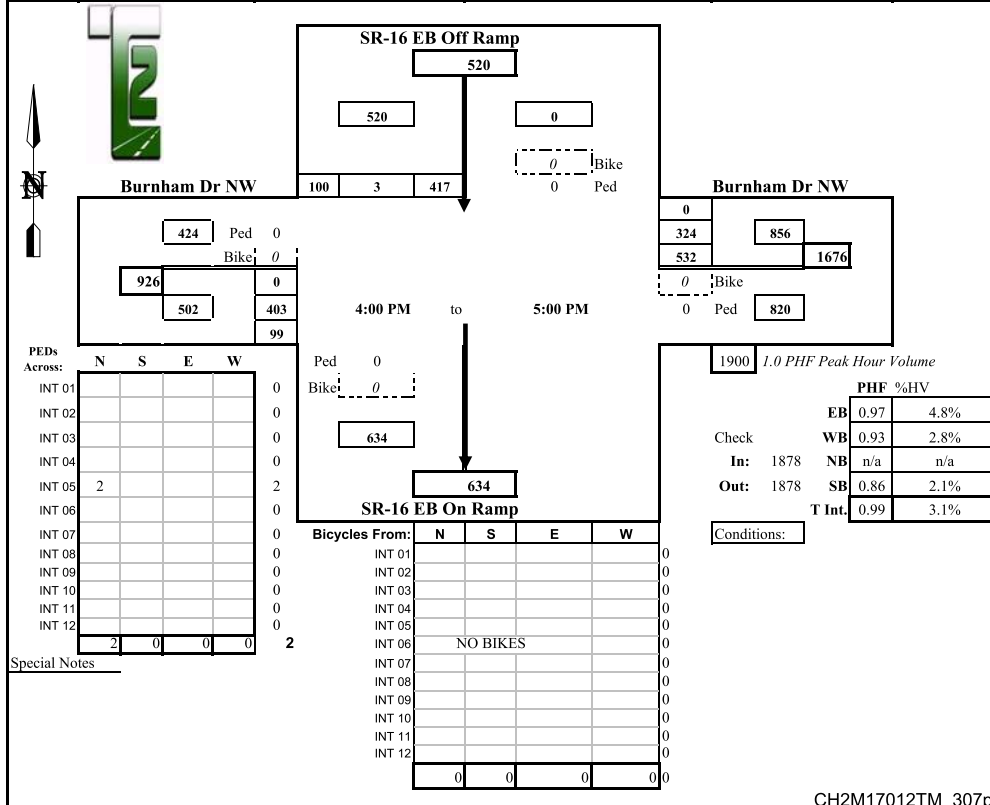
**Intersection:** SR-16 EB Ramps & Burnham Dr NW**Date of Count:** Tues 3/07/2017**Location:** Gig Harbor, Washington**Checked By:** Jess

| Time<br>Interval<br>Ending at | From North on (SB)<br>SR-16 EB Off Ramp |     |   |    | From South on (NB)<br>SR-16 EB On Ramp |   |   |   | From East on (WB)<br>Burnham Dr NW |     |    |   | From West on (EB)<br>Burnham Dr NW |   |     |    | Interval<br>Total |
|-------------------------------|-----------------------------------------|-----|---|----|----------------------------------------|---|---|---|------------------------------------|-----|----|---|------------------------------------|---|-----|----|-------------------|
|                               | T                                       | L   | S | R  | T                                      | L | S | R | T                                  | L   | S  | R | T                                  | L | S   | R  |                   |
| 4:15 P                        | 3                                       | 98  | 1 | 28 | 0                                      | 0 | 0 | 0 | 9                                  | 133 | 85 | 0 | 8                                  | 0 | 104 | 26 | 475               |
| 4:30 P                        | 0                                       | 91  | 0 | 24 | 0                                      | 0 | 0 | 0 | 6                                  | 140 | 78 | 0 | 11                                 | 0 | 105 | 25 | 463               |
| 4:45 P                        | 6                                       | 99  | 1 | 26 | 0                                      | 0 | 0 | 0 | 7                                  | 139 | 92 | 0 | 4                                  | 0 | 90  | 26 | 473               |
| 5:00 P                        | 2                                       | 129 | 1 | 22 | 0                                      | 0 | 0 | 0 | 2                                  | 120 | 69 | 0 | 1                                  | 0 | 104 | 22 | 467               |
| 5:15 P                        | 3                                       | 107 | 1 | 18 | 0                                      | 0 | 0 | 0 | 3                                  | 152 | 82 | 0 | 0                                  | 0 | 78  | 25 | 463               |
| 5:30 P                        | 1                                       | 118 | 0 | 22 | 0                                      | 0 | 0 | 0 | 3                                  | 131 | 92 | 0 | 2                                  | 0 | 69  | 20 | 452               |
| 5:45 P                        | 0                                       | 110 | 0 | 25 | 0                                      | 0 | 0 | 0 | 3                                  | 125 | 68 | 0 | 3                                  | 0 | 57  | 22 | 407               |
| 6:00 P                        | 0                                       | 94  | 0 | 31 | 0                                      | 0 | 0 | 0 | 4                                  | 149 | 86 | 0 | 1                                  | 0 | 65  | 18 | 443               |
| 6:15 P                        | 0                                       | 0   | 0 | 0  | 0                                      | 0 | 0 | 0 | 0                                  | 0   | 0  | 0 | 0                                  | 0 | 0   | 0  | 0                 |
| 6:30 P                        | 0                                       | 0   | 0 | 0  | 0                                      | 0 | 0 | 0 | 0                                  | 0   | 0  | 0 | 0                                  | 0 | 0   | 0  | 0                 |
| 6:45 P                        | 0                                       | 0   | 0 | 0  | 0                                      | 0 | 0 | 0 | 0                                  | 0   | 0  | 0 | 0                                  | 0 | 0   | 0  | 0                 |
| 7:00 P                        | 0                                       | 0   | 0 | 0  | 0                                      | 0 | 0 | 0 | 0                                  | 0   | 0  | 0 | 0                                  | 0 | 0   | 0  | 0                 |

|                 |    |     |   |     |   |   |   |   |    |      |     |   |    |   |     |     |      |
|-----------------|----|-----|---|-----|---|---|---|---|----|------|-----|---|----|---|-----|-----|------|
| Total<br>Survey | 15 | 846 | 4 | 196 | 0 | 0 | 0 | 0 | 37 | 1089 | 652 | 0 | 30 | 0 | 672 | 184 | 3643 |
|-----------------|----|-----|---|-----|---|---|---|---|----|------|-----|---|----|---|-----|-----|------|

Peak Hour: 4:00 PM to 5:00 PM

|          |      |     |   |     |     |   |   |   |      |     |     |   |      |   |     |    |      |
|----------|------|-----|---|-----|-----|---|---|---|------|-----|-----|---|------|---|-----|----|------|
| Total    | 11   | 417 | 3 | 100 | 0   | 0 | 0 | 0 | 24   | 532 | 324 | 0 | 24   | 0 | 403 | 99 | 1878 |
| Approach | 520  |     |   |     | 0   |   |   |   | 856  |     |     |   | 502  |   |     |    | 1878 |
| %HV      | 2.1% |     |   |     | n/a |   |   |   | 2.8% |     |     |   | 4.8% |   |     |    | 3.1% |
| PHF      | 0.86 |     |   |     | n/a |   |   |   | 0.93 |     |     |   | 0.97 |   |     |    | 0.99 |



CH2M17012TM\_307p



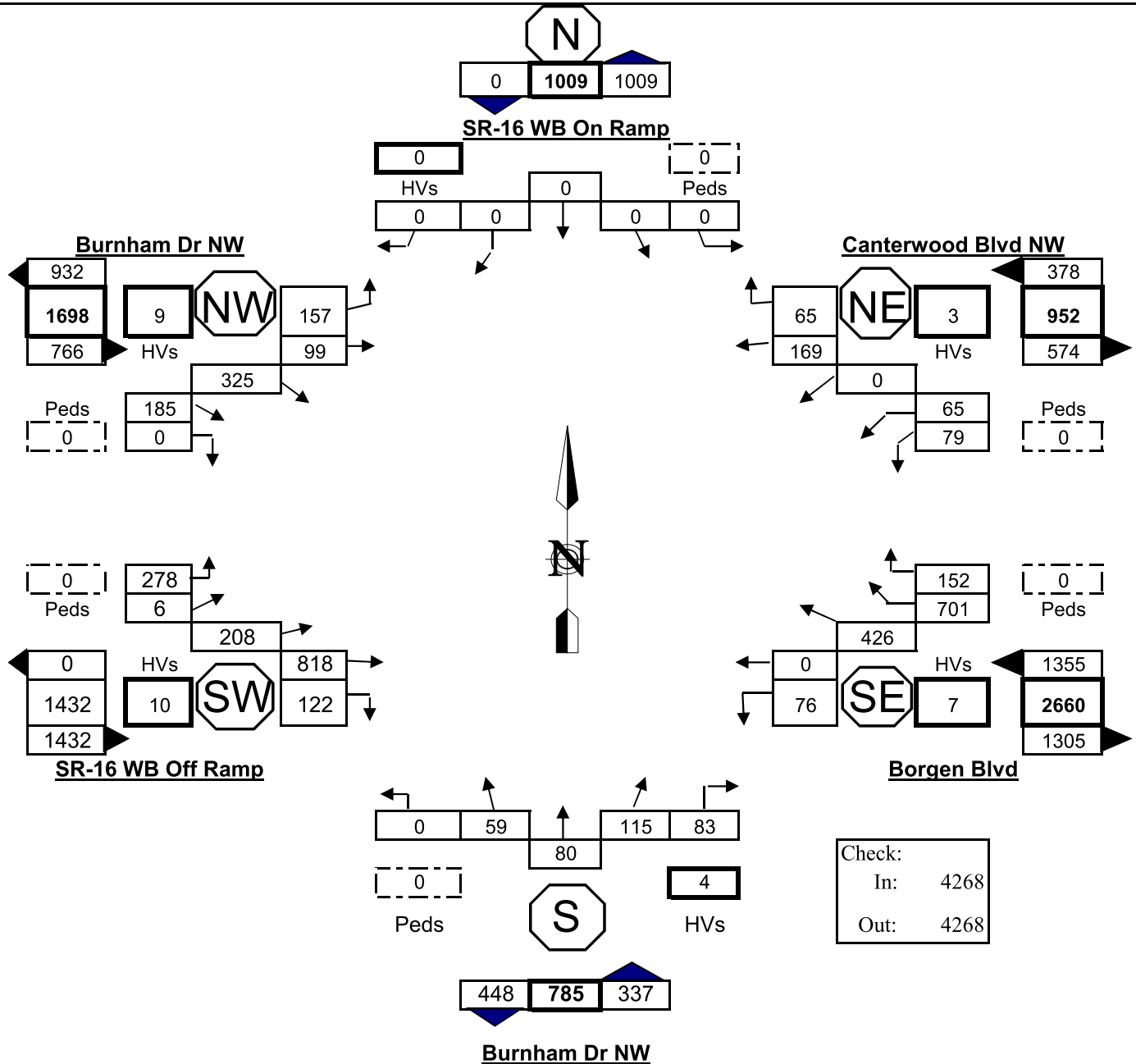
**Traffic Count Consultants, Inc.**

DBE/WBE

DBE/WBE

Phone: (425) 253 926-6009

E-Mail: Team@TC2inc.com



**Intersection:** SR-16 WB Ramps & Canterwood Blvd NW/Burnham Dr NW & Borgen Blvd/Burnham Dr NW  
**Location:** Gig Harbor, Washington  
**Date of Count:** Tues 3/07/2017  
**Peak Period:** 4:30 P - 5:30 P  
**Checked By:** Jess  
**Prepared For:** CH2M HILL

Notes:

|              | %HV  | PHF  |
|--------------|------|------|
| SB           | n/a  | n/a  |
| SWB          | 0.8% | 0.88 |
| NWB          | 0.5% | 0.89 |
| NB           | 1.2% | 0.80 |
| NEB          | 0.7% | 0.92 |
| SEB          | 1.2% | 0.87 |
| Intersection | 0.8% | 0.96 |

CH2M17012TM\_308p



Traffic Count Consultants, Inc.

## Vehicle Volume Summary

DBE/WBE

Phone: (425) 253 926-6009 E-Mail: Team@TC2inc.com

Intersection: SR-16 WB Ramps & Canterwood Blvd NW/Burnham Dr NW & Borgen Blvd/Burnham Dr NW  
Location: Gig Harbor, Washington

Date of Count: Tues 3/07/2017  
Checked By: Jess

| Time Interval | From North (SB)<br>SR-16 WB On Ramp |    |    |      |    |    | From NE (SWB)<br>Canterwood Blvd NW |    |    |      |    |    | From SE (NWB)<br>Borgen Blvd |    |     |      |    |    | From South (NB)<br>Burnham Dr NW |    |    |      |    |    | From SW (NEB)<br>SR-16 WB Off Ramp |    |     |      |    |    | From NW (SEB)<br>Burnham Dr NW |    |    |      |    |    | Interval Total |
|---------------|-------------------------------------|----|----|------|----|----|-------------------------------------|----|----|------|----|----|------------------------------|----|-----|------|----|----|----------------------------------|----|----|------|----|----|------------------------------------|----|-----|------|----|----|--------------------------------|----|----|------|----|----|----------------|
|               | T                                   | HR | SR | Thru | SL | HL | T                                   | HR | SR | Thru | SL | HL | T                            | HR | SR  | Thru | SL | HL | T                                | HR | SR | Thru | SL | HL | T                                  | HR | SR  | Thru | SL | HL | T                              | HR | SR | Thru | SL | HL |                |
| 4:15 P        | 0                                   | 0  | 0  | 0    | 0  | 0  | 1                                   | 14 | 36 | 0    | 9  | 9  | 3                            | 29 | 140 | 103  | 0  | 12 | 0                                | 16 | 14 | 23   | 6  | 0  | 2                                  | 15 | 204 | 66   | 1  | 45 | 4                              | 0  | 39 | 73   | 32 | 60 | 946            |
| 4:30 P        | 0                                   | 0  | 0  | 0    | 0  | 0  | 1                                   | 13 | 35 | 0    | 12 | 11 | 1                            | 35 | 147 | 96   | 0  | 11 | 1                                | 19 | 18 | 15   | 12 | 0  | 2                                  | 23 | 224 | 72   | 2  | 57 | 2                              | 0  | 48 | 79   | 31 | 63 | 1023           |
| 4:45 P        | 0                                   | 0  | 0  | 0    | 0  | 0  | 0                                   | 15 | 42 | 0    | 15 | 17 | 2                            | 36 | 167 | 99   | 0  | 14 | 1                                | 22 | 15 | 20   | 3  | 0  | 4                                  | 33 | 210 | 65   | 0  | 80 | 3                              | 0  | 46 | 86   | 29 | 60 | 1074           |
| 5:00 P        | 0                                   | 0  | 0  | 0    | 0  | 0  | 2                                   | 17 | 45 | 0    | 20 | 14 | 1                            | 39 | 162 | 107  | 0  | 18 | 0                                | 18 | 20 | 17   | 18 | 0  | 1                                  | 24 | 221 | 57   | 3  | 83 | 3                              | 0  | 45 | 79   | 17 | 29 | 1053           |
| 5:15 P        | 0                                   | 0  | 0  | 0    | 0  | 0  | 1                                   | 15 | 44 | 0    | 18 | 30 | 1                            | 44 | 198 | 119  | 0  | 21 | 2                                | 24 | 39 | 19   | 23 | 0  | 3                                  | 29 | 193 | 42   | 1  | 71 | 1                              | 0  | 50 | 77   | 24 | 36 | 1117           |
| 5:30 P        | 0                                   | 0  | 0  | 0    | 0  | 0  | 0                                   | 18 | 38 | 0    | 12 | 18 | 3                            | 33 | 174 | 101  | 0  | 23 | 1                                | 19 | 41 | 24   | 15 | 0  | 2                                  | 36 | 194 | 44   | 2  | 44 | 2                              | 0  | 44 | 83   | 29 | 32 | 1024           |
| 5:45 P        | 0                                   | 0  | 0  | 0    | 0  | 0  | 1                                   | 16 | 33 | 0    | 11 | 18 | 1                            | 42 | 155 | 113  | 0  | 16 | 0                                | 16 | 32 | 18   | 9  | 0  | 1                                  | 35 | 205 | 54   | 1  | 59 | 2                              | 0  | 54 | 74   | 26 | 29 | 1016           |
| 6:00 P        | 0                                   | 0  | 0  | 0    | 0  | 0  | 0                                   | 12 | 21 | 0    | 9  | 9  | 2                            | 29 | 138 | 114  | 0  | 13 | 1                                | 12 | 30 | 15   | 16 | 0  | 1                                  | 30 | 192 | 47   | 1  | 51 | 2                              | 0  | 36 | 58   | 23 | 26 | 882            |
| 6:15 P        | 0                                   | 0  | 0  | 0    | 0  | 0  | 0                                   | 0  | 0  | 0    | 0  | 0  | 0                            | 0  | 0   | 0    | 0  | 0  | 0                                | 0  | 0  | 0    | 0  | 0  | 0                                  | 0  | 0   | 0    | 0  | 0  | 0                              | 0  | 0  | 0    | 0  | 0  | 0              |
| 6:30 P        | 0                                   | 0  | 0  | 0    | 0  | 0  | 0                                   | 0  | 0  | 0    | 0  | 0  | 0                            | 0  | 0   | 0    | 0  | 0  | 0                                | 0  | 0  | 0    | 0  | 0  | 0                                  | 0  | 0   | 0    | 0  | 0  | 0                              | 0  | 0  | 0    | 0  | 0  | 0              |
| 6:45 P        | 0                                   | 0  | 0  | 0    | 0  | 0  | 0                                   | 0  | 0  | 0    | 0  | 0  | 0                            | 0  | 0   | 0    | 0  | 0  | 0                                | 0  | 0  | 0    | 0  | 0  | 0                                  | 0  | 0   | 0    | 0  | 0  | 0                              | 0  | 0  | 0    | 0  | 0  | 0              |
| 7:00 P        | 0                                   | 0  | 0  | 0    | 0  | 0  | 0                                   | 0  | 0  | 0    | 0  | 0  | 0                            | 0  | 0   | 0    | 0  | 0  | 0                                | 0  | 0  | 0    | 0  | 0  | 0                                  | 0  | 0   | 0    | 0  | 0  | 0                              | 0  | 0  | 0    | 0  | 0  | 0              |

|                   |           |   |   |   |   |   |      |     |     |   |     |     |      |     |      |     |   |     |      |     |     |     |     |   |      |     |      |     |    |                  |      |   |        |     |     |                   |      |  |  |  |  |  |  |  |  |  |
|-------------------|-----------|---|---|---|---|---|------|-----|-----|---|-----|-----|------|-----|------|-----|---|-----|------|-----|-----|-----|-----|---|------|-----|------|-----|----|------------------|------|---|--------|-----|-----|-------------------|------|--|--|--|--|--|--|--|--|--|
| Total Survey      | 0         | 0 | 0 | 0 | 0 | 0 | 6    | 120 | 294 | 0 | 106 | 126 | 14   | 287 | 1281 | 852 | 0 | 128 | 6    | 146 | 209 | 151 | 102 | 0 | 16   | 225 | 1643 | 447 | 11 | 490              | 19   | 0 | 362    | 609 | 211 | 335               | 8135 |  |  |  |  |  |  |  |  |  |
| 4:30 P            |           |   |   |   |   |   |      |     |     |   |     |     |      |     |      |     |   |     |      |     |     |     |     |   |      |     |      |     |    | to               |      |   | 5:30 P |     |     | Peak Hour Summary |      |  |  |  |  |  |  |  |  |  |
| Total             | 0         | 0 | 0 | 0 | 0 | 0 | 3    | 65  | 169 | 0 | 65  | 79  | 7    | 152 | 701  | 426 | 0 | 76  | 4    | 83  | 115 | 80  | 59  | 0 | 10   | 122 | 818  | 208 | 6  | 278              | 9    | 0 | 185    | 325 | 99  | 157               | 4268 |  |  |  |  |  |  |  |  |  |
| Approach          | 0         |   |   |   |   |   | 378  |     |     |   |     |     | 1355 |     |      |     |   |     | 337  |     |     |     |     |   | 1432 |     |      |     |    |                  | 766  |   |        |     |     |                   | 4268 |  |  |  |  |  |  |  |  |  |
| %HV               | n/a       |   |   |   |   |   | 0.8% |     |     |   |     |     | 0.5% |     |      |     |   |     | 1.2% |     |     |     |     |   | 0.7% |     |      |     |    |                  | 1.2% |   |        |     |     |                   | 0.8% |  |  |  |  |  |  |  |  |  |
| PHF               | n/a       |   |   |   |   |   | 0.88 |     |     |   |     |     | 0.89 |     |      |     |   |     | 0.80 |     |     |     |     |   | 0.92 |     |      |     |    |                  | 0.87 |   |        |     |     |                   | 0.96 |  |  |  |  |  |  |  |  |  |
| Peds Total Survey | 0         |   |   |   |   |   | 0    |     |     |   |     |     | 0    |     |      |     |   |     | 0    |     |     |     |     |   | 0    |     |      |     |    |                  | 0    |   |        |     |     |                   |      |  |  |  |  |  |  |  |  |  |
| Prepared For:     | CH2M HILL |   |   |   |   |   |      |     |     |   |     |     |      |     |      |     |   |     |      |     |     |     |     |   |      |     |      |     |    | CH2M17012TM_308p |      |   |        |     |     |                   |      |  |  |  |  |  |  |  |  |  |

| NE U's | S U's | EU's | WU's |
|--------|-------|------|------|
| 1      |       | 0    | 2    |
| 0      |       | 1    | 1    |
| 1      |       | 2    | 1    |
| 0      |       | 1    | 0    |
| 1      |       | 1    | 2    |
| 1      |       | 0    | 1    |
| 0      |       | 0    | 0    |
| 0      |       | 1    | 0    |
|        |       |      |      |
|        |       |      |      |
|        |       |      |      |
|        |       |      |      |
| 4      | 0     | 6    | 7    |

| PEDS across |   |    |    |   |    |    |
|-------------|---|----|----|---|----|----|
| Int'l       | N | NE | SE | S | SW | NW |
| 1           | 0 | 0  | 0  | 0 | 0  | 0  |
| 2           | 0 | 0  | 0  | 0 | 0  | 0  |
| 3           | 0 | 0  | 0  | 0 | 0  | 0  |
| 4           | 0 | 0  | 0  | 0 | 0  | 0  |
| 5           | 0 | 0  | 0  | 0 | 0  | 0  |
| 6           | 0 | 0  | 0  | 0 | 0  | 0  |
| 7           | 0 | 0  | 0  | 0 | 0  | 0  |
| 8           | 0 | 0  | 0  | 0 | 0  | 0  |
| 9           | 0 | 0  | 0  | 0 | 0  | 0  |
| 10          | 0 | 0  | 0  | 0 | 0  | 0  |
| 11          | 0 | 0  | 0  | 0 | 0  | 0  |
| 12          | 0 | 0  | 0  | 0 | 0  | 0  |
|             | 0 | 0  | 0  | 0 | 0  | 0  |

| Bicycles FROM |   |    |    |   |    |    |
|---------------|---|----|----|---|----|----|
| Int'l         | N | NE | SE | S | SW | NW |
| 1             |   |    |    |   |    |    |
| 2             |   |    |    |   |    |    |
| 3             |   |    |    |   |    |    |
| 4             |   |    |    |   |    |    |
| 5             |   |    |    |   |    |    |
| 6             |   |    |    |   |    |    |
| 7             |   |    |    |   |    |    |
| 8             |   |    |    |   |    |    |
| 9             |   |    |    |   |    |    |
| 10            |   |    |    |   |    |    |
| 11            |   |    |    |   |    |    |
| 12            |   |    |    |   |    |    |
|               | 0 | 0  | 0  | 0 | 0  | 0  |



*APPENDIX*

ITE TRIP GENERATION SHEETS

GENERAL OFFICE BUILDING (LUC 710)

# General Office Building (710)

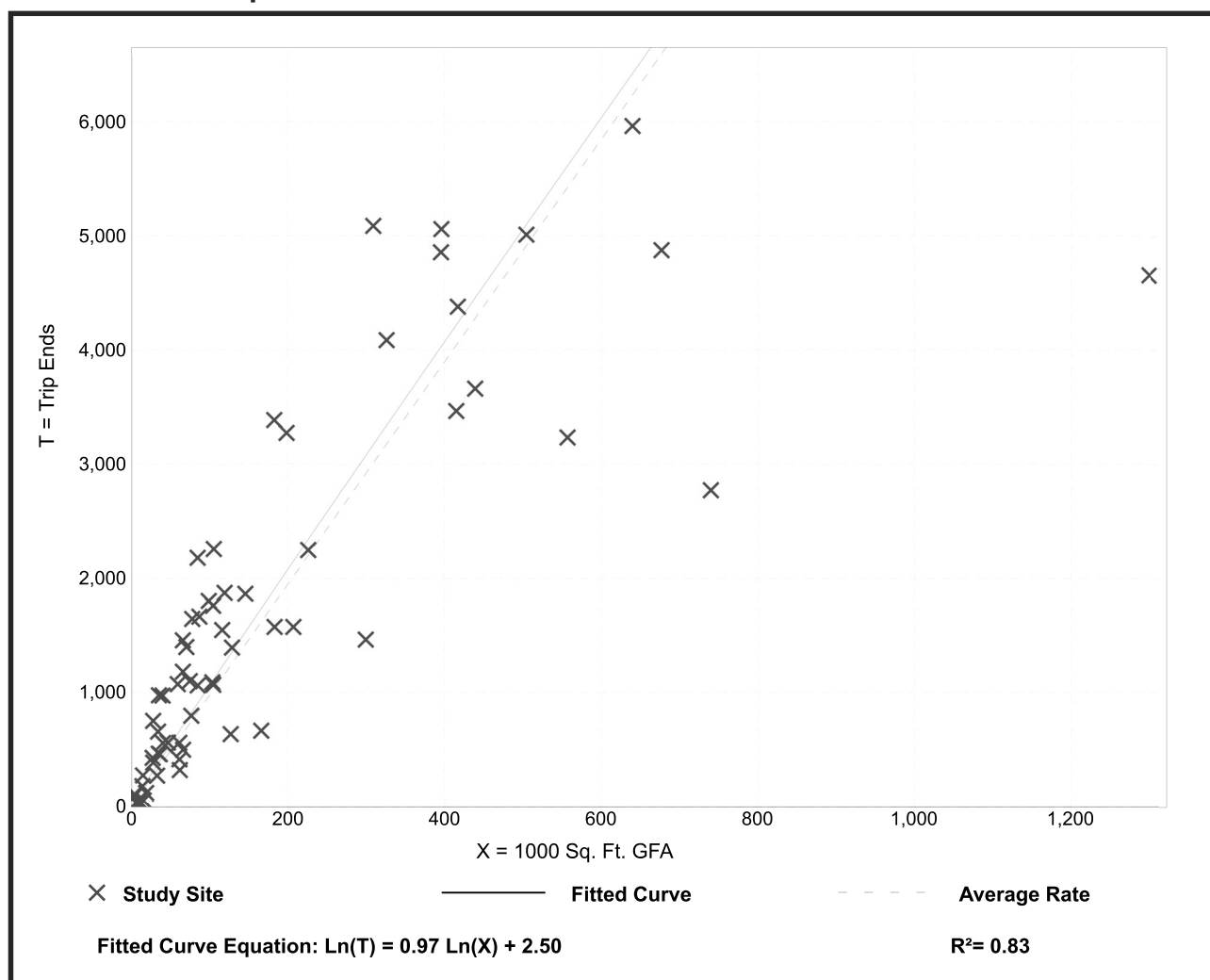
**Vehicle Trip Ends vs: 1000 Sq. Ft. GFA**  
**On a: Weekday**

**Setting/Location: General Urban/Suburban**  
Number of Studies: 66  
Avg. 1000 Sq. Ft. GFA: 171  
Directional Distribution: 50% entering, 50% exiting

## Vehicle Trip Generation per 1000 Sq. Ft. GFA

| Average Rate | Range of Rates | Standard Deviation |
|--------------|----------------|--------------------|
| 9.74         | 2.71 - 27.56   | 5.15               |

## Data Plot and Equation



*Trip Generation Manual*, 10th Edition • Institute of Transportation Engineers

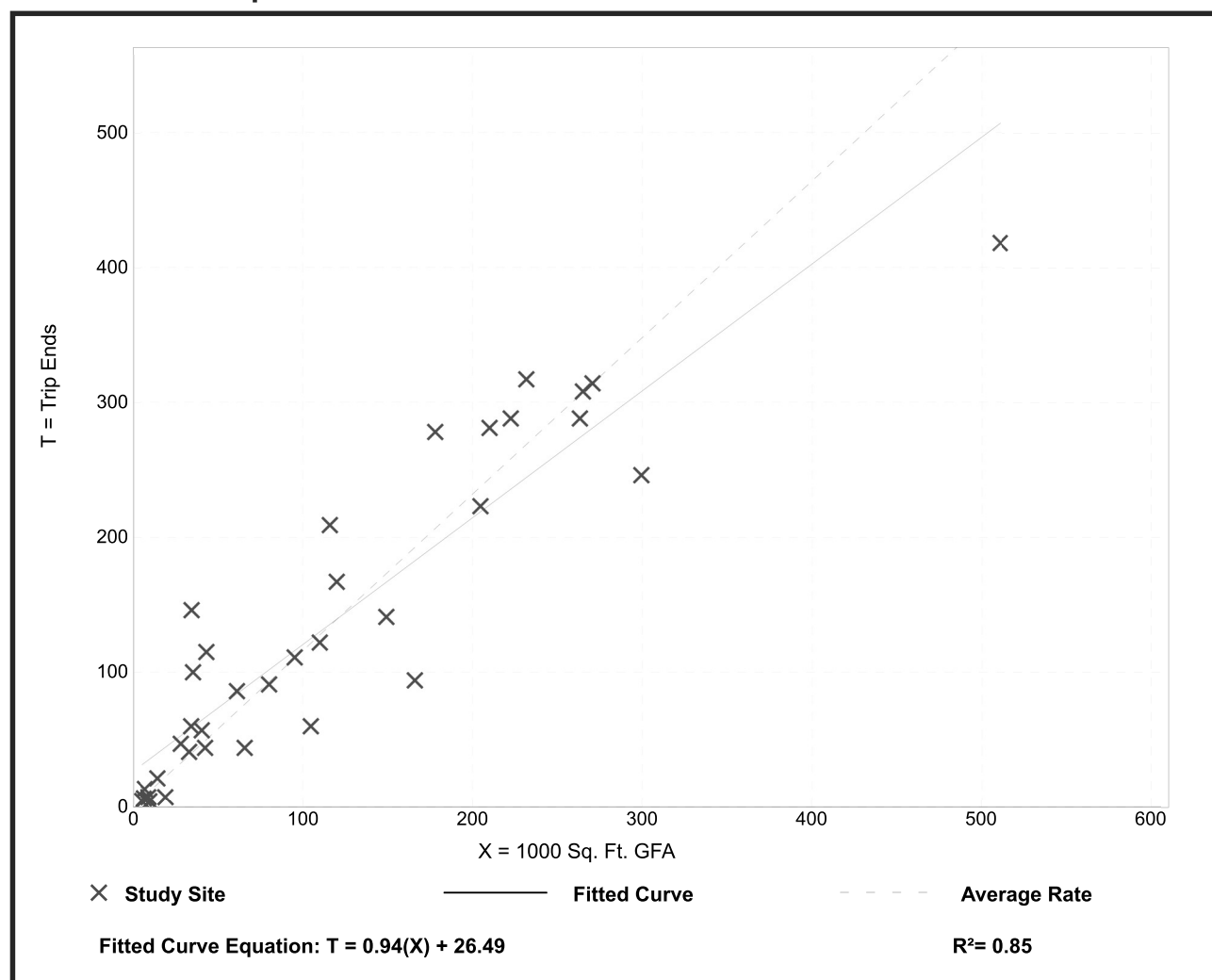
## General Office Building (710)

**Vehicle Trip Ends vs: 1000 Sq. Ft. GFA**  
**On a: Weekday,**  
**Peak Hour of Adjacent Street Traffic,**  
**One Hour Between 7 and 9 a.m.**  
**Setting/Location: General Urban/Suburban**  
 Number of Studies: 35  
 Avg. 1000 Sq. Ft. GFA: 117  
 Directional Distribution: 86% entering, 14% exiting

### Vehicle Trip Generation per 1000 Sq. Ft. GFA

| Average Rate | Range of Rates | Standard Deviation |
|--------------|----------------|--------------------|
| 1.16         | 0.37 - 4.23    | 0.47               |

### Data Plot and Equation



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## General Office Building (710)

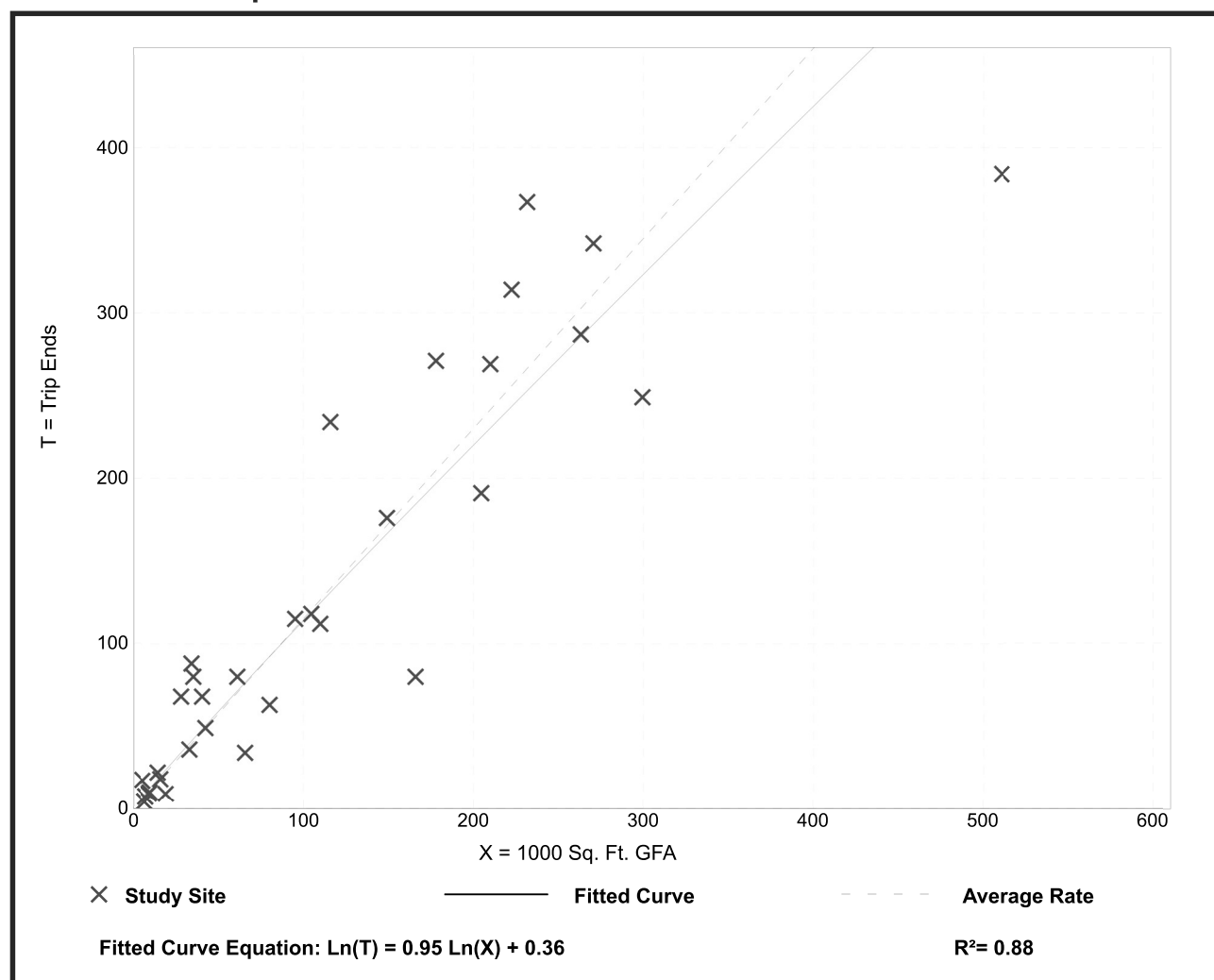
**Vehicle Trip Ends vs: 1000 Sq. Ft. GFA**  
**On a: Weekday,**  
**Peak Hour of Adjacent Street Traffic,**  
**One Hour Between 4 and 6 p.m.**

**Setting/Location: General Urban/Suburban**  
 Number of Studies: 32  
 Avg. 1000 Sq. Ft. GFA: 114  
 Directional Distribution: 16% entering, 84% exiting

### Vehicle Trip Generation per 1000 Sq. Ft. GFA

| Average Rate | Range of Rates | Standard Deviation |
|--------------|----------------|--------------------|
| 1.15         | 0.47 - 3.23    | 0.42               |

### Data Plot and Equation



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*APPENDIX*

ITE TRIP GENERATION SHEETS

FAST-FOOD RESTAURANT WITH  
DRIVE-THROUGH WINDOW (LUC 934)

# Fast-Food Restaurant with Drive-Through Window (934)

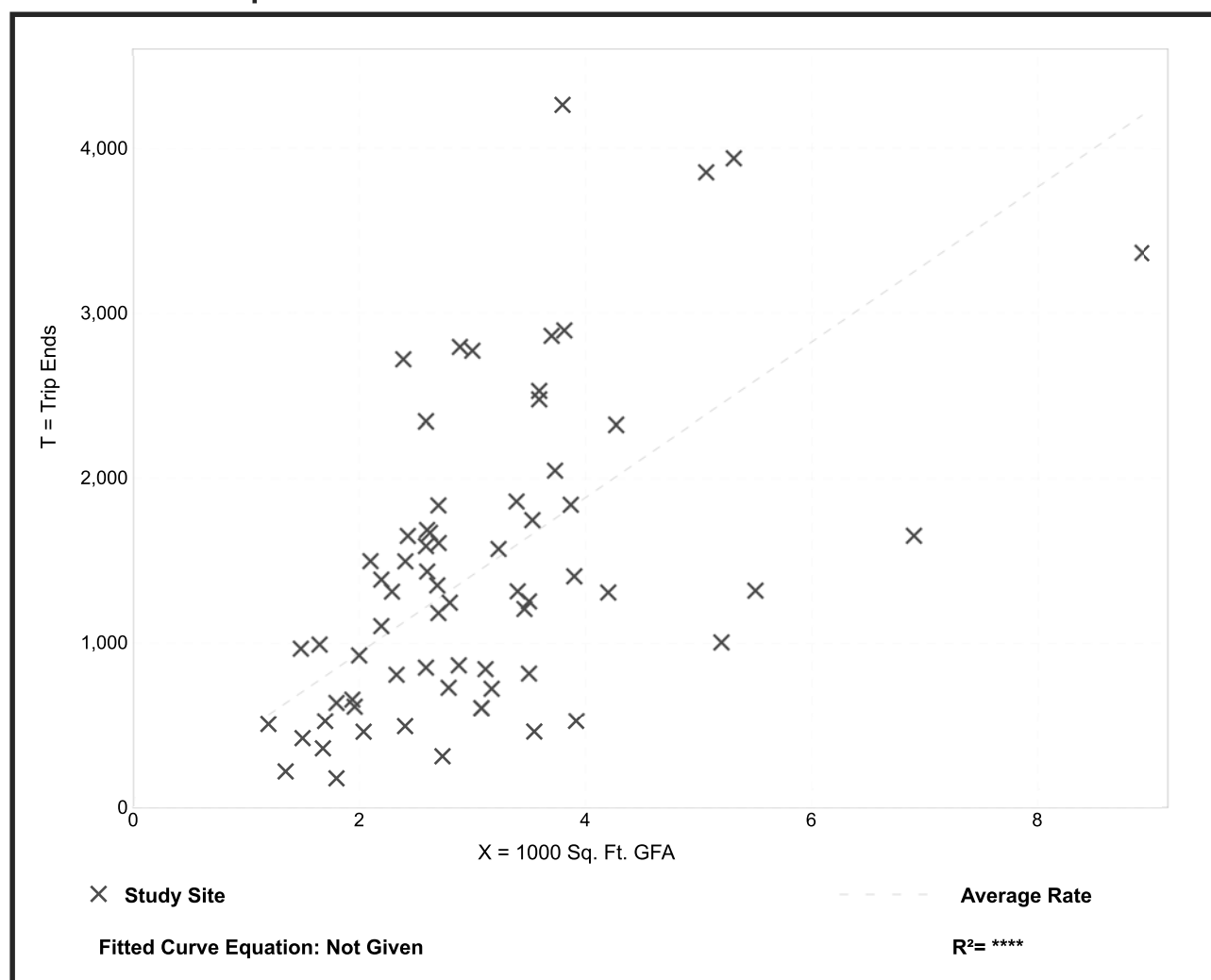
Vehicle Trip Ends vs: 1000 Sq. Ft. GFA  
On a: Weekday

Setting/Location: General Urban/Suburban  
Number of Studies: 67  
Avg. 1000 Sq. Ft. GFA: 3  
Directional Distribution: 50% entering, 50% exiting

## Vehicle Trip Generation per 1000 Sq. Ft. GFA

| Average Rate | Range of Rates  | Standard Deviation |
|--------------|-----------------|--------------------|
| 470.95       | 98.89 - 1137.66 | 244.44             |

## Data Plot and Equation



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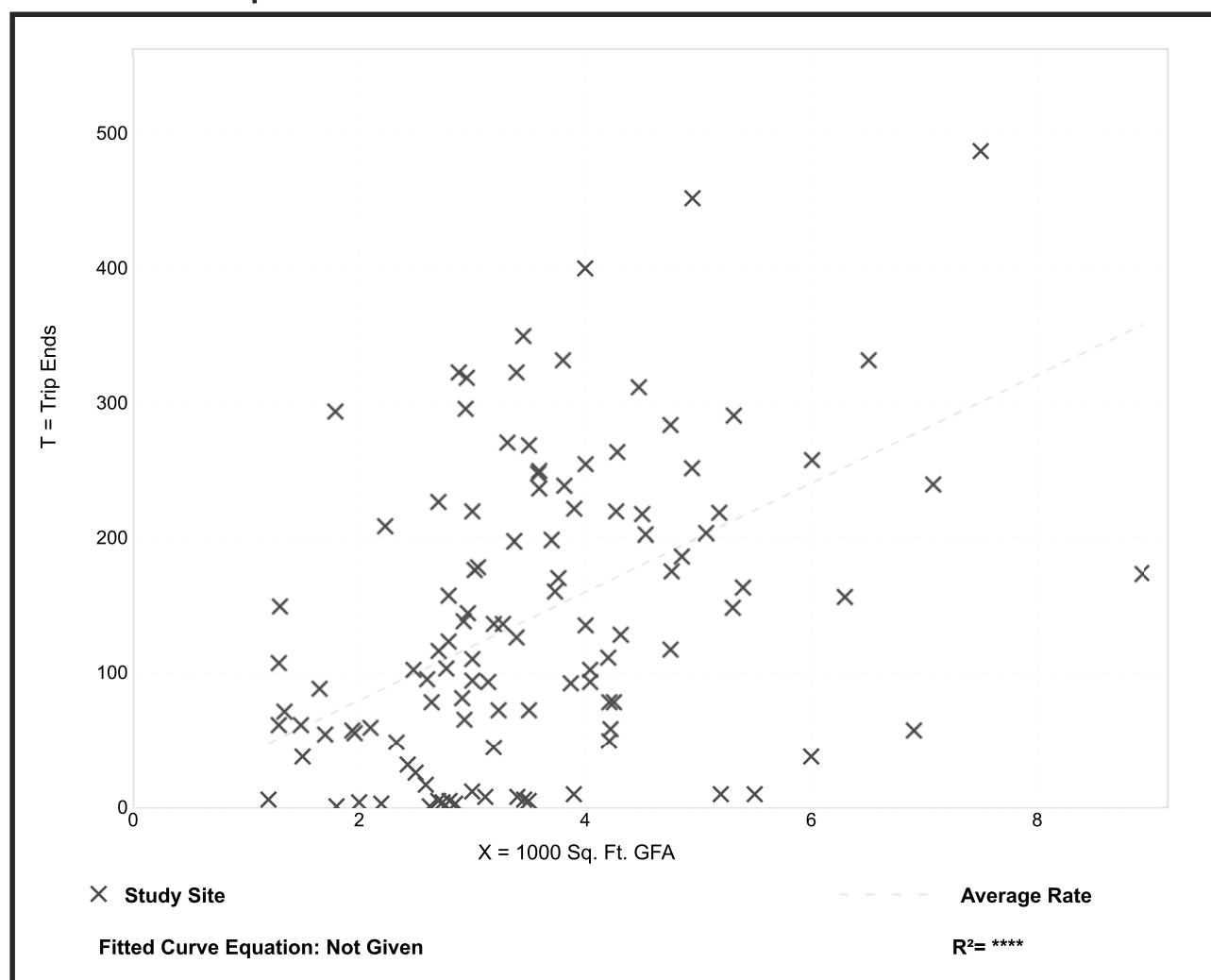
## Fast-Food Restaurant with Drive-Through Window (934)

**Vehicle Trip Ends vs:** 1000 Sq. Ft. GFA  
**On a:** Weekday,  
 Peak Hour of Adjacent Street Traffic,  
 One Hour Between 7 and 9 a.m.  
**Setting/Location:** General Urban/Suburban  
 Number of Studies: 111  
 Avg. 1000 Sq. Ft. GFA: 4  
 Directional Distribution: 51% entering, 49% exiting

### Vehicle Trip Generation per 1000 Sq. Ft. GFA

| Average Rate | Range of Rates | Standard Deviation |
|--------------|----------------|--------------------|
| 40.19        | 0.38 - 164.25  | 28.78              |

### Data Plot and Equation



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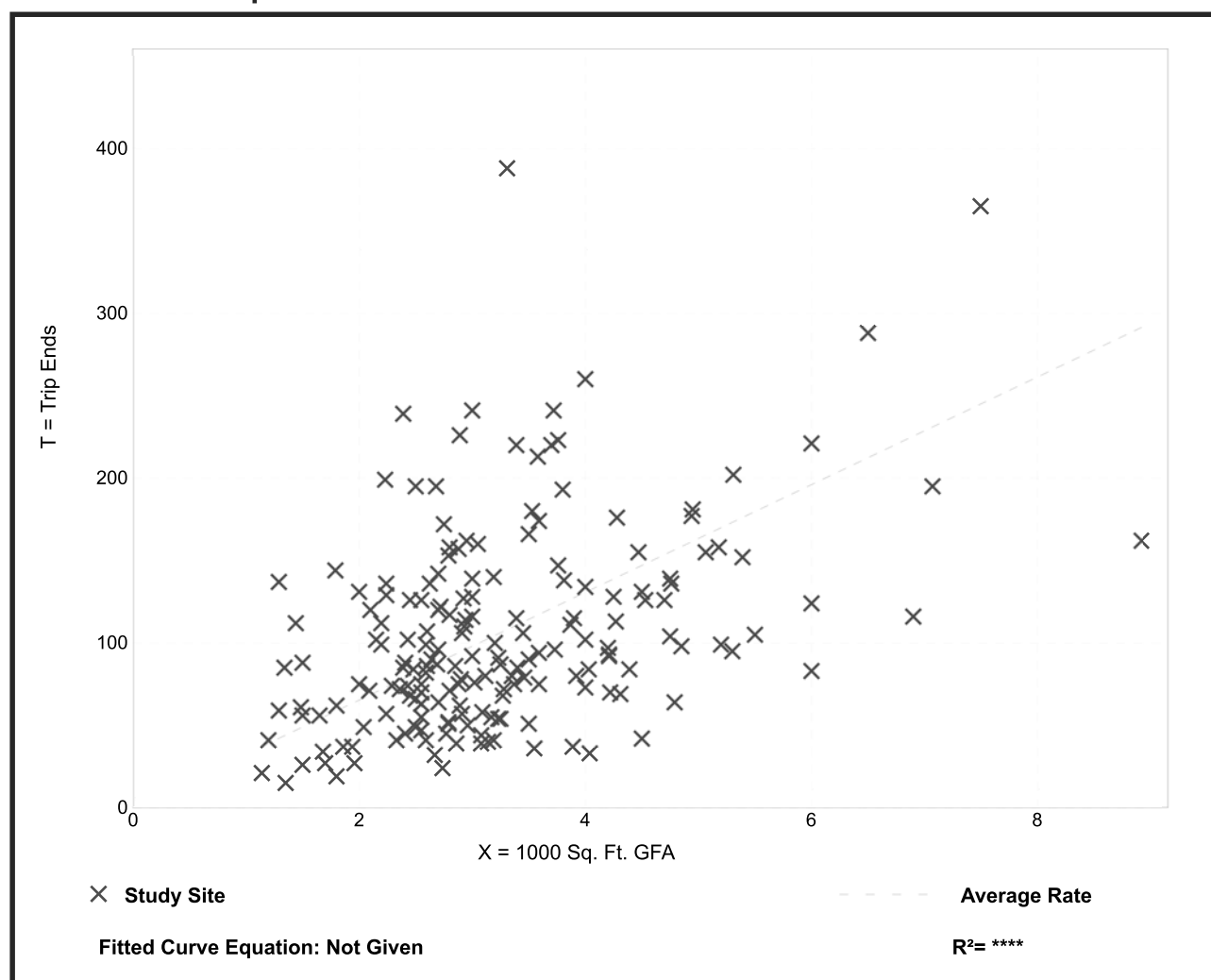
## Fast-Food Restaurant with Drive-Through Window (934)

**Vehicle Trip Ends vs:** 1000 Sq. Ft. GFA  
**On a:** Weekday,  
 Peak Hour of Adjacent Street Traffic,  
 One Hour Between 4 and 6 p.m.  
**Setting/Location:** General Urban/Suburban  
 Number of Studies: 185  
 Avg. 1000 Sq. Ft. GFA: 3  
 Directional Distribution: 52% entering, 48% exiting

### Vehicle Trip Generation per 1000 Sq. Ft. GFA

| Average Rate | Range of Rates | Standard Deviation |
|--------------|----------------|--------------------|
| 32.67        | 8.17 - 117.22  | 17.87              |

### Data Plot and Equation



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*APPENDIX*

ITE TRIP GENERATION SHEETS

SPECIALTY RETAIL CENTER (LUC 826)

# Specialty Retail Center (826)

**Average Vehicle Trip Ends vs: 1000 Sq. Feet Gross Leasable Area**  
**On a: Weekday**

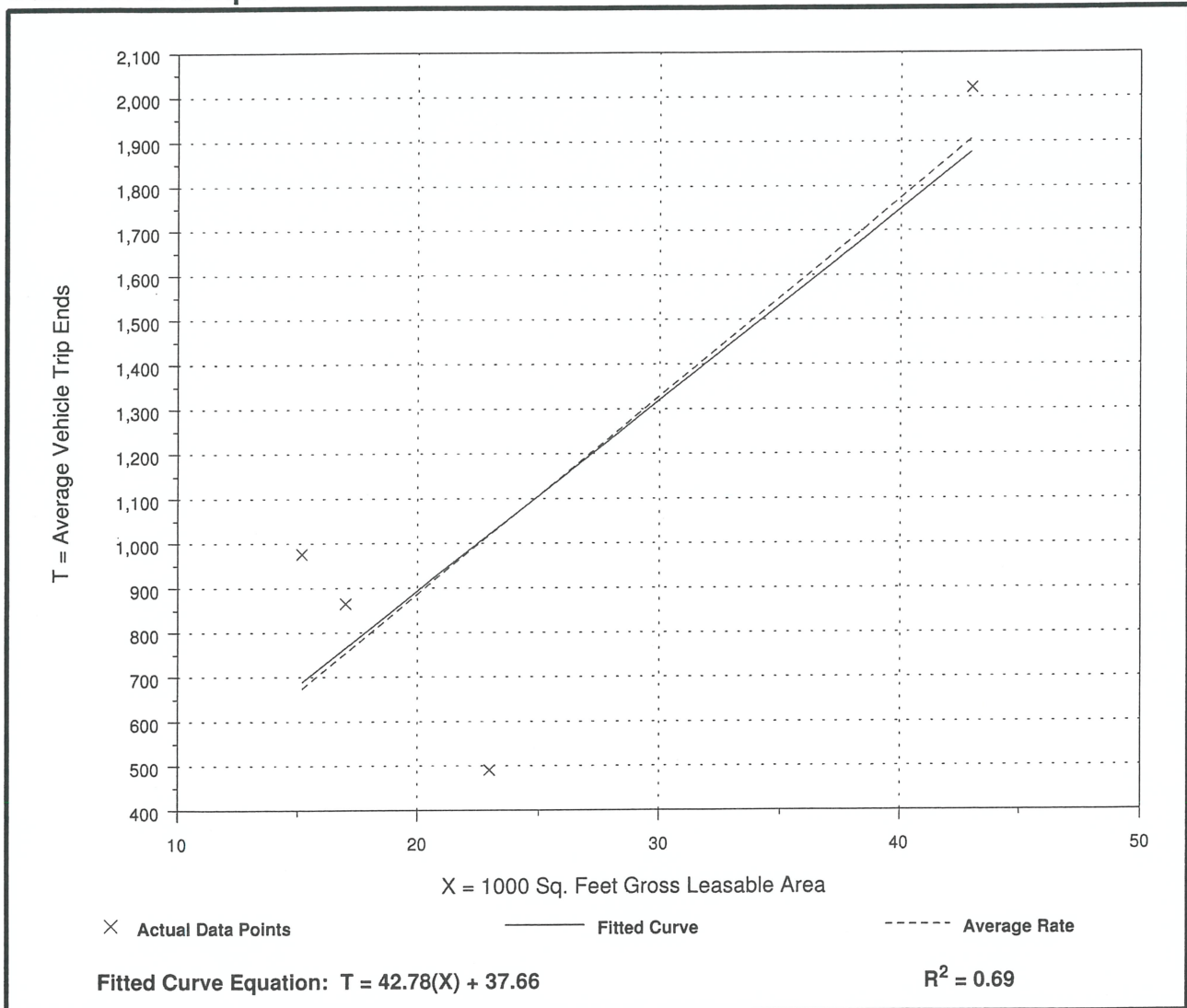
Number of Studies: 4  
Average 1000 Sq. Feet GLA: 25  
Directional Distribution: 50% entering, 50% exiting

## Trip Generation per 1000 Sq. Feet Gross Leasable Area

| Average Rate | Range of Rates | Standard Deviation |
|--------------|----------------|--------------------|
| 44.32        | 21.30 - 64.21  | 15.52              |

## Data Plot and Equation

*Caution - Use Carefully - Small Sample Size*



# Specialty Retail Center (826)

**Average Vehicle Trip Ends vs: 1000 Sq. Feet Gross Leasable Area**  
**On a: Weekday,**  
**Peak Hour of Adjacent Street Traffic,**  
**One Hour Between 4 and 6 p.m.**

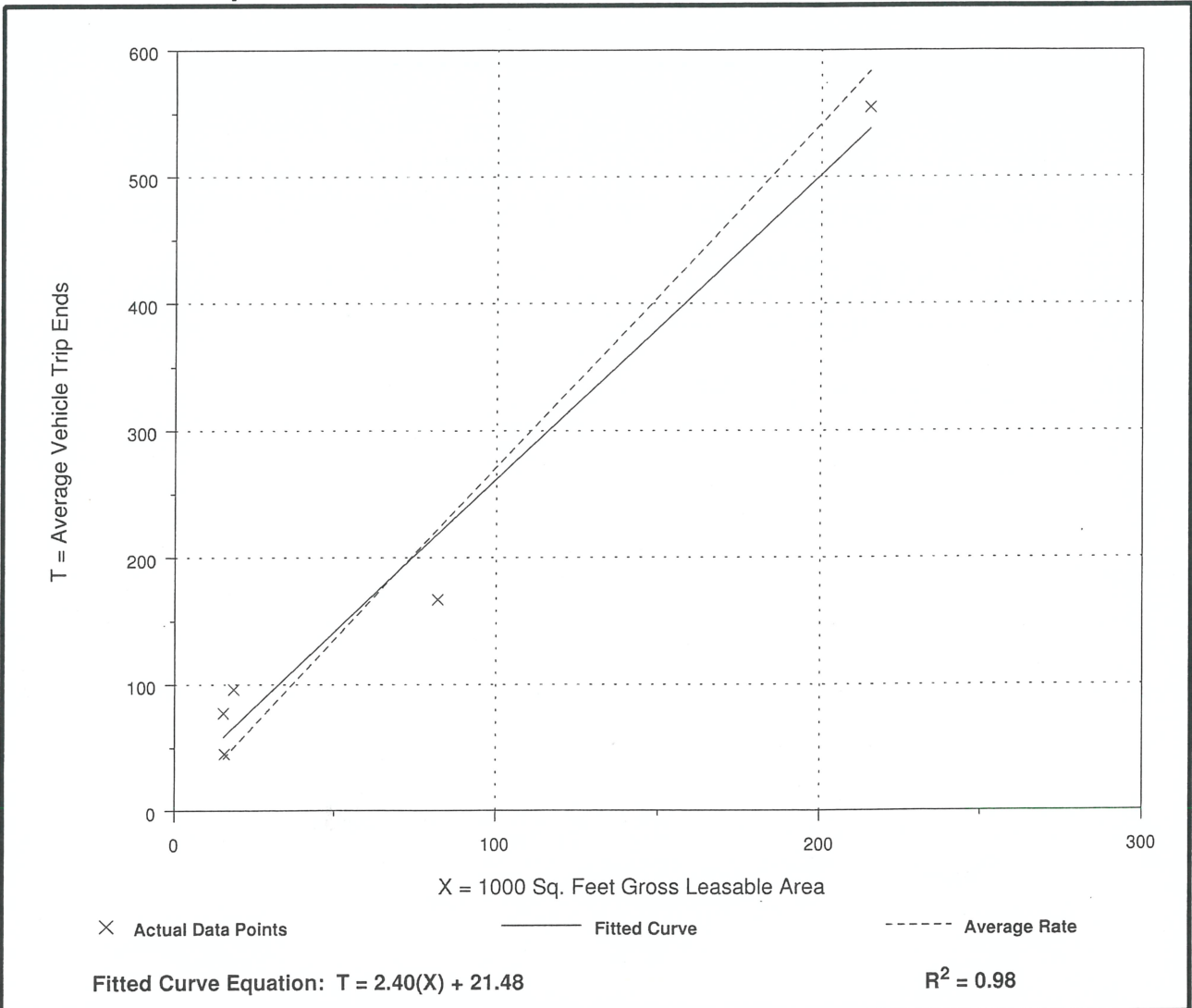
Number of Studies: 5  
Average 1000 Sq. Feet GLA: 69  
Directional Distribution: 44% entering, 56% exiting

## Trip Generation per 1000 Sq. Feet Gross Leasable Area

| Average Rate | Range of Rates | Standard Deviation |
|--------------|----------------|--------------------|
| 2.71         | 2.03 - 5.16    | 1.83               |

## Data Plot and Equation

*Caution - Use Carefully - Small Sample Size*



*APPENDIX*

LEVEL OF SERVICE



| Intersection             |                                                                                   |                                                                                   |                                                                                   |      |                                                                                   |                                                                                   |
|--------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| Int Delay, s/veh         | 1.1                                                                               |                                                                                   |                                                                                   |      |                                                                                   |                                                                                   |
| Movement                 | WBL                                                                               | WBR                                                                               | NBT                                                                               | NBR  | SBL                                                                               | SBT                                                                               |
| Lane Configurations      |  |  |  |      |  |  |
| Traffic Vol, veh/h       | 47                                                                                | 12                                                                                | 572                                                                               | 28   | 6                                                                                 | 264                                                                               |
| Future Vol, veh/h        | 47                                                                                | 12                                                                                | 572                                                                               | 28   | 6                                                                                 | 264                                                                               |
| Conflicting Peds, #/hr   | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0    | 0                                                                                 | 0                                                                                 |
| Sign Control             | Stop                                                                              | Stop                                                                              | Free                                                                              | Free | Free                                                                              | Free                                                                              |
| RT Channelized           | -                                                                                 | None                                                                              | -                                                                                 | None | -                                                                                 | None                                                                              |
| Storage Length           | 0                                                                                 | 0                                                                                 | -                                                                                 | -    | 125                                                                               | -                                                                                 |
| Veh in Median Storage, # | 1                                                                                 | -                                                                                 | 0                                                                                 | -    | -                                                                                 | 0                                                                                 |
| Grade, %                 | 0                                                                                 | -                                                                                 | 0                                                                                 | -    | -                                                                                 | 0                                                                                 |
| Peak Hour Factor         | 80                                                                                | 80                                                                                | 80                                                                                | 80   | 80                                                                                | 80                                                                                |
| Heavy Vehicles, %        | 2                                                                                 | 1                                                                                 | 1                                                                                 | 12   | 1                                                                                 | 3                                                                                 |
| Mvmt Flow                | 59                                                                                | 15                                                                                | 715                                                                               | 35   | 8                                                                                 | 330                                                                               |

| Major/Minor          | Minor1 | Major1 | Major2 |   |       |   |
|----------------------|--------|--------|--------|---|-------|---|
| Conflicting Flow All | 1079   | 733    | 0      | 0 | 750   | 0 |
| Stage 1              | 733    | -      | -      | - | -     | - |
| Stage 2              | 346    | -      | -      | - | -     | - |
| Critical Hdwy        | 6.42   | 6.21   | -      | - | 4.11  | - |
| Critical Hdwy Stg 1  | 5.42   | -      | -      | - | -     | - |
| Critical Hdwy Stg 2  | 5.42   | -      | -      | - | -     | - |
| Follow-up Hdwy       | 3.518  | 3.309  | -      | - | 2.209 | - |
| Pot Cap-1 Maneuver   | 242    | 422    | -      | - | 864   | - |
| Stage 1              | 475    | -      | -      | - | -     | - |
| Stage 2              | 716    | -      | -      | - | -     | - |
| Platoon blocked, %   |        |        | -      | - |       | - |
| Mov Cap-1 Maneuver   | 240    | 422    | -      | - | 864   | - |
| Mov Cap-2 Maneuver   | 362    | -      | -      | - | -     | - |
| Stage 1              | 475    | -      | -      | - | -     | - |
| Stage 2              | 710    | -      | -      | - | -     | - |

| Approach             | WB   | NB | SB  |
|----------------------|------|----|-----|
| HCM Control Delay, s | 16.3 | 0  | 0.2 |
| HCM LOS              | C    |    |     |

| Minor Lane/Major Mvmt | NBT | NBRWBLn1WBLn2 | SBL   | SBT |
|-----------------------|-----|---------------|-------|-----|
| Capacity (veh/h)      | -   | - 362 422     | 864   | -   |
| HCM Lane V/C Ratio    | -   | - 0.162 0.036 | 0.009 | -   |
| HCM Control Delay (s) | -   | - 16.9 13.8   | 9.2   | -   |
| HCM Lane LOS          | -   | - C B         | A     | -   |
| HCM 95th %tile Q(veh) | -   | - 0.6 0.1     | 0     | -   |

HCM 6th TWSC  
2: Canterwood Blvd & Southern Driveway

Baseline 2021 PM Peak Hour  
01/22/2021

| Intersection             |                                                                                   |                                                                                   |                                                                                   |      |                                                                                   |                                                                                   |
|--------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| Int Delay, s/veh         | 1.8                                                                               |                                                                                   |                                                                                   |      |                                                                                   |                                                                                   |
| Movement                 | WBL                                                                               | WBR                                                                               | NBT                                                                               | NBR  | SBL                                                                               | SBT                                                                               |
| Lane Configurations      |  |  |  |      |  |  |
| Traffic Vol, veh/h       | 84                                                                                | 24                                                                                | 576                                                                               | 21   | 1                                                                                 | 310                                                                               |
| Future Vol, veh/h        | 84                                                                                | 24                                                                                | 576                                                                               | 21   | 1                                                                                 | 310                                                                               |
| Conflicting Peds, #/hr   | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0    | 0                                                                                 | 0                                                                                 |
| Sign Control             | Stop                                                                              | Stop                                                                              | Free                                                                              | Free | Free                                                                              | Free                                                                              |
| RT Channelized           | -                                                                                 | None                                                                              | -                                                                                 | None | -                                                                                 | None                                                                              |
| Storage Length           | 0                                                                                 | 0                                                                                 | -                                                                                 | -    | 125                                                                               | -                                                                                 |
| Veh in Median Storage, # | 1                                                                                 | -                                                                                 | 0                                                                                 | -    | -                                                                                 | 0                                                                                 |
| Grade, %                 | 0                                                                                 | -                                                                                 | 0                                                                                 | -    | -                                                                                 | 0                                                                                 |
| Peak Hour Factor         | 85                                                                                | 85                                                                                | 85                                                                                | 85   | 85                                                                                | 85                                                                                |
| Heavy Vehicles, %        | 1                                                                                 | 1                                                                                 | 1                                                                                 | 1    | 1                                                                                 | 3                                                                                 |
| Mvmt Flow                | 99                                                                                | 28                                                                                | 678                                                                               | 25   | 1                                                                                 | 365                                                                               |

| Major/Minor          | Minor1 | Major1 | Major2 |   |       |
|----------------------|--------|--------|--------|---|-------|
| Conflicting Flow All | 1058   | 691    | 0      | 0 | 703   |
| Stage 1              | 691    | -      | -      | - | -     |
| Stage 2              | 367    | -      | -      | - | -     |
| Critical Hdwy        | 6.41   | 6.21   | -      | - | 4.11  |
| Critical Hdwy Stg 1  | 5.41   | -      | -      | - | -     |
| Critical Hdwy Stg 2  | 5.41   | -      | -      | - | -     |
| Follow-up Hdwy       | 3.509  | 3.309  | -      | - | 2.209 |
| Pot Cap-1 Maneuver   | 250    | 446    | -      | - | 899   |
| Stage 1              | 499    | -      | -      | - | -     |
| Stage 2              | 703    | -      | -      | - | -     |
| Platoon blocked, %   |        |        | -      | - | -     |
| Mov Cap-1 Maneuver   | 250    | 446    | -      | - | 899   |
| Mov Cap-2 Maneuver   | 375    | -      | -      | - | -     |
| Stage 1              | 499    | -      | -      | - | -     |
| Stage 2              | 702    | -      | -      | - | -     |

| Approach             | WB | NB | SB |
|----------------------|----|----|----|
| HCM Control Delay, s | 17 | 0  | 0  |
| HCM LOS              | C  |    |    |

| Minor Lane/Major Mvmt | NBT | NBRWBLn1WBLn2 | SBL   | SBT |
|-----------------------|-----|---------------|-------|-----|
| Capacity (veh/h)      | -   | - 375 446     | 899   | -   |
| HCM Lane V/C Ratio    | -   | - 0.264 0.063 | 0.001 | -   |
| HCM Control Delay (s) | -   | - 18 13.6     | 9     | -   |
| HCM Lane LOS          | -   | - C B         | A     | -   |
| HCM 95th %tile Q(veh) | -   | - 1 0.2       | 0     | -   |

# MOVEMENT SUMMARY

 **Site: 101 [Burnham Drive/Borgen Drive & SR 16/Canterwood  
(Site Folder: General)]**

Baseline 2021 PM Peak Hour  
Site Category: (None)  
Roundabout

| Vehicle Movement Performance |      |               |      |               |      |           |             |                  |                   |           |           |                     |                  |             |
|------------------------------|------|---------------|------|---------------|------|-----------|-------------|------------------|-------------------|-----------|-----------|---------------------|------------------|-------------|
| Mov ID                       | Turn | INPUT VOLUMES |      | DEMAND FLOWS  |      | Deg. Satn | Aver. Delay | Level of Service | 95% BACK OF QUEUE |           | Prop. Que | Effective Stop Rate | Aver. No. Cycles | Aver. Speed |
|                              |      | [ Total veh/h | HV % | [ Total veh/h | HV % | v/c       | sec         |                  | [ Veh. veh        | Dist ] ft |           |                     |                  | mph         |
| South: Burnham Drive         |      |               |      |               |      |           |             |                  |                   |           |           |                     |                  |             |
| 3                            | L2   | 61            | 1.0  | 64            | 1.0  | 0.470     | 18.6        | LOS B            | 3.2               | 79.4      | 0.92      | 1.03                | 1.14             | 33.1        |
| 3a                           | L1   | 83            | 1.0  | 86            | 1.0  | 0.470     | 17.3        | LOS B            | 3.2               | 79.4      | 0.92      | 1.03                | 1.14             | 32.7        |
| 8                            | T1   | 120           | 1.0  | 125           | 1.0  | 0.470     | 11.8        | LOS B            | 3.2               | 79.4      | 0.92      | 1.03                | 1.14             | 33.0        |
| 18                           | R2   | 86            | 1.0  | 90            | 1.0  | 0.210     | 11.2        | LOS B            | 1.0               | 26.4      | 0.84      | 0.91                | 0.84             | 33.1        |
| Approach                     |      | 350           | 1.0  | 365           | 1.0  | 0.470     | 14.1        | LOS B            | 3.2               | 79.4      | 0.90      | 1.00                | 1.07             | 33.0        |
| East: Borgen Blvd            |      |               |      |               |      |           |             |                  |                   |           |           |                     |                  |             |
| 1                            | L2   | 79            | 1.0  | 82            | 1.0  | 0.954     | 65.9        | LOS E            | 24.5              | 617.8     | 1.00      | 1.80                | 3.11             | 20.2        |
| 6                            | T1   | 443           | 1.0  | 461           | 1.0  | 0.954     | 59.1        | LOS E            | 24.5              | 617.8     | 1.00      | 1.80                | 3.11             | 20.0        |
| 16a                          | R1   | 729           | 1.0  | 759           | 1.0  | 1.092     | 90.0        | LOS F            | 59.0              | 1487.5    | 1.00      | 2.60                | 4.86             | 15.6        |
| 16                           | R2   | 158           | 1.0  | 165           | 1.0  | 1.092     | 90.4        | LOS F            | 59.0              | 1487.5    | 1.00      | 2.60                | 4.86             | 15.4        |
| Approach                     |      | 1409          | 1.0  | 1468          | 1.0  | 1.092     | 79.0        | LOS E            | 59.0              | 1487.5    | 1.00      | 2.30                | 4.21             | 17.0        |
| North: Canterwood Blvd       |      |               |      |               |      |           |             |                  |                   |           |           |                     |                  |             |
| 7                            | L2   | 82            | 1.0  | 85            | 1.0  | 0.380     | 19.2        | LOS B            | 2.3               | 57.3      | 0.91      | 1.00                | 1.02             | 32.6        |
| 4                            | T1   | 68            | 1.0  | 71            | 1.0  | 0.380     | 12.6        | LOS B            | 2.3               | 57.3      | 0.91      | 1.00                | 1.02             | 32.4        |
| 14                           | R2   | 176           | 1.0  | 183           | 1.0  | 0.273     | 9.4         | LOS A            | 2.1               | 52.5      | 0.99      | 0.95                | 0.99             | 34.2        |
| 14b                          | R3   | 68            | 1.0  | 71            | 1.0  | 0.045     | 3.5         | LOS A            | 0.0               | 0.0       | 0.00      | 0.47                | 0.00             | 37.0        |
| Approach                     |      | 394           | 1.0  | 410           | 1.0  | 0.380     | 11.0        | LOS B            | 2.3               | 57.3      | 0.79      | 0.89                | 0.83             | 33.9        |
| West: Burnham Drive          |      |               |      |               |      |           |             |                  |                   |           |           |                     |                  |             |
| 5b                           | L3   | 163           | 1.0  | 170           | 1.0  | 0.284     | 12.7        | LOS B            | 1.9               | 48.0      | 0.49      | 0.63                | 0.49             | 35.7        |
| 5                            | L2   | 103           | 1.0  | 107           | 1.0  | 0.284     | 11.4        | LOS B            | 1.9               | 48.0      | 0.49      | 0.63                | 0.49             | 35.2        |
| 2                            | T1   | 338           | 1.0  | 352           | 1.0  | 0.284     | 4.3         | LOS A            | 2.0               | 51.2      | 0.46      | 0.49                | 0.46             | 36.7        |
| 12                           | R2   | 193           | 1.0  | 201           | 1.0  | 0.284     | 4.4         | LOS A            | 2.0               | 51.2      | 0.46      | 0.44                | 0.46             | 36.0        |
| Approach                     |      | 797           | 1.0  | 830           | 1.0  | 0.284     | 6.9         | LOS A            | 2.0               | 51.2      | 0.47      | 0.52                | 0.47             | 36.1        |
| SouthWest: SR 16 WB Off Ramp |      |               |      |               |      |           |             |                  |                   |           |           |                     |                  |             |
| 5bx                          | L3   | 289           | 1.0  | 301           | 1.0  | 0.662     | 17.3        | LOS B            | 5.0               | 126.5     | 0.82      | 1.04                | 1.12             | 33.4        |
| 5x                           | L2   | 6             | 1.0  | 6             | 1.0  | 0.662     | 16.0        | LOS B            | 5.0               | 126.5     | 0.82      | 1.04                | 1.12             | 33.0        |
| 5ax                          | L1   | 216           | 1.0  | 225           | 1.0  | 0.662     | 14.6        | LOS B            | 5.0               | 126.5     | 0.82      | 1.04                | 1.12             | 32.6        |
| 12ax                         | R1   | 851           | 1.0  | 886           | 1.0  | 0.662     | 7.4         | LOS A            | 5.6               | 142.4     | 0.80      | 0.88                | 1.04             | 35.5        |
| 12bx                         | R3   | 127           | 1.0  | 132           | 1.0  | 0.085     | 3.5         | LOS A            | 0.0               | 0.0       | 0.00      | 0.47                | 0.00             | 36.9        |
| Approach                     |      | 1489          | 1.0  | 1551          | 1.0  | 0.662     | 10.0        | LOS B            | 5.6               | 142.4     | 0.74      | 0.90                | 0.98             | 34.7        |
| All Vehicles                 |      | 4439          | 1.0  | 4624          | 1.0  | 1.092     | 31.8        | LOS C            | 59.0              | 1487.5    | 0.79      | 1.29                | 1.91             | 26.1        |

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

Intersection and Approach LOS values are based on average delay for all movements (v/c not used).

Roundabout Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: HCM Queue Formula.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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# MOVEMENT SUMMARY

 **Site: 101 [Burnham Drive & SR 16 EB Ramps (Site Folder: General)]**

Baseline 2021 PM Peak Hour  
Site Category: (None)  
Roundabout

| Vehicle Movement Performance |      |                                          |     |                                         |     |                      |                        |                  |                                              |       |           |                     |                  |                        |
|------------------------------|------|------------------------------------------|-----|-----------------------------------------|-----|----------------------|------------------------|------------------|----------------------------------------------|-------|-----------|---------------------|------------------|------------------------|
| Mov ID                       | Turn | INPUT VOLUMES<br>[ Total HV ]<br>veh/h % |     | DEMAND FLOWS<br>[ Total HV ]<br>veh/h % |     | Deg. Satn<br><br>v/c | Aver. Delay<br><br>sec | Level of Service | 95% BACK OF QUEUE<br>[ Veh. Dist ]<br>veh ft |       | Prop. Que | Effective Stop Rate | Aver. No. Cycles | Aver. Speed<br><br>mph |
| East: Burnham Drive          |      |                                          |     |                                         |     |                      |                        |                  |                                              |       |           |                     |                  |                        |
| 1u                           | U    | 1                                        | 0.0 | 1                                       | 0.0 | 0.664                | 11.9                   | LOS B            | 0.0                                          | 0.0   | 0.00      | 0.60                | 0.00             | 36.8                   |
| 1                            | L2   | 554                                      | 2.0 | 577                                     | 2.0 | 0.664                | 9.6                    | LOS A            | 0.0                                          | 0.0   | 0.00      | 0.60                | 0.00             | 35.9                   |
| 6                            | T1   | 337                                      | 2.0 | 351                                     | 2.0 | 0.664                | 4.0                    | LOS A            | 0.0                                          | 0.0   | 0.00      | 0.60                | 0.00             | 35.9                   |
| Approach                     |      | 892                                      | 2.0 | 929                                     | 2.0 | 0.664                | 7.5                    | LOS A            | 0.0                                          | 0.0   | 0.00      | 0.60                | 0.00             | 35.9                   |
| North: SR 16 EB Off-Ramp     |      |                                          |     |                                         |     |                      |                        |                  |                                              |       |           |                     |                  |                        |
| 7                            | L2   | 434                                      | 2.0 | 452                                     | 2.0 | 0.507                | 18.7                   | LOS B            | 4.8                                          | 121.5 | 0.90      | 0.99                | 1.11             | 30.6                   |
| 4                            | T1   | 3                                        | 2.0 | 3                                       | 2.0 | 0.183                | 11.9                   | LOS B            | 1.1                                          | 27.3  | 0.78      | 0.83                | 0.78             | 33.3                   |
| 14                           | R2   | 104                                      | 2.0 | 108                                     | 2.0 | 0.183                | 12.1                   | LOS B            | 1.1                                          | 27.3  | 0.78      | 0.83                | 0.78             | 32.3                   |
| Approach                     |      | 541                                      | 2.0 | 564                                     | 2.0 | 0.507                | 17.4                   | LOS B            | 4.8                                          | 121.5 | 0.88      | 0.96                | 1.04             | 30.9                   |
| West: Burnham Drive          |      |                                          |     |                                         |     |                      |                        |                  |                                              |       |           |                     |                  |                        |
| 2                            | T1   | 419                                      | 2.0 | 436                                     | 2.0 | 0.459                | 15.6                   | LOS B            | 4.3                                          | 109.3 | 0.98      | 1.02                | 1.15             | 31.7                   |
| 12                           | R2   | 103                                      | 2.0 | 107                                     | 2.0 | 0.459                | 14.1                   | LOS B            | 4.3                                          | 109.3 | 1.00      | 0.99                | 1.13             | 31.5                   |
| Approach                     |      | 522                                      | 2.0 | 544                                     | 2.0 | 0.459                | 15.3                   | LOS B            | 4.3                                          | 109.3 | 0.99      | 1.02                | 1.14             | 31.7                   |
| All Vehicles                 |      | 1955                                     | 2.0 | 2036                                    | 2.0 | 0.664                | 12.3                   | LOS B            | 4.8                                          | 121.5 | 0.51      | 0.81                | 0.59             | 33.2                   |

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

Intersection and Approach LOS values are based on average delay for all movements (v/c not used).

Roundabout Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: HCM Queue Formula.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Project: T:\Sidra\4199\1. Existing.sip9



| Intersection             |                                                                                   |                                                                                   |                                                                                   |      |                                                                                   |                                                                                   |
|--------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| Int Delay, s/veh         | 1.2                                                                               |                                                                                   |                                                                                   |      |                                                                                   |                                                                                   |
| Movement                 | WBL                                                                               | WBR                                                                               | NBT                                                                               | NBR  | SBL                                                                               | SBT                                                                               |
| Lane Configurations      |  |  |  |      |  |  |
| Traffic Vol, veh/h       | 50                                                                                | 13                                                                                | 582                                                                               | 30   | 6                                                                                 | 263                                                                               |
| Future Vol, veh/h        | 50                                                                                | 13                                                                                | 582                                                                               | 30   | 6                                                                                 | 263                                                                               |
| Conflicting Peds, #/hr   | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0    | 0                                                                                 | 0                                                                                 |
| Sign Control             | Stop                                                                              | Stop                                                                              | Free                                                                              | Free | Free                                                                              | Free                                                                              |
| RT Channelized           | -                                                                                 | None                                                                              | -                                                                                 | None | -                                                                                 | None                                                                              |
| Storage Length           | 0                                                                                 | 0                                                                                 | -                                                                                 | -    | 125                                                                               | -                                                                                 |
| Veh in Median Storage, # | 1                                                                                 | -                                                                                 | 0                                                                                 | -    | -                                                                                 | 0                                                                                 |
| Grade, %                 | 0                                                                                 | -                                                                                 | 0                                                                                 | -    | -                                                                                 | 0                                                                                 |
| Peak Hour Factor         | 80                                                                                | 80                                                                                | 80                                                                                | 80   | 80                                                                                | 80                                                                                |
| Heavy Vehicles, %        | 2                                                                                 | 1                                                                                 | 1                                                                                 | 12   | 1                                                                                 | 3                                                                                 |
| Mvmt Flow                | 63                                                                                | 16                                                                                | 728                                                                               | 38   | 8                                                                                 | 329                                                                               |

| Major/Minor          | Minor1 | Major1 | Major2 |   |       |   |
|----------------------|--------|--------|--------|---|-------|---|
| Conflicting Flow All | 1092   | 747    | 0      | 0 | 766   | 0 |
| Stage 1              | 747    | -      | -      | - | -     | - |
| Stage 2              | 345    | -      | -      | - | -     | - |
| Critical Hdwy        | 6.42   | 6.21   | -      | - | 4.11  | - |
| Critical Hdwy Stg 1  | 5.42   | -      | -      | - | -     | - |
| Critical Hdwy Stg 2  | 5.42   | -      | -      | - | -     | - |
| Follow-up Hdwy       | 3.518  | 3.309  | -      | - | 2.209 | - |
| Pot Cap-1 Maneuver   | 237    | 415    | -      | - | 852   | - |
| Stage 1              | 468    | -      | -      | - | -     | - |
| Stage 2              | 717    | -      | -      | - | -     | - |
| Platoon blocked, %   |        |        | -      | - |       | - |
| Mov Cap-1 Maneuver   | 235    | 415    | -      | - | 852   | - |
| Mov Cap-2 Maneuver   | 357    | -      | -      | - | -     | - |
| Stage 1              | 468    | -      | -      | - | -     | - |
| Stage 2              | 711    | -      | -      | - | -     | - |

| Approach             | WB   | NB | SB  |
|----------------------|------|----|-----|
| HCM Control Delay, s | 16.5 | 0  | 0.2 |
| HCM LOS              | C    |    |     |

| Minor Lane/Major Mvmt | NBT | NBRWBLn1WBLn2 | SBL   | SBT |
|-----------------------|-----|---------------|-------|-----|
| Capacity (veh/h)      | -   | - 357 415     | 852   | -   |
| HCM Lane V/C Ratio    | -   | - 0.175 0.039 | 0.009 | -   |
| HCM Control Delay (s) | -   | - 17.2 14     | 9.3   | -   |
| HCM Lane LOS          | -   | - C B         | A     | -   |
| HCM 95th %tile Q(veh) | -   | - 0.6 0.1     | 0     | -   |

| Intersection             |                                                                                   |                                                                                   |                                                                                   |      |                                                                                   |                                                                                   |
|--------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| Int Delay, s/veh         | 1.9                                                                               |                                                                                   |                                                                                   |      |                                                                                   |                                                                                   |
| Movement                 | WBL                                                                               | WBR                                                                               | NBT                                                                               | NBR  | SBL                                                                               | SBT                                                                               |
| Lane Configurations      |  |  |  |      |  |  |
| Traffic Vol, veh/h       | 89                                                                                | 25                                                                                | 587                                                                               | 22   | 1                                                                                 | 312                                                                               |
| Future Vol, veh/h        | 89                                                                                | 25                                                                                | 587                                                                               | 22   | 1                                                                                 | 312                                                                               |
| Conflicting Peds, #/hr   | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0    | 0                                                                                 | 0                                                                                 |
| Sign Control             | Stop                                                                              | Stop                                                                              | Free                                                                              | Free | Free                                                                              | Free                                                                              |
| RT Channelized           | -                                                                                 | None                                                                              | -                                                                                 | None | -                                                                                 | None                                                                              |
| Storage Length           | 0                                                                                 | 0                                                                                 | -                                                                                 | -    | 125                                                                               | -                                                                                 |
| Veh in Median Storage, # | 1                                                                                 | -                                                                                 | 0                                                                                 | -    | -                                                                                 | 0                                                                                 |
| Grade, %                 | 0                                                                                 | -                                                                                 | 0                                                                                 | -    | -                                                                                 | 0                                                                                 |
| Peak Hour Factor         | 85                                                                                | 85                                                                                | 85                                                                                | 85   | 85                                                                                | 85                                                                                |
| Heavy Vehicles, %        | 1                                                                                 | 1                                                                                 | 1                                                                                 | 1    | 1                                                                                 | 3                                                                                 |
| Mvmt Flow                | 105                                                                               | 29                                                                                | 691                                                                               | 26   | 1                                                                                 | 367                                                                               |

| Major/Minor          | Minor1 | Major1 | Major2 |   |       |   |
|----------------------|--------|--------|--------|---|-------|---|
| Conflicting Flow All | 1073   | 704    | 0      | 0 | 717   | 0 |
| Stage 1              | 704    | -      | -      | - | -     | - |
| Stage 2              | 369    | -      | -      | - | -     | - |
| Critical Hdwy        | 6.41   | 6.21   | -      | - | 4.11  | - |
| Critical Hdwy Stg 1  | 5.41   | -      | -      | - | -     | - |
| Critical Hdwy Stg 2  | 5.41   | -      | -      | - | -     | - |
| Follow-up Hdwy       | 3.509  | 3.309  | -      | - | 2.209 | - |
| Pot Cap-1 Maneuver   | 245    | 439    | -      | - | 888   | - |
| Stage 1              | 492    | -      | -      | - | -     | - |
| Stage 2              | 702    | -      | -      | - | -     | - |
| Platoon blocked, %   |        |        | -      | - |       | - |
| Mov Cap-1 Maneuver   | 245    | 439    | -      | - | 888   | - |
| Mov Cap-2 Maneuver   | 370    | -      | -      | - | -     | - |
| Stage 1              | 492    | -      | -      | - | -     | - |
| Stage 2              | 701    | -      | -      | - | -     | - |

| Approach             | WB   | NB | SB |
|----------------------|------|----|----|
| HCM Control Delay, s | 17.5 | 0  | 0  |
| HCM LOS              | C    |    |    |

| Minor Lane/Major Mvmt | NBT | NBRWBLn1WBLn2 | SBL   | SBT |
|-----------------------|-----|---------------|-------|-----|
| Capacity (veh/h)      | -   | - 370 439     | 888   | -   |
| HCM Lane V/C Ratio    | -   | - 0.283 0.067 | 0.001 | -   |
| HCM Control Delay (s) | -   | - 18.5 13.8   | 9.1   | -   |
| HCM Lane LOS          | -   | - C B         | A     | -   |
| HCM 95th %tile Q(veh) | -   | - 1.1 0.2     | 0     | -   |

# MOVEMENT SUMMARY

 **Site: 101 [Burnham Drive/Borgen Drive & SR 16/Canterwood  
(Site Folder: General)]**

Forecast 2023 PM Peak Hour without Project  
Site Category: (None)  
Roundabout

| Vehicle Movement Performance |      |                                          |     |                                         |     |                      |                        |                  |                                              |        |           |                     |                  |                        |
|------------------------------|------|------------------------------------------|-----|-----------------------------------------|-----|----------------------|------------------------|------------------|----------------------------------------------|--------|-----------|---------------------|------------------|------------------------|
| Mov ID                       | Turn | INPUT VOLUMES<br>[ Total veh/h    HV % ] |     | DEMAND FLOWS<br>[ Total veh/h    HV % ] |     | Deg. Satn<br><br>v/c | Aver. Delay<br><br>sec | Level of Service | 95% BACK OF QUEUE<br>[ Veh. veh    Dist ft ] |        | Prop. Que | Effective Stop Rate | Aver. No. Cycles | Aver. Speed<br><br>mph |
| South: Burnham Drive         |      |                                          |     |                                         |     |                      |                        |                  |                                              |        |           |                     |                  |                        |
| 3                            | L2   | 63                                       | 1.0 | 66                                      | 1.0 | 0.494                | 19.5                   | LOS B            | 3.4                                          | 86.4   | 0.93      | 1.05                | 1.19             | 32.7                   |
| 3a                           | L1   | 85                                       | 1.0 | 89                                      | 1.0 | 0.494                | 18.2                   | LOS B            | 3.4                                          | 86.4   | 0.93      | 1.05                | 1.19             | 32.3                   |
| 8                            | T1   | 122                                      | 1.0 | 127                                     | 1.0 | 0.494                | 12.7                   | LOS B            | 3.4                                          | 86.4   | 0.93      | 1.05                | 1.19             | 32.5                   |
| 18                           | R2   | 88                                       | 1.0 | 92                                      | 1.0 | 0.219                | 11.6                   | LOS B            | 1.1                                          | 28.1   | 0.85      | 0.92                | 0.85             | 33.0                   |
| Approach                     |      | 358                                      | 1.0 | 373                                     | 1.0 | 0.494                | 14.9                   | LOS B            | 3.4                                          | 86.4   | 0.91      | 1.02                | 1.11             | 32.6                   |
| East: Borgen Blvd            |      |                                          |     |                                         |     |                      |                        |                  |                                              |        |           |                     |                  |                        |
| 1                            | L2   | 81                                       | 1.0 | 84                                      | 1.0 | 1.006                | 81.0                   | LOS F            | 30.1                                         | 758.8  | 1.00      | 1.99                | 3.59             | 17.8                   |
| 6                            | T1   | 452                                      | 1.0 | 471                                     | 1.0 | 1.006                | 74.2                   | LOS F            | 30.1                                         | 758.8  | 1.00      | 1.99                | 3.59             | 17.7                   |
| 16a                          | R1   | 744                                      | 1.0 | 775                                     | 1.0 | 1.147                | 110.8                  | LOS F            | 70.4                                         | 1774.1 | 1.00      | 2.88                | 5.52             | 13.6                   |
| 16                           | R2   | 161                                      | 1.0 | 168                                     | 1.0 | 1.147                | 111.2                  | LOS F            | 70.4                                         | 1774.1 | 1.00      | 2.88                | 5.52             | 13.5                   |
| Approach                     |      | 1438                                     | 1.0 | 1498                                    | 1.0 | 1.147                | 97.6                   | LOS F            | 70.4                                         | 1774.1 | 1.00      | 2.55                | 4.81             | 14.9                   |
| North: Canterwood Blvd       |      |                                          |     |                                         |     |                      |                        |                  |                                              |        |           |                     |                  |                        |
| 7                            | L2   | 84                                       | 1.0 | 88                                      | 1.0 | 0.393                | 19.9                   | LOS B            | 2.4                                          | 60.7   | 0.92      | 1.00                | 1.05             | 32.3                   |
| 4                            | T1   | 69                                       | 1.0 | 72                                      | 1.0 | 0.393                | 13.3                   | LOS B            | 2.4                                          | 60.7   | 0.92      | 1.00                | 1.05             | 32.0                   |
| 14                           | R2   | 179                                      | 1.0 | 186                                     | 1.0 | 0.281                | 9.7                    | LOS A            | 2.2                                          | 55.0   | 1.00      | 0.96                | 1.00             | 34.0                   |
| 14b                          | R3   | 69                                       | 1.0 | 72                                      | 1.0 | 0.046                | 3.5                    | LOS A            | 0.0                                          | 0.0    | 0.00      | 0.47                | 0.00             | 37.0                   |
| Approach                     |      | 401                                      | 1.0 | 418                                     | 1.0 | 0.393                | 11.4                   | LOS B            | 2.4                                          | 60.7   | 0.80      | 0.89                | 0.85             | 33.7                   |
| West: Burnham Drive          |      |                                          |     |                                         |     |                      |                        |                  |                                              |        |           |                     |                  |                        |
| 5b                           | L3   | 167                                      | 1.0 | 174                                     | 1.0 | 0.290                | 12.7                   | LOS B            | 2.0                                          | 49.5   | 0.49      | 0.63                | 0.49             | 35.6                   |
| 5                            | L2   | 105                                      | 1.0 | 109                                     | 1.0 | 0.290                | 11.4                   | LOS B            | 2.0                                          | 49.5   | 0.49      | 0.63                | 0.49             | 35.2                   |
| 2                            | T1   | 345                                      | 1.0 | 359                                     | 1.0 | 0.290                | 4.3                    | LOS A            | 2.1                                          | 52.8   | 0.47      | 0.49                | 0.47             | 36.7                   |
| 12                           | R2   | 196                                      | 1.0 | 204                                     | 1.0 | 0.290                | 4.4                    | LOS A            | 2.1                                          | 52.8   | 0.47      | 0.44                | 0.47             | 36.0                   |
| Approach                     |      | 813                                      | 1.0 | 847                                     | 1.0 | 0.290                | 7.0                    | LOS A            | 2.1                                          | 52.8   | 0.48      | 0.53                | 0.48             | 36.1                   |
| SouthWest: SR 16 WB Off Ramp |      |                                          |     |                                         |     |                      |                        |                  |                                              |        |           |                     |                  |                        |
| 5bx                          | L3   | 295                                      | 1.0 | 307                                     | 1.0 | 0.681                | 17.7                   | LOS B            | 5.3                                          | 134.3  | 0.83      | 1.06                | 1.16             | 33.3                   |
| 5x                           | L2   | 6                                        | 1.0 | 6                                       | 1.0 | 0.681                | 16.3                   | LOS B            | 5.3                                          | 134.3  | 0.83      | 1.06                | 1.16             | 32.8                   |
| 5ax                          | L1   | 221                                      | 1.0 | 230                                     | 1.0 | 0.681                | 15.0                   | LOS B            | 5.3                                          | 134.3  | 0.83      | 1.06                | 1.16             | 32.4                   |
| 12ax                         | R1   | 868                                      | 1.0 | 904                                     | 1.0 | 0.681                | 7.6                    | LOS A            | 6.0                                          | 152.0  | 0.81      | 0.92                | 1.08             | 35.5                   |
| 12bx                         | R3   | 130                                      | 1.0 | 135                                     | 1.0 | 0.087                | 3.5                    | LOS A            | 0.0                                          | 0.0    | 0.00      | 0.47                | 0.00             | 36.9                   |
| Approach                     |      | 1520                                     | 1.0 | 1583                                    | 1.0 | 0.681                | 10.3                   | LOS B            | 6.0                                          | 152.0  | 0.75      | 0.93                | 1.02             | 34.6                   |
| All Vehicles                 |      | 4530                                     | 1.0 | 4719                                    | 1.0 | 1.147                | 37.9                   | LOS D            | 70.4                                         | 1774.1 | 0.80      | 1.37                | 2.12             | 24.4                   |

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

Intersection and Approach LOS values are based on average delay for all movements (v/c not used).

Roundabout Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: HCM Queue Formula.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Project: T:\Sidra\4199\New Configuration\Without.sip9

# MOVEMENT SUMMARY

 **Site: 101 [Burnham Drive & SR 16 EB Ramps (Site Folder: General)]**

Forecast 2023 PM Peak Hour without Project  
Site Category: (None)  
Roundabout

| Vehicle Movement Performance |      |                                          |     |                                         |     |                      |                        |                  |                                              |       |           |                     |                  |                        |
|------------------------------|------|------------------------------------------|-----|-----------------------------------------|-----|----------------------|------------------------|------------------|----------------------------------------------|-------|-----------|---------------------|------------------|------------------------|
| Mov ID                       | Turn | INPUT VOLUMES<br>[ Total veh/h    HV % ] |     | DEMAND FLOWS<br>[ Total veh/h    HV % ] |     | Deg. Satn<br><br>v/c | Aver. Delay<br><br>sec | Level of Service | 95% BACK OF QUEUE<br>[ Veh. veh    Dist ft ] |       | Prop. Que | Effective Stop Rate | Aver. No. Cycles | Aver. Speed<br><br>mph |
| East: Burnham Drive          |      |                                          |     |                                         |     |                      |                        |                  |                                              |       |           |                     |                  |                        |
| 1u                           | U    | 1                                        | 0.0 | 1                                       | 0.0 | 0.677                | 11.9                   | LOS B            | 0.0                                          | 0.0   | 0.00      | 0.60                | 0.00             | 36.8                   |
| 1                            | L2   | 565                                      | 2.0 | 589                                     | 2.0 | 0.677                | 9.6                    | LOS A            | 0.0                                          | 0.0   | 0.00      | 0.60                | 0.00             | 35.9                   |
| 6                            | T1   | 344                                      | 2.0 | 358                                     | 2.0 | 0.677                | 4.0                    | LOS A            | 0.0                                          | 0.0   | 0.00      | 0.60                | 0.00             | 35.9                   |
| Approach                     |      | 910                                      | 2.0 | 948                                     | 2.0 | 0.677                | 7.5                    | LOS A            | 0.0                                          | 0.0   | 0.00      | 0.60                | 0.00             | 35.9                   |
| North: SR 16 EB Off-Ramp     |      |                                          |     |                                         |     |                      |                        |                  |                                              |       |           |                     |                  |                        |
| 7                            | L2   | 443                                      | 2.0 | 461                                     | 2.0 | 0.526                | 19.6                   | LOS B            | 5.2                                          | 132.6 | 0.92      | 1.02                | 1.18             | 30.3                   |
| 4                            | T1   | 3                                        | 2.0 | 3                                       | 2.0 | 0.189                | 12.2                   | LOS B            | 1.1                                          | 28.5  | 0.79      | 0.84                | 0.79             | 33.1                   |
| 14                           | R2   | 106                                      | 2.0 | 110                                     | 2.0 | 0.189                | 12.4                   | LOS B            | 1.1                                          | 28.5  | 0.79      | 0.84                | 0.79             | 32.2                   |
| Approach                     |      | 552                                      | 2.0 | 575                                     | 2.0 | 0.526                | 18.2                   | LOS B            | 5.2                                          | 132.6 | 0.89      | 0.99                | 1.10             | 30.6                   |
| West: Burnham Drive          |      |                                          |     |                                         |     |                      |                        |                  |                                              |       |           |                     |                  |                        |
| 2                            | T1   | 427                                      | 2.0 | 445                                     | 2.0 | 0.483                | 16.9                   | LOS B            | 4.7                                          | 120.4 | 0.99      | 1.05                | 1.21             | 31.1                   |
| 12                           | R2   | 105                                      | 2.0 | 109                                     | 2.0 | 0.483                | 15.4                   | LOS B            | 4.7                                          | 120.4 | 1.00      | 1.02                | 1.18             | 31.0                   |
| Approach                     |      | 532                                      | 2.0 | 554                                     | 2.0 | 0.483                | 16.6                   | LOS B            | 4.7                                          | 120.4 | 0.99      | 1.04                | 1.20             | 31.1                   |
| All Vehicles                 |      | 1994                                     | 2.0 | 2077                                    | 2.0 | 0.677                | 12.9                   | LOS B            | 5.2                                          | 132.6 | 0.51      | 0.83                | 0.62             | 33.0                   |

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

Intersection and Approach LOS values are based on average delay for all movements (v/c not used).

Roundabout Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: HCM Queue Formula.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Project: T:\Sidra\4199\2. 2023 without.sip9



| Intersection             |                                                                                   |                                                                                   |      |                                                                                   |      |                                                                                   |                                                                                   |                                                                                   |      |                                                                                     |                                                                                     |      |
|--------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|-----------------------------------------------------------------------------------|------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|------|
| Int Delay, s/veh         | 1.5                                                                               |                                                                                   |      |                                                                                   |      |                                                                                   |                                                                                   |                                                                                   |      |                                                                                     |                                                                                     |      |
| Movement                 | EBL                                                                               | EBT                                                                               | EBR  | WBL                                                                               | WBT  | WBR                                                                               | NBL                                                                               | NBT                                                                               | NBR  | SBL                                                                                 | SBT                                                                                 | SBR  |
| Lane Configurations      |  |  |      |  |      |  |  |  |      |  |  |      |
| Traffic Vol, veh/h       | 4                                                                                 | 0                                                                                 | 14   | 50                                                                                | 0    | 13                                                                                | 1                                                                                 | 594                                                                               | 30   | 6                                                                                   | 276                                                                                 | 2    |
| Future Vol, veh/h        | 4                                                                                 | 0                                                                                 | 14   | 50                                                                                | 0    | 13                                                                                | 1                                                                                 | 594                                                                               | 30   | 6                                                                                   | 276                                                                                 | 2    |
| Conflicting Peds, #/hr   | 0                                                                                 | 0                                                                                 | 0    | 0                                                                                 | 0    | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0    | 0                                                                                   | 0                                                                                   | 0    |
| Sign Control             | Stop                                                                              | Stop                                                                              | Stop | Stop                                                                              | Stop | Stop                                                                              | Free                                                                              | Free                                                                              | Free | Free                                                                                | Free                                                                                | Free |
| RT Channelized           | -                                                                                 | -                                                                                 | None | -                                                                                 | -    | None                                                                              | -                                                                                 | -                                                                                 | None | -                                                                                   | -                                                                                   | None |
| Storage Length           | 0                                                                                 | -                                                                                 | -    | 0                                                                                 | -    | 0                                                                                 | 0                                                                                 | -                                                                                 | -    | 125                                                                                 | -                                                                                   | -    |
| Veh in Median Storage, # | -                                                                                 | 1                                                                                 | -    | -                                                                                 | 1    | -                                                                                 | -                                                                                 | 0                                                                                 | -    | -                                                                                   | 0                                                                                   | -    |
| Grade, %                 | -                                                                                 | 0                                                                                 | -    | -                                                                                 | 0    | -                                                                                 | -                                                                                 | 0                                                                                 | -    | -                                                                                   | 0                                                                                   | -    |
| Peak Hour Factor         | 92                                                                                | 92                                                                                | 92   | 80                                                                                | 92   | 80                                                                                | 92                                                                                | 80                                                                                | 80   | 80                                                                                  | 80                                                                                  | 92   |
| Heavy Vehicles, %        | 2                                                                                 | 2                                                                                 | 2    | 2                                                                                 | 2    | 1                                                                                 | 2                                                                                 | 1                                                                                 | 12   | 1                                                                                   | 3                                                                                   | 2    |
| Mvmt Flow                | 4                                                                                 | 0                                                                                 | 15   | 63                                                                                | 0    | 16                                                                                | 1                                                                                 | 743                                                                               | 38   | 8                                                                                   | 345                                                                                 | 2    |

| Major/Minor          | Minor2 |       | Minor1 |       | Major1 |       |       | Major2 |   |       |   |   |
|----------------------|--------|-------|--------|-------|--------|-------|-------|--------|---|-------|---|---|
| Conflicting Flow All | 1134   | 1145  | 346    | 1134  | -      | 762   | 347   | 0      | 0 | 781   | 0 | 0 |
| Stage 1              | 362    | 362   | -      | 764   | -      | -     | -     | -      | - | -     | - | - |
| Stage 2              | 772    | 783   | -      | 370   | -      | -     | -     | -      | - | -     | - | - |
| Critical Hdwy        | 7.12   | 6.52  | 6.22   | 7.12  | -      | 6.21  | 4.12  | -      | - | 4.11  | - | - |
| Critical Hdwy Stg 1  | 6.12   | 5.52  | -      | 6.12  | -      | -     | -     | -      | - | -     | - | - |
| Critical Hdwy Stg 2  | 6.12   | 5.52  | -      | 6.12  | -      | -     | -     | -      | - | -     | - | - |
| Follow-up Hdwy       | 3.518  | 4.018 | 3.318  | 3.518 | -      | 3.309 | 2.218 | -      | - | 2.209 | - | - |
| Pot Cap-1 Maneuver   | 180    | 200   | 697    | 180   | 0      | 406   | 1212  | -      | - | 841   | - | - |
| Stage 1              | 657    | 625   | -      | 396   | 0      | -     | -     | -      | - | -     | - | - |
| Stage 2              | 392    | 404   | -      | 650   | 0      | -     | -     | -      | - | -     | - | - |
| Platoon blocked, %   |        |       |        |       |        |       |       | -      | - | -     | - | - |
| Mov Cap-1 Maneuver   | 171    | 198   | 697    | 175   | -      | 406   | 1212  | -      | - | 841   | - | - |
| Mov Cap-2 Maneuver   | 284    | 304   | -      | 295   | -      | -     | -     | -      | - | -     | - | - |
| Stage 1              | 656    | 619   | -      | 396   | -      | -     | -     | -      | - | -     | - | - |
| Stage 2              | 376    | 404   | -      | 630   | -      | -     | -     | -      | - | -     | - | - |

| Approach             | EB | WB   | NB | SB  |
|----------------------|----|------|----|-----|
| HCM Control Delay, s | 12 | 19.2 | 0  | 0.2 |
| HCM LOS              | B  | C    |    |     |

| Minor Lane/Major Mvmt | NBL   | NBT | NBR | EBLn1 | EBLn2 | WBLn1 | WBLn2 | SBL   | SBT | SBR |
|-----------------------|-------|-----|-----|-------|-------|-------|-------|-------|-----|-----|
| Capacity (veh/h)      | 1212  | -   | -   | 284   | 697   | 295   | 406   | 841   | -   | -   |
| HCM Lane V/C Ratio    | 0.001 | -   | -   | 0.015 | 0.022 | 0.212 | 0.04  | 0.009 | -   | -   |
| HCM Control Delay (s) | 8     | -   | -   | 17.9  | 10.3  | 20.5  | 14.2  | 9.3   | -   | -   |
| HCM Lane LOS          | A     | -   | -   | C     | B     | C     | B     | A     | -   | -   |
| HCM 95th %tile Q(veh) | 0     | -   | -   | 0     | 0.1   | 0.8   | 0.1   | 0     | -   | -   |

## Intersection

Int Delay, s/veh 4.9

| Movement                 | EBL                                                                               | EBT                                                                               | EBR  | WBL                                                                               | WBT  | WBR                                                                               | NBL                                                                               | NBT                                                                                 | NBR  | SBL                                                                                 | SBT                                                                                 | SBR  |
|--------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|-----------------------------------------------------------------------------------|------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|------|
| Lane Configurations      |  |  |      |  |      |  |  |  |      |  |  |      |
| Traffic Vol, veh/h       | 51                                                                                | 0                                                                                 | 59   | 89                                                                                | 0    | 25                                                                                | 90                                                                                | 549                                                                                 | 22   | 1                                                                                   | 313                                                                                 | 26   |
| Future Vol, veh/h        | 51                                                                                | 0                                                                                 | 59   | 89                                                                                | 0    | 25                                                                                | 90                                                                                | 549                                                                                 | 22   | 1                                                                                   | 313                                                                                 | 26   |
| Conflicting Peds, #/hr   | 0                                                                                 | 0                                                                                 | 0    | 0                                                                                 | 0    | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0    | 0                                                                                   | 0                                                                                   | 0    |
| Sign Control             | Stop                                                                              | Stop                                                                              | Stop | Stop                                                                              | Stop | Stop                                                                              | Free                                                                              | Free                                                                                | Free | Free                                                                                | Free                                                                                | Free |
| RT Channelized           | -                                                                                 | -                                                                                 | None | -                                                                                 | -    | None                                                                              | -                                                                                 | -                                                                                   | None | -                                                                                   | -                                                                                   | None |
| Storage Length           | 0                                                                                 | -                                                                                 | -    | 0                                                                                 | -    | 0                                                                                 | 0                                                                                 | -                                                                                   | -    | 125                                                                                 | -                                                                                   | -    |
| Veh in Median Storage, # | -                                                                                 | 1                                                                                 | -    | -                                                                                 | 1    | -                                                                                 | -                                                                                 | 0                                                                                   | -    | -                                                                                   | 0                                                                                   | -    |
| Grade, %                 | -                                                                                 | 0                                                                                 | -    | -                                                                                 | 0    | -                                                                                 | -                                                                                 | 0                                                                                   | -    | -                                                                                   | 0                                                                                   | -    |
| Peak Hour Factor         | 92                                                                                | 92                                                                                | 92   | 85                                                                                | 92   | 85                                                                                | 92                                                                                | 85                                                                                  | 85   | 85                                                                                  | 85                                                                                  | 92   |
| Heavy Vehicles, %        | 2                                                                                 | 2                                                                                 | 2    | 1                                                                                 | 2    | 1                                                                                 | 2                                                                                 | 1                                                                                   | 1    | 1                                                                                   | 3                                                                                   | 2    |
| Mvmt Flow                | 55                                                                                | 0                                                                                 | 64   | 105                                                                               | 0    | 29                                                                                | 98                                                                                | 646                                                                                 | 26   | 1                                                                                   | 368                                                                                 | 28   |

| Major/Minor          | Minor2 |       | Minor1 |       | Major1 |       |       | Major2 |   |       |   |   |
|----------------------|--------|-------|--------|-------|--------|-------|-------|--------|---|-------|---|---|
| Conflicting Flow All | 1254   | 1252  | 382    | 1271  | -      | 659   | 396   | 0      | 0 | 672   | 0 | 0 |
| Stage 1              | 384    | 384   | -      | 855   | -      | -     | -     | -      | - | -     | - | - |
| Stage 2              | 870    | 868   | -      | 416   | -      | -     | -     | -      | - | -     | - | - |
| Critical Hdwy        | 7.12   | 6.52  | 6.22   | 7.11  | -      | 6.21  | 4.12  | -      | - | 4.11  | - | - |
| Critical Hdwy Stg 1  | 6.12   | 5.52  | -      | 6.11  | -      | -     | -     | -      | - | -     | - | - |
| Critical Hdwy Stg 2  | 6.12   | 5.52  | -      | 6.11  | -      | -     | -     | -      | - | -     | - | - |
| Follow-up Hdwy       | 3.518  | 4.018 | 3.318  | 3.509 | -      | 3.309 | 2.218 | -      | - | 2.209 | - | - |
| Pot Cap-1 Maneuver   | 149    | 172   | 665    | 145   | 0      | 465   | 1163  | -      | - | 923   | - | - |
| Stage 1              | 639    | 611   | -      | 354   | 0      | -     | -     | -      | - | -     | - | - |
| Stage 2              | 346    | 370   | -      | 616   | 0      | -     | -     | -      | - | -     | - | - |
| Platoon blocked, %   |        |       |        |       |        |       |       | -      | - | -     | - | - |
| Mov Cap-1 Maneuver   | 131    | 157   | 665    | 123   | -      | 465   | 1163  | -      | - | 923   | - | - |
| Mov Cap-2 Maneuver   | 230    | 261   | -      | 227   | -      | -     | -     | -      | - | -     | - | - |
| Stage 1              | 585    | 610   | -      | 324   | -      | -     | -     | -      | - | -     | - | - |
| Stage 2              | 297    | 339   | -      | 556   | -      | -     | -     | -      | - | -     | - | - |

| Approach             | EB   |  | WB   |  | NB  |  |  | SB |  |  |  |  |
|----------------------|------|--|------|--|-----|--|--|----|--|--|--|--|
| HCM Control Delay, s | 17.8 |  | 29.3 |  | 1.1 |  |  | 0  |  |  |  |  |
| HCM LOS              | C    |  | D    |  |     |  |  |    |  |  |  |  |

| Minor Lane/Major Mvmt | NBL   | NBT | NBR | EBLn1 | EBLn2 | WBLn1 | WBLn2 | SBL   | SBT | SBR |
|-----------------------|-------|-----|-----|-------|-------|-------|-------|-------|-----|-----|
| Capacity (veh/h)      | 1163  | -   | -   | 230   | 665   | 227   | 465   | 923   | -   | -   |
| HCM Lane V/C Ratio    | 0.084 | -   | -   | 0.241 | 0.096 | 0.461 | 0.063 | 0.001 | -   | -   |
| HCM Control Delay (s) | 8.4   | -   | -   | 25.6  | 11    | 33.8  | 13.3  | 8.9   | -   | -   |
| HCM Lane LOS          | A     | -   | -   | D     | B     | D     | B     | A     | -   | -   |
| HCM 95th %tile Q(veh) | 0.3   | -   | -   | 0.9   | 0.3   | 2.2   | 0.2   | 0     | -   | -   |

# MOVEMENT SUMMARY

 **Site: 101 [Burnham Drive/Borgen Drive & SR 16/Canterwood  
(Site Folder: General)]**

Forecast 2023 PM Peak Hour with Project  
Site Category: (None)  
Roundabout

| Vehicle Movement Performance |      |               |      |               |      |           |             |                  |                   |           |           |                     |                  |             |
|------------------------------|------|---------------|------|---------------|------|-----------|-------------|------------------|-------------------|-----------|-----------|---------------------|------------------|-------------|
| Mov ID                       | Turn | INPUT VOLUMES |      | DEMAND FLOWS  |      | Deg. Satn | Aver. Delay | Level of Service | 95% BACK OF QUEUE |           | Prop. Que | Effective Stop Rate | Aver. No. Cycles | Aver. Speed |
|                              |      | [ Total veh/h | HV % | [ Total veh/h | HV % | v/c       | sec         |                  | [ Veh. veh        | Dist ] ft |           |                     |                  | mph         |
| South: Burnham Drive         |      |               |      |               |      |           |             |                  |                   |           |           |                     |                  |             |
| 3                            | L2   | 63            | 1.0  | 66            | 1.0  | 0.526     | 20.7        | LOS C            | 3.8               | 95.4      | 0.94      | 1.07                | 1.25             | 32.2        |
| 3a                           | L1   | 85            | 1.0  | 89            | 1.0  | 0.526     | 19.4        | LOS B            | 3.8               | 95.4      | 0.94      | 1.07                | 1.25             | 31.8        |
| 8                            | T1   | 131           | 1.0  | 136           | 1.0  | 0.526     | 13.9        | LOS B            | 3.8               | 95.4      | 0.94      | 1.07                | 1.25             | 32.1        |
| 18                           | R2   | 88            | 1.0  | 92            | 1.0  | 0.222     | 11.9        | LOS B            | 1.2               | 29.0      | 0.86      | 0.92                | 0.86             | 32.8        |
| Approach                     |      | 367           | 1.0  | 382           | 1.0  | 0.526     | 15.8        | LOS B            | 3.8               | 95.4      | 0.92      | 1.04                | 1.16             | 32.2        |
| East: Borgen Blvd            |      |               |      |               |      |           |             |                  |                   |           |           |                     |                  |             |
| 1                            | L2   | 81            | 1.0  | 84            | 1.0  | 1.075     | 105.1       | LOS F            | 37.8              | 951.5     | 1.00      | 2.22                | 4.23             | 15.0        |
| 6                            | T1   | 452           | 1.0  | 471           | 1.0  | 1.075     | 98.3        | LOS F            | 37.8              | 951.5     | 1.00      | 2.22                | 4.23             | 14.9        |
| 16a                          | R1   | 744           | 1.0  | 775           | 1.0  | 1.232     | 146.5       | LOS F            | 87.0              | 2191.8    | 1.00      | 3.26                | 6.41             | 11.1        |
| 16                           | R2   | 170           | 1.0  | 177           | 1.0  | 1.232     | 146.9       | LOS F            | 87.0              | 2191.8    | 1.00      | 3.26                | 6.41             | 11.1        |
| Approach                     |      | 1447          | 1.0  | 1507          | 1.0  | 1.232     | 129.2       | LOS F            | 87.0              | 2191.8    | 1.00      | 2.88                | 5.61             | 12.3        |
| North: Canterwood Blvd       |      |               |      |               |      |           |             |                  |                   |           |           |                     |                  |             |
| 7                            | L2   | 95            | 1.0  | 99            | 1.0  | 0.414     | 19.4        | LOS B            | 2.5               | 64.1      | 0.91      | 1.01                | 1.06             | 32.5        |
| 4                            | T1   | 76            | 1.0  | 79            | 1.0  | 0.414     | 12.8        | LOS B            | 2.5               | 64.1      | 0.91      | 1.01                | 1.06             | 32.2        |
| 14                           | R2   | 206           | 1.0  | 215           | 1.0  | 0.309     | 9.2         | LOS A            | 2.3               | 59.0      | 0.99      | 0.95                | 0.99             | 34.3        |
| 14b                          | R3   | 84            | 1.0  | 88            | 1.0  | 0.056     | 3.5         | LOS A            | 0.0               | 0.0       | 0.00      | 0.47                | 0.00             | 36.9        |
| Approach                     |      | 461           | 1.0  | 480           | 1.0  | 0.414     | 10.9        | LOS B            | 2.5               | 64.1      | 0.78      | 0.89                | 0.83             | 33.9        |
| West: Burnham Drive          |      |               |      |               |      |           |             |                  |                   |           |           |                     |                  |             |
| 5b                           | L3   | 167           | 1.0  | 174           | 1.0  | 0.300     | 12.8        | LOS B            | 2.1               | 51.7      | 0.51      | 0.64                | 0.51             | 35.5        |
| 5                            | L2   | 120           | 1.0  | 125           | 1.0  | 0.300     | 11.5        | LOS B            | 2.1               | 51.7      | 0.51      | 0.64                | 0.51             | 35.0        |
| 2                            | T1   | 345           | 1.0  | 359           | 1.0  | 0.300     | 4.4         | LOS A            | 2.2               | 55.4      | 0.49      | 0.49                | 0.49             | 36.7        |
| 12                           | R2   | 196           | 1.0  | 204           | 1.0  | 0.300     | 4.4         | LOS A            | 2.2               | 55.4      | 0.49      | 0.45                | 0.49             | 35.9        |
| Approach                     |      | 828           | 1.0  | 863           | 1.0  | 0.300     | 7.1         | LOS A            | 2.2               | 55.4      | 0.50      | 0.53                | 0.50             | 36.0        |
| SouthWest: SR 16 WB Off Ramp |      |               |      |               |      |           |             |                  |                   |           |           |                     |                  |             |
| 5bx                          | L3   | 295           | 1.0  | 307           | 1.0  | 0.702     | 18.2        | LOS B            | 5.7               | 143.3     | 0.85      | 1.08                | 1.22             | 33.0        |
| 5x                           | L2   | 6             | 1.0  | 6             | 1.0  | 0.702     | 16.9        | LOS B            | 5.7               | 143.3     | 0.85      | 1.08                | 1.22             | 32.5        |
| 5ax                          | L1   | 240           | 1.0  | 250           | 1.0  | 0.702     | 15.5        | LOS B            | 5.7               | 143.3     | 0.85      | 1.08                | 1.22             | 32.1        |
| 12ax                         | R1   | 868           | 1.0  | 904           | 1.0  | 0.702     | 8.0         | LOS A            | 6.5               | 163.6     | 0.83      | 0.97                | 1.14             | 35.5        |
| 12bx                         | R3   | 130           | 1.0  | 135           | 1.0  | 0.087     | 3.5         | LOS A            | 0.0               | 0.0       | 0.00      | 0.47                | 0.00             | 36.9        |
| Approach                     |      | 1539          | 1.0  | 1603          | 1.0  | 0.702     | 10.8        | LOS B            | 6.5               | 163.6     | 0.77      | 0.96                | 1.07             | 34.5        |
| All Vehicles                 |      | 4642          | 1.0  | 4835          | 1.0  | 1.232     | 47.4        | LOS D            | 87.0              | 2191.8    | 0.80      | 1.48                | 2.37             | 22.1        |

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

Intersection and Approach LOS values are based on average delay for all movements (v/c not used).

Roundabout Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: HCM Queue Formula.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Project: T:\Sidra\4199\New Configuration\With Project.sip9

# MOVEMENT SUMMARY

 **Site: 101 [Burnham Drive & SR 16 EB Ramps (Site Folder: General)]**

Forecast 2023 PM Peak Hour with Project  
Site Category: (None)  
Roundabout

| Vehicle Movement Performance |      |                                          |     |                                         |     |                      |                        |                  |                                              |       |           |                     |                  |                        |
|------------------------------|------|------------------------------------------|-----|-----------------------------------------|-----|----------------------|------------------------|------------------|----------------------------------------------|-------|-----------|---------------------|------------------|------------------------|
| Mov ID                       | Turn | INPUT VOLUMES<br>[ Total HV ]<br>veh/h % |     | DEMAND FLOWS<br>[ Total HV ]<br>veh/h % |     | Deg. Satn<br><br>v/c | Aver. Delay<br><br>sec | Level of Service | 95% BACK OF QUEUE<br>[ Veh. Dist ]<br>veh ft |       | Prop. Que | Effective Stop Rate | Aver. No. Cycles | Aver. Speed<br><br>mph |
| East: Burnham Drive          |      |                                          |     |                                         |     |                      |                        |                  |                                              |       |           |                     |                  |                        |
| 1u                           | U    | 1                                        | 0.0 | 1                                       | 0.0 | 0.697                | 11.9                   | LOS B            | 0.0                                          | 0.0   | 0.00      | 0.61                | 0.00             | 36.8                   |
| 1                            | L2   | 588                                      | 2.0 | 612                                     | 2.0 | 0.697                | 9.6                    | LOS A            | 0.0                                          | 0.0   | 0.00      | 0.61                | 0.00             | 35.9                   |
| 6                            | T1   | 348                                      | 2.0 | 363                                     | 2.0 | 0.697                | 4.0                    | LOS A            | 0.0                                          | 0.0   | 0.00      | 0.61                | 0.00             | 35.9                   |
| Approach                     |      | 937                                      | 2.0 | 976                                     | 2.0 | 0.697                | 7.5                    | LOS A            | 0.0                                          | 0.0   | 0.00      | 0.61                | 0.00             | 35.9                   |
| North: SR 16 EB Off-Ramp     |      |                                          |     |                                         |     |                      |                        |                  |                                              |       |           |                     |                  |                        |
| 7                            | L2   | 455                                      | 2.0 | 474                                     | 2.0 | 0.555                | 21.1                   | LOS C            | 5.9                                          | 150.4 | 0.94      | 1.07                | 1.28             | 29.7                   |
| 4                            | T1   | 3                                        | 2.0 | 3                                       | 2.0 | 0.193                | 12.7                   | LOS B            | 1.2                                          | 29.5  | 0.80      | 0.85                | 0.80             | 32.9                   |
| 14                           | R2   | 106                                      | 2.0 | 110                                     | 2.0 | 0.193                | 12.9                   | LOS B            | 1.2                                          | 29.5  | 0.80      | 0.85                | 0.80             | 31.9                   |
| Approach                     |      | 564                                      | 2.0 | 588                                     | 2.0 | 0.555                | 19.5                   | LOS B            | 5.9                                          | 150.4 | 0.91      | 1.03                | 1.19             | 30.1                   |
| West: Burnham Drive          |      |                                          |     |                                         |     |                      |                        |                  |                                              |       |           |                     |                  |                        |
| 2                            | T1   | 430                                      | 2.0 | 448                                     | 2.0 | 0.512                | 19.2                   | LOS B            | 5.3                                          | 135.6 | 1.00      | 1.09                | 1.29             | 30.2                   |
| 12                           | R2   | 105                                      | 2.0 | 109                                     | 2.0 | 0.512                | 17.5                   | LOS B            | 5.3                                          | 135.6 | 1.00      | 1.06                | 1.26             | 30.1                   |
| Approach                     |      | 535                                      | 2.0 | 557                                     | 2.0 | 0.512                | 18.9                   | LOS B            | 5.3                                          | 135.6 | 1.00      | 1.08                | 1.28             | 30.2                   |
| All Vehicles                 |      | 2036                                     | 2.0 | 2121                                    | 2.0 | 0.697                | 13.8                   | LOS B            | 5.9                                          | 150.4 | 0.52      | 0.85                | 0.67             | 32.5                   |

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

Intersection and Approach LOS values are based on average delay for all movements (v/c not used).

Roundabout Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: HCM Queue Formula.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Project: T:\Sidra\4199\3. 2023 with.sip9





DAVID EVANS  
AND ASSOCIATES INC.

## Technical Memorandum

**DATE:** April 2 , 2014

**TO:** Emily Appleton, P.E.  
Senior Engineer  
City of Gig Harbor  
3510 Grandview Street  
Gig Harbor, WA 98335

**FROM:** Min Luo, P.E., PTOE, PTP  
Associate

**SUBJECT:** Concurrency Report – Canterwood Commercial Center

**PROJECT:** On-Call Traffic Review Services

**PROJECT NO.:** COGH0000-0049

**COPIES:** File

In accordance with our agreement to provide concurrency analysis of new developments, this Technical Memorandum reports the results of a test of the proposed development described in **Table 1**.

### **STARTING POINT: THE 2014 UPDATED CITYWIDE CONCURRENCY PIPELINE MODEL WITH OLYMPIC TOWNE CENTER**

The tested development was added to the traffic model files for the following case:

- **The 2014 Updated Citywide Concurrency Pipeline Model with Olympic Towne Center, March 20, 2014**

### **DEVELOPMENTS TESTED**

The development included in this test is listed in **Table 1**.

**Table 1. Proposed Development and Trip Generation**

| TAZ No. | Name of Development          | Proposed Land Use Description                                                                                                                                                                                                                                                                                                                                                                                                         | New PM Trips     |                 |
|---------|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|-----------------|
| 501     | Canterwood Commercial Center | The project is located north of Borgen Boulevard and west of Canterwood Boulevard NW in the City of Gig Harbor, Washington. It is proposed to build: <ul style="list-style-type: none"><li>• 18,300 square feet of General Office – Building A</li><li>• 5,140 square feet of Fast Food with drive-thru – Buildings B &amp; C</li><li>• 1,280 square feet of Coffee Shop/3,400 square feet of Specialty Retail – Building D</li></ul> | 174              |                 |
|         |                              |                                                                                                                                                                                                                                                                                                                                                                                                                                       | 79<br>(Entering) | 95<br>(Exiting) |



## TRIP GENERATION

The trip generation method documented in the Institute of Transportation Engineers (ITE) *Trip Generation Manual* (9th Edition) was used to calculate the project-generated trips. It is typical to select the trip generation rates or equations for the PM peak hour (one hour between 4:00 and 6:00 PM) of the adjacent street traffic on a weekday basis to estimate the project-generated trips, because the combination of site-generated traffic and adjacent street traffic is usually at its maximum.

Based on the ITE Recommended Procedure for Selecting between Trip Generation Average Rates and Equations described in the *Trip Generation Manual* (9th edition - Volume 1: *User's Guide and Handbook*), the trip generation average rates were selected to estimate the trip generation for the proposed project's land use categories, including office (LUC 710), fast-food restaurant (LUC 934), coffee shop (LUC 936), and specialty retail (LUC 826).

Pass-by trip discounts were considered for the Fast-Food Restaurant with Drive-Through Window. The pass-by trip discount percentages obtained from the *Trip Generation Manual* (9th edition - Volume 1: *User's Guide and Handbook*) were selected to estimate the pass-by trips.

Internalization discounts and diverted-linked trip discounts were not considered based on the proposed development land use sizes and the site location.

The land use categories, average trip generation rates, pass-by trip discounts, directional splits, and project-generated gross trips and net trips for the proposed Canterwood Commercial Center are shown in **Table 2**. After discounting 85 pass-by trips, there are 174 project-generated net trips, of which 79 are entering trips and 95 are exiting trips.

**Table 2. Canterwood Commercial Center Trip Generation (PM Peak Hour)**

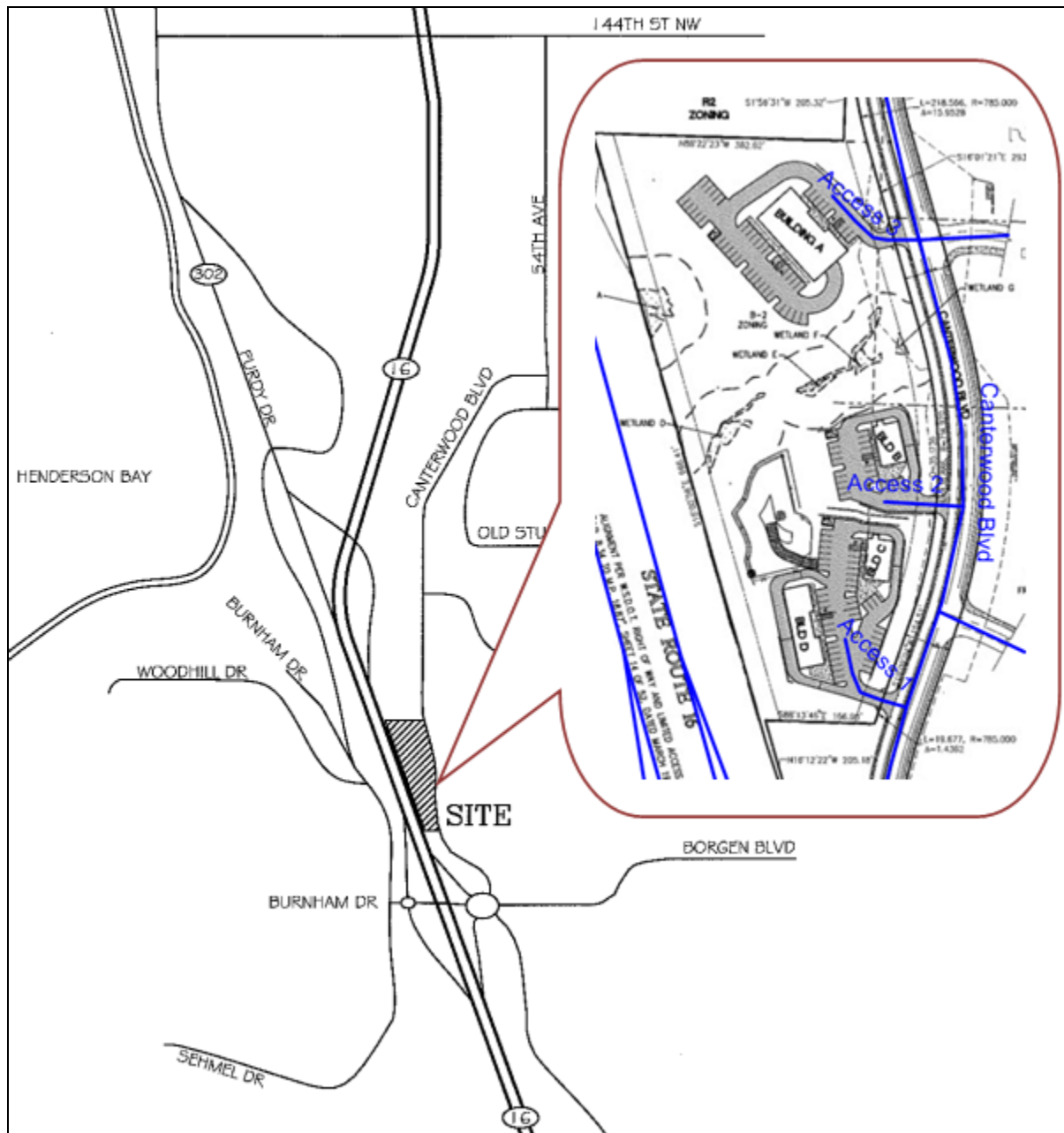
| Land Use Code/Description                         | Unit              | Size | ITE Average Trip Rate | Gross Trips | Pass-By Trip Discount |       | Net Trips | Entering |       | Exiting |       |
|---------------------------------------------------|-------------------|------|-----------------------|-------------|-----------------------|-------|-----------|----------|-------|---------|-------|
|                                                   |                   |      |                       |             | Percent               | Trips |           | Percent  | Trips | Percent | Trips |
| LUC 710 – General Office                          | 1,000 Square Feet | 18.3 | 1.49                  | 27          |                       |       | 27        | 17%      | 5     | 83%     | 22    |
| LUC 934 – Fast-Food Restaurant with Drive-Through | 1,000 Square Feet | 5.14 | 32.65                 | 168         | 51%                   | 85    | 83        | 52%      | 43    | 48%     | 40    |
| LUC 936 – Coffee Shop without Drive-Through       | 1,000 Square Feet | 1.28 | 42.8                  | 55          |                       |       | 55        | 50%      | 27    | 50%     | 28    |
| LUC 826 – Specialty Retail                        | 1,000 Square Feet | 3.4  | 2.71                  | 9           |                       |       | 9         | 44%      | 4     | 56%     | 5     |
| Project-Generated New Trips                       |                   |      |                       | 259         |                       | 85    | 174       |          | 79    |         | 95    |



## ROAD IMPROVEMENTS TESTED

The road system includes the currently funded/committed improvements of the Six-Year Transportation Improvement Program. The following streets shown in **Figure 1** were changed from the concurrency pipeline traffic forecasting model. There are three new driveways (Accesses 1, 2, and 3) accessing the proposed project from Canterwood Boulevard. Access 1 provides access to Building C for the fast-food restaurant and to Building D for the specialty retail/coffee shop. Access 2 provides access to Building B for the fast-food restaurant, and Access 3 is to the office Building A.

**Figure 1. Site Plan and Site Accesses**





## TEST PROCEDURES

The following standard procedures were applied:

- The latest concurrency test case – Gig Harbor Citywide Concurrency Pipeline Traffic Forecasting Model for the Olympic Town Center – was used as a starting point. The model's study area includes the entire Gig Harbor Peninsula surrounding the city of Gig Harbor with external road connections north to Kitsap County, south to Tacoma, and west to Key Peninsula.
- The proposed 18,300-square-foot office; and 5,140-square-foot fast-food restaurant with drive-through window, 1,280-square-foot coffee shop, and 3,400-square-foot specialty retail were added to the study area land use inventory.
- The new trip generation (174 trips, of which 79 are entering trips and 95 are exiting trips) was added to the Citywide Concurrency Pipeline Traffic Forecasting Model.
- Pass-by trips (85 trips) were manually estimated and assigned to the site access intersections for site access intersection Level of Service (LOS) analysis.
- External trip generation was balanced with the new trip generation within the study area.
- The new site trips were assigned to the road network using the multi-equilibrium method in VISUM software for the PM peak hour.
- Traffic model output volumes were systematically adjusted in a standardized post-processing step in order to remove the known base year (2014) calibration differences from all forecast volumes.
- Citywide intersection LOS and delay was evaluated against the City's concurrency standard using the SYNCHRO program. Roadway segment volumes were checked against the roadway segment capacity table. Deficient intersections and roadway segments with new site trips passing through are summarized in this memo, and results for all intersections and all road segments in Gig Harbor are shown in the attachments.

## SITE TRIP DISTRIBUTION

The proposed project will generate 174 new trips, of which 79 are entering trips and 95 are exiting trips in the PM peak hour. The majority of the site trips are present on Canterwood Boulevard and Borgen Boulevard, and on Burnham Drive.

Most of the new site-generated traffic accesses the site from New Access 1 and New Access 2 via Canterwood Boulevard. The majority of the pass-by trips are expected to be present at the intersections of New Access 1/Canterwood Boulevard and New Access 2/Canterwood Boulevard.

The site trip distributions citywide and near the project site are shown in **Figure 2** and **Figure 3**, respectively.



Figure 2. Site Trip Distribution – Citywide

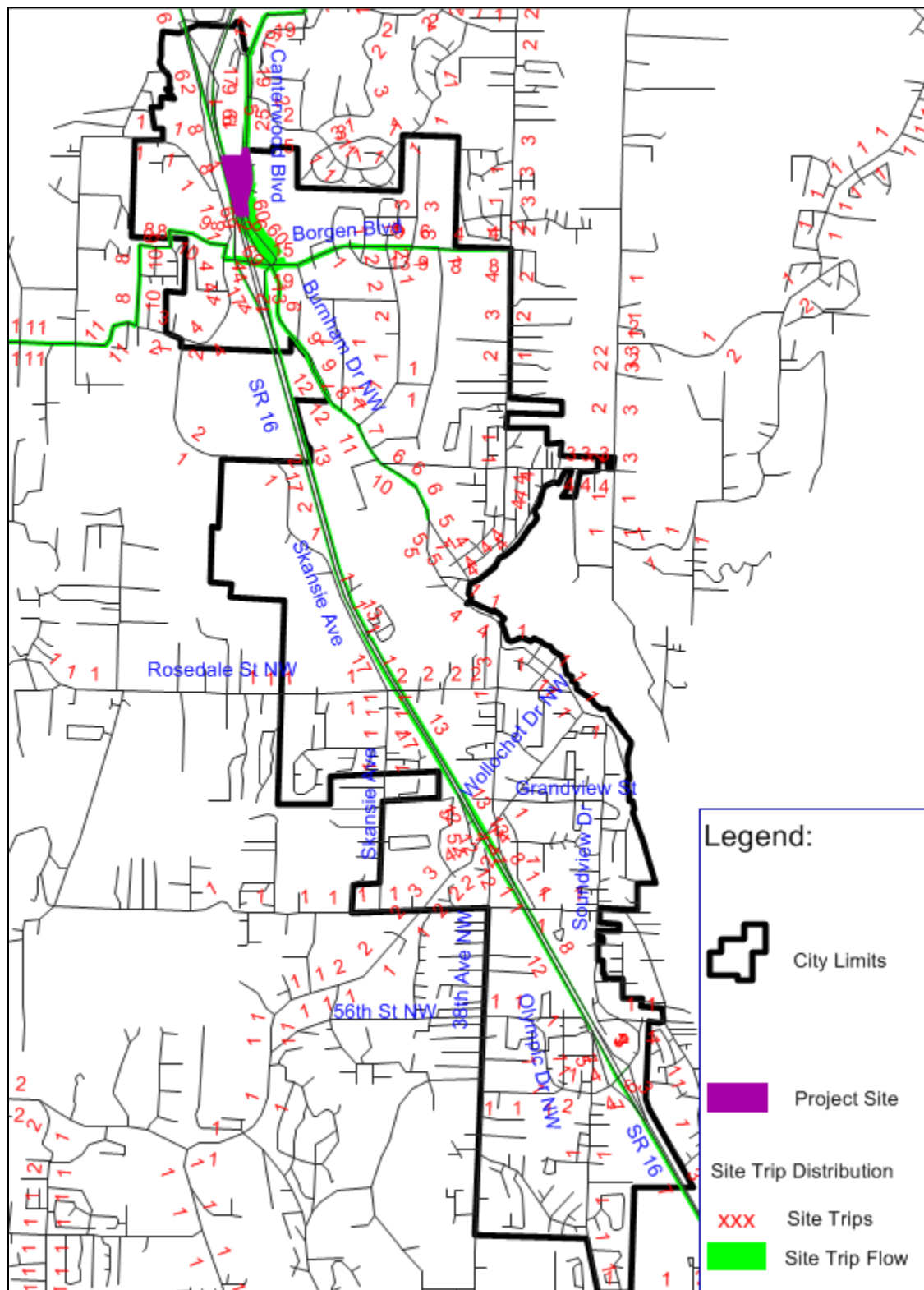
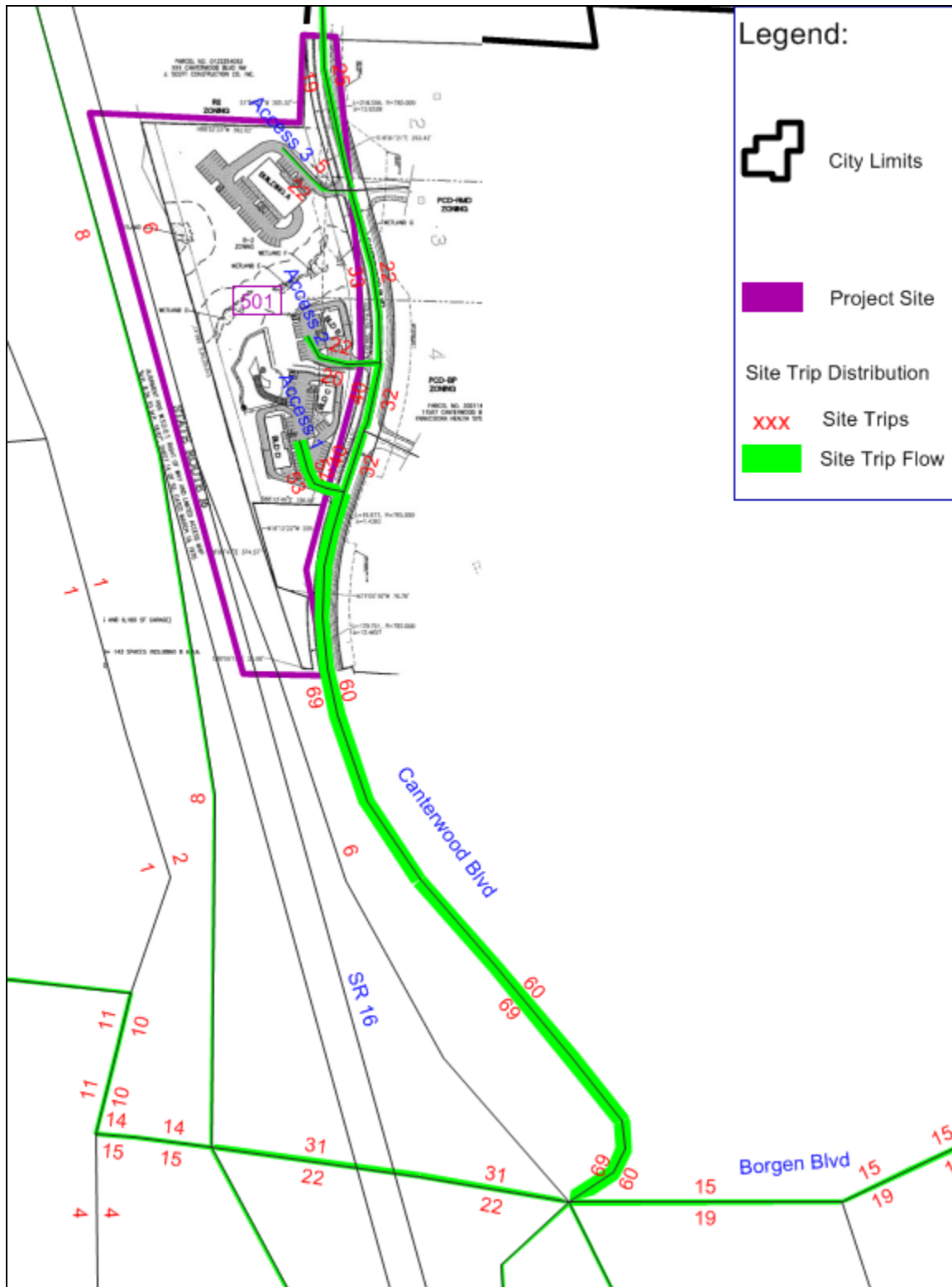




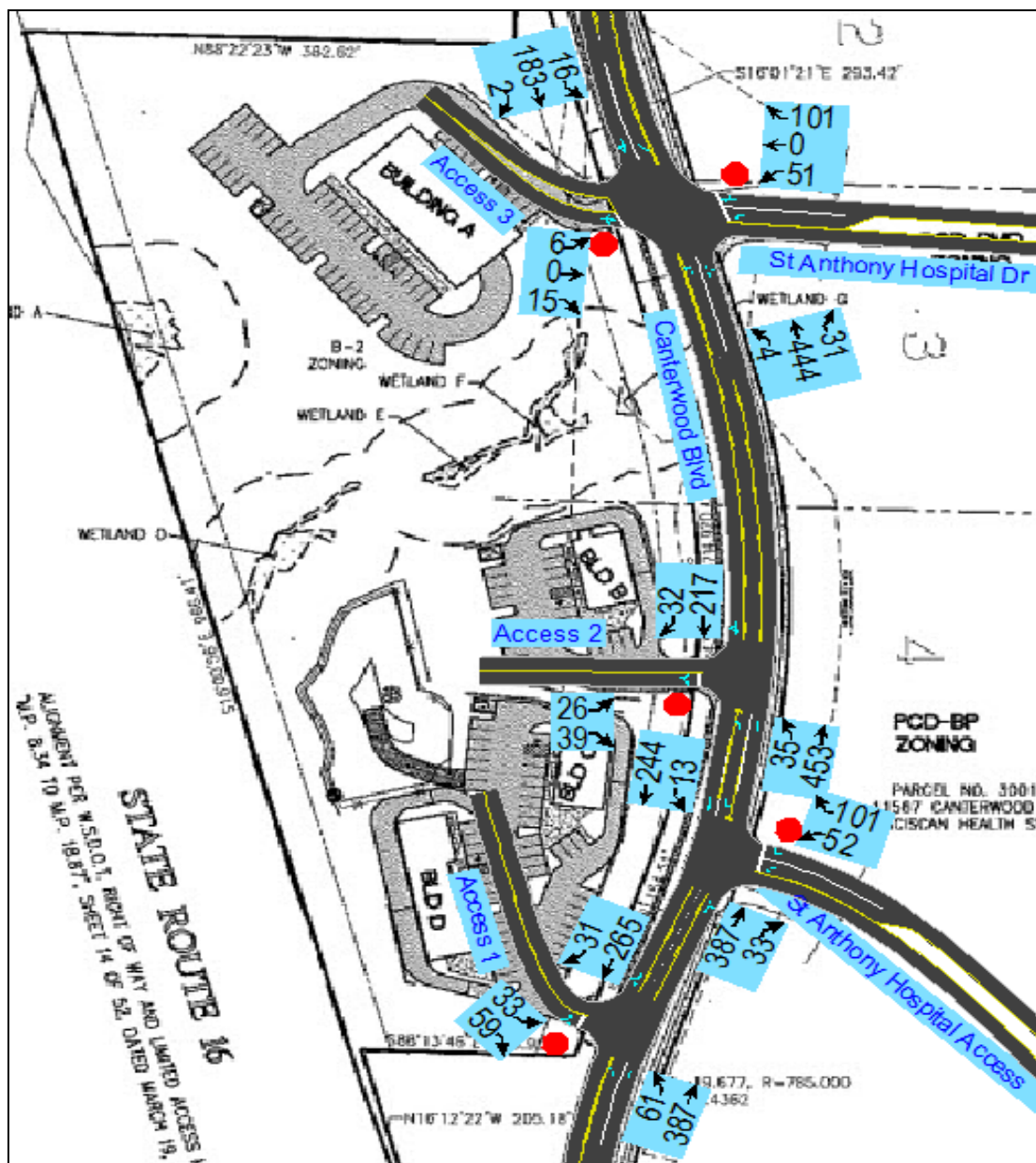


Figure 3. Site Trip Distribution – Near Project Site



The final traffic model volumes were used to evaluate intersection LOS and delay using the citywide SYNCHRO model for sign-controlled and signalized intersections. Roundabout LOS was evaluated using the aaSIDRA (Version 5.1) program, where the Highway Capacity Manual (2000) methodology was selected for the analysis.

**Figure 4. Site Access Intersections' Control Type and Traffic Volumes in Pipeline PM**





Intersection LOS for the site access intersections was evaluated and is shown in **Table 3**. **Table 3** indicates that all of the site access intersections meet the City's LOS standard of LOS D or better.

**Table 3. Site Access Intersection LOS**

| Intersection Name            | Control      | LOS (Delay) | Net Site Trips | Pass-by Trips | Comments                                                                     |
|------------------------------|--------------|-------------|----------------|---------------|------------------------------------------------------------------------------|
| New Access 1/Canterwood Blvd | Two-way Stop | B (11.8)    | 153            | 45            | Main access to retail, coffee shop, and fast-food restaurant Buildings C & D |
| New Access 2/Canterwood Blvd | Two-way Stop | B (11.3)    | 85             | 40            | Access to fast-food restaurant Building B                                    |
| New Access 3/Canterwood Blvd | Two-way Stop | B (12.9)    | 63             |               | Access to Office Building A                                                  |

Intersection LOS was estimated for the citywide intersections. The deficient intersections are shown in **Table 4**. The citywide intersection LOS table and map for the pipeline condition with the proposed development is shown in **Attachment A**.

**Table 4. Deficient Intersections**

| Intersection Name               | Control      | LOS (Delay) | Site Trips | Comments                                                                                                                                                                                                                                    |
|---------------------------------|--------------|-------------|------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Harborview Drive/Stinson Avenue | Two-way Stop | F (408.4)   | 5          | Tolerate because the intersection is in the "Downtown Strategy Area" defined in the City's Transportation Element of the Comprehensive Plan and is allowed to operate at an LOS worse than D. A roundabout or signal would improve the LOS. |

The LOS F at Harborview Drive/Stinson Avenue was also present in the previous pipeline model without the tested development. The tested development adds relatively small traffic volumes to the previous test. A roundabout or signal would improve the LOS to LOS D or better.

Road capacity analysis was accomplished in Excel. There are no deficient roadway segments within the city limits. The citywide roadway capacity evaluation is shown in **Attachment B**.

#### **ATTACHMENTS:**

**Attachment A:** Intersection Concurrency Report\_Canterwood Commercial Center.pdf

**Attachment B:** Roadway Segments Concurrency Report\_Canterwood Commercial Center.pdf

Attachment A: City of Gig Harbor Intersection Concurrency Report

| Intersection Evaluation - Pipeline+Canterwood Commercial Center                              |                       |                     |                              |                             |                |     |                                                                       |               |
|----------------------------------------------------------------------------------------------|-----------------------|---------------------|------------------------------|-----------------------------|----------------|-----|-----------------------------------------------------------------------|---------------|
| City<br>or UGA                                                                               | Intersection Location |                     | Intersection<br>Control Type | Forecast<br>Total<br>Volume | Intersection   |     | Improvement Indicated                                                 | Site<br>Trips |
|                                                                                              | Main Route            | Cross Street        |                              |                             | Delay<br>(sec) | LOS |                                                                       |               |
| North Area                                                                                   |                       |                     |                              |                             |                |     |                                                                       |               |
| City                                                                                         | Borgen Blvd           | 51st Ave NW         | Roundabout                   | 3,152                       | 7.4            | A   |                                                                       | 33            |
| City                                                                                         | Borgen Blvd           | Harbor Hill Drive   | Roundabout                   | 2,117                       | 9.6            | A   |                                                                       | 28            |
| City                                                                                         | Borgen Blvd           | Peacock Hill Ave NW | Roundabout                   | 1,259                       | 6.6            | A   |                                                                       | 11            |
| WSDOT                                                                                        | Borgen Blvd           | SR 16 WB Ramp       | Roundabout                   | 4,012                       | 6.9            | A   |                                                                       | 128           |
| City                                                                                         | Burnham Dr NW         | 53rd Ave Ct NW      | 2-Way Stop                   | 671                         | 12.4           | B   |                                                                       | 21            |
| City                                                                                         | Burnham Dr NW         | 50th Ave NW         | 2-Way Stop                   | 779                         | 14.4           | B   |                                                                       | 20            |
| City                                                                                         | Burnham Dr NW         | Harbor Hill Dr      | Roundabout                   | 1,019                       | 9.7            | A   |                                                                       | 19            |
| City                                                                                         | Burnham Dr NW         | 97th St NW          | 2-Way Stop                   | 958                         | 14.8           | B   |                                                                       | 16            |
| Following Intersections are not under city control but are of interest for planning purposes |                       |                     |                              |                             |                |     |                                                                       |               |
| WSDOT                                                                                        | Burnham Dr NW         | SR 16 EB Ramp       | Roundabout                   | 2,316                       | 8.9            | A   |                                                                       | 54            |
| UGA                                                                                          | 144th St NW           | 54th Ave NW         | 2-Way Stop                   | 907                         | 24.8           | C   |                                                                       | 27            |
| UGA                                                                                          | 144th St NW           | Peacock Hill Ave NW | 4-Way Stop                   | 856                         | 11.2           | B   |                                                                       | 7             |
| UGA                                                                                          | 54th Ave NW           | Canterwood Dr NW    | 2-Way Stop                   | 559                         | 13.5           | B   |                                                                       | 36            |
| UGA                                                                                          | Burnham Dr NW         | Wood Hill Dr NW     | 2-Way Stop                   | 571                         | 11.1           | B   |                                                                       | 3             |
| UGA                                                                                          | Burnham Dr NW         | Sehmel Dr NW        | 4-Way Stop                   | 1,305                       | 17.3           | C   |                                                                       | 29            |
| UGA                                                                                          | Canterwood Blvd NW    | Tow hee Dr NW       | 2-Way Stop                   | 763                         | 18.8           | C   |                                                                       | 43            |
| UGA                                                                                          | Peacock Hill Ave NW   | Canterwood Dr NW    | 2-Way Stop                   | 685                         | 16.2           | C   |                                                                       | 2             |
| UGA                                                                                          | Purdy Dr NW           | 144th St NW         | Signal                       | 1,367                       | 44.8           | D   |                                                                       | 18            |
| UGA                                                                                          | Purdy Dr NW           | SR 302              | Signal                       | 2,596                       | 54.6           | D   |                                                                       | 10            |
| UGA                                                                                          | Purdy Dr NW           | Goodnough Dr NW     | 2-Way Stop                   | 2,553                       | 9999.0         | F   | Tolerate; delay can't be<br>calculated due to capacity<br>constraints | 6             |
| UGA                                                                                          | Sehmel Dr NW          | Bujacich Rd NW      | 2-Way Stop                   | 839                         | 15.4           | C   |                                                                       | 8             |

**Attachment A: City of Gig Harbor Intersection Concurrency Report**

| Intersection Evaluation - Pipeline+Canterwood Commercial Center                              |                       |                       |                              |                             |                |     |                                                                            |               |
|----------------------------------------------------------------------------------------------|-----------------------|-----------------------|------------------------------|-----------------------------|----------------|-----|----------------------------------------------------------------------------|---------------|
| City<br>or UGA                                                                               | Intersection Location |                       | Intersection<br>Control Type | Forecast<br>Total<br>Volume | Intersection   |     | Improvement Indicated                                                      | Site<br>Trips |
|                                                                                              | Main Route            | Cross Street          |                              |                             | Delay<br>(sec) | LOS |                                                                            |               |
| East Area                                                                                    |                       |                       |                              |                             |                |     |                                                                            |               |
| City                                                                                         | Burnham Dr NW         | 96th St NW            | 2-Way Stop                   | 893                         | 14.4           | B   |                                                                            | 16            |
| City                                                                                         | Harborview Dr         | Austin St NW          | 4-Way Stop                   | 900                         | 14.4           | B   |                                                                            | 6             |
| City                                                                                         | Harborview Dr         | Stinson Ave           | 2-Way Stop                   | 1,468                       | 408.4          | F   | Tolerate; a roundabout or signal would resolve the deficiencies            | 5             |
| City                                                                                         | Harborview Dr         | Rosedale St NW        | 2-Way Stop                   | 945                         | 12.7           | B   |                                                                            | 2             |
| City                                                                                         | Harborview Dr         | Pioneer Way           | 4-Way Stop                   | 1,027                       | 18.8           | C   |                                                                            | 1             |
| City                                                                                         | N Harborview Dr       | Vernhardson St NW     | 2-Way Stop                   | 770                         | 18.1           | C   |                                                                            | 9             |
| City                                                                                         | N Harborview Dr       | Peacock Hill Ave      | 2-Way Stop                   | 916                         | 10.4           | B   |                                                                            | 4             |
| City                                                                                         | Olympic Dr            | Hollycroft St         | Signal                       | 1,429                       | 7.9            | A   |                                                                            | 1             |
| City                                                                                         | Olympic Dr            | Spur To Hollycraft NW |                              | 1,428                       |                |     | Future one-way street eliminates the intersection                          | 2             |
| City                                                                                         | Peacock Hill Ave      | 96th St NW            | 2-Way Stop                   | 650                         | 12.5           | B   |                                                                            | 5             |
| City                                                                                         | Pioneer Way           | Judson St             | 2-Way Stop                   | 792                         | 18.8           | C   |                                                                            |               |
| City                                                                                         | Pioneer Way           | Edwards Dr            | 2-Way Stop                   | 617                         | 9.9            | A   |                                                                            |               |
| City                                                                                         | Pioneer Way           | Grandview St          | Signal                       | 950                         | 5.6            | A   |                                                                            |               |
| City                                                                                         | Pioneer Way           | Kimball Dr            | Signal                       | 1,505                       | 19.2           | B   |                                                                            | 2             |
| City                                                                                         | Soundview Dr          | Judson St             | 2-Way Stop                   | 824                         | 12.7           | B   |                                                                            | 1             |
| City                                                                                         | Soundview Dr          | Grandview St          | 2-Way Stop                   | 943                         | 12.1           | B   |                                                                            |               |
| City                                                                                         | Soundview Dr          | 64th St NW            | Signal                       | 1,289                       | 7.1            | A   |                                                                            |               |
| City                                                                                         | Stinson Ave           | Rosedale St NW        | 4-Way Stop                   | 1,438                       | 21.9           | C   |                                                                            | 3             |
| City                                                                                         | Stinson Ave           | Edwards Dr            | 2-Way Stop                   | 991                         | 20.0           | C   |                                                                            |               |
| City                                                                                         | Stinson Ave           | Grandview St          | 4-Way Stop                   | 1,156                       | 20.8           | C   |                                                                            |               |
| Following Intersections are not under city control but are of interest for planning purposes |                       |                       |                              |                             |                |     |                                                                            |               |
| WSDOT                                                                                        | Pioneer Way           | SR 16 WB Ramp         | Signal                       | 2,444                       | 38.5           | D   |                                                                            | 5             |
| WSDOT                                                                                        | Olympic Dr            | SR 16 WB Ramp         | Signal                       | 3,324                       | 56.5           | E   | TIP #11 - re-channelization and re-timing will addresses the deficiencies. | 6             |
| WSDOT                                                                                        | 24th St NW            | SR 16 WB Ramp         | Signal                       | 1,200                       | 24.5           | C   |                                                                            | 1             |
| UGA                                                                                          | 24th St NW            | 14th Ave NW           | 2-Way Stop                   | 464                         | 12.8           | B   |                                                                            | 1             |
| UGA                                                                                          | Crescent Valley Dr NW | Vernhardson St NW     | 2-Way Stop                   | 606                         | 29.7           | D   |                                                                            | 7             |
| UGA                                                                                          | Reid Dr NW            | Hollycroft St         | 2-Way Stop                   | 594                         | 15.5           | C   |                                                                            | 1             |



**Attachment A: City of Gig Harbor Intersection Concurrency Report**

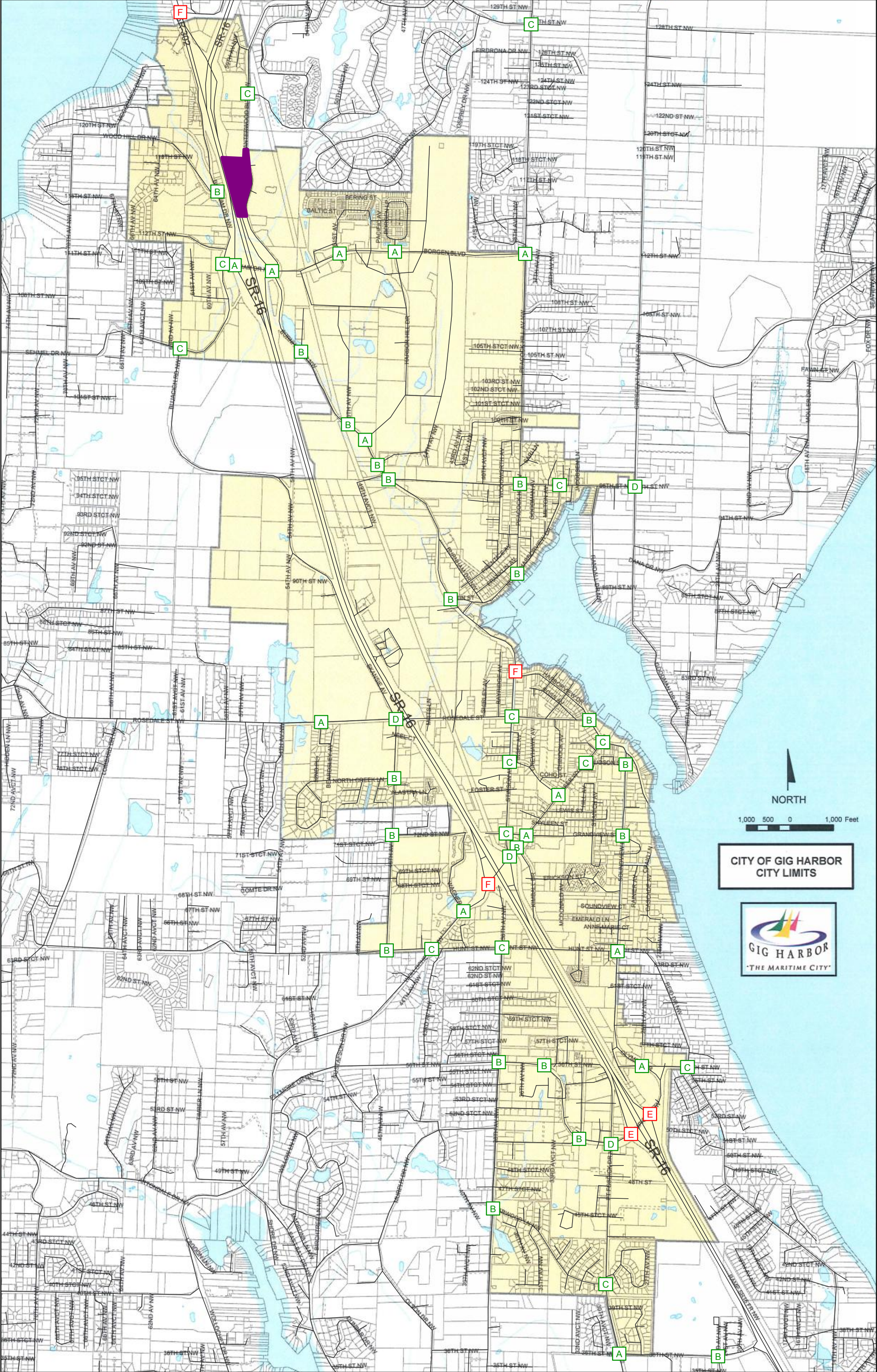
| Intersection Evaluation - Pipeline+Canterwood Commercial Center                              |                       |                     |                              |                             |                |     |                                                                             |               |
|----------------------------------------------------------------------------------------------|-----------------------|---------------------|------------------------------|-----------------------------|----------------|-----|-----------------------------------------------------------------------------|---------------|
| City<br>or UGA                                                                               | Intersection Location |                     | Intersection<br>Control Type | Forecast<br>Total<br>Volume | Intersection   |     | Improvement Indicated                                                       | Site<br>Trips |
|                                                                                              | Main Route            | Cross Street        |                              |                             | Delay<br>(sec) | LOS |                                                                             |               |
| West Area                                                                                    |                       |                     |                              |                             |                |     |                                                                             |               |
| City                                                                                         | 38th Ave NW           | Briarwood Ln NW     | 2-Way Stop                   | 372                         | 11.5           | B   |                                                                             |               |
| City                                                                                         | 56th St NW            | 38th Ave NW         | Signal                       | 2,054                       | 17.6           | B   |                                                                             |               |
| City                                                                                         | Hunt St NW            | 46th Ave NW         | Signal                       | 861                         | 10.2           | B   |                                                                             | 1             |
| City                                                                                         | Hunt St NW            | 38th Ave NW         | 4-Way Stop                   | 814                         | 18.8           | C   |                                                                             |               |
| City                                                                                         | Olympic Dr            | Point Fosdick Dr NW | Signal                       | 4,369                       | 50.2           | D   |                                                                             | 8             |
| City                                                                                         | Olympic Dr            | 50th St Ct NW       | Signal                       | 2,077                       | 19.5           | B   |                                                                             | 3             |
| City                                                                                         | Olympic Dr            | 56th St NW          | Signal                       | 1,905                       | 13.4           | B   |                                                                             | 1             |
| City                                                                                         | Point Fosdick Dr NW   | Briarwood Ln NW     | 2-Way Stop                   | 875                         | 15.5           | C   |                                                                             | 1             |
| City                                                                                         | Point Fosdick Dr NW   | 36th St NW          | Roundabout                   | 834                         | 6.9            | A   |                                                                             | 2             |
| City                                                                                         | Rosedale St NW        | Skansie Ave         | 4-Way Stop                   | 1,430                       | 33.1           | D   |                                                                             | 4             |
| City                                                                                         | Rosedale St NW        | Schoolhouse Ave NW  | Signal                       | 826                         | 8.2            | A   |                                                                             | 1             |
| City                                                                                         | Skansie Ave           | North Creek Ln      | 2-Way Stop                   | 750                         | 13.2           | B   |                                                                             | 2             |
| City                                                                                         | Wollochet Dr NW       | Wagner Way          | Signal                       | 1,573                       | 8.8            | A   |                                                                             | 5             |
| City                                                                                         | Wollochet Dr NW       | Hunt St NW          | Signal                       | 1,845                       | 23.6           | C   |                                                                             | 4             |
| Following Intersections are not under city control but are of interest for planning purposes |                       |                     |                              |                             |                |     |                                                                             |               |
| WSDOT                                                                                        | Wollochet Dr NW       | SR 16 EB Ramp       | Signal                       | 2,000                       | 80.0           | F   | Add a right-turn pocket on either SR 16 EB Ramp or SB Wollochet Dr NW       | 8             |
| WSDOT                                                                                        | Olympic Dr            | SR 16 EB Ramp       | Signal                       | 3,793                       | 56.8           | E   | Re-optimize timing                                                          | 9             |
| UGA                                                                                          | 24th St NW            | Jahn Ave NW         | 2-Way Stop                   | 1,199                       | 9999.0         | F   | Delay can't be calculated due to capacity constraints; change to 4-way stop |               |
| UGA                                                                                          | 36th St NW            | 22nd Ave NW         | Signal                       | 760                         | 15.4           | B   |                                                                             | 2             |
| UGA                                                                                          | 46th Ave NW           | 72nd St NW          | 2-Way Stop                   | 717                         | 12.8           | B   |                                                                             | 1             |

Note: for 2-stop intersections, the delay applies only to stopped side streets, not through traffic.

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Gig Harbor Citywide Intersection LOS\_Pipeline+Canterwood Commercial Center PM





Attachment B: City of Gig Harbor Roadway Concurrency Report

| Road Segment Evaluation - Pipeline+Canterwood Commercial Center |                     |                  |                     |                  |                  |                 |                    |                           |                         |                       |     | Site Trips |
|-----------------------------------------------------------------|---------------------|------------------|---------------------|------------------|------------------|-----------------|--------------------|---------------------------|-------------------------|-----------------------|-----|------------|
| City or UGA                                                     | Route Name          | Segment From     | Segment To          | 2-Way Thru Lanes | Left Turn Median | # of Side-Walks | Peak Hour Capacity | Forecast Peak Hour Volume | Road Capacity Available | Improvement Indicated |     |            |
| North Area                                                      |                     |                  |                     |                  |                  |                 |                    |                           |                         |                       |     |            |
| City                                                            | Borgen Blvd         | SR 16 WB Ramp    | 51st Ave NW         | 4                | YES              | 2               | 3,600              | 2,844                     | 756                     |                       | 34  |            |
| City                                                            | Borgen Blvd         | 51st Ave NW      | Harbor Hill Dr      | 4                | YES              | 2               | 3,600              | 2,589                     | 1,011                   |                       | 30  |            |
| City                                                            | Borgen Blvd         | Harbor Hill Dr   | Peacock Hill Ave NW | 2                | no               | 1               | 1,400              | 1,228                     | 172                     |                       | 22  |            |
| City                                                            | Burnham Dr NW       | SR 16 EB Ramp    | SR 16 WB Ramp       | 3                | YES              | 2               | 2,700              | 2,092                     | 608                     |                       | 53  |            |
| City                                                            | Burnham Dr NW       | SR 16 WB Ramp    | 53rd Ave Ct NW      | 2                | no               | 2               | 1,600              | 649                       | 951                     |                       | 21  |            |
| City                                                            | Burnham Dr NW       | 53rd Ave Ct NW   | 50th Ave NW         | 2                | no               | 2               | 1,600              | 645                       | 955                     |                       | 21  |            |
| City                                                            | Burnham Dr NW       | 50th Ave NW      | Harbor Hill Dr      | 2                | no               | 2               | 1,600              | 527                       | 1,073                   |                       | 18  |            |
| City                                                            | Burnham Dr NW       | Harbor Hill Dr   | 97th St NW          | 2                | no               | 2               | 1,600              | 923                       | 677                     |                       | 18  |            |
| City                                                            | Burnham Dr NW       | 97th St NW       | 96th St NW          | 2                | no               | 2               | 1,600              | 897                       | 703                     |                       | 16  |            |
| City                                                            | Canterwood Blvd NW  | City Limits      | Borgen Blvd         | 3                | YES              | 2               | 2,700              | 889                       | 1,811                   |                       | 129 |            |
| City                                                            | Harbor Hill Dr      | Borgen Blvd      | Costco Road         | 4                | YES              | 2               | 3,600              | 892                       | 2,708                   |                       | 4   |            |
| City                                                            | Harbor Hill Dr      | Costco Road      | Existing End        | 2                | YES              | 2               | 1,800              | 908                       | 892                     |                       | 3   |            |
| City                                                            | Harbor Hill Dr      | Existing End     | Burnham Dr Nw       | 2                | YES              | 2               | 1,800              | 590                       | 1,210                   |                       | 1   |            |
| City                                                            | Peacock Hill Ave NW | Borgen Blvd      | 96th St NW          | 2                | no               |                 | 1,200              | 512                       | 688                     |                       | 1   |            |
| Following road segments are not under city control              |                     |                  |                     |                  |                  |                 |                    |                           |                         |                       |     |            |
| WSDOT                                                           | SR 16 WB Off-Ramp   | SR 16            | Borgen Blvd         | 2                | YES              |                 | 2,000              | 963                       | 1,037                   |                       | 13  |            |
| WSDOT                                                           | SR 16 WB On-Ramp    | Borgen Blvd      | SR 16               | 2                | YES              |                 | 2,000              | 587                       | 1,413                   |                       | 6   |            |
| WSDOT                                                           | SR 16 EB Off-Ramp   | SR 16            | Burnham Dr NW       | 2                | YES              |                 | 2,000              | 486                       | 1,514                   |                       | 8   |            |
| WSDOT                                                           | SR 16 EB On-Ramp    | Burnham Dr NW    | SR 16               | 2                | YES              |                 | 2,000              | 886                       | 1,114                   |                       | 17  |            |
| UGA                                                             | 144th St NW         | Purdy Dr NW      | 54th Ave NW         | 2                | no               |                 | 1,200              | 905                       | 295                     |                       | 18  |            |
| UGA                                                             | 144th St NW         | 54th Ave NW      | Peacock Hill Ave NW | 2                | no               |                 | 1,200              | 593                       | 607                     |                       | 8   |            |
| UGA                                                             | 54th Ave NW         | 144th St NW      | Canterwood Dr NW    | 2                | no               |                 | 1,200              | 449                       | 751                     |                       | 30  |            |
| UGA                                                             | 54th Ave NW         | Canterwood Dr NW | Canterwood Blvd NW  | 2                | no               |                 | 1,200              | 536                       | 664                     |                       | 36  |            |
| UGA                                                             | Bujacich Rd NW      | Sehmel Dr NW     | 96th St NW          | 2                | no               |                 | 1,200              | 594                       | 606                     |                       | 3   |            |
| UGA                                                             | Burnham Dr NW       | Purdy Dr NW      | Wood Hill Dr NW     | 2                | no               |                 | 1,200              | 502                       | 698                     |                       | 1   |            |
| UGA                                                             | Burnham Dr NW       | Wood Hill Dr NW  | Sehmel Dr NW        | 2                | no               |                 | 1,200              | 629                       | 571                     |                       | 21  |            |
| UGA                                                             | Burnham Dr NW       | Sehmel Dr NW     | SR 16 EB Ramp       | 2                | no               |                 | 1,200              | 1,172                     | 28                      |                       | 29  |            |
| UGA                                                             | Canterwood Blvd NW  | 54th Ave NW      | Tow hee Dr NW       | 2                | no               |                 | 1,200              | 582                       | 618                     |                       | 36  |            |
| UGA                                                             | Peacock Hill Ave NW | 144th St NW      | Canterwood Dr NW    | 2                | no               |                 | 1,200              | 564                       | 636                     |                       | 2   |            |
| UGA                                                             | Peacock Hill Ave NW | Canterwood Dr NW | Borgen Blvd         | 2                | no               |                 | 1,200              | 774                       | 426                     |                       | 5   |            |
| UGA                                                             | Purdy Dr NW         | 147th St Ct NW   | 144th St NW         | 2                | no               |                 | 1,200              | 805                       | 395                     |                       | 14  |            |
| UGA                                                             | Purdy Dr NW         | 144th St NW      | Purdy Ln NW         | 2                | no               |                 | 1,200              | 966                       | 234                     |                       | 4   |            |
| UGA                                                             | Purdy Dr NW         | Purdy Ln NW      | SR302               | 2                | YES              |                 | 1,400              | 955                       | 445                     |                       | 4   |            |
| UGA                                                             | Purdy Dr NW         | SR302            | Goodnough Dr NW     | 4                | YES              |                 | 2,800              | 2,198                     | 602                     |                       | 6   |            |
| UGA                                                             | Sehmel Dr NW        | Burnham Dr NW    | Bujacich Rd NW      | 2                | no               |                 | 1,200              | 809                       | 391                     |                       | 8   |            |

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Attachment B: City of Gig Harbor Roadway Concurrency Report

| Road Segment Evaluation - Pipeline+Canterwood Commercial Center |                   |                       |                       |                  |                  |                 |                    |                           |                         |                        |            |  |
|-----------------------------------------------------------------|-------------------|-----------------------|-----------------------|------------------|------------------|-----------------|--------------------|---------------------------|-------------------------|------------------------|------------|--|
| City or UGA                                                     | Route Name        | Segment From          | Segment To            | 2-Way Thru Lanes | Left Turn Median | # of Side-Walks | Peak Hour Capacity | Forecast Peak Hour Volume | Road Capacity Available | Improvement Indicated  | Site Trips |  |
| East Area                                                       |                   |                       |                       |                  |                  |                 |                    |                           |                         |                        |            |  |
| City                                                            | 64th St NW        | Soundview Dr          | Reid Dr NW            | 2                | no               |                 | 1,200              | 268                       | 932                     |                        |            |  |
| City                                                            | 96th St NW        | Burnham Dr NW         | Peacock Hill Ave      | 2                | no               |                 | 1,200              | 13                        | 1,187                   |                        |            |  |
| City                                                            | 96th St NW        | Peacock Hill Ave      | N Harborview Dr       | 2                | no               |                 | 1,200              | 289                       | 911                     |                        | 5          |  |
| City                                                            | Burnham Dr        | 96th St NW            | Harborview Dr         | 2                | no               | 2               | 1,600              | 868                       | 732                     |                        | 16         |  |
| City                                                            | Grandview St      | Stinson Ave           | Pioneer Way           | 2                | no               | 1               | 1,400              | 256                       | 1,144                   |                        |            |  |
| City                                                            | Grandview St      | Pioneer Way           | Soundview Dr          | 2                | no               | 1               | 1,400              | 146                       | 1,254                   |                        |            |  |
| City                                                            | Harborview Dr     | Burnham Dr            | N Harborview Dr       | 2                | no               |                 | 1,200              | 592                       | 608                     |                        | 6          |  |
| City                                                            | Harborview Dr     | N Harborview Dr       | Stinson Ave           | 2                | YES              | 1               | 1,600              | 1,451                     | 149                     |                        | 5          |  |
| City                                                            | Harborview Dr     | Stinson Ave           | Rosedale St NW        | 2                | YES              | 2               | 1,800              | 709                       | 1,091                   |                        | 2          |  |
| City                                                            | Harborview Dr     | Rosedale St NW        | Pioneer Way           | 2                | no               | 2               | 1,600              | 934                       | 666                     |                        | 2          |  |
| City                                                            | Harborview Dr     | Pioneer Way           | Soundview Dr          | 2                | no               | 2               | 1,600              | 673                       | 927                     |                        | 1          |  |
| City                                                            | Hollycroft St     | Soundview Dr          | Olympic Dr            | 2                | no               | 1               | 1,400              | 426                       | 974                     |                        |            |  |
| City                                                            | Hollycroft St     | Olympic Dr            | Reid Dr NW            | 2                | no               | 1               | 1,400              | 439                       | 961                     |                        | 2          |  |
| City                                                            | Hunt St NW        | Kimball Dr            | Soundview Dr          | 2                | no               | 1               | 1,400              | 351                       | 1,049                   |                        | 1          |  |
| City                                                            | Kimball Dr        | Pioneer Way           | Hunt St NW            | 2                | YES              | 2               | 1,800              | 872                       | 928                     |                        | 2          |  |
| City                                                            | N Harborview Dr   | 96th St NW            | Peacock Hill Ave      | 2                | no               | 1               | 1,400              | 583                       | 817                     |                        | 4          |  |
| City                                                            | N Harborview Dr   | Peacock Hill Ave      | Harborview Dr         | 2                | no               | 2               | 1,600              | 879                       | 721                     |                        |            |  |
| City                                                            | Olympic Dr        | Soundview Dr          | Hollycroft St         | 2                | YES              | 2               | 1,800              | 782                       | 1,018                   |                        |            |  |
| City                                                            | Olympic Dr        | Hollycroft St         | Spur To Hollycroft NW | 2                | YES              | 2               | 1,800              | 1,180                     | 620                     |                        | 1          |  |
| City                                                            | Olympic Dr        | Spur To Hollycraft NW | SR 16 WB Ramp         | 4                | YES              | 2               | 3,600              | 1,918                     | 1,682                   |                        | 2          |  |
| City                                                            | Peacock Hill Ave  | 96th St NW            | N Harborview Dr       | 2                | no               | 1               | 1,400              | 333                       | 1,067                   |                        |            |  |
| City                                                            | Pioneer Way       | Harborview Dr         | Judson St             | 2                | no               | 2               | 1,600              | 640                       | 960                     |                        |            |  |
| City                                                            | Pioneer Way       | Judson St             | Edwards Dr            | 2                | no               | 1               | 1,400              | 538                       | 862                     |                        |            |  |
| City                                                            | Pioneer Way       | Edwards Dr            | Grandview St          | 2                | no               | 1               | 1,400              | 626                       | 774                     |                        |            |  |
| City                                                            | Pioneer Way       | Grandview St          | Kimball Dr            | 2                | no               | 1               | 1,400              | 900                       | 500                     |                        |            |  |
| City                                                            | Pioneer Way       | Kimball Dr            | SR 16 WB Ramp         | 2                | YES              | 2               | 1,800              | 1,237                     | 563                     |                        | 3          |  |
| City                                                            | Reid Dr NW        | 64th St NW            | Hollycroft St         | 2                | no               |                 | 1,200              | 320                       | 880                     |                        |            |  |
| City                                                            | Reid Dr NW        | 64th St NW            | Hollycroft St         | 2                | no               |                 | 1,200              | 320                       | 880                     |                        |            |  |
| City                                                            | Rosedale St NW    | Skansie Ave           | Stinson Ave           | 2                | no               | 1               | 1,400              | 856                       | 544                     |                        | 2          |  |
| City                                                            | Rosedale St NW    | Stinson Ave           | Harborview Dr         | 2                | no               | 1               | 1,400              | 234                       | 1,166                   |                        |            |  |
| City                                                            | Soundview Dr      | Harborview Dr         | Judson St             | 2                | no               | 1               | 1,400              | 658                       | 742                     |                        | 1          |  |
| City                                                            | Soundview Dr      | Judson St             | Grandview St          | 2                | no               | 1               | 1,400              | 876                       | 524                     |                        |            |  |
| City                                                            | Soundview Dr      | Grandview St          | Hunt St NW            | 2                | YES              | 1               | 1,600              | 949                       | 651                     |                        |            |  |
| City                                                            | Soundview Dr      | Hunt St NW            | Olympic Dr            | 2                | YES              | 1               | 1,600              | 1,045                     | 555                     |                        |            |  |
| City                                                            | Stinson Ave       | Harborview Dr         | Rosedale St NW        | 2                | no               | 1               | 1,400              | 783                       | 617                     |                        | 3          |  |
| City                                                            | Stinson Ave       | Rosedale St NW        | Edwards Dr            | 2                | no               | 1               | 1,400              | 985                       | 415                     |                        |            |  |
| City                                                            | Stinson Ave       | Edwards Dr            | Grandview St          | 2                | no               | 1               | 1,400              | 1,051                     | 349                     |                        |            |  |
| City                                                            | Stinson Ave       | Grandview St          | Pioneer Way           | 2                | no               | 2               | 1,600              | 1,051                     | 549                     |                        |            |  |
| Following road segments are not under city control              |                   |                       |                       |                  |                  |                 |                    |                           |                         |                        |            |  |
| WSDOT                                                           | Olympic Dr        | SR 16 WB Ramp         | SR 16 EB Ramp         | 4                | YES              | 2               | 3,600              | 2,786                     | 814                     |                        | 6          |  |
| WSDOT                                                           | Pioneer Way       | SR 16 WB Ramp         | SR 16 EB Ramp         | 2                | YES              |                 | 1,400              | 1,472                     | -72                     | WSDOT's responsibility | 4          |  |
| WSDOT                                                           | SR 16 WB Off-Ramp | SR 16                 | Olympic Dr            | 2                | YES              |                 | 2,000              | 874                       | 1,126                   |                        |            |  |
| WSDOT                                                           | SR 16 WB On-Ramp  | Olympic Dr            | SR 16                 | 2                | no               |                 | 2,000              | 1,068                     | 932                     |                        | 5          |  |
| WSDOT                                                           | SR 16 WB Ramp     | SR 16                 | Pioneer Way           | 2                | no               |                 | 2,000              | 1,223                     | 777                     |                        | 4          |  |
| UGA                                                             | 24th St NW        | Reid Dr NW            | SR 16 WB Ramp         | 2                | no               |                 | 1,200              | 447                       | 753                     |                        | 1          |  |
| UGA                                                             | 96th St NW        | N Harborview Dr       | Crescent Valley Dr NW | 2                | no               |                 | 1,200              | 752                       | 448                     |                        | 9          |  |
| UGA                                                             | Reid Dr NW        | Hollycroft St         | 42nd St NW            | 2                | no               |                 | 1,200              | 419                       | 781                     |                        | 1          |  |
| UGA                                                             | Reid Dr NW        | 42nd St NW            | 24th St NW            | 2                | no               |                 | 1,200              | 267                       | 933                     |                        |            |  |

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Attachment B: City of Gig Harbor Roadway Concurrency Report

| Road Segment Evaluation - Pipeline+Canterwood Commercial Center |                     |                     |                     |                  |                  |                 |                    |                           |                         |                       |   | Site Trips |
|-----------------------------------------------------------------|---------------------|---------------------|---------------------|------------------|------------------|-----------------|--------------------|---------------------------|-------------------------|-----------------------|---|------------|
| City or UGA                                                     | Route Name          | Segment From        | Segment To          | 2-Way Thru Lanes | Left Turn Median | # of Side-Walks | Peak Hour Capacity | Forecast Peak Hour Volume | Road Capacity Available | Improvement Indicated |   |            |
| West Area                                                       |                     |                     |                     |                  |                  |                 |                    |                           |                         |                       |   |            |
| City                                                            | 36th St NW          | SR 16 EB Ramp       | 22nd Ave NW         | 3                | no               |                 | 1,800              | 447                       | 1,353                   |                       | 2 |            |
| City                                                            | 36th St NW          | 22nd Ave NW         | Point Fosdick Dr NW | 2                | no               |                 | 1,200              | 568                       | 632                     |                       | 1 |            |
| City                                                            | 38th Ave NW         | Hunt St NW          | 56th St NW          | 2                | no               |                 | 1,200              | 857                       | 343                     |                       |   |            |
| City                                                            | 38th Ave NW         | 56th St NW          | 50th St Ct NW       | 2                | no               | 2               | 1,800              | 393                       | 1,407                   |                       |   |            |
| City                                                            | 38th Ave NW         | 50th St Ct NW       | Briarwood Ln NW     | 2                | no               | 2               | 1,800              | 381                       | 1,419                   |                       |   |            |
| City                                                            | 46th Ave NW         | 72nd St NW          | Hunt St NW          | 2                | no               | 1               | 1,400              | 573                       | 827                     |                       | 1 |            |
| City                                                            | 50th St Ct NW       | 56th St NW          | 38th Ave NW         | 2                | no               | 2               | 1,600              | 439                       | 1,161                   |                       | 1 |            |
| City                                                            | 56th St NW          | Point Fosdick Dr NW | Olympic Dr NW       | 2                | no               | 2               | 1,800              | 191                       | 1,609                   |                       |   |            |
| City                                                            | 56th St NW          | Olympic Dr NW       | 38th Ave NW         | 4                | YES              | 2               | 3,600              | 1,861                     | 1,739                   |                       | 1 |            |
| City                                                            | Hunt St NW          | 38th Ave NW         | Wollochet Dr NW     | 2                | no               | 2               | 1,800              | 779                       | 1,021                   |                       |   |            |
| City                                                            | Hunt St NW          | Wollochet Dr NW     | 46th Ave NW         | 2                | no               | 2               | 1,800              | 779                       | 1,021                   |                       | 1 |            |
| City                                                            | Hunt St NW          | 46th Ave NW         | 48th Ave NW         | 2                | no               | 2               | 1,800              | 459                       | 1,341                   |                       | 1 |            |
| City                                                            | Olympic Dr NW       | SR 16 EB Ramp       | Point Fosdick Dr NW | 5                | YES              | 2               | 4,500              | 3,483                     | 1,017                   |                       | 8 |            |
| City                                                            | Olympic Dr NW       | Point Fosdick Dr NW | 50th St Ct NW       | 4                | YES              | 2               | 3,600              | 1,938                     | 1,662                   |                       | 4 |            |
| City                                                            | Olympic Dr NW       | 50th St Ct NW       | 56th St NW          | 4                | YES              | 2               | 3,600              | 1,579                     | 2,021                   |                       | 1 |            |
| City                                                            | Point Fosdick Dr NW | 56th St NW          | Olympic Dr NW       | 4                | YES              |                 | 2,800              | 974                       | 1,826                   |                       |   |            |
| City                                                            | Point Fosdick Dr NW | Olympic Dr NW       | 45th St Ct NW       | 4                | YES              | 2               | 3,600              | 2,342                     | 1,258                   |                       | 4 |            |
| City                                                            | Point Fosdick Dr NW | 45th St Ct NW       | Briarwood Ln NW     | 4                | YES              |                 | 2,400              | 886                       | 1,514                   |                       | 1 |            |
| City                                                            | Point Fosdick Dr NW | Briarwood Ln NW     | 36th St NW          | 2                | no               |                 | 1,200              | 731                       | 469                     |                       | 1 |            |
| City                                                            | Rosedale St NW      | Skansie Ave         | Schoolhouse Ave NW  | 2                | no               | 2               | 1,600              | 763                       | 837                     |                       | 2 |            |
| City                                                            | Rosedale St NW      | Schoolhouse Ave NW  | 54th Ave NW         | 2                | YES              |                 | 1,400              | 685                       | 715                     |                       | 1 |            |
| City                                                            | Skansie Ave         | Rosedale St NW      | North Creek Ln      | 2                | no               | 1               | 1,400              | 584                       | 816                     |                       | 2 |            |
| City                                                            | Skansie Ave         | North Creek Ln      | 72nd St NW          | 2                | no               |                 | 1,200              | 680                       | 520                     |                       | 1 |            |
| City                                                            | Wollochet Dr NW     | SR 16 EB Ramp       | Wagner Way          | 2                | YES              | 2               | 1,800              | 1,379                     | 421                     |                       | 6 |            |
| City                                                            | Wollochet Dr NW     | Wagner Way          | Hunt St NW          | 2                | YES              | 2               | 1,800              | 1,303                     | 497                     |                       | 5 |            |
| City                                                            | Wollochet Dr NW     | Hunt St NW          | 62nd St NW          | 2                | no               | 2               | 1,800              | 722                       | 1,078                   |                       | 3 |            |
| Following road segments are not under city control              |                     |                     |                     |                  |                  |                 |                    |                           |                         |                       |   |            |
| WSDOT                                                           | SR 16 EB Ramp       | SR 16               | Wollochet Dr NW     | 2                | no               |                 | 2,000              | 1,149                     | 851                     |                       | 5 |            |
| WSDOT                                                           | SR 16 EB Off-Ramp   | SR 16               | Olympic Dr NW       | 2                | YES              |                 | 2,000              | 799                       | 1,201                   |                       | 5 |            |
| WSDOT                                                           | SR 16 EB On-Ramp    | Olympic Dr NW       | SR 16               | 2                | no               |                 | 2,000              | 519                       | 1,481                   |                       |   |            |
| UGA                                                             | 24th St NW          | SR 16 WB Ramp       | Jahn Ave NW         | 2                | no               |                 | 1,200              | 979                       | 221                     |                       | 1 |            |
| UGA                                                             | 56th St NW          | 38th Ave NW         | 43rd Ave NW         | 2                | no               |                 | 1,200              | 997                       | 203                     |                       |   |            |
| UGA                                                             | Jahn Ave NW         | 24th St NW          | Stone Dr NW         | 2                | no               |                 | 1,200              | 807                       | 393                     |                       |   |            |
| UGA                                                             | Skansie Ave         | 96th St NW          | Rosedale St NW      | 2                | no               |                 | 1,200              | 674                       | 526                     |                       | 1 |            |

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JAN 08 2014

CITY OF GIG HARBOR  
ENGINEERING

"THE MARITIME CITY"

# City of Gig Harbor

## Transportation Concurrency Management Program

### Capacity Reservation Certificate Application

Submit completed application to:  
City of Gig Harbor Engineering Department  
3510 Grandview Street, Gig Harbor, Washington 98335  
(253) 851-6170 FAX (253) 853-7597

\$90.00 Commercial Only Pd. 11:00:00Today's Date: 1/8/20141. Applicant (Developer or Owner) please circle one

Name John Xitco Company Swede Hill, LLC Telephone (253) 627-6179  
Address 2320 Milwaukee Way / P.O. Box 1397 City/State/Zip Tacoma, WA 98401

## 2. Property Owner (If other than applicant)

Name John Xitco Company Swede Hill, LLC Telephone (253) 627-6179  
Address 2320 Milwaukee Way / P.O. Box 1397 City/State/Zip Tacoma, WA 98401

Project Name Canterwood Commercial CenterProject Address 10700X Canterwood Blvd. Total Acreage 7.6 acres

## 3. Property Legal Description (A map showing road access points must be submitted with this application, attach separate pages if needed)

See attached legal and site plan showing road access points.Parcel No. 01222540904. Request of Capacity for the legal description described above: 174 new P.M. peak hour trips139 ADL 1/3/19

## 5. Property Description (check one)

Note: Applicants are responsible for accurate land use designations. The issuance of a Capacity Reservation Certificate does not constitute land use or development approval.

- ☐ Short Plat ☒ Commercial/Industrial  
☐ Sub-division ☐ Multi-family (3+ units)

A. Number of new dwelling units \_\_\_\_\_

B. Commercial building area in square feet 28,1206. Traffic Report attached ☒ Yes ☐ No4 BLDGS28,120 SF PER  
TIA 10/2018

Note: The traffic report must be prepared by a licensed professional engineer who is practicing as a traffic engineer.

7. Existing Use of Property Vacant8. Proposed property use, if applicable Commercial center consisting of 4 buildings, 3 with drive thru facilities.

Signature: \_\_\_\_\_

(Property Owner signature)

Date: 1/6/14(initial) JS☒ I, the property owner, authorize my agent to receive all original correspondenceAgent's Name Barghausen Consulting Engineers, Inc. Address 18215 72nd Avenue South, Kent, WA 98032

## Questions?

Please call (253) 851-6170 if you have any questions about the Concurrency Management Program.

Road Segment: CANTERWOOD BLVD BBC RABApproved Reservation Capacity: 139Public Works Approval: [Signature]Date: 1/4/19





## TECHNICAL MEMORANDUM

Prepared by: Grette Associates<sup>LLC</sup>  
2102 North 30<sup>th</sup> Street, Ste A  
Tacoma, WA 98403

March 5, 2018

Prepared for: City of Gig Harbor  
Attention: Carl de Simas  
3510 Grandview Street  
Gig Harbor, WA 98335

File No.: 250.001.2046

Re: Canterwood Commercial – Third Party Review

**Mitigated Determination of  
Nonsignificance (MDNS)**  
PL-SEPA-07-0060  
Reference No. 5

### 1 INTRODUCTION

The City of Gig Harbor (City) has contracted with Grette Associates to assist in the review of a Wetland Delineation and Habitat Assessment Report and Mitigation Plan prepared by Soundview Consultants, LLC (the "Report", dated January 2018). According to the Report, due to design changes and project delays this revised document was submitted to the City on February 2, 2018 in support of a resubmittal associated with the Canterwood Commercial project.

As proposed, the Project will result in the loss of approximately 5,525 square feet of Category IV wetland area to facility construction of the proposed Project.

### 2 REVIEW METHODS

#### 2.1 Site Visit

Grette Associates completed a site visit on March 4, 2014 to assess the area in the vicinity of the proposed Project (Grette Associates 2014). This site visit was completed during Grette Associates' 2014 review of the 2013 report (Soundview Consultants 2013) prepared for the proposed Project. As no development has occurred since the referenced site visit, it is assumed that conditions have not significantly changed; therefore, no site visit was completed during this review.

#### 2.2 Document Review

A Grette Associates biologist conducted a thorough review of the Report submitted to the City of Gig Harbor on February 2, 2018. The review focused on verifying the accuracy of the descriptions within the Report and compliance with the current version of the Gig Harbor Municipal Code (GHMC) Title 18.

In addition, guidance from a City memorandum (City of Gig Harbor 2013) defining the administrative interpretation of GHMC 18.08.100 and GHMC 18.08.186 and applicable buffer requirements was used to determine compliance with the current version of the GHMC.

### **3 REVIEW RESULTS**

Based on Grette Associates' observations at the site during the 2014 site assessment and review of the Report, the Report is largely compliant with the GHMC. However, as discussed below there are two deficiencies that must be addressed.

#### **3.1 Site Visit Review**

This section summarizes the site conditions observed during Grette Associates' 2014 site assessment. Grette Associates identified a total of seven wetland areas and one stream that are within 300 feet of the Project. These features were accurately defined by Soundview Consultants. No additional critical areas were observed within 300 feet of the Project that are not addressed in the Report.

#### **3.2 Critical Areas Review**

Overall, the Report is largely compliant with Chapter 18.08 of the GHMC; however, Grette Associates identified two deficiencies with the Project's design that do not conform to said chapter. Please refer to the subsections below for details.

As mentioned above, the City Planning Director's interpretation of GHMC Chapter 18.08 is that both the wetland buffer requirements of GHMC Section 18.08.100 and the Critical Fish and Wildlife Habitat Area buffer requirements of GHMC 18.08.186.D apply to projects that contain both critical areas. While this specific Project does not contain a Critical Fish and Wildlife Habitat Area, this rationale is applicable for the Stream buffer requirements of GHMC 18.08.184. This specific project does trigger both wetland and stream requirements.

##### **3.2.1 Wetlands**

The Report is compliant with the wetland reporting requirements of Chapter 18.08 of the GHMC. The Report has adequately documented the extent and function of all wetlands within the Project area as well as all wetlands within 300 feet. In addition, the Report was revised to include Ecology's current wetland rating system (Hruby 2014) as required by GHMC 18.08.040.

Wetlands A through G appear to be accurately rated according to GHMC 18.08.040. Grette Associates agrees with the categorization of the wetlands as Category IV slope wetlands. Per GHMC 18.08.100, Category IV wetlands are subject to a 50 foot buffer.

##### **3.2.2 Wetland Mitigation**

The Report is compliant with the conceptual phase wetland mitigation requirements of GHMC 18.08.150.A. The Report discusses the general goals of a conceptual mitigation plan and the nature of compensation. According to the Report, the proposed layout has been configured to minimize wetland impacts while providing reasonable use of the site. Furthermore, the Report complies with the replacement ratios required for Category IV wetlands. Per GHMC 18.08.170, alterations to or elimination of Category IV wetlands require a minimum replacement ratio of 1.5 to 1. Based on Table 12 within the Report, the 5,525 square feet of permanent Category IV wetland impacts will be compensated for through the creation of 8,288 square feet of Category IV wetland. Furthermore, according to page 26 of the Report, the initial wetland creation area will be constructed to the size of approximately 10,561 square feet to ensure that proposed mitigation will comply with 18.08.170. Additional mitigation proposed beyond the minimum requirements of 18.08.170 include approximately 2,301 square feet of wetland enhancement,

preservation of the mitigation site through a conservation easement, and removal of two 24 inch culverts within the onsite stream.

The Report's proposed mitigation implementation strategy, maintenance, monitoring, and contingency plans are compliant with GHMC 18.08.150.A. The Report's planting schedule contains a variety of native trees, shrubs, and herbaceous vegetation species that will likely increase habitat diversity within the mitigation area.

However, while the Report contains the minimum requirements of a conceptual mitigation plan, two deficiencies associated with the Project's layout configuration were identified. According to Sheet 3 within Appendix C of the Report, the Project will extend portions of three rock retaining walls into the buffer area. Per GHMC 18.08.110.D, qualitative alterations to wetland buffers may be allowed, pending approval, if proposed alterations do not reduce the functions and/or values of the wetland. Alterations do not include structures associated with development unless identified under GHMC 18.08.120. Per GHMC 18.08.120, permitted uses in wetland buffers do not include construction of structures such as retaining walls. Therefore, the portions of the retaining walls that extend into the buffer do not conform to the standards of GHMC 18.08.110 or 18.08.120.

In addition to the retaining walls extending into the buffer area, the proposed dispersion trench will be constructed near the boundary of the created wetland area. Per GHMC 18.08.120, permitted uses in wetland buffers include general stormwater management features, as defined in GHMC 18.08.120.C; however, said structures shall not extend greater than 25 percent into the wetland buffer. Therefore, the proposed location of the dispersion trench does not conform to GHMC 18.08.120.C.

Per GHMC 18.08.100, a 15 foot building setback is required from the edge of the wetland buffer. Therefore, the referenced retaining walls do not conform to the building setback requirements defined in GHMC 18.08.100. According to GHMC 18.08.020, the building setback line means the distance beyond which the footprint or foundation of a building or structure shall not extend. The definition of *structure* is not defined under Chapter 18.08 of the GHMC. Therefore, Grette Associates assumes that the retaining walls are considered a type of structure associated with development under Chapter 18.08 of the GHMC.

### 3.2.3 Streams

The report is compliant with the stream reporting requirements of Chapter 18.08 of the GHMC. All streams within 200 feet of the Project are discussed and analyzed within the Report. Based on the information contained in the Report and Grette Associates' professional opinion, the stream is accurately rated as a Type 3 stream. Per GHMC 18.08.184, Type 3 streams are subject to a 50 foot buffer.

### 3.2.4 Stream Mitigation

Per GHMC 18.08.185, stream mitigation shall occur to address any adverse impacts to streams or their associated riparian habitat areas. With the exception of removing the two 24 inch culverts within the onsite Type 3 stream, no work is proposed to occur within the stream. The Report has provided the appropriate mitigation through the implementation of TESC and BMP measures to ensure no adverse effects will occur to the stream or riparian areas during the removal of the culverts. However, as summarized above, the Project proposes to extend portions of three retaining walls into the buffer area. Similar to the wetland provisions summarized in



GHMC 18.08.110 and 18.08.120, GHMC 18.08.184 does not allow for structures associated with development to be constructed within stream buffers. Therefore, the portions of the retaining walls that extend into the buffer area do not conform to the standard provisions defined in GHMC 18.08.184.

Additionally, per GHMC 18.08.184, a 15 foot building setback is required from the edge of the stream buffer. Therefore, the referenced retaining walls do not conform to the building setback requirements defined in GHMC 18.08.184.

### *3.2.5 Critical Fish and Wildlife Habitat Areas*

While McCormick Creek is considered a critical fish and wildlife habitat area, the Type 3 stream situated onsite does not meet the definition of a critical fish and wildlife habitat area according to GHMC 18.08.186. According to the information contained in the Report, the Type 3 stream does not provide accessible habitat for federal or state endangered, threatened, and/or sensitive species of fish or species of local importance. Additionally, Grette Associates queried the Washington Department of Natural Resources' (WDNR) Forest Practices Application Mapping Tool on-line mapper to identify the water typing of any streams mapped by WDNR (WDNR 2018). According to WDNR, there are two potential streams mapped in the Project area. The northern stream is a Type U (unknown) stream and the southern stream is a Type N (non-fish) stream. Based on Soundview's and Grette Associates site assessments, the southern stream does not exist. Furthermore, the northern stream is inaccurately mapped by WDNR. This stream is mapped in the general location of the onsite Type 3 stream which flows south and beneath the highway prior to its confluence with McCormick Creek. Given this information, no critical fish and wildlife habitat areas are within 300 feet of the Project; therefore, this section does not apply.

### **3.3 Flood Hazard Assessment and ESA Compliance**

Per GHMC 18.08.100, this section does not apply to the Project. This Project is not within the area of special flood hazard or riparian buffer zone.

## **4 SUMMARY AND RECOMMENDATIONS**

In summary, the Report is largely compliant with the requirements of Chapter 18.08 of the GHMC; however, prior to the City's acceptance of the Report, Grette Associates recommends that the two discrepancies associated with the Project's layout configuration be addressed. The two discrepancies identified are summarized below.

- Per Chapter 18.08 of the GHMC, structures associated with development are not allowed within buffers unless those structures meet the requirements defined in GHMC 18.08.120 or 18.08.184. According to GHMC 18.08.110, buffer alteration (reduction/averaging) may be approved if the applicant meets the requirements defined in GHMC 18.08.110. The Report does not propose any buffer modifications to facilitate the construction of the retaining walls. Similarly, the Report does not provide any analysis to demonstrate that the placement of the retaining walls within the stream/wetland buffers will not have an adverse effect or that any adverse effects shall be mitigated and result in equivalent functions and values. Grette Associates recommends that the Report be revised to address the structures proposed within the wetland and stream buffer areas.
- Per GHMC 18.08.120.C, the placement of stormwater management features shall be placed at a distance from the wetland edge no less than 75 percent of the buffer width.

Therefore, the dispersion trench needs to be repositioned to the outer 25 percent of the wetland buffer to comply with GHMC 18.08.120.C.

The review of this Report was conducted using the best available scientific information and methodologies and the best professional judgment of Grette Associates staff wetland biologists. Final acceptance and approval of the report is at the discretion of City staff.

If you have any questions on the document review, please contact me at (253) 573-9300, or by email at [chadw@gretteassociates.com](mailto:chadw@gretteassociates.com).

Regards,



Chad Wallin  
Biologist  
GRETTIE ASSOCIATES<sup>LLC</sup>

**References:**

- City of Gig Harbor. 2013. Administrative Interpretation of the City of Gig Harbor Planning Director. File No. ADMIN 13-0001 – Wetland Buffer Requirement – 8715 North Harborview Drive – Parcel No. 4102000013. September 17, 2013.
- Grette Associates, LLC. 2014. Canterwood Commercial Properties – Document Review. Prepared for the City of Gig Harbor. March 14, 2014.
- Hruby, T. 2014. Washington State Wetland Rating System for Western Washington: 2014 Update. Washington State Department of Ecology Publication # 14-06-029.
- Washington Department of Natural Resources (WDNR). 2018. Forest Practices Application Mapping Tool [map online]. Streams and Water Type Breaks. Queried March 1, 2018. URL: <https://fortress.wa.gov/dnr/protectiongis/fpamt/index.html>



*"THE MARITIME CITY"*

DEVELOPMENT SERVICES

**ADMINISTRATIVE INTERPRETATION  
OF THE  
CITY OF GIG HARBOR  
PLANNING DIRECTOR**

**Date:** September 17, 2013

**Authority:** Interpretations and Appeals  
Gig Harbor Municipal Code Section 17.66.050

**Subject:** File No. ADMIN 13-0001-Wetland Buffer Requirement-8715 North  
Harborview Drive-Parcel No. 4102000013

**Applicant:** Burnham Construction LLC  
P.O. Box 245  
Gig Harbor, WA 98335

**Introduction:** The Planning Director or her designated representative has the authority to review and determine any questions involving the proper interpretation or application of the provisions of Title 18. See Gig Harbor Municipal Code (GHMC) Section 18.08.034 and Subsection 17.66.050.A.1.

**Facts:** The applicant has applied for an interpretation of the GHMC, regarding the required regulated buffer for a Category II Estuarine Wetland located on the property referenced above. See letter from Lisa Klein dated July 23, 2013 which is marked and attached as Exhibit "A". The applicant proposes to construct an 864 square foot, two-story parking garage on the subject site to serve an existing duplex, and the code interpretation is necessary to determine the required critical area buffers for the property.

Under the request, the applicant notes that the subject Category II Estuarine Wetland has been "typed" both by its wetland biologist, Marine Surveys and Assessments (MSA) and the city's wetland biologist, Parametrix in conjunction with the Donkey Creek restoration project. The MSA Wetland Delineation is marked as Exhibit "B" to this interpretation and is incorporated herein as though fully set forth.

Ms. Klein notes in her letter that the site's Ordinary High Water Mark on Gig Harbor Bay establishes the landward edge of the wetland in this instance. Further, she notes that the city's Critical Areas Ordinance, Gig Harbor Municipal Code (GHMC) Chapter 18.08, has two sections that address the application of wetland buffers to property. In this regard, she notes that GHMC Sections 18.08.038 through 18.08.180 is specific to wetlands with

Subsection 18.08.100.D prescribing wetland buffer widths based on category of wetland and type of use. She also notes that per the aforementioned provision, the prescribed buffer for the Category II Wetland located on the site would be 150-feet.

Ms. Klein also notes that GHMC Section 18.08.186-Critical Fish and Wildlife Habitat Areas is applicable to the site as Gig Harbor Bay has been determined to be a Critical Fish and Wildlife Habitat Area<sup>1</sup>. With regard to GHMC Subsection 18.08.186, Ms. Klein notes that the preamble states in pertinent part the following:

“Areas which are identified or classified as fish and wildlife habitat areas subject to this section shall be subject to the requirements of this section.”

She notes that this is a “shall” statement; therefore, the wetland buffer requirements of GHMC Section 18.08.186 shall apply. She further notes, that per 18.08.186.D, a Habitat Management Plan (HMP) is required to be prepared for projects located on sites designated as Critical Fish and Wildlife Habitat Areas to address the potential effects of the proposal, and necessary mitigation measures that may be required including an undisturbed buffer that shall not exceed 150-feet or be less than 25-feet in width.

Pursuant to the requirements of Section 18.08.186, the applicant has prepared a Habitat Management Plan (HMP) dated July 18, 2013 that is marked as Exhibit “C” to this interpretation and is incorporated herein as though fully set forth. Due to the degraded nature of the existing Critical Fish and Wildlife Habitat Area buffer, removal of non-native and invasive plant species, and enhancement of the existing buffer with native vegetation is proposed by the HMP<sup>2</sup>.

Ms. Klein concludes by noting that it would not make sense to apply a standard prescriptive wetland buffer of 150-feet to the project per the requirements of GHMC 18.08.100, and also require a HMP per the requirements of GHMC 18.08.186, which is specific to a wetland in a Critical Fish and Wildlife Habitat Area, and which describes a different method of determining buffer widths. Only one method should apply and it is her opinion that the method addressed in GHMC 18.08.186 is the applicable method.

**Question Presented:** Do the wetland buffer requirements of GHMC Subsection 18.08.100.D, or the Critical Fish and Wildlife Habitat Area requirements of GHMC

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<sup>1</sup> Per GHMC Subsection 18.08.186.A.1 & 2, areas with which federal or state endangered, threatened and sensitive species of fish, wildlife and plants have primary association and which, if altered, may reduce the likelihood that the species will maintain and reproduce over the long term, and Category 2 Wetlands are regulated Critical Fish and Wildlife Habitat Areas. Per Exhibit “C,” the applicant’s HPM, the project area and Gig Harbor Bay is utilized by Puget Sound Chinook salmon, yellow eye and canary rockfish, Southern Resident Killer Whale and several other species listed as threatened or endangered under the Federal Endangered Species Act. Per Exhibit “B,” the applicant’s Wetland Delineation, a Category II wetland extends to the site’s Ordinary High Water Mark on Gig Harbor Bay.

<sup>2</sup> Per GHMC Subsection 18.08.186.D, if it’s determined, based on comments received on the HMP, that a buffer would serve to mitigate impacts to a critical fish or wildlife habitat, an undisturbed buffer shall be required on the development site. The width of the buffer shall be based upon recommendation of at least one of the state or federal agencies provided with the opportunity to review and comment on the HMP.

Section 18.08.186 apply to the subject property and the applicant's development proposal?

Brief Interpretation/Answer: Both the wetland buffer requirements of GHMC Subsection 18.08.100.D and the Critical Fish and Wildlife Habitat Area requirements set forth in GHMC 18.08.186 apply to the property and the proposed development.

Analysis:

The Director would note that GHMC Subsection 18.08.100.A states the following in pertinent part:

A. Following the department's determination of the category for a wetland associated with a proposal, the department shall determine appropriate buffer widths. Wetland buffer zones shall be evaluated for all development proposals and activities adjacent to wetlands to determine their need to protect the integrity, functions and values of the wetland. Wetland buffer widths are determined by the category of wetland, the intensity of impacts of a land use and the functions or special characteristics of the wetland that need to be protected as determined by the rating system.

Further, GHMC Subsection 18.08.100.B states:

B. Impact of Land Use. Different uses of land can result in a high, moderate or low level of impact to adjacent wetlands. Types of land use are categorized into impact levels as shown on the following table:

| Level of Impact from Land Use | Types of Land Uses Based on Common Use Categories                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| High                          | Residential uses (greater than one unit per acre); schools; churches; public facilities, public/private services and government administrative uses (excluding parks, rights-of-way and utilities); lodging uses; personal, professional, product and automotive services; health care services; commercial and sales uses; animal clinics and kennels; marine-related uses; industrial uses; restaurant uses; museum, club and recreation hall uses; high-intensity parks, outdoor and indoor recreation (golf courses, ballfields, tennis clubs, swimming pools, etc.); conversion to high-intensity agriculture (dairies, nurseries, greenhouses, growing and harvesting crops requiring annual tilling and raising and maintaining animals, etc.); hobby farms. (emphasis supplied) |
| Moderate                      | Residential uses (less than one unit per acre); moderate-intensity parks and outdoor recreation (parks with biking, jogging, etc.); conversion to moderate-intensity agriculture (orchards, hay fields, etc.) and paved trails; building of logging roads;                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |



|     |                                                                                                                                                                                                                                               |
|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|     | utility corridor or right-of-way shared by several utilities and including access/maintenance road.                                                                                                                                           |
| Low | Forestry (cutting of trees only); low-intensity parks and open space (hiking, bird-watching, preservation of natural resources, etc.) and unpaved trails; utility corridor without a maintenance road and little or no vegetation management. |

Lastly, GHMC Subsection 18.08.100.E states:

E. Category II Wetlands. The following buffer widths for Category II wetlands are required:

| Wetland Characteristics                                                                                                                        | Buffer Widths by Impact of Land Use                                                   | Other Protection Measures Required                   |
|------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|------------------------------------------------------|
| High level of function for habitat (score for habitat 29 – 36 points)                                                                          | Low – 150 feet<br>Moderate – 225 feet<br>High – 300 feet                              | Maintain connections to other habitat areas          |
| Moderate level of function for habitat (score for habitat 20 – 28 points)                                                                      | Low – 75 feet<br>Moderate – 110 feet<br>High – 150 feet                               | None required                                        |
| High level of function for water quality improvement and low for habitat (score for water quality 24 – 32 points; habitat less than 20 points) | Low – 50 feet<br>Moderate – 75 feet<br>High – 100 feet                                | No additional surface discharges of untreated runoff |
| <b>Estuarine</b>                                                                                                                               | Low – 75 feet<br>Moderate – 110 feet<br><b>High – 150 feet</b><br>(emphasis supplied) | None required                                        |
| Interdunal                                                                                                                                     | Low – 75 feet<br>Moderate – 110 feet<br>High – 150 feet                               | None required                                        |
| Not meeting above characteristics                                                                                                              | Low – 50 feet<br>Moderate – 75                                                        | None required                                        |

|  |                         |  |
|--|-------------------------|--|
|  | feet<br>High – 100 feet |  |
|--|-------------------------|--|

Turning to the city's Critical Fish and Wildlife Habitat Area requirements, the Director would note that the preamble of GHMC Section 18.08.186 states the following:

**"Critical fish and wildlife habitat areas are those areas identified as being of critical importance in the maintenance and preservation of fish, wildlife and natural vegetation. Areas which are identified or classified as fish and wildlife habitat areas subject to this section shall be subject to the requirements of this section."**

Further, GHMC Subsection 18.08.186.A.1 states the following:

**"A. General. Critical fish and wildlife habitat areas are identified as follows:**

**1. Areas with which federal or state endangered, threatened and sensitive species of fish, wildlife and plants have a primary association and which, if altered, may reduce the likelihood that the species will maintain and reproduce over the long term;**

**2. Habitats and species of local importance, including:**

a. Areas with which state-listed monitor or candidate species or federally listed candidate species have a primary association and which, if altered, may reduce the likelihood that the species will maintain and reproduce over the long term;

b. Special habitat areas which are infrequent in occurrence in the city of Gig Harbor and which provide specific habitats as follows:

i. Old-growth forests;

ii. Snag-rich areas;

iii. **Category 2 wetland areas;**

iv. Significant stands of trees which provide roosting areas for endangered, threatened, rare or species of concern as identified by the Washington State Department of Wildlife;" (emphasis supplied)

A review of GHMC Section 18.08.100 and Section 18.08.186 finds that the two provisions are not mutually exclusive or in conflict; they can be read and applied concurrently and without conflict. In this regard, the buffer requirements of GHMC

18.08.100 are intended to protect wetlands, while the buffer requirement of GHMC 18.08.186 is intended to protect Critical Fish and Wildlife Habitat. They are two separate and different requirements that have been adopted to protect two separate and different natural features. If a project and property only triggers the wetland requirement, then 18.08.100 applies. If the project and property only triggers the Critical Fish and Wildlife Habitat Area requirement, then 18.08.186 applies. But if the project triggers both requirements, both 18.08.100 and 18.08.186 would apply. See *Faben Point Neighbors v. City of Mercer Island*, 102 Wn. App. 775, 11 P. 3d 322 (2000).

There is no provision in GHMC Chapter 18.08 providing that when a property triggers both wetland and Critical Fish and Wildlife Habitat Area requirements, the buffer provisions of GHMC 18.08.186 shall apply exclusively or supersede or take precedence over conflicting provisions. GHMC 18.08.186 provides merely that "areas which are identified or classified as fish and wildlife habitat areas subject to this section shall be subject to the requirements of this section." It does not state that such areas shall only be subject to the requirements of the section. "Shall does not mean "shall only" as the applicant's representative argues in this instance.

Therefore, per the applicant's Wetland Delineation and Analysis Report dated July 22, 2013, a 150-foot buffer is required to protect the Category II Estuarine Wetland located on the subject site. While the applicant's HMP doesn't recommend the establishment of a new Critical Fish and Wildlife Habitat Area buffer on the site, a final determination on whether a larger buffer will be required will be based on the comments of state and federal agencies that will review the plan.

#### Conclusion:

Based upon the preceding findings, it's the Director's interpretation of GHMC Chapter 18.08 that both the wetland buffer requirements of GHMC Section 18.08.100 and the Critical Fish and Wildlife Habitat Area buffer requirements of GHMC 18.08.186 apply to the applicant's proposal and the subject site.

The Director notes, that the proposed parking garage does not comply with the 150-foot wetland buffer required pursuant to GHMC 18.08.100 for the site. Since the required agency review of the HMP has not been completed per the requirements of GHMC Subsection 18.08.186.D, it's not known at this time if a regulated buffer will be required for the project to protect Critical Fish and Wildlife Habitat. That determination will be made at the conclusion of the agency review.

GHMC Section 18.08.100 addresses the alteration of wetland buffers. Per the section, buffers for a high impact land uses can be reduced to the buffer required for a moderate impact use upon a showing of consistency with certain conditions. In such cases, the wetland buffer could potentially be used from 150-feet to 110-feet.

If additional relief from the buffer requirement is necessary, GHMC Section 18.08.204 addresses the variance process for granting relief from the minimum requirements of the

city's Critical Area Ordinance. A variance may be authorized upon a showing of consistency with the criteria in GHMC Subsection 18.08.204.B. The fee for a variance is \$1625.

This interpretation shall apply to the property identified above, and be applicable to the facts presented herein. Nothing in this interpretation shall authorize any construction, development or demolition that is inconsistent with this interpretation, regardless of whether it is authorized by a permit issued by the City. This interpretation is limited to the code sections identified above, and shall not be interpreted as authorizing development and construction regulated by any other code, building code, public works standard or ordinance.

  
Jennifer Kester  
Planning Director

7/17/13  
Date

cc: Lisa Klein, c/o AHBL, 2215 North 30<sup>th</sup> Street, Suite 300, Tacoma, WA 98403-3350

SEPA Threshold Decision: Exempt

Administrative Appeal: Parties of record may appeal this administrative decision to the City of Gig Harbor Hearing Examiner. Such appeals must be filed, in writing, pursuant to GHMC Section 19.06.004, within fourteen (14) days after the issuance of this notice of decision. Appeals shall be delivered to the Planning Director by mail, by personal delivery or by fax before 5:00 p.m. on the last business day of the appeal period. Appeals shall be mailed or delivered to: Planning Director, City of Gig Harbor, 3510 Grandview Street, Gig Harbor, WA 98335; or faxed to: 253-858-6804. Appeals received by mail after 5:00 p.m. on the last day of the appeal period will not be accepted, no matter when such appeals were mailed or postmarked. A filing fee of \$275.00 must be submitted with any appeal filed. This fee is refunded if the appellant substantially prevails. Appellants that do not substantially prevail on appeal will be charged the cost of the Hearing Examiner.

Property Tax Valuation: Affected property owners may request a change in property tax valuation notwithstanding any program of revaluation by contacting the Pierce County Assessor-Treasurer.

Permit Documents: The complete project permit file, including official decision, findings, and conclusions is available for review at the City of Gig Harbor Planning Department, 3510 Grandview Street, Gig Harbor, WA 98335, during normal business hours, Monday through Friday. Additional permit information can also be found at [permitportal.cityofgigharbor.net](http://permitportal.cityofgigharbor.net) by entering the above permit numbers. Questions

regarding the above stated decision should be made to Jennifer Kester, Planning Director at [kesterj@cityofgigharbor.net](mailto:kesterj@cityofgigharbor.net) or 253- 851-6170.





## TECHNICAL MEMORANDUM

Prepared by: Grette Associates<sup>LLC</sup>  
2102 North 30<sup>th</sup> Street, Ste A  
Tacoma, WA 98403

March 14, 2014

Prepared for: City of Gig Harbor  
Attention: Kristin Moerler  
3510 Grandview Street  
Gig Harbor, WA 98335

File No.: 250.00.2020

Re: Canterwood Commercial Properties – Document Review

### 1 INTRODUCTION

The City of Gig Harbor (City) has contracted with Grette Associates<sup>LLC</sup> to assist in the review of a Wetland Delineation and Habitat Assessment Report and Conceptual Mitigation Plan prepared by Soundview Consultants<sup>LLC</sup> (the "Report", dated December 20, 2013). This document was submitted to the City on December 20, 2013 in support of an application to construct four new buildings and associated infrastructure (Project) on an approximately 7.6 acre parcel located within the City of Gig Harbor (Pierce County Tax Parcel 0122254090).

As currently designed, the proposed Project will result in the loss of approximately 5,225 square feet of Category IV wetland area.

### 2 REVIEW METHODS

#### 2.1 Site Visit

Grette Associates<sup>LLC</sup> completed a site visit on March 5, 2014 to assess the identified critical areas for consistency with the information contained in the Report (Soundview Consultants 2013). The wetland areas proposed for impact, Wetland B and Wetland C, were verified according to the procedures described in the U.S. Army Corps of Engineers' (USACE) *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0)* (2010). Data plots and soil test pits were excavated to evaluate wetland and upland conditions. Guidance from the USACE's *Regional Supplement* was used to evaluate the data at each data point. The *National Wetland Plant List* (Lichvar 2013) was used to determine vegetation indicator status. All remaining wetlands proposed for conservation and/or enhancement were visually assessed for consistency with the information contained in the Report.

#### 2.2 Document Review

A Grette Associates biologist conducted a thorough review of the document submitted to the City of Gig Harbor on December 20, 2013. The review focused on verifying the accuracy of the

descriptions within the report and compliance with the current version of the Gig Harbor Municipal Code (GHMC) Title 18.

### **3 REVIEW RESULTS**

Based on Grette Associates<sup>LLC</sup> observations at the site and review of the Report, the Report is compliant with Title 18 of the GHMC.

#### **3.1 Site Visit Review**

The site assessment identified a total of seven wetland areas and one stream that are within the subject parcel. No other critical areas were observed within 300 feet of the Project area that are not addressed in the Report. Wetlands B and Wetland C exhibited sufficient indicators of the required parameters for the presence of wetland conditions. These parameters include a predominance of hydrophytic vegetation, presence of wetland hydrology, and indicators of hydric soils. The wetland boundary locations were verified based on these indicators, the general topographic relief at the site, and on best professional judgment. Based on these findings, the Wetland B and Wetland C boundary flags are accurately defined by Soundview Consultants.

The remaining wetlands that are proposed for preservation and/or enhancement are well defined by topography, the presence of obligate vegetation species, and surface hydrology indicators. Based on these findings all remaining wetlands are accurately defined by Soundview Consultants. Furthermore, the ordinary high water mark (OHWM) of the onsite stream was accurately flagged by Soundview Consultants.

#### **3.2 Critical Areas Review**

Overall, the Report is compliant with Title 18 of the GHMC. However, there appears to be one minor inconsistency with the report and the site plans in Appendix C. Sheet 5 and Sheet 7 indicate that the targeted creation area is to be approximately 14,285 square feet in size. However, the language in the Report states that the target creation area is to be approximately 15,028 square feet in size. No other inconsistencies were observed within the Report.

##### **3.2.1 Wetlands**

The Report is compliant with the wetland requirements of Chapter 18.08 of the GHMC. The Report has adequately documented the extent and function of all wetlands within the project area and within 300 feet of the project (GHMC 18.08.170.E).

Wetlands A through G appear to be accurately rated using Ecology's rating system (Hruby 2006). Grette Associates agrees with the categorization of the wetlands as Category IV wetlands. Per GHMC 18.08.100, Category IV wetlands are subject to a 50 foot wetland buffer width.

##### **3.2.2 Wetland Mitigation**

The Report is compliant with the conceptual phase wetland mitigation requirements of GHMC 18.08.150.A. The Report discusses the general goals of a conceptual mitigation plan and the nature of the compensation. Based on the Report, the proposed site layout has been designed to minimize wetland impacts and provide reasonable use of the site. In addition to the proposed compensation for wetland impacts, the proposed project will restore all temporary wetland buffer impacts. No temporary wetland impacts are proposed outside of the current project footprint.

According to the Report, the Project will comply with the replacement ratios required for Category IV wetlands. Per GHMC 18.08.170, alterations to or elimination of Category IV wetlands require a minimum replacement ratio of 1.5 to 1. Based on the Report, the proposed creation area will have equal or greater function compared to Wetland B and Wetland C once completed, and as such there will be no net loss of wetland function and acreage.

Furthermore, the conceptual mitigation implementation, maintenance, monitoring, and contingency plans are compliant with GHMC 18.08.150. The Report's plant list contains a variety of native trees, shrubs, and herbaceous vegetation species that will likely increase habitat diversity within the mitigation areas. Per GHMC 18.08.150.A.7 and 18.08.150.A.8, conceptual mitigation plans shall contain maintenance, monitoring, and contingency plans to keep mitigations site free of non-native invasive vegetation species and to achieve the overall goal of mitigation. The Report accurately addresses contingency actions in the event the site does not meet annual performance standards.

### **3.2.3 Streams**

The Report is compliant with the stream requirements of Chapter 18.08 of the GHMC. All streams that are within 200 feet of the proposed Project are addressed within the Report. With the exception of removing two 24 inch culverts, no impacts to the stream are proposed during this Project. The stream is accurately classified as a Type 3 stream. Per GHMC 18.08.184, Type 3 streams are subject to a 50 foot stream buffer width.

### **3.2.4 Critical Fish and Wildlife Habitat Areas**

Per GHMC 18.08.186, this section does not apply to the Project. As defined by GHMC 18.08.186, there are no critical fish and wildlife habitat areas within 300 feet of the Project site.

### **3.3 Flood Hazard Assessment and ESA Compliance**

Per GHMC 18.10.100, this section does not apply to this project. The subject parcel is not within an area of special flood hazard or riparian buffer zone.

## **4 SUMMARY AND RECOMMENDATIONS**

Upon thorough review, the Report meets the requirements of Title 18 of the GHMC. Grette Associates recommends that the applicant confirm the size of the targeted wetland creation area prior to submitting the detailed mitigation plan to the City. As the Report meets the requirements of Title 18 of the GHMC, Grette Associates recommends that the Report be accepted by City staff.

This review of the Wetland Delineation and Habitat Assessment and Conceptual Mitigation Plan was conducted using the best available scientific information and methodologies and the best professional judgment of Grette Associates staff wetland biologists. Final acceptance and approval of the report is at the discretion of City staff.

If you have any questions on the document review, please contact me at (253) 573-9300 or by email at [chadw@gretteassociates.com](mailto:chadw@gretteassociates.com).

Regards,



Chad Wallin  
Biologist  
GRETTIE ASSOCIATES<sup>LLC</sup>

**References:**

Hruby, T. 2006. Washington State Wetlands Rating System for Western Washington – Revised (Annotated Version). Washington State Department of Ecology Publication # 04-06-025.

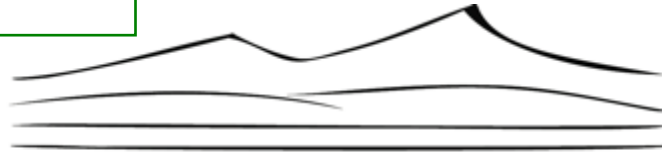
Lichvar, R. 2013. 2013 National Wetland Plant List. Technical Report ERDC/CRREL TR12-11. U.S. Army Engineers Research and Development Center, Hanover, NH.

U.S. Army Corps of Engineers (USACE). 2010. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0)*, ed. J. S. Wakeley, R. W. Lichvar, and C. V. Noble. ERDC/EL TR-10-3. Vicksburg, MS: U.S. Army Engineer Research and Development Center.

**Mitigated Determination of  
Nonsignificance (MDNS)**

PL-SEPA-07-0060

Reference No. 6



Cultural Resource Consultants, Inc.

**TECHNICAL MEMO 1503D-2**

DATE: June 10, 2015

TO: John Xitco  
Swede Hill, LLC

FROM: Glenn Hartmann, Principal Investigator

RE: Cultural Resources Assessment of the Canterwood Commercial Project, Pierce County, WA

The attached short report form constitutes our final report for the above referenced project. Assessment did not identify cultural resources that could be affected by this project. An inadvertent discovery plan is attached. Please contact the office should you have any questions about our findings and/or recommendations.



# CULTURAL RESOURCES REPORT COVER SHEET

Author: Sonja Kassa and James Schumacher

Title of Report: Cultural Resources Assessment of the Canterwood Commercial Project, Pierce County, WA

Date of Report: June 10, 2015

County(ies): Pierce Section: 25 Township: 22 N Range: 1 E

Quad: Gig Harbor, WA Acres: 7.6

PDF of report submitted (REQUIRED) ☒ Yes

Historic Property Inventory Forms to be Approved Online? ☐ Yes ☒ No

Archaeological Site(s)/Isolate(s) Found or Amended? ☐ Yes ☒ No

TCP(s) found? ☐ Yes ☒ No

Replace a draft? ☐ Yes ☒ No

Satisfy a DAHP Archaeological Excavation Permit requirement? ☐ Yes # ☒ No

Were Human Remains Found? ☐ Yes DAHP Case # ☒ No

DAHP Archaeological Site #:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

- Submission of PDFs is required.
- Please be sure that any PDF submitted to DAHP has its cover sheet, figures, graphics, appendices, attachments, correspondence, etc., compiled into one single PDF file.
- Please check that the PDF displays correctly when opened.

## Management Summary

This report describes a cultural resources assessment for the Canterwood Commercial project, located between Canterwood Boulevard and State Route 16 in Gig Harbor, Pierce County, Washington. The Canterwood Commercial project involves the development of a 7.6-acre parcel along the east side of SR-16. This assessment was developed to identify any previously recorded archaeological or historic sites in the project location and evaluate the potential for the project to affect cultural resources. No previously recorded archaeological sites are located in or adjacent to the project boundary. Assessment did not result in identification of cultural resources that would be affected by this project.

### 1. Administrative Data

Report Title: Cultural Resources Assessment of the Canterwood Commercial Project, Pierce County, WA

Author (s): Sonja Kassa and James Schumacher

Report Date: June 10, 2015

Location: The project parcel is located adjacent to SR-16 in Gig Harbor, Pierce County (Figures 1 and 2). The approximate situs address is 10700 Canterwood Boulevard. The Pierce County Tax Parcel number is 0122254090.

USGS 7.5' Topographic Map (s): Gig Harbor, WA

Total Area Involved: 7.6 acres.

Objective (Research Design): This assessment was developed as a component of preconstruction environmental review with the goal of ensuring that no cultural resources are disturbed during construction of the proposed project by determining the potential for any as-yet unrecorded archaeological or historic sites within the project area. This project requires compliance with the Washington State Environmental Policy Act (SEPA) and a Joint Aquatic Resources Permit (i.e., JARPA) from the United States Army Corps of Engineers. CRC's work was intended, in part, to assist in addressing agency responsibilities regarding the identification of potential impacts to archaeological and historic sites in compliance with Section 106 of the National Historic Preservation Act (NHPA), as well as state laws and regulations protecting cultural resources (e.g., RCW 27.44, RCW 27.53). Under Section 106, agencies involved in a federal undertaking must take into account the undertaking's potential effects to historic properties (36 CFR 800.16(l)(1)). The Washington State Archaeological Sites and Resources Act (RCW 27.53) prohibits knowingly disturbing archaeological sites without a permit from the Washington Department of Archaeology and Historic Preservation (DAHP), and the Indian Graves and Records Act (RCW 27.44) prohibits knowingly disturbing Native American or historic graves.

Assessment methods consisted of review of available project information provided by Soundview Consultants LLC, local environmental, cultural, and historical information, and records on file at DAHP, as well as field investigations. CRC also contacted the cultural resources department at the Puyallup Tribe to inquire about project-related cultural information or concerns (Attachment A). This assessment utilized a research design that considered previous studies, the magnitude and nature of the project, the nature and extent of potential effects on historic properties, and the likely nature and location of historic properties within the project area, as well as other applicable laws, standards, and guidelines (per 36CFR800.4 (b)(1)).

Recorded Cultural Resources Present: Yes ☐ No ☒

No archaeological or historic sites have been previously recorded in the project location.

Project Background: Soundview Consultants, on behalf of Swede Hill, LLC, requested this assessment prior to development for the Canterwood Commercial project. The Canterwood Commercial project involves the development of a 7.6-acre parcel along the east side of SR-16 (Figure 3). The project includes construction of four buildings, with associated parking and infrastructure, which will support St. Anthony's Hospital. The project will require filling one wetland and conversion of another wetland to a stormwater detention feature. Mitigation for the loss of 5,525 square feet of wetland will be provided through on-site wetland creation and removal of two in-stream culverts. Replanting with native species is planned at stream and wetland buffer areas. For purposes of this assessment, the area of potential effects (APE) for this project is understood to be the 7.6 acres described above and depicted on attached maps.

## **2. Background Research**

Background research was conducted in May 2015.

### Archival Sources Checked:

|                         |                                                                                                                                                                                                                           |
|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DAHP WISAARD            | <input checked="" type="checkbox"/> Recorded cultural resource sites are not located in or adjacent to the project location.                                                                                              |
| Web Soil Survey         | <input checked="" type="checkbox"/> Soils mapped in the project location consist of Harstine gravelly ashy sandy loam, 15-30 percent slopes, and Harstine gravelly ashy sandy loam, 6-15 percent slopes (USDA NRCS 2015). |
| Library                 | <input checked="" type="checkbox"/> Various historical, archaeological, and ethnographic references.                                                                                                                      |
| General Land Office Map | <input checked="" type="checkbox"/> 1858                                                                                                                                                                                  |

Context Overview: Environmental and cultural context information for this project is derived from relevant published reports, articles, and books; historical maps and documents; geological and soils surveys; ethnographic accounts; and local archaeological survey reports.

Environmental Context: The contemporary topography and surficial geology of the Gig Harbor area is largely a result of multiple glaciations that occurred during the end of the Pleistocene, about 15,000 years before present (B.P.). By about 13,600 B.P., the last of the Pleistocene glaciers had retreated as far north as Seattle, exposing the predominately north-trending ridges and relatively level uplands characteristic of the Puget Sound region. As the

glaciers retreated, outwash sediments were deposited over the landscape and formed the parent material for the local soils including the local Harstine gravelly sandy loam soils. During this time, isostatic rebound also occurred, allowing the landscape to lift as the weight of the ice decreased (Thorson 1980, 1981). These functions of glacial retreat and landmass rebound contributed to the present landforms and elevation of the Gig Harbor area.

Surface geology mapped for the project area consists of Quaternary (Pleistocene) glacial drift (Qgd), which consists of massive accumulations of boulders, gravel, clay, silt, sand, and clay (WADNR 2015). Soil mapped within the project is generally Harstine gravelly ashy sandy loam, 15 – 30 percent slopes (83 percent of the APE). This soil is found on terrace slopes and treads, and was formed from glacial drift. The soil profile typically consists of 32 inches of gravelly ashy sandy loam overlying gravelly loamy sand (USDA NRCS 2015). If archaeological deposits were present within the project area, they would have been on the surface or very shallowly buried. Due to the lack of post-glacial soil development, any present deposits would likely have been obscured or destroyed by natural erosional forces, such as rainwash, sheetwash, and slow continuous downslope creep. Thus, this type of depositional environment is considered to have a low potential to contain intact archaeological deposits. Buried archaeological features might be expected at the interface of the glacial till and upper sandy loam on terrace treads, but not below deeper gravelly deposits.

The project property is a 7.6-acre parcel of undeveloped hilly forest, bisected from northeast to southwest by an unnamed tributary to McCormick Creek. Two 24-inch diameter culverts are present near the midpoint of this stream within the parcel. Downstream of the confluence of the unnamed tributary and McCormick Creek is a documented total fish passage barrier. There are wetlands adjacent to the stream channel and elsewhere on the subject property. The surrounding emergent vegetation mostly consists of red alder, red cedar, sword fern, lady fern, slough sedge, salmonberry, deer fern, and skunk cabbage.

Archaeological Context: Local and regional studies have enabled an archaeological and historical synthesis that informs a research design for the present project. A general understanding of approximately the last 10,000 years of human occupation has emerged within a Southern Coast Salish area inclusive of Puget Sound (Nelson 1990). Apparent continuities in material culture demonstrate early reliance upon a suite of basic stone tools useful for a variety of tasks, including the manufacture of other tools from more perishable materials.

The southern Puget Sound region includes the traditional territory of people speaking mutually intelligible dialects of the Lushootseed language family, speakers of which lived along river drainages as far east as the Cascade Mountains. Native Americans by the early historic period practiced a seasonal subsistence economy that consisted of spring, summer and fall migrations to areas for hunting, fishing, gathering of berries and roots, and procurement of shellfish followed by a more sedentary lifestyle as they returned to longhouse villages as winter approached. Although salmon and other fish were the primary food source, the complexity of the Puget Lowland environment provided a rich subsistence base.

Patterns of seasonal residence and logistical mobility characterizing the ethnographic pattern in the Puget Sound region find their foundation from about 3,000 B.P. In the Puget lowlands, many

types of archaeological sites have been identified. Villages were typically adjacent to or near river or marine transportation routes. Fish weirs and other permanent constructions are often associated with large residential groups. Sites dating from this period represent seasonal specialized spring and summer fishing and root gathering campsites and winter village locations. The archaeologically-visible increase through time in the diversity of site types present in varied microenvironments such as the marine littoral, estuaries, and river channels is mirrored in the distribution of specialized resource procurement tools. Artifacts consonant with everyday activities include a range of food gathering and processing tools; bone and shell implements for fabric and basket weaving; and, associated middens (Suttles and Lane 1990). Similar economic and occupational trends reflected by these sites persisted throughout the Puget Sound region until the arrival of European explorers.

Ethnographic Context: The project location would have been utilized by Southern Lushootseed-speaking people such as the Shotlemamish, Puyallup, Squaxin or Homamish, and Nisqually (Suttles and Lane 1990). The Shotlemamish, Puyallup, Squaxin or Homamish, and Nisqually were signatories to the 1854 Treaty of Medicine Creek and are now politically affiliated with the Nisqually, Puyallup, Squaxin, and Suquamish reservations. Puyallup people had winter villages stretching from Vashon Island and Commencement Bay to Wapato Creek, and along the Puyallup River. A village at the head of Gig Harbor bay, two miles southeast of the project, was known as *twawelkax*, and described as the main village “founded many generations before by Puyallup from Commencement Bay” (Smith 1940). A village located at the head of Wollochet Bay, several miles further south, was established to accommodate an increasing population from the village at Gig Harbor. At the head of Burley Lagoon, Carr Inlet, just over 3 miles from the project, was a village known as *tw’leh-lah-khle*. Peter Puget saw a village here in 1792, but by the mid-1800s, its people appeared to have moved to other sites on Carr Inlet (Smith 1940), on the sand spit which separates Burley Lagoon from Carr Inlet was the village of *too-skhoht-lehb* (Waterman 2001).

Historic Context: European-American settlement of the Oregon Territory was spurred by the passage of the Donation Land Claims Act in 1850. In 1854, following negotiations between Puyallup people and the United States government, the Treaty of Medicine Creek was invoked by federal authorities to compel many Indian people to relocate to one of several reservations (Ruby and Brown 1992). By 1855-56, the federal government used military force to contain people dissatisfied with the poor quality of reservation lands. First in 1857 then in 1873, the Puyallup Reservation was enlarged to 18,032 acres and included the confluence of Clark’s Creek and the Puyallup River.

Local European-American residence is recorded to have begun in 1867, when a Slovenian fisherman named Sam Jerisich and his wife Anna Willesh Henemat, of the Penelakut Tribe on Kupyier Island, British Columbia, settled on the west side of Gig Harbor following a search for good fishing grounds. In the late 1870s, subsequent Euro-American settlers supported development of a sawmill and growth of the community then known as Millville. Immigrants supported themselves by timber harvesting, lumber milling and fishing, and, later, by berry farming and holly growing (Eckrom 2004; Kirk and Alexander 1990). In 1891, 157.66 acres, containing and surrounding the current project boundary, were deeded to George B. McCormick (Accession No. WASAA 078995, issued 8/24/1891) as “Sale – Cash Entry” (BLM 2015).



Historical Maps: The General Land Office (GLO) cadastral survey plat for the area does not show any cultural features such as structures, trails, or clearings in the project location or vicinity (USSG 1858). In 1960, parcels containing the project were owned by the Puget Mill Company, the Buchanan Lumber Company, and R. Hurd (Metsker 1960). No cultural features such as buildings or roads are indicated on the 1960 map (Figure 4).

Historic aerial imagery was accessed on the Internet via Google Earth (Google 2015), in order to examine recent changes in the land. The project is bounded on the west by the SR16 Right of Way, in the south by a large stormwater facility, on the east by Canterwood Boulevard, and by undeveloped land to the north. The road designated today as SR-16 (SR14 between 1923 and 1937) was once the primary connector between the Olympic and Kitsap peninsulas. In 1937, SR14 was re-designated Primary State Highway 14 (PSH14) and, by 1939, was routed over the Tacoma Narrows Bridge. In the mid 1960s, PSH14 was replaced by SR16 in the new state highway numbering system and WSDOT began converting the present-day SR16 corridor to a controlled-access freeway (Kelly and Hartmann 2013). Based on historic imagery and related documentation, SR-16 adjacent to the project APE was probably improved after about 1971. The stormwater facility was built and Canterwood Boulevard was improved after 1990; the St. Anthony Hospital complex across Canterwood Boulevard was developed after 2006.

Within the project, the 1994 air photo shows dense forest across the parcel. The 2002 photo depicts what appears to be a large (ca. 120-feet by 500-feet) irregular polygon partly cleared of large trees and dense forest. This polygon is oriented roughly north-south across the middle of the parcel, and is associated with Canterwood Boulevard by an area of mostly exposed and disturbed mineral soil that measures about 0.25-acre. By June 2010, the understory appears to have regrown significantly. Changes visible over the last two decades of air photos suggest that the middle portion of the parcel underwent at least one significant episode of industrial timber harvest during this time.

Recorded Cultural Resources: Five cultural resource investigations have been conducted within an approximately one-mile radius from the project. All of these occurred between 0.25 – 1 mile southeast of the project APE. These studies (i.e., Greene 2010; Kelly 2013; Kelly and Hartmann 2013; Kelly et al., 2013; Piper 2007) conducted on landforms very similar to that in the project APE have addressed the archaeological potential of this terrain. These studies identified the project area as having a low potential to contain intact precontact-era archaeological deposits, but with a low-to-moderate potential to contain historic archaeological deposits or structural remains. None of the four cultural resource surveys identified buried archaeological deposits.

No archaeological sites or cemeteries have been recorded with DAHP within a one-mile radius of the project location. The nearest recorded archaeological sites are located over one mile from the Canterwood Commercial Project boundary. These include precontact shell midden sites and historic debris scatters near the shorelines of Henderson Bay and Burley Lagoon. No historic structures are known to be present within, or have been inventoried adjacent to the APE. No specific Traditional Cultural Properties were identified in published literature as recorded within the project boundary.

Archaeological Expectations: The DAHP statewide predictive model uses environmental data about the locations of known archaeological sites to identify where previously unknown archaeological sites are more likely to be found. The model correlates locations of known archaeological to environmental data “to determine the probability that, under a particular set of environmental conditions, another location would be expected to contain an archaeological site (Kauhi and Markert 2009:2-3). Environmental data categories included in the computer-based model are elevation, slope, aspect, distance to water, geology, soils, and landforms. The model classifies different parts of the project area as low, moderate, and high potential, likely based on slope and distance to water (i.e., streams) variables.

In this region, precontact sites are generally located near freshwater sources (e.g., larger stream sides or near stream confluences with Puget Sound); most of the project is located in the upland. Pre-modern human use of the project area likely would have consisted of transient subsistence activities, such as hunting and collection of floral resources. Such activities are unlikely to result in well-defined archaeological deposits. The wetland is not likely to contain long-term habitation sites, though resource procurement might have occurred along wetland margins. Recent archaeological investigations of property nearby (e.g., Piper 2007) did not identify any evidence of archaeological deposits.

Based upon the results of background research, most of the project location is in an area with a low-to-moderate potential to contain archaeological sites. Local geomorphology, the shallow depositional environment, a precontact land-use pattern that precludes distinctive archaeological signatures, and the moderately-steep to steep terrain make it unlikely that the project could encounter intact, significant archaeological deposits. Historic-period archaeological deposits would likely consist of sparse and unsystematic discard related to logging activities.

### **3. Fieldwork**

Field investigations were conducted by the authors; notes and photographs are on file at CRC.

Total Area Examined: The entire project area.

Areas not examined: None.

Date(s) of Survey: May 20 and June 2, 2015

Weather and Surface Visibility: Weather conditions were warm and dry. Surface visibility of mineral soils varied from poor to very good, with numerous exposures distributed across the project area.

### **4. Results**

The project area can be generally described as a steep (30% slope) hillslope along Canterwood Boulevard NW on the east to moderate (15% slope) hillslope along SR 16 to the west (Figure 5). Small gullies and uneven hillocks were irregularly distributed across the area. A stream, flowing approximately east-west, is situated near the center of the project area (Figure 6).

Fieldwork consisted of a systematic pedestrian survey and examination of surface and subsurface conditions throughout the project footprint. Pedestrian survey was conducted in meandering north-south transects at approximately 20 meter spacing over the project area. Archaeologists paid close attention to the margins alongside the stream and wetlands. The ground surface was examined for aboveground evidence of archaeological deposits. Ground visibility and in cases subsurface visibility was good throughout the project area. A small number of pieces of modern debris (e.g., beer bottles and plastic trash) was observed randomly scattered. At the time of survey, designated wetlands could be characterized as small mucky areas distributed across the APE, rather than as large distinctive water features such as an open marsh or pond.

Evidence of modern disturbances was observed at places across the project area. Two old-growth conifer saw-cut stumps were observed in the southwestern quarter of the APE; no historic debris was associated with these. While no established roadway through the project area is indicated on historic or modern maps (e.g., Metsker 1960), through the center of the project area is an abandoned access road trending north-south (Figure 7). Its location is consistent with the modern disturbance observed in the Google Earth Imagery previously described. This remnant road corridor appeared cut by bulldozer for access into the project area, possibly for logging; to install the two culverts; or, for staging activities associated with the improvement of Canterwood Boulevard after 1990. A section of steel culvert several yards long was observed lying on top of a mound of disturbed ground at the base of a nearby slope.

Along the east and west borders of the roadcut was a palimpsest of vegetated and unvegetated push piles and construction material remnants. Saplings, trees, and other understory vegetation within the roadway appeared less than 20 - 30 years old. Vegetation that thrives in disturbed sediments such as Himalayan blackberry and Scotch broom characterized much of this area, as well as other sections of the project. All encountered mineral soil exposures and road cuts during survey were examined for evidence of archaeological deposits (Figures 8 and 9). No evidence of peeled cedar trees or surface or subsurface artifacts, charcoal concentrations, or other potential indications of archaeological sites was found.

Shovel probes were dug at opportunistic locations in the western portion of the project area, mapped as high probability for cultural resources by DAHP (Figure 10). Excavated sediment was screened in 0.25-inch mesh and the holes backfilled. Probe locations were determined by criteria that included relatively level and undisturbed terrain; mostly dry soil conditions; ability to penetrate dense root mat with hand tools; and, safety of traverse. Level ground just south of and north of the stream supported these criteria. Sediment were as expected based on geological and soils data. Probe conditions can be generalized as a shallow (ca. 40 centimeters or less) stratum of sandy loam developed soil overlying coarser-grained sandy loam. No cultural material or indication of pre-modern anthropogenic sediments was observed in the probes (Table 1).

Cultural Resources Identified:           None.

Conclusions, Findings and Recommendations:       Pedestrian survey and examination of mineral soil exposures did not identify any evidence of prehistoric or historic sites within the project area. Archaeological survey and DAHP's predictive model indicated a low-to-moderate

potential for archaeological sites in the eastern and central parts of the project APE, due to factors such as the absence of nearby archaeological sites and ethnographic named places, distance from large freshwater sources and Puget Sound, and the presence of steeply sloped topography. This, in addition to the depositional environment and modern land use conditions observed in pedestrian survey, suggests a low potential for cultural deposits. Survey and shovel probes in the westernmost portion of the APE did not suggest a high potential exists for buried cultural resources.

An archaeological inadvertent discovery protocol is attached (Attachment B). In the event that ground disturbing or other activities do result in the inadvertent discovery of archaeological deposits, work should be halted in the immediate area and contact made with the State Department of Archaeology and Historic Preservation (DAHP) in Olympia. Work should be halted until such time as further investigation and appropriate consultation is concluded. In the unlikely event of the inadvertent discovery of human remains, work should be immediately halted in the area, the discovery covered and secured against further disturbance, and contact effected with law enforcement personnel.

|                                          |                                     |  |
|------------------------------------------|-------------------------------------|--|
| No historic properties affected          | <input checked="" type="checkbox"/> |  |
| Historic properties affected             | <input type="checkbox"/>            |  |
| No adverse effect to historic properties | <input type="checkbox"/>            |  |
| Adverse effect to historic properties    | <input type="checkbox"/>            |  |

Attachments:

|             |                                     |                                      |
|-------------|-------------------------------------|--------------------------------------|
| Figures     | <input checked="" type="checkbox"/> |                                      |
| Photographs | <input checked="" type="checkbox"/> |                                      |
| Other       | <input checked="" type="checkbox"/> | Project related correspondence;      |
|             | <input checked="" type="checkbox"/> | Proposed inadvertent discovery plan. |

## 5. Limitations of this Assessment

No cultural resources study can wholly eliminate uncertainty regarding the potential for prehistoric sites, historic properties or traditional cultural properties to be associated with a project. The information presented in this report is based on professional opinions derived from our analysis and interpretation of available documents, records, literature, and information identified in this report, and on our field investigation and observations as described herein. Conclusions and recommendations presented apply to project conditions existing at the time of our study and those reasonably foreseeable. The data, conclusions, and interpretations in this report should not be construed as a warranty of subsurface conditions described in this report. They cannot necessarily apply to site changes of which CRC is not aware and has not had the opportunity to evaluate.

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## 7. Figures

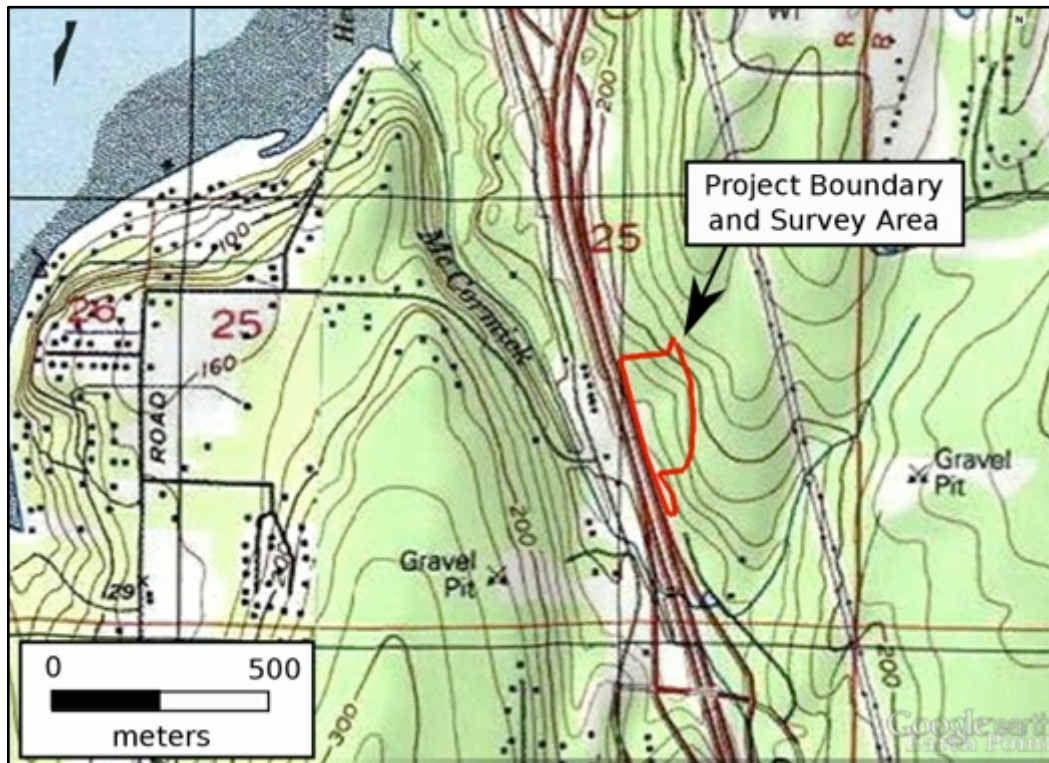


Figure 1. USGS Gig Harbor, WA 7.5-minute quad marked with project boundary.



Figure 2. Air photo annotated with project location.

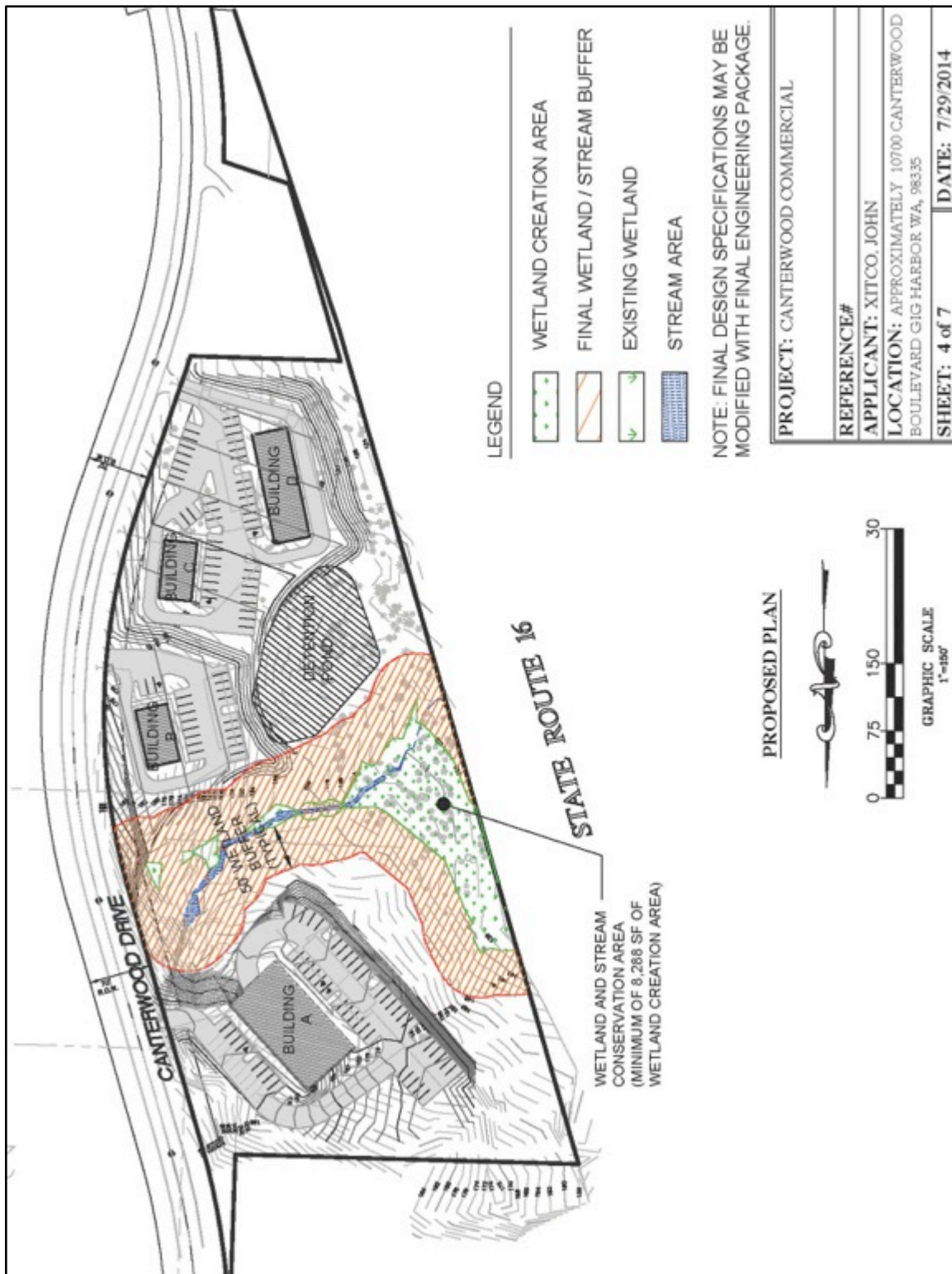


Figure 3. Plan of proposed development.



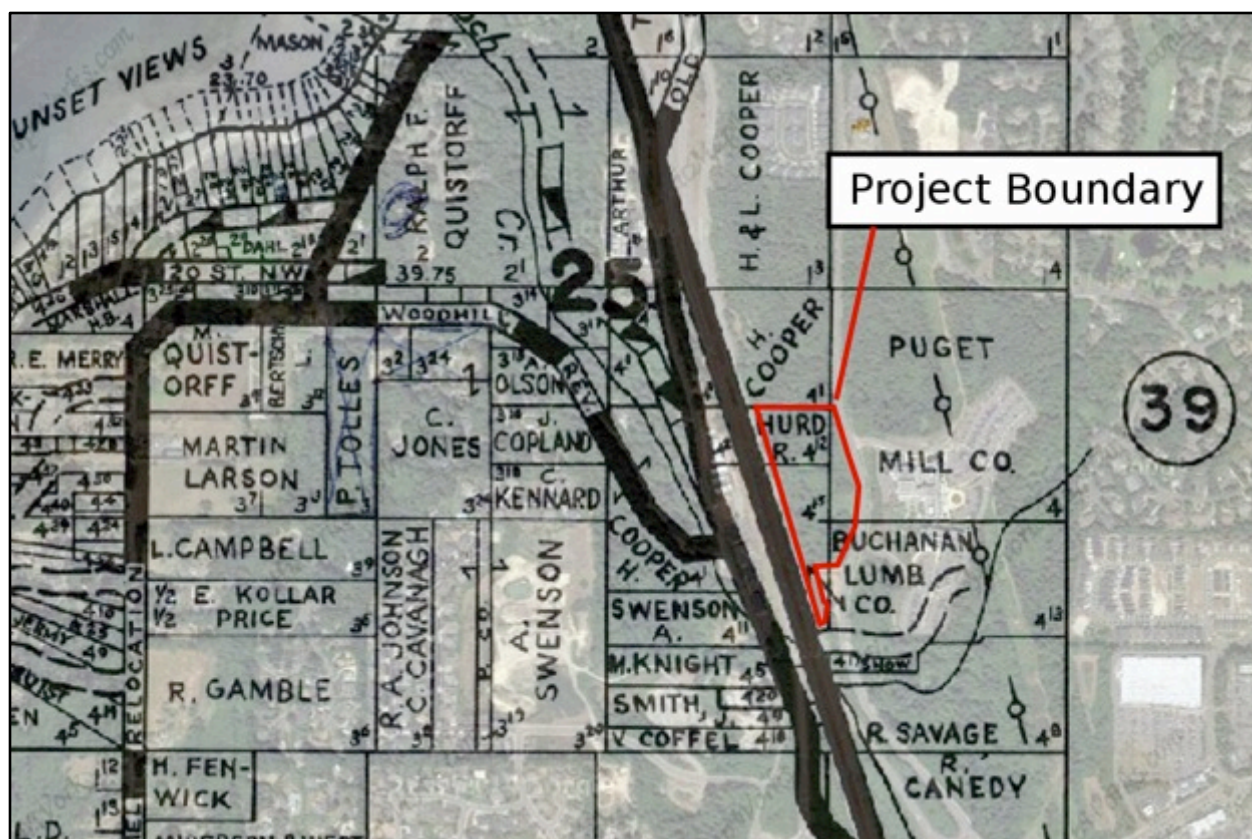


Figure 4. Modern (ca. 2014) air photo overlaid with 1960 Metsker's map.



Figure 5. Overview of the project location (beyond fenced area); view is to the north.



Figure 6. Overview of the stream in the eastern section of the project area.



Figure 7. Overview of the old access roadway and young growth.





Figure 8. Mineral soil exposures in the push pile of a road cut.



Figure 9. Mineral soil exposures from recently disturbed soils in the southern portion of the project.

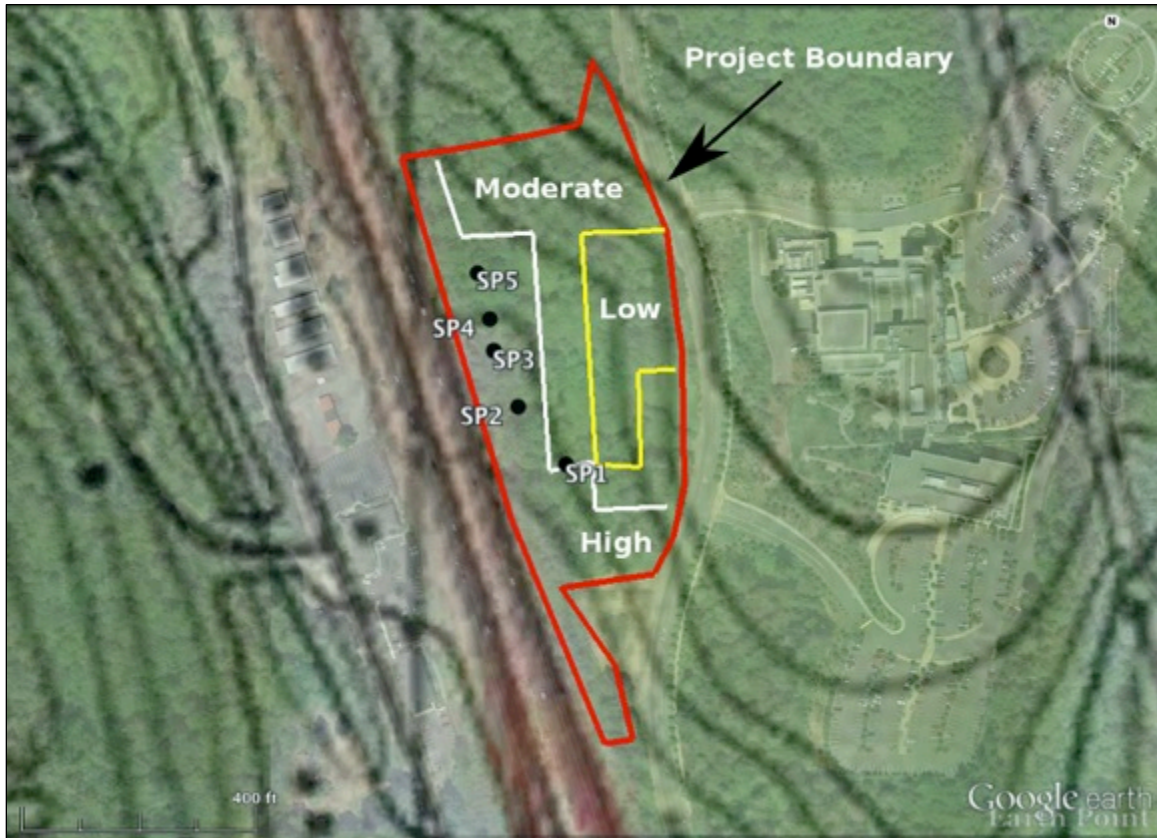


Figure 10. Air photo overlaid with USGS topographic map, shovel probe locations, and simplified DAHP predictive model probability zone boundaries (high-moderate-low probability trending west-to east).

Table 1. Summary of subsurface testing results.

| Probe | Location (WGS84 Zone 10 UTM coordinates, +/- 5 meters) | Stratigraphic Description (depths are centimeters below surface [cmbs])                                                                                                            | Cultural Materials Found |
|-------|--------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
| 1     | 528996 E, 5245652 N                                    | 0-4: duff. 4-40: brown fine sandy loam. 40-50: dark yellowish brown coarser sand and gravelly sandy loam.                                                                          | None.                    |
| 2     | 528968 E, 5245687 N                                    | 0-5: duff. 5-20: brown fine sandy loam, gravels and cobbles. 20-30: dark yellowish brown coarser sand and gravelly sandy loam; cobbles. Probe stopped at 30 cmbs by large cobbles. | None.                    |
| 3     | 528954 E, 5245721 N                                    | 0-7: duff. 7-26: brown fine sandy loam. 26-30: cobbles; dark yellowish brown coarser sand and gravelly sandy loam.                                                                 | None.                    |
| 4     | 528952 E, 5245740 N                                    | 0-10: dark gray sandy loam. Probe unable to penetrate densely interbraided tree roots.                                                                                             | None.                    |
| 5     | 528945 E, 5245768 N                                    | 0-4: duff. 4-48: wet black silt and sandy loam. 48-55: wet black silt and sandy loam; water table.                                                                                 | None.                    |

**Attachment A. Project related correspondence with cultural resources staff of the Puyallup Tribe.**



May 15, 2015

Puyallup Tribe of Indians  
Brandon Reynon  
3009 East Portland Ave  
Tacoma, WA 98404

Re: Cultural Resources Assessment for the Canterwood Commerical Project, Gig Harbor, WA

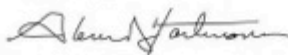
Dear Brandon:

I am writing to inform you of a cultural resources assessment for the above referenced project and to seek additional information about the project area the Tribe may have that is not readily available through other written sources. The project is located in Section 25, Township 22 North, Range 01 East Willamette Meridian in Gig Harbor, Washington. Soundview Consultants, on behalf of Swede Hill, LLC, is requesting this assessment prior to development for the Canterwood Commercial project; Pierce County Tax Parcel 0122254090. The Canterwood Commercial project would provide four additional mixed use buildings supporting St Anthony's Hospital. The four buildings with associated parking and infrastructure would be on the eastern portion of the site to avoid most of the wetlands. One building will be separated from the rest due to site conditions. The removal of two in-stream culverts within the on-site unnamed tributary to McCormick Creek is planned below ordinary high water; all of the actions for this commercial development will occur about ordinary high water. Property restoration will include the excavation of an old road where in the location of the current culverts. Replanting with native species with large woody debris is planned within the stream and wetland buffer areas. The project involves the development of an approximated 7.6 acres site along the east side of SR-16 which will require the filing of one wetland and conversion of another wetland to a stormwater detention feature. Mitigation for the loss of 5,525 square feet of wetland will be provided through on-site wetland creation and removal of in-stream culverts.

We are in the process of reviewing available information. Background research will include a site files search at the Washington State Department of Archaeology and Historic Preservation, review of previously recorded cultural resource reports, and review of pertinent published literature and ethnographies. Results of our investigations will be presented in a technical memo.

We are aware that not all information is contained within published sources. Should the Tribe have additional information to support our assessment, we would very much like to include it in our study. Please contact me should you wish to provide any comments. I appreciate your assistance in this matter and look forward to hearing from you.

Sincerely,



Glenn D. Hartmann  
President/Principal Investigator

PO BOX 10668, BAINBRIDGE ISLAND, WA 98110  
PHONE 206.855.9020 - info@crcwa.com



**Attachment B.**

**PLAN AND PROCEDURES FOR THE UNANTICIPATED DISCOVERY OF  
CULTURAL RESOURCES AND HUMAN SKELETAL REMAINS**

**CANTERWOOD COMMERCIAL PROJECT  
PIERCE COUNTY, WASHINGTON**

**1. INTRODUCTION**

Swede Hill, LLC intends to develop the Canterwood Commercial project. The project will involve the development of a 7.6-acre parcel along the east side of SR-16. The project includes construction of four buildings, with associated parking and infrastructure, which will support St. Anthony's Hospital. The following Inadvertent Discovery Plan (IDP) outlines procedures to follow, in accordance with state and federal laws, if archaeological materials or human remains are discovered.

**2. RECOGNIZING CULTURAL RESOURCES**

A cultural resource discovery could be prehistoric or historic. Examples include:

- An accumulation of shell, burned rocks, or other food related materials,
- Bones or small pieces of bone,
- An area of charcoal or very dark stained soil with artifacts,
- Stone tools or waste flakes (i.e. an arrowhead, or stone chips),
- Clusters of tin cans or bottles, logging or agricultural equipment that appear to be older than 50 years,
- Buried railroad tracks, decking, or other industrial materials.

When in doubt, assume the material is a cultural resource.

**3. ON-SITE RESPONSIBILITIES**

STEP 1: STOP WORK. If any Swede Hill contractor or subcontractor believes that he or she has uncovered a cultural resource at any point in the project, all work adjacent to the discovery must stop. The discovery location should be secured at all times.

STEP 2: NOTIFY MONITOR. If there is an archaeological monitor for the project, notify that person. If there is a monitoring plan in place, the monitor will follow its provisions.

STEP 3: NOTIFY SWEDE HILL PROJECT MANAGEMENT  
Contact the Swede Hill Project Manager.

Swede Hill's Project Manager:

Cultural Resources Manager:

Name: Glenn Hartmann, Principal

Phone: (206) 855-9020

Email: glenn@crcwa.com

The Project Manager will make all other calls and notifications.

**If human remains are encountered**, treat them with dignity and respect at all times. Cover the remains with a tarp or other materials (not soil or rocks) for temporary protection in place and to shield them from being photographed. **Do not call 911 or speak with the media.**

#### **4. FURTHER CONTACTS AND CONSULTATION**

##### **A. Project Manager's Responsibilities:**

- **Protect Find:** The Project Manager is responsible for taking appropriate steps to protect the discovery site. All work will stop in an area adequate to provide for the total security, protection, and integrity of the resource. Vehicles, equipment, and unauthorized personnel will not be permitted to traverse the discovery site. Work in the immediate area will not resume until treatment of the discovery has been completed following provisions for treating archaeological/cultural material as set forth in this document.
- **Direct Construction Elsewhere On-site:** The Project Manager may direct construction away from cultural resources to work in other areas prior to contacting the concerned parties.
- **Contact Cultural Resources Manager:** If the Cultural Resources Manager has not yet been contacted, the Project Manager will do so.

##### **B. Swede Hill's Project Manager's Responsibilities:**

- **Identify Find:** The Swede Hill's Project Manager will ensure that a qualified professional archaeologist examines the find to determine if it is archaeological.
  - If it is determined not archaeological, work may proceed with no further delay.
  - If it is determined to be archaeological, the Cultural Resources Manager or CR Specialist will continue with notification.
  - If the find may be human remains or funerary objects, the Cultural Resources Manager or CR Specialist will ensure that the State Physical Anthropologist examines the find. If it is determined to be human remains, the procedure described in Section 5 will be followed.



- **Notify DAHP:** The Swede Hill's Project Manager will contact the involved federal agencies (if any) and the Department of Archaeology and Historic Preservation (DAHP).
- **Notify Tribes:** If the discovery may relate to Native American interests, the Manager or Specialist will also contact the project's Tribal Liaison, or, if the project is not assigned a Liaison, the Tribal Cultural Resources Office.

## General Contacts

### Federal Agencies:

Seattle District, U.S. Army Corps of  
Engineers (USACE)  
Col. John G. Buck  
Commander  
(206) 764-3742

Seattle District, U.S. Army Corps of  
Engineers  
Historic Preservation  
(206) 764-3538

### Department of Archaeology and Historic Preservation:

Allyson Brooks  
State Historic Preservation Officer  
(360) 586-3066

Robert Whitlam  
State Archaeologist  
(360) 586-3080

Guy Tasa  
State Physical Anthropologist  
(360) 586-3534

### Tribal Liaisons:

Puyallup Tribe  
Bill Sterud  
Chair  
(253) 573-7800

Brandon Reynon  
Cultural Resources  
(253) 573-7986  
brandon.reynon@puyalluptribe.com

## C. Further Activities

- Archaeological discoveries will be documented as described in Section 6.
- Construction in the discovery area may resume as described in Section 7.

## 5. SPECIAL PROCEDURES FOR THE DISCOVERY OF HUMAN SKELETAL MATERIAL

Any human skeletal remains, regardless of antiquity or ethnic origin, will at all times be treated with dignity and respect.

Swede Hill will comply with applicable state and federal laws, and the following procedure:

A. Notify Law Enforcement Agency or Coroner's Office:

In addition to the actions described in Sections 3 and 4, the Swede Hill Project Manager will immediately notify the local law enforcement agency or coroner's office.

The coroner (with assistance of law enforcement personnel) will determine if the remains are human, whether the discovery site constitutes a crime scene, and will notify DAHP.

Gig Harbor Police Department  
Kelly Busey, Police Chief  
Non-Emergency Number: (253) 851-2236

Pierce County Medical Examiner  
Thomas Clark, MD, Chief Medical Examiner  
Number: (253) 798-6494

B. Participate in Consultation:

Per RCW 27.44.055, RCW 68.50, and RCW 68.60, DAHP will have jurisdiction over non-forensic human remains.

C. Further Activities:

- Documentation of human skeletal remains and funerary objects will be agreed upon through the consultation process described in RCW 27.44.055, RCW 68.50, and RCW 68.60.
- When consultation and documentation activities are complete, construction in the discovery area may resume as described in Section 7.

## **6. DOCUMENTATION OF ARCHAEOLOGICAL MATERIALS**

Archaeological deposits discovered during construction will be assumed eligible for inclusion in the National Register of Historic Places under Criterion D until a formal Determination of Eligibility is made.

Swede Hill staff will ensure the proper documentation and assessment of any discovered cultural resources in cooperation with the USACE, DAHP, affected tribes, and a contracted consultant (if any).

All prehistoric and historic cultural material discovered during project construction will be recorded by a professional archaeologist on cultural resource site or isolate form using standard techniques. Site overviews, features, and artifacts will be photographed; stratigraphic profiles and soil/sediment descriptions will be prepared for subsurface

exposures. Discovery locations will be documented on scaled site plans and site location maps.

Cultural features, horizons and artifacts detected in buried sediments may require further evaluation using hand-dug test units. Units may be dug in controlled fashion to expose features, collect samples from undisturbed contexts, or interpret complex stratigraphy. A test excavation unit or small trench might also be used to determine if an intact occupation surface is present. Test units will be used only when necessary to gather information on the nature, extent, and integrity of subsurface cultural deposits to evaluate the site's significance. Excavations will be conducted using state-of-the-art techniques for controlling provenience.

Spatial information, depth of excavation levels, natural and cultural stratigraphy, presence or absence of cultural material, and depth to sterile soil, regolith, or bedrock will be recorded for each probe on a standard form. Test excavation units will be recorded on unit-level forms, which include plan maps for each excavated level, and material type, number, and vertical provenience (depth below surface and stratum association where applicable) for all artifacts recovered from the level. A stratigraphic profile will be drawn for at least one wall of each test excavation unit.

Sediments excavated for purposes of cultural resources investigation will be screened through 1/8-inch mesh, unless soil conditions warrant 1/4-inch mesh.

All prehistoric and historic artifacts collected from the surface and from probes and excavation units will be analyzed, catalogued, and temporarily curated. Ultimate disposition of cultural materials will be determined in consultation with the federal agencies (if any), DAHP, and the affected tribes.

Within 90 days of concluding fieldwork, a technical report describing any and all monitoring and resultant archaeological excavations will be provided to the Swede Hill Project Manager, who will forward the report to the USACE, DAHP, and the affected tribe(s).

If assessment activity exposes human remains (burials, isolated teeth, or bones), the process described in Section 5 above will be followed.

## **7. PROCEEDING WITH CONSTRUCTION**

Project construction outside the discovery location may continue while documentation and assessment of the cultural resources proceed. A professional archaeologist must determine the boundaries of the discovery location. In consultation with USACE, DAHP, and affected tribes, the Swede Hill Project Manager will determine the appropriate level of documentation and treatment of the resource.

Construction may continue at the discovery location only after the process outlined in this plan is followed and Swede Hill, USACE, DAHP, affected tribes determine that compliance with state and federal laws is complete.

## **8. RECIPIENT RESPONSIBILITY**

Swede Hill, LLC is responsible for developing an IDP. The IDP must be immediately available by request by any party. An IDP must be immediately available and be implemented to address any discovery.



DEPARTMENT OF THE ARMY  
CORPS OF ENGINEERS, SEATTLE DISTRICT  
P.O. BOX 3755  
SEATTLE, WASHINGTON 98124-3755

NOV 05 2018

Regulatory Branch

**Mitigated Determination of  
Nonsignificance (MDNS)**  
PL-SEPA-07-0060  
Reference No. 7

Swede Hill, LLC  
Mr. John Xitco  
Post Office Box 1693  
Tacoma, Washington 98401

Reference: NWS-2014-954  
Swede Hill, LLC

Dear Mr. Xitco:

We have reviewed your application to place fill in 0.11 of an acre of wetlands to construct a commercial facility and associated infrastructure at/near Gig Harbor, Washington. Based on the information you provided to us, Nationwide Permit (NWP) 39, *Commercial and Institutional Development* (Federal Register January 6, 2017, Vol. 82, No. 4), authorizes your proposal as depicted on the enclosed drawings dated May 22, 2018: provided you implement the mitigation plan dated November 2015, revised January 2018.

In order for this authorization to be valid, you must ensure the work is performed in accordance with the enclosed *NWP 3, Terms and Conditions* and the following special conditions:

- a. You must implement and abide by the Endangered Species Act (ESA) requirements and/or agreements set forth in the Biological Evaluation, dated June 2014, in its entirety. The U.S. Army Corps of Engineers (Corps) made a determination of No Effect for all species [and critical habitat] based on this document. Failure to comply with the commitments made in this document constitutes non-compliance with the ESA and your Corps permit.
- b. You shall implement and abide by the mitigation plan, Wetland Delineation and Habitat Assessment Report and Mitigation Plan dated November 2015 revised January 2018. Mitigation shall be constructed before or concurrent with the work authorized by the permit.
- c. A status report on the implementation of the authorized work and on the construction of the mitigation shall be submitted annually to the U.S. Army Corps of Engineers, Seattle District, Regulatory Branch (Corps) by October 31st each year until mitigation construction is complete



as determined by the Corps. This report must prominently display the reference number NWS-2014-954.

d. An as-built mitigation construction report and as-built drawings of the mitigation area(s) shall be submitted upon completion of mitigation construction, in lieu of the status report described in Special Condition "c." This report must be submitted to the U.S. Army Corps of Engineers, Seattle District, Regulatory Branch (Corps) for review and approval and must prominently display the reference number NWS-2014-954. The year mitigation construction is completed, as determined by the Corps, represents Year 0 for mitigation monitoring.

e. Mitigation monitoring reports shall be submitted annually for 5 years to the U.S. Army Corps of Engineers, Seattle District, Regulatory Branch (Corps) by December 31st of each monitoring year. Year 1 monitoring will occur at least one year after completion of the mitigation site as determined by the Corps. All reports must prominently display the reference number NWS-2014-954.

f. A delineation using the currently approved federal wetland delineation manual and appropriate regional supplement must be included with the final monitoring report and shall include all mitigation areas.

g. To ensure the long-term protection of the mitigation site, you shall record on the mitigation site property deed a copy of this Department of the Army permit and a description of the mitigation area identified in the final mitigation plan. These documents shall be recorded with the Registrar of Deeds or other appropriate official charged with maintaining records on real property. Proof of this recorded documentation must be submitted to the U.S. Army Corps of Engineers, Seattle District, Regulatory Branch within 60 days from the date of permit issuance.

h. Your responsibility to complete the required compensatory mitigation as set forth in Special Conditions "b" through "g" will not be considered fulfilled until you have demonstrated mitigation success and have received written verification from the U.S. Army Corps of Engineers, Seattle District, Regulatory Branch.

We have reviewed your project pursuant to the requirements of the Endangered Species Act, the Magnuson-Stevens Fishery Conservation and Management Act and the National Historic Preservation Act. We have determined this project complies with the requirements of these laws provided you comply with all of the permit general and special conditions.

We are unable to determine whether or not your project requires individual Water Quality Certification (WQC) and/or a Coastal Zone Management (CZM) consistency determination response from the Washington State Department of Ecology (Ecology). Before you may proceed with the work authorized by this NWP, you must contact Ecology regarding these requirements at: Washington Department of Ecology, Federal Permit Coordinator, P.O. Box 47600, Olympia, Washington 98504-7660; telephone: (360) 407-6076; or email: [ecyrefedpermits@ecy.wa.gov](mailto:ecyrefedpermits@ecy.wa.gov).

If more than 180 days pass from when you provide Ecology a copy of this letter and request your individual WQC and CZM consistency determination concurrence review and you have not heard from Ecology, your requirement to obtain an individual WQC and CZM consistency determination response becomes waived. You may then proceed to construction.

We have prepared and enclosed a *Preliminary Jurisdictional Determination* (JD) dated December 2, 2015, which is a written indication that wetlands and waterways within your project area may be waters of the U.S. Such waters will be treated as jurisdictional waters of the U.S. for purposes of computation of impact area and compensatory mitigation requirements associated with your permit application. If you believe the Preliminary JD is inaccurate, you may request an Approved JD, which is an official determination regarding the presence or absence of waters of the U.S. If one is requested, please be aware that we may require the submittal of additional information to complete an approved JD and work authorized in this letter may not occur until the approved JD has been finalized.

Our verification of this NWP authorization is valid until March 18, 2022, unless the NWP is modified, reissued, or revoked prior to that date. If the authorized work has not been completed by that date and you have commenced or are under contract to commence this activity before March 18, 2022, you will have until March 18, 2023, to complete the activity under the enclosed terms and conditions of this NWP. Failure to comply with all terms and conditions of this NWP verification invalidates this authorization and could result in a violation of Section 404 of the Clean Water Act and/or Section 10 of the Rivers and Harbors Act. You must also obtain all local, State, and other Federal permits that apply to this project.

You are cautioned that any change in project location or plans will require that you submit a copy of the revised plans to this office and obtain our approval before you begin work. Deviating from the approved plans could result in the assessment of criminal or civil penalties.

Upon completing the authorized work, you must fill out and return the enclosed *Certificate of Compliance with Department of the Army Permit*. Thank you for your cooperation during the permitting process. We are interested in your experience with our Regulatory Program and encourage you to complete a customer service survey. These documents and information about

our program are available on our website at [www.nws.usace.army.mil](http://www.nws.usace.army.mil), select "Regulatory Branch, Permit Information" and then "Contact Us."

A copy of this letter with enclosures will be furnished to Soundview Consulting at 2907 Harborview Drive, Gig Harbor, Washington 98335. If you have any questions, please contact me at [kristin.l.mcdermott@usace.army.mil](mailto:kristin.l.mcdermott@usace.army.mil) or (206) 316-3975.

Sincerely,

A handwritten signature in blue ink that reads "Kristin McDermott". The signature is fluid and cursive, with a long horizontal stroke at the end.

Kristin McDermott, Project Manager  
Regulatory Branch

Enclosures



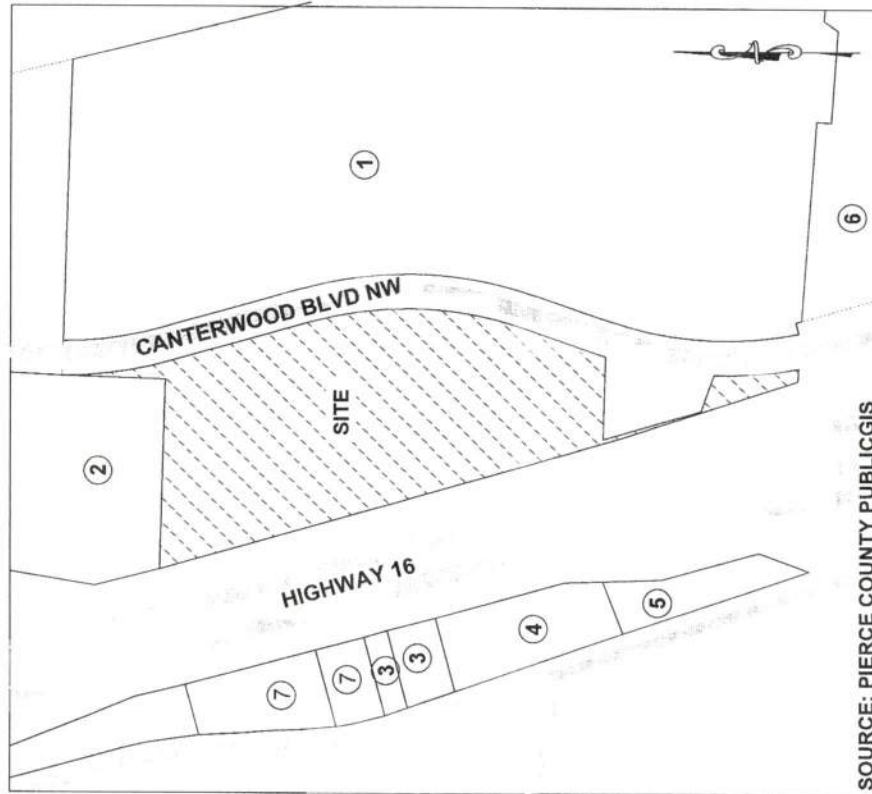
**LOCATION:**

THE SE ¼ OF SECTION 25, TOWNSHIP 22 N, RANGE 01 E, W.M.  
PIERCE COUNTY PARCEL NUMBER: 0122254090  
LAT 47° 21' 53.05" N LONG -122° 36' 58.27" W

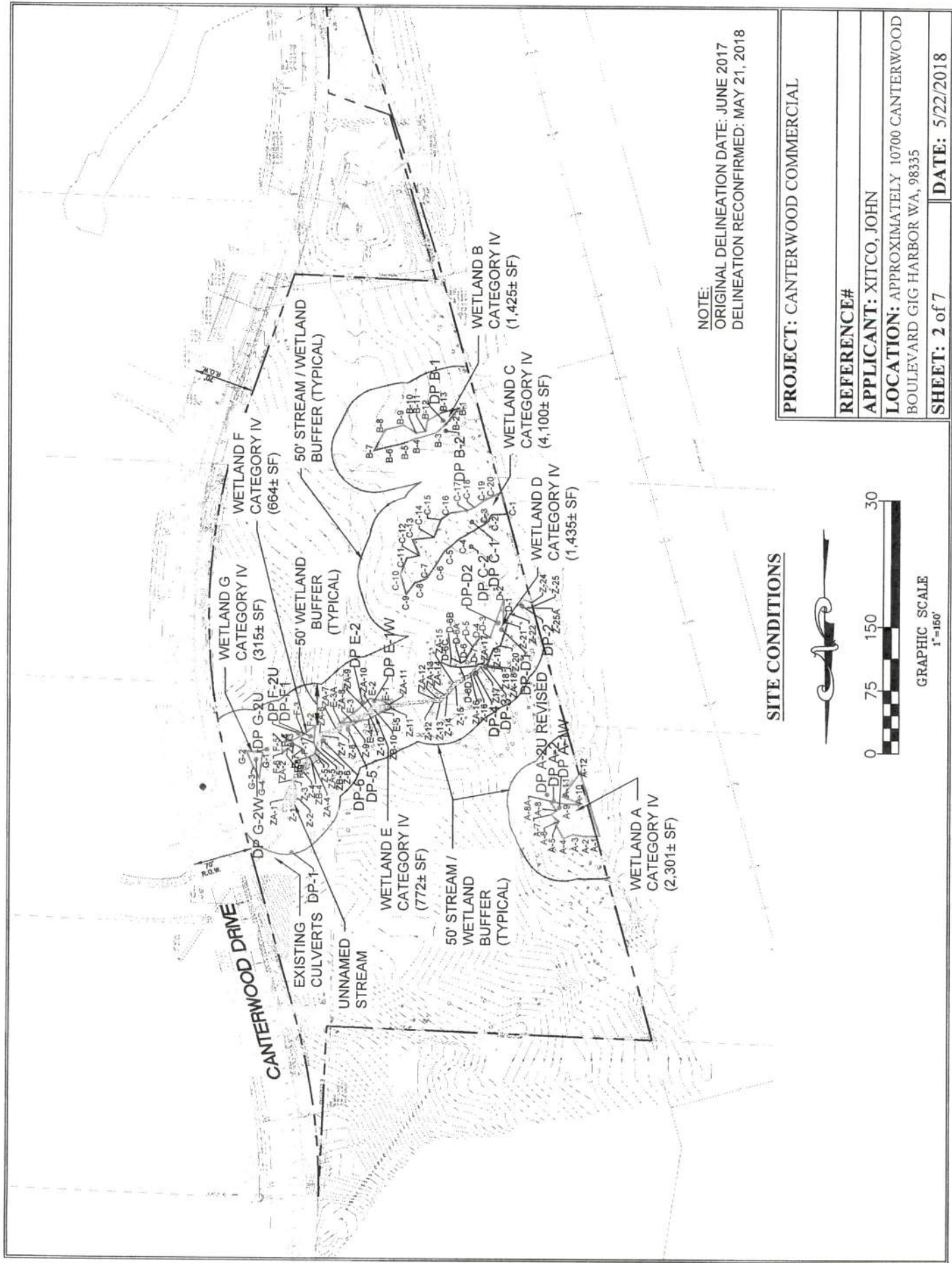
**VICINITY MAP**



**ADJACENT OWNERSHIP**



|                                                                                                                                                                                                                                                             |  |                                                                                                                                                                                                                              |                        |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|
| <b>ADJACENT OWNERS:</b><br>1. FRANCISCAN HEALTH SYSTEMS WEST<br>2. J SCOTT CONSTRUCTION COMPANY INC.<br>3. PURDY INVESTMENTS LLC<br>4. D&M MORRIS FAMILY LLC<br>5. BURNHAM PARTNERS LLC<br>6. GIG HARBOR NORTH ANNEX LLC<br>7. WORLUND THOMAS J & ALLISON R |  | <b>PROJECT:</b> CANTERWOOD COMMERCIAL<br><b>PURPOSE:</b> PROVIDE FOUR ADDITIONAL MIXED USE BUILDINGS TO SUPPORT ST ANTHONY'S HOSPITAL.<br><b>SITE ADDRESS:</b> APPROXIMATELY 10700 CANTERWOOD BOULEVARD GIG HARBOR WA, 98335 |                        |
| <b>REFERENCE #:</b>                                                                                                                                                                                                                                         |  | <b>NEAR:</b> GIG HARBOR                                                                                                                                                                                                      |                        |
| <b>IN:</b>                                                                                                                                                                                                                                                  |  | <b>COUNTY:</b> PIERCE COUNTY                                                                                                                                                                                                 |                        |
|                                                                                                                                                                                                                                                             |  | <b>APPLICANT:</b> XITCO, JOHN                                                                                                                                                                                                |                        |
|                                                                                                                                                                                                                                                             |  | <b>SHEET:</b> 1 of 7                                                                                                                                                                                                         | <b>DATE:</b> 5/22/2018 |



NOTE:  
ORIGINAL DELINEATION DATE: JUNE 2017  
DELINEATION RECONFIRMED: MAY 21, 2018

# **SITE CONDITIONS**

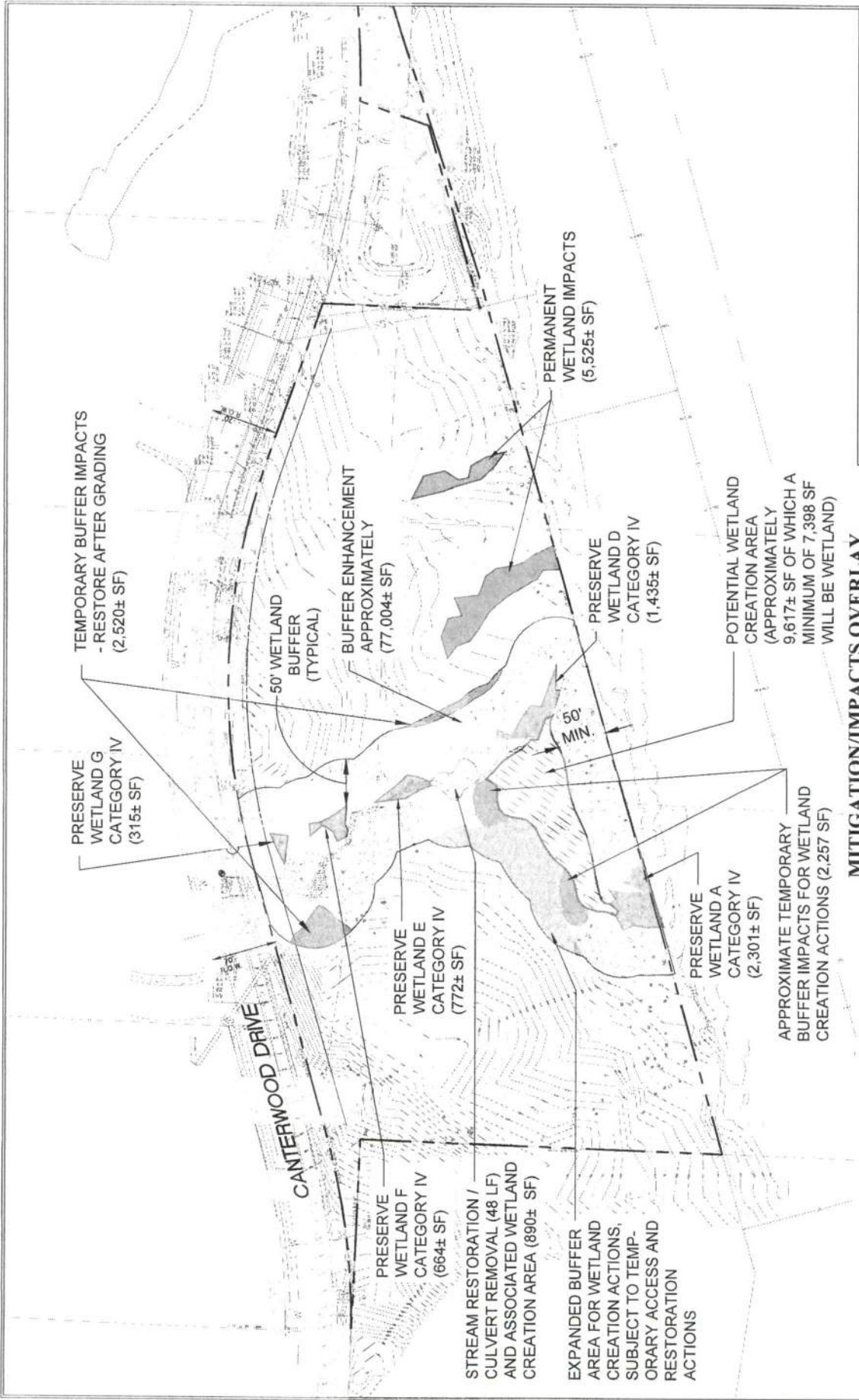


GRAPHIC SCALE  
1"=150'

|                                                                                |
|--------------------------------------------------------------------------------|
| <b>PROJECT:</b> CANTERWOOD COMMERCIAL                                          |
| <b>REFERENCE#</b>                                                              |
| <b>APPLICANT:</b> XITCO, JOHN                                                  |
| <b>LOCATION:</b> APPROXIMATELY 10700 CANTERWOOD BOULEVARD GIG HARBOR WA, 98335 |
| <b>SHEET:</b> 2 of 7 <b>DATE:</b> 5/22/2018                                    |

**DRAFT FOR REVIEW**





**PROJECT:** CANTERWOOD COMMERCIAL

**REFERENCE#**

**APPLICANT:** XITCO, JOHN

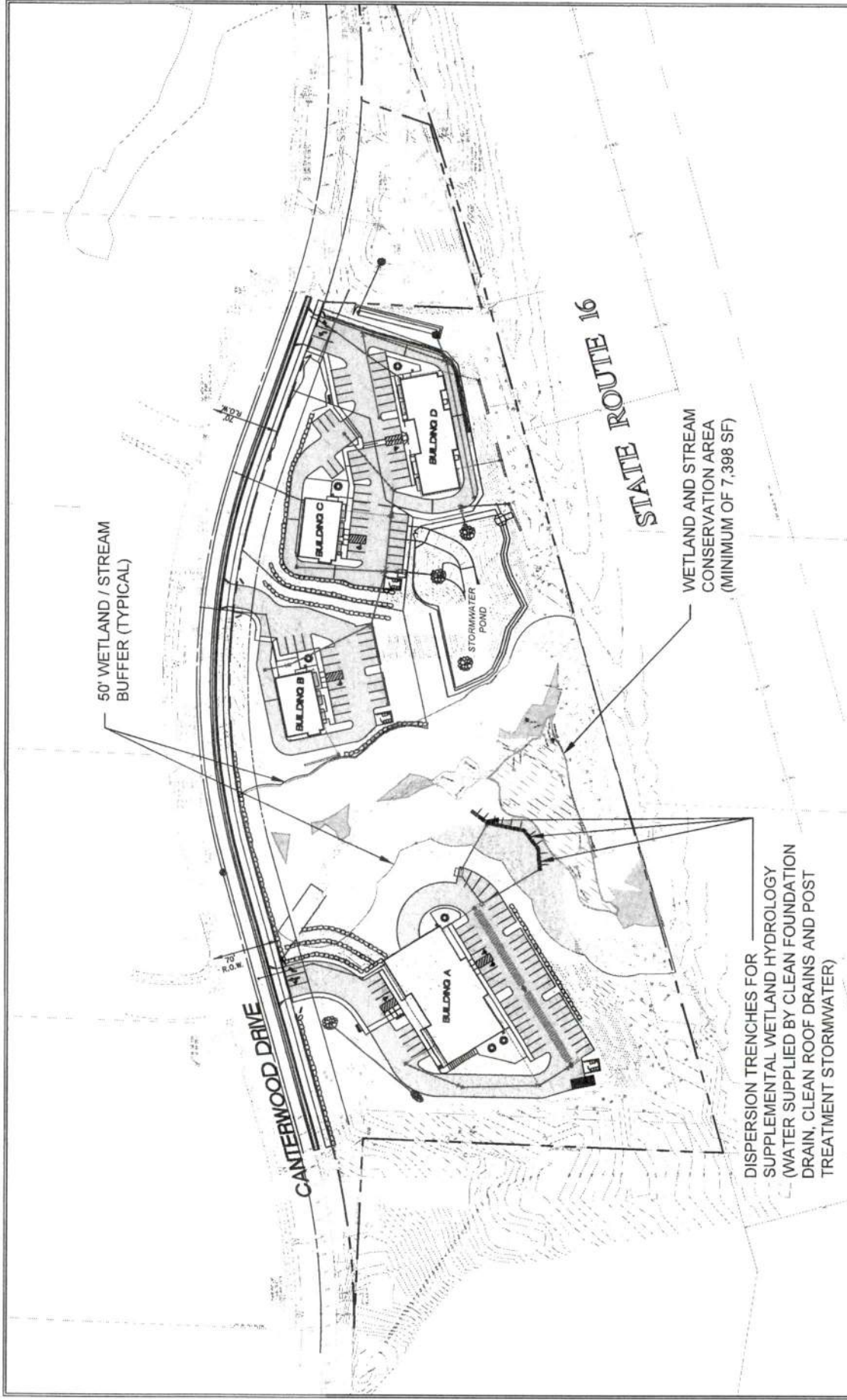
**LOCATION:** APPROXIMATELY 10700 CANTERWOOD BOULEVARD GIG HARBOR WA, 98335

**SHEET:** 3 of 7 **DATE:** 5/22/2018

**MITIGATION/IMPACTS OVERLAY**



GRAPHIC SCALE  
1"=150'



**PROPOSED PLAN**



GRAPHIC SCALE  
1"=150'

|                                                                         |                 |
|-------------------------------------------------------------------------|-----------------|
| PROJECT: CANTERWOOD COMMERCIAL                                          |                 |
| REFERENCE#                                                              |                 |
| APPLICANT: XITCO, JOHN                                                  |                 |
| LOCATION: APPROXIMATELY 10700 CANTERWOOD BOULEVARD GIG HARBOR WA, 98335 |                 |
| SHEET: 4 of 7                                                           | DATE: 5/22/2018 |





# NATIVE PLANT KEY

| TREES      |                       | LOCATION         |
|------------|-----------------------|------------------|
|            | BIGLEAF MAPLE         | BUFFER           |
|            | BITTER CHERRY         | BUFFER           |
|            | DOUGLAS FIR           | BUFFER           |
|            | GRAND FIR             | BUFFER           |
|            | PACIFIC WILLOW        | WETLAND          |
|            | SITKA SPRUCE          | WETLAND / BUFFER |
|            | WESTERN RED CEDAR     | WETLAND / BUFFER |
| SHRUBS     |                       | LOCATION         |
|            | BEAKED HAZELNUT       | BUFFER           |
|            | COMMON SWORD-FERN     | BUFFER           |
|            | EVERGREEN HUCKLEBERRY | BUFFER           |
|            | HOOKE'S WILLOW        | WETLAND          |
|            | INDIAN PLUM           | BUFFER           |
|            | NOOTKA ROSE           | BUFFER           |
|            | PACIFIC CRABAPPLE     | WETLAND / BUFFER |
|            | PACIFIC NINEBARK      | WETLAND          |
|            | RED-FLOWERING CURRANT | BUFFER           |
|            | SALAL                 | BUFFER           |
|            | STINK CURRANT         | WETLAND          |
|            | SWAMP GOOSEBERRY      | WETLAND          |
|            | SWAMP ROSE            | WETLAND          |
|            | TWINBERRY             | WETLAND          |
|            | VINE MAPLE            | BUFFER           |
| HERBACEOUS |                       | LOCATION         |
|            | LADY FERN             | WETLAND          |
|            | SLOUGH SEDGE          | WETLAND          |
|            | SMALL-FRUITED BULRUSH | WETLAND          |

NOTE:  
FINAL DESIGN SPECIFICATIONS MAY BE  
MODIFIED WITH FINAL ENGINEERING PACKAGE.

## PLANTING PLAN

GRAPHIC SCALE  
1"=80'

### LEGEND

|  |                                     |  |                         |
|--|-------------------------------------|--|-------------------------|
|  | EXISTING TREES TO BE RETAINED       |  | WETLAND / STREAM BUFFER |
|  | PARTIALLY BURIED LARGE WOODY DEBRIS |  | EXISTING WETLAND        |
|  | STORMWATER DISPERSION TRENCH        |  | STREAM AREA             |
|  |                                     |  | WETLAND CREATION AREA   |

PROJECT: CANTERWOOD COMMERCIAL

REFERENCE#

APPLICANT: XITCO, JOHN

LOCATION: APPROXIMATELY 10700 CANTERWOOD  
BOULEVARD GIG HARBOR WA, 98335

SHEET: 5 of 7

DATE: 5/22/2018

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## WETLAND PLANT SPECIES

| COMMON NAME           | SPECIES NAME          | SIZE (GAL) | TYPICAL SPACING (FT OC) | QUANTITY |
|-----------------------|-----------------------|------------|-------------------------|----------|
| <b>TREES</b>          |                       |            |                         |          |
| PACIFIC WILLOW        | SALIX LASANDRA        | 1          | 5                       | 18       |
| SITKA SPRUCE          | PICEA SITCHENSIS      | 3          | 10                      | 12       |
| WESTERN RED CEDAR     | THUJA PLICATA         | 3          | 10                      | 13       |
| <b>SHRUBS</b>         |                       |            |                         |          |
| HOOKE'S WILLOW        | SALIX HOOKERIANA      | 1          | 5                       | 25       |
| PACIFIC CRABAPPLE     | MALUS FUSCA           | 1          | 5                       | 25       |
| PACIFIC NINEBARK      | PHYDOCARPUS CAPITATUS | 1          | 5                       | 23       |
| STINK CURRANT         | RIBES BRAGTEOSUM      | 1          | 5                       | 22       |
| SWAMP GOOSEBERRY      | RIBES LACUS TRE       | 1          | 5                       | 25       |
| SWAMP ROSE            | ROSA PISOCARPA        | 1          | 5                       | 25       |
| TYMBERRY              | LONICERA INVOLUCRATA  | 1          | 5                       | 26       |
| <b>HERBACEOUS</b>     |                       |            |                         |          |
| LADYFERN              | ATHYRIUM ANGUSTUM     | PLUGS      | 3                       | 210      |
| SLOUGH SEDGE          | CAREX OBNUPTA         | PLUGS      | 3                       | 210      |
| SMALL-FRUITED BULRUSH | SCIRPUS MICROCARPUS   | PLUGS      | 3                       | 210      |

## BUFFER PLANT SPECIES

| COMMON NAME           | SPECIES NAME                       | SIZE (GAL) | TYPICAL SPACING | QUANTITY |
|-----------------------|------------------------------------|------------|-----------------|----------|
| <b>TREES</b>          |                                    |            |                 |          |
| BIGLEAF MAPLE         | ACER MACROPHYLLUM                  | 3          | 10              | 9        |
| BITTER CHERRY         | PRUNUS EMARGINATA VAR. MOLIS       | 1          | 8               | 15       |
| DOUGLAS FR            | PSEUDOTSUGA MENZIESII              | 3          | 10              | 10       |
| GRAND FR              | ABIES GRANDIS                      | 3          | 10              | 12       |
| SITKA SPRUCE          | PICEA SITCHENSIS                   | 3          | 10              | 17       |
| WESTERN RED CEDAR     | THUJA PLICATA                      | 3          | 10              | 9        |
| <b>SHRUBS</b>         |                                    |            |                 |          |
| BEAKED HAZELNUT       | CORYLUS CORNUITA, VAR. CALIFORNICA | 1          | 5               | 15       |
| COMMON SWORD-FERN     | POLYSTICHUM MUNITUM                | 1          | 3               | 19       |
| EVERGREEN HUCKLEBERRY | VACCINIUM OVATUM                   | 1          | 5               | 20       |
| INDIAN PLUM           | OEMLERIA CERASIFORMIS              | 1          | 5               | 15       |
| NOOTKA ROSE           | ROSA NUTKANA                       | 1          | 5               | 16       |
| PACIFIC CRABAPPLE     | MALUS FUSCA                        | 1          | 5               | 14       |
| RED-FLOWERING CURRANT | RIBES SANGUINEUM                   | 1          | 5               | 15       |
| SALAL                 | GAULTHERIA SHALLOX                 | 1          | 3               | 18       |
| VINE MAPLE            | ACER CIRCINATUM                    | 1          | 8               | 16       |

## WETLAND SEED MIX (0.34 ACRES)

| SPECIES NAME           | COMMON NAME           | % (BY WEIGHT) | QUANTITY         |
|------------------------|-----------------------|---------------|------------------|
| CAREX OBNUPTA          | SLOUGH SEDGE          | 10 PERCENT    | 10 LBS           |
| GLYCERIA BOREALIS      | NORTHERN MANNA GRASS  | 30 PERCENT    | AT 30 LBS / ACRE |
| SCIRPUS MICROCARPUS    | SMALL-FRUITED BULRUSH | 10 PERCENT    | ACRE             |
| HORDEUM BRACHYANTHERUM | MEADOW BARLEY         | 50 PERCENT    | (APPROX.)        |

## BUFFER SEED MIX (0.39 ACRES)

| SPECIES NAME              | COMMON NAME       | % (BY WEIGHT) | QUANTITY   |
|---------------------------|-------------------|---------------|------------|
| AGROSTIS EXERATA          | SPIKE BENTGRASS   | 10 PERCENT    | 10 PERCENT |
| DESCHAMPSIA CESPITOSA     | TUFTED HAIRGRASS  | 10 PERCENT    | 10 PERCENT |
| DESCHAMPSIA DANTHONIOIDES | ANNUAL HAIRGRASS  | 10 PERCENT    | 10 PERCENT |
| DESCHAMPSIA ELONGATA      | SLENDER HAIRGRASS | 10 PERCENT    | 10 PERCENT |
| ELYMUS GLAUCUS            | BLUE WILDRYE      | 25 PERCENT    | 25 PERCENT |
| HORDEUM BRACHYANTHERUM    | MEADOW BARLEY     | 25 PERCENT    | 25 PERCENT |
| LUPINUS POLYPHYLLUS       | STREAMSIDE LUPINE | 10 PERCENT    | 10 PERCENT |

## PLANT LIST

PROJECT: CANTERWOOD COMMERCIAL

REFERENCE#

APPLICANT: XITCO, JOHN

LOCATION: APPROXIMATELY 10700 CANTERWOOD BOULEVARD GIG HARBOR WA, 98335

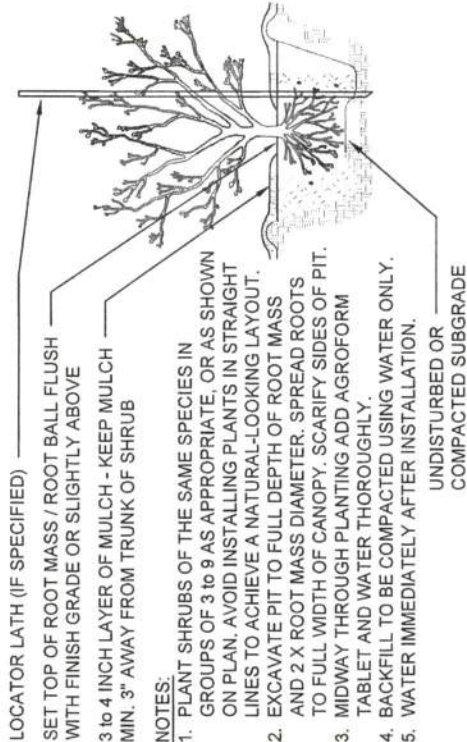
SHEET: 6 of 7 DATE: 5/22/2018

DRAFT FOR REVIEW



## TREE AND SHRUB PLANTING DETAIL (TYPICAL)

NOT TO SCALE



### NOTES:

1. PLANT SHRUBS OF THE SAME SPECIES IN GROUPS OF 3 TO 9 AS APPROPRIATE, OR AS SHOWN ON PLAN. AVOID INSTALLING PLANTS IN STRAIGHT LINES TO ACHIEVE A NATURAL-LOOKING LAYOUT.
2. EXCAVATE PIT TO FULL DEPTH OF ROOT MASS AND 2 X ROOT MASS DIAMETER. SPREAD ROOTS TO FULL WIDTH OF CANOPY. SCARIFY SIDES OF PIT.
3. MIDWAY THROUGH PLANTING ADD AGROFORM TABLET AND WATER THOROUGHLY.
4. BACKFILL TO BE COMPACTED USING WATER ONLY.
5. WATER IMMEDIATELY AFTER INSTALLATION.

UNDISTURBED OR  
COMPACTED SUBGRADE

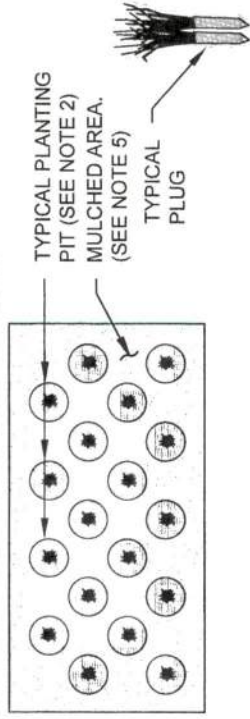
## PLUG PLANTING DETAIL (TYPICAL)

NOT TO SCALE

### NOTES:

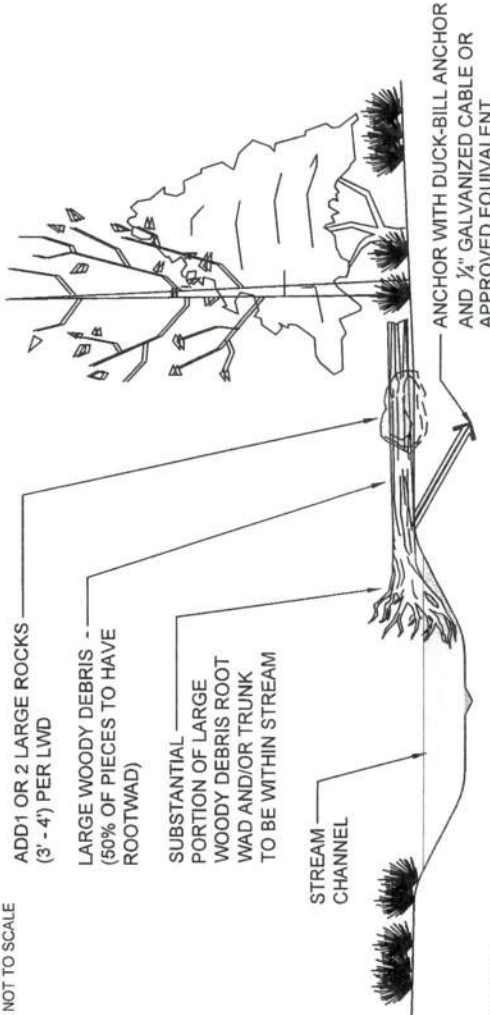
1. PLANT HERBACEOUS PLUGS STAGGERED 2'-0" O.C.
2. EXCAVATE PLANTING PIT TO 6" DIA. AND ADEQUATE DEPTH.
3. FORM A RING OF SOIL AROUND THE EDGE OF EACH PLANTING PIT.
4. WATER IMMEDIATELY AFTER INSTALLATION.
5. AFTER PLANTING IS COMPLETE PLACE 3 TO 4 INCHES OF MULCH IN BUFFER ESTABLISHMENT AREA.

### PLAN VIEW OF TYPICAL PLUG INSTALLATION



## LARGE WOODY DEBRIS DETAIL

NOT TO SCALE



### NOTES:

1. ALL IN-STREAM LARGE WOODY DEBRIS SHALL CONSIST OF CEDAR OR FIR WITH MINIMAL EVIDENCE OF DECAY. SIZES SHALL BE AS INDICATED IN THE PLANT SCHEDULE.
2. ROOTWADS SHALL HAVE A RELATIVELY EVEN SPREAD OF ROOTS WITH A MINIMUM ROOTBALL DIAMETER OF THREE (3) FEET. ROOTWADS SHALL BE CLEANED PRIOR TO PLACEMENT IN THE CHANNEL.

## SITE DETAILS

PROJECT: CANTERWOOD COMMERCIAL

REFERENCE#

APPLICANT: XITCO, JOHN

LOCATION: APPROXIMATELY 10700 CANTERWOOD BOULEVARD GIG HARBOR WA, 98335

SHEET: 7 of 7

DATE: 5/22/2018

DRAFT FOR REVIEW



# PRELIMINARY JURISDICTIONAL DETERMINATION FORM

## BACKGROUND INFORMATION

- A. REPORT COMPLETION DATE FOR PRELIMINARY JURISDICTIONAL DETERMINATION (JD): 12/2/15
- B. NAME AND ADDRESS OF PERSON REQUESTING PRELIMINARY JD:  
Swede Hill LLC
- C. DISTRICT OFFICE, FILE NAME, AND NUMBER: Seattle District, Swede Hill LLC; NWS-2014-954
- D. PROJECT LOCATION(S) AND BACKGROUND INFORMATION:  
State: WA County: Pierce City: Gig Harbor  
Center coordinates of site (lat/long in degree decimal format): Lat. 47.364737°N, Long. -122.61618°W  
Name of nearest waterbody: \_\_\_\_\_  
Name of any water bodies on the site, in the review area, that have been identified as Section 10 waters:  
Tidal: None  
Non-Tidal: None

Identify (estimate) amount of waters in the review area (if there are multiple sites, use the table instead):  
Non-wetland waters (total for site): linear feet 1265 and width (ft) \_\_\_\_\_ or \_\_\_\_\_ acres.  
Stream Flow: RPW Flow path: \_\_\_\_\_  
Wetlands: 0.25 acres (total for site).  
Cowardin Class(es): \_\_\_\_\_

| Site number            | Latitude | Longitude | Cowardin Class | Estimated amount of aquatic resource in review area | Class of aquatic resource |
|------------------------|----------|-----------|----------------|-----------------------------------------------------|---------------------------|
| See delineation report |          |           |                |                                                     |                           |
|                        |          |           |                |                                                     |                           |
|                        |          |           |                |                                                     |                           |
|                        |          |           |                |                                                     |                           |

## E. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):

- ☒ Office (Desk) Determination. Date: Delineation report dated November 2015
- ☐ Field Determination. Date(s): \_\_\_\_\_

SUPPORTING DATA. Data reviewed for preliminary JD (check all that apply - checked items should be included in case file and, where checked and requested, appropriately reference sources below):

- ☒ Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant: Drawings dated 1/30/15.
- ☒ Data sheets prepared/submitted by or on behalf of the applicant/consultant.
- ☒ Office concurs with data sheets/delineation report.
- ☐ Office does not concur with data sheets/delineation report. Explain: \_\_\_\_\_
- ☐ Data sheets prepared by the Corps: \_\_\_\_\_
- ☐ Corps navigable waters' study: \_\_\_\_\_
- ☐ U.S. Geological Survey Hydrologic Atlas: \_\_\_\_\_
- ☐ USGS NHD data: ☐ USGS 8 and 12 digit HUC maps.
- ☐ U.S. Geological Survey map(s). Cite scale & quad name: \_\_\_\_\_
- ☐ USDA Natural Resources Conservation Service Soil Survey. Citation: \_\_\_\_\_
- ☐ National wetlands inventory map(s). Cite name: \_\_\_\_\_
- ☐ State/Local wetland inventory map(s): \_\_\_\_\_
- ☐ FEMA/FIRM maps: \_\_\_\_\_
- ☐ 100-year Floodplain Elevation is: \_\_\_\_\_ (National Geodetic Vertical Datum of 1929)
- ☐ Photographs: ☐ Aerial (Name & Date): \_\_\_\_\_
- ☐ Photographs: ☐ Other (Name & Date): \_\_\_\_\_
- ☐ Previous determination(s). File no., date (and findings) of response letter (determination and coordination): \_\_\_\_\_
- ☐ Other information (please specify): \_\_\_\_\_

1. The Corps of Engineers believes that there may be jurisdictional waters of the United States on the subject site, and the permit applicant or other affected party who requested this preliminary JD is hereby advised of his or her option to request and obtain an approved jurisdictional determination (JD) for that site. Nevertheless, the permit applicant or other person who requested this preliminary JD has declined to exercise the option to obtain an approved JD in this instance and at this time.

2. In any circumstance where a permit applicant obtains an individual permit, or a Nationwide General Permit (NWP) or other general permit verification requiring "pre-construction notification" (PCN), or requests verification for a non-reporting NWP or other general permit, and the permit applicant has not requested an approved JD for the activity, the permit applicant is hereby made aware of the following: (1) the permit applicant has elected to seek a permit authorization based on a preliminary JD, which does not make an official determination of jurisdictional waters; (2) that the applicant has the option to request an approved JD before accepting the terms and conditions of the permit authorization, and that basing a permit authorization on an approved JD could possibly result in less compensatory mitigation being required or different special conditions; (3) that the applicant has the right to request an individual permit rather than accepting the terms and conditions of the NWP or other general permit authorization; (4) that the applicant can accept a permit authorization and thereby agree to comply with all the terms and conditions of that permit, including whatever mitigation requirements the Corps has determined to be necessary; (5) that undertaking any activity in reliance upon the subject permit authorization without requesting an approved JD constitutes the applicant's acceptance of the use of the preliminary JD, but that either form of JD will be processed as soon as is practicable; (6) accepting a permit authorization (e.g., signing a proffered individual permit) or undertaking any activity in reliance on any form of Corps permit authorization based on a preliminary JD constitutes agreement that all wetlands and other water bodies on the site affected in any way by that activity are jurisdictional waters of the United States, and precludes any challenge to such jurisdiction in any administrative or judicial compliance or enforcement action, or in any administrative appeal or in any Federal court; and (7) whether the applicant elects to use either an approved JD or a preliminary JD, that JD will be processed as soon as is practicable. Further, an approved JD, a proffered individual permit (and all terms and conditions contained therein), or individual permit denial can be administratively appealed pursuant to 33 C.F.R. Part 331, and that in any administrative appeal, jurisdictional issues can be raised (see 33 C.F.R. 331.5(a)(2)). If, during that administrative appeal, it becomes necessary to make an official determination whether CWA jurisdiction exists over a site, or to provide an official delineation of jurisdictional waters on the site, the Corps will provide an approved JD to accomplish that result, as soon as is practicable. This preliminary JD finds that there "may be" waters of the United States on the subject project site, and identifies all aquatic features on the site that could be affected by the proposed activity, based on the information in this document.

IMPORTANT NOTE: The information recorded on this form has not necessarily been verified by the Corps and should not be relied upon for later jurisdictional determinations.

Signature:

  
Regulatory Project Manager

2/12/14  
Date

Person<sup>1</sup> Requesting Preliminary JD

Date

<sup>1</sup> Permit applicant, landowner, a lease, easement or option holder, or individual with identifiable and substantial legal interest in the property; this signature is not required for preliminary JDs associated with enforcement actions.



US Army Corps  
of Engineers  
Seattle District

## CERTIFICATE OF COMPLIANCE WITH DEPARTMENT OF THE ARMY PERMIT



Permit Number: NWS-

Name of Permittee: \_\_\_\_\_

Date of Issuance: \_\_\_\_\_

Upon completion of the activity authorized by this permit, please check the applicable boxes below, date and sign this certification, and return it to the following address:

Department of the Army  
U.S. Army Corps of Engineers  
Seattle District, Regulatory Branch  
Post Office Box 3755  
Seattle, Washington 98124-3755

Please note that your permitted activity is subject to a compliance inspection by a U.S. Army Corps of Engineers representative. If you fail to comply with the terms and conditions of your authorization, your permit may be subject to suspension, modification, or revocation.

|                          |                                                                                                                                                                                                                                                        |
|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> | The work authorized by the above-referenced permit has been completed in accordance with the terms and conditions of this permit.<br>Date work complete: _____                                                                                         |
| <input type="checkbox"/> | Photographs and as-built drawings of the authorized work (OPTIONAL, unless required as a Special Condition of the permit).                                                                                                                             |
| <input type="checkbox"/> | If applicable, the mitigation required (e.g., construction and plantings) in the above-referenced permit has been completed in accordance with the terms and conditions of this permit (not including future monitoring).<br>Date work complete: _____ |
| <input type="checkbox"/> | Photographs and as-built drawings of the mitigation (OPTIONAL, unless required as a Special Condition of the permit).                                                                                                                                  |

Printed Name: \_\_\_\_\_

Signature: \_\_\_\_\_

Date: \_\_\_\_\_





STATE OF WASHINGTON  
DEPARTMENT OF ECOLOGY

PO Box 47775 • Olympia, Washington 98504-7775 • (360) 407-6300  
711 for Washington Relay Service • Persons with a speech disability can call 877-833-6341

January 23, 2019

**Mitigated Determination of  
Nonsignificance (MDNS)**  
PL-SEPA-07-0060  
Reference No. 8

Swede Hill LLC  
ATTN: John Xitco  
PO Box 1693  
Tacoma, WA 98401

**RE: U.S. Army Corps of Engineers Reference No. NWS-2014-954  
Nationwide Permit 39, Commercial and Institutional Development for Swede Hill,  
Canterwood Commercial, wetlands, Gig Harbor, Pierce County, Washington**

Dear John Xitco:

The Department of Ecology (Ecology) has received the U.S. Army Corps of Engineers' letter dated November 5, 2018, approving coverage under Nationwide Permit (NWP) 39 for the above project.

Upon review of the JARPA received January 26, 2018, Ecology has determined that the project meets the requirements for Washington State 401 Water Quality Certification and Coastal Zone Management Act Consistency under NWP 39. Therefore, an Individual 401 certification will not be required for this project and you may proceed as directed by the Corps.

Any changes to your project that would impact water quality should be submitted in writing to Ecology before work begins for additional review.

This letter does not exempt you from other requirements of federal, state, and local agencies.

Please contact me if you have any questions regarding this letter at (360) 407-6926 or e-mail at [Lori.Kingsbury@ecy.wa.gov](mailto:Lori.Kingsbury@ecy.wa.gov).

Sincerely,

A handwritten signature in cursive script that reads "Lori Kingsbury".

Lori Kingsbury  
Federal Permit Manager  
Southwest Regional Office  
Shorelands and Environmental Assistance Program

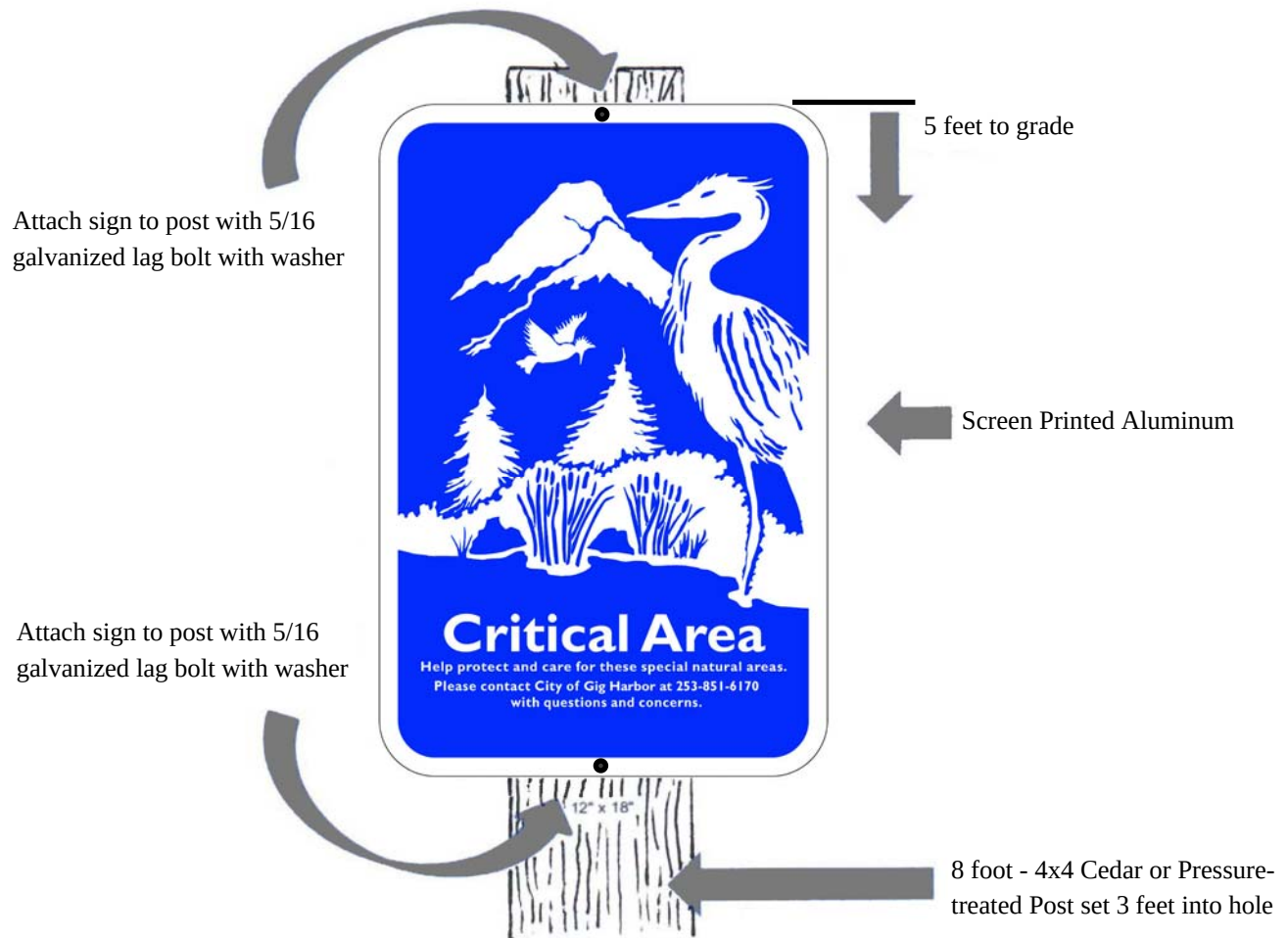
cc: Kristin McDermott, U.S. Army Corps of Engineers

e-cc: [ecyrefedpermits@ecy.wa.gov](mailto:ecyrefedpermits@ecy.wa.gov)  
Loree' Randall, Ecology – HQ  
Zach Meyer, Ecology – SWRO  
Lori Kingsbury, Ecology - SWRO



## CLIENT ASSISTANCE MEMO

### Critical Area Sign Installation Detail



- The Critical Area sign shall be posted at the outer boundary of the Critical Area buffer, unless otherwise specified in project approvals.
- If not specified in project approvals, one sign shall be posted per lot or posted every 50-feet, whichever distance is less and resulting in a greater number of signs.
- The signs shall be posted in prominent and visible locations, and at the closest distance to the proposed development.
- Signs may alternatively be attached to critical area fencing when fencing is required.

Client Assistance Memos are not intended to replace the Gig Harbor Municipal Code. Should you have any questions regarding this information please call the Planner of the Day at (253) 851-6170



# GEORESOURCES

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May 10, 2021

Swede Hill, LLC.  
PO Box 1397  
Tacoma, Washington 98401

**Mitigated Determination of  
Nonsignificance (MDNS)**

PL-SEPA-07-0060  
Reference No. 10

Geotechnical Consultation –  
Building A Dispersion Trench Recommendations  
Proposed Commercial Development  
Canterwood Commercial Center  
Gig Harbor, Washington  
Doc ID: SwedeHill.Canterwood.L2

As requested, this letter addresses the City of Gig Harbor comment that a geotechnical review of changes to the drainage plan since our May 28, 2020 *Updated Geotechnical Engineering Report* was written. Specifically, changes to the plan include reducing the length of dispersion trench from Building A from 80 feet to 50 feet, and relocating the emergency overflow to the bottom of the swale east of Building A.

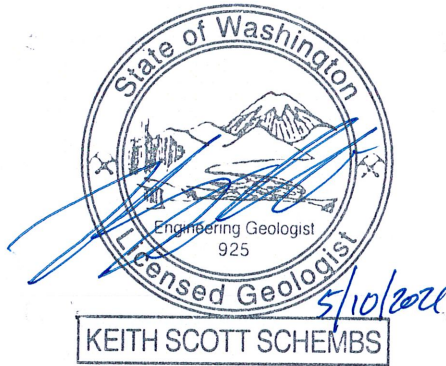
Our updated report provided recommendations for constructing the fill and siting the dispersion trench at the top of the slope, because the City no longer allows dispersion trenches to be in the wetland buffer. The reduction of the length of the dispersion trench will result in less area of the slope being impacted by the runoff. The new outfall location is at the base of a natural slope where a series of wetlands are located. Runoff from the emergency overflow should follow the natural drainage course.

Recommendations contained in our report included construction the slope as a Reinforced Soil Slope (RSS) and that the entire face of the slope be protected against scouring by including a robust cellular confinement system such as GeoWeb, in addition to the planting plan provided by Soundview Consultants (wetland consultant). Riprap may also be used downhill of the dispersion trenches flowpath to mitigate scouring. Provided that the recommendations from our report are incorporated into the design, it is our opinion that the two changes should have a minimal impact on the overall stability of the from a geotechnical standpoint.

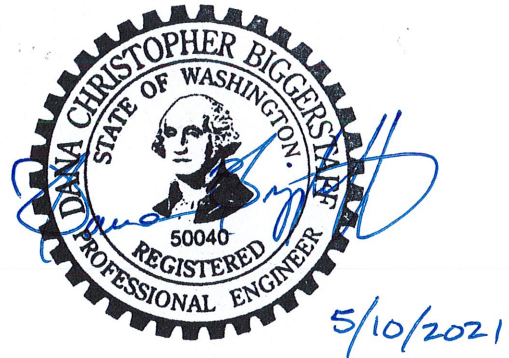


We have appreciated the opportunity to be of service to you on this project. If you have any questions or comments, please do not hesitate to call at your earliest convenience.

Respectfully submitted,  
GeoResources, LLC



Keith Schembs, LEG  
Principal



Dana C. Biggerstaff, PE  
Senior Geotechnical Engineer

KSS:DCB/kss

DocID: SwedeHill.Canterwood.L2

c/c Carl Halsan, Halsan Frye



May 28, 2020

Swede Hill, LLC.  
PO Box 1397  
Tacoma, Washington 98401

c/o Barghausen Consulting Engineers, Inc.  
18215 – 72<sup>nd</sup> Avenue South  
Kent, Washington 98032

Updated Geotechnical Engineering  
Report  
Proposed Commercial Development  
Canterwood Commercial Center  
Gig Harbor, Washington  
Doc ID: SwedeHill.Canterwood.RGu

## INTRODUCTION

This updated report presents the results of our geotechnical engineering studies for the proposed Canterwood Commercial Center (CCC) to be constructed in Gig Harbor, Washington. The location of the project is shown in the attached Site Location Map, Figure 1. The site is in the Gig Harbor North neighborhood, and is situated between Canterwood Boulevard and Highway 16, immediately west of St. Anthony's Hospital, as shown on the Site Vicinity Map, Figure 2. We previously prepared a *Geotechnical Engineering Report* for this site dated January 2014.

The proposed CCC project will consist of four new commercial/office buildings. According to the provided site plans, Building A in the north central portion of the site, will consist of a three-story building with the lowest level being a daylight parking level and two levels of interior office space above. Buildings B, C, and D will be one to two-story on-grade structures situated in the east and south-central portion of the site. Proposed site grading will be extensive, resulting in fill slopes as tall as 35 feet, most of the retaining walls that vary in height up to 6 feet, with 5 of the proposed walls being taller. A new stormwater detention pond will be situated in the lower, western portion of the site below buildings B, C, and D. Several new stormwater dispersion trenches are also proposed around the site. Access to site will be via three new driveway approaches that extend west into the development from Canterwood Boulevard. The project site and the proposed development are shown on the updated Site and Exploration Plan, Figure 3.

Our assumptions and understanding of the proposed grading of the project is based on our conversations and email correspondence with Mr. Carl Halsan and Mr. Jason Hubbell of Barghausen Consulting Engineers Inc and the provided update civil drawings sheets C6 and C7 dated May 13, 2020.

## SCOPE

The purpose of our original services was to evaluate the surface and subsurface conditions across the site as a basis for providing geotechnical recommendations and design criteria for the proposed development. Specifically, the scope of services for this project included the following:

1. Geologic description of the site and project location;
2. Site plan showing approximate exploration locations on a base site plan supplied to us by Barghausen Consulting Engineers;
3. Descriptive logs of our subsurface explorations;
4. Results of our field and laboratory tests;
5. Description of surface, soil, groundwater (measured and seasonal fluctuations), and seismic conditions;
6. Review of the City of Gig Harbor Critical Areas Ordinance, including steep slopes, landslides, erosion and seismic;
7. Recommended setbacks and buffers, per the City of Gig Harbor Critical Areas Ordinance, including recommendations for buffer reduction, if required;
8. Recommended seismic design parameters, including 2015 IBC site class;
9. Recommendations for site preparation;
10. Recommendations concerning excavations, including temporary slope inclinations;
11. Design criteria for shallow footings, including allowable bearing pressures;
12. Estimated total and differential settlements of foundations;
13. Recommendations concerning slab-on-grade floors;
14. Recommendations concerning temporary and permanent drainage systems;
15. Recommendations concerning structural fill and the reuse of onsite soils as structural fill;
16. Recommendations for stormwater management, including onsite infiltration if feasible;
17. Recommendations concerning permanent slopes, including maximum inclinations, keying and benching, and construction methods;
18. Recommendations for temporary and permanent erosion control
19. Recommendations for additional studies, if required; and
20. Explanation of report limitations.

Our work was completed in general accordance with our *Proposal for Geotechnical Engineering Report* dated January 3, 2013. Authorization to proceed with the original scope of services was provided by Mr. Luke Xitco, of Swede Hill LLC, on January 7, 2013.

This updated report is based on the current proposed civil design sheets C6 and C7 (May 13, 2020), review comments from the City of Gig Harbor provided to us on April 29, 2020, and follow-up conversations and correspondences with you permitting agent, Mr. Carl Halsan; Mr. Jason Hubbell of Barghausen Consulting Engineers, Inc, and Mr. Don Babineau of Soundview Consultants. We were directed to provide this updated report on April 29, 2020 by Mr. Halsan. No additional subsurface explorations were completed as part of this scope of work, but we did visit the site and perform an updated site reconnaissance on May 15, 2020.

## **SITE CONDITIONS**

### **Surface Conditions**

The site consists of a single tax parcel located west of St. Anthony's Hospital in Gig Harbor, Washington. The site is situated between Canterwood Boulevard on the east and State Route 16 on the west, an undeveloped tract to the north, and a City of Gig Harbor storm pond to south. The parcel is irregular in shape and encompasses approximately 7.6 acres. Portions of the site appear to have been logged in the past. The ground surface on the site slopes down from Canterwood





Boulevard to the west towards Highway 16. The site encompasses an old drainage with a stream that was covered by the Canterwood Boulevard roadway embankment. The lower reaches of the stream bisect the site and has been mapped for wetlands by Soundview Consultants. Slopes range from 40 to 70 percent on the east portion of the site, 10 to 25 percent on the center of the site, and 10 to 35 percent on the lower third of the site. The upper steeper sloping portions of site consists of the lower portion of the Canterwood Boulevard Road embankment. Total topographic relief across the site is on the order of 140 feet.

### Site Soils

The USDA Natural Resource Conservation Service (NRCS) Web Soil Survey for Pierce County maps the soils in the area of the site as Harstine gravelly sandy loam (type 16) soils. The Harstine soils are derived from sandy glacial till that form on 6 to 15 percent (16C) and 15 to 30 percent (16D). The soils are listed as having a “moderate” or “moderate to severe” erosion hazard when exposed. The Harstine soils are listed in hydrologic soils group C. Because the Harstine soils are underlain by indurate (cemented) soils at relatively shallow depths, the ability of the Harstine soils to support onsite infiltration of collected stormwater is limited. A copy of the NRCS map for the site vicinity is attached as Figure 4. We observed no evidence of surficial erosion at the site during our reconnaissance.

### Site Geology

Our knowledge of the geologic conditions in the project area is based on our subsurface explorations, a published draft *Geological Map of the Gig Harbor 7.5 minute Quadrangle, Washington* (Troost, K.G., Booth, D.B., and Wells, R.E.) and our experience in the area. The map indicates the site is underlain by a sequence of glacial till (Qvt) and advance outwash (Qva) that was deposited during the most recent Vashon Stade of the Fraser Glaciation, approximately 12,000 to 15,000 years ago. The glacial till consists of a heterogeneous mixture of clay, silt, sand, and gravel that was deposited at the base of the prehistoric continental glacial ice mass and was subsequently over-ridden. Typically, the glacial till is underlain by advance outwash. Advance outwash consists of poorly stratified sand and gravel that was deposited by meltwater streams and rivers emanating from the advancing glacial ice mass. Both the glacial till, and advance outwash, are considered over-consolidated and exhibit high strength and low compressibility characteristics, whereas recessional outwash and alluvial deposits are considered normally consolidated. An excerpt from the referenced map is included as Figure 5.

We also reviewed the Washington State Department of Ecology Atlas with regards to the mapped slope stability for the site area. The Coastal Zone does extend across the entire site, but the slopes below Canterwood Boulevard north of the site are generally mapped as stable, with no areas of recent or historic landslide activity. A copy of the Washington DNR Landslide Inventory Map is included as Figure 6.

The Washington Department of Natural Resources Landslide Inventory map indicates the steeply sloping portion of the site to as having a “moderate” to “high” shallow landslide susceptibility, with a “moderate” deep landslide susceptibility. No areas of active or historic landslides are mapped on or within 300 feet of the site from the DNR susceptibility map. A copy of the Washington DNR Landslide Inventory Map is included as Figure 7.



### Subsurface Explorations

On January 16, 2014 a representative from GeoResources, LLC (GeoResources) visited the site and monitored the excavation of 22 test pits to depths of 3.5 to 9 feet below the existing ground surface, logged the subsurface conditions encountered in each test pit, and obtained representative soil samples. The test pits were excavated by a small sized track-mounted excavator operated by a contractor working under subcontract to us. Table 1 summarizes the approximate functional locations, surface elevations, and termination depths of our test pits explorations.

**TABLE 1:**  
**APPROXIMATE LOCATIONS, ELEVATIONS, AND DEPTHS OF EXPLORATIONS**

| Test Pit Number                                                                                                                              | Functional Location                      | Surface Elevation <sup>1</sup> (feet) | Termination Depth (feet) | Termination Elevation <sup>1</sup> (feet) |
|----------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|---------------------------------------|--------------------------|-------------------------------------------|
| TP-1                                                                                                                                         | Driveway to Building D                   | 137                                   | 7                        | 130                                       |
| TP-2                                                                                                                                         | Parking above Building D                 | 138                                   | 7.5                      | 130.5                                     |
| TP-3                                                                                                                                         | Driveway to Building C                   | 145                                   | 7.5                      | 137.5                                     |
| TP-4                                                                                                                                         | Building Pad C                           | 152                                   | 8                        | 144                                       |
| TP-5                                                                                                                                         | Retaining walls between Building C/B     | 158                                   | 6                        | 152                                       |
| TP-6                                                                                                                                         | Building Pad B                           | 173                                   | 8                        | 165                                       |
| TP-7                                                                                                                                         | Wall above Building B                    | 180                                   | 9                        | 171                                       |
| TP-8                                                                                                                                         | Fill slope below Building B parking lot  | 150                                   | 9                        | 141                                       |
| TP-9                                                                                                                                         | West (upslope) edge of storm pond berm   | 140                                   | 8                        | 132                                       |
| TP-10                                                                                                                                        | Center of storm pond berm                | 138                                   | 8                        | 130                                       |
| TP-11                                                                                                                                        | East (downslope) edge of storm pond berm | 135                                   | 7.5                      | 127.5                                     |
| TP-12                                                                                                                                        | Parking area below Building B            | 152                                   | 6                        | 146                                       |
| TP-13                                                                                                                                        | Driveway north of Building A             | 176                                   | 9                        | 167                                       |
| TP-14                                                                                                                                        | Building Pad A                           | 180                                   | 3.5                      | 176.5                                     |
| TP-15                                                                                                                                        | Driveway south of Building A             | 173                                   | 9                        | 164                                       |
| TP-16                                                                                                                                        | Parking lot above Building A             | 189                                   | 6                        | 183                                       |
| TP-17                                                                                                                                        | Cut slope above Building A parking lot   | 206                                   | 7                        | 199                                       |
| TP-18                                                                                                                                        | Parking lot below Building A             | 175                                   | 7.5                      | 167.5                                     |
| TP-19                                                                                                                                        | Fill slope below Building A parking lot  | 152                                   | 9                        | 143                                       |
| TP-20                                                                                                                                        | Driveway north of Building B             | 172                                   | 7                        | 165                                       |
| TP-21                                                                                                                                        | Building Pad D                           | 136                                   | 8.5                      | 127.5                                     |
| TP-22                                                                                                                                        | Fill slope below Building D              | 128                                   | 9                        | 119                                       |
| <b>Notes:</b><br><sup>1</sup> = Surface elevations estimated from Barghausen Consulting Engineers Inc site plan dated May 13, 2020 (NAVD 88) |                                          |                                       |                          |                                           |

The specific number, locations, and depths of our explorations were selected based on the configuration of the proposed development, and were adjusted in the field based on consideration for underground utilities, existing site conditions, site access limitations and encountered stratigraphy. The densities presented in the logs were determined by the difficulty of excavation and our experience. Representative soil samples obtained from the test pits were placed in sealed

plastic bags and then taken to a laboratory for further examination and testing as deemed necessary. The test pits were then backfilled with the excavated soils and bucket tamped, but not otherwise compacted.

The subsurface explorations excavated as part of this evaluation indicate the subsurface conditions at specific locations only, as actual subsurface conditions can vary across the site. Furthermore, the nature and extent of such variation would not become evident until additional explorations are performed or until construction activities have begun.

The approximate locations and numbers of our test pits are shown on the attached Site and Exploration Plan, Figure 3. The locations shown on Figure 3 were determined by pacing or taping from existing site features and reference points. As such, the locations should only be considered accurate to the degree implied by our measuring methods. The soils encountered were visually classified in accordance with the Unified Soil Classification System (USCS) and ASTM D: 2488. The USCS is included in Appendix A as Figure A-1, while the descriptive logs of our test pits are included as Figures A-2 and A-9.

### **Subsurface Conditions**

Our test pits encountered slightly variable subsurface conditions that generally confirmed the mapped stratigraphy. The subsurface conditions encountered in each test pit are included below in Table 2 and description of the various soil types encountered across the site are summarized in the following sections.

#### Surficial Organic Soils

The site is typically covered by 3 to 12 inches of forest duff and topsoil. We anticipate that deeper areas of topsoil and forest duff will be encountered in areas of larger trees and in localized depressions across the site, similar to those encountered in test pit TP-19.

#### Undocumented Fill Soils

Fill soils likely associated with the old logging roads crossing the site were encountered in five of our test pits, including TP-5, TP-6, TP-12, TP-15, and TP-18. The fill consisted of black gravel with silt, organic debris, and woody pieces. The fill in test pit TP-5 was underlain by a geotextile separation fabric. Given the higher fines content and organics, the fill soils are likely highly compressible and had a high moisture content, making it susceptible to decomposition over time.

#### Upper Silty Sand

Below the surficial forest duff, our test pits typically encountered loose to medium dense silty fine to medium sand with varying amounts of gravel and minor amounts of roots. We interpret these shallow soils to be a subsoil horizon between the topsoil and the deeper weathered till.

In the lower portion of the site, near the wetland area and stream channel, several of our test pits TP-8, TP-9, TP-10, TP-11, TP-18, TP-19, and TP-22 encountered a medium stiff to stiff silt with some sand. The silt had elevated moisture contents. Laboratory tests indicate that the silt is non-plastic. We interpret these cohesive soils to be alluvium on the lower, flatter, western portion of the site. The silt was typically underlain by loose to medium dense sand with minor amounts of silt and variable amounts of gravel that we also interpret to be alluvium.

### Glacially Consolidated Soils

Underlying the surficial forest duff and upper weathered soils, our test pits encountered a dense to very dense glacial till. In the test pits excavated across the upper portions of the site (TP-5, TP-6, TP-7, TP-12, TP-14, and TP-16) consisted of a light gray silty fine to medium sand with varying amounts of gravel. The glacial till in the lower portions of the site, such as in test pits TP-1, TP-2, TP-3, TP-20, 21) consisted more of a gravelly sand with varying amounts of silt (some silt to silty). Test Pit TP-13 encountered in the north central portion of the site encountered a dense to very dense sandy gravel with cobbles and minor amounts of silt that we interpret to be more representative of advance outwash.

**TABLE 2:**  
**APPROXIMATE THICKNESS, DEPTHS, AND ELEVATION OF SOIL TYPES ENCOUNTERED IN EXPLORATIONS**

| Test Pit Number | Thickness of Topsoil (feet) | Thickness of Loamy Sand (feet) | Thickness of Weathered Till/ Outwash (feet) | Depth to Glacial Till (feet) | Elevation <sup>1</sup> of Top of Glacial Till (feet) |
|-----------------|-----------------------------|--------------------------------|---------------------------------------------|------------------------------|------------------------------------------------------|
| TP-1            | 0.5                         | 1                              | 2.5                                         | 4                            | 133                                                  |
| TP-2            | 0.3                         | 1.7                            | 3                                           | 5                            | 133                                                  |
| TP-3            | 0.7                         | 1.3                            | 3.5                                         | 5.5                          | 139.5                                                |
| TP-4            | 0.5                         | 1                              | 2.5                                         | 4                            | 148                                                  |
| TP-5            | 0.2                         | 1.3 <sup>2</sup>               | 3                                           | 4.5                          | 153.5                                                |
| TP-6            | 0.5                         | 2 <sup>2</sup>                 | 2.5                                         | 5                            | 168                                                  |
| TP-7            | 0.3                         | 2.2                            | 2.5                                         | 5                            | 175                                                  |
| TP-8            | 0.5                         | 2                              | 6.5 <sup>3</sup>                            | N/E                          | N/E                                                  |
| TP-9            | 0.5                         | 1                              | 6.5 <sup>3</sup>                            | N/E                          | N/E                                                  |
| TP-10           | 0.5                         | 1.5                            | 6 <sup>3</sup>                              | N/E                          | N/E                                                  |
| TP-11           | 0.7                         | 1.8                            | 5+ <sup>3</sup>                             | N/E                          | N/E                                                  |
| TP-12           | 0.3                         | 3.2 <sup>2</sup>               | 0                                           | 3.5                          | 148.5                                                |
| TP-13           | 0.5                         | 0                              | 1.5                                         | 1.5                          | 174.5                                                |
| TP-14           | 0.3                         | 0                              | 1                                           | 1.3                          | 178.7                                                |
| TP-15           | 0.2                         | 4.3 <sup>2</sup>               | 3.5                                         | 7                            | 166                                                  |
| TP-16           | 0.8                         | 1.7                            | 1.5                                         | 4                            | 185                                                  |
| TP-17           | 1.0                         | 0                              | 4                                           | 5                            | 201                                                  |
| TP-18           | 0.2                         | 2.3 <sup>2</sup>               | 5+ <sup>3</sup>                             | N/E                          | N/E                                                  |
| TP-19           | 2.0                         | 5                              | 2+ <sup>3</sup>                             | N/E                          | N/E                                                  |
| TP-20           | 0.5                         | 1.5                            | 4.5                                         | 6                            | 166                                                  |
| TP-21           | 1.0                         | 2                              | 1                                           | 4                            | 132                                                  |
| TP-22           | 1.0                         | 2                              | 3 <sup>3</sup>                              | N/E                          | N/E                                                  |

**Notes:**  
<sup>1</sup> Surface elevations estimated from Barghausen Consulting Engineers Inc site plan dated December 19, 2013 (NAVD 88)  
<sup>2</sup> Old Fill, <sup>3</sup> Alluvium, N/E = Not Encountered

As stated on our test pit logs, several of our test pits encountered cobbles within the explored depths. A larger boulder (glacial erratic) was also observed on the ground surface near test pit TP-4. These larger cobbles and boulders can make excavations and construction very difficult and should be anticipated by the contractor for subgrade construction.

### Laboratory Testing

Geotechnical laboratory tests were performed on select samples retrieved from the test pits to determine soil index and engineering properties encountered. Laboratory testing included visual soil classification, moisture content determinations, Atterberg Limit tests, and grain size analysis. Geotechnical laboratory testing was performed in the GeoResources, LLC laboratory in Fife, Washington. Testing was performed in general accordance with the ASTM International (ASTM) standard procedures (ASTM, 2007). Brief descriptions of the laboratory test procedures and the test results are presented in Appendix B.

### Groundwater Conditions

Groundwater conditions were evaluated by observations made at the time our test pits were excavated. Groundwater seepage was observed in two of our test pits at the time of digging. Table 3 summarizes our depth to, and elevation of groundwater encountered in our test pits.

**TABLE 3:**  
**APPROXIMATE DEPTHS AND ELEVATIONS OF GROUNDWATER ENCOUNTERED IN EXPLORATIONS**

| Test Pit Number                                                                                                                                                                       | Depth to Groundwater (feet) | Elevation of Groundwater <sup>1</sup> (feet) | Date Observed                        |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|----------------------------------------------|--------------------------------------|
| TP-8                                                                                                                                                                                  | 6                           | 144                                          | January 16, 2014 (ATD <sup>2</sup> ) |
| TP-15                                                                                                                                                                                 | 7                           | 167                                          | January 16, 2014 (ATD <sup>2</sup> ) |
| <b>Notes:</b> <sup>1</sup> Surface elevations estimated from Barghausen Consulting Engineers Inc site plan dated December 19, 2013 (NAVD 88)<br><sup>2</sup> ATD = At time of digging |                             |                                              |                                      |

Since our test pits were excavated during the wetter winter months, we anticipate that these depths represent the seasonally average to high groundwater levels. We expect the water to be shallower in the wetter, winter months. Changes in local groundwater levels will also occur in response to off-site construction activities and site utilization. Analysis or modeling of anticipated groundwater levels during construction is beyond the scope of this report.

### ENGINEERING CONCLUSIONS AND RECOMMENDATIONS

Based on our current understanding of the proposed project and on the results of our geotechnical studies, we have updated the geotechnical recommendations for design and construction of the proposed CCC Project to reflect changes to the proposed site plan, City ordinances, and building codes since our original report was prepared. Based on our recent site reconnaissance, the site conditions appeared unchanged, and the findings of our original report are





still applicable. The following sections provide recommendations for seismic design considerations, foundation design, permanent building walls, floor slabs, drainage, pavements, and other pertinent geotechnical design and construction issues.

### Seismic Design

The site is located in the Puget Sound region of western Washington, which is seismically active. Seismicity in this region is attributed primarily to the interaction between the Pacific, Juan de Fuca, and North American plates. The Juan de Fuca plate is subducting beneath the North American plate at the Cascadia Subduction Zone (CSZ). This produces both intercrustal (between plates) and intracrustal (within a plate) earthquakes. In the following sections we discuss the design criteria and potential hazards associated with the regional seismicity.

#### Seismic Site Class

Based on our explorations and the subsurface units mapped at the site, we interpret the structural site conditions to correspond to a seismic Site Class "D" in accordance with the 2015 IBC documents and American Society of Civil Engineers (ASCE) standard 7-10 Chapter 20 Table 20.3-1. This is based on inferred SPT blow counts for the soils encountered in our test pit explorations. These conditions are assumed to be representative for the subsurface across the site.

#### Design parameters

The U.S. Geological Survey (USGS) completed probabilistic seismic hazard analyses (PSHA) for the entire country in November 1996, which were updated and republished in 2002 and 2008. We used the *ATC Hazard by Location* website to estimate seismic design parameters at the site. Table 4, below, summarizes the recommended design parameters.

**TABLE 4:**  
**2015 IBC PARAMETERS FOR DESIGN OF SEISMIC STRUCTURES**

| Spectral Response Acceleration (SRA) and Site Coefficients for Existing Conditions | Short Period     | 1 Second Period  |
|------------------------------------------------------------------------------------|------------------|------------------|
| Mapped SRA                                                                         | $S_s = 1.370$    | $S_1 = 0.538$    |
| Site Coefficients (Site Class D)                                                   | $F_a = 1.000$    | $F_v = 1.500$    |
| Maximum Considered Earthquake SRA                                                  | $S_{MS} = 1.370$ | $S_{M1} = 0.808$ |
| Design SRA                                                                         | $S_{DS} = 0.913$ | $S_{D1} = 0.538$ |

#### Peak Ground Acceleration

The mapped peak ground acceleration (PGA) for this site is 0.563g. To account for site class, the PGA is multiplied by a site amplification factor ( $F_{PGA}$ ) of 1.0.

#### Seismic Hazards

Earthquake-induced geologic hazards may include liquefaction, lateral spreading, slope instability, and ground surface fault rupture. Liquefaction is a phenomenon where there is a reduction or complete loss of soil strength due to an increase in pore water pressure in soils. The

increase in pore water pressure is induced by seismic vibrations. Liquefaction primarily affects geologically recent deposits of loose, uniformly graded, fine-grained sands and granular silts that are below the groundwater table. In our opinion, the potential for liquefaction and lateral spreading is not significant because of the dense nature of the on-site soils and the groundwater depth. This coincides with the conditions observed in the explorations performed at the site. Because of the relatively low susceptibility of site soils to liquefaction, it is our opinion that the likelihood of lateral spreading is also relatively low.

Based on our review of the Department of Natural Resources Geologic Hazards Map (Geologic Information Portal), the site is located about 0.17 miles south and 0.91 miles north of the Tacoma Fault Zone (Figure 8). No evidence of ground fault rupture was observed in the subsurface explorations or our site reconnaissance. Therefore, in our opinion, the proposed structure should have no greater risk for ground fault rupture than other structures located in the area.

### **Recommended Setback from Steep Slopes**

The 2015 International Building Code (IBC), Section 1808.7 requires a building setback from slopes that are steeper than 3H:1V (Horizontal: Vertical) or 33 percent with greater than 10 feet in vertical height, unless evaluated and reduced and/or a structural setback is provided by a licensed geotechnical engineer. The setback distance is calculated based on the vertical height of the slope. The typical 2015 IBC setback from the top of the slope equals one third the height of the slope or 40 feet, whichever is less, while a setback from the toe of the slope equals one half the height of the slope or 15 feet, whichever is less. It appears that the four building locations generally meet the IBC guidelines for setbacks.

### **Foundation Support**

Based on the subsurface conditions encountered in the field explorations, glacially consolidated soils are present approximately 1 to 5-feet below ground surface (bgs) at most locations across the upland portion of the site where the buildings are proposed, but may be locally as deep as 7-feet or more. Conventional spread and continuous footings that bear directly on the glacial soils or on properly placed and compacted structural fill that extends down to the glacial soils, should be applicable, depending on loading conditions. The following sections present our recommendations.

#### **Shallow Foundations**

Conventional spread and continuous footings that bear directly on the glacial soils or on properly placed and compacted structural fill that extends down to the glacial soils, should be appropriate, depending on loading conditions.

The soil at the base of the excavations should be disturbed as little as possible. All loose, soft, or unsuitable material should be removed or recompacted, as appropriate. A representative from our firm should observe the foundation excavations to determine if suitable bearing surfaces have been prepared, particularly in the areas where the foundation will be situated on fill material.

We recommend that spread or continuous be founded on the native glacially consolidated soils or on structural fill that extends to suitable native soils, which may require that the soils beneath the proposed footings to be over excavated and replaced with properly compacted structure fill or with CDF. Over excavation should extend laterally out from the footing 1 foot for every vertical foot of excavation. The native soil at the base of the excavations should be disturbed



as little as possible. All loose, soft, or unsuitable material, such as the upper undocumented fill material encountered in all of our subsurface explorations, should be removed or recompacted, as appropriate. The following sections present our recommendations.

#### *Bearing Capacity and Footing Size*

Based on our recent field explorations, we recommend an allowable bearing capacity of 2,500 pounds per square foot (psf) for footings that bear on undisturbed, medium dense weathered till, or on properly placed and compacted structural fill. Foundations that extend down to the very dense native glacial till or advance outwash may be designed for a maximum allowable bearing capacity of 3,500 psf. Please note that areas of thicker, soft/loose material and fill may exist between test pits. If softer/looser material is found at a footing base, the unsuitable material must be overexcavated and replaced with structural fill. These allowable values may be increased by up to one-third to account for wind, seismic, or other short-term loads. The allowable bearing capacity values include a factor of safety (FS) of 3.0.

Continuous footings should have a minimum width determined in accordance with the 2015 IBC section 1809.7. The base of all footings should be located at least 18 inches below the lowest adjacent grade for frost protection.

We recommend that exposed footing subgrades be evaluated by a representative from GeoResources, LLC to confirm soil conditions and provide recommendations where unanticipated conditions are found. Native soils that are disturbed during footing excavation should be removed prior to the placement of the concrete forms and reinforcement.

#### *Estimated Settlement*

We estimate that spread footing foundations founded as described above would undergo a total settlement of approximately 1-inch or less. Differential settlements between adjacent column footings or over a 50-foot span of continuous footing are estimated to be approximately one-half the total settlement between columns. A more precise estimate of settlement can be provided once the actual loads are provided.

#### *Lateral Resistance of Shallow Foundations*

For portions of the structure founded on footings, lateral loads may be resisted by a combination of base friction and passive pressure against the footings and buried portions of the wall. In our opinion, passive earth pressures developed from the very dense, undisturbed native soils could be based on an allowable equivalent fluid density of 350 pounds per cubic foot (pcf) or 250 pcf for fill soil. This passive resistance value assumes that the footings extend at least 24 inches below the lowest adjacent grade and that the ground surface is horizontal for a minimum distance of  $1\frac{1}{2}$  times the embedment depth. The above passive earth pressure includes an FS of 1.5 to limit lateral deflections. We recommend a coefficient of friction of 0.32 be used between cast-in-place concrete and undisturbed, native, silty, gravelly sand for calculating the resistance to sliding at the base of the footings. This friction factor also includes an FS of 1.5.

We recommend that all foundations be provided with footing drains constructed in accordance with the 2015 IBC Section 1805.4.2.



## Floor Slab Support

Slab-on-grade floors, where constructed, should be supported on the Dense, native soils or compacted structural fill would provide a suitable subgrade for floor slabs constructed on grade. We recommend that a vertical modulus of subgrade reaction equal to 300 pounds per cubic inch (pci) be used in the design of the floor slab-on-grade on dense, glacially overridden soil or on compacted, structural fill.

To provide firm bedding for floor slabs, we recommend areas be prepared as described in construction considerations section. The exposed soils should be compacted to at least 95 percent of the Modified Proctor (ASTM D 1557) maximum dry density and to a dense and unyielding condition. All fill under slab-on-grade floors, including backfill for footing excavations, overexcavated areas, utilities, etc., should consist of compacted structural fill. Structural fill requirements are discussed in a later section of this report.

Assuming the below-grade building areas are constructed with long-term drainage, a capillary break should be installed. At-grade structures should also have a capillary break. For a capillary break, we recommend that a minimum 4-inch-thick layer of washed pea gravel (¾ inch to No. 8 sieve size) or clean, 5/8-inch minus crushed rock (less than 2 percent passing the No. 200 sieve) and a vapor retarder consisting of plastic sheeting be placed beneath floor slabs, as shown in Figure 9. If pea gravel is used, a 2-inch layer of clean crushed rock can be placed over a 4-inch minimum layer of washed pea gravel to provide a firmer working surface on which to place the reinforcement. The vapor retarder should be placed on top of the capillary break material where floors are covered with carpet, linoleum, or other floor covers and the space is heated.

Prior to placing pea gravel and/or crushed rock for a working surface or capillary break, the exposed subgrade surface should be evaluated by a representative of our firm and compacted as needed to achieve a dense, unyielding condition. If used, the crushed rock should be compacted to 95 percent of the MDD.

If a subgrade modulus of 300 is used for floor slab design, we estimate that settlement of the floor slabs designed and constructed as recommended, will be ½-inch or less over a span of 50 feet.

## Subgrade/Basement Walls

The lateral pressures against permanent below-grade walls are dependent upon many factors, including groundwater conditions, method of backfill placement and degree of compaction (if applicable), backslope, surcharges, the type of backfill soil and/or adjacent native soils, drainage provisions, and wall flexibility. If the wall is free to yield at the top an amount equal to approximately 0.001 times the height of the wall, then active earth pressures should be mobilized. If movement is not allowed because of stiffness or resistance of the wall, the wall should be designed for at-rest earth pressures. Wall restraint may occur if a rigid structural network is constructed prior to backfilling. However, if temporary shoring is allowed to yield and the buried permanent walls are cast against the shoring, the soil adjacent to the walls would be in an active earth pressure condition.

Building A is the only building currently proposed to have a subgrade wall. We recommend allowable equivalent fluid pressures of 35 pcf be used for the active condition and 60 pcf for the at rest condition. The equivalent fluid weights given are based on the assumptions that the ground surface behind the wall is level. The pressures assume that structural fill is used as wall backfill and properly compacted.



We understand that permanent drainage is planned for the below-grade walls to prevent build-up of hydrostatic pressures. Permanent drainage should consist of either a 1-foot-thick (minimum) layer of clean, drainage gravel placed against the wall or a geocomposite drain mat attached to the basement wall face. For either drainage method, the water should be collected in a perforated, footing drain at the base of the wall. Typical wall backfill and subdrainage recommendations are shown in Figure 9. Backfill should not be placed and compacted behind a wall until the wall is capable of supporting lateral pressures. Compaction criteria for areas behind walls are also presented in Figure 9.

The total active earth pressure should be analyzed for seismic loading conditions using a dynamic load surcharge of 14H. This increment should be applied as a uniform load to the wall and is consistent with a pseudostatic analysis using the Mononobe-Okabe equation for lateral earth pressures for a horizontal seismic coefficient of 0.27g. The horizontal seismic coefficient is not necessarily equivalent to the design peak ground acceleration at the site. The magnitude of this coefficient accounts for the fact that the peak ground acceleration is experienced only a few times within the record of earthquake shaking, and that the actual earthquake ground motion is cyclic in nature, as opposed to a static force. Values of the horizontal seismic coefficient are typically one-third to one-half the value of design peak ground acceleration of 0.563g that may be experienced at the site. Those pressures assume drained conditions behind the wall and a horizontal backfill surface.

Lateral pressures due to surcharge should be added to the recommended lateral earth pressures when appropriate. Other lateral pressures due to surcharge loads may be determined as required. Traffic surcharges should also be included as appropriate. For other surcharge loads, each case should be analyzed individually; we can provide recommendations as needed.

### Site Drainage

All ground surfaces, pavements and sidewalks at the site should be sloped away from the structures. Surface water runoff should be controlled by a system of curbs, berms, drainage swales, and or catch basins, and conveyed to an appropriate discharge point.

We recommend that footing drains are installed for the each building in accordance with the 2015 IBC, Section 1805.4.2, and basement walls (if utilized) have a wall drain as describe above. The roof drain should not be connected to the footing drain. We recommend material used for footing drains be of approximately the same quality as *"Gravel Backfill for Drains"* (WSDOT Standard Specifications Section 9-03.12(4)). A geotextile separation fabric should be placed between the drainage material and native/structural fill soils. Recommendations for a footing or wall drain system are presented in Figure 9. For permanent drainage of below-grade walls, the groundwater level should be maintained 2 feet below the basement finished floor.

### Retaining Walls

Several retaining walls are currently proposed across the site, original wall configurations included walls up to 10 feet in height and tiered retaining walls. Based on the updated plans, all the walls appear to be single walls up to a maximum exposed face height of 6 feet. Rockeries may be suitable for the walls in front of stable cut slopes, while mechanically stabilized earth (MSE) walls with modular concrete blocks are more appropriate for walls in front of constructed fills. Large pre-cast concrete blocks may also be appropriate for both the cut and fill configurations.





### Rockerries

We recommend that rockeries be constructed against stable native cut banks or in front of properly placed and compacted structural fills of 4 feet or less. In all cases, the backslope and foreslope should be as close to level as possible. All rockeries should be constructed per ARC guidelines.

Rockery wall should be constructed of hard, dense, sound, and durable rock, free from seams, cracks, and other defects in accordance with WSDOT Standard Specification 9-13.7(1). Backfill materials for rockery walls should consist of quarry spalls or shot rock of the same quality.

As shown on the attached details, the bottom course of all rocks should be founded in firm, unyielding soils at least 18 inches below the adjacent ground surface for frost and erosion protection, as well as sliding resistance. The subgrade soil for the bottom course of rocks should be excavated, as necessary, to ensure full contact between the rock and soil surfaces.

Rockery boulders should be placed in uniformly decreasing sizes from the bottom of the rockery to the top, with a battered face of at least 1H:6V from vertical towards the cut face. All rocks should be placed in running bond construction, with no continuous joint planes in vertical or lateral directions, and each rock should maintain at least two points of contact with adjacent rocks so that they are keyed together. The maximum void between adjacent rocks should be less than 6 inches as measured at the largest dimension of the void; voids larger than 6 inches should be keyed with chinking rocks to fill the void.

To prevent the build-up of hydrostatic pressures, a free draining backfill material should be provided behind the entire rockery. We recommend the use of ballast rock (1- to 2-inch quarry spalls) for this purpose. This backfill should be placed behind each boulder course and should extend at least 12 inches behind the rockery. Also, a perforated drainpipe should be placed along the heel of the rockery and be embedded in pea gravel or washed rock. This drainpipe should be tightlined to a catch basin or other suitable discharge point.

### Gravity Walls

For a gravity type retaining wall, we recommend using the Ultra Block, Redi-Rock, or Kelly Block segmental concrete blocks. The Ultra Blocks consist of 2½-foot by 2½-foot by 5-foot concrete blocks that have cruciform interlocking shear keys on the top and bottom. The Redi-Rock system uses blocks that are 18-inches tall, 40-inches wide, and range in depth from 28, 41, and 60 inches. Redi-Rock has round nobs on top that interlock into keyways of the bottom of each block and are tapered towards the back to allow for some minor curvature of the wall. In contrast, Kelly-Blocks are proprietary pre-cast concrete modules that measure 2 feet by 2 feet by 4 feet that have two hollow-cores that align with subsequent blocks and allow for concrete to be poured down the entire height of the wall, locking the blocks together.

These walls should bear on firm and unyielding native soils or on structural fill soils placed over such native soils. In our opinion, the native soils underlying the proposed wall alignment will provide adequate support, although a 6-inch leveling course of crushed rock is commonly placed beneath the wall. We recommend that any localized zones of soft, yielding, or organic soils exposed in the subgrade areas be overexcavated and or replaced with compacted structural fill.

For frost and erosion protection, all gravity walls should be embedded at least 18 inches below the adjacent ground surface. Greater depths might be required in certain locations to develop adequate sliding resistance or passive pressure.



These large block systems can include reinforcing grid to make them act as an MSE wall. Inclusion of the reinforcing grid will eliminate the need for a double row or deeper blocks on the lower tiers. Regardless of height, the wall face should be battered into the slope at an angle no steeper than 12 degrees.

Effective drainage behind gravity walls is critical to prevent a buildup of hydrostatic pressure. Consequently, we recommend that a curtain drain be placed behind the entire wall, with a 4-inch-diameter perforated pipe at the base. The drainpipe should be bedded in pea gravel or washed rock and be wrapped with filter fabric.

### MSE Walls

Reinforced soil walls consist of structural fill lifts with reinforcing grids or strips and supported at the face by a reinforcing material or segmental (modular) concrete façade, such as those proprietary systems produced by Allan Block, Keystone, Basallite and others. If appearance is not a criterion, the Hilfiker or Sierra Scape grid-face system, which utilizes welded-wire mesh for the horizontal and facing reinforcement materials, may be suitable.

The entire area beneath the new reinforced soil zone should be stripped of all vegetation and organic soils, as per the “**Site Preparation and Grading**” section of this report. All subgrade soils should then be compacted to a firm, unyielding condition. We also recommend that the face of the existing roadway embankment be benched prior to new fill placement.

Reinforced soil walls with proprietary facades (either segmental concrete or welded-wire mesh) are typically designed by the wall supplier or a specialty consultant, using design values provided by the geotechnical engineer. These design values include soil density, internal friction angle, cohesion, and allowable bearing capacities, as well as seismic acceleration. Table 5 summarizes our recommended design values for the various soils involved in the wall construction, based on our explorations and subsequent interpretations. We also recommend using the seismic acceleration provided previously in this report.

Based on subsurface conditions encountered in our test pits, the proposed retaining wall will likely be founded on dense glacially consolidated native soils. If at the time of excavation, relict topsoil or soft soils are encountered, it may be necessary to overexcavate the unsuitable soils and create a bearing pad of quarry spalls or other free draining material.

All fill soils located within the reinforced backfill and retained backfill zones would consist of clean, well-graded sand and gravel, such as “*Gravel Borrow*” or “*Ballast*” per WSDOT Standard Specifications 9-03.14(1) and 9-03.9(1), respectively. However, the excavated embankment fill soils and/or native soils could be reused as backfill if they are free of organic matter, are at or near optimum moisture content at the time of placement, and are not used for structural fill during the wetter winter months. Existing organic matter, sod, or topsoil stripped from the wall subgrade would not be suitable for this purpose under any circumstances.

**TABLE 5:**  
**RECOMMENDED DESIGN VALUES FOR REINFORCED SOIL WALLS**

| Soil Type                                   | Density<br>(pcf) | Internal<br>Friction<br>Angle<br>(degrees) | Cohesion<br>(psf) | Allowable<br>Bearing<br>Capacity<br>(psf) |
|---------------------------------------------|------------------|--------------------------------------------|-------------------|-------------------------------------------|
| Reinforced Soil<br>(imported granular fill) | 130              | 35                                         | 0                 | N/A                                       |
| Retained Soil<br>(embankment fill)          | 125              | 30                                         | 0                 | N/A                                       |
| Subgrade Soil<br>(weathered till)           | 135              | 34                                         | 0                 | 2,500                                     |
| Subgrade Soil<br>(glacial till)             | 135              | 36                                         | 0                 | 3,500                                     |
| Bearing Pad Soil<br>(quarry spalls)         | 125              | 40                                         | 0                 | N/A                                       |

Soils located within the reinforced backfill and retained backfill zones should be placed and compacted in accordance with our recommendations given in the “**Structural Fill**” section of this report. Specifically, we recommend that fill be compacted to a uniform density of at least 95 percent (based on ASTM:D-1557).

As the wall facing has not been determined, to our knowledge, the strength properties of the mechanical reinforcement have not been determined. This should be done after a wall system has been selected. Typical reinforcement lengths vary from 0.9H to 1.2H (where H is the total height of the wall) but may differ depending on the height and steepness of surcharging slopes.

#### Additional Services

Once the site grading plan is completed, GeoResources should review the proposed wall types and location and provide site specific designs and plan review, as appropriate.

#### **Temporary Excavations**

All job site safety issues and precautions are the responsibility of the contractor providing services/work. The following temporary cut/fill slope guidelines are provided for planning purposes only. Temporary cut slopes will likely be necessary during grading operations or utility installation. Un-shored, temporary excavation slopes may be used where planned excavation limits will not undermine Canterwood Boulevard to the east, associated utilities, interfere with other construction, or extend beyond the approved construction limits. Where there is not enough area for sloped excavations, temporary shoring should be provided. If shallow temporary shoring is required, we recommend that it be designed to withstand the lateral earth pressures provided in the basement wall section of this report.

All excavations at the site associated with confined spaces, such as utility trenches and retaining walls, must be completed in accordance with local, state, or federal requirements including the Washington Administrative Code (WAC) and Washington Industrial Safety and Health

Administration (WISHA). Excavation, trenching, and shoring is covered under the WAC 296-155 Part N.

Based on the WAC 296-155-66401, it is our opinion that the upper weathered soils at the site would be classified as Type C soils, while the lower glacially consolidated soils would be classified as Type A soils. According to WAC 296-155-66403, for temporary excavations of less than 20 feet in depth, the side slopes in Type C soils should be sloped at a maximum inclination of 1½H:1V or flatter from the toe to top of the slope, and Type A soils should be laid back at a slope inclination of 0.75H:1V or flatter. All exposed slope faces should be covered with a durable reinforced plastic membrane during construction to prevent slope raveling and rutting during periods of precipitation. These guidelines assume that all surface loads are kept at a minimum distance of at least one half the depth of the cut away from the top of the slope and that significant seepage is not present on the slope face. Flatter cut slopes will be necessary where significant raveling or seepage occurs, or if construction materials will be stockpiled along the slope crest.

Where it is not feasible to slope the site soils back at these inclinations, a retaining structure should be considered. Retaining structures greater than 4-feet in height (bottom of footing to top of structure) or that have slopes of greater than 15 percent above them, should be engineered per Washington Administrative Code (WAC 51-16-080 item 5). This information is provided solely for the benefit of the owner and other design consultants and should not be construed to imply that GeoResources assumes responsibility for job site safety. It is understood that job site safety is the sole responsibility of the project contractor.

### **Permanent Cut and Fill Slopes**

Permanent slopes in soil should be no steeper than 2H:1V. Fill slopes constructed on grades that are steeper than 5H:1V should be constructed in accordance with Appendix J, Section J107 of the 2015 IBC and should utilize proper keying and benching methods. Fill should be "keyed" into the undisturbed native soils by cutting a series of horizontal benches. The benches should be 1½ times the width of the equipment used for grading and be a maximum of 3 feet in height. Subsurface drainage may be required in areas where significant seepage is encountered during grading. Collected drainage should be directed to an appropriate discharge point. Surface drainage should be directed away from all slope faces.

All slopes should be protected from erosion. Typical erosion control BMPs as adopted by the City of Gig Harbor Stormwater Management and Site Development Manual should be sufficient for proposed site grading activities. Additionally, permanent slopes should be planted with a mulch, hardy vegetative groundcover or armored with quarry spalls as soon as feasible after grading is completed. A typical detail of the Appendix J guidelines is attached as Figure 10.

### **Pavement Section**

Our original scope of work did not include pavement sections. As currently proposed, we understand the offsite improvements to Canterwood Boulevard will include widening the existing roadway to accommodate new turning lanes, curbs, gutters, and sidewalks. Since we have not performed a site-specific pavement design for the new asphalt along Canterwood Boulevard should conform to the Pavement Design Standards (Detail 2-13) of the 2018 City of Gig Harbor Public Works Standards Chapter 2 – Transportation Drawings.

For onsite paving, we have not been provided with proposed traffic counts, but anticipate that the traffic loading will primarily consist of passenger vehicles and lighter delivery and utility



trucks. A similar section to the standard from the City could be used or we could perform pavement section analysis prior to paving to confirm that the section is appropriate for the actual traffic and soil conditions. A site specific section could be thinner and more cost effective.

### **Stormwater Management**

Groundwater seepage was only encountered in two of our test pits at the time of digging. However, we expect that the site is prone to a “perched” groundwater conditions. Perched groundwater develops when the infiltration of water through a shallow, more permeable soil is slowed at depth by a deeper, less permeable soil type, such as the deeper, dense to very dense glacial till.

According to the Grading and Storm Drainage Plan, sheets C6 and C7 (Barghausen, May 13, 2020), collected stormwater from the Buildings B, C, and D) will be collected and conveyed to the proposed pond, 4 dispersion trenches, and the existing pond south of the parcel, while runoff from the area around Building A will be collected and conveyed to a stormwater detention facility between Building A and the top of the constructed fill slope. The water from the detention facility is proposed to be released through a control device to dispersion trench at the top of the constructed fill slope.

The original drainage plan showed the dispersion trench on the face of the constructed slope below Building A while our report recommended that the dispersion trench not be installed on the constructed fill slope below Building A. Instead, we recommended the dispersion trench be installed on the toe of the slope and outside of the wetland buffer. Based on the changes to the grading the plan, the constructed slope below the dispersion below building A will be about 8 to 14 feet of fill with the remainder being a cut.

The City of Gig Harbor does not allow for dispersion trenches to be installed within wetland buffers. If the dispersion trench was relocated to the toe of the slope, it would need to be further to the north and would not have sufficient room to meet minimum vegetated flow path lengths before the property line, nor would it provide water to the constructed wetland.

Since it will be necessary to keep the dispersion trench in its current location, we recommend that the fill slope below the dispersion trench be constructed as a Reinforced Soil Slope (RSS) and that the entire face of the slope be protected against scouring by including a robust cellular confinement system such as GeoWeb in addition to the planting plan provided by Soundview Consultants (wetland consultant). The City may require a global stability analysis of the slope and dispersion trench, which was not in our current scope work, but could be completed as part of the final design drawings, under a separate scope.

## **EARTHWORK RECOMMENDATIONS**

### **Site Preparation**

We recommend that the site be cleared of all vegetation, including roots, stumps, forest duff, topsoil, previously placed fill and any construction debris be removed from beneath the site where buildings, parking lots, driveways, retaining walls, and structural fill will be placed. Organic topsoil is not suitable for use as structural fill but may be used for limited depths in non-structural areas. Stripping depths ranging from 6 to 24 inches should be expected to remove these unsuitable soils. Areas of thicker topsoil or organic debris may be encountered in areas of heavy vegetation or depressions.





In areas to be filled, the exposed soil surface (after clearing and stripping and prior to any fill placement or foundation construction) should be compacted using a vibratory roller. The subgrade soils should be proof-rolled and, if necessary, compacted to achieve at least 95 percent of the Modified Proctor maximum dry density. The proof-rolling operations should consist of several passes of a heavy (10-ton or heavier static weight) vibratory roller to compact the surface to a dense, unyielding condition. The density of the subgrade should be evaluated by an experienced field representative from our firm by probing with a steel T-probe. Areas that are wet, soft, loose, or yielding under the compaction process should be further compacted, removed, and reconditioned, or replaced with compacted structural fill so that a dense and unyielding condition is achieved.

The old fill encountered in test pits TP-5, TP-6, TP-12, TP-15, and TP-18 was observed to be in a loose to medium dense condition, and to contain a moderate amount of organic and topsoil type material. We do not have documentation about the placement of the fill and there is a risk that areas were not placed and compacted per current industry standards. This could result in settlement from the placement of the proposed new fill, particularly if there are pockets of loose fill or thicker organics than was observed in our subsurface explorations, as such, the fill should also be removed and replaced with structural fill.

### **Structural Fill**

According to the provided site Grading and Storm Drainage Plan and accompanying cross sections, there will be considerable amount of cutting and filling required to achieve design grades. Cuts will on the order of 2 to 10 feet, while constructed fill pads and slopes will be on the order of 5 to 17 feet. Some of the larger fills will be constructed on slopes that are steeper than 5H:1V. All structural fills constructed on slopes should be constructed in accordance with Appendix J or the 2015 IBC for proper keying and benching. A typical detail of the Appendix J guidelines is attached as Figure 10.

All fill material placed beneath structures, such as non-structural floor slabs, pavements, sidewalks, and around shaft caps and footings, or other areas where settlements are to be reduced, should consist of structural fill. Structural fill soil should consist of a well-graded mixture of sand and gravel, free of organics, debris, and rubbish. If imported structural fill is used, it should contain no more than 15 percent fines (material passing the US No. 200 sieve, based on the minus ¾-inch fraction). The gravel content should range between 25 and 50 percent retained on a No. 4 sieve. Structural fill should have a maximum particle size of 3 inches. As an alternative, "*Select Borrow*" (WSDOT Section 9-03.14(2)) or an approved substitute could be used; the maximum particle size should be limited to 3 inches.

If earthwork takes place in wet weather or wet conditions, no matter what time of the year, the structural fill material should contain no more than 5 percent fines passing the No. 200 sieve. Fines should be non-plastic.

**TABLE 6:**  
**RECOMMENDATIONS FOR FILL COMPACTION**

| Location of Fill                                                                                            | Recommended Minimum Percentage of Modified Proctor Maximum Dry Density <sup>1</sup> |
|-------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Beneath Pavement Areas Within 2 Feet of Pavement Subgrade                                                   | 95                                                                                  |
| Landscaped Areas/General Fill                                                                               | 90                                                                                  |
| <b>Note:</b> <sup>1</sup> As determined by ASTM International (ASTM) Designation: D 1557-70, Method C or D. |                                                                                     |

We recommend that fill placement and compaction be observed and tested by qualified geotechnical personnel.

### Utility Trench Backfill

All utility trenches should be backfilled with clean granular material, such as sand, sand and gravel, or crushed rock with a maximum 2-inch-diameter, and with not more than 5 percent passing the No. 200 sieve (wet-sieve analysis, ASTM D 1140). We recommend "*Gravel Backfill for Pipe Zone Bedding*", WSDOT Section 9-03.12(3) within the pipe zone bedding, and "*Gravel Borrow*", WSDOT Section 9-03.14(1) or an approved substitution for the subsequent trench backfill. Fines should be non-plastic.

The backfill should be placed in lifts not exceeding 6-inches if compacted with hand-operated equipment, or 12-inches if compacted with heavy equipment. Each lift should be compacted to a dense, unyielding condition and to the recommended densities in Table 6 above. We recommend following the manufacturer's recommendations for the minimum depth of fill over the pipe prior to compaction. The pipe zone bedding above the middle two-thirds of the pipe should not be compacted with heavy vibratory equipment or rollers that could cause damage to the pipe. We recommend a minimum cover over utilities of 2 feet from the crown of the pipes or conduits to the top of the pavement subgrade. Catch basins, utility vaults, and other structures installed flush with the pavement should be designed and constructed to transfer wheel loads to the base of the structure.

### Suitability of On-Site Materials as Fill

Based on our visual classification and results of the grain size analysis performed (see Appendix B), the on-site soil would not satisfy the structural fill gradation recommendations for use during wet weather or in wet conditions. In general, the potential to reuse the encountered site soils is described below.

- Surficial Organic Soils: The forest duff, topsoil, and organic-rich soils mantling most of the site are not suitable for use as structural fill under any circumstances, due to their high organic content. Consequently, these materials can be used only for non-structural purposes, such as in landscaping areas.
- Upper Silty Sands and Sandy Silts: The silty sands and sandy silts underlying the surficial organic soils do appear suitable for reuse as structural fill at their present moisture contents.

However, these soils will be difficult or impossible to reuse during wet weather, due to their moderately high silt contents.

- Glacial Till: The glacial till soils underlying most of the site appear suitable for reuse as structural fill at their present moisture contents. However, these soils will be difficult or impossible to reuse during wet weather, due to their moderately high silt contents.
- Alluvium: The alluvium encountered in the lower, western portion of the site will likely be not used as structural as only the stormwater pond excavation will occur in this area. The upper silty alluvium would not be feasible to reuse as structural fill in its current moisture condition. Given the higher fines content, these soils will be extremely difficult, if not impossible, to reuse during extended periods of wet weather.

The upper silt sand/sandy silt, glacial till, and alluvium should be suitable for use as structural fill provided the moisture content is maintained within 2 percent of the optimum moisture level. We recommend that completed graded areas be restricted from traffic or protected prior to wet weather conditions. The graded areas may be protected by paving, placing asphalt-treated base, a layer of free-draining material such as pit run sand and gravel or clean crushed rock material containing less than 5 percent fines, or some combination of the above.

### **Dewatering Considerations**

Except as otherwise designed and/or specifically covered in the contract, the Contractor should be made responsible for control of all surface and groundwater encountered during construction. In this regard, sloping, slope protection, ditching, sumps, trench drains, dewatering, and other measures should be employed as necessary to permit proper completion of work. The Contractor should anticipate the need to provide dewatering, trenches, and sump pumps to control perched groundwater encountered during excavation.

### **Erosion Control**

Weathering, erosion and the resulting surficial sloughing and shallow land sliding are natural processes. To manage and reduce the potential for these natural processes, we recommend erosion hazards be mitigated by applying Best Management Practices (BMPs), as outlined in the City of Gig Harbor Stormwater Management and Site Development Manual. Temporary erosion control BMPs should be installed at the site prior to the beginning of clearing, grading, or other construction activities, and should be updated and maintained throughout construction until final site stabilization is established. Temporary erosion control BMPs may include, but are not limited to:

- Silt fencing and appropriate soil stockpiling techniques to prevent silty stormwater from leaving the site,
- Jute matting, hydroseeding, or plastic covering to protect exposed soils,
- Straw wattles, quarry spall armoring, check dams, or other energy attenuation BMPs to slow the flow of stormwater over slopes and within drainage channels, and,
- Swales and berms to convey construction stormwater away from the slope.

Where native vegetated is removed because of clearing and grading activities, a dense vegetative groundcover, grass lawn, or native vegetation should be reestablished as soon as feasible. Permanent erosion control, such as mulched landscaping areas, groundcovers, hardscaping, or grass lawns, should be established as soon as feasible once final grades have been completed. All permanent erosion control methods should be maintained after construction activities have been completed.

We recommend earthwork activities be completed during the dry season (May 1 through September 30), and that any exposed soil areas be stabilized during the wet season (October 1 through April 30).

### **Wet Weather and Wet Condition Considerations**

In the Puget Sound area, the Washington State Department of Ecology generally defines the wet season as beginning October 1<sup>st</sup> and continuing through about April 30<sup>th</sup>, although rainy periods could occur at any time of year. Therefore, it is strongly encouraged that earthwork be scheduled during the dry weather months. Most of the soil at the site have a high fines content and are highly susceptible to changes in water content and tends to become unstable and impossible to proof-roll and compact if the moisture content exceeds the optimum.

In addition, during wet weather months, the groundwater levels could increase, resulting in seepage into site excavations. Performing earthwork during dry weather would reduce these problems and costs associated with rainwater, construction traffic, and handling of wet soil. However, should wet weather/wet condition earthwork be unavoidable, the following recommendations are provided:

- The ground surface in and surrounding the construction area should be sloped as much as possible to promote runoff of precipitation away from work areas and to prevent ponding of water.
- Work areas or slopes should be covered with plastic, when not being worked. The use of sloping, ditching, sumps, dewatering, and other measures should be employed as necessary to permit proper completion of the work.
- Earthwork should be accomplished in small sections to minimize exposure to wet conditions. That is, each section should be small enough so that the removal of unsuitable soils and placement and compaction of clean structural fill could be accomplished on the same day. The size of construction equipment may have to be limited to prevent soil disturbance. It may be necessary to excavate soils with a backhoe, or equivalent, and locate them so that equipment does not pass over the excavated area. Thus, subgrade disturbance caused by equipment traffic would be minimized.
- Fill material should consist of clean, well-graded, sand and gravel, such as *Gravel Backfill for Walls* (WSDOT Standard Specification 9-03.12(2)).
- No exposed soil should be left uncompacted and exposed to moisture. A smooth-drum vibratory roller, or equivalent, should roll the surface to seal out as much water as possible.
- In-place soil or fill soil that becomes wet and unstable and/or too wet to suitably compact should be removed and replaced with clean, granular soil (see gradation requirements above).

- Excavation and placement of structural fill material should be observed on a full-time basis by a geotechnical engineer (or representative) experienced in wet weather/wet condition earthwork to determine that all work is being accomplished in accordance with the project specifications and our recommendations.
- Grading and earthwork should not be accomplished during periods of heavy, continuous rainfall.

We recommend that the above requirements for wet weather/wet condition earthwork be incorporated into the contract specification.

### **Additional Services and Construction Observation**

We recommend that GeoResources, LLC be retained to review those portions of the plans and specifications pertaining to the foundations, shoring, and earthwork to evaluate if they are in accordance with the recommendations presented in this report.

Additionally, we recommend GeoResources be retained to observe the geotechnical aspects of construction, particularly the fill placement and compaction, drainage systems, and retaining wall construction. This observation would allow us to verify the subsurface conditions as they are exposed during construction and to determine that work is accomplished in accordance with our recommendations contained herein. If conditions encountered during construction differ from those anticipated, we can provide recommendations for the conditions encountered.

### **LIMITATIONS**

We have prepared this report for use by Swede Hill, LLC, Barghausen, and other members of the design team, for use in the design of a portion of this project. The data used in preparing this report and this report should be provided to prospective contractors for their bidding or estimating purposes only. Our report, conclusions and interpretations are based on our subsurface explorations, data from others and limited site reconnaissance, and should not be construed as a warranty of the subsurface conditions.

Variations in subsurface conditions are possible between the explorations and may also occur with time. A contingency for unanticipated conditions should be included in the budget and schedule. Sufficient monitoring, testing and consultation should be provided by our firm during construction to confirm that the conditions encountered are consistent with those indicated by the explorations, to provide recommendations for design changes should the conditions revealed during the work differ from those anticipated, and to evaluate whether earthwork and foundation installation activities comply with contract plans and specifications.

The scope of our services does not include services related to environmental remediation and construction safety precautions. Our recommendations are not intended to direct the contractor's methods, techniques, sequences, or procedures, except as specifically described in our report for consideration in design.

If there are any changes in the loads, grades, locations, configurations or type of facilities to be constructed, the conclusions and recommendations presented in this report may not be fully applicable. If such changes are made, we should be given the opportunity to review our recommendations and provide written modifications or verifications, as appropriate.





We have appreciated the opportunity to be of service to you on this project. If you have any questions or comments, please do not hesitate to call at your earliest convenience.

Respectfully submitted,  
GeoResources, LLC



Keith S. Schembs, LEG  
Principal



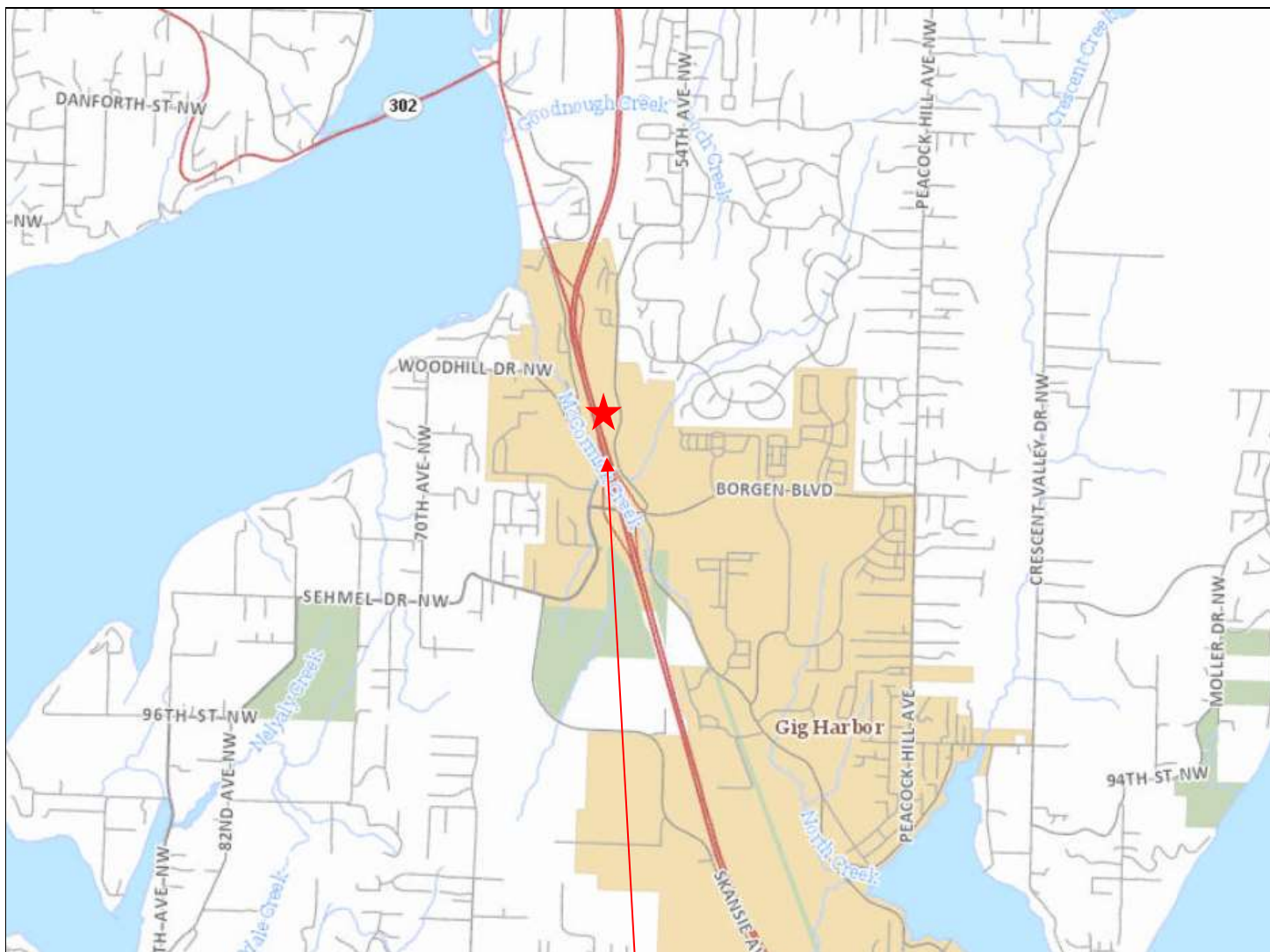
Dana C. Biggerstaff, PE  
Senior Geotechnical Engineer

KSS:DCB/kss

DocID: SwedeHill.Canterwood.RGu

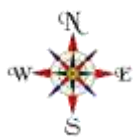
Attachments:

- Figure 1: Site Location Map
- Figure 2: Site Vicinity Map
- Figure 3: Site & Exploration Plan
- Figure 4: NRCS Soils Map
- Figure 5: Geological Map
- Figure 6: Coastal Atlas Map
- Figure 7: Landslide Susceptibility Map
- Figure 8: Fault Hazard Map
- Figure 9: Typical Drainage and Backfilling Detail
- Figure 10: IBC Appendix J – Keyed and Bench Fill Slope Detail
- Appendix A - Subsurface Explorations
- Appendix B - Laboratory Test Results



### Approximate Site Location

Map created from Pierce County Public GIS (<http://matterhornwab.co.pierce.wa.us/publicgis/>)

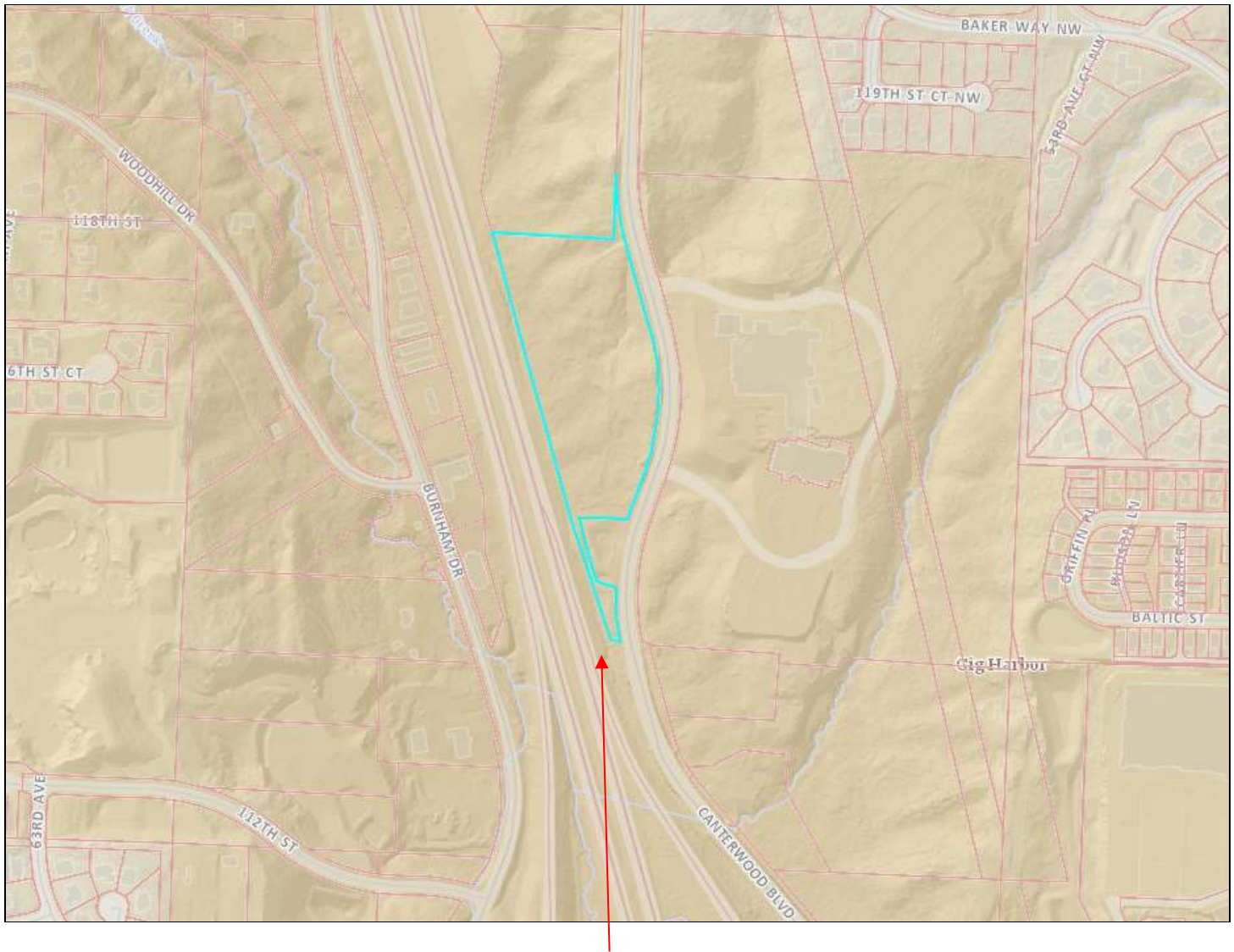


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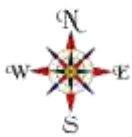
### Site Location Map

Canterwood Commercial Center  
xxx – Canterwood Blvd  
Gig Harbor, Washington  
PN: 0122254090



### Approximate Site Location

Map created from Pierce County Public GIS (<http://matterhornwab.co.pierce.wa.us/publicgis/>)



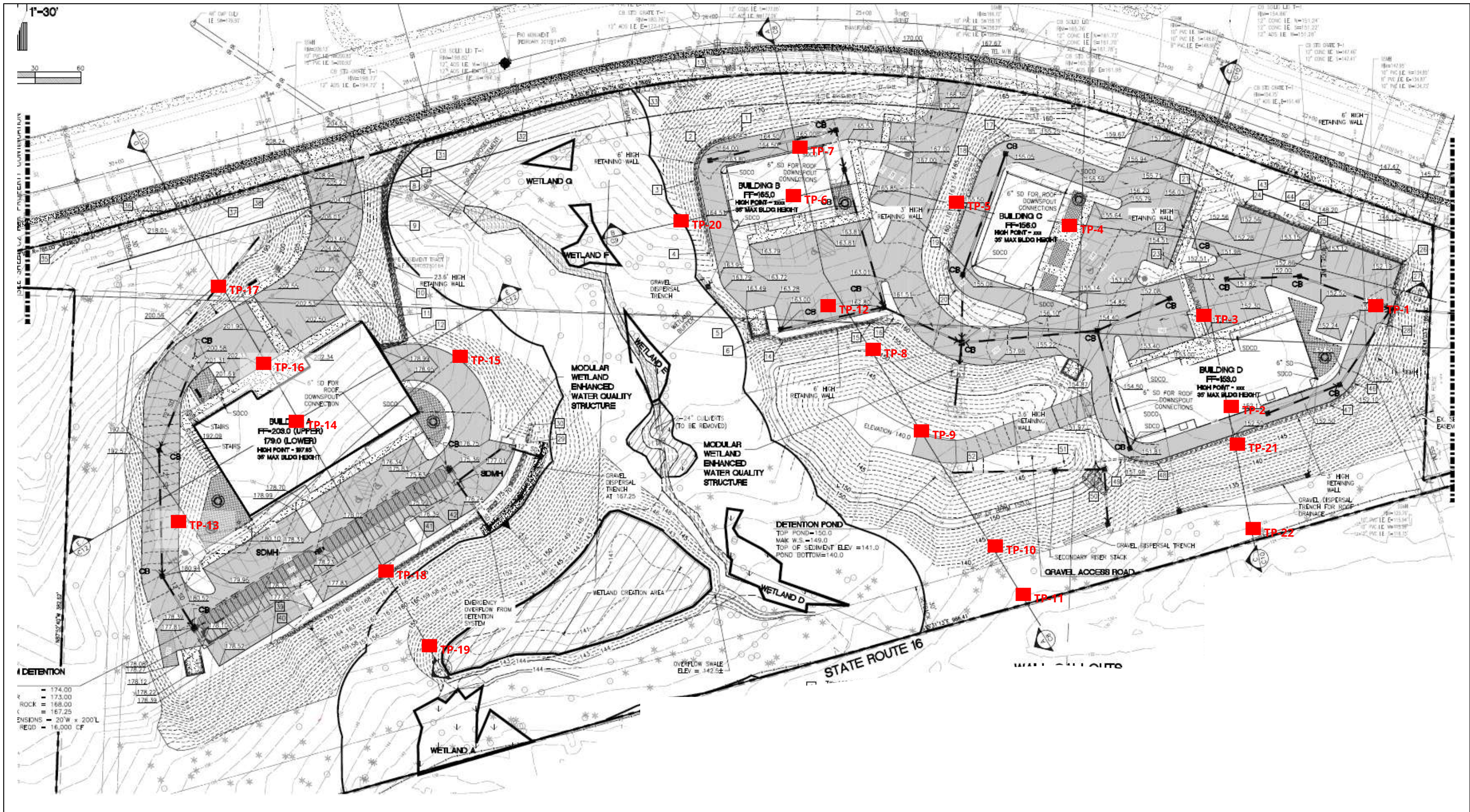
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### Site Vicinity Map

Canterwood Commercial Center  
xxx - Canterwood Blvd  
Gig Harbor, Washington  
PN: 0122254090





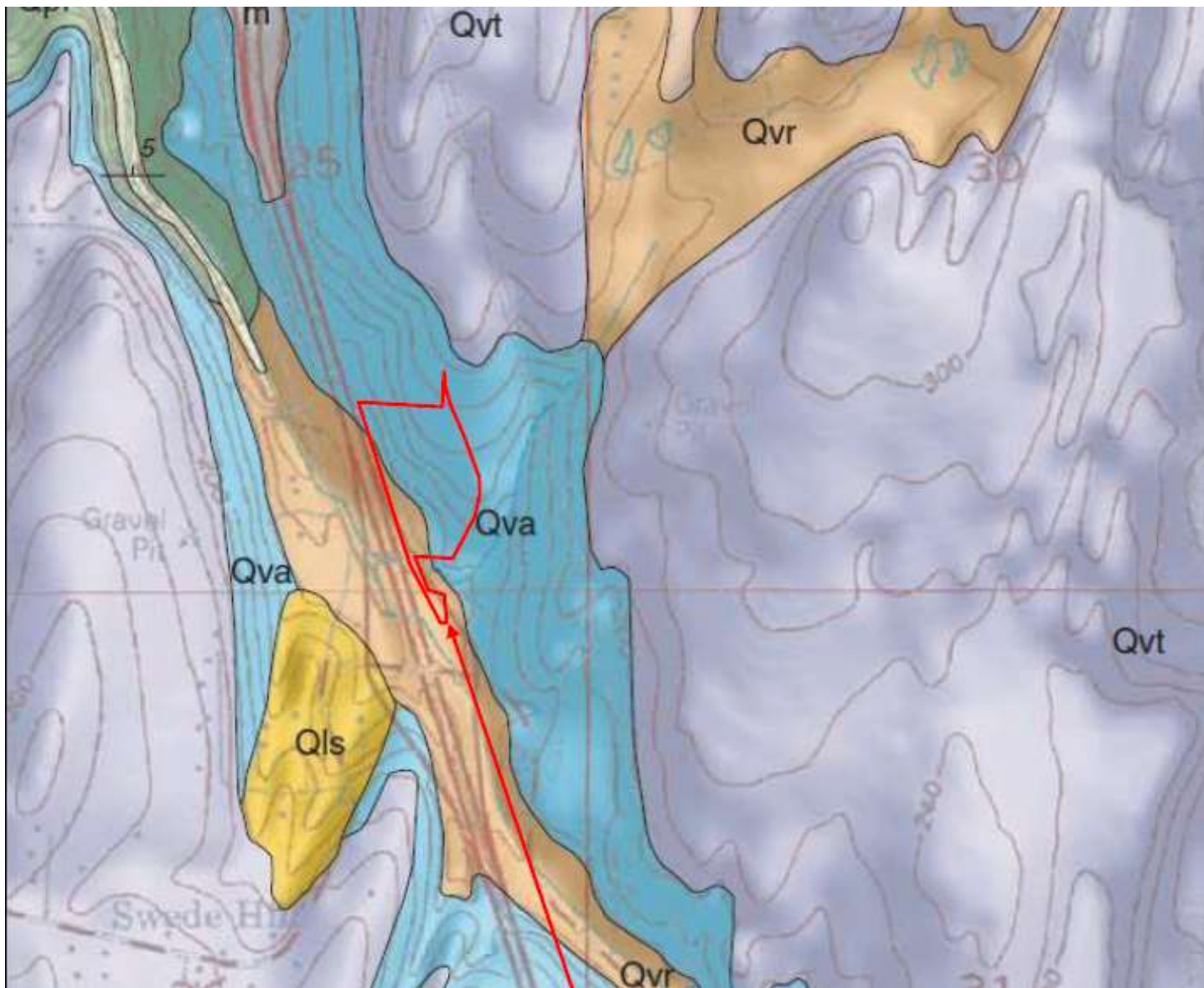
## Site & Exploration Plan

Canterwood Commercial Center  
 xxx - Canterwood Blvd  
 Gig Harbor, Washington  
 PN: 0122254090





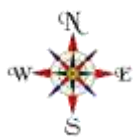




### Approximate Site Location

An excerpt from the draft *Geologic Map of the Gig Harbor 7.5-minute Quadrangle, Pierce County, Washington*

|     |                              |
|-----|------------------------------|
| Qvr | Recessional outwash deposits |
| Qva | Advance outwash deposits     |



Not to Scale



### Geologic Map

Canterwood Commercial Center  
xxx – Canterwood Blvd  
Gig Harbor, Washington  
PN: 0122254090



### Approximate Site Location

Map created from the Washington State Department of Ecology Coastal Atlas  
(<http://geologyportal.dnr.wa.gov/>)



Not to Scale



### Coastal Atlas Map

Canterwood Commercial Center  
xxx – Canterwood Blvd  
Gig Harbor, Washington  
PN: 0122254090





#### Shallow Susceptibility

- Moderate
- High

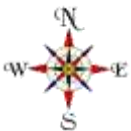


#### Deep Susceptibility

- Moderate
- High

### Approximate Site Location

Map created from the Washington State Department of Natural Resources (Information Portal <https://geologyportal.dnr.wa.gov/>)

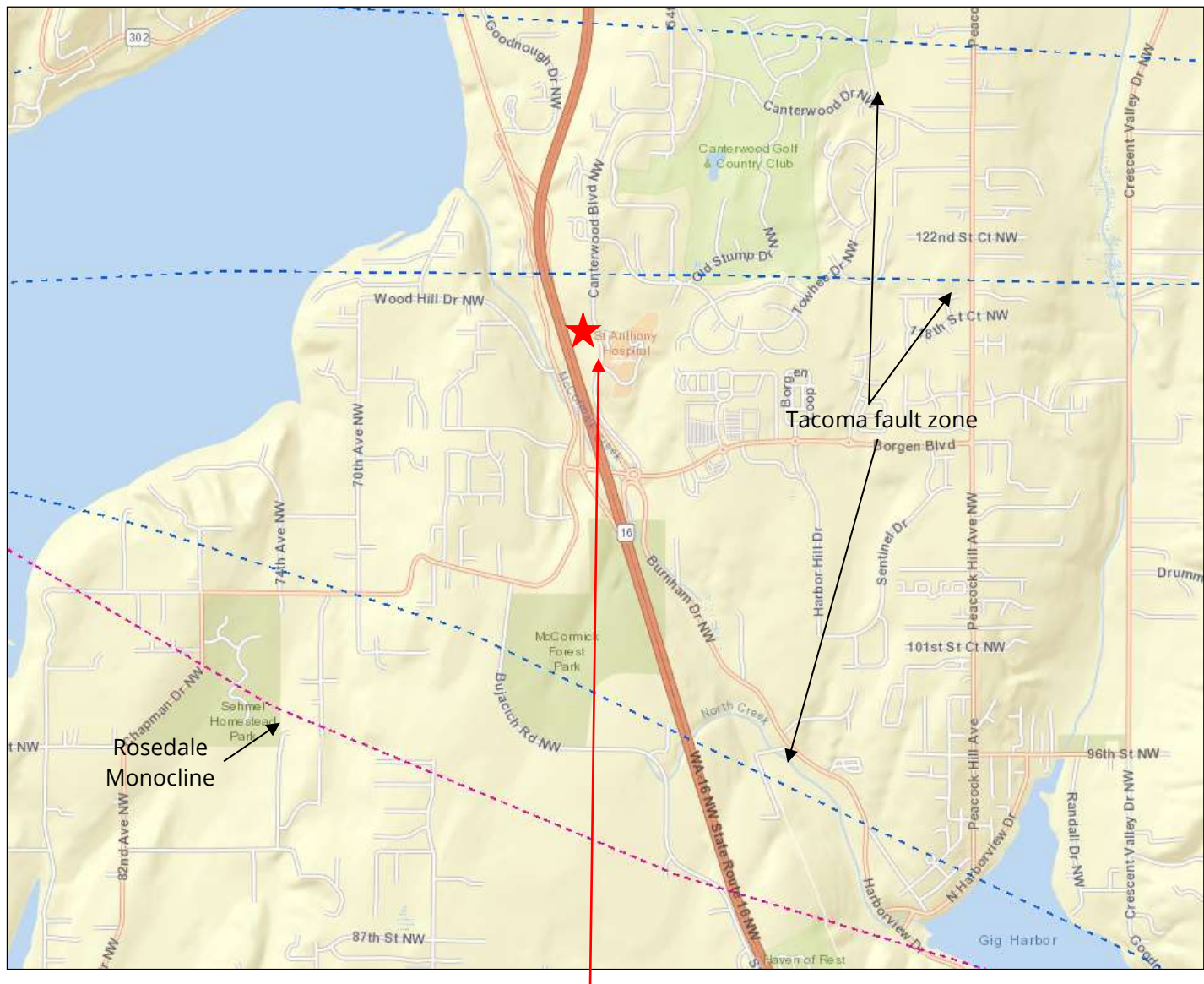


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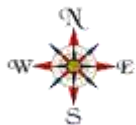
## Landslide Susceptibility Map

Canterwood Commercial Center  
xxx – Canterwood Blvd  
Gig Harbor, Washington  
PN: 0122254090



### Approximate Site Location

Map created from Washington DNR Geologic Information Portal  
<http://fortress.wa.gov/dnr/protectiongis/geology/?Theme=wigm>



Not to Scale



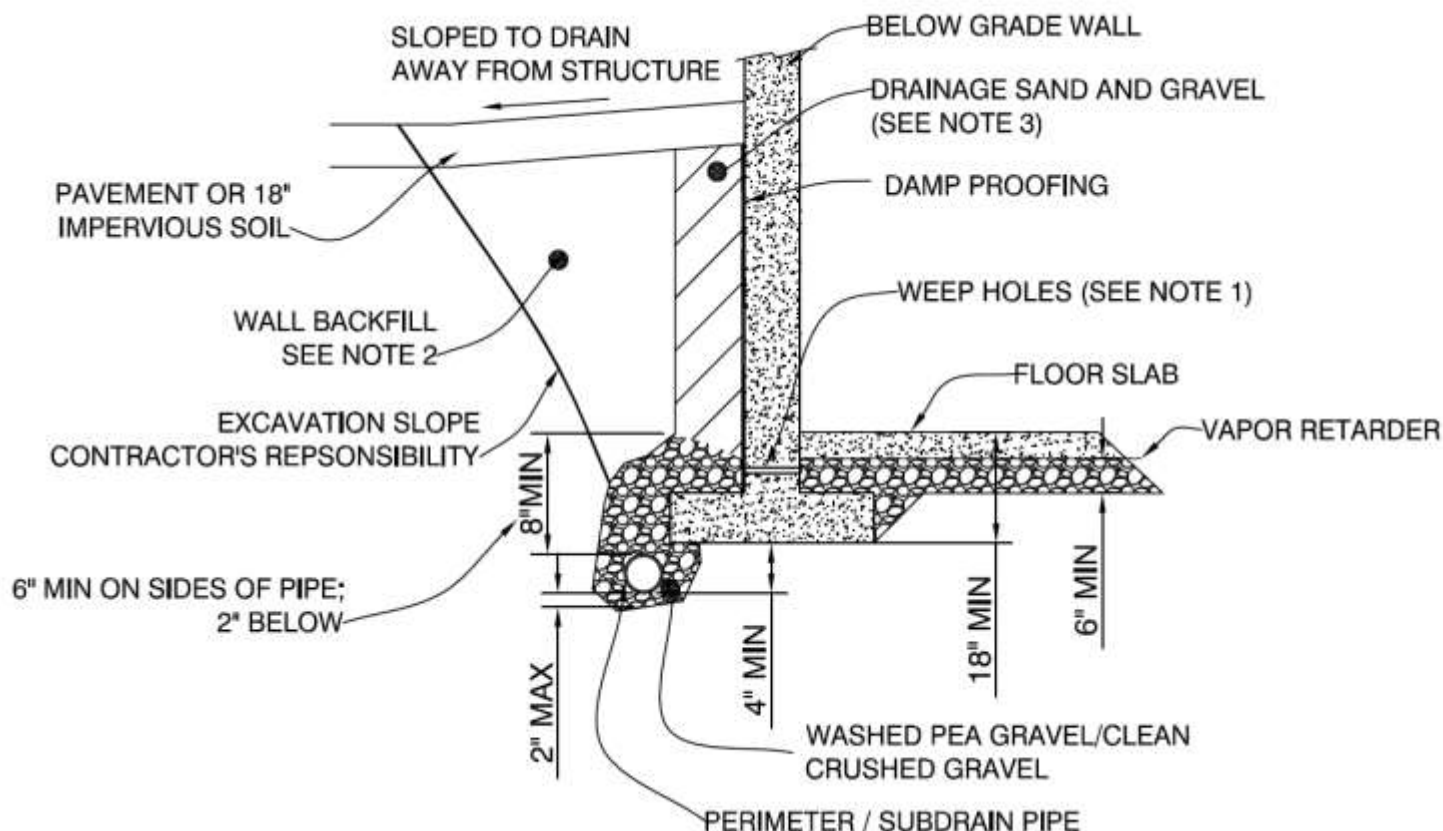
### Fault Hazards Map

Canterwood Commercial Center  
 xxx – Canterwood Blvd  
 Gig Harbor, Washington  
 PN: 0122254090

Doc ID: SwedeHillLLC.CanterwoodBlvd.Fu

May 2020

Figure 8



## Notes

1. Washed pea gravel/crushed rock beneath floor slab could be hydraulically connected to perimeter/subdrain pipe. Use of 1" diameter weep holes as shown is one applicable method. Crushed gravel should consist of 3/4" minus. Washed pea gravel should consist of 3/8" to No. 8 standard sieve.
2. Wall backfill should meet WSDOT Gravel Backfill for Walls Specification 9-03-12(2).
3. Drainage sand and gravel backfill within 18" of wall should be compacted with hand-operated equipment. Heavy equipment should not be used for backfill, as such equipment operated near the wall could increase lateral earth pressures and possibly damage the wall. The table below presents the drainage sand and gravel gradation.
4. All wall back fill should be placed in layers not exceeding 4" loose thickness for light equipment and 8" for heavy equipment and should be densely compacted. Beneath paved or sidewalk areas, compact to at least 95% Modified Proctor maximum density (ASTM: 01557-70 Method C). In landscaping areas, compact to 90% minimum.
5. Drainage sand and gravel may be replaced with a geocomposite core sheet drain placed against the wall and connected to the subdrain pipe. The geocomposite core sheet should have a minimum transmissivity of 3.0 gallons/minute/foot when tested under a gradient of 1.0 according to ASTM 04716.
6. The subdrain should consist of 4" diameter (minimum), slotted or perforated plastic pipe meeting the requirements of AASHTO M 304; 1/8-inch maximum slot width; 3/16- to 3/8-inch perforated pipe holes in the lower half of pipe, with lower third segment unperforated for water flow; tight joints; sloped at a minimum of 6"/100' to drain; cleanouts to be provided at regular intervals.
7. Surround subdrain pipe with 8 inches (minimum) of washed pea gravel (2" below pipe" or 5/8" minus clean crushed gravel. Washed pea gravel to be graded from 3/8-inch to No.8 standard sieve.
8. See text for floor slab subgrade preparation.

## Materials

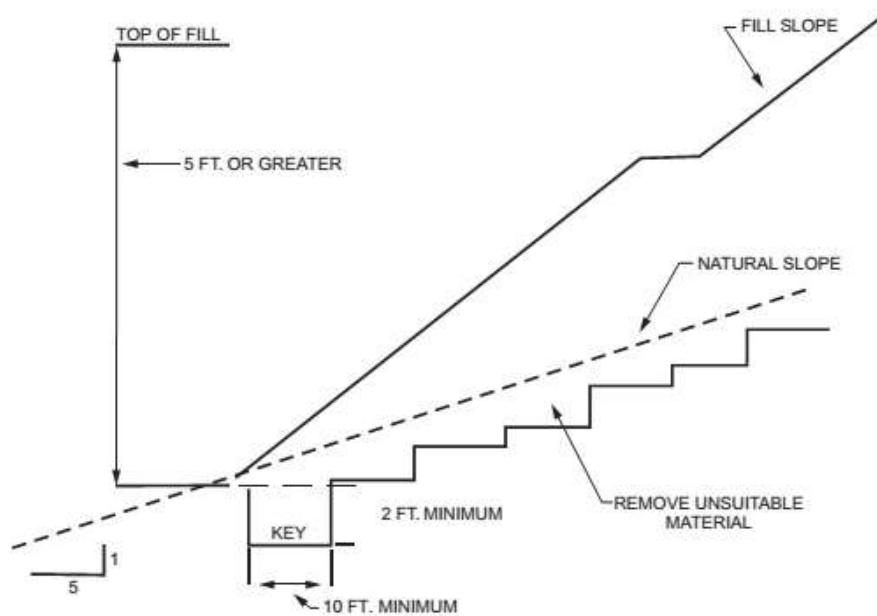
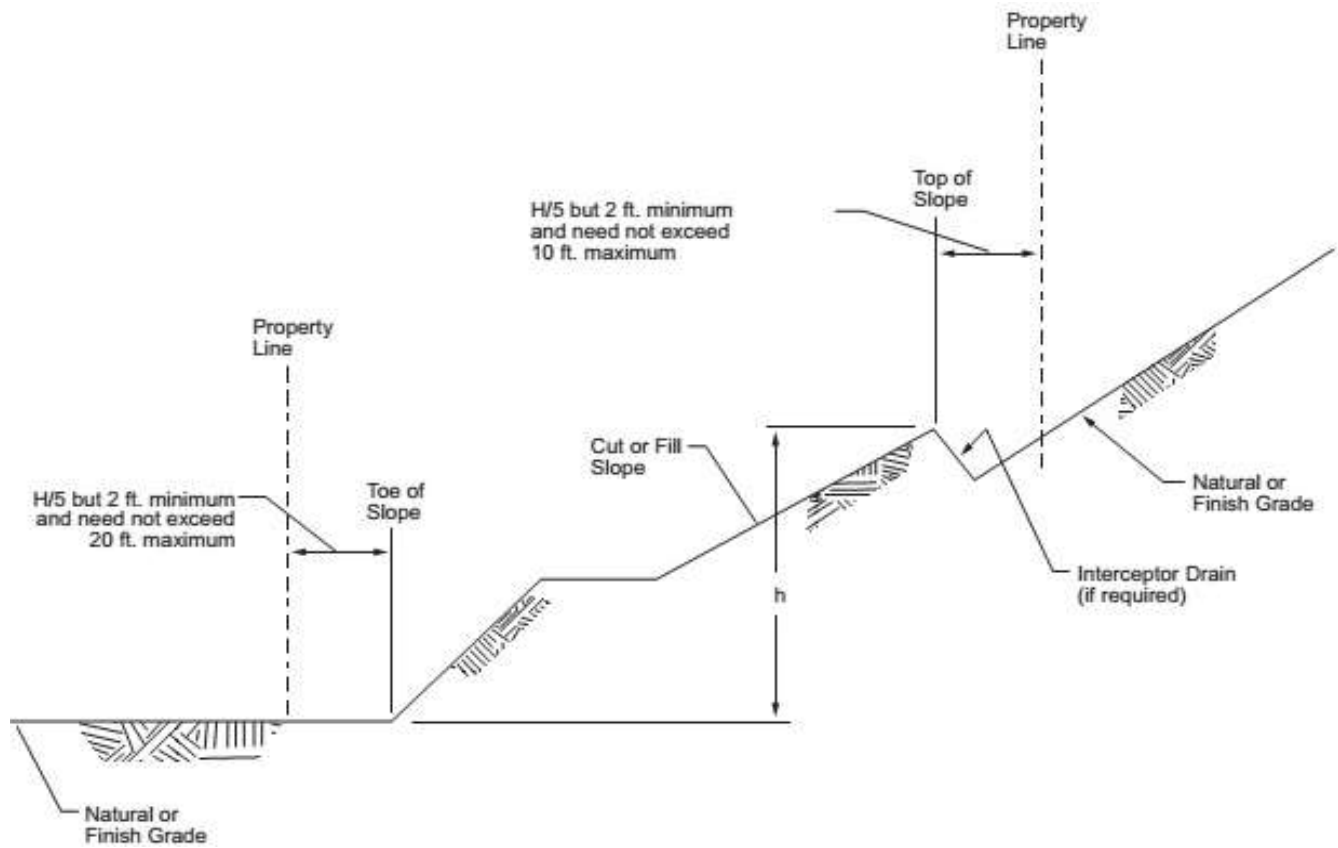
| Drainage Sand and Gravel |                     | 3/4" Minus Crushed Gravel |                     |
|--------------------------|---------------------|---------------------------|---------------------|
| Sieve Size               | % Passing by Weight | Sieve Size                | % Passing by Weight |
| 3/4"                     | 100                 | 3/4"                      | 100                 |
| No 4                     | 28-56               | 1/2"                      | 75 - 100            |
| No 8                     | 20-50               | 1/4"                      | 0 - 25              |
| No 50                    | 3-12                | No 100                    | 0 - 2               |
| No 100                   | 0-2                 | (by wet sieving)          | (non-plastic)       |



## Typical Drainage and Backfilling

Proposed Commercial Development  
11854 SW Lake Flora Road  
Kitsap County, Washington  
PN: 222301-2-015-1003





**Preliminary – Not for Construction**



## IBC APPENDIX J DETAIL

Canterwood Commercial Center  
xxx – Canterwood Blvd  
Gig Harbor, Washington  
PN: 0122254090

# **Appendix A**

## Subsurface Explorations

# SOIL CLASSIFICATION SYSTEM

| MAJOR DIVISIONS                                                     |                                                                        |                   | GROUP SYMBOL | GROUP NAME                                |
|---------------------------------------------------------------------|------------------------------------------------------------------------|-------------------|--------------|-------------------------------------------|
| COARSE GRAINED SOILS<br><br>More than 50% Retained on No. 200 Sieve | GRAVEL<br><br>More than 50% Of Coarse Fraction Retained on No. 4 Sieve | CLEAN GRAVEL      | GW           | WELL-GRADED GRAVEL, FINE TO COARSE GRAVEL |
|                                                                     |                                                                        |                   | GP           | POORLY-GRADED GRAVEL                      |
|                                                                     |                                                                        | GRAVEL WITH FINES | GM           | SILTY GRAVEL                              |
|                                                                     |                                                                        |                   | GC           | CLAYEY GRAVEL                             |
|                                                                     | SAND<br><br>More than 50% Of Coarse Fraction Passes No. 4 Sieve        | CLEAN SAND        | SW           | WELL-GRADED SAND, FINE TO COARSE SAND     |
|                                                                     |                                                                        |                   | SP           | POORLY-GRADED SAND                        |
|                                                                     |                                                                        | SAND WITH FINES   | SM           | SILTY SAND                                |
|                                                                     |                                                                        |                   | SC           | CLAYEY SAND                               |
| FINE GRAINED SOILS<br><br>More than 50% Passes No. 200 Sieve        | SILT AND CLAY<br><br>Liquid Limit Less than 50                         | INORGANIC         | ML           | SILT                                      |
|                                                                     |                                                                        |                   | CL           | CLAY                                      |
|                                                                     |                                                                        | ORGANIC           | OL           | ORGANIC SILT, ORGANIC CLAY                |
|                                                                     | SILT AND CLAY<br><br>Liquid Limit 50 or more                           | INORGANIC         | MH           | SILT OF HIGH PLASTICITY, ELASTIC SILT     |
|                                                                     |                                                                        |                   | CH           | CLAY OF HIGH PLASTICITY, FAT CLAY         |
|                                                                     |                                                                        | ORGANIC           | OH           | ORGANIC CLAY, ORGANIC SILT                |
| HIGHLY ORGANIC SOILS                                                |                                                                        |                   | PT           | PEAT                                      |

## NOTES:

- Field classification is based on visual examination of soil in general accordance with ASTM D2488-90.
- Soil classification using laboratory tests is based on ASTM D2487-90.
- Description of soil density or consistency are based on interpretation of blow count data, visual appearance of soils, and or test data.

## SOIL MOISTURE MODIFIERS:

- Dry- Absence of moisture, dry to the touch
- Moist- Damp, but no visible water
- Wet- Visible free water or saturated, usually soil is obtained from below water table



## Unified Soils Classification System

Canterwood Commercial Center

xxx Canterwood Boulevard

Gig Harbor, Washington

PN: 012225-4062, -1032, -5002, -5003, -5004

### Test Pit TP- 1

Location: Driveway to Building D  
Approximate Elevation: 137 feet

| Depth (feet) | Soil Type | Soil Description                                                                                                            |
|--------------|-----------|-----------------------------------------------------------------------------------------------------------------------------|
| 0.0 - 0.5    |           | Duff/Topsoil                                                                                                                |
| 0.5 - 1.5    | SM        | Brown silty (loamy) gravelly SAND/sandy gravelly SILT with some gravel, roots (loose, moist)                                |
| 1.5 - 4.0    | SM        | Orange brown silty SAND, with some gravel, cobbles (loose to medium dense, moist)                                           |
| 4.0 - 7.0    | SW        | Gray with some orange mottling gravelly SAND with some silt to silty, occasional cobbles (dense, moist)(SANDY GLACIAL TILL) |

Terminated at 7 feet below ground surface.  
No caving observed.  
No groundwater seepage observed.

### Test Pit TP- 2

Location: Parking above Building D  
Approximate Elevation: 138 feet

| Depth (feet) | Soil Type | Soil Description                                                                                                   |
|--------------|-----------|--------------------------------------------------------------------------------------------------------------------|
| 0.0 - 0.3    |           | Duff/Topsoil                                                                                                       |
| 0.3 - 2.0    | SM        | Light orange-brown silty (loamy) SAND with some, roots (loose, moist)                                              |
| 2.0 - 5.0    | SM        | Gray with some orange mottling silty fine to medium SAND with trace to some gravel (loosed to medium dense, moist) |
| 5.0 - 7.5    | SM        | Gray silty fine to medium SAND, with a trace gravel, lightly cemented (medium dense, moist) (SANDY GLACIAL TILL)   |

Terminated at 7.5 feet below ground surface.  
No caving observed.  
No groundwater seepage observed.

### Test Pit TP- 3

Location: Driveway to Building C  
Approximate Elevation: 145 feet

| Depth (feet) | Soil Type | Soil Description                                                                                     |
|--------------|-----------|------------------------------------------------------------------------------------------------------|
| 0.0 - 0.7    |           | Duff/Topsoil                                                                                         |
| 0.7 - 2.0    |           | Light orange brown silty (loamy) fine SAND, with roots                                               |
| 2.0 - 5.5    | SP        | Tan/gray with orange mottling medium to fine SAND with some silt, trace gravel (medium dense, moist) |
| 5.5 - 7.5    | SW        | Yellow-gray gravelly medium to coarse SAND with some silt (medium dense, moist) (SANDY GLACIAL TILL) |

Terminated at 7.5 feet below ground surface.  
No caving observed.  
No groundwater seepage observed.

Logged by: KSS

Excavated on: January 16, 2014



### Test Pit Logs

Canterwood Commercial Center  
xxx Canterwood Boulevard  
Gig Harbor, Washington

PN: 012225-4062, -1032, -5002, -5003, -5004

Doc ID: SwedeHillLLC.CanterwoodBlvd.Fu

May 2020

Figure A-2a

### Test Pit TP- 4

Location: Building Pad C  
Approximate Elevation: 152 feet

| Depth (feet) | Soil Type | Soil Description                                                                                     |
|--------------|-----------|------------------------------------------------------------------------------------------------------|
| 0.0 - 0.5    |           | Duff/Topsoil                                                                                         |
| 0.5 - 1.5    |           | Light orange brown silty (loamy) fine SAND, with roots                                               |
| 1.5 - 4.0    | SP        | Tan/gray with orange mottling gravelly medium to coarse SAND with some silt (medium dense, moist)    |
| 4.0 - 8.0    | SW        | Yellow-gray gravelly medium to coarse SAND with some silt (medium dense, moist) (SANDY GLACIAL TILL) |

Terminated at 8 feet below ground surface.  
No caving observed.  
No groundwater seepage observed.

### Test Pit TP- 5

Location: Retaining walls between Building C/B  
Approximate Elevation: 158 feet

| Depth (feet) | Soil Type | Soil Description                                                                                                                 |
|--------------|-----------|----------------------------------------------------------------------------------------------------------------------------------|
| 0.0 - 0.2    | -         | Topsoil                                                                                                                          |
| 0.2 - 1.5    |           | Old Road Fill (black silty sandy GRAVEL with a separation fabric)                                                                |
| 1.5 - 4.5    | SP        | Tan/gray with some orange mottling, fine to medium SAND, some silt to silty, trace gravel (medium dense, moist) (WEATHERED TILL) |
| 4.5 - 6.0    | SM        | Tan/gray silty SAND with some gravel, occasional cobble (dense, moist) (GLACIAL TILL)                                            |

Terminated at 6 feet below ground surface.  
No caving observed.  
No groundwater seepage observed.

### Test Pit TP- 6

Location: Building Pad B  
Approximate Elevation: 173 feet

| Depth (feet) | Soil Type | Soil Description                                                                                                                 |
|--------------|-----------|----------------------------------------------------------------------------------------------------------------------------------|
| 0.0 - 0.5    |           | Duff/Topsoil                                                                                                                     |
| 0.5 - 2.5    |           | Old Road Fill (black silty sandy GRAVEL)                                                                                         |
| 2.5 - 5.0    | SM        | Tan/gray with some orange mottling, fine to medium SAND, some silt to silty, trace gravel (medium dense, moist) (WEATHERED TILL) |
| 5.0 - 8.0    | SM        | Tan/gray silty fine SAND with some gravel, occasional cobble (dense, moist) (GLACIAL TILL)                                       |

Terminated at 8 feet below ground surface.  
No caving observed.  
No groundwater seepage observed.

Logged by: KSS

Excavated on: January 16, 2014



### Test Pit Logs

Canterwood Commercial Center  
xxx Canterwood Boulevard  
Gig Harbor, Washington

PN: 012225-4062, -1032, -5002, -5003, -5004

Doc ID: SwedeHillLLC.CanterwoodBlvd.Fu

May 2020

Figure A-2b



### Test Pit TP- 7

Location: Wall above Building B

Approximate Elevation: 180 feet

| Depth (feet) | Soil Type | Soil Description                                                                                                                 |
|--------------|-----------|----------------------------------------------------------------------------------------------------------------------------------|
| 0.0 - 0.3    |           | Duff/Topsoil                                                                                                                     |
| 0.3 - 2.5    |           | Orange brown silty (loamy) SAND, with some gravel and roots (loose to medium dense, moist)                                       |
| 2.5 - 5.0    | SP        | Tan/gray with some orange mottling, fine to medium SAND, some silt to silty, trace gravel (medium dense, moist) (WEATHERED TILL) |
| 5.0 - 9.0    | SM        | Tan/gray silty fine SAND with some gravel, occasional cobble (dense, moist) (GLACIAL TILL)                                       |

Terminated at 9 feet below ground surface.

No caving observed.

No groundwater seepage observed.

### Test Pit TP- 8

Location: Fill slope below Building B parking lot

Approximate Elevation: 150 feet

| Depth (feet) | Soil Type | Soil Description                                                                                            |
|--------------|-----------|-------------------------------------------------------------------------------------------------------------|
| 0.0 - 0.5    |           | Duff/Topsoil                                                                                                |
| 0.5 - 2.5    | SM        | Gray with orange/tan mottling, fine sandy SILT, trace rootlets. (soft to medium stiff, wet)                 |
| 2.5 - 5.0    | ML        | Tan/buff with some orange mottling, SILT with some fine and roots (medium stiff to stiff, moist) (ALLUVIUM) |
| 5.0 - 9.0    | SW        | Gray/tan fine to medium SAND, with trace silt, gravel (medium dense to dense, wet) (ALLUVIUM)               |

Terminated at 9 feet below ground surface.

No caving observed.

Slow groundwater seepage observed at 6 feet.

### Test Pit TP- 9

Location: West (upslope) edge of storm pond berm

Approximate Elevation: 140 feet

| Depth (feet) | Soil Type | Soil Description                                                                                                      |
|--------------|-----------|-----------------------------------------------------------------------------------------------------------------------|
| 0.0 - 0.5    |           | Duff/Topsoil                                                                                                          |
| 0.5 - 1.5    | SM        | Gray with orange/tan mottling, fine sandy SILT, trace rootlets. (soft to medium stiff, wet)                           |
| 1.5 - 3.5    | ML        | Tan/buff with some orange mottling, SILT with some fine and roots (medium stiff to stiff, moist) (ALLUVIUM)           |
| 3.5 - 5.5    | ML        | Gray with some orange mottling, non-plastic SILT with some fine sand, roots (medium stiff to stiff, moist) (ALLUVIUM) |
| 5.5 - 8.0    | SM        | Gray/tan silty fine SAND, with gravel (medium dense to dense, wet) (ALLUVIUM)                                         |

Terminated at 8 feet below ground surface.

No caving observed.

Logged by: KSS

Excavated on: January 16, 2014



### Test Pit Logs

Canterwood Commercial Center

xxx Canterwood Boulevard

Gig Harbor, Washington

PN: 012225-4062, -1032, -5002, -5003, -5004

Doc ID: SwedeHillLLC.CanterwoodBlvd.Fu

May 2020

Figure A-2c

### Test Pit TP- 10

Location: Center of storm pond berm

Approximate Elevation: 138 feet

| Depth (feet) | Soil Type | Soil Description                                                                                                  |
|--------------|-----------|-------------------------------------------------------------------------------------------------------------------|
| 0.0 - 0.5    |           | Duff/Topsoil                                                                                                      |
| 0.5 - 2.0    | SM        | Dark orange brown fine sandy SILT/silty fine SAND, with trace gravel and roots (loose to medium dense) (ALLUVIUM) |
| 2.0 - 4.5    | SM        | Tan with orange mottling silty fine to medium SAND (loose to medium dense, moist) (ALLUVIUM)                      |
| 4.5 - 8.0    | SM        | Yellow gray silty fine to medium SAND with some gravel, cobbles (medium dense, moist to wet) (ALLUVIUM)           |

Terminated at 8 feet below ground surface.

No caving observed.

No groundwater seepage observed.

### Test Pit TP- 11

Location: East (down slope) edge of storm pond berm

Approximate Elevation: 135 feet

| Depth (feet) | Soil Type | Soil Description                                                                                |
|--------------|-----------|-------------------------------------------------------------------------------------------------|
| 0.0 - 0.7    |           | Duff/Topsoil                                                                                    |
| 0.7 - 2.5    | SM        | Dark orange brown fine silty fine SAND, with trace gravel and roots (loose to medium dense)     |
| 2.5 - 7.5    | SM        | Yellow gray gravelly fine to medium SAND with some silt (medium dense, moist to wet) (ALLUVIUM) |

Terminated at 7.5 feet below ground surface.

No caving observed.

No groundwater seepage observed.

### Test Pit TP- 12

Location: Parking area below Building B

Approximate Elevation: 152feet

| Depth (feet) | Soil Type | Soil Description                                                         |
|--------------|-----------|--------------------------------------------------------------------------|
| 0.0 - 0.3    |           | Duff/Topsoil                                                             |
| 0.3 - 3.5    |           | Brown silty SAND with gravel, organics (loose, moist)(OLD FILL)          |
| 3.5 - 6.0    | SM        | Tan/gray silty gravelly SAND (dense to very dense, moist) (GLACIAL TILL) |

Terminated at 6 feet below ground surface.

No caving observed.

No groundwater seepage observed.

Logged by: KSS

Excavated on: January 16, 2014



### Test Pit Logs

Canterwood Commercial Center

xxx Canterwood Boulevard

Gig Harbor, Washington

PN: 012225-4062, -1032, -5002, -5003, -5004

Doc ID: SwedeHillLLC.CanterwoodBlvd.Fu

May 2020

Figure A-2d

### Test Pit TP- 13

Location: Driveway north of Building A  
Approximate Elevation: 176 feet

| Depth (feet) | Soil Type | Soil Description                                                                                              |
|--------------|-----------|---------------------------------------------------------------------------------------------------------------|
| 0.0 - 0.5    |           | Duff/Topsoil                                                                                                  |
| 0.5 - 1.5    | SM        | Orange-brown silty (loamy) fine to medium SAND with some gravel, roots (medium dense, moist) (WEATHERED TILL) |
| 1.5 - 9.0    | SM        | Tan/gray silty fine SAND with some gravel, occasional cobble (dense, moist) (GLACIAL TILL)                    |

Terminated at 9 feet below ground surface.  
No caving observed.  
No groundwater seepage observed.

### Test Pit TP- 14

Location: Building Pad A  
Approximate Elevation: 180 feet

| Depth (feet) | Soil Type | Soil Description                                                                                                     |
|--------------|-----------|----------------------------------------------------------------------------------------------------------------------|
| 0.0 - 0.3    |           | Duff/Topsoil                                                                                                         |
| 0.3 - 1.3    | SM        | Orange-brown silty (loamy) SAND, with some gravel, rootlets (medium dense, moist)                                    |
| 1.3 - 3.5    | SM        | Yellow brown sandy GRAVEL/gravelly SAND with some cobbles, trace silt (dense to very dense, moist) (ADVANCE OUTWASH) |

Terminated at 3.5 feet below ground surface.  
No caving observed.  
No groundwater seepage observed.

### Test Pit TP- 15

Location: Driveway south of Building A  
Approximate Elevation: 173 feet

| Depth (feet) | Soil Type | Soil Description                                                                                                                     |
|--------------|-----------|--------------------------------------------------------------------------------------------------------------------------------------|
| 0.0 - 0.2    |           | Duff/Topsoil                                                                                                                         |
| 0.2 - 4.5    |           | Brown silty SAND with gravel, significant woody debris (logs, stumps) (loose to medium dense, moist) (Regraded Native soils as Fill) |
| 4.5 - 7.0    | SM        | Relic topsoil over brown silty SAND (loose, moist to wet at depth) (WEATHERED TILL)                                                  |
| 7.0 - 9.0    | SM        | Gray silty SAND with gravel (dense, moist) (GLACIAL TILL)                                                                            |

Terminated at 9 feet below ground surface.  
Moderate caving observed from surface to depth of 7 feet.  
Slow groundwater seepage observed at 7 feet depth.

Logged by: KSS/RMP

Excavated on: January 16, 2014



### Test Pit Logs

Canterwood Commercial Center  
xxx Canterwood Boulevard  
Gig Harbor, Washington

PN: 012225-4062, -1032, -5002, -5003, -5004

Doc ID: SwedeHillLLC.CanterwoodBlvd.Fu

May 2020

Figure A-2e

### Test Pit TP- 16

Location: Parking lot above Building A

Approximate Elevation: 189 feet

| Depth (feet) | Soil Type | Soil Description                                                           |
|--------------|-----------|----------------------------------------------------------------------------|
| 0.0 - 0.8    | -         | Topsoil/Forest Duff                                                        |
| 0.8 - 2.5    | SM        | Brown silty (loamy) SAND with fibrous roots (loose to medium dense, moist) |
| 2.5 - 4.0    | SM        | Brown to tan mottled silty SAND (medium dense, moist) (WEATHERED TILL)     |
| 4.0 - 6.0    | SM        | Gray silty SAND with gravel (dense to very dense, moist) (GLACIAL TILL)    |

Terminated at 6 feet below ground surface.

Slight caving observed from surface to 3 feet.

No groundwater seepage observed. Mottling observed above 4 feet depth.

### Test Pit TP- 17

Location: Cut slope above Building A parking lot

Approximate Elevation: 206 feet

| Depth (feet) | Soil Type | Soil Description                                                           |
|--------------|-----------|----------------------------------------------------------------------------|
| 0.0 - 1.0    | -         | Topsoil/Forest Duff                                                        |
| 1.0 - 5.0    | SM        | Brown silty (loamy) SAND with fibrous roots (loose to medium dense, moist) |
| 5.0 - 7.0    | SM        | Light gray fine sandy SILT, with some gravel (dense, moist) (GLACIAL TILL) |

Terminated at 7 feet below ground surface.

Slight caving observed from surface to 5 feet deep.

No groundwater seepage observed.

### Test Pit TP- 18

Location: Parking lot below Building A

Approximate Elevation: 175 feet

| Depth (feet) | Soil Type | Soil Description                                                                            |
|--------------|-----------|---------------------------------------------------------------------------------------------|
| 0.0 - 0.2    | -         | Duff                                                                                        |
| 0.2 - 2.5    | -         | Topsoil strippings with debris (silt fence material, plastic sheeting) (loose, moist)(FILL) |
| 2.5 - 6.3    | SM        | Brown silty SAND (loose to medium dense, moist) (ALLUVIUM)                                  |
| 6.3 - 7.5    | ML        | Light gray fine sandy SILT (stiff, moist) (ALLUVIUM)                                        |

Terminated at 7½ feet below ground surface.

Slight caving observed from surface to depth of 4 feet.

No groundwater seepage observed, but increased moisture content observed at and above at 6¼ feet.

Logged by: RMP

Excavated on: January 16, 2014



### Test Pit Logs

Canterwood Commercial Center

xxx Canterwood Boulevard

Gig Harbor, Washington

PN: 012225-4062, -1032, -5002, -5003, -5004

Doc ID: SwedeHillLLC.CanterwoodBlvd.Fu

May 2020

Figure A-2f

### Test Pit TP- 19

Location: Fill slope below Building A parking lot  
Approximate Elevation: 152 feet

| Depth (feet) | Soil Type | Soil Description                                                                           |
|--------------|-----------|--------------------------------------------------------------------------------------------|
| 0.0 - 2.0    | -         | Duff/Topsoil with woody debris/roots                                                       |
| 2.0 - 7.0    | SM/ML     | Gray/tan SILT/SAND with cobbles, boulders (medium dense, moist to wet at depth) (ALLUVIUM) |
| 7.0 - 9.0    | ML        | Gray sandy SILT (stiff, moist) (ALLUVIUM)                                                  |

Terminated at 9 feet below ground surface.  
No caving observed.  
Slow groundwater seepage observed at 7 feet.

### Test Pit TP- 20

Location: Driveway north of Building B  
Approximate Elevation: 172 feet

| Depth (feet) | Soil Type | Soil Description                                                                           |
|--------------|-----------|--------------------------------------------------------------------------------------------|
| 0.0 - 0.5    |           | Duff/Topsoil                                                                               |
| 0.5 - 1.5    |           | Orange brown silty (loamy) SAND, with some gravel and roots (loose to medium dense, moist) |
| 1.5 - 6.0    | SM        | Brown silty SAND (loose to medium dense, moist)                                            |
| 6.0 - 7.0    | SM        | Gray silty SAND with gravel (dense, moist) (sandy GLACIAL TILL)                            |

Terminated at 7 feet below ground surface.  
Slight caving observed from surface to 4 feet.  
No groundwater seepage observed.

### Test Pit TP- 21

Location: Building Pad D  
Approximate Elevation: 136 feet

| Depth (feet) | Soil Type | Soil Description                                                                          |
|--------------|-----------|-------------------------------------------------------------------------------------------|
| 0.0 - 1.0    | -         | Topsoil                                                                                   |
| 1.0 - 3.0    | SM        | Brown silty SAND with trace gravel (loose to medium dense, moist)                         |
| 3.0 - 4.0    | SM        | Brown mottled silty SAND with trace gravel (medium dense, moist) (WEATHERED GLACIAL TILL) |
| 4.0 - 8.5    | SM        | Gray silty SAND with gravel (dense, moist) (SANDY GLACIAL TILL)                           |

Terminated at 8½ feet below ground surface.  
Slight caving observed from surface to 3 feet.  
No groundwater seepage observed, but mottling observed from 3 to 4 feet below the ground surface. .

Logged by: RMP

Excavated on: January 16, 2014



### Test Pit Logs

Canterwood Commercial Center  
xxx Canterwood Boulevard  
Gig Harbor, Washington

PN: 012225-4062, -1032, -5002, -5003, -5004

Job: SwedeHillLLC.CanterwoodBlvd.F

January 2014

Figure A-2g



## Test Pit TP- 22

Location: Fill slope below Building D

Approximate Elevation: 128 feet

| Depth (feet) | Soil Type | Soil Description                                           |
|--------------|-----------|------------------------------------------------------------|
| 0.0 - 1.0    | -         | Duff/Topsoil                                               |
| 1.0 - 3.0    | ML        | Olive gray mottled sandy SILT (medium stiff, moist to wet) |
| 3.0 - 9.0    | ML        | Olive gray mottled sandy SILT (stiff, moist)(ALLUVIUM)     |

Terminated at 9 feet below ground surface.

No caving observed.

Mottling observed to full depth explored.

Logged by: RMP

Excavated on: January 16, 2014



### Test Pit Logs

Canterwood Commercial Center

xxx Canterwood Boulevard

Gig Harbor, Washington

PN: 012225-4062, -1032, -5002, -5003, -5004

Doc ID: SwedeHillLLC.CanterwoodBlvd.Fu

May 2020

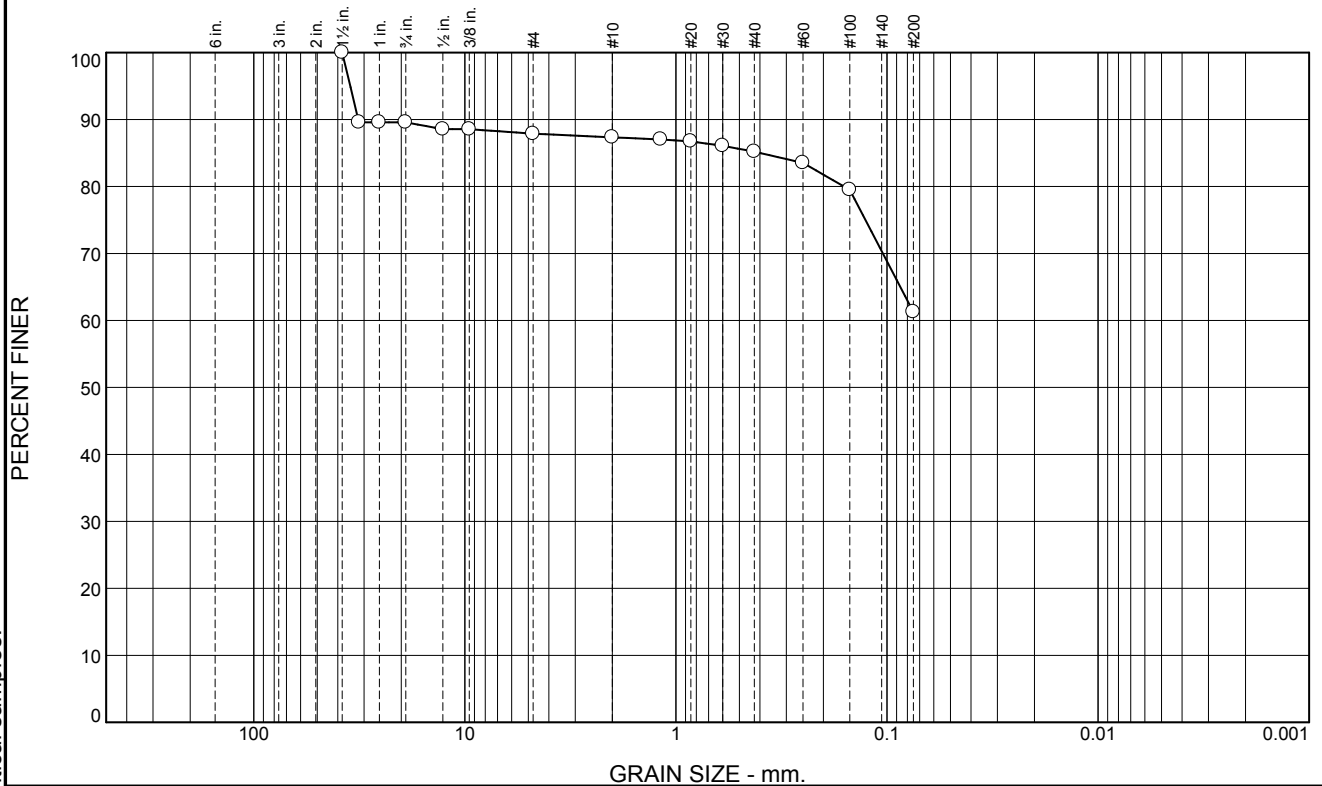
Figure A-2h

## **Appendix B**

### Laboratory Test Results

These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicative of apparently identical samples.

# Particle Size Distribution Report



| % +3" | % Gravel |      | % Sand |        |      | % Fines |      |
|-------|----------|------|--------|--------|------|---------|------|
|       | Coarse   | Fine | Coarse | Medium | Fine | Silt    | Clay |
| 0     | 10       | 2    | 1      | 2      | 24   | 61      |      |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|------------|---------------|----------------|--------------|
| 1.5        | 100           |                |              |
| 1.25       | 90            |                |              |
| 1.0        | 90            |                |              |
| 3/4        | 90            |                |              |
| 1/2        | 89            |                |              |
| 3/8        | 89            |                |              |
| #4         | 88            |                |              |
| #10        | 87            |                |              |
| #16        | 87            |                |              |
| #20        | 87            |                |              |
| #30        | 86            |                |              |
| #40        | 85            |                |              |
| #60        | 84            |                |              |
| #100       | 79            |                |              |
| #200       | 61            |                |              |

\* (no specification provided)

## Material Description

Grey Fine Silty Sand  
Natural Moisture = 13.59%

## Atterberg Limits

PL=      LL=      PI=

D<sub>90</sub>= 31.9862      D<sub>85</sub>= 0.3989      D<sub>60</sub>=

D<sub>50</sub>=      D<sub>30</sub>=      D<sub>15</sub>=

D<sub>10</sub>=      C<sub>u</sub>=      C<sub>c</sub>=

## Classification

USCS=      AASHTO=

## Remarks

Location: TP-17 S-1  
Sample Number: 090764      Depth: 5'-7.5'

Date: 1/22/2014

**GeoResources, LLC**

**Fife, WA**

Client: Swede Hill LLC.  
Project: Canterwood Commercial Center

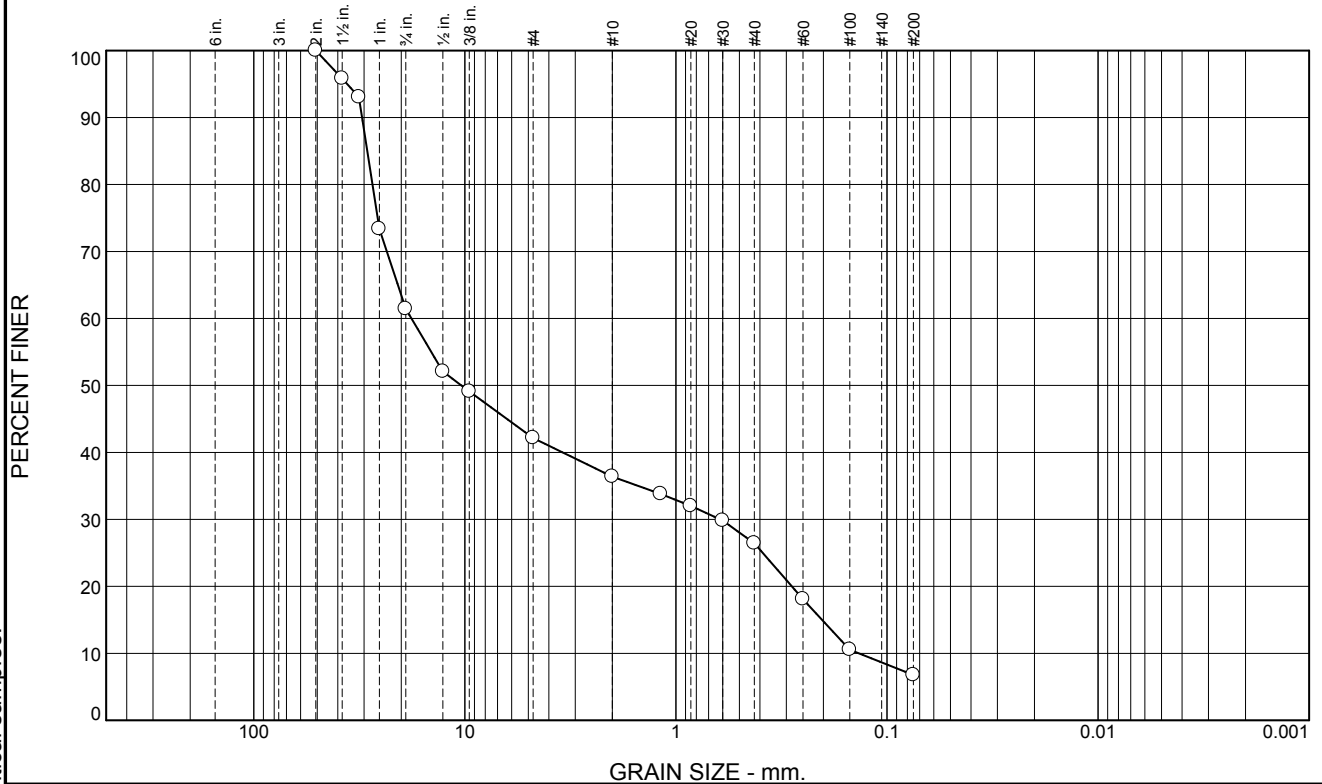
Project No: SwedeHillLLC.Canterwood

Figure B-9

Tested By: Timothy Bergstrom      Checked By: Keith Schembs

These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicative of apparently identical samples.

## Particle Size Distribution Report



| % +3" | % Gravel |      | % Sand |        |      | % Fines |      |
|-------|----------|------|--------|--------|------|---------|------|
|       | Coarse   | Fine | Coarse | Medium | Fine | Silt    | Clay |
| 0     | 39       | 19   | 6      | 10     | 19   | 7       |      |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|------------|---------------|----------------|--------------|
| 2.0        | 100           |                |              |
| 1.5        | 96            |                |              |
| 1.25       | 93            |                |              |
| 1.0        | 73            |                |              |
| 3/4        | 61            |                |              |
| 1/2        | 52            |                |              |
| 3/8        | 49            |                |              |
| #4         | 42            |                |              |
| #10        | 36            |                |              |
| #16        | 34            |                |              |
| #20        | 32            |                |              |
| #30        | 30            |                |              |
| #40        | 26            |                |              |
| #60        | 18            |                |              |
| #100       | 11            |                |              |
| #200       | 6.8           |                |              |

\* (no specification provided)

**Material Description**

Sandy Gravel  
Natural Moisture = 4.18%

**Atterberg Limits**

PL=                      LL=                      PI=

**Coefficients**

D<sub>90</sub>= 30.6742      D<sub>85</sub>= 28.9835      D<sub>60</sub>= 17.9034  
D<sub>50</sub>= 10.3836      D<sub>30</sub>= 0.6173      D<sub>15</sub>= 0.2028  
D<sub>10</sub>= 0.1359      C<sub>u</sub>= 131.70      C<sub>c</sub>= 0.16

**Classification**

USCS=                      AASHTO=

**Remarks**

**Location:** TP-14 S-1  
**Sample Number:** 090763      **Depth:** 2'-3.5'

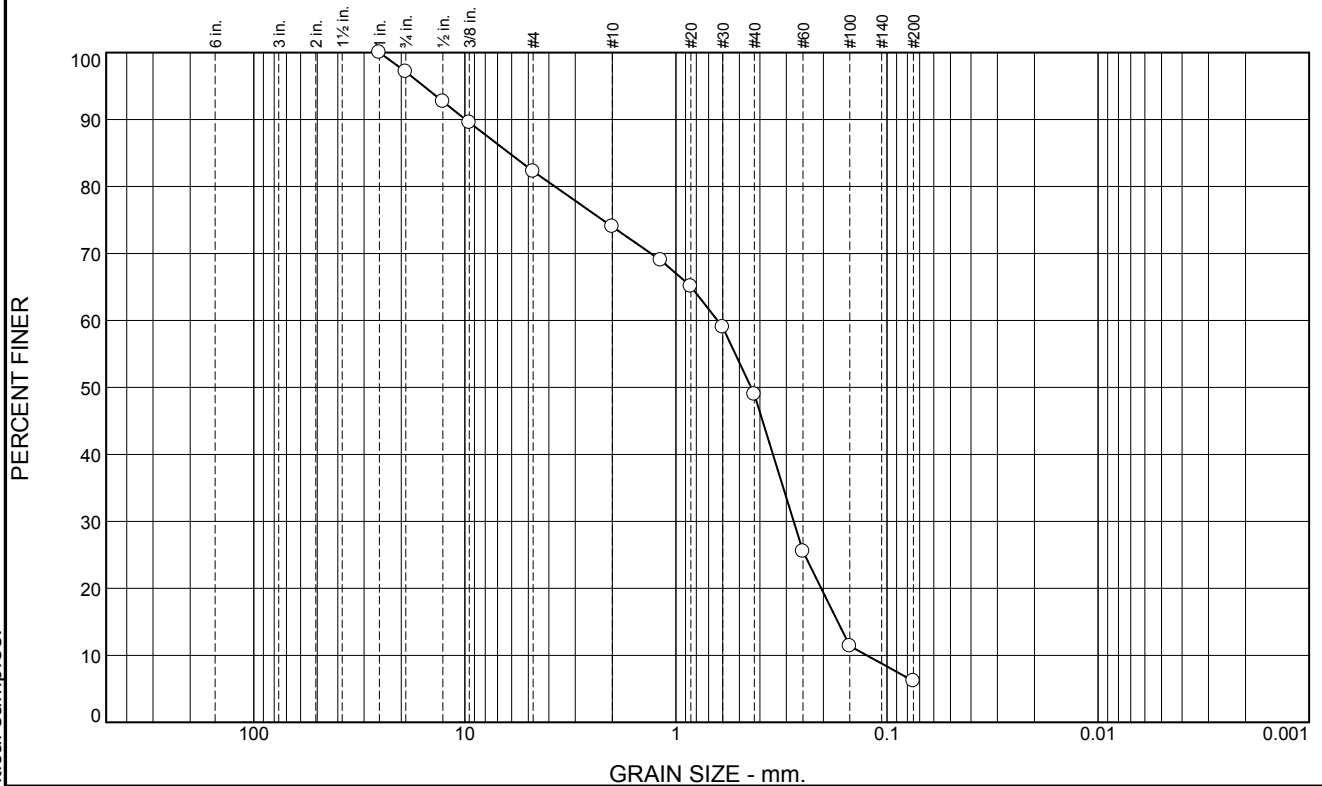
**Date:** 1/22/2014

|                                                 |                                                                                                                                  |                   |
|-------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|-------------------|
| <b>GeoResources, LLC</b><br><br><b>Fife, WA</b> | <b>Client:</b> Swede Hill LLC.<br><b>Project:</b> Canterwood Commercial Center<br><br><b>Project No:</b> SwedeHillLLC.Canterwood | <b>Figure</b> B-8 |
|-------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|-------------------|

**Tested By:** Timothy Bergstrom      **Checked By:** Keith Schembs

These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicative of apparently identical samples.

# Particle Size Distribution Report



| % +3" | % Gravel |      | % Sand |        |      | % Fines |      |
|-------|----------|------|--------|--------|------|---------|------|
|       | Coarse   | Fine | Coarse | Medium | Fine | Silt    | Clay |
| 0     | 3        | 15   | 8      | 25     | 43   | 6       |      |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|------------|---------------|----------------|--------------|
| 1.0        | 100           |                |              |
| 3/4        | 97            |                |              |
| 1/2        | 93            |                |              |
| 3/8        | 90            |                |              |
| #4         | 82            |                |              |
| #10        | 74            |                |              |
| #16        | 69            |                |              |
| #20        | 65            |                |              |
| #30        | 59            |                |              |
| #40        | 49            |                |              |
| #60        | 26            |                |              |
| #100       | 11            |                |              |
| #200       | 6.2           |                |              |

\* (no specification provided)

**Material Description**  
 Brown Gravelly Sand  
 Natural Moisture = 9.25%

**Atterberg Limits**  
 PL=      LL=      PI=

**Coefficients**  
 D<sub>90</sub>= 9.9202      D<sub>85</sub>= 6.1633      D<sub>60</sub>= 0.6353  
 D<sub>50</sub>= 0.4401      D<sub>30</sub>= 0.2766      D<sub>15</sub>= 0.1709  
 D<sub>10</sub>= 0.1247      C<sub>u</sub>= 5.10      C<sub>c</sub>= 0.97

**Classification**  
 USCS=      AASHTO=

**Remarks**

Location: TP-11 S-1  
 Sample Number: 090762      Depth: 4'-6'

Date: 1/22/2014

**GeoResources, LLC**

**Fife, WA**

Client: Swede Hill LLC.  
 Project: Canterwood Commercial Center

Project No: SwedeHillLLC.Canterwood

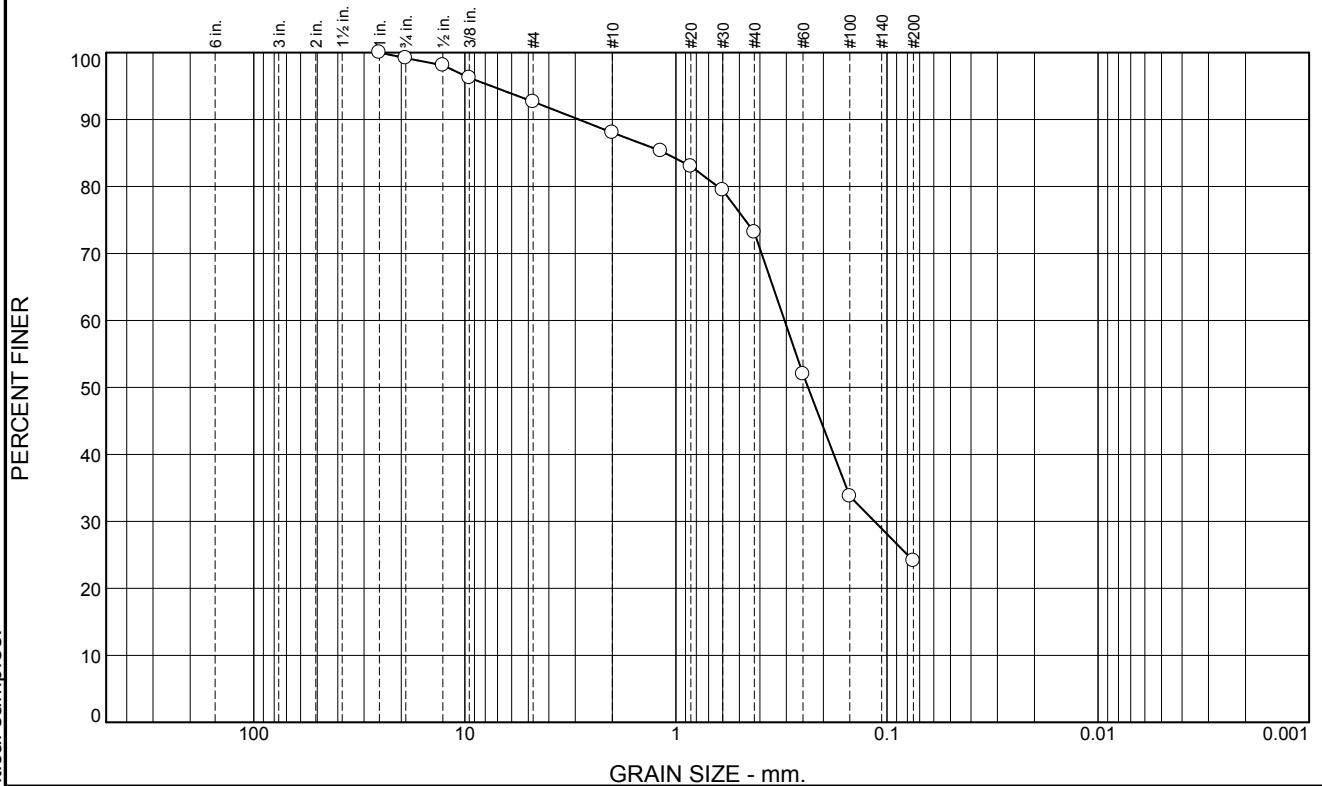
Figure B-7

Tested By: Timothy Bergstrom      Checked By: Keith Schembs



These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicative of apparently identical samples.

# Particle Size Distribution Report



| % +3" | % Gravel |      | % Sand |        |      | % Fines |      |
|-------|----------|------|--------|--------|------|---------|------|
|       | Coarse   | Fine | Coarse | Medium | Fine | Silt    | Clay |
| 0     | 1        | 6    | 5      | 15     | 49   | 24      |      |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|------------|---------------|----------------|--------------|
| 1.0        | 100           |                |              |
| 3/4        | 99            |                |              |
| 1/2        | 98            |                |              |
| 3/8        | 96            |                |              |
| #4         | 93            |                |              |
| #10        | 88            |                |              |
| #16        | 85            |                |              |
| #20        | 83            |                |              |
| #30        | 79            |                |              |
| #40        | 73            |                |              |
| #60        | 52            |                |              |
| #100       | 34            |                |              |
| #200       | 24            |                |              |

\* (no specification provided)

**Material Description**  
 Brown Silty Sand with Gravel  
 Natural Moisture = 14.47%

**Atterberg Limits**  
 PL=      LL=      PI=

**Coefficients**  
 D<sub>90</sub>= 2.8840      D<sub>85</sub>= 1.1265      D<sub>60</sub>= 0.3055  
 D<sub>50</sub>= 0.2364      D<sub>30</sub>= 0.1145      D<sub>15</sub>=  
 D<sub>10</sub>=      C<sub>u</sub>=      C<sub>c</sub>=

**Classification**  
 USCS=      AASHTO=

**Remarks**

Location: TP-10 S-2  
Sample Number: 090761      Depth: 6'-8'

Date: 1/23/2014

**GeoResources, LLC**

**Fife, WA**

Client: Swede Hill LLC.  
Project: Canterwood Commercial Center

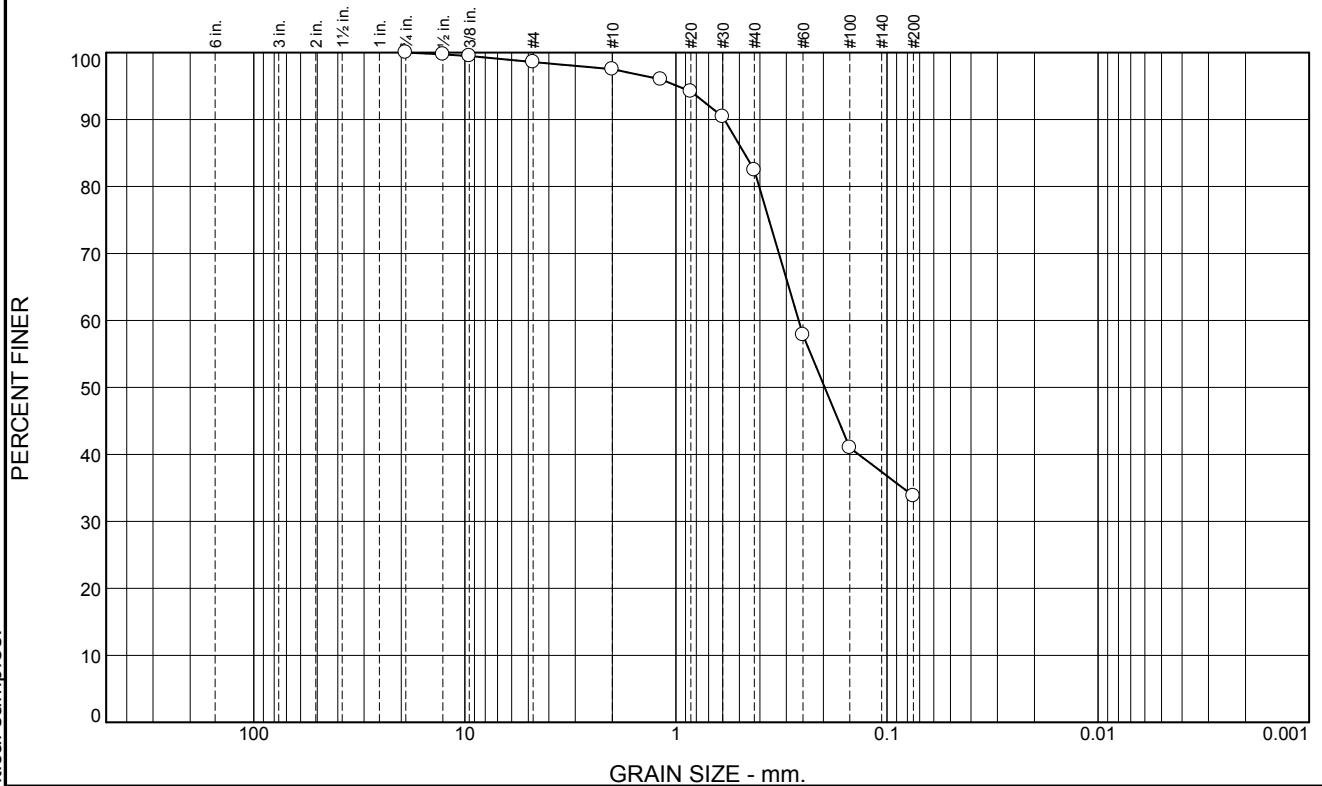
Project No: SwedeHillLLC.Canterwood

Figure B-6

Tested By: Timothy Bergstrom      Checked By: Keith Schembs

These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicative of apparently identical samples.

## Particle Size Distribution Report



| % +3" | % Gravel |      | % Sand |        |      | % Fines |      |
|-------|----------|------|--------|--------|------|---------|------|
|       | Coarse   | Fine | Coarse | Medium | Fine | Silt    | Clay |
| 0     | 0        | 1    | 1      | 16     | 48   | 34      |      |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|------------|---------------|----------------|--------------|
| 3/4        | 100           |                |              |
| 1/2        | 100           |                |              |
| 3/8        | 99            |                |              |
| #4         | 99            |                |              |
| #10        | 98            |                |              |
| #16        | 96            |                |              |
| #20        | 94            |                |              |
| #30        | 90            |                |              |
| #40        | 82            |                |              |
| #60        | 58            |                |              |
| #100       | 41            |                |              |
| #200       | 34            |                |              |

\* (no specification provided)

**Material Description**

Tan Silty Sand  
Natural Moisture = 36.3%

**Atterberg Limits**

PL=                      LL=                      PI=

**Coefficients**

D<sub>90</sub>= 0.5891                      D<sub>85</sub>= 0.4746                      D<sub>60</sub>= 0.2620  
D<sub>50</sub>= 0.1971                      D<sub>30</sub>=                      D<sub>15</sub>=  
D<sub>10</sub>=                      C<sub>u</sub>=                      C<sub>c</sub>=

**Classification**

USCS=                      AASHTO=

**Remarks**

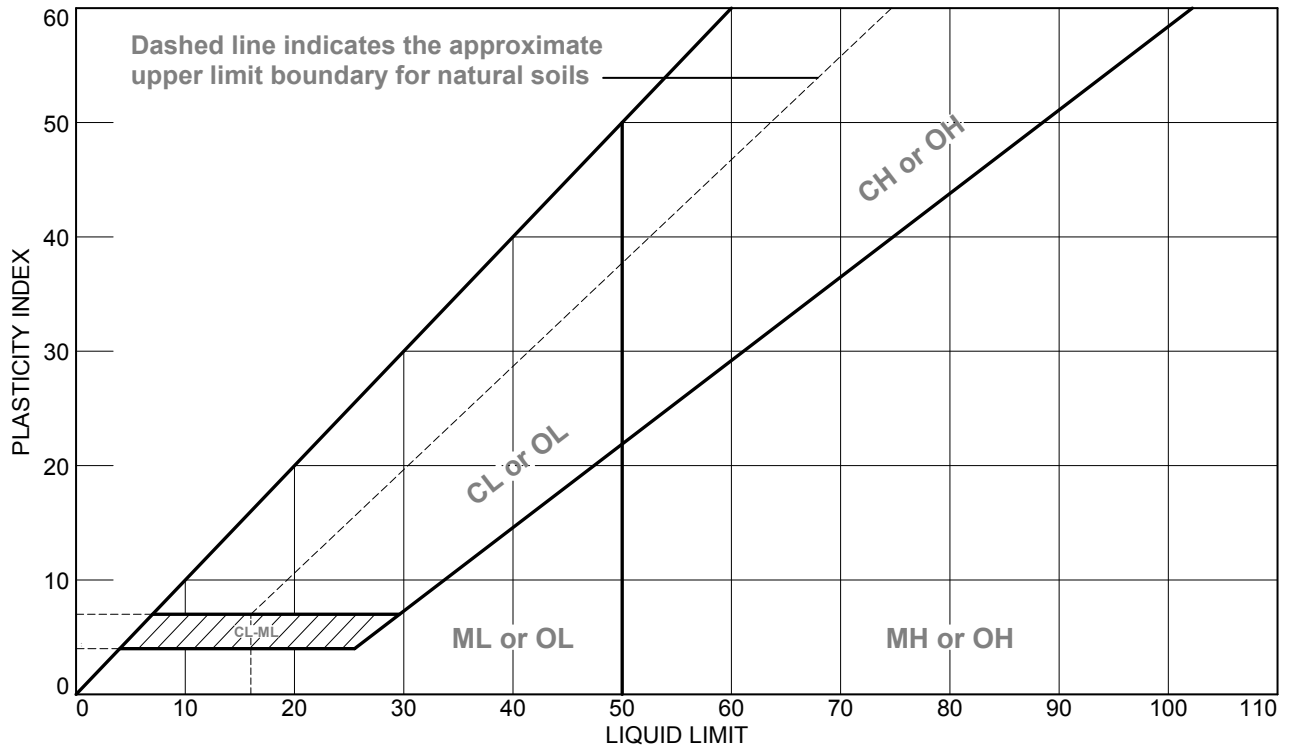
**Location:** TP-9 S-2  
**Sample Number:** 090760      **Depth:** 6'-8'

**Date:** 1/22/2014

|                                                 |                                                                                                                                  |                   |
|-------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|-------------------|
| <b>GeoResources, LLC</b><br><br><b>Fife, WA</b> | <b>Client:</b> Swede Hill LLC.<br><b>Project:</b> Canterwood Commercial Center<br><br><b>Project No:</b> SwedeHillLLC.Canterwood | <b>Figure</b> B-5 |
|-------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|-------------------|

**Tested By:** Timothy Bergstrom      **Checked By:** Keith Schembs

# LIQUID AND PLASTIC LIMITS TEST REPORT



## SOIL DATA

|   | SOURCE | SAMPLE NO. | DEPTH   | NATURAL WATER CONTENT (%) | PLASTIC LIMIT (%) | LIQUID LIMIT (%) | PLASTICITY INDEX (%) | USCS |
|---|--------|------------|---------|---------------------------|-------------------|------------------|----------------------|------|
| ● |        | 090759     | 3.5'-5' |                           | NP                | NV               | NP                   |      |

**GeoResources, LLC**

**Fife, WA**

**Client:** Swede Hill LLC.

**Project:** Canterwood Commercial Center

**Project No.:** SwedeHillLLC.Canterwood

**Figure** B-4

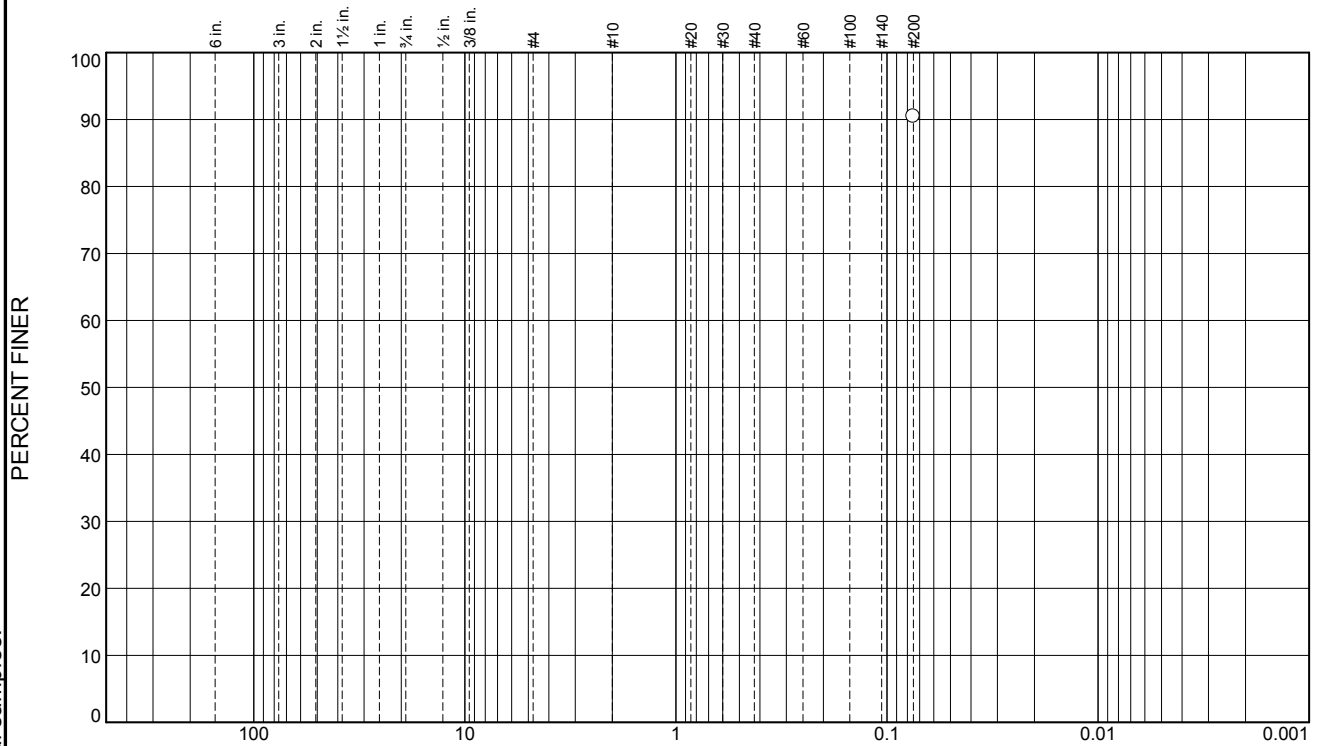
**Tested By:** Timothy Bergstrom

**Checked By:** Keith Schembs

These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicative of apparently identical samples.

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# Particle Size Distribution Report



| % +3" | % Gravel |      | % Sand |        |      | % Fines |      |
|-------|----------|------|--------|--------|------|---------|------|
|       | Coarse   | Fine | Coarse | Medium | Fine | Silt    | Clay |
|       |          |      |        |        |      | 90      |      |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|------------|---------------|----------------|--------------|
| #200       | 90            |                |              |

\* (no specification provided)

**Material Description**

Grey/Brown Silty Clay  
Natural Moisture = 25.57%

**Atterberg Limits**  
 PL= NP      LL= NV      PI= NP

**Coefficients**  
 D<sub>90</sub>=      D<sub>85</sub>=      D<sub>60</sub>=  
 D<sub>50</sub>=      D<sub>30</sub>=      D<sub>15</sub>=  
 D<sub>10</sub>=      C<sub>u</sub>=      C<sub>c</sub>=

**Classification**  
 USCS=      AASHTO=

**Remarks**  
 200 Wash Only

Location: TP-9 S-1

Sample Number: 090759

Depth: 3.5'-5'

Date: 1/23/2014

**GeoResources, LLC**

**Fife, WA**

Client: Swede Hill LLC.

Project: Canterwood Commercial Center

Project No: SwedeHillLLC.Canterwood

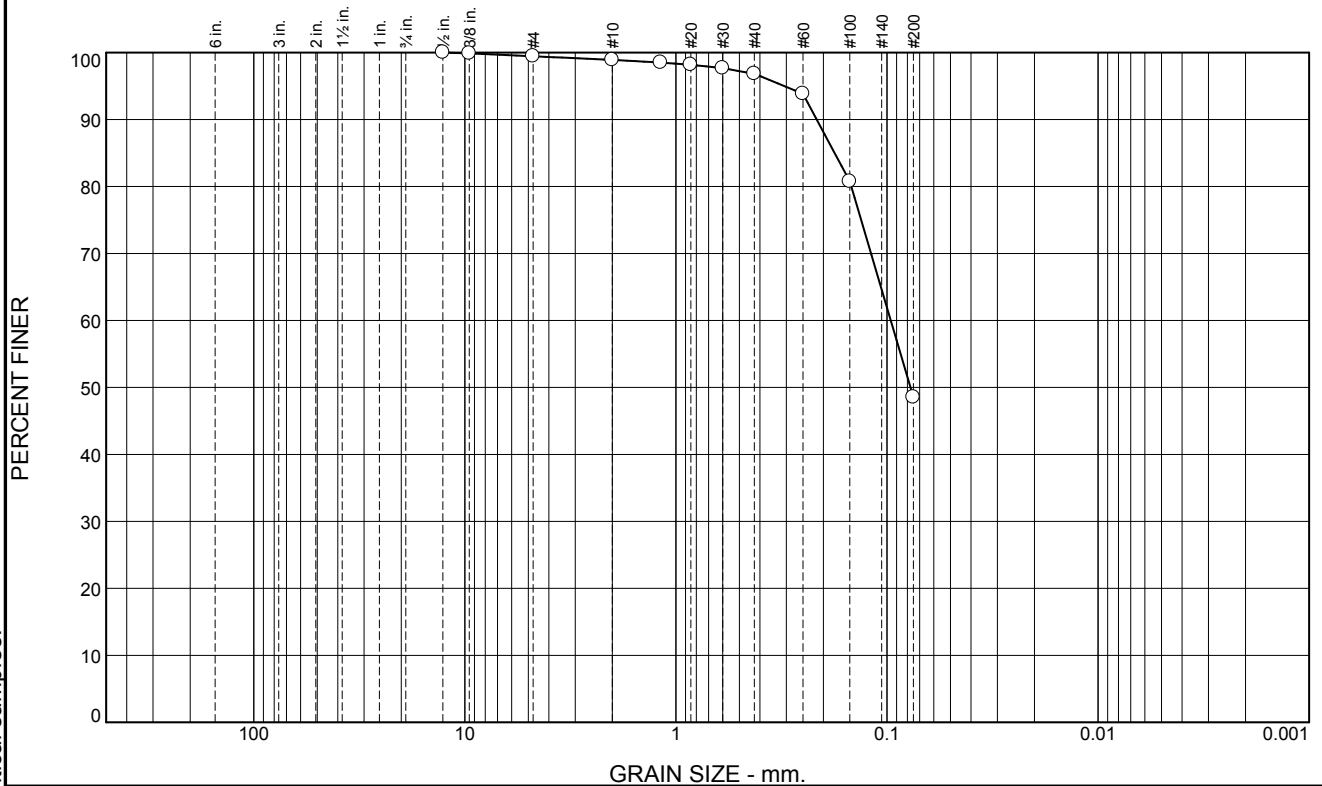
Figure B-3

Tested By: Timothy Bergstrom

Checked By: Keith Schembs

These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicative of apparently identical samples.

## Particle Size Distribution Report



| % +3" | % Gravel |      | % Sand |        |      | % Fines |      |
|-------|----------|------|--------|--------|------|---------|------|
|       | Coarse   | Fine | Coarse | Medium | Fine | Silt    | Clay |
| 0     | 0        | 1    | 0      | 2      | 48   | 49      |      |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|------------|---------------|----------------|--------------|
| 1/2        | 100           |                |              |
| 3/8        | 100           |                |              |
| #4         | 99            |                |              |
| #10        | 99            |                |              |
| #16        | 99            |                |              |
| #20        | 98            |                |              |
| #30        | 98            |                |              |
| #40        | 97            |                |              |
| #60        | 94            |                |              |
| #100       | 81            |                |              |
| #200       | 49            |                |              |

\* (no specification provided)

### Material Description

Fine Grey Silty Sand with Trace Gravel  
Natural Moisture = 15.26%

### Atterberg Limits

PL=

LL=

PI=

### Coefficients

D<sub>90</sub>= 0.2152

D<sub>85</sub>= 0.1770

D<sub>60</sub>= 0.0960

D<sub>50</sub>= 0.0774

D<sub>30</sub>=

D<sub>15</sub>=

D<sub>10</sub>=

C<sub>u</sub>=

C<sub>c</sub>=

### Classification

USCS=

AASHTO=

### Remarks

Location: TP-7

Sample Number: 090758

Depth: 5'-8'

Date:

**GeoResources, LLC**

Client: Swede Hill LLC.

Project: Canterwood Commercial Center

**Fife, WA**

Project No: SwedeHillLLC.Canterwood

Figure B-2

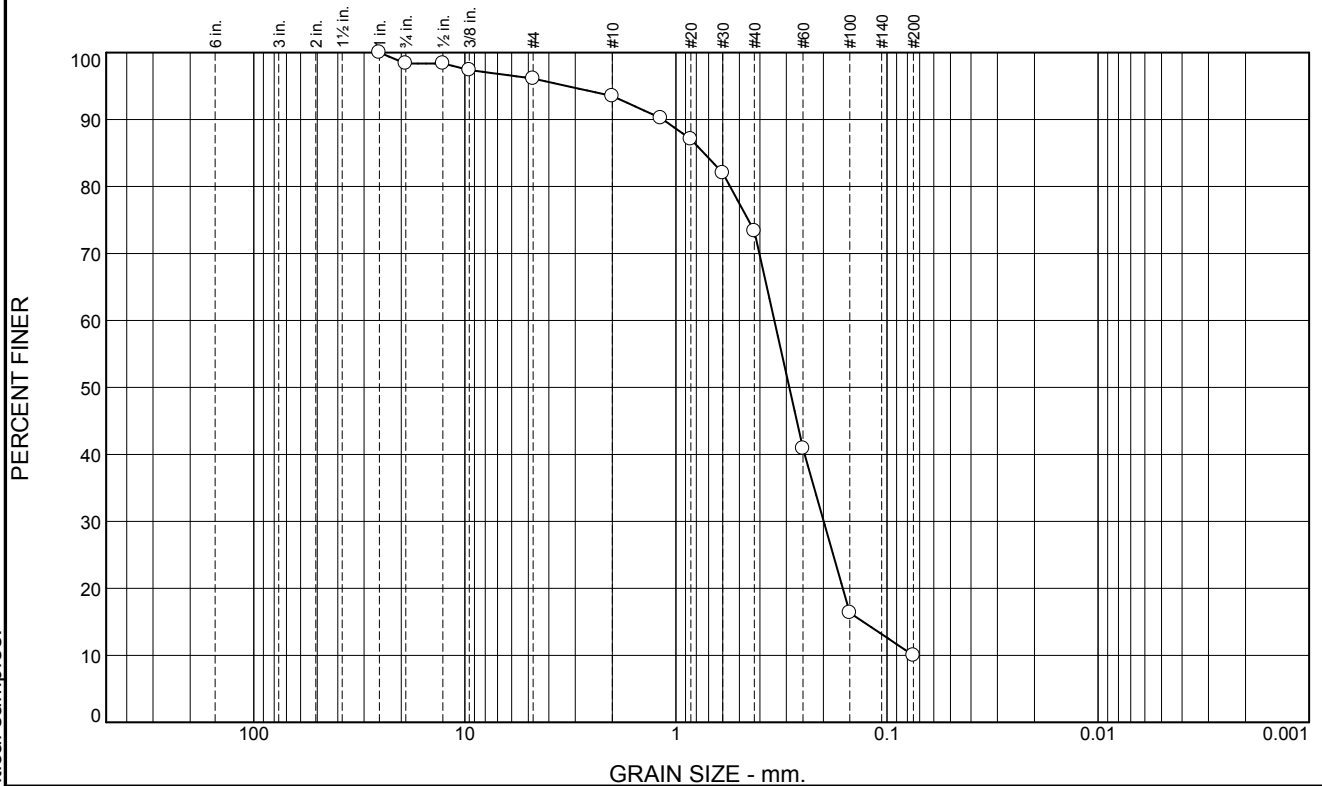
Tested By: Timothy Bergstrom

Checked By: Keith Schembs



These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicative of apparently identical samples.

# Particle Size Distribution Report



| % +3" | % Gravel |      | % Sand |        |      | % Fines |      |
|-------|----------|------|--------|--------|------|---------|------|
|       | Coarse   | Fine | Coarse | Medium | Fine | Silt    | Clay |
| 0     | 2        | 2    | 2      | 21     | 63   | 10      |      |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|------------|---------------|----------------|--------------|
| 1.0        | 100           |                |              |
| 3/4        | 98            |                |              |
| 1/2        | 98            |                |              |
| 3/8        | 97            |                |              |
| #4         | 96            |                |              |
| #10        | 94            |                |              |
| #16        | 90            |                |              |
| #20        | 87            |                |              |
| #30        | 82            |                |              |
| #40        | 73            |                |              |
| #60        | 41            |                |              |
| #100       | 16            |                |              |
| #200       | 10.0          |                |              |

\* (no specification provided)

**Material Description**  
 Fine to Medium Grey Sand with Trace Gravel  
 Natural Moisture = 11.22%

**Atterberg Limits**  
 PL=      LL=      PI=

**Coefficients**  
 D<sub>90</sub>= 1.1525      D<sub>85</sub>= 0.7367      D<sub>60</sub>= 0.3416  
 D<sub>50</sub>= 0.2901      D<sub>30</sub>= 0.1993      D<sub>15</sub>= 0.1295  
 D<sub>10</sub>= 0.0751      C<sub>u</sub>= 4.55      C<sub>c</sub>= 1.55

**Classification**  
 USCS=      AASHTO=

**Remarks**

Location: TP-3 S-1  
Sample Number: 090757      Depth: 3'-5'

Date: 1/22/2014

**GeoResources, LLC**

Client: Swede Hill LLC.  
Project: Canterwood Commercial Center

**Fife, WA**

Project No: SwedeHillLLC.Canterwood

Figure B-1

Tested By: Timothy Bergstrom      Checked By: Keith Schembs