AGENDA
GIG HARBOR CITY STUDY SESSION
Thursday, November 17, 2022 – 3:00 p.m.
Community Rooms

This meeting may also be accessed through Zoom at https://zoom.us/j/93216056382 or by calling (253) 215-8782 and entering Meeting ID 932 1605 6382.

CALL TO ORDER/ROLL CALL

DISCUSSION ITEMS

1. **2023 Legislative Agenda Discussion**
   Gordon Thomas Honeywell Lobbyists Josh Weiss and Annika Vaughn

   a. 2023 Gig Harbor Legislative Agenda

   Documents:

   2023 GIG HARBOR LEGISLATIVE AGENDA.PDF

   b. 2023 Gig Harbor Policy Document

   Documents:

   2023 GIG HARBOR POLICY DOCUMENT.PDF

2. **Housing Needs Assessment Presentation**
   Community Development Director Carl de Simas

   Documents:

   Housing Needs Assessment Presentation.pdf

3. **North Creek Culvert Replacement Alternatives Discussion**
   Public Works Director Jeff Langhelm

   Documents:

   STAFF MEMO North Creek Culvert Replacement Alternatives.pdf

4. **Civic Center HVAC Alternatives Discussion**
   Public Works Director Jeff Langhelm

   Documents:

   STAFF MEMO Civic Center HVAC Alternatives Review.pdf

ADJOURN

AMERICANS WITH DISABILITIES (ADA) ACCOMMODATIONS

ADA accommodations can be provided upon request. Those requiring special accommodations should contact the City Clerk at cityclerk@gigharborwa.gov or (253) 853-7613 at least 24 hours prior to the meeting.

2023 State Legislative Agenda

Gig Harbor Sports Complex – Capital Budget Request

The City continues to partner with the community to develop the Gig Harbor Sports Complex. The Complex is a multi-phase project and represents a significant partnership between the YMCA and other local organizations, the state, and the City. This facility will serve nearly 50,000 people in the surrounding 5-mile radius and was designed through a robust public process.

The next phase of the project: pickleball courts, bocce ball courts, a playground area, event lawn, sheltered performance stage, two covered picnic areas, and associated parking. In total this project is estimated to cost $5.25 million, of which the City is requesting **$2 million**.

Gig Harbor Waterfront Climate Resiliency Study – Operating Budget Request

The City anticipates that climate change will have an impact on Puget Sound, including sea levels. The waterfront has always been the heart of the City, and it is important for the City and its residents to better understand and prepare for how the waterfront will be impacted. The City requests **$250,000** to commission a study on what the possible impacts might be and how the City can prepare to mitigate them.

Public Safety

Gig Harbor has experienced a rise in criminal activity similar to other cities across the state, and public safety has become a top-of-mind issue for our residents. We request that the Legislature address these issues, and place particular emphasis on the following:

- *State v. Blake* response - enact a simple possession criminal offense statute incentivizing treatment and accountability
- Vehicular pursuits – restore officers ability to conduct vehicular pursuits using a reasonable suspicion standard in order to address concerns about impacts to public safety and allow for effective and safe pursuit of suspects when there is an immediate threat to public safety
- Training and resources – provide resources so our officers can successfully implement new public safety laws, and resources for behavioral health and substance use treatment services

State Route 16 Congestion Relief – Transportation Budget Request

Gig Harbor residents experience daily traffic congestion along the SR 16 corridor. The Washington State Department of Transportation completed a congestion relief study in 2017 that identified improvements along the SR16 corridor. The City requests that the state invest in the following projects in the following order to address short-term and long-term traffic demands on the corridor:

- Signalize/meter EB Burnham Dr. approach to Borgen Blvd. in advance of the Burnham/Borgen WB SR16 offramp. COST: $500,000.
- Add NB Pioneer Way RT turn lane at the Wollochet WB/SR16 Bremerton bound onramp. COST: $400,000.
- Add EB Wollochet offramp right turn slip lane. COST: $550,000.
- Add WB Wollochet onramp right turn late. COST: $830,000

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The City requests **$2.28 million**, which with city matching dollars will provide for design and construction costs for the four short-term projects.

Fund Local Culverts

The City of Gig Harbor joins AWC in requesting that the Legislature provide adequate funding to address public and private culverts. The City supports state investments on a watershed basis to maximize the amount of fish habitat gained and improve water quality.

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The City of Gig Harbor Supports/Opposes - 2023

FINANCE	
State-Shared Revenues	The City ***supports*** the continued appropriation of state-shared funds to local governments, including funds such as liquor excise taxes and profits, streamlined sales tax mitigation funding, the city-county assistance account, and the municipal criminal justice account. Additionally, the City supports legislation to restore growth to the liquor profit/fee revenues. Combined, these funds provide a significant amount of revenue to the City's general fund.
HOUSING AND HUMAN SERVICES	
Housing	Gig Harbor is not immune from Washington's housing affordability and homelessness crisis. The City supports a proactive approach to create new tools, incentives, and revenues for cities to use to support increasing housing supply and addressing affordability. Cities need resources to encourage development of housing at all income levels and particularly state funding to support housing for the lowest income levels.
Behavioral Health and Substance Use Treatment	The City supports creating greater access to behavioral health services and substance abuse treatment. This includes continued state funding to help communities establish alternative response programs like co-responder programs, diversion programs, and others that provide options beyond law-enforcement for responding to situations with individuals suffering from behavioral health issues.
ENVIRONMENT	
Climate Change	Gig Harbor recognizes the significant impact that climate change is having on our region. We **support** legislation to reduce carbon emissions in the state and to respond to the current and future impacts of climate change.
INFRASTRUCTURE & ECONOMIC DEVELOPMENT	
Infrastructure Program Funding	Gig Harbor **supports** full funding for the Public Works Assistance Account (PWAA), including allowing the current revenue diversions to sunset at the end of fiscal year 2023 and refraining from further transfers or diversions of funds to other infrastructure programs or other non-infrastructure accounts. The City also **supports** expanding state funding opportunities to assist with maintenance and operations of local infrastructure.
Wastewater Nutrient Cap	The City **supports** the goal of reducing effluents, including nutrients, to the Puget Sound, and the Department of Ecology general permit for wastewater facilities. However, implementing this permit may result in additional costs for the City and we **support** state assistance with these costs.

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Business Climate	The City **supports** better alignment of government programs and regulations with business needs and encourages the Legislature to consider ways to foster economic development.
Electric Vehicle Infrastructure	The City **supports** state funding to install electric vehicle charging stations on City owned property, as well as the electrification of city fleets.
Support Main Street Legislation	The City ***supports*** policy and budget decisions that increase funding for Main Street Tax Incentive Program. The Main Street Program was created in 2005 to support downtown revitalization programs. The Downtown Gig Harbor Waterfront Alliance participates in the program.
LOCAL CONTROL	
Retain Local Control	Local decisions are best made by elected officials who know their community well and the Legislature must refrain from imposing one-size-fits-all solutions on cities. However, the City must make sure that it is not using "local control" as an excuse to avoid addressing difficult issues. In recent years, the legislature has passed zoning mandates. The City of Gig Harbor opposes legislation pre-empting local control, including density mandates.

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CITY OF GIG HARBOR
HOUSING NEEDS ASSESSMENT
PROJECT OVERVIEW

City Council Study Session

November 17, 2022

CONTENTS

01 INTRODUCTION

02 SCOPE OF WORK

03 WORK SCHEDULE & DELIVERABLES

04 WORK IN PROGRESS & NEXT STEPS

05 DISCUSSION AND QUESTIONS

01 INTRODUCTION

Project Background:

- House Bill 1220 (HB 1220)
- Periodic update of the city's Comprehensive Plan

The City wants to ensure that Gig Harbor residents are provided with a variety of housing choices that are available to all economic segments of the population; address any identified gaps in housing availability or affordability; craft strategies for policy development that address housing needs identified in the gap analysis.

Purpose:

- Provide key data and analysis on the current housing inventory and future housing need in the City.
- Identify key recommendations to encourage more housing development.
- Help the City and its partners plan for additional housing over the next 20 years.

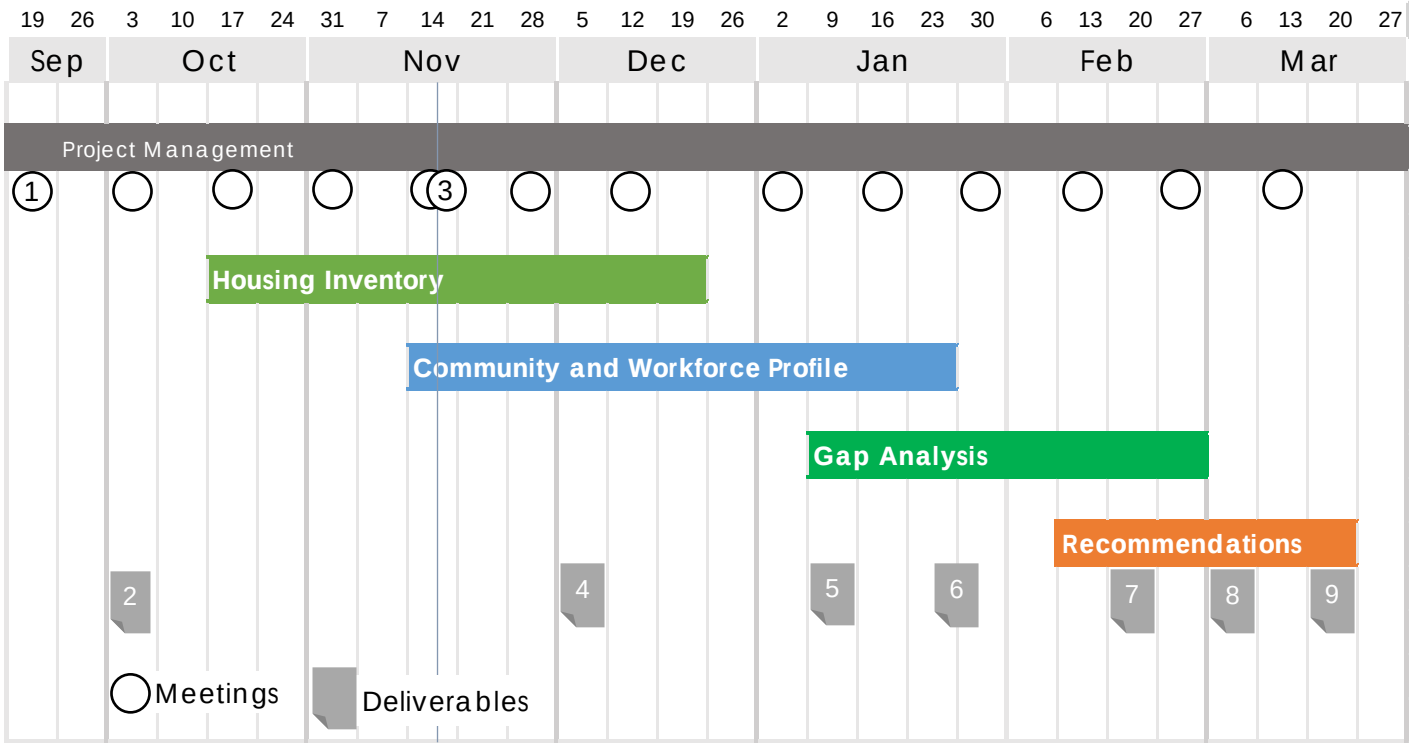
Alignment:

Department of Commerce Guidance for Developing a Housing Needs Assessment

02 SCOPE OF WORK

1. **Housing Inventory**
   - Describe Gig Harbor's housing stock with a focus on characteristics such as size, location, cost, and tenure
   - Analysis of residential market conditions
2. **Community and Workforce Profile**
   - Analysis of characteristics that shape current and future needs for housing
3. **Gap Analysis**
   - Identify gaps in housing supply and affordability
   - Compare/align with Department of Commerce final projected housing needs
4. **Develop Recommendations**
   - Provide recommendations for increasing housing affordability and housing choices
   - Identify sources of funding
5. **Draft and Final HNA and Presentations**

03 WORK SCHEDULE & DELIVERABLES



1. Project Kickoff and Regular Project Check-ins
2. Draft Housing Inventory and Community and Workforce Profile Outline
3. City Council Presentation (November 17)
4. Draft Housing Inventory Report Chapter
5. Draft Community and Workforce Profile Report Chapter
6. Draft Gap Analysis Methodology
7. Draft Gap Analysis
8. **Draft Housing Needs Assessment Report**
9. **Final Housing Needs Assessment Report**

04 WORK IN PROGRESS & NEXT STEPS

Housing Inventory Analysis

- General Housing Inventory
- Housing Market Conditions and Trends
- Special Housing Inventory
- Housing Affordability and Cost Burden

What this section will help answer:

- What types of housing are available in Gig Harbor?
- Are there any groups of people who are not able to find housing that is safe, inclusive, and meets their household needs?
- What range of housing is needed for all income levels over the next 20 years?

05 DISCUSSION & QUESTIONS

THANK YOU!

COMMUNITY ATTRIBUTES INC

PUBLIC WORKS DEPARTMENT

MEMORANDUM

TO: Mayor and City Council

FROM: Jeff Langhelm, PE, Public Works Director

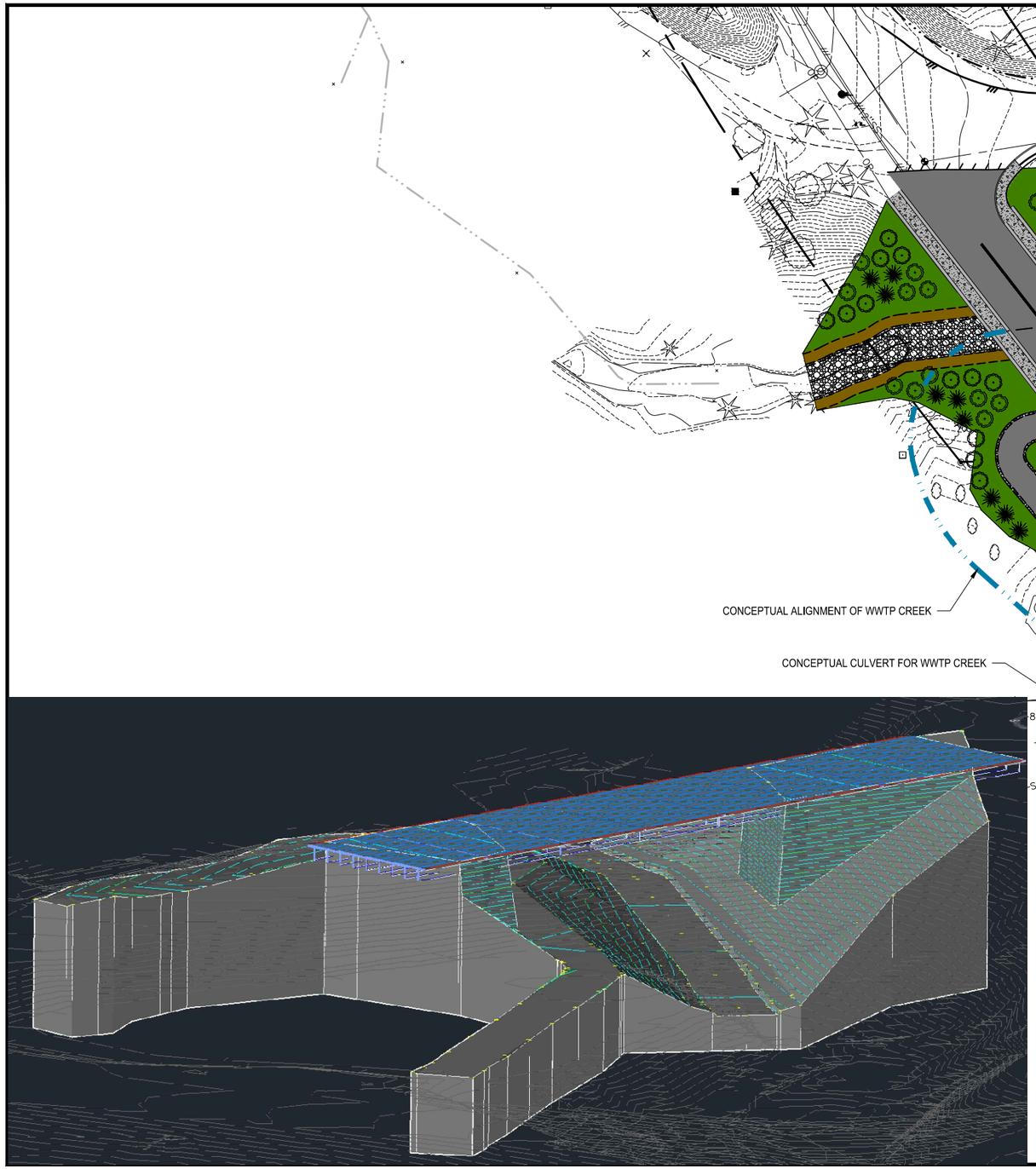
DATE: November 10, 2022

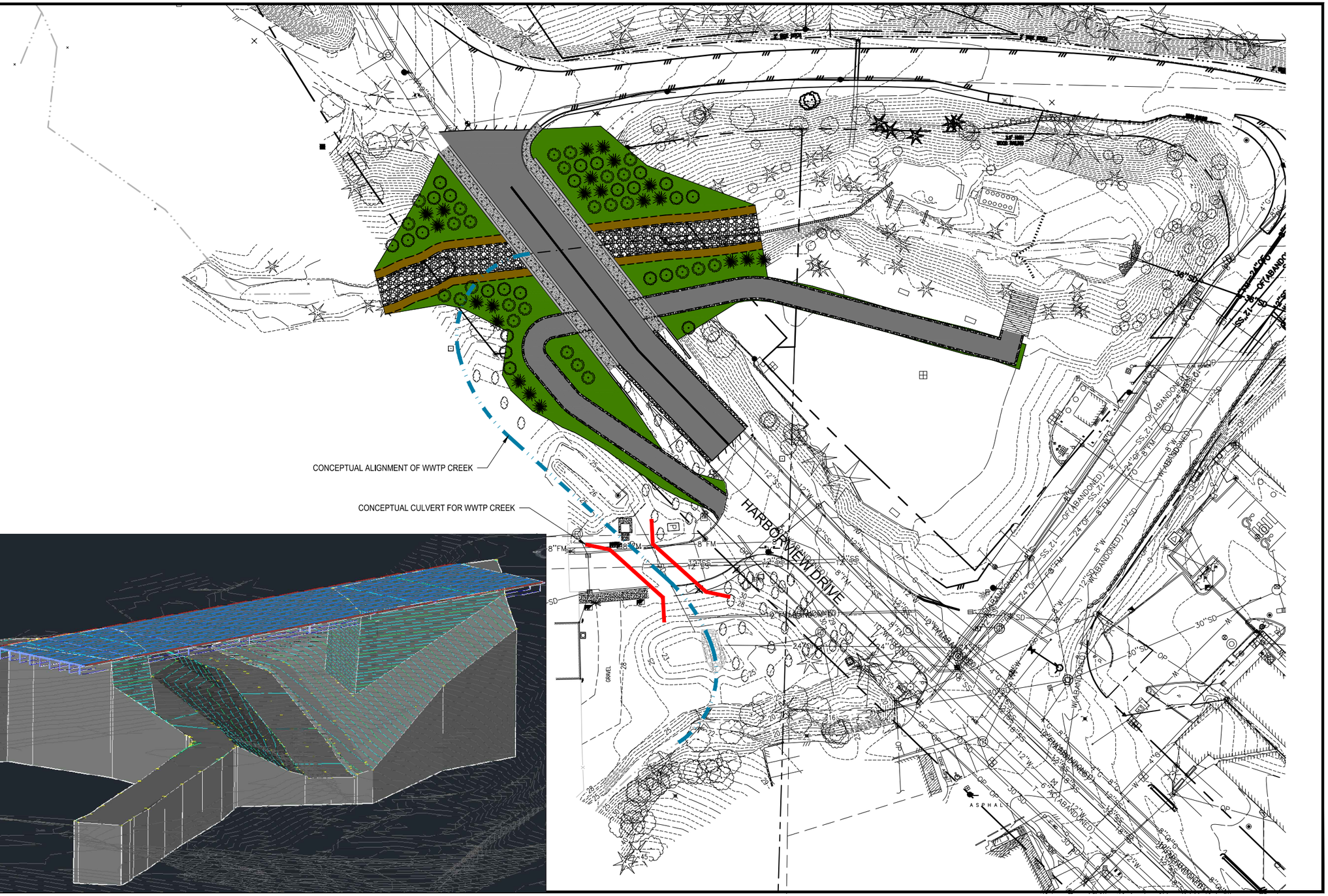
SUBJECT: North Creek Culvert Replacement Alternatives Review

On January 27, 2022, the City held a study session regarding the City's proposed North Creek culvert replacement project at Harborview Drive. The primary project goal is to further improve fish passage and expand access to high quality salmon spawning and rearing habitat by removing the partial fish barrier as identified by the Washington State Department of Fish and Wildlife (WDFW) and included representatives from the Washington Department of Fish and Wildlife (WDFW), the Puyallup Tribe of Indians, the Gig Harbor Commercial Fishing Club and Harbor WildWatch.

The outcome of the study session included Staff proceeding with a professional services contract to prepare an alternatives analysis. The City contracted with Parametrix in June to proceed with the alternatives analysis, which included receiving input from stakeholders, reviewing potential permitting issues, preparing renderings for each alternative, and preparing cost estimates for each alternative.

The City and Parametrix have completed their analysis and presented the findings to stakeholders at a November meeting. At the November 17 study session Staff and Parametrix will present the findings of the alternatives analysis. Please see the attached documents with renderings and costs for Alternative 1 (bridge) and Alternative 2 (culvert) plus a cost estimate for the re-alignment of the unnamed creek along the treatment plant to North Creek. Staff will be asking Council at the end of the study session to provide general direction on how to proceed based on the alternatives provided.





Parametrix DATE: October 5, 2022 FILE: XPS2750042-DE_ALT1

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SCALE IN FEET

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Alternative 1 -
Bulb Tee Girder Bridge

North Creek Culvert FS
City of Gig Harbor, WA

City of Gig Harbor
North Creek Culvert Feasibility Study
Alternative 1 - Bulb Tee Girder Single Span Bridge
Conceptual Cost Estimate

Estimated By: D. Dinkuhn
Date: 11/4/22

Checked By: R. Sayles
Date: 11/4/22

SCHEDULE A - ROADWAY

ITEM NO.	DESCRIPTION OF ITEM	EST. QTY.	UNIT	UNIT PRICE	AMOUNT	NOTES
1	Minor Change	1	CALC	$50,000.00	$50,000.00	
2	Record Drawings	1	LS	$2,000.00	$2,000.00	
3	Structure and Roadway Surveying	1	LS	$11,000	$11,000	Brentwood Drive Bridge Bid Tab (4/17/22) Escalated to October 2022 (5%)
4	SPCC Plan	1	LS	$1,000.00	$1,000.00	Eng Est
5	Pothole	10	EA	$700.00	$7,000.00	Brentwood Drive Bridge Bid Tab (4/17/22) Escalated to October 2022 (5%)
6	Protection and Support of Existing Utilities	1	LS	$13,200	$13,200	Kitsap Way Culvert Bid Tab (01/26/21) Escalated to October 2022 (18%)
7	Type B Progress Schedule	1	LS	$2,000.00	$2,000.00	Eng Est
8	Mobilization	1	LS	$389,058.40	$389,058.40	10%
9	Project Temporary Traffic Control	1	LS	$130,000.00	$130,000.00	Kitsap Way Culvert Bid Tab (01/26/21) Escalated to October 2022 (18%)
10	Clearing and Grubbing	1	LS	$17,000.00	$17,000.00	Kitsap Way Culvert Bid Tab (01/26/21) Escalated to October 2022 (18%)
11	Removal of Structures and Obstructions	1	LS	$22,000.00	$22,000.00	Kitsap Way Culvert Bid Tab (01/26/21) Escalated to October 2022 (18%)
12	Sawcut Asphalt Concrete Pavement	75	LF	$18.00	$1,350.00	Brentwood Drive Bridge Bid Tab (4/17/22) Escalated to October 2022 (5%)
13	Remove Asphalt Concrete Pavement	681	SY	$20.00	$13,620.00	Brentwood Drive Bridge Bid Tab (4/17/22) Escalated to October 2022 (5%)
14	Roadway Excavation Incl. Haul	10,258	CY	$33.00	$338,514.00	WSDOT Murden Creek Bridge Bid Tabs (3/9/22) Escalated to October 2022 (5%)
15	Unsuitable Foundation Excavation Incl. Haul	100	CY	$45.00	$4,500.00	Kitsap Way Culvert Bid Tab (01/26/21) Escalated to October 2022 (18%)
16	Gravel Borrow Incl. Haul	552	TON	$40	$22,080	WSDOT Murden Creek Bridge Bid Tabs (3/9/22) Escalated to October 2022 (5%)
17	Structure Excavation Class A Incl. Haul	620	CY	$40.00	$24,800.00	WSDOT Murden Creek Bridge Bid Tabs (3/9/22) Escalated to October 2022 (5%)
18	Shoring or Extra Excavation Class A Incl. Haul	1	LS	$103,000	$103,000	Brentwood Drive Bridge Bid Tab (4/17/22) Escalated to October 2022 (5%)
19	Trimming and Cleanup	1	LS	$8,000.00	$8,000.00	Donkey Creek Bid Tab (10/17/2012) Escalated to October 2022 (62%)
20	Crushed Surfacing Top Course	408	TON	$58.00	$23,664.00	WSDOT Murden Creek Bridge Bid Tabs (3/9/22) Escalated to October 2022 (5%)
21	Crushed Surfacing Base Course	372	TON	$58.00	$21,576.00	WSDOT Murden Creek Bridge Bid Tabs (3/9/22) Escalated to October 2022 (5%)
22	HMA CL. 1/2 In. PG 58H-22	267	TON	$210.00	$56,070.00	Brentwood Drive Bridge Bid Tab (4/17/22) Escalated to October 2022 (5%)
23	Gravel Backfill for Wall – Bridge	213	CY	$67.00	$14,271.00	Kitsap Way Culvert Bid Tab (01/26/21) Escalated to October 2022 (18%)
24	St. Reinf. Bar for Bridge	27,313	LB	$5.00	$136,565.00	Brentwood Drive Bridge Bid Tab (4/17/22) Escalated to October 2022 (5%)
25	Conc. Class 3000 For Bridge (Sidewalks)	42	CY	$867.00	$36,414.00	Donkey Creek Bid Tab (10/17/2012) Escalated to October 2022 (62%)
26	Conc. Class 4000 for Bridge	180	CY	$2,050.00	$369,000.00	Brentwood Drive Bridge Bid Tab (4/17/22) Escalated to October 2022 (5%)
27	Furnishing and Installing 41 In. Deck Bulb Tees (85' Span)	595	LF	$760.00	$452,200.00	Donkey Creek Bid Tab (10/17/2012) Escalated to October 2022 (62%)
28	Install Utility Hangers and Supply and Attach Utilities	1	LS	$40,000.00	$40,000.00	Donkey Creek Bid Tab (10/17/2012) Escalated to October 2022 (62%)
29	Furnishing Steel Piling (20 ea. 18 In. Diam. Pipe Piles)	655	LF	$197.00	$129,035.00	Donkey Creek Bid Tab (10/17/2012) Escalated to October 2022 (62%)
30	Driving Steel Piling	20	EA	$3,500.00	$70,000.00	Donkey Creek Bid Tab (10/17/2012) Escalated to October 2022 (62%)
31	Four Tube Curb Mount Rail Incl. Approaches	500	LF	$594.00	$297,000.00	Donkey Creek Bid Tab (10/17/2012) Escalated to October 2022 (62%)
32	Membrane Waterproofing (Deck Seal)	500	SY	$60.00	$30,000.00	Brentwood Drive Bridge Bid Tab (4/17/22) Escalated to October 2022 (5%)
33	6 In. Perforated Underdrain Pipe – Bridge	280	LF	$26.00	$7,280.00	Donkey Creek Bid Tab (10/17/2012) Escalated to October 2022 (62%)
34	Gravel Backfill for Drain – Bridge	15	20	$60.00	$900.00	Donkey Creek Bid Tab (10/17/2012) Escalated to October 2022 (62%)
35	Temporary Stream Diversion	1	LS	$70,800	$70,800	Kitsap Way Culvert Bid Tab (01/26/21) Escalated to October 2022 (18%)
36	Corrugated Polyethylene Storm Sewer Pipe 12 In. Diam.	280	LF	$68.00	$19,040.00	Kitsap Way Culvert Bid Tab (01/26/21) Escalated to October 2022 (18%)
37	Catch Basin Type 1	3	EA	$2,500.00	$7,500.00	Eng Est
38	Connection to Drainage Structure	1	EA	$1,000.00	$1,000.00	Eng Est
39	Underdrain Cleanout 4 In. Diam.	8	EA	$800.00	$6,400.00	Eng Est
40	Silt Fence	500	LF	$8.00	$4,000.00	Eng Est
41	Temporary Erosion and Sediment Control	1	LS	$16,500.00	$16,500.00	Kitsap Way Culvert Bid Tab (01/26/21) Escalated to October 2022 (18%)
42	High Visibility Fence	1,000	LF	$7.00	$7,000.00	Eng Est
43	Woven Coir ECB	1,170	SY	$11.00	$12,870.00	Brentwood Drive Bridge Bid Tab (4/17/22) Escalated to October 2022 (5%)
44	Hydroseed	1,170	SY	$4.00	$4,680.00	Eng Est
45	Fine Compost	100	CY	$80.00	$8,000.00	Eng Est
46	Cement Conc. Traffic Curb and Gutter	340	LF	$39.00	$13,260.00	Kitsap Way Culvert Bid Tab (01/26/21) Escalated to October 2022 (18%)
47	Cement Conc. Sidewalk	25	SY	$63.00	$1,575.00	Kitsap Way Culvert Bid Tab (01/26/21) Escalated to October 2022 (18%)
48	Cement Conc. Curb Ramp Type Single Direction	3	EA	$2,500.00	$7,500.00	Eng Est
49	Quarry Spalls	30	TON	$90.00	$2,700.00	Brentwood Drive Bridge Bid Tab (4/17/22) Escalated to October 2022 (5%)
50	Streambed Aggregate	870	TON	$73.00	$63,510.00	Kitsap Way Culvert Bid Tab (01/26/21) Escalated to October 2022 (18%)
51	Large Woody Material	20	EA	$2,000.00	$40,000.00	Brentwood Drive Bridge Bid Tab (4/17/22) Escalated to October 2022 (5%)
52	Illumination and Electrical System Complete	1	LS	$60,000.00	$60,000.00	6 Luminaires at $20k Each
53	Permanent Signing	1	LS	$5,000.00	$5,000.00	Eng Est
54	Plastic Line	500	LF	$4.00	$2,000.00	Eng Est
55	Soldier Pile Wall for Bridge Abutments	4335	SF	$176.00	$762,960.00	Olympic Discovery Trtail (3/6/17) Escalated to October 2022 (44%)
55	Wood Guardrail with Handrail	470	LF	$110.00	$51,700.00	Donkey Creek Bid Tab (10/17/2012) Escalated to October 2022 (62%)
56	Dewatering	1	LS	$85,000.00	$85,000.00	Kitsap Way Culvert Bid Tab (01/26/21) Escalated to October 2022 (18%)
				Schedule A Total	**$4,097,092.40**	

SCHEDULE B - WATER AND SEWER

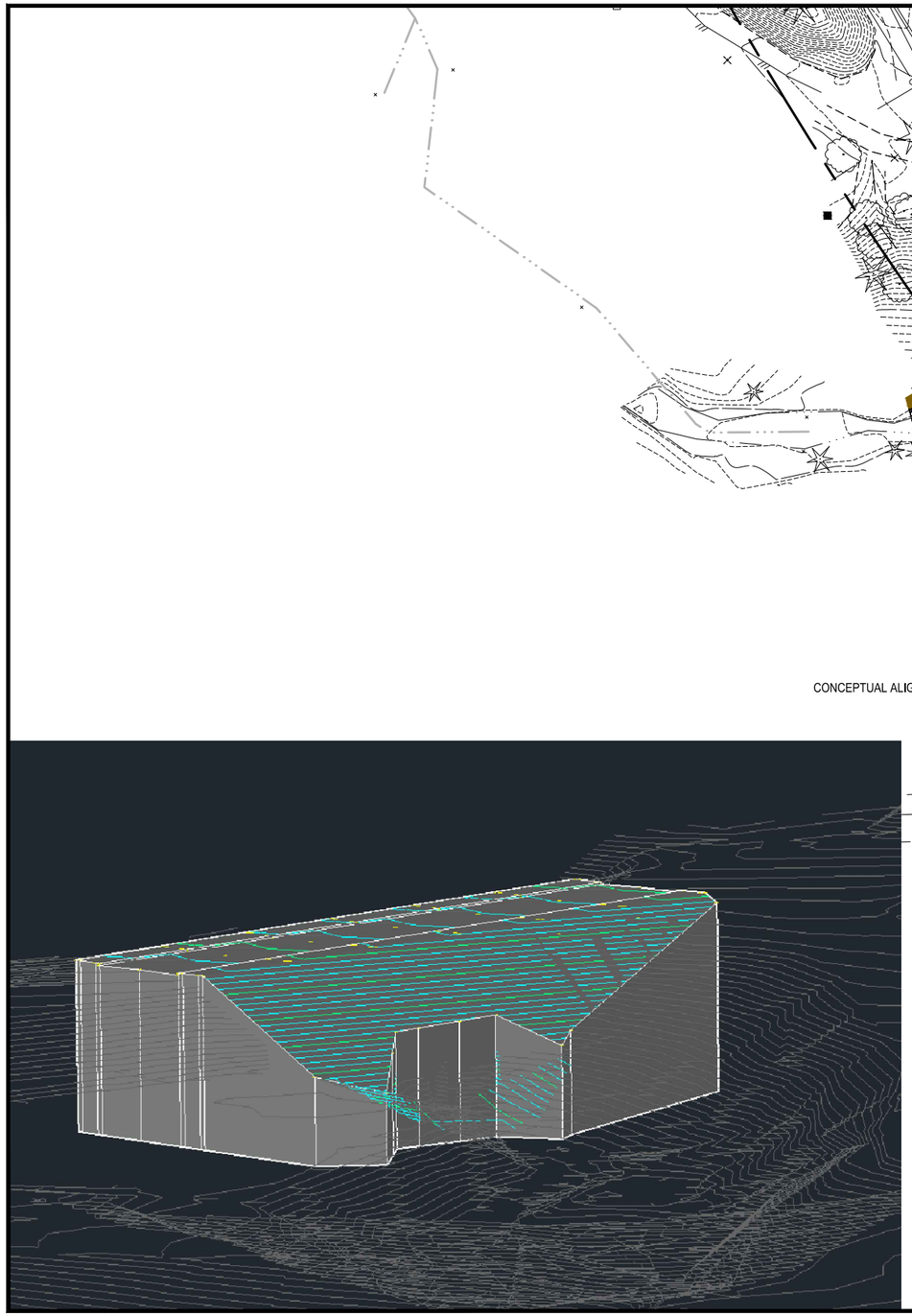
ITEM NO.	DESCRIPTION OF ITEM	EST. QTY.	UNIT	UNIT PRICE	AMOUNT	NOTES
1	Temporary Water and Sewer Bypass Plan	1	LS	$ 1,500.00	$ 1,500.00	Donkey Creek Bid Tab (10/17/2012) Escalated to October 2022 (62%)
2	Temporary Water and Sewer Bypass	1	LS	$ 88,000.00	$ 88,000.00	Donkey Creek Bid Tab (10/17/2012) Escalated to October 2022 (62%)
3	Ductile Iron Class 52 Water Pipe 12 In. Diam.	110	LF	$ 139.00	$ 15,290.00	WSDOT Bid Tabs
4	Connection to Existing Water Main	2	EA	$ 3,500.00	$ 7,000.00	Donkey Creek Bid Tab (10/17/2012) Escalated to October 2022 (62%)
5	Ductile Iron Gate Valve 12 In.	2	EA	$ 4,500.00	$ 9,000.00	WSDOT Bid Tabs
6	C900 PVC Sanitary Sewer Pipe 12 In. Diam.	110	LF	$ 68.00	$ 7,480.00	Kitsap Way Culvert Bid Tab (01/26/21) Escalated to October 2022 (18%)
7	Sewer Gate Valve 12 In.	2	EA	$ 4,500.00	$ 9,000.00	WSDOT Bid Tabs
8	Double Ball Flex Tend Coupling, 12 In. Diam.	4	EA	$ 9,970.00	$ 39,880.00	Donkey Creek Bid Tab (10/17/2012) Escalated to October 2022 (62%)
9	Connection to Existing Sanitary Sewer	2	EA	$ 2,700.00	$ 5,400.00	Donkey Creek Bid Tab (10/17/2012) Escalated to October 2022 (62%)
				Schedule B Subtotal	**$ 182,550.00**	
				Sales Tax (8.8%)	**$ 16,064.40**	
				Schedule B Total	**$ 198,614.40**	

Notes: All Costs are in 2022 Dollars

Subtotal Schedules A and B	**$4,295,707**
Contingency (30%)	**$1,288,712**
Total Construction Cost	**$5,584,419**

Preliminary Engineering (22%)	**$1,228,572**	Survey, Environmental, Permitting, and PS&E
Right of Way	**$0**	
Construction Engineering (2%)	**$111,688**	
Const. Admin./Mgmt. (7%)	**$390,909**	

GRAND TOTAL 2022 COST	**$7,315,589**



CONCEPTUAL ALIGNMENT OF WWTP CREEK

CONCEPTUAL CULVERT FOR WWTP CREEK

AUSTIN ST.

HARBORVIEW DRIVE

N. HARBORVIEW DR

Parametrix DATE: October 5, 2022 FILE: XPS2750042-DE_ALT2

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SCALE IN FEET

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Alternative 2 -

3-Sided Box Culvert

North Creek Culvert FS

City of Gig Harbor, WA

City of Gig Harbor
North Creek Culvert Feasibility Study
Alternative 2 - Three Sided Box Culvert
Conceptual Cost Estimate

Estimated By: D. Dinkuhn
Date: 11/4/22

Checked By: R. Sayles
Date: 11/4/22

SCHEDULE A - ROADWAY

ITEM NO.	DESCRIPTION OF ITEM	EST. QTY.	UNIT	UNIT PRICE	AMOUNT	NOTES
1	Minor Change	1	Est.	$50,000	$50,000	
2	Record Drawings	1	LS	$2,000.00	$2,000.00	
3	Structure and Roadway Surveying	1	LS	$9,500	$9,500	Kitsap Way Culvert Bid Tab (01/26/21) Escalated to October 2022 (18%)
4	SPCC Plan	1	LS	$700	$700	Brentwood Drive Bridge Bid Tab (4/17/22) Escalated to October 2022 (5%)
5	Pothole	10	Each	$700	$7,000	Brentwood Drive Bridge Bid Tab (4/17/22) Escalated to October 2022 (5%)
6	Protection and Support of Existing Utilities	1	LS	$13,200	$13,200	Kitsap Way Culvert Bid Tab (01/26/21) Escalated to October 2022 (18%)
7	Type B Progress Schedule	1	LS	$2,000.00	$2,000.00	Eng Est
8	Mobilization	1	LS	$332,497	$332,497	10%
9	Project Temporary Traffic Control	1	LS	$130,000	$130,000	Kitsap Way Culvert Bid Tab (01/26/21) Escalated to October 2022 (18%)
10	Temporary Bypass Road	1	LS	$58,000	$58,000	Kitsap Way Culvert Bid Tab (01/26/21) Escalated to October 2022 (18%)
11	Clearing and Grubbing	1	LS	$17,000	$17,000	Kitsap Way Culvert Bid Tab (01/26/21) Escalated to October 2022 (18%)
12	Removal of Structure and Obstruction	1	LS	$22,000	$22,000	Kitsap Way Culvert Bid Tab (01/26/21) Escalated to October 2022 (18%)
13	Sawcut Asphalt Concrete Pavement	66	LF	$18	$1,188	Brentwood Drive Bridge Bid Tab (4/17/22) Escalated to October 2022 (5%)
14	Remove Asphalt Concrete Pavement	420	SY	$20	$8,400	Brentwood Drive Bridge Bid Tab (4/17/22) Escalated to October 2022 (5%)
15	Roadway Excavation Incl. Haul	3,787	CY	$33	$124,971	WSDOT Murden Creek Bridge Bid Tabs (3/9/22) Escalated to October 2022 (5%)
16	Unsuitable Foundation Excavation Incl. Haul	100	CY	$45	$4,500	Kitsap Way Culvert Bid Tab (01/26/21) Escalated to October 2022 (18%)
17	Gravel Borrow Incl. Haul	1,771	TON	$40	$70,840	WSDOT Murden Creek Bridge Bid Tabs (3/9/22) Escalated to October 2022 (5%)
18	Structure Excavation Class A Incl. Haul	4,094	CY	$40	$163,760	WSDOT Murden Creek Bridge Bid Tabs (3/9/22) Escalated to October 2022 (5%)
19	Shoring or Extra Excavation Class A Incl. Haul	1	LS	$282,000	$282,000	Kitsap Way Culvert Bid Tab (01/26/21) Escalated to October 2022 (18%)
20	Trimming and Cleanup	1	LS	$8,000	$8,000	Donkey Creek Bid Tab (10/17/2012) Escalated to October 2022 (62%)
21	Crushed Surfacing Top Course	224	Ton	$58	$12,992	WSDOT Murden Creek Bridge Bid Tabs (3/9/22) Escalated to October 2022 (5%)
22	Crushed Surfacing Base Course	224	Ton	$58	$12,992	WSDOT Murden Creek Bridge Bid Tabs (3/9/22) Escalated to October 2022 (5%)
23	HMA Class 1/2 inch PG 58H-22	150	Ton	$210	$31,500	Brentwood Drive Bridge Bid Tab (4/17/22) Escalated to October 2022 (5%)
24	Gravel Backfill for Wall - Culvert	900	Ton	$67	$60,300	Kitsap Way Culvert Bid Tab (01/26/21) Escalated to October 2022 (18%)
25	Gravel Backfill for Foundation Class A	60	Ton	$94	$5,640	Kitsap Way Culvert Bid Tab (01/26/21) Escalated to October 2022 (18%)
26	Precast Reinf. Conc. Three-sided Structure	1	LS	$1,572,000	$1,572,000	Lake Helena/Wicks Rd Culvert (09/20/22)
27	Temporary Stream Diversion	1	LS	$70,800	$70,800	Kitsap Way Culvert Bid Tab (01/26/21) Escalated to October 2022 (18%)
28	Solid Wall PVC Storm Sewer Pipe 12 In. Diam.	280	LF	$68	$19,040	Kitsap Way Culvert Bid Tab (01/26/21) Escalated to October 2022 (18%)
29	Connect to Existing Storm Sewer Pipe	1	Each	$1,000	$1,000	Eng Est
30	Catch Basin Type 1	3	Each	$2,500	$7,500	Eng Est
31	Silt Fence	500	LF	$8.00	$4,000.00	Eng Est
31	Temporary Erosion and Sediment Control	1	LS	$16,500	$16,500	Kitsap Way Culvert Bid Tab (01/26/21) Escalated to October 2022 (18%)
32	High Visibility Fence	800	LF	$7	$5,600	Eng Est
33	Woven Coir ECB	1,444	SY	$11	$15,884	Eng Est
34	Hydroseed	1,444	SY	$4	$5,776	Eng Est
35	Fine Compost	120	CY	$80	$9,600	Eng Est
36	Cement Conc. Traffic Curb and Gutter	300	LF	$39	$11,700	Kitsap Way Culvert Bid Tab (01/26/21) Escalated to October 2022 (18%)
37	Cement Conc. Sidewalk	167	SY	$63	$10,521	Kitsap Way Culvert Bid Tab (01/26/21) Escalated to October 2022 (18%)
38	Cement Conc. Curb Ramp Type Single Direction	3	Each	$2,500	$7,500	Eng Est
39	Quarry Spalls	30	Ton	$90	$2,700	Brentwood Drive Bridge Bid Tab (4/17/22) Escalated to October 2022 (5%)
40	Streambed Aggregate	940	Ton	$73	$68,620	Brentwood Drive Bridge Bid Tab (4/17/22) Escalated to October 2022 (5%)
41	Large Woody Material	20	EA	$2,000.00	$40,000.00	Brentwood Drive Bridge Bid Tab (4/17/22) Escalated to October 2022 (5%)
42	Illumination and Electrical System Complete	1	LS	$120,000.00	$120,000.00	6 Luminaires at $20k Each
43	Permanent Signing	1	LS	$3,000	$3,000	Eng Est
44	Plastic Line	600	LF	$4	$2,400	Eng Est
45	Dewatering	1	LS	$85,000	$85,000	Kitsap Way Culvert Bid Tab (01/26/21) Escalated to October 2022 (18%)
				Schedule A Total	**$3,510,121**	

SCHEDULE B - WATER AND SEWER

ITEM NO.	DESCRIPTION OF ITEM	EST. QTY.	UNIT	UNIT PRICE	AMOUNT	NOTES
1	Temporary Water and Sewer Bypass Plan	1	LS	$ 1,500.00	$ 1,500.00	Donkey Creek Bid Tab (10/17/2012) Escalated to October 2022 (62%)
2	Temporary Water and Sewer Bypass	1	LS	$ 88,000.00	$ 88,000.00	Donkey Creek Bid Tab (10/17/2012) Escalated to October 2022 (62%)
3	Ductile Iron Class 52 Water Pipe 12 In. Diam.	75	LF	$ 139.00	$ 10,425.00	WSDOT Bid Tabs
4	Connection to Existing Water Main	2	EA	$ 3,500.00	$ 7,000.00	Donkey Creek Bid Tab (10/17/2012) Escalated to October 2022 (62%)
5	Ductile Iron Gate Valve 12 In.	2	EA	$ 4,500.00	$ 9,000.00	WSDOT Bid Tabs
6	C900 PVC Sanitary Sewer Pipe 12 In. Diam.	75	LF	$ 68.00	$ 5,100.00	Kitsap Way Culvert Bid Tab (01/26/21) Escalated to October 2022 (18%)
7	Sewer Gate Valve 12 In.	2	EA	$ 4,500.00	$ 9,000.00	WSDOT Bid Tabs
8	Connection to Existing Sanitary Sewer	2	EA	$ 2,700.00	$ 5,400.00	Donkey Creek Bid Tab (10/17/2012) Escalated to October 2022 (62%)
				Schedule B Subtotal	**$ 135,425.00**	
				Sales Tax (8.8%)	**$ 11,917.40**	
				Schedule B Total	**$ 147,342.40**	

Notes: All Costs are in 2022 Dollars

Subtotal Schedules A and B	**$3,657,463**
Contingency (30%)	**$1,097,239**
Total Construction Cost	**$4,754,702**

Preliminary Engineering (20%)	**$950,940**	Survey, Environmental, Permitting, and PS&E
Right of Way	**$0**	
Construction Engnineering (2%)	**$95,094**	
Const. Admin./Mgmt. (7%)	**$332,829**	

GRAND TOTAL 2022 COST	**$6,133,566**

City of Gig Harbor
North Creek Culvert Feasibility Study
WWTP Creek Realignment Alternative
Conceptual Cost Estimate

Estimated By: D. Dinkuhn
Date: 11/4/22

Checked By: R. Sayles
Date: 11/4/22

SCHEDULE A - ROADWAY

ITEM NO.	DESCRIPTION OF ITEM	EST. QTY.	UNIT	UNIT PRICE	AMOUNT	NOTES
1	Minor Change	1	Est.	$50,000	$50,000	
2	Record Drawings	1	LS	$2,000.00	$2,000.00	
3	Structure and Roadway Surveying	1	LS	$9,500	$9,500	Kitsap Way Culvert Bid Tab (01/26/21) Escalated to October 2022 (18%)
4	SPCC Plan	1	LS	$700	$700	Brentwood Drive Bridge Bid Tab (4/17/22) Escalated to October 2022 (5%)
5	Pothole	10	Each	$700	$7,000	Brentwood Drive Bridge Bid Tab (4/17/22) Escalated to October 2022 (5%)
6	Protection and Support of Existing Utilities	1	LS	$13,200	$13,200	Kitsap Way Culvert Bid Tab (01/26/21) Escalated to October 2022 (18%)
7	Mobilization	1	LS	$234,812	$234,812	10%
8	Project Temporary Traffic Control	1	LS	$130,000	$130,000	Kitsap Way Culvert Bid Tab (01/26/21) Escalated to October 2022 (18%)
9	Temporary Bypass Road	1	LS	$58,000	$58,000	Kitsap Way Culvert Bid Tab (01/26/21) Escalated to October 2022 (18%)
10	Clearing and Grubbing	1	LS	$17,000	$17,000	Kitsap Way Culvert Bid Tab (01/26/21) Escalated to October 2022 (18%)
11	Removal of Structure and Obstruction	1	LS	$22,000	$22,000	Kitsap Way Culvert Bid Tab (01/26/21) Escalated to October 2022 (18%)
12	Sawcut Asphalt Concrete Pavement	48	LF	$18	$864	Brentwood Drive Bridge Bid Tab (4/17/22) Escalated to October 2022 (5%)
13	Remove Asphalt Concrete Pavement	80	SY	$20	$1,600	Brentwood Drive Bridge Bid Tab (4/17/22) Escalated to October 2022 (5%)
14	Roadway Excavation Incl. Haul	7,742	CY	$33	$255,486	WSDOT Murden Creek Bridge Bid Tabs (3/9/22) Escalated to October 2022 (5%)
15	Unsuitable Foundation Excavation Incl. Haul	100	CY	$45	$4,500	Kitsap Way Culvert Bid Tab (01/26/21) Escalated to October 2022 (18%)
16	Shoring or Extra Excavation Class A Incl. Haul	1	LS	$201,000	$201,000	Kitsap Way Culvert Bid Tab (01/26/21) Escalated to October 2022 (18%)
17	Trimming and Cleanup	1	LS	$8,000	$8,000	Donkey Creek Bid Tab (10/17/2012) Escalated to October 2022 (62%)
18	Crushed Surfacing Top Course	25	Ton	$58	$1,450	WSDOT Murden Creek Bridge Bid Tabs (3/9/22) Escalated to October 2022 (5%)
19	Crushed Surfacing Base Course	25	Ton	$58	$1,450	WSDOT Murden Creek Bridge Bid Tabs (3/9/22) Escalated to October 2022 (5%)
20	HMA Class 1/2 inch PG 58H-22	30	Ton	$210	$6,300	Brentwood Drive Bridge Bid Tab (4/17/22) Escalated to October 2022 (5%)
21	Gravel Backfill for Wall - Culvert	1,102	Ton	$67	$73,834	Kitsap Way Culvert Bid Tab (01/26/21) Escalated to October 2022 (18%)
22	Gravel Backfill for Foundation Class A	10	Ton	$94	$940	Kitsap Way Culvert Bid Tab (01/26/21) Escalated to October 2022 (18%)
23	Precast Reinf. Conc. Three-sided Structure	1	LS	$230,400	$230,400	Lake Helena/Wicks Rd Culvert (09/20/22)
24	Temporary Stream Diversion	1	LS	$70,800	$70,800	Kitsap Way Culvert Bid Tab (01/26/21) Escalated to October 2022 (18%)
25	Solid Wall PVC Storm Sewer Pipe 12 In. Diam.	230	LF	$68	$15,640	Kitsap Way Culvert Bid Tab (01/26/21) Escalated to October 2022 (18%)
26	Connect to Existing Storm Sewer Pipe	1	Each	$1,000	$1,000	Eng Est
27	Catch Basin Type 1	3	Each	$2,500	$7,500	Eng Est
28	Catch Basin Type 2 - 72 In. Diam.	1	Each	$10,000	$10,000	Eng Est
29	Stormwater Treatment Vault 8'x12'	1	Each	$50,000	$50,000	Ostrich Bay Creek (09/10/21) Escalated to October 2022 (12%)
30	Silt Fence	200	LF	$8.00	$1,600.00	Eng Est
31	Temporary Erosion and Sediment Control	1	LS	$16,500	$16,500	Kitsap Way Culvert Bid Tab (01/26/21) Escalated to October 2022 (18%)
32	High Visibility Fence	200	LF	$7	$1,400	Eng Est
33	Woven Coir ECB	1,911	SY	$11	$21,021	Eng Est
34	Hydroseed	1,911	SY	$4	$7,644	Eng Est
35	Fine Compost	160	CY	$80	$12,800	Eng Est
36	Cement Conc. Traffic Curb and Gutter	180	LF	$39	$7,020	Kitsap Way Culvert Bid Tab (01/26/21) Escalated to October 2022 (18%)
37	Cement Conc. Sidewalk	120	SY	$63	$7,560	Kitsap Way Culvert Bid Tab (01/26/21) Escalated to October 2022 (18%)
38	Quarry Spalls	30	Ton	$90	$2,700	Brentwood Drive Bridge Bid Tab (4/17/22) Escalated to October 2022 (5%)
39	Streambed Aggregate	1,273	Ton	$73	$92,929	Brentwood Drive Bridge Bid Tab (4/17/22) Escalated to October 2022 (5%)
40	Large Woody Material Retrofit in North Creek	20	EA	$2,000.00	$40,000.00	Brentwood Drive Bridge Bid Tab (4/17/22) Escalated to October 2022 (5%)
41	Modular Block Wall	8040	SF	$76.00	$611,040.00	Warren Ave Playfield (3/3/20) Escalated to October 2022 (27%)
42	Relocate Power Cabinet	1	LS	$40,000.00	$40,000.00	Eng Est
43	Dewatering	1	LS	$85,000	$85,000	Kitsap Way Culvert Bid Tab (01/26/21) Escalated to October 2022 (18%)
				Schedule A Total	**$2,432,190**	

SCHEDULE B - WATER AND SEWER

ITEM NO.	DESCRIPTION OF ITEM	EST. QTY.	UNIT	UNIT PRICE	AMOUNT	NOTES
1	Temporary Water and Sewer Bypass Plan	1	LS	$ 1,500.00	$ 1,500.00	Donkey Creek Bid Tab (10/17/2012) Escalated to October 2022 (62%)
2	Temporary Water and Sewer Bypass	1	LS	$ 88,000.00	$ 88,000.00	Donkey Creek Bid Tab (10/17/2012) Escalated to October 2022 (62%)
3	Ductile Iron Class 52 Pipe 12 In. Diam.	100	LF	$ 139.00	$ 13,900.00	WSDOT Bid Tabs
4	Ductile Iron Class 52 Pipe 8 In. Diam.	50	LF	$ 103.00	$ 5,150.00	WSDOT Bid Tabs
5	Relocate Water Service Connection	1	LS	$ 5,000.00	$ 5,000.00	Eng Est
6	Ductile Iron Gate Valve 12 In.	4	EA	$ 4,500.00	$ 18,000.00	WSDOT Bid Tabs
7	Ductile Iron Gate Valve 8 In.	2	EA	$ 3,500.00	$ 7,000.00	WSDOT Bid Tabs
				Schedule B Subtotal	**$ 138,550.00**	
				Sales Tax (8.8%)	**$ 12,192.40**	
				Schedule B Total	**$ 150,742.40**	

Notes: All Costs are in 2022 Dollars

Subtotal Schedules A and B	**$2,582,932**	
Contingency (30%)	**$774,880**	
Total Construction Cost	**$3,357,812**	
Preliminary Engineering (22%)	**$738,719**	Survey, Environmental, Permitting, and PS&E
Right of Way	**$0**	
Construction Engineering (2%)	**$67,156**	
Const. Admin./Mgmt. (7%)	**$235,047**	
GRAND TOTAL 2022 COST	**$4,398,734**	

PUBLIC WORKS DEPARTMENT

MEMORANDUM

TO: Mayor and City Council

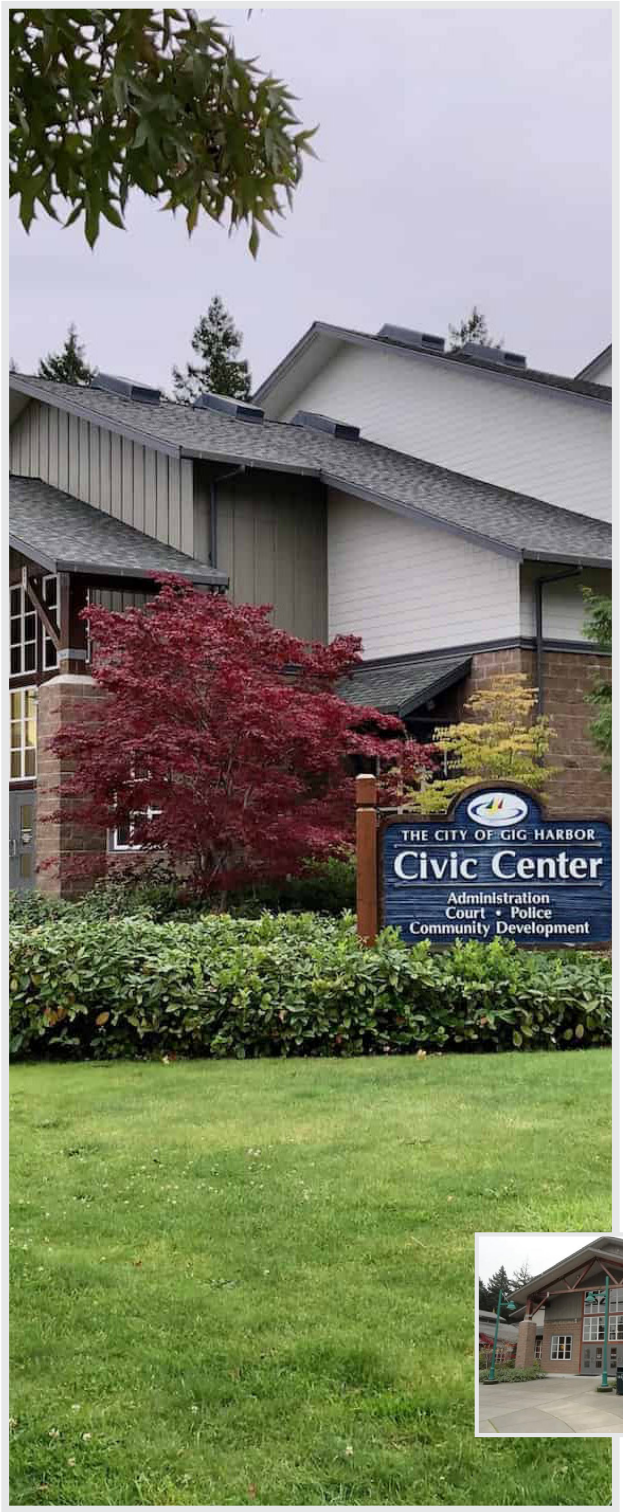
FROM: Jeff Langhelm, PE, Public Works Director

DATE: November 10, 2022

SUBJECT: Civic Center HVAC Alternatives Review

The City constructed it's 35,000 sq. ft. Civic Center in 2002. The HVAC system in the Civic Center has exceeded its useful life and must be replaced. In June 2022 the City requested qualifications from consultants to complete an assessment of the Civic Center's HVAC system then prepare a report that provides an alternatives analysis for HVAC replacement options. The final report is attached for your review.

At the November 17 study session Staff and the City's consultant, MacDonald Miller, will present the findings of the report and provide a recommended replacement option. Staff will be asking Council at the end of the study session to provide general direction on how to proceed based on the options provided study session.



Gig Harbor Civic Center

HVAC REPLACEMENT ASSESSMENT

November 9, 2022

MACMILLER.COM **1-800-962-5979**

SEATTLE EVERETT REDMOND TACOMA KENNEWICK PORTLAND EUGENE SPOKANE

MacDonald-Miller
FACILITY SOLUTIONS

November 9, 2022

Mr. Jeff Langhelm, P.E.
City of Gig Harbor – Public Works Director
3510 Grandview St
Gig Harbor, WA 98335

SUBJECT: GIG HARBOR CIVIC CENTER - HVAC REPLACEMENT ASSESSMENT
3510 GRANDVIEW ST. GIG HARBOR, WA 98335

PROJECT SCOPE

The City of Gig Harbor has requested MacDonald-Miller Facility Solutions (MMFS) to review the existing HVAC systems at the Gig Harbor Civic Center (GHCC) and provide a study with multiple HVAC system replacement options for the Police Department, City Council Chambers, and Planning Department.

A MMFS mechanical engineer, sustainability design manager, project estimator, and the account executive were at the job site on September 22, 2022, to survey the existing HVAC systems, controls, and associated ductwork and equipment.

In general, the existing HVAC systems are multizone air handling units with direct expansion (DX) cooling and gas-fired heating sections. Each of the three areas are served by multiple, independent multizone systems. Please refer to the detailed descriptions of existing systems at the end of this report for additional information.

EXECUTIVE SUMMARY

The existing HVAC systems were installed when the building was constructed in approximately 2002 and while there are some newer components, the systems have reached the end of their useful lives. Additionally, these systems utilize R-22 refrigerant and natural gas fired heating sections; both are major contributors to climate change. The United States banned import and production of R-22 in 2020 due to the harmful impact on the earth's ozone layer. MMFS was asked to assess the climate resiliency of each proposed system alternative and evaluate each system's ability to reduce carbon emissions. The summary tables below highlight our findings:

DESCRIPTIONS OF PROPOSED SYSTEM ALTERNATIVES

The descriptions of the three proposed system alternatives are outlined below. Systems examined include the following:

- **System A – Centralized Variable Refrigerant Flow (VRF)**
- **System B – Air Source Heat Pump (ASHP), 4-Pipe Fan Coil**
- **System C – Fluid Cooler and Water-Source Heat Pumps (WSHP)**
- **System D –** (Evaluated but not recommended) **Repurpose existing multizone unit: Variable Volume heat pump with electric reheat**

ENERGY & EMISSIONS

	CURRENT SYSTEM - No Change	SYSTEM A Centralized Variable Refrigerant Flow (VRF)	SYSTEM B Air Source Heat Pump (ASHP), 4-Pipe Fan Coil	SYSTEM C Fluid Cooler & Water-Source Heat Pumps (WSHP)
EUI	82.3 (actual)	33	35	48
CO2e Emissions (Site)/ estimates[1]	289 (actual)	143	155	220

(Metric tons of CO2e) [1] Electricity and natural gas emissions factors for Puget Sound Energy used

Emissions Reduction Equivalency[2]	0	32	29	15

(Gasoline-powered passenger vehicles removed for one year, compared to current)

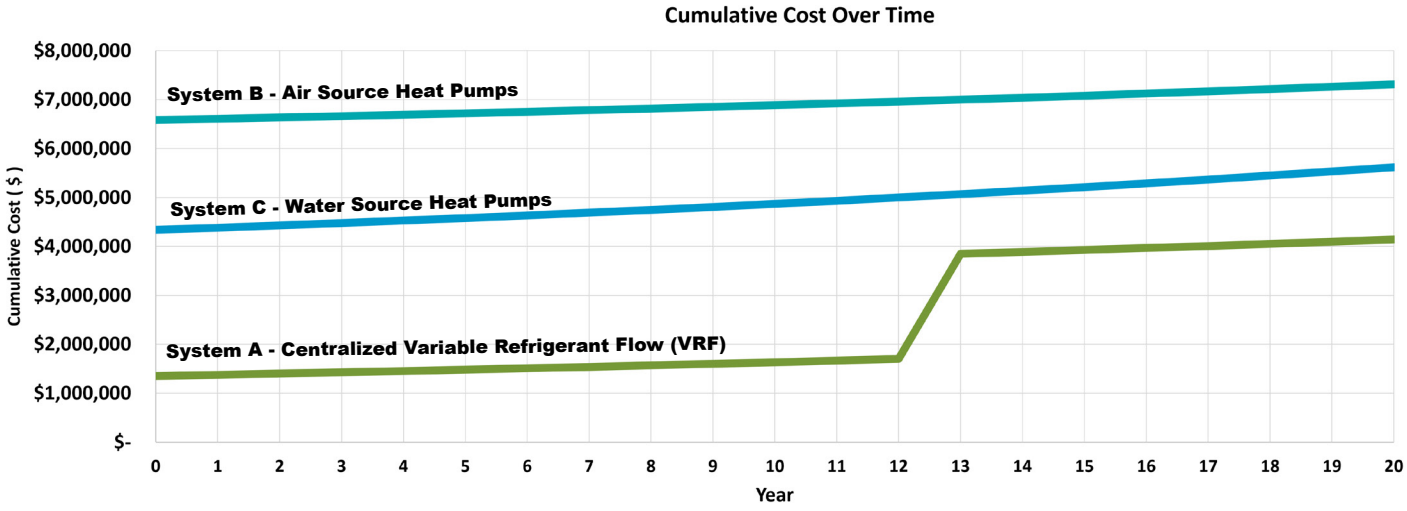
[2] Per: https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator

ROM COSTS

ROM COST Installation		$1,352,311	$6,583,335	$4,337,950
ROM COST ANNUAL Maintenance		$14,500	$14,500	$23,300
ROM COST ANNUAL Electricity Bill		$9,300	$11,230	$21,940
ROM COST ANNUAL Natural Gas Bill		$0	$0	$0

LIFECYCLE COSTS - 20 YEARS

The following line chart includes the first costs for the HVAC system installation, quarterly maintenance (e.g. filter changes), annual coil cleaning, and replacement at the end of their useful life (VRF).



DETAILED ANALYSIS

After surveying the HVAC systems both in the field and as shown in the building documents, MMFS considered these new system options for the purpose of this study:

SYSTEM A – CENTRALIZED VRF

This system would repurpose the existing multi-zone air handling unit and ductwork to move air to the spaces and to provide outside air to each zone. The existing R-22 DX coil and the gas heat section would be removed from the multi-zone air handling unit and the fans would be replaced with a variable speed fan to allow for airflow and duct pressure balancing. A Variable Refrigerant Flow (VRF) heat pump outdoor unit using R-410A refrigerant would be installed and connected to a refrigerant based energy recovery unit. The indoor section of this heat pump system would use individual refrigerant coils placed in the ductwork of each existing zone. Electric strip heat would be added to each zone for air tempering should the heat pump be required to operate below the ideal outside air temperatures. Having supplemental heat will ensure that each zone can operate to maintain its ideal temperature. VRF units use an “inverter compressor” that allows the outdoor unit to produce varied amounts of either heating or cooling. This feature allows the unit to tailor its output capacity to the demand of the space at any given time. VRF systems generally have a life expectancy between 12 and 15 years if properly maintained. Due to the flexibility of this system and the application benefits, **we recommend this option**.

AIR QUALITY

MERV 13, effective for removing wildfire smoke from outside air

- Alternate technologies for viral load control and TVOCS, (UV lights, IAQ CPR - bipolar ionization) could be explored if desired.

TEMPERATURE ADAPTABILITY

System provides heat & cooling for both mild and extreme outside air temperatures.

CONSIDERATIONS

Reducing Impact on Climate

- **Considerations:**
  Oversizing units results in more energy use and shorter equipment life
- **Refrigerants:**
  R410 – on list of High Global Warming Potential (GWP) refrigerants, manufacturers are not providing the alternatives currently
- **Life expectancy:**
  12-15 years, refrigerant changes – complete line changes (complete system changes)

SYSTEM B – AIR SOURCE HEAT PUMP

This system would repurpose the existing multi-zone air handling unit and ductwork to move outside air to the spaces to comply with the Dedicated Outside Air System (DOAS) requirements found in the Washington State Energy Code (WSEC). The existing R-22 DX coil and the gas heat section would be removed from the multi-zone air handling unit, the unit supply fans would be replaced with a reduced capacity variable speed fan system to right size the capacity for DOAS use. A return fan and an energy recovery wheel would be installed to complete the transformation of this unit. The zone level ductwork would remain to allow outside air to be distributed to each space. Air to water heat pumps would be used to provide heated and chilled water to a distribution piping network to each zone, and a fan coil unit would be used to extract either heat or cool from this piping network. The fan coil units installed at each zone may require additional ductwork to ensure air flow to each space. An electric boiler would be used for supplemental heat should the outside air temperature fall below the effective range of the air to water heat pump. This system has the highest upfront cost but would be most compatible with the carbon neutral goals of the Council. The anticipated life span of this equipment is varied, the outdoor portions of the equipment have a life span of 15 to 20 years, while the water distribution and fan coil systems have a 30-year lifespan if maintained. This system is the most flexible of the options shown and would lend itself well to building architectural changes that occur where revised zoning is desired. **We recommend this option.**

AIR QUALITY

MERV 13, effective for removing wildfire smoke from outside air

- Alternate technologies for viral load control and TVOCS, (UV lights, IAQ CPR - bipolar ionization) could be explored if desired

TEMPERATURE ADAPTABILITY

System provides heat & cooling for both mild and extreme outside air temperatures

CONSIDERATIONS

Reducing Impact on Climate

- **Refrigerants:** R410a, is a High Global Warming Potential (GWP) refrigerant, but alternatives are available currently to comply with low GWP requirements of the future. Washington State requires this equipment to use alternate refrigerants if manufactured after 12/31/23
- **Life expectancy:** Outdoor units have a life expectancy of 20 years, other components, such as outside lines // Indoor fan coils have a 30-year life – fan coil motor replacements may be needed periodically.
- **Managing for what we expect:** Running the system appropriate for occupancy, regular maintenance

SYSTEM C – WATER SOURCE HEAT PUMP

A water source heat pump system consists of an outdoor fluid cooler, pumps, expansion tank, air separator, condenser water piping and electric boiler. This system would repurpose the existing multi-zone air handling unit and ductwork to move outside air to the spaces to comply with the DOAS requirements found in the WSEC. The existing R-22 DX coil and the gas heat section would be removed from the multi-zone air handling unit, the unit supply fans would be replaced with a reduced capacity variable speed fan system to right size the capacity for DOAS use. A return fan and an energy recovery wheel would be installed to complete the transformation of this unit. The zone level ductwork would remain to allow outside air to be distributed to each space. A condenser water distribution network would be required throughout space and would be connected to a water source heat pump (WSHP) installed in each zone. This system allows the heat pumps to control the zone temperature in each respective zone while sharing energy through the condenser water loop. When the loop gets too warm, it uses evaporative cooling towers to remove heat from the system. When the loop is too cold, the electric boiler would be used to provide supplement heat. Fluid coolers and WSHP's have a life expectancy between 15 and 20 years. The loop piping has a 30-year life expectancy. The individual heat pumps use refrigerant but would have the lowest refrigerant release potential of any of the described systems. **We recommend this option.**

AIR QUALITY

MERV 8 filtration, due to added static pressure of more effective filters, this system is limited at the units themselves. MERV 13 filtration is available for the DOAS system and would be effective for removing wildfire smoke in the outside air.

- Alternate technologies for viral load control and TVOCS, (UV lights, IAQ CPR - bipolar ionization) could be explored if desired

TEMPERATURE ADAPTABILITY

System provides heat & cooling for both mild and extreme outside air temperatures

CONSIDERATIONS

Reducing Impact on Climate

- **Water usage:** This system uses water to create the cooling action. Water is an environmentally friendly refrigerant, but water consumption is high with this system. This may not align with the use of resources goals established by the Council.
- **Refrigerants:** R410a – is on the list of high GWP refrigerants, manufacturers are not providing alternatives currently. WSHP's have a small amount of refrigerant in each compared to the other presented systems.
- **Life Expectancy:** cooling tower 20 years, boiler, 20 years, heat pumps 20 years. Condenser water distribution 40 years.

SYSTEM D – REPURPOSE EXISTING MULTIZONE UNIT

Modify the existing multizone unit by replacing the existing DX cooling coil and removing the gas heat section. For a full unit refurbishment, fans would be replaced with new variable speed fans. The outdoor units would be replaced at the same time as the indoor coils to allow use as a heat pump with a currently available refrigerant. R-22 used in the current system has a high global warming potential (GWP) and would be replaced by a unit designed to operate on R-410a. The 410a refrigerant is sunsetting in the current market, but new refrigerants are not yet available in this type of equipment. Electric strip heat would need to be added to each individual zone to ensure space comfort when the outside air temperatures are below 20°F. Due to the limitations of this type of a heat pump system, the zones would have to "vote" to determine whether the unit operates in the heating mode or the cooling mode. This often causes zones that require heating to still receive air at temperatures intended for cooling. Energy code prevents the system from reheating this cooling air, even though the zones are requesting heat, they call this simultaneous heating and cooling. Based on the value of occupant comfort and the potential need for simultaneous heating and cooling, we do not recommend this option.

OTHER DESIGN CONSIDERATIONS FOR ADDRESSING CLIMATE IMPACTS:

TENANT/VISITOR EDUCATION & CULTURE OF HOW BUILDING IS USED

- Signage on windows – when to open and when to avoid opening
- Temperature control
- Discourage use of individual heaters
- Controls – training for facilities team
- Community hub for resiliency – in case of emergency/inclement weather – preparedness for this building to be a gathering place for community

MAINTENANCE

- Quarterly/Annual maintenance – increases life expectancy of equipment
- Smart Building Systems (SBS) – remote monitoring of potential equipment issues

ADDITIONAL OPPORTUNITIES

- Fire protection – bring up to code requirements
- Fleet utilization/conversion
- Heat island impact – roof and wall finishes
- Lighting – LED upgrades
- Water – low flow plumbing fixtures, reduce hot water (energy consumption)
- Tree canopy
- Solar

Appendices

APPENDIX I: SUSTAINABILITY REPORT CARD

APPENDIX II: DETAILED DESCRIPTIONS OF EXISTING SYSTEMS

SUSTAINABILITY REPORT CARD | GIG HARBOR CIVIC CENTER

MacDonald-Miller FACILITY SOLUTIONS®

Your sustainability cliff notes for your building's mechanical system design & impacts. This summary supports the best system selection for your business and our planet.

BUILDING VITALS

Location: Gig Harbor, WA

Type: Civic, Commercial

Size: 3 buildings, 2 floors, 40,975 sq. ft.

Year Built: 2002

Current HVAC: Multizone unit, variable volume heat pump, with electric reheat

PROJECT SCOPE CORE VALUES
for HVAC & Plumbing IMPACT POTENTIAL

- [X] Conservation (energy)
- [ ] Conservation (water)
- [ ] Decrease embodied carbon
- [X] Decrease operational carbon
- [X] Health & wellness (air quality)
- [ ] Waste reduction (construction)
- [ ] Diversity & inclusion (process)
- [ ] Other: _____

WA STATE CLEAN BUILDINGS ENERGY USE INTENSITY (EUI) TARGET

Note: *A project of this size is not required to meet this target at this time, however this project will be required to report annual EUI, Energy Management Planb, and O&M Program by 2027.*

Futureproofing: *There is a high likelihood that buildings of this size will need to comply, possibly as soon as 2029 and certainly within the next HVAC equipment's useful life.*

Proposed Mechanical System (SYSTEM A):

CENTRALIZED VARIABLE REFRIGERANT FLOW (VRF)

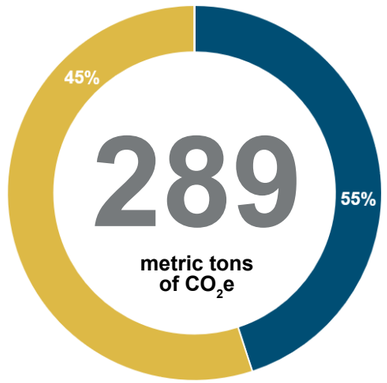
VRF 101: Uses a heat pump to supply a refrigerant based energy recovery unit and zone level refrigerant coils. This system allows simultaneous heating and cooling of the zones using the energy recovery unit.

ENERGY FUEL MIX

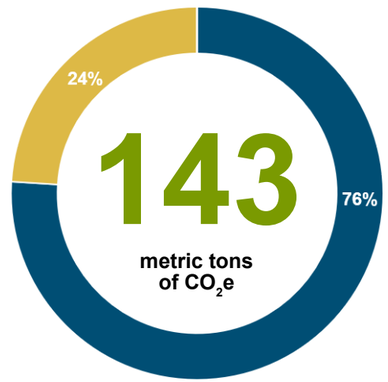
- Electricity
- Natural Gas

OPERATIONAL CARBON

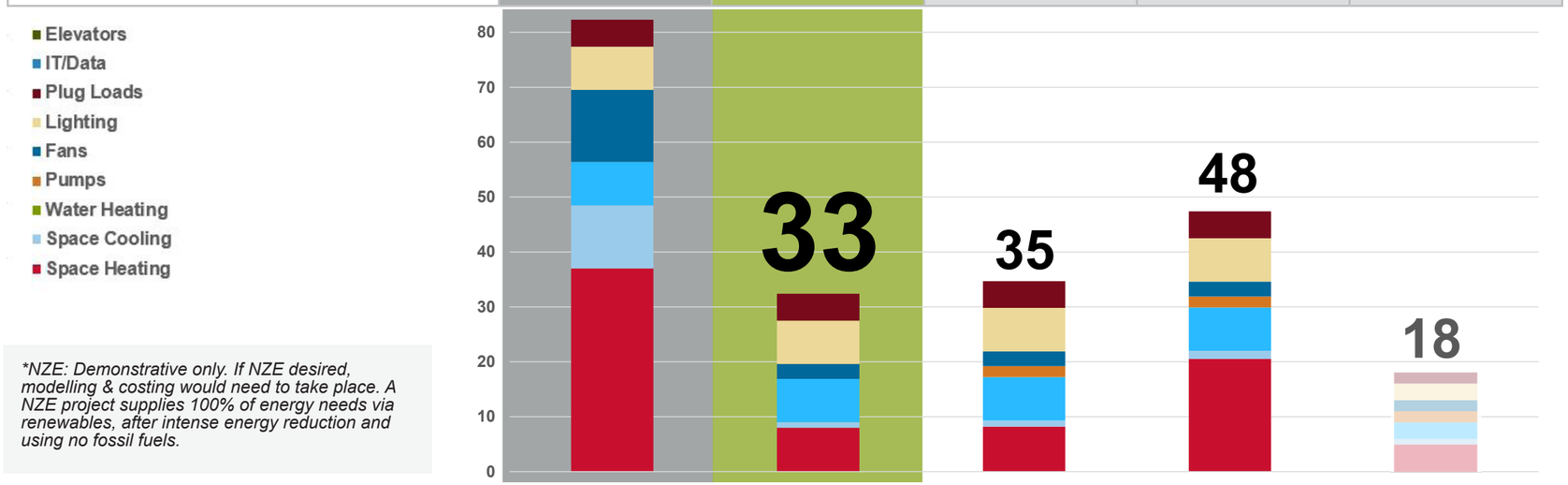
CURRENT



PROPOSED SYSTEM (VRF)
ANTICIPATED



COMPARING SYSTEM OPTIONS | ANTICIPATED BASED ON CURRENT SD LEVEL DESIGN |



**NZE: Demonstrative only. If NZE desired, modelling & costing would need to take place. A NZE project supplies 100% of energy needs via renewables, after intense energy reduction and using no fossil fuels.*

ENERGY USE INTENSITY (EUI)	CURRENT	A: CENTRALIZED VRF	B: AIR SOURCE HEAT PUMP	C: WATER SOURCE HEAT PUMP	TBD: NET ZERO ENERGY (NZE)
Energy Use Intensity (EUI) - **kBtu/sf/yr**	83	33	35	48	18
Carbon Impact - **metric tons of CO2e**	289	143	155	220	112
Gas-Powered Vehicles **Removed // Year compared to current system**	0	32	29	15	42

Updated: 11.08.2022

APPENDIX II – DETAILED DESCRIPTIONS OF EXISTING SYSTEMS

POLICE DEPARTMENT BUILDING - EXISTING HVAC EQUIPMENT

One existing indoor direct expansion multizone air handling unit (MZU-3) with 9,000 CFM of supply and 6,215 CFM of return air located in the loft level. MZU-3 serves a total of eleven zones (9 current and 2 for future). The existing MZU-3 has a nominal cooling capacity of 278.71 MBH (thousand BTUs per hour) and total sensible cooling of 243.64 MBH with an Energy Efficiency Rating (EER) of 8.9. In addition, MZU-3 also has a heating capacity of 399 MBH input and 320 MBH output via natural gas burner in the unit. The MZU-3 connects to an outdoor condensing unit (CU-3) via a set of refrigerant lines. The existing condensing unit is rated at 289.4 MBH total cooling load, and the refrigerant type is R22. Existing refrigerant lines from the outdoor unit to the indoor unit were routed inside a direct buried schedule 40 steel pipe.

Existing exhaust fans EF4-2 and EF4-4 serve this building.

CITY COUNCIL CHAMBER BUILDING - EXISTING HVAC EQUIPMENT

The City Council Chamber building has multiple floors, and the spaces are served by multiple indoor multi-zone air handling units. The ground level HVAC system is served by MZU-2 located on the first floor. All ductwork associated with MZU-2 is located under the foundation slab. MZU-2 airflow capacity is 9,000 CFM of supply and 8,100 CFM of return air. MZU-2 serves a total of five zones. The existing unit MZU-2 has a nominal cooling capacity of 268.71 MBH and total sensible cooling of 234.54 MBH with an EER rating of 8.9. In addition, MZU-2 also has a heating capacity of 399 MBH input and 320 MBH output via natural gas burner in the unit. The unit MZU-2 serves 5 zones and connects to an outdoor condensing unit (CU-2) via a set of refrigerant lines. The existing condensing unit is rated at 289.4 MBH total cooling load, and the refrigerant type is R22. Existing refrigerant lines connected the indoor to the outdoor unit were routed inside a direct buried schedule 40 steel pipe.

The second floor HVAC system is served by two indoor units, MZU-4 and MZU-5. MZU-4 serves the Council Chamber work rooms, and MZU-5 serves the Council Chamber offices.

The existing MZU-4 airflow capacity is 1,750 CFM and has a total nominal cooling capacity of 51.84 MBH and sensible cooling load of 49.72 MBH, and the heating capacity is 93 MBH input and 75 MBH output. MZU-4 serves 5 zones and is connected to the existing outdoor condensing unit (CU-4) via a set of refrigerant pipes and is currently using refrigerant type R22.

The existing MZU-5 has an airflow capacity of 3,000 CFM and has a total nominal cooling capacity of 88.94 MBH total and 81.77 MBH sensible., The heating capacity is 93 MBH input and 75 MBH output. MZU-5 is connected to the existing outdoor condensing unit (CU-5) via a set of refrigerant pipes, and it is currently using refrigerant type R22. Existing refrigerant lines connected the indoor to the outdoor unit were routed inside a direct buried schedule 40 steel pipe.

Existing exhaust fans EF2-, EF2-2, EF2-3, and EF2-4 serve this building.

PLANNING DEPARTMENT BUILDING - EXISTING HVAC EQUIPMENT

One existing indoor direct expansion multizone air handling unit (MZU-1) with 8,550 CFM of supply. It does not have return air back to the unit. The unit is located in the loft level. MZU-1 serves a total of seven zones. The existing MZU-1 has a nominal cooling capacity of 214 MBH total and sensible cooling capacity of 192 MBH with an EER rating of 9.1. In addition, MZU-1 also has a heating capacity of 399 MBH input and 320 MBH output via natural gas burner in the unit. MZU-1 connects to an outdoor condensing unit (CU-1) via a set of refrigerant lines. The existing condensing unit is rated at 231 MBH total cooling capacity, and the refrigerant type is R22. Exterior offices were also served by radiant heating panels in addition to MZU-1.

Existing exhaust fans EF1-1 and EF1-2 serve this building.

Typical existing indoor MZU (left) with zone control damper (right).

Typical existing supply ductwork (left) and zone control boxes (right).

Typical condensing unit with underground refrigerant pipes.