City Council Committee Meeting Agenda

Community Development Committee

This meeting will be conducted in person at City Hall at
10220 270th Street NW, Stanwood, WA 98292
https://www.stanwoodwa.org

Thursday, June 5, 2025, at 5:00 PM

1. Multimodal Level of Service Planning and Recommendations
2. Raplee Property Clean Up Options Report Findings and Discussion
3. July Meeting Schedule

June 2025 Staff Report

CITY OF STANWOOD
COMMUNITY DEVELOPMENT COMMITTEE
AGENDA STAFF REPORT

DATE: June 5, 2025

SUBJECT: CDC Agenda Topics

FROM: Patricia Love, Community Development Director

Multimodal Level of Service Planning and Recommendations :

The Washington State Growth Management Act (GMA) mandates that cities develop and adopt Comprehensive Plans to effectively guide their long-term growth and development. A crucial part of Comprehensive Plans is the Transportation Element, which focuses on creating and maintaining efficient, sustainable, and multimodal transportation systems.

GMA requires cities to adopt multimodal level of service (MMLOS) standards. Specifically:

> "Multimodal level of service standards for all locally owned arterials, locally and regionally operated transit routes that serve urban growth areas, state-owned or operated transit routes that serve urban areas if the department of transportation has prepared such standards, and active transportation facilities to serve as a gauge to judge performance of the system and success in helping to achieve the goals of this chapter consistent with environmental justice."

Stanwood has adopted Level of Service Standards for vehicles based on roadway type and intersection controls. To be compliant with state law, the City is initiating a project to evaluate appropriate MMLOS for the City and adopt implementing policies and regulations. The goal of the project is to expand the current vehicle-centric standards to a more inclusive and sustainable approach to mobility that benefits all transportation modes and users.

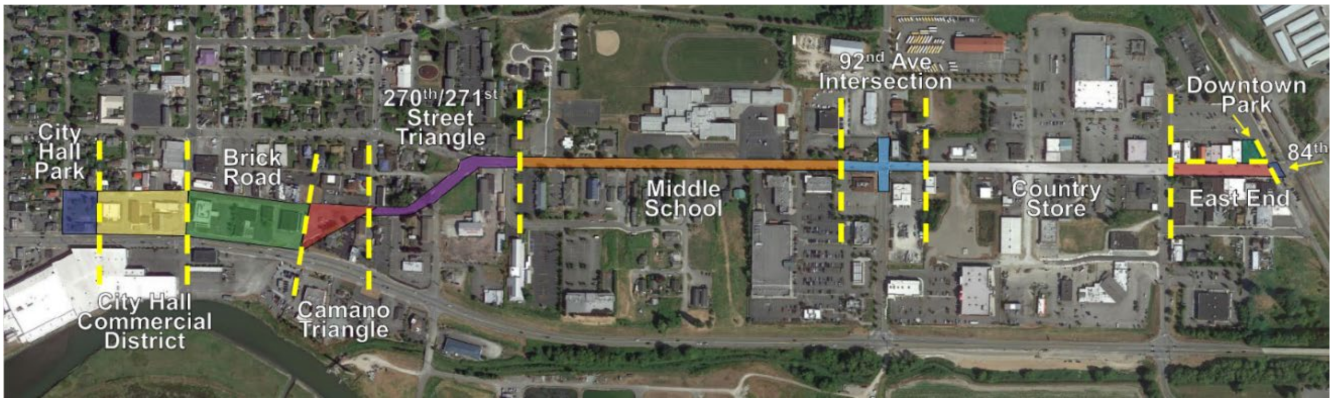
Transpogroup, the City's on-call transportation planning consultant, have prepared their initial assessment and recommendations on how best to proceed with adopting a MMLOS standard for the City. They have been tasked with:

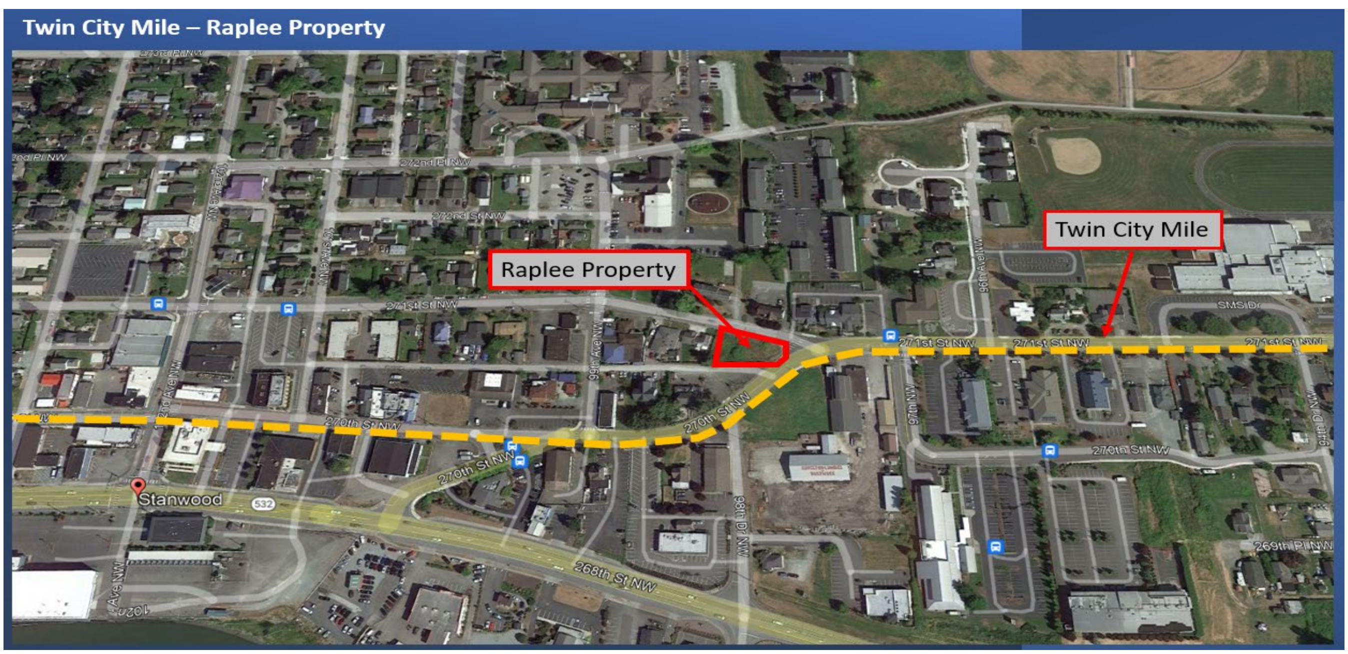
> Preparing a multimodal concurrency and LOS program(s) that meets the requirements of the Growth Management Act and Puget Sound Regional Council (PSRC) VISION 2050. MMLOS standards should align with community goals, available and anticipated funding, and city growth targets. It is anticipated that work will include:

Attached is their draft summary report with their suggested approach. They will also be attending the meeting remotely to present their findings and recommendations.

Raplee Property Clean Up Options Report Findings and Discussion:

The triangular parcel of land situated at the intersection of 271st Street and 270th Street in downtown Stanwood is currently owned by Kathleen Raplee. This property holds strategic importance as it could serve as a prominent gateway to the west end of the Twin City Mile. Due to its location, the site has been recognized as a key element in advancing the city's broader downtown revitalization goals.





The Twin City Mile is a downtown revitalization project, elements of which include constructing gateways, reconfiguring travel lanes and parking, building wider sidewalks and plaza areas, building park areas, and installing street trees, art, and other curb appeal amenities to promote a vibrant economic center. The Twin City Mile has generated renewed local interest around redevelopment of the Raplee property to serve as a park and owner Kathleen Raplee has expressed interest in selling the property to the City.

To evaluate the feasibility of redevelopment, City staff, in coordination with our environmental consultant, Maul Foster & Alongi, submitted a grant application to the Washington State Department of Ecology. The funding was requested to perform additional environmental testing to determine the extent of any contamination present on the site. The Department of Ecology approved the request and funded further site investigation activities. The *final Clean Up Options Report* has been completed and is now available for review. This document outlines the findings from the environmental assessment and presents potential remediation strategies.

The attached Clean Up Options Report is being provided for the Committee's review and consideration. The goal of the upcoming meeting is to:

- Present and discuss the environmental findings
- Review proposed cleanup options
- Consider the implications for site acquisition and redevelopment
- Determine next steps in the process, including possible purchase, clean up funding, and site planning efforts

July Meeting Schedule:

The July meeting falls on July 3rd, the day before the 4th of July holiday. To avoid potential conflicts with holiday travel or celebrations, would the Committee be open to rescheduling the meeting to either Tuesday, July 1, or Wednesday, July 2?

Transportation Level of Service Evaluation Memo

DRAFT

MEMORANDUM

Date:	May 19, 2025	**TG:**	21010.00
To:	Patricia Love, Shawn Smith – City of Stanwood		
From:	Paul Sharman, Patrick Lynch – Transpo Group		
cc:	Stanwood PW Committee, Stanwood CDC		
Subject:	Stanwood Active Transportation Level of Service Evaluation		

Transpo Group is currently supporting the City of Stanwood with the development of a multimodal level of service (LOS) standard for evaluating the City's transportation network. The following memorandum outlines the City's vision for the active transportation network, as well as potential approaches and standards for evaluating the roadways within that network.

Active Transportation Level of Service

Active Transportation Network Vision

The City's vision for the future roadway network is to provide active mode facilities on all roadways unless special circumstances make it prohibitive. The City's Transportation Improvement Plan identifies numerous projects to install sidewalks to improve access for active transportation users along roadways within the City that currently lack active mode facilities.

As part of new development projects, the City requires that sidewalk facilities be constructed along internal streets and adjacent frontages in accordance with the design standards outlined in the City of Stanwood's Street and Utility Standards. This has helped the City to achieve parts of the active transportation vision; however, reliance on developer-implemented improvements alone would result in gaps within the bicycle and pedestrian network.

The Active Transportation Plan Network, shown in Figure 1, identifies the future vision for a comprehensive network of active transportation facilities. The City envisions an interconnected system of on-road and off-road facilities, that include sidewalks, pathways, shared-use trails, and key connections.

The active transportation network contains a series of Primary or Secondary Routes. Corridors identified as Primary or Secondary Routes are not indicative of a hierarchy for future active transportation facility development, rather they are used to make a distinction between routes that are more regional or that extend completely through the community (primary), and those that serve to make the second leg of the journey to connect to destinations, extend into neighborhoods, or complete a loop (secondary). Table 1 further defines the functions of each tier within the Active Transportation Plan Network.

Note that the active transportation network does not differentiate between pedestrian and bicycle facilities, with the primary focus of this network being pedestrian connectivity. Due to the limited resources available for the Comprehensive Plan update process, additional work will be required as part of a separate effort to refine this network for bicycle connectivity. The City's vision for the bicycle network can build of that shown in Figure 1 and could be prepared as part of the development of a future Pedestrian and Bicycle Master Plan study. This study would provide greater detail and planning around mobility for pedestrian and bicycle modes throughout the City.

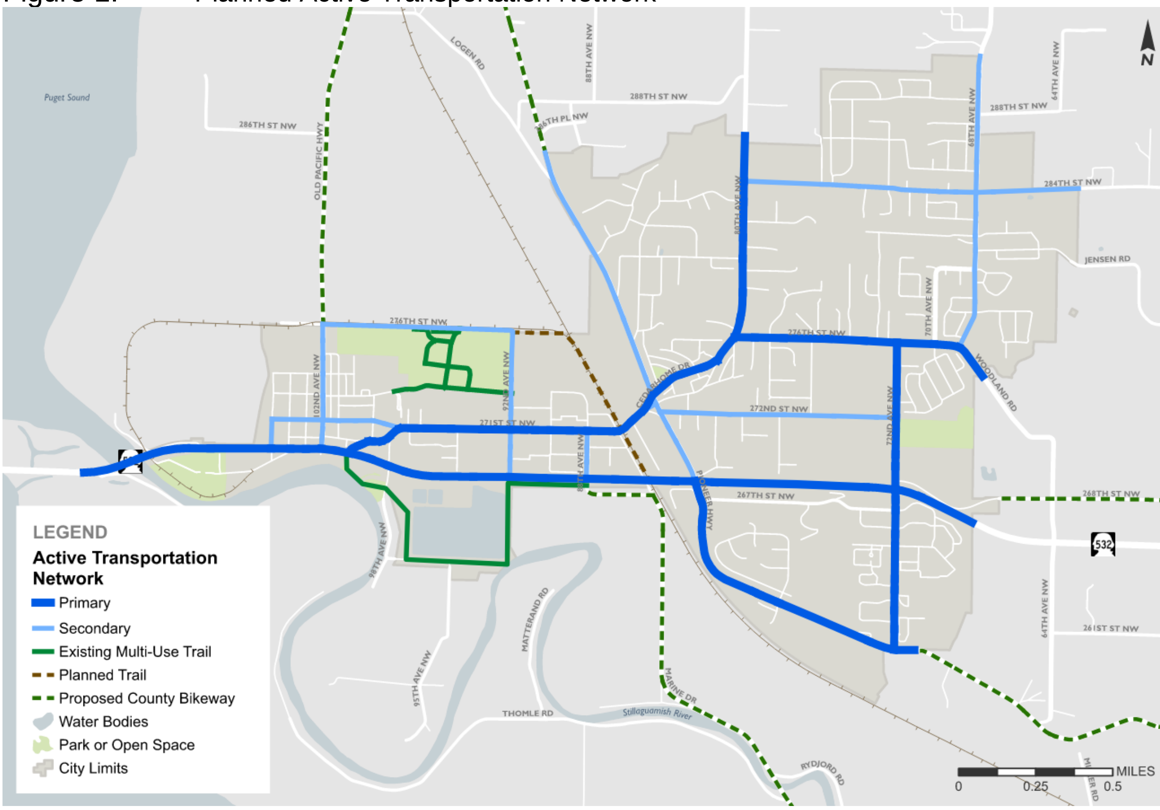
Table 1. Table 1 – Active Transportation Plan Network Definitions

Hierarchy	System Function
Primary Network	Backbone of the system. Offers direct connections to majority of important community destinations, usually on arterials or collectors. Primary Network routes are often the most attractive route in terms of convenience in urban areas.
Secondary Network	Supportive to the Primary Network, often providing system continuity by connecting segments of the primary network with on-street or off-street facilities. Secondary Network routes sometimes offer more comfortable routes on quieter streets, although the route may not be as direct as the Primary network.
Other Streets	This encompasses the majority of streets within the City (including residential neighborhood streets). While not specifically identified within the Active Transportation Plan Network, many of these roadways provide pedestrian and/or bicycle facilities in line with roadway design standards. Other Streets provide access to the Primary and Secondary Networks.
Off-Street Multiuse Trails	Trails represent the off-street pedestrian and bicycle facilities within the City. Trails often provide the direct connectivity of Primary Network routes but are located along alignments away from roadways (creating a more comfortable pedestrian and bicycle environment).

It should be noted that the roadways within the Active Transportation Plan Network are not the only roadways within the City designated to have pedestrian/bicycle facilities. As indicated in the Stanwood Street and Utility Standards, most roadways within the City are required to provide some level of pedestrian facilities.

The Active Transportation Network is not meant to define the type, width, and locations of these facilities for Primary and Secondary Network roadways. Instead, the roadway design standards designate the types of facilities planned for each roadway based on its functional classification. The Active Transportation Plan Network is intended to lay out the active transportation vision for the City, not to designate the sidewalk and bicycle facilities for each roadway.

Figure 1. Planned Active Transportation Network



Level of Service Evaluation Approaches

Various approaches can be taken to evaluate active transportation and assign a LOS value for roadways within the City. The approaches can range from simple to complex and require varying levels of data to implement. Two potential approaches which can be implemented for Stanwood have been outlined below. Benefits and drawbacks of each approach have also been provided to aid in selecting the preferred approach to implement.

The active transportation system performance standards outlined below do not replace the City's existing multimodal street policies and design standards, which require the installation of pedestrian and/or bicycle facilities along new or improved roadways. Instead, these standards are intended to guide the retrofit of older roadway infrastructure that was built with inadequate active transportation facilities (prior to the adoption of the existing design standards) to meet current expectations for system performance as it relates to bicycle and pedestrian travel.

Approach 1: Consistency with Design Standards

The first approach would be to evaluate the active transportation LOS based on the consistency of each roadway's pedestrian facilities with the roadway design standards corresponding to the functional classification of the roadway. This approach uses consistency with the City's Street and Utility Standards to evaluate each roadway instead of based on the presence of facilities on one vs. two sides of the roadway.

For this approach, the LOS standards that would be used to evaluate the active transportation network would be based on consistency with the roadway standards outlined in the City of Stanwood

Street and Utility Standards. The LOS standards are shown in Table 2, along with example facilities and their associated LOS value.

Table 2. Active Transportation Levels of Service Overview – Approach 1

LOS	Rating	Standard	Example Facilities*
(green)	Good	Roadway provides pedestrian/bicycle facilities in accordance with standards	• Sidewalks on both sides of the roadway • Multi-use path on one side of the roadway
(orange)	Acceptable	Roadway provides pedestrian/bicycle facilities, but does not fully meet standards	• Sidewalk along one side of the roadway • On-street shoulder facility for pedestrians/bicyclists
(red)	Poor	No facilities exist	• No facilities exist

* Note that the example facilities for each LOS standard will vary based on the roadway functional classification. A facility may indicate a "green/good LOS for one functional classification but an orange/acceptable LOS for another.

The active transportation network has been identified through a series of Primary or Secondary Routes. Corridors identified as **Primary** or **Secondary Routes** are not indicative of a hierarchy for future active transportation facility development, rather they are used to make a distinction between routes that are more regional or that extend completely through the community (primary), and those that serve to make the second leg of the journey to connect to destinations, extend into neighborhoods, or complete a loop (secondary). As Primary and Secondary Network roadways identified within the Active Transportation Plan work together to achieve the active transportation vision for the City, a single set of LOS standards was developed to apply to the roadways within both networks.

The LOS standards shown in Table 2 emphasize system completion of sidewalks, pathways, or multi-use trails on arterial and collector roadways, or along off-street corridors. The LOS designations are shown in green, orange, and red corresponding with good, acceptable, and poor LOS, respectively. The long-term vision for the City would be to have the Primary and Secondary Network roadways achieve a green or good LOS; however, in the near-term, the objective would be to achieve, at minimum, an orange or acceptable LOS along these roadways.

Generally, a green/good LOS indicates a roadway provides the design specified pedestrian facilities for that functional classification, while an orange/acceptable LOS indicates that a pedestrian facility is provided but does not meet the appropriate design standard. A red/poor LOS generally indicates no designated facilities are provided for active transportation users and is considered unacceptable.

Note that the example facilities provided in Table 2 may correspond with different LOS values based on the functional classification of the roadway. For example, a sidewalk on both sides of the roadway without bicycle lanes would align with the roadway standard for Collectors (corresponding with a green/good LOS) but would not fully meet the roadway design standard for an Arterial (corresponding with an orange/acceptable LOS).

The benefits and drawbacks of taking this approach to evaluate active transportation LOS are summarized below:

Approach Benefits

- Simple to implement/update as projects get completed
- Requires few data sources for evaluation
- Can apply to all roadways based on alignment with roadway standards
- Provides a structured, objective way to evaluate the LOS of each roadway
- Clearly defines the improvements required to improve the LOS
- Identifies specific locations where improvements are necessary

Approach Drawbacks

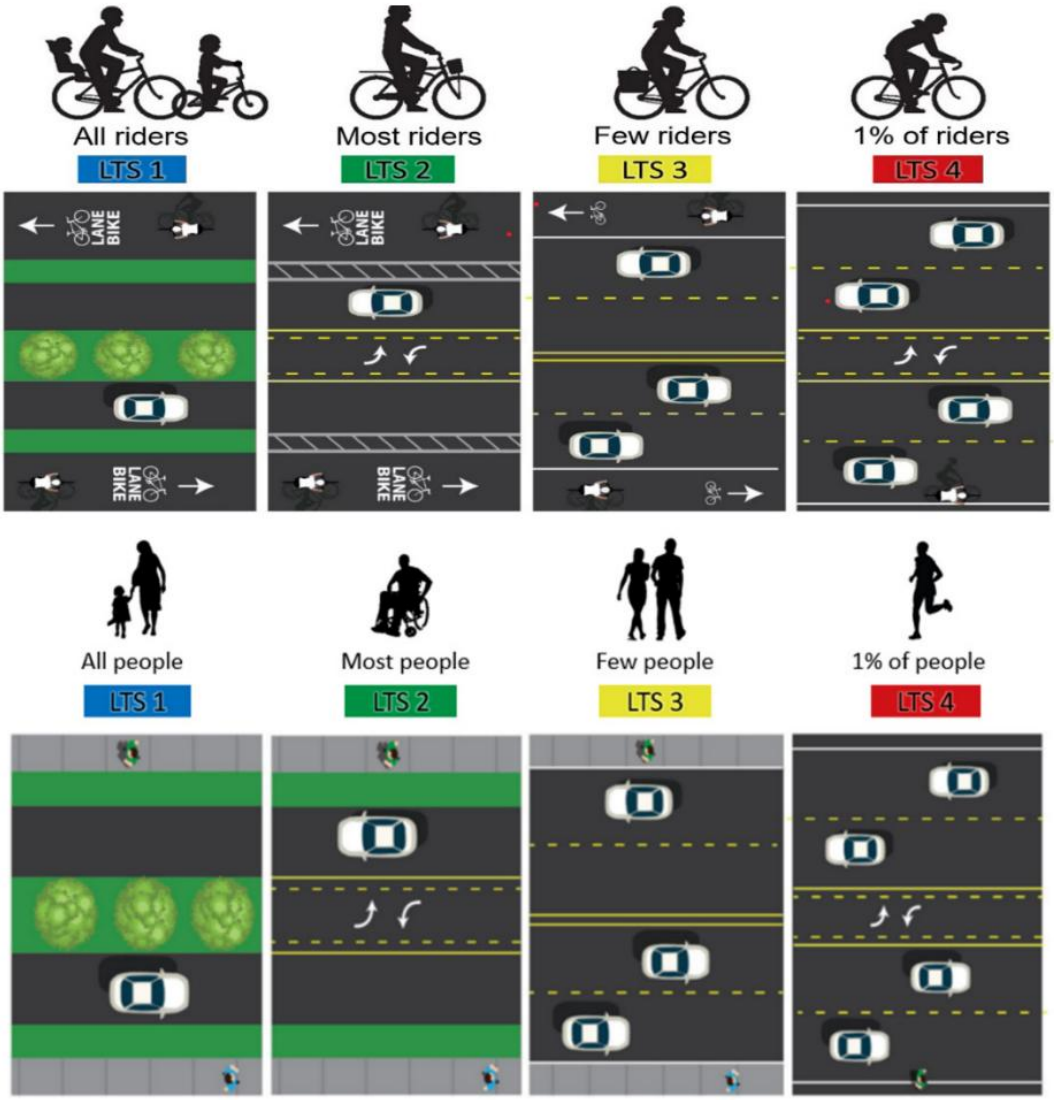
- Provides a simplistic evaluation of the pedestrian/bicycle network
- Does not evaluate the level of comfort for pedestrian/bicycle use
- Changes to roadway standards would require the LOS evaluation to be updated

Approach 2: Level of Traffic Stress Evaluation

The second approach would be to evaluate the active transportation LOS based on the level of traffic stress (LTS) along each roadway within the Active Transportation Plan Network. This approach would provide a more direct measurement of the pedestrian/bicycle network based on how comfortable each facility feels to use.

Each roadway identified on the planned Active Transportation Network would be evaluated and scored based on their pedestrian and bicycle LTS. According to the Washington State Department of Transportation (WSDOT), LTS is "*a ranking system where level 1 feels safe and comfortable for all users, while levels 3 and 4 represent stressful conditions that many people will not or cannot use. WSDOT's LTS rankings are informed by the Safe System Approach such that the probability of a serious injury or fatality is decreased in the event of a crash.*" As such, WSDOT uses a target LTS 1 or 2 for their design standards. LTS rankings 1 through 4 are illustrated in Figure 2.

Figure 2. Level of Traffic Stress Illustration

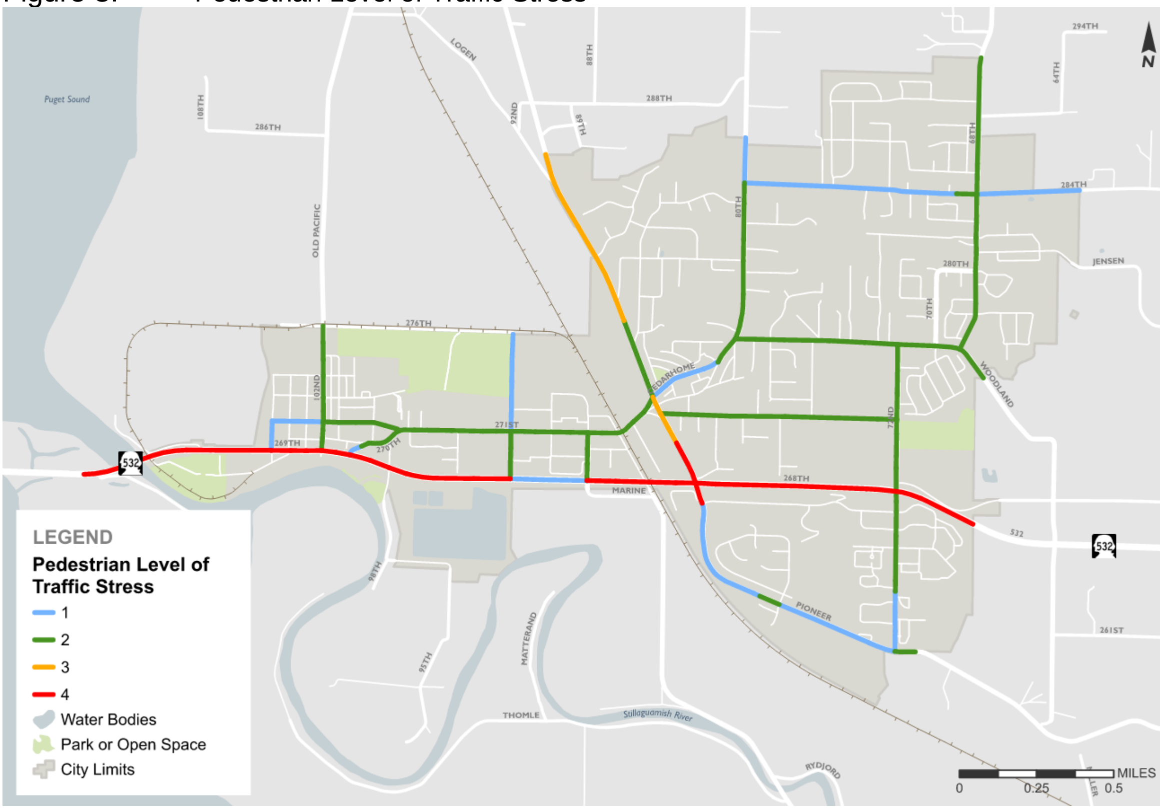


WSDOT has developed a methodology to score LTS based on roadway traffic volumes, roadway speeds, and the presence of active transportation facilities[1]. This methodology was directly leveraged to score the LTS along SR 532. However, the LTS methodology WSDOT has developed was specifically done for state highways, and does not translate well to local city streets. As such, the WSDOT LTS Methodology was tweaked to better reflect conditions on Stanwood roadways. The complete table of LTS scores is shown in Attachment A.

A level of service methodology based on LTS is as simple as stating LTS 1 or 2 as acceptable, and LTS 3 or 4 as unacceptable. The existing pedestrian LTS in Stanwood is shown in Figure 3.

[1] https://wsdot.wa.gov/sites/default/files/2024-07/LTS%20Level%20of%20Traffic%20Stress%20Flyer_0.pdf

Figure 3. Pedestrian Level of Traffic Stress



Generally, pedestrian LTS is scored at 1 or 2 along most City roadways, largely due to the presence of sidewalks on many city streets. Most of SR 532 has a high LTS due to the lack of facilities, high speeds and high traffic volumes. Some sections of Pioneer Hwy are also scored at LTS 3 or 4. Capital projects to mitigate high pedestrian LTS could include sidewalk installation or construction of off-street multiuse paths.

Existing Bicycle LTS is shown in Figure 4.

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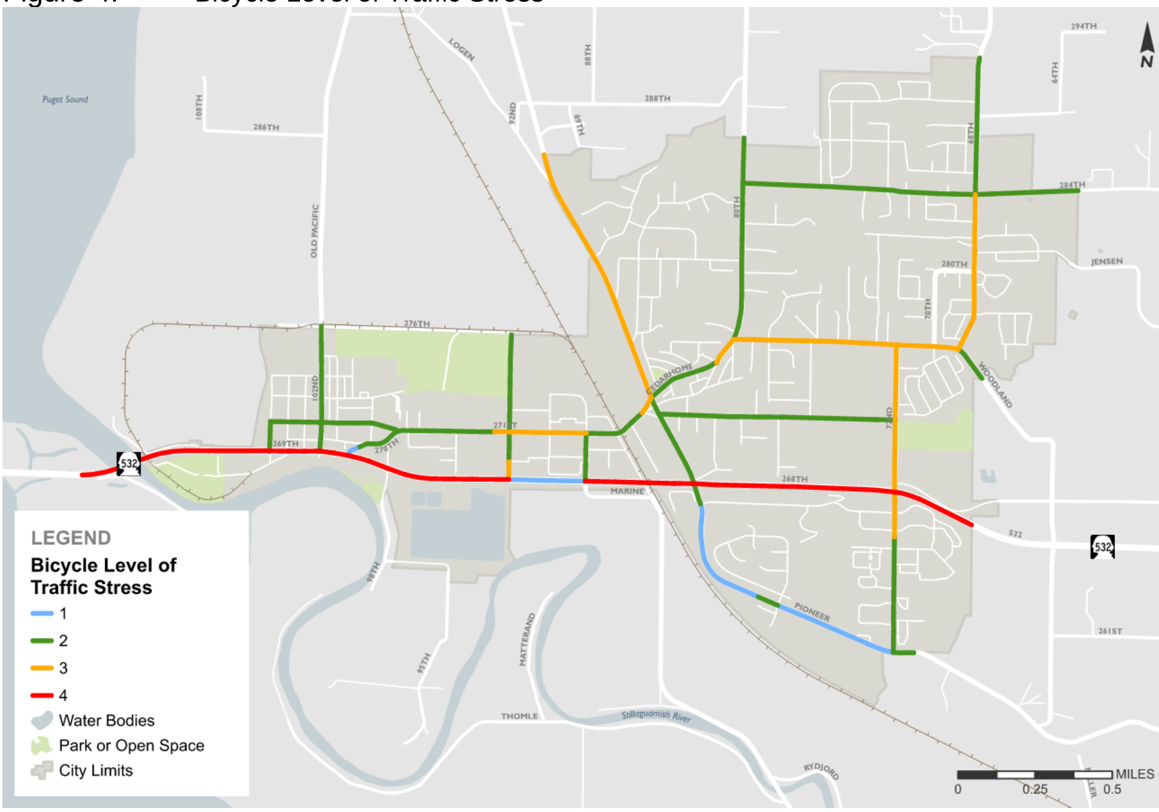
Figure 4. Bicycle Level of Traffic Stress



Existing Bicycle LTS in Stanwood ranges from 1 to 3 across City streets, while SR 532 scores 4. Despite Stanwood's current lack of bicycle infrastructure on city streets, many roadways have a bicycle LTS 2 because of low speeds and volumes – indicating that a shared roadway is appropriate for many city streets. Roadways with LTS 3 and 4 would need to better accommodate bicyclists under this methodology and improvements could include speed reductions, adding bicycle lanes, or off-street shared use paths.

The benefits and drawbacks of using the LTS methodology to evaluate active transportation LOS are summarized below:

<u>Approach Benefits</u>

- Provides a more comprehensive evaluation of the active transportation network
- Compatible with WSDOT and general industry best practice
- Incorporates an evaluation of the pedestrian/bicycle comfort levels
- Would not be affected by changes to roadway standards

<u>Approach Drawbacks</u>

- Requires more data sources to fully evaluate each roadway
- Requires a more detailed review and evaluation of each corridor to assign a LOS value
- Results in more roadway LOS 'failures'

Next Steps

After Stanwood has selected a preferred methodology for active transportation LOS evaluation, Transpo Group will assist the City with implementing the methodology. This will include amending the Transportation Element (TE) of the comprehensive plan to include the new LOS standards, updating the 20-year capital project list within the TE, and updating the City's transportation impact fees (TIFS) to include the new capital projects identified.

PEDESTRIAN LEVEL OF TRAFFIC STRESS

NO PEDESTRIAN FACILITY

Lanes	ADT	Speed Limit				
		≤20	25	30	35	≥40
2 lanes	0-750	1	1	3	4	4
	750-1,500	1	2	3	4	4
	1,500-3,000	2	2	3	4	4
	3,000-4,500	3	3	4	4	4
	4,500-6,000	3	3	4	4	4
	6,000+	3	3	4	4	4
3 lanes	0-1,500	1	2	3	4	4
	1,500-3,000	2	3	3	4	4
	3,000-6,000	2	3	4	4	4
	6,000-9,000	3	4	4	4	4
	9,000-12,000	3	4	4	4	4
	12,000+	3	4	4	4	4
4 lanes	0-2,000	3	3	3	4	4
	2,000-4,000	3	3	4	4	4
	4,000-8,000	3	4	4	4	4
	8,000-12,000	3	4	4	4	4
	12,000-16,000	4	4	4	4	4
	16,000+	4	4	4	4	4
5 lanes	0-3,000	3	3	4	4	4
	3,000-6,000	3	4	4	4	4
	6,000-12,000	3	4	4	4	4
	12,000-18,000	4	4	4	4	4
	18,000-24,000	4	4	4	4	4
	24,000+	4	4	4	4	4

SIDEWALK (5' TO 7.5' WIDE) WITHOUT BUFFER[1]

Lanes	ADT	Speed Limit				
		≤20	25	30	35	≥40
2 lanes	0-750	1	1	2	3	4
	750-1,500	1	1	2	3	4
	1,500-3,000	1	2	2	3	4
	3,000-4,500	2	2	2	3	4
	4,500-6,000	2	2	2	3	4
	6,000+	2	2	2	3	4
3 lanes	0-1,500	1	1	2	3	4
	1,500-3,000	1	2	2	3	4
	3,000-6,000	2	2	2	3	4
	6,000-9,000	2	2	2	3	4
	9,000-12,000	2	2	3	3	4
	12,000+	2	2	3	4	4
4 lanes	0-2,000	2	2	2	3	4
	2,000-4,000	2	2	2	3	4
	4,000-8,000	2	2	3	4	4
	8,000-12,000	2	2	3	4	4
	12,000-16,000	2	2	3	4	4
	16,000+	2	2	3	4	4
5 lanes	0-3,000	2	2	2	3	4
	3,000-6,000	2	2	2	3	4
	6,000-12,000	2	2	3	4	4
	12,000-18,000	2	2	3	4	4
	18,000-24,000	2	2	3	4	4
	24,000+	2	2	3	4	4

[1] "Without Buffer" indicates sidewalk is directly adjacent to the travel lane (i.e., no parking lane or bicycle lane)

PEDESTRIAN LEVEL OF TRAFFIC STRESS

SIDEWALK (8' WIDE OR MORE) AND/OR WITH BUFFER[2]

Lanes	ADT	Speed Limit				
		≤20	25	30	35	≥40
2 lanes	0-750	1	1	2	2	3
	750-1,500	1	1	2	2	3
	1,500-3,000	1	1	2	2	3
	3,000-4,500	1	2	2	2	3
	4,500-6,000	1	2	2	2	3
	6,000+	1	2	2	2	3
3 lanes	0-1,500	1	1	2	2	3
	1,500-3,000	1	1	2	2	3
	3,000-6,000	1	2	2	2	3
	6,000-9,000	1	2	2	2	3
	9,000-12,000	2	2	2	3	3
	12,000+	2	2	3	3	3
4 lanes	0-2,000	1	2	2	2	3
	2,000-4,000	1	2	2	2	3
	4,000-8,000	2	2	2	2	3
	8,000-12,000	2	2	2	3	3
	12,000-16,000	2	2	3	3	4
	16,000+	2	2	3	3	4
5 lanes	0-3,000	1	2	2	2	3
	3,000-6,000	2	2	2	2	3
	6,000-12,000	2	2	2	3	3
	12,000-18,000	2	2	3	3	4
	18,000-24,000	2	2	3	4	4
	24,000+	2	2	3	4	4

[2] "With Buffer" indicates that there is speration between the sidewalk and travel lane. This can be achieved through a striped shoulder, parking lane, or bicycle lane (minimum 3-foot width)

MULTI-USE PATH (MORE THAN 2 FEET OF ROBUST SEPARATION[3])

Lanes	ADT	Speed Limit				
		≤20	25	30	35	≥40
ANY	0-3,000	1	1	1	2	2
	3,000-6,000	1	1	1	2	2
	6,000-12,000	2	2	2	2	2
	12,000+	2	2	2	2	2

[3] "Multi-Use Path" must be minimum 10 feet in width
"Robust Separation" refers to indicates the presence of buffer between the pathway and vehicle travel lane which provides greater protection to the bicyclist (generally is grade-seperated by a curb, ditch, dike, berm, etc.).

BICYCLE LEVEL OF TRAFFIC STRESS

SHARED ROADWAY W/O TRAFFIC CALMING

Lanes	ADT	Speed Limit				
		≤20	25	30	35	≥40
2 lanes	0-750	1	2	3	4	4
	750-1,500	2	2	3	4	4
	1,500-3,000	2	2	3	4	4
	3,000-4,500	2	3	3	4	4
	4,500-6,000	2	3	3	4	4
	6,000+	2	3	3	4	4
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	9,000-12,000	2	3	4	4	4
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	6,000-12,000	3	4	4	4	4
	12,000-18,000	4	4	4	4	4
	18,000-24,000	4	4	4	4	4
	24,000+	4	4	4	4	4

SHARED ROADWAY W/ TRAFFIC CALMING

Lanes	ADT	Speed Limit				
		≤20	25	30	35	≥40
2 lanes	0-750	1	1	2	3	4
	750-1,500	1	1	2	3	4
	1,500-3,000	1	2	2	3	4
	3,000-4,500	2	2	3	3	4
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	6,000+	2	3	3	4	4
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	6,000-12,000	3	4	4	4	4
	12,000-18,000	4	4	4	4	4
	18,000-24,000	4	4	4	4	4
	24,000+	4	4	4	4	4

BICYCLE LEVEL OF TRAFFIC STRESS

BIKE LANE/SHOULDER W/O SEPARATION

Lanes	ADT	Speed Limit ≤20	25	30	35	≥40
2 lanes	0-750	1	1	2	2	3
	750-1,500	1	1	2	2	3
	1,500-3,000	1	2	2	3	3
	3,000-4,500	2	2	2	3	4
	4,500-6,000	2	2	2	3	4
	6,000+	2	2	3	3	4
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	6,000-12,000	3	3	3	4	4
	12,000-18,000	3	3	4	4	4
	18,000-24,000	3	4	4	4	4
	24,000+	4	4	4	4	4

BIKE LANE/SHOULDER W/ SEPARATION

Lanes	ADT	Speed Limit ≤20	25	30	35	≥40
2 lanes	0-750	1	1	2	2	2
	750-1,500	1	1	2	2	2
	1,500-3,000	1	1	2	2	3
	3,000-4,500	2	2	2	3	3
	4,500-6,000	2	2	2	3	3
	6,000+	2	2	2	3	3
3 lanes	0-1,500	1	1	2	2	2
	1,500-3,000	1	1	2	2	3
	3,000-6,000	2	2	2	3	3
	6,000-9,000	2	2	2	3	3
	9,000-12,000	2	2	2	3	3
	12,000+	2	2	3	3	4
4 lanes	0-2,000	1	1	2	2	3
	2,000-4,000	1	2	2	2	3
	4,000-8,000	2	2	2	3	4
	8,000-12,000	2	2	3	3	4
	12,000-16,000	2	2	3	3	4
	16,000+	2	2	3	4	4
5 lanes	0-3,000	1	2	2	3	3
	3,000-6,000	2	2	2	3	4
	6,000-12,000	2	2	3	3	4
	12,000-18,000	2	2	3	4	4
	18,000-24,000	2	3	4	4	4
	24,000+	2	3	4	4	4

MULTI-USE PATH (MORE THAN 2 FEET OF ROBUST SEPARATION[1])

Lanes	ADT	Speed Limit ≤20	25	30	35	≥40
ANY	0-3,000	1	1	1	2	2
	3,000-6,000	1	1	1	2	2
	6,000-12,000	2	2	2	2	2
	12,000+	2	2	2	2	2

[1] "Multi-Use Path" must be minimum 10 feet in width
"Robust Separation" refers to indicates the presence of buffer between the pathway and vehicle travel lane which provides greater protection to the bicyclist (generally is grade-seperated by a curb, ditch, dike, berm, etc.).

Multimodal Level of Service Presentation

MULTIMODAL LEVEL OF SERVICE (MMLOS)

City of Stanwood
(06/02/25)

transpogroup
WHAT TRANSPORTATION CAN BE.

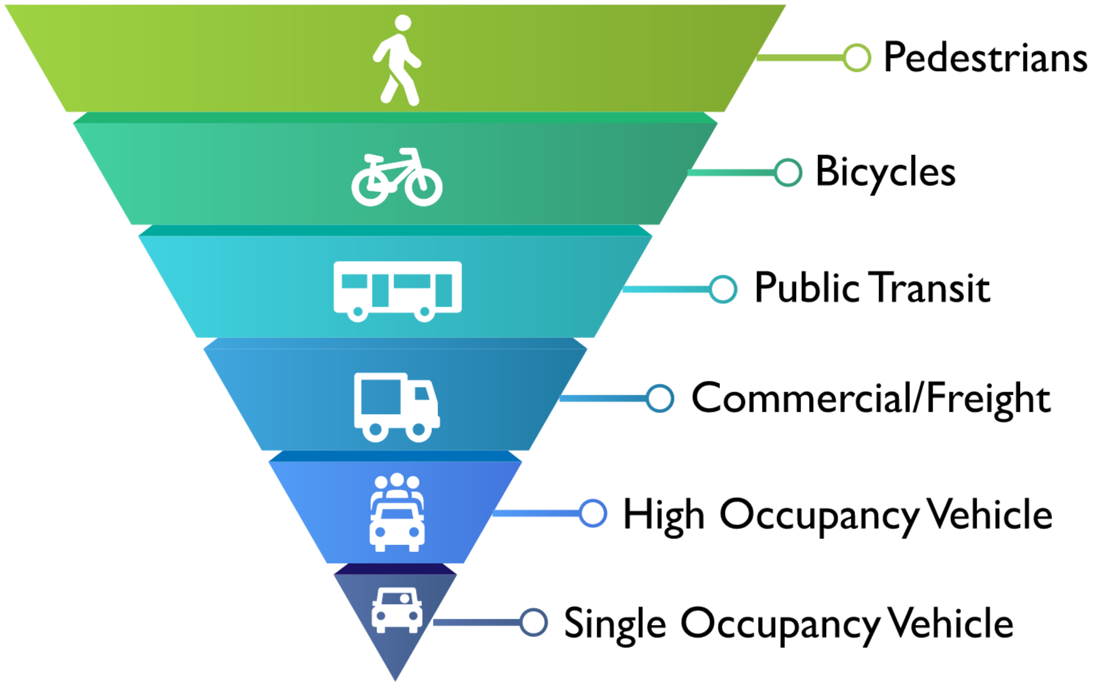
PRESENTATION OUTLINE

- Why are we doing this? (state and PSRC requirements)
- What is Level of Service?
- What options are we proposing in Stanwood?
  1. Roadway Design Standard Based
  2. Level of Traffic Stress (LTS) Based
- Next steps

WHY ARE WE DOING THIS?

GROWTH MANAGEMENT ACT (GMA)

- RCW 36.70A.070 Comprehensive Plans – Mandatory Elements
- “The plan shall be an internally consistent document and all elements shall be consistent with the future land use map.”
- (6) “A transportation element that implements, and is consistent with, the land use element.”
- (B) “***Multimodal*** level of service standards for all locally owned arterials, locally and regionally operated transit routes that serve urban growth areas, state-owned or operated transit routes”



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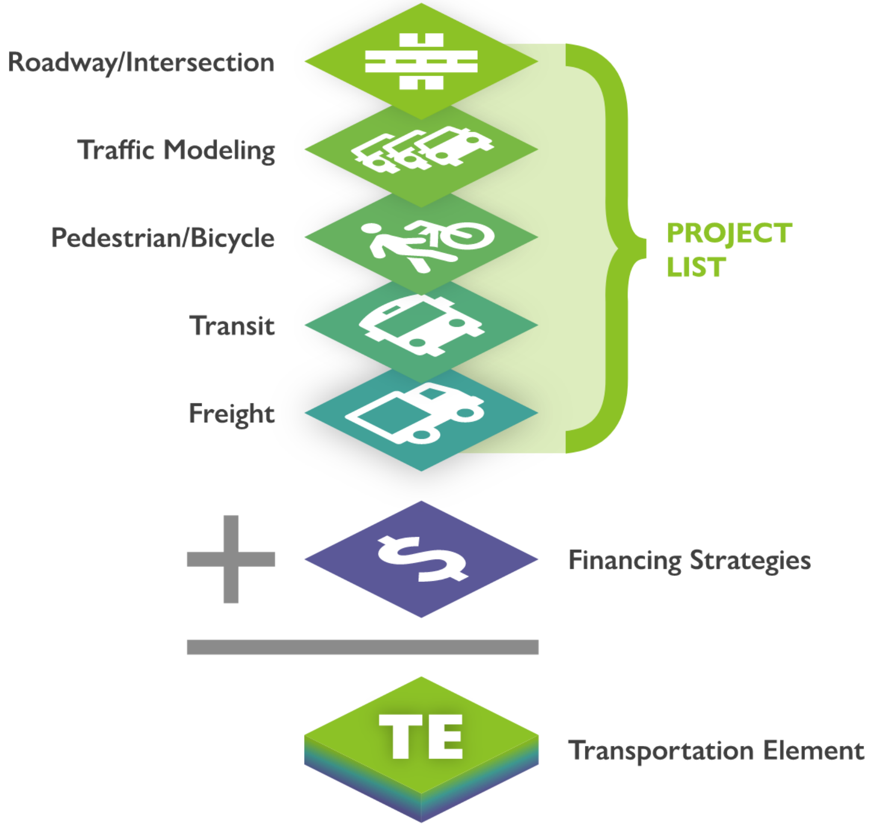
VISION 2050 PLANNING POLICIES

PSRC Minimum Expectations = Multimodal concurrency and LOS programs that meet GMA requirements and VISION 2050's multicounty planning policies will include:

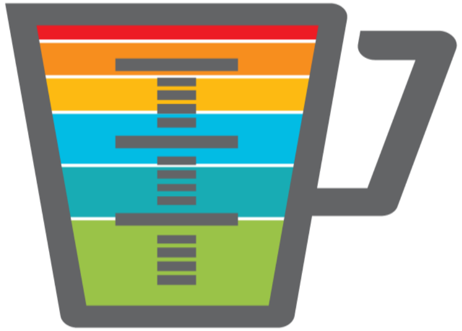
- Methodology to evaluate LOS for transit, bicycles, and pedestrians and vehicles
- Adopt LOS standard(s) based on the methodology
- Identification of existing and future deficiencies – to maintain LOS
- Measures for addressing existing and future deficiencies – to maintain LOS



WHAT IS LEVEL OF SERVICE?

TYPICAL VEHICULAR LOS STANDARDS

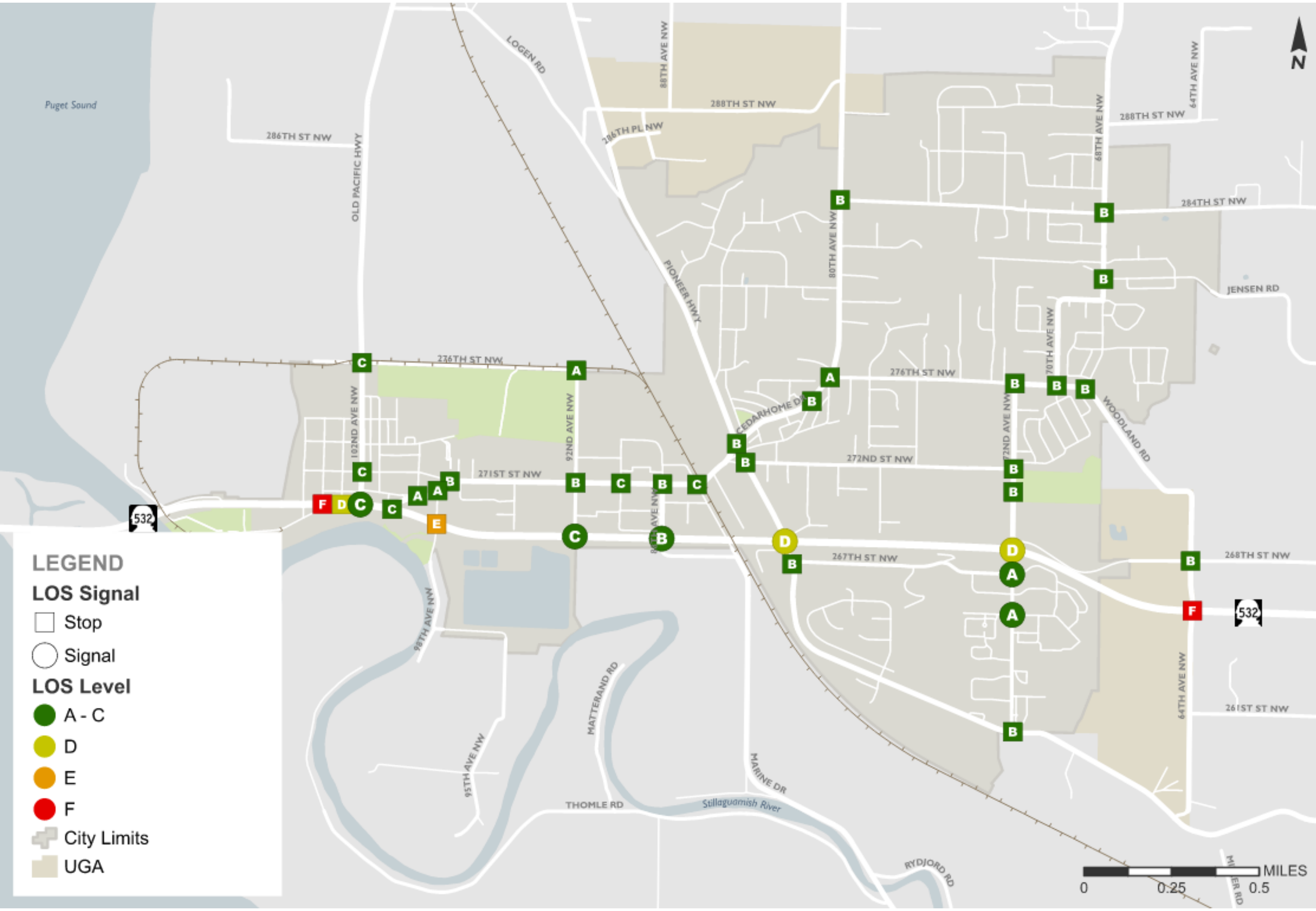
- Level of service (LOS) is a measure of transportation system performance (A to F)
- Typically measured in terms of vehicle delay or throughput



Roadway
Volume-to-Capacity
(vehicle throughput)

Intersection Delay/
seconds per vehicle
(driver inconvenience)

STANWOOD EXISTING LOS STANDARDS



Intersection Based

LOS D

- All traffic signals, roundabouts, and all-way stop intersections

LOS E

- *All two-way stop controlled intersections*

WSDOT LOS standards for intersections:

- *LOS D or better in urban areas (includes SR 532)*
- *LOS C or better in rural areas*

- **NOT PROPOSING A CHANGE TO VEHICLE LOS**

MMLOS OPTION 1 –

ROAD STANDARD BASED

ROAD STANDARD DESIGN BASED MMLOS

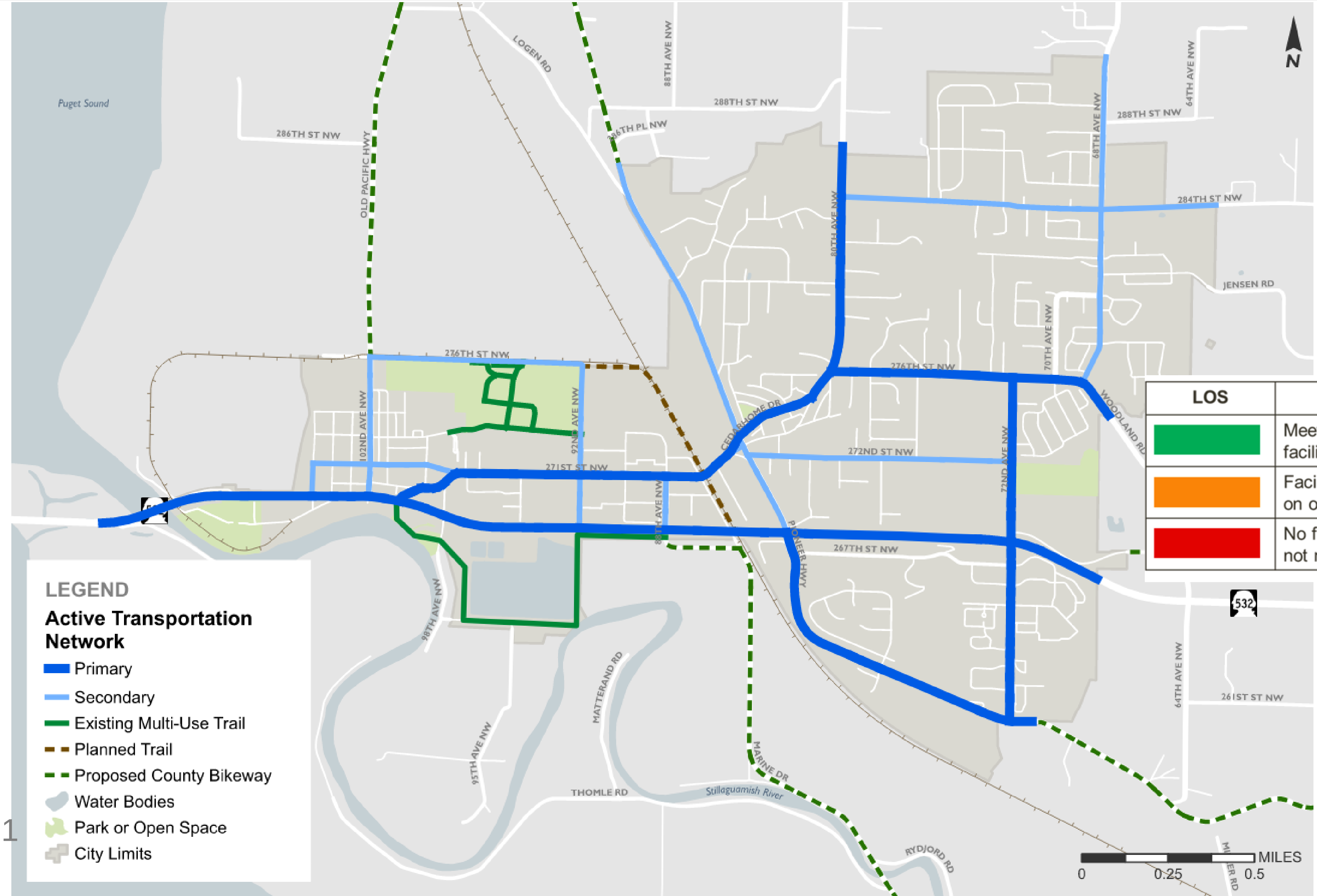
- Pedestrian / Bicycle LOS
  - Based on City's Design Standard along *identified Active Transportation Network*

MINIMUM STREET DESIGN STANDARDS

Design Standard	Arterial	Commercial/Neighborhood Major Collector	Neighborhood Minor Collector	Local Access/Cul-De-Sac
Transportation Standard Detail #	T-2	T-3	T-4	T-5/T-6
ROW Width (minimum)	86-98 ft.	57 ft.	49 ft.	49 ft.
Street Width (minimum)	48-60 ft. plus two 5 ft. bike lanes	36 ft.	28 ft.	28 ft.
Curb Requirements	Cement concrete curb (6") & gutter, both sides	Cement concrete curb (6") & gutter, both sides	Cement concrete curb (6") & gutter, both sides	Cement concrete curb (6") & gutter, both sides
Planter Width (minimum)	8.5 ft. wide both sides	5 ft. wide both sides	5 ft. wide both sides	5 ft. wide both sides
Sidewalk Requirements (minimum)	5 ft. wide both sides	5 ft. wide both sides	5 ft. wide both sides	5 ft. wide both sides
Utility Easements	10 ft. both sides	10 ft. both sides	10 ft. both sides	10 ft. both sides
Minimum-Maximum Grade	.50% to 7%	.50% to 12%	.50% to 12%	.50% to 14%

E. Class I, II, III, or IV Bikeways, as appropriate, shall be provided when traffic analysis or traffic planning indicates substantial bicycle usage which would benefit from a designated bicycle facility as determined by the City except where noted herein.

PLANNED ACTIVE TRANSPORTATION NETWORK



LOS	Primary Route	Secondary Route
Green	Meets City standards, facilities on both sides	Meets City standards, facilities on one or both sides
Orange	Facilities exist, but only on one side	N/A
Red	No facilities exist, does not meet standards	No facilities exist, does not meet standards

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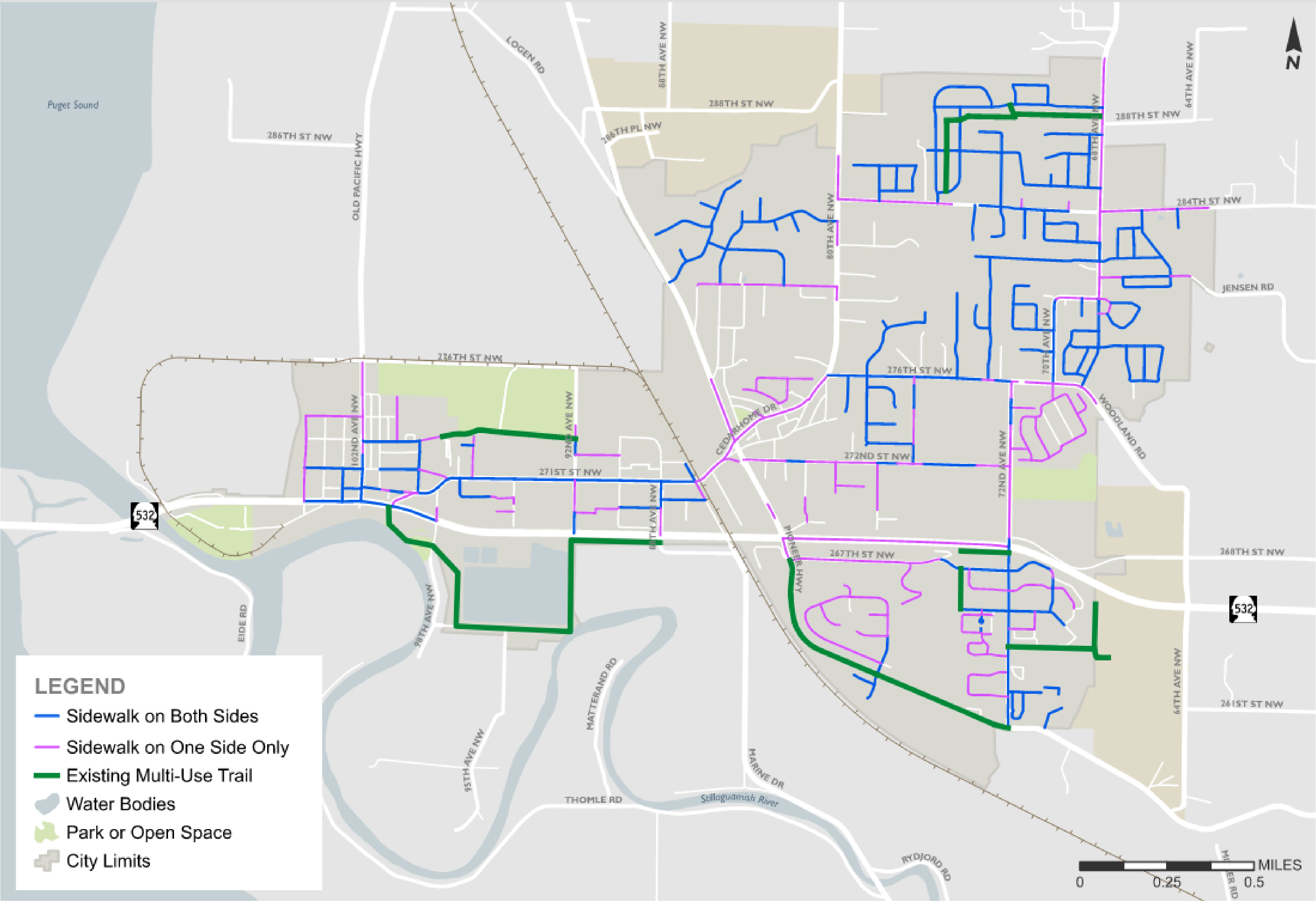
EXISTING ACTIVE TRANSPORTATION FACILITIES



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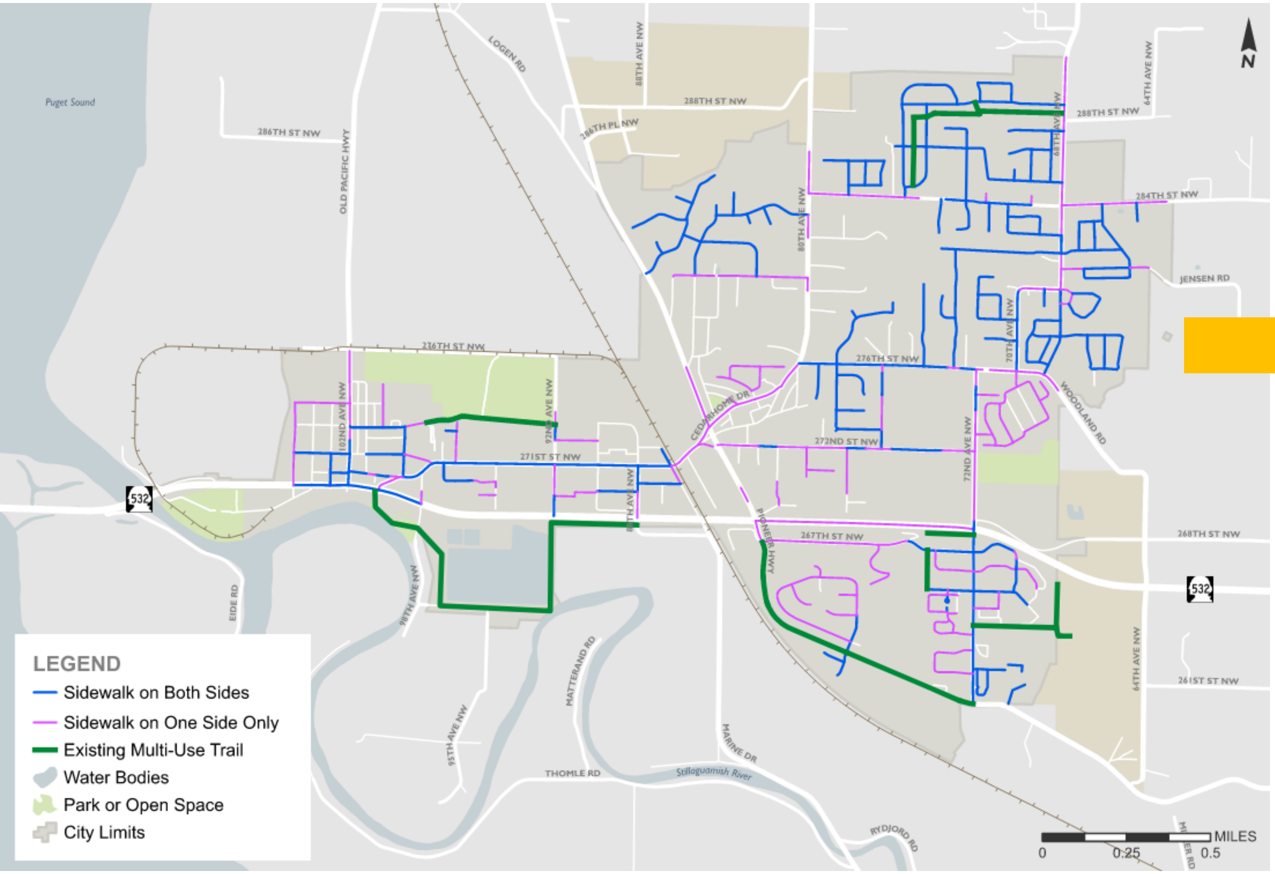
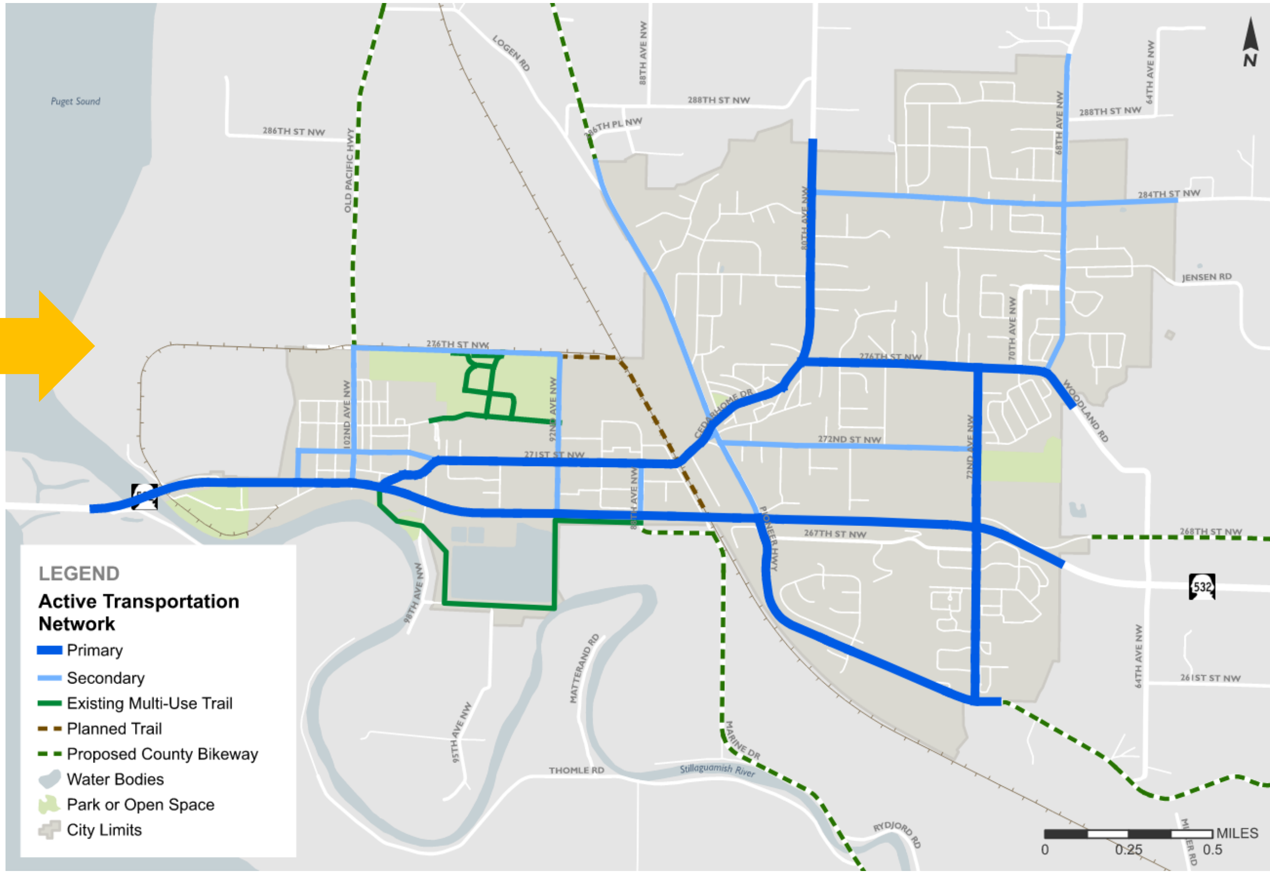
ACTIVE TRANSPORTATION NETWORK GAPS





- Gaps in network become LOS ‘failures’ which result in capital projects.
  - These new capital projects can be included as part of updated TIFs

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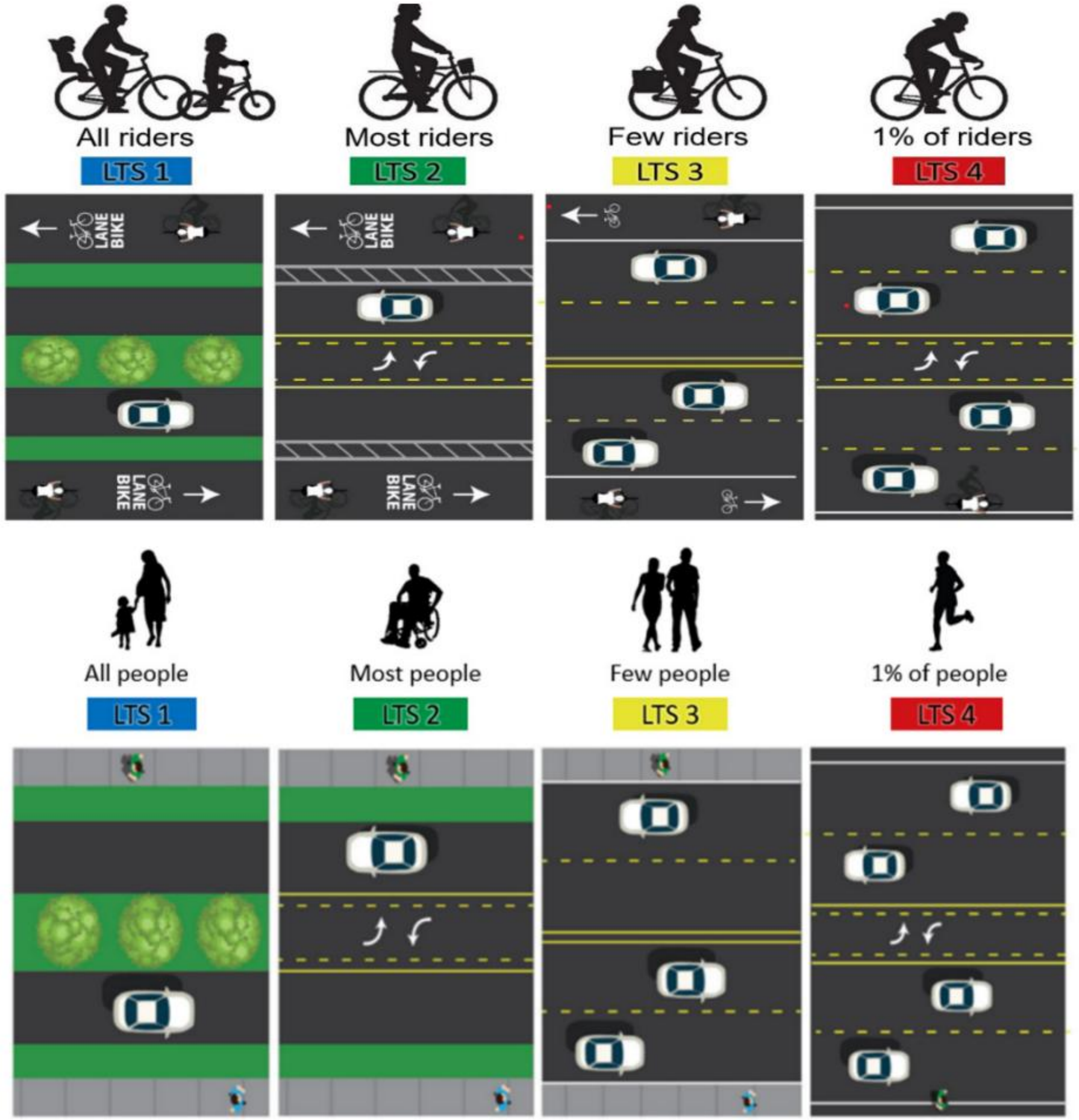
MMLOS OPTION 2 –

LEVEL OF TRAFFIC STRESS

LEVEL OF TRAFFIC STRESS



Level of Traffic Stress	Description
1	Suitable for all ages and abilities; children could walk or bike here independently. Separated and/or barrier-protected.
2	Comfortable for most adults, including most adults experiencing disabilities. Some separation, no barrier.
3	Tolerable for enthusiastic and/or confident adults. Little space, no separation.
4	Only used by highly confident people, or those with no alternative. No dedicated space, no separation

- *WSDOT uses LTS 2 as standard for active transportation facilities on state roadways*

BICYCLE LEVEL OF TRAFFIC STRESS

- LTS 3 and 4 would be considered ‘failing’
- LTS can be improved by lowering speeds or adding facilities for bicyclists (bike lanes, multiuse paths, etc.)

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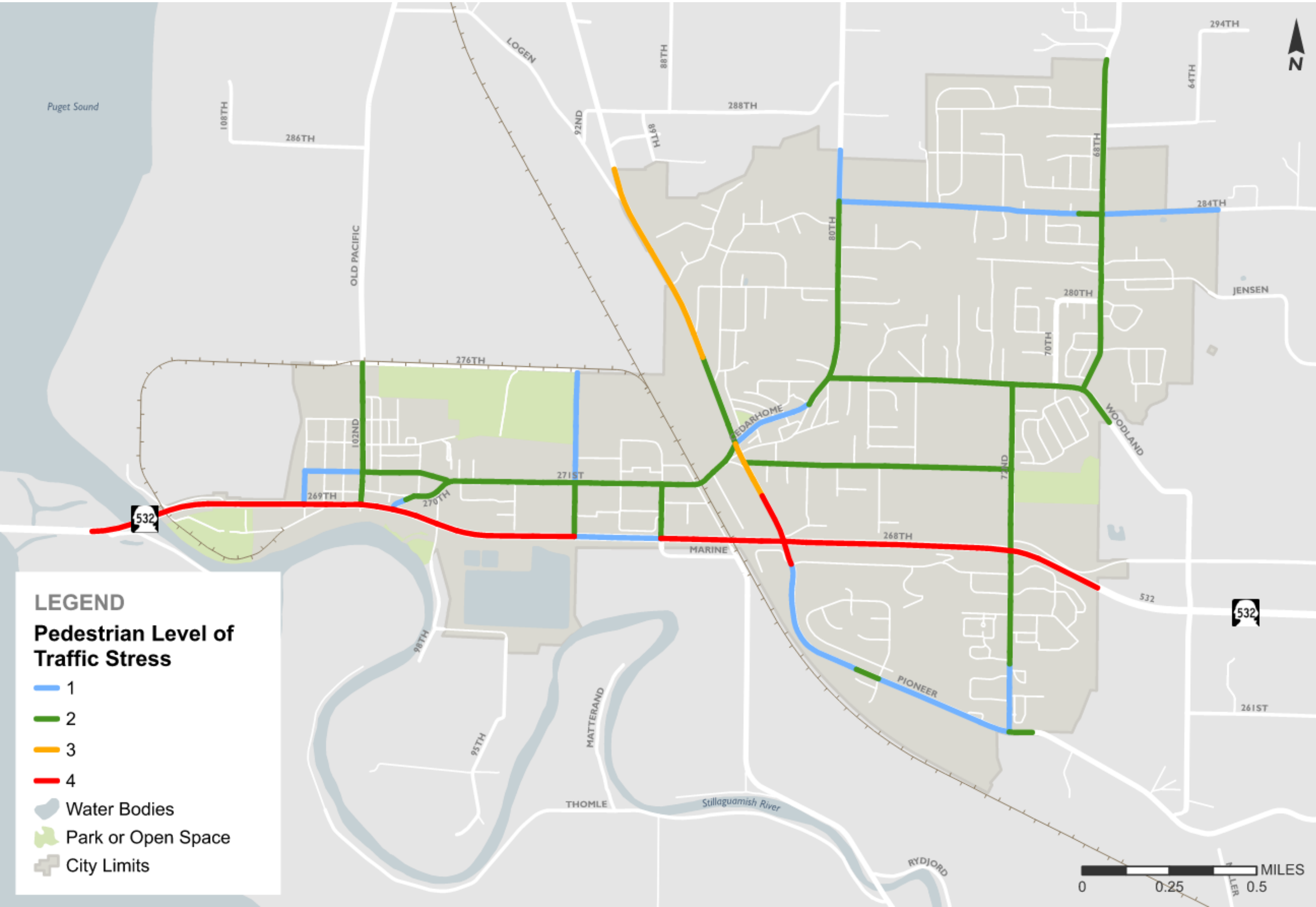
PEDESTRIAN LEVEL OF TRAFFIC STRESS



- LTS 3 and 4 would be considered 'failing'
- LTS can be improved by lowering speeds or adding facilities for pedestrians (sidewalks, multiuse paths, etc.)

transpogroup

COMPARISON OF ALTERNATIVES

1. Design Based Method
   - Pros: Simple, easy to administer, results in fewer LOS failures
   - Cons: no current requirement for bicycle accommodation, if city updates design standard – many roadways will ‘fail’

2. LTS Method
   - Pros: better measure of user experience, compatible with WSDOT, based on industry best practice
   - Cons: slightly more complicated, results in more roadway ‘failures’

FEEDBACK

- Any remaining questions?
- Any preference on MMLOS alternatives?

NEXT STEPS

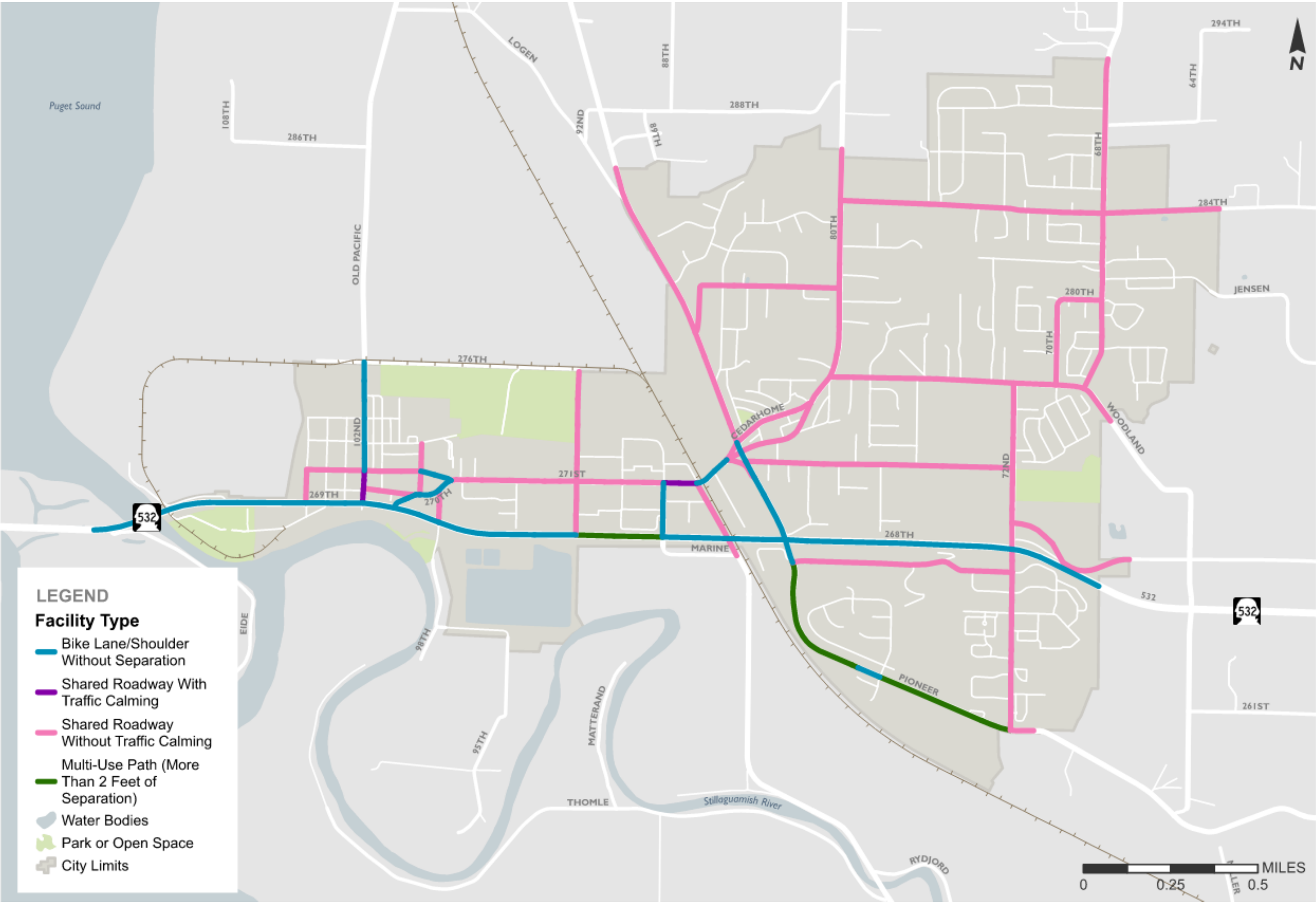
- Updated LOS methodology will be applied to Stanwood’s transportation system
- New projects will be added to the long-range transportation project list
- Update transportation impact fees

transpogroup

Q&A

Backup slides

BICYCLE FACILITIES



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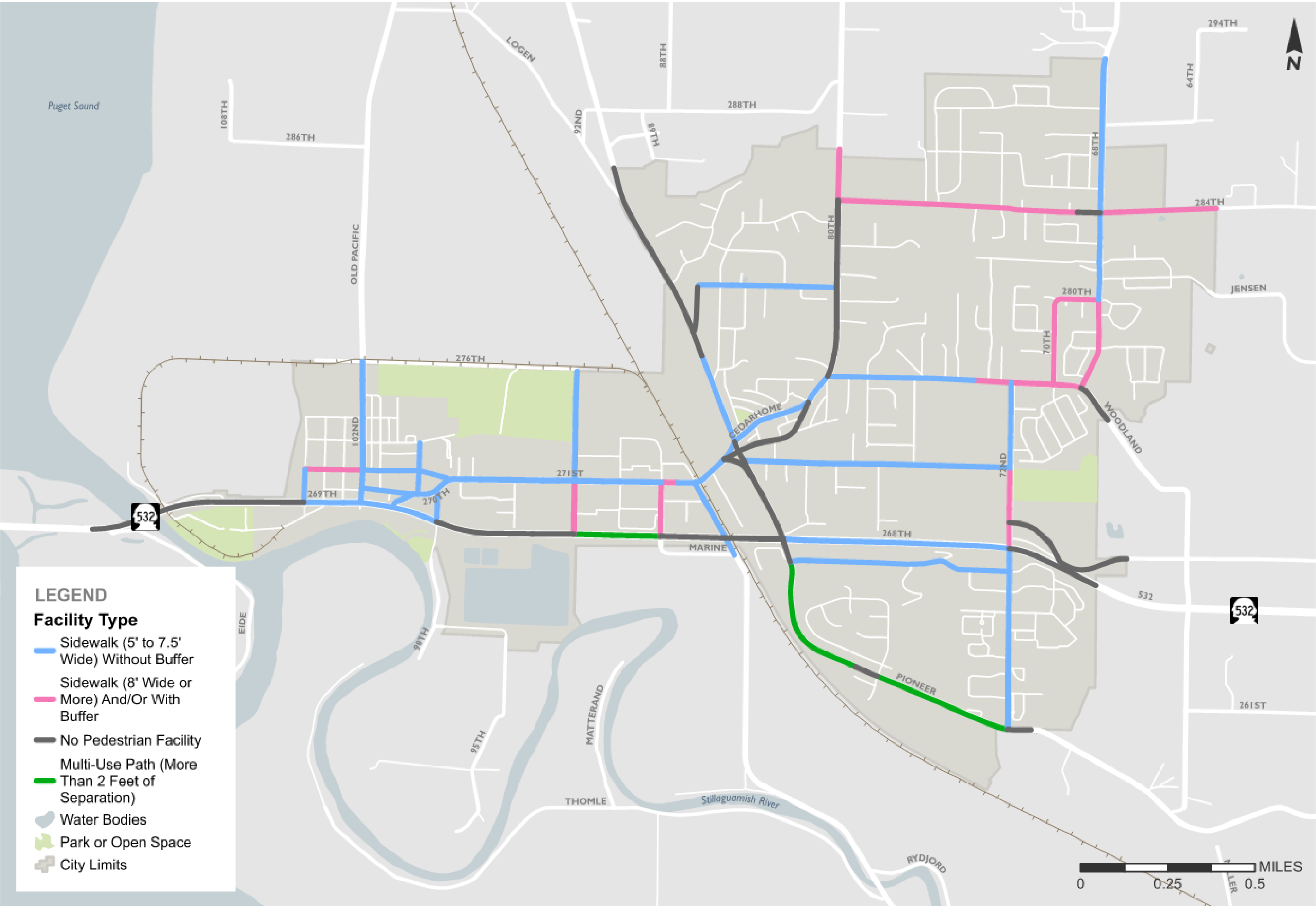
PEDESTRIAN FACILITIES



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BICYCLE LEVEL OF TRAFFIC STRESS

- BLTS range from 1 – 4
  - 1 = all ages and abilities
  - 4 = only the 'daring'

SHARED ROADWAY W/O TRAFFIC CALMING

Lanes	ADT	Speed Limit ≤20	25	30	35	≥40
2 lanes	0-750	1	2	3	4	4
	750-1500	2	2	3	4	4
	1500-3000	2	2	3	4	4
	3000+	2	3	3	4	4
3 lanes	0-3,500	1	2	3	4	4
	3,500-7,000	2	2	3	4	4
	7,000-10,000	2	3	3	4	4
	10,000+	2	3	4	4	4

SHARED ROADWAY W/ TRAFFIC CALMING

Lanes	ADT	Speed Limit ≤20	25	30	35	≥40
2 lanes	0-750	1	1	2	3	4
	750-1500	1	1	2	3	4
	1500-3000	1	2	2	3	4
	3000+	2	2	3	3	4
3 lanes	0-3,500	1	2	2	4	4
	3,500-7,000	2	2	3	4	4
	7,000-10,000	2	2	3	4	4
	10,000+	2	3	4	4	4

PEDESTRIAN LEVEL OF TRAFFIC STRESS

NO PEDESTRIAN FACILITY

Lanes	ADT	Speed Limit				
		≤20	25	30	35	≥40
2 lanes	0-750	1	1	3	4	4
	750-1500	1	2	3	4	4
	1500-3000	2	2	3	4	4
	3000+	3	3	4	4	4
3 lanes	0-3,500	2	2	3	4	4
	3,500-7,000	4	4	4	4	4
	7,000-10,000	4	4	4	4	4
	10,000+	4	4	4	4	4

SIDEWALK (5' TO 7.5' WIDE) WITHOUT BUFFER

Lanes	ADT	Speed Limit				
		≤20	25	30	35	≥40
2 lanes	0-750	1	1	2	3	4
	750-1500	1	1	2	3	4
	1500-3000	1	2	2	4	4
	3000+	2	2	2	4	4
3 lanes	0-3,500	1	1	2	4	4
	3,500-7,000	2	2	2	4	4
	7,000-10,000	2	2	3	4	4
	10,000+	2	2	3	4	4

[1] "Without Buffer" indicates sidewalk is directly adjacent to the travel lane (i.e., no parking lane or bicycle lane)

SIDEWALK (8' WIDE OR MORE) AND/OR WITH BUFFER

Lanes	ADT	Speed Limit				
		≤20	25	30	35	≥40
2 lanes	0-750	1	1	2	2	3
	750-1500	1	1	2	2	3
	1500-3000	1	1	2	2	3
	3000+	1	2	2	3	3
3 lanes	0-3,500	1	1	2	2	3
	3,500-7,000	1	2	2	3	4
	7,000-10,000	2	2	2	3	4
	10,000+	2	2	2	3	4

[2] "With Buffer" indicates that there is speration between the sidewalk and travel lane. This can be achieved through a striped shoulder, parking lane, or bicycle lane (minimum 3-foot width)

MULTI-USE PATH (MORE THAN 2 FEET OF SEPARATION)

Lanes	ADT	Speed Limit				
		≤20	25	30	35	≥40
ANY	0-3,500	1	1	1	2	2
	3,500-7,000	1	1	1	2	2
	7,000-10,000	2	2	2	2	2
	10,000+	2	2	2	2	2

Raplee Property Summary of Status and Next Steps

MAUL FOSTER ALONGI

Memorandum

To:	Patricia Love, City of Stanwood	Date:	May 14, 2025
From:	Phil Wiescher, PHD, and Carolyn Wise, LHG	Project No.:	M1030.08.003
Re:	Summary of Status and Next Steps for the Raplee Property Stanwood, Washington		

Raplee Property Status

Maul Foster & Alongi, Inc. (MFA) recently completed environmental sampling and cleanup options study for the Raplee Property located at 9816 271st Street NW in Stanwood, Washington (the Property) and the adjacent City right-of-way (see attached Figure). The Property is owned by Kathleen Raplee and is currently vacant. It is MFA's understanding that the City is interested in acquiring the Property, cleaning up the Property and adjacent right-of-way (if feasible), and redeveloping the Property as a public park that will enhance the downtown corridor.

Historically, the Property was used as an automotive fueling and service station. Three petroleum underground storage tanks (USTs) and associated piping were removed by predecessors in 2005. Two abandoned USTs remain in the City right-of-way under a natural gas pipeline to the south of the Property, and one smaller UST (likely waste oil) was identified on the Property. Groundwater and soil petroleum contamination are present with areas of contamination correspond with the remaining and former USTs (see attached Figure).

The cleanup remedy identified includes: UST removal (one tank on Property), UST decommissioning in-place (two tanks located within the right-of-way south of the Property), contaminated soil excavation and offsite disposal (approximately 300 cubic yards), amended soil backfill to mitigate remaining petroleum, institutional controls to prevent the use of shallow groundwater, and groundwater monitoring. The estimated probable cost of cleanup is $386,400 (-30%/+50%). This cost does not account for subsequent park development.

The work completed has been supported by Ecology brownfields funding. The City has communicated with Ecology and the Owner throughout the process. Based on the remedy selected and the characteristics of the site, Ecology has indicated that they agree with the cleanup approach.

Next Steps

The City now has an understanding of the environmental conditions and the cleanup approach with associated costs. Due to the current funding uncertainty at both the federal and state levels, MFA recommends evaluating the following potential funding sources to support cleanup:

- **State & Federal Funding.** Meet with Ecology Brownfields team to discuss potential funding options. This meeting will ideally clarify availability and source(s) of funding. The City has previously demonstrated its ability to leverage brownfield funding to achieve successful project outcomes (June 2025).

- **Evaluate Cost-Share Options.** Chevron (as the successor of the former operator on the Property) indicated in 2006 a "willingness" to share cleanup costs. Specifically, 30 percent of costs associated with soil remediation. The City could request Chevron's recommitment to participating in cleanup costs and engaging in a dialogue to discuss responsibility. Based on the likelihood staff turnover at Chevron, the City could provide recent documentation and some context regarding plans to purchase and redevelop the property. It is expected that investigating this option would also help support any public funding requests. (Spring 2025)
- **Historical Insurance.** The City assessed historical insurance recovery previously and determined this path was unlikely to be viable. (NA)

These approaches may result in full or partial funding for cleanup, and in combination with City resources dedicated to park redevelopment costs lead to successful Property acquisition and development. The nature of funding identified would then further inform 1) potential Property purchase 2) administrative pathway for site cleanup and 3) timeline for project completion.

Attachments

Limitations

Figure

Limitations

The services undertaken in completing this technical memorandum were performed consistent with generally accepted professional consulting principles and practices. No other warranty, express or implied, is made. These services were performed consistent with our agreement with our client. This technical memorandum is solely for the use and information of our client unless otherwise noted. Any reliance on this report by a third party is at such party's sole risk.

Opinions and recommendations contained in this technical memorandum apply to conditions existing when services were performed and are intended only for the client, purposes, locations, time frames, and project parameters indicated. We are not responsible for the impacts of any changes in environmental standards, practices, or regulations subsequent to performance of services. We do not warrant the accuracy of information supplied by others, or the use of segregated portions of this technical memorandum.

Figure

MAUL FOSTER ALONGI

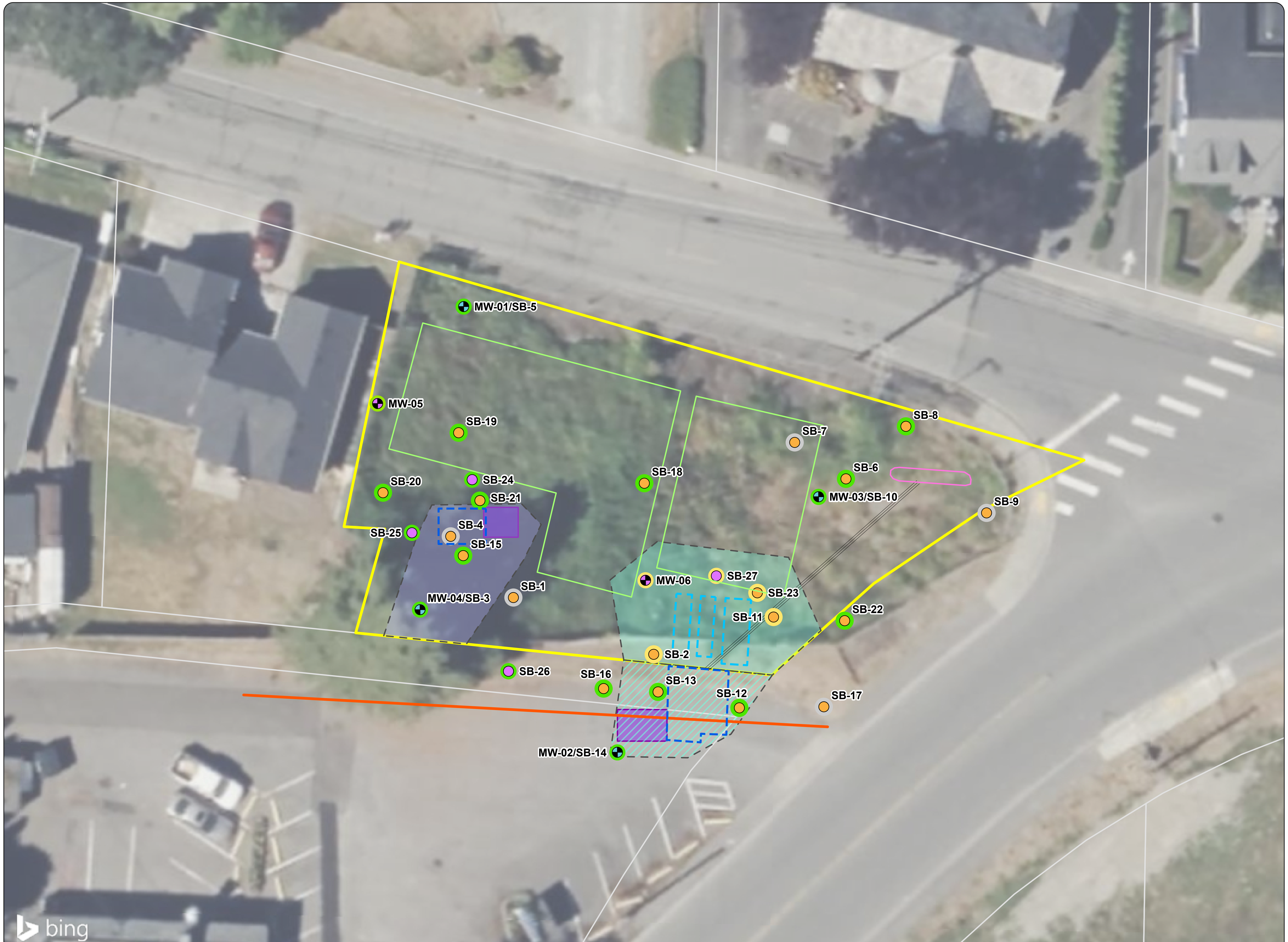

Figure Proposed Cleanup Action Areas

Raplee Property
Stanwood, Washington

Legend

- October 2024 Soil Boring
- October 2024 Monitoring Well Boring
- Historical Soil Boring
- Monitoring Well

Soil Exceedances

- Petroleum, BTEX, or lead non-detect or detected below the CUL.
- Petroleum, BTEX, or lead detected above the CUL.
- Soil sample not collected from boring.
- Proposed Southeast Excavation
- Proposed Southwest Excavation
- UST Decommissioning In-Place (Access Limited)
- 2024 UST GPR Anomaly
- Approximate Existing UST (SAIC 2006)
- Former UST
- Former Building
- Former Service Island
- Natural Gas Line
- Former Product Lines
- Property Parcel
- Tax Lot

Notes

All property feature locations are approximate.
Former property features obtained from previous reports (Pinnacle 2005; SAIC 2006).
BTEX = benzene, toluene, ethylbenzene, and xylenes.
CUL = MTCA Method A cleanup level.
GPR = ground penetrating radar.
Petroleum = gasoline-range hydrocarbons, diesel-range hydrocarbons, and/or motor oil range hydrocarbons.
UST = underground storage tank.

0 20
Feet

Data Sources
Aerial imagery obtained from Bing; property boundary obtained from Snohomish County.

MAUL FOSTER ALONGI
p. 971 544 2139 | www.maulfoster.com

Path: X:\0_MFA_Projects\M1030\08\003\Pro\M1030_08_003_004.aprx\Fig 6-1 Proposed Cleanup Action Areas
Print Date: 4/24/2025
Reviewed By: cwise
Produced By: sturner
Project: M1030.08.003

Final Data Gaps Investigation and Cleanup Options Report

Final Data Gaps Investigation and Cleanup Options Report

Raplee Property
Cleanup Site ID #5275

Prepared for:

City of Stanwood
Stanwood, Washington
May 14, 2025
Project No. M1030.08.003

Prepared by:

Maul Foster & Alongi, Inc.
114 W Magnolia St, Suite 500, Bellingham, WA 98225

MAUL FOSTER ALONGI

Final Data Gaps Investigation and Cleanup Options Report

Raplee Property
Cleanup Site ID #5275

The material and data in this report were prepared under the supervision and direction of the undersigned.

Maul Foster & Alongi, Inc.

Carolyn Wise, LHG
Senior Hydrogeologist

Josh Elliott, PE
Principal Engineer

Contents

Limitations

Figures

Following the Report

Tables

Following the Report

Appendixes

Abbreviations

bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene, and total xylenes
the City	City of Stanwood
COC	contaminant of concern
COPC	contaminant of potential concern
CSM	conceptual site model
CUL	cleanup level
DRO	diesel-range organics
Ecology	Washington Department of Ecology
EPA	U.S. Environmental Protection Agency
ESA	Environmental Science Associates
FEI	focused environmental investigation
GPR	ground-penetrating radar
GRO	gasoline-range organics
IAA	Interagency Agreement No. C2400206
IDW	investigation-derived waste
MFA	Maul Foster & Alongi, Inc.
MTCA	Model Toxics Control Act
NAPL	non-aqueous phase liquid
ORC	oxygen releasing compound
ORO	heavy-oil-range organics
Pinnacle	Pinnacle GeoSciences, Inc.
Preliminary Assessment	pre-field investigation, site reconnaissance, and data review
the Property	9816 271st Street NW in Stanwood, Washington
RCW	Revised Code Washington
SAIC	Science Applications International Corporation
SEPA	State Environmental Policy Act
the Site	the “Raplee Property” Site
South ROW	City right-of-way adjacent to the south boundary of the Property
South USTs	two USTS located south of the Property in the South ROW
TEE	terrestrial ecological evaluation
UST	underground storage tank
WAC	Washington Administrative Code
West UST	one UST in the west-central portion of the Property

1 Introduction

Maul Foster & Alongi, Inc. (MFA) has prepared this data gaps investigation and cleanup options report for the City of Stanwood (the City) for the Raplee Property located at 9816 271st Street NW in Stanwood, Washington (the Property) and the adjacent City right-of-way (South ROW; see Figure 1-1). This report summarizes the results of the soil and groundwater data gaps investigation conducted at the Property; as well as evaluates cleanup options based on site-specific conditions, technical feasibility, and preliminary cost evaluations for the Property.

The Washington Department of Ecology (Ecology) defines the “Raplee Property” Site (the Site; Cleanup Site ID #5275) as the Property and any adjacent properties may be impacted by contamination originating from the Property.

The Property is currently vacant and is located on Snohomish County parcel 32032400405900. The Property is owned by Kathleen Raplee. Historically, the Property was used for retail automotive fuel operations, including a filling and service station. It is MFA’s understanding that the City is interested in acquiring the Property, cleaning up the Property and Site (if feasible), and redeveloping the Property as a public park that will enhance the downtown corridor.

1.1 Regulatory Framework

This data gaps investigation and cleanup options report has been prepared in accordance with Interagency Agreement No. C2400206 (IAA), dated May 8, 2024, between Ecology and the City. The agreement provides funding from Ecology under Revised Code Washington (RCW) 39.34.130 and RCW 39.26.180(3). Investigation activities were conducted in general accordance with the Model Toxics Control Act (MTCA) (Washington Administrative Code [WAC] 173-340), and with the soil and groundwater data gaps sampling and analysis plan (SAP) (MFA 2024b).

1.2 Purpose and Objectives

The purpose of the data gaps investigation was to characterize environmental conditions and generate data sufficient for closing data gaps regarding the nature and extent of impacts. The purpose of this report is to summarize environmental conditions and evaluate potential cleanup options. The specific objectives are as follows:

- Further characterize the nature and extent of hazardous substances in environmental media above MTCA Method A cleanup levels (CULs) for unrestricted land use.
- Refine the conceptual site model (CSM) for the Property.
- Evaluate potential risk to current or reasonably likely current and future receptors on the Property.
- Determine the effectiveness, constructability, and cost of a preferred cleanup option.

The remedial alternatives analysis is based on the information from historical environmental investigations, the focused environmental investigation (FEI) report prepared by MFA (MFA 2019), site reconnaissance and data review (MFA 2024a), and results from the data gaps investigation, which are summarized in Sections 3 and 4 of this report.

1.3 Report Organization

This document is organized as follows:

- Section 2 discusses background information, including Property history, physical setting, and previous investigations.
- Section 3 describes the field and analytical methods of the data gaps investigation.
- Section 4 discusses the analytical results of the data gaps investigation.
- Section 5 describes the updated CSM and CULs.
- Section 6 discusses the different cleanup options considered for the Property.
- Section 7 discusses the evaluation of the different proposed cleanup options.
- Section 8 describes recommendations based on the evaluation of cleanup options.

2 Background

The background and physical setting information is summarized from previous investigations and a site reconnaissance and data review report prepared by MFA (MFA 2024a).

2.1 Property Description

The Property is located in the southeast quarter of section 24, township 32 north, and range 3 east of the Willamette Meridian (Figure 1-1). The approximately 0.21-acre Property is relatively level, sloping slightly to the northwest. The Property is zoned as Mainstreet Business but is currently undeveloped and vacant.

The Property is surrounded by a chain-link fence and contains brushy areas and partially intact asphalt and concrete surfaces, along with asphalt and concrete rubble and debris from a prior building demolition. Access to the Property is from the South ROW. The South ROW is an asphalt alleyway that connects 270th Street NW to the east and 99th Avenue NW to the west. A strip of grass lies between the paved alley and the Property's fence.

2.2 Current Uses of Adjoining Properties

The Site is bordered by 271st Street NW, residences, and law offices to the north; the intersection of 271st Street NW and 270th Street NW to the east; a restaurant parking lot to the south; a residential duplex to the west. An equipment rental, hardware and lumber store, J E Hamilton & Sons, is adjacent to and southeast of the Site.

2.3 Property History

According to previous environmental reports, the first recorded sale of the Property was in 1924, when the Lien family sold the Property to J. Norin Hafstad (Science Applications International Corporation [SAIC] 2006). In 1939, Mr. Hafstad sold the Property to Mr. Ed Peterson and his wife. In 1958, Standard Oil obtained a lease on the Property. The Property was the location of a Standard Oil (now Chevron Corporation) service station from approximately 1958 to when the lease expired in 1970. From 1970 to 1998, the Property's ownership passed through many parties. In 1984, the portion of the Property with the south-bounding alleyway was sold to the City. In 1998, Kathleen Raplee purchased the Property (SAIC 2006).

Based on SAIC's review of a 1941 Sanborn Fire Insurance Map, the Property had been developed into a filling station by that time, with at least two underground storage tanks (USTs) in the northeast portion of the Property, a greasing facility in the eastern portion of the station structure, and a store in the western section (SAIC 2006).

2.4 Regulatory History

A petroleum hydrocarbon release from a UST at the Site was reported to Ecology on January 10, 2005. Pertinent information from Ecology's database is as follows:

- Facility Site ID: 2132059
- Cleanup Site ID: 5275
- UST ID: 619125
- Alternate Names
  - Standard 305192
  - Standard Oil Station 30-5192 (former)
- Site Status: Cleanup Started

The Chevron Environmental Management Company was party to a Voluntary Cleanup Program agreement with Ecology from June 7, 2006, through July 9, 2012.

2.5 Previous Environmental Investigations

A summary of previous environmental investigations at the Site, including historical data, is provided in the site reconnaissance and data review report (MFA 2024a). Brief summaries of the investigations are provided below:

2.5.1 2005 UST Decommissioning

In 2005, Glacier Environmental Services, Inc., decommissioned three USTs in the south-central portion of the Site (see Figure 2-1). The decommissioning of these USTs included emptying of the

USTs, excavation and stockpiling of soil, removal of the USTs, product piping, and vent piping, and backfilling of the excavations. During the decommissioning process, Pinnacle GeoSciences, Inc. (Pinnacle) collected soil samples from the sidewalls and the bottom of the excavation area, as well as from below former product piping, dispenser islands, and stockpiles. Analytical results from the excavation soil samples identified concentrations of gasoline-range organics (GRO); heavy-oil-range organics (ORO); and benzene, toluene, ethylbenzene, and total xylenes (BTEX, collectively) above their respective MTCA Method A CULs. In addition to these excavation exceedances, concentrations of lead and diesel-range organics (DRO) were identified in stockpile samples above their respective MTCA Method A CULs (Pinnacle 2005).

2.5.2 2006 Site Investigation

In 2006, SAIC performed an environmental assessment of the Site which included the collection of soil and groundwater for chemical analysis, an electromagnetic and ground-penetrating radar (GPR) survey, and direct exploration of identified subsurface anomalies. Previous soil borings are shown on Figure 2-1. Boring logs from these borings are included in Appendix A. The soil and groundwater analytical results from this investigation are included in Tables 2-1 and 2-2 respectively.

Apollo Geophysics conducted the electromagnetic and GPR survey of the Site to identify subsurface anomalies including USTs. Five subsurface anomalies potentially indicative of USTs were identified on and adjacent to the Property. Four of the five anomalies subsequently excavated. One of the anomalies was identified as two USTs to the south of the Property in the South ROW (the South USTs), directly under a steel 4-inch-diameter, high-pressure natural gas line. The exact depth and location of this line is unknown. SAIC observed that the USTs contained liquid petroleum mixed with water. Another GPR anomaly was identified as one UST in the west-central portion of the Property (the West UST). The fifth, unexcavated anomaly suspected to be a hydraulic hoist (SAIC 2006). None of the USTs identified in the 2006 investigation were decommissioned.

Samples submitted for analysis showed GRO, DRO, ORO, and BTEX impacts to soil and groundwater near area where the former USTs were removed (SAIC 2006). Sheen and odor were observed in borings from this area as well as near the other identified USTs at the Site. Groundwater near these existing USTs had elevated concentrations of DRO; however, soil samples from these areas did not exceed CULs for petroleum hydrocarbons or BTEX.

2.5.3 2006 to 2014 Groundwater Monitoring

From April 2006 to July 2014, Gettler-Ryan Inc., on behalf of Leidos Engineering, LLC (formerly SAIC), monitored the groundwater at four wells located at the Site (MW-01 through MW-04; see Figure 2-1) (Leidos 2014). The groundwater samples were analyzed for GRO, DRO, ORO, and BTEX. According to the most recent available groundwater monitoring report, only one of the four monitoring wells, MW-4, had concentrations of DRO and ORO above their respective MTCA Method A CULs. Additionally, MW-4 had measurable non-aqueous phase liquid (NAPL) during sampling events between January 2012 and July 2014; therefore, samples from this well were not collected during those events (Leidos 2014).

2.5.4 2019 Site Reconnaissance and Groundwater Sampling

In February of 2019, MFA conducted a FEI consisting of reconnaissance, well redevelopment, and groundwater sample collection from existing monitoring wells at the Site (MFA 2019). The sampling showed NAPL was present in MW-04 and likely contains concentrations of GRO, DRO, and/or ORO above MTCA Method A CULs. Monitoring well MW-02 contained concentrations of DRO and ORO above the MTCA Method A CUL, and no exceedances were observed in the downgradient well MW-01 and crossgradient well MW-03. The following data gaps were identified at the Site:

- The full lateral and vertical extent of soil impacts is unknown.
- The lateral and vertical extent of groundwater impacts to the west and south of the Site is unknown.
- The lateral and vertical extent of groundwater impacts on the north and east portions of the Site appear to be bounded.
- The existing, abandoned UST(s) may be on-going sources of contamination.

2.5.5 2024 Site Reconnaissance and Data Review

A pre-field investigation, site reconnaissance, and data review (Preliminary Assessment) was conducted to gather environmental information to inform the data gaps investigation for the Site and to support the evaluation of potential cleanup options. Findings of the Preliminary Assessment are described in the site reconnaissance and data review report and summarized below (MFA 2024a).

A GPR survey was performed as part of the Preliminary Assessment to identify the locations of remaining USTs on the Property and South ROW over two mobilizations due to the presence of significant vegetation and multiple clearing efforts needed. Results of the GPR survey are presented in Appendix B.

Figure 2-1 shows approximate locations of remaining USTs from site plans included in SAIC's 2006 report, as well as the GPR anomalies identified during the 2024 surveys, as described below. The UST boundaries from the SAIC report are approximate, having been derived by georeferencing the parcel boundary from a figure in that report. Therefore, the 2024 GPR anomalies are considered more accurate representations of the remaining USTs on the Property.

The first mobilization identified one GPR anomaly:

- Anomaly 0 displayed a signal indicative of potential USTs (the South USTs) at a depth of approximately 3 feet below ground surface (bgs) within a single 7-foot by 11-foot rectangular area approximately 2 feet to the northeast of monitoring well MW-02 near the southeast corner of the fence line (see Figure 2-1) This area corresponds with the location of the South USTs identified in the 2006 site investigation (SAIC 2006) and is in the immediate vicinity of the two fill ports present near the base of the fence.

The second mobilization identified five additional GPR anomalies (see Figure 2-1):

- Anomaly 1, located near the southwest corner of the Property, measured approximately 3 feet by 4 feet at a depth of approximately 2.5 feet bgs. This anomaly was not identified during the 2006 site investigation GPR survey.
- Anomaly 2, measuring approximately 5 feet by 5 feet at a depth of approximately 3 feet bgs, corresponds with "GPR-3" in the 2006 site investigation which daylighted the West UST at this location.

- Anomaly 3, measuring 9 feet by 6 feet at a depth of 5 feet bgs, corresponds with "GPR-4" in the 2006 site investigation. Excavation for the 2006 site investigation determined that demolition debris was responsible for the GPR anomaly at this location.
- Anomaly 4, measuring 6 feet by 5 or more feet at a depth of 4 feet bgs, corresponds with "GPR-2" in the 2006 site investigation which daylighted concrete piping at this location.
- Anomaly 5, located near the former fueling islands near monitoring well MW-03 and historical boring SB-6, measures 3 feet by 4 feet at a depth of 5 feet bgs. The anomaly was not encountered during the 2006 site investigation.

The Preliminary Assessment proposed the following borings and monitoring wells to assess remaining data gaps at the Site:

- Boring SB-24 in the west side of the Site to assess potential downgradient impacts from the existing West UST in the west portion of the Site.
- Boring SB-25 in the southwest corner of the Site to assess the presence of petroleum impacts and potential NAPL migration into MW-04 from the existing West UST.
- Boring SB-26 south of the fence, in between MW-02 and MW-04, to evaluate the source of NAPL previously observed in MW-04 and the potential for a NAPL migration pathway from the existing USTs in the southeast portion of the Site.
- Boring SB-27 near the center of the Site to assess the presence of petroleum impacts to the north of the existing and former USTs in the southeast portion of the Site near the soil CUL exceedances at former boring SB-23.
- Monitoring well MW-05 to evaluate potential contaminant migration from the Site to the neighboring property to the east.
- Monitoring well MW-06 to assess potential soil and groundwater impacts downgradient of the existing South USTs in the southeast portion of the Site in the vicinity of SB-2, which had the highest heavy oil concentrations in soil.

The installation, sampling, and analysis of these borings and monitoring wells is described below in Sections 3 and 4.

2.6 Geology and Hydrogeology

The Site is located in the Snohomish River Valley, approximately 0.2 miles northeast of an oxbow of the Stillaguamish River. According to the Geologic Map of the Stanwood Quadrangle, the Site vicinity is located on Quaternary younger alluvial and estuarine deposits (Minard 1985).

MFA prepared hydrogeologic cross sections using the lithologic data presented in 2006 SAIC boring logs (see cross sections in Figures 2-2 and 2-3). Cross section transect lines are shown in Figure 2-1. SAIC reported the presence of fill in the upper 4 feet of the borings, consisting of brown medium sand and sandy silt with fine gravel with trace rounded cobbles (SAIC 2006). It is likely that during initial development of the Site, fill was placed to raise the grade above flood levels. During the 2006 well installation, SAIC encountered subsurface soils consisting primarily of gray silt or a silt/clay mixture from 4 to 14 feet below ground surface (bgs) (SAIC 2006, see hydrogeologic cross section Figures 2-2 and 2-3). When assessing petroleum impacts in the soils, contamination was found to be confined by a gray clay contact layer at 14 feet bgs (SAIC 2006).

Because of the low hydraulic conductivity of the silt/clay, the monitoring wells on the Site have poor groundwater recharge and were initially pumped dry during purging (SAIC 2006). During the February 2019 groundwater sampling fieldwork and during the 2024 data gaps investigation fieldwork, slow recharge was also observed in the sampled monitoring wells and reconnaissance wells (Appendices C and D; MFA 2019).

Groundwater elevations measured during the data gaps investigation were found to flow to the east and the south, roughly in the opposite direction as previously measured and at a greater hydraulic gradient of between 0.022 and 0.04 ft/ft for the east and south flow directions respectively (see Figure 2-4). Previous investigations found that groundwater flows northwest with a relatively flat gradient of 0.026 ft/ft was calculated during the February 2019 monitoring event (Figure 2-5; MFA 2019) and approximately 0.015 ft/ft for the July 2024 water levels (Figure 2-6) with less than 2 feet groundwater elevation difference across the entire Site (see Table 2-3) (MFA 2024a).

3 Field and Analytical Methods

The soil and groundwater data gaps investigation was conducted in general accordance with the methods and protocols described in the SAP, including standard field operating procedures for collecting soil and groundwater samples, monitoring well installation and development, decontaminating equipment, and managing waste (MFA 2024b). Soil and groundwater sample collection location details are provided in Table 3-1. MFA conducted fieldwork for the data gaps investigation between October 9 and October 17, 2024. Prior to subsurface sampling activities the Site, MFA coordinated public and private utility locates to identify potential underground utilities near the proposed sample locations.

3.1 Soil Sampling

A Washington state licensed driller with Holt Services, Inc., of Edgewood, Washington, advanced six borings on the Property using a track-mounted direct-push drill rig (SB-24 through SB-27, MW-05 and MW06; see Figure 3-1). Continuous cores were collected from the ground surface to a maximum depth of 15 feet bgs. Soil conditions were described, visual and olfactory observations were recorded, and soil was screened with a photoionization detector for volatiles. Soil types and photoionization detector screening results are detailed in the boring logs (Appendix A).

Soil samples were selected for analysis based on visual and olfactory observations. The soil samples were submitted under standard chain-of-custody procedures to Friedman & Bruya, Inc., of Seattle, Washington, and were analyzed for contaminants of potential concern (COPCs) encountered during previous site investigations and include the following:

- DRO and ORO by the Northwest Total Petroleum Hydrocarbon (NWTPH)-Dx method (with and without silica gel cleanup).
- GRO by the NWTPH-Gx method.
- BTEX by U.S. Environmental Protection Agency (EPA) Method 8021B.

3.2 Groundwater Sampling

MFA collected a total of four reconnaissance groundwater samples from of the six borings (SB-24 through SB-27; see Figure 3-2). Temporary polyvinyl chloride well screens were generally set between 5 and 15 feet bgs for collection of reconnaissance groundwater samples. Water levels and water quality parameters were measured and recorded on water field sampling data sheets (see Appendix C). Once reconnaissance groundwater sampling activities were completed, geographic coordinates of the boring locations were recorded using a handheld global positioning system device. The borings were then decommissioned by the driller using bentonite chips hydrated with potable water.

The remaining two boring locations were completed as permanent monitoring wells (MW-05 and MW-06; see Figure 3-2). The monitoring wells were constructed with a 2-inch diameter, schedule 40 polyvinyl chloride well casing with 10-foot-long 0.010-inch machine slot polyvinyl chloride well screens. The wells were screened from approximately 4 to 14 feet bgs to target the water table while allowing for the appropriate sand-pack and annular seal construction (see Table 3-1 and monitoring well completion details on the boring logs in Appendix A).

At least 24 hours after the installation of the monitoring wells, MFA developed the newly constructed monitoring wells (MW-05 and MW-06) and four existing monitoring wells (MW-01 through MW-04). The wells were surged with a bailer then purged using a peristaltic pump with dedicated, disposable tubing. Water levels and water quality parameters were measured and recorded until generally stabilized if groundwater recharge allowed (see well development forms in Appendix D). Prior to collection of groundwater samples, water level measurements from each monitoring well were recorded.

MFA collected seven groundwater samples (including one field duplicate sample) from all six monitoring wells on the Property (MW-01 through MW-06; see Figure 3-2). The samples were collected using low-flow sampling methods with a peristaltic pump and dedicated, disposable tubing. The monitoring wells were purged until water quality parameters stabilized if sufficient groundwater recharge was present. Several wells exhibited significant drawdown during purging with very low recharge rates due to the fine-grained, low hydraulic conductivity soils present at the Site. In these instances, field staff consulted with an MFA hydrogeologist and sample collection was attempted following recharge and prior to the well going dry.

Groundwater samples were collected directly into laboratory-supplied bottles. Field sampling data sheets for groundwater are provided in Appendix C. Groundwater samples were analyzed for a combination of the following COPCs:

- DRO and ORO by the NWTPH-Dx method (with and without silica gel cleanup).
- GRO by the NWTPH-Gx method.
- BTEX by EPA Method 8021B.

3.3 Groundwater Elevation

Prior to sampling and at least 24 hours following the development of the wells, concurrent depths to groundwater were measured in the six wells across the Site to determine a potentiometric groundwater surface (Figure 2-4). The well plugs were removed and allowed over 30 minutes to equalize the pressure within the well casing prior to water level measurement. Water levels were then measured within 10 minutes of each other in all wells (Table 2-3).

The horizontal position, top-of-casing elevation, and adjacent ground surface elevation of the monitoring wells were surveyed by a state of Washington registered land surveyor with Goldsmith Land Development services of Seattle, Washington (see Appendix E). Groundwater elevations were tabulated using the surveyed top-of-casing elevations and depth to water measurements (see Table 2-3).

3.4 Investigation-Derived Waste

The investigation-derived waste (IDW) was separated into solids, liquids, and sampling debris (e.g., personal protective equipment). IDW was stored in labelled and secured, Washington State Department of Transportation-approved drums on the southern portion of the Property and disposed of at Heritage Crystal Clean treatment facility in Tacoma, Washington. Waste profiles and disposal manifests are provided in Appendix F.

3.5 Archaeological Monitoring

A professional archaeologist with Environmental Science Associates (ESA) of Seattle, Washington monitored all ground disturbing activities during the investigation for the presence of cultural resources following the procedures outlined in the archaeological monitoring plan submitted to Ecology in October 2024 (ESA 2024). The monitoring report prepared by ESA is provided in Appendix G. No archaeological resources or potential indicators of past cultural activity, such as fire modified rocks, dense charcoal, or burned soils, were observed during archaeological monitoring of borings on the Site.

4 Analytical Results

Laboratory analytical reports are provided as Appendix H. Analytical data and the laboratory's internal quality assurance and quality control data were reviewed to assess whether they met project-specific data quality objectives. A data validation memorandum summarizing data evaluation procedures, data usability, and deviations from specific field or laboratory methods is included as Appendix I. The data are considered acceptable for their intended use, with the appropriate data qualifiers assigned. The data presented in this report has been submitted to Ecology's Environmental Information Management System.

4.1 Screening Levels

Soil and groundwater were analyzed for GRO, DRO, ORO, and BTEX. Analytical results for soil and groundwater are included in Tables 2-1 and 2-2, respectively. Soil and groundwater analytical results were compared to MTCA Method A CULs for unrestricted land use.

4.2 Soil

The subsurface soils at the Property during the data gaps investigation activities generally consisted of silty sand and sandy silt with varying amounts of gravel in the upper five feet, underlain by clay to 15 feet bgs.

Soil samples were submitted for laboratory analysis to evaluate the concentration of petroleum constituents in soils. The location of the borings placed during the data gaps investigation are provided in Table 3-1 and are shown Figure 3-1.

In general, most locations were non-detect for COPCs (Figure 3-1). Two soil locations exceeded MTCA Method A CULs during the data gaps investigation:

- SB-27: Concentrations of GRO, ORO, heavy oils (the sum of DRO and ORO), and benzene in soil exceed MTCA Method A CULs at SB-27 at 2.0 feet bgs. Benzene concentrations in soil exceed MTCA Method A CULs at SB-27 at 7.5 feet bgs.
- MW-06: Benzene concentrations in soil exceeded MTCA Method A CULs in MW-06 at 5.5 and 10.5 feet bgs.

No other exceedances in soil were identified (see Table 2-1). Both SB-27 and MW-06 are located near the area of the former USTs removed from the southeast corner of the Property in 2005.

4.3 Groundwater

Groundwater samples were collected from temporary boring locations and from permanent monitoring wells at the Property (see Figure 3-2).

In general, most locations exceeded MTCA Method CULs for DRO, ORO, or sum heavy oils in groundwater. The highest sum heavy oils concentrations were located in the former UST area and at MW-04 in the southwest corner of the Property (Figure 3-2). Additionally, concentrations of benzene in groundwater exceeded MTCA Method A CULs at SB-27 and MW-06 near the area of the former USTs.

Concentrations of GRO, ethylbenzene, toluene, and xylenes were non-detect or below the MTCA Method A CUL at all locations. No exceedances of COPCs were identified in groundwater at SB-26, MW-01, and MW-03 (see Table 2-2).

5 Conceptual Site Model and Screening Criteria

The primary purpose of a CSM is to identify potential pathways by which human and ecological receptors could be exposed to site-related chemicals. A complete exposure pathway consists of four necessary elements: (1) a source and mechanism of chemical release to the environment; (2) an environmental transport medium for a released chemical; (3) a point of potential contact with the impacted medium (referred to as the exposure point); and (4) an exposure route (e.g., soil ingestion) at the exposure point. The potential releases mechanisms and pathways are described below.

In the FEI report, a preliminary CSM was developed to describe release mechanisms, environmental transport processes, exposure routes, and receptors for sources of contamination identified on the Property (MFA 2019). The CSM is based on information collected during previous investigations and MFA's understanding of the proposed future use of the Property. The CSM has been updated to reflect the current understanding of the Site based on recent data collected in 2024. A flow chart depicting the updated CSM is presented as Figure 5-1.

5.1 Potential Sources and Release Mechanisms

Based on documented historical uses described by SAIC, historical soil and groundwater data, and on data obtained during the FEI and data gaps investigation, the following historical operations/uses at the Property and/or at adjoining properties have likely contributed to contamination at the Property:

- Former leaking USTs on the Property
- Existing abandoned USTs on and adjacent to the Property
- Former filling station operations on the Property

5.2 Fate and Transport Processes

The primary mechanisms likely to influence transport and fate of chemicals include natural biodegradation of organic chemicals, sorption of chemicals to soil, physical dispersion of adsorbed chemicals, leaching of chemicals from soil to groundwater, and volatilization from soil to air. The relative importance of these processes varies, depending on the chemical and physical properties of the released contaminant. The properties of the soil and the dynamics and elevation of groundwater also affect contaminant fate and transport.

The Property is primarily undeveloped land with partially intact asphalt and concrete surfaces. Precipitation may infiltrate through permeable ground surfaces on the Property into vadose-zone soil, potentially resulting in leaching of chemicals from near-surface soil impacts to shallow groundwater. The soil-to-groundwater leaching pathway is considered potentially complete.

Volatile contaminants may partition to the vapor phase in the source areas or downgradient of the source areas via groundwater transport of dissolved-phase contamination. Contaminant vapors partitioning from contaminated soil or groundwater could result in impacts to outdoor air quality. Building development will not occur on the Property; therefore, the volatilization to indoor air pathway on the Property is not present.

There are structures to the west of the Property boundary. Dissolved-phase concentrations of sum heavy oils (DRO plus ORO) slightly exceeded the MTCA A CUL in groundwater from MW-05 at the western Property boundary. GRO and BTEX compounds were not detected in this groundwater sample. Interpolated groundwater isoconcentration contours indicate that heavy oils concentrations attenuate to below the CUL just west of the Property boundary. In addition, DRO and ORO are non-detect or below the MTCA A CUL in soil samples collected in the western half of the Property (SB-15, SB-19, SB-20, SB-21, SB-24, and MW-01/SB-5, and MW-05. The few detections of DRO and ORO in soil from this area were from SB-25 and MW-04/SB-3, in the southwest corner of the Property near the West UST, at concentrations well below MTCA Method A CUL (Table 2-1). The DRO and ORO concentrations as measured by the NWTPH-Dx method are the semi-volatile petroleum products rather than the volatile petroleum products measured as GRO by the NWTPH-Gx method (Ecology 2013). In the west half of the Property, GRO was only detected in historical groundwater samples in MW-04 at concentrations well below the MTCA Method A CUL. GRO has not been detected in any other groundwater sample or soil sample from the western half of the Property. Additionally, there have been no detections of the volatile BTEX compounds in any soil or groundwater sample from this portion of the Property.

Based on the low volatility of the detected petroleum constituents, lack of volatile soil detections, and low heavy oil groundwater detections adjacent to the western Property boundary, the vapor intrusion to indoor air pathway is likely not complete. Removal of the West UST and any adjacent soil impacts would further reduce the likelihood of potential for volatilization of subsurface heavy oil contaminants.

5.3 Exposure Pathways and Potential Receptors

The Property is currently vacant and fenced but is zoned for Mainstreet business (i.e., commercial). Future use of the Property may include commercial businesses or a public park. Therefore, the following human receptors may be exposed to chemicals originating from the Property based on current and potential future uses:

- Construction workers
- Occupational workers (including visitors)

The following are potentially complete exposure pathways for human receptors at the Property:

- Incidental ingestion, contact, or inhalation associated with soil or groundwater.
- Ingestion, contact, or inhalation via use of groundwater as drinking water. Currently, the Property is connected to municipal drinking water and groundwater is unlikely to be used as a source of drinking water. However, unless it can be demonstrated that groundwater is not a future potential source of drinking water based on the criteria set forth in WAC 173-340-720(2), groundwater is classified as potable to protect drinking water beneficial uses.

5.4 Terrestrial Ecological Evaluation

A simplified terrestrial ecological evaluation (TEE) was completed in 2019 during the FEI for the Property to assess the potential for ecological exposure and is included as Appendix J of this report. The intent of a simplified TEE is to ensure protection of terrestrial wildlife at industrial or commercial sites, and of terrestrial plants, soil biota, and terrestrial wildlife at other sites, as provided under WAC 173-340-7490(3)(b). MTCA specifies that the simplified TEE process is intended to identify sites that do not have a substantial potential to pose a threat of significant adverse effects to terrestrial ecological receptors. Therefore, a simplified TEE may be used to remove a site from further ecological consideration during the remedial investigation and cleanup process (WAC 173- 340-7492).

WAC 173-340-7492(2) provides the steps necessary for conducting the simplified TEE. MTCA Table 749-1 may be used to determine whether land use at a site and surrounding area is likely to result in substantial wildlife exposure. MTCA specifies that if this is demonstrated to be unlikely, no further evaluation is necessary to conclude that a site does not pose a substantial threat to potential ecological receptors.

The completed MTCA Table 749-1 included in Appendix J indicates that the Property is unlikely to pose a threat to ecological receptors and that no further evaluation is necessary. Appendix J includes a table presenting the rationale for the scoring on Table 749-1.

5.5 Contaminants of Concern

Based on the revised CSM described above, the contaminants of concern (COCs) for the Property include GRO, DRO, ORO, and BTEX, and their associated concentrations in soil and/or groundwater. MTCA Method A CULs for these COCs are provided in Tables 2-1 and 2-2. In addition, light nonaqueous phase liquid (i.e., free product) that may be highly mobile and not reliably contained has been encountered in MW-04 during previous sampling events.

6 Analysis of Cleanup Options

6.1 Cleanup Action Areas

Two cleanup action areas corresponding to areas of identified soil and/or groundwater contamination and potential USTs at the Site were identified (see Figure 6-1):

- The Southwest Cleanup Action Area includes the West UST and an approximately 700 square foot area near MW-04 where free product was previously identified.
- The Southeast Cleanup Action Area includes an approximately 1000 square foot area along the southeast portion of the Property, extending into the South ROW, where soil contamination was identified surrounding the excavation area of the former decommissioned USTs and the two off-property USTs (the South USTs) located adjacent to the southern parcel boundary of the Property.

6.2 Cleanup Technologies

Cleanup technologies initially considered for cleanup options at the Site included the following:

- Excavation and offsite disposal
- Bioremediation via backfilling excavations
- In-situ chemical oxidation
- Permeable reactive barriers
- Pump and treat system

Due to the environmental and hydrogeological conditions on the Property, pump and treat systems and permeable reactive barriers were not considered to be feasible and were not investigated further. The poor groundwater recharge observed during monitoring events and the tight lithology logged during previous environmental investigations limit the ability of a pump and treat system to effectively operate and remove impacted groundwater. Similarly, slow groundwater flow prevents a permeable barrier wall from reducing concentrations on the Property within a reasonable timeframe.

6.3 Potential Cleanup Options

Cleanup technologies were assembled into a range of cleanup options. The objectives of the cleanup options include:

- Remove sources of COCs from the Property
- Remove free product from the Property
- Prevent contaminant migration
- Reduce levels of COCs below the CULs in soil and groundwater or eliminate the exposure pathways

Potential cleanup options are described below with estimated probable costs.

6.3.1 Option 1—No Further Action

Under Option 1, no additional action is taken to address the impacted soil or groundwater at the Site and the potential risks remain. As a result, no further consideration is given to Option 1.

6.3.2 Option 2—Excavation and Backfill with Bioremediation Compound

Option 2 addresses the probable source of groundwater contamination at MW-04 by decommissioning via removal the West UST and removing soil with free product impacts (elevated COCs and/or free-product) from in the Southwest Cleanup Action Area. In the Southeast Cleanup Action Area impacted soil is removed and adjacent South USTs are decommissioned. Within both cleanup action areas, impacted soil is excavated to approximately 2 feet below the smear zone. Any remaining soil impacts in the smear zone soil are addressed by the placement of an oxygen releasing compound (ORC) into the excavation base prior to backfilling.

Option 2 includes the following actions:

UST Removal—Excavate and remove West UST located in Southwest Cleanup Action Area.

UST Decommissioning—Decommission in-place the two South USTs in the Southeast Cleanup Action Area that are located below a natural gas line. Decommissioning will include removal of any remaining product/water present in the USTs following inertion and triple rinsing, and disposing of remaining product/water and rinsewater offsite at a licensed facility. The USTs will then be filled with a controlled density, inert slurry material to decommission in-place.

Excavation and offsite disposal—Excavate the extent of free product and elevated COC impacts in the Southwestern Cleanup Action Area which is assumed to be approximately 130 cubic yards of material to a maximum depth of 5 feet. In the Southeastern Cleanup Action Area, approximately 200 cubic yards of contaminated soil down will be excavated to a maximum depth of 5.5 feet. All excavated soil will be disposed of offsite at an appropriate landfill. Groundwater, stormwater, and/or surface water that accumulates in the excavation will be removed from the excavation, treated, and discharged to the municipal sanitary sewer. Field screening, including visual and olfactory observations of the excavated material and vapor screening with a photoionization detector, will be used to guide the excavation. Completed excavation extents would be confirmed by base and sidewall samples consistent with Ecology's *Site Assessment Guidance for Underground Storage Tank Systems* (Ecology 2022). Following confirmation that impacted soil has been removed, the excavation areas will be backfilled with clean imported material.

ORC—Apply solid phase ORC mixed with imported clean fill in the base of the excavation for long-term treatment of any remaining soil impacts or migrating COCs. ORC should be preferentially applied to areas upgradient of deeper groundwater impacts and the mixing of ORC into deeper soils should be considered where possible.

Institutional Controls—Record an environmental covenant to prevent the future use of shallow groundwater until such a time that monitoring indicates no COC impacts remain.

Monitoring—Monitor groundwater on a quarterly (i.e., four times a year) basis for 2 years or until impacts are no longer observed.

Cost—The estimated probable cost for Option 2 is $386,400 (-30%/+50%). Details are presented in Table 6-1.

6.3.3 Option 3—Excavation and In-situ Chemical Oxidation Injections

Option 3 relies on a shallower excavation depth and in-situ injection of an oxidizing compound to address impacted soil and groundwater. Option 3 consists of the same elements as Option 2 (including free product removal) with the following changes:

Excavation and offsite disposal—Excavation in the Southeastern and Southwestern Cleanup Action Areas will only extend to a depth of 3 feet to remove soil contamination above the groundwater table for an estimated 190 cubic yards of soil removal. Dewatering within the excavation should not be required. The excavation areas will be backfilled with clean imported material.

Oxidant Injections—Inject oxidant into the subsurface in the remedial action areas of the Property down to a depth of 14 feet. For the purposes of this evaluation, it is assumed that there will be 20 injection points with 4 injection events that will occur over the course of 12 months.

Monitoring—Monitor groundwater on a quarterly (i.e., four times a year) basis for 2 years or until impacts are no longer observed.

Cost—The estimated probable cost for Option 3 is $653,600 (-30%/+50%). Details are presented in Table 6-2.

6.3.4 Option 4—Complete Excavation

Option 4 relies on excavation to remove all contaminated media on the Property. Option 4 consists of the same elements as Option 2 with the following changes:

Excavation and offsite disposal—Excavation to extent of soil impacts (i.e. to a depth of approximately 14 feet) in the Southeastern Cleanup Action Area. Excavate to extent of free product and soil impacts in Southwest Cleanup Action Area, for cost estimating purposes, this depth is assumed to be 12 feet bgs, corresponding to the deepest observed soil sheen in MW-04/SB-3. The total amount of soil removed for Option 4 is assumed to be 830 cubic yards. Dewatering and shoring are required for both excavations. Excavation in the vicinity of the natural gas line overriding the South USTs would involve special accommodations for the pipe and close coordination with the natural gas utility.

Monitoring—Monitor groundwater semi-annually (i.e., two times per year) for two years post remedy to confirm success of remedy.

Cost—The estimated probable cost for Option 4 is $1,025,200 (-30%/+50%). Details are presented in Table 6-3.

7 Preliminary Evaluation of Cleanup Options

7.1 Model Toxics Control Act Threshold Requirements

Criteria typically used to evaluate cleanup alternatives are defined in the MTCA regulation (Washington Administrative Code [WAC] 173-340-360). These criteria are as follows:

- Threshold requirements:
  - Protect human health and the environment
  - Comply with cleanup standards (WAC 173-340-700 through 173 340 760)
  - Comply with applicable state and federal laws (WAC 173-340-710)
  - Provide for compliance monitoring (WAC 173-340-410 and 173-340-720 through 173-340-760)
- Other requirements:
  - Use permanent solutions to the maximum extent practicable
  - Provide for a reasonable restoration timeframe
  - Consider public concerns (WAC 173-340-600)

Option 1 does not pass the threshold requirements and is not discussed further. Options 2 through 4 meet MTCA threshold requirements and are therefore evaluated further.

The preliminary CULs, presented in Tables 2-1 and 2-2 are consistent with MTCA. Additionally, local, state, and federal laws related to environmental protection, health and safety, transportation, and disposal would apply to each proposed option. Applicable or relevant and appropriate requirements include:

- Resource Conservation and Recovery Act: Disposal of any material off-site would be subject to the Resource Conservation and Recovery Act to ensure appropriate disposal of waste, including hazardous and non-hazardous material. All options include soil excavation and off-site disposal; the material will be profiled and disposed of at a licensed Subtitle D disposal facility.
- The Washington State Environmental Policy Act (SEPA): The SEPA process is undertaken when a governmental entity makes a decision. A SEPA checklist is completed by the lead governmental agency to make a determination of impact.
- During remedial design, the selected option would be designed to comply with applicable, relevant, and appropriate requirements.

7.2 Evaluation Factors

The cleanup options are evaluated by the criteria below. The criteria used were consistent with WAC 173-340-360(3)(f). See Table 7-1 for a quantitative ranking of evaluation factors.

7.2.1 Protectiveness

Protectiveness is a factor by which human health and the environment are protected by the cleanup action, including the degree to which existing risks are reduced; the time required to reduce risk at the facility and attain cleanup standards; on-site and off-site risks resulting from implementing the cleanup option; and improvement of the overall environmental quality.

Option 4 had the highest score for protectiveness, as it removes contamination through the entire vertical extent of the plume over a short time period. Options 2 and 3 scored equally in this category because while the sources of contamination are removed from soil and groundwater, the residual concentrations are addressed over a longer period of time.

7.2.2 Permanence

Permanence is a factor by which the cleanup action alternative permanently reduces the toxicity, mobility, or volume of hazardous substances. It takes into account the adequacy of the alternative in destroying the hazardous substances, the reduction or elimination of hazardous substance releases and sources of releases, the degree of irreversibility of the waste-treatment process, and the characteristics and quantity of treatment residuals generated.

Option 4 earned the highest score for permanence as this remedy completely removes the sources of contamination and removes all of the impacted media. Options 2 and 3 earned equal scores in this category. Due to the tight nature of the formation, multiple injection events will likely be required for Option 3 to be an effective, permanent solution. Option 2 relies on the dispersion of ORC into the groundwater and subsurface soils in order to be effective. If this dispersion is not achieved, the remedy may be less permanent in the long-term.

7.2.3 Effectiveness over Long Term

Long-term effectiveness includes the degree of certainty that the alternative will be successful; the reliability of the alternative for the expected duration of hazardous substances remaining on site at concentrations that exceed CULs; the magnitude of residual risk with the alternative in place; and the effectiveness of controls required to manage treatment residues or remaining wastes.

Option 4 scored highest for effectiveness over the long-term as this remedy completely removes the sources of contamination and removes all of the impacted media. Due to the subsurface conditions Option 3 may require multiple injections which could affect the effectiveness of the remedy over the long-term. Options 2 scored lowest in this category. Option 2 required the dispersion of the ORC in the subsurface which also has the potential to lengthen the treatment period.

7.2.4 Management of Short-Term Risks

Short-term risks to remediation workers, the public, and the environment are assessed under this criterion. Generally, short-term risks are expected to be linearly related to the amount of material handled, treated, and/or transported and disposed of (e.g., worker injury per cubic yard excavated [equipment failure], public exposure per cubic yard-mile transported [highway accident]).

This factor addresses the risk to human health and the environment associated with the alternative during construction and implementation, and the effectiveness of measures that will be taken to manage such risks. Potential public exposure during transport, handling, and excavation required for the alternatives could lead to short-term risks.

Option 2 has the highest score for management of short-term risks because the remedy requires minimal contaminated soil disturbances and does not remove large volumes of contaminated groundwater from the subsurface, reducing the potential for worker exposures. Additionally, the amendments (ORC) used in Option 2 does not pose a risk to the public or construction workers. The chemical oxidants used for Option 3 pose some human health and safety risk during the injection process. Option 4 involves more risk because it requires larger volumes of contaminated media to be handled, shoring, and dewatering which increases the risk for workers during the excavation and transportation of materials. Excavation near the natural gas line overriding the South USTs under Option 4 would also increase the risk to workers.

7.2.5 Technical and Administrative Implementability

This factor addresses whether the alternative can be implemented and is technically possible. The availability of necessary materials, regulatory requirements, scheduling, access for construction operations and monitoring, and integration with existing and neighboring site uses must be considered.

Option 2 scored highest for implementability due to minimal site disturbances. Due to the shallow groundwater, the injections for Option 3 may be more difficult to complete without having the oxidant daylight. Option 4 earned a lower score in this category due to the equipment and amount of earthwork required to implement as well as the special considerations needed for excavation in the vicinity of the natural gas line.

7.2.6 Public Concerns

This factor includes considering concerns from individuals, community groups, local governments, tribes, federal and state agencies, and any other organization that may have an interest in or knowledge of the Site and that may have a preferred alternative. Through the public process, the public will have an opportunity to review and comment on plans.

8 Recommendations

Based on the results of the data gap investigation and cleanup options evaluation, Option 2 is the recommended remedial alternative. Option 2 involves the excavation and removal of impacted soils up to 5.5 feet bgs and backfill of excavations with a mixture of imported fill and solid phase ORC. Option 2 addresses the source of contamination by decommissioning the underground storage tanks on and adjacent to the Property and removing free product. While the excavation and soil removal would only extend a few feet below the water table due to soil stability considerations, targeted soil mixing could be included to get ORC product deeper into the subsurface upgradient of the deeper groundwater impacts. Option 2 is highly implementable by removing source contamination from the vadose zone soil and by treating residual groundwater through oxidation and biodegradation. Option 2 has a high degree of permanence, is protective, meets all other MTCA requirements, and is consistent with Ecology's model remedy structure for sites with petroleum impacts to groundwater (Ecology 2017).

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Limitations

The services undertaken in completing this report were performed consistent with generally accepted professional consulting principles and practices. No other warranty, express or implied, is made. These services were performed consistent with our agreement with our client. This report is solely for the use and information of our client unless otherwise noted. Any reliance on this report by a third party is at such party's sole risk.

Opinions and recommendations contained in this report apply to conditions existing when services were performed and are intended only for the client, purposes, locations, time frames, and project parameters indicated. We are not responsible for the impacts of any changes in environmental standards, practices, or regulations subsequent to performance of services. We do not warrant the accuracy of information supplied by others, or the use of segregated portions of this report.

Figures

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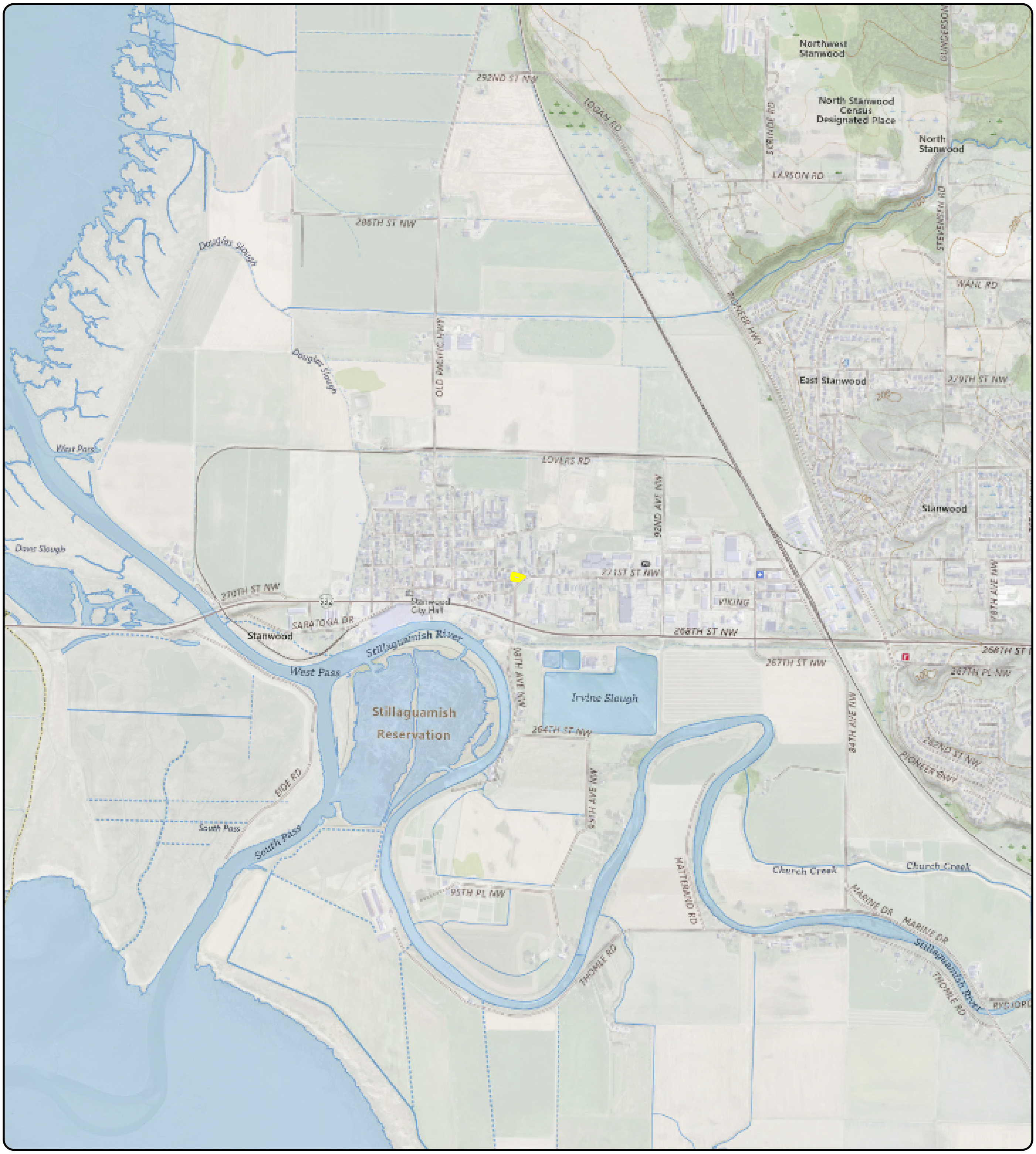

Notes
U.S. Geological Survey 7.5-minute topographic quadrangle (2020): Stanwood.
Township 32 north, range 3 east, section 25.

Legend

Property Parcel

Figure 1-1
Property Location

Raplee Property
Stanwood, Washington

Data Source
Property boundary obtained from Snohomish County.

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Reviewed By: cwise
Produced By: bmurphy
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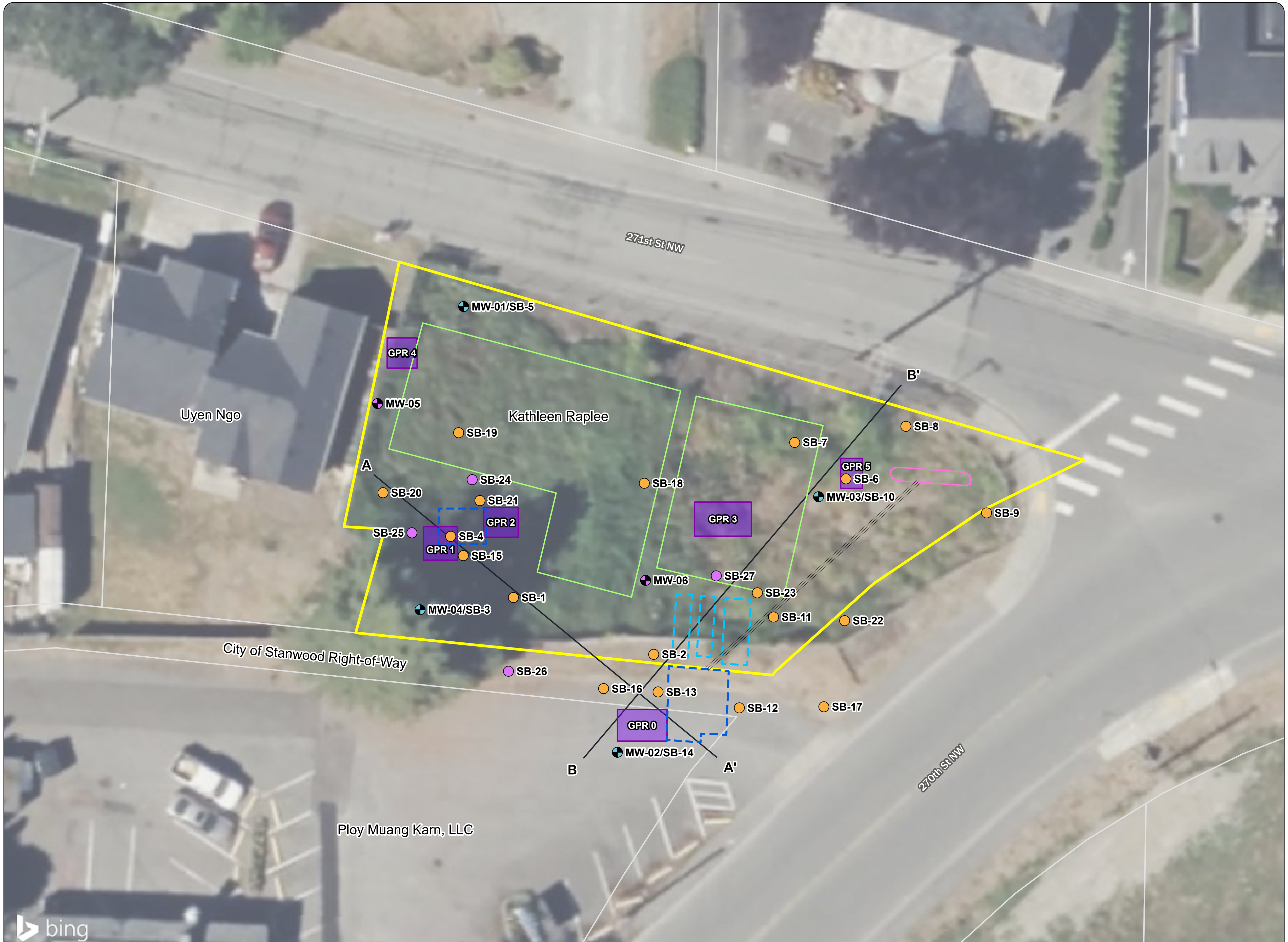
Figure 2-1
Sample Locations and Site Features

Raplee Property
Stanwood, Washington



Legend

- October 2024 Soil Boring
- October 2024 Monitoring Well Boring
- Historical Soil Borings
- Monitoring Well
- 2024 GPR Anomaly
- Approximate Existing UST (SAIC 2006)
- Former UST
- Former Building
- Former Service Island
- Former Product Line
- Geologic Cross Section
- Property Parcel
- Tax Lot

Notes
Parcel ownership noted on tax lots in figure.
All property feature locations are approximate.
Former property features obtained from previous reports (Pinnacle 2005; SAIC 2006).
GPR = ground penetrating radar.
UST = underground storage tank.

0 20
Feet

Data Sources
Aerial imagery obtained from Bing; property boundary obtained from Snohomish County.

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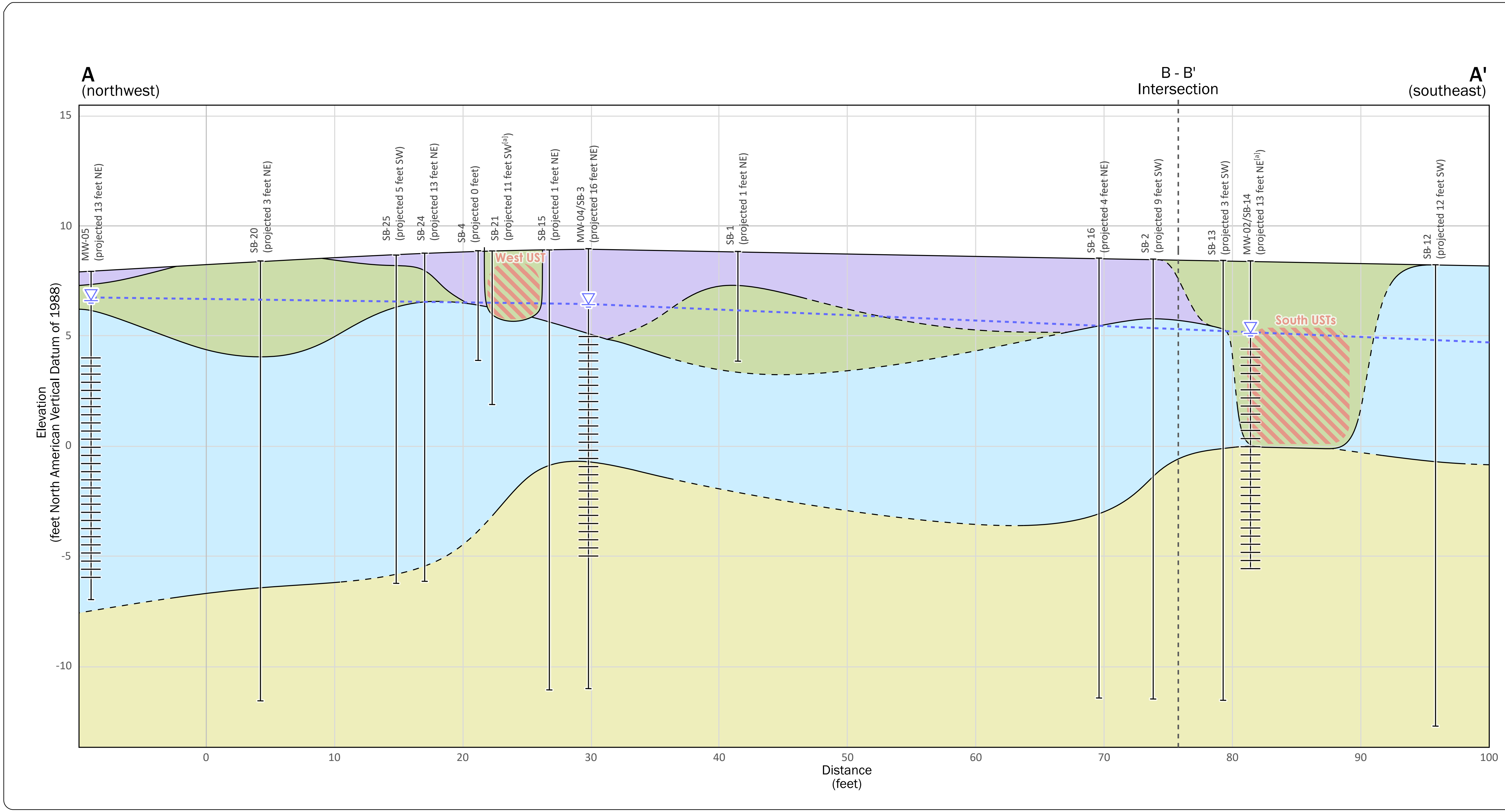

Lithology

- Coarse-grained gravel fill
- Fine-grained fill with sand and occasional gravel
- Clay to silt
- Sandy silt to silt with intermittent lenses of silty sand with occasional gravel
- Water level at time of site reconnaissance visit
- Approximate water table
- Presumed UST Location

Boring Features

- Top of boring
- Well screen
- Bottom of boring

Notes:

[a]Location shown is projected; well did not physically intersect USTs.
Contacts are dashed where inferred.
Groundwater elevations were measured on October 17, 2024.
The vertical axis has 2× exaggeration for visualization purposes.
Boring locations, lithology, and elevation from SAIC 2006 Site Investigation and the October 2024 data gaps investigation.
NE = northeast.
UST = underground storage tank.
SW = southwest.

Figure 2-2

Hydrogeologic Cross Section A - A'

Raplee Property Site
Stanwood, Washington

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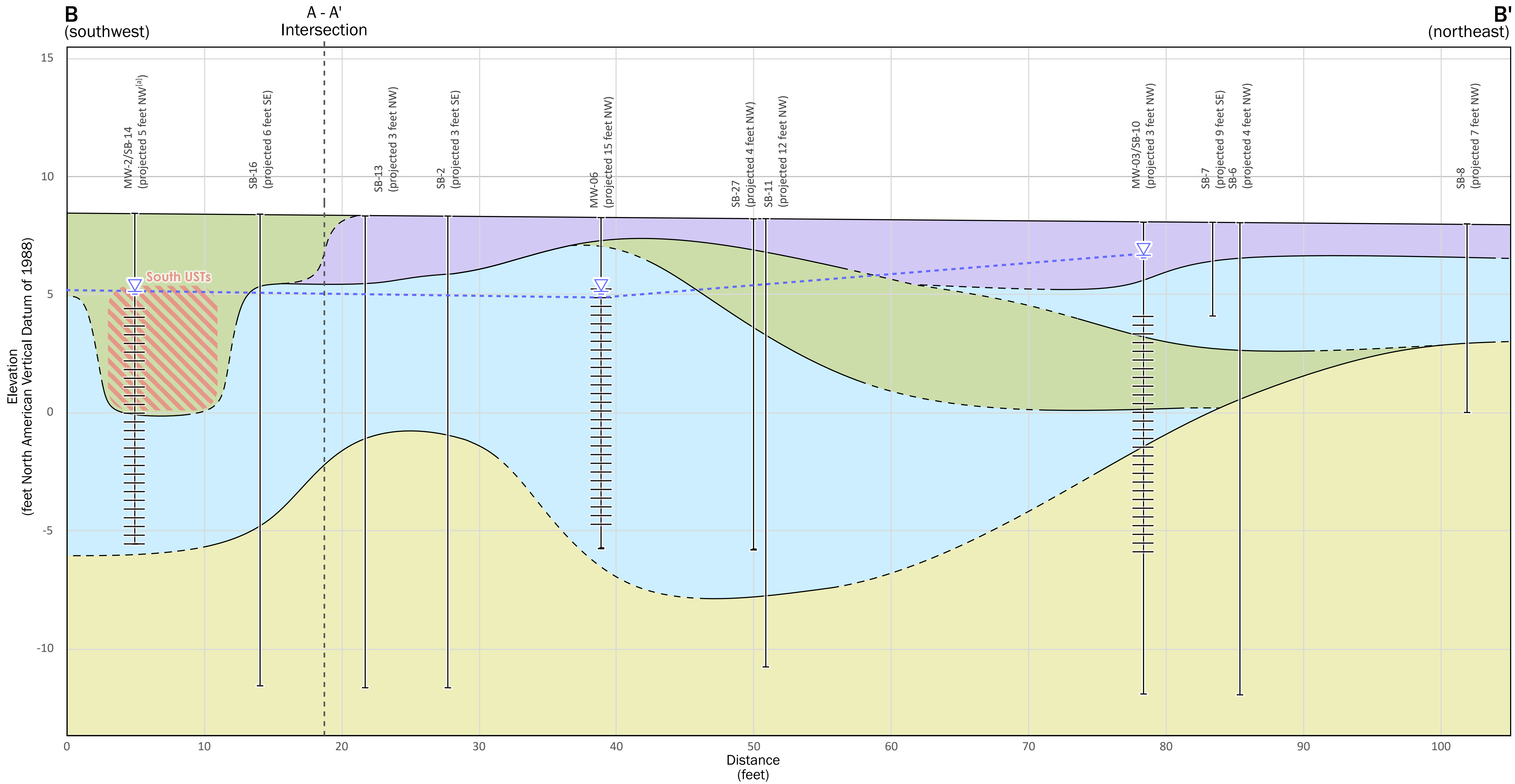

Lithology

- Coarse-grained gravel fill
- Fine-grained fill with sand and occasional gravel
- Clay to silt
- Sandy silt to silt with intermittent lenses of silty sand with occasional gravel
- Water level at time of site reconnaissance visit
- Approximate water table
- Presumed UST Location

Boring Features

- Top of boring
- Well screen
- Bottom of boring

Notes:

[a]Location shown is projected; well did not physically intersect USTs.
Contacts are dashed where inferred.
Groundwater elevations were measured on October 17, 2024.
The vertical axis has 2× exaggeration for visualization purposes.
Boring locations, lithology, and elevation from SAIC 2006 Site Investigation and the October 2024 data gaps investigation.
NW = northwest.
UST = underground storage tank.
SE = southeast.

Figure 2-3
Hydrogeologic Cross Section B - B'

Raplee Property Site
Stanwood, Washington

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Produced By: csifford
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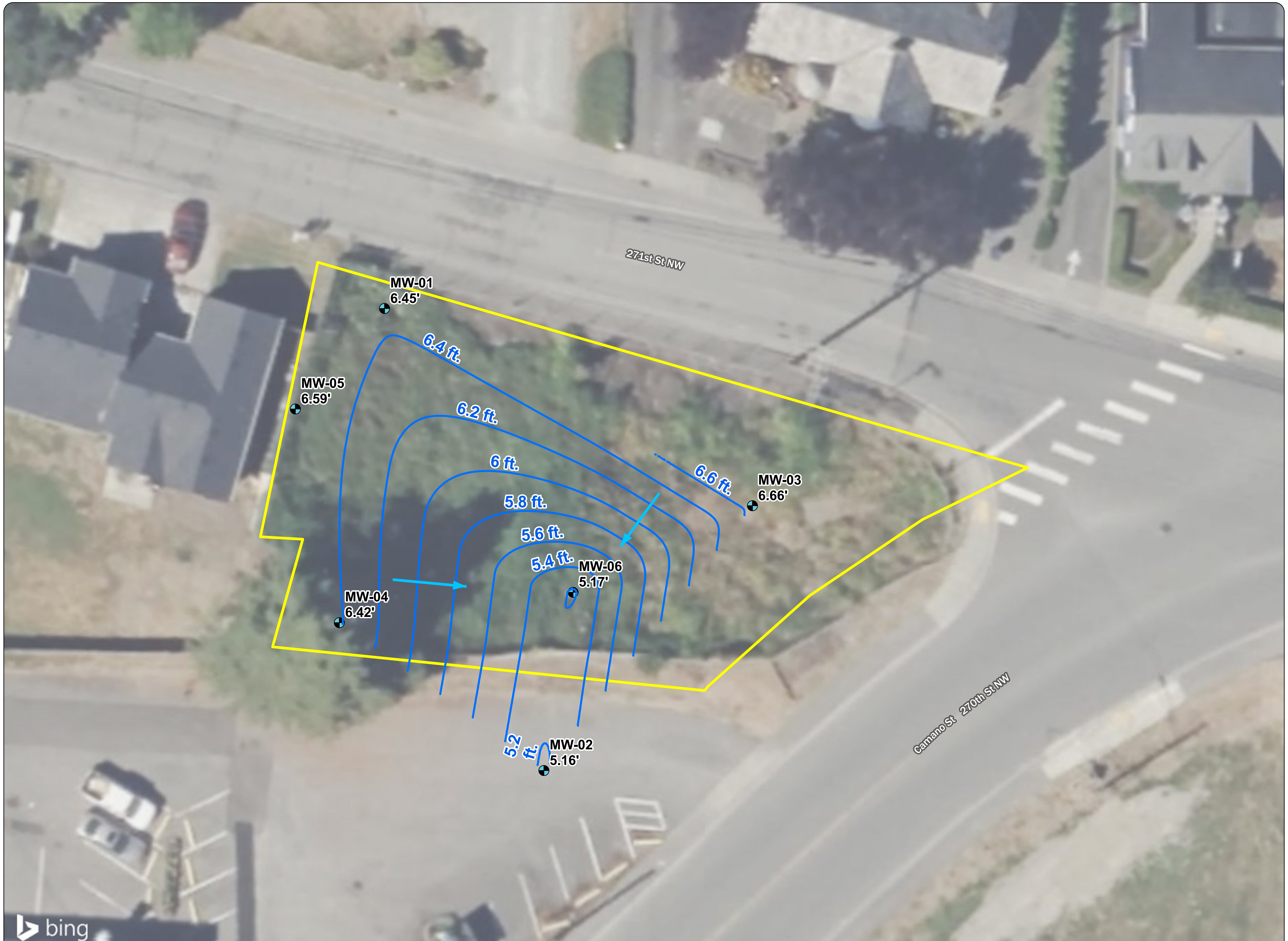
Figure 2-4
October 2024 Potentiometric Groundwater Contours

Raplee Property
Stanwood, Washington



Legend

- Potentiometric Groundwater Contour (feet NAVD 88)
- Approximate Groundwater Flow Direction
- Monitoring Well
- Property Parcel

Notes

Depths to groundwater measured between 10:07 am and 1:29 pm on October 17, 2024.
All property feature locations are approximate.
NAVD 88 = North American Vertical Datum of 1988.

0 20
Feet

Data Sources

Aerial photograph obtained from Esri; tax lot data obtained from Snohomish County.

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Figure 2-5
February 2019
Potentiometric Groundwater Contours
Raplee Property
Stanwood, Washington

Legend
- Potentiometric Groundwater Contour
- Approximate Groundwater Flow Direction
- Monitoring Well
- Property Parcel
- Tax Lot

Notes:
All property feature locations are approximate.
TOC elevations are expressed in feet relative to an arbitrary datum of 100.00 feet at MW-1 (SAIC, 2006).
TOC = top of casing.

0 25
Feet

Source: Aerial photograph obtained from Mapbox. Property boundary obtained from Snohomish County GIS.

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Approved By:
Produced By: aguse
Project: 1030.01

Figure 2-6
July 2024 Potentiometric Groundwater Contours

Raplee Property
Stanwood, Washington

Legend

- Potentiometric Groundwater Contour
- Approximate Groundwater Flow Direction
- Monitoring Well
- Property Parcel
- Tax Lot

Notes:
Depths to groundwater measured between 1:01 pm and 1:27 pm on July 12, 2024.
All property feature locations are approximate.
TOC elevations are expressed in feet relative to an arbitrary datum of 100.00 feet at MW-04 SAIC, 2006).
TOC = top of casing.

0 25
Feet

Source: Aerial imagery obtained from Bing. Property boundary obtained from Snohomish County GIS.

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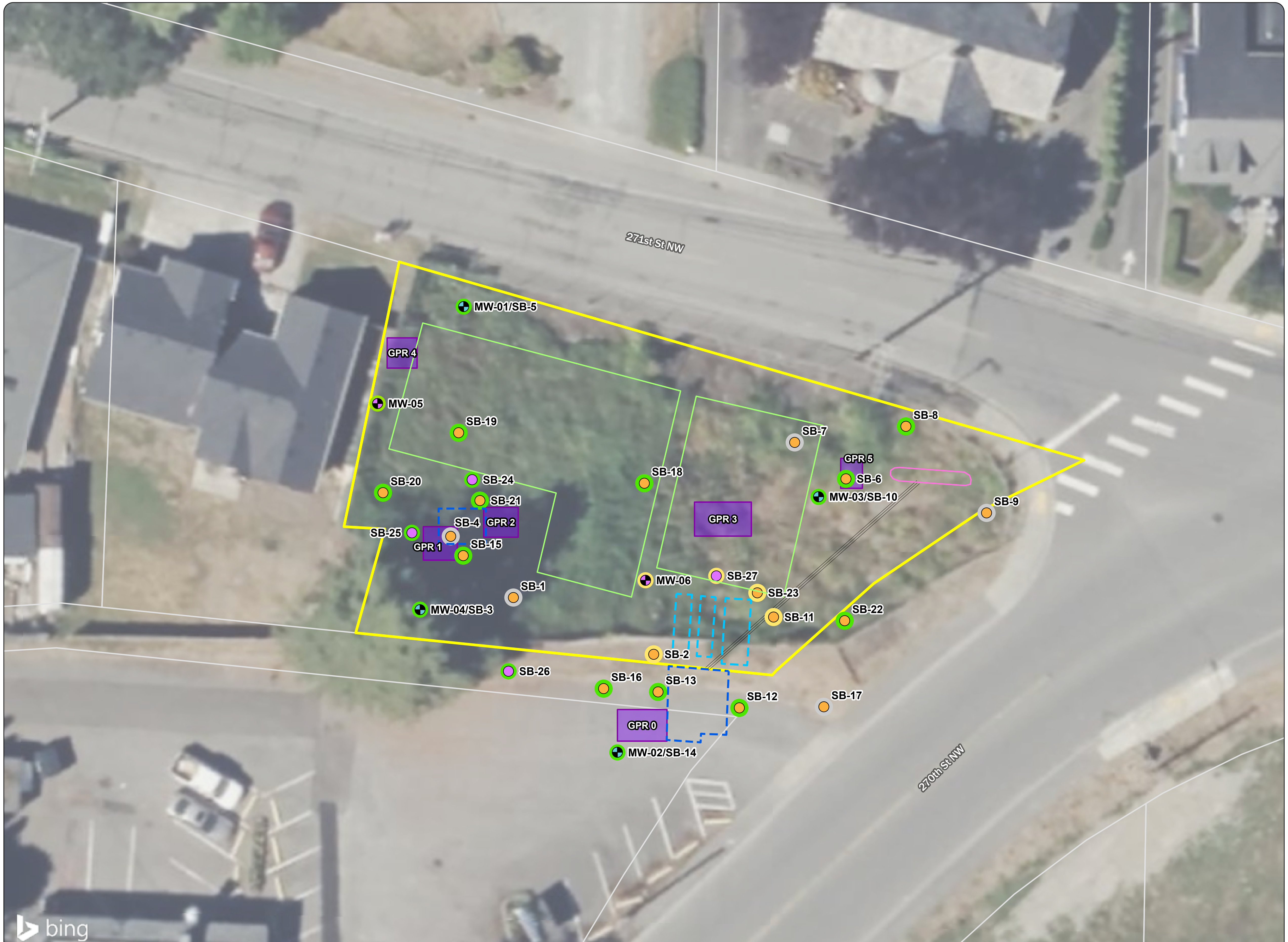
Approved By:
Produced By: gjaravata
Project: 1030.08

Figure 3-1
Soil Sample Locations and Exceedances

Raplee Property
Stanwood, Washington



Legend

- October 2024 Soil Boring
- October 2024 Monitoring Well Boring
- Historical Soil Boring
- Monitoring Well

Soil Exceedances

- Petroleum, BTEX, or lead non-detect or detected below the CUL.
- Petroleum, BTEX, or lead detected above the CUL.
- Soil sample not collected from boring.
- 2024 GPR Anomaly
- Approximate Existing UST (SAIC 2006)
- Former UST
- Former Building
- Former Service Island
- Former Product Lines
- Property Parcel
- Tax Lot

Notes

All property feature locations are approximate.
Former property features obtained from previous reports (Pinnacle 2005; SAIC 2006).
BTEX = benzene, toluene, ethylbenzene, and xylenes.
CUL = MTCA Method A cleanup level.
GPR = ground penetrating radar.
Petroleum = gasoline-range hydrocarbons, diesel-range hydrocarbons, and/or motor oil range hydrocarbons.
ug/L = micrograms per liter.
UST = underground storage tank.

0 20
Feet

Data Sources

Aerial imagery obtained from Bing; property boundary obtained from Snohomish County.

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Path: X:\0_MFA_Projects\M1030\08\003\Pro\M1030_08_003_004.aprx\Fig 3-1 Soil Sample Locations and Exceedances
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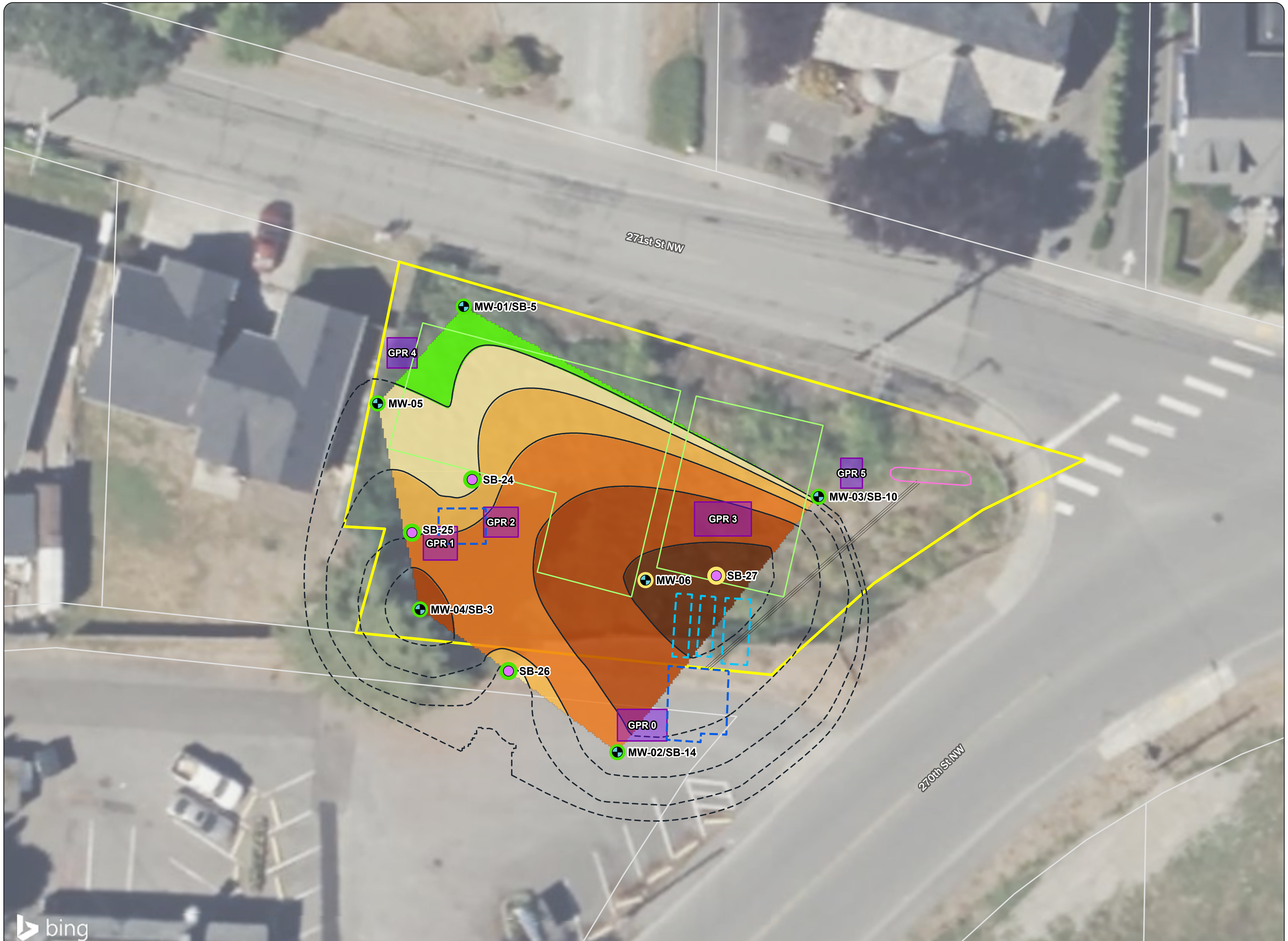
Reviewed By: cwise
Produced By: sturner
Project: M1030.08.003

Figure 3-2
October 2024 Groundwater Sample Locations and Exceedances

Raplee Property
Stanwood, Washington



Legend

- Reconnaissance Groundwater
- Monitoring Well

Benzene Exceedances

- Benzene not detected in groundwater
- Benzene detected above the CUL
- Approximate Existing UST (SAIC 2006)
- Former UST
- Former Building
- Former Service Island
- 2024 GPR Anomaly
- Isoconcentration Contour (Dashed Where Inferred)

Diesel + Motor Oil-Range Hydrocarbons (ug/L)

- 0 - 500
- 500 - 1,000
- 1,000 - 2,000
- 2,000 - 4,000
- 4,000 - 8,000
- 8,000 - 16,000
- Former Product Lines
- Property Parcel
- Tax Lot

Notes

All property feature locations are approximate.
Former property features obtained from previous reports (Pinnacle 2005; SAIC 2006).
There were no CUL exceedances of gasoline-range hydrocarbons, ethylbenzene, toluene, or xylenes.
CUL = MTCA Method A cleanup level.
GPR = ground penetrating radar.
ug/L = micrograms per liter.
UST = underground storage tank.

0 20
Feet

Data Sources
Aerial imagery obtained from Bing; property boundary obtained from Snohomish County.

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Path: X:\0_MFA_Projects\M1030\08\003\Pro\M1030_08_003_004.aprx\Fig 3-2 October 2024 Groundwater Sample Locations and Exceedances
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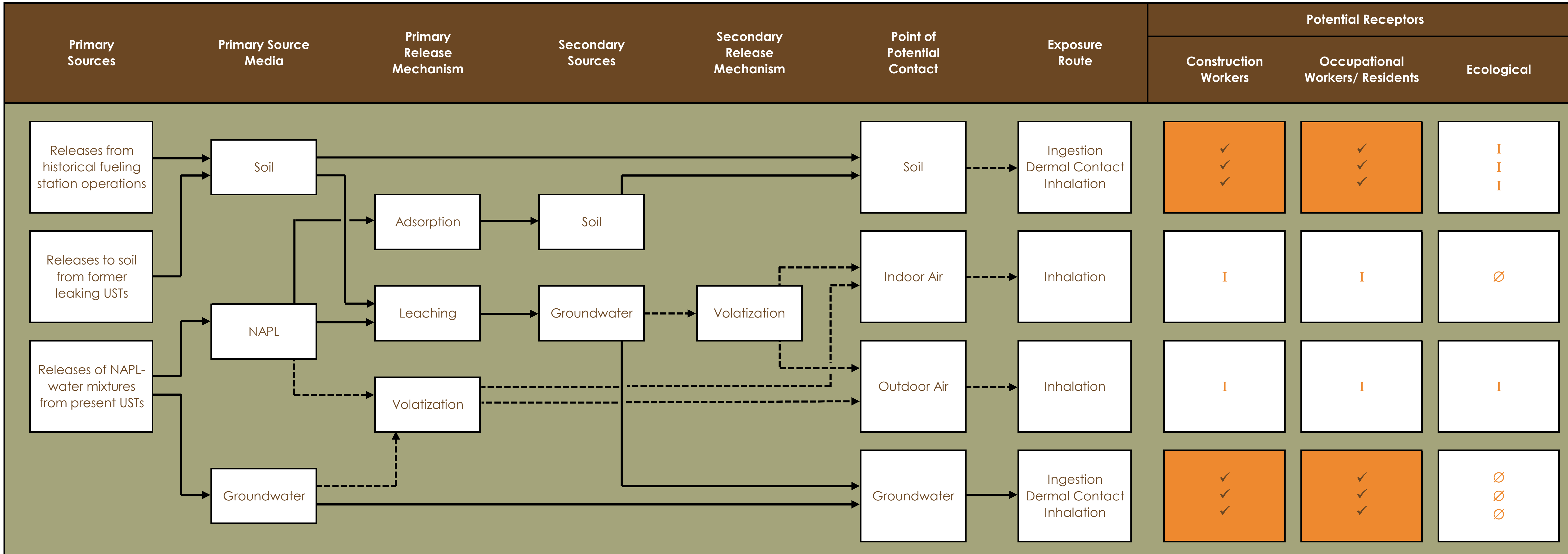
Figure 5-1
Conceptual Site Model
Raplee Property
City of Stanwood, Stanwood, Washington



Notes:

⟶ Primary pathway.

- - → Potential pathway.

✓ Potentially complete exposure route.

∅ Incomplete exposure route.

I Insignificant exposure route.

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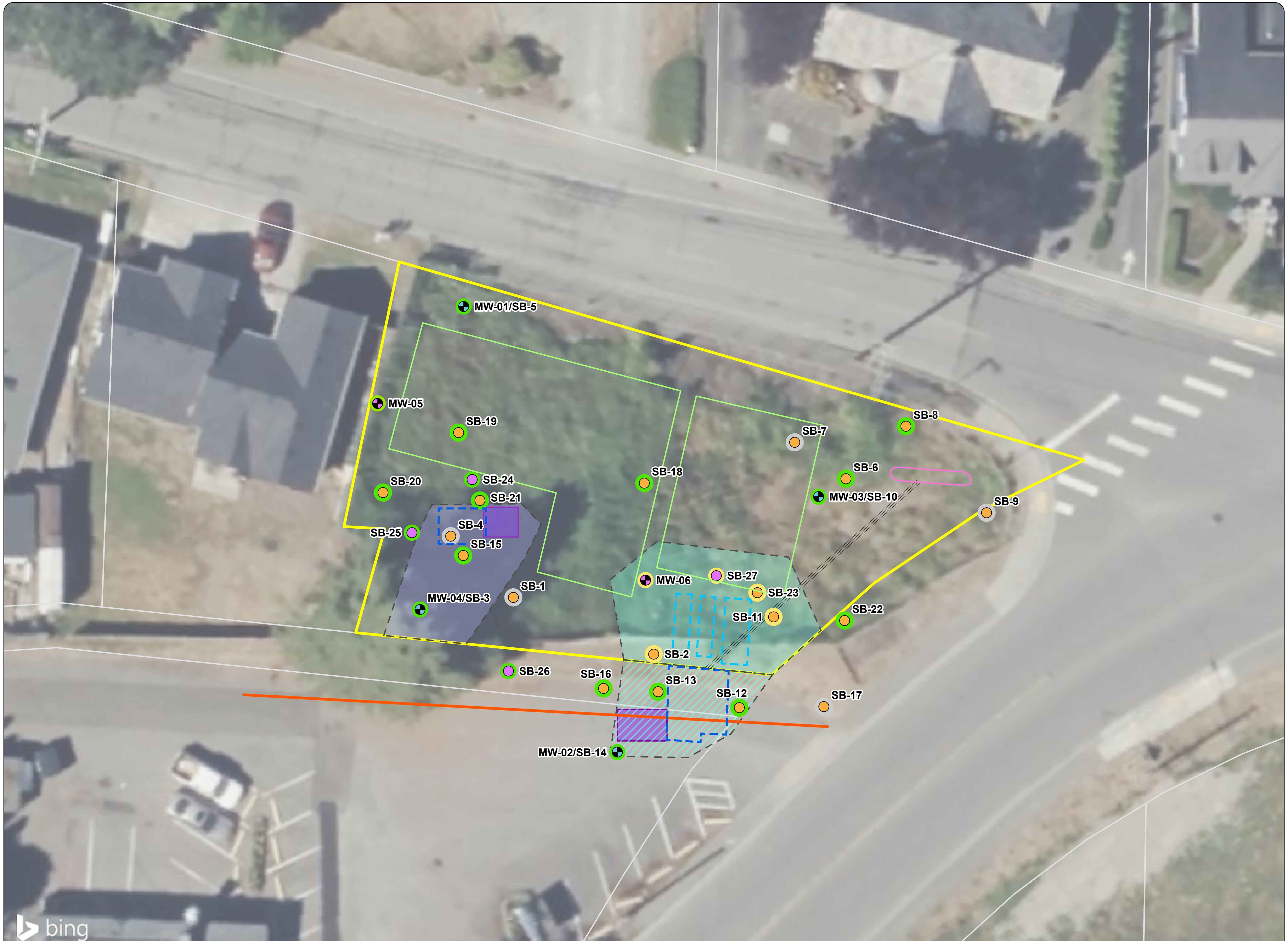
Reviewed By: cwise
Produced By: sturner
Project: M1030.08.003

Figure 6-1
Proposed Cleanup Action Areas

Raplee Property
Stanwood, Washington



Legend

- October 2024 Soil Boring
- October 2024 Monitoring Well Boring
- Historical Soil Boring
- Monitoring Well

Soil Exceedances

- Petroleum, BTEX, or lead non-detect or detected below the CUL.
- Petroleum, BTEX, or lead detected above the CUL.
- Soil sample not collected from boring.
- Proposed Southeast Excavation
- Proposed Southwest Excavation
- UST Decommissioning In-Place (Access Limited)
- 2024 UST GPR Anomaly
- Approximate Existing UST (SAIC 2006)
- Former UST
- Former Building
- Former Service Island
- Natural Gas Line
- Former Product Lines
- Property Parcel
- Tax Lot

Notes

All property feature locations are approximate.
Former property features obtained from previous reports (Pinnacle 2005; SAIC 2006).
BTEX = benzene, toluene, ethylbenzene, and xylenes.
CUL = MTCA Method A cleanup level.
GPR = ground penetrating radar.
Petroleum = gasoline-range hydrocarbons, diesel-range hydrocarbons, and/or motor oil range hydrocarbons.
UST = underground storage tank.

0 20
Feet

Data Sources
Aerial imagery obtained from Bing; property boundary obtained from Snohomish County.

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