HEARING EXAMINER
MEETING AGENDA

Online via Zoom and In Person at
Tumwater City Hall, Sunset Room, 555
Israel Rd. SW, Tumwater, WA 98501

Wednesday, June 22, 2022
7:00 PM

The Tumwater Hearing Examiner is an appointed official of the City, and rules upon land use and zoning matters. Within 10 business days of the conclusion of the hearing, the Examiner shall render a decision, including findings and conclusions. Questions on the operation and procedures of the Hearing Examiner may be directed to the Community Development Department at 360-754-4180.

1. Call to Order
2. Public Hearing
    a. Three Lakes Crossing Preliminary Plat and Preliminary Planned Unit Development (TUM-21-1885 and TUM-22-0036)
3. Adjourn

Meeting Information
All committee members will be attending remotely. The public is welcome to attend in person, by telephone or online via Zoom.

Attend In Person
Tumwater City Hall, Sunset Room, 555 Israel Rd SW, Tumwater, WA 98501

Watch Online
Go to http://www.zoom.us/join, and enter the Webinar ID: 874 9983 5788 and Passcode: 163752

Listen by Telephone
Call (253) 215-8782, listen for the prompts and enter the Webinar ID: 874 9983 5788 and Passcode: 163752.

The City of Tumwater Hearing Examiner will hear testimony from interested parties in person, via computer audio or by telephone by registering in advance to provide comment.

Public Comment – Register in advance for this webinar:
https://us02web.zoom.us/webinar/register/WN_DqtkoY33Ttm3FK7ObHtlSA

After registering, you will receive a confirmation email containing information about joining the webinar.

Written comments may be submitted to City of Tumwater, Community Development Department, 555 Israel Road SW, Tumwater, WA 98501, or by email at abaruch@ci.tumwater.wa.us or by fax at (360) 754-4138, and must be received by 6:00 p.m. on June 22, 2022.

Post Meeting
Audio of the meeting will be recorded and later available by request, please email

CityClerk@ci.tumwater.wa.us

Accommodations

The City of Tumwater takes pride in ensuring that people with disabilities are able to take part in, and benefit from, the range of public programs, services, and activities offered by the City. To request an accommodation or alternate format of communication, please contact the City Clerk by calling (360) 252-5488 or email CityClerk@ci.tumwater.wa.us. For vision or hearing impaired services, please contact the Washington State Relay Services at 7-1-1 or 1-(800)-833-6384. To contact the City's ADA Coordinator directly, call (360) 754-4128 or email ADACoordinator@ci.tumwater.wa.us.

TO: City of Tumwater Hearing Examiner

FROM: Alex Baruch, Associate Planner

DATE: June 14, 2022

SUBJECT: Three Lakes Crossing Preliminary Plat and Preliminary Planned Unit Development (TUM-21-1885 and TUM-22-0036)

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1) Recommended Action:
Staff recommends the preliminary plat and preliminary planned unit development be approved, subject to conditions of approval outlined in this staff report.

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2) Background:
Applicant requests preliminary plat and planned unit development to subdivide 9.68 acres into 45 single-family lots, three open space and tree tracts, one storm/open space/active/passive recreation/tree retention tract, one active recreation tract, two private share access tracts and a wetland buffer tract.

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3) Alternatives:

- ❑ Approve Case No. TUM-21-1885 and TUM-22-0036
- ❑ Approve Case No. TUM-21-1885 and TUM-22-0036 with additional conditions
- ❑ Deny Case No. TUM-21-1885 and TUM-22-0036
- ❑ Remand Case No. TUM-21-1885 and TUM-22-0036 to staff for further analysis

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4) Attachments:

Exhibit 1 Staff Report
Exhibit 2 Plat Map
Exhibit 3 Vicinity Map
Exhibit 4 MDNS w/attachments
Exhibit 5 Public Hearing Notice
Exhibit 6 Applications & Narrative
Exhibit 7 Notice of Application
Exhibit 8 Zoning Map
Exhibit 9 Public Notice Certification
Exhibit 10 Notice of Application Comments
Exhibit 11 Concurrency Ruling
Exhibit 12 SEPA Comments
Exhibit 13 Forestry Plan
Exhibit 14 Critical Areas Report
Exhibit 15 Gopher Report
Exhibit 16 Traffic Impact Analysis and Traffic Queuing Report
Exhibit 17 DAHP Cultural Resource Study Acceptance Letter
Exhibit 18 Geotech Report

EXHIBIT 1

CITY OF TUMWATER
HEARING EXAMINER STAFF REPORT
Hearing Date: June 22, 2022

Project Name: Three Lakes Crossing Preliminary Plat & Planned Unit Development

Case Number: TUM-21-1895 and TUM-22-0036

Applicant: Evan Mann Copper Ridge, LLC
PO BOX 73790, Puyallup, WA 98373

Representative: Sheri Greene, AHBL
2215 N. 30th Street #300, Tacoma, WA 98403

Type of Action Requested: The applicant is requesting preliminary plat and planned unit development approvals to subdivide 9.68 acres into 45 single-family lots, three open space and tree tracts, one storm/open space/active/passive recreation/tree retention tract, one active recreation tract, two private shared access tracts and a wetland buffer tract. (Exhibit 2).

Project Location: The property is located at 6609, 6715 and an unaddressed parcel on Henderson Blvd, Tumwater, WA 98501. Section 02, Township 17, Range 2W Q NE SE. Parcel Numbers 12701320105, 79300000100 and 79300000101 (Exhibit 3).

SEPA Determination: Pursuant to the State Environmental Policy Act, the City of Tumwater Community Development Department, after review of a SEPA environmental checklist and other information, issued a Mitigated Determination of Non-significance on May 13, 2022 (Exhibit 4).

Public Notification: Public notification for the June 22, 2022 public hearing was mailed to property owners within 300 feet of the subject property and various agencies, posted on-site and published in *The Olympian* on Thursday, June 9, 2022, in conformance with Tumwater Municipal Code (TMC) 14.06 (Exhibit 5).

Staff Recommendation: Approval, subject to conditions identified at the end of the staff report.

Staff Planner: Alex Baruch, Associate Planner
Phone: 360-754-4180
E-Mail: abaruch@ci.tumwater.wa.us

I. BACKGROUND INFORMATION

Application and Review Process

The Preliminary Plat and Planned Unit Development application was submitted on December 16, 2021. The applications were deemed complete on January 11, 2022 (Exhibits 6 & 7).

Under TMC 2.58.090, review authority for Preliminary Plat and Planned Unit Development applications fall under the purview of the Hearing Examiner.

Existing Conditions

The site is relatively flat and slopes down on the western portion of the property. There is a wetland buffer in the southern portion of the site. The existing home, business and miscellaneous outbuildings located on the property will be demolished.

The site is mostly surrounded by residential zoned property with the exception of one property to the south that is zoned Neighborhood Commercial. The property to the north is zoned Multifamily Medium. The parcels to the east, west and south west are zoned Single Family Low Density with a portion of those properties being developed as the Tumwater Boulevard Plat. The area is developed with a mixture of newer subdivisions that were approved in the County and are finishing up the site development/final plat process, older residential uses, small businesses and undeveloped parcels. There is a wetland located on the parcel to the south of the site (Exhibits 2).

Project Description

The proposal is to subdivide 9.68 acres into 45 single-family lots, three open space and tree tracts, one storm/open space/active/passive recreation/tree retention tract, one active recreation tract, two private shared access tracts and a wetland buffer tract.

Improvements will include grading for a public roads and lot pads, construction of approximately 680 lineal feet of frontage improvements on Henderson Boulevard and the intersection of 68th Ave SE.

Improvements include the extension of City water and sewer utilities to serve the project, storm water systems to treat and detain/retain storm water generated from new pollution generating impervious surfaces, street lighting and extension of private utilities (i.e. power, gas, cable and telephone)

The proposal includes the continuation of 68th Ave SE through the subdivision to

connect with the Tumwater Boulevard Plat improvements to complete the connection from Henderson Boulevard to Tumwater Boulevard (Exhibit 2).

Water and sewer will be provided by the City of Tumwater, electricity and natural gas by Puget Sound Energy, telephone and cable by Comcast and CenturyLink, and garbage collection by Pacific Disposal. All utilities on-site will be underground pursuant to Tumwater Municipal Code (TMC) 17.12.200.

II. REGULATORY FRAMEWORK

The proposal is subject to the following policies and regulations:

Comprehensive Plan

The site is located in Bush Prairie Neighborhood as designated by the City's Comprehensive Plan.

The land use designation for the 9.68 acre site is Single-Family Low Density Residential (SFL) and Single-Family Medium (SFM) Density. The Single-Family Low Density Residential zone allows a density of 4 to 7 units per acre, with transfer of development rights required for more than 6 and the Single-Family Medium Density Residential zone allows a density of 6 to 9 units per acre with transfer of development rights required for more than 8 units per acre..

Staff Response and Recommended Finding:

The overall density of the project with 45 lots meets the density for each district without the need for a transfer of development rights. For the SFL zoned property 6 dwelling units per acre is proposed and for the SFM zoned property 8 dwelling units per acre is proposed.

Staff finds that the preliminary plat is in compliance with the intent and densities allowed in the comprehensive plan.

Tumwater Parks and Recreation Plan

The Parks and Recreation element of the Tumwater Comprehensive Plan does not identify any neighborhood or community parks at this location. The developer must set aside the required amount of open space to meet the recreational needs of the future residents of the subdivision.

Staff Response and Recommended Finding:

The proposed open space area for the subdivision is .97 acres. This amounts to 10 percent of the gross site area. The amount of open space provided for the project meets the minimum open space set aside requirement of the Land Division Ordinance.

Park impact fees are required for new residential development and paid at building

permit issuance.

Staff finds that with the payment of park impact fees for each single-family residence proposed in the subdivision and setting the minimum amount of private open space with both passive and active recreation elements the project is consistent with the Comprehensive Parks Plan.

Tumwater Transportation Plan
The Tumwater Transportation Plan contemplates a modernized network of streets, sidewalks and bicycle routes. The Transportation Plan anticipates that such facilities will be provided through a combination of development-related improvements and City improvements funded by impact fees, grants, SEPA based mitigation fees, and general funds. The motorized Level of Service (LOS) standard for Henderson Boulevard and the project access is LOS-D and is projected to be at a LOS-D after project buildout.

Staff Response and Recommended Finding:
Staff finds that the proposed preliminary plat is consistent with the Tumwater Transportation Plan, if the new intersection, frontage improvements and internal roadways are constructed in accordance with the Tumwater Development Guide.

Thurston Regional Trail Plan
The City of Tumwater is a participating member of the Thurston Regional Planning Council (TRPC). TRPC adopted the Thurston Regional Trail Plan in December 2007.

The Regional Trails Plan defines a trail network blueprint and a set of guidelines and recommendations for all of Thurston County and its cities, towns and communities. The Goals and Policies section of the Plan serves to link local trail planning efforts within the broader context of planning the regional transportation network. The plan charts a systematic path creating interconnected corridors that improve access to community destinations.

Staff Response and Recommended Finding:
The project site is not affected by the regional trail network outlined in the Thurston Regional Trail Plan.

Staff finds that approval of the project will not affect implementation of the Thurston Regional Trail Plan.

Sustainable Development Plan for Thurston Region
The Plan indicates that the regional community has set a target to reduce vehicle miles traveled and to preserve sensitive areas, farmland, forest land, prairies and rural lands.

The Plan has a target goal stating that by 2035, 72 percent of all (new and existing) households in our cities, towns, and unincorporated growth areas will be within a half-mile (comparable to a 20-minute walk) of an urban center, corridor, or neighborhood center with access to goods and services to meet some of their daily needs.

The site is located more than a half-mile from an urban center, however is located in area designated for residential growth. The Plan also includes a goal of preserving environmentally sensitive lands, farmlands, forest lands, prairies, and rural lands and develop compact urban areas.

The project meets this this goal by providing compact development in the urban area, and protecting environmentally sensitive lands.

Staff finds the project is consistent with the Sustainable Development Plan for Thurston Region.

Hearing Examiner TMC 2.58
The Hearing Examiner has the authority to review Preliminary Plat requests.

Staff Response and Recommended Finding:
Preliminary Plats require a public hearing and decision by the Tumwater Hearing Examiner.

Tumwater Municipal Code TMC 14.06 – Public Notice Requirements
TMC Chapter 14.06 requires the City to provide public notification of certain application types by issuing a Notice of Application (TMC 14.06.010) and a Notice of Open Record Hearing. (TMC 14.06.070).

Staff Response and Recommended Finding:
The application was deemed complete on January 11, 2022. Public notice for the application indicating that the application was submitted and deemed complete was mailed to property owners within 300 feet of the subject property, affected agencies, posted on-site, and published in the Olympian on January 18, 2022 (Exhibits 7 & 9).

Public notice for the June 22, 2022 open record hearing was mailed to property owners within 300 feet of the subject property, affected agencies, posted on-site on; and published in The Olympian on June 9, 2022 (Exhibit 5).

COMMENTS FROM OTHER AGENCIES/CITIZENS:

Several comments were received from the Notice of Application (Exhibit 10).

Comment from the Squaxin Island Tribe and Nisqually Indian Tribe requested a

Cultural Resource Survey.

Staff comment: Cultural Resource Survey Completed.

Comments from surrounding community members (Bryon Agan and Robert Kondrat) have a similar theme with concern for increased traffic, safety and natural habitat/wetland.

Staff comment on similar concerns;

Transportation; the project was reviewed by our Transportation Manager who provided a concurrency ruling. Impacts from this development are mitigated by the applicant completing frontage improvements and off-site improvements including the intersection upgrade to Henderson Boulevard and 68th Ave SE. Trips are disbursed north or south on Henderson Boulevard and west on Tumwater Boulevard. Additionally, a through connection to Tumwater Boulevard through the Tumwater Boulevard plat will be available once the connection is completed.

The wetland buffer on site has been delineated, and all development is located outside appropriate buffer. Water runoff from new impervious surfaces will be treated, detained and released onsite. A gopher report showed no evidence of gophers on this site. The Growth Management Act requires development within Cities to meet specific density requirements, which protect lands outside the city for agriculture and resource land, which also provides wildlife habitat. The surrounding area is zoned at a similar or lower density.

Comment from Robert Kondrat expressing concern for tree cutting and notice regulations.

Staff comment: The applicant provided a tree mitigation plan that retains 10 trees. An additional 210 trees will be planted within designated open spaces and street trees.

Staff added the community member to the public notification list for this project moving forward once this comment was received. The community member was provided with the SEPA determination and public hearing notice. There is not a way for staff to notify residents of projects going on in a specific area of the City, we ask interested residents to review the Development Review Committee proposals from time to time to see what projects are being brought forward for review and provide us with comment if they have questions.

Transportation Concurrency TMC 15.48

In accordance with TMC 15.48, the City's Transportation Manager issued a transportation concurrency ruling for the project on February 8, 2022. The concurrency ruling indicates that the project meets concurrency with conditions. These include payment of transportation impact fee, construction of frontage improvements and

adjacent street connections, mitigation fees for trips generated to the Tumwater Boulevard/I-5 Interchange, and new intersection improvements at 68th Ave SE and Henderson Boulevard SE (Exhibit 11).

Staff Response and Recommended Finding:
Staff finds that, as conditioned, the project passes the City of Tumwater's concurrency test.

Tumwater Environment Code Title 16
Environmental Policy: The City of Tumwater Community Development Department reviewed a SEPA Environmental Checklist and other information submitted by the applicant and issued a Mitigated Determination of Non-significance (MDNS) on May 9, 2022 (Exhibit 4).

The MDNS was posted on-site, mailed to property owners within 300 feet of the subject property and agencies, and published in "The Olympian" newspaper on May 13, 2022 (Exhibit 9).

The MDNS includes traffic mitigation fees for trips generated to the Tumwater Boulevard/I-5 Interchange and intersection improvements to 68th Ave SE and Henderson Boulevard.

Staff Response and Recommended Finding:
The City's SEPA threshold determination was issued on May 13, 2022. No appeals of the SEPA threshold determination were filed.

COMMENTS FROM OTHER AGENCIES/CITIZENS:

Two comments were received from the Mitigated Determination of Non-significance (Exhibit 12).

Comment from the Squaxin Island Tribe and Nisqually Indian Tribe requested a Cultural Resource Survey.

Staff comment: Cultural Resource Survey Completed. An inadvertent discovery plan is required as part of Site Development/Grading.

Comment from Bryon Agan expressed concern for traffic safety on Henderson Boulevard and lacking data in the transportation impact analysis.

Staff comment: Staff responded to the community member's questions stating that the traffic study does show mitigated safety concerns per the requirements outlined by the Transportation and Engineering Department. Additionally, the PM trips on Henderson Boulevard turning left into the development is shown on figure 4, page 12 of the traffic impact analysis (Exhibit 16).

Tree Protection: A Tree Replacement Plan dated March 24, 2022 indicates 368 trees are located on site, of which 10 trees are proposed to be retained. This number is less than the "12 trees per acre" retention of 80 required by TMC 16.08.070. The applicant is unable to retain trees due to infrastructure requirements, and proposes to plant trees at a 3-to-1 ratio as provided in Chapter 16.08.070, resulting in 210 trees planted (Exhibit 13).

Staff Response and Recommended Finding:
TMC 16.08.070(R) requires that if tree retention cannot be achieved due to compliance with applicable zoning and development regulations, replacement trees shall be planted at a three-to-one ratio.

Staff finds that the planting of 210 additional trees meets the requirements of TMC 16.08.070(R).

Wetlands:
A Critical Areas Report dated September 15, 2021 was submitted for the project. The report investigated one wetland on 6911 Henderson Boulevard to the south of the subject property. Wetland "A" located on the adjacent property is considered a category III wetland. Wetland "A" requires a 150 foot buffer. There is no request to reduce the buffer. (Exhibit 14)

Staff Response and Recommended Finding:
Staff finds that the proposal is consistent with the wetland protection ordinance for the City of Tumwater. Wetland information and notations required by code must be identified on the final plat drawing and/or specified in the covenants, to assure that the land subject to wetland restrictions are guaranteed in perpetuity. In addition, wetland signage must be provided along the buffer boundary in accordance with TMC 16.28.

Fish and Wildlife Habitat Protection:
TMC Chapter 16.32 regulates fish and wildlife habitat and species.

Staff Response and Recommended Finding: *The geographic area of the subject property has soils preferred by the Mazama Pocket Gopher. The Gopher is listed as a protected species under both Washington State and Federal threatened and endangered species lists.*

A Mazama Pocket Gopher report dated September 28, 2021 concludes that no gopher mounds were observed on the subject property (Exhibit 15).

Cultural Resources:
The Squaxin Island Tribe requested a cultural resource survey as the WISAARD map by the Department of Archaeology & Historic Preservation shows the site as high risk of archeological resources.

Staff Response and Recommended Finding:

A Cultural Resource Assessment dated April 15, 2022 recommends compliance with a standard inadvertent discovery plan. The Department of Archeology & Historic Preservation concurs (Exhibit 17).

Tumwater Subdivision Code Title 17
The preliminary plat process requires consideration by the Hearing Examiner of all relevant evidence in order to determine approval or disapproval of the preliminary plat. The preliminary plat must be submitted in conformance with TMC 17.12 and TMC 17.14. All required improvements must either be installed or an agreement accompanied by a bond or other approved surety shall be entered into between the City and the applicant before Final Plat approval can be granted.

Staff Response and Recommended Finding:
Staff finds that the preliminary plat has been submitted in accordance with the Chapter 17.12 to include compliance with general design standards such as; lot size, protect wetlands and natural drainage, streets designed in accordance with adopted development standards, utilities installed underground, and provisions for open space.

Tumwater Zoning Code Single-Family Low Density (SFL) residential zone district TMC 18.10.
Single-family detached dwelling units are allowed at a minimum density of 4 dwelling units per acre and a maximum of 7 dwelling units per acre, with transfer of development rights required for more than 6 units per acre. Minimum lot size is 3,200 sq. ft., and minimum lot width is 50 feet, except for alley load, which reduces the lot width to 40 feet. Lots adjacent to a wetland or wetland buffer shall be encouraged to be as large as possible. Maximum building height is 35 feet.

Front yard setbacks are 10 feet, side yard is 5 feet, and rear yard is 20 feet.

Minimum open space requirement is 10 percent of total land area.

Staff Response and Recommended Finding:
The intended use for each lot within the proposed subdivision is for one single-family detached dwelling unit. Density is 6 dwelling units per acre. The smallest lot-size is 3,998 square feet. Lot widths are minimum 50 feet, with 40 foot width for alley load lots. Open space meets the minimum requirements. The homes will need to meet the

Single Family Design Guideline requirements per 18.43.010. The plat is consistent with the SFL zone district.

Tumwater Zoning Code Single-Family Medium Density (SML) residential zone district TMC 18.12.
Single-family detached dwelling units are allowed at a minimum density of 6 dwelling units per acre and a maximum of 9 dwelling units per acre, with transfer of development rights required for more than 8 units per acre. Minimum lot size is 3,200 sq. ft., and minimum lot width is 50 feet, except for alley load, which reduces the lot width to 40 feet. Lots adjacent to a wetland or wetland buffer shall be encouraged to be as large as possible. Maximum building height is 35 feet.

Front yard setbacks are 10 feet, side yard is 5 feet, and rear yard is 20 feet.

Minimum open space requirement is 10 percent of total land area.

Staff Response and Recommended Finding:
The intended use for each lot within the proposed subdivision is for one single-family detached dwelling unit. Density is 8 dwelling units per acre. The smallest lot-size is 3,998 square feet. Lot widths are minimum 50 feet, with 40 foot width for alley load lots. Open space meets the minimum requirements. The homes will need to meet the Single Family Design Guideline requirements per 18.43.010. The plat is consistent with the SFM zone district.

Aquifer Protection Overlay (AQP) zone district - TMC 18.39 – Restricted Land Uses
The AQP zone restricts hazardous uses to protect aquifer recharge areas.
Staff Response and Recommended Finding:
The intent of the aquifer protection (AQP) overlay zone district is to identify, classify and protect vulnerable and/or critical aquifer recharge areas within the city and urban growth area. Protection is to be accomplished by controlling the use and handling of hazardous substances. The proposed residential subdivision is not a restricted land use in the AQP overlay.

Planned Unit Development - TMC 18.36.

The intent of the Planned Unit Development (PUD) overlay is to encourage development by encouraging flexibility for more efficient use of land.

Staff Response and Recommended Finding: *An application for a Preliminary Planned Unit Development accompanied the Preliminary Plat application for this project and was submitted on December 16, 2021. The application was deemed complete on January 11, 2022. Under TMC 2.58.090, review authority for Planned Unit Development applications fall under the purview of the Hearing Examiner.*

The PUD application was submitted to seek relief from the minimum lot widths. 26 of the 45 proposed lots are less than the prescriptive requirement of 50 feet wide, not adjacent to an alley.

According to TMC 18.36.050, the Hearing Examiner's decision to approve or deny the development shall be based on at least, but not limited to, the following criteria:

A. Substantial conformance to the Tumwater comprehensive plan;
B. The proposal's harmony with the surrounding area or its potential future use; and
C. The adequacy of the size of the proposed overlay to accommodate the contemplated developments.

As discussed above, Staff finds that:

- *This proposal is in conformance with the Tumwater Comprehensive Plan.*
- *This proposal is consistent with surrounding residential development at urban densities.*
- *This proposal complies with the densities allowed in the SFL and SFM zoning districts.*

In accordance with TMC 18.36, a planned unit development shall be exempt from the minimum zoning ordinance requirements, as listed at TMC 18.36.080, except as provided for below:

A. Minimum Project Size: There is no minimum project size for a planned unit development.
B. Project Densities: Densities established by the underlying zone district shall prevail.
C. Setbacks: Project setbacks as required by the underlying zoning district shall prevail on all perimeter boundary lines.
D. Land Coverage: Maximum land coverage as established by the underlying zone district may be exceeded by no more than 25 percent.
E. Uses Allowed: The use of the development shall be limited to those allowed either as permitted, accessory, or conditional uses in the underlying zones.
F. Open Space/Park: The open space/park dedication requirements of the underlying zoning district shall prevail.

IV. STAFF ANALYSES:

As per Section 17.14.040 of the Tumwater Municipal Code, the Hearing Examiner is required to review the preliminary plat based on certain criteria and prepare findings of fact.

Staff analyses is as follows:

1. The preliminary plat, as conditioned, conforms to the subdivision regulations, comprehensive plan, zoning ordinance, wetland ordinance, fish and wildlife habitat protection ordinance, tree protection ordinance, and to planning standards, development standards, specifications and policies of the City of Tumwater.

2. Adequate provisions have been made for public health, safety, and general welfare for such open spaces, drainage ways, streets, sanitary wastes, parks and recreation, schools, sidewalks, and, that the public use and interest will be served by the subdivision of the property.

III. RECOMMENDATION

Pursuant to TMC 2.58.110, staff recommends approval of the Preliminary Plat and Planned Unit Development requests described herein with the following conditions:

1. Storm water from impervious surfaces associated with the project shall be managed in accordance with the City of Tumwater 2018 Storm Drainage Manual.

2. Erosion and sediment control measures that comply with the City of Tumwater 2018 Storm Drainage Manual shall be implemented during construction of the project to prevent sediment laden runoff from entering surface waters.

3. A Site Development/Grading Permit shall be obtained from the City for grading, street, sidewalk and utility construction, tree removal and construction of storm drainage facilities.

4. Should contaminated soils be encountered during construction, all of the following shall apply:

    a. Construction activity shall be immediately suspended;
    b. The contractor shall immediately notify the Washington State Department of Ecology;
    c. Contaminated materials shall be properly handled, characterized, and disposed of consistent with applicable regulations.

5. Should archeological artifacts be encountered during construction, all of the following shall apply:

    a. Construction activity shall be immediately suspended;
    b. The contractor shall immediately notify the City of Tumwater Community Development Department;
    c. The contractor shall immediately notify the Washington State Department of Archeology and Historic Preservation; and

d. The contractor shall immediately notify potentially affected tribal nations including, but not limited, to the Squaxin Island Tribe, Chehalis Tribe and Nisqually Tribe.

6. Fill for the project shall be clean material, void of solid waste or organic debris.

7. Disposal of construction debris and overburden associated with construction and grading activity that is not suitable for fill is required to be disposed of at an approved location.

8. The applicant shall secure a National Pollutant Discharge Elimination System (NPDES) Construction Storm Water General Permit from the Washington State Department of Ecology.

9. Street frontage improvements including curb and gutter, sidewalk, landscape strip, bike lane, street illumination and storm drainage facilities complying with the design requirements of the Tumwater Development Guide shall be constructed along the property frontage on Henderson Boulevard. Adequate right-of-way shall be dedicated to contain the improvements.

10. The 68th Ave SE improvements shown on the site plan shall be shown on the site development grading plan submittal and constructed prior to final plat approval.

11. Full lane overlays are required after patching. Additional improvements might be required on the opposing frontage, such as widening, realigning the crown to centerline of right-of-way or feathering to meet City of Tumwater standards. All accesses will meet city standards.

12. The City's water and sewer utilities shall be extended to serve the needs of the subdivision. The utility extensions shall be in accordance with the Tumwater Development Guide requirements in place at the time the preliminary plat application was vested. All necessary right-of-way and/or easement will need to be dedicated.

13. A 16" water main is required in Henderson Boulevard.

14. The project must meet minimum fire flow requirement. If the required fire flow cannot be achieved, residential fire sprinklers shall be required in the dwelling units.

15. A separate permit and engineered design is required for any retaining walls on-site if the height of the wall is over 4 feet measured from the bottom of the footing or if the wall is supporting a surcharge.

16. A final geotechnical engineering report shall be submitted for the grading and site work. The report shall include conclusions and recommendations for grading procedures, soil design criteria for structures or embankments required to accomplish the proposed grading and recommendations and conclusions regarding the site geology.

    a. All grading and filling work shall be conducted in accordance with the approved geotechnical report. Compaction testing of the soils under the building foundations and utility trenches shall be verified by the geotechnical engineer of record and the Washington Association of Building Officials (WABO) registered special inspection agency and inspectors.

17. Fire hydrants shall be provided at all intersections and at approximately 600-foot spacing along the internal streets.

18. Demolition permits are required to be issued by the City prior to removal of existing structures on the property. A separate permit is required for each structure.

19. A demolition permit is required to be issued by the Olympic Region Clean Air Agency for each structure proposed to be removed from the property. Olympic Region Clean Air Agency (ORCAA) regulations require an asbestos survey for all demolition projects. Prior to any demolition project, the following must be completed:
    a. A good faith asbestos survey must be conducted on the structure by a certified Asbestos Hazardous Emergency Response Act (AHERA) building inspector;
    b. If asbestos is found during the survey, an Asbestos Removal Notification must be completed and all asbestos-containing material must be properly removed prior to the demolition; and,
    c. If the structure is larger than 120 sq. ft., a Demolition Notification must be submitted regardless of the results of the asbestos survey.

20. All water wells on the site shall be abandoned in accordance with Washington State Department of Ecology requirements. A permit from the Department of Ecology shall be obtained for each well to be abandoned.

21. All septic systems on the property shall be abandoned in accordance with Thurston County Environmental Health requirements. A permit shall be obtained from Thurston County Environmental Health for each separate system that will be abandoned.

22. The project proponent shall be responsible for providing the City with all costs associated with the installation of water, sewer, street and storm drainage systems that are dedicated to the City of Tumwater.

23. All engineering designs and construction will need to be in accordance with the City of Tumwater's Development Guide and WSDOT standards.

24. All street construction, utility installation and storm drainage work requires engineered plans certified by a professional engineer licensed to practice in the State of Washington. The plans shall be submitted for review and approval by the City.

25. Any public or private utility relocation necessary to construct the project is the sole responsibility of the project proponent.

26. The applicant is required to submit a performance surety and surety agreement prior to release of the Site Development/Grading Permit to ensure successful completion of the required public improvements. The amount of the surety shall be 150% of the proponent engineer's estimate of completing the required public improvements.

27. The applicant shall be responsible for the maintenance and timely repair of all public improvements for a period of 30 months following final certification by the City and shall submit a surety and surety agreement for maintenance equal in value to fifteen (15) percent of the total value of the required public improvements certified by the Public Works Director.

28. Maintenance of the on-site storm water system will be the responsibility of the project proponent, their successors or assigns. A storm water maintenance agreement will be recorded against the property prior to or concurrent with final plat approval.

29. Back flow prevention is required on all irrigation services in accordance with the AWWA Cross Connection Control Manual.

30. A landscape and irrigation plan must be submitted with Site Development and Grading Permit application for the proposed street planter strips, proposed open space tracts and the storm water facilities showing proposed plantings, tree types and heights, and other vegetation. Street trees are required to be installed along Henderson Boulevard and the proposed interior public streets in accordance with the Tumwater Development Guide and Comprehensive Street Tree Plan.

31. Each residential lot shall have a building site no less than 3,200 square feet in area within which a suitable building can be built and served by utilities and vehicular

access unless dedicated or restricted by covenant for open space, park, recreation or other public use.

32. The maximum lot-coverage for impervious surface shall be 60 percent of the total lot area unless using provisions within the PUD to increase the amount up to 25% (maximum 75% impervious surface).

33. Two off-street parking spaces are required for each lot. Driveways shall be a minimum of 18 feet in length and shall be hard surface such as concrete or pavement.

34. Residences must provide pathway from building entry to sidewalk separate from the driveway, provide weather protection at entries and at least 8 percent of front facade shall include transparent windows or doors.

35. Where lots abut an alley, the garage must take access from the alley.

36. Garages must be set back from the public street at least 5' further than the enclosed portion of the house, and garage doors shall occupy no more than 50 percent of the ground-level façade facing the street.

37. Impact fees for traffic, community parks, and schools will be assessed to each dwelling unit in the subdivision as building permits are issued. The impact fees will be in accordance with the most current fee resolution adopted by the City at the time of vesting of the building permit applications.

38. An integrated pest management plan approved by the Thurston County Environmental Health must be submitted prior to final plat approval.

39. All legal descriptions on documents submitted to the City must be accompanied with an appropriate drawing that the City can use to verify the legal description.

40. The Professional Land Surveyor responsible for the surveying of the project must obtain a permit from Department of Natural Resources before any existing survey monuments are disturbed.

41. The applicant must provide and maintain a current Plat Name Reservation Certificate approved by the Thurston County Auditor.

42. Property taxes must be paid in full for the current year, including any advance and delinquent taxes, before a Final Plat can be recorded.

43. In order to comply with the City's Tree Protection and Replacement Standards, a minimum of 210 replacement trees must be planted on the site. Replacement trees

must be planted in proposed tree protection open spaces, prior to other placement on site. The size of the tree protection open space area(s) associated with the project is required to be a minimum of 5% of the buildable area of the site.

44. The following condition will be required to be noted on the Final Plat:
    a. All landscaped areas in public rights-of-way shall be maintained by the owner and his/her successor(s) and may be reduced or eliminated if deemed necessary for or detrimental to City road purposes.

45. A Homeowners Association is required. Prior to final plat approval, the project proponent shall supply the city with copies of the grantee organization's articles of incorporation and bylaws, and with evidence of a binding commitment to convey. The articles of incorporation shall provide that membership in the organization shall be appurtenant to ownership of land in the land division; that the corporation is empowered to assess such land for costs of construction and maintenance of the improvements and property owned by the corporation, and that such assessments shall be in lien upon the land.

Submitted on Behalf Of the Community Development Department by/ Staff Contact:

Alex Baruch, Associate Planner
Phone: 360-754-4180
E-mail: abaruch@ci.tumwater.wa.us

Report Issue Date: June 15, 2022

List of Exhibits:

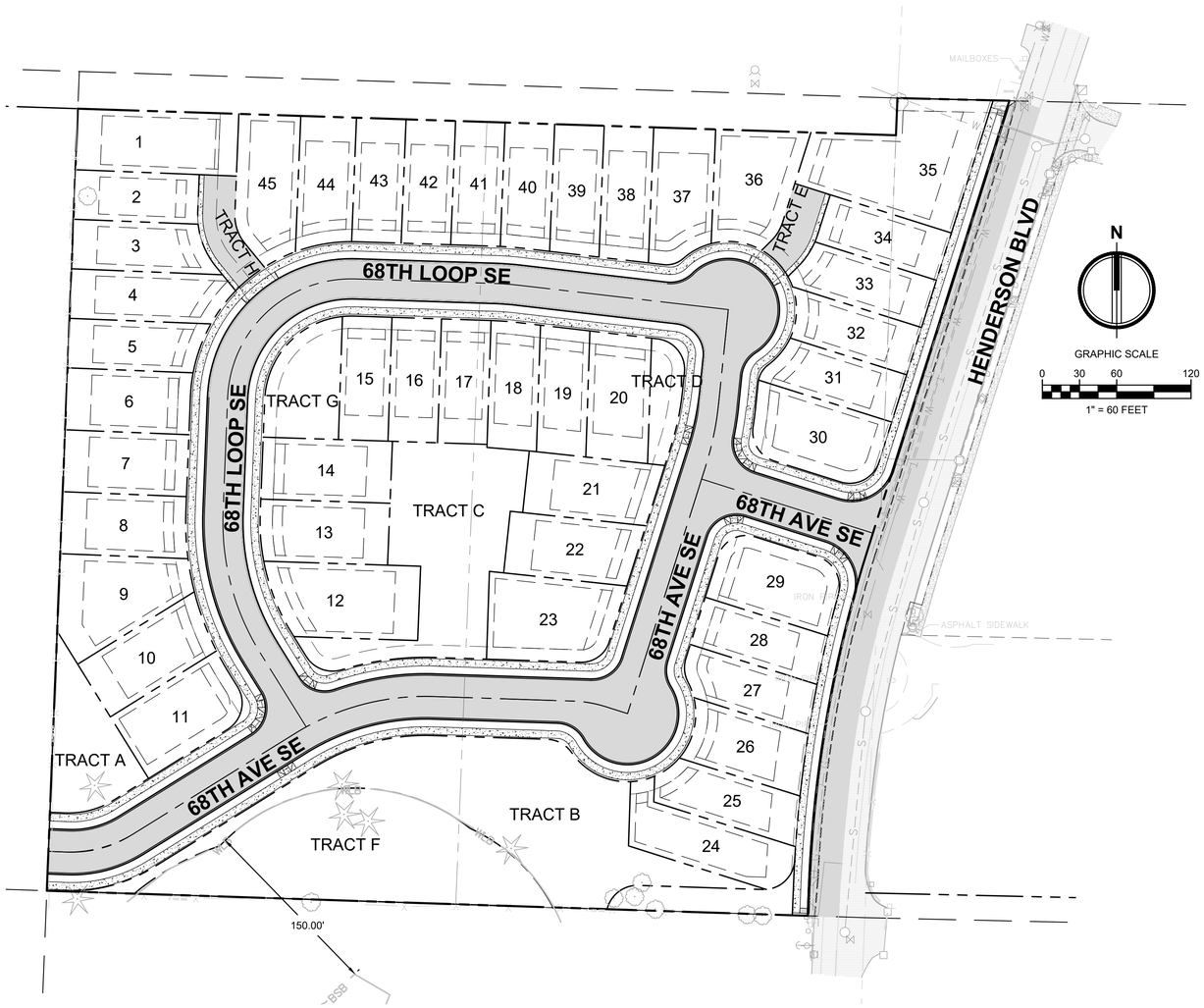
Exhibit 1 Staff Report
Exhibit 2 Plat Map
Exhibit 3 Vicinity Map
Exhibit 4 MDNS w/attachments
Exhibit 5 Public Hearing Notice
Exhibit 6 Applications & Narrative
Exhibit 7 Notice of Application
Exhibit 8 Zoning Map
Exhibit 9 Public Notice Certification
Exhibit 10 Notice of Application Comments
Exhibit 11 Concurrency Ruling
Exhibit 12 SEPA Comments
Exhibit 13 Forestry Plan

Exhibit 14 Critical Areas Report
Exhibit 15 Gopher Report
Exhibit 16 Traffic Impact Analysis and Traffic Queuing Report
Exhibit 17 DAHP Cultural Resource Study Acceptance Letter
Exhibit 18 Geotech Report

Know what's below. Call before you dig.

THREE LAKES PRELIMINARY PLAT AND PUD

A PORTION OF THE NE 1/4 OF THE SE 1/4 OF SEC. 2 & THE NW 1/4 OF THE SW 1/4 OF SEC.1 , TWN. 17 N., RGE. 1 W. W.M.
CITY OF TUMWATER, THURSTON COUNTY, WASHINGTON.



PROJECT SITE
SCALE 1"=60'

DEVELOPER
COPPER RIDGE, LLC
P.O.BOX 73790
PUYALLUP, WA 98403
CONTACT: EVAN MANN

CIVIL ENGINEER
AHBL ENGINEERS, PLANNERS, & SURVEYORS
2215 NORTH 30TH STREET, SUITE 300
TACOMA, WA 98403
PH. (253) 383-2422
FAX (253) 383-2572
CONTACT: MATT WEBER, P.E.

SURVEYOR
AHBL ENGINEERS, PLANNERS, & SURVEYORS
2215 NORTH 30TH STREET, SUITE 300
TACOMA, WA 98403
PH. (253) 383-2422
FAX (253) 383-2572
CONTACT: DAVE FOLLANSBEE, PLS.

LEGAL DESCRIPTION
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BY DEED RECORDED APRIL 23, 1993 UNDER AUDITOR'S FILE NO. 9304230302.
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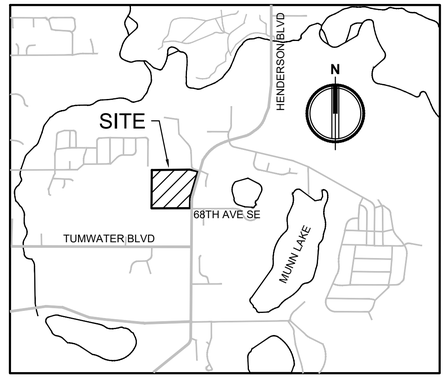
CONVEYED TO THURSTON COUNTY BY DEED RECORDED APRIL 23, 1993 UNDER AUDITOR'S FILE
NO. 9304230301.
IN THURSTON COUNTY, WASHINGTON.

VERTICAL DATUM
NAVD 1988 VERTICAL DATUM BASED ON THURSTON COUNTY SURVEY CONTROL POINTS #991 AND #6473.

BASIS OF BEARING
NAD 1983/2091
WASHINGTON STATE PLANE SOUTH PROJECTION, BASED ON THURSTON COUNTY SURVEY CONTROL POINTS #991 AND #6473; BEARING SOUTH 03°11'35" WEST, DISTANCE OF 1324.16. UNITS OF MEASUREMENT ARE US SURVEY FEET.

SITE DATA

PARCEL NUMBERS:	12701320105, 79300000100, AND 79300000101
ADDRESS:	6609 HENDERSON BLVD YELM, WA 98597
SITE AREA:	423,838 SF (9.73 AC)
EXISTING ZONING:	SFL / SFM



VICINITY MAP
SCALE: 1" = 1320' (1/4 MILE)

LEGEND

EXISTING	DESCRIPTION	PROPOSED
	LIGHT	
	POWER/TELE. POLE	
	GUY WIRE	
T	TELEPHONE MH	
	TELEPHONE RISER	
	CATCH BASIN	
D	STORM DRAIN MH	
S	SANITARY SEWER MH	
	SIGN	
	HYDRANT	
	WATER VALVE	
W	WATER METER	
X X X X	WIRE FENCE	
O O O O	CHAIN LINK FENCE	
	WOOD FENCE	
ELEV	CONTOURS	ELEV
D	STORM DRAIN LINE	D
W	WATER LINE	W
F	FIRE SERVICE	
SS	SANITARY SEWER LINE	
	STANDARD DUTY PAVING	
G	NATURAL GAS LINE	
	CONIFER TREE	
	DECIDUOUS TREE	
	CEMENT CONC. PAVEMENT	
	ASPHALT CONC. PAVEMENT	

FILL SPECIFICATION
IMPORTED FILL MATERIAL SHALL NOT CONTAIN PETROLEUM PRODUCTS, OR SUBSTANCES WHICH ARE HAZARDOUS, DANGEROUS, TOXIC, OR WHICH OTHERWISE VIOLATE ANY STATE, FEDERAL, OR LOCAL LAW, ORDINANCE, CODE, REGULATION, RULE, ORDER, OR STANDARD.

UTILITY NOTE
THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE APPROXIMATE ONLY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR ITS REPRESENTATIVE. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK AND AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES THAT HAPPEN DUE TO THE CONTRACTOR'S FAILURE TO LOCATE EXACTLY AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES. AHBL ASSUMES NO LIABILITY FOR THE LOCATION OF UNDERGROUND UTILITIES.

TRENCH NOTE
IF WORKERS ENTER ANY TRENCH OR OTHER EXCAVATION FOUR OR MORE FEET IN DEPTH THAT DOES NOT MEET THE OPEN PIT REQUIREMENTS OF WSDOT SECTION 2-09.3(3)B, IT SHALL BE SHORED AND CRIBBED. THE CONTRACTOR ALONE SHALL BE RESPONSIBLE FOR WORKER SAFETY AND AHBL ASSUMES NO RESPONSIBILITY. ALL TRENCH SAFETY SYSTEMS SHALL MEET THE REQUIREMENTS OF THE WASHINGTON INDUSTRIAL SAFETY AND HEALTH ACT, CHAPTER 49.17 RCW.

WETLAND DELINEATION
NO WETLANDS HAVE BEEN DELINEATED ON-SITE OR IMMEDIATELY ADJACENT TO THE PROJECT SITE.

EARTHWORK QUANTITIES
CUT = 19,000 CU. YDS
FILL = 23,000 CU. YDS
NET = 4,000 CU. YDS EXPORT

NOTE:
THE ABOVE QUANTITIES ARE ESTIMATES ONLY INTENDED FOR THE PERMITTING PROCESS. DO NOT USE FOR BID PURPOSES. THE QUANTITIES DO NOT HAVE STRIPPING, COMPACTION, OR CUT OR FILL ADJUSTMENT FACTORS APPLIED TO THEM, NOR DO THEY ACCOUNT FOR ROADWAY SECTION.

UTILITY PURVEYOR INFORMATION

SEWER / WATER:	CITY OF TUMWATER	(360) 754-4140
POWER / GAS:	PUGET SOUND ENERGY	(888) 225-5773
CABLE / TELEPHONE:	COMCAST CENTURYLINK	(800) 934-6489 (866) 963-6665
REFUSE COLLECTION:	LEMAY PACIFIC DISPOSAL	(360) 923-0111
STREET LIGHTS:	CITY OF TUMWATER	(360) 754-4140
STORMWATER:	PRIVATELY MAINTAINED BY HOA	

SHEET INDEX

Sheet Number	Sheet Title
C0.1	COVER SHEET
C0.2	EXISTING CONDITIONS PLAN
C1.1	PLAT MAP
C2.1	68TH AVE SE PLAN AND PROFILE
C2.2	68TH LOOP SE PLAN AND PROFILE
C2.3	HENDERSON BLVD PLAN AND PROFILE
C3.1	CONCEPT GRADING PLAN
C4.1	CONCEPT STORM PLAN
C5.1	CONCEPT UTILITY PLAN
C6.1	CONCEPT LANDSCAPING, TREE RETENTION & VEGETATION PLAN
L1.0	TREE PLACEMENT PLAN

APPLICATION

AHBL
TACOMA · SEATTLE · SPOKANE · TRI-CITIES

2215 North 30th Street, Suite 300 Tacoma, WA 98403
253.383.2422 TEL 253.383.2572 FAX www.ahbl.com WEB

Project Title:
THREE LAKES PRELIMINARY PLAT AND PUD

Client:
COPPER RIDGE, LLC

P.O.BOX 73790
PUYALLUP, WA 98373

CONTACT:
EVAN MANN (253) 820-7835

Project No.
2210648.10

Issue Set & Date:
PRELIMINARY PLAT & PUD
03/24/2022

MATTHEW WEBER — STATE OF WASHINGTON — 21485 — REGISTERED PROFESSIONAL ENGINEER
04/25/2022

4
3
2
1
Revisions:

Sheet Title:
COVER SHEET

Designed by: ML | Drawn by: TS | Checked by: MW / SK

Sheet No.
C0.1
1 of 11 Sheets

DATE: April 1, 2022 FILENAME: Q:\2021\2210648\10_CIV\CAD_Preliminary Plat\2210648-SH-COVR.dwg

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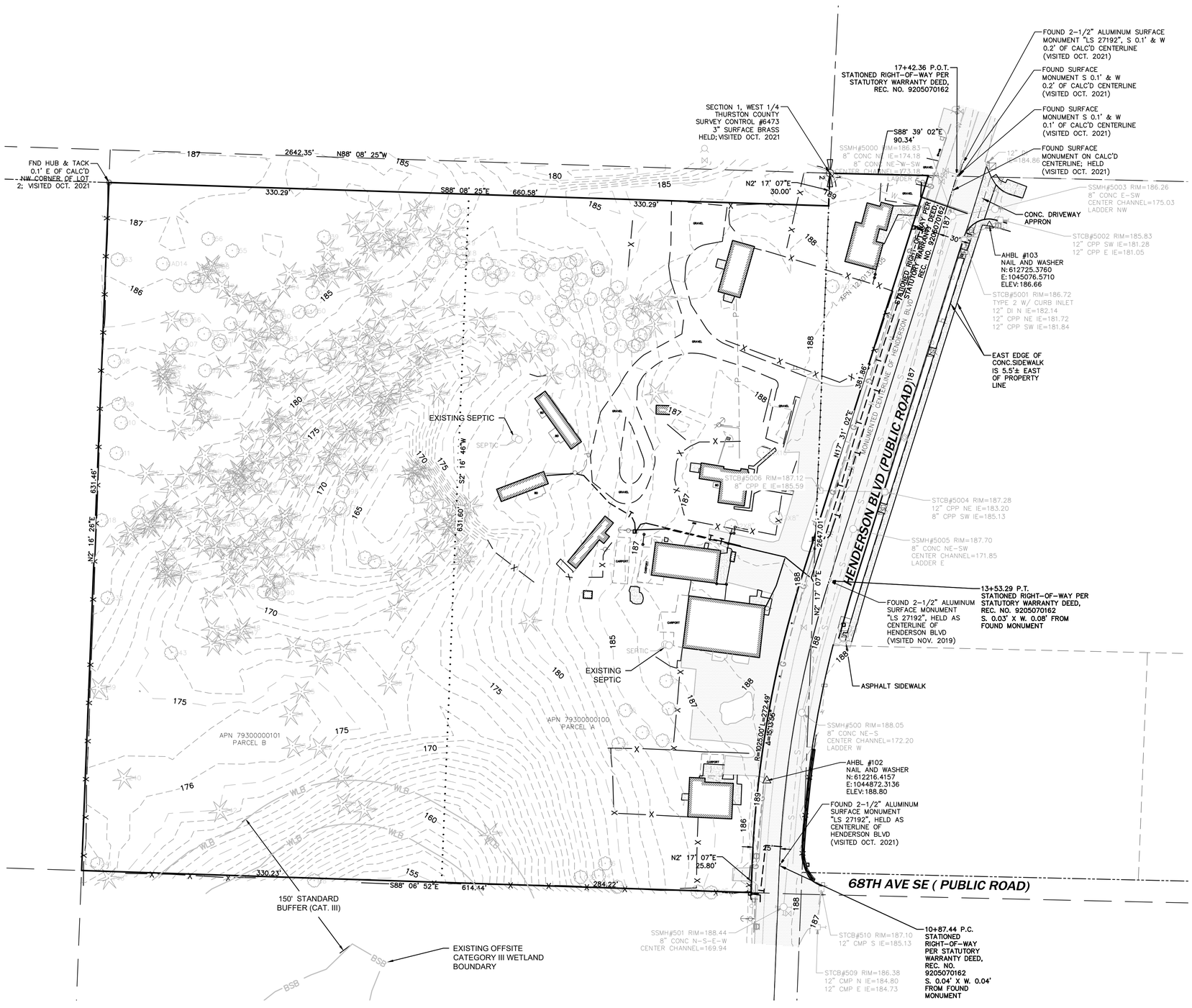

N

GRAPHIC SCALE
0 25 50 100
1" = 50 FEET

EXISTING SEPTIC AND WELLS NOTE

1. THE EXISTING SEPTIC SYSTEM IS TO BE DECOMMISSIONED PER THURSTON COUNTY DEPARTMENT OF HEALTH REQUIREMENTS.
2. IF THERE ARE ANY ACTIVE WELLS ONSITE THEY SHALL BE DECOMMISIONED PER THURSTON COUNTY DEPARTMENT OF HEALTH STANDARDS.

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LEGEND

- FOUND MONUMENT AS NOTED
- SET NAIL AND WASHER
- FOUND PROPERTY CORNER
- BOLLARD
- MAIL BOX
- SIGN AS NOTED
- CLEANOUT
- SANITARY SEWER MANHOLE
- STORM CATCH BASIN
- STORM MANHOLE
- CABLE RISER
- GAS VALVE
- GUY ANCHOR
- UTILITY POWER POLE
- JUNCTION BOX
- LUMINAIRE
- FIRE HYDRANT
- WATER VALVE
- BD BUILDING DECK
- CONIFEROUS TREE AS NOTED
- DECIDUOUS TREE AS NOTED
- STORM LINE
- SEWER LINE
- WATER LINE
- GAS LINE
- ELECTRICAL LINE
- COMMUNICATION LINE
- FENCE
- ASPHALT
- CONCRETE

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5
3
2
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Revisions:

Sheet Title:
EXISTING CONDITIONS PLAN

Designed by:	Drawn by:	Checked by:
ML	TS	MW / SK

Sheet No.
C0.2
2 of 11 Sheets

DATE: November 18, 2021 FILENAME: Q:\2021\2210648\10_CIV\CAD_Preliminary Plat\2210648-SH-EXIST.dwg

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N

GRAPHIC SCALE
0 25 50 100
1" = 50 FEET

PROJECT INFORMATION

ZONE	SFL, SFM
PARCEL NUMBERS	12701320105, 79300000100, 79300000101
SITE AREA	9.68 ACRES
TOTAL NET DEVELOPABLE AREA:	6.37 ACRES (3.105 + 3.265)
PROPOSED # OF LOTS:	45
MAX # OF LOTS ALLOWED:	45 (18.63+26.12= 44.75)

WEST PARCEL (79300000101)

ZONE:	SFL (4-7 DU/AC)
TOTAL AREA (TA):	4.787 AC (49.5% OF PROJECT SITE)
NET DEVELOPABLE (ND):	3.105 AC
ND = TA (4.787 AC) - ROW (1.235 AC) - TRACT H (0.063 AC) - TRACT F (0.384 AC) = 3.105 AC	
PROPOSED DENSITY:	6 DU/AC
# OF LOTS ALLOWED:	18.63

EAST PARCELS (79300000100, 12701320105)

ZONE:	SFM (6-9 DU/AC)
TOTAL AREA (TA):	4.889 AC (50.5% OF PROJECT SITE)
NET DEVELOPABLE (ND):	3.265 AC
ND = TA (4.889 AC) - ROW (1.514 AC)- TRACT E (0.046) - TRACT F (0.074 AC) = 3.265	
PROPOSED DENSITY:	8 DU/AC
# OF LOTS ALLOWED:	26.12

TRACT INFORMATION:

TRACT A (OPEN SPACE & TREE TRACT):	0.14 AC
TRACT B (STORM / OPEN SPACE/ ACTIVE/PASSIVE RECREATION / TREE RETENTION):	0.52 AC
TRACT C (ACTIVE RECREATION):	0.38 AC
TRACT D (OPEN SPACE / TREE TRACT):	0.05 AC
TRACT E (PRIVATE SHARED ACCESS): SERVES LOTS 33-35	0.046 AC
TRACT F (WETLAND BUFFER):	0.458 AC
TRACT G (OPEN SPACE / TREE TRACT):	0.11 AC
TRACT H (PRIVATE SHARED ACCESS): SERVES LOTS 1-3	0.063 AC
ROW AREA:	2.75 AC
OPEN SPACE REQUIRED:	0.97 AC (10% OF GROSS SITE AREA)
ACTIVE RECREATION:	0.485 AC (50% OF OPEN SPACE)
PASSIVE RECREATION:	0.485 AC (50% OF OPEN SPACE)

SETBACKS

FRONT YARD	10' / 18' TO GARAGE (DRIVEWAY LENGTH)
SIDE YARD	5'
REAR YARD	20'

(1) CORNER LOT SETBACKS — FRONT SETBACKS ON BOTH STREETS, SIDE SETBACK ON OTHER SIDES

LOT STANDARDS

MINIMUM LOT WIDTH PER SFL AND SFM = 50'.
MINIMUM LOT WIDTH PROPOSED PER PUD = 40'
LOT COVERAGE / LOT MAX IMPERVIOUS = 70%
NO LOTS SHALL HAVE DIRECT LOT ACCESS TO HENDERSON BLVD

BUILDING HEIGHT

THE MAXIMUM HEIGHT FOR ALL BUILDINGS IS 35 FEET.

ACTIVE OPEN SPACE STANDARDS

TRACT C WILL MEET ACTIVE RECREATION REQUIREMENTS PER 18.42.130 F. ONE OF THE FOLLOWING WILL BE PROVIDED:

1. CHILDREN'S PLAY EQUIPMENT, SUCH AS SLIDES, SWINGS, AND PLAY STRUCTURES;
2. A PAVED HARD COURT FOR ACTIVITIES SUCH AS BASKETBALL, TENNIS, OR PICKLEBALL;
3. A FLAT OPEN LAWN AREA WITH A SURFACE SUITABLE FOR UNSTRUCTURED ACTIVE PLAY.

TRACT B WILL PROVIDE APPROXIMATELY 0.10 ACRES OF FLAT OPEN LAWN AREA ABOVE THE STORM SYSTEM SUITABLE FOR UNSTRUCTURED ACTIVE PLAY

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CONTACT:
EVAN MANN (253) 820-7835

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03/24/2022

J. MATTHEW WEBER — STATE OF WASHINGTON — 34858 — REGISTERED PROFESSIONAL ENGINEER
04/25/2022

Revisions:
4
3
2
1

Sheet Title:
PLAT MAP

Designed by:	Drawn by:	Checked by:
ML	TS	MW / SK

Sheet No.
C1.1
3 of 11 Sheets

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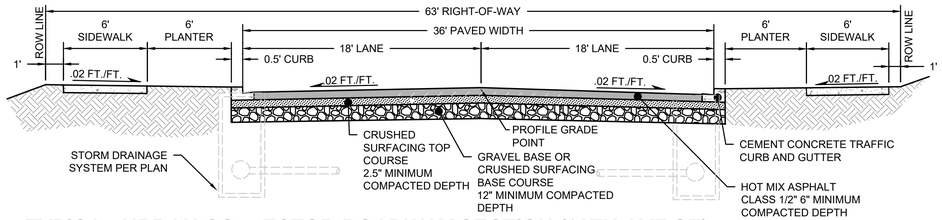
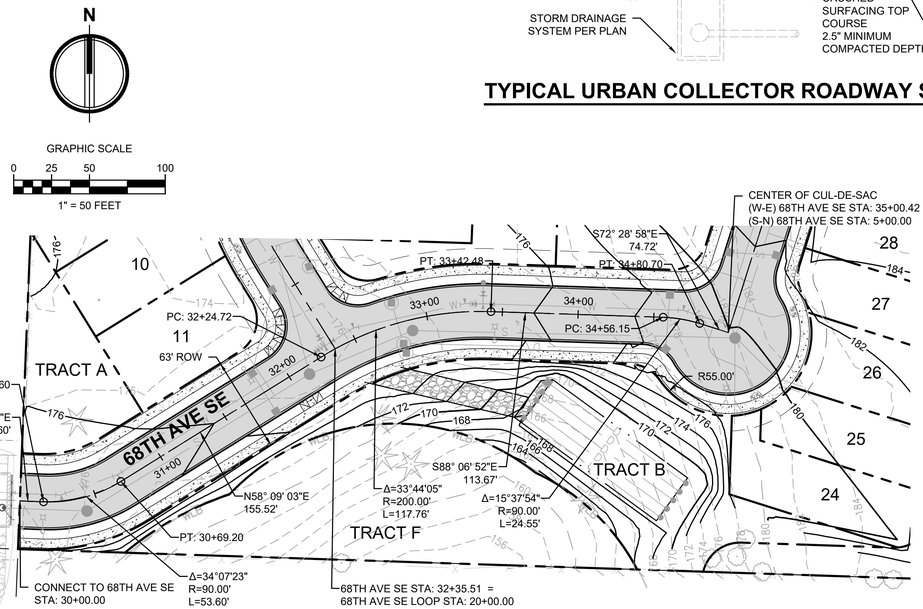
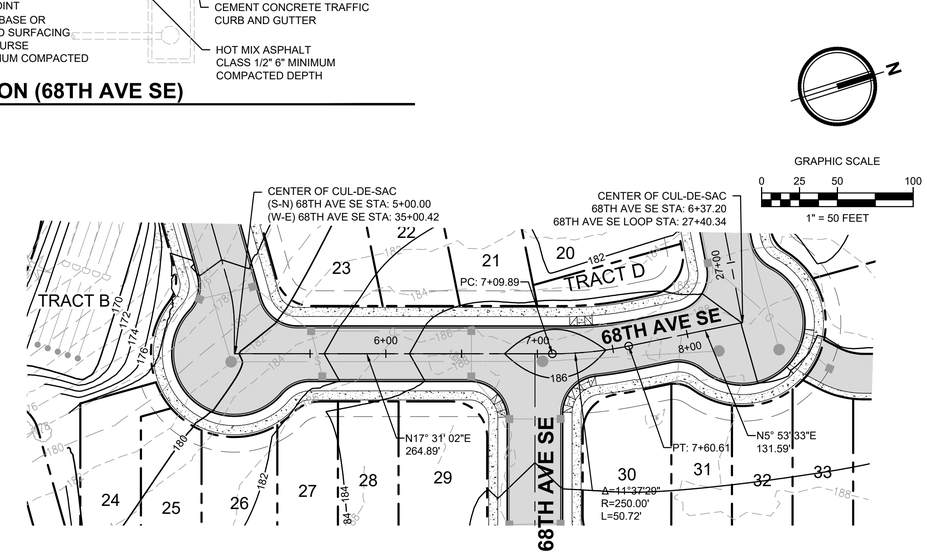
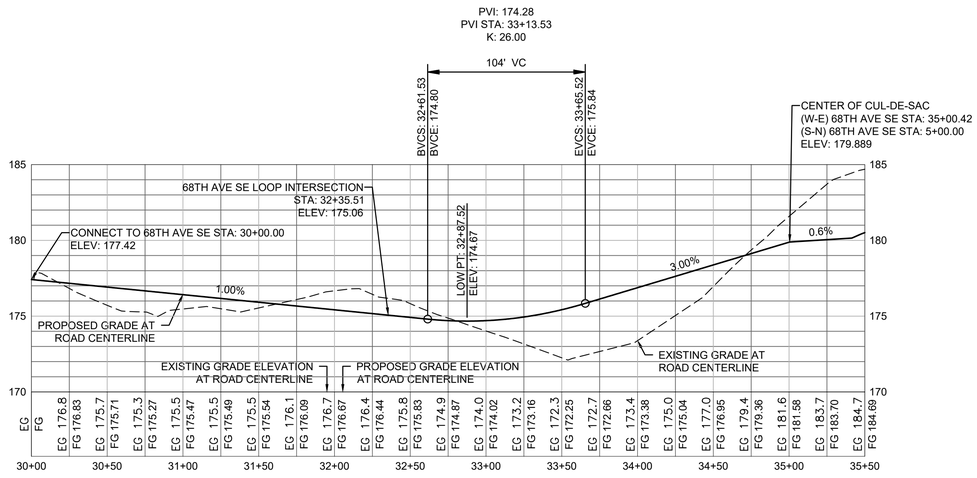
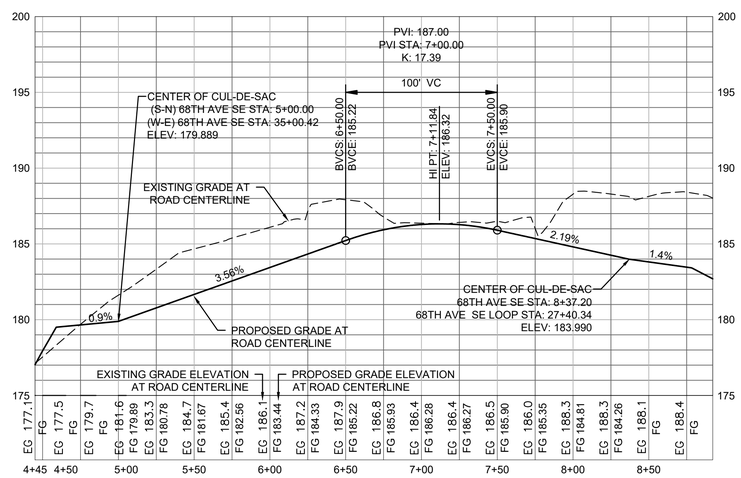


TYPICAL URBAN COLLECTOR ROADWAY SECTION (68TH AVE SE)









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EVAN MANN (253) 820-7835

Project No.
2210648.10

Issue Set & Date:
PRELIMINARY PLAT & PUD
03/24/2022

4
3
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1
Revisions:

Sheet Title:
68TH AVE SE PLAN AND PROFILE

Designed by:	Drawn by:	Checked by:
ML	TS	MW / SK

Sheet No.
C2.1
4 of 11 Sheets

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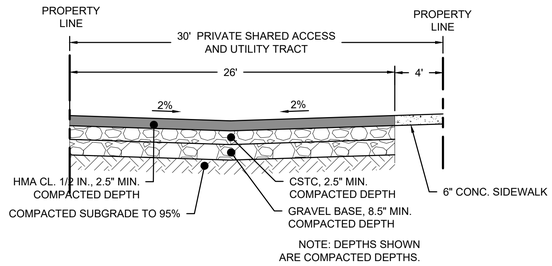
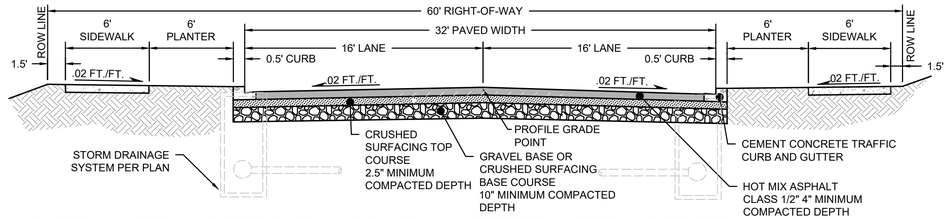
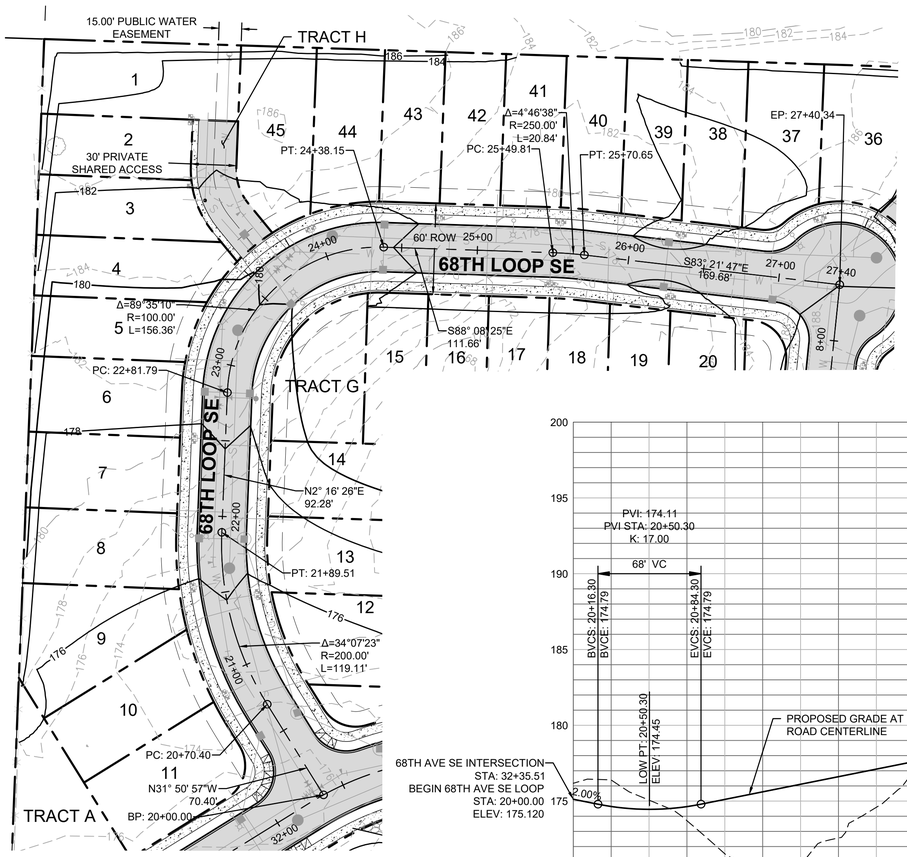
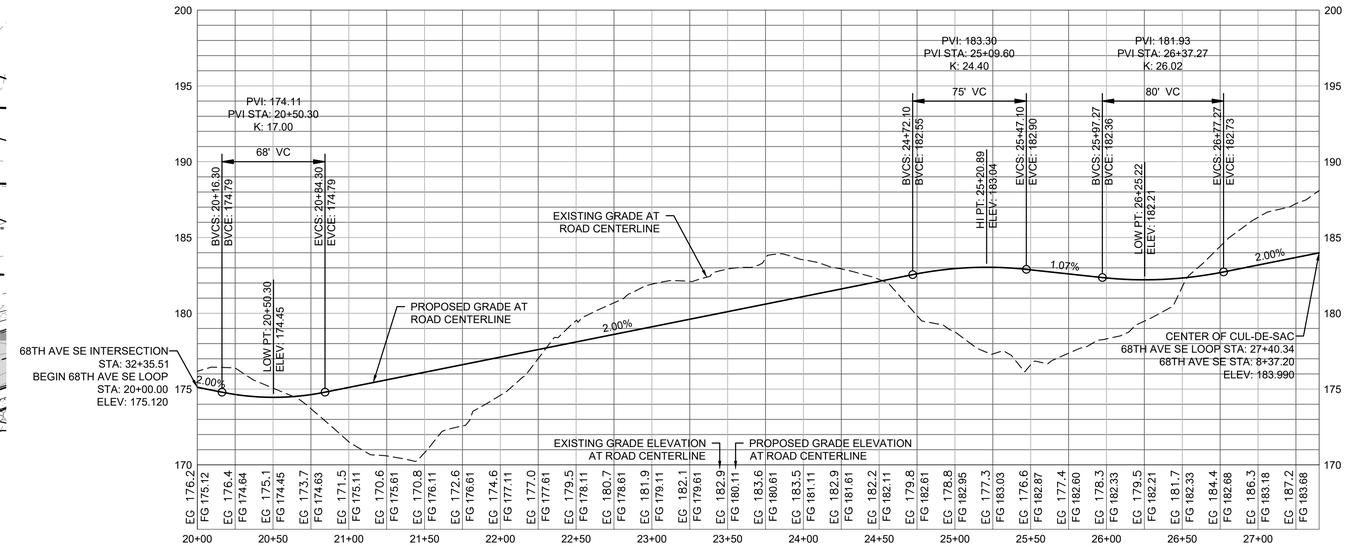


SHARED ACCESS TRACT E AND H

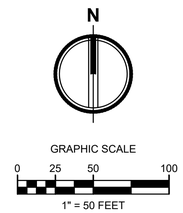


TYPICAL LOCAL RESIDENTIAL ROADWAY SECTION (68TH LOOP SE)





68TH LOOP SE
SCALE: H:1"=50', V:1"=5'



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2215 North 30th Street, Suite 300 Tacoma, WA 98403
253.383.2422 TEL 253.383.2572 FAX www.ahbl.com WEB

Project Title:
THREE LAKES PRELIMINARY PLAT AND PUD

Client:
COPPER RIDGE, LLC

P.O.BOX 73790
PUYALLUP, WA 98373

CONTACT:
EVAN MANN (253) 820-7835

Project No.
2210648.10

Issue Set & Date:
PRELIMINARY PLAT & PUD
03/24/2022

Revisions:
4
3
2
1

Sheet Title:
68TH LOOP SE PLAN AND PROFILE

Designed by:	Drawn by:	Checked by:
ML	TS	MW / SK

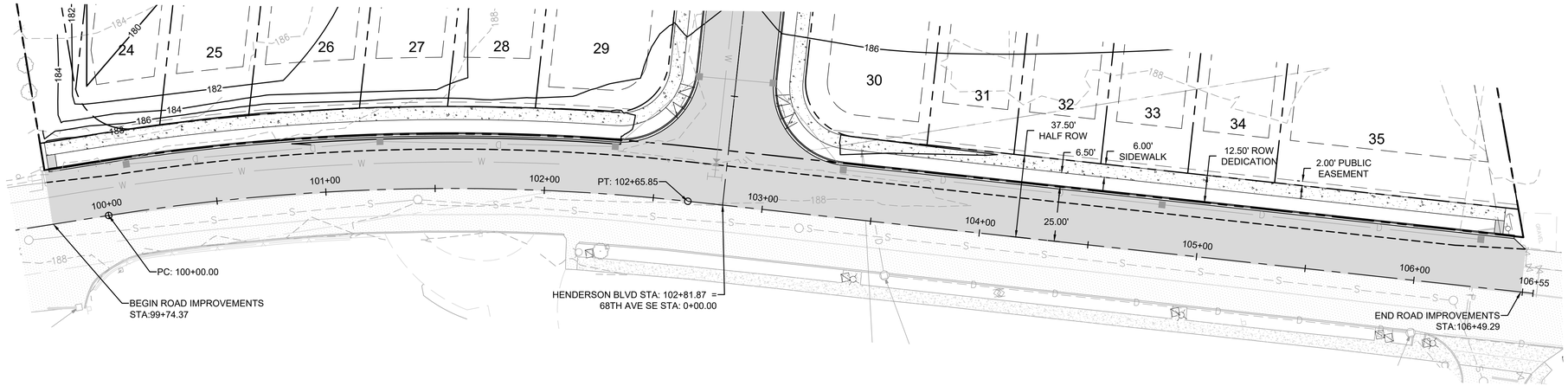
Sheet No.
C2.2
5 of 11 Sheets

Know what's below. Call before you dig.

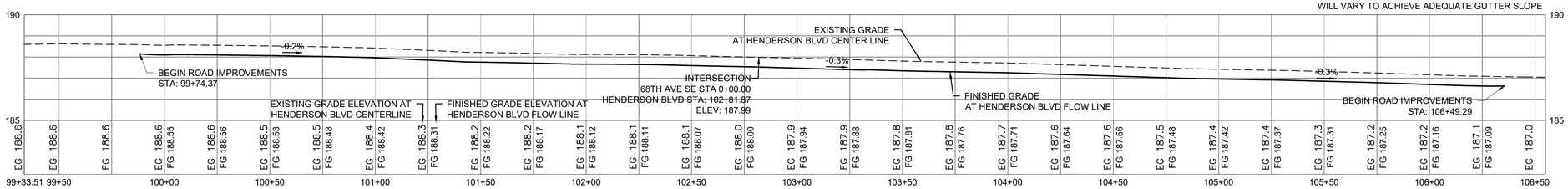
THREE LAKES PRELIMINARY PLAT AND PUD

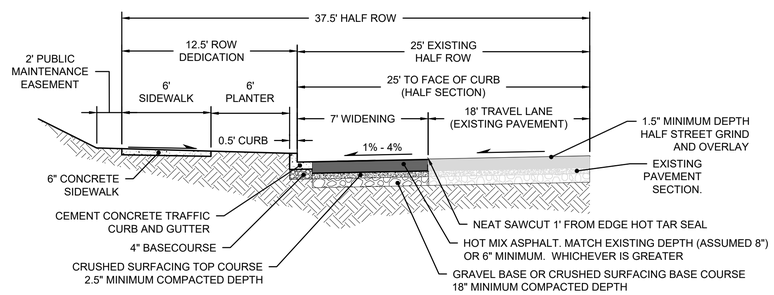
A PORTION OF THE NE 1/4 OF THE SE 1/4 OF SEC. 2 & THE NW 1/4 OF THE SW 1/4 OF SEC.1 , TWN. 17 N., RGE. 1 W. W.M.
CITY OF TUMWATER, THURSTON COUNTY, WASHINGTON.

GRAPHIC SCALE
0 15 30 60
1" = 30 FEET



ROAD GUTTER WILL BE SLOPED AT 0.5% MINIMUM SLOPE WITH FINAL ENGINEERING. CROSS-SLOPE WILL VARY TO ACHIEVE ADEQUATE GUTTER SLOPE





2.0' PUBLIC MAINTENANCE EASEMENT FOR ACCESS, SIDEWALK CONSTRUCTION, AND GRADING

HENDERSON BLVD (ARTERIAL STREET) WIDENING SECTION

NOT TO SCALE

APPLICATION #

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253.383.2422 TEL 253.383.2572 FAX www.ahbl.com WEB

Project Title:
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P.O.BOX 73790
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CONTACT:
EVAN MANN (253) 820-7835

Project No.
2210648.10

Issue Set & Date:
PRELIMINARY PLAT & PUD
03/24/2022

J. MATTHEW WEBER
STATE OF WASHINGTON
24858
REGISTERED
PROFESSIONAL ENGINEER
04/25/2022

Revisions:
4
3
2
1

Sheet Title:
HENDERSON BLVD PLAN AND PROFILE

Designed by: ML | Drawn by: TS | Checked by: MW / SK

Sheet No.
C2.3
6 of 11 Sheets

DATE: December 2, 2021 FILENAME: Q:\2021\2210648\10_CIV\CAD_Preliminary Plat\2210648-SH-FRONTAGE.dwg

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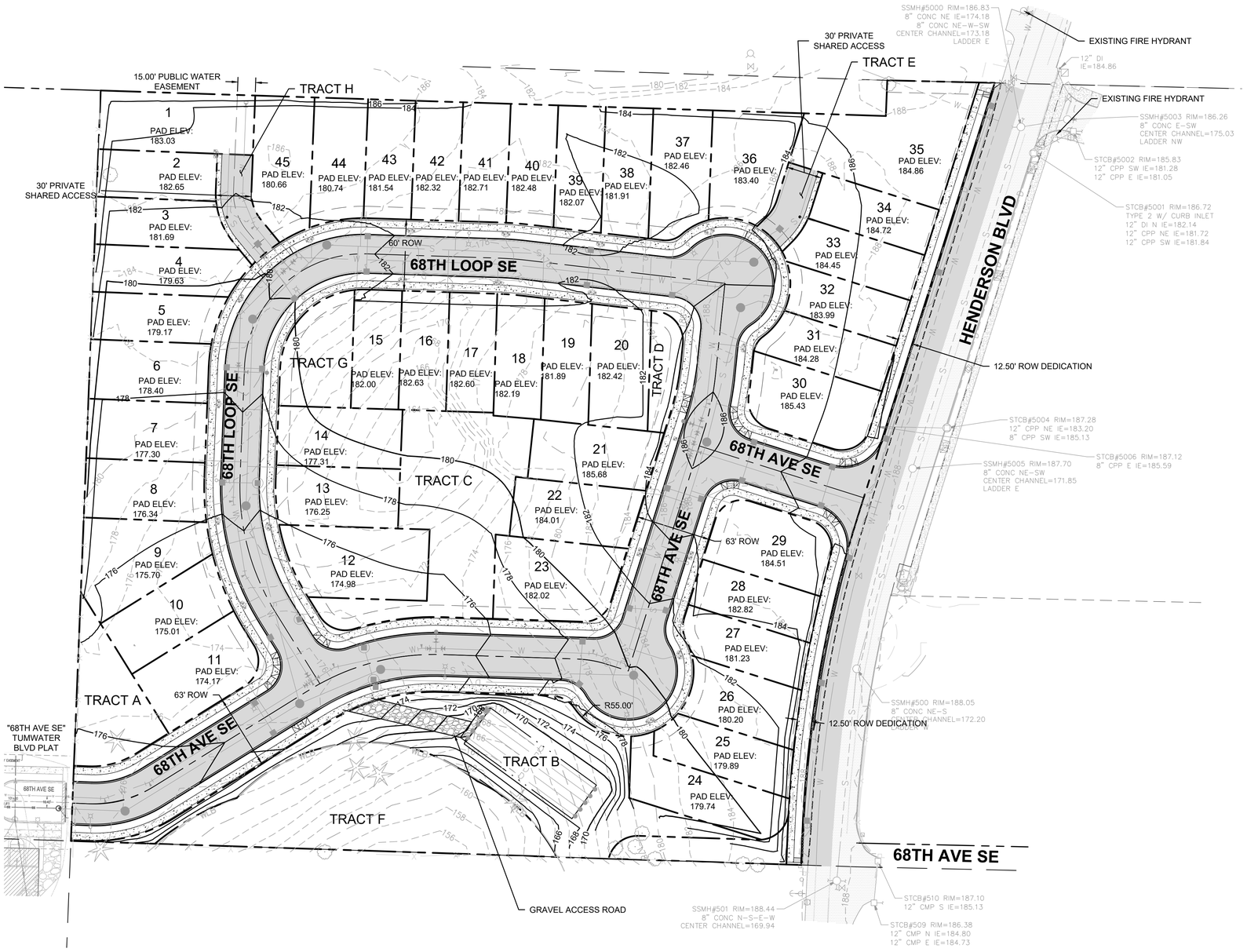
THREE LAKES PRELIMINARY PLAT AND PUD

A PORTION OF THE NE 1/4 OF THE SE 1/4 OF SEC. 2 & THE NW 1/4 OF THE SW 1/4 OF SEC.1 , TWN. 17 N., RGE. 1 W. W.M.
CITY OF TUMWATER, THURSTON COUNTY, WASHINGTON.



N

GRAPHIC SCALE
0 25 50 100
1" = 50 FEET

EARTHWORK QUANTITIES

CUT = 19,000 CU. YDS
FILL = 23,000 CU. YDS
NET = 4,000 CU. YDS EXPORT

NOTE:
THE ABOVE QUANTITIES ARE ESTIMATES ONLY INTENDED FOR THE PERMITTING PROCESS. DO NOT USE FOR BID PURPOSES. THE QUANTITIES DO NOT HAVE STRIPPING, COMPACTION, OR CUT OR FILL ADJUSTMENT FACTORS APPLIED TO THEM, NOR DO THEY ACCOUNT FOR ROADWAY SECTION.

APPLICATION #

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253.383.2422 TEL 253.383.2572 FAX www.ahbl.com WEB

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P.O.BOX 73790
PUYALLUP, WA 98373

CONTACT:
EVAN MANN (253) 820-7835

Project No.
2210648.10

Issue Set & Date:
PRELIMINARY PLAT & PUD
03/24/2022

MATTHEW WEBER — STATE OF WASHINGTON — 21485 — REGISTERED PROFESSIONAL ENGINEER
04/25/2022

Revisions:
3
2
1

Sheet Title:
CONCEPT GRADING PLAN

Designed by:	Drawn by:	Checked by:
ML	TS	MW / SK

Sheet No.
C3.1
7 of 11 Sheets

DATE: December 9, 2021 FILENAME: Q:\2021\2210648\10_CIV\CAD_Preliminary Plat\2210648-SH-GRAD.dwg

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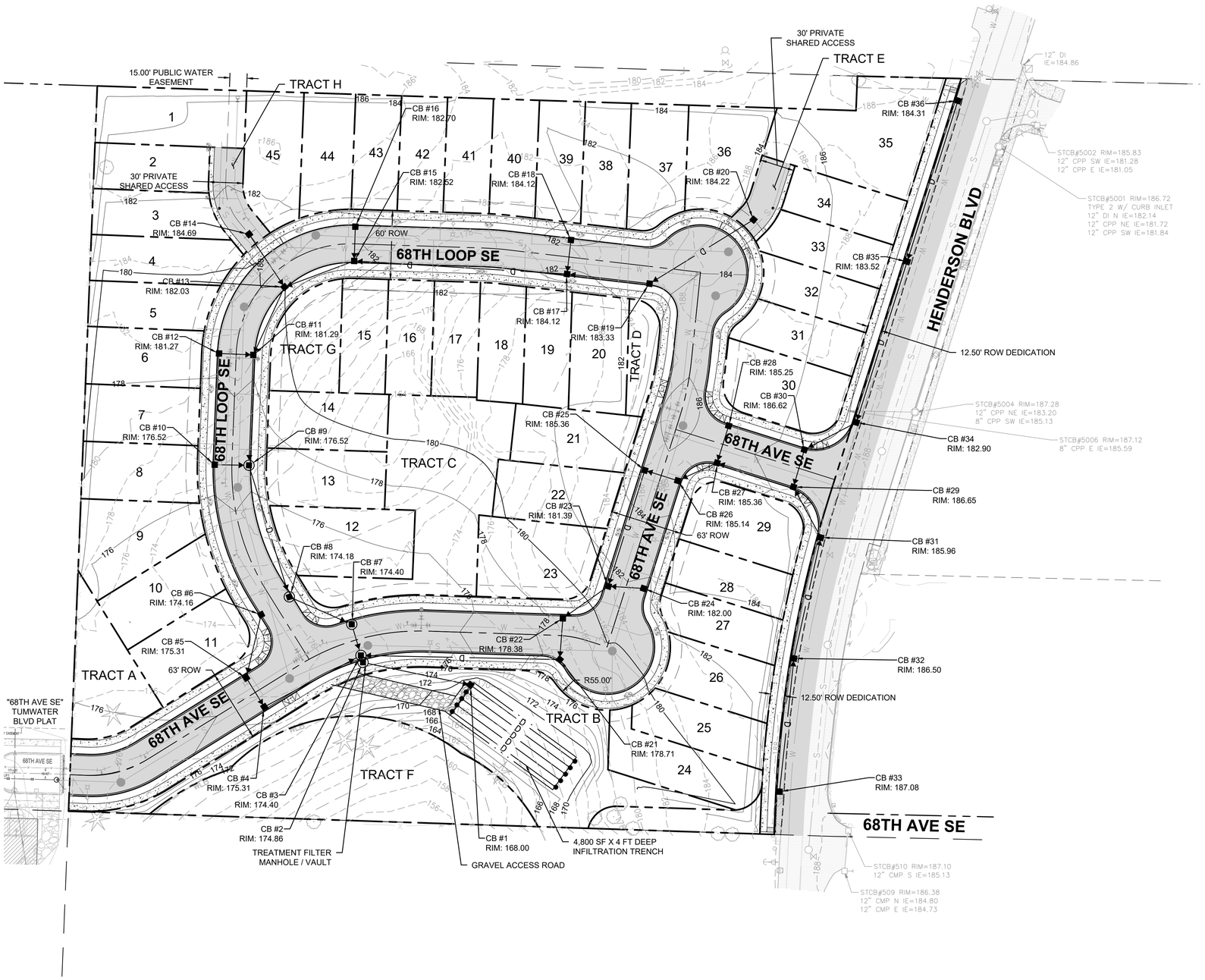

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Project Title:
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COPPER RIDGE, LLC

P.O.BOX 73790
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CONTACT:
EVAN MANN (253) 820-7835

Project No.
2210648.10

Issue Set & Date:
PRELIMINARY PLAT & PUD
03/24/2022

J. MATTHEW WEBER — STATE OF WASHINGTON — 21485 — REGISTERED PROFESSIONAL ENGINEER
04/25/2022

4 ____
3 ____
2 ____
1 ____
Revisions:

Sheet Title:
CONCEPT STORM PLAN

Designed by:	Drawn by:	Checked by:
ML	TS	MW / SK

Sheet No.
C4.1
8 of 11 Sheets

DATE: December 9, 2021 FILENAME: Q:\2021\2210648\10_CIV\CAD_Preliminary Plat\2210648-SH-STRM.dwg

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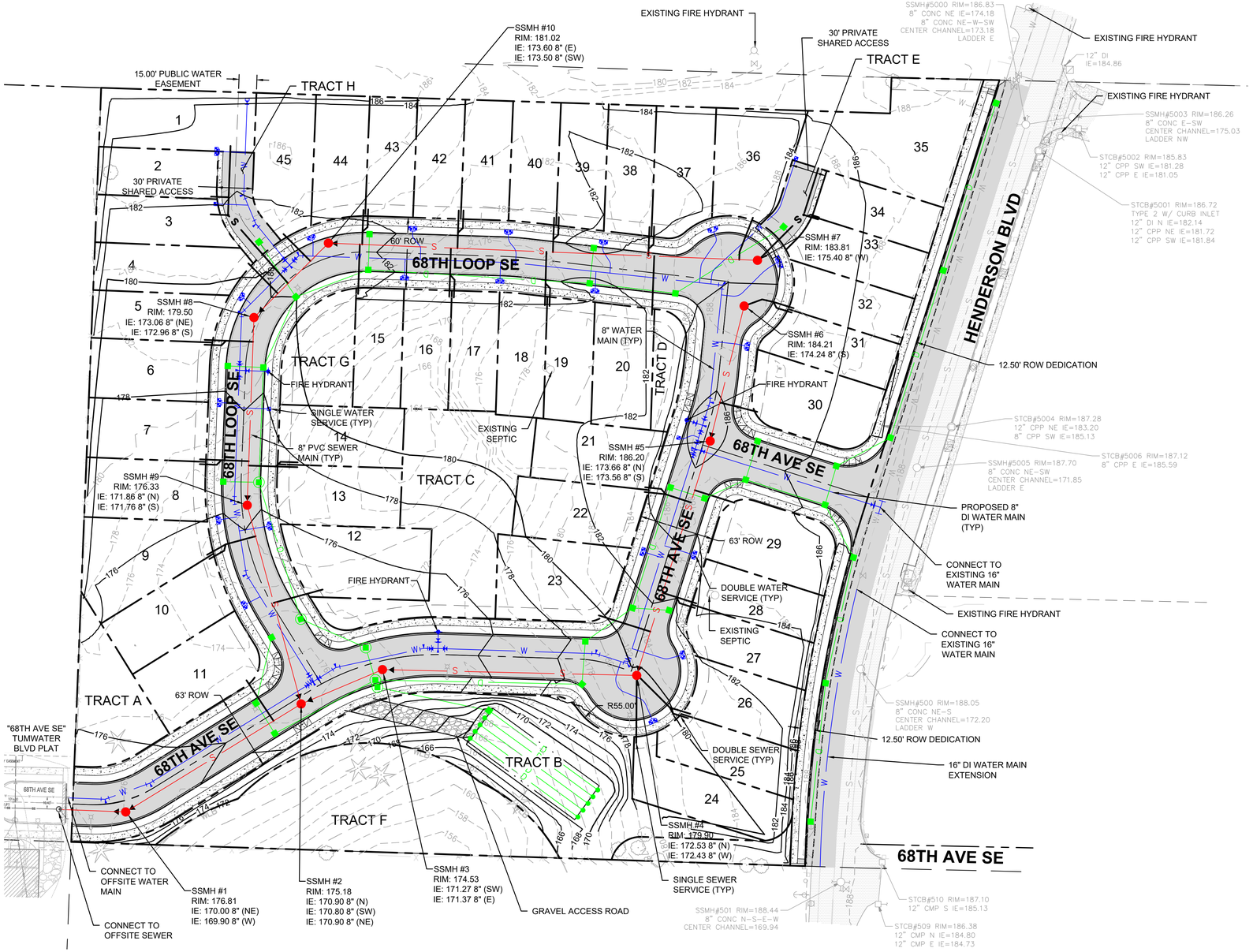

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GRAPHIC SCALE

0 25 50 100

1" = 50 FEET

EXISTING SEPTIC AND WELLS NOTE

1. THE EXISTING SEPTIC SYSTEM IS TO BE DECOMMISSIONED PER THURSTON COUNTY DEPARTMENT OF HEALTH REQUIREMENTS.
2. IF THERE ARE ANY ACTIVE WELLS ONSITE THEY SHALL BE DECOMMISIONED PER PIERCE COUNTY DEPARTMENT OF HEALTH STANDARDS.

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CONTACT:
EVAN MANN (253) 820-7835

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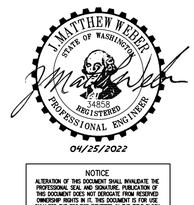

Revisions:
3
2
1

Sheet Title:
CONCEPT UTILITY PLAN

Designed by:	Drawn by:	Checked by:
ML	TS	MW / SK

Sheet No.
C5.1
9 of 11 Sheets

DATE: December 9, 2021 FILENAME: Q:\2021\2210648\10_CIV\CAD_Preliminary Plat\2210648-SH-UTIL.dwg

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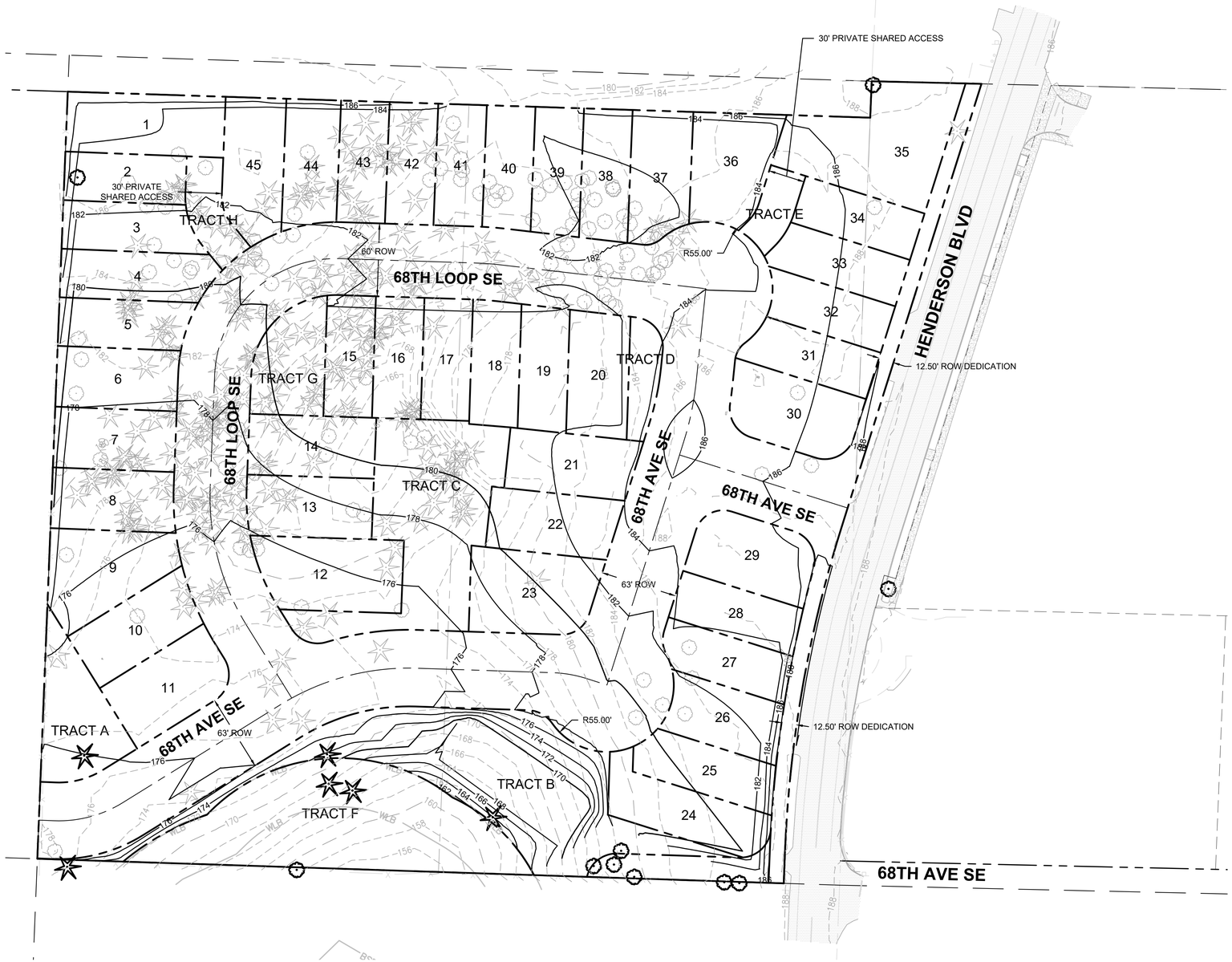

N

GRAPHIC SCALE

0 25 50 100

1" = 50 FEET

LEGEND

TREES TO BE REMOVED (358)
(6" & LARGER)

TREES TO BE RETAINED (10)
(6" & LARGER)

TREE RETENTION STATISTICS

TOTAL PROJECT AREA:	9.73 AC
TOTAL # OF TREES:	368
REQUIRED RETENTION (12 TREES / ACRE)	80 TREES
REQUIRED RETENTION (20%)	74 TREES
TREE RETENTION PROVIDED: (TREE 240 = 2 TREES)	10 TREES
SHORTFALL OF REQUIRED RETENTION: (80 - 10)	70 TREES
TREE REPLACEMENT (3 x 70)	210 TREES

TREE RETENTION WILL BE ACHIEVED THROUGH PLANTING STREET TREES, TREES ON THE LOTS, AND OPEN SPACE AREAS

NOTE

FINAL LANDSCAPE, TREE RETENTION AND VEGETATION PLAN TO BE PREPARED BY A LICENSED LANDSCAPE ARCHITECT AND SUBMITTED TO THE CITY OF YELM FOR APPROVAL PRIOR TO THE ISSUANCE OF SITE DEVELOPMENT PERMIT

STREETSCAPE

1. PURPOSE: STREETSCAPE LANDSCAPING IS INTENDED TO PROVIDE VISUAL RELIEF WHERE CLEAR SIGHT IS DESIRED. THIS LANDSCAPING IS UTILIZED ALONG PEDESTRIAN CORRIDORS AND WALKS FOR SEPARATION OF PEDSTRIANS FROM STREET AND PARKING AREAS WHILE PROVIDING AN ATTRACTIVE SETTLING AND OVERSTORY CANOPY.

2. WHEN REQUIRED: STREETSCAPE LANDSCAPING IS REQUIRED AS PART OF STREET FRONTAGE IMPROVEMENTS.

3. DESCRIPTION:
   a. THIS TYPE OF LANDSCAPING CONSISTS OF STREET TREES FOR A LARGE OVERSTORY CANOPY ALONG STREETS AND PEDESTRIAN CORRIDORS AND APPROVED VEGETATION FOR GROUNDCOVER.
   b. STREET TREES SHALL BE CHOSEN FROM A STREET TREE LIST AS ADOPTED BY THE YELM TREE ADVISORY BOARD. DECORATIVE PROTECTION MAY BE PLACED AROUND THE TREES.
   c. GROUNDCOVER SHALL BE A MINIMUM FOUR-INCH POTS SPACED 18 TO 20 INCHES ON CENTER OR ONE-GALLON POTS AT 20 INCHES ON CENTER. LOW GROWTH SHRUBS SHALL BE ONE-GALLON POTS AT THREE FEET ON CENTER. SHRUBS SHALL BE 18 TO 24 INCHES IN HEIGHT AT FIVE FEET ON CENTER OR THREE-GALLON POT AT FIVE FEET ON CENTER.
   d. EARTHEN BERMS WITH GRASS OR OTHER VEGETATIVE GROUNDCOVER AND OTHER DESIGN FEATURES MAY BE WORKED INTO LANDSCAPING PROVIDED THE RESULTANT EFFECT OF PROVIDING A PEDESTRIAN-FRIENDLY ENVIRONMENT AND VISUAL RELIEF WHERE CLEAR SITE IS REQUIRED CAN BE ACHIEVED.
   e. THE MINIMUM WIDTH FOR STREETSCAPE LANDSCAPING SHALL BE SIX FEET TO PROVIDE ROOTING AREA FOR LARGE STREET TREES AND TO PROVIDE ADEQUATE STREETSCAPE. A FOUR-FOOT WIDTH MAY BE USED THROUGH PARKING AREA PEDESTRIAN WALKS WHERE ACCENT TREES ARE USED AND LESS WIDTH IS REQUIRED.
   f. PLANTING THEME SHALL BE A RATIO OF THREE STREET TREES TO ONE ACCENT TREE.
   g. TREES SHALL BE SPACED 35 FEET ON CENTER STARTING 15 FEET FROM THE PROPERTY LINE. TREE SPACING MAY BE ADJUSTED TO ALLOW UNOBSTRUCTED SIGHT DISTANCE ON EITHER SIDE OF A DRIVEWAY AND AT STREET INTERSECTIONS. TREE SPACING MAY ALSO BE ADJUSTED WHEN IN CONFLICT WITH LUMINAIRE POLES.

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Client:
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P.O.BOX 73790
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CONTACT:
EVAN MANN (253) 820-7835

Project No.
2210648.10

Issue Set & Date:
PRELIMINARY PLAT & PUD
03/24/2022

J. MATTHEW WEBER — STATE OF WASHINGTON — 21485 — REGISTERED PROFESSIONAL ENGINEER
04/25/2022

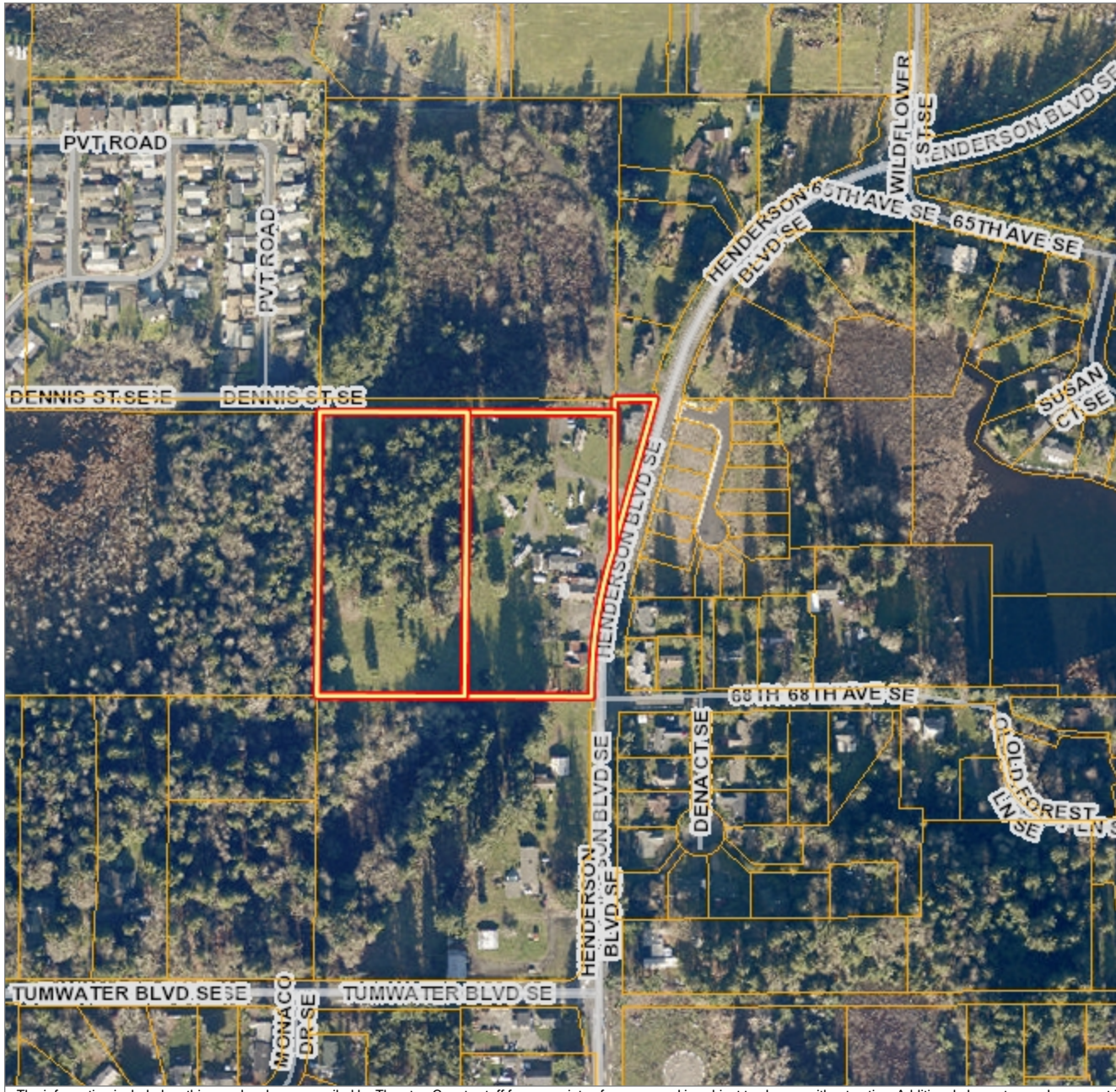
Revisions:
4
3
2
1

Sheet Title:
CONCEPT LANDSCAPING, TREE RETENTION & VEGETATION PLAN

Designed by:	Drawn by:	Checked by:
ML	TS	MW / SK

Sheet No.
C6.1
10 of 11 Sheets

DATE: December 9, 2021 FILENAME: Q:\2021\2210648\10_CIV\CAD_Preliminary Plat\2210648-SH-TREE.dwg



Three Lakes Crossing

Legend

- Parcel Boundaries
- Roads - Major
  - Major Roads
  - Ramp
  - I 5; US 101
- Roads (Large Scale)
- Railroads
- County Border

Scale 1: 6,347

0 300 600

Feet

Map Created Using GeoData Public Website

Published: 6/1/2022

Note: 12701320105, 79300000100 and 79300000101

THURSTON COUNTY
WASHINGTON
SINCE 1852

Thurston County GeoData Center

City Hall
555 Israel Road SW
Tumwater, WA 98501-6515
Phone: 360-754-5855
Fax: 360-754-4138

MITIGATED DETERMINATION OF NON-SIGNIFICANCE
TUM-22-0038 and TUM-21-1895
Three Lakes Crossing

Description of Proposal: Construction of a 45 lot residential subdivision.

Applicant: Evan Mann, Copper Ridge LLC, PO Box 73790, Puyallup, WA 98373.

Representative: Sheri Green, AHBL, 2215 N. 30th Street #300, Tacoma, WA 98403

Location of Proposal: 6609 Henderson Blvd SE, Olympia, WA 98501. Section 01, Township 17N, Range 1W. W.M. Parcel # 12701320105.

Lead agency: City of Tumwater, Community Development Department.
The lead agency for this proposal has determined that, as conditioned, does not have a probable significant adverse impact on the environment. An Environmental Impact Statement (EIS) is not required under RCW 43.21C.030(2)(c). This decision was made after review of a completed environmental checklist and other information on file with the lead-agency. This information is available to the public on request.

This MDNS assumes that the applicant will comply with all City ordinances and development standards governing the type of development proposed, including but not limited to, street standards, storm water standards, high groundwater hazard areas ordinance standards, water and sewer utility standards, critical areas ordinance standards, tree protection standards, zoning ordinance standards, land division ordinance standards, building and fire code standards, and level of service standards relating to traffic. These ordinances and standards provide mitigation for adverse environmental impacts of the proposed development.

Condition of Approval for mitigating environmental impacts:

Finding:
The project creates a new intersection at Henderson Road and 68th Ave. Intersection construction requires off site road improvements to align the new intersection along with the site improvements shown on the Preliminary Plat.

The Tumwater Boulevard/I-5 northbound ramps intersection currently operates at LOS F during both peak periods for the northbound left-turn movement. The project is projected to add several trips to this intersection. The City has recently developed a SEPA improvement project for the Tumwater Boulevard/I-5 interchange that include intersection improvements at the northbound I-5 ramps intersection, with a peak hour

per trip impact fee of $4,219 for each trip entering the interchange area.

Mitigation Measures:

1. The project shall construct a new intersection at Henderson Road and 68th Ave to assure safe traffic movements. Design shall be determined prior to and through site development and grading plan review.
2. Prior to issuance of the Building Permit:
    a. Construct a roundabout at the northbound Interstate 5 On/Off Ramp and Tumwater Boulevard intersection; or
    b. Voluntarily pay a mitigation fee of $4,219 per peak trip generated by this project under RCW 82.02.020 to be used as described herein: *Tumwater Boulevard/I-5 Interchange: The City's planned transportation improvements at the Tumwater Boulevard/I-5 interchange include converting the interchange to a roundabout diamond interchange by replacing the southbound on/off ramp signal and northbound stop controlled intersections with roundabouts.*

This MDNS is issued under WAC 197-11-350; the lead agency will not act on this proposal for 14 days from the date below. Comments must be submitted no later than May 27, 2022, by 5:00 p.m.

Date: May 13, 2022

Responsible Official:

Michael Matlock, AICP
Community Development Director

Contact person: Alex Baruch
555 Israel Road SW
Tumwater, WA 98501
tmerriman@ci.tumwater.wa.us

Appeals of this MDNS must be made to the City of Tumwater Community Development Department, no later than June 3, 2022, by 5:00 p.m. All appeals shall be in writing, be signed by the appellant, be accompanied by a filing fee of $175, and set forth the specific basis for such appeal, error alleged and relief requested.

CITY OF TUMWATER

555 ISRAEL RD. SW, TUMWATER, WA 98501

Email: cdd@ci.tumwater.wa.us

(360) 754-4180

TUM-22-0038

12/16/21

DATE STAMP

RECEIVED BY: Kelly

Any person proposing to develop in the incorporated limits of the City of Tumwater is required to submit an environmental checklist unless the project is exempt as specified in WAC 197-11-800 (Categorical Exemptions) of the State Environmental Policy Act Rules. **SUBMITTAL REQUIREMENTS** are as follows:

1. **A COMPLETE ENVIRONMENTAL CHECKLIST.** If the project is located within the Port of Olympia property, the checklist must also be signed by a representative of the Port.
2. **FEE OF $880.00 TO BE PAID UPON SUBMITTAL.** This includes the Public Notice fee.
3. **NAME AND ADDRESS LIST OF PROPERTY OWNERS WITHIN 300 FEET OF THE SUBJECT PROPERTY.**

SEPA ENVIRONMENTAL CHECKLIST

UPDATED 2015

Purpose of checklist:

Governmental agencies use this checklist to help determine whether the environmental impacts of your proposal are significant. This information is also helpful to determine if available avoidance, minimization or compensatory mitigation measures will address the probable significant impacts or if an environmental impact statement will be prepared to further analyze the proposal.

***Instructions for applicants*: [help]**

This environmental checklist asks you to describe some basic information about your proposal. Please answer each question accurately and carefully, to the best of your knowledge. You may need to consult with an agency specialist or private consultant for some questions. You may use "not applicable" or "does not apply" only when you can explain why it does not apply and not when the answer is unknown. You may also attach or incorporate by reference additional studies reports. Complete and accurate answers to these questions often avoid delays with the SEPA process as well as later in the decision-making process.

The checklist questions apply to all parts of your proposal, even if you plan to do them over a period of time or on different parcels of land. Attach any additional information that will help describe your proposal or its environmental effects. The agency to which you submit this checklist may ask you to explain your answers or provide additional information reasonably related to determining if there may be significant adverse impacts.

Instructions for Lead Agencies:

Please adjust the format of this template as needed. Additional information may be necessary to evaluate the existing environment, all interrelated aspects of the proposal and an analysis of adverse impacts. The checklist is considered the first but not necessarily the only source of information needed to make an adequate threshold determination. Once a threshold determination is made, the lead agency is responsible for the completeness and accuracy of the checklist and other supporting documents.

***Use of checklist for nonproject proposals:* [help]**

For nonproject proposals (such as ordinances, regulations, plans and programs), complete the applicable parts of sections A and B plus the SUPPLEMENTAL SHEET FOR NONPROJECT ACTIONS (part D). Please completely answer all questions that apply and note that the words "project," "applicant," and "property or site" should be read as "proposal," "proponent," and "affected geographic area," respectively. The lead

agency may exclude (for non-projects) questions in Part B - Environmental Elements – that do not contribute meaningfully to the analysis of the proposal.

A. Background

EVALUATION FOR AGENCY USE ONLY

1. Name of proposed project, if applicable:

   Three Lakes Crossing

2. Name of applicant:

   Sheri Greene, AHBL

3. Address and phone number of applicant and contact person:

   2215 N. 30th Street #300, Tacoma WA 98403

   (253) 383-2422

4. Date checklist prepared: **November 31, 2021**

5. Agency requesting checklist:

   City of Tumwater

6. Proposed timing or schedule (including phasing, if applicable):

   Construction will commence upon issuance of the site development permit.

7. Do you have any plans for future additions, expansion, or further activity related to or connected with this proposal? If yes, explain.

   No.

8. List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal.

   SEPA Checklist, Mazama Pocket Gopher study, Traffic Impact Analysis, Geotechnical study, Critical Areas Study

   Also cultural resource study.

9. Do you know whether applications are pending for governmental approvals of other proposals directly affecting the property covered by your proposal? If yes, explain.

   No.

10. List any government approvals or permits that will be needed for your proposal, if known.

Preliminary Site Plan Approval, Final Site Plan Approval, Preliminary Plat with PUD approval, SEPA Determination, Site Development Permit, Demolition Permit, Building Permits, NPDES Permit

11. Give brief, complete description of your proposal, including the proposed uses and the size of the project and site. There are several questions later in this checklist that ask you to describe certain aspects of your proposal. You do not need to repeat those answers on this page. (Lead agencies may modify this form to include additional specific information on project description.)

Project proposes subdividing 9.68 acres into 45 single family residential lots. The project proposes new roadways and the extension of water, sewer and dry utilities to the individual lots.

12. Location of the proposal. Give sufficient information for a person to understand the precise location of your proposed project, including a street address, if any, and section, township, and range, if known. If a proposal would occur over a range of area, provide the range or boundaries of the site(s). Provide a legal description, site plan, vicinity map, and topographic map, if reasonably available. While you should submit any plans required by the agency, you are not required to duplicate maps or detailed plans submitted with any permit applications related to this checklist.

The project is located at 6609 and 6715 Henderson Blvd SE on Parcels 12701320105, 79300000100 and 79300000101, in the city of Tumwater, Thurston County, Washington.

EVALUATION FOR AGENCY USE ONLY

B. ENVIRONMENTAL ELEMENTS

1. Earth

a. General description of the site

☐ Flat ☒ Rolling ☐ Hilly ☐ Steep Slopes ☐ Mountainous

☐ Other: _____

b. What is the steepest slope on the site (approximate percent slope)?

The steepest slope is 56% in the center of the site.

c. What general types of soils are found on the site (for example, clay, sand, gravel, peat, muck)? If you know the classification of agricultural soils, specify them and note any agricultural land of long-term commercial significance and whether the proposal results in removing any of these soils.

According the the NRCS Soil Survey, the site soils are predominately Indianola loamy sand, a somewhat excessively drained soil.

d. Are there surface indications or history of unstable soils in the immediate vicinity? If so, describe.

No, not to our knowledge.

e. Describe the purpose, type, total area, and approximate quantities and total affected area of any filling, excavation, and grading proposed. Indicate source of fill.

The site is in preliminary design but it is anticipated 19,000 cy of cut and 23,000 cy of fill, for a net 4,000 cy import.

f. Could erosion occur as a result of clearing, construction, or use? If so, generally describe.

Yes, some erosion could occur during the course of construction. A TESC plan will be submitted as part of the site development plans and BMPs recommended by the geotechnical engineer will be used during the course of construction.

g. About what percent of the site will be covered with impervious surfaces after project construction (for example, asphalt or buildings)?

The project will meet the code requirements for maximum impervious surfaces. Lots will be limited to 70% impervious surface. The full development including roads and tracts will be approximately 60% impervious.

h. Proposed measures to reduce or control erosion, or other impacts to the earth, if any:

A temporary erosion control plan will be submitted to the City prior to any site development and it will be implemented accordingly. Erosion potential will be mitigated in accordance with the City of Tumwater regulations.

2. Air

a. What types of emissions to the air would result from the proposal during construction, operation, and maintenance when the project is completed?

EVALUATION FOR AGENCY USE ONLY

If any, generally describe and give approximate quantities if known.
Unknown. Typical of a construction site. When the project is completed quantities will be typical of a residential neighborhood.

EVALUATION FOR AGENCY USE ONLY

b. Are there any off-site sources of emissions or odor that may affect your proposal? If so, generally describe.

No, not to our knowledge.

c. Proposed measures to reduce or control emissions or other impacts to air, if any:

Watering may be necessary during construction to control dust. Air quality is regulated by three agencies: The US Environmental Protection Agency (EPA), the Washington State Department of Ecology (DOE) and the Southwest Clean Air Agency. Each agency has established regulations that govern the concentration of pollutants and contaminant emissions from air pollution sources. Proposed construction of the project will be accordance with these regulations. `

3. **Water**

a. Surface Water:

1) Is there any surface water body on or in the immediate vicinity of the site (including year-round and seasonal streams, saltwater, lakes, ponds, wetlands)? If yes, describe type and provide names. If appropriate, state what stream or river it flows into. **There is an offsite wetland on the parcel to the south with it's buffer extending onto the southern portion of the project site. Susan Lake is approximately 0.18 miles east of the project site and Munn Lake is approximately 0.37 miles east of the project site.**

2) Will the project require any work over, in, or adjacent to (within 200 feet) the described waters? If yes, please describe and attach available plans. **Yes, the project may require work within 200 feet of the offsite wetland, however no work will be within the buffer area, and the buffer will remain undisturbed.**

Confirmed on Preliminary Plat and other documentation.

3) Estimate the amount of fill and dredge material that would be placed in or removed from surface water or wetlands and indicate the area of the site that would be affected. Indicate the source of fill material.

No fill or dredge material will be placed in or removed from the wetland.

4) Will the proposal require surface water withdrawals or diversions? Give general description, purpose, and

approximate quantities if known.

There will be no surface water withdrawals.

EVALUATION FOR AGENCY USE ONLY

5) Does the proposal lie within a 100-year floodplain? If so, note location on the site plan.

According to FEMA map panel 53067C0282F, the site lies outside of the 100-year floodplain.

6) Does the proposal involve any discharges of waste materials to surface waters? If so, describe the type of waste and anticipated volume of discharge.

The project does not involve discharges of waste materials to surface waters.

b. Ground Water:

1) Will groundwater be withdrawn from a well for drinking water or other purposes? If so, give a general description of the well, proposed uses and approximate quantities withdrawn from the well. Will water be discharged to groundwater? Give general description, purpose, and approximate quantities if known.

The proposed project will not withdraw or discharge to groundwater. The site will connect to the City of Tumwater water system.

2) Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (for example: Domestic sewage; industrial, containing the following chemicals. . . ; agricultural; etc.). Describe the general size of the system, the number of such systems, the number of houses to be served (if applicable), or the number of animals or humans the system(s) are expected to serve.

Waste materials will not be discharged into the ground. The project will connect to the City of Tumwater sewer system.

c. Water runoff (including stormwater):

1) Describe the source of runoff (including storm water) and method of collection and disposal, if any (include quantities, if known). Where will this water flow?

Stormwater will be collected by a series of catch basins and routed to a treatment filter manhole/vault where it will be treated then conveyed to an onsite infiltration trench.

Will this water flow into other waters? If so, describe.

No.

2) Could waste materials enter ground or surface waters? If so, generally describe **Minimal waste material (i.e., petroleum or other road fuel waste) will be generated from use of the proposed parking areas. The project design will include a surface water collection system intended to capture potential contaminates and runoff. Standard construction BMPs will include erosion and sediment control, and spill prevention countermeasures.**

3) Does the proposal alter or otherwise affect drainage patterns in the vicinity of the site? If so, describe.

No.

d. Proposed measures to reduce or control surface, ground, and runoff water, and drainage pattern impacts, if any:

Stormwater will be treated prior to discharge in accordance with the "Drainage Design and Erosion Control Manual for Tumwater (2018)". Stormwater quality and quantity measures will be provided on site. In addition, through the implementation of BMPs for this type of improvement work, the applicant will ensure that potential erosion resulting from construction activities is prevented. All catch basins will be protected with barriers to prevent sediment from entering the storm drainage system.

4. **Plants**

a. Check the types of vegetation found on the site:

- [X] deciduous tree: alder, maple, aspen, other
- [X] evergreen tree: fir, cedar, pine, other
- [X] shrubs
- [X] grass
- [ ] pasture
- [ ] crop or grain
- [ ] orchards, vineyards or other permanent crops.
- [ ] wet soil plants: cattail, buttercup, bullrush, skunk cabbage, other
- [ ] water plants: water lily, eelgrass, milfoil, other

other types of vegetation

b. What kind and amount of vegetation will be removed or altered?

All of the vegetation within the project area will be removed.

c. List threatened and endangered species known to be on or near the site. **None known.**

EVALUATION FOR AGENCY USE ONLY

d. Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any:

Perimeter landscaping and street trees will be provided in accordance with the City of Tumwater Municipal Code. Native vegetation within the wetland buffer and the open space tracts will remain undisturbed.

e. List all noxious weeds and invasive species known to be on or near the site.

Blackberries

5. **Animals**

a. List any birds and other animals which have been observed on or near the site or are known to be on or near the site. Examples include:
- birds: hawk, heron, eagle, songbirds, other: **Crows**
- mammals: deer, bear, elk, beaver, other: **mice, rabbits**
- fish: bass, salmon, trout, herring, shellfish
- other:

b. List any threatened and endangered species known to be on or near the site

None known.

Confirmed with gopher study.

c. Is the site part of a migration route? If so, explain.

The site is within the Pacific Flyway for Migratory Birds.

d. Proposed measures to preserve or enhance wildlife, if any:

No special measures are proposed.

e. List any invasive animal species known to be on or near the site.

None known.

6. **Energy and natural resources**

a. What kinds of energy (electric, natural gas, oil, wood stove, solar) will be used to meet the completed project's energy needs? Describe whether it will be used for heating, manufacturing, etc.

Electricity will be used for illumination and gas will be used for heating.

EVALUATION FOR AGENCY USE ONLY

b. Would your project affect the potential use of solar energy by adjacent properties? If so, generally describe.

No, not to our knowledge.

c. What kinds of energy conservation features are included in the plans of this proposal? List other proposed measures to reduce or control energy impacts, if any:

The project will be in compliance with the Washington State Energy Code and will utilize energy conservation features where possible.

EVALUATION FOR AGENCY USE ONLY

7. **Environmental health**

a. Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire and explosion, spill, or hazardous waste, that could occur as a result of this proposal? If so, describe.

1) Describe any known or possible contamination at the site from present or past uses.

None known.

2) Describe existing hazardous chemicals/conditions that might affect project development and design. This includes underground hazardous liquid and gas transmission pipelines located within the project area and in the vicinity.

None known.

3) Describe any toxic or hazardous chemicals that might be stored, used, or produced during the project's development or construction, or at any time during the operating life of the project.

None known.

4) Describe special emergency services that might be required.

None anticipated.

5) Proposed measures to reduce or control environmental health hazards, if any:

In the event hazardous material is stored at the site, the project will comply with all health and safety codes.

b. **Noise**

1) What types of noise exist in the area which may affect your project (for example: traffic, equipment, operation, other)?

Most of the noise is from traffic along Henderson Blvd SE. It is not anticipated to affect the project.

2) What types and levels of noise would be created by or associated with the project on a short-term or a long-term basis (for example: traffic, construction, operation, other)? Indicate what hours noise would come from the site.

Short term noise will be typical of construction activity. Long term noise will be passenger vehicles entering and leaving the site.

3) Proposed measures to reduce or control noise impacts, if any:

No special measures are proposed.

EVALUATION FOR AGENCY USE ONLY

8. **Land and shoreline use**

a. What is the current use of the site and adjacent properties? Will the proposal affect current land uses on nearby or adjacent properties? If so, describe **The site is currently being used as a mix of retail, a single family residence, and several mobile homes.**

b. Has the project site been used as working farmlands or working forest lands? If so, describe. How much agricultural or forest land of long-term commercial significance will be converted to other uses as a result of the proposal, if any? If resource lands have not been designated, how many acres in farmland or forest land tax status will be converted to nonfarm or nonforest use?

No, not to our knowledge.

1) Will the proposal affect or be affected by surrounding working farm or forest land normal business operations, such as oversize equipment access, the application of pesticides, tilling, and harvesting? If so, how:

No, not to our knowledge.

c. Describe any structures on the site.

There is an older commercial building, a single family residence and several mobile homes.

d. Will any structures be demolished? If so, what?

All of the structures onsite will be demolished.

e. What is the current zoning classification of the site?

The western portion of the site is zoned Single-Family Low Density and eastern portion of the site is zoned Single-Family Medium Density.

f. What is the current comprehensive plan designation of the site?

Single-Family Low Density and Single-Family Medium Density

g. If applicable, what is the current shoreline master program designation of the site?

Not applicable.

h. Has any part of the site been classified as a critical area by the city or county? If so, specify.

A small wetland to the south of the project was identified in the Critical Areas Report prepared by EnviroVector dated September 15, 2021. A 150 foot buffer is shown on the preliminary plat plans.

i. Approximately how many people would reside or work in the completed project?

Approximately 85 to 120 people may reside at the completed project.

j. Approximately how many people would the completed project displace?

None. The residents of the existing single family residence and mobile homes are voluntarily relocating.

k. Proposed measures to avoid or reduce displacement impacts, if any:

No special measures are proposed.

L. Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any:

The project meets the intended use for SFL and SFM zoning districts and existing and project land uses.

m. Proposed measures to ensure the proposal is compatible with nearby agricultural and forest lands of long-term commercial significance, if any:

No special measures are proposed.

EVALUATION FOR AGENCY USE ONLY

Verified by report.

9. **Housing**

EVALUATION FOR AGENCY USE ONLY

a. Approximately how many units would be provided, if any? Indicate whether high, middle, or low-income housing.

45 middle income housing units are proposed.

b. Approximately how many units, if any, would be eliminated? Indicate whether high, middle, or low-income housing.

Several mobile homes, a single family residence, and a small commercial building will be demolished. All of the structures are in poor condition.

c. Proposed measures to reduce or control housing impacts, if any:

No special measures are proposed.

10. **Aesthetics**

a. What is the tallest height of any proposed structure(s), not including antennas; what is the principal exterior building material(s) proposed?

The exterior material will be wood. The tallest height will not exceed what is permitted in the SFL/SFM zone.

b. What views in the immediate vicinity would be altered or obstructed?

The view will transition from mobile homes, a single family residence and a small commercial building, to an attractive residential neighborhood.

c. Proposed measures to reduce or control aesthetic impacts, if any:

Perimeter landscaping and interior roadway landscaping will reduce aesthetic impacts.

11. **Light and glare**

a. What type of light or glare will the proposal produce? What time of day would it mainly occur?

Lighting will be typical of a residential neighborhood and would likely occur at dusk.

b. Could light or glare from the finished project be a safety hazard or interfere with views?

No. Lighting will be directed downward so as not to interfere with views or provide glare.

c. What existing off-site sources of light or glare may affect your proposal?

There are no off-site sources of light or glare that will impact the proposal.

d. Proposed measures to reduce or control light and glare impacts, if any:

Lighting fixtures will be shielded and lighting cast downward to reduce light and glare impacts. All lighting fixtures will meet City requirements for light spill.

EVALUATION FOR AGENCY USE ONLY

12. **Recreation**

a. What designated and informal recreational opportunities are in the immediate vicinity?

Munn Lake is approximately 0.30 miles east of the site and offers fishing and boating opportunities. Tumwater High School is 1.20 miles west of the site and has ball fields and track available for public after school hours.

b. Would the proposed project displace any existing recreational uses? If so, describe.

No.

c. Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any:

No special measures are proposed.

13. **Historic and cultural preservation**

a. Are there any buildings, structures, or sites, located on or near the site that are over 45 years old listed in or eligible for listing in national, state, or local preservation registers located on or near the site? If so, specifically describe.

The existing house was constructed in 1921 and the commercial building was constructed in 1925, but neither structure is of historical value.

b. Are there any landmarks, features, or other evidence of Indian or historic use or occupation? This may include human burials or old cemeteries. Are there any material evidence, artifacts, or areas of cultural importance on or near the site? Please list any professional studies conducted at the site to identify such resources.

No, not to our knowledge.

Cultural resource study was completed after NOA and sent to DAHP and the tribes that requested the study. No resources were found in the study.

c. Describe the methods used to assess the potential impacts to cultural and historic resources on or near the project site. Examples include consultation with tribes and the department of archeology and historic preservation, archaeological surveys, historic maps, GIS data, etc.

Department of Archeology and Historic Preservation WISAARDmapping was used to assess the property for historical preservation.

d. Proposed measures to avoid, minimize, or compensate for loss, changes to, and disturbance to resources. Please include plans for the above and any permits that may be required.

If cultural or archeological objects are found during site preparation work, the Washington State Department of Archaeology and Historic Preservation will be notified, and appropriate measures will be taken.

EVALUATION FOR AGENCY USE ONLY

14. **Transportation**

a. Identify public streets and highways serving the site or affected geographic area and describe proposed access to the existing street system. Show on site plans, if any.

Henderson Blvd SE abuts the east boundary of the project. The project proposes one access from Henderson Blvd SE.

b. Is the site or affected geographic area currently served by public transit? If so, generally describe. If not, what is the approximate distance to the nearest transit stop?

The nearest Intercity Transit stop is at the intersection of Israel Road and Capitol Blvd, approximately 1 mile west of the site.

c. How many additional parking spaces would the completed project or non-project proposal have? How many would the project or proposal eliminate?

Each home will have a two car garage and parking available in the driveway.

d. Will the proposal require any new or improvements to existing roads, streets, pedestrian, bicycle or state transportation facilities, not including driveways? If so, generally describe (indicate whether public or private).

unknown at this time.

Dedication of ROW along Henderson and 1/2 street improvements along Henderson as shown on the site plan.

e. Will the project or proposal use (or occur in the immediate vicinity of) water, rail, or air transportation? If so, generally describe.

No.

f. How many vehicular trips per day would be generated by the completed project or proposal? If known, indicate when peak volumes would occur and what percentage of the volume would be trucks (such as commercial and nonpassenger vehicles).

According to the traffic impact analysis prepared by Heath and Associates dated October 2021, the project will generate 405 average trips per day, with 30 AM peak trips and 40 PM peak trips.

What data or transportation models were used to make these estimates?

See traffic impact analysis prepared by Heath and Associates dated October 2021.

EVALUATION FOR AGENCY USE ONLY

g. Will the proposal interfere with, affect or be affected by the movement of agricultural and forest products on roads or streets in the area? If so, generally describe:

No.

h. Proposed measures to reduce or control transportation impacts, if any:

Payment of traffic impact fees to the City of Tumwater.

15. **Public services**

a. Would the project result in an increased need for public services (for example: fire protection, police protection, public transit, health care, schools, other)? If so, generally describe.

The proposed development would not create a significant new need for these services.

b. Proposed measures to reduce or control direct impacts on public services, if any.

Payment of impact fees to the City of Tumwater.

16. **Utilities**

a. Circle utilities currently available at the site:
electricity, natural gas, water, refuse service, telephone, sanitary sewer, septic system, other:

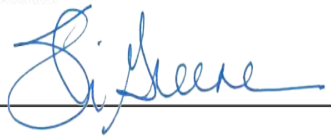
b. Describe the utilities that are proposed for the project, the utility providing the service, and the general construction activities on the site or in the immediate vicinity which might be needed.

Water: City of Tumwater
Sewer: City of Tumwater
Garbage: LeMay
Cable: Comcast
Electricity and Gas: PSE

C. Signature

EVALUATION FOR AGENCY USE ONLY

The above answers are true and complete to the best of my knowledge. I understand that the lead agency is relying on them to make its decision.

Signature: 

Name of signee: Sheri Greene

Position: Assistant Project Manager

Agency/Organization: AHBL

Date Submitted: 12/8/2021

D. Signature – Property Owner's Review, Port of Olympia (if applicable)

I certify that I have reviewed the above environmental checklist prepared by the applicant and that the project is consistent with the tenant's lease for Port property. The Port's comments have been incorporated in the document as submitted or as noted.

Port of Olympia – Please Print: _____

Port of Olympia – Signature: _____

Date Submitted: _____

E. CITY OF TUMWATER

Reviewed by: Alex Baruch, Associate Planner

Date: May 9, 2022

F. Supplemental sheet for nonproject actions [help]

(**IT IS NOT NECESSARY** to use this sheet for project actions)

Because these questions are very general, it may be helpful to read them in conjunction with the list of the elements of the environment.

When answering these questions, be aware of the extent the proposal, or the types of activities likely to result from the proposal, would affect the item at a greater intensity or at a faster rate than if the proposal were not implemented. Respond briefly and in general terms.

EVALUATION FOR AGENCY USE ONLY

1. How would the proposal be likely to increase discharge to water; emissions to air; production, storage, or release of toxic or hazardous substances; or production of noise?

Proposed measures to avoid or reduce such increases are:

2. How would the proposal be likely to affect plants, animals, fish, or marine life?

Proposed measures to protect or conserve plants, animals, fish, or marine life are:

3. How would the proposal be likely to deplete energy or natural resources?

Proposed measures to protect or conserve energy and natural resources are:

4. How would the proposal be likely to use or affect environmentally sensitive areas or areas designated (or eligible or under study) for governmental protection; such as parks, wilderness, wild and scenic rivers, threatened or endangered species habitat, historic or cultural sites, wetlands, floodplains, or prime farmlands?

Proposed measures to protect such resources or to avoid or reduce impacts are:

EVALUATION FOR AGENCY USE ONLY

5. How would the proposal be likely to affect land and shoreline use, including whether it would allow or encourage land or shoreline uses incompatible with existing plans?

Proposed measures to avoid or reduce shoreline and land use impacts are:

6. How would the proposal be likely to increase demands on transportation or public services and utilities?

Proposed measures to reduce or respond to such demand(s) are:

7. Identify, if possible, whether the proposal may conflict with local state, or federal laws or requirements for the protection of the environment.

HENDERSON BOULEVARD PROPERTY

THURSTON COUNTY, WASHINGTON

CRITICAL AREAS REPORT

Prepared By:

Curtis Wambach, M.S.
Senior Biologist and Principal

EnviroVector
OPTIMIZE USABLE LAND

15 September 2021

360-790-1559

www.envirovector.com

HENDERSON BOULEVARD PROPERTY

CRITICAL AREAS REPORT

Prepared For:

Soundbuilt

Prepared By:

Curtis Wambach, M.S.,
Senior Biologist and Principal
EnviroVector
Olympia, WA 98502

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EnviroVector
OPTIMIZE USABLE LAND
www.envirovector.com

15 September 2021

Contents

1.0 INTRODUCTION

1.1 Purpose

The purpose of this Critical Areas Report is to identify and map Critical Areas on and within three hundred (300) feet of the subject property. This Critical Areas Report has been prepared to satisfy City of Tumwater reporting requirements.

1.2 Property Location

The 9.73-acre subject property is located in Tumwater, WA Section 02 Township 17 North and Range 2 West (**Figure 1; Table 1**).

Table 1. Parcels Comprising Subject Property

No#	Property Address	Parcel Number	Section Township Range	Property Size (Acres)
1	---	12701320105	Section 02 Township 17N Range 2W	0.34
2	---	79300000101		4.77
3	---	79300000100		4.62
3 Parcels	Total Size			9.73 acres

The permitting jurisdiction is City of Tumwater.

1.3 Site Evaluation

Critical Areas evaluations were performed on the subject property on 7 July 2021.

1.4 Subject Property

The site is made up of three (3) contiguous parcels (**Figures 2 & 3**). The eastern portion of the subject property contains building and internal roads (**Appendix A, Photos 5-8**). The western portion of the subject property is forested with a herbaceous understory (**Appendix A, Photos 1 & 3**). Maintained lawn and grassy areas are located throughout the property (**Appendix A, Photos 2, 4-8**). The parcel west of the subject property is currently under development (**Appendix A, Photos 9 & 10**).

The property is bordered by Henderson Blvd SE to the east, single family homes to the east and south, undeveloped single-family lots to the north. The property to the west is currently under construction. The neighboring properties include high intensity single-family lots smaller than one (1) acre in size.

2.0 METHODOLOGY

This report is based on a review of existing information and field investigations. The goal of these efforts is to collect and document existing information that reflects current site conditions for assessing potential impacts.

2.1 Review of Existing Literature

Prior to conducting fieldwork, and throughout the duration of project design, biologists reviewed existing information to identify wetlands, streams, vegetation patterns, topography, soils, wildlife habitats, and other natural resources in the project area. Existing data sources that were reviewed for this report included, but were not limited to, the following:

- Washington. U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS) Soil Survey
- U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI), online wetlands mapper
- Washington Department of Fish and Wildlife (WDFW) Salmonscape Database
- Washington Department of Fish and Wildlife (WDFW) Priority Habitats and Species Database
- Washington State Department of Natural Resources (DNR) Natural Heritage Database
- Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM) and Flood Insurance Studies

2.2 Field Investigation

A wetland evaluation was performed on-site as well as off-site of the subject property to determine if wetlands, streams, or their buffers extend onto the subject property. The routine on-site determination method was used to identify potential wetlands using the procedures outlined in the *Corps of Engineers Wetland Delineation Manual* (Environmental Laboratory, 1987) and the 2010 USACE Regional Wetland Supplement.

Under the Thurston County Code (TCC), wetlands are defined as areas that are inundated or saturated by ground or surface water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

Wetlands do not include those artificial wetlands intentionally created from non-wetland sites, including, but not limited to, irrigation and drainage ditches, grass-lined swales, canals, detention facilities, wastewater treatment facilities, farm ponds, and landscape amenities, or those wetlands created after July 1, 1990, that were unintentionally created as a result of the construction of a road, street, or highway.

Wetlands may include those artificial wetlands intentionally created from non-wetland areas created to mitigate conversion of wetlands.

2.3 Wetland Identification

Prior to 2010, biologists delineated wetlands according to the methods specified in the U.S. Army Corps of Engineers (USACE) Wetlands Delineation Manual (Environmental Laboratory 1987). At that time, these methods complied with those in the Washington State Wetland Identification and Delineation Manual (Washington State Department of Ecology [Ecology] 1997).

Following 2010, biologists evaluate wetlands according to the methods specified in the USACE's Wetlands Delineation Manual (Environmental Laboratory 1987) and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0) (USACE 2010). These methods comply with those adopted by Washington State pursuant to Washington Administrative Code (WAC) 173-22-035, Revised Code of Washington (RCW) 90.58.380.

2.3.1 Vegetation

The dominant plants and their wetland indicator status were evaluated to determine whether the vegetation is hydrophytic. Hydrophytic vegetation is generally defined as vegetation adapted to prolonged saturated soil conditions. To meet the hydrophytic vegetation criterion, more than 50 percent of the dominant plants must be facultative, facultative wetland, or obligate, according to the plant indicator status category assigned to each plant species by the USACE National Wetland Plant List. **Insert 1** provides the definitions of the indicator status categories. The scientific and common names for plants follow the currently accepted nomenclature. Dominant plant species were observed and recorded.

Insert 1. Key to Plant Indicator Status Categories

Plant Indicator Status Category	Symbol	Description
Obligate Wetland Plants	OBL	Plants that almost always (>99% of the time) occur in wetlands but may rarely (<1% of the time) occur in non-wetlands
Facultative Wetland Plants	FACW	Plants that often (67% to 99% of the time) occur in wetlands but sometimes (1% to 33% of the time) occur in non-wetlands
Facultative Plants	FAC	Plants with a similar likelihood (33% to 66% of the time) of occurring in both wetlands and non-wetlands
Facultative Upland Plants	FACU	Plants that sometimes (1% to 33% of the time) occur in wetlands but occur more often (67% to 99% of the time) in non-wetlands
Upland Plants	UPL	Plants that rarely (<1% of the time) occur in wetlands and almost always (> 99% of the time) occur in non-wetlands

2.3.2 Soils

No test plots or soil samples were collected. No wetlands were identified on the subject property (See Results Section)

2.3.3 Hydrology

The project area was examined for evidence of hydrology. The U.S. Army Corps of Engineers (2005) provides a technical standard for monitoring hydrology on such sites. This standard requires fourteen (14) or more consecutive days of flooding or ponding, or a water table twelve (12) in. (thirty [30] cm) or less below the soil surface, during the growing season at a minimum frequency of five (5) years in 10 (fifty percent [50%] or higher probability). The USACE 2010 Regional Supplement provides a list of hydrology indicators to evaluate whether the hydrology standard is satisfied. If wetland hydrology, including pooling, ponding, and soil saturation, is not clearly evident, hydrological conditions may be observed through surface or soil indicators. Indicators of hydrological conditions include oxidized root channels, drainage patterns, drift lines, sediment deposition, watermarks, historic records, visual observation of saturated soils, and visual observation of inundation.

2.4 Wetland Classification and Rating

Delineated wetlands were classified according to the USFWS Classification of Wetlands and Deepwater Habitats of the United States. Hydrogeomorphic classifications were assigned to wetlands using USACE methods established in a Hydrogeomorphic Classification for Wetlands were rated using the revised Washington State Wetland Rating System for Western Washington.

3.0 STUDY RESULTS

3.1 Background Information

3.1.1 Thurston County Geodata Soils

No hydric soils are mapped on the subject property. Two (2) non-hydric soil types are mapped on the subject property by Thurston County Geodata (**Appendix B; Table 2**). Mukilteo muck is a hydric soil type mapped off-site immediately south of the subject property.

Table 2. Thurston County Geodata Soil Summary

Soil Unit	Hydric	Comments
Indianola loamy sand, 0 to 3% slopes	No	Covers eastern half of subject property
Indianola loamy sand, 3 to 15% slopes	No	Covers western half of subject property

3.1.2 Thurston County Geodata Wetlands & Streams

No wetlands are mapped on the subject property by Thurston County Geodata (**Appendix C**). Two (2) off-site wetlands are mapped five hundred sixty-five (565) feet west and three hundred sixty-two (362) feet to the east of the subject property across Henderson Boulevard SE.

3.1.3 WDFW Priority Habitats and Species (PHS) Database

No priority habitats or species are mapped on the subject property by the Washington Department of Fish and Wildlife (WDFW) PHS database (**Appendix D**). The Mazama pocket gopher is mapped directly south of subject property. Freshwater emergent wetland is mapped just over four hundred (400) feet west of the subject property. Freshwater Forested/shrub wetland is mapped just over three hundred (300) feet east of the subject property. The Big Brown bat and Townsend's bat is mapped in the township.

3.1.4 Clean Water Act 303(d) List

No 303(d) listed waterbodies are mapped on the subject property. One (1) 303(d) listed waterbody is mapped 0.27 miles north of the subject property by the Department of Ecology Water Quality Atlas Map (**Appendix E**). The site and surrounding basin drains to the south.

3.1.5 Total Maximum Daily Load (TMDL)

An approved TMDL is mapped on the subject property by the Department of Ecology Water Quality Atlas Map (**Appendix F**).

3.1.6 High Groundwater Hazard Area

No High Groundwater Hazard Area is mapped on the subject property by Thurston County Geodata (**Appendix G**).

3.1.7 FEMA Floodplain

No FEMA floodplain is mapped on the subject property by the Thurston County Geodata Center database (**Appendix H**). FEMA floodplains are mapped to over three hundred (300) feet the subject property east of Henderson Blvd (**Appendix H**).

3.2 Field Results

No wetlands or streams have been identified on the subject property during this study (**Figures 2 & 3; Table 3**). One (1) off-site wetland, labeled Wetland A, has been identified south of the subject property

Wetland A has not been delineated because it is located offsite. Permission was not obtained to delineate off-site wetlands.

No streams were identified onsite or within three hundred (300) feet of the subject property.

A summary of the Critical Areas study can be found in **Table 3**.

Table 3. Summary of Critical Areas Results

Wetlands						
Wetland	Area of Wetland		Cowardin Class	Buffer Condition	Habitat Features	Comments
	On-site	Total				
Wetland A	0 sf (0 acres)	44,753.00 sf (1.03 acres)	PSSC[1]	Upland vegetation at buffer	None Observed	Shallow depression

1. PSSC: Palustrine Scrub-shrub Seasonally-flooded

3.2.1 Wetland A

The off-site Wetland A is located south of the subject property. The wetland boundary is well-defined by skunk cabbage (

Wetland A is a shallow depression that holds water during the wet season (**Figures 2 & 3**). The Cowardin classification is Palustrine Scrub-shrub Seasonally flooded (PSSC). The Department of Ecology (DOE; 2014) Wetland Rating System describes vegetation classes and hydroperiods as emergent and seasonally ponded, respectively (**Figure 6**).

Wetland Conditions

Wetland A consists of a relatively undisturbed shallow topographic depression.

No potential sources of pollutants occur within one hundred fifty (150) feet as defined in the DOE (2014) Wetland Rating System (**Figure 7**). Habitat within one (1) kilometer is shown in **Figure 8**, and the wetland contributing basin is shown in **Figure 9**.

Hydrology

Hydrology derives from local precipitation and groundwater. Water accumulates and ponds in this shallow depression during the wet season. No outlet was identified during the site evaluation.

Vegetation

Dominant plant species identified in Wetland A include (**Appendix A, Photos 11-14 & 14-21**):

- Douglas spirea (*Spiraea douglasii*, FACW)
- Pacific crabapple (*Malus fusca*; FACW)
- Skunk cabbage (*Lysichiton americanus,* OBL)
- Slough sedge (*Carex obnupta*, OBL)
- Oregon Ash (*Fraxinus latifolia,* FACW)
- Salmonberry (*Rubus spectabilis*, FAC)
- Water parsley (*Oenanthe sarmentosa,* OBL)
- Red cedar (*Thuja plicata,* FAC)

Dominant upland plant species adjacent to wetland include (**Appendix A, Photo 914**):

- Bracken fern (*Pteridium aquilinum*, FACU)
- Queen Anne's Lace (*Daucus carota*, FACU)
- Oxeye daisy (*Leucanthemum vulgare*, FACU)
- Hawksbeard (*Crepis tectorum*, FACU)
- Hair cat's ear (*Hypochaeris radicata*, FACU)
- Ocean spray (*Holodiscus maxim*, FACU)
- Fox glove (*Digitalis purpurea*, FACU)
- Salal (*Gaultheria* shallon, FACU)
- Sweet vernal grass (*Anthoxanthum odoratum*, FACU)
- Sword fern (*Polystichum munitum*, FACU)
- Oregon grape (*Mahonia aquifolium*, FACU)
- Big leaf maple (*Acer macrophyllum*, FACU)

Soils

Soils were not excavated as the wetland is located on private property not controlled by the applicant. Thereby, no test plot data was collected.

Habitat Features

No habitat features were identified in Wetland A.

4.0 REGULATORY CONSIDERATIONS

Wetland regulatory considerations have been summarized in **Table 4** and illustrated in **Figures 4 & 5**.

Table 4. Summary of Regulatory Considerations

Wetlands								
Wetland	Area of Wetland		Category	Habitat Score	Land Use Intensity	Standard Buffer	Reduced Buffer	Comments
	Onsite	Total						
Wetland A	0 sf (0.00 acres)	44,753 sf (1.03 acres)	III	5 (L, M, M)	High	150 ft	110 ft	Off-site wetland, buffer extends onsite

4.1 Wetland A

Wetland A has been classified as a Category III wetland using the DOE (2014) Wetland Rating Form for Western Washington as required under Thurston County Code (TCC) Chapter 24.30.030---*Wetland categories*. The HGM class is depressional under the DOE (2014) Wetland Rating System.

Under Tumwater Municipal Code, Chapter 16.28.170 --- *Wetland buffers*, wetland buffers are calculated based on the habitat score determined by the DOE (2014) Wetland Rating System. The Habitat Functions score for Wetland A is "Low (L)" potential to provide habitat, "Medium (M)" landscape potential to support habitat, and "Medium (M)" potential value to society. Wetlands that rate as L, M, M (order of ratings are not important) for habitat receive a score of five (5) points for total habitat functions (**Appendix I**).

The standard buffer for wetlands that score five (5) points for Habitat Functions provided by the rating of L, M, M require a standard buffer width of one hundred fifty (150) feet (TMC 16.28.080---*Wetland buffers*) (**Figures 4 & 5; Table 5**).

4.2 Wetland Buffer Reduction

Under TMC Chapter 16.28.170---*Wetland buffers*, Subsection (C)---*Buffer Width Reduction*, the buffer widths recommended for land uses with high-intensity impacts to wetlands can be reduced to those widths recommended for moderate-intensity impacts under the following conditions:

1. For wetlands that score moderate or high for habitat (five points or more), the width of the buffer around the wetland can be reduced if both the following criteria are met:
    a. A relatively undisturbed vegetated corridor at least one hundred feet wide is protected between the wetland and any other priority habitats as defined by the Washington State Department of Fish and Wildlife. The corridor must be protected for the entire distance between the wetland and the priority habitat via some type of legal protection such as a conservation easement; and
    b. Measures to minimize the impacts of different land uses on wetlands, such as the examples summarized in Table 16.28.170(5), are applied (**Insert 2**).

Insert 2. Table 16.28.170(5): Measures to Minimize Impacts to Wetlands

Examples of Disturbance	Examples of Measures to Minimize Impacts	Activities That Cause the Disturbance
Lights	Direct lights away from wetland	Parking lots, warehouses, manufacturing, residential
Noise	Locate activity that generates noise away from wetland	Manufacturing, residential
Toxic runoff (1)	*Route all new runoff away from wetland while ensuring that wetland is not dewatered *Establish covenants limiting use of pesticides within 150 ft of wetland *Apply integrated pest management	Parking lots, roads, manufacturing, residential areas, application of agricultural pesticides, landscaping
Stormwater runoff	*Retrofit stormwater detention and treatment for roads and existing adjacent development *Prevent channelized flow from lawns that directly enters the buffer	Parking lots, roads, manufacturing, residential areas, commercial, landscaping
Change in water regime	Infiltrate or treat, detain, and disperse into buffer new runoff from impervious surfaces and new lawns	Impermeable surfaces, lawns, tilling
Pets and human disturbance	*Use privacy fencing *Plant dense vegetation to delineate buffer edge and to discourage disturbance using vegetation appropriate for the ecoregion *Place wetland and its buffer in a separate tract	Residential areas
Dust	Utilize best management practices to control dust	Tilled fields

The proposed project would reduce buffers in compliance with TMC Chapter 16.28.170---*Wetland buffers*, Subsection (C)---*Buffer Width Reduction* by 1) reducing the buffer from the one hundred fifty (150)-foot high land use intensity to the one hundred ten (110)-foot moderate land use intensity, 2) protect a relatively undisturbed vegetated corridor at least one hundred feet wide, and by 3) applying measures to minimize the impacts of different land uses on wetlands, such as the examples summarized in Table 16.28.170(5).

4.3 Wetland Buffer Averaging

Under TMC Chapter 16.28.170---*Wetland buffers*, Subsection (E)---*Standard Wetland Buffer Width Averaging*, standard wetland buffer zones may be modified by averaging buffer widths if it will improve the protection of wetland functions, or if it is the only way to allow for reasonable use of a parcel. Averaging cannot be used in conjunction with the provisions for reductions in buffer widths. Wetland buffer width averaging shall be allowed to improve wetland protection only where a qualified wetlands professional demonstrates all of the following:

1. The wetland has significant differences in characteristics that affect its habitat functions, such as a wetland with a forested component adjacent to a degraded emergent component or a “dual-rated” wetland with a category I area adjacent to a lower rated area;

2. The buffer is increased adjacent to the higher functioning area of habitat or more sensitive portion of the wetland and decreased adjacent to the lower functioning or less sensitive portion;
3. The total area contained in the buffer area after averaging is not less than that which would be contained within the standard buffer; and
4. The buffer at its narrowest point is never less than three-fourths of the required width.

Under TMC Chapter 16.28.170---*Wetland buffers*, Subsection (F), averaging to allow reasonable use of a parcel may be permitted when all of the following are met:

1. There are no feasible alternatives to the site design that could be accomplished without buffer averaging;
2. The averaged buffer will not result in degradation of the wetland's functions and values as demonstrated in the critical area report;
3. The total buffer area after averaging is equal to the area required without averaging; and
4. The buffer at its narrowest point is never less than three-fourths of the required width.

4.4 Stormwater in Buffers

Under TMC 16.28.170--*Wetland buffers*, Subsection (H)---*Permitted Uses in a Wetland Buffer Zone*, surface level stormwater management facilities may be allowed in the outer twenty-five percent (25%) of the wetland buffer using best management practices; provided the community development director makes all of the following determinations:

a. No other location is feasible.
b. The location of such facilities will not degrade the functions or values of the wetland.

5.0 PROPOSED LAND USE

No land use is proposed at this time.

Recommendations include:

- Buffer reduction from one hundred fifty (150) feet to one hundred ten (110) feet with mitigation measures under TMC Chapter 16.28.170---*Wetland buffers*, Subsection (C)---*Buffer Width Reduction.*
- Stormwater management facilities can be located within the outer twenty-five percent (25%) of the wetland buffer. The lowest portion of the subject property.

6.0 CONCLUSION

No wetlands or streams have been identified on the subject property during this study. One (1) off-site wetland, labeled Wetland A, has been identified near the southern subject property boundary (**Figures 2 & 3**).

Wetland A has not been delineated because it is located offsite. Permission was not obtained to delineate off-site wetlands. The off-site Wetland A is located fifty-eight (58) feet south of the subject property. No streams were identified onsite or within three hundred (300) feet of the subject property.

Wetland A is a shallow depression that holds water during the wet season (**Figures 2 & 3**). The Cowardin classification is Palustrine Scrub-shrub Seasonally Flooded (PSSC). The Department of Ecology (DOE; 2014) Wetland Rating System describes vegetation classes and hydroperiods as scrub-shrub and seasonally flooded, respectively.

Wetland A has been classified as a Category III wetland using the DOE (2014) Wetland Rating Form for Western Washington as required under Thurston County Code (TCC) Chapter 24.30.030---*Wetland categories*. The HGM class is depressional under the DOE (2014) Wetland Rating System.

Under Tumwater Municipal Code, Chapter 16.28.170 --- *Wetland buffers*, wetland buffers are calculated based on the habitat score determined by the DOE (2014) Wetland Rating System. The Habitat Functions score for Wetland A is "Low (L)" potential to provide habitat, "Medium (M)" landscape potential to support habitat, and "Medium (M)" potential value to society. Wetlands that rate as L, M, M (order of ratings are not important) for habitat receive a score of five (5) points for total habitat functions.

The standard buffer for wetlands that score five (5) points for Habitat Functions provided by the rating of L, M, M require a standard buffer width of one hundred fifty (150) feet (TMC 16.28.080---*Wetland buffers*) (**Figures 4 & 5**).

Recommendations include:

- Buffer reduction from one hundred fifty (150) feet to one hundred ten (110) feet with mitigation measures under TMC Chapter 16.28.170---*Wetland buffers*, Subsection (C)---*Buffer Width Reduction.*
- Stormwater management facilities can be located within the outer twenty-five percent (25%) of the wetland buffer. The lowest portion of the subject property.

7.0 REFERENCES

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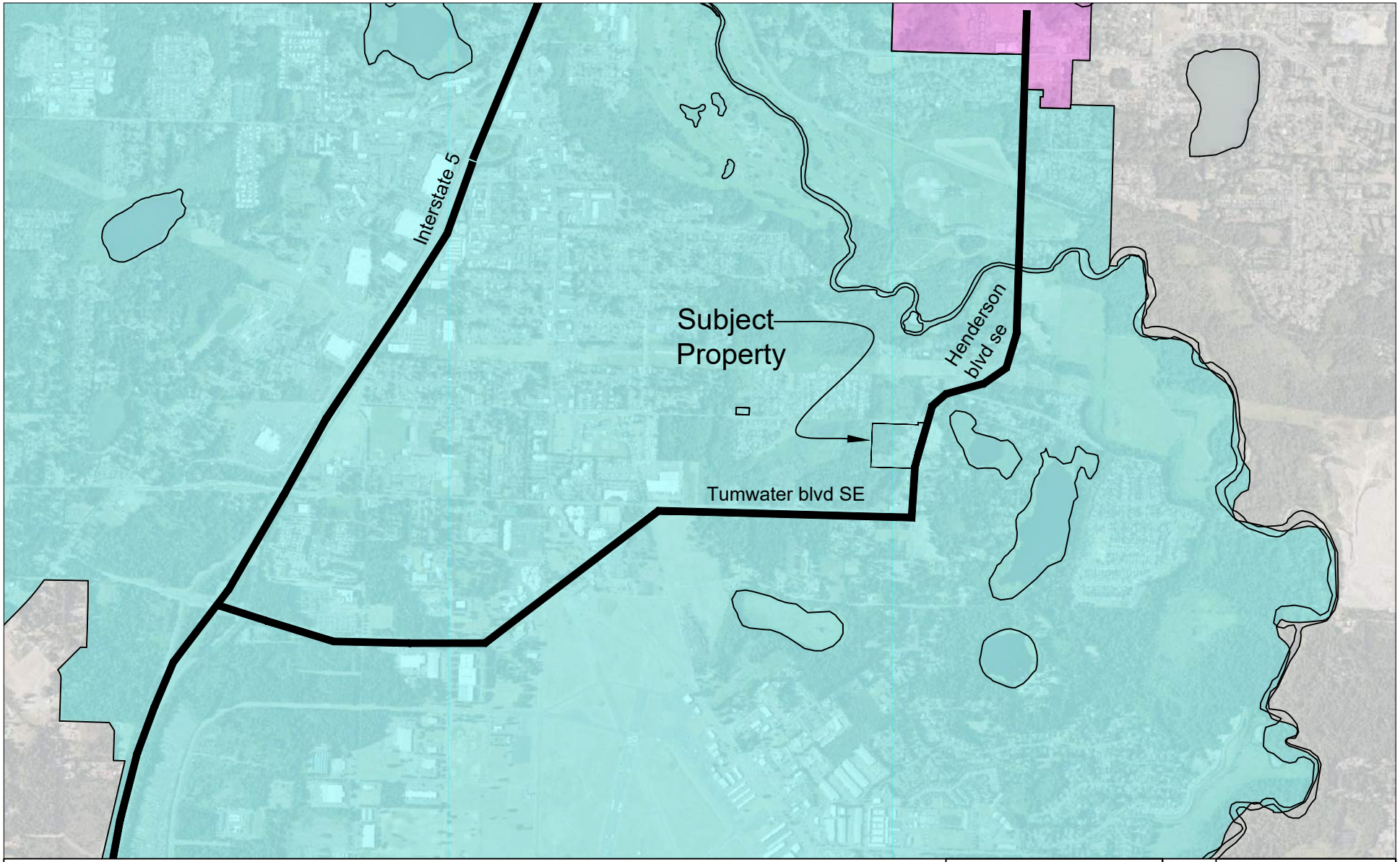
FIGURES



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City of Tumwater
City of Olympia

Figure 1

Henderson Property

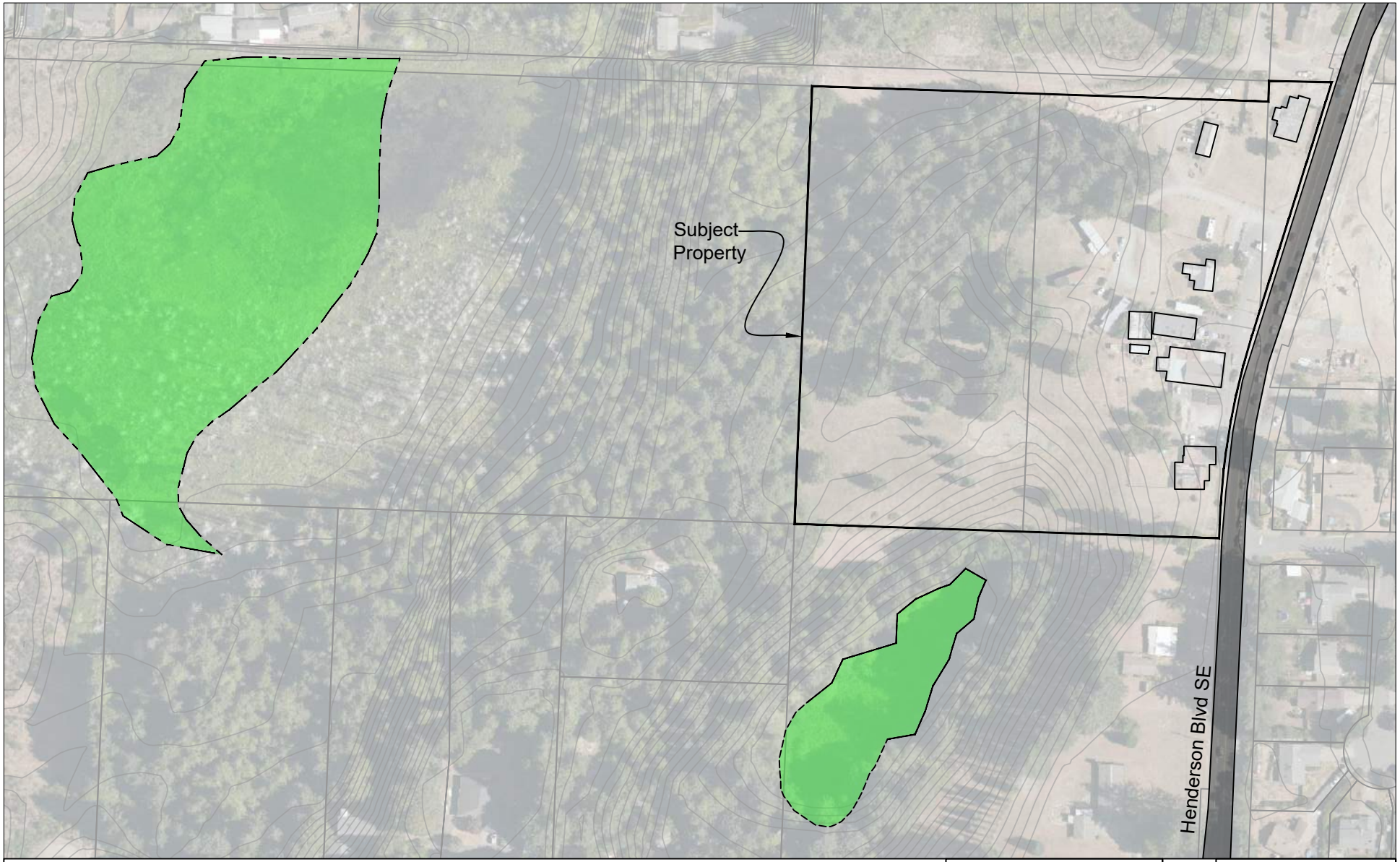
Vicinity Map

N

Scale: 1" = 2000'

0 2000'

15 September 2021



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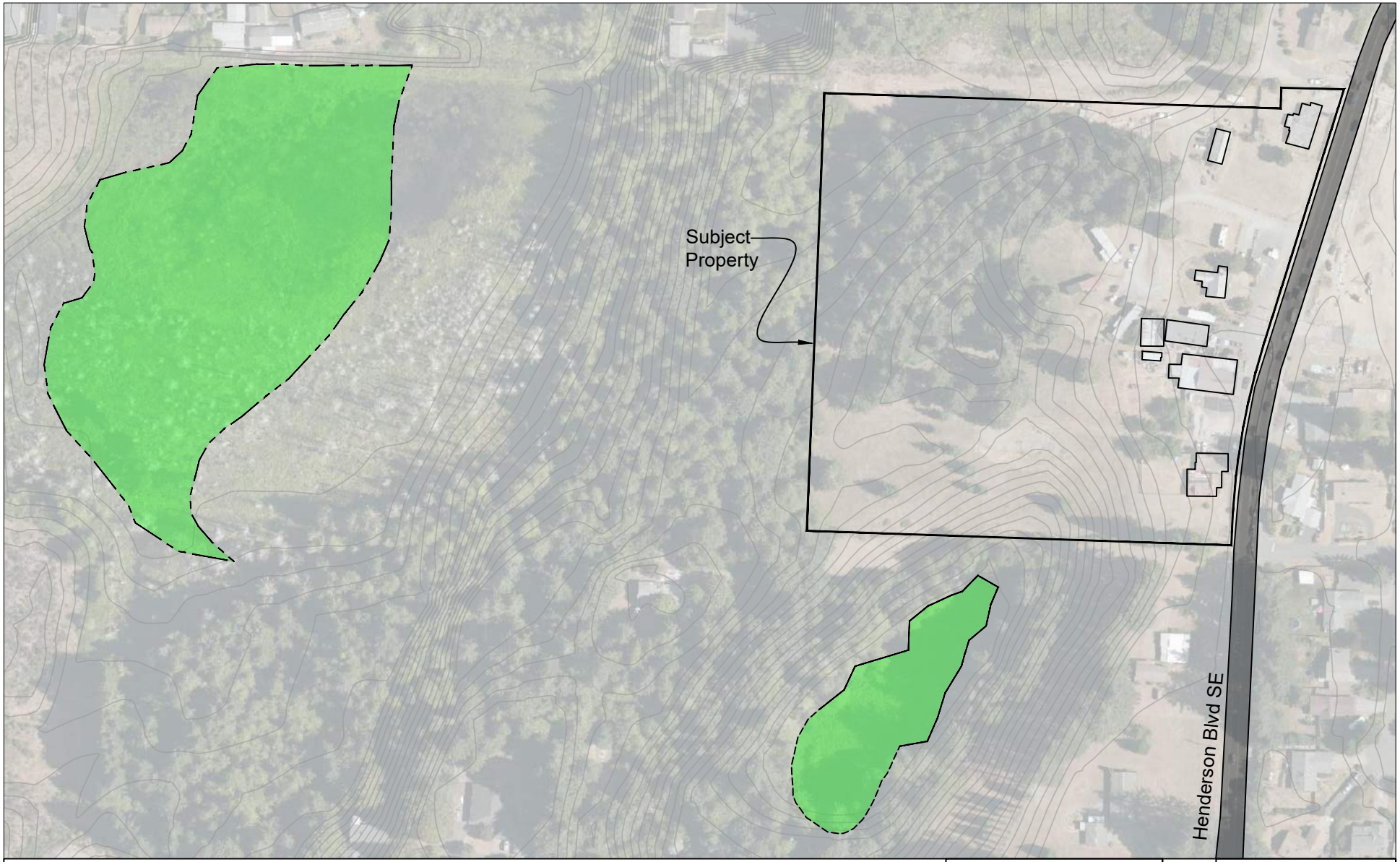
Wetland (Verified)
Wetland (Potential)
Wetland (Thurston Co. Geodata)

Figure 2
Henderson Property
Existing Conditions

N

Scale: 1" = 200'
0 200'

15 September 2021



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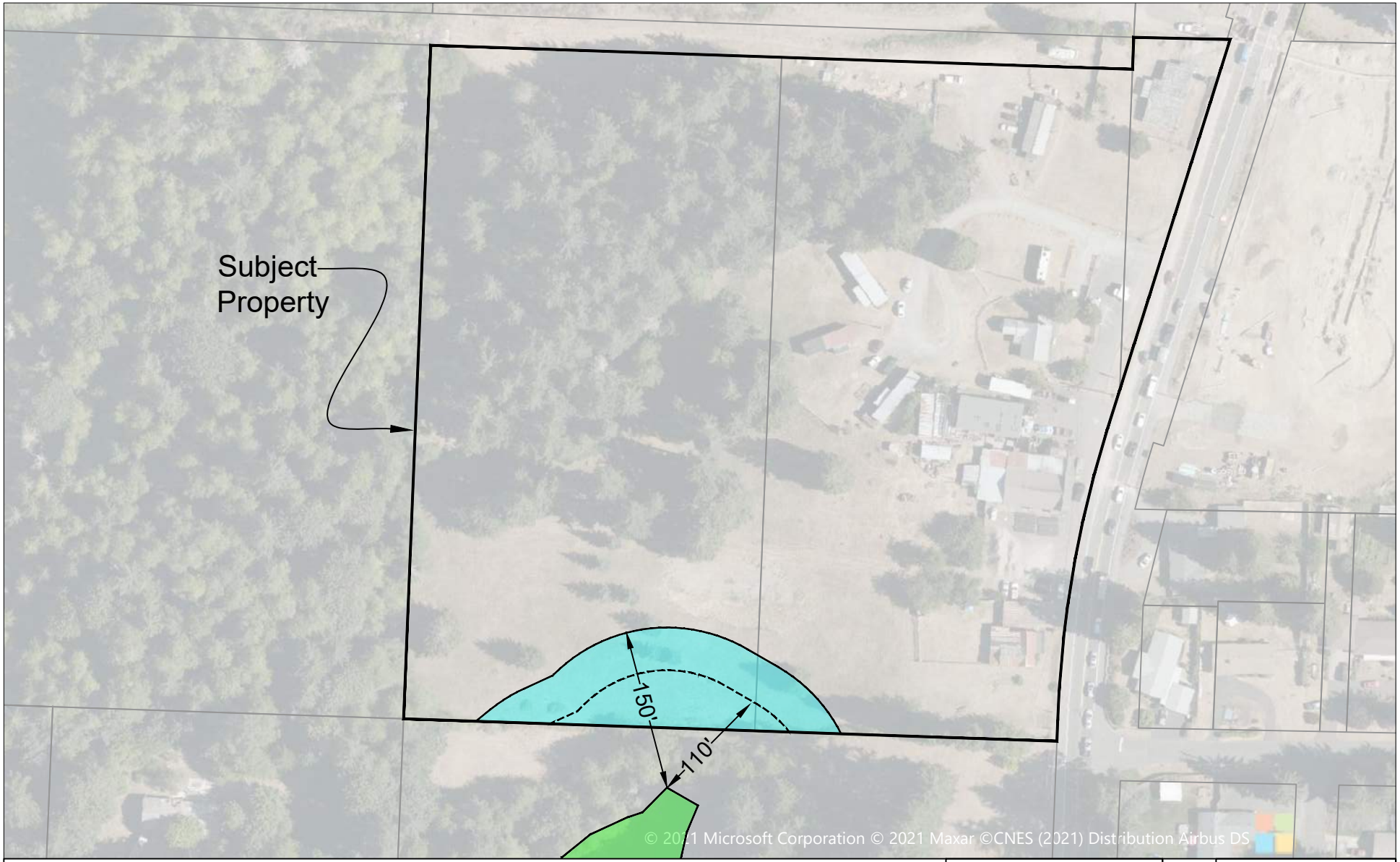
Wetland (Verified)
Wetland (Potential)
Wetland (Thurston Co. Geodata)

Figure 3
Henderson Property
Existing Conditions

N

Scale: 1" = 200'
0 200'

15 September 2021



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Wetland (Verified)
Wetland (Potential)
Wetland (Thurston Co. Geodata)
Wetland Buffers (150 feet)
Reducred Wetland Buffer (110 feet)

Figure 4

Henderson Property

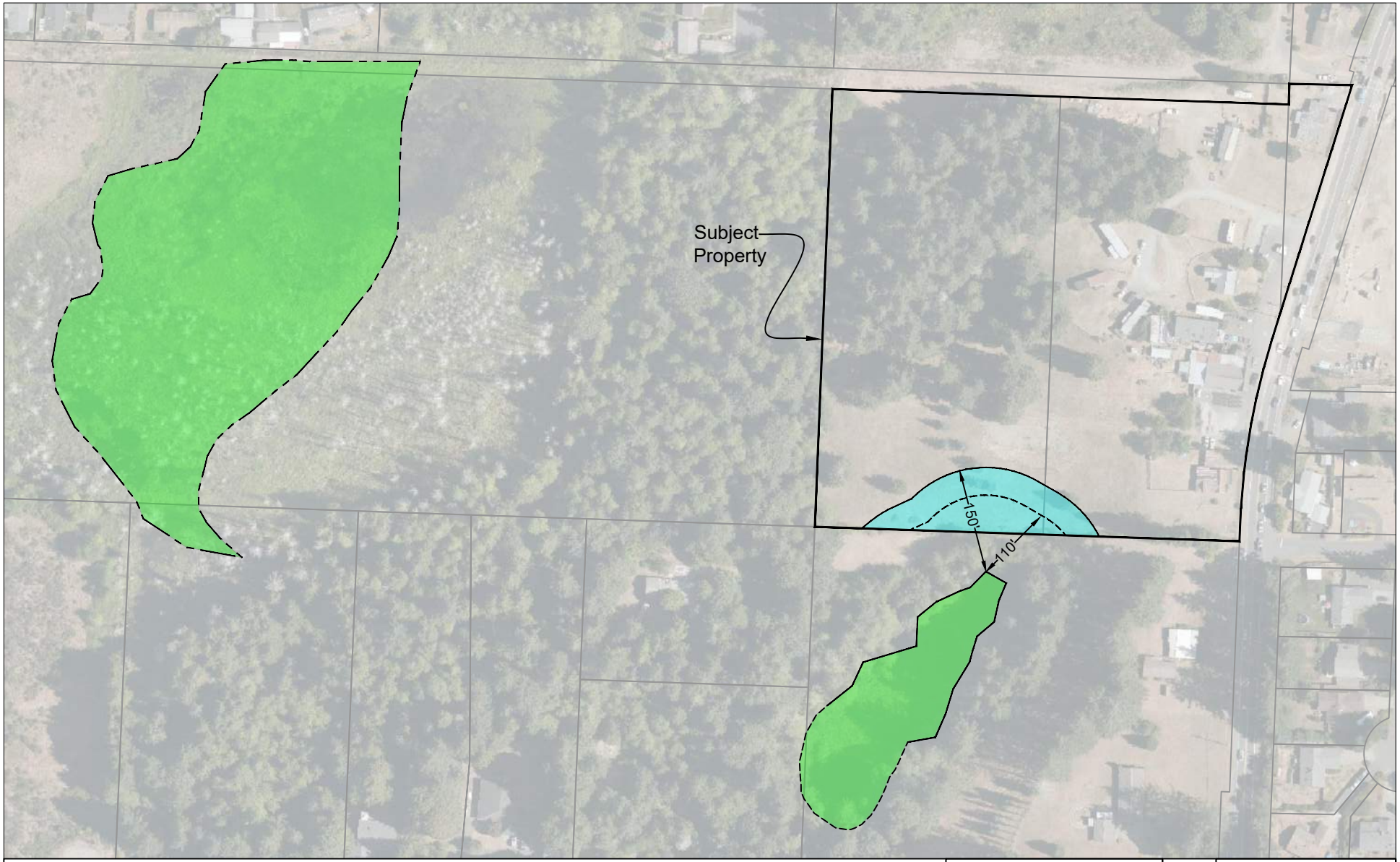
Critical Areas Buffers

N

Scale: 1" = 130'

0 130'

15 September 2021



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Wetland (Verified)
Wetland (Potential)
Wetland (Thurston Co. Geodata)
Wetland Buffers (150 feet)

Figure 5

Henderson Property

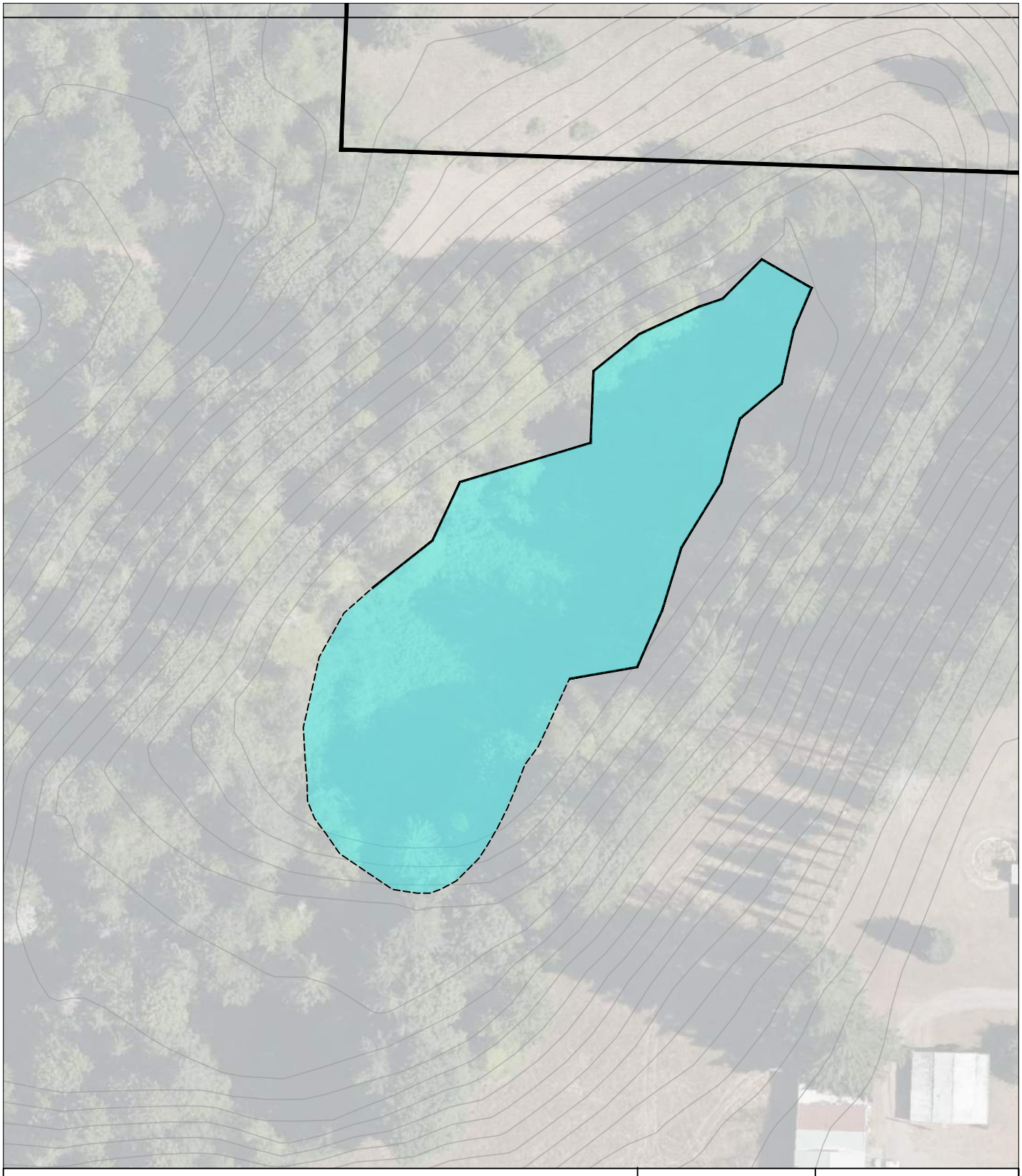
Critical Areas Buffers

N

Scale: 1" = 200'

0 200'

15 September 2021



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Scrub-shrub Seasonally-flooded

Figure 6

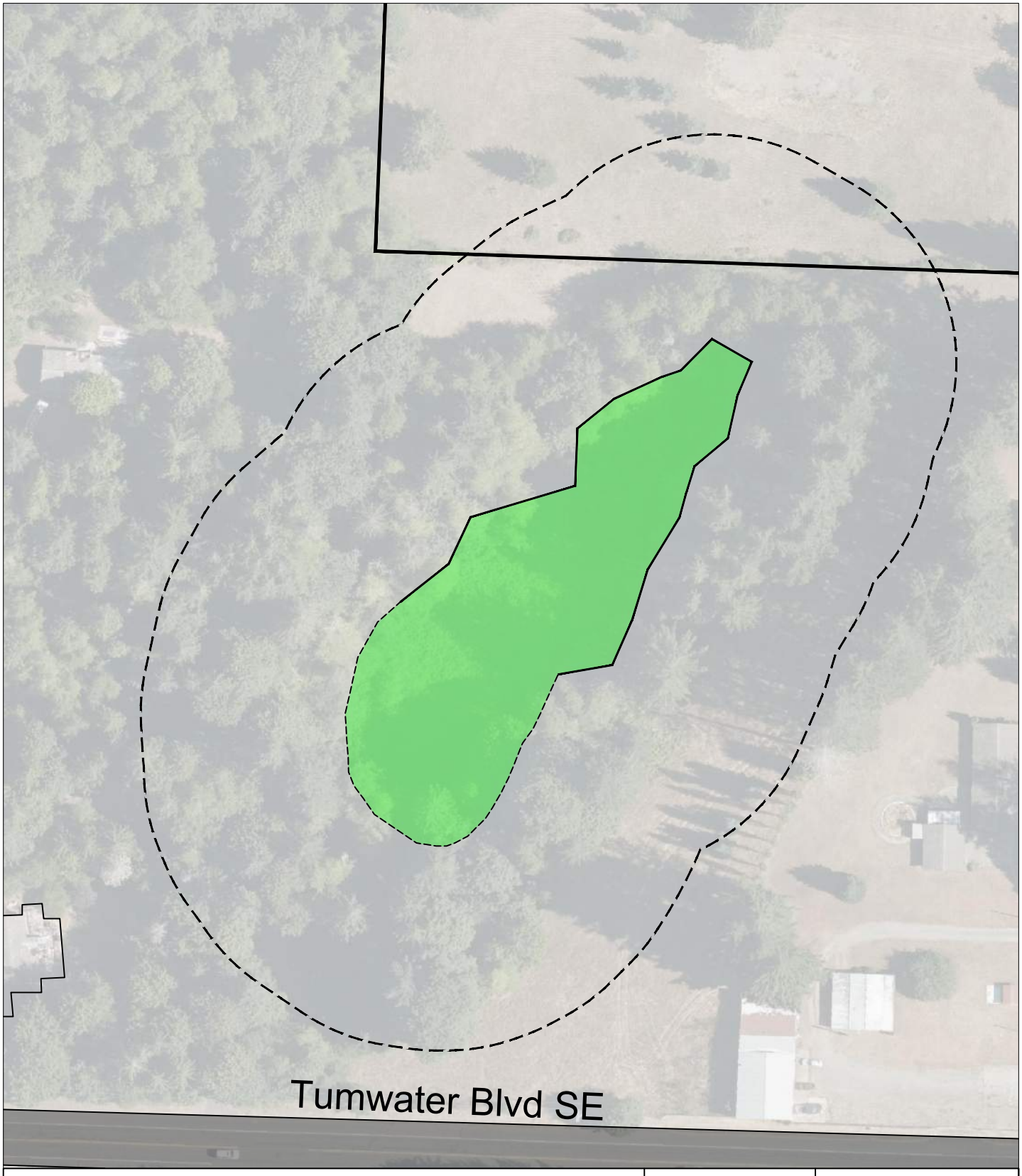
Henderson Property

Vegetation Classes & Hydroperiods

Scale: 1"= 80'

0 80'

15 September 2021



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Potential Pollutants (0%)
150 ft Polygon (267916 sf)
Potential Pollutants (0 sf)
150-foot Polygon

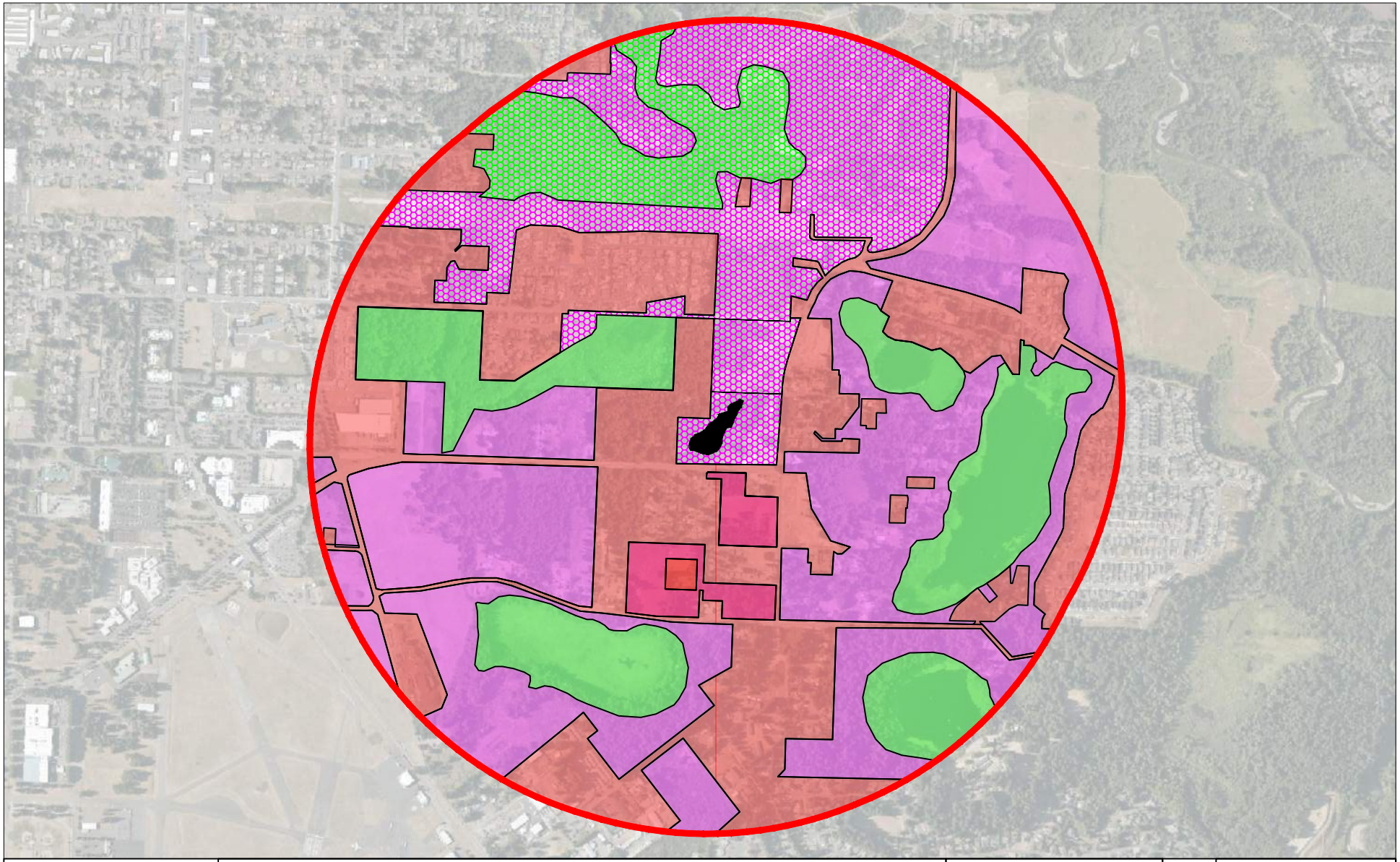
Figure 7

Henderson Property

Potential Pollutants within 150 ft of wetland

Scale: 1"= 100'
0 100'

15 September 2021



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Accessible Habitat (2,272,993 sf, 52 acres, 6%)

Accessible Moderate to Low Intensity Land Use (6,237,797sf, 143 acres, 16%)

Total Undisturbed Habitat + Accessible Habitat (5,851,362 sf, 134 acres, 15%)

Low to Moderate Intensity Land Use + accessible Low to Moderate (18,670,333 sf, 429 acres, 48%)

High Intensity Land Use (11,738,338 sf, 270 acres, 31%)

1km Polygon 38,547,237 sf, 885 acres

H2.1: 5.9% + 44%/2 = 16% (1 points) H2.2: 21% + 48%/2 = 45% (1 point) H2.3: High Intensity = 31% (0 points)

Figure 8

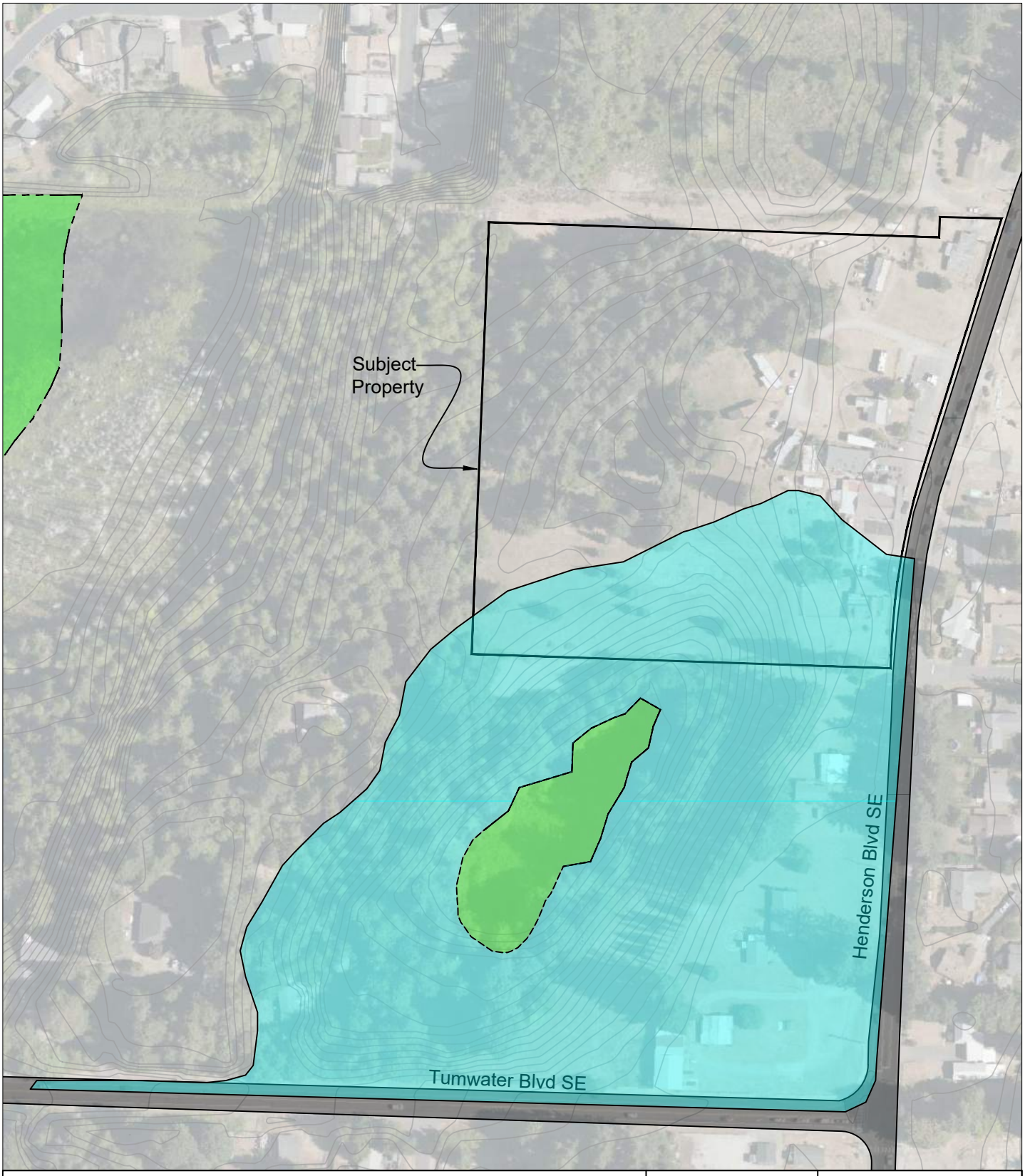
Henderson Property

1 KM Polygon

Scale: 1" = 1200'

0 1200'

15 September 2021



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Contributing Basin
<10x Wetlands A

Figure 9

Henderson
Property

Contributing Basin

Scale: 1"= 200'

0 200'

15 September 2021

APPENDIX A

Photographs

Subject Property and Vicinity

Photo 1. Western portion of subject property

Photo 2. Grassland on subject property

Photo 3. Area of bracken fern

Photo 4. Maintain grass lawn on subject property

Photo 5. Frontage of subject proeprty

Photo 6. Maintained lawn and fences on subject property

Photo 7. Internal roads on eastern portion of property

Photo 8. Eastern portion of subject property

Photo 9. Development east of subject property

Photo 10. Development occurring east of subject property

Wetland A

Photo 11. Skunk cabbage (OBL) in Wetland A

Photo 12. Water Parsley (OBL) in Wetland A

Photo 13. Wetland vegetation

Photo 14. Slough sedge (OBL) within wetland

Photo 15. Upland buffer area

Photo 16. Bare ground and hydric soil

Photo 17. Water parsley (OBL) and bare ground in wetland

Photo 18. Bare ground and hydric soil

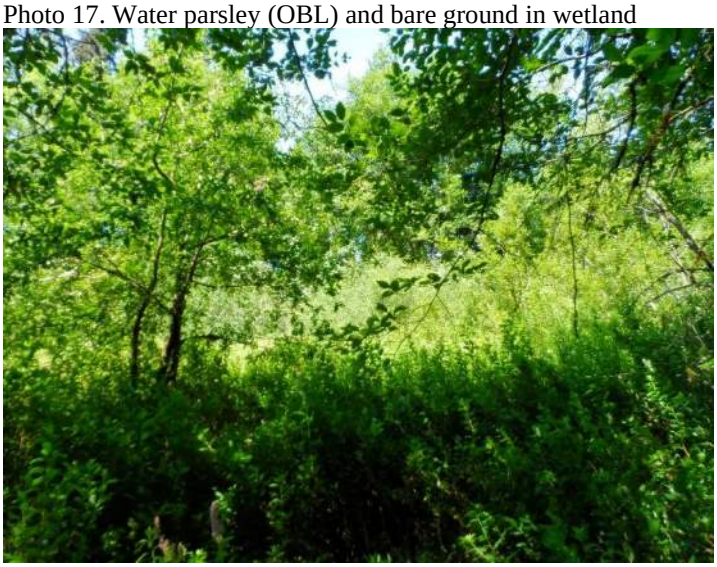


Photo 19. Douglas spirea (FACW) & pacific crabapple (FACW)

Photo 20. Water parsley (OBL) and pacific crabapple (FACW)

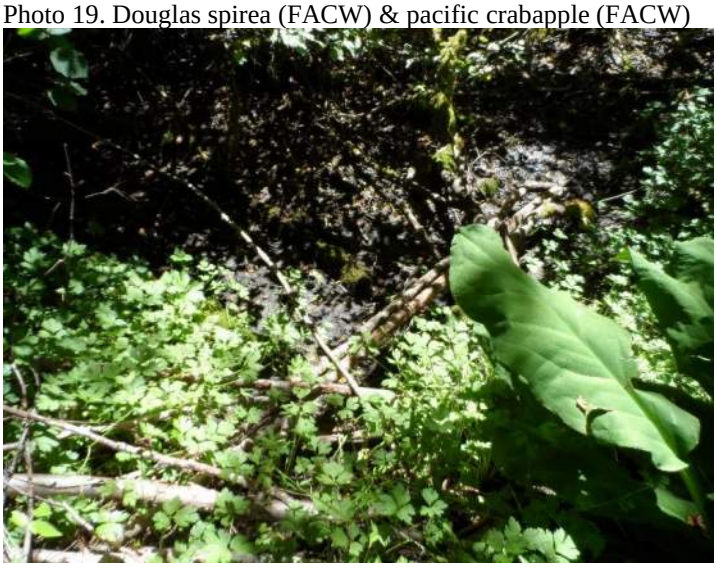
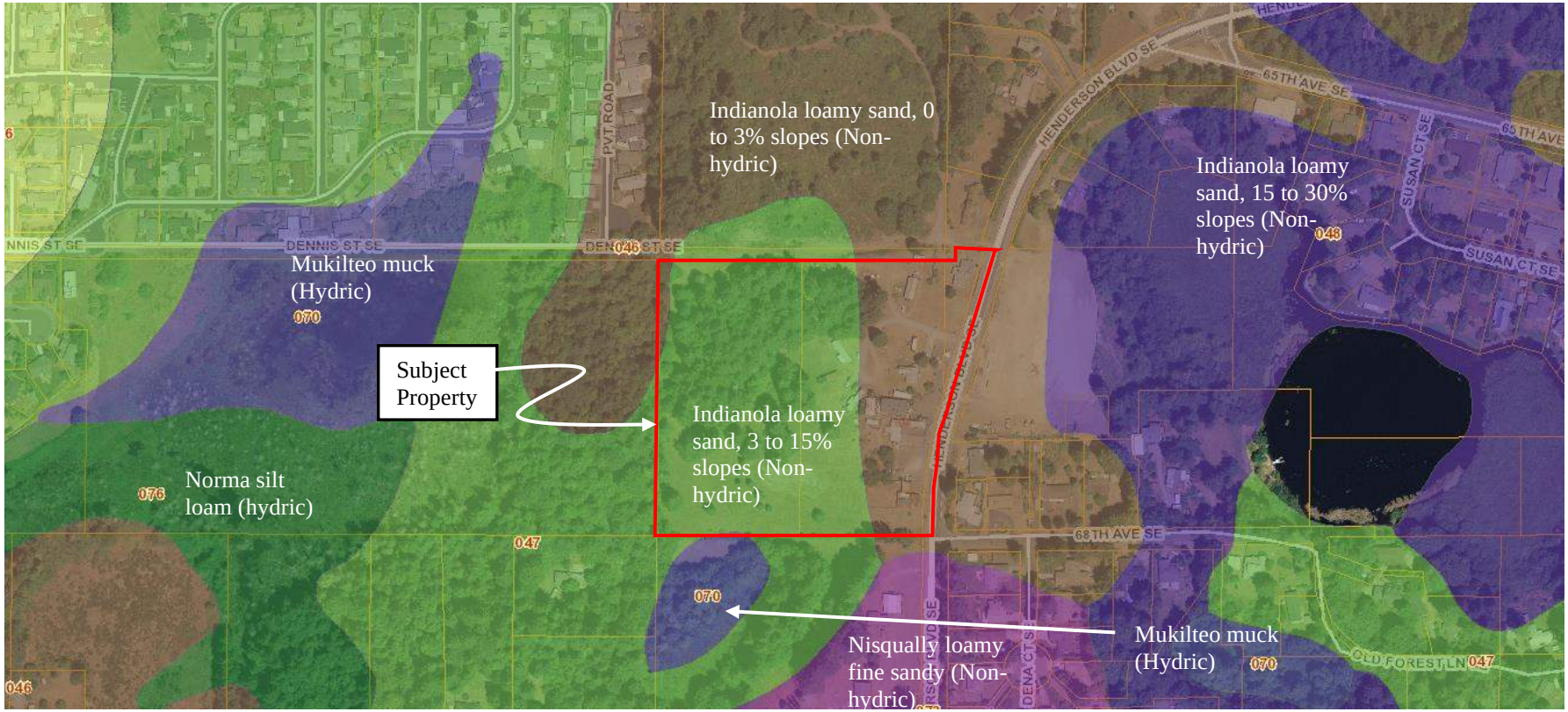


Photo 21. Creeping Buttercup (FAC) & skunk cabbage (OBL)

APPENDIX B

Thurston County Geodata

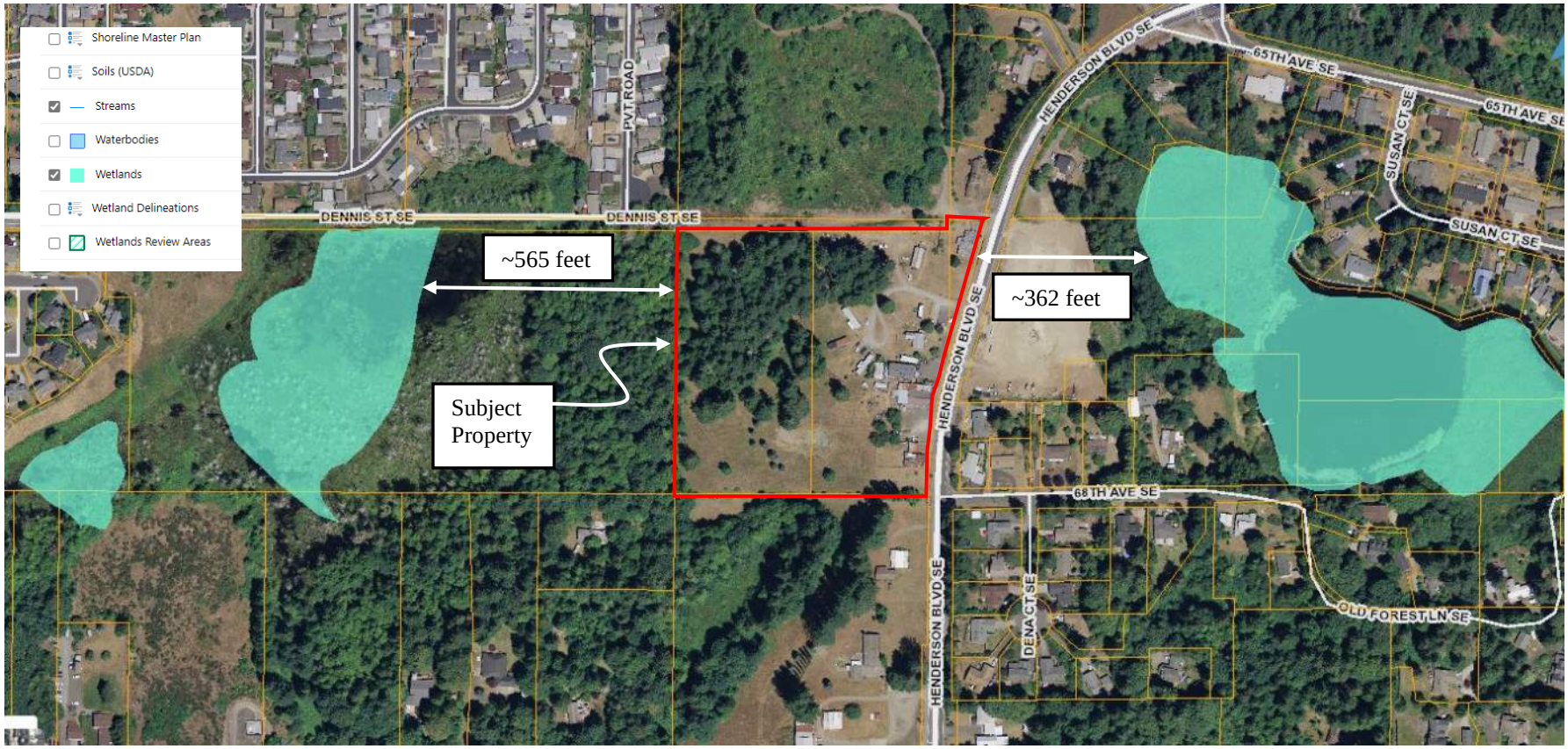
Soils


Indianola loamy sand, 0 to 3% slopes (Non-hydric)
Indianola loamy sand, 15 to 30% slopes (Non-hydric)
Mukilteo muck (Hydric)
Subject Property
Indianola loamy sand, 3 to 15% slopes (Non-hydric)
Norma silt loam (hydric)
Nisqually loamy fine sandy (Non-hydric)
Mukilteo muck (Hydric)
DENNIS ST SE
PVT ROAD
HENDERSON BLVD SE
65TH AVE SE
SUSAN CT SE
68TH AVE SE
OLD FOREST LN
070
047
046
076
048

APPENDIX C

Thurston County Geodata

Wetlands & Streams

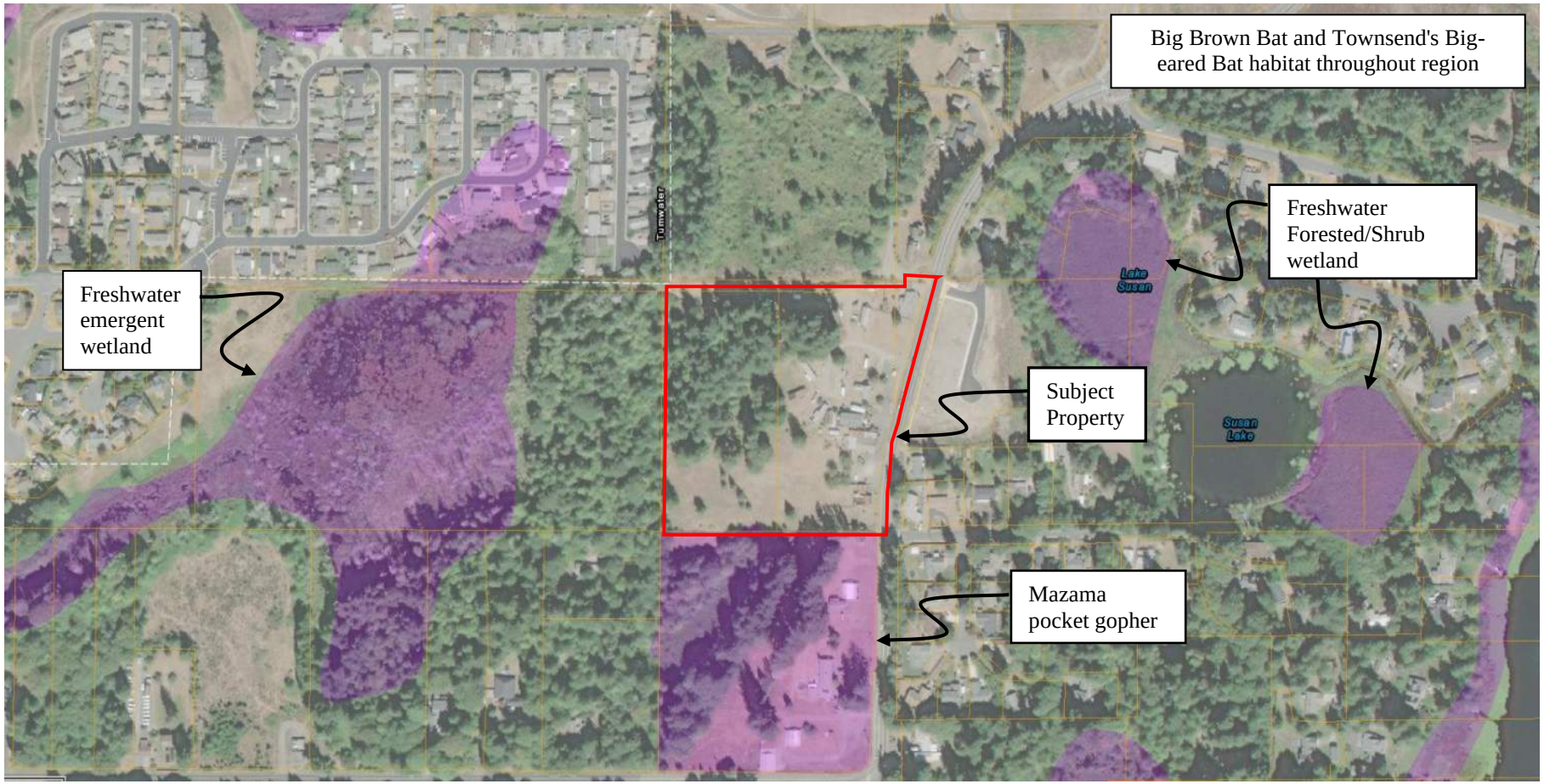

Shoreline Master Plan
Soils (USDA)
Streams
Waterbodies
Wetlands
Wetland Delineations
Wetlands Review Areas
DENNIS ST SE
DENNIS ST SE
PVT ROAD
HENDERSON BLVD SE
65TH AVE SE
65TH AVE SE
SUSAN CT SE
SUSAN CT SE
~565 feet
~362 feet
Subject Property
HENDERSON BLVD SE
68TH AVE SE
HENDERSON BLVD SE
DENA CT SE
OLD FOREST LN SE

APPENDIX D

Washington Department of Fish and Wildlife (WDFW)

Priority Habitats and Species (PHS)

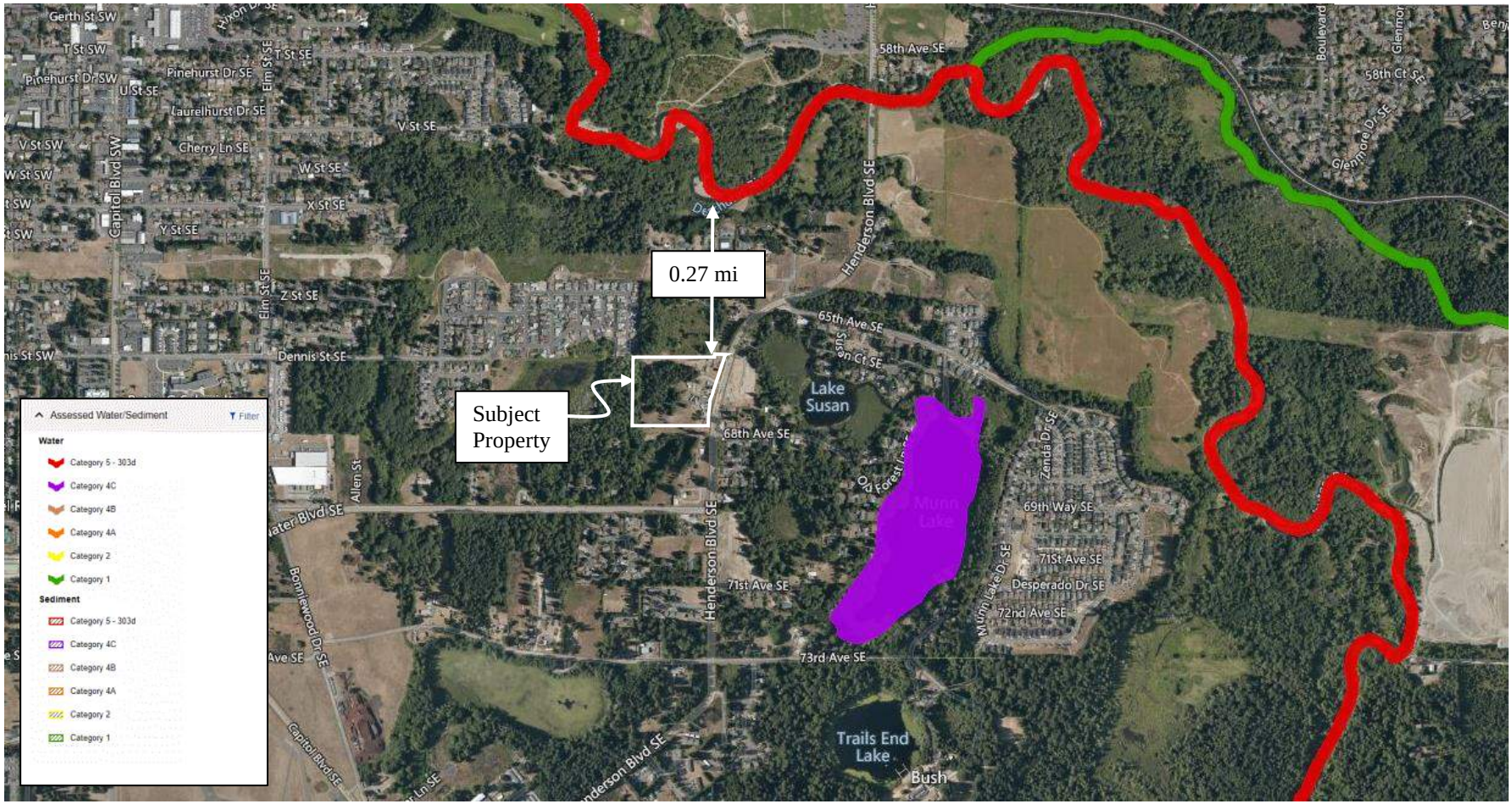
Database


Big Brown Bat and Townsend's Big-eared Bat habitat throughout region
Freshwater Forested/Shrub wetland
Freshwater emergent wetland
Subject Property
Mazama pocket gopher
Lake Susan
Susan Lake
Tumwater

APPENDIX E

Clean Water Act

303(d) List

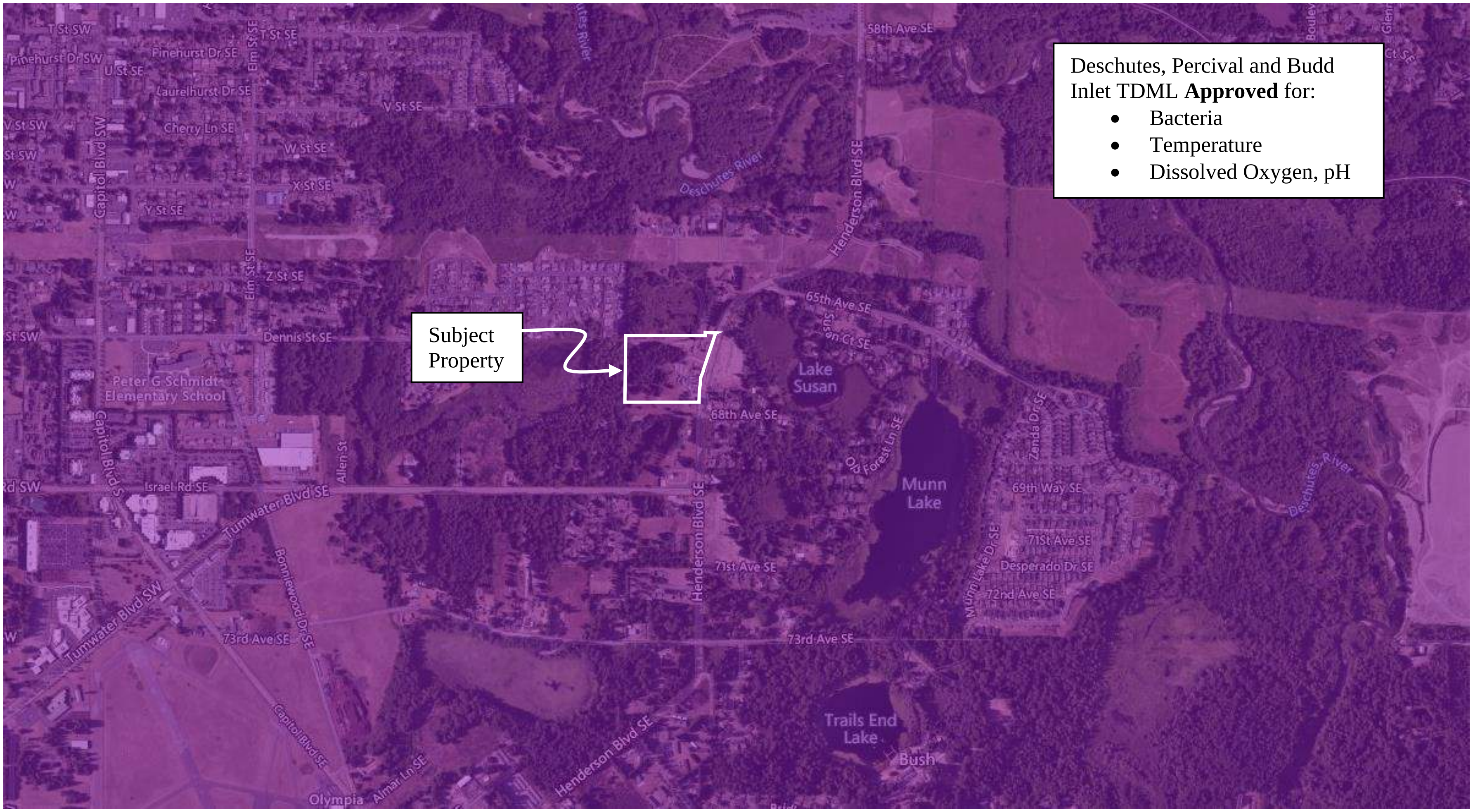

0.27 mi
Subject Property
Assessed Water/Sediment
Filter
Water
Category 5 - 303d
Category 4C
Category 4B
Category 4A
Category 2
Category 1
Sediment
Category 5 - 303d
Category 4C
Category 4B
Category 4A
Category 2
Category 1
Lake Susan
Munn Lake
Trails End Lake
Henderson Blvd SE
58th Ave SE
65th Ave SE
68th Ave SE
69th Way SE
71st Ave SE
72nd Ave SE
73rd Ave SE
Desperado Dr SE
Munn Lake Dr SE
Dennis St SE
Pinehurst Dr SE
Laurelhurst Dr SE
Cherry Ln SE
Capitol Blvd SW
Elm St SE
Allen St
Bonniewood Dr SE
Zenda Dr SE
Glenmore Dr SE
Bush

APPENDIX F

Total Maximum Daily Load

(TMDL)

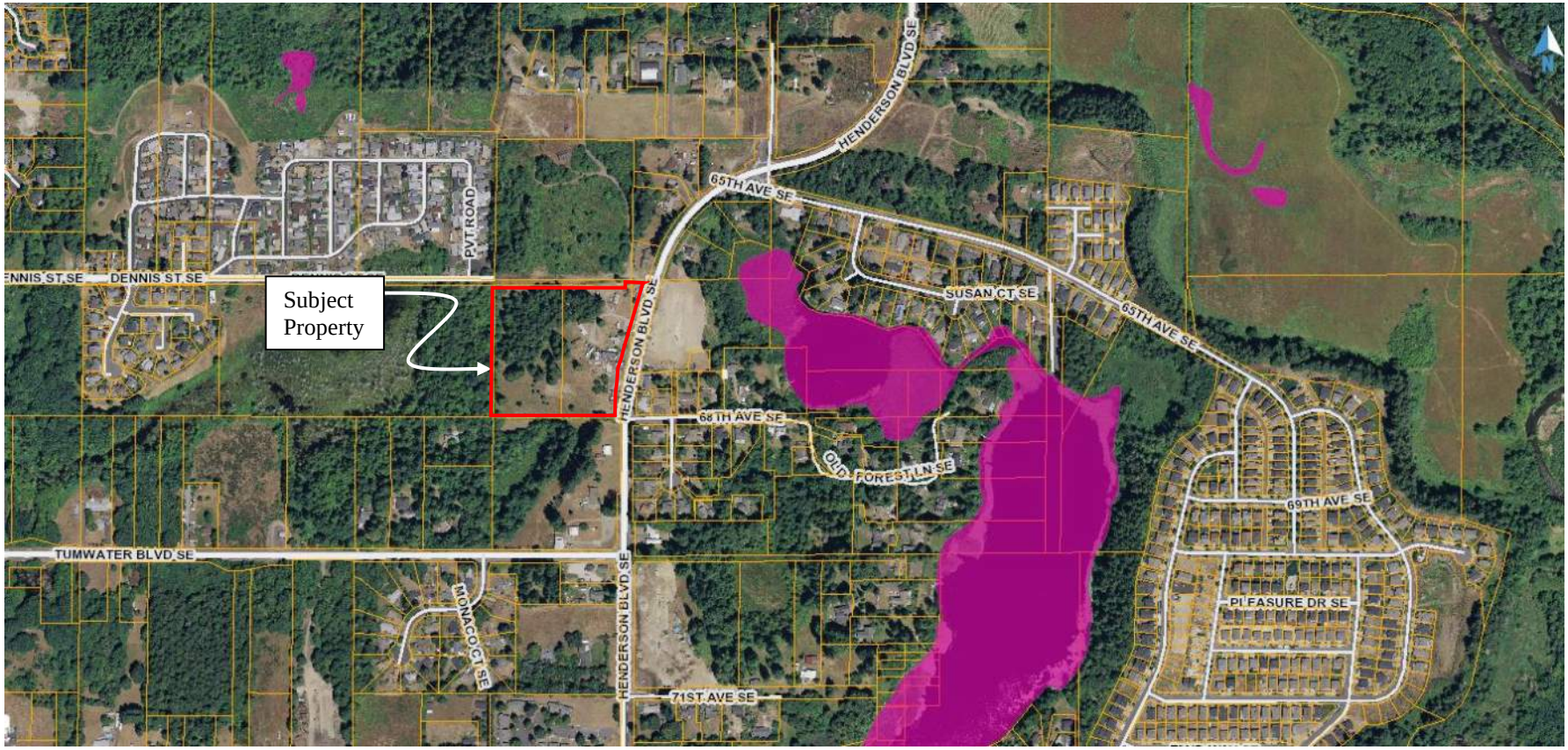
Item 2a.


Deschutes, Percival and Budd Inlet TDML **Approved** for:
Bacteria
Temperature
Dissolved Oxygen, pH
Subject Property
Lake Susan
Munn Lake
Trails End Lake
Peter G Schmidt Elementary School
Deschutes River
Henderson Blvd SE
65th Ave SE
68th Ave SE
69th Way SE
71st Ave SE
72nd Ave SE
73rd Ave SE
58th Ave SE
Capitol Blvd SE
Tumwater Blvd SE
Israel Rd SE
Dennis St SE
Elm St SE
Pinehurst Dr SE
Laurelhurst Dr SE
Cherry Ln SE
Desperado Dr SE
Zenda Dr SE
Munn Lake Dr SE
Old Forest Ln SE
Susan Ct SE
Bonniewood Dr SE
Allen St
Olympia
Bush

APPENDIX G

Thurston County Geodata

High Groundwater Hazard Area

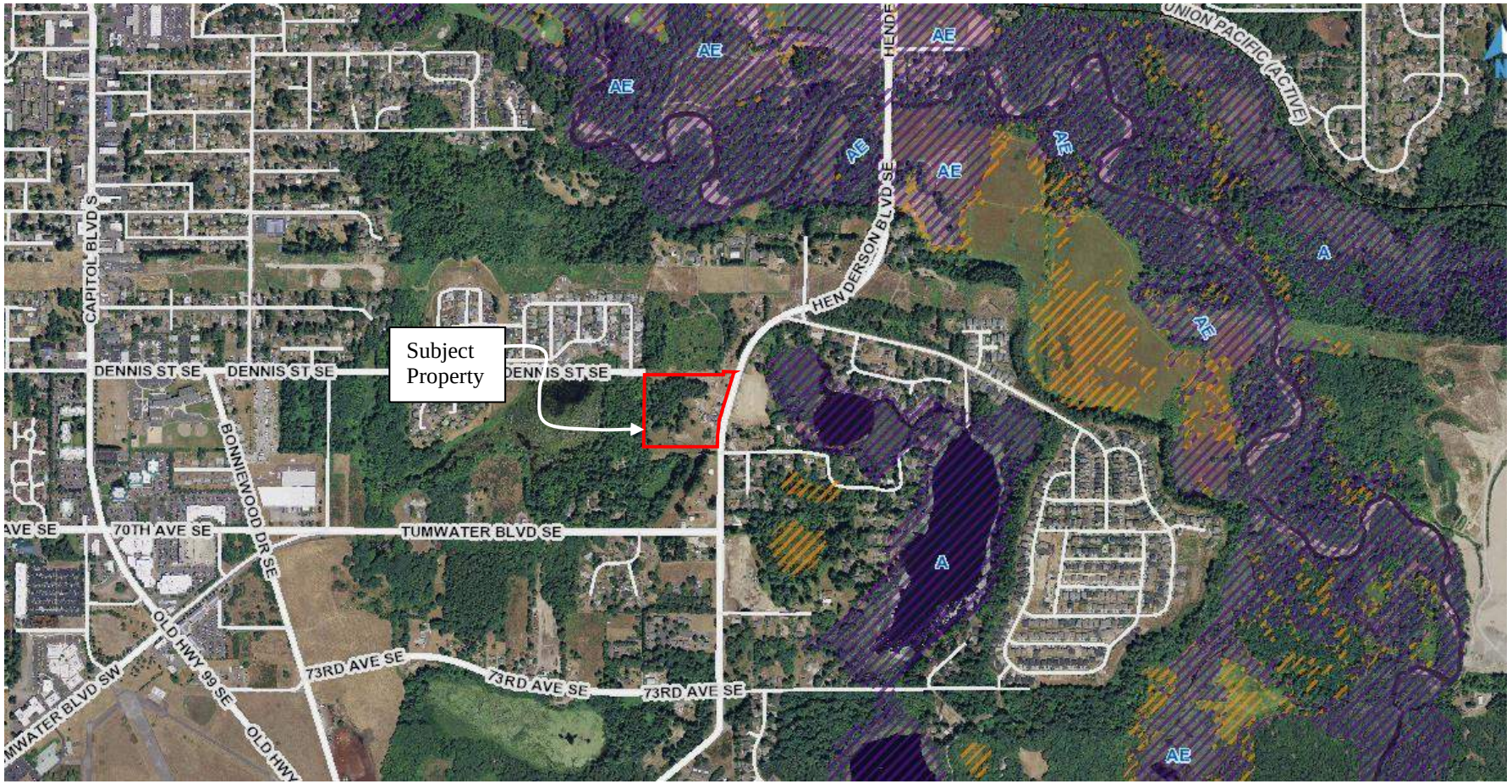


— High Groundwater Hazard Areas

High Groundwater Hazard Area

APPENDIX H

FEMA Floodplain


Subject Property
DENNIS ST SE
DENNIS ST SE
DENNIS ST SE
CAPITOL BLVD S
BONNIEWOOD DR SE
70TH AVE SE
TUMWATER BLVD SE
HENDERSON BLVD SE
73RD AVE SE
73RD AVE SE
73RD AVE SE
OLD HWY 99 SE
TUMWATER BLVD SW
UNION PACIFIC (ACTIVE)
AE
A

APPENDIX I

Wetland Rating Forms

Item 2a. Wetland name or number

RATING SUMMARY – Western Washington

Name of wetland (or ID #): Wetland A Date of site visit: 7-Jul-21

Rated by Curtis Wambach Trained by Ecology? ☑ Yes ☐ No Date of training Continual

HGM Class used for rating Depressional & Flats Wetland has multiple HGM classes? ☐ Yes ☑ No

NOTE: Form is not complete with out the figures requested (*figures can be combined*).
Source of base aerial photo/map Google Earth

OVERALL WETLAND CATEGORY III (based on functions ☐ or special characteristics ☐)

1. Category of wetland based on FUNCTIONS

_____ **Category I** - Total score = 23 - 27
_____ **Category II** - Total score = 20 - 22
X **Category III** - Total score = 16 - 19
_____ **Category IV** - Total score = 9 - 15

FUNCTION	Improving Water Quality	Hydrologic	Habitat	
	List appropriate rating (H, M, L)			
Site Potential	M	M	L	
Landscape Potential	M	M	M	
Value	H	L	M	**Total**
Score Based on Ratings	7	5	5	**17**

Score for each function based on three ratings (*order of ratings is not important*)

9 = H, H, H
8 = H, H, M
7 = H, H, L
7 = H, M, M
6 = H, M, L
6 = M, M, M
5 = H, L, L
5 = M, M, L
4 = M, L, L
3 = L, L, L

2. Category based on SPECIAL CHARACTERISTICS of wetland

CHARACTERISTIC	Category
Estuarine	
Wetland of High Conservation Value	
Bog	
Mature Forest	
Old Growth Forest	
Coastal Lagoon	
Interdunal	
None of the above	

Maps and Figures required to answer questions correctly for Western Washington

Depressional Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	D 1.3, H 1.1, H 1.4	
Hydroperiods	D 1.4, H 1.2	
Location of outlet (*can be added to map of hydroperiods*)	D 1.1, D 4.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	D 2.2, D 5.2	
Map of the contributing basin	D 4.3, D 5.3	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	D 3.1, D 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	D 3.3	

Riverine Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Ponded depressions	R 1.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	R 2.4	
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	
Width of unit vs. width of stream (*can be added to another figure*)	R 4.1	
Map of the contributing basin	R 2.2, R 2.3, R 5.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	R 3.1	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	R 3.2, R 3.3	

Lake Fringe Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	L 1.1, L 4.1, H 1.1, H 1.4	
Plant cover of trees, shrubs, and herbaceous plants	L 1.2	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	L 2.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	L 3.1, L 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	L 3.3	

Slope Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Plant cover of **dense** trees, shrubs, and herbaceous plants	S 1.3	
Plant cover of **dense, rigid** trees, shrubs, and herbaceous plants (*can be added to another figure*)	S 4.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	S 2.1, S 5.1	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	S 3.1, S 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	S 3.3	

HGM Classification of Wetland in Western Washington

For questions 1 -7, the criteria described must apply to the entire unit being rated.
If hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1 - 7 apply, and go to Question 8.

1. Are the water levels in the entire unit usually controlled by tides except during floods?

☐ NO - go to 2 ☐ **YES** - the wetland class is **Tidal Fringe** - go to 1.1

1.1 Is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)?

☐ **NO - Saltwater Tidal Fringe (Estuarine)** ☐ **YES - Freshwater Tidal Fringe**
*If your wetland can be classified as a Freshwater Tidal Fringe use the forms for **Riverine** wetlands. If it is Saltwater Tidal Fringe it is an **Estuarine** wetland and is not scored. This method **cannot** be used to score functions for estuarine wetlands.*

2. The entire wetland unit is flat and precipitation is the only source (>90%) of water to it. Groundwater and surface water runoff are NOT sources of water to the unit.

☐ NO - go to 3 ☐ **YES** - The wetland class is **Flats**
*If your wetland can be classified as a Flats wetland, use the form for **Depressional** wetlands.*

3. Does the entire wetland unit **meet all** of the following criteria?
☐ The vegetated part of the wetland is on the shores of a body of permanent open water (without any plants on the surface at any time of the year) at least 20 ac (8 ha) in size;
☐ At least 30% of the open water area is deeper than 6.6 ft (2 m).

☐ NO - go to 4 ☐ **YES** - The wetland class is **Lake Fringe** (Lacustrine Fringe)

4. Does the entire wetland unit **meet all** of the following criteria?
☐ The wetland is on a slope (*slope can be very gradual*),
☐ The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks.
☐ The water leaves the wetland **without being impounded.**

☐ NO - go to 5 ☐ **YES** - The wetland class is **Slope**

NOTE: Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3 ft diameter and less than 1 ft deep).

5. Does the entire wetland unit **meet all** of the following criteria?
☐ The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river,
☐ The overbank flooding occurs at least once every 2 years.

☐ NO - go to 6 ☐ **YES** - The wetland class is **Riverine**

NOTE: The Riverine unit can contain depressions that are filled with water when the river is not flooding.

6. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time during the year? *This means that any outlet, if present, is higher than the interior of the wetland.*

☐ NO - go to 7 ☐ **YES** - The wetland class is **Depressional**

7. Is the entire wetland unit located in a very flat area with no obvious depression and no overbank flooding? The unit does not pond surface water more than a few inches. The unit seems to be maintained by high groundwater in the area. The wetland may be ditched, but has no obvious natural outlet.

☐ NO - go to 8 ☐ **YES** - The wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a Depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within the wetland unit being scored.

NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the HGM class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM classes within the wetland unit being rated	HGM class to use in rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake Fringe	Lake Fringe
Depressional + Riverine along stream within boundary of depression	Depressional
Depressional + Lake Fringe	Depressional
Riverine + Lake Fringe	Riverine
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE

If you are still unable to determine which of the above criteria apply to your wetland, or if you have ***more than 2 HGM classes*** *within a wetland boundary, classify the wetland as Depressional for the rating.*

NOTES and FIELD OBSERVATIONS:

Item 2a. Wetland name or number

Item 2a. Wetland name or number

DEPRESSIONAL AND FLATS WETLANDS

Water Quality Functions - Indicators that the site functions to improve water quality

D 1.0. Does the site have the potential to improve water quality?		
D 1.1. Characteristics of surface water outflows from the wetland: Wetland is a depression or flat depression (QUESTION 7 on key) with no surface water leaving it (no outlet). points = 3 Wetland has an intermittently flowing stream or ditch, OR highly constricted permanently flowing outlet. points = 2 ☐ Wetland has an unconstricted, or slightly constricted, surface outlet that is permanently flowing points = 1 ☐ Wetland is a flat depression (QUESTION 7 on key), whose outlet is a permanently flowing ditch. points = 1		3
D 1.2. The soil 2 in below the surface (or duff layer) is true clay or true organic (*use NRCS definitions*).	Yes = 4 No = 0	0
D 1.3. Characteristics and distribution of persistent plants (Emergent, Scrub-shrub, and/or Forested Cowardin classes): Wetland has persistent, ungrazed, plants > 95% of area points = 5 Wetland has persistent, ungrazed, plants > ½ of area points = 3 Wetland has persistent, ungrazed plants > $^1/_{10}$ of area points = 1 Wetland has persistent, ungrazed plants < $^1/_{10}$ of area points = 0		5
D 1.4. Characteristics of seasonal ponding or inundation: *This is the area that is ponded for at least 2 months. See description in manual.* Area seasonally ponded is > ½ total area of wetland points = 4 Area seasonally ponded is > ¼ total area of wetland points = 2 Area seasonally ponded is < ¼ total area of wetland points = 0		2
Total for D 1	Add the points in the boxes above	**10**

Rating of Site Potential If score is: ☐ **12 - 16 = H** ☑ **6 - 11 = M** ☐ **0 - 5 = L** *Record the rating on the first page*

D 2.0. Does the landscape have the potential to support the water quality function of the site?		
D 2.1. Does the wetland unit receive stormwater discharges?	Yes = 1 No = 0	1
D 2.2. Is > 10% of the area within 150 ft of the wetland in land uses that generate pollutants?	Yes = 1 No = 0	0
D 2.3. Are there septic systems within 250 ft of the wetland?	Yes = 1 No = 0	1
D 2.4. Are there other sources of pollutants coming into the wetland that are not listed in questions D 2.1 - D 2.3? Source	Yes = 1 No = 0	0
Total for D 2	Add the points in the boxes above	**2**

Rating of Landscape Potential If score is: ☐ **3 or 4 = H** ☑ **1 or 2 = M** ☐ **0 = L** *Record the rating on the first page*

D 3.0. Is the water quality improvement provided by the site valuable to society?		
D 3.1. Does the wetland discharge directly (i.e., within 1 mi) to a stream, river, lake, or marine water that is on the 303(d) list?	Yes = 1 No = 0	1
D 3.2. Is the wetland in a basin or sub-basin where an aquatic resource is on the 303(d) list?	Yes = 1 No = 0	1
D 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality (*answer YES if there is a TMDL for the basin in which the unit is found*)?	Yes = 2 No = 0	2
Total for D 3	Add the points in the boxes above	**4**

Rating of Value If score is: ☑ **2 - 4 = H** ☐ **1 = M** ☐ **0 = L** *Record the rating on the first page*

Item 2a. Wetland name or number

DEPRESSIONAL AND FLATS WETLANDS

Hydrologic Functions - Indicators that the site functions to reduce flooding and stream degradation

D 4.0. Does the site have the potential to reduce flooding and erosion?	
D 4.1. Characteristics of surface water outflows from the wetland: Wetland is a depression or flat depression with no surface water leaving it (no outlet) points = 4 Wetland has an intermittently flowing stream or ditch, OR highly constricted permanently flowing outlet points = 2 Wetland is a flat depression (QUESTION 7 on key), whose outlet is a permanently flowing ditch points = 1 Wetland has an unconstricted, or slightly constricted, surface outlet that is permanently flowing points = 0	4
D 4.2. Depth of storage during wet periods: *Estimate the height of ponding above the bottom of the outlet. For wetlands with no outlet, measure from the surface of permanent water or if dry, the deepest part.* Marks of ponding are 3 ft or more above the surface or bottom of outlet points = 7 Marks of ponding between 2 ft to < 3 ft from surface or bottom of outlet points = 5 ☑ Marks are at least 0.5 ft to < 2 ft from surface or bottom of outlet points = 3 ☐ The wetland is a "headwater" wetland points = 3 Wetland is flat but has small depressions on the surface that trap water points = 1 Marks of ponding less than 0.5 ft (6 in) points = 0	3
D 4.3. Contribution of the wetland to storage in the watershed: *Estimate the ratio of the area of upstream basin contributing surface water to the wetland to the area of the wetland unit itself.* ☐ The area of the basin is less than 10 times the area of the unit points = 5 The area of the basin is 10 to 100 times the area of the unit points = 3 The area of the basin is more than 100 times the area of the unit points = 0 ☐ Entire wetland is in the Flats class points = 5	3
Total for D 4 — Add the points in the boxes above	**10**

Rating of Site Potential If score is: ☐ **12 - 16 = H** ☑ **6 - 11 = M** ☐ **0 - 5 = L** *Record the rating on the first page*

D 5.0. Does the landscape have the potential to support hydrologic function of the site?	
D 5.1. Does the wetland unit receive stormwater discharges? Yes = 1 No = 0	1
D 5.2. Is > 10% of the area within 150 ft of the wetland in land uses that generate excess runoff? Yes = 1 No = 0	1
D 5.3. Is more than 25% of the contributing basin of the wetland covered with intensive human land uses (residential at >1 residence/ac, urban, commercial, agriculture, etc.)? Yes = 1 No = 0	0
Total for D 5 — Add the points in the boxes above	**2**

Rating of Landscape Potential If score is: ☐ **3 = H** ☑ **1 or 2 = M** ☐ **0 = L** *Record the rating on the first page*

D 6.0. Are the hydrologic functions provided by the site valuable to society?	
D 6.1. The unit is in a landscape that has flooding problems. *Choose the description that best matches conditions around the wetland unit being rated. Do not add points. Choose the highest score if more than one condition is met.* The wetland captures surface water that would otherwise flow down-gradient into areas where flooding has damaged human or natural resources (e.g., houses or salmon redds): ● Flooding occurs in a sub-basin that is immediately down-gradient of unit. points = 2 ☐ ● Surface flooding problems are in a sub-basin farther down-gradient. points = 1 ☐ Flooding from groundwater is an issue in the sub-basin. points = 1 ☐ The existing or potential outflow from the wetland is so constrained by human or natural conditions that the water stored by the wetland cannot reach areas that flood. Explain why points = 0 ☑ There are no problems with flooding downstream of the wetland. points = 0	0
D 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan? Yes = 2 No = 0	0

Total for D 6	Add the points in the boxes above	0

Rating of Value If score is: ☐ **2 - 4 = H** ☐ **1 = M** ☑ **0 = L** *Record the rating on the first page*

Item 2a. Wetland name or number

These questions apply to wetlands of all HGM classes.

HABITAT FUNCTIONS - Indicators that site functions to provide important habitat

H 1.0. Does the site have the potential to provide habitat?

H 1.1. Structure of plant community: *Indicators are Cowardin classes and strata within the Forested class.* Check the Cowardin plant classes in the wetland. *Up to 10 patches may be combined for each class to meet the threshold of ¼ ac or more than 10% of the unit if it is smaller than 2.5 ac. Add the number of structures checked.*

- ☐ Aquatic bed
- ☐ Emergent
- ☑ Scrub-shrub (areas where shrubs have > 30% cover)
- ☐ Forested (areas where trees have > 30% cover)

4 structures or more: points = 4
3 structures: points = 2
2 structures: points - 1
1 structure: points = 0

If the unit has a Forested class, check if:

- ☐ The Forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the Forested polygon

0

H 1.2. Hydroperiods

Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or ¼ ac to count (*see text for descriptions of hydroperiods*).

- ☐ Permanently flooded or inundated
- ☑ Seasonally flooded or inundated
- ☐ Occasionally flooded or inundated
- ☐ Saturated only

4 or more types present: points = 3
3 types present: points = 2
2 types present: points = 1
1 types present: points = 0

- ☐ Permanently flowing stream or river in, or adjacent to, the wetland
- ☐ Seasonally flowing stream in, or adjacent to, the wetland
- ☐ **Lake Fringe wetland** **2 points**
- ☐ **Freshwater tidal wetland** **2 points**

0

H 1.3. Richness of plant species

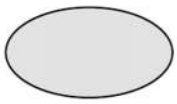
Count the number of plant species in the wetland that cover at least 10 ft^2.
Different patches of the same species can be combined to meet the size threshold and you do not have to name the species. ***Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Canadian thistle***

If you counted:
- > 19 species — points = 2
- 5 - 19 species — points = 1
- < 5 species — points = 0

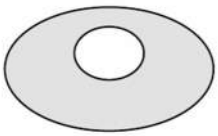
1

H 1.4. Interspersion of habitats

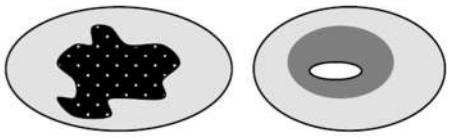
Decide from the diagrams below whether interspersion among Cowardin plants classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, moderate, low, or none. *If you have four or more plant classes or three classes and open water, the rating is always high.*



None = 0 points

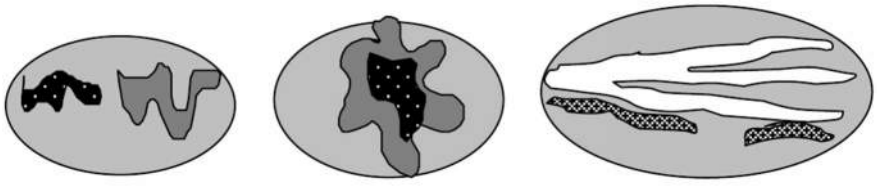


Low = 1 point



Moderate = 2 points

All three diagrams in this row are **HIGH** = 3 points



0

H 1.5. Special habitat features: Check the habitat features that are present in the wetland. *The number of checks is the number of points.* ☑ Large, downed, woody debris within the wetland (> 4 in diameter and 6 ft long) ☑ Standing snags (dbh > 4 in) within the wetland ☐ Undercut banks are present for at least 6.6 ft (2 m) **and/or** overhanging plants extends at least 3.3 ft (1 m) over a stream (or ditch) in, or contiguous with the wetland, for at least 33 ft (10 m) ☐ Stable steep banks of fine material that might be used by beaver or muskrat for denning (> 30 degree slope) OR signs of recent beaver activity are present (*cut shrubs or trees that have not yet weathered where wood is exposed*) ☑ At least ¼ ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated (*structures for egg-laying by amphibians*) ☐ Invasive plants cover less than 25% of the wetland area in every stratum of plants (*see H 1.1 for list of strata*)	3
Total for H 1 Add the points in the boxes above	**4**

Rating of Site Potential If Score is: ☐ **15 - 18 = H** ☐ **7 - 14 = M** ☑ **0 - 6 = L** *Record the rating on the first page*

H 2.0. Does the landscape have the potential to support the habitat function of the site?	
H 2.1 Accessible habitat (include *only habitat that directly abuts wetland unit*). *Calculate:* 5.9 % undisturbed habitat + (16 % moderate & low intensity land uses / 2) = 13.9% If total accessible habitat is: > 1/3 (33.3%) of 1 km Polygon points = 3 20 - 33% of 1 km Polygon points = 2 10 - 19% of 1 km Polygon points = 1 < 10 % of 1 km Polygon points = 0	1
H 2.2. Undisturbed habitat in 1 km Polygon around the wetland. *Calculate:* 21 % undisturbed habitat + (48 % moderate & low intensity land uses / 2) = 45% Undisturbed habitat > 50% of Polygon points = 3 Undisturbed habitat 10 - 50% and in 1-3 patches points = 2 Undisturbed habitat 10 - 50% and > 3 patches points = 1 Undisturbed habitat < 10% of 1 km Polygon points = 0	1
H 2.3 Land use intensity in 1 km Polygon: If > 50% of 1 km Polygon is high intensity land use points = (-2) ≤ 50% of 1km Polygon is high intensity points = 0	0
Total for H 2 Add the points in the boxes above	**2**

Rating of Landscape Potential If Score is: ☐ **4 - 6 = H** ☑ **1 - 3 = M** ☐ **< 1 = L** *Record the rating on the first page*

H 3.0. Is the habitat provided by the site valuable to society?	
H 3.1. Does the site provide habitat for species valued in laws, regulations, or policies? *Choose only the highest score that applies to the wetland being rated*. Site meets ANY of the following criteria: points = 2 ☐ It has 3 or more priority habitats within 100 m (see next page) ☐ It provides habitat for Threatened or Endangered species (any plant or animal on the state or federal lists) ☐ It is mapped as a location for an individual WDFW priority species ☐ It is a Wetland of High Conservation Value as determined by the Department of Natural Resources ☐ It has been categorized as an important habitat site in a local or regional comprehensive plan, in a Shoreline Master Plan, or in a watershed plan Site has 1 or 2 priority habitats (listed on next page) with in 100m points = 1 Site does not meet any of the criteria above points = 0	1

Item 2a. Wetland name or number

Rating of Value If Score is: ☐ **2 = H** ☑ **1 = M** ☐ **0 = L** *Record the rating on the first page*

WDFW Priority Habitats

Priority habitats listed by WDFW (see complete descriptions of WDFW priority habitats, and the counties in which they can be found, in: Washington Department of Fish and Wildlife. 2008. Priority Habitat and Species List. Olympia, Washington. 177 pp.
http://wdfw.wa.gov/publications/00165/wdfw00165.pdf or access the list from here:
http://wdfw.wa.gov/conservation/phs/list/

Count how many of the following priority habitats are within 330 ft (100 m) of the wetland unit: ***NOTE**: This question is independent of the land use between the wetland unit and the priority habitat.*

- ☐ **Aspen Stands**: Pure or mixed stands of aspen greater than 1 ac (0.4 ha).
- ☐ **Biodiversity Areas and Corridors**: Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report*).
- ☐ **Herbaceous Balds**: Variable size patches of grass and forbs on shallow soils over bedrock.
- ☐ **Old-growth/Mature forests**: Old-growth west of Cascade crest – Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) > 32 in (81 cm) dbh or > 200 years of age. Mature forests – Stands with average diameters exceeding 21 in (53 cm) dbh; crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80-200 years old west of the Cascade crest.
- ☐ **Oregon White Oak**: Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158 – see web link above*).
- ☐ **Riparian**: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.
- ☐ **Westside Prairies**: Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (*full descriptions in WDFW PHS report p. 161 – see web link above*).
- ☐ **Instream**: The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.
- ☐ **Nearshore**: Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore. (*full descriptions of habitats and the definition of relatively undisturbed are in WDFW report – see web link on previous page*).
- ☐ **Caves**: A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.
- ☐ **Cliffs**: Greater than 25 ft (7.6 m) high and occurring below 5000 ft elevation.
- ☐ **Talus**: Homogenous areas of rock rubble ranging in average size 0.5 - 6.5 ft (0.15 - 2.0 m), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.
- ☑ **Snags and Logs**: Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 20 in (51 cm) in western Washington and are > 6.5 ft (2 m) in height. Priority logs are > 12 in (30 cm) in diameter at the largest end, and > 20 ft (6 m) long.

Note: All vegetated wetlands are by definition a priority habitat but are not included in this list because they are

Wetland name or number

addressed elsewhere.

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Wetland Type *Check off any criteria that apply to the wetland. List the category when the appropriate criteria are met.*	Category
SC 1.0. Estuarine Wetlands Does the wetland meet the following criteria for Estuarine wetlands? ☐ The dominant water regime is tidal, ☐ Vegetated, and ☐ With a salinity greater than 0.5 ppt ☐ Yes - Go to **SC 1.1** ☐ No = **Not an estuarine wetland**	
SC 1.1. Is the wetland within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151? ☐ Yes = **Category I** ☐ No - Go to **SC 1.2**	
SC 1.2. Is the wetland unit at least 1 ac in size and meets at least two of the following three conditions? ☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of non-native plant species. (If non-native species are *Spartina* , see page 25) ☐ At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland. ☐ The wetland has at least two of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands. ☐ Yes = **Category I** ☐ No = **Category II**	
SC 2.0. Wetlands of High Conservation Value (WHCV) SC 2.1. Has the WA Department of Natural Resources updated their website to include the list of Wetlands of High Conservation Value? ☐ Yes - Go to **SC 2.2** ☐ No - Go to **SC 2.3** SC 2.2. Is the wetland listed on the WDNR database as a Wetland of High Conservation Value? ☐ Yes = **Category I** ☐ No = **Not WHCV** SC 2.3. Is the wetland in a Section/Township/Range that contains a Natural Heritage wetland? http://www1.dnr.wa.gov/nhp/refdesk/datasearch/wnhpwetlands.pdf ☐ Yes - **Contact WNHP/WDNR and to SC 2.4** ☐ No = **Not WHCV** SC 2.4. Has WDNR identified the wetland within the S/T/R as a Wetland of High Conservation Value and listed it on their website? ☐ Yes = **Category I** ☐ No = **Not WHCV**	
SC 3.0. Bogs Does the wetland (or any part of the unit) meet both the criteria for soils and vegetation in bogs? *Use the key below.* ***If you answer YES you will still need to rate the wetland based on its functions*** . SC 3.1. Does an area within the wetland unit have organic soil horizons, either peats or mucks, that compose 16 in or more of the first 32 in of the soil profile? ☐ Yes - Go to **SC 3.3** ☐ No - Go to **SC 3.2** SC 3.2. Does an area within the wetland unit have organic soils, either peats or mucks, that are less than 16 in deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond? ☐ Yes - Go to **SC 3.3** ☐ No = **Is not a bog** SC 3.3. Does an area with peats or mucks have more than 70% cover of mosses at ground level, AND at least a 30% cover of plant species listed in Table 4? ☐ Yes = **Is a Category I bog** ☐ No - Go to **SC 3.4** **NOTE**: If you are uncertain about the extent of mosses in the understory, you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16 in deep. If the pH is less than 5.0 and the plant species in Table 4 are present, the wetland is a bog. SC 3.4. Is an area with peats or mucks forested (> 30% cover) with Sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Engelmann spruce, or western white pine, AND any of the species (or combination of species) listed	

Item 2a. Wetland name or number

in Table 4 provide more than 30% of the cover under the canopy?

☐ Yes = **Is a Category I bog** ☐ No = **Is not a bog**

SC 4.0. Forested Wetlands

Does the wetland have at least 1 contiguous acre of forest that meets one of these criteria for the WA Department of Fish and Wildlife's forests as priority habitats? ***If you answer YES you will still need to rate the wetland based on its functions.***

- ☐ **Old-growth forests** (west of Cascade crest): Stands of at least two tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 in (81 cm) or more.
- ☐ **Mature forests** (west of the Cascade Crest): Stands where the largest trees are 80-200 years old OR the species that make up the canopy have an average diameter (dbh) exceeding 21 in (53 cm).

☐ Yes = **Category I** ☐ No = **Not a forested wetland for this section**

SC 5.0. Wetlands in Coastal Lagoons

Does the wetland meet all of the following criteria of a wetland in a coastal lagoon?

- ☐ The wetland lies in a depression adjacent to marine waters that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks
- ☐ The lagoon in which the wetland is located contains ponded water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon (*needs to be measured near the bottom*)

☐ Yes - Go to **SC 5.1** ☐ No = **Not a wetland in a coastal lagoon**

SC 5.1. Does the wetland meet all of the following three conditions?

- ☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of aggressive, opportunistic plant species (see list of species on p. 100).
- ☐ At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland.
- ☐ The wetland is larger than $^{1}/_{10}$ ac (4350 ft^2)

☐ Yes = **Category I** ☐ No = **Category II**

SC 6.0. Interdunal Wetlands

Is the wetland west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? ***If you answer yes you will still need to rate the wetland based on its habitat functions.***

In practical terms that means the following geographic areas:

- ☐ Long Beach Peninsula: Lands west of SR 103
- ☐ Grayland-Westport: Lands west of SR 105
- ☐ Ocean Shores-Copalis: Lands west of SR 115 and SR 109

☐ Yes - Go to **SC 6.1** ☐ No = **Not an interdunal wetland for rating**

SC 6.1. Is the wetland 1 ac or larger and scores an 8 or 9 for the habitat functions on the form (rates H,H,H or H,H,M for the three aspects of function)?

☐ Yes = **Category I** ☐ No - Go to **SC 6.2**

SC 6.2. Is the wetland 1 ac or larger, or is it in a mosaic of wetlands that is 1 ac or larger?

☐ Yes = **Category II** ☐ No - Go to **SC 6.3**

SC 6.3. Is the unit between 0.1 and 1 ac, or is it in a mosaic of wetlands that is between 0.1 and 1 ac?

☐ Yes = **Category III** ☐ No = **Category IV**

Category of wetland based on Special Characteristics

If you answered No for all types, enter "Not Applicable" on Summary Form

EnviroVector
1441 West Bay Drive, Suite 301
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Email: curtis@envirovector.com

www.envirovector.com

28 September 2021

Evan Mann
PO BOX 73790
Puyallup, WA 98373

Reference: Henderson Boulevard Property
Subject: Mazama Pocket Gopher Screening to Satisfy City of Tumwater Permitting Requirements

Dear Evan Mann:

At your request, EnviroVector prepared this report to satisfy City of Tumwater requirements for Mazama pocket gopher screenings on the Subject Property (**Table 1; Figure 1**).

Table 1. Parcels Comprising Subject Property

No#	Property Address	Parcel Number	Section Township Range	Property Size (Acres)
1	---	12701320105	Section 02 Township 17N Range 2W	0.34
2	---	79300000101		4.77
3	---	79300000100		4.62
3 Parcels	Total Size			9.73 acres

The permitting jurisdiction is City of Tumwater.

1.0 INTRODUCTION

The Mazama pocket gopher is a Federally Threatened species protected under the Endangered Species Act and the City of Tumwater Code. Mazama pocket gopher screenings were performed by a qualified biologist certified by the US Fish and Wildlife Service (USFWS) for the purpose of satisfying the City of Tumwater (2018) Site Inspection Protocol and Procedures: Mazama Pocket Gopher (**Appendix E**).

A Mazama pocket gopher screening is necessary to comply with City of Tumwater Code and the Endangered Species Act.

2.0 METHODOLOGY

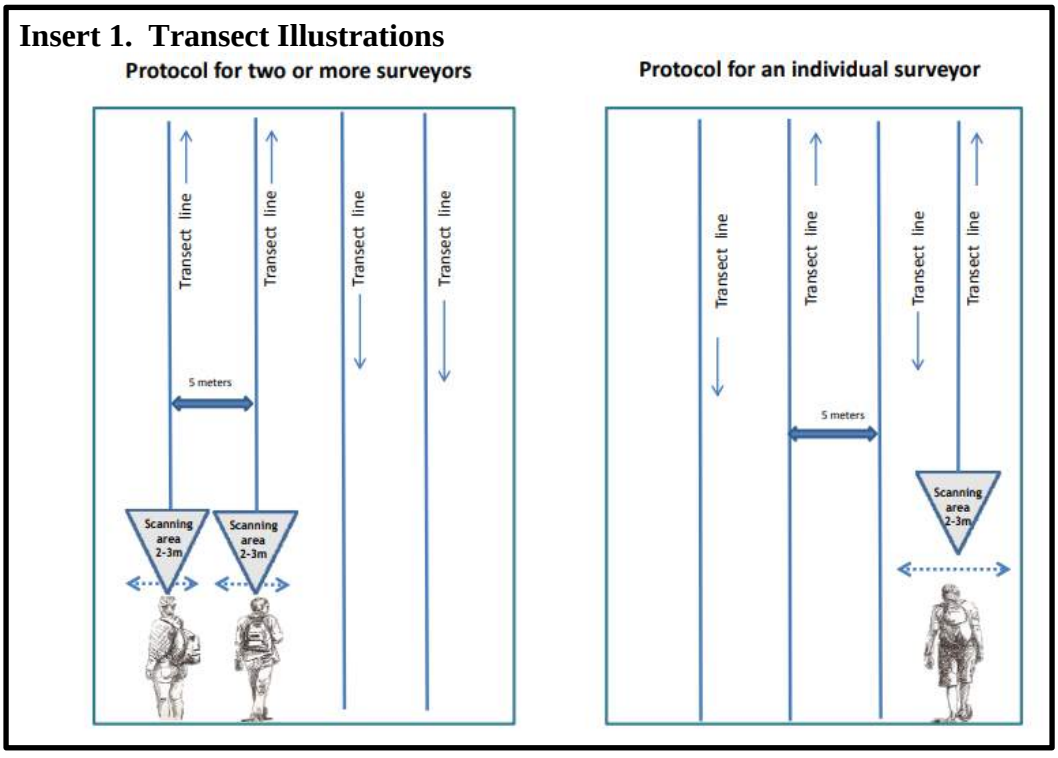
The Mazama pocket gopher screening was performed on 16 September 2020 and 27 October 2019 per City of Tumwater recommendations for two (2) site visits in compliance with the City of Tumwater (July 2018) Mazama Pocket Gopher Screening Protocol (**Appendix E**). The screening was performed within the USFWS prescribed survey window (June 1 through October 31).

In compliance with the USFWS and City of Tumwater (2018) Mazama Pocket Gopher Screening Protocols:

- The study has occurred during the prescribed work window of June 1 to October 31.
- A qualified biologist performed the screenings that has been trained and certified by the USFWS.
- The entire property was evaluated, not just the project footprint.
- The site was visited two (2) times at least thirty (30) days apart.
- Data was recorded on datasheets and provided in **Appendix F**.
- The areas of the property covered under the screening survey is illustrated in **Figure 2**.
- The ground was easily visible.

The site evaluation was conducted utilizing USFWS recommended protocol for one (1) surveyor (**Insert 1**). The search pattern had been performed along five (5) meter transects, including brushy and treed areas, examined for any evidence of mounding activity created by the Mazama pocket gopher.

Insert 1. Transect Illustrations



The detailed field methodology is in compliance with the City of Tumwater (2018) Site Inspection Protocol and Procedures: Mazama Pocket Gopher as follows:

1. The survey crew orients themselves with the layout of the property using aerial maps and strategizes their route for walking through the property.
2. Start GPS to record survey route.
3. Walk the survey transects methodically, slowly walking a straight line and scanning an area approximately 2-3 meters to the left and right as you walk, looking for mounds. Transects should be no more than five (5) meters apart when conducted by a single individual.
4. If the survey is performed by a team, walk together in parallel lines approximately 5 meters apart while you are scanning left to right for mounds.
5. At each mound found, stop and identify it as a MPG or mole mound. If it is a MPG mound, identify it as a singular mound or a group (3 mounds or more) on a data sheet to be submitted to the County.
6. Record all positive MPG mounds, likely MPG mounds, and MPG mound groups in a GPS unit that provides a date, time, georeferenced point, and other required information in County GPS data instruction for each MPG mound. Submit GPS data in a form acceptable to the County.
7. Photograph all MPG mounds or MPG mound groups. At a minimum, photograph MPG mounds or MPG mound groups representative of MPG detections on site.
8. Photos of mounds should include one that has identifiable landscape features for reference. In order to accurately depict the presence of gopher activity on a specific property, the following series of photos should be submitted to the County:
    a. At least one up-close photo to depict mound characteristics
    b. At least one photo depicting groups of mounds as a whole (when groups are encountered).
    c. At least one photo depicting gopher mounds with recognizable landscape features in the background, at each location where mounds are detected on a property
    d. Photos can be taken with the GPS unit or a separate, camera, preferably a camera with locational features (latitude, longitude)
    e. Photo point description or noteworthy landscape or other features to aid in relocation. Additional photos to be considered
    f. The approximate building footprint location from at least two cardinal directions.
    g. Landscape photos to depict habitat type and in some cases to indicate why not all portions of a property require gopher screening.
9. Describe and/or quantify what portion and proportion of the property was screened and record your survey route and any MPG mounds found on either an aerial or parcel map.

10. If MPG mounds are observed on a site, that day's survey effort should continue until the entire site is screened and all mounds present identified, but additional site visits are not required.
11. In order for the County to accurately review Critical Area Reports submitted in lieu of County field inspections the information collected in the field (GPS, data sheets, field notes, transect representations on aerial, etc.) shall be filed with the County. GPS information shall be submitted in a form approved by the County.

Soils known to be associated with the Mazama pocket gopher are listed in **Insert 2**.

Insert 2. Mazama pocket gopher soils

Table 1. Soils known to be associated with Mazama pocket gopher occupancy.

Mazama Pocket Gopher Preference	Soil Type
More Preferred (formerly High and Medium Preference Soils)	Nisqually loamy fine sand, 0 to 3 percent slopes Nisqually loamy fine sand, 3 to 15 percent slopes Spanaway-Nisqually complex, 2 to 10 percent slopes Cagey loamy sand Indianola loamy sand, 0 to 3 percent slopes Spanaway gravelly sandy loam, 0 to 3 percent slopes Spanaway gravelly sandy loam, 3 to 15% slopes
Less Preferred (formerly Low Preference Soils)	Alderwood gravelly sandy loam, 0 to 3 percent slopes Alderwood gravelly sandy loam, 3 to 15 percent slopes Everett very gravelly sandy loam, 0 to 3 percent slopes Everett very gravelly sandy loam, 3 to 15 percent slopes Indianola loamy sand, 3 to 15 percent slopes Kapowsin silt loam, 3 to 15 percent slopes McKenna gravelly silt loam, 0 to 5 percent slopes Norma fine sandy loam Norma silt loam Spana gravelly loam Spanaway stony sandy loam, 0 to 3 percent slopes Spanaway stony sandy loam, 3 to 15 percent slopes Yelm fine sandy loam, 0 to 3 percent slopes Yelm fine sandy loam, 3 to 15 percent slopes

3.0 BACKGROUND INFORMATION

3.1 Thurston County Geodatabase Soils

Two (2) soil types were identified on the subject property, Indianola loamy sand, 0 to 3 percent slopes, which is classified as "More preferred" gopher soils and Indianola loamy sand, 3 to 15 percent slopes "Less preferred" gopher soils (**Appendix B & C, Table 1**)

Table 1. Summary of Soil Preference

Soil Unit	Gopher Soil	Preference	Comments
Indianola loamy sand, 0 to 3% slopes	Yes	More preferred	Mapped on the eastern portion and the northwestern corner of the subject property
Indianola loamy sand, 3 to 15% slopes	Yes	Less preferred	Mapped on the ¾ of subject property

3.2 WDFW PHS Database

No priority habitats or species have been mapped on the subject property by the Washington Department of Fish and Wildlife (WDFW) Priority Habitats and Species (PHS) database (**Appendix D**).

The Mazama pocket gopher has been mapped to occur south of the subject property.

4.0 FIELD RESULTS

4.1 Mazama Pocket Gopher Site Evaluation

No mounds exhibiting characteristics typically associated with the Mazama pocket gopher have been identified on the subject property during this study. Mole mounds were identified on the site (**Appendix A, Photos 3-9**). A summary of findings is provided in **Table 2**.

The site is made up of three (3) contiguous parcels. The eastern portion of the subject property contains building and internal roads. The western portion of the subject property is forested with herbaceous understory. Maintained lawn and grassy areas are located throughout the property (**Appendix A, Photos 1-12**). The parcel west of the subject property is currently under development (**Appendix A, Photos 3, 4, & 11**).

Mounds created by the Mazama pocket gopher: 1) are crescent or oddly-shaped, 2) contain a plugged tunnel opening that extends diagonally underground from the mound edge, 3) exhibit a fine texture, and are 4) typically in a scattered distribution.

Mole mounds have centrally-located tunnel entrances that extend vertically below the surface, blocky texture, an in-line distribution pattern, and have a conical shape.

Table 2. Summary of Results

Site Visit	Date of Visit	Gopher Occurrence Observed	Comments
1st	7 July 2021	No	Site consists of buildings, maintained grass lawn, and forest
2nd	9 August 2021	No	Site consists of buildings, maintained grass lawn, and forest

4.2 Mazama Pocket Gopher Habitat Evaluation

Potential Mazama pocket gopher habitat occurs on the subject property and in the vicinity. Areas of flat grassland dominated by European pasture grasses is mapped as gopher soils.

5.0 CONCLUSION

This Mazama pocket gopher summary report was prepared to satisfy the Thurston County Mazama pocket gopher screening requirements and to comply with the City of Tumwater (2018) Site Inspection Protocol and Procedures: Mazama Pocket Gopher.

The entire subject property was evaluated for the Mazama pocket gopher on 7 July 2021 and on 9 August 2021 in accordance with the latest version of City of Tumwater (2018) Site Inspection Protocol and Procedures: Mazama Pocket Gopher. The site evaluation was performed within the prescribed survey window (June 1 through October 31).

Two (2) soil types were identified on the subject property, Indianola loamy sand, 0 to 3 percent slopes, which is classified as “More preferred” gopher soils and Indianola loamy sand, 3 to 15 percent slopes “Less preferred” gopher soils

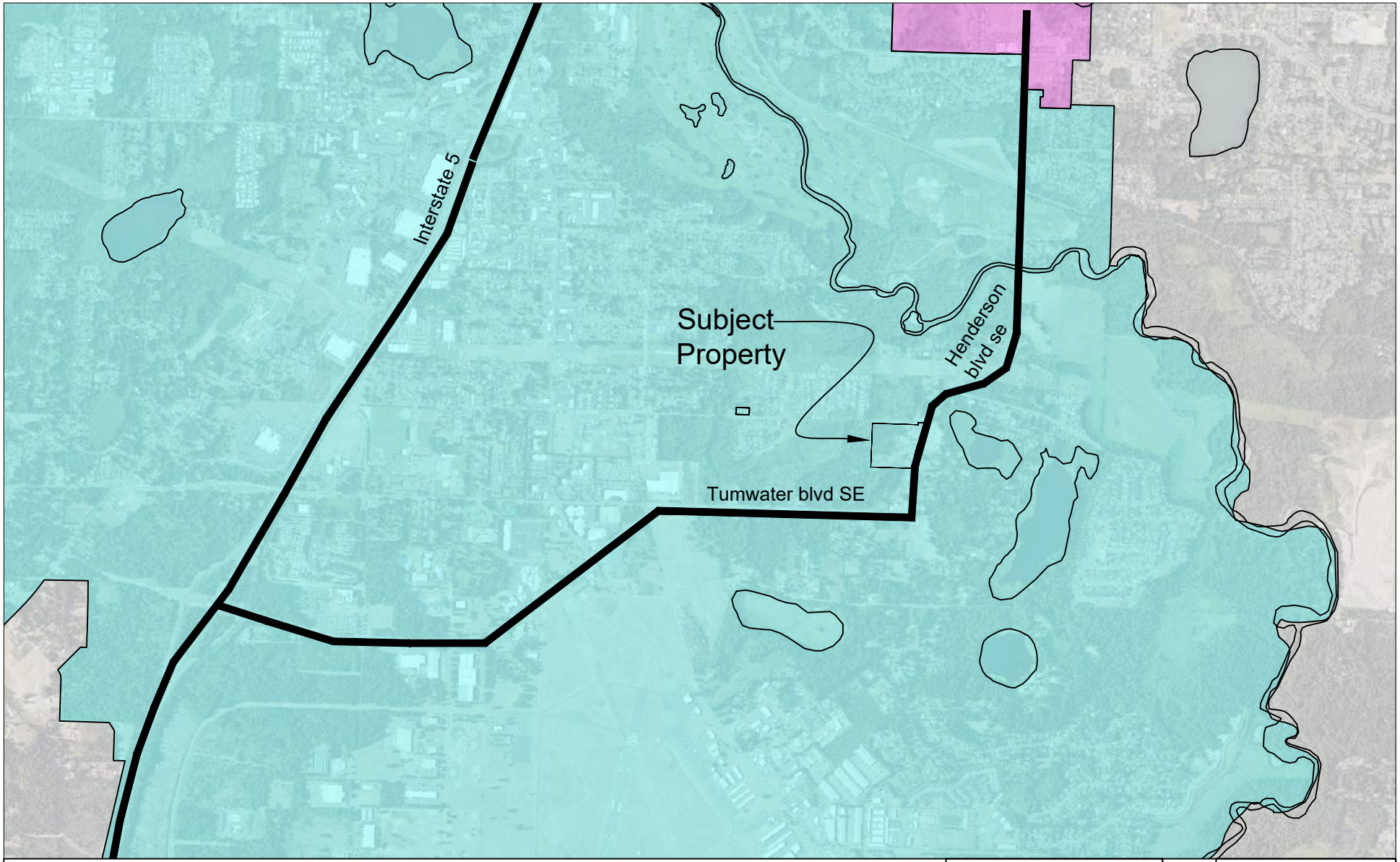
No mounds exhibiting characteristics typically associated with the Mazama pocket gopher have been identified on the subject property during this study.

If you have any questions or require further services, you can contact me at (360) 790-1559.

Sincerely,

Curtis Wambach, M.S.
Senior Biologist and Principal
EnviroVector

FIGURES



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360-790-1559

City of Tumwater
City of Olympia

Figure 1

Henderson Property

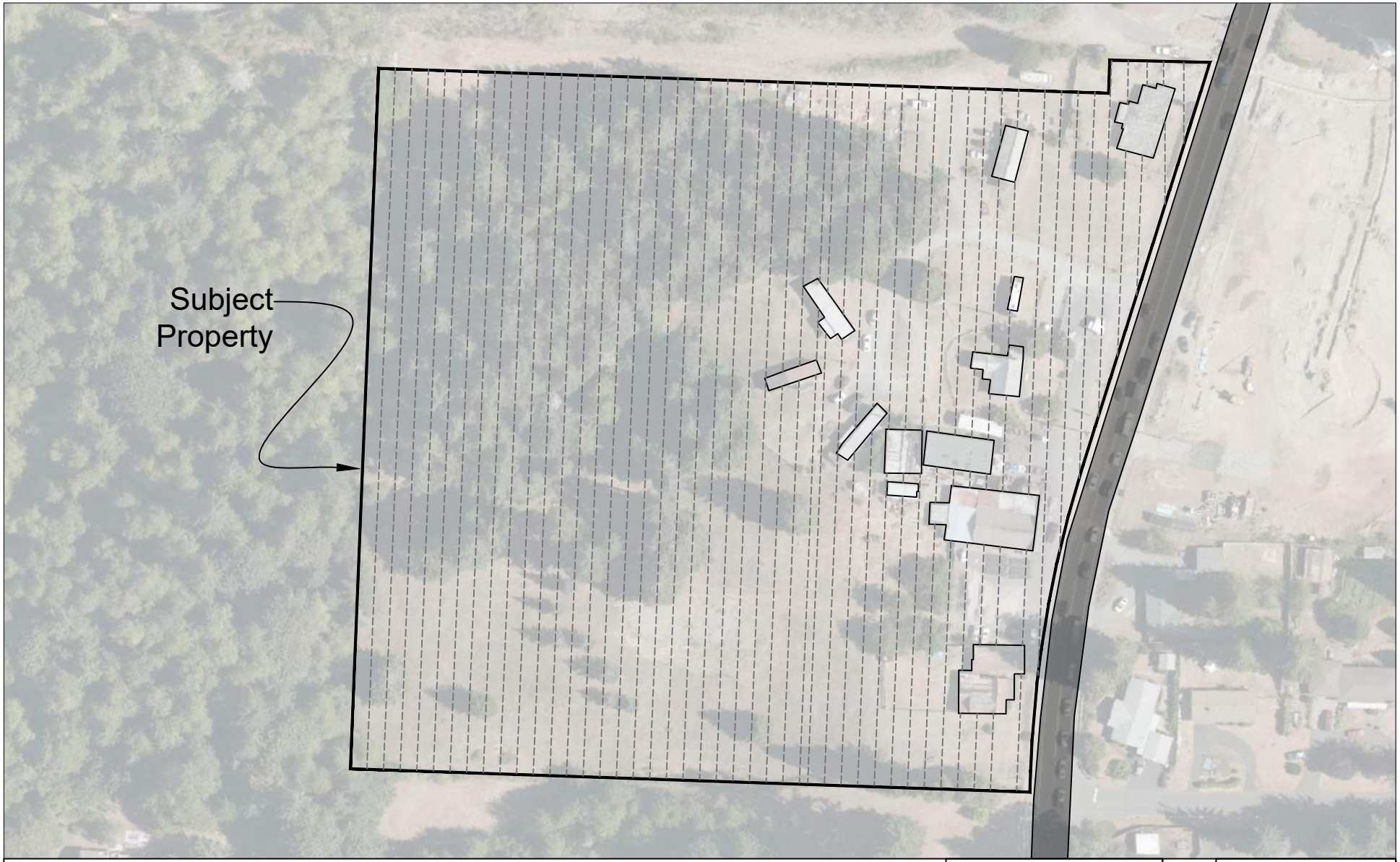
Vicinity Map

N

Scale: 1" = 2000'

0 2000'

6 October 2021



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----- Transects

Figure 2

Henderson Property

Gopher Screening

N

Scale: 1" = 125'

0 125'

6 October 2021

APPENDIX A

Photo Documentation

First Gopher Screening

Photo 1. A frontage of property

Photo 2. At frontage of property

Photo 3. Mole mound on western portion of property

Photo 4. Photo 3. Mole mound on western portion of property

Photo 5. Fmole mound on proeprty

Photo 6. Distinctive mole mound on proeprty

Second Gopher Screening

Photo 7. Mole mounds at frontage of property

Photo 8. Mole mounds at frontage of property

Photo 9. Mole mound near existing building

Photo 10. Grass lawn area, no mounds

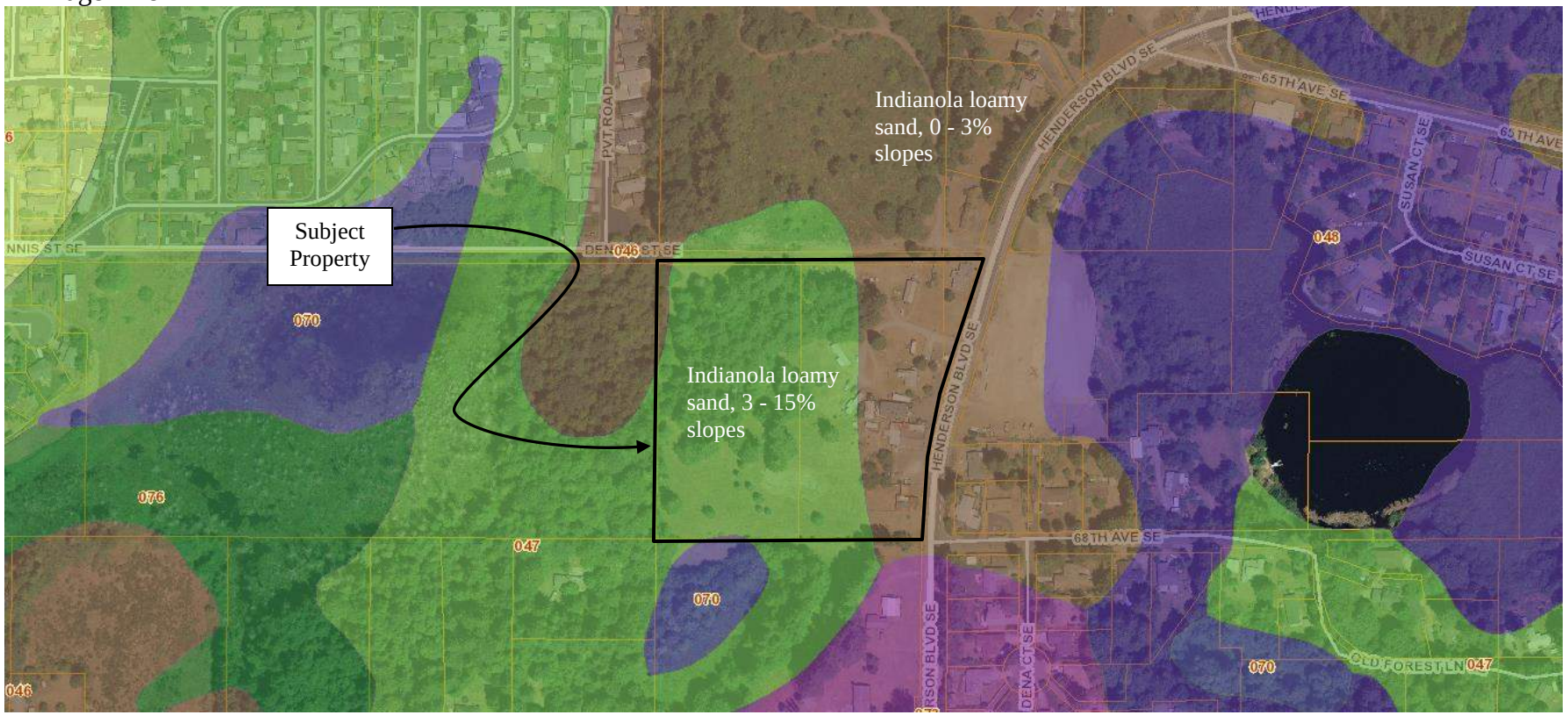
Photo 11. Western edge of property, near off-site development

Photo 12. Grass lawn area, no mounds

APPENDIX B

Thurston County Geodatabase

Soils

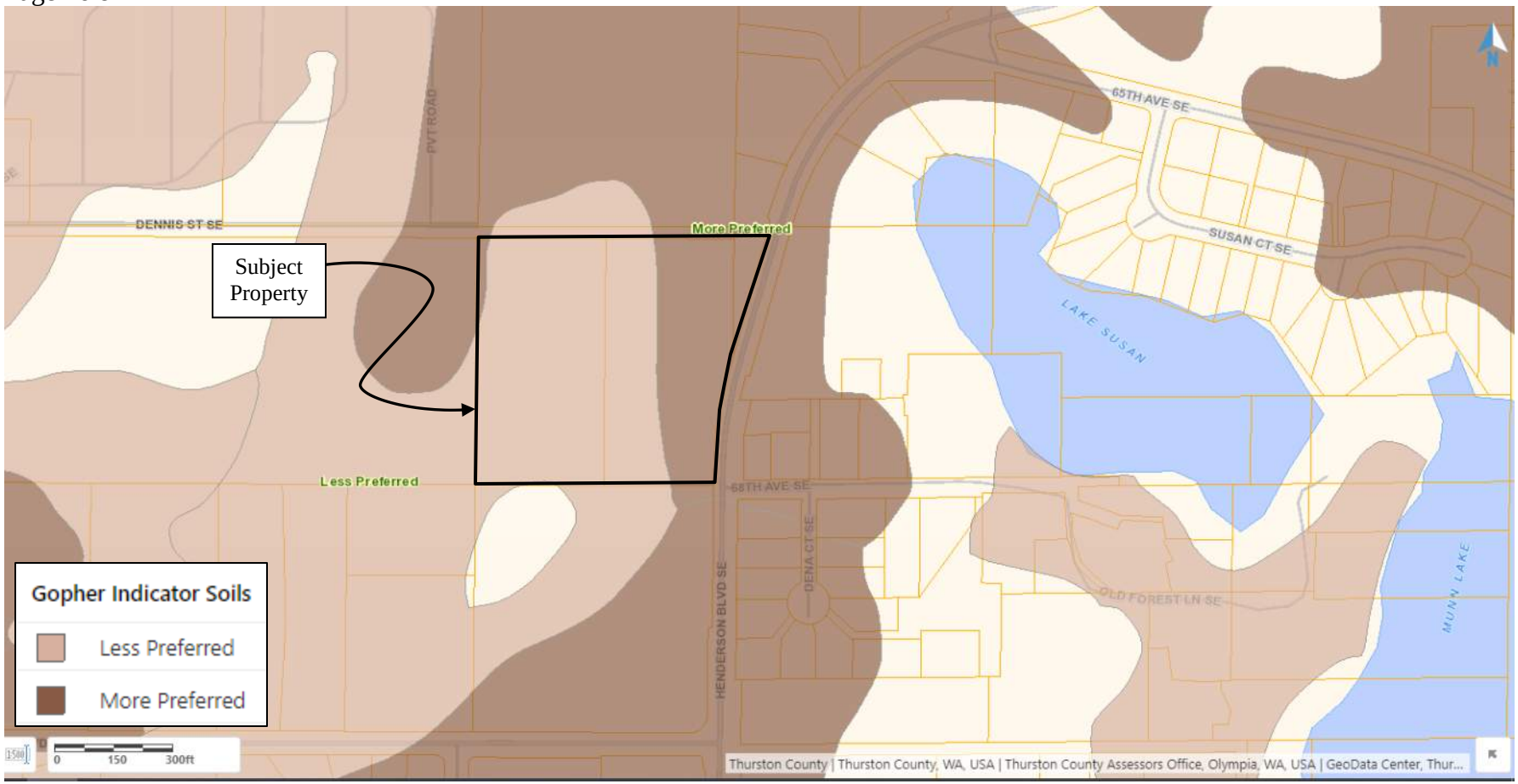

Subject Property
Indianola loamy sand, 0 - 3% slopes
Indianola loamy sand, 3 - 15% slopes
HENDERSON BLVD SE
65TH AVE SE
SUSAN CT SE
PVT ROAD
68TH AVE SE
OLD FOREST LN
070
076
047
046
048

APPENDIX C

Thurston County Geodatabase

Gopher Indicator Soils

Evan Mann

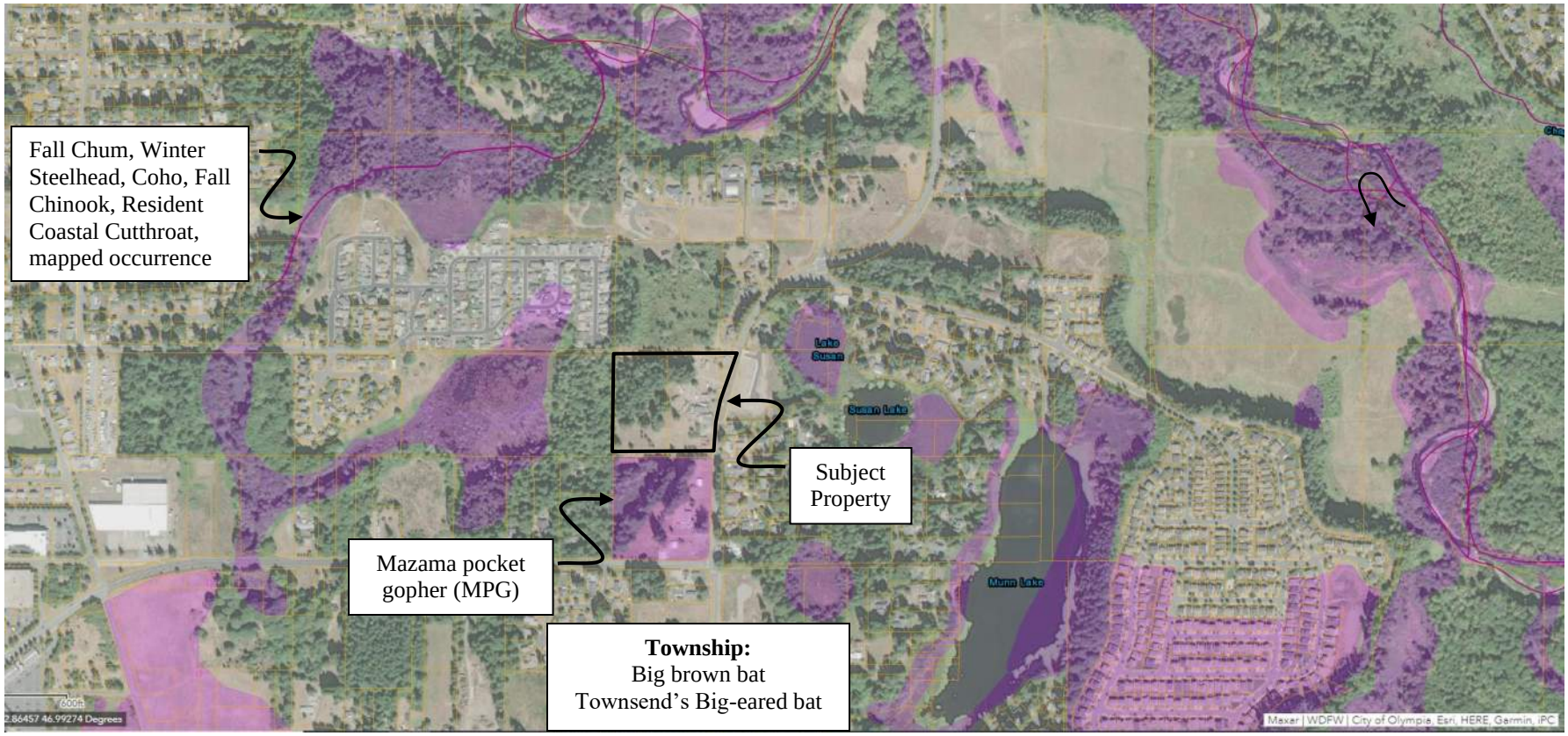

Subject Property
More Preferred
Less Preferred
DENNIS ST SE
PVT ROAD
65TH AVE SE
SUSAN CT SE
LAKE SUSAN
68TH AVE SE
DENA CT SE
HENDERSON BLVD SE
OLD FOREST LN SE
MUNN LAKE
Gopher Indicator Soils
Less Preferred
More Preferred
0
150
300ft
Thurston County | Thurston County, WA, USA | Thurston County Assessors Office, Olympia, WA, USA | GeoData Center, Thur...

APPENDIX D

Washington Department of Fish and Wildlife

Priority Habitat Species (PHS)

Database


Fall Chum, Winter Steelhead, Coho, Fall Chinook, Resident Coastal Cutthroat, mapped occurrence
Subject Property
Mazama pocket gopher (MPG)
Township:
Big brown bat
Townsend's Big-eared bat
Lake Susan
Susan Lake
Munn Lake
Maxar | WDFW | City of Olympia, Esri, HERE, Garmin, iPC

APPENDIX E

City of Tumwater

Site Inspection Protocol and Procedures:

Mazama Pocket Gopher

COMMUNITY DEVELOPMENT DEPARTMENT

ADMINISTRATIVE DETERMINATION

TOPIC: Mazama Pocket Gopher Screening

APPROVED: Michael Matlock DATE: 7/25/18

Michael Matlock, AICP
Community Development Director

BACKGROUND: The Mazama Pocket Gopher (MPG) became a federally listed endangered species in April 2014. This memo addresses the City regulatory structure. The Endangered Species Act (ESA) is a separate regulatory structure from the Growth Management Act, the State statute the City does implement, so compliance with City regulations does not necessarily mean an applicant complies with the ESA. While the City routinely addresses questions from property owners on how to comply with its local development regulations, it does not do so with respect to the ESA.[1] ESA compliance is the property owner's responsibility.

FINDINGS: In implementing the City's critical areas ordinance (CAO), and based on analysis prepared by qualified professionals, staff have found that projects in certain areas and with certain features lack gopher habitat, so do not require CAO review by a qualified professional. While the CAO governs these issues, the below summarizes what staff have found to date.

DETERMINATION: Based on the findings above, Tumwater summarizes assessment findings for MPG presence as follows:

1. **Geographic** – Due to lack of habitat, no properties in the City north of Trosper Road have required CAO review.
2. **Vegetative Cover** – Project Sites, parcels, or portions of these sites with 30% or greater forested cover have not required CAO review, although where there are adjacent unforested and undeveloped lots exceeding 7,600 square feet (SF) in area, CAO review may be needed.
3. **Project Use Level** –
   a. Single-family, manufactured homes, and duplexes for lots 7,600 SF or less
      1) New or additions to single-family, manufactured homes, and duplexes – CAO review has typically not been required on existing lots 7,600 SF

[1] For land owners seeking guidance on ESA compliance, while the City cannot assist, see USFWS Memorandum, Guidance on Trigger for an Incidental Take Permit Under Section 10(a)(1)(B) of the Endangered Species Act Where Occupied Habitat or Potentially Occupied Habitat is Being Modified, issued April 26, 2018.

or less in size. Unforested and undeveloped lots exceeding 7,600 SF may require CAO review.

2) Developed lots surrounded by existing development (homes, streets, storm ponds, sidewalks, etc.) that are of a similar size have not required CAO review. This would not exclude sites on the periphery areas where adjacent lands are not developed at an urban density level.

3) Single-family lots vested under RCW 58.17 and/or TMC 15.44.040 will likely not require CAO review.

b. Commercial/Industrial/Institutional

1) New or additions to buildings proposed in areas with 30% or greater forested coverage, existing impervious surfaces or significantly disturbed pervious areas (i.e. evidence of compacted gravel, formal landscape areas or other scenarios that would exclude the proposed developed area as being defined as habitat) have typically not required CAO review.

4. **Approved United States Fish and Wildlife Service (USFWS) Avoidance/Mitigation Strategy** – Any projects that have consulted with USFWS and have a documented avoidance/mitigation strategy that is acceptable to USFWS can typically proceed with normal permitting.

5. **Site Screening** – Properties may be screened by a qualified professional. Alternately, USFWS may screen properties by arrangement between the property owner and USFWS. At least two screenings, no less than 30 days apart, between June 1 and October 31, are consistent with best available science to determine the presence or absence of MPG.

PRIOR GUIDANCE: This Administrative Determination supersedes and replaces the City's prior Administrative Determination on Mazama Pocket Gopher Screening Protocol dated October 31, 2017.

APPEAL: This code determination shall become effective on the above date. Any person affected by this determination may appeal this decision to the Tumwater Hearing Examiner pursuant to Chapter 18.62 of the Tumwater Municipal Code.

APPENDIX F

Datasheets

Sample Mazama Pocket Gopher Screening Field Form

Site Visit Date: 7 July 2021

If 2nd or 3rd site visit, date(s) of previous visits: 9 August 2021

Site Information	**Parcel #:** #12701320105, 79300000101, 79300000100 **Site/Landowner:** Soundbuilt Homes	
How were the data collected? (circle the method for each)	**Transect:** **(GPS)** **Aerial** **Mounds:** **(GPS)** **Aerial** **Notes:**	
Field team names: (Note who filled out form and others conducting screening)	Curtis Wambach	
Others onsite (name/affiliation)		
Site visit # (CIRCLE all that apply)	**(1st)** **2nd** **3rd**	**Notes:**
Do onsite conditions throughout the entire parcel preclude the need for MPG surveys? **(CIRCLE and DESCRIBE)**	**Yes** **(No)** **Dense woody cover (trees/shrubs) that appears to preclude any MPG use** **Impervious Compacted Graveled Flooded Slope** **Other_____** **Notes:**	
Describe ground visibility for mound detection: (CIRCLE and DESCRIBE)	**Poor Fair (Good) Notes:**	

	MPG Mounds	**Indeterminate**	**Mole Mounds**
Quantify or describe amount of MPG mounds and approx. # of mounds or groups of mounds (specify whether count is individual mounds or groups)	0	0	25
	No MPG mounds observed (CIRCLE)		

Sample Mazama Pocket Gopher Screening Field Form

Does woody vegetation onsite match aerial photo? (CIRCLE and DESCRIBE)	**(Yes)** **No – describe differences and show on parcel map/aerial:**
What portion of the property was screened? (CIRCLE and DESCRIBE)	**(All)** **Part - describe and show on parcel map/aerial:**
Notes	
Team reviewed and agreed to data recorded on form? (CIRCLE, and EXPLAIN if "No")	**Yes No** **Reviewed by: ____ ____ ____ _____ _____** **Notes:**

Sample Mazama Pocket Gopher Screening Field Form

Site Visit Date: 7 July 2021

If 2nd or 3rd site visit, date(s) of previous visits: 9 August 2021

Site Information	**Parcel #:** #12701320105, 79300000101, 79300000100 **Site/Landowner:** Soundbuilt Homes	
How were the data collected? (circle the method for each)	**Transect:** **(GPS)** **Aerial** **Mounds:** **(GPS)** **Aerial** **Notes:**	
Field team names: (Note who filled out form and others conducting screening)	Julie Lewis/Curtis Wambach	
Others onsite (name/affiliation)		
Site visit # (CIRCLE all that apply)	**1st** **(2nd)** **3rd**	**Notes:**
Do onsite conditions throughout the entire parcel preclude the need for MPG surveys? **(CIRCLE and DESCRIBE)**	**Yes** **(No)** **Dense woody cover (trees/shrubs) that appears to preclude any MPG use** **Impervious Compacted Graveled Flooded Slope** **Other_____** **Notes:**	
Describe ground visibility for mound detection: (CIRCLE and DESCRIBE)	**Poor Fair (Good) Notes:**	

	MPG Mounds	**Indeterminate**	**Mole Mounds**
Quantify or describe amount of MPG mounds and approx. # of mounds or groups of mounds (specify whether count is individual mounds or groups)	0	5	14
	No MPG mounds observed (CIRCLE)		

Sample Mazama Pocket Gopher Screening Field Form

Does woody vegetation onsite match aerial photo? (CIRCLE and DESCRIBE)	**(Yes)** **No – describe differences and show on parcel map/aerial:**
What portion of the property was screened? (CIRCLE and DESCRIBE)	**(All)** **Part - describe and show on parcel map/aerial:**
Notes	
Team reviewed and agreed to data recorded on form? (CIRCLE, and EXPLAIN if "No")	**Yes No** **Reviewed by: ____ ____ ____ _____ _____** **Notes:**

THREE LAKES CROSSING
TRAFFIC IMPACT ANALYSIS

City of Tumwater, WA

12/10/2021

Prepared for: Mr. Evan Mann
Soundbuilt Homes
PO Box 73790
Puyallup, WA 98373

December 2021

THREE LAKES CROSSING
TRAFFIC IMPACT ANALYSIS

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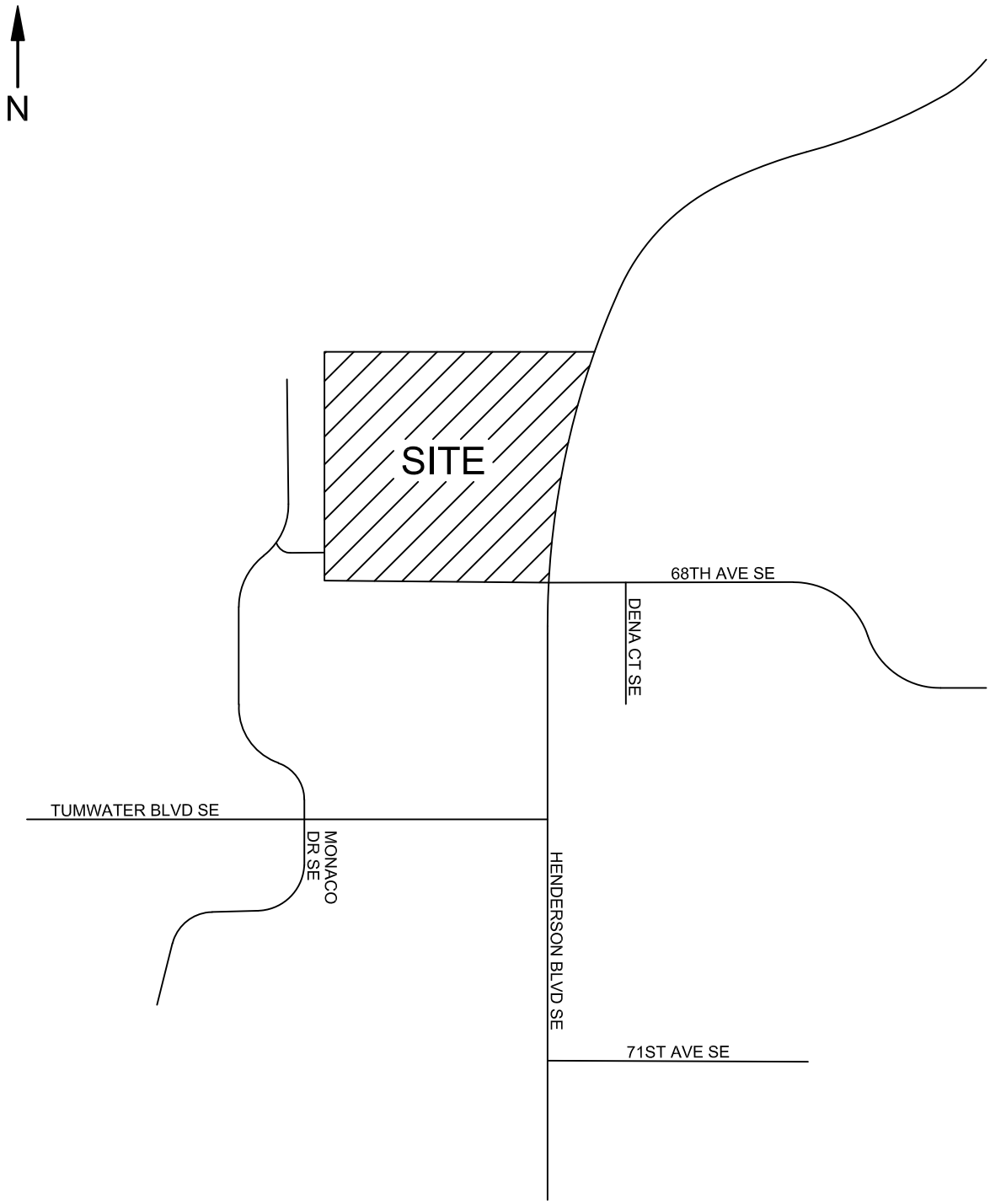
THREE LAKES CROSSING
TRAFFIC IMPACT ANALYSIS

1. INTRODUCTION

The main goals of this study focus on the analysis of existing roadway conditions and forecasts of newly generated project traffic. The first task includes the review of general roadway information on the adjacent street system, baseline vehicular volumes, and entering sight distance data. Forecasts of future traffic and dispersion patterns on the street system are then determined using established trip generation and distribution techniques. As a final step, appropriate conclusions and mitigation measures are defined.

2. PROJECT DESCRIPTION

The Three Lakes Crossing project is a proposed residential development comprising up to 45 single-family dwelling units in the city of Tumwater. The subject site, bordered to the east by Henderson Boulevard SE, is located on a cumulative 16.66-acres within tax parcel #'s: 1270132-0105; 7930000-0100; & -0101. Access to the site is proposed via one new driveway extending west from Henderson Boulevard SE into the subject site. Moreover, internal connection is to be provided with a new development located south of the subject site, subsequently providing access to Tumwater Boulevard SE. All existing structures on-site are to be demolished prior to new construction. Figure 1 on the following page shows the aerial vicinity of the project. A conceptual site plan illustrating the proposed site layout including all access points is presented in Figure 2. A site aerial is provided below.



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TRAFFIC AND CIVIL ENGINEERING

THREE LAKES CROSSING

VICINITY MAP & ROADWAY SYSTEM
FIGURE 1

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TRAFFIC AND CIVIL ENGINEERING

THREE LAKES CROSSING

SITE PLAN
FIGURE 2

3. EXISTING CONDITIONS

3.1 Existing Roadway Characteristics

The major roadways and arterials serving the subject site are described below:

Tumwater Boulevard SE: is an east-west, two-lane minor arterial located south of the subject site. Travel lanes are approximately 12-feet in width. Paved shoulders approximately 7- to 11- feet in width are provided in the vicinity of the subject site along either side of the roadway. The posted speed limit is 35-mph.

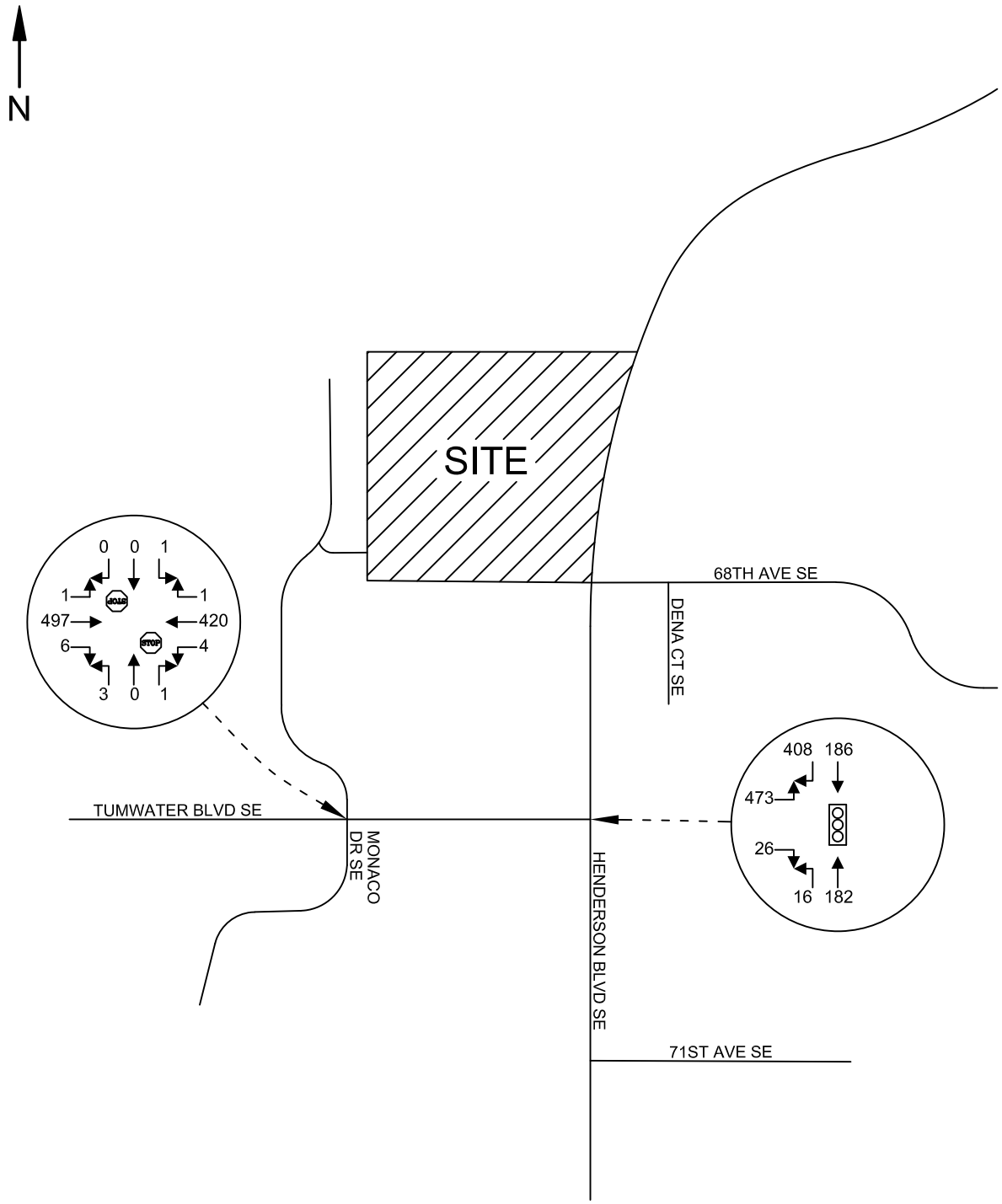
Henderson Boulevard SE: is a north-south, two-lane roadway that borders the subject site to the east. The roadway is designated as a minor arterial north of Tumwater Boulevard SE and an urban collector south of the intersection. Travel lanes are approximately 11- to 12-feet in width with additional turn-lanes provided at major intersections. Shoulder composition varies between paved segments varying in width to no formal treatment. The posted speed limit is 35-mph.

3.2 Non-Motorist Traffic

Non-motorist traffic was observed at the time of field counts. No non-motorist volumes were observed at the study intersection of Tumwater Boulevard SE & Henderson Boulevard SE during the PM peak hour. No pedestrians and three bicyclists were observed at Tumwater Boulevard SE & Monaco Drive SE during the PM peak hour. Non-motorist infrastructure is limited in the vicinity of the subject site. No significant increase in respect to non-motorist volumes is anticipated as a result of the proposed development.

3.3 Existing Peak Hour Volumes and Travel Patterns

Field data for this study was collected in September of 2021. Intersection data was collected at Tumwater Boulevard SE & Monaco Drive SE and Tumwater Boulevard SE & Henderson Boulevard SE. Data was obtained during the evening peak period between the hours of 4:00 PM – 6:00 PM, which generally translates to highest overall roadway volumes in a given 24-hour period. The one hour reflecting highest overall roadway volumes (peak hour) was then derived from these counts. Existing PM peak hour volumes observed on-site are illustrated in Figure 3. Full count sheets are attached in the appendix.



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TRAFFIC AND CIVIL ENGINEERING

THREE LAKES CROSSING

EXISTING PM PEAK HOUR VOLUMES
FIGURE 3

3.4 Level of Service

Baseline intersection delays were determined through the use of the *Highway Capacity Manual* 6th Edition. Capacity analysis is used to determine level of service (LOS) which is an established measure of congestion for transportation facilities. The range[1] for intersection level of service is LOS A to LOS F with the former indicating the best operating conditions with low control delays and the latter indicating the worst conditions with heavy control delays. Detailed descriptions of intersection LOS are given in the 2016 Highway Capacity Manual. Level of service calculations were made through the use of the *Synchro 11* analysis program. Delays presented represent overall weighted average delays for signalized control. For side-street, stop-controlled intersections, LOS is determined by the approach with the highest delay. Table 1 below portrays existing PM peak hour LOS delays for the key intersections of study.

Table 1: Existing PM Peak Hour Level of Service

Delays given in seconds per vehicle

Intersection	Control	LOS	Delay
Tumwater Blvd SE & Monaco Dr SE	Stop	A	6.2
Tumwater Blvd SE & Henderson Blvd SE	Signal	C	30.9

Existing PM peak hour delays are all shown to calculate within the LOS B or better range indicating stable operations during the critical peak hour of travel. All intersections meet the city of Tumwater's level of service standard of LOS D or better.

---

1 *Signalized Intersections - Level of Service*

Level of Service	Control Delay per Vehicle (sec)
A	≤10
B	> 10 and ≤20
C	> 20 and ≤35
D	> 35 and ≤55
E	> 55 and ≤80
F	> 80

Stop Controlled Intersections – Level of Service

Level of Service	Control Delay per Vehicle (sec)
A	≤10
B	> 10 and ≤15
C	> 15 and ≤25
D	> 25 and ≤35
E	> 35 and ≤50
F	> 50

Highway Capacity Manual, 6th Edition

3.5 Roadway Improvements

A review of the City of Tumwater's Six Year Transportation Improvement Program 2022-2027 indicates that improvement projects are planned in the vicinity. Descriptions and summaries of each project are provided in Table 2 below.

Table 2: Transportation Improvement Projects

Name	Location	Improvement	Cost
Henderson Blvd Bridge (Map ID# 5)	Henderson Blvd	Design stages for future bridge widening or replacement to add capacity/non-motorist facilities	$250,000
93rd Ave / Kimmie Street Intersection (Map ID# 6)	93rd Ave / Kimmie Street Intersection	ROW acquisition for future intersection improvements	$150,000
Old Highway 99 Corridor Improvements (Map ID# 7)	79th Ave to 73rd Ave	Design and construct urban road section and improvements determined from the Corridor Study. To include addition of traffic lanes, turn lanes, multi-modal facilities, etc.	$3,500,000
Tumwater Blvd Interchange (Map ID# 9)	I-5 SB Ramps to I-5 NB Ramps	Design, acquire ROW, and construct improvements to Interchange	$6,650,000
Deschutes Valley Trail (Map ID# 19-22)	E St to Pioneer Park	Construction of a paved walking / bicycling trail connection	$11,550,000

3.6 Transit Service

The Intercity Transit and TRPC regional bus schedules were reviewed in terms of transit available in the vicinity of the subject site. The nearest available transit service, provided 0.90 miles west at the intersection of Israel Road SE & Capitol Boulevard SE, is provided via Routes 2 and 12. Route 2 – Rainier, Tenino, Tumwater – provides service from Binghampton Street & Dakota Avenue to Tumwater Square from approximately 6:00 AM – 5:55 PM with 120-minute headways during peak travel hours. Route 12, L & I to Olympia Transit Center, provides service from the Olympia Transit Center to the Tumwater Labor & Industries Building. Other major destinations served by Route 12 include the Thurston County Courthouse and SPSCC. Weekday service is provided from approximately 5:39 AM to 8:25 PM with 30-minute headways during peak travel hours. Weekend service is provided from approximately 7:30 AM to 8:25 PM with approximately 30-minute headways. Refer to Intercity Transit and TRPC routes and schedules for more detailed information.

4. FUTURE TRAFFIC CONDITIONS

4.1 Trip Generation

Trip generation is defined as the number of vehicle movements that enter or exit a site during a designated time period such as a specific peak hour or an entire day. Data presented in this analysis was derived from the Institute of Transportation Engineer's (ITE) publication *Trip Generation,* 11th Edition. The proposed land use is to be defined as Single-Family Detached Housing (LUC 210). ITE average rates were used to determine trip ends with dwelling units used as the input variable. Table 3 below summarizes anticipated vehicular movements for the average weekday daily trips (AWDT), AM peak hour and PM peak hour. ITE Trip Generation sheets have been attached to the appendix for reference.

Table 3: Project Trip Generation

Land Use	Size	ADT	AM Peak-Hour Trips			PM Peak-Hour Trips		
			In	Out	Total	In	Out	Total
Single-Family Detached	45 dwelling units	424	8	23	**31**	26	16	**42**

Based on the data presented in Table 3, the project is anticipated to generate 424 new average weekday daily trips with 31 trips (8 in/23 out) occurring during the AM peak hour and 42 trips (26 in/16 out) occurring during the PM peak hour.

4.2 Trip Distribution and Assignment

Trip distribution describes the anticipated travel routes for inbound and outbound project traffic during the peak hour study period. The specific destinations and origins of the generated traffic primarily influences the key intersections, which will effectively receive the bulk of project impacts. Anticipated distribution percentages and travel routes for the PM peak hour are illustrated in Figure 4. Percentages are based on Thurston Regional Planning Council (TRPC) TAZ 232 Distribution Map. See appendix for complete TAZ map.

Moreover, project-generated trips anticipated to travel through the Tumwater I-5 Interchange to the south as identified from the TAZ 232 map are outlined in Figure A in the appendix. Approximately 2 project trips are identified to travel through the aforementioned interchanges during the critical PM peak hour.

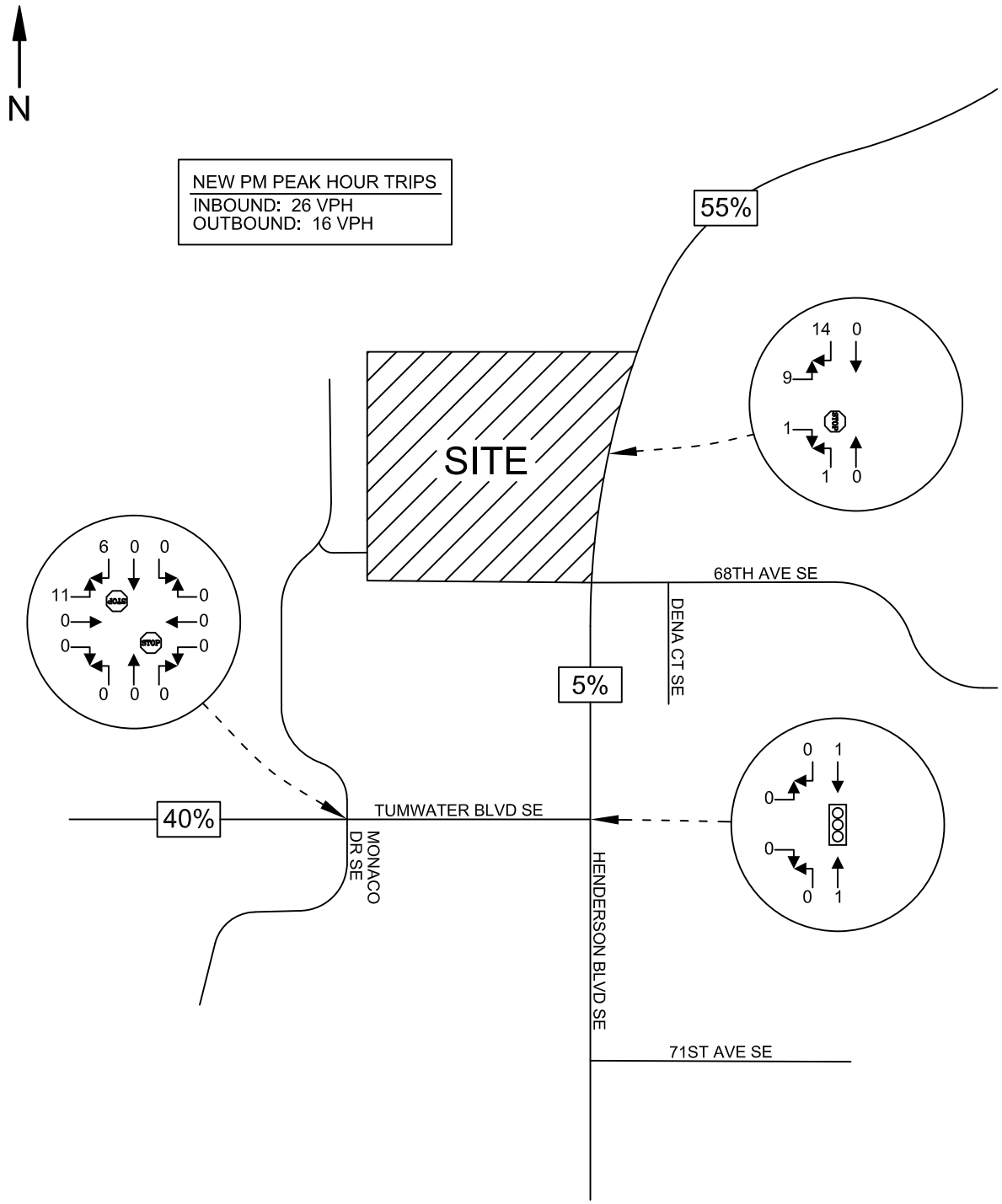
It should be noted that there is availability of access to the development by both the Tumwater Boulevard SE (via internal connection to southerly/westerly development) and Henderson Boulevard SE roadways.

4.3 Future Peak Hour Volumes

A 5-year horizon of 2026 was used for future traffic delay analysis. Forecast 2026 background traffic volumes were derived by applying a 1.5 percent compound annual growth rate to the existing volumes shown in Figure 3. This growth rate has been used for similar past projects in the area.

Moreover, pipeline volumes associated with the nearby Tumwater Boulevard Plat and Shinn Estates Plat projects were included in forecast analysis. It should be noted that Tumwater Boulevard Plat was under construction at the time of field counts. For this reason, trip generation associated with the proposed 26 single-family dwelling units was derived via ITE data and added to forecast volumes. PM peak hour pipeline volumes are illustrated in Figures 5A and 5B. Pipeline volumes illustrated in 5A are representative of forecast background volumes and do not include internal connection to the proposed Three Lakes Crossing development. Thereby, no access to Henderson Boulevard SE is illustrated. Pipeline volumes illustrated in Figure 5B include internal connection to the proposed project and redistribute traffic through the proposed Henderson Boulevard SE access.

Forecast 2026 PM peak hour volumes without and with project-generated traffic are illustrated in Figures 6 and 7.



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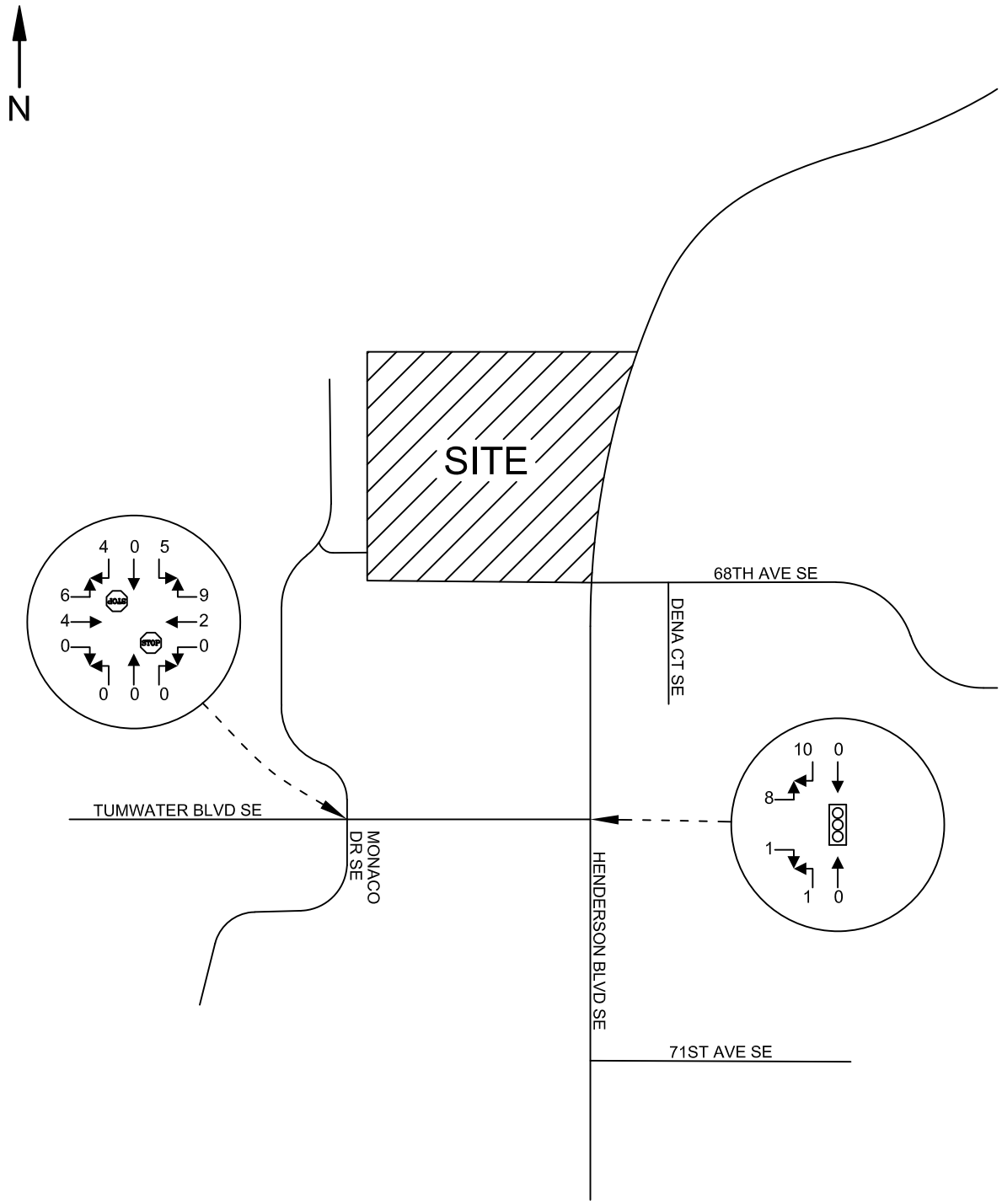
TRAFFIC AND CIVIL ENGINEERING

THREE LAKES CROSSING

PM PEAK HOUR TRIP DISTRIBUTION & ASSIGNMENT
FIGURE 4



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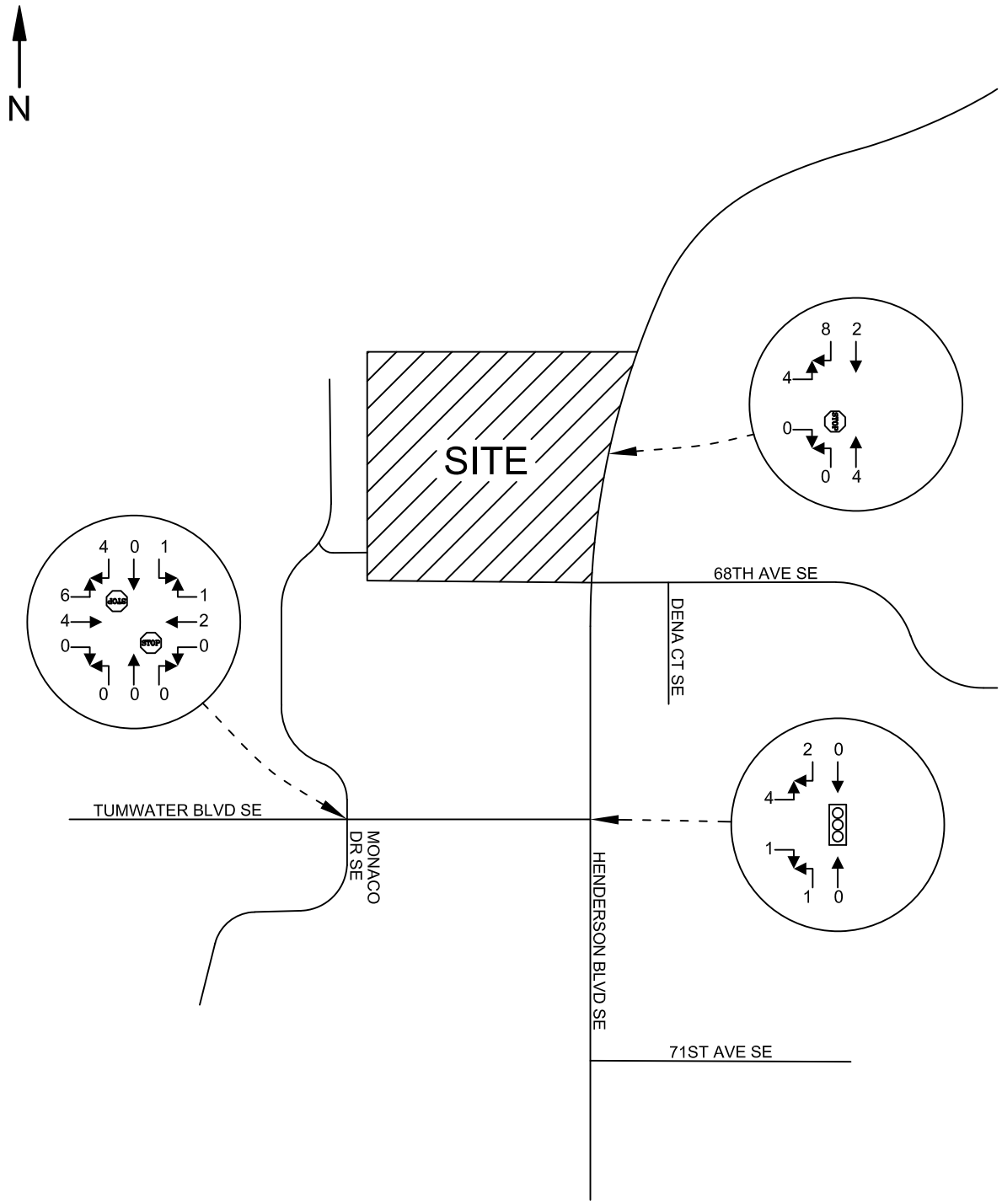
THREE LAKES CROSSING

PM PEAK HOUR PIPELINE VOLUMES: NO INTERNAL CONNECTION

FIGURE 5A



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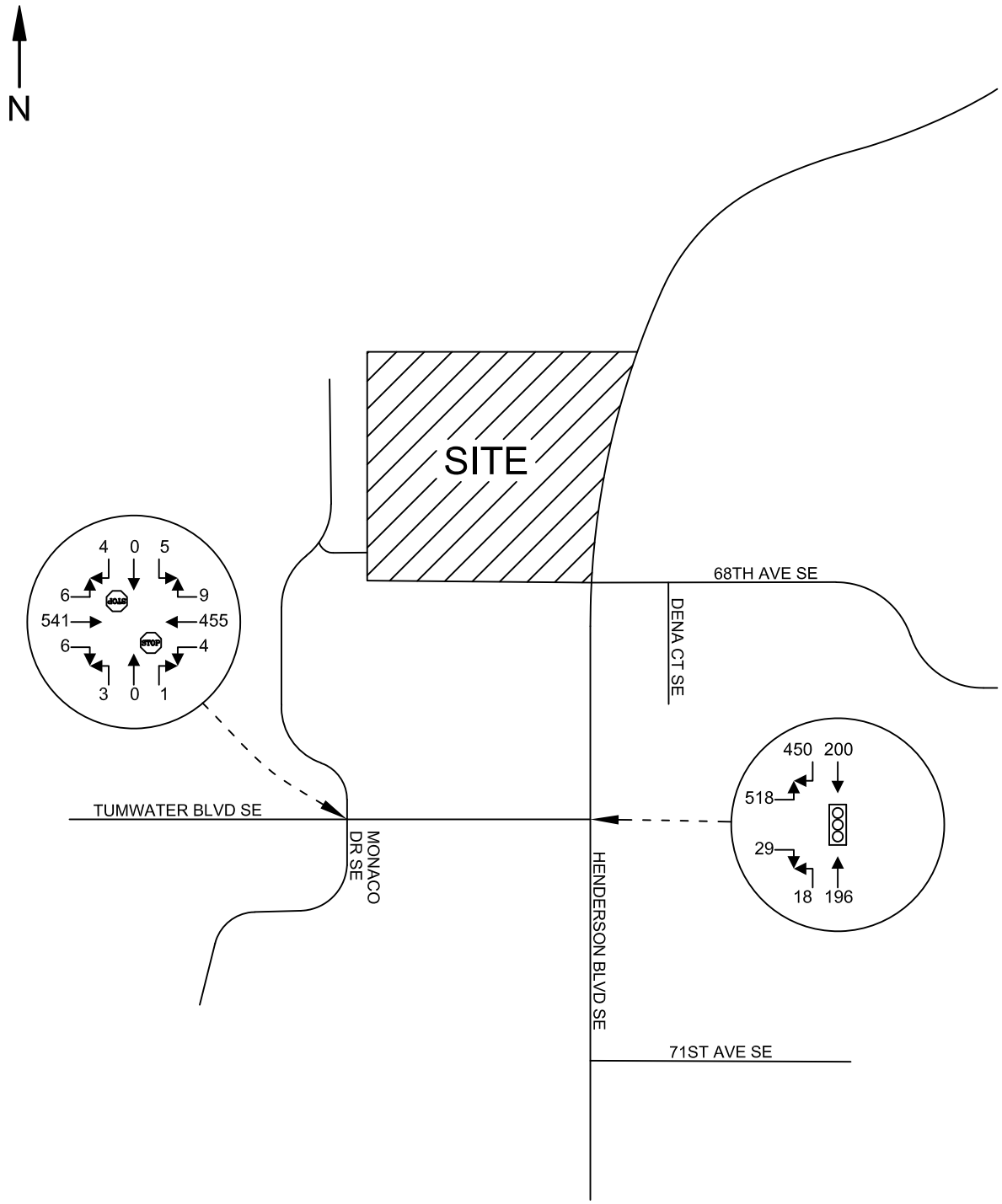
THREE LAKES CROSSING

PM PEAK HOUR PIPELINE VOLUMES: INTERNAL CONNECTION

FIGURE 5B



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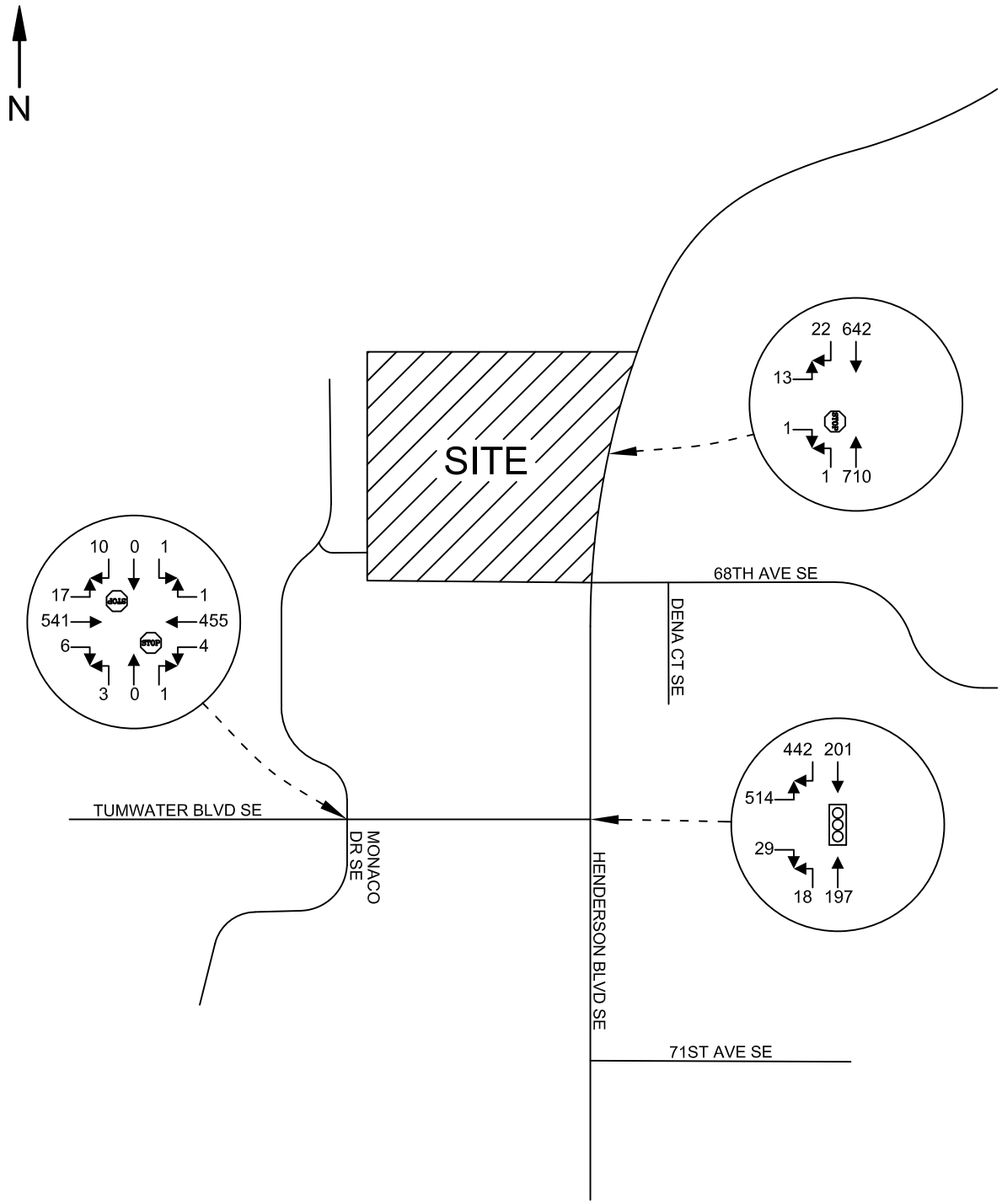
THREE LAKES CROSSING

FORECAST 2026 PM PEAK HOUR BACKGROUND VOLUMES
FIGURE 6



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THREE LAKES CROSSING

FORECAST 2026 PM PEAK HOUR VOLUMES WITH PROJECT

FIGURE 7

4.4 Future Level of Service

A level of service analysis was made of the future PM peak hour volumes without (background) and with project-generated trips. Results for intersection delay conditions were again determined using the *Synchro 11* analysis program. A summary of the results are shown in Table 4 for the forecast 2026 PM peak travel hour.

Table 4: Forecast 2026 PM Peak Hour Level of Service

Delays given in seconds per vehicle

		Background		*With Project*	
Intersection	**Control**	**LOS**	**Delay**	**LOS**	**Delay**
Tumwater Blvd SE & Monaco Dr SE	Stop	C	21.2	C	22.2
Tumwater Blvd SE & Henderson Blvd SE	Signal	D	48.4	D	45.5
Project Access & Henderson Blvd SE	Stop	-	-	D	32.9

Forecast 2026 PM peak hour delays are shown to operate at LOS D or better without or with the addition of project traffic. All intersections meet the city of Tumwater's level of service standard of LOS D or better.

It should be noted that Tumwater Boulevard SE & Henderson Boulevard SE is shown to operate with lesser delays with project-generated traffic than without. This is due to the diversion of a portion of pipeline traffic to the proposed project access on Henderson Boulevard SE, subsequently no longer traveling through the intersection.

4.5 Left Turn Lane Warrant

Left turn lanes are a means of providing necessary storage space for left turning vehicles at intersections. For this impact study, procedures prescribed by the WSDOT Design Manual Exhibit 1310-7a were used to ascertain storage requirements at the newly proposed access location on Henderson Boulevard SE and at Monaco Drive SE & Tumwater Boulevard SE. Based on forecast 2026 PM peak hour volumes with project traffic – a left turn lane *would not be warranted* at either intersection. Refer to the appendix for the warrant nomographs.

5. SUMMARY

The Three Lakes Crossing project proposes to construct 45 new single-family units within in the city of Tumwater. The subject site, bordered to the east by Henderson Boulevard SE, is located on a cumulative 16.66-acres within tax parcel #'s: 1270132-0105; 7930000-0100; & -0101. Access to the site is to be provided via one driveway extending west from Henderson Boulevard SE. Moreover, internal connection with the development to the southwest will provide access to Tumwater Boulevard SE. Refer to Figure 2 for the proposed access/roadway configuration and lot layout.

Based on ITE data the project would be anticipated to generate 424 new average weekday daily trips with 31 AM peak hour trips (8 in / 23 out) and 42 new PM peak hour trips (26 in / 16 out). Existing level of service (LOS) is summarized in Table 1 and indicates intersections operating with delays in the LOS C or better range. A five-year horizon of 2026 was utilized for forecast analyses, which included a compound annual growth rate of 1.5 percent and the addition of pipeline volumes. Forecast 2026 PM peak hour level of service without and with the addition of project generated traffic is provided in Table 4. All intersections of study are shown to operate with LOS D or better delays during the PM peak hour without or with the addition of project-generated traffic. All intersections are shown to meet the city of Tumwater's LOS standards.

Based on the analysis above, the following mitigation is required for the Three Lakes Crossing project.

1. Pay Traffic Impact Fees (TIF) as required by the city of Tumwater. Impact fees are collected at $3,918.63 per single-family dwelling unit in accordance to the City's 2021 Fee Resolution schedule. Therefore, the estimated TIF is collected at:

   45 units x $3,918.63 = $176,338.35

2. Pay Traffic Impact Fees (TIF) as required by the SEPA Mitigation Fee. Impact fees are collected at $4,219.00 per trip that travels through the I-5 Tumwater Interchanges located south of the subject site. Trip ends, as illustrated in Figure A in the appendix, were derived via the TRPC TAZ 232 Distribution Map. The estimated SEPA Mitigation Fee is collected at:

   2 trips x $4,219.00 = $8,438.00

No other mitigation is identified at this time.

THREE LAKES CROSSING
TRAFFIC IMPACT ANALYSIS

APPENDIX

Heath & Associates

PO Box 397
Puyallup, WA 98371

File Name : 4722b
Site Code : 00004722
Start Date : 9/8/2021
Page No : 1

Groups Printed- Passenger + - Heavy

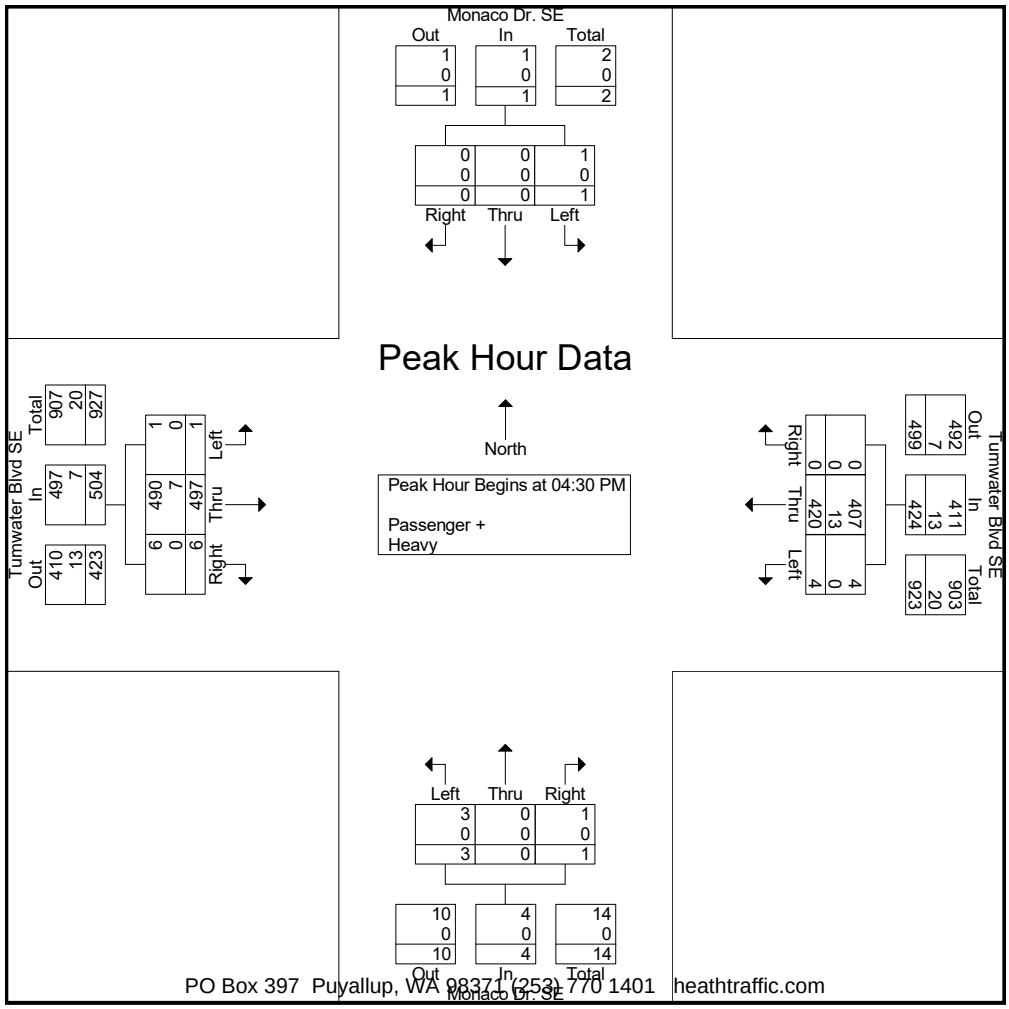
	Monaco Dr. SE Southbound				Tumwater Blvd SE Westbound				Monaco Dr. SE Northbound				Tumwater Blvd SE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
04:00 PM	0	0	1	1	0	88	0	88	0	0	0	0	2	88	0	90	179
04:15 PM	0	0	0	0	0	91	1	92	1	0	0	1	1	86	0	87	180
04:30 PM	0	0	0	0	0	101	1	102	0	0	2	2	1	114	0	115	219
04:45 PM	0	0	0	0	0	119	1	120	1	0	0	1	3	115	0	118	239
Total	0	0	1	1	0	399	3	402	2	0	2	4	7	403	0	410	817
05:00 PM	0	0	1	1	0	101	0	101	0	0	0	0	2	142	1	145	247
05:15 PM	0	0	0	0	0	99	2	101	0	0	1	1	0	126	0	126	228
05:30 PM	0	0	0	0	0	83	0	83	1	0	1	2	0	101	0	101	186
05:45 PM	0	0	0	0	0	85	1	86	0	0	0	0	1	82	0	83	169
Total	0	0	1	1	0	368	3	371	1	0	2	3	3	451	1	455	830
Grand Total	0	0	2	2	0	767	6	773	3	0	4	7	10	854	1	865	1647
Apprch %	0	0	100		0	99.2	0.8		42.9	0	57.1		1.2	98.7	0.1		
Total %	0	0	0.1	0.1	0	46.6	0.4	46.9	0.2	0	0.2	0.4	0.6	51.9	0.1	52.5	
Passenger +	0	0	1	1	0	746	6	752	3	0	4	7	10	841	1	852	1612
% Passenger +	0	0	50	50	0	97.3	100	97.3	100	0	100	100	100	98.5	100	98.5	97.9
Heavy	0	0	1	1	0	21	0	21	0	0	0	0	0	13	0	13	35
% Heavy	0	0	50	50	0	2.7	0	2.7	0	0	0	0	0	1.5	0	1.5	2.1

Heath & Associates

PO Box 397
Puyallup, WA 98371

File Name : 4722b
Site Code : 00004722
Start Date : 9/8/2021
Page No : 2

	Monaco Dr. SE Southbound				Tumwater Blvd SE Westbound				Monaco Dr. SE Northbound				Tumwater Blvd SE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	0	0	0	0	0	101	1	102	0	0	**2**	**2**	1	114	0	115	219
04:45 PM	0	0	0	0	0	**119**	1	**120**	**1**	0	0	1	**3**	115	0	118	239
05:00 PM	0	0	**1**	**1**	0	101	0	101	0	0	0	0	2	**142**	**1**	**145**	**247**
05:15 PM	0	0	0	0	0	99	**2**	101	0	0	1	1	0	126	0	126	228
Total Volume	0	0	1	1	0	420	4	424	1	0	3	4	6	497	1	504	933
% App. Total	0	0	100		0	99.1	0.9		25	0	75		1.2	98.6	0.2		
PHF	.000	.000	.250	.250	.000	.882	.500	.883	.250	.000	.375	.500	.500	.875	.250	.869	.944
Passenger +	0	0	1	1	0	407	4	411	1	0	3	4	6	490	1	497	913
% Passenger +	0	0	100	100	0	96.9	100	96.9	100	0	100	100	100	98.6	100	98.6	97.9
Heavy	0	0	0	0	0	13	0	13	0	0	0	0	0	7	0	7	20
% Heavy	0	0	0	0	0	3.1	0	3.1	0	0	0	0	0	1.4	0	1.4	2.1



Heath & Associates

PO Box 397
Puyallup, WA 98371

File Name : 4722a
Site Code : 00004722
Start Date : 9/8/2021
Page No : 1

Groups Printed- Passenger + - Heavy

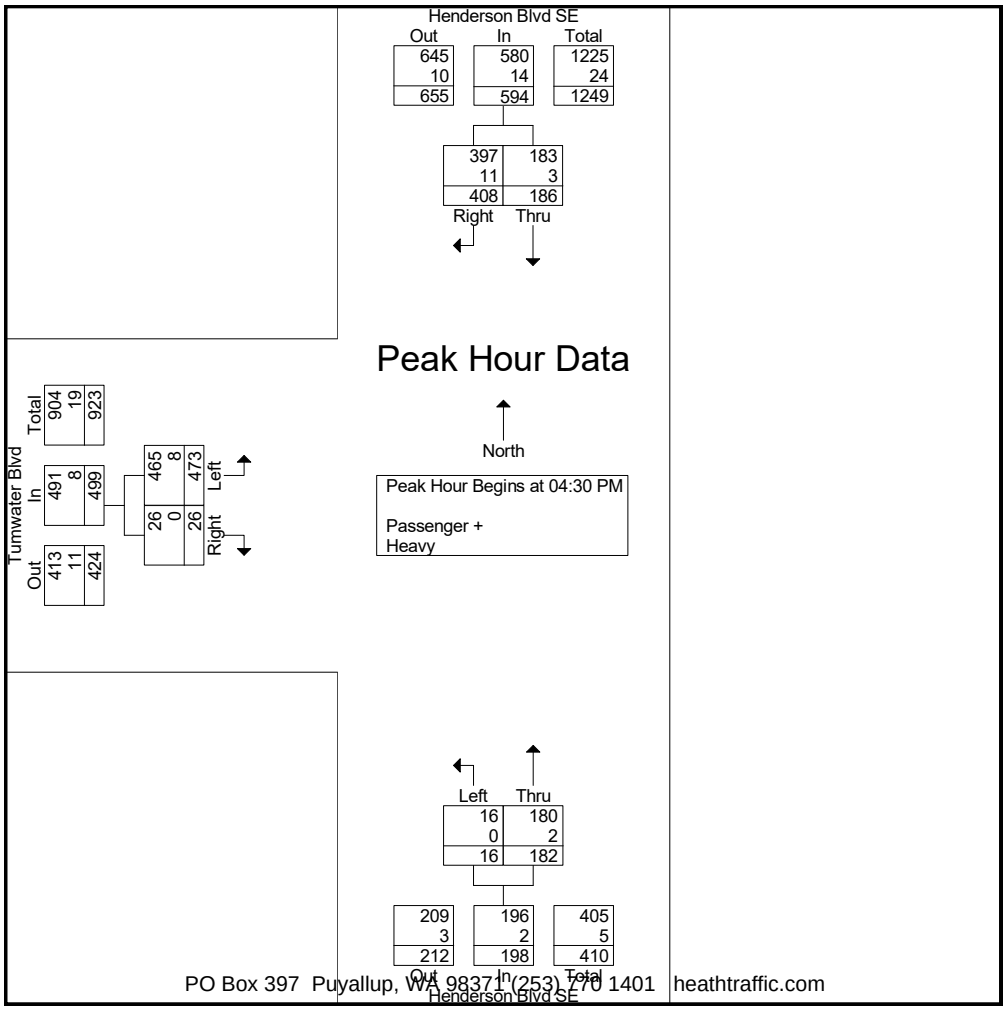
	Henderson Blvd SE Southbound			Henderson Blvd SE Northbound			Tumwater Blvd Eastbound			
Start Time	Right	Thru	App. Total	Thru	Left	App. Total	Right	Left	App. Total	Int. Total
04:00 PM	83	44	127	53	4	57	4	81	85	269
04:15 PM	92	37	129	48	1	49	0	84	84	262
04:30 PM	94	36	130	42	5	47	3	113	116	293
04:45 PM	114	53	167	42	6	48	6	102	108	323
Total	383	170	553	185	16	201	13	380	393	1147
05:00 PM	103	33	136	51	2	53	9	138	147	336
05:15 PM	97	64	161	47	3	50	8	120	128	339
05:30 PM	81	48	129	31	3	34	5	101	106	269
05:45 PM	79	35	114	41	4	45	4	73	77	236
Total	360	180	540	170	12	182	26	432	458	1180
Grand Total	743	350	1093	355	28	383	39	812	851	2327
Apprch %	68	32		92.7	7.3		4.6	95.4		
Total %	31.9	15	47	15.3	1.2	16.5	1.7	34.9	36.6	
Passenger +	729	344	1073	348	28	376	39	797	836	2285
% Passenger +	98.1	98.3	98.2	98	100	98.2	100	98.2	98.2	98.2
Heavy	14	6	20	7	0	7	0	15	15	42
% Heavy	1.9	1.7	1.8	2	0	1.8	0	1.8	1.8	1.8

Heath & Associates

PO Box 397
Puyallup, WA 98371

File Name : 4722a
Site Code : 00004722
Start Date : 9/8/2021
Page No : 2

	Henderson Blvd SE Southbound			Henderson Blvd SE Northbound			Tumwater Blvd Eastbound			
Start Time	Right	Thru	App. Total	Thru	Left	App. Total	Right	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:30 PM										
04:30 PM	94	36	130	42	5	47	3	113	116	293
04:45 PM	**114**	53	**167**	42	**6**	48	6	102	108	323
05:00 PM	103	33	136	**51**	2	**53**	**9**	**138**	**147**	336
05:15 PM	97	**64**	161	47	3	50	8	120	128	**339**
Total Volume	408	186	594	182	16	198	26	473	499	1291
% App. Total	68.7	31.3		91.9	8.1		5.2	94.8		
PHF	.895	.727	.889	.892	.667	.934	.722	.857	.849	.952
Passenger +	397	183	580	180	16	196	26	465	491	1267
% Passenger +	97.3	98.4	97.6	98.9	100	99.0	100	98.3	98.4	98.1
Heavy	11	3	14	2	0	2	0	8	8	24
% Heavy	2.7	1.6	2.4	1.1	0	1.0	0	1.7	1.6	1.9



Single-Family Detached Housing
(210)

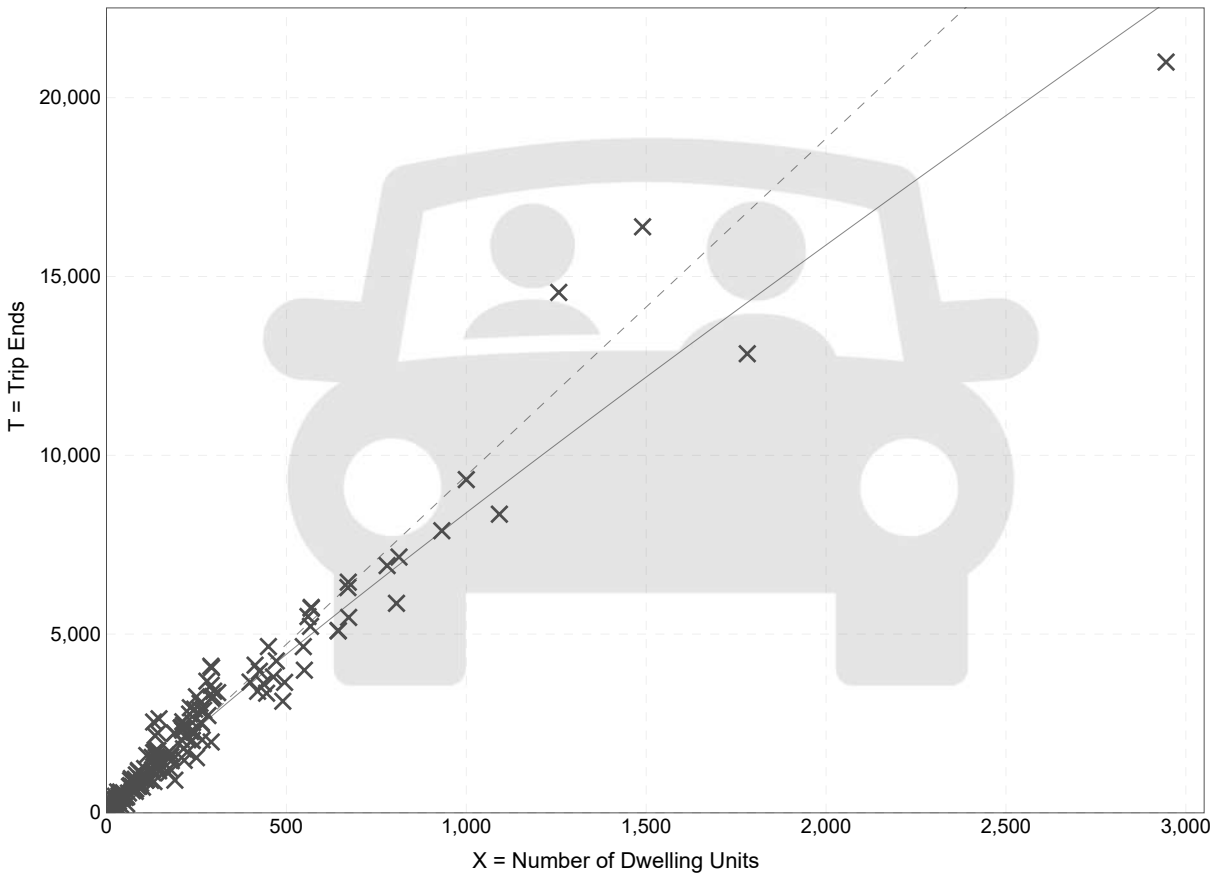
Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday**

Setting/Location: **General Urban/Suburban**
Number of Studies: 174
Avg. Num. of Dwelling Units: 246
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
9.43	4.45 - 22.61	2.13

Data Plot and Equation



Fitted Curve Equation: Ln(T) = 0.92 Ln(X) + 2.68 **R^2= 0.95**

Trip Gen Manual, 11th Edition ● Institute of Transportation Engineers

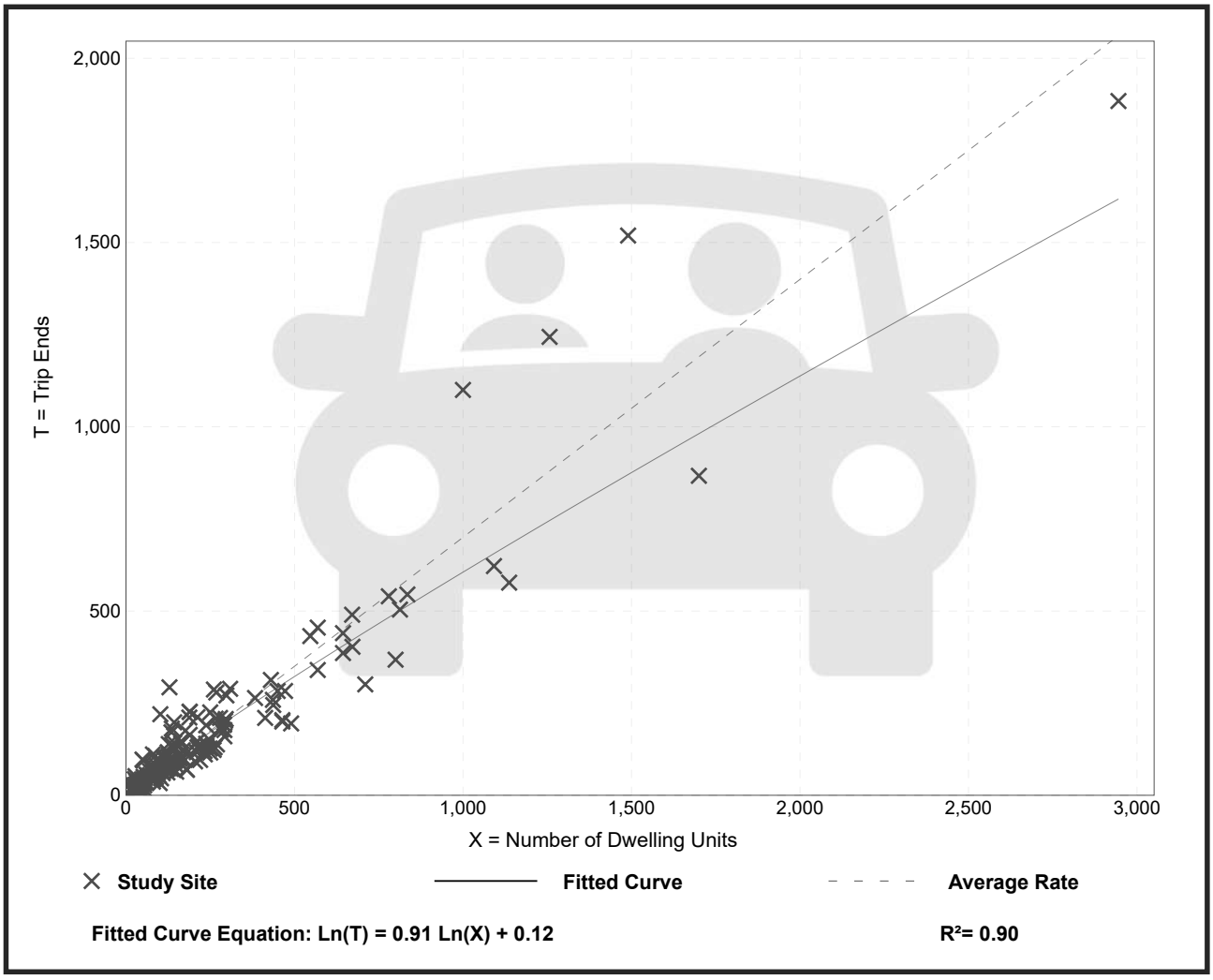
Single-Family Detached Housing
(210)

Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 192
Avg. Num. of Dwelling Units: 226
Directional Distribution: 26% entering, 74% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.70	0.27 - 2.27	0.24

Data Plot and Equation



Trip Gen Manual, 11th Edition ● Institute of Transportation Engineers

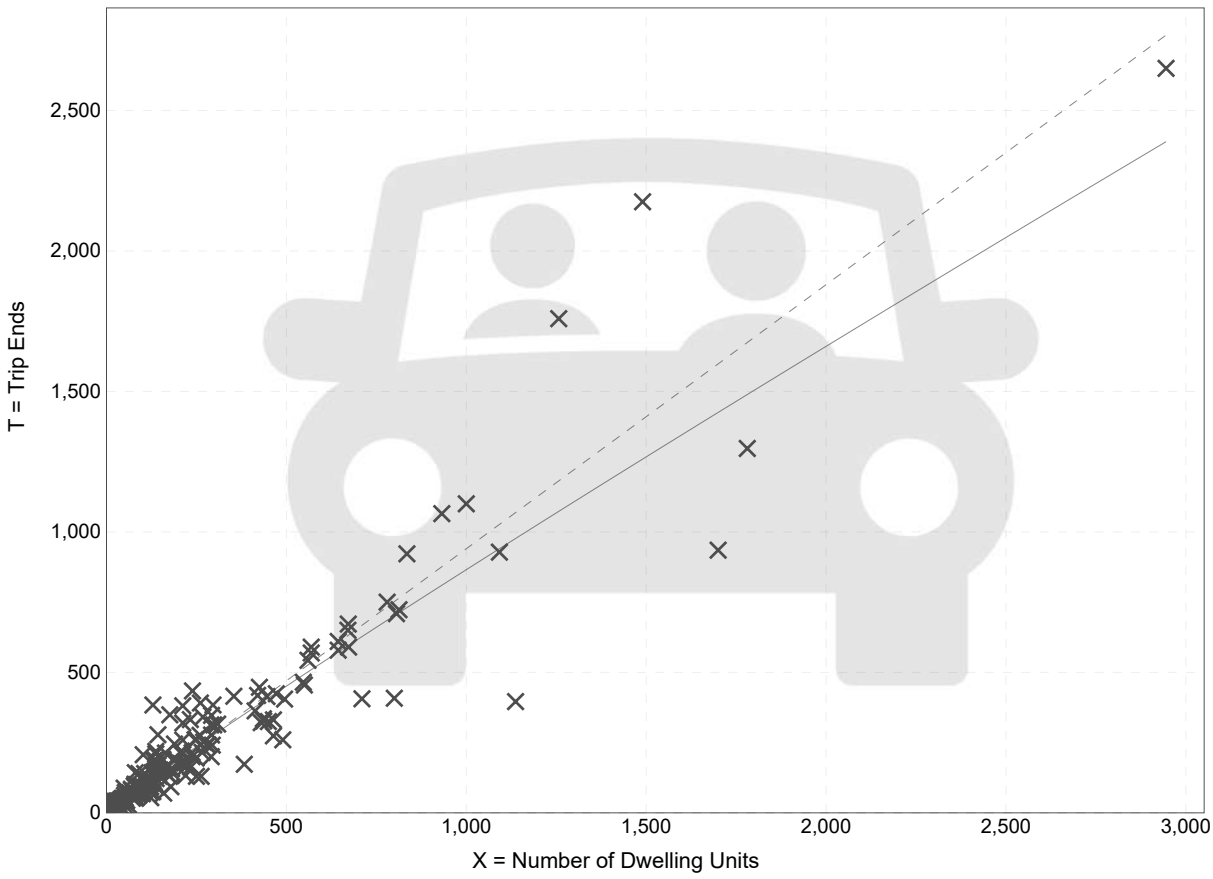
Single-Family Detached Housing
(210)

Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 208
Avg. Num. of Dwelling Units: 248
Directional Distribution: 63% entering, 37% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.94	0.35 - 2.98	0.31

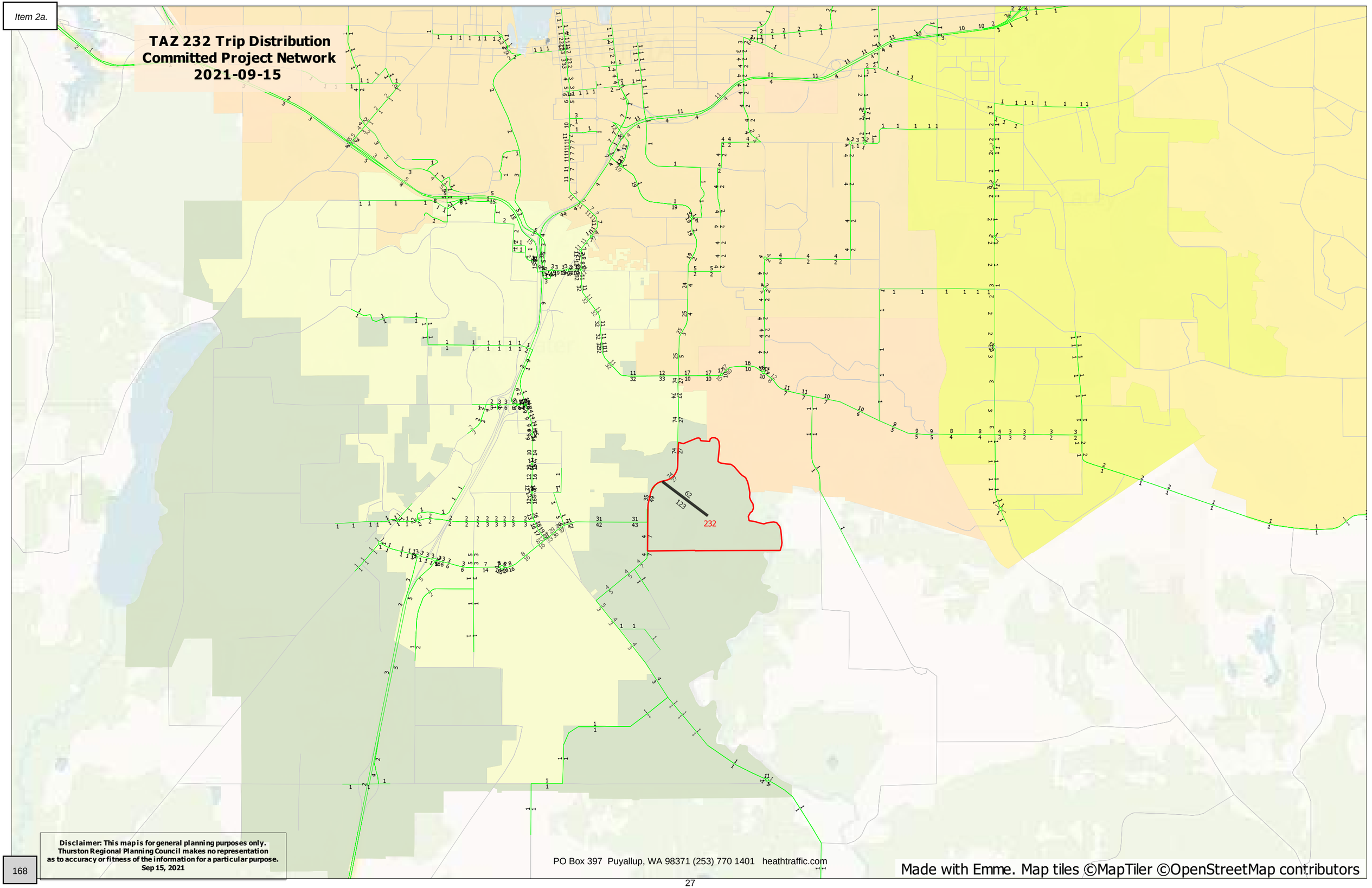
Data Plot and Equation



Fitted Curve Equation: Ln(T) = 0.94 Ln(X) + 0.27 **R^2= 0.92**

Trip Gen Manual, 11th Edition ● Institute of Transportation Engineers

TAZ 232 Trip Distribution
Committed Project Network
2021-09-15



Disclaimer: This map is for general planning purposes only.
Thurston Regional Planning Council makes no representation
as to accuracy or fitness of the information for a particular purpose.
Sep 15, 2021

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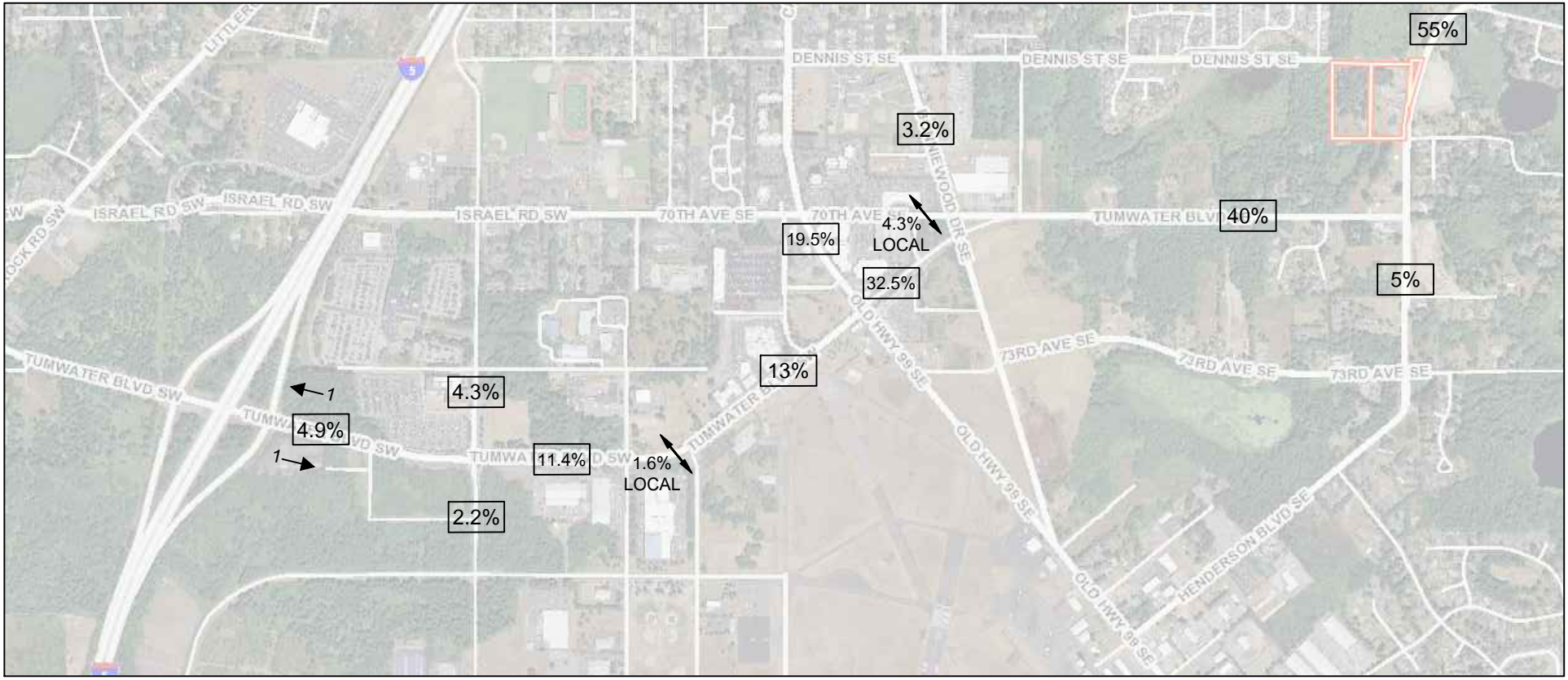
N

NEW PM PEAK HOUR TRIPS
INBOUND: 26 VPH
OUTBOUND: 16 VPH



HEATH & ASSOCIATES
TRAFFIC AND CIVIL ENGINEERING

THREE LAKES CROSSING
PM PEAK HOUR TRIP DISTRIBUTION & ASSIGNMENT
FIGURE A

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	1	497	6	4	420	0	3	0	1	1	0	0
Future Vol, veh/h	1	497	6	4	420	0	3	0	1	1	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	1	1	1	1	3	1	1	1	1	1	1	1
Mvmt Flow	1	529	6	4	447	0	3	0	1	1	0	0

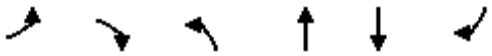
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	447	0	0	535	0	0	989	989	532	990	992	447
Stage 1	-	-	-	-	-	-	534	534	-	455	455	-
Stage 2	-	-	-	-	-	-	455	455	-	535	537	-
Critical Hdwy	4.11	-	-	4.11	-	-	7.11	6.51	6.21	7.11	6.51	6.21
Critical Hdwy Stg 1	-	-	-	-	-	-	6.11	5.51	-	6.11	5.51	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.11	5.51	-	6.11	5.51	-
Follow-up Hdwy	2.209	-	-	2.209	-	-	3.509	4.009	3.309	3.509	4.009	3.309
Pot Cap-1 Maneuver	1119	-	-	1038	-	-	227	248	549	226	247	614
Stage 1	-	-	-	-	-	-	532	526	-	587	570	-
Stage 2	-	-	-	-	-	-	587	570	-	531	524	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1119	-	-	1038	-	-	226	247	549	224	246	614
Mov Cap-2 Maneuver	-	-	-	-	-	-	226	247	-	224	246	-
Stage 1	-	-	-	-	-	-	531	525	-	586	567	-
Stage 2	-	-	-	-	-	-	584	567	-	529	523	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.1	18.8	21.1
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	265	1119	-	-	1038	-	-	224
HCM Lane V/C Ratio	0.016	0.001	-	-	0.004	-	-	0.005
HCM Control Delay (s)	18.8	8.2	0	-	8.5	0	-	21.1
HCM Lane LOS	C	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0

HCM 6th Signalized Intersection Summary
2: Tumwater Blvd SE & Henderson Blvd SE

Existing PM Peak Hour
10/04/2021



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	473	26	16	182	186	408
Future Volume (veh/h)	473	26	16	182	186	408
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1885	1885	1885	1870	1856
Adj Flow Rate, veh/h	498	27	17	192	196	429
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	1	1	1	2	3
Cap, veh/h	568	31	23	261	549	462
Arrive On Green	0.34	0.34	0.15	0.15	0.29	0.29
Sat Flow, veh/h	1676	91	153	1725	1870	1572
Grp Volume(v), veh/h	526	0	209	0	196	429
Grp Sat Flow(s),veh/h/ln	1770	0	1878	0	1870	1572
Q Serve(g_s), s	17.4	0.0	6.6	0.0	5.2	16.5
Cycle Q Clear(g_c), s	17.4	0.0	6.6	0.0	5.2	16.5
Prop In Lane	0.95	0.05	0.08			1.00
Lane Grp Cap(c), veh/h	600	0	284	0	549	462
V/C Ratio(X)	0.88	0.00	0.74	0.00	0.36	0.93
Avail Cap(c_a), veh/h	1099	0	587	0	549	462
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	19.4	0.0	25.3	0.0	17.4	21.4
Incr Delay (d2), s/veh	4.3	0.0	3.7	0.0	0.4	25.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.1	0.0	3.1	0.0	2.1	8.8
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	23.7	0.0	29.0	0.0	17.8	46.8
LnGrp LOS	C	A	C	A	B	D
Approach Vol, veh/h	526			209	625	
Approach Delay, s/veh	23.7			29.0	37.7	
Approach LOS	C			C	D	

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		13.9		25.6		22.8
Change Period (Y+Rc), s		4.5		4.5		4.5
Max Green Setting (Gmax), s		19.5		38.7		18.3
Max Q Clear Time (g_c+I1), s		8.6		19.4		18.5
Green Ext Time (p_c), s		0.8		1.7		0.0

Intersection Summary	
HCM 6th Ctrl Delay	30.9
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	6	541	6	4	455	9	3	0	1	5	0	4
Future Vol, veh/h	6	541	6	4	455	9	3	0	1	5	0	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	1	1	1	1	3	1	1	1	1	1	1	1
Mvmt Flow	6	576	6	4	484	10	3	0	1	5	0	4

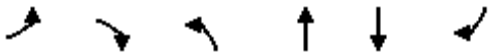
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	494	0	0	582	0	0	1090	1093	579	1089	1091	489
Stage 1	-	-	-	-	-	-	591	591	-	497	497	-
Stage 2	-	-	-	-	-	-	499	502	-	592	594	-
Critical Hdwy	4.11	-	-	4.11	-	-	7.11	6.51	6.21	7.11	6.51	6.21
Critical Hdwy Stg 1	-	-	-	-	-	-	6.11	5.51	-	6.11	5.51	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.11	5.51	-	6.11	5.51	-
Follow-up Hdwy	2.209	-	-	2.209	-	-	3.509	4.009	3.309	3.509	4.009	3.309
Pot Cap-1 Maneuver	1075	-	-	997	-	-	193	215	517	194	216	581
Stage 1	-	-	-	-	-	-	495	496	-	557	546	-
Stage 2	-	-	-	-	-	-	555	544	-	494	495	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1075	-	-	997	-	-	190	212	517	191	213	581
Mov Cap-2 Maneuver	-	-	-	-	-	-	190	212	-	191	213	-
Stage 1	-	-	-	-	-	-	491	492	-	553	543	-
Stage 2	-	-	-	-	-	-	548	541	-	489	491	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.1	21.2	18.7
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	226	1075	-	-	997	-	-	272
HCM Lane V/C Ratio	0.019	0.006	-	-	0.004	-	-	0.035
HCM Control Delay (s)	21.2	8.4	0	-	8.6	0	-	18.7
HCM Lane LOS	C	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0.1

HCM 6th Signalized Intersection Summary
2: Tumwater Blvd SE & Henderson Blvd SE

Forecast 2026 PM Peak Hour Without Project
10/04/2021



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	518	29	18	196	200	450
Future Volume (veh/h)	518	29	18	196	200	450
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1885	1885	1885	1870	1856
Adj Flow Rate, veh/h	545	31	19	206	211	474
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	1	1	1	2	3
Cap, veh/h	610	35	25	270	514	432
Arrive On Green	0.36	0.36	0.16	0.16	0.27	0.27
Sat Flow, veh/h	1672	95	159	1719	1870	1572
Grp Volume(v), veh/h	577	0	225	0	211	474
Grp Sat Flow(s),veh/h/ln	1770	0	1877	0	1870	1572
Q Serve(g_s), s	20.4	0.0	7.6	0.0	6.1	18.3
Cycle Q Clear(g_c), s	20.4	0.0	7.6	0.0	6.1	18.3
Prop In Lane	0.94	0.05	0.08			1.00
Lane Grp Cap(c), veh/h	646	0	295	0	514	432
V/C Ratio(X)	0.89	0.00	0.76	0.00	0.41	1.10
Avail Cap(c_a), veh/h	1024	0	556	0	514	432
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	19.9	0.0	26.8	0.0	19.7	24.1
Incr Delay (d2), s/veh	6.5	0.0	4.1	0.0	0.5	71.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.7	0.0	3.6	0.0	2.6	14.9
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	26.4	0.0	30.9	0.0	20.2	96.0
LnGrp LOS	C	A	C	A	C	F
Approach Vol, veh/h	577			225	685	
Approach Delay, s/veh	26.4			30.9	72.6	
Approach LOS	C			C	E	

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		15.0		28.8		22.8
Change Period (Y+Rc), s		4.5		4.5		4.5
Max Green Setting (Gmax), s		19.7		38.5		18.3
Max Q Clear Time (g_c+I1), s		9.6		22.4		20.3
Green Ext Time (p_c), s		0.8		1.8		0.0

Intersection Summary	
HCM 6th Ctrl Delay	48.4
HCM 6th LOS	D

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	17	541	6	4	455	1	3	0	1	1	0	10
Future Vol, veh/h	17	541	6	4	455	1	3	0	1	1	0	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	1	1	1	1	3	1	1	1	1	1	1	1
Mvmt Flow	18	576	6	4	484	1	3	0	1	1	0	11

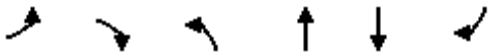
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	485	0	0	582	0	0	1113	1108	579	1109	1111	485
Stage 1	-	-	-	-	-	-	615	615	-	493	493	-
Stage 2	-	-	-	-	-	-	498	493	-	616	618	-
Critical Hdwy	4.11	-	-	4.11	-	-	7.11	6.51	6.21	7.11	6.51	6.21
Critical Hdwy Stg 1	-	-	-	-	-	-	6.11	5.51	-	6.11	5.51	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.11	5.51	-	6.11	5.51	-
Follow-up Hdwy	2.209	-	-	2.209	-	-	3.509	4.009	3.309	3.509	4.009	3.309
Pot Cap-1 Maneuver	1083	-	-	997	-	-	187	211	517	188	210	584
Stage 1	-	-	-	-	-	-	480	484	-	560	549	-
Stage 2	-	-	-	-	-	-	556	549	-	480	482	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1083	-	-	997	-	-	179	205	517	183	204	584
Mov Cap-2 Maneuver	-	-	-	-	-	-	179	205	-	183	204	-
Stage 1	-	-	-	-	-	-	468	472	-	546	546	-
Stage 2	-	-	-	-	-	-	543	546	-	467	470	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0.1	22.2	12.6
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	214	1083	-	-	997	-	-	487
HCM Lane V/C Ratio	0.02	0.017	-	-	0.004	-	-	0.024
HCM Control Delay (s)	22.2	8.4	0	-	8.6	0	-	12.6
HCM Lane LOS	C	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0	-	-	0.1

HCM 6th Signalized Intersection Summary
2: Tumwater Blvd SE & Henderson Blvd SE

Forecast 2026 PM Peak Hour With Project
10/04/2021



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	514	29	18	197	201	442
Future Volume (veh/h)	514	29	18	197	201	442
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1885	1885	1885	1870	1856
Adj Flow Rate, veh/h	541	31	19	207	212	465
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	1	1	1	2	3
Cap, veh/h	606	35	25	272	516	434
Arrive On Green	0.36	0.36	0.16	0.16	0.28	0.28
Sat Flow, veh/h	1671	96	158	1719	1870	1572
Grp Volume(v), veh/h	573	0	226	0	212	465
Grp Sat Flow(s),veh/h/ln	1770	0	1877	0	1870	1572
Q Serve(g_s), s	20.2	0.0	7.6	0.0	6.1	18.3
Cycle Q Clear(g_c), s	20.2	0.0	7.6	0.0	6.1	18.3
Prop In Lane	0.94	0.05	0.08			1.00
Lane Grp Cap(c), veh/h	642	0	297	0	516	434
V/C Ratio(X)	0.89	0.00	0.76	0.00	0.41	1.07
Avail Cap(c_a), veh/h	1027	0	557	0	516	434
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	19.9	0.0	26.7	0.0	19.6	24.0
Incr Delay (d2), s/veh	6.3	0.0	4.0	0.0	0.5	63.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.6	0.0	3.6	0.0	2.6	14.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	26.3	0.0	30.8	0.0	20.1	87.8
LnGrp LOS	C	A	C	A	C	F
Approach Vol, veh/h	573			226	677	
Approach Delay, s/veh	26.3			30.8	66.6	
Approach LOS	C			C	E	

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		15.0		28.6		22.8
Change Period (Y+Rc), s		4.5		4.5		4.5
Max Green Setting (Gmax), s		19.7		38.5		18.3
Max Q Clear Time (g_c+I1), s		9.6		22.2		20.3
Green Ext Time (p_c), s		0.8		1.8		0.0

Intersection Summary			
HCM 6th Ctrl Delay		45.5	
HCM 6th LOS		D	

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	13	1	1	710	642	22
Future Vol, veh/h	13	1	1	710	642	22
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	14	1	1	772	698	24

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1484	710	722	0	-	0
Stage 1	710	-	-	-	-	-
Stage 2	774	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	137	434	880	-	-	-
Stage 1	487	-	-	-	-	-
Stage 2	455	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	137	434	880	-	-	-
Mov Cap-2 Maneuver	137	-	-	-	-	-
Stage 1	486	-	-	-	-	-
Stage 2	455	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	32.9	0	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	880	-	144	-	-
HCM Lane V/C Ratio	0.001	-	0.106	-	-
HCM Control Delay (s)	9.1	0	32.9	-	-
HCM Lane LOS	A	A	D	-	-
HCM 95th %tile Q(veh)	0	-	0.3	-	-

Exhibit 1310-7a Left-Turn Storage Guidelines: Two-Lane, Unsignalized

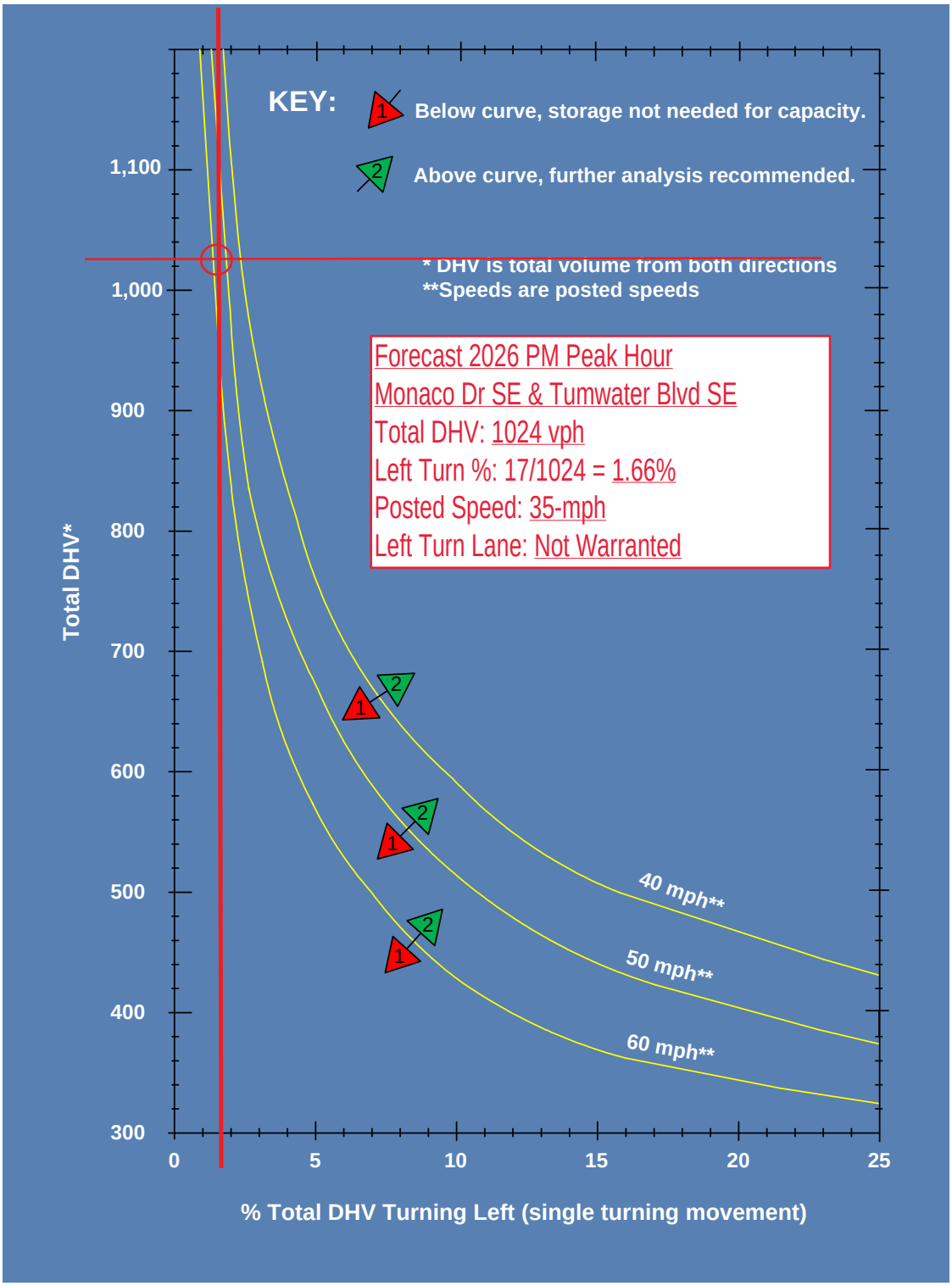
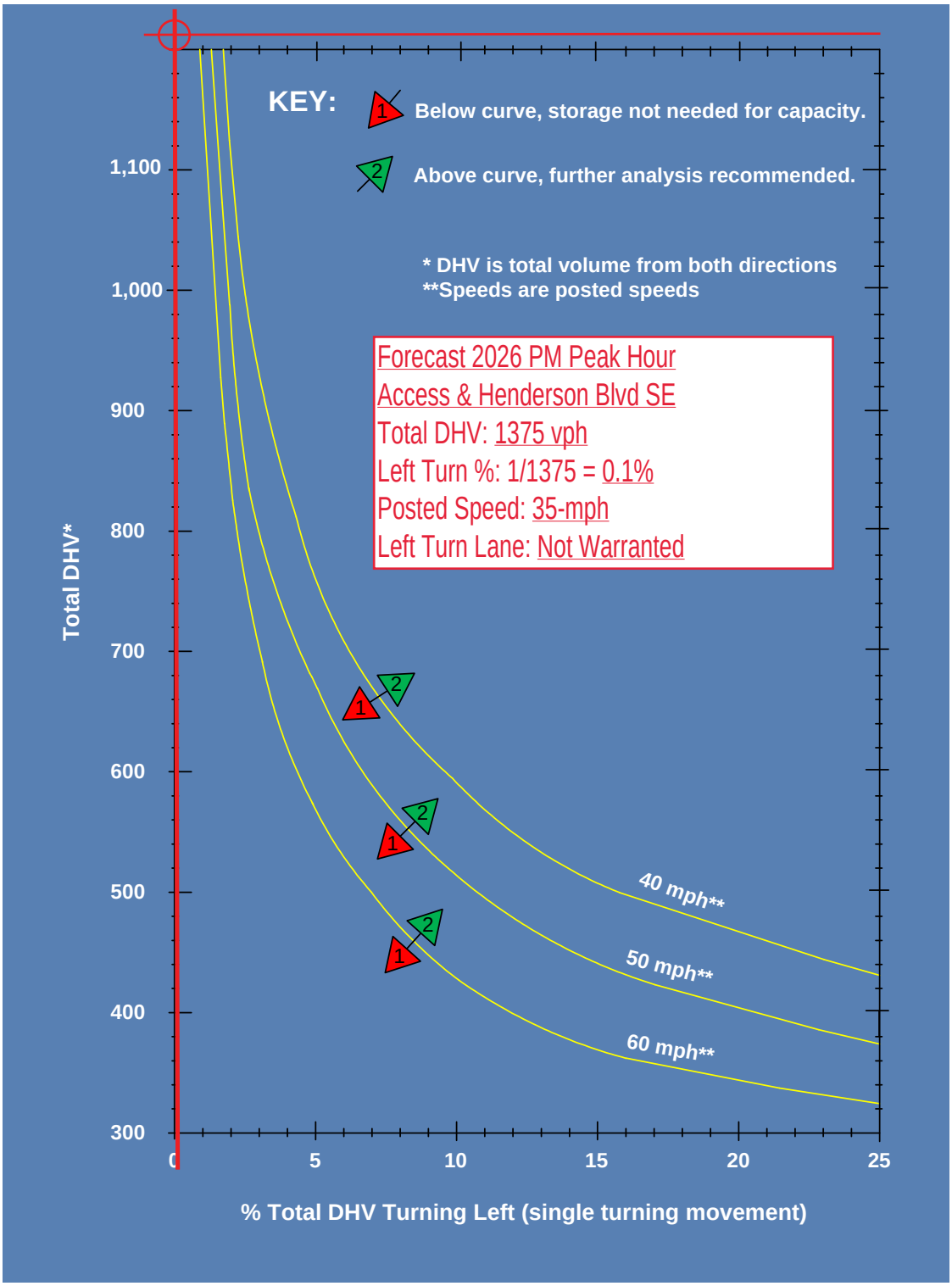


Exhibit 1310-7a Left-Turn Storage Guidelines: Two-Lane, Unsignalized



Date: December 10, 2021

To: Evan Mann
SoundBuilt Homes

From: Aaron Van Aken, PE, PTOE

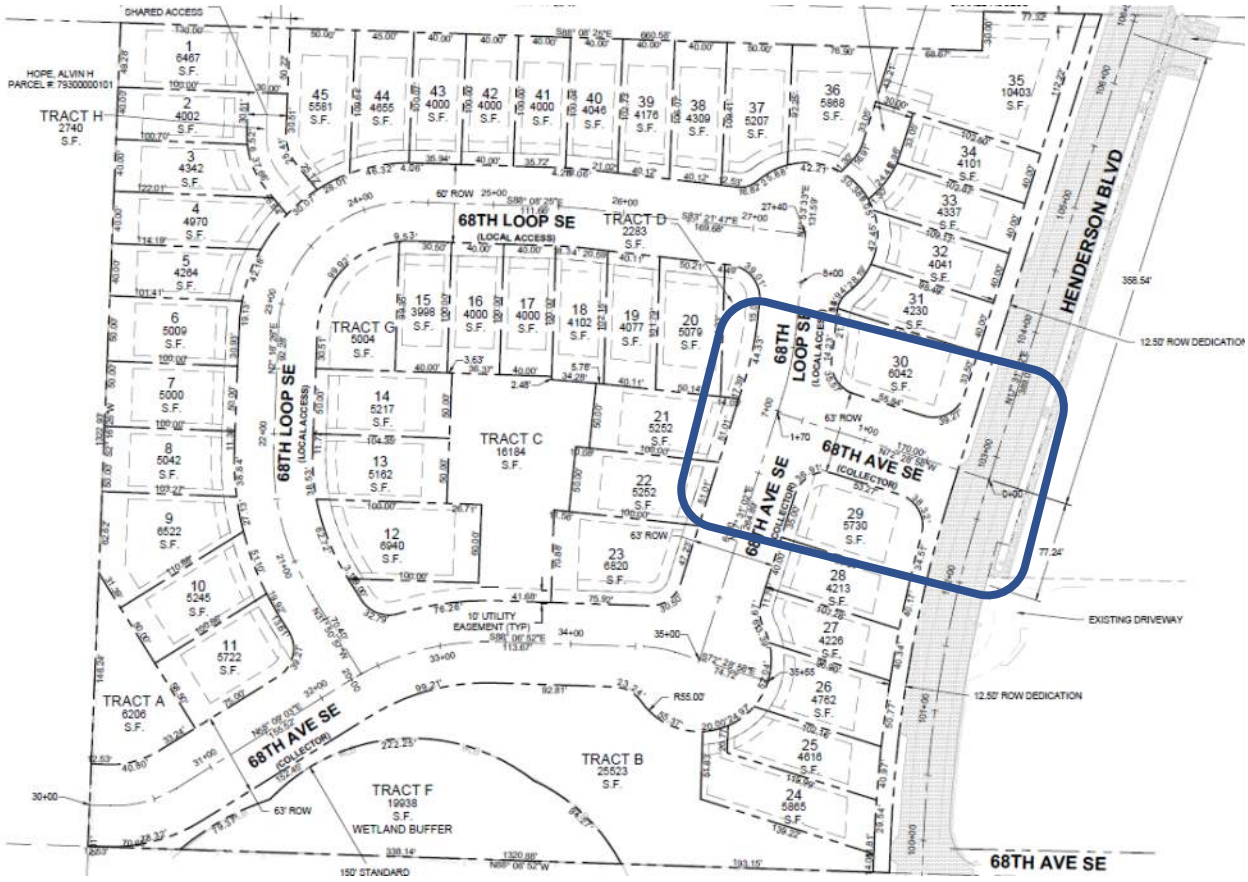
Subject: Three Lakes Crossing Queuing Analysis

The intent of this technical memorandum serves to evaluate queuing demands at the proposed access intersection to Henderson Boulevard SE for the proposed Three Lakes Crossing development. This evaluation uses data and information from the updated *Three Lakes Crossing* (12/10/2021) Transportation Impact Analysis (TIA). Below is a project summary and projected queuing estimates.

PROJECT DESCRIPTION

Three Lakes Crossing is a proposed 45-unit single-family development located in the city of Tumwater. The subject properties are situated on the west side of Henderson Blvd SE and just north of Tumwater Blvd SE. Access to and from the site is proposed via a new roadway extending west from Henderson Blvd SE and a connection to an adjacent property on the southwest corner of the site. According to the TIA, this project is estimated to generate 42 new trips in the PM peak hour (26 inbound / 16 outbound).

Figure 1: Site Plan



Shown above is the proposed site plan with proposed accesses and internal roadway configuration. This evaluation will focus on queuing at the primary access intersection with Henderson Blvd SE. Approximately 145 feet of spacing is available from Henderson Blvd SE to the internal intersection as shown the image above.

To evaluate peak hour queues, forecast 2026 PM peak hour projected volumes were applied (see attached figure from TIA). Queues were estimated using *SimTraffic* and *Synchro 11* modeling programs. Five peak hour simulations were performed in order to establish an average queue at the access intersection.

QUEUING

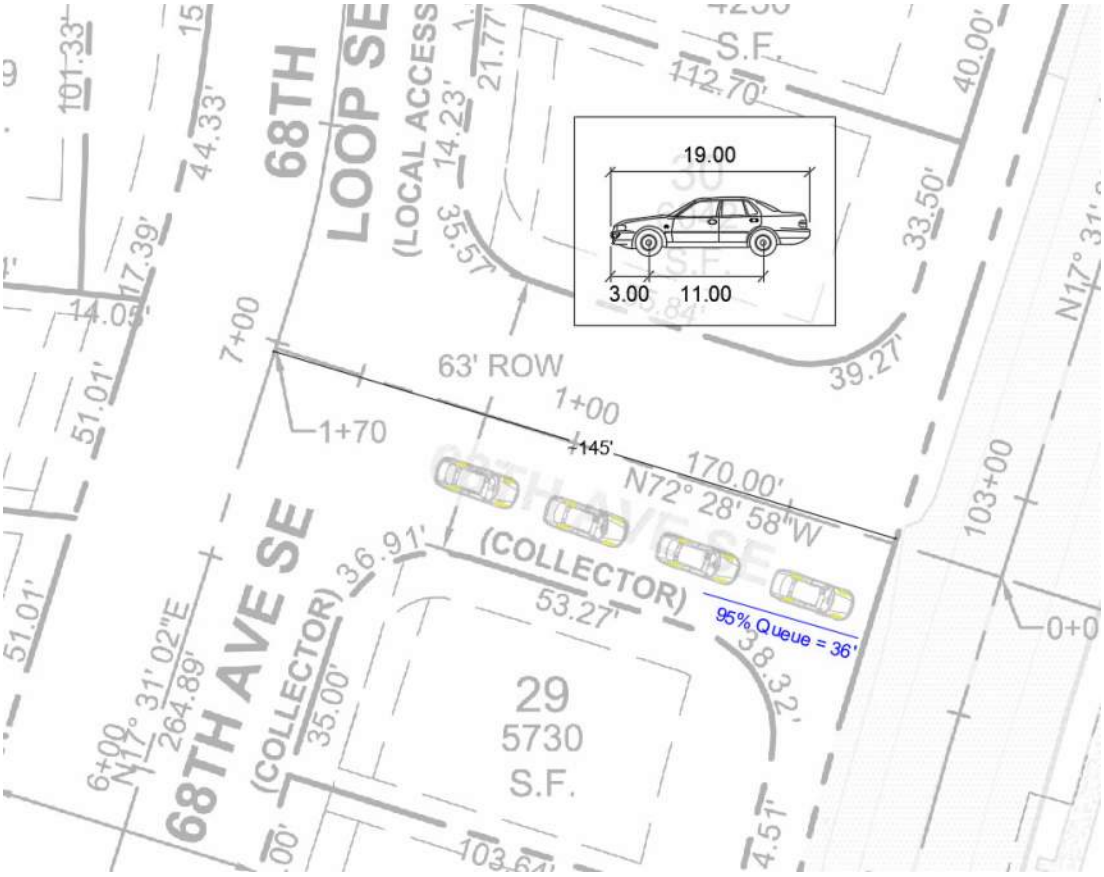
A total of five peak hour simulations were performed. The table below summarizes the aggregated findings. See appendix for detailed report sheets.

Table 1: Forecast 2026 PM Peak Hour Queues & Delays

Delays Given in Seconds per Vehicle

Intersection	Control	Movement	95th% Queue	Delay
Access & Henderson Blvd	Stop	Eastbound	36 ft	17.7 sec

Based on the modeling outputs, maximum queues are estimated to be up to 36 feet (1-2 vehicle lengths) during the critical peak travel hour. In other words, vehicles waiting to leave the subject site and enter Henderson Blvd SE are estimated to be up to two vehicles for all but the rarest events. With approximately 145-foot spacing to the internal intersection, no blockage or queue spillover is estimated to occur. Shown in the image below in blue is the calculated 95th percentile queuing distance (36'). Up to four vehicle lengths can comfortably stack up before the internal intersection indicating sufficient spacing availability.

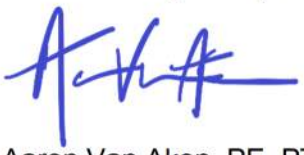


CONCLUSION

Three Lakes Crossing, a proposed 45-unit single-family development located in the city of Tumwater, has been evaluated in terms of queuing and operations at the proposed access off Henderson Boulevard SE. This memo uses information and builds upon the *Three Lakes Crossing* TIA (12/10/2021).

Using the 2026 PM peak hour traffic volume estimates from the original TIA in conjunction with additional traffic modeling and simulations, queues at the primary access intersection were calculated. Based on the simulations, a 95th percentile queue of 36 feet (one to two vehicles) was derived for the eastbound approach waiting to enter Henderson Blvd. On average, one vehicle or less would typically be waiting to leave the subject property. Based on the queuing assessments provided herein, no conflict with respect to the 145-foot spacing from Henderson Blvd to the internal plat intersection is expected.

Please call if you require additional information.



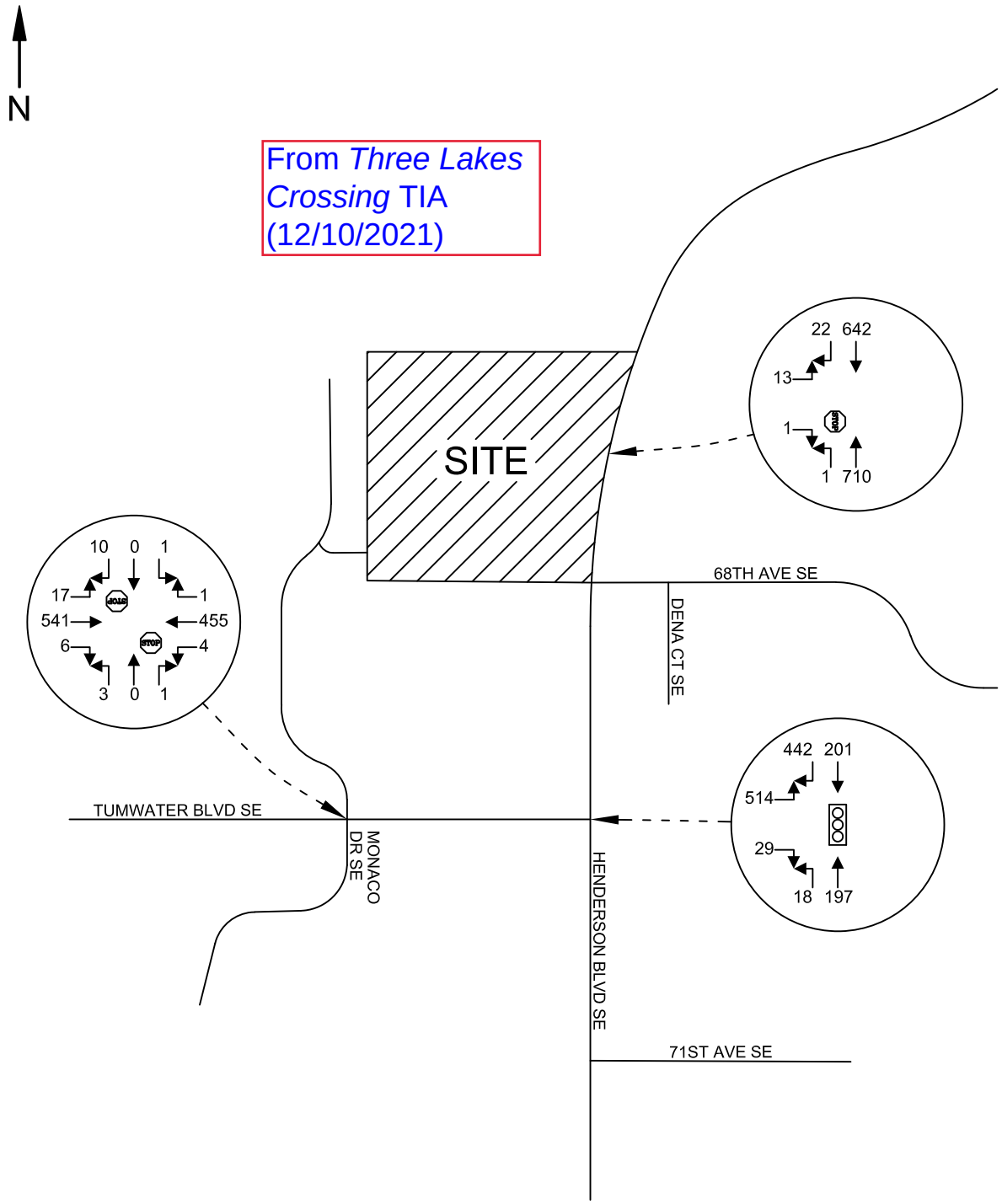
Aaron Van Aken, PE, PTOE

THREE LAKES CROSSING

QUEUING MEMO

APPENDIX

PO Box 397 Puyallup, WA 98371 (253) 770 1401 heathtraffic.com



HEATH & ASSOCIATES

TRAFFIC AND CIVIL ENGINEERING

THREE LAKES CROSSING

FORECAST 2026 PM PEAK HOUR VOLUMES WITH PROJECT

FIGURE 7

3: Henderson Blvd SE & Access Performance by approach

Approach	EB	NB	SB	All
Denied Del/Veh (s)	0.1	0.0	0.5	0.3
Total Del/Veh (s)	17.7	2.4	0.6	1.7

Intersection: 3: Henderson Blvd SE & Access

Movement	EB	NB	SB
Directions Served	LR	LT	TR
Maximum Queue (ft)	39	69	4
Average Queue (ft)	11	4	0
95th Queue (ft)	36	44	3
Link Distance (ft)	636	875	372
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

City Hall
555 Israel Road SW
Tumwater, WA 98501-6515
Phone: 360-754-5855
Fax: 360-754-4138

NOTICE OF PUBLIC HEARING
June 9, 2022

NOTICE IS HEREBY GIVEN that the City of Tumwater Hearing Examiner will conduct a public hearing at or about **7:00 p.m. on Wednesday, June 22, 2022**, for consideration of the following items:

Case #: **TUM-21-1895 Three Lakes Crossing Preliminary Plat and Preliminary Planned Unit Development.**

Description of Proposal: The applicant proposes to subdivide approximately 9.68 acres into 45 single family lots.

Applicant: Evan Mann, Copper Ridge LLC, PO Box 73790, Puyallup, WA 98373.

Location of Proposal: 6609 Henderson Blvd SE, Olympia, WA 98501. Section 01, Township 17N, Range 1W. W.M. Parcel Numbers 12701320105, 79300000100 and 79300000101.

The public hearing will be held both virtually via Zoom and in person at Tumwater City Hall.

ATTEND in Person
Tumwater City Hall, Sunset Room, 555 Israel Rd. SW, Tumwater, WA 98501.

WATCH Online
Go to http://www.zoom.us/join, and enter the Webinar ID: 874 9983 5788 Passcode 163752**.**

LISTEN by Telephone
Call (253) 215-8782, listen for the prompts, and enter the Webinar ID: 874 9983 5788 Passcode 163752**.**

The City of Tumwater Hearing Examiner will hear testimony from interested parties in person or via computer audio or by telephone. To provide comments via computer audio or by telephone you must register in advance:

https://us02web.zoom.us/webinar/register/WN_DqtkoY33Ttm3FK7ObHtlSA

After registering, you will receive a confirmation email containing information about joining the webinar.

Written comments may be submitted to City of Tumwater, Community Development Department, 555 Israel Road SW, Tumwater, WA 98501, or by email at abaruch@ci.tumwater.wa.us or by fax to 360-754-4138, and must be received by 6:00 p.m. on Wednesday, June 22, 2022. Verbal testimony will be received during the hearing either virtually, or in person.

The staff report for this request will be available for review five business-days prior to the public hearing. If you have any questions or would like additional information, please contact Alex Baruch, at 360-754-4180.

Do not publish below this line

Published: June 9, 2022
Posted: June 9, 2022

CITY OF TUMWATER

555 ISRAEL RD. SW, TUMWATER, WA 98501
Email: cdd@ci.tumwater.wa.us
(360) 754-4180

PRELIMINARY PLAT Application

TUM - 21-1895	DATE STAMP
Kelly	12/16/21
RCVD BY	

Application fee: $2,750.00, plus $38.50 per lot.

SUBJECT PROPERTY

ADDRESS OF PROPERTY (COMPLETE): 6609 Henderson Blvd

PROJECT NAME: Three Lakes Crossing

PARCEL NUMBER(S): 12701320105, 79300000100 and 79300000101

APPLICANT *(please print neatly)*

NAME OF APPLICANT: Evan Mann, Copper Ridge LLC

APPLICANT'S MAILING ADDRESS (COMPLETE): PO Box 73790, Puyallup, WA 98373

APPLICANT'S TELEPHONE(S): 253-820-7835

APPLICANT'S E-MAIL: evan@soundbuilthomes.com

PROJECT REPRESENTATIVE

NAME OF PROJECT REPRESENTATIVE: Sheri Greene, AHBL

REPRESENTATIVE'S MAILING ADDRESS (COMPLETE): 2215 N. 30th Street #300, Tacoma WA 98403

REPRESENTATIVE'S TELEPHONE(S): 253-383-2422

REPRESENTATIVE'S E-MAIL: sgreene@ahbl.com

PROPERTY OWNER

NAME OF PROPERTY OWNER: Alvin Hope

OWNER'S MAILING ADDRESS (COMPLETE): PO Box 1055, Rochester WA 98579

OWNER'S TELEPHONE(S):

OWNER'S E-MAIL:

PROJECT DESCRIPTION *(attach additional sheets and documentation, as needed)*

Subdivide three parcels (9.68 acres) into 45 single family residential lots

I affirm that all answers, statements, and information submitted with this application are correct and accurate to the best of my knowledge. I also affirm that I am the owner of the subject site or am duly authorized by the owner to act with respect to this application. Further, I grant permission to any and all employees and representatives of the City of Tumwater and other governmental agencies to enter upon and inspect said property as reasonably necessary to process this application. I agree to pay all fees of the City that apply to this application.

Signature of Applicant/Representative

December 8, 2021
Date

Please attach the **Preliminary Plat submittal checklist** to this Application.

CITY OF TUMWATER

555 ISRAEL RD. SW, TUMWATER, WA 98501
Email: cdd@ci.tumwater.wa.us
(360) 754-4180

PRELIMINARY PLANNED UNIT DEVELOPMENT Application

TUM - 22- 0036

Kelly
RCVD BY

DATE STAMP
12/16/21

Application fee: $1,320.00, plus $33.00 per lot.

SUBJECT PROPERTY

ADDRESS OF PROPERTY (COMPLETE): 6609 Henderson Blvd

PROJECT NAME: Three Lakes Crossing

PARCEL NUMBER(S): 12701320105, 79300000100 and 79300000101

APPLICANT *(please print neatly)*

NAME OF APPLICANT: Evan Mann, Copper Ridge LLC

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Signature of Applicant/Representative

December 8, 2021
Date

Please attach the **Preliminary Planned Unit Development submittal checklist** to this Application.

City Hall
555 Israel Road SW
Tumwater, WA 98501-6515
Phone: 360-754-5855
Fax: 360-754-4138

NOTICE OF APPLICATION

Three Lakes Crossing
TUM-21-1895 and TUM-22-0036
January 18, 2022

Proposal: The applicant proposes to subdivide approximately 9.73 acres into 45 single family lots.

Applicant: Evan Mann, Copper Ridge LLC, PO Box 73790, Puyallup, WA 98373.

Location: 6609 Henderson Blvd SE, Olympia, WA 98501. Section 01, Township 17N, Range 1W. W.M. Parcel # 12701320105.

Complete Application: Application submitted: December 16, 2021. Application deemed complete: January 11, 2022.

Project Permit/Approvals: The following permits or approvals may be required: Preliminary Plat, Preliminary Planned Unit Development, SEPA threshold determination, Transportation Concurrency Ruling, Site Development/Grading and Building Permits.

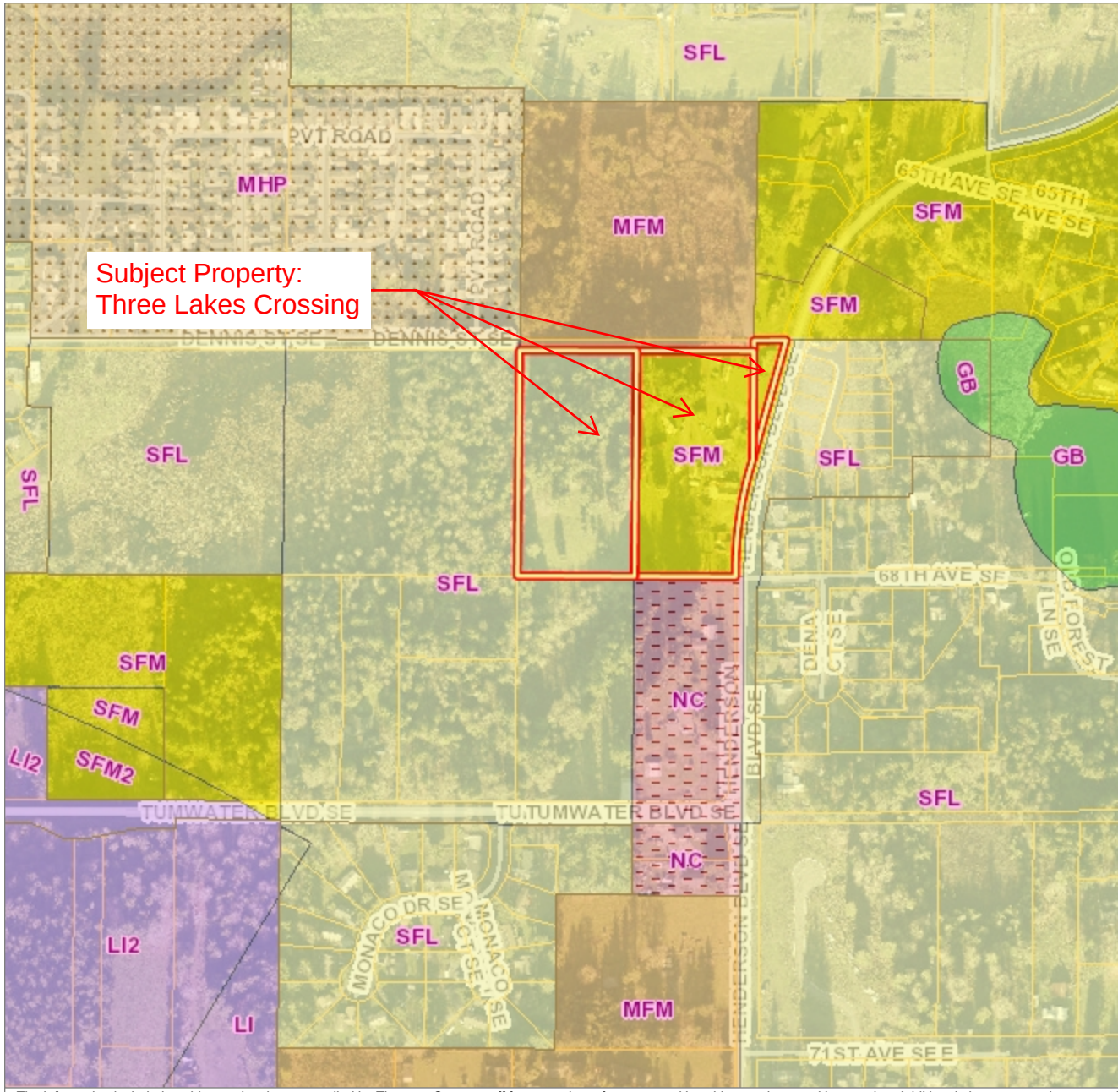
Environmental Documents Relating to the Project: A completed environmental checklist and related reports were submitted.

Preliminary Determination of Consistency: No determination of consistency with City of Tumwater or State of Washington plans, regulations, or standards has been made. At a minimum, this project will be subject to the following plans and regulations: Tumwater Comprehensive Plan, Tumwater Zoning Code (TMC Title 18), Tumwater Environmental Policy Ordinance (TMC 16.04), the City of Tumwater Drainage Design and Erosion Control Manual, and the International Building Code.

Public Hearing: A public hearing is required. No specific date has been set, however, persons receiving this notice will be informed of the date, time, and place of the hearing a minimum of 10 days prior to the hearing date.

Public Comment Period: The 15 day comment period ends at 5:00 p.m. on February 2, 2022. Written comments may be submitted to City of Tumwater Community Development Department, Attn: Tami Merriman, 555 Israel Road SW, Tumwater, WA 98501, or email tmerriman@ci.tumwater.wa.us.

If you have any questions or would like additional information, please contact Tami Merriman, Permit Manager, at 360-754-4180.



Zoning Map

Legend

Zoning

- AC - Arterial Commercial
- AG - Agriculture
- AQUATC - Aquatic
- ARI & ARI2 - Airport Related Industry
- AS - Auto Services
- BD - Breweru
- BP - Business Park
- C - Cemetery
- C-1 - Commercial
- C-2 - Heavy Commercial
- C-3 - Large Lot Commercial
- C-3 - Special-Use Commercial
- CBC & CBC2 - Capitol Boulevard Community
- CBD - Central Business District
- CBD 4 - Central Business District 4
- CBD 5 - Central Business District 5
- CBD 6 - Central Business District 6
- CBD 7 - Central Business District 7
- CC - Core Commercial
- CC/CS-H - Capitol Campus/Commercial Service High
- CCD - Community Commercial
- CD - Commercial Development
- COM - Commercial
- COSC - Commercial Oriented Shopping Center
- CS - Community Service
- DB - Downtown Business

Scale 1: 8,001

0 350 700

Feet

Map Created Using GeoData Public Website

Published: 6/8/2022

Note: TUM-21-1895, Three Lakes Crossing

THURSTON COUNTY
WASHINGTON
SINCE 1852

Thurston County GeoData Center

City Hall
555 Israel Road SW
Tumwater, WA 98501-6515
Phone: 360-754-5855
Fax: 360-754-4138

CERTIFICATION OF PUBLIC NOTICE

I, Alex Baruch, Associate Planner for the City of Tumwater hereby certify that public notice for the Project Numbers: TUM-21-1895; Three Lakes Crossing Preliminary Plat, TUM-22-0036; Planned Unit Development and TUM-22-0038; SEPA Determination was given as follows:

APPLICATION

Notice of Application Published in Olympian:	January 18, 2022
Notice of Application Uploaded to Website:	January 18, 2022
Notice of Application Mailed:	January 13, 2022
Notice of Application Posted:	January 13, 2022
Posting Locations:	On Henderson near Right Of Way

Environmental Determination Published:	May 13, 2022
Environmental Determination Uploaded to Website:	May 9, 2022
Environmental Determination Mailed:	May 12, 2022
Environmental Determination Posted:	May 13, 2022
Posting Locations:	On Henderson near Right Of Way

HEARING

Notice of Public Hearing Published:	June 9, 2022
Notice of Public Hearing Uploaded to Website:	June 9, 2022
Notice of Public Hearing Mailed:	June 9, 2022
Notice of Public Hearing Posted:	June 9, 2022
Posting Locations:	On Henderson near Right Of Way

The above is an accurate accounting of the public notice provided for the project.

Alex Baruch, Associate Planner	June 9, 2022
NAME, TITLE	Date

Tami Merriman

From: Shaun Dinubilo <sdinubilo@squaxin.us>
Sent: Tuesday, January 18, 2022 8:59 AM
To: Tami Merriman
Subject: RE: NOA - Three Lakes Crossing

Hello Tami,

Thank you for contacting the Squaxin Island Tribe Cultural Resources Department regarding the above listed project for our review and comment. The project area has a high potential for the location of cultural resources. We recommend a cultural resources survey and report be completed for this project. We would prefer to receive an electronic copy by email once completed.

Shaun Dinubilo
Archaeologist
Cultural Resource Department
Squaxin Island Tribe
200 S.E. Billy Frank Jr. Way
Shelton, WA 98584
Office Phone: 360-432-3998
Cell Phone: 360-870-6324
Email: sdinubilo@squaxin.us

Email is my perfered method of communication.

As per 43 CFR 7.18[a][1]) of the Archaeological Resource Protection Act, Section 304 of the National Historic Preservation Act, and RCW 42.56.300 of the Washington State Public Records Act-Archaeological Sites, all information concerning the location, character, and ownership of any cultural resource must be withheld from public disclosure.

From: Kelly Wallace <KWallace@ci.tumwater.wa.us>
Sent: Friday, January 14, 2022 3:09 PM
Subject: NOA - Three Lakes Crossing

Please see attached.

Kelly Wallace, CPT | Permit & Planning Technician
City of Tumwater, Community Development
555 Israel Rd SW | Tumwater, WA 98501
(360) 754-4180
KWallace@ci.tumwater.wa.us | www.ci.tumwater.wa.us

Nisqually Indian Tribe
Tribal Historic Preservation Office
4820 She-Nah-Num Dr. S.E.
Olympia, WA 98513
(360) 456-5221

January 20, 2022

To: Tami Merriman, Permit Manager
City of Tumwater
Community Development Department
555 Israel Road SW
Tumwater, WA 98501

Re: TUM-21-1895 and TUM-22-0036

The Nisqually Indian Tribe's THPO has reviewed the notice of application that you provided for the above named project and requests that a cultural resources survey be required as a condition of permitting.

The Deschutes River basin and the lands surrounding Three Lakes Crossing have been used by the Medicine Creek Treaty Tribes since time immemorial as evidenced by several archaeological sites in the vicinity.

Please keep us informed if there are any Inadvertent Discoveries of Archaeological Resources/Human Burials.

Sincerely,

Brad Beach, THPO
Nisqually Indian Tribe
360-456-5221 ext 1277
beach.brad@nisqually-nsn.gov

cc: Annette Bullchild, Director, Nisqually Indian Tribe

Alex Baruch

From: Tami Merriman
Sent: Tuesday, January 25, 2022 8:33 AM
To: Alex Baruch
Subject: FW: NOTICE OF APPLICATION Three Lakes Crossing TUM-21-1895 and TUM-22-0036

Tami Merriman | Permit Manager
City of Tumwater Community Development
555 Israel Rd SW | Tumwater, WA 98501
(360) 754-4180 | TMerriman@ci.tumwater.wa.us
www.ci.tumwater.wa.us

From: bryon Agan <bryonagan@yahoo.com>
Sent: Tuesday, January 25, 2022 8:32 AM
To: Tami Merriman <TMerriman@ci.tumwater.wa.us>
Subject: NOTICE OF APPLICATION Three Lakes Crossing TUM-21-1895 and TUM-22-0036

Merriman,
I have specific concerns that this development will create unsafe traffic challenges on Henderson Boulevard at the existing 68th avenue. This intersection is almost impossible to get out of and is unsafe. It is also unsafe for pedestrians to cross Henderson. The sight distance at 68th due to the curvature on Henderson makes it unsafe for pedestrian including kids along with vehicular access. The added 450 cars on Henderson will create unacceptable traffic delay. along with unsafe intersection for vehicles and safety hazardous for all users including bikes. The city and developer needs to address traffic capacity and safety coming out of existing 68th for vehicle, pedestrian and bike access to Henderson.

Sincerely
Bryon Agan

Alex Baruch

From: Alex Baruch
Sent: Thursday, January 27, 2022 5:05 PM
To: 'bryon Agan'
Cc: Tami Merriman
Subject: RE: NOTICE OF APPLICATION Three Lakes Crossing TUM-21-1895 and TUM-22-0036

Good afternoon Bryon,

Thank you for the additional questions. I have routed the transportation questions to our Engineering and Transportation department staff for a response.

My basic understanding is that during the Crestmoor Park development proposal a decision was made not to extend Dennis St to Henderson due to the wetlands located in this area. Instead, Crestmoor Park was proposed to connect Tumwater Blvd to Henderson when this property was proposed to be developed in the future which is what we are seeing proposed now with Three Lakes Crossing plat.

The files are quite large to send via email so I have setup a link where you will be able to find all of the documents that we currently have on file for this project. I also included one of the site development pages showing the Crestmoor Park project for your reference. I will continue to put documents in that folder over the course of the project as we receive more information moving forward and would be happy to discuss the project further if you have other questions.

Sincerely,

Alex Baruch | **he/him**
Associate Planner, Community Development
City of Tumwater
555 Israel Rd SW | Tumwater, WA 98501
(360) 754-4180 | ABaruch@ci.tumwater.wa.us
www.ci.tumwater.wa.us

From: bryon Agan <bryonagan@yahoo.com>
Sent: Thursday, January 27, 2022 6:39 AM
To: Alex Baruch <ABaruch@ci.tumwater.wa.us>
Cc: Tami Merriman <TMerriman@ci.tumwater.wa.us>
Subject: Re: NOTICE OF APPLICATION Three Lakes Crossing TUM-21-1895 and TUM-22-0036

Alex,
Please require the developer to conduct at traffic and safety analysis of existing 68th Ave. Also why is the developer being allowed to construct an new access to Henderson instead of completing the connection of Dennis to Henderson on their north property boundary with their access off of Dennis. I would like to be on the list to receive all notifications and would also like to request to see all documents that are submitted throughout the project duration.
Thanks
Bryon Agan, PE

On Tuesday, January 25, 2022, 10:12:22 AM PST, Alex Baruch <abaruch@ci.tumwater.wa.us> wrote:

Good morning Bryon,

I hope you are having a good day. The application is in the process of being reviewed for traffic considerations through the SEPA and Transportation Concurrency applications that were recently submitted. If you are within 300 ft of the development you will be notified of the SEPA determination once it is issued. We will be sure to pass along your comments to the developer. Any mitigation that is required of the development for traffic safety will be required as a condition of the SEPA and will need to be built or mitigated as a part of this development. Please let us know if you have any further questions and we will be happy to help.

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Sincerely

Bryon Agan

Alex Baruch

From: Alex Baruch
Sent: Thursday, February 3, 2022 4:41 PM
To: 'Evan Mann'
Cc: Tami Merriman; Mike Matlock; Kurt Wilson
Subject: RE: TUM-21-1895 and TUM-22-0036 Three Lakes Crossing Notice of Application Comments
Attachments: Habitat for Humanity Cultural Resource Survey 10-18-2021.pdf

Good afternoon Evan,

Thank you for your quick response. We sent the traffic impact analysis to the community member and replied to their other comments about Dennis St. I think their concerns have been addressed and will coordinate with you if any additional comments are submitted.

I have attached a recent cultural resources study that was requested by the Squaxin Indian Tribe for the Habitat for Humanity project down the road from this plat. Additionally, looking at the WISSARD map on the DAHP website the predictive model for Environmental Factors with Archaeological Resources Results shows this area as "survey highly advised" and a "very high risk area". I could not find cultural survey documentation for the Shin Plat (preliminary plat approval 2007) or Tumwater Blvd Plat (preliminary plat approval 2018) in the project files, but I also did not see comment from any tribes responding to the application notification at that time. The tribe has been more involved with land use project review over the last few years and have been commenting on the vast majority of notice of applications that have been sent out. It is our opinion that the cultural resource survey should be completed prior to moving forward with the SEPA determination so we are better able to address section 13 of the SEPA checklist and provide the survey to the tribes for review and comment.

At this time staff is still reviewing the application materials and will let you know of any comments as soon as they are available.

Sincerely,

Alex Baruch | **he/him**
Associate Planner, Community Development
City of Tumwater
555 Israel Rd SW | Tumwater, WA 98501
(360) 754-4180 | ABaruch@ci.tumwater.wa.us
www.ci.tumwater.wa.us

From: Evan Mann <evan@soundbuilthomes.com>
Sent: Thursday, February 3, 2022 3:13 PM
To: Alex Baruch <ABaruch@ci.tumwater.wa.us>
Cc: Tami Merriman <TMerriman@ci.tumwater.wa.us>; Mike Matlock <MMatlock@ci.tumwater.wa.us>; Kurt Wilson <kurt@soundbuilthomes.com>
Subject: RE: TUM-21-1895 and TUM-22-0036 Three Lakes Crossing Notice of Application Comments

Hi Alex,
Thanks for the comments. I believe we provided a full Traffic Impact Analysis that addresses traffic concerns for the neighbor.

As for the tribal requests, was a Cultural Resource Survey complete for the neighboring developments? Shin Plat or Tumwater Boulevard Plat? If so, can you provide a copy? If not, why would this project be considered to have any more potential for cultural resource impacts than the neighboring properties. While we are not able to make a public records request to the tribe as to why they are requiring the study, it seems at least they can provide some additional context as to why this application is subject to a study. We typically proceed with the understanding that if there are any inadvertent discoveries they would be documented with the tribes. This can be a very costly and time-consuming study so we just need to make sure that this approach is absolutely necessary.

Any other review comments from staff?
Thank you,

Evan Mann
SoundBuilt Homes
PO BOX 73790
Puyallup, WA 98373
Cell: 253.820.7835
evan@soundbuilthomes.com

From: Alex Baruch <ABaruch@ci.tumwater.wa.us>
Sent: Thursday, February 3, 2022 3:00 PM
To: Evan Mann <evan@soundbuilthomes.com>
Cc: Tami Merriman <TMerriman@ci.tumwater.wa.us>; Mike Matlock <MMatlock@ci.tumwater.wa.us>
Subject: TUM-21-1895 and TUM-22-0036 Three Lakes Crossing Notice of Application Comments

Good afternoon Evan,

I hope you are doing well. The comment period for the notice of application ended yesterday and I wanted to provide you with comment we received during that time. The comments from the Squaxin and Nisqually Indian Tribes should be addressed before we move forward with the SEPA determination as they are asking for a cultural resource survey to be completed. By completing the cultural resource survey prior to moving forward with the SEPA determination we will be better able to address section 13 of the SEPA checklist and provide the survey to the Tribes for review and comment. Lastly, there was another community member that had a question about some of the traffic impacts to Henderson Blvd. which I believe we have addressed via email but if you would like to provide any clarification I'd be happy to facilitate passing that information along. Please let us know if you have any questions and how you plan to move forward with the cultural resource study.

Sincerely,

Alex Baruch | **he/him**
Associate Planner, Community Development
City of Tumwater
555 Israel Rd SW | Tumwater, WA 98501
(360) 754-4180 | ABaruch@ci.tumwater.wa.us
www.ci.tumwater.wa.us

Alex Baruch

From: R Kondrat <robert.kondrat@outlook.com>
Sent: Tuesday, February 15, 2022 9:48 PM
To: Tami Merriman
Subject: Re: Three Lakes Crossing public comments

Dear Ms Merriman,

Thank you for sending all of the records related to the Three Lakes Crossing proposed subdivision.

I understand that there is a need for housing and that property owners have the right to seek approval to subdivide and develop their land. Before approving this proposed subdivision, I urge you to provide adequate notice to additional residents of the surrounding area (see below). I believe that you should require a more robust environmental assessment and analysis of the traffic impacts of this large project on residents of this area.

I have spoken with many of the more than two dozen residents in our tight-knit Monaco Park neighborhood about the rapid string of new developments that are adjacent to our subdivision, which has been part of our community for about 30 years. Over those decades, we have contributed to making Tumwater a great community to live in. My neighbors and I have serious concerns about approving another new subdivision that will add as many as 120 persons, before we know the impact of three other subdivisions nearby (see below).

As an attorney, I believe that city planners should thoughtfully carry out their legal obligation to uphold, enforce, and meaningfully apply the state and local environmental statutes, regulations and ordinances that are designed to protect habitat and the quality of life of the people who live here. We have many laws on the books. If those laws and ordinances are not meaningfully enforced, they are merely words on paper.

This proposed subdivision poses real concerns not only due to it size, but because of the cumulative impact of three other recently-developed (but not yet completed) subdivisions that are adjacent to this site, including, but not limited to: (1) 6700 Henderson (16 Lot plat on 5.19 acres) and 7028 Henderson (22 lot plat on 5.5 acres), and 3) 715 Dennis St. (Tumwater Blvd)(subdivision of 24.13 acres into approximately 30 single-family lots).

While these other three subdivisions have been started, the homes (and the traffic) have not yet come. By assessing and evaluating each subdivision individually, you will fail to consider the cumulative impact of adding several new houses and vehicles all at the same time. By the time that the full impact is felt, it will be too late.

Over the past three years, we witnessed clear-cutting in the other three subdivisions listed above. As this project's SEPA checklist states: "**All of the vegetation within the project area will be removed**." That sums it up well - total destruction. Our children regularly learn about climate change in our schools and yet they regularly witness wholesale environmental destruction in the "Evergreen State" - in fact, right in their own neighborhood. It is 2022, but we continue to allow wholesale destruction of habitat even in our state capital. I believe that Tumwater can and should require more from developers.

In the other subdivisions in this vicinity, virtually every living plant or tree was cut down, ground up, and cast aside. I realize that this allows developers to maximize their profits. In 2022, there are more environmentally sensitive methods of developing properties that do not leave such environmental ruin. Can you please do more than "rubber stamp" this project and require the developers to make a meaningful effort to preserve some of the existing vegetation - especially mature trees? Preserving the existing grove of mature trees on the property will help preserve some semblance of the natural beauty that first attracted people (including me) to Tumwater.
The developers that profit from this type of development are not residents of Tumwater. You must follow the law, but please do so with the existing - and future - residents of the city in mind.

This property has more than 360 trees. A "do the minimum" approach when interpreting and applying the city's tree ordinance means that mature cedars, oaks, and Douglas Firs (which provide real habitat for animals) are replaced by small decorative trees that provide no real habitat for animals.

From the aerial photos, you can see how this 9 acre property serves as a crucial animal corridor ("greenway") that connects other larger areas of remaining habitat in the surrounding area. This is especially important given the clear-cutting that occurred in the adjacent property that will soon be a subdivision. I have often witnessed wildlife in the area that need a patchwork of corridors to travel between food sources, which change during the course of the seasons. Please ensure that the environmental impact of this critical habitat corridor is fully evaluated as part of your environmental review.

We have lived in Tumwater for 18 years. What originally attracted us to Tumwater is that was not full of sprawl. It was green and in a word - liveable. Unfortunately, this part of Tumwater will soon resemble every other suburb, with traffic jams and cookie-cutter houses. Eventually, longtime residents who loved Tumwater will move away, as the quality of life deteriorates.

One clear change in this area is the traffic. This project's traffic analysis does not adequately consider the impact of the other new soon-to-be constructed subdivisions nearby. This proposed subdivision is near that critical "T" intersection of Henderson Blvd and Tumwater Blvd. Prior to the pandemic, there was a backup that extended to the Dart plant. The traffic analysis may be legally sufficient, but does not reflect the on-the-ground reality of this key intersection at rush hour. In truth, many homes with families have 3 or 4 cars and multiple drivers, which does not appear to be reflected in the technical plug-and-chug analysis in the report.

If you visit the site, you will observe that part of the property is flat (near Henderson Blvd), but the backside has a steep downhill "dip." In the Tumwater Boulevard development, we witnessed the fact that large subdivisions require significant equipment to substantially reshape and transform the terrain so that homes can be built. Much of this property is not suitable for development without substantial intervention and moving of large amounts of soil. Please consider how the project can better conform to the existing terrain by reducing the number of lots on the site.

I also have concerns about the lack of notice that has been provided to the residents of the surrounding area about this project. In 2018, I repeatedly communicated with the city about the need to improve the notice that is being provided by the city about development projects like this. Many residents of our subdivision were not notified about a project that was located almost across the street from our development. At that time, I was told that the minimum legal requirement was that notice had to be sent to residences within 300 feet of the project. I asked and was assured that I would receive notice of any new projects in the area. I did not receive written notice of this project and only learned about it from a neighbor. Again, the city must do more than "do the minimum" and

make a genuine effort to notify residents of major projects that will impact their lives. Doing so helps preserve the public's trust in its officials and civil servants.

Thank you for carefully considering my comments and working to consider the best interest of the citizens of Tumwater.

Sincerely,
Robert Kondrat

City Hall
555 Israel Road SW
Tumwater, WA 98501-6515
Phone: 360-754-4140
Fax: 360-754-4142

Memo

To: Tami Merriman, Permit Manager

From: Mary Heather Ames, Transportation Manager

Date: February 8, 2022

Re: Transportation Concurrency – Three Lakes Crossing

Based on the Transportation Impact Analysis prepared for the Three Lakes Crossing project, dated December 10, 2021 and the City of Tumwater Capital Facilities Plan, the City finds that the Three Lakes Crossing project is concurrent in regards to Transportation conditioned as follows:

1. Shall pay Transportation Impact Fees per the Fee Resolution current at time of permit application.
2. Shall construct transportation improvements as shown on the formal site plan.
3. A recent study of the I-5 interchange at Tumwater Boulevard indicates improvements are needed in order to meet established safety and level of service standards. This project shall either:
    a. Construct a roundabout at the northbound Interstate 5 On/Off Ramp and Tumwater Boulevard intersection;
    b. Voluntarily pay a mitigation fee of $4,219 per peak trip generated by this project under RCW 82.02.020 to be used as described herein:
    Tumwater Boulevard/I-5 Interchange: The City's planned transportation improvements at the Tumwater Boulevard/I-5 interchange include converting the interchange to a roundabout diamond interchange by replacing the southbound on/off ramp signal and northbound stop controlled intersections with roundabouts.

From: bryon Agan <bryonagan@yahoo.com>
Sent: Sunday, May 15, 2022 11:31 AM
To: Alex Baruch
Cc: Tami Merriman
Subject: Re: NOTICE OF APPLICATION Three Lakes Crossing TUM-21-1895 and TUM-22-0036

I was just reviewing the SEPA determination and it shows nothing has been address about the unsafe existing 68th ave that will be made more unsafe with this development. This city is taking on liability if something would occur. I also noted that there are no pm trips on on Henderson turning left into the development, which is definitely not a accurate representation of how traffic will flow. At this point I feel the city is failing at protecting the safety of its existing residents.
Bryon Agan, PE

On Thursday, January 27, 2022, 05:05:16 PM PST, Alearuch <abaruch@ci.tumwater.wa.us> wrote:

Good afternoon Bryon,

Thank you for the additional questions. I have routed the transportation questions to our Engineering and Transportation department staff for a response.

My basic understanding is that during the Crestmoor Park development proposal a decision was made not to extend Dennis St to Henderson due to the wetlands located in this area. Instead, Crestmoor Park was proposed to connect Tumwater Blvd to Henderson when this property was proposed to be developed in the future which is what we are seeing proposed now with Three Lakes Crossing plat.

The files are quite large to send via email so I have setup a link where you will be able to find all of the documents that we currently have on file for this project. I also included one of the site development pages showing the Crestmoor Park project for your reference. I will continue to put documents in that folder over the course of the project as we receive more information moving forward and would be happy to discuss the project further if you have other questions.

Sincerely,

Alex Baruch | **he/him**

Associate Planner, Community Development

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Subject: Re: NOTICE OF APPLICATION Three Lakes Crossing TUM-21-1895 and TUM-22-0036

Alex,

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Thanks

Bryon Agan, PE

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Good morning Bryon,

I hope you are having a good day. The application is in the process of being reviewed for traffic considerations through the SEPA and Transportation Concurrency applications that were recently submitted. If you are within 300 ft of the development you will be notified of the SEPA determination once it is issued. We will be sure to pass along your comments to the developer. Any mitigation that is required of the development for traffic safety will be required as a condition

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Sent: Tuesday, January 25, 2022 8:32 AM
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Sincerely

Bryon Agan

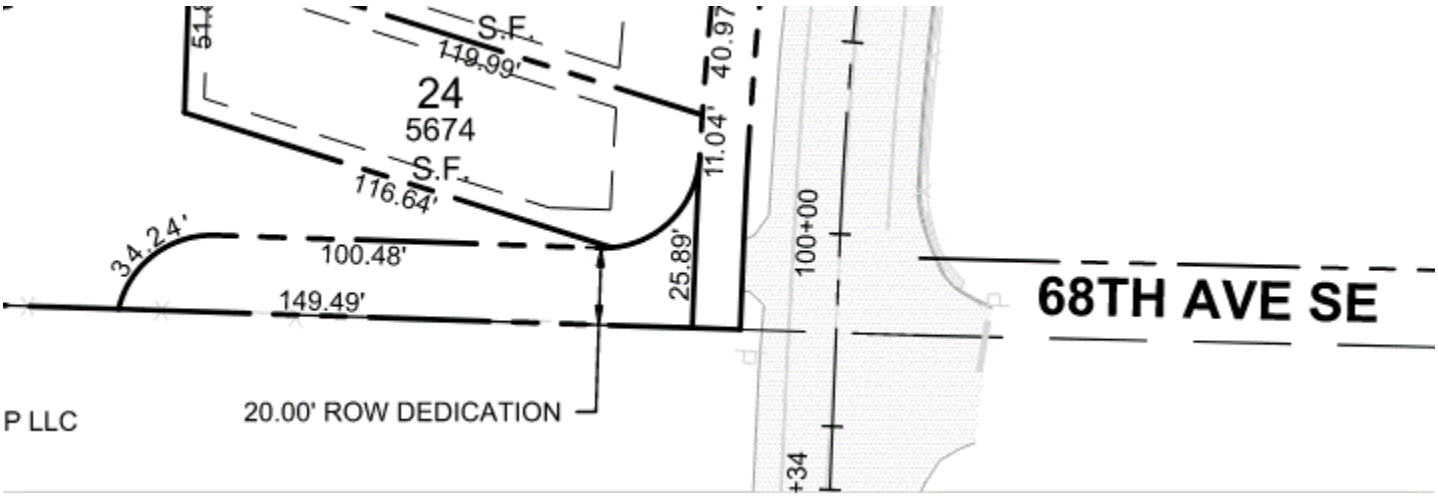
Alex Baruch

From: Alex Baruch
Sent: Monday, May 23, 2022 6:09 PM
To: 'bryon Agan'
Cc: Tami Merriman; Mary Heather Ames
Subject: RE: NOTICE OF APPLICATION Three Lakes Crossing TUM-21-1895 and TUM-22-0036

Hi Mr. Agan,

I hope you are doing well and having a good evening. The traffic impact analysis shows a low volume of vehicle left turning movements during the PM peak. Additionally, our crash data shows only one incident in the last 6 years at the intersection of 68th. The trip generation from this project does not drop the level of service at the intersection of 68th, and does not warrant any further improvements.

While not warranted by this project, the city is aware that future development across from 68th will need to access Henderson at the 68th intersection. The City requested, and the applicant is willing to provide right of way across from 68th, for future development to fully develop the intersection of 68th at such time as they develop (see snip of the plan below depicting the proposed ROW dedication).



Please let us know if you have any additional questions, I've copied Mary Heather on this email as she helped pull together the data for this response.

Sincerely,

Alex Baruch | **he/him**
Associate Planner, Community Development
City of Tumwater
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Sincerely

Bryon Agan

THREE LAKES CROSSING PRELIMINARY PLAT AND PUD

Know what's below. Call before you dig.

1 TREE REPLACEMENT PLAN

TREE SCHEDULE

TREES	CODE	QTY	BOTANICAL NAME	COMMON NAME	SIZE
	AA	15	ACER RUBRUM 'ARMSTRONG'	ARMSTRONG RED MAPLE	2" CAL
	CD	12	CALOCEDRUS DECURRENS	INCENSE CEDAR	6" HT MIN
	CF	30	CARPINUS BETULUS 'FASTIGIATA'	PYRAMIDAL EUROPEAN HORNBEAN	2" CAL
	CM	15	CORNUS KOUSA 'MILKY WAY'	MILKY WAY KOUSA DOGWOOD	2" CAL
	MS	16	MALUS TRANSITORIA 'SCHMIDCUTLEAF'	GOLDEN RAINDROPS FLOWERING CRABAPPLE	2" CAL
	NF	30	NYSSA SYLVATICA 'DAVID ODOM' TM	AFTERBURNER TUPELO	2" CAL
	PD	13	PSEUDOTSUGA MENZIESII	DOUGLAS FIR	6" HT MIN
	QC	6	QUERCUS COCCINEA	SCARLET OAK	2" CAL
	QS	73	QUERCUS ROBUR 'FASTIGIATA' TM	SKYROCKET ENGLISH OAK	2" CAL

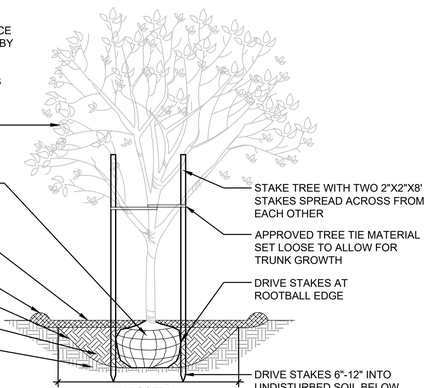
TREE REPLACEMENT NOTES

1. SEE PRELIMINARY TREE REPLACEMENT PLAN PREPARED BY WASHINGTON FORESTRY CONSULTANTS FOR MORE INFORMATION.
2. ALL REPLACEMENT TREES SHALL BE PLANTED IN CONFORMANCE WITH TUMWATER MUNICIPAL CODE SECTIONS 18.47 AND 16.08. AS WELL AS CITY OF TUMWATER STANDARD DETAIL ST-31.
3. ALL NEWLY PLANTED TREES SHALL RECEIVE A 3" DEPTH WOOD CHIP MULCH RING 5' IN DIAMETER.

TREE RETENTION CALCULATIONS

TOTAL PROJECT AREA:			9.73 ACRES
TOTAL # OF TREES:			368
REQUIRED TREE RETENTION	TMC 16.08.070.R	12 TREES PER ACRE =	80
TREE RETENTION PROVIDED			10
REQUIRED TREE RETENTION SHORTFALL		80 - 10 =	70
REQUIRED TREE REPLACEMENT	TMC 16.08.070.R.3	3 to 1	210
TREE PLANTING PROVIDED			210

NOTE:
1. TREES NOT PLANTED IN CONFORMANCE WITH THIS DETAIL WILL BE REJECTED BY THE LANDSCAPE ARCHITECT. REPLACEMENT OF REJECTED TREES WILL BE DONE AT THE CONTRACTOR'S EXPENSE.



1 DECIDUOUS TREE PLANTING
3/8" = 1'-0"

P-2021-TLCPP-70

LEGEND

EXISTING TREE TO REMAIN

PROPERTY LINE

CEMENT CONCRETE PAVEMENT

GRAPHIC SCALE
0 25 50 100 FEET
1" = 50 FEET

APPLICATION #

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Project Title:
THREE LAKES CROSSING PRELIMINARY PLAT

Client:
COPPER RIDGE, LLC

P.O.BOX 73790
PUYALLUP, WA 98373

CONTACT:
EVAN MANN (253) 820-7835

Project No.
2210648.40

Issue Set & Date:
PRELIMINARY PLAT AND PUD
12/08/2021

4
3
2
1
Revisions:

Sheet Title:
TREE REPLACEMENT PLAN

Designed by: SJ | Drawn by: SJ | Checked by: SSS

Sheet No.
L1.0
1 of 1 Sheets

HENDERSON BOULEVARD PROPERTY

THURSTON COUNTY, WASHINGTON

CRITICAL AREAS REPORT

Prepared By:

Curtis Wambach, M.S.
Senior Biologist and Principal

EnviroVector
OPTIMIZE USABLE LAND

15 September 2021

360-790-1559

www.envirovector.com

HENDERSON BOULEVARD PROPERTY

CRITICAL AREAS REPORT

Prepared For:

Soundbuilt

Prepared By:

Curtis Wambach, M.S.,
Senior Biologist and Principal
EnviroVector
Olympia, WA 98502

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EnviroVector
OPTIMIZE USABLE LAND
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15 September 2021

Contents

1.0 INTRODUCTION

1.1 Purpose

The purpose of this Critical Areas Report is to identify and map Critical Areas on and within three hundred (300) feet of the subject property. This Critical Areas Report has been prepared to satisfy City of Tumwater reporting requirements.

1.2 Property Location

The 9.73-acre subject property is located in Tumwater, WA Section 02 Township 17 North and Range 2 West (**Figure 1; Table 1**).

Table 1. Parcels Comprising Subject Property

No#	Property Address	Parcel Number	Section Township Range	Property Size (Acres)
1	---	12701320105	Section 02 Township 17N Range 2W	0.34
2	---	79300000101		4.77
3	---	79300000100		4.62
3 Parcels	Total Size			9.73 acres

The permitting jurisdiction is City of Tumwater.

1.3 Site Evaluation

Critical Areas evaluations were performed on the subject property on 7 July 2021.

1.4 Subject Property

The site is made up of three (3) contiguous parcels (**Figures 2 & 3**). The eastern portion of the subject property contains building and internal roads (**Appendix A, Photos 5-8**). The western portion of the subject property is forested with a herbaceous understory (**Appendix A, Photos 1 & 3**). Maintained lawn and grassy areas are located throughout the property (**Appendix A, Photos 2, 4-8**). The parcel west of the subject property is currently under development (**Appendix A, Photos 9 & 10**).

The property is bordered by Henderson Blvd SE to the east, single family homes to the east and south, undeveloped single-family lots to the north. The property to the west is currently under construction. The neighboring properties include high intensity single-family lots smaller than one (1) acre in size.

2.0 METHODOLOGY

This report is based on a review of existing information and field investigations. The goal of these efforts is to collect and document existing information that reflects current site conditions for assessing potential impacts.

2.1 Review of Existing Literature

Prior to conducting fieldwork, and throughout the duration of project design, biologists reviewed existing information to identify wetlands, streams, vegetation patterns, topography, soils, wildlife habitats, and other natural resources in the project area. Existing data sources that were reviewed for this report included, but were not limited to, the following:

- Washington. U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS) Soil Survey
- U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI), online wetlands mapper
- Washington Department of Fish and Wildlife (WDFW) Salmonscape Database
- Washington Department of Fish and Wildlife (WDFW) Priority Habitats and Species Database
- Washington State Department of Natural Resources (DNR) Natural Heritage Database
- Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM) and Flood Insurance Studies

2.2 Field Investigation

A wetland evaluation was performed on-site as well as off-site of the subject property to determine if wetlands, streams, or their buffers extend onto the subject property. The routine on-site determination method was used to identify potential wetlands using the procedures outlined in the *Corps of Engineers Wetland Delineation Manual* (Environmental Laboratory, 1987) and the 2010 USACE Regional Wetland Supplement.

Under the Thurston County Code (TCC), wetlands are defined as areas that are inundated or saturated by ground or surface water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

Wetlands do not include those artificial wetlands intentionally created from non-wetland sites, including, but not limited to, irrigation and drainage ditches, grass-lined swales, canals, detention facilities, wastewater treatment facilities, farm ponds, and landscape amenities, or those wetlands created after July 1, 1990, that were unintentionally created as a result of the construction of a road, street, or highway.

Wetlands may include those artificial wetlands intentionally created from non-wetland areas created to mitigate conversion of wetlands.

2.3 Wetland Identification

Prior to 2010, biologists delineated wetlands according to the methods specified in the U.S. Army Corps of Engineers (USACE) Wetlands Delineation Manual (Environmental Laboratory 1987). At that time, these methods complied with those in the Washington State Wetland Identification and Delineation Manual (Washington State Department of Ecology [Ecology] 1997).

Following 2010, biologists evaluate wetlands according to the methods specified in the USACE's Wetlands Delineation Manual (Environmental Laboratory 1987) and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0) (USACE 2010). These methods comply with those adopted by Washington State pursuant to Washington Administrative Code (WAC) 173-22-035, Revised Code of Washington (RCW) 90.58.380.

2.3.1 Vegetation

The dominant plants and their wetland indicator status were evaluated to determine whether the vegetation is hydrophytic. Hydrophytic vegetation is generally defined as vegetation adapted to prolonged saturated soil conditions. To meet the hydrophytic vegetation criterion, more than 50 percent of the dominant plants must be facultative, facultative wetland, or obligate, according to the plant indicator status category assigned to each plant species by the USACE National Wetland Plant List. **Insert 1** provides the definitions of the indicator status categories. The scientific and common names for plants follow the currently accepted nomenclature. Dominant plant species were observed and recorded.

Insert 1. Key to Plant Indicator Status Categories

Plant Indicator Status Category	Symbol	Description
Obligate Wetland Plants	OBL	Plants that almost always (>99% of the time) occur in wetlands but may rarely (<1% of the time) occur in non-wetlands
Facultative Wetland Plants	FACW	Plants that often (67% to 99% of the time) occur in wetlands but sometimes (1% to 33% of the time) occur in non-wetlands
Facultative Plants	FAC	Plants with a similar likelihood (33% to 66% of the time) of occurring in both wetlands and non-wetlands
Facultative Upland Plants	FACU	Plants that sometimes (1% to 33% of the time) occur in wetlands but occur more often (67% to 99% of the time) in non-wetlands
Upland Plants	UPL	Plants that rarely (<1% of the time) occur in wetlands and almost always (> 99% of the time) occur in non-wetlands

2.3.2 Soils

No test plots or soil samples were collected. No wetlands were identified on the subject property (See Results Section)

2.3.3 Hydrology

The project area was examined for evidence of hydrology. The U.S. Army Corps of Engineers (2005) provides a technical standard for monitoring hydrology on such sites. This standard requires fourteen (14) or more consecutive days of flooding or ponding, or a water table twelve (12) in. (thirty [30] cm) or less below the soil surface, during the growing season at a minimum frequency of five (5) years in 10 (fifty percent [50%] or higher probability). The USACE 2010 Regional Supplement provides a list of hydrology indicators to evaluate whether the hydrology standard is satisfied. If wetland hydrology, including pooling, ponding, and soil saturation, is not clearly evident, hydrological conditions may be observed through surface or soil indicators. Indicators of hydrological conditions include oxidized root channels, drainage patterns, drift lines, sediment deposition, watermarks, historic records, visual observation of saturated soils, and visual observation of inundation.

2.4 Wetland Classification and Rating

Delineated wetlands were classified according to the USFWS Classification of Wetlands and Deepwater Habitats of the United States. Hydrogeomorphic classifications were assigned to wetlands using USACE methods established in a Hydrogeomorphic Classification for Wetlands were rated using the revised Washington State Wetland Rating System for Western Washington.

3.0 STUDY RESULTS

3.1 Background Information

3.1.1 Thurston County Geodata Soils

No hydric soils are mapped on the subject property. Two (2) non-hydric soil types are mapped on the subject property by Thurston County Geodata (**Appendix B; Table 2**). Mukilteo muck is a hydric soil type mapped off-site immediately south of the subject property.

Table 2. Thurston County Geodata Soil Summary

Soil Unit	Hydric	Comments
Indianola loamy sand, 0 to 3% slopes	No	Covers eastern half of subject property
Indianola loamy sand, 3 to 15% slopes	No	Covers western half of subject property

3.1.2 Thurston County Geodata Wetlands & Streams

No wetlands are mapped on the subject property by Thurston County Geodata (**Appendix C**). Two (2) off-site wetlands are mapped five hundred sixty-five (565) feet west and three hundred sixty-two (362) feet to the east of the subject property across Henderson Boulevard SE.

3.1.3 WDFW Priority Habitats and Species (PHS) Database

No priority habitats or species are mapped on the subject property by the Washington Department of Fish and Wildlife (WDFW) PHS database (**Appendix D**). The Mazama pocket gopher is mapped directly south of subject property. Freshwater emergent wetland is mapped just over four hundred (400) feet west of the subject property. Freshwater Forested/shrub wetland is mapped just over three hundred (300) feet east of the subject property. The Big Brown bat and Townsend's bat is mapped in the township.

3.1.4 Clean Water Act 303(d) List

No 303(d) listed waterbodies are mapped on the subject property. One (1) 303(d) listed waterbody is mapped 0.27 miles north of the subject property by the Department of Ecology Water Quality Atlas Map (**Appendix E**). The site and surrounding basin drains to the south.

3.1.5 Total Maximum Daily Load (TMDL)

An approved TMDL is mapped on the subject property by the Department of Ecology Water Quality Atlas Map (**Appendix F**).

3.1.6 High Groundwater Hazard Area

No High Groundwater Hazard Area is mapped on the subject property by Thurston County Geodata (**Appendix G**).

3.1.7 FEMA Floodplain

No FEMA floodplain is mapped on the subject property by the Thurston County Geodata Center database (**Appendix H**). FEMA floodplains are mapped to over three hundred (300) feet the subject property east of Henderson Blvd (**Appendix H**).

3.2 Field Results

No wetlands or streams have been identified on the subject property during this study (**Figures 2 & 3; Table 3**). One (1) off-site wetland, labeled Wetland A, has been identified south of the subject property

Wetland A has not been delineated because it is located offsite. Permission was not obtained to delineate off-site wetlands.

No streams were identified onsite or within three hundred (300) feet of the subject property.

A summary of the Critical Areas study can be found in **Table 3**.

Table 3. Summary of Critical Areas Results

Wetlands						
Wetland	Area of Wetland		Cowardin Class	Buffer Condition	Habitat Features	Comments
	On-site	Total				
Wetland A	0 sf (0 acres)	44,753.00 sf (1.03 acres)	PSSC[1]	Upland vegetation at buffer	None Observed	Shallow depression

1. PSSC: Palustrine Scrub-shrub Seasonally-flooded

3.2.1 Wetland A

The off-site Wetland A is located south of the subject property. The wetland boundary is well-defined by skunk cabbage (

Wetland A is a shallow depression that holds water during the wet season (**Figures 2 & 3**). The Cowardin classification is Palustrine Scrub-shrub Seasonally flooded (PSSC). The Department of Ecology (DOE; 2014) Wetland Rating System describes vegetation classes and hydroperiods as emergent and seasonally ponded, respectively (**Figure 6**).

Wetland Conditions

Wetland A consists of a relatively undisturbed shallow topographic depression.

No potential sources of pollutants occur within one hundred fifty (150) feet as defined in the DOE (2014) Wetland Rating System (**Figure 7**). Habitat within one (1) kilometer is shown in **Figure 8**, and the wetland contributing basin is shown in **Figure 9**.

Hydrology

Hydrology derives from local precipitation and groundwater. Water accumulates and ponds in this shallow depression during the wet season. No outlet was identified during the site evaluation.

Vegetation

Dominant plant species identified in Wetland A include (**Appendix A, Photos 11-14 & 14-21**):

- Douglas spirea (*Spiraea douglasii*, FACW)
- Pacific crabapple (*Malus fusca*; FACW)
- Skunk cabbage (*Lysichiton americanus,* OBL)
- Slough sedge (*Carex obnupta*, OBL)
- Oregon Ash (*Fraxinus latifolia,* FACW)
- Salmonberry (*Rubus spectabilis*, FAC)
- Water parsley (*Oenanthe sarmentosa,* OBL)
- Red cedar (*Thuja plicata,* FAC)

Dominant upland plant species adjacent to wetland include (**Appendix A, Photo 914**):

- Bracken fern (*Pteridium aquilinum*, FACU)
- Queen Anne's Lace (*Daucus carota*, FACU)
- Oxeye daisy (*Leucanthemum vulgare*, FACU)
- Hawksbeard (*Crepis tectorum*, FACU)
- Hair cat's ear (*Hypochaeris radicata*, FACU)
- Ocean spray (*Holodiscus maxim*, FACU)
- Fox glove (*Digitalis purpurea*, FACU)
- Salal (*Gaultheria* shallon, FACU)
- Sweet vernal grass (*Anthoxanthum odoratum*, FACU)
- Sword fern (*Polystichum munitum*, FACU)
- Oregon grape (*Mahonia aquifolium*, FACU)
- Big leaf maple (*Acer macrophyllum*, FACU)

Soils

Soils were not excavated as the wetland is located on private property not controlled by the applicant. Thereby, no test plot data was collected.

Habitat Features

No habitat features were identified in Wetland A.

4.0 REGULATORY CONSIDERATIONS

Wetland regulatory considerations have been summarized in **Table 4** and illustrated in **Figures 4 & 5**.

Table 4. Summary of Regulatory Considerations

Wetlands								
Wetland	Area of Wetland		Category	Habitat Score	Land Use Intensity	Standard Buffer	Reduced Buffer	Comments
	Onsite	Total						
Wetland A	0 sf (0.00 acres)	44,753 sf (1.03 acres)	III	5 (L, M, M)	High	150 ft	110 ft	Off-site wetland, buffer extends onsite

4.1 Wetland A

Wetland A has been classified as a Category III wetland using the DOE (2014) Wetland Rating Form for Western Washington as required under Thurston County Code (TCC) Chapter 24.30.030---*Wetland categories*. The HGM class is depressional under the DOE (2014) Wetland Rating System.

Under Tumwater Municipal Code, Chapter 16.28.170 --- *Wetland buffers*, wetland buffers are calculated based on the habitat score determined by the DOE (2014) Wetland Rating System. The Habitat Functions score for Wetland A is "Low (L)" potential to provide habitat, "Medium (M)" landscape potential to support habitat, and "Medium (M)" potential value to society. Wetlands that rate as L, M, M (order of ratings are not important) for habitat receive a score of five (5) points for total habitat functions (**Appendix I**).

The standard buffer for wetlands that score five (5) points for Habitat Functions provided by the rating of L, M, M require a standard buffer width of one hundred fifty (150) feet (TMC 16.28.080---*Wetland buffers*) (**Figures 4 & 5; Table 5**).

4.2 Wetland Buffer Reduction

Under TMC Chapter 16.28.170---*Wetland buffers*, Subsection (C)---*Buffer Width Reduction*, the buffer widths recommended for land uses with high-intensity impacts to wetlands can be reduced to those widths recommended for moderate-intensity impacts under the following conditions:

1. For wetlands that score moderate or high for habitat (five points or more), the width of the buffer around the wetland can be reduced if both the following criteria are met:
    a. A relatively undisturbed vegetated corridor at least one hundred feet wide is protected between the wetland and any other priority habitats as defined by the Washington State Department of Fish and Wildlife. The corridor must be protected for the entire distance between the wetland and the priority habitat via some type of legal protection such as a conservation easement; and
    b. Measures to minimize the impacts of different land uses on wetlands, such as the examples summarized in Table 16.28.170(5), are applied (**Insert 2**).

Insert 2. Table 16.28.170(5): Measures to Minimize Impacts to Wetlands

Examples of Disturbance	Examples of Measures to Minimize Impacts	Activities That Cause the Disturbance
Lights	Direct lights away from wetland	Parking lots, warehouses, manufacturing, residential
Noise	Locate activity that generates noise away from wetland	Manufacturing, residential
Toxic runoff (1)	*Route all new runoff away from wetland while ensuring that wetland is not dewatered *Establish covenants limiting use of pesticides within 150 ft of wetland *Apply integrated pest management	Parking lots, roads, manufacturing, residential areas, application of agricultural pesticides, landscaping
Stormwater runoff	*Retrofit stormwater detention and treatment for roads and existing adjacent development *Prevent channelized flow from lawns that directly enters the buffer	Parking lots, roads, manufacturing, residential areas, commercial, landscaping
Change in water regime	Infiltrate or treat, detain, and disperse into buffer new runoff from impervious surfaces and new lawns	Impermeable surfaces, lawns, tilling
Pets and human disturbance	*Use privacy fencing *Plant dense vegetation to delineate buffer edge and to discourage disturbance using vegetation appropriate for the ecoregion *Place wetland and its buffer in a separate tract	Residential areas
Dust	Utilize best management practices to control dust	Tilled fields

The proposed project would reduce buffers in compliance with TMC Chapter 16.28.170---*Wetland buffers*, Subsection (C)---*Buffer Width Reduction* by 1) reducing the buffer from the one hundred fifty (150)-foot high land use intensity to the one hundred ten (110)-foot moderate land use intensity, 2) protect a relatively undisturbed vegetated corridor at least one hundred feet wide, and by 3) applying measures to minimize the impacts of different land uses on wetlands, such as the examples summarized in Table 16.28.170(5).

4.3 Wetland Buffer Averaging

Under TMC Chapter 16.28.170---*Wetland buffers*, Subsection (E)---*Standard Wetland Buffer Width Averaging*, standard wetland buffer zones may be modified by averaging buffer widths if it will improve the protection of wetland functions, or if it is the only way to allow for reasonable use of a parcel. Averaging cannot be used in conjunction with the provisions for reductions in buffer widths. Wetland buffer width averaging shall be allowed to improve wetland protection only where a qualified wetlands professional demonstrates all of the following:

1. The wetland has significant differences in characteristics that affect its habitat functions, such as a wetland with a forested component adjacent to a degraded emergent component or a “dual-rated” wetland with a category I area adjacent to a lower rated area;

2. The buffer is increased adjacent to the higher functioning area of habitat or more sensitive portion of the wetland and decreased adjacent to the lower functioning or less sensitive portion;
3. The total area contained in the buffer area after averaging is not less than that which would be contained within the standard buffer; and
4. The buffer at its narrowest point is never less than three-fourths of the required width.

Under TMC Chapter 16.28.170---*Wetland buffers*, Subsection (F), averaging to allow reasonable use of a parcel may be permitted when all of the following are met:

1. There are no feasible alternatives to the site design that could be accomplished without buffer averaging;
2. The averaged buffer will not result in degradation of the wetland's functions and values as demonstrated in the critical area report;
3. The total buffer area after averaging is equal to the area required without averaging; and
4. The buffer at its narrowest point is never less than three-fourths of the required width.

4.4 Stormwater in Buffers

Under TMC 16.28.170--*Wetland buffers*, Subsection (H)---*Permitted Uses in a Wetland Buffer Zone*, surface level stormwater management facilities may be allowed in the outer twenty-five percent (25%) of the wetland buffer using best management practices; provided the community development director makes all of the following determinations:

a. No other location is feasible.
b. The location of such facilities will not degrade the functions or values of the wetland.

5.0 PROPOSED LAND USE

No land use is proposed at this time.

Recommendations include:

- Buffer reduction from one hundred fifty (150) feet to one hundred ten (110) feet with mitigation measures under TMC Chapter 16.28.170---*Wetland buffers*, Subsection (C)---*Buffer Width Reduction.*
- Stormwater management facilities can be located within the outer twenty-five percent (25%) of the wetland buffer. The lowest portion of the subject property.

6.0 CONCLUSION

No wetlands or streams have been identified on the subject property during this study. One (1) off-site wetland, labeled Wetland A, has been identified near the southern subject property boundary (**Figures 2 & 3**).

Wetland A has not been delineated because it is located offsite. Permission was not obtained to delineate off-site wetlands. The off-site Wetland A is located fifty-eight (58) feet south of the subject property. No streams were identified onsite or within three hundred (300) feet of the subject property.

Wetland A is a shallow depression that holds water during the wet season (**Figures 2 & 3**). The Cowardin classification is Palustrine Scrub-shrub Seasonally Flooded (PSSC). The Department of Ecology (DOE; 2014) Wetland Rating System describes vegetation classes and hydroperiods as scrub-shrub and seasonally flooded, respectively.

Wetland A has been classified as a Category III wetland using the DOE (2014) Wetland Rating Form for Western Washington as required under Thurston County Code (TCC) Chapter 24.30.030---*Wetland categories*. The HGM class is depressional under the DOE (2014) Wetland Rating System.

Under Tumwater Municipal Code, Chapter 16.28.170 --- *Wetland buffers*, wetland buffers are calculated based on the habitat score determined by the DOE (2014) Wetland Rating System. The Habitat Functions score for Wetland A is "Low (L)" potential to provide habitat, "Medium (M)" landscape potential to support habitat, and "Medium (M)" potential value to society. Wetlands that rate as L, M, M (order of ratings are not important) for habitat receive a score of five (5) points for total habitat functions.

The standard buffer for wetlands that score five (5) points for Habitat Functions provided by the rating of L, M, M require a standard buffer width of one hundred fifty (150) feet (TMC 16.28.080---*Wetland buffers*) (**Figures 4 & 5**).

Recommendations include:

- Buffer reduction from one hundred fifty (150) feet to one hundred ten (110) feet with mitigation measures under TMC Chapter 16.28.170---*Wetland buffers*, Subsection (C)---*Buffer Width Reduction.*
- Stormwater management facilities can be located within the outer twenty-five percent (25%) of the wetland buffer. The lowest portion of the subject property.

7.0 REFERENCES

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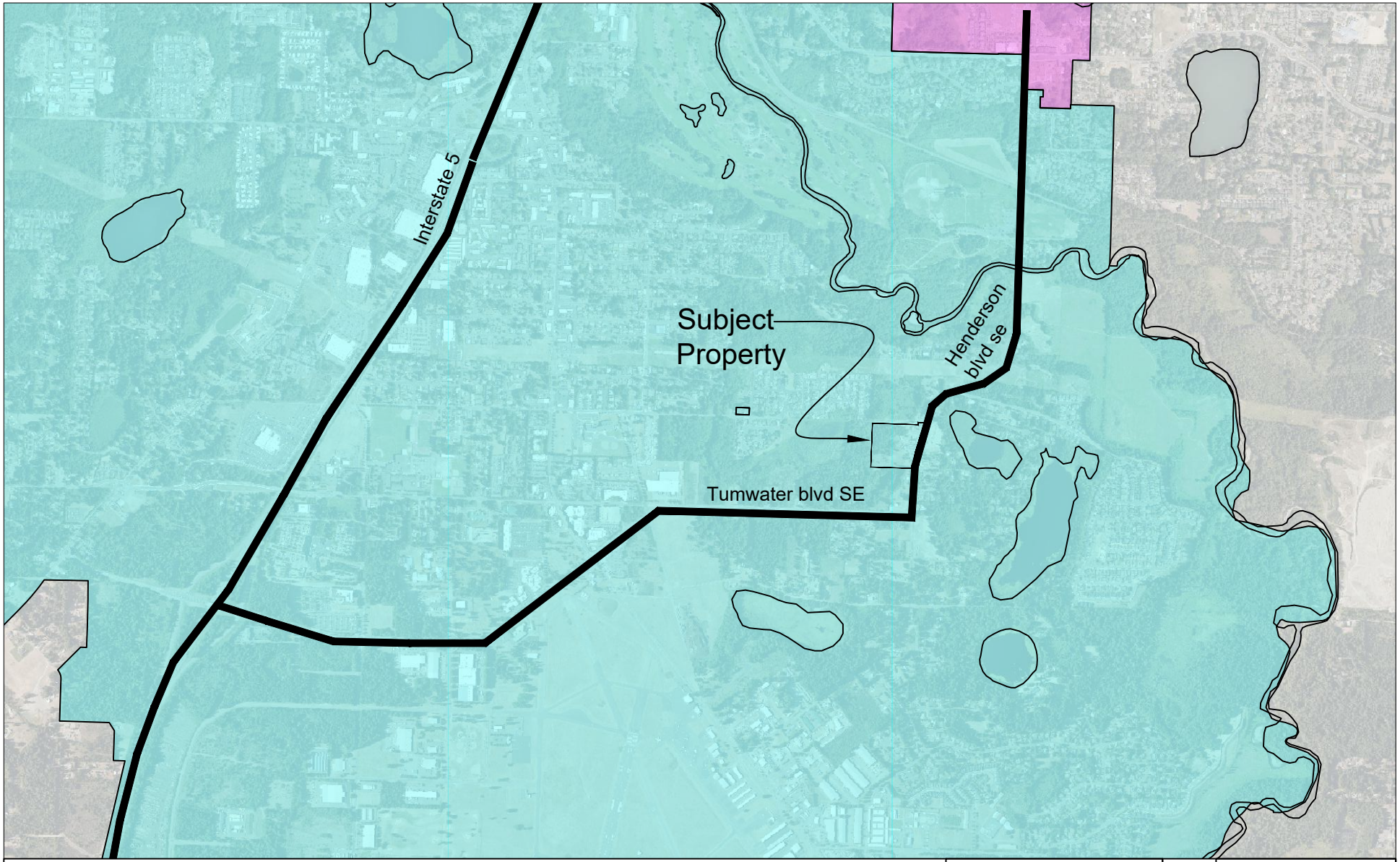
FIGURES



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City of Tumwater
City of Olympia

Figure 1

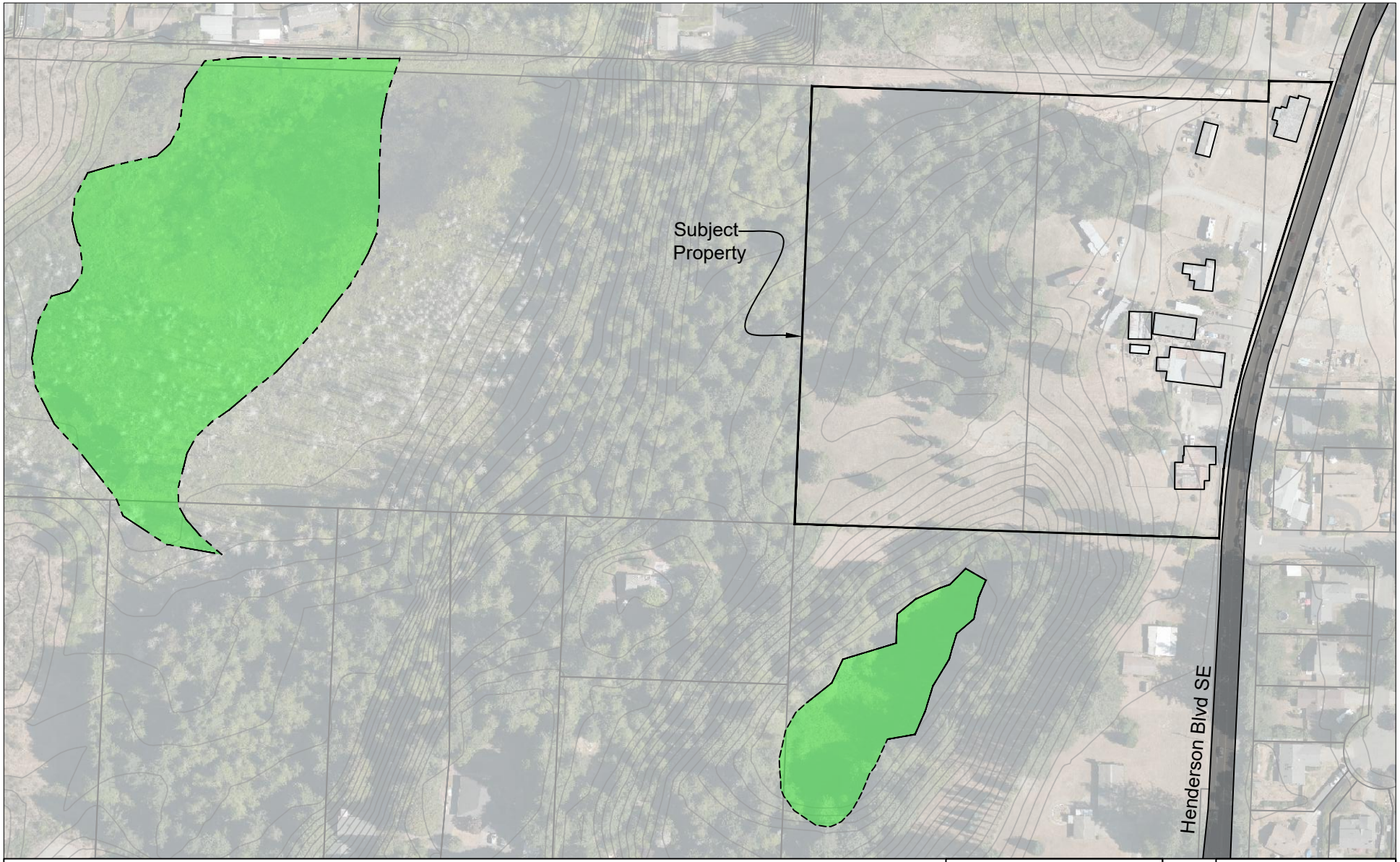
Henderson Property

Vicinity Map

Scale: 1" = 2000'

0 2000'

15 September 2021



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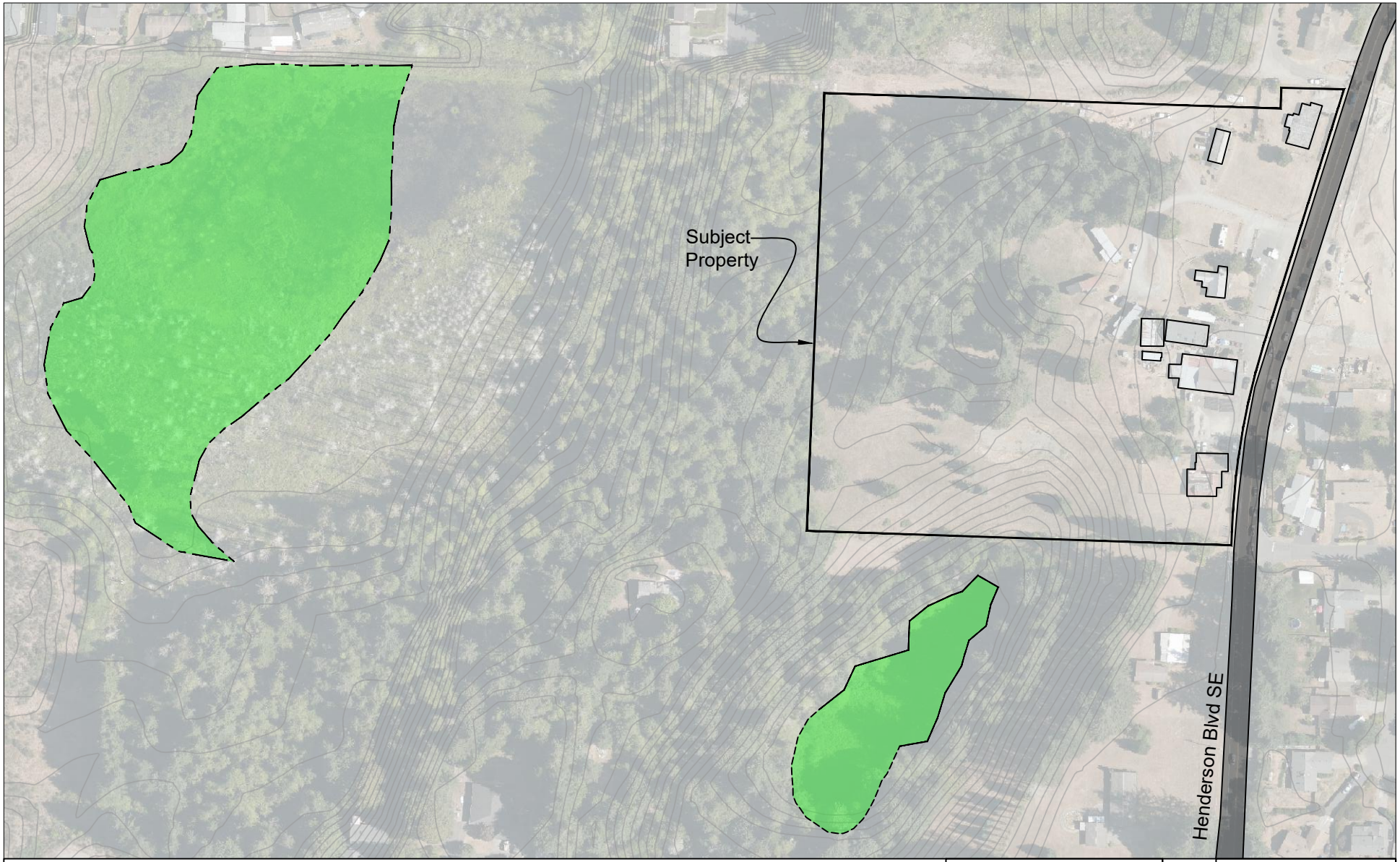
Wetland (Verified)
Wetland (Potential)
Wetland (Thurston Co. Geodata)

Figure 2
Henderson Property
Existing Conditions

N

Scale: 1" = 200'
0 200'

15 September 2021



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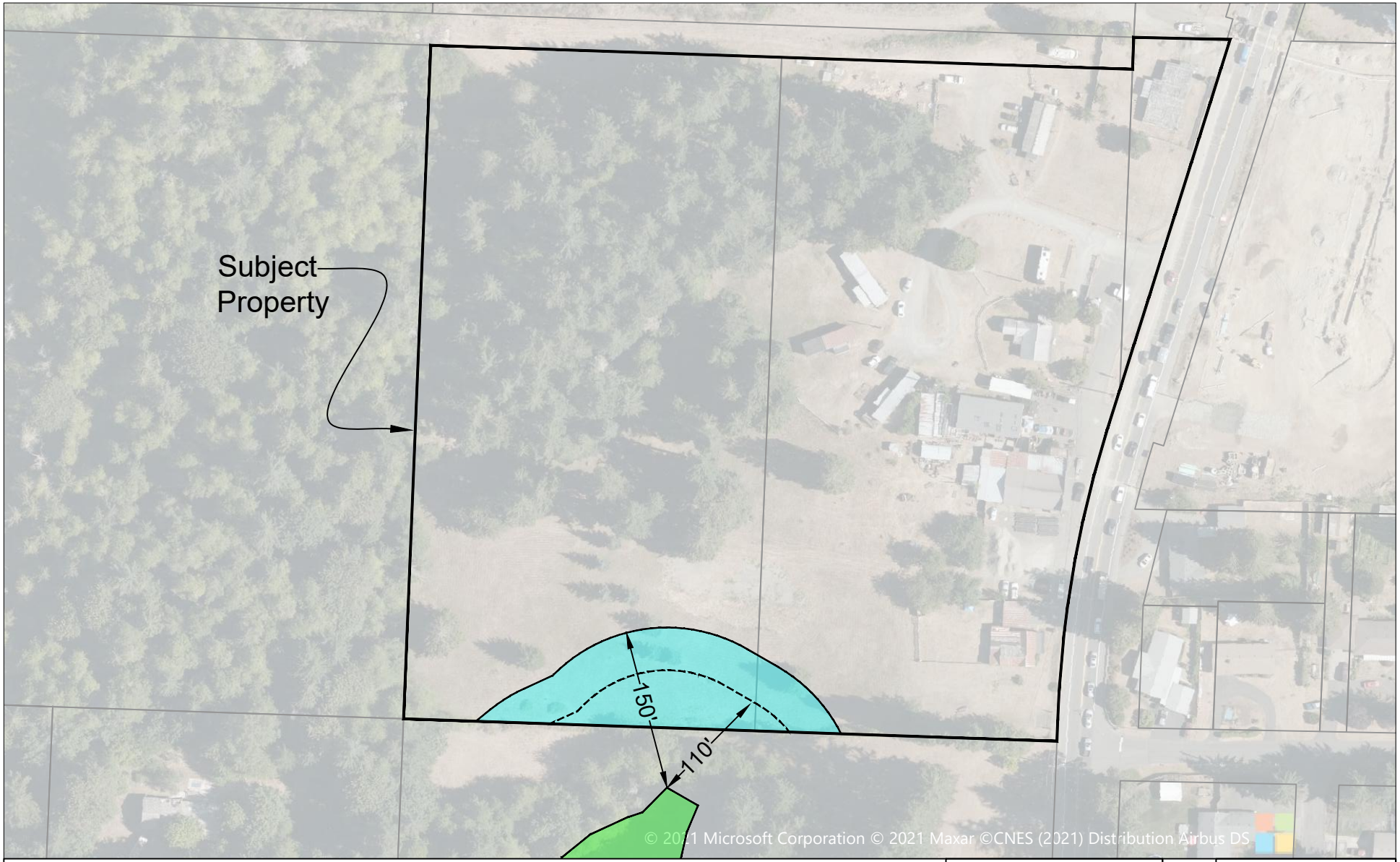
Wetland (Verified)
Wetland (Potential)
Wetland (Thurston Co. Geodata)

Figure 3
Henderson Property
Existing Conditions

N

Scale: 1" = 200'
0 200'

15 September 2021



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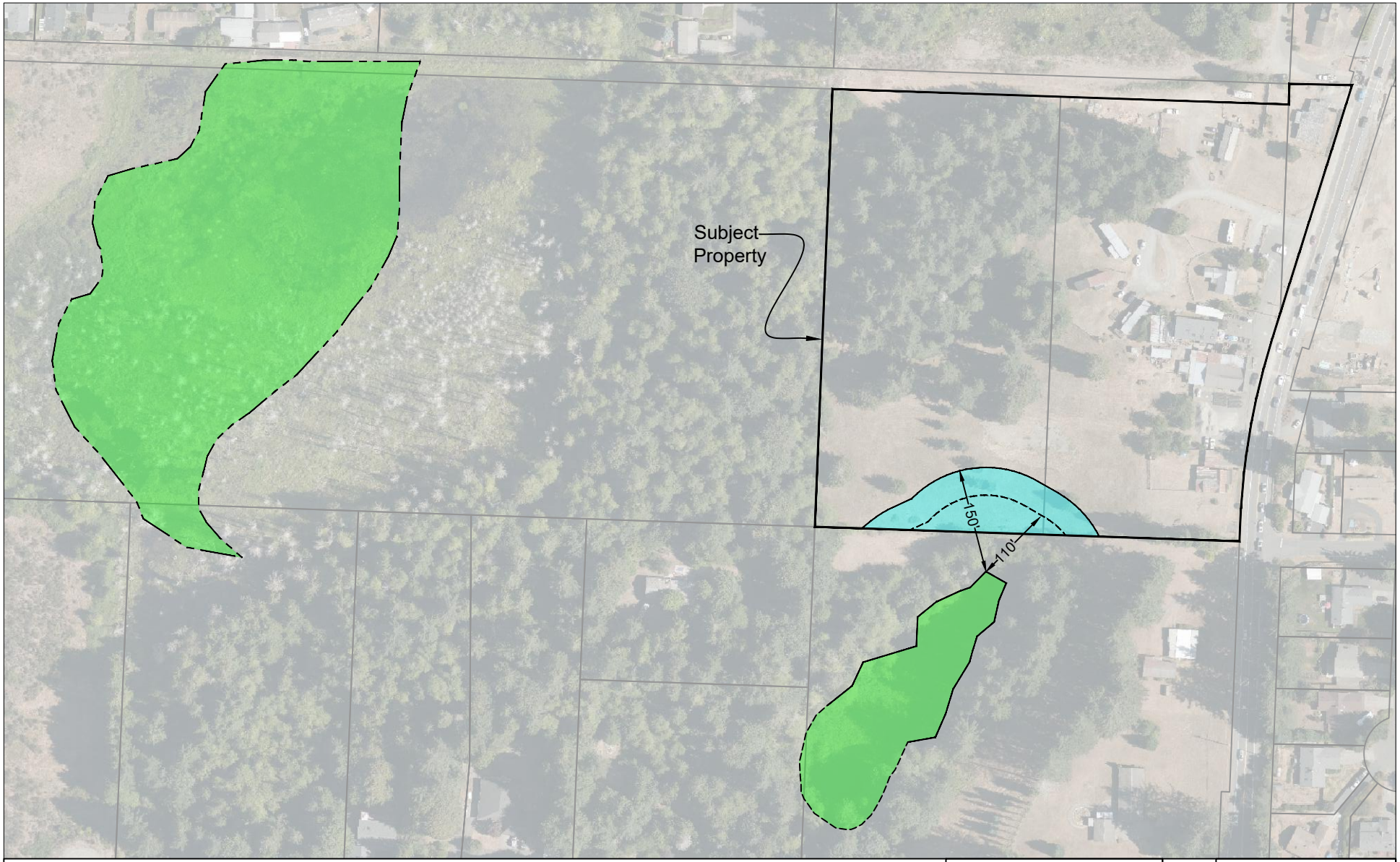
Wetland (Verified)
Wetland (Potential)
Wetland (Thurston Co. Geodata)
Wetland Buffers (150 feet)
Reducred Wetland Buffer (110 feet)

Figure 4
Henderson Property
Critical Areas Buffers

N

Scale: 1" = 130'
0 130'

15 September 2021



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Wetland (Verified)
Wetland (Potential)
Wetland (Thurston Co. Geodata)
Wetland Buffers (150 feet)

Figure 5

Henderson Property

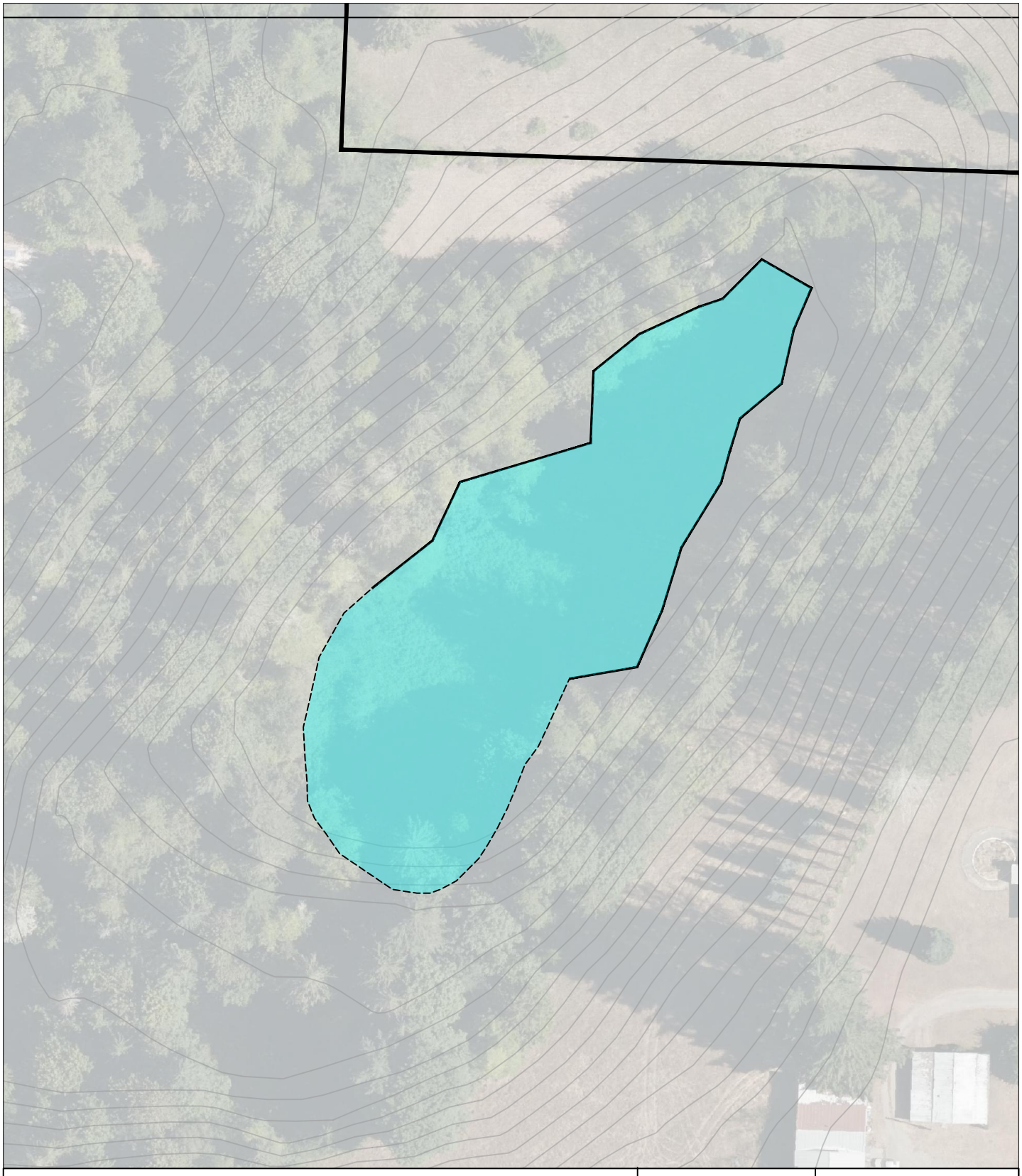
Critical Areas Buffers

N

Scale: 1" = 200'

0 200'

15 September 2021



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Scrub-shrub Seasonally-flooded

Figure 6

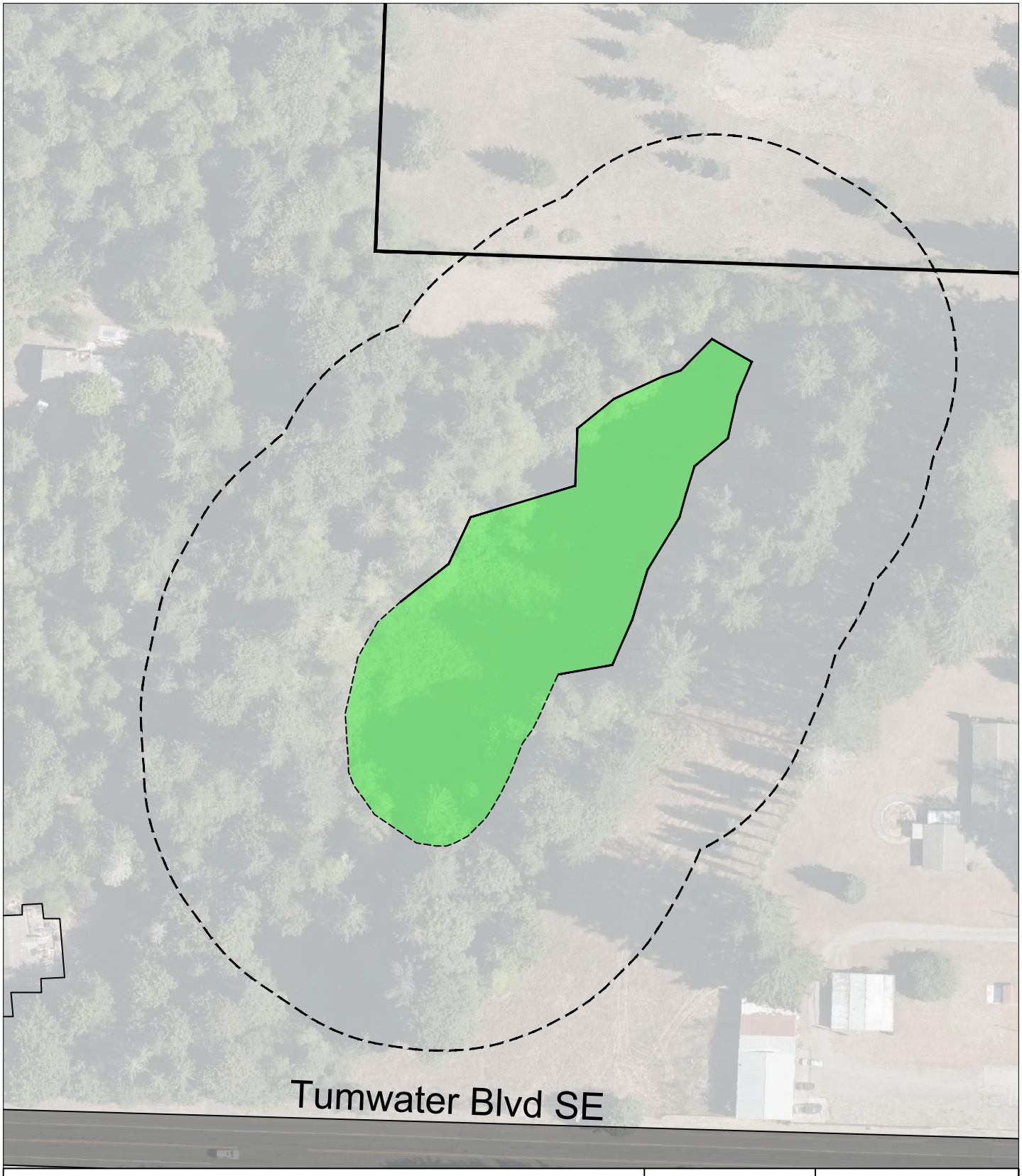
Henderson Property

Vegetation Classes & Hydroperiods

Scale: 1"= 80'

0 80'

15 September 2021



EnviroVector
OPTIMIZE USABLE LAND
curtis@envirovector.com
www.envirovector.com
360-790-1559

Potential Pollutants (0%)
150 ft Polygon (267916 sf)
Potential Pollutants (0 sf)
150-foot Polygon

Figure 7

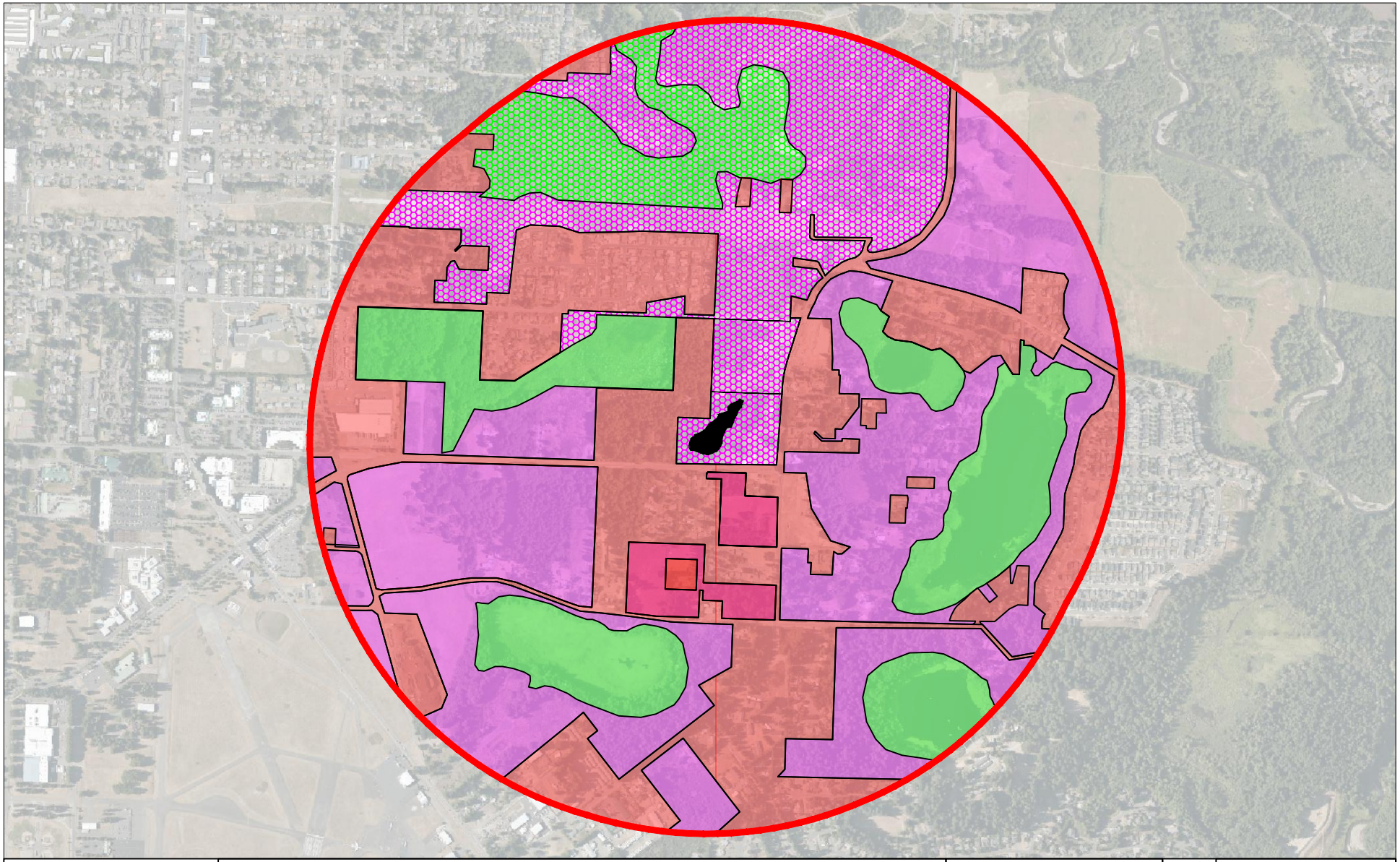
Henderson Property

Potential Pollutants within 150 ft of wetland

Scale: 1"= 100'

0 100'

15 September 2021



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360-790-1559

Figure 8

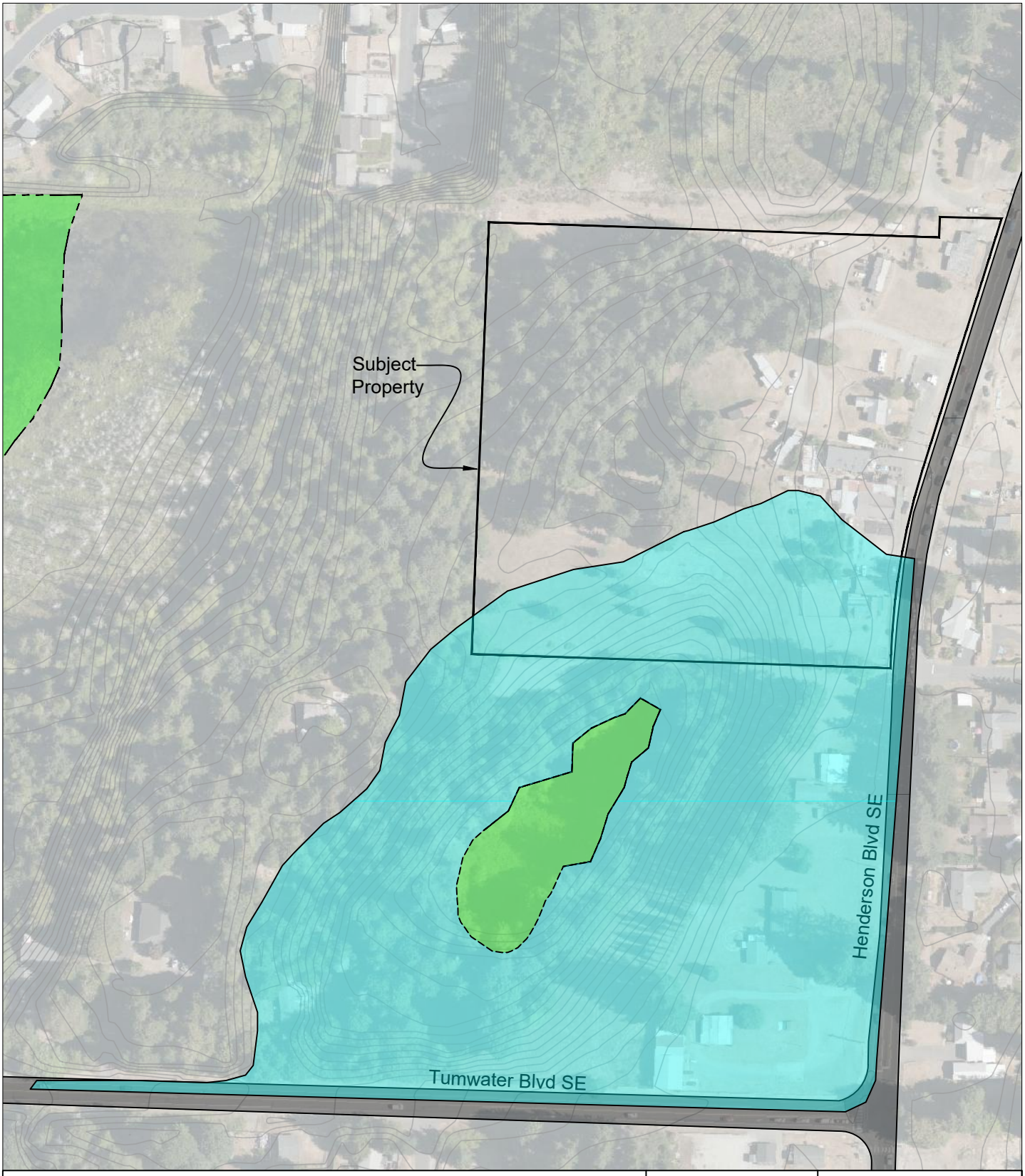
Henderson Property

1 KM Polygon

Scale: 1" = 1200'

0 1200'

15 September 2021



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Contributing Basin
<10x Wetlands A

Figure 9

Henderson
Property

Contributing Basin

Scale: 1"= 200'

0 200'

15 September 2021

APPENDIX A

Photographs

Subject Property and Vicinity

Photo 1. Western portion of subject property

Photo 2. Grassland on subject property

Photo 3. Area of bracken fern

Photo 4. Maintain grass lawn on subject property

Photo 5. Frontage of subject proeprty

Photo 6. Maintained lawn and fences on subject property

Photo 7. Internal roads on eastern portion of property

Photo 8. Eastern portion of subject property

Photo 9. Development east of subject property

Photo 10. Development occurring east of subject property

Wetland A

Photo 11. Skunk cabbage (OBL) in Wetland A

Photo 12. Water Parsley (OBL) in Wetland A

Photo 13. Wetland vegetation

Photo 14. Slough sedge (OBL) within wetland

Photo 15. Upland buffer area

Photo 16. Bare ground and hydric soil


Photo 17. Water parsley (OBL) and bare ground in wetland


Photo 18. Bare ground and hydric soil


Photo 19. Douglas spirea (FACW) & pacific crabapple (FACW)


Photo 20. Water parsley (OBL) and pacific crabapple (FACW)

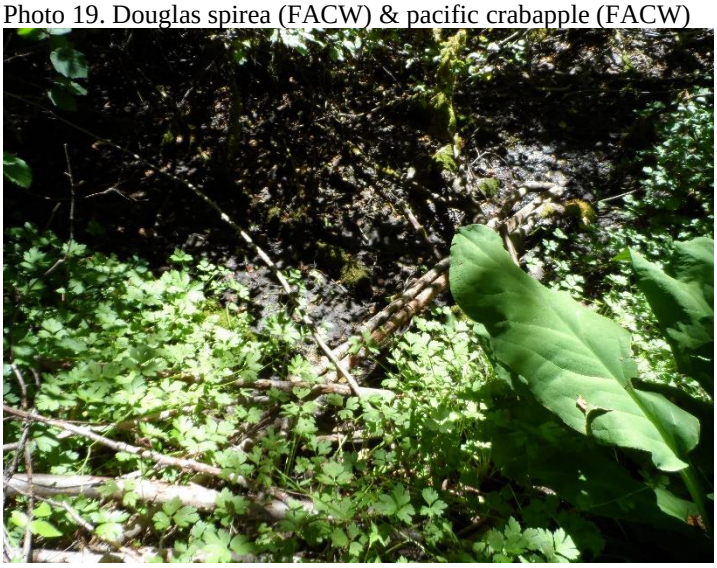
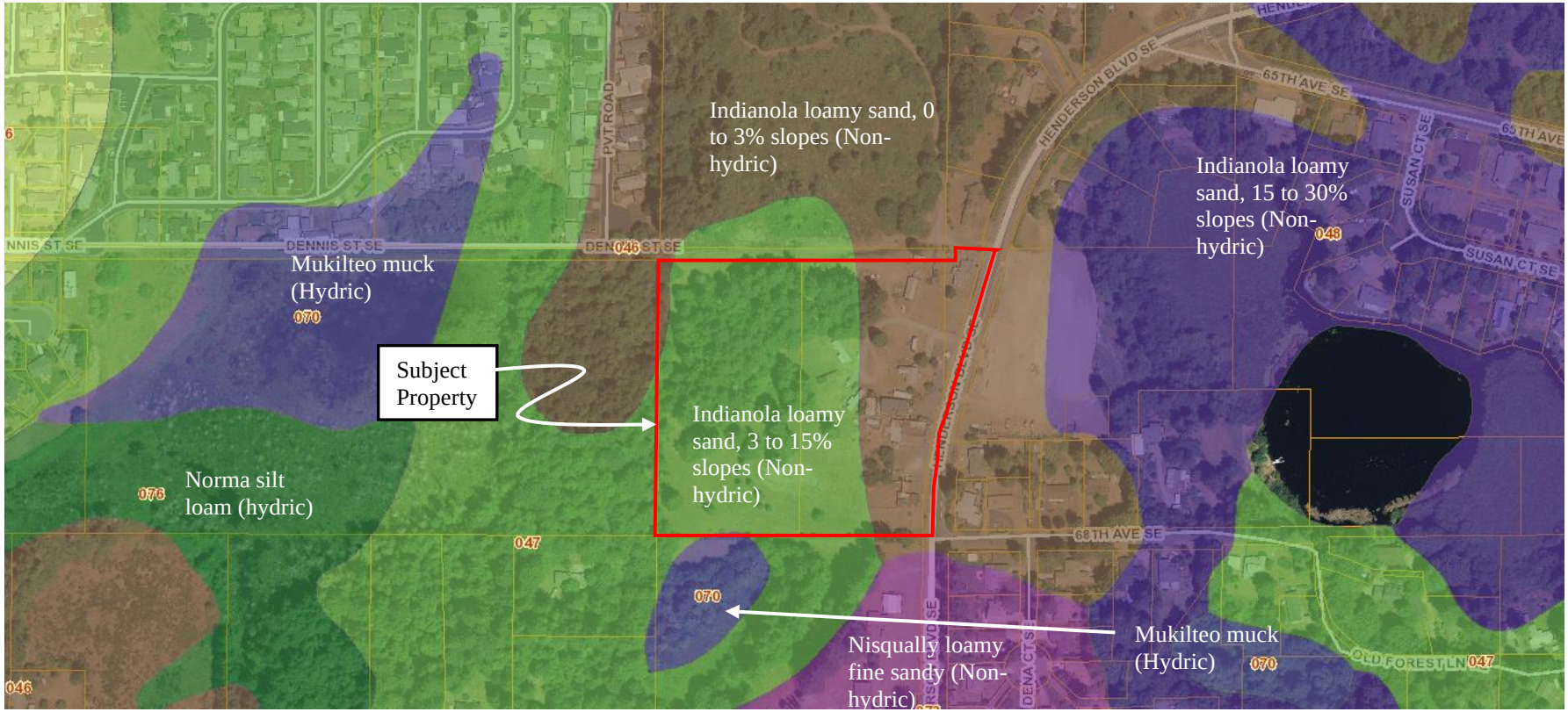


Photo 21. Creeping Buttercup (FAC) & skunk cabbage (OBL)

APPENDIX B

Thurston County Geodata

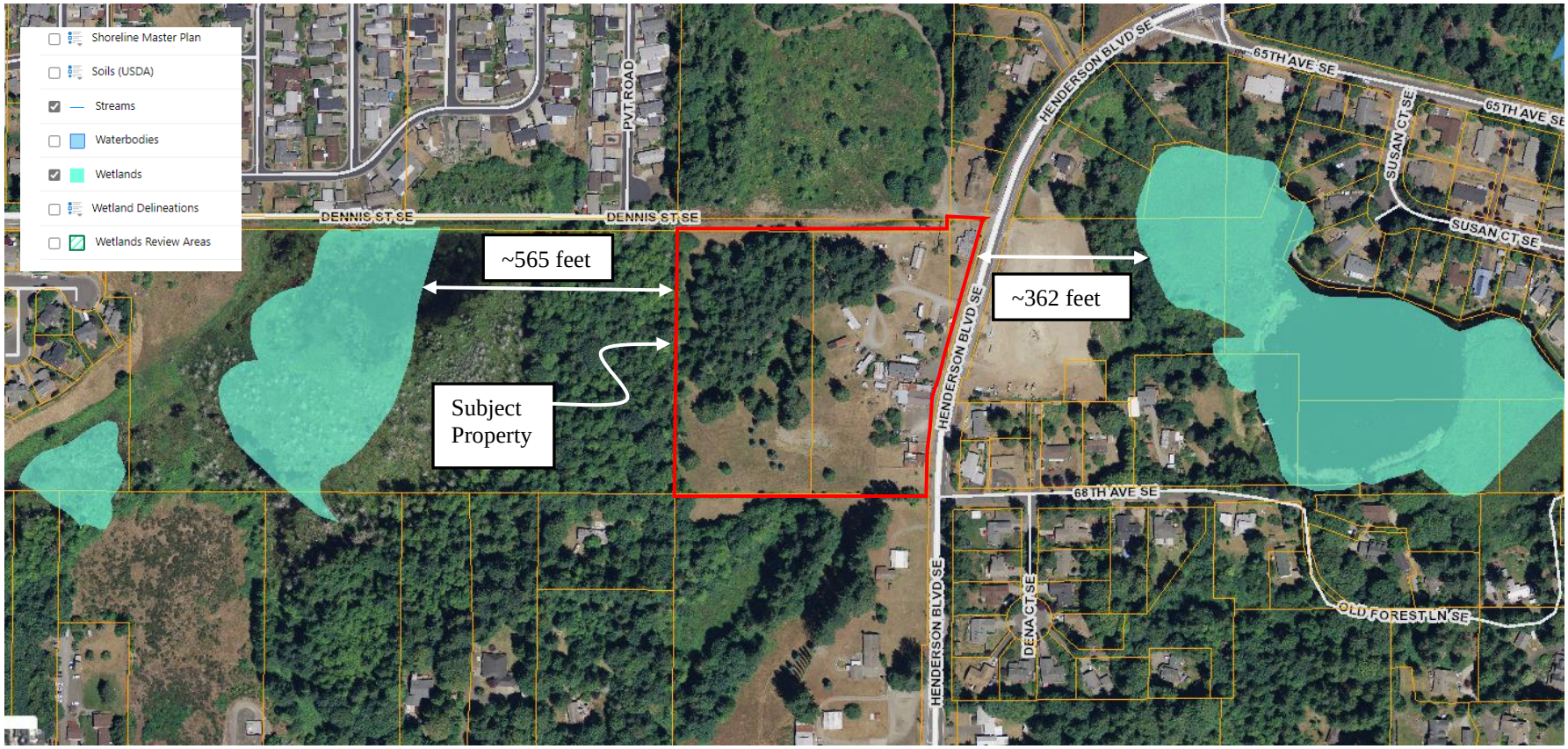
Soils


Indianola loamy sand, 0 to 3% slopes (Non-hydric)
Indianola loamy sand, 15 to 30% slopes (Non-hydric)
Mukilteo muck (Hydric)
Subject Property
Indianola loamy sand, 3 to 15% slopes (Non-hydric)
Norma silt loam (hydric)
Nisqually loamy fine sandy (Non-hydric)
Mukilteo muck (Hydric)
DENNIS ST SE
PVT ROAD
HENDERSON BLVD SE
65TH AVE SE
SUSAN CT SE
68TH AVE SE
OLD FOREST LN
070
076
047
046
048

APPENDIX C

Thurston County Geodata

Wetlands & Streams

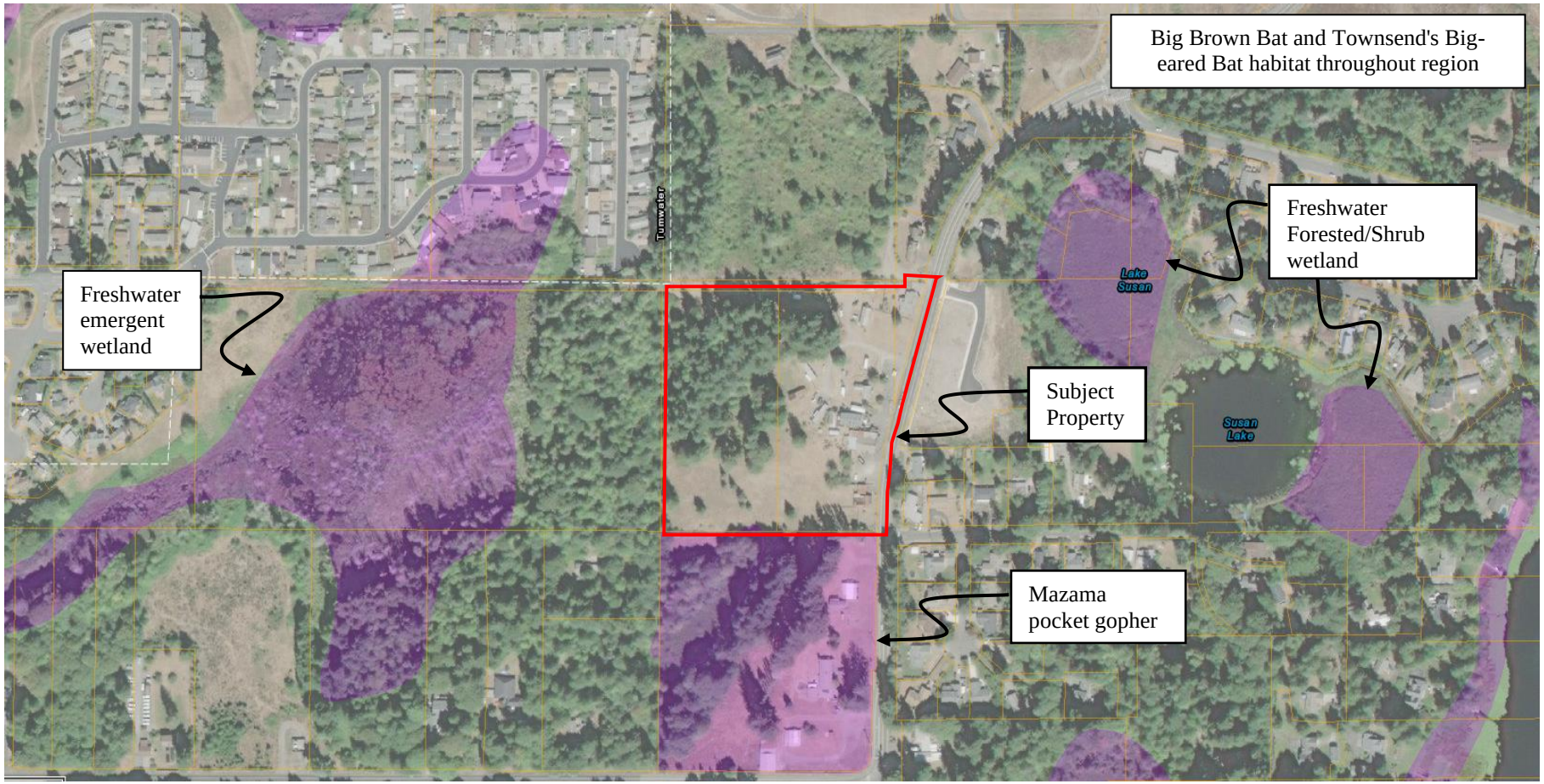

Shoreline Master Plan
Soils (USDA)
Streams
Waterbodies
Wetlands
Wetland Delineations
Wetlands Review Areas
DENNIS ST SE
DENNIS ST SE
PVT ROAD
HENDERSON BLVD SE
65TH AVE SE
65TH AVE SE
SUSAN CT SE
SUSAN CT SE
~565 feet
~362 feet
Subject Property
HENDERSON BLVD SE
68TH AVE SE
HENDERSON BLVD SE
DENA CT SE
OLD FOREST LN SE

APPENDIX D

Washington Department of Fish and Wildlife (WDFW)

Priority Habitats and Species (PHS)

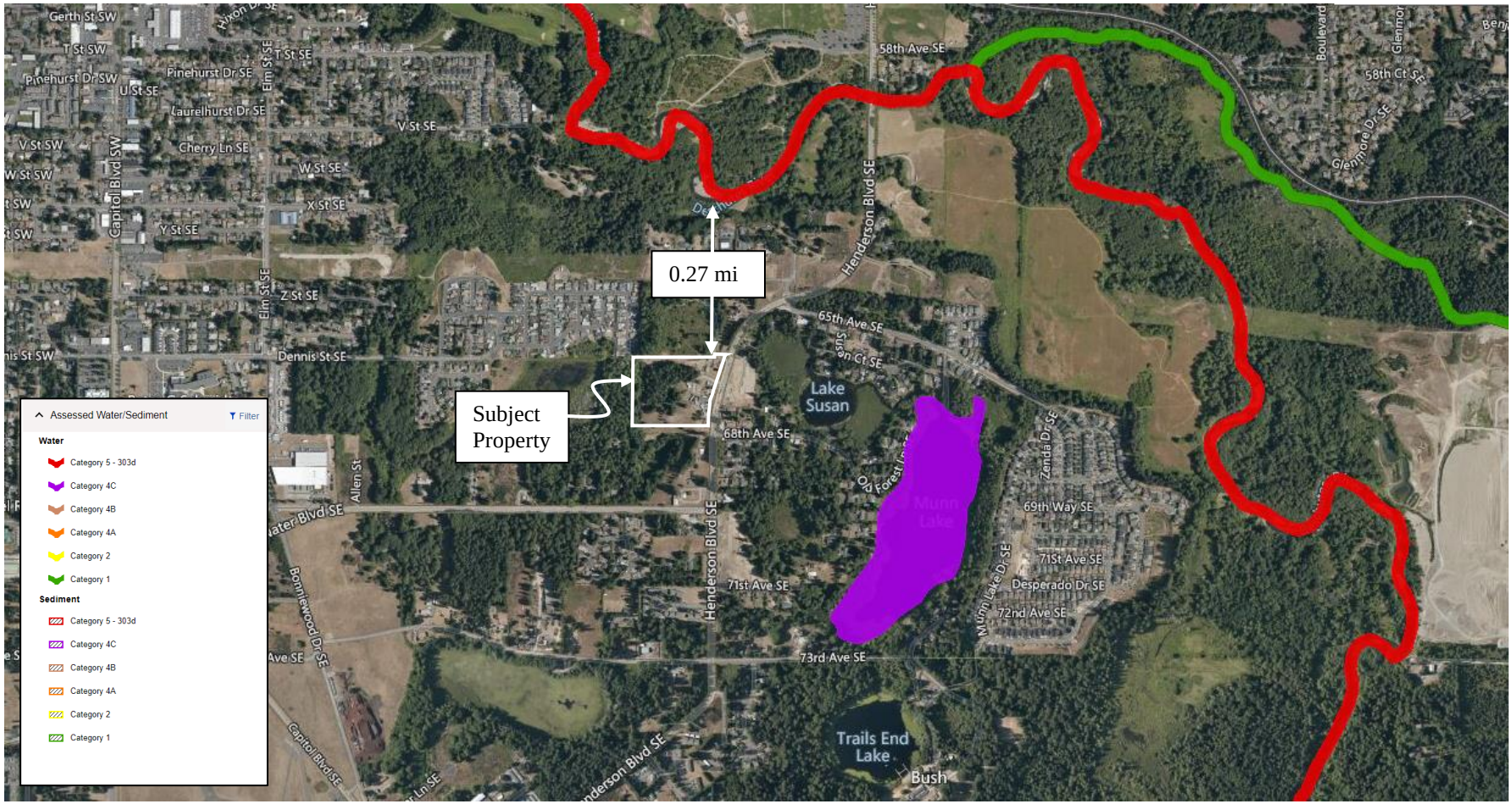
Database


Big Brown Bat and Townsend's Big-eared Bat habitat throughout region
Freshwater Forested/Shrub wetland
Freshwater emergent wetland
Subject Property
Mazama pocket gopher
Lake Susan
Susan Lake
Tumwater

APPENDIX E

Clean Water Act

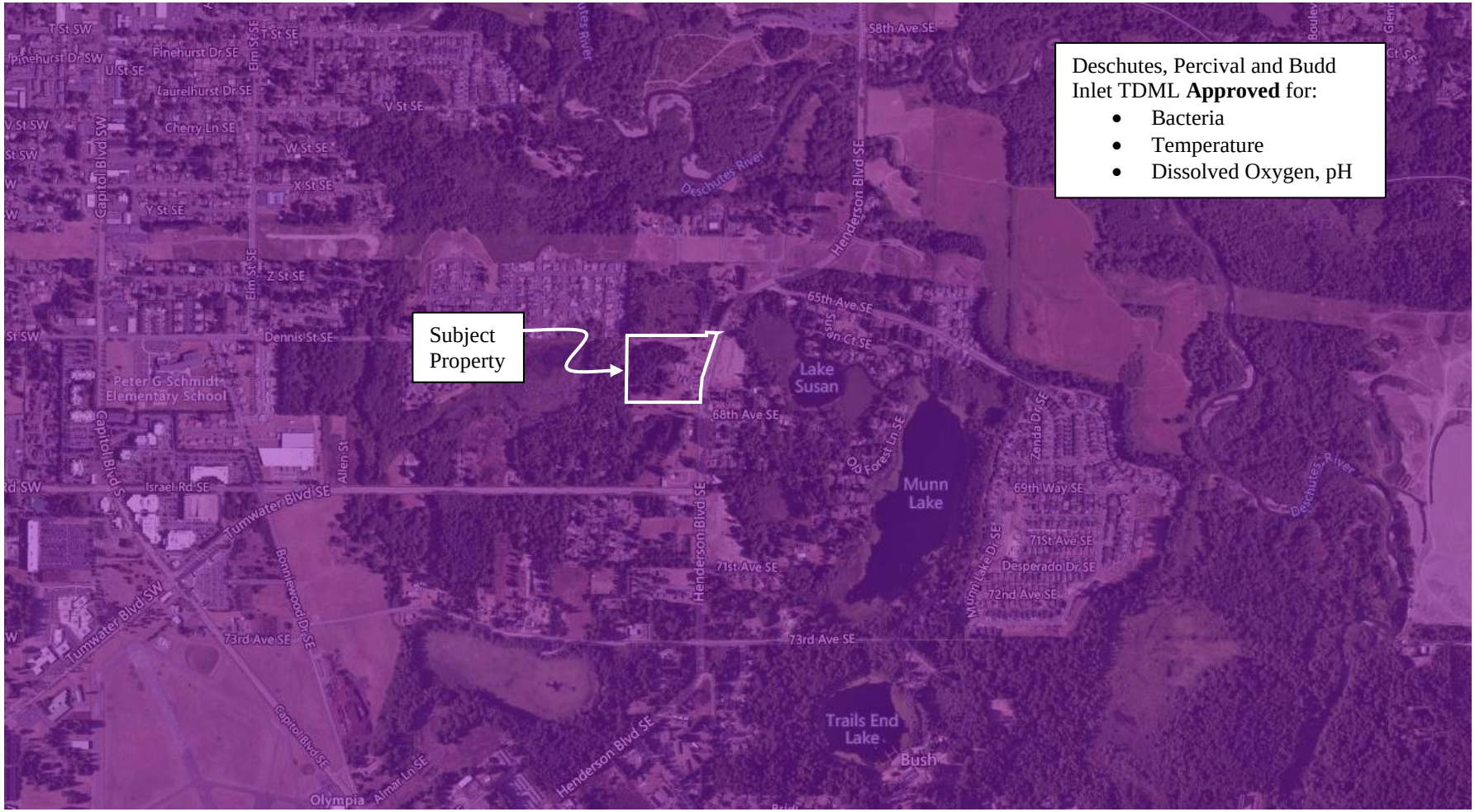
303(d) List


0.27 mi
Subject Property
Assessed Water/Sediment
Filter
Water
Category 5 - 303d
Category 4C
Category 4B
Category 4A
Category 2
Category 1
Sediment
Category 5 - 303d
Category 4C
Category 4B
Category 4A
Category 2
Category 1
Lake Susan
Munn Lake
Trails End Lake
Bush
Henderson Blvd SE
58th Ave SE
65th Ave SE
68th Ave SE
69th Way SE
71st Ave SE
72nd Ave SE
73rd Ave SE
Desperado Dr SE
Zenda Dr SE
Dennis St SE
Pinehurst Dr SE
Laurelhurst Dr SE
Cherry Ln SE
Capitol Blvd SW
Elm St SE
Allen St
Bonniewood Dr SE
Capitol Blvd SE
Glenmore Dr SE
58th Ct SE

APPENDIX F

Total Maximum Daily Load

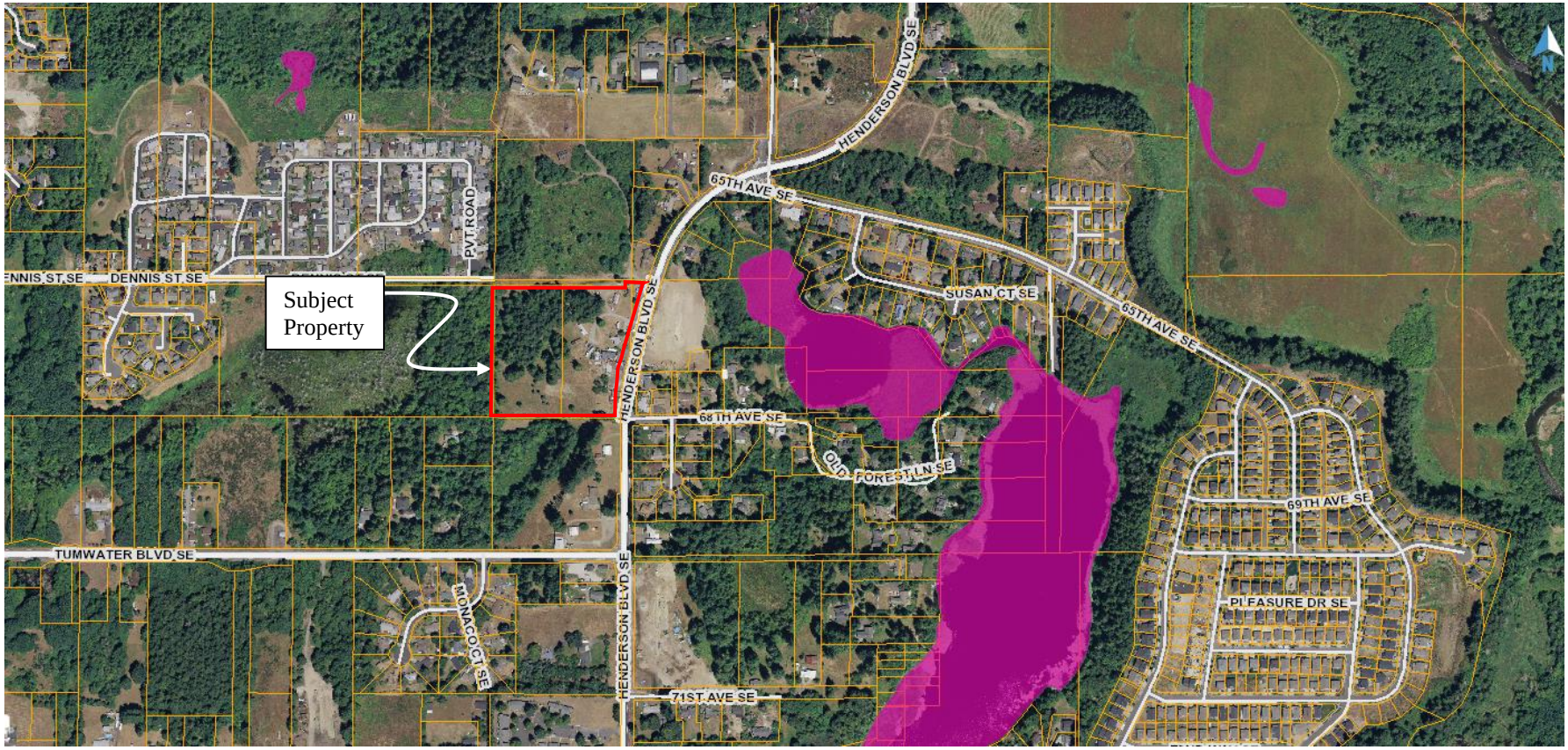
(TMDL)


Deschutes, Percival and Budd Inlet TDML **Approved** for:
• Bacteria
• Temperature
• Dissolved Oxygen, pH
Subject Property
Lake Susan
Munn Lake
Trails End Lake
Bush
Peter G Schmidt Elementary School
Pinehurst Dr SE
Laurelhurst Dr SE
Cherry Ln SE
V St SE
W St SE
X St SE
Y St SE
Z St SE
Dennis St SE
Israel Rd SE
Turnwater Blvd SE
Turnwater Blvd SW
Capitol Blvd SW
Capitol Blvd SE
Elm St SE
Allen St
Bonniewood Dr SE
Henderson Blvd SE
Deschutes River
58th Ave SE
65th Ave SE
68th Ave SE
71st Ave SE
72nd Ave SE
73rd Ave SE
69th Way SE
Old Forest Ln SE
Zenda Dr SE
Munn Lake Dr SE
Desperado Dr SE
Olympia
Almar Ln SE

APPENDIX G

Thurston County Geodata

High Groundwater Hazard Area

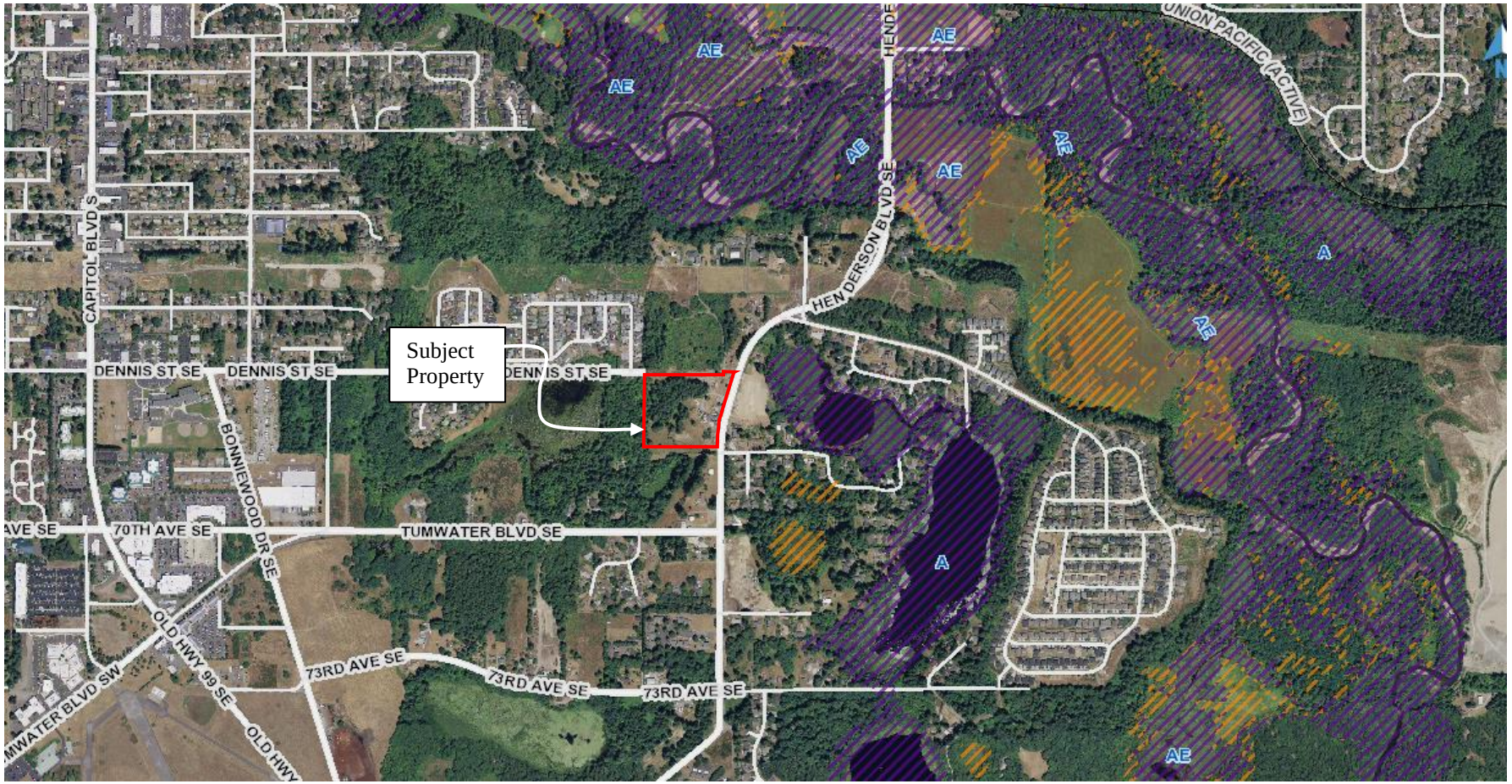


High Groundwater Hazard Areas

High Groundwater Hazard Area

APPENDIX H

FEMA Floodplain


Subject Property
AE
A
CAPITOL BLVD S
DENNIS ST SE
BONNIEWOOD DR SE
70TH AVE SE
TUMWATER BLVD SE
73RD AVE SE
OLD HWY 99 SE
HENDERSON BLVD SE
UNION PACIFIC (ACTIVE)

APPENDIX I

Wetland Rating Forms

Item 2a. Wetland name or number

RATING SUMMARY – Western Washington

Name of wetland (or ID #): Wetland A Date of site visit: 7-Jul-21

Rated by Curtis Wambach Trained by Ecology? ☑ Yes ☐ No Date of training Continual

HGM Class used for rating Depressional & Flats Wetland has multiple HGM classes? ☐ Yes ☑ No

NOTE: Form is not complete with out the figures requested (*figures can be combined*).
Source of base aerial photo/map Google Earth

OVERALL WETLAND CATEGORY III (based on functions ☐ or special characteristics ☐)

1. Category of wetland based on FUNCTIONS

_____ **Category I** - Total score = 23 - 27
_____ **Category II** - Total score = 20 - 22
X **Category III** - Total score = 16 - 19
_____ **Category IV** - Total score = 9 - 15

FUNCTION	Improving Water Quality	Hydrologic	Habitat	
		List appropriate rating (H, M, L)		
Site Potential	M	M	L	
Landscape Potential	M	M	M	
Value	H	L	M	**Total**
Score Based on Ratings	7	5	5	**17**

Score for each function based on three ratings (*order of ratings is not important*)

9 = H, H, H
8 = H, H, M
7 = H, H, L
7 = H, M, M
6 = H, M, L
6 = M, M, M
5 = H, L, L
5 = M, M, L
4 = M, L, L
3 = L, L, L

2. Category based on SPECIAL CHARACTERISTICS of wetland

CHARACTERISTIC	Category
Estuarine	
Wetland of High Conservation Value	
Bog	
Mature Forest	
Old Growth Forest	
Coastal Lagoon	
Interdunal	
None of the above	

Maps and Figures required to answer questions correctly for Western Washington

Depressional Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	D 1.3, H 1.1, H 1.4	
Hydroperiods	D 1.4, H 1.2	
Location of outlet (*can be added to map of hydroperiods*)	D 1.1, D 4.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	D 2.2, D 5.2	
Map of the contributing basin	D 4.3, D 5.3	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	D 3.1, D 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	D 3.3	

Riverine Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Ponded depressions	R 1.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	R 2.4	
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	
Width of unit vs. width of stream (*can be added to another figure*)	R 4.1	
Map of the contributing basin	R 2.2, R 2.3, R 5.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	R 3.1	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	R 3.2, R 3.3	

Lake Fringe Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	L 1.1, L 4.1, H 1.1, H 1.4	
Plant cover of trees, shrubs, and herbaceous plants	L 1.2	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	L 2.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	L 3.1, L 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	L 3.3	

Slope Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Plant cover of **dense** trees, shrubs, and herbaceous plants	S 1.3	
Plant cover of **dense, rigid** trees, shrubs, and herbaceous plants (*can be added to another figure*)	S 4.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	S 2.1, S 5.1	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	S 3.1, S 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	S 3.3	

HGM Classification of Wetland in Western Washington

For questions 1 -7, the criteria described must apply to the entire unit being rated.
If hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1 - 7 apply, and go to Question 8.

1. Are the water levels in the entire unit usually controlled by tides except during floods?

☐ NO - go to 2 ☐ **YES** - the wetland class is **Tidal Fringe** - go to 1.1

1.1 Is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)?

☐ **NO - Saltwater Tidal Fringe (Estuarine)** ☐ **YES - Freshwater Tidal Fringe**
*If your wetland can be classified as a Freshwater Tidal Fringe use the forms for **Riverine** wetlands. If it is Saltwater Tidal Fringe it is an **Estuarine** wetland and is not scored. This method **cannot** be used to score functions for estuarine wetlands.*

2. The entire wetland unit is flat and precipitation is the only source (>90%) of water to it. Groundwater and surface water runoff are NOT sources of water to the unit.

☐ NO - go to 3 ☐ **YES** - The wetland class is **Flats**
*If your wetland can be classified as a Flats wetland, use the form for **Depressional** wetlands.*

3. Does the entire wetland unit **meet all** of the following criteria?
☐ The vegetated part of the wetland is on the shores of a body of permanent open water (without any plants on the surface at any time of the year) at least 20 ac (8 ha) in size;
☐ At least 30% of the open water area is deeper than 6.6 ft (2 m).

☐ NO - go to 4 ☐ **YES** - The wetland class is **Lake Fringe** (Lacustrine Fringe)

4. Does the entire wetland unit **meet all** of the following criteria?
☐ The wetland is on a slope (*slope can be very gradual*),
☐ The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks.
☐ The water leaves the wetland **without being impounded.**

☐ NO - go to 5 ☐ **YES** - The wetland class is **Slope**

NOTE: Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3 ft diameter and less than 1 ft deep).

5. Does the entire wetland unit **meet all** of the following criteria?
☐ The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river,
☐ The overbank flooding occurs at least once every 2 years.

☐ NO - go to 6 ☐ **YES** - The wetland class is **Riverine**

NOTE: The Riverine unit can contain depressions that are filled with water when the river is not flooding.

6. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time during the year? *This means that any outlet, if present, is higher than the interior of the wetland.*

☐ NO - go to 7 ☐ **YES** - The wetland class is **Depressional**

7. Is the entire wetland unit located in a very flat area with no obvious depression and no overbank flooding? The unit does not pond surface water more than a few inches. The unit seems to be maintained by high groundwater in the area. The wetland may be ditched, but has no obvious natural outlet.

☐ NO - go to 8 ☐ **YES** - The wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a Depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within the wetland unit being scored.

NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the HGM class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM classes within the wetland unit being rated	HGM class to use in rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake Fringe	Lake Fringe
Depressional + Riverine along stream within boundary of depression	Depressional
Depressional + Lake Fringe	Depressional
Riverine + Lake Fringe	Riverine
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE

If you are still unable to determine which of the above criteria apply to your wetland, or if you have ***more than 2 HGM classes*** *within a wetland boundary, classify the wetland as Depressional for the rating.*

NOTES and FIELD OBSERVATIONS:

Item 2a. Wetland name or number

DEPRESSIONAL AND FLATS WETLANDS

Water Quality Functions - Indicators that the site functions to improve water quality

D 1.0. Does the site have the potential to improve water quality?		
D 1.1. Characteristics of surface water outflows from the wetland: Wetland is a depression or flat depression (QUESTION 7 on key) with no surface water leaving it (no outlet). Wetland has an intermittently flowing stream or ditch, OR highly constricted permanently flowing outlet. ☐ Wetland has an unconstricted, or slightly constricted, surface outlet that is permanently flowing ☐ Wetland is a flat depression (QUESTION 7 on key), whose outlet is a permanently flowing ditch.	points = 3 points = 2 points = 1 points = 1	3
D 1.2. The soil 2 in below the surface (or duff layer) is true clay or true organic (*use NRCS definitions*).	Yes = 4 No = 0	0
D 1.3. Characteristics and distribution of persistent plants (Emergent, Scrub-shrub, and/or Forested Cowardin classes): Wetland has persistent, ungrazed, plants > 95% of area Wetland has persistent, ungrazed, plants > ½ of area Wetland has persistent, ungrazed plants > $^1/_{10}$ of area Wetland has persistent, ungrazed plants < $^1/_{10}$ of area	points = 5 points = 3 points = 1 points = 0	5
D 1.4. Characteristics of seasonal ponding or inundation: *This is the area that is ponded for at least 2 months. See description in manual.* Area seasonally ponded is > ½ total area of wetland Area seasonally ponded is > ¼ total area of wetland Area seasonally ponded is < ¼ total area of wetland	points = 4 points = 2 points = 0	2
Total for D 1	Add the points in the boxes above	**10**

Rating of Site Potential If score is: ☐ **12 - 16 = H** ☑ **6 - 11 = M** ☐ **0 - 5 = L** *Record the rating on the first page*

D 2.0. Does the landscape have the potential to support the water quality function of the site?		
D 2.1. Does the wetland unit receive stormwater discharges?	Yes = 1 No = 0	1
D 2.2. Is > 10% of the area within 150 ft of the wetland in land uses that generate pollutants?	Yes = 1 No = 0	0
D 2.3. Are there septic systems within 250 ft of the wetland?	Yes = 1 No = 0	1
D 2.4. Are there other sources of pollutants coming into the wetland that are not listed in questions D 2.1 - D 2.3? Source	Yes = 1 No = 0	0
Total for D 2	Add the points in the boxes above	**2**

Rating of Landscape Potential If score is: ☐ **3 or 4 = H** ☑ **1 or 2 = M** ☐ **0 = L** *Record the rating on the first page*

D 3.0. Is the water quality improvement provided by the site valuable to society?		
D 3.1. Does the wetland discharge directly (i.e., within 1 mi) to a stream, river, lake, or marine water that is on the 303(d) list?	Yes = 1 No = 0	1
D 3.2. Is the wetland in a basin or sub-basin where an aquatic resource is on the 303(d) list?	Yes = 1 No = 0	1
D 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality (*answer YES if there is a TMDL for the basin in which the unit is found*)?	Yes = 2 No = 0	2
Total for D 3	Add the points in the boxes above	**4**

Rating of Value If score is: ☑ **2 - 4 = H** ☐ **1 = M** ☐ **0 = L** *Record the rating on the first page*

Item 2a. Wetland name or number

DEPRESSIONAL AND FLATS WETLANDS

Hydrologic Functions - Indicators that the site functions to reduce flooding and stream degradation

D 4.0. Does the site have the potential to reduce flooding and erosion?	
D 4.1. Characteristics of surface water outflows from the wetland: Wetland is a depression or flat depression with no surface water leaving it (no outlet) points = 4 Wetland has an intermittently flowing stream or ditch, OR highly constricted permanently flowing outlet points = 2 Wetland is a flat depression (QUESTION 7 on key), whose outlet is a permanently flowing ditch points = 1 Wetland has an unconstricted, or slightly constricted, surface outlet that is permanently flowing points = 0	4
D 4.2. Depth of storage during wet periods: *Estimate the height of ponding above the bottom of the outlet. For wetlands with no outlet, measure from the surface of permanent water or if dry, the deepest part.* Marks of ponding are 3 ft or more above the surface or bottom of outlet points = 7 Marks of ponding between 2 ft to < 3 ft from surface or bottom of outlet points = 5 ☑ Marks are at least 0.5 ft to < 2 ft from surface or bottom of outlet points = 3 ☐ The wetland is a "headwater" wetland points = 3 Wetland is flat but has small depressions on the surface that trap water points = 1 Marks of ponding less than 0.5 ft (6 in) points = 0	3
D 4.3. Contribution of the wetland to storage in the watershed: *Estimate the ratio of the area of upstream basin contributing surface water to the wetland to the area of the wetland unit itself.* ☐ The area of the basin is less than 10 times the area of the unit points = 5 The area of the basin is 10 to 100 times the area of the unit points = 3 The area of the basin is more than 100 times the area of the unit points = 0 ☐ Entire wetland is in the Flats class points = 5	3
Total for D 4 — Add the points in the boxes above	**10**

Rating of Site Potential If score is: ☐ **12 - 16 = H** ☑ **6 - 11 = M** ☐ **0 - 5 = L** *Record the rating on the first page*

D 5.0. Does the landscape have the potential to support hydrologic function of the site?	
D 5.1. Does the wetland unit receive stormwater discharges? Yes = 1 No = 0	1
D 5.2. Is > 10% of the area within 150 ft of the wetland in land uses that generate excess runoff? Yes = 1 No = 0	1
D 5.3. Is more than 25% of the contributing basin of the wetland covered with intensive human land uses (residential at >1 residence/ac, urban, commercial, agriculture, etc.)? Yes = 1 No = 0	0
Total for D 5 — Add the points in the boxes above	**2**

Rating of Landscape Potential If score is: ☐ **3 = H** ☑ **1 or 2 = M** ☐ **0 = L** *Record the rating on the first page*

D 6.0. Are the hydrologic functions provided by the site valuable to society?	
D 6.1. The unit is in a landscape that has flooding problems. *Choose the description that best matches conditions around the wetland unit being rated. Do not add points. Choose the highest score if more than one condition is met.* The wetland captures surface water that would otherwise flow down-gradient into areas where flooding has damaged human or natural resources (e.g., houses or salmon redds): ● Flooding occurs in a sub-basin that is immediately down-gradient of unit. points = 2 ☐ ● Surface flooding problems are in a sub-basin farther down-gradient. points = 1 ☐ Flooding from groundwater is an issue in the sub-basin. points = 1 ☐ The existing or potential outflow from the wetland is so constrained by human or natural conditions that the water stored by the wetland cannot reach areas that flood. Explain why points = 0 ☑ There are no problems with flooding downstream of the wetland. points = 0	0
D 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan? Yes = 2 No = 0	0

Total for D 6	Add the points in the boxes above	0

Rating of Value If score is: ☐ **2 - 4 = H** ☐ **1 = M** ☑ **0 = L** *Record the rating on the first page*

Item 2a. Wetland name or number

These questions apply to wetlands of all HGM classes.

HABITAT FUNCTIONS - Indicators that site functions to provide important habitat

H 1.0. Does the site have the potential to provide habitat?

H 1.1. Structure of plant community: *Indicators are Cowardin classes and strata within the Forested class.* Check the Cowardin plant classes in the wetland. *Up to 10 patches may be combined for each class to meet the threshold of ¼ ac or more than 10% of the unit if it is smaller than 2.5 ac. Add the number of structures checked.*

- ☐ Aquatic bed
- ☐ Emergent
- ☑ Scrub-shrub (areas where shrubs have > 30% cover)
- ☐ Forested (areas where trees have > 30% cover)

4 structures or more: points = 4
3 structures: points = 2
2 structures: points - 1
1 structure: points = 0

If the unit has a Forested class, check if:

- ☐ The Forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the Forested polygon

0

H 1.2. Hydroperiods

Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or ¼ ac to count (*see text for descriptions of hydroperiods*).

- ☐ Permanently flooded or inundated
- ☑ Seasonally flooded or inundated
- ☐ Occasionally flooded or inundated
- ☐ Saturated only

4 or more types present: points = 3
3 types present: points = 2
2 types present: points = 1
1 types present: points = 0

- ☐ Permanently flowing stream or river in, or adjacent to, the wetland
- ☐ Seasonally flowing stream in, or adjacent to, the wetland
- ☐ **Lake Fringe wetland** **2 points**
- ☐ **Freshwater tidal wetland** **2 points**

0

H 1.3. Richness of plant species

Count the number of plant species in the wetland that cover at least 10 ft^2.
Different patches of the same species can be combined to meet the size threshold and you do not have to name the species. ***Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Canadian thistle***

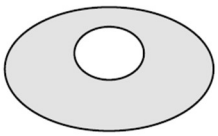
If you counted:
- > 19 species — points = 2
- 5 - 19 species — points = 1
- < 5 species — points = 0

1

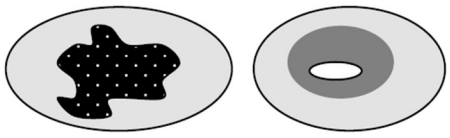
H 1.4. Interspersion of habitats

Decide from the diagrams below whether interspersion among Cowardin plants classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, moderate, low, or none. *If you have four or more plant classes or three classes and open water, the rating is always high.*

None = 0 points

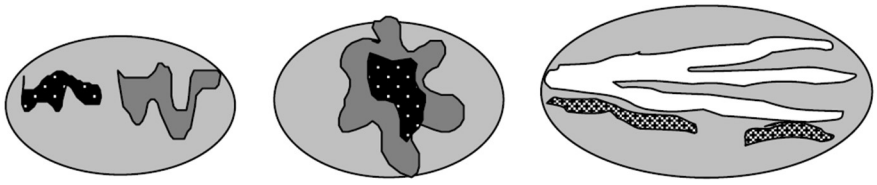


Low = 1 point



Moderate = 2 points

All three diagrams in this row are **HIGH** = 3 points



0

H 1.5. Special habitat features: Check the habitat features that are present in the wetland. *The number of checks is the number of points.* ☑ Large, downed, woody debris within the wetland (> 4 in diameter and 6 ft long) ☑ Standing snags (dbh > 4 in) within the wetland ☐ Undercut banks are present for at least 6.6 ft (2 m) **and/or** overhanging plants extends at least 3.3 ft (1 m) over a stream (or ditch) in, or contiguous with the wetland, for at least 33 ft (10 m) ☐ Stable steep banks of fine material that might be used by beaver or muskrat for denning (> 30 degree slope) OR signs of recent beaver activity are present (*cut shrubs or trees that have not yet weathered where wood is exposed*) ☑ At least ¼ ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated (*structures for egg-laying by amphibians*) ☐ Invasive plants cover less than 25% of the wetland area in every stratum of plants (*see H 1.1 for list of strata*)	3
Total for H 1 Add the points in the boxes above	**4**

Rating of Site Potential If Score is: ☐ **15 - 18 = H** ☐ **7 - 14 = M** ☑ **0 - 6 = L** *Record the rating on the first page*

H 2.0. Does the landscape have the potential to support the habitat function of the site?	
H 2.1 Accessible habitat (include *only habitat that directly abuts wetland unit*). *Calculate:* 5.9 % undisturbed habitat + (16 % moderate & low intensity land uses / 2) = 13.9% If total accessible habitat is: > 1/3 (33.3%) of 1 km Polygon points = 3 20 - 33% of 1 km Polygon points = 2 10 - 19% of 1 km Polygon points = 1 < 10 % of 1 km Polygon points = 0	1
H 2.2. Undisturbed habitat in 1 km Polygon around the wetland. *Calculate:* 21 % undisturbed habitat + (48 % moderate & low intensity land uses / 2) = 45% Undisturbed habitat > 50% of Polygon points = 3 Undisturbed habitat 10 - 50% and in 1-3 patches points = 2 Undisturbed habitat 10 - 50% and > 3 patches points = 1 Undisturbed habitat < 10% of 1 km Polygon points = 0	1
H 2.3 Land use intensity in 1 km Polygon: If > 50% of 1 km Polygon is high intensity land use points = (-2) ≤ 50% of 1km Polygon is high intensity points = 0	0
Total for H 2 Add the points in the boxes above	**2**

Rating of Landscape Potential If Score is: ☐ **4 - 6 = H** ☑ 1 **- 3 = M** ☐ **< 1 = L** *Record the rating on the first page*

H 3.0. Is the habitat provided by the site valuable to society?	
H 3.1. Does the site provide habitat for species valued in laws, regulations, or policies? *Choose only the highest score that applies to the wetland being rated*. Site meets ANY of the following criteria: points = 2 ☐ It has 3 or more priority habitats within 100 m (see next page) ☐ It provides habitat for Threatened or Endangered species (any plant or animal on the state or federal lists) ☐ It is mapped as a location for an individual WDFW priority species ☐ It is a Wetland of High Conservation Value as determined by the Department of Natural Resources ☐ It has been categorized as an important habitat site in a local or regional comprehensive plan, in a Shoreline Master Plan, or in a watershed plan Site has 1 or 2 priority habitats (listed on next page) with in 100m points = 1 Site does not meet any of the criteria above points = 0	1

Item 2a. Wetland name or number

Rating of Value If Score is: ☐ **2 = H** ☑ **1 = M** ☐ **0 = L** *Record the rating on the first page*

WDFW Priority Habitats

Priority habitats listed by WDFW (see complete descriptions of WDFW priority habitats, and the counties in which they can be found, in: Washington Department of Fish and Wildlife. 2008. Priority Habitat and Species List. Olympia, Washington. 177 pp.
http://wdfw.wa.gov/publications/00165/wdfw00165.pdf or access the list from here:
http://wdfw.wa.gov/conservation/phs/list/

Count how many of the following priority habitats are within 330 ft (100 m) of the wetland unit: ***NOTE**: This question is independent of the land use between the wetland unit and the priority habitat.*

- ☐ **Aspen Stands**: Pure or mixed stands of aspen greater than 1 ac (0.4 ha).
- ☐ **Biodiversity Areas and Corridors**: Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report*).
- ☐ **Herbaceous Balds**: Variable size patches of grass and forbs on shallow soils over bedrock.
- ☐ **Old-growth/Mature forests**: Old-growth west of Cascade crest – Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) > 32 in (81 cm) dbh or > 200 years of age. Mature forests – Stands with average diameters exceeding 21 in (53 cm) dbh; crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80-200 years old west of the Cascade crest.
- ☐ **Oregon White Oak**: Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158 – see web link above*).
- ☐ **Riparian**: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.
- ☐ **Westside Prairies**: Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (*full descriptions in WDFW PHS report p. 161 – see web link above*).
- ☐ **Instream**: The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.
- ☐ **Nearshore**: Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore. (*full descriptions of habitats and the definition of relatively undisturbed are in WDFW report – see web link on previous page*).
- ☐ **Caves**: A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.
- ☐ **Cliffs**: Greater than 25 ft (7.6 m) high and occurring below 5000 ft elevation.
- ☐ **Talus**: Homogenous areas of rock rubble ranging in average size 0.5 - 6.5 ft (0.15 - 2.0 m), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.
- ☑ **Snags and Logs**: Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 20 in (51 cm) in western Washington and are > 6.5 ft (2 m) in height. Priority logs are > 12 in (30 cm) in diameter at the largest end, and > 20 ft (6 m) long.

Note: All vegetated wetlands are by definition a priority habitat but are not included in this list because they are

Wetland name or number

addressed elsewhere.

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Wetland Type *Check off any criteria that apply to the wetland. List the category when the appropriate criteria are met.*	Category
SC 1.0. Estuarine Wetlands Does the wetland meet the following criteria for Estuarine wetlands? ☐ The dominant water regime is tidal, ☐ Vegetated, and ☐ With a salinity greater than 0.5 ppt ☐ Yes - Go to **SC 1.1** ☐ No = **Not an estuarine wetland**	
SC 1.1. Is the wetland within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151? ☐ Yes = **Category I** ☐ No - Go to **SC 1.2**	
SC 1.2. Is the wetland unit at least 1 ac in size and meets at least two of the following three conditions? ☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of non-native plant species. (If non-native species are *Spartina* , see page 25) ☐ At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland. ☐ The wetland has at least two of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands. ☐ Yes = **Category I** ☐ No = **Category II**	
SC 2.0. Wetlands of High Conservation Value (WHCV) SC 2.1. Has the WA Department of Natural Resources updated their website to include the list of Wetlands of High Conservation Value? ☐ Yes - Go to **SC 2.2** ☐ No - Go to **SC 2.3** SC 2.2. Is the wetland listed on the WDNR database as a Wetland of High Conservation Value? ☐ Yes = **Category I** ☐ No = **Not WHCV** SC 2.3. Is the wetland in a Section/Township/Range that contains a Natural Heritage wetland? http://www1.dnr.wa.gov/nhp/refdesk/datasearch/wnhpwetlands.pdf ☐ Yes - **Contact WNHP/WDNR and to SC 2.4** ☐ No = **Not WHCV** SC 2.4. Has WDNR identified the wetland within the S/T/R as a Wetland of High Conservation Value and listed it on their website? ☐ Yes = **Category I** ☐ No = **Not WHCV**	
SC 3.0. Bogs Does the wetland (or any part of the unit) meet both the criteria for soils and vegetation in bogs? *Use the key below.* ***If you answer YES you will still need to rate the wetland based on its functions*** . SC 3.1. Does an area within the wetland unit have organic soil horizons, either peats or mucks, that compose 16 in or more of the first 32 in of the soil profile? ☐ Yes - Go to **SC 3.3** ☐ No - Go to **SC 3.2** SC 3.2. Does an area within the wetland unit have organic soils, either peats or mucks, that are less than 16 in deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond? ☐ Yes - Go to **SC 3.3** ☐ No = **Is not a bog** SC 3.3. Does an area with peats or mucks have more than 70% cover of mosses at ground level, AND at least a 30% cover of plant species listed in Table 4? ☐ Yes = **Is a Category I bog** ☐ No - Go to **SC 3.4** **NOTE**: If you are uncertain about the extent of mosses in the understory, you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16 in deep. If the pH is less than 5.0 and the plant species in Table 4 are present, the wetland is a bog. SC 3.4. Is an area with peats or mucks forested (> 30% cover) with Sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Engelmann spruce, or western white pine, AND any of the species (or combination of species) listed	

in Table 4 provide more than 30% of the cover under the canopy?

☐ Yes = **Is a Category I bog** ☐ No = **Is not a bog**

SC 4.0. Forested Wetlands

Does the wetland have at least 1 contiguous acre of forest that meets one of these criteria for the WA Department of Fish and Wildlife's forests as priority habitats? ***If you answer YES you will still need to rate the wetland based on its functions.***

☐ **Old-growth forests** (west of Cascade crest): Stands of at least two tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 in (81 cm) or more.

☐ **Mature forests** (west of the Cascade Crest): Stands where the largest trees are 80-200 years old OR the species that make up the canopy have an average diameter (dbh) exceeding 21 in (53 cm).

☐ Yes = **Category I** ☐ No = **Not a forested wetland for this section**

SC 5.0. Wetlands in Coastal Lagoons

Does the wetland meet all of the following criteria of a wetland in a coastal lagoon?

☐ The wetland lies in a depression adjacent to marine waters that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks

☐ The lagoon in which the wetland is located contains ponded water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon (*needs to be measured near the bottom*)

☐ Yes - Go to **SC 5.1** ☐ No = **Not a wetland in a coastal lagoon**

SC 5.1. Does the wetland meet all of the following three conditions?

☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of aggressive, opportunistic plant species (see list of species on p. 100).

☐ At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland.

☐ The wetland is larger than $^{1}/_{10}$ ac (4350 ft^2)

☐ Yes = **Category I** ☐ No = **Category II**

SC 6.0. Interdunal Wetlands

Is the wetland west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? ***If you answer yes you will still need to rate the wetland based on its habitat functions.***

In practical terms that means the following geographic areas:

☐ Long Beach Peninsula: Lands west of SR 103

☐ Grayland-Westport: Lands west of SR 105

☐ Ocean Shores-Copalis: Lands west of SR 115 and SR 109

☐ Yes - Go to **SC 6.1** ☐ No = **Not an interdunal wetland for rating**

SC 6.1. Is the wetland 1 ac or larger and scores an 8 or 9 for the habitat functions on the form (rates H,H,H or H,H,M for the three aspects of function)?

☐ Yes = **Category I** ☐ No - Go to **SC 6.2**

SC 6.2. Is the wetland 1 ac or larger, or is it in a mosaic of wetlands that is 1 ac or larger?

☐ Yes = **Category II** ☐ No - Go to **SC 6.3**

SC 6.3. Is the unit between 0.1 and 1 ac, or is it in a mosaic of wetlands that is between 0.1 and 1 ac?

☐ Yes = **Category III** ☐ No = **Category IV**

Category of wetland based on Special Characteristics

If you answered No for all types, enter "Not Applicable" on Summary Form

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www.envirovector.com

28 September 2021

Evan Mann
PO BOX 73790
Puyallup, WA 98373

Reference: Henderson Boulevard Property
Subject: Mazama Pocket Gopher Screening to Satisfy City of Tumwater Permitting Requirements

Dear Evan Mann:

At your request, EnviroVector prepared this report to satisfy City of Tumwater requirements for Mazama pocket gopher screenings on the Subject Property (**Table 1; Figure 1**).

Table 1. Parcels Comprising Subject Property

No#	Property Address	Parcel Number	Section Township Range	Property Size (Acres)
1	---	12701320105	Section 02 Township 17N Range 2W	0.34
2	---	79300000101		4.77
3	---	79300000100		4.62
3 Parcels	Total Size			9.73 acres

The permitting jurisdiction is City of Tumwater.

1.0 INTRODUCTION

The Mazama pocket gopher is a Federally Threatened species protected under the Endangered Species Act and the City of Tumwater Code. Mazama pocket gopher screenings were performed by a qualified biologist certified by the US Fish and Wildlife Service (USFWS) for the purpose of satisfying the City of Tumwater (2018) Site Inspection Protocol and Procedures: Mazama Pocket Gopher (**Appendix E**).

A Mazama pocket gopher screening is necessary to comply with City of Tumwater Code and the Endangered Species Act.

2.0 METHODOLOGY

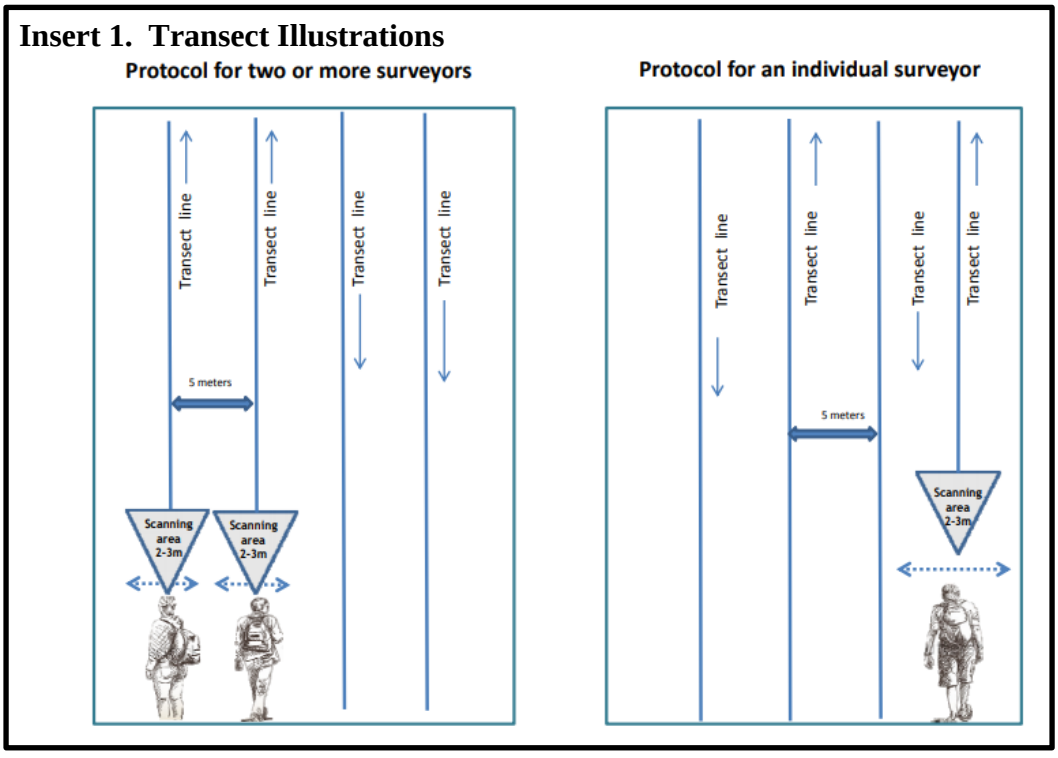
The Mazama pocket gopher screening was performed on 16 September 2020 and 27 October 2019 per City of Tumwater recommendations for two (2) site visits in compliance with the City of Tumwater (July 2018) Mazama Pocket Gopher Screening Protocol (**Appendix E**). The screening was performed within the USFWS prescribed survey window (June 1 through October 31).

In compliance with the USFWS and City of Tumwater (2018) Mazama Pocket Gopher Screening Protocols:

- The study has occurred during the prescribed work window of June 1 to October 31.
- A qualified biologist performed the screenings that has been trained and certified by the USFWS.
- The entire property was evaluated, not just the project footprint.
- The site was visited two (2) times at least thirty (30) days apart.
- Data was recorded on datasheets and provided in **Appendix F**.
- The areas of the property covered under the screening survey is illustrated in **Figure 2**.
- The ground was easily visible.

The site evaluation was conducted utilizing USFWS recommended protocol for one (1) surveyor (**Insert 1**). The search pattern had been performed along five (5) meter transects, including brushy and treed areas, examined for any evidence of mounding activity created by the Mazama pocket gopher.

Insert 1. Transect Illustrations



The detailed field methodology is in compliance with the City of Tumwater (2018) Site Inspection Protocol and Procedures: Mazama Pocket Gopher as follows:

1. The survey crew orients themselves with the layout of the property using aerial maps and strategizes their route for walking through the property.
2. Start GPS to record survey route.
3. Walk the survey transects methodically, slowly walking a straight line and scanning an area approximately 2-3 meters to the left and right as you walk, looking for mounds. Transects should be no more than five (5) meters apart when conducted by a single individual.
4. If the survey is performed by a team, walk together in parallel lines approximately 5 meters apart while you are scanning left to right for mounds.
5. At each mound found, stop and identify it as a MPG or mole mound. If it is a MPG mound, identify it as a singular mound or a group (3 mounds or more) on a data sheet to be submitted to the County.
6. Record all positive MPG mounds, likely MPG mounds, and MPG mound groups in a GPS unit that provides a date, time, georeferenced point, and other required information in County GPS data instruction for each MPG mound. Submit GPS data in a form acceptable to the County.
7. Photograph all MPG mounds or MPG mound groups. At a minimum, photograph MPG mounds or MPG mound groups representative of MPG detections on site.
8. Photos of mounds should include one that has identifiable landscape features for reference. In order to accurately depict the presence of gopher activity on a specific property, the following series of photos should be submitted to the County:
    a. At least one up-close photo to depict mound characteristics
    b. At least one photo depicting groups of mounds as a whole (when groups are encountered).
    c. At least one photo depicting gopher mounds with recognizable landscape features in the background, at each location where mounds are detected on a property
    d. Photos can be taken with the GPS unit or a separate, camera, preferably a camera with locational features (latitude, longitude)
    e. Photo point description or noteworthy landscape or other features to aid in relocation. Additional photos to be considered
    f. The approximate building footprint location from at least two cardinal directions.
    g. Landscape photos to depict habitat type and in some cases to indicate why not all portions of a property require gopher screening.
9. Describe and/or quantify what portion and proportion of the property was screened and record your survey route and any MPG mounds found on either an aerial or parcel map.

10. If MPG mounds are observed on a site, that day's survey effort should continue until the entire site is screened and all mounds present identified, but additional site visits are not required.
11. In order for the County to accurately review Critical Area Reports submitted in lieu of County field inspections the information collected in the field (GPS, data sheets, field notes, transect representations on aerial, etc.) shall be filed with the County. GPS information shall be submitted in a form approved by the County.

Soils known to be associated with the Mazama pocket gopher are listed in **Insert 2**.

Insert 2. Mazama pocket gopher soils

Table 1. Soils known to be associated with Mazama pocket gopher occupancy.

Mazama Pocket Gopher Preference	Soil Type
More Preferred (formerly High and Medium Preference Soils)	Nisqually loamy fine sand, 0 to 3 percent slopes Nisqually loamy fine sand, 3 to 15 percent slopes Spanaway-Nisqually complex, 2 to 10 percent slopes Cagey loamy sand Indianola loamy sand, 0 to 3 percent slopes Spanaway gravelly sandy loam, 0 to 3 percent slopes Spanaway gravelly sandy loam, 3 to 15% slopes
Less Preferred (formerly Low Preference Soils)	Alderwood gravelly sandy loam, 0 to 3 percent slopes Alderwood gravelly sandy loam, 3 to 15 percent slopes Everett very gravelly sandy loam, 0 to 3 percent slopes Everett very gravelly sandy loam, 3 to 15 percent slopes Indianola loamy sand, 3 to 15 percent slopes Kapowsin silt loam, 3 to 15 percent slopes McKenna gravelly silt loam, 0 to 5 percent slopes Norma fine sandy loam Norma silt loam Spana gravelly loam Spanaway stony sandy loam, 0 to 3 percent slopes Spanaway stony sandy loam, 3 to 15 percent slopes Yelm fine sandy loam, 0 to 3 percent slopes Yelm fine sandy loam, 3 to 15 percent slopes

3.0 BACKGROUND INFORMATION

3.1 Thurston County Geodatabase Soils

Two (2) soil types were identified on the subject property, Indianola loamy sand, 0 to 3 percent slopes, which is classified as "More preferred" gopher soils and Indianola loamy sand, 3 to 15 percent slopes "Less preferred" gopher soils (**Appendix B & C, Table 1**)

Table 1. Summary of Soil Preference

Soil Unit	Gopher Soil	Preference	Comments
Indianola loamy sand, 0 to 3% slopes	Yes	More preferred	Mapped on the eastern portion and the northwestern corner of the subject property
Indianola loamy sand, 3 to 15% slopes	Yes	Less preferred	Mapped on the ¾ of subject property

3.2 WDFW PHS Database

No priority habitats or species have been mapped on the subject property by the Washington Department of Fish and Wildlife (WDFW) Priority Habitats and Species (PHS) database (**Appendix D**).

The Mazama pocket gopher has been mapped to occur south of the subject property.

4.0 FIELD RESULTS

4.1 Mazama Pocket Gopher Site Evaluation

No mounds exhibiting characteristics typically associated with the Mazama pocket gopher have been identified on the subject property during this study. Mole mounds were identified on the site (**Appendix A, Photos 3-9**). A summary of findings is provided in **Table 2**.

The site is made up of three (3) contiguous parcels. The eastern portion of the subject property contains building and internal roads. The western portion of the subject property is forested with herbaceous understory. Maintained lawn and grassy areas are located throughout the property (**Appendix A, Photos 1-12**). The parcel west of the subject property is currently under development (**Appendix A, Photos 3, 4, & 11**).

Mounds created by the Mazama pocket gopher: 1) are crescent or oddly-shaped, 2) contain a plugged tunnel opening that extends diagonally underground from the mound edge, 3) exhibit a fine texture, and are 4) typically in a scattered distribution.

Mole mounds have centrally-located tunnel entrances that extend vertically below the surface, blocky texture, an in-line distribution pattern, and have a conical shape.

Table 2. Summary of Results

Site Visit	Date of Visit	Gopher Occurrence Observed	Comments
1st	7 July 2021	No	Site consists of buildings, maintained grass lawn, and forest
2nd	9 August 2021	No	Site consists of buildings, maintained grass lawn, and forest

4.2 Mazama Pocket Gopher Habitat Evaluation

Potential Mazama pocket gopher habitat occurs on the subject property and in the vicinity. Areas of flat grassland dominated by European pasture grasses is mapped as gopher soils.

5.0 CONCLUSION

This Mazama pocket gopher summary report was prepared to satisfy the Thurston County Mazama pocket gopher screening requirements and to comply with the City of Tumwater (2018) Site Inspection Protocol and Procedures: Mazama Pocket Gopher.

The entire subject property was evaluated for the Mazama pocket gopher on 7 July 2021 and on 9 August 2021 in accordance with the latest version of City of Tumwater (2018) Site Inspection Protocol and Procedures: Mazama Pocket Gopher. The site evaluation was performed within the prescribed survey window (June 1 through October 31).

Two (2) soil types were identified on the subject property, Indianola loamy sand, 0 to 3 percent slopes, which is classified as “More preferred” gopher soils and Indianola loamy sand, 3 to 15 percent slopes “Less preferred” gopher soils

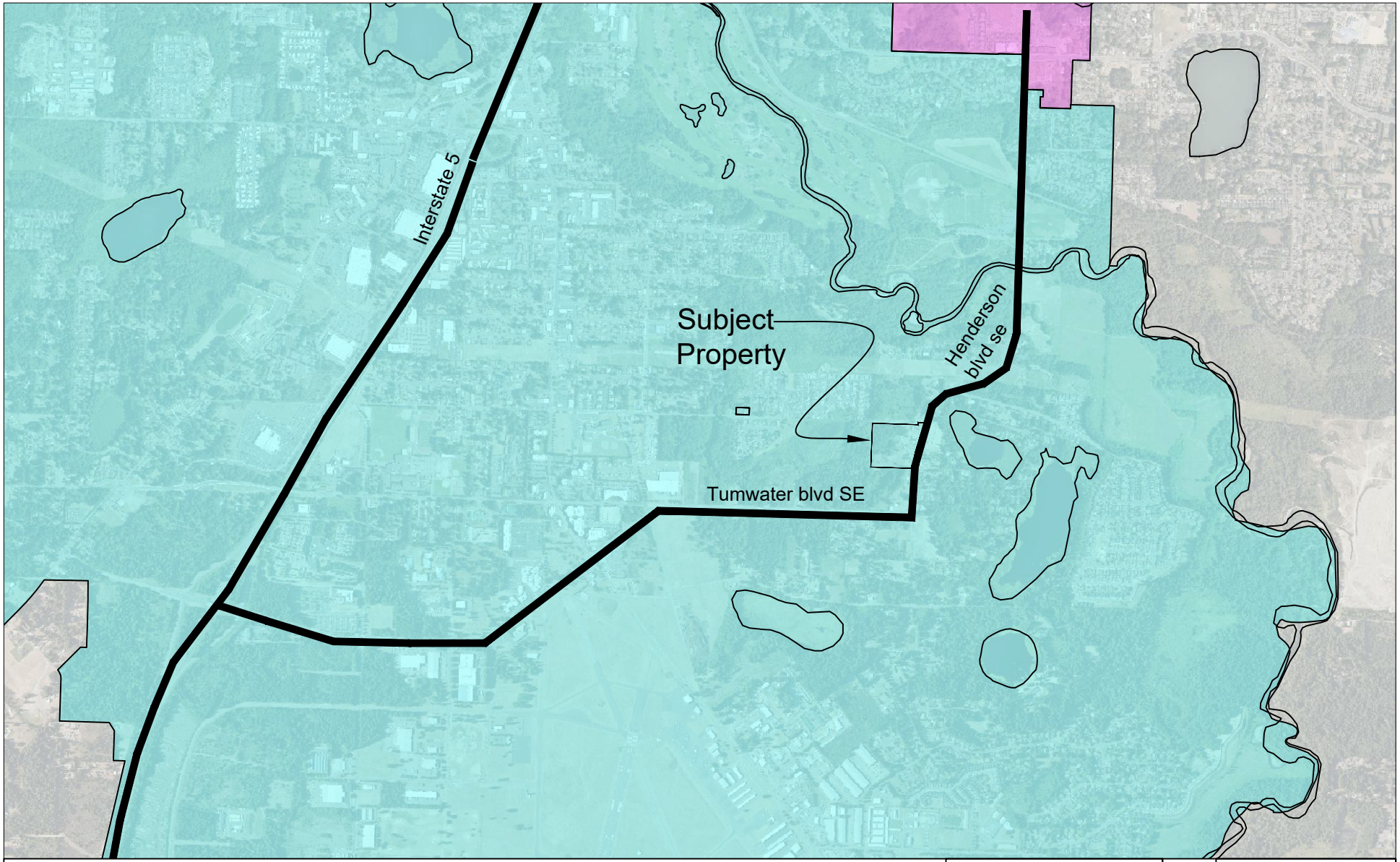
No mounds exhibiting characteristics typically associated with the Mazama pocket gopher have been identified on the subject property during this study.

If you have any questions or require further services, you can contact me at (360) 790-1559.

Sincerely,

Curtis Wambach, M.S.
Senior Biologist and Principal
EnviroVector

FIGURES



EnviroVector
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City of Tumwater
City of Olympia

Figure 1

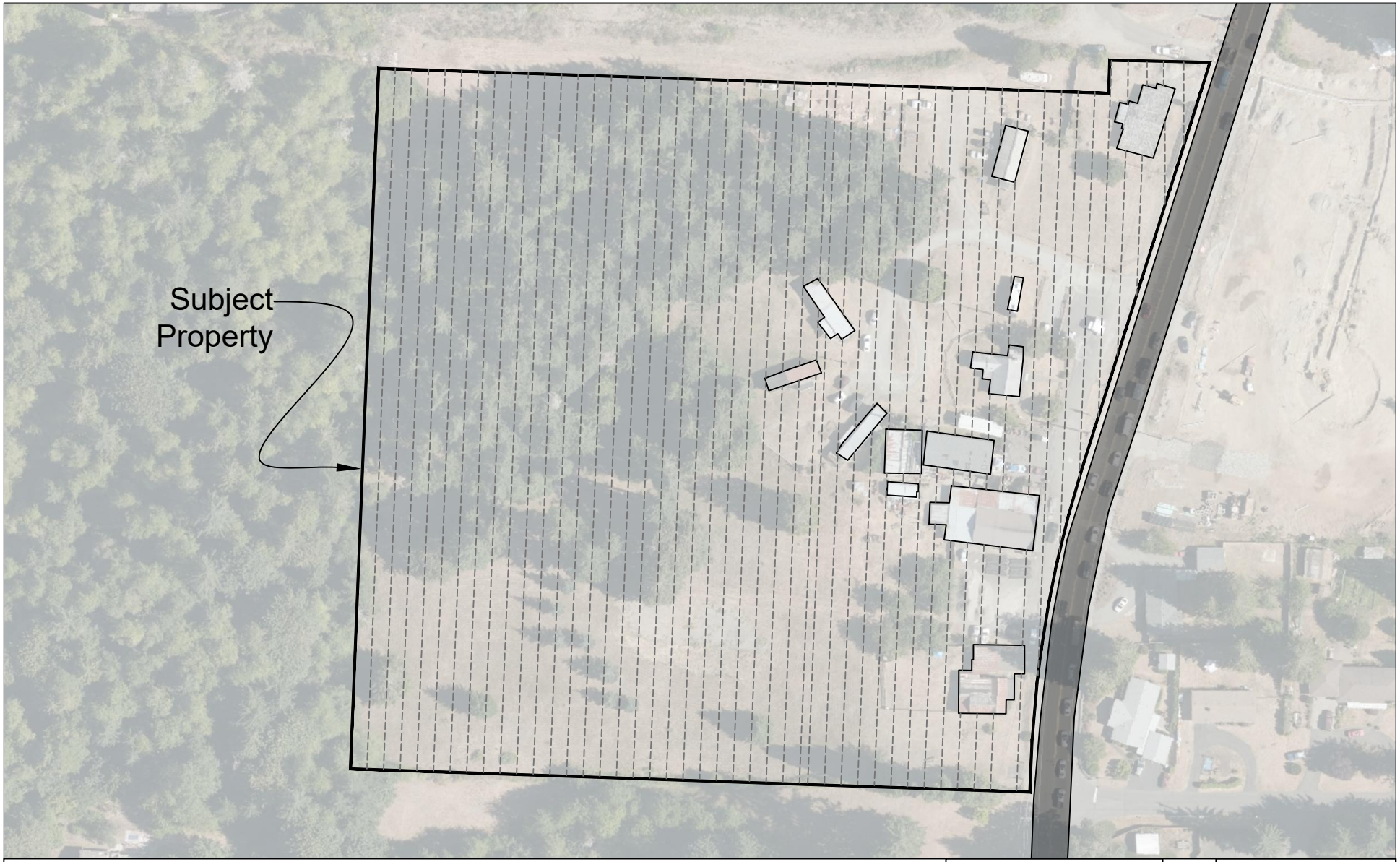
Henderson Property

Vicinity Map

Scale: 1" = 2000'

0 2000'

6 October 2021



EnviroVector
OPTIMIZE USABLE LAND
curtis@envirovector.com
www.envirovector.com
360-790-1559

----- Transects

Figure 2

Henderson Property

Gopher Screening

Scale: 1" = 125'

0 125'

6 October 2021

APPENDIX A

Photo Documentation

First Gopher Screening

Photo 1. A frontage of property

Photo 2. At frontage of property

Photo 3. Mole mound on western portion of property

Photo 4. Photo 3. Mole mound on western portion of property

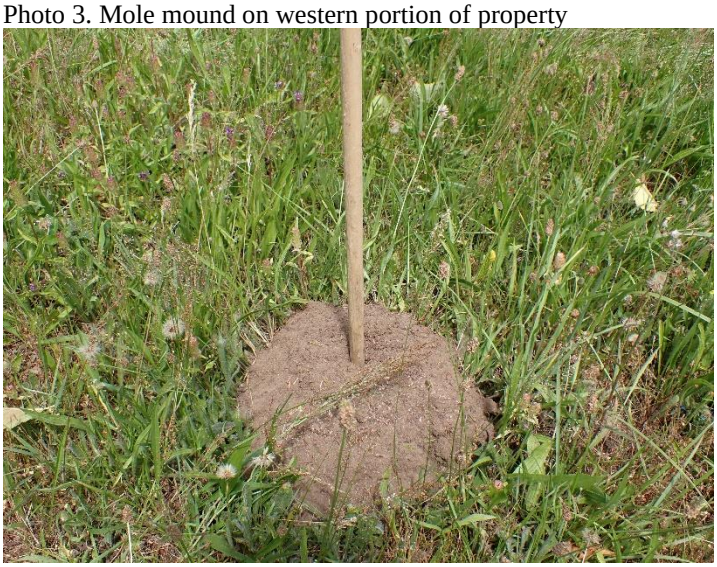


Photo 5. Fmole mound on proeprty

Photo 6. Distinctive mole mound on proeprty

Second Gopher Screening

Photo 7. Mole mounds at frontage of property

Photo 8. Mole mounds at frontage of property

Photo 9. Mole mound near existing building

Photo 10. Grass lawn area, no mounds

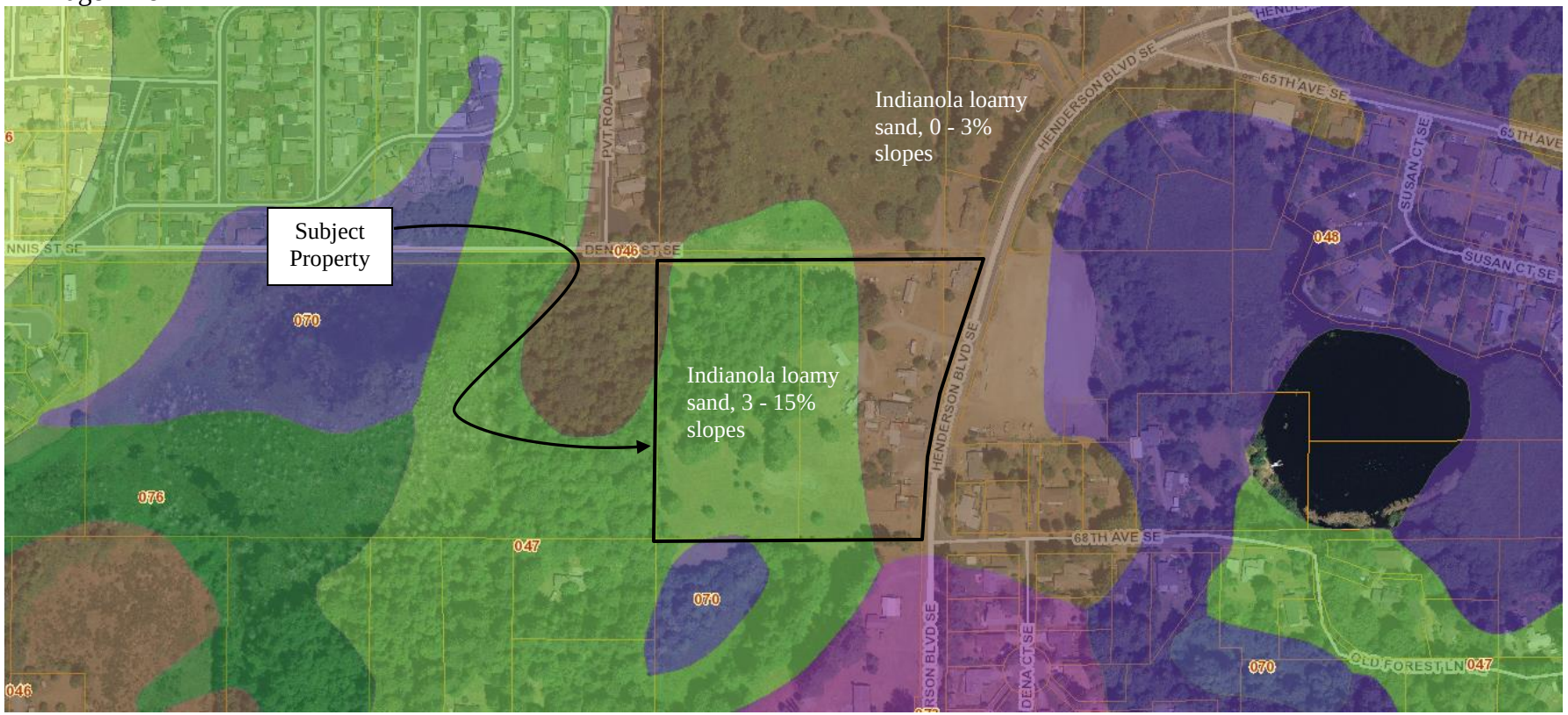
Photo 11. Western edge of property, near off-site development

Photo 12. Grass lawn area, no mounds

APPENDIX B

Thurston County Geodatabase

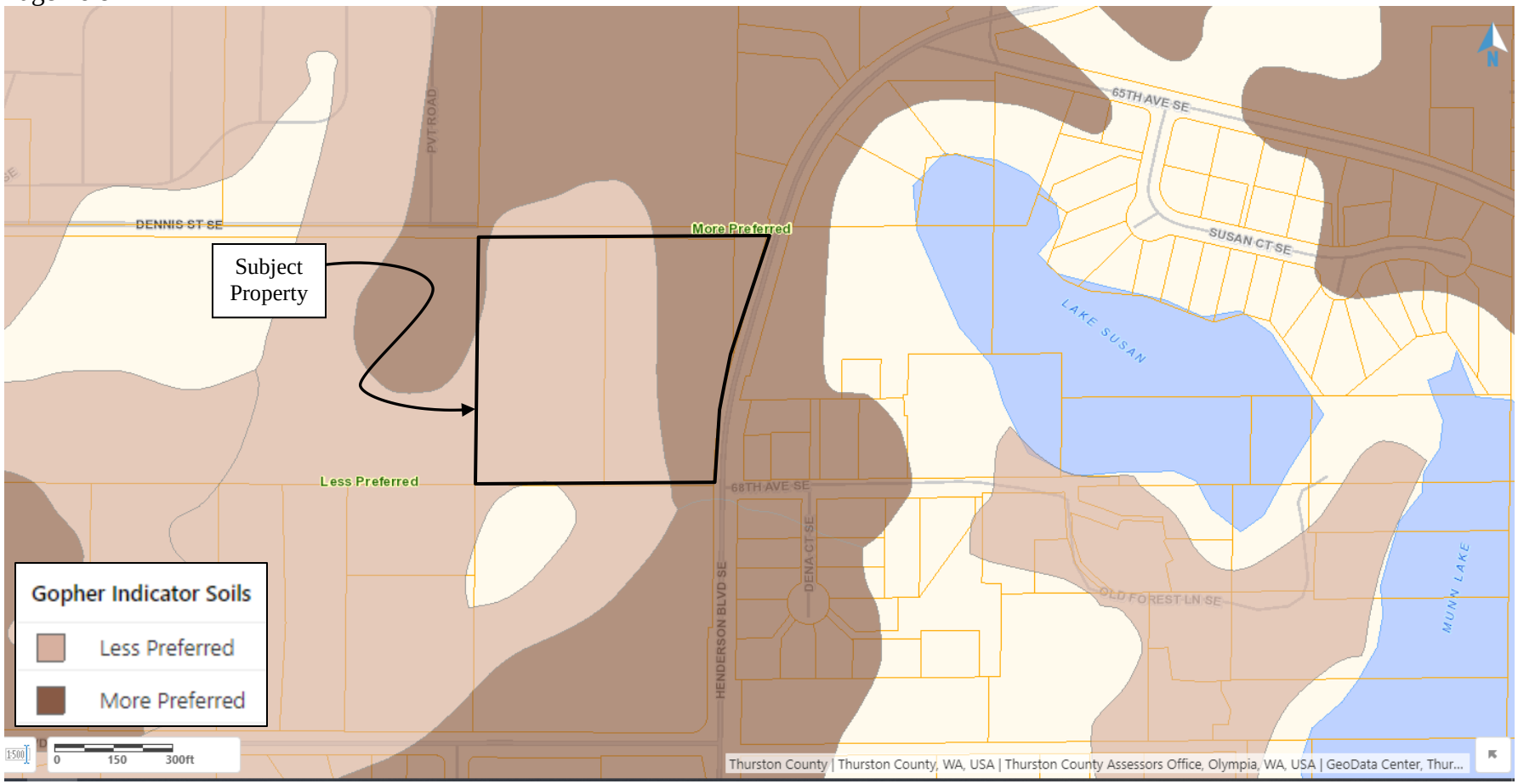
Soils


Subject Property
Indianola loamy sand, 0 - 3% slopes
Indianola loamy sand, 3 - 15% slopes
HENDERSON BLVD SE
65TH AVE SE
SUSAN CT SE
PVT ROAD
DENA CT SE
68TH AVE SE
OLD FOREST LN
070
076
047
046
048

APPENDIX C

Thurston County Geodatabase

Gopher Indicator Soils

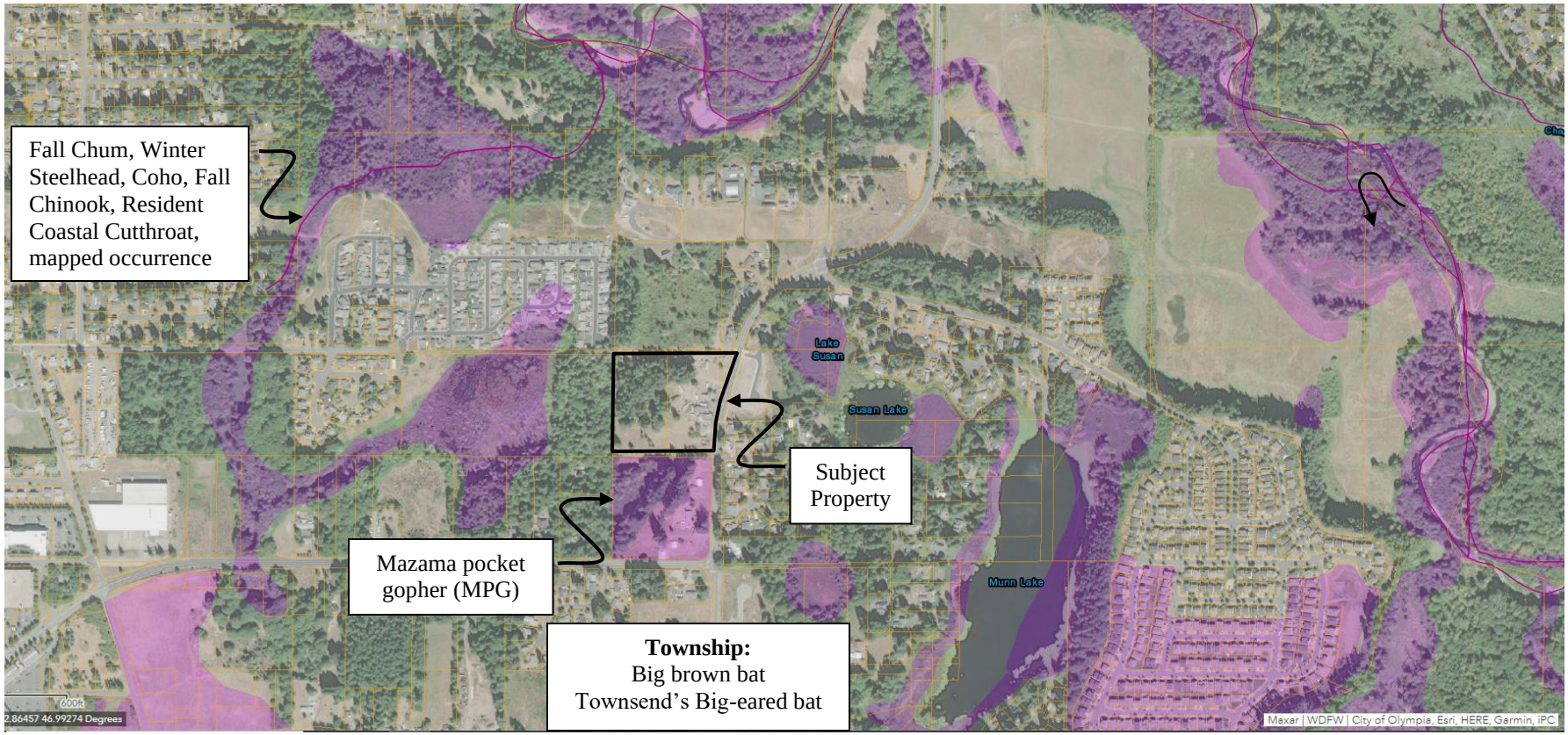

Subject Property
More Preferred
Less Preferred
DENNIS ST SE
PVT ROAD
65TH AVE SE
SUSAN CT SE
LAKE SUSAN
68TH AVE SE
DENA CT SE
HENDERSON BLVD SE
OLD FOREST LN SE
MUNN LAKE
Gopher Indicator Soils
Less Preferred
More Preferred
0
150
300ft
Thurston County | Thurston County, WA, USA | Thurston County Assessors Office, Olympia, WA, USA | GeoData Center, Thur...

APPENDIX D

Washington Department of Fish and Wildlife

Priority Habitat Species (PHS)

Database


Fall Chum, Winter Steelhead, Coho, Fall Chinook, Resident Coastal Cutthroat, mapped occurrence
Lake Susan
Susan Lake
Subject Property
Mazama pocket gopher (MPG)
Munn Lake
Township:
Big brown bat
Townsend's Big-eared bat
600ft
2.86457 46.99274 Degrees
Maxar | WDFW | City of Olympia, Esri, HERE, Garmin, iPC

APPENDIX E

City of Tumwater

Site Inspection Protocol and Procedures:

Mazama Pocket Gopher

COMMUNITY DEVELOPMENT DEPARTMENT

ADMINISTRATIVE DETERMINATION

TOPIC: Mazama Pocket Gopher Screening

APPROVED: _____ DATE: 7/25/18

Michael Matlock, AICP
Community Development Director

BACKGROUND: The Mazama Pocket Gopher (MPG) became a federally listed endangered species in April 2014. This memo addresses the City regulatory structure. The Endangered Species Act (ESA) is a separate regulatory structure from the Growth Management Act, the State statute the City does implement, so compliance with City regulations does not necessarily mean an applicant complies with the ESA. While the City routinely addresses questions from property owners on how to comply with its local development regulations, it does not do so with respect to the ESA.[1] ESA compliance is the property owner's responsibility.

FINDINGS: In implementing the City's critical areas ordinance (CAO), and based on analysis prepared by qualified professionals, staff have found that projects in certain areas and with certain features lack gopher habitat, so do not require CAO review by a qualified professional. While the CAO governs these issues, the below summarizes what staff have found to date.

DETERMINATION: Based on the findings above, Tumwater summarizes assessment findings for MPG presence as follows:

1. **Geographic** – Due to lack of habitat, no properties in the City north of Trosper Road have required CAO review.
2. **Vegetative Cover** – Project Sites, parcels, or portions of these sites with 30% or greater forested cover have not required CAO review, although where there are adjacent unforested and undeveloped lots exceeding 7,600 square feet (SF) in area, CAO review may be needed.
3. **Project Use Level** –
   a. Single-family, manufactured homes, and duplexes for lots 7,600 SF or less
      1) New or additions to single-family, manufactured homes, and duplexes – CAO review has typically not been required on existing lots 7,600 SF

[1] For land owners seeking guidance on ESA compliance, while the City cannot assist, see USFWS Memorandum, Guidance on Trigger for an Incidental Take Permit Under Section 10(a)(1)(B) of the Endangered Species Act Where Occupied Habitat or Potentially Occupied Habitat is Being Modified, issued April 26, 2018.

or less in size. Unforested and undeveloped lots exceeding 7,600 SF may require CAO review.

2) Developed lots surrounded by existing development (homes, streets, storm ponds, sidewalks, etc.) that are of a similar size have not required CAO review. This would not exclude sites on the periphery areas where adjacent lands are not developed at an urban density level.

3) Single-family lots vested under RCW 58.17 and/or TMC 15.44.040 will likely not require CAO review.

b. Commercial/Industrial/Institutional

1) New or additions to buildings proposed in areas with 30% or greater forested coverage, existing impervious surfaces or significantly disturbed pervious areas (i.e. evidence of compacted gravel, formal landscape areas or other scenarios that would exclude the proposed developed area as being defined as habitat) have typically not required CAO review.

4. **Approved United States Fish and Wildlife Service (USFWS) Avoidance/Mitigation Strategy** – Any projects that have consulted with USFWS and have a documented avoidance/mitigation strategy that is acceptable to USFWS can typically proceed with normal permitting.

5. **Site Screening** – Properties may be screened by a qualified professional. Alternately, USFWS may screen properties by arrangement between the property owner and USFWS. At least two screenings, no less than 30 days apart, between June 1 and October 31, are consistent with best available science to determine the presence or absence of MPG.

PRIOR GUIDANCE: This Administrative Determination supersedes and replaces the City's prior Administrative Determination on Mazama Pocket Gopher Screening Protocol dated October 31, 2017.

APPEAL: This code determination shall become effective on the above date. Any person affected by this determination may appeal this decision to the Tumwater Hearing Examiner pursuant to Chapter 18.62 of the Tumwater Municipal Code.

APPENDIX F

Datasheets

Sample Mazama Pocket Gopher Screening Field Form

Site Visit Date: 7 July 2021

If 2nd or 3rd site visit, date(s) of previous visits: 9 August 2021

Site Information	**Parcel #:** #12701320105, 79300000101, 79300000100 **Site/Landowner:** Soundbuilt Homes	
How were the data collected? (circle the method for each)	**Transect:** **(GPS)** **Aerial** **Mounds:** **(GPS)** **Aerial** **Notes:**	
Field team names: (Note who filled out form and others conducting screening)	Curtis Wambach	
Others onsite (name/affiliation)		
Site visit # (CIRCLE all that apply)	**(1st)** **2nd** **3rd**	**Notes:**
Do onsite conditions throughout the entire parcel preclude the need for MPG surveys? **(CIRCLE and DESCRIBE)**	**Yes** **(No)** **Dense woody cover (trees/shrubs) that appears to preclude any MPG use** **Impervious Compacted Graveled Flooded Slope** **Other_____** **Notes:**	
Describe ground visibility for mound detection: (CIRCLE and DESCRIBE)	**Poor Fair (Good) Notes:**	

	MPG Mounds	**Indeterminate**	**Mole Mounds**
Quantify or describe amount of MPG mounds and approx. # of mounds or groups of mounds (specify whether count is individual mounds or groups)	0	0	25
	No MPG mounds observed (CIRCLE)		

Sample Mazama Pocket Gopher Screening Field Form

Does woody vegetation onsite match aerial photo? (CIRCLE and DESCRIBE)	**(Yes)** **No – describe differences and show on parcel map/aerial:**
What portion of the property was screened? (CIRCLE and DESCRIBE)	**(All)** **Part - describe and show on parcel map/aerial:**
Notes	
Team reviewed and agreed to data recorded on form? (CIRCLE, and EXPLAIN if "No")	**Yes No** **Reviewed by: ____ ____ ____ _____ _____** **Notes:**

Sample Mazama Pocket Gopher Screening Field Form

Site Visit Date: 7 July 2021

If 2nd or 3rd site visit, date(s) of previous visits: 9 August 2021

Site Information	**Parcel #:** #12701320105, 79300000101, 79300000100 **Site/Landowner:** Soundbuilt Homes	
How were the data collected? (circle the method for each)	**Transect:** (GPS) **Aerial** **Mounds:** (GPS) **Aerial** **Notes:**	
Field team names: (Note who filled out form and others conducting screening)	Julie Lewis/Curtis Wambach	
Others onsite (name/affiliation)		
Site visit # (CIRCLE all that apply)	**1st** (**2nd**) **3rd**	**Notes:**
Do onsite conditions throughout the entire parcel preclude the need for MPG surveys? **(CIRCLE and DESCRIBE)**	**Yes** (**No**) **Dense woody cover (trees/shrubs) that appears to preclude any MPG use** **Impervious Compacted Graveled Flooded Slope** **Other_____** **Notes:**	
Describe ground visibility for mound detection: (CIRCLE and DESCRIBE)	**Poor Fair** (**Good**) **Notes:**	

	MPG Mounds	**Indeterminate**	**Mole Mounds**
Quantify or describe amount of MPG mounds and approx. # of mounds or groups of mounds (specify whether count is individual mounds or groups)	0	5	14
	No MPG mounds observed (CIRCLE)		

Sample Mazama Pocket Gopher Screening Field Form

Does woody vegetation onsite match aerial photo? (CIRCLE and DESCRIBE)	**(Yes)** **No – describe differences and show on parcel map/aerial:**
What portion of the property was screened? (CIRCLE and DESCRIBE)	**(All)** **Part - describe and show on parcel map/aerial:**
Notes	
Team reviewed and agreed to data recorded on form? (CIRCLE, and EXPLAIN if "No")	**Yes No** **Reviewed by: ____ ____ ____ _____ _____** **Notes:**

THREE LAKES CROSSING
TRAFFIC IMPACT ANALYSIS

City of Tumwater, WA

12/10/2021

Prepared for: Mr. Evan Mann
Soundbuilt Homes
PO Box 73790
Puyallup, WA 98373

December 2021

THREE LAKES CROSSING
TRAFFIC IMPACT ANALYSIS

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LIST OF FIGURES

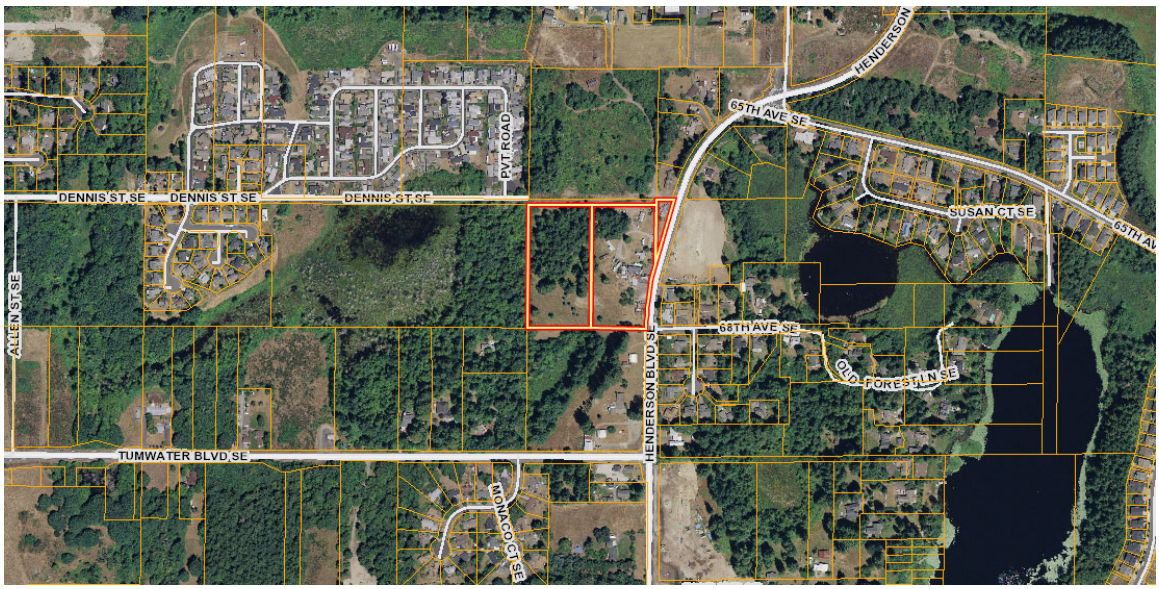
THREE LAKES CROSSING
TRAFFIC IMPACT ANALYSIS

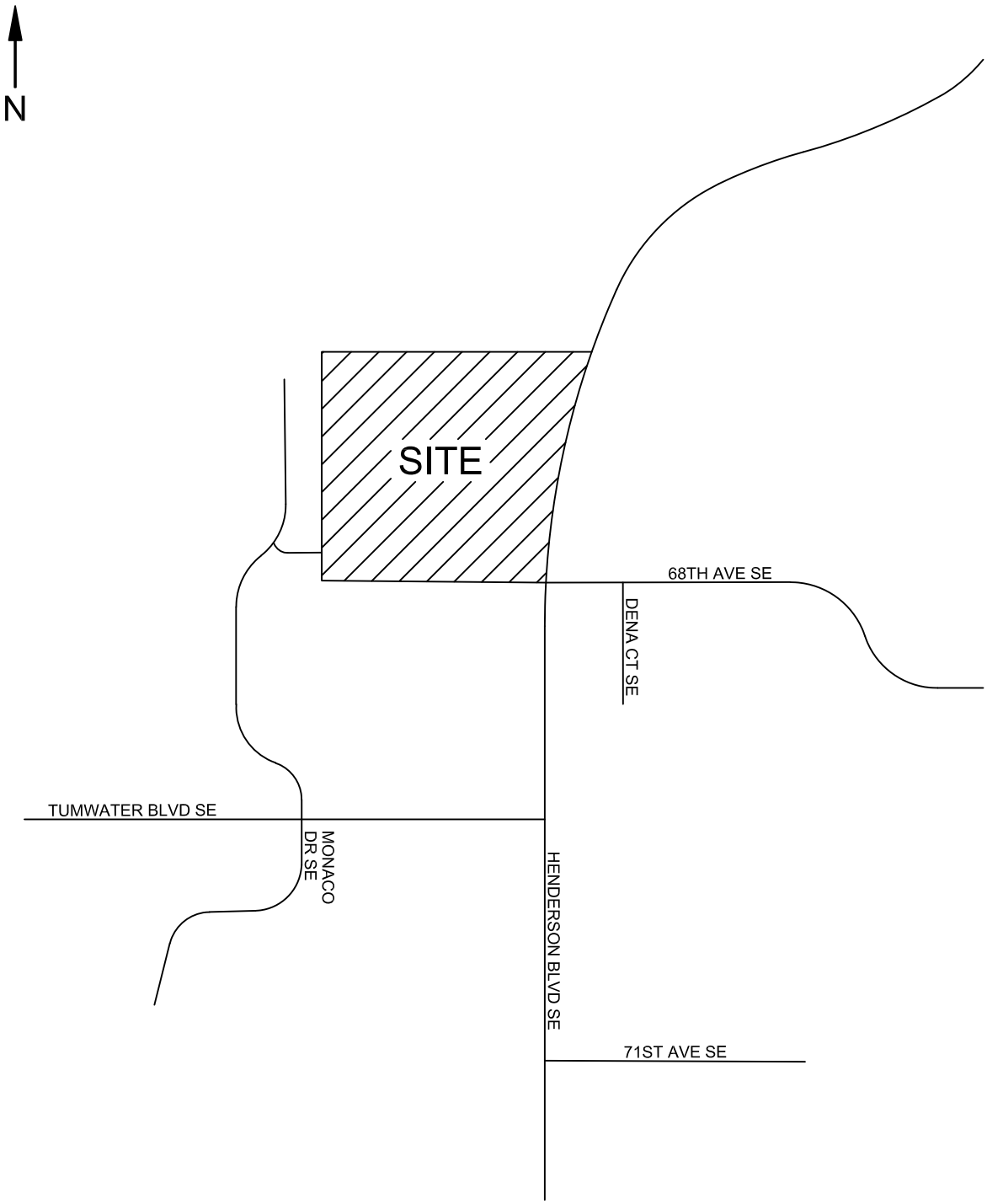
1. INTRODUCTION

The main goals of this study focus on the analysis of existing roadway conditions and forecasts of newly generated project traffic. The first task includes the review of general roadway information on the adjacent street system, baseline vehicular volumes, and entering sight distance data. Forecasts of future traffic and dispersion patterns on the street system are then determined using established trip generation and distribution techniques. As a final step, appropriate conclusions and mitigation measures are defined.

2. PROJECT DESCRIPTION

The Three Lakes Crossing project is a proposed residential development comprising up to 45 single-family dwelling units in the city of Tumwater. The subject site, bordered to the east by Henderson Boulevard SE, is located on a cumulative 16.66-acres within tax parcel #'s: 1270132-0105; 7930000-0100; & -0101. Access to the site is proposed via one new driveway extending west from Henderson Boulevard SE into the subject site. Moreover, internal connection is to be provided with a new development located south of the subject site, subsequently providing access to Tumwater Boulevard SE. All existing structures on-site are to be demolished prior to new construction. Figure 1 on the following page shows the aerial vicinity of the project. A conceptual site plan illustrating the proposed site layout including all access points is presented in Figure 2. A site aerial is provided below.





HEATH & ASSOCIATES

TRAFFIC AND CIVIL ENGINEERING

THREE LAKES CROSSING

VICINITY MAP & ROADWAY SYSTEM
FIGURE 1

HEATH & ASSOCIATES

TRAFFIC AND CIVIL ENGINEERING

THREE LAKES CROSSING

SITE PLAN
FIGURE 2

3. EXISTING CONDITIONS

3.1 Existing Roadway Characteristics

The major roadways and arterials serving the subject site are described below:

Tumwater Boulevard SE: is an east-west, two-lane minor arterial located south of the subject site. Travel lanes are approximately 12-feet in width. Paved shoulders approximately 7- to 11- feet in width are provided in the vicinity of the subject site along either side of the roadway. The posted speed limit is 35-mph.

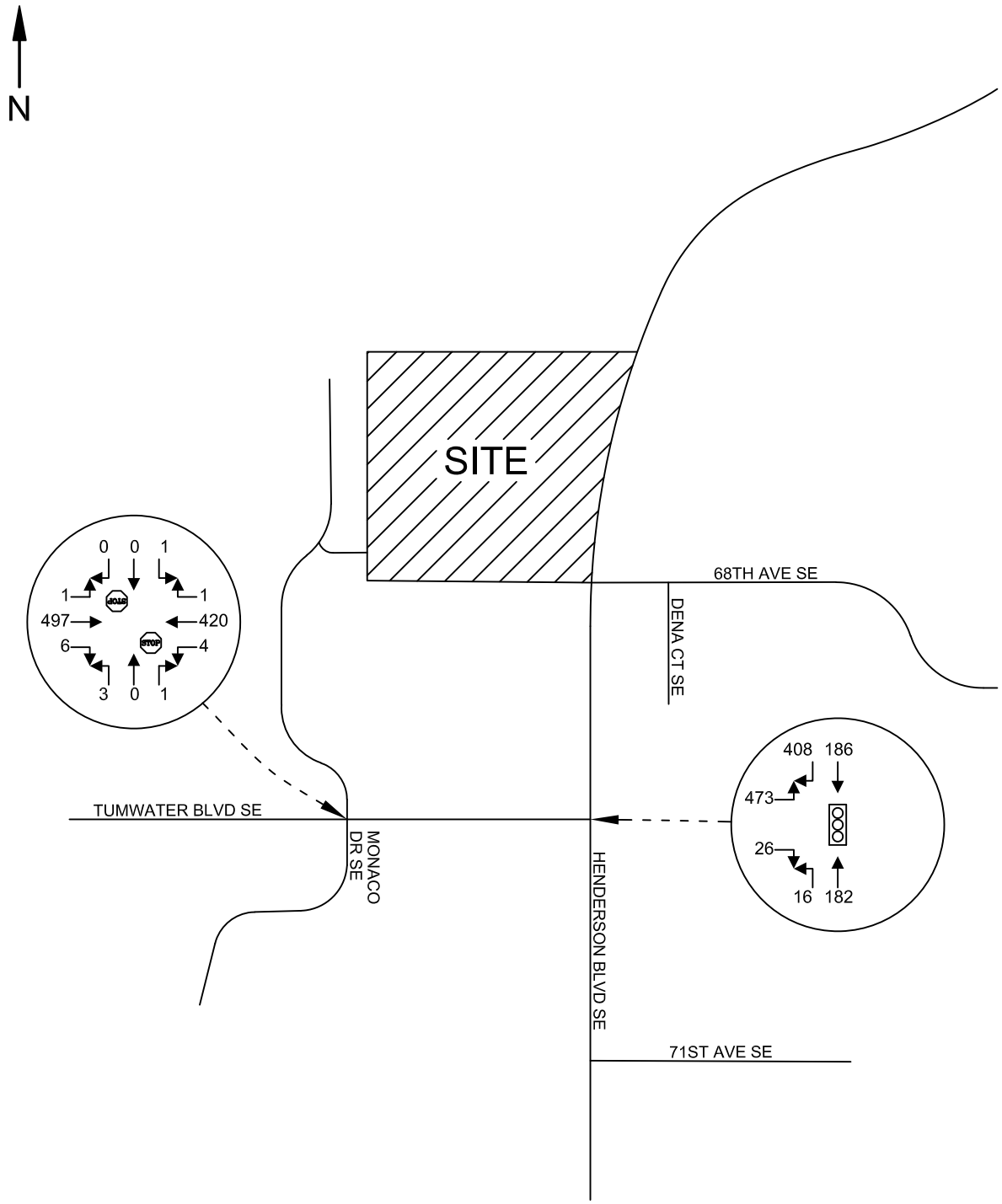
Henderson Boulevard SE: is a north-south, two-lane roadway that borders the subject site to the east. The roadway is designated as a minor arterial north of Tumwater Boulevard SE and an urban collector south of the intersection. Travel lanes are approximately 11- to 12-feet in width with additional turn-lanes provided at major intersections. Shoulder composition varies between paved segments varying in width to no formal treatment. The posted speed limit is 35-mph.

3.2 Non-Motorist Traffic

Non-motorist traffic was observed at the time of field counts. No non-motorist volumes were observed at the study intersection of Tumwater Boulevard SE & Henderson Boulevard SE during the PM peak hour. No pedestrians and three bicyclists were observed at Tumwater Boulevard SE & Monaco Drive SE during the PM peak hour. Non-motorist infrastructure is limited in the vicinity of the subject site. No significant increase in respect to non-motorist volumes is anticipated as a result of the proposed development.

3.3 Existing Peak Hour Volumes and Travel Patterns

Field data for this study was collected in September of 2021. Intersection data was collected at Tumwater Boulevard SE & Monaco Drive SE and Tumwater Boulevard SE & Henderson Boulevard SE. Data was obtained during the evening peak period between the hours of 4:00 PM – 6:00 PM, which generally translates to highest overall roadway volumes in a given 24-hour period. The one hour reflecting highest overall roadway volumes (peak hour) was then derived from these counts. Existing PM peak hour volumes observed on-site are illustrated in Figure 3. Full count sheets are attached in the appendix.



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TRAFFIC AND CIVIL ENGINEERING

THREE LAKES CROSSING

EXISTING PM PEAK HOUR VOLUMES
FIGURE 3

3.4 Level of Service

Baseline intersection delays were determined through the use of the *Highway Capacity Manual* 6th Edition. Capacity analysis is used to determine level of service (LOS) which is an established measure of congestion for transportation facilities. The range[1] for intersection level of service is LOS A to LOS F with the former indicating the best operating conditions with low control delays and the latter indicating the worst conditions with heavy control delays. Detailed descriptions of intersection LOS are given in the 2016 Highway Capacity Manual. Level of service calculations were made through the use of the *Synchro 11* analysis program. Delays presented represent overall weighted average delays for signalized control. For side-street, stop-controlled intersections, LOS is determined by the approach with the highest delay. Table 1 below portrays existing PM peak hour LOS delays for the key intersections of study.

Table 1: Existing PM Peak Hour Level of Service

Delays given in seconds per vehicle

Intersection	Control	LOS	Delay
Tumwater Blvd SE & Monaco Dr SE	Stop	A	6.2
Tumwater Blvd SE & Henderson Blvd SE	Signal	C	30.9

Existing PM peak hour delays are all shown to calculate within the LOS B or better range indicating stable operations during the critical peak hour of travel. All intersections meet the city of Tumwater's level of service standard of LOS D or better.

---

1 *Signalized Intersections - Level of Service*

Level of Service	Control Delay per Vehicle (sec)
A	≤10
B	> 10 and ≤20
C	> 20 and ≤35
D	> 35 and ≤55
E	> 55 and ≤80
F	> 80

Stop Controlled Intersections – Level of Service

Level of Service	Control Delay per Vehicle (sec)
A	≤10
B	> 10 and ≤15
C	> 15 and ≤25
D	> 25 and ≤35
E	> 35 and ≤50
F	> 50

Highway Capacity Manual, 6th Edition

3.5 Roadway Improvements

A review of the City of Tumwater's Six Year Transportation Improvement Program 2022-2027 indicates that improvement projects are planned in the vicinity. Descriptions and summaries of each project are provided in Table 2 below.

Table 2: Transportation Improvement Projects

Name	Location	Improvement	Cost
Henderson Blvd Bridge (Map ID# 5)	Henderson Blvd	Design stages for future bridge widening or replacement to add capacity/non-motorist facilities	$250,000
93rd Ave / Kimmie Street Intersection (Map ID# 6)	93rd Ave / Kimmie Street Intersection	ROW acquisition for future intersection improvements	$150,000
Old Highway 99 Corridor Improvements (Map ID# 7)	79th Ave to 73rd Ave	Design and construct urban road section and improvements determined from the Corridor Study. To include addition of traffic lanes, turn lanes, multi-modal facilities, etc.	$3,500,000
Tumwater Blvd Interchange (Map ID# 9)	I-5 SB Ramps to I-5 NB Ramps	Design, acquire ROW, and construct improvements to Interchange	$6,650,000
Deschutes Valley Trail (Map ID# 19-22)	E St to Pioneer Park	Construction of a paved walking / bicycling trail connection	$11,550,000

3.6 Transit Service

The Intercity Transit and TRPC regional bus schedules were reviewed in terms of transit available in the vicinity of the subject site. The nearest available transit service, provided 0.90 miles west at the intersection of Israel Road SE & Capitol Boulevard SE, is provided via Routes 2 and 12. Route 2 – Rainier, Tenino, Tumwater – provides service from Binghampton Street & Dakota Avenue to Tumwater Square from approximately 6:00 AM – 5:55 PM with 120-minute headways during peak travel hours. Route 12, L & I to Olympia Transit Center, provides service from the Olympia Transit Center to the Tumwater Labor & Industries Building. Other major destinations served by Route 12 include the Thurston County Courthouse and SPSCC. Weekday service is provided from approximately 5:39 AM to 8:25 PM with 30-minute headways during peak travel hours. Weekend service is provided from approximately 7:30 AM to 8:25 PM with approximately 30-minute headways. Refer to Intercity Transit and TRPC routes and schedules for more detailed information.

4. FUTURE TRAFFIC CONDITIONS

4.1 Trip Generation

Trip generation is defined as the number of vehicle movements that enter or exit a site during a designated time period such as a specific peak hour or an entire day. Data presented in this analysis was derived from the Institute of Transportation Engineer's (ITE) publication *Trip Generation,* 11th Edition. The proposed land use is to be defined as Single-Family Detached Housing (LUC 210). ITE average rates were used to determine trip ends with dwelling units used as the input variable. Table 3 below summarizes anticipated vehicular movements for the average weekday daily trips (AWDT), AM peak hour and PM peak hour. ITE Trip Generation sheets have been attached to the appendix for reference.

Table 3: Project Trip Generation

Land Use	Size	ADT	AM Peak-Hour Trips			PM Peak-Hour Trips		
			In	Out	Total	In	Out	Total
Single-Family Detached	45 dwelling units	424	8	23	**31**	26	16	**42**

Based on the data presented in Table 3, the project is anticipated to generate 424 new average weekday daily trips with 31 trips (8 in/23 out) occurring during the AM peak hour and 42 trips (26 in/16 out) occurring during the PM peak hour.

4.2 Trip Distribution and Assignment

Trip distribution describes the anticipated travel routes for inbound and outbound project traffic during the peak hour study period. The specific destinations and origins of the generated traffic primarily influences the key intersections, which will effectively receive the bulk of project impacts. Anticipated distribution percentages and travel routes for the PM peak hour are illustrated in Figure 4. Percentages are based on Thurston Regional Planning Council (TRPC) TAZ 232 Distribution Map. See appendix for complete TAZ map.

Moreover, project-generated trips anticipated to travel through the Tumwater I-5 Interchange to the south as identified from the TAZ 232 map are outlined in Figure A in the appendix. Approximately 2 project trips are identified to travel through the aforementioned interchanges during the critical PM peak hour.

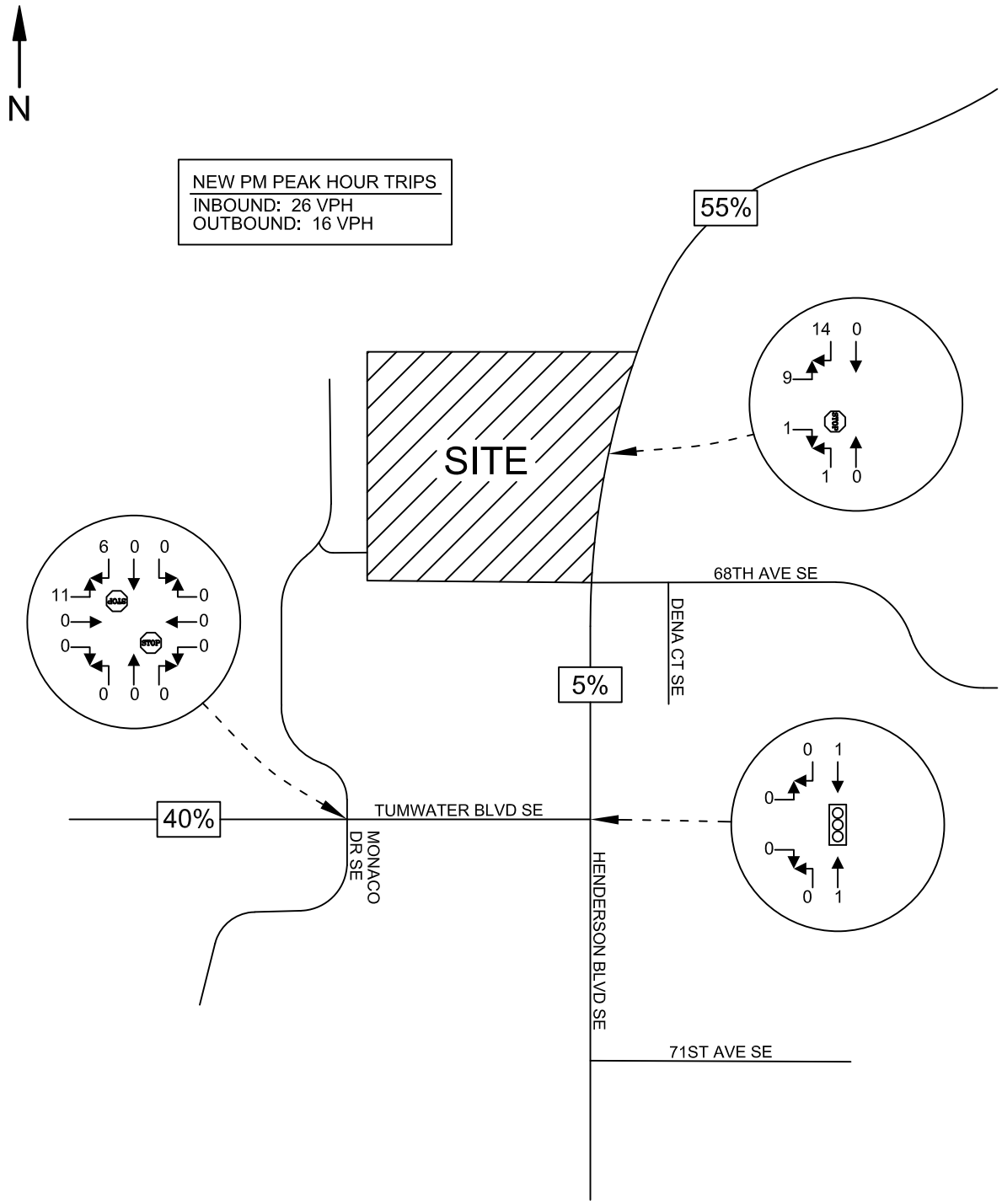
It should be noted that there is availability of access to the development by both the Tumwater Boulevard SE (via internal connection to southerly/westerly development) and Henderson Boulevard SE roadways.

4.3 Future Peak Hour Volumes

A 5-year horizon of 2026 was used for future traffic delay analysis. Forecast 2026 background traffic volumes were derived by applying a 1.5 percent compound annual growth rate to the existing volumes shown in Figure 3. This growth rate has been used for similar past projects in the area.

Moreover, pipeline volumes associated with the nearby Tumwater Boulevard Plat and Shinn Estates Plat projects were included in forecast analysis. It should be noted that Tumwater Boulevard Plat was under construction at the time of field counts. For this reason, trip generation associated with the proposed 26 single-family dwelling units was derived via ITE data and added to forecast volumes. PM peak hour pipeline volumes are illustrated in Figures 5A and 5B. Pipeline volumes illustrated in 5A are representative of forecast background volumes and do not include internal connection to the proposed Three Lakes Crossing development. Thereby, no access to Henderson Boulevard SE is illustrated. Pipeline volumes illustrated in Figure 5B include internal connection to the proposed project and redistribute traffic through the proposed Henderson Boulevard SE access.

Forecast 2026 PM peak hour volumes without and with project-generated traffic are illustrated in Figures 6 and 7.



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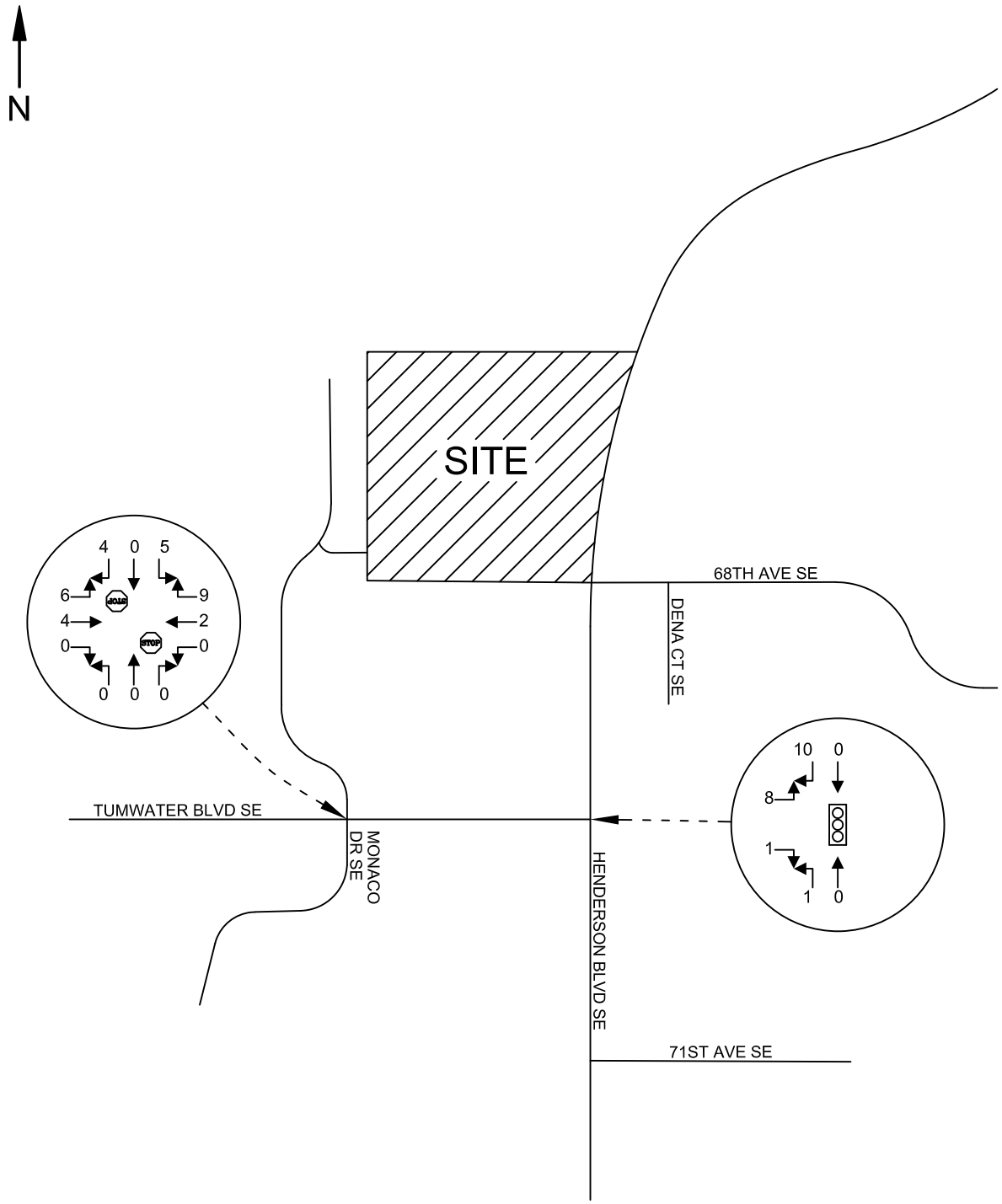
TRAFFIC AND CIVIL ENGINEERING

THREE LAKES CROSSING

PM PEAK HOUR TRIP DISTRIBUTION & ASSIGNMENT
FIGURE 4



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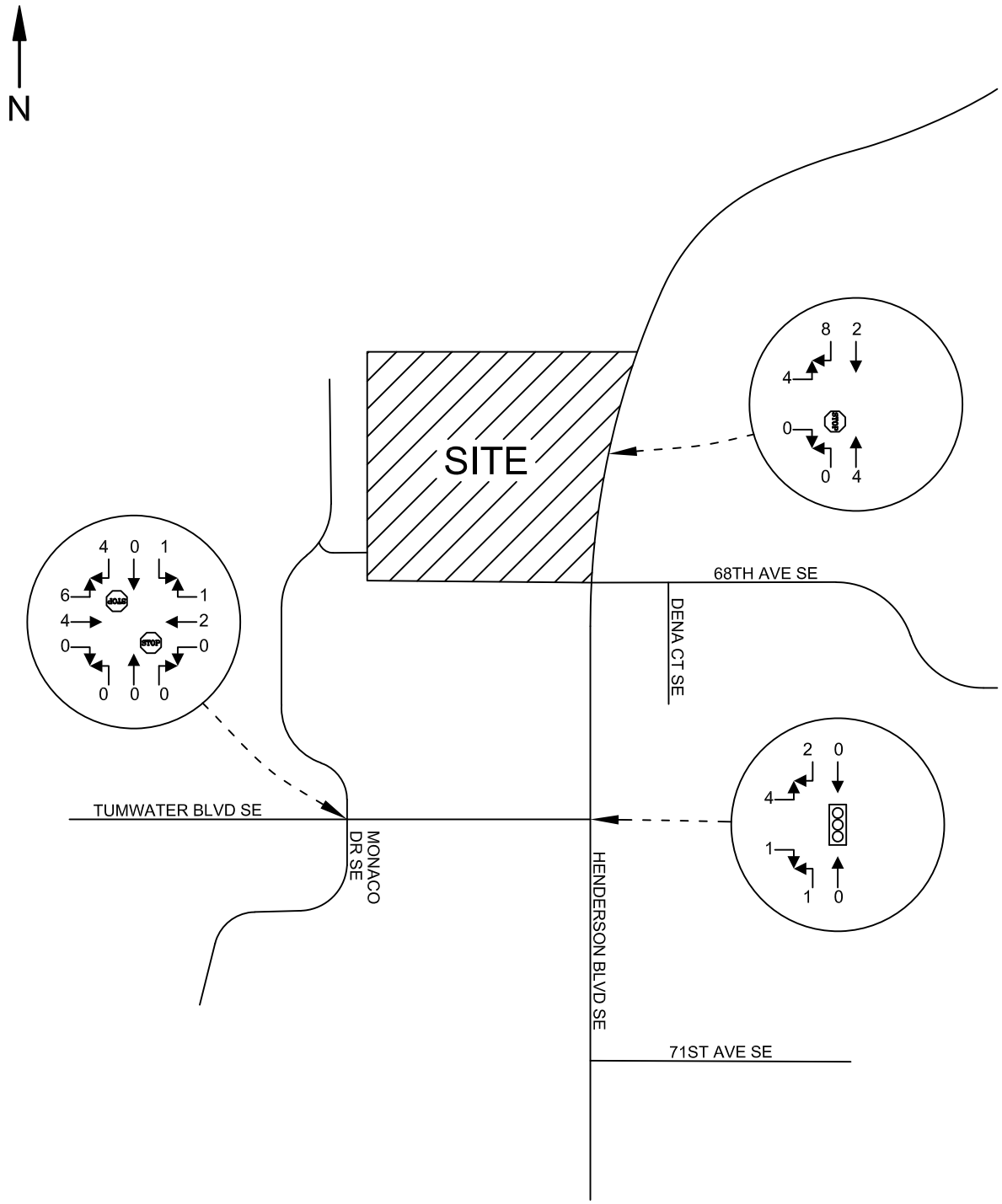
TRAFFIC AND CIVIL ENGINEERING

THREE LAKES CROSSING

PM PEAK HOUR PIPELINE VOLUMES: NO INTERNAL CONNECTION

FIGURE 5A



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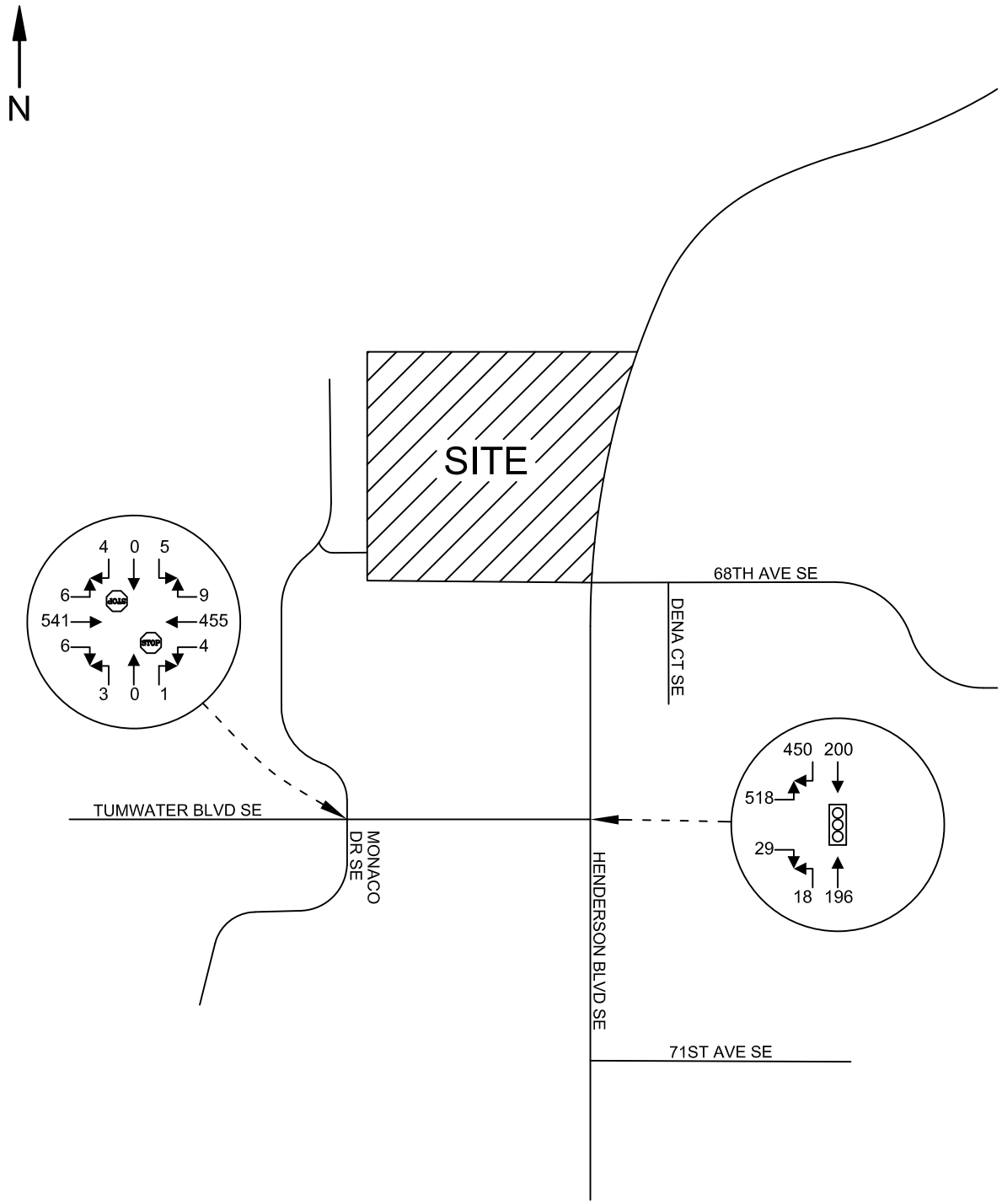
THREE LAKES CROSSING

PM PEAK HOUR PIPELINE VOLUMES: INTERNAL CONNECTION

FIGURE 5B



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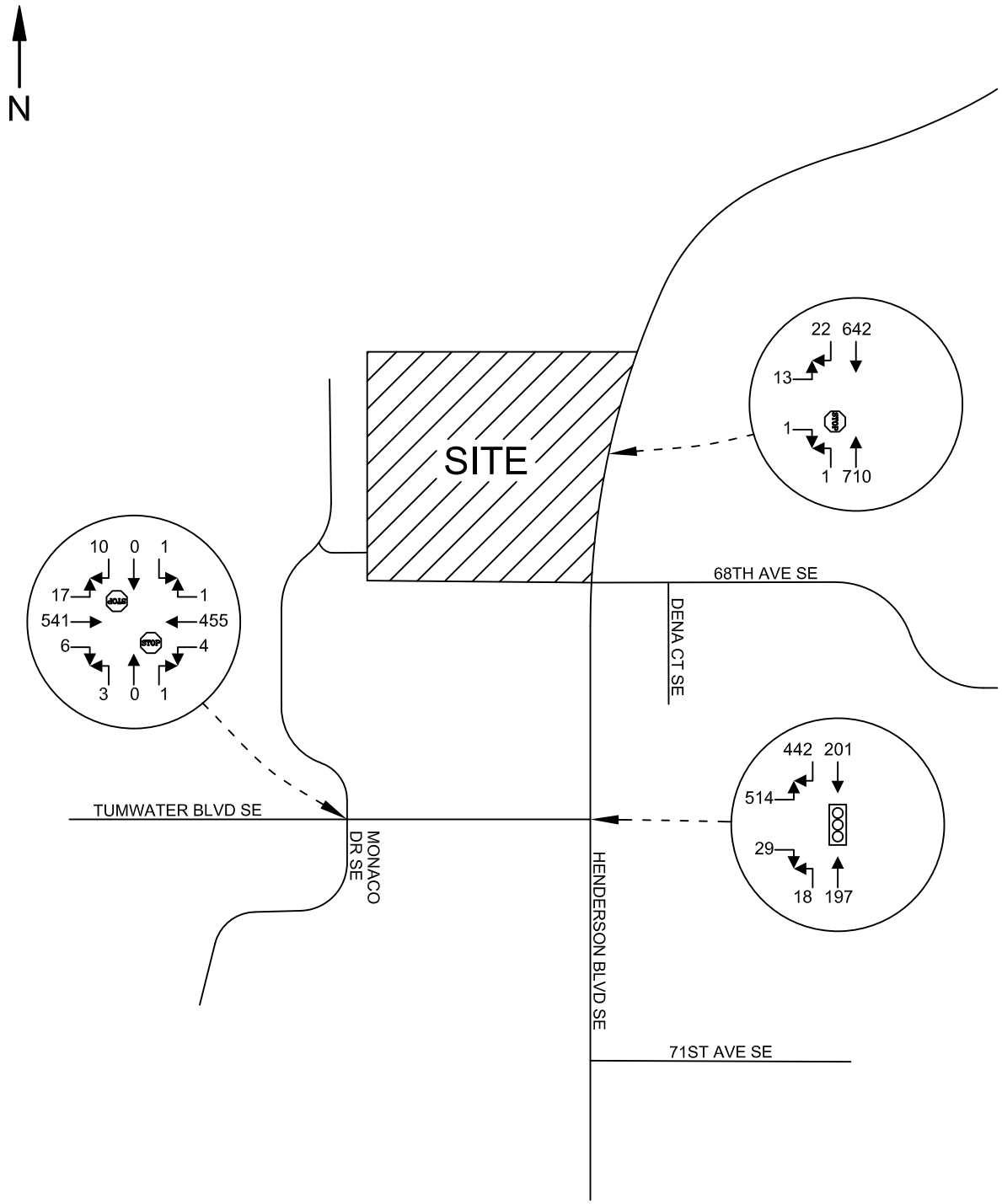
TRAFFIC AND CIVIL ENGINEERING

THREE LAKES CROSSING

FORECAST 2026 PM PEAK HOUR BACKGROUND VOLUMES
FIGURE 6



HEATH & ASSOCIATES

TRAFFIC AND CIVIL ENGINEERING

THREE LAKES CROSSING

FORECAST 2026 PM PEAK HOUR VOLUMES WITH PROJECT

FIGURE 7

4.4 Future Level of Service

A level of service analysis was made of the future PM peak hour volumes without (background) and with project-generated trips. Results for intersection delay conditions were again determined using the *Synchro 11* analysis program. A summary of the results are shown in Table 4 for the forecast 2026 PM peak travel hour.

Table 4: Forecast 2026 PM Peak Hour Level of Service

Delays given in seconds per vehicle

		Background		*With Project*	
Intersection	**Control**	**LOS**	**Delay**	**LOS**	**Delay**
Tumwater Blvd SE & Monaco Dr SE	Stop	C	21.2	C	22.2
Tumwater Blvd SE & Henderson Blvd SE	Signal	D	48.4	D	45.5
Project Access & Henderson Blvd SE	Stop	-	-	D	32.9

Forecast 2026 PM peak hour delays are shown to operate at LOS D or better without or with the addition of project traffic. All intersections meet the city of Tumwater's level of service standard of LOS D or better.

It should be noted that Tumwater Boulevard SE & Henderson Boulevard SE is shown to operate with lesser delays with project-generated traffic than without. This is due to the diversion of a portion of pipeline traffic to the proposed project access on Henderson Boulevard SE, subsequently no longer traveling through the intersection.

4.5 Left Turn Lane Warrant

Left turn lanes are a means of providing necessary storage space for left turning vehicles at intersections. For this impact study, procedures prescribed by the WSDOT Design Manual Exhibit 1310-7a were used to ascertain storage requirements at the newly proposed access location on Henderson Boulevard SE and at Monaco Drive SE & Tumwater Boulevard SE. Based on forecast 2026 PM peak hour volumes with project traffic – a left turn lane *would not be warranted* at either intersection. Refer to the appendix for the warrant nomographs.

5. SUMMARY

The Three Lakes Crossing project proposes to construct 45 new single-family units within in the city of Tumwater. The subject site, bordered to the east by Henderson Boulevard SE, is located on a cumulative 16.66-acres within tax parcel #'s: 1270132-0105; 7930000-0100; & -0101. Access to the site is to be provided via one driveway extending west from Henderson Boulevard SE. Moreover, internal connection with the development to the southwest will provide access to Tumwater Boulevard SE. Refer to Figure 2 for the proposed access/roadway configuration and lot layout.

Based on ITE data the project would be anticipated to generate 424 new average weekday daily trips with 31 AM peak hour trips (8 in / 23 out) and 42 new PM peak hour trips (26 in / 16 out). Existing level of service (LOS) is summarized in Table 1 and indicates intersections operating with delays in the LOS C or better range. A five-year horizon of 2026 was utilized for forecast analyses, which included a compound annual growth rate of 1.5 percent and the addition of pipeline volumes. Forecast 2026 PM peak hour level of service without and with the addition of project generated traffic is provided in Table 4. All intersections of study are shown to operate with LOS D or better delays during the PM peak hour without or with the addition of project-generated traffic. All intersections are shown to meet the city of Tumwater's LOS standards.

Based on the analysis above, the following mitigation is required for the Three Lakes Crossing project.

1. Pay Traffic Impact Fees (TIF) as required by the city of Tumwater. Impact fees are collected at $3,918.63 per single-family dwelling unit in accordance to the City's 2021 Fee Resolution schedule. Therefore, the estimated TIF is collected at:

   45 units x $3,918.63 = $176,338.35

2. Pay Traffic Impact Fees (TIF) as required by the SEPA Mitigation Fee. Impact fees are collected at $4,219.00 per trip that travels through the I-5 Tumwater Interchanges located south of the subject site. Trip ends, as illustrated in Figure A in the appendix, were derived via the TRPC TAZ 232 Distribution Map. The estimated SEPA Mitigation Fee is collected at:

   2 trips x $4,219.00 = $8,438.00

No other mitigation is identified at this time.

THREE LAKES CROSSING
TRAFFIC IMPACT ANALYSIS

APPENDIX

Heath & Associates

PO Box 397
Puyallup, WA 98371

File Name : 4722b
Site Code : 00004722
Start Date : 9/8/2021
Page No : 1

Groups Printed- Passenger + - Heavy

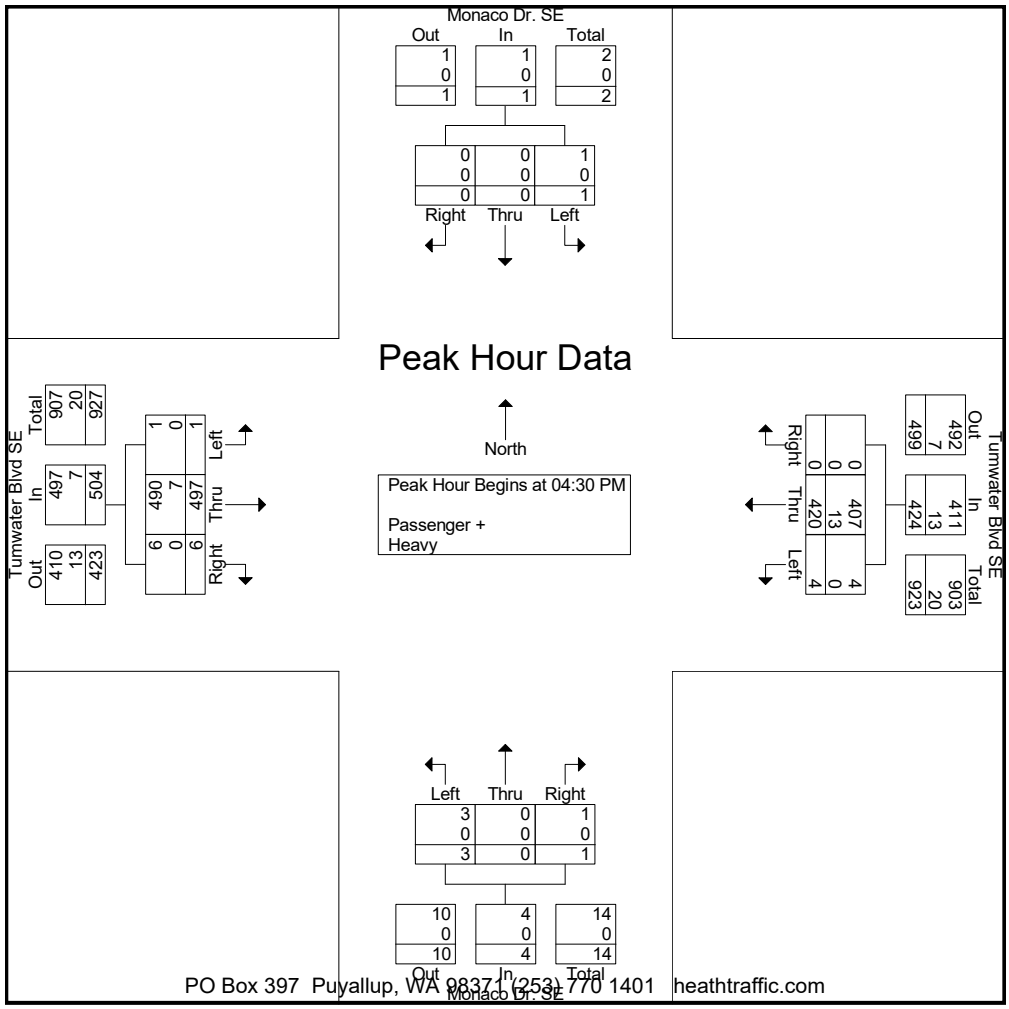
	Monaco Dr. SE Southbound				Tumwater Blvd SE Westbound				Monaco Dr. SE Northbound				Tumwater Blvd SE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
04:00 PM	0	0	1	1	0	88	0	88	0	0	0	0	2	88	0	90	179
04:15 PM	0	0	0	0	0	91	1	92	1	0	0	1	1	86	0	87	180
04:30 PM	0	0	0	0	0	101	1	102	0	0	2	2	1	114	0	115	219
04:45 PM	0	0	0	0	0	119	1	120	1	0	0	1	3	115	0	118	239
Total	0	0	1	1	0	399	3	402	2	0	2	4	7	403	0	410	817
05:00 PM	0	0	1	1	0	101	0	101	0	0	0	0	2	142	1	145	247
05:15 PM	0	0	0	0	0	99	2	101	0	0	1	1	0	126	0	126	228
05:30 PM	0	0	0	0	0	83	0	83	1	0	1	2	0	101	0	101	186
05:45 PM	0	0	0	0	0	85	1	86	0	0	0	0	1	82	0	83	169
Total	0	0	1	1	0	368	3	371	1	0	2	3	3	451	1	455	830
Grand Total	0	0	2	2	0	767	6	773	3	0	4	7	10	854	1	865	1647
Apprch %	0	0	100		0	99.2	0.8		42.9	0	57.1		1.2	98.7	0.1		
Total %	0	0	0.1	0.1	0	46.6	0.4	46.9	0.2	0	0.2	0.4	0.6	51.9	0.1	52.5	
Passenger +	0	0	1	1	0	746	6	752	3	0	4	7	10	841	1	852	1612
% Passenger +	0	0	50	50	0	97.3	100	97.3	100	0	100	100	100	98.5	100	98.5	97.9
Heavy	0	0	1	1	0	21	0	21	0	0	0	0	0	13	0	13	35
% Heavy	0	0	50	50	0	2.7	0	2.7	0	0	0	0	0	1.5	0	1.5	2.1

Heath & Associates

PO Box 397
Puyallup, WA 98371

File Name : 4722b
Site Code : 00004722
Start Date : 9/8/2021
Page No : 2

	Monaco Dr. SE Southbound				Tumwater Blvd SE Westbound				Monaco Dr. SE Northbound				Tumwater Blvd SE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	0	0	0	0	0	101	1	102	0	0	**2**	**2**	1	114	0	115	219
04:45 PM	0	0	0	0	0	**119**	1	**120**	**1**	0	0	1	**3**	115	0	118	239
05:00 PM	0	0	**1**	**1**	0	101	0	101	0	0	0	0	2	**142**	**1**	**145**	**247**
05:15 PM	0	0	0	0	0	99	**2**	101	0	0	1	1	0	126	0	126	228
Total Volume	0	0	1	1	0	420	4	424	1	0	3	4	6	497	1	504	933
% App. Total	0	0	100		0	99.1	0.9		25	0	75		1.2	98.6	0.2		
PHF	.000	.000	.250	.250	.000	.882	.500	.883	.250	.000	.375	.500	.500	.875	.250	.869	.944
Passenger +	0	0	1	1	0	407	4	411	1	0	3	4	6	490	1	497	913
% Passenger +	0	0	100	100	0	96.9	100	96.9	100	0	100	100	100	98.6	100	98.6	97.9
Heavy	0	0	0	0	0	13	0	13	0	0	0	0	0	7	0	7	20
% Heavy	0	0	0	0	0	3.1	0	3.1	0	0	0	0	0	1.4	0	1.4	2.1



Heath & Associates

PO Box 397
Puyallup, WA 98371

File Name : 4722a
Site Code : 00004722
Start Date : 9/8/2021
Page No : 1

Groups Printed- Passenger + - Heavy

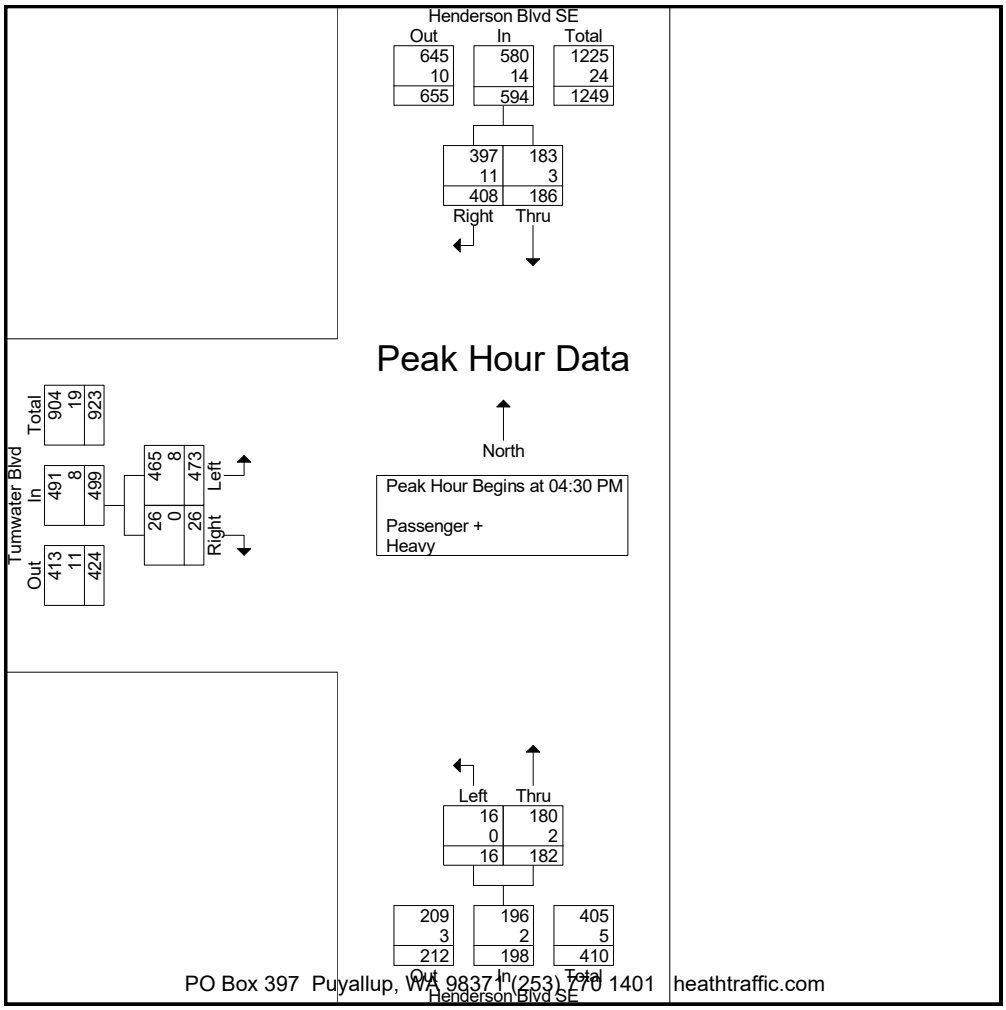
	Henderson Blvd SE Southbound			Henderson Blvd SE Northbound			Tumwater Blvd Eastbound			
Start Time	Right	Thru	App. Total	Thru	Left	App. Total	Right	Left	App. Total	Int. Total
04:00 PM	83	44	127	53	4	57	4	81	85	269
04:15 PM	92	37	129	48	1	49	0	84	84	262
04:30 PM	94	36	130	42	5	47	3	113	116	293
04:45 PM	114	53	167	42	6	48	6	102	108	323
Total	383	170	553	185	16	201	13	380	393	1147
05:00 PM	103	33	136	51	2	53	9	138	147	336
05:15 PM	97	64	161	47	3	50	8	120	128	339
05:30 PM	81	48	129	31	3	34	5	101	106	269
05:45 PM	79	35	114	41	4	45	4	73	77	236
Total	360	180	540	170	12	182	26	432	458	1180
Grand Total	743	350	1093	355	28	383	39	812	851	2327
Apprch %	68	32		92.7	7.3		4.6	95.4		
Total %	31.9	15	47	15.3	1.2	16.5	1.7	34.9	36.6	
Passenger +	729	344	1073	348	28	376	39	797	836	2285
% Passenger +	98.1	98.3	98.2	98	100	98.2	100	98.2	98.2	98.2
Heavy	14	6	20	7	0	7	0	15	15	42
% Heavy	1.9	1.7	1.8	2	0	1.8	0	1.8	1.8	1.8

Heath & Associates

PO Box 397
Puyallup, WA 98371

File Name : 4722a
Site Code : 00004722
Start Date : 9/8/2021
Page No : 2

	Henderson Blvd SE Southbound			Henderson Blvd SE Northbound			Tumwater Blvd Eastbound			
Start Time	Right	Thru	App. Total	Thru	Left	App. Total	Right	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:30 PM										
04:30 PM	94	36	130	42	5	47	3	113	116	293
04:45 PM	**114**	53	**167**	42	**6**	48	6	102	108	323
05:00 PM	103	33	136	**51**	2	**53**	**9**	**138**	**147**	336
05:15 PM	97	**64**	161	47	3	50	8	120	128	**339**
Total Volume	408	186	594	182	16	198	26	473	499	1291
% App. Total	68.7	31.3		91.9	8.1		5.2	94.8		
PHF	.895	.727	.889	.892	.667	.934	.722	.857	.849	.952
Passenger +	397	183	580	180	16	196	26	465	491	1267
% Passenger +	97.3	98.4	97.6	98.9	100	99.0	100	98.3	98.4	98.1
Heavy	11	3	14	2	0	2	0	8	8	24
% Heavy	2.7	1.6	2.4	1.1	0	1.0	0	1.7	1.6	1.9



Single-Family Detached Housing
(210)

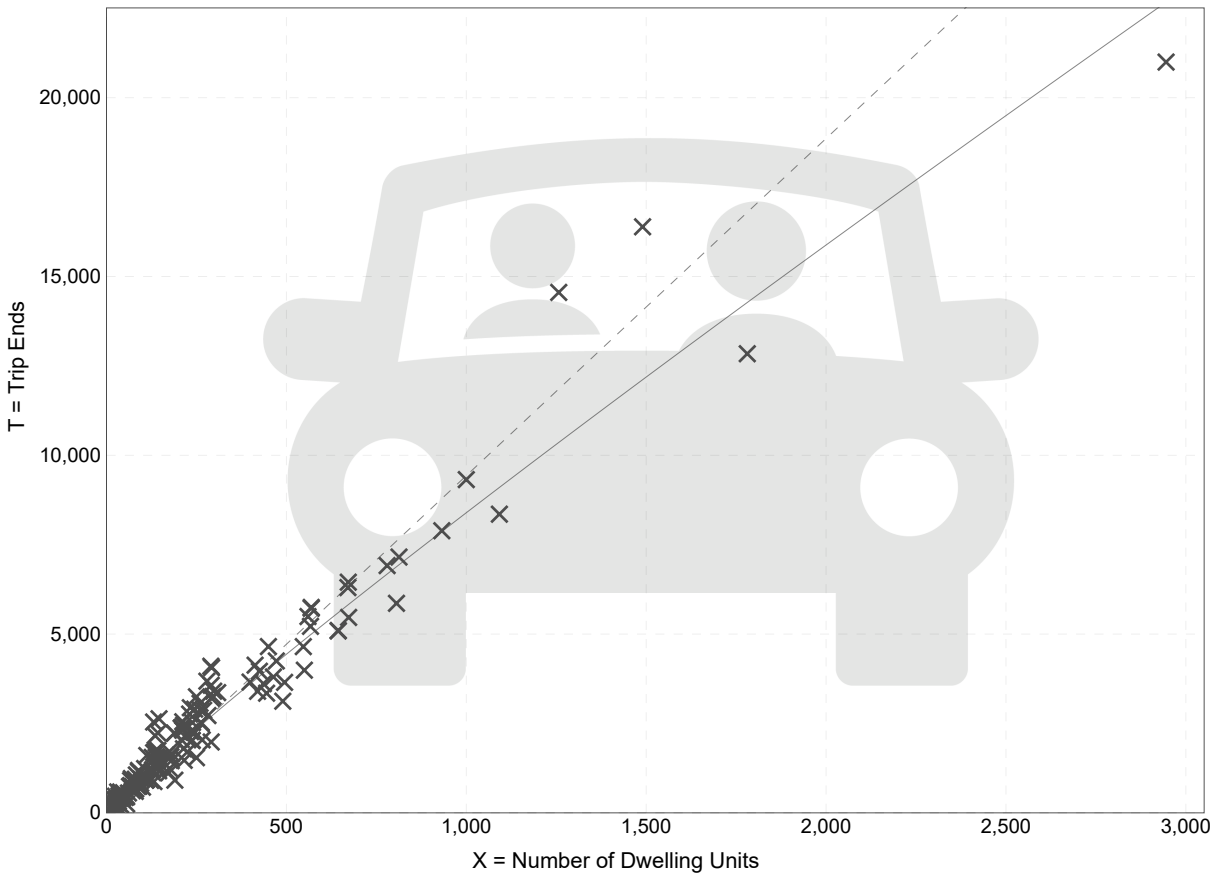
Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday**

Setting/Location: **General Urban/Suburban**
Number of Studies: 174
Avg. Num. of Dwelling Units: 246
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
9.43	4.45 - 22.61	2.13

Data Plot and Equation



Fitted Curve Equation: Ln(T) = 0.92 Ln(X) + 2.68 **R^2= 0.95**

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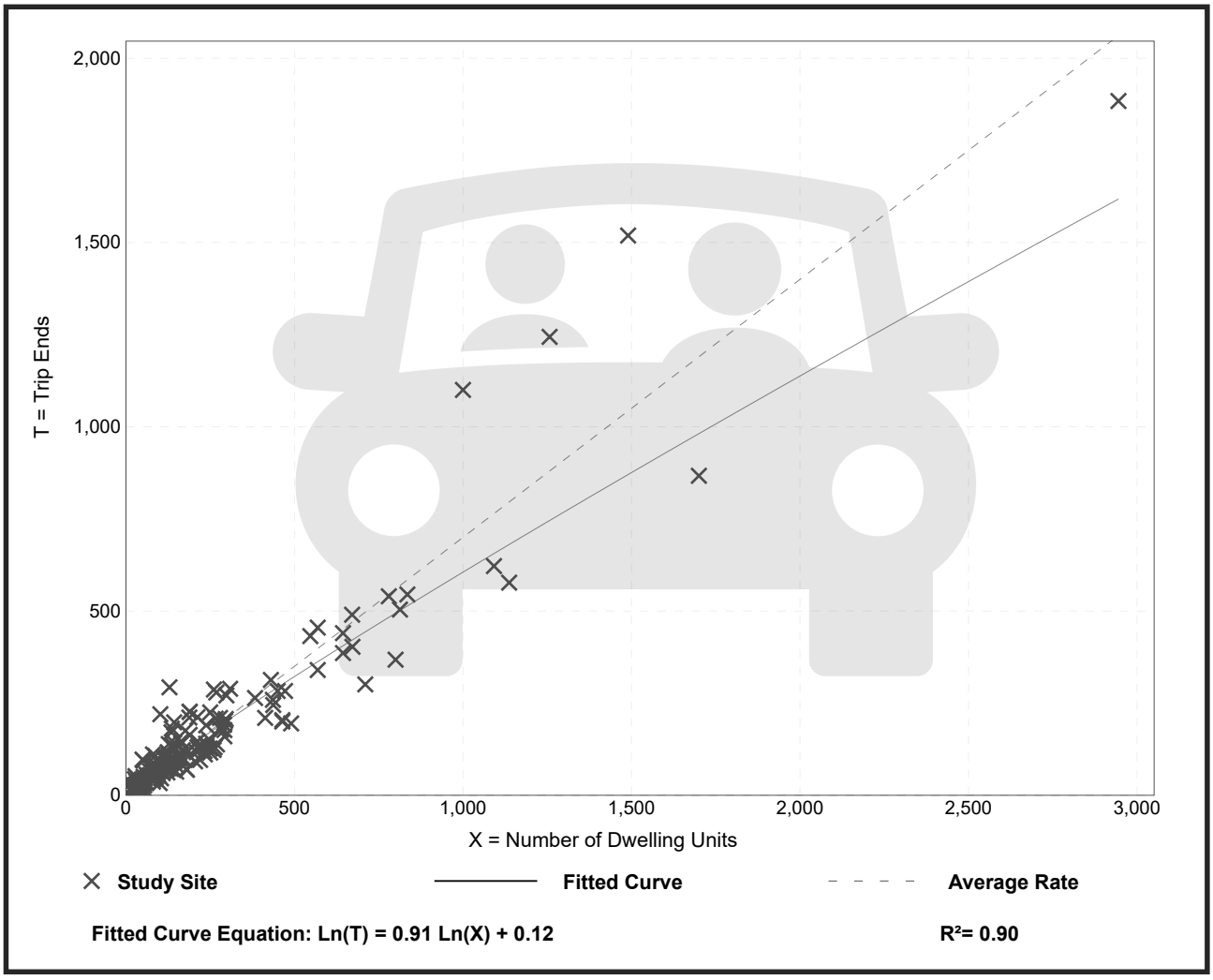
Single-Family Detached Housing
(210)

Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 192
Avg. Num. of Dwelling Units: 226
Directional Distribution: 26% entering, 74% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.70	0.27 - 2.27	0.24

Data Plot and Equation



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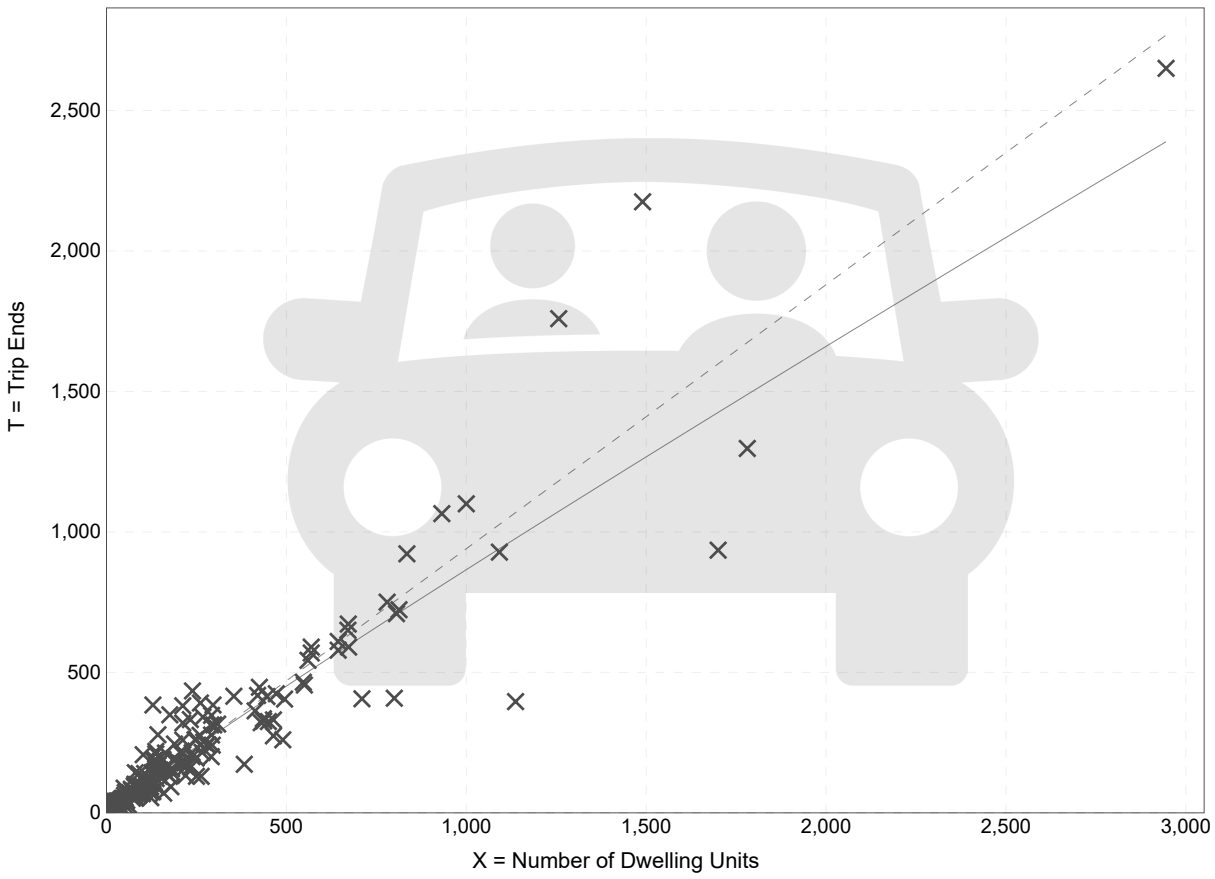
Single-Family Detached Housing
(210)

Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 208
Avg. Num. of Dwelling Units: 248
Directional Distribution: 63% entering, 37% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.94	0.35 - 2.98	0.31

Data Plot and Equation



Fitted Curve Equation: Ln(T) = 0.94 Ln(X) + 0.27 **R^2= 0.92**

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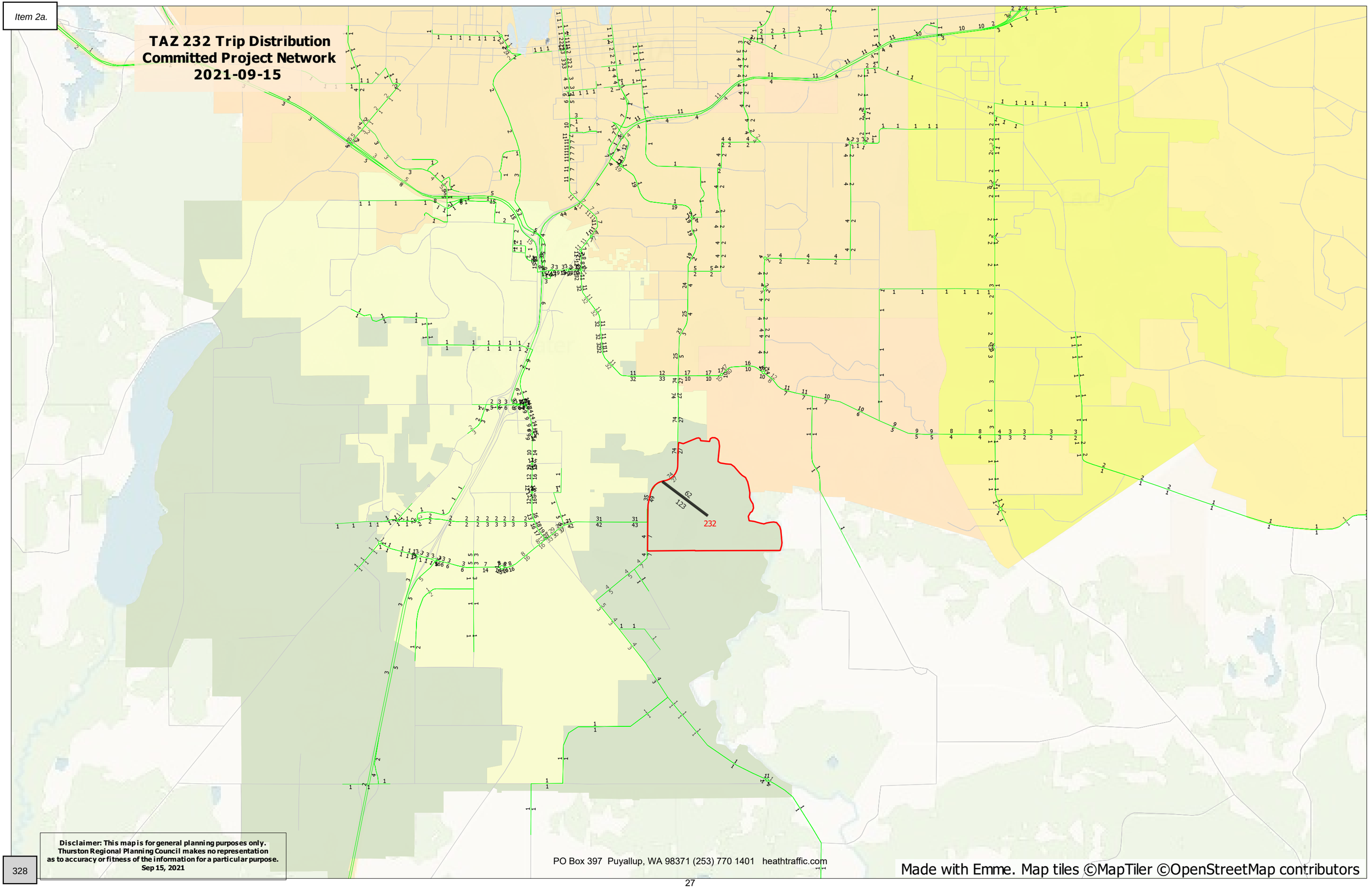
TAZ 232 Trip Distribution
Committed Project Network
2021-09-15



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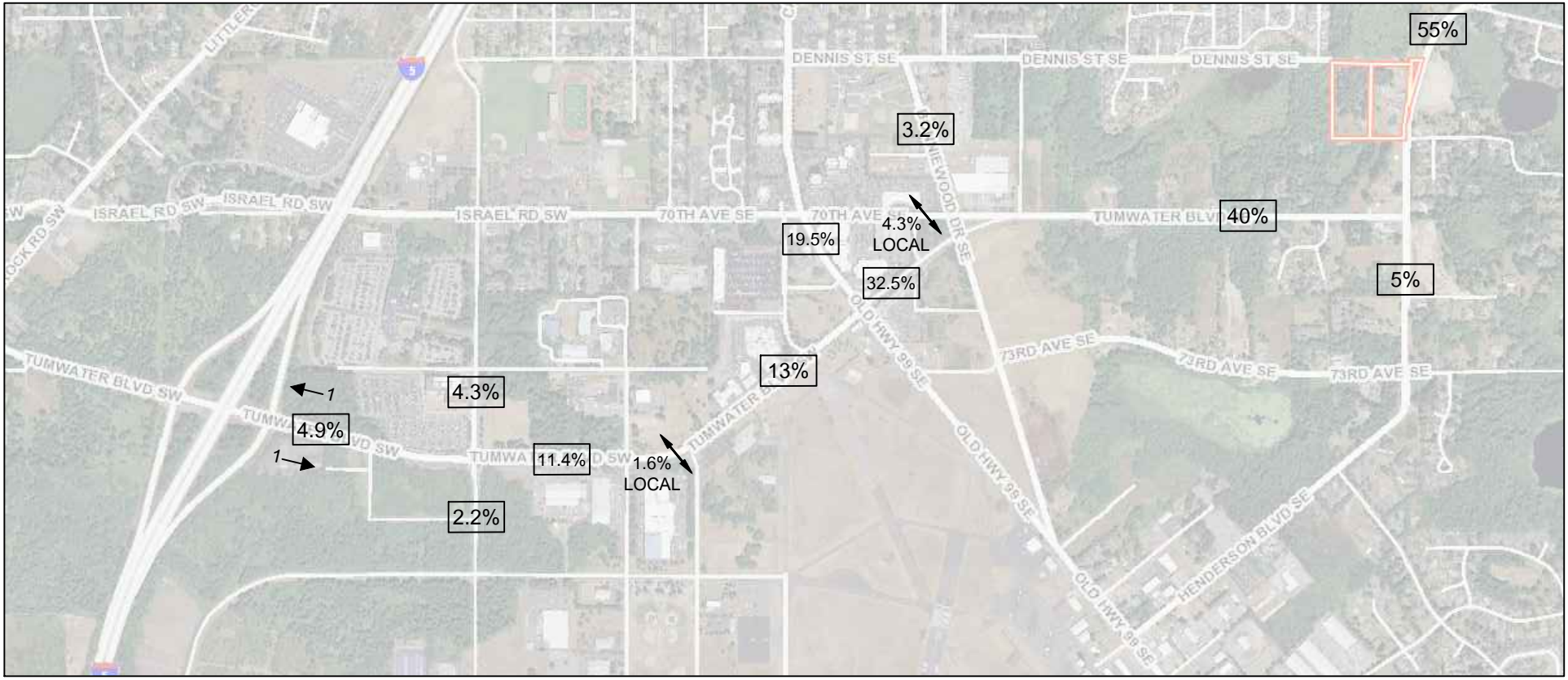
N

NEW PM PEAK HOUR TRIPS
INBOUND: 26 VPH
OUTBOUND: 16 VPH



HEATH & ASSOCIATES
TRAFFIC AND CIVIL ENGINEERING

THREE LAKES CROSSING
PM PEAK HOUR TRIP DISTRIBUTION & ASSIGNMENT
FIGURE A

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	1	497	6	4	420	0	3	0	1	1	0	0
Future Vol, veh/h	1	497	6	4	420	0	3	0	1	1	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	1	1	1	1	3	1	1	1	1	1	1	1
Mvmt Flow	1	529	6	4	447	0	3	0	1	1	0	0

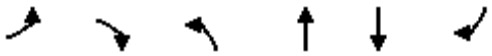
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	447	0	0	535	0	0	989	989	532	990	992	447
Stage 1	-	-	-	-	-	-	534	534	-	455	455	-
Stage 2	-	-	-	-	-	-	455	455	-	535	537	-
Critical Hdwy	4.11	-	-	4.11	-	-	7.11	6.51	6.21	7.11	6.51	6.21
Critical Hdwy Stg 1	-	-	-	-	-	-	6.11	5.51	-	6.11	5.51	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.11	5.51	-	6.11	5.51	-
Follow-up Hdwy	2.209	-	-	2.209	-	-	3.509	4.009	3.309	3.509	4.009	3.309
Pot Cap-1 Maneuver	1119	-	-	1038	-	-	227	248	549	226	247	614
Stage 1	-	-	-	-	-	-	532	526	-	587	570	-
Stage 2	-	-	-	-	-	-	587	570	-	531	524	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1119	-	-	1038	-	-	226	247	549	224	246	614
Mov Cap-2 Maneuver	-	-	-	-	-	-	226	247	-	224	246	-
Stage 1	-	-	-	-	-	-	531	525	-	586	567	-
Stage 2	-	-	-	-	-	-	584	567	-	529	523	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.1	18.8	21.1
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	265	1119	-	-	1038	-	-	224
HCM Lane V/C Ratio	0.016	0.001	-	-	0.004	-	-	0.005
HCM Control Delay (s)	18.8	8.2	0	-	8.5	0	-	21.1
HCM Lane LOS	C	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0

HCM 6th Signalized Intersection Summary
2: Tumwater Blvd SE & Henderson Blvd SE

Existing PM Peak Hour
10/04/2021



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	473	26	16	182	186	408
Future Volume (veh/h)	473	26	16	182	186	408
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1885	1885	1885	1870	1856
Adj Flow Rate, veh/h	498	27	17	192	196	429
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	1	1	1	2	3
Cap, veh/h	568	31	23	261	549	462
Arrive On Green	0.34	0.34	0.15	0.15	0.29	0.29
Sat Flow, veh/h	1676	91	153	1725	1870	1572
Grp Volume(v), veh/h	526	0	209	0	196	429
Grp Sat Flow(s),veh/h/ln	1770	0	1878	0	1870	1572
Q Serve(g_s), s	17.4	0.0	6.6	0.0	5.2	16.5
Cycle Q Clear(g_c), s	17.4	0.0	6.6	0.0	5.2	16.5
Prop In Lane	0.95	0.05	0.08			1.00
Lane Grp Cap(c), veh/h	600	0	284	0	549	462
V/C Ratio(X)	0.88	0.00	0.74	0.00	0.36	0.93
Avail Cap(c_a), veh/h	1099	0	587	0	549	462
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	19.4	0.0	25.3	0.0	17.4	21.4
Incr Delay (d2), s/veh	4.3	0.0	3.7	0.0	0.4	25.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.1	0.0	3.1	0.0	2.1	8.8
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	23.7	0.0	29.0	0.0	17.8	46.8
LnGrp LOS	C	A	C	A	B	D
Approach Vol, veh/h	526			209	625	
Approach Delay, s/veh	23.7			29.0	37.7	
Approach LOS	C			C	D	

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		13.9		25.6		22.8
Change Period (Y+Rc), s		4.5		4.5		4.5
Max Green Setting (Gmax), s		19.5		38.7		18.3
Max Q Clear Time (g_c+I1), s		8.6		19.4		18.5
Green Ext Time (p_c), s		0.8		1.7		0.0

Intersection Summary	
HCM 6th Ctrl Delay	30.9
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	6	541	6	4	455	9	3	0	1	5	0	4
Future Vol, veh/h	6	541	6	4	455	9	3	0	1	5	0	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	1	1	1	1	3	1	1	1	1	1	1	1
Mvmt Flow	6	576	6	4	484	10	3	0	1	5	0	4

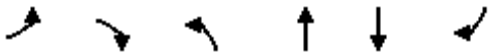
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	494	0	0	582	0	0	1090	1093	579	1089	1091	489
Stage 1	-	-	-	-	-	-	591	591	-	497	497	-
Stage 2	-	-	-	-	-	-	499	502	-	592	594	-
Critical Hdwy	4.11	-	-	4.11	-	-	7.11	6.51	6.21	7.11	6.51	6.21
Critical Hdwy Stg 1	-	-	-	-	-	-	6.11	5.51	-	6.11	5.51	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.11	5.51	-	6.11	5.51	-
Follow-up Hdwy	2.209	-	-	2.209	-	-	3.509	4.009	3.309	3.509	4.009	3.309
Pot Cap-1 Maneuver	1075	-	-	997	-	-	193	215	517	194	216	581
Stage 1	-	-	-	-	-	-	495	496	-	557	546	-
Stage 2	-	-	-	-	-	-	555	544	-	494	495	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1075	-	-	997	-	-	190	212	517	191	213	581
Mov Cap-2 Maneuver	-	-	-	-	-	-	190	212	-	191	213	-
Stage 1	-	-	-	-	-	-	491	492	-	553	543	-
Stage 2	-	-	-	-	-	-	548	541	-	489	491	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.1	21.2	18.7
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	226	1075	-	-	997	-	-	272
HCM Lane V/C Ratio	0.019	0.006	-	-	0.004	-	-	0.035
HCM Control Delay (s)	21.2	8.4	0	-	8.6	0	-	18.7
HCM Lane LOS	C	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0.1

HCM 6th Signalized Intersection Summary
2: Tumwater Blvd SE & Henderson Blvd SE

Forecast 2026 PM Peak Hour Without Project
10/04/2021



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	518	29	18	196	200	450
Future Volume (veh/h)	518	29	18	196	200	450
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1885	1885	1885	1870	1856
Adj Flow Rate, veh/h	545	31	19	206	211	474
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	1	1	1	2	3
Cap, veh/h	610	35	25	270	514	432
Arrive On Green	0.36	0.36	0.16	0.16	0.27	0.27
Sat Flow, veh/h	1672	95	159	1719	1870	1572
Grp Volume(v), veh/h	577	0	225	0	211	474
Grp Sat Flow(s),veh/h/ln	1770	0	1877	0	1870	1572
Q Serve(g_s), s	20.4	0.0	7.6	0.0	6.1	18.3
Cycle Q Clear(g_c), s	20.4	0.0	7.6	0.0	6.1	18.3
Prop In Lane	0.94	0.05	0.08			1.00
Lane Grp Cap(c), veh/h	646	0	295	0	514	432
V/C Ratio(X)	0.89	0.00	0.76	0.00	0.41	1.10
Avail Cap(c_a), veh/h	1024	0	556	0	514	432
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	19.9	0.0	26.8	0.0	19.7	24.1
Incr Delay (d2), s/veh	6.5	0.0	4.1	0.0	0.5	71.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.7	0.0	3.6	0.0	2.6	14.9
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	26.4	0.0	30.9	0.0	20.2	96.0
LnGrp LOS	C	A	C	A	C	F
Approach Vol, veh/h	577			225	685	
Approach Delay, s/veh	26.4			30.9	72.6	
Approach LOS	C			C	E	

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		15.0		28.8		22.8
Change Period (Y+Rc), s		4.5		4.5		4.5
Max Green Setting (Gmax), s		19.7		38.5		18.3
Max Q Clear Time (g_c+I1), s		9.6		22.4		20.3
Green Ext Time (p_c), s		0.8		1.8		0.0

Intersection Summary		
HCM 6th Ctrl Delay		48.4
HCM 6th LOS		D

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Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	17	541	6	4	455	1	3	0	1	1	0	10
Future Vol, veh/h	17	541	6	4	455	1	3	0	1	1	0	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	1	1	1	1	3	1	1	1	1	1	1	1
Mvmt Flow	18	576	6	4	484	1	3	0	1	1	0	11

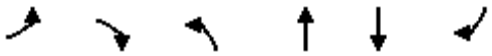
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	485	0	0	582	0	0	1113	1108	579	1109	1111	485
Stage 1	-	-	-	-	-	-	615	615	-	493	493	-
Stage 2	-	-	-	-	-	-	498	493	-	616	618	-
Critical Hdwy	4.11	-	-	4.11	-	-	7.11	6.51	6.21	7.11	6.51	6.21
Critical Hdwy Stg 1	-	-	-	-	-	-	6.11	5.51	-	6.11	5.51	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.11	5.51	-	6.11	5.51	-
Follow-up Hdwy	2.209	-	-	2.209	-	-	3.509	4.009	3.309	3.509	4.009	3.309
Pot Cap-1 Maneuver	1083	-	-	997	-	-	187	211	517	188	210	584
Stage 1	-	-	-	-	-	-	480	484	-	560	549	-
Stage 2	-	-	-	-	-	-	556	549	-	480	482	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1083	-	-	997	-	-	179	205	517	183	204	584
Mov Cap-2 Maneuver	-	-	-	-	-	-	179	205	-	183	204	-
Stage 1	-	-	-	-	-	-	468	472	-	546	546	-
Stage 2	-	-	-	-	-	-	543	546	-	467	470	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0.1	22.2	12.6
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	214	1083	-	-	997	-	-	487
HCM Lane V/C Ratio	0.02	0.017	-	-	0.004	-	-	0.024
HCM Control Delay (s)	22.2	8.4	0	-	8.6	0	-	12.6
HCM Lane LOS	C	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0	-	-	0.1

HCM 6th Signalized Intersection Summary
2: Tumwater Blvd SE & Henderson Blvd SE

Forecast 2026 PM Peak Hour With Project
10/04/2021



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	514	29	18	197	201	442
Future Volume (veh/h)	514	29	18	197	201	442
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1885	1885	1885	1870	1856
Adj Flow Rate, veh/h	541	31	19	207	212	465
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	1	1	1	2	3
Cap, veh/h	606	35	25	272	516	434
Arrive On Green	0.36	0.36	0.16	0.16	0.28	0.28
Sat Flow, veh/h	1671	96	158	1719	1870	1572
Grp Volume(v), veh/h	573	0	226	0	212	465
Grp Sat Flow(s),veh/h/ln	1770	0	1877	0	1870	1572
Q Serve(g_s), s	20.2	0.0	7.6	0.0	6.1	18.3
Cycle Q Clear(g_c), s	20.2	0.0	7.6	0.0	6.1	18.3
Prop In Lane	0.94	0.05	0.08			1.00
Lane Grp Cap(c), veh/h	642	0	297	0	516	434
V/C Ratio(X)	0.89	0.00	0.76	0.00	0.41	1.07
Avail Cap(c_a), veh/h	1027	0	557	0	516	434
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	19.9	0.0	26.7	0.0	19.6	24.0
Incr Delay (d2), s/veh	6.3	0.0	4.0	0.0	0.5	63.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.6	0.0	3.6	0.0	2.6	14.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	26.3	0.0	30.8	0.0	20.1	87.8
LnGrp LOS	C	A	C	A	C	F
Approach Vol, veh/h	573			226	677	
Approach Delay, s/veh	26.3			30.8	66.6	
Approach LOS	C			C	E	

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		15.0		28.6		22.8
Change Period (Y+Rc), s		4.5		4.5		4.5
Max Green Setting (Gmax), s		19.7		38.5		18.3
Max Q Clear Time (g_c+I1), s		9.6		22.2		20.3
Green Ext Time (p_c), s		0.8		1.8		0.0

Intersection Summary			
HCM 6th Ctrl Delay		45.5	
HCM 6th LOS		D	

Intersection	
Int Delay, s/veh	0.3

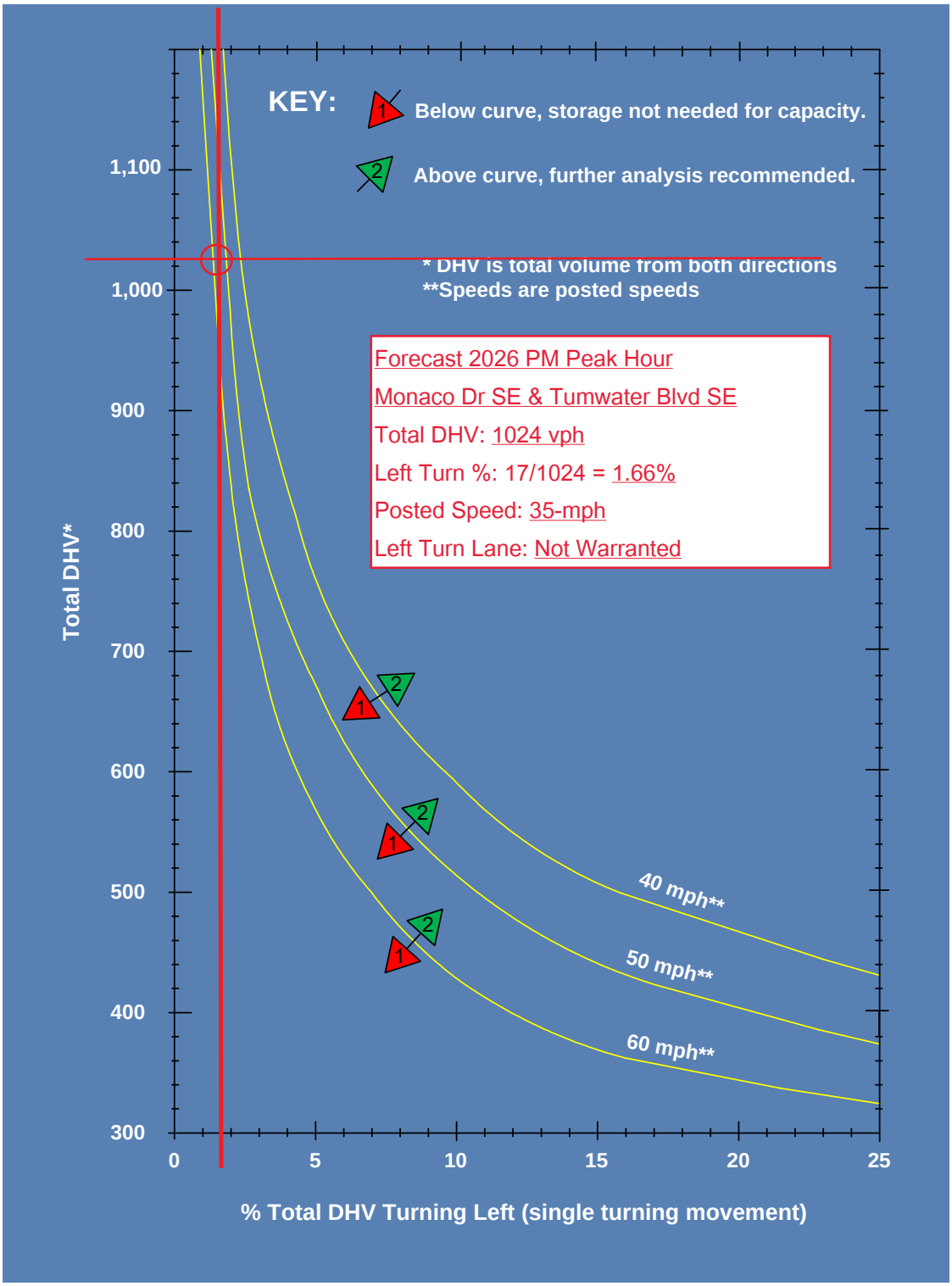
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	13	1	1	710	642	22
Future Vol, veh/h	13	1	1	710	642	22
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	14	1	1	772	698	24

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1484	710	722	0	-	0
Stage 1	710	-	-	-	-	-
Stage 2	774	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	137	434	880	-	-	-
Stage 1	487	-	-	-	-	-
Stage 2	455	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	137	434	880	-	-	-
Mov Cap-2 Maneuver	137	-	-	-	-	-
Stage 1	486	-	-	-	-	-
Stage 2	455	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	32.9	0	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	880	-	144	-	-
HCM Lane V/C Ratio	0.001	-	0.106	-	-
HCM Control Delay (s)	9.1	0	32.9	-	-
HCM Lane LOS	A	A	D	-	-
HCM 95th %tile Q(veh)	0	-	0.3	-	-

Exhibit 1310-7a Left-Turn Storage Guidelines: Two-Lane, Unsignalized



Date: December 10, 2021

To: Evan Mann
SoundBuilt Homes

From: Aaron Van Aken, PE, PTOE

Subject: Three Lakes Crossing Queuing Analysis

The intent of this technical memorandum serves to evaluate queuing demands at the proposed access intersection to Henderson Boulevard SE for the proposed Three Lakes Crossing development. This evaluation uses data and information from the updated *Three Lakes Crossing* (12/10/2021) Transportation Impact Analysis (TIA). Below is a project summary and projected queuing estimates.

PROJECT DESCRIPTION

Three Lakes Crossing is a proposed 45-unit single-family development located in the city of Tumwater. The subject properties are situated on the west side of Henderson Blvd SE and just north of Tumwater Blvd SE. Access to and from the site is proposed via a new roadway extending west from Henderson Blvd SE and a connection to an adjacent property on the southwest corner of the site. According to the TIA, this project is estimated to generate 42 new trips in the PM peak hour (26 inbound / 16 outbound).

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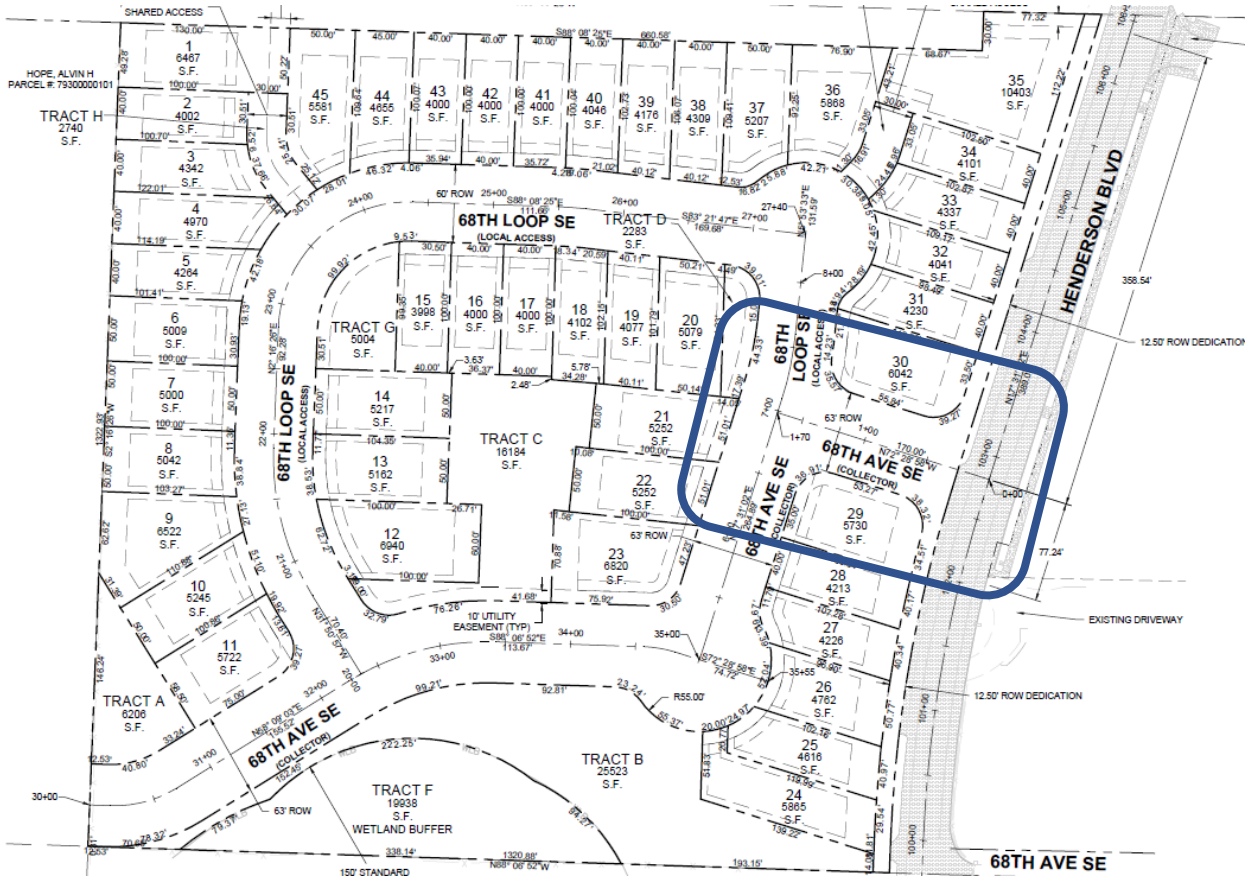
Figure 1: Site Plan



Shown above is the proposed site plan with proposed accesses and internal roadway configuration. This evaluation will focus on queuing at the primary access intersection with Henderson Blvd SE. Approximately 145 feet of spacing is available from Henderson Blvd SE to the internal intersection as shown the image above.

To evaluate peak hour queues, forecast 2026 PM peak hour projected volumes were applied (see attached figure from TIA). Queues were estimated using *SimTraffic* and *Synchro 11* modeling programs. Five peak hour simulations were performed in order to establish an average queue at the access intersection.

QUEUING

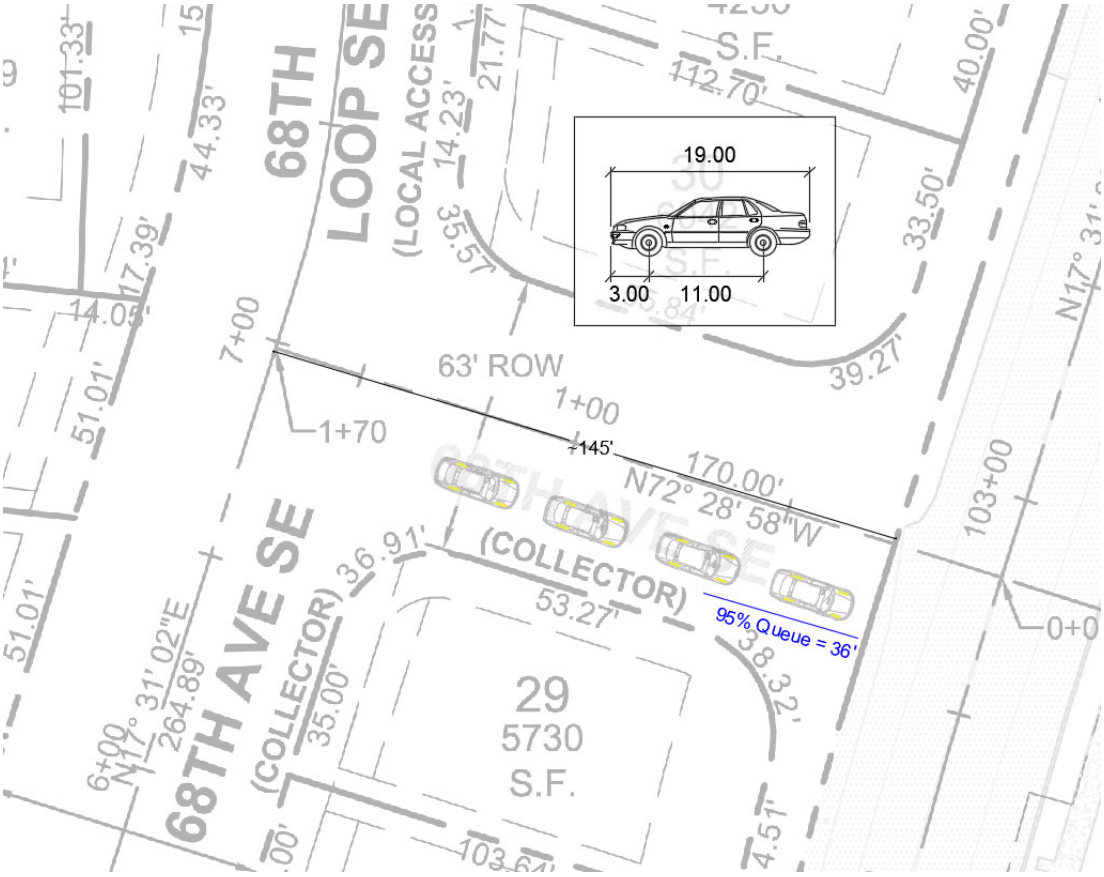
A total of five peak hour simulations were performed. The table below summarizes the aggregated findings. See appendix for detailed report sheets.

Table 1: Forecast 2026 PM Peak Hour Queues & Delays

Delays Given in Seconds per Vehicle

Intersection	Control	Movement	95th% Queue	Delay
Access & Henderson Blvd	Stop	Eastbound	36 ft	17.7 sec

Based on the modeling outputs, maximum queues are estimated to be up to 36 feet (1-2 vehicle lengths) during the critical peak travel hour. In other words, vehicles waiting to leave the subject site and enter Henderson Blvd SE are estimated to be up to two vehicles for all but the rarest events. With approximately 145-foot spacing to the internal intersection, no blockage or queue spillover is estimated to occur. Shown in the image below in blue is the calculated 95th percentile queuing distance (36'). Up to four vehicle lengths can comfortably stack up before the internal intersection indicating sufficient spacing availability.

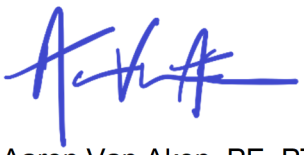


CONCLUSION

Three Lakes Crossing, a proposed 45-unit single-family development located in the city of Tumwater, has been evaluated in terms of queuing and operations at the proposed access off Henderson Boulevard SE. This memo uses information and builds upon the *Three Lakes Crossing* TIA (12/10/2021).

Using the 2026 PM peak hour traffic volume estimates from the original TIA in conjunction with additional traffic modeling and simulations, queues at the primary access intersection were calculated. Based on the simulations, a 95th percentile queue of 36 feet (one to two vehicles) was derived for the eastbound approach waiting to enter Henderson Blvd. On average, one vehicle or less would typically be waiting to leave the subject property. Based on the queuing assessments provided herein, no conflict with respect to the 145-foot spacing from Henderson Blvd to the internal plat intersection is expected.

Please call if you require additional information.



Aaron Van Aken, PE, PTOE

THREE LAKES CROSSING

QUEUING MEMO

APPENDIX

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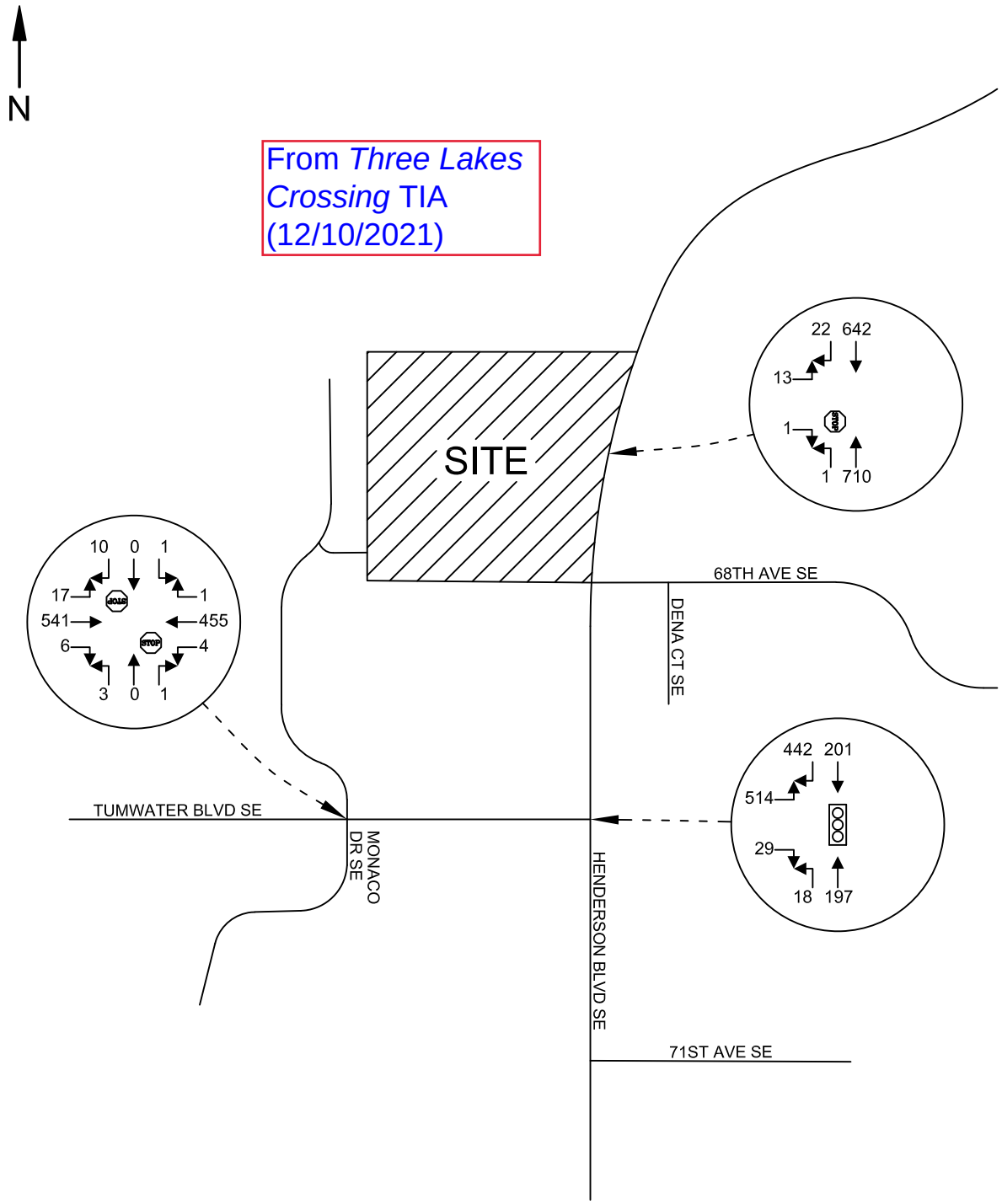

HEATH & ASSOCIATES

TRAFFIC AND CIVIL ENGINEERING

THREE LAKES CROSSING

FORECAST 2026 PM PEAK HOUR VOLUMES WITH PROJECT

FIGURE 7

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3: Henderson Blvd SE & Access Performance by approach

Approach	EB	NB	SB	All
Denied Del/Veh (s)	0.1	0.0	0.5	0.3
Total Del/Veh (s)	17.7	2.4	0.6	1.7

Intersection: 3: Henderson Blvd SE & Access

Movement	EB	NB	SB
Directions Served	LR	LT	TR
Maximum Queue (ft)	39	69	4
Average Queue (ft)	11	4	0
95th Queue (ft)	36	44	3
Link Distance (ft)	636	875	372
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Allyson Brooks Ph.D., Director
State Historic Preservation Officer

May 12, 2022

Alex Baruch
Associate Planner
City of Tumwater

In future correspondence please refer to:
Project Tracking Code: 2022-01-00563
Property: City of Tumwater_ Three Lakes Crossing
Re: Archaeology - Concur with Survey; Follow Inadvertent Discovery Plan

Dear Alex Baruch:

Thank you for contacting the State Historic Preservation Officer (SHPO) and the Department of Archaeology and Historic Preservation (DAHP) with documentation regarding the above referenced project. In response, we concur with the results and recommendations made in the survey report. Specifically, as no cultural resources were found during the survey, we do not recommend further direct archaeological supervision of the project. However, we do recommend that a standard Inadvertent Discovery Plan is followed during all ground disturbing activities.

Please note that the recommendations provided in this letter reflect only the opinions of DAHP. Any interested Tribes may have different recommendations. We appreciate receiving copies of any correspondence or comments from Tribes or other parties concerning cultural resource issues that you receive.

These comments are based on the information available at the time of this review and on behalf of the SHPO pursuant to Washington State law. Please note that should the project scope of work and/or location change significantly, please contact DAHP for further review.

Thank you for the opportunity to review and comment. Please ensure that the DAHP Project Number (a.k.a. Project Tracking Code) is attached to any future communications about this project. Should you have any questions, please feel free to contact me.

Sincerely,

Stephanie Jolivette
Local Governments Archaeologist
(360) 586-3088
Stephanie.Jolivette@dahp.wa.gov

INSIGHT GEOLOGIC, INC.

December 16, 2021

Sound Built Homes
P.O. Box 73790
Puyallup, Washington 98373
Attention: Evan Mann

Report - Revised
Geotechnical and Stormwater Investigation
Three Lakes Crossing Development
6715 and 6609 Henderson Blvd SE
Tumwater, Washington
Project No. 362-007-01

INTRODUCTION

Insight Geologic, Inc. is pleased to provide our report for the evaluation of site soil conditions as they relate to geotechnical properties and the infiltration and disposal of stormwater at the proposed residential development to be located at 6715 and 6609 Henderson Blvd SE in Tumwater, Washington. The location of the site is shown relative to surrounding physical features in the Vicinity Map, Figure 1. The project site consists of three parcels of land (Parcel No. 79300000100, 79300000101 and 12701320105) comprising approximately 9.73 acres.

The site is currently developed with a single-family residence. We understand that the proposed development will include forty-five single-family lots and appurtenant drive areas. Stormwater runoff for the development is to be infiltrated on-site.

SCOPE OF SERVICES

The purpose of our services was to evaluate subsurface soil conditions as they relate to geotechnical conditions and the infiltration and disposal of stormwater from the proposed site improvements. We proposed to perform our evaluation in general accordance with the procedures outlined in the City of Tumwater Drainage Design and Erosion Control Manual (2009 Manual). The specific tasks performed are outlined below:

Geotechnical Investigation

1. Provided for the location of subsurface utilities on the site. We performed this task by notifying the "One Call" system.
2. Conducted a site reconnaissance to evaluate and mark proposed test pit and drilling locations at the site, and for truck-mounted drilling rig access.

1015 East 4th Avenue, Olympia, Washington 98506
Phone: 360.754.2128 Fax: 360.754.9299

3. Excavated twelve (12) exploratory test pits across the site using a track-mounted excavator provided by Johnson & Maddox. The test pits were excavated to a depth of 8 feet below ground surface and backfilled at the end of the day
4. Collected representative soil samples from the test pits for laboratory analysis.
5. Logged the soils exposed in the test pits in general accordance with ASTM D2487-06.
6. Provided for laboratory testing of the soils. We performed gradation analyses to evaluate bearing capacity and stormwater infiltration rates.
7. Provided preliminary infiltration rates for the soils using the "Detailed Method" as described in the Manual.
8. Prepared a report summarizing our field activities including our recommendations for site preparation and grading, bearing capacity, seismic class, temporary and final cut slopes, earth pressures, suitability of the on-site soils for use as fill.

Stormwater Investigation

9. Drilled two exploratory boreholes in the area of the proposed infiltration structure to evaluate soils for infiltration and depth to groundwater. Borings were drilled using a truck-mounted drilling rig.
10. Maintained logs of the soil encountered in the boreholes. Soils were described in general accordance with the Unified Soil Classification System and presented on the field logs.
11. Conducted grain-size analyses on selected soil samples from the borings to determine design stormwater infiltration rates for the project using the grain-size method described in the Manual.
12. Provided for the analysis of cation exchange capacity and organic content of the soils to evaluate the treatment capability for stormwater disposal. We analyzed 4 samples in the infiltration locations.
13. Prepared a report for review by the City of Tumwater summarizing our design infiltration rates and estimated high groundwater elevations for the site.

FINDINGS

Surface Conditions

The project site consists of three parcels forming a roughly square shaped area and totaling about 9.73 acres. The site topography is gently rolling with elevations ranging from approximately 152 feet above mean sea level (MSL) along the edge of the glacial kettle along the southern edge of the site to about 184 feet MSL along the upland on the eastern portion of the site. A small kettle depression is located adjacent to the southern edge of the site with the base at an elevation of approximately 148 feet MSL. A gently sloping and shallow draw runs along the central portion of the site at an elevation of approximately 166 feet above MSL. The site is bounded by Henderson Boulevard SE to the east and residential properties to the west, south, and north. The site is currently developed with multiple single-family residences and a retail business along the eastern edge of the property and fronting Henderson Boulevard SE. These structures are to be removed prior to the beginning of construction activities. The northwest portion of the property is vegetated with a moderately dense growth of Douglas fir trees. The remainder of the property is predominantly grass fields with isolated fir trees.

Geology

Based on our review of available published geologic maps, Vashon age glacial recessional outwash deposits underlie the project site and surrounding area. This material is described as recessional sands in kettle walls. This material was deposited around the margins of glacially-formed kettle lakes, during the waning stages of the most recent glacial period in the Puget Sound. These deposits are not glacially consolidated.

Subsurface Explorations

We explored subsurface conditions at the site on September 15 and 16, 2021, by excavating twelve test pits and advancing two borings in the locations as shown on the Site Plan, Figure 2. The test pits were excavated by Johnson & Maddox using a track-mounted excavator. The exploratory borings were completed by Standard Environmental Probe using a truck-mounted, direct-push drill rig. A geologist from Insight Geologic monitored the explorations and maintained a log of the conditions encountered. The test pits were completed to a depth of approximately 8 feet bgs and the borings were completed to a depth of 30 feet bgs. The soils were visually classified in general accordance with the system described in ASTM D2487-06. A copy of the explorations is contained in Attachment A.

Monitoring wells, consisting of 1-inch diameter casing and screen, were installed in each of the borings to a depth of 30 feet bgs. The monitoring wells were completed within locking, tamper-resistant steel covers, installed flush with the surrounding grade. The monitoring well construction details are included in Attachment A. For the purposes of this report, groundwater elevations were based on estimated ground surface elevations obtained from the Thurston County Geodata website digital elevation model.

Soil Conditions

Soil conditions encountered were generally consistent across the site. Underlying approximately 6 inches forest duff or sod, we generally encountered dark brown to brown fine to medium sand with silt and varying percentages of gravel (SP-SM), in a loose to medium dense and dry to moist condition. The upper 3 feet of soil was generally dry and test pits within the wooded portions of the site contained abundant roots in the upper soils.

The surficial soils encountered at the site are generally consistent with Indianola loamy sand, which is mapped for the area. This soil is generally formed from glacial outwash and generally has restrictive layers occurring at depths greater than 7 feet below grade. Percolation is generally high to very high, according to the U.S. Department of Agriculture Soil Survey.

Groundwater Conditions

Groundwater was encountered in boring B-2 at a depth of approximately 21 feet bgs. Based on the approximate surface location, this correlated to an approximate elevation of 137 feet above sea level. Two larger wetlands located to the west and east of the site appear to contain water year-round at or near an elevation of 139 feet above mean sea level. No evidence of intermediate perched water was encountered within the explorations.

Laboratory Testing

We selected eleven soil samples for gradation analyses in general accordance with ASTM D422 to define soil class and obtain parameters for stormwater infiltration calculations. We also selected four samples for analysis of the Cation Exchange Capacity (CEC) and organic content by an outside laboratory according to EPA method 9081. Our geotechnical laboratory tests, CEC analysis, and organic content results are presented in Attachment B.

Cation Exchange Capacity Evaluation

According to the City of Tumwater 2018 Stormwater Design Manual (2018 Manual), soils used in bioretention facilities must have a minimum Cation Exchange Capacity (CEC) of 5 milliequivalents (meq) per 100 grams of soil. CEC is an intrinsic characteristic of soils, which depends on the soil's grain size, pH, organic, and moisture content. The CEC of a soil is also a proportional measure of the soil's ability to chemically bind with negatively charged ions in pollutants and remove them from infiltrated stormwater.

Four samples were selected from the gallery locations for CEC analysis. The samples were delivered to Soiltest Farm Consultants, Inc., in Moses Lake, Washington, and analyzed in accordance with the requirements of the 2016 Manual using EPA method 9081, Cation Exchange Capacity of Soils (Sodium Acetate) and for organic content. The laboratory analysis indicated that the samples analyzed had CECs of between 5.4 and 3.4 meq/100g and organic contents of between 1.3 and 0.1 percent. The laboratory results are provided in Attachment B and summarized in Table 1.

Table 1. Cation Exchange Capacity Results

Boring Number	Depth (feet bgs)	CEC (meq/100g)	Organic Content (percent)
MW-1	0.0 – 5.0	5.4	1.1
MW-1	5.0 – 10.0	5.3	0.4
MW-2	0.0 – 5.0	4.8	1.3
MW-2	5.0 – 10.0	3.4	0.1

STORMWATER INFILTRATION

We completed a stormwater infiltration rate evaluation in general accordance with the 2018 City of Tumwater Drainage Design and Erosion Control Manual (2018 Manual) as required for projects located within the City of Tumwater UGA. The 2018 Manual uses a detailed method that utilizes the relationship between the D10, D60, and D90 results of the ASTM grain-size distribution analyses, along with site specific correction factors to estimate long-term design infiltration rates.

Based on our gradation analyses, we estimate that the preliminary long-term design infiltration rate (F_{design}) for the proposed stormwater infiltration system is 10.2 inches per hour, based on the location on the site and after applying the appropriate correction factors. Our calculations assume that stormwater infiltration will occur at a depth of at 5 feet bgs as part of an infiltration gallery and groundwater is at a depth of approximately 21 feet bgs. Infiltration rates can change depending on

the final geometry of the infiltration facility. The results of our stormwater infiltration evaluation are presented in Table 1 and Attachment C.

Table 2. Design Infiltration Rates – ASTM Method

Exploration	Unit	Depth Range (feet)	D_{10} Value	D_{60} Value	D_{90} Value	Correction Factor Plugging	Correction Factor Geometry	Correction Factor Testing Methodology	Long-Term Design Infiltration Rate (Inches per hour)
MW-2	SP-SM	5.0 – 10.0	0.09	0.35	6.5	0.8	0.85	0.4	10.2
	SP-SM	10.0 – 15.0	0.08	0.21	0.34				
	SP-SM	15.0 – 20.0	0.14	0.43	11.0				
	GP-GM	20.0 – 21.0	0.15	11.0	23.0				

SEISMIC DESIGN CONSIDERATIONS

General

We understand that seismic design will likely be performed using the 2018 IBC standards. The following parameters may be used in computing seismic base shear forces:

Table 3. 2018 IBC Seismic Design Parameters

Spectral Response Accel. at Short Periods (SS) = 1.379
Spectral Response Accel. at 1 Second Periods (S1) = 0.515
Site Class = D
Site Coefficient (FA) = 1.0
Site Coefficient (FV) = 1.785

Ground Rupture

Because of the location of the site with respect to the nearest known active crustal faults, and the presence of a relatively thick layer of glacial outwash deposits, it is our opinion that the risk of ground rupture at the site due to surface faulting is low.

Soil Liquefaction

Liquefaction refers to a condition where vibration or shaking of the ground, usually from earthquake forces, results in the development of excess pore water pressures in saturated soils, and a subsequent loss of stiffness in the soil occurs. Liquefaction also causes a temporary reduction of soil shear strength and bearing capacity, which can cause settlement of the ground surface above the liquefied soil layers. In general, soils that are most susceptible to liquefaction include saturated, loose to medium dense, clean to silty sands and non-plastic silts within 50 feet of ground surface.

Based on our review of the *Liquefaction Susceptibility Map of Thurston County (Palmer, 2004)*, the project site is identified to have a low to moderate potential risk for soil liquefaction. Based on our experience with detailed seismic studies in the Olympia and Tumwater area, including areas that are

mapped within the same recessional outwash soil deposits as the project site, we concur with the reviewed map. It is our opinion that there is a moderate risk for soil liquefaction at the site. Additional investigation and evaluation would be needed to further define this risk.

Seismic Compression

Seismic compression is defined as the accrual of contractive volumetric strains in unsaturated soils during strong shaking from earthquakes (Stewart et al., 2004). Loose to medium dense clean sands and non-plastic silts are particularly prone to seismic compression settlement. Seismic compression settlement is most prevalent on slopes, but it can also occur on flat ground. It is our opinion that the upper 15 feet of the soil profile at the site has a moderate risk for seismic compression settlement.

Seismic Settlement Discussion

Based on the materials encountered in our explorations, it is our preliminary opinion that seismic settlements (liquefaction-induced plus seismic compression) could potentially total a few inches at the site as the result of an IBC design level earthquake. We are available upon request to perform deep subsurface explorations and detailed seismic settlement estimates during the design phase.

Seismic Slope Instability

The maximum inclination of the slopes on the southern portion of the site are approximately 15 percent and we did not observe signs of slope instability during our site work. In our opinion, there is a low to moderate risk of seismic slope instability at the project site under current conditions. If slope instability due to a seismic event did occur, it could result in damage to the stormwater infiltration gallery due to seismically induced liquification as a result of elevated moisture contents from the stormwater gallery location as well as residential lots near the steepest slopes.

Lateral Spreading

Lateral spreading involves the lateral displacement of surficial blocks of non-liquefied soil when an underlying soil layer liquefies. Lateral spreading generally develops in areas where sloping ground or large grade changes are present. Based on our limited understanding of the subsurface conditions along the southern site slope, it is our opinion that there could be a low to moderate risk for the development of lateral spreading as a result of an IBC design level earthquake.

Seismic Slope Deformation Discussion

In our experience, it is unlikely that the potential slope deformations described above (seismic compression or lateral spreading) would be mitigated for in the typical design of residential buildings. If necessary, we are available to perform detailed slope stability/lateral spreading evaluations to include borings and/or CPT soundings at the site.

CONCLUSIONS AND RECOMMENDATIONS

Based on the results of our review, subsurface explorations, and engineering analyses, it is our opinion that the proposed development is feasible from a geotechnical standpoint. We recommend that the proposed structures be supported on shallow concrete foundations that are designed using an allowable soil bearing capacity of 2,000 pounds per square foot (psf) when founded within the sand with silt units.

The soils encountered in our explorations are typically in a loose condition near ground surface. To limit the potential for structure settlement, we recommend that shallow foundations and slabs-on-grade be established on a minimum 1-foot thick layer of structural fill. Depending on final grading plans and the time of year earthwork is performed; it could be practical to reuse a portion of the on-site soils as structural fill under the foundations/slabs.

Stormwater infiltration at the site is feasible. We have provided a design infiltration rate of 10.2 inches per hour for the proposed stormwater infiltration systems, based on the location and depth of stormwater infiltration at the site.

Earthwork

General

We anticipate that site development earthwork will include removal of the existing residential buildings, clearing and stripping of existing vegetation, preparing subgrades, excavating for utility trenches, and placing and compacting structural fill. We expect that the majority of site grading can be accomplished with conventional earth moving equipment in proper working order.

Our explorations did not encounter appreciable amounts of debris or unsuitable soils associated with past site development. Still, it is possible that concrete slabs, abandoned utility lines or other development features from the existing residence could be encountered during construction. The contractor should be prepared to deal with these conditions.

Clearing and Stripping

Clearing and stripping should consist of removing surface and subsurface deleterious materials including sod/topsoil, trees, brush, debris and other unsuitable loose/soft or organic materials. Stripping and clearing should extend at least 5 feet beyond all structures and areas to receive structural fill.

We estimate that a stripping depth of about 0.5 feet will be required to remove the surficial organic layer encountered in several of our explorations. Deeper stripping depths may be required if additional unsuitable soils are exposed during stripping operations. We recommend that trees be removed by overturning so that the majority of roots are also removed. Depressions created by tree or stump removal should be backfilled with structural fill and properly compacted.

Subgrade Preparation

After stripping and excavating to the proposed subgrade elevation, and before placing structural fill or foundation concrete, the exposed subgrade should be thoroughly compacted to a firm and unyielding condition. The exposed subgrade should then be proof-rolled using loaded, rubber-tired heavy equipment. We recommend that Insight Geologic be retained to observe the proof-rolling prior to placement of structural fill or foundation concrete. Areas of limited access that cannot be proof-rolled can be evaluated using a steel probe rod. If soft or otherwise unsuitable areas are revealed during proof-rolling or probing, that cannot be compacted to a stable and uniformly firm condition, we generally recommend that: 1) the subgrade soils be scarified (e.g., with a ripper or farmer's disc), aerated and recompacted; or 2) the unsuitable soils be overexcavated and replaced with structural fill.

Temporary Excavations and Groundwater Handling

Excavations deeper than 4 feet should be shored or laid back at a stable slope if workers are required to enter. Shoring and temporary slope inclinations must conform to the provisions of Title 296 Washington Administrative Code (WAC), Part N, "Excavation, Trenching and Shoring." Regardless of the soil type encountered in the excavation, shoring, trench boxes or sloped sidewalls were required under the Washington Industrial Safety and Health Act (WISHA). The contract documents should specify that the contractor is responsible for selecting excavation and dewatering methods, monitoring the excavations for safety and providing shoring, as required, to protect personnel and structures.

In general, temporary cut slopes should be inclined no steeper than about 1.5H:1V (horizontal: vertical). This guideline assumes that all surface loads are kept at a minimum distance of at least one-half the depth of the cut away from the top of the slope, and that significant seepage is not present on the slope face. Flatter cut slopes were necessary where significant seepage occurs or if large voids are created during excavation. Some sloughing and raveling of cut slopes should be expected. Temporary covering with heavy plastic sheeting should be used to protect slopes during periods of wet weather.

We anticipate that if perched groundwater is encountered during construction can be handled adequately with sumps, pumps, and/or diversion ditches. Groundwater handling needs will generally be lower during the late summer and early fall months. We recommend that the contractor performing the work be made responsible for controlling and collecting groundwater encountered during construction.

Permanent Slopes

We anticipate that permanent slopes will be utilized along slopes leading to wetland area south of the site. Where permanent slopes are necessary, we recommend the slopes be constructed at a maximum inclination of 2H:1V. Where 2H:1V permanent slopes are not feasible, protective facings and/or retaining structures should be considered.

To achieve uniform compaction, we recommend that fill slopes be overbuilt and subsequently cut back to expose well-compacted fill. Fill placement on slopes should be benched into the slope face and include keyways. The configuration of the bench and keyway depends on the equipment being used. Bench excavations should be level and extend into the slope face. We recommend that a vertical cut of about 3 feet be maintained for benched excavations. Keyways should be about 1-1/2 times the width of the equipment used for grading or compaction.

Erosion Control

We anticipate that erosion control measures such as silt fences, straw bales and sand bags will generally be adequate during development. Temporary erosion control should be provided during construction activities and until permanent erosion control measures are functional. Surface water runoff should be properly contained and channeled using drainage ditches, berms, swales, and tightlines, and should not discharge onto sloped areas. Any disturbed sloped areas should be protected with a temporary covering until new vegetation can take effect. Jute or coconut fiber matting, excelsior matting or clear plastic sheeting is suitable for this purpose. Graded or disturbed slopes should be tracked in-place with the equipment running perpendicular to the slope contours so that the

track marks provide a texture to help resist erosion. Ultimately, erosion control measures should be in accordance with local regulations and should be clearly described on project plans.

Wet Weather Earthwork

Some of the near surface soils contain up to about 14 percent fines. When the moisture content of the soil is more than a few percent above the optimum moisture content, the soil will become unstable and it may become difficult or impossible to meet the required compaction criteria. Disturbance of near surface soils should be expected if earthwork is completed during periods of wet weather.

The wet weather season in this area generally begins in October and continues through May. However, periods of wet weather may occur during any month of the year. If wet weather earthwork is unavoidable, we recommend that:

- The ground surface is sloped so that surface water is collected and directed away from the work area to an approved collection/dispersion point.
- Earthwork activities not take place during periods of heavy precipitation.
- Slopes with exposed soil be covered with plastic sheeting or otherwise protected from erosion.
- Measures are taken to prevent on-site soil and soil stockpiles from becoming wet or unstable. Sealing the surficial soil by rolling with a smooth-drum roller prior to periods of precipitation should reduce the extent that the soil becomes wet or unstable.
- Construction traffic is restricted to specific areas of the site, preferably areas that are surfaced with materials not susceptible to wet weather disturbance.
- A minimum 1-foot thick layer of 4- to 6-inch quarry spalls is used in high traffic areas of the site to protect the subgrade soil from disturbance.
- Contingencies are included in the project schedule and budget to allow for the above elements.

Structural Fill Materials

General

Material used for structural fill should be free of debris, organic material and rock fragments larger than 3 inches. The workability of material for use as structural fill will depend on the gradation and moisture content of the soil. As the amount of fines increases, soil becomes increasingly more sensitive to small changes in moisture content and adequate compaction becomes more difficult or impossible to achieve.

On-Site Soil

We anticipate that the majority of the on-site soils encountered during construction will consist of the sands with silt located at or near the surface of the site. It is our opinion that this material is a suitable source for structural fill during a significant portion of the year. However, we anticipate that thin lifts (6-inches thick or less) will likely be needed to obtain structural fill compaction specifications. On-site materials used as structural fill should be free of roots, organic matter and other deleterious materials and particles larger than 3 inches in diameter.

Select Granular Fill

Select granular fill should consist of imported, well-graded sand and gravel or crushed rock with a maximum particle size of 3 inches and less than 5 percent passing a U.S. Standard No. 200 sieve based on the minus ¾-inch fraction. Organic matter, debris or other deleterious material should not be present. In our experience, "gravel borrow" as described in Section 9-03.14(1) of the 2020 WSDOT Standard Specifications is typically a suitable source for select granular fill during periods of wet weather, provided that the percent passing a U.S. Standard No. 200 sieve is less than 5 percent based on the minus ¾-inch fraction.

Structural Fill Placement and Compaction

General

Structural fill should be placed on an approved subgrade that consists of uniformly firm and unyielding inorganic native soils or compacted structural fill. Structural fill should be compacted at a moisture content near optimum. The optimum moisture content varies with the soil gradation and should be evaluated during construction.

Structural fill should be placed in uniform, horizontal lifts and uniformly densified with vibratory compaction equipment. The maximum lift thickness will vary depending on the material and compaction equipment used, but should generally not exceed the loose thicknesses provided on Table 4. Structural fill materials should be compacted in accordance with the compaction criteria provided in Table 5.

Table 4. Recommended Uncompacted Lift Thickness

Compaction Equipment	Recommended Uncompacted Fill Thickness (inches)	
	Granular Materials Maximum Particle Size ≤ 1 1/2 inch	Granular Materials Maximum Particle Size > 1 1/2 inch
Hand Tools (Plate Compactors and Jumping Jacks)	4 – 8	Not Recommended
Rubber-tire Equipment	10 – 12	6 – 8
Light Roller	10 – 12	8 – 10
Heavy Roller	12 – 18	12 – 16
Hoe Pack Equipment	18 – 24	12 – 16

Note: The above table is intended to serve as a guideline and should not be included in the project specifications.

Table 5. Recommended Compaction Criteria in Structural Fill Zones

Fill Type	Percent Maximum Dry Density Determined by ASTM Test Method D 1557 at ±3% of Optimum Moisture		
	0 to 2 Feet Below Subgrade	> 2 Feet Below Subgrade	Pipe Zone
Imported or On-site Granular, Maximum Particle Size < 1-1/4-inch	95	95	-----

Imported or On-site Granular, Maximum Particle Size >1-1/4-inch	N/A (Proof-roll)	N/A (Proof-roll)	-----
Trench Backfill[1]	95	92	90

Note: [1]Trench backfill above the pipe zone in nonstructural areas should be compacted to at least 85 percent.

Shallow Foundation Support

General

We recommend that the proposed structure be founded on continuous wall or isolated column footings, bearing on a minimum 1-foot thick overexcavation and replacement with compacted structural fill where underlying soils are not able to be compacted as structural fill. The structural fill zone should extend to a horizontal distance equal to the overexcavation depth on each side of the footing. The actual overexcavation depth will vary, depending on the conditions encountered.

We recommend that a representative from Insight Geologic observe the foundation surfaces before overexcavation, and before placing structural fill in overexcavations. This representative should confirm that adequate bearing surfaces have been prepared and that the soil conditions are as anticipated. Unsuitable foundation bearing soils should be recompacted or removed and replaced with compacted structural fill, as recommended by the geotechnical engineer.

Bearing Capacity and Footing Dimensions

We recommend an allowable soil bearing pressure of 2,000 psf for shallow foundations that are supported as recommended. This allowable bearing pressure applies to long-term dead and live loads exclusive of the weight of the footing and any overlying backfill. The allowable soil bearing pressure can be increased by one-third when considering total loads, including transient loads such as those induced by wind and seismic forces.

We recommend a minimum width of 18 inches for continuous wall footings and 2 feet for isolated column footings. For settlement considerations, we have assumed a maximum width of 4 feet for continuous wall footings and 6 feet for isolated column footings.

Perimeter footings should be embedded at least 12 inches below the lowest adjacent grade where the ground is flat. Interior footings should be embedded a minimum of 6 inches below the nearest adjacent grade.

Settlement

We estimate that total settlement of footings that are designed and constructed as recommended should be less than 1 inch. We estimate that differential settlements should be ½ inch or less between comparably loaded isolated footings or along 50 feet of continuous footing. We anticipate that the settlement will occur essentially as loads are applied during construction.

Lateral Load Resistance

Lateral loads on shallow foundation elements may be resisted by passive resistance on the sides of footings and by friction on the base of footings. Passive resistance may be estimated using an equivalent fluid density of 300 pounds per cubic foot (pcf), assuming that the footings are backfilled with structural fill. Frictional resistance may be estimated using 0.25 for the coefficient of base friction.

The lateral resistance values provided above incorporate a factor of safety of 1.5. The passive earth pressure and friction components can be combined, provided that the passive component does not exceed two-thirds of the total. The top foot of soil should be neglected when calculating passive resistance, unless the foundation perimeter area is covered by a slab-on-grade or pavement.

Slabs-On-Grade

Slabs-on-grade should be established on a minimum 1-foot thick section of structural fill extending to an approved bearing surface. A modulus of vertical subgrade reaction (subgrade modulus) can be used to design slabs-on-grade. The subgrade modulus varies based on the dimensions of the slab and the magnitude of applied loads on the slab surface; slabs with larger dimensions and loads are influenced by soils to a greater depth. We recommend a modulus value of 250 pounds per cubic inch (pci) for design of on-grade floor slabs with floor loads up to 500 psf. We are available to provide alternate subgrade modulus recommendations during design, based on specific loading information.

We recommend that slabs-on-grade in interior spaces be underlain by a minimum 4-inch thick capillary break layer to reduce the potential for moisture migration into the slab. The capillary break material should consist of a well-graded sand and gravel or crushed rock containing less than 5 percent fines based on the fraction passing the ¾-inch sieve. The 4-inch thick capillary break layer can be included when calculating the minimum 1-foot thick structural fill section beneath the slab. If dry slabs are required (e.g., where adhesives are used to anchor carpet or tile to the slab), a waterproofing liner should be placed below the slab to act as a vapor barrier

.

Subsurface Drainage

It is our opinion that foundation footing drains and underslab drains are likely unnecessary for the proposed structures. The majority of subsurface site soils are well draining and it is unlikely that subsurface drains would produce water. The soils are suitable for roof runoff drywells and should be classified as Group A for the purposes of design.

Conventional Retaining Walls

General

While we do not anticipate that retaining walls will be utilized for the proposed project, the following sections provide general guidelines for retaining wall design on this site. We should be contacted during the design phase to review retaining wall plans and provide supplemental recommendations, if needed.

Drainage

Positive drainage is imperative behind any retaining structure. This can be accomplished by using a zone of free-draining material behind the wall with perforated pipes to collect water seepage. The drainage material should consist of coarse sand and gravel containing less than 5 percent fines based on the fraction of material passing the ¾-inch sieve. The wall drainage zone should extend horizontally at least 12 inches from the back of the wall. If a stacked block wall is constructed, we recommend that a barrier such as a non-woven geotextile filter fabric be placed against the back of the wall to prevent loss of the drainage material through the wall joints.

A perforated smooth-walled rigid PVC pipe, having a minimum diameter of 4 inches, should be placed at the bottom of the drainage zone along the entire length of the wall. Drainpipes should discharge to a tightline leading to an appropriate collection and disposal system. An adequate number of cleanouts should be incorporated into the design of the drains in order to provide access for regular maintenance. Roof downspouts, perimeter drains or other types of drainage systems should not be connected to retaining wall drain systems.

Design Parameters

We recommend an active lateral earth pressure of 37 pcf (equivalent fluid density) for a level backfill condition. This assumes that the top of the wall is not structurally restrained and is free to rotate. For restrained walls that are fixed against rotation (at-rest condition), an equivalent fluid density of 56 pcf can be used for the level backfill condition. For seismic conditions, we recommend a uniform lateral pressure of 14H psf (where H is the height of the wall) be added to the lateral pressures. This seismic pressure assumes a peak ground acceleration of 0.32 g. Note that if the retaining system is designed as a braced system but is expected to yield a small amount during a seismic event, the active earth pressure condition may be assumed and combined with the seismic surcharge.

The recommended earth pressure values do not include the effects of surcharges from surface loads or structures. If vehicles were operated within one-half the height of the wall, a traffic surcharge should be added to the wall pressure. The traffic surcharge can be approximated by the equivalent weight of an additional 2 feet of backfill behind the wall. Other surcharge loads, such as construction equipment, staging areas and stockpiled fill, should be considered on a case-by-case basis.

DOCUMENT REVIEW AND CONSTRUCTION OBSERVATION

We recommend that we be retained to review the portions of the plans and specifications that pertain to earthwork construction and stormwater infiltration. We recommend that monitoring, testing and consultation be performed during construction to confirm that the conditions encountered are consistent with our explorations and our stated design assumptions. Insight Geologic would be pleased to provide these services upon request.

REFERENCES

City of Tumwater, Drainage Design and Erosion Control Manual, 2018.

International Code Council, International Building Code, 2018.

Seismic Compression of As-compacted Fill Soils with Variable Levels of Fines Content and Fines Plasticity, Department of Civil and Environmental Engineering, University of California, Los Angeles, July 2004.

Washington State Department of Transportation (WSDOT), Standard Specifications for Road, Bridge and Municipal Construction Manual, 2020.

LIMITATIONS

We have prepared this geotechnical and stormwater evaluation report for the exclusive use of Sound Built Homes and their authorized agents for the proposed residential development project to be located on Tumwater Boulevard SE in Tumwater, Washington.

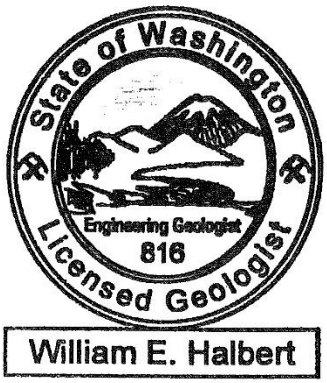
Within the limitations of scope, schedule and budget, our services have been executed in accordance with generally accepted practices in the field of geotechnical engineering in this area at the time this report was prepared. No warranty or other conditions, expressed or implied, should be understood.

Please refer to Attachment C titled "Report Limitations and Guidelines for Use" for additional information pertaining to use of this report.

We appreciate the opportunity to be of service to you on this project. Please contact us if you have questions or require additional information.

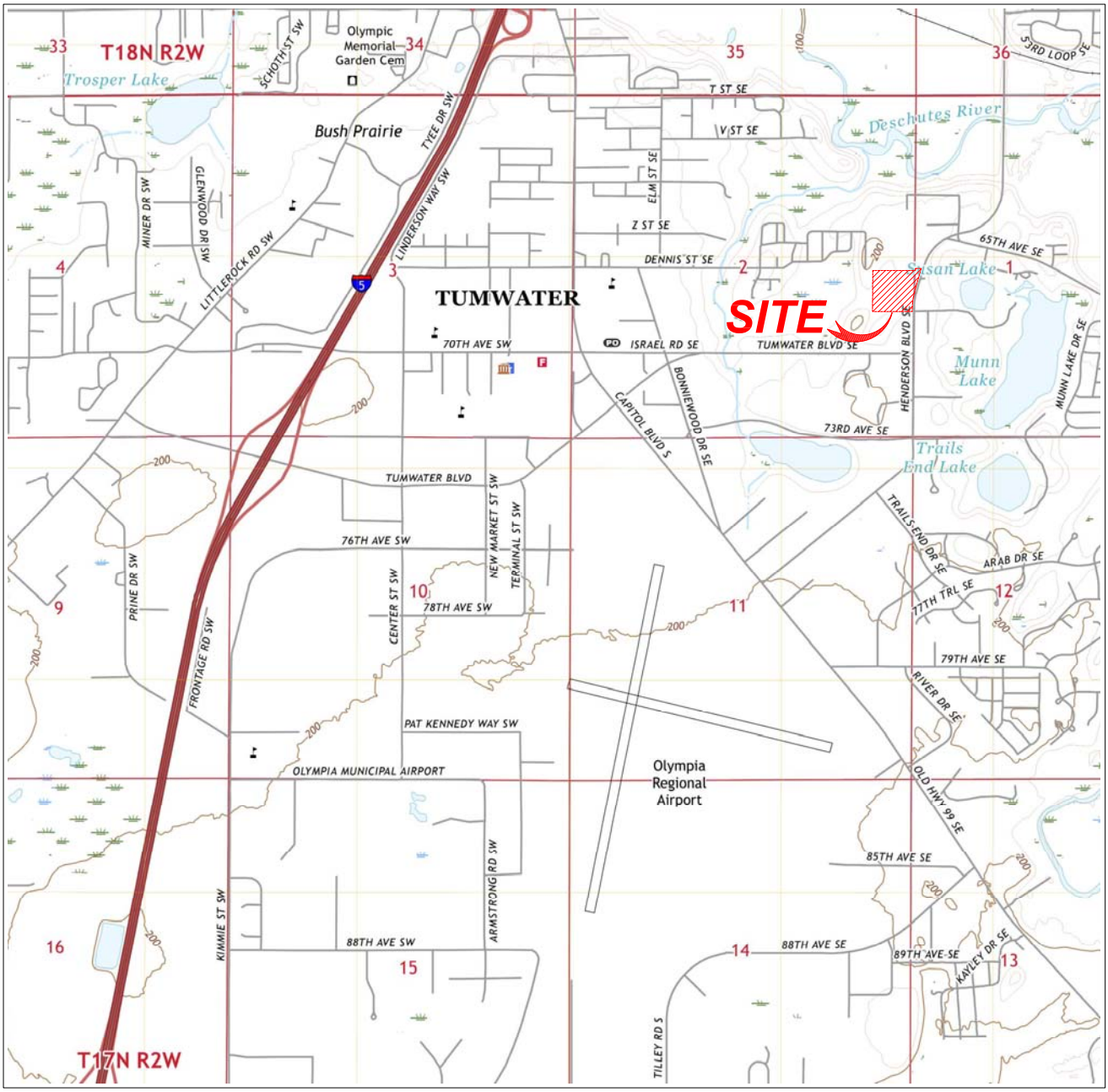
Respectfully Submitted,
INSIGHT GEOLOGIC, INC.

William E. Halbert, L.E.G., L.HG.
Principal



Attachments

FIGURES



Source: USGS (c) 2021

MAYTOWN QUADRANGLE
WASHINGTON - THURSTON COUNTY
7.5-MINUTE SERIES
Year 2015

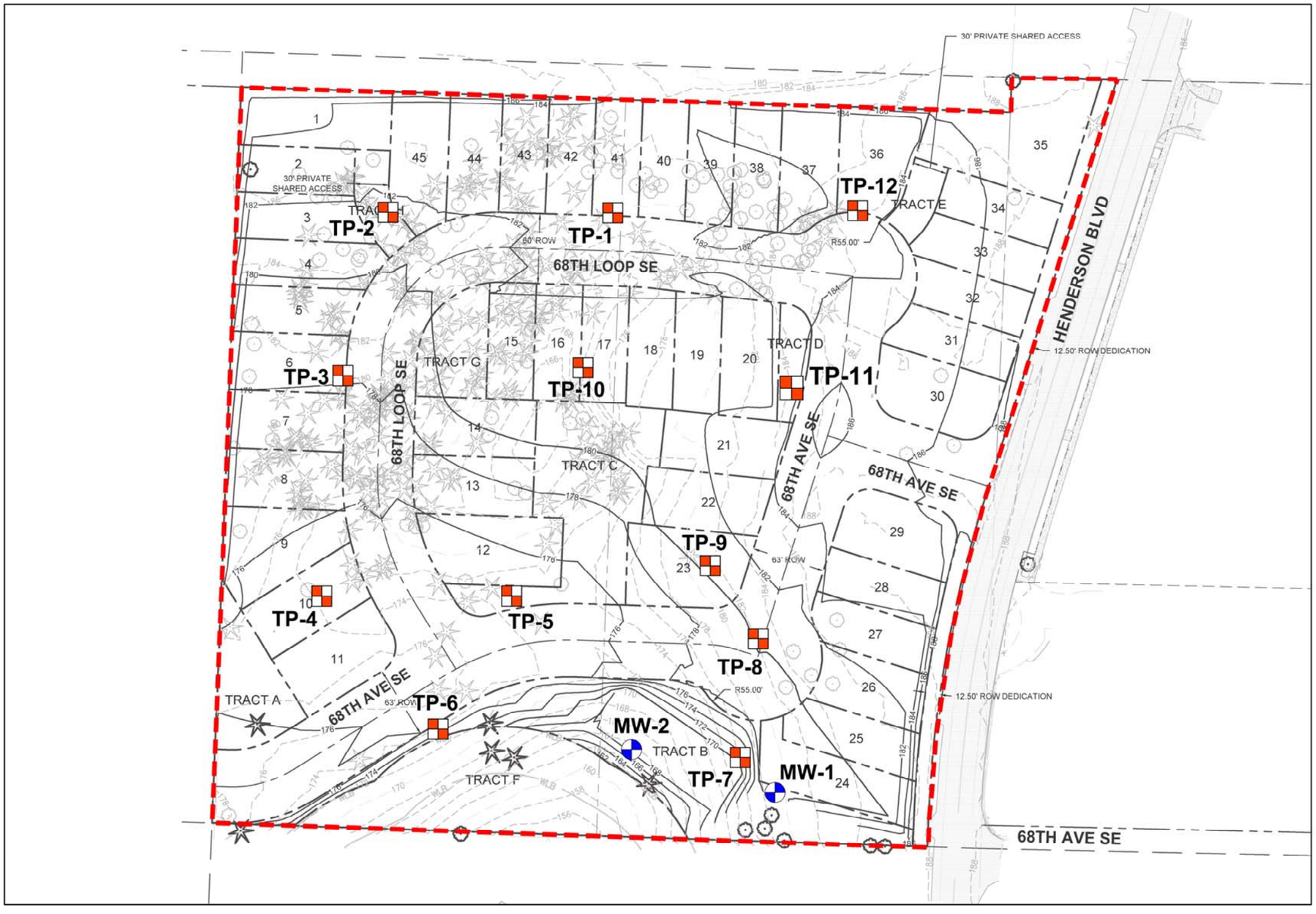
SCALE: 1" = 2500'

THREE LAKES CROSSING DEVELOPMENT

TUMWATER, WASHINGTON

INSIGHT GEOLOGIC, INC.

Figure 1
Vicinity Map



LEGEND:

TP-1	APPROXIMATE TEST PIT LOCATION
MW-1	APPROXIMATE SOIL BORING LOCATION
---------	APPROXIMATE PROJECT BOUNDARY

SCALE: 1"=100'

INSIGHT GEOLOGIC, INC.

THREE LAKES CROSSING DEVELOPMENT

TUMWATER, WASHINGTON

Figure 2

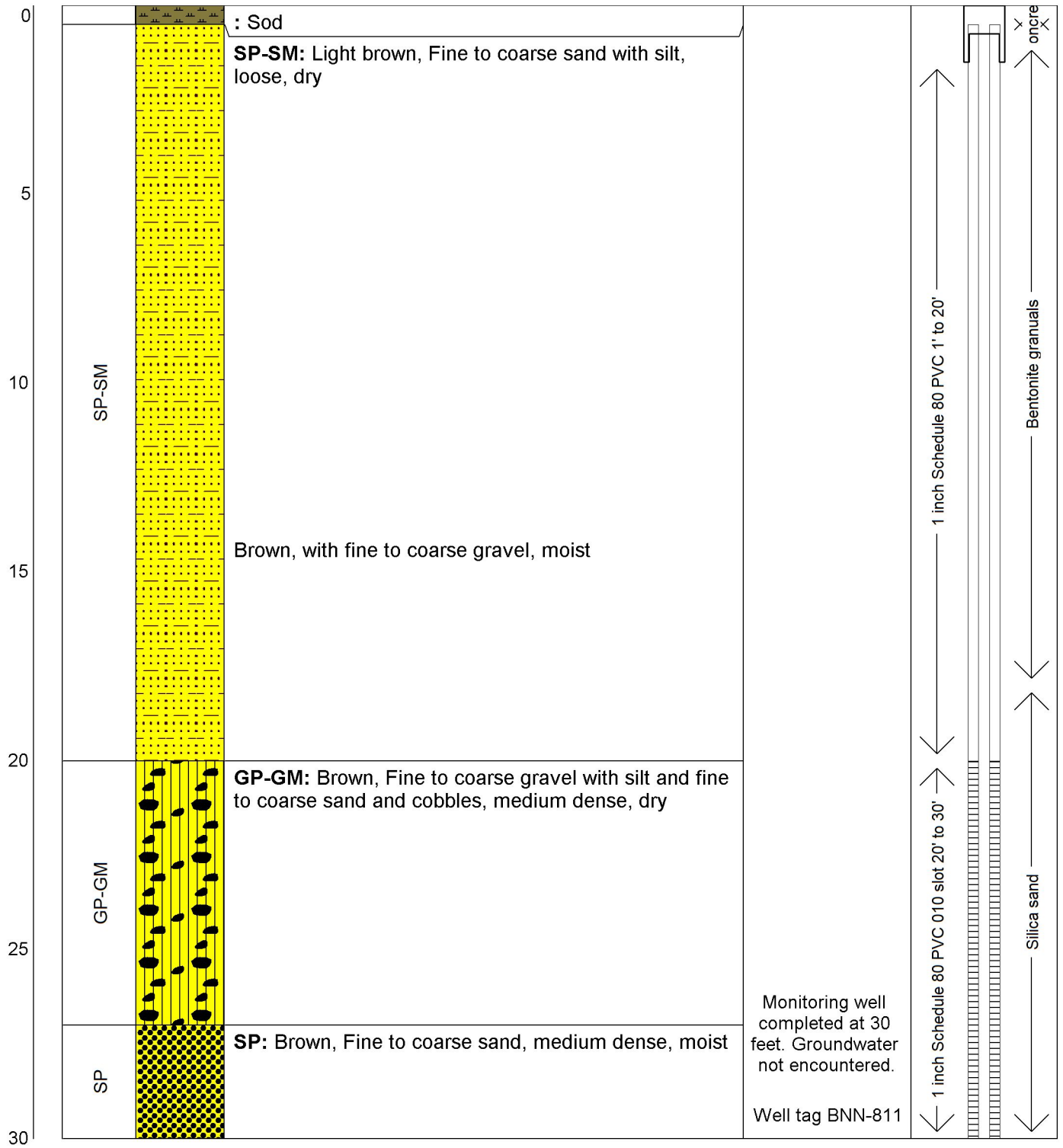
Site Plan

ATTACHMENT A
EXPLORATION LOGS

PROJECT: **SBH - Three Lakes Crossing**
PROJECT NO.: **362-007-01**
LOCATION: **Tumwater, Washington**

MW-1

DATE: **9/16/21**
TOTAL DEPTH: **30**



INSIGHT GEOLOGIC, INC.

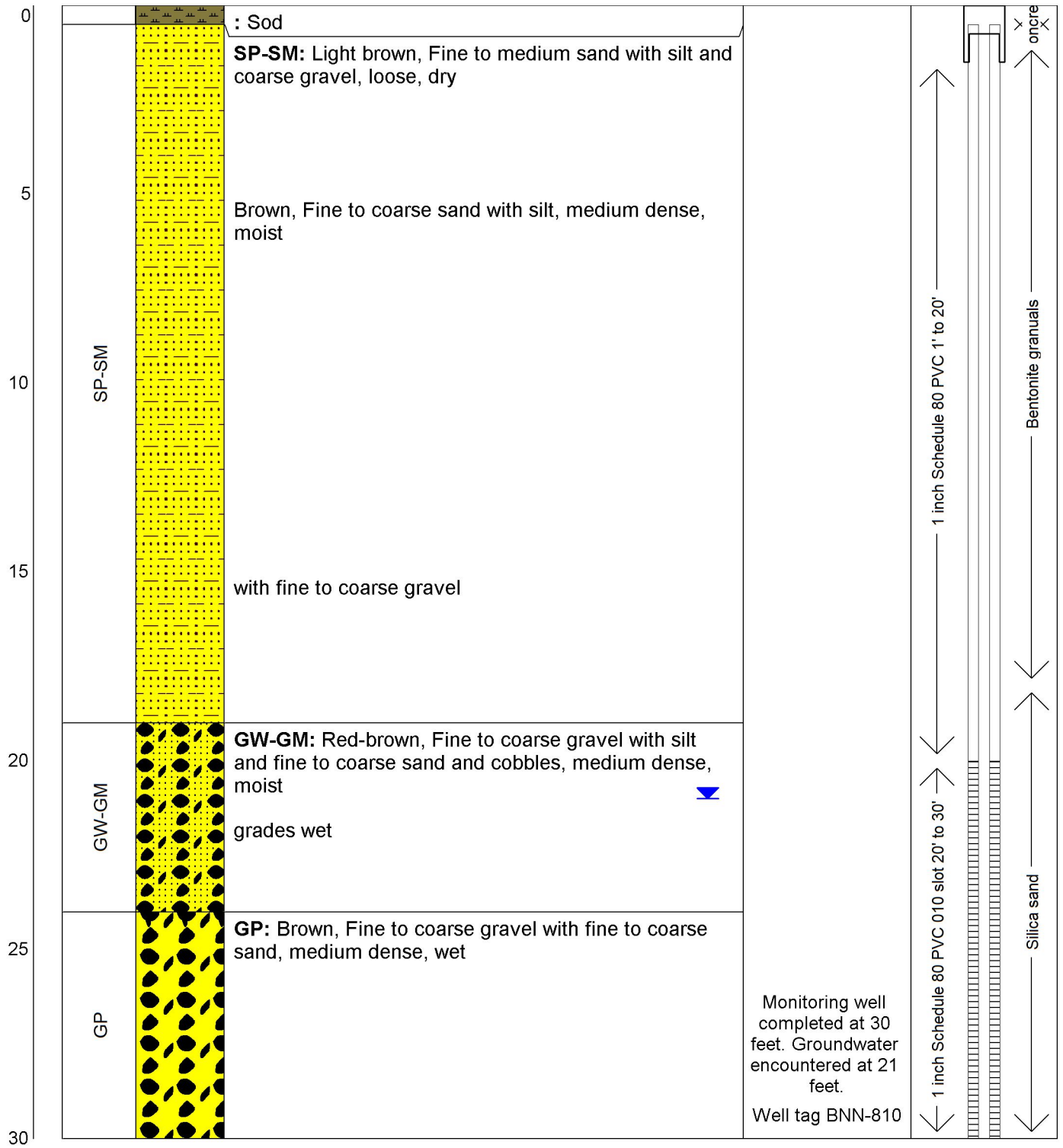
Drilling Contractor: **Standard Environmental Probe**
Drilling Equipment: **Geoprobe 5410**
Logged By: **Neal Graham**

Figure A-2

PROJECT: **SBH - Three Lakes Crossing**
PROJECT NO.: **362-007-01**
LOCATION: **Tumwater, Washington**

MW-2

DATE: **9/16/21**
TOTAL DEPTH: **30**



INSIGHT GEOLOGIC, INC.

Drilling Contractor: **Standard Environmental Probe**
Drilling Equipment: **Geoprobe 5410**
Logged By: **Neal Graham**

Figure A-3

PROJECT: Three Lakes Crossing
PROJECT NO.: 362-007-01
LOCATION: Tumwater, Washington

TP-1

DATE: 9/15/21
TOTAL DEPTH: 8

DEPTH (FT)	U.S.C.S.	LITHOLOGY	SOIL DESCRIPTION	REMARKS AND OTHER TESTS
0			: Forest duff	
1	SP-SM		**SP-SM:** Brown, Fine to coarse sand with silt, loose, dry	
2				
3			Brown to gray, with trace gravel	
4				
5				
6				
7				Test pit completed at 8 feet bgs. No groundwater encountered.
8				
9				
10				

INSIGHT GEOLOGIC, INC.

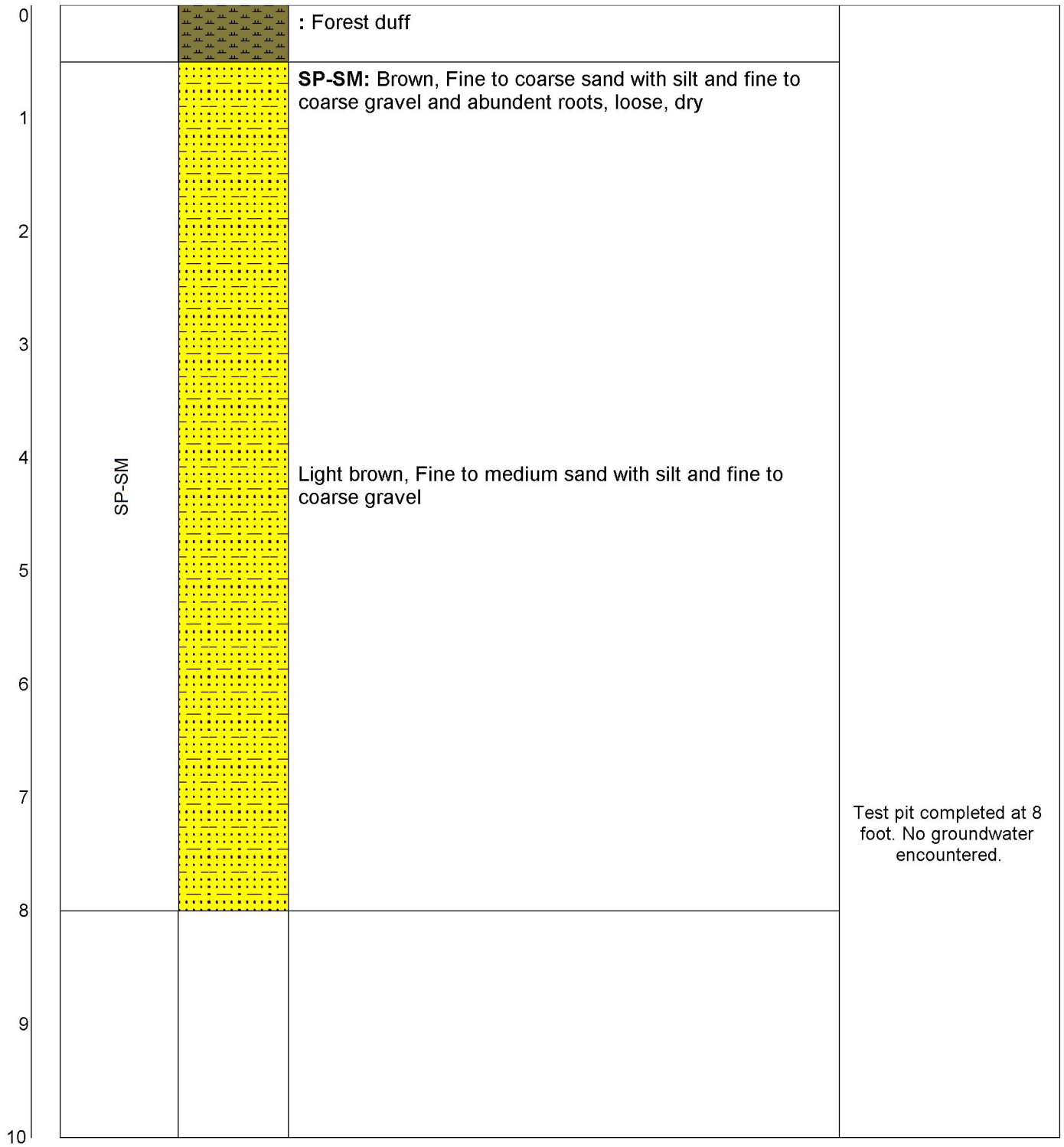
Operator **Johnson Maddox**
Equipment: **John Deere 160C LC Excavator**
Logged By: **Neal Graham**

Figure A-4

PROJECT: Three Lakes Crossing
PROJECT NO.: 362-007-01
LOCATION: Tumwater, Washington

TP-2

DATE: 9/15/21
TOTAL DEPTH: 8



INSIGHT GEOLOGIC, INC.

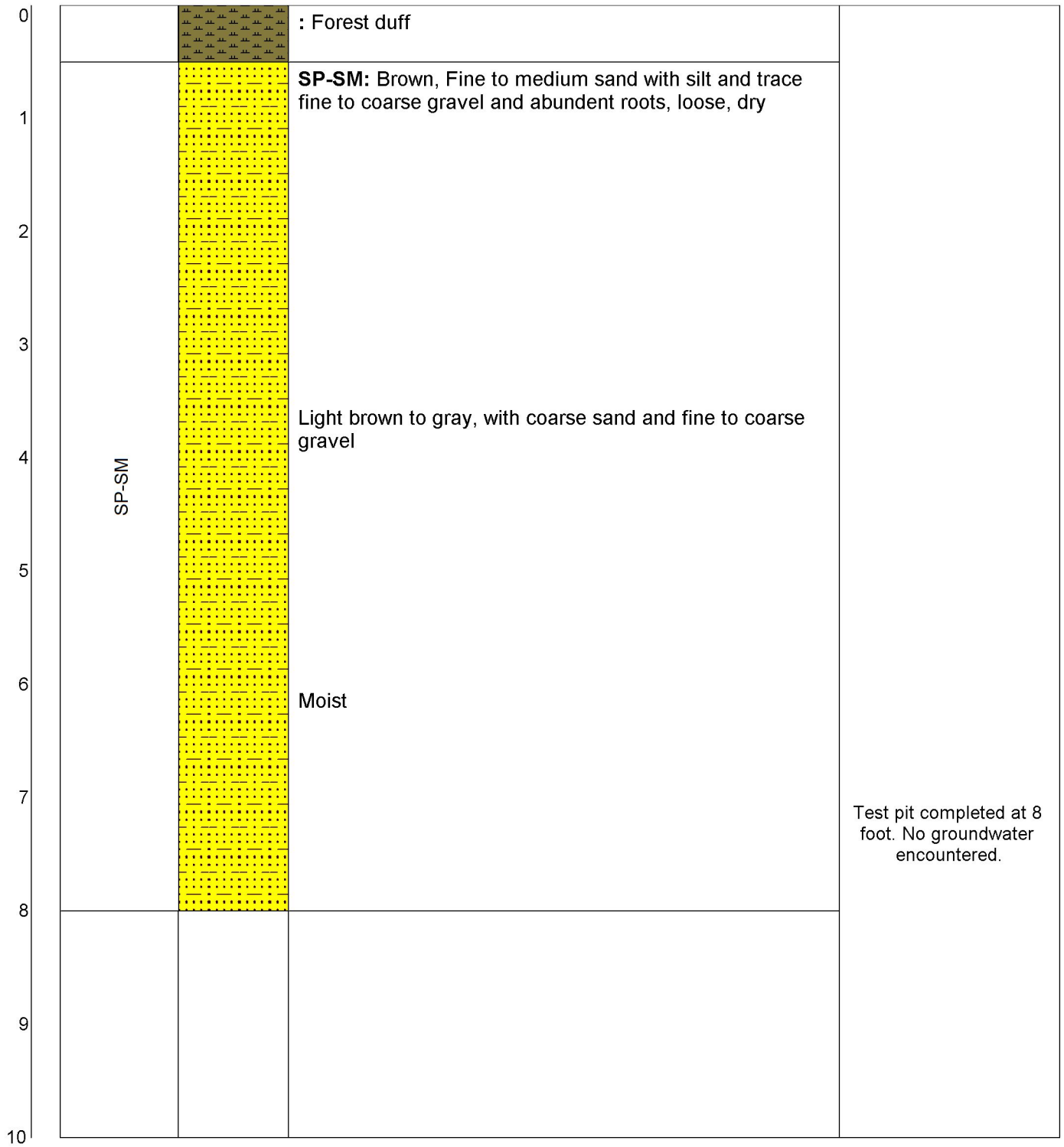
Operator **Johnson Maddox**
Equipment: **John Deere 160C LC Excavator**
Logged By: **Neal Graham**

Figure A-5

PROJECT: Three Lakes Crossing
PROJECT NO.: 362-007-01
LOCATION: Tumwater, Washington

TP-3

DATE: 9/15/21
TOTAL DEPTH: 8



INSIGHT GEOLOGIC, INC.

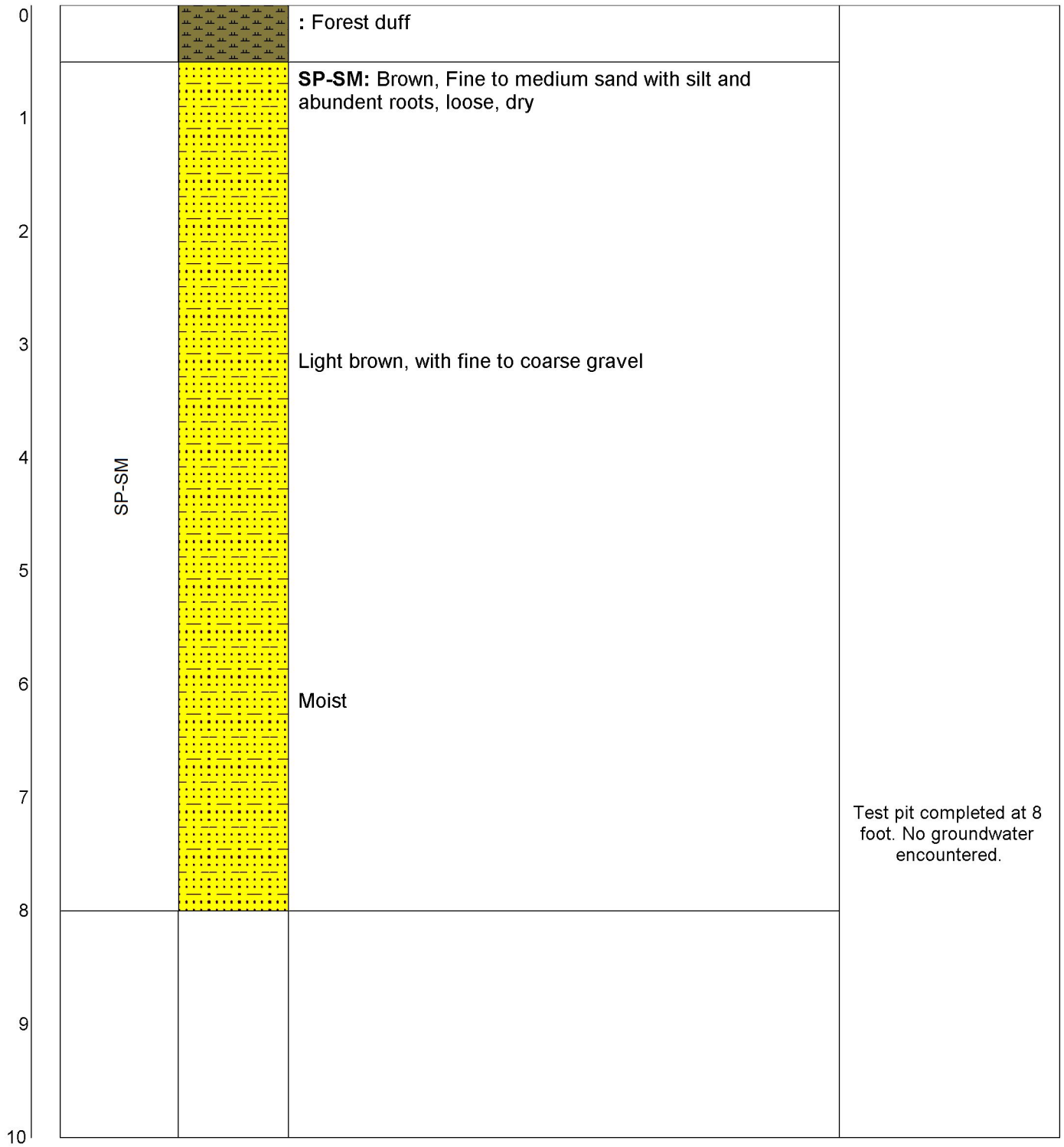
Operator **Johnson Maddox**
Equipment: **John Deere 160C LC Excavator**
Logged By: **Neal Graham**

Figure A-6

PROJECT: Three Lakes Crossing
PROJECT NO.: 362-007-01
LOCATION: Tumwater, Washington

TP-4

DATE: 9/15/21
TOTAL DEPTH: 8



INSIGHT GEOLOGIC, INC.

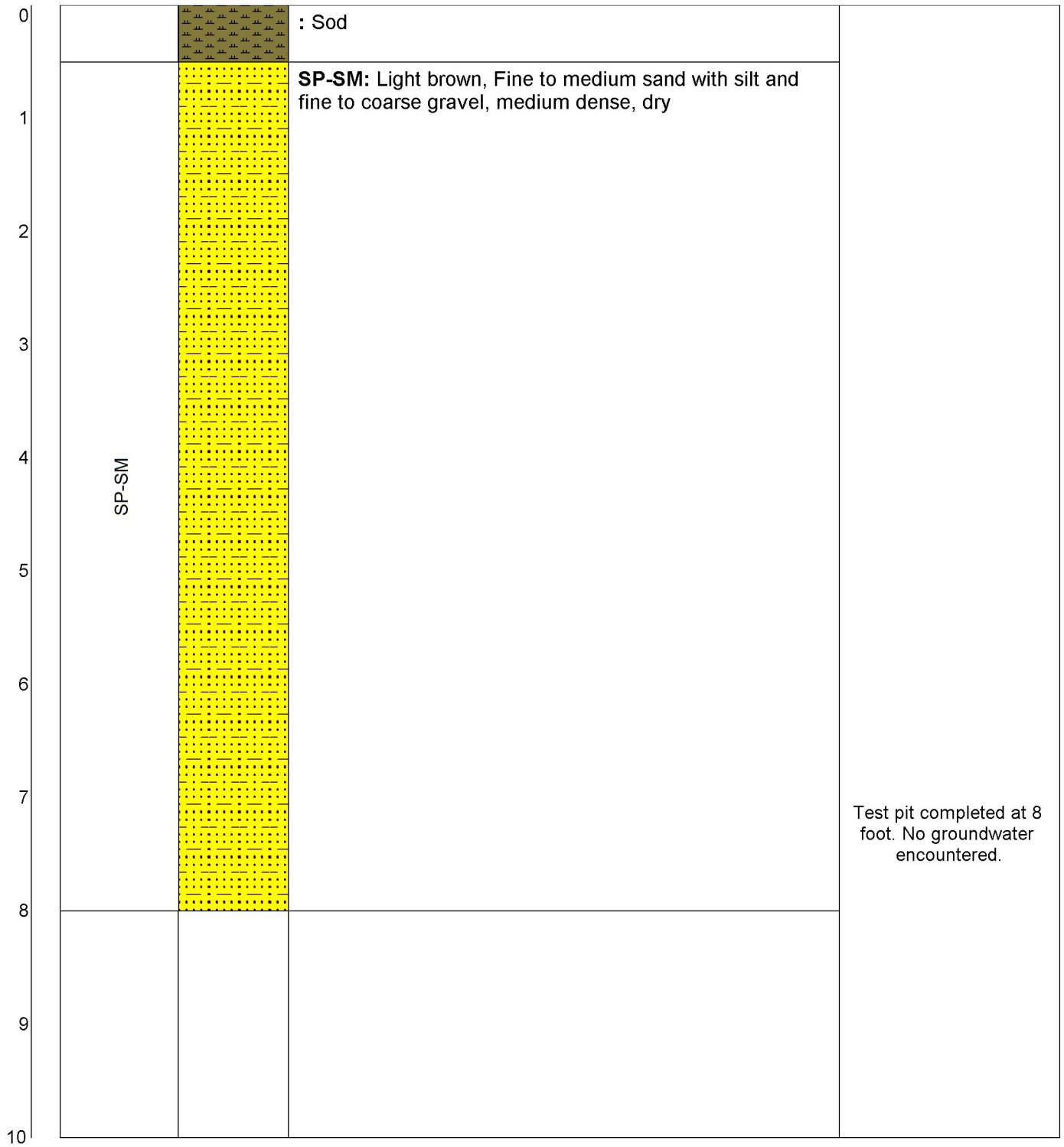
Operator **Johnson Maddox**
Equipment: **John Deere 160C LC Excavator**
Logged By: **Neal Graham**

Figure A-7

PROJECT: Three Lakes Crossing
PROJECT NO.: 362-007-01
LOCATION: Tumwater, Washington

TP-5

DATE: 9/15/21
TOTAL DEPTH: 8



INSIGHT GEOLOGIC, INC.

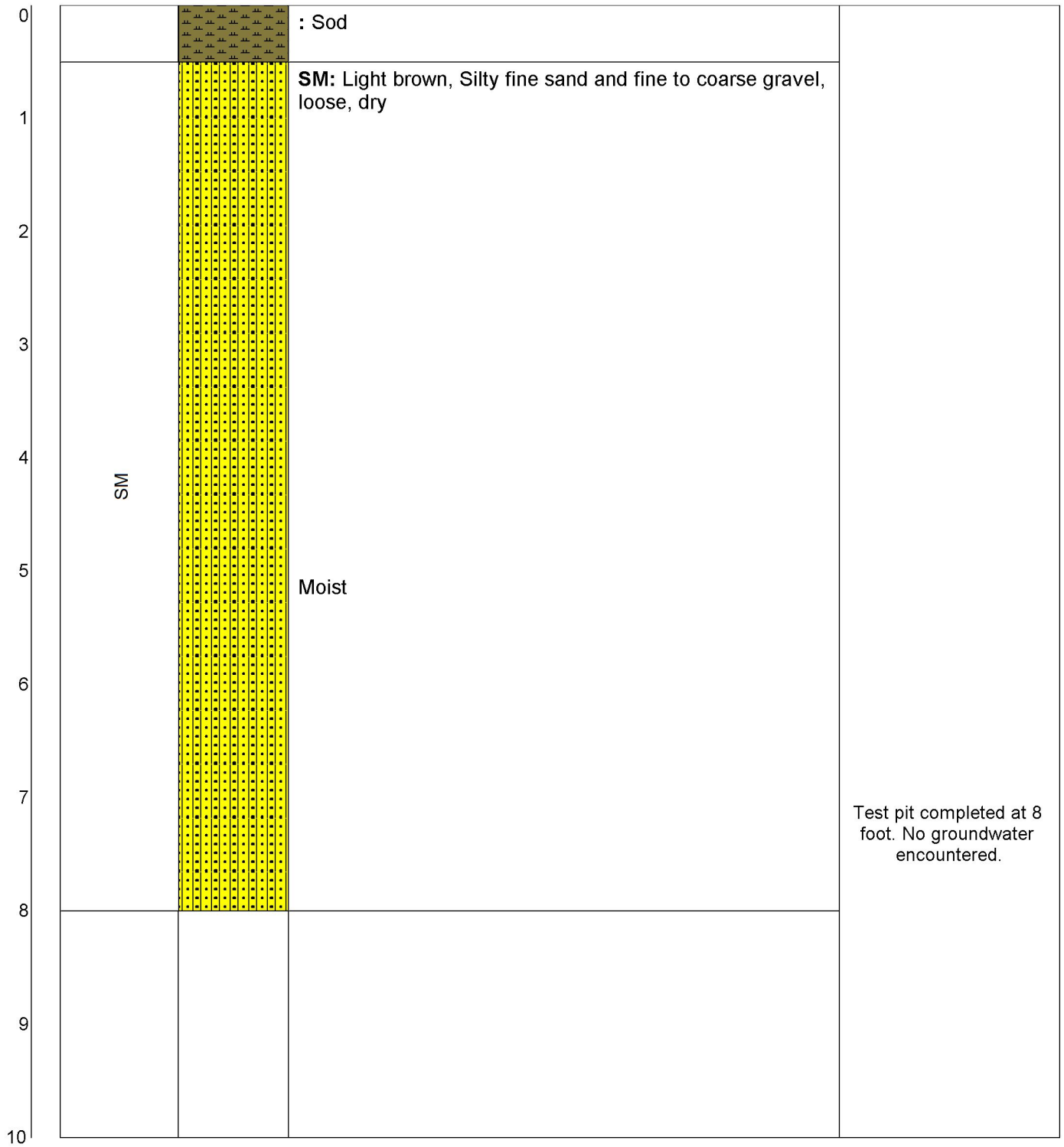
Operator **Johnson Maddox**
Equipment: **John Deere 160C LC Excavator**
Logged By: **Neal Graham**

Figure A-8

PROJECT: Three Lakes Crossing
PROJECT NO.: 362-007-01
LOCATION: Tumwater, Washington

TP-6

DATE: 9/15/21
TOTAL DEPTH: 8



INSIGHT GEOLOGIC, INC.

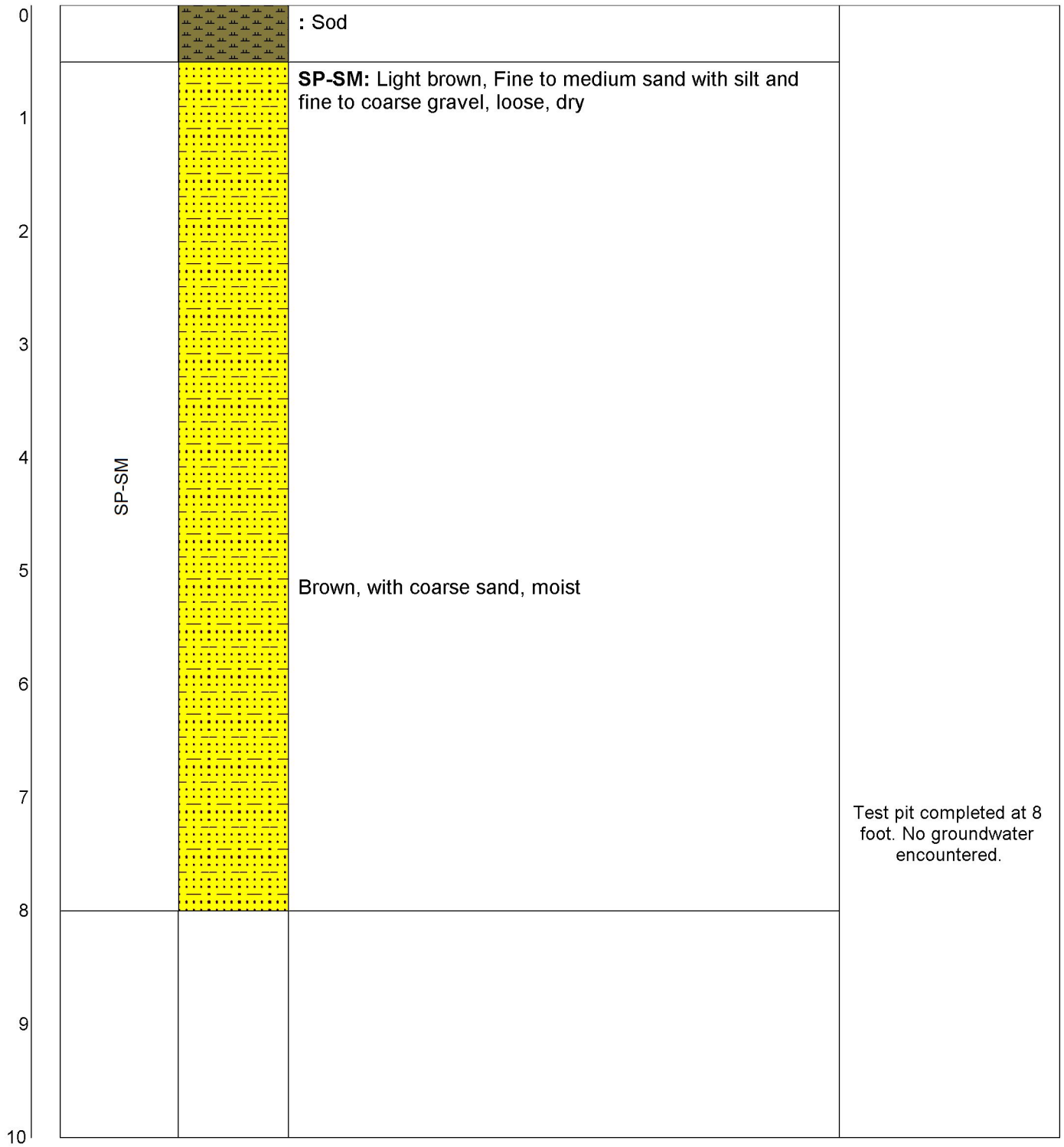
Operator Johnson Maddox
Equipment: John Deere 160C LC Excavator
Logged By: Neal Graham

Figure A-9

PROJECT: Three Lakes Crossing
PROJECT NO.: 362-007-01
LOCATION: Tumwater, Washington

TP-7

DATE: 9/15/21
TOTAL DEPTH: 8



INSIGHT GEOLOGIC, INC.

Operator Johnson Maddox
Equipment: John Deere 160C LC Excavator
Logged By: Neal Graham

Figure A-10

PROJECT: Three Lakes Crossing
PROJECT NO.: 362-007-01
LOCATION: Tumwater, Washington

TP-8

DATE: 9/15/21
TOTAL DEPTH: 8

DEPTH (FT)	U.S.C.S.	LITHOLOGY	SOIL DESCRIPTION	REMARKS AND OTHER TESTS
0			: Sod	
1	SP-SM		**SP-SM:** Light brown, Fine to medium sand with silt and fine to coarse gravel and abundant roots, loose, dry	
4			Brown, with coarse sand and cobbles, medium dense, moist	
6			No cobbles	
7				Test pit completed at 8 foot. No groundwater encountered.
8				
10				

INSIGHT GEOLOGIC, INC.

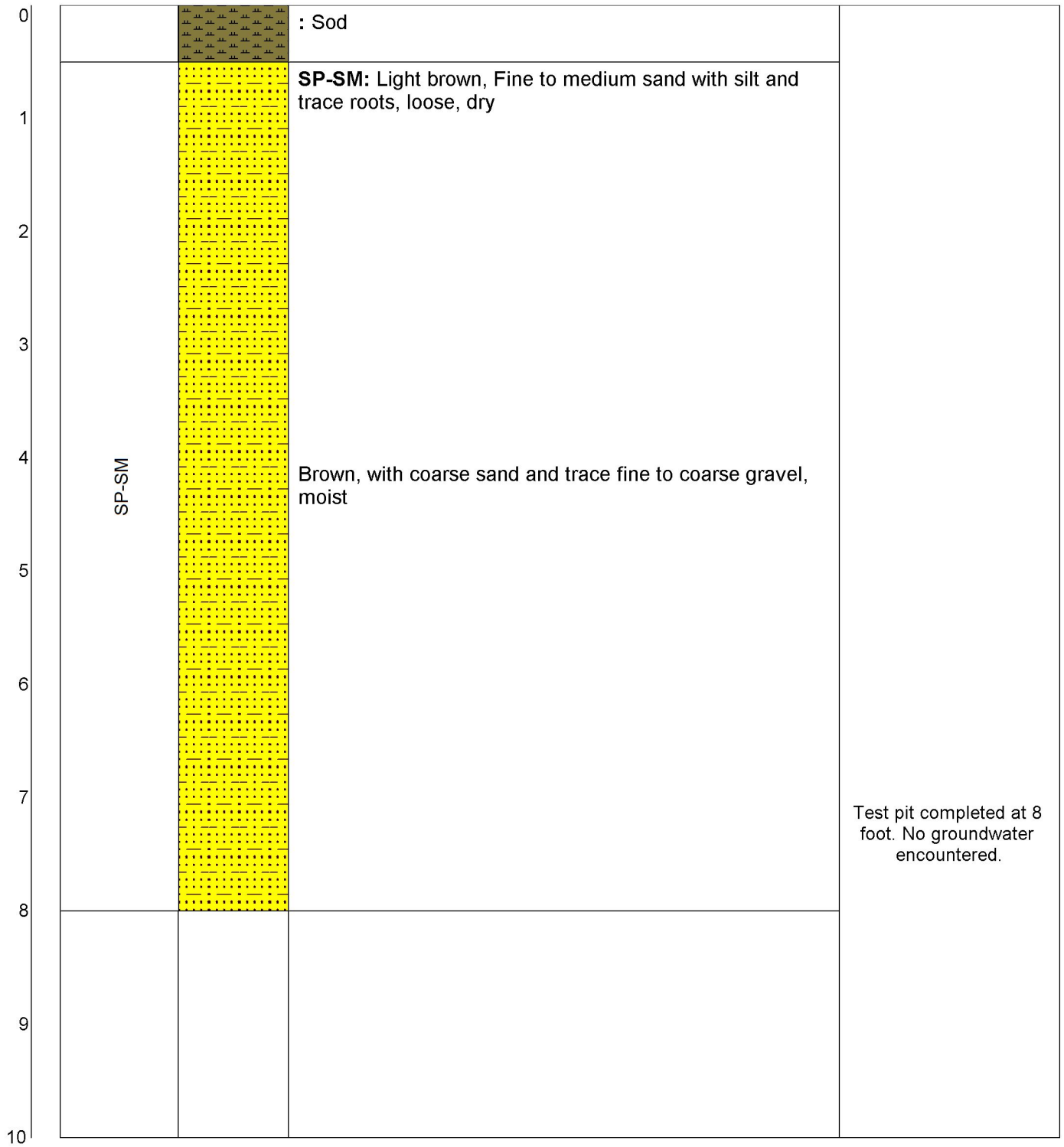
Operator **Johnson Maddox**
Equipment: **John Deere 160C LC Excavator**
Logged By: **Neal Graham**

Figure A-11

PROJECT: Three Lakes Crossing
PROJECT NO.: 362-007-01
LOCATION: Tumwater, Washington

TP-9

DATE: 9/15/21
TOTAL DEPTH: 8



INSIGHT GEOLOGIC, INC.

Operator **Johnson Maddox**
Equipment: **John Deere 160C LC Excavator**
Logged By: **Neal Graham**

Figure A-12

PROJECT: Three Lakes Crossing
PROJECT NO.: 362-007-01
LOCATION: Tumwater, Washington

TP-10

DATE: 9/15/21
TOTAL DEPTH: 8

DEPTH (FT)	U.S.C.S.	LITHOLOGY	SOIL DESCRIPTION	REMARKS AND OTHER TESTS
0			: Sod	
1	SP-SM		**SP-SM:** Light brown, Fine to medium sand with silt and abundant roots, loose, dry	
2				
3				
4			Brown, with coarse sand, moist	
5				
6				
7				Test pit completed at 8 foot. No groundwater encountered.
8				
9				
10				

INSIGHT GEOLOGIC, INC.

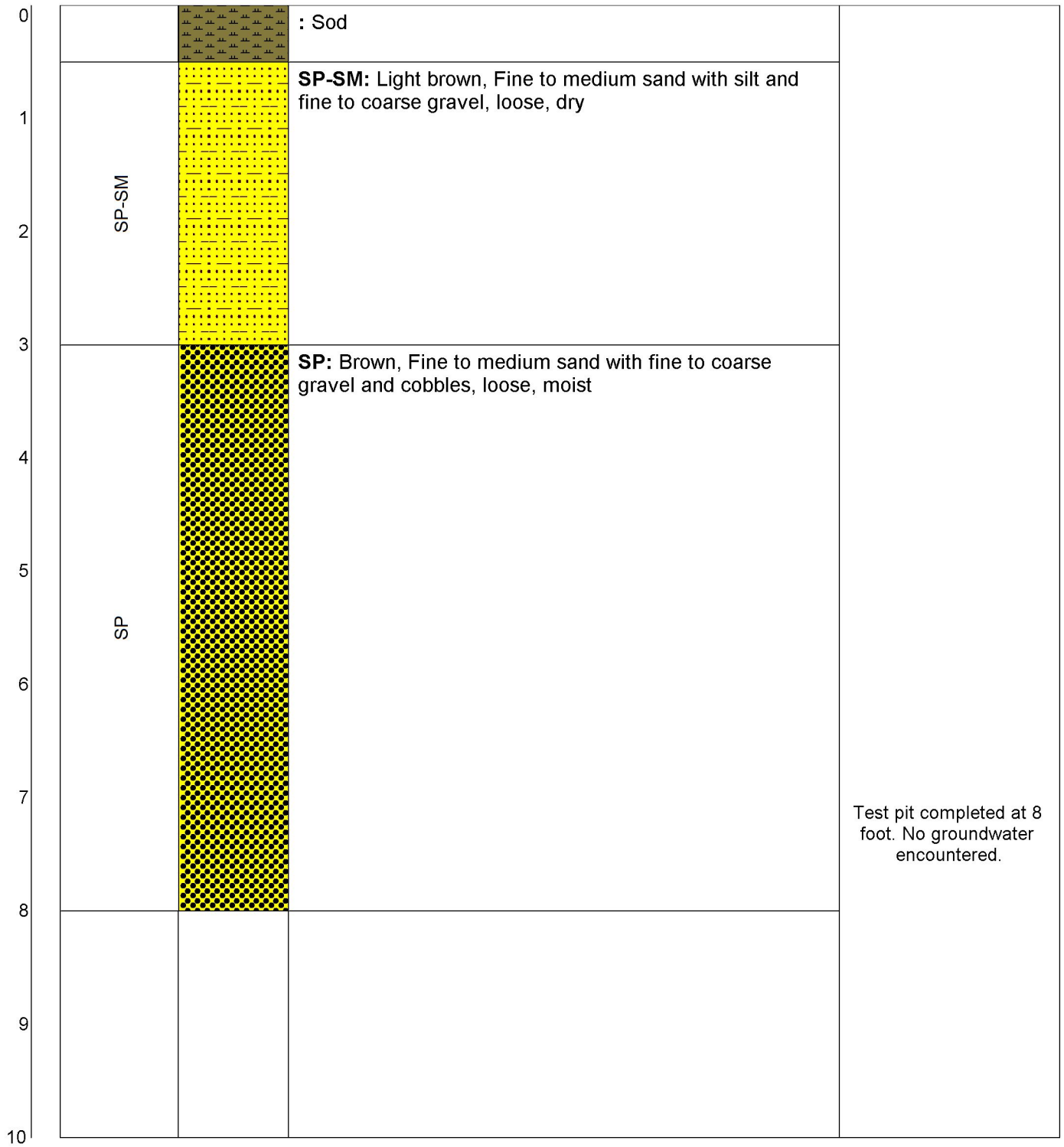
Operator **Johnson Maddox**
Equipment: **John Deere 160C LC Excavator**
Logged By: **Neal Graham**

Figure A-13

PROJECT: Three Lakes Crossing
PROJECT NO.: 362-007-01
LOCATION: Tumwater, Washington

TP-11

DATE: 9/15/21
TOTAL DEPTH: 8



INSIGHT GEOLOGIC, INC.

Operator **Johnson Maddox**
Equipment: **John Deere 160C LC Excavator**
Logged By: **Neal Graham**

Figure A-14

PROJECT: Three Lakes Crossing
PROJECT NO.: 362-007-01
LOCATION: Tumwater, Washington

TP-12

DATE: 9/15/21
TOTAL DEPTH: 8

DEPTH (FT)	U.S.C.S.	LITHOLOGY	SOIL DESCRIPTION	REMARKS AND OTHER TESTS
0			: Sod	
1	SP-SM		**SP-SM:** Light brown, Fine to medium sand with silt and fine to coarse gravel, loose, dry	
3	SP		**SP:** Brown, Fine to medium sand with fine to coarse gravel and cobbles, loose, moist	Test pit completed at 8 foot. No groundwater encountered.
8				
10				

INSIGHT GEOLOGIC, INC.

Operator **Johnson Maddox**
Equipment: **John Deere 160C LC Excavator**
Logged By: **Neal Graham**

Figure A-15

ATTACHMENT B
LABORATORY ANALYSES RESULTS

Gradation Analysis Summary Data

Job Name: Three Lakes Crossing
Job Number: 362-007-01
Date Tested: 9/17/21
Tested By: Dalton Prichard

Sample Location: TP-2
Sample Name: TP-2 4.0' - 8.0'
Depth: 4 - 8 Feet

Moisture Content (%) 5.1%

Sieve Size	Percent Passing
3.0 in. (75.0)	100.0
1.5 in. (37.5)	100.0
3/4 in. (19.0)	93.3
3/8 in. (9.5-mm)	87.8
No. 4 (4.75-mm)	87.3
No. 10 (2.00-mm)	86.1
No. 20 (.850-mm)	81.5
No. 40 (.425-mm)	61.4
No. 60 (.250-mm)	30.6
No. 100 (.150-mm)	16.6
No. 200 (.075-mm)	6.6

Size Fraction	Percent by Weight
Coarse Gravel	6.7
Fine Gravel	5.9
Coarse Sand	1.2
Medium Sand	24.7
Fine Sand	54.8
Fines	6.6
Total	**100.0**

LL	- -
PL	- -
PI	- -
D_{10}	0.10
D_{30}	0.25
D_{60}	0.42
D_{90}	13.00
Cc	1.57
Cu	4.42

ASTM Classification
Group Name: **Poorly Graded Sand with Silt**
Symbol: **SP-SM**

INSIGHT GEOLOGIC, INC.

Gradation Analysis Summary Data

Job Name: Three Lakes Crossing
Job Number: 362-007-01
Date Tested: 9/17/21
Tested By: Dalton Prichard

Sample Location: TP-6
Sample Name: TP-6 0.0' - 5.0'
Depth: 0 - 5 Feet

Moisture Content (%) 4.7%

Sieve Size	Percent Passing
3.0 in. (75.0)	100.0
1.5 in. (37.5)	100.0
3/4 in. (19.0)	100.0
3/8 in. (9.5-mm)	100.0
No. 4 (4.75-mm)	100.0
No. 10 (2.00-mm)	99.6
No. 20 (.850-mm)	98.8
No. 40 (.425-mm)	92.1
No. 60 (.250-mm)	69.0
No. 100 (.150-mm)	35.9
No. 200 (.075-mm)	14.3

Size Fraction	Percent by Weight
Coarse Gravel	0.0
Fine Gravel	0.0
Coarse Sand	0.4
Medium Sand	7.5
Fine Sand	77.8
Fines	14.3
Total	**100.0**

LL	- -
PL	- -
PI	- -
D_{10}	0.07
D_{30}	0.14
D_{60}	0.21
D_{90}	0.40
Cc	1.44
Cu	3.23

ASTM Classification
Group Name: **Silty Sand**
Symbol: **SM**

INSIGHT GEOLOGIC, INC.

Gradation Analysis Summary Data

Job Name: Three Lakes Crossing
Job Number: 362-007-01
Date Tested: 9/17/21
Tested By: Dalton Prichard

Sample Location: TP-9
Sample Name: TP-9 4.0' - 8.0'
Depth: 4 - 8 Feet

Moisture Content (%) 8.0%

Sieve Size	Percent Passing
3.0 in. (75.0)	100.0
1.5 in. (37.5)	100.0
3/4 in. (19.0)	100.0
3/8 in. (9.5-mm)	100.0
No. 4 (4.75-mm)	99.2
No. 10 (2.00-mm)	98.5
No. 20 (.850-mm)	96.7
No. 40 (.425-mm)	81.3
No. 60 (.250-mm)	43.7
No. 100 (.150-mm)	14.3
No. 200 (.075-mm)	5.0

Size Fraction	Percent by Weight
Coarse Gravel	0.0
Fine Gravel	0.8
Coarse Sand	0.7
Medium Sand	17.2
Fine Sand	76.3
Fines	5.0
Total	**100.0**

LL	- -
PL	- -
PI	- -
D_{10}	0.13
D_{30}	0.20
D_{60}	0.31
D_{90}	0.56
Cc	1.01
Cu	2.35

ASTM Classification
Group Name: **Poorly Graded Sand with Silt**
Symbol: **SP-SM**

INSIGHT GEOLOGIC, INC.

Gradation Analysis Summary Data

Job Name: Three Lakes Crossing
Job Number: 362-007-01
Date Tested: 9/17/21
Tested By: Dalton Prichard

Sample Location: TP-10
Sample Name: TP-10 0.0' - 4.0'
Depth: 0 - 4 Feet

Moisture Content (%) 8.1%

Sieve Size	Percent Passing
3.0 in. (75.0)	100.0
1.5 in. (37.5)	100.0
3/4 in. (19.0)	100.0
3/8 in. (9.5-mm)	99.2
No. 4 (4.75-mm)	98.4
No. 10 (2.00-mm)	97.9
No. 20 (.850-mm)	94.9
No. 40 (.425-mm)	74.8
No. 60 (.250-mm)	40.3
No. 100 (.150-mm)	23.4
No. 200 (.075-mm)	9.7

Size Fraction	Percent by Weight
Coarse Gravel	0.0
Fine Gravel	1.6
Coarse Sand	0.5
Medium Sand	23.1
Fine Sand	65.1
Fines	9.7
Total	**100.0**

LL	- -
PL	- -
PI	- -
D_{10}	0.08
D_{30}	0.19
D_{60}	0.34
D_{90}	0.67
Cc	1.42
Cu	4.53

ASTM Classification
Group Name: **Poorly Graded Sand with Silt**
Symbol: **SP-SM**

INSIGHT GEOLOGIC, INC.

Gradation Analysis Summary Data

Job Name: Three Lakes Crossing
Job Number: 362-007-01
Date Tested: 9/17/21
Tested By: Dalton Prichard

Sample Location: TP-12
Sample Name: TP-12 3.0' - 8.0'
Depth: 3 - 8 Feet

Moisture Content (%) 3.7%

Sieve Size	Percent Passing
3.0 in. (75.0)	100.0
1.5 in. (37.5)	100.0
3/4 in. (19.0)	84.3
3/8 in. (9.5-mm)	70.1
No. 4 (4.75-mm)	65.0
No. 10 (2.00-mm)	61.4
No. 20 (.850-mm)	55.9
No. 40 (.425-mm)	34.5
No. 60 (.250-mm)	9.2
No. 100 (.150-mm)	2.9
No. 200 (.075-mm)	1.0

Size Fraction	Percent by Weight
Coarse Gravel	15.7
Fine Gravel	19.3
Coarse Sand	3.5
Medium Sand	26.9
Fine Sand	33.5
Fines	1.0
Total	**100.0**

LL	- -
PL	- -
PI	- -
D_{10}	0.26
D_{30}	0.38
D_{60}	1.40
D_{90}	24.00
Cc	0.40
Cu	5.38

ASTM Classification
Group Name: **Poorly Graded Sand with Gravel**
Symbol: **SP**

INSIGHT GEOLOGIC, INC.

Gradation Analysis Summary Data

Job Name: Three Lakes Crossing
Job Number: 362-007-01
Date Tested: 9/17/21
Tested By: Dalton Prichard

Sample Location: MW-2
Sample Name: MW-2 0.0' - 5.0'
Depth: 0 - 5 Feet

Moisture Content (%) 4.7%

Sieve Size	Percent Passing
3.0 in. (75.0)	100.0
1.5 in. (37.5)	94.3
3/4 in. (19.0)	94.3
3/8 in. (9.5-mm)	94.3
No. 4 (4.75-mm)	94.3
No. 10 (2.00-mm)	94.0
No. 20 (.850-mm)	92.7
No. 40 (.425-mm)	80.7
No. 60 (.250-mm)	46.1
No. 100 (.150-mm)	26.2
No. 200 (.075-mm)	11.1

Size Fraction	Percent by Weight
Coarse Gravel	5.7
Fine Gravel	0.0
Coarse Sand	0.3
Medium Sand	13.2
Fine Sand	69.6
Fines	11.1
Total	**100.0**

LL	- -
PL	- -
PI	- -
D_{10}	0.07
D_{30}	0.16
D_{60}	0.31
D_{90}	7.50
Cc	1.18
Cu	4.43

ASTM Classification
Group Name: **Poorly Graded Sand with Silt**
Symbol: **SP-SM**

INSIGHT GEOLOGIC, INC.

Gradation Analysis Summary Data

Job Name: Three Lakes Crossing
Job Number: 362-007-01
Date Tested: 9/17/21
Tested By: Dalton Prichard

Sample Location: MW-2
Sample Name: MW-2 5.0' - 10.0'
Depth: 5 - 10 Feet

Moisture Content (%) 5.8%

Sieve Size	Percent Passing
3.0 in. (75.0)	100.0
1.5 in. (37.5)	100.0
3/4 in. (19.0)	100.0
3/8 in. (9.5-mm)	100.0
No. 4 (4.75-mm)	99.6
No. 10 (2.00-mm)	99.3
No. 20 (.850-mm)	97.4
No. 40 (.425-mm)	77.7
No. 60 (.250-mm)	36.3
No. 100 (.150-mm)	18.0
No. 200 (.075-mm)	6.6

Size Fraction	Percent by Weight
Coarse Gravel	0.0
Fine Gravel	0.4
Coarse Sand	0.4
Medium Sand	21.6
Fine Sand	71.1
Fines	6.6
Total	**100.0**

LL	- -
PL	- -
PI	- -
D_{10}	0.09
D_{30}	0.21
D_{60}	0.35
D_{90}	6.50
Cc	1.38
Cu	3.85

ASTM Classification
Group Name: **Poorly Graded Sand with Silt**
Symbol: **SP-SM**

INSIGHT GEOLOGIC, INC.

Gradation Analysis Summary Data

Job Name: Three Lakes Crossing
Job Number: 362-007-01
Date Tested: 9/17/21
Tested By: Dalton Prichard

Sample Location: MW-2
Sample Name: MW-2 10.0' - 15.0'
Depth: 10 - 15 Feet

Moisture Content (%) 7.7%

Sieve Size	Percent Passing
3.0 in. (75.0)	100.0
1.5 in. (37.5)	100.0
3/4 in. (19.0)	100.0
3/8 in. (9.5-mm)	100.0
No. 4 (4.75-mm)	100.0
No. 10 (2.00-mm)	99.9
No. 20 (.850-mm)	99.7
No. 40 (.425-mm)	97.5
No. 60 (.250-mm)	74.5
No. 100 (.150-mm)	27.9
No. 200 (.075-mm)	7.1

Size Fraction	Percent by Weight
Coarse Gravel	0.0
Fine Gravel	0.0
Coarse Sand	0.1
Medium Sand	2.5
Fine Sand	90.4
Fines	7.1
Total	**100.0**

LL	- -
PL	- -
PI	- -
D_{10}	0.08
D_{30}	0.16
D_{60}	0.21
D_{90}	0.34
Cc	1.40
Cu	2.56

ASTM Classification
Group Name: **Poorly Graded Sand with Silt**
Symbol: **SP-SM**

INSIGHT GEOLOGIC, INC.

Gradation Analysis Summary Data

Job Name: Three Lakes Crossing
Job Number: 362-007-01
Date Tested: 9/17/21
Tested By: Dalton Prichard

Sample Location: MW-2
Sample Name: MW-2 15.0' - 20.0'
Depth: 15 - 20 Feet

Moisture Content (%) 9.1%

Sieve Size	Percent Passing
3.0 in. (75.0)	100.0
1.5 in. (37.5)	100.0
3/4 in. (19.0)	94.9
3/8 in. (9.5-mm)	89.0
No. 4 (4.75-mm)	83.9
No. 10 (2.00-mm)	80.0
No. 20 (.850-mm)	75.7
No. 40 (.425-mm)	59.7
No. 60 (.250-mm)	30.6
No. 100 (.150-mm)	11.9
No. 200 (.075-mm)	5.7

Size Fraction	Percent by Weight
Coarse Gravel	5.1
Fine Gravel	11.0
Coarse Sand	4.0
Medium Sand	20.3
Fine Sand	54.0
Fines	5.7
Total	**100.0**

LL	- -
PL	- -
PI	- -
D_{10}	0.14
D_{30}	0.25
D_{60}	0.43
D_{90}	11.00
Cc	1.04
Cu	3.07

ASTM Classification
Group Name: **Poorly Graded Sand with Gravel and Silt**
Symbol: **SP-SM**

INSIGHT GEOLOGIC, INC.

Gradation Analysis Summary Data

Job Name: Three Lakes Crossing
Job Number: 362-007-01
Date Tested: 9/17/21
Tested By: Dalton Prichard

Sample Location: MW-2
Sample Name: MW-2 20.0' - 25.0'
Depth: 20 - 25 Feet

Moisture Content (%) 7.1%

Sieve Size	Percent Passing
3.0 in. (75.0)	100.0
1.5 in. (37.5)	100.0
3/4 in. (19.0)	83.5
3/8 in. (9.5-mm)	54.0
No. 4 (4.75-mm)	42.7
No. 10 (2.00-mm)	34.1
No. 20 (.850-mm)	25.6
No. 40 (.425-mm)	20.2
No. 60 (.250-mm)	15.5
No. 100 (.150-mm)	9.9
No. 200 (.075-mm)	6.0

Size Fraction	Percent by Weight
Coarse Gravel	16.5
Fine Gravel	40.8
Coarse Sand	8.6
Medium Sand	13.9
Fine Sand	14.2
Fines	6.0
Total	**100.0**

LL	- -
PL	- -
PI	- -
D_{10}	0.15
D_{30}	1.40
D_{60}	11.00
D_{90}	23.00
Cc	1.19
Cu	73.33

ASTM Classification
Group Name: **Well Graded Gravel with Sand and Silt**
Symbol: **GW-GM**

INSIGHT GEOLOGIC, INC.

Gradation Analysis Summary Data

Job Name: Three Lakes Crossing
Job Number: 362-007-01
Date Tested: 9/17/21
Tested By: Dalton Prichard

Sample Location: MW-2
Sample Name: MW-2 25.0' - 30.0'
Depth: 25 - 30 Feet

Moisture Content (%) 11.8%

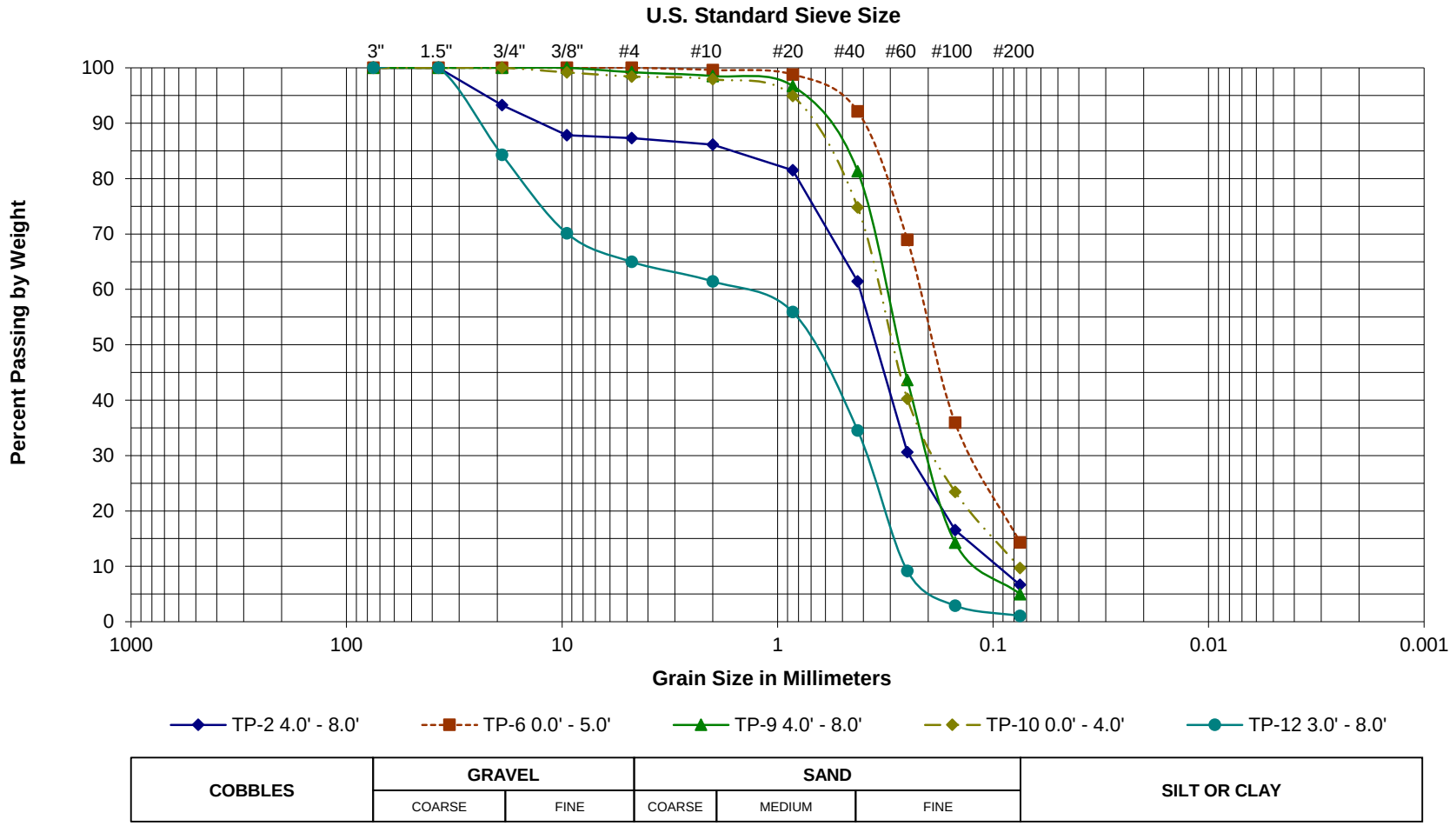
Sieve Size	Percent Passing
3.0 in. (75.0)	100.0
1.5 in. (37.5)	100.0
3/4 in. (19.0)	85.9
3/8 in. (9.5-mm)	56.3
No. 4 (4.75-mm)	45.3
No. 10 (2.00-mm)	35.7
No. 20 (.850-mm)	28.3
No. 40 (.425-mm)	18.5
No. 60 (.250-mm)	10.6
No. 100 (.150-mm)	6.8
No. 200 (.075-mm)	4.0

Size Fraction	Percent by Weight
Coarse Gravel	14.1
Fine Gravel	40.6
Coarse Sand	9.6
Medium Sand	17.3
Fine Sand	14.5
Fines	4.0
Total	**100.0**

LL	- -
PL	- -
PI	- -
D_{10}	0.24
D_{30}	1.00
D_{60}	10.50
D_{90}	22.00
Cc	0.40
Cu	43.75

ASTM Classification
Group Name: **Poorly Graded Gravel with Sand**
Symbol: **GP**

INSIGHT GEOLOGIC, INC.



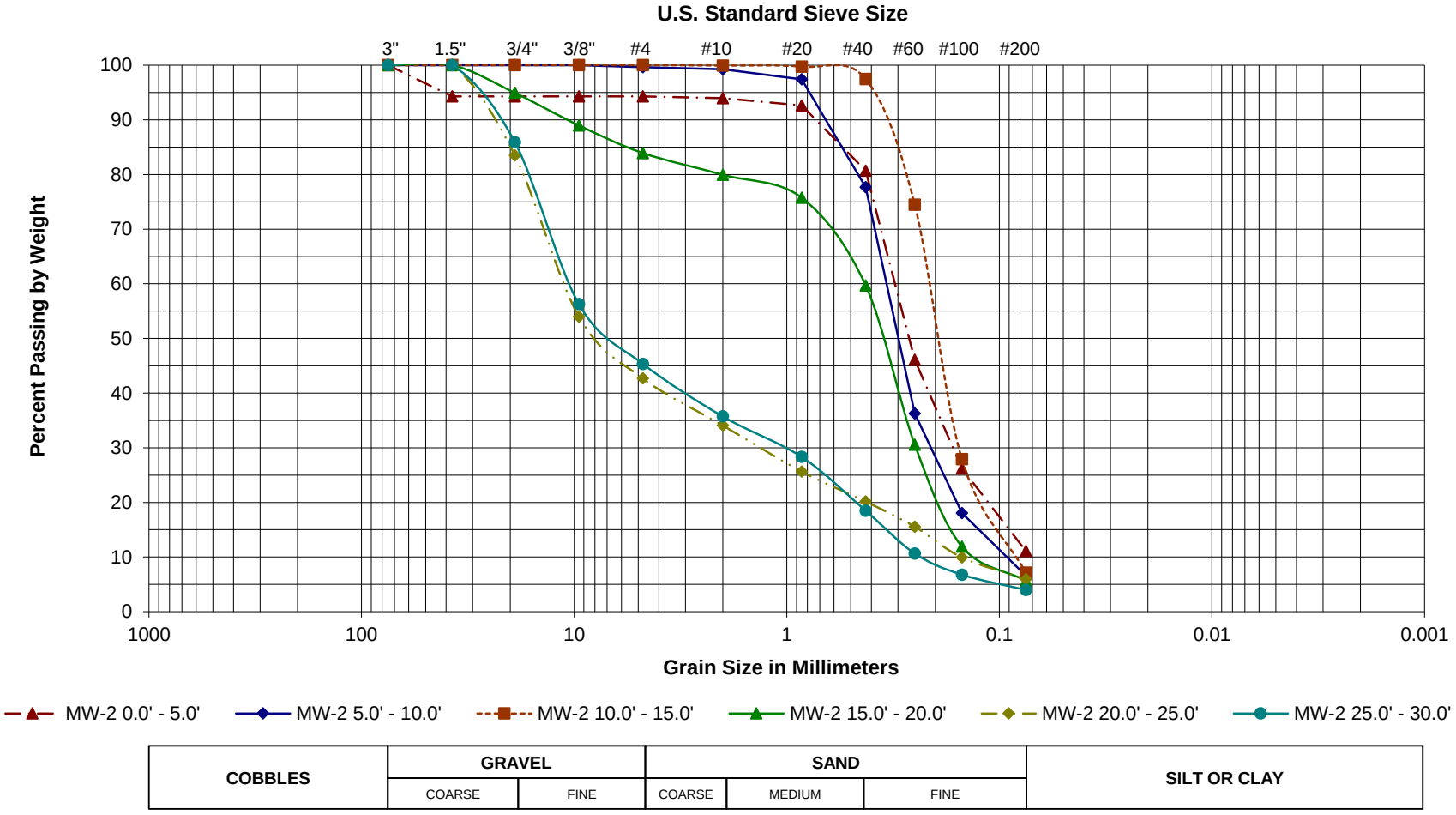
COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

THREE LAKES CROSSING

TUMWATER, WASHINGTON

INSIGHT GEOLOGIC, INC.

Graph 1
Gradation Analysis Results



COBBLES	GRAVEL		SAND			SILT OR CLAY
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THREE LAKES CROSSING

TUMWATER, WASHINGTON

INSIGHT GEOLOGIC, INC.

Graph 2
Gradation Analysis Results

ATTACHMENT C
REPORT LIMITATIONS AND GUIDELINES FOR USE

ATTACHMENT C

REPORT LIMITATIONS AND GUIDELINES FOR USE[1]

This attachment provides information to help you manage your risks with respect to the use of this report.

GEOTECHNICAL SERVICES ARE PERFORMED FOR SPECIFIC PURPOSES, PERSONS AND PROJECTS

This report has been prepared for the exclusive use of Sound Built Homes (Client) and their authorized agents. This report may be made available to regulatory agencies for review. This report is not intended for use by others, and the information contained herein is not applicable to other sites.

Insight Geologic Inc. structures our services to meet the specific needs of our clients. For example, a geotechnical or geologic study conducted for a civil engineer or architect may not fulfill the needs of a construction contractor or even another civil engineer or architect that are involved in the same project. Because each geotechnical or geologic study is unique, each geotechnical engineering or geologic report is unique, prepared solely for the specific client and project site. Our report is prepared for the exclusive use of our Client. No other party may rely on the product of our services unless we agree in advance to such reliance in writing. This is to provide our firm with reasonable protection against open-ended liability claims by third parties with whom there would otherwise be no contractual limits to their actions. Within the limitations of scope, schedule and budget, our services have been executed in accordance with our Agreement with the Client and generally accepted geotechnical practices in this area at the time this report was prepared. This report should not be applied for any purpose or project except the one originally contemplated.

A GEOTECHNICAL ENGINEERING OR GEOLOGIC REPORT IS BASED ON A UNIQUE SET OF PROJECT-SPECIFIC FACTORS

Insight Geologic, Inc. considered a number of unique, project-specific factors when establishing the scope of services for this project and report. Unless Insight Geologic specifically indicates otherwise, do not rely on this report if it was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

For example, changes that can affect the applicability of this report include those that affect:

- the function of the proposed structure;
- elevation, configuration, location, orientation or weight of the proposed structure;
- composition of the design team; or
- project ownership.

If important changes are made after the date of this report, Insight Geologic should be given the opportunity to review our interpretations and recommendations and provide written modifications or confirmation, as appropriate.

[1] Developed based on material provided by ASFE, Professional Firms Practicing in the Geosciences; www.asfe.org .

SUBSURFACE CONDITIONS CAN CHANGE

This geotechnical or geologic report is based on conditions that existed at the time the study was performed. The findings and conclusions of this report may be affected by the passage of time, by manmade events such as construction on or adjacent to the site, or by natural events such as floods, earthquakes, slope instability or ground water fluctuations. Always contact Insight Geologic before applying a report to determine if it remains applicable.

MOST GEOTECHNICAL AND GEOLOGIC FINDINGS ARE PROFESSIONAL OPINIONS

Our interpretations of subsurface conditions are based on field observations from widely spaced sampling locations at the site. Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Insight Geologic reviewed field and laboratory data and then applied our professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ, sometimes significantly, from those indicated in this report. Our report, conclusions and interpretations should not be construed as a warranty of the subsurface conditions.

GEOTECHNICAL ENGINEERING REPORT RECOMMENDATIONS ARE NOT FINAL

Do not over-rely on the preliminary construction recommendations included in this report. These recommendations are not final, because they were developed principally from Insight Geologic's professional judgment and opinion. Insight Geologic's recommendations can be finalized only by observing actual subsurface conditions revealed during construction. Insight Geologic cannot assume responsibility or liability for this report's recommendations if we do not perform construction observation.

Sufficient monitoring, testing and consultation by Insight Geologic should be provided during construction to confirm that the conditions encountered are consistent with those indicated by the explorations, to provide recommendations for design changes should the conditions revealed during the work differ from those anticipated, and to evaluate whether or not earthwork activities are completed in accordance with our recommendations. Retaining Insight Geologic for construction observation for this project is the most effective method of managing the risks associated with unanticipated conditions.

A GEOTECHNICAL ENGINEERING OR GEOLOGIC REPORT COULD BE SUBJECT TO MISINTERPRETATION

Misinterpretation of this report by other design team members can result in costly problems. You could lower that risk by having Insight Geologic confer with appropriate members of the design team after submitting the report. Also retain Insight Geologic to review pertinent elements of the design team's plans and specifications. Contractors can also misinterpret a geotechnical engineering or geologic report. Reduce that risk by having Insight Geologic participate in pre-bid and pre-construction conferences, and by providing construction observation.

DO NOT REDRAW THE EXPLORATION LOGS

Geotechnical engineers and geologists prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical engineering or geologic report should never be redrawn for inclusion in architectural or

other design drawings. Only photographic or electronic reproduction is acceptable, but recognize that separating logs from the report can elevate risk.

GIVE CONTRACTORS A COMPLETE REPORT AND GUIDANCE

Some owners and design professionals believe they can make contractors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give contractors the complete geotechnical engineering or geologic report, but preface it with a clearly written letter of transmittal. In that letter, advise contractors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with Insight Geologic and/or to conduct additional study to obtain the specific types of information they need or prefer. A pre-bid conference can also be valuable. Be sure contractors have sufficient time to perform additional study. Only then might an owner be in a position to give contractors the best information available, while requiring them to at least share the financial responsibilities stemming from unanticipated conditions. Further, a contingency for unanticipated conditions should be included in your project budget and schedule.

CONTRACTORS ARE RESPONSIBLE FOR SITE SAFETY ON THEIR OWN CONSTRUCTION PROJECTS

Our geotechnical recommendations are not intended to direct the contractor’s procedures, methods, schedule or management of the work site. The contractor is solely responsible for job site safety and for managing construction operations to minimize risks to on-site personnel and to adjacent properties.

READ THESE PROVISIONS CLOSELY

Some clients, design professionals and contractors may not recognize that the geoscience practices (geotechnical engineering or geology) are far less exact than other engineering and natural science disciplines. This lack of understanding can create unrealistic expectations that could lead to disappointments, claims and disputes. Insight Geologic includes these explanatory “limitations” provisions in our reports to help reduce such risks. Please confer with Insight Geologic if you are unclear how these “Report Limitations and Guidelines for Use” apply to your project or site.

GEOTECHNICAL, GEOLOGIC AND ENVIRONMENTAL REPORTS SHOULD NOT BE INTERCHANGED

The equipment, techniques and personnel used to perform an environmental study differ significantly from those used to perform a geotechnical or geologic study and vice versa. For that reason, a geotechnical engineering or geologic report does not usually relate any environmental findings, conclusions or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. Similarly, environmental reports are not used to address geotechnical or geologic concerns regarding a specific project.