HEARING EXAMINER - DESCHUTES VALLEY TRAIL - SEGMENT C - WETLAND INFRASTRUCTURE EXEMPTION
MEETING AGENDA

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

Monday, October 05, 2026
6:00 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. Public Hearing
    a. Deschutes Valley Trail Segment C – Wetland Infrastructure Exemption
2. Adjourn

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

Watch Online
Go to http://www.zoom.us/join and enter the Webinar ID 883 3125 1463 and Passcode 020413.

Listen by Telephone
Call (253) 215-8782, listen for the prompts and enter the Webinar ID 883 3125 1463 and Passcode 020413.

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_BcPLCN98TfCDQTqLcziBHw

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 shunter@ci.tumwater.wa.us or by fax at (360) 754-4138, and must be received by noon on October 5, 2026.

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: Sam Hunter, Associate Planner

DATE: October 5, 2026

SUBJECT: Deschutes Valley Trail Segment C – Wetland Infrastructure Exemption

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1) Recommended Action:
Staff recommends approval of the Wetland Infrastructure Exemption subject to the conditions outlined in this staff report.

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2) Background:
The applicant requests approval of a Wetland Infrastructure Exemption to construct a paved non-motorized trail with gravel shoulders linking Tumwater Valley Drive to Deschutes Valley Park located at 4611 Tumwater Valley Dr SE, Tumwater, WA 98501; Tax Parcel Numbers 09470051000 and 12835430000.

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3) Alternatives:
- Approve Case No. TUM-26-1184 with recommended conditions
- Approve Case No. TUM-26-1184 with amended conditions
- Deny Case No. TUM-26-1184
- Remand Case No. TUM-26-1184 to staff for further analysis

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4) Attachments:
Exhibit 1. Staff Report, dated September 18, 2026
Exhibit 2. Wetland Permit Application, dated September 8, 2026
Exhibit 3. Civil Plans, dated September 8, 2026
Exhibit 4. Wetland Mitigation Plan, dated September 2, 2026
Exhibit 5. Mitigation Map, dated September 2, 2026
Exhibit 6. Vicinity and Zoning Map
Exhibit 7. SEPA Determination, dated July 24, 2026
Exhibit 7a. SEPA Comment OORCA, dated August 4, 2026
Exhibit 7b. SEPA Comment Thomas, dated August 3, 2026
Exhibit 7c. SEPA Comment ECY, dated August 6, 2026
Exhibit 7d. SEPA Comment Oberlander, August 4, 2026
Exhibit 8. Notice of Application and Public Hearing, dated September 18, 2026
Exhibit 9. Arborist Report, dated September 4, 2026
Exhibit 10. Drainage Report, dated June 1, 2026
Exhibit 11. Gopher Report, dated October 20, 2025
Exhibit 12. Public Notice Certification, dated September 18, 2026

EXHIBIT 1

CITY OF TUMWATER
HEARING EXAMINER STAFF REPORT
Hearing Date: October 5, 2026

Project Name: Deschutes Valley Trail – Segment C

Case Numbers: TUM-26-1184 Wetland Infrastructure Exception

Owner: City of Tumwater
555 Israel Rd SW
Tumwater, WA 98501

Project Proponent/ Representative: Jared VerHey
City of Tumwater
555 Israel Rd SW
Tumwater, WA 98501

Type of Action Requested: The project proponent is requesting approval of a Wetland Infrastructure Exception (Infrastructure Exception) (TUM-26-1184) to construct a paved non-motorized trail with gravel shoulders linking Tumwater Valley Drive to Deschutes Valley Park located in the Open Space (OS) zone district. The OS zone allows parks and other related active and passive recreation facilities as a permitted use. The request for the Infrastructure Exception is to construct the proposed associated stormwater facilities for the trail within critical area buffers.

Project Location: The project is located at 4611 Tumwater Valley Dr SE, Tumwater, WA 98501 totaling 220.53 acres; Tax Parcel Numbers 09470051000 and 12835430000.

Project Permit: The following have been issued for the project:

1. Determination of Non-Significance on July 24, 2026 (TUM-26-0924) (Exhibit 7)
2. Combined Notice of Application and Notice of Hearing issued on September 18, 2026 (TUM-26-1184) (Exhibit 8)

Public Notification: Public notification for the October 5, 2026, 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 September 18, 2026, in conformance with Tumwater Municipal Code (TMC) TMC 14.16 (Exhibit 8).

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

Staff Planner: Sam Hunter, Associate Planner
Phone: (360) 754-4180
E-Mail: shunter@ci.tumwater.wa.us

I. BACKGROUND INFORMATION

A. Application and Review Process

During pre-application review of the project, staff identified that an Infrastructure Exception would be required for portions of the proposed project. Over the past several months the applicant has been working to identify appropriate mitigation to address impacts of the project to adjoining wetlands and wetland buffers. The proposed design balances golf course operations, the long-term vision for a multi-use trail, and various critical areas. The proposed scope includes impacts to wetland buffers that require an Infrastructure Exception. The Infrastructure Exception request (TUM-26-1184) was submitted on September 8, 2026 and deemed complete on September 11, 2026.

A Site Development Grading Permit will be required to construct the proposed scope of work.

Under TMC 2.58.090, and TMC 16.28.115(C), review authority for the Infrastructure Exception falls under the purview of the Hearing Examiner.

B. Existing Conditions

The property has historically and currently is being utilized as a municipal golf course. The topography of the property is mostly flat except for a gradual upward slope to the west and steep slopes on the southwestern-most edges of the property. There are three wetlands located within the project boundary. Wetland A, B, and C are located in depressions or along a slope on the southwestern portions of the property and are also partially located on the adjacent Palermo Valley Park and residential properties (Exhibits 5 & 6).

C. Project Description

The applicant is proposing to construct a paved non-motorized trail with gravel shoulders, linking Tumwater Valley Drive to Deschutes Valley Park. The project includes fencing between the trail and golf course and plans for a future prefabricated bridge to cross over a stream within the Shoreline jurisdiction (Exhibit 3).

II. REGULATORY FRAMEWORK

The proposal is subject to the following policies and regulations:

A. **Tumwater Comprehensive Plan:** The project site is located primarily within the Deschutes Neighborhood and partially within the Brewery Neighborhood and SE Capitol Boulevard Neighborhood as designated by the Land Use Element of the City's Comprehensive Plan. The land use designation for the approximately 220.53-acre parcels is Parks and Open Space (Exhibit 6).

The Comprehensive Plan Land Use Element Part 2, Section 7.D. Deschutes neighborhood states:

"The dominant feature of this neighborhood is the Deschutes River Valley. Recreation and open space, including Pioneer Park and the Tumwater Valley Municipal Golf Course, are the main uses in the valley. The northern and eastern portions of the neighborhood are composed of single family and duplex residential uses."

"In the next 20 years the neighborhood will continue to be predominately parks and open space with low density residential where possible. Development will continue to be low intensity since most of this neighborhood is classified as a flood plain."

The Comprehensive Plan was prepared in response to the state Growth Management Act (Chapter 36.70A RCW) which requires Tumwater to show how the Land Use Element meets the fifteen planning goals included within the act. A larger goal of the RCW reflected within the Comprehensive Plan Land Use document includes providing efficient multi-modal transportation systems that will reduce greenhouse gas emissions and per capita vehicle miles travelled, providing open space and recreation, and protection and enhancement of the environment.

The Comprehensive Plan Land Use Element Part 1 includes goals such as:
LU-2.4: Support complete neighborhoods consisting of connected, transit-oriented communities with a range of transportation choices for all residents.
LU-5.2: Establish and maintain multimodal links between land uses.
LU-6.1: Ensure development conforms with environmental standards and requirements.
LU-6.2: Evaluate and set reasonable conditions on development to mitigate anticipated adverse environmental impacts.
LU-10.1: Coordinate provision of open space, parks, trails, and space for recreational opportunities with the Parks, Recreation, and Open Space Plan.
LU-11.2: Distribute public facilities throughout Tumwater to ensure multimodal access.
LU-12.2: Ensure that where possible, essential public facility sites are used jointly for public benefit.

Staff Response and Recommended Finding: *The goals stated in the Comprehensive Plan encourage development in line with the surrounding area and the Comprehensive Plan designation. A multi-modal paved bike path is in line with the designation and the surrounding area and meets several goals specified within the Comprehensive Plan.*

Staff finds that the project is consistent with the Comprehensive Plan with the proposed conditions.

B. **Tumwater Park, Recreation & Open Space Plan:** The Park, Recreation & Open Space Plan analyzed the city-wide need for parks and trail facilities based on growth patterns, public feedback, and feasibility. Goals of the plan include fiscal responsibility and feasibility, coordination with external agencies, environmental conservation and

protection, and historic preservation. The plan includes the general scope for future proposed boat launches, public waterfront access, multi-purpose trails, enhanced streetscapes, public artworks, on-road bicycle facilities, support facilities, community facilities, and various types of public parks. The City adopted the Parks, Recreation, & Open Space Plan August 2007.

Staff Response and Recommended Finding: *The Tumwater Park, Recreation & Open Space plan includes the Deschutes River Trail within the scope of future multi-purpose trails (Sec. 4.4, pg. 45). The proposed scope of this project includes a segment of the overall planned "multipurpose gravel-based hike and bike trail along the Deschutes River from the brewery complex south through Pioneer Park to the railroad line south of 93rd Ave" (pg. 47).*

Staff finds that the project is consistent with the goals of the Tumwater Park, Recreation & Open Space plan.

C. **Tumwater Transportation Plan:** The Transportation Plan includes language speaking to regional consistency and coordination to address both motorized and non-motorized transportation links and corridor. Goals are to establish a street and road network that provides for the safe and efficient movement of goods and people, neighborhood connectivity, to ensure pedestrian connectivity, and concurrency to meet PM peak hour level of service standards.

The Tumwater Transportation Plan, Appendix C – Bicycling, Walking, and Rolling Plan identifies an overall goal of increasing non-motorized trips within the City of Tumwater. In addition, the Deschutes Valley Trail Corridor is identified as one of the priority trail segments to be constructed in Tumwater.

Staff Response and Recommended Finding: *Staff finds that the project is consistent with the goals of the Tumwater Transportation Plan.*

D. **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.

Staff Response and Recommended Finding: *The Plan has a target goal to become a carbon-neutral community by 2050 and to reduce or offset greenhouse gases, which includes the goal of reducing annual per capita vehicle miles traveled.*

The trail is situated between growing commercial development of the Brewery District and municipal amenities such as the Valley Athletic Club and the Tumwater Valley Golf Club and connects these areas to a larger residential and commercial area at the intersection of Trosper Road and Capitol Blvd, providing an important and safe pedestrian and bicycle corridor in a developed area of town. In addition to casual recreational users, the trail will also provide a safe off-road trail that will serve as an alternative to more high-risk bike travel on roadways that may not have dedicated bike lanes. The proposed plan seeks to balance preservation of the adjacent natural areas and wetlands as well as providing accessible and safe alternatives to motorized travel.

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

E. **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 one of the future proposed trails within the regional trail network outlined in the Thurston Regional Trail Plan and will connect the City of Tumwater to the larger network of Thurston County existing and proposed trails.*

Staff finds that approval of the project is in line with the Thurston Regional Trail Plan.

F. **Hearing Examiner – TMC 2.58.090, 14.12.020, 16.28.115.C:** The Hearing Examiner has authority to review Infrastructure Exceptions.

Staff Response and Recommended Finding: *Infrastructure Exceptions require a public hearing and decision by the Tumwater Hearing Examiner. Site Plan Review is being reviewed concurrently so all applications need to be considered by the Hearing Examiner per 14.12.020.A.1.*

G. **Public Notice Requirements –TMC Title 14:** TMC Title 14 requires the City to provide public notification of certain application types by issuing a Notice of Application (TMC 14.16.050) and a Notice of Open Record Hearing (TMC 14.18.040).

Staff Response and Recommended Finding: *A combined public Notice of Application and Notice of Hearing for the Infrastructure Exception application was mailed to property owners within 300 feet of the subject property, affected agencies and posted on-site; and published in the Olympian on September 18, 2026 (Exhibit 8).*

Public comments:
No comments have been received as of the date of this report.

The City's SEPA threshold determination was mailed to property owners within 300 feet of the subject property, affected agencies and posted on-site; and published in the Olympian on July 24, 2026 (Exhibit 7).

Public comments:

Olympia Regional Clean Air Agency (ORCAA) made comments on the requirements for construction dust.

Washington State Department of Ecology provided comments regarding water quality, solid waste and toxic cleanup.

Two community members also sent comments to the City about the SEPA determination. The comments were positive and in support of the project.

Public comments received from the Determination of Non-significance are found in Exhibit 7a – 7d.

H. **State Environmental Policy Act – TMC 16.04:** The City of Tumwater Community Development Department reviewed a Washington Department of Transportation (WSDOT) National Environmental Policy Act (NEPA) Documented Categorical Exclusion (DCE) and other information submitted by the project proponent and issued a Determination of Non-Significance by adoption of an existing document on July 24, 2026.

Staff Response and Recommended Finding: *The City of Tumwater Community Development Department, as lead agency, completed environmental review in accordance with TMC 16.04, RCW 43-21C and WAC 197-11. The City's SEPA threshold determination, a Determination of Non-significance was issued on July 24, 2026 (Exhibit 7). See above for public comment received.*

I. **Tree Protection and Replacement Ordinance – TMC 16.08:** TMC Chapter 16.08 regulates the removal and preservation of existing trees on a site to be developed.

Staff Response and Recommended Finding*: An arborist report completed by SCJ Alliance, dated September 4, 2026 shows a total of approximately 6,200 trees located across multiple sites totaling 220.5 acres. Parcel 09470051000 has a total of approximately 3,200 trees across 135.9 acres and parcel 12835430000 has a total of approximately 3,000 trees across 84.6 acres. TMC 16.08 requires retention of 20% or 12 trees per acre, whichever is greater. 12 trees per acre would require retaining 2,646 trees across both sites. Parcel 09470051000 requires 1,631 minimum trees to be retained and parcel 12835430000 requires a minimum 1,015 trees to be retained. A total of 334 trees are proposed to be removed across both sites with parcel 09470051000 having 35 trees proposed to be removed and parcel 12835430000 having 299 trees proposed to be removed. A sufficient number of trees are proposed to be retained with the project. Tree protection fencing and best management practices will be required as a part of the site development grading permit review. Additionally, new trees are proposed to be planted per the required mitigation and wetland enhancement proposed for the project (Exhibits 4 & 9). The submitted arborist report is preliminary in nature and will go through a full review with potential revisions during the Site Development Grading permit review.*

Staff finds that the proposed preliminary civil plans are consistent with TMC 16.08.

J. Fish and Wildlife Habitat Protection – TMC 16.32:

TMC Chapter 16.32 regulates fish and wildlife and species.

Staff Response and Recommended Finding: The parcels include both more and less preferred soils by the Mazama Pocket Gopher. A Mazama Pocket Gopher Screening report dated October 2025 found no mound formations exhibiting characteristics created by the Mazama pocket gopher were identified on the subject property during gopher screenings or by agency databases. (Exhibit 11).

No Oregon Spotted Frog critical habitat is mapped on the subject property (Exhibit 4).

K. Wetland Protection Standards Ordinance – TMC 16.28: TMC Chapter 16.28 is intended to avoid or minimize impacts to wetlands wherever possible and provide mitigation for any direct or indirect impacts to wetlands.

1. Critical Areas and Mitigation Report:

A Critical Area and Wetland Mitigation Plan were submitted for review for this application (Exhibits 4 & 5). Three wetlands were found on the subject properties (parcels 09470051000 and 12835430000) and partially located on adjacent properties to the west (parcel 12835320200, 54500001800, and 54500001700).

Wetland A is located on the western portion of the property and partially within the adjacent City owned Palermo Valley Park parcel (12835320200) and is rated a category II wetland. Wetland A also has a type 3 stream that discharges directly to the Deschutes River.

Wetland B is located in the southwestern portion of the subject property entirely on-site and is rated as a category III wetland. Wetland B includes a type NS stream that discharges to a culvert. Wetland B is a forested slope wetland that appears to have City stormwater discharge from upland which may be impacting the system and scouring the wetland.

Wetland C is located on the southern portion of the subject property and partially within adjacent residential parcels (54500001800, and 54500001700) and is rated as a Category II wetland.

In addition to these standards, TMC 16.28.180.A states that regulated activities shall not be authorized in a regulated wetland buffer except where it can be demonstrated that the impact is both unavoidable and necessary or that all reasonable economic uses are denied. The applicant outlines the reasons to approve the work within the wetland buffers with proposed mitigation as discussed in the wetland and mitigation report (Exhibit 4). The project scope includes utilization of existing disturbed areas to the maximum extent possible without impacting the function of the existing adjacent golf course, and includes extensive mitigation proposed for new impacts to the buffer. Additionally, the

construction of the non-motorized multi-use paved trail to this area is in line with the Comprehensive Transportation Plan Appendix C and Thurston Regional Trail Plan and will allow for an important non-vehicular transportation connection between two established areas of the city with existing residential and commercial development.

Staff Response: The wetland mitigation plan proposes to enhance impacts to the buffer of Wetlands A and C at a 12:1 ratio and enhance the buffer of Wetland B at an 8:1 ratio per the standards of TMC 16.28.220(6). In total, 296,986 square feet of enhancements to the buffer will be implemented, exceeding the minimum required 267,398 square feet of enhancement mitigation. Enhancement will include removal of invasive weeds from the buffer, plantings and will also include the re-establishment of a buffer in areas which had been previously cleared and maintained as part of the golf course. Overall, no direct impacts to the wetlands are anticipated and mitigation is being provided to off-set any indirect impacts created by the project being located within portions of the wetland buffers, particularly in areas which were not previously disturbed. Mitigation would be implemented with the site development grading plans and after development is complete, through a 10-year monitoring plan.

2. **Exceptions - Infrastructure: TMC 16.28.115.A:**

TMC 16.28.115 (A) states that if the application of the wetland protection standards found in Title 16 of the Tumwater Municipal Code would prohibit a development proposal by a public agency, public utility, or a private entity installing public or private infrastructure that is in compliance with the comprehensive transportation, capital facilities or utility plans of Tumwater, the agency or utility may apply for an exception pursuant to this section.

Under 16.28.115 (B) – Exception Request and Review Process: An application for an Infrastructure Exception shall be made to the City and shall include a Critical Area Identification Form; Critical Area Report, including Mitigation Plan; and any other related project documents such as permit applications to other agencies, special studies and environmental documents prepared pursuant to the State Environmental Policy Act. The community development director shall prepare a recommendation to the hearing examiner based on review of the submitted information, a site inspection and the proposal's ability to comply with Infrastructure Exception review criteria in 16.28.115.D.

Subsection C states that the hearing examiner shall review the application and the community development director's recommendation and conduct a public hearing. The hearing examiner shall approve, approve with conditions, or deny the request based on the proposal's ability to comply with all of the Infrastructure Exception review criteria in subsection D.

The applicant is requesting an Infrastructure Exemption from the requirements of TMC 16.28.170.H.3 which does not allow stormwater management facilities in the buffer of category I or II wetlands and TMC 16.28.170.H.2. which does not allow stormwater

management facilities outside of the outer 25% of the wetland buffer. The applicant is requesting the Infrastructure Exemption as the proposed trail was determined to not be feasible without utilization of sheet flow dispersion within the buffer of Wetlands A, B, and C.

Infrastructure Exception Review Criteria:

1. There is no other practical alternative to the proposed development with less impact on the critical areas;
   a. *Applicant Response:*
      - *The majority of the project is aligned with the existing Tumwater Valley Golf course golf cart trail along the right side of the fairways. The Deschutes Valley Trail relies on existing infrastructure (Tumwater Valley Golf Course Cart Path) which was legally built for the purpose of providing a non-degrading surface along the Tumwater Valley Golf Course primarily for use by golf carts, although pedestrian use is accommodated too. Widening will occur from the edge of the existing path and extend towards the golf course to allow for a dedicated cart path and shared-use path, opening access to other patrons to experience the exceptional natural environment associated with the wetlands, streams and open spaces that are situated along this path. The current alignment has moved tee boxes and golf course infrastructure to the maximum extent practical while maintaining the viable golfing uses.*
      - *Other areas for the path were considered, however alternative areas of the golf course were not available without creating additional environmental impacts to floodplains, wetlands and shorelines. The original design, completed prior to 2018, proposed retaining the existing golf cart path and expanding the path toward the wetlands to accommodate the shared-use trail. Following delineation of the wetland in 2025, the design was revised at each project milestone to reduce impacts to the wetland and wetland buffer. The current proposed alignment will replace both the existing cart path and the shared-use trail within the footprint of the existing cart path, allowing the alignment to shift farther toward the golf course and away from the wetland and wetland buffer. As a result, impacts to the wetland and wetland buffer have been reduced to the maximum extent feasible with the proposed alignment. The expansion in use is accommodated by expanding the existing cart path for the majority of the trail and creating new trail areas in specific locations. The majority of the path expansion will occur to the east of the existing cart path, however there are two locations where the path will result in new impacts within the wetland buffer. These two locations could not remain outside of the wetland buffer without impacting portions of the golf course functional facilities, specifically near the Tee Boxes for Hole 2 and 4 (Exhibit 4 - Appendix J).*
      - *A portion of the area the new path is proposed is routinely mowed and cleared of invasive species, including, but not limited to blackberry bushes, based on aerial imagery over the years (Exhibit 4 - Appendix K). The routine clearing and mowing within the wetland buffer presents an ongoing negative impact on wetland functions. This impact will be mitigated through wetland buffer*

enhancements and will prevent future clearing on the east side of the course due to the separation the trail will create between the wetland and golf course.

- *The project will increase the area of non-pollution generating impervious surface. However, maintained golf course areas are considered pollution generating pervious surfaces per the definition in WAC 173-218-030 and the majority of the additional non-pollution generating impervious surface area will replace areas currently managed as pollution generating pervious areas due to the fertilizers and maintenance that occurs on golf course.*
- *Due to site constraints with high ground water, the proximity of the wetlands, and the shoreline, many stormwater best management practices (BMPs) are not feasible. The BMP selected for this project is sheet flow dispersion, which is considered low impact and the preferred BMP when feasible. Sheet flow dispersion is based on using overland flow across native vegetation to provide stormwater flow control. The current condition of the wetland buffer on the golf course side contains non-native species, primarily Himalayan Blackberry, that encroaches on the wetland and the golf course. The wetland buffer enhancement will remove non-native species from the wetland buffer increasing its wetland buffer function and stormwater dispersion efficacy as it will realign the area with its native state. With enhanced and rehabilitated vegetation, the wetland buffer will be closer in line to a natural wetland buffer than its current state. A natural wetland buffer is an ideal condition for sheet flow dispersion as it uses the natural ecology to manage stormwater.*
- *Even with the avoidance and minimization measures incorporated into the project, some new impacts will occur. These impacts will be mitigated through an extensive mitigation and enhancement plan including invasive species removal, as described in Section 9.0 of this Wetland Report. This combination of wetland enhancement and invasive species removal will result in a substantial improvement in wetland and adjacent upland functions while also providing additional amenities for the public.*

2. The application of this title would unreasonably restrict the ability to provide utility services to the public;
   a. *<u>Applicant Response:</u>*
      - *Without approval of the Infrastructure Exception, there is no feasible alternative alignment that would allow the project to meet its intended purpose while avoiding additional impacts to regulated critical areas and maintaining the functional use of the golf course. Relocating the shared-use path farther east would conflict with the operational functions of the golf course and would result in increased encounters with regulated environmental constraints, including wetlands, wetland buffers, floodplains, and shoreline areas. Accordingly, further eastward relocation does not provide a practicable means of avoiding or minimizing critical area impacts.*
      - *The Segment C alignment of the Deschutes Valley Trail has been refined through the project design process to avoid encroachment into the shoreline and to reduce impacts within the floodplain. The current alignment also reflects iterative design modifications following wetland delineation and has*

been configured to avoid and minimize impacts to the wetland and wetland buffer to the maximum extent feasible. The remaining wetland buffer impact is associated with the proposed stormwater best management practice (BMP), which is necessary to provide stormwater management for the trail improvements. The BMP has been located to minimize additional disturbance and will maintain the existing drainage pattern, including the existing flow path and sheet flow toward the wetland. Therefore, the proposed design represents the practicable alternative that minimizes impacts to regulated critical areas while maintaining the functional use of the golf course and providing the intended shared-use trail connection.

- *It is not anticipated that the new shared use path will have adverse impacts to the wetlands. The buffer enhancements and rehabilitations will provide increase wetland functionality and restore the wetland buffer closer to its natural functional state. The shared use path will also provide a separation from the golf course maintenance and pollution generating elements further enhancing the wetland and wetland buffer function.*

3. The proposal does not pose an unreasonable threat to the public health, safety, or welfare on or off the development proposed site;
   a. *Applicant Response:*
   - *The new trail will not pose an unreasonable threat to public health, safety, or welfare. Public safety will be improved through the proposed upgrades, including new fencing to keep golf balls from the shared non-motorized path area and wetland. The existing path will be widened and its surface improved to meet the ADA standards for Accessible Design. Public use of the path will also provide a public health benefit by providing opportunities for walking, exercise, and recreation.*
   - *The project is not expected to result in an increase in environmental impacts, as supported by the functional analysis. The increase in native vegetation from the mitigation plan described in Section 9.0 will improve the overall environmental health by removal of invasive species and planting of native species.*
4. The proposal attempts to protect and mitigate impacts to the critical area functions and values consistent with other applicable regulations and standards.
   a. Applicant Response:
   - *An assessment of critical area functions has been provided to demonstrate that the critical area functions and values will be maintained due to the planned mitigation actions in accordance with applicable critical areas regulations and standards. The project includes a mitigation plan designed to meet the Department of Ecology's applicable mitigation standards.*
   - *Even with the proposed encroachment of the wetland buffer, there will be no-net-loss of wetland functions and values, as demonstrated by the assessment of wetland and stream functions provided in Section 9.3 of this report.*

Staff Response: Though the burden of proof for the Infrastructure Exception is the responsibility of the applicant, staff agrees with the applicant's findings and further states that the proposed improvements are in line with the City's Transportation Comprehensive

Plan, Tumwater Park, Recreation & Open Space Plan, and wetland protection standards.

With the proposed mitigation plans listed in the Wetland Report and Mitigation Plan (Exhibit 4 & 5) and recommendations to protect the wetlands identified in the Drainage Report (Exhibit 10) staff recommends approval of the Infrastructure Exception.

Staff Response to Wetlands Section and Recommended Finding: *Overall, Staff finds that the proposal is consistent with the wetland protection ordinance for the City of Tumwater. The applicant has analyzed the requirements for the Infrastructure Exception and staff agrees with the applicant's analysis and recommends approval.*

L. Tumwater Zoning Code – TMC Title 18:

3. Open Space Zone District TMC 18.31 – Permitted Uses and Development Standards

Staff Response and Recommended Finding: *The project site is located in the Open Space (OS) zone district (Exhibit 6).*

18.31.020 lists 'Parks and other related active and passive recreation facilities' as a permitted use.

Staff finds that the proposed project is consistent with the permitted uses and development standards in the Open Space (OS) Zone.

4. Aquifer Protection Overlay (AQP) zone district - TMC 18.39 – Restricted Land Uses

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 use is not a restricted land use in the aquifer protection (AQP) overlay zone district.

III. RECOMMENDATION

Pursuant to TMC 2.58.100, staff recommends approval of the Infrastructure Exception described herein with the following conditions:

1. Project shall follow the mitigation plan requirement outlined in the Deschutes Valley Trail Wetland/Stream Delineation and Mitigation Plan dated September 2, 2026 (Exhibit 4).

2. Stormwater facilities within the wetland buffers shall meet the requirements of the Wetland Hydroperiod Protection (method 2) outlined in Appendix I-C, Volume I of

the 2019 Stormwater Management Manual for Western Washington per the Tumwater Drainage and Design Manual as identified in the submitted Drainage Report dated June 2026 (Exhibit 10). Mean daily and monthly total discharge volumes from the existing site and proposed modeling shall be provided with the project prior to Site Development Grading approval.

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

Sam Hunter, Associate Planner
Phone: (360) 754-4180
E-mail: shunter@ci.tumwater.wa.us

Report Issue Date: September 24, 2026

List of Exhibits:

Exhibit 1. Staff Report, dated September 18, 2026
Exhibit 2. Wetland Permit Application, dated September 8, 2026
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Exhibit 4. Wetland Mitigation Plan, dated September 2, 2026
Exhibit 5. Mitigation Map, dated September 2, 2026
Exhibit 6. Zoning and Vicinity Map
Exhibit 7. SEPA Determination, dated July 24, 2026
Exhibit 7a. SEPA Comment OORCA, dated August 4, 2026
Exhibit 7b. SEPA Comment Thomas, dated August 3, 2026
Exhibit 7c. SEPA Comment ECY, dated August 6, 2026
Exhibit 7d. SEPA Comment Oberlander, August 4, 2026
Exhibit 8. Notice of Application and Public Hearing, dated September 18, 2026
Exhibit 9. Arborist Report, dated September 4, 2026
Exhibit 10. Drainage Report, dated June 1, 2026
Exhibit 11. Gopher Report, dated October 20, 2025
Exhibit 12. Public Notice Certification, dated September 18, 2026

EXHIBIT 2

CITY OF TUMWATER

555 ISRAEL RD. SW, TUMWATER, WA 98501
(360) 754-4180
Email: cdd@ci.tumwater.wa.us

WETLAND PERMIT
Application

TUM - 26-	DATE STAMP
1184	09-08-2026
Kerri RCVD BY	

Application fee: $440.00

SUBJECT PROPERTY

ADDRESS OF PROPERTY (COMPLETE): 4611 Tumwater Valley Drive SE Tumwater, WA 98501

PROJECT NAME: Deschutes Valley Trail Seg C

PARCEL NUMBER(s): 09470051000, 12835430000, 12702110100

APPLICANT *(please print neatly)*

NAME OF APPLICANT: City of Tumwater

APPLICANT'S MAILING ADDRESS (COMPLETE): 555 Israel Rd SW Tumwater, WA 98501

APPLICANT'S TELEPHONE(S): 360-754-4140

APPLICANT'S E-MAIL: jverhey@ci.tumwater.wa.us

PROJECT REPRESENTATIVE

NAME OF PROJECT REPRESENTATIVE: Jared VerHey

REPRESENTATIVE'S MAILING ADDRESS (COMPLETE): 555 Israel Rd SW Tumwater, WA 98501

REPRESENTATIVE'S TELEPHONE(S): 360-754-4140

REPRESENTATIVE'S E-MAIL: jverhey@ci.tumwater.wa.us

PROPERTY OWNER

NAME OF PROPERTY OWNER: City of Tumwater

OWNER'S MAILING ADDRESS (COMPLETE): 555 Israel Rd SW Tumwater, WA 98501

OWNER'S TELEPHONE(S): 360-754-4140

OWNER'S E-MAIL: jverhey@ci.tumwater.wa.us

PROJECT DESCRIPTION *(attach additional sheets and documentation, as needed)*

The project proposes to construct a paved, non-motorized trail with gravel shoulders mostly overlapping the existing golf cart path of the Tumwater Valley Golf Course, which is where most of the project is located. This project is a segment (Segment C) of a longer, complete Deschutes Valley Trail Project that will be 2 mile long ultimately, connecting Tumwater Historical Park to Pioneer Park.

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

Date

Please attach the **Wetland Permit submittal checklist** to this Application.

EXHIBIT 3

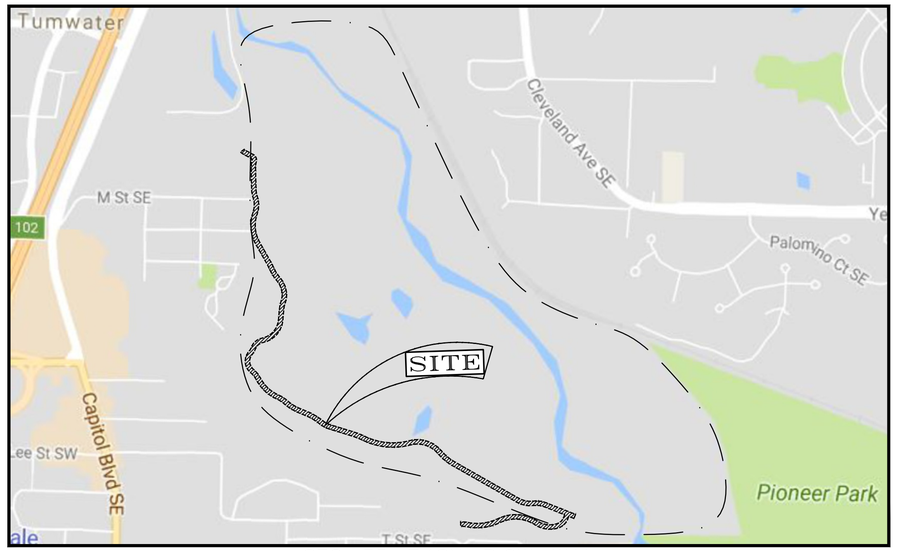
DESCHUTES VALLEY TRAIL
SEGMENT C

100% CONSTRUCTION DOCUMENTS

CITY OF TUMWATER

CITY OF TUMWATER

SCJ ALLIANCE
CONSULTING SERVICES



SEC. 35, T.18N, R.2W, W.M.

VICINITY MAP

NOT TO SCALE

INDEX TO DRAWINGS

SHEET NUMBER	SHEET INDEX	SHEET DESCRIPTION
1	CV-01	COVER SHEET
2	LN-01	CONSTRUCTION NOTES AND LEGEND
3	LN-02	PROJECT OVERVIEW
4-6	XS-01 - XS-03	TYPICAL CROSS SECTIONS
7-15	AL-01 - AL-09	CONSTRUCTION ALIGNMENT PLAN
16-24	EC-01 - EC-09	EXISTING CONDITIONS
25-34	DM-01 - DM-10	DEMOLITION AND TESC PLAN
35-37	ST-01 - ST-03	CONSTRUCTION STAGING AND ACCESS PLAN
38-53	PP-01 - PP-16	PLAN AND PROFILE
54-59	CG-01 - CG-06	DETAILED GRADING PLAN
60	RW-01	RETAINING WALL PLAN
61-62	TG-01 - TG-02	TRAIL GENERAL NOTES AND DETAILS
63	SD-01	STORMWATER NOTES AND DETAILS
64	SN-01	SIGNING PLAN
65 - 66	WT-01 - WT-02	RECLAIMED WATER PLAN AND PROFILE
67	WT-03	RECLAIMED WATER NOTES AND DETAILS
68-105	CS-01 - CS-38	CROSS SECTION
106-111	CF-01 - CF-06	SAFETY FENCING PLAN
112-115	TR-01 - TR-04	TEE BOX RELOCATION PLAN
116	S1	BRIDGE STRUCTURAL NOTES
117	S2	BRIDGE PLAN AND PROFILE
118	S3	BRIDGE FOUNDATION LAYOUT
119-120	S4 - S5	BRIDGE ABUTMENT
121	S6	BRIDGE FENCE ATTACHMENT DETAILS
122	S7	BRIDGE FOUNDATION BARLIST
123	S8	SAFETY FENCE DETAILS
124	S9	STRUCTURAL EARTH WALL LAYOUT
125	S10	STRUCTURAL EARTH WALL DETAILS
126-134	LS-01 - LS-09	LANDSCAPE RESTORATION PLAN
135-141	IR-01 - IR-07	IRRIGATION MODIFICATION PLAN
142	WM-01	WETLAND MITIGATION NOTES
143-146	WM-02 - WM-05	WETLAND MITIGATION PLAN
147	WM-06	WETLAND MITIGATION SPECIES LIST & PLANT COUNT
148	FP-01	COMPENSATORY STORAGE

MAYOR

LEATTA DAHLHOFF

COUNCIL MEMBERS

ANGELA JEFFERSON
BRANDON WEEDON
JOAN CATHEY
EILEEN SWARTHOUT
MEGHAN SULLIVAN
PETER AGABI
KELLY VON HOLTZ

CITY ADMINISTRATOR

PAUL SIMMONS

PARKS AND RECREATION DEPARTMENT

CHUCK DENNEY
(360) 754-4160

TRANSPORTATION AND ENGINEERING DEPARTMENT

BRANDON HICKS, PE

APPROVED FOR CONSTRUCTION

PATRICK HOEY — STATE OF WASHINGTON — 89470 — REGISTERED PROFESSIONAL ENGINEER
PRELIMINARY

CV-01

File: 25-000313-C-CV-01.dwg Path: N:\Projects\0825 City of Tumwater\25-000313 Tumwater Deschutes Valley Trail\CADD\ Plotted by: audrey.nielsen Date: 20-Aug-26 12:43:34pm

ABBREVIATIONS:

APPROX	APPROXIMATELY
CL	CENTERLINE
CLR	CLEAR
CONC	CONCRETE
CSBC	CRUSHED SURFACING BASE COURSE
CSTC	CRUSHED SURFACING TOP COURSE
CURB	CEMENT CONCRETE TRAFFIC CURB
DIA	DIAMETER
EL/ELEV	ELEVATION
EQ	EQUALLY SPACED
ETC	ET CETERA
EX	EXISTING
FG	FINISHED GRADE
FT	FOOT
HMA	HOT MIX ASPHALT
IE	INVERT ELEVATION
IN	INCH
INCL	INCLUDING
K	XXX
LBS	POUNDS
LF	LINEAR FEET
LT	LEFT
LVC	LENGTH OF VERTICAL CURVE
NST	NO STEEPER THAN
NTS	NOT TO SCALE
OC	ON CENTER
OD	OUTSIDE DIAMETER
PC	POINT OF CURVATURE
PCC	POINT OF COMPOUND CURVATURE
PI	POINT OF INTERSECTION
PL	PROPERTY LINE
PRC	POINT OF REVERSE CURVATURE
PT	POINT OF TANGENCY
PVI	POINT OF VERTICAL INTERSECTION
R	RADIUS
R/W	RIGHT-OF-WAY
RT	RIGHT
SF	SQUARE FEET
STA	STATION
TBC	TOP BACK OF CURB
TESC	TEMPORARY EROSION AND SEDIMENT CONTROL
TYP	TYPICAL

GENERAL CONSTRUCTION NOTES:

1. THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR THE LOCATION AND PROTECTION OF ALL EXISTING UTILITIES. THE CONTRACTOR SHALL VERIFY ALL UTILITY LOCATIONS PRIOR TO CONSTRUCTION BY CALLING THE UNDERGROUND LOCATE LINE AT 1-800-424-5555 OR 811 A MINIMUM OF 48 HOURS PRIOR TO ANY EXCAVATION. THE CONTRACTOR WILL ALSO BE RESPONSIBLE FOR MAINTAINING ALL LOCATE MARKS ONCE THE UTILITIES HAVE BEEN LOCATED.

2. THE LOCATIONS AND ELEVATIONS OF EXISTING UNDERGROUND FACILITIES, WHERE SHOWN ON THE PLANS, ARE BASED ON AVAILABLE RECORDS AND MAY NOT ACCURATELY REFLECT THE ACTUAL LOCATIONS OR ELEVATIONS. THE CONTRACTOR SHALL ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR LOCATING AND HAVING LOCATED ALL EXISTING UNDERGROUND UTILITIES AND OTHER FACILITIES DURING THE COURSE OF THE PROJECT. ANY DEVIATIONS FROM THE LOCATIONS SHOWN ON THE PLANS SHALL IMMEDIATELY BE BROUGHT TO THE ATTENTION OF THE ENGINEER.

3. CONTRACTOR SHALL FIELD VERIFY LOCATION AND DEPTH OF ALL EXISTING UTILITIES WHERE NEW FACILITIES CROSS. ALL UTILITY CROSSINGS MARKED OR SHOWN ON THE DRAWINGS SHALL BE POTHOLED AND FIELD DATA RECORDED PRIOR TO COMMENCING THE WORK. CONTRACTOR SHALL BE RESPONSIBLE FOR EXPOSING POTENTIAL UTILITY CONFLICTS FAR ENOUGH AHEAD OF CONSTRUCTION TO MAKE NECESSARY GRADE MODIFICATIONS WITHOUT DELAYING THE WORK. IF GRADE MODIFICATION IS NECESSARY, CONTRACTOR SHALL NOTIFY THE ENGINEER TO OBTAIN REVISED PLANS OR APPROVAL PRIOR TO CONSTRUCTION.

4. THE CONTRACTOR SHALL MAINTAIN EXISTING TRAFFIC SIGNS WITHIN THE PROJECT LIMITS. IF THE EXISTING TRAFFIC SIGNS ARE IN CONFLICT WITH THE CONSTRUCTION OPERATION, THE SIGNS SHALL BE TEMPORARILY RELOCATED AND MAINTAINED BY THE CONTRACTOR. UPON COMPLETION OF THE PROJECT, TRAFFIC SIGNS WILL BE RESET IN THEIR PROPER LOCATION. EXISTING TRAFFIC SIGNS CANNOT BE REMOVED UNTIL THE NEW SIGNS ARE PROPERLY INSTALLED AND ACCEPTED BY THE CITY.

5. WORK FOR THIS PROJECT SHALL MEET OR EXCEED THE PROJECT SPECIFICATIONS AND THE 2026 WSDOT STANDARD SPECIFICATIONS FOR ROAD, BRIDGE, AND MUNICIPAL CONSTRUCTION WHICH ARE HEREBY REFERENCED AS A PART OF THESE PLANS.

OWNER

CITY OF TUMWATER
555 ISRAEL RD SW
TUMWATER, WA 98501
(360) 754-4140
CONTACT: BILL LINDAUER, P.E.

CIVIL ENGINEER

SCJ ALLIANCE
8730 TALLON LANE NE, SUITE 200
LACEY, WA 98516
(360) 352-1465
CONTACT: PATRICK HOLM, P.E.

SURVEYOR

DAVID EVANS AND ASSOCIATES, INC.
703 DOUGLAS FIR DR.
MAGNOLIA, TX 77354
(360) 628-5016
CONTACT: RYNEA EDWARDS

STRUCTURAL ENGINEER

SARGENT ENGINEERS INC
320 RONLEE LANE NW,
OLYMPIA WA 98502
(360) 867-9284

GEOTECHNICAL ENGINEER

SAGE GEOTECHNICAL.
2840 CRITES ST SW STE 104
TUMWATER, WA 98512
(360) 259-7660
CONTACT: LANCE LEVINE, P.E.

GOVERNING AGENCIES

CITY OF TUMWATER
555 ISRAEL RD SW
TUMWATER, WA 98501
(360) 252-5499
CONTACT: JARED VERHEY, P.E.

UTILITIES

COMMUNICATIONS

LUMEN (CENTURY LINK)
CHRIS MCCALL
(360) 504-0481

COMCAST
TED AXTELL
(253) 878-2794

AT&T
JOSH COGGINS
(253) 209-0260

PUGET SOUND ENERGY

PSE POWER
JAMES LENGEL
O:(425) 449-7472
C:(425) 449-9954

PSE GAS
ANTHONY FAY
C:(425) 213-2514

PSE FIBER - MAIN CONTACT
CHRIS MANTLE
(425) 248-5632

WATER/SEWER/STORM

CITY OF TUMWATER
WATER RESOURCES &
SUSTAINABILITY
555 ISRAEL RD SW
TUMWATER, WA 98501
(360) 754-4140

DATUM:

HORIZONTAL
BASIS OF BEARINGS AND COORDINATES BASED ON TIES TO THURSTON COUNTY MONUMENTS. DATUM IS NAD 1983/91 WASHINGTON SOUTH ZONE.
PROJECT COMBINED SCALE FACTOR: 0.999941675
PROJECT CONVERGENCE: -1°44'46"

THE FOLLOWING MONUMENTS WERE USED:
GP34005-4T - NGS CONTROL DISC SET IN CONCRETE AT SURFACE OF ROAD AT ENTRANCE TO TUMWATER VALLEY GOLF COURSE.
NORTHING: 619421.184
EASTING: 1040781.301

6037 - WEST QUARTER CORNER SECTION 35, T18N, R2W, 2.5" BRASS DISC IN 2" IRON PIPE, 0.5' BELOW SURFACE, IN NORTH GRAVEL SHOULDER OF 'M' ST SE.
NORTHING: 618260.214
EASTING: 1039865.571

VERTICAL
NGVD 29 BASED ON TIES TO GP34005-4T
ELEVATION = 98.15 FEET

EXISTING LEGEND

- RIGHT-OF-WAY (R/W)
- PROPERTY LINE
- TRAIL CENTERLINE
- EXISTING CONTOUR MAJOR
- EXISTING CONTOUR MINOR
- EXISTING SIDEWALK
- EXISTING CURB
- EXISTING EDGE OF ASPHALT
- EXISTING EDGE DRIVEWAY
- EXISTING FENCE
- EXISTING BUILDING
- EXISTING WATER LINE
- EXISTING SANITARY SEWER
- EXISTING FORCE MAIN
- EXISTING STORM SEWER
- EXISTING GAS
- EXISTING OVERHEAD POWER
- EXISTING UNDERGROUND POWER
- EXISTING UNDERGROUND TELEPHONE
- EXISTING UNDERGROUND FIBER OPTICS
- EXISTING UNDERGROUND CABLE
- ORDINARY HIGH WATER MARK
- EXISTING IRRIGATION
- WETLAND BOUNDARY
- WETLAND BUFFER
- DEMO TURF LINE
- RETAINING WALL
- EXISTING CATCH BASIN TYPE 1
- EXISTING CATCH BASIN TYPE 2
- EXISTING HYDRANT
- EXISTING WATER VALVE
- EXISTING WATER METER
- EXISTING WATER FAUCET
- EXISTING SANITARY SEWER MANHOLE
- EXISTING SEWER CLEANOUT
- EXISTING POWER POLE
- EXISTING JUNCTION BOX
- EXISTING JUNCTION BOX
- EXISTING LUMINARIE
- EXISTING GUY WIRE
- EXISTING POWER VAULT
- EXISTING GAS METER
- EXISTING SHRUB
- EXISTING CONIFER TREE
- EXISTING DECIDUOUS TREE
- EXISTING DOUGLAS-FIR TREE
- EXISTING MAPLE TREE
- EXISTING MAILBOX
- MONUMENT IN CASE
- BRASS CAP MONUMENT
- EXISTING SIGN & POST
- EXISTING SIGN & DOUBLE POST
- EXISTING DOUBLE SIGN

PROPOSED LEGEND

- TRAIL CENTERLINE
- HMA TRAIL
- GRAVEL SHOULDER
- EDGE OF PAVEMENT
- EDGE OF GRAVEL
- CEMENT CONC. TRAFFIC CURB
- SAFETY FENCE & POLE
- MAJOR CONTOUR
- MINOR CONTOUR
- APPROX. FILL LINE
- APPROX. CUT LINE
- CATCH BASIN TYPE 1
- 8 IN. DIA. CORRUGATED HDPE STORM SEWER PIPE
- POWER LINE
- PROPOSED WATER MAIN
- RECLAIMED WATER
- PROPOSED WATER VALVE
- PROPOSED WATER METER
- PROPOSED THRUST BLOCK
- ROCK CHECK DAM
- DITCH
- INFILTRATION TRENCH
- REDI ROCK RETAINING WALL
- TYPE 3 CHAIN LINK FENCE
- MULTI-USE PATH MARKINGS
- ADA ACCESSIBILITY
- ACCESSIBILITY SIGN AND POST
- ADA PARKING STRIPING
- BOLLARD TYPE 1
- EDGE OF FULL DISPERSION
- SIGN NOTE
- TYPE 3 BARRICADE
- CONCRETE PAD
- ECOLOGY BLOCK
- ROCK EMBANKMENT
- SLOPE ARROW
- 8 INCH CAP
- BEND W/ THRUST BLOCKING
- DOUBLE CHAIN LINK GATE

CALL BEFORE YOU DIG

THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR THE LOCATION AND PROTECTION OF ALL EXISTING UTILITIES. THE CONTRACTOR SHALL VERIFY ALL UTILITY LOCATIONS PRIOR TO CONSTRUCTION BY CALLING THE UNDERGROUND LOCATE LINE 811 OR SUBMITTING AN ONLINE REQUEST AT WWW.CALLBEFOREYOUDIG.ORG/CONTACT.ASP A MINIMUM OF 48 HOURS PRIOR TO ANY EXCAVATION.

△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ
DRAWN BY: M. HENDRICKS-MATSUDA
APPROVED BY: P. HOLM
ISSUE DATE: AUGUST 2026
JOB No.: 25-000313
DRAWING FILE No.: 25-000313-C-LN-01

ALL DIMENSIONS SHOWN IN FEET UNLESS OTHERWISE DESIGNATED

PATRICK HOLM — STATE OF WASHINGTON — 49470 — REGISTERED PROFESSIONAL ENGINEER — PRELIMINARY

SCJ ALLIANCE
CONSULTING SERVICES
8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
P: 360.352.1465
SCJALLIANCE.COM

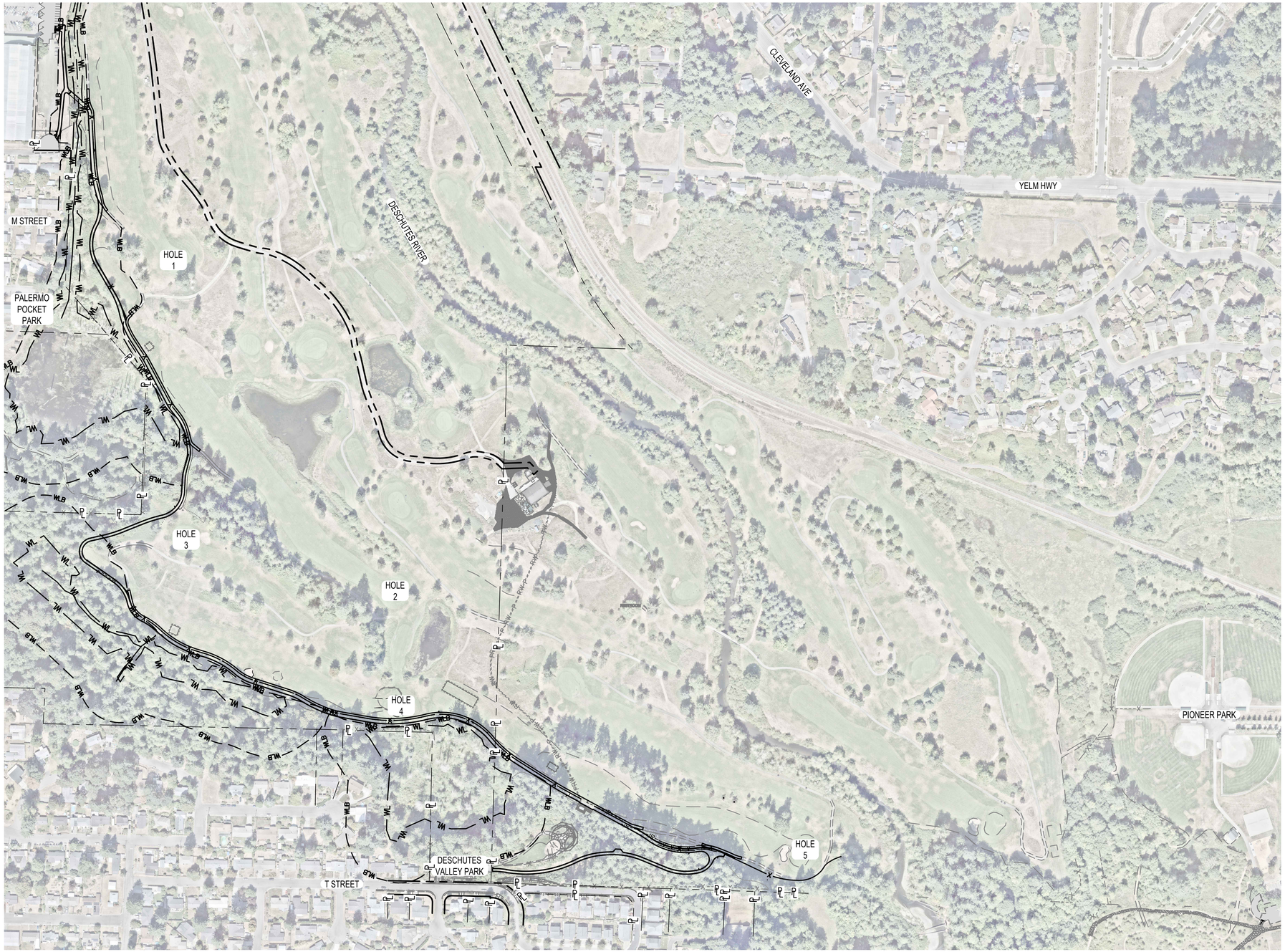
PROJECT NAME:
CITY OF TUMWATER

DESCHUTES VALLEY TRAIL
SEGMENT C

CONSTRUCTION NOTES AND LEGEND

DRAWING No.: LN-01
SHEET No.: 2 OF 148

Aug 20, 2026 - 12:43:38pm - User: aufreyrideson
N:\PROJECTS\0625 CITY OF TUMWATER\25-000313 TUMWATER DESCHUTES VALLEY TRAIL\CADD\25-000313-C-LN-01.DWG



△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ
DRAWN BY: M. HENDRICKS-MATSUDA
APPROVED BY: P. HOLM
ISSUE DATE: AUGUST 2026
JOB No.: 25-000313
DRAWING FILE No.: 25-000313-C-LN-02

ALL DIMENSIONS SHOWN IN FEET UNLESS OTHERWISE DESIGNATED

PATRICK HOLM — STATE OF WASHINGTON — 49170 — REGISTERED PROFESSIONAL ENGINEER — PRELIMINARY

SCJ ALLIANCE
CONSULTING SERVICES
8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
P: 360.352.1465
SCJALLIANCE.COM

PROJECT NAME:
CITY OF TUMWATER

DESCHUTES VALLEY TRAIL
SEGMENT C

PROJECT OVERVIEW
C 150+00 - C 205+39

DRAWING No.: LN-02
SHEET No.: 3 OF 148

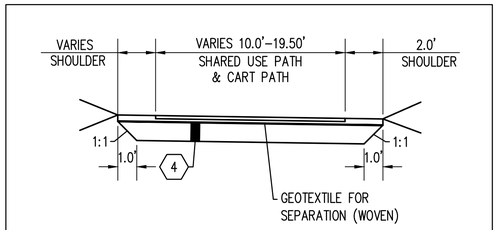
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TRAIL SECTION KEY NOTES:

1. 0.17' COMMERCIAL HMA.
2. 0.33' CRUSHED SURFACING BASE COURSE (CSBC), WSDOT STD SPEC 9-03.9(3).
3. 0.5' CRUSHED SURFACING BASE COURSE (CSBC), WSDOT STD SPEC 9-03.9(3).
4. 1.0' QUARRY SPALLS, SEE QUARRY SPALLS BASE DETAIL ON XS-01 FOR INSTALLATION DETAILS AND STATION LIMITS
5. 0.33' TOPSOIL TYPE A, SEE TYPICAL SPECIAL PROVISIONS AND SEE LANDSCAPE PLANS FOR SEEDING MIX.
6. POST CONSTRUCTION SOIL QUALITY, SEE SPECIAL PROVISIONS 8-02.3(5)D.
7. ROCK EMBANKMENT, SEE DETAIL ON TG-01.
8. SEE LANDSCAPE PLANS FOR SEEDING MIX.

TRAIL SECTION NOTES:

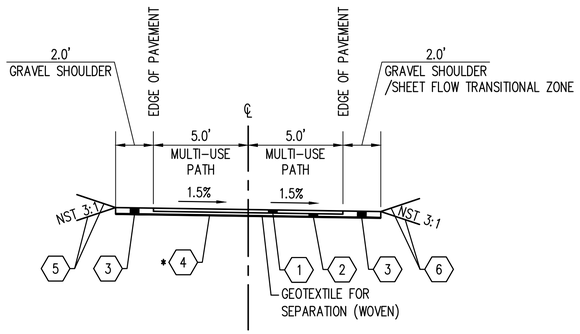
1. ALL SURFACING AND PAVING DEPTHS ARE COMPACTED DEPTHS.
2. NST = NO STEEPER THAN.
3. NTS = NOT TO SCALE.
4. SUBGRADE, CRUSHED SURFACING, AND GRAVEL BORROW SHALL BE COMPACTED TO 95 PERCENT OF THE MAXIMUM DENSITY DETERMINED UNDER THE TEST DESCRIBED IN THE WSDOT STD SPEC 3-03.3(14)D.
5. HMA SHALL BE COMPACTED PER THE REQUIREMENTS IN THE SPECIAL PROVISIONS SECTION 5-04.
6. ALL BACKFILL MATERIAL SHALL BE EMBANKMENT COMPACTION (WSDOT STD SPEC 3-03) UNLESS OTHERWISE SPECIFIED.
7. CUT SLOPES STEEPER THAN 3:1 SHALL BE STABILIZED WITH ROCK ARMOR AT A MINIMUM DEPTH OF 18-INCHES AND SHALL BE PREPARED IN ACCORDANCE WITH THE REQUIREMENTS FOR HILLSIDE TERRACES IN WSDOT STD SPEC 3-03.3(14)



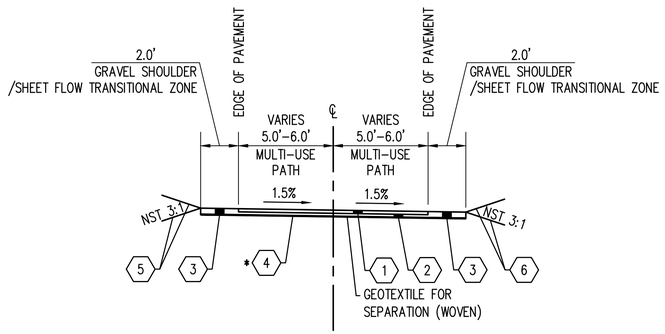
NOTE: CONTRACTOR SHALL PROVIDE 1' OF QUARRY SPALLS PER THIS DETAIL IN THE FOLLOWING TRAIL STATIONING SEGMENTS.

TRAIL STATION LOCATIONS:
M250+00 TO M251+00
C151+75 TO C152+54
C155+00 TO C156+82
C160+55 TO C168+05
C175+05 TO C193+05

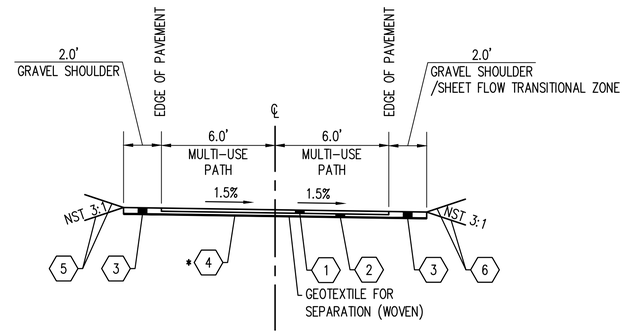
*QUARRY SPALLS BASE DETAIL
NTS



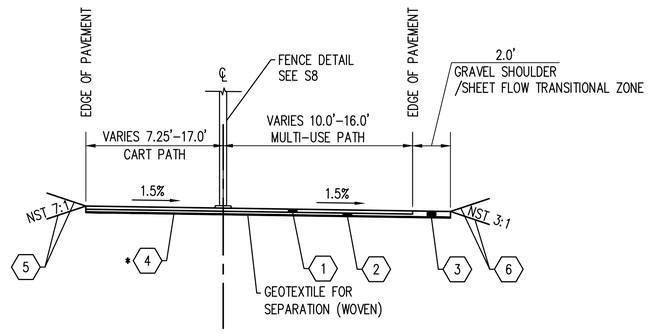
TYPICAL SECTION C-1
NTS
M250+06 TO M251+89
C150+00 TO C151+75



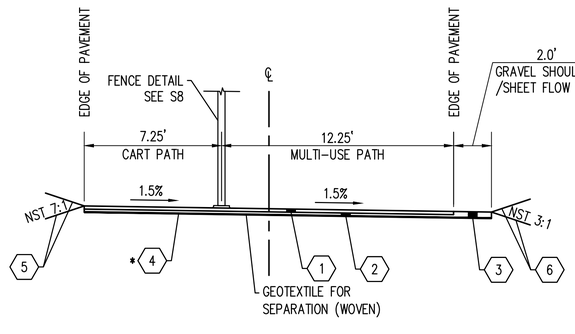
TRANSITIONAL SECTION C-2
NTS
C151+75 TO C152+24



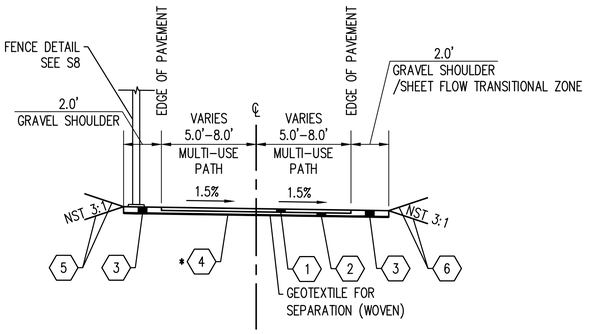
TYPICAL SECTION C-3
NTS
C152+24 TO C152+54



TRANSITIONAL SECTION C-4
NTS
C153+39 TO C153+70
C156+68 TO C157+04
C161+69 TO C162+44
C165+63 TO C166+66
C175+91 TO C176+74
C196+78 TO C196+96



TYPICAL SECTION C-5
NTS
C153+70 TO C156+68
C176+74 TO C182+45
C185+64 TO C192+11



TRANSITIONAL SECTION C-6
NTS
C157+04 TO C157+84 (NO FENCE ALONG THIS SECTION)
C160+69 TO C161+70

△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ
DRAWN BY: M. WOLFF
APPROVED BY: P. HOLM
ISSUE DATE: AUGUST 2026
JOB No.: 25-000313
DRAWING FILE No.: 25-000313-C-XS-01

ALL DIMENSIONS SHOWN IN FEET UNLESS OTHERWISE DESIGNATED

PATRICK HOLM — STATE OF WASHINGTON — 49670 — REGISTERED PROFESSIONAL ENGINEER — PRELIMINARY

SCJ ALLIANCE
CONSULTING SERVICES
8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
P: 360.352.1465
SCJALLIANCE.COM

PROJECT NAME:

CITY OF TUMWATER

DESCHUTES VALLEY TRAIL
SEGMENT C

TYPICAL CROSS SECTIONS

DRAWING No.: XS-01
SHEET No.: 4 OF 148

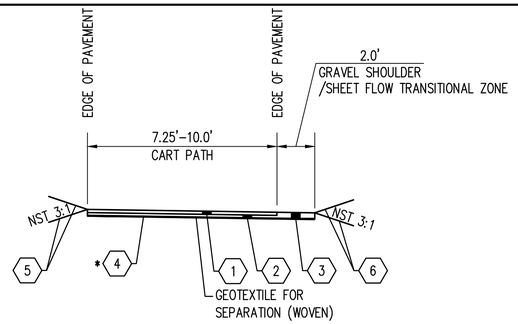
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N:\PROJECTS\0625 CITY OF TUMWATER\25-000313 TUMWATER DESCHUTES VALLEY TRAIL\CADD\25-000313-C-XS-01.DWG

TRAIL SECTION KEY NOTES:

1. 0.17' COMMERCIAL HMA.
2. 0.33' CRUSHED SURFACING BASE COURSE (CSBC), WSDOT STD SPEC 9-03.9(3).
3. 0.5' CRUSHED SURFACING BASE COURSE (CSBC), WSDOT STD SPEC 9-03.9(3).
4. 1.0' QUARRY SPALLS, SEE QUARRY SPALLS BASE DETAIL ON XS-01 FOR INSTALLATION DETAILS AND STATION LIMITS
5. 0.33' TOPSOIL TYPE A, SEE TYPICAL SPECIAL PROVISIONS AND SEE LANDSCAPE PLANS FOR SEEDING MIX.
6. POST CONSTRUCTION SOIL QUALITY, SEE SPECIAL PROVISIONS 8-02.3(5)D.
7. ROCK EMBANKMENT, SEE DETAIL ON TG-01.
8. SEE LANDSCAPE PLANS FOR SEEDING MIX.

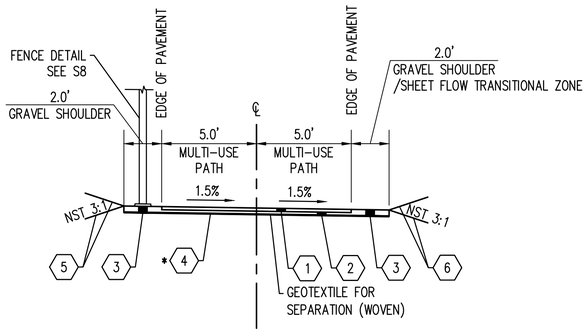
TRAIL SECTION NOTES:

1. ALL SURFACING AND PAVING DEPTHS ARE COMPACTED DEPTHS.
2. NST = NO STEEPER THAN.
3. NTS = NOT TO SCALE.
4. SUBGRADE, CRUSHED SURFACING, AND GRAVEL BORROW SHALL BE COMPACTED TO 95 PERCENT OF THE MAXIMUM DENSITY DETERMINED UNDER THE TEST DESCRIBED IN THE WSDOT STD SPEC 3-03.3(14)D.
5. HMA SHALL BE COMPACTED PER THE REQUIREMENTS IN THE SPECIAL PROVISIONS SECTION 5-04.
6. ALL BACKFILL MATERIAL SHALL BE EMBANKMENT COMPACTION (WSDOT STD SPEC 3-03) UNLESS OTHERWISE SPECIFIED.
7. CUT SLOPES STEEPER THAN 3:1 SHALL BE STABILIZED WITH ROCK ARMOR AT A MINIMUM DEPTH OF 18-INCHES AND SHALL BE PREPARED IN ACCORDANCE WITH THE REQUIREMENTS FOR HILLSIDE TERRACES IN WSDOT STD SPEC 3-03.3(14)



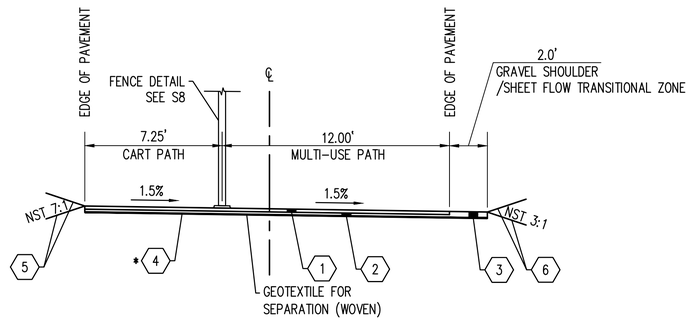
CART PATH SPURS

NTS
SEE SHEETS CG-02 TO CG-05 FOR GRADING AND HORIZONTAL GEOMETRY



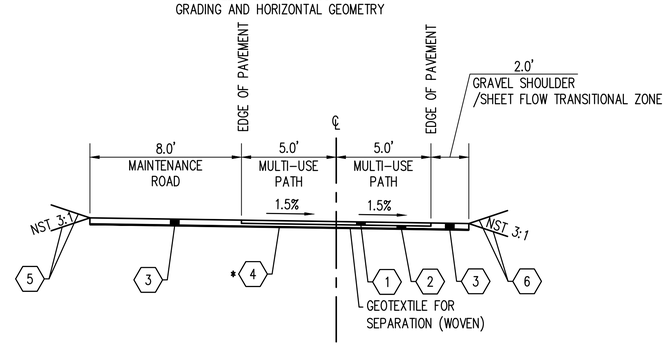
TYPICAL SECTION C-7

NTS
C157+84 TO C159+00 (NO FENCE ALONG THIS SECTION)
C159+00 TO C160+45
C169+30 TO C173+00 (NO FENCE ALONG THIS SECTION)



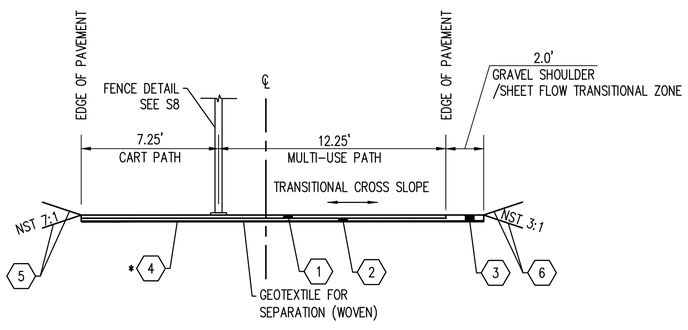
TYPICAL SECTION C-8

NTS
C162+44 TO C165+63



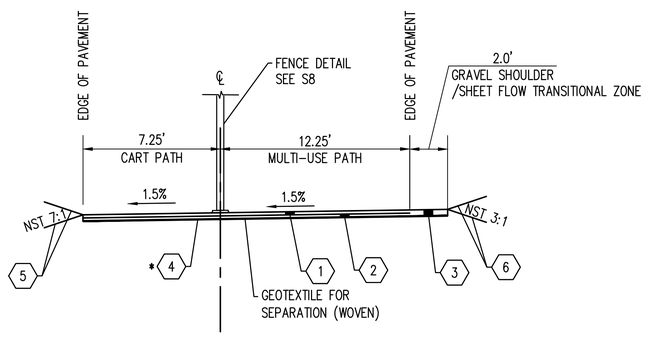
TYPICAL SECTION C-9

NTS
C166+66 TO C166+89 (MAINTENANCE ROAD WIDTH VARIES BETWEEN 0'-8' WIDE)
C166+89 TO 169+30



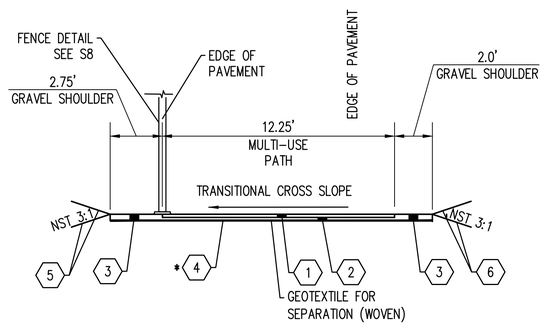
TYPICAL SECTION C-10

NTS
C182+45 TO C183+00
C185+03 TO C185+65
C192+11 TO C192+80



TYPICAL SECTION C-11

NTS
C183+00 TO C185+03
C192+80 TO C196+78



TRANSITIONAL CROSS SLOPE SECTION C-12

NTS
C196+96 TO C197+08 (GRAVEL SHOULDER TAPERS FROM 0'-2')
C197+08 TO C197+50

△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ	ISSUE DATE: AUGUST 2026
DRAWN BY: M. HENDRICKS-MATSUDA	JOB No.: 25-000313
APPROVED BY: P. HOLM	DRAWING FILE No.: 25-000313-C-XS-01

ALL DIMENSIONS SHOWN IN FEET UNLESS OTHERWISE DESIGNATED

PATRICK HOLM — STATE OF WASHINGTON — 49670 — REGISTERED PROFESSIONAL ENGINEER
PRELIMINARY

SCJ ALLIANCE
CONSULTING SERVICES
8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
P: 360.352.1465
SCJALLIANCE.COM

PROJECT NAME:

CITY OF TUMWATER

DESCHUTES VALLEY TRAIL
SEGMENT C

TYPICAL CROSS SECTIONS

DRAWING No.: XS-02

SHEET No.: 5 OF 148

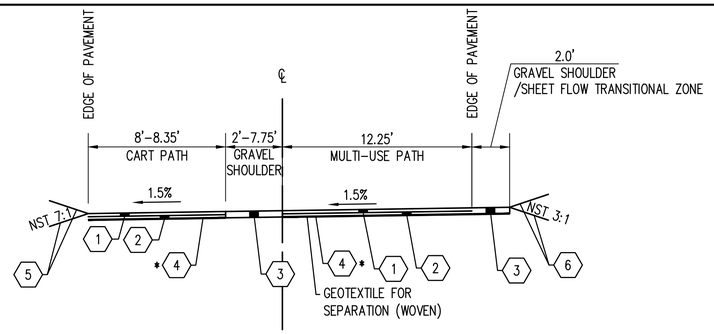
Aug 20, 2026 2:46:23pm - User: nikki.martinez
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TRAIL SECTION KEY NOTES:

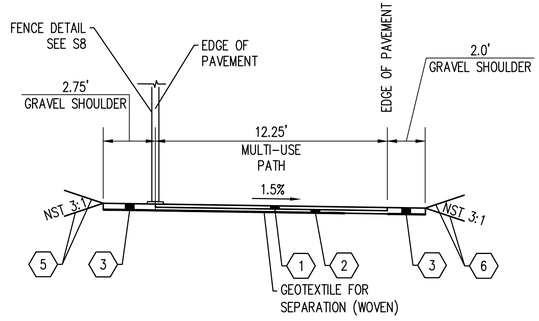
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3. 0.5' CRUSHED SURFACING BASE COURSE (CSBC), WSDOT STD SPEC 9-03.9(3).
4. 1.0' QUARRY SPALLS, SEE QUARRY SPALLS BASE DETAIL ON XS-01 FOR INSTALLATION DETAILS AND STATION LIMITS
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6. POST CONSTRUCTION SOIL QUALITY, SEE SPECIAL PROVISIONS 8-02.3(5)D.
7. ROCK EMBANKMENT, SEE DETAIL ON TG-01.
8. SEE LANDSCAPE PLANS FOR SEEDING MIX.

TRAIL SECTION NOTES:

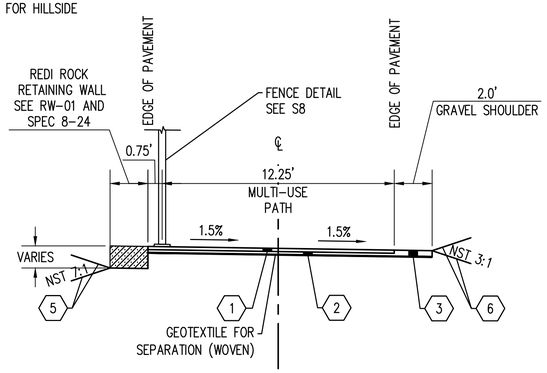
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3. NTS = NOT TO SCALE.
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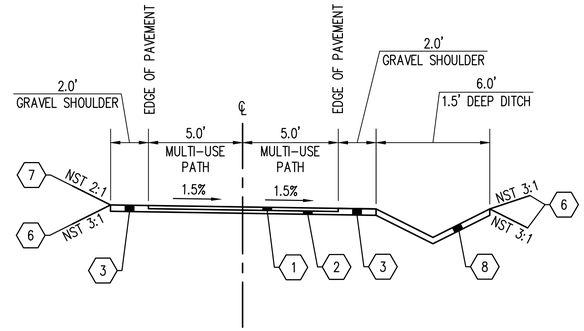
TYPICAL SECTION C-17
NTS
C175+51 TO C175+91



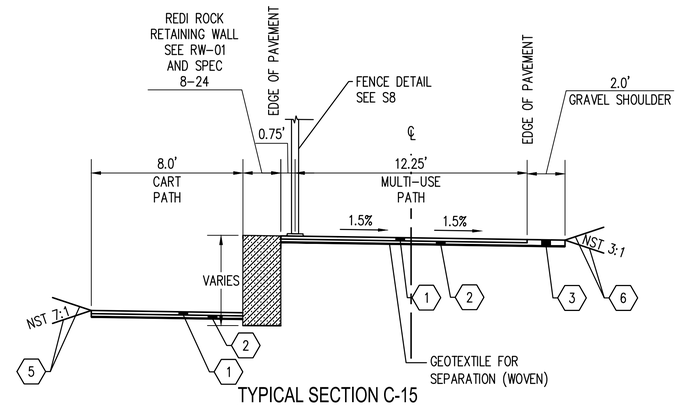
TYPICAL SECTION C-13
NTS
C197+50 TO C198+02



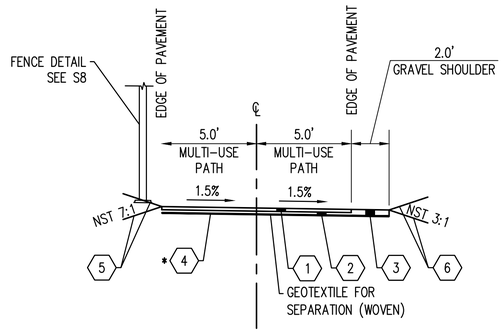
TYPICAL SECTION C-14
NTS
C198+02 TO C199+97



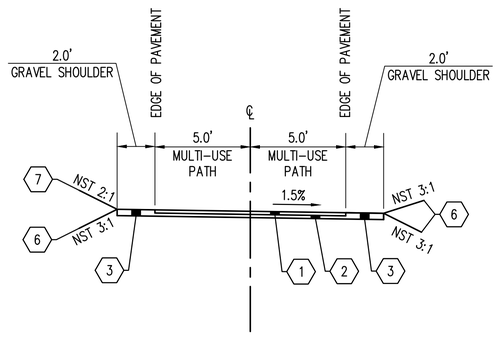
TYPICAL SECTION T-1
NTS
T300+00 TO T308+41



TYPICAL SECTION C-15
NTS
C199+97 TO C200+59



TYPICAL SECTION C-16
NTS
C173+00 TO C173+69 (NO FENCE ALONG THIS SECTION)
C173+69 TO C175+51



TYPICAL SECTION T-2
NTS
T308+41 TO T308+69

△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ
ISSUE DATE: AUGUST 2026
DRAWN BY: M. HENDRICKS-MATSUDA
JOB No.: 25-000313
APPROVED BY: P. HOLM
DRAWING FILE No.: 25-000313-C-XS-01

ALL DIMENSIONS SHOWN IN FEET UNLESS OTHERWISE DESIGNATED

PATRICK HOLM — STATE OF WASHINGTON — 49470 — REGISTERED PROFESSIONAL ENGINEER
PRELIMINARY

SCJ ALLIANCE
CONSULTING SERVICES
8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
P: 360.352.1465
SCJALLIANCE.COM

PROJECT NAME:

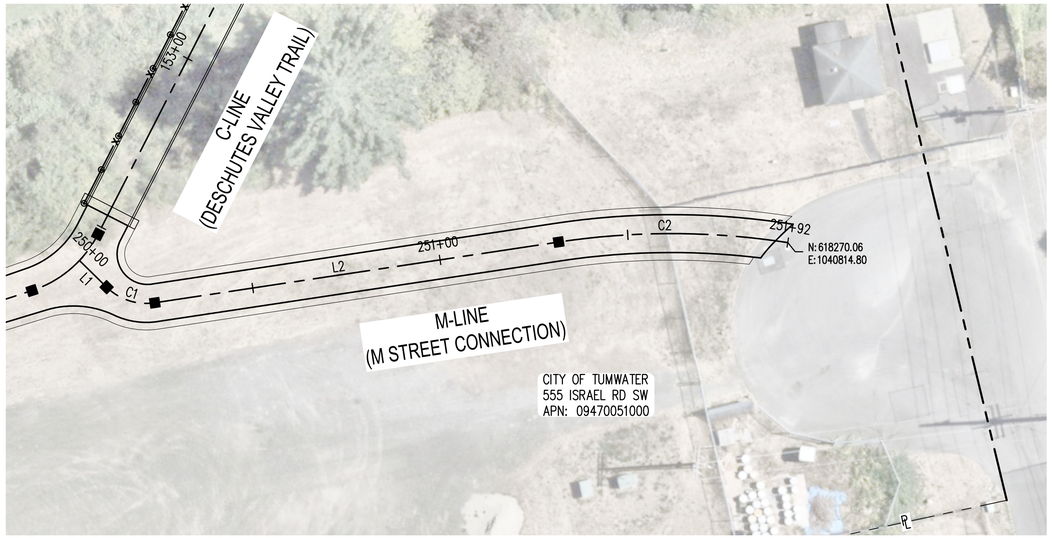
CITY OF TUMWATER

DESCHUTES VALLEY TRAIL
SEGMENT C

TYPICAL CROSS SECTIONS

DRAWING No.: XS-03
SHEET No.: 6 OF 148

Aug 20, 2026 - 3:35:04pm - User: nikki.martinez
N:\PROJECTS\0625 CITY OF TUMWATER\25-000313 TUMWATER DESCHUTES VALLEY TRAIL\CAD\25-000313-C-XS-01.DWG



M–LINE, M STREET CONNECTION									
NUMBER	ALIGNMENT	PC STATION	PI STATION	PT STATION	DELTA	RADIUS	TANGENT	LENGTH	DIRECTION
L1	M	250+00.00		250+09.98				9.98'	S58° 29' 58"W
C1	M	250+09.98	250+17.46	250+23.86	53°00'58"	15.00'	7.48'	13.88'	
L2	M	250+23.86		251+31.66				107.79'	S5° 28' 59"W
C2	M	251+31.66	251+62.25	251+92.37	17°23'33"	200.00'	30.59'	60.71'	

VERTICAL DATUM
NGVD '29 BASED ON TIES TO GP34005–4T
ELEVATION = 98.15 FEET

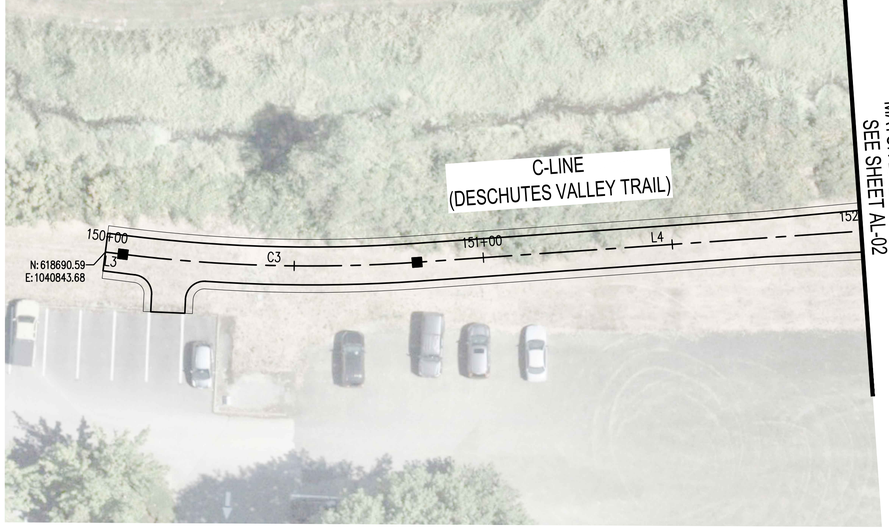
BASIS OF BEARINGS AND COORDINATES BASED ON TIES TO THURSTON COUNTY MONUMENTS. DATUM IS NAD 1983/91, WASHINGTON SOUTH ZONE.

PROJECT COMBINED SCALE FACTOR: 0.999941675
PROJECT CONVERGENCE: –1°44'46"

0 20 40
SCALE IN FEET

LEGEND

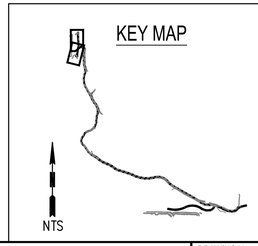
- RIGHT–OF–WAY
- PROPERTY LINE
- TRAIL CENTERLINE
- PC/PT/PCC/PRC OF TRAIL ALIGNMENT
- SURVEY NAIL
- BRASS CAP
- CONCRETE MONUMENT
- REBAR AND CONTROL CAP
- SURVEY HUB AND TACK
- MONUMENT IN CASE
- CONTROL POINT



0 20 40
SCALE IN FEET

C–LINE, DESCHUTES VALLEY TRAIL									
NUMBER	ALIGNMENT	PC STATION	PI STATION	PT STATION	DELTA	RADIUS	TANGENT	LENGTH	DIRECTION
L3	C	148+14.90		150+04.66				189.76'	S7° 08' 16"W
C3	C	150+04.66	150+43.68	150+82.46	11°08'41"	400.00'	39.03'	77.80'	
L4	C	150+82.46		152+24.46				142.00'	S4° 00' 25"E

KEY MAP



NTS

△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ
ISSUE DATE: AUGUST 2026
DRAWN BY: M. HENDRICKS-MATSUDA
JOB No.: 25-000313
APPROVED BY: P. HOLM
DRAWING FILE No.: 25-000313-C-AL-00

ALL DIMENSIONS SHOWN IN FEET UNLESS OTHERWISE DESIGNATED

PATRICK HOLM — STATE OF WASHINGTON — 19970 — REGISTERED PROFESSIONAL ENGINEER — PRELIMINARY

SCJ ALLIANCE
CONSULTING SERVICES
8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
P: 360.352.1465
SCJALLIANCE.COM

PROJECT NAME:

CITY OF TUMWATER

DESCHUTES VALLEY TRAIL
SEGMENT C

CONSTRUCTION ALIGNMENT PLAN
C 150+00 - C 152+00 & M 250+00 - M 251+92

DRAWING No.: AL-01
SHEET No.: 7 OF 148

Aug 20, 2026 12:56:21pm – User: audreyhelsen
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VERTICAL DATUM
NGVD '29 BASED ON TIES TO GP34005-4T
ELEVATION = 98.15 FEET

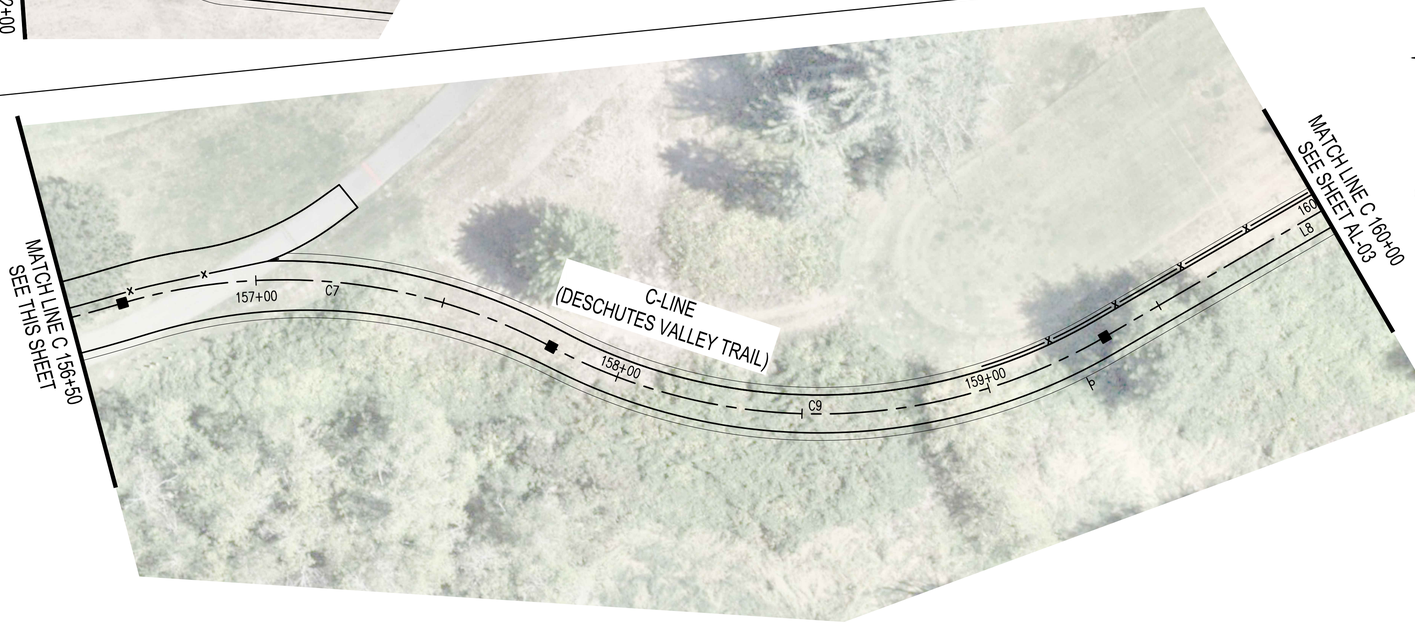
BASIS OF BEARINGS AND COORDINATES BASED ON TIES TO THURSTON COUNTY MONUMENTS. DATUM IS NAD 1983/91, WASHINGTON SOUTH ZONE.

PROJECT COMBINED SCALE FACTOR: 0.999941675
PROJECT CONVERGENCE: -1°44'46"

0 20 40
SCALE IN FEET

LEGEND

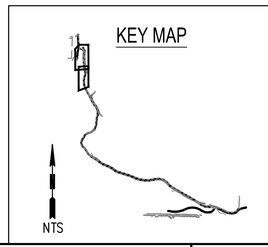
- RIGHT-OF-WAY
- PROPERTY LINE
- TRAIL CENTERLINE
- PC/PT/PCC/PRC OF TRAIL ALIGNMENT
- SURVEY NAIL
- BRASS CAP
- CONCRETE MONUMENT
- REBAR AND CONTROL CAP
- SURVEY HUB AND TACK
- MONUMENT IN CASE
- CONTROL POINT



0 20 40
SCALE IN FEET

C-LINE, DESCHUTES VALLEY TRAIL

NUMBER	ALIGNMENT	PC STATION	PI STATION	PT STATION	DELTA	RADIUS	TANGENT	LENGTH	DIRECTION
C4	C	152+24.46	152+36.84	152+47.95	44°51'55"	30.00'	12.39'	23.49'	
L5	C	152+47.95		153+42.53				94.58'	S48° 52' 20"E
C5	C	153+42.53	153+56.94	153+69.80	45°57'08"	34.00'	14.42'	27.27'	
L6	C	153+69.80		155+24.05				154.26'	S2° 55' 12"E
L7	C	155+24.05		155+57.42				33.37'	S4° 13' 53"E
C6	C	155+57.42	156+11.01	156+64.20	12°14'09"	500.00'	53.59'	106.78'	
C7	C	156+64.20	157+25.70	157+80.92	44°35'08"	150.00'	61.50'	116.72'	
C9	C	157+80.92	158+64.58	159+33.54	58°17'49"	150.00'	83.65'	152.62'	
L8	C	159+33.54		160+60.02				126.47'	S30° 10' 43"E



△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ
DRAWN BY: M. HENDRICKS-MATSUDA
APPROVED BY: P. HOLM
ISSUE DATE: AUGUST 2026
JOB No.: 25-000313
DRAWING FILE No.: 25-000313-C-AL-01

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PROJECT NAME:

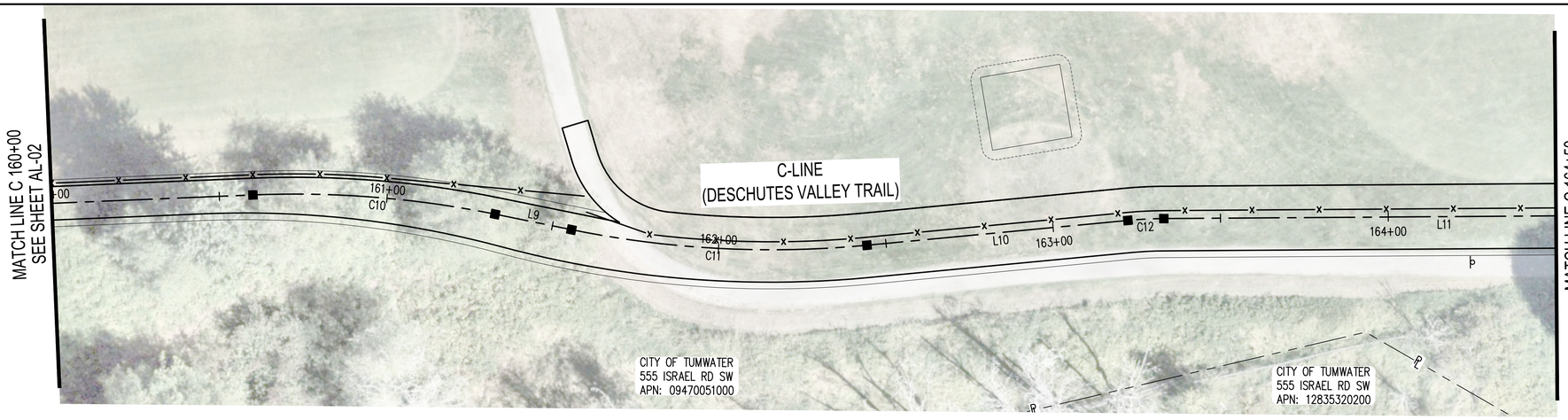
CITY OF TUMWATER

DESCHUTES VALLEY TRAIL
SEGMENT C

CONSTRUCTION ALIGNMENT PLAN
C 152+00 - C 160+00

DRAWING No.: AL-02
SHEET No.: 8 OF 148

Aug 20, 2026 1:06:46pm - User audreyvielsen
N:\PROJECTS\0625 CITY OF TUMWATER\25-000313 TUMWATER DESCHUTES VALLEY TRAIL\CADD\25-000313-C-AL-01.DWG



VERTICAL DATUM
NGVD '29 BASED ON TIES TO GP34005-4T
ELEVATION = 98.15 FEET

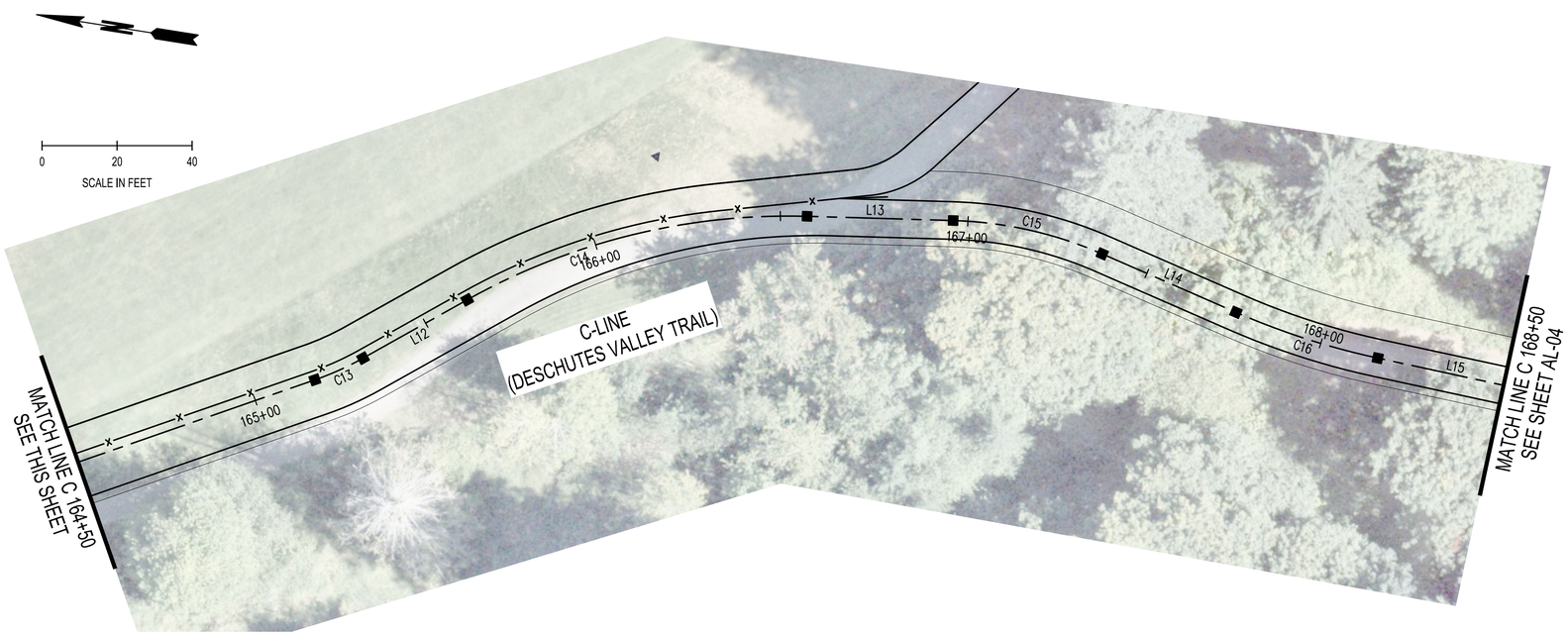
BASIS OF BEARINGS AND COORDINATES BASED ON TIES TO THURSTON COUNTY MONUMENTS. DATUM IS NAD 1983/91, WASHINGTON SOUTH ZONE.

PROJECT COMBINED SCALE FACTOR: 0.999941675
PROJECT CONVERGENCE: -1°44'46"

0 20 40
SCALE IN FEET

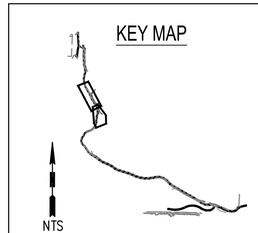
LEGEND

- RIGHT-OF-WAY
- PROPERTY LINE
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- PC/PT/PCC/PRC OF TRAIL ALIGNMENT
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- CONTROL POINT



C-LINE, DESCHUTES VALLEY TRAIL									
NUMBER	ALIGNMENT	PC STATION	PI STATION	PT STATION	DELTA	RADIUS	TANGENT	LENGTH	DIRECTION
C10	C	160+60.02	160+96.48	161+32.58	13°51'33"	300.00'	36.46'	72.57'	
L9	C	161+32.58		161+55.79				23.21'	S16° 19' 10"E
C11	C	161+55.79	162+00.37	162+44.30	16°54'10"	300.00'	44.58'	88.50'	
L10	C	162+44.30		163+22.40				78.10'	S33° 13' 20"E
C12	C	163+22.40	163+27.76	163+33.12	5°02'14"	122.00'	5.37'	10.73'	
L11	C	163+33.12		165+16.81				183.69'	S28° 11' 06"E
C13	C	165+16.81	165+23.87	165+30.90	10°05'31"	80.00'	7.06'	14.09'	
L12	C	165+30.90		165+62.71				31.82'	S38° 16' 37"E
C14	C	165+62.71	166+11.10	166+57.12	30°54'31"	175.00'	48.38'	94.40'	
L13	C	166+57.12		166+96.07				38.95'	S7° 22' 06"E
C15	C	166+96.07	167+16.80	167+37.03	21°56'02"	107.00'	20.73'	40.96'	
L14	C	167+37.03		167+75.92				38.89'	S14° 33' 55"W
C16	C	167+75.92	167+95.86	168+15.67	11°23'18"	200.00'	19.94'	39.75'	
L15	C	168+15.67		168+58.17				42.50'	S3° 10' 37"W

KEY MAP



△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ
DRAWN BY: M. HENDRICKS-MATSUDA
APPROVED BY: P. HOLM
ISSUE DATE: AUGUST 2026
JOB No.: 25-000313
DRAWING FILE No.: 25-000313-C-AL-01

ALL DIMENSIONS SHOWN IN FEET UNLESS OTHERWISE DESIGNATED

PATRICK HOLM — STATE OF WASHINGTON — 49870 — REGISTERED PROFESSIONAL ENGINEER
PRELIMINARY

SCJ ALLIANCE
CONSULTING SERVICES
8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
P: 360.352.1465
SCJALLIANCE.COM

PROJECT NAME:

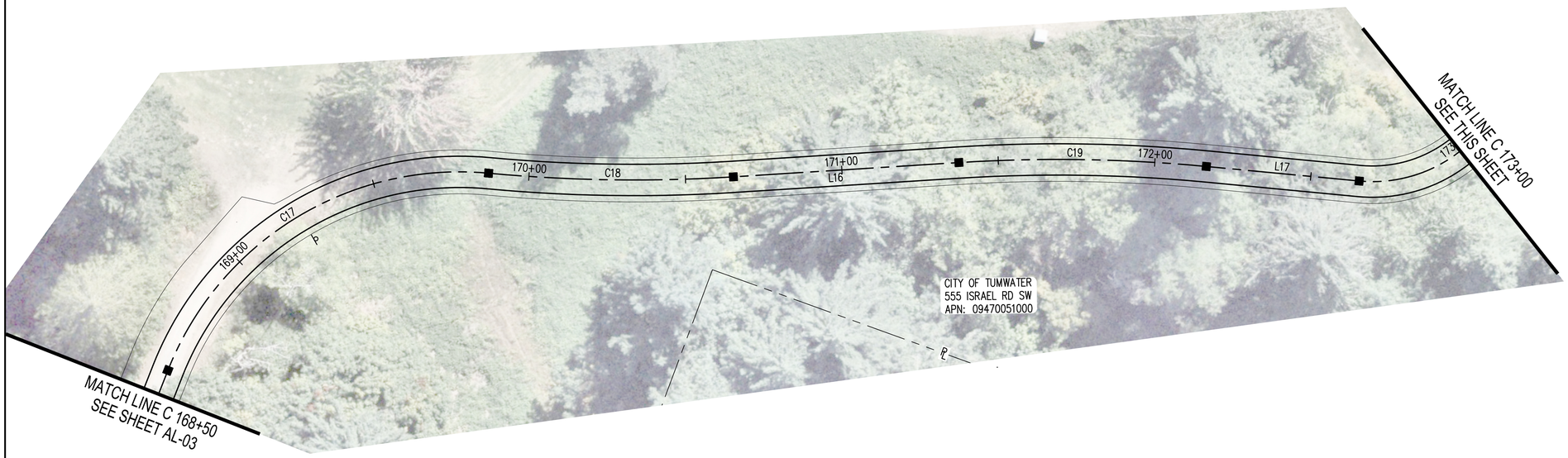
CITY OF TUMWATER

DESCHUTES VALLEY TRAIL
SEGMENT C

CONSTRUCTION ALIGNMENT PLAN
C 160+00 - C 168+50

DRAWING No.: AL-03
SHEET No.: 9 OF 148

Aug 20, 2026 1:04:39pm - User: aufreyrideen
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VERTICAL DATUM
NGVD '29 BASED ON TIES TO GP34005-4T
ELEVATION = 98.15 FEET

BASIS OF BEARINGS AND COORDINATES BASED ON TIES TO THURSTON COUNTY MONUMENTS. DATUM IS NAD 1983/91, WASHINGTON SOUTH ZONE.

PROJECT COMBINED SCALE FACTOR: 0.999941675
PROJECT CONVERGENCE: -1°44'46"

0 20 40
SCALE IN FEET

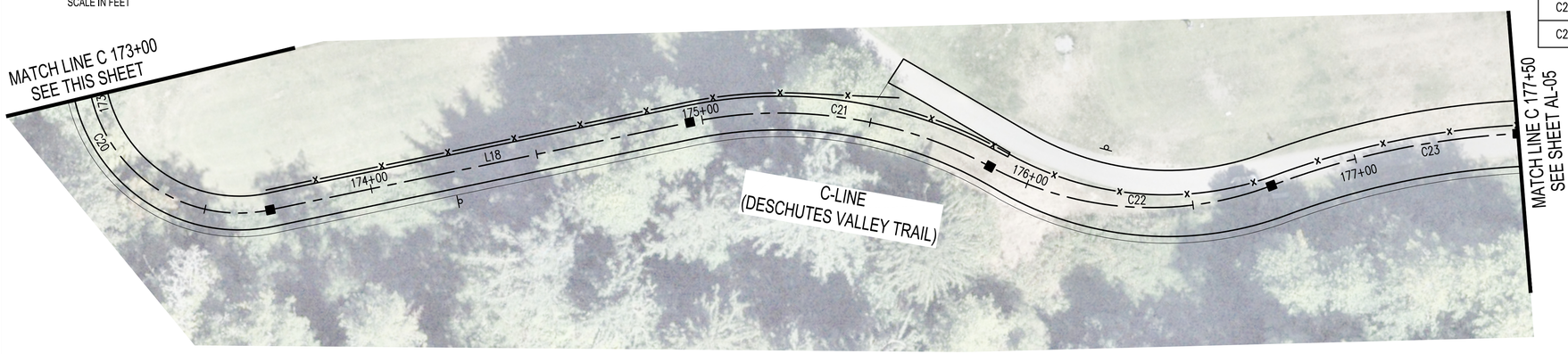
LEGEND

- RIGHT-OF-WAY
- PROPERTY LINE
- TRAIL CENTERLINE
- PC/PT/PCC/PRC OF TRAIL ALIGNMENT
- SURVEY NAIL
- BRASS CAP
- CONCRETE MONUMENT
- REBAR AND CONTROL CAP
- SURVEY HUB AND TACK
- MONUMENT IN CASE
- CONTROL POINT

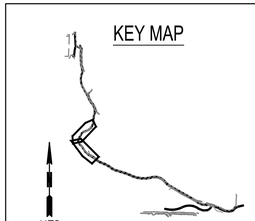
C-LINE, DESCHUTES VALLEY TRAIL

NUMBER	ALIGNMENT	PC STATION	PI STATION	PT STATION	DELTA	RADIUS	TANGENT	LENGTH	DIRECTION
C17	C	168+58.17	169+33.33	169+87.07	73°51'11"	100.00'	75.15'	128.90'	
C18	C	169+87.07	170+26.26	170+65.30	8°57'50"	500.00'	39.19'	78.22'	
L16	C	170+65.30		171+37.42				72.12'	S68° 03' 57"W
C19	C	171+37.42	171+77.04	172+16.50	9°03'43"	500.00'	39.62'	79.08'	
L17	C	172+16.50		172+65.51				49.01'	S77° 07' 41"W
C20	C	172+65.51	173+67.46	173+69.47	132°21'52"	45.00'	101.94'	103.96'	
L18	C	173+69.47		174+96.27				126.80'	S55° 14' 11"E
C21	C	174+96.27	175+44.04	175+87.83	40°21'09"	130.00'	47.77'	91.56'	
C22	C	175+87.83	176+33.77	176+73.96	49°21'02"	100.00'	45.94'	86.13'	
C23	C	176+73.96	177+11.57	177+48.58	17°41'02"	241.75'	37.61'	74.61'	

0 20 40
SCALE IN FEET



KEY MAP



NTS

△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ
DRAWN BY: M. HENDRICKS-MATSUDA
APPROVED BY: P. HOLM
ISSUE DATE: AUGUST 2026
JOB No.: 25-000313
DRAWING FILE No.: 25-000313-C-AL-01

ALL DIMENSIONS SHOWN IN FEET UNLESS OTHERWISE DESIGNATED

PATRICK HOLM — STATE OF WASHINGTON — 49470 — REGISTERED PROFESSIONAL ENGINEER — PRELIMINARY

SCJ ALLIANCE
CONSULTING SERVICES
8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
P: 360.352.1465
SCJALLIANCE.COM

PROJECT NAME:

CITY OF TUMWATER

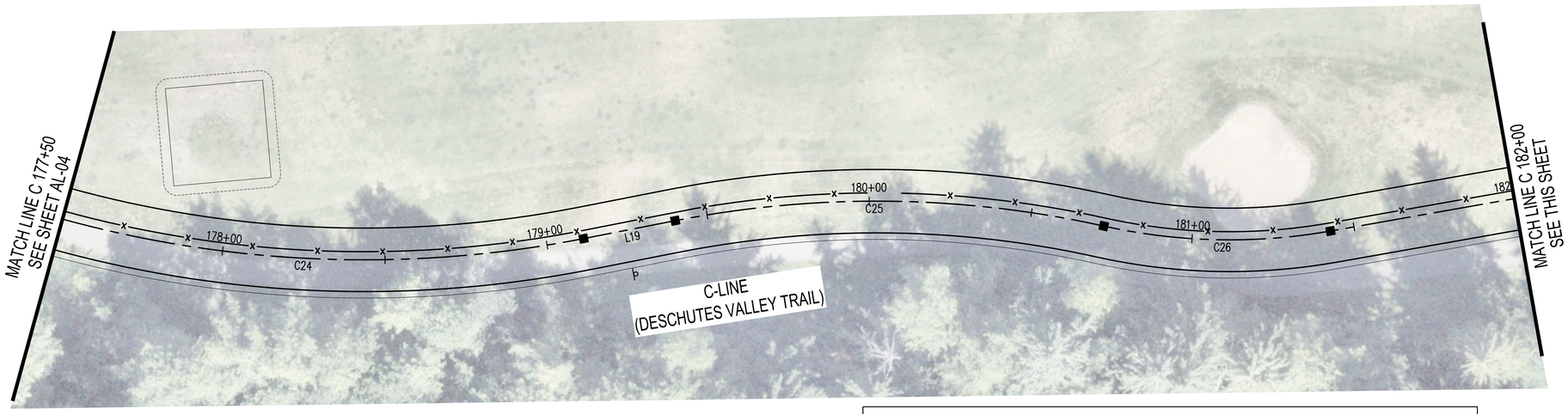
DESCHUTES VALLEY TRAIL
SEGMENT C

CONSTRUCTION ALIGNMENT PLAN
C 168+50 - C 177+50

DRAWING No.: AL-04

SHEET No.: 10 OF 148

Aug 20, 2026 12:53:39pm - User: audreyn@esassoc
N:\PROJECTS\0625 CITY OF TUMWATER\25-000313 TUMWATER DESCHUTES VALLEY TRAIL\CADD\25-000313-C-AL-01.DWG



VERTICAL DATUM
NGVD '29 BASED ON TIES TO GP34005-4T
ELEVATION = 98.15 FEET

BASIS OF BEARINGS AND COORDINATES BASED ON TIES TO THURSTON COUNTY MONUMENTS. DATUM IS NAD 1983/91, WASHINGTON SOUTH ZONE.

PROJECT COMBINED SCALE FACTOR: 0.999941675
PROJECT CONVERGENCE: -1°44'46"

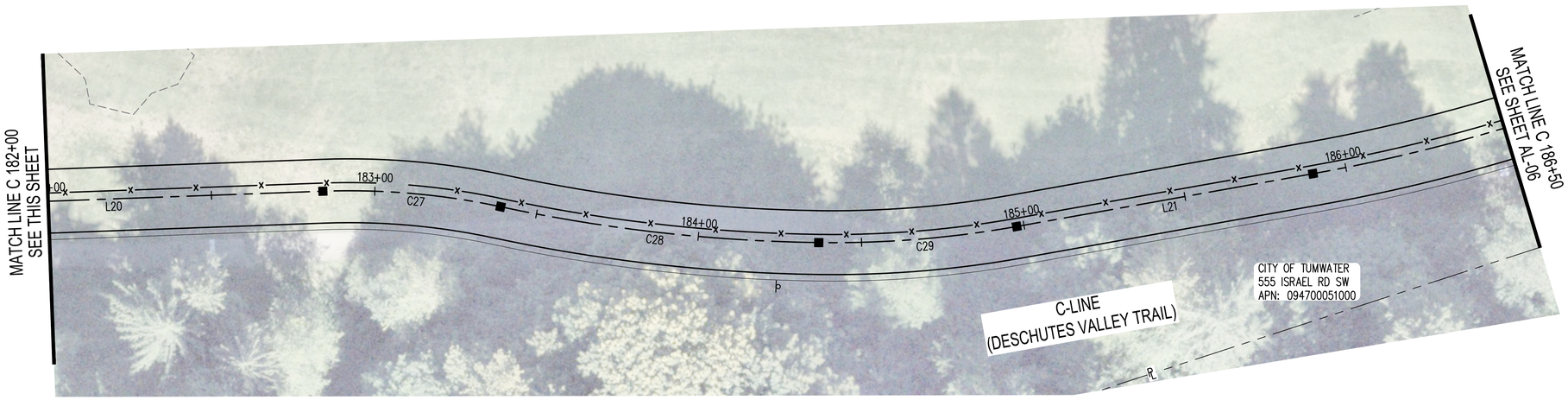
0 20 40
SCALE IN FEET

LEGEND

- RIGHT-OF-WAY
- PROPERTY LINE
- TRAIL CENTERLINE
- PC/PT/PCC/PRC OF TRAIL ALIGNMENT
- SURVEY NAIL
- BRASS CAP
- CONCRETE MONUMENT
- REBAR AND CONTROL CAP
- SURVEY HUB AND TACK
- MONUMENT IN CASE
- CONTROL POINT

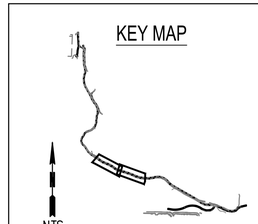
C-LINE, DESCHUTES VALLEY TRAIL

NUMBER	ALIGNMENT	PC STATION	PI STATION	PT STATION	DELTA	RADIUS	TANGENT	LENGTH	DIRECTION
C24	C	177+48.58	178+31.48	179+11.38	26°39'06"	350.00'	82.90'	162.81'	
L19	C	179+11.38		179+40.04				28.66'	S73° 12' 08"E
C25	C	179+40.04	180+07.27	180+72.59	23°36'14"	321.75'	67.23'	132.55'	
C26	C	180+72.59	181+08.09	181+42.67	22°31'37"	178.25'	35.50'	70.08'	
L20	C	181+42.67		182+84.11				141.43'	S72° 07' 31"E
C27	C	182+84.11	183+11.60	183+38.81	14°08'00"	221.75'	27.49'	54.70'	
C28	C	183+38.81	183+88.01	184+36.89	11°14'24"	500.00'	49.20'	98.09'	
C29	C	184+36.89	184+67.41	184+97.75	10°53'44"	320.00'	30.52'	60.85'	
L21	C	184+97.75		185+89.78				92.04'	S80° 07' 40"E



0 20 40
SCALE IN FEET

KEY MAP



NTS

△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ
DRAWN BY: M. HENDRICKS-MATSUDA
APPROVED BY: P. HOLM
ISSUE DATE: AUGUST 2026
JOB No.: 25-000313
DRAWING FILE No.: 25-000313-C-AL-04

ALL DIMENSIONS SHOWN IN FEET UNLESS OTHERWISE DESIGNATED

PRELIMINARY — PATRICK HOLM — STATE OF WASHINGTON — 49470 — REGISTERED PROFESSIONAL ENGINEER

SCJ ALLIANCE
CONSULTING SERVICES
8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
P: 360.352.1465
SCJALLIANCE.COM

PROJECT NAME:

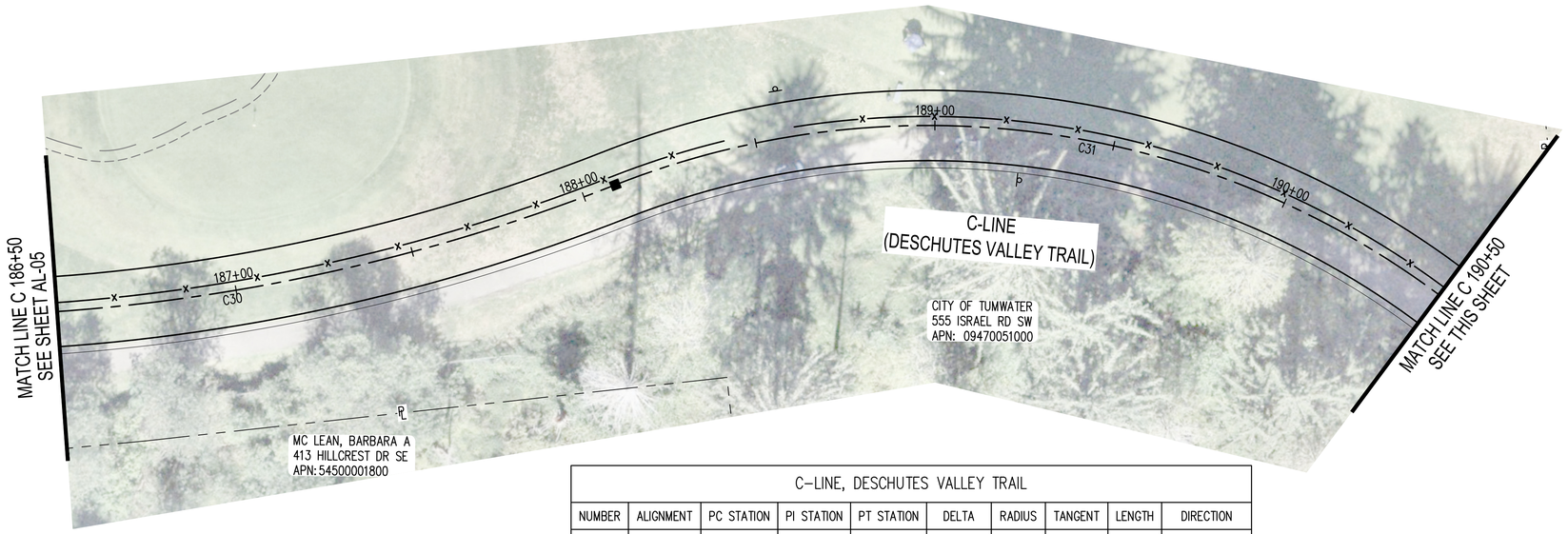
CITY OF TUMWATER

DESCHUTES VALLEY TRAIL
SEGMENT C

CONSTRUCTION ALIGNMENT PLAN
C 177+50 - C 186+50

DRAWING No.: AL-05
SHEET No.: 11 OF 148

Aug 20, 2026 12:52:19pm - User audrey.nielsen
N:\PROJECTS\0625 CITY OF TUMWATER\25-000313 TUMWATER DESCHUTES VALLEY TRAIL\CADD\25-000313-C-AL-04.DWG



C-LINE, DESCHUTES VALLEY TRAIL									
NUMBER	ALIGNMENT	PC STATION	PI STATION	PT STATION	DELTA	RADIUS	TANGENT	LENGTH	DIRECTION
C30	C	185+89.78	187+01.18	188+09.32	23°57'32"	525.00'	111.39'	219.53'	
C31	C	188+09.32	189+58.93	190+76.23	64°31'36"	237.00'	149.61'	266.91'	
C32	C	190+76.23	191+40.08	192+02.87	18°08'24"	400.00'	63.86'	126.64'	
L22	C	192+02.87		193+75.93				173.06'	S57° 42' 00"E
C33	C	193+75.93	193+92.17	194+08.39	3°43'09"	500.00'	16.23'	32.46'	

VERTICAL DATUM
NGVD '29 BASED ON TIES TO GP34005-4T
ELEVATION = 98.15 FEET

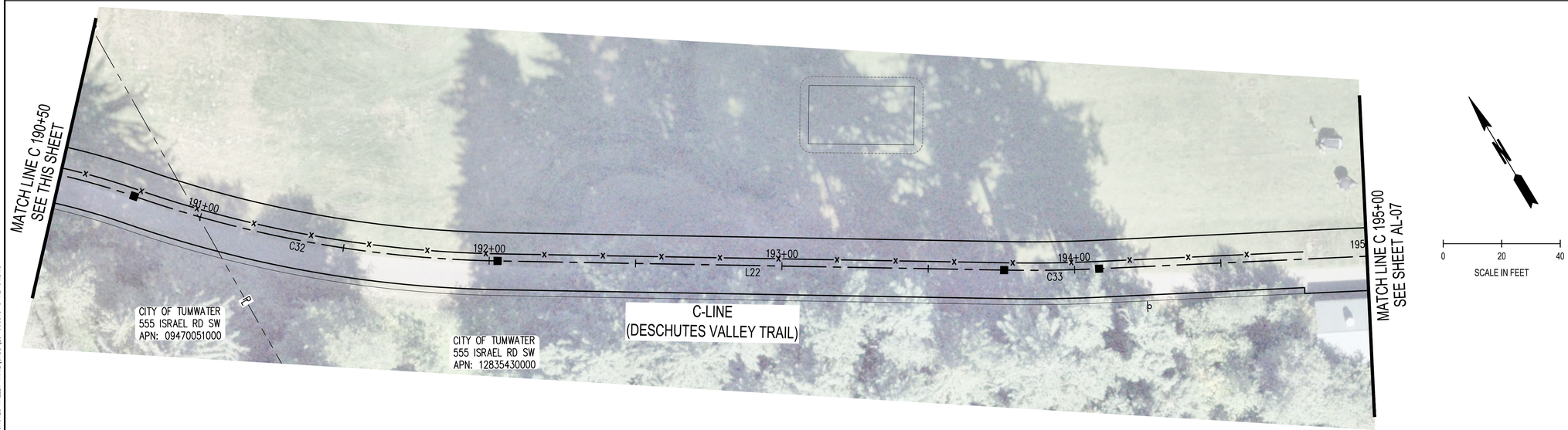
BASIS OF BEARINGS AND COORDINATES BASED ON TIES TO THURSTON COUNTY MONUMENTS. DATUM IS NAD 1983/91, WASHINGTON SOUTH ZONE.

PROJECT COMBINED SCALE FACTOR: 0.999941675
PROJECT CONVERGENCE: -1°44'46"

0 20 40
SCALE IN FEET

LEGEND

- RIGHT-OF-WAY
- PROPERTY LINE
- TRAIL CENTERLINE
- PC/PT/PCC/PRC OF TRAIL ALIGNMENT
- SURVEY NAIL
- BRASS CAP
- CONCRETE MONUMENT
- REBAR AND CONTROL CAP
- SURVEY HUB AND TACK
- MONUMENT IN CASE
- CONTROL POINT



0 20 40
SCALE IN FEET

KEY MAP

NTS

△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ
DRAWN BY: M. HENDRICKS-MATSUDA
APPROVED BY: P. HOLM
ISSUE DATE: AUGUST 2026
JOB No.: 25-000313
DRAWING FILE No.: 25-000313-C-AL-04

ALL DIMENSIONS SHOWN IN FEET UNLESS OTHERWISE DESIGNATED

PATRICK HOLM — STATE OF WASHINGTON — 49470 — REGISTERED PROFESSIONAL ENGINEER — PRELIMINARY

SCJ ALLIANCE
CONSULTING SERVICES
8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
P: 360.352.1465
SCJALLIANCE.COM

PROJECT NAME:

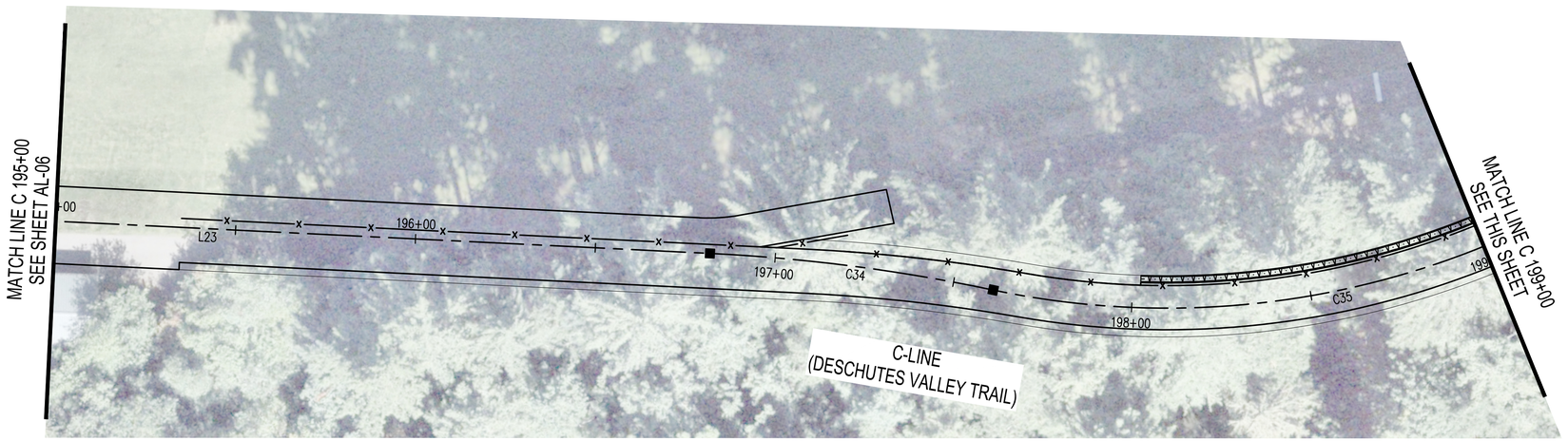
CITY OF TUMWATER

DESCHUTES VALLEY TRAIL
SEGMENT C

CONSTRUCTION ALIGNMENT PLAN
C 186+50 - C 195+00

DRAWING No.: AL-06
SHEET No.: 12 OF 148

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C-LINE, DESCHUTES VALLEY TRAIL									
NUMBER	ALIGNMENT	PC STATION	PI STATION	PT STATION	DELTA	RADIUS	TANGENT	LENGTH	DIRECTION
L23	C	194+08.39		196+81.85				273.46'	S61° 25' 08"E
C34	C	196+81.85	197+21.62	197+61.22	9°05'41"	500.00'	39.77'	79.37'	
C35	C	197+61.22	198+62.40	199+52.20	46°48'46"	233.75'	101.18'	190.98'	
C36	C	199+52.20	199+92.22	200+30.32	30°36'13"	146.25'	40.01'	78.12'	
L24	C	200+30.32		200+55.32				25.00'	S68° 32' 00"E

VERTICAL DATUM
NGVD '29 BASED ON TIES TO GP34005-4T
ELEVATION = 98.15 FEET

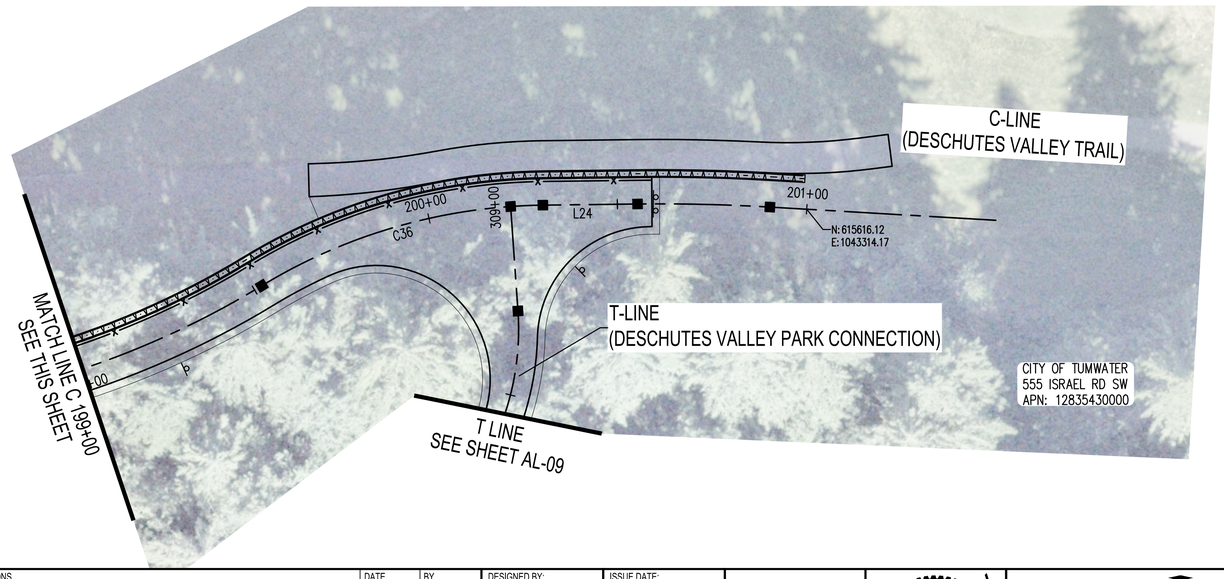
BASIS OF BEARINGS AND COORDINATES BASED ON TIES TO THURSTON COUNTY MONUMENTS. DATUM IS NAD 1983/91, WASHINGTON SOUTH ZONE.

PROJECT COMBINED SCALE FACTOR: 0.999941675
PROJECT CONVERGENCE: -1°44'46"

0 20 40
SCALE IN FEET

LEGEND

- RIGHT-OF-WAY
- PROPERTY LINE
- TRAIL CENTERLINE
- PC/PT/PCC/PRC OF TRAIL ALIGNMENT
- SURVEY NAIL
- BRASS CAP
- CONCRETE MONUMENT
- REBAR AND CONTROL CAP
- SURVEY HUB AND TACK
- MONUMENT IN CASE
- CONTROL POINT



0 20 40
SCALE IN FEET

KEY MAP

NTS

△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ
DRAWN BY: M. HENDRICKS-MATSUDA
APPROVED BY: P. HOLM
ISSUE DATE: AUGUST 2026
JOB No.: 25-000313
DRAWING FILE No.: 25-000313-C-AL-04

ALL DIMENSIONS SHOWN IN FEET UNLESS OTHERWISE DESIGNATED

PATRICK HOLM — STATE OF WASHINGTON — 49470 — REGISTERED PROFESSIONAL ENGINEER
PRELIMINARY

SCJ ALLIANCE
CONSULTING SERVICES
8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
P: 360.352.1465
SCJALLIANCE.COM

PROJECT NAME:

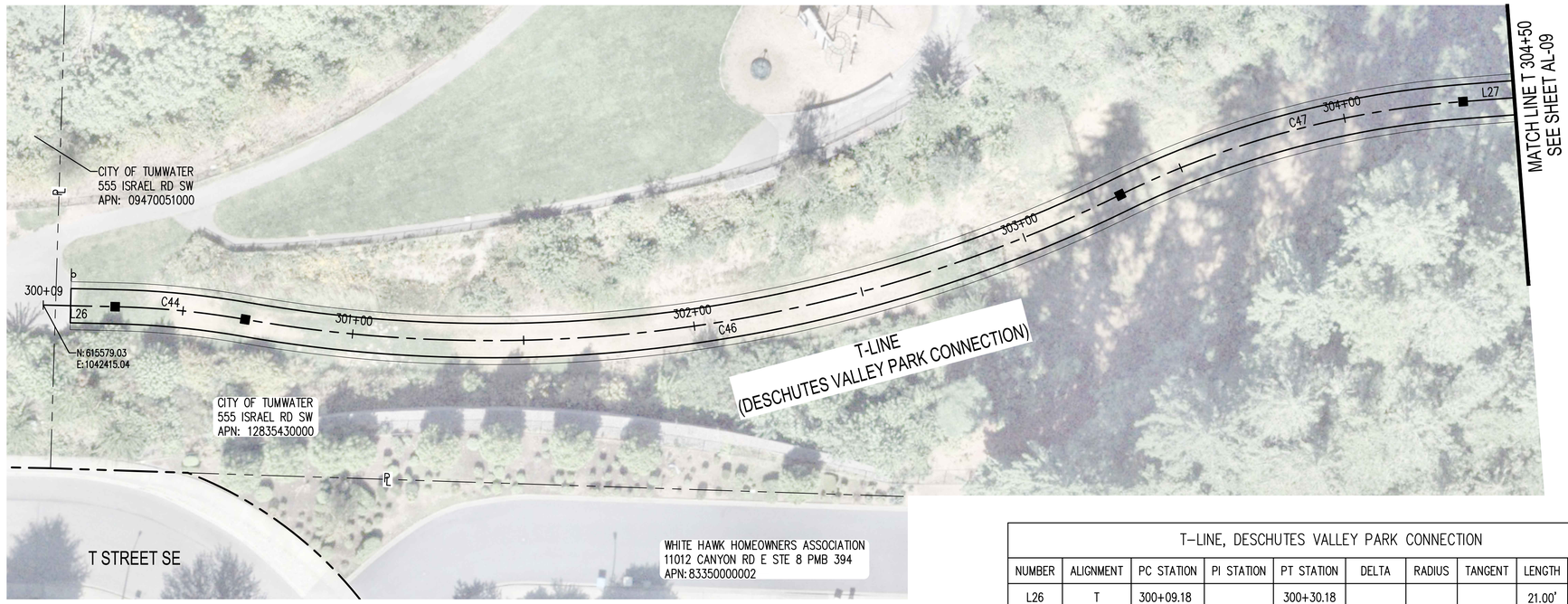
CITY OF TUMWATER

DESCHUTES VALLEY TRAIL
SEGMENT C

CONSTRUCTION ALIGNMENT PLAN
C 195+00 - C 201+50

DRAWING No.: AL-07
SHEET No.: 13 OF 148

Aug 20, 2026 12:45:26pm - User: audreyn.nielsen
N:\PROJECTS\0625 CITY OF TUMWATER\25-000313 TUMWATER DESCHUTES VALLEY TRAIL\CADD\25-000313-C-AL-04.DWG



VERTICAL DATUM
NGVD '29 BASED ON TIES TO GP34005-4T
ELEVATION = 98.15 FEET

BASIS OF BEARINGS AND COORDINATES BASED ON TIES TO THURSTON COUNTY MONUMENTS. DATUM IS NAD 1983/91, WASHINGTON SOUTH ZONE.

PROJECT COMBINED SCALE FACTOR: 0.999941675
PROJECT CONVERGENCE: -1°44'46"

N

0 20 40
SCALE IN FEET

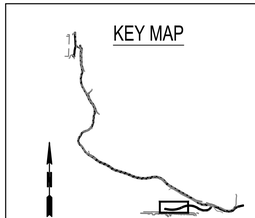
LEGEND

- RIGHT-OF-WAY
- PROPERTY LINE
- TRAIL CENTERLINE
- PC/PT/PCC/PRC OF TRAIL ALIGNMENT
- SURVEY NAIL
- BRASS CAP
- CONCRETE MONUMENT
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- CONTROL POINT

T-LINE, DESCHUTES VALLEY PARK CONNECTION

NUMBER	ALIGNMENT	PC STATION	PI STATION	PT STATION	DELTA	RADIUS	TANGENT	LENGTH	DIRECTION
L26	T	300+09.18		300+30.18				21.00'	S88° 42' 06"E
C44	T	300+30.18	300+49.30	300+68.35	8°34'34"	255.00'	19.12'	38.17'	
C46	T	300+68.35	302+03.98	303+30.66	35°57'19"	418.00'	135.64'	262.31'	
C47	T	303+30.66	303+83.46	304+35.00	21°44'17"	275.00'	52.80'	104.33'	
L27	T	304+35.00		304+53.12				18.12'	N85° 39' 26"E

KEY MAP



NTS

△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ
DRAWN BY: M. HENDRICKS-MATSUDA
APPROVED BY: P. HOLM
ISSUE DATE: AUGUST 2026
JOB No.: 25-000313
DRAWING FILE No.: 25-000313-C-AL-07

ALL DIMENSIONS SHOWN IN FEET UNLESS OTHERWISE DESIGNATED

PATRICK HOLM — STATE OF WASHINGTON — 49470 — REGISTERED PROFESSIONAL ENGINEER — PRELIMINARY

SCJ ALLIANCE
CONSULTING SERVICES
8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
P: 360.352.1465
SCJALLIANCE.COM

PROJECT NAME:

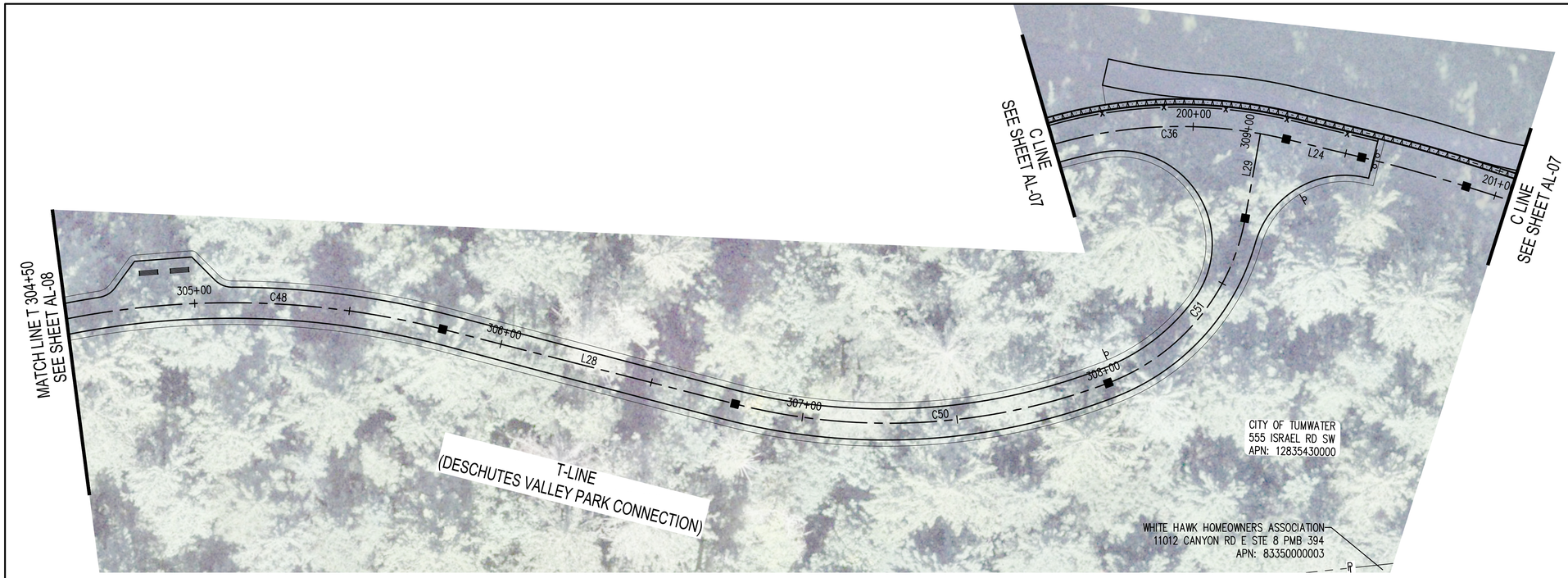
CITY OF TUMWATER

DESCHUTES VALLEY TRAIL
SEGMENT C

CONSTRUCTION ALIGNMENT PLAN
T 300+00 - T 304+50

DRAWING No.: AL-08
SHEET No.: 14 OF 148

Aug 20, 2026 1:34:01pm - User audreyvielsen
N:\PROJECTS\0625 CITY OF TUMWATER\25-000313 TUMWATER DESCHUTES VALLEY TRAIL\CAD\25-000313-C-AL-07.DWG



VERTICAL DATUM
NGVD '29 BASED ON TIES TO GP34005-4T
ELEVATION = 98.15 FEET

BASIS OF BEARINGS AND COORDINATES BASED ON TIES TO THURSTON COUNTY MONUMENTS. DATUM IS NAD 1983/91, WASHINGTON SOUTH ZONE.

PROJECT COMBINED SCALE FACTOR: 0.999941675
PROJECT CONVERGENCE: -1°44'46"

0 20 40
SCALE IN FEET

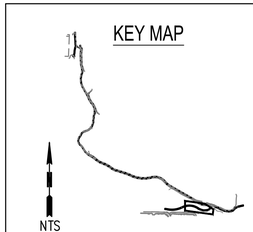
LEGEND

- RIGHT-OF-WAY
- PROPERTY LINE
- TRAIL CENTERLINE
- PC/PT/PCC/PRC OF TRAIL ALIGNMENT
- SURVEY NAIL
- BRASS CAP
- CONCRETE MONUMENT
- REBAR AND CONTROL CAP
- SURVEY HUB AND TACK
- MONUMENT IN CASE
- CONTROL POINT

T-LINE, DESCHUTES VALLEY PARK CONNECTION

NUMBER	ALIGNMENT	PC STATION	PI STATION	PT STATION	DELTA	RADIUS	TANGENT	LENGTH	DIRECTION
C48	T	304+53.12	305+18.04	305+80.63	26°34'01"	275.00'	64.92'	127.51'	
L28	T	305+80.63		306+77.86				97.23'	S67° 46' 33"E
C50	T	306+77.86	307+41.02	308+00.22	35°03'11"	200.00'	63.16'	122.36'	
C51	T	308+00.22	308+39.85	308+72.35	59°02'31"	70.00'	39.64'	72.13'	
L29	T	308+72.35		309+00.00				27.65'	N18° 07' 46"E

KEY MAP



△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ
DRAWN BY: M. HENDRICKS-MATSUDA
APPROVED BY: P. HOLM
ISSUE DATE: AUGUST 2026
JOB No.: 25-000313
DRAWING FILE No.: 25-000313-C-AL-07

ALL DIMENSIONS SHOWN IN FEET UNLESS OTHERWISE DESIGNATED

PATRICK HOLM — STATE OF WASHINGTON — 49670 — REGISTERED PROFESSIONAL ENGINEER
PRELIMINARY

SCJ ALLIANCE
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8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
P: 360.352.1465
SCJALLIANCE.COM

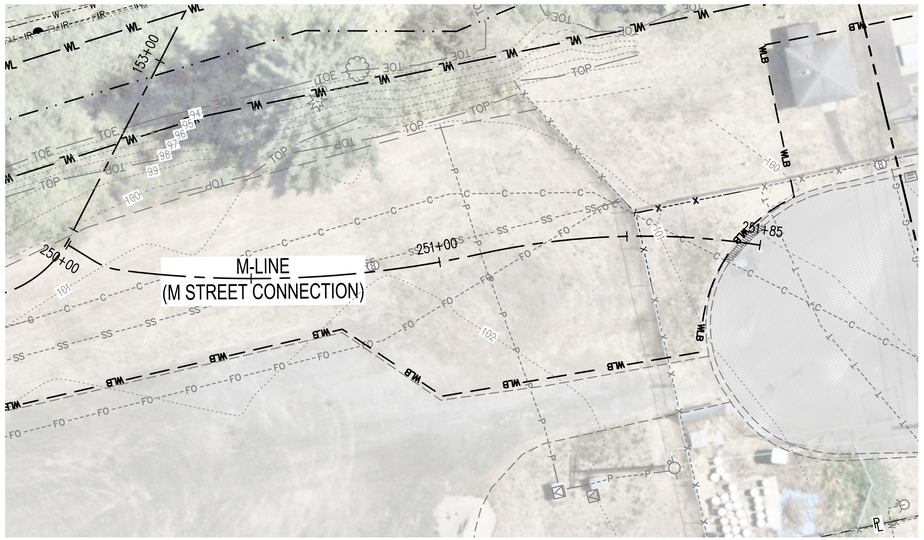
PROJECT NAME:
CITY OF TUMWATER

DESCHUTES VALLEY TRAIL
SEGMENT C

CONSTRUCTION ALIGNMENT PLAN
T 304+50 - T 309+05

DRAWING No.: AL-09
SHEET No.: 15 OF 148

Aug 20, 2026 12:58:02pm - User: audrey.nielsen
N:\PROJECTS\625 CITY OF TUMWATER\25-000313 TUMWATER DESCHUTES VALLEY TRAIL\CADD\25-000313-C-AL-07.DWG





N

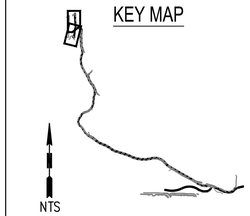
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SCALE IN FEET

EXISTING LEGEND

- RIGHT-OF-WAY (R/W)
- PROPERTY LINE
- TRAIL CENTERLINE
- EXISTING CONTOUR MAJOR
- EXISTING CONTOUR MINOR
- EXISTING CART PATH
- EXISTING DIRT PATH
- EXISTING TEE BOX & FAIRWAY
- EXISTING VEGETATION LINE
- DEMO TURF LINE
- EXISTING FENCE
- EXISTING BUILDING
- EXISTING FLOOD ELEVATION LINE
- EXISTING WATER LINE
- DEMO WATER LINE
- EXISTING IRRIGATION LINE
- DEMO IRRIGATION LINE
- EXISTING SANITARY SEWER
- EXISTING FORCEMAIN
- EXISTING STORM SEWER
- EXISTING UNDERGROUND POWER
- WETLAND
- WETLAND BOUNDARY
- GROUND TOP
- GROUND TOE
- RETAINING WALL
- EXISTING SPRINKLERS
- EXISTING CATCH BASIN TYPE 1
- EXISTING WATER VALVE
- EXISTING TREES

KEY MAP



NTS

△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ	ISSUE DATE: AUGUST 2026
DRAWN BY: M. HENDRICKS-MATSUDA	JOB No.: 25-000313
APPROVED BY: P. HOLM	DRAWING FILE No.: 25-000313-C-EC-00

ALL DIMENSIONS SHOWN IN FEET UNLESS OTHERWISE DESIGNATED

PATRICK HOLM — STATE OF WASHINGTON — 19970 — REGISTERED PROFESSIONAL ENGINEER

PRELIMINARY

SCJ ALLIANCE
CONSULTING SERVICES
8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
P: 360.352.1465
SCJALLIANCE.COM

PROJECT NAME:

CITY OF TUMWATER

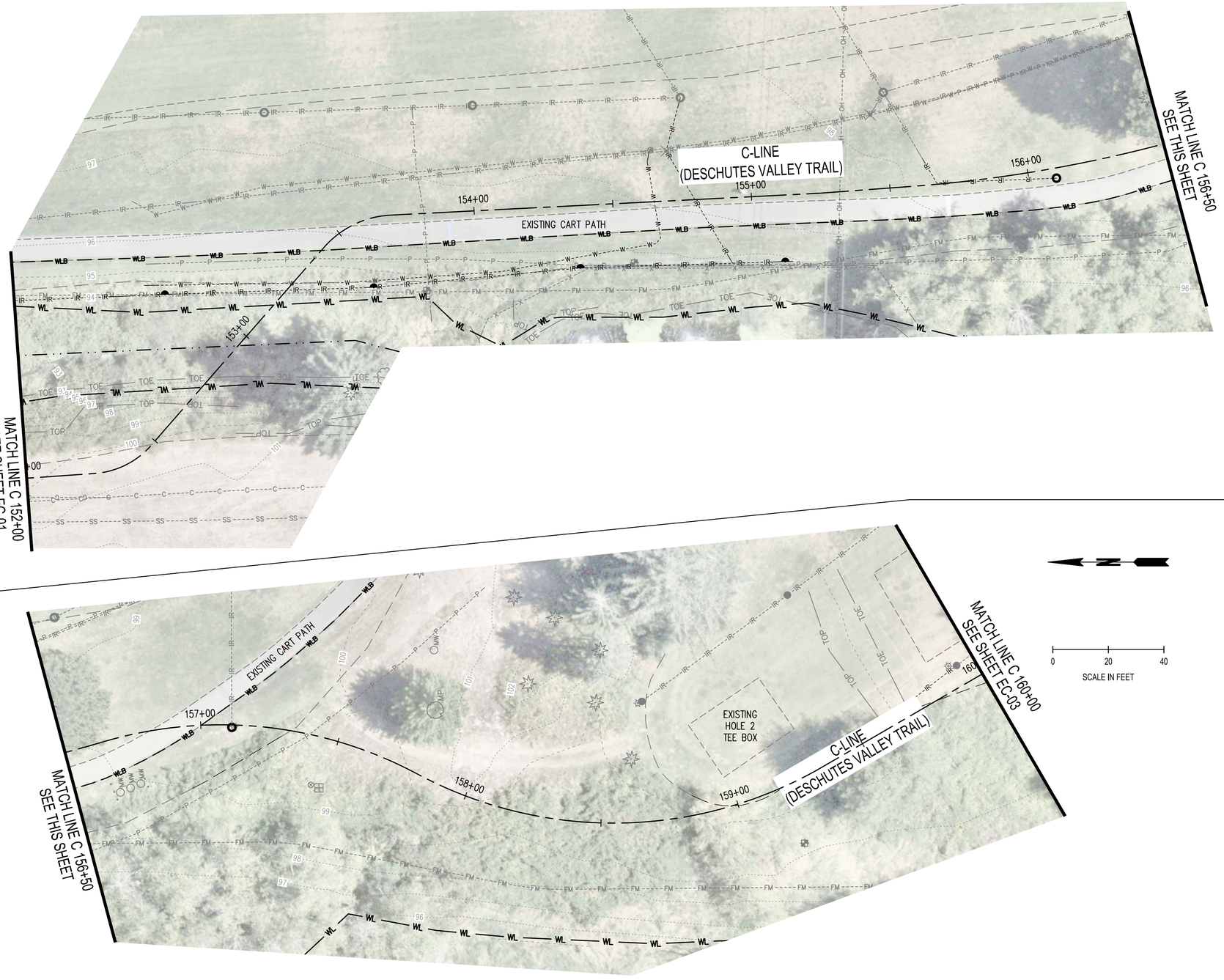
DESCHUTES VALLEY TRAIL
SEGMENT C

EXISTING CONDITIONS
C 150+00 - C 152+00 & M 250+00 - M 251+92

DRAWING No.: EC-01

SHEET No.: 16 OF 148

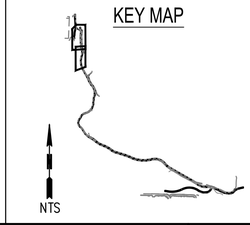
Aug 20, 2026 12:49:30pm - User: aufreynielsen
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EXISTING LEGEND

- RIGHT-OF-WAY (R/W)
- PROPERTY LINE
- TRAIL CENTERLINE
- EXISTING CONTOUR MAJOR
- EXISTING CONTOUR MINOR
- EXISTING CART PATH
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- GROUND TOE
- RETAINING WALL
- EXISTING SPRINKLERS
- EXISTING CATCH BASIN TYPE 1
- EXISTING WATER VALVE
- EXISTING TREES

KEY MAP



NTS

△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ
DRAWN BY: M. WOLFF
APPROVED BY: P. HOLM
ISSUE DATE: AUGUST 2026
JOB No.: 25-000313
DRAWING FILE No.: 25-000313-C-EC-01

ALL DIMENSIONS SHOWN IN FEET UNLESS OTHERWISE DESIGNATED

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PRELIMINARY

SCJ ALLIANCE
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8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
P: 360.352.1465
SCJALLIANCE.COM

PROJECT NAME:

CITY OF TUMWATER

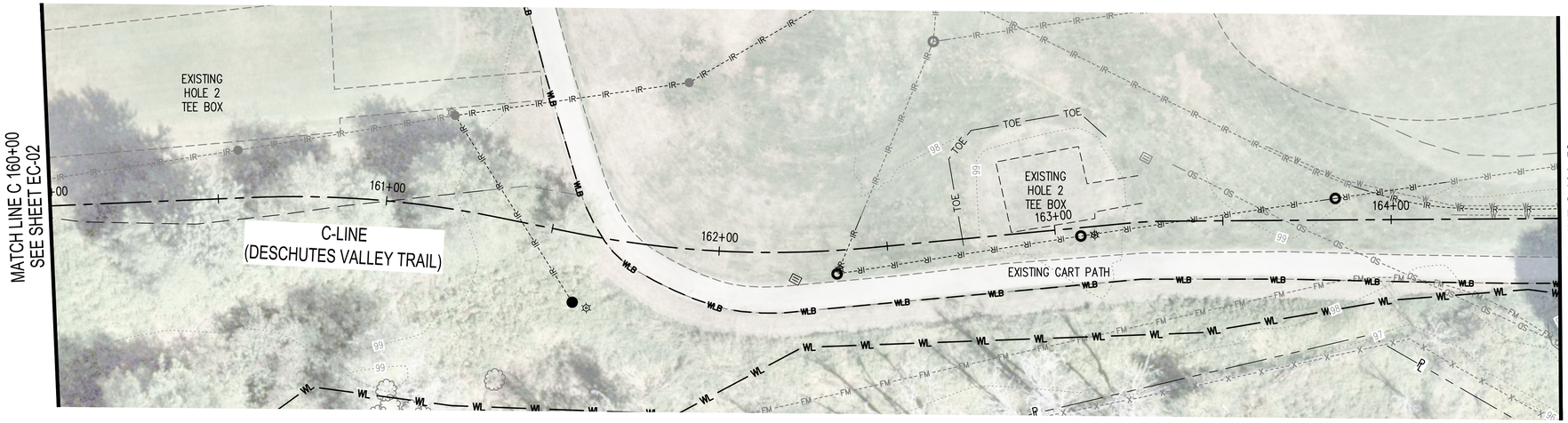
DESCHUTES VALLEY TRAIL
SEGMENT C

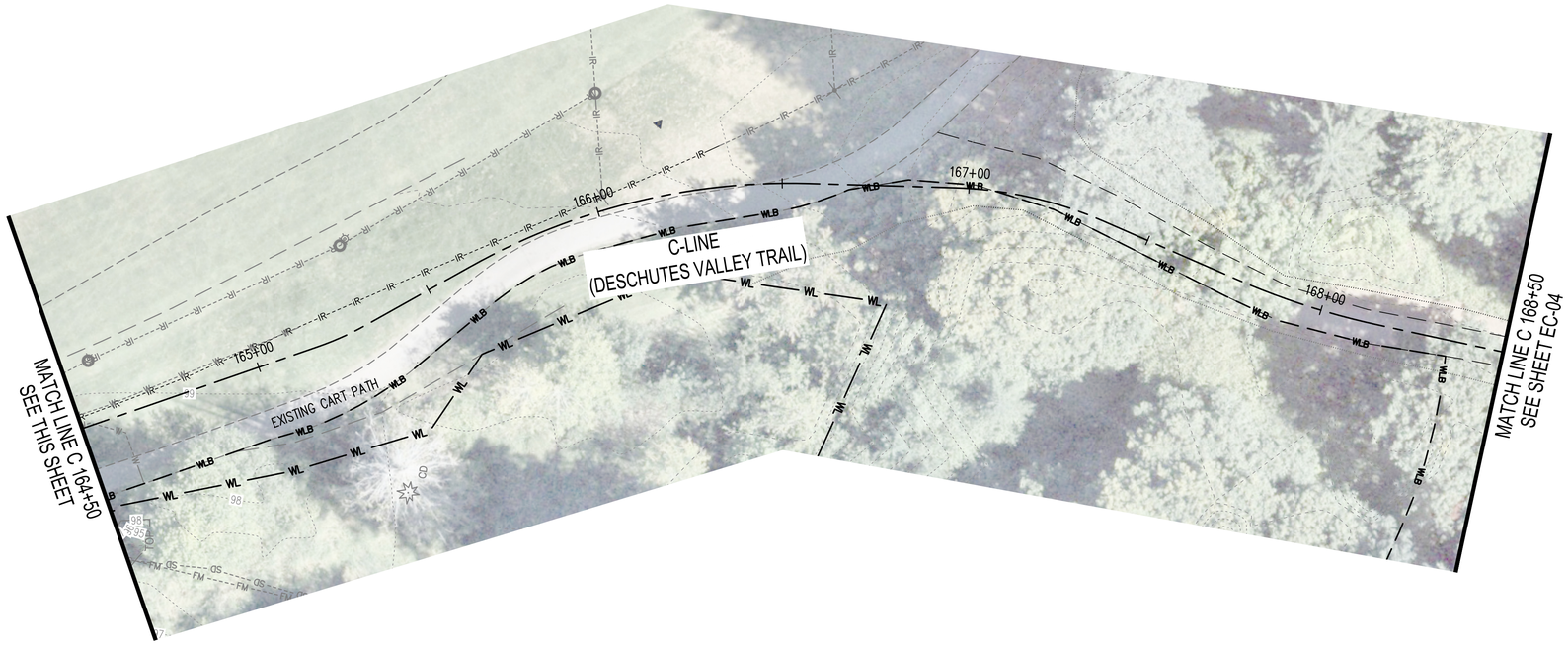
EXISTING CONDITIONS
C 152+00 - C 160+00

DRAWING No.: EC-02

SHEET No.: 17 OF 148

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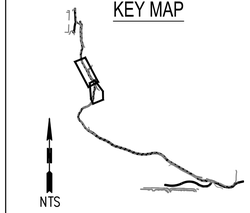
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SCALE IN FEET

EXISTING LEGEND

- RIGHT-OF-WAY (R/W)
- PROPERTY LINE
- TRAIL CENTERLINE
- EXISTING CONTOUR MAJOR
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- RETAINING WALL
- EXISTING SPRINKLERS
- EXISTING CATCH BASIN TYPE 1
- EXISTING WATER VALVE
- EXISTING TREES

0 20 40
SCALE IN FEET

KEY MAP



NTS

△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ
DRAWN BY: M. WOLFF
APPROVED BY: P. HOLM
ISSUE DATE: AUGUST 2026
JOB No.: 25-000313
DRAWING FILE No.: 25-000313-C-EC-02

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8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
P: 360.352.1465
SCJALLIANCE.COM

PROJECT NAME:

CITY OF TUMWATER

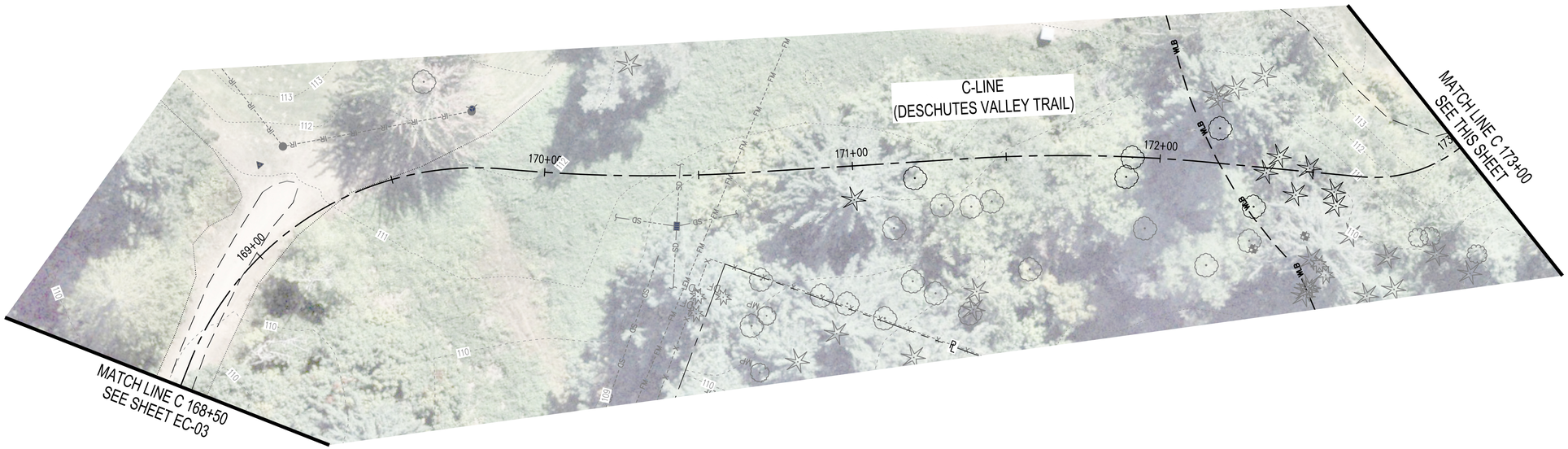
DESCHUTES VALLEY TRAIL
SEGMENT C

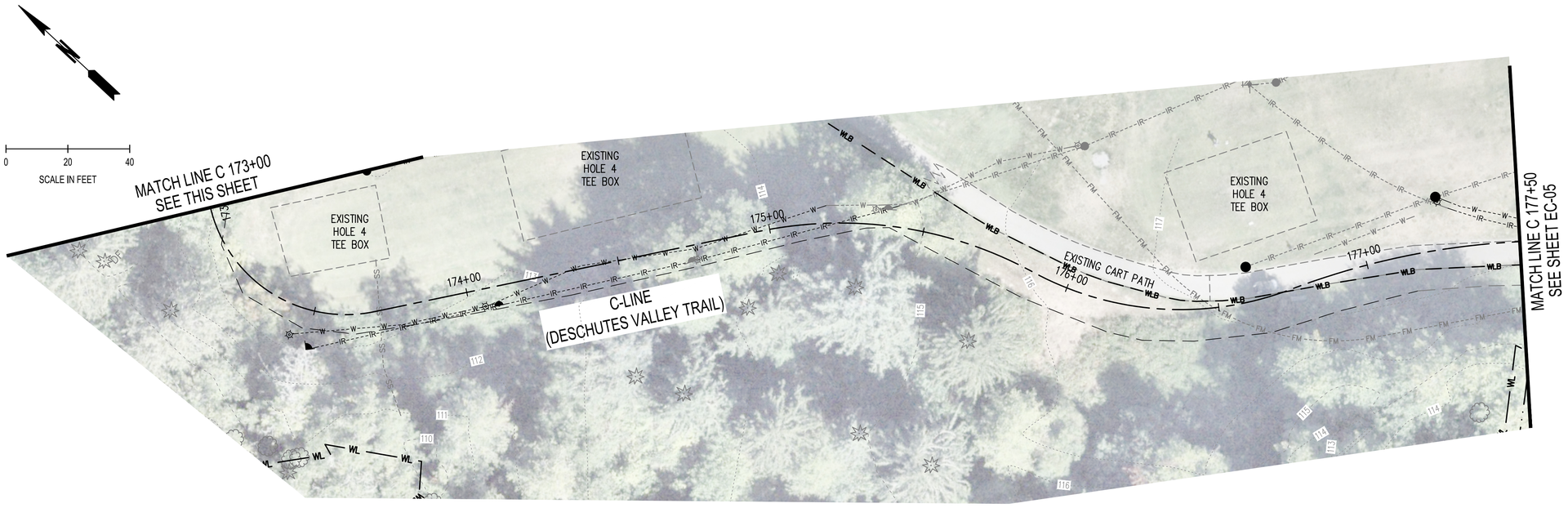
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C 160+00 - C 168+50

DRAWING No.: EC-03

SHEET No.: 18 OF 148

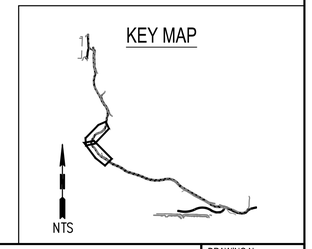
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EXISTING LEGEND

- RIGHT-OF-WAY (R/W)
- PROPERTY LINE
- TRAIL CENTERLINE
- EXISTING CONTOUR MAJOR
- EXISTING CONTOUR MINOR
- EXISTING CART PATH
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- RETAINING WALL
- EXISTING SPRINKLERS
- EXISTING CATCH BASIN TYPE 1
- EXISTING WATER VALVE
- EXISTING TREES



△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ
DRAWN BY: M. WOLFF
APPROVED BY: P. HOLM
ISSUE DATE: AUGUST 2026
JOB No.: 25-000313
DRAWING FILE No.: 25-000313-C-EC-03

ALL DIMENSIONS SHOWN IN FEET UNLESS OTHERWISE DESIGNATED

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SCJ ALLIANCE
CONSULTING SERVICES
8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
P: 360.352.1465
SCJALLIANCE.COM

PROJECT NAME:

CITY OF TUMWATER

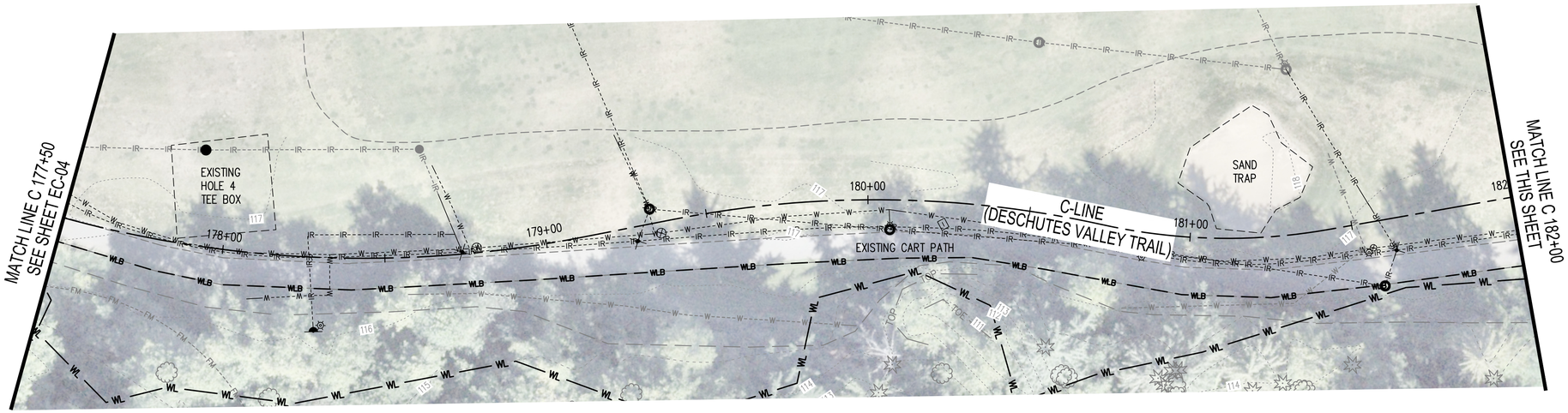
DESCHUTES VALLEY TRAIL
SEGMENT C

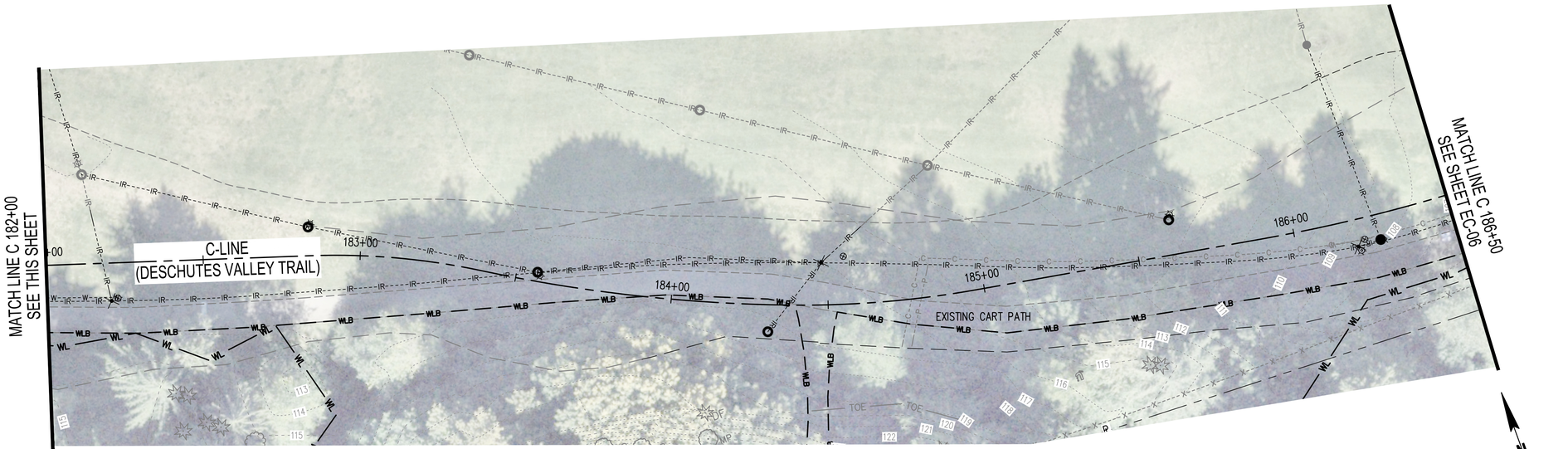
EXISTING CONDITIONS
C 168+50 - C 177+50

DRAWING No.: EC-04

SHEET No.: 19 OF 148

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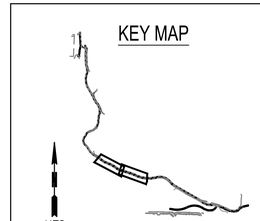


0 20 40
SCALE IN FEET

EXISTING LEGEND

- RIGHT-OF-WAY (R/W)
- PROPERTY LINE
- TRAIL CENTERLINE
- EXISTING CONTOUR MAJOR
- EXISTING CONTOUR MINOR
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- GROUND TOP
- GROUND TOE
- RETAINING WALL
- EXISTING SPRINKLERS
- EXISTING CATCH BASIN TYPE 1
- EXISTING WATER VALVE
- EXISTING TREES

KEY MAP



NTS

△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ
DRAWN BY: M. WOLFF
APPROVED BY: P. HOLM
ISSUE DATE: AUGUST 2026
JOB No.: 25-000313
DRAWING FILE No.: 25-000313-C-EC-04

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CONSULTING SERVICES
8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
P: 360.352.1465
SCJALLIANCE.COM

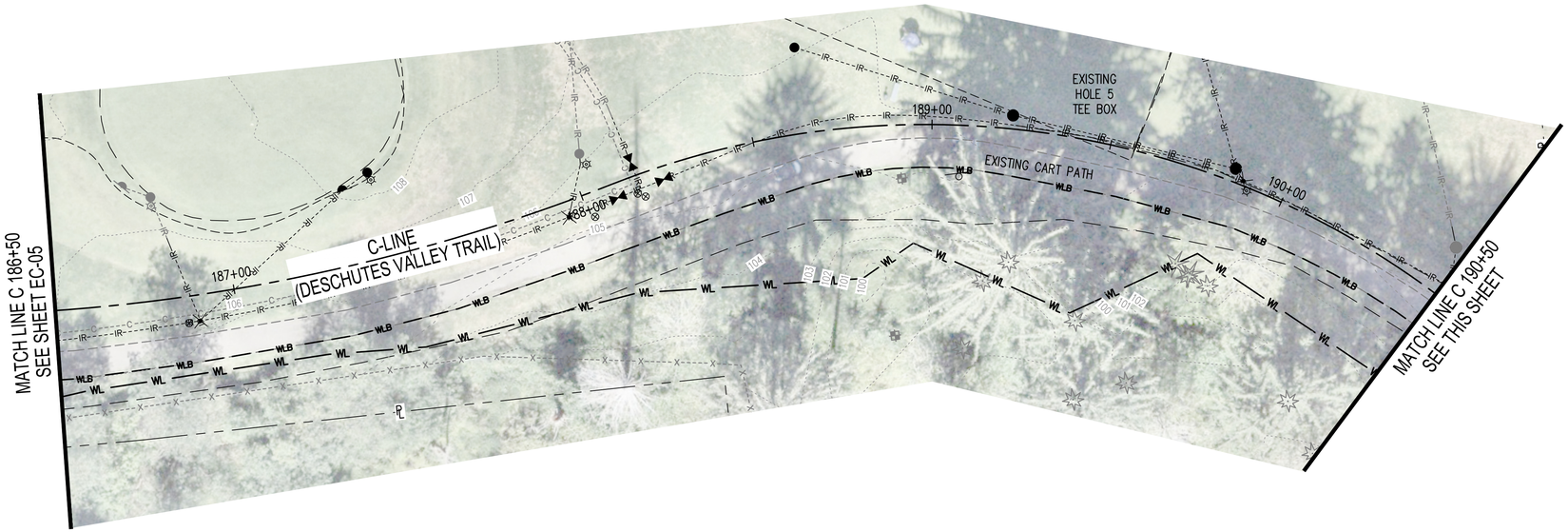
PROJECT NAME:
CITY OF TUMWATER

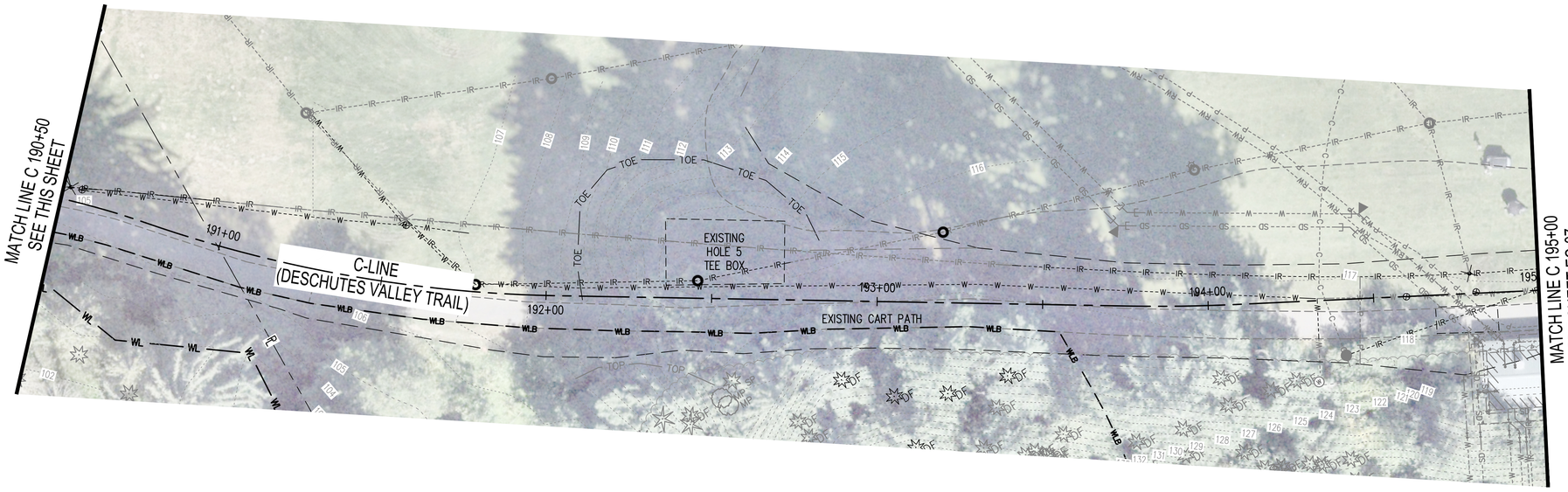
DESCHUTES VALLEY TRAIL
SEGMENT C

EXISTING CONDITIONS
C 177+50 - C 186+50

DRAWING No.: EC-05
SHEET No.: 20 OF 148

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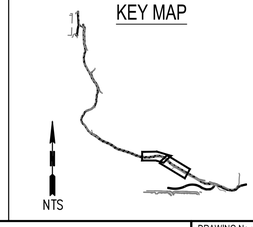
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SCALE IN FEET

EXISTING LEGEND

- RIGHT-OF-WAY (R/W)
- PROPERTY LINE
- TRAIL CENTERLINE
- EXISTING CONTOUR MAJOR
- EXISTING CONTOUR MINOR
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- EXISTING SPRINKLERS
- EXISTING CATCH BASIN TYPE 1
- EXISTING WATER VALVE
- EXISTING TREES

0 20 40
SCALE IN FEET

KEY MAP



NTS

△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ
DRAWN BY: M. WOLFF
APPROVED BY: P. HOLM
ISSUE DATE: AUGUST 2026
JOB No.: 25-000313
DRAWING FILE No.: 25-000313-C-EC-05

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PRELIMINARY

SCJ ALLIANCE
CONSULTING SERVICES
8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
P: 360.352.1465
SCJALLIANCE.COM

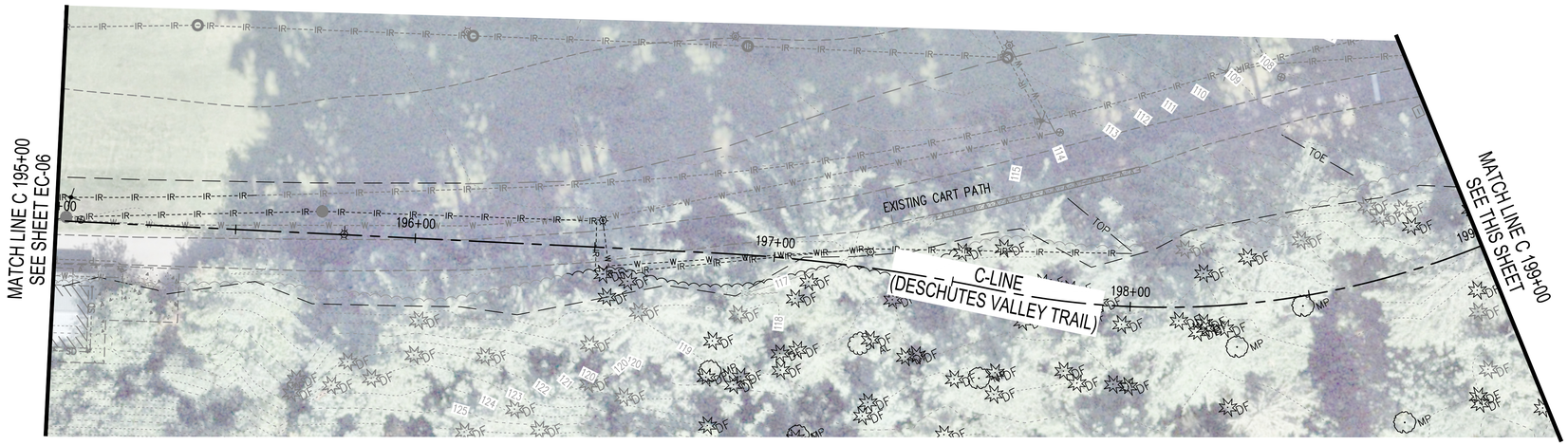
PROJECT NAME:
CITY OF TUMWATER

DESCHUTES VALLEY TRAIL SEGMENT C

EXISTING CONDITIONS C 186+50 - C 195+00

DRAWING No.: EC-06
SHEET No.: 21 OF 148

Aug 20, 2026 1:42:12pm - User: audreyn@scjalliance.
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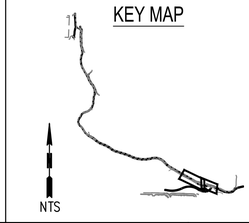
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SCALE IN FEET

EXISTING LEGEND

- RIGHT-OF-WAY (R/W)
- PROPERTY LINE
- TRAIL CENTERLINE
- EXISTING CONTOUR MAJOR
- EXISTING CONTOUR MINOR
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- EXISTING SPRINKLERS
- EXISTING CATCH BASIN TYPE 1
- EXISTING WATER VALVE
- EXISTING TREES

0 20 40
SCALE IN FEET

KEY MAP



△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ
DRAWN BY: M. WOLFF
APPROVED BY: P. HOLM
ISSUE DATE: AUGUST 2026
JOB No.: 25-000313
DRAWING FILE No.: 25-000313-C-EC-06

ALL DIMENSIONS SHOWN IN FEET UNLESS OTHERWISE DESIGNATED

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PRELIMINARY

SCJ ALLIANCE
CONSULTING SERVICES
8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
P: 360.352.1465
SCJALLIANCE.COM

PROJECT NAME:
CITY OF TUMWATER

DESCHUTES VALLEY TRAIL
SEGMENT C

EXISTING CONDITIONS
C 195+00 - C 202+00

DRAWING No.: EC-07
SHEET No.: 22 OF 148

Aug 20, 2026 1:28:44pm – User: aufreyrieken
N:\PROJECTS\0625 CITY OF TUMWATER\25-000313 TUMWATER DESCHUTES VALLEY TRAIL\CADD\25-000313-C-EC-06.DWG



N

0 20 40

SCALE IN FEET

EXISTING LEGEND

- RIGHT-OF-WAY (R/W)
- PROPERTY LINE
- TRAIL CENTERLINE
- EXISTING CONTOUR MAJOR
- EXISTING CONTOUR MINOR
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- EXISTING SPRINKLERS
- EXISTING CATCH BASIN TYPE 1
- EXISTING WATER VALVE
- EXISTING TREES

KEY MAP

NTS

△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ
ISSUE DATE: AUGUST 2026
DRAWN BY: M. WOLFF
JOB No.: 25-000313
APPROVED BY: P. HOLM
DRAWING FILE No.: 25-000313-C-EC-08

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8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
P: 360.352.1465
SCJALLIANCE.COM

PROJECT NAME:

CITY OF TUMWATER

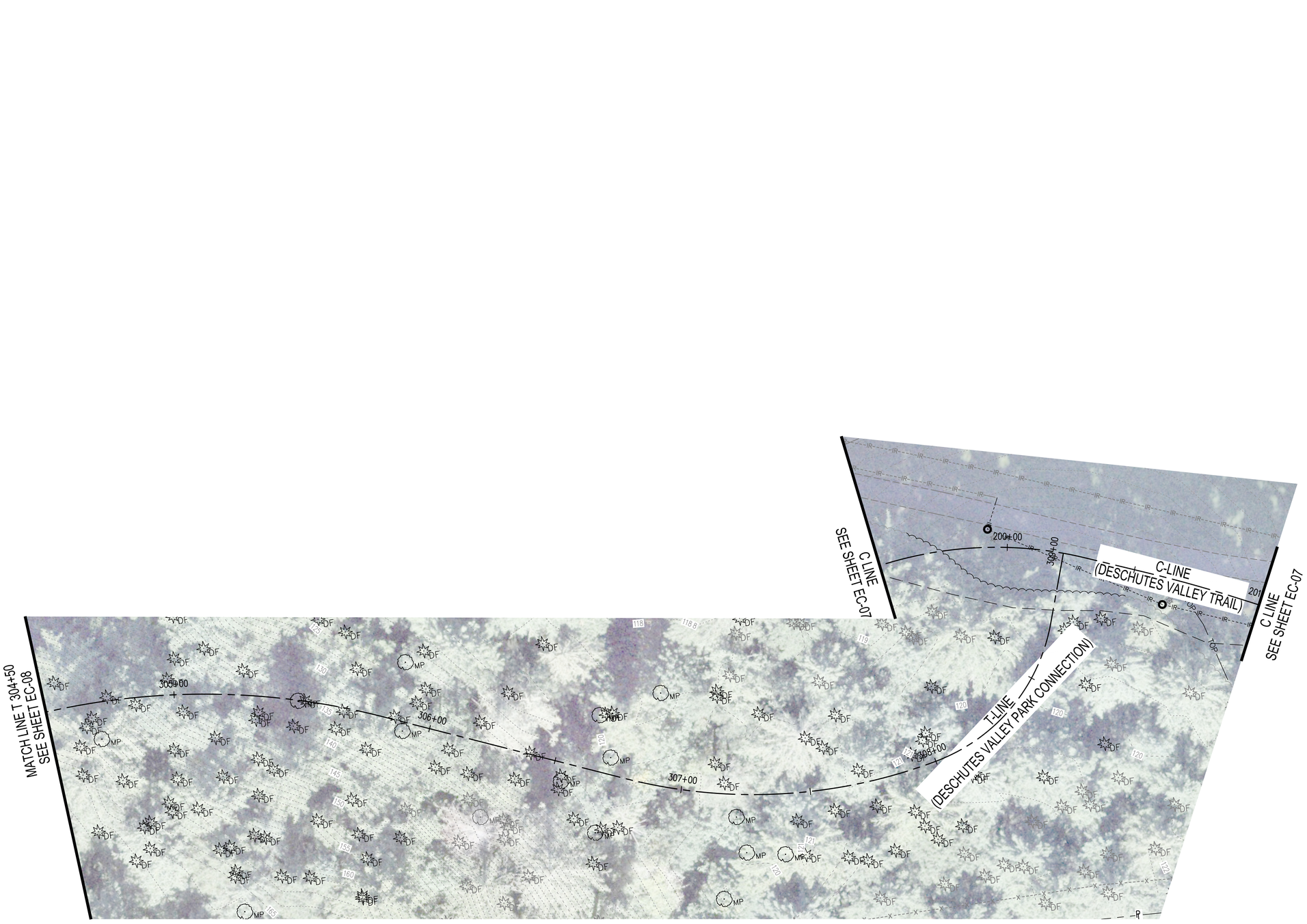
DESCHUTES VALLEY TRAIL
SEGMENT C

EXISTING CONDITIONS
T 300+00 - T 304+50

DRAWING No.: EC-08

SHEET No.: 23 OF 148

Aug 20, 2026 1:45:05pm – User: aufreyriedsen
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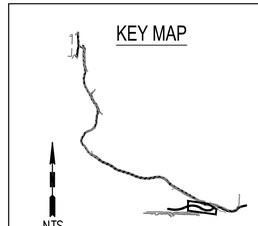
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SCALE IN FEET

EXISTING LEGEND

- RIGHT-OF-WAY (R/W)
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- TRAIL CENTERLINE
- EXISTING CONTOUR MAJOR
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- RETAINING WALL
- EXISTING SPRINKLERS
- EXISTING CATCH BASIN TYPE 1
- EXISTING WATER VALVE
- EXISTING TREES

KEY MAP



NTS

△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ
ISSUE DATE: AUGUST 2026
DRAWN BY: M. WOLFF
JOB No.: 25-000313
APPROVED BY: P. HOLM
DRAWING FILE No.: 25-000313-C-EC-09

ALL DIMENSIONS SHOWN IN FEET UNLESS OTHERWISE DESIGNATED

PATRICK HOLM — STATE OF WASHINGTON — 19870 — REGISTERED PROFESSIONAL ENGINEER — PRELIMINARY

SCJ ALLIANCE
CONSULTING SERVICES
8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
P: 360.352.1465
SCJALLIANCE.COM

PROJECT NAME:

CITY OF TUMWATER

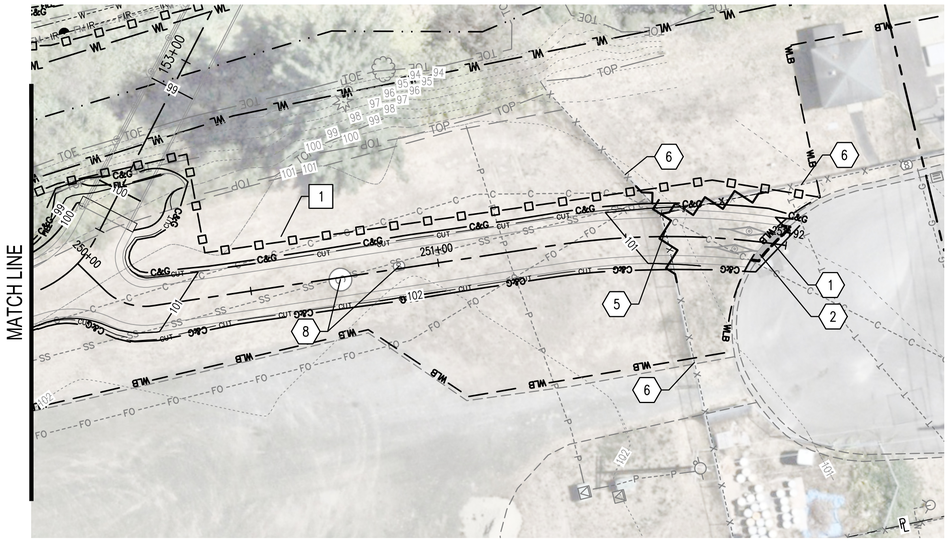
DESCHUTES VALLEY TRAIL
SEGMENT C

EXISTING CONDITIONS
T 304+50 - T 309+05

DRAWING No.: EC-09

SHEET No.: 24 OF 148

Aug 20, 2026 1:26:37pm - User: aufreyrichelson
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0 20 40
SCALE IN FEET

LEGEND

- INLET PROTECTION
- REMOVE TREE WITH ROOT WAD & DISPOSE OFFSITE (PAID FOR AS CLEARING AND GRUBBING)
- HIGH VISIBILITY SILT FENCE
- COIR LOG
- TREE PROTECTION FENCING
- TEMPORARY CONSTRUCTION FENCING
- CUT LINE
- FILL LINE
- CLEAR AND GRUB LIMIT
- EXISTING CONTOUR MAJOR
- EXISTING CONTOUR MINOR
- SHORELINE
- SAWCUT (TYP)
- REMOVAL
- ASPHALT PAVEMENT REMOVAL
- EXISTING CART PATH REMOVAL (PAID UNDER ROADWAY EXCAVATION)
- ASPHALT PAVEMENT AND SUBGRADE REMOVAL

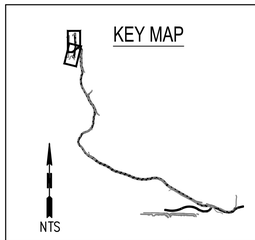
X EROSION CONTROL NOTES:

1. HIGH VISIBILITY SILT FENCE PER WSDOT STD PLAN I-30.17-01.
2. INLET PROTECTION PER WSDOT STD PLAN I-40.20.
3. COIR LOG PER WSDOT STD PLAN I-30.60.
4. TEMPORARY CONSTRUCTION FENCING PER DETAIL ON SHEET DM-10, SEE SPECIAL PROVISION 2-04.
5. TEMPORARY TREE PROTECTION FENCING PER DETAIL ON SHEET DM-10.

X DEMOLITION NOTES:

1. SAWCUT EX. ASPHALT PAVEMENT OR CONCRETE PAVEMENT WHERE SHOWN.
2. REMOVE ASPHALT PAVEMENT AND DISPOSE OFF SITE.
3. REMOVE ASPHALT PAVEMENT AND SUBGRADE TO NATIVE MINERAL SOIL OR TO A MINIMUM DEPTH OF 0.5' BELOW PROPOSED FINISH GRADE, AND DISPOSE OFF SITE.
4. REMOVE EX. CATCH BASIN & DISPOSE OFF SITE.
5. REMOVE EX. CHAIN LINK FENCE & FOOTINGS TO NEAREST POST & DISPOSE OFF SITE.
6. RETAIN & PROTECT EX. CHAIN LINK FENCE TO REMAIN.
7. ADJUST RIM ELEVATION OF CATCH BASIN OR OTHER DRAINAGE STRUCTURE TO MATCH FINISH GRADE.
8. ADJUST RIM ELEVATION OF EX. UTILITY VAULTS/BOXES, CLEANOUTS, ETC., TO MATCH FINISH GRADE.
9. RETAIN & PROTECT ALL EXISTING UTILITY VAULTS, BOXES, POSTS, ETC. IN PLACE.
10. TEE BOX AND SAND TRAP SHALL BE RELOCATED. SEE SHEET TR-01 TO TR-04.
11. CONTRACTOR TO LOCATE HOLE SIGN. IF THERE IS A CONFLICT WITH THE SIGN AND PROPOSED CONSTRUCTION REMOVE AND PROTECT HOLE SIGN FOR RELOCATION.
12. REMOVE POWER LINE. SEE PP-03 FOR MODIFICATIONS AND REINSTALLATION. COORDINATE POWER SHUTOFF WITH THE CITY OF TUMWATER. POWER SHALL BE RESTORED WITHIN 24 HOURS.

KEY MAP



△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ
DRAWN BY: M. HENDRICKS-MATSUDA
APPROVED BY: P. HOLM
ISSUE DATE: AUGUST 2026
JOB No.: 25-000313
DRAWING FILE No.: 25-000313-C-DM-00

ALL DIMENSIONS SHOWN IN FEET UNLESS OTHERWISE DESIGNATED

PATRICK HOLM — STATE OF WASHINGTON — 49470 — REGISTERED PROFESSIONAL ENGINEER — PRELIMINARY

SCJ ALLIANCE
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8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
P: 360.352.1465
SCJALLIANCE.COM

PROJECT NAME:

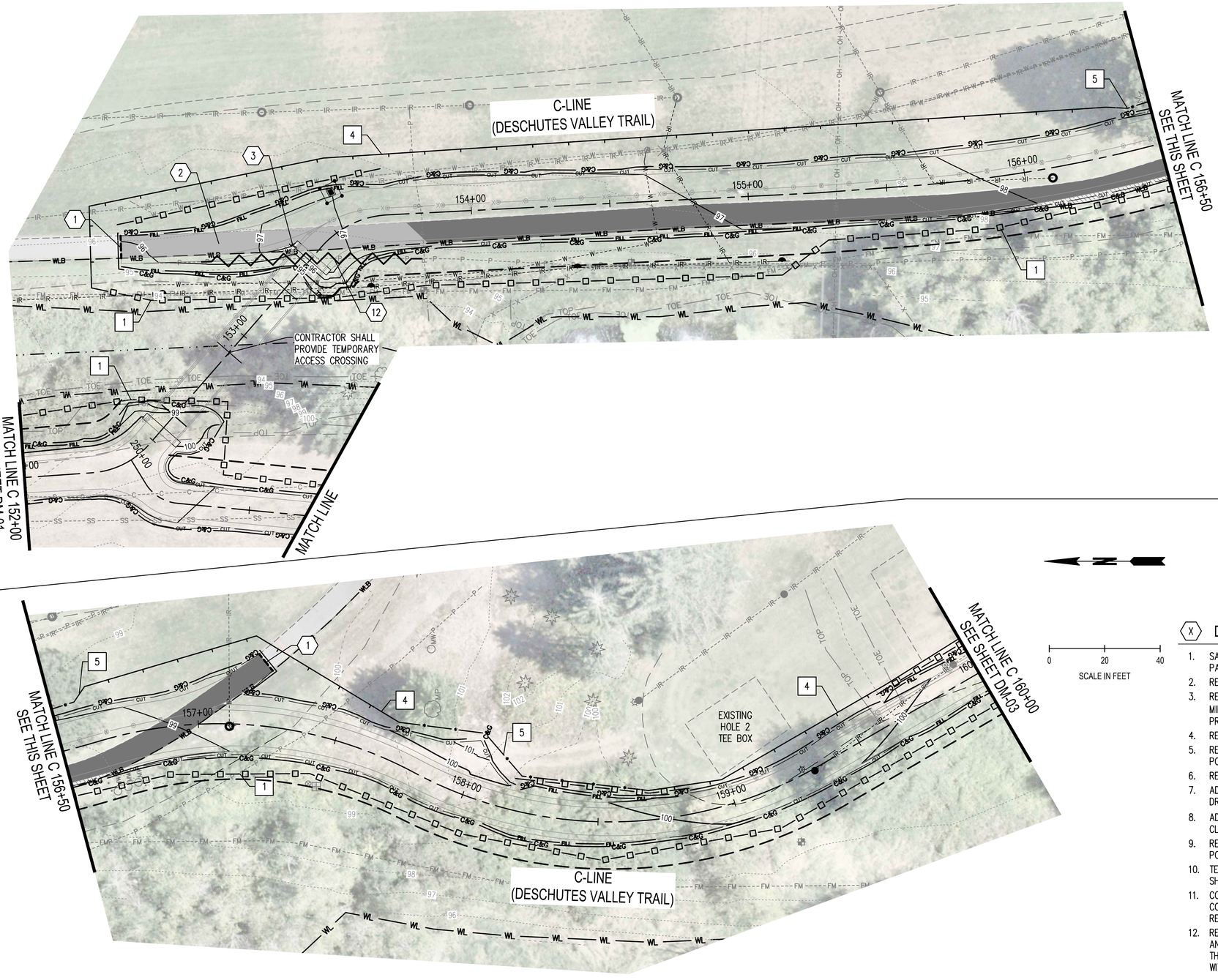
CITY OF TUMWATER

DESCHUTES VALLEY TRAIL
SEGMENT C

DEMOLITION AND TESC PLAN
C 150+00 - C 152+00 & M 250+00 - M 251+92

DRAWING No.: DM-01
SHEET No.: 25 OF 148

Aug 20, 2026 1:34:46pm - User: audreynielsen
N:\PROJECTS\0625 CITY OF TUMWATER\25-000313 TUMWATER DESCHUTES VALLEY TRAIL\CADD\25-000313-C-DM-00.DWG



N

0 20 40
SCALE IN FEET

LEGEND

- INLET PROTECTION
- REMOVE TREE WITH ROOT WAD & DISPOSE OFFSITE (PAID FOR AS CLEARING AND GRUBBING)
- HIGH VISIBILITY SILT FENCE
- COIR LOG
- TREE PROTECTION FENCING
- TEMPORARY CONSTRUCTION FENCING
- CUT LINE
- FILL LINE
- CLEAR AND GRUB LIMIT
- EXISTING CONTOUR MAJOR
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8. ADJUST RIM ELEVATION OF EX. UTILITY VAULTS/BOXES, CLEANOUTS, ETC., TO MATCH FINISH GRADE.
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(X) EROSION CONTROL NOTES:

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4. TEMPORARY CONSTRUCTION FENCING PER DETAIL ON SHEET DM-10, SEE SPECIAL PROVISION 2-04.
5. TEMPORARY TREE PROTECTION FENCING PER DETAIL ON SHEET DM-10.

GENERAL NOTES:

1. IRRIGATION DEMOLITION IS SHOWN ON THE IRRIGATION MODIFICATION PLAN, SEE IR-01 TO IR-06.

KEY MAP

NTS

△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ
DRAWN BY: M. WOLFF
APPROVED BY: P. HOLM
ISSUE DATE: AUGUST 2026
JOB No.: 25-000313
DRAWING FILE No.: 25-000313-C-DM-01

ALL DIMENSIONS SHOWN IN FEET UNLESS OTHERWISE DESIGNATED

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SCJ ALLIANCE
CONSULTING SERVICES
8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
P: 360.352.1465
SCJALLIANCE.COM

PROJECT NAME:

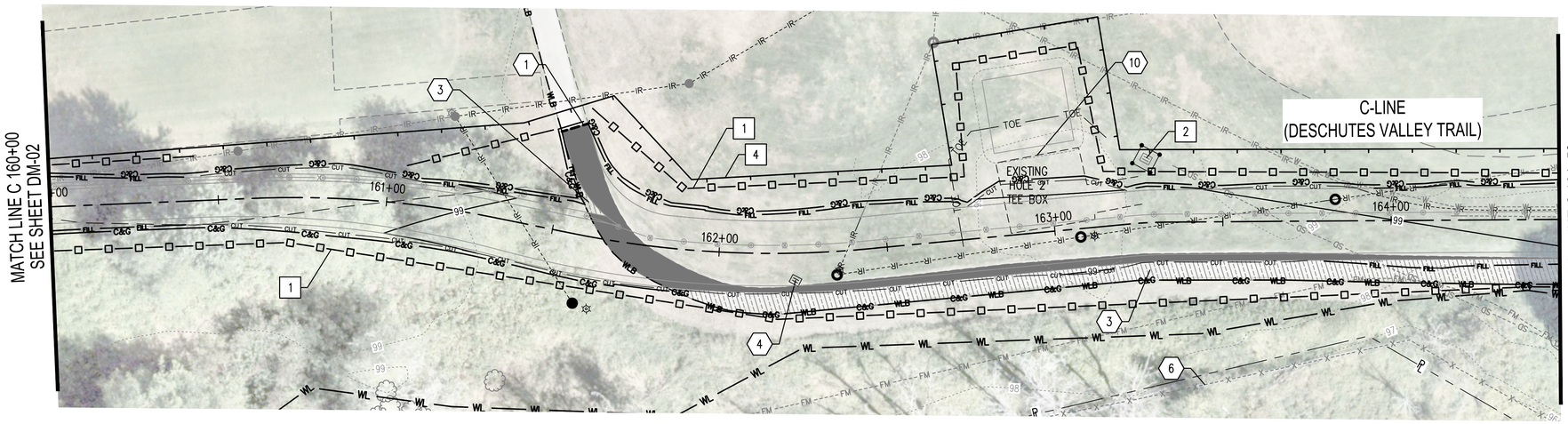
CITY OF TUMWATER

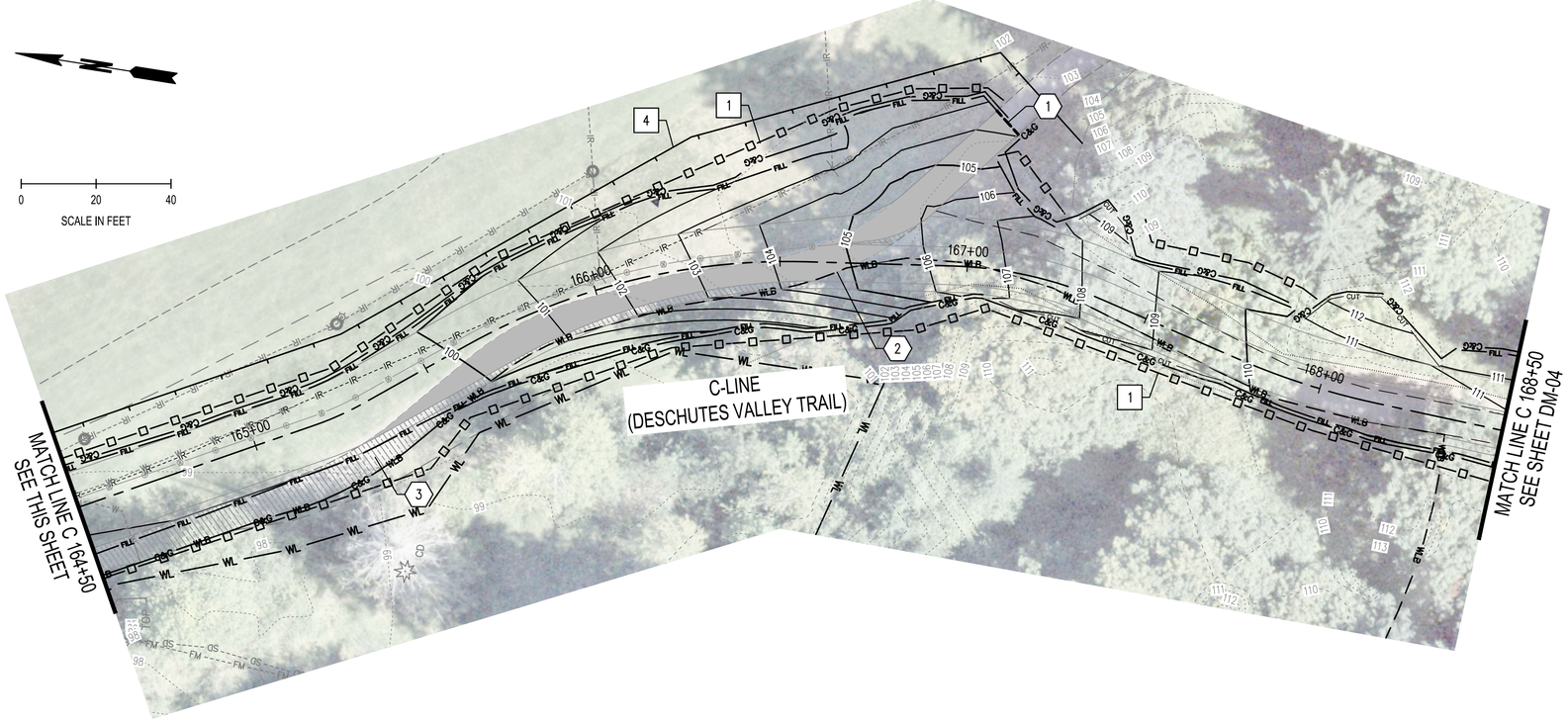
DESCHUTES VALLEY TRAIL
SEGMENT C

DEMOLITION AND TESC PLAN
C 152+00 - C 160+00

DRAWING No.: DM-02
SHEET No.: 26 OF 148

Aug 20, 2026 3:21:17pm - User: rikki.martinez
N:\PROJECTS\0625 CITY OF TUMWATER\25-000313 TUMWATER DESCHUTES VALLEY TRAIL\CADD\25-000313-C-DM-01.DWG





0 20 40

SCALE IN FEET

LEGEND

- INLET PROTECTION
- REMOVE TREE WITH ROOT WAD & DISPOSE OFFSITE (PAID FOR AS CLEARING AND GRUBBING)
- HIGH VISIBILITY SILT FENCE
- COIR LOG
- TREE PROTECTION FENCING
- TEMPORARY CONSTRUCTION FENCING
- CUT LINE
- FILL LINE
- CLEAR AND GRUB LIMIT
- EXISTING CONTOUR MAJOR
- EXISTING CONTOUR MINOR
- SHORELINE
- SAWCUT (TYP)
- REMOVAL
- ASPHALT PAVEMENT REMOVAL
- EXISTING CART PATH REMOVAL (PAID UNDER ROADWAY EXCAVATION)
- ASPHALT PAVEMENT AND SUBGRADE REMOVAL

(X) DEMOLITION NOTES:

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4. REMOVE EX. CATCH BASIN & DISPOSE OFF SITE.
5. REMOVE EX. CHAIN LINK FENCE & FOOTINGS TO NEAREST POST & DISPOSE OFF SITE.
6. RETAIN & PROTECT EX. CHAIN LINK FENCE TO REMAIN.
7. ADJUST RIM ELEVATION OF CATCH BASIN OR OTHER DRAINAGE STRUCTURE TO MATCH FINISH GRADE.
8. ADJUST RIM ELEVATION OF EX. UTILITY VAULTS/BOXES, CLEANOUTS, ETC., TO MATCH FINISH GRADE.
9. RETAIN & PROTECT ALL EXISTING UTILITY VAULTS, BOXES, POSTS, ETC. IN PLACE.
10. TEE BOX AND SAND TRAP SHALL BE RELOCATED. SEE SHEET TR-01 TO TR-04.
11. CONTRACTOR TO LOCATE HOLE SIGN. IF THERE IS A CONFLICT WITH THE SIGN AND PROPOSED CONSTRUCTION REMOVE AND PROTECT HOLE SIGN FOR RELOCATION.
12. REMOVE POWER LINE. SEE PP-03 FOR MODIFICATIONS AND REINSTALLATION. COORDINATE POWER SHUTOFF WITH THE CITY OF TUMWATER. POWER SHALL BE RESTORED

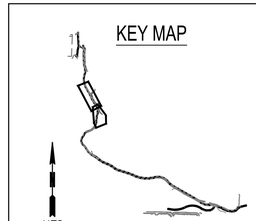
(X) EROSION CONTROL NOTES:

1. HIGH VISIBILITY SILT FENCE PER WSDOT STD PLAN I-30.17-01.
2. INLET PROTECTION PER WSDOT STD PLAN I-40.20.
3. COIR LOG PER WSDOT STD PLAN I-30.60.
4. TEMPORARY CONSTRUCTION FENCING PER DETAIL ON SHEET DM-10, SEE SPECIAL PROVISION 2-04.
5. TEMPORARY TREE PROTECTION FENCING PER DETAIL ON SHEET DM-10.

GENERAL NOTES:

1. IRRIGATION DEMOLITION IS SHOWN ON THE IRRIGATION MODIFICATION PLAN, SEE IR-01 TO IR-06.

KEY MAP



NTS

△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ
DRAWN BY: M. WOLFF
APPROVED BY: P. HOLM
ISSUE DATE: AUGUST 2026
JOB No.: 25-000313
DRAWING FILE No.: 25-000313-C-DM-02

ALL DIMENSIONS SHOWN IN FEET UNLESS OTHERWISE DESIGNATED

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SCJ ALLIANCE
CONSULTING SERVICES
8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
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SCJALLIANCE.COM

PROJECT NAME:

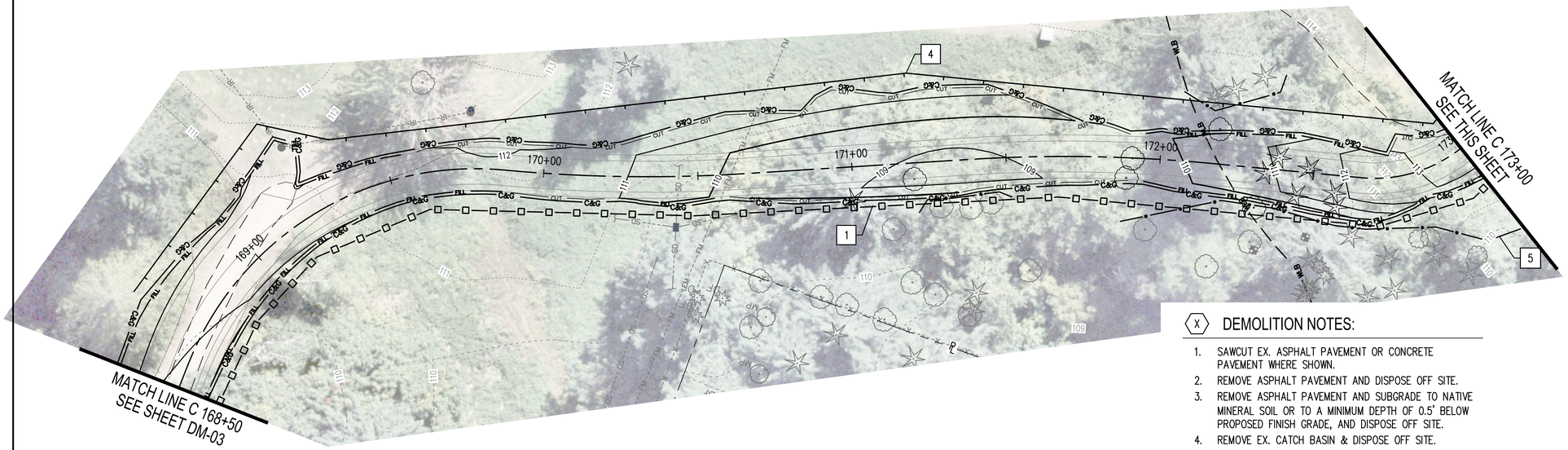
CITY OF TUMWATER

DESCHUTES VALLEY TRAIL
SEGMENT C

DEMOLITION AND TESC PLAN
C 160+00 - C 168+50

DRAWING No.: DM-03
SHEET No.: 27 OF 148

Aug 20, 2026 3:21:19pm - User: nikkimartinez
N:\PROJECTS\2025 CITY OF TUMWATER\25-000313 TUMWATER DESCHUTES VALLEY TRAIL\CADD\25-000313-C-DM-02.DWG



DEMOLITION NOTES:

1. SAWCUT EX. ASPHALT PAVEMENT OR CONCRETE PAVEMENT WHERE SHOWN.
2. REMOVE ASPHALT PAVEMENT AND DISPOSE OFF SITE.
3. REMOVE ASPHALT PAVEMENT AND SUBGRADE TO NATIVE MINERAL SOIL OR TO A MINIMUM DEPTH OF 0.5' BELOW PROPOSED FINISH GRADE, AND DISPOSE OFF SITE.
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12. REMOVE POWER LINE. SEE PP-03 FOR MODIFICATIONS AND REINSTALLATION. COORDINATE POWER SHUTOFF WITH THE CITY OF TUMWATER. POWER SHALL BE RESTORED WITHIN 24 HOURS.

0 20 40
SCALE IN FEET

LEGEND

- INLET PROTECTION
- REMOVE TREE WITH ROOT WAD & DISPOSE OFFSITE (PAID FOR AS CLEARING AND GRUBBING)
- HIGH VISIBILITY SILT FENCE
- COIR LOG
- TREE PROTECTION FENCING
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- CUT LINE
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- ASPHALT PAVEMENT AND SUBGRADE REMOVAL

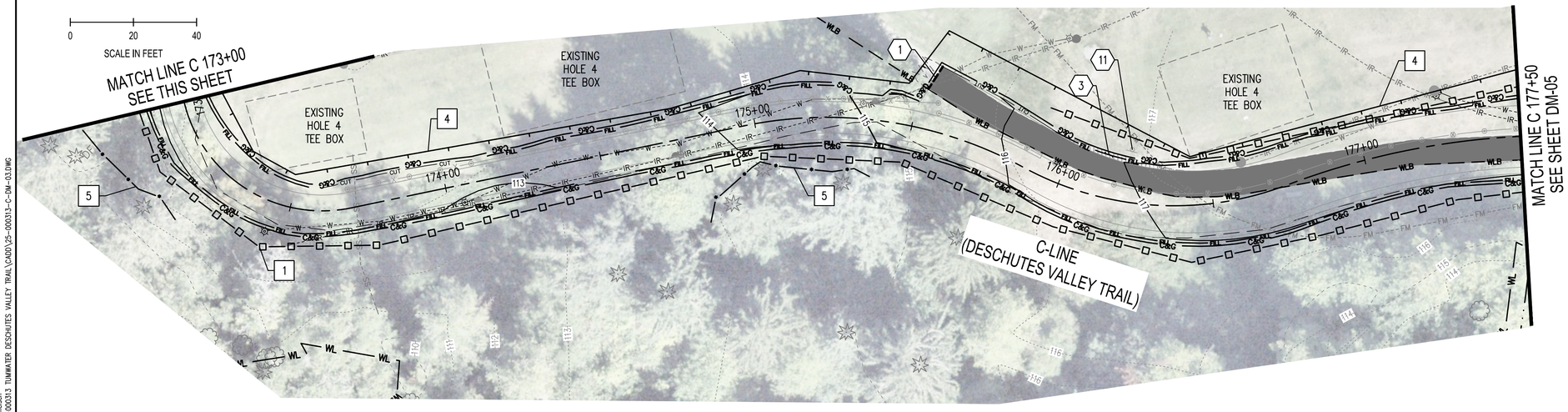
EROSION CONTROL NOTES:

1. HIGH VISIBILITY SILT FENCE PER WSDOT STD PLAN I-30.17-01.
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5. TEMPORARY TREE PROTECTION FENCING PER DETAIL ON SHEET DM-10.

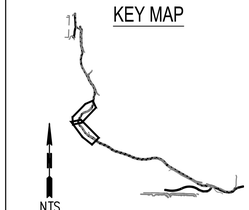
GENERAL NOTES:

1. IRRIGATION DEMOLITION IS SHOWN ON THE IRRIGATION MODIFICATION PLAN, SEE IR-01 TO IR-06.

0 20 40
SCALE IN FEET



KEY MAP



NTS

△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ	ISSUE DATE: AUGUST 2026
DRAWN BY: M. WOLFF	JOB No.: 25-000313
APPROVED BY: P. HOLM	DRAWING FILE No.: 25-000313-C-DM-03

ALL DIMENSIONS SHOWN IN FEET UNLESS OTHERWISE DESIGNATED

PATRICK HOLM — STATE OF WASHINGTON — 19870 — REGISTERED PROFESSIONAL ENGINEER — PRELIMINARY

SCJ ALLIANCE
CONSULTING SERVICES
8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
P: 360.352.1465
SCJALLIANCE.COM

PROJECT NAME:

CITY OF TUMWATER

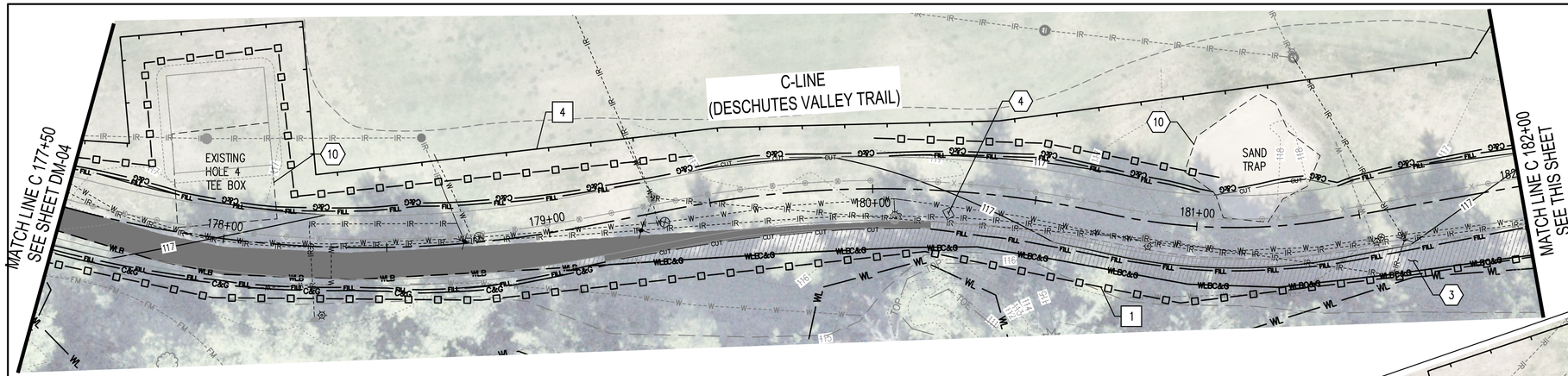
DESCHUTES VALLEY TRAIL
SEGMENT C

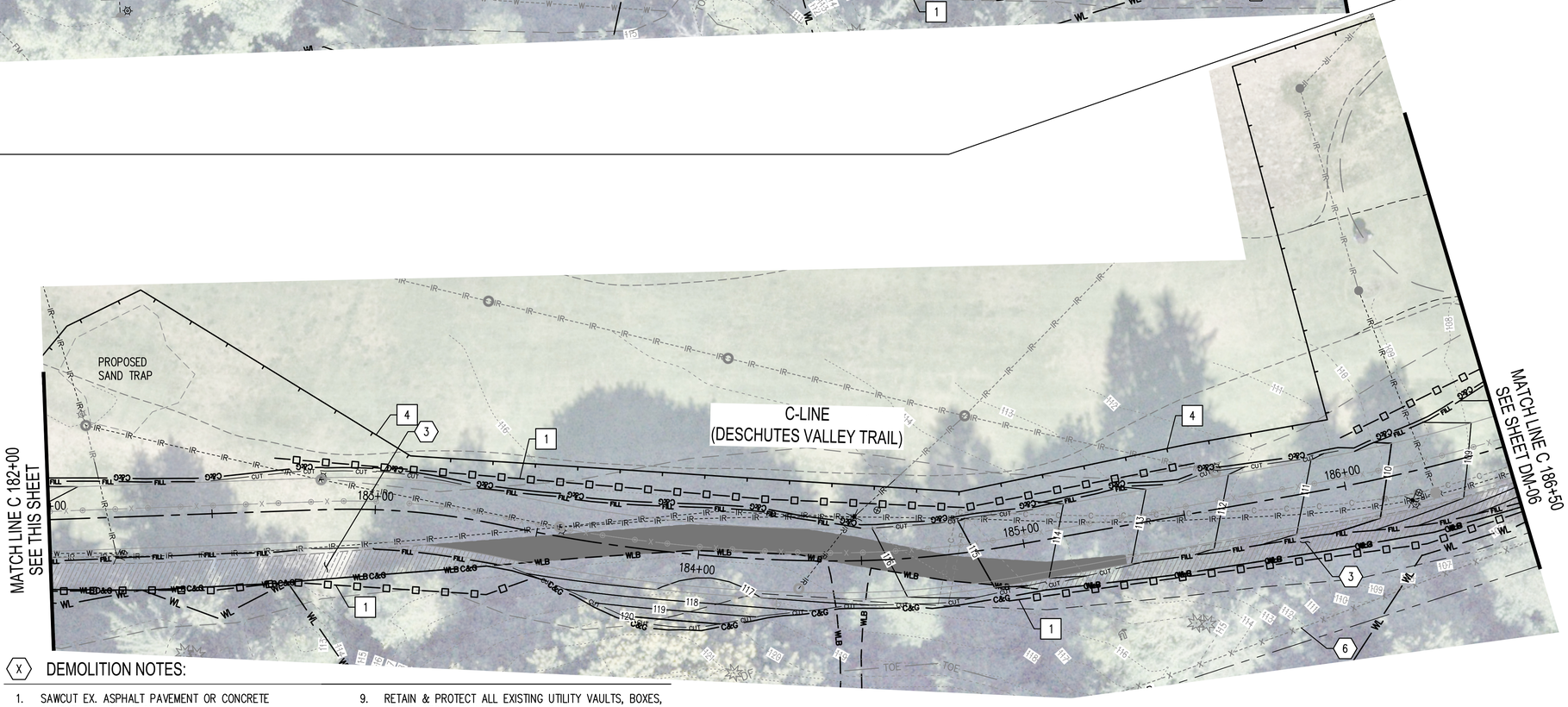
DEMOLITION AND TESC PLAN
C 168+50 - C 177+50

DRAWING No.: DM-04

SHEET No.: 28 OF 148

Aug 20, 2026 12:57:31pm - User: aufreyhelsen
N:\PROJECTS\0625 CITY OF TUMWATER\25-000313 TUMWATER DESCHUTES VALLEY TRAIL\CADD\25-000313-C-DM-03.DWG





0 20 40
SCALE IN FEET

LEGEND

- INLET PROTECTION
- REMOVE TREE WITH ROOT WAD & DISPOSE OFFSITE (PAID FOR AS CLEARING AND GRUBBING)
- HIGH VISIBILITY SILT FENCE
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0 20 40
SCALE IN FEET

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KEY MAP

NTS

△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ
DRAWN BY: M. WOLFF
APPROVED BY: P. HOLM
ISSUE DATE: AUGUST 2026
JOB No.: 25-000313
DRAWING FILE No.: 25-000313-C-DM-04

ALL DIMENSIONS SHOWN IN FEET UNLESS OTHERWISE DESIGNATED

PATRICK HOLM — STATE OF WASHINGTON — 19870 — REGISTERED PROFESSIONAL ENGINEER — PRELIMINARY

SCJ ALLIANCE
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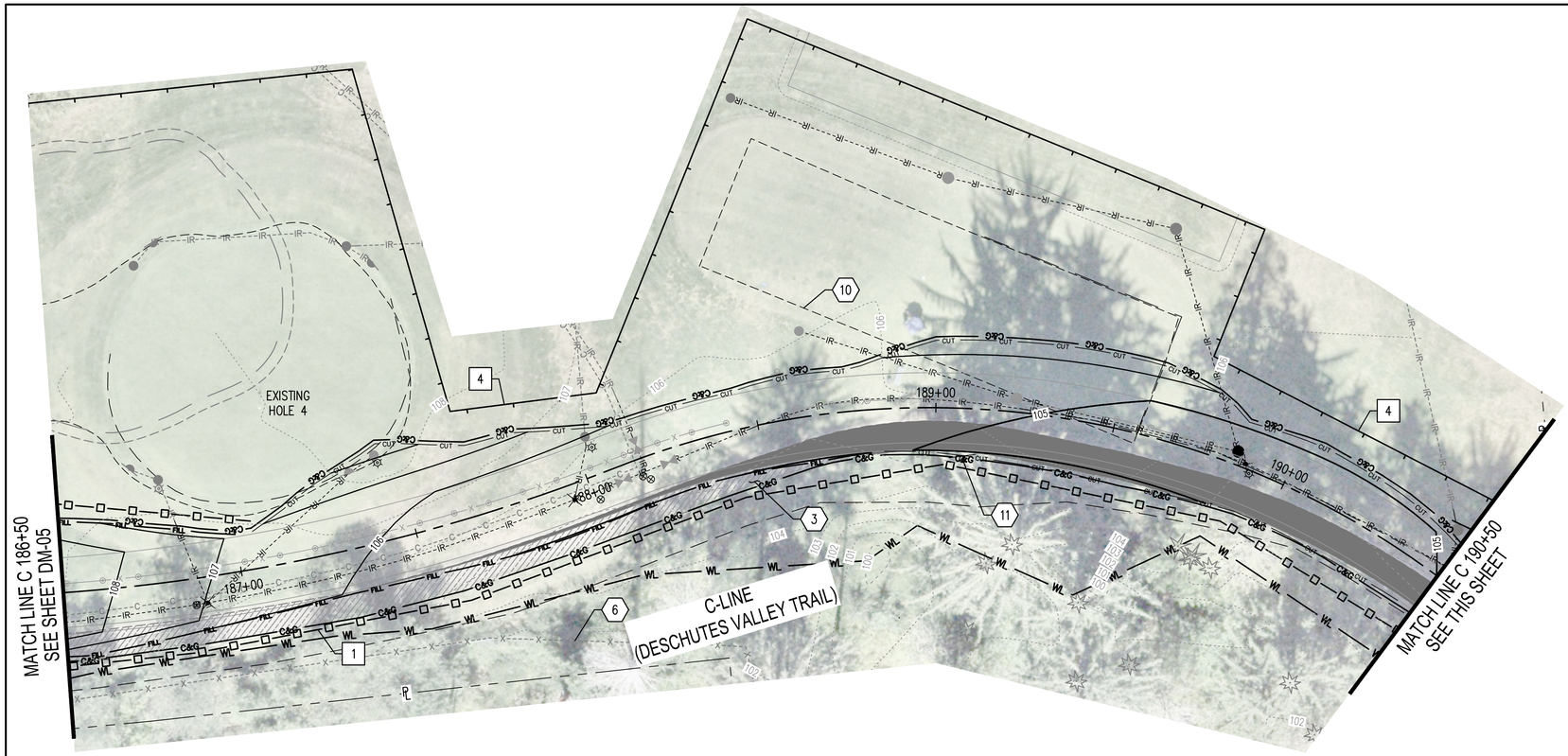
PROJECT NAME:
CITY OF TUMWATER

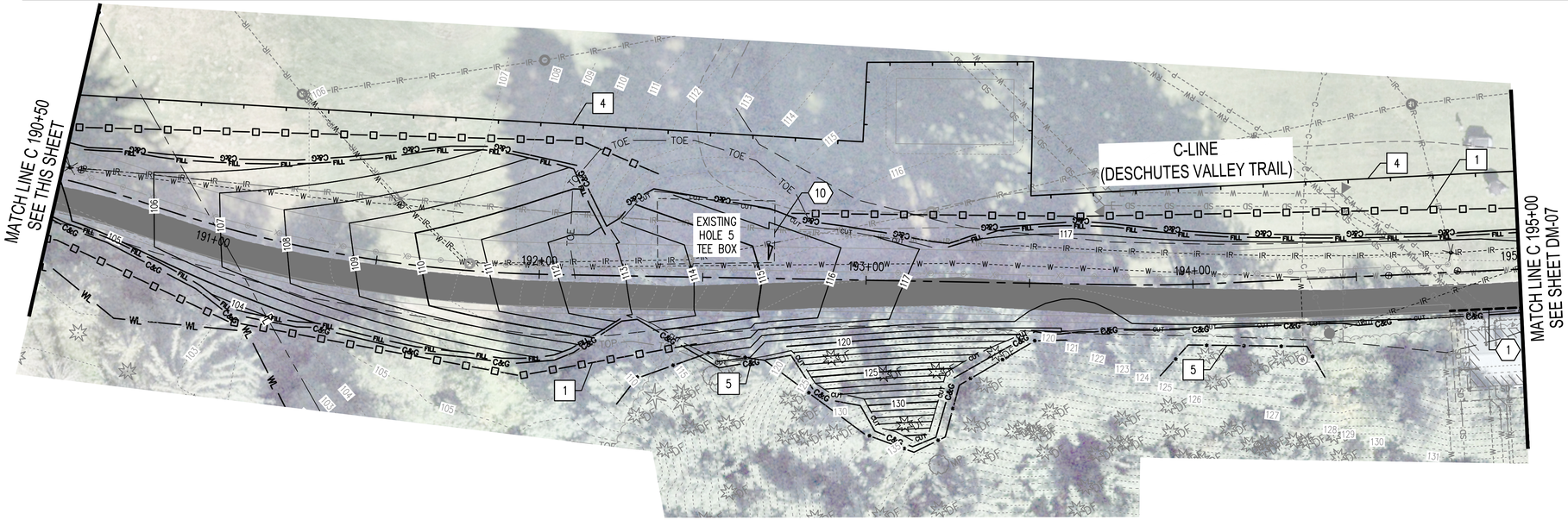
DESCHUTES VALLEY TRAIL
SEGMENT C

DEMOLITION AND TESC PLAN
C 177+50 - C 186+50

DRAWING No.: DM-05
SHEET No.: 29 OF 148

Aug 20, 2026 1:37:20pm – User: audreynielsen
N:\PROJECTS\0625 CITY OF TUMWATER\25-000313 TUMWATER DESCHUTES VALLEY TRAIL\CADD\25-000313-C-DM-04.DWG





DEMOLITION NOTES:

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4. REMOVE EX. CATCH BASIN & DISPOSE OFF SITE.
5. REMOVE EX. CHAIN LINK FENCE & FOOTINGS TO NEAREST POST & DISPOSE OFF SITE.
6. RETAIN & PROTECT EX. CHAIN LINK FENCE TO REMAIN.
7. ADJUST RIM ELEVATION OF CATCH BASIN OR OTHER DRAINAGE STRUCTURE TO MATCH FINISH GRADE.
8. ADJUST RIM ELEVATION OF EX. UTILITY VAULTS/BOXES, CLEANOUTS, ETC., TO MATCH FINISH GRADE.
9. RETAIN & PROTECT ALL EXISTING UTILITY VAULTS, BOXES, POSTS, ETC. IN PLACE.
10. TEE BOX AND SAND TRAP SHALL BE RELOCATED. SEE SHEET TR-01 TO TR-04.
11. CONTRACTOR TO LOCATE HOLE SIGN. IF THERE IS A CONFLICT WITH THE SIGN AND PROPOSED CONSTRUCTION REMOVE AND PROTECT HOLE SIGN FOR RELOCATION.
12. REMOVE POWER LINE. SEE PP-03 FOR MODIFICATIONS AND REINSTALLATION. COORDINATE POWER SHUTOFF WITH THE CITY OF TUMWATER. POWER SHALL BE RESTORED WITHIN 24 HOURS.

LEGEND

- INLET PROTECTION
- REMOVE TREE WITH ROOT WAD & DISPOSE OFFSITE (PAID FOR AS CLEARING AND GRUBBING)
- HIGH VISIBILITY SILT FENCE
- COIR LOG
- TREE PROTECTION FENCING
- TEMPORARY CONSTRUCTION FENCING
- CUT LINE
- FILL LINE
- CLEAR AND GRUB LIMIT
- EXISTING CONTOUR MAJOR
- EXISTING CONTOUR MINOR
- SHORELINE
- SAWCUT (TYP)
- REMOVAL
- ASPHALT PAVEMENT REMOVAL
- EXISTING CART PATH REMOVAL (PAID UNDER ROADWAY EXCAVATION)
- ASPHALT PAVEMENT AND SUBGRADE REMOVAL

0 20 40
SCALE IN FEET

EROSION CONTROL NOTES:

1. HIGH VISIBILITY SILT FENCE PER WSDOT STD PLAN I-30.17-01.
2. INLET PROTECTION PER WSDOT STD PLAN I-40.20.
3. COIR LOG PER WSDOT STD PLAN I-30.60.
4. TEMPORARY CONSTRUCTION FENCING PER DETAIL ON SHEET DM-10, SEE SPECIAL PROVISION 2-04.
5. TEMPORARY TREE PROTECTION FENCING PER DETAIL ON SHEET DM-10.

0 20 40
SCALE IN FEET

GENERAL NOTES:

1. IRRIGATION DEMOLITION IS SHOWN ON THE IRRIGATION MODIFICATION PLAN, SEE IR-01 TO IR-06.

KEY MAP

NTS

△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ
DRAWN BY: M .WOLFF
APPROVED BY: P. HOLM
ISSUE DATE: AUGUST 2026
JOB No.: 25-000313
DRAWING FILE No.: 25-000313-C-DM-05

ALL DIMENSIONS SHOWN IN FEET UNLESS OTHERWISE DESIGNATED

PATRICK HOLM — STATE OF WASHINGTON — 49970 — REGISTERED PROFESSIONAL ENGINEER — PRELIMINARY

SCJ ALLIANCE
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8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
P: 360.352.1465
SCJALLIANCE.COM

PROJECT NAME:

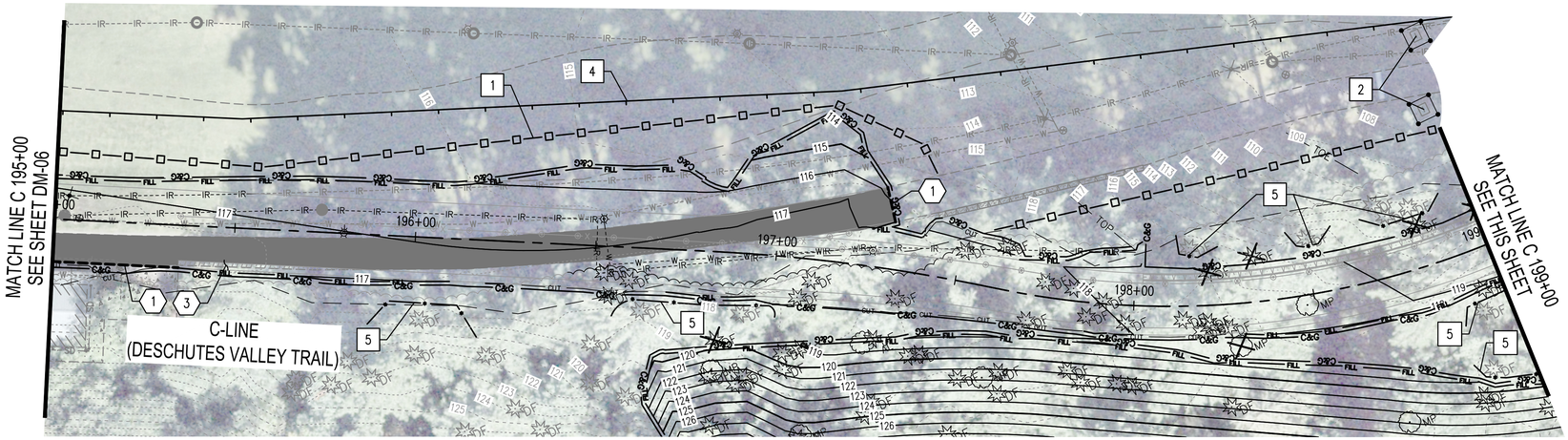
CITY OF TUMWATER

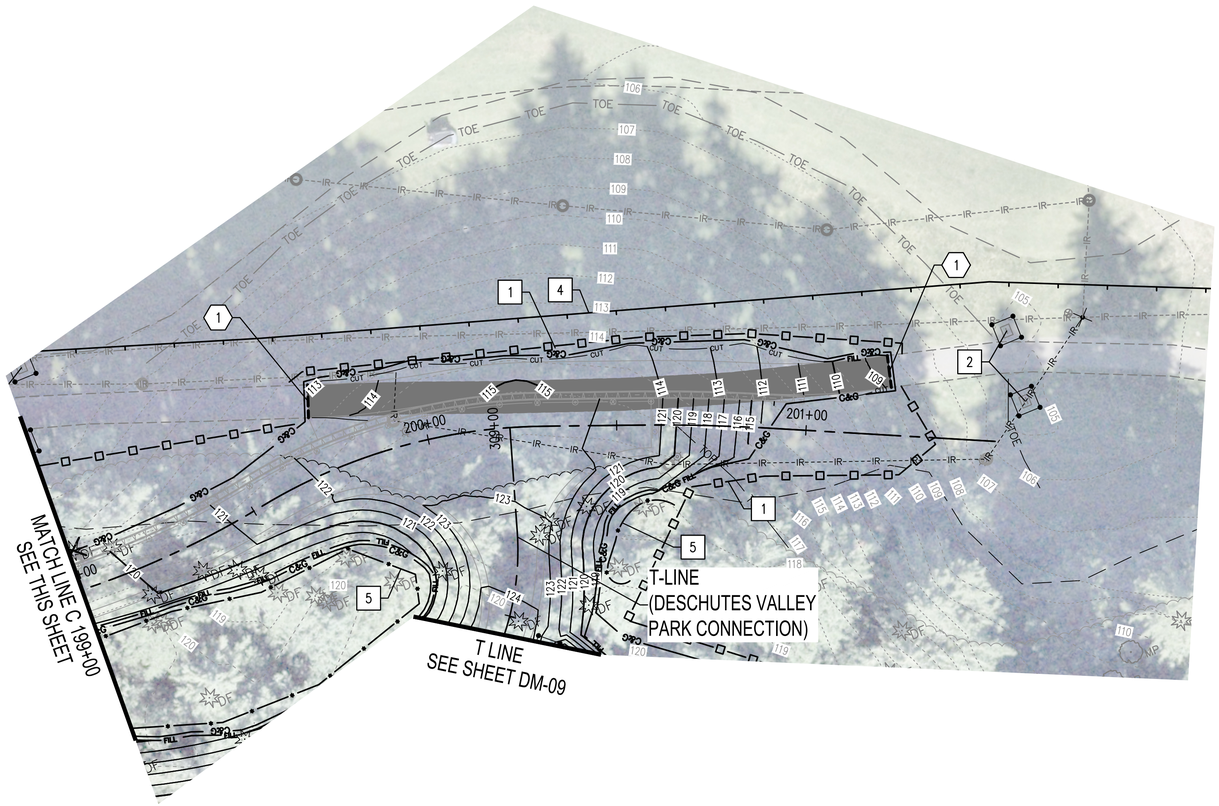
DESCHUTES VALLEY TRAIL
SEGMENT C

DEMOLITION AND TESC PLAN
C 186+50 - C 195+00

DRAWING No.: DM-06
SHEET No.: 30 OF 148

Aug 20, 2026 12:52:23pm – User audreymelsen
N:\PROJECTS\0625 CITY OF TUMWATER\25-000313 TUMWATER DESCHUTES VALLEY TRAIL\CADD\25-000313-C-DM-05.DWG





0 20 40
SCALE IN FEET

LEGEND

- INLET PROTECTION
- REMOVE TREE WITH ROOT WAD & DISPOSE OFFSITE (PAID FOR AS CLEARING AND GRUBBING)
- HIGH VISIBILITY SILT FENCE
- COIR LOG
- TREE PROTECTION FENCING
- TEMPORARY CONSTRUCTION FENCING
- CUT LINE
- FILL LINE
- CLEAR AND GRUB LIMIT
- EXISTING CONTOUR MAJOR
- EXISTING CONTOUR MINOR
- SHORELINE
- SAWCUT (TYP)
- REMOVAL
- ASPHALT PAVEMENT REMOVAL
- EXISTING CART PATH REMOVAL (PAID UNDER ROADWAY EXCAVATION)
- ASPHALT PAVEMENT AND SUBGRADE REMOVAL

X EROSION CONTROL NOTES:

1. HIGH VISIBILITY SILT FENCE PER WSDOT STD PLAN I-30.17-01.
2. INLET PROTECTION PER WSDOT STD PLAN I-40.20.
3. COIR LOG PER WSDOT STD PLAN I-30.60.
4. TEMPORARY CONSTRUCTION FENCING PER DETAIL ON SHEET DM-10, SEE SPECIAL PROVISION 2-04.
5. TEMPORARY TREE PROTECTION FENCING PER DETAIL ON SHEET DM-10.

GENERAL NOTES:

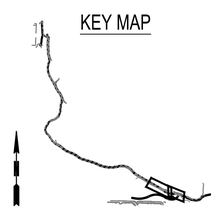
1. IRRIGATION DEMOLITION IS SHOWN ON THE IRRIGATION MODIFICATION PLAN, SEE IR-01 TO IR-06.

0 20 40
SCALE IN FEET

X DEMOLITION NOTES:

1. SAWCUT EX. ASPHALT PAVEMENT OR CONCRETE PAVEMENT WHERE SHOWN.
2. REMOVE ASPHALT PAVEMENT AND DISPOSE OFF SITE.
3. REMOVE ASPHALT PAVEMENT AND SUBGRADE TO NATIVE MINERAL SOIL OR TO A MINIMUM DEPTH OF 0.5' BELOW PROPOSED FINISH GRADE, AND DISPOSE OFF SITE.
4. REMOVE EX. CATCH BASIN & DISPOSE OFF SITE.
5. REMOVE EX. CHAIN LINK FENCE & FOOTINGS TO NEAREST POST & DISPOSE OFF SITE.
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12. REMOVE POWER LINE. SEE PP-03 FOR MODIFICATIONS AND REINSTALLATION. COORDINATE POWER SHUTOFF WITH THE CITY OF TUMWATER. POWER SHALL BE RESTORED WITHIN 24 HOURS.

KEY MAP



NTS

△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ
DRAWN BY: M. WOLFF
APPROVED BY: P. HOLM
ISSUE DATE: AUGUST 2026
JOB No.: 25-000313
DRAWING FILE No.: 25-000313-C-DM-06

ALL DIMENSIONS SHOWN IN FEET UNLESS OTHERWISE DESIGNATED

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CONSULTING SERVICES
8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
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PROJECT NAME:

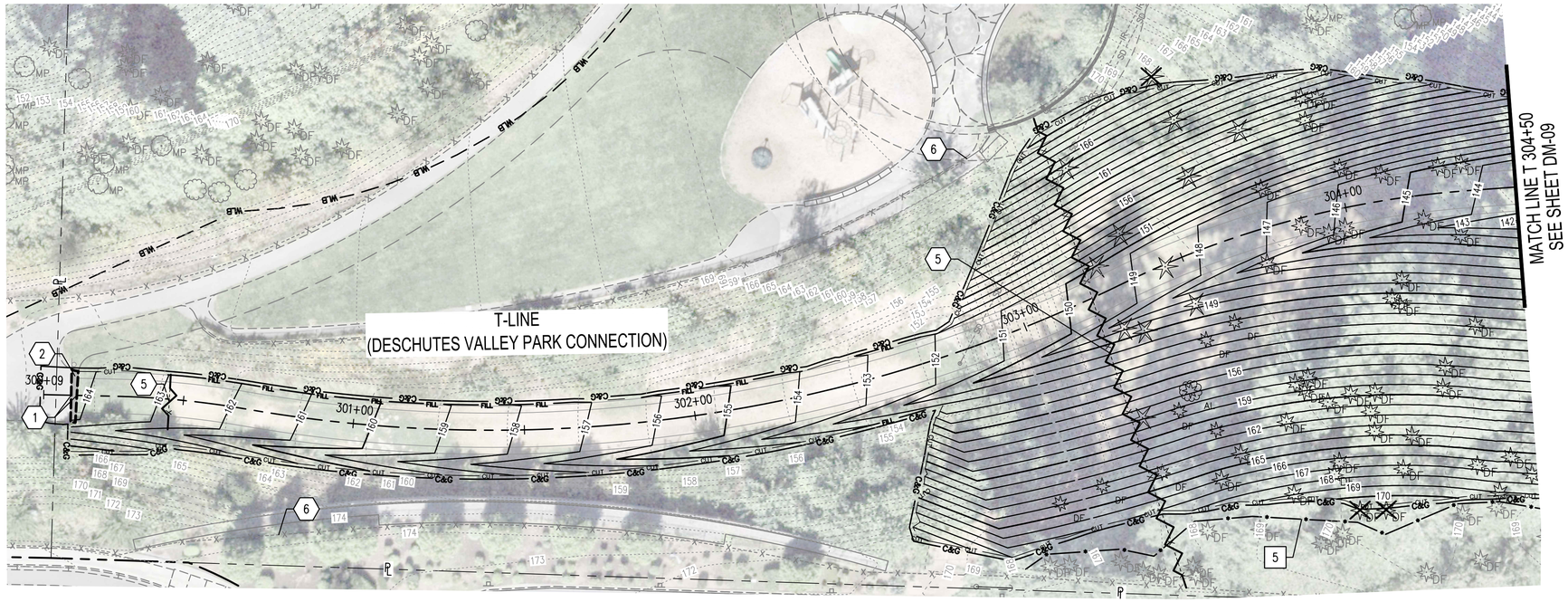
CITY OF TUMWATER

DESCHUTES VALLEY TRAIL
SEGMENT C

DEMOLITION AND TESC PLAN
C 195+00 - C 202+00

DRAWING No.: DM-07
SHEET No.: 31 OF 148

Aug 20, 2026 1:36:00pm - User: aufreynielsen
N:\PROJECTS\2025 CITY OF TUMWATER\25-000313 TUMWATER DESCHUTES VALLEY TRAIL\CADD\25-000313-C-DM-06.DWG



N

0 20 40

SCALE IN FEET

LEGEND

- INLET PROTECTION
- REMOVE TREE WITH ROOT WAD & DISPOSE OFFSITE (PAID FOR AS CLEARING AND GRUBBING)
- HIGH VISIBILITY SILT FENCE
- COIR LOG
- TREE PROTECTION FENCING
- TEMPORARY CONSTRUCTION FENCING
- CUT LINE
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- REMOVAL
- ASPHALT PAVEMENT REMOVAL
- EXISTING CART PATH REMOVAL (PAID UNDER ROADWAY EXCAVATION)
- ASPHALT PAVEMENT AND SUBGRADE REMOVAL

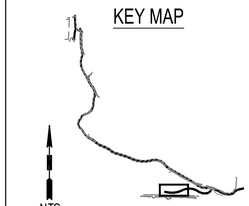
⟨X⟩ DEMOLITION NOTES:

1. SAWCUT EX. ASPHALT PAVEMENT OR CONCRETE PAVEMENT WHERE SHOWN.
2. REMOVE ASPHALT PAVEMENT AND DISPOSE OFF SITE.
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⟨X⟩ EROSION CONTROL NOTES:

1. HIGH VISIBILITY SILT FENCE PER WSDOT STD PLAN I-30.17-01.
2. INLET PROTECTION PER WSDOT STD PLAN I-40.20.
3. COIR LOG PER WSDOT STD PLAN I-30.60.
4. TEMPORARY CONSTRUCTION FENCING PER DETAIL ON SHEET DM-10, SEE SPECIAL PROVISION 2-04.
5. TEMPORARY TREE PROTECTION FENCING PER DETAIL ON SHEET DM-10.

KEY MAP



NTS

△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ
DRAWN BY: M. WOLFF
APPROVED BY: P. HOLM
ISSUE DATE: AUGUST 2026
JOB No.: 25-000313
DRAWING FILE No.: 25-000313-C-DM-08

ALL DIMENSIONS SHOWN IN FEET UNLESS OTHERWISE DESIGNATED

PATRICK HOLM — STATE OF WASHINGTON — 49870 — REGISTERED PROFESSIONAL ENGINEER — PRELIMINARY

SCJ ALLIANCE
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8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
P: 360.352.1465
SCJALLIANCE.COM

PROJECT NAME:

CITY OF TUMWATER

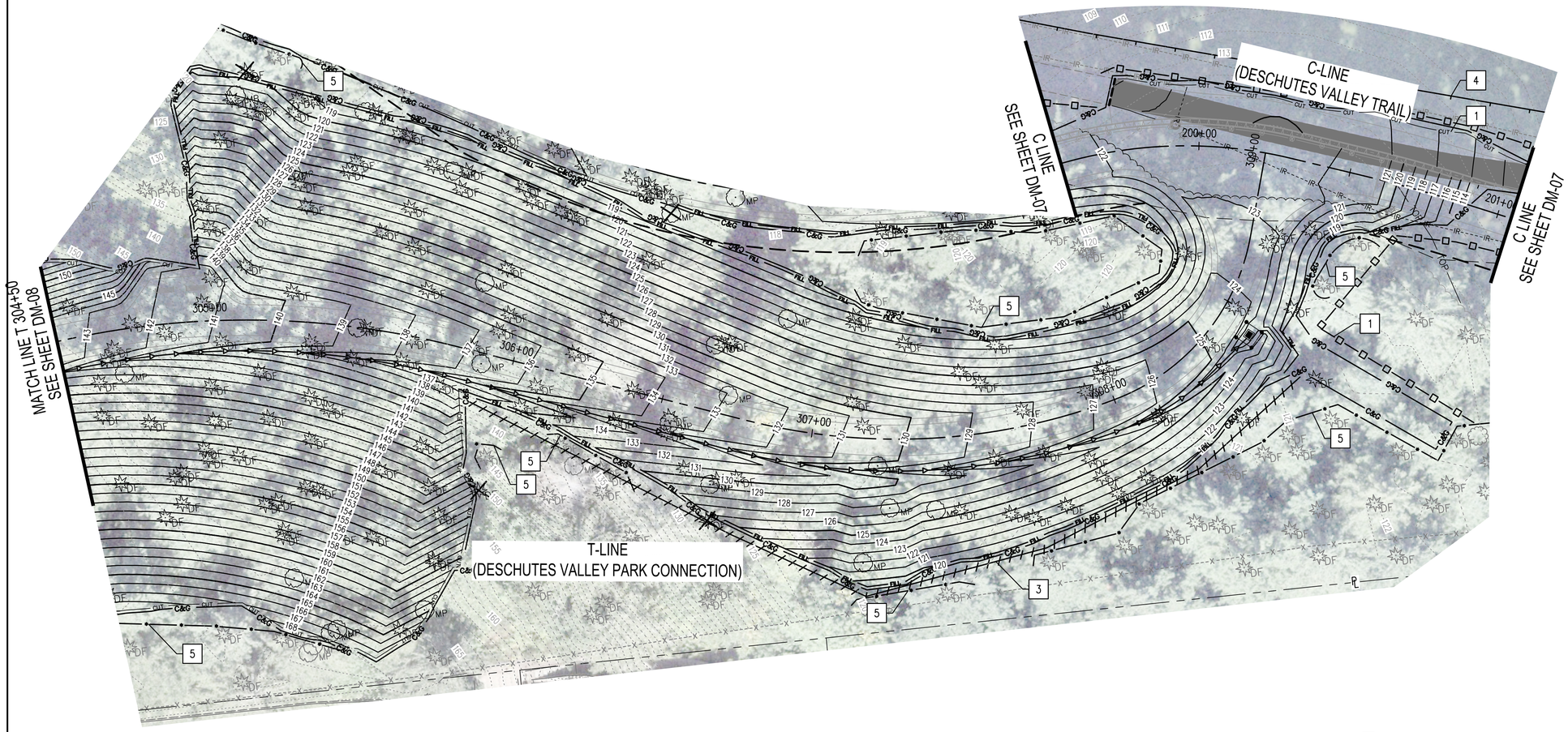
DESCHUTES VALLEY TRAIL
SEGMENT C

DEMOLITION AND TESC PLAN
T 300+00 - T 304+50

DRAWING No.: DM-08

SHEET No.: 32 OF 148

Aug 20, 2026 1:17:31pm – User: aufrenjdean
N:\PROJECTS\0625 CITY OF TUMWATER\25-000313 TUMWATER DESCHUTES VALLEY TRAIL\CADD\25-000313-C-DM-08.DWG



LEGEND

- INLET PROTECTION
- REMOVE TREE WITH ROOT WAD & DISPOSE OFFSITE (PAID FOR AS CLEARING AND GRUBBING)
- HIGH VISIBILITY SILT FENCE
- COIR LOG
- TREE PROTECTION FENCING
- TEMPORARY CONSTRUCTION FENCING
- CUT LINE
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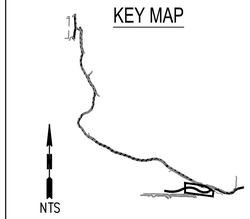
⟨X⟩ EROSION CONTROL NOTES:

1. HIGH VISIBILITY SILT FENCE PER WSDOT STD PLAN I-30.17-01.
2. INLET PROTECTION PER WSDOT STD PLAN I-40.20.
3. COIR LOG PER WSDOT STD PLAN I-30.60.
4. TEMPORARY CONSTRUCTION FENCING PER DETAIL ON SHEET DM-10, SEE SPECIAL PROVISION 2-04.
5. TEMPORARY TREE PROTECTION FENCING PER DETAIL ON SHEET DM-10.

⟨X⟩ DEMOLITION NOTES:

1. SAWCUT EX. ASPHALT PAVEMENT OR CONCRETE PAVEMENT WHERE SHOWN.
2. REMOVE ASPHALT PAVEMENT AND DISPOSE OFF SITE.
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11. CONTRACTOR TO LOCATE HOLE SIGN. IF THERE IS A CONFLICT WITH THE SIGN AND PROPOSED CONSTRUCTION REMOVE AND PROTECT HOLE SIGN FOR RELOCATION.
12. REMOVE POWER LINE. SEE PP-03 FOR MODIFICATIONS AND REINSTALLATION. COORDINATE POWER SHUTOFF WITH THE CITY OF TUMWATER. POWER SHALL BE RESTORED WITHIN 24 HOURS.

KEY MAP



△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ
DRAWN BY: M. WOLFF
APPROVED BY: P. HOLM
ISSUE DATE: AUGUST 2026
JOB No.: 25-000313
DRAWING FILE No.: 25-000313-C-DM-09

ALL DIMENSIONS SHOWN IN FEET UNLESS OTHERWISE DESIGNATED

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SCJALLIANCE.COM

PROJECT NAME:

CITY OF TUMWATER

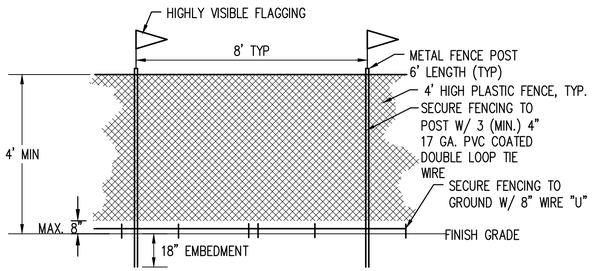
DESCHUTES VALLEY TRAIL
SEGMENT C

DEMOLITION AND TESC PLAN
T 304+50 - T 309+05

DRAWING No.: DM-09

SHEET No.: 33 OF 148

Aug 20, 2026 1:12:46pm – User: aukeynielsen
N:\PROJECTS\0625 CITY OF TUMWATER\25-000313 TUMWATER DESCHUTES VALLEY TRAIL\CAD\25-000313-C-DM-09.DWG



NOTE:
ALL TREE PROTECTION AREAS SHALL HAVE PROTECTIVE BARRIER FENCES ERECTED IN A 12' MIN. RADIUS FROM TREE TRUNK WHERE SPACE ALLOWS, OTHERWISE LOCATE AS SHOWN. THE FENCES SHALL BE HIGH-DENSITY POLYETHYLENE PLASTIC, RECTANGULAR PATTERN, AND SUPPORTED BY T-POST STEEL FENCE POSTS SPACED AT A MAXIMUM OF 8' APART. COLOR IS SAFETY ORANGE

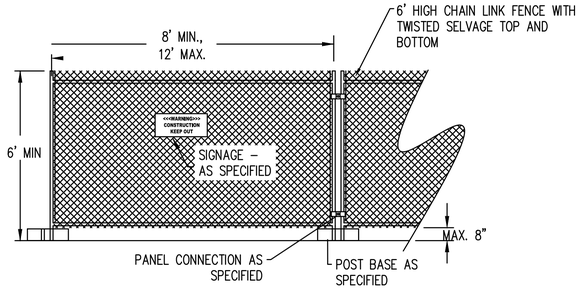
TREE PROTECTIVE FENCING
NTS

DEMOLITION GENERAL NOTES:

1. PRIOR TO DEMOLITION AND REMOVAL OF EXISTING STORM DRAINAGE, THIS EXISTING SYSTEM SHALL BE PROTECTED AND REMAIN FUNCTIONAL UNTIL PROPOSED SYSTEMS ARE CONSTRUCTED AND ACCEPTED BY THE CITY.
2. PROTECT EXISTING LANDSCAPING OUTSIDE THE CLEARING AND GRUBBING LIMITS. DAMAGE TO EXISTING LANDSCAPING SHALL BE REMOVED AND REPLACED BY THE CONTRACTOR AT NO COST TO CONTRACTING AGENCY.
3. RELOCATE ALL EXISTING SIGNS THAT ARE IN DIRECT CONFLICT WITH CONSTRUCTION OPERATION UNTIL PERMANENT SIGNS ARE INSTALLED. COORDINATE WITH THE ENGINEER FOR TEMPORARY LOCATIONS.
4. ALL VEGETATION WITHIN LIMITS SHALL BE CLEARED AND GRUBBED TO 6" DEPTH AND DISPOSED OF OFF SITE.
5. CONCRETE PAVEMENT REMOVAL INCL. HAUL LIMITS ARE APPROXIMATE. CONTRACTOR SHALL NOTIFY THE ENGINEER IF THE LIMITS VARY FROM THE PLANS.
6. SEE SHEETS IR-01 TO IR-07, IRRIGATION MODIFICATION PLAN(S) FOR THE ADDITIONAL DEMOLITION PLAN(S) OF THE EXISTING IRRIGATION SYSTEM.
7. TEMPORARY SECURING FENCING AND TEMPORARY TREE PROTECTION FENCING SHALL BE CONNECTED WHERE THEY MEET.

EROSION GENERAL NOTE:

EROSION CONTROL IS NOT LIMITED TO THE ITEMS ON THESE PLANS. THE CONTRACTOR IS RESPONSIBLE FOR THE INSTALLATION AND MAINTENANCE OF ALL EROSION CONTROL MEASURES. NO SILTATION OF EXISTING OR PROPOSED DRAINAGE FACILITIES SHALL BE ALLOWED. CARE SHALL BE TAKEN TO PREVENT MIGRATION OF SILTS TO OFFSITE PROPERTIES.



NOTES: INSTALLATION - NON-SLOPED AREAS:

1. CHAIN LINK FABRIC TO BE MIN. 11 GAUGE, GALVANIZED. NO RUSTED OR EXCESSIVELY MALFORMED FABRIC.
2. FENCE BASES SHALL BE OF SUFFICIENT WEIGHT AND/OR SPREAD TO ADEQUATELY SUPPORT EACH PANEL.
3. PANEL-TOPANEL CONNECTIONS SHALL BE MADE AT A MINIMUM OF TWO LOCATIONS PER CONNECTION UNLESS OTHERWISE APPROVED.
4. FENCE SCREENING SHALL BE DURABLE HDPE, UV RESISTANT KNITTED FABRIC WITH AN 80% MINIMUM VISIBILITY BLOCKAGE.

PROVIDE OWNER WITH SHOP DRAWINGS DESCRIBING MATERIALS & METHODS FOR SECURE, PLUMB INSTALLTIONS ON SLOPED AREAS.

PROVIDE OWNER WITH SHOP DRAWINGS DESCRIBING MATERIALS & METHODS FOR GATES/ACCESS POINTS INSTALLATIONS.

TEMPORARY CONSTRUCTION FENCING
NTS

△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ
DRAWN BY: M. WOLFF
APPROVED BY: P. HOLM
ISSUE DATE: AUGUST 2026
JOB No.: 25-000313
DRAWING FILE No.: 25-000313-C-DM-10

ALL DIMENSIONS SHOWN IN FEET UNLESS OTHERWISE DESIGNATED

PATRICK HOLM — STATE OF WASHINGTON — 49470 — REGISTERED PROFESSIONAL ENGINEER — PRELIMINARY

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PROJECT NAME:
CITY OF TUMWATER

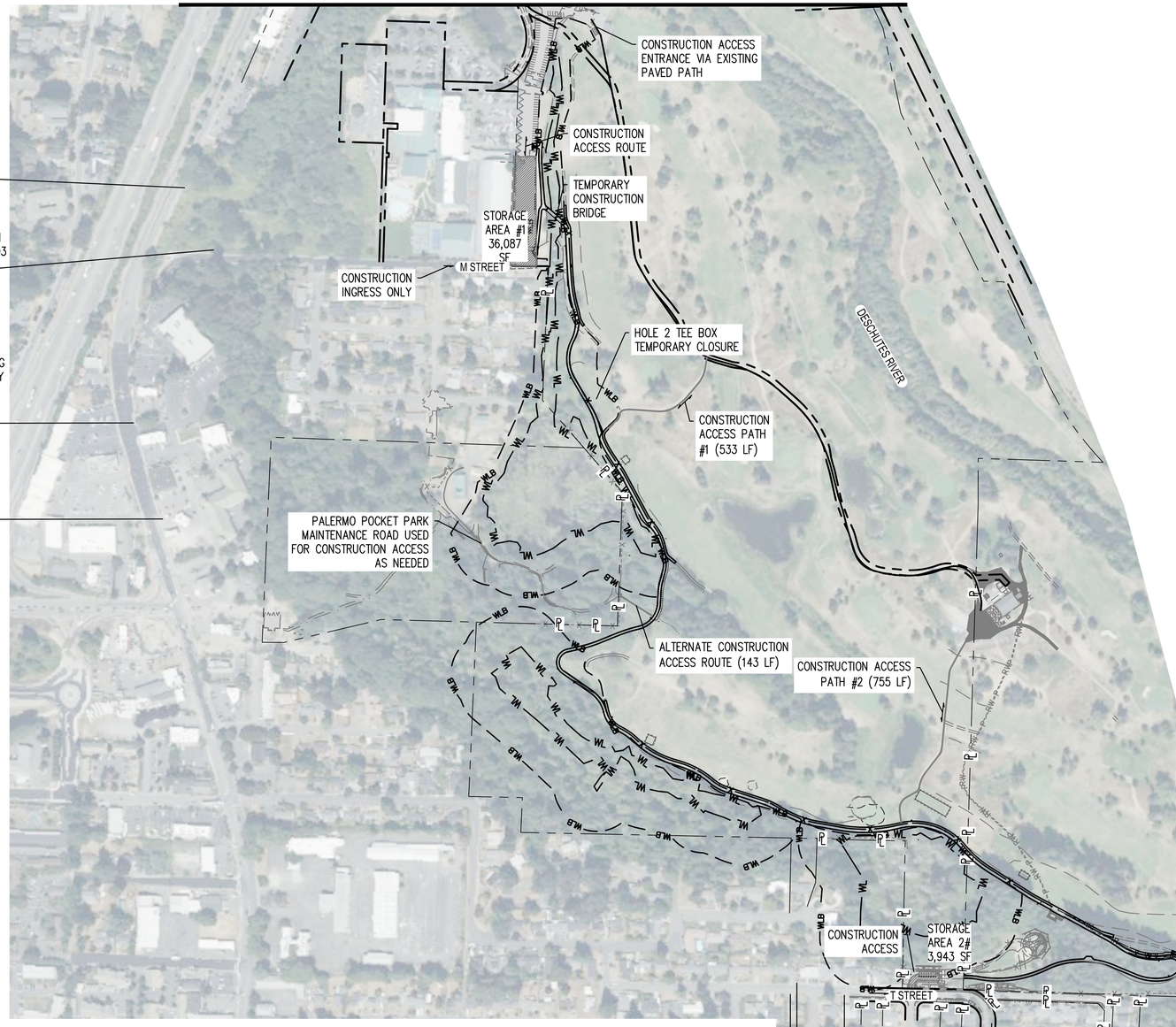
DESCHUTES VALLEY TRAIL
SEGMENT C

DEMOLITION AND TESC DETAILS

DRAWING No.: DM-10
SHEET No.: 34 OF 148

Aug 20, 2026 12:55:19pm - User audreynielsen
N:\PROJECTS\2025 CITY OF TUMWATER\25-000313 TUMWATER DESCHUTES VALLEY TRAIL\CADD\25-000313-C-DM-10.DWG

MATCH LINE
SEE SHEET ST-02



END ROAD WORK SIGN SEE SHEET ST-03 — 1

WORK ZONE SIGN SEE SHEET ST-03 — 2

3

SPEED LIMIT 25 SIGN SEE SHEET ST-03

TRUCKS ENTERING EXITING ROADWAY SIGN SEE SHEET ST-03 — 4

ROAD WORK AHEAD SIGN SEE SHEET ST-03 — 5

ROAD WORK AHEAD SIGN SEE SHEET ST-03 — 6

TRUCKS ENTERING EXITING ROADWAY SIGN SEE SHEET ST-03 — 7

END ROAD WORK SIGN SEE SHEET ST-03 — 8

9 — TRUCKS ENTERING EXITING ROADWAY SIGN SEE SHEET ST-03

10 — END ROAD WORK SIGN SEE SHEET ST-03

11 — ROAD WORK AHEAD SIGN SEE SHEET ST-03

N

0 250 500
SCALE IN FEET

LEGEND

- STAGING AND STORAGE AREA
- TEMPORARY 12-FOOT WIDE CONSTRUCTION ACCESS PATH
- EXISTING PAVED PATHWAY
- SHORELINE
- WL — WETLAND
- WLB — WETLAND BUFFER

NOTES:

1. DAMAGES CAUSED BY CONSTRUCTION TO EXISTING FACILITIES SHALL BE REPAIRED IN KIND.
2. MOBILIZATION IN AND OUT THROUGH THE GOLF COURSE SHALL BE COORDINATED AND SCHEDULED WITH TUMWATER VALLEY GOLF COURSE AHEAD OF TIME.
3. CONSTRUCTION SIGNS CLASS A SHALL BE INSTALLED PER WSDOT STD. PLAN G-22.10.
4. CONTRACTOR SHALL PROTECT EXISTING IRRIGATION SYSTEM. AS-BUILT DRAWINGS SHALL BE REFERENCED TO PREVENT DAMAGE OR IMPACTS TO THE IRRIGATION SYSTEM, SEE APPENDIX xx.

△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ
DRAWN BY: R. PIERCE
APPROVED BY: P. HOLM
ISSUE DATE: AUGUST 2026
JOB No.: 25-000313
DRAWING FILE No.: 25-000313-C-ST-01

ALL DIMENSIONS SHOWN IN FEET UNLESS OTHERWISE DESIGNATED

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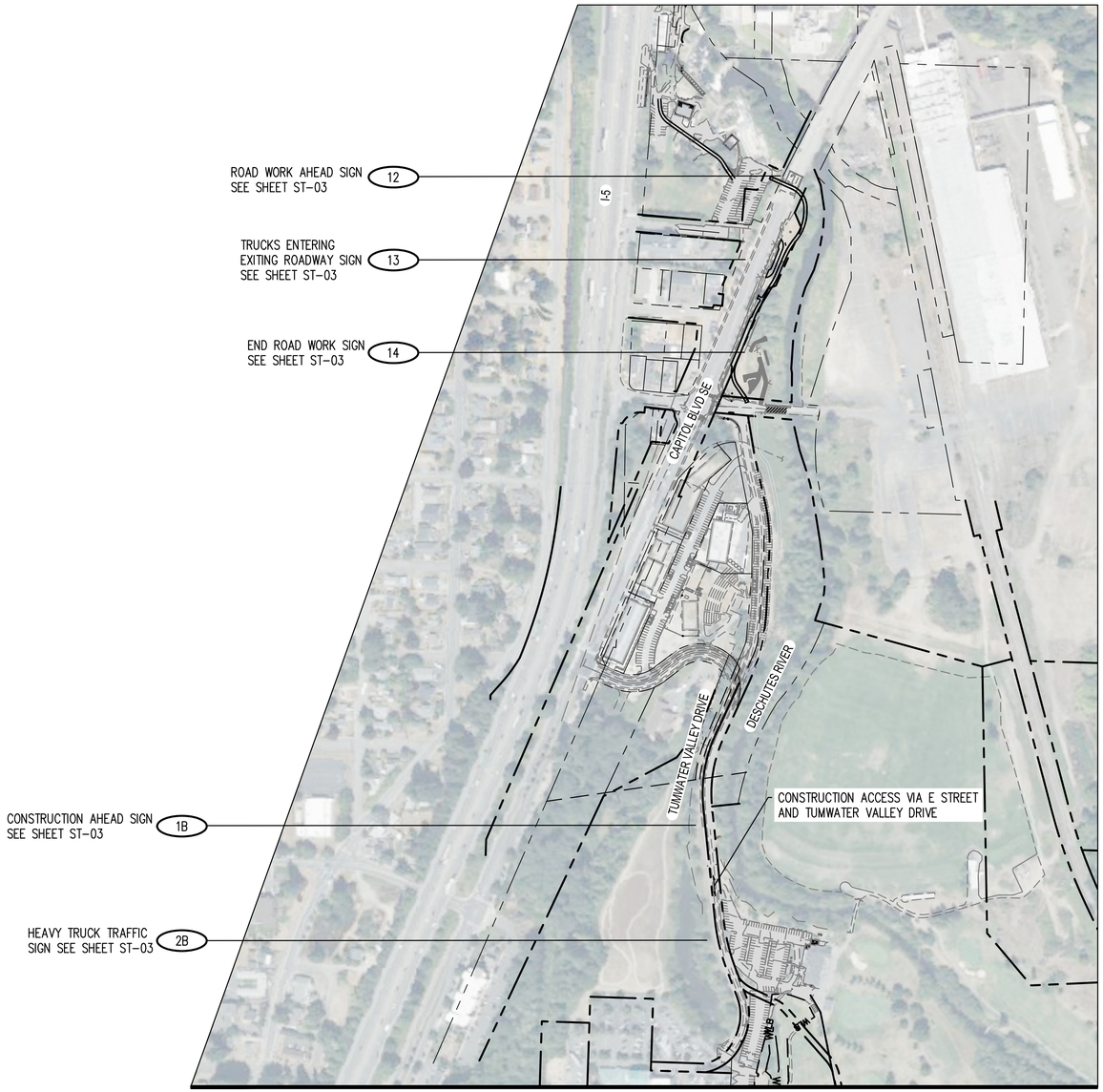
PROJECT NAME:
CITY OF TUMWATER

DESCHUTES VALLEY TRAIL
SEGMENT C

CONSTRUCTION STAGING AND ACCESS PLAN
SEGMENT C

DRAWING No.: ST-01
SHEET No.: 35 OF 148

Aug 20, 2026 3:21:31pm – User: nikkimartinez
N:\PROJECTS\2025 CITY OF TUMWATER\25-000313 TUMWATER DESCHUTES VALLEY TRAIL\CADD\25-000313-C-ST-01.DWG



SEE SHEET ST-01
MATCH LINE

N

0 250 500

SCALE IN FEET

LEGEND

- STAGING AND STORAGE AREA
- TEMPORARY 12-FOOT WIDE CONSTRUCTION ACCESS PATH
- EXISTING PAVED PATHWAY
- SHORELINE
- WL — WETLAND
- WLB — WETLAND BUFFER

NOTES:

1. DAMAGES CAUSED BY CONSTRUCTION TO EXISTING FACILITIES SHALL BE REPAIRED IN KIND.
2. MOBILIZATION IN AND OUT THROUGH THE GOLF COURSE SHALL BE COORDINATED AND SCHEDULED WITH TUMWATER VALLEY GOLF COURSE AHEAD OF TIME.
3. CONSTRUCTION SIGNS CLASS A SHALL BE INSTALLED PER WSDOT STD. PLAN G-22.10.
4. CONTRACTOR SHALL PROTECT EXISTING IRRIGATION SYSTEM. AS-BUILT DRAWINGS SHALL BE REFERENCED TO PREVENT DAMAGE OR IMPACTS TO THE IRRIGATION SYSTEM, SEE APPENDIX xx.

△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ
DRAWN BY: M. HENDRICKS-MATSUDA
APPROVED BY: P. HOLM
ISSUE DATE: AUGUST 2026
JOB No.: 25-000313
DRAWING FILE No.: 25-000313-C-ST-01

ALL DIMENSIONS SHOWN IN FEET UNLESS OTHERWISE DESIGNATED

PATRICK HOLM — STATE OF WASHINGTON — 49470 — REGISTERED PROFESSIONAL ENGINEER — PRELIMINARY

SCJ ALLIANCE
CONSULTING SERVICES
8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
P: 360.352.1465
SCJALLIANCE.COM

PROJECT NAME:

CITY OF TUMWATER

DESCHUTES VALLEY TRAIL
SEGMENT C

CONSTRUCTION STAGING AND ACCESS PLAN
SEGMENT C

DRAWING No.: ST-02

SHEET No.: 36 OF 148

Aug 20, 2026 3:21:31pm - User: nikkimartinez
N:\PROJECTS\2025 CITY OF TUMWATER\25-000313 TUMWATER DESCHUTES VALLEY TRAIL\CADD\25-000313-C-ST-01.DWG

CLASS A SIGNAGE							
SIGN #	SIGN CODE #	SIGN DESCRIPTION	SIGN SIZE X (INCH) - Y (INCH)	POST MATERIAL	POST SIZE	POST LENGTH	REMARKS
1	G20-2	END ROAD WORK	36 18	TIMBER	4"x4"	7.0'	
2	G20-5aP	WORK ZONE (PLAQUE)	24 18	TIMBER	4"x4"	7.0'	
3	R2-1	SPEED LIMIT 25	24 30	TIMBER	4"x4"	7.0'	
4	N/A	TRUCKS ENTERING EXITING ROADWAY	36 36	TIMBER	4"x4"	7.0'	
5	W20-1	ROAD WORK AHEAD	36 36	TIMBER	4"x4"	7.0'	
6	W20-1	ROAD WORK AHEAD	36 36	TIMBER	4"x4"	7.0'	
7	N/A	TRUCKS ENTERING EXITING ROADWAY	36 36	TIMBER	4"x4"	7.0'	
8	G20-2	END ROAD WORK	36 18	TIMBER	4"x4"	7.0'	
9	N/A	TRUCKS ENTERING EXITING ROADWAY	36 36	TIMBER	4"x4"	7.0'	
10	G20-2	END ROAD WORK	36 18	TIMBER	4"x4"	7.0'	
11	W20-1	ROAD WORK AHEAD	36 36	TIMBER	4"x4"	7.0'	
12	W20-1	ROAD WORK AHEAD	36 36	TIMBER	4"x4"	7.0'	
13	N/A	TRUCKS ENTERING EXITING ROADWAY	36 36	TIMBER	4"x4"	7.0'	
14	G20-2	END ROAD WORK	36 18	TIMBER	4"x4"	7.0'	

CLASS B SIGNAGE			
SIGN #	SIGN CODE #	SIGN DESCRIPTION	SIGN SIZE X (INCH) - Y (INCH)
1B	N/A	CONSTRUCTION AHEAD	36 36
2B	N/A	HEAVY TRUCK TRAFFIC	36 36

△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ
DRAWN BY: M. HENDRICKS-MATSUDA
APPROVED BY: P. HOLM
ISSUE DATE: AUGUST 2026
JOB No.: 25-000313
DRAWING FILE No.: 25-000313-C-ST-01

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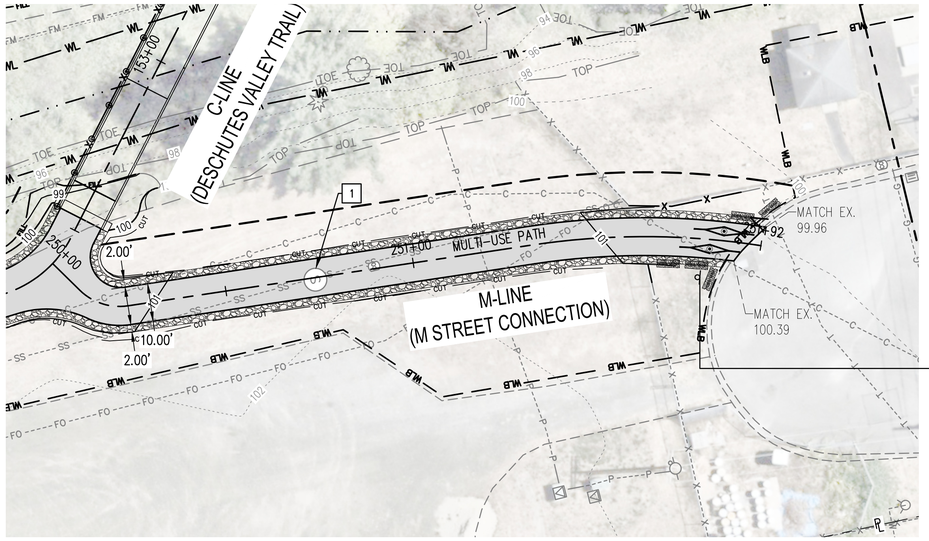
PROJECT NAME: CITY OF TUMWATER

DESCHUTES VALLEY TRAIL
SEGMENT C

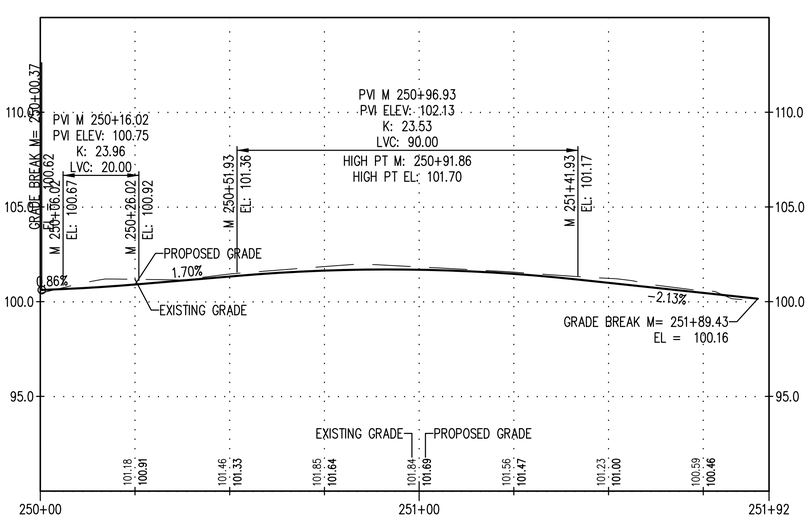
CONSTRUCTION STAGING AND ACCESS PLAN
SEGMENT C

DRAWING No.: ST-03
SHEET No.: 37 OF 148

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M PROFILE



H
0 20 40

V
0 4 8

SCALE IN FEET

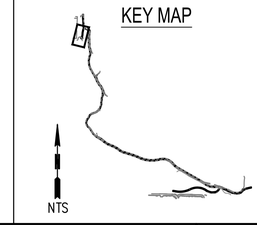
LEGEND

	HMA TRAIL	SEE SHEET XS-01-XS-03
	GRAVEL SHOULDER	SEE SHEET XS-01-XS-03
	EDGE OF PAVEMENT	
	EDGE OF GRAVEL	
	CEMENT CONC. TRAFFIC CURB	WSDOT STD PLAN F-10.12
X X	SAFETY FENCE & POLE	SEE SHEET CF-01-CF-06
XX	EX. MAJOR CONTOUR	
XX	EX. MINOR CONTOUR	
XX	MAJOR CONTOUR	
XX	MINOR CONTOUR	
FILL	APPROX. FILL LINE	
CUT	APPROX. CUT LINE	
	CATCH BASIN TYPE 1	WSDOT STD PLAN B-5.20
SD	8 IN. DIA. CORRUGATED HDPE STORM SEWER PIPE	
P	POWER LINE	
	ROCK CHECK DAM	SEE SHEET SD-01
	DITCH	
	REDI ROCK RETAINING WALL	
X X	TYPE 3 CHAIN LINK FENCE	WSDOT STD PLAN L-20.10-03
	MULTI-USE PATH MARKINGS	WSDOT STD PLAN M-9.60
	ADA ACCESSIBILITY	SEE SHEET TG-01
	ACCESSIBILITY SIGN AND POST	SEE SHEET TG-01
	ADA PARKING STRIPING	SEE SHEET TG-01
	BOLLARD TYPE 1	WSDOT STD PLAN H-60.10
	EDGE OF FULL DISPERSION	
	ECOLOGY BLOCK	
	CONCRETE PAD	SEE SHEET TG-01
	ROCK EMBANKMENT	SEE SHEET TG-02
P	SIGN NOTE	SEE SHEET SN-01
P P	TYPE 3 BARRICADE	SEE SHEET SN-01
X	SIGN NOTE	
REL-X	SIGN RELOCATION NOTE	

[X] CONSTRUCTION NOTES:

1. ADJUST SEWER MANHOLE AND CLEANOUT TO GRADE.

KEY MAP



△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ	ISSUE DATE: AUGUST 2026
DRAWN BY: M. HENDRICKS-MATSUDA	JOB No.: 25-000313
APPROVED BY: P. HOLM	DRAWING FILE No.: 25-000313-C-PP-00

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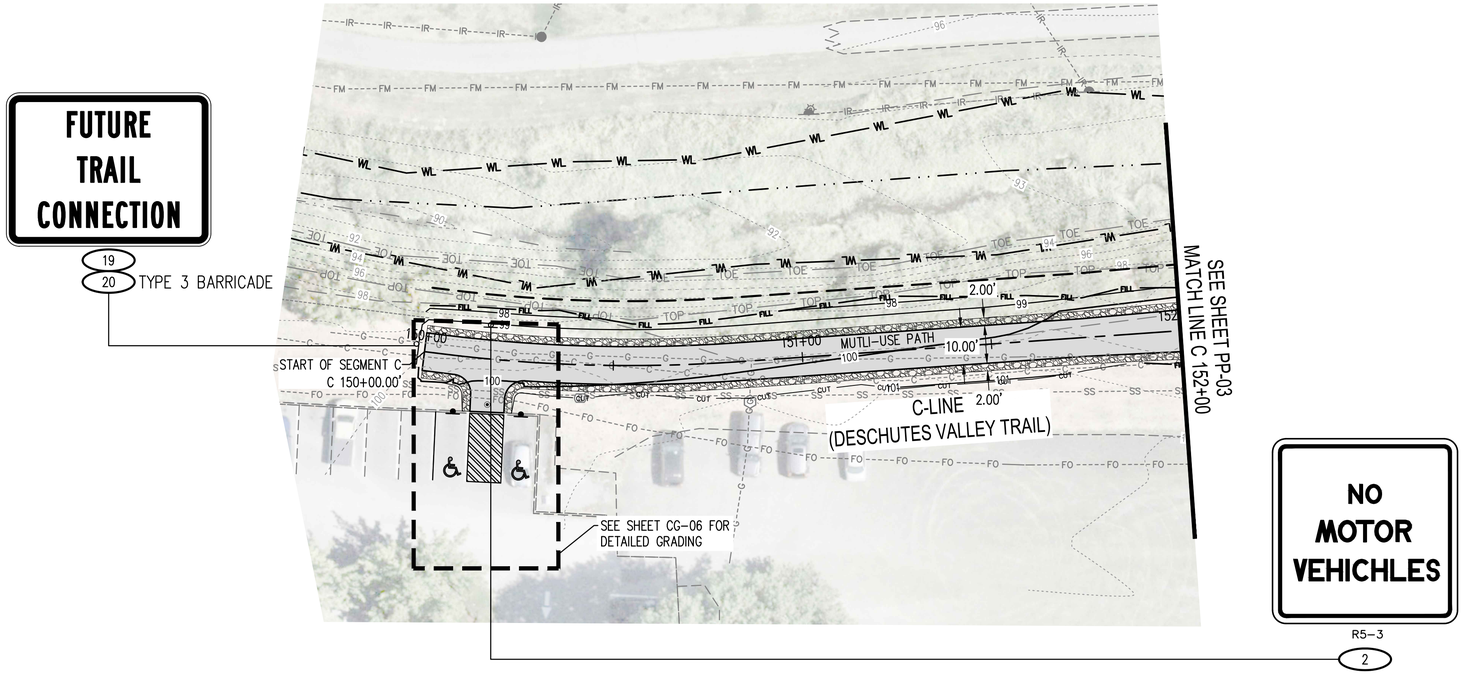
DESCHUTES VALLEY TRAIL
SEGMENT C

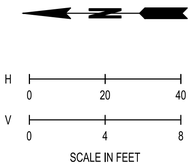
PLAN AND PROFILE
M 250+00 - M 251+92

DRAWING No.: PP-01

SHEET No.: 38 OF 148

Aug 20, 2026 1:03:20pm - User: aufreynielsen
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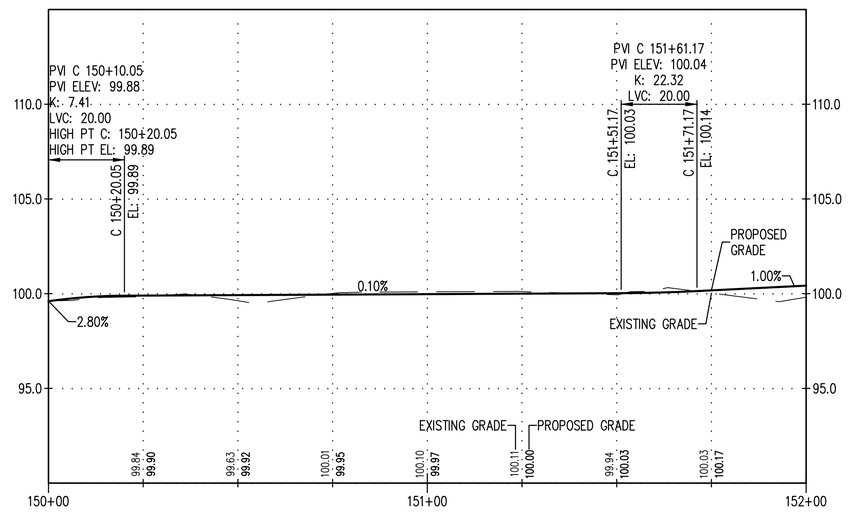


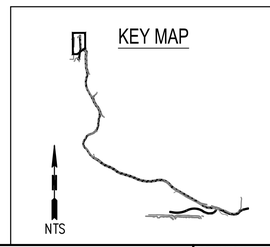


LEGEND

	HMA TRAIL	SEE SHEET XS-01-XS-03
	GRAVEL SHOULDER	SEE SHEET XS-01-XS-03
	EDGE OF PAVEMENT	
	EDGE OF GRAVEL	
	CEMENT CONC. TRAFFIC CURB	WSDOT STD PLAN F-10.12
	SAFETY FENCE & POLE	SEE SHEET CF-01-CF-06
XX	EX. MAJOR CONTOUR	
XX	EX. MINOR CONTOUR	
XX	MAJOR CONTOUR	
XX	MINOR CONTOUR	
FILL	APPROX. FILL LINE	
CUT	APPROX. CUT LINE	
	CATCH BASIN TYPE 1	WSDOT STD PLAN B-5.20
SD	8 IN. DIA. CORRUGATED HDPE STORM SEWER PIPE	
P	POWER LINE	
	ROCK CHECK DAM	SEE SHEET SD-01
	DITCH	
	REDI ROCK RETAINING WALL	
X X	TYPE 3 CHAIN LINK FENCE	WSDOT STD PLAN L-20.10-03
	MULTI-USE PATH MARKINGS	WSDOT STD PLAN M-9.60
	ADA ACCESSIBILITY	SEE SHEET TG-01
	ACCESSIBILITY SIGN AND POST	SEE SHEET TG-01
	ADA PARKING STRIPING	SEE SHEET TG-01
	BOLLARD TYPE 1	WSDOT STD PLAN H-60.10
	EDGE OF FULL DISPERSION	
	ECOLOGY BLOCK	
	CONCRETE PAD	SEE SHEET TG-01
	ROCK EMBANKMENT	SEE SHEET TG-02
	SIGN NOTE	SEE SHEET SN-01
	TYPE 3 BARRICADE	SEE SHEET SN-01
X	SIGN NOTE	
REL-X	SIGN RELOCATION NOTE	

C PROFILE





△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ	ISSUE DATE: AUGUST 2026
DRAWN BY: M. HENDRICKS-MATSUDA	JOB No.: 25-000313
APPROVED BY: P. HOLM	DRAWING FILE No.: 25-000313-C-PP-000

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8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
P: 360.352.1465
SCJALLIANCE.COM

PROJECT NAME:

CITY OF TUMWATER

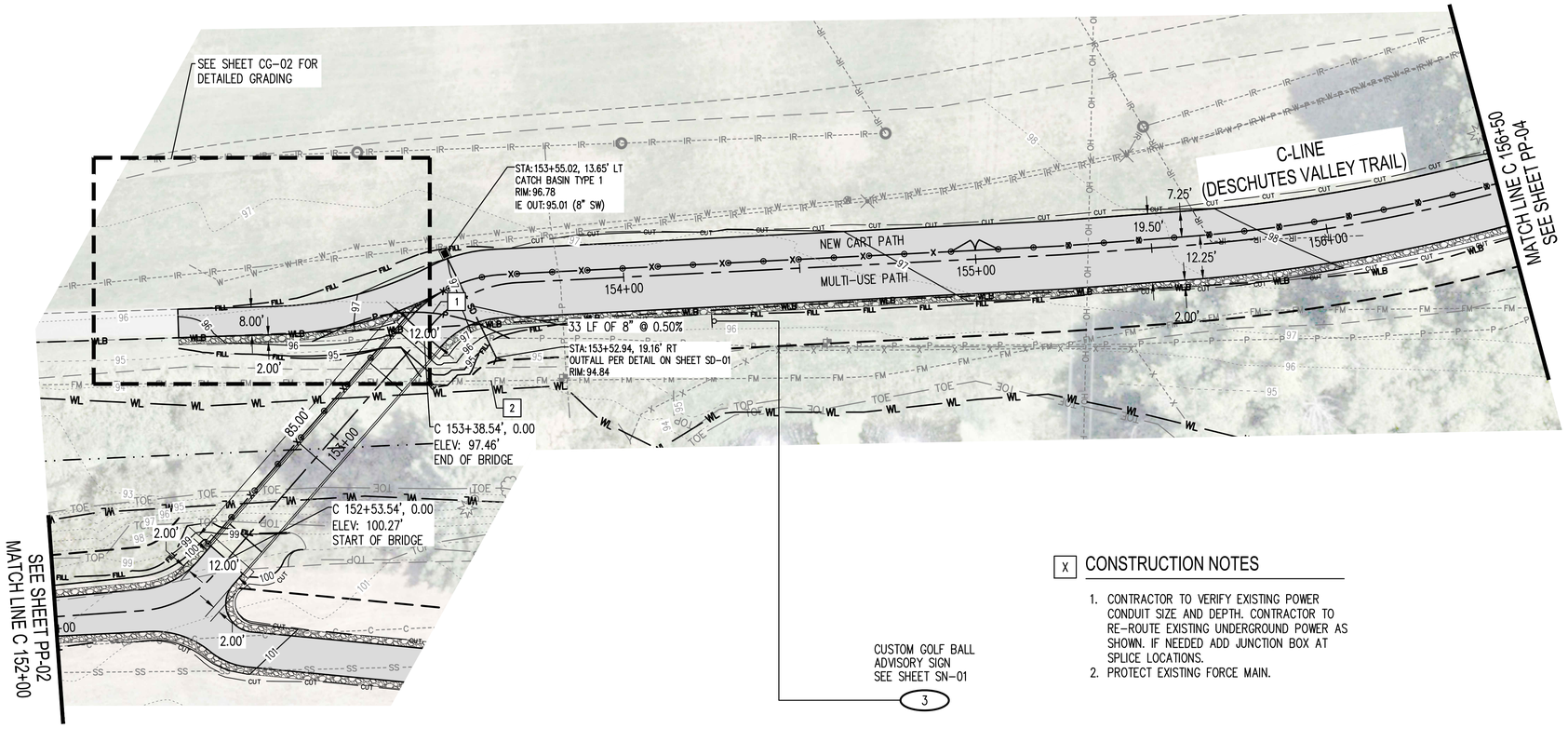
DESCHUTES VALLEY TRAIL
SEGMENT C

PLAN AND PROFILE
C 150+00 - C 152+00

DRAWING No.: PP-02

SHEET No.: 39 OF 148

Aug 20, 2026 1:39:00pm – User: audreynielsen
N:\PROJECTS\0625 CITY OF TUMWATER\25-000313 TUMWATER DESCHUTES VALLEY TRAIL\CADD\25-000313-C-PP-000.DWG



X CONSTRUCTION NOTES

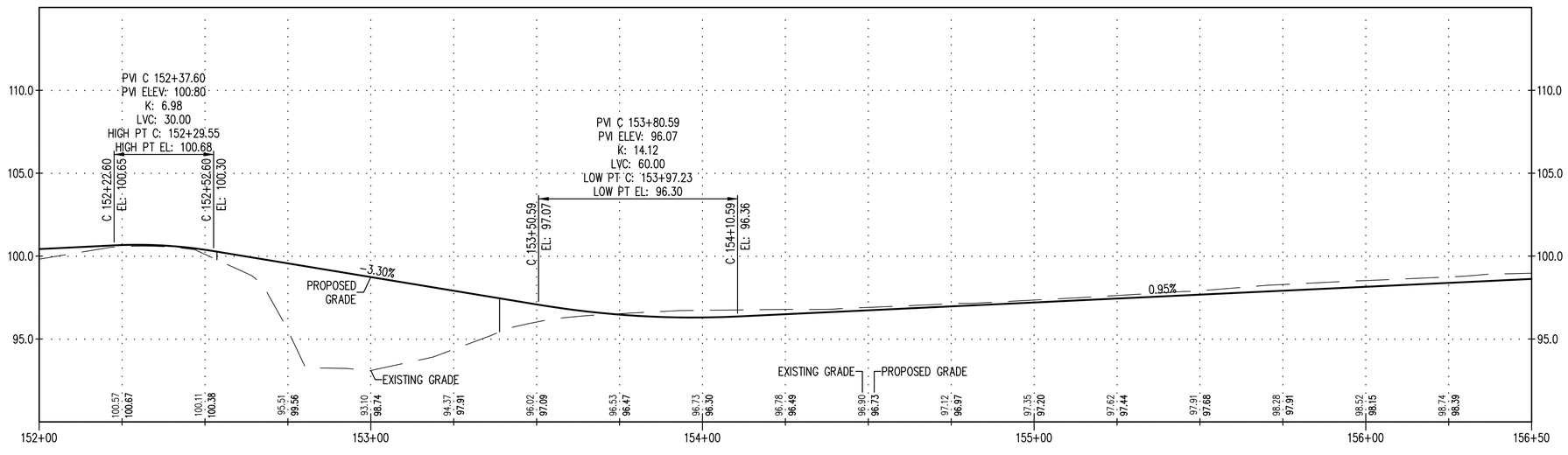
1. CONTRACTOR TO VERIFY EXISTING POWER CONDUIT SIZE AND DEPTH. CONTRACTOR TO RE-ROUTE EXISTING UNDERGROUND POWER AS SHOWN. IF NEEDED ADD JUNCTION BOX AT SPLICE LOCATIONS.
2. PROTECT EXISTING FORCE MAIN.

H 0 20 40
V 0 4 8
SCALE IN FEET

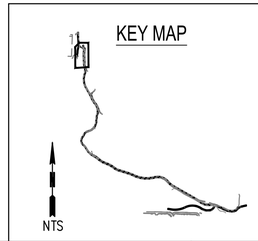
LEGEND

	HMA TRAIL	SEE SHEET XS-01-XS-03
	GRAVEL SHOULDER	SEE SHEET XS-01-XS-03
	EDGE OF PAVEMENT	
	EDGE OF GRAVEL	
	CEMENT CONC. TRAFFIC CURB	WSDOT STD PLAN F-10.12
X X	SAFETY FENCE & POLE	SEE SHEET CF-01-CF-06
XX	EX. MAJOR CONTOUR	
XX	EX. MINOR CONTOUR	
XX	MAJOR CONTOUR	
XX	MINOR CONTOUR	
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	CATCH BASIN TYPE 1	WSDOT STD PLAN B-5.20
SD	8 IN. DIA. CORRUGATED HDPE STORM SEWER PIPE	
P	POWER LINE	
	ROCK CHECK DAM	SEE SHEET SD-01
	DITCH	
	REDI ROCK RETAINING WALL	
X X	TYPE 3 CHAIN LINK FENCE	WSDOT STD PLAN L-20.10-03
	MULTI-USE PATH MARKINGS	WSDOT STD PLAN M-9.60
	ADA ACCESSIBILITY	SEE SHEET TG-01
	ACCESSIBILITY SIGN AND POST	SEE SHEET TG-01
	ADA PARKING STRIPING	SEE SHEET TG-01
	BOLLARD TYPE 1	WSDOT STD PLAN H-60.10
	EDGE OF FULL DISPERSION	
	ECOLOGY BLOCK	
	CONCRETE PAD	SEE SHEET TG-01
	ROCK EMBANKMENT	SEE SHEET TG-02
P	SIGN NOTE	SEE SHEET SN-01
P P	TYPE 3 BARRICADE	SEE SHEET SN-01
X	SIGN NOTE	
REL-X	SIGN RELOCATION NOTE	

C PROFILE



KEY MAP



△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ	ISSUE DATE: AUGUST 2026
DRAWN BY: M. WOLFF	JOB No.: 25-000313
APPROVED BY: P. HOLM	DRAWING FILE No.: 25-000313-C-PP-01

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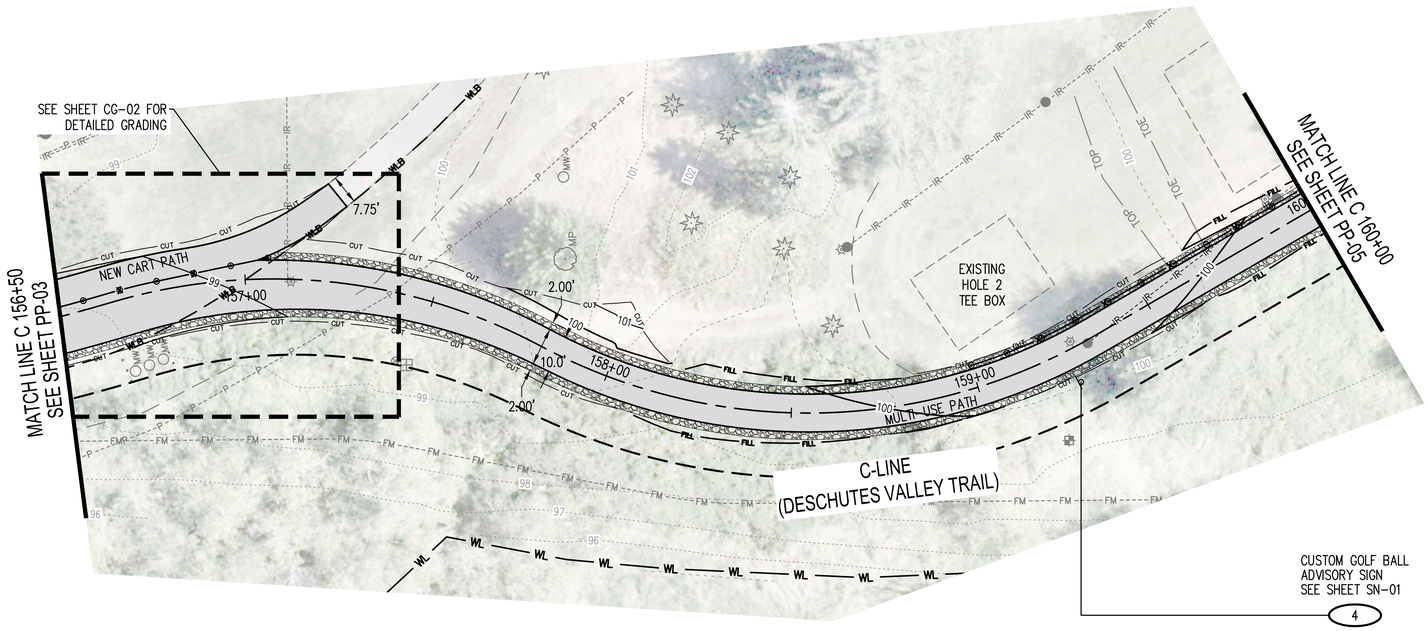
DESCHUTES VALLEY TRAIL
SEGMENT C

PLAN AND PROFILE
C 152+00 - C 156+50

DRAWING No.: PP-03

SHEET No.: 40 OF 148

Aug 20, 2026 1:27:13pm - User:audreyvielsen
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H 0 20 40

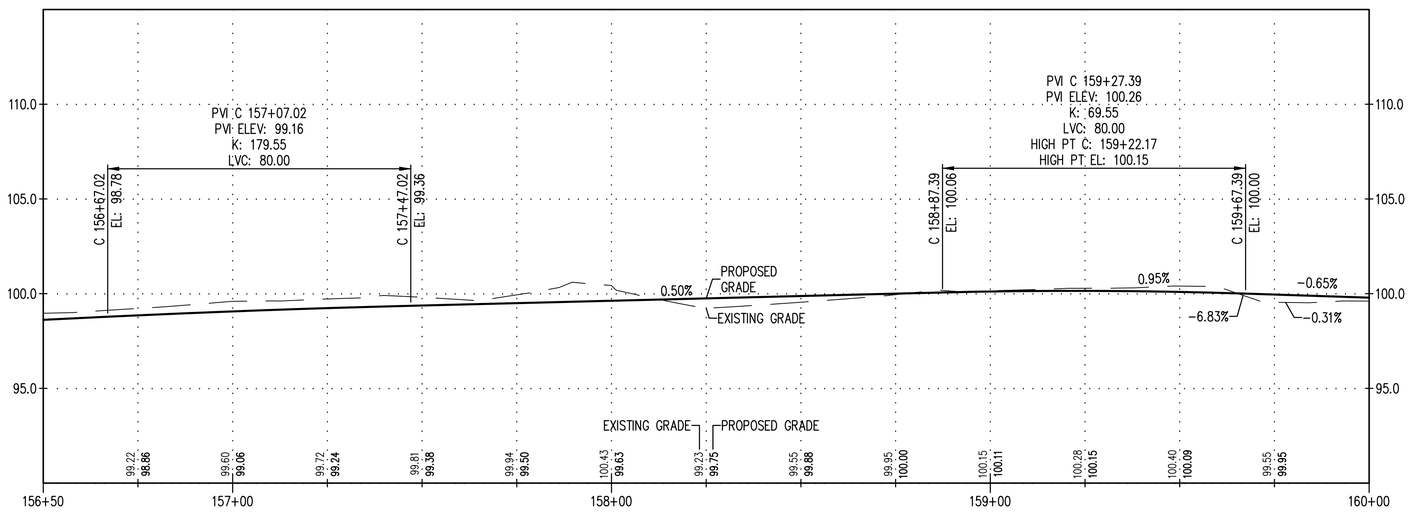
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SCALE IN FEET

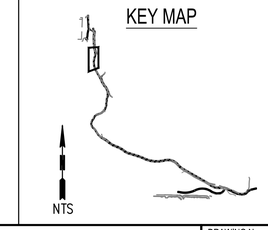
LEGEND

	HMA TRAIL	SEE SHEET XS-01-XS-03
	GRAVEL SHOULDER	SEE SHEET XS-01-XS-03
	EDGE OF PAVEMENT	
	EDGE OF GRAVEL	
	CEMENT CONC. TRAFFIC CURB	WSDOT STD PLAN F-10.12
	SAFETY FENCE & POLE	SEE SHEET CF-01-CF-06
XX	EX. MAJOR CONTOUR	
XX	EX. MINOR CONTOUR	
XX	MAJOR CONTOUR	
XX	MINOR CONTOUR	
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CUT	APPROX. CUT LINE	
	CATCH BASIN TYPE 1	WSDOT STD PLAN B-5.20
SD	8 IN. DIA. CORRUGATED HDPE STORM SEWER PIPE	
P	POWER LINE	
	ROCK CHECK DAM	SEE SHEET SD-01
	DITCH	
	REDI ROCK RETAINING WALL	
	TYPE 3 CHAIN LINK FENCE	WSDOT STD PLAN L-20.10-03
	MULTI-USE PATH MARKINGS	WSDOT STD PLAN M-9.60
	ADA ACCESSIBILITY	SEE SHEET TG-01
	ACCESSIBILITY SIGN AND POST	SEE SHEET TG-01
	ADA PARKING STRIPING	SEE SHEET TG-01
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	ECOLOGY BLOCK	
	CONCRETE PAD	SEE SHEET TG-01
	ROCK EMBANKMENT	SEE SHEET TG-02
P	SIGN NOTE	SEE SHEET SN-01
	TYPE 3 BARRICADE	SEE SHEET SN-01
X	SIGN NOTE	
REL-X	SIGN RELOCATION NOTE	

C PROFILE



KEY MAP



REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ	ISSUE DATE: AUGUST 2026
DRAWN BY: M. WOLFF	JOB No.: 25-000313
APPROVED BY: P. HOLM	DRAWING FILE No.: 25-000313-C-PP-02

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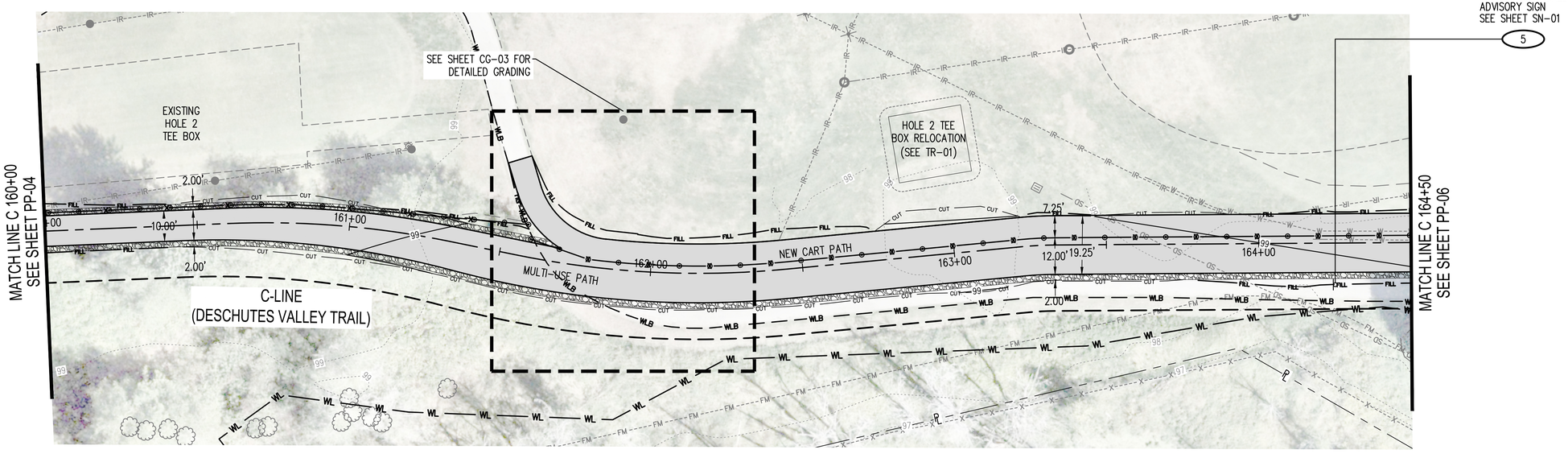
DESCHUTES VALLEY TRAIL
SEGMENT C

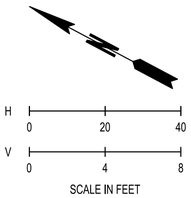
PLAN AND PROFILE
C 156+50 - C 160+00

DRAWING No.: PP-04

SHEET No.: 41 OF 148

Aug 20, 2026 1:36:13pm – User: audreyvaleen
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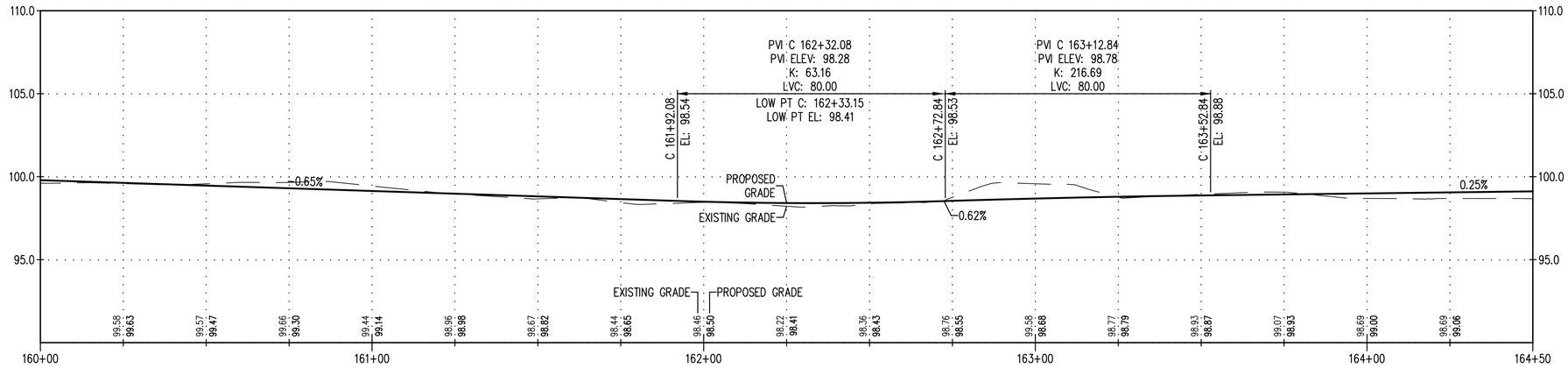


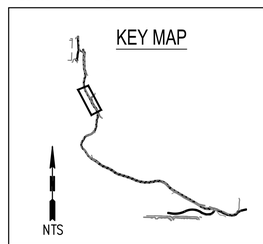


LEGEND

	HMA TRAIL	SEE SHEET XS-01-XS-03
	GRAVEL SHOULDER	SEE SHEET XS-01-XS-03
	EDGE OF PAVEMENT	
	EDGE OF GRAVEL	
	CEMENT CONC. TRAFFIC CURB	WSDOT STD PLAN F-10.12
	SAFETY FENCE & POLE	SEE SHEET CF-01-CF-06
XX	EX. MAJOR CONTOUR	
XX	EX. MINOR CONTOUR	
XX	MAJOR CONTOUR	
XX	MINOR CONTOUR	
FILL	APPROX. FILL LINE	
CUT	APPROX. CUT LINE	
	CATCH BASIN TYPE 1	WSDOT STD PLAN B-5.20
SD	8 IN. DIA. CORRUGATED HDPE STORM SEWER PIPE	
P	POWER LINE	
	ROCK CHECK DAM	SEE SHEET SD-01
	DITCH	
	REDI ROCK RETAINING WALL	
	TYPE 3 CHAIN LINK FENCE	WSDOT STD PLAN L-20.10-03
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	ECOLOGY BLOCK	
	CONCRETE PAD	SEE SHEET TG-01
	ROCK EMBANKMENT	SEE SHEET TG-02
	SIGN NOTE	SEE SHEET SN-01
	TYPE 3 BARRICADE	SEE SHEET SN-01
X	SIGN NOTE	
REL-X	SIGN RELOCATION NOTE	

C PROFILE





△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ	ISSUE DATE: AUGUST 2026
DRAWN BY: M. WOLFF	JOB No.: 25-000313
APPROVED BY: P. HOLM	DRAWING FILE No.: 25-000313-C-PP-03

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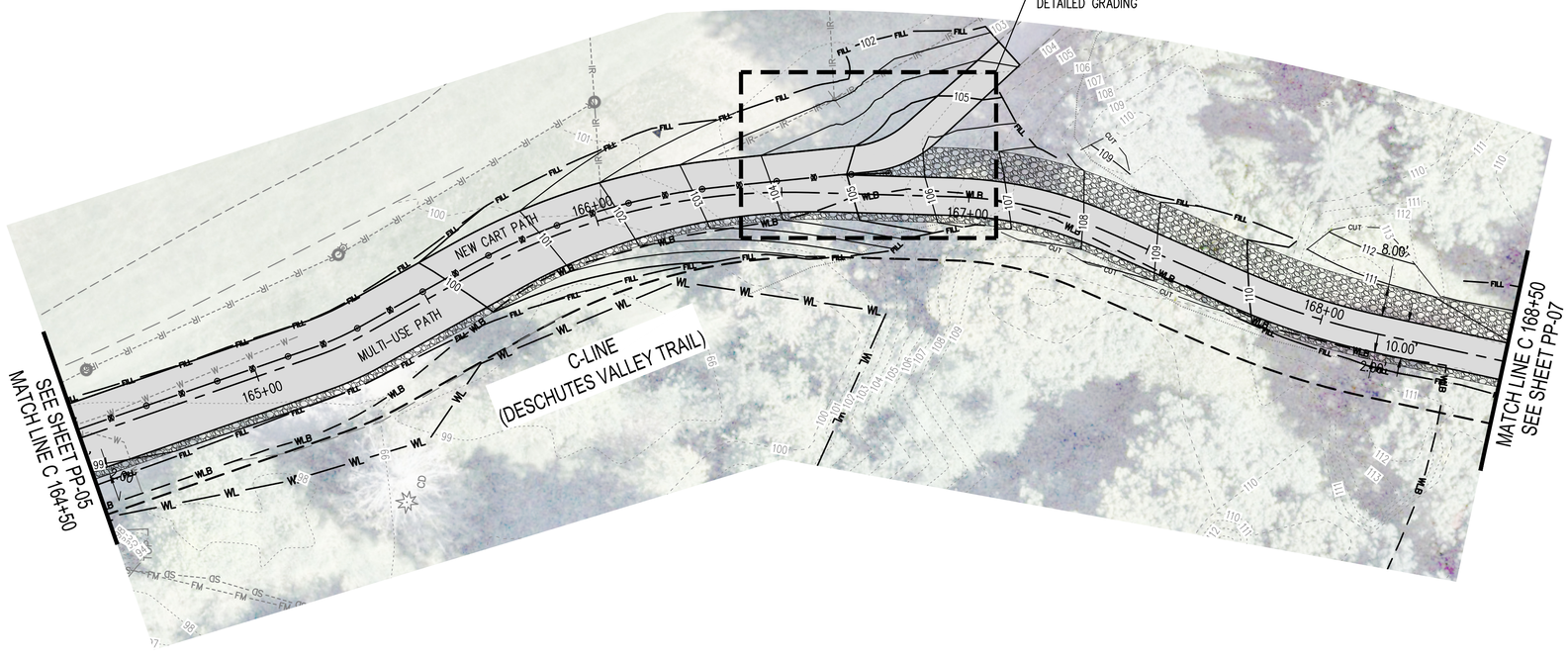
DESCHUTES VALLEY TRAIL
SEGMENT C

PLAN AND PROFILE
C 160+00 - C 164+50

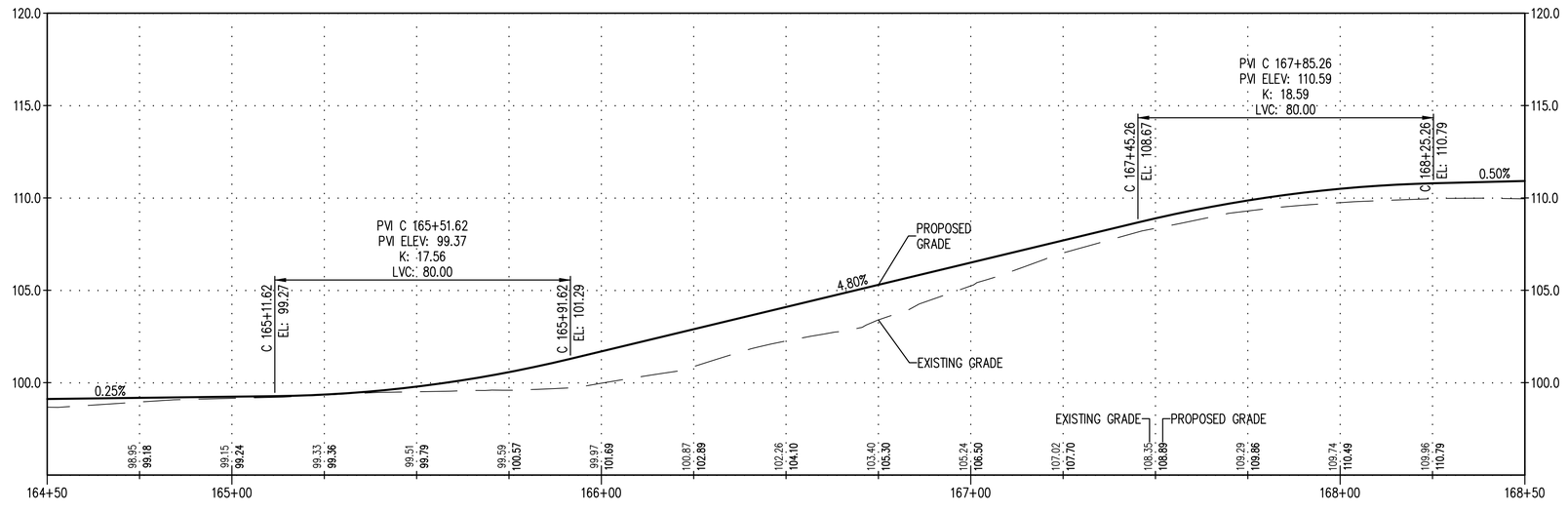
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SHEET No.: 42 OF 148

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C PROFILE



H 0 20 40

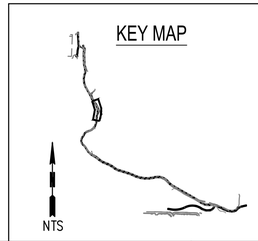
V 0 4 8

SCALE IN FEET

LEGEND

	HMA TRAIL	SEE SHEET XS-01-XS-03
	GRAVEL SHOULDER	SEE SHEET XS-01-XS-03
	EDGE OF PAVEMENT	
	EDGE OF GRAVEL	
	CEMENT CONC. TRAFFIC CURB	WSDOT STD PLAN F-10.12
	SAFETY FENCE & POLE	SEE SHEET CF-01-CF-06
XX	EX. MAJOR CONTOUR	
XX	EX. MINOR CONTOUR	
XX	MAJOR CONTOUR	
XX	MINOR CONTOUR	
FILL	APPROX. FILL LINE	
CUT	APPROX. CUT LINE	
	CATCH BASIN TYPE 1	WSDOT STD PLAN B-5.20
SD	8 IN. DIA. CORRUGATED HDPE STORM SEWER PIPE	
P	POWER LINE	
	ROCK CHECK DAM	SEE SHEET SD-01
	DITCH	
	REDI ROCK RETAINING WALL	
X X	TYPE 3 CHAIN LINK FENCE	WSDOT STD PLAN L-20.10-03
	MULTI-USE PATH MARKINGS	WSDOT STD PLAN M-9.60
	ADA ACCESSIBILITY	SEE SHEET TG-01
	ACCESSIBILITY SIGN AND POST	SEE SHEET TG-01
	ADA PARKING STRIPING	SEE SHEET TG-01
	BOLLARD TYPE 1	WSDOT STD PLAN H-60.10
	EDGE OF FULL DISPERSION	
ECOLOGY BLOCK	ECOLOGY BLOCK	
	CONCRETE PAD	SEE SHEET TG-01
	ROCK EMBANKMENT	SEE SHEET TG-02
	SIGN NOTE	SEE SHEET SN-01
	TYPE 3 BARRICADE	SEE SHEET SN-01
X	SIGN NOTE	
REL-X	SIGN RELOCATION NOTE	

KEY MAP



△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ
DRAWN BY: M. WOLFF
APPROVED BY: P. HOLM
ISSUE DATE: AUGUST 2026
JOB No.: 25-000313
DRAWING FILE No.: 25-000313-C-PP-04

ALL DIMENSIONS SHOWN IN FEET UNLESS OTHERWISE DESIGNATED

PATRICK HOLM — STATE OF WASHINGTON — 49470 — REGISTERED PROFESSIONAL ENGINEER — PRELIMINARY

SCJ ALLIANCE
CONSULTING SERVICES
8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
P: 360.352.1465
SCJALLIANCE.COM

PROJECT NAME:

CITY OF TUMWATER

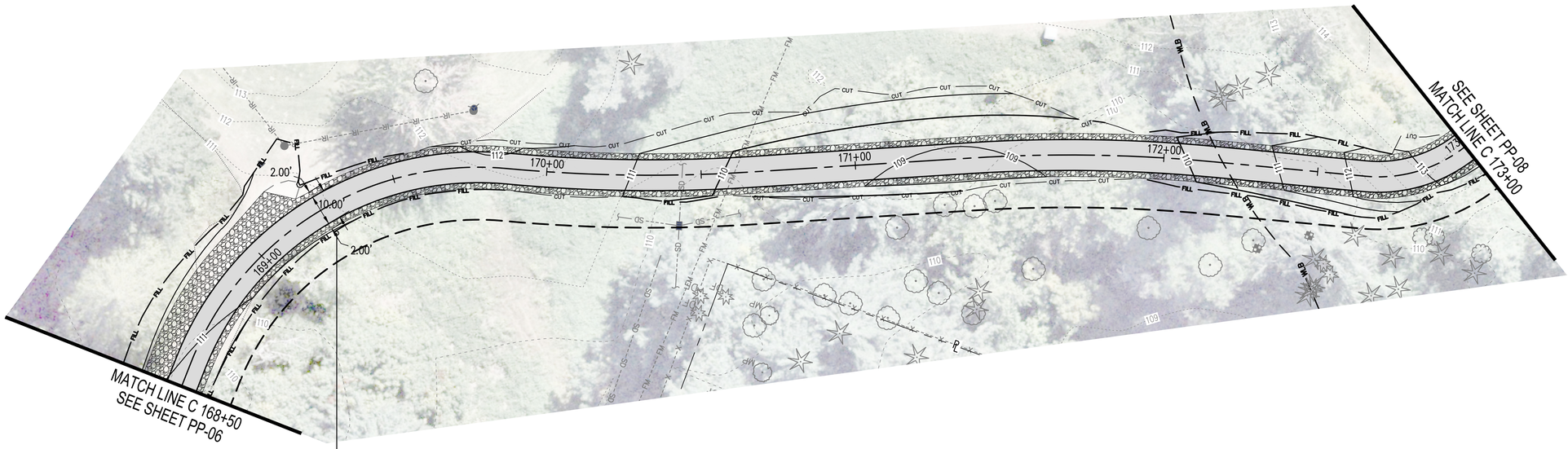
DESCHUTES VALLEY TRAIL
SEGMENT C

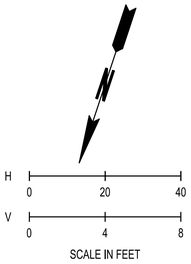
PLAN AND PROFILE
C 164+50 - C 168+50

DRAWING No.: PP-06

SHEET No.: 43 OF 148

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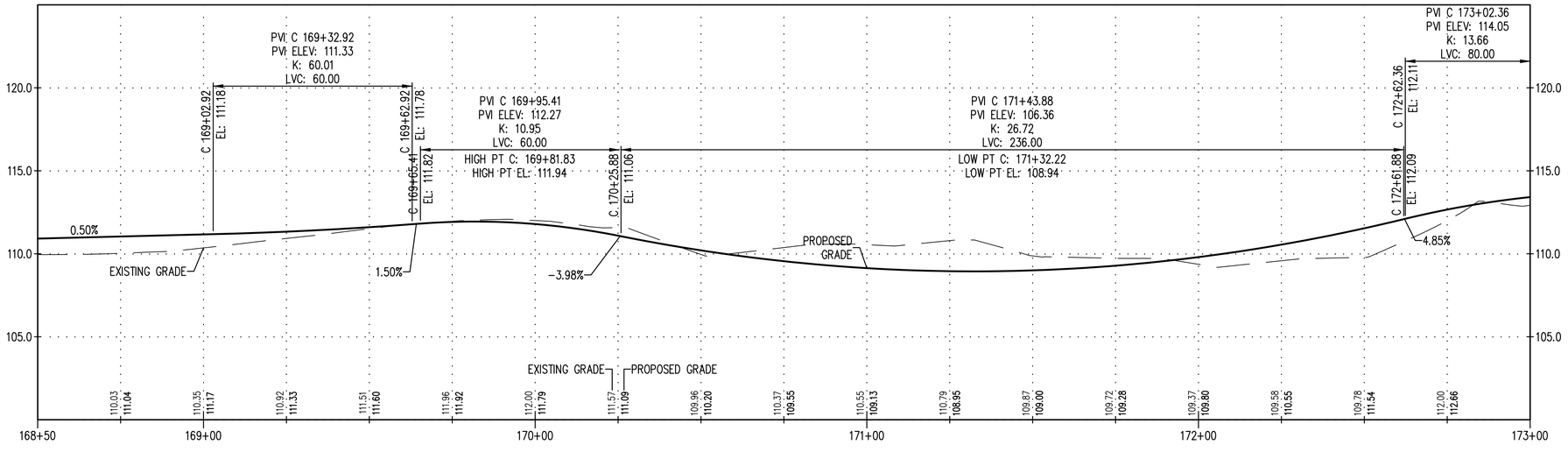




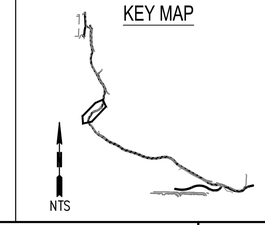
LEGEND

	HMA TRAIL	SEE SHEET XS-01-XS-03
	GRAVEL SHOULDER	SEE SHEET XS-01-XS-03
	EDGE OF PAVEMENT	
	EDGE OF GRAVEL	
	CEMENT CONC. TRAFFIC CURB	WSDOT STD PLAN F-10.12
	SAFETY FENCE & POLE	SEE SHEET CF-01-CF-06
XX	EX. MAJOR CONTOUR	
XX	EX. MINOR CONTOUR	
XX	MAJOR CONTOUR	
XX	MINOR CONTOUR	
FILL	APPROX. FILL LINE	
CUT	APPROX. CUT LINE	
	CATCH BASIN TYPE 1	WSDOT STD PLAN B-5.20
SD	8 IN. DIA. CORRUGATED HDPE STORM SEWER PIPE	
P	POWER LINE	
	ROCK CHECK DAM	SEE SHEET SD-01
	DITCH	
	REDI ROCK RETAINING WALL	
	TYPE 3 CHAIN LINK FENCE	WSDOT STD PLAN L-20.10-03
	MULTI-USE PATH MARKINGS	WSDOT STD PLAN M-9.60
	ADA ACCESSIBILITY	SEE SHEET TG-01
	ACCESSIBILITY SIGN AND POST	SEE SHEET TG-01
	ADA PARKING STRIPING	SEE SHEET TG-01
	BOLLARD TYPE 1	WSDOT STD PLAN H-60.10
	EDGE OF FULL DISPERSION	
	ECOLOGY BLOCK	
	CONCRETE PAD	SEE SHEET TG-01
	ROCK EMBANKMENT	SEE SHEET TG-02
P	SIGN NOTE	SEE SHEET SN-01
	TYPE 3 BARRICADE	SEE SHEET SN-01
X	SIGN NOTE	
REL-X	SIGN RELOCATION NOTE	

C PROFILE



KEY MAP



	REVISIONS	DATE	BY
△			

DESIGNED BY: R. MARTINEZ	ISSUE DATE: AUGUST 2026
DRAWN BY: M. WOLFF	JOB No.: 25-000313
APPROVED BY: P. HOLM	DRAWING FILE No.: 25-000313-C-PP-05

ALL DIMENSIONS SHOWN IN FEET UNLESS OTHERWISE DESIGNATED

PATRICK HOLM — STATE OF WASHINGTON — 49470 — REGISTERED PROFESSIONAL ENGINEER — PRELIMINARY

SCJ ALLIANCE
CONSULTING SERVICES
8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
P: 360.352.1465
SCJALLIANCE.COM

PROJECT NAME:

CITY OF TUMWATER

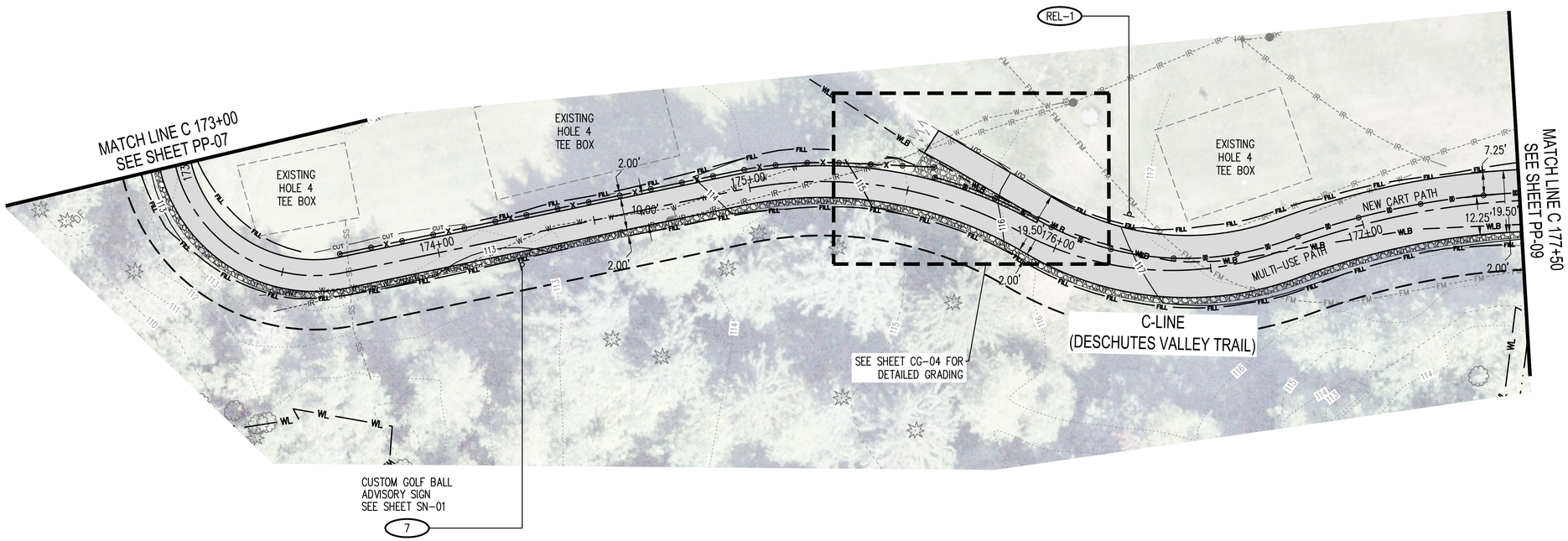
DESCHUTES VALLEY TRAIL
SEGMENT C

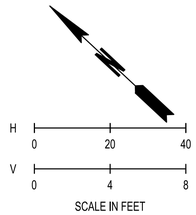
PLAN AND PROFILE
C 168+50 - C 173+00

DRAWING No.: PP-07

SHEET No.: 44 OF 148

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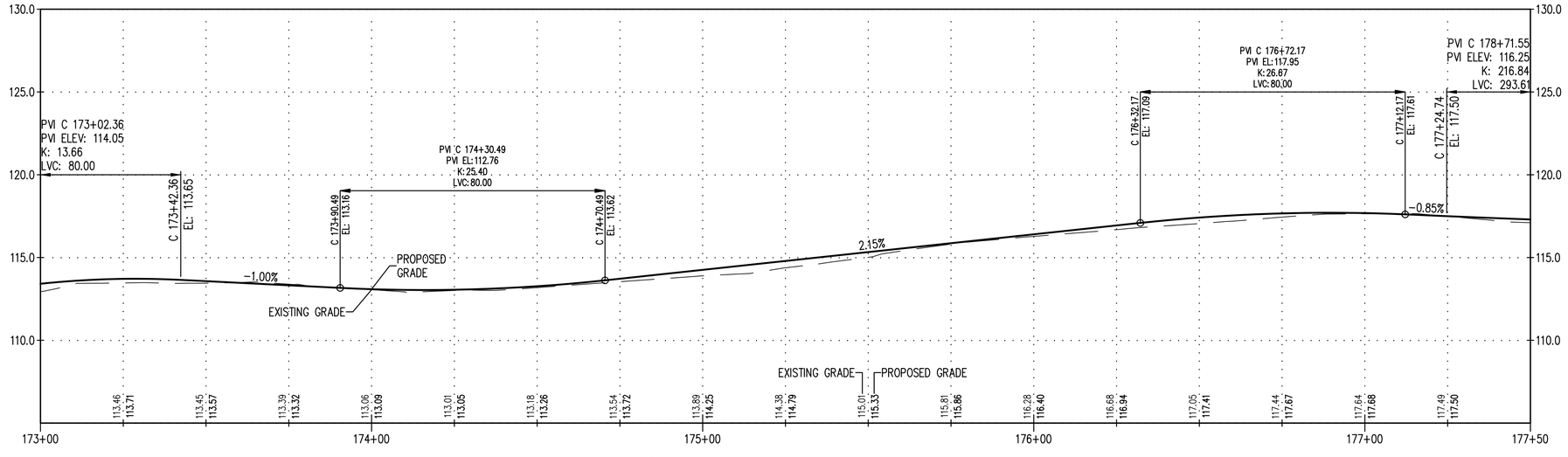




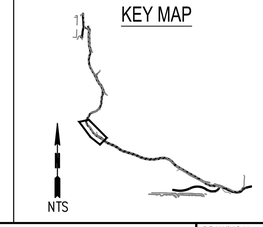
LEGEND

	HMA TRAIL	SEE SHEET XS-01-XS-03
	GRAVEL SHOULDER	SEE SHEET XS-01-XS-03
	EDGE OF PAVEMENT	
	EDGE OF GRAVEL	
	CEMENT CONC. TRAFFIC CURB	WSDOT STD PLAN F-10.12
	SAFETY FENCE & POLE	SEE SHEET CF-01-CF-06
XX	EX. MAJOR CONTOUR	
XX	EX. MINOR CONTOUR	
XX	MAJOR CONTOUR	
XX	MINOR CONTOUR	
FILL	APPROX. FILL LINE	
CUT	APPROX. CUT LINE	
	CATCH BASIN TYPE 1	WSDOT STD PLAN B-5.20
SD	8 IN. DIA. CORRUGATED HDPE STORM SEWER PIPE	
P	POWER LINE	
	ROCK CHECK DAM	SEE SHEET SD-01
	DITCH	
	REDI ROCK RETAINING WALL	
	TYPE 3 CHAIN LINK FENCE	WSDOT STD PLAN L-20.10-03
	MULTI-USE PATH MARKINGS	WSDOT STD PLAN M-9.60
	ADA ACCESSIBILITY	SEE SHEET TG-01
	ACCESSIBILITY SIGN AND POST	SEE SHEET TG-01
	ADA PARKING STRIPING	SEE SHEET TG-01
	BOLLARD TYPE 1	WSDOT STD PLAN H-60.10
	EDGE OF FULL DISPERSION	
	ECOLOGY BLOCK	
	CONCRETE PAD	SEE SHEET TG-01
	ROCK EMBANKMENT	SEE SHEET TG-02
	SIGN NOTE	SEE SHEET SN-01
	TYPE 3 BARRICADE	SEE SHEET SN-01
X	SIGN NOTE	
REL-X	SIGN RELOCATION NOTE	

C PROFILE



KEY MAP



△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ	ISSUE DATE: AUGUST 2026
DRAWN BY: M. WOLFF	JOB No.: 25-000313
APPROVED BY: P. HOLM	DRAWING FILE No.: 25-000313-C-PP-06

ALL DIMENSIONS SHOWN IN FEET UNLESS OTHERWISE DESIGNATED

PATRICK HOLM — STATE OF WASHINGTON — 49870 — REGISTERED PROFESSIONAL ENGINEER — PRELIMINARY

SCJ ALLIANCE
CONSULTING SERVICES
8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
P: 360.352.1465
SCJALLIANCE.COM

PROJECT NAME:

CITY OF TUMWATER

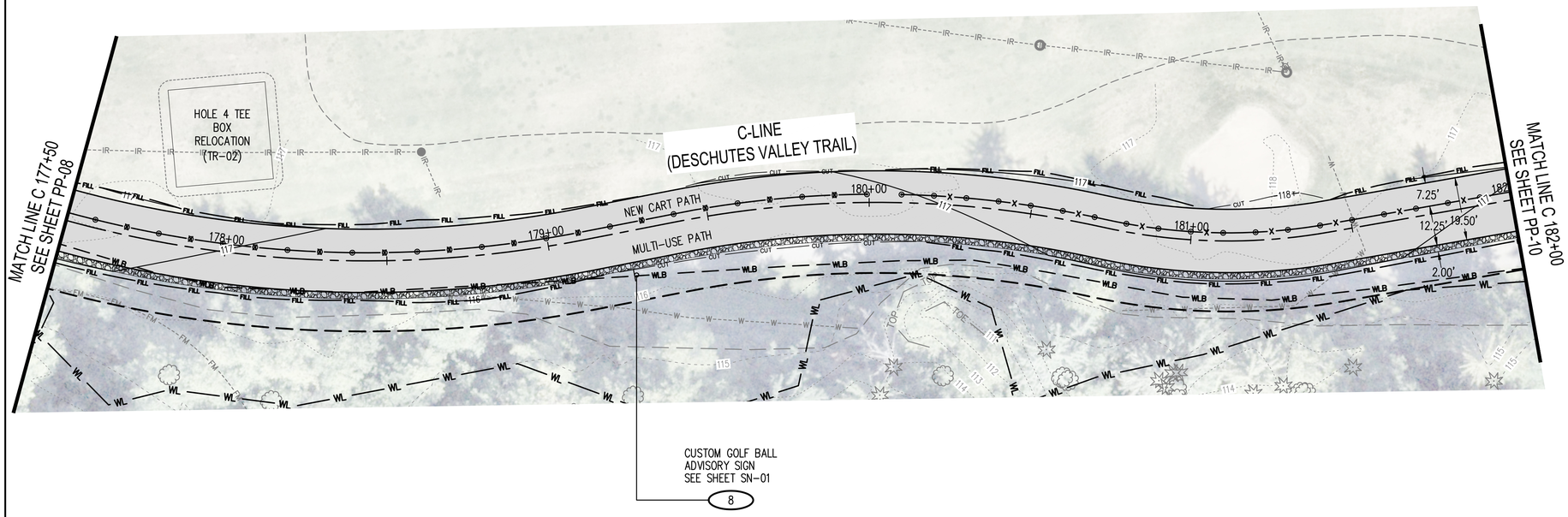
DESCHUTES VALLEY TRAIL
SEGMENT C

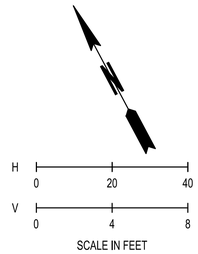
PLAN AND PROFILE
C 173+00 - C 177+50

DRAWING No.: PP-08

SHEET No.: 45 OF 148

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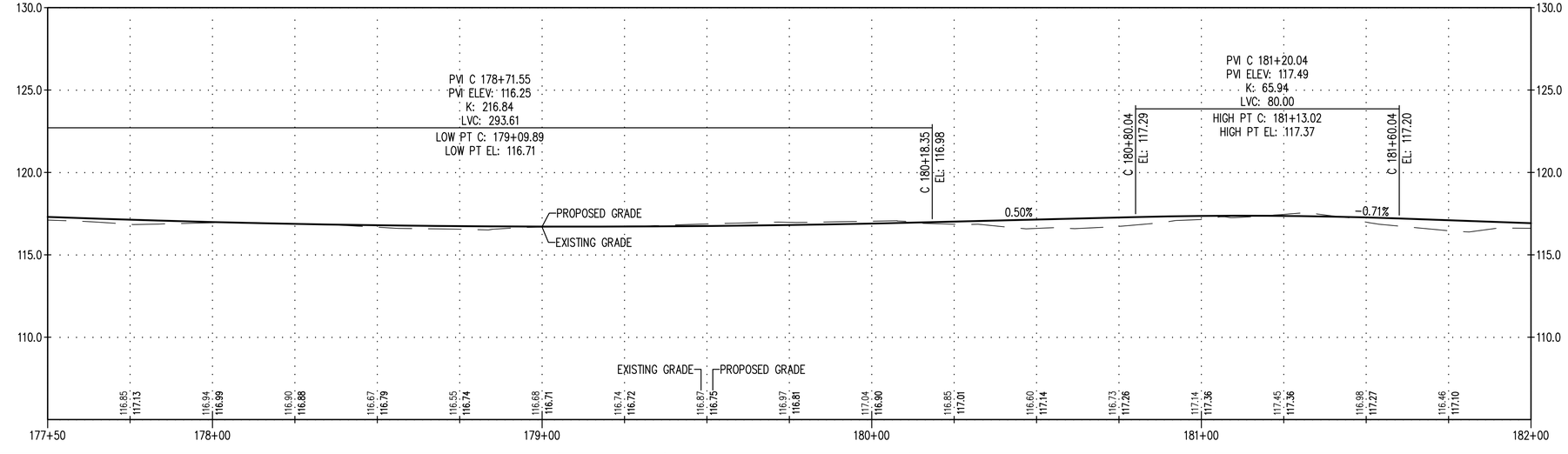




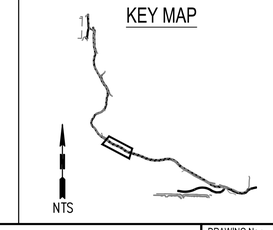
LEGEND

	HMA TRAIL	SEE SHEET XS-01-XS-03
	GRAVEL SHOULDER	SEE SHEET XS-01-XS-03
	EDGE OF PAVEMENT	
	EDGE OF GRAVEL	
	CEMENT CONC. TRAFFIC CURB	WSDOT STD PLAN F-10.12
X X	SAFETY FENCE & POLE	SEE SHEET CF-01-CF-06
XX	EX. MAJOR CONTOUR	
XX	EX. MINOR CONTOUR	
XX	MAJOR CONTOUR	
XX	MINOR CONTOUR	
FILL	APPROX. FILL LINE	
CUT	APPROX. CUT LINE	
	CATCH BASIN TYPE 1	WSDOT STD PLAN B-5.20
SD	8 IN. DIA. CORRUGATED HDPE STORM SEWER PIPE	
P	POWER LINE	
	ROCK CHECK DAM	SEE SHEET SD-01
	DITCH	
	REDI ROCK RETAINING WALL	
X X	TYPE 3 CHAIN LINK FENCE	WSDOT STD PLAN L-20.10-03
	MULTI-USE PATH MARKINGS	WSDOT STD PLAN M-9.60
	ADA ACCESSIBILITY	SEE SHEET TG-01
	ACCESSIBILITY SIGN AND POST	SEE SHEET TG-01
	ADA PARKING STRIPING	SEE SHEET TG-01
	BOLLARD TYPE 1	WSDOT STD PLAN H-60.10
	EDGE OF FULL DISPERSION	
	ECOLOGY BLOCK	
	CONCRETE PAD	SEE SHEET TG-01
	ROCK EMBANKMENT	SEE SHEET TG-02
	SIGN NOTE	SEE SHEET SN-01
	TYPE 3 BARRICADE	SEE SHEET SN-01
X	SIGN NOTE	
REL-X	SIGN RELOCATION NOTE	

C PROFILE



KEY MAP



REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ	ISSUE DATE: AUGUST 2026
DRAWN BY: M. WOLFF	JOB No.: 25-000313
APPROVED BY: P. HOLM	DRAWING FILE No.: 25-000313-C-PP-07

ALL DIMENSIONS SHOWN IN FEET UNLESS OTHERWISE DESIGNATED

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SCJ ALLIANCE
CONSULTING SERVICES
8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
P: 360.352.1465
SCJALLIANCE.COM

PROJECT NAME:

CITY OF TUMWATER

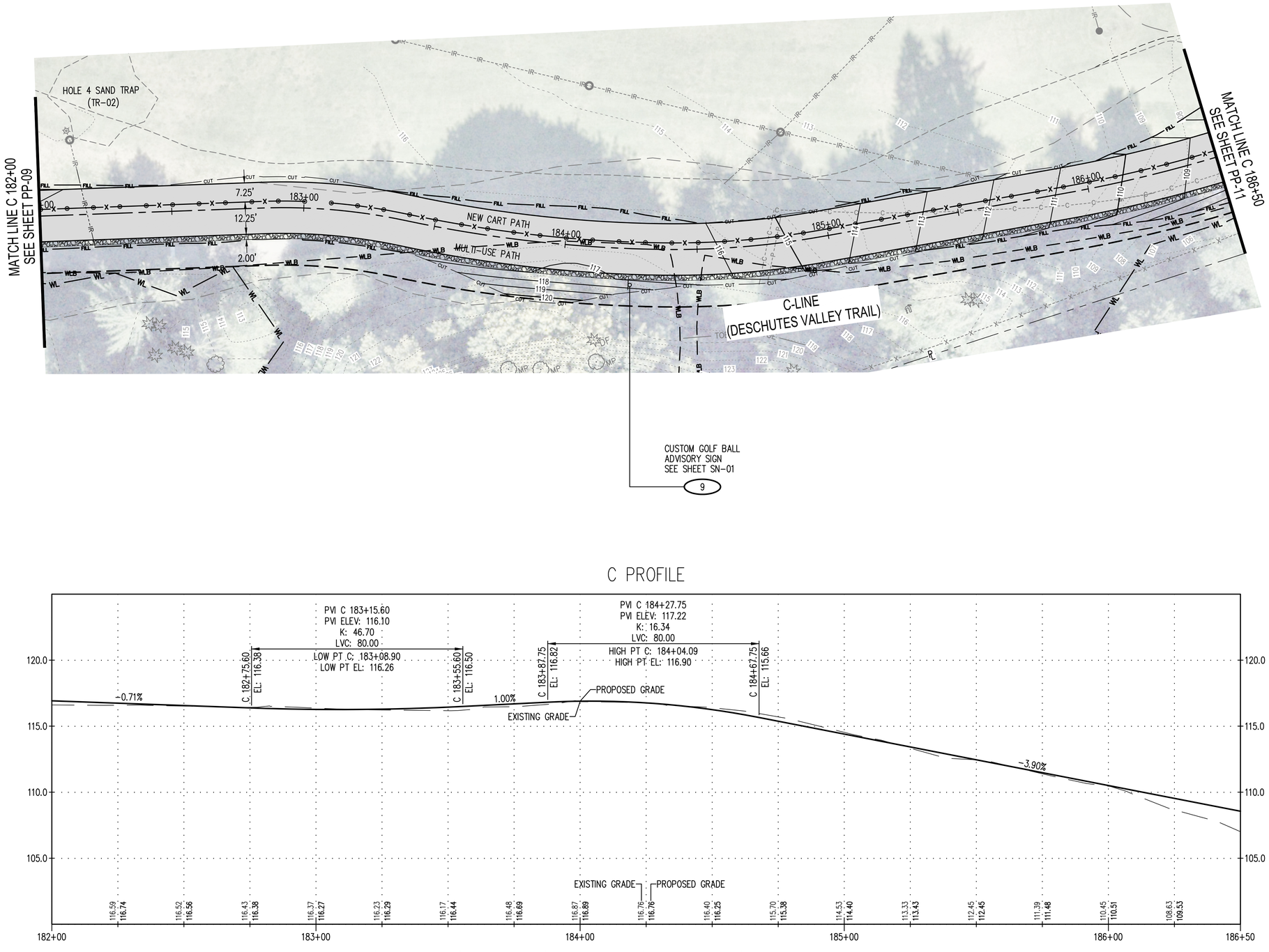
DESCHUTES VALLEY TRAIL
SEGMENT C

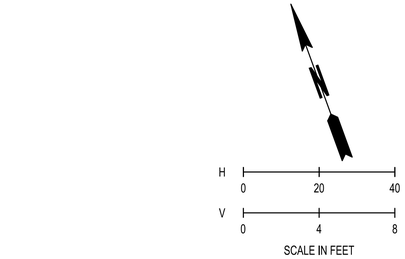
PLAN AND PROFILE
C 177+50 - C 182+00

DRAWING No.: PP-09

SHEET No.: 46 OF 148

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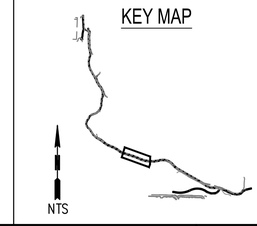




LEGEND

	HMA TRAIL	SEE SHEET XS-01-XS-03
	GRAVEL SHOULDER	SEE SHEET XS-01-XS-03
	EDGE OF PAVEMENT	
	EDGE OF GRAVEL	
	CEMENT CONC. TRAFFIC CURB	WSDOT STD PLAN F-10.12
X X	SAFETY FENCE & POLE	SEE SHEET CF-01-CF-06
XX	EX. MAJOR CONTOUR	
XX	EX. MINOR CONTOUR	
XX	MAJOR CONTOUR	
XX	MINOR CONTOUR	
FILL	APPROX. FILL LINE	
CUT	APPROX. CUT LINE	
	CATCH BASIN TYPE 1	WSDOT STD PLAN B-5.20
SD	8 IN. DIA. CORRUGATED HDPE STORM SEWER PIPE	
P	POWER LINE	
	ROCK CHECK DAM	SEE SHEET SD-01
	DITCH	
	REDI ROCK RETAINING WALL	
X X	TYPE 3 CHAIN LINK FENCE	WSDOT STD PLAN L-20.10-03
	MULTI-USE PATH MARKINGS	WSDOT STD PLAN M-9.60
	ADA ACCESSIBILITY	SEE SHEET TG-01
	ACCESSIBILITY SIGN AND POST	SEE SHEET TG-01
	ADA PARKING STRIPING	SEE SHEET TG-01
	BOLLARD TYPE 1	WSDOT STD PLAN H-60.10
	EDGE OF FULL DISPERSION	
	ECOLOGY BLOCK	
	CONCRETE PAD	SEE SHEET TG-01
	ROCK EMBANKMENT	SEE SHEET TG-02
	SIGN NOTE	SEE SHEET SN-01
	TYPE 3 BARRICADE	SEE SHEET SN-01
X	SIGN NOTE	
REL-X	SIGN RELOCATION NOTE	

KEY MAP



△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ
DRAWN BY: S. GUSTAFSON
APPROVED BY: P. HOLM
ISSUE DATE: AUGUST 2026
JOB No.: 25-000313
DRAWING FILE No.: 25-000313-C-PP-08

ALL DIMENSIONS SHOWN IN FEET UNLESS OTHERWISE DESIGNATED

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SCJ ALLIANCE
CONSULTING SERVICES
8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
P: 360.352.1465
SCJALLIANCE.COM

PROJECT NAME:

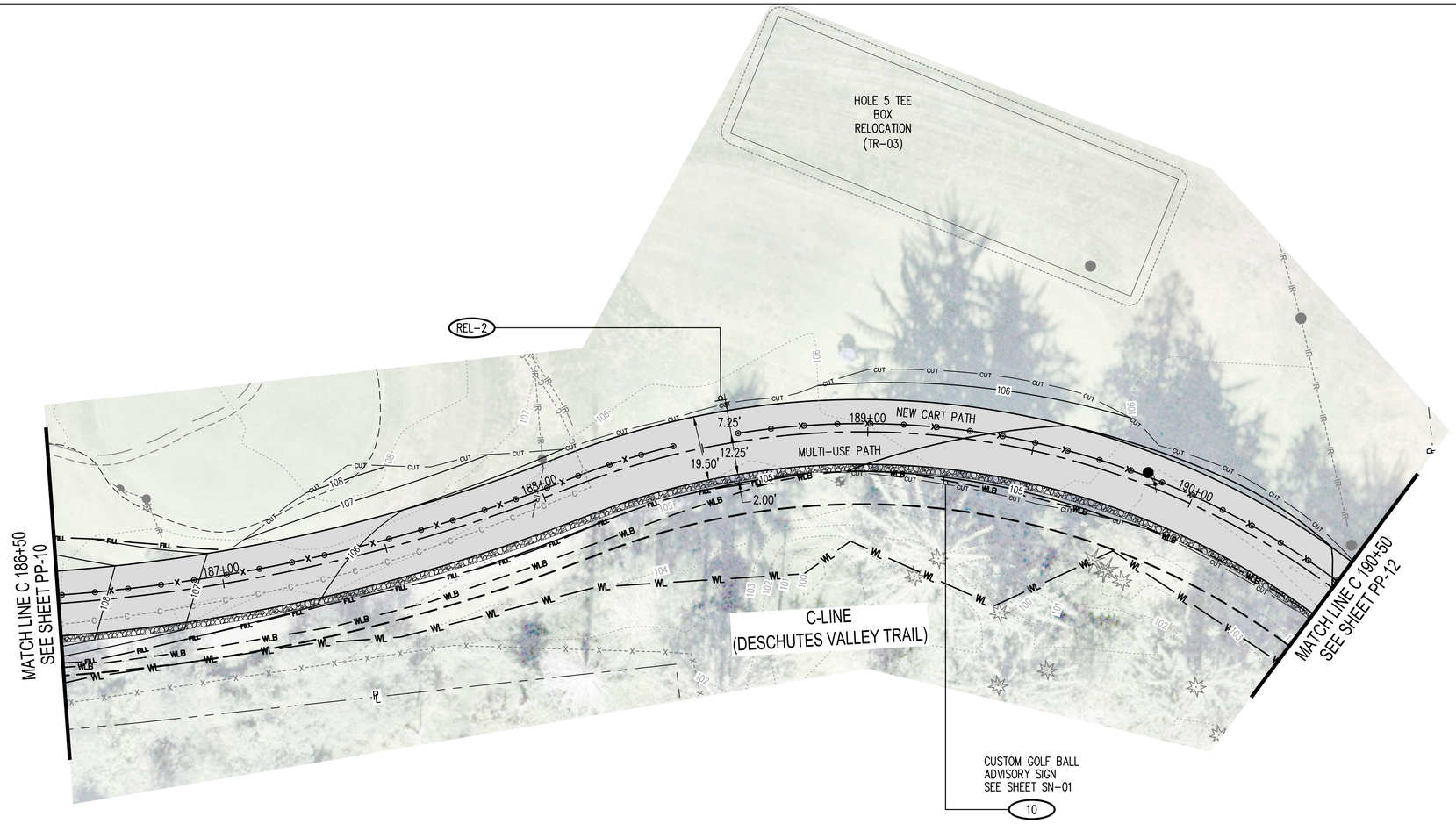
CITY OF TUMWATER

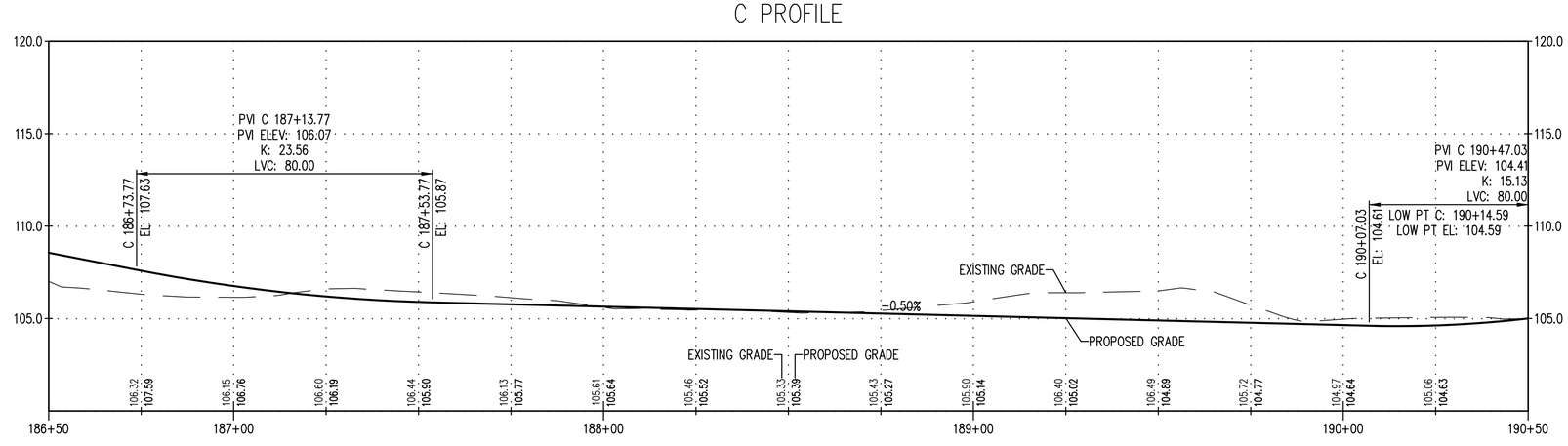
DESCHUTES VALLEY TRAIL
SEGMENT C

PLAN AND PROFILE
C 182+00 - C 186+50

DRAWING No.: PP-10
SHEET No.: 47 OF 148

Aug 20, 2026 1:13:59pm - User: aufreychelsen
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H 0 20 40

V 0 4 8

SCALE IN FEET

LEGEND

	HMA TRAIL	SEE SHEET XS-01-XS-03
	GRAVEL SHOULDER	SEE SHEET XS-01-XS-03
	EDGE OF PAVEMENT	
	EDGE OF GRAVEL	
	CEMENT CONC. TRAFFIC CURB	WSDOT STD PLAN F-10.12
X X	SAFETY FENCE & POLE	SEE SHEET CF-01-CF-06
XX	EX. MAJOR CONTOUR	
XX	EX. MINOR CONTOUR	
XX	MAJOR CONTOUR	
XX	MINOR CONTOUR	
FILL	APPROX. FILL LINE	
CUT	APPROX. CUT LINE	
	CATCH BASIN TYPE 1	WSDOT STD PLAN B-5.20
SD	8 IN. DIA. CORRUGATED HDPE STORM SEWER PIPE	
P	POWER LINE	
	ROCK CHECK DAM	SEE SHEET SD-01
	DITCH	
	REDI ROCK RETAINING WALL	
X X	TYPE 3 CHAIN LINK FENCE	WSDOT STD PLAN L-20.10-03
	MULTI-USE PATH MARKINGS	WSDOT STD PLAN M-9.60
	ADA ACCESSIBILITY	SEE SHEET TG-01
	ACCESSIBILITY SIGN AND POST	SEE SHEET TG-01
	ADA PARKING STRIPING	SEE SHEET TG-01
	BOLLARD TYPE 1	WSDOT STD PLAN H-60.10
	EDGE OF FULL DISPERSION	
	ECOLOGY BLOCK	
	CONCRETE PAD	SEE SHEET TG-01
	ROCK EMBANKMENT	SEE SHEET TG-02
P	SIGN NOTE	SEE SHEET SN-01
	TYPE 3 BARRICADE	SEE SHEET SN-01
X	SIGN NOTE	
REL-X	SIGN RELOCATION NOTE	

KEY MAP

NTS

△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ
DRAWN BY: M. WOLFF
APPROVED BY: P. HOLM
ISSUE DATE: AUGUST 2026
JOB No.: 25-000313
DRAWING FILE No.: 25-000313-C-PP-09

ALL DIMENSIONS SHOWN IN FEET UNLESS OTHERWISE DESIGNATED

PATRICK HOLM — STATE OF WASHINGTON — 19870 — REGISTERED PROFESSIONAL ENGINEER

PRELIMINARY

SCJ ALLIANCE
CONSULTING SERVICES
8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
P: 360.352.1465
SCJALLIANCE.COM

PROJECT NAME:

CITY OF TUMWATER

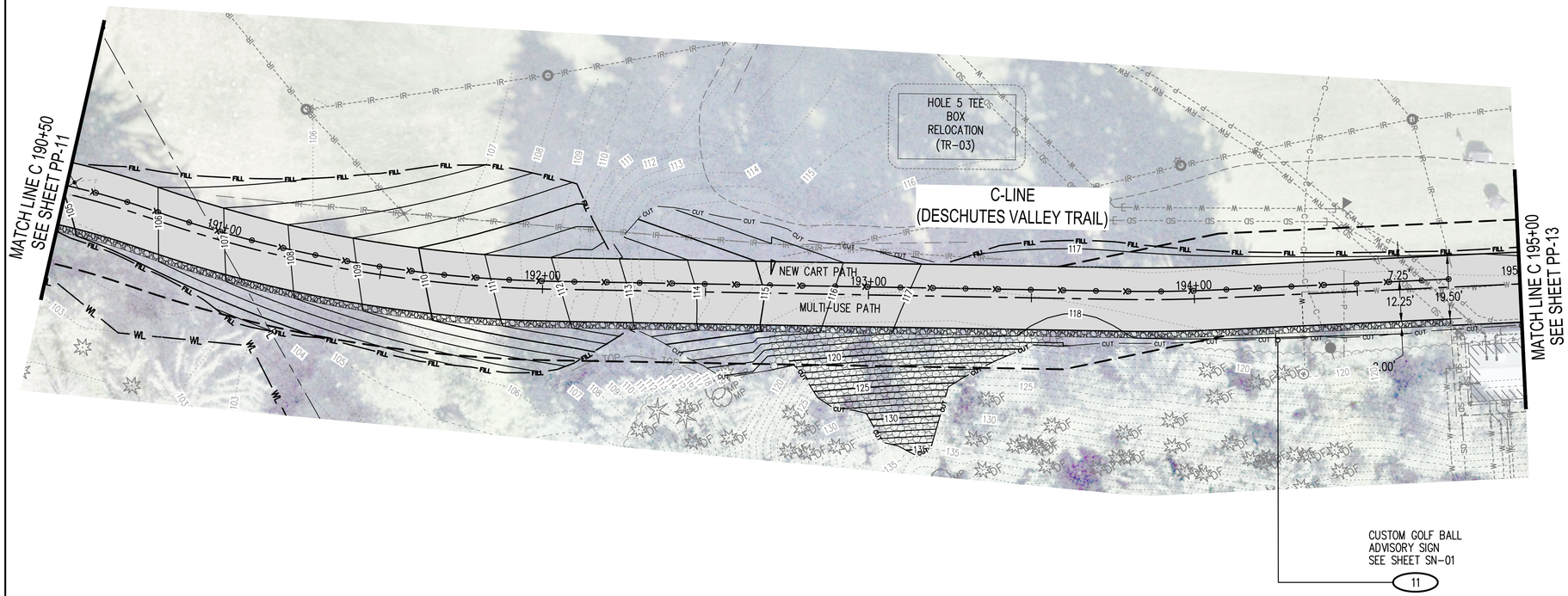
DESCHUTES VALLEY TRAIL
SEGMENT C

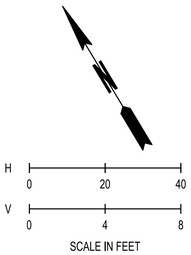
PLAN AND PROFILE
C 186+50 - C 190+50

DRAWING No.: PP-11

SHEET No.: 48 OF 148

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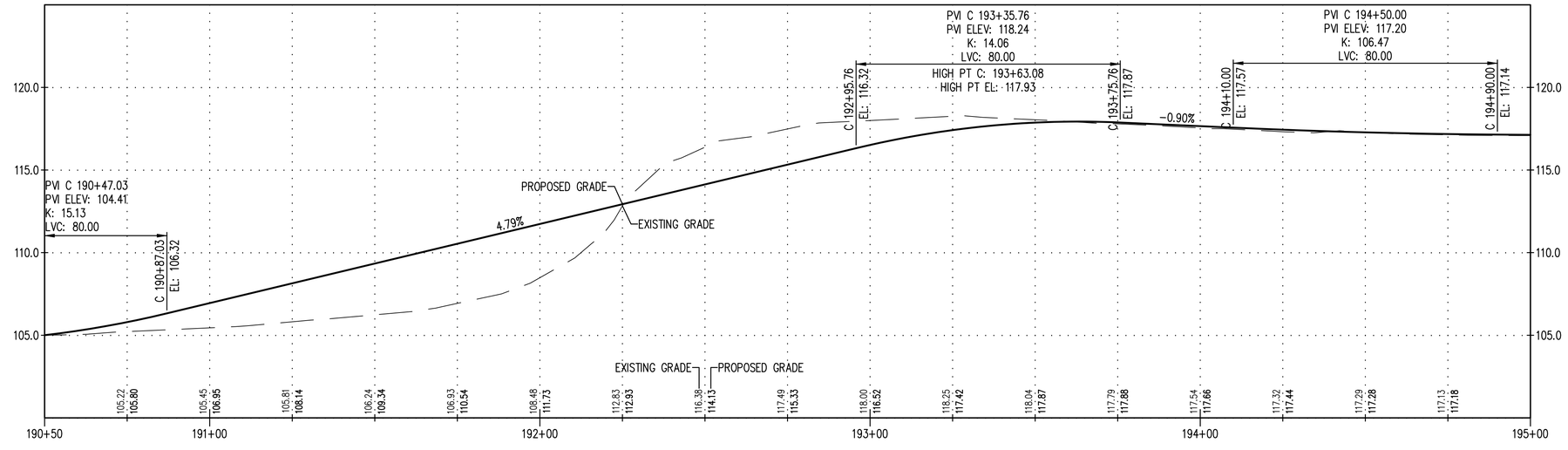


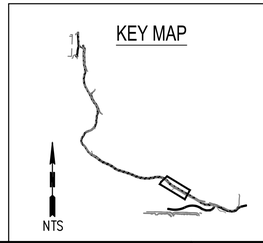


LEGEND

	HMA TRAIL	SEE SHEET XS-01-XS-03
	GRAVEL SHOULDER	SEE SHEET XS-01-XS-03
	EDGE OF PAVEMENT	
	EDGE OF GRAVEL	
	CEMENT CONC. TRAFFIC CURB	WSDOT STD PLAN F-10.12
	SAFETY FENCE & POLE	SEE SHEET CF-01-CF-06
XX	EX. MAJOR CONTOUR	
XX	EX. MINOR CONTOUR	
XX	MAJOR CONTOUR	
XX	MINOR CONTOUR	
FILL	APPROX. FILL LINE	
CUT	APPROX. CUT LINE	
	CATCH BASIN TYPE 1	WSDOT STD PLAN B-5.20
SD	8 IN. DIA. CORRUGATED HDPE STORM SEWER PIPE	
P	POWER LINE	
	ROCK CHECK DAM	SEE SHEET SD-01
	DITCH	
	REDI ROCK RETAINING WALL	
	TYPE 3 CHAIN LINK FENCE	WSDOT STD PLAN L-20.10-03
	MULTI-USE PATH MARKINGS	WSDOT STD PLAN M-9.60
	ADA ACCESSIBILITY	SEE SHEET TG-01
	ACCESSIBILITY SIGN AND POST	SEE SHEET TG-01
	ADA PARKING STRIPING	SEE SHEET TG-01
	BOLLARD TYPE 1	WSDOT STD PLAN H-60.10
	EDGE OF FULL DISPERSION	
	ECOLOGY BLOCK	
	CONCRETE PAD	SEE SHEET TG-01
	ROCK EMBANKMENT	SEE SHEET TG-02
P	SIGN NOTE	SEE SHEET SN-01
P P	TYPE 3 BARRICADE	SEE SHEET SN-01
X	SIGN NOTE	
REL-X	SIGN RELOCATION NOTE	

C PROFILE





REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ	ISSUE DATE: AUGUST 2026
DRAWN BY: A.NIELSEN	JOB No.: 25-000313
APPROVED BY: P. HOLM	DRAWING FILE No.: 25-000313-C-PP-10

ALL DIMENSIONS SHOWN IN FEET UNLESS OTHERWISE DESIGNATED

PATRICK HOLM — STATE OF WASHINGTON — 19470 — REGISTERED PROFESSIONAL ENGINEER — PRELIMINARY

SCJ ALLIANCE
CONSULTING SERVICES
8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
P: 360.352.1465
SCJALLIANCE.COM

PROJECT NAME:

CITY OF TUMWATER

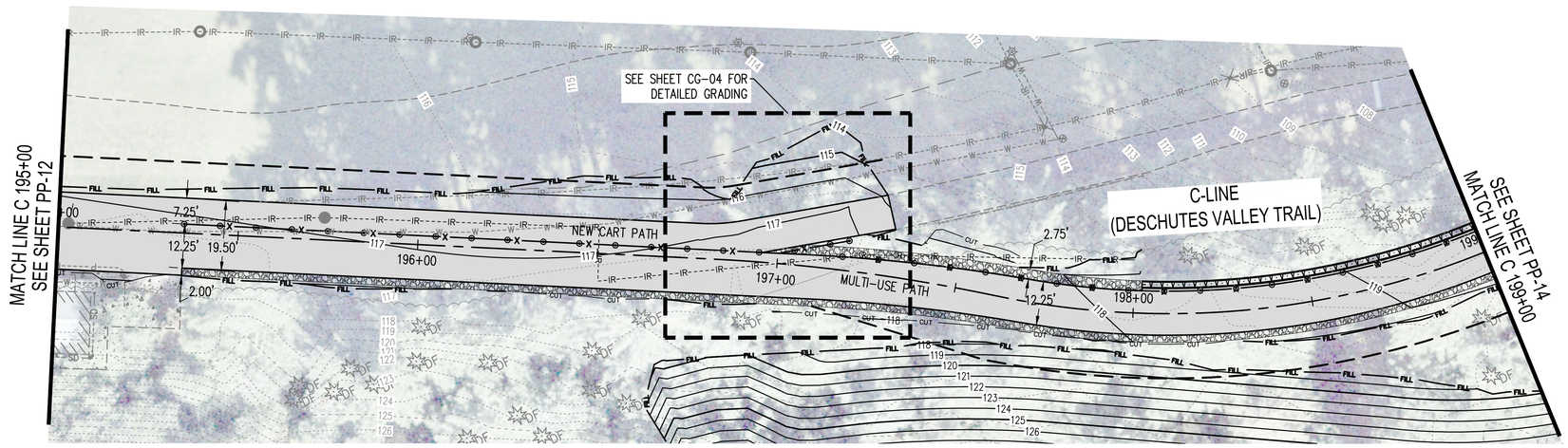
DESCHUTES VALLEY TRAIL
SEGMENT C

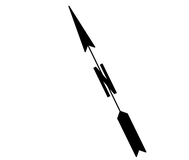
PLAN AND PROFILE
C 190+50 - C 195+00

DRAWING No.: PP-12

SHEET No.: 49 OF 148

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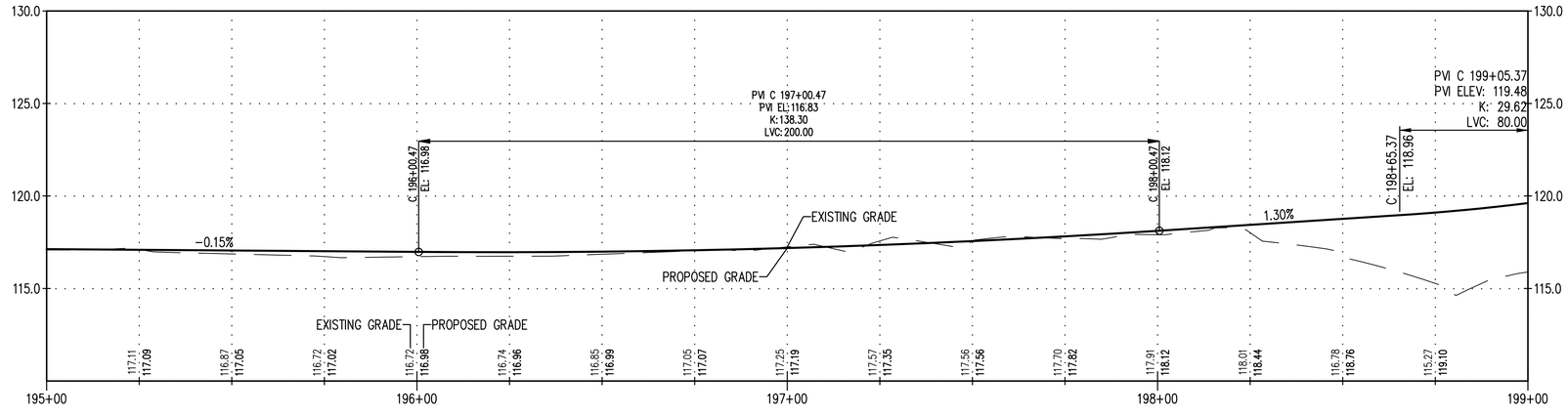




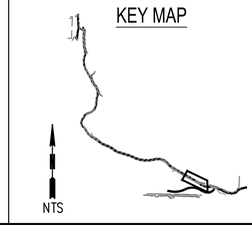
LEGEND

	HMA TRAIL	SEE SHEET XS-01-XS-03
	GRAVEL SHOULDER	SEE SHEET XS-01-XS-03
	EDGE OF PAVEMENT	
	EDGE OF GRAVEL	
	CEMENT CONC. TRAFFIC CURB	WSDOT STD PLAN F-10.12
	SAFETY FENCE & POLE	SEE SHEET CF-01-CF-06
XX	EX. MAJOR CONTOUR	
XX	EX. MINOR CONTOUR	
XX	MAJOR CONTOUR	
XX	MINOR CONTOUR	
FILL	APPROX. FILL LINE	
CUT	APPROX. CUT LINE	
	CATCH BASIN TYPE 1	WSDOT STD PLAN B-5.20
SD	8 IN. DIA. CORRUGATED HDPE STORM SEWER PIPE	
P	POWER LINE	
	ROCK CHECK DAM	SEE SHEET SD-01
	DITCH	
	REDI ROCK RETAINING WALL	
	TYPE 3 CHAIN LINK FENCE	WSDOT STD PLAN L-20.10-03
	MULTI-USE PATH MARKINGS	WSDOT STD PLAN M-9.60
	ADA ACCESSIBILITY	SEE SHEET TG-01
	ACCESSIBILITY SIGN AND POST	SEE SHEET TG-01
	ADA PARKING STRIPING	SEE SHEET TG-01
	BOLLARD TYPE 1	WSDOT STD PLAN H-60.10
	EDGE OF FULL DISPERSION	
	ECOLOGY BLOCK	
	CONCRETE PAD	SEE SHEET TG-01
	ROCK EMBANKMENT	SEE SHEET TG-02
P	SIGN NOTE	SEE SHEET SN-01
P P	TYPE 3 BARRICADE	SEE SHEET SN-01
X	SIGN NOTE	
REL-X	SIGN RELOCATION NOTE	

C PROFILE



KEY MAP



REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ	ISSUE DATE: AUGUST 2026
DRAWN BY: M. WOLFF	JOB No.: 25-000313
APPROVED BY: P. HOLM	DRAWING FILE No.: 25-000313-C-PP-11

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SCJ ALLIANCE
CONSULTING SERVICES
8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
P: 360.352.1465
SCJALLIANCE.COM

PROJECT NAME:

CITY OF TUMWATER

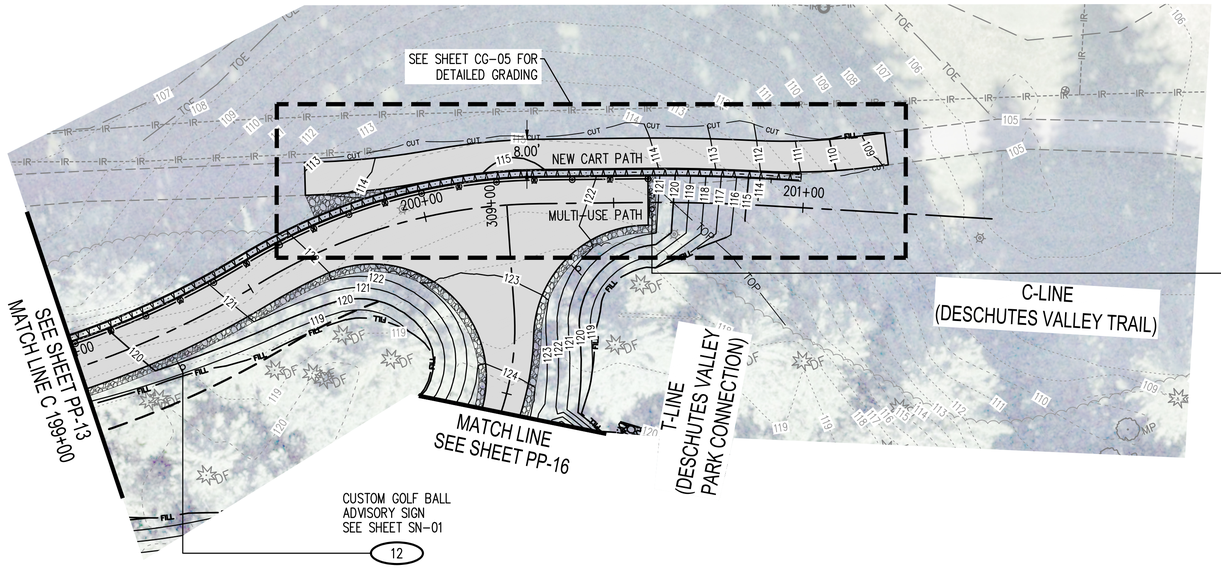
DESCHUTES VALLEY TRAIL
SEGMENT C

PLAN AND PROFILE
C 195+00 - C 199+00

DRAWING No.: PP-13

SHEET No.: 50 OF 148

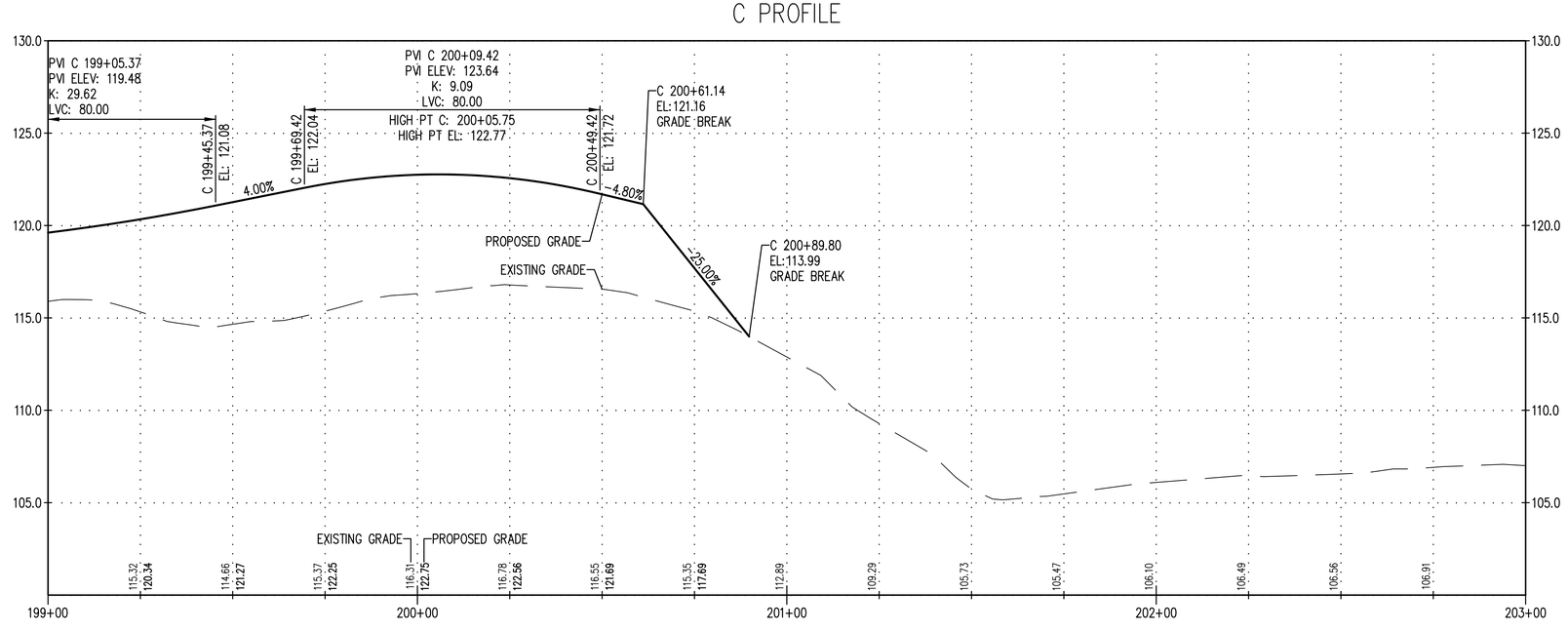
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FUTURE TRAIL CONNECTION

13
21 TYPE 3 BARRICADE

C PROFILE



H 0 20 40

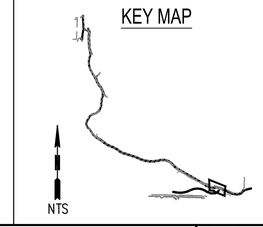
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SCALE IN FEET

LEGEND

	HMA TRAIL	SEE SHEET XS-01-XS-03
	GRAVEL SHOULDER	SEE SHEET XS-01-XS-03
	EDGE OF PAVEMENT	
	EDGE OF GRAVEL	
	CEMENT CONC. TRAFFIC CURB	WSDOT STD PLAN F-10.12
	SAFETY FENCE & POLE	SEE SHEET CF-01-CF-06
XX	EX. MAJOR CONTOUR	
XX	EX. MINOR CONTOUR	
XX	MAJOR CONTOUR	
XX	MINOR CONTOUR	
FILL	APPROX. FILL LINE	
CUT	APPROX. CUT LINE	
	CATCH BASIN TYPE 1	WSDOT STD PLAN B-5.20
SD	8 IN. DIA. CORRUGATED HDPE STORM SEWER PIPE	
P	POWER LINE	
	ROCK CHECK DAM	SEE SHEET SD-01
	DITCH	
	REDI ROCK RETAINING WALL	
	TYPE 3 CHAIN LINK FENCE	WSDOT STD PLAN L-20.10-03
	MULTI-USE PATH MARKINGS	WSDOT STD PLAN M-9.60
	ADA ACCESSIBILITY	SEE SHEET TG-01
	ACCESSIBILITY SIGN AND POST	SEE SHEET TG-01
	ADA PARKING STRIPING	SEE SHEET TG-01
	BOLLARD TYPE 1	WSDOT STD PLAN H-60.10
	EDGE OF FULL DISPERSION	
	ECOLOGY BLOCK	
	CONCRETE PAD	SEE SHEET TG-01
	ROCK EMBANKMENT	SEE SHEET TG-02
	SIGN NOTE	SEE SHEET SN-01
	TYPE 3 BARRICADE	SEE SHEET SN-01
X	SIGN NOTE	
REL-X	SIGN RELOCATION NOTE	

KEY MAP



NTS

△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ
DRAWN BY: M. WOLFF
APPROVED BY: P. HOLM
ISSUE DATE: AUGUST 2026
JOB No.: 25-000313
DRAWING FILE No.: 25-000313-C-PP-12

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PATRICK HOLM — STATE OF WASHINGTON — 49470 — REGISTERED PROFESSIONAL ENGINEER — PRELIMINARY

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8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
P: 360.352.1465
SCJALLIANCE.COM

PROJECT NAME:

CITY OF TUMWATER

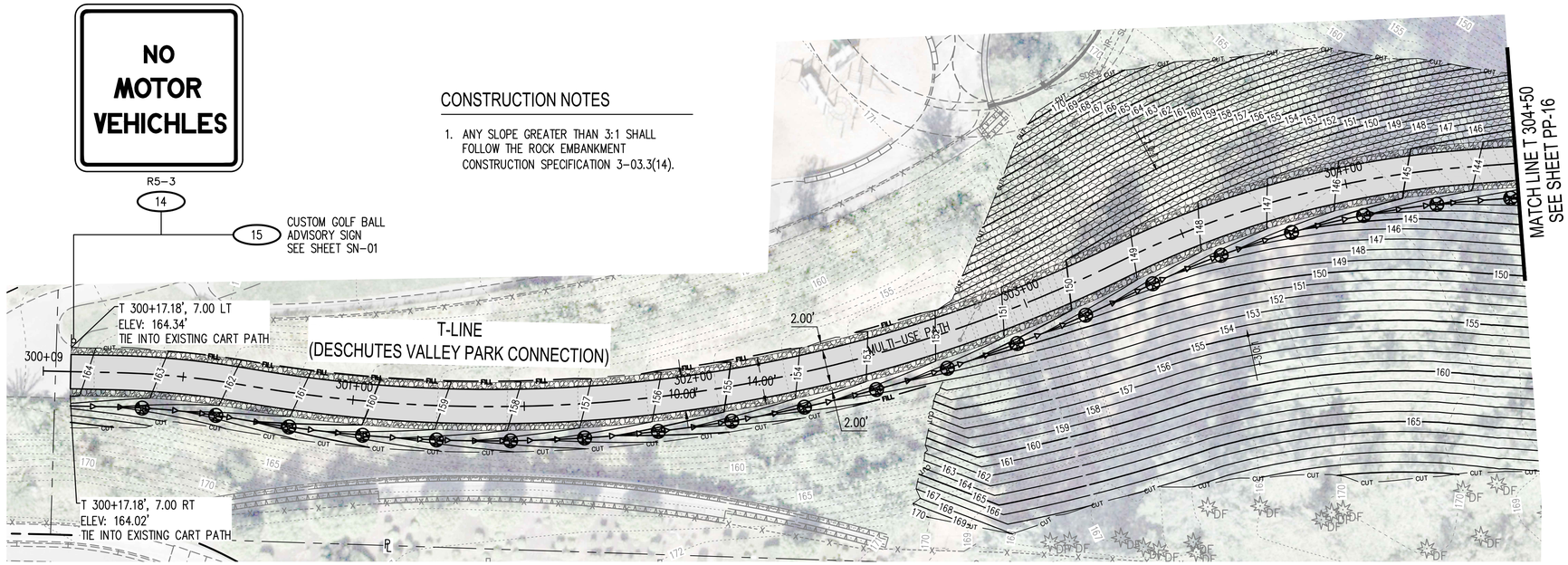
DESCHUTES VALLEY TRAIL
SEGMENT C

PLAN AND PROFILE
C 199+00 - C 201+00

DRAWING No.: PP-14

SHEET No.: 51 OF 148

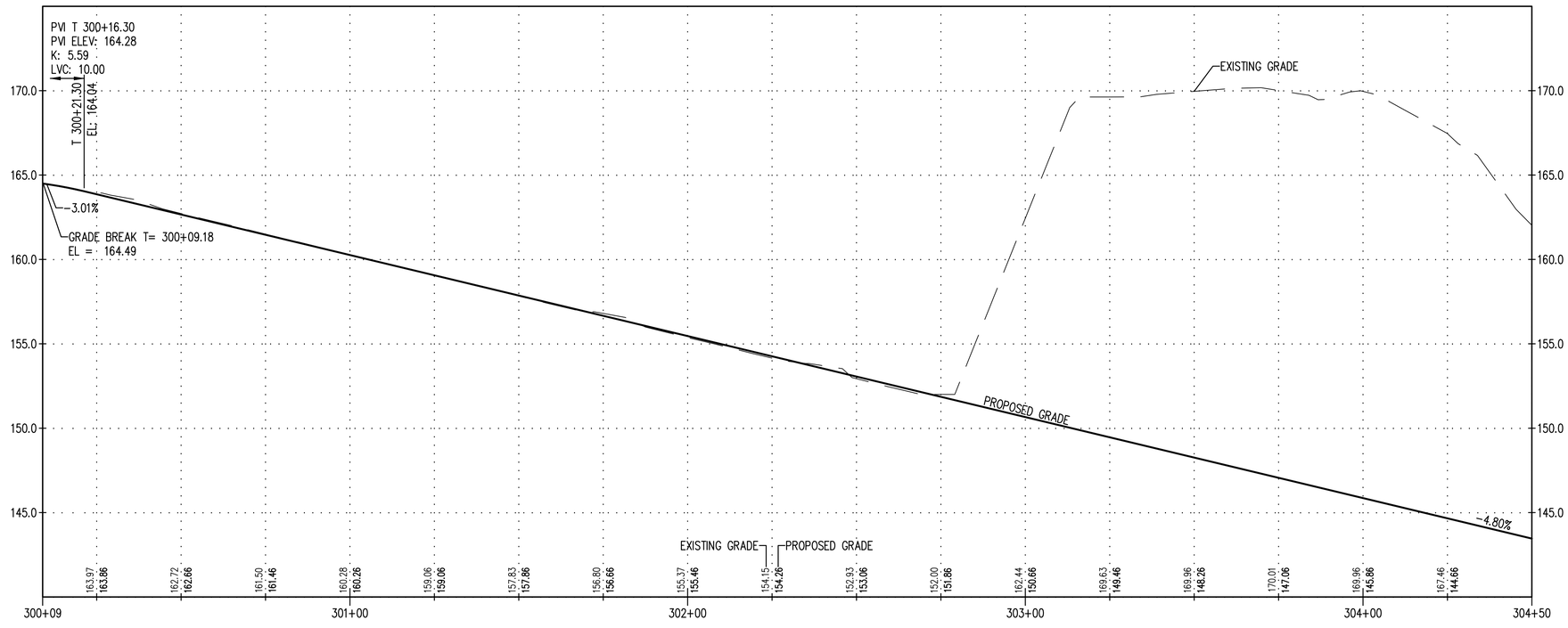
Aug 20, 2026 1:26:05pm – User: aufrey.nielsen
N:\PROJECTS\2025 CITY OF TUMWATER\25-000313 TUMWATER DESCHUTES VALLEY TRAIL\CADD\25-000313-C-PP-12.DWG



CONSTRUCTION NOTES

1. ANY SLOPE GREATER THAN 3:1 SHALL FOLLOW THE ROCK EMBANKMENT CONSTRUCTION SPECIFICATION 3-03.3(14).

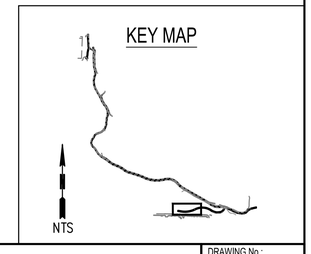
T PROFILE



LEGEND

	HMA TRAIL	SEE SHEET XS-01-XS-03
	GRAVEL SHOULDER	SEE SHEET XS-01-XS-03
	EDGE OF PAVEMENT	
	EDGE OF GRAVEL	
	CEMENT CONC. TRAFFIC CURB	WSDOT STD PLAN F-10.12
	SAFETY FENCE & POLE	SEE SHEET CF-01-CF-06
XX	EX. MAJOR CONTOUR	
XX	EX. MINOR CONTOUR	
XX	MAJOR CONTOUR	
XX	MINOR CONTOUR	
FILL	APPROX. FILL LINE	
CUT	APPROX. CUT LINE	
	CATCH BASIN TYPE 1	WSDOT STD PLAN B-5.20
SD	8 IN. DIA. CORRUGATED HDPE STORM SEWER PIPE	
P	POWER LINE	
	ROCK CHECK DAM	SEE SHEET SD-01
	DITCH	
	REDI ROCK RETAINING WALL	
	TYPE 3 CHAIN LINK FENCE	WSDOT STD PLAN L-20.10-03
	MULTI-USE PATH MARKINGS	WSDOT STD PLAN M-9.60
	ADA ACCESSIBILITY	SEE SHEET TG-01
	ACCESSIBILITY SIGN AND POST	SEE SHEET TG-01
	ADA PARKING STRIPING	SEE SHEET TG-01
	BOLLARD TYPE 1	WSDOT STD PLAN H-60.10
	EDGE OF FULL DISPERSION	
	ECOLOGY BLOCK	
	CONCRETE PAD	SEE SHEET TG-01
	ROCK EMBANKMENT	SEE SHEET TG-02
	SIGN NOTE	SEE SHEET SN-01
	TYPE 3 BARRICADE	SEE SHEET SN-01
X	SIGN NOTE	
REL-X	SIGN RELOCATION NOTE	

H 0 20 40
V 0 4 8
SCALE IN FEET



REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ
DRAWN BY: M. WOLFF
APPROVED BY: P. HOLM
ISSUE DATE: AUGUST 2026
JOB No.: 25-000313
DRAWING FILE No.: 25-000313-C-PP-14

ALL DIMENSIONS SHOWN IN FEET UNLESS OTHERWISE DESIGNATED

PATRICK HOLM, STATE OF WASHINGTON, 19970, REGISTERED PROFESSIONAL ENGINEER — PRELIMINARY

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CONSULTING SERVICES
8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
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SCJALLIANCE.COM

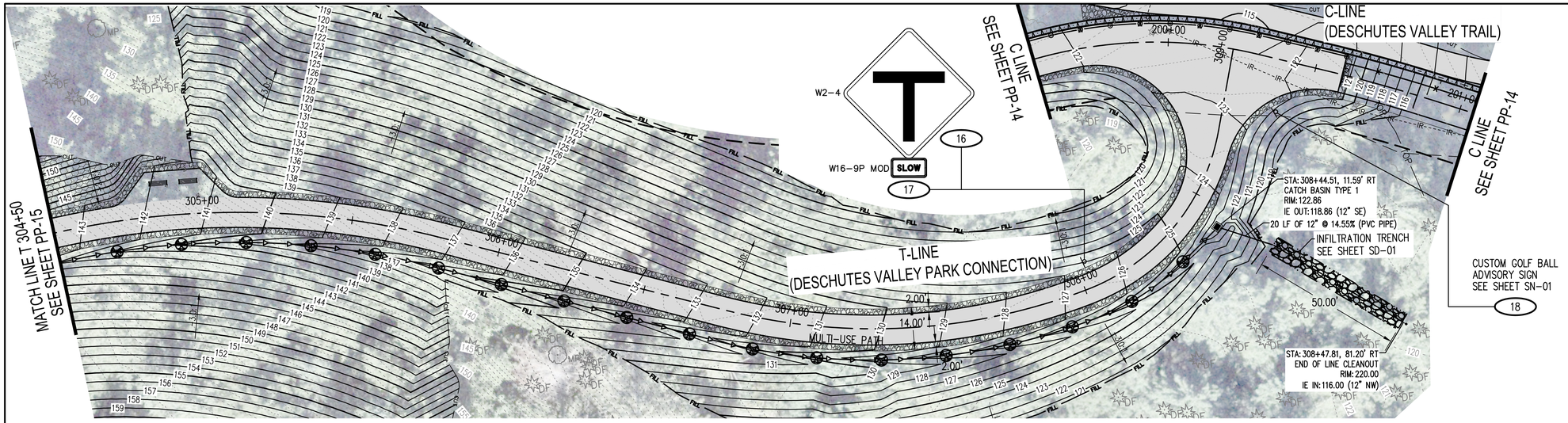
PROJECT NAME: CITY OF TUMWATER

DESCHUTES VALLEY TRAIL
SEGMENT C

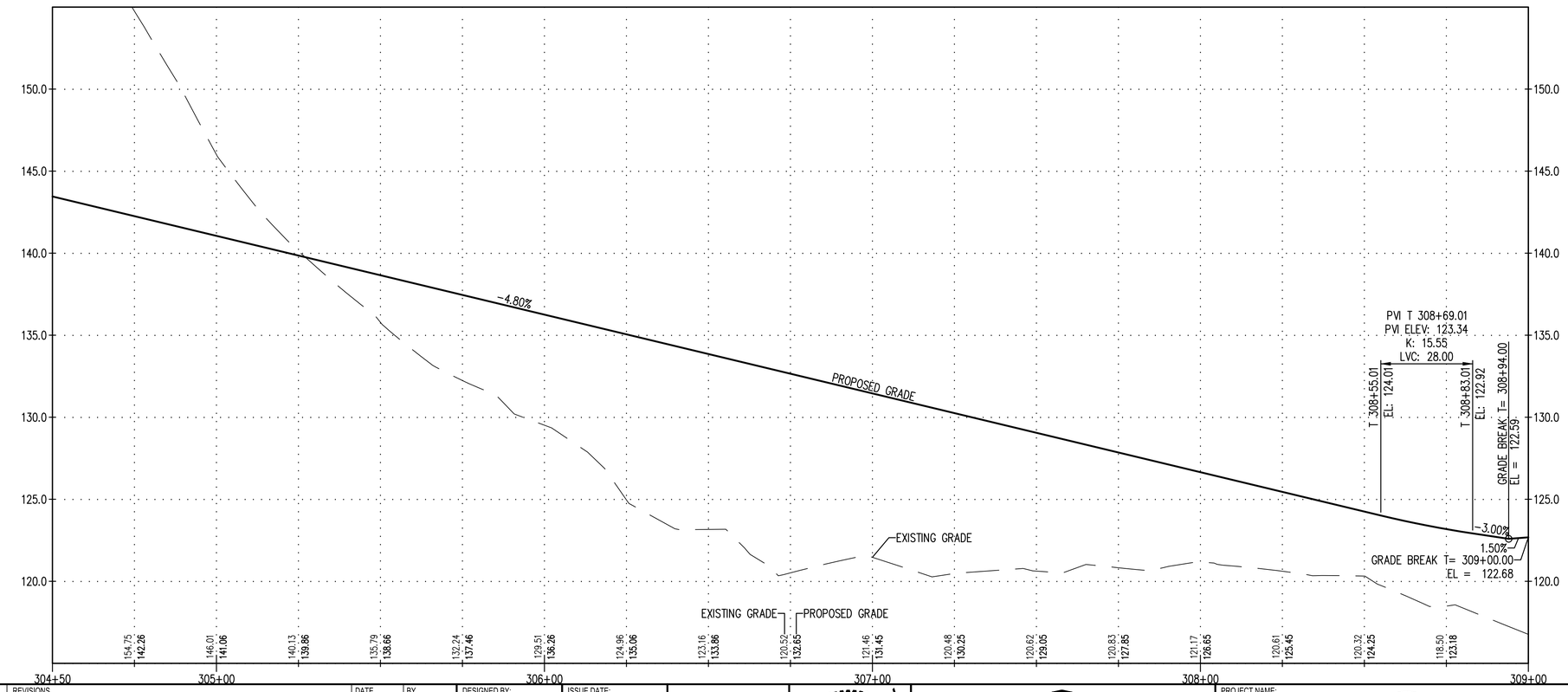
PLAN AND PROFILE
T 300+00 - T 304+50

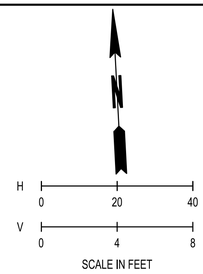
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SHEET No.: 52 OF 148

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T PROFILE





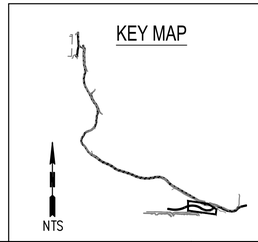
LEGEND

	HMA TRAIL	SEE SHEET XS-01-XS-03
	GRAVEL SHOULDER	SEE SHEET XS-01-XS-03
	EDGE OF PAVEMENT	
	EDGE OF GRAVEL	
	CEMENT CONC. TRAFFIC CURB	WSDOT STD PLAN F-10.12
	SAFETY FENCE & POLE	SEE SHEET CF-01-CF-06
XX	EX. MAJOR CONTOUR	
XX	EX. MINOR CONTOUR	
XX	MAJOR CONTOUR	
XX	MINOR CONTOUR	
FILL	APPROX. FILL LINE	
CUT	APPROX. CUT LINE	
	CATCH BASIN TYPE 1	WSDOT STD PLAN B-5.20
SD	8 IN. DIA. CORRUGATED HDPE STORM SEWER PIPE	
P	POWER LINE	
	ROCK CHECK DAM	SEE SHEET SD-01
	DITCH	
	REDI ROCK RETAINING WALL	
	TYPE 3 CHAIN LINK FENCE	WSDOT STD PLAN L-20.10-03
	MULTI-USE PATH MARKINGS	WSDOT STD PLAN M-9.60
	ADA ACCESSIBILITY	SEE SHEET TG-01
	ACCESSIBILITY SIGN AND POST	SEE SHEET TG-01
	ADA PARKING STRIPING	SEE SHEET TG-01
	BOLLARD TYPE 1	WSDOT STD PLAN H-60.10
	EDGE OF FULL DISPERSION	
	ECOLOGY BLOCK	
	CONCRETE PAD	SEE SHEET TG-01
	ROCK EMBANKMENT	SEE SHEET TG-02
	SIGN NOTE	SEE SHEET SN-01
	TYPE 3 BARRICADE	SEE SHEET SN-01
X	SIGN NOTE	
REL-X	SIGN RELOCATION NOTE	

CONSTRUCTION NOTES

1. ANY SLOPE GREATER THAN 3:1 SHALL FOLLOW THE ROCK EMBANKMENT CONSTRUCTION SPECIFICATION 3-03.3(14).
2. SEE SHEET CG-01 FOR FULL GRADING EXTENTS OF THE T-LINE BETWEEN STATION T 304+50 TO THE INTERSECTION OF C-LINE AND T-LINE

KEY MAP



△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ
DRAWN BY: M. WOLFF
APPROVED BY: P. HOLM
ISSUE DATE: AUGUST 2026
JOB No.: 25-000313
DRAWING FILE No.: 25-000313-C-PP-15

ALL DIMENSIONS SHOWN IN FEET UNLESS OTHERWISE DESIGNATED

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8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
P: 360.352.1465
SCJALLIANCE.COM

PROJECT NAME:

CITY OF TUMWATER

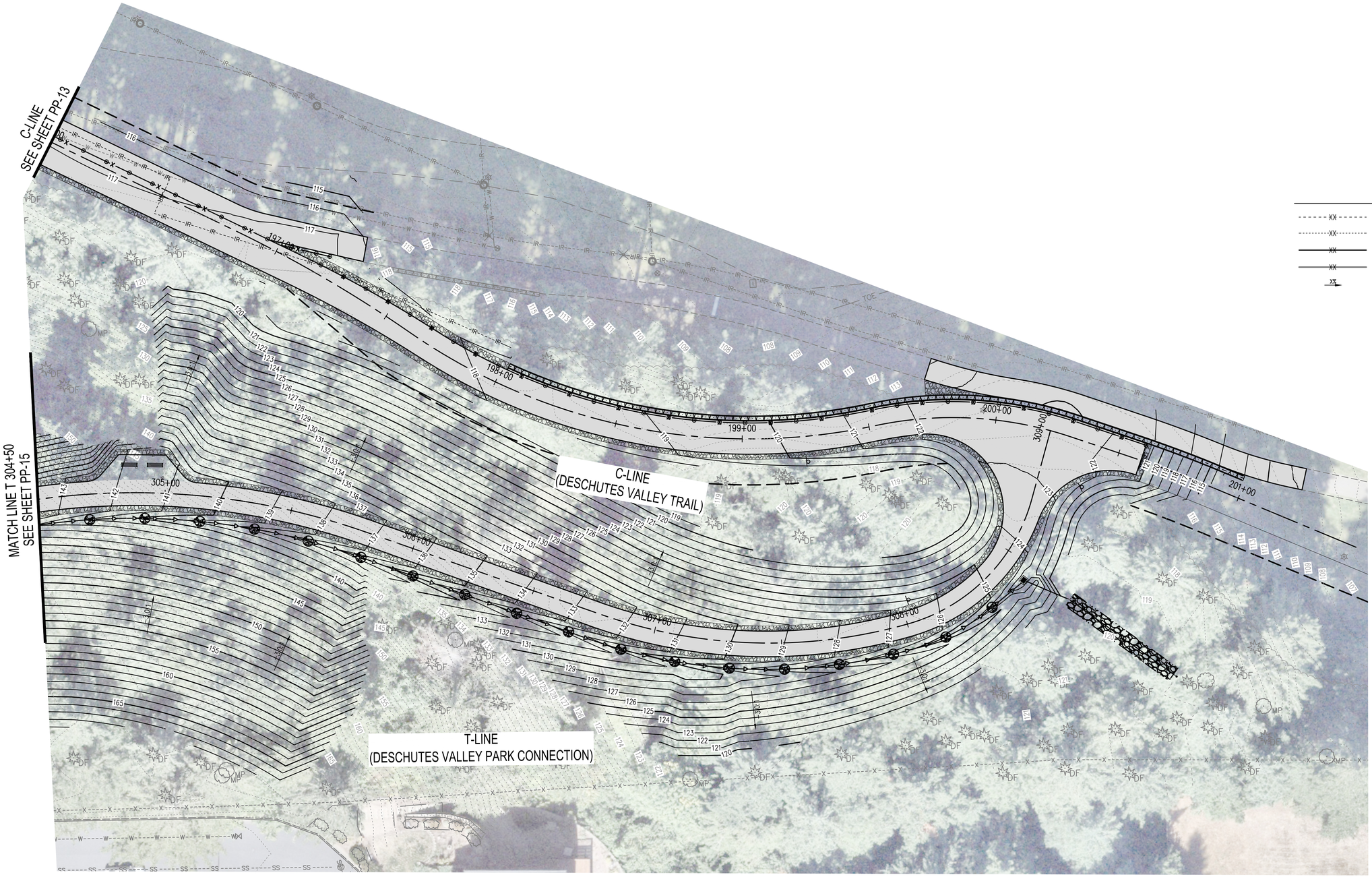
DESCHUTES VALLEY TRAIL
SEGMENT C

PLAN AND PROFILE
T 304+50 - T 309+05

DRAWING No.: PP-16

SHEET No.: 53 OF 148

Aug 20, 2026 - 12:59:19pm - User: audreyjohnsen
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△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ	ISSUE DATE: AUGUST 2026
DRAWN BY: M. HENDRICKS-MATSUDA	JOB No.: 25-000313
APPROVED BY: P. HOLM	DRAWING FILE No.: 25-000313-C-CG-01

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PROJECT NAME:

CITY OF TUMWATER

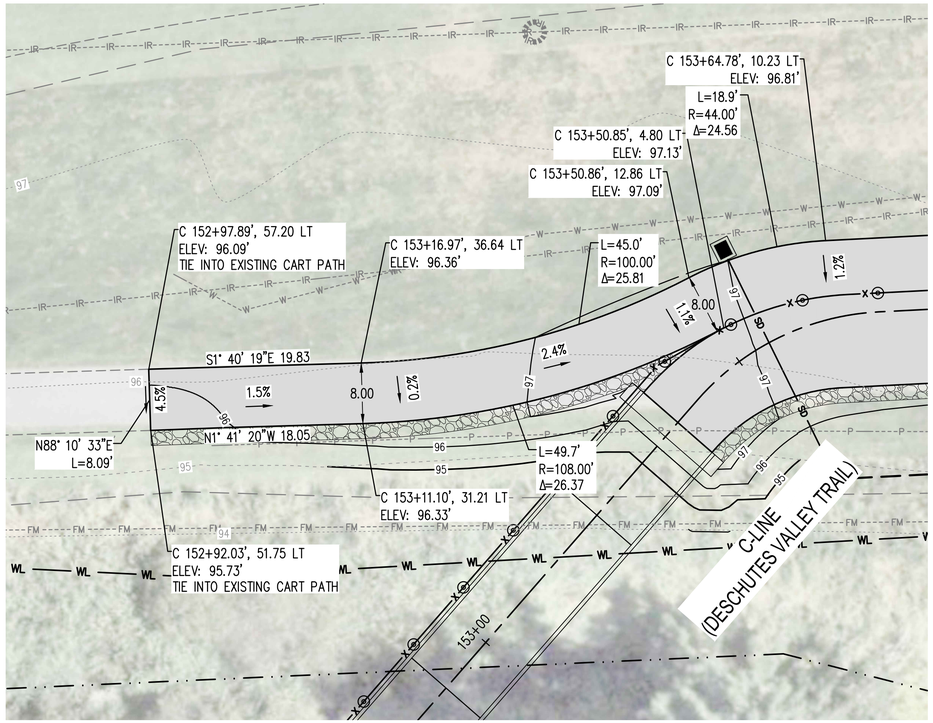
DESCHUTES VALLEY TRAIL
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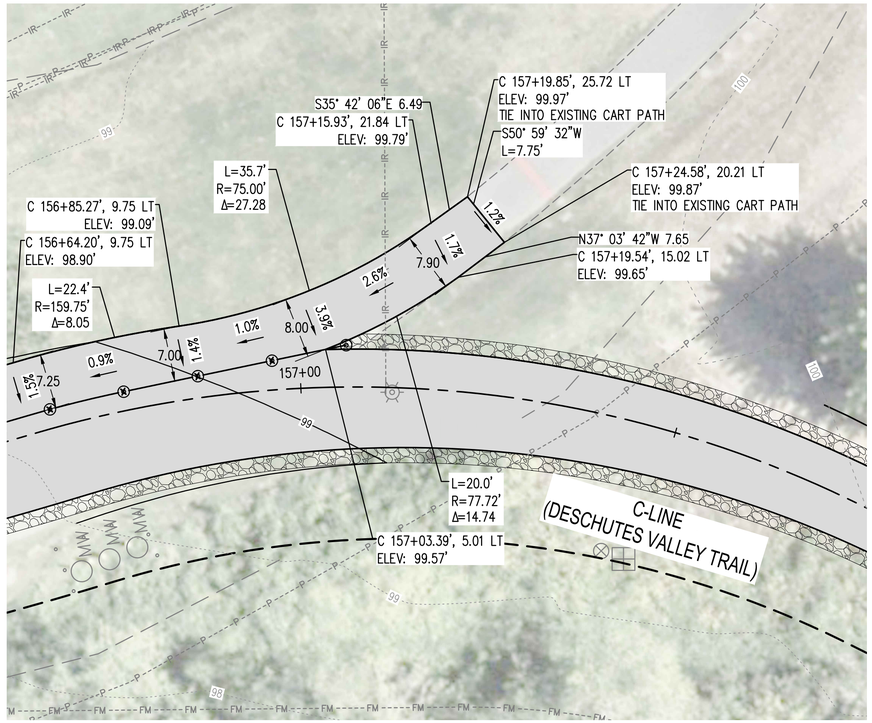
DETAILED GRADING PLAN
T 304+50 - T 309+05

DRAWING No.: CG-01

SHEET No.: 54 OF 148

Aug 20, 2026 1:01:51pm – User: audreynielsen
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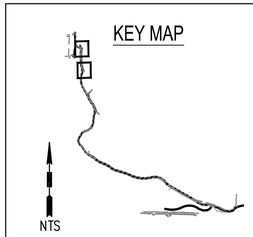


0 10 20
SCALE IN FEET

LEGEND

- EX. MAJOR CONTOUR
- EX. MINOR CONTOUR
- MAJOR CONTOUR
- MINOR CONTOUR
- SLOPE ARROW

KEY MAP



△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ	ISSUE DATE: AUGUST 2026
DRAWN BY: M. HENDRICKS-MATSUDA	JOB No.: 25-000313
APPROVED BY: P. HOLM	DRAWING FILE No.: 25-000313-C-CG-02

ALL DIMENSIONS SHOWN IN FEET UNLESS OTHERWISE DESIGNATED

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SCJ ALLIANCE
CONSULTING SERVICES
8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
P: 360.352.1465
SCJALLIANCE.COM

PROJECT NAME:

CITY OF TUMWATER

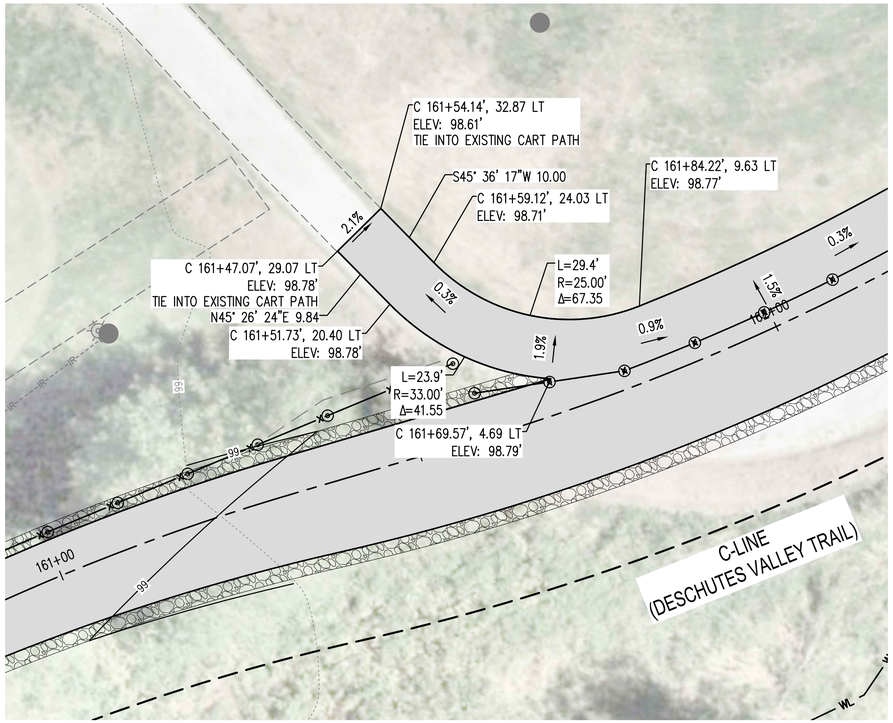
DESCHUTES VALLEY TRAIL
SEGMENT C

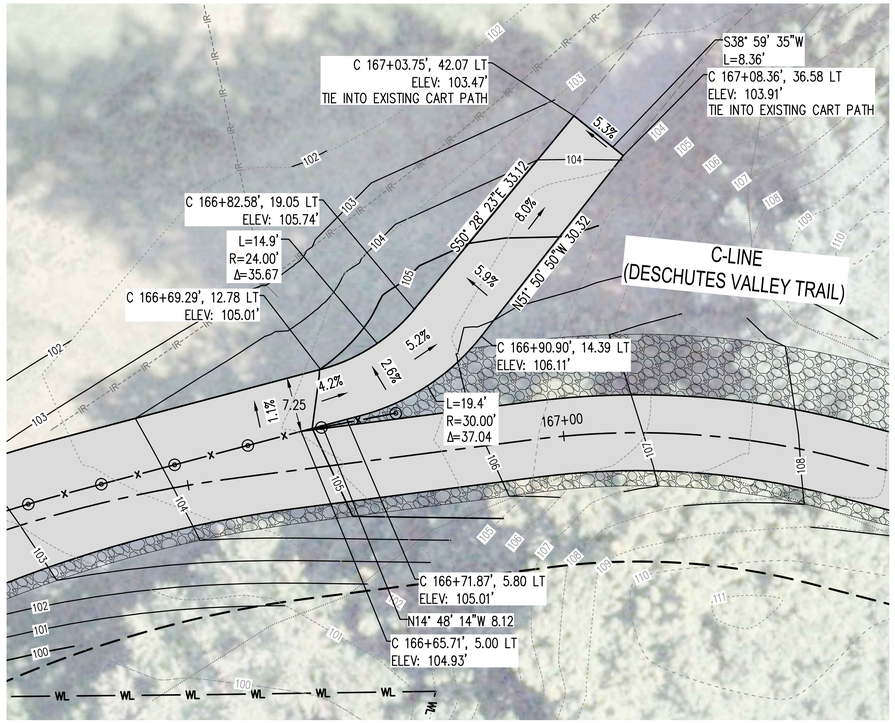
DETAILED GRADING PLAN

DRAWING No.: CG-02

SHEET No.: 55 OF 148

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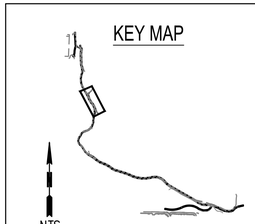


0 10 20
SCALE IN FEET

LEGEND

- EX. MAJOR CONTOUR
- EX. MINOR CONTOUR
- MAJOR CONTOUR
- MINOR CONTOUR
- SLOPE ARROW

KEY MAP



△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ
DRAWN BY: M. HENDRICKS-MATSUDA
APPROVED BY: P. HOLM
ISSUE DATE: AUGUST 2026
JOB No.: 25-000313
DRAWING FILE No.: 25-000313-C-CG-03

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CONSULTING SERVICES
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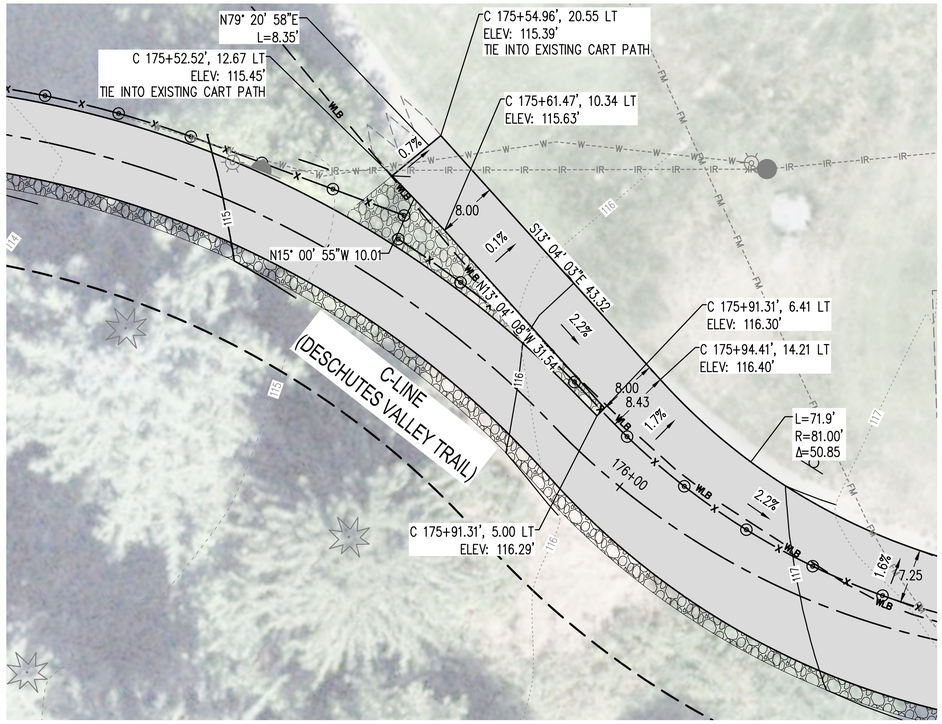
PROJECT NAME:
CITY OF TUMWATER

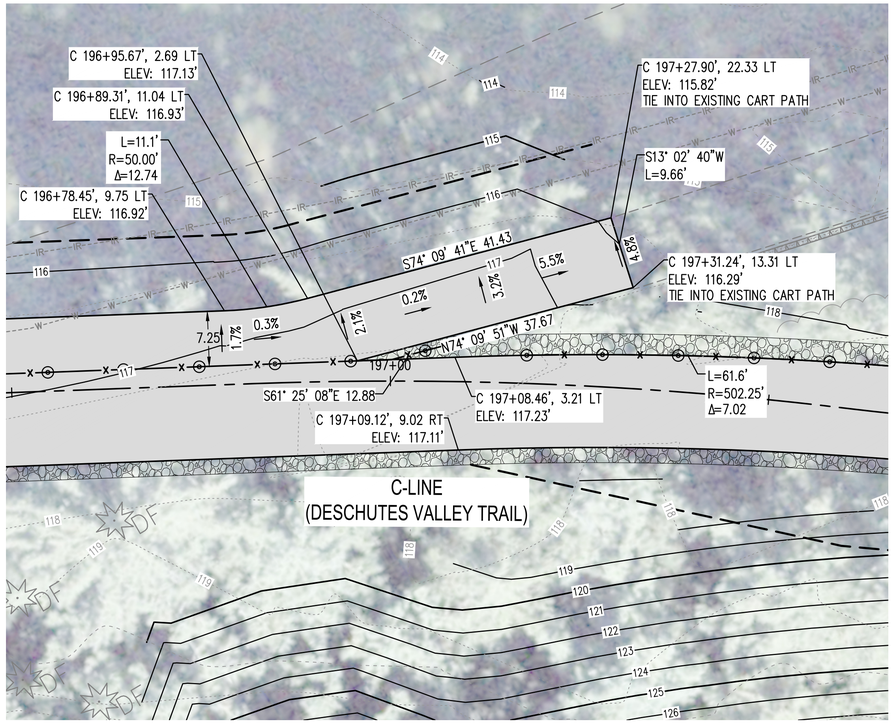
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SEGMENT C

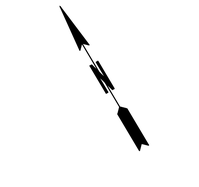
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DRAWING No.: CG-03
SHEET No.: 56 OF 148

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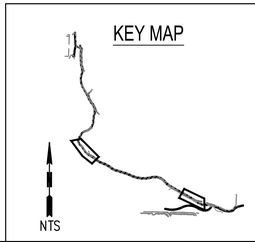




LEGEND

- EX. MAJOR CONTOUR
- EX. MINOR CONTOUR
- MAJOR CONTOUR
- MINOR CONTOUR
- SLOPE ARROW

KEY MAP



△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ	ISSUE DATE: AUGUST 2026
DRAWN BY: M. HENDRICKS-MATSUDA	JOB No.: 25-000313
APPROVED BY: P. HOLM	DRAWING FILE No.: 25-000313-C-CG-04

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PROJECT NAME:

CITY OF TUMWATER

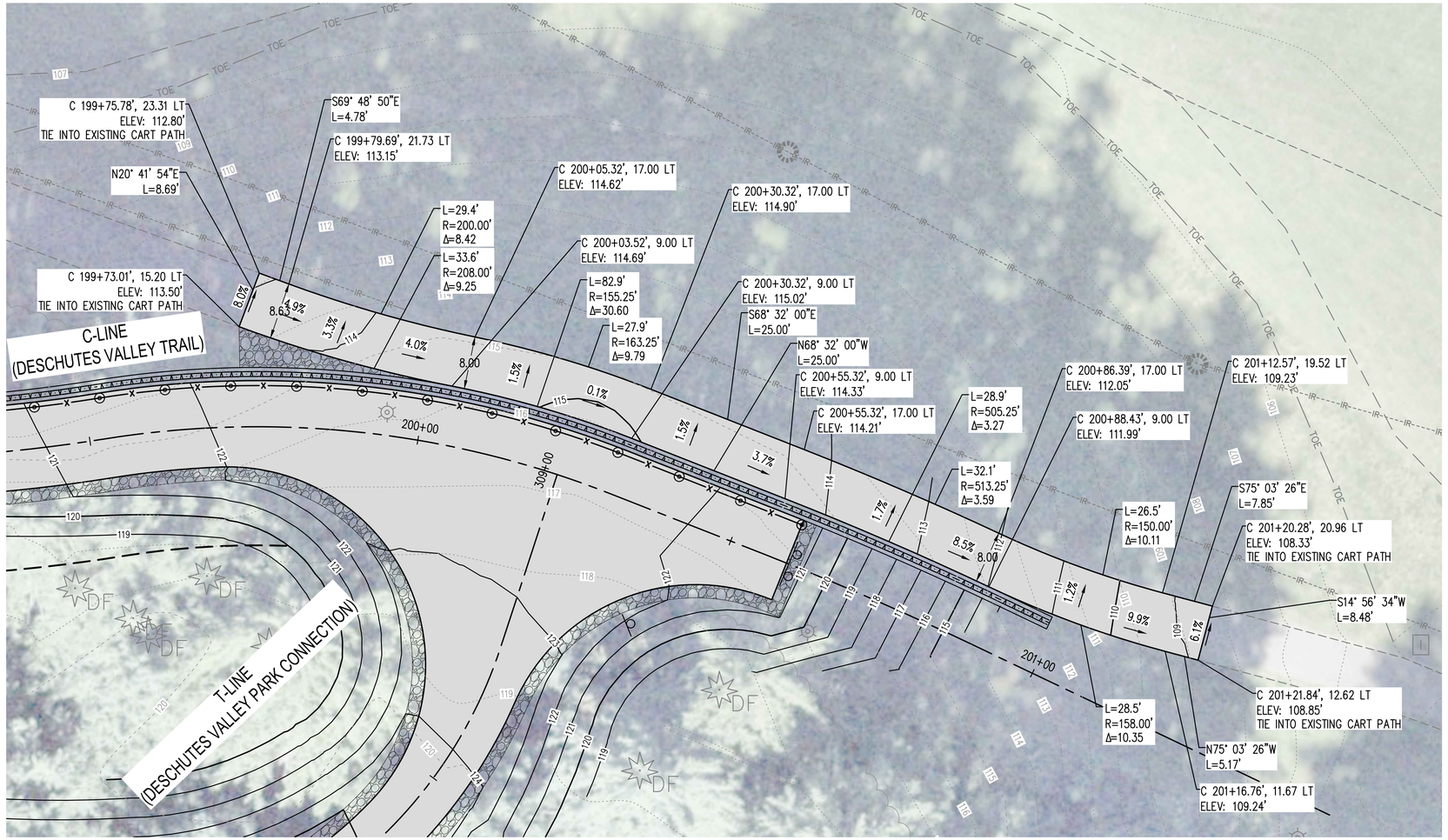
DESCHUTES VALLEY TRAIL
SEGMENT C

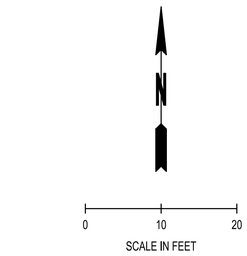
DETAILED GRADING PLAN

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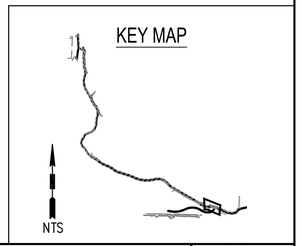
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LEGEND

- EX. MAJOR CONTOUR
- EX. MINOR CONTOUR
- MAJOR CONTOUR
- MINOR CONTOUR
- SLOPE ARROW



△	REVISIONS	DATE	BY

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APPROVED BY: P. HOLM
ISSUE DATE: AUGUST 2026
JOB No.: 25-000313
DRAWING FILE No.: 25-000313-C-CG-05

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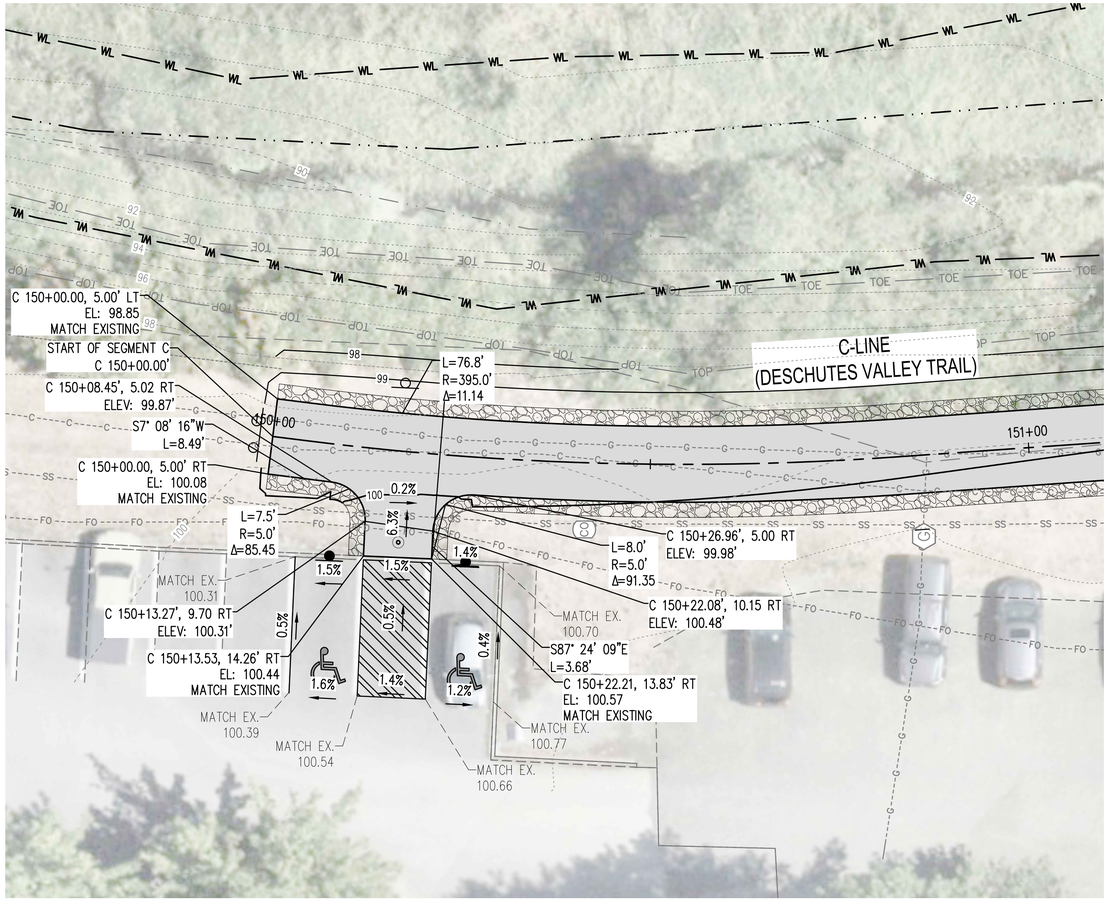
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SEGMENT C

DETAILED GRADING PLAN

DRAWING No.: CG-05

SHEET No.: 58 OF 148

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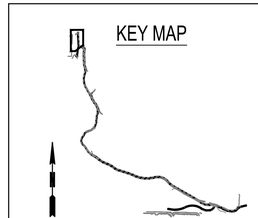
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0 10 20
SCALE IN FEET

LEGEND

- EX. MAJOR CONTOUR
- EX. MINOR CONTOUR
- MAJOR CONTOUR
- MINOR CONTOUR
- SLOPE ARROW

KEY MAP



NTS

△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ
DRAWN BY: M. HENDRICKS-MATSUDA
APPROVED BY: P. HOLM
ISSUE DATE: AUGUST 2026
JOB No.: 25-000313
DRAWING FILE No.: 25-000313-C-CG-07

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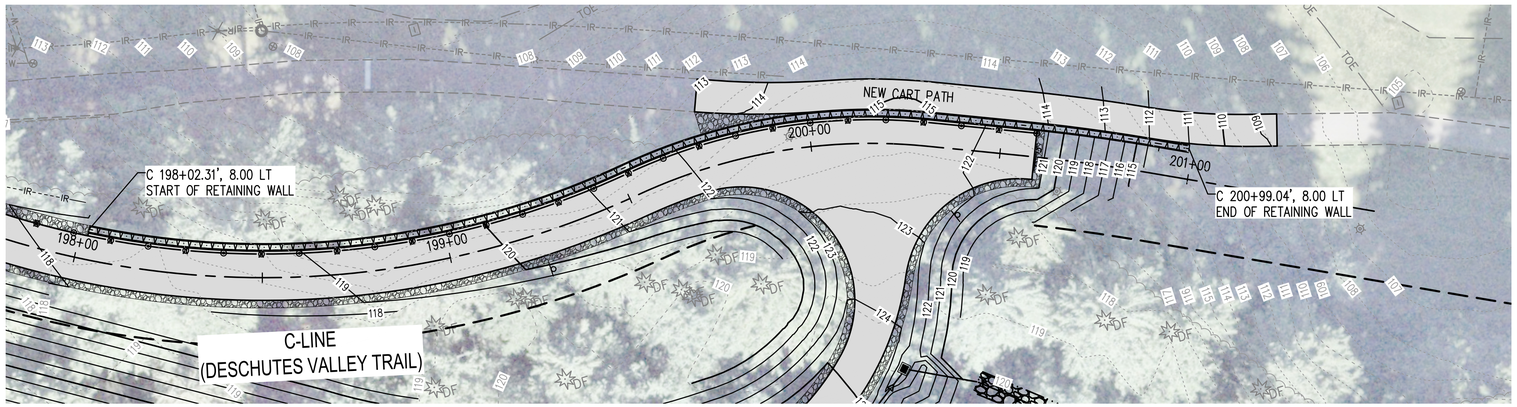
PROJECT NAME:
CITY OF TUMWATER

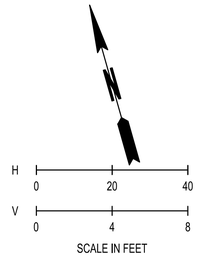
DESCHUTES VALLEY TRAIL
SEGMENT C

DETAILED GRADING PLAN

DRAWING No.: CG-06
SHEET No.: 59 OF 148

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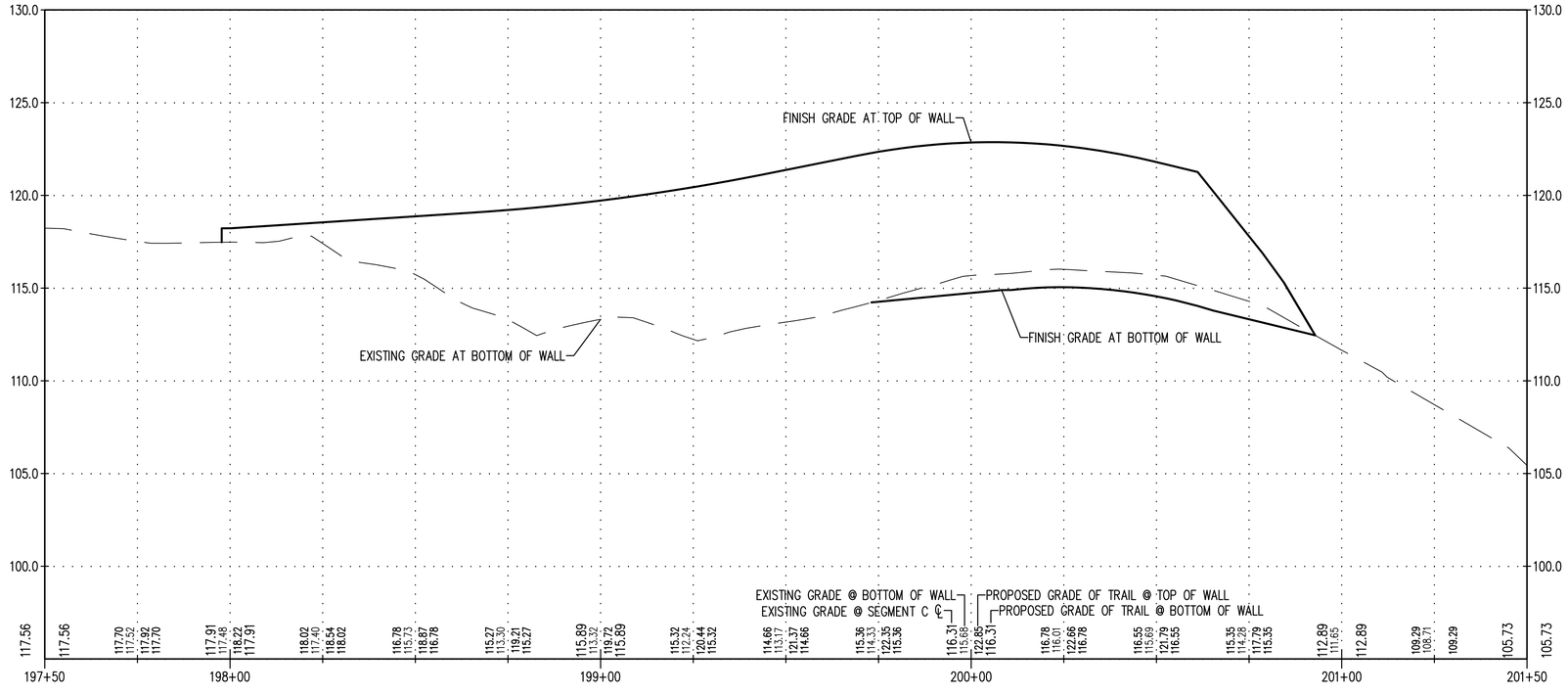


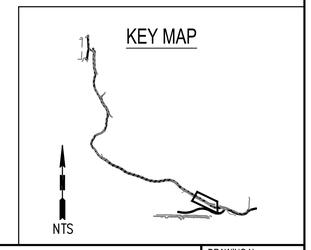


GENERAL NOTES

SEE SHEET S9 AND S10 FOR DETAILED STRUCTURAL DESIGN ON THE REDI-ROCK RETAINING WALL DESIGN

C PROFILE





△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ	ISSUE DATE: AUGUST 2026
DRAWN BY: M. HENDRICKS-MATSUDA	JOB No.: 25-000313
APPROVED BY: P. HOLM	DRAWING FILE No.: 25-000313-C-RW-01

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PROJECT NAME:

CITY OF TUMWATER

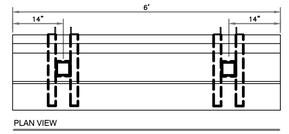
DESCHUTES VALLEY TRAIL
SEGMENT C

RETAINING WALL PLAN
C 197+75 - C 203+00

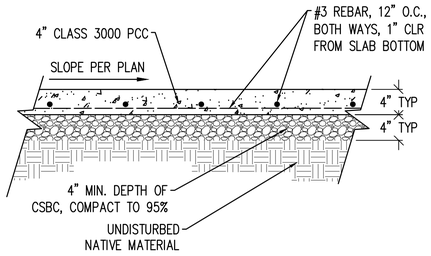
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SHEET No.: 60 OF 148

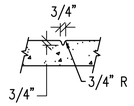
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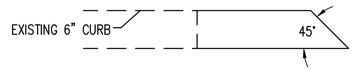
BENCH WITH BACK REST
NTS



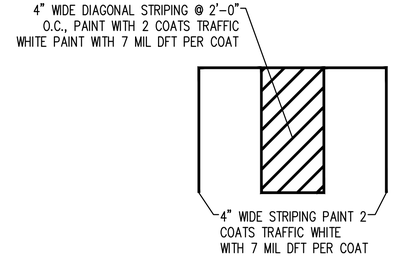
CONCRETE PAD SECTION
NTS



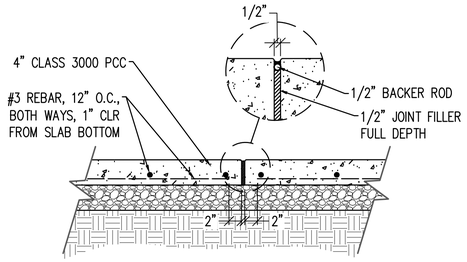
CONTROL JOINT
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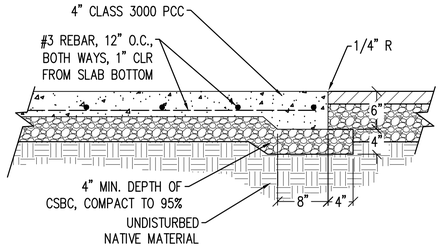
CHAMFERED CONCRETE CURB
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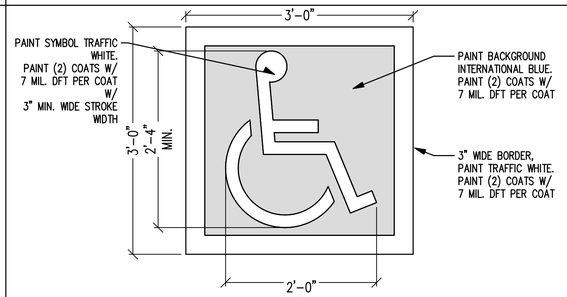
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NTS



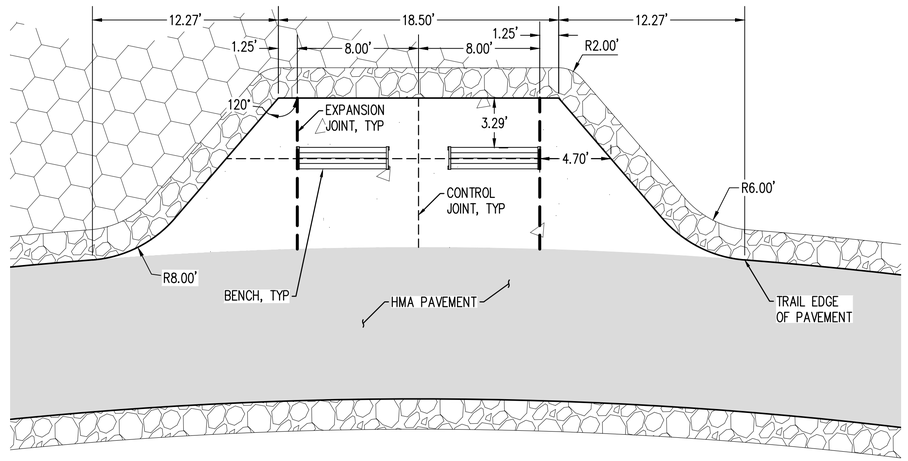
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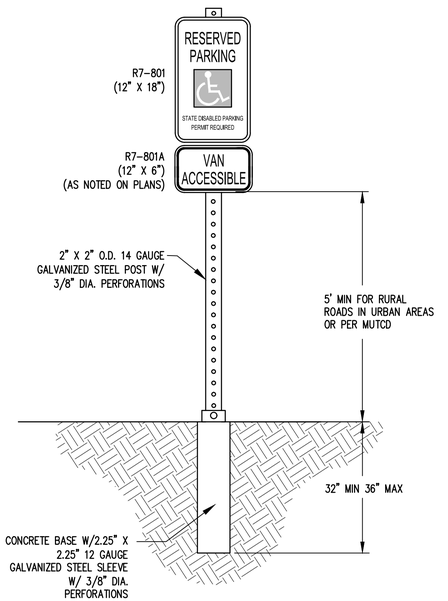
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NTS



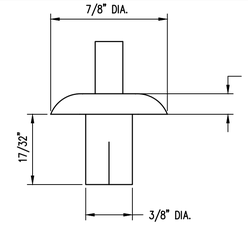
ACCESSIBILITY SYMBOL
NTS



PEDESTRIAN LANDING
1" = 5'



CONCRETE BASE, SIGN POST AND SIGN PLACEMENT



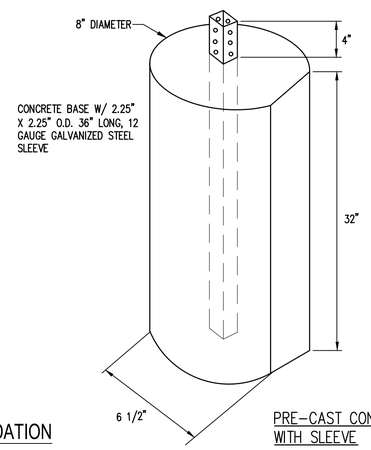
STEEL DRIVE RIVET STANDARDS

NOTE: USE STEEL DRIVE RIVETS TO FASTEN POST TO SLEEVE AND SIGNS TO POST.

MATERIALS: C1006-1008 ALUMINUM KILNED FINE GRADE STEEL.

FINISH: ZINC PLATE W/ CHROMATE SEALER.

GRIP RANGE: NOMINAL 3/16" IN A 3/8" DIA. HOLE.



PRE-CAST CONCRETE BASE WITH SLEEVE

ACCESSIBILITY SIGN, POST, AND FOUNDATION
NTS

△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ	ISSUE DATE: AUGUST 2026
DRAWN BY: M. HENDRICKS-MATSUDA	JOB No.: 25-000313
APPROVED BY: P. HOLM	DRAWING FILE No.: 25-000313-C-PP-16

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P: 360.352.1465
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PROJECT NAME:

CITY OF TUMWATER

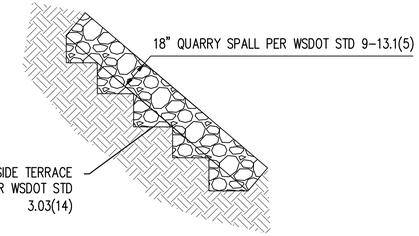
DESCHUTES VALLEY TRAIL
SEGMENT C

TRAIL GENERAL NOTES AND DETAILS

DRAWING No.: TG-01

SHEET No.: 61 OF 148

Aug 20, 2026 1:29:57pm - User: aufreyrichelson
N:\PROJECTS\2025 CITY OF TUMWATER\25-000313 TUMWATER DESCHUTES VALLEY TRAIL\CADD\25-000313-C-PP-16.DWG



NOTES:
1. ROCK EMBANKMENT SHALL BE PLACED IN ALL LOCATIONS WITH SLOPES STEEPER THAN 3.1.
2. SEE SPECIFICATIONS 3-03.3(14).

ROCK EMBANKMENT
NTS

△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ	ISSUE DATE: AUGUST 2026
DRAWN BY: M. HENDRICKS-MATSUDA	JOB No.: 25-000313
APPROVED BY: P. HOLM	DRAWING FILE No.: 25-000313-C-PP-16

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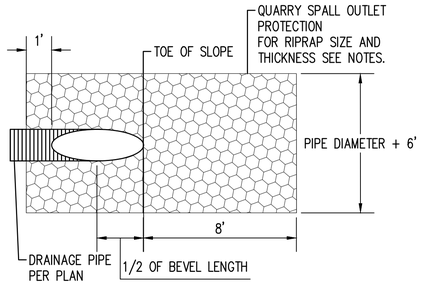
DESCHUTES VALLEY TRAIL
SEGMENT C

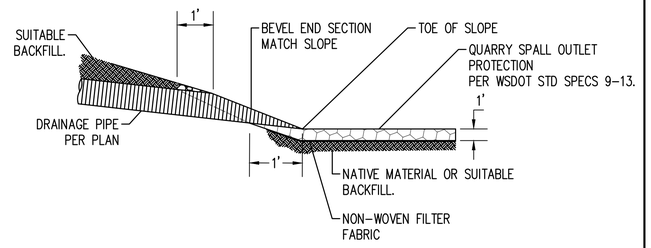
TRAIL GENERAL NOTES AND DETAILS

DRAWING No.: TG-02

SHEET No.: 62 OF 148

Aug 20, 2026 1:40:41pm – User: audreynielsen
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OUTLET PROTECTION DETAIL
NTS

CITY OF TUMWATER DRAINAGE DESIGN AND EROSION CONTROL MANUAL

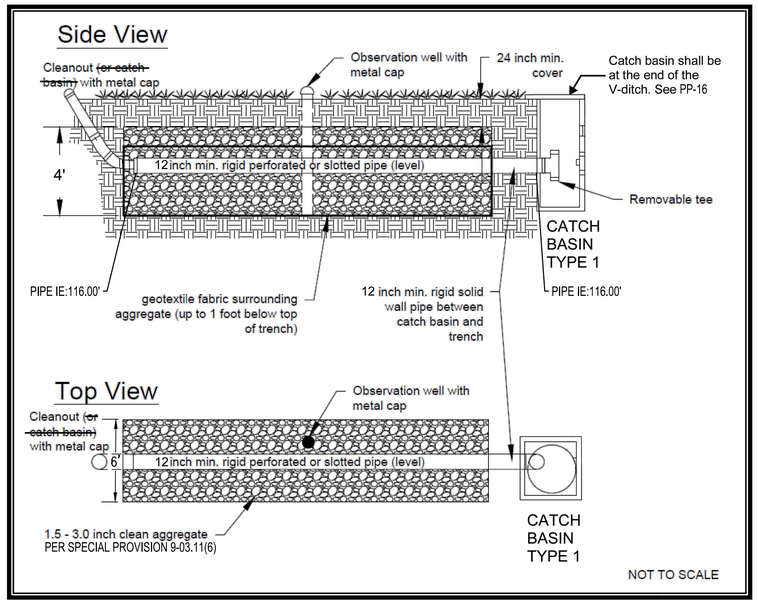


Figure 12.1. Infiltration Trench Design.

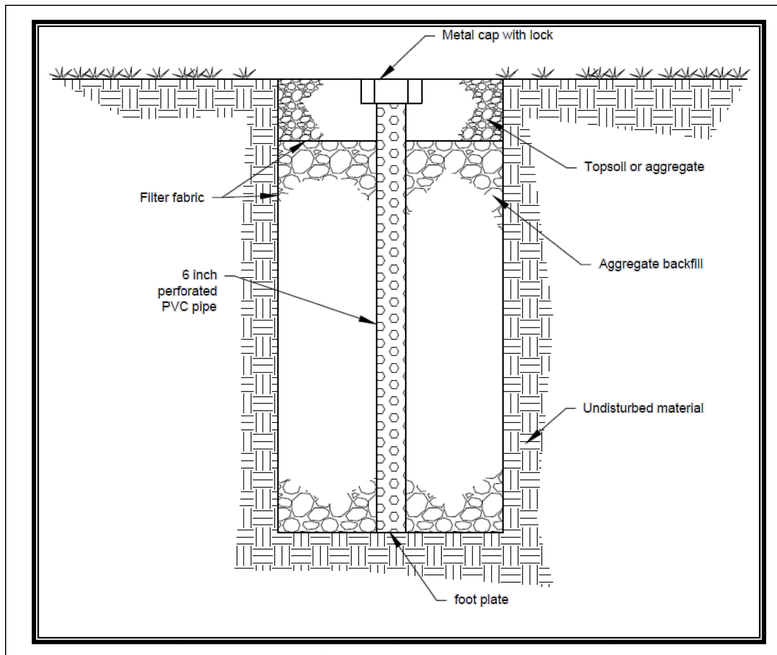
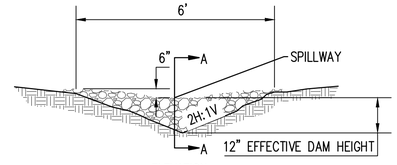
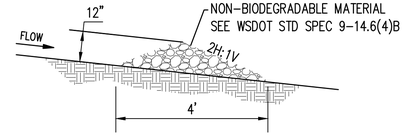


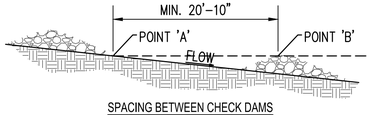
Figure 12.3. Observation Well Details.



ELEVATION



SECTION A-A



SPACING BETWEEN CHECK DAMS

CHECK DAM NOTES:

1. NON-BIODEGRADABLE MANUFACTURES CHECK DAM DEVICES APPROCED FOR USE UNDER WSDOT STANDARD SPECIFICATION SECTION 9-14.6(4)B SHALL BE INSTALLED PER MANUFACTURES RECOMMENDATIONS AND SHALL PERFORM IN ACCORDANCE WITH STANDARD SPECIFICATION SECTION 8-01.3(6).
2. TO ENSURE ADEQUATE DETENTION TIME, ROCK CHECK DAMS USED AS SEDIMENT CONTROL MAY NEED TO BE INHANCED WITH PLASTIC THAT MEETS THE REQUIREMENTS OF WSDOT STANDARD SPECIFICATION SECTION 9-14.6(3) OR FABRIC THAT MEETS THE GEOTEXTILE REQUIREMENTS OF WSDOT STANDARD SPECIFICATION SECTION 9-33(1), TABLE 6.

ROCK CHECK DAM
NTS

△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ | ISSUE DATE: AUGUST 2026
DRAWN BY: M. HENDRICKS-MATSUDA | JOB No.: 25-000313
APPROVED BY: P. HOLM | DRAWING FILE No.: 25-000313-C-SD-01

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8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
P: 360.352.1465
SCJALLIANCE.COM

PROJECT NAME: CITY OF TUMWATER

DESCHUTES VALLEY TRAIL
SEGMENT C

STORMWATER NOTES AND DETAILS

DRAWING No.: SD-01
SHEET No.: 63 OF 148

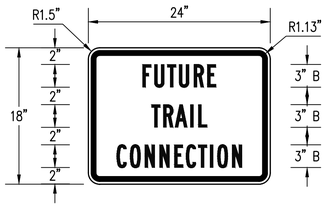
Aug 20, 2026 1:05:46pm – User: aufreyhelsen
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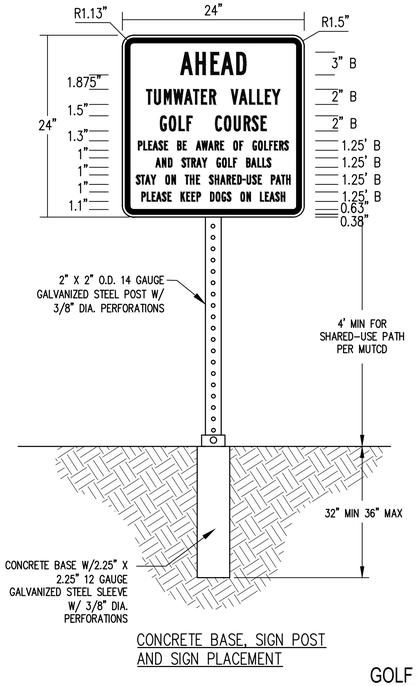
SIGN INSTALLATION SPECIFICATIONS

SIGN NO.	SIGN CODE	SIGN DESCRIPTION	STA. LOC. (or MP)	SIGN SIZE X	SIGN SIZE Y	POST MATERIAL	POST SIZE	POST LENGTH H1	POST LENGTH H2	MAXIMUM XYZ (CU. FT.)	REMARKS
1	R5-3	NO MOTOR VEHICLES	M 251+76.25, 10.19 RT	24	24	STEEL	2"x2"	4.0'	-- -- --		
2	R5-3	NO MOTOR VEHICLES	C 150+16.77, 9.00 LT	24	24	STEEL	2"x2"	4.0'	-- -- --		
3	N/A	GOLF BALL ADVISORY	C 154+25.00, 13.75 RT	24	24	STEEL	2"x2"	4.0'	-- -- --		
4	N/A	GOLF BALL ADVISORY	C 159+25.00, 9.00 RT	24	24	STEEL	2"x2"	4.0'	-- -- --		
5	N/A	GOLF BALL ADVISORY	C 164+25.00, 13.63 RT	24	24	STEEL	2"x2"	4.0'	-- -- --		
6	N/A	GOLF BALL ADVISORY	C 169+25.00, 9.00 RT	24	24	STEEL	2"x2"	4.0'	-- -- --		
7	N/A	GOLF BALL ADVISORY	C 174+25.00, 9.00 RT	24	24	STEEL	2"x2"	4.0'	-- -- --		
8	N/A	GOLF BALL ADVISORY	C 179+25.00, 13.75 RT	24	24	STEEL	2"x2"	4.0'	-- -- --		
9	N/A	GOLF BALL ADVISORY	C 184+25.00, 13.75 RT	24	24	STEEL	2"x2"	4.0'	-- -- --		
10	N/A	GOLF BALL ADVISORY	C 189+25.00, 13.75 RT	24	24	STEEL	2"x2"	4.0'	-- -- --		
11	N/A	GOLF BALL ADVISORY	C 194+24.99, 13.75 RT	24	24	STEEL	2"x2"	4.0'	-- -- --		
12	N/A	GOLF BALL ADVISORY	C 199+24.99, 10.00 RT	24	24	STEEL	2"x2"	4.0'	-- -- --		
13	N/A	FUTURE TRAIL CONNECTION	C 200+59.48, 0.00	24	18	TYPE III BARRICADE		-- -- --	--		
14	R5-3	NO MOTOR VEHICLES	T 300+17.82, 8.99 LT	24	24	STEEL	2"x2"	4.0'	-- -- --		
15	N/A	GOLF BALL ADVISORY	T 300+17.82, 8.99 LT	24	24	STEEL		-- -- --	--		MOUNT BELOW SIGN NO. 15
16	W2-4	INTERSECTION WARNING	T 308+03.42, 9.00 LT	24	24	STEEL	2"x2"	4.0'	-- -- --		
17	W16-9P MOD	SLOW	T 308+03.42, 9.00 LT	24	12	STEEL	2"x2"	-- -- --	--		MOUNT BELOW W2-4
18	N/A	GOLF BALL ADVISORY	T 308+81.95, 17.64 RT	24	24	STEEL	2"x2"	4.0'	-- -- --		
19	N/A	FUTURE TRAIL CONNECTION	C 149+98.28, 0.00	24	18	TYPE III BARRICADE		-- -- --	--		
20	N/A	TYPE III BARRICADE	C 149+98.28, 0.00	144	96	PRESSURE TREATED	4"x4"	8.0' 8.0' 8.0'	--		
21	N/A	TYPE III BARRICADE	C 200+59.48, 0.00	144	96	PRESSURE TREATED	4"x4"	8.0' 8.0' 8.0'	--		

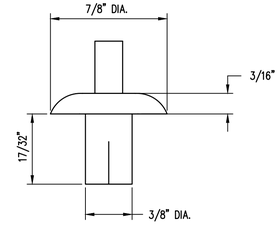
SIGN RELOCATION SPECIFICATIONS

SIGN NO.	SIGN CODE	SIGN DESCRIPTION	EXIST. STA. LOC. (or MP)	STA. LOC. (or MP)
REL-1	N/A	HOLE 4	A 177+73.31, 14.94 LT	C 176+21.59, 16.73 LT
REL-2	N/A	HOLE 5	A 189+08.05, 14.22 RT	C 188+57.83, 13.78 LT





CONCRETE BASE, SIGN POST AND SIGN PLACEMENT



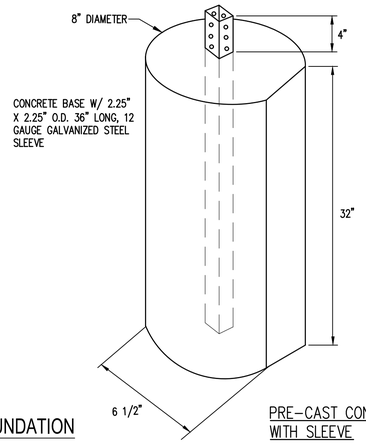
STEEL DRIVE RIVET STANDARDS

NOTE: USE STEEL DRIVE RIVETS TO FASTEN POST TO SLEEVE AND SIGNS TO POST.

MATERIALS: C1006-1008 ALUMINUM KILNED FINE GRADE STEEL.

FINISH: ZINC PLATE W/ CHROMATE SEALER.

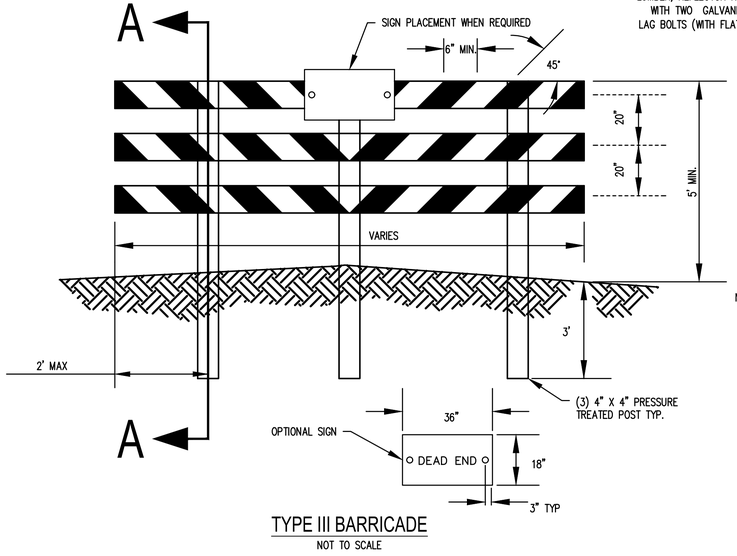
GRIP RANGE: NOMINAL 3/16" IN A 3/8" DIA. HOLE.



PRE-CAST CONCRETE BASE WITH SLEEVE

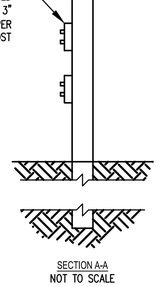
GOLF BALL ADVISORY SIGN, POST, AND FOUNDATION

NTS



TYPE III BARRICADE

NOT TO SCALE



SECTION A-A

NOT TO SCALE

NOTES:

1. BARRICADES SHALL BE INSTALLED IN CONFORMANCE WITH THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) AS MODIFIED BY THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION (WSDOT)
2. MARKINGS FOR BARRICADE RAILS SHALL BE ALTERNATIVE WHITE AND RED STRIPES (SLOPING DOWNWARD AT AN ANGLE OF 45 DEGREES).
3. THE ENTIRE AREA OF WHITE AND RED STRIPES SHALL BE REFLECTIONIZED SO AS TO BE VISIBLE UNDER NORMAL ATMOSPHERIC CONDITIONS FROM A MINIMUM DISTANCE OF 1,000 FEET WHEN ILLUMINATED BY THE LOW BEAMS OF STANDARD AUTOMOBILE HEADLIGHTS. THE PREDOMINANT COLOR FOR OTHER BARRICADE COMPONENTS SHALL BE WHITE.
4. BARRICADE SECTION SHALL EXTEND ACROSS THE ENTIRE STREET AREA. WHERE BARRICADE EXTENDS ENTIRELY ACROSS A ROADWAY, THE STRIPES SHALL SLOPE DOWNWARD IN THE DIRECTION TOWARD WHICH TRAFFIC MUST TURN IN DETOURING. WHERE BOTH RIGHT AND LEFT TURNS ARE ALLOWED, THE CHEVRON STRIPING SHALL SLOPE DOWNWARD IN BOTH DIRECTIONS FROM THE CENTER OF THE BARRICADE. RAILS SHALL BE PLACED BOTH FRONT AND BACK OF BARRICADE IF REQUIRED FOR TWO-WAY TRAFFIC. RAILS SHALL BE THE SAME SIZE. FOR WIDER APPLICATIONS, MULTIPLE SECTIONS, SPACED NO FURTHER THAN 4" SHALL BE USED.
5. RAILS SHALL BE PLACED BOTH ON THE FRONT AND BACK OF THE BARRICADE IF REQUIRED FOR TWO-WAY TRAFFIC. RAILS SHALL BE THE SAME SIZE.
6. LUMBER SHALL BE STANDARD GRADE OR BETTER.
7. IF SIGN IS REQUIRED, FIELD DRILL TWO HOLES TO ACCOMODATE GALVANIZED 3/8" MACHINE BOLT, WASHER AND NUT. THE SIGN SHALL BE INSTALLED SO THAT THE CENTER RAIL IS NOT COVERED.

△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ
DRAWN BY: M. HENDRICKS-MATSUDA
APPROVED BY: P. HOLM
ISSUE DATE: AUGUST 2026
JOB No.: 25-000313
DRAWING FILE No.: 25-000313-C-SN-01

ALL DIMENSIONS SHOWN IN FEET UNLESS OTHERWISE DESIGNATED

PATRICK HOLM, STATE OF WASHINGTON, 49470, REGISTERED PROFESSIONAL ENGINEER
PRELIMINARY

SCJ ALLIANCE
CONSULTING SERVICES
8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
P: 360.352.1465
SCJALLIANCE.COM

PROJECT NAME:

CITY OF TUMWATER

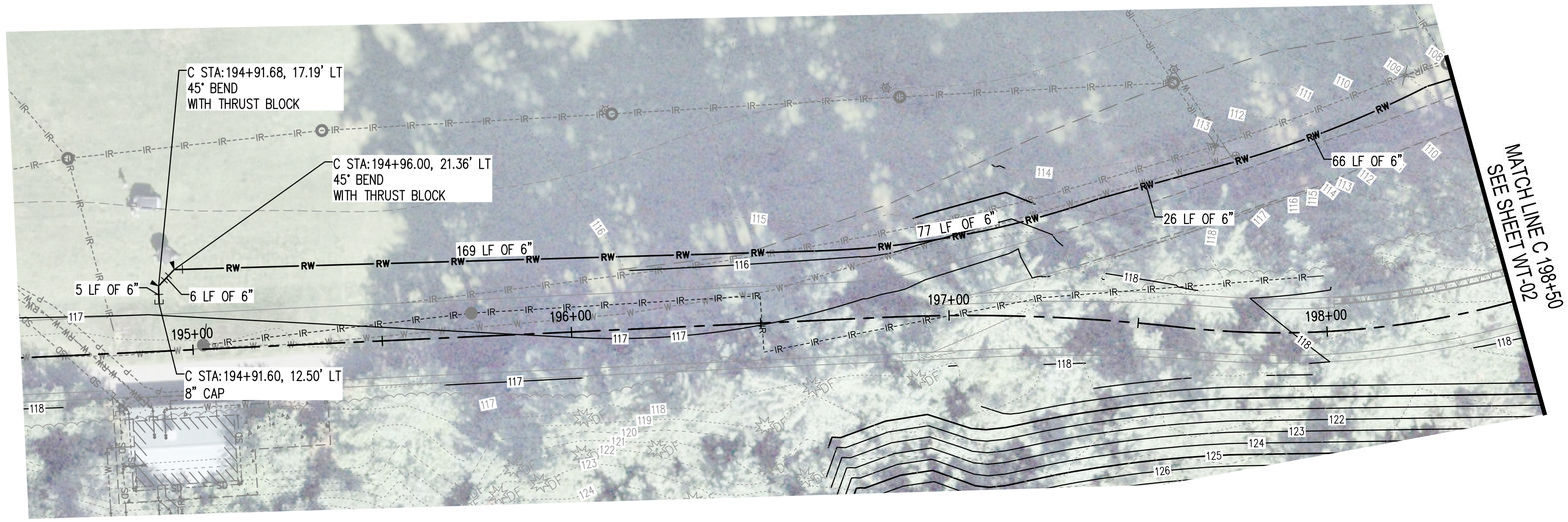
DESCHUTES VALLEY TRAIL
SEGMENT C

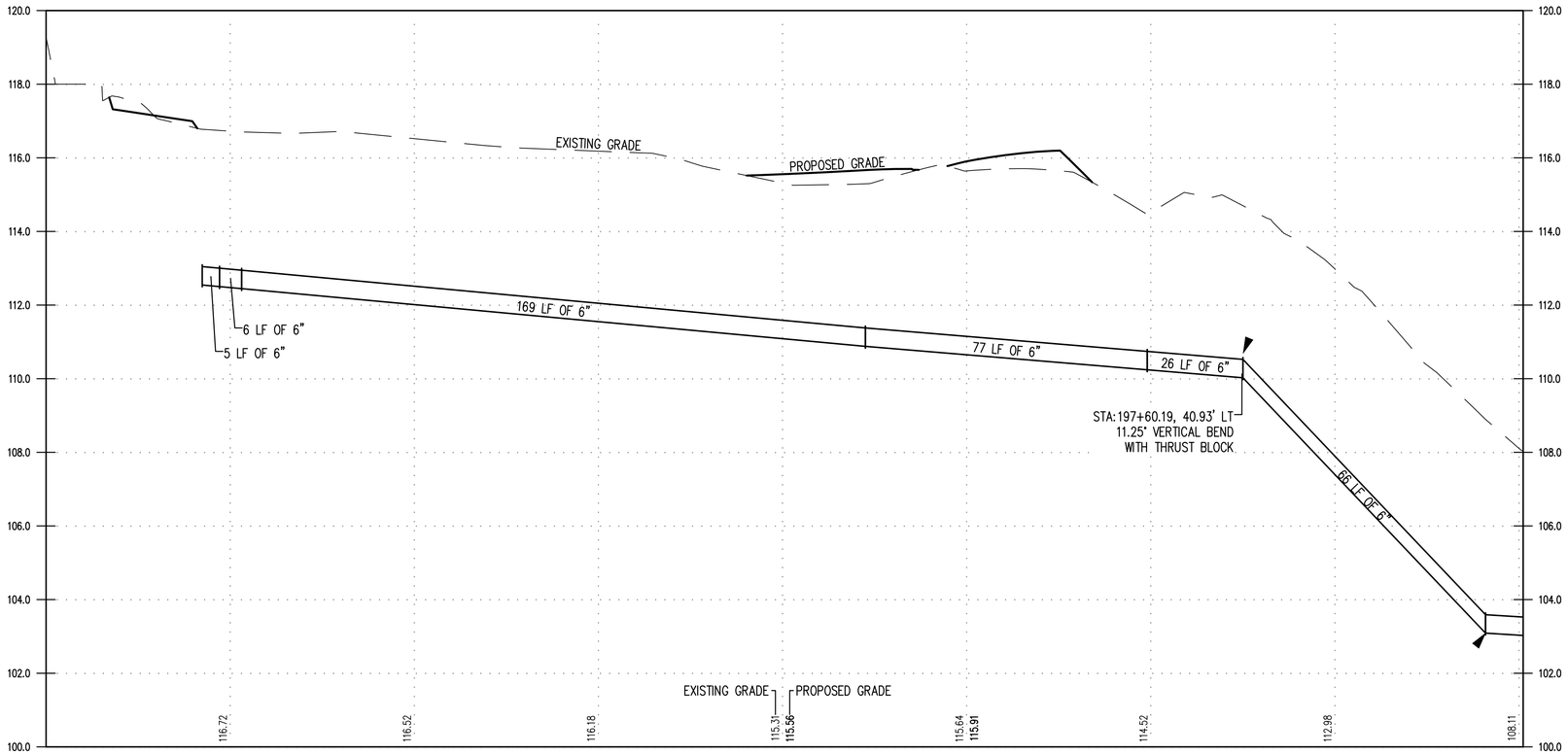
SIGNING PLAN

DRAWING No.: SN-01

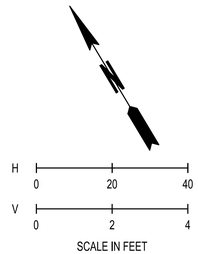
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SEG C RECLAIMED WATER



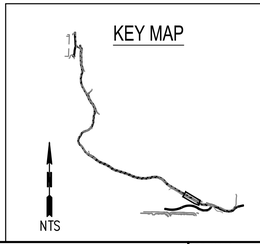
LEGEND

RW	RECLAIMED WATER LINE, PURPLE, 6 INCH PVC AWWA C900 (CLASS 150)
W	EXISTING WATER LINE
IR	EXISTING IRRIGATION LINE
	8 INCH CAP
	BEND W/ THRUST BLOCKING

NOTES:

1. ALL WORKMANSHIP AND MATERIAL SHALL BE IN ACCORDANCE WITH CITY OF TUMWATER STANDARDS AND THE LATEST VERSION OF STATE OF WASHINGTON STANDARD SPECIFICATIONS FOR ROAD, BRIDGE, AND MUNICIPAL CONSTRUCTION, LATEST EDITION.
2. A PRECONSTRUCTION MEETING SHALL BE HELD WITH THE CITY PRIOR TO THE START OF CONSTRUCTION.
3. RECLAIMED WATER SHALL BE PURPLE AWWA C900 CLASS 150 PIPE.
4. GATE VALVES SHALL BE RESILIENT WEDGE, NRS (NON RISING STEM) WITH O-RINGS SEALS. VALVE ENDS SHALL BE MECHANICAL JOINT OR ANSI FLANGES. VALVES SHALL CONFORM TO AWWA 509-80. VALVES SHALL BE MUELLER, M&H, KENNEDY, CLOW R/W, OR WATEROUS SERIES 500. EXISTING VALVES SHALL BE OPERATED BY CITY EMPLOYEES ONLY.
5. ALL LINES SHALL BE CHLORINATED AND TESTED IN CONFORMANCE WITH THE SPECIFICATIONS.
6. ALL PIPE AND SERVICES SHALL BE INSTALLED WITH 14 GAUGE COATED COPPER WIRE, WRAPPED AROUND THE PIPE, BROUGHT UP AND TIED OFF AT TOP OF VALVE BOX.
7. ALL RECLAIMED WATER MAINS SHALL BE STAKED FOR GRADES AND ALIGNMENT BY AN ENGINEERING OR SURVEYING FIRM CAPABLE OF PERFORMING SUCH WORK.
8. CALL UNDERGROUND LOCATE AT 1-800-424-5555 A MINIMUM OF 48 HOURS PRIOR TO ANY EXCAVATIONS.
9. THE MINIMUM COVER FOR ALL RECLAIMED WATER MAINS FROM TOP OF PIPE TO FINISH GRADE SHALL BE 42 INCHES UNLESS OTHERWISE APPROVED.
10. RECLAIMED WATER WILL NOT BE CONNECTED TO A SOURCE. THIS WILL BE COMPLETED BY THE CITY OF TUMWATER AT A LATER DATE.

KEY MAP



△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ
DRAWN BY: A. NIELSEN
APPROVED BY: P. HOLM
ISSUE DATE: AUGUST 2026
JOB No.: 25-000313
DRAWING FILE No.: 25-000313-C-WT-01

ALL DIMENSIONS SHOWN IN FEET UNLESS OTHERWISE DESIGNATED

PATRICK HOLM — STATE OF WASHINGTON — 49470 — REGISTERED PROFESSIONAL ENGINEER — PRELIMINARY

SCJ ALLIANCE
CONSULTING SERVICES
8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
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PROJECT NAME:

CITY OF TUMWATER

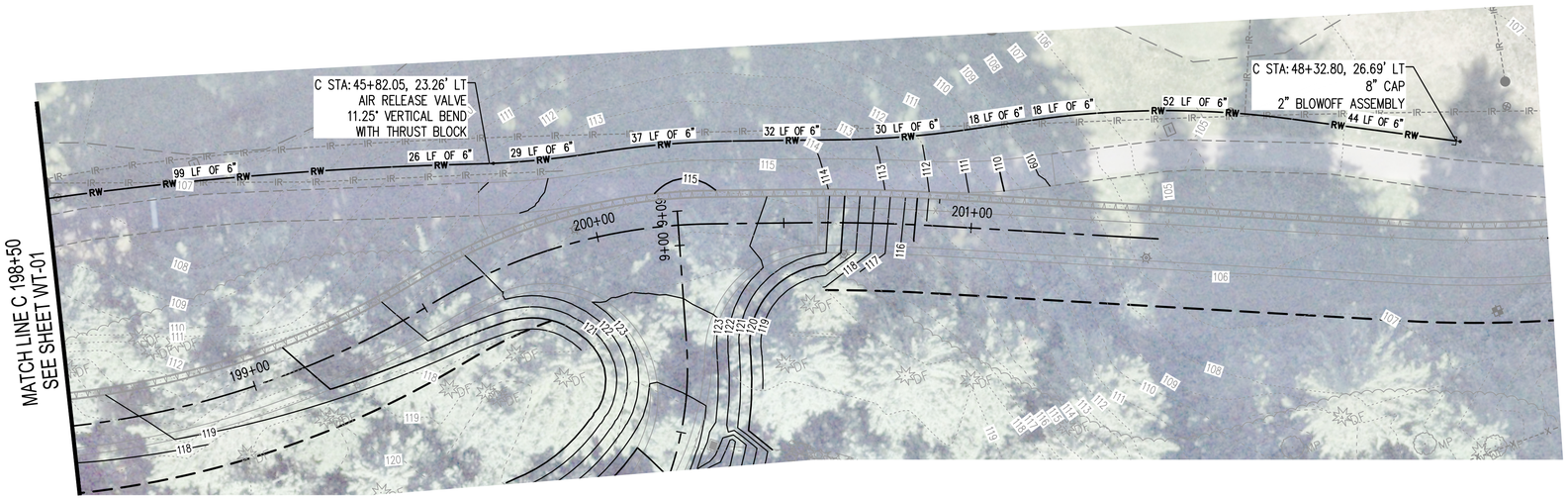
DESCHUTES VALLEY TRAIL
SEGMENT C

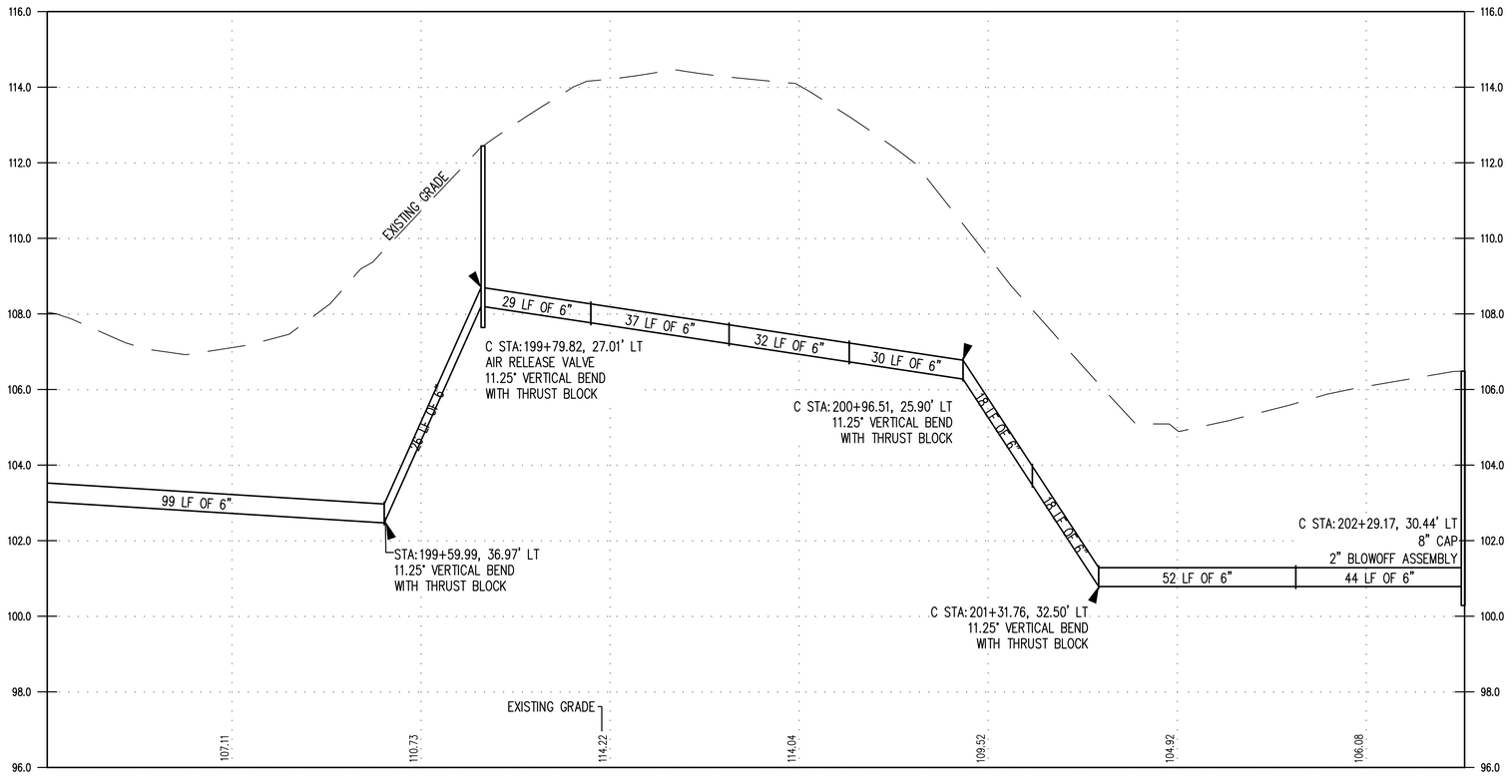
RECLAIMED WATER PLAN AND PROFILE
C 194+50 - C 198+50

DRAWING No.: WT-01

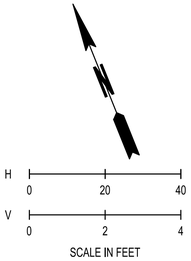
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SEG C RECLAIMED WATER



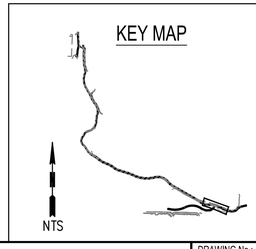
LEGEND

RW	RECLAIMED WATER LINE, PURPLE, 6 INCH PVC AWWA C900 (CLASS 150)
W	EXISTING WATER LINE
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	8 INCH CAP
	BEND W/ THRUST BLOCKING

NOTES:

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KEY MAP



△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ
DRAWN BY: A. NIELSEN
APPROVED BY: P. HOLM
ISSUE DATE: AUGUST 2026
JOB No.: 25-000313
DRAWING FILE No.: 25-000313-C-WT-02

ALL DIMENSIONS SHOWN IN FEET UNLESS OTHERWISE DESIGNATED

PATRICK HOLM, STATE OF WASHINGTON, 49470, REGISTERED PROFESSIONAL ENGINEER — PRELIMINARY

SCJ ALLIANCE
CONSULTING SERVICES
8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
P: 360.352.1465
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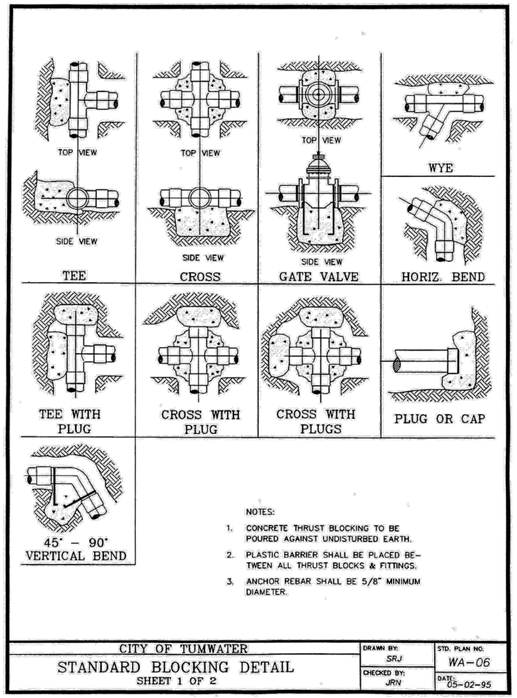
PROJECT NAME:
CITY OF TUMWATER

DESCHUTES VALLEY TRAIL
SEGMENT C

RECLAIMED WATER PLAN AND PROFILE
C 198+50 - C 202+50

DRAWING No.: WT-02
SHEET No.: 66 OF 148

Aug 20, 2026 1:22:34pm - User: aufreyhelsen
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NOTES:
1. CONCRETE THRUST BLOCKING TO BE POURED AGAINST UNDISTURBED EARTH.
2. PLASTIC BARRIER SHALL BE PLACED BE-TWEEN ALL THRUST BLOCKS & FITTINGS.
3. ANCHOR REBAR SHALL BE 5/8" MINIMUM DIAMETER.

CITY OF TUMWATER	DRAWN BY: SRJ	STD. PLAN NO. WA-06
STANDARD BLOCKING DETAIL SHEET 1 OF 2	CHECKED BY: JRN	DATE: 05-02-95

NOTES:
1. CONCRETE THRUST BLOCKING TO BE POURED AGAINST UNDISTURBED EARTH.
2. KEEP CONCRETE CLEAR OF JOINT AND ACCESSORIES.
3. THE REQUIRED THRUST BEARING AREAS FOR SPECIAL CONNECTIONS ARE SHOWN ENCIRCLED ON THE PLANS; e.g. (15) INDICATES 15 SQUARE FEET BEARING AREA REQUIRED.
4. IF NOT SHOWN ON PLANS REQUIRED BEARING AREAS AT FITTING SHALL BE AS PRESSURE(S) AND ALLOWABLE SOIL BEARING STRESS(ES) STATED IN THE SPECIAL SPECIFICATIONS.
5. BEARING AREAS AND SPECIAL BLOCKING DETAILS SHOWN ON PLANS TAKE PRECEDENCE OVER BEARING AREAS AND BLOCKING DETAILS SHOWN ON THIS STANDARD DETAIL.

BEARING AREA OF THRUST BLOCKS IN SQ. FT.

FITTING SIZE	TEE, WYE PLUG OR CAP	90°BEND PLUGGED CROSS	TEE PLUGGED ON RUN A_1	TEE PLUGGED ON RUN A_2	45°BEND	22.5°BEND	11.5°BEND
4	1.0	1.4	1.9	1.4	1.0		
6	2.1	3.0	4.3	3.0	1.6	1.0	
8	3.8	5.3	7.6	5.4	2.9	1.5	1.0
10	5.9	8.4	11.8	8.4	4.6	2.4	1.2
12	8.5	12.0	17.0	12.0	6.6	3.4	1.7
14	11.5	16.3	23.0	16.3	8.9	4.6	2.3
16	15.0	21.3	30.0	21.3	11.6	6.0	3.0
18	19.0	27.0	38.0	27.0	14.6	7.6	3.8
20	23.5	33.3	47.0	33.3	18.1	9.4	4.7
24	34.0	48.0	68.0	48.0	26.2	13.6	6.8

NOTE:
ABOVE BEARING AREAS BASED ON TEST PRESSURE OF 150 psi AND AN ALLOWABLE SOIL BEARING STRESS OF 2,000 POUNDS PER SQUARE FOOT. TO COMPUTE BEARING AREAS FOR DIFFERENT TEST PRESSURES AND SOIL BEARING STRESSES, USE STANDARD PLAN TEMP-41.

CITY OF TUMWATER	DRAWN BY: SRJ	STD. PLAN NO. WA-07
STANDARD BLOCKING DETAIL SHEET 2 OF 2	CHECKED BY: JRN	DATE: 05-30-95

THRUST LOADS

THRUST AT FITTINGS IN POUNDS AT 200 POUNDS PER SQUARE INCH OF WATER PRESSURE

PIPE DIAMETER	90° BEND	45° BEND	22-1/2° BEND	11-1/4° BEND	DEAD END OR TEE
4"	3,600	2,000	1,000	500	2,600
6"	8,000	4,400	2,300	1,200	5,700
8"	14,300	7,700	4,000	2,000	10,100
10"	22,300	12,100	6,200	3,100	15,800
12"	32,000	17,400	8,900	4,500	22,700
14"	43,600	23,600	12,100	6,100	30,800
16"	57,000	30,800	15,700	7,900	40,300

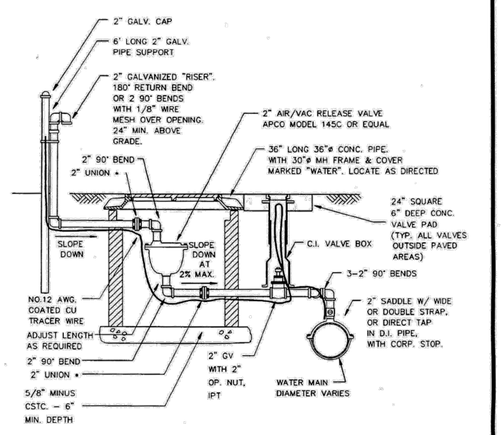
NOTES:
1. BLOCKING SHALL BE CEMENT CONCRETE CLASS "B" POURED IN PLACE AGAINST UNDISTURBED EARTH. FITTING SHALL BE ISOLATED FROM CONCRETE THRUST BLOCK WITH PLASTIC OR SIMILAR MATERIAL.
2. TO DETERMINE THE BEARING AREA OF THE THRUST BLOCK IN SQUARE FEET (S.F.):
   EXAMPLE : 12" – 90° BEND IN SAND AND GRAVEL
   32,000 LBS 3000 LB/S.F. = 10.7 S.F. OF AREA
3. AREAS MUST BE ADJUSTED FOR OTHER PIPE SIZE, PRESSURES AND SOIL CONDITIONS.
4. BLOCKING SHALL BE ADEQUATE TO WITHSTAND FULL TEST PRESSURE AS WELL AS TO CONTINUOUSLY WITHSTAND OPERATING PRESSURE UNDER ALL CONDITIONS OF SERVICE.

SAFE SOIL BEARING LOADS

FOR HORIZONTAL THRUSTS WHEN THE DEPTH OF COVER OVER THE PIPE EXCEEDS 2 FEET

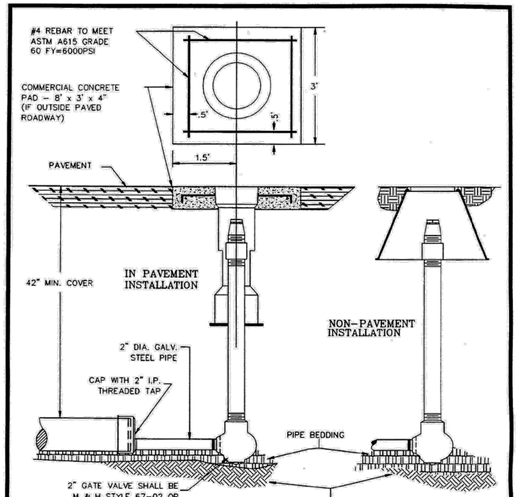
SOIL	POUNDS PER SQUARE FOOT
MUCK, PEAT	0
SOFT CLAY	1,000
SAND	2,000
SAND & GRAVEL	3,000
SAND & GRAVEL CEMENTED WITH CLAY	4,000
HARD SHALE	10,000

CITY OF TUMWATER	DRAWN BY: SRJ	STD. PLAN NO. WA-08
THRUST LOADS	CHECKED BY: JRN	DATE: 05-02-95



NOTES:
1) ALL PIPE TO BE SCHED. 40 GALV. (EXCEPT AS NOTED)
2) GROUT STRUCTURE AT PIPE ENTRIES.
3) FILL VAULT WITH VERMICULITE.
4) GROUT MH COVER TO PIPE.
5) FASTEN VENT TO POST WITH SS STRAP.
6) FASTEN SCREEN TO BEND W/ SS CLAMP
7) 2" UNIONS TO BE CONSTRUCTED OF TWO 2" COMPANION FLANGES. CONNECT WITH STAINLESS BOLTS.

CITY OF TUMWATER	DRAWN BY: SRJ	STD. PLAN NO. WA-10
AIR RELEASE VALVE DETAIL	CHECKED BY: JRN	DATE: 05-25-95



NOTES:
1. ON WATERMAINS WHICH WILL BE EXTENDED IN THE FUTURE, THE VALVE WHICH OPERATES THE BLOWOFF ASSEMBLY SHALL BE THE SAME SIZE AND PROVIDED WITH A CONCRETE THRUST BLOCK.
2. THESE ASSEMPLIES COMPLY WITH THE #2000 SPECS AND DETAILS MANUFACTURED BY KUPFERLE FOUNDRY.

CITY OF TUMWATER	DRAWN BY: SRJ	STD. PLAN NO. WA-11
2" BLOWOFF ASSEMBLY	CHECKED BY: JRN	DATE: 05-30-95

△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ
ISSUE DATE: AUGUST 2026
DRAWN BY: M. HENDRICKS-MATSUDA
JOB No.: 25-000313
APPROVED BY: P. HOLM
DRAWING FILE No.: 25-000313-C-WT-03

ALL DIMENSIONS SHOWN IN FEET UNLESS OTHERWISE DESIGNATED

PATRICK HOLM — STATE OF WASHINGTON — 49470 — REGISTERED PROFESSIONAL ENGINEER — PRELIMINARY

SCJ ALLIANCE
CONSULTING SERVICES
8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
P: 360.352.1465
SCJALLIANCE.COM

PROJECT NAME:
CITY OF TUMWATER

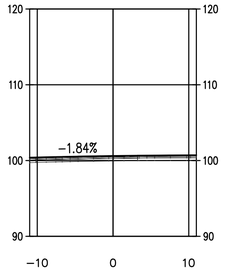
DESCHUTES VALLEY TRAIL
SEGMENT C

RECLAIMED WATER NOTES AND DETAILS

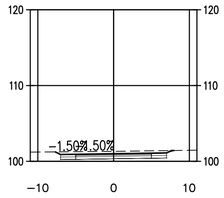
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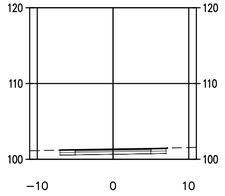
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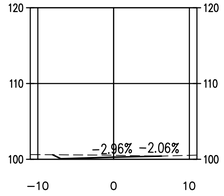
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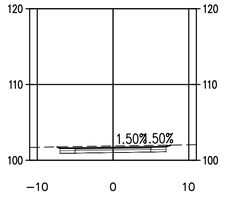
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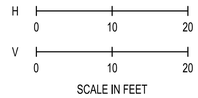


M 251+85.26



M 251+00.00





△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ	ISSUE DATE: APRIL 2026
DRAWN BY: M. HENDRICKS-MATSUDA	JOB No.: 25-000313
APPROVED BY: P. HOLM	DRAWING FILE No.: _25-000313-C-CS-01

ALL DIMENSIONS SHOWN IN FEET UNLESS OTHERWISE DESIGNATED

PATRICK HOLM — STATE OF WASHINGTON — 49670 — REGISTERED PROFESSIONAL ENGINEER

PRELIMINARY

SCJ ALLIANCE
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P: 360.352.1465
SCJALLIANCE.COM

PROJECT NAME:

CITY OF TUMWATER

DESCHUTES VALLEY TRAIL
SEGMENT C

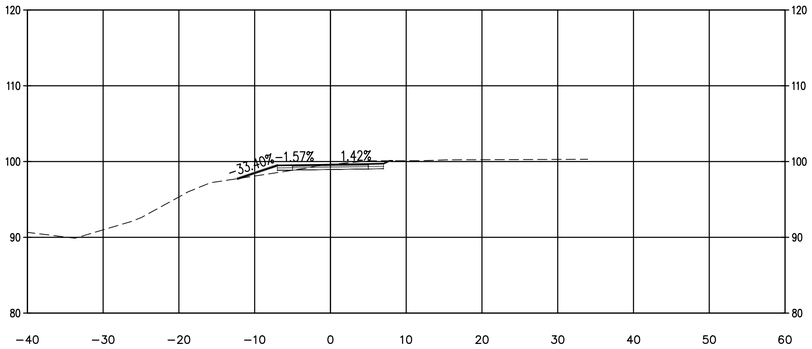
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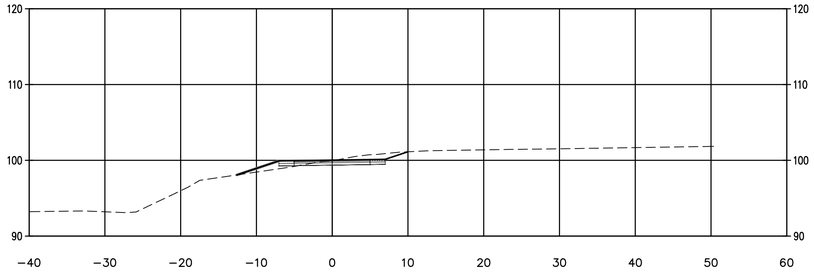
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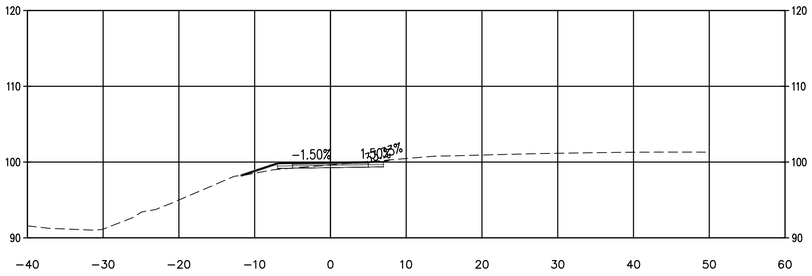


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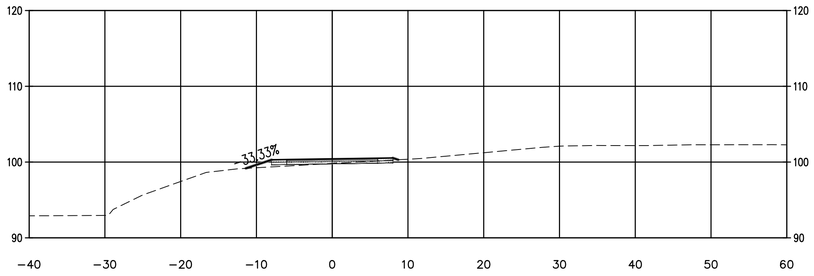


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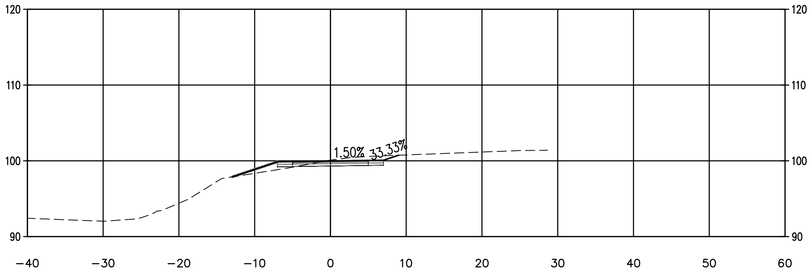
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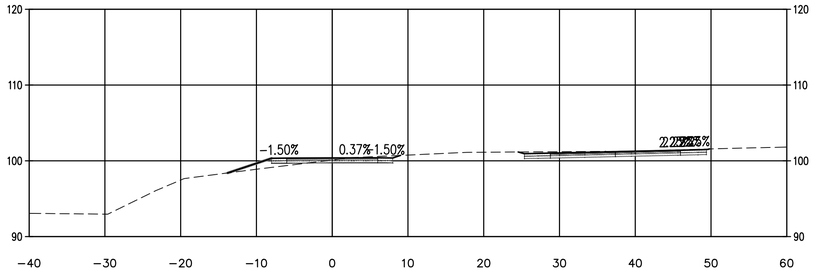
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C 151+00.00



C 152+50.00



	REVISIONS	DATE	BY
△			

DESIGNED BY: R. MARTINEZ
DRAWN BY: M. HENDRICKS-MATSUDA
APPROVED BY: P. HOLM
ISSUE DATE: APRIL 2026
JOB No.: 25-000313
DRAWING FILE No.: _25-000313-C-CS-01

ALL DIMENSIONS SHOWN IN FEET UNLESS OTHERWISE DESIGNATED

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CONSULTING SERVICES
8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
P: 360.352.1465
SCJALLIANCE.COM

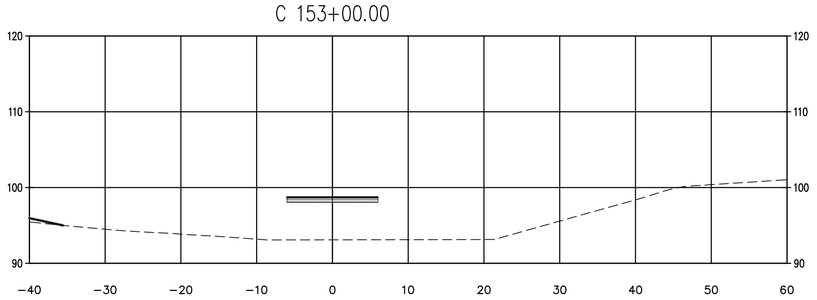
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CITY OF TUMWATER

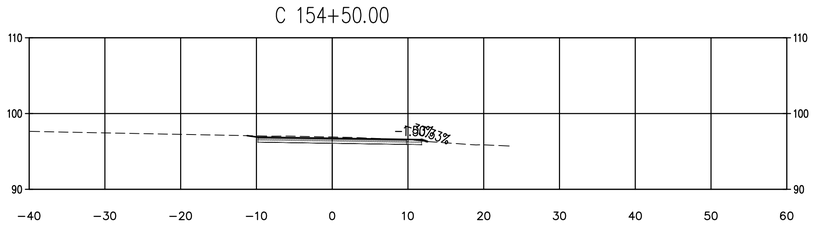
DESCHUTES VALLEY TRAIL
SEGMENT C

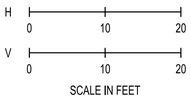
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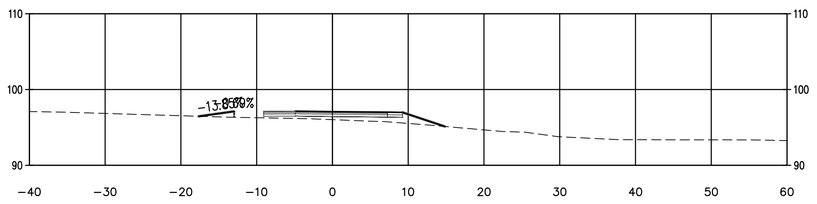
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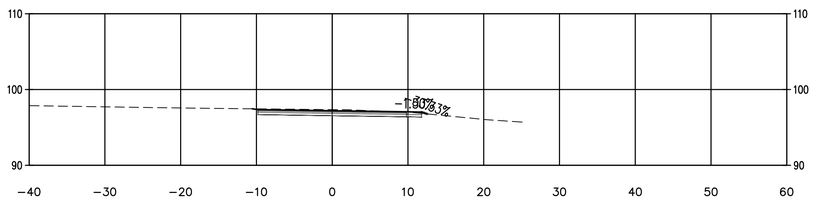
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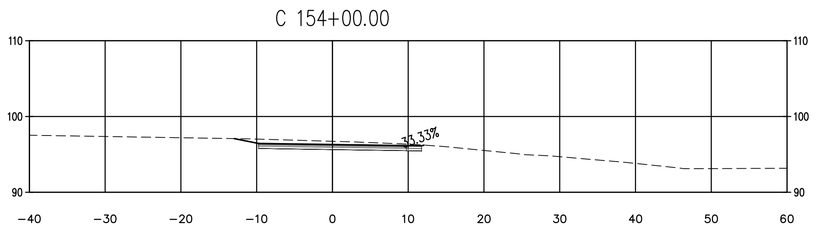


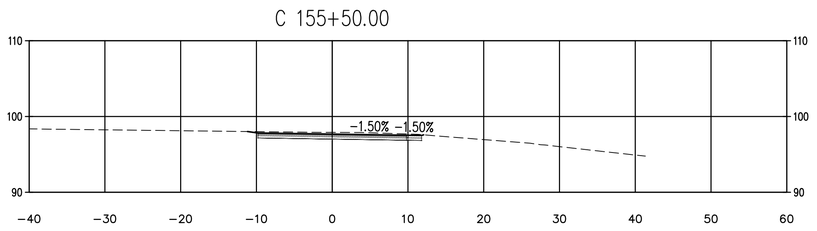












△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ	ISSUE DATE: APRIL 2026
DRAWN BY: M. HENDRICKS-MATSUDA	JOB No.: 25-000313
APPROVED BY: P. HOLM	DRAWING FILE No.: _25-000313-C-CS-01

ALL DIMENSIONS SHOWN IN FEET UNLESS OTHERWISE DESIGNATED

PATRICK HOLM — STATE OF WASHINGTON — 49670 — REGISTERED PROFESSIONAL ENGINEER

PRELIMINARY

SCJ ALLIANCE
CONSULTING SERVICES
8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
P: 360.352.1465
SCJALLIANCE.COM

PROJECT NAME:

CITY OF TUMWATER

DESCHUTES VALLEY TRAIL
SEGMENT C

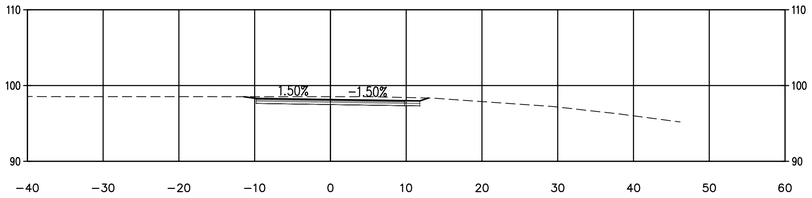
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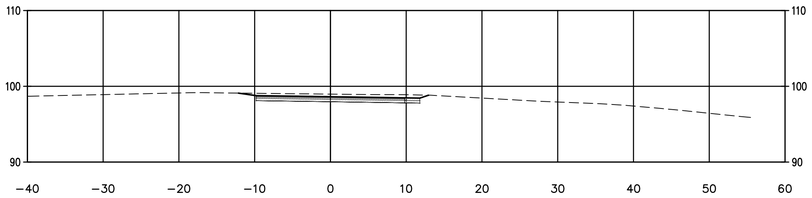
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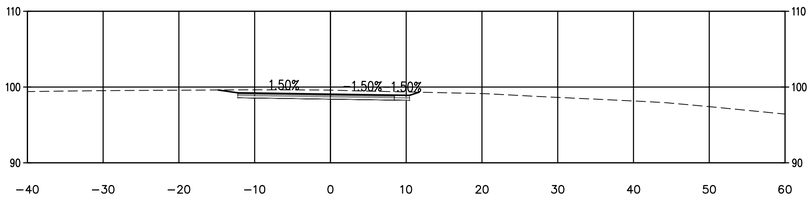
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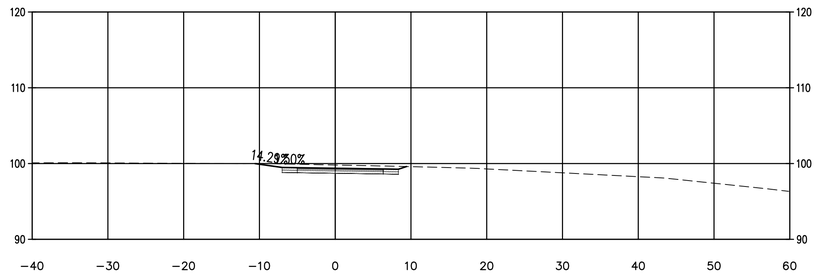
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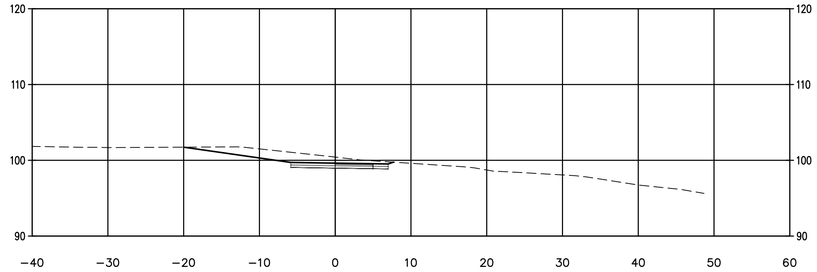
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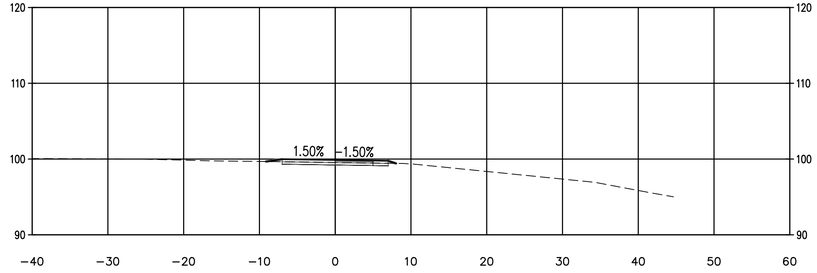
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C 158+00.00



C 158+50.00



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SCALE IN FEET

△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ	ISSUE DATE: APRIL 2026
DRAWN BY: M. HENDRICKS-MATSUDA	JOB No.: 25-000313
APPROVED BY: P. HOLM	DRAWING FILE No.: _25-000313-C-CS-01

ALL DIMENSIONS SHOWN IN FEET UNLESS OTHERWISE DESIGNATED

PATRICK HOLM — STATE OF WASHINGTON — 49470 — REGISTERED PROFESSIONAL ENGINEER

PRELIMINARY

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P: 360.352.1465
SCJALLIANCE.COM

PROJECT NAME:

CITY OF TUMWATER

DESCHUTES VALLEY TRAIL
SEGMENT C

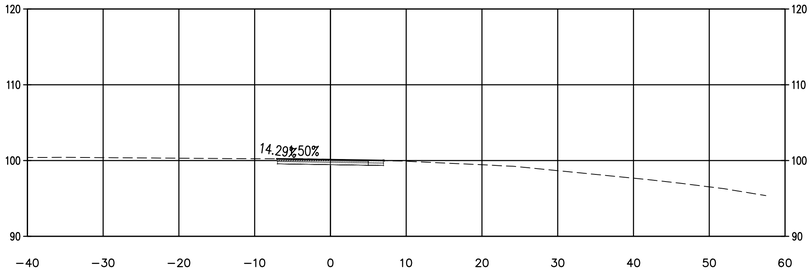
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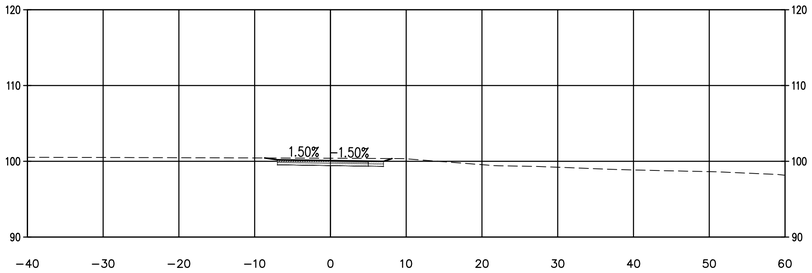
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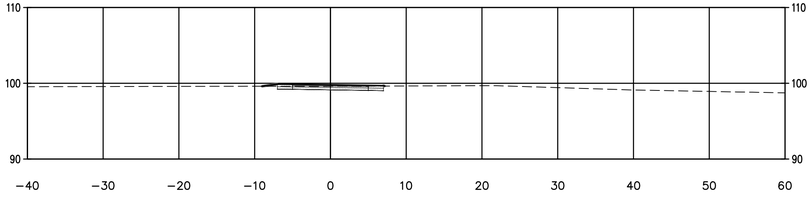
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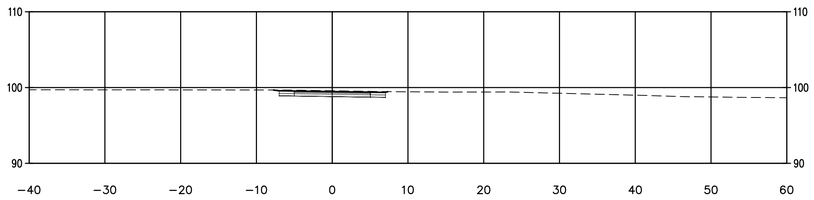
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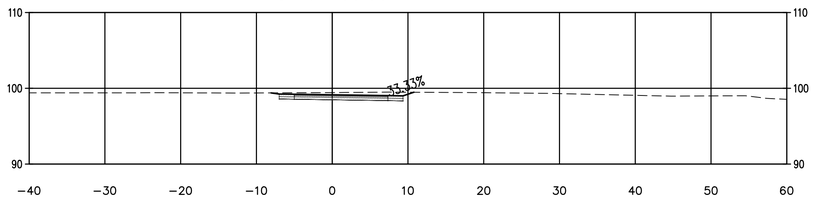
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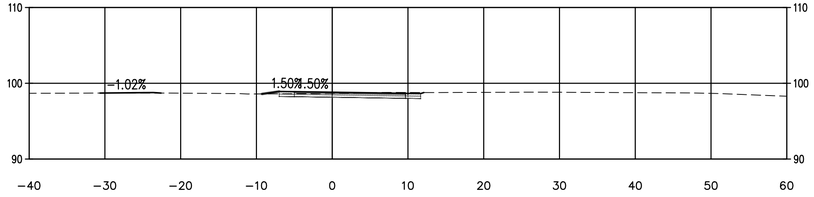
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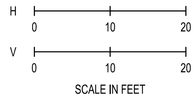


C 161+00.00



C 161+50.00





△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ	ISSUE DATE: APRIL 2026
DRAWN BY: M. HENDRICKS-MATSUDA	JOB No.: 25-000313
APPROVED BY: P. HOLM	DRAWING FILE No.: _25-000313-C-CS-01

ALL DIMENSIONS SHOWN IN FEET UNLESS OTHERWISE DESIGNATED

PATRICK HOLM — STATE OF WASHINGTON — 49670 — REGISTERED PROFESSIONAL ENGINEER

PRELIMINARY

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P: 360.352.1465
SCJALLIANCE.COM

PROJECT NAME:

CITY OF TUMWATER

DESCHUTES VALLEY TRAIL
SEGMENT C

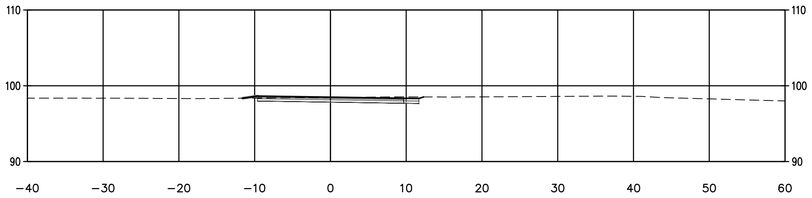
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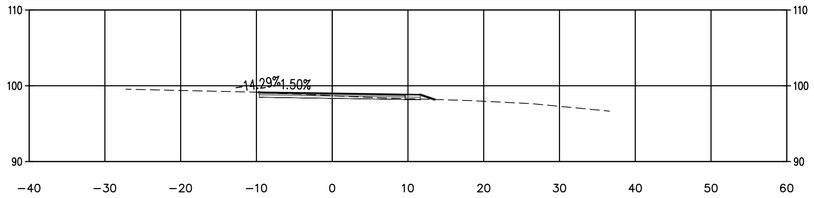
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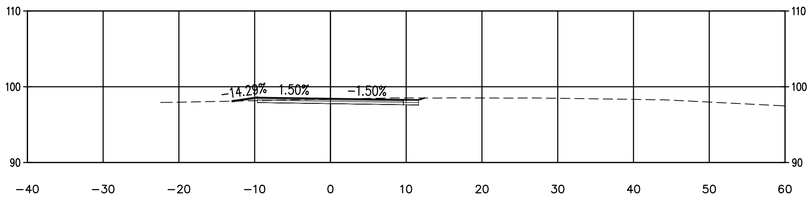


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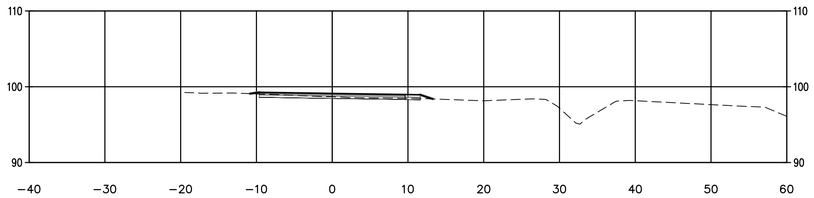


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SCALE IN FEET

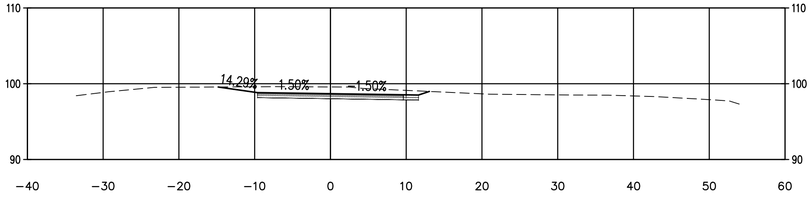
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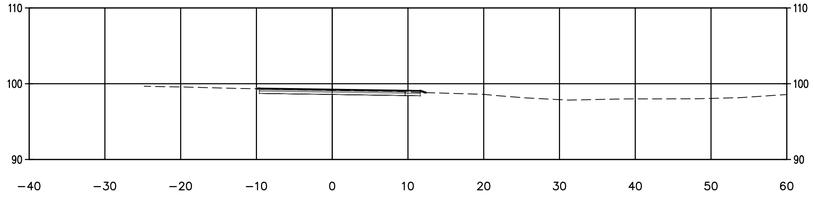
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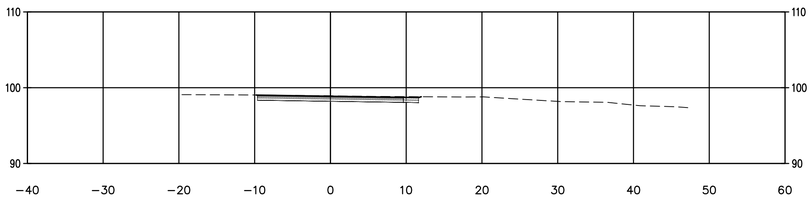
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C 165+00.00



C 163+50.00



△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ	ISSUE DATE: APRIL 2026
DRAWN BY: M. HENDRICKS-MATSUDA	JOB No.: 25-000313
APPROVED BY: P. HOLM	DRAWING FILE No.: _25-000313-C-CS-01

ALL DIMENSIONS SHOWN IN FEET UNLESS OTHERWISE DESIGNATED

PATRICK HOLM — STATE OF WASHINGTON — 19870 — REGISTERED PROFESSIONAL ENGINEER

PRELIMINARY

SCJ ALLIANCE
CONSULTING SERVICES
8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
P: 360.352.1465
SCJALLIANCE.COM

PROJECT NAME:

CITY OF TUMWATER

DESCHUTES VALLEY TRAIL
SEGMENT C

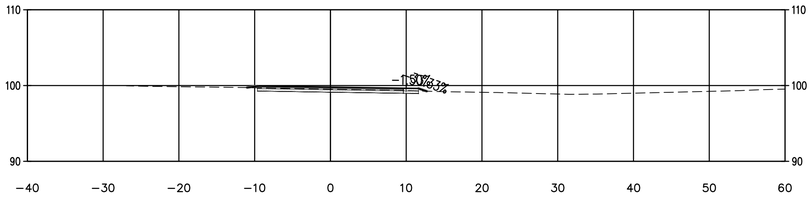
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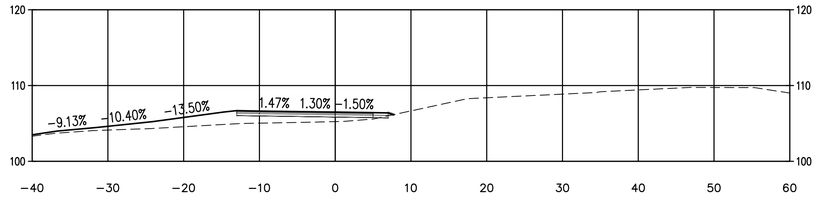
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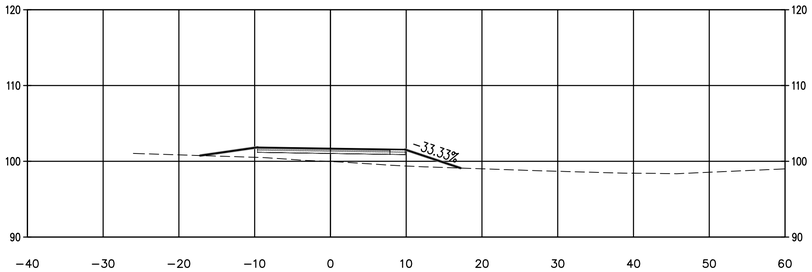


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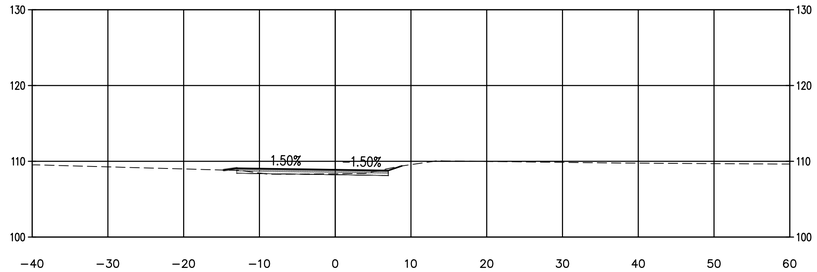


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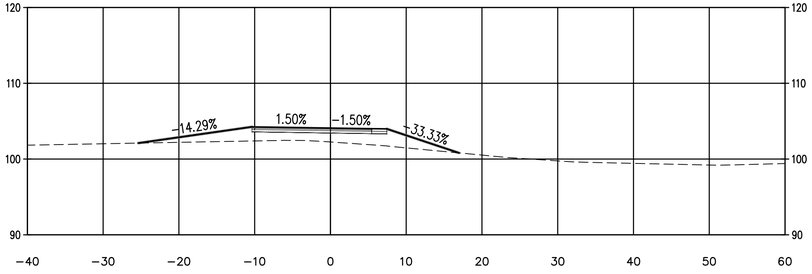
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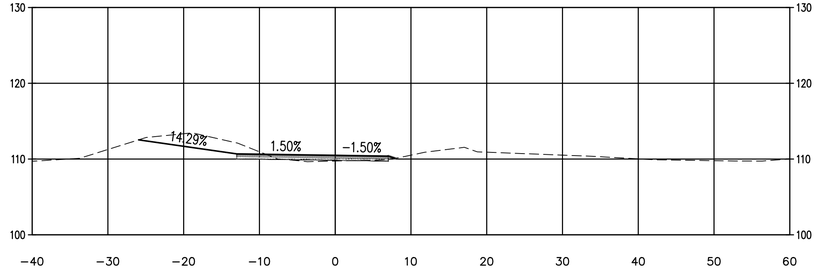
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C 166+50.00



C 168+00.00



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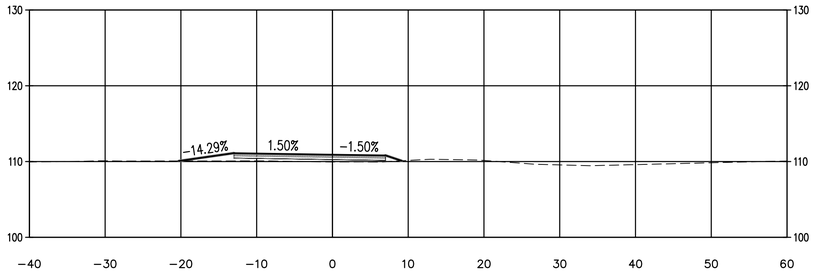
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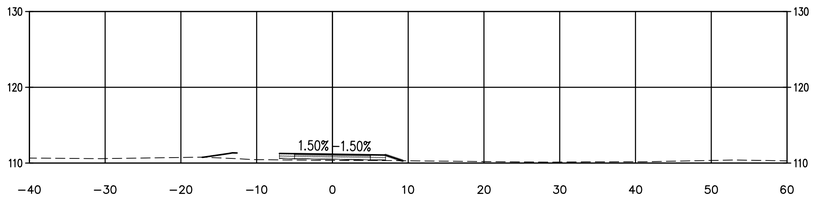
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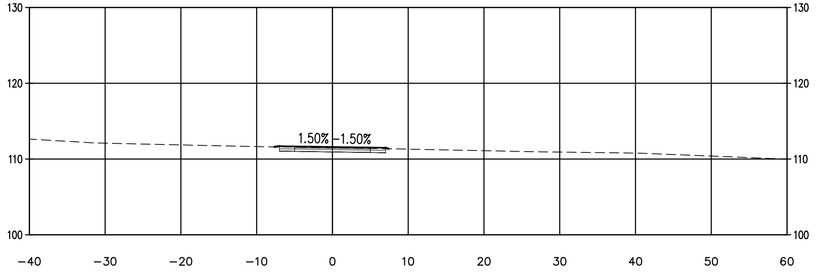
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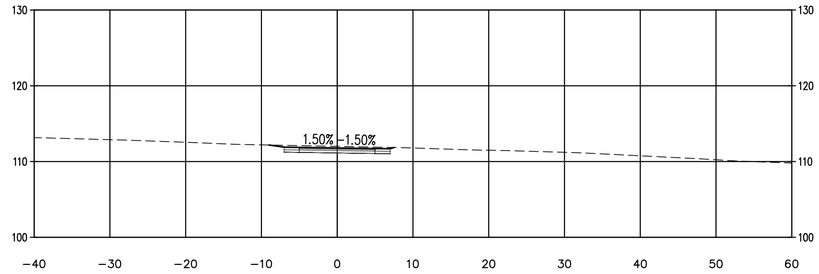
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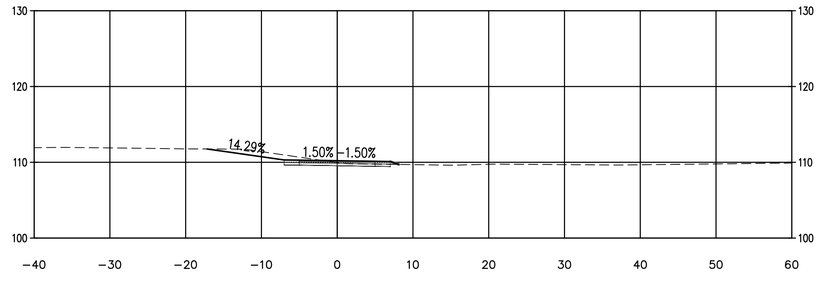
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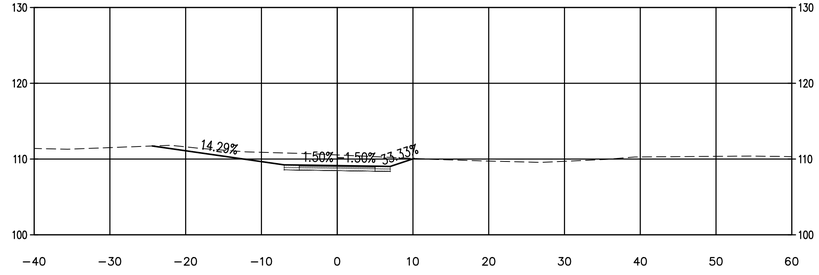
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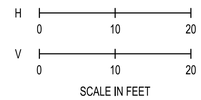


C 170+50.00



C 171+00.00





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DRAWN BY: M. HENDRICKS-MATSUDA	JOB No.: 25-000313
APPROVED BY: P. HOLM	DRAWING FILE No.: _25-000313-C-CS-01

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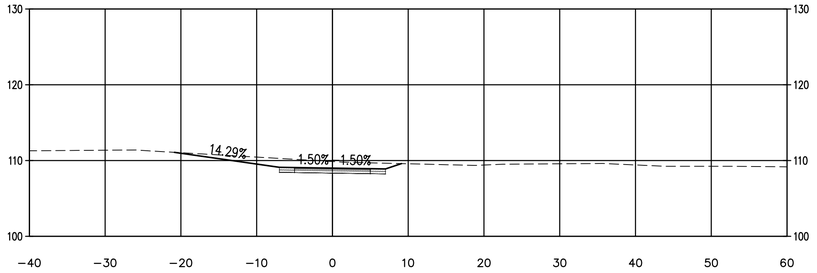
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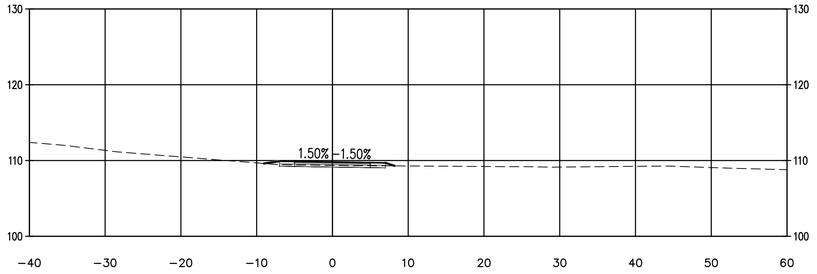
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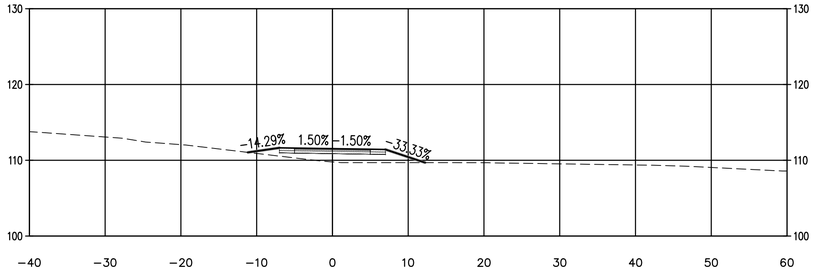
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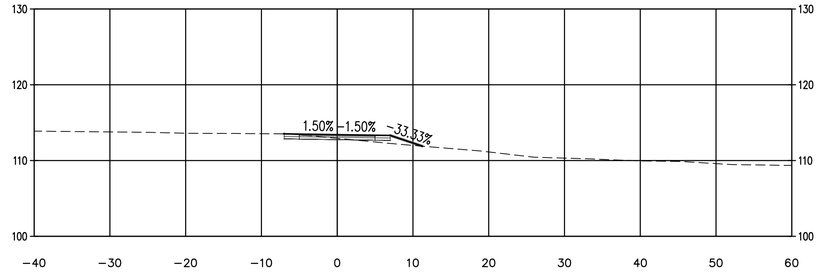
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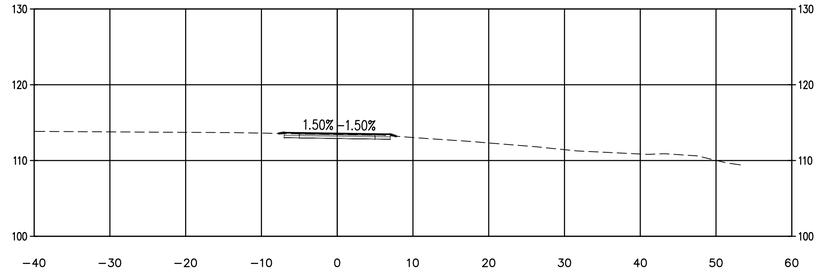
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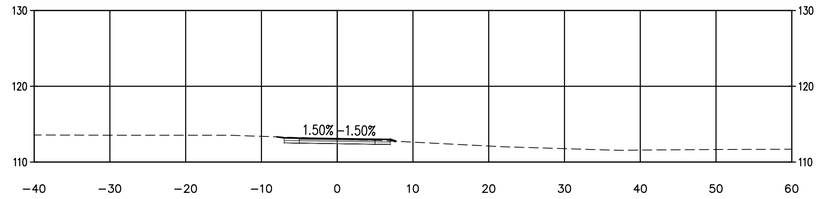
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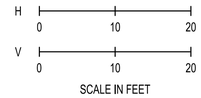


C 173+50.00



C 174+00.00





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DRAWN BY: M. HENDRICKS-MATSUDA	JOB No.: 25-000313
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DESCHUTES VALLEY TRAIL
SEGMENT C

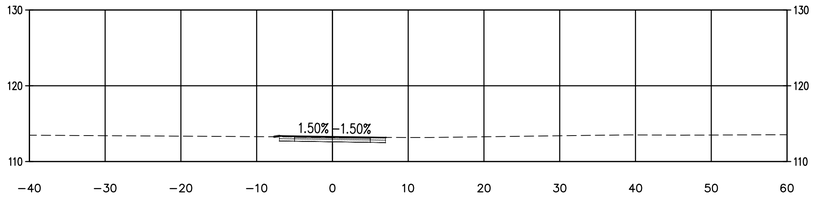
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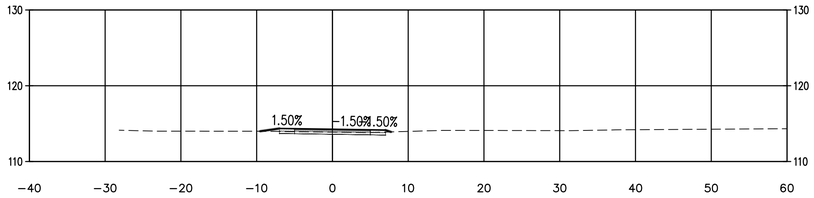
SHEET No.: 76 OF 147

Aug 20, 2026 3:21:06pm – User: mia.hendricksmatsuda
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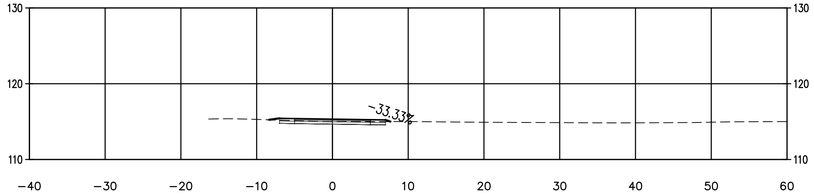
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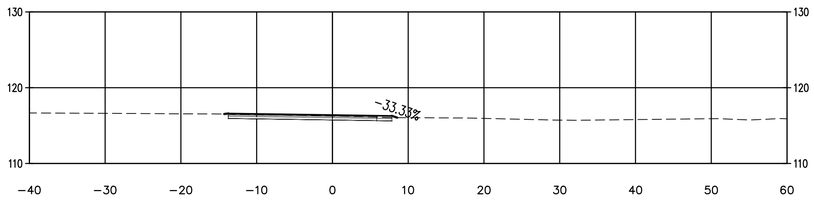
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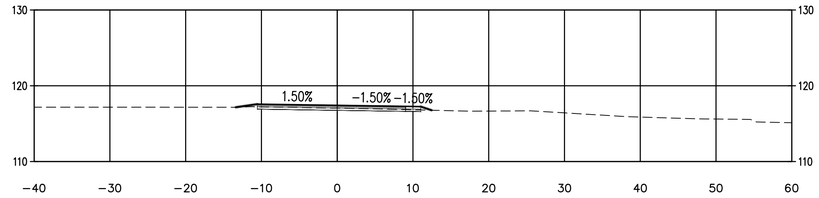
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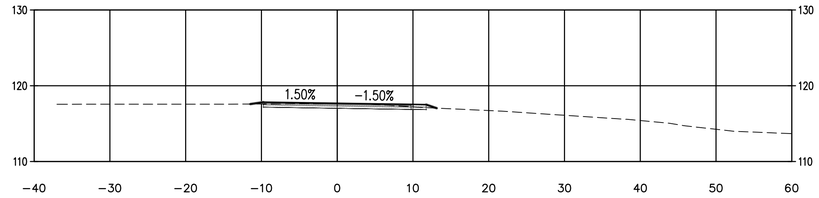
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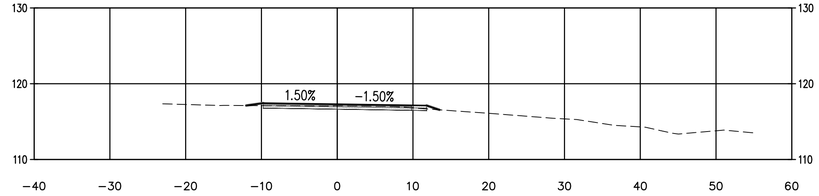
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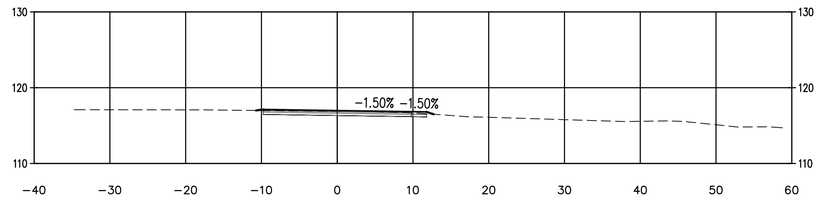
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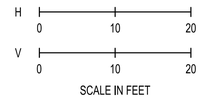


C 177+50.00



C 178+00.00





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DRAWN BY: M. HENDRICKS-MATSUDA	JOB No.: 25-000313
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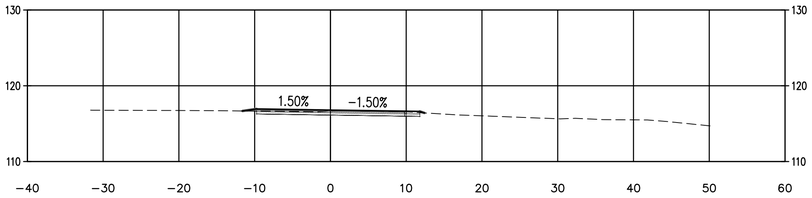
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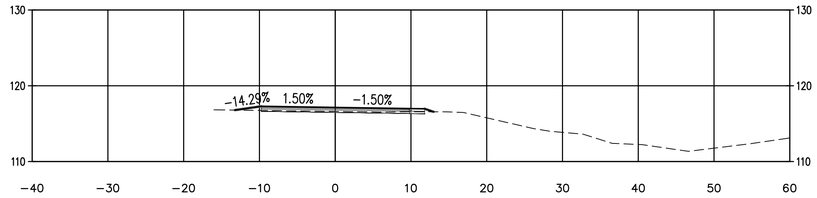
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Aug 20, 2026 3:21:10pm – User: michendricksmatsuda
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C 178+50.00

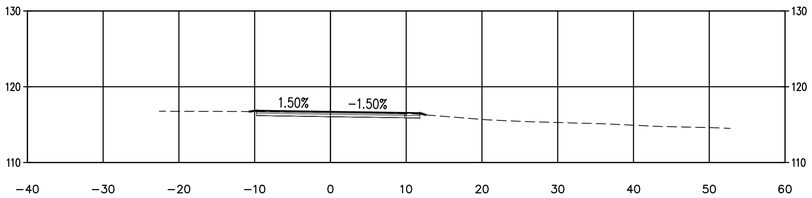


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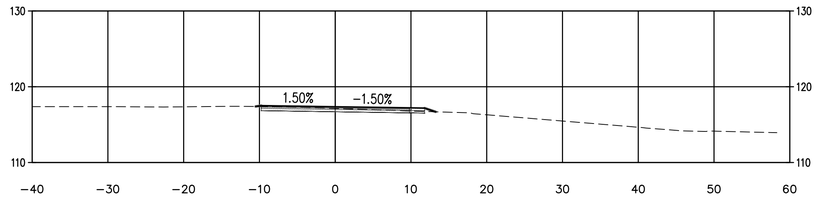


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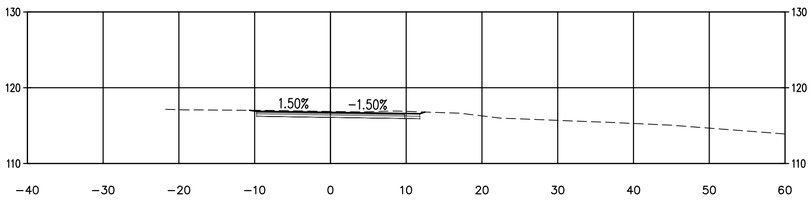
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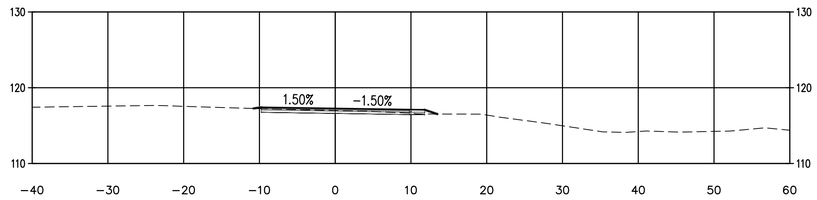
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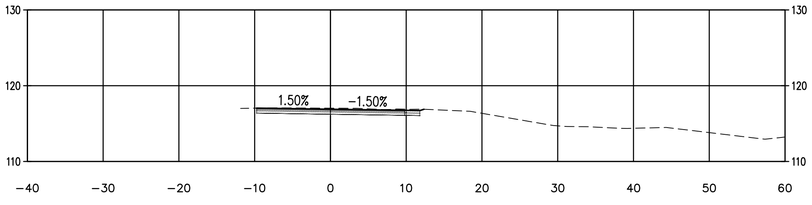
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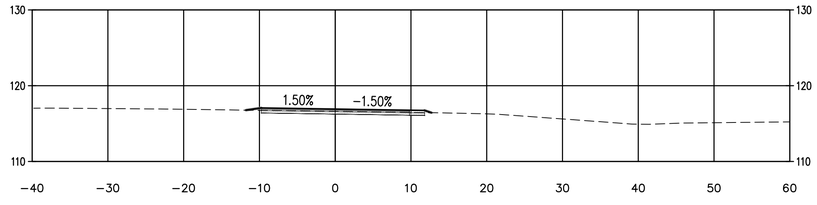
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C 180+00.00



C 182+00.00



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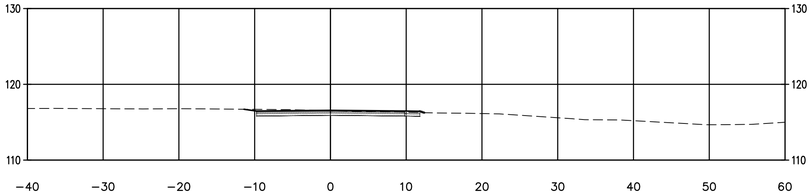
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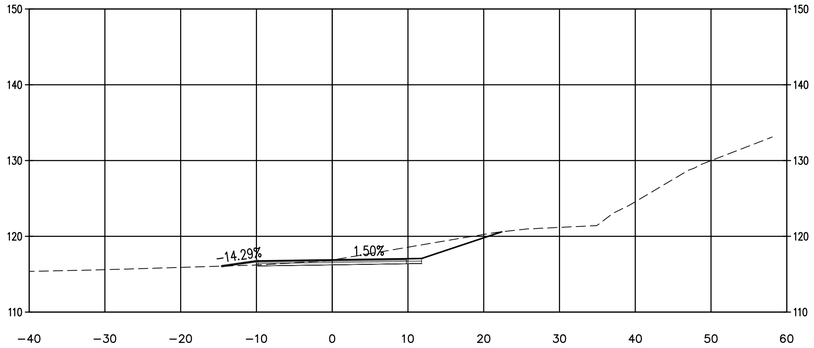
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C 184+00.00

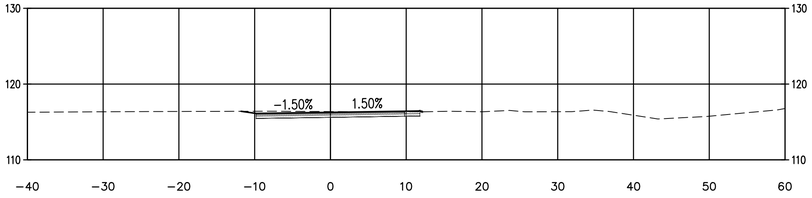


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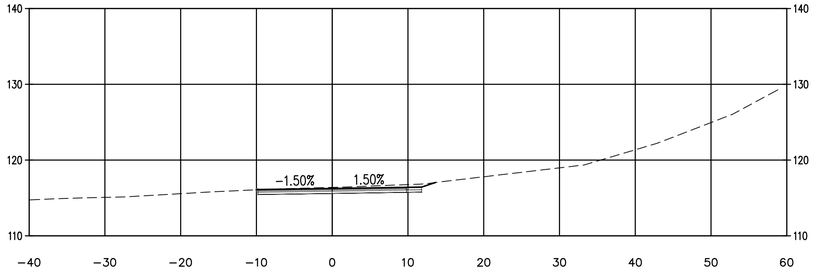
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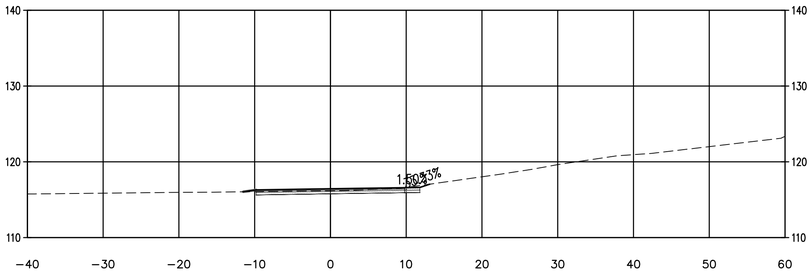
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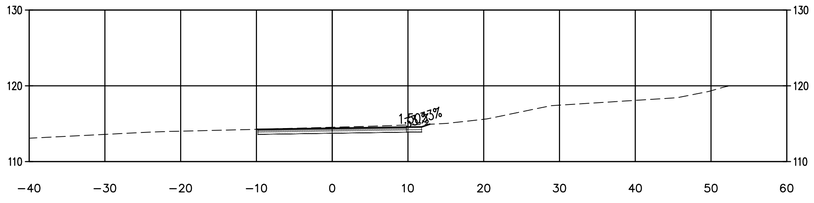
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C 183+50.00



C 185+00.00



△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ	ISSUE DATE: APRIL 2026
DRAWN BY: M. HENDRICKS-MATSUDA	JOB No.: 25-000313
APPROVED BY: P. HOLM	DRAWING FILE No.: _25-000313-C-CS-01

ALL DIMENSIONS SHOWN IN FEET UNLESS OTHERWISE DESIGNATED

PATRICK HOLM — STATE OF WASHINGTON — 49470 — REGISTERED PROFESSIONAL ENGINEER

PRELIMINARY

SCJ ALLIANCE
CONSULTING SERVICES
8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
P: 360.352.1465
SCJALLIANCE.COM

PROJECT NAME:

CITY OF TUMWATER

DESCHUTES VALLEY TRAIL
SEGMENT C

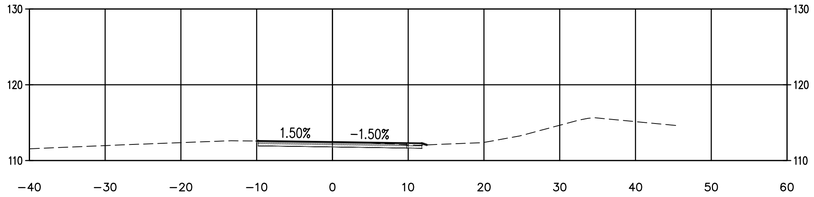
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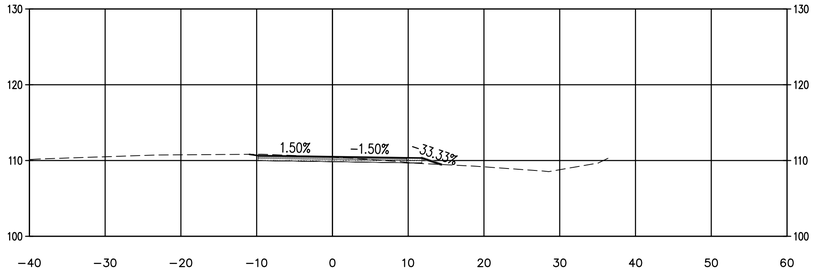
SHEET No.: 79 OF 147

Aug 20, 2026 - 3:21:18pm - User: mia.hendricksmatsuda
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C 185+50.00



C 186+00.00



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SCALE IN FEET

△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ	ISSUE DATE: APRIL 2026
DRAWN BY: M. HENDRICKS-MATSUDA	JOB No.: 25-000313
APPROVED BY: P. HOLM	DRAWING FILE No.: _25-000313-C-CS-01

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PROJECT NAME:

CITY OF TUMWATER

DESCHUTES VALLEY TRAIL
SEGMENT C

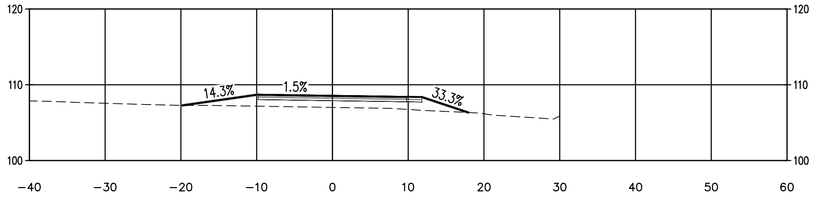
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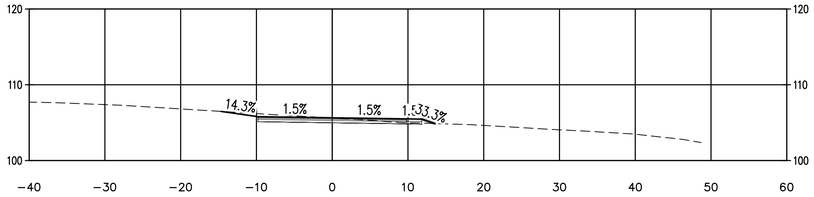
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C 186+50.00



C 188+00.00

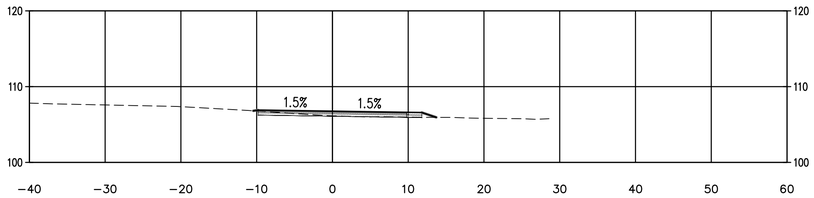


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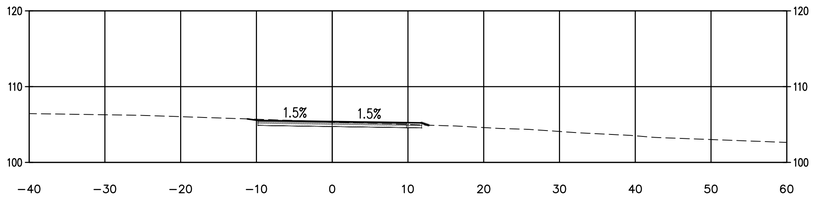
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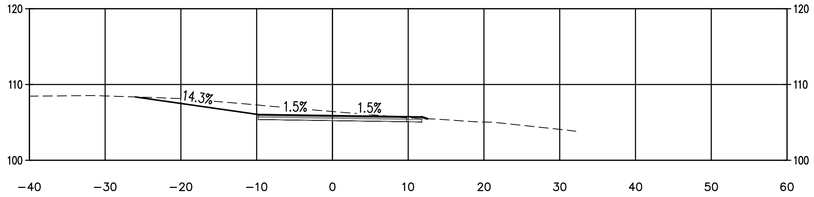
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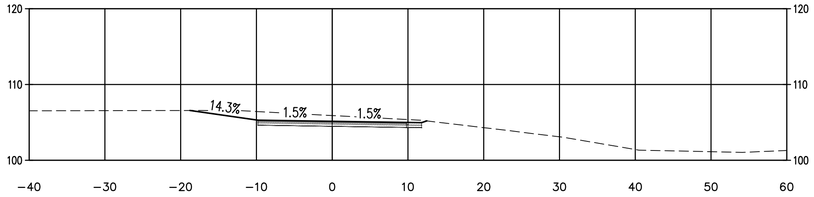
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C 187+50.00



C 189+00.00



△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ	ISSUE DATE: APRIL 2026
DRAWN BY: M. HENDRICKS-MATSUDA	JOB No.: 25-000313
APPROVED BY: P. HOLM	DRAWING FILE No.: _25-000313-C-CS-02

ALL DIMENSIONS SHOWN IN FEET UNLESS OTHERWISE DESIGNATED

PATRICK HOLM — STATE OF WASHINGTON — 49470 — REGISTERED PROFESSIONAL ENGINEER

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SCJALLIANCE.COM

PROJECT NAME:

CITY OF TUMWATER

DESCHUTES VALLEY TRAIL
SEGMENT C

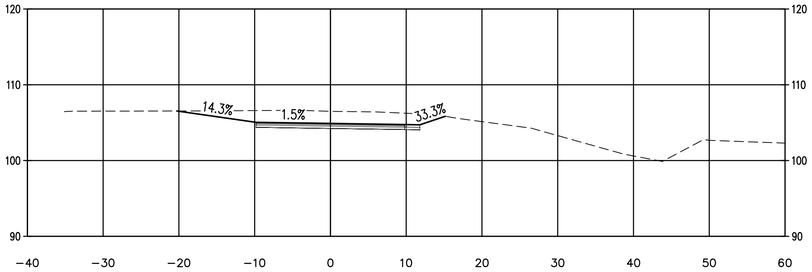
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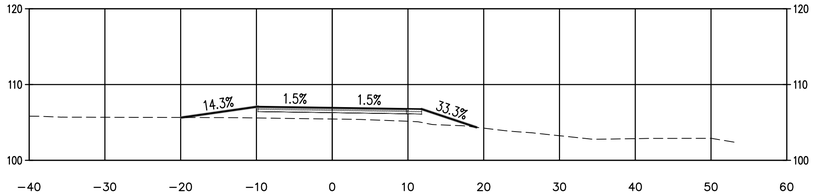
SHEET No.: 81 OF 147

Aug 20, 2026 3:21:26pm – User: mia.hendricksmatsuda
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C 189+50.00

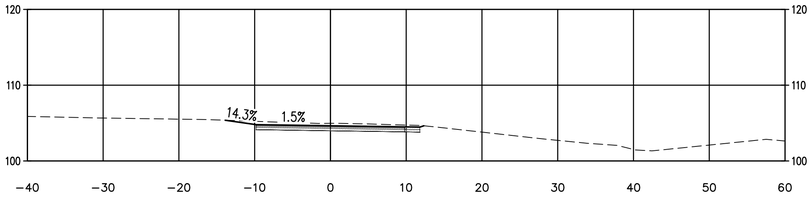


C 191+00.00

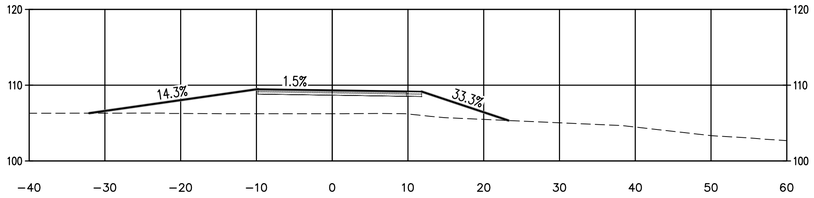


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V 0 10 20
SCALE IN FEET

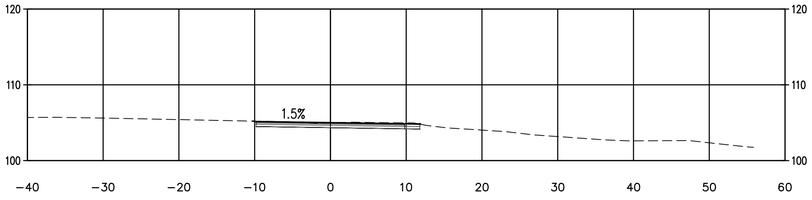
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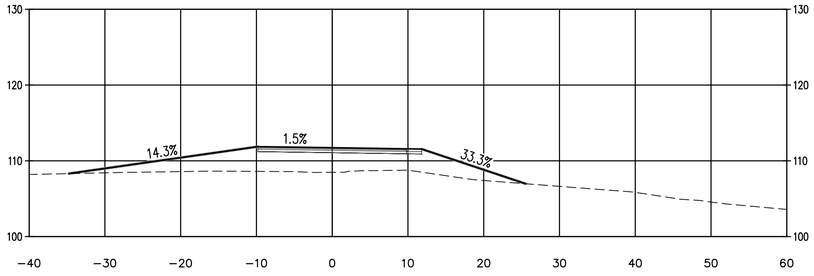
C 191+50.00



C 190+50.00



C 192+00.00



△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ
ISSUE DATE: APRIL 2026
DRAWN BY: M. HENDRICKS-MATSUDA
JOB No.: 25-000313
APPROVED BY: P. HOLM
DRAWING FILE No.: _25-000313-C-CS-02

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8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
P: 360.352.1465
SCJALLIANCE.COM

PROJECT NAME:
CITY OF TUMWATER

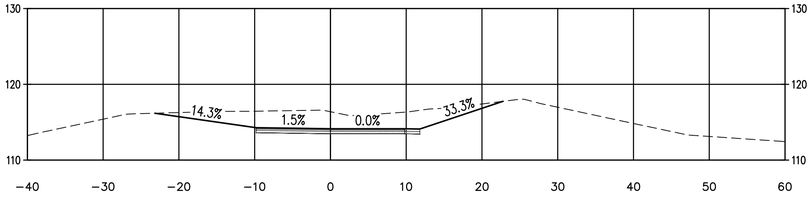
DESCHUTES VALLEY TRAIL
SEGMENT C

CROSS SECTION
C 189+50 - C 192+00

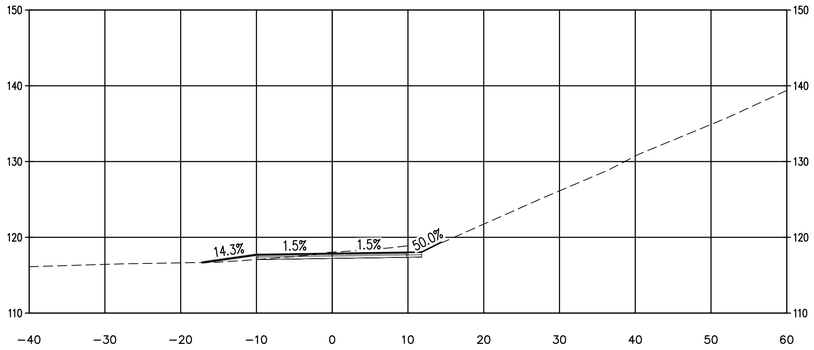
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SHEET No.: 82 OF 147

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C 192+50.00



C 193+50.00

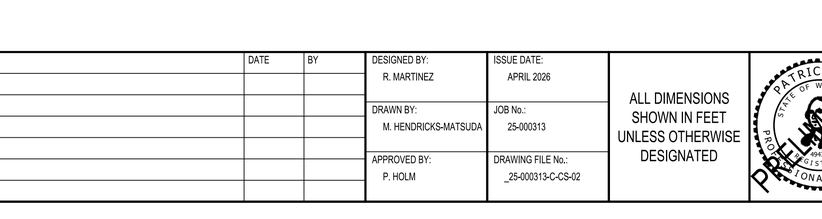


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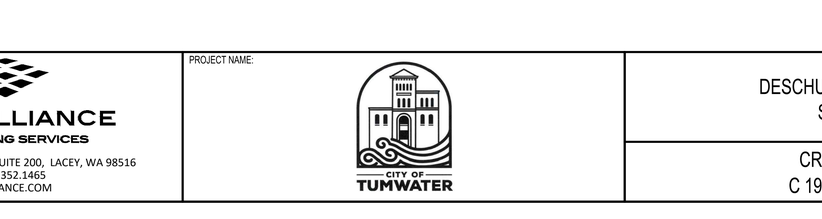
V 0 10 20

SCALE IN FEET

C 193+00.00



C 194+00.00



△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ
DRAWN BY: M. HENDRICKS-MATSUDA
APPROVED BY: P. HOLM
ISSUE DATE: APRIL 2026
JOB No.: 25-000313
DRAWING FILE No.: _25-000313-C-CS-02

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8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
P: 360.352.1465
SCJALLIANCE.COM

PROJECT NAME:

CITY OF TUMWATER

DESCHUTES VALLEY TRAIL
SEGMENT C

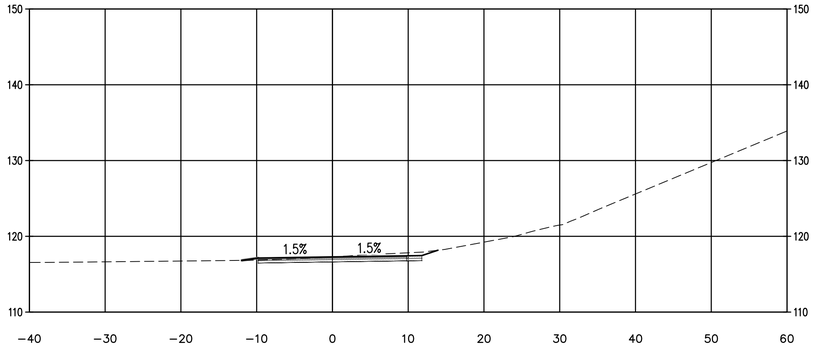
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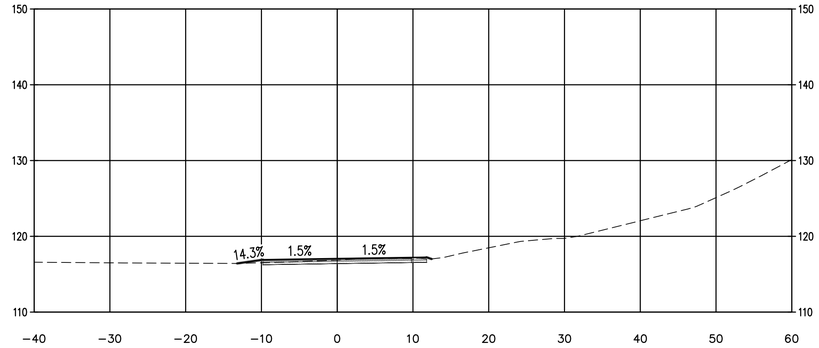
SHEET No.: 83 OF 147

Aug 20, 2026 - 3:21:33pm - User: mia.hendricksmatsuda
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C 194+50.00



C 195+50.00



H 0 10 20

V 0 10 20

SCALE IN FEET

C 195+00.00

C 196+00.00

△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ
DRAWN BY: M. HENDRICKS-MATSUDA
APPROVED BY: P. HOLM
ISSUE DATE: APRIL 2026
JOB No.: 25-000313
DRAWING FILE No.: _25-000313-C-CS-02

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PRELIMINARY

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P: 360.352.1465
SCJALLIANCE.COM

PROJECT NAME:

CITY OF TUMWATER

DESCHUTES VALLEY TRAIL
SEGMENT C

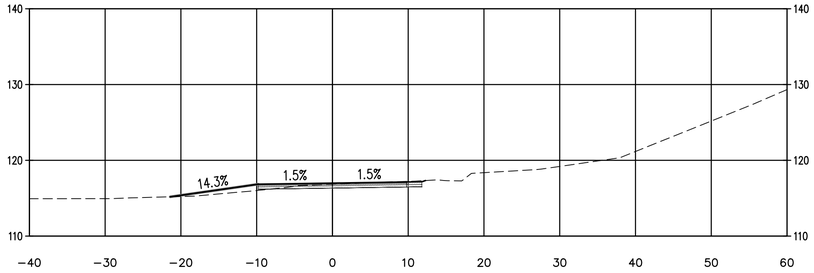
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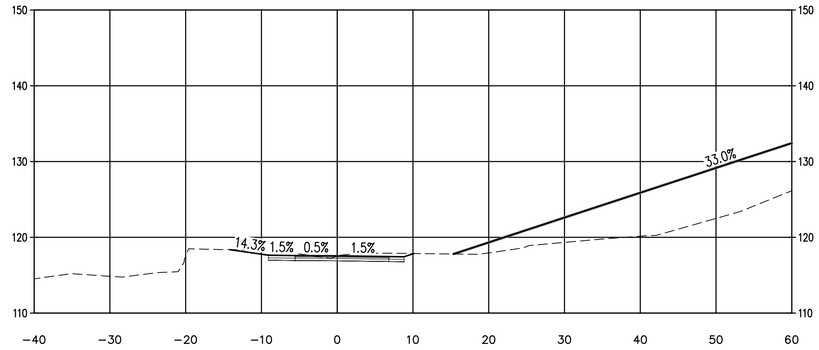
SHEET No.: 84 OF 147

Aug 20, 2026 3:21:36pm – User: mia.hendricksmatsuda
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C 196+50.00



C 197+50.00

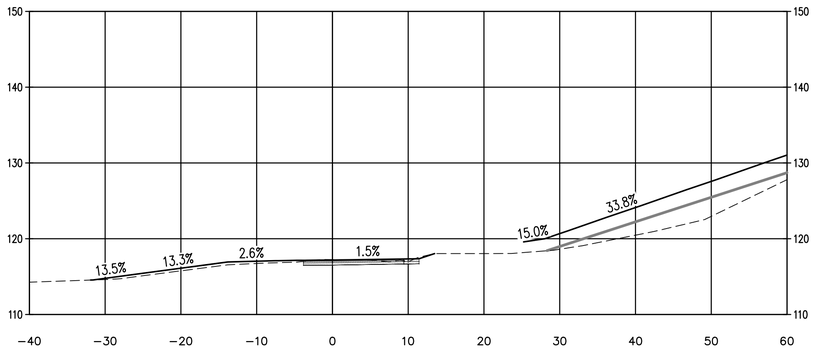


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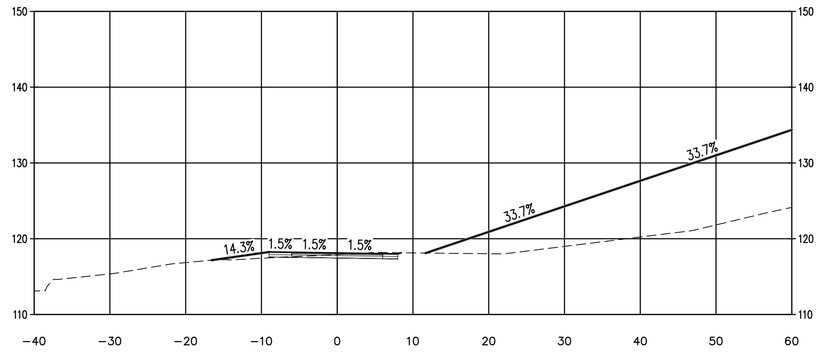
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SCALE IN FEET

C 197+00.00



C 198+00.00



△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ	ISSUE DATE: APRIL 2026
DRAWN BY: M. HENDRICKS-MATSUDA	JOB No.: 25-000313
APPROVED BY: P. HOLM	DRAWING FILE No.: _25-000313-C-CS-02

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PATRICK HOLM — STATE OF WASHINGTON — 49470 — REGISTERED PROFESSIONAL ENGINEER — PRELIMINARY

SCJ ALLIANCE
CONSULTING SERVICES
8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
P: 360.352.1465
SCJALLIANCE.COM

PROJECT NAME:

CITY OF TUMWATER

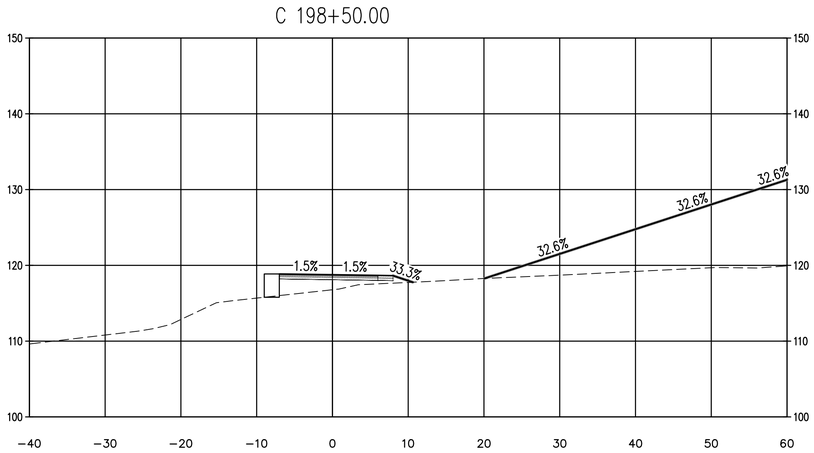
DESCHUTES VALLEY TRAIL
SEGMENT C

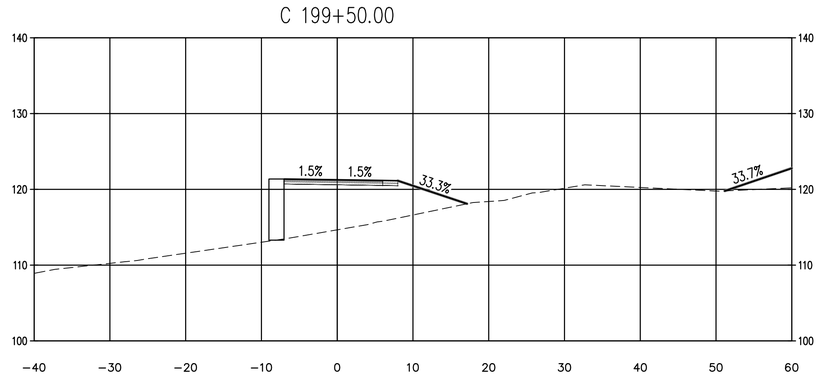
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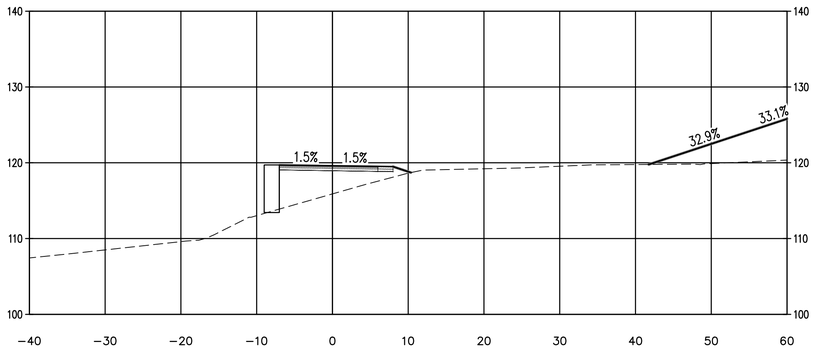
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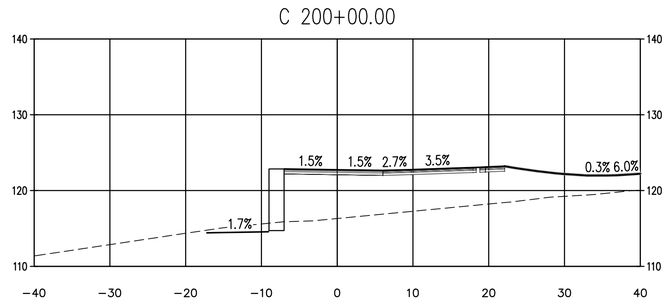
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V 0 10 20
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Aug 20, 2026 3:21:41pm – User: mis.hendricksmatsuda
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△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ	ISSUE DATE: APRIL 2026
DRAWN BY: M. HENDRICKS-MATSUDA	JOB No.: 25-000313
APPROVED BY: P. HOLM	DRAWING FILE No.: _25-000313-C-CS-02

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PRELIMINARY

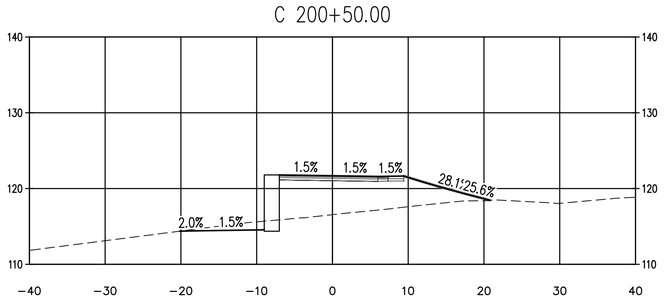
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CONSULTING SERVICES
8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
P: 360.352.1465
SCJALLIANCE.COM

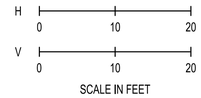
PROJECT NAME:
CITY OF TUMWATER

DESCHUTES VALLEY TRAIL
SEGMENT C

CROSS SECTION
C 198+50 - C 200+00

DRAWING No.: CS-19
SHEET No.: 86 OF 147





△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ	ISSUE DATE: APRIL 2026
DRAWN BY: M. HENDRICKS-MATSUDA	JOB No.: 25-000313
APPROVED BY: P. HOLM	DRAWING FILE No.: _25-000313-C-CS-02

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SCJALLIANCE.COM

PROJECT NAME:

CITY OF TUMWATER

DESCHUTES VALLEY TRAIL
SEGMENT C

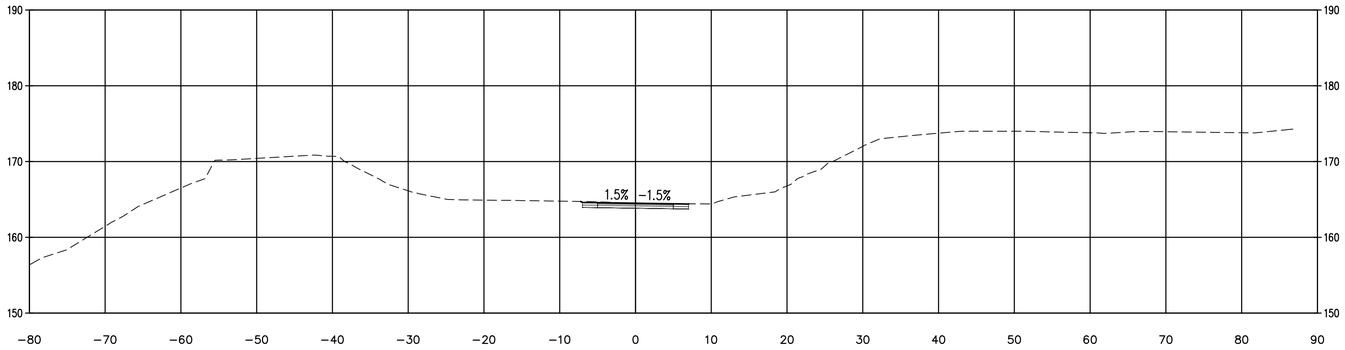
CROSS SECTION
C 200+50

DRAWING No.: CS-20

SHEET No.: 87 OF 147

Aug 20, 2026 3:21:45pm – User: mia.hendricksmatsuda
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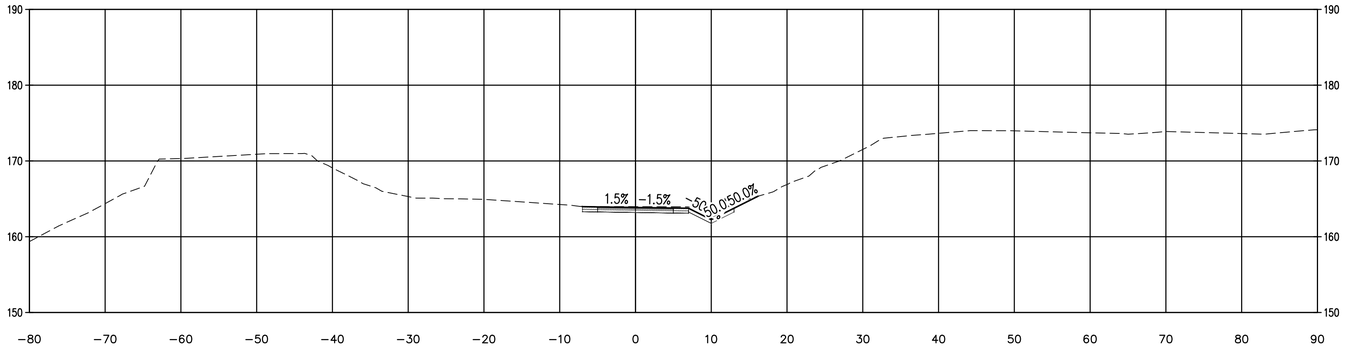


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SCALE IN FEET

T 300+25.00



△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ
DRAWN BY: M. HENDRICKS-MATSUDA
APPROVED BY: P. HOLM

ISSUE DATE: AUGUST 2026
JOB No.: 25-000313
DRAWING FILE No.: _25-000313-C-CS-03

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8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
P: 360.352.1465
SCJALLIANCE.COM

PROJECT NAME:

CITY OF TUMWATER

DESCHUTES VALLEY TRAIL
SEGMENT C

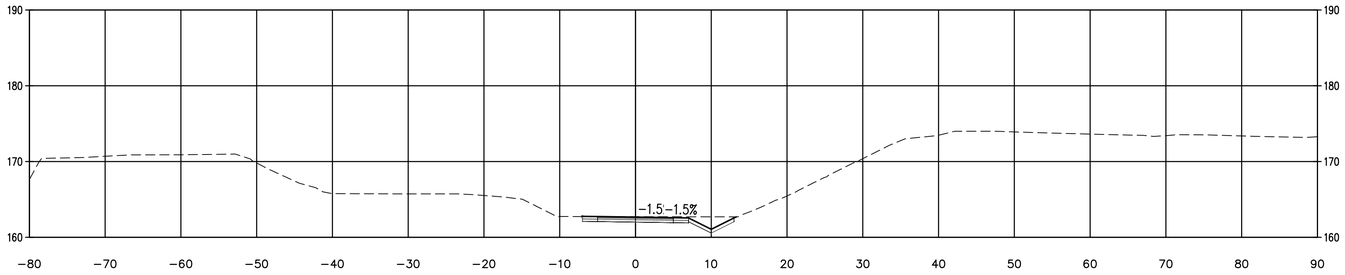
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SHEET No.: 88 OF 148

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T 300+50.00

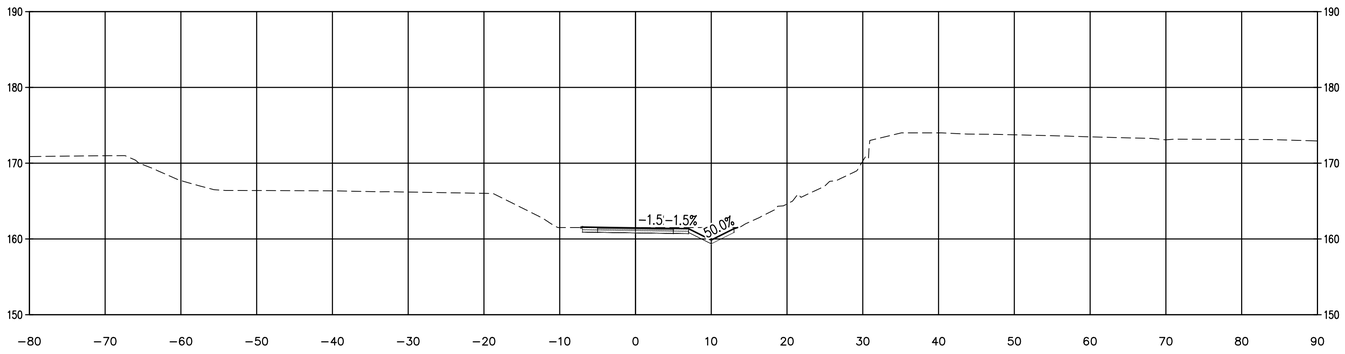


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V 0 10 20

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T 300+75.00



△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ	ISSUE DATE: AUGUST 2026
DRAWN BY: M. HENDRICKS-MATSUDA	JOB No.: 25-000313
APPROVED BY: P. HOLM	DRAWING FILE No.: _25-000313-C-CS-03

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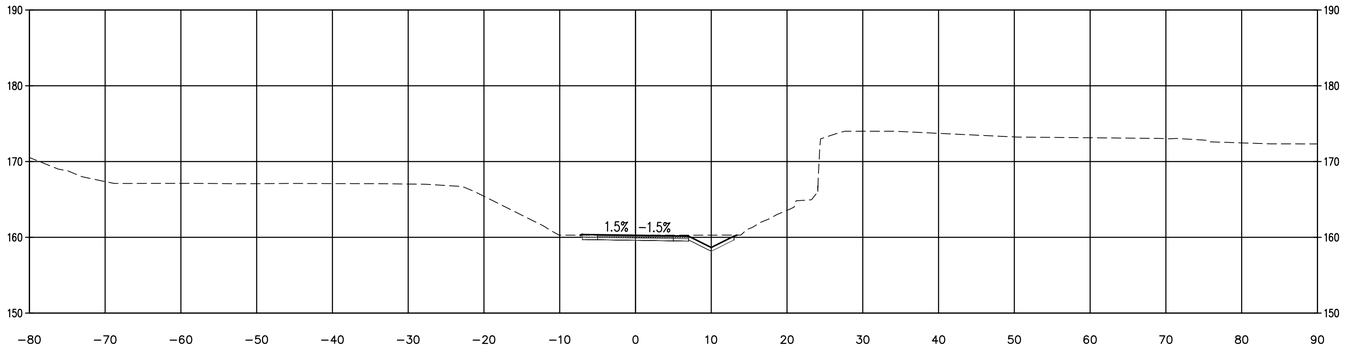
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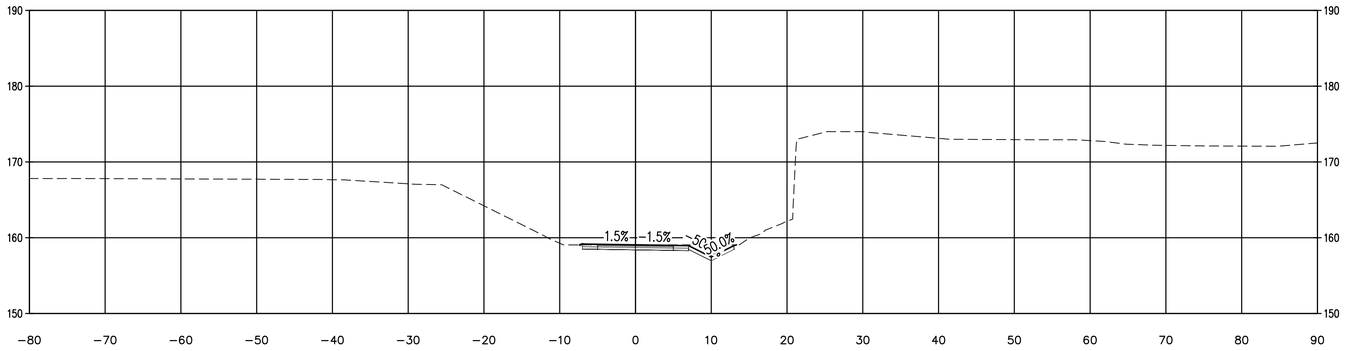
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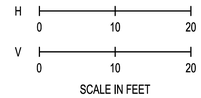
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T 301+00.00



T 301+25.00





△	REVISIONS	DATE	BY

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DRAWN BY: M. HENDRICKS-MATSUDA
APPROVED BY: P. HOLM
ISSUE DATE: AUGUST 2026
JOB No.: 25-000313
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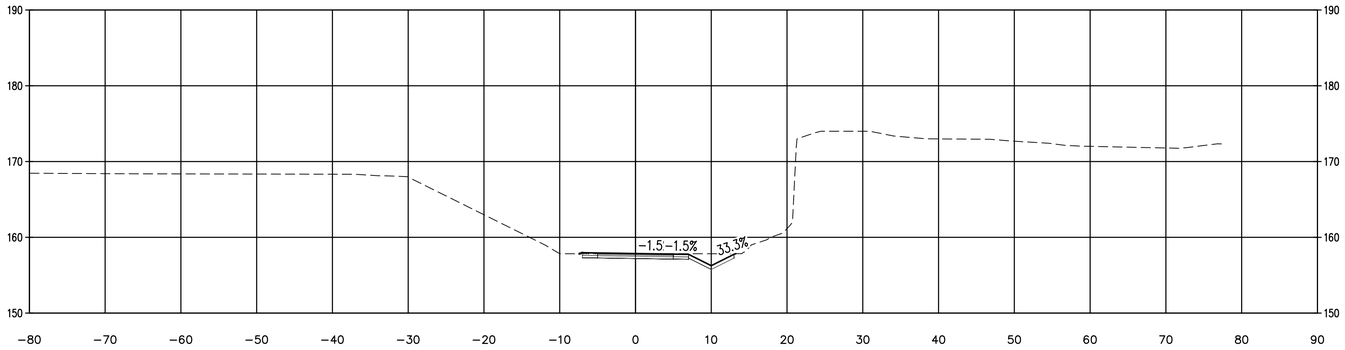
DESCHUTES VALLEY TRAIL
SEGMENT C

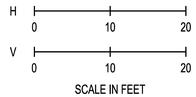
CROSS SECTION
T 301+00 - T 301+25

DRAWING No.: CS-23
SHEET No.: 90 OF 148

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T 301+50.00





T 301+75.00

△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ
DRAWN BY: M. HENDRICKS-MATSUDA
APPROVED BY: P. HOLM
ISSUE DATE: AUGUST 2026
JOB No.: 25-000313
DRAWING FILE No.: _25-000313-C-CS-03

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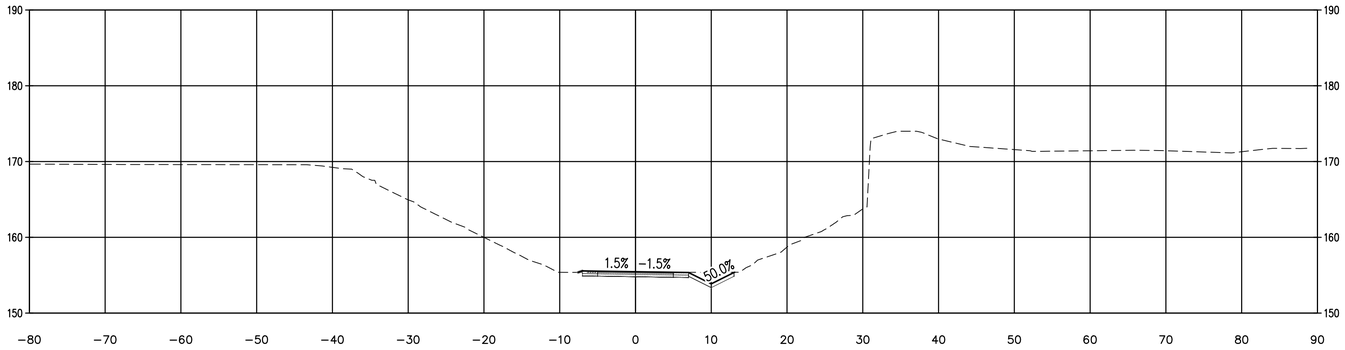
DESCHUTES VALLEY TRAIL
SEGMENT C

CROSS SECTION
T 301+50 - T 301+75

DRAWING No.: CS-24
SHEET No.: 91 OF 148

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T 302+00.00

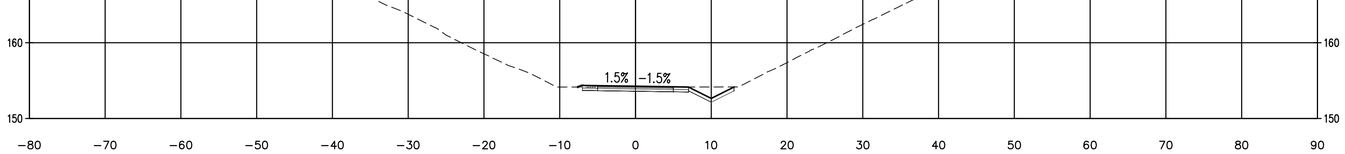


H 0 10 20

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T 302+25.00



△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ
DRAWN BY: M. HENDRICKS-MATSUDA
APPROVED BY: P. HOLM
ISSUE DATE: AUGUST 2026
JOB No.: 25-000313
DRAWING FILE No.: _25-000313-C-CS-03

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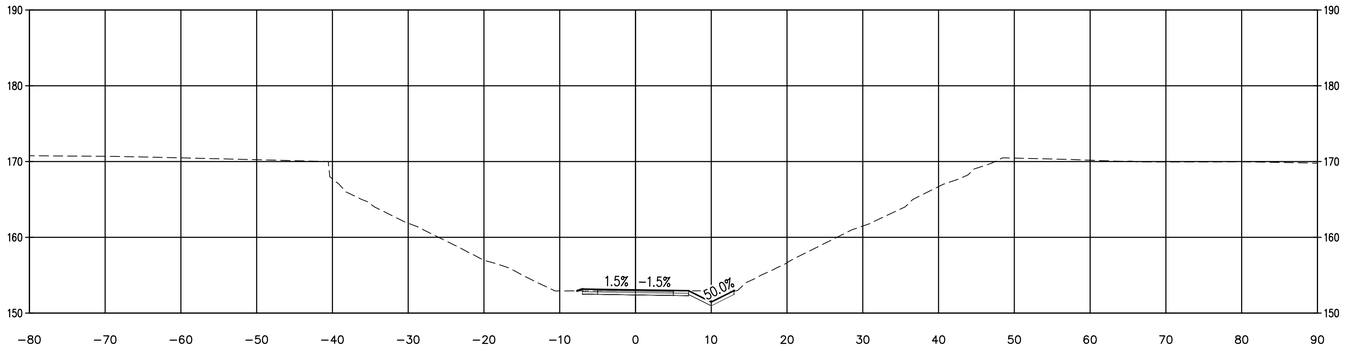
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T 302+00 - T 302+25

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SHEET No.: 92 OF 148

Aug 20, 2026 3:22:50pm - User: mickendricksmatsuda
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T 302+50.00

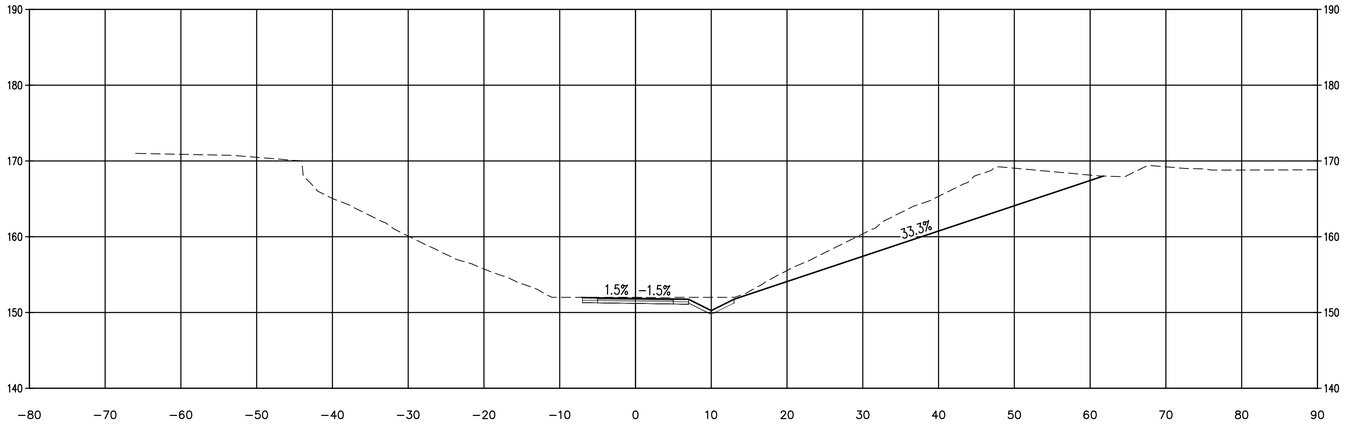


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V 0 10 20

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T 302+75.00



△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ
DRAWN BY: M. HENDRICKS-MATSUDA
APPROVED BY: P. HOLM

ISSUE DATE: AUGUST 2026
JOB No.: 25-000313
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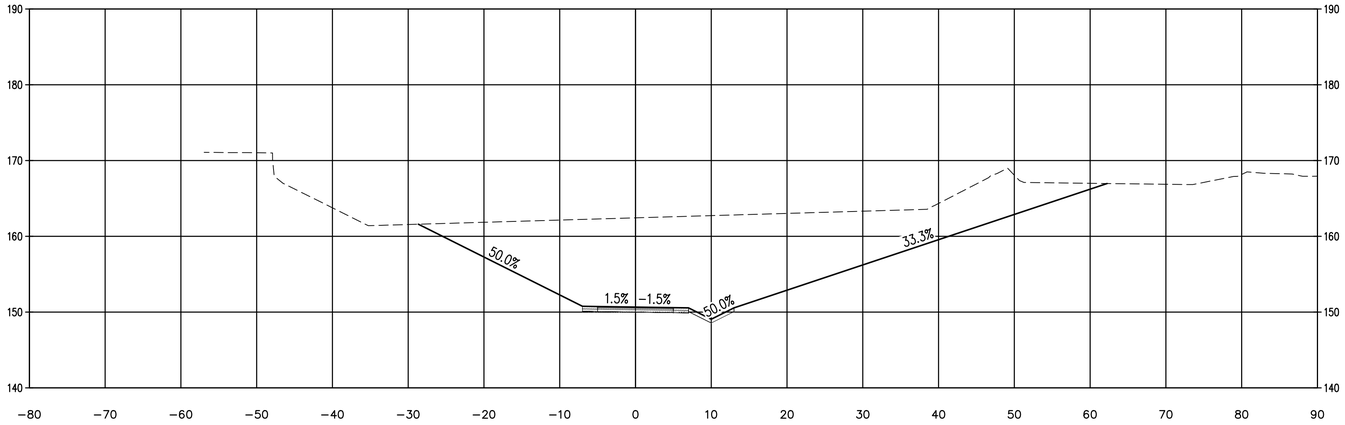
CROSS SECTION
T 302+50 - T 302+75

DRAWING No.: CS-26

SHEET No.: 93 OF 148

Aug 20, 2026 3:22:53pm - User: mikehendricksmatsuda
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T 303+00.00

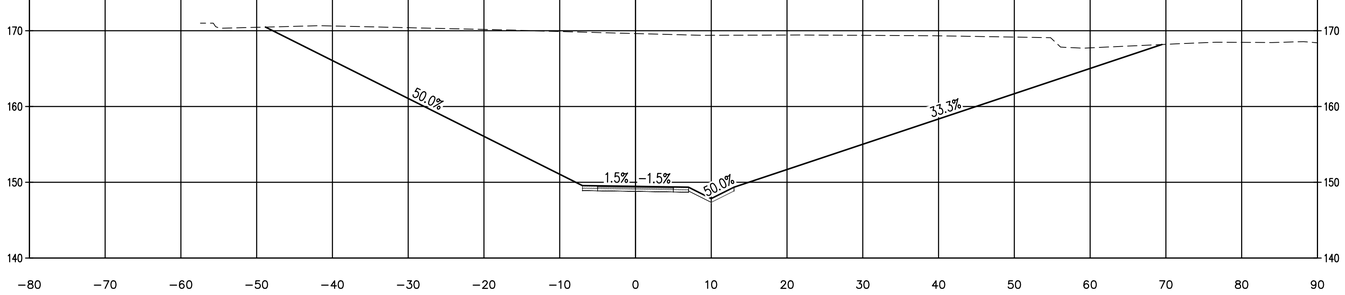


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SCALE IN FEET

T 303+25.00



△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ	ISSUE DATE: AUGUST 2026
DRAWN BY: M. HENDRICKS-MATSUDA	JOB No.: 25-000313
APPROVED BY: P. HOLM	DRAWING FILE No.: _25-000313-C-CS-03

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PROJECT NAME:

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DESCHUTES VALLEY TRAIL
SEGMENT C

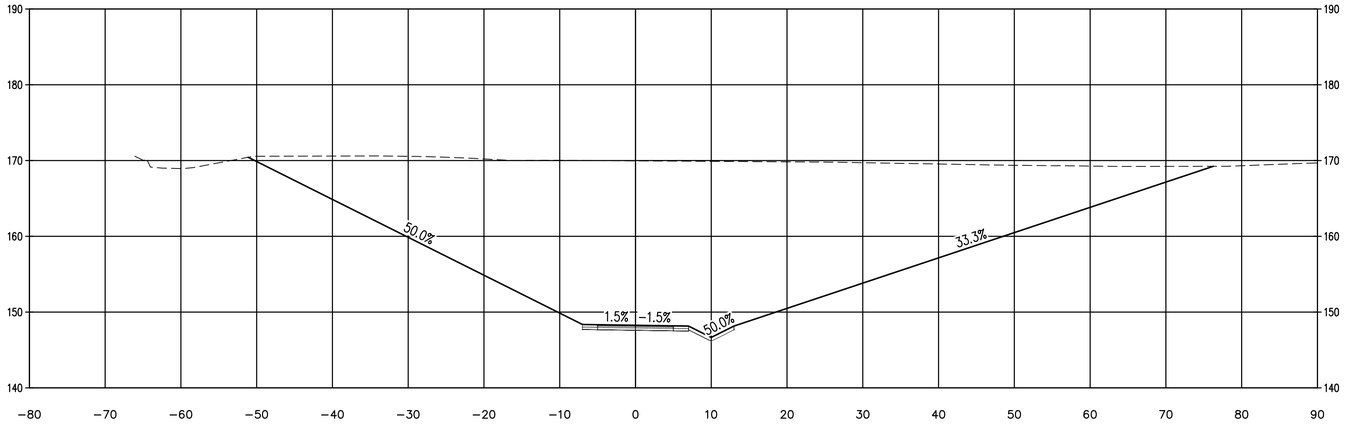
CROSS SECTION
T 303+00 - T 303+25

DRAWING No.: CS-27

SHEET No.: 94 OF 148

Aug 20, 2026 3:22:56pm – User: mia.hendricksmatsuda
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T 303+50.00



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△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ	ISSUE DATE: AUGUST 2026
DRAWN BY: M. HENDRICKS-MATSUDA	JOB No.: 25-000313
APPROVED BY: P. HOLM	DRAWING FILE No.: _25-000313-C-CS-03

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PROJECT NAME:

CITY OF TUMWATER

DESCHUTES VALLEY TRAIL
SEGMENT C

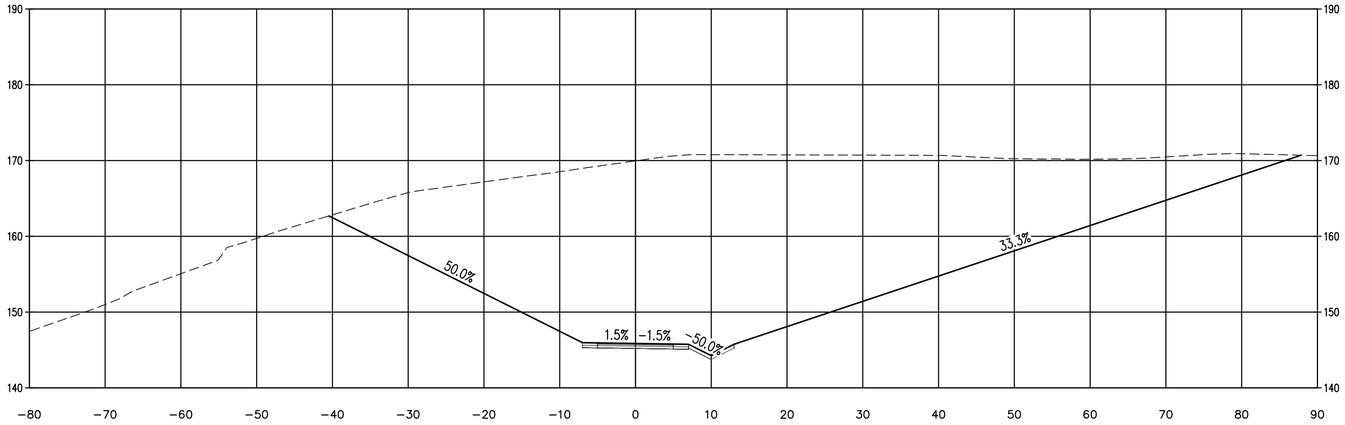
CROSS SECTION
T 303+50 - T 303+75

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T 304+00.00



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T 304+25.00

△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ	ISSUE DATE: AUGUST 2026
DRAWN BY: M. HENDRICKS-MATSUDA	JOB No.: 25-000313
APPROVED BY: P. HOLM	DRAWING FILE No.: _25-000313-C-CS-03

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PROJECT NAME:

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SEGMENT C

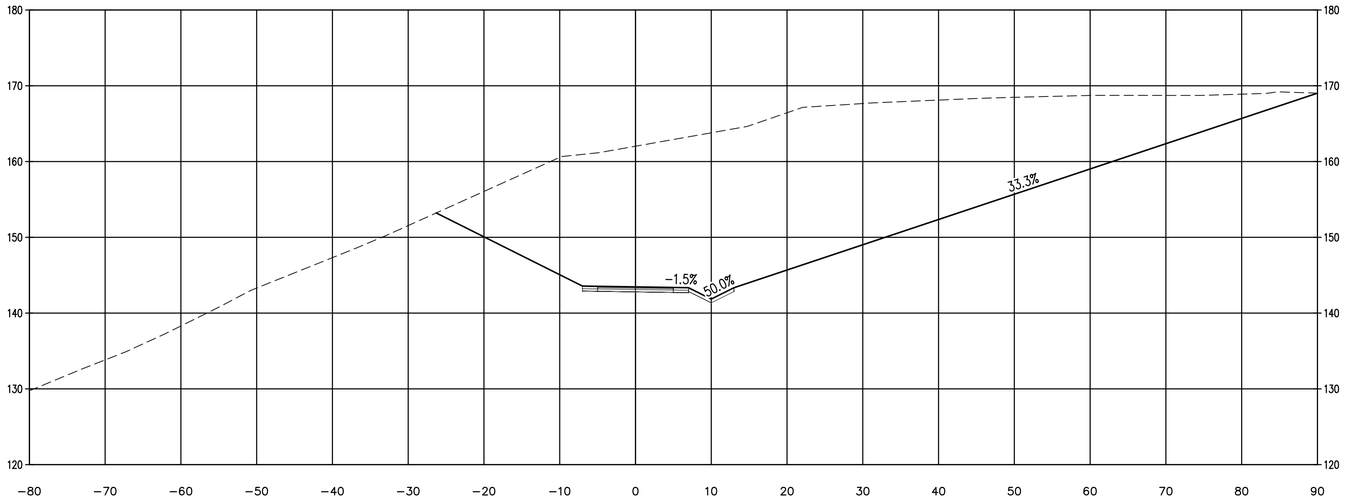
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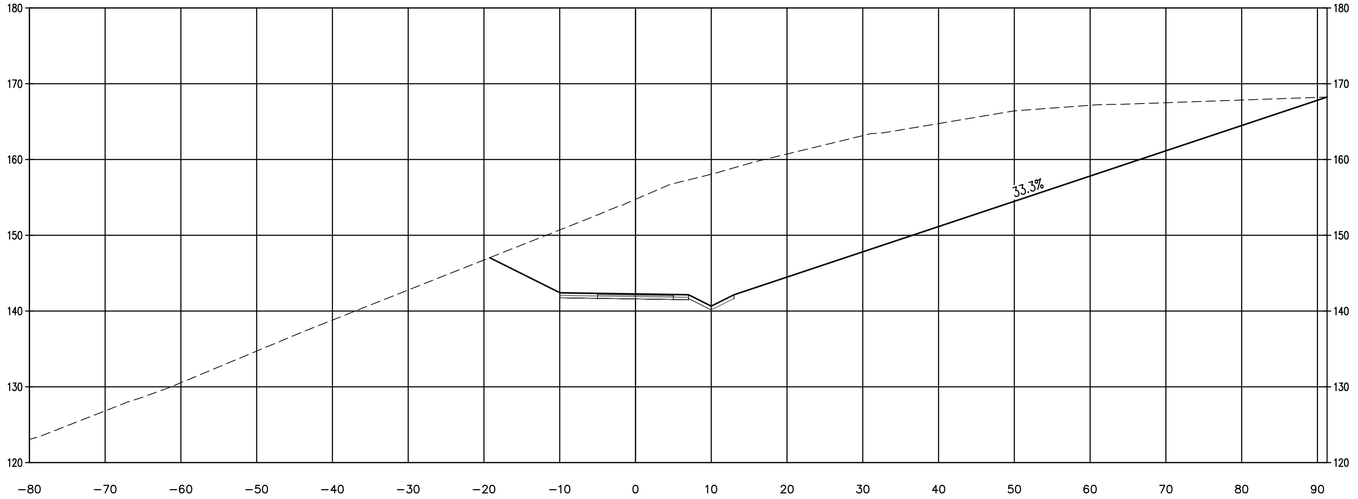


H 0 10 20

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SCALE IN FEET

T 304+75.00



△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ
DRAWN BY: M. HENDRICKS-MATSUDA
APPROVED BY: P. HOLM
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JOB No.: 25-000313
DRAWING FILE No.: _25-000313-C-CS-03

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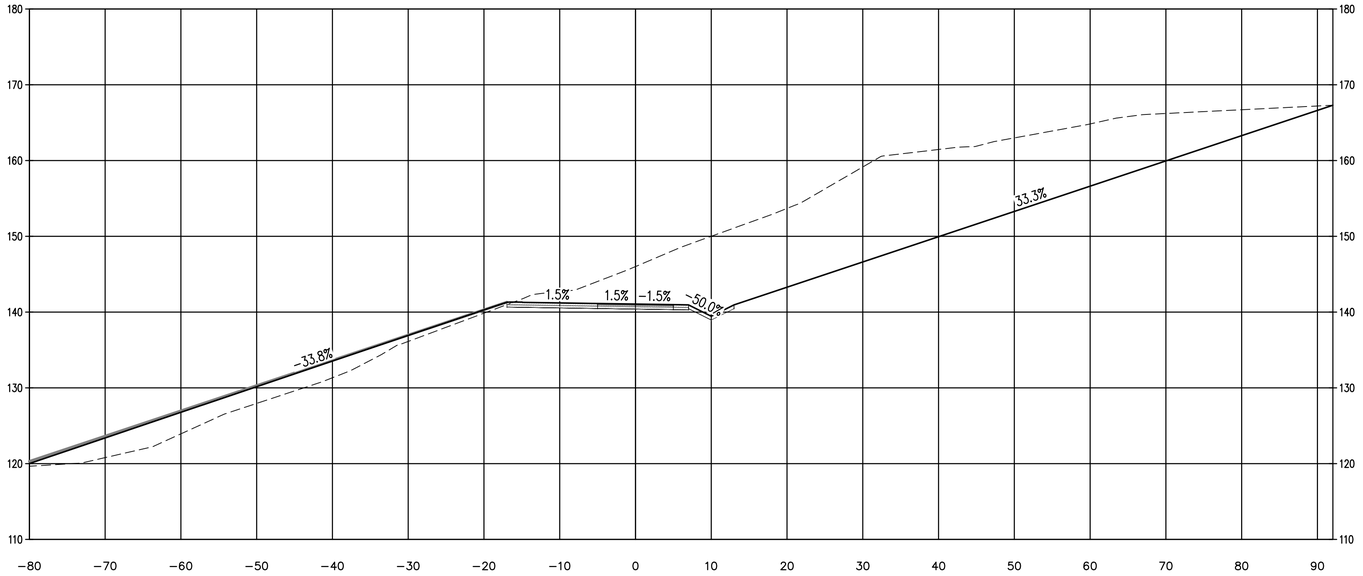
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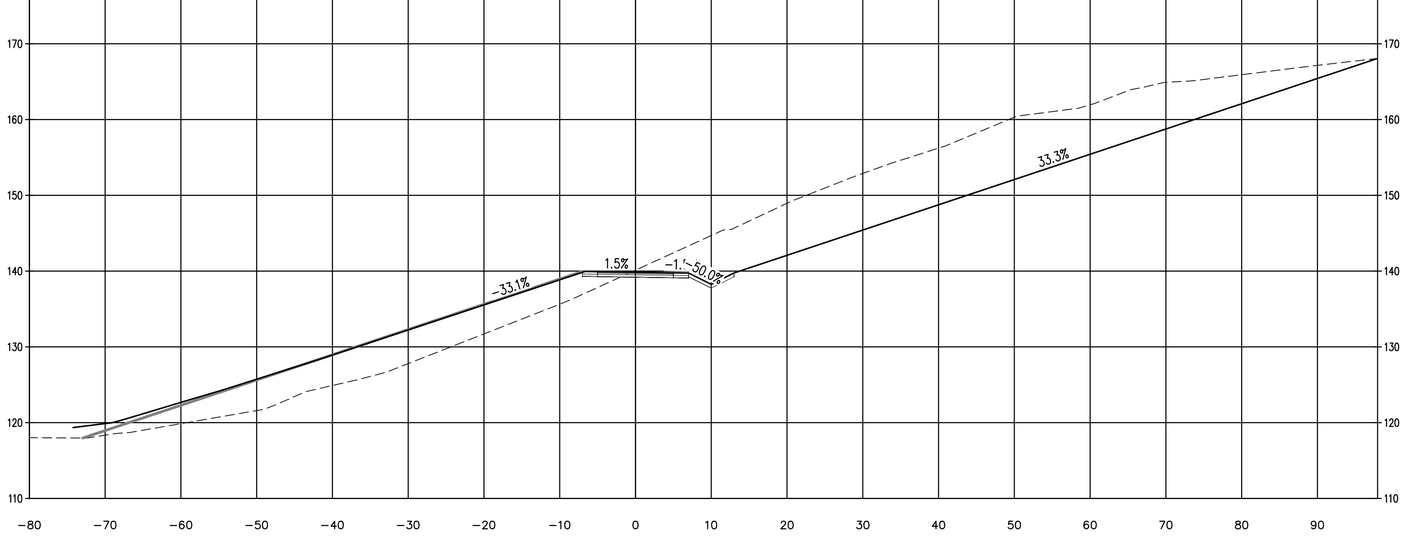
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DESIGNED BY: R. MARTINEZ	ISSUE DATE: AUGUST 2026
DRAWN BY: M. HENDRICKS-MATSUDA	JOB No.: 25-000313
APPROVED BY: P. HOLM	DRAWING FILE No.: _25-000313-C-CS-03

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PROJECT NAME:

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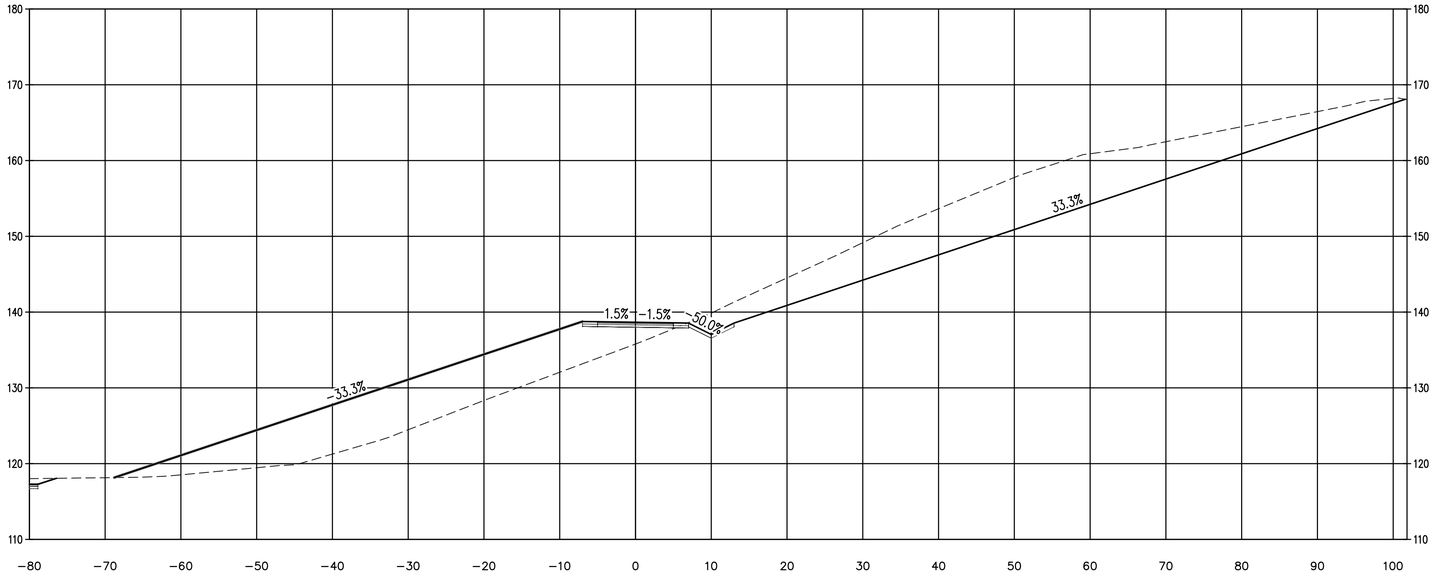
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DRAWING No.: CS-31

SHEET No.: 98 OF 148

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V 0 10 20

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DESIGNED BY: R. MARTINEZ
DRAWN BY: M. HENDRICKS-MATSUDA
APPROVED BY: P. HOLM
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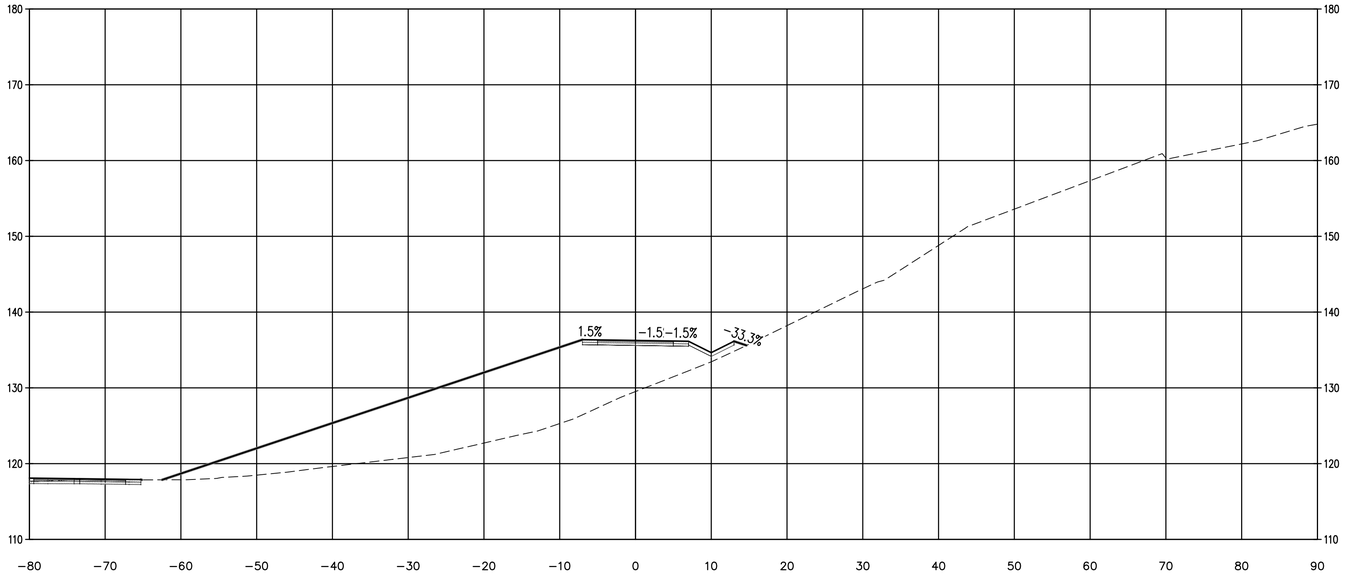
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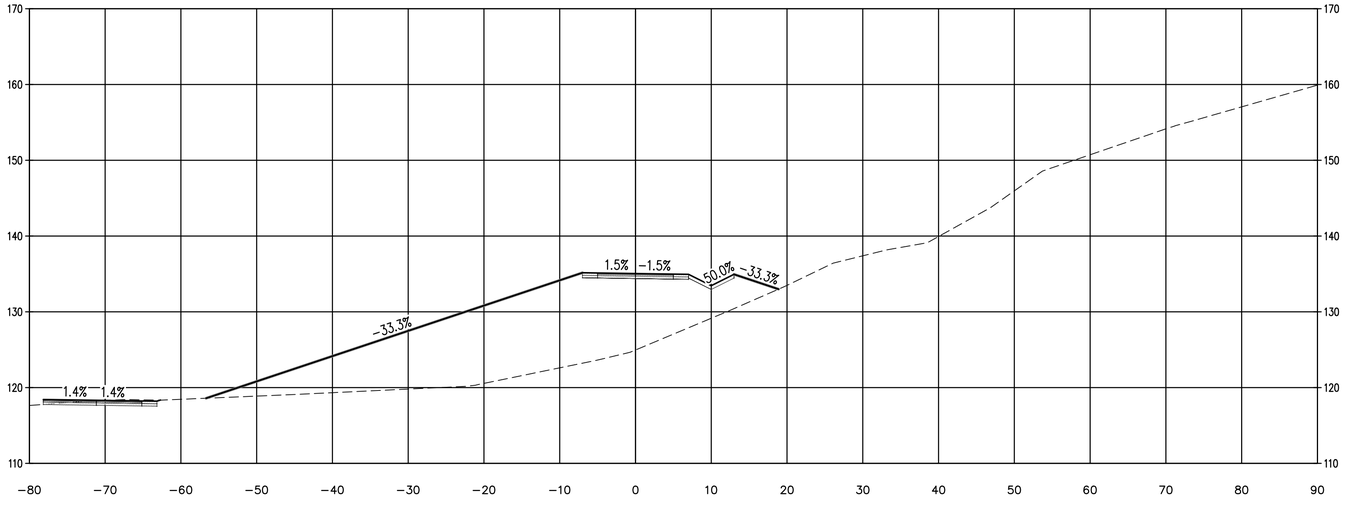


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SCALE IN FEET

T 306+25.00



△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ
ISSUE DATE: AUGUST 2026
DRAWN BY: M. HENDRICKS-MATSUDA
JOB No.: 25-000313
APPROVED BY: P. HOLM
DRAWING FILE No.: _25-000313-C-CS-03

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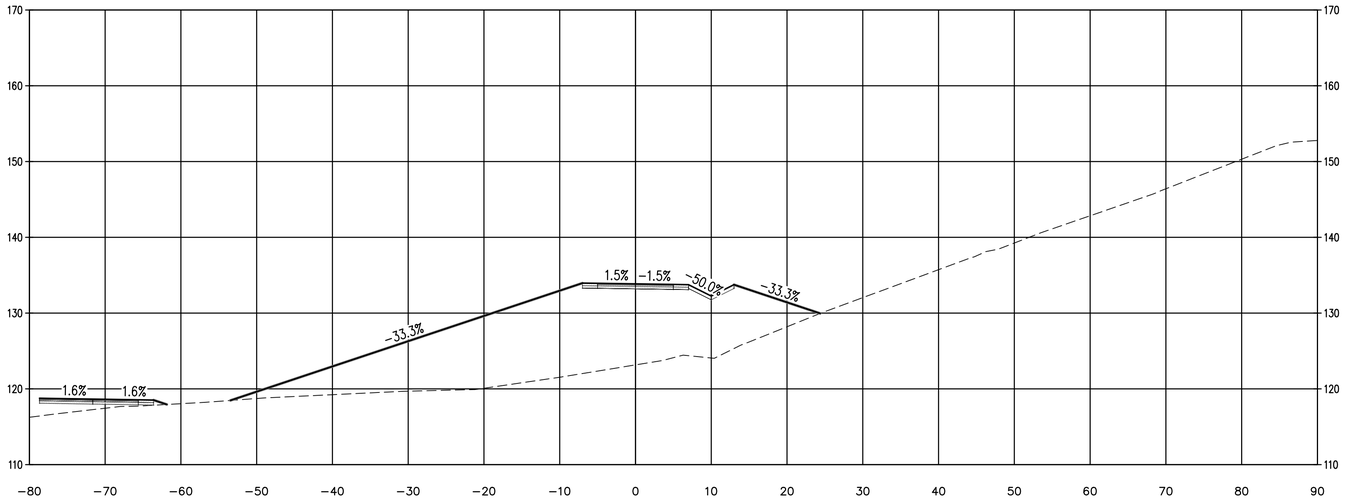
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T 306+00 - T 306+25

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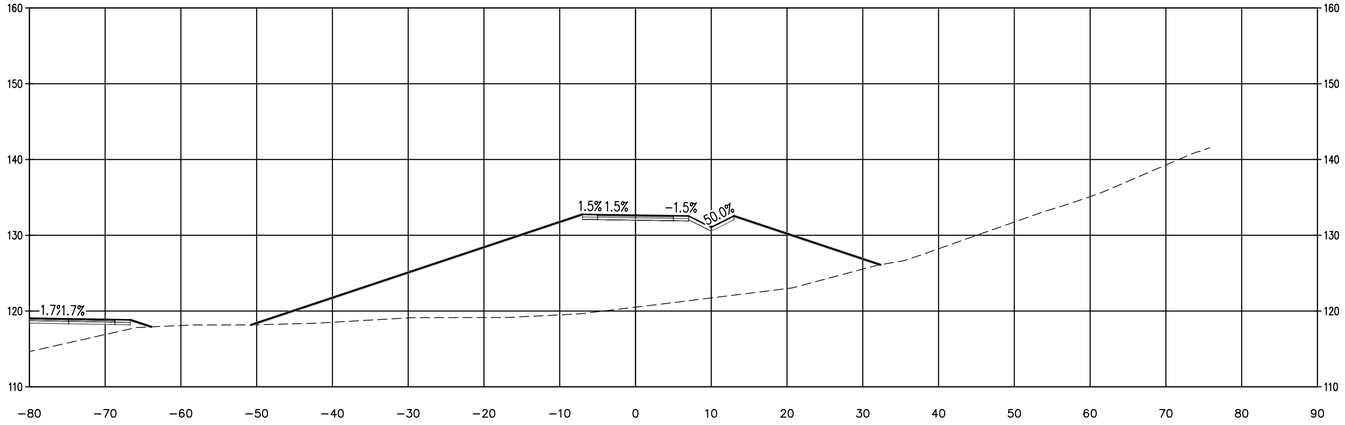


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SCALE IN FEET

T 306+75.00



△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ
DRAWN BY: M. HENDRICKS-MATSUDA
APPROVED BY: P. HOLM

ISSUE DATE: AUGUST 2026
JOB No.: 25-000313
DRAWING FILE No.: _25-000313-C-CS-03

ALL DIMENSIONS SHOWN IN FEET UNLESS OTHERWISE DESIGNATED

PATRICK HOLM — STATE OF WASHINGTON — 19870 — REGISTERED PROFESSIONAL ENGINEER — PRELIMINARY

SCJ ALLIANCE
CONSULTING SERVICES
8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
P: 360.352.1465
SCJALLIANCE.COM

PROJECT NAME:

CITY OF TUMWATER

DESCHUTES VALLEY TRAIL
SEGMENT C

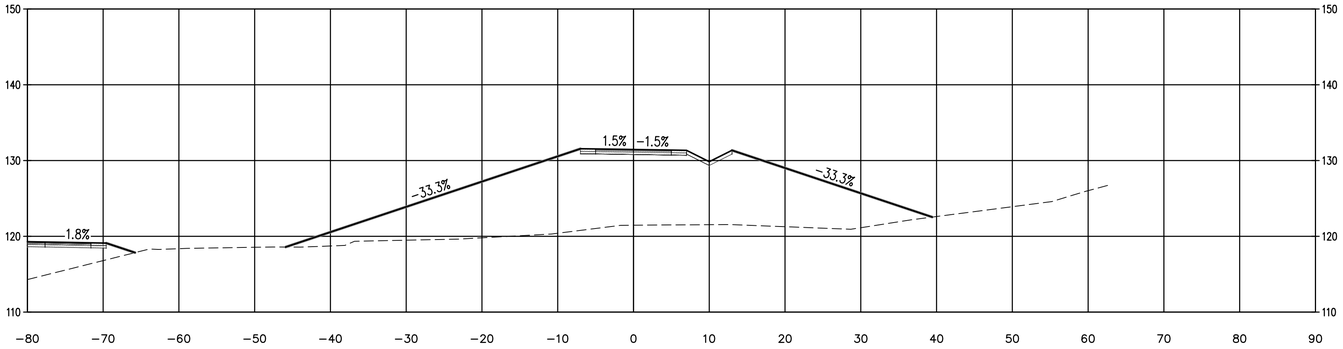
CROSS SECTION
T 306+50 - T 306+75

DRAWING No.: CS-34

SHEET No.: 101 OF 148

Aug 20, 2026 - 3:23:20pm - User: mis.hendricksmatsuda
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T 307+00.00

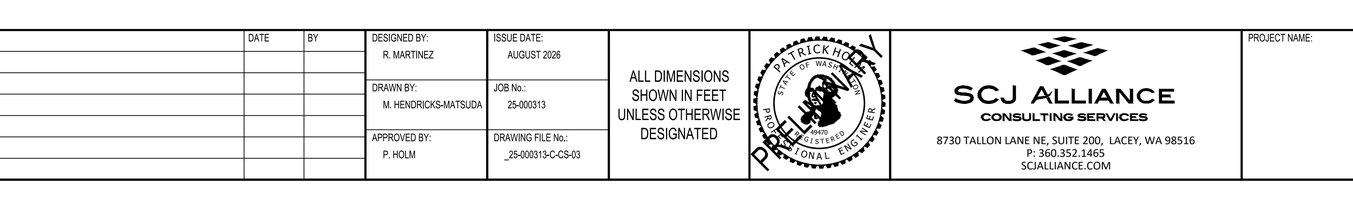


H 0 10 20

V 0 10 20

SCALE IN FEET

T 307+25.00



△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ
ISSUE DATE: AUGUST 2026
DRAWN BY: M. HENDRICKS-MATSUDA
JOB No.: 25-000313
APPROVED BY: P. HOLM
DRAWING FILE No.: _25-000313-C-CS-03

ALL DIMENSIONS SHOWN IN FEET UNLESS OTHERWISE DESIGNATED

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PROJECT NAME:

CITY OF TUMWATER

DESCHUTES VALLEY TRAIL
SEGMENT C

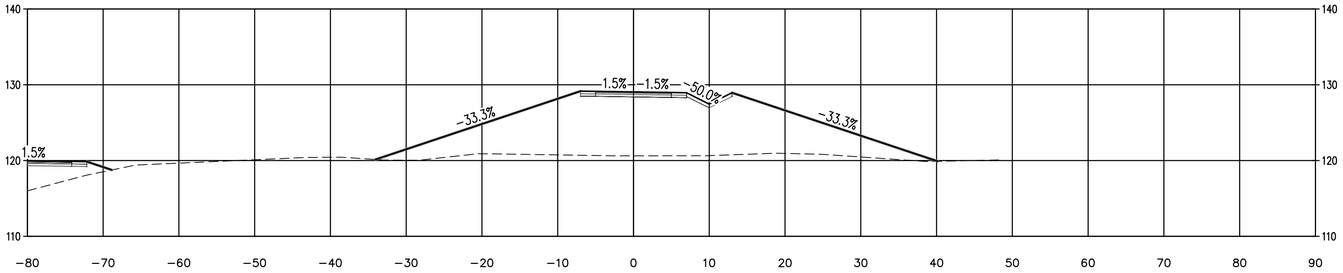
CROSS SECTION
T 303+50 - T 303+75

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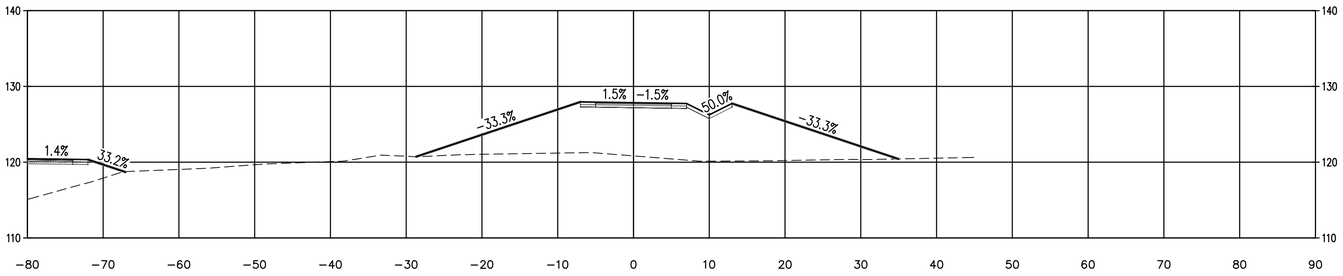
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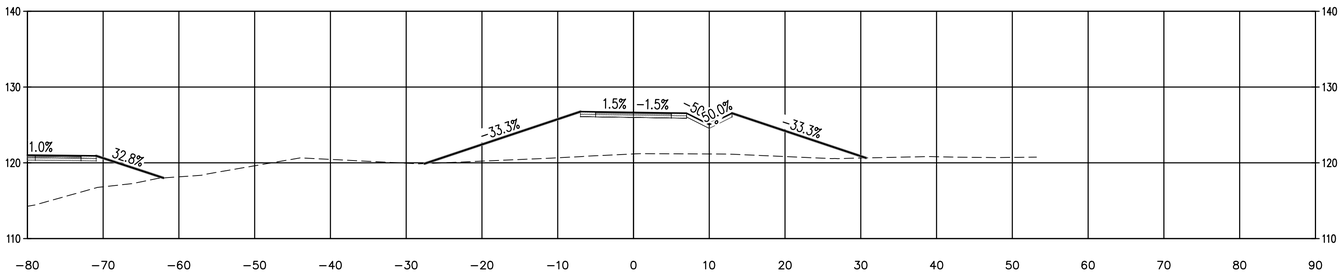
T 307+50.00



T 307+75.00



T 308+00.00



H 0 10 20

V 0 10 20

SCALE IN FEET

△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ
ISSUE DATE: AUGUST 2026
DRAWN BY: M. HENDRICKS-MATSUDA
JOB No.: 25-000313
APPROVED BY: P. HOLM
DRAWING FILE No.: _25-000313-C-CS-03

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PROJECT NAME:

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DESCHUTES VALLEY TRAIL
SEGMENT C

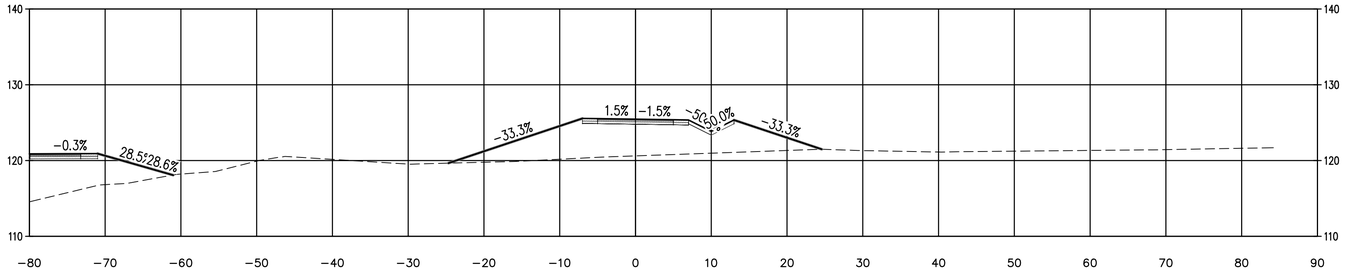
CROSS SECTION
T 304+00 - T 304+25

DRAWING No.: CS-29

SHEET No.: 96 OF 148

Aug 20, 2026 3:23:28pm - User: michendricksmatsuda
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T 308+25.00

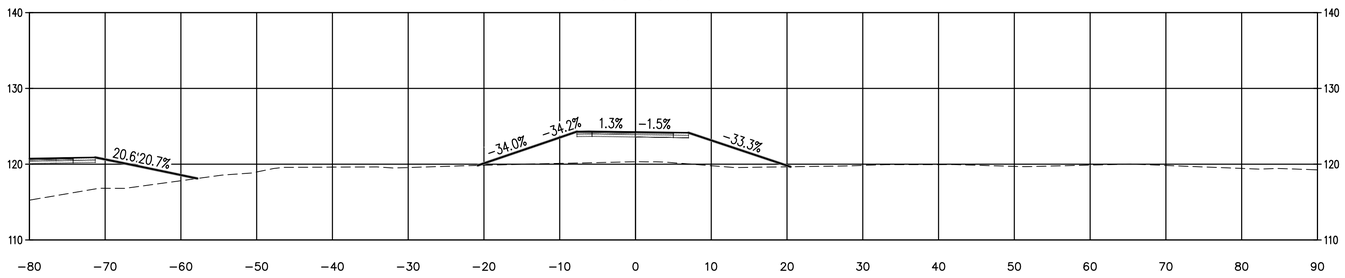


H 0 10 20

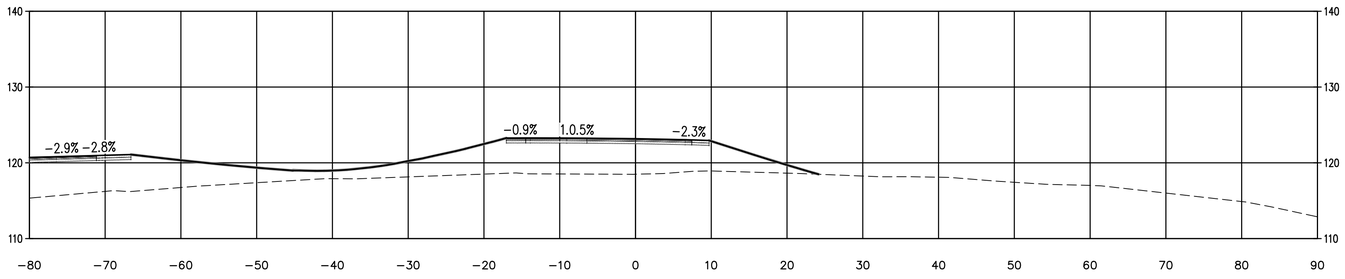
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SCALE IN FEET

T 308+50.00



T 308+75.00



△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ	ISSUE DATE: AUGUST 2026
DRAWN BY: M. HENDRICKS-MATSUDA	JOB No.: 25-000313
APPROVED BY: P. HOLM	DRAWING FILE No.: _25-000313-C-CS-03

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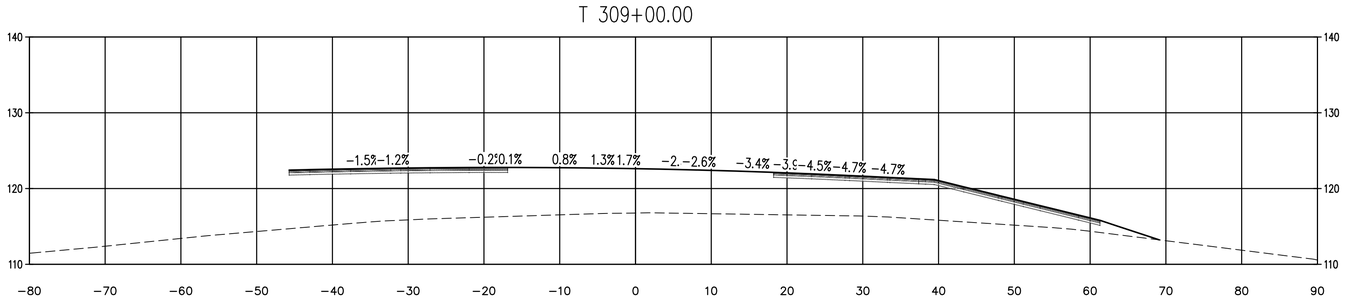
DESCHUTES VALLEY TRAIL
SEGMENT C

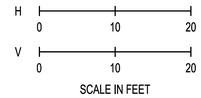
CROSS SECTION
T 304+50 - T 304+75

DRAWING No.: CS-30

SHEET No.: 97 OF 148

Aug 20, 2026 - 3:23:31pm - User: mia.hendricksmatsuda
N:\PROJECTS\0625 CITY OF TUMWATER\25-000313 TUMWATER DESCHUTES VALLEY TRAIL\CADD_25-000313-C-CS-03.DWG





△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ	ISSUE DATE: AUGUST 2026
DRAWN BY: M. HENDRICKS-MATSUDA	JOB No.: 25-000313
APPROVED BY: P. HOLM	DRAWING FILE No.: _25-000313-C-CS-03

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P: 360.352.1465
SCJALLIANCE.COM

PROJECT NAME:

CITY OF TUMWATER

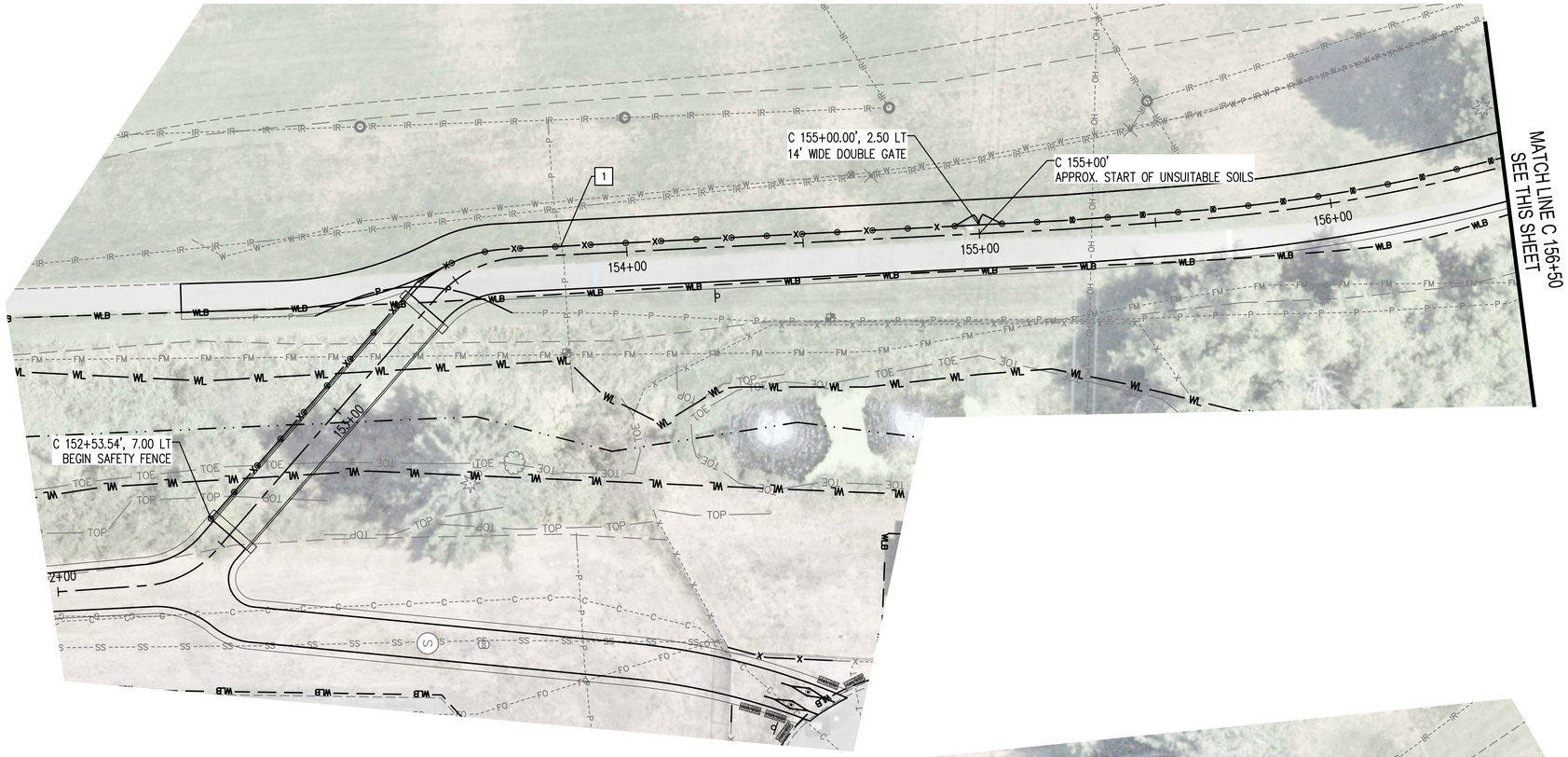
DESCHUTES VALLEY TRAIL
SEGMENT C

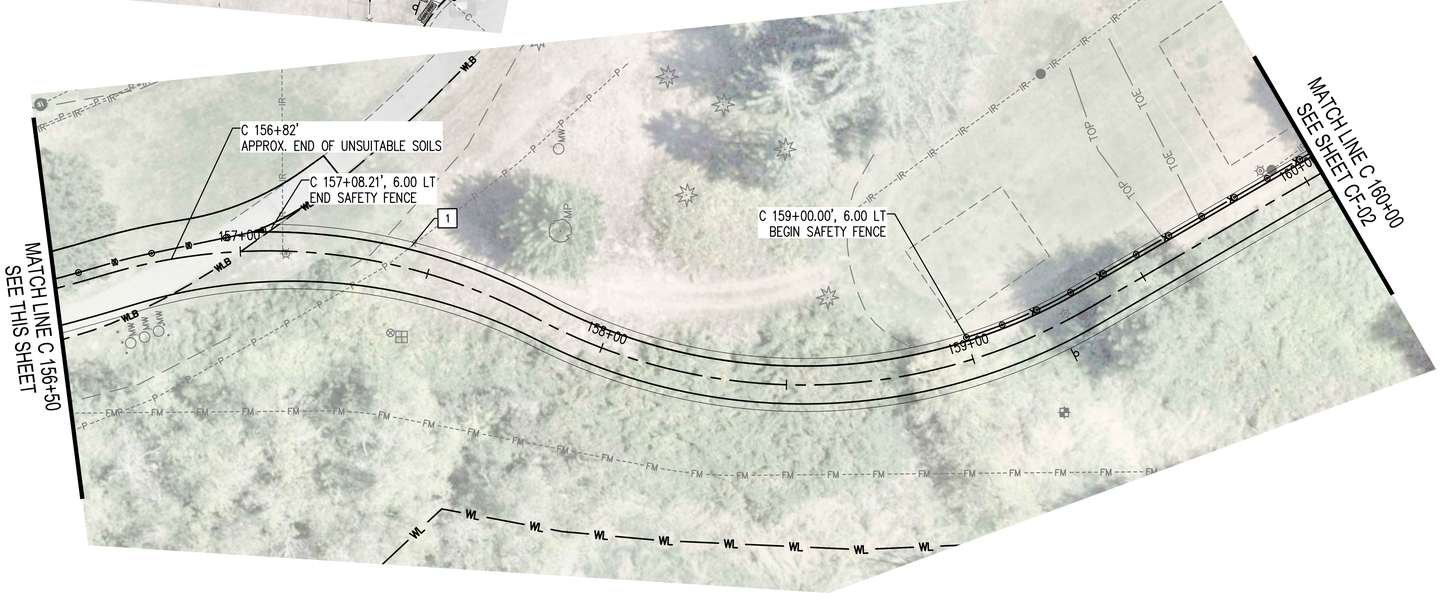
CROSS SECTION
T 305+00

DRAWING No.: CS-31

SHEET No.: 98 OF 148

Aug 20, 2026 - 3:23:34pm - User: michaelhendricksmatsuda
N:\PROJECTS\0625 CITY OF TUMWATER\25-000313 TUMWATER DESCHUTES VALLEY TRAIL\CADD_25-000313-C-CS-03.DWG





0 20 40

SCALE IN FEET

LEGEND

- FENCE & FOOTING OUTLINE SPEC 8-12
- DOUBLE CHAIN LINK GATE WSDOT STD PLAN L-30.10

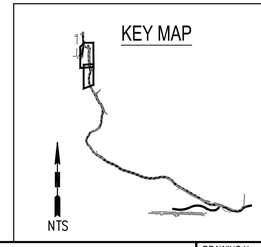
X CONSTRUCTION NOTES:

1. FENCE POST AND FOOTINGS SHALL BE SHIFTED TO AVOID EXISTING UTILITIES. CONTRACTOR SHALL VERIFY LOCATION, SIZE, AND DEPTH OF EXISTING UTILITIES PRIOR TO CONSTRUCTION. FENCE POST SPACING SHALL BE A MINIMUM OF 6 FEET AND MAXIMUM OF 10 FEET.

GENERAL NOTE:

1. IN REGIONS OF UNSUITABLE SOILS, THE TRAIL CROSS SECTION HAS ONE FOOT OF QUARRY SPALLS BELOW BASE COURSE. CONTRACTOR SHALL ENSURE THE INSTALLATION OF THE FENCE FOOTINGS DO NOT AFFECT THE COMPACTION AND PLACEMENT OF THE QUARRY SPALLS.
2. SEE SAFETY FENCE DETAILS ON SHEET S8

KEY MAP



△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ	ISSUE DATE: AUGUST 2026
DRAWN BY: M. HENDRICKS-MATSUDA	JOB No.: 25-000313
APPROVED BY: P. HOLM	DRAWING FILE No.: 25-000313-C-CF-01

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8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
P: 360.352.1465
SCJALLIANCE.COM

PROJECT NAME:

CITY OF TUMWATER

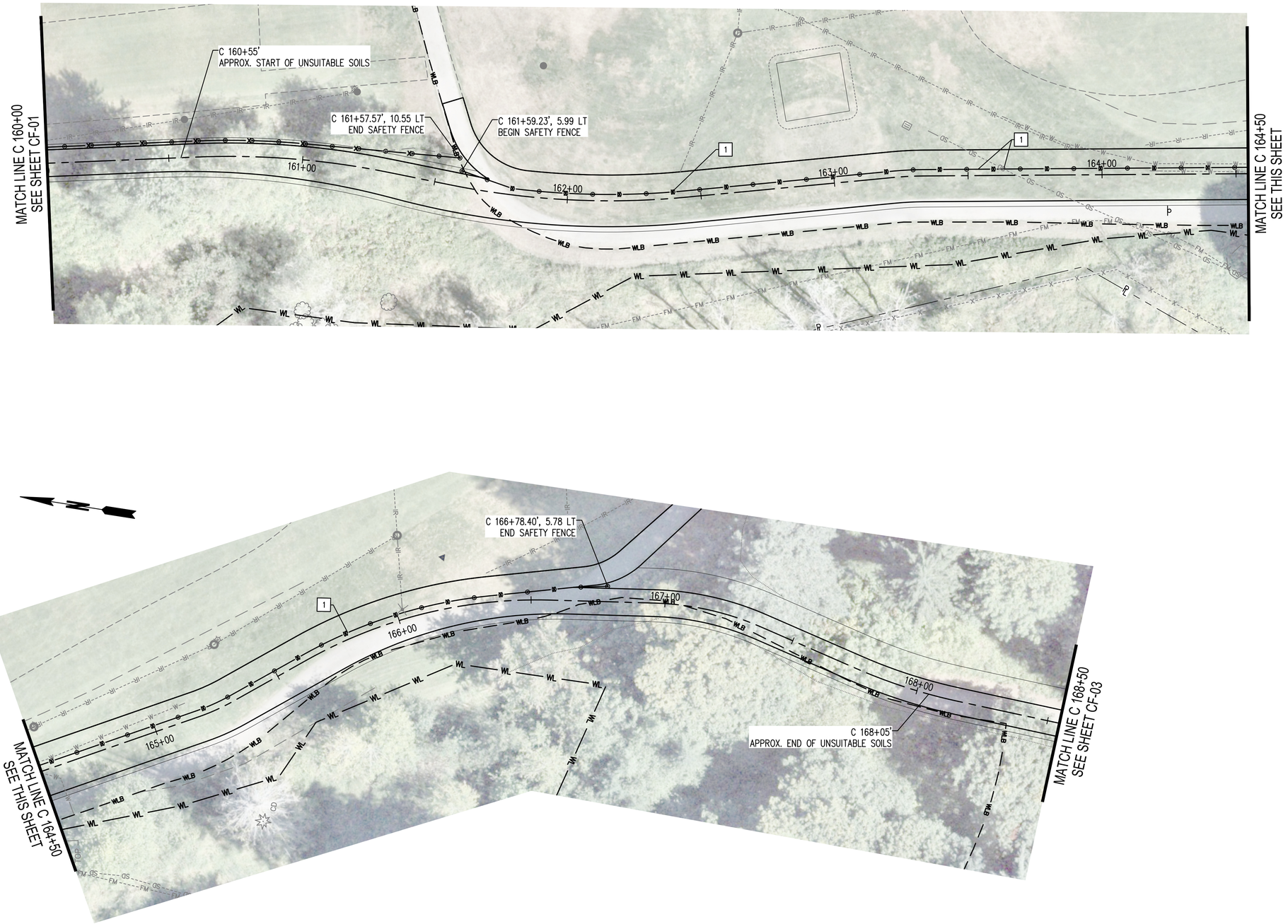
DESCHUTES VALLEY TRAIL
SEGMENT C

SAFETY FENCING PLAN
C 152+00 - C 160+00

DRAWING No.: CF-01

SHEET No.: 106 OF 148

Aug 20, 2026 1:00:45pm – User: aafreyrichelen
N:\PROJECTS\2025 CITY OF TUMWATER\25-000313 TUMWATER DESCHUTES VALLEY TRAIL\CADD\25-000313-C-CF-01.DWG



0 20 40
SCALE IN FEET

LEGEND

- FENCE & FOOTING OUTLINE SPEC 8-12
- DOUBLE CHAIN LINK GATE WSDOT STD PLAN L-30.10

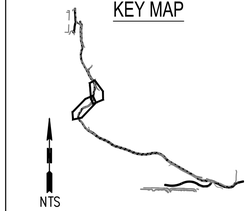
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2. SEE SAFETY FENCE DETAILS ON SHEET S8

KEY MAP



NTS

△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ
DRAWN BY: M. HENDRICKS-MATSUDA
APPROVED BY: P. HOLM
ISSUE DATE: AUGUST 2026
JOB No.: 25-000313
DRAWING FILE No.: 25-000313-C-CF-02

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8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
P: 360.352.1465
SCJALLIANCE.COM

PROJECT NAME:

CITY OF TUMWATER

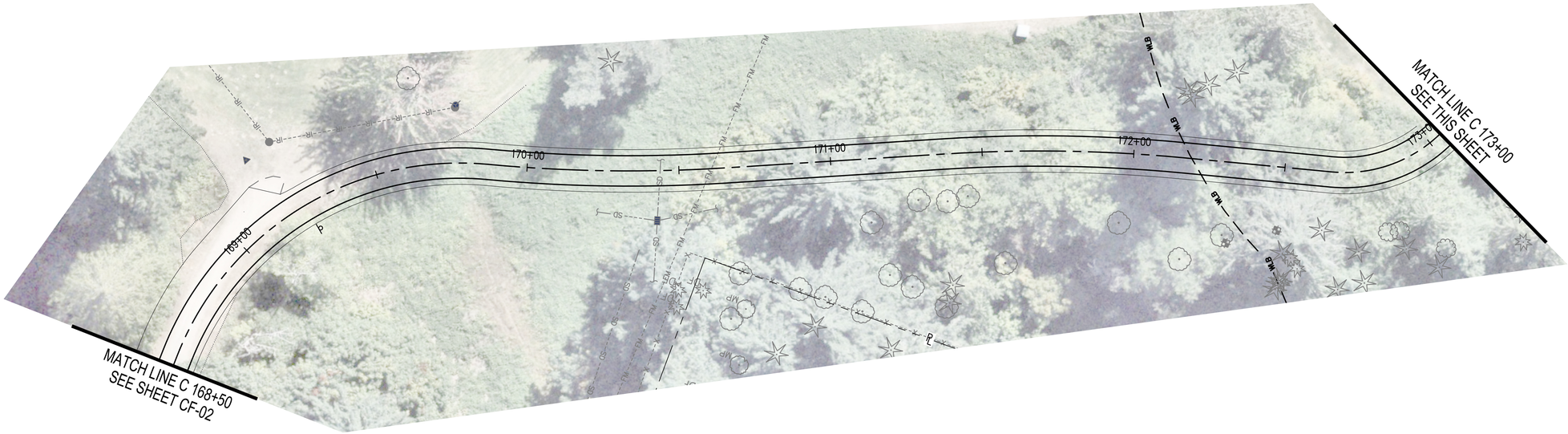
DESCHUTES VALLEY TRAIL
SEGMENT C

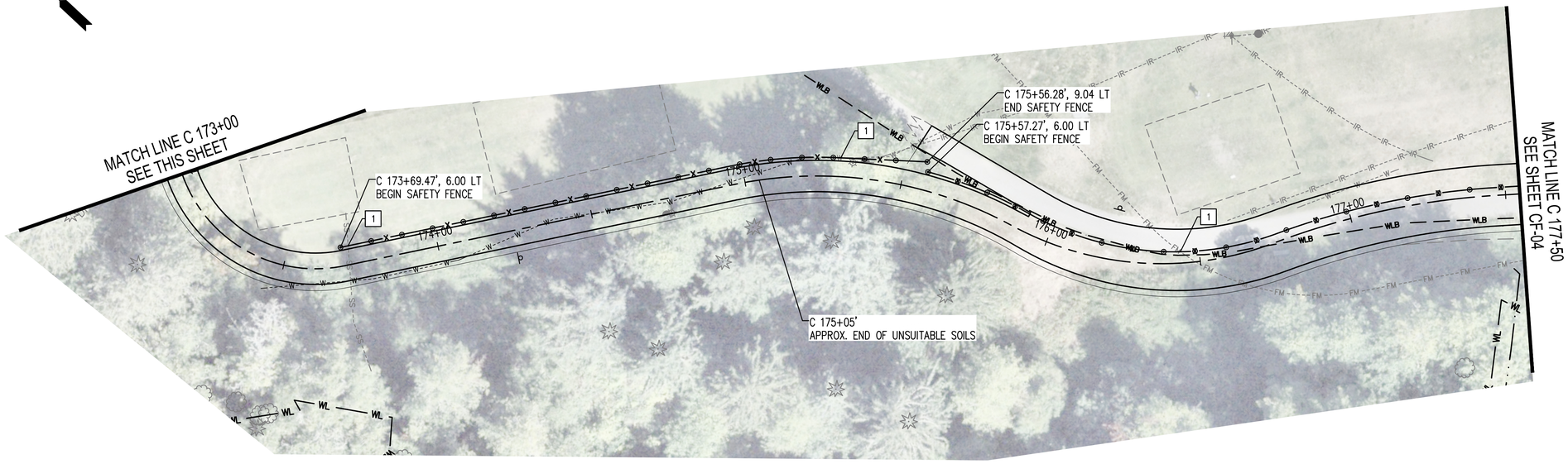
SAFETY FENCING PLAN
C 160+00 - C 168+50

DRAWING No.: CF-02

SHEET No.: 107 OF 148

Aug 20, 2026 12:59:42pm – User: audreynielsen
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0 20 40

SCALE IN FEET

LEGEND

FENCE & FOOTING OUTLINE
SPEC 8–12

DOUBLE CHAIN LINK GATE
WSDOT STD PLAN L–30.10

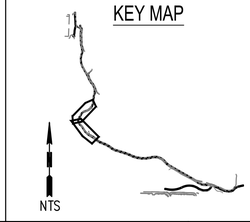
X CONSTRUCTION NOTES:

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GENERAL NOTE:

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2. SEE SAFETY FENCE DETAILS ON SHEET S8

KEY MAP



NTS

△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ	ISSUE DATE: AUGUST 2026
DRAWN BY: M. HENDRICKS-MATSUDA	JOB No.: 25-000313
APPROVED BY: P. HOLM	DRAWING FILE No.: 25-000313-C-CF-03

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PRELIMINARY

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8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
P: 360.352.1465
SCJALLIANCE.COM

PROJECT NAME:

CITY OF TUMWATER

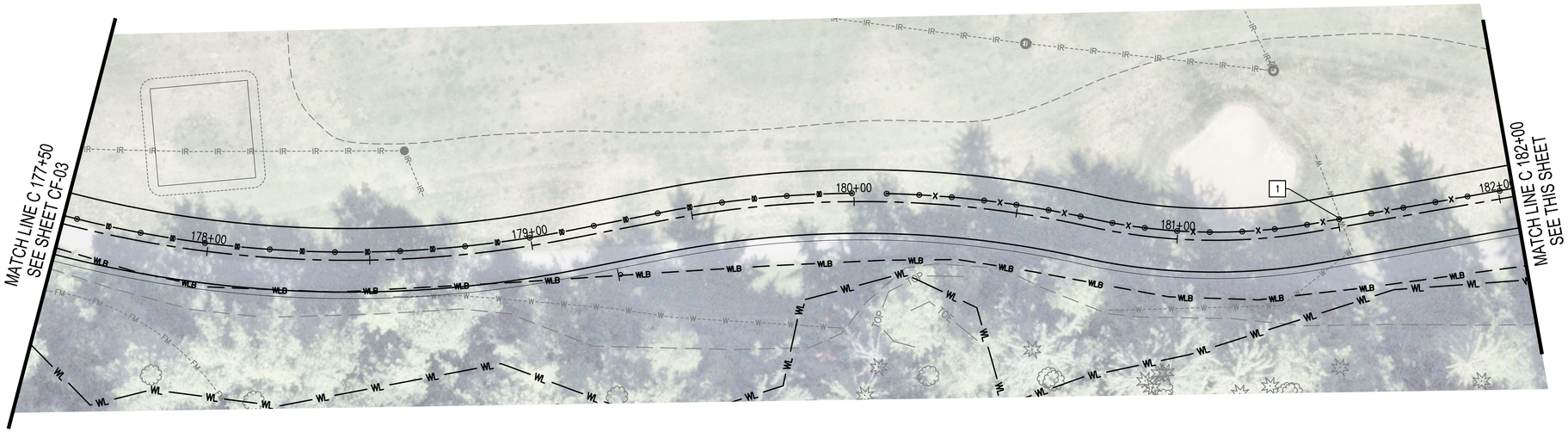
DESCHUTES VALLEY TRAIL
SEGMENT C

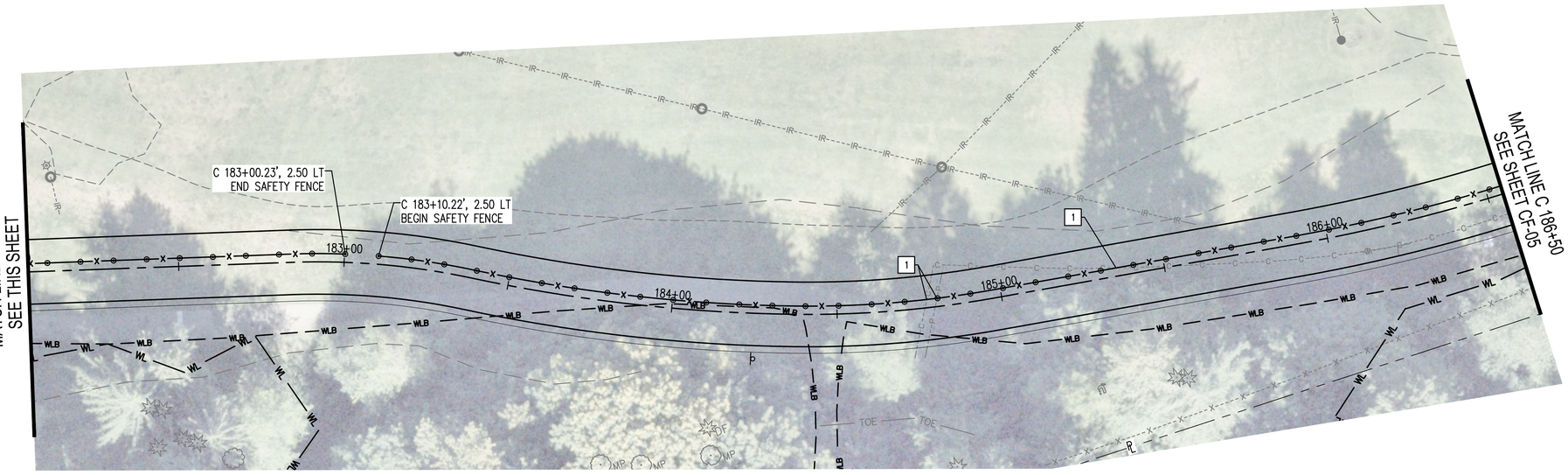
SAFETY FENCING PLAN
C 168+50 - C 177+50

DRAWING No.: CF-03

SHEET No.: 108 OF 148

Aug 20, 2026 1:20:03pm – User: audreyvieleson
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0 20 40
SCALE IN FEET

LEGEND

- FENCE & FOOTING OUTLINE SPEC 8-12
- DOUBLE CHAIN LINK GATE WSDOT STD PLAN L-30.10

X CONSTRUCTION NOTES:

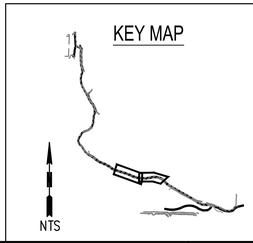
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2. SEE SAFETY FENCE DETAILS ON SHEET S8

0 20 40
SCALE IN FEET

KEY MAP



NTS

△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ
ISSUE DATE: AUGUST 2026
DRAWN BY: M. HENDRICKS-MATSUDA
JOB No.: 25-000313
APPROVED BY: P. HOLM
DRAWING FILE No.: 25-000313-C-CF-04

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PROJECT NAME:

CITY OF TUMWATER

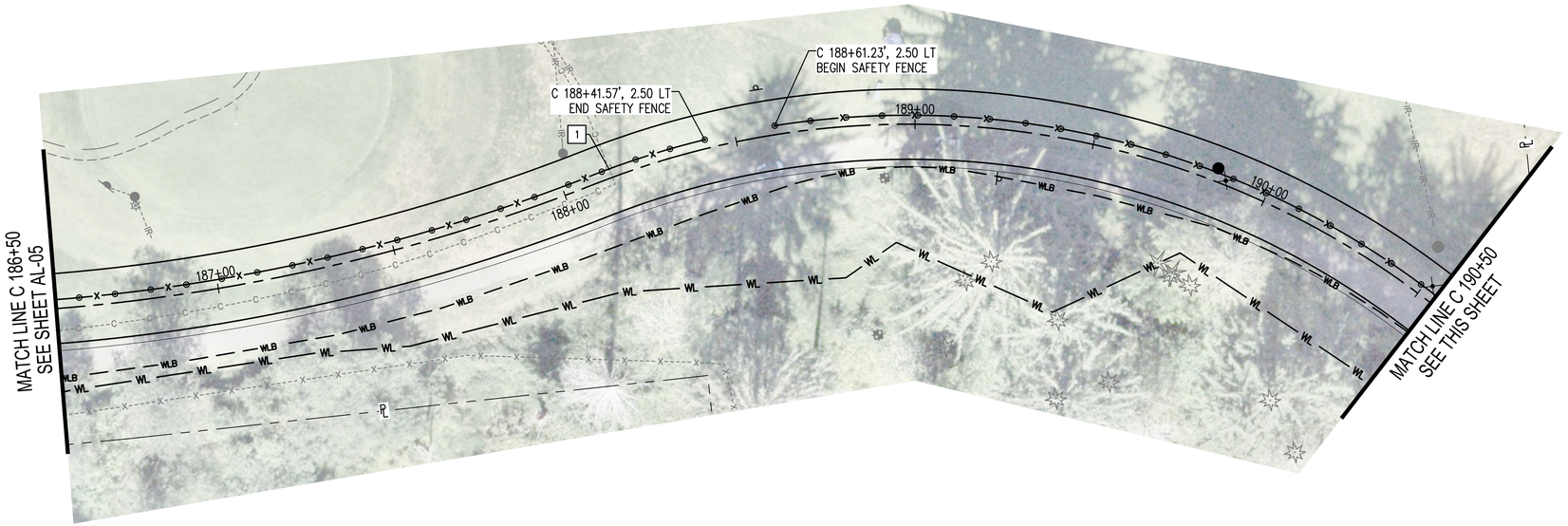
DESCHUTES VALLEY TRAIL
SEGMENT C

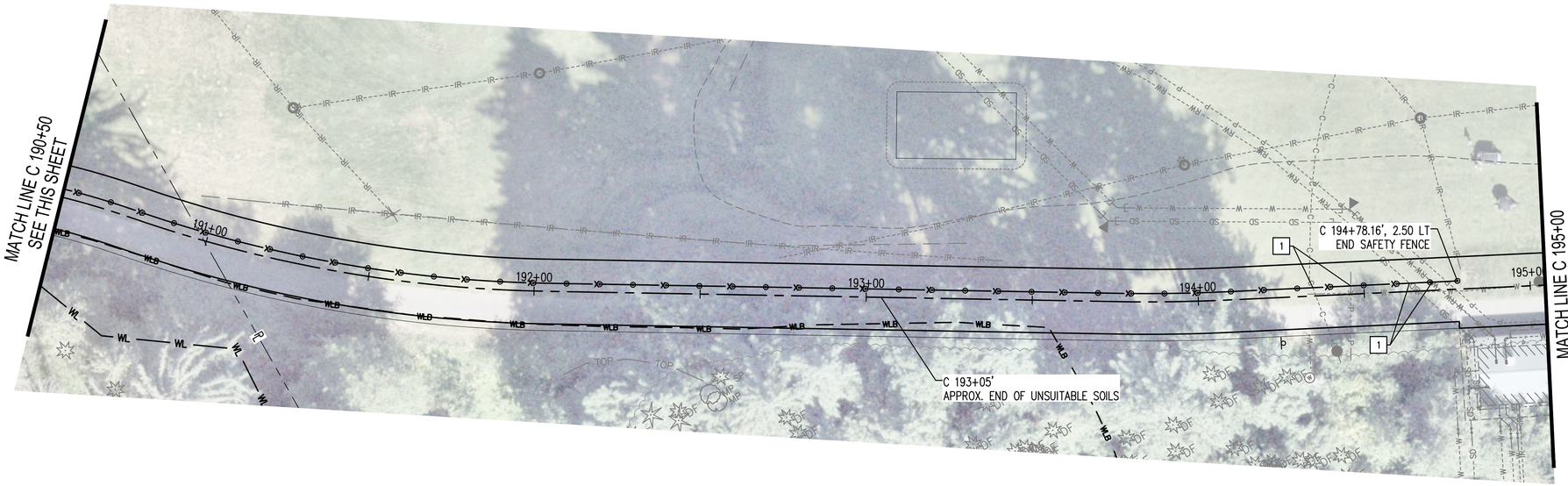
SAFETY FENCING PLAN
C 177+50 - C 186+50

DRAWING No.: CF-04

SHEET No.: 109 OF 148

Aug 20, 2026 1:20:01pm - User: aufenglehlen
N:\PROJECTS\0625 CITY OF TUMWATER\25-000313 TUMWATER DESCHUTES VALLEY TRAIL\CADD\25-000313-C-CF-04.DWG





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0 20 40

SCALE IN FEET

LEGEND

—x—o—x—	FENCE & FOOTING OUTLINE SPEC 8–12
⩚	DOUBLE CHAIN LINK GATE WSDOT STD PLAN L–30.10

X CONSTRUCTION NOTES:

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GENERAL NOTE:

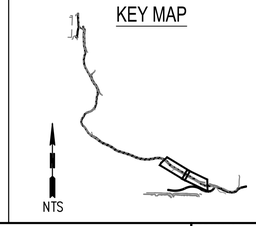
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2. SEE SAFETY FENCE DETAILS ON SHEET S8

N

0 20 40

SCALE IN FEET

KEY MAP



NTS

△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ
DRAWN BY: M. HENDRICKS-MATSUDA
APPROVED BY: P. HOLM
ISSUE DATE: AUGUST 2026
JOB No.: 25-000313
DRAWING FILE No.: 25-000313-C-CF-05

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PROJECT NAME:

CITY OF TUMWATER

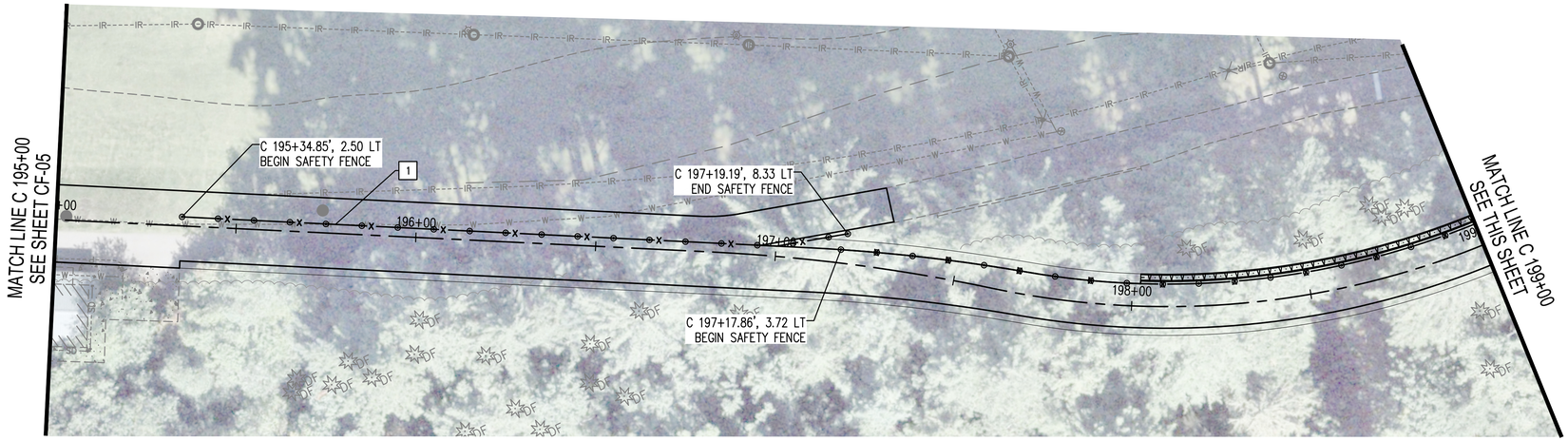
DESCHUTES VALLEY TRAIL
SEGMENT C

SAFETY FENCING PLAN
C 186+50 - C 195+00

DRAWING No.: CF-05

SHEET No.: 110 OF 148

Aug 20, 2026 - 1:07:36pm - User: audreynielsen
N:\PROJECTS\625\CITY OF TUMWATER\25-000313 TUMWATER DESCHUTES VALLEY TRAIL\CADD\25-000313-C-CF-05.DWG





LEGEND

FENCE & FOOTING OUTLINE
SPEC 8-12

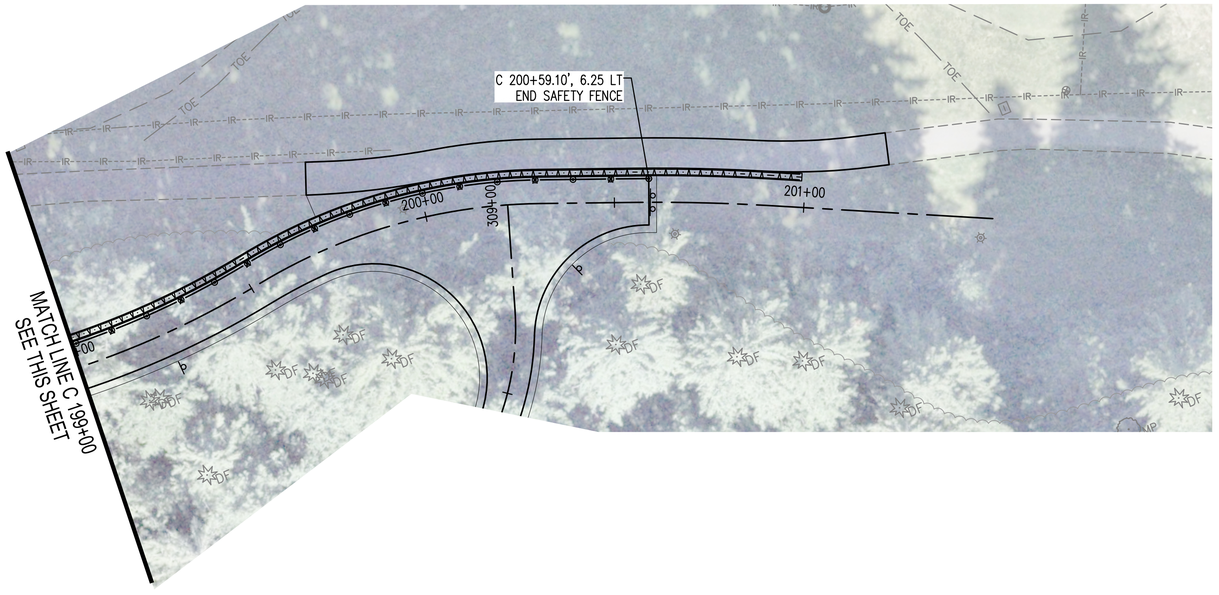
DOUBLE CHAIN LINK GATE
WSDOT STD PLAN L-30.10

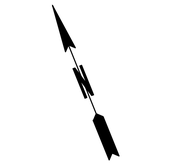
X CONSTRUCTION NOTES:

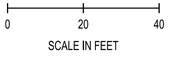
1. FENCE POST AND FOOTINGS SHALL BE SHIFTED TO AVOID EXISTING UTILITIES. CONTRACTOR SHALL VERIFY LOCATION, SIZE, AND DEPTH OF EXISTING UTILITIES PRIOR TO CONSTRUCTION. FENCE POST SPACING SHALL BE A MINIMUM OF 6 FEET AND MAXIMUM OF 10 FEET.

GENERAL NOTE:

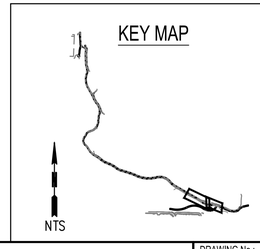
1. IN REGIONS OF UNSUITABLE SOILS, THE TRAIL CROSS SECTION HAS ONE FOOT OF QUARRY SPALLS BELOW BASE COURSE. CONTRACTOR SHALL ENSURE THE INSTALLATION OF THE FENCE FOOTINGS DO NOT AFFECT THE COMPACTION AND PLACEMENT OF THE QUARRY SPALLS.
2. SEE SAFETY FENCE DETAILS ON SHEET S8







KEY MAP



△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ
ISSUE DATE: AUGUST 2026
DRAWN BY: M. HENDRICKS-MATSUDA
JOB No.: 25-000313
APPROVED BY: P. HOLM
DRAWING FILE No.: 25-000313-C-CF-06

ALL DIMENSIONS SHOWN IN FEET UNLESS OTHERWISE DESIGNATED

PATRICK HOLM — STATE OF WASHINGTON — 49470 — REGISTERED PROFESSIONAL ENGINEER
PRELIMINARY

SCJ ALLIANCE
CONSULTING SERVICES
8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
P: 360.352.1465
SCJALLIANCE.COM

PROJECT NAME:

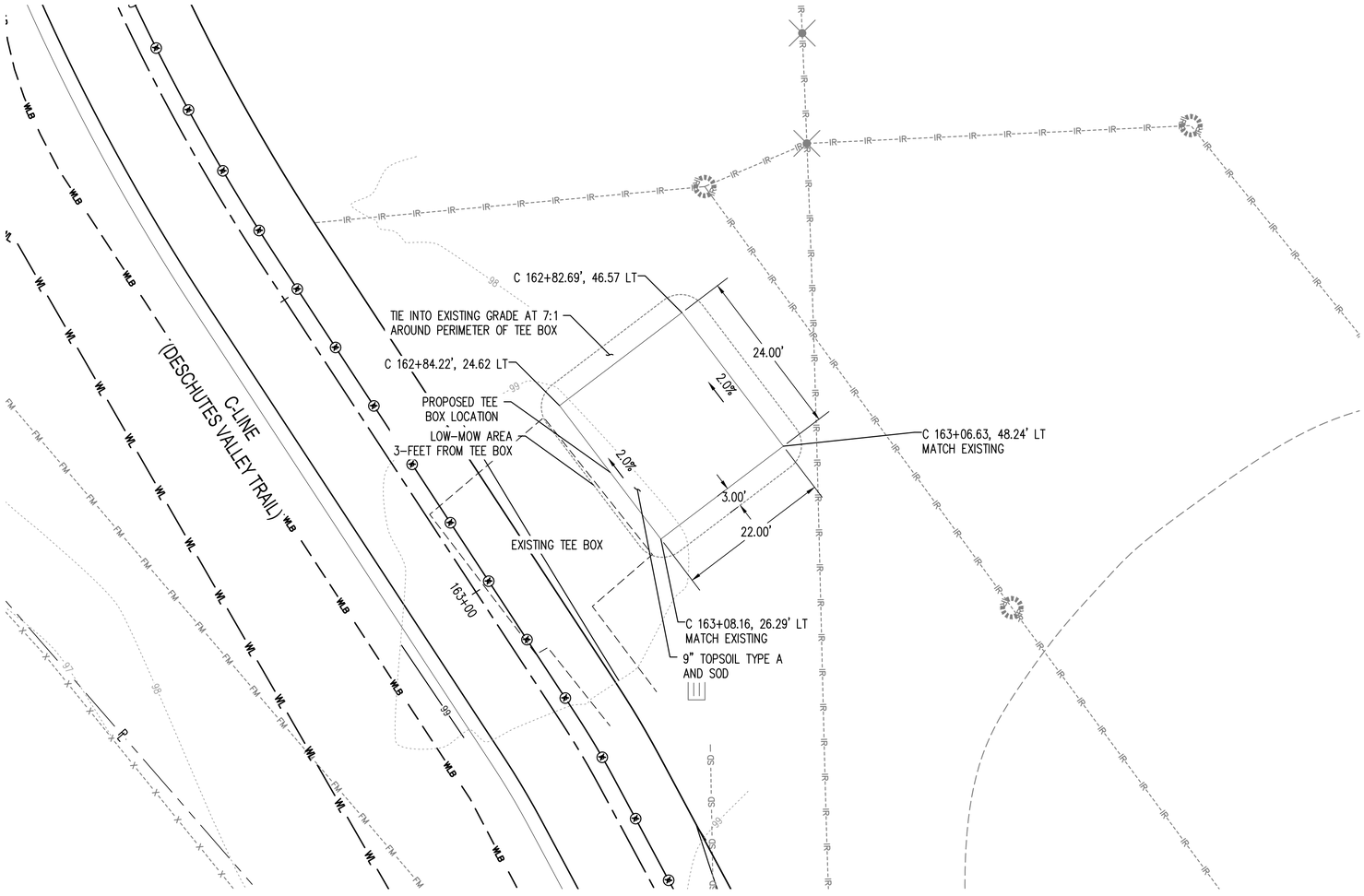
CITY OF TUMWATER

DESCHUTES VALLEY TRAIL
SEGMENT C

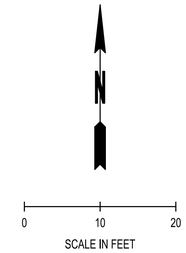
SAFETY FENCING PLAN
C 195+00 - C 202+00

DRAWING No.: CF-06
SHEET No.: 111 OF 148

Aug 20, 2026 1:16:26pm - User: audreyriebsen
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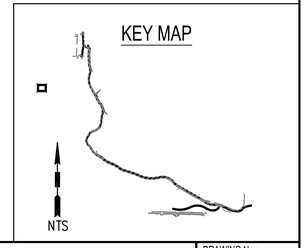


HOLE 2 - WHITE TEE BOX



GENERAL NOTE:

1. SURVEY LIMITS DO NOT ENCOMPASS THE FULL TEE BOX, THEREFORE CONTRACTOR SHALL VERIFY THE EXISTING GRADE OF THE PROPOSED TEE BOX PRIOR TO THE START OF CONSTRUCTION.
2. CONTRACTOR SHALL RESTORE THE EXISTING TEE BOX WITH 3-WAY RYE SEED MIX. IF FILL MATERIAL IS NEEDED CONTRACTOR SHALL USE TOPSOIL TYPE A.



△	REVISIONS	DATE	BY

DESIGNED BY: C. OWEN	ISSUE DATE: MAY 2026
DRAWN BY: M. HENDRICKS-MATSUDA	JOB No.: 25-000313
APPROVED BY: T. GRANTHAM	DRAWING FILE No.: 25-000313-C-TR-01

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SCJ ALLIANCE
CONSULTING SERVICES
8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
P: 360.352.1465
SCJALLIANCE.COM

PROJECT NAME:

CITY OF TUMWATER

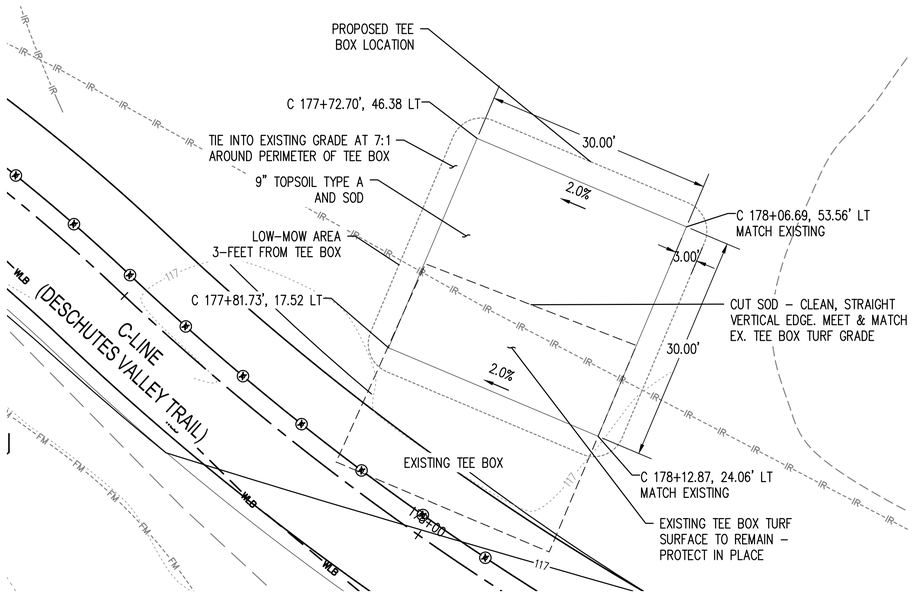
DESCHUTES VALLEY TRAIL
SEGMENT C

TEE BOX RELOCATION PLAN

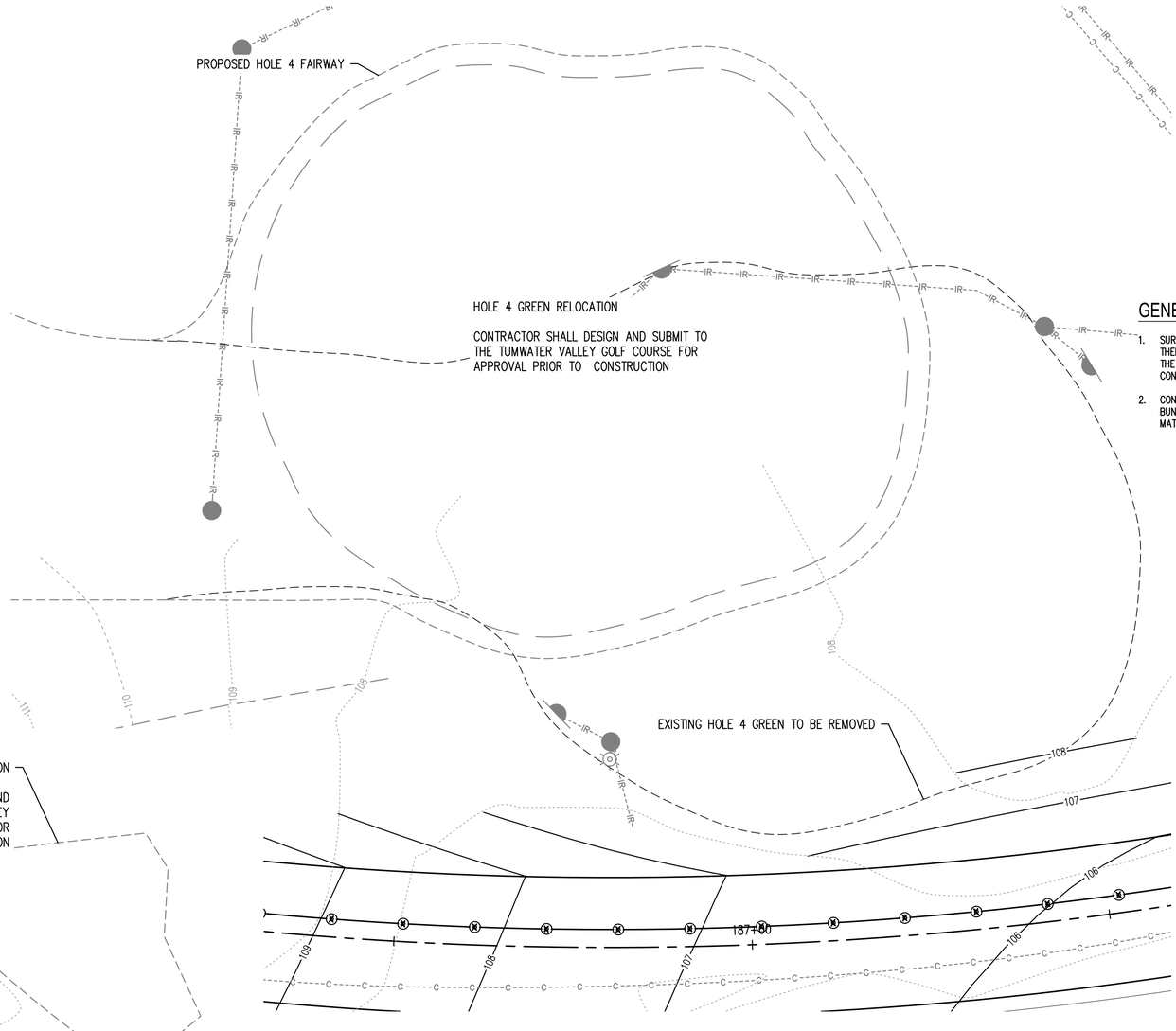
DRAWING No.: TR-01

SHEET No.: 112 OF 147

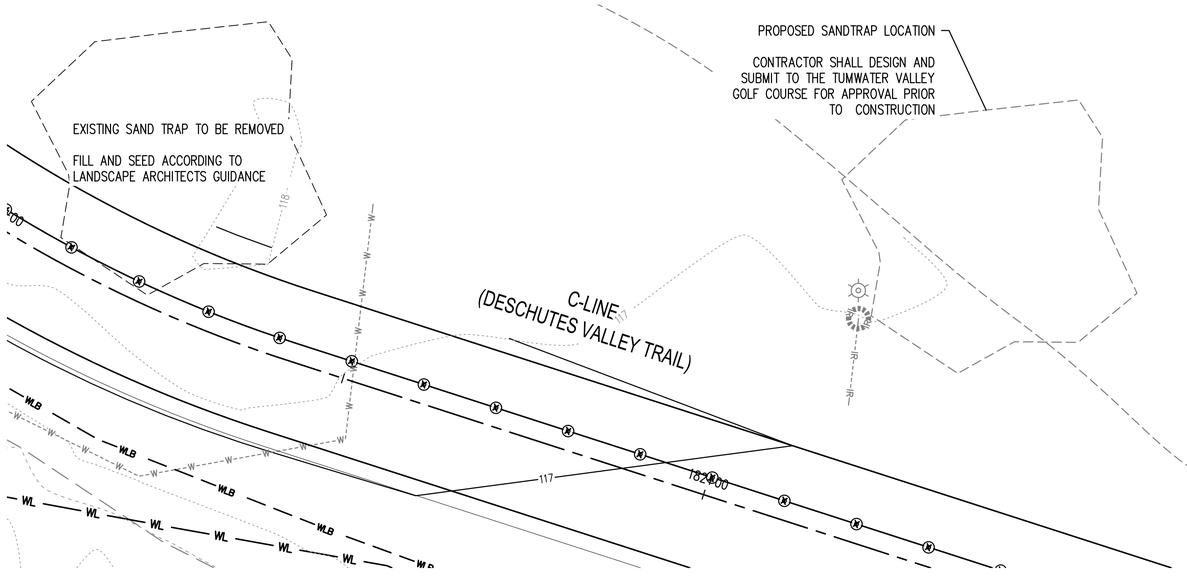
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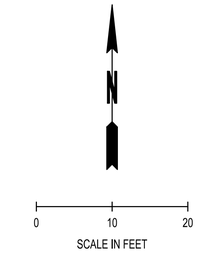
HOLE 4 - RED TEE BOX



HOLE 4 - GREEN



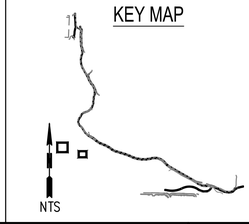
HOLE 4 - SAND TRAP



GENERAL NOTE:

1. SURVEY LIMITS DO NOT ENCOMPASS THE FULL TEE BOX, THEREFORE CONTRACTOR SHALL VERIFY THE EXISTING GRADE OF THE PROPOSED TEE BOX PRIOR TO THE START OF CONSTRUCTION.
2. CONTRACTOR SHALL RESTORE THE EXISTING TEE BOX, SAND BUNKER, AND GREEN WITH 3-WAY RYE SEED MIX. IF FILL MATERIAL IS NEEDED CONTRACTOR SHALL USE TOPSOIL TYPE A.

KEY MAP



	REVISIONS	DATE	BY

DESIGNED BY: C. OWEN	ISSUE DATE: MAY 2026
DRAWN BY: M. HENDRICKS-MATSUDA	JOB No.: 25-000313
APPROVED BY: T. GRANTHAM	DRAWING FILE No.: 25-000313-C-TR-01

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STATE OF WASHINGTON — PRELIMINARY — Authorized Signature — Date — Signed Text (ATTR) — Date Signed Text (ATTR)

SCJ ALLIANCE
CONSULTING SERVICES
8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
P: 360.352.1465
SCJALLIANCE.COM

PROJECT NAME:

CITY OF TUMWATER

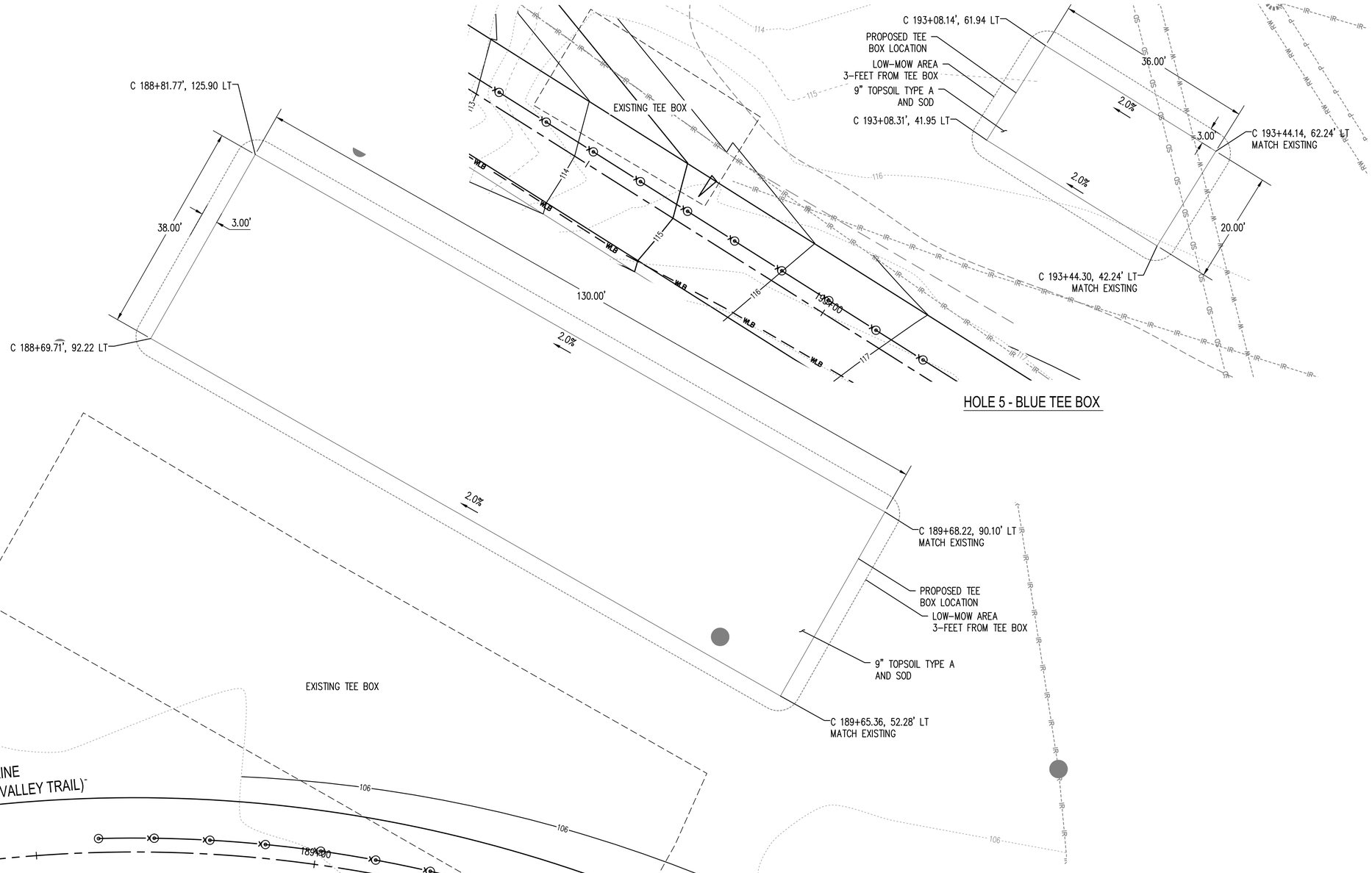
DESCHUTES VALLEY TRAIL
SEGMENT C

TEE BOX RELOCATION PLAN

DRAWING No.: TR-02

SHEET No.: 113 OF 147

Aug 20, 2026 1:41:22pm - User: aufrey.nielsen
N:\PROJECTS\0625 CITY OF TUMWATER\25-000313 TUMWATER DESCHUTES VALLEY TRAIL\CADD\25-000313-C-TR-01.DWG



HOLE 5 - BLUE TEE BOX

HOLE 5 - BLACK TEE BOX

N

0 10 20

SCALE IN FEET

GENERAL NOTE:

1. SURVEY LIMITS DO NOT ENCOMPASS THE FULL TEE BOX, THEREFORE CONTRACTOR SHALL VERIFY THE EXISTING GRADE OF THE PROPOSED TEE BOX PRIOR TO THE START OF CONSTRUCTION.
2. CONTRACTOR SHALL RESTORE THE EXISTING TEE BOX WITH 3-WAY RYE SEED MIX. IF FILL MATERIAL IS NEEDED CONTRACTOR SHALL USE TOPSOIL TYPE A.

KEY MAP

NTS

△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ	ISSUE DATE: MAY 2026
DRAWN BY: M. HENDRICKS-MATSUDA	JOB No.: 25-000313
APPROVED BY: P. HOLM	DRAWING FILE No.: 25-000313-C-TR-01

ALL DIMENSIONS SHOWN IN FEET UNLESS OTHERWISE DESIGNATED

STATE OF WASHINGTON — PRELIMINARY — Authorized Signature — Date — Designated Text (ATEXT) — Designated Text (ATEXT)

SCJ ALLIANCE
CONSULTING SERVICES
8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
P: 360.352.1465
SCJALLIANCE.COM

PROJECT NAME:

CITY OF TUMWATER

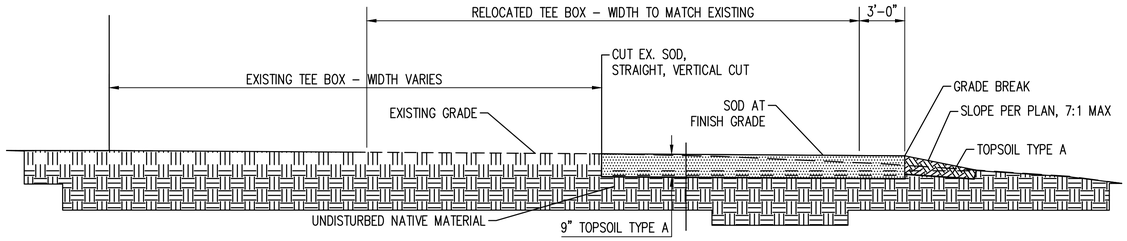
DESCHUTES VALLEY TRAIL
SEGMENT C

TEE RELOCATION PLAN

DRAWING No.: TR-03

SHEET No.: 114 OF 147

Aug 20, 2026 1:28:31pm – User: aufenjelsen
N:\PROJECTS\0625 CITY OF TUMWATER\25-000313 TUMWATER DESCHUTES VALLEY TRAIL\CADD\25-000313-C-TR-01.DWG



TEE BOX RELOCATION SCHEMATIC CROSS SECTION

NTS

△	REVISIONS	DATE	BY

DESIGNED BY:	ISSUE DATE: MAY 2026
DRAWN BY: M. HENDRICKS-MATSUDA	JOB No.: 25-000313
APPROVED BY: P. HOLM	DRAWING FILE No.: 25-000313-C-TR-01

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CONSULTING SERVICES
8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
P: 360.352.1465
SCJALLIANCE.COM

PROJECT NAME:

CITY OF TUMWATER

DESCHUTES VALLEY TRAIL
SEGMENT C

TEE BOX RELOCATION NOTES & DETAILS

DRAWING No.: TR-04

SHEET No.: 115 OF 147

Aug 20, 2026 1:30:45pm – User: aufreyriddem
N:\PROJECTS\0625 CITY OF TUMWATER\25-000313 TUMWATER DESCHUTES VALLEY TRAIL\CADD\25-000313-C-TR-01.DWG

BRIDGE STRUCTURAL NOTES

ALL MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR ROAD, BRIDGE, AND MUNICIPAL CONSTRUCTION DATED 2026.

A CONTRACTOR DESIGNED BRIDGE HAS BEEN SPECIFIED FOR THE PALERMO WATERWAY BRIDGE. THE REQUIRED GEOMETRIC CONSTRAINTS ARE INDICATED ON THIS PLAN SET. THE DESIGN OF THE BRIDGE SHALL BE PER THE REQUIREMENTS OF THE LRFD GUIDE SPECIFICATIONS FOR THE DESIGN OF PEDESTRIAN BRIDGES, 2ND EDITION AND INTERIMS THROUGH 2015. THE UNIFORM PEDESTRIAN LIVE LOAD PER THIS STANDARD IS 90 PSF. THE DESIGN VEHICULAR LOAD PER THIS STANDARD IS AN H10.

THE BRIDGE SUBSTRUCTURE HAS BEEN DESIGNED IN ACCORDANCE WITH THE REQUIREMENTS OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 10TH EDITION. A LIMITED SEISMIC DESIGN OF THIS STRUCTURE HAS BEEN COMPLETED AS REQUESTED BY THE OWNER. THE FOLLOWING PARAMETERS WERE USED FOR THE SEISMIC DESIGN:

RESPONSE SPECTRA PER AASHTO–USGS SEISMIC DESIGN GROUND MOTION DATABASE
SITE CLASS = D/E
IMPORTANCE CATEGORY = OTHER BRIDGE

THE REACTION LOADS APPLIED BY THE CONTRACTOR DESIGNED BRIDGE WERE ESTIMATED IN ORDER TO DESIGN THE BRIDGE SUBSTRUCTURE. THE CONTRACTOR SHALL ENSURE THAT THE REACTIONS APPLIED TO THE SUBSTRUCTURE DO NOT EXCEED THE VALUES SHOWN IN THE 'PRELIMINARY BRIDGE REACTIONS' TABLE, THIS SHEET.

ALL CAST–IN–PLACE CONCRETE SHALL BE CLASS 4000 UNLESS NOTED OTHERWISE.

ALL REINFORCING STEEL SHALL BE GRADE 60. UNLESS OTHERWISE SHOWN IN THE PLANS, CONCRETE COVER MEASURED FROM THE FACE OF CONCRETE TO THE FACE OF ANY REINFORCING STEEL SHALL BE 2 1/2" AT THE TOP OF THE BRIDGE DECK, 1" AT THE BOTTOM OF THE BRIDGE DECK, 3" AT THE BOTTOM OF THE FOOTING, 2" AT THE TOP OF THE FOOTING, AND 2" AT ALL OTHER LOCATIONS.

THE PIPE PILE SHALL BE PER ASTM A252 GRADE 2. THE PILES SHALL BE DRIVEN TO A DEPTH SUFFICIENT TO DEVELOP A MINIMUM NOMINAL AXIAL BEARING CAPACITY OF 115 TONS PER PILE AT STRENGTH OR EXTREME EVENT LIMIT STATES WITH A RESISTANCE FACTOR OF 0.45 AT THE STRENGTH LIMIT STATE IN ACCORDANCE WITH THE SPECIFICATIONS. SEE THE GEOTECHNICAL REPORT FOR PILE DRIVING RECOMMENDATIONS.

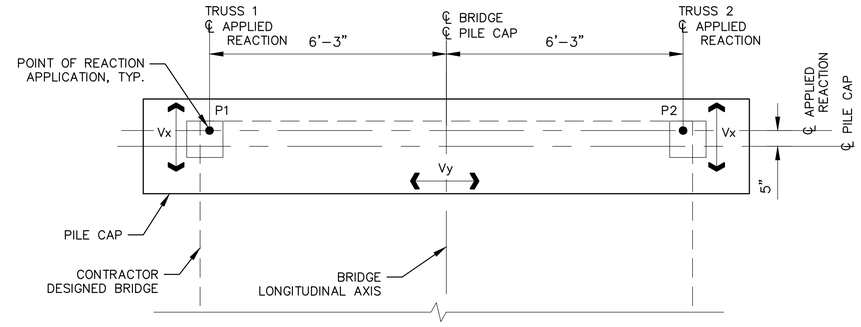
FORMWORK SHALL BE CAREFULLY RELEASED TO PREVENT IMPACT OR UNDUE STRESS IN THE STRUCTURE.

STANDARD ABBREVIATIONS

A.B.	ANCHOR BOLT	E.W.	EACH WAY	MISC.	MISCELLANEOUS		TOP OF COLUMN
ALT.	ALTERNATE					T.O.S.	TOP OF STEEL
A.F.F.	ABOVE FINISH FLOOR	F.O.C.	FACE OF CONCRETE	NBSEI	NOT BY SEI		
A.C.P.	ASPHALT CONCRETE PAVING	F.O.F	FACE OF FASCIA	N.I.C.	NOT IN CONTRACT	UNO	UNLESS NOTED OTHERWISE
		F.O.W.	FACE OF WALL	N.T.S.	NOT TO SCALE		
BOTT.	BOTTOM	FT.	FOOT OR FEET	NO.	NUMBER	VERT.	VERTICAL
B/W	BETWEEN						
		HORIZ.	HORIZONTAL	O.C.	ON CENTER	WHS	WELDED HEADED STUD
C.I.P.	CAST–IN–PLACE			O.D.	OUTSIDE DIAMETER	WTS	WELDED THREADED STUD
C.M.U.	CONCRETE MASONRY UNITS	I.D.	INSIDE DIAMETER			W.W.F.	WELDED WIRE FABRIC
CONC.	CONCRETE			PAV.	PAVING	W/	WITH
C.R.S.I.	CONCRETE REINFORCING STEEL	K.	KIPS	PLF	POUNDS PER LINEAL FOOT		
				PSF	POUNDS PER SQUARE FOOT		
INSTITUTE		LBS.	POUNDS	PSI	POUNDS PER SQUARE INCH	STANDARD SYMBOLS	
CONT.	CONTINUOUS	LF	LINEAR FOOT (FEET)	PT	PRESSURE TREATED	@	AT
		LL	LIVE LOAD			℄	CENTERLINE
DBL.	DOUBLE	LP	LOW POINT	R.	RADIUS OR RISER	ø	DIAMETER
DIA.	DIAMETER	LLH	LONG LEG HORIZONTAL			#	NUMBER
D.L.	DEAD LOAD	LLV	LONG LEG VERTICAL	SEI	SARGENT ENGINEERS INC.		
				SIM.	SIMILAR		
EA.	EACH	MAX.	MAXIMUM				
EOR	ENGINEER OF RECORD	MFR.	MANUFACTURER	T.O.B.	TOP OF BEAM		
EL., ELEV.	ELEVATION	MIN.	MINIMUM	T.O.C.	TOP OF CONCRETE OR		

LEGEND

- B / 5 — IDENTIFIES SECTION, VIEW OR DETAIL; SHOWN ON SHEET 5
- B / – — DASH INDICATES SECTION, VIEW OR DETAIL IS TAKEN AND SHOWN ON THE SAME SHEET.
- E — EPOXY COATED REINFORCING STEEL



CONTRACTOR DESIGNED BRIDGE REACTION APPLICATION DIAGRAM

SCALE: ½"=1'–0"
SIMILAR AT BOTH ABUTMENTS

THE ABUTMENTS HAVE BEEN DESIGNED BASED ON THE ESTIMATED PRELIMINARY REACTIONS LISTED IN THE TABLE BELOW. THE BRIDGE DESIGNER SHALL VERIFY THAT THE REACTIONS IMPARTED BY THE CONTRACTOR DESIGNED BRIDGE DO NOT EXCEED THE VALUES INCLUDED IN THE TABLE.

PRELIMINARY BRIDGE REACTIONS						
	DC	DW	LL	PL	WS	TU
P1 (KIP)	24.8	0.0	11.3	23.0	2.4	0.0
P2 (KIP)	24.8	0.0	8.2	23.0	-12.8	0.0
Vx (KIP)	0.0	0.0	0.0	0.0	0.0	3.2
Vy (KIP)	0.0	0.0	0.0	0.0	20.5	0.0

P1 IS THE VERTICAL REACTION APPLIED AT TRUSS 1 BEARING
P2 IS THE VERTICAL REACTION APPLIED AT TRUSS 2 BEARING
Vx IS THE LATERAL REACTION, PER BEARING, APPLIED IN A DIRECTION PARALLEL TO THE LONGITUDINAL AXIS OF THE BRIDGE,
Vy IS THE LATERAL REACTION, PER ABUTMENT, APPLIED IN A DIRECTION TRANSVERSE TO THE LONGITUDINAL AXIS OF THE BRIDGE

LOADS ARE APPLIED AT THE TOP OF THE PILE CAP.

LOAD DEFINITIONS PER AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS:
- DC = DEAD LOAD OF STRUCTURAL COMPONENTS AND NONSTRUCTURAL ATTACHMENTS
- DW = DEAD LOAD OF WEARING SURFACES AND UTILITIES
- LL = VEHICULAR LIVE LOAD
- PL = PEDESTRIAN LIVE LOAD
- WS = WIND LOAD ON STRUCTURE
- TU = FORCE EFFECT DUE TO UNIFORM TEMPERATURE

Rev.	Date	By	Revision
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CLIENT REFERENCE:25–000313

SCOTT CHRISTOPHER OLSON — STATE OF WASHINGTON — 50100 — STRUCTURAL ENGINEER — PROFESSIONAL ENGINEER — PRELIMINARY

SARGENT
SARGENT ENGINEERS, INC.
320 Ronlee Lane NW, Olympia, WA 98502
Tel. 360 867–9284

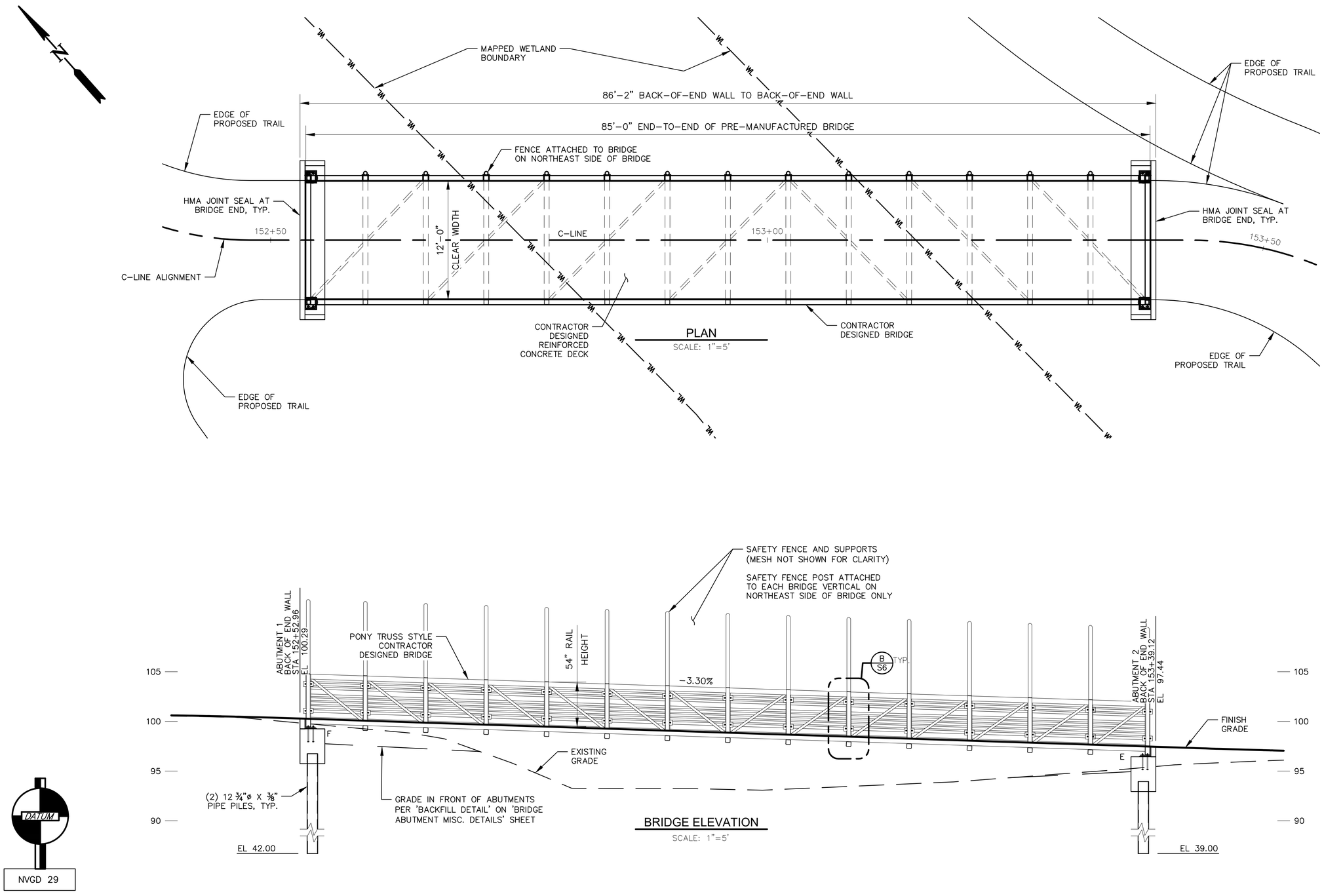
DESCHUTES VALLEY TRAIL
SEGMENT C

BRIDGE STRUCTURAL NOTES

DESIGN TEAM	
DESIGNED BY:	S.C. Olson
CHECKED BY:	Q.G. Calquhoun
PRJ. DRAFTER	S.C. Olson
	.
	.
ISSUED:	8/7/2026

SHEET
S1
116
OF
147
SHEETS
SEI REF NO.
A25139.00

Plotted: Aug 7, 2026 – 15:08 ScottO B:\25Files\A25139.00 SCJ – Deschutes Valley Trail\Drawings\S1 Structural Notes.dwg Layout Name: S1 Bridge Structural Notes xrefs: titlesht / xbx / xbe / xbp



Rev.	Date	By	Revision
.	.	.	.

CLIENT REFERENCE:25–000313

SCOTT CHRISTOPHER OLSON — STATE OF WASHINGTON — 50100 — PROFESSIONAL ENGINEER — STRUCTURAL ENGINEER
PRELIMINARY

SARGENT
SARGENT ENGINEERS, INC.
320 Ronlee Lane NW, Olympia, WA 98502
Tel. 360 867–9284

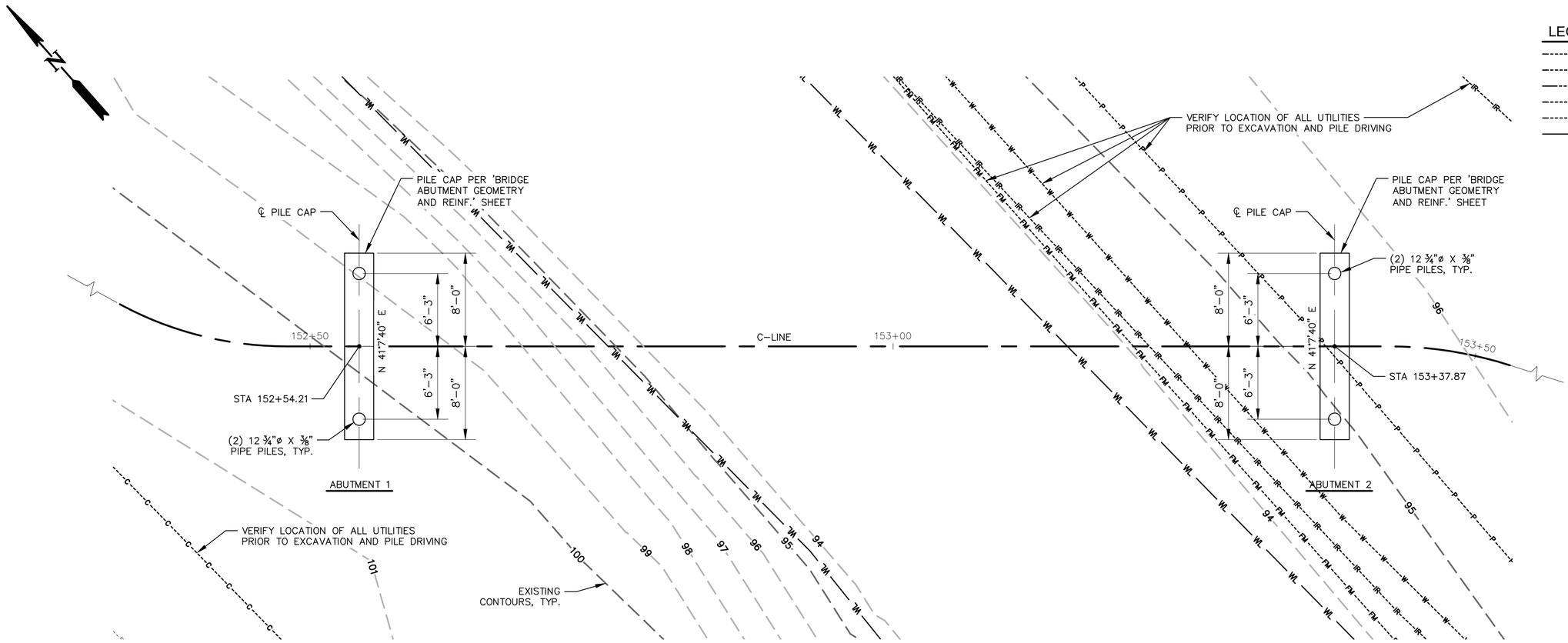
DESCHUTES VALLEY TRAIL
SEGMENT C

BRIDGE PLAN AND PROFILE

DESIGN TEAM	
DESIGNED BY:	S.C. Olson
CHECKED BY:	Q.G. Calquhoun
PRJ. DRAFTER	S.C. Olson
	.
	.
ISSUED:	8/7/2026

SHEET
S2
117
OF
147
SHEETS
SEI REF NO.
A25139.00

Plotted: Aug 7, 2026 – 15:08 Scott0 B:\25Files\A25139.00 SCJ – Deschutes Valley Trail\Drawings\S2 Bridge Plan and Profile.dwg Layout Name: S2 Bridge Plan and Profile xrefs: titlesht / xbp / xbe / _25-000313-X-SV / _25-000313-X-MRP



FOUNDATION PLAN

5 0 5 10
SCALE IN FEET

Rev.	Date	By	Revision
.	.	.	.

CLIENT REFERENCE: 25–000313

PRELIMINARY
SCOTT CHRISTOPHER OLSON
STATE OF WASHINGTON
50100
PROFESSIONAL ENGINEER

SARGENT
SARGENT ENGINEERS, INC.
320 Ronlee Lane NW, Olympia, WA 98502
Tel. 360 867–9284

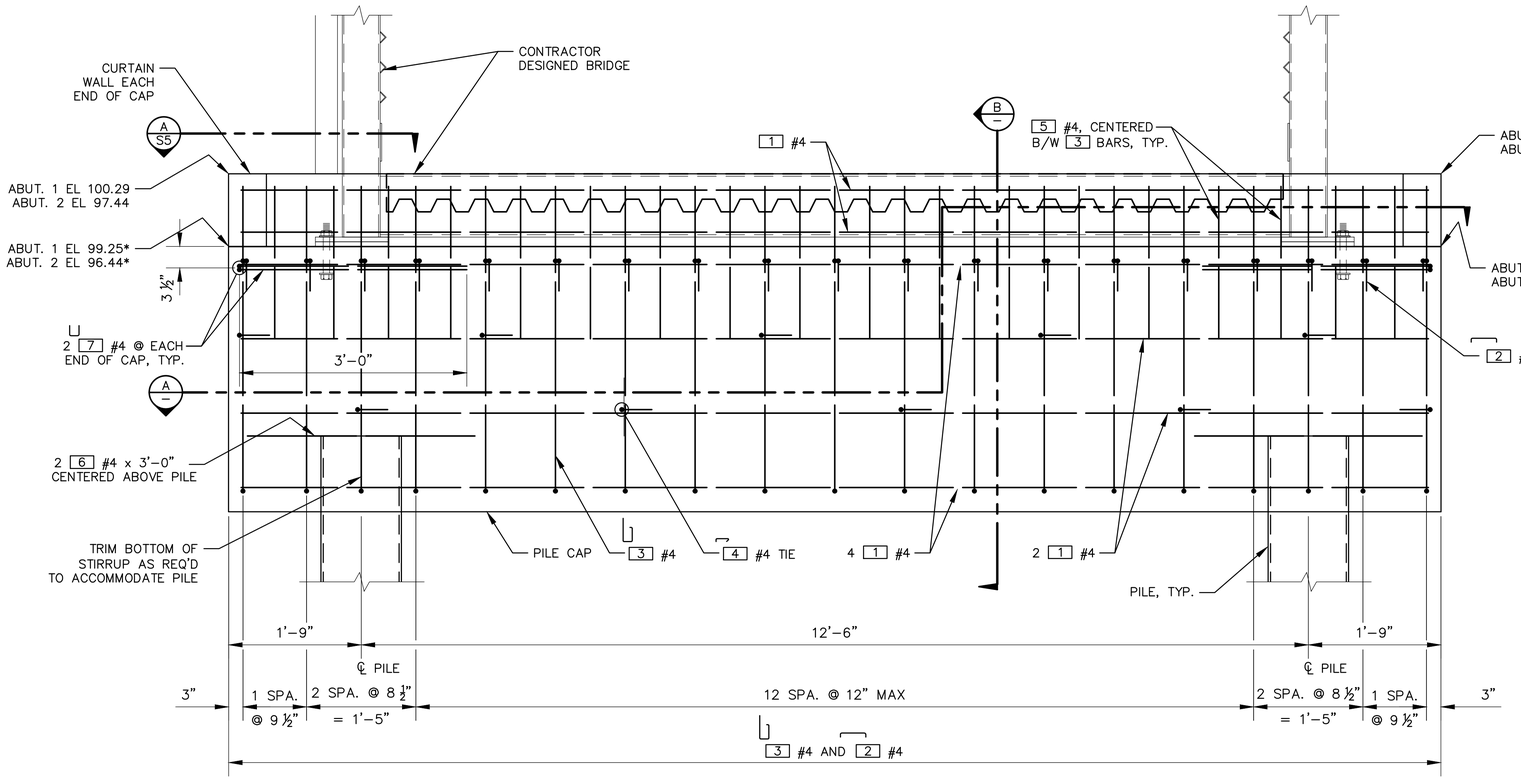
DESCHUTES VALLEY TRAIL
SEGMENT C

BRIDGE FOUNDATION LAYOUT

DESIGN TEAM	
DESIGNED BY:	S.C. Olson
CHECKED BY:	Q.G. Calquhoun
PRJ. DRAFTER	S.C. Olson
	.
	.
ISSUED:	8/7/2026

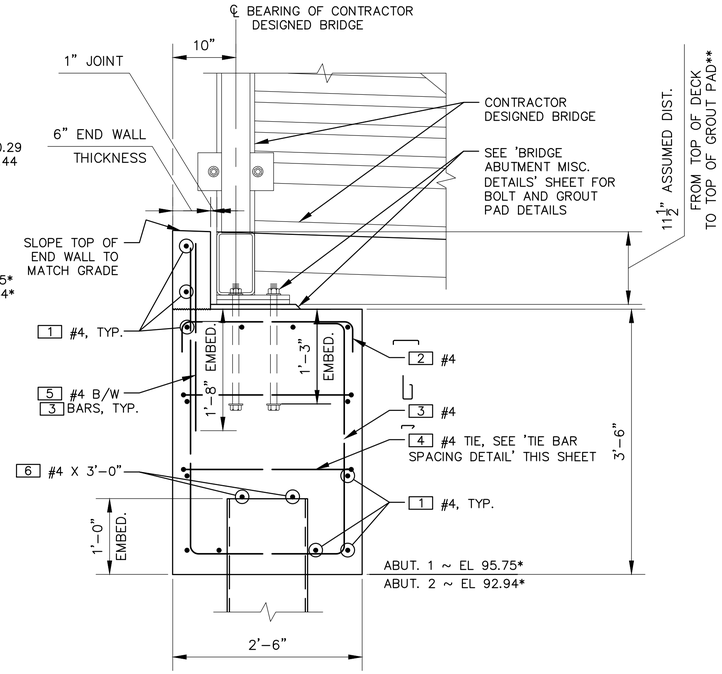
SHEET
S3
118
OF
147
SHEETS
SEI REF NO.
A25139.00

Plotted: Aug 7, 2026 – 15:08 Scott0 B:\25Files\A25139.00 SCJ – Deschutes Valley Trail\Drawings\S2 Bridge Plan and Profile.dwg Layout Name: S3 Bridge Foundation Layout xrefs: titlesht / xbp / xbe / _25–000313–X–SV / _25–000313–X–MR



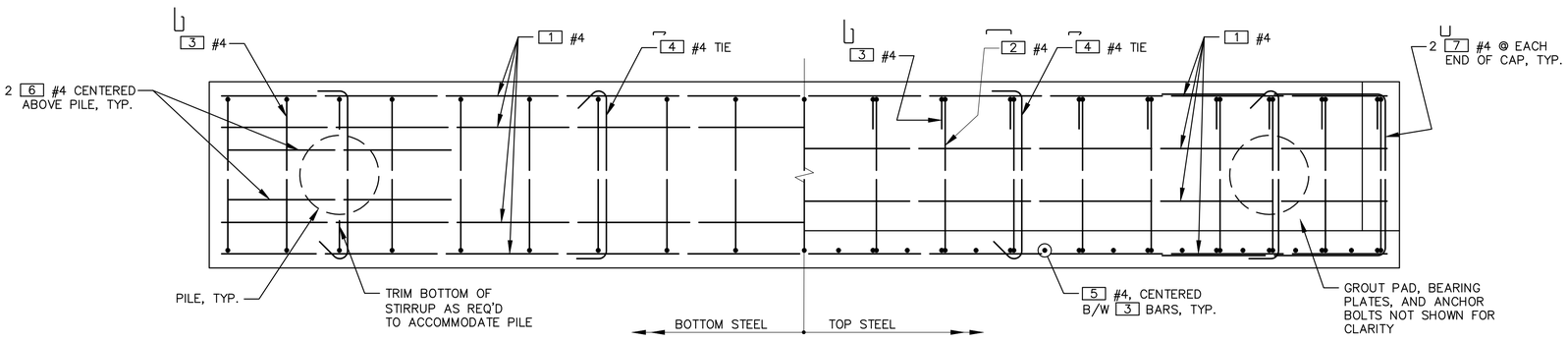
ABUTMENT ELEVATION

SCALE: 1"=1'–0"
LOOKING AHEAD ON STATION FOR BOTH ABUTMENTS
ELEVATIONS SHOWN ARE TAKEN BACK OF END WALL
*ADJUST ELEVATION AS REQUIRED BASED ON FINAL SUPERSTRUCTURE DEPTH



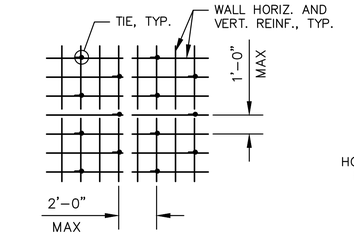
SECTION B –
SCALE: 1" = 1'–0"

ALL DIMENSION SHOWN PERPENDICULAR TO ABUTMENT CENTERLINE
*ADJUST ELEVATION AS REQUIRED BASED ON FINAL SUPERSTRUCTURE DEPTH
**VERIFY BASED ON CONTRACTOR DESIGNED BRIDGE DOCUMENTS (CAN VARY BY UP TO ±6")

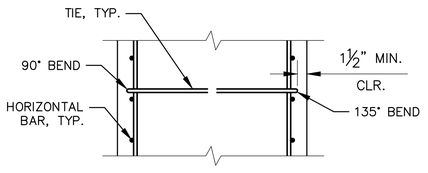


SECTION A –
SCALE: 1" = 1'–0"

LOOKING AHEAD ON STATION FOR ABUTMENT 1
ABUTMENT 2 SIMILAR



TIE BAR SPACING DETAIL



TIED BAR DETAIL

ALTERNATE 135 BEND EVERY OTHER TIE

Rev.	Date	By	Revision
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CLIENT REFERENCE:25–000313

SCOTT CHRISTOPHER OLSON — STATE OF WASHINGTON — 50100 — STRUCTURAL ENGINEER — PROFESSIONAL ENGINEER — PRELIMINARY

SARGENT ENGINEERS, INC.
320 Ronlee Lane NW, Olympia, WA 98502
Tel. 360 867–9284

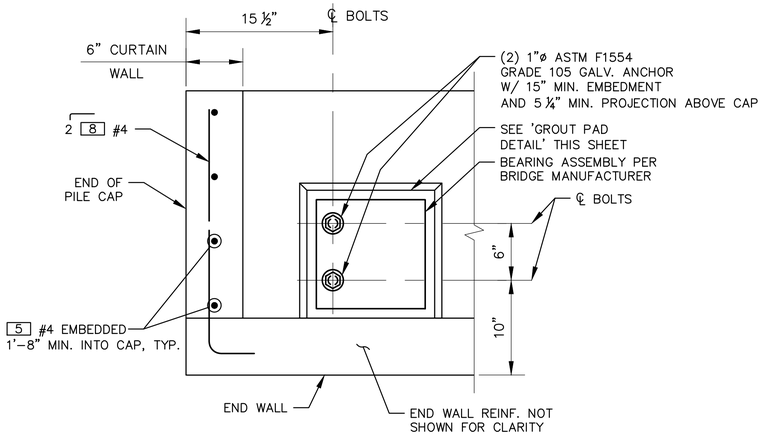
DESCHUTES VALLEY TRAIL
SEGMENT C

BRIDGE ABUTMENT GEOMETRY AND REINF.

DESIGN TEAM	
DESIGNED BY:	S.C. Olson
CHECKED BY:	Q.G. Calquhoun
PRJ. DRAFTER	S.C. Olson
	.
	.
ISSUED:	8/7/2026

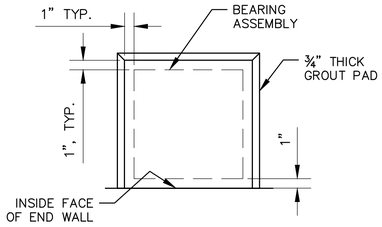
SHEET
S4
119
OF
147
SHEETS
SEI REF NO.
A25139.00

Plotted: Aug 7, 2026 – 15:08 ScottO B:\25Files\A25139.00 SCJ – Deschutes Valley Trail\Drawings\S1 Structural Notes.dwg Layout Name: S4 Bridge Abutment Geometry and Reinf. xrefs: titlesht / xbx / xbe / xbp



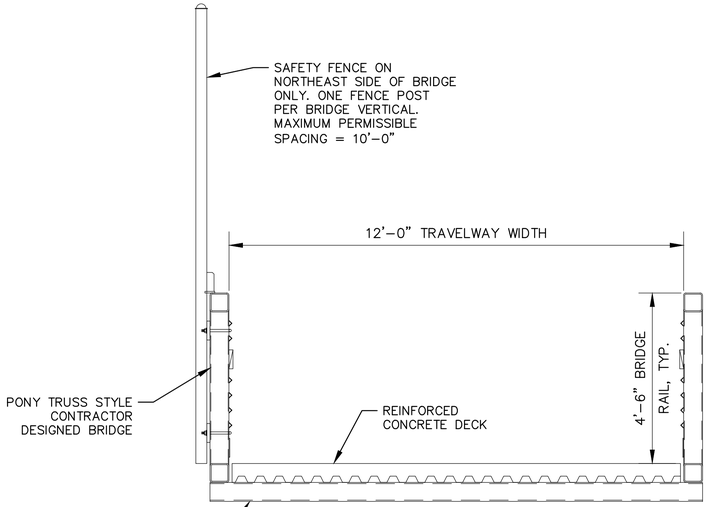
ANCHOR BOLTS AND CURTAIN WALL DETAIL (A / -)

SCALE: 1 ½" = 1'-0"
VERIFY BOLT SIZE AND LOCATION WITH CONTRACTOR DESIGNED BRIDGE DESIGNER



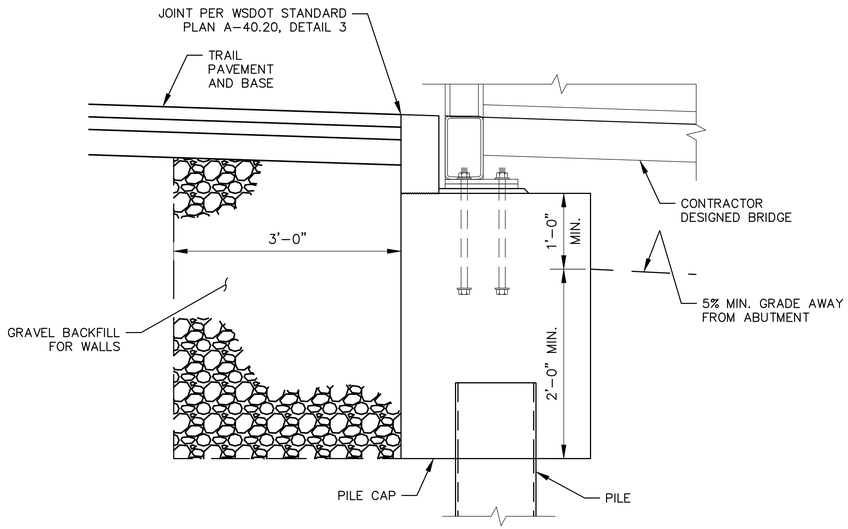
GROUT PAD DETAIL

SCALE: 1" = 1'-0"
TYP. AT ALL BEARINGS



SCHEMATIC CONTRACTOR DESIGNED BRIDGE SECTION

SCALE: ½" = 1'-0"



BACKFILL DETAIL

SCALE: 1" = 1'-0"
TYP. AT EACH ABUTMENT
LIMITS OF STRUCTURE EXCAVATION CLASS A INCL. HAUL TO INCLUDE EXCAVATION REQUIRED TO INSTALL GRAVEL BACKFILL FOR WALLS

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CLIENT REFERENCE:25-000313

SCOTT CHRISTOPHER OLSON — STATE OF WASHINGTON — 50100 — STRUCTURAL ENGINEER — PROFESSIONAL ENGINEER — PRELIMINARY

SARGENT ENGINEERS, INC.
320 Ronlee Lane NW, Olympia, WA 98502
Tel. 360 867-9284

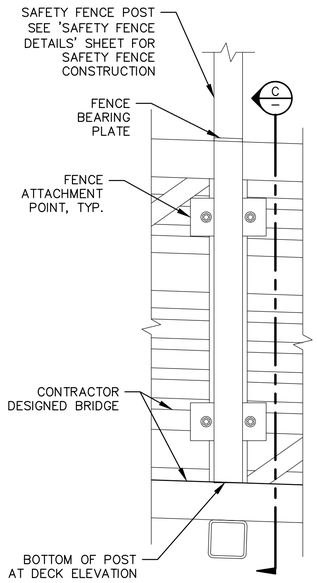
DESCHUTES VALLEY TRAIL
SEGMENT C

BRIDGE ABUTMENT MISC. DETAILS

DESIGN TEAM	
DESIGNED BY:	S.C. Olson
CHECKED BY:	Q.G. Calquhoun
PRJ. DRAFTER	S.C. Olson
	.
	.
ISSUED:	8/7/2026

SHEET
S5
120
OF
147
SHEETS
SEI REF NO.
A25139.00

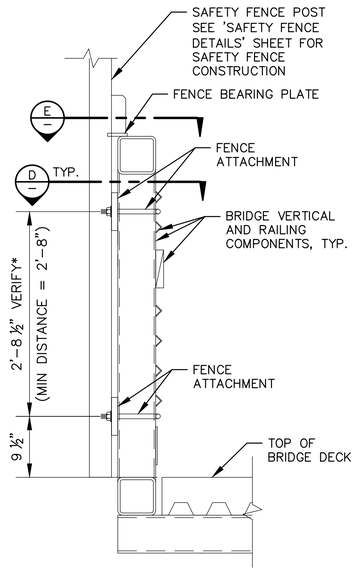
Plotted: Aug 7, 2026 - 15:08 ScottO B:\25Files\A25139.00 SCJ - Deschutes Valley Trail\Drawings\S1 Structural Notes.dwg Layout Name: S5 Bridge Abutment Misc. Details xrefs: titlesht / xbx / xbe / xbp



FENCE ATTACHMENT ELEVATION (B)

SCALE: 1" = 1'–0"

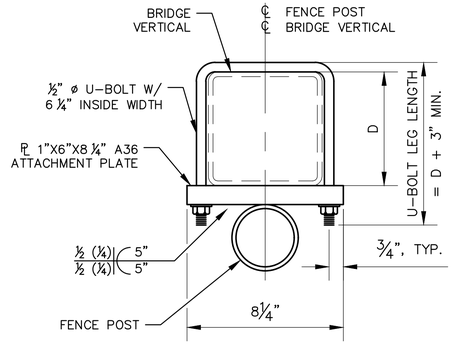
LOADS TRANSFERRED TO BRIDGE SHALL BE ACCOUNTED FOR BY BRIDGE DESIGNER. SEE 'LOAD TRANSFER DIAGRAM' THIS SHEET.



FENCE ATTACHMENT SECTION (C)

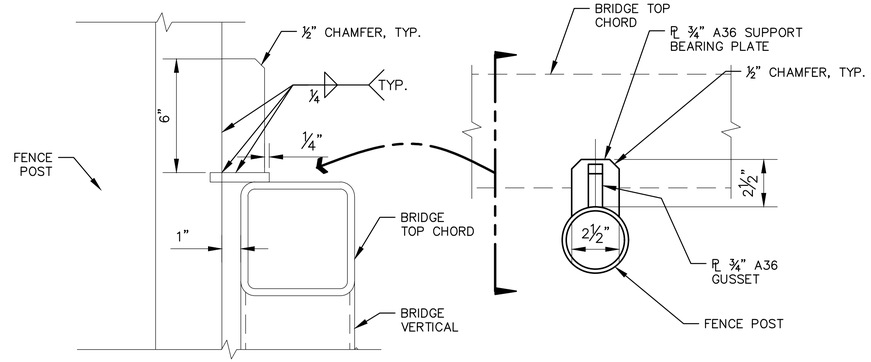
SCALE: 1" = 1'–0"

*VERIFY ATTACHMENT POINTS ARE COMPATIBLE WITH RAILING OF CONTRACTOR DESIGNED BRIDGE. ADJUST VERTICAL LOCATION OF ATTACHMENT POINTS AS REQ'D, MAINTAINING MINIMUM SPACING SHOWN



FENCE ATTACHMENT DETAIL (D)

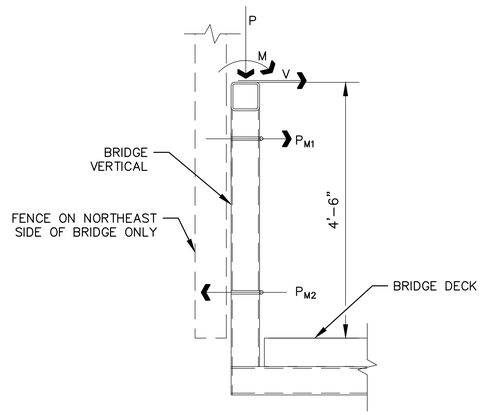
SCALE: 1" = 1'–0"
D = BRIDGE MEMBER DEPTH



FENCE BEARING PLATE DETAIL (E)

SCALE: 1" = 1'–0"

DO NOT WELD B/W SUPPORT BEARING PLATE AND BRIDGE



LOAD TRANSFER DIAGRAM

SCALE: 1" = 1'–0"
LOAD APPLIED ARE LISTED IN THE 'BRIDGE FENCE ATTACHMENT LOAD TABLE', THIS SHEET

BRIDGE FENCE ATTACHMENT LOAD TABLE		
	DC	WS*
P (KIP)	0.23	0.00
M (KIP-FT)	0.10	0.92
V (KIP)	0.00	0.25

LOADS ARE UNFACTORED AND BASED ON 6–FOOT POST AND BRIDGE VERTICAL SPACING. IF SPACING VARIES FROM THIS, RATIO LOADS TO ACTUAL SPACING. MAXIMUM PERMISSIBLE SPACING ON BRIDGE BASED ON ATTACHMENT DESIGN IS 10 FEET.

MOMENTS ARE TRANSFERRED TO BRIDGE VIA FORCE COUPLE P_{M1} AND P_{M2} AT FENCE ATTACHMENT POINTS (DETAILED THIS SHEET). THESE SHOULD BE DETERMINED AND APPLIED AS APPROPRIATE BY BRIDGE DESIGNER BASED ON FINAL BRIDGE CONFIGURATION.

VERTICAL FORCES ARE TRANSFERRED TO BRIDGE VIA BEARING PLATE (DETAILED THIS SHEET).

* WIND LOAD ON STRUCTURE (WS) REPRESENTS WIND LOAD ON FENCE ABOVE BRIDGE RAIL. WIND LOAD BELOW TOP OF BRIDGE RAIL SHOULD BE DETERMINED BY BRIDGE DESIGNER.

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CLIENT REFERENCE: 25–000313

SCOTT CHRISTOPHER GRAY — STATE OF WASHINGTON — 50100 — PROFESSIONAL ENGINEER — STRUCTURAL ENGINEER — PRELIMINARY NOT FOR CONSTRUCTION

SARGENT ENGINEERS, INC.
320 Ronlee Lane NW, Olympia, WA 98502
Tel. 360 867–9284

DESCHUTES VALLEY TRAIL
SEGMENT C

BRIDGE FENCE ATTACHMENT DETAILS

DESIGN TEAM	
DESIGNED BY:	S.C. Olson
CHECKED BY:	Q.G. Calquhoun
PRJ. DRAFTER	S.C. Olson
	.
	.
ISSUED:	8/7/2026

SHEET
S6
121
OF
147
SHEETS
SEI REF NO.
A25139.00

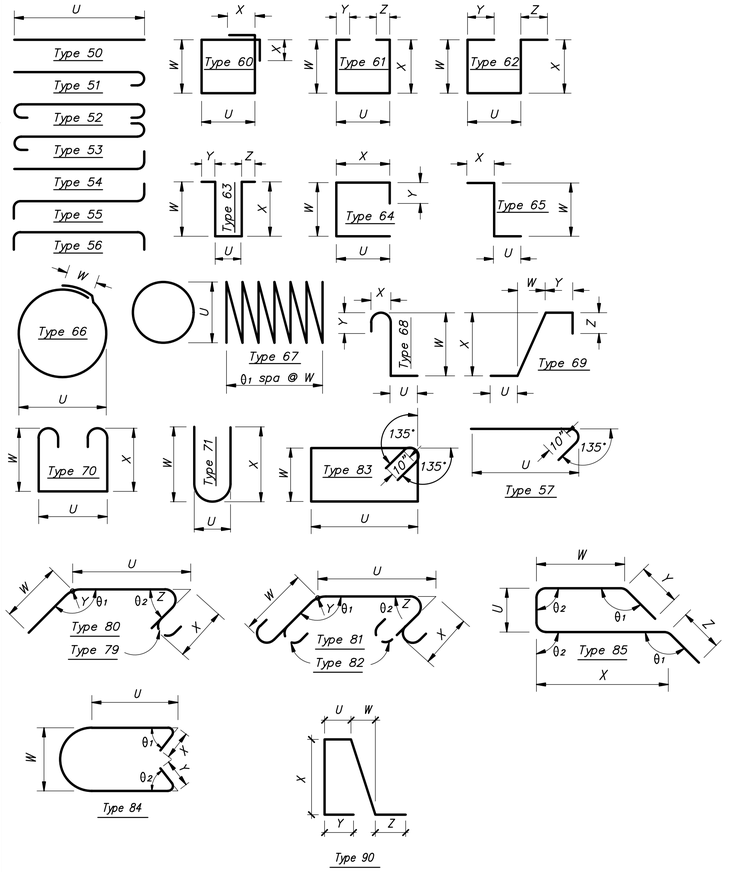
Plotted: Aug 7, 2026 – 15:08 Scott0 B:\25Files\A25139.00 SCJ – Deschutes Valley Trail\Drawings\S1 Structural Notes.dwg Layout Name: S6 Bridge Fence Attachment Details xrefs: titlesht / xbx / xbe / xbp

Item 1a.

S=Bar Is Included In Substructure Quantities
F=Bar is to be Field Welded
T=Tie or Stirrup.
E=Bar is to be Epoxy Coated
V=Bar dimensions vary between dimensions shown on this line and following line.

Mark No.	Location	Size	No. Req'd	Bend Type	Tie or Stir.	Fld. Weld	Substr.	Epoxy Coat	Varies	No. Each	DIMENSIONS (OUT TO OUT) U Ft.	U In.	W Ft.	W In.	X Ft.	X In.	Y Ft.	Y In.	Z Ft.	Z In.	θ1 Deg	θ2 Deg	Length Ft.	Length In.	Weight
	ABUTMENTS																								
1	ABUTMENT LONG	4	28	50			S			1	15	8.0											15	8.0	293
2	ABUTMENT TOP TIES	4	38	80	T					1	2	2.0	0	4.8	0	4.8	0	0.0	0	0.0	90	90	2	11.0	74
3	ABUTMENT STIRRUP	4	38	61	T					1	2	2.0	4	1.3	3	1.0	0	0.0	0	4.8			9	6.0	241
4	HORIZ TIE	4	20	80	T					1	2	3.0	0	4.8	0	5.0	0	0.0	0	0.0	90	45	3	0.0	40
5	END WALL VERT	4	44	50						1	3	0.0											3	0.0	88
6	TOP OF PILE	4	8	50						1	3	0.0											3	0.0	16
7	CAP END HOOKS	4	8	61						1	2	2.0	3	0.0	3	0.0	0	0.0	0	0.0			7	11.0	42
8	CURTAIN WALL HORIZ	4	8	54			S			1	2	2.0											2	9.0	15

REINFORCEMENT BENDING DIAGRAMS



REINFORCING NOTES:

1. All reinforcing bars on this sheet shall be AASTM A 706 Grade 60, unless shown otherwise.
2. Reinforcing for traffic barriers not shown in this Bar List. See Traffic Barrier Sheet.
3. Bend for transverse bars due to roadway crown conditions are not shown. These bars shall be bent as required to conform to the configuration of the structure.
4. Reinforcing for prestressed deck units not shown in this bar list. See Slab Sheet.
5. Contractor shall be responsible for verifying all dimensions & quantities of reinforcing steel. See Section 6-02.3(24) of the Standard Specifications.

Rev.	Date	By	Revision
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CLIENT REFERENCE:25-000313

SCOTT CHRISTOPHER OLSON STATE OF WASHINGTON 50100 PROFESSIONAL ENGINEER PRELIMINARY

SARGENT
SARGENT ENGINEERS, INC.
320 Ronlee Lane NW, Olympia, WA 98502
Tel. 360 867-9284

DESCHUTES VALLEY TRAIL
SEGMENT C

BRIDGE FOUNDATION BARLIST

DESIGN TEAM	
DESIGNED BY:	S.C. Olson
CHECKED BY:	Q.G. Calquhoun
PRJ. DRAFTER	S.C. Olson
	.
	.
ISSUED:	8/7/2026

SHEET S7 122 OF 147 SHEETS
SEI REF NO. A25139.00

Plotted: Aug 7, 2026 - 15:08 ScottO B:\25Files\A25139.00 SCJ - Deschutes Valley Trail\Drawings\S1 Structural Notes.dwg Layout Name: S7 Bridge Foundation Barlist xrefs: titlesht / xbx / xbe / xbp

SAFETY FENCING NOTES

ALL MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR ROAD, BRIDGE, AND MUNICIPAL CONSTRUCTION DATED 2026.

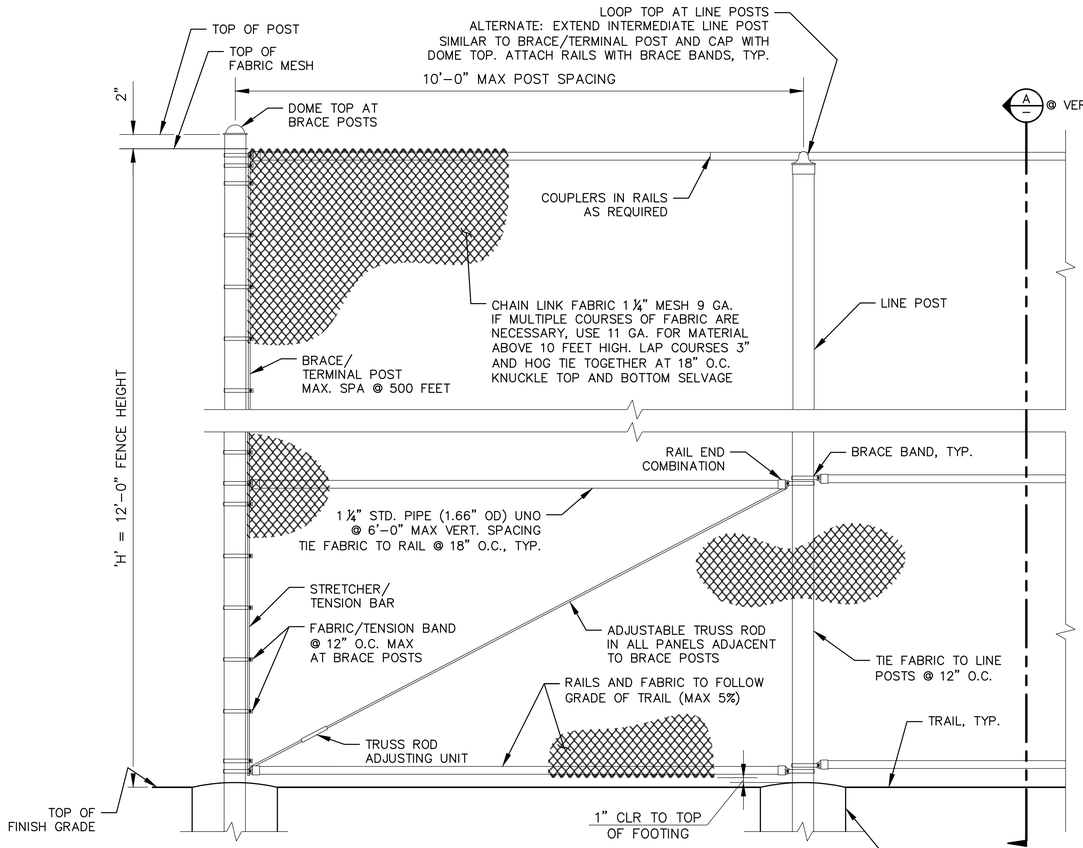
CONSTRUCTION DETAILS SHOWN ARE FOR 12–FOOT TALL SAFETY FENCE.

FOR 6–FOOT TALL FENCE, CONSTRUCT FENCE AND FOUNDATIONS PER WSDOT STANDARD PLAN L–20.10 FOR TYPE 3 CHAIN LINK FENCE.

AT TRANSITION POSTS BETWEEN SAFETY FENCE AND TYPE 3 CHAIN LINK FENCE, SIZE POST AND FOUNDATION BASED ON DETAILS THIS SHEET (IN LIEU OF STANDARD PLAN DETAILS).

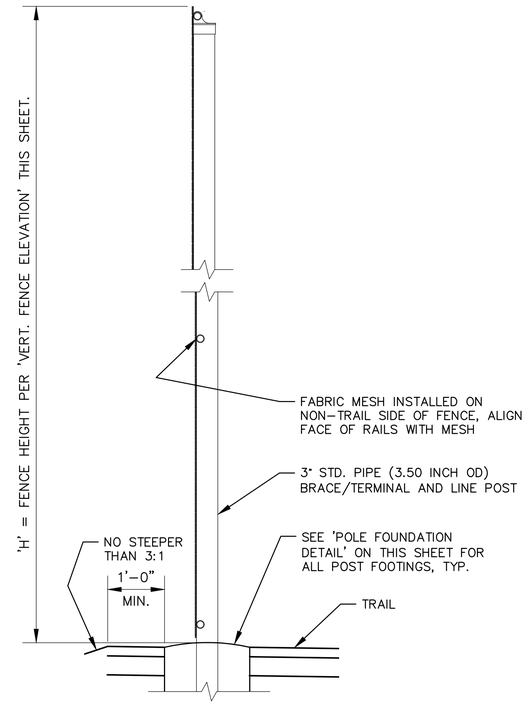
MATERIALS SHALL MEET THE REQUIREMENTS OF STANDARD SPECIFICATION 9–16. ALL STEEL PIPE (POSTS AND RAILS) SHALL BE PER ASTM F1043, HIGH STRENGTH GRADE (FY = 50 KSI MIN.).

ALL FENCE COMPONENTS (POSTS, RAILS, FITTINGS, ETC.) AND CHAIN LINK FABRIC SHALL BE COATED PER SPECIAL PROVISIONS.



VERT. FENCE ELEVATION

SCALE: ¾"=1'–0"

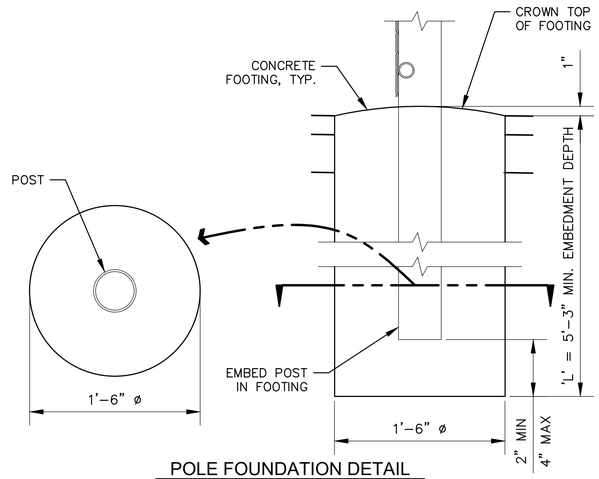


VERT. FENCE SECTION

SCALE: ¾" = 1'–0"

A

SEE 'VERT. FENCE ELEVATION' THIS SHEET FOR DETAILS NOT SHOWN



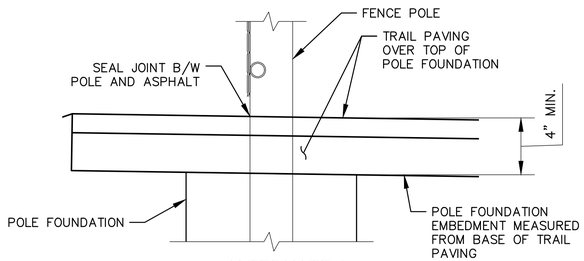
POLE FOUNDATION DETAIL

SCALE: ¾"=1'–0"

THE INSTALLATION PROCEDURE FOR THE POLE FOUNDATIONS IS TO BE DEVELOPED BY THE CONTRACTOR AND SHALL RESULT IN A FINISHED TRAIL SURFACE AND/OR EXPOSED CONCRETE SURFACE THAT MEETS THE REQUIREMENTS OF THE PERFORMANCE SPECIFICATION INCLUDED IN THE PROJECT SPECIAL PROVISIONS.

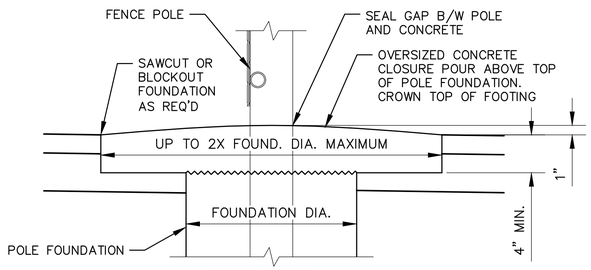
SPECIAL CARE SHALL BE TAKEN TO NOT DISTURB OR DAMAGE THE NEW ASPHALT SURFACE AT ALL FOUNDATIONS, BUT ESPECIALLY WHERE QUARRY SPALLS ARE REQUIRED BELOW THE TRAIL PAVING.

SEE 'ALTERNATE POLE FOUNDATION FINISHES' THIS SHEET FOR ADDITIONAL FOUNDATION FINISH OPTIONS



ALTERNATE 1

FOUNDATION SHOWN INSTALLED PRE–PAVING



ALTERNATE 2

FOUNDATION SHOWN INSTALLED POST–PAVING

ALTERNATE POLE FOUNDATION FINISHES

SCALE: ¾"=1'–0"
ALTERNATES SHOWN ARE NOT INTENDED TO ENCOMPASS ALL POSSIBLE METHODS OF INSTALLATION.

Rev.	Date	By	Revision
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CLIENT REFERENCE:25–000313

SCOTT CHRISTOPHER OLSON — STATE OF WASHINGTON — 50100 — STRUCTURAL ENGINEER — PROFESSIONAL ENGINEER — PRELIMINARY

SARGENT ENGINEERS, INC.
320 Ronlee Lane NW, Olympia, WA 98502
Tel. 360 867–9284

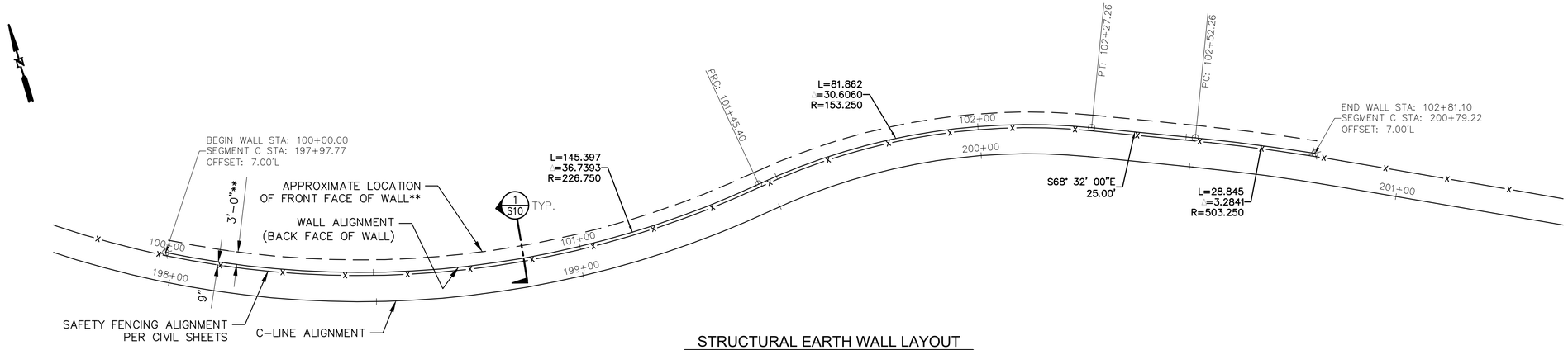
DESCHUTES VALLEY TRAIL
SEGMENT C

SAFETY FENCE DETAILS

DESIGN TEAM	
DESIGNED BY:	S.C. Olson
CHECKED BY:	Q.G. Calquhoun
PRJ. DRAFTER	S.C. Olson
	.
	.
ISSUED:	8/7/2026

SHEET
S8
123
OF
147
SHEETS
SEI REF NO.
A25139.00

Plotted: Aug 7, 2026 – 15:08 ScottO B:\25Files\A25139.00 SCJ – Deschutes Valley Trail\Drawings\S7 Safety Fence Details 1REV.dwg Layout Name: S8 Safety Fence Details xrefs: titlesht / xbx / xbe / xbp



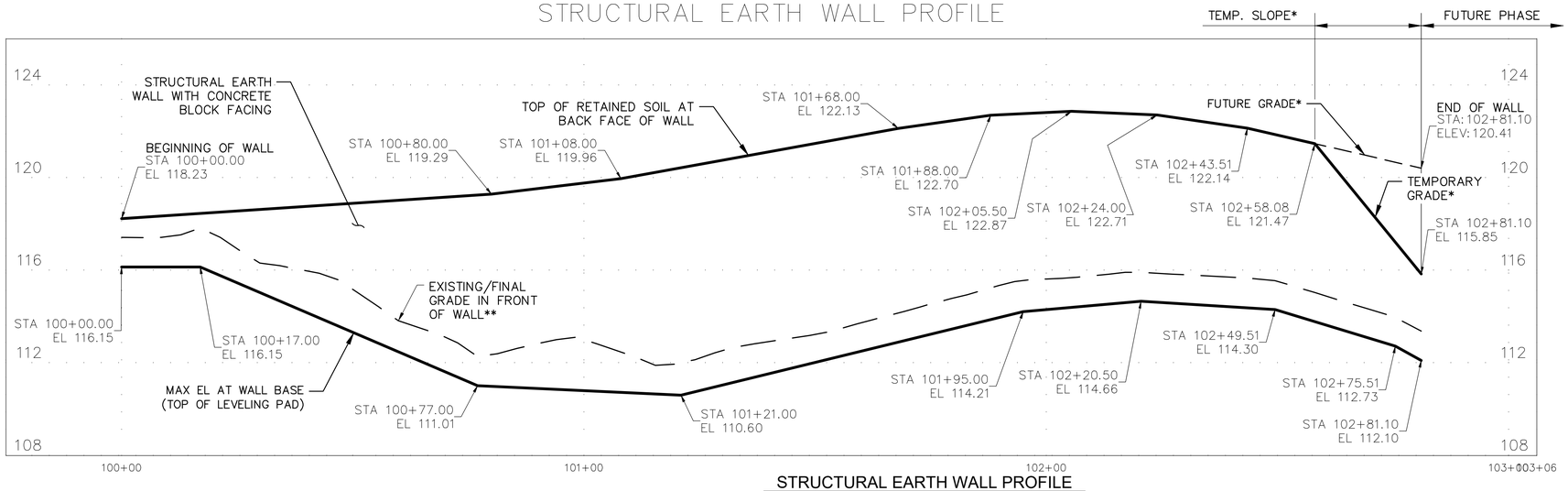
STRUCTURAL EARTH WALL LAYOUT

SCALE: 1"=15'

STRUCTURAL EARTH WALL NOTES

ALL MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR ROAD, BRIDGE, AND MUNICIPAL CONSTRUCTION DATED 2026.

STRUCTURAL EARTH WALL PROFILE



STRUCTURAL EARTH WALL PROFILE

SCALE: 1"=15'

* WALL EXTENSION PLANNED BEYOND PROFILE SHOWN FOR FUTURE PHASE. CONSTRUCT WALL TO TEMPORARY GRADE PROFILE. DESIGN AND CONSTRUCT THIS PORTION OF WALL SUCH THAT THE INSTALLED BLOCKS CAN REMAIN IN PLACE AND BE INCORPORATED INTO THE FUTURE WALL EXTENSION, WHICH WILL BE BASED ON THE FUTURE WALL GRADE PROFILE. DO NOT INSTALL DUAL-FACED BLOCKS AND CAPSTONE THIS SECTION.

** EXISTING/FINAL GRADE TAKEN AT A LOCATION 3'-0" IN FRONT OF THE WALL ALIGNMENT TO ACCOUNT FOR THE SLOPE OF THE EXISTING GRADE. THIS LOCATION WILL VARY WITH WALL HEIGHT DUE TO THE FACE BATTER. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THAT THEIR PROPOSED WALL LAYOUT ACCOUNTS FOR THE VARIED WIDTH/THICKNESS OF THEIR PROPOSED WALL SYSTEM.

Rev.	Date	By	Revision
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CLIENT REFERENCE:25-000313

SCOTT CHRISTOPHER OLSON STATE OF WASHINGTON 50100 PROFESSIONAL ENGINEER STRUCTURAL ENGINEER

PRELIMINARY

SARGENT
SARGENT ENGINEERS, INC.
320 Ronlee Lane NW, Olympia, WA 98502
Tel. 360 867-9284

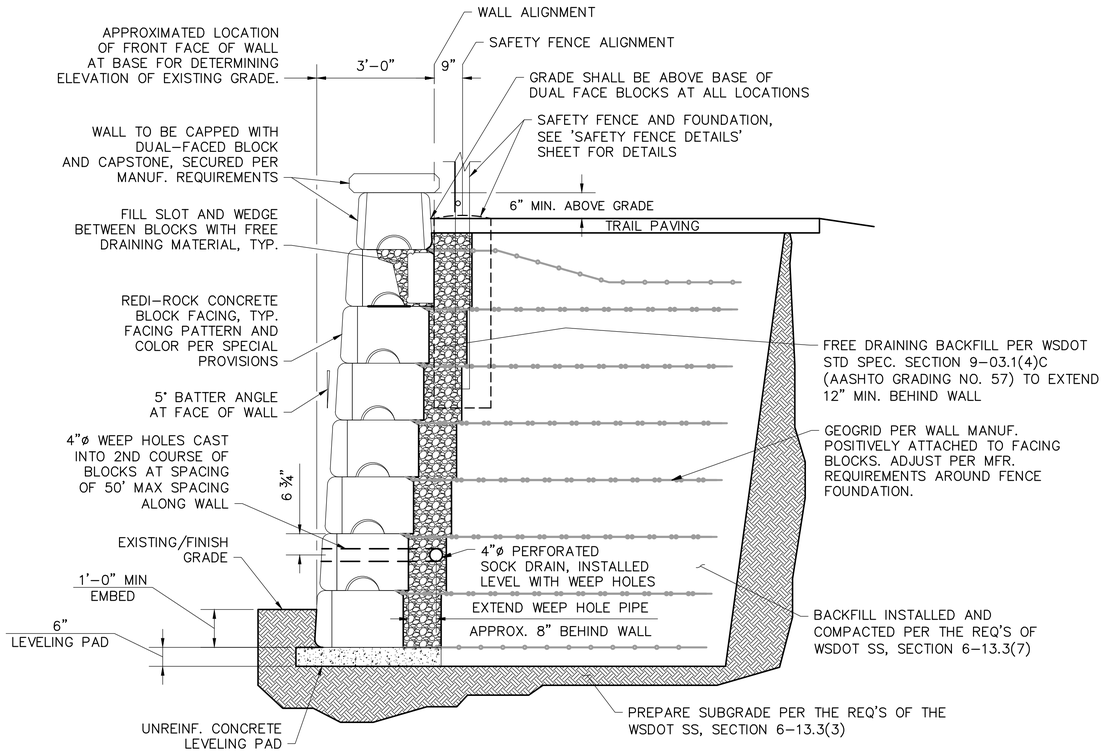
DESCHUTES VALLEY TRAIL
SEGMENT C

STRUCTURAL EARTH WALL LAYOUT

DESIGN TEAM	
DESIGNED BY:	S.C. Olson
CHECKED BY:	Q.G. Calquhoun
PRJ. DRAFTER	S.C. Olson
	.
	.
ISSUED:	8/7/2026

SHEET
S9
124
OF
147
SHEETS
SEI REF NO.
A25139.00

Plotted: Aug 7, 2026 - 15:08 Scott0 B:\25Files\A25139.00 SCJ - Deschutes Valley Trail\Drawings\S8 Structural Earth Wall Layout.dwg Layout Name: S9 Structural Earth Wall Layout xrefs: titlesht / xbp



TYP. STRUCTURAL EARTH WALL SECTION (1/-)

DETAIL IS REPRESENTATIVE OF A TYPICAL STRUCTURAL EARTH WALL. SPECIFIC DESIGN DETAILS TO BE DEVELOPED BY WALL FABRICATOR PER PROJECT SPECIFICATIONS

ALL COSTS ASSOCIATED WITH THE FURNISHING AND CONSTRUCTING WEEP HOLES, SOCK DRAIN, AND FREE DRAINING BACKFILL MATERIALS SHALL BE INCLUDED IN THE COST FOR THE STRUCTURAL EARTH WALL

Rev.	Date	By	Revision
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CLIENT REFERENCE:25-000313

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320 Ronlee Lane NW, Olympia, WA 98502
Tel. 360 867-9284

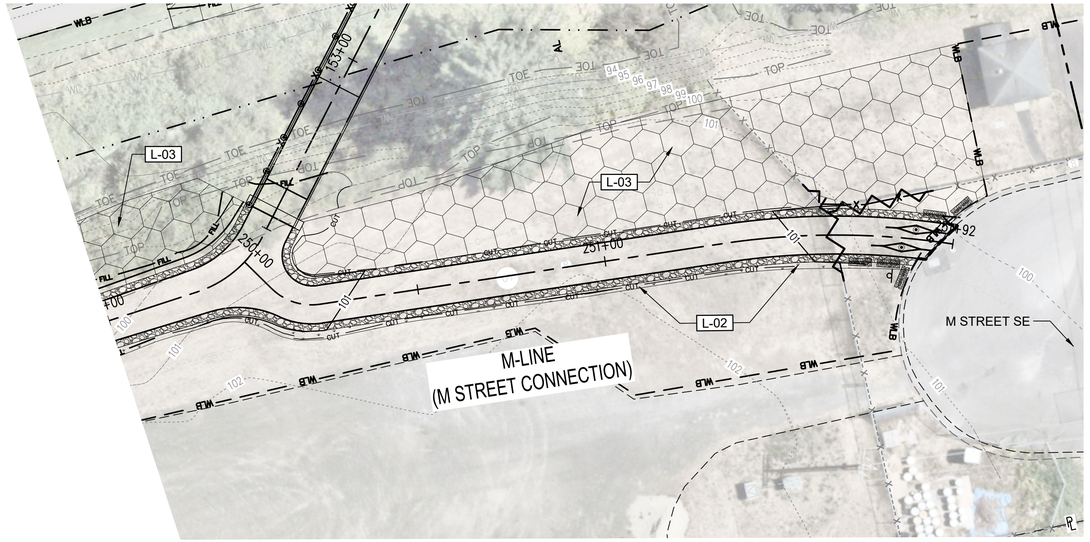
DESCHUTES VALLEY TRAIL
SEGMENT C

STRUCTURAL EARTH WALL DETAILS

DESIGN TEAM	
DESIGNED BY:	S.C. Olson
CHECKED BY:	Q.G. Calquhoun
PRJ. DRAFTER	S.C. Olson
	.
	.
ISSUED:	8/7/2026

SHEET
S10
125
OF
147
SHEETS
SEI REF NO.
A25139.00

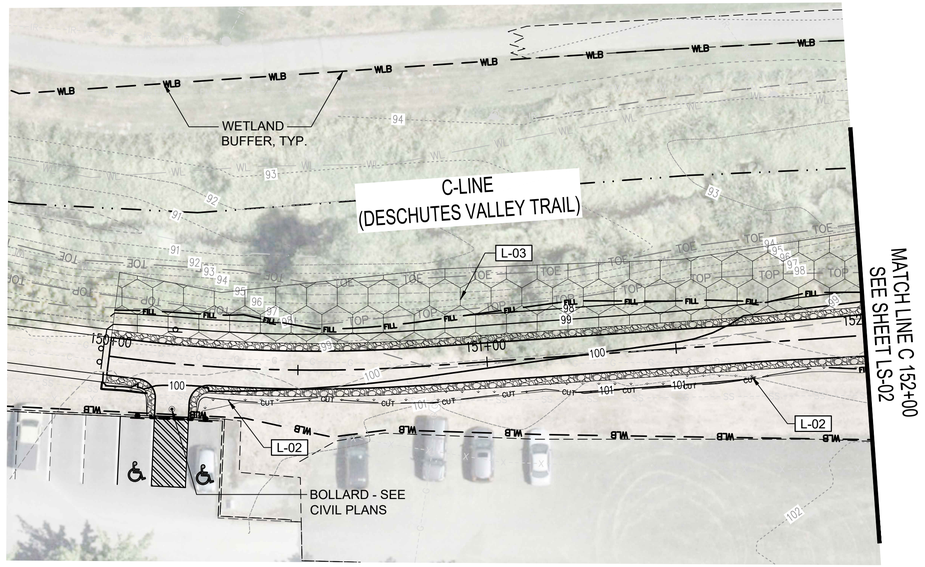
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0 20 40 60 feet

SCALE: 1" = 20'

NORTH



0 20 40 60 feet

SCALE: 1" = 20'

NORTH

2026-08-03 12:08

REFERENCE NOTES SCHEDULE LS-01

SYMBOL	CODE	DESCRIPTION
LANDSCAPE		
	L-02	NATIVE SHRUB MIX 1 GAL. CONT. @ 3' O.C. SNOWBERRY (SYMPHORICARPOS ALBUS) MAHONIA NERVOSA (MAHONIA NERVOSA) SALAL (GAULTHERIA SHALLON) EVERGREEN HUCKLEBERRY(VACCINIUM OVATUM) DOUGLAS SPIREA (SPIRAEA DOUGLASII) ALL PLANT AREAS SHALL RECIEVE A 4" DEPTH OF COMPOST, PLANTS SHALL BE PIT PLANTED IN COMPOST AND SOIL, FINE GRADE ALL AREAS AFTER PLANTING.
	L-03	WETLAND MITIGATION PLANTING. SEE SHEET WM-01 THROUGH WM-06 FOR MORE INFORMATION.

HABITAT RESTORATION GENERAL NOTES

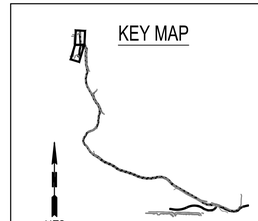
1. ALL DISTURBED AREAS SHALL BE PLANTED AND SHALL RECEIVE A MINIMUM 2" COMPOST LAYER. COMPOST SHALL BE TILLED IN TO A 6" DEPTH. TILLED SOIL SHALL THEN BE GRADED SMOOTH AND UNIFORM.
2. ALL DISTURBED AREAS (EXCEPT LANDSCAPE ISLANDS AT PARKING LOT) SHALL BE HYDROSEEDED WITH SPECIFIED SEED MIX AT SEED SUPPLIER'S RECOMMENDED APPLICATION RATE.
3. CONTRACTOR SHALL INSTALL BIODEGRADABLE EROSION CONTROL BLANKET PER WSDOT 9-14.5(2) ON ALL AREAS HAVING SLOPES 2:1 OR STEEPER.
4. AFTER SEED HAS ESTABLISHED, DURING PERIOD WHEN WEATHER CONDITIONS ARE FAVORABLE FOR SEEDLING PLANTING AND SURVIVAL (OCTOBER 15 THROUGH APRIL 15), CONTRACTOR SHALL INSTALL TREES & SHRUBS AS DIRECTED.
5. CONTRACTOR SHALL WATER IN ALL PLANTS AT TIME OF PLANTING.
6. INSTALL WOOD CHIP MULCH TO A DEPTH OF 3 INCHES IN A RING AROUND ALL SHRUB AND TREE PLANTINGS. MULCH RING SHALL COMPLETELY COVER WEED BARRIER MAT. PRIOR TO MULCH PLACEMENT TOPSOIL GRADE SHALL BE BROUGHT TO A UNIFORM LINE WITH NO SURFACE IRREGULARITIES. WATERING BERMS AROUND PLANTS SHALL BE HAND COMPACTED AND OF A SMOOTH AND EVEN GRADE PRIOR TO MULCH PLACEMENT. MULCH SHALL BE WATER-COMPACTED UPON PLACEMENT. NO NATIVE SOIL OR TOPSOIL SHALL BE LEFT VISIBLE ANYWHERE.
7. NO SUBSTITUTIONS SHALL BE CONSIDERED FOR PLANTS OR OTHER MATERIALS DURING THE BIDDING PROCESS.
8. CONTRACTOR SHALL WARRANTY ALL TREES AND SHRUBS, AND ALL OTHER PLANTS INSTALLED UNDER THIS CONTRACT FOR A PERIOD OF ONE YEAR AFTER FINAL ACCEPTANCE HAS BEEN GRANTED, COMPLYING WITH WSDOT STANDARD SPECIFICATIONS 8-02.3(13)
9. CONTRACTOR SHALL PROVIDE WEED CONTROL IN ACCORDANCE WITH WSDOT 8-02.3(3)A PLANTING AREA WEED CONTROL.

2026-07-14 09:08

NATIVE SHRUB MIX SCHEDULE - ALL SHEETS

	NATIVE SHRUB MIX	48,432 SF		
	GAULTHERIA SHALLON / SALAL	9,686 SF	1 GAL, 3` O.C.	20%
	MAHONIA NERVOSA / OREGON GRAPE	9,686 SF	1 GAL, 3` O.C.	20%
	SPIRAEA DOUGLASII / WESTERN SPIREA	9,686 SF	1 GAL, 3` O.C.	20%
	SYMPHORICARPOS ALBUS / COMMON SNOWBERRY	9,686 SF	1 GAL, 3` O.C.	20%
	VACCINIUM OVATUM / EVERGREEN HUCKLEBERRY	9,686 SF	1 GAL, 3` O.C.	20%

KEY MAP



NTS

△	REVISIONS	DATE	BY

DESIGNED BY: L. ZEPEDA
DRAWN BY: L. ZEPEDA
APPROVED BY: T. GRANTHAM
ISSUE DATE: MAY 2026
JOB No.: 25-000313
DRAWING FILE No.: 25-000313-C-LS-00

ALL DIMENSIONS SHOWN IN FEET UNLESS OTHERWISE DESIGNATED

STATE OF WASHINGTON · TRENT L. GRANTHAM · NO. 843 EXP. 07/20/2028 · LANDSCAPE ARCHITECT

SCJ ALLIANCE
CONSULTING SERVICES
8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
P: 360.352.1465
SCJALLIANCE.COM

PROJECT NAME:

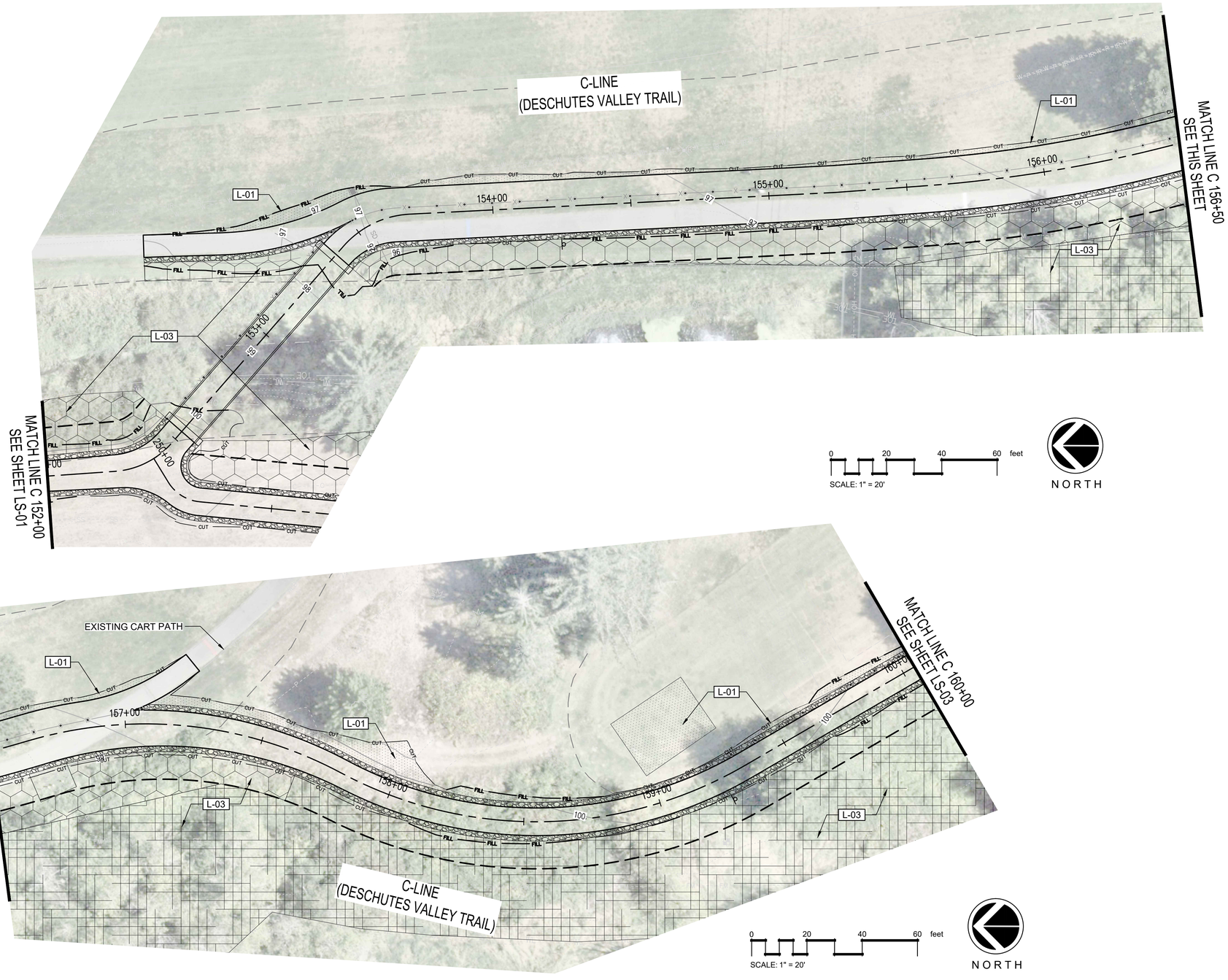
CITY OF TUMWATER

DESCHUTES VALLEY TRAIL
SEGMENT C

LANDSCAPE RESTORATION PLAN
C 150+00 TO C 152+00 & M 250+00 - M 251+85

DRAWING No.: LS-01
SHEET No.: 126 OF 147

Aug 20, 2026 1:24:05pm – User audreyclelen
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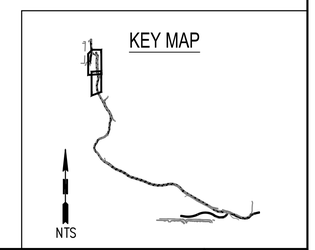
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REFERENCE NOTES SCHEDULE LS-02

SYMBOL	CODE	DESCRIPTION
LANDSCAPE		
	L-01	SEED MIX SHALL BE A 3-WAY RYE MIX AS APPROVED BY GOLF COURSE SUPERINTENDENT. ALL SEED ARES SHALL RECIEVE A MIN. 4" LAYER OF TOPSOIL TYPE A, PER SPECIFICATIONS.
	L-03	WETLAND MITIGATION PLANTING. SEE SHEET WM-01 THROUGH WM-06 FOR MORE INFORMATION.

SHEET NOTES (ALL SHEETS)

1. REFER TO DETAILS AND SPECIFICATIONS FOR ADDITIONAL INFORMATION.
2. ALL DISTURBED AREAS SHALL BE HYDROSEEDED WITH SPECIFIED SEED MIX AT SEED SUPPLIER'S RECOMMENDED APPLICATION RATE.
3. ALL NEW LAWN AND LANDSCAPE AREAS SHALL BE WATERED BY AN UNDERGOUND IRRIGATION SYSTEM UTILIZING A STATE APPROVED BACKFLOW PREVENTOR AND A SMART CONTROLLER.
4. NO SUBSTITUTIONS SHALL BE CONSIDERED FOR PLANTS OR OTHER MATERAILS DURING THE BIDDING PROCESS.
5. ALL WORK SHALL BE PERFORMED TO THE SATISFACTION OF THE LANDSCAPE ARCHITECT/OWNER. CONTRACTOR SHALL WARRANTY ALL TREES, SHRUBS, AND OTHER PLANTS INSTALLED UNDER THIS CONTRACT FOR A PERIOD OF ONE YEAR AFTER FINAL ACCEPTANCE HAS BEEN GRANTED.
6. PLANT LIST QUANTITIES ARE SHOWN FOR REFERENCE ONLY. CONTRACTOR IS RESPONSIBLE FOR VERIFYING ALL QUANTITIES IN LIST WITH ACTUAL PLAN CALL-OUTS, AND INSTALLING PLANTINGS PER THE LANDSCAPE PLAN. GROUNDCOVER QUANTITIES SHALL BE ADJUSTED AS REQUIRED FOR FIELD CONDITIONS AT THE SPECIFIED SPACING.
7. ALL PLANTS MUST BE APPROVED BY LANDSCAPE ARCHITECT OR OWNER'S REPRESENTATIVE PRIOR TO INSTALLATION.
8. CONTRACTOR SHALL PROVIDE WEED CONTROL IN ACCORDANCE WITH WSDOT 8-02.3(3)A *PLANTING AREA WEED CONTROL*.



△	REVISIONS	DATE	BY

DESIGNED BY: L. ZEPEDA	ISSUE DATE: MAY 2026
DRAWN BY: L. ZEPEDA	JOB No.: 25-000313
APPROVED BY: T. GRANTHAM	DRAWING FILE No.: 25-000313-C-LS-01

ALL DIMENSIONS SHOWN IN FEET UNLESS OTHERWISE DESIGNATED

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CONSULTING SERVICES
8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
P: 360.352.1465
SCJALLIANCE.COM

PROJECT NAME:

CITY OF TUMWATER

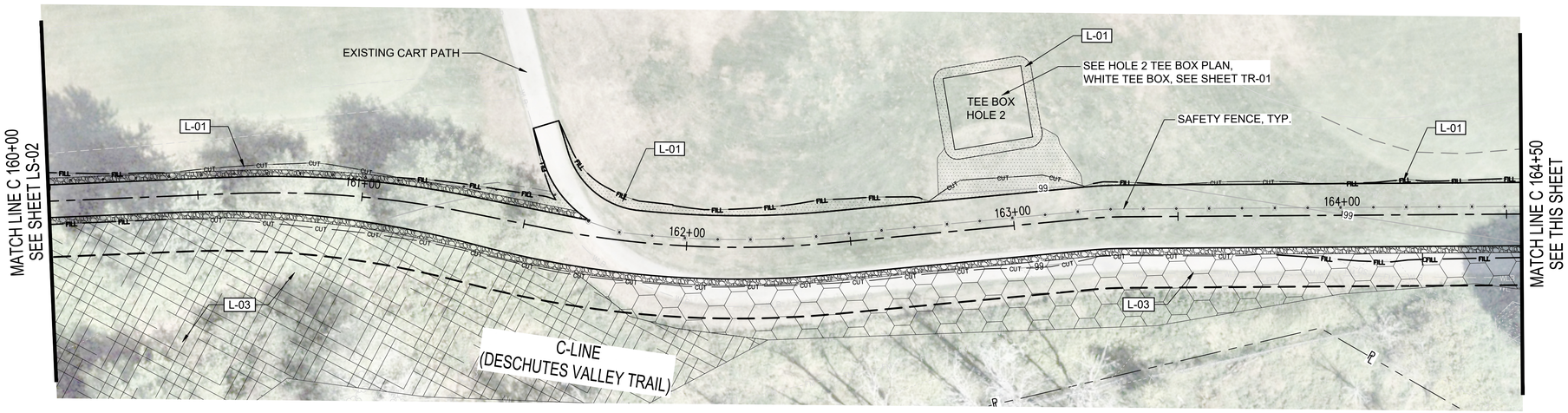
DESCHUTES VALLEY TRAIL
SEGMENT C

LANDSCAPE RESTORATION PLAN
C 152+00 - C 160+00

DRAWING No.: LS-02

SHEET No.: 127 OF 147

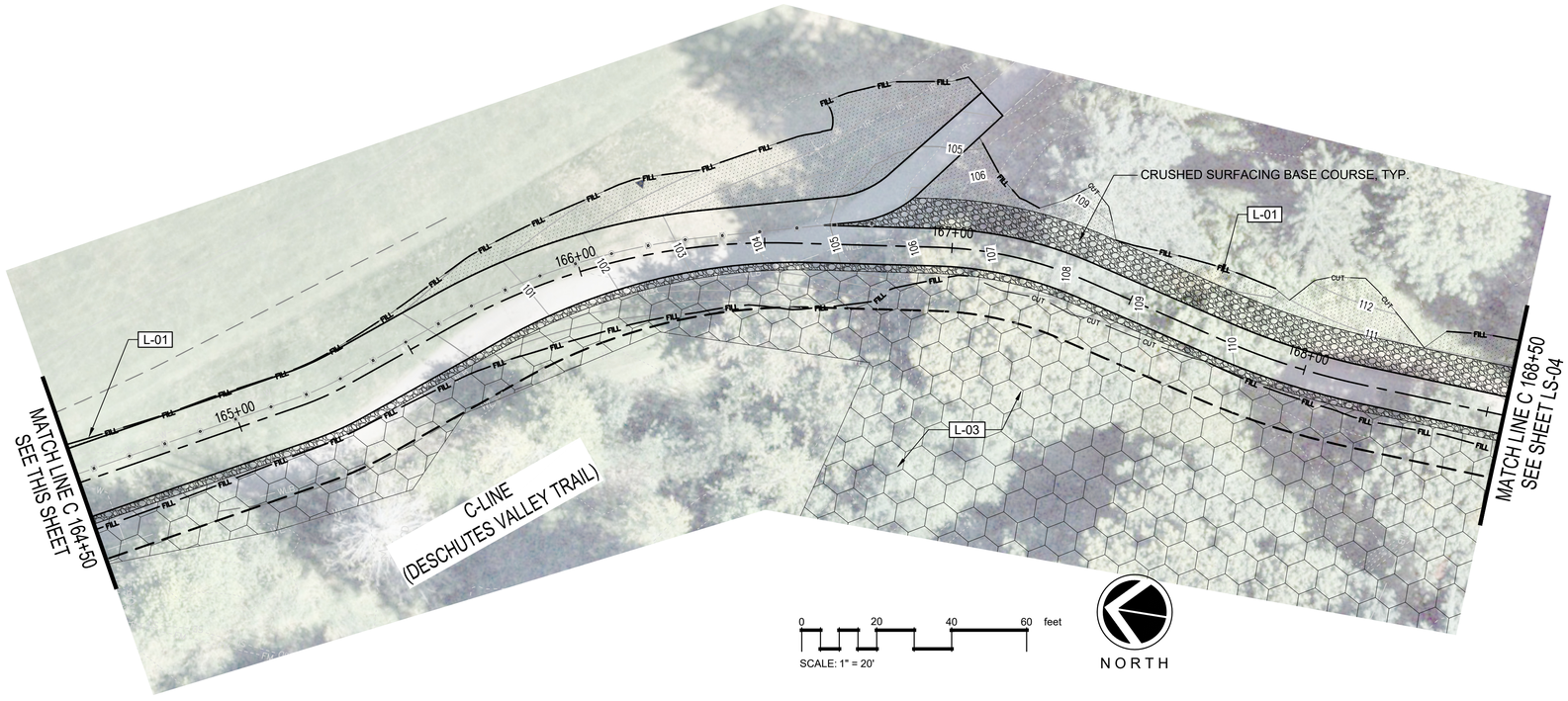
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0 20 40 60 feet

SCALE: 1" = 20'

NORTH



0 20 40 60 feet

SCALE: 1" = 20'

NORTH

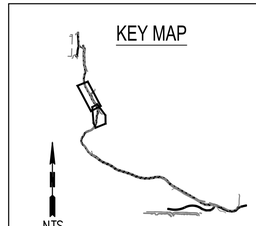
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REFERENCE NOTES SCHEDULE LS-03

SYMBOL	CODE	DESCRIPTION
LANDSCAPE		
	L-01	SEED MIX SHALL BE A 3-WAY RYE MIX AS APPROVED BY GOLF COURSE SUPERINTENDENT. ALL SEED ARES SHALL RECIEVE A MIN. 4" LAYER OF TOPSOIL TYPE A, PER SPECIFICATIONS.
	L-03	WETLAND MITIGATION PLANTING. SEE SHEET WM-01 THROUGH WM-06 FOR MORE INFORMATION.

NOTE: REFER TO SPECIFICATIONS FOR TEE BOX SOIL INFORMATION.

KEY MAP



NTS

△	REVISIONS	DATE	BY

DESIGNED BY: L. ZEPEDA
DRAWN BY: L. ZEPEDA
APPROVED BY: T. GRANTHAM
ISSUE DATE: MAY 2026
JOB No.: 25-000313
DRAWING FILE No.: 25-000313-C-LS-01

ALL DIMENSIONS SHOWN IN FEET UNLESS OTHERWISE DESIGNATED

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CONSULTING SERVICES
8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
P: 360.352.1465
SCJALLIANCE.COM

PROJECT NAME:

CITY OF TUMWATER

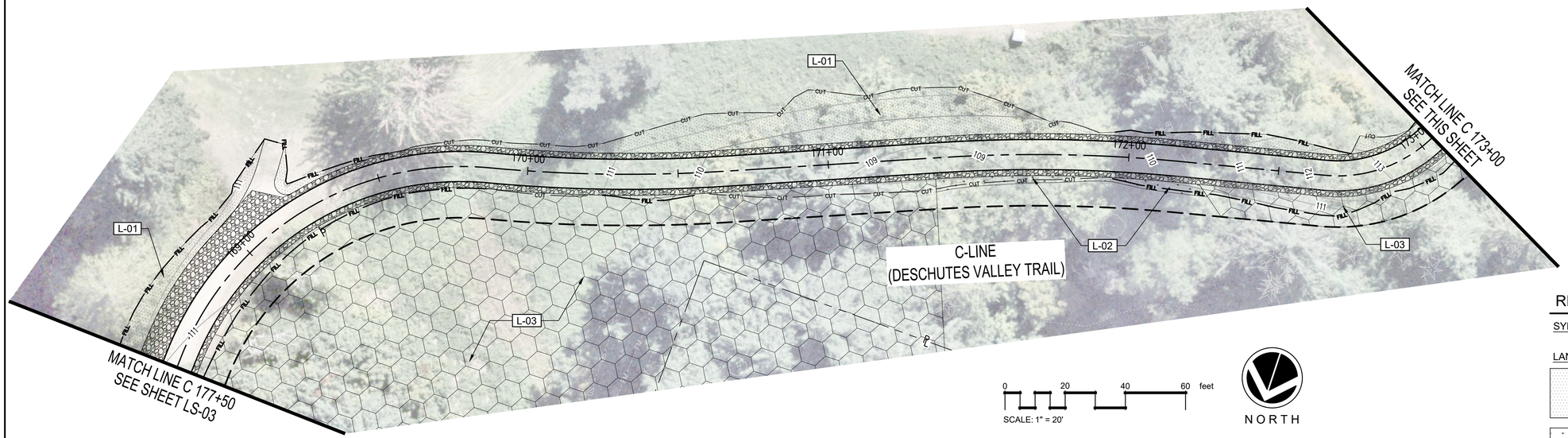
DESCHUTES VALLEY TRAIL
SEGMENT C

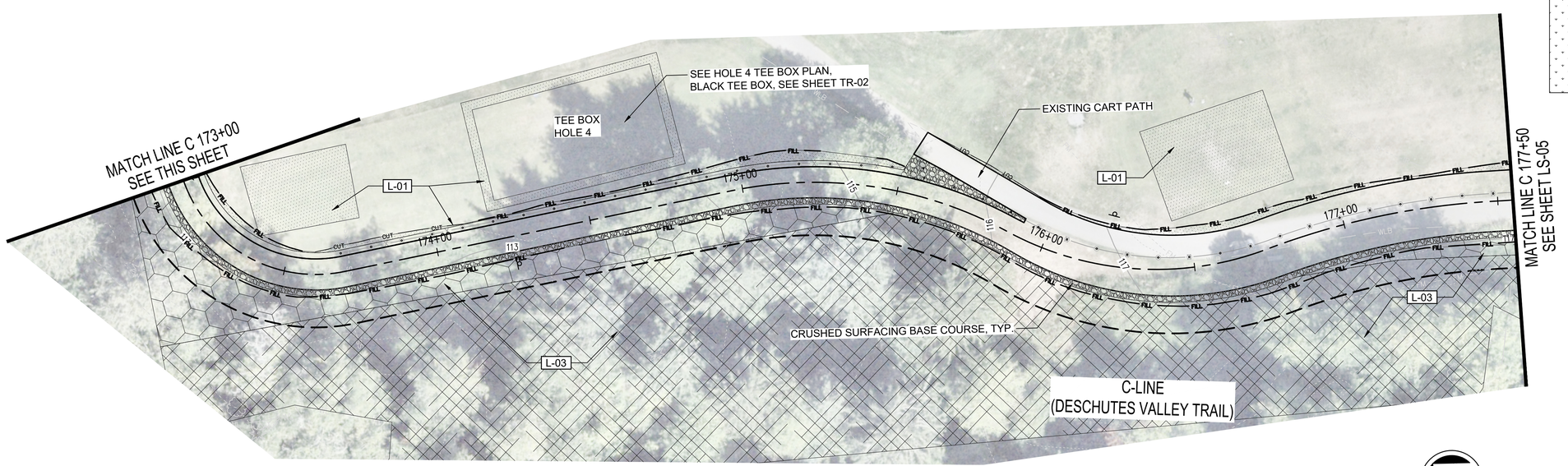
LANDSCAPE RESTORATION PLAN
C 160+00 - C 168+50

DRAWING No.: LS-03

SHEET No.: 128 OF 147

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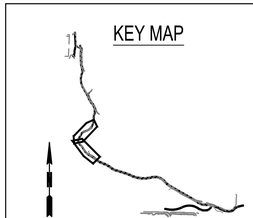
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REFERENCE NOTES SCHEDULE LS-04

SYMBOL	CODE	DESCRIPTION
LANDSCAPE		
	L-01	SEED MIX SHALL BE A 3-WAY RYE MIX AS APPROVED BY GOLF COURSE SUPERINTENDENT. ALL SEED ARES SHALL RECIEVE A MIN. 4" LAYER OF TOPSOIL TYPE A, PER SPECIFICATIONS.
	L-02	NATIVE SHRUB MIX 1 GAL. CONT. @ 3' O.C. SNOWBERRY (SYMPHORICARPOS ALBUS) MAHONIA NERVOSA (MAHONIA NERVOSA) SALAL (GAULTHERIA SHALLON) EVERGREEN HUCKLEBERRY(VACCINIUM OVATUM) DOUGLAS SPIREA (SPIRAEA DOUGLASII) ALL PLANT AREAS SHALL RECIEVE A 4" DEPTH OF COMPOST, PLANTS SHALL BE PIT PLANTED IN COMPOST AND SOIL, FINE GRADE ALL AREAS AFTER PLANTING.
	L-03	WETLAND MITIGATION PLANTING. SEE SHEET WM-01 THROUGH WM-06 FOR MORE INFORMATION.

NOTE: REFER TO SPECIFICATIONS FOR TEE BOX SOIL INFORMATION.

KEY MAP



△	REVISIONS	DATE	BY

DESIGNED BY: L. ZEPEDA
DRAWN BY: L. ZEPEDA
APPROVED BY: T. GRANTHAM
ISSUE DATE: MAY 2026
JOB No.: 25-000313
DRAWING FILE No.: 25-000313-C-LS-01

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P: 360.352.1465
SCJALLIANCE.COM

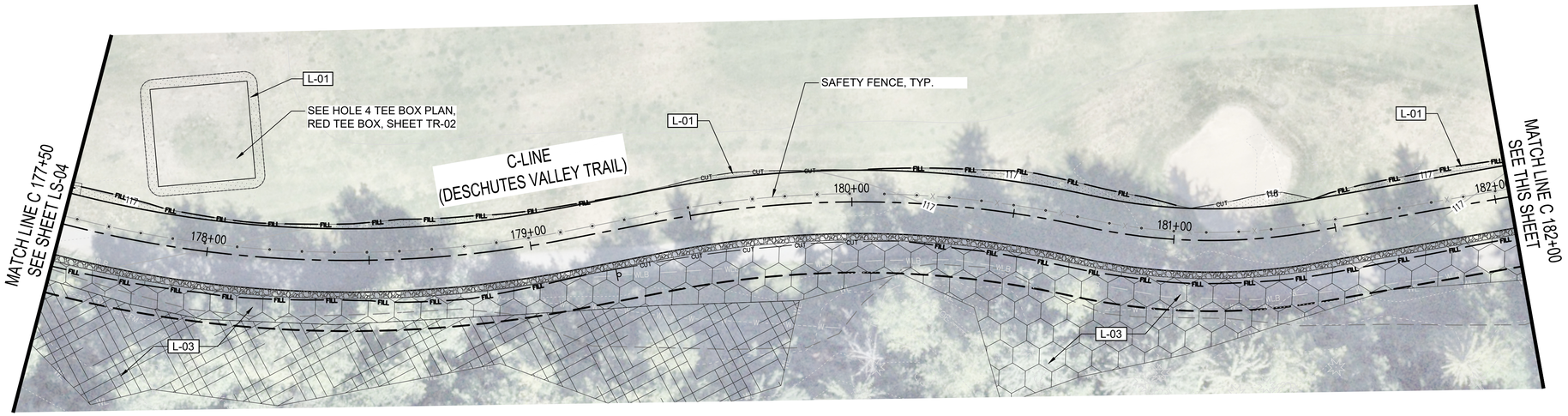
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CITY OF TUMWATER

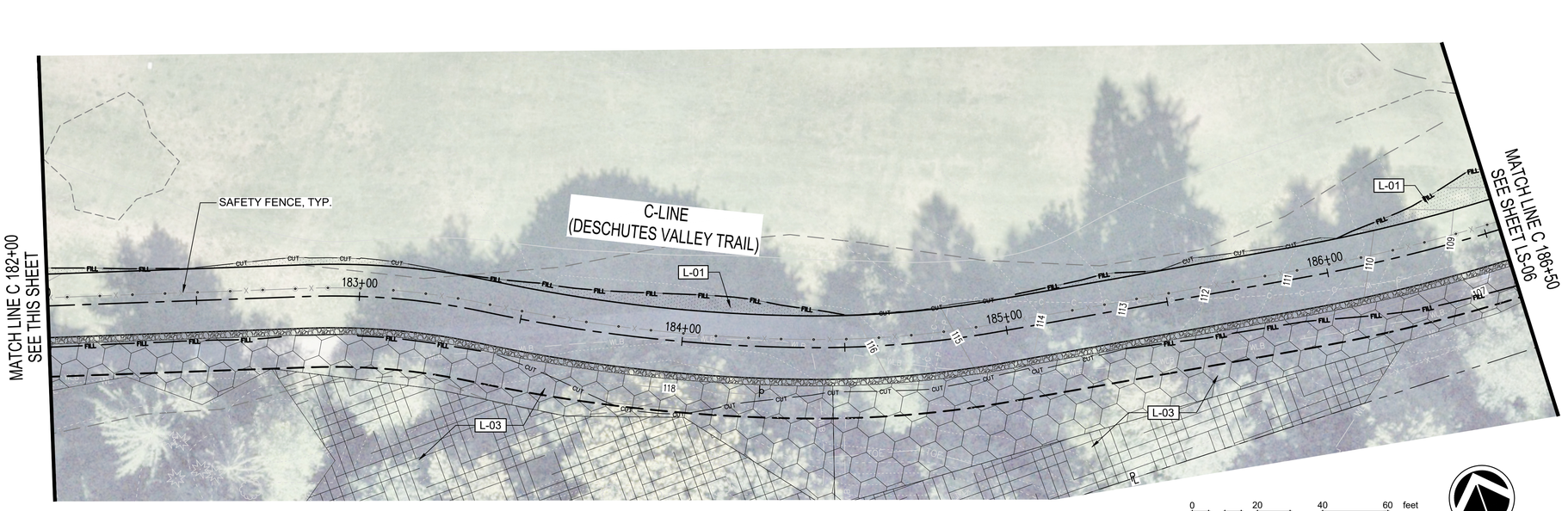
DESCHUTES VALLEY TRAIL
SEGMENT C

LANDSCAPE RESTORATION PLAN
C 168+50 - C 177+50

DRAWING No.: LS-04
SHEET No.: 129 OF 147

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N:\PROJECTS\0625 CITY OF TUMWATER\25-000313 TUMWATER DESCHUTES VALLEY TRAIL\CADD\25-000313-C-LS-01.DWG





2026-08-20 09:37

REFERENCE NOTES SCHEDULE LS-05

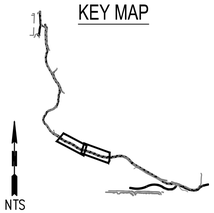
SYMBOL	CODE	DESCRIPTION
LANDSCAPE		
	L-01	SEED MIX SHALL BE A 3-WAY RYE MIX AS APPROVED BY GOLF COURSE SUPERINTENDENT. ALL SEED ARES SHALL RECIEVE A MIN. 4" LAYER OF TOPSOIL TYPE A, PER SPECIFICATIONS.
	L-03	WETLAND MITIGATION PLANTING. SEE SHEET WM-01 THROUGH WM-06 FOR MORE INFORMATION.

NOTE: REFER TO SPECIFICATIONS FOR TEE BOX SOIL INFORMATION.

0 20 40 60 feet
SCALE: 1" = 20'

NORTH

KEY MAP



NTS

REVISIONS	DATE	BY

DESIGNED BY: L. ZEPEDA
DRAWN BY: L. ZEPEDA
APPROVED BY: T. GRANTHAM
ISSUE DATE: MAY 2026
JOB No.: 25-000313
DRAWING FILE No.: 25-000313-C-LS-01

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PROJECT NAME:

CITY OF TUMWATER

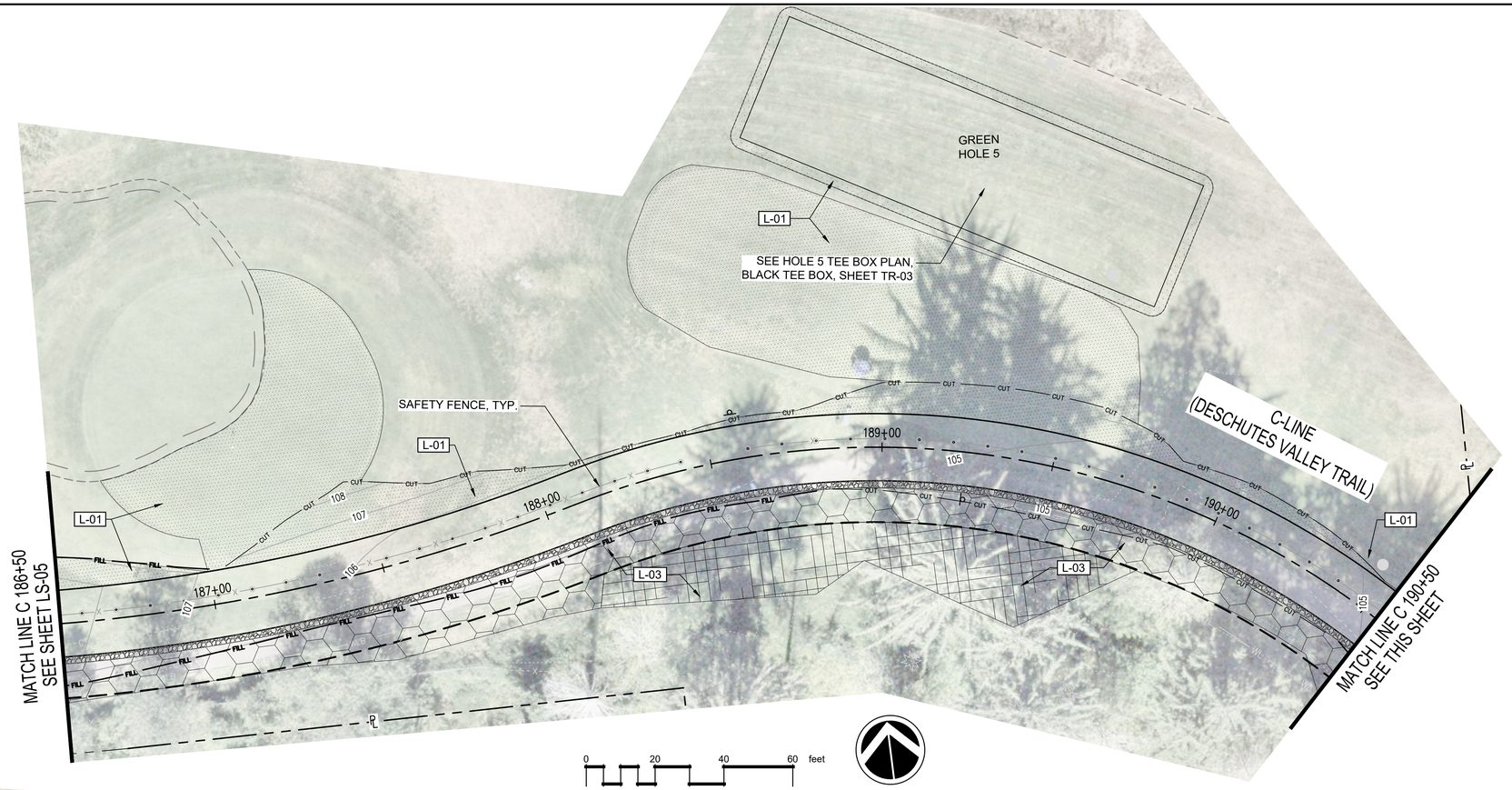
DESCHUTES VALLEY TRAIL
SEGMENT C

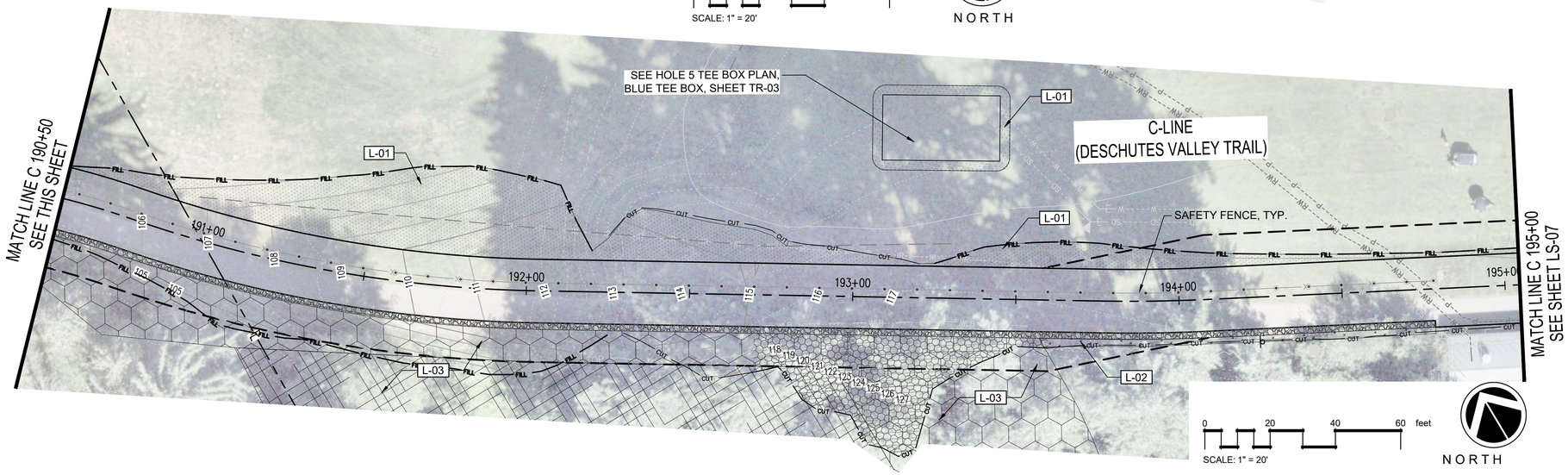
LANDSCAPE RESTORATION PLAN
C 177+50 - C 186+50

DRAWING No.: LS-05

SHEET No.: 130 OF 147

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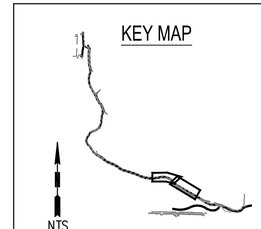
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REFERENCE NOTES SCHEDULE LS-06

SYMBOL	CODE	DESCRIPTION
LANDSCAPE		
	L-01	SEED MIX SHALL BE A 3-WAY RYE MIX AS APPROVED BY GOLF COURSE SUPERINTENDENT. ALL SEED ARES SHALL RECIEVE A MIN. 4" LAYER OF TOPSOIL TYPE A, PER SPECIFICATIONS.
	L-02	NATIVE SHRUB MIX 1 GAL. CONT. @ 3' O.C. SNOWBERRY (SYMPHORICARPOS ALBUS) MAHONIA NERVOSA (MAHONIA NERVOSA) SALAL (GAULTHERIA SHALLON) EVERGREEN HUCKLEBERRY(VACCINIUM OVATUM) DOUGLAS SPIREA (SPIRAEA DOUGLASII) ALL PLANT AREAS SHALL RECIEVE A 4" DEPTH OF COMPOST, PLANTS SHALL BE PIT PLANTED IN COMPOST AND SOIL, FINE GRADE ALL AREAS AFTER PLANTING.
	L-03	WETLAND MITIGATION PLANTING. SEE SHEET WM-01 THROUGH WM-06 FOR MORE INFORMATION.

NOTE: REFER TO SPECIFICATIONS FOR TEE BOX SOIL INFORMATION.

KEY MAP



△	REVISIONS	DATE	BY

DESIGNED BY: L. ZEPEDA
DRAWN BY: L. ZEPEDA
APPROVED BY: T. GRANTHAM
ISSUE DATE: MAY 2026
JOB No.: 25-000313
DRAWING FILE No.: 25-000313-C-LS-01

ALL DIMENSIONS SHOWN IN FEET UNLESS OTHERWISE DESIGNATED

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PROJECT NAME:

CITY OF TUMWATER

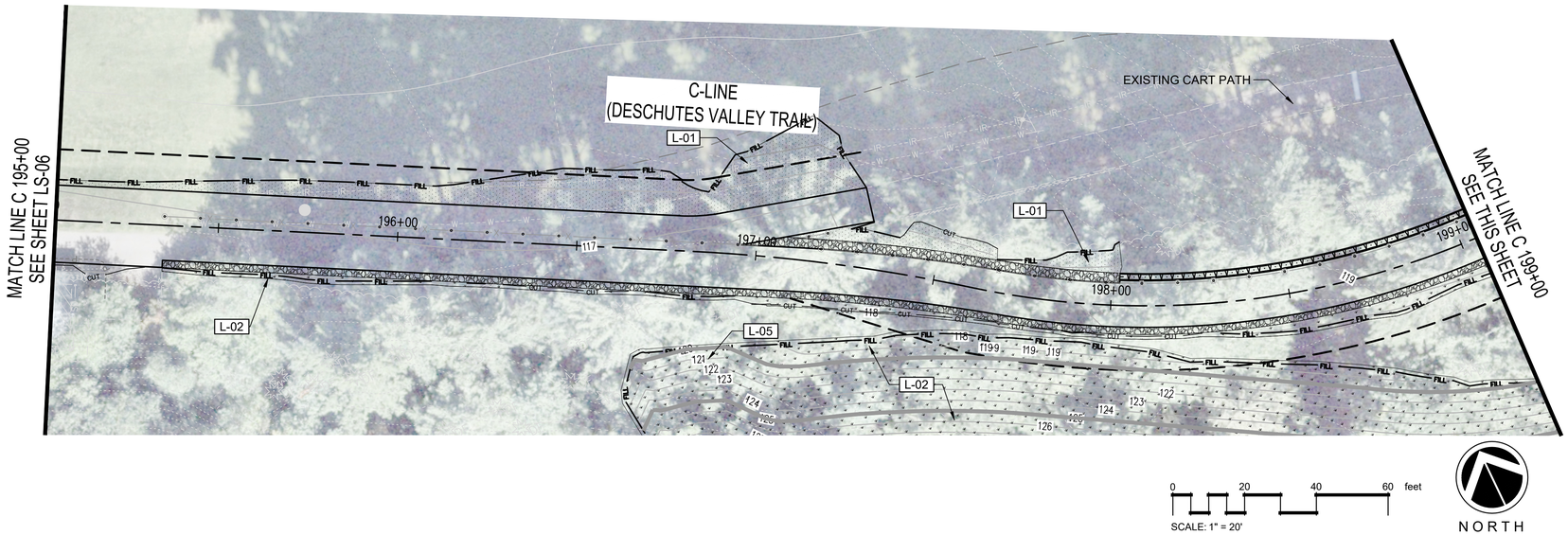
DESCHUTES VALLEY TRAIL
SEGMENT C

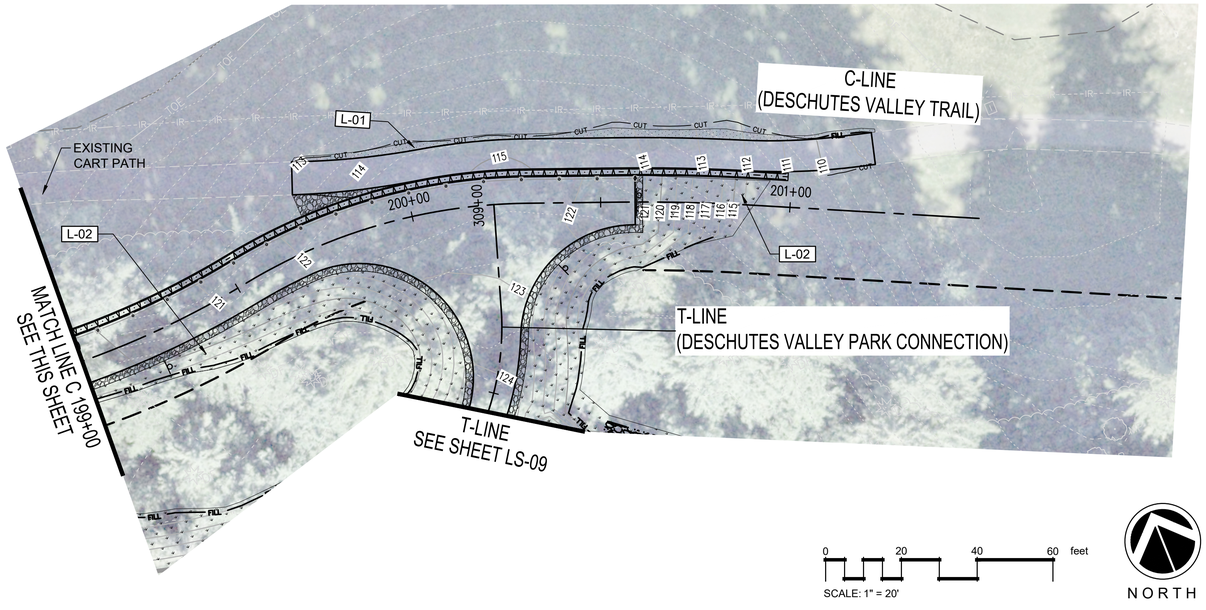
LANDSCAPE RESTORATION PLAN
C 186+50 - C 195+00

DRAWING No.: LS-06

SHEET No.: 131 OF 147

Aug 20, 2026 1:39:28pm - User: audrey.nielsen
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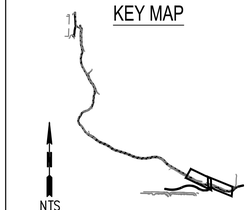
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REFERENCE NOTES SCHEDULE LS-07

SYMBOL	CODE	DESCRIPTION
LANDSCAPE		
	L-01	SEED MIX SHALL BE A 3-WAY RYE MIX AS APPROVED BY GOLF COURSE SUPERINTENDENT. ALL SEED ARES SHALL RECIEVE A MIN. 4" LAYER OF TOPSOIL TYPE A, PER SPECIFICATIONS.
	L-02	NATIVE SHRUB MIX 1 GAL. CONT. @ 3' O.C. SNOWBERRY (SYMPHORICARPOS ALBUS) MAHONIA NERVOSA (MAHONIA NERVOSA) SALAL (GAULTHERIA SHALLON) EVERGREEN HUCKLEBERRY(VACCINIUM OVATUM) DOUGLAS SPIREA (SPIRAEA DOUGLASII) ALL PLANT AREAS SHALL RECIEVE A 4" DEPTH OF COMPOST, PLANTS SHALL BE PIT PLANTED IN COMPOST AND SOIL, FINE GRADE ALL AREAS AFTER PLANTING.
	L-05	10"–12" DIAMETER PERMANENT WATTLES INSTALL PERMANENT WATTLES IN ACCORDANCE WITH WSDOT STANDARD DETAIL I-30.30-02. REFER TO THE STANDARD DETAIL FOR ADDITIONAL INFORMATION.

NOTE: REFER TO SPECIFICATIONS FOR TEE BOX SOIL INFORMATION.

KEY MAP



△	REVISIONS	DATE	BY

DESIGNED BY: L. ZEPEDA
DRAWN BY: L. ZEPEDA
APPROVED BY: T. GRANTHAM
ISSUE DATE: MAY 2026
JOB No.: 25-000313
DRAWING FILE No.: 25-000313-C-LS-01

ALL DIMENSIONS SHOWN IN FEET UNLESS OTHERWISE DESIGNATED

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PROJECT NAME:

CITY OF TUMWATER

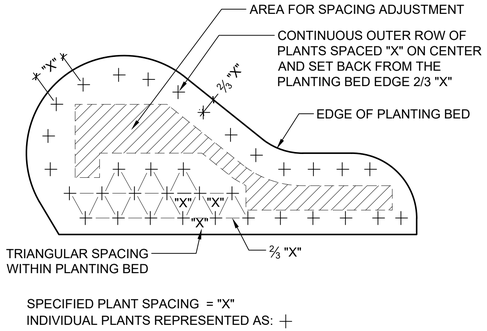
DESCHUTES VALLEY TRAIL
SEGMENT C

LANDSCAPE RESTORATION PLAN
C 195+00 - C 203+00

DRAWING No.: LS-07

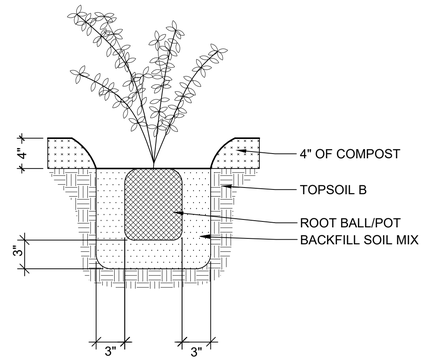
SHEET No.: 132 OF 147

Aug 20, 2026 12:54:17pm – User: audreyn.nielsen
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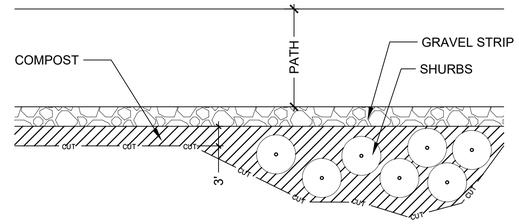
1 PLANT SPACING DETAIL

NTS P-PA-DVT-DVTC-01



2 GROUNDCOVER PLANTING DETAIL

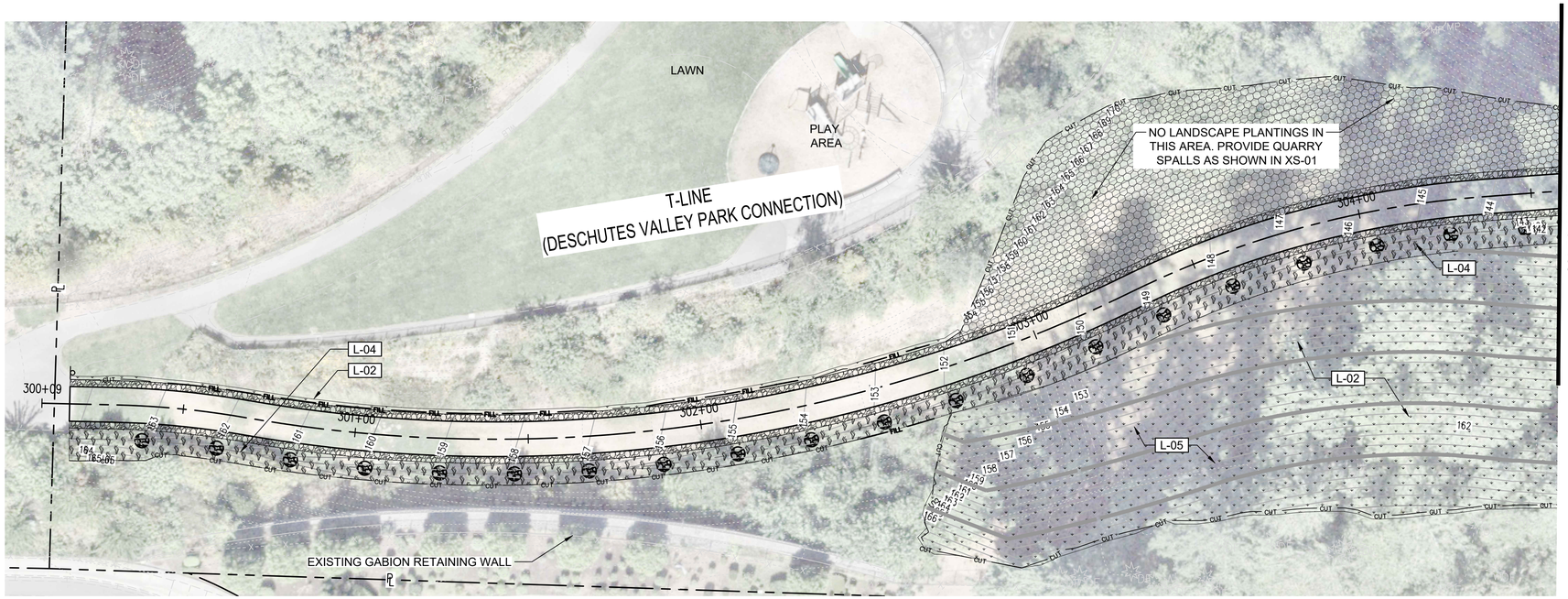
(2" & 4" POTS) 1" = 1" P-PA-DVT-DVTC-43



NOTE: TOP-DRESS ALL DISTURBED AREAS THAT ARE LESS THAN 3 FEET IN WIDTH WITH COMPOST

3 RESTORATION WEST OF TRAIL

1" = 1" P-PA-DVT-DVTC-19



0 20 40 60 feet

SCALE: 1" = 20'

NORTH

2026-08-20 09:43

REFERENCE NOTES SCHEDULE LS-08

SYMBOL	CODE	DESCRIPTION
LANDSCAPE		
	L-02	NATIVE SHRUB MIX 1 GAL. CONT. @ 3' O.C. SNOWBERRY (SYMPHORICARPOS ALBUS) MAHONIA NERVOSA (MAHONIA NERVOSA) SALAL (GAULTHERIA SHALLON) EVERGREEN HUCKLEBERRY(VACCINIUM OVATUM) DOUGLAS SPIREA (SPIRAEA DOUGLASII) ALL PLANT AREAS SHALL RECIEVE A 4" DEPTH OF COMPOST, PLANTS SHALL BE PIT PLANTED IN COMPOST AND SOIL, FINE GRADE ALL AREAS AFTER PLANTING.
	L-04	EROSION CONTROL SEED MIX (PERCENTAGE BY WEIGHT) SHALL BE THE FOLLOWING: PERENNIAL TURF TYPE RYE GRASS (DERBY, CITATION OR PENNFINE) (40%), RED FESCUE (40%), BENTGRASS (10%), WHITE DUTCH CLOVER (10%). THE ABOVE MIXTURE SHALL BE APPLIED AT THE RATE OF 120 POUNDS PER ACRE.
	L-05	10"–12" DIAMETER PERMANENT WATTLES INSTALL PERMANENT WATTLES IN ACCORDANCE WITH WSDOT STANDARD DETAIL I-30.30-02. REFER TO THE STANDARD DETAIL FOR ADDITIONAL INFORMATION.

KEY MAP

NTS

△	REVISIONS	DATE	BY

DESIGNED BY: L. ZEPEDA
DRAWN BY: L. ZEPEDA
APPROVED BY: T. GRANTHAM
ISSUE DATE: MAY 2026
JOB No.: 25-000313
DRAWING FILE No.: 25-000313-C-LS-01

ALL DIMENSIONS SHOWN IN FEET UNLESS OTHERWISE DESIGNATED

STATE OF WASHINGTON · TRENT L. GRANTHAM · NO. 943 EXP. 07/22/2026 · LANDSCAPE ARCHITECT

SCJ ALLIANCE
CONSULTING SERVICES
8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
P: 360.352.1465
SCJALLIANCE.COM

PROJECT NAME:

CITY OF TUMWATER

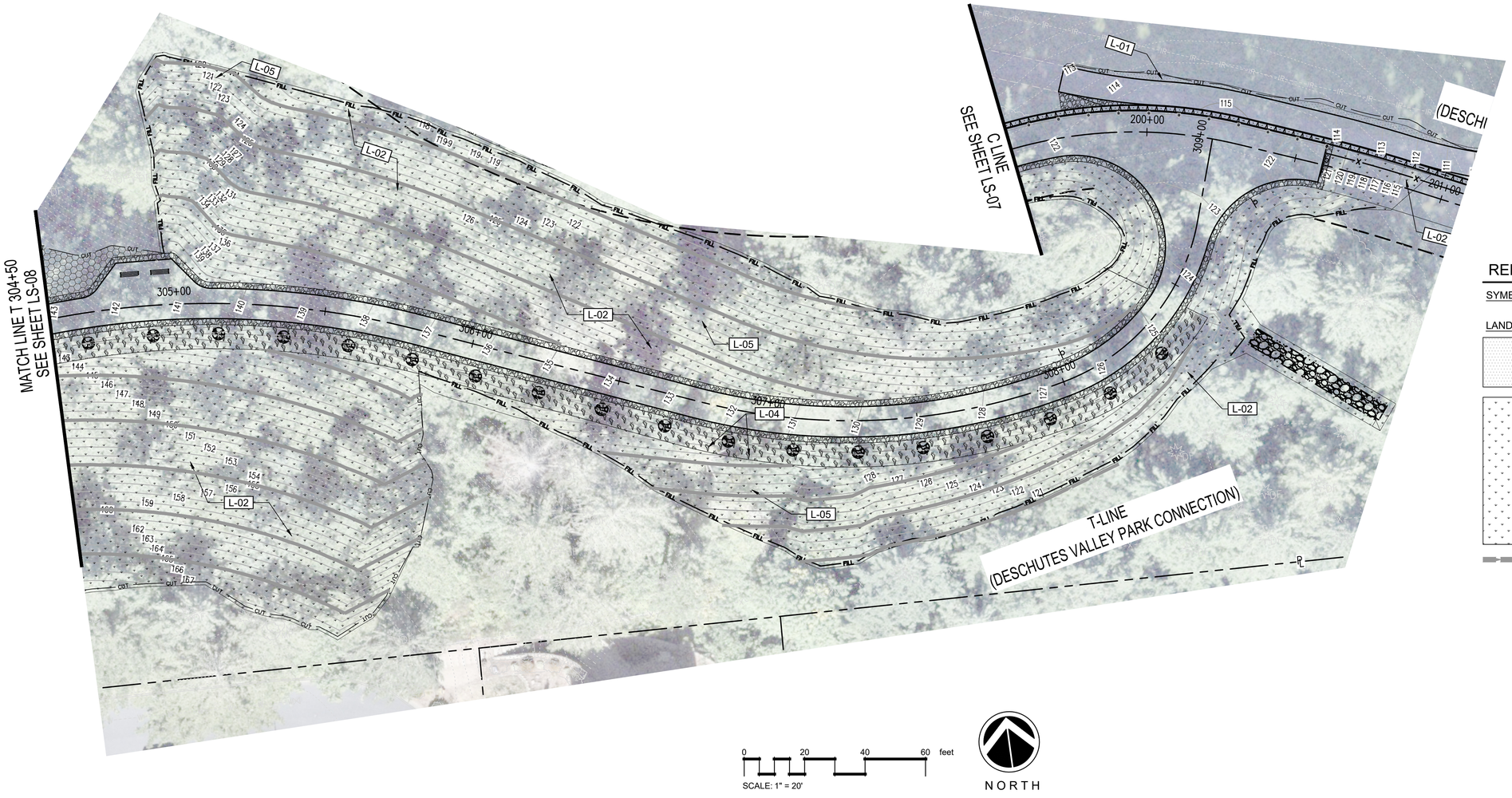
DESCHUTES VALLEY TRAIL
SEGMENT C

LANDSCAPE RESTORATION PLAN
T 300+00 - T 304+50

DRAWING No.: LS-08

SHEET No.: 133 OF 147

Aug 20, 2026 1:09:15pm – User: audreyvielsen
N:\PROJECTS\625 CITY OF TUMWATER\25-000313 TUMWATER DESCHUTES VALLEY TRAIL\CADD\25-000313-C-LS-01.DWG

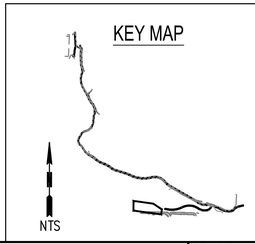


2026-08-20 09:44

REFERENCE NOTES SCHEDULE LS-09

SYMBOL	CODE	DESCRIPTION
LANDSCAPE		
	L-01	SEED MIX SHALL BE A 3-WAY RYE MIX AS APPROVED BY GOLF COURSE SUPERINTENDENT. ALL SEED ARES SHALL RECIEVE A MIN. 4" LAYER OF TOPSOIL TYPE A, PER SPECIFICATIONS.
	L-02	NATIVE SHRUB MIX 1 GAL. CONT. @ 3' O.C. SNOWBERRY (SYMPHORICARPOS ALBUS) MAHONIA NERVOSA (MAHONIA NERVOSA) SALAL (GAULTHERIA SHALLON) EVERGREEN HUCKLEBERRY(VACCINIUM OVATUM) DOUGLAS SPIREA (SPIRAEA DOUGLASII) ALL PLANT AREAS SHALL RECIEVE A 4" DEPTH OF COMPOST, PLANTS SHALL BE PIT PLANTED IN COMPOST AND SOIL, FINE GRADE ALL AREAS AFTER PLANTING.
	L-05	10"–12" DIAMETER PERMANENT WATTLES INSTALL PERMANENT WATTLES IN ACCORDANCE WITH WSDOT STANDARD DETAIL I-30.30-02. REFER TO THE STANDARD DETAIL FOR ADDITIONAL INFORMATION.

KEY MAP



△	REVISIONS	DATE	BY

DESIGNED BY: L. ZEPEDA
DRAWN BY: L. ZEPEDA
APPROVED BY: T. GRANTHAM
ISSUE DATE: MAY 2026
JOB No.: 25-000313
DRAWING FILE No.: 25-000313-C-LS-01

ALL DIMENSIONS SHOWN IN FEET UNLESS OTHERWISE DESIGNATED

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8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
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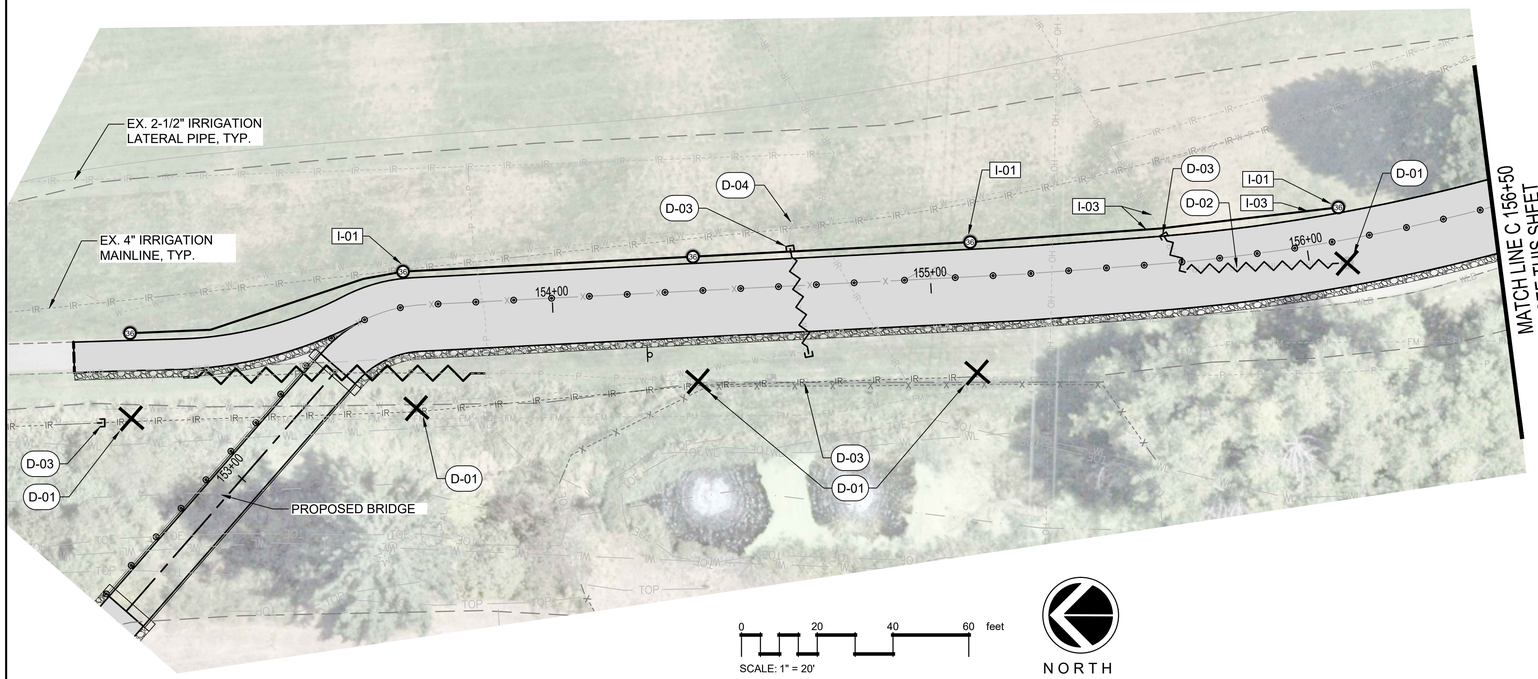
PROJECT NAME:
CITY OF TUMWATER

DESCHUTES VALLEY TRAIL
SEGMENT C

LANDSCAPE RESTORATION PLAN
T 304+50 - T 308+50

DRAWING No.: LS-09
SHEET No.: 134 OF 147

Aug 20, 2026 1:33:06pm – User: audrey.nielsen
N:\PROJECTS\0625 CITY OF TUMWATER\25-000313 TUMWATER DESCHUTES VALLEY TRAIL\CADD\25-000313-C-LS-01.DWG



0 20 40 60 feet

SCALE: 1" = 20'

NORTH

IRRIGATION DEMO AND INSTALLATION NOTES IR-01

SYMBOL	CODE	DESCRIPTION
DEMOLITION		
✕	D-01	SALVAGE IRRIGATION HEAD AND PROVIDE TO OWNER.
⌇	D-02	REMOVE ALL IRRIGATION MAINLINE AND LATERAL LINE PIPING AND CONTROL OR TRACE WIRE FROM ENTIRE TRAIL WIDTH PLUS ADDITIONAL 2'-0" MIN. ON EITHER SIDE OF TRAIL PAVEMENT, OR AS SHOWN. (TYP. FOR ENTIRE TRAIL LENGTH)
	D-03	CUT IRRIGATION LATERAL PIPE AND CAP. ABANDON IRRIGATION PIPE AND WIRE DOWNSTREAM OF CUT, OR BETWEEN CUTS, IN PLACE.
	D-04	PROTECT AND RETAIN IRRIGATION HEAD (AND LATERAL LINE) IN PLACE.
IRRIGATION		
	I-01	INSTALL NEW IRRIGATION PART-CIRCLE ROTOR HEAD 2'-0" FROM PROPOSED TRAIL EDGE OF PAVEMENT.
	I-02	CONNECT 2" LATERAL PIPE TO EXISTING LATERAL OR RELOCATED VALVE AS/WHERE SHOWN.
	I-03	INSTALL NEW IRRIGATION HEAD WHERE SHOWN.

DISPOSE OF ALL PIPING AND WIRE REMOVED FROM GROUND OFF SITE. NO POPE OR WIRE SHALL BE SALVAGED AND REINSTALLED AS PART OF THIS PROJECT.

EXISTING IRRIGATION SYSTEM LEGEND

SYMBOL	DESCRIPTION
IM	EXISTING 4" OR 6" IRRIGATION MAINLINE PER AS-BUILT PLANS
IR	EXISTING 2" PVC IRRIGATION LATERAL LINE PER AS-BUILT PLANS
	EXISTING ISOLATION VALVE PER AS-BUILT PLANS
	EXISTING ISOLATION VALVE AS SURVEYED
	EXISTING VALVE-IN-HEAD ROTOR IRRIGATION HEADS PER AS-BUILT PLANS
	EXISTING VALVE-IN-HEAD ROTOR IRRIGATION HEADS AS SURVEYED
	PROPOSED SCHEDULE 40 2" PVC LATERAL LINES @ 24" DEPTH
NOT SHOWN	STATION & COMMON WIRE SIZE-AWG 14 GAUGE MINIMUM INSTALL ONE SPARE WIRE FOR ALL IRRIGATION ZONE WIRE RUNS

IRRIGATION SCHEDULE IR-01

SYMBOL	MANUFACTURER/MODEL/DESCRIPTION	PSI	RADIUS
36	RAIN BIRD 752-E 36 VALVE IN HEAD ROTOR FOR GOLF APPLICATIONS. STANDARD NOZZLES, FULL CIRCLE ARC. RADIUS IS 27FT. TO 84FT.. FLOW RATE IS 6.7 GPM TO 47 GPM. PRESSURE REGULATION RANGE FROM 50PSI TO 100PSI.	80	68'
SYMBOL	MANUFACTURER/MODEL/DESCRIPTION		
⊓	CAP FOR FUTURE USE CAP AT THE MAINLINE OR LATERAL LINE FOR FUTURE USE. THE PRESSURE AND FLOW PROVIDED TO THAT LOCATION ARE INDICATED NEXT TO THE CAP SYMBOL.		
———	IRRIGATION LATERAL LINE: PVC CLASS 200 SDR 21 BURY A MINIMUM OF 12" BELOW FINISHED GRADE. PLACE 24" BELOW GRADE UNDER PAVED SURFACED.		

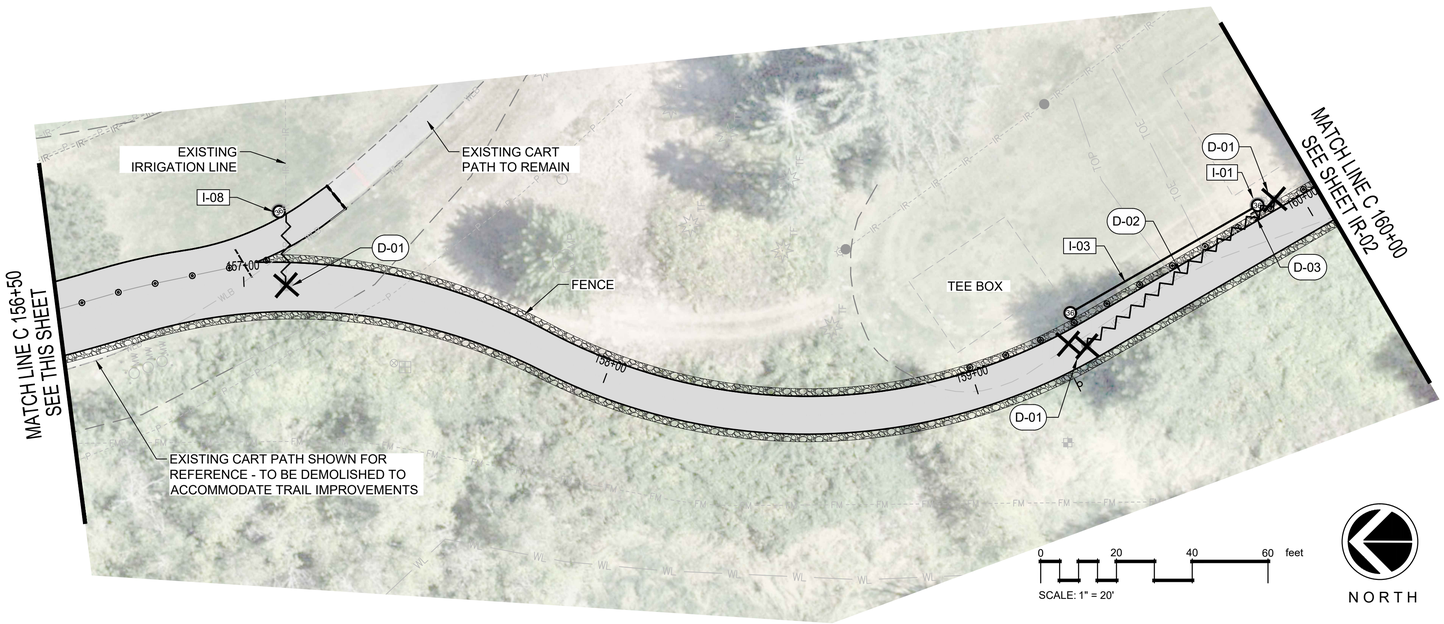
SURVEY INFORMATION NOTE (ALL SHEETS)

CONTRACTOR IS INFORMED THAT THIS SURVEY CONTAINS IRRIGATION INFORMATION FROM TWO SOURCES.

VARIOUS SYSTEM COMPONENTS (I.E. PIPING, IRRIGATION HEADS, CONTROL VALVES, ETC.) THAT WERE FIELD-LOCATED BY THE SURVEYOR ARE SHOWN ON THE PLANS. PLEASE NOTE THAT THE SURVEYOR'S INVENTORY OF THE SYSTEM IS INCOMPLETE, AS NOT ALL OF THE COMPONENTS WERE LOCATED IN THE FIELD.

THE SURVEY ALSO INCLUDES "AS-BUILT PLAN" REPRESENTATIONS OF MORE SPECIFIC SYSTEM COMPONENTS SUCH AS: MAINLINE PIPING, LATERAL LINE PIPING, VARIOUS IRRIGATION HEAD TYPES, CONTROL VALVES, ETC.

WITHIN THE SURVEY BOUNDARIES, REPRESENTATIONS FROM BOTH SOURCES ARE SHOWN WITH DISCREPANCIES IN COMPONENTS' LOCATIONS.



0 20 40 60 feet

SCALE: 1" = 20'

NORTH

KEY MAP

NTS

△	REVISIONS	DATE	BY

DESIGNED BY: L. ZEPEDA
DRAWN BY: L. ZEPEDA
APPROVED BY: T. GRANTHAM
ISSUE DATE: MAY 2026
JOB No.: 25-000313
DRAWING FILE No.: 25-000313-C-IR-01

ALL DIMENSIONS SHOWN IN FEET UNLESS OTHERWISE DESIGNATED

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8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
P: 360.352.1465
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PROJECT NAME:

CITY OF TUMWATER

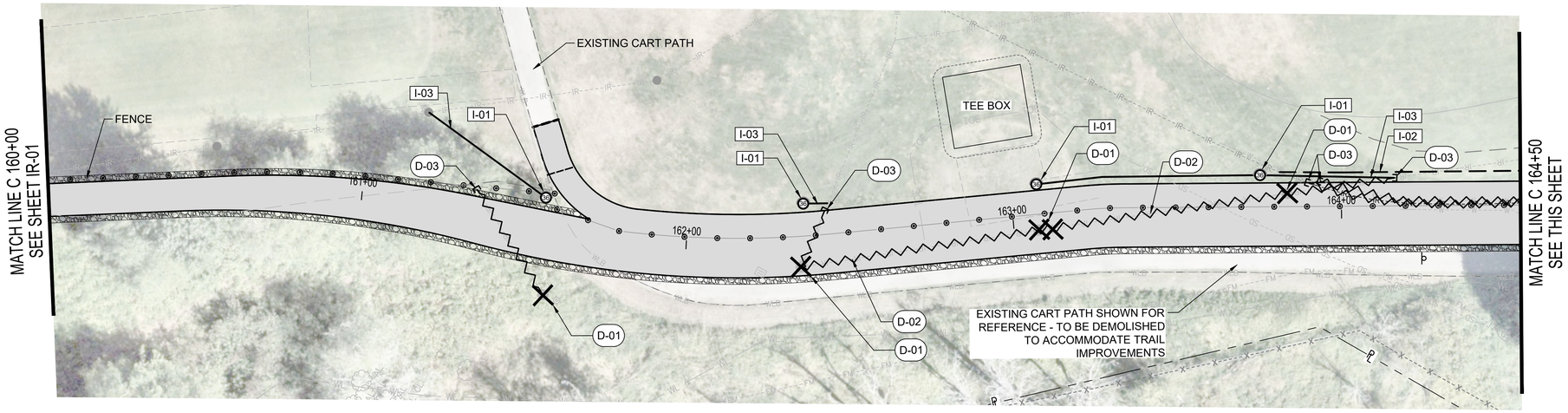
DESCHUTES VALLEY TRAIL
SEGMENT C

IRRIGATION MODIFICATION PLAN
C 152+50 - C 160+00

DRAWING No.: IR-01

SHEET No.: 135 OF 147

Aug 20, 2026 12:46:24pm – User audreyjaiden
N:\PROJECTS\2025 CITY OF TUMWATER\25-000313 TUMWATER DESCHUTES VALLEY TRAIL\CADD\25-000313-C-IR-01.DWG



0 20 40 60 feet
SCALE: 1" = 20'

NORTH

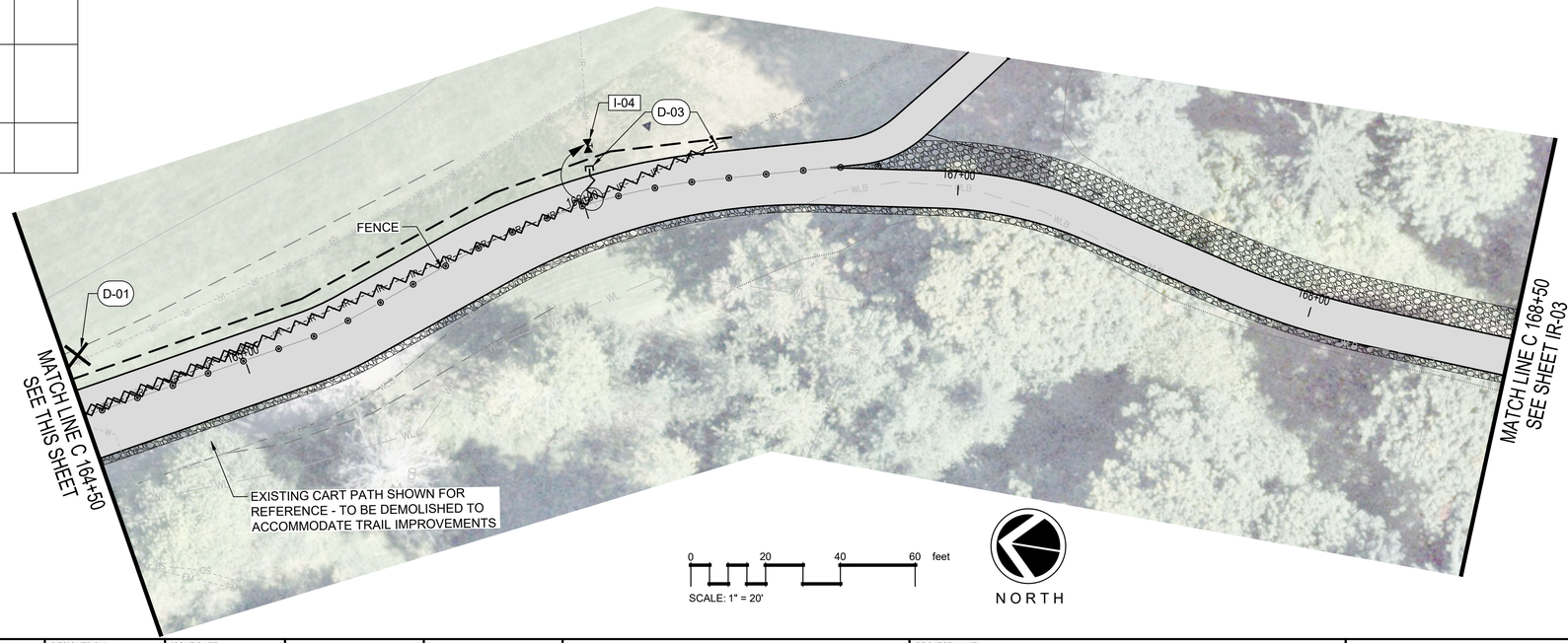
REFERENCE NOTES SCHEDULE IR-02

SYMBOL	CODE	DESCRIPTION
DEMOLITION		
X	D-01	SALVAGE IRRIGATION HEAD AND PROVIDE TO OWNER.
ZIGZAG	D-02	REMOVE ALL IRRIGATION MAINLINE AND LATERAL LINE PIPING AND CONTROL OR TRACE WIRE FROM ENTIRE TRAIL WIDTH PLUS ADDITIONAL 2'-0" MIN. ON EITHER SIDE OF TRAIL PAVEMENT, OR AS SHOWN. (TYP. FOR ENTIRE TRAIL LENGTH)
	D-03	CUT IRRIGATION LATERAL PIPE AND CAP. ABANDON IRRIGATION PIPE AND WIRE DOWNSTREAM OF CUT, OR BETWEEN CUTS, IN PLACE.
IRRIGATION		
	I-01	INSTALL NEW IRRIGATION PART-CIRCLE ROTOR HEAD 2'-0" FROM PROPOSED TRAIL EDGE OF PAVEMENT.
	I-02	CONNECT 2" LATERAL PIPE TO EXISTING LATERAL OR RELOCATED VALVE AS/WHERE SHOWN.
	I-03	REROUTE MAINLINE. CUT EX. MAINLINE AND CONNECT NEW 4" IRRIGATION MAINLINE, LOCATE 6'-0" FROM PROPOSED TRAIL EDGE OF PAVEMENT, OR WHERE SHOWN.
	I-04	SALVAGE EX. MANUAL LATERAL ISOLATION VALVE ASSEMBLY AND REINSTALL AT NEW LATERAL CONNECTION TO NEW MAINLINE.

DISPOSE OF ALL PIPING AND WIRE REMOVED FROM GROUND OFF SITE. NO POPE OR WIRE SHALL BE SALVAGED AND REINSTALLED AS PART OF THIS PROJECT.

IRRIGATION SCHEDULE IR-02

SYMBOL	MANUFACTURER/MODEL/DESCRIPTION	PSI	RADIUS
36	RAIN BIRD 752-E 36 VALVE IN HEAD ROTOR FOR GOLF APPLICATIONS. STANDARD NOZZLES, FULL CIRCLE ARC. RADIUS IS 27FT. TO 84FT.. FLOW RATE IS 6.7 GPM TO 47 GPM. PRESSURE REGULATION RANGE FROM 50PSI TO 100PSI.	80	68'
SYMBOL	MANUFACTURER/MODEL/DESCRIPTION		
	EXISTING LATERAL ISOLATION VALVE EXISTING MANUAL LATERAL ISOLATION VALVE ASSEMBLY TO BE SALVAGED AND REINSTALLED		
	CAP FOR FUTURE USE CAP AT THE MAINLINE OR LATERAL LINE FOR FUTURE USE. THE PRESSURE AND FLOW PROVIDED TO THAT LOCATION ARE INDICATED NEXT TO THE CAP SYMBOL.		
	IRRIGATION LATERAL LINE: PVC CLASS 200 SDR 21 BURY A MINIMUM OF 12" BELOW FINISHED GRADE. PLACE 24" BELOW GRADE UNDER PAVED SURFACED.		
	IRRIGATION MAINLINE: PVC SCHEDULE 40 BURY A MINIMUM OF 18" BELOW FINISHED GRADE, 24" BELOW PAVED SURFACES.		



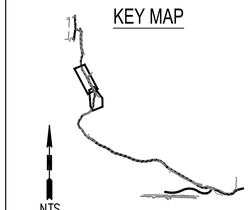
0 20 40 60 feet
SCALE: 1" = 20'

NORTH

EXISTING IRRIGATION SYSTEM LEGEND

SYMBOL	DESCRIPTION
IM	EXISTING 4" OR 6" IRRIGATION MAINLINE PER AS-BUILT PLANS
IR	EXISTING 2" PVC IRRIGATION LATERAL LINE PER AS-BUILT PLANS
	EXISTING ISOLATION VALVE PER AS-BUILT PLANS
	EXISTING ISOLATION VALVE AS SURVEYED
	EXISTING VALVE-IN-HEAD ROTOR IRRIGATION HEADS PER AS-BUILT PLANS
	EXISTING VALVE-IN-HEAD ROTOR IRRIGATION HEADS AS SURVEYED
	PROPOSED SCHEDULE 40 2" PVC LATERAL LINES @ 24" DEPTH
NOT SHOWN	STATION & COMMON WIRE SIZE-AWG 14 GAUGE MINIMUM INSTALL ONE SPARE WIRE FOR ALL IRRIGATION ZONE WIRE RUNS

KEY MAP



NTS

△	REVISIONS	DATE	BY

DESIGNED BY: L. ZEPEDA
ISSUE DATE: MAY 2026
DRAWN BY: L. ZEPEDA
JOB No.: 25-000313
APPROVED BY: T. GRANTHAM
DRAWING FILE No.: 25-000313-C-IR-01

ALL DIMENSIONS SHOWN IN FEET UNLESS OTHERWISE DESIGNATED

STATE OF WASHINGTON TRENT L. GRANTHAM NO. 843 EXP. 07/22/2026 LANDSCAPE ARCHITECT

SCJ ALLIANCE
CONSULTING SERVICES
8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
P: 360.352.1465
SCJALLIANCE.COM

PROJECT NAME:

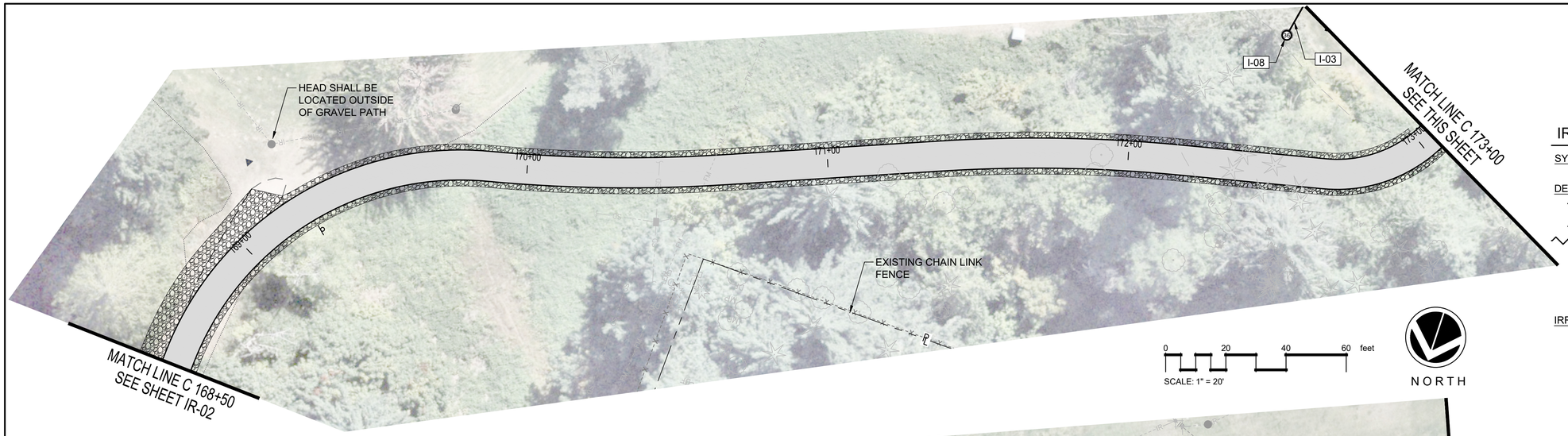
CITY OF TUMWATER

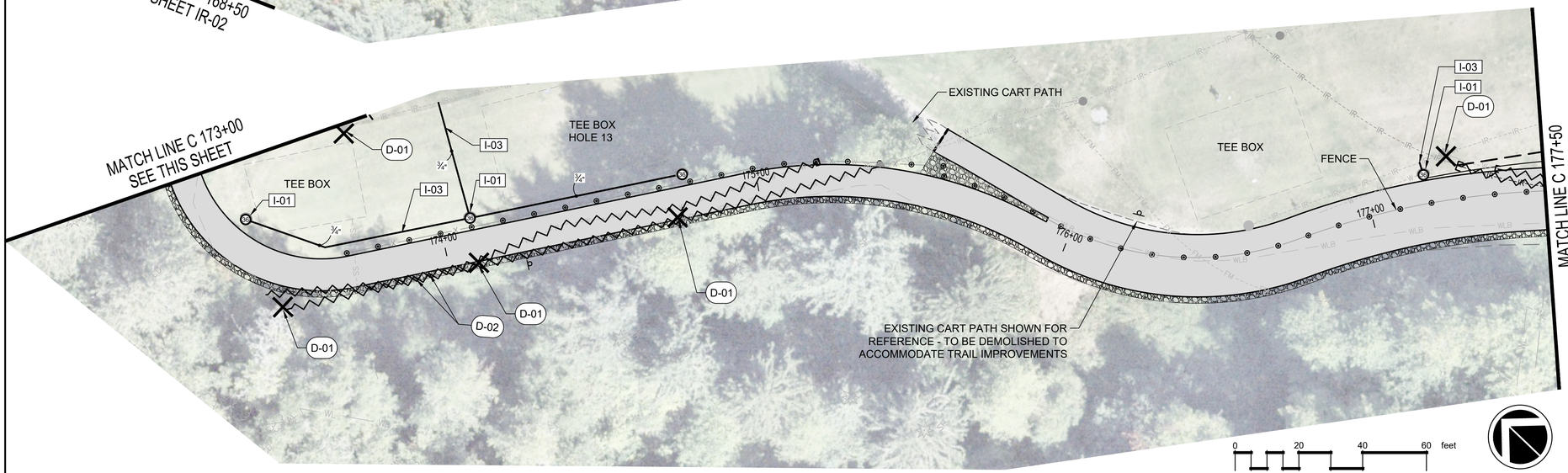
DESCHUTES VALLEY TRAIL
SEGMENT C

IRRIGATION MODIFICATION PLAN
C 160+00 - C 168+50

DRAWING No.: IR-02
SHEET No.: 136 OF 147

Aug 20, 2026 1:04:25pm - User: audreyvieleen
N:\PROJECTS\0625 CITY OF TUMWATER\25-000313 TUMWATER DESCHUTES VALLEY TRAIL\CAD\25-000313-C-IR-01.DWG





IRRIGATION DEMO AND INSTALLATION NOTES IR-03

SYMBOL	CODE	DESCRIPTION
DEMOLITION		
X	D-01	SALVAGE IRRIGATION HEAD AND PROVIDE TO OWNER.
~~	D-02	REMOVE ALL IRRIGATION MAINLINE AND LATERAL LINE PIPING AND CONTROL OR TRACE WIRE FROM ENTIRE TRAIL WIDTH PLUS ADDITIONAL 2'-0" MIN. ON EITHER SIDE OF TRAIL PAVEMENT, OR AS SHOWN. (TYP. FOR ENTIRE TRAIL LENGTH)
IRRIGATION		
	I-01	INSTALL NEW IRRIGATION PART-CIRCLE ROTOR HEAD 2'-0" FROM PROPOSED TRAIL EDGE OF PAVEMENT.
	I-02	CONNECT 2" LATERAL PIPE TO EXISTING LATERAL OR RELOCATED VALVE AS/WHERE SHOWN.
	I-03	INSTALL NEW IRRIGATION HEAD WHERE SHOWN. DISPOSE OF ALL PIPING AND WIRE REMOVED FROM GROUND OFF SITE. NO POPE OR WIRE SHALL BE SALVAGED AND REINSTALLED AS PART OF THIS PROJECT.

IRRIGATION SCHEDULE IR-03

SYMBOL	MANUFACTURER/MODEL/DESCRIPTION	PSI	RADIUS
36	RAIN BIRD 752-E 36 VALVE IN HEAD ROTOR FOR GOLF APPLICATIONS. STANDARD NOZZLES, FULL CIRCLE ARC. RADIUS IS 27FT. TO 84FT.. FLOW RATE IS 6.7 GPM TO 47 GPM. PRESSURE REGULATION RANGE FROM 50PSI TO 100PSI.	80	68'
SYMBOL	MANUFACTURER/MODEL/DESCRIPTION		
⊓	CAP FOR FUTURE USE CAP AT THE MAINLINE OR LATERAL LINE FOR FUTURE USE. THE PRESSURE AND FLOW PROVIDED TO THAT LOCATION ARE INDICATED NEXT TO THE CAP SYMBOL.		
———	IRRIGATION LATERAL LINE: PVC CLASS 200 SDR 21 BURY A MINIMUM OF 12" BELOW FINISHED GRADE. PLACE 24" BELOW GRADE UNDER PAVED SURFACED.		
— — — —	IRRIGATION MAINLINE: PVC SCHEDULE 40 BURY A MINIMUM OF 18" BELOW FINISHED GRADE, 24" BELOW PAVED SURFACES.		

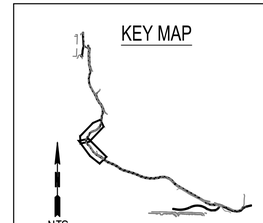
EXISTING IRRIGATION SYSTEM LEGEND

SYMBOL	DESCRIPTION
IM	EXISTING 4" OR 6" IRRIGATION MAINLINE PER AS-BUILT PLANS
IR	EXISTING 2" PVC IRRIGATION LATERAL LINE PER AS-BUILT PLANS
	EXISTING ISOLATION VALVE PER AS-BUILT PLANS
	EXISTING ISOLATION VALVE AS SURVEYED
	EXISTING VALVE-IN-HEAD ROTOR IRRIGATION HEADS PER AS-BUILT PLANS
	EXISTING VALVE-IN-HEAD ROTOR IRRIGATION HEADS AS SURVEYED
	PROPOSED SCHEDULE 40 2" PVC LATERAL LINES @ 24" DEPTH
NOT SHOWN	STATION & COMMON WIRE SIZE-AWG 14 GAUGE MINIMUM INSTALL ONE SPARE WIRE FOR ALL IRRIGATION ZONE WIRE RUNS

VALVE AND PIPING SCHEDULE

SYMBOL	DESCRIPTION
	SCHEDULE 40 3" PVC MAINLINE @ 30" DEPTH
	SCHEDULE 200 PVC LATERAL LINES @ 18" DEPTH
	SCHEDULE 40 PVC SLEEVES @ 24" DEPTH, 6" DIA. (UNLESS OTHERWISE INDICATED)
	EXISTING MANUAL LATERAL ISOLATION VALVE ASSEMBLY TO BE SALVAGED AND REINSTALLED.
	EXISTING MAINLINE GATE VALVE TO BE SALVAGED AND REINSTALLED ON NEW MAINLINE.
	EXISTING QUICK COUPLING VALVE TO BE SALVAGED AND REINSTALLED WHERE SHOWN.
NOT SHOWN	*STATION AND COMMON WIRE SIZE - AWG 14 GAUGE MINIMUM INSTALL ONE SPARE WIRE FOR ALL IRRIGATION ZONE WIRE RUNS*

KEY MAP



△	REVISIONS	DATE	BY

DESIGNED BY: L. ZEPEDA | ISSUE DATE: MAY 2026
DRAWN BY: L. ZEPEDA | JOB No.: 25-000313
APPROVED BY: T. GRANTHAM | DRAWING FILE No.: 25-000313-C-IR-01

ALL DIMENSIONS SHOWN IN FEET UNLESS OTHERWISE DESIGNATED

STATE OF WASHINGTON TRENT L. GRANTHAM NO. 843 EXP. 07/22/2026 LANDSCAPE ARCHITECT

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8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
P: 360.352.1465
SCJALLIANCE.COM

PROJECT NAME:

CITY OF TUMWATER

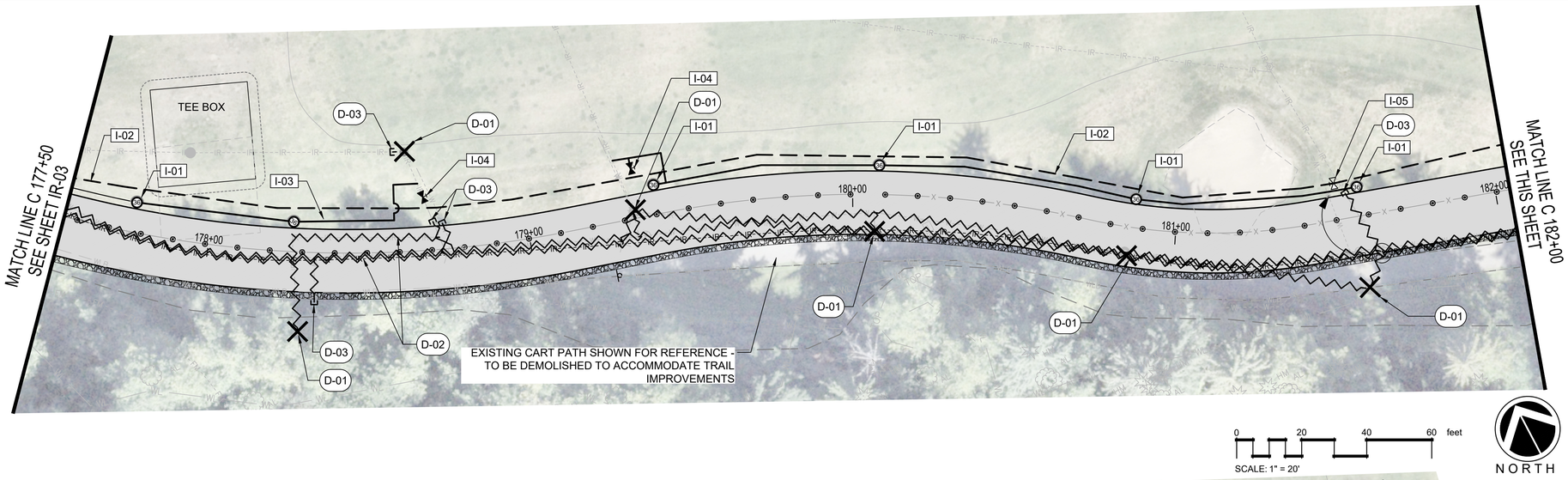
DESCHUTES VALLEY TRAIL
SEGMENT C

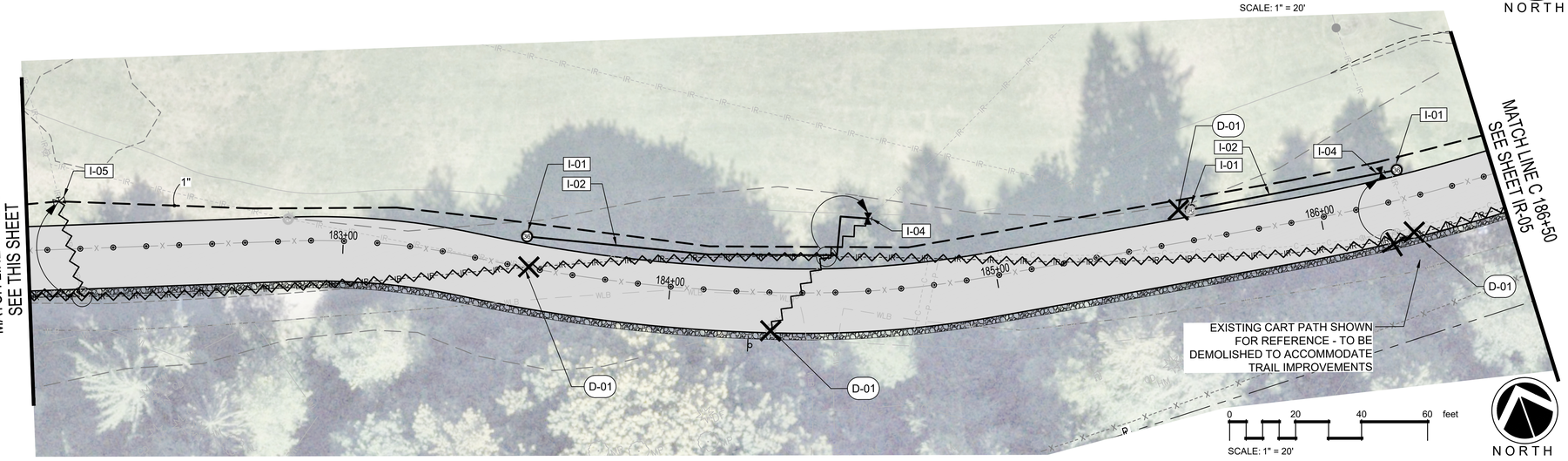
IRRIGATION MODIFICATION PLAN
C 168+50 - C 177+50

DRAWING No.: IR-03

SHEET No.: 137 OF 147

Aug 20, 2026 12:49:56pm - User: audreyjolsen
N:\PROJECTS\2025 CITY OF TUMWATER\25-000313 TUMWATER DESCHUTES VALLEY TRAIL\CADD\25-000313-C-IR-01.DWG





REFERENCE NOTES SCHEDULE IR-04

SYMBOL	CODE	DESCRIPTION
DEMOLITION		
	D-01	SALVAGE IRRIGATION HEAD AND PROVIDE TO OWNER.
	D-02	REMOVE ALL IRRIGATION MAINLINE AND LATERAL LINE PIPING AND CONTROL OR TRACE WIRE FROM ENTIRE TRAIL WIDTH PLUS ADDITIONAL 2'-0" MIN. ON EITHER SIDE OF TRAIL PAVEMENT, OR AS SHOWN. (TYP. FOR ENTIRE TRAIL LENGTH)
	D-03	CUT IRRIGATION LATERAL PIPE AND CAP. ABANDON IRRIGATION PIPE AND WIRE DOWNSTREAM OF CUT, OR BETWEEN CUTS, IN PLACE.
IRRIGATION		
	I-01	INSTALL NEW IRRIGATION PART-CIRCLE ROTOR HEAD 2'-0" FROM PROPOSED TRAIL EDGE OF PAVEMENT.
	I-02	CONNECT 2" LATERAL PIPE TO EXISTING LATERAL OR RELOCATED VALVE AS/WHERE SHOWN.
	I-03	REROUTE MAINLINE. CUT EX. MAINLINE AND CONNECT NEW 4" IRRIGATION MAINLINE, LOCATE 6'-0" FROM PROPOSED TRAIL EDGE OF PAVEMENT, OR WHERE SHOWN.
	I-04	SALVAGE EX. MANUAL LATERAL ISOLATION VALVE ASSEMBLY AND REINSTALL AT NEW LATERAL CONNECTION TO NEW MAINLINE.
	I-05	SALVAGE EX. 4" MAINLINE GATE VALVE AND REINSTALL ON NEW 4" MAINLINE WHERE SHOWN.

IRRIGATION SCHEDULE IR-04

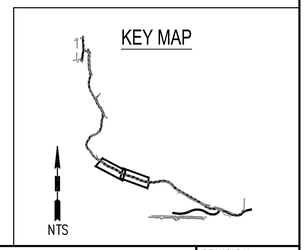
SYMBOL	MANUFACTURER/MODEL/DESCRIPTION	PSI	RADIUS
36	RAIN BIRD 752-E 36 VALVE IN HEAD ROTOR FOR GOLF APPLICATIONS. STANDARD NOZZLES, FULL CIRCLE ARC. RADIUS IS 27FT. TO 84FT.. FLOW RATE IS 6.7 GPM TO 47 GPM. PRESSURE REGULATION RANGE FROM 50PSI TO 100PSI.	80	68'
SYMBOL	MANUFACTURER/MODEL/DESCRIPTION		
	EXISTING LATERAL ISOLATION VALVE EXISTING MANUAL LATERAL ISOLATION VALVE ASSEMBLY TO BE SALVAGED AND REINSTALLED		
	CAP FOR FUTURE USE CAP AT THE MAINLINE OR LATERAL LINE FOR FUTURE USE. THE PRESSURE AND FLOW PROVIDED TO THAT LOCATION ARE INDICATED NEXT TO THE CAP SYMBOL.		
	IRRIGATION LATERAL LINE: PVC CLASS 200 SDR 21 BURY A MINIMUM OF 12" BELOW FINISHED GRADE. PLACE 24" BELOW GRADE UNDER PAVED SURFACED.		
	IRRIGATION MAINLINE: PVC SCHEDULE 40 BURY A MINIMUM OF 18" BELOW FINISHED GRADE, 24" BELOW PAVED SURFACES.		

EXISTING IRRIGATION SYSTEM LEGEND

SYMBOL	DESCRIPTION
IM	EXISTING 4" OR 6" IRRIGATION MAINLINE PER AS-BUILT PLANS
IR	EXISTING 2" PVC IRRIGATION LATERAL LINE PER AS-BUILT PLANS
	EXISTING ISOLATION VALVE PER AS-BUILT PLANS
	EXISTING ISOLATION VALVE AS SURVEYED
	EXISTING VALVE-IN-HEAD ROTOR IRRIGATION HEADS PER AS-BUILT PLANS
	EXISTING VALVE-IN-HEAD ROTOR IRRIGATION HEADS AS SURVEYED
	PROPOSED SCHEDULE 40 2" PVC LATERAL LINES @ 24" DEPTH
NOT SHOWN	STATION & COMMON WIRE SIZE-AWG 14 GAUGE MINIMUM INSTALL ONE SPARE WIRE FOR ALL IRRIGATION ZONE WIRE RUNS

VALVE AND PIPING SCHEDULE

SYMBOL	DESCRIPTION
	SCHEDULE 40 3" PVC MAINLINE @ 30" DEPTH
	SCHEDULE 200 PVC LATERAL LINES @ 18" DEPTH
	SCHEDULE 40 PVC SLEEVES @ 24" DEPTH, 6" DIA. (UNLESS OTHERWISE INDICATED)
	EXISTING MANUAL LATERAL ISOLATION VALVE ASSEMBLY TO BE SALVAGED AND REINSTALLED.
	EXISTING MAINLINE GATE VALVE TO BE SALVAGED AND REINSTALLED ON NEW MAINLINE.
	EXISTING QUICK COUPLING VALVE TO BE SALVAGED AND REINSTALLED WHERE SHOWN.
NOT SHOWN	*STATION AND COMMON WIRE SIZE - AWG 14 GAUGE MINIMUM INSTALL ONE SPARE WIRE FOR ALL IRRIGATION ZONE WIRE RUNS*



△	REVISIONS	DATE	BY

DESIGNED BY: L. ZEPEDA	ISSUE DATE: MAY 2026
DRAWN BY: L. ZEPEDA	JOB No.: 25-000313
APPROVED BY: T. GRANTHAM	DRAWING FILE No.: 25-000313-C-IR-01

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PROJECT NAME:

CITY OF TUMWATER

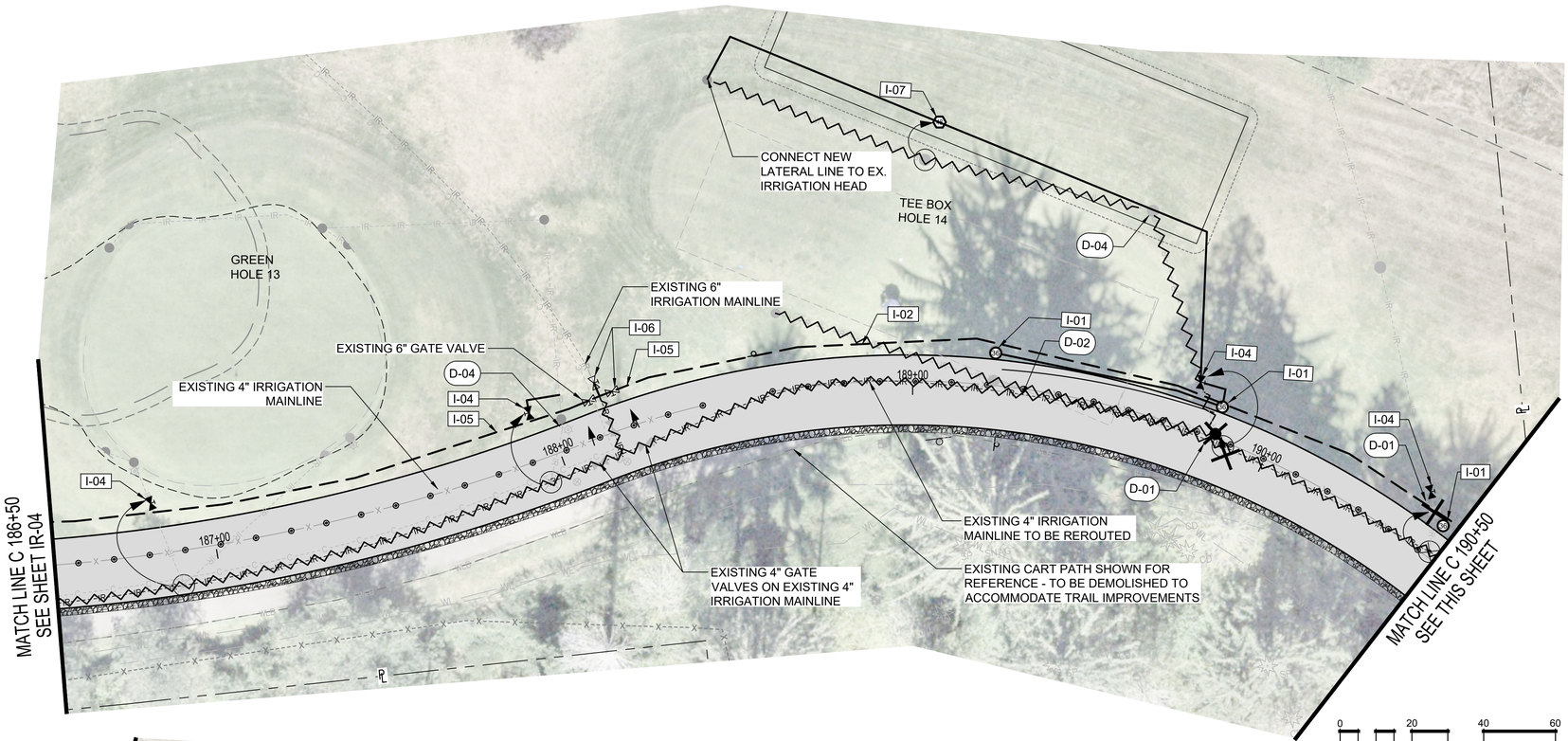
DESCHUTES VALLEY TRAIL
SEGMENT C

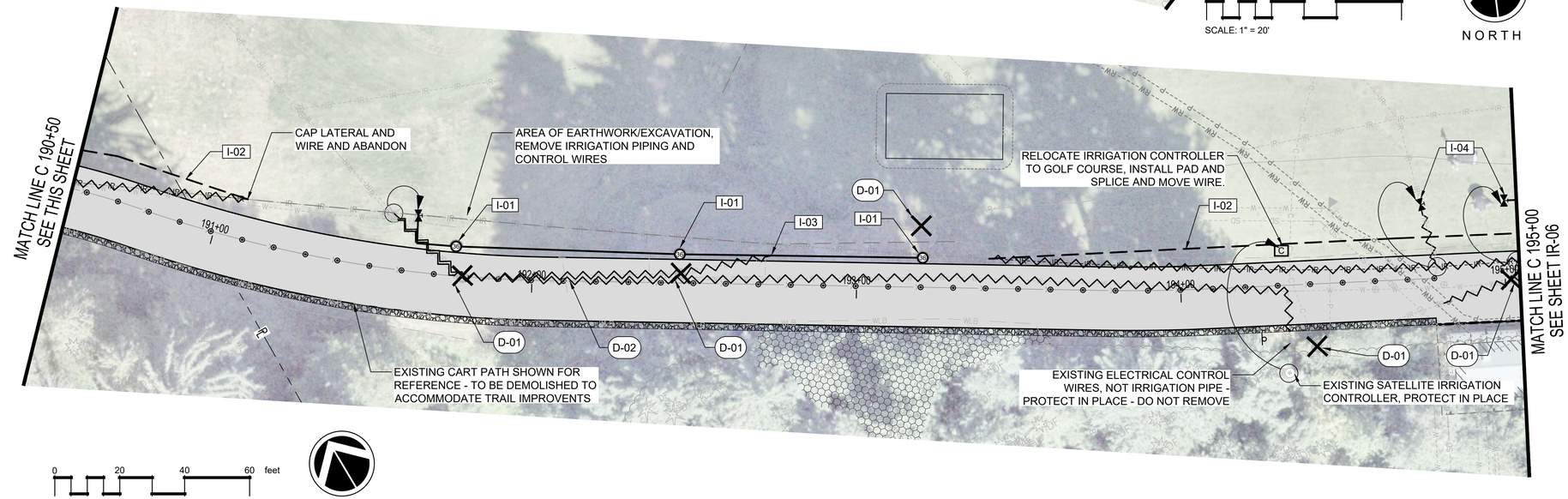
IRRIGATION MODIFICATION PLAN
C 177+50 - C 186+50

DRAWING No.: IR-04

SHEET No.: 138 OF 147

Aug 20, 2026 1:25:10pm - User: aufreg.nielsen
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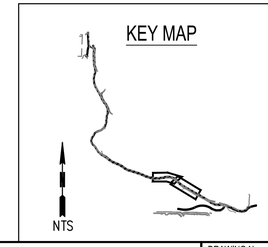
REFERENCE NOTES SCHEDULE IR-05

SYMBOL	CODE	DESCRIPTION
DEMOLITION		
	D-01	SALVAGE IRRIGATION HEAD AND PROVIDE TO OWNER.
	D-02	REMOVE ALL IRRIGATION MAINLINE AND LATERAL LINE PIPING AND CONTROL OR TRACE WIRE FROM ENTIRE TRAIL WIDTH PLUS ADDITIONAL 2'-0" MIN. ON EITHER SIDE OF TRAIL PAVEMENT, OR AS SHOWN. (TYP. FOR ENTIRE TRAIL LENGTH)
	D-03	PROTECT AND RETAIN IRRIGATION HEAD (AND LATERAL LINE) IN PLACE.
IRRIGATION		
	I-01	INSTALL NEW IRRIGATION PART-CIRCLE ROTOR HEAD 2'-0" FROM PROPOSED TRAIL EDGE OF PAVEMENT.
	I-02	CONNECT 2" LATERAL PIPE TO EXISTING LATERAL OR RELOCATED VALVE AS/WHERE SHOWN.
	I-03	REROUTE MAINLINE. CUT EX. MAINLINE AND CONNECT NEW 4" IRRIGATION MAINLINE, LOCATE 6'-0" FROM PROPOSED TRAIL EDGE OF PAVEMENT, OR WHERE SHOWN.
	I-04	SALVAGE EX. MANUAL LATERAL ISOLATION VALVE ASSEMBLY AND REINSTALL AT NEW LATERAL CONNECTION TO NEW MAINLINE.
	I-05	SALVAGE EX. 4" MAINLINE GATE VALVE AND REINSTALL ON NEW 4" MAINLINE WHERE SHOWN.
	I-06	SALVAGE EX. GATE VALVE FROM 6" MAINLINE AND REINSTALL ON SAME 6" MAINLINE WHERE SHOWN.
	I-07	SALVAGE EX. IRRIGATION FULL-CIRCLE ROTOR HEAD AND REINSTALL IN LOCATION AS SHOWN.

IRRIGATION SCHEDULE IR-05

SYMBOL	MANUFACTURER/MODEL/DESCRIPTION	PSI	RADIUS
80	RAIN BIRD 752-E 36 VALVE IN HEAD ROTOR FOR GOLF APPLICATIONS. STANDARD NOZZLES, FULL CIRCLE ARC. RADIUS IS 27FT. TO 84FT.. FLOW RATE IS 6.7 GPM TO 47 GPM. PRESSURE REGULATION RANGE FROM 50PSI TO 100PSI.	80	68'
49	RAIN BIRD 952E 48 CLOSED CASE ROTOR FOR GOLF APPLICATIONS. ELECTRIC VALVE IN HEAD. TWO ROTORS IN ONE: FULL AND PART-CIRCLE. ADJUSTABLE ARC 30 TO 345 DEGREES AND FULL-CIRCLE 360 DEGREES. RADIUS IS 70FT. TO 101FT.. FLOW RATE IS 19.7 GPM TO 54.5 GPM. PRESSURE REGULATION RANGE FROM 60PSI TO 100PSI. STANDARD NOZZLE TRAJECTORY, 25 DEGREES.	80	79'
SYMBOL	MANUFACTURER/MODEL/DESCRIPTION		
	EXISTING LATERAL ISOLATION VALVE EXISTING MANUAL LATERAL ISOLATION VALVE ASSEMBLY TO BE SALVAGED AND REINSTALLED		
	EXISTING MAINLINE GATE VALVE EXISTING MAINLINE GATE VALVE TO BE SALVAGED AND REINSTALLED ON NEW MAINLINE.		
C	EXISTING IRRIGATION CONTROLLER		
	IRRIGATION LATERAL LINE: PVC CLASS 200 SDR 21 BURY A MINIMUM OF 12" BELOW FINISHED GRADE. PLACE 24" BELOW GRADE UNDER PAVED SURFACED.		
	IRRIGATION MAINLINE: PVC SCHEDULE 40 BURY A MINIMUM OF 18" BELOW FINISHED GRADE, 24" BELOW PAVED SURFACES.		

KEY MAP



△	REVISIONS	DATE	BY

DESIGNED BY: L. ZEPEDA
DRAWN BY: L. ZEPEDA
APPROVED BY: T. GRANTHAM
ISSUE DATE: MAY 2026
JOB No.: 25-000313
DRAWING FILE No.: 25-000313-C-IR-01

ALL DIMENSIONS SHOWN IN FEET UNLESS OTHERWISE DESIGNATED

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8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
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PROJECT NAME:

CITY OF TUMWATER

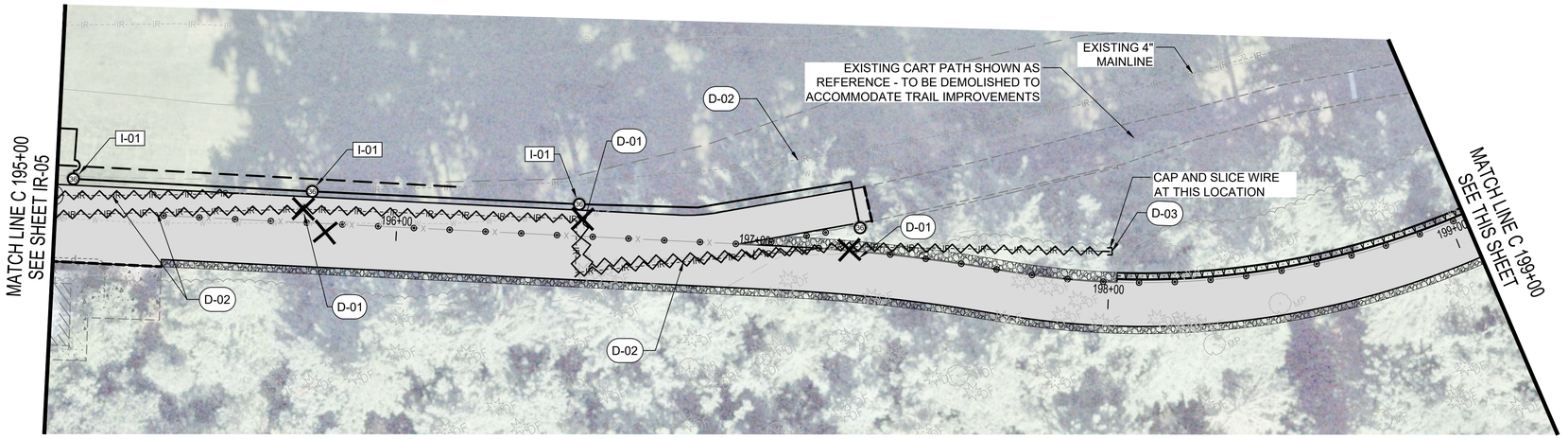
DESCHUTES VALLEY TRAIL
SEGMENT C

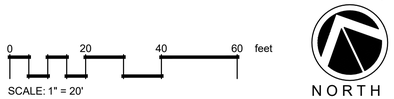
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C 186+50 - C 195+00

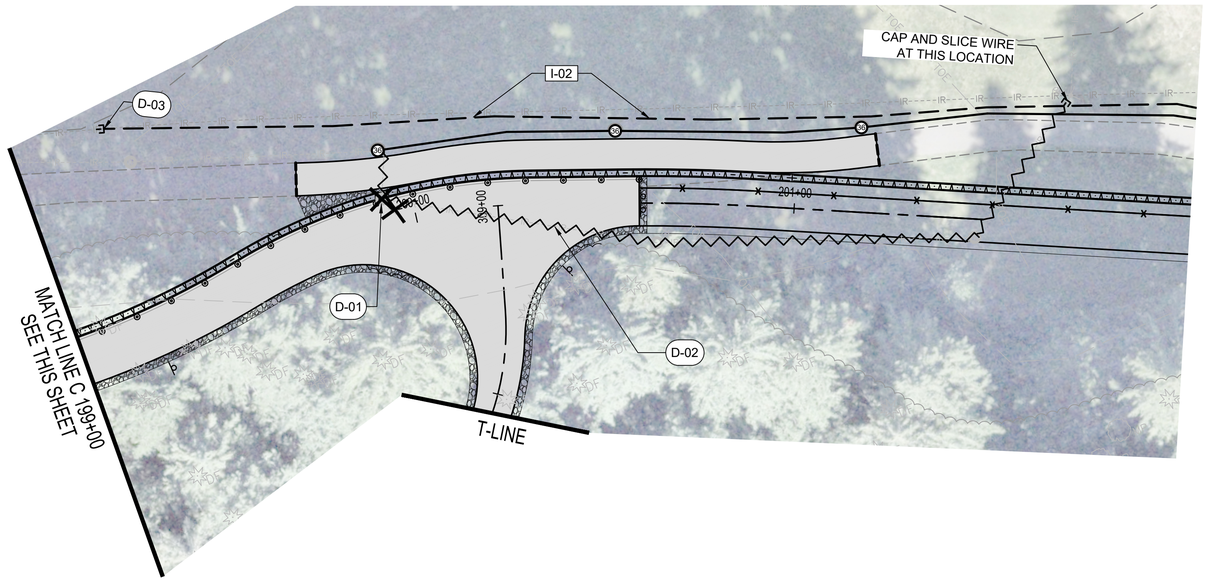
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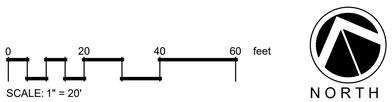
SHEET No.: 139 OF 147

Aug 20, 2026 - 1:29:34pm - User: audreyvieldsen
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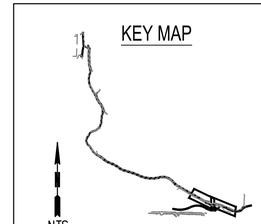
IRRIGATION DEMO AND INSTALLATION NOTES IR-06

SYMBOL	CODE	DESCRIPTION
DEMOLITION		
X	D-01	SALVAGE IRRIGATION HEAD AND PROVIDE TO OWNER.
~~	D-02	REMOVE ALL IRRIGATION MAINLINE AND LATERAL LINE PIPING AND CONTROL OR TRACE WIRE FROM ENTIRE TRAIL WIDTH PLUS ADDITIONAL 2'-0" MIN. ON EITHER SIDE OF TRAIL PAVEMENT, OR AS SHOWN. (TYP. FOR ENTIRE TRAIL LENGTH)
	D-03	CUT IRRIGATION LATERAL PIPE AND CAP. ABANDON IRRIGATION PIPE AND WIRE DOWNSTREAM OF CUT, OR BETWEEN CUTS, IN PLACE.
IRRIGATION		
	I-01	INSTALL NEW IRRIGATION PART-CIRCLE ROTOR HEAD 2'-0" FROM PROPOSED TRAIL EDGE OF PAVEMENT.
	I-02	REROUTE MAINLINE. CUT EX. MAINLINE AND CONNECT NEW 4" IRRIGATION MAINLINE, LOCATE 6'-0" FROM PROPOSED TRAIL EDGE OF PAVEMENT, OR WHERE SHOWN.
		DISPOSE OF ALL PIPING AND WIRE REMOVED FROM GROUND OFF SITE. NO POPE OR WIRE SHALL BE SALVAGED AND REINSTALLED AS PART OF THIS PROJECT.

IRRIGATION SCHEDULE IR-06

SYMBOL	MANUFACTURER/MODEL/DESCRIPTION	PSI	RADIUS
36	RAIN BIRD 752-E 36 VALVE IN HEAD ROTOR FOR GOLF APPLICATIONS. STANDARD NOZZLES, FULL CIRCLE ARC. RADIUS IS 27FT. TO 84FT.. FLOW RATE IS 6.7 GPM TO 47 GPM. PRESSURE REGULATION RANGE FROM 50PSI TO 100PSI.	80	68'
SYMBOL	MANUFACTURER/MODEL/DESCRIPTION		
⊤	CAP FOR FUTURE USE CAP AT THE MAINLINE OR LATERAL LINE FOR FUTURE USE. THE PRESSURE AND FLOW PROVIDED TO THAT LOCATION ARE INDICATED NEXT TO THE CAP SYMBOL.		
———	IRRIGATION LATERAL LINE: PVC CLASS 200 SDR 21 BURY A MINIMUM OF 12" BELOW FINISHED GRADE. PLACE 24" BELOW GRADE UNDER PAVED SURFACED.		
— — — —	IRRIGATION MAINLINE: PVC SCHEDULE 40 BURY A MINIMUM OF 18" BELOW FINISHED GRADE, 24" BELOW PAVED SURFACES.		

KEY MAP



△	REVISIONS	DATE	BY

DESIGNED BY: L. ZEPEDA
DRAWN BY: L. ZEPEDA
APPROVED BY: T. GRANTHAM
ISSUE DATE: MAY 2026
JOB No.: 25-000313
DRAWING FILE No.: 25-000313-C-IR-01

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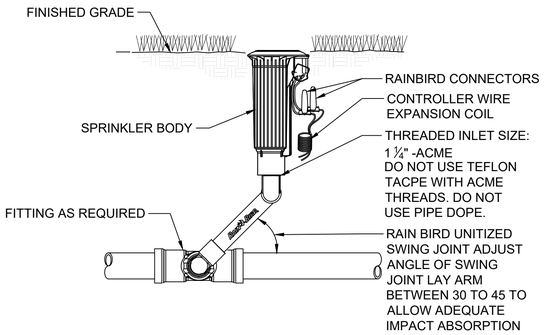
PROJECT NAME:
CITY OF TUMWATER

DESCHUTES VALLEY TRAIL
SEGMENT C

IRRIGATION MODIFICATION PLAN
C 195+00 - C 203+00 & T 308+50 - T 309+05

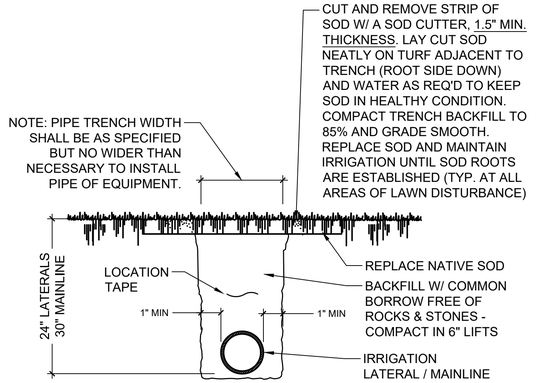
DRAWING No.: IR-06
SHEET No.: 140 OF 147

Aug 20, 2026 1:30:58pm - User audreyvielsen
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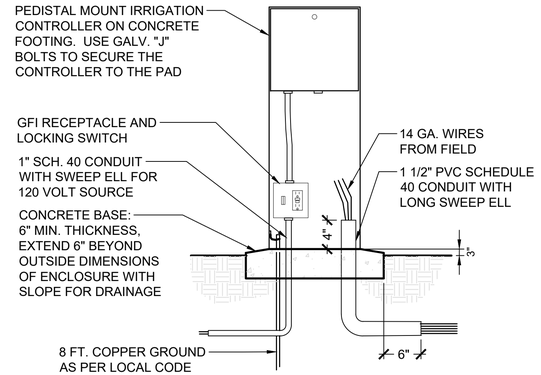
1 POP-UP SPRINKLER HEAD

N.T.S. P-PA-DVT-DVTD-05



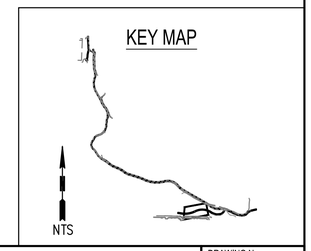
2 TYPICAL IRRIGATION PIPE TRENCH

N.T.S. P-PA-DVT-DVTD-07



3 PEDESTAL MOUNT CONTROLLER

1" = 1'-0" P-PA-DVT-DVTC-06



△	REVISIONS	DATE	BY

DESIGNED BY: L. ZEPEDA	ISSUE DATE: MAY 2026
DRAWN BY: L. ZEPEDA	JOB No.: 25-000313
APPROVED BY: T. GRANTHAM	DRAWING FILE No.: 25-000313-C-IR-01

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PROJECT NAME:

CITY OF TUMWATER

DESCHUTES VALLEY TRAIL
SEGMENT C

IRRIGATION MODIFICATION PLAN
C 203+00 - C 203+34

DRAWING No.: IR-07

SHEET No.: 141 OF 147

Aug 20, 2026 12:48:19pm - User: aufreynielsen
N:\PROJECTS\0625 CITY OF TUMWATER\25-000313 TUMWATER DESCHUTES VALLEY TRAIL\CADD\25-000313-C-IR-01.DWG

CONTRACTOR INSTALLATION AND PLANTING PLAN MITIGATION NOTES:

THE OVERALL GOAL OF THE MITIGATION WILL BE TO DECREASE WEEDY VEGETATION AND REPLACE WITH A SUITE OF NATIVE PLANTS THAT CAN PROVIDE A WIDER RANGE OF HABITAT OPPORTUNITIES FOR BIRDS AND SMALL MAMMALS IN THE AREA. THE CONTRACTOR SHALL ENSURE THAT THE MINIMUM PERFORMANCE STANDARDS OF THE MITIGATION PLANTING PLAN TECHNICAL MEMO COMPLETED IN JUNE 2026 BY LAND SERVICES NW ARE MET AND FOLLOW THE INSTALLATION AND PLANTING PLAN PHASES BELOW.

PHASE 1: WEED REMOVAL AND SITE PREPARATION

- CONTRACTOR TO PREPARE THE MITIGATION AREAS FOR PLANTING BY CLEARING THE PLANTING AREAS OF GARBAGE AND WEEDY PLANT SPECIES.
- CONTRACTOR SHALL TREAT REED CANARY GRASS AT LEAST 2 MONTHS PRIOR TO PLANTING.
- CONTRACTOR SHALL REMOVE INVASIVE SPECIES IN EARLY SUMMER.

PHASE 2: MITIGATION AREA PREP AND PLANTING SIGNAGE

- CONTRACTOR TO PROVIDE SURFACE MULCHING 3–4 INCHES DEEP AROUND NEW PLANTS.
- PLANTING OF THE MITIGATION AREA WILL BE CARRIED OUT WHEN PLANTS ARE DORMANT BETWEEN LATE FALL AND EARLY SPRING, FOLLOWING COMPLETION OF PHASE 1.
- PLANTINGS SHALL BE INSTALLED WITH PROTECTIVE WIRE CAGES TO PREVENT DAMAGE.
- PLANT SPECIES LISTS FOR BUFFER AREAS ARE PROVIDED ON SHEET WM–06.

PHASE 3: PLANT ESTABLISHMENT

- THE CONTRACTOR IS RESPONSIBLE FOR 1 YEAR OF PLANT ESTABLISHMENT PER THE WSDOT STANDARD SPECIFICATIONS.
- ADDITIONAL MONITORING WILL BE REQUIRED BY OTHERS.

CITY OF TUMWATER WILL ENSURE THE CONTRACTOR IS FOLLOWING ALL INSTALLATION AND PLANTING PLAN PHASES. THE CITY IS RESPONSIBLE FOR MAKING SURE THE ANNUAL MONITORING IS CARRIED OUT CORRECTLY. MONITORING IMMEDIATELY AFTER INSTALLATION (BY THE CITY) WILL CONSIST OF:

- EVALUATION OF THE PLANTINGS IMMEDIATELY AFTER INSTALLATION CONSTRUCTION TO DOCUMENT HOW THE PLAN WAS FOLLOWED;
- DOCUMENTATION OF CHANGES TO THE PLANTING PLAN;
- DOCUMENTATION THAT PLANTS WERE INSTALLED APPROPRIATELY; AND
- DOCUMENTATION OF WHAT PLANTS WERE INSTALLED OR SUBSTITUTED.

△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ
DRAWN BY: M. HENDRICKS-MATSUDA
APPROVED BY: P. HOLM
ISSUE DATE: AUGUST 2026
JOB No.: 25-000313
DRAWING FILE No.: _25-000313-WM-05

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PATRICK HOLM — STATE OF WASHINGTON — 49470 — REGISTERED PROFESSIONAL ENGINEER — PRELIMINARY

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8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
P: 360.352.1465
SCJALLIANCE.COM

PROJECT NAME:

CITY OF TUMWATER

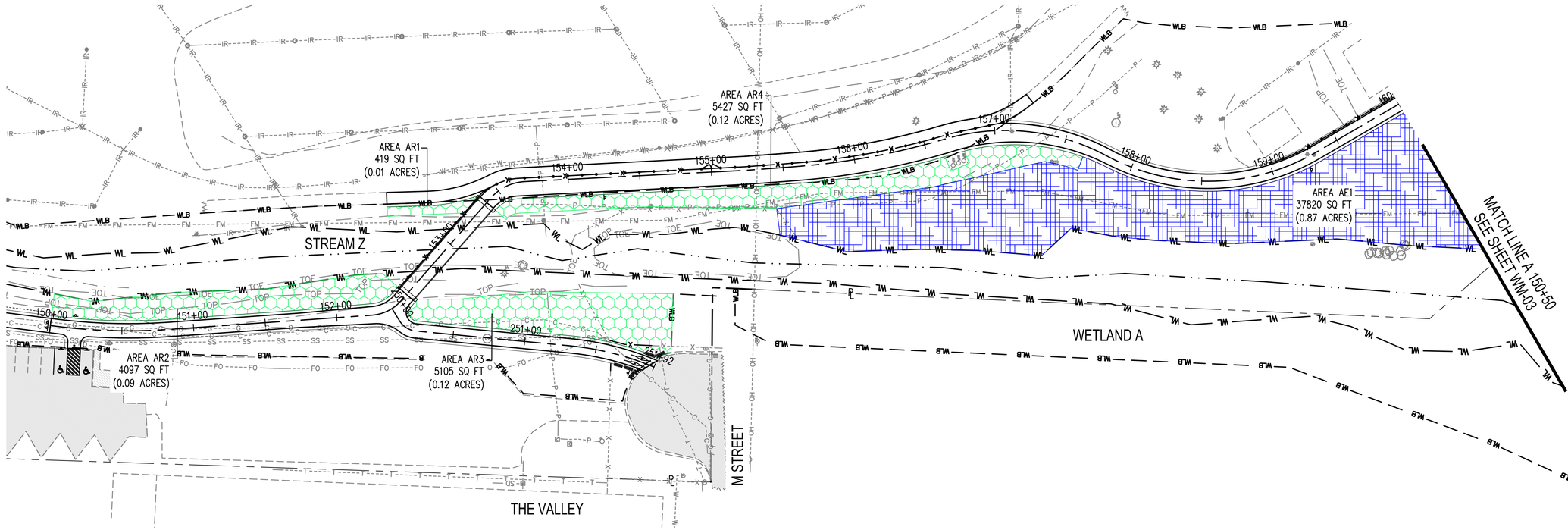
DESCHUTES VALLEY TRAIL
SEGMENT C

WETLAND MITIGATION NOTES

DRAWING No.: WM-01

SHEET No.: 142 OF 148

Aug 20, 2026 12:47:31pm – User: audreyvieleen
N:\PROJECTS\0625 CITY OF TUMWATER\25-000313 TUMWATER DESCHUTES VALLEY TRAIL\CADD_25-000313-WM-05.DWG



0 40 80
SCALE IN FEET

LEGEND

- EDGE OF PAVEMENT
- GRAVEL SHOULDER
- EDGE OF FAIRWAY
- PROPERTY LINE
- STREAM
- WETLAND DELINEATION
- WETLAND BUFFER
- REHABILITATED AREA
- ENHANCED AREA

GENERAL NOTES:

FOR BUFFER ENHANCEMENT AND REHABILITATION AREA PLANTING SPECIES AND PLANT COUNT, SEE TABLES ON SHEET 4 AND THE SPECIAL PROVISIONS.

KEY MAP

NTS

△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ
DRAWN BY: M. HENDRICKS-MATSUDA
APPROVED BY: P. HOLM
ISSUE DATE: AUGUST 2026
JOB No.: 25-000313
DRAWING FILE No.: _25-000313-WM-01

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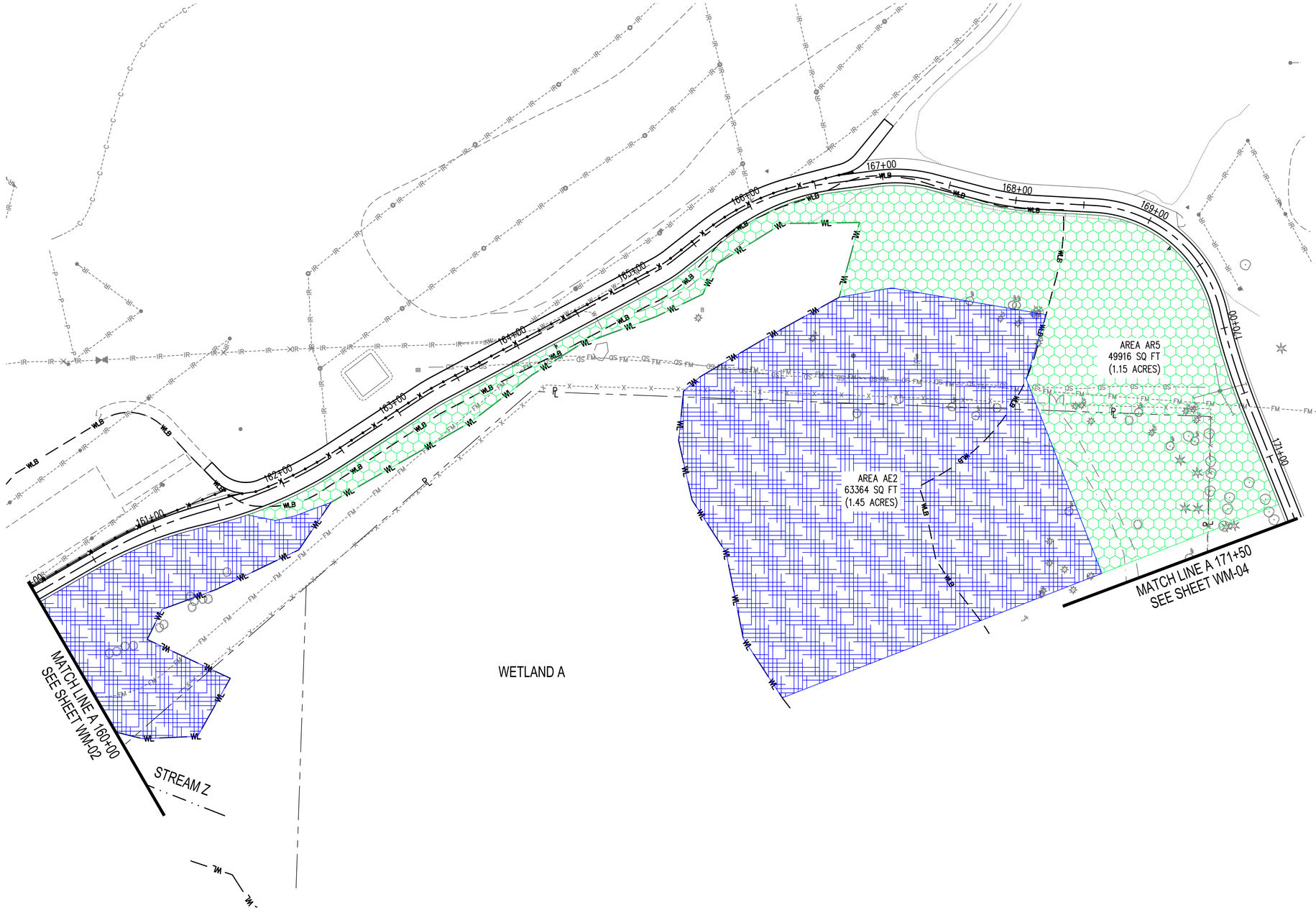
PROJECT NAME:
CITY OF TUMWATER

DESCHUTES VALLEY TRAIL
SEGMENT C

WETLAND MITIGATION PLAN
A 150+00 - A 150+50

DRAWING No.: WM-02
SHEET No.: 143 OF 148

Aug 20, 2026 1:17:38pm – User: ourkeynielsen
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0 40 80
SCALE IN FEET

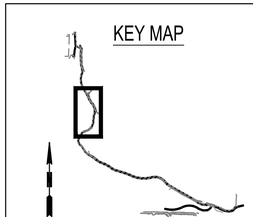
LEGEND

- EDGE OF PAVEMENT
- GRAVEL SHOULDER
- EDGE OF FAIRWAY
- PROPERTY LINE
- STREAM
- WL — WETLAND DELINEATION
- WLB — WETLAND BUFFER
- REHABILITATED AREA
- ENHANCED AREA

GENERAL NOTES:

FOR BUFFER EHANCEMENT AND REHABILITATION AREA PLANTING SPECIES AND PLANT COUNT, SEE TABLES ON SHEET 4 AND THE SPECIAL PROVISIONS.

KEY MAP



NTS

△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ
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ISSUE DATE: AUGUST 2026
JOB No.: 25-000313
DRAWING FILE No.: _25-000313-WM-02

ALL DIMENSIONS SHOWN IN FEET UNLESS OTHERWISE DESIGNATED

PATRICK HOLM — STATE OF WASHINGTON — 49470 — REGISTERED PROFESSIONAL ENGINEER — PRELIMINARY

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CONSULTING SERVICES
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PROJECT NAME:
CITY OF TUMWATER

DESCHUTES VALLEY TRAIL
SEGMENT C

WETLAND MITIGATION PLAN
A 160+00 - A 171+50

DRAWING No.: WM-03
SHEET No.: 144 OF 148

Aug 20, 2026 1:43:27pm - User: aufreynielsen
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0 40 80
SCALE IN FEET

LEGEND

- EDGE OF PAVEMENT
- GRAVEL SHOULDER
- EDGE OF FAIRWAY
- PROPERTY LINE
- STREAM
- WL — WETLAND DELINEATION
- WLB — WETLAND BUFFER
- REHABILITATED AREA
- ENHANCED AREA

GENERAL NOTES:

FOR BUFFER EHANCEMENT AND REHABILITATION AREA PLANTING SPECIES AND PLANT COUNT, SEE TABLES ON SHEET 4 AND THE SPECIAL PROVISIONS.

MATCH LINE A 171+50
SEE SHEET WM-03

MATCH LINE A 184+00
SEE SHEET WM-05

AREA BR1
3558 SQ FT
(0.08 ACRES)

AREA BR2
10862 SQ FT
(0.25 ACRES)

AREA BE1
28684 SQ FT
(0.66 ACRES)

AREA BE2
24482 SQ FT
(0.56 ACRES)

WETLAND B

STREAM Y

171+00 172+00 173+00 174+00 175+00 176+00 177+00 178+00 179+00 180+00 181+00 182+00 183+00 184+00

KEY MAP

NTS

REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ
DRAWN BY: M. HENDRICKS-MATSUDA
APPROVED BY: P. HOLM
ISSUE DATE: AUGUST 2026
JOB No.: 25-000313
DRAWING FILE No.: _25-000313-WM-03

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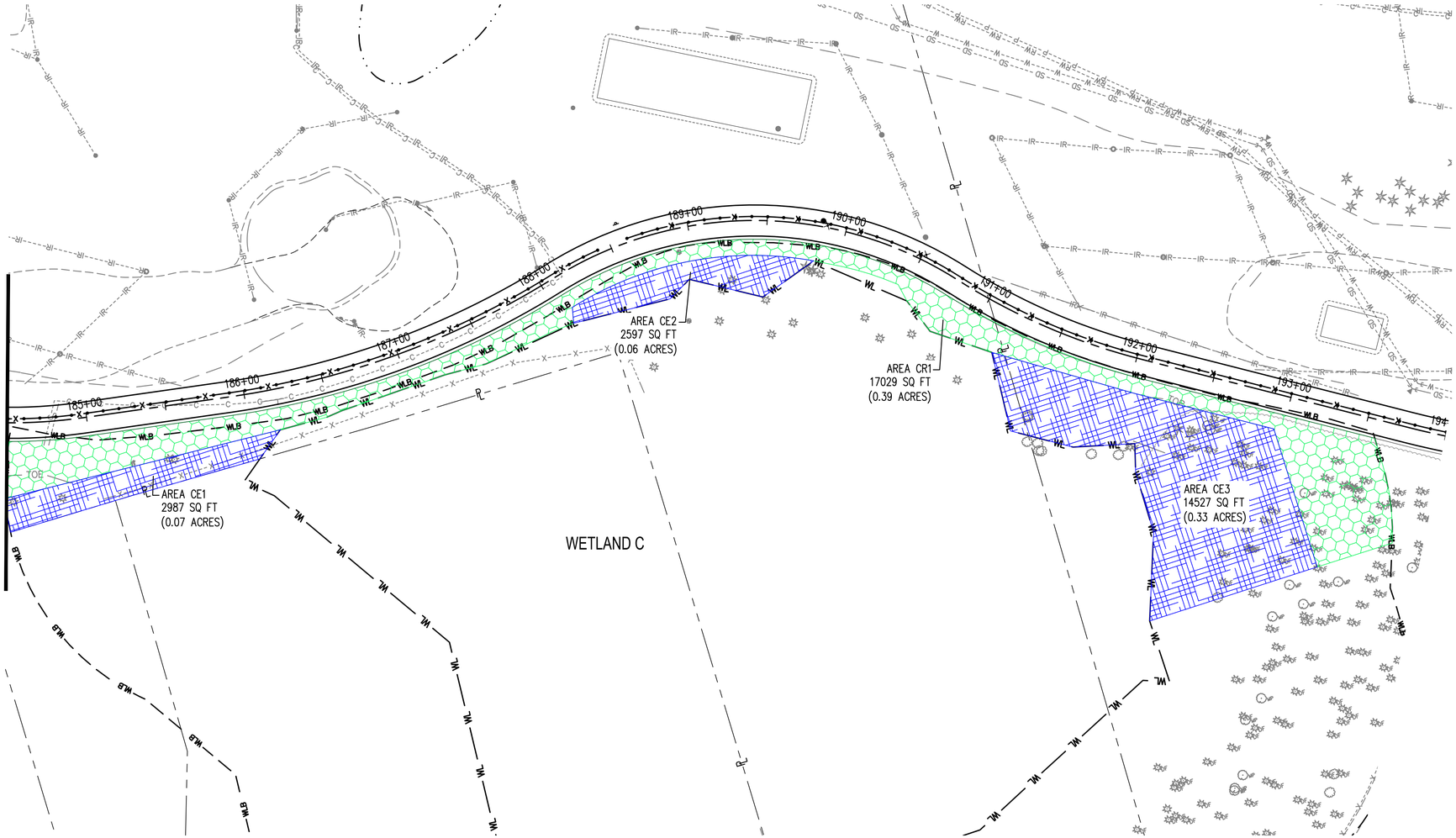
PROJECT NAME:
CITY OF TUMWATER

DESCHUTES VALLEY TRAIL
SEGMENT C

WETLAND MITIGATION PLAN
A 171+50 - A 184+00

DRAWING No.: WM-04
SHEET No.: 145 OF 148

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0 40 80

SCALE IN FEET

LEGEND

- EDGE OF PAVEMENT
- GRAVEL SHOULDER
- EDGE OF FAIRWAY
- PROPERTY LINE
- STREAM
- WL — WETLAND DELINEATION
- WLB — WETLAND BUFFER
- REHABILITATED AREA
- ENHANCED AREA

GENERAL NOTES:

FOR BUFFER ENHANCEMENT AND REHABILITATION AREA PLANTING SPECIES AND PLANT COUNT, SEE TABLES ON SHEET 4 AND THE SPECIAL PROVISIONS.

KEY MAP

NTS

△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ
DRAWN BY: M. HENDRICKS-MATSUDA
APPROVED BY: P. HOLM
ISSUE DATE: AUGUST 2026
JOB No.: 25-000313
DRAWING FILE No.: _25-000313-WM-04

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PROJECT NAME:

CITY OF TUMWATER

DESCHUTES VALLEY TRAIL
SEGMENT C

WETLAND MITIGATION PLAN
A 184+50 - A 194+00

DRAWING No.: WM-05

SHEET No.: 146 OF 148

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DESCHUTES VALLEY TRAIL

POLYGON	AREA (SQ FT)	SPECIES LIST	PLANT COUNT	COMMENT
NOTE: ALL PLANTING DESCRIBES BELOW IS ONLY TO OCCUR AFTER INITIAL REMOVAL OF GARBAGE AND WEED CONTROL IS DEEMED COMPLETE BY THE CITY OF TUMWATER.				
AE1 ENHANCED	37,820	PACIFIC WILLOW (SALIX.LASSIANDRA) SITKA SPUCE (PICEA.SITCHENSIS) WESTERN HEMLOCK (TSUGA.HETEROPHYLLA) NOOTKA ROSE (RANUNCULUS.OCCIDENTALIS) PACIFIC NINEBARK (PHYSOCARPUS.CAPITATUS) DOUGLAS HAWTHORNE (CRATAEGUS.DOUGLASII) OSOBERRY (OEMLERIA.CERASIFORMIS) SLOUGH SEDGE (CAREX OBNUPTA)	40 80 56 100 100 100 43 100	5 GAL @ 15 FT. O.C. SPACING 1 GAL @ 15 FT. O.C. SPACING 1 GAL @ 15 FT. O.C. SPACING 1 GAL @ 5 FT. O.C. SPACING 1 GAL @ 8 FT. O.C. SPACING 1 GAL @ 8 FT. O.C. SPACING 1 GAL @ 8 FT. O.C. SPACING 1 GAL @ 5 FT. O.C. SPACING
AE2 ENHANCED	63,364	PACIFIC WILLOW (SALIX.LASSIANDRA) SITKA SPUCE (PICEA.SITCHENSIS) WESTERN HEMLOCK (TSUGA.HETEROPHYLLA) NOOTKA ROSE (RANUNCULUS.OCCIDENTALIS) PACIFIC NINEBARK (PHYSOCARPUS.CAPITATUS) DOUGLAS HAWTHORNE (CRATAEGUS.DOUGLASII) OSOBERRY (OEMLERIA.CERASIFORMIS) SLOUGH SEDGE (CAREX OBNUPTA)	60 120 84 150 150 150 64 150	5 GAL @ 15 FT. O.C. SPACING 1 GAL @ 15 FT. O.C. SPACING 1 GAL @ 15 FT. O.C. SPACING 1 GAL @ 5 FT. O.C. SPACING 1 GAL @ 8 FT. O.C. SPACING 1 GAL @ 8 FT. O.C. SPACING 1 GAL @ 8 FT. O.C. SPACING 1 GAL @ 5 FT. O.C. SPACING
AR1 REHABILITATED	419	SITKA SPRUCE (PICEA SITCHENSIS) BITTER CHERRY (PRUNUS EMARGINATA) BLACK COTTONWOOD (POPULUS BALSAMIFER) VINE MAPLE (ACER CIRCINATUM) PACIfiC CRABAPPLE (MALUS.FUSCA) SALMONBERRY (RUBUS.SPECTABILIS) RED ELDERBERRY (SAMBUCA.RACEMOSA) MOCK ORANGE (PHILADELPHUS.LEWISII) OCEANSPRAY (HOLODISCUS.DISCOLOR)	1 1 1 10 1 2 1 1 1	1 GAL @ 15 FT. O.C. SPACING 1 GAL @ 15 FT. O.C. SPACING 1 GAL @ 15 FT. O.C. SPACING 1 GAL @ 8 FT. O.C. SPACING 1 GAL @ 5 FT. O.C. SPACING 1 GAL @ 5 FT. O.C. SPACING 1 GAL @ 5 FT. O.C. SPACING 1 GAL @ 8 FT. O.C. SPACING 1 GAL @ 8 FT. O.C. SPACING
AR2 REHABILITATED	4,097	SITKA SPRUCE (PICEA SITCHENSIS) BITTER CHERRY (PRUNUS EMARGINATA) BLACK COTTONWOOD (POPULUS BALSAMIFER) VINE MAPLE (ACER CIRCINATUM) PACIfiC CRABAPPLE (MALUS.FUSCA) SALMONBERRY (RUBUS.SPECTABILIS) RED ELDERBERRY (SAMBUCA.RACEMOSA) MOCK ORANGE (PHILADELPHUS.LEWISII) OCEANSPRAY (HOLODISCUS.DISCOLOR)	7 7 7 70 7 14 8 7 7	1 GAL @ 15 FT. O.C. SPACING 1 GAL @ 15 FT. O.C. SPACING 1 GAL @ 15 FT. O.C. SPACING 1 GAL @ 8 FT. O.C. SPACING 1 GAL @ 5 FT. O.C. SPACING 1 GAL @ 5 FT. O.C. SPACING 1 GAL @ 5 FT. O.C. SPACING 1 GAL @ 8 FT. O.C. SPACING 1 GAL @ 8 FT. O.C. SPACING
AR3 REHABILITATED	5,105	SITKA SPRUCE (PICEA SITCHENSIS) BITTER CHERRY (PRUNUS EMARGINATA) BLACK COTTONWOOD (POPULUS BALSAMIFER) VINE MAPLE (ACER CIRCINATUM) PACIfiC CRABAPPLE (MALUS.FUSCA) SALMONBERRY (RUBUS.SPECTABILIS) RED ELDERBERRY (SAMBUCA.RACEMOSA) MOCK ORANGE (PHILADELPHUS.LEWISII) OCEANSPRAY (HOLODISCUS.DISCOLOR)	8 8 8 80 8 16 9 8 8	1 GAL @ 15 FT. O.C. SPACING 1 GAL @ 15 FT. O.C. SPACING 1 GAL @ 15 FT. O.C. SPACING 1 GAL @ 8 FT. O.C. SPACING 1 GAL @ 5 FT. O.C. SPACING 1 GAL @ 5 FT. O.C. SPACING 1 GAL @ 5 FT. O.C. SPACING 1 GAL @ 8 FT. O.C. SPACING 1 GAL @ 8 FT. O.C. SPACING

POLYGON	AREA (SQ FT)	SPECIES LIST	PLANT COUNT	COMMENT
NOTE: ALL PLANTING DESCRIBES BELOW IS ONLY TO OCCUR AFTER INITIAL REMOVAL OF GARBAGE AND WEED CONTROL IS DEEMED COMPLETE BY THE CITY OF TUMWATER.				
AR4 REHABILITATED	5,427	SITKA SPRUCE (PICEA SITCHENSIS) BITTER CHERRY (PRUNUS EMARGINATA) BLACK COTTONWOOD (POPULUS BALSAMIFER) VINE MAPLE (ACER CIRCINATUM) PACIfiC CRABAPPLE (MALUS.FUSCA) SALMONBERRY (RUBUS.SPECTABILIS) RED ELDERBERRY (SAMBUCA.RACEMOSA) MOCK ORANGE (PHILADELPHUS.LEWISII) OCEANSPRAY (HOLODISCUS.DISCOLOR)	9 9 9 90 9 18 10 9 9	1 GAL @ 15 FT. O.C. SPACING 1 GAL @ 15 FT. O.C. SPACING 1 GAL @ 15 FT. O.C. SPACING 1 GAL @ 8 FT. O.C. SPACING 1 GAL @ 5 FT. O.C. SPACING 1 GAL @ 5 FT. O.C. SPACING 1 GAL @ 5 FT. O.C. SPACING 1 GAL @ 8 FT. O.C. SPACING 1 GAL @ 8 FT. O.C. SPACING
AR5 REHABILITATED	49,916	SITKA SPRUCE (PICEA SITCHENSIS) BITTER CHERRY (PRUNUS EMARGINATA) BLACK COTTONWOOD (POPULUS BALSAMIFER) VINE MAPLE (ACER CIRCINATUM) PACIfiC CRABAPPLE (MALUS.FUSCA) SALMONBERRY (RUBUS.SPECTABILIS) RED ELDERBERRY (SAMBUCA.RACEMOSA) MOCK ORANGE (PHILADELPHUS.LEWISII) OCEANSPRAY (HOLODISCUS.DISCOLOR)	79 79 79 790 79 158 92 79 79	1 GAL @ 15 FT. O.C. SPACING 1 GAL @ 15 FT. O.C. SPACING 1 GAL @ 15 FT. O.C. SPACING 1 GAL @ 8 FT. O.C. SPACING 1 GAL @ 5 FT. O.C. SPACING 1 GAL @ 5 FT. O.C. SPACING 1 GAL @ 5 FT. O.C. SPACING 1 GAL @ 8 FT. O.C. SPACING 1 GAL @ 8 FT. O.C. SPACING
BE1 ENHANCED	28,684	WESTERN RED CEDAR (THUJA.PLICATA) SCOULERS WILLOW (SALIX.SCOULERIANA) OREGON ASH (FRAXINUS.LATIFOLIA) TWINBERRY (LONICERA.INVOLUCRATA) SALMONBERRY (RUBUS.SPECTABILIS) SCOULERS WILLOW (SALIX.SCOULERI) RED OSIER DOGWOOD (CORNUS.SERICEA) PACIfiC RHODODENDRON (RHODODENDRON.MACROPHYLLUM) RED ELDERBERRY (SAMBUCA.RACEMOSA)	28 28 75 55 55 55 55 55 55	5 GAL @ 15 FT. O.C. SPACING 1 GAL @ 10 FT. O.C. SPACING 5 GAL @ 15 FT. O.C. SPACING 1 GAL @ 8 FT. O.C. SPACING 1 GAL @ 5 FT. O.C. SPACING 1 GAL @ 8 FT. O.C. SPACING 1 GAL @ 8 FT. O.C. SPACING 1 GAL @ 5 FT. O.C. SPACING 1 GAL @ 8 FT. O.C. SPACING
BE2 ENHANCED	24,482	WESTERN RED CEDAR (THUJA.PLICATA) SCOULERS WILLOW (SALIX.SCOULERIANA) OREGON ASH (FRAXINUS.LATIFOLIA) TWINBERRY (LONICERA.INVOLUCRATA) SALMONBERRY (RUBUS.SPECTABILIS) SCOULERS WILLOW (SALIX.SCOULERI) RED OSIER DOGWOOD (CORNUS.SERICEA) PACIfiC RHODODENDRON (RHODODENDRON.MACROPHYLLUM) RED ELDERBERRY (SAMBUCA.RACEMOSA)	22 22 61 45 45 45 45 45 45	5 GAL @ 15 FT. O.C. SPACING 1 GAL @ 10 FT. O.C. SPACING 5 GAL @ 15 FT. O.C. SPACING 1 GAL @ 8 FT. O.C. SPACING 1 GAL @ 5 FT. O.C. SPACING 1 GAL @ 8 FT. O.C. SPACING 1 GAL @ 8 FT. O.C. SPACING 1 GAL @ 5 FT. O.C. SPACING 1 GAL @ 8 FT. O.C. SPACING
BR1 REHABILITATED	3,558	WESTERN RED CEDAR (THUJA PLICATA) SITKA WILLOW (SALIX.SITCHENSIS) SALMONBERRY (RUBUS.SPECTABILIS) PACIfiC CRAB (MALUS FUSCA) BLUE ELDERBERRY (SAMBUCA.NEGRA) DOUGLAS HAWTHORNE (CRATAEGUS.DOUGLASII) OCEANSPRAY (HOLODISCUS.DISCOLOR)	10 6 10 10 10 5 5	1 GAL @ 15 FT. O.C. SPACING 1 GAL @ 10 FT. O.C. SPACING 1 GAL @ 5 FT. O.C. SPACING 1 GAL @ 8 FT. O.C. SPACING 1 GAL @ 5 FT. O.C. SPACING 1 GAL @ 8 FT. O.C. SPACING 1 GAL @ 8 FT. O.C. SPACING

POLYGON	AREA (SQ FT)	SPECIES LIST	PLANT COUNT	COMMENT
NOTE: ALL PLANTING DESCRIBES BELOW IS ONLY TO OCCUR AFTER INITIAL REMOVAL OF GARBAGE AND WEED CONTROL IS DEEMED COMPLETE BY THE CITY OF TUMWATER.				
BR2 REHABILITATED	10,862	WESTERN RED CEDAR (THUJA PLICATA) SITKA WILLOW (SALIX.SITCHENSIS) SALMONBERRY (RUBUS.SPECTABILIS) PACIfiC CRAB (MALUS FUSCA) BLUE ELDERBERRY (SAMBUCA.NEGRA) DOUGLAS HAWTHORNE (CRATAEGUS.DOUGLASII) OCEANSPRAY (HOLODISCUS.DISCOLOR)	30 18 30 30 30 15 15	1 GAL @ 15 FT. O.C. SPACING 1 GAL @ 10 FT. O.C. SPACING 1 GAL @ 5 FT. O.C. SPACING 1 GAL @ 8 FT. O.C. SPACING 1 GAL @ 5 FT. O.C. SPACING 1 GAL @ 8 FT. O.C. SPACING 1 GAL @ 8 FT. O.C. SPACING
CE1 ENHANCED	2,987	SITKA SPRUCE (PICEA.SITCHENSIS) WESTERN RED CEDAR (THUJA.PLICATA) SNOWBERRY (SYMPHORICARPUS.ALBA) SALMONBERRY (RUBUS.SPECTABILIS) RED ELDERBERRY (SAMBUCA.RACEMOSA) RED fLOWERING CURRANT (RIBES.SANGUINEUM) OCEANSPRAY (HOLODISCUS.DISCOLOR)	7 6 8 8 8 8 3	1 GAL @ 15 FT. O.C. SPACING 5 GAL @ 15 FT. O.C. SPACING 1 GAL @ 5 FT. O.C. SPACING 1 GAL @ 5 FT. O.C. SPACING 1 GAL @ 5 FT. O.C. SPACING 1 GAL @ 8 FT. O.C. SPACING 1 GAL @ 8 FT. O.C. SPACING
CE2 ENHANCED	2,597	SITKA SPRUCE (PICEA.SITCHENSIS) WESTERN RED CEDAR (THUJA.PLICATA) SNOWBERRY (SYMPHORICARPUS.ALBA) SALMONBERRY (RUBUS.SPECTABILIS) RED ELDERBERRY (SAMBUCA.RACEMOSA) RED fLOWERING CURRANT (RIBES.SANGUINEUM) OCEANSPRAY (HOLODISCUS.DISCOLOR)	6 5 5 5 5 5 3	1 GAL @ 15 FT. O.C. SPACING 5 GAL @ 15 FT. O.C. SPACING 1 GAL @ 5 FT. O.C. SPACING 1 GAL @ 5 FT. O.C. SPACING 1 GAL @ 5 FT. O.C. SPACING 1 GAL @ 8 FT. O.C. SPACING 1 GAL @ 8 FT. O.C. SPACING
CE3 ENHANCED	14,527	SITKA SPRUCE (PICEA.SITCHENSIS) WESTERN RED CEDAR (THUJA.PLICATA) SNOWBERRY (SYMPHORICARPUS.ALBA) SALMONBERRY (RUBUS.SPECTABILIS) RED ELDERBERRY (SAMBUCA.RACEMOSA) RED fLOWERING CURRANT (RIBES.SANGUINEUM) OCEANSPRAY (HOLODISCUS.DISCOLOR)	36 29 37 37 37 37 19	1 GAL @ 15 FT. O.C. SPACING 5 GAL @ 15 FT. O.C. SPACING 1 GAL @ 5 FT. O.C. SPACING 1 GAL @ 5 FT. O.C. SPACING 1 GAL @ 5 FT. O.C. SPACING 1 GAL @ 8 FT. O.C. SPACING 1 GAL @ 8 FT. O.C. SPACING
CR1 REHABILITATED	17,029	WESTERN HEMLOCK (PICEA SITCHENSIS) PACIfiC WILLOW (SALIX LASSIANDRA) VINE MAPLE (ACER MACROPHYLLUM) SNOWBERRY (SYMPHORICARPUS.ALBA) OSOBERRY (OEMLERIA.CERASIFORMUS) RED ELDERBERRY (SAMBUCA.RACEMOSA) MOCK ORANGE (PHILADELPHUS.LEWISII) OCEANSPRAY (HOLODISCUS.DISCOLOR)	40 20 16 50 50 40 25 25	1 GAL @ 15 FT. O.C. SPACING 1 GAL @ 15 FT. O.C. SPACING 1 GAL @ 15 FT. O.C. SPACING 1 GAL @ 5 FT. O.C. SPACING 1 GAL @ 5 FT. O.C. SPACING 1 GAL @ 5 FT. O.C. SPACING 1 GAL @ 8 FT. O.C. SPACING 1 GAL @ 8 FT. O.C. SPACING

△	REVISIONS	DATE	BY

DESIGNED BY: R. MARTINEZ
DRAWN BY: M. HENDRICKS-MATSUDA
APPROVED BY: P. HOLM
ISSUE DATE: AUGUST 2026
JOB No.: 25-000313
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PROJECT NAME:

CITY OF TUMWATER

DESCHUTES VALLEY TRAIL
SEGMENT C

WETLAND MITIGATION SPECIES LIST & PLANT COUNT

DRAWING No.: WM-06
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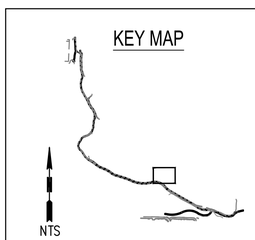


LEGEND

EXISTING DITCH

X% SLOPE ARROW

KEY MAP



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DRAWN BY: M. HENDRICKS-MATSUDA	JOB No.: 25-000313
APPROVED BY: P. HOLM	DRAWING FILE No.: 25-000313-C-FP-01

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PROJECT NAME:

CITY OF TUMWATER

DESCHUTES VALLEY TRAIL
SEGMENT C

COMPENSATORY STORAGE

DRAWING No.: FP-01

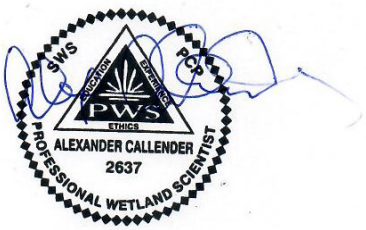
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EXHIBIT 4

Deschutes Valley Trail
Wetland /Stream Delineation and Mitigation Plan
Tumwater, WA

Prepared for
City of Tumwater
September 2, 2026



Land Services Northwest
Alex Callender MS, PWS
120 State Ave NE PMB 190, Olympia, WA, 98501
360.481.4208

Executive Summary

Site Name: Deschutes Valley Trail

Parcel Numbers: Project is to occur on a portion of parcels 09470051000, 1283520200, and 01283543000.

Project Staff: Alex Callender MS, PWS and Betsy Knutson-Keller, Associate Ecologist

Field Survey Conducted: January 28, 2026, February 18, 2026, and February 23, 2026

Findings: Three jurisdictional wetlands, and two streams were found on- and offsite and were delineated.

Wetland A is a Category II wetland with an overall score of 22 and a habitat score of seven (HLH). Wetlands in the City of Tumwater with a habitat score of seven (HLH) carry a 150-foot buffer.

Wetland B is a Category III wetland with an overall score of 16 and a habitat score of seven(MMH). Category III wetlands with a habitat score of seven (MMH) in the City of Tumwater typically carry a 150-foot buffer.

Wetland C is a Category II wetland with an overall score of 21 and a habitat score of six (MMM). This wetland will also carry a 150-foot buffer.

Stream Z is located within Wetland A. This stream is a type 3 stream 5-20 feet wide and will carry a 200-foot buffer.

Stream Y is located within Wetland B. This is a type NS stream, and this stream discharges to a culvert. The stream is less than 2 feet wide and is a type 4 stream. It will carry a 50-foot buffer.

Project Description: The project proposes an approximately 0.87 mile pedestrian/bicycle trail utilizing parts of an existing golf cart path on a portion of the Tumwater Valley Municipal Golf Course, currently ending at the Deschutes River.

Impact Avoidance and Minimization: As mentioned the project will use an existing golf cart path which has been in place as a integral part of the golf course since before the passage of the current critical areas code. It is legal non-conforming, and the current path and golf course represent the baseline conditions. By using this existing path the project will not require as much new impervious surface. This is the least impactful manner to provide the path in the required alignment with future portions of the trail. No direct impacts to wetlands are expected; however, the trail will encompass an existing cart path that is located up to 0 feet from the wetlands in some areas. New portions of the trail will likely have wetland buffer impacts, however, the project will avoid direct impacts to the fullest extent and the planned expansions for the trail will occur away from wetlands and avoid any direct impacts to wetlands. Impacts are quantified in Table 3.

Mitigation: Mitigation is provided to meet the no-net-loss of wetland and stream functions and values. An The City will have two types of mitigation, enhancement and rehabilitation. Because the new impacts will occur within the inner 25% of the buffer, mitigation of the impacts will occur at Department of Ecology recommended ratios for direct impacts for the respective wetland categories. The mitigation plantings will be maintained and monitored for a period of 10 years. An functional assessment of wetland functions is provided which shows that the mitigation will result in an increase of functions after the mitigation has been completed.

Table of Contents

Executive Summary ii

1.0 INTRODUCTION 1

Figure 1 - Vicinity Map 2

2.0 GENERAL DESCRIPTION AND LAND USE 3

2.1 Historical and Current Land Use 3

Figure 2 - Current Conditions 4

3.0 METHODOLOGY 5

3.1 Existing Information Review 5

3.2 Analysis of Existing Information 5

National Wetland Inventory (NWI) Map 5
NRCS Soils Map 5
Thurston County Geodata Wetland Inventory 11
USGS 7.5 Minute Topo Map 11
WADNR Forest Practices Stream Type Map 11
WDFW Priority Habitats and Species Inventory (PHS) and Salmonscape 11
NOAA NOW Precipitation Data 12

3.3 Field Investigation 12

Determination Guidelines 12
Table 1 - Indicator Status Ratings 13

3.4 Wetland Study 13

Figure 3 - Test Pit Locations 15

4.0 RESULTS 16

4.1 Existing Conditions 16

4.2 Wetlands 16

Wetland A 16
Wetland B 16
Wetland C 17

5.0 WETLAND FUNCTIONAL VALUES 17

5.1 Wetland Functional Analysis Methodology 17

5.2 Wetland Functions 18

Wetland A 18
Wetland B 19
Wetland C 19

6.0 REGULATORY CONSIDERATIONS 20

6.1 City of Tumwater Regulations 20

Wetland A 20
Streams 25
Figure 4 - Standard Wetland Buffers 26

TMC 16.28.115.D Exceptions – Infrastructure. 28

Table 2 - Summary of Wetlands and Streams on or in the Vicinity of the Subject Property 32

6.2 Corps Regulations 32

6.3 Department of Ecology 32
7.0 WILDLIFE 33
8.0 PROPOSED PROJECT 33
8.1 Description 33
8.2 Development Impacts 33
8.3 Impact Avoidance and Minimization 34
8.4 Minimization of Water Quality Impacts 34
9.0 MITIGATION 35
9.1 Mitigation Plan Requirements 36
9.2 IMPACTS 36
Table 3 – Summary of Buffer Impact Areas 39
9.2 Integrated Pest Management 39
9.3 Functional Analysis 40
Table 4- Buffer Functions Comparison Before and After Rehabilitation 41
9.4 Planting Plan 41
Table 5 - Wetland A Enhancement Area (98,856 sq. ft.) 42
Table 6 –Wetland B Enhancement Area (53,048 sq. ft.) 43
Table 7 – Wetland C Enhancement Area (20,100 sq. ft.) 43
Table8 – Wetland A – Rehabilitation (63,966 sq ft) 44
Table 9 – Wetland B – Rehabilitation Planting (14,412 sq ft) 44
Table 10– Wetland C – Rehabilitation Planting (17,016 sq ft) 45
9.5 Monitoring Plan 45
9.6 Performance Standards 45
9.7 Contingency Plans 46
10.0 SUMMARY AND CONCLUSIONS 46
11.0 LIMITATIONS 47
12.0 REFERENCE 48
Appendix A - Photographs 50
Appendix B - U.S. Fish and Wildlife Service NWI MAP 75
Appendix C - NRSC Soil Survey Map for Thurston County 76
Appendix D - Thurston County Stream and Wetland Inventory 77
Appendix E - USGS 7.5 Minute Topographic Map 78
Appendix F - WADNR Forest Practices Stream Type Map 79
Appendix G - WDFW Priority Habitats and Species Map and Salmonscape Map 80
Appendix H - NOAA NOW Precipitation Data 96
Appendix I - USACE WMVC Soil Data Sheets 98
Appendix J – Realignment for Tee Boxes on Hole 2 and 4 99
Appendix K – Historical Aerial Imagery of Tee Box 2 and 4 Showing Maintenance Mowing 100
Appendix L- ECY Wetland Rating Forms for Western Washington 101
Appendix M – WETLAND BUFFER IMPACTS DESCHUTES VALLEY TRAIL – SEGMENT C) 102
Appendix N – WETLAND BUFFER IMPACTS MITIGATION AREAS DESCHUTES VALLEY TRAIL – SEGMENT C) 103
Appendix O - Invasive Species Removal Recommendations 104

Appendix P– Maintenance and Monitoring Form 105

1.0 INTRODUCTION

This report is the result of a critical areas study of the proposed project area to occur on Parcel #09470051000, 1283520200, and 1283543000 in the City of Tumwater in Thurston County Washington. (**Figure 1**).

The purpose of this report is to determine mitigation requirements for expected impacts as detailed in the "WETLAND BUFFER IMPACTS DESCHUTES VALLEY TRAIL - SEGMENT C" which we have attached in Appendix B. We will:

1) identify and describe the wetlands or other critical areas onsite and within 315 feet offsite of the property, 2) identify impacts to wetlands or critical areas and their buffers, and 3) apply mitigation and conservation measures to offset any critical areas or buffer impact in accordance with Title 15 – Environment.

The City of Tumwater, and possibly other agencies that may evaluate impacts on critical areas from the proposed project, will be able to utilize information in this report.

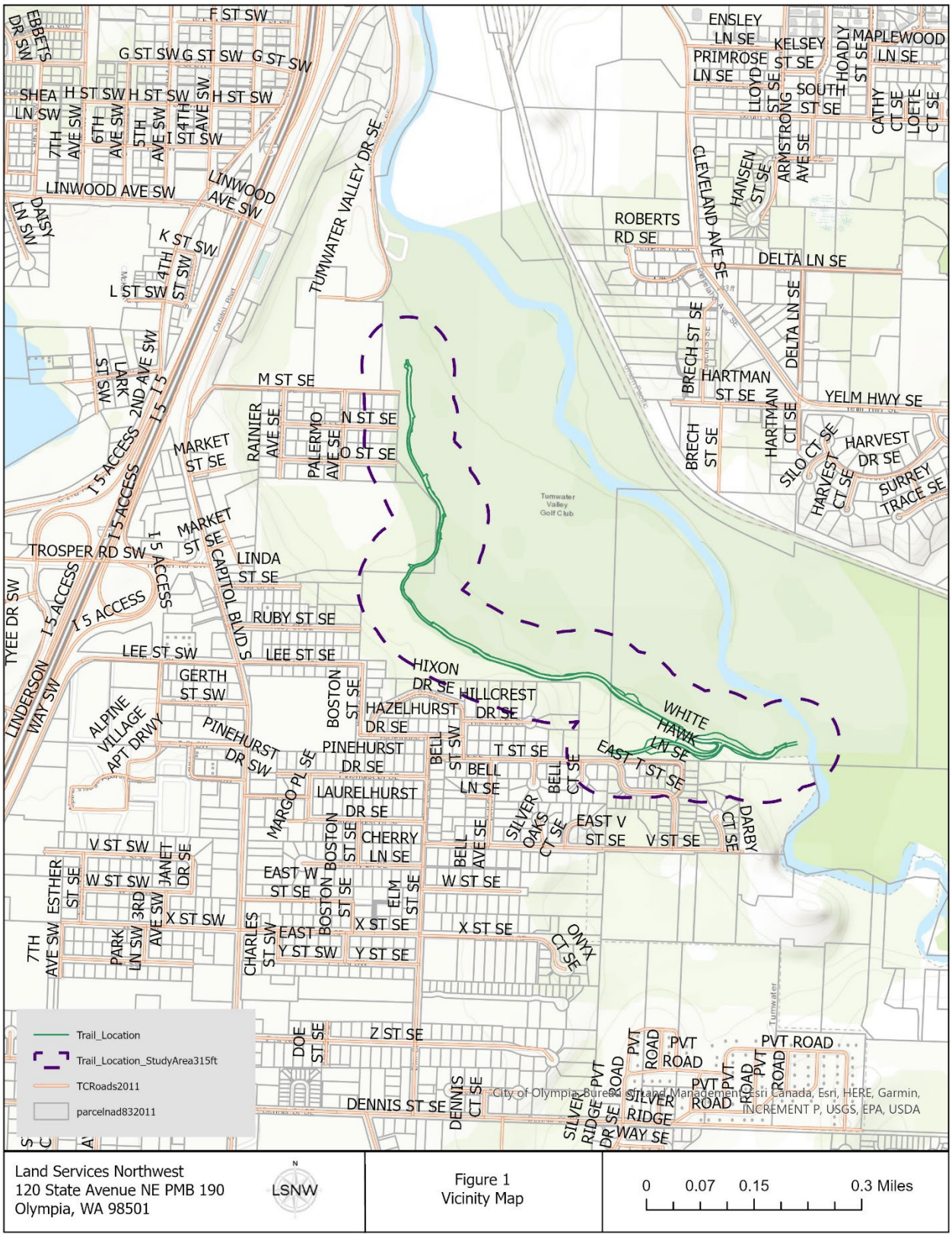


Figure 1 - Vicinity Map

2.0 GENERAL DESCRIPTION AND LAND USE

2.1 Historical and Current Land Use

Historically, the property has been a municipal golf course located directly east of Capitol Boulevard. (**Figure 2**). The golf course has an existing asphalt cart path for golfers that allows them to drive the electric carts without degrading the turf that is necessary for a proper golf surface. This path is especially necessary during the winter months when the winter rains would make the area very muddy without the path. Mostly the cart path follows the right side of each fairway next to the more natural area wetlands and forests that border the course to the west and south. Like many of the area golf courses,the wetlands along the course have culverts that provide outlets underneath the course to other wetlands to support the extensive water hazards on the course. These outlets prevent flooding and limit the extent of the wetlands to prevent flooding of the course and were installed during the inception of the golf course.

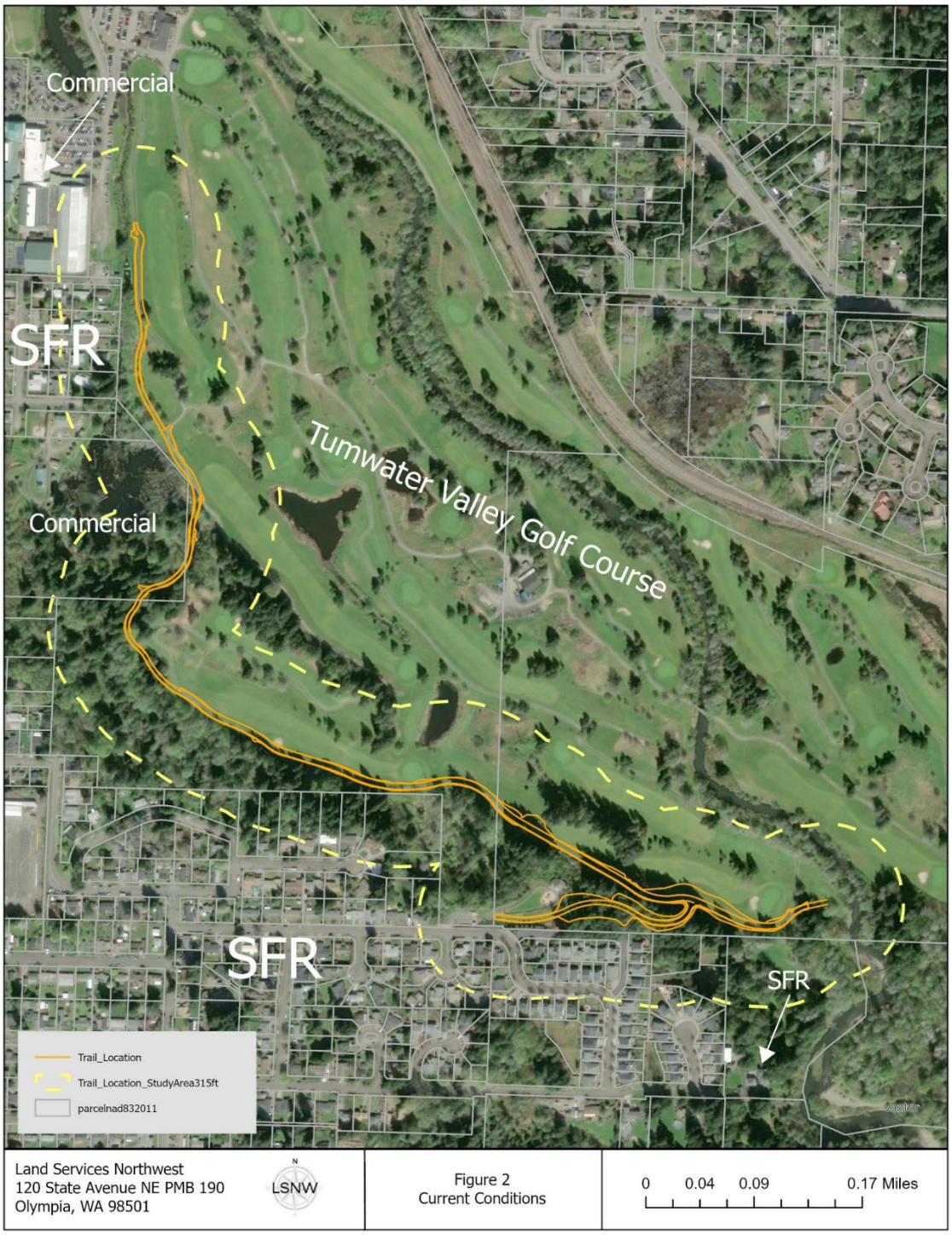


Figure 2 - Current Conditions

3.0 METHODOLOGY

3.1 Existing Information Review

Background information on possible wetlands was reviewed prior to field investigations and included the following:

National Wetlands Inventory (NWI) Map, USFWS Shapefile Data (**Appendix B**)

Thurston County Area Soil Survey, Soil Conservation Service (U.S. Department of Agriculture, 1973)
National Resource Conservation Service Shapefiles (NRCS Soils Data Mart, 2006) (**Appendix C**)

Thurston County Geodata Wetland Inventory (**Appendix D**)

USGS 7.5 Minute Quadrangle Topographic Maps (**Appendix E**)

Washington Department of Fish and Wildlife Priority Habitats and Species Database (**Appendix G**)

Washington Department of Fish and Wildlife Salmonscape (**Appendix H**)

NOAA NOW Precipitation Data (**Appendix I**)

Washington Department of Natural Resources Natural Heritage Database
United States Hydric Soils List (U.S. Department of Agriculture 1991)
Thurston County Code Chapter 24

3.2 Analysis of Existing Information

The following existing information was reviewed to gain a better understanding of onsite conditions and its position in the landscape.

National Wetland Inventory (NWI) Map

The National Wetland Inventory (NWI) map (**Appendix B**), developed by the U.S. Fish and Wildlife Service (USFWS), shows the following in the vicinity of the project area:

- PUBHx (palustrine, unconsolidated bottom, permanently flooded, excavated)
- PUBH (palustrine, unconsolidated bottom, permanently flooded)
- PSSC (palustrine, scrub-shrub. seasonally flooded)
- R4SBC (riverine, intermittent, streambed, seasonally flooded)
- PFOC (palustrine, forested, seasonally flooded)

NRCS Soils Map

The Natural Resources Conservation Service (NRCS) has mapped the site (Appendix C) as containing:

- Norma silt loam (Hydric)
- Indianola loamy sand, 0 to 3 percent slopes, 3 to 15 percent slopes and 15 to 30 percent slopes
- Cagey loamy sand
- Everett very gravelly sandy loam, 3 to 15 percent slopes
- Puyallup silt loam

- Xerorthents, 0 to 5 percent slopes

Norma silt loam

Map Unit Setting

- National map unit symbol: 2ndcc
- Landscape: Till plains
- Elevation: 0 to 1,000 feet
- Mean annual precipitation: 35 to 60 inches
- Mean annual air temperature: 48 to 52 degrees F
- Frost-free period: 150 to 200 days
- Farmland classification: Prime farmland if drained

Map Unit Composition

- Norma, silt loam, and similar soils: 90 percent
- Minor components: 10 percent
  Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Norma, Silt Loam

Setting

- Landscape: Till plains
- Landform: Depressions, Drainageways
- Parent material: Alluvium

Typical profile

- H1 - 0 to 8 inches: silt loam
- H2 - 8 to 30 inches: sandy loam
- H3 - 30 to 60 inches: sandy loam

Properties and qualities

- Slope: 0 to 3 percent
- Depth to restrictive feature: More than 80 inches
- Drainage class: Poorly drained
- Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
- Depth to water table: About 0 to 12 inches
- Frequency of flooding: None
- Frequency of ponding: Frequent
- Available water supply, 0 to 60 inches: Moderate (about 8.9 inches)

Interpretive groups

- Land capability classification (irrigated): None specified
- Land capability classification (nonirrigated): 5w
- Hydrologic Soil Group: B/D
- Ecological site: F002XA007WA - Puget Lowlands Wet Hemlock Forest
- Forage suitability group: Wet Soils (G002XS101WA)
- Other vegetative classification: Wet Soils (G002XS101WA)
- **Hydric soil rating: Yes**

Indianola loamy sand

Map Unit Setting

- National map unit symbol: 2t62k

- Landscape: Glacial drift and outwash plains
- Elevation: 0 to 980 feet
- Mean annual precipitation: 30 to 81 inches
- Mean annual air temperature: 48 to 50 degrees F
- Frost-free period: 170 to 210 days
- Farmland classification: Prime farmland if irrigated

Map Unit Composition

- Indianola and similar soils: 85 percent
- Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Indianola

Setting

- Landscape: Glacial drift and outwash plains
- Landform: Kames, Terraces, Eskers
- Landform position (three-dimensional): Tread
- Down-slope shape: Linear
- Across-slope shape: Linear
- Parent material: Sandy glacial outwash

Typical profile

- Oi - 0 to 1 inches: slightly decomposed plant material
- A - 1 to 6 inches: loamy sand
- Bw1 - 6 to 17 inches: loamy sand
- Bw2 - 17 to 27 inches: sand
- BC - 27 to 37 inches: sand
- C - 37 to 60 inches: sand

Properties and qualities

Slope: 0 to 5 percent

- Depth to restrictive feature: More than 80 inches
- Drainage class: Somewhat excessively drained
- Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 99.90 in/hr)
- Depth to water table: More than 80 inches
- Frequency of flooding: None
- Frequency of ponding: None
- Available water supply, 0 to 60 inches: Low (about 3.9 inches)

Interpretive groups

- Land capability classification (irrigated): 4s
- Land capability classification (nonirrigated): 4s
- Hydrologic Soil Group: A
- Ecological site: F002XA004WA - Puget Lowlands Forest
- Forage suitability group: Droughty Soils (G002XF403WA), Droughty Soils (G002XN402WA), Droughty Soils (G002XS401WA), Droughty Soils (G002XV402WA)
- Other vegetative classification: Droughty Soils (G002XF403WA), Droughty Soils (G002XN402WA), Droughty Soils (G002XS401WA), Droughty Soils (G002XV402WA)
- **Hydric soil rating: No**
-

Cagey loamy sand

Map Unit Setting

- National map unit symbol: 2nd8d
- Elevation: 330 to 980 feet
- Mean annual precipitation: 40 to 60 inches
- Mean annual air temperature: 50 degrees F
- Frost-free period: 165 to 195 days
- Farmland classification: Prime farmland if irrigated

Map Unit Composition

- Cagey and similar soils: 85 percent
- Minor components: 5 percent

  Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cagey

Setting

- Landform: Terraces
- Parent material: Sandy glacial drift
- Typical profile
- H1 - 0 to 6 inches: loamy sand
- H2 - 6 to 28 inches: loamy sand
- H3 - 28 to 60 inches: fine sand

Properties and qualities

- Slope: 0 to 4 percent
- Depth to restrictive feature: More than 80 inches
- Drainage class: Moderately well drained
- Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
- Depth to water table: About 18 to 30 inches
- Frequency of flooding: None
- Frequency of ponding: None
- Available water supply, 0 to 60 inches: Low (about 4.0 inches)

Interpretive groups

- Land capability classification (irrigated): None specified
- Land capability classification (nonirrigated): 3w
- Hydrologic Soil Group: A
- Ecological site: F002XA005WA - Puget Lowlands Moist Forest
- Forage suitability group: Seasonally Wet Soils (G002XS201WA)
- Other vegetative classification: Seasonally Wet Soils (G002XS201WA)
- **Hydric soil rating: No**

Everett very gravelly sandy loam, 8 to 15 percent slopes

Map Unit Setting

- National map unit symbol: 2t62b
- Landscape: Glacial drift and outwash plains
- Elevation: 30 to 900 feet
- Mean annual precipitation: 35 to 91 inches
- Mean annual air temperature: 48 to 52 degrees F

- Frost-free period: 180 to 240 days
- Farmland classification: Farmland of statewide importance

Map Unit Composition

- Everett and similar soils: 80 percent
- Minor components: 20 percent

  Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Everett

Setting

- Landscape: Glacial drift and outwash plains
- Landform: Moraines, Eskers, Kames
- Landform position (two-dimensional): Shoulder, footslope
- Landform position (three-dimensional): Base slope, crest
- Down-slope shape: Convex
- Across-slope shape: Convex
- Parent material: Sandy and gravelly glacial outwash

Typical profile

- Oi - 0 to 1 inches: slightly decomposed plant material
- A - 1 to 3 inches: very gravelly sandy loam
- Bw - 3 to 24 inches: very gravelly sandy loam
- C1 - 24 to 35 inches: very gravelly loamy sand
- C2 - 35 to 60 inches: extremely cobbly coarse sand

Properties and qualities

- Slope: 8 to 15 percent
- Depth to restrictive feature: More than 80 inches
- Drainage class: Somewhat excessively drained
- Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
- Depth to water table: More than 80 inches
- Frequency of flooding: None
- Frequency of ponding: None
- Available water supply, 0 to 60 inches: Low (about 3.2 inches)

Interpretive groups

- Land capability classification (irrigated): None specified
- Land capability classification (nonirrigated): 4s
- Hydrologic Soil Group: A
- Ecological site: F002XA004WA - Puget Lowlands Forest
- Forage suitability group: Droughty Soils (G002XS401WA), Droughty Soils (G002XN402WA), Droughty Soils (G002XF403WA)
- Other vegetative classification: Droughty Soils (G002XS401WA), Droughty Soils (G002XN402WA), Droughty Soils (G002XF403WA)
- **Hydric soil rating: No**

Puyallup silt loam

Map Unit Setting

- National map unit symbol: 2nd9z
- Elevation: 70 to 1,970 feet
- Mean annual precipitation: 35 to 60 inches

- Mean annual air temperature: 50 degrees F
- Frost-free period: 170 to 200 days
- Farmland classification: All areas are prime farmland

Map Unit Composition

- Puyallup and similar soils: 85 percent
- Minor components: 10 percent

  Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Puyallup

Setting

- Landform: Low terraces, Flood plains
- Parent material: Alluvium

Typical profile

- H1 - 0 to 10 inches: silt loam
- H2 - 10 to 19 inches: fine sandy loam
- H3 - 19 to 60 inches: sand

Properties and qualities

- Slope: 0 to 3 percent
- Depth to restrictive feature: 14 to 20 inches to strongly contrasting textural stratification
- Drainage class: Well drained
- Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
- Depth to water table: More than 80 inches
- Frequency of flooding: Occasional
- Frequency of ponding: None
- Available water supply, 0 to 60 inches: Low (about 3.2 inches)

Interpretive groups

- Land capability classification (irrigated): 3w
- Land capability classification (nonirrigated): 3w
- Hydrologic Soil Group: B
- Ecological site: F002XA008WA - Puget Lowlands Riparian Forest
- Forage suitability group: Droughty Soils (G002XS401WA)
- Other vegetative classification: Droughty Soils (G002XS401WA)
- **Hydric soil rating: No**

Xerorthents, 0 to 5 percent slopes

Map Unit Setting

- National map unit symbol: 2nd87
- Landscape: Uplands
- Elevation: 0 to 2,620 feet
- Mean annual precipitation: 30 to 60 inches
- Mean annual air temperature: 39 to 50 degrees F
- Frost-free period: 150 to 200 days
- Farmland classification: Not prime farmland

Map Unit Composition

- Xerorthents and similar soils: 100 percent

  Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Xerorthents

Setting
Landscape: Uplands

- Landform: Tidal flats
- Parent material: Sandy and loamy cut and fill material

Typical profile

- H1 - 0 to 60 inches: variable
- Properties and qualities
- Slope: 0 to 5 percent
- Depth to restrictive feature: More than 80 inches
- Drainage class: Somewhat excessively drained
- Depth to water table: About 24 inches
- Frequency of flooding: None
- Frequency of ponding: None

Interpretive groups

- Land capability classification (irrigated): None specified
- Land capability classification (nonirrigated): 7s
- **Hydric soil rating: No**

Thurston County Geodata Wetland Inventory

The Thurston County Geodata website has a mapping tool that depicts various critical areas such as streams and wetlands (**Appendix D**). This site shows the following in the vicinity of the project area:

- Deschutes River
- PFO (palustrine, forested)
- PEM (palustrine, emergent)
- POW (palustrine, open water)

USGS 7.5 Minute Topo Map

The USGS has topographical maps that depict natural and artificial features on the landscape including wetlands (**Appendix E**). This map shows the Deschutes River and wetlands in the vicinity of the project area.

WADNR Forest Practices Stream Type Map

The Washington State Department of Natural Resources has a map that shows wetlands, streams, lakes, and their stream type for the purpose of Forest Practices according to WAC 222-16-31 **(Appendix F).**

This map shows the Deschutes River and numerous wetlands in the vicinity of the project area.

WDFW Priority Habitats and Species Inventory (PHS) and Salmonscape

The Department of Fish and Wildlife maintains an inventory of priority habitats and species information (**Appendix G**). This database shows:

Occurence Name	Federal Status	State Status	Sensitive Location
Fall Chinook	N/A	N/A	No
Coho	N/A	N/A	No
Cutthroat	Not Warranted	N/A	No
Fall Chum	N/A	N/A	No
Winter Steelhead	N/A	N/A	No
Coho	Candidate	N/A	No
Steelhead	Threatened	N/A	No
Snag-rich Areas	N/A	N/A	No
Freshwater Emergent Wetland	N/A	N/A	No
Freshwater Forested/Shrub Wetland	N/A	N/A	No
Big brown bat			Yes
Little Brown Bat			Yes
myotis spp			Yes
Yuma myotis			Yes
Townsend's Big-eared Bat		Candidate	Yes

SalmonScape shows documented artificial rearing of coho, documented artificial spawning of fall Chinook, documented transported presence of fall chum, gradient accessible for winter chum and documented artificial spawning of winter steelhead.

NOAA NOW Precipitation Data

NOAA maintains a database that graphs the current precipitation against the wettest, driest, and normal accumulations of record. This data shows that the precipitation between October 1, 2025, and February 23, 2026, has been slightly above normal beginning in early November with record rains in mid-November.

3.3 Field Investigation

Determination Guidelines

Land Services Northwest based its wetland identification and delineation upon the 1987 Army Corps of Engineers Wetland Delineation Manual (Environmental Laboratory, 1987) and the regional specificity found in Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0) (USACE, 2010). Generally, as outlined in the manuals, wetlands are distinguished from other landforms by three criteria: 1) hydrophytic vegetation, 2) hydric soils, and 3) wetland hydrology.

Plant species were identified according to the taxonomy in *Flora of the Pacific Northwest* (Hitchcock and Cronquist, 1973), and the wetland status of plant species was assigned according to*: The National Wetland Plant List: 2016* (Lichvar, 2016). Wetland classes were determined by the U.S. Fish and Wildlife Service's system of wetland classification (FGDC, 2013). The wetland determination was based mainly on soils, vegetation, and hydrology characteristics indicative of wetland conditions.

The COE describe a wetland rating system for plants. Each plant species is assigned a probability of occurrence within wetlands, which is referred to as its wetland status. The wetland plant indicator system is as follows:

Table 1 - Indicator Status Ratings

Indicator Status	Abbr.	Definitions - Short Version (ERDC/CRREL TN-12-1)
Obligate	OBL	Almost always occur in wetlands.
Facultative Wetland	FACW	Usually occur in wetlands, but may occur in non-wetlands.
Facultative	FAC	Occur in wetlands and nonwetlands.
Facultative Upland	FACU	Usually occur in non-wetlands, but may occur in wetlands.
Upland	UPL	Almost never occur in wetlands.
		(USACE, 2016)

In general, under the federal methodology, more than 50% of the predominant plant species within a test plot must be rated FAC or wetter (i.e., FACW, OBL) to satisfy the wetland criteria for hydrophytic vegetation. Dominant species are those when ranked comprise 50% of the total or those that have a percentage cover greater or equal to 20% within the test plot. Only dominant plant species were considered in the data analysis.

The Corps Manual and Supplement describe soil, vegetation, and hydrological indicators of wetlands. A hydric soil is a soil that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper par (National Technical Committee for Hydric Soils, 1994). Anaerobic conditions cause redoximorphic features to develop, which can be evidenced through the observation of mottling or gleying in the soil. Soils are hydric if they match the indicators in the supplement or meet the technical definition.

A soils evaluation was performed to determine if the area contained hydric soils. Additional test plots were sampled to gage possible wetland indicators and characteristics. Soils are normally excavated to 18 inches or more below the surface within a test pit to evaluate soil characteristics and hydrological conditions in both wetland and upland areas. Soil chroma (color) is evaluated using the *Munsell Color Chart* (Munsell Color, 1988).

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 drainage patterns, drift lines, sediment deposition, watermarks, historic records, visual observation of saturated soils, and visual observation of inundation.

3.4 Wetland Study

A wetland reconnaissance was performed on February 18, 2026, to identify wetlands present on the subject property. Observations were made of the general plant communities, wildlife habitats, and the locations of potential streams and wetland areas. Present and past land-use practices were also noted, as were significant geological and hydrological features.

Once likely wetland areas were located, the Routine Onsite Determination Method was used to identify the presence of wetland parameters and to delineate the outer edge of the wetlands using the procedures outlined in the *Corps of Engineers Wetland Delineation Manual* (Environmental Laboratory, 1987). The Routine Onsite Determination Method was used in areas that maintained normal circumstances, were not significantly disturbed, and were not potential problem areas. A formal wetland delineation was performed on February 18 and February 23, 2026, to document offsite wetlands and to identify and map offsite wetlands within 315 feet of the subject property as we are able.

Test pits were dug on February 18, 2026, and February 23, 2026, (**Figure 3**) to develop a better understanding of soil profiles onsite. Soils were excavated to 18 inches or more below the surface within a test pit to evaluate soil characteristics and hydrological conditions throughout the site. Soil chroma (color) is evaluated using the *Munsell Color Chart* (Munsell Color, 1988). The result was entered in wetland data sheets **(Appendix I).**

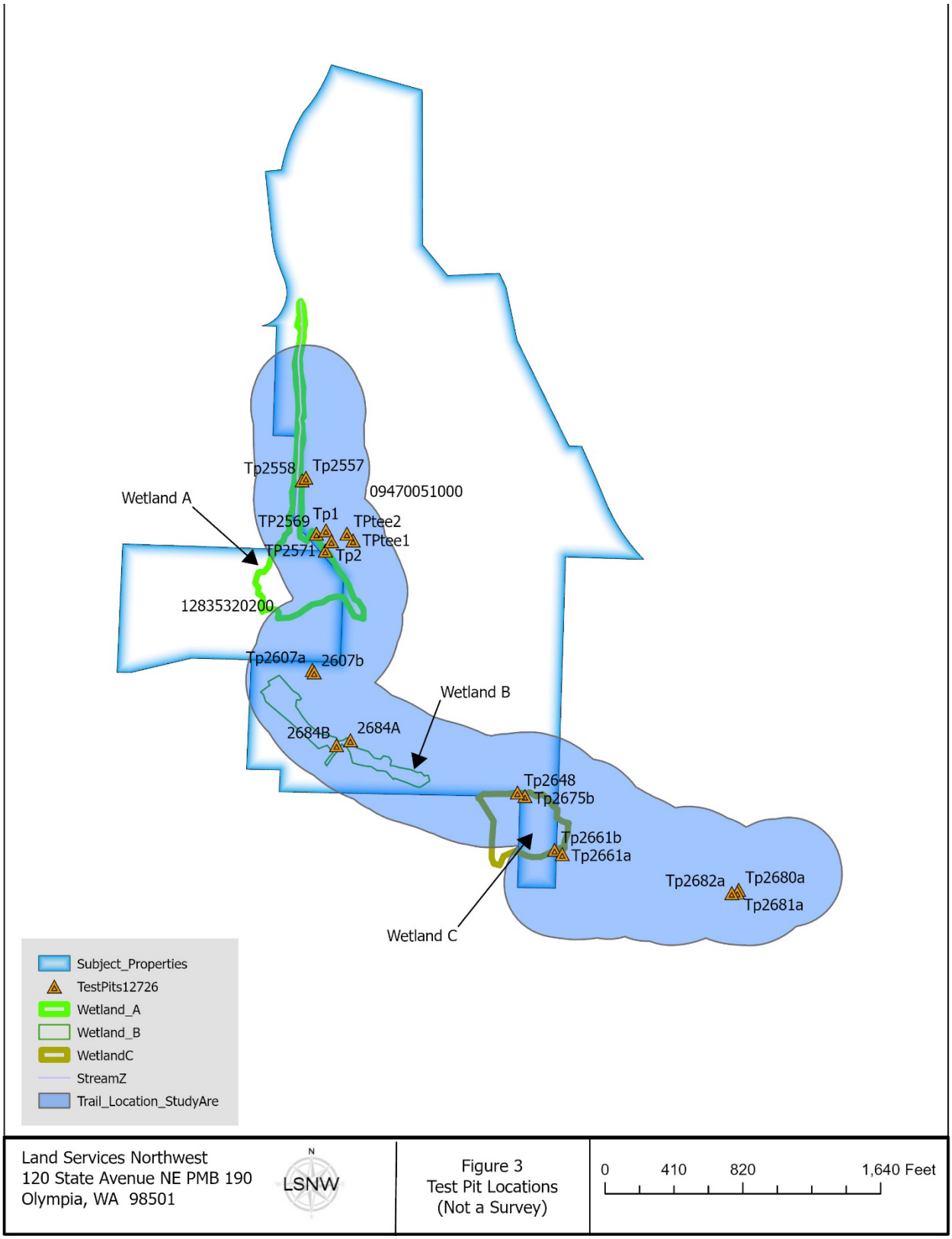


Figure 3 - Test Pit Locations

4.0 RESULTS

4.1 Existing Conditions

The existing Tumwater Valley Golf Course cart path is being improved and modified to serve the purpose of the new Deschutes Valley Trail. It was built as part of the golf course amenities within the existing buffer of the nearby critical areas during a period before the current critical areas code, so what is existing is mostly legal non-conforming with regard to buffers.

Existing nearby activities such as the golf course and the ongoing maintenance and general upkeep of the course are baseline conditions. No additional activities are being considered for the golf course that would create impacts beyond the ongoing baseline condition of the area, which includes the maintenance of the playing surface for golf. The cart path itself is not a pollution generating surface, and the existing impervious surface that comprises the golf cart path would be considered part of the baseline conditions as well.

4.2 Wetlands

Wetlands in the study area occur along a break in the slope on a landscape scale.

Wetland A

As mentioned, Wetland A is a large, depressional wetland discharging via a ditched stream to culvert which we crosses the parking lot and continues as a ditched stream until it discharges to the Deschutes River.

- *Plants*
  Red alder (*Alnus rubra*; FAC), reed canary grass (*Phalaris arundinacea*; FACW), Pacific ninebark (*Physocarpus capitatus*; FACW), Himalayan blackberry (*Rubus armeniacus*; FAC), and slough sedge (*Carex obnupta*; OBL) are the primary plants found in the wetland.

- *Soils*
  Soils were sampled, and a dark brown, 10YR 3/2 silt loam underlain with 10YR4/2 with 10YR4/6 redox was found.

- *Hydrology*
  It was end of the rainy season, so hydrology was directly observed at 12 inches.

Wetland B

Wetland B is a large, forested slope wetland that forms a stream in the midst of the swale. It discharges to a culvert that carries the water to another water feature on the other side of the fairway. It appears that there may be stormwater discharge from the city above, overwhelming the system and flooding this wetland, as there appeared to be scouring of the wetland due to water from the storm system.

- *Plants*

Vegetation is dominated by red alder (*Alnus rubra*; FAC), western red cedar (*Thuja plicata*; FAC), salmonberry (*Rubus spectabilis*; FAC), vine maple (*Acer circinatum*; FAC), slough sedge (*Carex obnupta*; OBL) and skunk cabbage (*Lysichiton americanum*; OBL).

- *Soils*

Soils were a 10YR3/1, black sandy loam underlain with a 10YY 4/2 and 10YR 4/6 redox.

- *Hydrology*

Hydrology was directly observed within 12 inches of the surface. The area appears to be drained by a storm system which has changed the hydrology of the area due to drying a large area to the northeast.

Wetland C

Wetland C is a large depressional wetland that receives water from a pipe as well as numerous springs along the wetland.

- *Plants*

Himalayan blackberry (*Rubus armeniacus*; FAC), salmonberry (*Rubus spectabilis*; FAC), field horsetail (*Equisetum arvense*; FAC), and common ladyfern (*Athyrium cyclosorum*; FAC) were the primary plants found in the wetland.

- *Soils*

Soils were sampled, and a dark brown, 10YR 3/2 silt loam underlain with a 10YR4/1 with a 10YR3/6 redox was found.

- *Hydrology*

It was end of the rainy season, so hydrology was directly observed at 8 inches. High groundwater and surface water after rain events sustain wetland hydrology.

5.0 WETLAND FUNCTIONAL VALUES

5.1 Wetland Functional Analysis Methodology

Wetlands, in general, provide many valuable ecological and social functions, including 1) stormwater storage, 2) groundwater recharge, 3) erosion control, 4) water quality improvement, 5) natural biological support, 6) overall habitat functions, 7) specific habitat functions, and 8) cultural and socioeconomic value.

Several procedures have been developed for assessing the importance and magnitude of functions and include the Washington Functional Assessment Method (WAFAM) Wetland Evaluation Technique, the Hydrogeomorphic Assessment Method the Habitat Evaluation Procedure (HEP), and numerous regional and/or local procedures. However, none of these methods were consistent with the needs of this project.

Wetland functions were also semi-quantitatively assessed using information gathered while performing the ECY Wetland Rating System for Western Washington (Hruby, 2014). The scores from the analysis of the wetland are found in Appendix J. This method is a comprehensive approach requiring substantial data input and assessment of onsite and landscape functions. The descriptions of wetland functions and the factors and parameters considered by that method are very helpful in interpreting the functioning of the subject wetlands and buffer areas. The methodology is scientifically based, in that its application requires a prior understanding of how wetlands function. Advanced experience, training and scientific objectivity of a wetland scientist applying the method is essential for an accurate assessment. Alex Callender has attended and received credit for the training in this method.

5.2 Wetland Functions

Wetland A

Wetland A is an approximately 5.46 – acre, mostly undisturbed depressional wetland that drains much of the springs along the way to the east and to a culvert where it finally discharges to the Deschutes River. The wetland scored 22 overall and had a habitat score of seven (HLH)

- *Water Quality*

  Wetland has an intermittently flowing stream or ditch, OR highly constricted permanently flowing outlet. The soil two inches below the surface is not true clay or true organic. The wetland has persistent, ungrazed plants in greater than 95% of area. The area seasonally ponded is greater than ¼ the total area of wetland. The wetland unit receives stormwater discharges, and greater than 10% of the area within 150 feet of the wetland is in land uses that generate pollutants. There are no septic systems within 250 feet of the wetland, and there are no other sources of pollutants coming into the wetland. The wetland discharges directly (i.e., within 1 mile) to a stream, river, lake, or marine water that is on the 303(d) list. The wetland is in a basin or sub-basin where an aquatic resource is on the 303(d) list. The site has been identified in a watershed or local plan as important for maintaining water quality.

- *Hydrologic Functions*

  Wetland A has an intermittently flowing stream/ditch. Marks of ponding are at least 0.5 feet to less than two feet from surface or bottom of outlet. The area of the basin is 10 to 100 times the area of the unit. The wetland receives stormwater discharges, and greater than 10% of the area within 150 feet of the wetland is in land uses that generate excess runoff. More than 25% of the contributing basin of the wetland is covered with intensive human land uses. Flooding from groundwater is an issue in the sub-basin. The site has not been identified as important for flood storage or flood conveyance in a regional flood control plan.

- *Habitat functions*

  The structure of the plant community is comprised of aquatic bed, emergent, scrub-shrub, forested, and forested class that has three out of five strata. There are four hydroperiods: permanently flooded or inundated, seasonally flooded or inundated, occasionally flooded or inundated, and saturated only. There are greater than 19 plant species and high interspersion of habitat. The wetland has five special habitat features: large, downed, woody debris; standing snags; undercut banks; stable steep banks of fine materials; and at least ¼ acres of thin-stemmed persistent plants or woody branches. Accessible habitat is 10-19% of one-kilometer

polygon, and total habitat is 10-50% and greater than three patches. Greater than 50% of one-kilometer polygon is high intensity land use. The wetland has three Priority Habitats (instream, riparian, and snags and logs) within 100 meters and is mapped as a location for an individual WDFW Priority Species.

Wetland B

Wetland B is an approximately 2.3-acre, mostly undisturbed slope wetland that drains the springs along the way to the southeast and to a culvert where it crosses the golf course to another water feature to the northeast. The wetland had an overall score of 16 and a habitat score of seven (MMH).

- *Water Quality*

  The slope of Wetland B is 1% or less. The soil two inches below the surface (or duff layer) is not true clay or true organic. Dense, uncut, herbaceous plants are greater than ¼ of the area. Less than 10% of the area within 150 feet on the uphill side of the wetland is in land uses that generate pollutants. There are no other sources of pollutants coming into the wetland. The wetland discharges directly (i.e., within 1 mile) to a stream, river, lake, or marine water that is on the 303(d) list. The wetland is in a basin or sub-basin where water quality is an issue. The site has been identified in a watershed or local plan as important for maintaining water quality.

- *Hydrologic Functions*

  Less than 25% of the area within 150 feet upslope of wetland is in land uses or cover that generate excess surface runoff. Surface flooding problems are in a sub-basin farther downgradient. The site has not been identified as important for flood storage or flood conveyance in a regional flood control plan.

- *Habitat functions*

  The structure of the plant community is scrub-shrub, forested, and the forested class has 3 out of 5 strata. There are two hydroperiods: seasonally flooded or inundated, and intermittently or seasonally flowing stream in, or adjacent to, the wetland. There are 5-19 plant species and a moderate interspersion of habitat. There are four special habitat features: large, downed woody debris; standing snags; undercut banks; and at least ¼ acre of thin-stemmed persistent plants or woody branches. Accessible habitat is 10-19% of one-kilometer polygon, and total habitat in the polygon is 10-50% and greater than 3 patches. Greater than 50% of one-kilometer polygon is high intensity land use. There are three Priority Habitats within 100m: riparian, instream functions, as well as snags and log habitat.

Wetland C

Wetland C is large depressional wetland that has a storm drain to the northeast via a culvert. The wetland is a Category II wetland with an overall score of 21 and a habitat score of six (MMM)

- *Water Quality*

  Wetland C is a depression or flat depression with no surface water leaving it. The soil two inches below the surface is true clay or true organic. There are persistent, ungrazed plants in greater than 95% of the area. The area seasonally ponded is greater than ¼ the total area of wetland. The wetland unit does not receive stormwater discharges, and greater than 10% of the area

within 150 feet of the wetland is in land uses that generate pollutants. There are no septic systems within 250 feet of the wetland, and there are no other sources of pollutants coming into the wetland. The wetland does not discharge directly to a stream, river, lake, or marine water that is on the 303(d) list. The wetland is in a basin or sub-basin where an aquatic resource is on the 303(d) list. The site has been identified in a watershed or local plan as important for maintaining water quality.

- *Hydrologic Functions*
  Wetland C is a depression or flat depression with no surface water leaving it. Marks of ponding are at least 0.5 feet to less than two feet from surface or bottom of outlet. The area of the basin is 10 to 100 times the area of the unit. The wetland does not receive stormwater discharges, and greater than 10% of the area within 150 feet of the wetland is in land uses that generate excess runoff. More than 25% of the contributing basin of the wetland is covered with intensive human land uses. Flooding occurs in a sub-basin that is immediately downgradient of the unit. The site has not been identified as important for flood storage or flood conveyance in a regional flood control plan.

- *Habitat functions*
  The structure of the plant community is scrub-shrub, forested and the forested class has 3 out of 5 strata. There are three hydroperiods: permanently flooded or inundated, seasonally flooded or inundated, and saturated only. There are 5-19 plant species and a moderate interspersion of habitat. There are three special habitat features: large, downed woody debris; standing snags; and at least ¼ acre of thin-stemmed persistent plants or woody branches. Accessible habitat is 20-33% of 1-kilometer polygon and total habitat in the polygon is 10-50% and greater than patches. Greater than 50% of 1-kilometer polygon is high intensity land use. The site has one Priority Habitat of snags and logs within 100 meters.

6.0 REGULATORY CONSIDERATIONS

6.1 City of Tumwater Regulations

The City of Tumwater regulates wetlands using a combination of land use intensity wetland category and habitat scores. The wetlands were rated using the Wetland Rating System for Western WA (Hruby, 2014)

Wetland A

Wetland A is rated a Category II wetland with an overall score of 22, and a habitat score of seven (HLH) for habitat. According to **TMC Table 24.30-1. Standard Wetland Buffer Widths**. Wetlands with a habitat score of seven (HLH) would require a 150-foot buffer. This can be reduced to the buffers recommended for moderate land use intensity using mitigation measures in the table below to reduce the land use intensity of the project and maintain no net loss of wetland functions and values.

Wetland B is a Category III wetland with an overall score of 16 and a habitat score of seven (MMH). Category III wetlands in the City of Tumwater with a habitat score of six typically carry a 150-foot buffer.

This can be reduced to the buffers recommended for moderate land use intensity using mitigation measures in the table below to reduce the land use intensity of the project and maintain no net loss of wetland functions and values.

Wetland C is a Category II wetland with an overall score of 21 and a habitat score of six (MMM). Category II wetlands in the City of Tumwater with a habitat score of seven typically carry a 150-foot buffer. This can be reduced to the buffers recommended for moderate land use intensity using mitigation measures in the table below to reduce the land use intensity of the project and maintain no net loss of wetland functions and values.

The primary land use is a golf course that will also be home to a multi-use trail that will occupy a small portion of the course. No new impacts to the wetlands is due to the golf course and the existing trail as they are both legal existing non-conforming uses.

Under **16.28.030 Definitions.**

P. "High-intensity land use" includes land uses which are associated with high levels of human disturbance or substantial wetland habitat impacts including, but not limited to: commercial, industrial, institutional, residential densities of one or more units per acre, new agricultural uses (high-intensity processing such as dairies, nurseries and green houses, raising and harvesting crops requiring annual tilling, raising and maintaining animals), **high-intensity recreation (golf courses**, ball fields) and hobby farms.

Table 16.28.170(2): Category II Wetland Buffer Widths

(Buffers for wetlands scoring twenty to twenty-two points for all functions or having the "special characteristics" identified in the rating system)

Wetland Characteristics	**Buffer Widths by Impact of Proposed Land Use (Apply Most Protective if More Than One Criterion Is Met)**	**Other Measures Recommended for Protection**
High level of function for habitat (score for habitat 8 – 9 points)	Low – 150 ft Moderate – 225 ft High – 300 ft	Maintain connections to other habitat areas
Moderate level of function for habitat (score for habitat 5 – 7 points)	Low – 75 ft	No recommendations at this time (1)

Table 16.28.170(2): Category II Wetland Buffer Widths

(Buffers for wetlands scoring twenty to twenty-two points for all functions or having the "special characteristics" identified in the rating system)

Wetland Characteristics	**Buffer Widths by Impact of Proposed Land Use (Apply Most Protective if More Than One Criterion Is Met)**	**Other Measures Recommended for Protection**
Wetland B and C	Moderate – 110 ft **High – 150 ft**	
High level of function for water quality improvement and low for habitat (score for water quality 8 – 9 points; habitat less than 5 points)	Low – 50 ft Moderate – 75 ft High – 100 ft	No additional discharges of untreated runoff
Not meeting above criteria	Low – 50 ft Moderate – 75 ft High – 100 ft	No recommendations at this time (1)

Table 16.28.170(2) Explanatory Notes:

(1) No information on other measures for protection was available at the time the 2014 Washington State Wetland Rating System for Western Washington was written. The Washington State Department of Ecology will continue to collect new information for future updates of the 2014 rating system.

Table 16.28.170(3): Category III Wetland Buffer Widths

(Buffers for wetlands scoring sixteen to nineteen points for all functions)

Wetland Characteristics	Buffer Widths by Impact of Proposed Land Use	Other Measures Recommended for Protection
Moderate level of function for habitat (score for habitat 5 – 7 points) If wetland scores 8 – 9 habitat points, use Table 16.28.170(2): Category II Wetland Buffer Widths	Low – 75 ft Moderate – 110 ft **High – 150 ft**	No recommendations at this time (1)
Score for habitat 3 – 4 points	Low – 40 ft Moderate – 60 ft High – 80 ft	No recommendations at this time (1)

Table 16.28.170(3) Explanatory Notes:

(1) No information on other measures for protection was available at the time the 2014 Washington State Wetland Rating System for Western Washington was written. The Washington State Department of Ecology will continue to collect new information for future updates of the 2014 rating system.

TMC 16.28.170 Wetland buffers.

A. Standard Buffer Zone Widths. Wetland buffer zones shall be required for all regulated activities adjacent to regulated wetlands.

1. Any wetland created, restored or enhanced as compensation for approved wetland alterations shall also include the standard buffer required for the category of the created, restored, or enhanced wetland.

2. All buffers shall be measured from the wetland boundary as surveyed in the field pursuant to the requirements of TMC 16.28.080.

3. The width of the wetland buffer zone shall be determined according to wetland category, the functions and special characteristics of the wetland, and the proposed land use.

4. Wetlands of high conservation value, bogs, and forested wetlands shall have the buffers shown in the table below independent of points scored for habitat in the rating system.

5. If a wetland meets more than one of the characteristics listed in Tables 16.28.170(1) to 16.28.170(4), the buffer recommended to protect the wetland is the widest one.

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
There is a 110-ft buffer after the reduction.

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.

2. For wetlands that score less than five points for habitat, the buffer width can be reduced to that required for moderate land use impacts if measures to minimize impacts of different land uses on wetlands, such as the examples summarized in Table 16.28.170(5), are applied.

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

Table 16.28.170(5) Explanatory Notes:

(1) These examples are not necessarily adequate to meet the rules for minimizing toxic runoff if threatened or endangered species are present at the site.

The applicant will be able to meet the requirements of the table above.

The wetlands, and their buffers are depicted below (**Figure 4**).

Streams

Streams in the City of Tumwater are regulated under TMC 16.32.

16.32.065 Riparian habitat areas – Buffers.

Recommended riparian habitat area widths are shown in the table below. A riparian habitat shall have the width recommended, unless a greater width is required pursuant to subsection A of this section, or a lesser width is allowed pursuant to subsection B of this section. Widths shall be measured outward in each direction, from the ordinary high water mark or the top of the bank if the ordinary high water mark cannot be identified. Riparian areas should be sufficiently wide to achieve the full range of riparian and aquatic ecosystem functions. Such functions include but are not limited to protection of instream fish habitat through control of temperature and sedimentation in streams; preservation of fish and wildlife habitat; and connection of riparian habitat to other habitats.

Table 1: Riparian Habitat Areas

Stream Type	**Recommended RHA Widths**
Type 1 and 2; or shorelines of the state, or shorelines of statewide significance	250 feet
Type 3; or other perennial or fish bearing streams, 5 – 20 feet wide	**200 feet Stream Z**
Type 3; or other perennial or fish bearing streams, < 5 feet wide	100 feet
Type 4 and 5	**50 feet Stream Y**

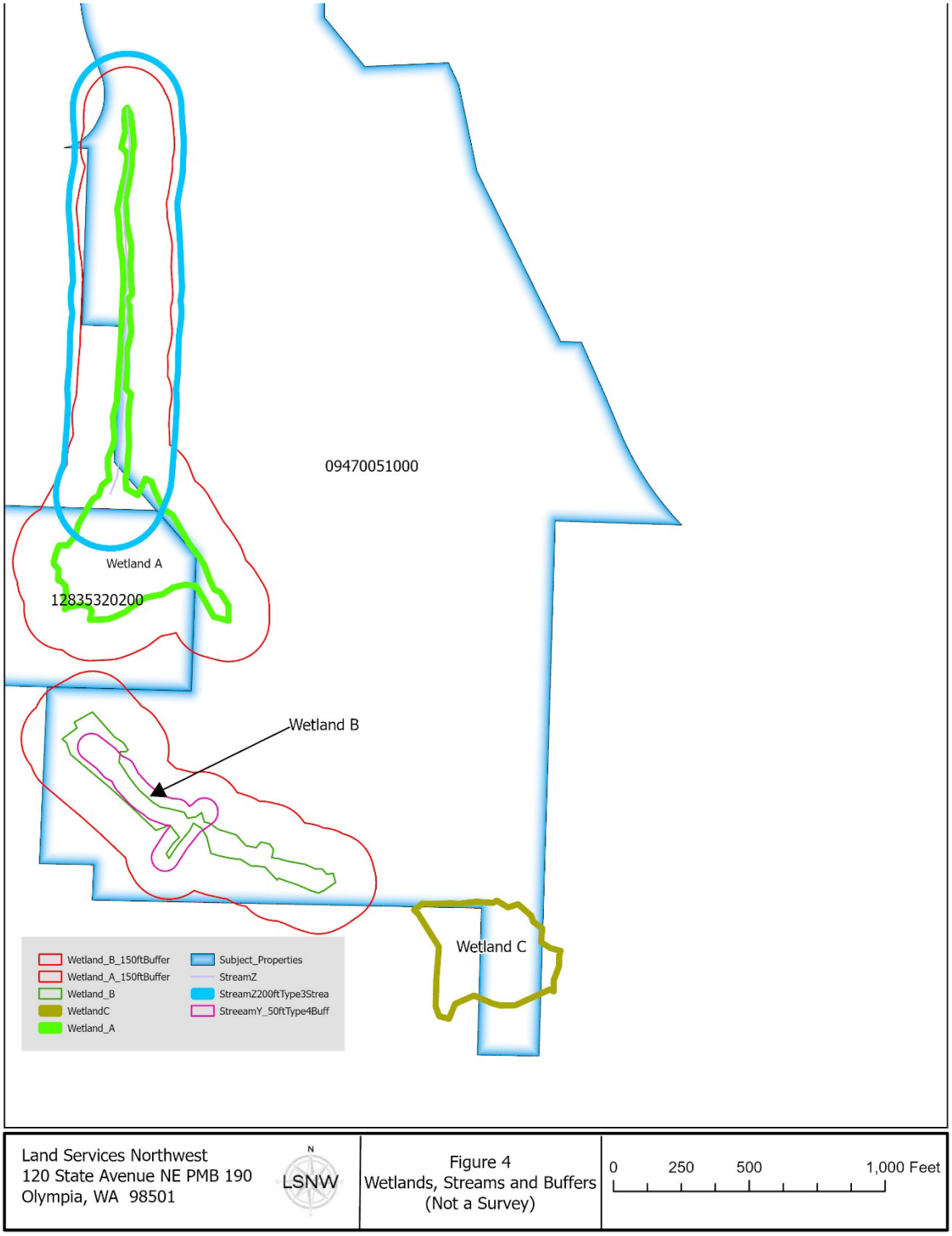


Figure 4 - Standard Wetland Buffers

TMC 16.28.290 Legal Non-conforming structures uses and Activities
The trail is located along the wetland edge and is within the inner 75% of the wetland buffer. This condition existed before the latest code revisions and would then be regulated under TMC-16.28.290 Existing legal nonconforming structures, uses, and activities which states:

A regulated structure, use or activity that legally existed or was approved prior to the passage of this chapter, but which is not in conformity with the provisions of this chapter may be continued subject to the following:

A. No such structure, use or activity shall be expanded, changed, enlarged or altered in any way that increases the extent of its nonconformity without a permit issued pursuant to the provisions of this chapter;

We will be applying for a permit in accordance with the provisions in this chapter for any expansion of the trail, or its associated facilities.

B. Except for cases of discontinuance as part of normal agricultural practices, if a nonconforming activity is discontinued for twelve consecutive months, any resumption of the activity shall conform to this chapter;

This does not apply.

C. If a nonconforming structure, use or activity is destroyed by human activities or an act of God, it shall not be resumed except in conformity with the provisions of this chapter;

Nothing has been destroyed, so this does not apply.

D. Structures, uses or activities or adjuncts thereof that are or become nuisances shall not be entitled to continue as nonconforming activities.

No nuisance has been established here.

A. Standard Buffer Zone Widths. Wetland buffer zones shall be required for all regulated activities adjacent to regulated wetlands.

1. Any wetland created, restored or enhanced as compensation for approved wetland alterations shall also include the standard buffer required for the category of the created, restored, or enhanced wetland.

No direct impacts to wetlands are expected from the new trail. Impacts to the wetland buffers are expected and the category of the wetlands is provided in this report to help with impacts and mitigation.

2. All buffers shall be measured from the wetland boundary as surveyed in the field pursuant to the requirements of TMC 16.28.080.

LSNW Inc has conducted a survey of the wetland boundary as required in TMC 16.28.080 buffers will be measured from the wetland boundary. Buffers will be determined by using the Wetland Rating System for Western Washington.

3. The width of the wetland buffer zone shall be determined according to wetland category, the functions and special characteristics of the wetland, and the proposed land use.

The wetland category is presented in this report. The other requirements will be met with the wetland delineation and mitigation report which will be produced with the acceptance of the mitigation concepts in this memorandum.

4. Wetlands of high conservation value, bogs, and forested wetlands shall have the buffers shown in the table below independent of points scored for habitat in the rating system.

Noted.

5. If a wetland meets more than one of the characteristics listed in Tables 16.28.170(1) to 16.28.170(4), the buffer recommended to protect the wetland is the widest one.

We will consider this in the report.

TMC 16.28.115.D Exceptions – Infrastructure.

A. If the application of this title would prohibit a development proposal by a public agency, public utility, or a private entity installing public or private infrastructure that is in compliance with the comprehensive transportation, capital facilities or utility plans of Tumwater, the agency or utility may apply for an exception pursuant to this section.

B. Exception Request and Review Process. An application for an infrastructure exception shall be made to the city and shall include a critical area identification form; critical area report, including mitigation plan, if necessary; and any other related project documents such as permit applications to other agencies, special studies, and environmental documents prepared pursuant to the State Environmental Policy Act (Chapter 43.21C RCW). The community development director shall prepare a recommendation to the hearing examiner based on review of the submitted information, a site inspection, and the proposal's ability to comply with infrastructure exception review criteria in subsection D of this section.

C. Hearing Examiner Review. The hearing examiner shall review the application and the community development director's recommendation, and conduct a public hearing. The hearing examiner shall approve, approve with conditions, or deny the request based on the proposal's ability to comply with all of the infrastructure exception review criteria in subsection D of this section.

D. Infrastructure Exception Review Criteria per Tumwater Municipal Code 16.28.170H.3

The criteria for review and approval of infrastructure exceptions are provided below, along with justification demonstrating how the Deschutes Valley Trail Segment C project meets each criterion:

1. There is no other practical alternative to the proposed development with less impact on critical areas;

The majority of the project is aligned with the existing Tumwater Valley Golf course golf cart trail along the right side of the fairways. The Deschutes Valley Trail relies on existing infrastructure (Tumwater Valley Golf Course Cart Path) which was legally built for the purpose of providing a non-degrading surface along the Tumwater Valley Golf Course primarily for use by golf carts, although pedestrian use is

accommodated too. Widening will occur from the edge of the existing path and extend towards the golf course to allow for a dedicated cart path and shared-use path, opening access to other patrons to experience the exceptional natural environment associated with the wetlands, streams and open spaces that are situated along this path. The current alignment has moved tee boxes and golf course infrastructure to the maximum extent practical while maintaining the viable golfing uses.

Other areas for the path were considered, however alternative areas of the golf course were not available without creating additional environmental impacts to floodplains, wetlands and shorelines. The original design, completed prior to 2018, proposed retaining the existing golf cart path and expanding the path toward the wetlands to accommodate the shared-use trail. Following delineation of the wetland in 2025, the design was revised at each project milestone to reduce impacts to the wetland and wetland buffer. The current proposed alignment will replace both the existing cart path and the shared-use trail within the footprint of the existing cart path, allowing the alignment to shift farther toward the golf course and away from the wetland and wetland buffer. As a result, impacts to the wetland and wetland buffer have been reduced to the maximum extent feasible with the proposed alignment. The expansion in use is accommodated by expanding the existing cart path for the majority of the trail and creating new trail areas in specific locations. The majority of the path expansion will occur to the east of the existing cart path, however there are two locations where the path will result in new impacts within the wetland buffer. These two locations could not remain outside of the wetland buffer without impacting portions of the golf course functional facilities, specifically near the Tee Boxes for Hole 2 and 4 (Appendix J).

A portion of the area the new path is proposed is routinely mowed and cleared of invasive species, including, but not limited to blackberry bushes, based on aerial imagery over the years (Appendix K). The routine clearing and mowing within the wetland buffer presents an ongoing negative impact on wetland functions. This impact will be mitigated through wetland buffer enhancements and will prevent future clearing on the east side of the course due to the separation the trail will create between the wetland and golf course.

The project will increase the area of non-pollution generating impervious surface. However, maintained golf course areas are considered pollution generating pervious surfaces per the definition in WAC 173-218-030 and the majority of the additional non-pollution generating impervious surface area will replace areas currently managed as pollution generating pervious areas due to the fertilizers and maintenance that occurs on golf course.

Due to site constraints with high ground water, the proximity of the wetlands, and the shoreline, many stormwater best management practices (BMPs) are not feasible. The BMP selected for this project is sheet flow dispersion, which is considered low impact and the preferred BMP when feasible. Sheet flow dispersion is based on using overland flow across native vegetation to provide stormwater flow control. The current condition of the wetland buffer on the golf course side contains non-native species, primarily Himalayan Blackberry, that encroaches on the wetland and the golf course. The wetland buffer enhancement will remove non-native species from the wetland buffer increasing its wetland buffer function and stormwater dispersion efficacy as it will realign the area with its native state. With enhanced and rehabilitated vegetation, the wetland buffer will be closer in line to a natural wetland buffer than its current state. A natural wetland buffer is an ideal condition for sheet flow dispersion as it uses the natural ecology to manage stormwater.

Even with the avoidance and minimization measures incorporated into the project, some new impacts will occur. These impacts will be mitigated through an extensive mitigation and enhancement plan,

including invasive species removal, as described in Section 9.0 of this Wetland Report. This combination of wetland enhancement and invasive species removal will result in a substantial improvement in wetland and adjacent upland functions while also providing additional amenities for the public.

2. The application of this title would unreasonably restrict the ability to provide utility services to the public;

Without approval of the infrastructure exemption, there is no feasible alternative alignment that would allow the project to meet its intended purpose while avoiding additional impacts to regulated critical areas and maintaining the functional use of the golf course. Relocating the shared-use path farther east would conflict with the operational functions of the golf course and would result in increased encounters with regulated environmental constraints, including wetlands, wetland buffers, floodplains, and shoreline areas. Accordingly, further eastward relocation does not provide a practicable means of avoiding or minimizing critical area impacts.

The Segment C alignment of the Deschutes Valley Trail has been refined through the project design process to avoid encroachment into the shoreline and to reduce impacts within the floodplain. The current alignment also reflects iterative design modifications following wetland delineation and has been configured to avoid and minimize impacts to the wetland and wetland buffer to the maximum extent feasible. The remaining wetland buffer impact is associated with the proposed stormwater best management practice (BMP), which is necessary to provide stormwater management for the trail improvements. The BMP has been located to minimize additional disturbance and will maintain the existing drainage pattern, including the existing flow path and sheet flow toward the wetland. Therefore, the proposed design represents the practicable alternative that minimizes impacts to regulated critical areas while maintaining the functional use of the golf course and providing the intended shared-use trail connection.

It is not anticipated that the new shared use path will have adverse impacts to the wetlands. The buffer enhancements and rehabilitations will provide increase wetland functionality and restore the wetland buffer closer to its natural functional state. The shared use path will also provide a separation from the golf course maintenance and pollution generating elements further enhancing the wetland and wetland buffer function.

3. The proposal does not pose an unreasonable threat to the public health, safety, or welfare on or off the development proposal site;

The new trail will not pose an unreasonable threat to public health, safety, or welfare. Public safety will be improved through the proposed upgrades, including new fencing to keep golf balls from the shared non-motorized path area and wetland. The existing path will be widened and its surface improved to meet the ADA standards for Accessible Design. Public use of the path will also provide a public health benefit by providing opportunities for walking, exercise, and recreation.

The project is not expected to result in an increase in environmental impacts, as supported by the functional analysis. The increase in native vegetation from the mitigation plan described in Section 9.0 will improve the overall environmental health by removal of invasive species and planting of native species.

4. The proposal attempts to protect and mitigate impacts to the critical area functions and values consistent with other applicable regulations and standards.

An assessment of critical area functions has been provided to demonstrate that the critical area functions and values will be maintained due to the planned mitigation actions in accordance with applicable critical areas regulations and standards. The project includes a mitigation plan designed to meet the Department of Ecology's applicable mitigation standards.

Even with the proposed encroachment of the wetland buffer, there will be no-net-loss of wetland functions and values, as demonstrated by the assessment of wetland and stream functions provided in Section 9.3 of this report.

E. Burden of Proof. The burden of proof shall be on the applicant to bring forth evidence in support of the application and to provide sufficient information on which any decision has to be made on the application.

The wetland functional assessment which is conducted using the best available science (BAS) looks at functions before and after the project shows a functional lift of wetland functions due to the improved screening of the wetland with common native flora and will also provided other improved buffer functions such food production, shade, roughness, and aesthetics to patrons.

Table 2 - Summary of Wetlands and Streams on or in the Vicinity of the Subject Property

Wetland	Onsite Size (acres)	Offsite Size (acres)	Category/Type	Habitat Score	Buffer Width (feet)	Buffer after Mitigation	Comments
A	5.46		II	7 (HLH)	150	Variable	Buffer impacts only
B	2.31		III	7 (MMH)	50	Variable	Buffer impacts only
C	2.00	1.52	II	6 (MMM)	150	Variable	Buffer impacts only
Stream Z	150 ft		3		200	Variable	Buffer impacts only
Stream Y	200 ft		4-5		50	Variable	Buffer impacts only

6.2 Corps Regulations

Wetland A flows to the Deschutes River via a culvert to a connected stream channel. B flows via a culvert to other wetlands, and it is assumed that it connects with the Deschutes River and then to the Puget Sound. Therefore, it would be maintained as a water of the U.S. and regulated under the Clean Water Act. No impacts are proposed to Wetland A beyond the buffer reduction.

6.3 Department of Ecology

Under RCW 90.48, the Washington Department of Ecology (DOE) reserves regulatory authority to regulate “waters of the state” under Section 401 of the Clean Water Act. No wetland impacts are proposed.

7.0 WILDLIFE

Wildlife observed during the field investigations are typical of urban/suburban adapted species (Table 2). The European starling, possum, and other species adapted to urbanization may inhabit or visit the site for food and shelter.

No other federally listed, or priority species was observed on the subject property or near the site based on the WDFW Priority Habitats and Species (PHS) and field observations during the reconnaissance and delineation. During the limited duration of the site reconnaissance and delineation, no evidence of the marbled murrelet, or spotted owl was observed onsite. No raptors such as Bald eagles or other raptors, or their nests were found along the trail.

Although some species of salmon may visit the site, no federally listed salmonid species are known to use the Deschutes as a primary spawning ground onsite, based on the WDFW SalmonScape database, the WDFW PHS database, and site reconnaissance. The Deschutes Falls are a significant barrier to access, although the WDFW fish ladder is managed to allow sea run cutthroat trout and some salmon are given access to the upper Deschutes.

Wildlife observed onsite during site visits included the occasional mole mound, deer and coyote scat, and beaver dams. There was one Great blue Heron (*Ardea Herodias)* found feeding in Wetland A along with a few pairs of Mallard ducks (*Anas platyrhynchos*). It does not appear that there is a heron rookery here. Robins (*Turdus migratorius*) were seen on the fairways.

8.0 PROPOSED PROJECT

8.1 Description

The project is to build the first phase of an approximately .87 mile pedestrian/bicycle trail utilizing parts of an existing golf cart path on a portion of the Tumwater Valley Municipal Golf Course. The path will start near the clubhouse and end for this phase to the southeast along the Deschutes River (**See Figure 1**). This will provide improved public access to a limited access area of the shoreline in accordance with the policies of the Tumwater SMP and the Shoreline Management Act.

To accomplish this project, the city proposes an expansion of the driving/walking surface and unavoidable buffer impacts, but as the mitigation analysis will show, there will be no net loss of the shoreline functions or wetland and stream ecological functions as a result of this expansion of the trail after the mitigation is installed (See Site Plan).

8.2 Development Impacts

Since the golf course, the maintenance of the golf course, and the existing cart path are determined to be ongoing, legal non-conforming structures and uses, they are considered part of the baseline condition of the area. The activities within these areas are ongoing, not considered as an impact and should not require mitigation.

Any activity beyond the footprint of the existing trail for accommodating the trail or improving the stormwater treatment would be considered an impact, so the question to be asked is how much impact would be attributed to each type of activity.

We consider the activities/ impacts due to the project as follows:

- Proposed New Impervious Trail Within Maintained Areas (Typically grass or invasive blackberry and grassy areas.)
- Proposed New Impervious Trail Within Unmaintained Natural Areas (Typically forested or shrub with some invasives, but much more native vegetation currently present.

8.3 Impact Avoidance and Minimization

In order to maintain wetland functions, the city has avoided impacts to the greatest extent possible by maintaining the footprint of the trail within the bounds of the existing paved cart path for the Tumwater Valley Golf Course. There are some small areas where the path will diverge from the existing cart path, but these areas will be in well-drained upland forest or upland grassy fields and will be proposed only as needed to make interconnections with other parts of the trail. No new wetland impacts will occur, and buffer impacts will mostly be limited to areas near the edge of already impacted areas. The two main areas of new impact have been discussed and they are found along Tee box 2 and Tee box 4. The impacts have been reduced by moving the Tee boxes and the remaining impacts will result in an improvement through native mitigation plantings and the new non-polluting surfaces.

8.4 Minimization of Water Quality Impacts

Although most work will be done in the dry, implementing water quality and sedimentation best management practices (BMPs) will act to minimize sedimentation and protect water quality onsite. Any bare areas will be planted with a cover crop. Silt fences and straw waddles will be used where necessary. infiltration galleries will be used to reduce stormwater impacts from the residence. The increase in vegetation from the proposed buffer enhancement plan will provide for increased surface roughness and nutrient uptake among other improvements (See Chapter 9 – Mitigation).

9.0 MITIGATION

16.28.030 Definitions

W. "Mitigation" includes avoiding, minimizing or compensating for adverse wetland impacts. Mitigation, in the following order of preference, is defined as:

1. Avoiding the impact altogether by not taking a certain action or parts of an action;

The avoidance of impact as mentioned before includes expansion away from the wetlands and moving the Tee boxes and alignment away from the wetlands

2. Minimizing impacts by limiting the degree or magnitude of the action and its implementation, by using appropriate technology, or by taking affirmative steps to avoid or reduce impacts;

As mentioned earlier the degree or magnitude of the action was explored and the current alignment has the greatest avoidance of new impacts and minimizes impacts by using existing non polluting cart path and creating new non-polluting trail that replaces pollution generating golf course turf.

3. Rectifying the impact by repairing, rehabilitating or restoring the affected environment to the conditions existing at the time of the initiation of the project;

The project will rehabilitate and enhance affected areas existing at the time of the initiation of the project.

4. Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action;

The impact over time will be minimized as the mitigation matures and becomes self sustaining.

5. Compensating for the impact by replacing, enhancing, or providing substitute resources or environments;

An extensive planting plan is provided to enhance and rehabilitate the buffer.

6. Monitoring the impact and the compensation project and taking appropriate corrective measures. Mitigation for individual actions may include a combination of the above measures.

A maintenance and monitoring plan is included.

9.1 Mitigation Plan Requirements

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The objective of the mitigation is to meet the no-net-loss requirements found in code.

It will be necessary to provide an invasive species removal plan followed by a native plant buffer enhancement plan. The applicant will enhance the **buffer** of the wetlands along the trail by removing invasive blackberries, English ivy, and English holly and other invasive species that may be present along the route and install native plants to enhance the density and provide a resilient buffer that will be self-maintaining once established. The plantings may require some trimming along the interface with the golf course in order to prevent encroachment into the playing area or the new paved pathway. The shrubs chosen should perform well in this position in the landscape and be able to withstand periodic trimming while maintaining functions.

9.2 IMPACTS

As mentioned earlier, the applicant proposes only buffer impacts and mitigation will be conducted in accordance with the mitigation requirements found in TCC.

There are two main impacts to be considered for the expansion and reconfiguration of the cart path into the multi-use Deschutes Valley Trail

The impacts that will be considered are:

- Proposed New Impervious Trail Within Maintained Areas
- Proposed New Impervious Trail Within Unmaintained Natural Areas

These areas are illustrated (**See Appendix K- WETLAND BUFFER IMPACTS DESCHUTES VALLEY TRAIL – SEGMENT C**)

Typically, buffer Impacts to the outer 75% in the City of Tumwater are mitigated at a 1:1 enhancement to impact ratio with invasive species removal in an area that is impacted. The expected impacts to the trail will mostly be within the inner 75% of the wetland buffers due to the existing legal non-conforming nature of the existing cart path that was built well before the change to the newest version of the Tumwater CAO.

Therefore, the intensification of the impacts due to the reconfiguration of the trail will require greater mitigation, and they are treated more as an indirect impact to the Wetland. We will use the mitigation table 16.28.220(6): Mitigation Ratios for Projects in Western Washington in conjunction with the impact reducing measures found in Table 16.28.170(5) below.

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

Table 16.28.170(5) Explanatory Notes:

(1) These examples are not necessarily adequate to meet the rules for minimizing toxic runoff if threatened or endangered species are present at the site.

The table will be followed as relevant to the project plans and activities; however, there may be some recommendations that are not applicable.

In addition to the impact reducing measures of the table above, it is recommended that the following table is used to provide mitigation for impacts to the wetlands at levels that are supported by the best available science.

Unmaintained Areas will be enhanced and use the appropriate enhancement ratios determined by the category of the wetland.

Maintained areas will be rehabilitated.

The impact and mitigation area are found in Appendix K -Wetland Buffer Impact Areas – Segment C and Appendix L - Wetland Buffer Impact Mitigation Areas – Segment C)

The impacts due to the project are buffer impacts only, so the rehabilitation definition used here is slightly different than the 2008 Federal Rule. Rehabilitation of buffer vegetation, which is primarily invasive species or golf course turf, will be removed and replaced with native trees and shrubs. Enhancement areas will be adding shrubs and trees to improve functions by improving density and therefore the roughness, screening, nutrient uptake and other functions as shown in the functional analysis. The removal of invasive species may also occur in enhancement areas, but not typically to the extent that will occur in the rehabilitation areas which are primarily not native vegetation now.

Table 16.28.220(6): Mitigation Ratios for Projects in Western Washington

Category and Type of Wetland Impacts (1)	Reestablishment or Creation	Rehabilitation (2)	Enhancement (2)
Category I – bogs or wetlands of high conservation value	Not considered possible (3)	6:1	Case-by-case
Category I – mature forested	6:1	12:1	24:1
Category I based on score for functions	4:1	8:1	16:1
All category II	3:1	**6:1**	**12:1**
All category III	2:1	**4:1**	**8:1**
All category IV	1.5:1	3:1	6:1

The table below has the overall mitigation totals for a quick understanding of the expected impacts to mitigation acreages.

Table 3 – Summary of Buffer Impact Areas

Summary of Wetland Buffer Impact Areas	Impacts Within Golf Course Maintained Areas			Impacts within Unmaintained Areas		
	Proposed Impacts sq ft	Ratio	Proposed Rehabilitation Mitigation sq. ft.	Proposed Impacts sq. ft.	Ratio	Proposed Enhancement Mitigation sq. ft.
Wetland A Category II	10,661	6:1	63,966	8,238	12:1	98,856
Wetland B; Category III	3,603	4:1	14,412	6,631	8:1	53,048
Wetland C; Category II	2,836	6:1	17,016	1,675	12:1	20,100
Total	**17,100**		**95,394**	**16,544**		**172,004**

9.2 Integrated Pest Management

The applicant will use the Integrated pest Management Plan (IPM) methods and utilize management recommendations from the Thurston County IPM Website. The primary objectives of the planting plan is to provide shrub species that will shade and outcompete the two main species which require control: **Himalayan blackberries Scotch broom, English holly, and the single-seeded hawthorn.**
The applicant will use manual or mechanical means as the preferred method for removal of the Himalayan and Evergreen blackberries onsite. If these methods are found to be ineffective or infeasible, other more aggressive methods will be considered to include use of popular effective herbicides consistent with the recommended label application rates and conducted during the dry season by licensed applicators. Other species which may require control from time to time will use recommendations from the Thurston County Noxious Weed website and the Homeowner IPM recommendations adopted for this particular purpose.

Reed Canary Grass (Phalaris arundanacea; FACW) and Himalayan and Evergreen blackberry (*Rubus armeniacus and laciniatus; FAC*)
These are the primary invasive weeds found throughout the golf course edges. Recommendations for removal are provided in **Appendix M**. These weeds are known to be a persistent and problematic weed, when found growing in native planting areas for mitigation plans. The National Park Service has had success with the herbicide Imazapyr for this persistent weed. It may take a concentrated effort over a period of years, and offsite sources may provide a continuing seed source that may be difficult to overcome, however, once established, native plants can shade out and ultimately provide a resilient impact to prevent reinfestation of the weeds over time.

9.3 Functional Analysis

As mentioned earlier, the following planting plan to rehabilitate the buffer will maintain wetland functions and improve the overall landscape as well by:

- providing increase roughness,
- increasing nutrient uptake of stormwater,
- increasing site plant diversity,
- providing screening for wildlife,
- providing shade for improved water quality and habitat,
- producing food for wildlife and structure,
- providing nectar for threatened butterflies.

Currently, the areas that will be impacted are on the edge of the paved pathway consisting of fields with invasive Himalayan blackberry and Scotch broom (Cytisus scoparius, One seeded hawthorne (Crataegus monogyna; FAC), English holly (*Ilex aquiliinum*; FACU), and English ivy (*Helix hedera*; FACU). There is a lack of trees, and native shrub vegetation and the screening that they provide. This plan will provide a properly rehabilitated buffer in the area, where it matters most, between the wetland and the trail.

Areas will be planted with buffer plants, which will not only provide benefits already mentioned, but will also become a landscape amenity that combines the practical plantings with aesthetic attributes of our native flora which are not so dependent on water during our dry summers. There were areas of beaver use where the plantings could quickly be wiped out by the beavers so protection may be required for the tree and shrubs to prevent them from becoming food or forage for the area beavers.

The following analysis uses the qualitative scoring values like the values developed in the Wetland Rating System for Western Washington (Hruby, 2014). The best available science has found that the resolution of value can only be rated using a qualitative system and maintain a rapid assessment of less than one day. Therefore, we have examined common buffer functions for wetlands and other habitats to show the overall expected lift by the rehabilitation plan. The functions we are studying were found in the latest buffer BAS (Hruby, 2013)

Table 4- Buffer Functions Comparison Before and After Rehabilitation

Buffer Perf criteria	Other Habitats (Bat, Martin and Wood duck habitat	Screening	Nutrient uptake	Invasive Species	Food source	Structure	Surface roughness	Temperature attenuation	Diversity
Before mitigating measures	Low	Medium	Low	High	Low	Low	Medium	Low	Low
After mitigating measures	Medium	High	Medium	Low	Medium	High	High	Medium	Medium

The enhancement and rehabilitation measures will have many similar results over time; however, the enhancement will mostly add to the existing functions while the rehabilitation will require removal of invasives and preparation of the substrate to allow for the introduction of native plants to the point where they can dominate the area. Once applied, the rehabilitation and enhancement should have similar results and will provide new habitat for birds, bats and macroinvertebrates and in the future provide structure and reduce invasive species. There is little doubt that the small impacts will be compensated for by an effective enhancement and rehabilitation plan. The objective of the enhancement area is to provide shrub and tree species to create a long-lasting conifer dominated overstory and a shrub scrub understory to improve buffer functions.

9.4 Planting Plan

To provide for a higher functioning wetland, a wetland invasive removal plan was developed to make the remaining buffer and wetland more resilient and effective.

Blackberries will be removed using brushing equipment on a skid steer to knock down the existing canes. These will be raked up and either composted, landfilled or disposed of in some acceptable manner. One seeded hawthorne and other shrubs like English holly could be ground or girdled.

The placement area which was created to maximize plant performance by placing species in a position in the landscape where they will thrive and provide the most benefit to the system (Appendix L- WETLAND BUFFER IMPACTS MITIGATION DESCHUTES VALLEY TRAIL – SEGMENT C)

Trees and shrubs will be planted at grade in holes 2-3 times the width of the container or root ball. Mulch will be applied around each tree two to four inches deep in a three-foot diameter around the tree with an edge to retain water. Containerized rootbound trees will be cut with sharp shears on the bottom in an x pattern to promote root growth. Four cuts will be made vertically to allow roots to spread. Trees and shrubs will be thoroughly watered after installation.

Table 5 - Wetland A Enhancement Area (98,856 sq. ft.)

Common Name	Scientific Name	Size	Spacing	Quantity
Pacific willow	*Salix lasiandra*	5 Gallon	15 ft. oc	100
Sitka spruce	*Picea sitchensis*	1 Gallon	15 ft. oc	200
Western hemlock	*Tsuga heterophylla*	1 Gallon	15 ft oc	139
Nootka rose	*ranunculus occidentalis*	1 Gallon	5 ft. oc	250
Pacific ninebark	*Physocarpus capitatus*	1 Gallon	8 ft oc	250
Douglas hawthorne	*Crataegus douglasii*	1 Gallon	8 ft. oc	250
Osoberry	*Oemleria cerasiformis*	1 Gallon	8 ft oc	106
Slough sedge	Carex obnupta	1 Gallon	5 ft oc	250
Total				**1545**

Table 6 –Wetland B Enhancement Area (53,048 sq. ft.)

Common Name	Scientific Name	Size	Spacing	Quantity
Western red cedar	*Thuja plicata*	5 gal	15 ft oc	**50**
Scoulers willow	*Salix scouleriana*	1 gal	10 ft oc	50
Oregon ash	*Fraxinus latifolia*	5 gal	15 ft oc	136
Twinberry	*Lonicera involucrata*	1 Gallon	8 ft. oc	100
Salmonberry	*Rubus spectabilis*	1 gal	5 ft oc	100
Scoulers willow	*Salix scouleri*	1 Gallon	8 ft. oc	100
Red osier dogwood	*Cornus sericea*	1 Gallon	8 ft oc	100
Pacific rhododendron	*Rhododendron macrophyllum*	1 Gallon	5 ft oc	100
Red elderberry	*Sambuca racemosa*	1 Gallon	8 ft oc	100
Total				**836**

Table 7 – Wetland C Enhancement Area (20,100 sq. ft.)

Common Name	Scientific Name	Size	Spacing	Quantity
Sitka spruce	*Picea sitchensis*	1 Gallon	15 ft oc	49
Western red cedar	*Thuja plicata*	1 Gallon	15 ft oc	40
Snowberry	*Symphoricarpus alba*	1 Gallon	5 ft. oc	50
Salmonberry	*Rubus spectabilis*	1 Gallon	5 ft. oc	50
Red elderberry	*Sambuca racemosa*	1 Gallon	5 ft. oc	50
Red flowering currant	*Ribes sanguineum*	1 Gallon	8 ft. oc	50
Oceanspray	*Holodiscus discolor*	1 Gallon	8 ft. O.C.	25
Total				

Table8 – Wetland A – Rehabilitation (63,966 sq ft)

Common Name	Scientific Name	Size	Spacing	Quantity
Sitka spruce	Picea sitchensis	1 Gallon	15 ft oc	100
Bitter cherry	Prunus emarginata	1 Gallon	15 ft oc	100
Black cottonwood	Populus balsamifera	1 Gallon	15 ft oc	100
Vine maple	Acer circinatum	1 Gallon	8 ft oc	1000
Pacific crabapple	*Malus fusca*	1 Gallon	5 ft. O.C.	100
Salmonberry	*Rubus spectabilis*	1 Gallon	5 ft. O.C.	200
Red elderberry	*Sambuca racemosa*	1 Gallon	5 ft. O.C.	116
Mock orange	*Philadelphus lewisii*	1 Gallon	8 ft. O.C.	100
Oceanspray	*Holodiscus discolor*	1 Gallon	8 ft. O.C.	100
Total				

Table 9 – Wetland B – Rehabilitation Planting (14,412 sq ft)

Common Name	Scientific Name	Size	Spacing	Quantity
Western red cedar	Thuja plicata	1 Gallon	15 ft oc	40
Sitka willow	*Salix sitchensis*	1 Gallon	10 ft. oc	24
Salmonberry	*Rubus spectabilis*	1 Gallon	5 ft. oc	40
Pacific crab	Malus fusca	1 Gallon	8 ft oc	40
Blue elderberry	*Sambuca negra*	1 Gallon	5 ft. oc	40
Douglas hawthorne	*Crataegus douglasii*	1 Gallon	8 ft. oc	20
Oceanspray	*Holodiscus discolor*	1 Gallon	8 ft. oc	20
Total				

Table 10– Wetland C – Rehabilitation Planting (17,016 sq ft)

Common Name	Scientific Name	Size	Spacing	Quantity
Western hemlock	Picea sitchensis	1 Gallon	15 ft oc	40
Pacific willow	Salix lasiandra	1 Gallon	15 ft oc	20
Vine maple	Acer macrophyllum	1 Gallon	15 ft oc	16
Snowberry	*Symphoricarpus alba*	1 Gallon	5 ft. O.C.	50
Osoberry	*Oemleria cerasiformis*	1 Gallon	5 ft. O.C.	50
Red elderberry	*Sambuca racemosa*	1 Gallon	5 ft. O.C.	40
Mock orange	*Philadelphus lewisii*	1 Gallon	8 ft. O.C.	25
Oceanspray	*Holodiscus discolor*	1 Gallon	8 ft. O.C.	25
Total				

9.5 Monitoring Plan

The planting plan will be monitored for 10 years following the as – built (Year 0). Monitoring of the performance standards will be provided each spring, shortly after leafing out, to aid in plant identification. A report that communicates the findings will be provided to the city staff a month following the monitoring.

The report will contain pictures from photo points established during the as-built year to allow the city personnel to evaluate site conditions and performance standards. The photos in the report will be taken in four cardinal directions, unless there is a direction that provides a better view. Four photo points will be established during the as-built (Year 0). Management of performance deficiencies or maintenance will occur during the spring or fall season following monitoring, and a summary of management actions will be included in the following year's monitoring report to track effectiveness and adaptively manage the site. A form has been developed to facilitate the monitoring process (**Appendix M**).

9.6 Performance Standards

The performance standards are as follows:

Year 0 - an inventory of plants and photo points will be established for monitoring during the monitoring period within 1 month of the installation.

Year 1-2 will have 100% survival of installed plants. Noxious weeds will be less than 10% aerial coverage.

Volunteer trees or shrubs may account for up to 10% of the overall count of surviving plants. Dead plants will be replaced in kind unless a volunteer is a replacement.

Year 2 -10 will have a survival rate of 80 % of the original count. Volunteers can account for 10% of the total, if present. Noxious weeds such as Himalayan blackberry, Scotch broom, reed canary grass, and other invasives will not have more than 10% aerial coverage of the planting area.

If the area meets the survival and aerial coverage performance measure in Year 5, the applicant can be given approval to end monitoring.

Japanese knotweed, yellow flag iris, and hogweed will have a zero percent tolerance and will be removed or sprayed using an appropriate herbicide approved for aquatic use by a licensed applicator.

The aerial coverage will be 70% by Year 5, 80% by Year 7, and 90% by Year 10. If these coverage measures are not met and it does not appear that they will meet performance measures because of neglect, more plants may be planted to make up the difference.

Failure to meet standards by Year 10 will require an additional year of monitoring.

9.7 Contingency Plans

If the site does not meet performance standards, contingencies may be developed to adapt to the site-specific conditions. Contingencies may include:

- Increased watering
- Mulching
- Integrated Pest Management
- Microtopography changes
- Species substitution
- Herbivory protection
- Bark wrap

The area is frequented by deer, and the choice of plants was chosen to avoid herbivory issues, but exclusion fencing may be necessary until the plants reach maturity. This is not expected to be needed as a permanent fixture, if required. Any contingencies will be developed in conjunction with landscapers, nursery staff, and City Staff. The city would be notified in advance of the contingency plans. No contingencies will be applied without city consent.

10.0 SUMMARY AND CONCLUSIONS

Three jurisdictional wetlands and two streams were found on- and offsite and were delineated.

Wetland A is a Category II wetland with an overall score of 22 and a habitat score of 7(HLH). Wetlands in the City of Tumwater with a habitat score of seven (HLH) carry a 150-foot buffer.

Wetland B is a Category III wetland with an overall score of 16 and a habitat score of seven (MMM). Category IV wetlands in the City of Tumwater typically carry a 150-foot buffer.

Wetland C is a Category II wetland with an overall score of 21 and a habitat score of six (MMM This wetland will also carry a 150-foot buffer.

Stream Z is located within Wetland A. This stream is a type 3 stream 5-20 feet wide and will carry a 200-foot buffer.

Stream Y is located within Wetland B. This is a type NS stream, and this stream discharges to a culvert. The stream is less than 2 feet wide and is a type 4 stream. It will carry a 50-foot buffer.

The City wants to provide a new trail in approximately the same position as an existing golf cart path with expansions to occur outside of wetlands but due to the legal non-conforming status within the inner 75% of the current buffers. No direct impacts to wetlands are proposed and the expected buffer impacts are unavoidable and will be mitigated at a much higher enhancement and rehabilitation rate than typical buffer impacts treating them more like indirect wetland impacts. The mitigation will be combined with invasive species removal. This should stop the natural resource degradation that occurs when invasive species are left unmanaged as they will be removed and monitored for 10 years at which time the mitigation areas will be self-sustaining. All the mitigation treatments will have a positive impact to the wetlands and result in no-net-loss in accordance with the City of Tumwater Municipal Code.

This project will be a great community asset and will maintain and improve the natural resources to the benefit of the citizens of the Puget Sound region and the City of Tumwater.

11.0 LIMITATIONS

This report was created with care and best professional judgment using the current best available science, but the report is subject to interpretation by local state and federal regulators who have the final regulatory authority on wetlands and other boundary determinations. No outcomes are warranted by this report.

12.0 REFERENCE

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Appendix A - Photographs




TVGC
Drain
01.27.2026 03:39 PM
47.00182, -122.90216
310 O St SE, Tumwater, WA 98501


TVGC
Tp1
01.27.2026 03:19 PM
47.00210,-122.90265
315 N St SE, Tumwater, WA 98501


TVGC
Tp1
01.27.2026 03:19 PM
47.00209, -122.90265
315 N St SE, Tumwater, WA 98501


TVGC
Tp1
01.27.2026 03:19 PM
47.00210, -122.90265
315 N St SE, Tumwater, WA 98501


MUNSELL
TVGC
Tp1
01.27.2026 03:19 PM
47.00209, -122.90266
315 N St SE, Tumwater, WA 98501


TVGC
Tp2
01.27.2026 03:29 PM
47.00197, -122.90256
310 O St SE, Tumwater, WA 98501


TVGC
Tp2
01.27.2026 03:29 PM
47.00196, -122.90256
310 O St SE, Tumwater, WA 98501


TVGC
Tp2
01.27.2026 03:29 PM
47.00196, -122.90255
310 O St SE, Tumwater, WA 98501


TVGC
Tp2
01.27.2026 03:29 PM
47.00197, -122.90256
310 O St SE, Tumwater, WA 98501


TVGC
Offsite
02.23.2026 03:39 PM
46.99639, -122.89267
787 T St SE, Tumwater, WA 98501


TVGC
Tp266b
02.23.2026 02:29 PM
46.99694, -122.89676
Deschutes Valley Park, 600 T St SE, Tumwater, WA 98501


TVGC
Tp2661b
02.23.2026 02:29 PM
46.99693, -122.89671
Deschutes Valley Park, 600 T St SE, Tumwater, WA 98501


TVGC
Tp2682a
02.23.2026 03:45 PM
46.99637, -122.89268
787 T St SE, Tumwater, WA 98501


TVGC
Tp2682a
02.23.2026 03:46 PM
46.99637, -122.89268
787 T St SE, Tumwater, WA 98501


TVGC
Tp2682a
02.23.2026 03:46 PM
46.99637, -122.89268
787 T St SE, Tumwater, WA 98501


TVGC
Tp2684a
02.23.2026 04:15 PM
46.99991, -122.90283
231 Ruby St SE, Tumwater, WA 98501


TVGC
Tp2684a
02.23.2026 04:15 PM
46.99982, -122.90285
231 Ruby St SE, Tumwater, WA 98501


TVGC
Tp2780a
02.23.2026 03:27 PM
46.99637, -122.89246
787 T St SE, Tumwater, WA 98501


TVGC
Tp2780a
02.23.2026 03:27 PM
46.99634, -122.89244
787 T St SE, Tumwater, WA 98501


TVGC
Tp2780a
02.23.2026 03:27 PM
46.99636, -122.89245
787 T St SE, Tumwater, WA 98501

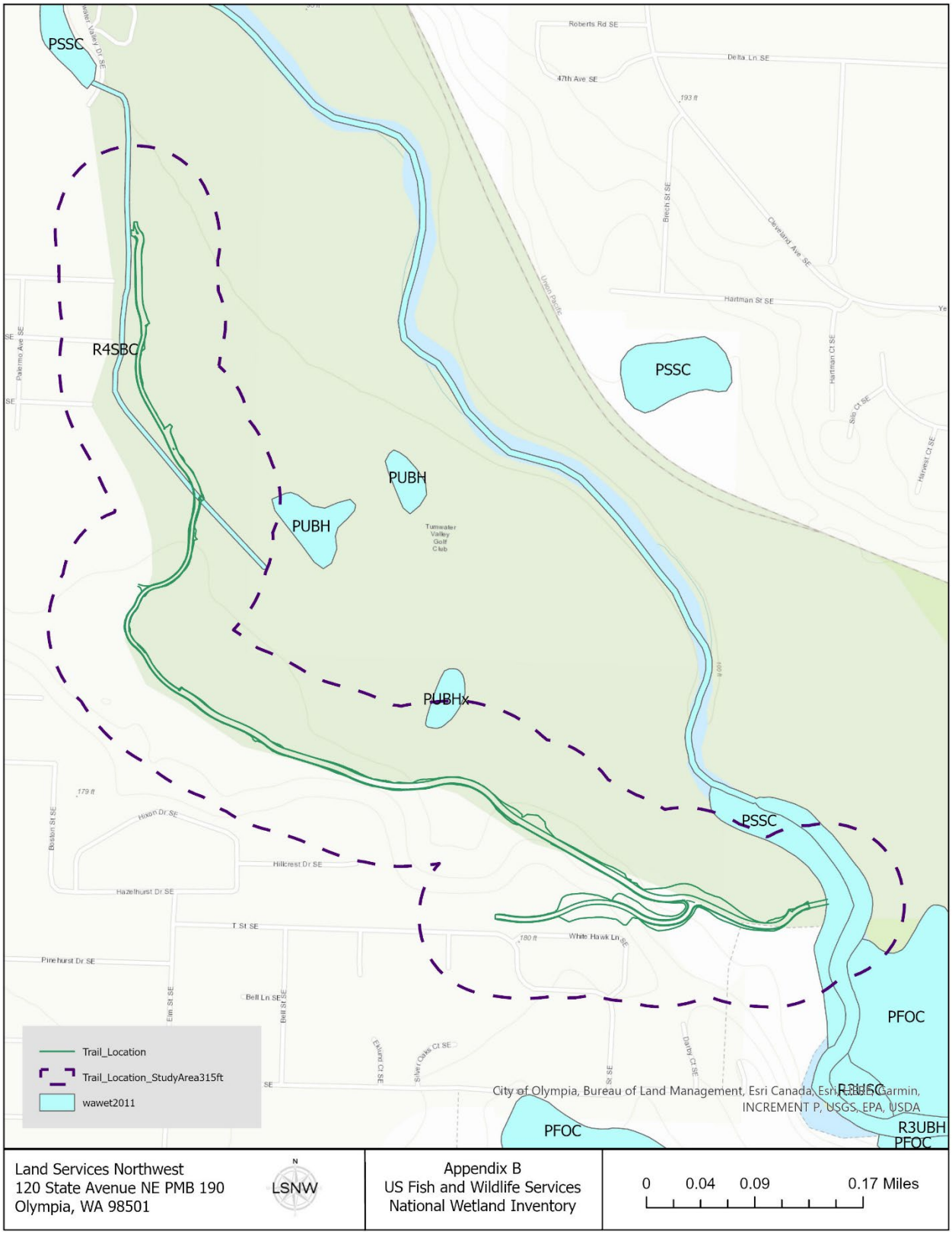

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787 T St SE, Tumwater, WA 98501


TVGC
Tp2781a
02.23.2026 03:34 PM
46.99633, -122.89263
787 T St SE, Tumwater, WA 98501

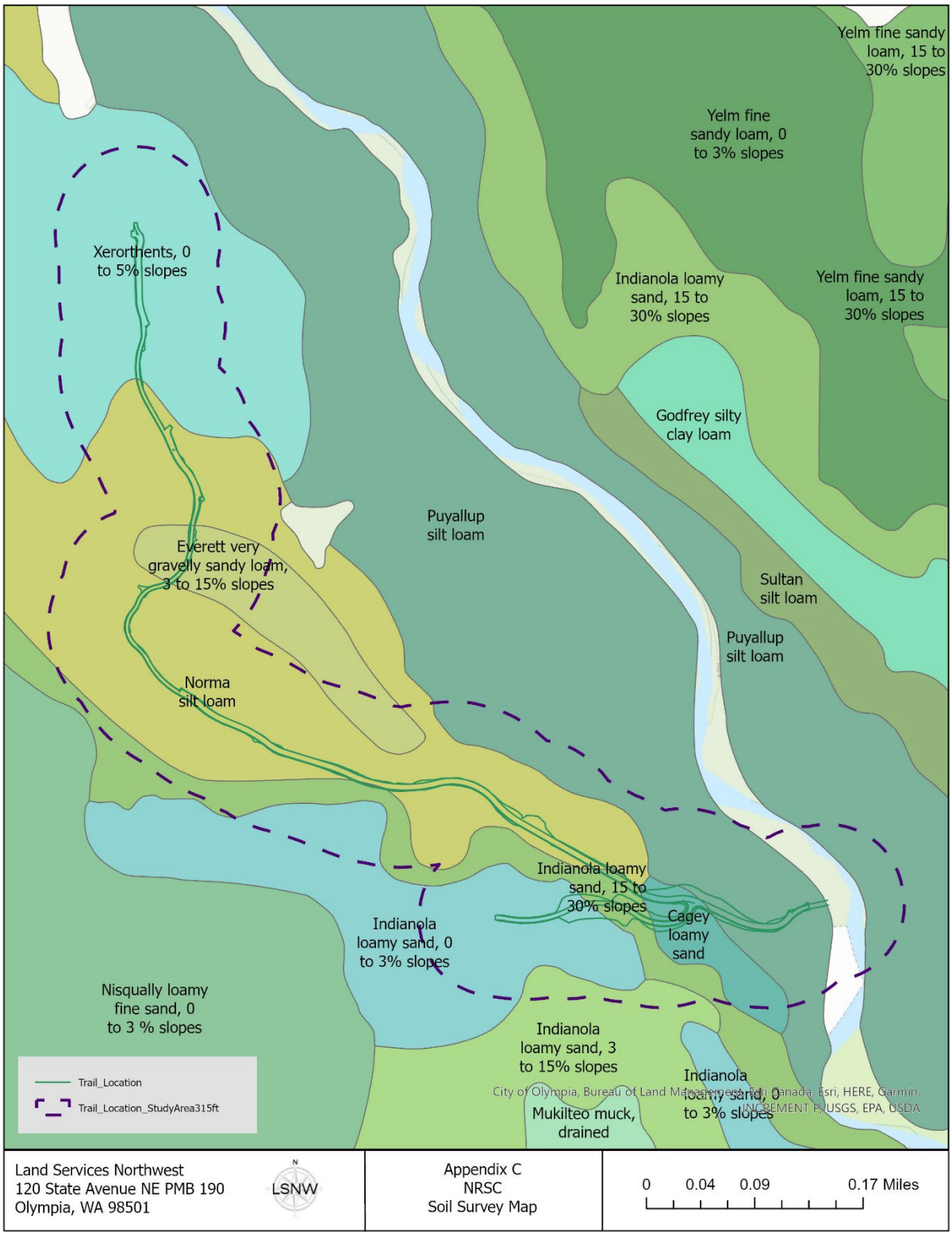

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787 T St SE, Tumwater, WA 98501


TVGC
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02.23.2026 03:34 PM
46.99637, -122.89259
787 T St SE, Tumwater, WA 98501

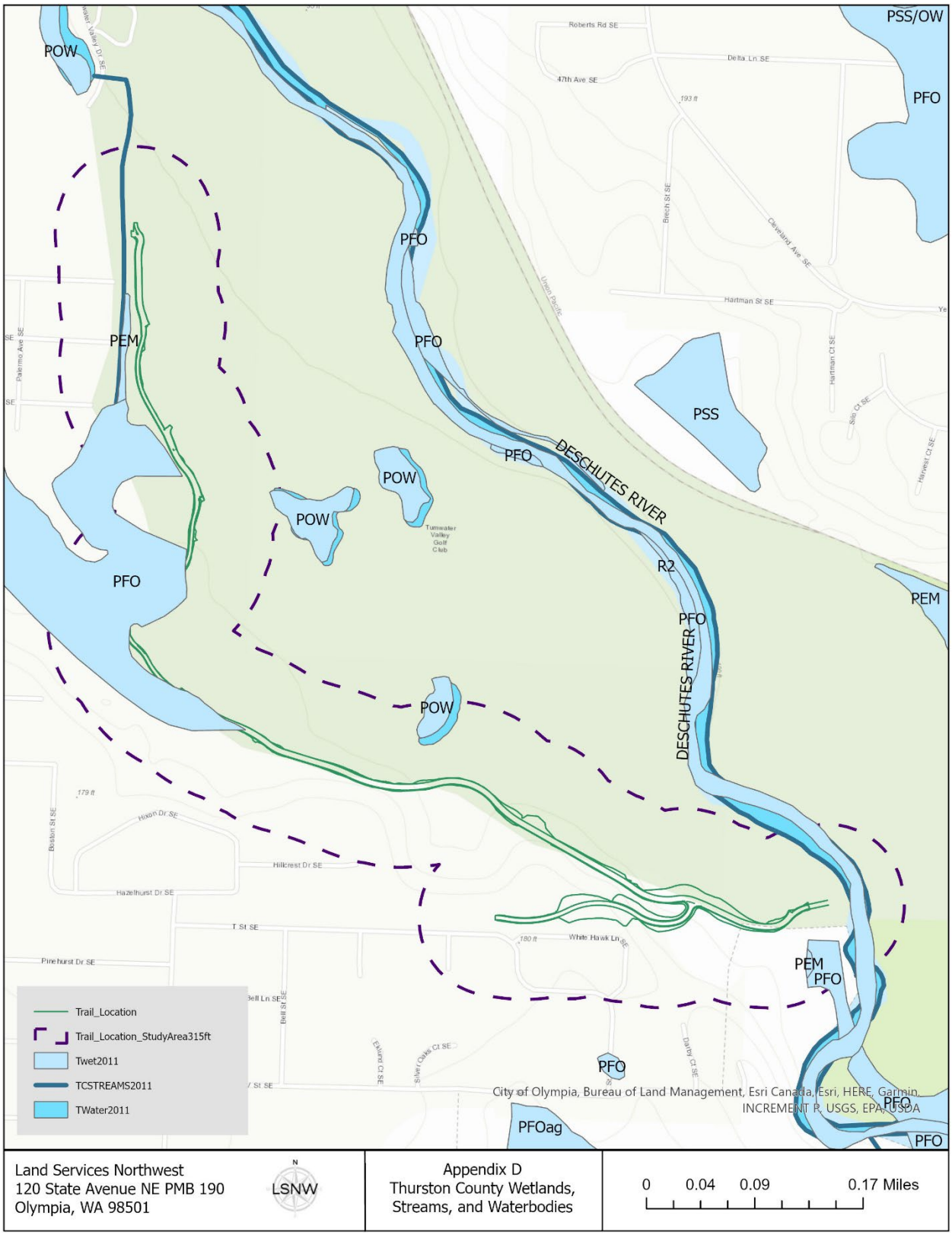
Appendix B - U.S. Fish and Wildlife Service NWI MAP



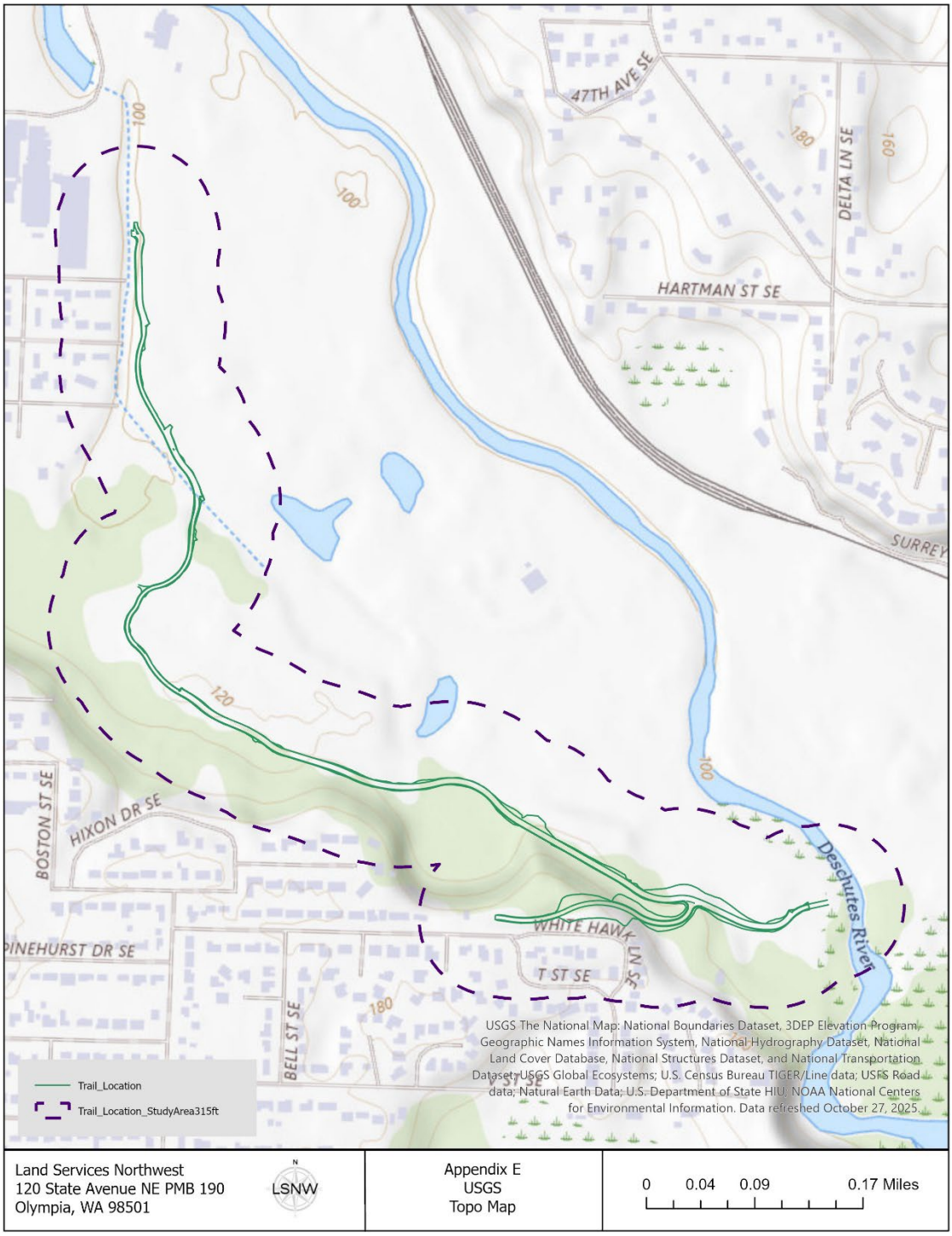
Appendix C - NRSC Soil Survey Map for Thurston County



Appendix D - Thurston County Stream and Wetland Inventory

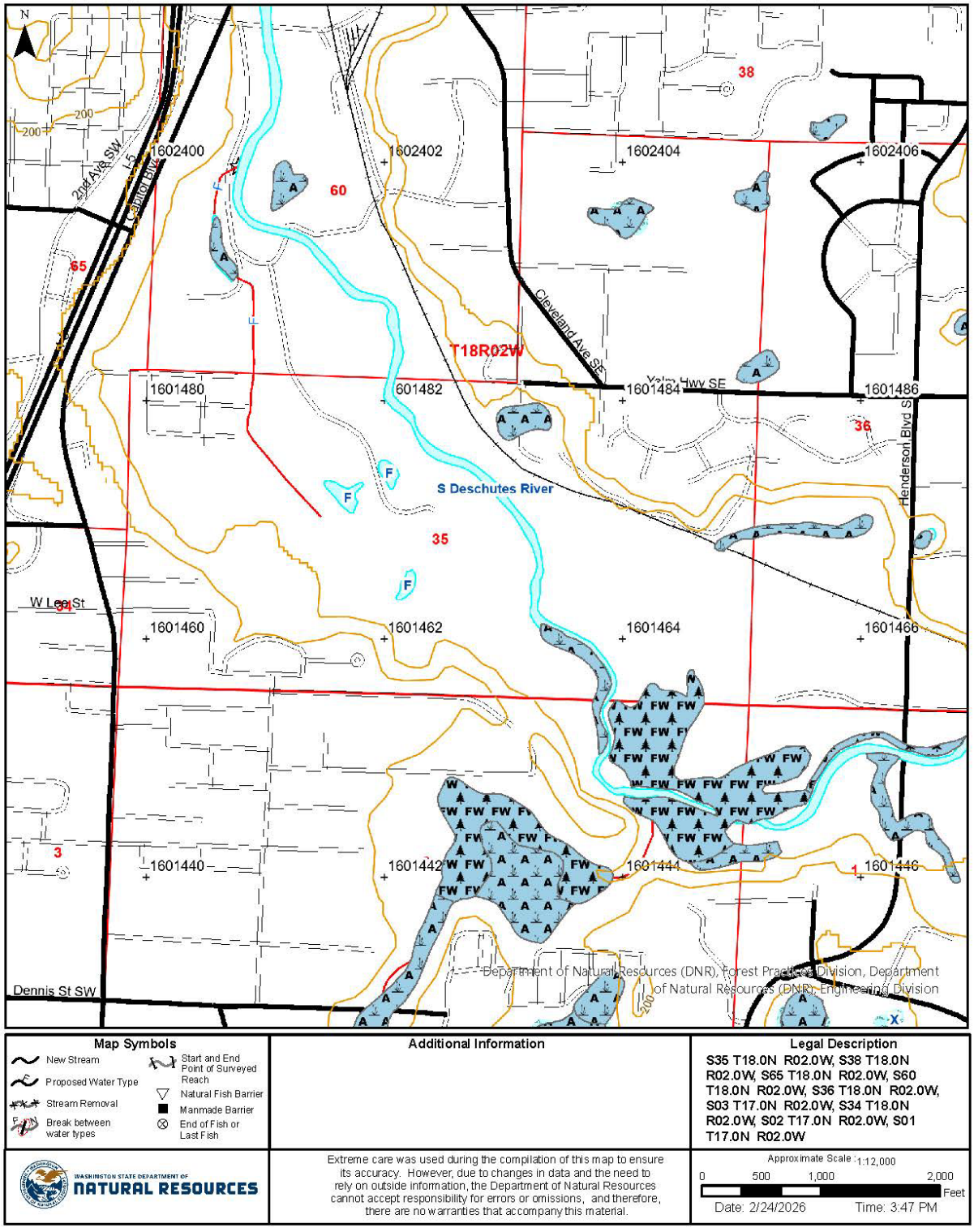


Appendix E - USGS 7.5 Minute Topographic Map



Appendix F - WADNR Forest Practices Stream Type Map

Forest Practices Water Type Map



Map Symbols

- New Stream
- Proposed Water Type
- Stream Removal
- Break between water types
- Start and End Point of Surveyed Reach
- Natural Fish Barrier
- Manmade Barrier
- End of Fish or Last Fish

Additional Information

Legal Description

S35 T18.0N R02.0W, S38 T18.0N R02.0W, S65 T18.0N R02.0W, S60 T18.0N R02.0W, S36 T18.0N R02.0W, S03 T17.0N R02.0W, S34 T18.0N R02.0W, S02 T17.0N R02.0W, S01 T17.0N R02.0W

WASHINGTON STATE DEPARTMENT OF NATURAL RESOURCES

Extreme care was used during the compilation of this map to ensure its accuracy. However, due to changes in data and the need to rely on outside information, the Department of Natural Resources cannot accept responsibility for errors or omissions, and therefore, there are no warranties that accompany this material.

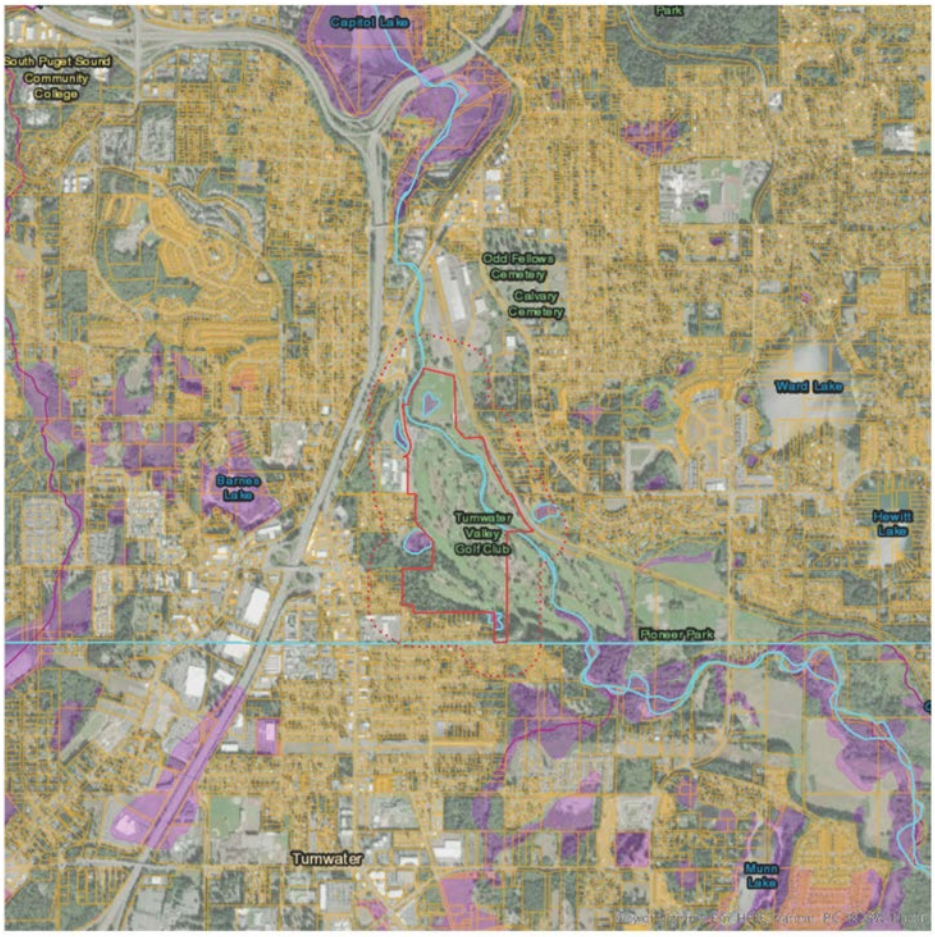
Approximate Scale: 1:12,000

0 500 1,000 2,000 Feet

Date: 2/24/2026 Time: 3:47 PM

Appendix G - WDFW Priority Habitats and Species Map and Salmonscape Map

Priority Habitats and Species on the Web



Buffer radius: 600 Feet

Report Date: 09/09/2025, Parcel ID: 09470051000

PHS Species/Habitats Overview:

Occurence Name	Federal Status	State Status	Sensitive Location
Fall Chinook	N/A	N/A	No
Coho	N/A	N/A	No
Cutthroat	Not Warranted	N/A	No
Fall Chum	N/A	N/A	No
Winter Steelhead	N/A	N/A	No
Coho	Candidate	N/A	No
Steelhead	Threatened	N/A	No
Snag-rich Areas	N/A	N/A	No
Freshwater Emergent Wetland	N/A	N/A	No
Freshwater Forested/Shrub Wetland	N/A	N/A	No
Big brown bat			Yes
Little Brown Bat			Yes
myotis spp			Yes
Yuma myotis			Yes
Townsend's Big-eared Bat		Candidate	Yes

PHS Species/Habitats Details:

Fall Chinook	
Scientific Name	*Oncorhynchus tshawytscha*
Priority Area	Breeding Area
Site Name	Deschutes River
Accuracy	NA
Notes	LLID: 1229016470241, Fish Name: Chinook Salmon, Run Time: Fall, Life History: Anadromous
Source Record	56036
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Coho	
Scientific Name	*Oncorhynchus kisutch*
Priority Area	Occurrence/Migration
Site Name	Unnamed stream [1229025470085]
Accuracy	NA
Notes	LLID: 1229025470085, Fish Name: Coho Salmon, Run Time: Unknown or not Applicable, Life History: Anadromous
Source Record	56059
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Cutthroat	
Scientific Name	*Oncorhynchus clarki*
Priority Area	Occurrence
Site Name	Deschutes River
Accuracy	NA
Notes	LLID: 1229016470241, Stock Name: West South Sound Coastal Cutthroat, Run: Unspecified, Status: Unknown
Source Record	7020
Source Dataset	SASI
Source Name	Not Given
Source Entity	WDFW Fish Program
Federal Status	Not Warranted
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Fall Chum	
Scientific Name	*Oncorhynchus keta*
Priority Area	Occurrence/Migration
Site Name	Deschutes River
Accuracy	NA
Notes	LLID: 1229016470241, Fish Name: Chum Salmon, Run Time: Fall, Life History: Anadromous
Source Record	56037
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Winter Steelhead	
Scientific Name	*Oncorhynchus mykiss*
Priority Area	Occurrence/Migration
Site Name	Deschutes River
Accuracy	NA
Notes	LLID: 1229016470241, Fish Name: Steelhead Trout, Run Time: Winter, Life History: Anadromous
Source Record	56045
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Coho	
Scientific Name	*Oncorhynchus kisutch*
Priority Area	Occurrence
Site Name	Deschutes River
Accuracy	NA
Notes	LLID: 1229016470241, Stock Name: Deschutes Coho, Run: Unspecified, Status: Critical
Source Record	3199
Source Dataset	SASI
Source Name	Not Given
Source Entity	WDFW Fish Program
Federal Status	Candidate
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Steelhead	
Scientific Name	*Oncorhynchus mykiss*
Priority Area	Occurrence
Site Name	Deschutes River
Accuracy	NA
Notes	LLID: 1229016470241, Stock Name: Deschutes Winter Steelhead, Run: Winter, Status: Not Rated
Source Record	6210
Source Dataset	SASI
Source Name	Not Given
Source Entity	WDFW Fish Program
Federal Status	Threatened
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Coho	
Scientific Name	*Oncorhynchus kisutch*
Priority Area	Breeding Area
Site Name	Deschutes River
Accuracy	NA
Notes	LLID: 1229016470241, Fish Name: Coho Salmon, Run Time: Unknown or not Applicable, Life History: Anadromous
Source Record	56043
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Winter Steelhead	
Scientific Name	*Oncorhynchus mykiss*
Priority Area	Breeding Area
Site Name	Deschutes River
Accuracy	NA
Notes	LLID: 1229016470241, Fish Name: Steelhead Trout, Run Time: Winter, Life History: Anadromous
Source Record	56046
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Snag-rich Areas	
Priority Area	Habitat Feature
Site Name	Tumwater Valley Golf Course
Accuracy	1/4 mile (Quarter Section)
Notes	Scattered snags and possibly downed trees in the area.
Source Record	921016
Source Dataset	PHSREGION
Source Name	Johnson, Terry WDFW
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1C
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PSSC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Big brown bat	
Scientific Name	*Eptesicus fuscus*
Notes	This polygon mask represents one or more records of the above species or habitat occurrence. Contact PHS Data Release at phsproducts@dfw.wa.gov for obtaining information about masked sensitive species and habitats.
PHS Listing Status	PHS Listed Occurrence
Sensitive	Y
Display Resolution	TOWNSHIP
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=00605

Little Brown Bat	
Scientific Name	*Myotis lucifugus*
Notes	This polygon mask represents one or more records of the above species or habitat occurrence. Contact PHS Data Release at phsproducts@dfw.wa.gov for obtaining information about masked sensitive species and habitats.
PHS Listing Status	PHS Listed Occurrence
Sensitive	Y
Display Resolution	TOWNSHIP
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=00605

myotis spp	
Scientific Name	*Myotis myotis spp*
Notes	This polygon mask represents one or more records of the above species or habitat occurrence. Contact PHS Data Release at phsproducts@dfw.wa.gov for obtaining information about masked sensitive species and habitats.
PHS Listing Status	PHS Listed Occurrence
Sensitive	Y
Display Resolution	TOWNSHIP

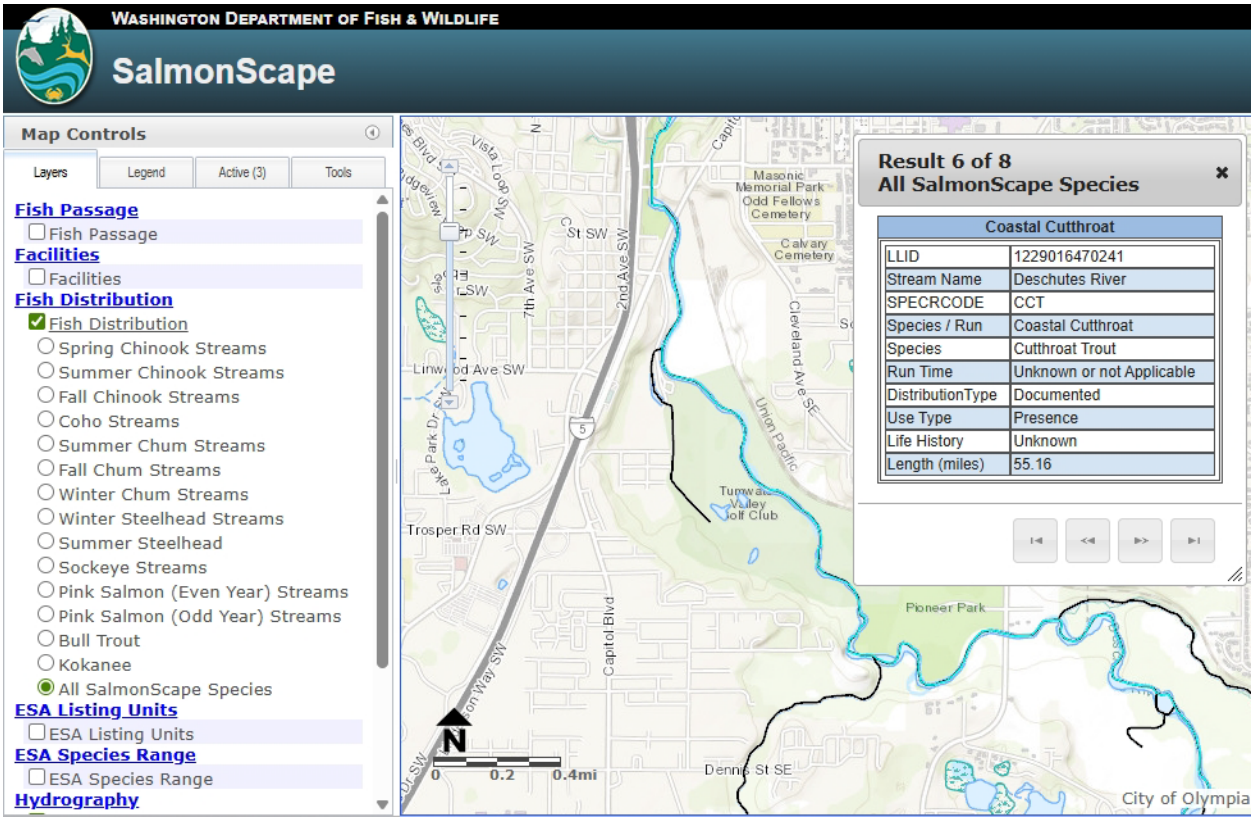
Yuma myotis	
Scientific Name	*Myotis yumanensis*
Notes	This polygon mask represents one or more records of the above species or habitat occurrence. Contact PHS Data Release at phsproducts@dfw.wa.gov for obtaining information about masked sensitive species and habitats.
PHS Listing Status	PHS Listed Occurrence
Sensitive	Y
Display Resolution	TOWNSHIP
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=00605

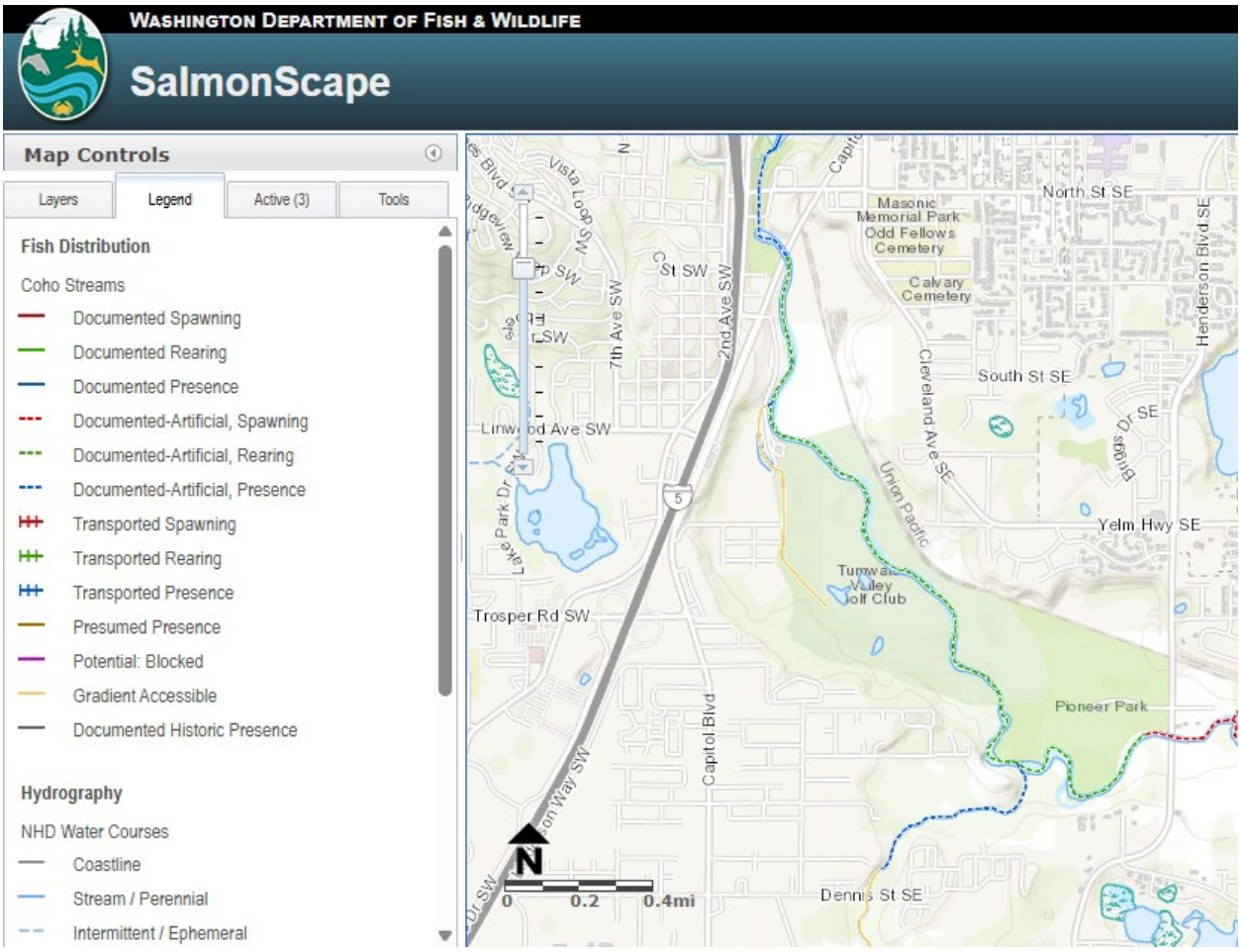
Big brown bat	
Scientific Name	*Eptesicus fuscus*
Notes	This polygon mask represents one or more records of the above species or habitat occurrence. Contact PHS Data Release at phsproducts@dfw.wa.gov for obtaining information about masked sensitive species and habitats.
PHS Listing Status	PHS Listed Occurrence
Sensitive	Y
Display Resolution	TOWNSHIP
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=00605

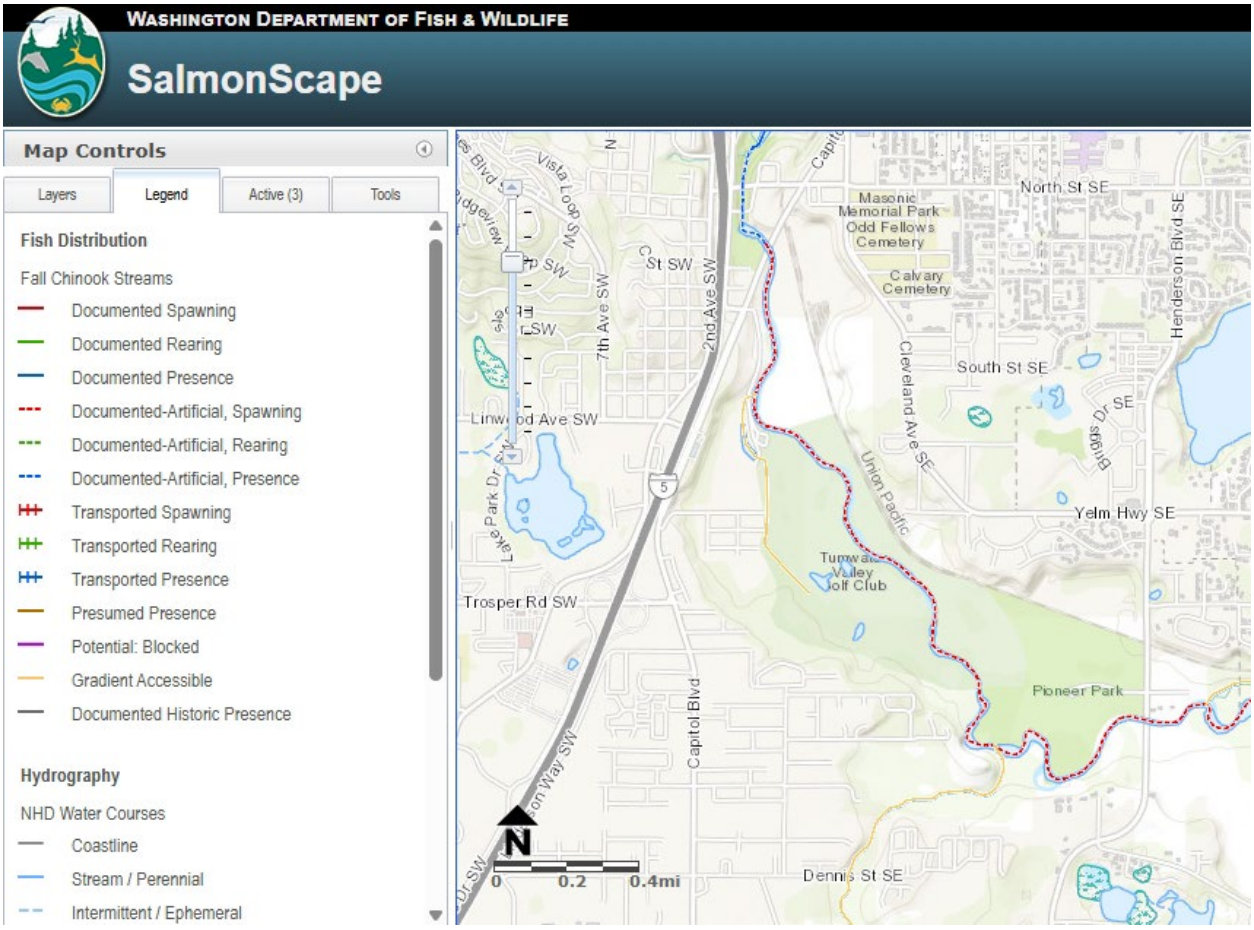
Little Brown Bat	
Scientific Name	*Myotis lucifugus*
Notes	This polygon mask represents one or more records of the above species or habitat occurrence. Contact PHS Data Release at phsproducts@dfw.wa.gov for obtaining information about masked sensitive species and habitats.
PHS Listing Status	PHS Listed Occurrence
Sensitive	Y
Display Resolution	TOWNSHIP
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=00605

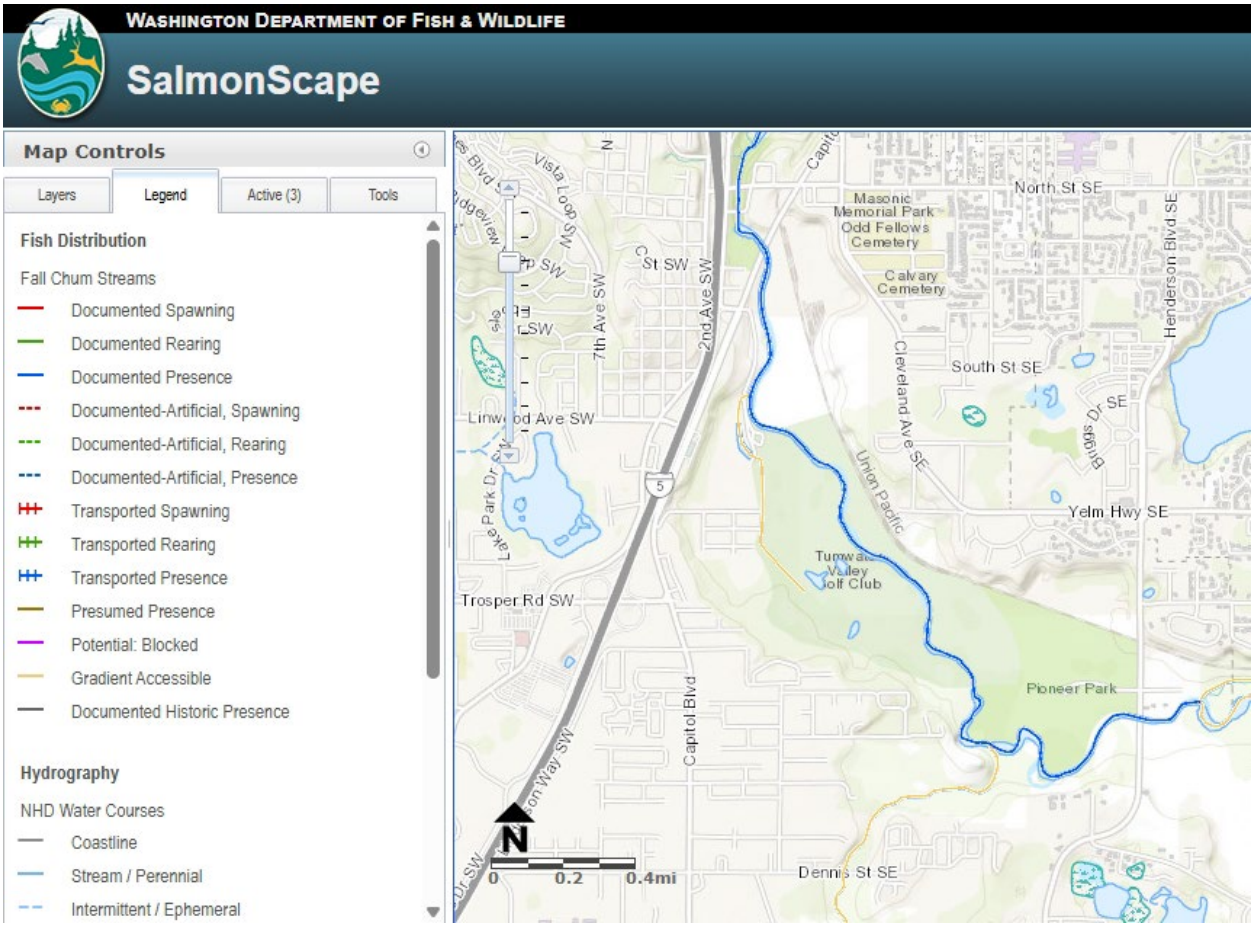
myotis spp	
Scientific Name	*Myotis myotis spp*
Notes	This polygon mask represents one or more records of the above species or habitat occurrence. Contact PHS Data Release at phsproducts@dfw.wa.gov for obtaining information about masked sensitive species and habitats.
PHS Listing Status	PHS Listed Occurrence
Sensitive	Y
Display Resolution	TOWNSHIP

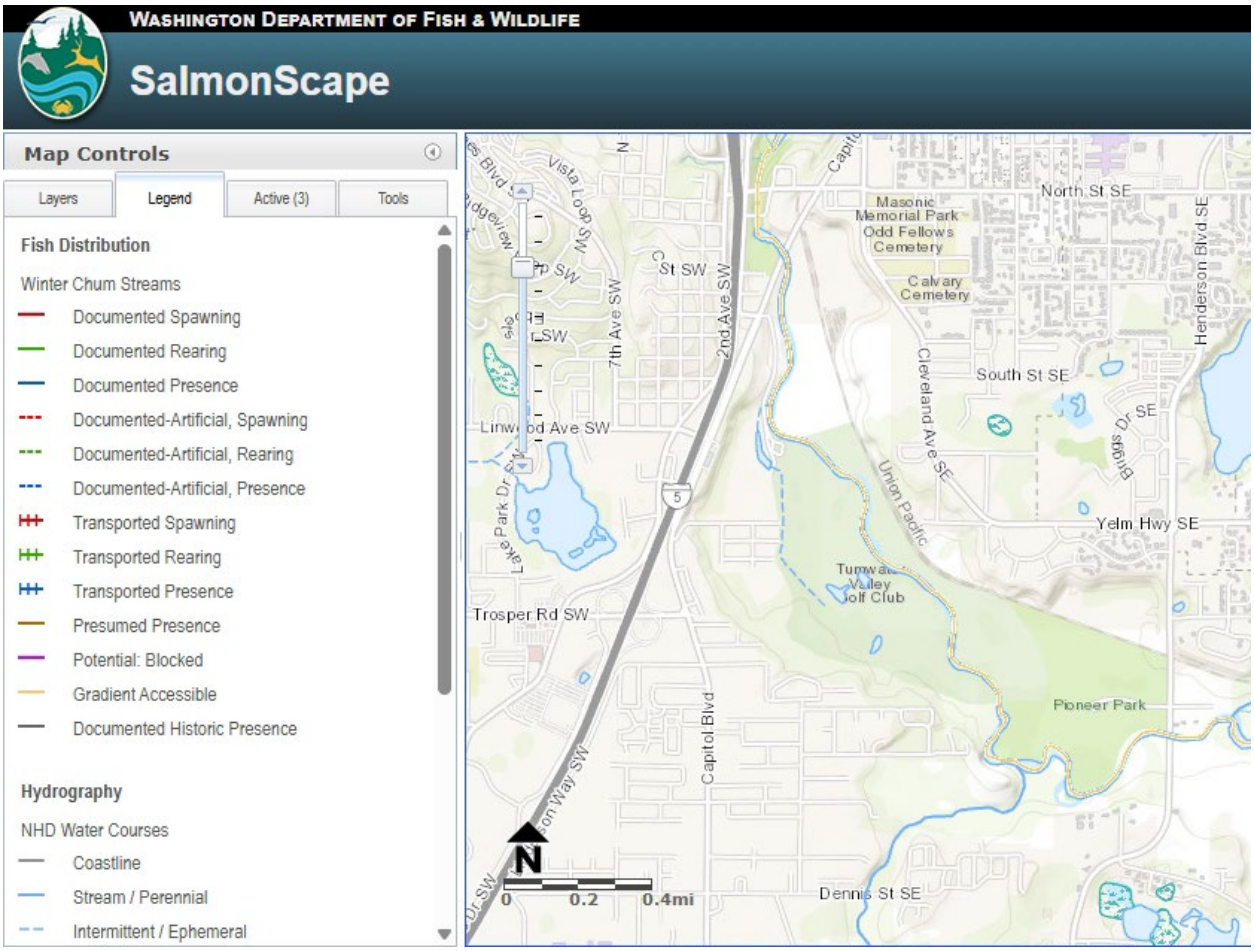
Townsend's Big-eared Bat	
Scientific Name	*Corynorhinus townsendii*
Notes	This polygon mask represents one or more records of the above species or habitat occurrence. Contact PHS Data Release at phsproducts@dfw.wa.gov for obtaining information about masked sensitive species and habitats.
State Status	Candidate
PHS Listing Status	PHS Listed Occurrence
Sensitive	Y
SGCN	Y
Display Resolution	TOWNSHIP
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=00027

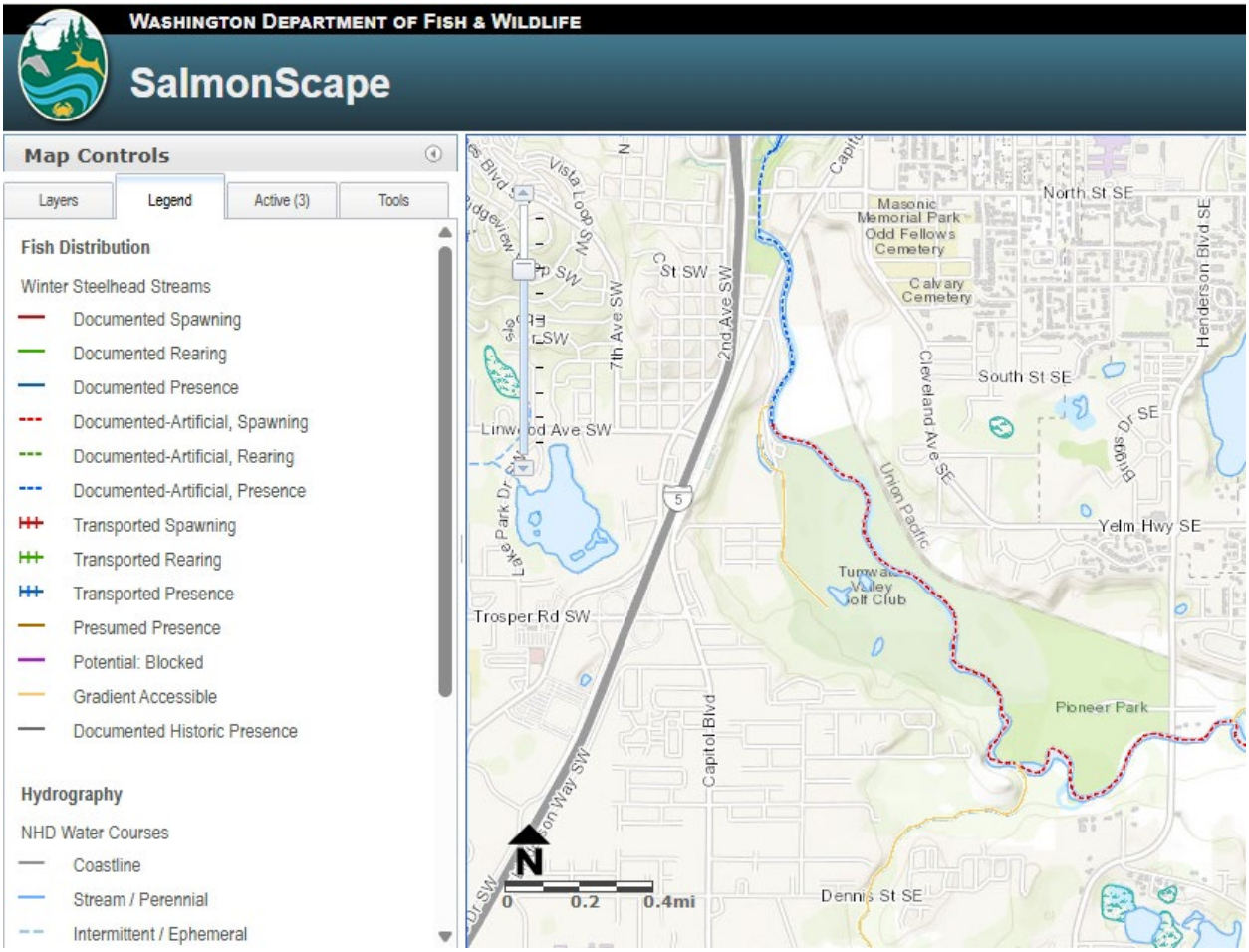

WASHINGTON DEPARTMENT OF FISH & WILDLIFE
SalmonScape
Map Controls
Layers
Legend
Active (3)
Tools
Fish Passage
Fish Passage
Facilities
Facilities
Fish Distribution
Fish Distribution
Spring Chinook Streams
Summer Chinook Streams
Fall Chinook Streams
Coho Streams
Summer Chum Streams
Fall Chum Streams
Winter Chum Streams
Winter Steelhead Streams
Summer Steelhead
Sockeye Streams
Pink Salmon (Even Year) Streams
Pink Salmon (Odd Year) Streams
Bull Trout
Kokanee
All SalmonScape Species
ESA Listing Units
ESA Listing Units
ESA Species Range
ESA Species Range
Hydrography
Result 6 of 8
All SalmonScape Species
Coastal Cutthroat
LLID 1229016470241
Stream Name Deschutes River
SPECRCODE CCT
Species / Run Coastal Cutthroat
Species Cutthroat Trout
Run Time Unknown or not Applicable
DistributionType Documented
Use Type Presence
Life History Unknown
Length (miles) 55.16
Masonic Memorial Park
Odd Fellows Cemetery
Calvary Cemetery
Cleveland Ave SE
Union Pacific
Tumwater Valley Golf Club
Trosper Rd SW
Capitol Blvd
Pioneer Park
Dennis St SE
City of Olympia
2nd Ave SW
7th Ave SW
Vista Loop SW
Linwood Ave SW
Lake Park Dr SW
Evergreen Park Dr SW
N
0
0.2
0.4mi


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SalmonScape
Map Controls
Layers
Legend
Active (3)
Tools
Fish Distribution
Coho Streams
Documented Spawning
Documented Rearing
Documented Presence
Documented-Artificial, Spawning
Documented-Artificial, Rearing
Documented-Artificial, Presence
Transported Spawning
Transported Rearing
Transported Presence
Presumed Presence
Potential: Blocked
Gradient Accessible
Documented Historic Presence
Hydrography
NHD Water Courses
Coastline
Stream / Perennial
Intermittent / Ephemeral
Masonic Memorial Park
Odd Fellows Cemetery
Calvary Cemetery
North St SE
South St SE
Yelm Hwy SE
Henderson Blvd SE
Cleveland Ave SE
Union Pacific
Tumwater Valley Golf Club
Trosper Rd SW
Capitol Blvd
Pioneer Park
Dennis St SE
7th Ave SW
2nd Ave SW
Vista Loop SW
Lakeridge Dr SW
Linwood Ave SW
Bridges Dr SE
N
0
0.2
0.4mi

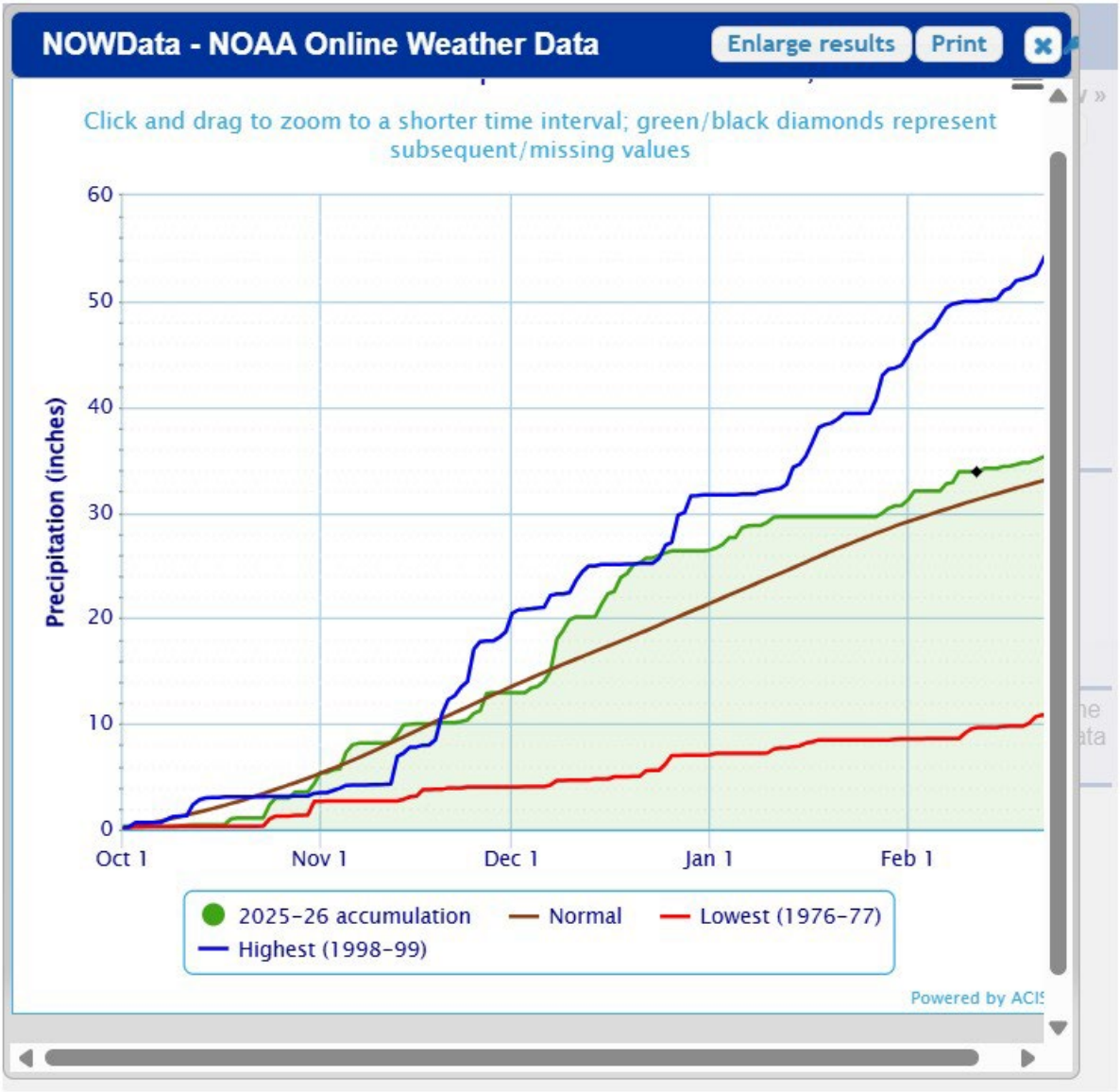

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SalmonScape
Map Controls
Layers
Legend
Active (3)
Tools
Fish Distribution
Fall Chinook Streams
Documented Spawning
Documented Rearing
Documented Presence
Documented-Artificial, Spawning
Documented-Artificial, Rearing
Documented-Artificial, Presence
Transported Spawning
Transported Rearing
Transported Presence
Presumed Presence
Potential: Blocked
Gradient Accessible
Documented Historic Presence
Hydrography
NHD Water Courses
Coastline
Stream / Perennial
Intermittent / Ephemeral
Masonic Memorial Park
Odd Fellows Cemetery
Calvary Cemetery
North St SE
South St SE
Henderson Blvd SE
Cleveland Ave SE
Union Pacific
Yelm Hwy SE
Tumwater Valley Golf Club
Pioneer Park
Trosper Rd SW
Capitol Blvd
Dennis St SE
Linwood Ave SW
7th Ave SW
2nd Ave SW
C St SW
Vista Loop SW
Lake Park Dr SW
N
0
0.2
0.4mi


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SalmonScape
Map Controls
Layers
Legend
Active (3)
Tools
Fish Distribution
Fall Chum Streams
Documented Spawning
Documented Rearing
Documented Presence
Documented-Artificial, Spawning
Documented-Artificial, Rearing
Documented-Artificial, Presence
Transported Spawning
Transported Rearing
Transported Presence
Presumed Presence
Potential: Blocked
Gradient Accessible
Documented Historic Presence
Hydrography
NHD Water Courses
Coastline
Stream / Perennial
Intermittent / Ephemeral
Masonic Memorial Park
Odd Fellows Cemetery
Calvary Cemetery
North St SE
South St SE
Henderson Blvd SE
Cleveland Ave SE
Union Pacific
Yelm Hwy SE
Trosper Rd SW
Capitol Blvd
Pioneer Park
Dennis St SE
7th Ave SW
2nd Ave SW
Vista Loop SW
Lake Park Dr SW
5
N
0
0.2
0.4mi


WASHINGTON DEPARTMENT OF FISH & WILDLIFE
SalmonScape
Map Controls
Layers
Legend
Active (3)
Tools
Fish Distribution
Winter Chum Streams
Documented Spawning
Documented Rearing
Documented Presence
Documented-Artificial, Spawning
Documented-Artificial, Rearing
Documented-Artificial, Presence
Transported Spawning
Transported Rearing
Transported Presence
Presumed Presence
Potential: Blocked
Gradient Accessible
Documented Historic Presence
Hydrography
NHD Water Courses
Coastline
Stream / Perennial
Intermittent / Ephemeral
Vista Loop SW
St SW
7th Ave SW
2nd Ave SW
Linwood Ave SW
Trosper Rd SW
Capitol Blvd
Masonic Memorial Park Odd Fellows Cemetery
Calvary Cemetery
North St SE
South St SE
Cleveland Ave SE
Union Pacific
Yelm Hwy SE
Pioneer Park
Dennis St SE
Henderson Blvd SE
N
0
0.2
0.4mi


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SalmonScape
Map Controls
Layers
Legend
Active (3)
Tools
Fish Distribution
Winter Steelhead Streams
Documented Spawning
Documented Rearing
Documented Presence
Documented-Artificial, Spawning
Documented-Artificial, Rearing
Documented-Artificial, Presence
Transported Spawning
Transported Rearing
Transported Presence
Presumed Presence
Potential: Blocked
Gradient Accessible
Documented Historic Presence
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Coastline
Stream / Perennial
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Vista Loop SW
7th Ave SW
2nd Ave SW
Capitol Blvd
Trosper Rd SW
Linwood Ave SW
Lake Park Dr SW
Masonic Memorial Park Odd Fellows Cemetery
Calvary Cemetery
North St SE
South St SE
Henderson Blvd SE
Cleveland Ave SE
Union Pacific
Yelm Hwy SE
Pioneer Park
Dennis St SE
N
0
0.2
0.4mi

Appendix H - NOAA NOW Precipitation Data


NOWData - NOAA Online Weather Data
Enlarge results
Print
Click and drag to zoom to a shorter time interval; green/black diamonds represent subsequent/missing values
Precipitation (inches)
60
50
40
30
20
10
0
Oct 1
Nov 1
Dec 1
Jan 1
Feb 1
2025-26 accumulation
Normal
Lowest (1976-77)
Highest (1998-99)
Powered by ACIS

Appendix I - USACE WMVC Soil Data Sheets

Item 1a.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Tumwater Valley GC City/County: Tumwater/Thurston Sampling Date: 2.18.26
Applicant/Owner: City of Tumwater State: WA Sampling Point: TP1
Investigator(s): Alex Callender Section, Township, Range: 35 18 2W
Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): concave Slope (%): 2
Subregion (LRR): 2 Lat: 47.010829 Long: -122.904540 Datum: Wgs84
Soil Map Unit Name: Puyallup Silt Loam NWI classification: PSSC
Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No ___ (If no, explain in Remarks.)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes x No ___
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	x	No	
Hydric Soil Present?	Yes		No	x
Wetland Hydrology Present?	Yes		No	x

Is the Sampled Area within a Wetland? **Yes** ___ **No** x

Remarks: No hydric soil or wetland hydrology indicators are present. Hydrophytic vegetation is present.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15)			
1. *Alnus rubra*	25	Y	FAC
2. *Salix X pendulina*	35	Y	FAC
3.			
4.			
5.			
	60 = Total Cover		
Herb Stratum (Plot size: 15)			
1. *Juncus effusus*	15	Y	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	15 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum ___

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- x 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** x **No** ___

Remarks: Greater than 50% of dominant vegetation is FAC or wetter.

Item 1a.

SOIL

Sampling Point: TP1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-5	10YR4/2	100					Silt loam	
5-18	10YR3/2	100					Silt loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** x

Remarks: No hydric soil indicators present.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No x Depth (inches): _____

Water Table Present? Yes x No ___ Depth (inches): 16”

Saturation Present? (includes capillary fringe) Yes ___ No x Depth (inches): _____

Wetland Hydrology Present? **Yes** ___ **No** x

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: No wetland hydrology indicators present.

Item 1a.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Tumwater Valley GC City/County: Tumwater/Thurston Sampling Date: 2.18.26
Applicant/Owner: City of Tumwater State: WA Sampling Point: TP2
Investigator(s): Alex Callender Section, Township, Range: 35 18 2W
Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): convex Slope (%): 0
Subregion (LRR): 2 Lat: 47.010829 Long: -122.904540 Datum: Wgs84
Soil Map Unit Name: Puyallup Silt Loam NWI classification: PSSC
Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No ___ (If no, explain in Remarks.)
Are Vegetation ___ , Soil ___ , or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes x No ___
Are Vegetation ___ , Soil ___ , or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	x	No	
Hydric Soil Present?	Yes		No	x
Wetland Hydrology Present?	Yes		No	x

Is the Sampled Area within a Wetland? **Yes** ___ **No** x

Remarks: No hydric soil or wetland hydrology indicators are present. Hydrophytic vegetation is present.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15)			
1. *Rubus armeniacus*	10	Y	FAC
2.			
3.			
4.			
5.			
	10 = Total Cover		
Herb Stratum (Plot size: 15)			
1. *Phalaris arundinacea*	90	Y	FACW
2. *Agrostis capillaris*	10	N	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	100 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum ___

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)
Total Number of Dominant Species Across All Strata: 2 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A = ___

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- x 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** x **No** ___

Remarks: Greater than 50% of dominant vegetation is FAC or wetter.

Item 1a.

SOIL

Sampling Point: TP2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-4	10YR3/2	100				M	Silt loam	
4-10	10YR4/3	100				M	Silt loam	
10-18	10YR4/2	85	10YR4/6	15	C	M	Silt loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** x

Remarks: No hydric soil indicators present.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No x Depth (inches): _____

Water Table Present? Yes x No ___ Depth (inches): 17”

Saturation Present? (includes capillary fringe) Yes ___ No x Depth (inches): _____

Wetland Hydrology Present? **Yes** ___ **No** x

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: No wetland hydrology indicators present. After rain.

Item 1a.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Tumwater Valley GC City/County: Tumwater/Thurston Sampling Date: 2.18.26
Applicant/Owner: City of Tumwater State: WA Sampling Point: TP2557
Investigator(s): Alex Callender Section, Township, Range: 35 18 2W
Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): concave Slope (%): 1
Subregion (LRR): 2 Lat: 47.010829 Long: -122.904540 Datum: Wgs84
Soil Map Unit Name: Puyallup Silt Loam NWI classification: PSSC
Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No ___ (If no, explain in Remarks.)
Are Vegetation ___ , Soil ___ , or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes x No ___
Are Vegetation ___ , Soil ___ , or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	x	No	
Hydric Soil Present?	Yes	x	No	
Wetland Hydrology Present?	Yes	x	No	

Is the Sampled Area within a Wetland? **Yes x No ___**

Remarks: Hydrophytic vegetation, hydric soil indicators, and wetland hydrology indicators are present.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Alnus rubra*	45	Y	FAC
2.			
3.			
4.			
	45	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
	___	= Total Cover	

Herb Stratum (Plot size: 15)			
1. *Hedera helix*	65	Y	FACU
2. *Ranunculus repens*	5	N	FAC
3. *Phalaris arundinacea*	30	Y	FACW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	100	= Total Cover	

Woody Vine Stratum (Plot size:)			
1.			
2.			
	___	= Total Cover	

% Bare Ground in Herb Stratum ___

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 66 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
x 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes x No ___**

Remarks: Greater than 50% of dominant vegetation is FAC or wetter.

Item 1a.

SOIL

Sampling Point: TP2557

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-4	10YR3/2	100					Silt loam	
4-18	10YR4/2	95	10YR4/6	5	C	M	Silt loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- x Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- x Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** x **No** ___

Remarks: Hydric soil indicator present.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- x High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No x Depth (inches): _____

Water Table Present? Yes x No ___ Depth (inches): 12”

Saturation Present? (includes capillary fringe) Yes ___ No x Depth (inches): _____

Wetland Hydrology Present? **Yes** x **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Wetland hydrology indicator present.

Item 1a.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Tumwater Valley GC City/County: Tumwater/Thurston Sampling Date: 2.18.26
Applicant/Owner: City of Tumwater State: WA Sampling Point: TP2558
Investigator(s): Alex Callender Section, Township, Range: 35 18 2W
Landform (hillslope, terrace, etc.): valley Local relief (concave, convex, none): convex Slope (%): 0
Subregion (LRR): 2 Lat: 47.010829 Long: -122.904540 Datum: Wgs84
Soil Map Unit Name: Puyallup Silt Loam NWI classification: PSSC
Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No ___ (If no, explain in Remarks.)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes x No ___
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	x	No	
Hydric Soil Present?	Yes		No	x
Wetland Hydrology Present?	Yes		No	x

Is the Sampled Area within a Wetland? **Yes** ___ **No** x

Remarks: No hydric soil or wetland hydrology indicators are present. Hydrophytic vegetation is present.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Alnus rubra*	15	Y	FAC
2.			
3.			
4.			
	15	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15)			
1. *Sambucus racemosa*	35	Y	FACU
2. *Cornus alba*	15	Y	FACW
3.			
4.			
5.			
	50	= Total Cover	

Herb Stratum (Plot size: 15)			
1. *Ranunculus repens*	35	Y	FAC
2. *Hedera helix*	30	Y	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	65	= Total Cover	

Woody Vine Stratum (Plot size:)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum ___

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)
Total Number of Dominant Species Across All Strata: 5 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 60 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- x 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** x **No** ___

Remarks: Greater than 50% of dominant vegetation is FAC or wetter.

Item 1a.

SOIL

Sampling Point: TP2558

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-8	10YR3/2	100				M	Sandy loam	
8-18	10YR4/2	100				M	Sandy loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** x

Remarks: No hydric soil indicators present.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No x Depth (inches): _____

Water Table Present? Yes ___ No x Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ___ No x Depth (inches): _____

Wetland Hydrology Present? **Yes** ___ **No** x

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: No wetland hydrology indicators present.

Item 1a.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Tumwater Valley GC City/County: Tumwater/Thurston Sampling Date: 2.18.26
Applicant/Owner: City of Tumwater State: WA Sampling Point: TP2569
Investigator(s): Alex Callender Section, Township, Range: 35 18 2W
Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): concave Slope (%): 0
Subregion (LRR): 2 Lat: 47.010829 Long: -122.904540 Datum: Wgs84
Soil Map Unit Name: Puyallup Silt Loam NWI classification: PSSC
Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No ___ (If no, explain in Remarks.)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes x No ___
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	x	No	
Hydric Soil Present?	Yes		No	x
Wetland Hydrology Present?	Yes		No	x

Is the Sampled Area within a Wetland? **Yes** ___ **No** x

Remarks: No hydric soil or wetland hydrology indicators are present. Hydrophytic vegetation is present.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	___ = Total Cover		

Sapling/Shrub Stratum (Plot size: 15)			
1. *Cornus alba*	45	Y	FACW
2. *Rubus armeniacus*	25	Y	FAC
3.			
4.			
5.			
	70 = Total Cover		

Herb Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	___ = Total Cover		

Woody Vine Stratum (Plot size: ___)			
1.			
2.			
	___ = Total Cover		

% Bare Ground in Herb Stratum ___

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)
Total Number of Dominant Species Across All Strata: 2 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	___	x 1 =	
FACW species	___	x 2 =	
FAC species	___	x 3 =	
FACU species	___	x 4 =	
UPL species	___	x 5 =	
Column Totals:	___ (A)		___ (B)

Prevalence Index = B/A = ___

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- x 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** x **No** ___

Remarks: Greater than 50% of dominant vegetation is FAC or wetter.

Item 1a.

SOIL

Sampling Point: TP2569

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-6	10YR4/2	100					Silt loam	
6-18	Gley10YR4/10	100						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ____ **No** x

Remarks: No hydric soil indicators present.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ____ No x Depth (inches): _____

Water Table Present? Yes x No ____ Depth (inches): 16”

Saturation Present? (includes capillary fringe) Yes ____ No x Depth (inches): _____

Wetland Hydrology Present? **Yes** ____ **No** x

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: No wetland hydrology indicators present.

Item 1a.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Tumwater Valley GC City/County: Tumwater/Thurston Sampling Date: 2.18.26
Applicant/Owner: City of Tumwater State: WA Sampling Point: TP2571
Investigator(s): Alex Callender Section, Township, Range: 35 18 2W
Landform (hillslope, terrace, etc.): Valleu Local relief (concave, convex, none): convex Slope (%): 1
Subregion (LRR): 2 Lat: 47.010829 Long: -122.904540 Datum: Wgs84
Soil Map Unit Name: Puyallup Silt Loam NWI classification: PSSC
Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No ___ (If no, explain in Remarks.)
Are Vegetation ___ , Soil ___ , or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes x No ___
Are Vegetation ___ , Soil ___ , or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	x	No	
Hydric Soil Present?	Yes		No	x
Wetland Hydrology Present?	Yes		No	x

Is the Sampled Area within a Wetland? **Yes** ___ **No** x

Remarks: No hydric soil or wetland hydrology indicators are present. Hydrophytic vegetation is present.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 15)			
1. *Ranunculus repens*	45		FAC
2. *Phalaris arundinacea*	55		FACW
3. *Epilobium ciliatum*	10		FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	110 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum ___

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)
Total Number of Dominant Species Across All Strata: 2 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- x 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** x **No** ___

Remarks: Greater than 50% of dominant vegetation is FAC or wetter.

Item 1a.

SOIL

Sampling Point: TP2571

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-8	10YR4/2	100					Silt loam	
8-18	10YR4/2	75	10YR4/6	25	c	m	Silt loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** x

Remarks: No hydric soil indicators present.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No x Depth (inches): _____

Water Table Present? Yes x No ___ Depth (inches): 16”

Saturation Present? (includes capillary fringe) Yes ___ No x Depth (inches): _____

Wetland Hydrology Present? **Yes** ___ **No** x

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: No wetland hydrology indicators present.

Item 1a.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Tumwater Valley GC City/County: Tumwater/Thurston Sampling Date: 2.23.26
Applicant/Owner: City of Tumwater State: WA Sampling Point: TP2607a
Investigator(s): Alex Callender Section, Township, Range: 35 18 2W
Landform (hillslope, terrace, etc.): Valley Local relief (concave, convex, none): convex Slope (%): 1-2
Subregion (LRR): 2 Lat: 47.010829 Long: -122.904540 Datum: Wgs84
Soil Map Unit Name: Puyallup Silt Loam NWI classification: PSSC
Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No ___ (If no, explain in Remarks.)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes x No ___
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	x	No	
Hydric Soil Present?	Yes		No	x
Wetland Hydrology Present?	Yes		No	x

Is the Sampled Area within a Wetland? **Yes** ___ **No** x

Remarks: No hydric soil or wetland hydrology indicators are present. Hydrophytic vegetation is present.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Acer circinatum*	55	Y	FAC
2. *Alnus rubra*	25	Y	FAC
3.			
4.			
	80	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
	___	= Total Cover	

Herb Stratum (Plot size: 15)			
1. *Montia parvifolia*	55	Y	FACW
2. *Claytonia sibirica*	10	N	FAC
3. *Polypodium glycyrrhiza*	10	N	UPL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	75	= Total Cover	

Woody Vine Stratum (Plot size:)			
1.			
2.			
	___	= Total Cover	

% Bare Ground in Herb Stratum ___

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- x 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** x **No** ___

Remarks: Greater than 50% of dominant vegetation is FAC or wetter.

Item 1a.

SOIL

Sampling Point: TP2607a

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-6	10YR2/1	100					Sandy loam	
6-18	10YR3/3	100					Sandy loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** x

No hydric soil indicators present.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No x Depth (inches): _____

Water Table Present? Yes ___ No x Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ___ No x Depth (inches): _____

Wetland Hydrology Present? **Yes** ___ **No** x

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: No wetland hydrology indicators present.

Item 1a.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Tumwater Valley GC | City/County: Tumwater/Thurston | Sampling Date: 2.23.26
Applicant/Owner: City of Tumwater | State: WA | Sampling Point: TP2607b
Investigator(s): Alex Callender | Section, Township, Range: 35 18 2W
Landform (hillslope, terrace, etc.): Valley | Local relief (concave, convex, none): convex | Slope (%): 1-2
Subregion (LRR): 2 | Lat: 47.010829 | Long: -122.904540 | Datum: Wgs84
Soil Map Unit Name: Puyallup Silt Loam | NWI classification: PSSC
Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No ___ (If no, explain in Remarks.)
Are Vegetation ___ , Soil ___ , or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes x No ___
Are Vegetation ___ , Soil ___ , or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes x	No ___	**Is the Sampled Area within a Wetland?** **Yes** ___ **No** x
Hydric Soil Present?	Yes ___	No x	
Wetland Hydrology Present?	Yes ___	No x	

Remarks: No hydric soil or wetland hydrology indicators are present. Hydrophytic vegetation is present.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Acer circinatum*	75	Y	FAC
2.			
3.			
4.			
	75	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
	___	= Total Cover	

Herb Stratum (Plot size: 15)			
1. *Carex obnupta*	25	Y	OBL
2. *Claytonia sibirica*	25	Y	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	50	= Total Cover	

Woody Vine Stratum (Plot size:)			
1.			
2.			
	___	= Total Cover	

% Bare Ground in Herb Stratum ___

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	___	x 1 =	___
FACW species	___	x 2 =	___
FAC species	___	x 3 =	___
FACU species	___	x 4 =	___
UPL species	___	x 5 =	___
Column Totals:	___ (A)		___ (B)

Prevalence Index = B/A = ___

Hydrophytic Vegetation Indicators:
___ 1 - Rapid Test for Hydrophytic Vegetation
x 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** x **No** ___

Remarks: Greater than 50% of dominant vegetation is FAC or wetter.

Item 1a.

SOIL

Sampling Point: TP2607b

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-3	10YR2/1	100					Silt loam	
3-18	10YR5/1	99	10YR5/6	1	c	m	Silt loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** x

Remarks: No hydric soil indicators present.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No x Depth (inches): _____

Water Table Present? Yes ___ No x Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ___ No x Depth (inches): _____

Wetland Hydrology Present? **Yes** ___ **No** x

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: No wetland hydrology indicators present.

Item 1a.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Tumwater Valley GC City/County: Tumwater/Thurston Sampling Date: 2.23.26
Applicant/Owner: City of Tumwater State: WA Sampling Point: TP2648
Investigator(s): Alex Callender Section, Township, Range: 35 18 2W
Landform (hillslope, terrace, etc.): Valley Local relief (concave, convex, none): concave Slope (%): 1-2
Subregion (LRR): 2 Lat: 47.010829 Long: -122.904540 Datum: Wgs84
Soil Map Unit Name: Puyallup Silt Loam NWI classification: PSSC
Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No ___ (If no, explain in Remarks.)
Are Vegetation ___ , Soil ___ , or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes x No ___
Are Vegetation ___ , Soil ___ , or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	x	No	
Hydric Soil Present?	Yes		No	x
Wetland Hydrology Present?	Yes		No	x

Is the Sampled Area within a Wetland? **Yes** ___ **No** x

Remarks: No hydric soil or wetland hydrology indicators are present. Hydrophytic vegetation is present.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 15)			
1. *Phalaris arundinacea*	100	Y	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	100 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum ___

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across All Strata: 1 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:
___ 1 - Rapid Test for Hydrophytic Vegetation
x 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** x **No** ___

Remarks: Greater than 50% of dominant vegetation is FAC or wetter.

Item 1a.

SOIL

Sampling Point: TP2648

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-18	10YR4/3	100					Silt loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** x

Remarks: No hydric soil indicators present.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No x Depth (inches): _____

Water Table Present? Yes ___ No x Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ___ No x Depth (inches): _____

Wetland Hydrology Present? **Yes** ___ **No** x

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: No wetland hydrology indicators present.

Item 1a.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Tumwater Valley GC City/County: Tumwater/Thurston Sampling Date: 2.23.26
Applicant/Owner: City of Tumwater State: WA Sampling Point: TP2661a
Investigator(s): Alex Callender Section, Township, Range: 35 18 2W
Landform (hillslope, terrace, etc.): Valley Local relief (concave, convex, none): concave Slope (%): 1-2
Subregion (LRR): 2 Lat: 47.010829 Long: -122.904540 Datum: Wgs84
Soil Map Unit Name: Puyallup Silt Loam NWI classification: PSSC
Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No ___ (If no, explain in Remarks.)
Are Vegetation ___ , Soil ___ , or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes x No ___
Are Vegetation ___ , Soil ___ , or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___	No x	**Is the Sampled Area within a Wetland?**	**Yes ___ No X**
Hydric Soil Present?	Yes ___	No X		
Wetland Hydrology Present?	Yes ___	No X		

Remarks: No hydric soil indicators, hydrophytic vegetation, or wetland hydrology present.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15)			
1. *Rubus spectabilis*	5	Y	FAC
2. *Acer circinatum*	20	Y	FAC
3.			
4.			
5.			
	25 = Total Cover		
Herb Stratum (Plot size: 15)			
1. *Polystichum munitum*	30	Y	FACU
2. *Rubus ursinus*	20	Y	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	50 = Total Cover		
Woody Vine Stratum (Plot size: ___)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum ___

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)
Total Number of Dominant Species Across All Strata: 4 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species	25	x 3 =	75
FACU species	50	x 4 =	200
UPL species		x 5 =	
Column Totals:	75 (A)		275 (B)

Prevalence Index = B/A = 3.67

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No x

Remarks: Prevalence test >3.0.

Item 1a.

SOIL

Sampling Point: TP2661a

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-14	10YR 2/2	100					Peaty sandy loam	
14-18	10YR 3/2	100					Sandy loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** **X**

Remarks: No hydric soil indicators present.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): _____

Water Table Present? Yes ___ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): _____

Wetland Hydrology Present? **Yes** ___ **No** **X**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: No wetland hydrology indicators present.

Item 1a.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Tumwater Valley GC City/County: Tumwater/Thurston Sampling Date: 2.23.26
Applicant/Owner: City of Tumwater State: WA Sampling Point: TP2661b
Investigator(s): Alex Callender Section, Township, Range: 35 18 2W
Landform (hillslope, terrace, etc.): Valley Local relief (concave, convex, none): convex Slope (%): 1-2
Subregion (LRR): 2 Lat: 47.010829 Long: -122.904540 Datum: Wgs84
Soil Map Unit Name: Puyallup Silt Loam NWI classification: PSSC
Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No ___ (If no, explain in Remarks.)
Are Vegetation ___ , Soil ___ , or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes x No ___
Are Vegetation ___ , Soil ___ , or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No ___
Hydric Soil Present? Yes X No ___
Wetland Hydrology Present? Yes X No ___

Is the Sampled Area within a Wetland? Yes X No ___

Remarks: Hydric soil indicators, wetland hydrology, and hydrophytic vegetation present.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15)			
1. *Sambucus racemosa*	20	Y	FACU
2. *Acer circinatum*	10	Y	FAC
3.			
4.			
5.			
	30	= Total Cover	
Herb Stratum (Plot size: 15)			
1. *Athyrium cyclosorum*	15	Y	FAC
2. *Lysichiton americanus*	10	N	OBL
3. *Cardamine cordifolia*	40	Y	NR (FAC)
4. *Rubus ursinus*	10	Y	FACU
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	75	= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum ___

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)
Total Number of Dominant Species Across All Strata: 5 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 60 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
x 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks: Greater than 50% of dominant vegetation is FAC or wetter.

Item 1a.

SOIL

Sampling Point: TP2661b

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-6	10YR 2/1	100					Mucky sandy loam	
6-18	10YR 4/1	90	10YR 3/6	10	c	m	Sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- x Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** **X** **No** _____

Remarks: Hydric soil indicators present.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- x High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes		No	X	Depth (inches):	
Water Table Present?	Yes	X	No		Depth (inches):	8
Saturation Present? (includes capillary fringe)	Yes		No	X	Depth (inches):	

Wetland Hydrology Present? **Yes** **X** **No** _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Wetland hydrology indicators present. High water table at 8".

Item 1a.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Tumwater Valley GC City/County: Tumwater/Thurston Sampling Date: 2.23.26
Applicant/Owner: City of Tumwater State: WA Sampling Point: TP2675b
Investigator(s): Alex Callender Section, Township, Range: 35 18 2W
Landform (hillslope, terrace, etc.): Valley Local relief (concave, convex, none): convex Slope (%): 1-2
Subregion (LRR): 2 Lat: 47.010829 Long: -122.904540 Datum: Wgs84
Soil Map Unit Name: Puyallup Silt Loam NWI classification: PSSC
Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No ___ (If no, explain in Remarks.)
Are Vegetation ___ , Soil ___ , or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes x No ___
Are Vegetation ___ , Soil ___ , or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	X	No	
Hydric Soil Present?	Yes	X	No	
Wetland Hydrology Present?	Yes	X	No	

Is the Sampled Area within a Wetland? **Yes X No**

Remarks: Hydric soil indicators, wetland hydrology, and hydrophytic vegetation present.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15)			
1. *Rubus spectabilis*	10	Y	FAC
2. *Rubus armeniacus*	20	Y	FAC
3.			
4.			
5.			
	30 = Total Cover		
Herb Stratum (Plot size: 15)			
1. *Equisetum arvense*	90	Y	FAC
2. *Cardamine cordifolia*	10	N	NR (FAC)
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	100 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:
___ 1 - Rapid Test for Hydrophytic Vegetation
x 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes X No**

Remarks: Greater than 50% of dominant vegetation is FAC or wetter.

Item 1a.

SOIL

Sampling Point: TP2675b

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-2	10YR 3/2	100					Sandy loam	
2-18	10YR 4/1	85	10YR 3/6	15	c	m	Sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- x Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks: Hydric soil indicators present.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- x High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): _____

Water Table Present? Yes X No ___ Depth (inches): 8

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): _____

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Wetland hydrology indicators present. High water table at 8".

Item 1a.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Tumwater Valley GC City/County: Tumwater/Thurston Sampling Date: 2.23.26
Applicant/Owner: City of Tumwater State: WA Sampling Point: TP2680a
Investigator(s): Alex Callender Section, Township, Range: 35 18 2W
Landform (hillslope, terrace, etc.): Valley Local relief (concave, convex, none): convex Slope (%): 1-2
Subregion (LRR): 2 Lat: 47.010829 Long: -122.904540 Datum: Wgs84
Soil Map Unit Name: Puyallup Silt Loam NWI classification: PSSC
Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No ___ (If no, explain in Remarks.)
Are Vegetation ___ , Soil ___ , or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes x No ___
Are Vegetation ___ , Soil ___ , or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___	No X	**Is the Sampled Area within a Wetland?**	**Yes ___ No X**
Hydric Soil Present?	Yes ___	No X		
Wetland Hydrology Present?	Yes ___	No X		

Remarks: No hydric soil indicators, hydrophytic vegetation, or wetland hydrology present.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Pseudotsuga menziesii*	20	Y	FACU
2.			
3.			
4.			
	20	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15)			
1. *Malus fusca*	80	Y	FACW
2. *Symphoricarpos albus*	15	N	FACU
3.			
4.			
5.			
	95	= Total Cover	
Herb Stratum (Plot size: 15)			
1. *Carex leptopoda*	10	Y	FAC
2. *Polystichum munitum*	2	Y	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	12	= Total Cover	
Woody Vine Stratum (Plot size:)			
1. *Rubus ursinus*	10	Y	FACU
2.			
	10	= Total Cover	

% Bare Ground in Herb Stratum ___

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)
Total Number of Dominant Species Across All Strata: 5 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 40 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	___	x 1 =	___
FACW species	___	x 2 =	___
FAC species	___	x 3 =	___
FACU species	___	x 4 =	___
UPL species	___	x 5 =	___
Column Totals:	___ (A)		___ (B)

Prevalence Index = B/A = ___

Hydrophytic Vegetation Indicators:
___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No X

Remarks: Less than 50% of dominant vegetation is FAC or wetter.

Item 1a.

SOIL

Sampling Point: TP2680a

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-18	10YR 3/2	100					Silt loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** **X**

Remarks: No hydric soil indicators present.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): _____

Water Table Present? Yes ___ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): _____

Wetland Hydrology Present? **Yes** ___ **No** **X**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: No wetland hydrology indicators present.

Item 1a.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Tumwater Valley GC City/County: Tumwater/Thurston Sampling Date: 2.23.26
Applicant/Owner: City of Tumwater State: WA Sampling Point: TP2681a
Investigator(s): Alex Callender Section, Township, Range: 35 18 2W
Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): convex Slope (%): 1-2
Subregion (LRR): 2 Lat: 47.010829 Long: -122.904540 Datum: Wgs84
Soil Map Unit Name: Puyallup Silt Loam NWI classification: PSSC
Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No ___ (If no, explain in Remarks.)
Are Vegetation ___ , Soil ___ , or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes x No ___
Are Vegetation ___ , Soil ___ , or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	X	No	
Hydric Soil Present?	Yes		No	X
Wetland Hydrology Present?	Yes		No	X

Is the Sampled Area within a Wetland? **Yes** ___ **No** **X**

Remarks: No hydric soil indicators or wetland hydrology present. Hydrophytic vegetation is present.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Alnus rubra*	50	Y	FAC
2.			
3.			
4.			
	50	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15)			
1. *Malus fusca*	60	Y	FACW
2. *Cornus alba*	20	Y	FACW
3.			
4.			
5.			
	80	= Total Cover	

Herb Stratum (Plot size: 15)			
1. *Tolmiea menziesii*	5	Y	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	5	= Total Cover	

Woody Vine Stratum (Plot size:)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum ___

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)
Total Number of Dominant Species Across All Strata: 4 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- x 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** **X** **No** ___

Remarks: Greater than 50% of dominant vegetation is FAC or wetter.

Item 1a.

SOIL

Sampling Point: TP2681a

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-14	10YR 3/2	100					Silt loam	
14-18	10YR 4/2	100					Silt loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** **X**

Remarks: No hydric soil indicators present.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): _____

Water Table Present? Yes ___ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): _____

Wetland Hydrology Present? **Yes** ___ **No** **X**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: No wetland hydrology indicators present.

Item 1a.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Tumwater Valley GC City/County: Tumwater/Thurston Sampling Date: 2.23.26
Applicant/Owner: City of Tumwater State: WA Sampling Point: TP2682a
Investigator(s): Alex Callender Section, Township, Range: 35 18 2W
Landform (hillslope, terrace, etc.): Valley Local relief (concave, convex, none): convex Slope (%): 1-2
Subregion (LRR): 2 Lat: 47.010829 Long: -122.904540 Datum: Wgs84
Soil Map Unit Name: Puyallup Silt Loam NWI classification: PSSC
Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No ___ (If no, explain in Remarks.)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes x No ___
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	X	No	
Hydric Soil Present?	Yes		No	X
Wetland Hydrology Present?	Yes		No	X

Is the Sampled Area within a Wetland? **Yes** ___ **No** **X**

Remarks: No hydric soil indicators or wetland hydrology present. Hydrophytic vegetation is present.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Alnus rubra*	40	Y	FAC
2.			
3.			
4.			
	40	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15)			
1. *Rubus spectabilis*	10	Y	FAC
2. *Cornus alba*	40	Y	FACW
3.			
4.			
5.			
	50	= Total Cover	

Herb Stratum (Plot size: 15)			
1. *Ranunculus repens*	30	Y	FAC
2. *Carex leptopoda*	5	Y	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	35	= Total Cover	

Woody Vine Stratum (Plot size: ___)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum ___

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)
Total Number of Dominant Species Across All Strata: 5 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:
___ 1 - Rapid Test for Hydrophytic Vegetation
x 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** **X** **No** ___

Remarks: Greater than 50% of dominant vegetation is FAC or wetter.

Item 1a.

SOIL

Sampling Point: TP2682a

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-10	10YR 4/2	100					Clay loam	
10-18	10YR 4/2	90	10YR 3/6	10	c	m	Clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** **X**

Remarks: No hydric soil indicators present.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): _____

Water Table Present? Yes ___ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): _____

Wetland Hydrology Present? **Yes** ___ **No** **X**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: No wetland hydrology indicators present.

Item 1a.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Tumwater Valley GC City/County: Tumwater/Thurston Sampling Date: 2.23.26
Applicant/Owner: City of Tumwater State: WA Sampling Point: TP2684A
Investigator(s): Alex Callender Section, Township, Range: 35 18 2W
Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): CONCAVE Slope (%): 2
Subregion (LRR): 2 Lat: 47.010829 Long: -122.904540 Datum: Wgs84
Soil Map Unit Name: Puyallup Silt Loam NWI classification: PSSC
Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No ___ (If no, explain in Remarks.)
Are Vegetation ___ , Soil ___ , or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes x No ___
Are Vegetation ___ , Soil ___ , or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	X	No	
Hydric Soil Present?	Yes		No	x
Wetland Hydrology Present?	Yes		No	x

Is the Sampled Area within a Wetland? **Yes** ___ **No** **X**

Remarks: No hydric soil indicators or wetland hydrology present. Hydrophytic vegetation is present.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Alnus rubra*	20	Y	FAC
2.			
3.			
4.			
	20	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15)			
1. *Acer circinatum*	20	Y	FAC
2. *Rubus spectabilis*	15	Y	FAC
3.			
4.			
5.			
	35	= Total Cover	

Herb Stratum (Plot size: 15)			
1. *Carex obnupta*	80	Y	OBL
2. *Athyrium cyclosorum*	10	N	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	90	= Total Cover	

Woody Vine Stratum (Plot size:)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum ___

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)
Total Number of Dominant Species Across All Strata: 4 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A = ___

Hydrophytic Vegetation Indicators:
___ 1 - Rapid Test for Hydrophytic Vegetation
x 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** **X** **No** ___

Remarks: Greater than 50% of dominant vegetation is FAC or wetter.

Item 1a.

SOIL

Sampling Point: TP2684a

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-6	10YR 2/2	100					Peaty loam	
6-18	10YR 5/1	98	10YR 5/6	2	c	m	Sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** **X**

Remarks: No hydric soil indicators present.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): _____

Water Table Present? Yes ___ No x Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ___ No x Depth (inches): _____

Wetland Hydrology Present? **Yes** ___ **No** **x**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: No wetland hydrology indicators present.

Item 1a.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Tumwater Valley GC City/County: Tumwater/Thurston Sampling Date: 2.23.26
Applicant/Owner: City of Tumwater State: WA Sampling Point: TP2684B
Investigator(s): Alex Callender Section, Township, Range: 35 18 2W
Landform (hillslope, terrace, etc.): Valley Local relief (concave, convex, none): CONCAVE Slope (%): 2
Subregion (LRR): 2 Lat: 47.010829 Long: -122.904540 Datum: Wgs84
Soil Map Unit Name: Puyallup Silt Loam NWI classification: PSSC
Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No ___ (If no, explain in Remarks.)
Are Vegetation ___ , Soil ___ , or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes x No ___
Are Vegetation ___ , Soil ___ , or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	X	No	
Hydric Soil Present?	Yes	X	No	
Wetland Hydrology Present?	Yes		No	X

Is the Sampled Area within a Wetland? **Yes** ___ **No** **X**

Remarks: No hydric soil indicators or wetland hydrology present. Hydrophytic vegetation is present.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ___)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Alnus rubra*	20	Y	FAC
2.			
3.			
4.			
	20	= Total Cover	

Sapling/Shrub Stratum (Plot size: ___)			
1. *Acer circinatum*	20	Y	FAC
2. *Rubus spectabilis*	15	Y	FAC
3.			
4.			
5.			
	35	= Total Cover	

Herb Stratum (Plot size: ___)			
1. *Equisetum arvense*	10	Y	FAC
2. Polystichum munitum	15	Y	FACU
3. *Athyrium cyclosorum*	10	Y	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	35	= Total Cover	

Woody Vine Stratum (Plot size: ___)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum ___

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)
Total Number of Dominant Species Across All Strata: 6 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 83 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A = ___

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- x 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** **X** **No** ___

Remarks: Greater than 50% of dominant vegetation is FAC or wetter.

Item 1a.

SOIL

Sampling Point: TP2684a

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-6	10YR 3/1	100					Sandy loam	
6-18	10YR 5/2	98	10YR5/6	2	c	m	Sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** **X**

Remarks: No hydric soil indicators present.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): _____

Water Table Present? Yes ___ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): _____

Wetland Hydrology Present? **Yes** ___ **No** **X**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: No wetland hydrology indicators present.

Item 1a.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Tumwater Valley GC City/County: Tumwater/Thurston Sampling Date: 2..26
Applicant/Owner: City of Tumwater State: WA Sampling Point: Tptee1
Investigator(s): Alex Callender Section, Township, Range: 35 18 2W
Landform (hillslope, terrace, etc.): Valley Local relief (concave, convex, none): concave Slope (%): 1-2
Subregion (LRR): 2 Lat: 47.010829 Long: -122.904540 Datum: Wgs84
Soil Map Unit Name: Puyallup Silt Loam NWI classification: PSSC
Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No ___ (If no, explain in Remarks.)
Are Vegetation ___ , Soil ___ , or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes x No ___
Are Vegetation ___ , Soil ___ , or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	x	No	
Hydric Soil Present?	Yes		No	x
Wetland Hydrology Present?	Yes		No	x

Is the Sampled Area within a Wetland? **Yes** ___ **No** x

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1. *Alnus rubra*	25	Y	FAC
2. *Salix sp*	35	Y	FAC
3.			
4.			
5.			
	60 = Total Cover		
Herb Stratum (Plot size:)			
1. *Juncus effusus*	15	Y	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	15 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum ___

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:
___ 1 - Rapid Test for Hydrophytic Vegetation
x 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** x **No** ___

Remarks: Greater than 50% of dominant vegetation is FAC or wetter.

Item 1a.

SOIL

Sampling Point: TP

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-5	10YR3/2	100					Sandy loam	
5-18	10YR4/2	100					Sandy loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** x

Remarks: No hydric soil indicators present.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No x Depth (inches): _____

Water Table Present? Yes ___ No x Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ___ No x Depth (inches): _____

Wetland Hydrology Present? **Yes** ___ **No** x

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: No wetland hydrology indicators present.

Item 1a.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, andCoast Region

Project/Site: Tumwater Valley GC | City/County: Tumwater/Thurston | Sampling Date: 2..18.26

Applicant/Owner: City of Tumwater | State: WA | Sampling Point: Tptee2

Investigator(s): Alex Callender | Section, Township, Range: 35 18 2W

Landform (hillslope, terrace, etc.): valley | Local relief (concave, convex, none): convex | Slope (%): 1-2

Subregion (LRR): 2 | Lat: 47.010829 | Long: -122.904540 | Datum: Wgs84

Soil Map Unit Name: Puyallup Silt Loam | NWI classification: PSSC

Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No ___ (If no, explain in Remarks.)

Are Vegetation ___ , Soil ___ , or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes x No ___

Are Vegetation ___ , Soil ___ , or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes x	No ___	**Is the Sampled Area within a Wetland?** **Yes** ___ **No** x
Hydric Soil Present?	Yes ___	No x	
Wetland Hydrology Present?	Yes ___	No x	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	___ = Total Cover		
Sapling/Shrub Stratum (Plot size: 15)			
1. *Rubus armeniacus*	10	Y	FAC
2.			
3.			
4.			
5.			
	10 = Total Cover		
Herb Stratum (Plot size: 15)			
1. *Phalaris arundinacea*	90	Y	FACW
2. *Agrostis capillaris*	10	N	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	100 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
	___ = Total Cover		

% Bare Ground in Herb Stratum ___

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	___	x 1 =	
FACW species	___	x 2 =	
FAC species	___	x 3 =	
FACU species	___	x 4 =	
UPL species	___	x 5 =	
Column Totals:	___ (A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

x 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ 5 - Wetland Non-Vascular Plants[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** x **No** ___

Remarks: Greater than 50% of dominant vegetation is FAC or wetter.

Item 1a.

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-4	10YR3/2	100					Sandy loam	
4-18	10YR4/2	90	10YR4/6	10	c	m	Sandy loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** x

Remarks: No hydric soil indicators present.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No x Depth (inches): _____

Water Table Present? Yes ___ No x Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ___ No x Depth (inches): _____

Wetland Hydrology Present? **Yes** ___ **No** x

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: No wetland hydrology indicators present.

Appendix J – Realignment for Tee Boxes on Hole 2 and 4



SCJ ALLIANCE
CONSULTING SERVICES
8730 TALLON LANE NE, LACEY, WA 98516
P: 360.352.1465
SCJALLIANCE.COM

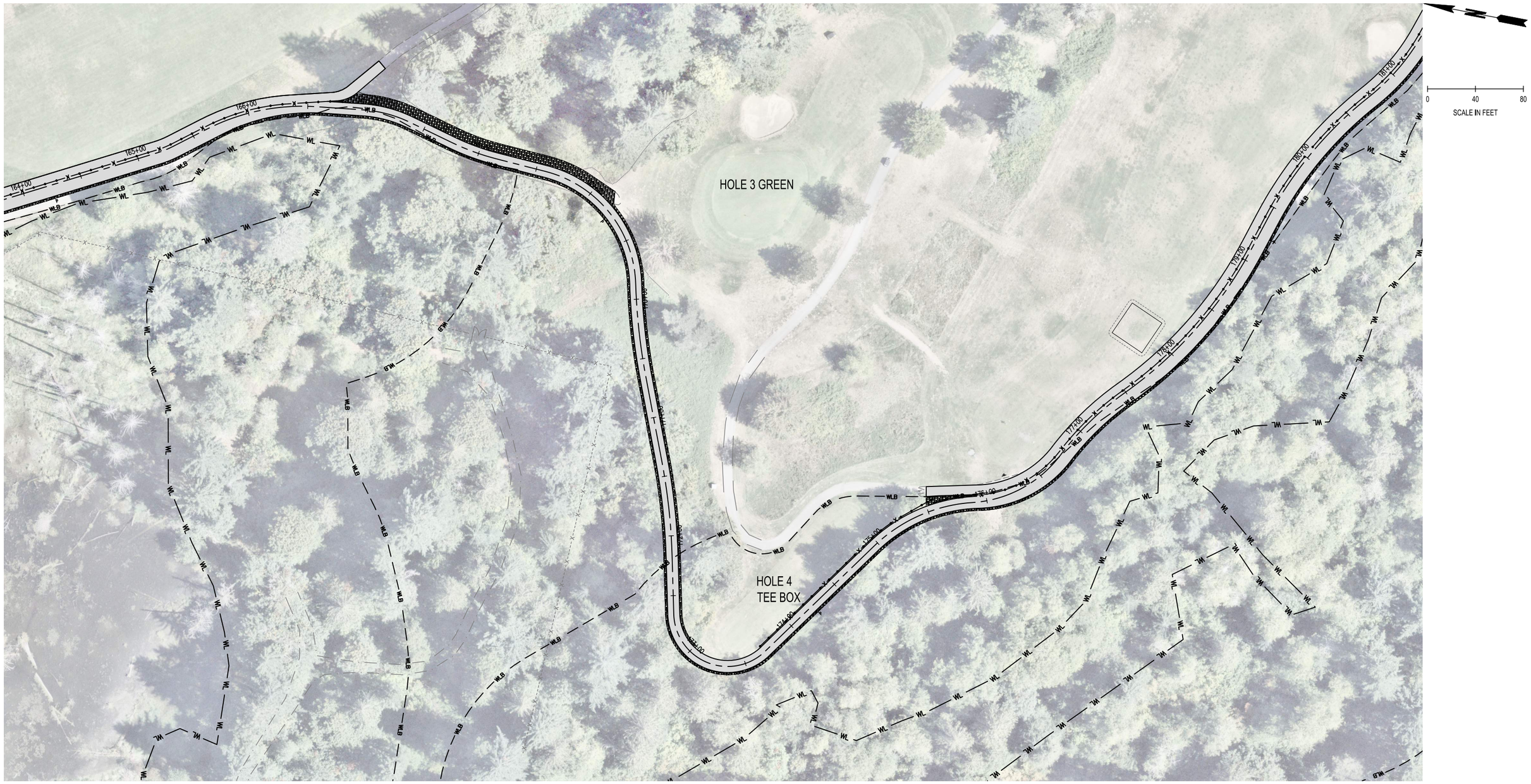
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DATE:	SEPTEMBER 2026
JOB No.:	25-000313
DRAWING FILE No.:	WETLAND REPORT EXHIBIT.DWG

WETLAND BUFFER ENCROACHMENT
DESCHUTES VALLEY TRAIL

EXHIBIT No:

SHEET No:
1 OF 2

Sep 9, 2026 4:45:01pm - User: rikki.martinez
J:\PROJECTS\0625 CITY OF TUMWATER\25-000313 TUMWATER DESCHUTES VALLEY TRAIL\CAD\EXHIBITS\HOLE 2 AND 4 WETLAND REPORT EXHIBITS\WETLAND REPORT EXHIBIT.DWG



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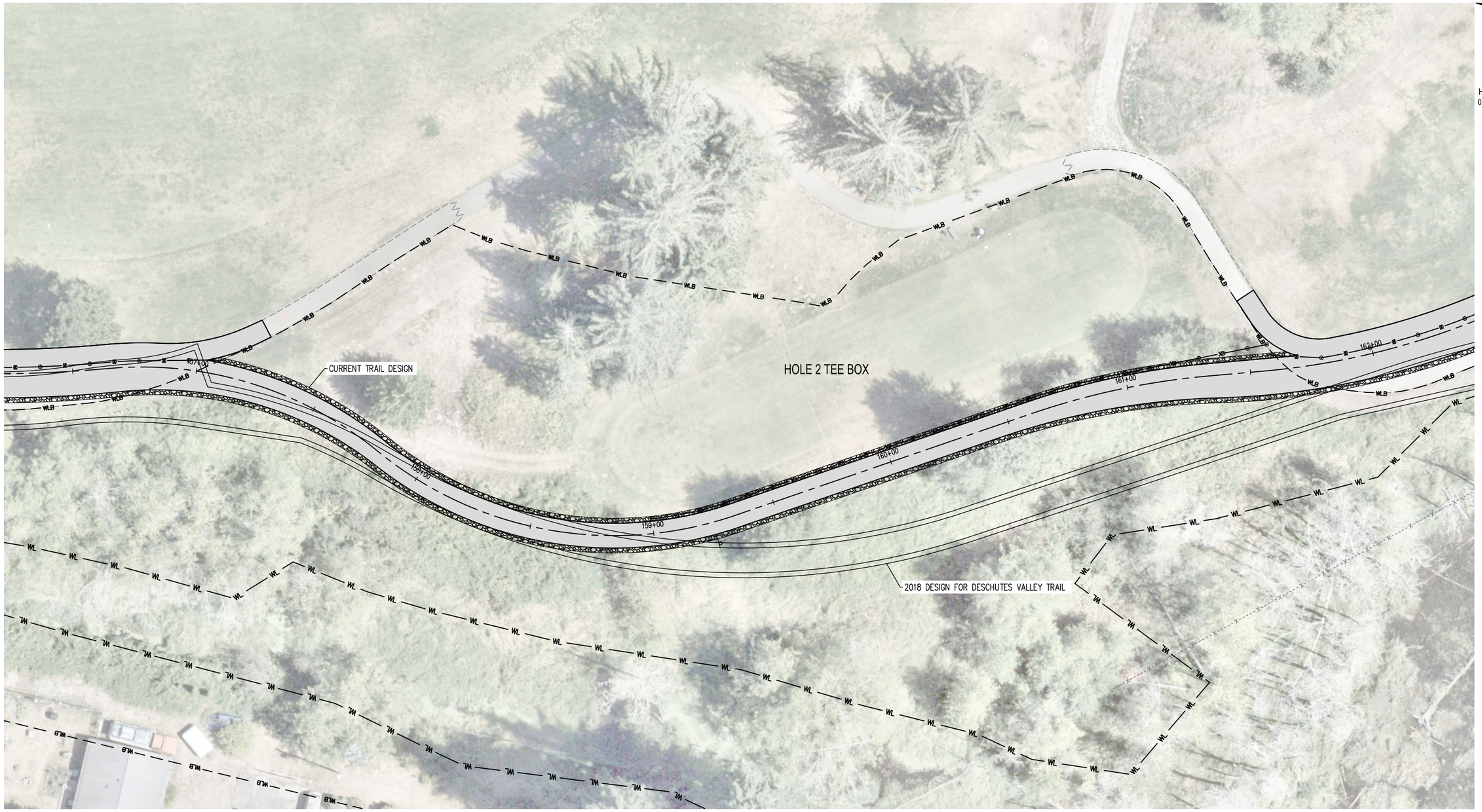
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DATE:	SEPTEMBER 2026
JOB No.:	25-000313
DRAWING FILE No.:	WETLAND REPORT EXHIBIT.DWG

WETLAND BUFFER ENCROACHMENT
DESCHUTES VALLEY TRAIL

EXHIBIT No:

SHEET No:
2 OF 2

9, 2026 4:45:02pm – User: nikkimartinez
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9/13/2026 9:13:26am – User: nikki.martinez
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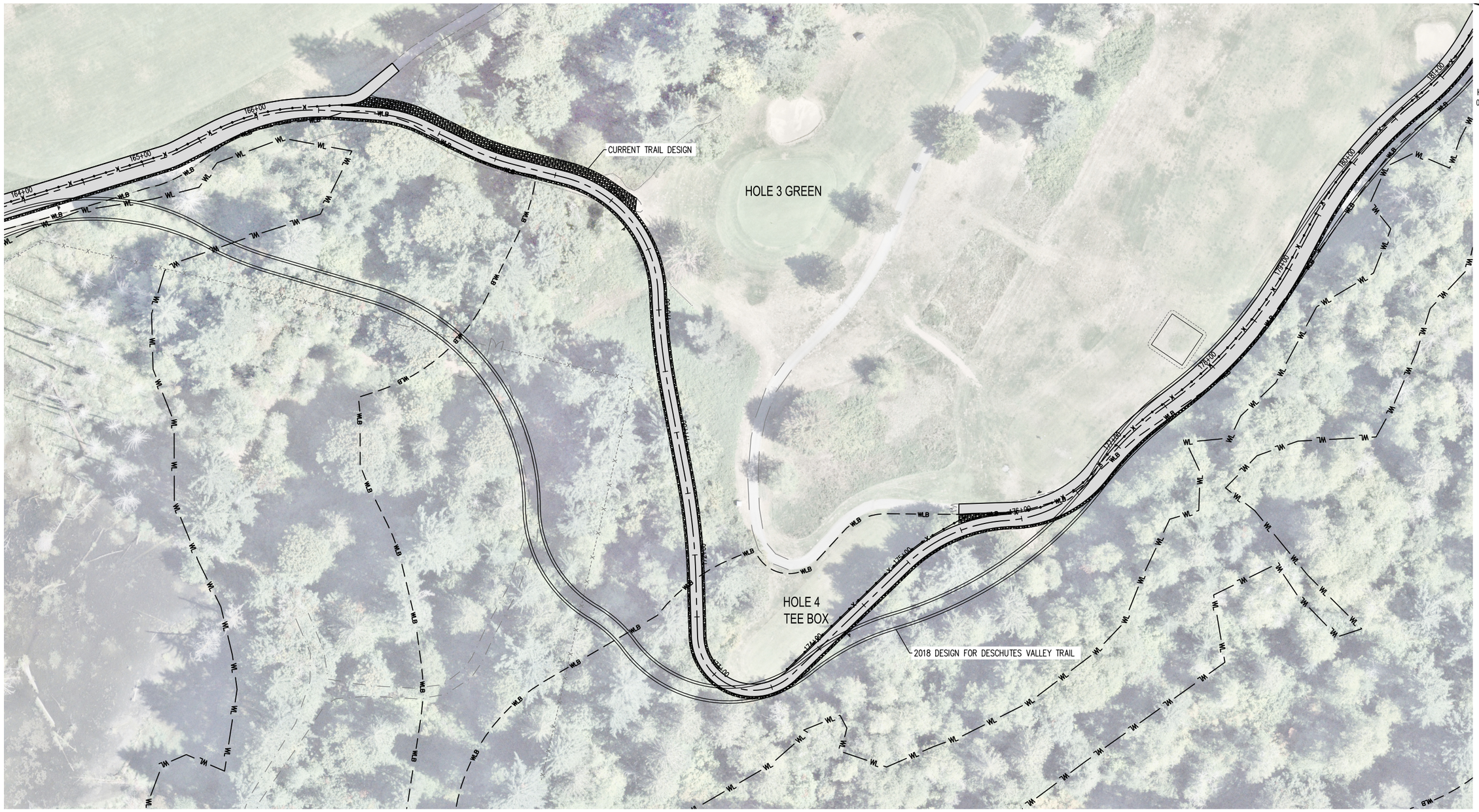
SCJ ALLIANCE
CONSULTING SERVICES
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P: 360.352.1465
SCJALLIANCE.COM

HORIZONTAL SCALE: 1"=20'
DATE: SEPTEMBER 2026
JOB No.: 25-000313
DRAWING FILE No.: WETLAND REPORT EXHIBIT_OVERLAY WITH 2018 DESIGN.DWG

DESIGN EVOLUTION
DESCHUTES VALLEY TRAIL

EXHIBIT No:

SHEET No: 1 OF 2



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HORIZONTAL SCALE: 1"=40'
DATE: SEPTEMBER 2026
JOB No.: 25-000313
DRAWING FILE No.: WETLAND REPORT EXHIBIT_OVERLAY WITH 2018 DESIGN.DWG

DESIGN EVOLUTION
DESCHUTES VALLEY TRAIL

EXHIBIT No:

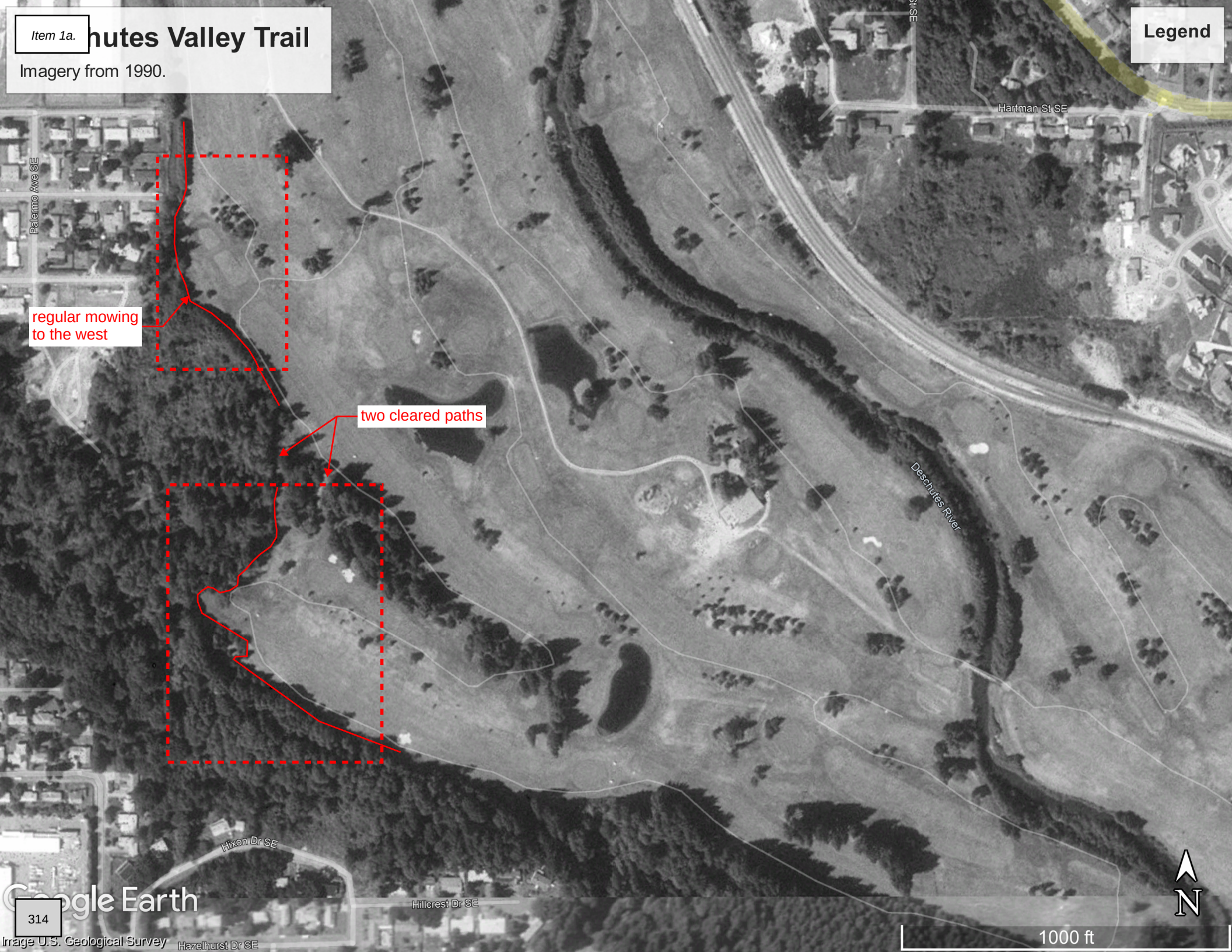
SHEET No: 2 OF 2

Plotted: 03 APR 2026 9:13:28am - User: nikkimartinez
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Appendix K – Historical Aerial Imagery of Tee Box 2 and 4 Showing Maintenance Mowing

hutes Valley Trail

Imagery from 1990.



hutes Valley Trail

Imagery from 2003.



hutes Valley Trail

Imagery from 2006.



hutes Valley Trail

Imagery from 2011.



hutes Valley Trail

Imagery from 2016.



hutes Valley Trail

Imagery from 2022.



Item 1a.

hutes Valley Trail

Imagery from 2023.



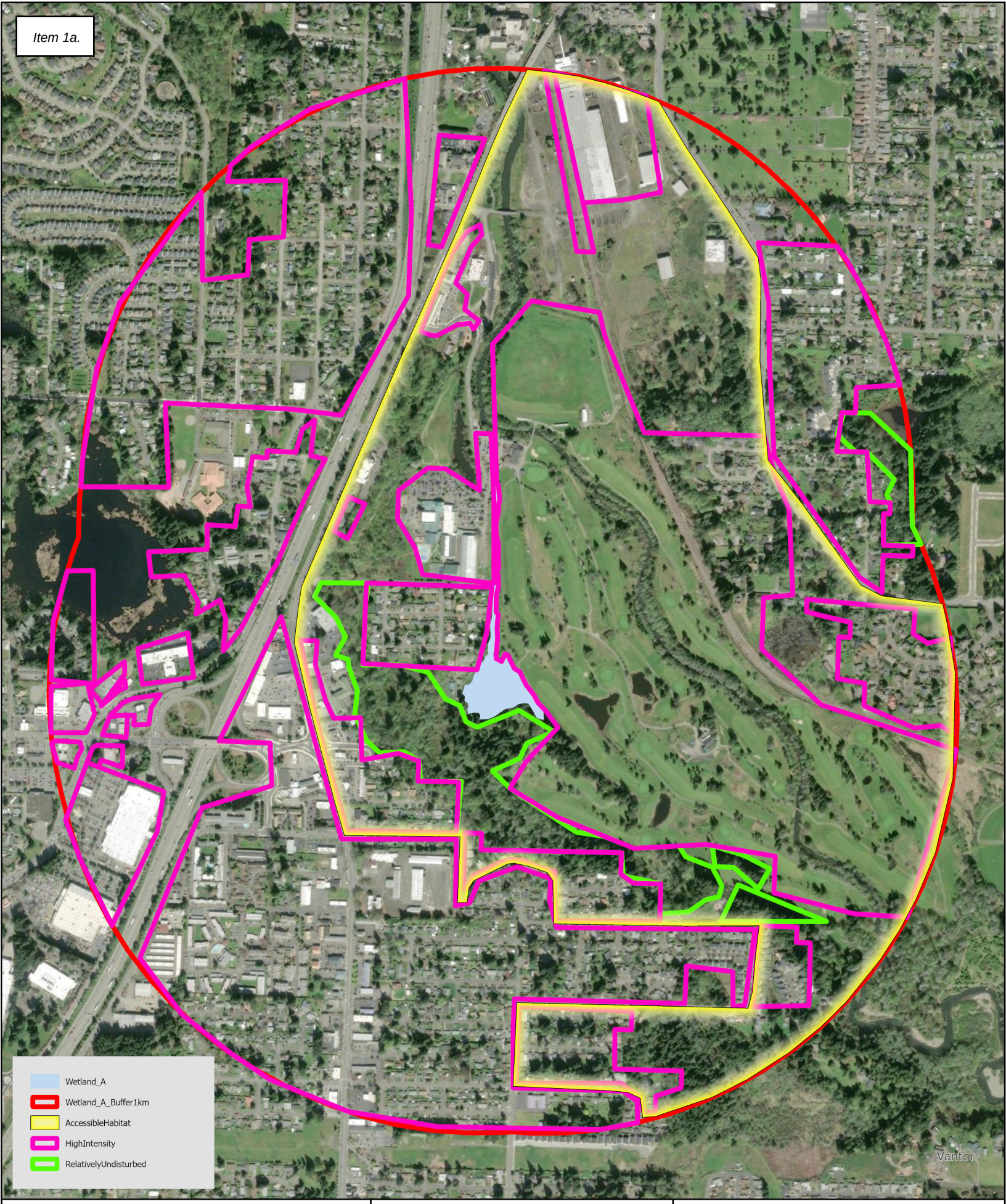

Item 1a.
hutes Valley Trail
Imagery from 2024.
Legend
clearing still occuring west of trees
two cleared paths
Palermo Ave SE
Hartman St SE
Yelm Hwy SE
Deschutes River
Hixon Dr SE
Hillcrest Dr SE
Hazelhurst Dr SE
T St SE
T St SE
N
1000 ft
321

hutes Valley Trail

Imagery from 2026.



Appendix L- ECY Wetland Rating Forms for Western Washington



Land Services Northwest
1[illegible] State Avenue NE PMB 190
O[illegible], WA 98501

LSNW

Wetland A
1 km Land Use Intensity Map

0 0.07 0.15 0.3 Miles

Land Use Calculations

	ACRES		%
1KM	1120		
Wetland A	5		
1KM-Wetland A	1115		100
High Intensity	707.634651	0.63465	63.46499
Relatively Undisturbed	48.7680566	0.043738	4.373817
Low Medium Use	358.597292	0.321612	32.16119
Accessible Habitat	581.13147	0.518867	
Wetland A	5		
Accessible Habitat-Wet A	576.13147	0.51671	
RU	42.3629935	0.037994	3.799372
Low/Medium LU	228.959221	0.206565	20.6565
High Intensity	304.809256	0.272151	27.21511



Land Services Northwest
1[illegible] State Avenue NE PMB 190
O[illegible], WA 98501

LSNW

Wetland A
150 ft
Pollution Generating Land Use

0 0.02 0.04 0.09 Miles



Land Services Northwest
120 State Avenue NE PMB 190
Olympia, WA 98501

N
LSNW

Wetland A
Cowardin Classifications

0 110 220 440 Feet



Land Services Northwest
1[illegible] State Avenue NE PMB 190
C[illegible], WA 98501

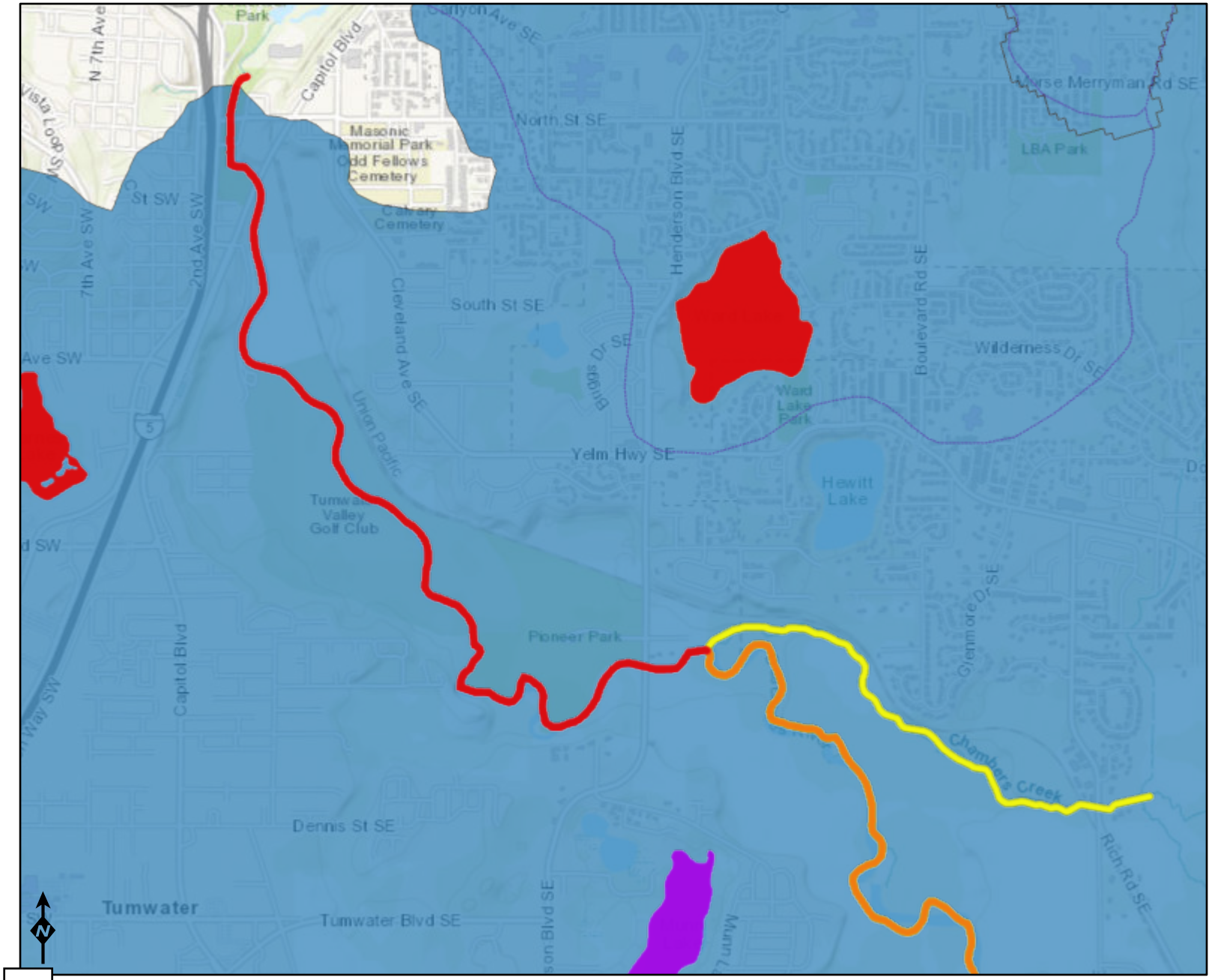
N
LSNW

Wetland A
Hydroperiod Classification Map

0 0.02 0.04 0.09 Miles

March 6, 2026

303d and TMDL



Assessed Water/Sediment

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

WQ Improvement Projects
- TMDL - Approved
- 4B - Approved
- STI - Approved
- ARP - Approved
- TMDL - In Development
- STI - In Development
- ARP - In Development

Parcels
- Parcel boundary

Subbasins (12 digit HUCs)
- HUC boundary

Miles
0 0.23 0.45 0.9

City of Olympia, WA State Parks GIS, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, US Census Bureau, USDA, USFWS

Item 1a.

Wetland name or number Wetland A

RATING SUMMARY – Western Washington

Name of wetland (or ID #): Wetland A Date of site visit: 2/23/26

Rated by Alexander Callender Trained by Ecology? X Yes ___No Date of training 12/2013

HGM Class used for rating Depressional Wetland has multiple HGM classes? ___Y x N

NOTE: **Form is not complete without the required figures** (figures can be combined).
Source of base aerial photo/map ESRI 2024

OVERALL WETLAND CATEGORY II (based on functions x or special characteristics __)

1. Category of wetland based on FUNCTIONS

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

Site Potential	H	(M)	L	H	(M)	L	(H)	M	L
Landscape Potential	(H)	M	L	(H)	M	L	H	M	(L)
Value	(H)	M	L	H	(M)	L	(H)	M	L
		8			7			7	

TOTAL
22

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	**I II**
Wetland of High Conservation Value	**I**
Bog	**I**
Mature Forest	**I**
Old Growth Forest	**I**
Coastal Lagoon	**I II**
Interdunal	**I II III IV**
None of the above	N/A

Wetland name or number A

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	Cowardin
Hydroperiods	D 1.4, H 1.2	Hydro
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	150 Ft
Map of the contributing basin	D 4.3, D 5.3	Cont Basin
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and total habitat	H 2.1, H 2.2, H 2.3	1 KM
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	D 3.1, D 3.2	303d
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	D 3.3	TMDL

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 total 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 total 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 figure above)*	S 4.1	
Boundary of 150 ft buffer (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 total 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	

Wetland name or number A

HGM Classification of Wetlands in Western Washington

For questions 1-7, the criteria described must apply to the entire unit being rated.

If the 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 sheet flow, 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).

Wetland name or number A

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.

Wetland name or number A

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	2
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	9

Rating of Site Potential If score is: **12-16 = H** x **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	1
D 2.3. Are there septic systems within 250 ft of the wetland? Yes = 1 No = 0	0
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	1
Total for D 2 Add the points in the boxes above	3

Rating of Landscape Potential If score is: x **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 in development or in effect 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: x **2-4 = H** **1 = M** **0 = L** *Record the rating on the first page*

Wetland name or number A

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	2
Wetland has an intermittently flowing stream/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	
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	3
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	
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 area of the wetland unit itself.	
The area of the basin is less than 10 times the area of the unit points = 5	3
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	
Total for D 4 Add the points in the boxes above	8

Rating of Site Potential If score is: ___**12-16 = H** _X_ **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 functions of the site?

D 5.1. Does the wetland 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	1
Total for D 5 Add the points in the boxes above	3

Rating of Landscape Potential If score is: _X_ **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. Is the unit 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 downgradient into areas where flooding has damaged human or natural resources (e.g., houses or salmon redds):	1
• Flooding occurs in a sub-basin that is immediately downgradient of unit. points = 2	
• Surface flooding problems are in a sub-basin farther downgradient. 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	
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	1

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

Wetland name or number A

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 if the unit is at least 2.5 ac, or more than 10% of the unit if it is smaller than 2.5 ac.

x	Aquatic bed	4 structures or more: points = 4
x	Emergent	3 structures: points = 2
x	Scrub-shrub (areas where shrubs have > 30% cover)	2 structures: points = 1
x	Forested (areas where trees have > 30% cover)	1 structure: points = 0

If the unit has a Forested class, check if:

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

4

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 if the unit is < 2.5 ac, or ¼ ac if the unit is at least 2.5 ac to count (see text for descriptions of hydroperiods).

x	Permanently flooded or inundated	4 or more types present: points = 3
x	Seasonally flooded or inundated	3 types present: points = 2
x	Occasionally flooded or inundated	2 types present: points = 1
x	Saturated only	1 type present: points = 0
	Permanently flowing stream or river in, or adjacent to, the wetland	
	Intermittently or seasonally flowing stream in, or adjacent to, the wetland	
	Lake Fringe wetland	**2 points**
	Freshwater tidal wetland	**2 points**

3

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, Canada thistle**

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

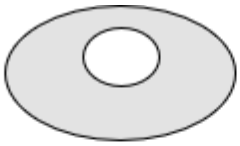
2

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.

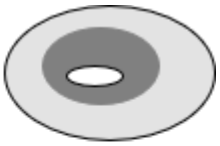


None = 0 points



Low = 1 point



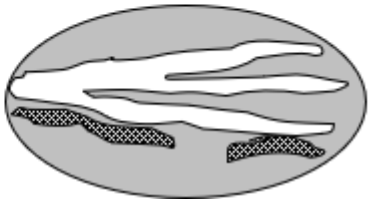


Moderate = 2 points

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







3

Wetland name or number A

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. [x] Large, downed, woody debris within the wetland (> 4 in. diameter and 6 ft long). [x] Standing snags (dbh > 4 in.) within the wetland [x] Undercut banks are present for at least 6.6 ft (2 m) **and/or** overhanging plants extend at least 3.3 ft (1 m) over open water or a stream (or ditch) in, or contiguous with the wetland, for at least 33 ft (10 m) [x] 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) [x] 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 above for the list of strata and H 1.5 in the manual for the list of aggressive plant species)	5
Total for H 1 — Add the points in the boxes above	17

Rating of Site Potential If score is: [x] **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 functions of the site?

H 2.1. Accessible habitat (include only habitat polygons accessible from the wetland. *Calculate:* % relatively undisturbed habitat 4 + [(% moderate and low intensity land uses)/2] 10.3 = 14 % 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. Total habitat in 1 km Polygon around the wetland. *Calculate:* % relatively undisturbed habitat 4 + [(% moderate and low intensity land uses)/2] 16 = 20 % Total habitat > 50% of Polygon — points = 3 Total habitat 10-50% and in 1-3 patches — points = 2 Total habitat 10-50% and > 3 patches — points = 1 Total habitat < 10% of 1 km Polygon — points = 0	1
H 2.3. Land use intensity in 1 km Polygon: > 50% of 1 km Polygon is high intensity land use — points = (- 2) ≤ 50% of 1 km Polygon is high intensity — points = 0	-2
Total for H 2 — Add the points in the boxes above	0

Rating of Landscape Potential If score is: **4-6 = H** **1-3 = M** [x] **< 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 [x] 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) [x] 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 data [ ] 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) within 100 m — points = 1 Site does not meet any of the criteria above — points = 0	2

Rating of Value If score is: [x] **2 = H** [ ] **1 = M** [ ] **0 = L** *Record the rating on the first page*

Wetland name or number A

WDFW Priority Habitats

See complete descriptions of Priority Habitats listed by WDFW, and the counties in which they can be found, in: Washington Department of Fish and Wildlife. 2008 (current year, as revised). Priority Habitat and Species List.[133] This list was updated for consistency with guidance from WDFW.

This question is independent of the land use between the wetland unit and the Priority Habitat. All vegetated wetlands are by definition a Priority Habitat but are not included in this list because they are addressed by this rating system.

Count how many of the following Priority Habitats are within 330 ft (100 m) of the wetland unit:

— **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. This habitat automatically counts if mapped on the PHS online map within 100m of the wetland. If not mapped, a determination can be made in the field.

— **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.

— **Fresh Deepwater:** Lands permanently flooded with freshwater, including environments where surface water is permanent and often deep, so that water, rather than air, is the principal medium within which the dominant organisms live. Substrate does not support emergent vegetation. Do not select if Instream habitat is also present, or if the entire Deepwater feature is included in the wetland unit being rated (such as a pond with a vegetated fringe).

— **Herbaceous Balds:** Variable size patches of grass and forbs on shallow soils over bedrock.

x **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. Do not select if Fresh Deepwater habitat is also present.

— **Nearshore:** Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore.

— **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) diameter at breast height (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.

[133] http://wdfw.wa.gov/publications/00165/wdfw00165.pdf

Wetland name or number A

— **Oregon White Oak:** Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important. For single oaks or oak stands <0.4 ha in urban areas, WDFW's Management Recommendations for Oregon White Oak[134] provides more detail for determining if they are Priority Habitats

_x_ **Riparian:** The area adjacent to freshwater aquatic systems with flowing or standing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.

x **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.

— **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.

— **Westside Prairies:** Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie.

[134] https://wdfw.wa.gov/publications/00030/wdfw00030.pdf

Wetland name or number A

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

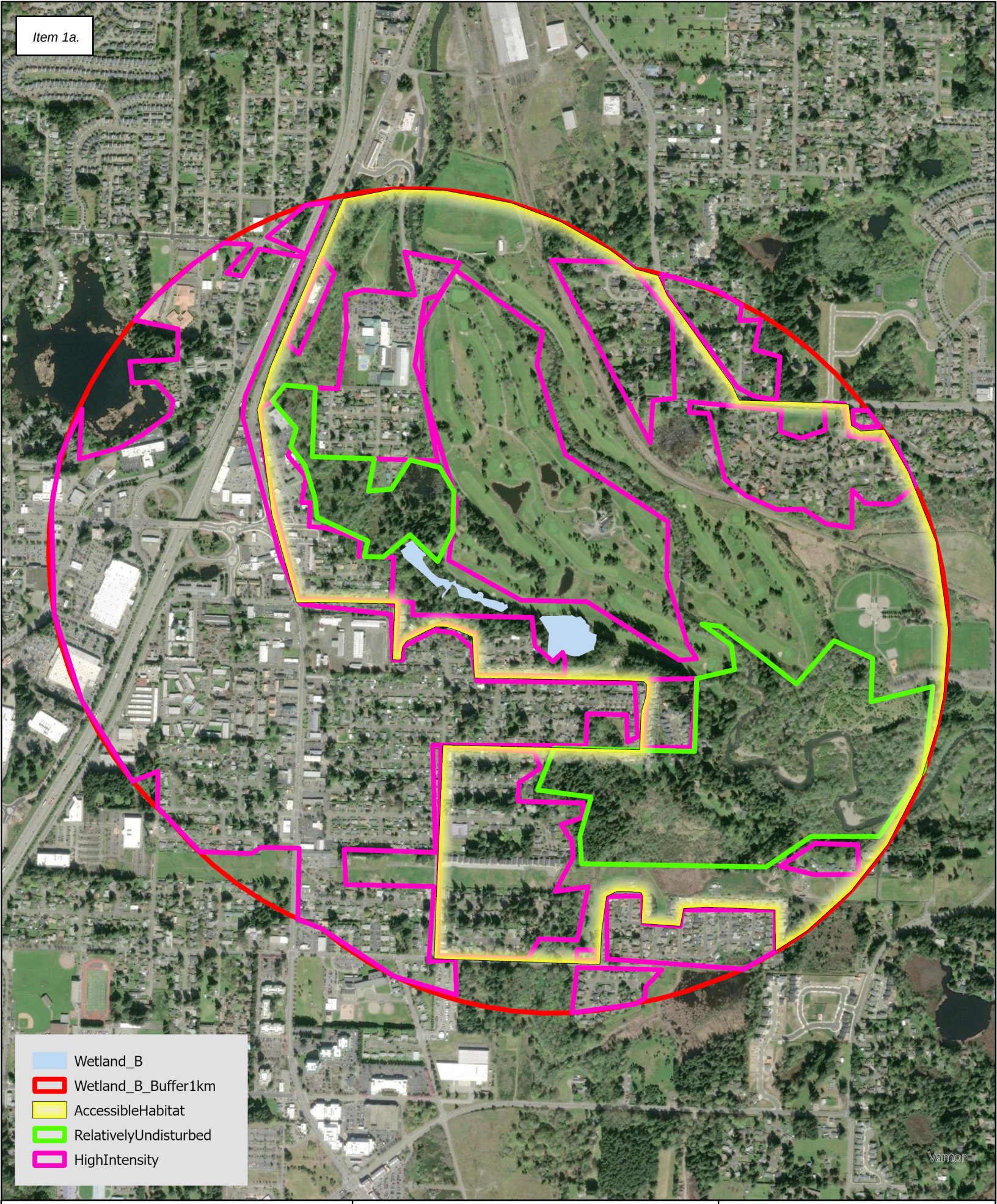
Wetland Type *Check off any criteria that apply to the wetland. Circle the category when the appropriate criteria are met.*	**Category**
SC 1.0. Estuarine wetlands Does the wetland meet the following criteria for Estuarine wetlands? — The dominant water regime is tidal, — Vegetated, and — With a salinity 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**	**Cat. I**
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 chapter 4.8 in the manual. — 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**	**Cat. I** **Cat. II**
SC 2.0. Wetlands of High Conservation Value (WHCV) SC 2.1. Does the wetland overlap with any known or historical rare plant or rare & high-quality ecosystem polygons on the WNHP Data Explorer?[135] Yes **= Category I** (No) – Go to **SC 2.2** SC 2.2. Does the wetland have a rare plant species, rare ecosystem (e.g., plant community), or high-quality common ecosystem that may qualify the site as a WHCV? Contact WNHP for resources to help determine the presence of these elements. Yes – Submit data to WA Natural Heritage Program for determination,[136] Go to **SC 2.3** (No) = **Not a WHCV** SC 2.3. Did WNHP review the site within 30 days and determine that it has a rare plant or ecosystem that meets their criteria? Yes **= Category I** (No)**= Not a WHCV**	**Cat. I**
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)= **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 = **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 = **Category I bog** (No) **= Not a bog**	**Cat. I**

[135] https://www.dnr.wa.gov/NHPdata

[136] https://www.dnr.wa.gov/Publications/amp_nh_sighting_form.pdf

Wetland name or number A

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**	**Cat. I**
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)* — The lagoon retains some of its surface water at low tide during spring tides 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 in H 1.5 in the manual). — 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**	**Cat. I** **Cat. 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 and Ocean Shores Blvd SW, including lands west of E. Oceans Shores Blvd SW. 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**	**Cat I** **Cat. II** **Cat. III** **Cat. IV**
Category of wetland based on Special Characteristics If you answered No for all types, enter "Not Applicable" on Summary Form	N/A



Land Services Northwest
1 te Avenue NE PMB 190
C , WA 98501

LSNW

Wetland B
1 km
Land Use Intensity Map

0 0.07 0.15 0.3 Miles

Land Use Calculations

	ACRES		%
1KM	1124.5867		
Wetland B	5.82838202		
1KM-Wetland B	1118.75832		100
High Intensity	633.633938	0.566372	56.63725
Relatively Undisturbed	133.769775	0.11957	11.95699
Low Medium Use	351.354604	0.314058	31.40576
Accessible Habitat	686.50604	0.610452	
Wetland B	5.82838202		
Accessible Habitat-Wet B	680.677658	0.608422	
RU	133.769775	0.11957	11.95699
Low/Medium LU	268.603234	0.24138	24.13797
High Intensity	278.304649	0.247473	24.74728

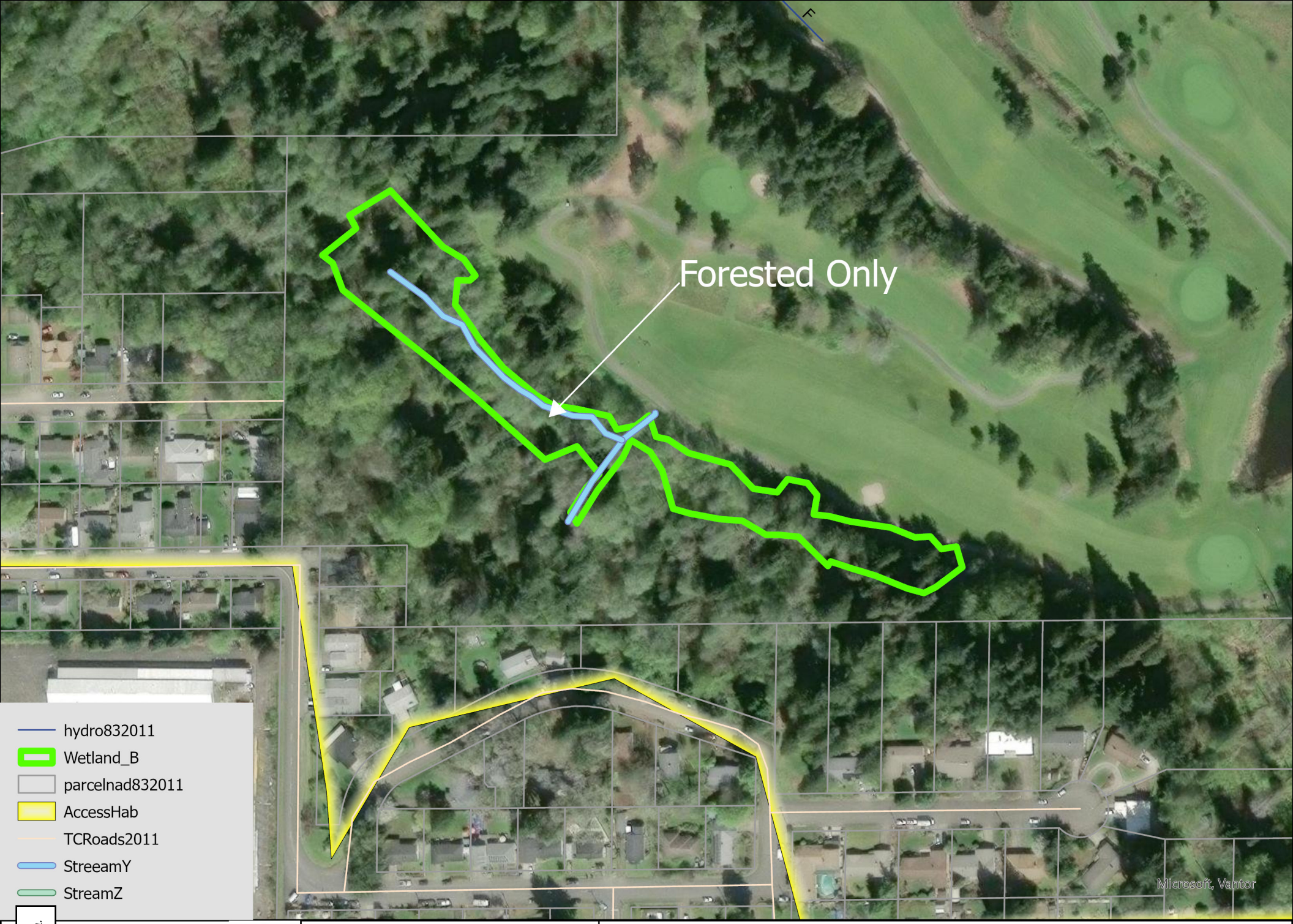


Land Services Northwest
1 te Avenue NE PMB 190
C , WA 98501

LSNW

Wetland B
150 ft
Pollution Generating Land Use

0 0.02 0.04 0.09 Mi



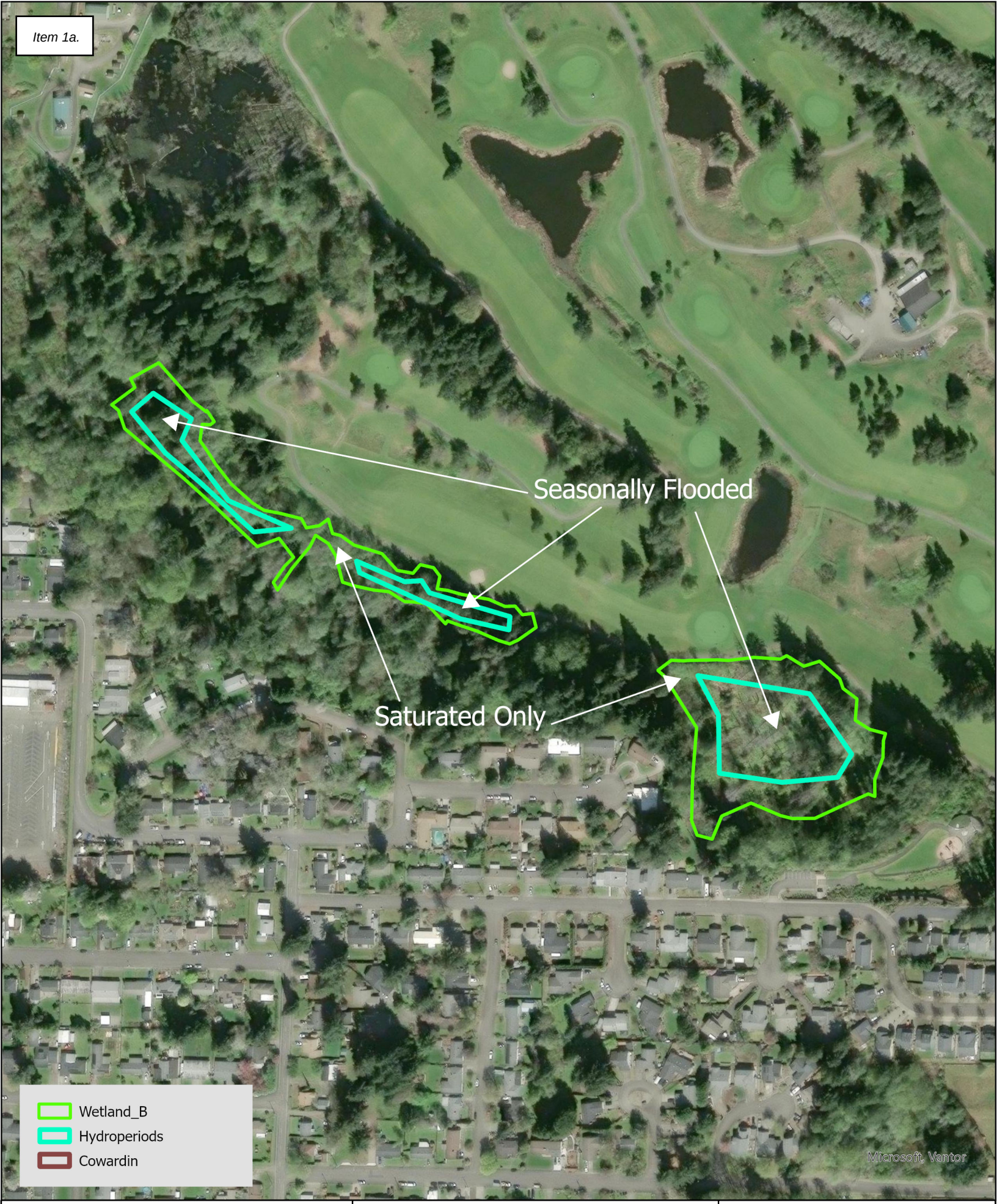
Item 1a.

nd Services Northwest
0 State Avenue NE PMB 190
ympia, WA 98501

LSNW

Cowardin Classification Map

0 250 500 1,000 Feet



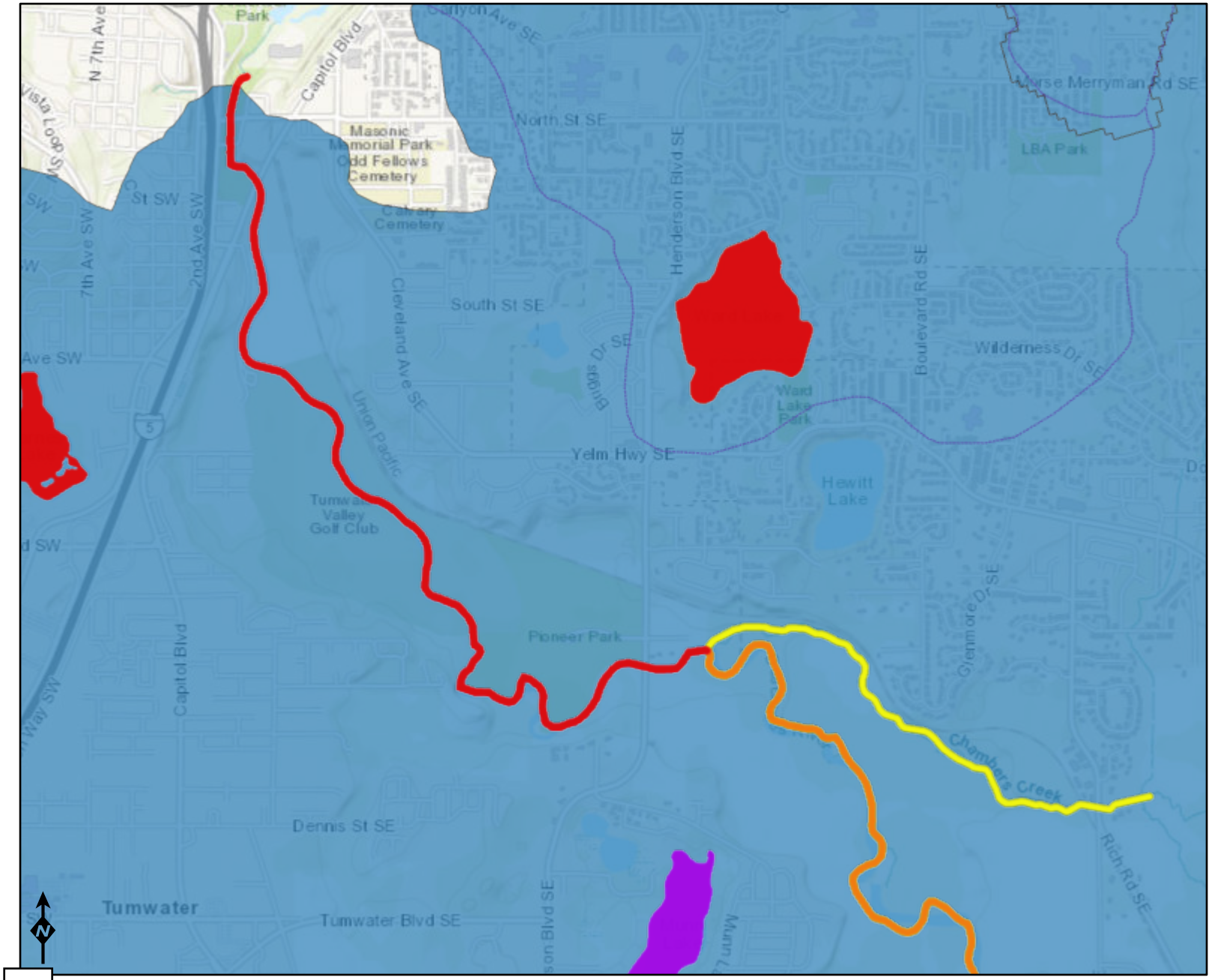
Land Services Northwest
1 te Avenue NE PMB 190
C , WA 98501

LSNW

Wetland B
Hydroperiod Classification Map

0 0.02 0.04 0.09 Miles

303d and TMDL



Assessed Water/Sediment

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

WQ Improvement Projects

- TMDL - Approved
- 4B - Approved
- STI - Approved
- ARP - Approved
- TMDL - In Development
- STI - In Development
- ARP - In Development

Parcels

- Parcel boundary

Subbasins (12 digit HUCs)

- HUC boundary

Miles
0 0.23 0.45 0.9

City of Olympia, WA State Parks GIS, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, US Census Bureau, USDA, USFWS

Wetland name or number B

RATING SUMMARY – Western Washington

Name of wetland (or ID #): Wetland B Date of site visit: Feb 18, 2026

Rated by Alex Callender Trained by Ecology? X Yes ___No Date of training 12.2013

HGM Class used for rating Slope Wetland has multiple HGM classes? ___Y x N

NOTE: **Form is not complete without the required figures** (figures can be combined).

Source of base aerial photo/map 2024 ESRI

OVERALL WETLAND CATEGORY III (based on functions X 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			
	Circle the appropriate ratings									
Site Potential	H	M	(L)	H	M	(L)	H	(M)	L	
Landscape Potential	H	M	(L)	H	M	(L)	H	(M)	L	
Value	(H)	M	L	H	(M)	L	(H)	M	L	**TOTAL**
	5			4			7			16

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	**I II**
Wetland of High Conservation Value	**I**
Bog	**I**
Mature Forest	**I**
Old Growth Forest	**I**
Coastal Lagoon	**I II**
Interdunal	**I II III IV**
None of the above	N/A

Wetland name or number B

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 total 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 total 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 total 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	Cowardin
Hydroperiods	H 1.2	Hydro
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 figure above)*	S 4.1	
Boundary of 150 ft buffer (can be added to another figure)	S 2.1, S 5.1	150ft
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and total habitat	H 2.1, H 2.2, H 2.3	1km
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	S 3.1, S 3.2	303d
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	S 3.3	

Wetland name or number B

HGM Classification of Wetlands in Western Washington

For questions 1-7, the criteria described must apply to the entire unit being rated.

If the 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?

   x___The wetland is on a slope (slope can be very gradual),

   _x_The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheet flow, or in a swale without distinct banks,

   x___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).

Wetland name or number B

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.

Wetland name or number B

SLOPE WETLANDS

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

S 1.0. Does the site have the potential to improve water quality?	
S 1.1. Characteristics of the average slope of the wetland: (A 1% slope has a 1 ft vertical change in elevation for every 100 ft of horizontal distance.) Slope is 1% or less points = 3 Slope is > 1%-2% points = 2 Slope is > 2%-5% points = 1 Slope is greater than 5% points = 0	3
S 1.2. The soil 2 in. below the surface (or duff layer) is true clay or true organic *(use NRCS definitions)*: Yes = 3 No = 0	0
S 1.3. Characteristics of the plants in the wetland that trap sediments and pollutants: Choose the points appropriate for the description that best fits the plants in the wetland. Dense means you have trouble seeing the soil surface (>75% cover), and uncut means not grazed or mowed, and plants are higher than 6 in. Dense, uncut, herbaceous plants > 90% of the wetland area points = 6 Dense, uncut, herbaceous plants > ½ of area points = 3 Dense, woody, plants > ½ of area points = 2 Dense, uncut, herbaceous plants > ¼ of area points = 1 Does not meet any of the criteria above for plants points = 0	1
Total for S 1 Add the points in the boxes above	4

Rating of Site Potential If score is: **__12 = H ___6-11 = M _x__0-5 = L** *Record the rating on the first page*

S 2.0. Does the landscape have the potential to support the water quality function of the site?	
S 2.1. Is > 10% of the area within 150 ft on the uphill side of the wetland in land uses that generate pollutants? Yes = 1 No = 0	0
S 2.2. Are there other sources of pollutants coming into the wetland that are not listed in question S 2.1? Other sources _____ Yes = 1 No = 0	0
Total for S 2 Add the points in the boxes above	0

Rating of Landscape Potential If score is**: __1-2 = M __x0 = L** *Record the rating on the first page*

S 3.0. Is the water quality improvement provided by the site valuable to society?	
S 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
S 3.2. Is the wetland in a basin or sub-basin where water quality is an issue? (At least one aquatic resource in the basin is on the 303(d) list.) Yes = 1 No = 0	1
S 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 in development or in effect for the basin in which unit is found.) Yes = 2 No = 0	2
Total for S 3 Add the points in the boxes above	4

Rating of Value If score is: **x2-4 = H ____1 = M ___0 = L** *Record the rating on the first page*

Wetland name or number B

SLOPE WETLANDS

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

S 4.0. Does the site have the potential to reduce flooding and stream erosion?	
S 4.1. Characteristics of plants that reduce the velocity of surface flows during storms: Choose the points appropriate for the description that best fits conditions in the wetland. Stems of plants should be thick enough (usually > 1/8 in), or dense enough, to remain erect during surface flows. Dense, uncut, **rigid** plants cover > 90% of the area of the wetland points = 1 All other conditions points = 0	0

Rating of Site Potential If score is: **1 = M** x **0 = L** *Record the rating on the first page*

S 5.0. Does the landscape have the potential to support the hydrologic functions of the site?	
S 5.1. Is more than 25% of the area within 150 ft upslope of wetland in land uses or cover that generate excess surface runoff? Yes = 1 No = 0	0

Rating of Landscape Potential If score is: **1 = M** x **0 = L** *Record the rating on the first page*

S 6.0. Are the hydrologic functions provided by the site valuable to society?	
S 6.1. Distance to the nearest areas downstream that have flooding problems: The sub-basin immediately downgradient of site has flooding problems that result in damage to human or natural resources (e.g., houses or salmon redds) points = 2 Surface flooding problems are in a sub-basin farther downgradient points = 1 No flooding problems anywhere downstream points = 0	1
S 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 S 6 Add the points in the boxes above	1

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

NOTES and FIELD OBSERVATIONS:

Item 1a.

Wetland name or number B

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 if the unit is at least 2.5 ac, or more than 10% of the unit if it is smaller than 2.5 ac.

___	Aquatic bed	4 structures or more: points = 4
___	Emergent	3 structures: points = 2
___	Scrub-shrub (areas where shrubs have > 30% cover)	2 structures: points = 1
x	Forested (areas where trees have > 30% cover)	1 structure: points = 0

If the unit has a Forested class, check if:

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

1

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 if the unit is < 2.5 ac, or ¼ ac if the unit is at least 2.5 ac to count (see text for descriptions of hydroperiods).

___	Permanently flooded or inundated	4 or more types present: points = 3
x	Seasonally flooded or inundated	3 types present: points = 2
___	Occasionally flooded or inundated	2 types present: points = 1
___	Saturated only	1 type present: points = 0
___	Permanently flowing stream or river in, or adjacent to, the wetland	
x	Intermittently or seasonally flowing stream in, or adjacent to, the wetland	
___	**Lake Fringe wetland**	**2 points**
___	**Freshwater tidal wetland**	**2 points**

1

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, Canada 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



2

Wetland name or number B

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. [x] Large, downed, woody debris within the wetland (> 4 in. diameter and 6 ft long). [x] Standing snags (dbh > 4 in.) within the wetland [ ] Undercut banks are present for at least 6.6 ft (2 m) **and/or** overhanging plants extend at least 3.3 ft (1 m) over open water or 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) [x] 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 above for the list of strata and H 1.5 in the manual for the list of aggressive plant species)	3
Total for H 1 — Add the points in the boxes above	8

Rating of Site Potential If score is: [ ] **15-18 = H** [x] **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 functions of the site?

H 2.1. Accessible habitat (include only habitat polygons accessible from the wetland. *Calculate:* % relatively undisturbed habitat 11 + [(% moderate and low intensity land uses)/2] 12 = 23 % 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	2
H 2.2. Total habitat in 1 km Polygon around the wetland. *Calculate:* % relatively undisturbed habitat 11 + [(% moderate and low intensity land uses)/2] 15 = 26 % Total habitat > 50% of Polygon — points = 3 Total habitat 10-50% and in 1-3 patches — points = 2 Total habitat 10-50% and > 3 patches — points = 1 Total habitat < 10% of 1 km Polygon — points = 0	1
H 2.3. Land use intensity in 1 km Polygon: > 50% of 1 km Polygon is high intensity land use — points = (- 2) ≤ 50% of 1 km Polygon is high intensity — points = 0	-2
Total for H 2 — Add the points in the boxes above	1

Rating of Landscape Potential If score is: [ ] **4-6 = H** [x] **1-3 = M** [x] **< 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 [x] 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 data [ ] 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) within 100 m — points = 1 Site does not meet any of the criteria above — points = 0	2

Rating of Value If score is: [x] **2 = H** [ ] **1 = M** [ ] **0 = L** *Record the rating on the first page*

Wetland name or number B

WDFW Priority Habitats

See complete descriptions of Priority Habitats listed by WDFW, and the counties in which they can be found, in: Washington Department of Fish and Wildlife. 2008 (current year, as revised). Priority Habitat and Species List.[133] This list was updated for consistency with guidance from WDFW.

This question is independent of the land use between the wetland unit and the Priority Habitat. All vegetated wetlands are by definition a Priority Habitat but are not included in this list because they are addressed by this rating system.

Count how many of the following Priority Habitats are within 330 ft (100 m) of the wetland unit:

— **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. This habitat automatically counts if mapped on the PHS online map within 100m of the wetland. If not mapped, a determination can be made in the field.

— **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.

— **Fresh Deepwater:** Lands permanently flooded with freshwater, including environments where surface water is permanent and often deep, so that water, rather than air, is the principal medium within which the dominant organisms live. Substrate does not support emergent vegetation. Do not select if Instream habitat is also present, or if the entire Deepwater feature is included in the wetland unit being rated (such as a pond with a vegetated fringe).

— **Herbaceous Balds:** Variable size patches of grass and forbs on shallow soils over bedrock.

x **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. Do not select if Fresh Deepwater habitat is also present.

— **Nearshore:** Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore.

— **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) diameter at breast height (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.

[133] http://wdfw.wa.gov/publications/00165/wdfw00165.pdf

Wetland name or number _____B

- **Oregon White Oak:** Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important. For single oaks or oak stands <0.4 ha in urban areas, WDFW's Management Recommendations for Oregon White Oak[134] provides more detail for determining if they are Priority Habitats

x **Riparian:** The area adjacent to freshwater aquatic systems with flowing or standing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.

x **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.

- **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.

- **Westside Prairies:** Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie.

[134] https://wdfw.wa.gov/publications/00030/wdfw00030.pdf

Item 1a.

Wetland name or number _B

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Wetland Type *Check off any criteria that apply to the wetland. Circle 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**	**Cat. I**
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 chapter 4.8 in the manual. — 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**	**Cat. I** **Cat. II**
SC 2.0. Wetlands of High Conservation Value (WHCV) SC 2.1. Does the wetland overlap with any known or historical rare plant or rare & high-quality ecosystem polygons on the WNHP Data Explorer?[135] Yes = **Category I** (No – Go to **SC 2.2**) SC 2.2. Does the wetland have a rare plant species, rare ecosystem (e.g., plant community), or high-quality common ecosystem that may qualify the site as a WHCV? Contact WNHP for resources to help determine the presence of these elements. Yes – Submit data to WA Natural Heritage Program for determination,[136] Go to **SC 2.3** (No = **Not a WHCV**) SC 2.3. Did WNHP review the site within 30 days and determine that it has a rare plant or ecosystem that meets their criteria? Yes = **Category I** (No = **Not a WHCV**)	**Cat. I**
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 = **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 = **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 = **Category I bog** (No = **Not a bog**)	**Cat. I**

[135] https://www.dnr.wa.gov/NHPdata

[136] https://www.dnr.wa.gov/Publications/amp_nh_sighting_form.pdf

Wetland name or number B

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** → **Cat. I**

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)*
- The lagoon retains some of its surface water at low tide during spring tides

Yes – Go to **SC 5.1** | No = **Not a wetland in a coastal lagoon** → **Cat. I**

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 in H 1.5 in the manual).
- 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** → **Cat. 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 and Ocean Shores Blvd SW, including lands west of E. Oceans Shores Blvd SW.

→ **Cat I**

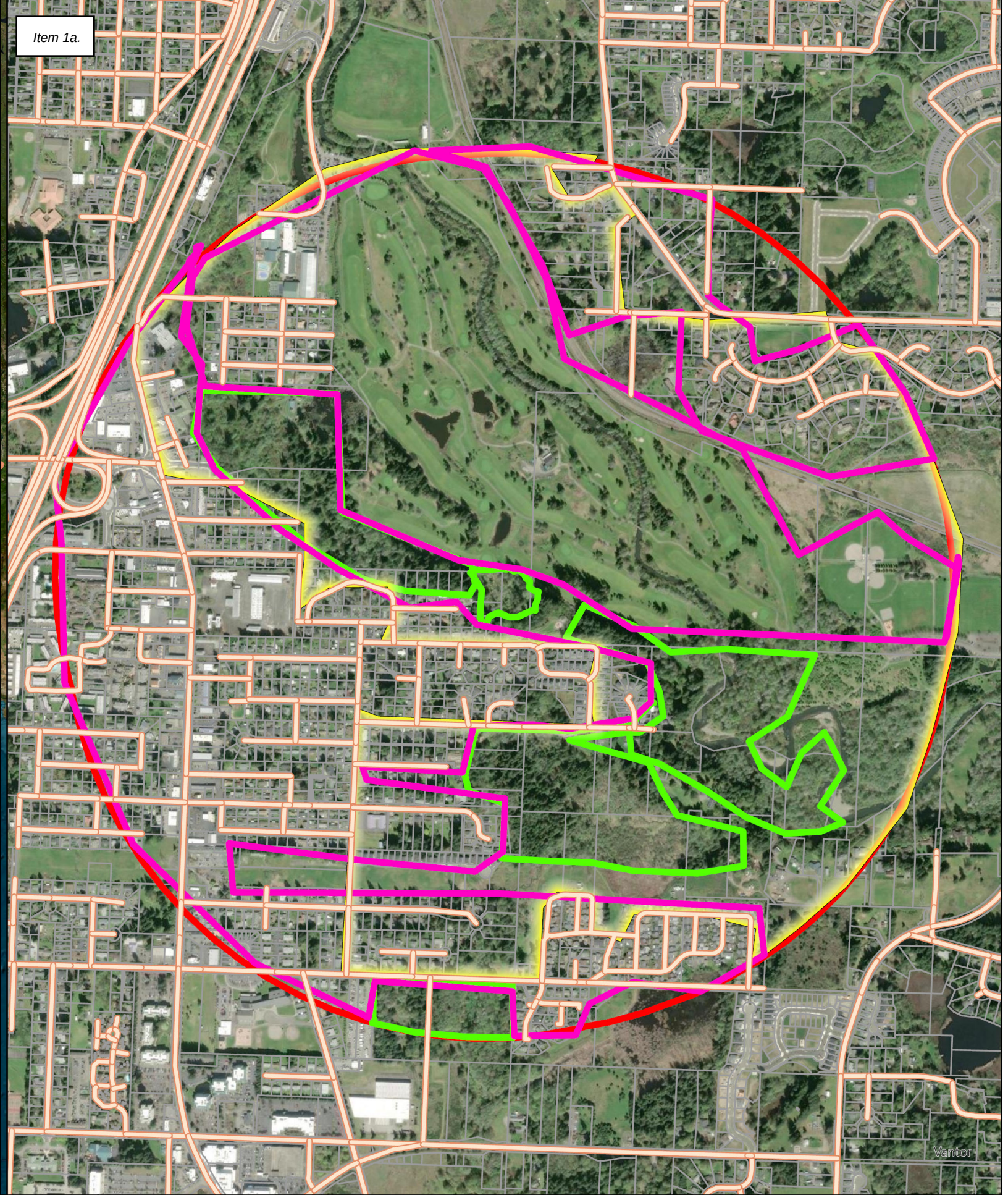
Yes – Go to **SC 6.1** | No = **Not an interdunal wetland for rating** → **Cat. II**

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** → **Cat. III**

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** → **Cat. IV**

Category of wetland based on Special Characteristics
If you answered No for all types, enter "Not Applicable" on Summary Form → NA



Land Services Northwest
120 State Avenue NE PMB 190
O WA 98501

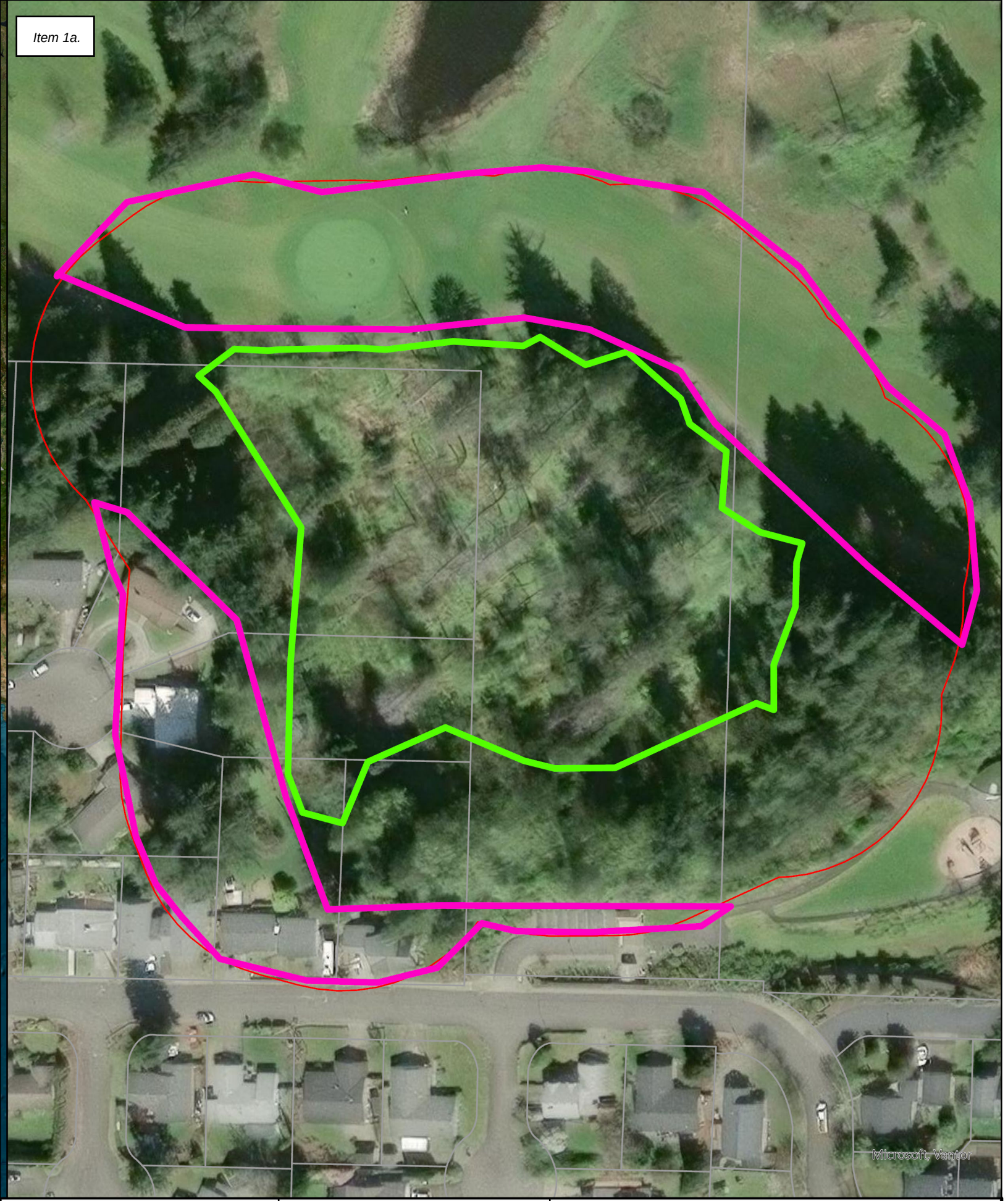
LSNW

Wetland C
1 KM Land Use Map

0 927,083.42 1,854,166.79 3,708,333.58 Feet

Land Use Calculations

	ACRES		%
1KM	1328.4926		
Wetland C	3.52		
1KM-Wetland C	1324.9726		100
High Intensity	626	0.472463	47.24626
Relatively Undisturbed	118.385258	0.089349	8.934921
Low Medium Use	580.587342	0.438188	43.81882
Accessible Habitat	623.468567	0.469305	
Wetland C	3.52		
Accessible Habitat-Wet C	619.948567	0.467895	
RU	0	0	0
Low/Medium LU	312.948567	0.236806	23.68064
High Intensity	307	0.231089	23.1089



Land Services Northwest
120 State Avenue NE PMB 190
O WA 98501

N

LSNW

Wetland C
1 KM Land Use Map

0 927,083.21 1,854,166.79 3,708,333.58 Feet

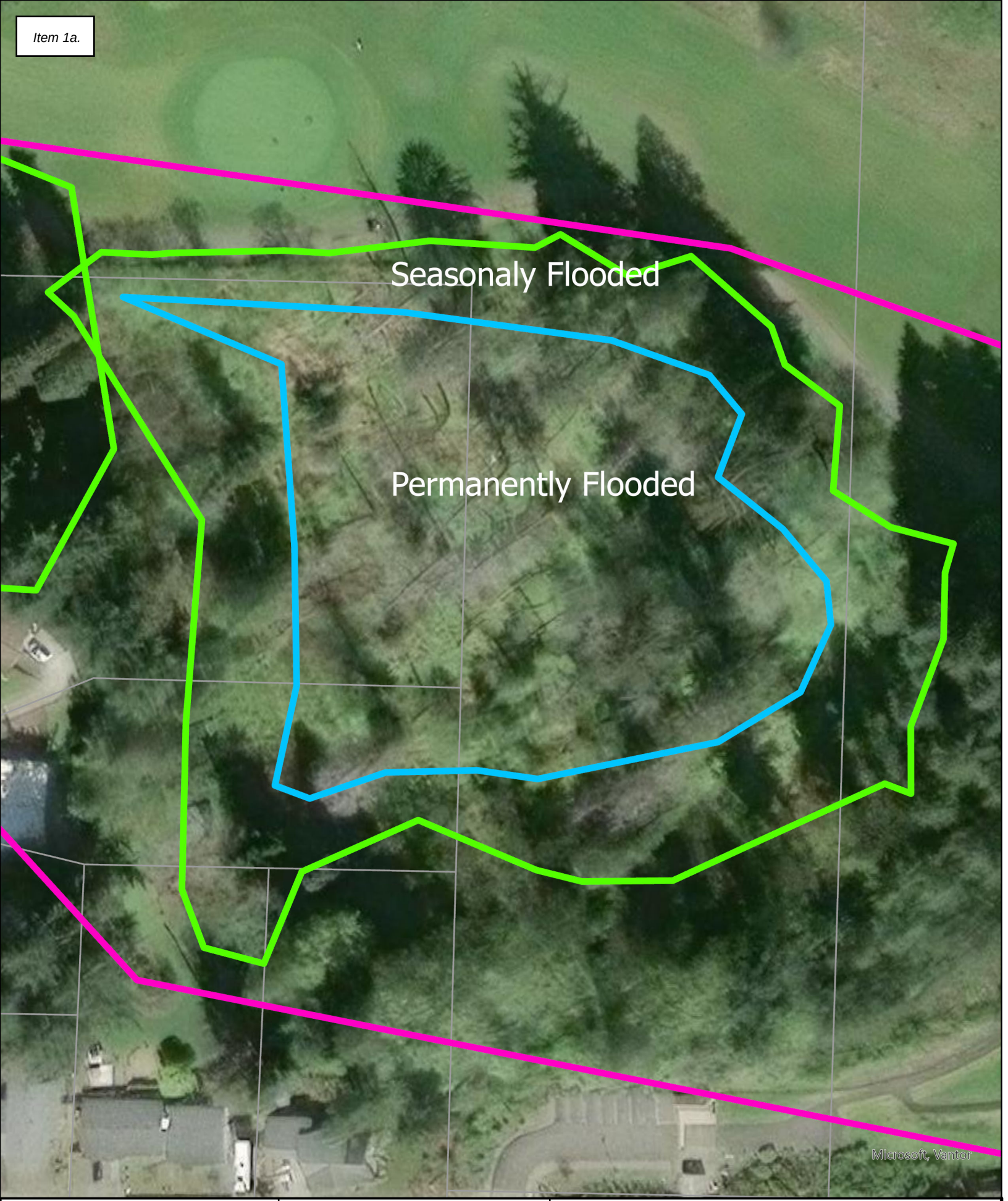


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LSNW

Wetland C
Cowardin Classification Map

0 25 50 100 Feet



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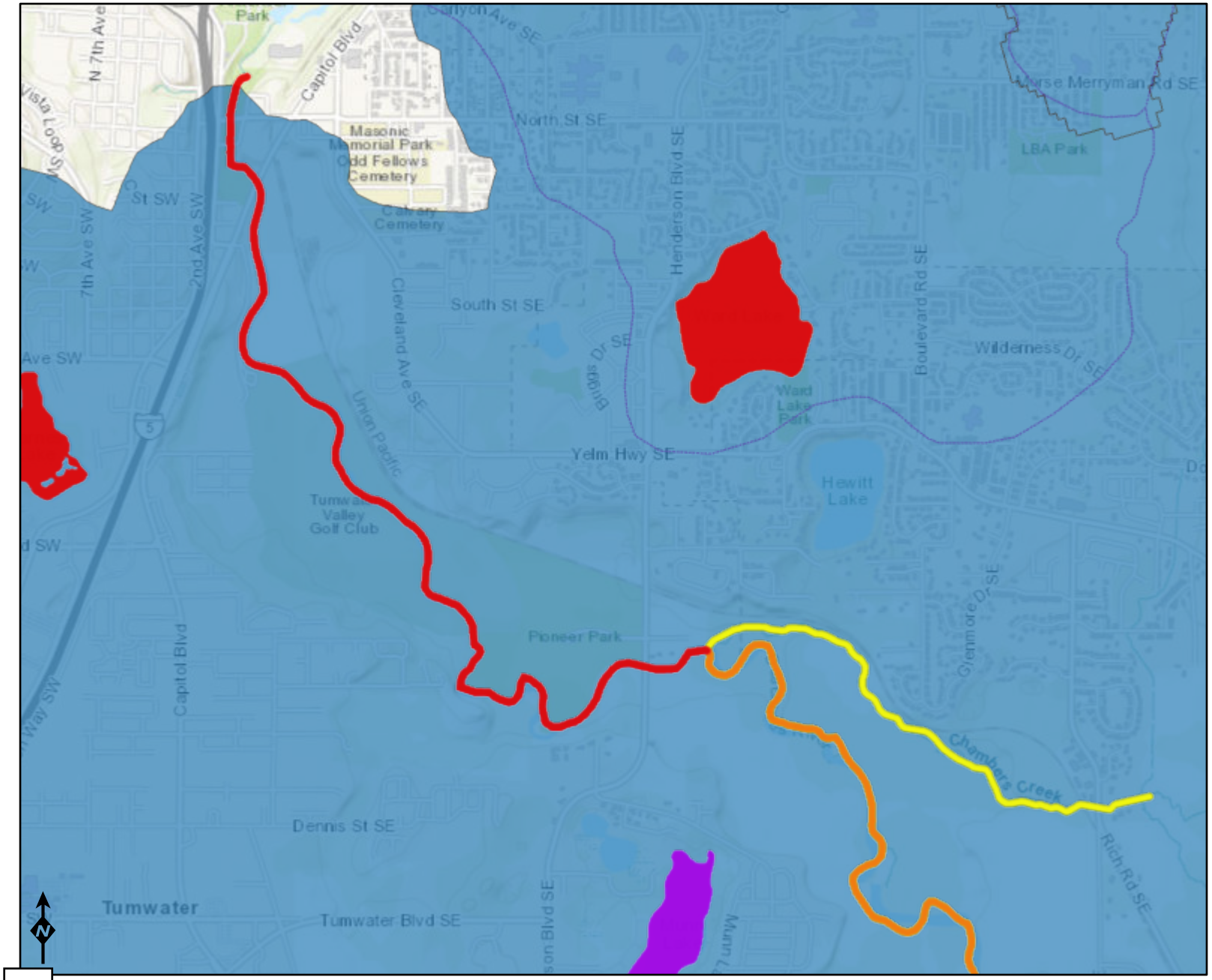
LSNW

Wetland C
Hydroperiod Classification
Map

0 25 50 100 Feet

March 6, 2026

303d and TMDL



Assessed Water/Sediment

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

WQ Improvement Projects
- TMDL - Approved
- 4B - Approved
- STI - Approved
- ARP - Approved
- TMDL - In Development
- STI - In Development
- ARP - In Development

Parcels
- Parcel boundary

Subbasins (12 digit HUCs)
- HUC boundary

Miles
0 0.23 0.45 0.9

City of Olympia, WA State Parks GIS, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, US Census Bureau, USDA, USFWS

Item 1a.

Item 1a.

Wetland name or number Wetland C

RATING SUMMARY – Western Washington

Name of wetland (or ID #): Wetland C Date of site visit: 2/23/26

Rated by Alexander Callender Trained by Ecology? X Yes ___ No Date of training 12/2013

HGM Class used for rating Depressional Wetland has multiple HGM classes? ___ Y x N

NOTE: **Form is not complete without the required figures** (figures can be combined).

Source of base aerial photo/map ESRI 2024

OVERALL WETLAND CATEGORY II (based on functions x or special characteristics __)

1. Category of wetland based on FUNCTIONS

___ **Category I** – Total score = 23 - 27

x **Category II** – Total score = 20 - 22

___ **Category III** – Total score = 16 - 19

___ **Category IV** – Total score = 9 - 15

Site Potential	(H)	M	L	H	(M)	L	H	(M)	L
Landscape Potential	H	(M)	L	H	(M)	L	H	(M)	L
Value	(H)	M	L	(H)	M	L	H	(M)	L
	8			7			6		

TOTAL
21

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	**I II**
Wetland of High Conservation Value	**I**
Bog	**I**
Mature Forest	**I**
Old Growth Forest	**I**
Coastal Lagoon	**I II**
Interdunal	**I II III IV**
None of the above	N/A

Wetland name or number C

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	Cowardin
Hydroperiods	D 1.4, H 1.2	Hydro
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	150 Ft
Map of the contributing basin	D 4.3, D 5.3	Cont Basin
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and total habitat	H 2.1, H 2.2, H 2.3	1 KM
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	D 3.1, D 3.2	303d
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	D 3.3	TMDL

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 total 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 total 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 figure above)*	S 4.1	
Boundary of 150 ft buffer (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 total 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	

Wetland name or number C

HGM Classification of Wetlands in Western Washington

For questions 1-7, the criteria described must apply to the entire unit being rated.

If the 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 sheet flow, 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).

Wetland name or number C

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.

Wetland name or number C

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	4
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	14

Rating of Site Potential If score is: x **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	0
D 2.2. Is > 10% of the area within 150 ft of the wetland in land uses that generate pollutants? Yes = 1 No = 0	1
D 2.3. Are there septic systems within 250 ft of the wetland? Yes = 1 No = 0	0
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	1

Rating of Landscape Potential If score is: **3 or 4 = H** x **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	0
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 in development or in effect 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	3

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

Wetland name or number C

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	4
Wetland has an intermittently flowing stream/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	
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	3
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	
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 area of the wetland unit itself.	
The area of the basin is less than 10 times the area of the unit points = 5	3
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	
Total for D 4 Add the points in the boxes above	10

Rating of Site Potential If score is: ___**12-16 = H** _X_ **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 functions of the site?

D 5.1. Does the wetland receive stormwater discharges? Yes = 1 No = 0	0
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	1
Total for D 5 Add the points in the boxes above	2

Rating of Landscape Potential If score is: ___**3 = H** _X_ **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. Is the unit 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 downgradient into areas where flooding has damaged human or natural resources (e.g., houses or salmon redds):	2
• Flooding occurs in a sub-basin that is immediately downgradient of unit. points = 2	
• Surface flooding problems are in a sub-basin farther downgradient. 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	
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	2

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

Wetland name or number C

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 if the unit is at least 2.5 ac, or more than 10% of the unit if it is smaller than 2.5 ac.

___	Aquatic bed	4 structures or more: points = 4
___	Emergent	3 structures: points = 2
x	Scrub-shrub (areas where shrubs have > 30% cover)	2 structures: points = 1
x	Forested (areas where trees have > 30% cover)	1 structure: points = 0

If the unit has a Forested class, check if:

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

2

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 if the unit is < 2.5 ac, or ¼ ac if the unit is at least 2.5 ac to count (see text for descriptions of hydroperiods).

x	Permanently flooded or inundated	4 or more types present: points = 3
x	Seasonally flooded or inundated	3 types present: points = 2
___	Occasionally flooded or inundated	2 types present: points = 1
x	Saturated only	1 type present: points = 0
___	Permanently flowing stream or river in, or adjacent to, the wetland	
___	Intermittently or seasonally flowing stream in, or adjacent to, the wetland	
___	**Lake Fringe wetland**	**2 points**
___	**Freshwater tidal wetland**	**2 points**

2

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, Canada thistle**

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

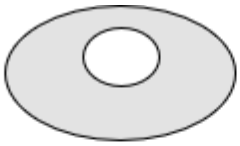
1

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.

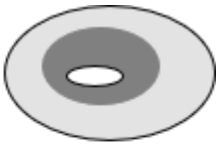


None = 0 points



Low = 1 point



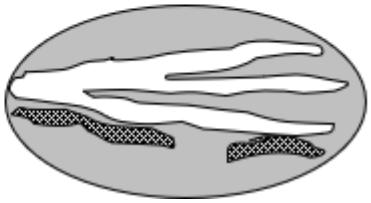


Moderate = 2 points

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







2

Wetland name or number C

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. [x] Large, downed, woody debris within the wetland (> 4 in. diameter and 6 ft long). [x] Standing snags (dbh > 4 in.) within the wetland [ ] Undercut banks are present for at least 6.6 ft (2 m) **and/or** overhanging plants extend at least 3.3 ft (1 m) over open water or 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) [x] 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 above for the list of strata and H 1.5 in the manual for the list of aggressive plant species)	3
Total for H 1 — Add the points in the boxes above	10

Rating of Site Potential If score is: [ ] **15-18 = H** [x] **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 functions of the site?	
H 2.1. Accessible habitat (include only habitat polygons accessible from the wetland. *Calculate:* % relatively undisturbed habitat 9 **+** [(% moderate and low intensity land uses)/2] 22 **=** 31 % 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	2
H 2.2. Total habitat in 1 km Polygon around the wetland. *Calculate:* % relatively undisturbed habitat 011 **+** [(% moderate and low intensity land uses)/2] 12 **=** 12 % Total habitat > 50% of Polygon — points = 3 Total habitat 10-50% and in 1-3 patches — points = 2 Total habitat 10-50% and > 3 patches — points = 1 Total habitat < 10% of 1 km Polygon — points = 0	1
H 2.3. Land use intensity in 1 km Polygon: > 50% of 1 km Polygon is high intensity land use — points = (- 2) ≤ 50% of 1 km Polygon is high intensity — points = 0	-2
Total for H 2 — Add the points in the boxes above	1

Rating of Landscape Potential If score is: [ ] **4-6 = H** [x] **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 data [ ] 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) within 100 m — points = 1 Site does not meet any of the criteria above — points = 0	1

Rating of Value If score is: [ ] **2 = H** [x] **1 = M** [ ] **0 = L** *Record the rating on the first page*

Wetland name or number C

WDFW Priority Habitats

See complete descriptions of Priority Habitats listed by WDFW, and the counties in which they can be found, in: Washington Department of Fish and Wildlife. 2008 (current year, as revised). Priority Habitat and Species List.[133] This list was updated for consistency with guidance from WDFW.

This question is independent of the land use between the wetland unit and the Priority Habitat. All vegetated wetlands are by definition a Priority Habitat but are not included in this list because they are addressed by this rating system.

Count how many of the following Priority Habitats are within 330 ft (100 m) of the wetland unit:

— **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. This habitat automatically counts if mapped on the PHS online map within 100m of the wetland. If not mapped, a determination can be made in the field.

— **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.

— **Fresh Deepwater:** Lands permanently flooded with freshwater, including environments where surface water is permanent and often deep, so that water, rather than air, is the principal medium within which the dominant organisms live. Substrate does not support emergent vegetation. Do not select if Instream habitat is also present, or if the entire Deepwater feature is included in the wetland unit being rated (such as a pond with a vegetated fringe).

— **Herbaceous Balds:** Variable size patches of grass and forbs on shallow soils over bedrock.

— **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. Do not select if Fresh Deepwater habitat is also present.

— **Nearshore:** Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore.

— **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) diameter at breast height (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.

[133] http://wdfw.wa.gov/publications/00165/wdfw00165.pdf

Wetland name or number C

— **Oregon White Oak:** Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important. For single oaks or oak stands <0.4 ha in urban areas, WDFW's Management Recommendations for Oregon White Oak[134] provides more detail for determining if they are Priority Habitats

— **Riparian:** The area adjacent to freshwater aquatic systems with flowing or standing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.

x — **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.

— **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.

— **Westside Prairies:** Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie.

[134] https://wdfw.wa.gov/publications/00030/wdfw00030.pdf

Wetland name or number C

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Wetland Type *Check off any criteria that apply to the wetland. Circle 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**	**Cat. I**
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 chapter 4.8 in the manual. — 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**	**Cat. I** **Cat. II**
SC 2.0. Wetlands of High Conservation Value (WHCV) SC 2.1. Does the wetland overlap with any known or historical rare plant or rare & high-quality ecosystem polygons on the WNHP Data Explorer?[135] Yes **=** **Category I** (No) – Go to **SC 2.2** SC 2.2. Does the wetland have a rare plant species, rare ecosystem (e.g., plant community), or high-quality common ecosystem that may qualify the site as a WHCV? Contact WNHP for resources to help determine the presence of these elements. Yes – Submit data to WA Natural Heritage Program for determination,[136] Go to **SC 2.3** (No) **= Not a WHCV** SC 2.3. Did WNHP review the site within 30 days and determine that it has a rare plant or ecosystem that meets their criteria? Yes **=** **Category I** (No)**= Not a WHCV**	**Cat. I**
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)= **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 = **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 = **Category I bog** (No) **= Not a bog**	**Cat. I**

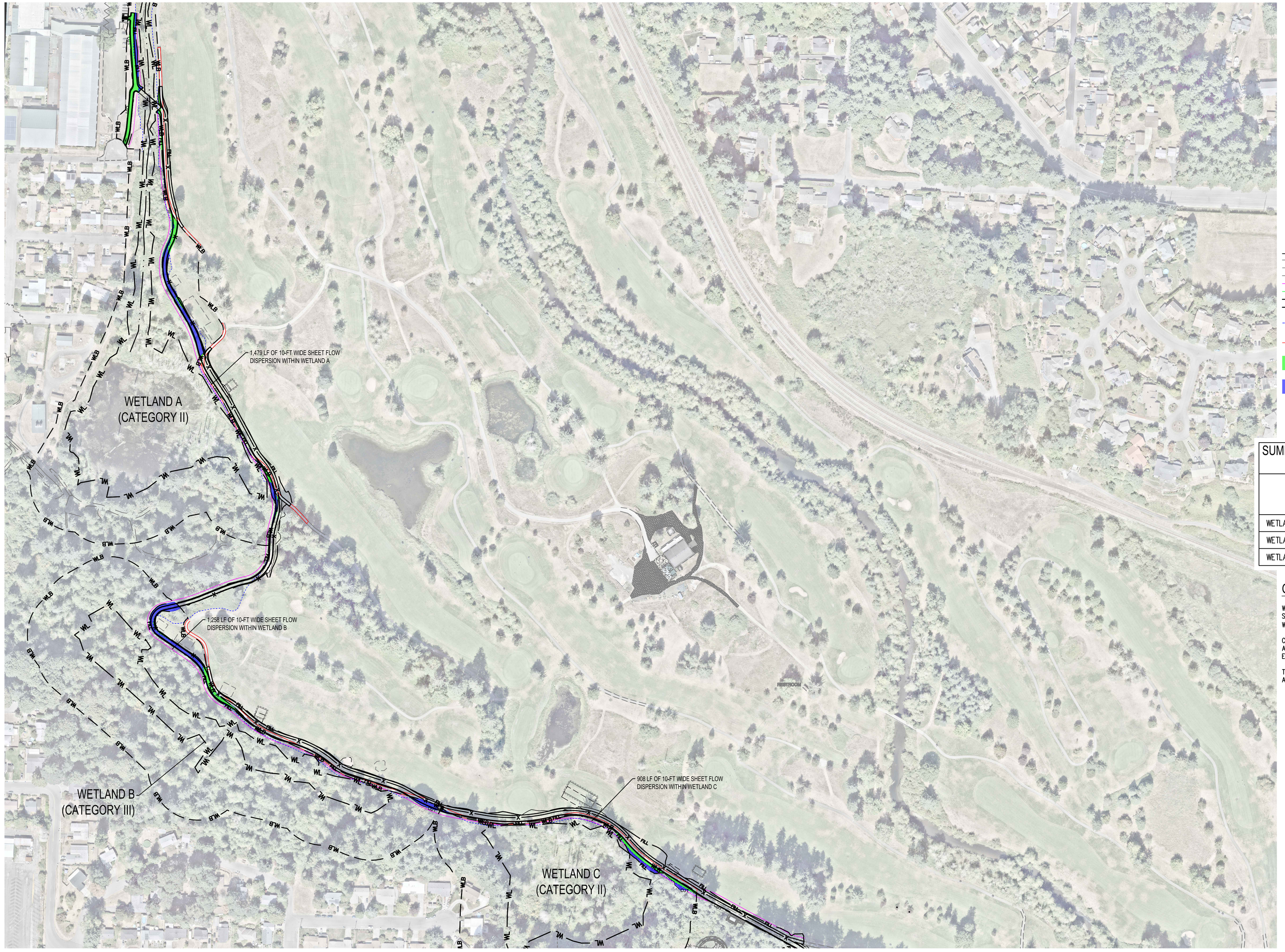
[135] https://www.dnr.wa.gov/NHPdata

[136] https://www.dnr.wa.gov/Publications/amp_nh_sighting_form.pdf

Wetland name or number C

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**	**Cat. I**
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)* — The lagoon retains some of its surface water at low tide during spring tides 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 in H 1.5 in the manual). — 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**	**Cat. I** **Cat. 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 and Ocean Shores Blvd SW, including lands west of E. Oceans Shores Blvd SW. 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**	**Cat I** **Cat. II** **Cat. III** **Cat. IV**
Category of wetland based on Special Characteristics If you answered No for all types, enter "Not Applicable" on Summary Form	N/A

Appendix M – WETLAND BUFFER IMPACTS DESCHUTES VALLEY TRAIL – (SEGMENT C)



N

0 150 300

SCALE IN FEET

LEGEND

- EDGE OF PAVEMENT
- GRAVEL SHOULDER
- EDGE OF FAIRWAY
- SHEET FLOW
- STREAM
- WL — WL — WETLAND DELINEATION
- WLB — — WETLAND BUFFER
- LIMIT OF MAINTAINED AREAS
- EX CART PATH (WETLAND BUFFER WEST OF PATH)
- REHABILITATED IMPACT AREAS
- ENHANCED IMPACT AREAS

SUMMARY OF WETLAND BUFFER IMPACT AREAS

	WETALND REHABILITATION AREAS	WETLAND ENHANCEMENT AREA
WETLAND A	10,661 SF	8,238 SF
WETLAND B	3,603 SF	6,631 SF
WETLAND C	2,836 SF	1,675 SF

GENERAL NOTE:

WETLAND INFORMATION SHOWN IS FROM THE WETLAND AND STREAM DELINEATION COMPLETED BY LAND SERVICES NORTHWEST. WETLAND RECONNAISSANCE PERFORMED 2/18/2026.

CITY OF TUMWATER DETERMINED THAT WETLAND BUFFER IMPACTS ARE FOR ANY IMPROVEMENTS MADE TO THE WEST OF THE EXISTING CART PATH.

THE LIMIT OF THE MAINTAINED AREAS WEST OF THE GOLF COURSE ARE BUILT OFF AERIAL IMAGERY AND ARE APPROXIMATE.

SCJ ALLIANCE
CONSULTING SERVICES
8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
P: 360.352.1465
SCJALLIANCE.COM

HORIZONTAL SCALE:	AS SHOWN
DATE:	MAY 2026
JOB No.:	SCJ #25-000313
DRAWING FILE No.:	-

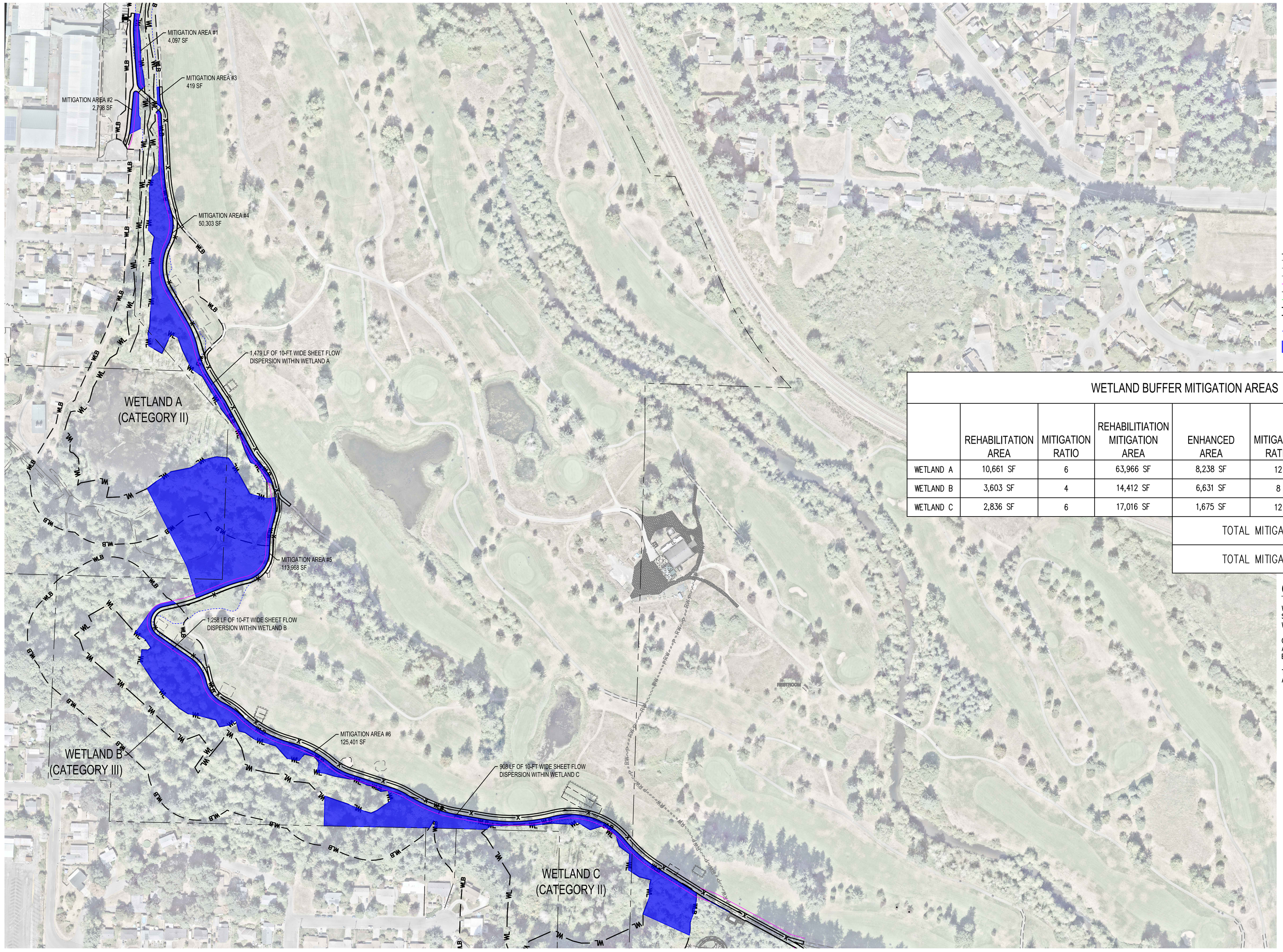
WETLAND BUFFER IMPACTS
DESCHUTES VALLEY TRAIL - SEGMENT C

EXHIBIT No: **EX-02**

SHEET No: **02**

May 20, 2026 8:04:26am – User rikki.martinez
N:\PROJECTS\0625 CITY OF TUMWATER\25-000313 TUMWATER DESCHUTES VALLEY TRAIL\CADD\EXHIBITS\SEG C WETLANDS_25-000313-WETLAND_EXHIBIT.DWG

Appendix N – WETLAND BUFFER IMPACTS MITIGATION AREAS DESCHUTES VALLEY TRAIL – (SEGMENT C)



WETLAND BUFFER MITIGATION AREAS

	REHABILITATION AREA	MITIGATION RATIO	REHABILITIATION MITIGATION AREA	ENHANCED AREA	MITIGATION RATIO	ENHANCED MITIGATION AREA	REQUIRED MITIGATION PER TMC TABLE 16.28.220(6)
WETLAND A	10,661 SF	6	63,966 SF	8,238 SF	12	98,856 SF	162,822 SF
WETLAND B	3,603 SF	4	14,412 SF	6,631 SF	8	53,048 SF	67,460 SF
WETLAND C	2,836 SF	6	17,016 SF	1,675 SF	12	20,100 SF	37,116 SF
					TOTAL MITIGATION AREA REQUIRED		267,398 SF
					TOTAL MITIGATION AREA PROVIDED		296,986 SF

GENERAL NOTE:

WETLAND INFORMATION SHOWN IS FROM THE WETLAND AND STREAM DELINEATION COMPLETED BY LAND SERVICES NORTHWEST. WETLAND RECONNAISSANCE PERFORMED 2/18/2026.

CITY OF TUMWATER DETERMINED THAT WETLAND BUFFER IMPACTS ARE FOR ANY IMPROVEMENTS MADE TO THE WEST OF THE EXISTING CART PATH.

THE LIMIT OF THE MAINTAINED AREAS WEST OF THE GOLF COURSE ARE BUILT OFF AERIAL IMAGERY AND ARE APPROXIMATE.

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HORIZONTAL SCALE: AS SHOWN
DATE: MAY 2026
JOB No.: SCJ #25-000313
DRAWING FILE No.: -

WETLAND MITIGATION AREA
DESCHUTES VALLEY TRAIL - SEGMENT C

EXHIBIT No: **EX-02**
SHEET No: **02**

May 26, 2026 - 3:02:04pm - User: nikkimartinez
N:\PROJECTS\2025 CITY OF TUMWATER\25-000313 TUMWATER DESCHUTES VALLEY TRAIL\CADD\EXHIBITS\SEG C WETLANDS_25-000313-WETLAND_EXHIBIT_RESTORATION.DWG

Item 1a.

Appendix O - Invasive Species Removal Recommendations



Photo: WA STATE NOXIOUS WEED BOARD

Himalayan and Cutleaf Blackberry Control Methods

Himalayan blackberry (Rubus aremeniacus and Cutleaf blackberry Rubus laciniatus are two very common noxious weeds. They are particularly persistent due to the large root crown that stores the plant's energy.

Typically, blackberries like sunny disturbed areas and grow right up to the edge of wetlands, ponds and streams outcompeting beneficial native plants that have better root systems for preventing erosion and shading functions.

The vectors are typically birds and other animals that spread the seeds to other areas so the plant seemingly spreads to other areas overnight.

Control

Cutting the canes can from the top is one method of weakening this large root system, but it takes persistence 3-5 years and is not the most effective method, unless one is in an

open field that is infested. Typically, nativ*e species interwoven in the area of infestation and care must be taken to prevent removing existing beneficial vegetation*. The dried canes are effective at preventing other species from establishing, and if they can be removed that it best.

Machetes, Claw mattocks, Hedge trimmers, and Line trimmers with metal blades are effective tools for cutting the canes down to the root crown and digging the remaining roots.

If revisiting the site is not optimum, it is recommended that one removes the root crown. This is the most effective method of removal, and it is also the most labor intensive. Mcleods, picks, shovels and weed wrenches are the most effective tools for this method of removal. Once the root crown is removed, it is important to restabilize the area by grading flat and recompacting the area that was disturbed. Best management practices require replanting the area with native species to outcompete any remaining unsprouted seeds that may occupy the newly disturbed area. Salmonberry and native roses like Nootka rose or Clustered rose can be a good replacement as they favor similar habitat.

Chemical removal

Chemical removal is effective but has its own issues as blackberry removal products typically will kill non-target woody species and require safety procedures be followed to prevent accidental exposure. Also work near aquatic systems makes it a sub-optimal.

Popular herbicides are Trichlorpyr, imazapyr, or glyphosate.

It is recommended that if herbicides are applied for blackberries, that they be applied in the late summer, and fall as the root systems are bringing nutrients back into the roots for the winter. During the spring and early summer, the plant is pushing nutrients to grow and fruit in the spring and early summer. The herbicides may impact the leaves, but they typically resprout quickly leaving the plant mostly unharmed.

Targeted application to the root crown after removal of the upper part of the plant is the most effective application method. Care should be taken to apply the herbicide at a time where the product can breakdown before the winter rains wash the product into nearby aquatic systems. In Western Washington that would be late July. so it has approximately 3 - 4 months to breakdown.



Photo: WA STATE NOXIOUS WEED BOARD

Reed Canarygrass Removal

Reed canarygrass is another *persistent invasive species. It is rated as a Class III noxious weed which means it is widespread enough that landowners are not required to control it, but for the park, the native species enhancement plan will not work with it growing in the areas we would like to exhibit native species for the park therefore, we are recommending treatment of this weed before undertaking planting of trees shrubs and herbs.*

This grass is highly ryzomatous and crowds and chokes out all but the most aggressive native species. It typically creates a thick monoculture and outcompetes through shading and chocking out native species. It is tall and grows vigorously in the spring and can get several feet tall. Mowing can knock it down to a point where the roots may not be as formidable. Then people have tried smothering with cardboard and other methods, but ultimately chemical treatment appears to be the most effective

The National Park Service has found that Imazapyr is the most effective herbicide to treat large infestations.

The NRCS has the following recommendations:

Herbicide: broad spectrum (i.e. glyphosate, imazapyr)

Apply In late summer for maximum translocation to roots •

As an initial herbicide treatment on monotypic stands of RCG • If RCG height precludes use of other herbicides • In early spring or late fall, when RCG is live, but other plants dormant •

On wet sites, with a surfactant approved for aquatic use •

On sites with desirable native plants actively growing

• Soon after mowing/burning • When amphibians are on site (unless using Rodeo + a surfactant approved for aquatic use, as Roundup formulation can have negative effects on amphibians) •

Should be part of a continued control strategy, where natives are later introduced • Multiple treatments may be necessary • May need a permit for application on wetlands

• Rhizome translocation less effective if temperature >70°F

• Other treatments may influence herbicide effectiveness • Add ammonium sulfate to tank mix if water is hard Herbicide: grass- specific (i.e. sethoxydim or fluazifop)

• Suppresses growth of most grasses •

Releases native plant community (except for grasses) • On sites with desirable, native, non-grass species • When active growth resumes aftermowing, when RCG is 6-12" tall

• Following other herbicide treatments to control residual or re-emerging RCG • For immediate eradication

• If standing water is present • On sites with desirable grasses • When RCG is >12" tall • Apply with surfactant/crop oil.

Appendix P– Maintenance and Monitoring Form

Mitigation Monitoring for Deschutes Valley Trail Project

A copy of this form should be made and used to record planting plan performance and document management actions and contingencies use to maintain a successful planting area. This form with pictures should be delivered to the City of Tumwater Planning/SEPA Official upon completion of the monitoring and after follow up with the management actions.

Deschutes Valley Trail has a mitigation areas that were designed to maintain wetland functions and values and restore wetland buffer functions as outlined in the report.

During the construction of the trail wetland buffers were reduced to allow trail expansion. These impacts were mitigated using six different planting areas.

Enhancement areas were designed to reduce invasive species using mechanical and other means and planting native plants in the areas between the wetland and the trail to increase the density and shade out aggressive noxious weeds like scotchbroom and blackberries. These weeds crowd out natives and make a monoculture of their own that severely reduces habitat.

Guidance from the joint agency document "Wetland Mitigation in Washington State Parts 1 and 2 is accepted as mitigation BAS (ECY, 2023) and requires a 1:1 enhancement mitigation to maintain no net loss of wetland ecological functions for buffer functions, however, we have provided mitigation with ratios from ECY Guidance that meet BAS at nearly 12:1 enhancement mitigation to invasive species and buffer impacts for Category II wetlands and 8:1 for Category III wetland buffer impacts.

In addition to the enhancement areas, other areas that had very little native plants and were typically managed as grassy potions of the golf course or adjacent rough with invasive weeds. These areas were rehabilitated these areas by removing invasive species and replanting native species after removal of the invasive species. These ratios were

In order to insure the success of the plantings and maintain a mitigation area free of invasive species it was determined that the mitigation should be monitored for 10 years and maintained using performance standards to evaluate the success of the mitigation found in the Deschutes Valley Trail Wetland /Stream Delineation and Mitigation Plan. This monitoring will be performed in the fall with maintenance and management actions in the winter and a follow up in the spring.

Pretreatment

Mark off treatment areas (Areas to be Planted) and determine appropriate treatments (Imazapyr) at recommended application rates. Treat Reed canary grass at least 2 months before planting.

Invasive species will mowed or line trimmed f in the early summer before installation of the planting plan. Invasive species currently consists of Scotch broom (Cytisis.scoparius), Himalayan and evergreen blackberries (Rubus.armeniacus.and.Rubus.Lacianitus) and Reed canary grass (Phalaris.arundanacea) although we want to use the least invasive method, experience has shown that reed canary grass should be sprayed. The National Park Service has been very successful using imazapyr with Hasten EA. This should be conducted in the summer of 2026. Others have had success using mowing, spraying, and after a period of time (2 months) planting and sheet mulch in order to shade out remaining reed canary grass. Spray treatment may be done in early June for planting in the fall.

English holly (Ilex aquilfolium), One seeded Hawthorne (Crataegus.monogyna) should be girdle and leave in place or cut down and removed.

Himalayan blackberry (Rubus.armeniacus) and Evergreen blackberry (Rubus.lacianatus) Cut with trimmers equipped with metal blades dig up roots. Immediately plant with substitute natives plants in place.

The applicant will plant the mitigation and provide an as built map of the project. The project will be successful if the planting plan is installed as outlined in the report.

As built Year Zero

The following is the expected plant inventory to be installed.

Wetland A Enhancement Area (98,856 sq. ft.)

Common Name	Scientific Name	Size	Spacing	Quantity	Installed
Pacific willow	Salix.lassiandra	5 Gallon	15 ft. oc	100	
Sitka spuce	Picea.sitchensis	1 Gallon	15 ft. oc	200	
Western hemlock	Tsuga.heterophylla	1 Gallon	15 ft oc	139	
Nootka rose	ranunculus.occidentalis	1 Gallon	5 ft. oc	250	
Pacific ninebark	Physocarpus.capitatus	1 Gallon	8 ft oc	250	

Douglas hawthorne	Crataegus.douglasii	1 Gallon	8 ft. oc	250	
Osoberry	Oemleria.cerasiformis	1 Gallon	8 ft oc	106	
Slough sedge	Carex obnupta	1 Gallon	5 ft oc	250	
Total					

Wetland B Enhancement Area (53,048 sq. ft.)

Common Name	**Scientific Name**	**Size**	**Spacing**	**Quantity**	**Installed**
Western red cedar	Thuja.plicata	5 gal	15 ft oc	**50**	
Scoulers willow	Salix.scouleriana	1 gal	10 ft oc	50	
Oregon ash	Fraxinus.latifolia	5 gal	15 ft oc	136	
Twinberry	Lonicera.involucrata	1 Gallon	8 ft. oc	100	
Salmonberry	Rubus.spectabilis	1 Gallon	5 ft oc	100	
Scoulers willow	Salix.scouleri	1 Gallon	8 ft. oc	100	
Red osier dogwood	Cornus.sericea	1 Gallon	8 ft. oc	100	
Pacific rhododendron	Rhododendron. macrophyllum	1 Gallon	5 ft oc	100	
Red elderberry	Sambuca.racemosa	1 Gallon	8 ft oc	100	
Total					

Wetland C Enhancement Area (20,100 sq. ft.)

Common Name	Scientific Name	Size	Spacing	Quantity	Installed
Sitka spruce	Picea.sitchensis	1 Gallon	15 ft oc	49	
Western red cedar	Thuja.plicata	1 Gallon	15 ft oc	40	
Snowberry	Symphoricarpus. alba	1 Gallon	5 ft. oc	50	
Salmonberry	Rubus.spectabilis	1 Gallon	5 ft. oc	50	
Red elderberry	Sambuca. racemosa	1 Gallon	5 ft. oc	50	
Red flowering currant	Ribes. sanguineum	1 Gallon	8 ft. oc	50	
Oceanspray	Holodiscus. discolor	1 Gallon	8 ft. O.C.	25	
Total					

Wetland A – Rehabilitation (63,966 sq ft)

Common Name	Scientific Name	Size	Spacing	Quantity	Installed
Sitka spruce	Picea sitchensis	1 Gallon	15 ft oc	100	
Bitter cherry	Prunus emarginata	1 Gallon	15 ft oc	100	
Black cottonwood	Populus balsamifera	1 Gallon	15 ft oc	100	
Vine maple	Acer circinatum	1 Gallon	8 ft oc	1000	
Pacific crabapple	Malus.fusca	1 Gallon	5 ft. O.C.	100	
Salmonberry	Rubus.spectabilis	1 Gallon	5 ft. O.C.	200	
Red elderberry	Sambuca.racemosa	1 Gallon	5 ft. O.C.	116	
Mock orange	Philadelphus.lewisii	1 Gallon	8 ft. O.C.	100	
Oceanspray	Holodiscus.discolor	1 Gallon	8 ft. O.C.	100	
Total					

Wetland B – Rehabilitation Planting (14,412 sq ft)

Common Name	Scientific Name	Size	Spacing	Quantity	Installed
Western red cedar	Thuja plicata	1 Gallon	15 ft oc	40	
Sitka willow	Salix. sitchensis	1 Gallon	10 ft. oc	24	
Salmonberry	Rubus. spectabilis	1 Gallon	5 ft. oc	40	
Pacific crab	Malus fusca	1 Gallon	8 ft oc	40	

Blue elderberry	Sambuca. negra	1 Gallon	5 ft. oc	40	
Douglas hawthorne	Crataegus. douglasii	1 Gallon	8 ft. oc	20	
Oceanspray	Holodiscus. discolor	1 Gallon	8 ft. oc	20	
Total					

Wetland C – Rehabilitation Planting (17,016 sq ft)

Common Name	Scientific Name	Size	Spacing	Quantity	Installed
Western hemlock	Picea sitchensis	1 Gallon	15 ft oc	40	
Pacific willow	Salix lassiandra	1 Gallon	15 ft oc	20	
Vine maple	Acer macrophyllum	1 Gallon	15 ft oc	16	
Snowberry	Symphoricarpus.alba	1 Gallon	5 ft. O.C.	50	
Osoberry	Oemleria.cerasiformus	1 Gallon	5 ft. O.C.	50	
Red elderberry	Sambuca.racemosa	1 Gallon	5 ft. O.C.	40	
Mock orange	Philadelphus.lewisii	1 Gallon	8 ft. O.C.	25	
Oceanspray	Holodiscus.discolor	1 Gallon	8 ft. O.C.	25	
Total					

APPLICATION OF IMMAZAPYR_____

1MONTH SPRAY OF REED CANARY GRASS SUCCESSFUL

2 MONTH SPRAY OF REED CANARY GRASS SUCCESSFUL

NOTES AND RECOMMENDATIONS

_____

_____

Plant Installation Substitutions/ Replacements

_____

_____

_____

Irrigation Installed_____ Irrigation Frequency_____

Mulch Installed_____

After Planting of the indicated species, Photo points will be established in each of the Mitigation Areas in order to provide a baseline condition for the planting plan and document onsite conditions at the time of the as-built. Five photo points will be taken in four cardinal directions and a stake will be installed to allow for easy establishment of photo points in the monitoring reports for each monitoring year.

Photo Points with rebar for each Mitigation Area

Enhancement Mitigation Wetland A

1. Lat Long

2. Lat Long

3. Lat Lon

4. Lat Long

Enhancement Mitigation Wetland B

1. Lat Long

2. Lat Long

3. Lat Lon

4. Lat Long

Enhancement Mitigation Wetland C

1. Lat Long

2. Lat Long

3. Lat Lon

4. Lat Long

Rehabilitation Wetland A

1. Lat Long

2. Lat Long

3. Lat Lon

4. Lat Long

5. Lat Long

Rehabilitation Wetland B

1. Lat Long

2. Lat Long

3. Lat Lon

4. Lat Long

5. Lat Long

Rehabilitation Wetland C

1. Lat Long

2. Lat Long

3. Lat Lon

4. Lat Long

5. Lat Long

The plantings will be installed after the invasive species treatment in the spring summer in the fall of 2026 or in the fall of the year in which the invasive species treatment is conducted.

Percent cover of invasive species in Planting Area and Recommendations

_____

_____

_____

Additional Recommendations

Performance Standards

The performance standards are as follows:

Year 0 - an inventory of plants and photo points will be established for monitoring during the monitoring period within 1 month of the installation. Year 1-2 will have 100% survival of installed plants. Noxious weeds will be less than 10% aerial coverage.

Volunteer trees or shrubs may account for up to 10% of the overall count of surviving plants. Dead plants will be replaced in kind unless a volunteer is a replacement.

Year 2 -10 will have a survival rate of 80 % of the original count. Volunteers can account for 10% of the total, if present. Noxious weeds such as Himalayan blackberry, Scotch broom, reed canary grass, and other invasives will not have more than 10% aerial coverage of the planting area.

Japanese knotweed, yellow flag iris, and hogweed will have a zero percent tolerance and will be removed or sprayed using an appropriate herbicide approved for aquatic use by a licensed applicator.

The aerial coverage will be 50% by Year 5, 70% by Year 7, and 80% by Year 10. If these coverage measures are not met and it does not appear that they will meet performance standards because of **neglect**, more plants may required to be planted to make up the difference.

If the area meets the Year 10 survival and aerial coverage performance measures in Year 5, the applicant can be given approval to end monitoring.

Failure to meet standards by Year 10 will require an additional year of monitoring with contingencies to meet goals worked out with the city authority.

Year _____Monitoring Report Fill Out for Years 1, 2, 3, 5, 7, 9, 10

Wetland A Enhancement Area (98,856 sq. ft.)

Common Name	Scientific Name	Size	Spacing	Quantity	Replace
Pacific willow	*Salix lassiandra*	5 Gallon	15 ft. oc	100	
Sitka spuce	*Picea sitchensis*	1 Gallon	15 ft. oc	200	
Western hemlock	*Tsuga heterophylla*	1 Gallon	15 ft oc	139	
Nootka rose	*ranunculus occidentalis*	1 Gallon	5 ft. oc	250	
Pacific ninebark	*Physocarpus capitatus*	1 Gallon	8 ft oc	250	
Douglas hawthorne	*Crataegus douglasii*	1 Gallon	8 ft. oc	250	
Osoberry	*Oemleria cerasiformis*	1 Gallon	8 ft oc	106	
Slough sedge	Carex obnupta	1 Gallon	5 ft oc	250	
Total					

Wetland B Enhancement Area (53,048 sq. ft.)

Common Name	Scientific Name	Size	Spacing	Quantity	Replaced
Western red cedar	Thuja.plicata	5 gal	15 ft oc	**100**	
Oregon ash	Fraxinus.latifolia	5 gal	15 ft oc	**50**	
Twinberry	Lonicera.involucrata	1 Gallon	8 ft. oc	100	
Salmonberry	Rubus.spectabilis	1 gal	5 ft oc	100	
Scoulers willow	Salix.scouleri	1 Gallon	8 ft. oc	50	
Red osier dogwood	Cornus.sericea	1 Gallon	8 ft. oc	100	
Pacific rhododendron	Rhododendron.macrophyllum	1 Gallon	5 ft oc	50	
Red elderberry	Sambuca.racemosa	1 Gallon	8 ft oc	100	
Total					

Wetland C Enhancement Area (20,100 sq. ft.)

Common Name	Scientific Name	Size	Spacing	Quantity	Installed
Sitka spruce	*Picea sitchensis*	1 Gallon	15 ft oc	**40**	
Western red cedar	*Thuja plicata*	1 Gallon	15 ft oc	**40**	
Snowberry	*Symphoricarpus alba*	1 Gallon	5 ft. oc	50	
Salmonberry	*Rubus spectabilis*	1 Gallon	5 ft. oc	50	
Red elderberry	*Sambuca racemosa*	1 Gallon	5 ft. oc	50	
Red flowering currant	*Ribes sanguineum*	1 Gallon	8 ft. oc	50	
Oceanspray	*Holodiscus discolor*	1 Gallon	8 ft. O.C.	50	
Total					

Wetland A – Rehabilitation (63,966 sq ft)

Common Name	Scientific Name	Size	Spacing	Quantity	Installed
Sitka spruce	Picea sitchensis	1 Gallon	15 ft oc	100	
Bitter cherry	Prunus emarginata	1 Gallon	15 ft oc	50	
Vine maple	Acer circinatum	1 Gallon	8 ft oc	50	
Pacific crabapple	*Malus fusca*	1 Gallon	5 ft. O.C.	50	
Salmonberry	*Rubus spectabilis*	1 Gallon	5 ft. O.C.	100	
Red elderberry	*Sambuca racemosa*	1 Gallon	5 ft. O.C.	50	
Mock orange	*Philadelphus lewisii*	1 Gallon	8 ft. O.C.	100	
Oceanspray	*Holodiscus discolor*	1 Gallon	8 ft. O.C.	100	
Total					

Wetland B – Rehabilitation (14,412 sq ft)

Common Name	Scientific Name	Size	Spacing	Quantity	Installed
Western red cedar	Thuja plicata	1 Gallon	15 ft oc	40	
Sitka willow	*Salix sitchensis*	1 Gallon	5 ft. O.C.	20	
Salmonberry	*Rubus spectabilis*	1 Gallon	5 ft. O.C.	40	
Blue elderberry	*Sambuca negra*	1 Gallon	5 ft. O.C.	20	
Douglas hawthorne	*Crataegus douglasii*	1 Gallon	8 ft. O.C.	20	
Oceanspray	*Holodiscus discolor*	1 Gallon	8 ft. O.C.	20	
Total					

Table 9– Wetland C – Rehabilitation (17,016 sq ft)

Common Name	Scientific Name	Size	Spacing	Quantity	Installed
Western hemlock	Picea sitchensis	1 Gallon	15 ft oc	40	
Pacific willow	Salix lassiandra	1 Gallon	15 ft oc	20	
Vine maple	Acer macrophyllum		15 ft oc	20	
Snowberry	*Symphoricarpus alba*	1 Gallon	5 ft. O.C.	20	
Osoberry	*Oemleria cerasiformus*	1 Gallon	5 ft. O.C.	20	
Red elderberry	*Sambuca racemosa*	1 Gallon	5 ft. O.C.	25	
Mock orange	*Philadelphus lewisii*	1 Gallon	8 ft. O.C.	25	
Oceanspray	*Holodiscus discolor*	1 Gallon	8 ft. O.C.	25	
Total					

Management.Actions.In.Year.(((((((((((

Substitutions/ Replacements Comtingencies

_____

_____

_____

Irrigation Installed_____Irrigation Removed_____

Aerial Coverage of Plants_____Meets Standard?_____

Volunteer Coverage_____

Coverage of Invasive Species_____

Management Actions Previous Year

_____

_____

_____

_____

Management Actions Current Year

_____

_____

_____

_____

Success/Failure/Contingencies

_____

_____

_____

_

Photo Points Mitigation Enhancement Area Wetland A

Photo Points Mitigation Enhancement Area Wetland B

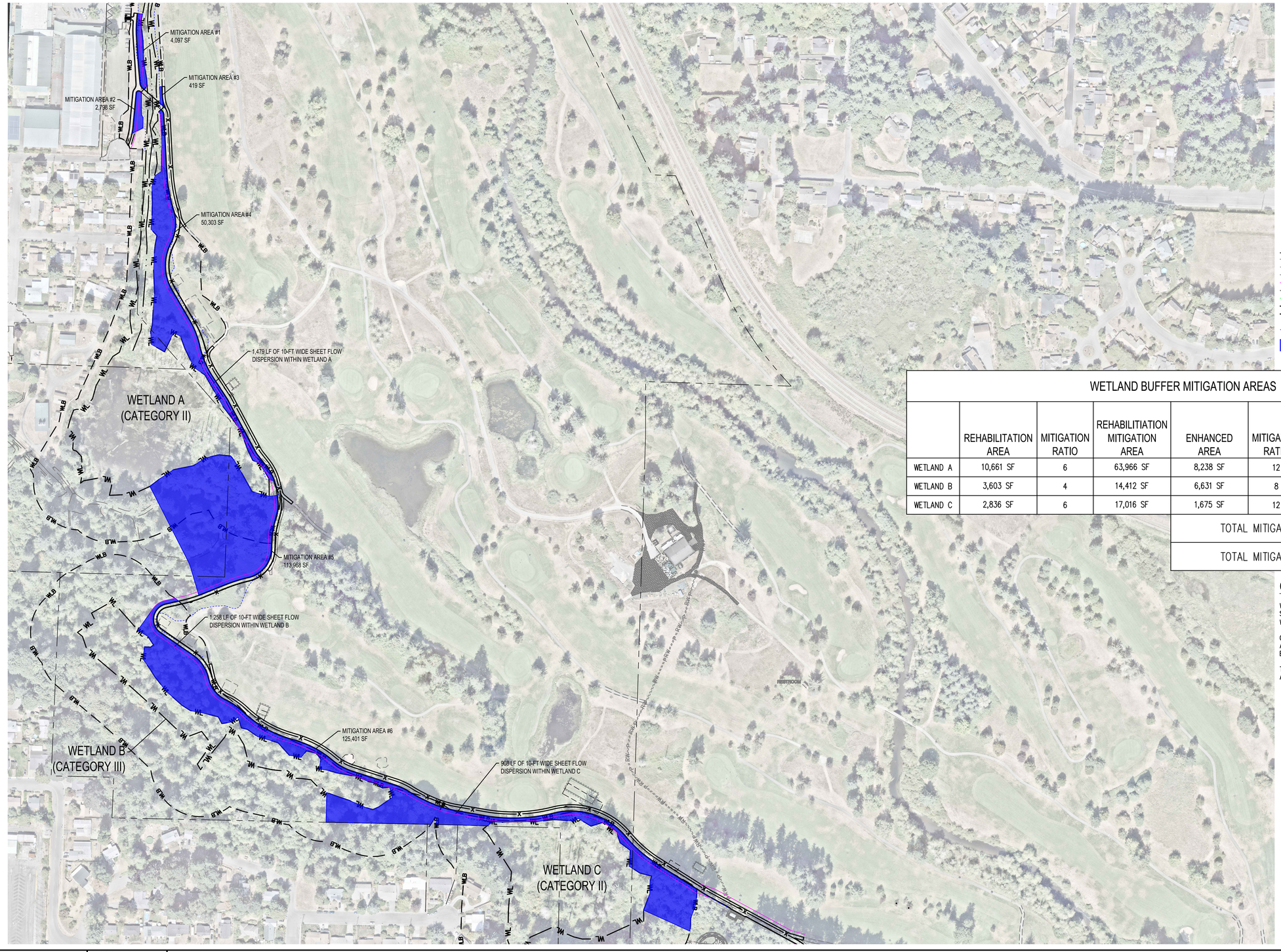
Photo Points Mitigation Enhancement Area Wetland C

Photo Points Buffer Rehab Wetland A

Photo Points Buffer Rehab Wetland B

Photo Points Buffer Rehab Wetland C

EXHIBIT 5



N

0 150 300

SCALE IN FEET

LEGEND

- EDGE OF PAVEMENT
- GRAVEL SHOULDER
- EDGE OF FAIRWAY
- SHEET FLOW
- PROPERTY LINE
- STREAM
- WL — WETLAND DELINEATION
- WLB — WETLAND BUFFER
- LIMIT OF MAINTAINED AREAS
- REHABILITATED IMPACT AREAS

WETLAND BUFFER MITIGATION AREAS

	REHABILITATION AREA	MITIGATION RATIO	REHABILITIATION MITIGATION AREA	ENHANCED AREA	MITIGATION RATIO	ENHANCED MITIGATION AREA	REQUIRED MITIGATION PER TMC TABLE 16.28.220(6)
WETLAND A	10,661 SF	6	63,966 SF	8,238 SF	12	98,856 SF	162,822 SF
WETLAND B	3,603 SF	4	14,412 SF	6,631 SF	8	53,048 SF	67,460 SF
WETLAND C	2,836 SF	6	17,016 SF	1,675 SF	12	20,100 SF	37,116 SF
					TOTAL MITIGATION AREA REQUIRED		267,398 SF
					TOTAL MITIGATION AREA PROVIDED		296,986 SF

GENERAL NOTE:

WETLAND INFORMATION SHOWN IS FROM THE WETLAND AND STREAM DELINEATION COMPLETED BY LAND SERVICES NORTHWEST. WETLAND RECONNAISSANCE PERFORMED 2/18/2026.

CITY OF TUMWATER DETERMINED THAT WETLAND BUFFER IMPACTS ARE FOR ANY IMPROVEMENTS MADE TO THE WEST OF THE EXISTING CART PATH.

THE LIMIT OF THE MAINTAINED AREAS WEST OF THE GOLF COURSE ARE BUILT OFF AERIAL IMAGERY AND ARE APPROXIMATE.

SCJ ALLIANCE
CONSULTING SERVICES
8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
P: 360.352.1465
SCJALLIANCE.COM

HORIZONTAL SCALE: AS SHOWN
DATE: MAY 2026
JOB No.: SCJ #25-000313
DRAWING FILE No.: -

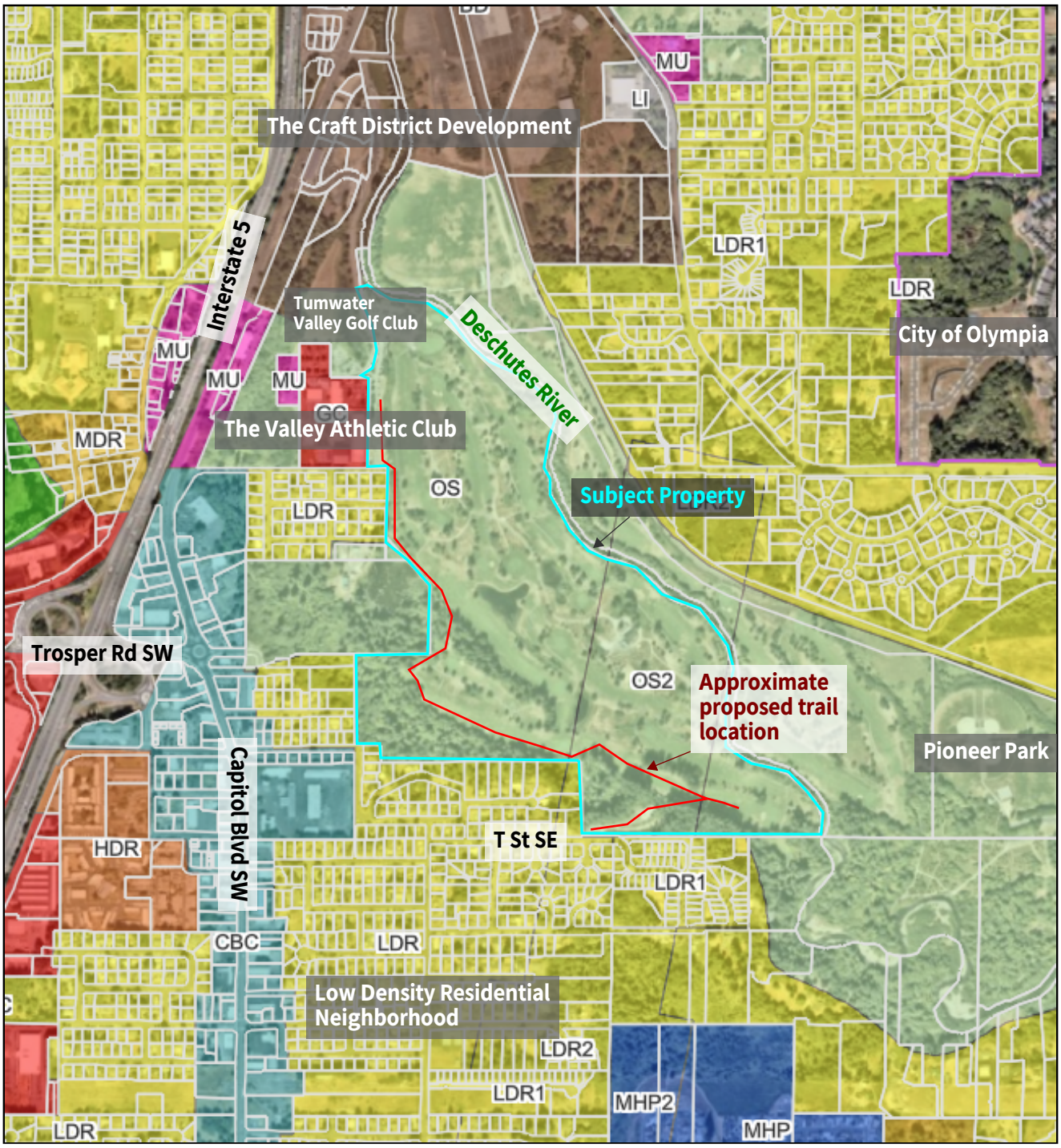
WETLAND MITIGATION AREA
DESCHUTES VALLEY TRAIL - SEGMENT C

EXHIBIT No: EX-02
SHEET No: 02

May 26, 2026 - 3:02:04pm - User: nikki.martinez
N:\PROJECTS\625 CITY OF TUMWATER\25-000313 TUMWATER DESCHUTES VALLEY TRAIL\CADD\EXHIBITS\SEG C WETLANDS_25-000313-WETLAND_EXHIBIT_RESTORATION.DWG

EXHIBIT 6

Vicinity and Zoning Map
Deschutes Valley Trail Segment C
Site Plan Review, Infrastructure Exemption
TPN 09470051000, and 12835430000



1:30,465

0 1,250 2,500 5,000 ft

0 387.5 775 1,550 m

City of Olympia, City of Tumwater (WA), WA State Parks GIS, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, US Census Bureau, USDA, USFWS

9/23/2026, 1:03:34 PM

Tumwater City Limits

Zoning

- Airport Related Industrial
- Brewery District
- Capitol Boulevard Community
- Community Services
- General Commercial
- Green Belt
- High Density Residential
- Historic Commercial
- Light Industrial
- Low Density Residential
- Manufactured Home Park
- Medium Density Residential
- Mixed Use
- Neighborhood Commercial
- Open Space
- Residential/Sensitive Resource
- Town Center

Disclaimer: The City of Tumwater does not warrant, guarantee, or accept any liability for accuracy, precision, or completeness of any information shown hereon or for any inferences therefrom.

EXHIBIT 7

CITY OF TUMWATER

Community Development
555 Israel Road SW
Tumwater, WA 98501-6515
Phone: 360-754-4180

DETERMINATION OF NON-SIGNIFICANCE (DNS)
ADOPTION OF EXISTING DOCUMENT

Deschutes Valley Trail Segment C
TUM-26-0924

Description of proposal: Construct a paved non-motorized trail with gravel shoulders linking Tumwater Valley Drive to Deschutes Valley Park.

Proponent: City of Tumwater, Transportation and Engineering, Attn: Jared VerHey – Capital Projects Manager, 555 Israel Road SW, Tumwater, WA 98501.

Location of proposal: 4611 Tumwater Valley Drive SE, Tumwater, WA 98501. Parcel numbers 09470051000 & 12835430000.

Lead agency: City of Tumwater, Community Development Department.

Title of Adopted Document: Washington Department of Transportation (WSDOT) National Environmental Policy Act (NEPA) Documented Categorical Exclusion (DCE). (DOT Form 140-100).

Description of document (or portion thereof) being adopted:

The WSDOT DCE (DOT form 140-100EF) for NEPA is an approved process for the Department of Transportation Washington State to provide NEPA approval to local agencies. The proposed Deschutes Valley Trail – Segment C project was reviewed and approved through this process.

The project consulted with the Washington Department of Archeology (DAHP) for the section 106 Cultural Resource Process. The site was determined to meet the NEPA classification of a Federal Highway Administration (FHWA) Determination of Categorical Exclusion (DCE).

The City of Tumwater has identified and adopted this document as being appropriate for this proposal after independent review. The referenced documents meet the need for the environmental review for the proposal.

The Federal Highway Administration (FHWA) has determined that this proposal will 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 determination is based on the following findings and conclusions:

The application materials include a wetland delineation and mitigation plan, critical areas report, and mazama pocket gopher screening study.

Consultations with DAHP for Cultural Resource determined this project would have "no effect to historic resources".

The NEPA reviewed 12 additional environmental laws and policies for the above titles project action area. The NEPA found no effect concerning the additional laws and policies.

This project was determined to meet the NEPA classification of a FHWA DCE.

Date: July 24th, 2026

Responsible official:

Brad Medrud, AICP
Community Development Director

Contact person: Jared VerHey, 360-754-4140
555 Israel Road SW
Tumwater, WA 98501

Comments on this DNS will be accepted until end of the workday on August 7, 2026. Appeals of this DNS must be made to the City Clerk, no later than August 13, 2026, by 5:00 p.m. All appeals shall be in writing, be signed by the appellant, be accompanied by a filing fee of $2,000, and set forth the specific basis for such appeal, error alleged and relief requested.

EXHIBIT 7a

Sam Hunter

From: SEPA <SEPA@orcaa.org>
Sent: Monday, August 3, 2026 8:33 AM
To: Sam Hunter
Subject: Re: SEPA/NEPA Determination - Deschutes Valley Trail Segment C - TUM-26-0924

Follow Up Flag: Follow up
Flag Status: Flagged

Good morning,

ORCAA reviewed the proposal for the Deschutes Valley Trail Segment C - TUM-26-0924 and has the following comments regarding construction:

For construction projects please refer to this guide for handling fugitive dust from construction projects: https://wsdot.wa.gov/sites/default/files/2024-09/Handling-FugitiveDust-%20from-ConstructionProjects-Guide.pdf.

Thank you for your time and the opportunity to comment.

From: Jessica Lee <JLee@ci.tumwater.wa.us>
Sent: Thursday, July 23, 2026 11:47 AM
Subject: SEPA/NEPA Determination - Deschutes Valley Trail Segment C - TUM-26-0924

The SEPA Determination for, Deschutes Valley Trail Segment C - TUM-26-0924 is ready to view HERE. If you have any questions or would like additional information, please contact Sam Hunter at 360-754-4180 or shunter@ci.tumwater.wa.us.

Jessica Lee | Administrative Assistant
City of Tumwater Community Development
555 Israel Rd SW | Tumwater, WA 98501
(360) 754-4180
jlee@ci.tumwater.wa.us | www.ci.tumwater.wa.us
Permit Counter Hours - Walk Ins: Monday - Thursday 8 a.m. - 1 p.m. Closed Friday
Appointments: Monday -Thursday 1:30 p.m. - 4:00 p.m.

ATTENTION: This email came from outside of ORCAA's system. Use caution when replying, or when opening attachments unless you know the sender *and* were expecting the attachment.

EXHIBIT 7b

July 31, 2026

Jared VerHey
Community Development
555 Israel Road SW
Tumwater, WA 98501

Dear Mr. VerHey,

We were excited to get a notice this week that plans for the Deschutes Valley Trail Segment C are going ahead.

We have lived next door to the Deschutes Valley Park for 10 years. One of the reasons we built our house here is because of its proximity to the then newly developed park and the proposed trail. Now, we have four grandchildren ranging in age from 4 to 9. Three of them ride bicycles and scooters. One of them rollerblades. And one of them was born with muscular dystrophy, a degenerative muscle disease, and may someday be in a wheelchair.
An accessible paved trail from our neighborhood will help insure that my husband and I, our neighbors, and *all* of our grandchildren, can remain active and outside.

Thank you for moving forward with this long-anticipated project, and for keeping us informed.

Sincerely,

Margaret Thomas

Margaret Thomas
416 T. St. SE
Tumwater
360-481-1250

EXHIBIT 7c

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
Southwest Region Office
PO Box 47775, Olympia, WA 98504-7775 • 360-407-6300

August 6, 2026

Brad Medrud, AICP Community Development Director
City of Tumwater
Development Services Department
555 Israel Road Southwest
Tumwater, WA 98501

Dear Brad Medrud:

Thank you for the opportunity to comment on the determination of non-significance for the Deschutes Valley Trail – Segment C Project (TUM-26-0924) located at 4611 Tumwater Valley Drive Southeast as proposed by City of Tumwater, Transportation and Engineering, Attn: Jared VerHey – Capital Projects Manager. The Department of Ecology (Ecology) reviewed the environmental checklist and has the following comment(s):

SOLID WASTE MANAGEMENT: Derek Rockett (360) 995-3176

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

TOXICS CLEANUP: John Pearch (360) 819-0460

This project is immediately adjacent to a known or suspected contaminated site, known as the Palermo Well Field Superfund Site, FSID # 55237647, CSID# 4616 or U.S Environmental Protection Agency (EPA) Site ID WA0000026534. To search and access information concerning this site
see http://www.ecy.wa.gov/fs/ and https://fortress.wa.gov/ecy/gsp/SiteSearchPage.aspx o r https://cumulis.epa.gov/supercpad/cursites/csitinfo.cfm?id=1001761. If contamination is suspected, discovered, or occurs during the proposed SEPA action, testing of the potentially contaminated media may be needed. The Department of Ecology also recommends following additional recommendations by the EPA provided to the City of Tumwater in an email dated February 19, 2026. If contamination of soil or groundwater is readily apparent, or is revealed by sampling, the Department of Ecology must be notified. Contact the Environmental Report Tracking System Coordinator at the Southwest Regional Office at (360) 407-6300 or report any release by using the online statewide environmental incident report (ERTS) form at: https://ecology.wa.gov/footer-pages/report-an-environmental-issue/statewide-reporting-form-erts. For assistance and information about subsequent

cleanup and to identify the type of testing that will be required, contact John Pearch with the Toxics Cleanup Program at the Southwest Regional Office at (360) 819-0460.

WATER QUALITY/General Permit Unit:
Jacob Neuharth (360) 742-9751

Erosion control measures must be in place prior to any clearing, grading, excavation, or construction. These control measures must be effective to prevent stormwater runoff from carrying soil and other pollutants into surface water or storm drains that lead to waters of the state. Discharges must not cause or contribute to a violation of surface water quality standards, groundwater quality standards, sediment management standards, and human health-based criteria. Sand, silt, clay particles, and soil will damage aquatic habitat and are considered to be pollutants.

If there are known contaminated soils and/or groundwater present on site, additional information will be required to be submitted. Contamination includes sites with known, remediated, or historically contaminated groundwater and/or soil. For contaminated construction sites, contact Evan Wood at evan.wood@ecy.wa.gov, or by phone at (360) 706-4599.

Construction Stormwater General Permit:

The following construction activities require coverage under the Construction Stormwater General Permit:
1. Clearing, grading, excavation, construction support activity, and other soil disturbing activity that results in the disturbance of one or more acres (including off-site disturbance acreage related to construction-support activity) and discharges stormwater to surface waters of the State; and
2. Clearing, grading and/or excavation on sites smaller than one acre that are part of a larger common plan of development or sale, if the common plan of development or sale will ultimately disturb one acre or more and discharge stormwater to surface waters of the State.
a) This includes forest practices (including, but not limited to, class IV conversions) that are part of a construction activity that will result in the disturbance of one or more acres, and discharge to surface waters of the State (that is, forest practices that prepare a site for construction activities); and
3. Any size construction activity discharging stormwater to waters of the State that Ecology:
a) Determines to be a significant contributor of pollutants to waters of the State of Washington.
b) Reasonably expects to cause a violation of any water quality standard.

Some projects may be eligible for coverage under an Erosivity Waiver if they result in the disturbance of under five acres, are not a portion of a common plan of development, and the entire period of construction activity occurs between June 15 – September 15. Additional requirements about the Erosivity Waiver may be found in Section S1.F of the Construction Stormwater General Permit.

Construction site operators must apply for a permit at least 60 days prior to discharging stormwater from construction activities and must submit it on or before the date of the first public notice. Applicants may apply online or obtain an application from Ecology's website

at: https://ecology.wa.gov/Regulations-Permits/Permits-certifications/Stormwater-general-permits/Construction-stormwater-permit.

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

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

Department of Ecology
Southwest Regional Office

(JKT:202603070)

cc: Derek Rockett, SWM
John Pearch, TCP
Jacob Neuharth, WQ

EXHIBIT 7d

Sam Hunter

From: Jim Oberlander <jimo201@comcast.net>
Sent: Tuesday, August 4, 2026 6:05 PM
To: Sam Hunter
Subject: Deschutes Valley Trail Segment C - TUM-26-0924

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from jimo201@comcast.net. Learn why this is important

Sam & Chuck,

I support his project!
Build it.

Jim Oberlander
715 SW Ferry St.
Tumwater

EXHIBIT 8

Community Development
555 Israel Road SW
Tumwater, WA 98501-6515
Phone: 360-754-4180

NOTICE OF APPLICATION AND PUBLIC HEARING NOTICE
Deschutes Valley Trail – Segment C
Permit No. TUM-26-1184
September 18, 2026

Notice of Application Public Comment Period: The fourteen-day comment period ends at 5:00pm on October 2, 2026.
Notice of Public Hearing Comment Period: Comment will be accepted up to 12:00pm on Monday, October 5, 2026.
Proposal: Construct a paved non-motorized trail with gravel shoulders linking Tumwater Valley Drive to Deschutes Valley Park.
Applicant: Jared VerHey, City of Tumwater, Department of Engineering and Transportation; 555 Israel Rd SW, Tumwater, WA 98501.
Representative: Jared VerHey, City of Tumwater, Department of Engineering and Transportation, Jared VerHey, 555 Israel Rd SW, Tumwater, WA 98501.
Location: 135.9 acres located at 4611 Tumwater Valley Dr SE, Tumwater, WA 98501; Tax Parcel Numbers 09470051000 and 12835430000.
Complete Application: Application submitted: September 8, 2026. Application deemed complete: September 11, 2026.
Project Permit/Approvals: The following permits and approvals may be required: Site Development Grading, Shoreline Substantial Development Permit, Environmental Review (SEPA Determination).
Environmental Documents Relating to the Project: The City of Tumwater Community Development Department reviewed a Washington Department of Transportation (WSDOT) National Environmental Policy Act (NEPA) Documented Categorical Exclusion (DCE) and other information submitted by the project proponent and issued a Determination of Non-Significance (DNS) by adoption of an existing document on July 24, 2026. This information is available to the public upon request.
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) and Tumwater Environment Ordinance (TMC 16).
Public Hearing: A public hearing is required for this project.
The public hearing will be held on Monday, October 5, 2026 at 6:00pm, remotely online via Zoom and in person at Tumwater City Hall Sunset Room, 555 Israel Rd. SW, Tumwater, WA 98501.
The public is invited to attend this public hearing remotely or in person to provide comments on the application.
Public Comment via Zoom - Register in advance for this webinar:
https://us02web.zoom.us/webinar/register/WN_BcPLCN98TfCDQTqLcziBHw

If you have any questions or would like additional information, please contact Sam Hunter, Associate Planner, at 360-754-4180.

Published: September 18, 2026
Posted: September 18, 2026

EXHIBIT 9

SCJ ALLIANCE
CONSULTING SERVICES

Deschutes Valley Trail Segment C
Arborist Report
Tumwater, WA

Prepared For: City of Tumwater

Prepared By: Colin Owen, SCJ Alliance
ISA Certified Arborist PN-9606A
ISA Tree Risk Assessment Qualified

Date: September 4, 2026

Parcel #: 09470051000; 12835430000

Introduction

The following arborist memo has been developed as part of the permit package for the proposed Deschutes Valley Trail Segment C located in Tumwater, Washington.

This Memo serves to document the quantity of existing trees that are proposed for removal as part of the project, as well as any required mitigation trees (if applicable). The requirements and recommendations in this Memo are in response to *Tumwater Municipal Code section 16.08 Protection of Trees and Vegetation*, an online version of which can be found here:

https://www.codepublishing.com/WA/Tumwater/html/Tumwater16/Tumwater1608.html

Project Narrative

This section of the proposed Deschutes Valley Trail ("Segment C") runs for approximately 1 mile and is located within two parcels owned by the City of Tumwater: 09470051000 and 12835430000 (See Appendix A). These two parcels are occupied by the Tumwater Golf Course. The 10-foot wide asphalt paved trail will extend from the southeast corner of The Valley Athletic Club's south parking lot to the southeastern edge of the Tumwater Golf Course, just before crossing the Deschutes River. The trail will skirt the western and southern boundaries of the golf course, following the existing tree line and utilizing some of the golf course's existing paved trail network. Connections to this section of trail will include a 200-foot connection to M Street SE, located just south of the athletic club, and another 900-foot connection to Deschutes Valley Park, located off T Street SE.

Methodology & Scope of Work

On **May 6 and August 13, 2026**, SCJ conducted a site visit for the purpose of reviewing existing trees on site that may be impacted by construction. This site evaluation was conducted to achieve the following goals:

1.) Complete a site visit to assess any trees likely to be impacted by the project;

SCJ ALLIANCE
CONSULTING SERVICES

2.) Make recommendations for tree retention and/or replacement (if necessary) per the City of Tumwater landscape code;

3.) Provide input on tree protection locations and measures (tree protection plan to be provided by civil engineer).

Trees were evaluated for health and general condition only, based on a limited visual inspection (no core sampling, root excavation, or aerial inspection). A tree risk assessment was not included as part of this memo.

Tree Density Calculations

Due to direct conflicts with the proposed site improvements, an estimated total of 334 trees will be removed for this section of the trail. Tree density calculations for each parcel can be found below:

Parcel #: 09470051000 (Tumwater Golf Course)

Total Acreage of Parcel:	**135.9 Acres**
Required 12 Trees/Acre* Retention:	**1,631 Trees**
Existing Significant Trees On-Site:	**3,200 Trees****
Existing Significant Trees to be Removed for Construction:	**35 Trees**
Total On-site Trees to be Retained:	**3,165 Trees**
Deficit of Trees to be Replaced:	**0 Trees**

Parcel #: 12835430000 (Tumwater Golf Course)

Total Acreage of Parcel:	**84.6 Acres**
Required 12 Trees/Acre* Retention:	**1,015 Trees**
Existing Significant Trees On-Site:	**3,000 Trees****
Existing Significant Trees to be Removed for Construction:	**299 Trees**
Total On-site Trees to be Retained:	**2,701 Trees**
Deficit of Trees to be Replaced:	**0 Trees**

*When land clearing is performed in conjunction with a specific development proposal, not less than twenty percent of the trees, or not less than twelve trees per acre (whichever is greater), shall be retained. (TMC 16.08.07)

**This figure is an estimate based on multiple sources, including surveyed tree locations and aerial imagery.

Tree Protection Timeline

Pre-Construction Site Preparation Phase

- Stage equipment away from trees and vegetation to be retained so that existing plants and their roots are protected.
- Fence off with chain link or construction fencing all entry and exit routes. When planning routes, avoid utility access corridors.
- Protect irrigation and drainage systems from damage unless plans call for renovation of such systems.
- Stake and/or flag clearing limits and tree protection to be verified and approved by the City's Urban Forestry prior to construction.
- Project Arborist will supervise and verify the following tree protection measures are in place and comply with the approved TPP:
  - ◊ A 5" layer of coarse mulch or woodchips is to be placed beneath the Tree Protection Zone (TPZ) of the protected trees. Mulch is to be kept 12" from the trunk.
  - ◊ Tree Protection Fencing of 6' chain link fencing shall be installed around the TPZ of protected tree(s). The fencing can be moved within the TPZ if authorized by the Urban Forester or the Project Arborist but not closer than 2'

from the trunk of any tree. Fence posts shall be 1.5” in diameter and are to be driven 2’ into the ground. The distance between posts shall not be more than 10’.

Construction Phase

- During the Construction phase, ensure the TPP is being followed and report any conflicts or deviations to the Urban Forester and the Project Arborist.
- Monitor construction activities that require encroachment within the TPZ, such as grading or trenching.
- Avoid the following conditions:
  1. Allowing run off or spillage of damaging materials into the approved TPZ.
  2. Storing construction materials or portable toilets, stockpiling of soil, or parking or driving vehicles within the TPZ.
  3. Cutting, breaking, skinning, or bruising roots, branches, or trunks without first obtaining authorization from the Project Arborist.
  4. Discharging exhaust into foliage.
  5. Securing cable, chain, or rope to trees or shrubs.
  6. Trenching, digging, tunneling or otherwise excavating within the CRZ or TPZ of the tree(s) without first obtaining authorization from the Project Arborist.
- The following activities should be observed and inspected by the project arborist during the construction phase to ensure compliance with the approved TPP:
  1. Only excavation by hand or compressed air shall be allowed within the TPZ of trees. Machine trenching shall not be allowed.
  2. In order to avoid injury to tree roots, when a trenching machine is being used outside of the TPZ of trees, and roots are encountered smaller than 2”, the wall of the trench adjacent to the trees shall be hand trimmed, making clear, clean cuts through the roots. All damaged, torn and cut roots shall be given a clean cut to remove ragged edges, which promote decay. Trenches shall be filled within 24 hours, but where this is not possible, the side of the trench adjacent to the trees shall be kept shaded with four layers of dampened, untreated burlap, wetted as frequently as necessary to keep the burlap wet. Roots 2” or larger, when encountered, shall be reported immediately to the Project Arborist, who will decide whether the Contractor may cut the root as mentioned above or shall excavate by hand or with compressed air under the root. All exposed roots are to be protected with dampened burlap.
  3. Route pipes outside of the TPZ of a protected tree to avoid conflict with roots. Where it is not possible to reroute pipes or trenches, bore or tunnel beneath the TPZ of the tree. The boring shall take place not less than 3’ below the surface of the soil in order to avoid encountering “feeder” roots. All boring equipment must be staged outside of the TPZ.

Post-Construction

- The Post-Construction Phase begins when the equipment leaves. Important follow-up monitoring of the protected trees will help ensure their survival and identify signs of early stress.
- The applicant shall arrange with the Project Arborist for the long-term care and monitoring of preserved trees by complying with the following conditions:
  1. Complete post-construction tree maintenance, including pruning, mulching, fertilization, irrigation, and soil aeration where necessary.
  2. Remove, by hand, all soil and root protection material such as wood chips, gravel and plywood.
  3. Provide for remediation of compacted soil by methods such as aeration or vertical mulching.

4. Apply at least 1 inch of water per week by deep watering in the absence of adequate rainfall.
5. Inspect trees annually for at least 3 and up to 5 years after construction to look for changes in condition and signs of insects or disease, and to determine maintenance needs.
6. Remove trees that are badly damaged or are in irreversible decline as determined by the Project Arborist.

Respectfully submitted,



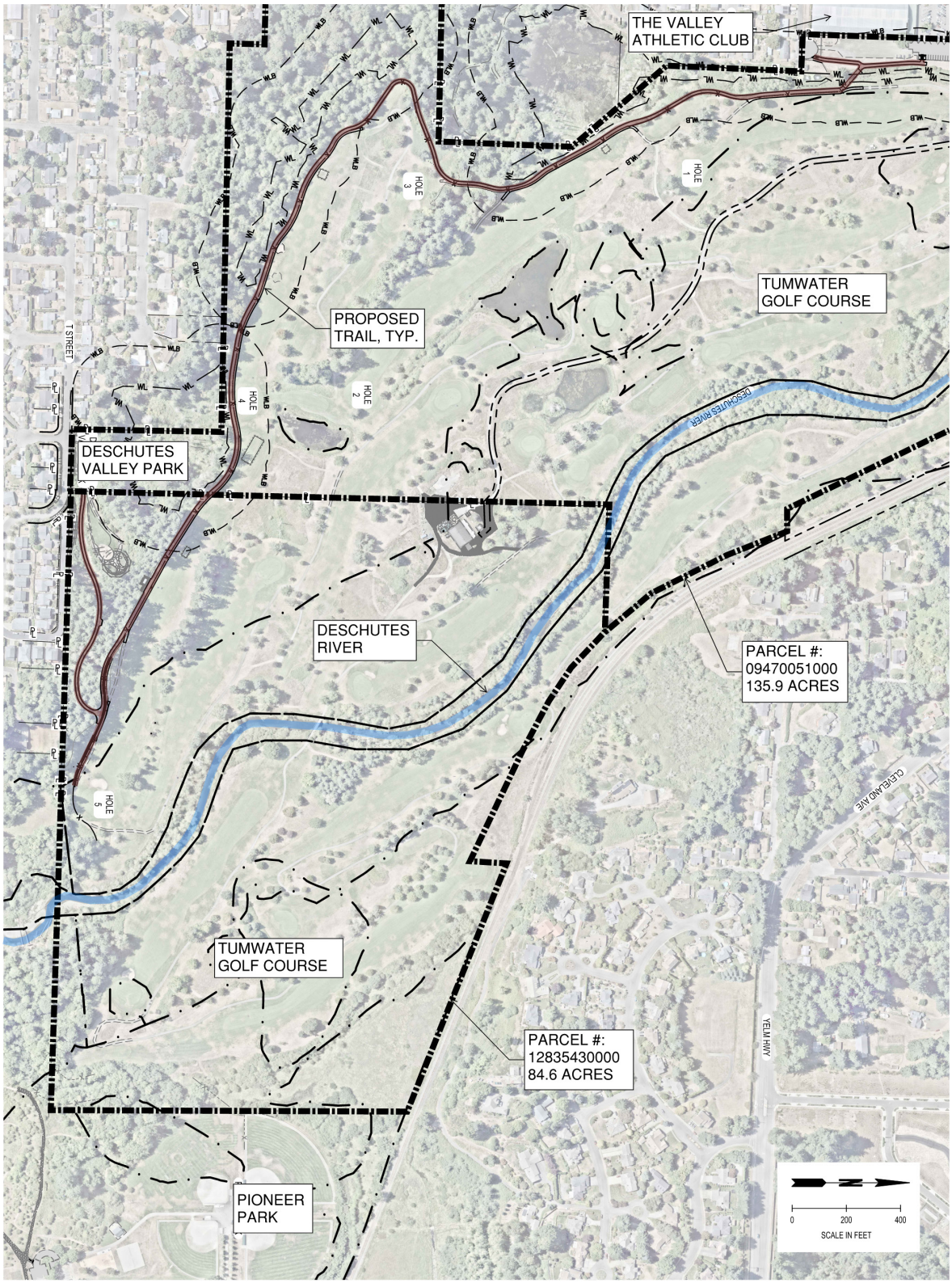
Colin W. Owen, SCJ Alliance
ISA Certified Arborist (PN-9606-A)
ISA Tree Risk Assessment Qualified

Appendices

Appendix A – *Overview of Project Site*
Appendix B – *Trees to be Removed*
Appendix C – *Tree Protection Fencing Detail*
Appendix D – *Tree Protection During Construction*
Appendix E – *Assumptions and Limiting Conditions*

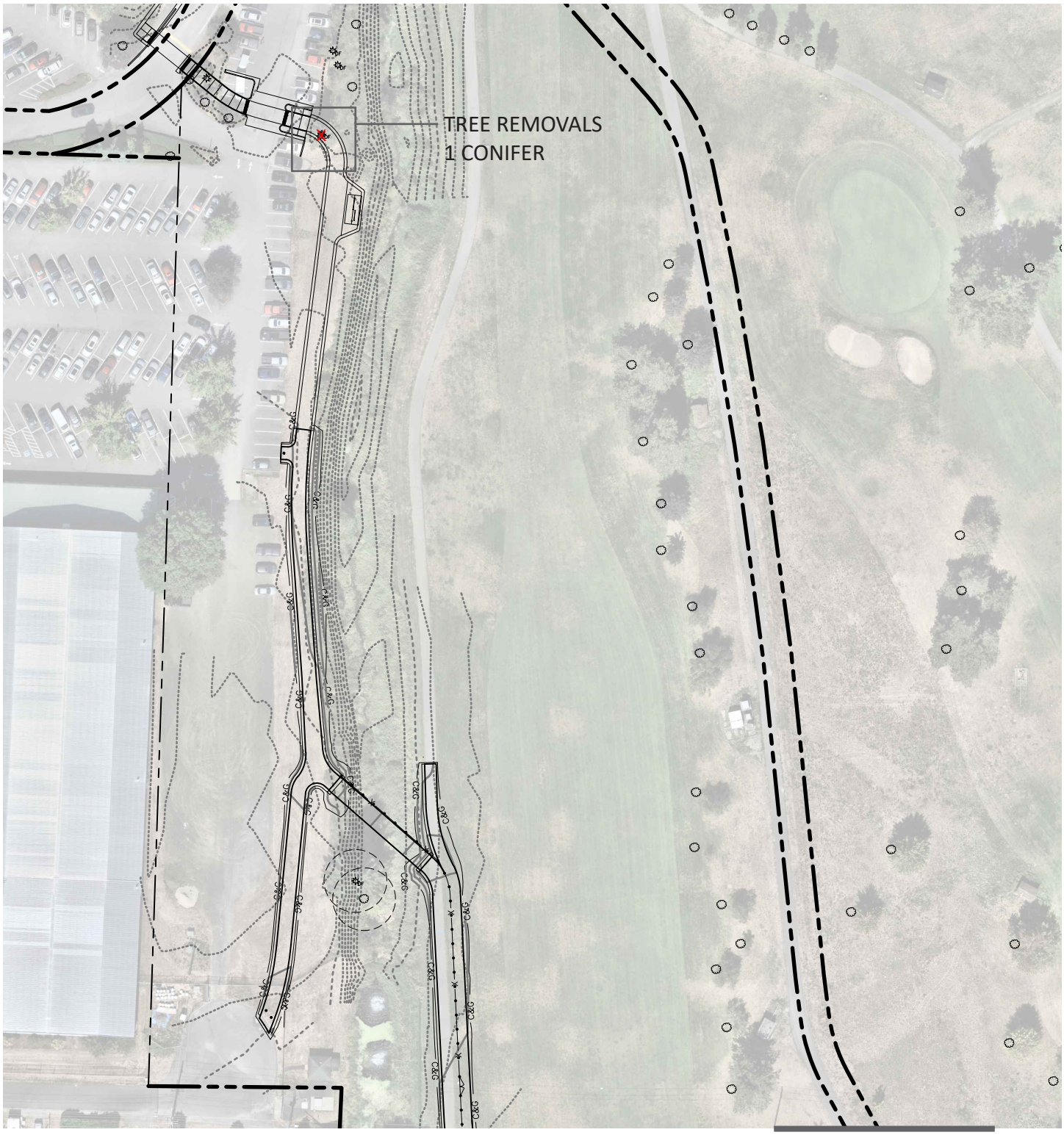
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Appendix A: Overview of Project Site



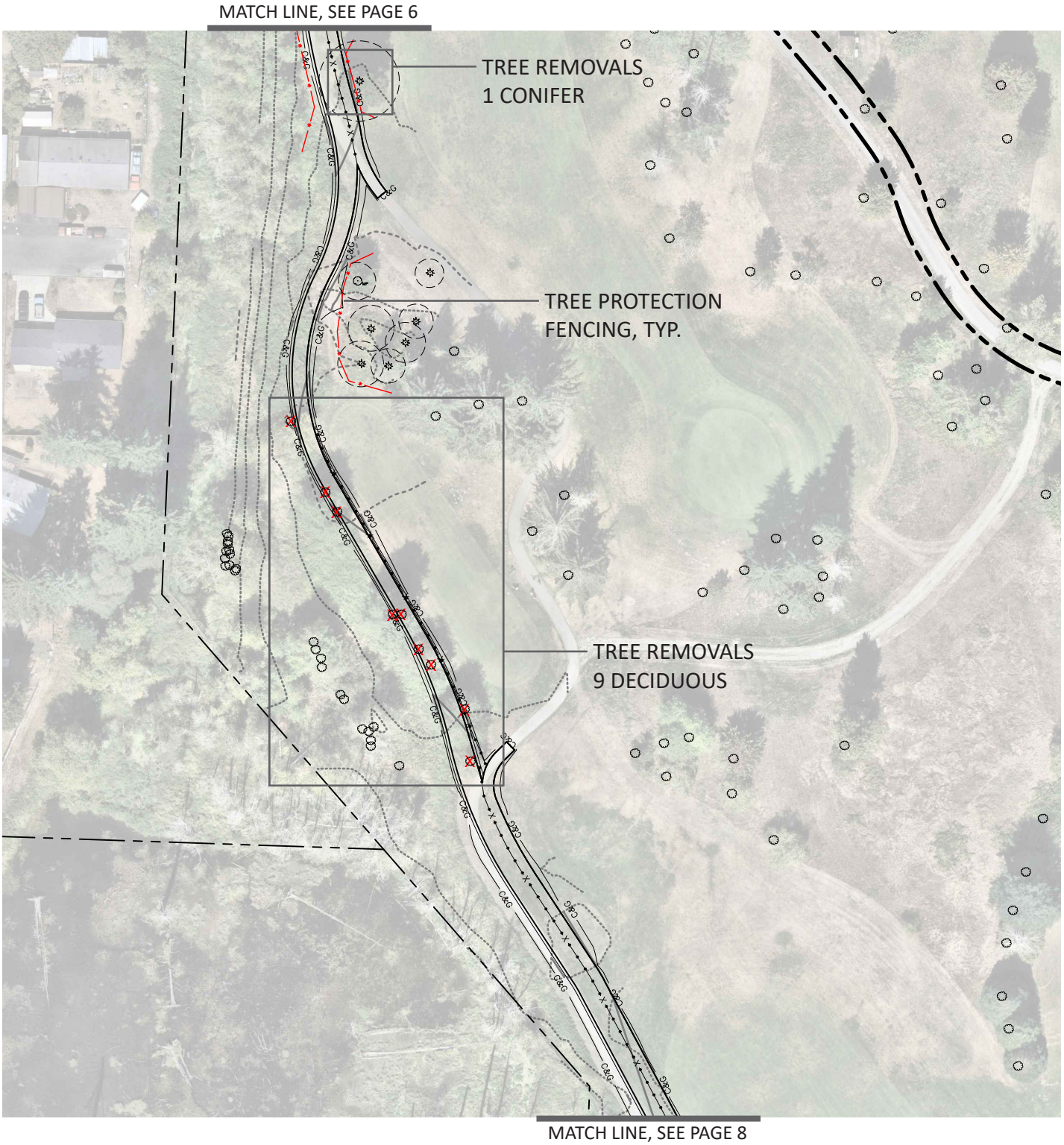
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Appendix B: Trees to be Removed



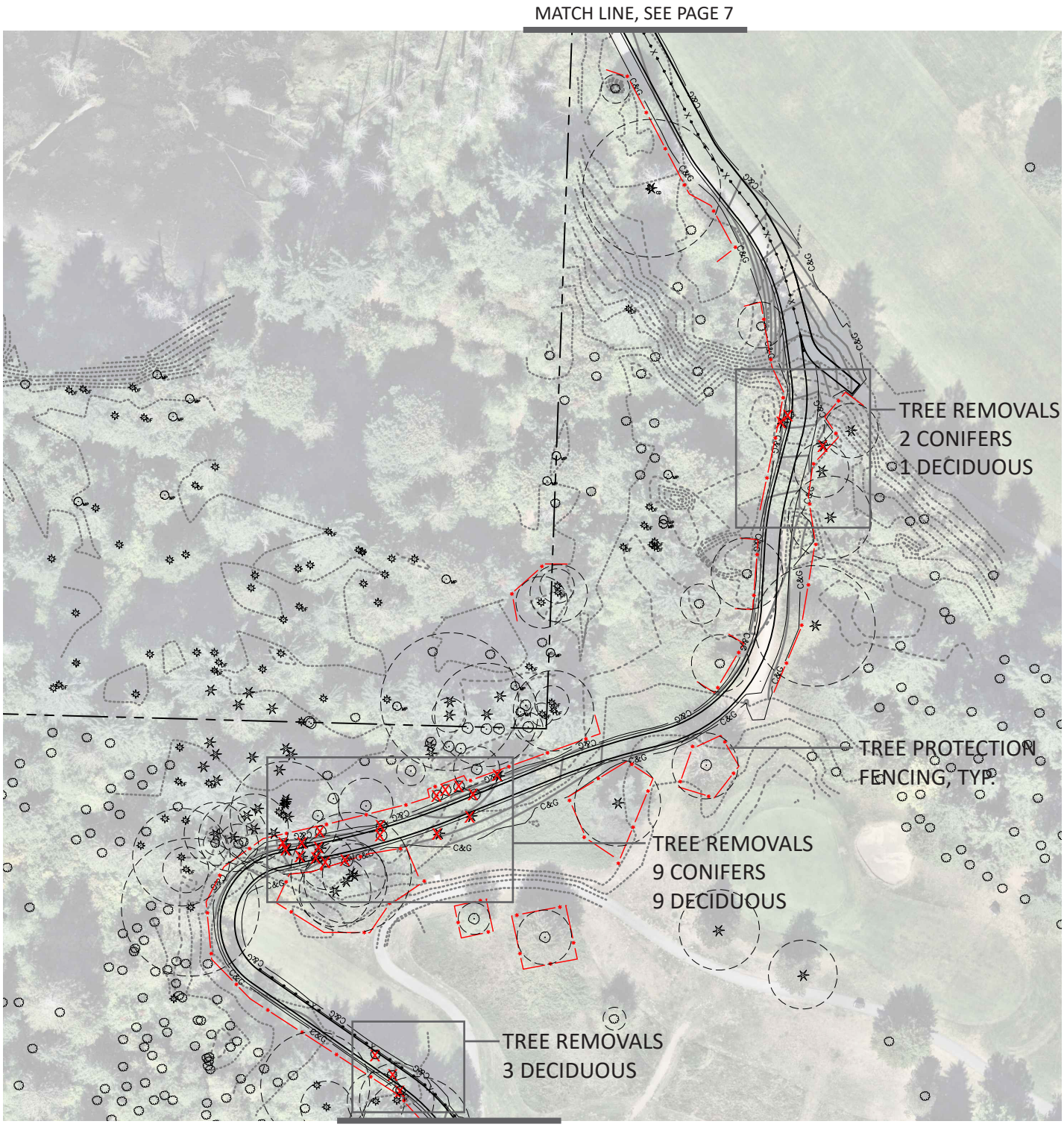
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Appendix B: Trees to be Removed (con't.)



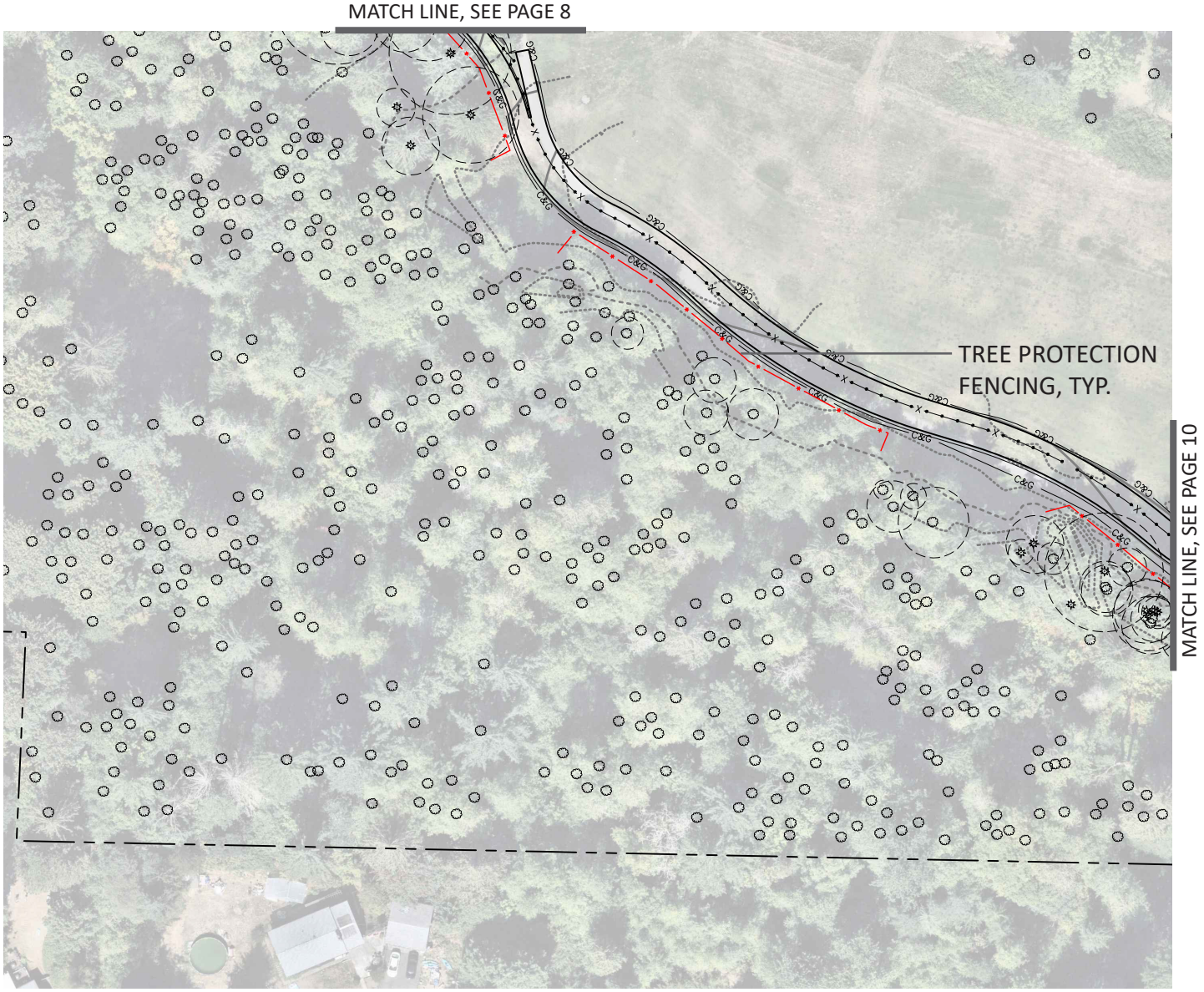
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Appendix B: Trees to be Removed (con't.)



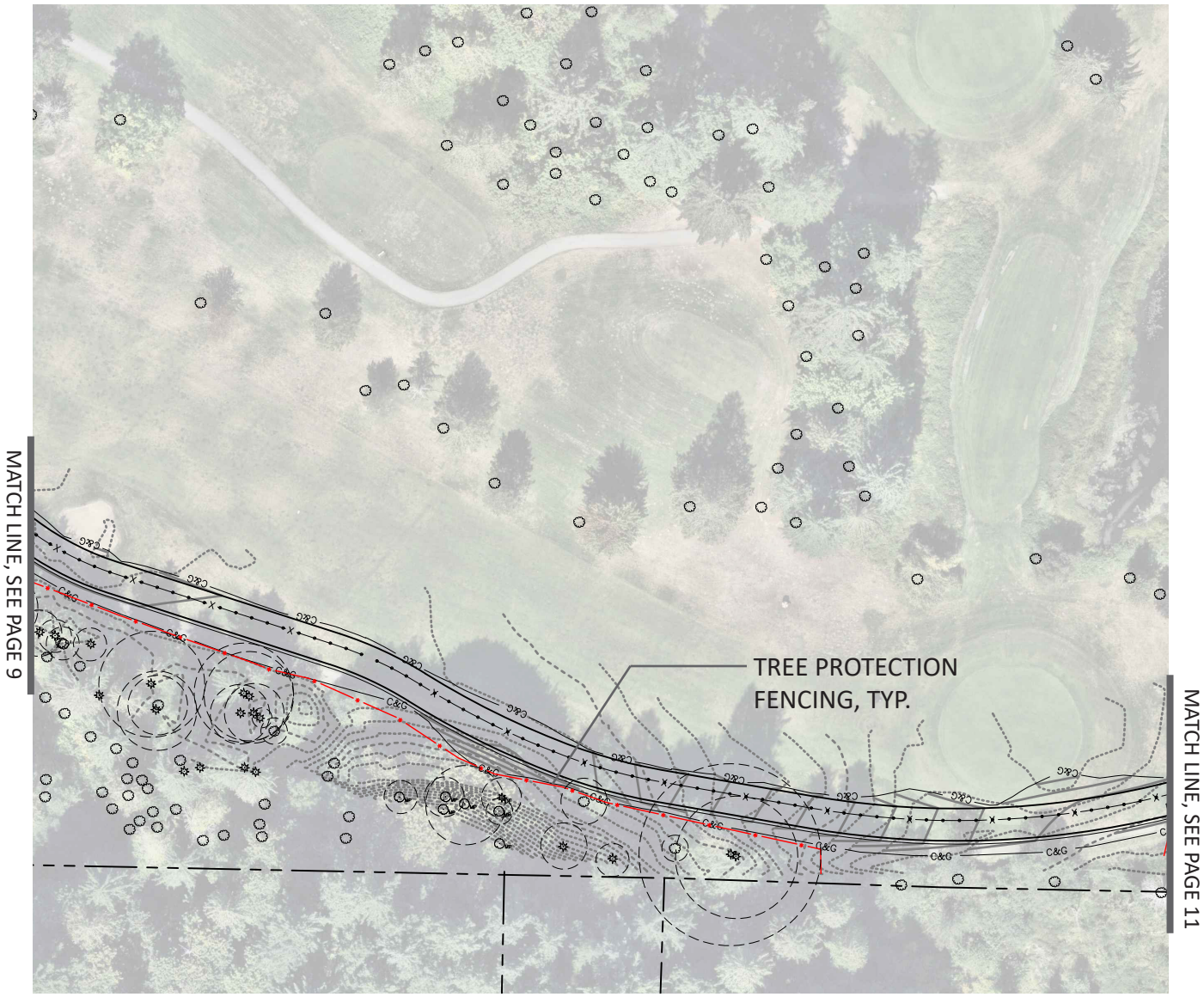
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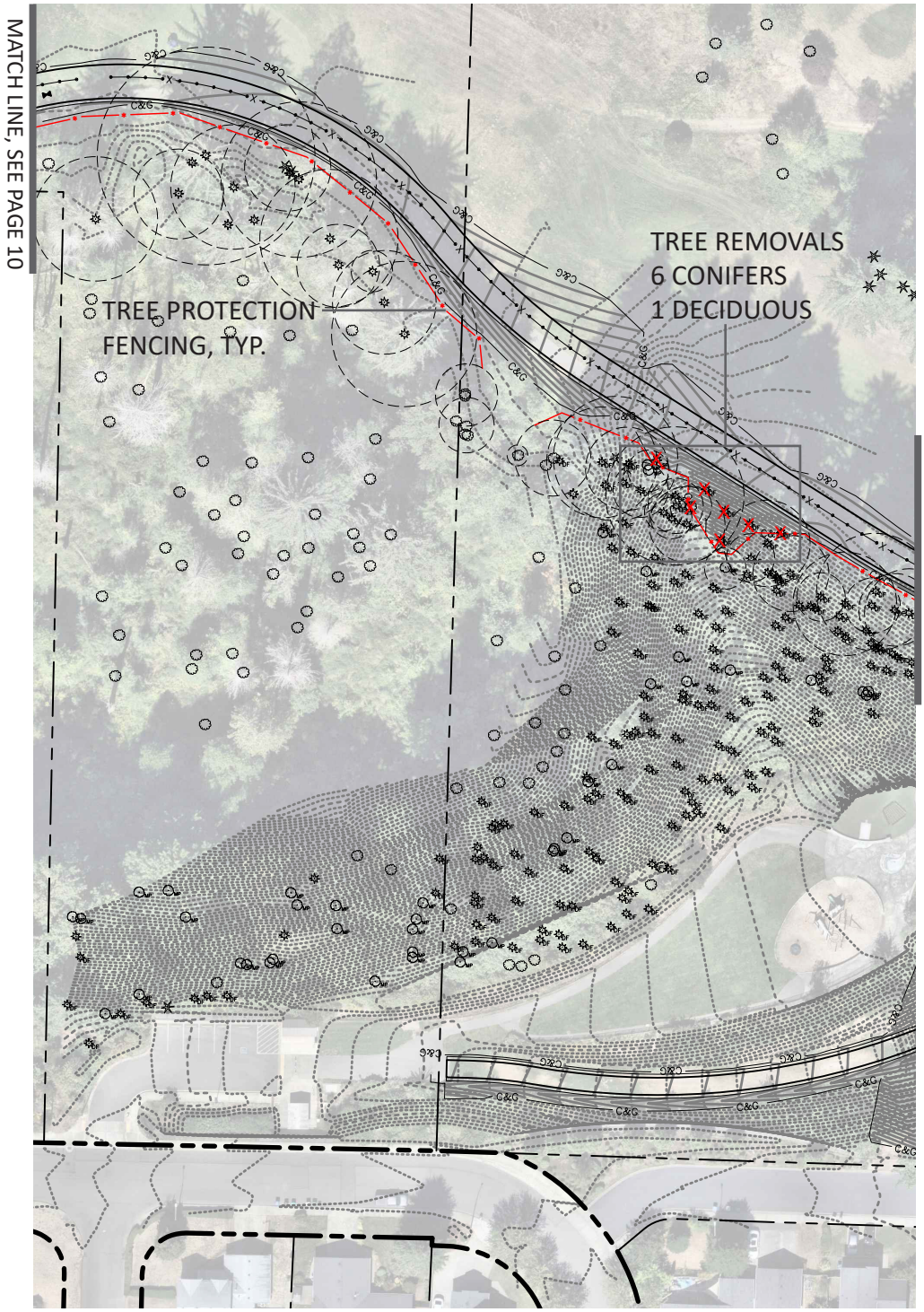
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Appendix B: Trees to be Removed (con't.)



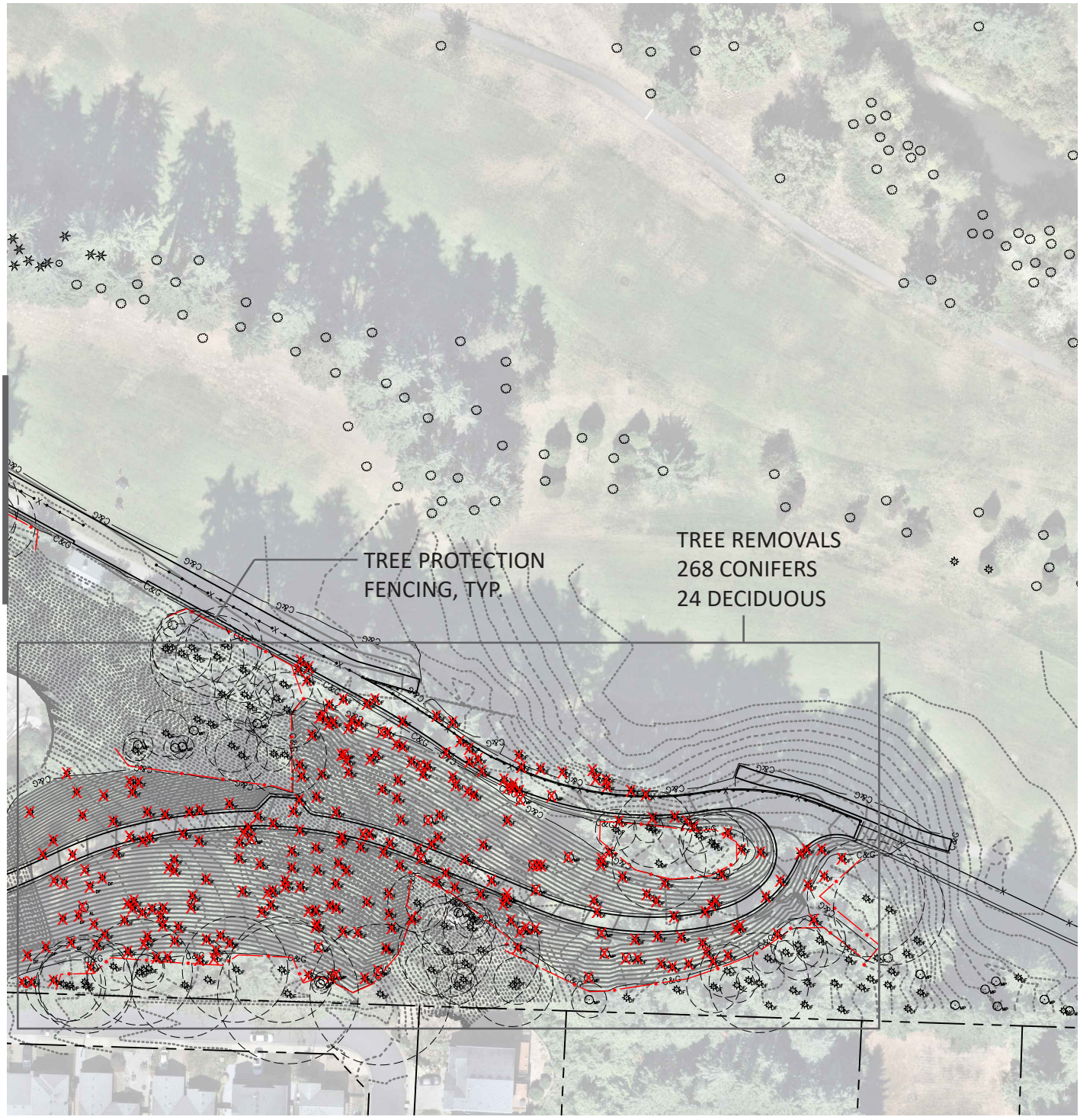
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Appendix B: Trees to be Removed (con't.)



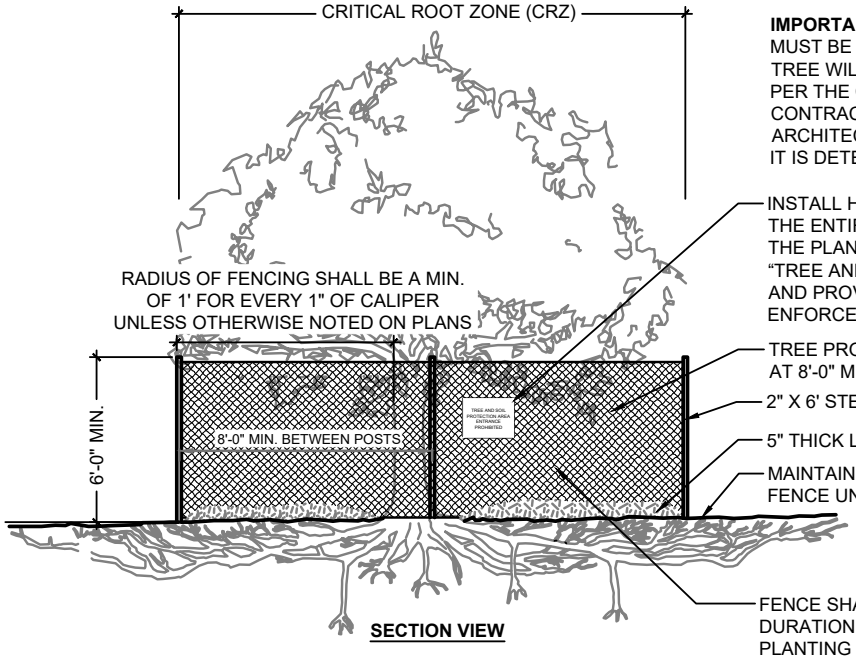
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Appendix B: Trees to be Removed (con't.)



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Appendix B: Tree Protection Fencing Detail



IMPORTANT: ALL TREES INDICATED AS "TO REMAIN" MUST BE RETAINED. FAILURE TO RETAIN ANY INDICATED TREE WILL RESULT IN CONTRACTOR REPLACING TREE PER THE CITY OR OTHER REQUIREMENTS. CONTRACTOR SHALL NOTIFY THE LANDSCAPE ARCHITECT, ARBORIST AND/OR CITY (AS APPLICABLE) IF IT IS DETERMINED THAT A TREE CANNOT BE RETAINED.

INSTALL HIGHLY VISIBLE SIGNS (15' MAX. SPACING) ALONG THE ENTIRETY OF FENCE. SIGNS MUST BE APPROVED BY THE PLANNING OFFICIAL AND SHALL STATE AT A MINIMUM "TREE AND SOIL PROTECTION AREA, ENTRANCE PROHIBITED" AND PROVIDE THE CITY PHONE NUMBER FOR CODE ENFORCEMENT TO REPORT VIOLATIONS.

TREE PROTECTION FENCE: 6' HT. CHAIN LINK, POSTS SPACED AT 8'-0" MIN.

2" X 6' STEEL POSTS OR APPROVED EQUAL

5" THICK LAYER OF MEDIUM BARK MULCH

MAINTAIN EXISTING GRADE WITH THE TREE PROTECTION FENCE UNLESS OTHERWISE INDICATED ON THE PLANS

FENCE SHALL BE MAINTAINED THROUGHOUT DURATION OF CONSTRUCTION. ALL CLEARING AND PLANTING WITHIN THE ROOT ZONE SHALL BE DONE BY HAND.

TREE PROTECTION NOTES

1. NO PRUNING SHALL BE PERFORMED EXCEPT BY APPROVED ARBORIST.
2. NO EQUIPMENT SHALL OPERATE INSIDE THE PROTECTIVE FENCING INCLUDING DURING FENCE INSTALLATION AND REMOVAL.
3. PLACING MATERIALS NEAR TREES: NO PERSON MAY CONDUCT ACTIVITY WITHIN THE CRITICAL ROOT ZONE (CRZ) OF ANY EXISTING TREE TO BE RETAINED, EXCEPT AS OTHERWISE NOTED (SEE TREE RETENTION PLAN). THIS INCLUDES BUT IS NOT LIMITED TO PARKING EQUIPMENT, PLACING SOLVENTS, STORING BUILDING MATERIAL AND SOIL DEPOSITS, DUMPING CONCRETE WASH OUT AND LOCATING BURN HOLES.
4. PROTECTIVE BARRIER. BEFORE DEVELOPMENT, LAND CLEARING, FILLING OR ANY LAND ALTERATION, THE CONTRACTOR:
   A. SHALL FIELD VERIFY LOCATION, SIZE AND SPECIES TO DETERMINE CRZ.
   B. SHALL ERECT TREE PROTECTION FENCING AROUND THE CRZ OF THE TREE, AS DESCRIBED IN THE TEMPORARY TREE PROTECTION FENCE DETAIL. THE FENCING SHALL BE RETAINED THROUGHOUT CONSTRUCTION.
   C. SHALL PROHIBIT GRADING, TRENCHING, CUTTING, IMPERVIOUS SURFACING, OTHER CONSTRUCTION, COMPACTION OF EARTH, OR OTHER POTENTIALLY DAMAGING ACTIVITIES WITHIN THE CRZ'S OF EXISTING TREES.
   D. SHALL ENSURE THAT ANY CLEARING OR LANDSCAPING DONE WITHIN THE DRIP LINE SHALL BE ACCOMPLISHED WITH HAND LABOR ONLY.
   E. SHALL ENSURE NO ROOTS GREATER THAN 2" SHALL BE CUT.
5. ATTACHMENTS TO TREES: DURING CONSTRUCTION, NO PERSON SHALL ATTACH ANY OBJECT TO ANY EXISTING TREE.
6. THE CRITICAL ROOT ZONE (CRZ) IS DEFINED AS THE AREA WITHIN THE DRIP LINE OF THE TREE TO BE RETAINED.
7. RETURN ALL AREAS TO THEIR PRE-CONSTRUCTION STATE AFTER INSTALLATION IS COMPLETE.

1 TREE PROTECTION FENCING

N.T.S.

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Appendix G: Assumptions and Limiting Conditions

1.) Field examinations of the site were made on May 6 and August 13**, 2026**. The observations and conclusions presented in this report are as of those dates.

2.) To enjoy the many benefits that trees provide, some degree of risk must be accepted. Even healthy trees without obvious defects can fail under normal or storm conditions. The only way to eliminate all risk is to remove all trees within reach of all targets. It is impossible to predict with certainty that a tree will stand or fail, or the timing of the failure. Annual monitoring by an ISA Certified Arborist or Certified Forester will reduce the potential of tree failures.

3.) When a tree fails, it is considered an 'Act of God.' While there are many different definitions of an Act of God, it's generally considered to be an unanticipated natural disaster or other natural phenomenon whose effects would not have been prevented or avoided by due care or foresight.

4.) Any legal description (whether graphic or narrative) provided to SCJ Alliance is assumed to be correct. Any titles and ownerships to any property are assumed to be good and marketable. No responsibility is assumed for matters legal in character. Any and all property is appraised or evaluated as though free and clear, under responsible ownership and competent management.

5.) It is assumed that any property is not in violation of any applicable codes, ordinances, statutes, or other govern mental regulations, unless otherwise stated.

6.) Care has been taken to obtain all information from reliable sources. All data has been verified insofar as possi ble; however, SCJ Alliance can neither guarantee nor be responsible for the accuracy of information.

7.) SCJ Alliance shall not be required to give testimony or to attend court by reason of this report unless subsequent contractual arrangements are made, including payment of an additional fee for such services as described in the fee schedule and contract of engagement.

8.) Loss or alteration of any part of this report will invalidate the entire report.

9.) If a tree risk assessment is included as part of this report, it shall be considered valid only for the stated period of time.

10.) Possession of this report or a copy thereof does not imply right of publication or use for any purpose by any entity other than the person to whom it is addressed, without the prior expressed written or verbal consent of SCJ Alliance.

11.) Neither all nor any part of the contents of this report, or copy thereof, shall be conveyed by anyone, including the client, to the public through advertising, public relations, news, sales or other media, without the prior expressed written or verbal consent of SCJ Alliance – particularly as to value conclusions, identity of SCJ

Alliance, or any reference to any professional society or to any initialed designation conferred upon SCJ Alliance as stated in its qualifications.

12.) This report and any values expressed herein represent the opinion of SCJ Alliance, and the fee is in no way contingent upon the reporting of a specified value, a stipulated result, the occurrence neither of a subsequent event, nor upon any finding in to reported.

13.) Any sketches, diagrams, graphs, photographs, etc. referenced in this report, being intended as visual aids, are not necessarily to scale and should not be construed as engineering or architectural reports or surveys.

14.) Unless expressed otherwise: 1) information contained in this report covers only those items that were examined and reflects the condition of those items at the time of inspection; and 2) the inspection is limited to visual examination of accessible items without dissection, excavation, probing, or coring. There is no warranty or guarantee, expressed or implied, that problems or deficiencies of the tree or other plant or property in question may not arise in the future.

EXHIBIT 10

Drainage Report: 100% Design

Deschutes Valley Trail – Segment C
City of Tumwater

Prepared For:
City of Tumwater

Prepared By:
SCJ Alliance
8730 Tallon Ln NE, Ste 200
Lacey, WA 98516
360.352.1465

June 2026

SCJ ALLIANCE
CONSULTING SERVICES

Drainage Report: 100% Design

Project Information

Project:	**Deschutes Valley Trail – Segment C**
Prepared for:	**City of Tumwater** Jared VerHey Capital Projects Manager

Reviewing Agency

Jurisdiction:	City of Tumwater

Project Representative

Prepared by:	SCJ Alliance 8730 Tallon Ln NE, Ste 200 Lacey, WA 98516 360.352.1465 scjalliance.com
Contact:	Whitney Holm, PE
Project Reference:	SCJ #23-000313
	Path: N:\Projects\0625 City of Tumwater\25-000313 Tumwater Deschutes Valley Trail\Design\Storm\Seg C Stormwater\2026-0220_SegC Storm Report.docx

Signature

I hereby state that this Drainage Control Plan for the Deschutes Valley Trail Project – Segment C has been prepared by me or under my supervision and meets the standard of care and expertise that is usual and customary in this community for professional engineers. I understand that the City of Tumwater does not and will not assume liability for the sufficiency, suitability, or performance of drainage facilities prepared by me.

Whitney Holm, PE

Approved by Whitney Holm, PE

Table of Contents

1 Proposed Project Description....1

1.1 Summary of Requirements....2

2 Existing Conditions Description....2

2.1.1 Existing Soils....6

2.1.2 Critical Areas....7

3 Vicinity Analysis and Subbasin Description....8

3.1.1 Vicinity Analysis....8

3.1.2 Subbasin Description....10

4 Flow Control and Water Quality Facility Sizing....12

4.1.1 Minimum Requirements Overview....12

4.1.2 MR #1: Stormwater Site Planning....13

4.1.3 MR #2: Construction Stormwater Pollution Prevention Plan (SWPPP)....13

4.1.4 MR #3: Source Control of Pollution....13

4.1.5 MR #4: Preservation of Natural Drainage Systems and Outfalls....13

4.1.6 MR #5: On-Site Stormwater Management....14

4.1.7 MR #6: Runoff Treatment....15

4.1.8 MR #7: Flow Control....17

4.1.9 MR #8: Wetlands Protection....18

4.1.10 MR #9: Operation and Maintenance....19

4.1.11 MR #10: Financial Liability....19

4.1.12 MR #11: Off-Site Analysis and Mitigation....19

5 Aesthetic Considerations for Facilities....19

6 Covenants, Dedications, Easements....20

7 Agreements and Guarantees....20

8 Other Permits or Conditions Placed on the Project....21

List of Tables

Table 1. Existing Area Takeoffs for TDA 1 3
Table 2. Existing Area Takeoffs for TDA 2 3
Table 3. Existing Area Takeoffs for TDA 3 4
Table 4. Existing Area Takeoffs for TDA 4 5
Table 5. Existing Area Takeoffs for TDA 5 5
Table 6. Existing Area Takeoffs for TDA 6 6
Table 7. Proposed Area Takeoffs for TDA 1 10
Table 8. Proposed Area Takeoffs for TDA 2 10
Table 9. Proposed Area Takeoffs for TDA 3 11
Table 10. Proposed Area Takeoffs for TDA 4 11
Table 11. Proposed Area Takeoffs for TDA 5 12
Table 12. Proposed Area Takeoffs for TDA 6 12
Table 13. TDA and Project Site Areas 17
Table 14. Flow Control Exemption 18
Table 15. Anticipated Permits and Variances 21

List of Figures

Figure 1 – Site Vicinity Map 1

List of Appendices

Appendix 1 – Design Calculations 28
Appendix 2 – Soil Management Plan 132
Appendix 3 – Supplemental Reports and Information 134
Exhibit 3A – Critical Areas 135
Exhibit 3B – NRCS Soil Report 169
Exhibit 3C – Draft Geotechnical Report 194
Appendix 4 – Maps and Area Takeoffs 372
Exhibit 4A – Minimum Requirements Flow Chart 373
Exhibit 4B – Basin Map 377
Exhibit 4C – Work Map 379
Appendix 5 – Construction SWPPP 399
Appendix 6 – Wetlands Requirements 513

1 Proposed Project Description

The Deschutes Valley Trail Project will be approximately a 2-mile trail connecting from Tumwater Historical Park to Pioneer Park. The trail is broken into five segments, A1 has been constructed connecting Tumwater Historical Park to Brewery Park, A2, B, C, and D. This report focuses on Segment C, which begins east of the Valley Athletic Club and extends to Deschutes Valley Park. Segment C is located in Tumwater, Washington within the City of Tumwater property. The goal of Segment C is to complete a missing link in the existing trail by providing a paved, non-motorized trail along the edge of the existing Valley Golf Course. Project improvements include a 10-foot to 12-foot wide HMA trail with 2 foot gravel shoulders and the replacement of segments of existing cart paths. The Segment C trail alignment is approximately 5,150 LF and the Deschutes Valley Park Spur adds an additional 950 LF. The project site is located within the Budd/Deschutes Watershed and the Deschutes River Basin (See **Appendix 3, Exhibit 3A**).

See **Figure 1** below for the project location.

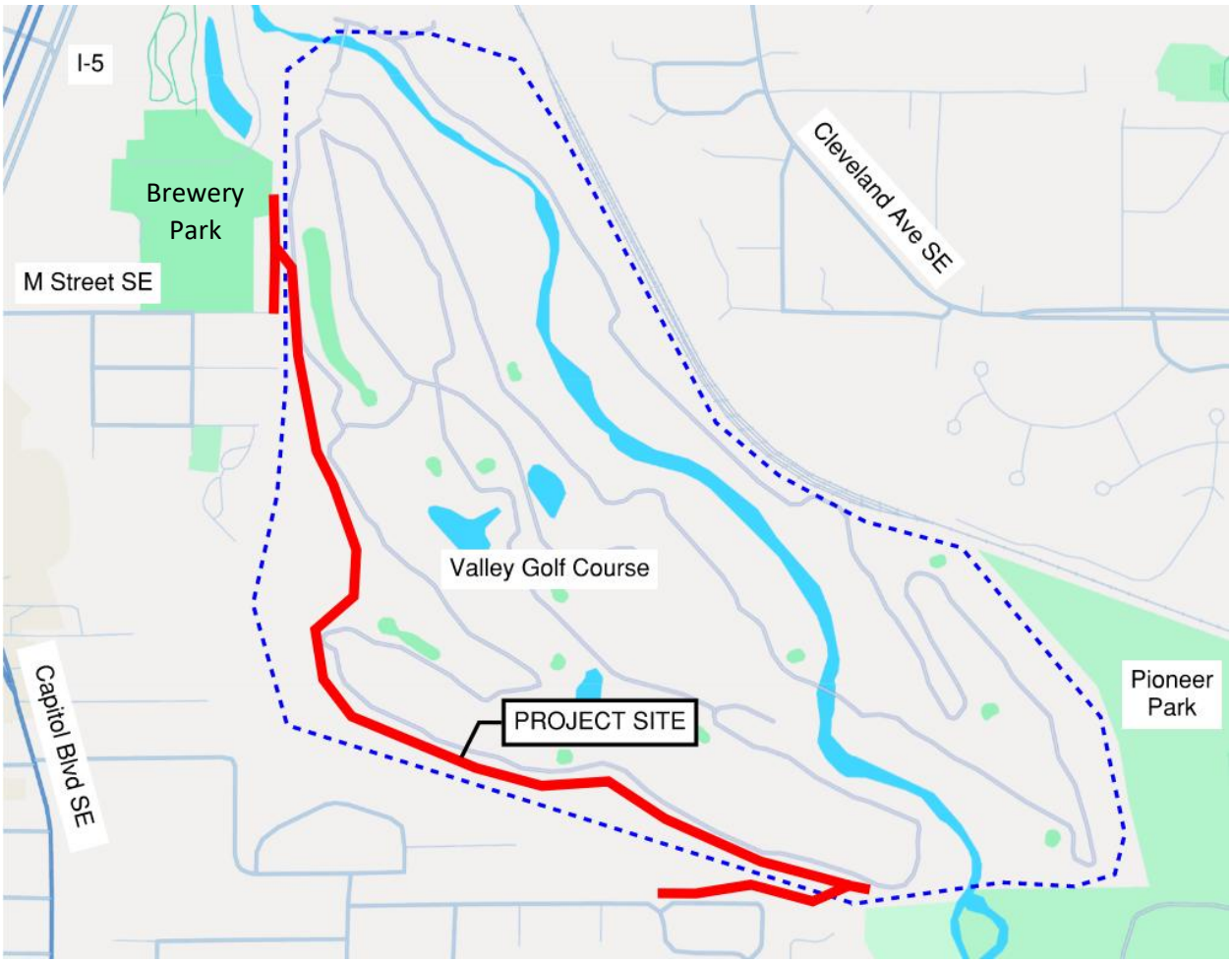


Figure 1 – Site Vicinity Map

1.1 Summary of Requirements

The stormwater design for this project meets the requirements outlined in the July 1, 2022 City of Tumwater Drainage Design and Erosion Control Manual (DDECM).

Per Figure 2.1 of the City of Tumwater DDECM, all minimum requirements apply to the new and replaced hard surfaces and converted vegetation areas (Refer to **Appendix 4, Exhibit 4A**). In addition, the requirements for redevelopment project sites in Section 2.3.2 of the City of Tumwater DDECM must be evaluated to determine if retrofitting existing surface is required. For a description of how each minimum requirement is being addressed, see **Sections 4.1.2 – 4.1.12** of this report.

2 Existing Conditions Description

The existing site consists of undeveloped land within the City of Tumwater property and portions of existing cart path near the boundary of the Tumwater Valley Golf Course, within City of Tumwater property. Surrounding land use includes parks/open space (Tumwater Valley Golf Course), General Commercial (The Valley Athletic Club, Serendipity Children's Center recently acquired by the City of Tumwater and Tumwater Valley Physical Therapy), and low-density single-family developments. Most of the existing surface on site consists of open grassy slopes or forested areas. For approximately 2,600 LF of the proposed trail footprint, the existing surface contains 8-foot-wide HMA cart paths and open grassy slopes to the north. In existing conditions, stormwater infiltrates in the grass and treed areas or sheet flows from the HMA cart path and infiltrates in nearby vegetation. The project site is composed of 6 Threshold Discharge Areas (TDAs) as shown in **Appendix 4, Exhibit 4C**. For a map of off-site drainage to the project site, refer to **Appendix 4, Exhibit 4B**.

TDA 1

TDA 1 is composed of two subbasins, Subbasin A, and Subbasin B:

- Subbasin A extends from the Valley Athletic Club parking lot to C 152+54 and M-line. The existing topography in this segment has a gradual downward slope from west to east.
- Subbasin B extends from C 153+38 to C 169+75. The grade is almost flat in this section of the project with a slight downward slope from east to west.

Surfaces that will be impacted by improvements in TDA 1 include existing pervious surface along the edge of the golf course, segments of existing cart paths, and undeveloped, forested areas. See **Table 1** below for the existing area takeoffs for TDA 1:

Table 1. Existing Area Takeoffs for TDA 1

TDA 1 EXISTING SURFACES IMPACTED BY THE PROJECT		
Surface Type	**Subbasin A Area (SF)**	**Subbasin B Area (SF)**
NPGIS	61	8,382
PGIS	0	0
Pervious	8,862	34,509
Impervious Total	61	8,382

Refer to **Appendix 4, Exhibit 4C for a breakdown of existing areas by subbasin.*

In TDA 1, stormwater currently flows into an existing wetland area between Palermo Valley Park and the Valley Golf Course. In Subbasin A, stormwater flows west into a stream located between the Valley Athletic Club and the golf course. The swale carries water south and discharges into the wetland. In Subbasin B, stormwater flows north through a buffer of trees and discharges into the same wetland. In Subbasin C, stormwater flows east into a stream located between the athletic center and the golf course. The stream carries water south and discharges into the category II wetland. Subbasins A, B and C are all part of TDA 1 because storm flows from the basins combine within one quarter mile downstream of the project site. Refer to **Appendix 4, Exhibit 4B** for a map of the flow path of existing stormwater from each basin area.

TDA 2

There is only one basin in TDA 2, Subbasin A:

- Subbasin A extends and is offset from C 166+50 – C 167+00. Existing topography in TDA 2 slopes downhill to the northeast.

Surfaces that will be impacted by improvements in TDA 2 consist of undeveloped, forested areas. See **Table 2** below for the existing area takeoffs for TDA 2:

Table 2. Existing Area Takeoffs for TDA 2

TDA 2 EXISTING SURFACES IMPACTED BY THE PROJECT	
Surface Type	**Area (SF)**
NPGIS	592
PGIS	0
Pervious	1,230
Impervious Total	592

In TDA 2, stormwater currently flows northeast through a forested area and across the golf course before entering a pond in the middle of the course. From the pond, stormwater flows southeast to another pond and eventually discharges into the Deschutes River near the east end of the project.

TDA 3

TDA 3 has one subbasin, Subbasin A :

- Subbasin A extends from C 182+75 – C 185+25. In Subbasin A, the existing grade slopes downward from west to east.

Surfaces that will be impacted by improvements in TDA 3 include existing pervious surface along the edge of the golf course, segments of existing cart paths, and undeveloped, forested areas. See **Table 3** below for the existing area takeoffs for TDA 3:

Table 3. Existing Area Takeoffs for TDA 3

TDA 3 EXISTING SURFACES IMPACTED BY THE PROJECT	
Surface Type	**Area (SF)**
NPGIS	1,648
PGIS	0
Pervious	5,291
Impervious Total	1,648

Refer to **Appendix 4, Exhibit 4C for a breakdown of existing areas by subbasin.*

In existing conditions, stormwater from TDA 3 flows to a pond in the golf course located southeast of the project site. The pond is within 1,000 feet of the Deschutes River. Any excess water that overtops the pond in a larger storm event follows the grade of the site to the east and discharges into the Deschutes River. In Subbasin A, stormwater flows southeast through a treed valley before it is captured in the pond. In Subbasin B, stormwater flows northeast across a grassy hillside before entering the pond. Subbasin A and Subbasin B are both part of TDA 3 because storm flows from the basins merge within one quarter mile downstream of the project site at a pond. Refer to **Appendix 4, Exhibit 4B** for a map of the flow path of existing stormwater from each basin area.

TDA 4

TDA 4 has two subbasins, Subbasin A and Subbasin B:

- Subbasin A is located between C 172+20 – C 182+75. The existing topography in this segment of the project slopes downhill from north to south to an existing valley that runs parallel to the project site.
- Subbasin B is located between C 185+25 – C 192+50. The existing grade in Subbasin B also slopes downhill from north to south.

Surfaces that will be impacted by the project in TDA 4 include existing pervious surface along the edge of the golf course and segments of existing cart paths. See **Table 4** below for the existing area takeoffs for TDA 4:

Table 4. Existing Area Takeoffs for TDA 4

TDA 4 EXISTING SURFACES IMPACTED BY THE PROJECT		
Surface Type	**Subbasin A Area (SF)**	**Subbasin B Area (SF)**
NPGIS	4,100	4,491
PGIS	0	0
Pervious	21,683	36,035
Impervious Total	4,100	4,491

Refer to **Appendix 4, Exhibit 4C for a breakdown of existing areas by subbasin.*

In TDA 4, Stormwater currently flows south to an existing valley running parallel to the project site. From the valley, the existing grade carries water southeast where it discharges into a category II wetland bordering the Tumwater Valley Golf Course. Subbasin A and Subbasin B are both part of TDA 4 because storm flows from the basins merge within one quarter mile downstream of the project site at the wetland. Refer to **Appendix 4, Exhibit 4B** for a map of the flow path of existing stormwater from each basin area.

TDA 5

TDA 5 is composed of 4 subbasins, Subbasin A, Subbasin B, Subbasin C, and Subbasin D:

- Subbasin A spans between C 192+50 – C 197+25. Existing topography in Subbasin A slopes downhill from south to north.
- Subbasin B spans between C 197+25 – C 200+90. In this segment, the existing topography is almost flat, with a slight downward slope from north to south.
- Subbasin C includes the Deschutes Valley Park Spur and spans between C 300+00 – C 308+64. Existing topography in Subbasin C slopes downhill from south to north.

Surfaces that will be impacted by the project in TDA 5 include existing pervious surface along the edge of the golf course, segments of existing cart paths, and undeveloped, forested areas. See **Table 5** below for the existing area takeoffs for TDA 5:

Table 5. Existing Area Takeoffs for TDA 5

TDA 5 EXISTING SURFACES IMPACTED BY THE PROJECT			
Surface Type	**Subbasin A Area (SF)**	**Subbasin B Area (SF)**	**Subbasin C Area (SF)**
NPGIS	3,995	1,304	168
PGIS	0	0	0
Pervious	11,682	9,627	64,918
Impervious Total	3,995	1,304	168

Refer to **Appendix 4, Exhibit 4C for a breakdown of existing areas by subbasin.*

In TDA 5, stormwater from Subbasin A currently flows northeast across the golf course and into the Deschutes River. In Subbasin B, stormwater flows southeast through an existing forested area before discharging into the Deschutes River. In Subbasin C, the stormwater is currently doing two things. The upper section near Deschutes Valley Park flows to the embankment where it is collected by a catch basin that connects to the golf course's stormwater pipes and the other portion of the site is sheet flowing through a forested area and across the golf course into the Deschutes River similar to Subbasin A. Subbasins A, B, and C are all part of TDA 5 because storm flows from the basins merge within one quarter mile downstream of the project site at the Deschutes River. Refer to **Appendix 4, Exhibit 4B** for a map of the flow path of existing stormwater from each basin area.

TDA 6

TDA 6 has one subbasin, Subbasin A:

- Subbasin A extends from C 169+75 – C 172+25. In Subbasin A, the existing grade slopes downward from west to east.

Surfaces that will be impacted by improvements in TDA 6 made up of undeveloped, forested areas. See **Table 6** below for the existing area takeoffs for TDA 6:

Table 6. Existing Area Takeoffs for TDA 6

TDA 6 EXISTING SURFACES IMPACTED BY THE PROJECT	
Surface Type	**Area (SF)**
NPGIS	0
PGIS	0
Pervious	5,847
Impervious Total	0

Refer to **Appendix 4, Exhibit 4C for a breakdown of existing areas by subbasin.*

In existing conditions, stormwater from TDA 6 flows to a depression between wetlands A and B. This depression is directly south of wetland A and northeast of wetland B. Any stormwater overtopping this depression is expected to flow into either of the wetlands. Refer to **Appendix 4, Exhibit 4B** for a map of the flow path of existing stormwater from each basin area.

2.1.1 Existing Soils

A draft geotechnical report evaluating soil and groundwater conditions was prepared by Sage Geotechnical on March 10th, 2026.

Based on the geology review completed by Sage Geotechnical, soils in Segment C are comprised of post-glaciation sand, silt, and gravel alluvium deposits from the Deschutes River. Recessional outwash was also found to be present given due to the significant fill material involved in grading the golf course. Subsurface conditions were analyzed based on 4 drilled borings and 40 hand augers. Soils discovered include sod/topsoil between depths of 0.15 and 2 feet, forest duff between depths of 0.7 and 1.4 feet in wooded areas, fill between depths of 0.25 and 4.5 feet in developed portions of the site, marsh deposits between depths of 1 and 10 feet in historic wetland areas, alluvium between depths of 2 and 5.1 feet, and recessional outwash between the surface soils and the full depth of exploration.

The existing groundwater level is located between 1.1 and 9.0 feet below the ground surface, including perched irrigation water and the groundwater table associated with the Deschutes River. Fill grading activities at the site created a complicated groundwater regime, trapping and perching groundwater along the west side of the golf course. It is anticipated that groundwater in the valley fluctuates seasonally and is near the ground surface over most of the project site during the winter. Refer to **Appendix 3, Exhibit 3C** for the draft geotechnical report.

Soil data from the NRCS web soil survey is consistent with findings from the geotechnical report, confirming that soils are composed primarily of Xerorthents fill material, Everett very gravelly sandy loam, Norma silt loam, Indianola loamy sand, and Puyallup silt loam. The groundwater data is also consistent with the geotechnical report, confirming a variable depth to the water table from 0-6.6 feet below the existing ground surface. Refer to **Appendix 3, Exhibit 3B** for the NRCS Soil Report.

The geotechnical report by Sage Geotechnical has yielded infiltration rates for TDA 5 and soil types for the entire project area; refer to **Appendix 3, Exhibit 3D**.

2.1.2 Critical Areas

There are no City of Tumwater maps for the following types of critical areas; the information provided below is based on Thurston County maps included as **Appendix 3, Exhibit 3A**.

- Geologic Hazard Areas
  - There are no known landslide and no volcanic hazard areas within the project site.
- Known Areas of Soil or Groundwater Concern
  - There are no known areas of soil or groundwater concern within the project site.
- High Groundwater Hazard Areas
  - There are three ponds north of the project improvements that have a high groundwater hazard. Construction activities will not affect these areas.
- Flood Zones
  - The northern section of the project is located within the 100-year flood zone.
- Critical Aquifer Recharge Areas
  - The project improvements are in a moderate-to-high class aquifer recharge area. Per the City of Tumwater DDECM and Section 16.24.050 of the Municipal Code, the project does not involve storage of hazardous materials and therefore does not trigger any additional requirements for the aquifer recharge area.
- Wetlands
  - The northern section of the project is adjacent to a designated category II wetland A. Along the central western portion of the trail category III wetland B resides. The southern section of the project is adjacent to a designated category II wetland C. Approximately half of the project improvements are within 300 feet of a wetland area.

  - The existing cart path stretches within these wetland boundaries, and the planned improvements are designed to follow the existing path closely. Additional impervious surface is expected to be minimal and stretched across the several basins on the project site. See *section 4.1.9* for further descriptions of each wetland.

- Wellhead Protection Areas
  - Wellhead No. 89700 is located west of the project site and project improvements are located within the 6-month - 5-year travel times. Since new impervious surfaces on the project are non-pollution-generating and the project does not fall under any of the prohibited uses listed in Section 16.26.040 of the City of Tumwater Municipal Code, no additional requirements are triggered.

- Washington State Department of Ecology Water Quality Atlas Map
  - The site is in the Budd/Deschutes Watershed, Water Resource Inventory Area (WRIA) 13 and the Deschutes River Basin (see **Appendix 3, Exhibit 3A**).
  - The Deschutes River is designated as a Category 5 Assessed Water - 303(d) (see **Appendix 3, Exhibit 3A**) specifically for:
    - Bacteria - fecal coliform, and
    - Benthic Macroinvertebrates Bioassessments.
  - At the time the City of Tumwater DDECM was written, a Water Quality Improvement Report and Implementation Plan (also known as a TMDL) had been developed for the Deschutes River, Percival Creek, and Budd Inlet Tributaries for Temperature, Fecal Coliform Bacteria, Dissolved Oxygen, pH, and Fine Sediment Total Maximum Daily Load (see **Appendix 3, Exhibit 3A**). The plan lists nine specific actions the City of Tumwater implemented via additional water quality mitigation requirements included in City of Tumwater DDECM, Volume I, Section 4.3.5 to meet requirements of the TMDL.

3 Vicinity Analysis and Subbasin Description

3.1.1 Vicinity Analysis

A qualitative analysis of off-site tributary areas is included as **Appendix 4, Exhibit 4B**. Off-site tributary areas were delineated based on surface contours provided by the survey and Thurston County GIS. The downstream analysis was completed from upstream contributing areas to a minimum of ½ mile downstream of the project site for each TDA.

The following items were analyzed during development of the Basin and Work Maps included as **Appendix 4**:

- All areas pertinent to the analyses such as site boundaries, study area boundaries, streets and prominent features, downstream flow path, potential/existing problems, etc. shall be keyed to features shown on the Work Map.

  - Refer to **Appendix 4, Exhibit 4C** for the Work Map.

- Describe the drainage system between the site and the receiving surface waters (or pothole, regional detention facility, etc.). Provide information on pipe sizes, channel characteristics, and drainage structures. Describe emergency services located along the flow path (e.g., fire/police stations, hospitals). Describe environmentally sensitive areas, such as wetlands, etc.

    - In existing conditions, stormwater sheet flows across forested areas and the Valley Golf Course into wetlands, ponds, and the Deschutes River. There are no emergency services located along the flow path. Refer to **Section 2** of this report for a detailed description of the existing drainage path from each TDA and subbasin. Refer to **Section 4.1.9** of this report for a description of wetland areas.

- Describe off-site drainage tributary to the project. Describe any bypass drainage from the project that will not be controlled.

    - Refer to **Appendix 4, Exhibit 4B** for a map of off-site drainage tributary to the project. There is no bypass drainage from the project.

- Evaluate existing and potential impacts from conveyance system capacity issues, flooding or bank overtopping, upland erosion impacts, including slope stability and landslide hazards, stream channel erosion, violations of surface water quality standards or violations of groundwater standards in a wellhead protection area.

    - Per **Section 2.1.2** of this report, the only critical areas that impact the project are flood zones, critical aquifer recharge areas, wetlands, and wellhead protection areas. The project improvements are not anticipated to impact these critical areas. Wetland migration will be completed per the direction of Land Services Northwest (LSNW) report.

- Identify the existence of wellhead protection areas, drinking water wells, and septic systems both of record and others on the site and adjacent property within setback distance for stormwater retention/detention facilities identified in Volume V of the City of Tumwater DDECM.

    - Refer to **Section 2.1.2** of this report for a description of wellhead protection areas.

- Identify the existence of fuel tanks, in-use or abandoned.

    - No fuel tanks are located within the project site.

- Determine whether the project is within the potential flood hazard area as defined in TMC Title 18.38, show the 100-year flood hazard area on the plans.

    - The project falls under the special flood hazard area according to the FEMA Flood Map included in **Appendix 3, Exhibit 3A** and is therefore subject to a floodplain development permit per TMC Title 18.38. The project shall be designed and located to minimize the impact on flood flows, food storage, water quality, and habitat. Sheet flow dispersion shall be implemented to mimic predeveloped hydrologic conditions.

3.1.2 Subbasin Description

Below is a description of proposed surfaces in each TDA and subbasin. Project improvements generally include a 10-foot to 12-foot wide HMA shared-use path with 1-2-foot gravel shoulders and 8-foot to 7.25-foot cart path where practicable. Sections of trail canopy fence are included as needed to delineate the shared use path from the cart path in areas with both vehicular and pedestrian travel. The proposed HMA trail is graded at a 1.5% slope to the west, away from the existing golf course.

TDA 1

See **Table 6** below for a summary of proposed surfaces in TDA 1:

Table 7. Proposed Area Takeoffs for TDA 1

TDA 1 PROPOSED AREAS		
Surface Type	**Subbasin A Area (SF)**	**Subbasin B Area (SF)**
NPGIS (New)	6,311	24,147
PGIS (New)	0	0
New Hard Surface	6,311	24,147
Pervious	2,612	10,719
NPGIS (Replaced)	0	8,025
PGIS (Replaced)	0	0
Replaced Hard Surface	0	8,025

Refer to **Appendix 4, Exhibit 4C for a breakdown of proposed areas by subbasin.*

TDA 2

See **Table 7** below for a summary of proposed surfaces in TDA 2:

Table 8. Proposed Area Takeoffs for TDA 2

TDA 2 PROPOSED AREAS	
Surface Type	**Subbasin A Area (SF)**
NPGIS (New)	86
PGIS (New)	0
New Hard Surface	86
Pervious	1,148
NPGIS (Replaced)	588
PGIS (Replaced)	0
Replaced Hard Surface	588

Refer to **Appendix 4, Exhibit 4C for a breakdown of proposed areas by subbasin.*

TDA 3

See **Table 8** below for a summary of proposed surfaces in TDA 3:

Table 9. Proposed Area Takeoffs for TDA 3

TDA 3 PROPOSED AREAS	
Surface Type	**Subbasin A Area (SF)**
NPGIS (New)	3,921
PGIS (New)	0
New Hard Surface	3,921
Pervious	1,476
NPGIS (Replaced)	1,542
PGIS (Replaced)	0
Replaced Hard Surface	1,542

Refer to **Appendix 4, Exhibit 4C for a breakdown of proposed areas by subbasin.*

TDA 4

See **Table 9** below for a summary of proposed surfaces in TDA 4:

Table 10. Proposed Area Takeoffs for TDA 4

TDA 4 PROPOSED AREAS		
Surface Type	**Subbasin A Area (SF)**	**Subbasin B Area (SF)**
NPGIS (New)	16,109	12,254
PGIS (New)	0	0
New Hard Surface	16,109	12,254
Pervious	6,173	25,020
NPGIS (Replaced)	3,501	3,252
PGIS (Replaced)	0	0
Replaced Hard Surface	3,501	3,252

Refer to **Appendix 4, Exhibit 4C for a breakdown of proposed areas by subbasin.*

TDA 5

See **Table 10** below for a summary of proposed surfaces in TDA 5:

Table 11. Proposed Area Takeoffs for TDA 5

TDA 5 PROPOSED AREAS			
Surface Type	**Subbasin A Area (SF)**	**Subbasin B Area (SF)**	**Subbasin C Area (SF)**
NPGIS (New)	6,466	7,815	12,175
PGIS (New)	0	0	0
New Hard Surface	6,466	7,815	12,175
Pervious	5,269	3,086	52,911
NPGIS (Replaced)	3,942	30	0
PGIS (Replaced)	0	0	0
Replaced Hard Surface	3,942	30	0

Refer to **Appendix 4, Exhibit 4C for a breakdown of proposed areas by subbasin.*

TDA 6

See **Table 11** below for a summary of proposed surfaces in TDA 6:

Table 12. Proposed Area Takeoffs for TDA 6

TDA 6 PROPOSED AREAS	
Surface Type	**Subbasin A Area (SF)**
NPGIS (New)	3,397
PGIS (New)	0
New Hard Surface	3,397
Pervious	2,450
NPGIS (Replaced)	0
PGIS (Replaced)	0
Replaced Hard Surface	0

Refer to **Appendix 4, Exhibit 4C for a breakdown of proposed areas by subbasin.*

4 Flow Control and Water Quality Facility Sizing

4.1.1 Minimum Requirements Overview

The stormwater design for this project complies with applicable minimum requirements outlined in the City of Tumwater DDECM. See **Section 4.1.2 – 4.1.12** of this report for a description of how the project complies with each minimum requirement.

According to Figure 2.1 of the City of Tumwater DDECM, this project is classified as new development since the project site has less than 35% existing impervious surface coverage. The project also adds over 5,000 square feet of new plus replaced hard surfaces, so all minimum requirements apply to the new and replaced hard surfaces and converted vegetation areas. Since the site has existing impervious area,

the City of Tumwater DDECM also requires a review of additional requirements for redevelopment project sites which was determined to be required

This project results in 113,216 SF of new hard surface, which is approximately 360% of the existing hard surface. In addition, none of the new hard surfaces are pollution-generating. Refer to **Appendix 4, Exhibit 4A** for the minimum requirements flow chart.

4.1.2 MR #1: Stormwater Site Planning

Stormwater site plans are included as part of the Design Submittal Package. The stormwater design for this project retains native vegetation and minimizes impervious surfaces to the maximum extent feasible.

According to Chapter 3, Table 3.1 of the City of Tumwater DDECM, the following documents are required to meet Minimum Requirement #1:

- Stormwater Pollution Prevention Plan (SWPPP)
    - Refer to **Appendix 5**.

- Drainage Control Plan
    - This report along with the stormwater site plans included with the Design Submittal Package serve as the drainage control plan.

4.1.3 MR #2: Construction Stormwater Pollution Prevention Plan (SWPPP)

The Construction SWPPP addresses erosion and sediment control during site construction activities and demonstrate compliance with the 13 required elements per Volume II of the City of Tumwater DDECM. Refer to **Appendix 5** for the Construction SWPPP.

4.1.4 MR #3: Source Control of Pollution

All known available, and reasonable source control BMPs shall be applied to the project to prevent stormwater from coming into contact with pollutants on the developed site. Pollutants are not anticipated in developed conditions; pollutant sources are limited to construction activities.

The Source control BMPs are:

- BMP C152: Sawcutting and Surfacing Pollution Prevention
- BMP C153: Material Delivery, Storage, and Containment
- BMP C154: Concrete Washout Area
- BMP C250: Construction Stormwater Filtration
- BMP C252: Treating and Disposing of High pH Water

4.1.5 MR #4: Preservation of Natural Drainage Systems and Outfalls

Natural drainage patterns shall be maintained, and discharges from the project site shall occur at the natural location, to the maximum extent practicable. The manner by which runoff is discharged from the project site shall not cause a significant adverse impact to downstream receiving waters and downgradient properties. All outfalls shall employ energy dissipation.

Throughout the project, the existing stormwater either flows across the existing golf course and collects at low points or is absorbed by native vegetation in forested areas. In the proposed C-Line conditions, stormwater shall continue to sheet flow from the path into surrounding vegetation and follow the natural topography of the site. In the proposed T-Line conditions, stormwater will flow along a ditch populated with check dams into a catch basin that pipes into an infiltration trench drain.

4.1.6 MR #5: On-Site Stormwater Management

Per Section 2.4.6 of the City of Tumwater DDECM, the BMPs from List #2 for all surfaces within each type of surface in List #2 shall be evaluated to meet Minimum Requirement 5. List #2 applies since the project triggers Minimum Requirements #1 – 11. BMPs shall be considered for each type of surface in the order listed and the first feasible BMP shall be implemented. Below are the List #2 BMPs for each surface type and explanations for why the BMPs were or were not implemented on this project.

Lawn and Landscaped Areas:

- **Postconstruction soil quality and depth (City of Tumwater DDECM Volume, Chapter 6) (Ecology BMP T5.13)** - This BMP is feasible and will be implemented onsite to the maximum extent feasible.

Roofs

- No roofs are proposed with this project.

Other Hard Surfaces:

- **Full Dispersion (City of Tumwater DDECM Volume V, Section 7.2) (Ecology BMP T5.30)** – This BMP is infeasible and will not be implemented onsite: a minimum forested or native vegetation flowpath length of 100 feet cannot be achieved.
- **Permeable Pavement (City of Tumwater DDECM Volume V, Chapter 11) (Ecology BMP T5.15)** – This BMP is infeasible and will not be implemented onsite. According to the NRCS web soil survey included in **Appendix 3, Exhibit 3B**, the depth to the water table is less than 3 feet for approximately half of the project area. The geotechnical report states that the water table varies due to perched groundwater and is at the ground surface throughout the winter months.
- **Bioretention (City of Tumwater DDECM Volume V, Chapter 9) (Ecology BMPs T5.14 and T7.30)** – This BMP is infeasible and will not be implemented onsite. According to the NRCS web soil survey included in **Appendix 3, Exhibit 3B**, the depth to the water table is less than 3 feet for approximately half of the project area. The geotechnical report states that the water table varies due to perched groundwater and is at the ground surface throughout the winter months.
- **Sheet Flow Dispersion (City of Tumwater DDECM Volume V, Sections 7.3) (Ecology BMP T5.12)** – This BMP is feasible and will be implemented onsite:
    - Site setbacks and design criteria provided in DDECM Volume V, Chapter 7.3.4 are achieved by proposing:
        - A 2-foot-wide transition zone to discourage channeling must be provided between the edge of the contributing surface (or building eaves) and the downslope vegetation.

        - A 10-foot-wide vegetated buffer for up to 20 feet of width of contributing surface.
    - The contributing surface is designed to meet ADA requirements with 1.5% max cross slope.
    - The dispersion area runs parallel to the proposed path, accepting sheet flow runoff.
    - The length of the dispersion area is equivalent to the length of the proposed path.
    - Positive drainage for sheet flow runoff is proposed:
        - The average longitudinal slope of the dispersion area is approximately 3%, ranging from 0% - 20% throughout the project.
    - Per City of Tumwater DDECM Volume V, Section 7.3.3 Modeling and Sizing: Where sheet flow dispersion is used to disperse runoff into an undisturbed native landscape area or an area that meets the requirements of Chapter 6, the impervious area may be modeled as grass/lawn area.

4.1.7 MR #6: Runoff Treatment

This project triggers Minimum Requirement 6 for new hard surfaces and converted vegetation areas since the improvements add more than 5,000 SF of new plus replaced hard surface at the project level (see **Appendix 4, Exhibit 4C** for area takeoffs). Per Section 2.4.7 of the City of Tumwater DDECM, the following thresholds for Minimum Requirement 6 are considered for each individual TDA, for new and replaced hard surfaces. If a TDA does not meet either of the following criteria, then Runoff Treatment is not required for that TDA:

- Projects in which the total pollution-generating hard surface (PGHS) is 5,000 square feet or more in a threshold discharge area of the project, or
- Projects in which the total pollution-generating pervious surface (PGPS) – not including permeable pavements – are 0.75 acre or more in a threshold discharge area, and from which there will be a surface water discharge in a natural or artificial conveyance system from the site.

Below is a summary of how each TDA complies with Minimum Requirement #6 according to the TDA thresholds listed above:

TDA 1

TDA 1 has 0 SF of new and replaced pollution-generating hard surface. TDA 1 also has no pollution-generating pervious surface. TDA 1 therefore falls below both thresholds and does not require runoff treatment BMPs.

TDA 2

TDA 2 has 0 SF of new and replaced pollution-generating hard surface. TDA 2 also has no pollution-generating pervious surface. TDA 2 therefore falls below both thresholds and does not require runoff treatment BMPs.

TDA 3

TDA 3 has 0 SF of new and replaced pollution-generating hard surface. TDA 3 also has no pollution-generating pervious surface. TDA 3 therefore falls below both thresholds and does not require runoff treatment BMPs.

TDA 4

TDA 4 has 0 SF of new and replaced pollution-generating hard surface. TDA 4 also has no pollution-generating pervious surface. TDA 4 therefore falls below both thresholds and does not require runoff treatment BMPs.

TDA 5

TDA 5 has 0 SF of new and replaced pollution-generating hard surface. TDA 5 also has no pollution-generating pervious surface. TDA 5 therefore falls below both thresholds and does not require runoff treatment BMPs.

Runoff Treatment is triggered for the project, but runoff treatment BMPs are not required for any of the TDAs because TDAs 1-5 fall below the TDA threshold criteria.

A flow control is required in Subbasin C. Stormwater running south will collect in a ditch with check dams and convey runoff into a catch basin that flows into an infiltration trench which is 6 feet wide and 50 feet long designed for 99.99% infiltration. Flow is designed to mimic existing drainage patterns into the Deschutes River.

TDA 6

TDA 6 has 0 SF of new and replaced pollution-generating hard surface. TDA 6 also has no pollution-generating pervious surface. TDA 6 therefore falls below both thresholds and does not require runoff treatment BMPs.

4.1.8 MR #7: Flow Control

Minimum Requirement 7 is triggered at a project-level for new hard surfaces and converted vegetation areas. Below is a summary of TDA and project site areas, along with a description of the types of surfaces within each TDA for reference.

Table 13. TDA and Project Site Areas

Surface Type	TDA 1 (SF)	TDA 2 (SF)	TDA 3 (SF)	TDA 4 (SF)	TDA 5 (SF)	TDA 6 (SF)	Project Area (SF)	Surface Description
New PGIS	0	0	0	0	0	0	0	
New NPGIS	30,458	86	3,921	28,363	26,456	3,397	92,681	HMA trail
New Hard Surface	30,458	86	3,921	28,363	26,456	3,397	92,681	360% of existing hard surface
Replaced PGIS	0	0	0	0	0	0	0	
Replaced NPGIS	8,025	588	1,542	6,753	3,972	0	20,880	HMA trail
Replaced Hard Surface	8,025	588	1,542	6,753	3,972	0	20,880	HMA trail
New + Replaced Impervious	38,483	674	5,463	35,116	30,428	3,397	113,561	HMA trail
Effective Impervious	38,483	674	5,463	35,116	30,428	3,397	113,561	HMA trail
Existing Impervious Surface	8,443	592	1,648	8,591	5,467	0	24,741	12% of total project area
Total Project Area*	51,814	1,822	6,939	66,309	91,694	5,847	224,425	

Project Area is defined as outlined in **Appendix 4, Exhibit 4C.*

Per City of Tumwater DDECM Volume I, Section 2.4.8 Minimum Requirement #7: Flow Control, Thresholds: the following circumstances require achievement of the standard flow control requirement for western Washington:

A. Projects in which the total of effective impervious surfaces is 10,000 square feet or more in a threshold discharge area.
B. Projects that convert 0.75 acre or more of native vegetation to lawn or landscape, or convert 2.5 acres or more of native vegetation to pasture in a threshold discharge area, and from which there is a surface discharge in a conveyance system (natural or man-made) from the site.
C. Projects that, through a combination of effective hard surfaces and converted vegetation areas, cause a 0.1 cubic feet per second increase in the 100-year recurrence interval flow frequency from a threshold discharge area, as estimated using the WWHM, or other approved model and 1-hour time steps (or a 0.15 cubic feet per second increase using 15-minute time steps).

Using WWHM at 15-minute time steps (with predeveloped land cover being existing condition and mitigated impervious area modeled as lawn), TDA 2, TDA 3, and TDA 6 are flow control exempt and do not require flow control BMPs:

Table 14. Flow Control Exemption

Threshold		TDA					
		1	2	3	4	5	6
A		Yes	No	No	Yes	Yes	No
B		No	No	No	No	Yes	No
C	100-year Peak Flow (cfs)						
	Predeveloped	0.364	0.009	0.036	0.228	0.207	0.051
	Developed	0.831	0.019	0.120	0.901	1.349	0.090
	Increase	0.467	0.010	0.084	0.673	1.142	0.039
	Increase > 0.15 cfs	Yes	No	No	Yes	Yes	No
Flow Control Exempt		No	Yes	Yes	No	No	Yes

TDA 1, TDA 4, and TDA 5 will utilize Sheet Flow Dispersion (City of Tumwater DDECM Volume V, Sections 7.3) (Ecology BMP T5.12) as described in Section 4.1.6 of this report.

TDA 5 will also utilize concentrated flow dispersion (Ecology BMP T5.11) in Subbasin C.

4.1.9 MR #8: Wetlands Protection

Minimum Requirement #8 states that discharges to wetlands shall maintain the hydrologic conditions, hydrophytic vegetation, and substrate characteristics necessary to support existing and designated wetland uses and functions. Wetlands Protection applies to TDA 1, TDA 2, TDA 3, and TDA 4, all of which discharge into designated wetland areas. The following information went under investigation for all wetlands adjacent to the project site:

- Wetland A is Category II with a habitat score of seven
- Wetland B is Category III with a habitat score of seven

- Wetland C is Category II with a habitat score of six
- No known Presence/absence of endangered species currently
- No known Presence/absence of breeding native amphibians currently

Wetland protection requirements shall be determined per Figure 2.4 of the City of Tumwater DDECM included as **Appendix 6**.

4.1.10 MR #9: Operation and Maintenance

Sheet flow dispersion areas shall be maintained and managed by the City of Tumwater. An Operation and Maintenance plan is not provided as part of this report and shall be completed by the City of Tumwater as desired.

4.1.11 MR #10: Financial Liability

This project is located within the publicly owned property and shall be owned and maintained by the City of Tumwater.

4.1.12 MR #11: Off-Site Analysis and Mitigation

Refer to **Section 3.1.1** of this report for a qualitative downstream analysis. A quantitative analysis is not anticipated given that the stormwater management strategy is sheet flow dispersion.

5 Aesthetic Considerations for Facilities

The City of Tumwater DDECM states that stormwater facilities shall be designed to be aesthetically pleasing and meet the landscaping requirements of TMC 18.47 and of Volume V, Appendix V-E of the DDECM.

Aesthetic Considerations:

- **Post-Construction Soil Quality and Depth**
  - Any areas disturbed during construction shall be replaced with the appropriate soil section and re-seeded prior to final completion.
- **Sheet Flow Dispersion**
  - Designated dispersion areas shall be maintained as vegetation throughout the life of the project.

Landscaping Requirements (TMC 18.47):

- The Deschutes Valley Trail – Segment C Project site is located in a parks/open space zoning category. TMC 18.47 does not have any additional landscaping requirements for open space zones.

Landscaping Requirements (DDECM Volume V, Appendix V-E):

- Volume V, Appendix V-E of the City of Tumwater DDECM discusses the use of facility liners to minimize pollutant-laden runoff from treatment facilities. Runoff treatment BMPs are not required as part of this project, so this section does not apply to the project.

6 Covenants, Dedications, Easements

This project is located within the publicly owned property and is owned and maintained by the City of Tumwater. No covenants, dedications, or easements apply to the project.

7 Agreements and Guarantees

Maintenance and/or operational bonding or other financial guarantees shall be consistent with Minimum Requirement #10. Refer to **Section 4.1.11** of this report.

8 Other Permits or Conditions Placed on the Project

SCJ shall provide permit support as needed for the anticipated permits below along with any additional permits identified by the City of Tumwater:

Table 15. Anticipated Permits and Variances

Agency	Permit/Approval	Notes
City of Tumwater	Floodplain Development Permit	Required per TMC 18.38
City of Tumwater	Wetland Permit	Required per City permits dashboard
NEPA	*	Identified in Section 5.6 the scope of work
SEPA	*	Identified in Section 5.6 the scope of work
City of Tumwater	Sheet Flow Dispersion Variance	Required to comply with Minimum Requirement #7

** Permit requirements to be provided by the City of Tumwater*

Appendix 1
Design Calculations

WWHM Calcs
6/30/2026
NWS

Existing Area Calculations **	sf	ac	Slope: Flat (0-5%), Moderate (5-15%), Steep (>15%).	Sidewalk	Lawn	Pasture	Forest
				ac			
TDA 1							
Subbasin A			Flat	Hydrologic Soil Group C/D and B/D			
Pervious	8,862	0.20				0.20	
NPGIS	61	0.00		0.00			
Total	8,923	0.20		0.00	0.00	0.20	0.00
Subbasin B			Flat	Hydrologic Soil Group B/D			
Pervious	34,509	0.79					0.79
NPGIS	8,382	0.19		0.19			
Total	42,891	0.98		0.19	0.00	0.00	0.79
TDA 2							
Subbasin A			Flat	Hydrologic Soil Group A			
Pervious	1,230	0.03				0.03	
NPGIS	592	0.01		0.01			
Total	1,822	0.04		0.01	0.00	0.03	0.00
TDA 3							
Subbasin A			Flat	Hydrologic Soil Group B/D			
Pervious	5,291	0.12					0.12
NPGIS	1,648	0.04		0.04			
Total	6,939	0.16		0.04	0.00	0.00	0.12
TDA 4							
Subbasin A			Flat	Hydrologic Soil Group B/D			
Pervious	21,683	0.50					0.50
NPGIS	4,100	0.09		0.09			
Total	25,783	0.59		0.09	0.00	0.00	0.50
Subbasin B			Flat	Hydrologic Soil Group B/D			
Pervious	36,035	0.83				0.83	
NPGIS	4,491	0.10		0.10			
Total	40,526	0.93		0.10	0.00	0.83	0.00
TDA 5							
Subbasin A			Moderate	Hydrologic Soil Group B/D			
Pervious	11,682	0.27				0.27	
NPGIS	3,995	0.09		0.09			
Total	15,677	0.36		0.09	0.00	0.27	0.00
Subbasin B			Moderate	Hydrologic Soil Group A			
Pervious	9,627	0.22					0.22
NPGIS	1,304	0.03		0.03			
Total	10,931	0.25		0.03	0.00	0.00	0.22
Subbasin C (T-Line)			Steep	Hydrologic Soil Group A			
Pervious	64,918	1.49					1.49
NPGIS	168	0.00		0.00			
Total	65,086	1.49		0.00	0.00	0.00	1.49
TDA 6							
Subbasin A			Flat	Hydrologic Soil Group B/D			
Pervious	5,847	0.13					0.13
NPGIS	0	0.00		0.00			
Total	5,847	0.13		0.00	0.00	0.00	0.13

** MR7 Flow Control TDA threshold: pre-developed landcover is existing condition.

Developed Area Calculations	sf	ac	Slope: Flat (0-5%), Moderate (5-15%), Steep (>15%).	Sidewalk	Lawn	Pasture	Forest
				ac			
TDA 1							
Subbasin A			Flat	Hydrologic Soil Group C/D and B/D			
Pervious	2,612	0.06			0.06		
NPGIS (New)*	6,311	0.14			0.14		
NPGIS (Replaced)*	0	0.00			0.00		
Total	8,923	0.20		0.00	0.20	0.00	0.00
Subbasin B			Flat	Hydrologic Soil Group B/D			
Pervious	10,719	0.25			0.25		
NPGIS (New)*	24,147	0.55			0.55		
NPGIS (Replaced)*	8,025	0.18			0.18		
Total	42,891	0.98		0.00	0.98	0.00	0.00
TDA 2							
Subbasin A			Flat	Hydrologic Soil Group A			
Pervious	1,148	0.03			0.03		
NPGIS (New)*	86	0.00			0.00		
NPGIS (Replaced)*	588	0.01			0.01		
Total	1,822	0.04		0.00	0.04	0.00	0.00
TDA 3							
Subbasin A			Flat	Hydrologic Soil Group B/D			
Pervious	1,476	0.03			0.03		
NPGIS (New)*	3,921	0.09			0.09		
NPGIS (Replaced)*	1,542	0.04			0.04		
Total	6,939	0.16		0.00	0.16	0.00	0.00
TDA 4							
Subbasin A			Flat	Hydrologic Soil Group B/D			
Pervious	6,173	0.14			0.14		
NPGIS (New)*	16,109	0.37			0.37		
NPGIS (Replaced)*	3,501	0.08			0.08		
Total	25,783	0.59		0.00	0.59	0.00	0.00
Subbasin B			Flat	Hydrologic Soil Group B/D			
Pervious	25,020	0.57			0.57		
NPGIS (New)*	12,254	0.28			0.28		
NPGIS (Replaced)*	3,252	0.07			0.07		
Total	40,526	0.93		0.00	0.93	0.00	0.00
TDA 5							
Subbasin A			Moderate	Hydrologic Soil Group B/D			
Pervious	5,269	0.12			0.12		
NPGIS (New)*	6,466	0.15			0.15		
NPGIS (Replaced)*	3,942	0.09			0.09		
Total	15,677	0.36		0.00	0.36	0.00	0.00
Subbasin B			Moderate	Hydrologic Soil Group A			
Pervious	3,086	0.07			0.07		
NPGIS (New)*	7,815	0.18			0.18		
NPGIS (Replaced)*	30	0.00			0.00		
Total	10,931	0.25		0.00	0.25	0.00	0.00
Subbasin C			Steep	Hydrologic Soil Group A			
Pervious	52,911	1.21			1.21		0.00
NPGIS (New)*	12,175	0.28			0.28		
NPGIS (Replaced)*	0	0.00			0.00		
Total	65,086	1.49		0.00	1.49	0.00	0.00

TDA 6

Subbasin A			Flat	Hydrologic Soil Group B/D			
Pervious	2,450	0.06		0.06			0.00
NPGIS (New)*	3,397	0.08		0.08			
NPGIS (Replaced)*	0	0.00		0.00			
Total	5,847	0.13		0.00	0.13	0.00	0.00

** Per City of Tumwater DDECM Volume V, Section 7.3.3: Where sheet flow dispersion is used to disperse runoff into an undisturbed native landscape area or an area that meets the requirements of Chapter 6, the impervious area may be modeled as grass/lawn area.*

NEXT DOCUMENT

WWHM4

PROJECT REPORT

General Model Information

WWHM2012 Project Name: Flow Control Exemption

Site Name: Flow Control Exemption
Site Address:
City:
Report Date: 7/1/2026
Gage: Olympia Airport
Data Start: 1955/10/01
Data End: 2008/09/30
Timestep: 15 Minute
Precip Scale: 0.000 (adjusted)
Version Date: 2024/06/28

POC Thresholds

Low Flow Threshold for POC1:	50 Percent of the 2 Year
High Flow Threshold for POC1:	50 Year
Low Flow Threshold for POC2:	50 Percent of the 2 Year
High Flow Threshold for POC2:	50 Year
Low Flow Threshold for POC3:	50 Percent of the 2 Year
High Flow Threshold for POC3:	50 Year
Low Flow Threshold for POC4:	50 Percent of the 2 Year
High Flow Threshold for POC4:	50 Year
Low Flow Threshold for POC5:	50 Percent of the 2 Year
High Flow Threshold for POC5:	50 Year
Low Flow Threshold for POC6:	50 Percent of the 2 Year
High Flow Threshold for POC6:	50 Year

Landuse Basin Data

Predeveloped Land Use

TDA 1

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
A B, Forest, Flat	0.2
C, Pasture, Flat	0.79
Pervious Total	0.99

Impervious Land Use	acre
SIDEWALKS FLAT	0.19
Impervious Total	0.19
Basin Total	1.18

Element Flow Componants:

Surface	Interflow	Groundwater
Componant Flows To:		
POC 1	POC 1	

TDA 2

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
A B, Forest, Flat	0.03
Pervious Total	0.03

Impervious Land Use	acre
SIDEWALKS FLAT	0.01
Impervious Total	0.01
Basin Total	0.04

Element Flow Componants:

Surface	Interflow	Groundwater
Componant Flows To:		
POC 2	POC 2	

TDA 3

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
A B, Forest, Flat	0.12
Pervious Total	0.12

Impervious Land Use	acre
SIDEWALKS FLAT	0.04
Impervious Total	0.04
Basin Total	0.16

Element Flow Componants:

Surface	Interflow	Groundwater
Componant Flows To:		
POC 3	POC 3	

TDA 4

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
A B, Forest, Flat	0.5
A B, Pasture, Flat	0.83
Pervious Total	1.33

Impervious Land Use	acre
SIDEWALKS FLAT	0.19
Impervious Total	0.19
Basin Total	1.52

Element Flow Componants:

Surface	Interflow	Groundwater
Componant Flows To:		
POC 4	POC 4	

TDA 5

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
A B, Forest, Steep	1.49
A B, Pasture, Mod	0.27
A B, Forest, Mod	0.22
Pervious Total	1.98

Impervious Land Use	acre
SIDEWALKS FLAT	0.12
Impervious Total	0.12
Basin Total	2.1

Element Flow Componants:

Surface	Interflow	Groundwater
Componant Flows To:		
POC 5	POC 5	

TDA 6

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
A B, Lawn, Flat	0.13
Pervious Total	0.13

Impervious Land Use	acre
Impervious Total	0
Basin Total	0.13

Element Flow Componants:

Surface	Interflow	Groundwater

Componant Flows To:

POC 6	POC 6

Mitigated Land Use

TDA 1

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
A B, Lawn, Flat	0.31
Pervious Total	0.31

Impervious Land Use	acre
SIDEWALKS FLAT	0.87
Impervious Total	0.87
Basin Total	1.18

Element Flow Componants:

Surface	Interflow	Groundwater

Componant Flows To:

POC 1	POC 1

TDA 2

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
A B, Lawn, Flat	0.03
Pervious Total	0.03

Impervious Land Use	acre
SIDEWALKS FLAT	0.01
Impervious Total	0.01
Basin Total	0.04

Element Flow Componants:

Surface	Interflow	Groundwater

Componant Flows To:

POC 2	POC 2

TDA 3

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
A B, Lawn, Flat	0.03
Pervious Total	0.03

Impervious Land Use	acre
SIDEWALKS FLAT	0.13
Impervious Total	0.13
Basin Total	0.16

Element Flow Componants:

Surface	Interflow	Groundwater
Componant Flows To:		
POC 3	POC 3	

TDA 4

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
A B, Lawn, Flat	0.71
Pervious Total	0.71

Impervious Land Use	acre
SIDEWALKS FLAT	0.81
Impervious Total	0.81
Basin Total	1.52

Element Flow Componants:

Surface	Interflow	Groundwater
Componant Flows To:		
POC 4	POC 4	

TDA 5

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
A B, Lawn, Steep	1.21
A B, Lawn, Mod	0.19
Pervious Total	1.4

Impervious Land Use	acre
SIDEWALKS MOD	0.42
SIDEWALKS STEEP	0.28
Impervious Total	0.7
Basin Total	2.1

Element Flow Componants:

Surface	Interflow	Groundwater
Componant Flows To:		
POC 5	POC 5	

TDA 6

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
A B, Lawn, Steep	0.01
A B, Lawn, Flat	0.06
Pervious Total	0.07

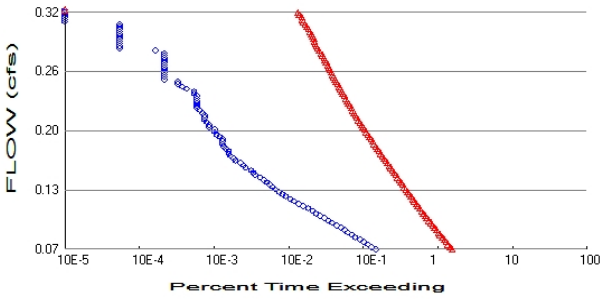
Impervious Land Use	acre
SIDEWALKS FLAT	0.08
Impervious Total	0.08
Basin Total	0.15

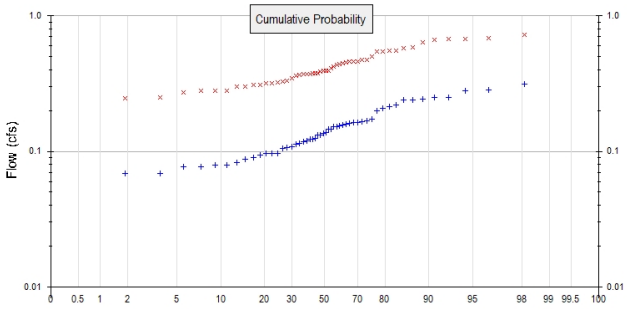
Element Flow Componants:

Surface	Interflow	Groundwater
Componant Flows To:		
POC 6	POC 6	

Analysis Results

POC 1





\+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 0.99
Total Impervious Area: 0.19

Mitigated Landuse Totals for POC #1
Total Pervious Area: 0.31
Total Impervious Area: 0.87

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	Flow(cfs)
2 year	0.135413
5 year	0.191963
10 year	0.231276
25 year	0.282941
50 year	0.322827
100 year	0.363885

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	Flow(cfs)
2 year	0.401883
5 year	0.516297
10 year	0.591812
25 year	0.687463
50 year	0.759111
100 year	0.831234

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #1

Year	Predeveloped	Mitigated
1956	0.118	0.371
1957	0.219	0.584
1958	0.097	0.321
1959	0.123	0.379
1960	0.153	0.458
1961	0.115	0.362
1962	0.068	0.310
1963	0.240	0.660
1964	0.146	0.420
1965	0.123	0.374

1966	0.090	0.279
1967	0.107	0.309
1968	0.083	0.271
1969	0.079	0.281
1970	0.094	0.298
1971	0.108	0.302
1972	0.198	0.452
1973	0.096	0.280
1974	0.138	0.461
1975	0.249	0.499
1976	0.162	0.438
1977	0.167	0.555
1978	0.159	0.471
1979	0.215	0.544
1980	0.113	0.345
1981	0.207	0.544
1982	0.146	0.461
1983	0.169	0.722
1984	0.132	0.334
1985	0.077	0.317
1986	0.151	0.378
1987	0.279	0.678
1988	0.079	0.243
1989	0.131	0.390
1990	0.241	0.581
1991	0.283	0.641
1992	0.097	0.319
1993	0.064	0.248
1994	0.068	0.247
1995	0.105	0.373
1996	0.156	0.444
1997	0.119	0.391
1998	0.162	0.391
1999	0.174	0.472
2000	0.151	0.433
2001	0.077	0.327
2002	0.136	0.378
2003	0.087	0.395
2004	0.244	0.683
2005	0.125	0.368
2006	0.312	0.679
2007	0.250	0.555
2008	0.164	0.410

Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	Predeveloped	Mitigated
1	0.3118	0.7219
2	0.2831	0.6834
3	0.2792	0.6789
4	0.2501	0.6781
5	0.2487	0.6601
6	0.2445	0.6408
7	0.2409	0.5839
8	0.2397	0.5806
9	0.2188	0.5554
10	0.2145	0.5550
11	0.2067	0.5443

12	0.1978	0.5443
13	0.1740	0.4987
14	0.1686	0.4721
15	0.1667	0.4713
16	0.1643	0.4610
17	0.1623	0.4608
18	0.1616	0.4575
19	0.1589	0.4517
20	0.1561	0.4443
21	0.1535	0.4378
22	0.1511	0.4333
23	0.1511	0.4205
24	0.1464	0.4103
25	0.1462	0.3947
26	0.1377	0.3913
27	0.1356	0.3908
28	0.1324	0.3896
29	0.1313	0.3790
30	0.1247	0.3779
31	0.1231	0.3775
32	0.1229	0.3736
33	0.1194	0.3730
34	0.1182	0.3713
35	0.1151	0.3676
36	0.1127	0.3623
37	0.1077	0.3447
38	0.1070	0.3340
39	0.1052	0.3272
40	0.0972	0.3212
41	0.0970	0.3189
42	0.0962	0.3175
43	0.0937	0.3100
44	0.0895	0.3094
45	0.0872	0.3020
46	0.0828	0.2983
47	0.0795	0.2807
48	0.0794	0.2800
49	0.0773	0.2791
50	0.0767	0.2712
51	0.0682	0.2482
52	0.0682	0.2473
53	0.0643	0.2430

Duration Flows

The Duration Matching Failed

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0677	2725	28899	1060	Fail
0.0703	2407	27134	1127	Fail
0.0729	2132	25480	1195	Fail
0.0754	1881	23937	1272	Fail
0.0780	1671	22562	1350	Fail
0.0806	1448	21279	1469	Fail
0.0832	1295	19997	1544	Fail
0.0857	1159	18826	1624	Fail
0.0883	1049	17745	1691	Fail
0.0909	934	16758	1794	Fail
0.0935	815	15842	1943	Fail
0.0961	711	14933	2100	Fail
0.0986	631	14089	2232	Fail
0.1012	553	13232	2392	Fail
0.1038	491	12519	2549	Fail
0.1064	432	11807	2733	Fail
0.1089	387	11177	2888	Fail
0.1115	337	10588	3141	Fail
0.1141	291	10038	3449	Fail
0.1167	253	9478	3746	Fail
0.1192	222	8999	4053	Fail
0.1218	194	8519	4391	Fail
0.1244	169	8107	4797	Fail
0.1270	152	7688	5057	Fail
0.1296	138	7294	5285	Fail
0.1321	123	6925	5630	Fail
0.1347	115	6583	5724	Fail
0.1373	102	6246	6123	Fail
0.1399	94	5930	6308	Fail
0.1424	87	5639	6481	Fail
0.1450	77	5341	6936	Fail
0.1476	65	5048	7766	Fail
0.1502	62	4797	7737	Fail
0.1527	58	4546	7837	Fail
0.1553	49	4336	8848	Fail
0.1579	46	4103	8919	Fail
0.1605	42	3901	9288	Fail
0.1631	36	3702	10283	Fail
0.1656	34	3514	10335	Fail
0.1682	31	3338	10767	Fail
0.1708	29	3159	10893	Fail
0.1734	29	3003	10355	Fail
0.1759	27	2855	10574	Fail
0.1785	25	2708	10832	Fail
0.1811	24	2585	10770	Fail
0.1837	24	2475	10312	Fail
0.1862	24	2362	9841	Fail
0.1888	22	2236	10163	Fail
0.1914	20	2132	10660	Fail
0.1940	19	2033	10700	Fail
0.1966	19	1927	10142	Fail
0.1991	16	1842	11512	Fail
0.2017	16	1747	10918	Fail
0.2043	15	1668	11120	Fail

0.2069	14	1589	11350	Fail
0.2094	14	1511	10792	Fail
0.2120	14	1454	10385	Fail
0.2146	13	1395	10730	Fail
0.2172	12	1340	11166	Fail
0.2197	11	1285	11681	Fail
0.2223	11	1222	11109	Fail
0.2249	11	1172	10654	Fail
0.2275	11	1121	10190	Fail
0.2301	11	1080	9818	Fail
0.2326	11	1028	9345	Fail
0.2352	10	989	9890	Fail
0.2378	10	952	9520	Fail
0.2404	8	916	11450	Fail
0.2429	7	878	12542	Fail
0.2455	6	844	14066	Fail
0.2481	6	805	13416	Fail
0.2507	4	779	19475	Fail
0.2532	4	743	18575	Fail
0.2558	4	715	17875	Fail
0.2584	4	690	17250	Fail
0.2610	4	663	16575	Fail
0.2636	4	637	15925	Fail
0.2661	4	619	15475	Fail
0.2687	4	591	14775	Fail
0.2713	4	571	14275	Fail
0.2739	4	554	13850	Fail
0.2764	4	526	13150	Fail
0.2790	4	498	12450	Fail
0.2816	3	470	15666	Fail
0.2842	1	453	45300	Fail
0.2867	1	435	43500	Fail
0.2893	1	422	42200	Fail
0.2919	1	413	41300	Fail
0.2945	1	401	40100	Fail
0.2971	1	387	38700	Fail
0.2996	1	373	37300	Fail
0.3022	1	354	35400	Fail
0.3048	1	343	34300	Fail
0.3074	1	323	32300	Fail
0.3099	1	308	30800	Fail
0.3125	0	293	n/a	Fail
0.3151	0	284	n/a	Fail
0.3177	0	278	n/a	Fail
0.3203	0	256	n/a	Fail
0.3228	0	246	n/a	Fail

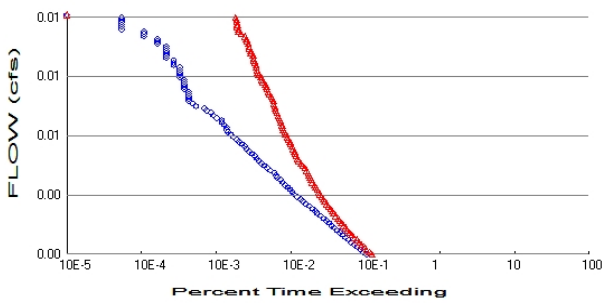
The development has an increase in flow durations from 1/2 Predeveloped 2 year flow to the 2 year flow or more than a 10% increase from the 2 year to the 50 year flow.
The development has an increase in flow durations for more than 50% of the flows for the range of the duration analysis.

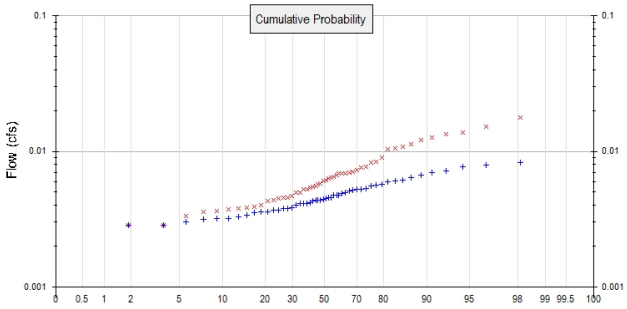
Water Quality

Water Quality BMP Flow and Volume for POC #1

On-line facility volume:	0 acre-feet
On-line facility target flow:	0 cfs.
Adjusted for 15 min:	0 cfs.
Off-line facility target flow:	0 cfs.
Adjusted for 15 min:	0 cfs.

POC 2





\+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #2
Total Pervious Area: 0.03
Total Impervious Area: 0.01

Mitigated Landuse Totals for POC #2
Total Pervious Area: 0.03
Total Impervious Area: 0.01

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #2

Return Period	Flow(cfs)
2 year	0.004491
5 year	0.005699
10 year	0.006488
25 year	0.00748
50 year	0.008219
100 year	0.00896

Flow Frequency Return Periods for Mitigated. POC #2

Return Period	Flow(cfs)
2 year	0.00602
5 year	0.008939
10 year	0.011135
25 year	0.014218
50 year	0.016744
100 year	0.01947

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #2

Year	Predeveloped	Mitigated
1956	0.004	0.006
1957	0.006	0.011
1958	0.004	0.005
1959	0.004	0.005
1960	0.005	0.007
1961	0.004	0.006
1962	0.004	0.004
1963	0.007	0.013
1964	0.005	0.008
1965	0.004	0.007
1966	0.003	0.004

1967	0.004	0.005
1968	0.003	0.004
1969	0.003	0.004
1970	0.003	0.005
1971	0.003	0.004
1972	0.005	0.008
1973	0.003	0.003
1974	0.005	0.005
1975	0.006	0.007
1976	0.005	0.007
1977	0.006	0.006
1978	0.005	0.008
1979	0.006	0.010
1980	0.004	0.005
1981	0.006	0.011
1982	0.005	0.006
1983	0.008	0.008
1984	0.004	0.005
1985	0.004	0.004
1986	0.004	0.007
1987	0.008	0.015
1988	0.003	0.003
1989	0.004	0.005
1990	0.006	0.012
1991	0.007	0.013
1992	0.004	0.004
1993	0.003	0.003
1994	0.003	0.003
1995	0.004	0.004
1996	0.005	0.007
1997	0.004	0.007
1998	0.004	0.006
1999	0.005	0.009
2000	0.005	0.007
2001	0.004	0.004
2002	0.004	0.006
2003	0.005	0.005
2004	0.007	0.014
2005	0.004	0.004
2006	0.008	0.018
2007	0.006	0.010
2008	0.005	0.006

Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #2

Rank	Predeveloped	Mitigated
1	0.0083	0.0179
2	0.0079	0.0152
3	0.0077	0.0138
4	0.0072	0.0133
5	0.0070	0.0127
6	0.0067	0.0122
7	0.0064	0.0113
8	0.0061	0.0109
9	0.0060	0.0104
10	0.0059	0.0104
11	0.0057	0.0089
12	0.0056	0.0083

13	0.0056	0.0083
14	0.0054	0.0077
15	0.0053	0.0076
16	0.0052	0.0072
17	0.0052	0.0071
18	0.0051	0.0070
19	0.0050	0.0069
20	0.0049	0.0069
21	0.0048	0.0068
22	0.0048	0.0067
23	0.0047	0.0065
24	0.0046	0.0064
25	0.0045	0.0063
26	0.0045	0.0062
27	0.0044	0.0060
28	0.0044	0.0058
29	0.0044	0.0057
30	0.0043	0.0055
31	0.0043	0.0054
32	0.0042	0.0054
33	0.0041	0.0052
34	0.0041	0.0052
35	0.0041	0.0050
36	0.0040	0.0049
37	0.0038	0.0047
38	0.0038	0.0046
39	0.0038	0.0045
40	0.0037	0.0045
41	0.0037	0.0044
42	0.0036	0.0043
43	0.0036	0.0040
44	0.0036	0.0039
45	0.0034	0.0038
46	0.0033	0.0038
47	0.0032	0.0037
48	0.0032	0.0037
49	0.0032	0.0036
50	0.0030	0.0033
51	0.0029	0.0029
52	0.0028	0.0029
53	0.0028	0.0028

Duration Flows

The Duration Matching Failed

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0022	1948	2284	117	Fail
0.0023	1756	2098	119	Fail
0.0024	1597	1933	121	Fail
0.0024	1448	1774	122	Fail
0.0025	1329	1643	123	Fail
0.0025	1205	1533	127	Fail
0.0026	1115	1419	127	Fail
0.0027	1007	1319	130	Fail
0.0027	922	1227	133	Fail
0.0028	854	1148	134	Fail
0.0028	772	1071	138	Fail
0.0029	710	1009	142	Fail
0.0030	655	953	145	Fail
0.0030	608	894	147	Fail
0.0031	556	842	151	Fail
0.0032	510	799	156	Fail
0.0032	465	742	159	Fail
0.0033	418	700	167	Fail
0.0033	393	664	168	Fail
0.0034	363	635	174	Fail
0.0035	333	597	179	Fail
0.0035	293	559	190	Fail
0.0036	268	529	197	Fail
0.0036	254	506	199	Fail
0.0037	227	482	212	Fail
0.0038	207	462	223	Fail
0.0038	194	438	225	Fail
0.0039	182	421	231	Fail
0.0039	169	403	238	Fail
0.0040	156	382	244	Fail
0.0041	145	363	250	Fail
0.0041	134	351	261	Fail
0.0042	123	335	272	Fail
0.0042	117	327	279	Fail
0.0043	112	318	283	Fail
0.0044	99	306	309	Fail
0.0044	90	287	318	Fail
0.0045	82	270	329	Fail
0.0045	75	253	337	Fail
0.0046	69	240	347	Fail
0.0047	65	229	352	Fail
0.0047	61	219	359	Fail
0.0048	56	212	378	Fail
0.0048	51	208	407	Fail
0.0049	47	200	425	Fail
0.0050	45	192	426	Fail
0.0050	41	184	448	Fail
0.0051	38	181	476	Fail
0.0051	35	171	488	Fail
0.0052	32	167	521	Fail
0.0053	29	158	544	Fail
0.0053	27	154	570	Fail
0.0054	26	148	569	Fail
0.0054	26	145	557	Fail

0.0055	24	142	591	Fail
0.0056	22	136	618	Fail
0.0056	22	134	609	Fail
0.0057	19	130	684	Fail
0.0057	17	125	735	Fail
0.0058	16	121	756	Fail
0.0059	14	117	835	Fail
0.0059	13	114	876	Fail
0.0060	10	113	1130	Fail
0.0060	9	110	1222	Fail
0.0061	8	109	1362	Fail
0.0062	8	106	1325	Fail
0.0062	8	102	1275	Fail
0.0063	8	95	1187	Fail
0.0063	8	92	1150	Fail
0.0064	7	89	1271	Fail
0.0065	7	88	1257	Fail
0.0065	7	85	1214	Fail
0.0066	7	79	1128	Fail
0.0067	7	75	1071	Fail
0.0067	6	74	1233	Fail
0.0068	6	69	1150	Fail
0.0068	6	67	1116	Fail
0.0069	6	66	1100	Fail
0.0070	6	64	1066	Fail
0.0070	5	64	1280	Fail
0.0071	5	61	1220	Fail
0.0071	5	60	1200	Fail
0.0072	4	59	1475	Fail
0.0073	4	58	1450	Fail
0.0073	4	54	1350	Fail
0.0074	4	54	1350	Fail
0.0074	4	52	1300	Fail
0.0075	4	51	1275	Fail
0.0076	3	50	1666	Fail
0.0076	3	48	1600	Fail
0.0077	3	47	1566	Fail
0.0077	2	45	2250	Fail
0.0078	2	40	2000	Fail
0.0079	2	37	1850	Fail
0.0079	1	37	3700	Fail
0.0080	1	36	3600	Fail
0.0080	1	36	3600	Fail
0.0081	1	35	3500	Fail
0.0082	1	35	3500	Fail
0.0082	1	34	3400	Fail

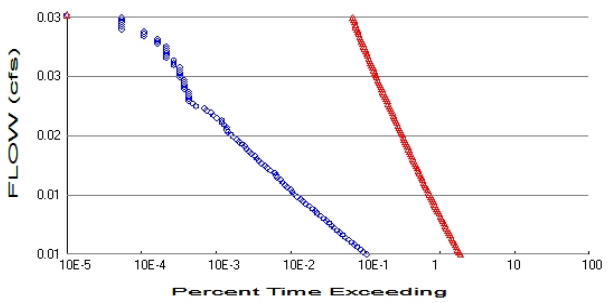
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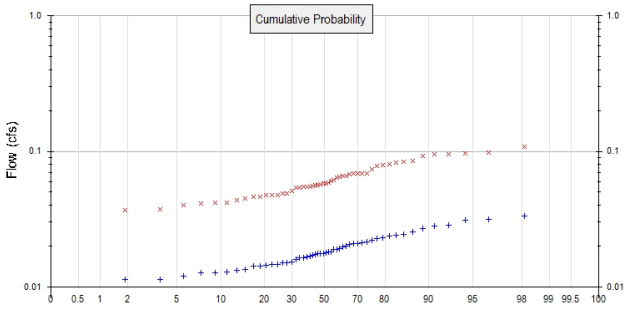
Water Quality

Water Quality BMP Flow and Volume for POC #2

On-line facility volume:	0 acre-feet
On-line facility target flow:	0 cfs.
Adjusted for 15 min:	0 cfs.
Off-line facility target flow:	0 cfs.
Adjusted for 15 min:	0 cfs.

POC 3





\+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #3
Total Pervious Area: 0.12
Total Impervious Area: 0.04

Mitigated Landuse Totals for POC #3
Total Pervious Area: 0.03
Total Impervious Area: 0.13

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #3

Return Period	Flow(cfs)
2 year	0.017966
5 year	0.022795
10 year	0.025951
25 year	0.029922
50 year	0.032878
100 year	0.035839

Flow Frequency Return Periods for Mitigated. POC #3

Return Period	Flow(cfs)
2 year	0.059198
5 year	0.07543
10 year	0.086077
25 year	0.0995
50 year	0.109514
100 year	0.119563

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #3

Year	Predeveloped	Mitigated
1956	0.017	0.055
1957	0.024	0.084
1958	0.014	0.047
1959	0.017	0.057
1960	0.021	0.068
1961	0.017	0.054
1962	0.014	0.046
1963	0.028	0.095
1964	0.019	0.061
1965	0.016	0.054
1966	0.013	0.041

1967	0.014	0.046
1968	0.012	0.040
1969	0.013	0.042
1970	0.013	0.044
1971	0.013	0.045
1972	0.019	0.066
1973	0.013	0.042
1974	0.021	0.069
1975	0.022	0.074
1976	0.019	0.064
1977	0.026	0.083
1978	0.020	0.069
1979	0.023	0.079
1980	0.015	0.051
1981	0.023	0.078
1982	0.021	0.069
1983	0.033	0.108
1984	0.015	0.049
1985	0.015	0.047
1986	0.016	0.055
1987	0.032	0.097
1988	0.011	0.036
1989	0.018	0.058
1990	0.024	0.083
1991	0.027	0.092
1992	0.015	0.048
1993	0.011	0.037
1994	0.011	0.037
1995	0.017	0.056
1996	0.020	0.065
1997	0.018	0.057
1998	0.018	0.058
1999	0.021	0.068
2000	0.020	0.065
2001	0.015	0.049
2002	0.017	0.056
2003	0.018	0.059
2004	0.029	0.098
2005	0.017	0.055
2006	0.031	0.095
2007	0.024	0.080
2008	0.018	0.060

Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #3

Rank	Predeveloped	Mitigated
1	0.0332	0.1079
2	0.0316	0.0984
3	0.0309	0.0967
4	0.0287	0.0952
5	0.0279	0.0951
6	0.0268	0.0925
7	0.0255	0.0844
8	0.0244	0.0833
9	0.0241	0.0829
10	0.0238	0.0805
11	0.0229	0.0787
12	0.0226	0.0785

13	0.0222	0.0737
14	0.0214	0.0690
15	0.0211	0.0688
16	0.0210	0.0686
17	0.0208	0.0684
18	0.0205	0.0681
19	0.0199	0.0656
20	0.0196	0.0654
21	0.0191	0.0647
22	0.0190	0.0641
23	0.0190	0.0611
24	0.0182	0.0604
25	0.0181	0.0590
26	0.0179	0.0583
27	0.0177	0.0578
28	0.0175	0.0575
29	0.0175	0.0566
30	0.0174	0.0565
31	0.0171	0.0557
32	0.0168	0.0551
33	0.0165	0.0548
34	0.0165	0.0546
35	0.0164	0.0543
36	0.0160	0.0540
37	0.0153	0.0509
38	0.0151	0.0489
39	0.0151	0.0489
40	0.0146	0.0476
41	0.0146	0.0474
42	0.0143	0.0472
43	0.0142	0.0463
44	0.0142	0.0462
45	0.0134	0.0446
46	0.0132	0.0439
47	0.0128	0.0418
48	0.0127	0.0416
49	0.0126	0.0414
50	0.0121	0.0400
51	0.0114	0.0371
52	0.0114	0.0369
53	0.0113	0.0363

Duration Flows

The Duration Matching Failed

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0090	1946	34865	1791	Fail
0.0092	1755	33452	1906	Fail
0.0095	1597	32096	2009	Fail
0.0097	1448	30869	2131	Fail
0.0099	1327	29698	2237	Fail
0.0102	1211	28565	2358	Fail
0.0104	1115	27450	2461	Fail
0.0107	1007	26409	2622	Fail
0.0109	922	25387	2753	Fail
0.0112	854	24402	2857	Fail
0.0114	773	23510	3041	Fail
0.0116	711	22618	3181	Fail
0.0119	657	21818	3320	Fail
0.0121	607	20982	3456	Fail
0.0124	556	20202	3633	Fail
0.0126	510	19440	3811	Fail
0.0128	465	18733	4028	Fail
0.0131	418	18075	4324	Fail
0.0133	393	17397	4426	Fail
0.0136	363	16799	4627	Fail
0.0138	333	16206	4866	Fail
0.0141	293	15628	5333	Fail
0.0143	268	15068	5622	Fail
0.0145	254	14518	5715	Fail
0.0148	227	14004	6169	Fail
0.0150	207	13461	6502	Fail
0.0153	194	12968	6684	Fail
0.0155	183	12513	6837	Fail
0.0157	167	12054	7217	Fail
0.0160	156	11623	7450	Fail
0.0162	145	11247	7756	Fail
0.0165	134	10874	8114	Fail
0.0167	123	10519	8552	Fail
0.0169	117	10170	8692	Fail
0.0172	113	9831	8700	Fail
0.0174	99	9460	9555	Fail
0.0177	90	9168	10186	Fail
0.0179	83	8848	10660	Fail
0.0182	75	8573	11430	Fail
0.0184	69	8304	12034	Fail
0.0186	65	8032	12356	Fail
0.0189	61	7772	12740	Fail
0.0191	55	7512	13658	Fail
0.0194	51	7272	14258	Fail
0.0196	47	7047	14993	Fail
0.0198	45	6813	15139	Fail
0.0201	41	6603	16104	Fail
0.0203	38	6391	16818	Fail
0.0206	35	6189	17682	Fail
0.0208	32	5992	18725	Fail
0.0211	29	5795	19982	Fail
0.0213	27	5609	20774	Fail
0.0215	26	5419	20842	Fail
0.0218	26	5258	20223	Fail

0.0220	24	5059	21079	Fail
0.0223	22	4899	22268	Fail
0.0225	22	4735	21522	Fail
0.0227	19	4581	24110	Fail
0.0230	17	4444	26141	Fail
0.0232	16	4302	26887	Fail
0.0235	14	4157	29692	Fail
0.0237	13	4027	30976	Fail
0.0239	10	3903	39030	Fail
0.0242	9	3767	41855	Fail
0.0244	8	3654	45675	Fail
0.0247	8	3542	44275	Fail
0.0249	8	3423	42787	Fail
0.0252	8	3317	41462	Fail
0.0254	8	3189	39862	Fail
0.0256	7	3081	44014	Fail
0.0259	7	2998	42828	Fail
0.0261	7	2910	41571	Fail
0.0264	7	2808	40114	Fail
0.0266	7	2725	38928	Fail
0.0268	6	2637	43950	Fail
0.0271	6	2559	42650	Fail
0.0273	6	2490	41500	Fail
0.0276	6	2416	40266	Fail
0.0278	6	2353	39216	Fail
0.0281	5	2264	45280	Fail
0.0283	5	2189	43780	Fail
0.0285	5	2132	42640	Fail
0.0288	4	2070	51750	Fail
0.0290	4	2000	50000	Fail
0.0293	4	1942	48550	Fail
0.0295	4	1881	47025	Fail
0.0297	4	1829	45725	Fail
0.0300	4	1768	44200	Fail
0.0302	3	1712	57066	Fail
0.0305	3	1657	55233	Fail
0.0307	3	1615	53833	Fail
0.0309	2	1567	78350	Fail
0.0312	2	1519	75950	Fail
0.0314	2	1484	74200	Fail
0.0317	1	1444	144400	Fail
0.0319	1	1397	139700	Fail
0.0322	1	1370	137000	Fail
0.0324	1	1336	133600	Fail
0.0326	1	1300	130000	Fail
0.0329	1	1260	126000	Fail

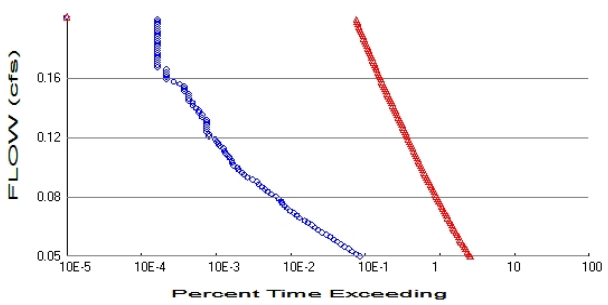
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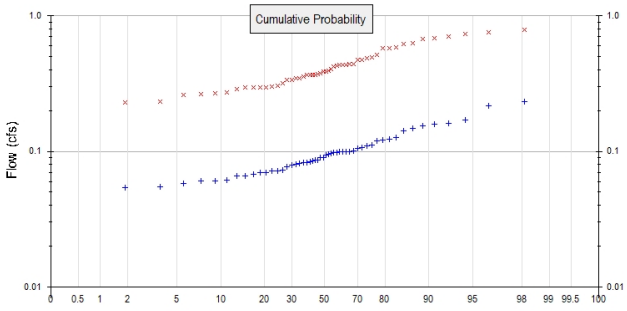
Water Quality

Water Quality BMP Flow and Volume for POC #3

On-line facility volume:	0 acre-feet
On-line facility target flow:	0 cfs.
Adjusted for 15 min:	0 cfs.
Off-line facility target flow:	0 cfs.
Adjusted for 15 min:	0 cfs.

POC 4





\+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #4
Total Pervious Area: 1.33
Total Impervious Area: 0.19

Mitigated Landuse Totals for POC #4
Total Pervious Area: 0.71
Total Impervious Area: 0.81

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #4

Return Period	Flow(cfs)
2 year	0.090898
5 year	0.12304
10 year	0.14607
25 year	0.17722
50 year	0.201952
100 year	0.228023

Flow Frequency Return Periods for Mitigated. POC #4

Return Period	Flow(cfs)
2 year	0.396951
5 year	0.526649
10 year	0.614363
25 year	0.727534
50 year	0.813661
100 year	0.901421

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #4

Year	Predeveloped	Mitigated
1956	0.090	0.369
1957	0.123	0.618
1958	0.076	0.319
1959	0.083	0.364
1960	0.099	0.432
1961	0.097	0.357
1962	0.068	0.289
1963	0.169	0.706
1964	0.109	0.436
1965	0.096	0.388
1966	0.061	0.272

1967	0.072	0.300
1968	0.058	0.265
1969	0.060	0.270
1970	0.066	0.296
1971	0.065	0.295
1972	0.093	0.470
1973	0.061	0.262
1974	0.100	0.431
1975	0.106	0.486
1976	0.098	0.443
1977	0.121	0.517
1978	0.099	0.474
1979	0.111	0.574
1980	0.073	0.337
1981	0.120	0.580
1982	0.100	0.436
1983	0.158	0.672
1984	0.079	0.337
1985	0.069	0.296
1986	0.090	0.386
1987	0.217	0.750
1988	0.053	0.226
1989	0.083	0.375
1990	0.154	0.629
1991	0.148	0.682
1992	0.070	0.298
1993	0.054	0.231
1994	0.054	0.231
1995	0.081	0.347
1996	0.100	0.439
1997	0.105	0.391
1998	0.085	0.366
1999	0.126	0.496
2000	0.095	0.420
2001	0.072	0.305
2002	0.083	0.366
2003	0.087	0.367
2004	0.160	0.731
2005	0.080	0.345
2006	0.234	0.793
2007	0.142	0.581
2008	0.086	0.405

Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #4

Rank	Predeveloped	Mitigated
1	0.2338	0.7926
2	0.2173	0.7499
3	0.1693	0.7314
4	0.1603	0.7059
5	0.1576	0.6818
6	0.1545	0.6724
7	0.1476	0.6288
8	0.1421	0.6176
9	0.1261	0.5814
10	0.1234	0.5803
11	0.1213	0.5735
12	0.1198	0.5170

13	0.1114	0.4956
14	0.1095	0.4857
15	0.1060	0.4744
16	0.1048	0.4700
17	0.1003	0.4426
18	0.1000	0.4387
19	0.0996	0.4361
20	0.0990	0.4358
21	0.0990	0.4322
22	0.0976	0.4311
23	0.0975	0.4197
24	0.0963	0.4051
25	0.0946	0.3906
26	0.0935	0.3882
27	0.0904	0.3862
28	0.0895	0.3746
29	0.0865	0.3694
30	0.0863	0.3675
31	0.0852	0.3663
32	0.0833	0.3658
33	0.0831	0.3643
34	0.0829	0.3572
35	0.0815	0.3473
36	0.0800	0.3450
37	0.0786	0.3367
38	0.0765	0.3366
39	0.0731	0.3191
40	0.0718	0.3046
41	0.0716	0.2996
42	0.0695	0.2979
43	0.0695	0.2962
44	0.0681	0.2956
45	0.0655	0.2954
46	0.0654	0.2886
47	0.0610	0.2723
48	0.0605	0.2700
49	0.0602	0.2650
50	0.0583	0.2615
51	0.0544	0.2313
52	0.0540	0.2305
53	0.0534	0.2263

Duration Flows

The Duration Matching Failed

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0454	1590	47149	2965	Fail
0.0470	1397	45012	3222	Fail
0.0486	1236	43042	3482	Fail
0.0502	1110	41091	3701	Fail
0.0518	979	39288	4013	Fail
0.0534	882	37522	4254	Fail
0.0549	782	35943	4596	Fail
0.0565	699	34475	4932	Fail
0.0581	630	32932	5227	Fail
0.0597	559	31612	5655	Fail
0.0613	487	30349	6231	Fail
0.0628	429	29104	6784	Fail
0.0644	398	27896	7009	Fail
0.0660	358	26799	7485	Fail
0.0676	317	25740	8119	Fail
0.0692	286	24643	8616	Fail
0.0707	243	23714	9758	Fail
0.0723	223	22748	10200	Fail
0.0739	205	21911	10688	Fail
0.0755	182	21094	11590	Fail
0.0771	166	20239	12192	Fail
0.0786	157	19440	12382	Fail
0.0802	143	18696	13074	Fail
0.0818	138	17994	13039	Fail
0.0834	128	17295	13511	Fail
0.0850	117	16670	14247	Fail
0.0866	103	16079	15610	Fail
0.0881	91	15474	17004	Fail
0.0897	84	14877	17710	Fail
0.0913	77	14321	18598	Fail
0.0929	69	13754	19933	Fail
0.0945	65	13219	20336	Fail
0.0960	57	12710	22298	Fail
0.0976	49	12249	24997	Fail
0.0992	44	11799	26815	Fail
0.1008	41	11418	27848	Fail
0.1024	37	11002	29735	Fail
0.1039	36	10627	29519	Fail
0.1055	32	10262	32068	Fail
0.1071	31	9880	31870	Fail
0.1087	30	9519	31729	Fail
0.1103	28	9207	32882	Fail
0.1118	27	8883	32900	Fail
0.1134	25	8566	34264	Fail
0.1150	24	8302	34591	Fail
0.1166	23	8025	34891	Fail
0.1182	21	7746	36885	Fail
0.1197	20	7493	37465	Fail
0.1213	19	7241	38110	Fail
0.1229	18	7003	38905	Fail
0.1245	15	6780	45200	Fail
0.1261	15	6546	43640	Fail
0.1277	14	6334	45242	Fail
0.1292	14	6098	43557	Fail

0.1308	14	5902	42157	Fail
0.1324	14	5732	40942	Fail
0.1340	14	5533	39521	Fail
0.1356	14	5352	38228	Fail
0.1371	12	5135	42791	Fail
0.1387	12	4955	41291	Fail
0.1403	11	4802	43654	Fail
0.1419	11	4642	42200	Fail
0.1435	10	4497	44970	Fail
0.1450	9	4343	48255	Fail
0.1466	9	4196	46622	Fail
0.1482	8	4059	50737	Fail
0.1498	8	3929	49112	Fail
0.1514	8	3797	47462	Fail
0.1529	8	3672	45900	Fail
0.1545	7	3555	50785	Fail
0.1561	7	3436	49085	Fail
0.1577	7	3319	47414	Fail
0.1593	6	3206	53433	Fail
0.1609	5	3098	61959	Fail
0.1624	4	2998	74950	Fail
0.1640	4	2903	72575	Fail
0.1656	4	2816	70400	Fail
0.1672	4	2721	68025	Fail
0.1688	4	2630	65750	Fail
0.1703	3	2565	85500	Fail
0.1719	3	2485	82833	Fail
0.1735	3	2422	80733	Fail
0.1751	3	2347	78233	Fail
0.1767	3	2267	75566	Fail
0.1782	3	2206	73533	Fail
0.1798	3	2137	71233	Fail
0.1814	3	2074	69133	Fail
0.1830	3	2003	66766	Fail
0.1846	3	1951	65033	Fail
0.1861	3	1886	62866	Fail
0.1877	3	1825	60833	Fail
0.1893	3	1770	59000	Fail
0.1909	3	1725	57500	Fail
0.1925	3	1672	55733	Fail
0.1940	3	1621	54033	Fail
0.1956	3	1569	52300	Fail
0.1972	3	1527	50900	Fail
0.1988	3	1475	49166	Fail
0.2004	3	1439	47966	Fail
0.2020	3	1405	46833	Fail

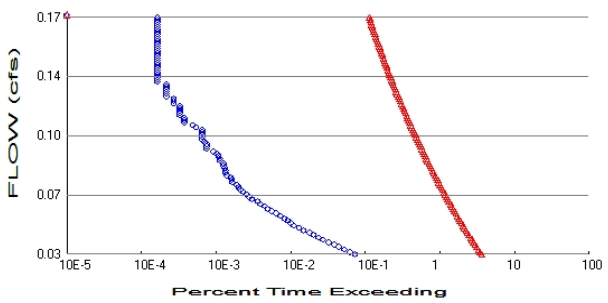
The development has an increase in flow durations from 1/2 Predeveloped 2 year flow to the 2 year flow or more than a 10% increase from the 2 year to the 50 year flow.
The development has an increase in flow durations for more than 50% of the flows for the range of the duration analysis.

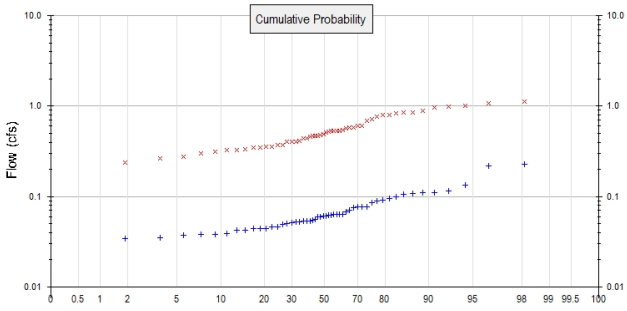
Water Quality

Water Quality BMP Flow and Volume for POC #4

On-line facility volume:	0 acre-feet
On-line facility target flow:	0 cfs.
Adjusted for 15 min:	0 cfs.
Off-line facility target flow:	0 cfs.
Adjusted for 15 min:	0 cfs.

POC 5





\+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #5
Total Pervious Area: 1.98
Total Impervious Area: 0.12

Mitigated Landuse Totals for POC #5
Total Pervious Area: 1.4
Total Impervious Area: 0.7

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #5

Return Period	Flow(cfs)
2 year	0.061045
5 year	0.089693
10 year	0.112486
25 year	0.146077
50 year	0.174874
100 year	0.207161

Flow Frequency Return Periods for Mitigated. POC #5

Return Period	Flow(cfs)
2 year	0.502844
5 year	0.712357
10 year	0.85793
25 year	1.049174
50 year	1.196767
100 year	1.348663

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #5

Year	Predeveloped	Mitigated
1956	0.060	0.474
1957	0.077	0.833
1958	0.049	0.405
1959	0.053	0.459
1960	0.064	0.532
1961	0.086	0.535
1962	0.044	0.324
1963	0.114	0.958
1964	0.090	0.602
1965	0.064	0.545
1966	0.038	0.359

1967	0.054	0.371
1968	0.037	0.347
1969	0.038	0.331
1970	0.042	0.405
1971	0.043	0.345
1972	0.077	0.762
1973	0.039	0.273
1974	0.063	0.471
1975	0.068	0.716
1976	0.062	0.537
1977	0.077	0.583
1978	0.063	0.587
1979	0.070	0.806
1980	0.046	0.405
1981	0.074	0.890
1982	0.063	0.473
1983	0.100	0.807
1984	0.061	0.443
1985	0.044	0.303
1986	0.059	0.508
1987	0.216	1.084
1988	0.035	0.228
1989	0.053	0.482
1990	0.110	0.851
1991	0.134	0.988
1992	0.044	0.324
1993	0.034	0.265
1994	0.034	0.239
1995	0.051	0.358
1996	0.089	0.610
1997	0.094	0.563
1998	0.054	0.526
1999	0.108	0.693
2000	0.060	0.531
2001	0.046	0.311
2002	0.052	0.436
2003	0.056	0.375
2004	0.106	1.006
2005	0.051	0.409
2006	0.228	1.122
2007	0.110	0.859
2008	0.055	0.495

Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #5

Rank	Predeveloped	Mitigated
1	0.2283	1.1220
2	0.2164	1.0841
3	0.1342	1.0056
4	0.1144	0.9877
5	0.1100	0.9585
6	0.1096	0.8899
7	0.1083	0.8588
8	0.1063	0.8515
9	0.0996	0.8327
10	0.0943	0.8074
11	0.0905	0.8063
12	0.0891	0.7617

13	0.0861	0.7161
14	0.0774	0.6929
15	0.0773	0.6102
16	0.0768	0.6024
17	0.0745	0.5868
18	0.0701	0.5827
19	0.0675	0.5632
20	0.0638	0.5448
21	0.0636	0.5373
22	0.0634	0.5355
23	0.0629	0.5315
24	0.0626	0.5308
25	0.0616	0.5259
26	0.0610	0.5078
27	0.0602	0.4945
28	0.0598	0.4815
29	0.0593	0.4739
30	0.0555	0.4732
31	0.0545	0.4709
32	0.0540	0.4588
33	0.0537	0.4430
34	0.0533	0.4357
35	0.0527	0.4092
36	0.0524	0.4049
37	0.0515	0.4049
38	0.0506	0.4047
39	0.0490	0.3747
40	0.0462	0.3705
41	0.0462	0.3587
42	0.0443	0.3577
43	0.0440	0.3466
44	0.0440	0.3451
45	0.0426	0.3314
46	0.0424	0.3243
47	0.0386	0.3239
48	0.0382	0.3112
49	0.0380	0.3029
50	0.0371	0.2729
51	0.0346	0.2652
52	0.0344	0.2393
53	0.0341	0.2275

Duration Flows

The Duration Matching Failed

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0305	1345	67183	4995	Fail
0.0320	1140	63671	5585	Fail
0.0334	974	60567	6218	Fail
0.0349	820	57650	7030	Fail
0.0364	711	54973	7731	Fail
0.0378	604	52279	8655	Fail
0.0393	501	49788	9937	Fail
0.0407	442	47502	10747	Fail
0.0422	377	45291	12013	Fail
0.0436	329	43302	13161	Fail
0.0451	276	41425	15009	Fail
0.0466	240	39567	16486	Fail
0.0480	204	37894	18575	Fail
0.0495	185	36166	19549	Fail
0.0509	169	34567	20453	Fail
0.0524	153	33099	21633	Fail
0.0539	134	31687	23647	Fail
0.0553	117	30386	25970	Fail
0.0568	103	29141	28292	Fail
0.0582	91	27877	30634	Fail
0.0597	84	26762	31859	Fail
0.0611	72	25647	35620	Fail
0.0626	67	24606	36725	Fail
0.0641	56	23602	42146	Fail
0.0655	52	22673	43601	Fail
0.0670	47	21781	46342	Fail
0.0684	43	20926	48665	Fail
0.0699	39	20146	51656	Fail
0.0713	37	19421	52489	Fail
0.0728	35	18659	53311	Fail
0.0743	31	17906	57761	Fail
0.0757	30	17245	57483	Fail
0.0772	29	16576	57158	Fail
0.0786	26	15938	61300	Fail
0.0801	25	15358	61432	Fail
0.0816	25	14780	59120	Fail
0.0830	24	14249	59370	Fail
0.0845	23	13777	59900	Fail
0.0859	23	13240	57565	Fail
0.0874	21	12749	60709	Fail
0.0888	21	12299	58566	Fail
0.0903	20	11868	59340	Fail
0.0918	19	11482	60431	Fail
0.0932	17	11067	65100	Fail
0.0947	14	10677	76264	Fail
0.0961	14	10316	73685	Fail
0.0976	14	9963	71164	Fail
0.0991	13	9608	73907	Fail
0.1005	12	9294	77450	Fail
0.1020	12	8988	74900	Fail
0.1034	12	8685	72375	Fail
0.1049	12	8408	70066	Fail
0.1063	12	8118	67650	Fail
0.1078	10	7843	78430	Fail

0.1093	9	7566	84066	Fail
0.1107	7	7328	104685	Fail
0.1122	7	7086	101228	Fail
0.1136	7	6863	98042	Fail
0.1151	6	6663	111050	Fail
0.1166	6	6466	107766	Fail
0.1180	6	6256	104266	Fail
0.1195	6	6072	101200	Fail
0.1209	6	5865	97750	Fail
0.1224	5	5670	113400	Fail
0.1238	5	5490	109800	Fail
0.1253	5	5328	106560	Fail
0.1268	4	5165	129125	Fail
0.1282	4	4977	124425	Fail
0.1297	4	4849	121225	Fail
0.1311	4	4696	117400	Fail
0.1326	4	4551	113775	Fail
0.1340	4	4419	110475	Fail
0.1355	3	4304	143466	Fail
0.1370	3	4195	139833	Fail
0.1384	3	4064	135466	Fail
0.1399	3	3946	131533	Fail
0.1413	3	3836	127866	Fail
0.1428	3	3723	124100	Fail
0.1443	3	3618	120600	Fail
0.1457	3	3526	117533	Fail
0.1472	3	3436	114533	Fail
0.1486	3	3327	110900	Fail
0.1501	3	3258	108600	Fail
0.1515	3	3171	105700	Fail
0.1530	3	3094	103133	Fail
0.1545	3	3026	100866	Fail
0.1559	3	2946	98200	Fail
0.1574	3	2866	95533	Fail
0.1588	3	2780	92666	Fail
0.1603	3	2708	90266	Fail
0.1618	3	2624	87466	Fail
0.1632	3	2565	85500	Fail
0.1647	3	2496	83200	Fail
0.1661	3	2423	80766	Fail
0.1676	3	2377	79233	Fail
0.1690	3	2318	77266	Fail
0.1705	3	2256	75200	Fail
0.1720	3	2199	73300	Fail
0.1734	3	2150	71666	Fail
0.1749	3	2102	70066	Fail

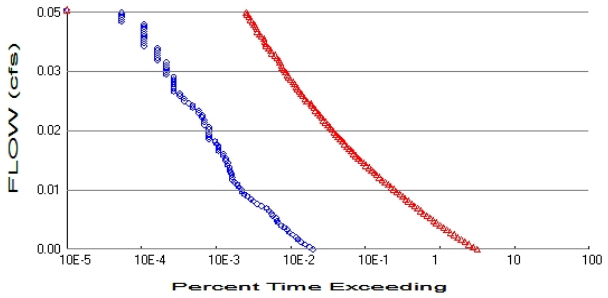
The development has an increase in flow durations from 1/2 Predeveloped 2 year flow to the 2 year flow or more than a 10% increase from the 2 year to the 50 year flow.
The development has an increase in flow durations for more than 50% of the flows for the range of the duration analysis.

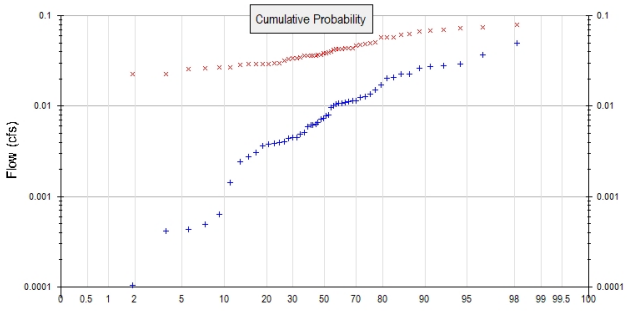
Water Quality

Water Quality BMP Flow and Volume for POC #5

On-line facility volume:	0 acre-feet
On-line facility target flow:	0 cfs.
Adjusted for 15 min:	0 cfs.
Off-line facility target flow:	0 cfs.
Adjusted for 15 min:	0 cfs.

POC 6





\+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #6
Total Pervious Area: 0.13
Total Impervious Area: 0

Mitigated Landuse Totals for POC #6
Total Pervious Area: 0.07
Total Impervious Area: 0.08

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #6

Return Period	Flow(cfs)
2 year	0.007538
5 year	0.019015
10 year	0.027568
25 year	0.037986
50 year	0.045007
100 year	0.051247

Flow Frequency Return Periods for Mitigated. POC #6

Return Period	Flow(cfs)
2 year	0.03946
5 year	0.052459
10 year	0.061263
25 year	0.072636
50 year	0.081299
100 year	0.090133

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #6

Year	Predeveloped	Mitigated
1956	0.007	0.037
1957	0.023	0.062
1958	0.006	0.032
1959	0.004	0.036
1960	0.011	0.043
1961	0.011	0.036
1962	0.000	0.029
1963	0.028	0.070
1964	0.014	0.044
1965	0.012	0.039
1966	0.005	0.027

1967	0.006	0.030
1968	0.004	0.026
1969	0.003	0.027
1970	0.006	0.030
1971	0.004	0.029
1972	0.015	0.047
1973	0.003	0.026
1974	0.007	0.043
1975	0.008	0.048
1976	0.011	0.044
1977	0.000	0.051
1978	0.011	0.047
1979	0.021	0.057
1980	0.005	0.033
1981	0.023	0.058
1982	0.004	0.043
1983	0.010	0.066
1984	0.008	0.034
1985	0.001	0.029
1986	0.011	0.039
1987	0.037	0.075
1988	0.000	0.022
1989	0.004	0.037
1990	0.027	0.062
1991	0.026	0.068
1992	0.001	0.029
1993	0.004	0.023
1994	0.000	0.023
1995	0.004	0.034
1996	0.010	0.044
1997	0.013	0.039
1998	0.010	0.036
1999	0.017	0.050
2000	0.011	0.042
2001	0.000	0.030
2002	0.006	0.036
2003	0.002	0.036
2004	0.029	0.073
2005	0.004	0.034
2006	0.050	0.079
2007	0.021	0.058
2008	0.007	0.040

Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #6

Rank	Predeveloped	Mitigated
1	0.0495	0.0788
2	0.0366	0.0750
3	0.0294	0.0731
4	0.0282	0.0705
5	0.0272	0.0683
6	0.0263	0.0664
7	0.0228	0.0623
8	0.0227	0.0616
9	0.0206	0.0582
10	0.0206	0.0581
11	0.0173	0.0574
12	0.0152	0.0511

13	0.0137	0.0496
14	0.0127	0.0483
15	0.0124	0.0473
16	0.0114	0.0471
17	0.0114	0.0441
18	0.0112	0.0437
19	0.0110	0.0436
20	0.0108	0.0432
21	0.0107	0.0428
22	0.0105	0.0426
23	0.0101	0.0418
24	0.0096	0.0403
25	0.0079	0.0391
26	0.0079	0.0386
27	0.0073	0.0385
28	0.0071	0.0372
29	0.0066	0.0368
30	0.0063	0.0365
31	0.0062	0.0363
32	0.0062	0.0362
33	0.0059	0.0362
34	0.0051	0.0358
35	0.0049	0.0343
36	0.0045	0.0341
37	0.0045	0.0336
38	0.0044	0.0335
39	0.0041	0.0318
40	0.0040	0.0301
41	0.0039	0.0298
42	0.0038	0.0295
43	0.0037	0.0294
44	0.0031	0.0294
45	0.0027	0.0292
46	0.0024	0.0285
47	0.0014	0.0271
48	0.0006	0.0268
49	0.0005	0.0264
50	0.0004	0.0258
51	0.0004	0.0228
52	0.0001	0.0228
53	0.0001	0.0223

Duration Flows

The Duration Matching Failed

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0038	371	58802	15849	Fail
0.0042	330	51647	15650	Fail
0.0046	290	45570	15713	Fail
0.0050	252	40403	16032	Fail
0.0054	232	35850	15452	Fail
0.0059	218	31966	14663	Fail
0.0063	199	28620	14381	Fail
0.0067	179	25684	14348	Fail
0.0071	167	22989	13765	Fail
0.0075	153	20778	13580	Fail
0.0079	138	18678	13534	Fail
0.0084	127	16832	13253	Fail
0.0088	122	15256	12504	Fail
0.0092	117	13723	11729	Fail
0.0096	107	12376	11566	Fail
0.0100	102	11240	11019	Fail
0.0104	96	10235	10661	Fail
0.0109	88	9274	10538	Fail
0.0113	76	8471	11146	Fail
0.0117	66	7724	11703	Fail
0.0121	59	7081	12001	Fail
0.0125	54	6464	11970	Fail
0.0129	49	5895	12030	Fail
0.0133	44	5403	12279	Fail
0.0138	41	4910	11975	Fail
0.0142	40	4490	11225	Fail
0.0146	38	4115	10828	Fail
0.0150	36	3750	10416	Fail
0.0154	33	3436	10412	Fail
0.0158	31	3135	10112	Fail
0.0163	31	2869	9254	Fail
0.0167	30	2630	8766	Fail
0.0171	29	2448	8441	Fail
0.0175	28	2249	8032	Fail
0.0179	28	2074	7407	Fail
0.0183	27	1905	7055	Fail
0.0188	27	1756	6503	Fail
0.0192	25	1619	6476	Fail
0.0196	25	1492	5968	Fail
0.0200	23	1393	6056	Fail
0.0204	23	1296	5634	Fail
0.0208	20	1211	6055	Fail
0.0213	20	1129	5645	Fail
0.0217	20	1050	5250	Fail
0.0221	19	987	5194	Fail
0.0225	18	922	5122	Fail
0.0229	15	859	5726	Fail
0.0233	15	805	5366	Fail
0.0238	15	752	5013	Fail
0.0242	15	707	4713	Fail
0.0246	15	659	4393	Fail
0.0250	15	624	4160	Fail
0.0254	13	590	4538	Fail
0.0258	13	540	4153	Fail

0.0263	13	506	3892	Fail
0.0267	12	481	4008	Fail
0.0271	12	454	3783	Fail
0.0275	11	430	3909	Fail
0.0279	11	403	3663	Fail
0.0283	9	378	4200	Fail
0.0288	9	356	3955	Fail
0.0292	8	345	4312	Fail
0.0296	7	306	4371	Fail
0.0300	7	289	4128	Fail
0.0304	6	269	4483	Fail
0.0308	6	257	4283	Fail
0.0313	5	243	4860	Fail
0.0317	5	228	4560	Fail
0.0321	5	218	4360	Fail
0.0325	5	208	4160	Fail
0.0329	5	198	3959	Fail
0.0333	5	184	3680	Fail
0.0338	5	175	3500	Fail
0.0342	4	167	4175	Fail
0.0346	4	159	3975	Fail
0.0350	4	149	3725	Fail
0.0354	4	143	3575	Fail
0.0358	4	139	3475	Fail
0.0363	4	133	3325	Fail
0.0367	3	130	4333	Fail
0.0371	3	121	4033	Fail
0.0375	3	114	3800	Fail
0.0379	3	103	3433	Fail
0.0383	3	100	3333	Fail
0.0388	3	94	3133	Fail
0.0392	2	86	4300	Fail
0.0396	2	86	4300	Fail
0.0400	2	83	4150	Fail
0.0404	2	81	4050	Fail
0.0408	2	75	3750	Fail
0.0413	2	71	3550	Fail
0.0417	2	66	3300	Fail
0.0421	2	65	3250	Fail
0.0425	2	63	3150	Fail
0.0429	2	60	3000	Fail
0.0433	1	57	5700	Fail
0.0438	1	54	5400	Fail
0.0442	1	51	5100	Fail
0.0446	1	48	4800	Fail
0.0450	1	47	4700	Fail

The development has an increase in flow durations from 1/2 Predeveloped 2 year flow to the 2 year flow or more than a 10% increase from the 2 year to the 50 year flow.
The development has an increase in flow durations for more than 50% of the flows for the range of the duration analysis.

Water Quality

Water Quality BMP Flow and Volume for POC #6

On-line facility volume:	0 acre-feet
On-line facility target flow:	0 cfs.
Adjusted for 15 min:	0 cfs.
Off-line facility target flow:	0 cfs.
Adjusted for 15 min:	0 cfs.

Model Default Modifications

Total of 0 changes have been made.

PERLND Changes

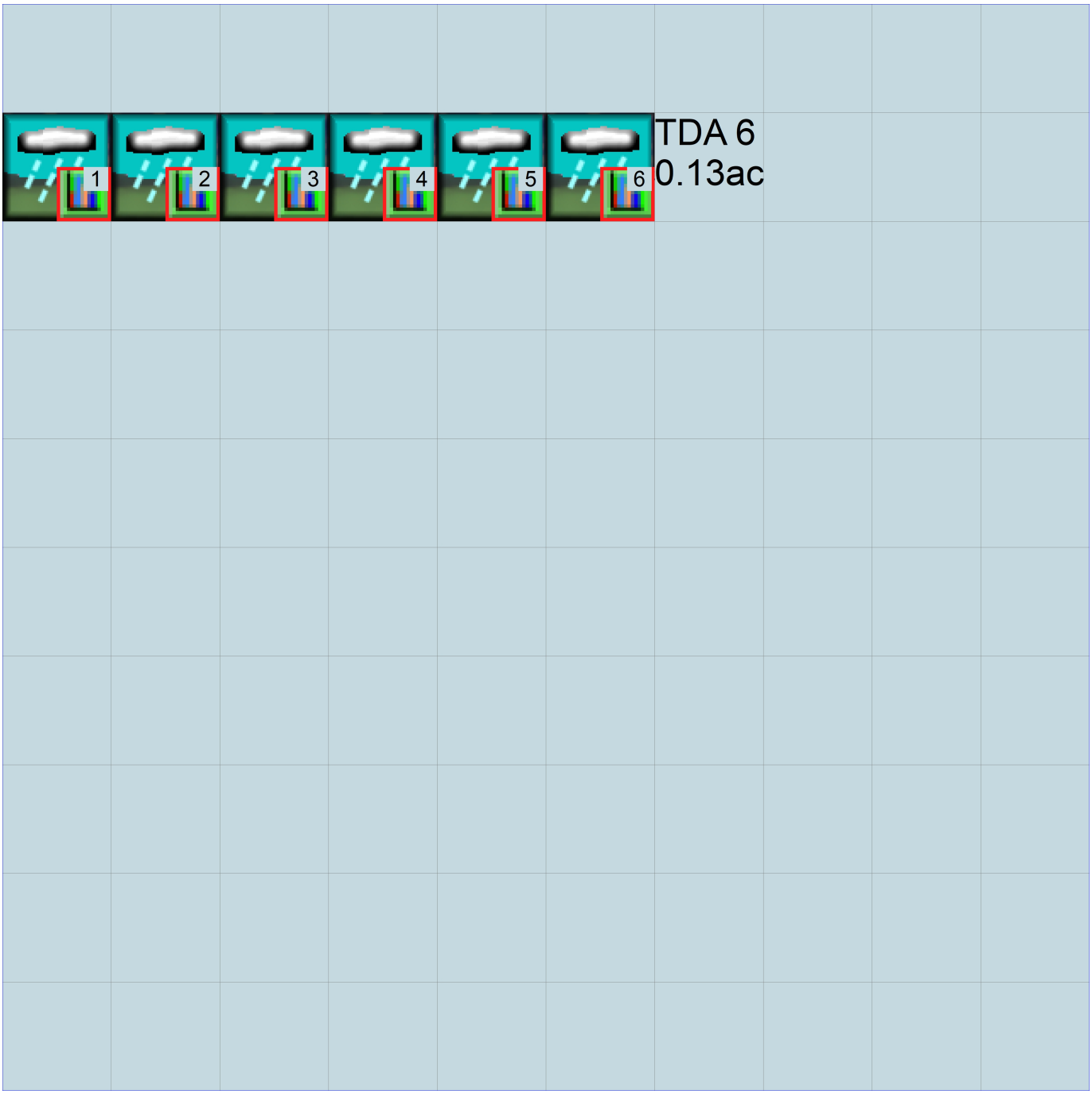
No PERLND changes have been made.

IMPLND Changes

No IMPLND changes have been made.

Appendix

Predeveloped Schematic



Mitigated Schematic



Predeveloped UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1955 10 01        END    2008 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                    UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                               ***
WDM         26   Flow Control Exemption.wdm
MESSU       25   PreFlow Control Exemption.MES
            27   PreFlow Control Exemption.L61
            28   PreFlow Control Exemption.L62
            30   POCFlow Control Exemption1.dat
            31   POCFlow Control Exemption2.dat
            32   POCFlow Control Exemption3.dat
            33   POCFlow Control Exemption4.dat
            34   POCFlow Control Exemption5.dat
            35   POCFlow Control Exemption6.dat
END FILES

OPN SEQUENCE
    INGRP               INDELT 00:15
      PERLND       1
      PERLND      13
      IMPLND       8
      PERLND       4
      PERLND       3
      PERLND       5
      PERLND       2
      PERLND       7
      COPY       501
      COPY       502
      COPY       503
      COPY       504
      COPY       505
      COPY       506
      DISPLY       1
      DISPLY       2
      DISPLY       3
      DISPLY       4
      DISPLY       5
      DISPLY       6
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title----------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        TDA 1                      MAX                    1    2   30    9
    2        TDA 2                      MAX                    1    2   31    9
    3        TDA 3                      MAX                    1    2   32    9
    4        TDA 4                      MAX                    1    2   33    9
    5        TDA 5                      MAX                    1    2   34    9
    6        TDA 6                      MAX                    1    2   35    9
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1         1    1
  501         1    1
  502         1    1
  503         1    1
  504         1    1
  505         1    1
```

```
  506         1    1
  END TIMESERIES
END COPY
GENER
  OPCODE
    #    # OPCD ***
  END OPCODE
  PARM
    #    #         K ***
  END PARM
END GENER
PERLND
  GEN-INFO
    <PLS ><-------Name------->NBLKS   Unit-systems   Printer ***
    # -  #                          User  t-series Engl Metr ***
                                        in  out           ***
    1     A/B, Forest, Flat       1    1    1    1   27    0
   13     C, Pasture, Flat        1    1    1    1   27    0
    4     A/B, Pasture, Flat      1    1    1    1   27    0
    3     A/B, Forest, Steep      1    1    1    1   27    0
    5     A/B, Pasture, Mod       1    1    1    1   27    0
    2     A/B, Forest, Mod        1    1    1    1   27    0
    7     A/B, Lawn, Flat         1    1    1    1   27    0
  END GEN-INFO
  *** Section PWATER***

  ACTIVITY
    <PLS > ************* Active Sections ******************************
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC ***
    1         0    0    1    0    0    0    0    0    0    0    0    0
   13         0    0    1    0    0    0    0    0    0    0    0    0
    4         0    0    1    0    0    0    0    0    0    0    0    0
    3         0    0    1    0    0    0    0    0    0    0    0    0
    5         0    0    1    0    0    0    0    0    0    0    0    0
    2         0    0    1    0    0    0    0    0    0    0    0    0
    7         0    0    1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ***************************** PIVL  PYR
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC  *********
    1         0    0    4    0    0    0    0    0    0    0    0    0    1    9
   13         0    0    4    0    0    0    0    0    0    0    0    0    1    9
    4         0    0    4    0    0    0    0    0    0    0    0    0    1    9
    3         0    0    4    0    0    0    0    0    0    0    0    0    1    9
    5         0    0    4    0    0    0    0    0    0    0    0    0    1    9
    2         0    0    4    0    0    0    0    0    0    0    0    0    1    9
    7         0    0    4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO

  PWAT-PARM1
    <PLS >  PWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE INFC  HWT ***
    1         0    0    0    0    0    0    0    0    0    0    0
   13         0    0    0    0    0    0    0    0    0    0    0
    4         0    0    0    0    0    0    0    0    0    0    0
    3         0    0    0    0    0    0    0    0    0    0    0
    5         0    0    0    0    0    0    0    0    0    0    0
    2         0    0    0    0    0    0    0    0    0    0    0
    7         0    0    0    0    0    0    0    0    0    0    0
  END PWAT-PARM1

  PWAT-PARM2
    <PLS >      PWATER input info: Part 2          ***
    # -  # ***FOREST      LZSN    INFILT      LSUR     SLSUR      KVARY     AGWRC
    1              0         5         2       400      0.05        0.3     0.996
   13              0       4.5      0.06       400      0.05        0.5     0.996
    4              0         5       1.5       400      0.05        0.3     0.996
    3              0         5         2       400      0.15        0.3     0.996
    5              0         5       1.5       400       0.1        0.3     0.996
```

```
    2              0         5         2       400       0.1       0.3     0.996
    7              0         5       0.8       400      0.05       0.3     0.996
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3          ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
    1              0         0         2         2         0         0         0
   13              0         0         2         2         0         0         0
    4              0         0         2         2         0         0         0
    3              0         0         2         2         0         0         0
    5              0         0         2         2         0         0         0
    2              0         0         2         2         0         0         0
    7              0         0         2         2         0         0         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                                  ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
    1          0.2       0.5      0.35         0       0.7       0.7
   13         0.15       0.4       0.3         6       0.5       0.4
    4         0.15       0.5       0.3         0       0.7       0.4
    3          0.2       0.5      0.35         0       0.7       0.7
    5         0.15       0.5       0.3         0       0.7       0.4
    2          0.2       0.5      0.35         0       0.7       0.7
    7          0.1       0.5      0.25         0       0.7      0.25
  END PWAT-PARM4

  PWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
             ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
    # -  # ***  CEPS      SURS       UZS      IFWS       LZS      AGWS      GWVS
    1              0         0         0         0         3         1         0
   13              0         0         0         0       2.5         1         0
    4              0         0         0         0         3         1         0
    3              0         0         0         0         3         1         0
    5              0         0         0         0         3         1         0
    2              0         0         0         0         3         1         0
    7              0         0         0         0         3         1         0
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name------->   Unit-systems   Printer ***
    # -  #                     User  t-series Engl Metr ***
                                     in  out           ***
    8      SIDEWALKS/FLAT         1    1    1   27    0
  END GEN-INFO
  *** Section IWATER***

  ACTIVITY
    <PLS > ************ Active Sections ******************************
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL   ***
    8         0    0    1    0    0    0
  END ACTIVITY

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL    *********
    8         0    0    4    0    0    4    1    9
  END PRINT-INFO

  IWAT-PARM1
    <PLS >  IWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP  VRS  VNN RTLI     ***
    8         0    0    0    0    0
  END IWAT-PARM1

  IWAT-PARM2
```

```
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
    8            400      0.01       0.1       0.1
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
    8              0         0
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
    8              0         0
  END IWAT-STATE1

END IMPLND

SCHEMATIC
<-Source->                  <--Area-->     <-Target->   MBLK   ***
<Name>   #                  <-factor->     <Name>   #   Tbl#   ***
TDA 1***
PERLND   1                        0.2     COPY   501     12
PERLND   1                        0.2     COPY   501     13
PERLND  13                       0.79     COPY   501     12
PERLND  13                       0.79     COPY   501     13
IMPLND   8                       0.19     COPY   501     15
TDA 2***
PERLND   1                       0.03     COPY   502     12
PERLND   1                       0.03     COPY   502     13
IMPLND   8                       0.01     COPY   502     15
TDA 3***
PERLND   1                       0.12     COPY   503     12
PERLND   1                       0.12     COPY   503     13
IMPLND   8                       0.04     COPY   503     15
TDA 4***
PERLND   1                        0.5     COPY   504     12
PERLND   1                        0.5     COPY   504     13
PERLND   4                       0.83     COPY   504     12
PERLND   4                       0.83     COPY   504     13
IMPLND   8                       0.19     COPY   504     15
TDA 5***
PERLND   3                       1.49     COPY   505     12
PERLND   3                       1.49     COPY   505     13
PERLND   5                       0.27     COPY   505     12
PERLND   5                       0.27     COPY   505     13
PERLND   2                       0.22     COPY   505     12
PERLND   2                       0.22     COPY   505     13
IMPLND   8                       0.12     COPY   505     15
TDA 6***
PERLND   7                       0.13     COPY   506     12
PERLND   7                       0.13     COPY   506     13

******Routing******
END SCHEMATIC

NETWORK
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
COPY   501 OUTPUT MEAN   1 1   48.4        DISPLY   1     INPUT  TIMSER 1
COPY   502 OUTPUT MEAN   1 1   48.4        DISPLY   2     INPUT  TIMSER 1
COPY   503 OUTPUT MEAN   1 1   48.4        DISPLY   3     INPUT  TIMSER 1
COPY   504 OUTPUT MEAN   1 1   48.4        DISPLY   4     INPUT  TIMSER 1
COPY   505 OUTPUT MEAN   1 1   48.4        DISPLY   5     INPUT  TIMSER 1
COPY   506 OUTPUT MEAN   1 1   48.4        DISPLY   6     INPUT  TIMSER 1



<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
```

```
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
END NETWORK

RCHRES
  GEN-INFO
    RCHRES       Name        Nexits   Unit Systems   Printer                ***
    # -  #<----------------><---> User T-series  Engl Metr LKFG             ***
                                     in  out                                ***
  END GEN-INFO
  *** Section RCHRES***

  ACTIVITY
    <PLS > ************ Active Sections ****************************
    # -  # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG ***
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ****************** PIVL  PYR
    # -  # HYDR ADCA CONS HEAT  SED  GQL OXRX NUTR PLNK PHCB PIVL  PYR  *********
  END PRINT-INFO

  HYDR-PARM1
    RCHRES  Flags for each HYDR Section                                  ***
    # -  #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each     FUNCT  for each
            FG FG FG FG  possible  exit  *** possible  exit      possible  exit
             *  *  *  *    *  *  *  *  *       *  *  *  *  *         ***
  END HYDR-PARM1

  HYDR-PARM2
    # -  #    FTABNO       LEN     DELTH     STCOR        KS      DB50       ***
  <------><--------><--------><--------><--------><--------><-------->       ***
  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                     ***
    # -  # ***   VOL     Initial  value  of COLIND     Initial  value  of OUTDGT
          *** ac-ft     for each possible exit        for each possible exit
  <------><-------->     <---><---><---><---><---> *** <---><---><---><---><--->
  END HYDR-INIT
END RCHRES

SPEC-ACTIONS
END SPEC-ACTIONS
FTABLES
END FTABLES

EXT SOURCES
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #  ***
WDM      2 PREC     ENGL    1              PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1              IMPLND   1 999 EXTNL  PREC
WDM      1 EVAP     ENGL    0.76           PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    0.76           IMPLND   1 999 EXTNL  PETINP

END EXT SOURCES

EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
COPY   501 OUTPUT MEAN   1 1     48.4      WDM    501 FLOW     ENGL      REPL
COPY   502 OUTPUT MEAN   1 1     48.4      WDM    502 FLOW     ENGL      REPL
COPY   503 OUTPUT MEAN   1 1     48.4      WDM    503 FLOW     ENGL      REPL
COPY   504 OUTPUT MEAN   1 1     48.4      WDM    504 FLOW     ENGL      REPL
COPY   505 OUTPUT MEAN   1 1     48.4      WDM    505 FLOW     ENGL      REPL
COPY   506 OUTPUT MEAN   1 1     48.4      WDM    506 FLOW     ENGL      REPL
END EXT TARGETS

MASS-LINK
<Volume>   <-Grp> <-Member-><--Mult-->     <Target>       <-Grp> <-Member->***
<Name>           <Name> # #<-factor->     <Name>                <Name> # #***
  MASS-LINK       12
```

```
PERLND     PWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   12

  MASS-LINK       13
PERLND     PWATER IFWO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   13

  MASS-LINK       15
IMPLND     IWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   15


END MASS-LINK

END RUN
```

Mitigated UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1955 10 01        END    2008 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                   UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                              ***
WDM         26   Flow Control Exemption.wdm
MESSU       25   MitFlow Control Exemption.MES
            27   MitFlow Control Exemption.L61
            28   MitFlow Control Exemption.L62
            30   POCFlow Control Exemption1.dat
            31   POCFlow Control Exemption2.dat
            32   POCFlow Control Exemption3.dat
            33   POCFlow Control Exemption4.dat
            34   POCFlow Control Exemption5.dat
            35   POCFlow Control Exemption6.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:15
      PERLND       7
      IMPLND       8
      PERLND       9
      PERLND       8
      IMPLND       9
      IMPLND      10
      COPY       501
      COPY       502
      COPY       503
      COPY       504
      COPY       505
      COPY       506
      DISPLY       1
      DISPLY       2
      DISPLY       3
      DISPLY       4
      DISPLY       5
      DISPLY       6
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title----------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        TDA 1                      MAX                    1    2   30    9
    2        TDA 2                      MAX                    1    2   31    9
    3        TDA 3                      MAX                    1    2   32    9
    4        TDA 4                      MAX                    1    2   33    9
    5        TDA 5                      MAX                    1    2   34    9
    6        TDA 6                      MAX                    1    2   35    9
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1         1    1
  501         1    1
  502         1    1
  503         1    1
  504         1    1
  505         1    1
  506         1    1
  END TIMESERIES
```

```
END COPY
GENER
  OPCODE
    #    # OPCD ***
  END OPCODE
  PARM
    #    #         K ***
  END PARM
END GENER
PERLND
  GEN-INFO
    <PLS ><-------Name------->NBLKS   Unit-systems   Printer ***
    # -  #                          User  t-series Engl Metr ***
                                        in  out           ***
    7     A/B, Lawn, Flat         1    1    1    1   27    0
    9     A/B, Lawn, Steep        1    1    1    1   27    0
    8     A/B, Lawn, Mod          1    1    1    1   27    0
  END GEN-INFO
  *** Section PWATER***

  ACTIVITY
    <PLS > ************ Active Sections ******************************
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC ***
    7         0    0    1    0    0    0    0    0    0    0    0    0
    9         0    0    1    0    0    0    0    0    0    0    0    0
    8         0    0    1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags **************************** PIVL  PYR
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC  *********
    7         0    0    4    0    0    0    0    0    0    0    0    0    1    9
    9         0    0    4    0    0    0    0    0    0    0    0    0    1    9
    8         0    0    4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO

  PWAT-PARM1
    <PLS >  PWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE INFC  HWT ***
    7         0    0    0    0    0    0    0    0    0    0    0
    9         0    0    0    0    0    0    0    0    0    0    0
    8         0    0    0    0    0    0    0    0    0    0    0
  END PWAT-PARM1

  PWAT-PARM2
    <PLS >      PWATER input info: Part 2         ***
    # -  # ***FOREST      LZSN    INFILT      LSUR     SLSUR      KVARY     AGWRC
    7              0         5       0.8       400      0.05        0.3     0.996
    9              0         5       0.8       400      0.15        0.3     0.996
    8              0         5       0.8       400       0.1        0.3     0.996
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
    7              0         0         2         2         0         0         0
    9              0         0         2         2         0         0         0
    8              0         0         2         2         0         0         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                              ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
    7          0.1       0.5      0.25         0       0.7      0.25
    9          0.1       0.5      0.25         0       0.7      0.25
    8          0.1       0.5      0.25         0       0.7      0.25
  END PWAT-PARM4

  PWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
               ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
```

```
    # -  # ***  CEPS      SURS       UZS       IFWS       LZS       AGWS      GWVS
    7              0         0         0          0         3          1         0
    9              0         0         0          0         3          1         0
    8              0         0         0          0         3          1         0
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name------->   Unit-systems   Printer ***
    # -  #                     User  t-series Engl Metr ***
                                     in  out           ***
    8      SIDEWALKS/FLAT         1    1    1   27    0
    9      SIDEWALKS/MOD          1    1    1   27    0
   10      SIDEWALKS/STEEP        1    1    1   27    0
  END GEN-INFO
  *** Section IWATER***

  ACTIVITY
    <PLS > ************ Active Sections ******************************
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL   ***
    8         0    0    1    0    0    0
    9         0    0    1    0    0    0
   10         0    0    1    0    0    0
  END ACTIVITY

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL    *********
    8         0    0    4    0    0    4    1    9
    9         0    0    4    0    0    0    1    9
   10         0    0    4    0    0    0    1    9
  END PRINT-INFO

  IWAT-PARM1
    <PLS >  IWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP  VRS  VNN RTLI     ***
    8         0    0    0    0    0
    9         0    0    0    0    0
   10         0    0    0    0    0
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
    8            400      0.01       0.1       0.1
    9            400      0.05       0.1      0.08
   10            400       0.1       0.1      0.05
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
    8              0         0
    9              0         0
   10              0         0
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
    8              0         0
    9              0         0
   10              0         0
  END IWAT-STATE1

END IMPLND

SCHEMATIC
```

```
<-Source->                  <--Area-->     <-Target->   MBLK   ***
<Name>   #                  <-factor->     <Name>   #   Tbl#   ***
TDA 1***
PERLND   7                        0.31     COPY   501     12
PERLND   7                        0.31     COPY   501     13
IMPLND   8                        0.87     COPY   501     15
TDA 2***
PERLND   7                        0.03     COPY   502     12
PERLND   7                        0.03     COPY   502     13
IMPLND   8                        0.01     COPY   502     15
TDA 3***
PERLND   7                        0.03     COPY   503     12
PERLND   7                        0.03     COPY   503     13
IMPLND   8                        0.13     COPY   503     15
TDA 4***
PERLND   7                        0.71     COPY   504     12
PERLND   7                        0.71     COPY   504     13
IMPLND   8                        0.81     COPY   504     15
TDA 5***
PERLND   9                        1.21     COPY   505     12
PERLND   9                        1.21     COPY   505     13
PERLND   8                        0.19     COPY   505     12
PERLND   8                        0.19     COPY   505     13
IMPLND   9                        0.42     COPY   505     15
IMPLND  10                        0.28     COPY   505     15
TDA 6***
PERLND   9                        0.01     COPY   506     12
PERLND   9                        0.01     COPY   506     13
PERLND   7                        0.06     COPY   506     12
PERLND   7                        0.06     COPY   506     13
IMPLND   8                        0.08     COPY   506     15

******Routing******
END SCHEMATIC

NETWORK
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
COPY   501 OUTPUT MEAN   1 1   48.4        DISPLY   1     INPUT  TIMSER 1
COPY   502 OUTPUT MEAN   1 1   48.4        DISPLY   2     INPUT  TIMSER 1
COPY   503 OUTPUT MEAN   1 1   48.4        DISPLY   3     INPUT  TIMSER 1
COPY   504 OUTPUT MEAN   1 1   48.4        DISPLY   4     INPUT  TIMSER 1
COPY   505 OUTPUT MEAN   1 1   48.4        DISPLY   5     INPUT  TIMSER 1
COPY   506 OUTPUT MEAN   1 1   48.4        DISPLY   6     INPUT  TIMSER 1



<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
END NETWORK

RCHRES
  GEN-INFO
    RCHRES       Name        Nexits   Unit Systems   Printer                ***
    # -  #<------------------><---> User T-series  Engl Metr LKFG           ***
                                       in  out                              ***
  END GEN-INFO
  *** Section RCHRES***

  ACTIVITY
    <PLS > ************* Active Sections ****************************
    # -  # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG ***
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ******************* PIVL  PYR
    # -  # HYDR ADCA CONS HEAT  SED  GQL OXRX NUTR PLNK PHCB PIVL  PYR  *********
  END PRINT-INFO

  HYDR-PARM1
```

```
    RCHRES  Flags for each HYDR Section                                    ***
    # -  #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each     FUNCT  for each
           FG FG FG FG  possible  exit  *** possible  exit      possible  exit
            *  *  *  *    *  *  *  *  *       *  *  *  *  *         ***
  END HYDR-PARM1

  HYDR-PARM2
    # -  #    FTABNO       LEN     DELTH     STCOR        KS      DB50       ***
  <------><--------><--------><--------><--------><--------><-------->       ***
  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                       ***
    # -  # ***   VOL     Initial  value  of COLIND     Initial  value  of OUTDGT
          *** ac-ft     for each possible exit        for each possible exit
  <------><-------->     <---><---><---><---><---> *** <---><---><---><---><--->
  END HYDR-INIT
END RCHRES

SPEC-ACTIONS
END SPEC-ACTIONS
FTABLES
END FTABLES

EXT SOURCES
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #  ***
WDM      2 PREC     ENGL    1              PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1              IMPLND   1 999 EXTNL  PREC
WDM      1 EVAP     ENGL    0.76           PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    0.76           IMPLND   1 999 EXTNL  PETINP

END EXT SOURCES

EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
COPY     1 OUTPUT MEAN   1 1     48.4      WDM    701 FLOW     ENGL       REPL
COPY   501 OUTPUT MEAN   1 1     48.4      WDM    801 FLOW     ENGL       REPL
COPY     2 OUTPUT MEAN   1 1     48.4      WDM    702 FLOW     ENGL       REPL
COPY   502 OUTPUT MEAN   1 1     48.4      WDM    802 FLOW     ENGL       REPL
COPY     3 OUTPUT MEAN   1 1     48.4      WDM    703 FLOW     ENGL       REPL
COPY   503 OUTPUT MEAN   1 1     48.4      WDM    803 FLOW     ENGL       REPL
COPY     4 OUTPUT MEAN   1 1     48.4      WDM    704 FLOW     ENGL       REPL
COPY   504 OUTPUT MEAN   1 1     48.4      WDM    804 FLOW     ENGL       REPL
COPY     5 OUTPUT MEAN   1 1     48.4      WDM    705 FLOW     ENGL       REPL
COPY   505 OUTPUT MEAN   1 1     48.4      WDM    805 FLOW     ENGL       REPL
COPY     6 OUTPUT MEAN   1 1     48.4      WDM    706 FLOW     ENGL       REPL
COPY   506 OUTPUT MEAN   1 1     48.4      WDM    806 FLOW     ENGL       REPL
END EXT TARGETS

MASS-LINK
<Volume>   <-Grp> <-Member-><--Mult-->     <Target>       <-Grp> <-Member->***
<Name>            <Name> # #<-factor->     <Name>                <Name> # #***
  MASS-LINK       12
PERLND     PWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   12

  MASS-LINK       13
PERLND     PWATER IFWO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   13

  MASS-LINK       15
IMPLND     IWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   15


END MASS-LINK

END RUN
```

Predeveloped HSPF Message File

Mitigated HSPF Message File

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NEXT DOCUMENT

WWHM2012

PROJECT REPORT

General Model Information

WWHM2012 Project Name: T-Line Infiltration Trench

Site Name:	DVT_T-Line
Site Address:	
City:	
Report Date:	7/1/2026
Gage:	Olympia Airport
Data Start:	1955/10/01
Data End:	2008/09/30
Timestep:	15 Minute
Precip Scale:	1.000
Version Date:	2024/06/28
Version:	4.3.1

POC Thresholds

Low Flow Threshold for POC1:	50 Percent of the 2 Year
High Flow Threshold for POC1:	50 Year

Landuse Basin Data

Predeveloped Land Use

Basin 1

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
A B, Forest, Steep	1.49
Pervious Total	1.49

Impervious Land Use	acre
Impervious Total	0
Basin Total	1.49

Element Flow Componants:

Surface	Interflow	Groundwater

Componant Flows To:

POC 1	POC 1	

Mitigated Land Use

Basin 1

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
A B, Forest, Steep	1.21
Pervious Total	1.21

Impervious Land Use	acre
SIDEWALKS FLAT	0.28
Impervious Total	0.28
Basin Total	1.49

Element Flow Componants:

Surface	Interflow	Groundwater
Componant Flows To:		
Gravel Trench Bed 1	Gravel Trench Bed 1	

Routing Elements

Predeveloped Routing

Mitigated Routing

Gravel Trench Bed 1

Bottom Length:	50.00 ft.
Bottom Width:	6.00 ft.
Trench bottom slope 1:	1 To 1
Trench Left side slope 0:	1 To 1
Trench right side slope 2:	1 To 1
Material thickness of first layer:	4
Pour Space of material for first layer:	0.33
Material thickness of second layer:	0
Pour Space of material for second layer:	0
Material thickness of third layer:	0
Pour Space of material for third layer:	0
Infiltration On	
Infiltration rate:	12
Infiltration safety factor:	1
Total Volume Infiltrated (ac-ft.):	53.713
Total Volume Through Riser (ac-ft.):	0.002
Total Volume Through Facility (ac-ft.):	53.715
Percent Infiltrated:	100
Total Precip Applied to Facility:	0
Total Evap From Facility:	0
Discharge Structure	
Riser Height:	4 ft.
Riser Diameter:	12 in.
Element Outlets:	
Outlet 1	Outlet 2
Outlet Flows To:	

Gravel Trench Bed Hydraulic Table

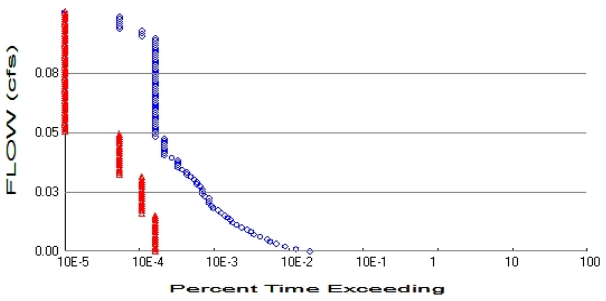
Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.006	0.000	0.000	0.000
0.0444	0.007	0.000	0.000	0.083
0.0889	0.007	0.000	0.000	0.083
0.1333	0.007	0.000	0.000	0.083
0.1778	0.007	0.000	0.000	0.083
0.2222	0.007	0.000	0.000	0.083
0.2667	0.007	0.000	0.000	0.083
0.3111	0.007	0.000	0.000	0.083
0.3556	0.007	0.000	0.000	0.083
0.4000	0.007	0.001	0.000	0.083
0.4444	0.008	0.001	0.000	0.083
0.4889	0.008	0.001	0.000	0.083
0.5333	0.008	0.001	0.000	0.083
0.5778	0.008	0.001	0.000	0.083
0.6222	0.008	0.001	0.000	0.083
0.6667	0.008	0.001	0.000	0.083
0.7111	0.008	0.001	0.000	0.083
0.7556	0.008	0.002	0.000	0.083
0.8000	0.009	0.002	0.000	0.083
0.8444	0.009	0.002	0.000	0.083
0.8889	0.009	0.002	0.000	0.083
0.9333	0.009	0.002	0.000	0.083
0.9778	0.009	0.002	0.000	0.083

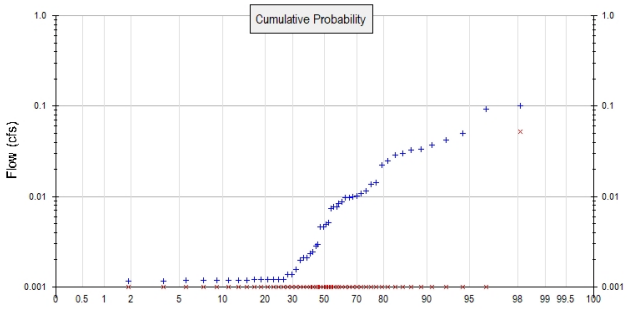
1.0222	0.009	0.002	0.000	0.083
1.0667	0.009	0.002	0.000	0.083
1.1111	0.009	0.003	0.000	0.083
1.1556	0.010	0.003	0.000	0.083
1.2000	0.010	0.003	0.000	0.083
1.2444	0.010	0.003	0.000	0.083
1.2889	0.010	0.003	0.000	0.083
1.3333	0.010	0.003	0.000	0.083
1.3778	0.010	0.004	0.000	0.083
1.4222	0.010	0.004	0.000	0.083
1.4667	0.010	0.004	0.000	0.083
1.5111	0.011	0.004	0.000	0.083
1.5556	0.011	0.004	0.000	0.083
1.6000	0.011	0.004	0.000	0.083
1.6444	0.011	0.004	0.000	0.083
1.6889	0.011	0.005	0.000	0.083
1.7333	0.011	0.005	0.000	0.083
1.7778	0.011	0.005	0.000	0.083
1.8222	0.011	0.005	0.000	0.083
1.8667	0.012	0.005	0.000	0.083
1.9111	0.012	0.006	0.000	0.083
1.9556	0.012	0.006	0.000	0.083
2.0000	0.012	0.006	0.000	0.083
2.0444	0.012	0.006	0.000	0.083
2.0889	0.012	0.006	0.000	0.083
2.1333	0.012	0.006	0.000	0.083
2.1778	0.012	0.007	0.000	0.083
2.2222	0.013	0.007	0.000	0.083
2.2667	0.013	0.007	0.000	0.083
2.3111	0.013	0.007	0.000	0.083
2.3556	0.013	0.007	0.000	0.083
2.4000	0.013	0.008	0.000	0.083
2.4444	0.013	0.008	0.000	0.083
2.4889	0.013	0.008	0.000	0.083
2.5333	0.014	0.008	0.000	0.083
2.5778	0.014	0.008	0.000	0.083
2.6222	0.014	0.009	0.000	0.083
2.6667	0.014	0.009	0.000	0.083
2.7111	0.014	0.009	0.000	0.083
2.7556	0.014	0.009	0.000	0.083
2.8000	0.014	0.009	0.000	0.083
2.8444	0.014	0.010	0.000	0.083
2.8889	0.015	0.010	0.000	0.083
2.9333	0.015	0.010	0.000	0.083
2.9778	0.015	0.010	0.000	0.083
3.0222	0.015	0.011	0.000	0.083
3.0667	0.015	0.011	0.000	0.083
3.1111	0.015	0.011	0.000	0.083
3.1556	0.015	0.011	0.000	0.083
3.2000	0.016	0.011	0.000	0.083
3.2444	0.016	0.012	0.000	0.083
3.2889	0.016	0.012	0.000	0.083
3.3333	0.016	0.012	0.000	0.083
3.3778	0.016	0.012	0.000	0.083
3.4222	0.016	0.013	0.000	0.083
3.4667	0.016	0.013	0.000	0.083
3.5111	0.017	0.013	0.000	0.083
3.5556	0.017	0.013	0.000	0.083

3.6000	0.017	0.014	0.000	0.083
3.6444	0.017	0.014	0.000	0.083
3.6889	0.017	0.014	0.000	0.083
3.7333	0.017	0.014	0.000	0.083
3.7778	0.017	0.015	0.000	0.083
3.8222	0.018	0.015	0.000	0.083
3.8667	0.018	0.015	0.000	0.083
3.9111	0.018	0.016	0.000	0.083
3.9556	0.018	0.016	0.000	0.083
4.0000	0.018	0.016	0.000	0.083

Analysis Results

POC 1





\+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 1.49
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1
Total Pervious Area: 1.21
Total Impervious Area: 0.28

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	Flow(cfs)
2 year	0.004737
5 year	0.015504
10 year	0.029966
25 year	0.062369
50 year	0.101841
100 year	0.16011

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	Flow(cfs)
2 year	0
5 year	0
10 year	0
25 year	0
50 year	0
100 year	0

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #1

Year	Predeveloped	Mitigated
1956	0.010	0.000
1957	0.001	0.000
1958	0.002	0.000
1959	0.002	0.000
1960	0.009	0.000
1961	0.029	0.000
1962	0.001	0.000
1963	0.014	0.000
1964	0.025	0.000
1965	0.008	0.000

1966	0.003	0.000
1967	0.010	0.000
1968	0.002	0.000
1969	0.001	0.000
1970	0.002	0.000
1971	0.011	0.000
1972	0.022	0.000
1973	0.001	0.000
1974	0.012	0.000
1975	0.005	0.000
1976	0.007	0.000
1977	0.001	0.000
1978	0.005	0.000
1979	0.001	0.000
1980	0.003	0.000
1981	0.010	0.000
1982	0.005	0.000
1983	0.002	0.000
1984	0.014	0.000
1985	0.001	0.000
1986	0.005	0.000
1987	0.093	0.000
1988	0.001	0.000
1989	0.001	0.000
1990	0.042	0.000
1991	0.050	0.000
1992	0.001	0.000
1993	0.001	0.000
1994	0.001	0.000
1995	0.008	0.000
1996	0.030	0.000
1997	0.032	0.000
1998	0.002	0.000
1999	0.033	0.000
2000	0.001	0.000
2001	0.001	0.000
2002	0.008	0.000
2003	0.001	0.000
2004	0.010	0.000
2005	0.001	0.000
2006	0.101	0.052
2007	0.037	0.000
2008	0.001	0.000

Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	Predeveloped	Mitigated
1	0.1014	0.0521
2	0.0927	0.0000
3	0.0499	0.0000
4	0.0422	0.0000
5	0.0368	0.0000
6	0.0334	0.0000
7	0.0325	0.0000
8	0.0299	0.0000
9	0.0288	0.0000
10	0.0249	0.0000
11	0.0224	0.0000

12	0.0143	0.0000
13	0.0136	0.0000
14	0.0115	0.0000
15	0.0109	0.0000
16	0.0102	0.0000
17	0.0098	0.0000
18	0.0097	0.0000
19	0.0097	0.0000
20	0.0088	0.0000
21	0.0083	0.0000
22	0.0077	0.0000
23	0.0076	0.0000
24	0.0073	0.0000
25	0.0051	0.0000
26	0.0050	0.0000
27	0.0046	0.0000
28	0.0046	0.0000
29	0.0029	0.0000
30	0.0028	0.0000
31	0.0024	0.0000
32	0.0023	0.0000
33	0.0021	0.0000
34	0.0021	0.0000
35	0.0020	0.0000
36	0.0015	0.0000
37	0.0014	0.0000
38	0.0014	0.0000
39	0.0012	0.0000
40	0.0012	0.0000
41	0.0012	0.0000
42	0.0012	0.0000
43	0.0012	0.0000
44	0.0012	0.0000
45	0.0012	0.0000
46	0.0012	0.0000
47	0.0012	0.0000
48	0.0012	0.0000
49	0.0012	0.0000
50	0.0012	0.0000
51	0.0012	0.0000
52	0.0012	0.0000
53	0.0012	0.0000

Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0024	357	3	0	Pass
0.0034	230	3	1	Pass
0.0044	167	3	1	Pass
0.0054	127	3	2	Pass
0.0064	104	3	2	Pass
0.0074	96	3	3	Pass
0.0084	77	3	3	Pass
0.0094	63	3	4	Pass
0.0104	58	3	5	Pass
0.0114	52	3	5	Pass
0.0124	43	3	6	Pass
0.0134	37	3	8	Pass
0.0144	33	3	9	Pass
0.0154	31	3	9	Pass
0.0164	28	3	10	Pass
0.0174	26	3	11	Pass
0.0184	23	2	8	Pass
0.0194	21	2	9	Pass
0.0205	18	2	11	Pass
0.0215	17	2	11	Pass
0.0225	16	2	12	Pass
0.0235	16	2	12	Pass
0.0245	16	2	12	Pass
0.0255	14	2	14	Pass
0.0265	13	2	15	Pass
0.0275	13	2	15	Pass
0.0285	13	2	15	Pass
0.0295	12	2	16	Pass
0.0305	11	2	18	Pass
0.0315	11	2	18	Pass
0.0325	10	2	20	Pass
0.0335	9	2	22	Pass
0.0345	8	1	12	Pass
0.0355	8	1	12	Pass
0.0365	7	1	14	Pass
0.0375	6	1	16	Pass
0.0385	6	1	16	Pass
0.0395	6	1	16	Pass
0.0405	6	1	16	Pass
0.0416	5	1	20	Pass
0.0426	4	1	25	Pass
0.0436	4	1	25	Pass
0.0446	4	1	25	Pass
0.0456	4	1	25	Pass
0.0466	4	1	25	Pass
0.0476	4	1	25	Pass
0.0486	4	1	25	Pass
0.0496	4	1	25	Pass
0.0506	3	1	33	Pass
0.0516	3	1	33	Pass
0.0526	3	0	0	Pass
0.0536	3	0	0	Pass
0.0546	3	0	0	Pass

0.0556	3	0	0	Pass
0.0566	3	0	0	Pass
0.0576	3	0	0	Pass
0.0586	3	0	0	Pass
0.0596	3	0	0	Pass
0.0606	3	0	0	Pass
0.0617	3	0	0	Pass
0.0627	3	0	0	Pass
0.0637	3	0	0	Pass
0.0647	3	0	0	Pass
0.0657	3	0	0	Pass
0.0667	3	0	0	Pass
0.0677	3	0	0	Pass
0.0687	3	0	0	Pass
0.0697	3	0	0	Pass
0.0707	3	0	0	Pass
0.0717	3	0	0	Pass
0.0727	3	0	0	Pass
0.0737	3	0	0	Pass
0.0747	3	0	0	Pass
0.0757	3	0	0	Pass
0.0767	3	0	0	Pass
0.0777	3	0	0	Pass
0.0787	3	0	0	Pass
0.0797	3	0	0	Pass
0.0807	3	0	0	Pass
0.0817	3	0	0	Pass
0.0828	3	0	0	Pass
0.0838	3	0	0	Pass
0.0848	3	0	0	Pass
0.0858	3	0	0	Pass
0.0868	3	0	0	Pass
0.0878	3	0	0	Pass
0.0888	3	0	0	Pass
0.0898	3	0	0	Pass
0.0908	3	0	0	Pass
0.0918	3	0	0	Pass
0.0928	2	0	0	Pass
0.0938	2	0	0	Pass
0.0948	2	0	0	Pass
0.0958	1	0	0	Pass
0.0968	1	0	0	Pass
0.0978	1	0	0	Pass
0.0988	1	0	0	Pass
0.0998	1	0	0	Pass
0.1008	1	0	0	Pass
0.1018	0	0	0	Pass

Water Quality

Water Quality BMP Flow and Volume for POC #1

On-line facility volume:	0 acre-feet
On-line facility target flow:	0 cfs.
Adjusted for 15 min:	0 cfs.
Off-line facility target flow:	0 cfs.
Adjusted for 15 min:	0 cfs.

Model Default Modifications

Total of 0 changes have been made.

PERLND Changes

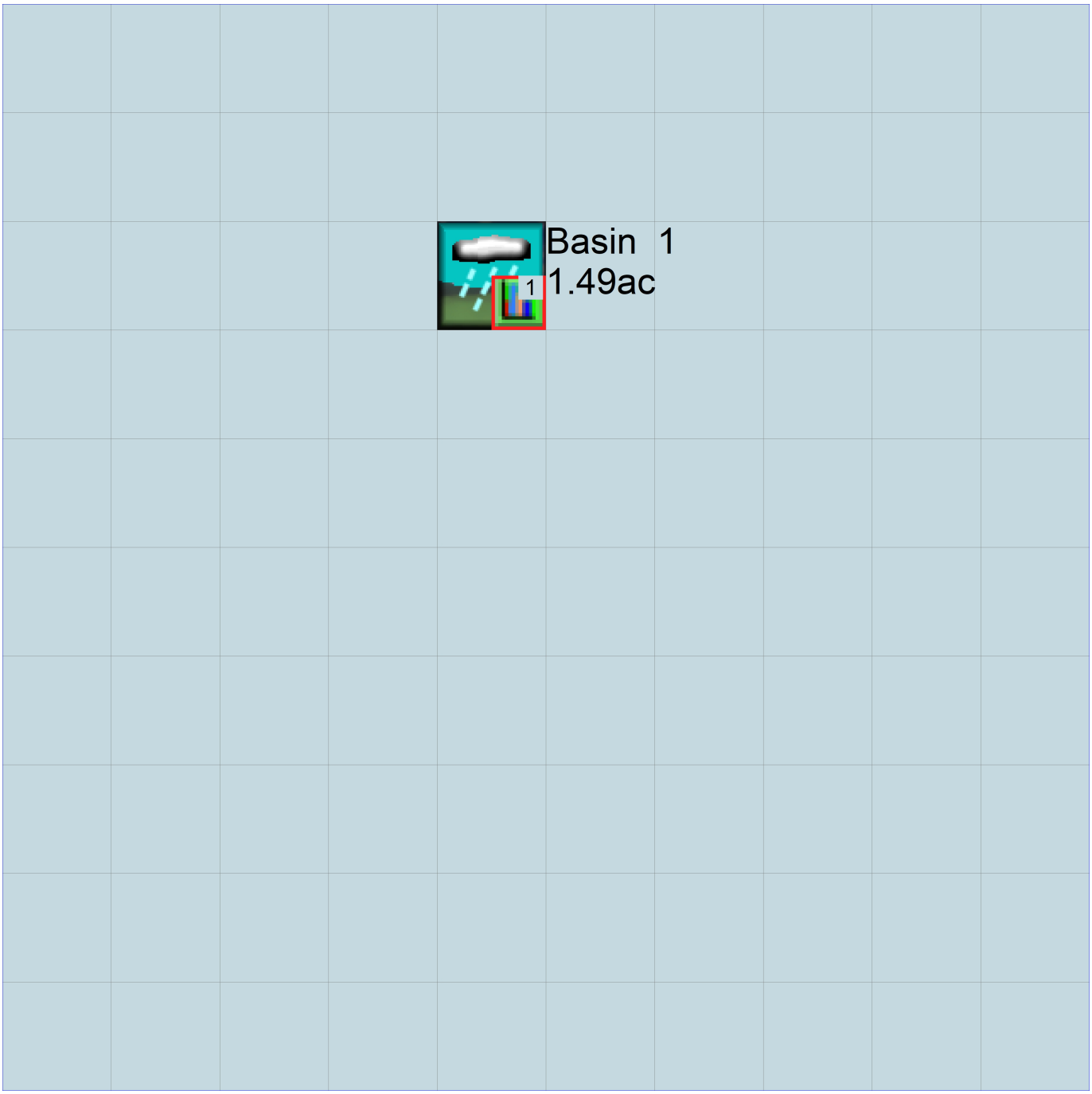
No PERLND changes have been made.

IMPLND Changes

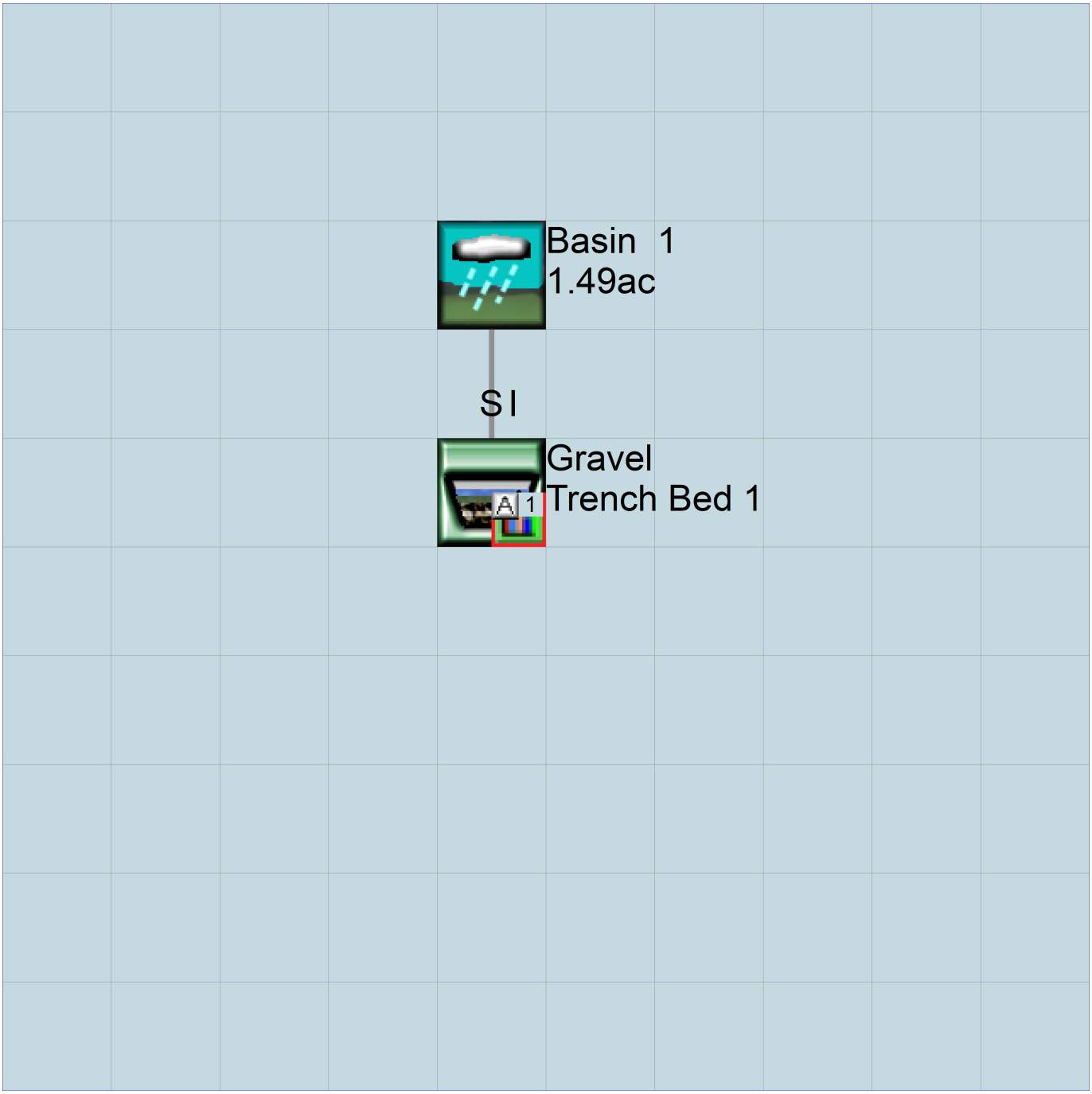
No IMPLND changes have been made.

Appendix

Predeveloped Schematic



Mitigated Schematic



Predeveloped UCI File

Mitigated UCI File

Predeveloped HSPF Message File

Mitigated HSPF Message File

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Appendix 2
Soil Management Plan

2/20/2026

Deschutes Valley Trail – Segment C
Soil Management Plan

The Deschutes Valley Trail – Segment C project utilizes the Postconstruction Soil Quality and Depth BMP. See below for compliance with the following requirements as outlined in the City of Tumwater DDECM:

- A site map showing areas to be fenced and left undisturbed during construction, and areas that will be amended at the turf or planting bed rates.
    - Any areas that are disturbed during construction and are not replaced with impervious surface shall employ Postconstruction Soil Quality and Depth and be reseeded. Refer to the civil engineering plans for the limits of grading associated with construction of the trail.
- Determination of soil conditions
    - Refer to Appendix 3: Exhibits 3B, 3C and 3D of the Drainage Report for information on existing site soil conditions.
- Identified soil quality implementation option
    - The soil section specified under Postconstruction Soil Quality and Depth shall be met by bringing in off-site soils that meet the BMP requirements.
- Calculations of the amounts of compost, compost amended topsoil, and mulch to be used on the site.
    - Refer to the civil engineering estimate for calculations of compost, compost amended topsoil, and mulch.

Appendix 3
Supplemental Reports and Information

Exhibit 3A - Critical Areas

Thurston County

Critical Aquifer Recharge Areas & McAllister Springs Geological Sensitive Area

Aquifer Recharge Classes*
- Extreme
- High
- Moderate

Geological Sensitive Area
- McAllister Springs

PROJECT SITE

Cities | Urban Growth Are

0 Miles

*Thurston County Critical Area Ordinance Chapter 24.10, Appendix B:
Table 24.10-3 Critical Aquifer Recharge Areas Geologic Features.
Table 24.10-4 Critical Aquifer Recharge Area soil series.

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Updated on 11/14

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THURSTON COUNTY

Map Exported on 12/20/2025
PDF:Library/APRX/Environmental Health/Water.aprx\Aquifer Recharge(54x30)

Thurston County
Drainage Basins

Military Bases
Native American Reservations
Public Forests
Cities
Urban Growth Areas

PROJECT SITE

TUMWATER

R4W R3W R2W R1W R1E R2E R3E R4E R5E

T20N T19N T18N T17N T16N T15N

Thurston County

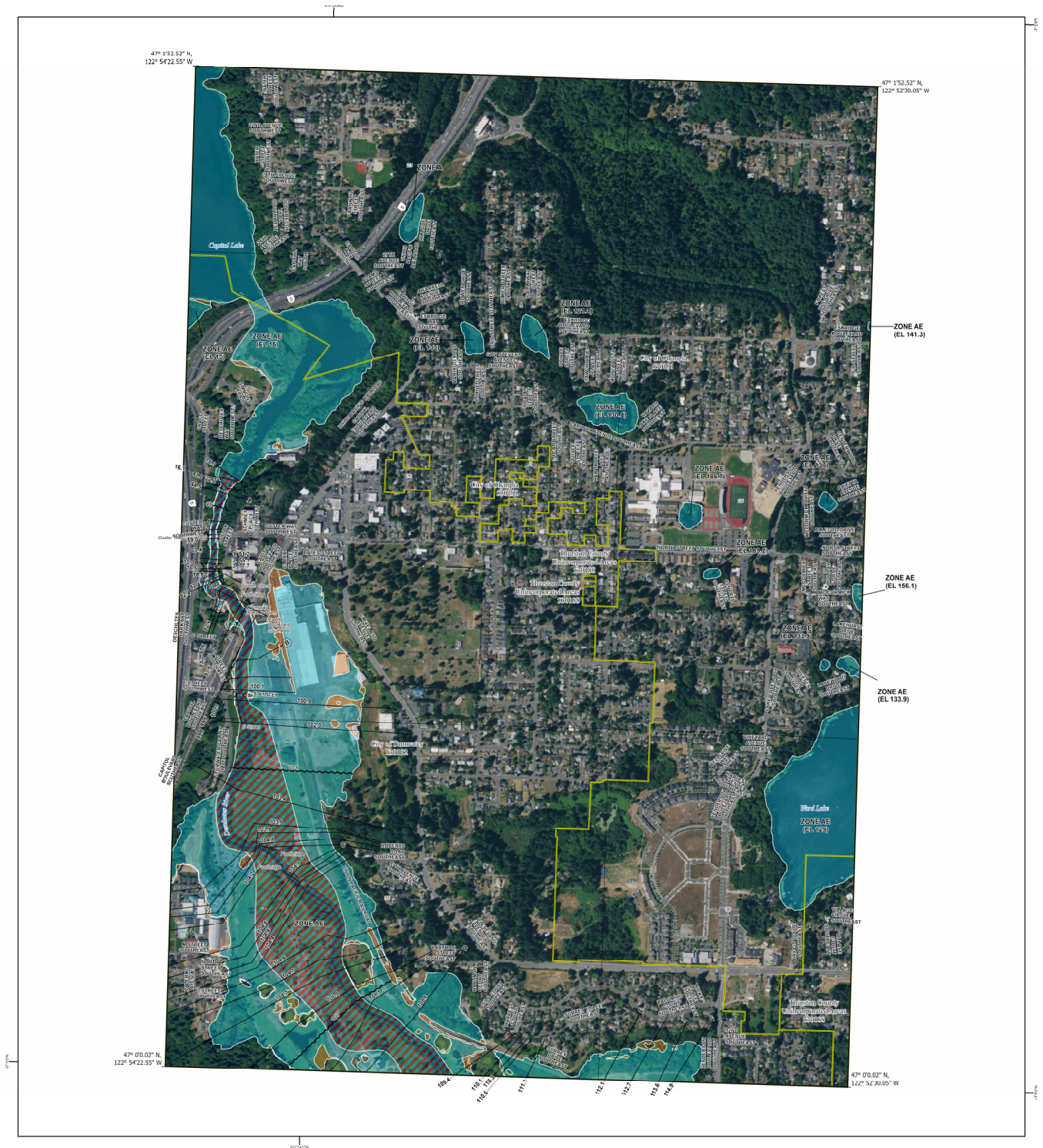
100 Year & 500 Year Flood Zones
1996 Historical Flood

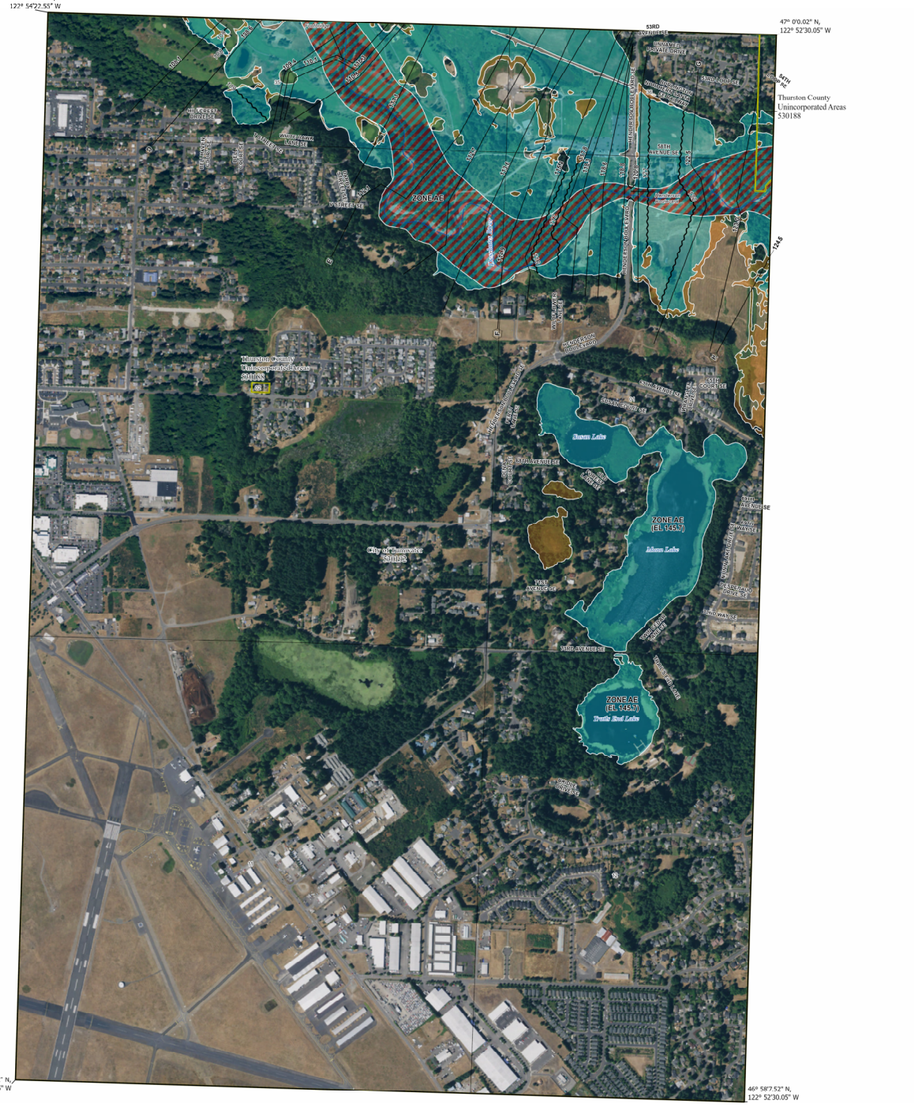
100 Year Flood Zone

500 Year Flood Zone

Flood of 1996

PROJECT SITE


47° 1'52.52" N,
122° 54'22.55" W
47° 1'52.52" N,
122° 52'30.05" W
47° 0'0.02" N,
122° 54'22.55" W
47° 0'0.02" N,
122° 52'30.05" W
ZONE AE
ZONE AE (EL 141.3)
ZONE AE (EL 166.1)
ZONE AE (EL 133.9)
Capitol Lake
West Lake
ZONE AE (EL 104.2)
City of Olympia Zone
Thurston County Unincorporated Area Zone
Tumwater Zone
Thurston County Unincorporated Area
ZONE AE (EL 141.3)
ZONE AE (EL 133.9)
ZONE AE (EL 104.2)
ZONE AE (EL 166.1)



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT HTTPS://MSC.FEMA.GOV

SPECIAL FLOOD HAZARD AREAS	Without Base Flood Elevation (BFE) *Zone A, V, A99*
	With BFE or Depth *Zone AE, AO, AH, VE, AR*
	Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD	0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
	Future Conditions 1% Annual Chance Flood Hazard *Zone X*
	Area with Reduced Flood Risk due to Levee *See Notes Zone X*
	Area with Flood Risk due to Levee *Zone D*
OTHER AREAS	NO SCREEN Area of Minimal Flood Hazard *Zone X*
	Area of Undetermined Flood Hazard *Zone D*
GENERAL STRUCTURES	Channel, Culvert, or Storm Sewer
	Levee, Dike, or Floodwall
	20.2 Cross Sections with 1% Annual Chance
	17.5 Water Surface Elevation
	Coastal Transect
	Coastal Transect Baseline
	Profile Baseline
	Hydrographic Feature
	Base Flood Elevation Line (BFE)
OTHER FEATURES	Limit of Study
	Jurisdiction Boundary

NOTES TO USERS

For information and questions about this Flood Insurance Rate Map (FIRM), available effective flood hazard information for your community, or the National Flood Insurance Program (NFIP) in general, please call the FEMA Mapping and Insurance Information eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Flood Map Service Center website at https://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website. Users should be aware that individual FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM Index. These may be acquired directly from the Flood Map Service Center at the website listed above.

For community and countywide map dates refer to the Flood Insurance Study Report for this jurisdiction.

To determine if flood insurance is available in this community, contact your Insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

Basemap information shown on this FIRM was provided in digital format by the United States Geological Survey (USGS). The basemap shown is the USGS National Map: Orthoimagery. Last refreshed October, 2020.

Note: Some Special Flood Hazard Areas with elevations may not appear with elevation labels if the Base Flood Elevation or Cross-section line which communicates the elevation for the location appears on the adjacent panel. Please see the Panel Locator Diagram on this map panel to determine the adjacent panel and find the elevation feature there, or alternatively use the Flood Insurance Study report for detailed elevations by flood source.

SCALE

1 inch = 500 feet 1:6,000

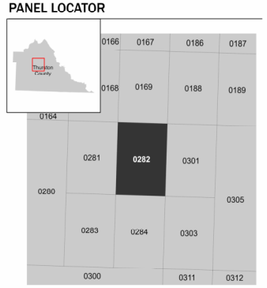
0 250 500 1,000 1,500 2,000 feet

0 50 100 200 300 400 meters

Map Projection:
NAD 1983 StatePlane Washington South FIPS 4602 Feet

Vertical Datum: NAVD88

PANEL LOCATOR



FEMA

National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGR

FLOOD INSURANCE RATE MAP

THURSTON COUNTY
WASHINGTON
AND INCORPORATED
AREAS

Panel Contains:

COMMUNITY	NUMBER	PANEL	S
THURSTON COUNTY (UNINCORPORATED AREAS	530188	0282	G
CITY OF TUMWATER	530193	0282	G

MAP NUM
53067C02
EFFECTIVE
May 08, 2

Thurston County

Geologic Hazard Areas

Landslide Hazard Area

Volcanic Hazard Area - Case 1

PROJECT SITE

Cities **Urban Growth Areas**

0 5

Miles

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Updated on 11/14/2025

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NORTH

Map Exported on 12/25/2025
PDP:\Library\APROX\Planning\CriticalAreas.aprx\Geologic Hazard(54x36)

Thurston County

High Groundwater Hazard Areas

- Salmon Creek Basin
- High Groundwater Hazard
- High Groundwater Hazard - 300' Buffer
- Salmon Creek Basin High Groundwater Hazard
- Salmon Creek High Groundwater Hazard - 300' Buffer

PROJECT SITE

- Cities
- Urban Growth Areas

0 5
Miles

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THURSTON COUNTY GEODATA CENTER

NORTH

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Thurston County

Known Areas of Soil or Groundwater Concern

THIS MAP IS BASED ON DATA THAT IS NOT ALWAYS FULLY CONCLUSIVE AND IS INTENDED MAINLY AS A GUIDE TO AREAS WHERE FURTHER MONITORING IS APPROPRIATE. IT IS A MAP OF SUSPECTED OR CONFIRMED GROUNDWATER QUALITY PROBLEMS.



AREAS OF PESTICIDE CONTAMINATION
Includes EDB, DBCP, 1.2 DCP and others

ELEVATED CHLORIDE AREAS
Areas containing significant numbers of wells with chloride levels exceeding 4 parts/million

ELEVATED NITRATE AREAS
Areas containing significant numbers of wells with nitrate levels exceeding 4 parts/million (1999-2003)

AREAS OF VERY LIMITED GROUNDWATER
Volcanic bedrock unlikely to produce enough water for any type of well

AREAS OF LIMITED GROUNDWATER
Sedimentary bedrock that may produce enough water for low-yield wells

SITES OF CONCERN

1 . EDB 1 Thurston County
2 . Restover Truck Stop
3 . Cascade Pole Inc McFarland
4 . The Ostrom Company
5 . Weyerhaeuser Co Box Plant
6 . Cedar Creek Corrections DNR
7 . Citflor Inc
8 . Puget Sound Power & Light
9 . Rhodes Chemical Co
10 . Rhodes Chemical Co Barn
11 . Pattison Lake EDB
12 . Lacey Valve Grinding
13 . Lacey Laundromat
14 . Black Lake Grocery
15 . West Olympia Landfill Former
16 . Warehouse One Port
17 . Industrial Petroleum Distributors
18 . US West Capitol Peak
19 . Unocal Service Station 0266
20 . Tumwater City N 5th & Bates
21 . Puget Power Eld Inlet Substation
22 . Olympia Dry Cleaners
23 . Boulevard Nursery
24 . Clarke Residence
25 . Franks Property
26 . Former Mervyns Westifeld Capital Mall
27 . Tumwater Falls Park Reclaimed Water Lines
28 . Former WSDOT Materials Testing Facility
29 . The Evergreen State College
30 . J & J Salvage Drums
31 . Faber & Sons Recycling Rochester
32 . Arrowood Subdivision Property
33 . Stacey Property
34 . Meridian Campus
35 . Chestnut Street ROW
36 . Pacific Pride Marvin Rd
37 . Tri Way Properties
38 . PSE ROW Lot 140 9101 Steilacoom Rd
39 . Port Of Olympia Texaco Bulk Storage Facility
40 . SR8, MP 18 Westbound Spill
41 . Kemp Property
42 . Steilacoom Ridge
43 . PSE Olympia Switching Substation
44 . LOTT Construction Project ROW Martin Way
45 . Vacant Property Rochester
46 . WA DFW Fishery Resource Management
47 . Lacey Gateway
48 . Peranzi Property
49 . WA State Dept Information Svcs Office Bldg
50 . Carlyon Beach Homeowners Assn Shop
51 . North Thurston Middle School #5
52 . WA Dept Of Fish & Wildlife Print Shop
53 . Old Sears Building
54 . Franklin Street Row
55 . WA Dept Of Fish & Wildlife Parking Lot
56 . 2040 Mottman Rd
57 . Capital City Studios
58 . Phoenix Inn
59 . Arco 4435
60 . Lacey Fuel
61 . Evergreen Sportsman Club
62 . WA DOT E I5 Milepost 87.5
63 . 1515 Division Nursery
64 . 318 State Ave NE Olympia
65 . Budd Inlet Sediment
66 . Taco Bell/Former Chevron 96801
67 . Haumann Property
68 . WA GA Olympia
69 . 8th & Capitol Investigation
70 . Gallagher Cove LLC
71 . 5th & Columbia St Parking Lot
72 . 7 Eleven Food Store 230325983H
73 . Gull Harbor Mercantile
74 . Diamond Parking/Chevron 9-0292
75 . East Bay Redevelopment
76 . Old Brewhouse Former Paint Shop
77 . WA DNR Triangle Pit
78 . PSE Blumauer Substation
79 . Buckeye Court Gasoline Spill
80 . Valentine Fyrst Property
81 . North Thurston School Dist Transp Dept
82 . 1203 Edison St NE
83 . City Of Olympia 4th & Sylvester Utility Corridor
84 . WA DNR Webster Nursery
85 . Eighth Avenue Park
86 . Lacey Market Square
87 . Handy Pantry
88 . WA Grange Parking Lot Chevron
89 . Jacks Auto Repair
90 . Zittle's Johnson Point
91 . Eastside Laundry/Allisons Norge Village
92 . WA DNR Marine Research Cntr
93 . Intercity Transit/Treasure Chest
94 . Low Ronts Wost Inc
95 . Howards Cleaners
96 . LOTT Wastewater Treatment Plant
97 . Tacoma Smelter Plume Thurston County
98 . Olympic Pipeline Co Olympia Station
99 . MJMG Group Llc
100 . Shell Oil Co Black Lake Blvd
101 . Port Of Olympia Warehouse 2
102 . City Of Olympia-Heritage Park
103 . Olympia City Sewer Pump Station
104 . Jackpot Station #371
105 . Olympia School District Bus Barn
106 . Shop Fast
107 . Briggs Nursery
108 . Littlerock Grocery
109 . Acme Fuel Bulk Plant 305
1'0 . Summit Lake BP
1'1 . Stop N Go
1'2 . Premier Auto Detail
1'3 . Performance Corner
1'4 . Intercity Transit
1'5 . 6110 Olympia Chevron
1'6 . Fast Fuel 1
1'7 . WA St CB&G Steamplant
1'8 . Circle K 5497/BP 01690
1'9 . Darigold Site Former
120 . Kens Tire
121 . Pearson Air Inc
122 . U S West Capital Peak Radio 070585
123 . Lacey Food Mart
124 . Palermo Wellfield
125 . Western Pacific Cleaners
126 . Secured Safe Storage
127 . Johns Auto Wrecking
128 . Evergreen Shores Grocery
129 . Northwest Pipeline GP Olympia M/S
130 . Olympia City Public Works 7th Ave
131 . Martin Way Shell
132 . PHO Olympia Restaurant Utility Pole
133 . Puget Power Olympia Serv Center
134 . McMahans Furniture
135 . Mos Mini Mart
136 . BMT Northwest AKA Reliable Steel
137 . Pit Stop Olympia
138 . Tenino Blumear Substation
139 . Massoth Machine
140 . Tenino Corner Grocery
141 . Jackpot Station 372
142 . Tanglewilde Chevron
143 . Phil Wall & Sons Inc
144 . Great Western Soil
145 . Capital Plumbing And Heating
146 . 4th Ave Shell Texaco Station 120948
147 . Jack Wilmarth Triangle General Store
148 . Flintstone Fuel Inc
149 . Jiffy Lube 2071
150 . Olympia Fuel & Asphalt Inc Tumwater
151 . City Of Olympia-Miller Central
152 . US West Martin Way SOC
153 . Arnolds Texaco Service
154 . Columbia Square Properties
155 . West Bay Marina
156 . Solid Wood Inc
157 . Astro Western 617
158 . Old Tumwater City Hall/2nd Ave
159 . Union Oil Station

PROJECT SITE

Cities Urban Growth Are

0
Miles

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Updated on 11/14

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THURSTON COUNTY

NORT

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Thurston County
Watersheds

- BLACK RIVER
- BUDD/DESCHUTES
- CHEHALIS RIVER
- ELD INLET
- HENDERSON INLET
- NISQUALLY RIVER
- SKOOKUMCHUCK RIVER
- TOTTEN INLET
- WEST CAPITOL FOREST

PROJECT SITE

Cities | Urban Growth Are

0 Miles

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Updated on 11/14

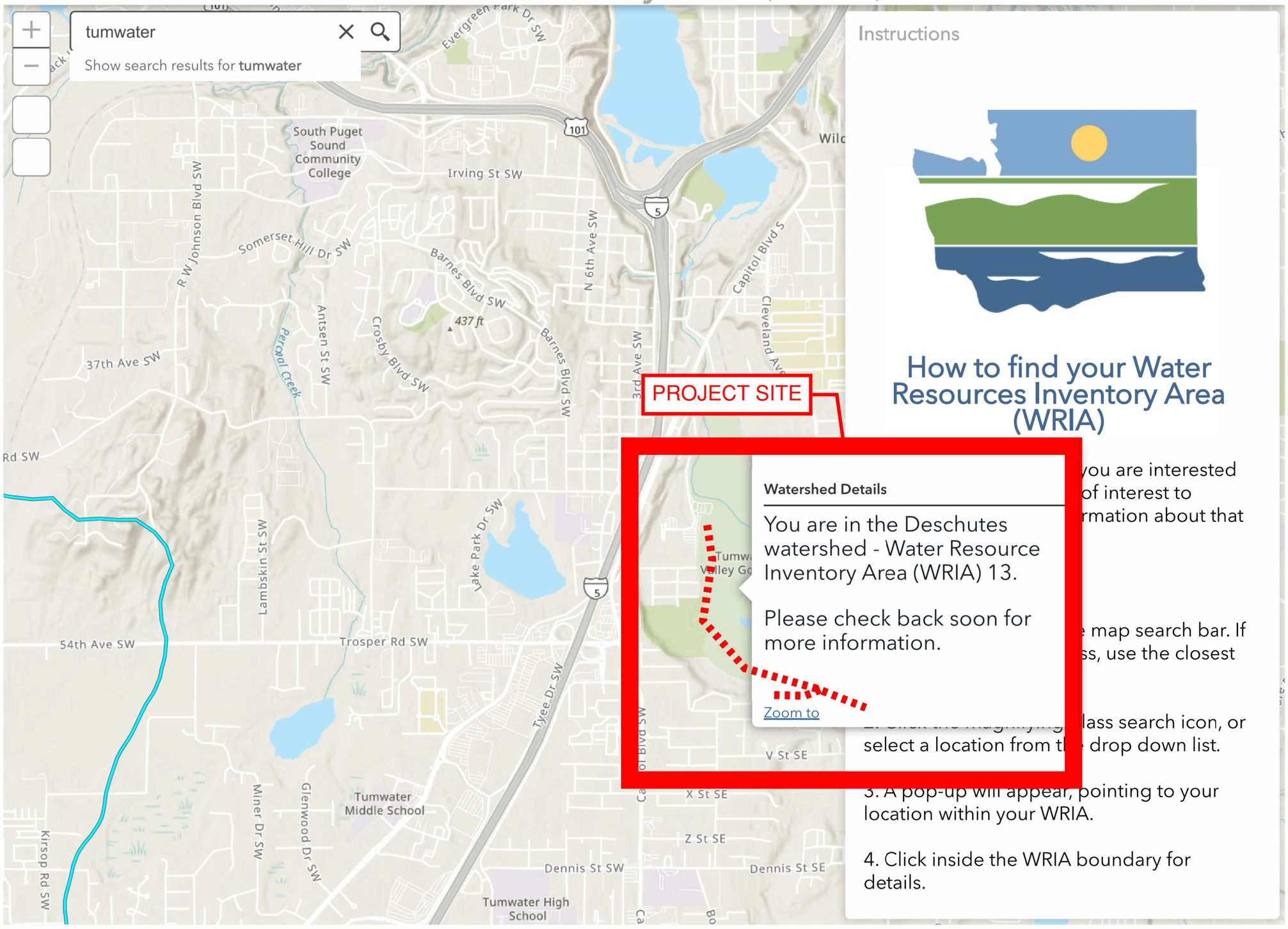
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THURSTON COUNTY

NORT

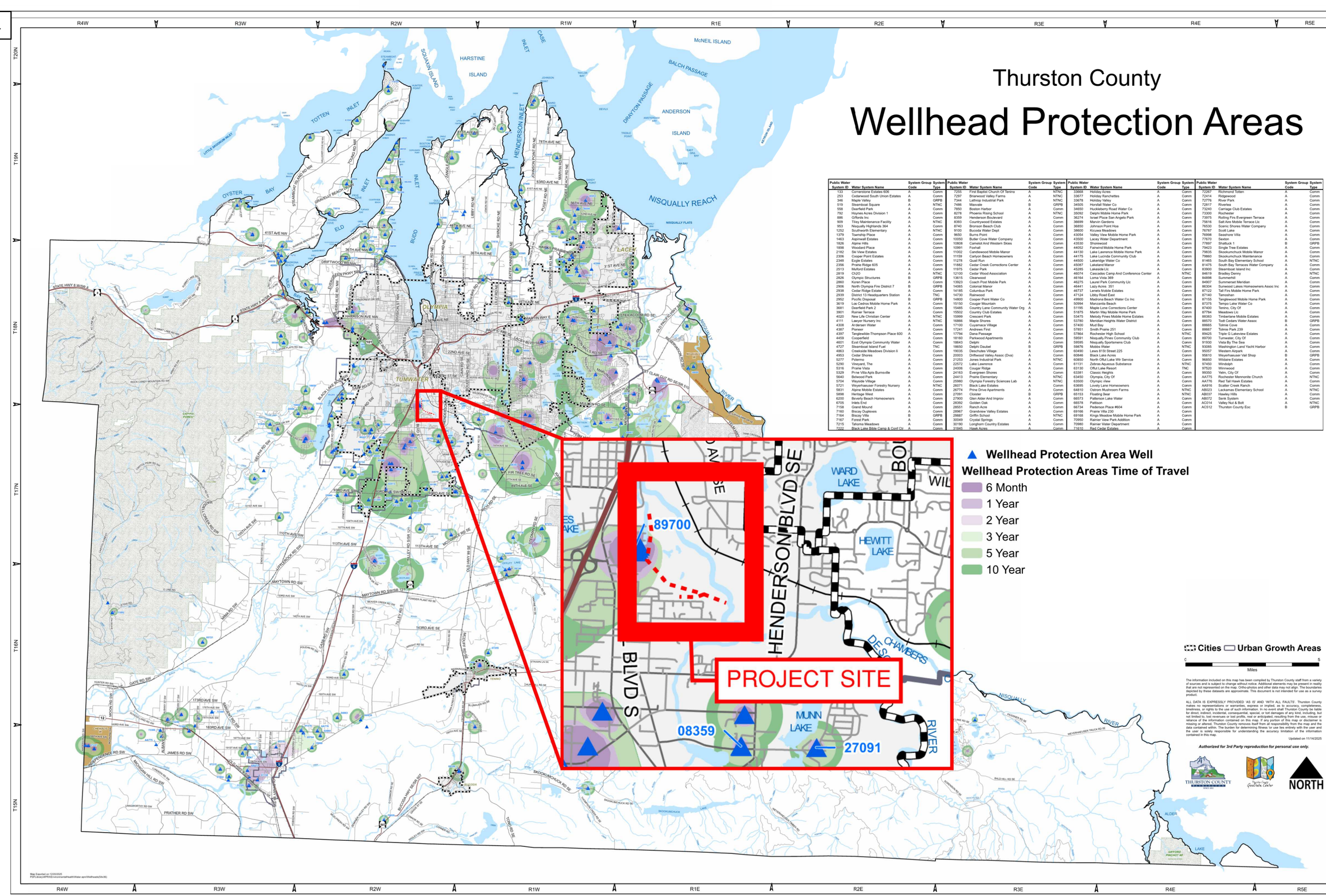
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Find Your Water Resources Inventory Area (WRIA)



Thurston County
Wellhead Protection Areas

Public Water System ID	Water System Name	System Group Code	System Type
133	Cornerstone Estates 606	A	Comm
253	Cedarwood South Union Estates	A	Comm
346	Maple Valley	B	GRPB
519	Steamboat Square	A	NTNC
558	Deerfield Park	A	Comm
782	Haynes Acres Division 1	A	Comm
886	Giffords Inc	A	Comm
909	Tilley Maintenance Facility	A	NTNC
953	Nisqually Highlands 364	A	Comm
1252	Southworth Elementary	A	NTNC
1379	Township Place	A	Comm
1463	Aspinwall Estates	A	Comm
1826	Alpine Hills	A	Comm
1898	Woodard Place	A	Comm
2182	Ski-View Estates	A	Comm
2306	Cooper Point Estates	A	Comm
2348	Eagle Estates	A	Comm
2356	Prairie Ridge 605	A	Comm
2513	Mulford Estates	A	Comm
2819	CIQO	A	NTNC
2826	Olympic Structures	B	GRPB
2860	Koren Place	A	Comm
2906	North Olympia Fire District 7	B	GRPB
2938	Cedar Ridge Estate	A	Comm
2939	District 13 Headquarters Station	A	TNC
2952	Pacific Disposal	B	GRPB
3619	Los Cedros Mobile Home Park	A	Comm
3681	Deerfield Park 2	A	Comm
3901	Rainier Terrace	A	Comm
4020	New Life Christian Center	A	NTNC
4111	Lawyer Nursery Inc	A	NTNC
4308	Ar-densen Water	A	Comm
4387	Pioneer	A	Comm
4397	Tanglewilde-Thompson Place 600	A	Comm
4459	Cooperfield	A	Comm
4601	East Olympia Community Water	A	Comm
4727	Steamboat Island Fuel	A	TNC
4863	Creekside Meadows Division Ii	A	Comm
4953	Cedar Shores	A	Comm
5277	Palermo	A	Comm
5290	Vineyard, The	A	Comm
5316	Prairie Vista	A	Comm
5329	Prine Villa Apts Burnsville	A	Comm
5640	Belwood Park	A	Comm
5704	Wayside Village	A	Comm
5721	Weyerhaeuser Forestry Nursery	A	NTNC
5831	Alpine Mobile Estates	A	Comm
5898	Heritage West	A	Comm
6200	Beverly Beach Homeowners	A	Comm
6705	Inlets End	A	Comm
7158	Grand Mound	A	Comm
7160	Biscay Duplexes	A	Comm
7164	Biscay Villa	B	GRPB
7167	Forest Park	A	Comm
7215	Tahoma Meadows	A	Comm
7222	Black Lake Bible Camp & Conf Ctr	A	Comm
7255	First Baptist Church Of Tenino	A	Comm
7297	Briarwood Valley Farms	A	Comm
7344	Lathrop Industrial Park	A	NTNC
7486	Maxvale	B	GRPB
7850	Boston Harbor	A	Comm
8278	Phoenix Rising School	A	NTNC
8359	Henderson Boulevard	A	Comm
8393	Countrywood Estates	A	Comm
8740	Bronson Beach Club	A	Comm
9100	Bucoda Water Dept	A	Comm
9650	Burns Point	A	Comm
10050	Butler Cove Water Company	A	Comm
10808	Camelot And Western Skies	A	Comm
10991	Foxhall	A	Comm
11002	Candlewood Mobile Manor	A	Comm
11159	Carlyon Beach Homeowners	A	Comm
11278	Quail Run	A	Comm
11882	Cedar Creek Corrections Center	A	Comm
11975	Cedar Park	A	Comm
12100	Cedar Wood Association	A	Comm
13615	Clearwood	A	Comm
13923	Coach Post Mobile Park	A	Comm
14065	Colonial Manor	A	Comm
14185	Columbus Park	A	Comm
14730	Rainwood	A	Comm
14800	Cooper Point Water Co	A	Comm
15150	Cougar Mountain	A	Comm
15485	Country Lane Community Water Org	A	Comm
15502	Country Club Estates	A	Comm
15999	Crescent Park	A	Comm
16866	Maple Shores	A	Comm
17100	Cuyamaca Village	A	Comm
17241	Andrews First	A	Comm
17784	Dana Passage	A	Comm
18160	Parkwood Apartments	A	Comm
18643	Delphi Dr	A	Comm
18650	Delphi Daubel	B	GRPB
19035	Deschutes Village	A	Comm
20003	Driftwood Valley Assoc (Dva)	A	Comm
21253	Jones Industrial Park	A	NTNC
22572	Lake Lawrence	A	Comm
24006	Cougar Ridge	A	Comm
24163	Evergreen Shores	A	Comm
24413	Prairie Elementary	A	NTNC
25980	Olympia Forestry Sciences Lab	A	NTNC
26071	Black Lake Estates	A	Comm
26774	Prine Drive Apartments	A	Comm
27091	Cloister	B	GRPB
27900	Glen Alder And Improv	A	Comm
28392	Golden Oak	A	Comm
28551	Ranch Acre	A	Comm
28967	Grandview Valley Estates	A	Comm
29887	Griffin School	A	NTNC
30049	Crystal Springs	A	Comm
30190	Longhorn Country Estates	A	Comm
31845	Hawk Acres	A	Comm
33668	Holiday Acres	A	Comm
33677	Holiday Ranchettes	A	Comm
33678	Holiday Valley	A	Comm
34505	Horsfall Water Co	A	Comm
34650	Huckleberry Road Water Co	A	Comm
35092	Delphi Mobile Home Park	A	Comm
36274	Israel Place San Angelo Park	A	Comm
36899	Marvin Gardens	A	Comm
36850	Johnson Point Hoa	A	Comm
38600	Kcuwa Meadows	A	Comm
43054	Valley View Mobile Home Park	A	Comm
43500	Lacey Water Department	A	Comm
43530	Shorewood	A	Comm
44052	Fairwind Mobile Home Park	A	Comm
44130	Lake Lawrence Mobile Home Park	A	Comm
44175	Lake Lucinda Community Club	A	Comm
44500	Lakeridge Water Co	A	Comm
45087	Lakeland Manor	A	Comm
45285	Lakeside Llc	A	Comm
46074	Cascade Camp And Conference Center	A	NTNC
46164	Loma Vista 369	A	Comm
46274	Laurel Park Community Llc	A	Comm
46441	Lazy Acres 351	A	Comm
46737	Lenets Mobile Estates	A	Comm
47124	Libby Road East	A	Comm
49900	Madrona Beach Water Co Inc	A	Comm
50994	Manzanita Beach	A	Comm
51195	Maple Lane Corrections Center	A	Comm
51875	Martin Way Mobile Home Park	A	Comm
53475	Melody Pines Mobile Home Estates	A	Comm
53780	Meridian Heights Water District	A	Comm
57400	Mud Bay	A	Comm
57851	Smith Prairie 251	A	Comm
57864	Rochester High School	A	NTNC
59591	Nisqually Pines Community Club	A	Comm
59595	Nisqually Sportsmens Club	A	Comm
59876	Mobbs Water	A	NTNC
60490	Lacey 6119 Street 225	A	Comm
60846	Black Lake Acres	A	Comm
60850	North Offut Lake Wtr Service	A	Comm
61131	Zebras Aqueous Substance	A	NTNC
63130	Offut Lake Resort	A	TNC
63381	Classic Heights	A	Comm
63450	Olympia, City Of	A	Comm
63500	Olympic View	A	Comm
63695	Lovely Lane Homeowners	A	Comm
64810	Oolrons Mushroom Farms	A	NTNC
65153	Floating Bear	A	NTNC
66573	Patterson Lake Water	A	Comm
66578	Pattison	A	Comm
66734	Pederson Place #604	A	Comm
69166	Prairie Villa 230	A	Comm
69168	Kings Meadow Mobile Home Park	A	Comm
70950	Rainier View Park Addition	A	Comm
70980	Rainier Water Department	A	Comm
71610	Red Cedar Estates	A	Comm
72267	Richmond Totten	A	Comm
72414	Ridgewood	A	Comm
72776	River Park	A	Comm
72817	Riverlea	A	Comm
73240	Carriage Club Estates	A	Comm
73300	Rochester	A	Comm
73975	Rolling Firs Evergreen Terrace	A	Comm
75616	Salt Aire Mobile Terrace Llc	A	Comm
76530	Scenic Shores Water Company	A	Comm
76787	Scott Lake	A	Comm
76998	Seashore Villa	A	Comm
77670	Sexton	A	Comm
77897	Shattuck 1	B	GRPB
79423	Single Tree Estates	A	Comm
79835	Skookumchuck Mobile Manor	A	Comm
79860	Skookumchuck Maintenance	A	Comm
81465	South Bay Elementary School	A	NTNC
81475	South Bay Terraces Water Company	A	Comm
83900	Steamboat Island Inc	A	Comm
84074	Bradley Denny	A	NTNC
84898	Summerhill	A	Comm
84907	Summerset Meridian	A	Comm
86304	Sunwood Lakes Homeowners Assoc Inc	A	Comm
87122	Tall Firs Mobile Home Park	A	Comm
87140	Tamoshan	A	Comm
87155	Tanglewood Mobile Home Park	A	Comm
87375	Tempo Lake Water Co	A	Comm
87400	Tenino, City Of	A	Comm
87784	Meadows Llc	A	Comm
88383	Timberlane Mobile Estates	A	Comm
88570	Todt Cedars Water Assoc	B	GRPB
88665	Tolmie Cove	A	Comm
88667	Tolmie Park 239	A	Comm
89425	Tojio Ct Lakeview Estates	A	Comm
89700	Tumwater, City Of	A	Comm
91930	Valley By The Sea	A	Comm
93085	Washington Land Yacht Harbor	A	Comm
95057	Western Airpark	A	Comm
95610	Weyerhaeuser Vail Shop	B	GRPB
96850	Wildaire Estates	A	Comm
97450	Windolph	A	Comm
97520	Winwood	A	Comm
99350	Yelm, City Of	A	Comm
AA775	Rochester Mennonite Church	A	NTNC
AA776	Red Tail Hawk Estates	A	Comm
AA916	Scatter Creek Ranch	A	Comm
AB023	Lackamas Elementary School	A	NTNC
AB037	Hawley Hills	A	Comm
AB072	Senk System	A	Comm
AC014	Valley Nut & Bolt	A	NTNC
AC512	Thurston County Eoc	B	GRPB



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THURSTON COUNTY

NORTH

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Thurston County

Wetlands & 300 Foot Wetland Buffer

Wetlands

300 Foot Wetlands Buffer

PROJECT SITE

Cities **Urban Growth Areas**

0 5

Miles

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THURSTON COUNTY GEODATA CENTER

NORTH

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February 27, 2026

Water Quality Atlas Map



WQ Improvement Projects

- TMDL - Approved
- 4B - Approved
- STI - Approved
- ARP - Approved
- TMDL - In Development
- STI - In Development
- ARP - In Development

Miles
0 0.1 0.2 0.4

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Deschutes River, Percival Creek, & Budd Inlet tributaries

Parts of the Deschutes River and its tributary creeks do not meet state clean water standards. To return these waters to a healthy condition, we are working with local governments and other groups to implement a total maximum daily load (TMDL) project.

Water quality issues

The Deschutes River is under pressure from growth, resulting in many small, uncontrolled sources of pollution that enter the river. Local city, county, and state government agencies monitor and protect water quality. In the Deschutes, water quality monitoring revealed that levels of pH, dissolved oxygen, temperature, fine sediment, and fecal coliform did not meet state standards. We began the TMDL process to address these problems.

What is being done

With the help of an advisory group of affected stakeholders, special interest groups, and interested residents, we developed a TMDL plan to solve the river's pollution problems. The Deschutes River, Percival Creek, and Budd Inlet Tributaries Water Quality Improvement Plan (also known as a TMDL) assigns the amount of pollution the water bodies can receive and still meet water quality standards. Any additional amount needs to be eliminated to achieve clean water.

This plan provides a framework for how stakeholders will track, monitor, and implement the water cleanup plan. It outlines what is needed, establishes a schedule, and guides corrective actions with adaptive management practices.

We gathered public comments on the draft plan in 2015. We held two public meetings to provide a broad overview of the project and findings. In 2018, EPA approved some elements of the TMDL plan and disapproved others. See our 2018 Letter to Stakeholders for details.

On August 10, 2020, EPA finalized the replacement of the TMDL elements that were disapproved. They were open for public comment until October 7, 2020 and can be found on EPA's Deschutes River TMDLs web page.

We are also continuing to work with the Department of Enterprise Services on the Deschutes Estuary Restoration Project, which will clean and restore Capitol Lake by returning the Deschutes Estuary to a tidal salt marsh habitat.

Why this matters

Water must be of high quality to support fish and wildlife.

Dissolved oxygen — oxygen dissolved in healthy water — is vital for the survival of fish and aquatic life. It is more difficult to transfer oxygen from water to blood than it is to transfer oxygen from air to blood. Therefore, it is critical that an adequate amount of oxygen is maintained in the water for this transfer to take place efficiently and sustain aquatic life. Oxygen is also necessary to help decompose organic matter in the water and bottom sediments as well as for other biological and chemical processes.

Fecal coliform is a type of bacteria common in human and animal waste. It can make people sick and cause the closure of shellfish harvesting beds. Bacteria can get into waters from untreated or partially treated discharges from wastewater treatment plants, from improperly functioning septic systems, and from livestock, pets, and wildlife.

People can help keep bacteria out of the water. Properly collect, bag, and trash dog poop. Check your on-site sewage system to make sure it is maintained and working properly. Use proper storage, management, and disposal practices for livestock manure.

pH is a measure of the acidity or alkalinity of the water. pH can affect the solubility of nutrients and metal compounds. By affecting the solubility of nutrients, it can change the amount of nutrients available for plant growth. If too many nutrients are available, aquatic plants can grow out of control. When these plants decompose, they can deplete the water of oxygen. The solubility of many metal compounds also changes greatly with pH. When more metals are dissolved in the water, aquatic animals may absorb them faster. Therefore, a lower pH may make these metals more toxic to aquatic life.

Water temperature influences what types of organisms can live in a water body. Cooler water holds more dissolved oxygen that fish and other aquatic life need to breathe. Warmer water holds less dissolved oxygen. Threatened and endangered salmon need cold, clean water to survive. Removing streamside vegetation tends to raise water temperature to a level that may be harmful to fish, other aquatic animals, and insects.

Finally, too much **sediment** in the water can irritate fish gills and make it difficult for them to breathe.

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State of Washington
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Publication Summary

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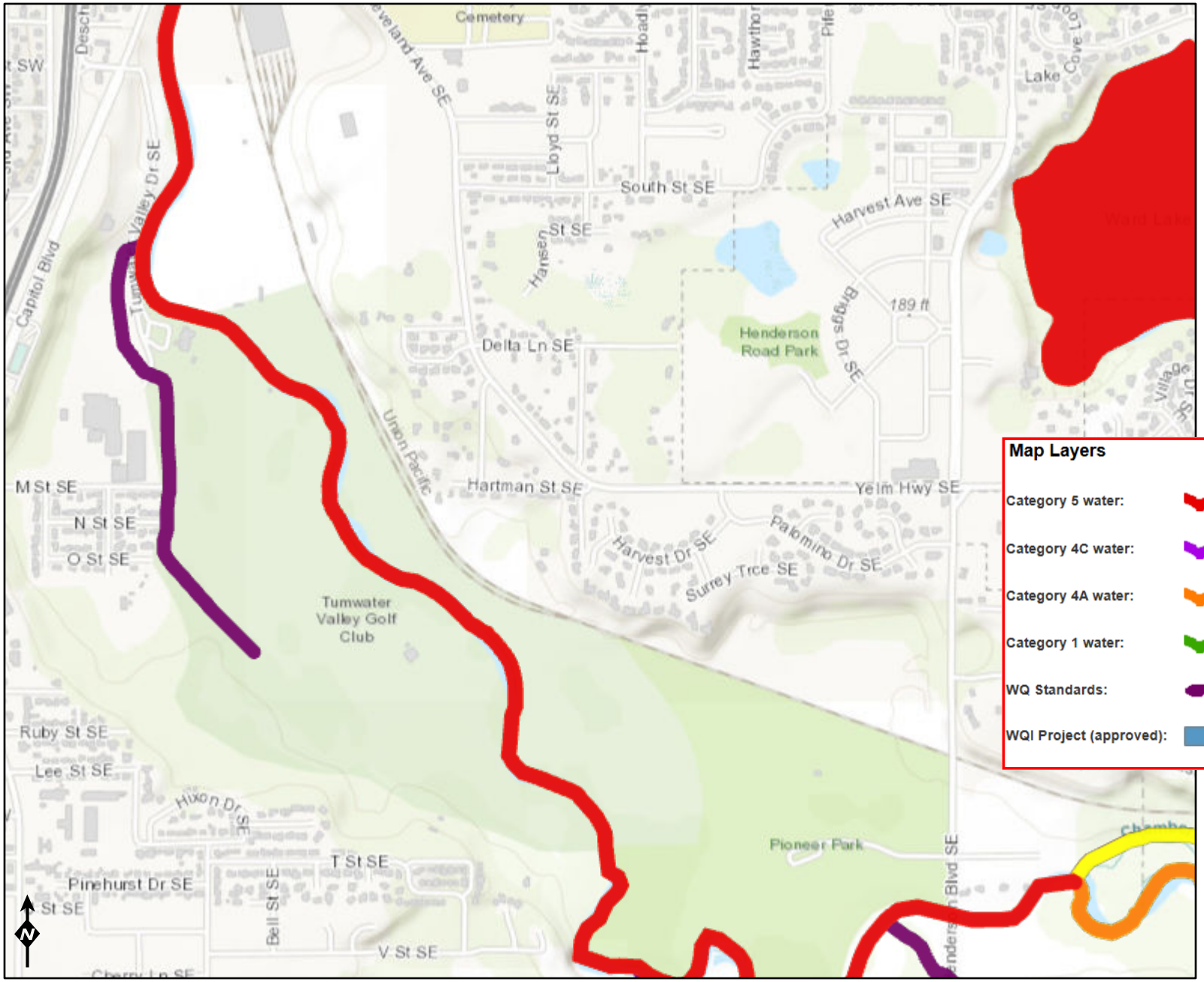
TITLE	**Deschutes River, Percival Creek, and Budd Inlet Tributaries Temperature, Fecal Coliform Bacteria, Dissolved Oxygen, pH, and Fine Sediment TMDL: Water Quality Improvement Report and Implementation Plan**
	Publication number: 15-10-012 | Date Published: April 2015 | Date Revised: July 2018
VIEW NOW	Deschutes River, Percival Creek, and Budd Inlet Tributaries Temperature, Fecal Coliform Bacteria, Dissolved Oxygen, pH, and Fine Sediment TMDL: Water Quality Improvement Report and Implementation Plan (Number of pages: 335) (Publication Size: 14292KB) Trouble viewing? Try these free options. • Get the latest Adobe Reader for PDFs. • For Excel or Word viewing get Open Office, Microsoft OneDrive, DropBox Basic or a mobile app at your favorite app store.
AUTHOR(S)	Wagner, Lydia, Bilhimer, Dustin
DESCRIPTION	Portions of the Deschutes River, Percival Creek, and Budd Inlet tributaries do not meet water quality standards and are on the Clean Water Act Section 303(d) list for one or more of the following parameters: fecal coliform bacteria, temperature, dissolved oxygen (DO), pH, or fine sediment. This Total Maximum Daily Load (TMDL) report sets the load and wasteload reductions needed to meet Washington State water quality standards, and describes implementation actions to achieve those reductions.
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	• Water Quality Order Form
CONTACT	Leanne Weiss at 360-407-0243 or leanne.weiss@ecy.wa.gov
KEYWORDS	water quality improvement plan, Deschutes River, water cleanup plan, Total Maximum Daily Load
WEB PAGE	Deschutes River watershed area: Budd Inlet
WATERSHED	Water Resource Inventory Area 13 Deschutes
DATA	Environmental Information Management (EIM) #MROB0001
RELATED PUBLICATIONS	Title: Budd Inlet Total Maximum Daily Load for Dissolved Oxygen Deschutes River, Capitol Lake, and Budd Inlet Total Maximum Daily Load Study: Supplemental Modeling Scenarios Deschutes River, Capitol Lake, and Budd Inlet Temperature, Fecal Coliform Bacteria, Dissolved Oxygen, pH, and Fine Sediment Total Maximum Daily Load Technical Report: Water Quality Study Findings Assessment of Surface Water / Groundwater Interactions and Associated Nutrient Fluxes in the Deschutes River and Percival Creek Watersheds, Thurston County Quality Assurance Project Plan: Deschutes River, Capitol Lake, and Budd Inlet Temperature, Fecal Coliform Bacteria, Dissolved Oxygen, pH, and Fine Sediment Total Maximum Daily Load Study

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February 27, 2026

Water Quality Atlas Map



Assessed Water/Sediment

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

Water Quality Standards

- All Standards

Map Layers

Category 5 water:	2 listings found
Category 4C water:	1 listing found
Category 4A water:	2 listings found
Category 1 water:	9 listings found
WQ Standards:	1 water quality standard found
WQI Project (approved):	Deschutes River, Percival Creek, and Budd Inlet Tributaries TMDL

Miles 0 0.1 0.2 0.4

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Assessed Water/Sediment

Water

Category 5 - 303d

DEPARTMENT OF ECOLOGY State of Washington

Washington State Water Quality Assessment 303(d)/305(b) List

Approved WQ Assessment | Candidate List | Contact Us | WQ Atlas

Back To Results

Water Quality Listing Policy

Listing ID: 16722

Main Listing Information

Listing ID: 16722

Waterbody Name: DESCHUTES RIVER

Medium: Water

Parameter: Bacteria - Fecal coliform

WQI Project: None

Designated Use: Recreation - Primary Contact

Current Category: 5

View Category History

Assessment Unit

Assessment Unit ID: 17110016000007_001_001

Size: 4.855 Kilometers

Associated Components(s): Reach: 17110016000007 0% - 100%, Type: Rivers/Streams

County: Thurston

WRIA: Deschutes

Basis Table

Assessment Year

2018

Sampling Year	Excursion Count	Sample Count	Criterion/Threshold	Aggregate	Calculated Value	Criterion 2	Aggregate 2	Calculated Value 2
2016	1	14	200 #col/100ml	Highest daily average	280	100 #col/100ml	Three-month geometric mean	137

Assessed Water/Sediment

Water

Category 5 - 303d

DEPARTMENT OF ECOLOGY State of Washington

Washington State Water Quality Assessment 303(d)/305(b) List

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Water Quality Listing Policy

Listing ID: 70194

Main Listing Information

Listing ID: 70194

Current Category: 5

Waterbody Name: DESCHUTES RIVER

View Category History

Medium: Other

Parameter: Benthic Macroinvertebrates Bioassessments

WQI Project: None

Designated Use: Aquatic Life - General

Assessment Unit

Assessment Unit ID: 17110016000007_001_001

County: Thurston

Size: 4.855 Kilometers

WRIA: Deschutes

Associated Components(s): Reach: 17110016000007 0% - 100%, Type: Rivers/Streams

Basis Table

sessment Year

2018

Sampling Year	Excursion Count	Sample Count	Criterion/Threshold	Aggregate	Calculated Value	Fine Sediment Biotic Index Score	FSB Threshold	Hilsenhoff Biotic Index Score	HBI Threshold	Metals Tolerance Index Score	MTI Threshold
2012; 2015	3	3	65 (Puget Lowland)	Average BIBI score	56.7	46.2	89	4.84	>5.5	2.8	>4.0

Assessed Water/Sediment

Water

Category 4C

DEPARTMENT OF ECOLOGY State of Washington

Washington State Water Quality Assessment 303(d)/305(b) List

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Back To Results

Water Quality Listing Policy

Listing ID: 6195

Main Listing Information

Listing ID: 6195

Waterbody Name: DESCHUTES RIVER

Medium: Habitat

Parameter: Instream Flow

WQI Project: None

Designated Use: Aquatic Life - General

Current Category: 4C

View Category History

Assessment Unit

Assessment Unit ID: 17110016000007_001_001

Size: 4.855 Kilometers

Associated Components(s): Reach: 17110016000007 0% - 100%, Type: Rivers/Streams

County: Thurston

WRIA: Deschutes

Basis Table

See Basis Statement field.

Basis Statement

USGS flow data collected at RM 3.4 between 1990 and 1995 (submitted by Jeff Dickison on 2/27/96) are consistently below minimum flows established in WAC 173-513-030.

USGS and Thurston County flow data (submitted by Jeff Dickison on 2/27/96) show intensified peak flows likely due to silvicultural activities in the upper watershed (Thurston County, 1995).

The following references document characteristic uses: Squaxin Island Tribal data (submitted by Jeff Dickison on 2/27/96) show numbers of Coho salmon stock.

Baranski, 1996 SASSI Update shows that Coho are reclassified to depressed.

Remarks

This listing was on the 1998 303(d) list, but has been moved to the new Category 4C (impaired by a non-pollutant) based on EPA Guidance for preparing the 2004 Integrated Report.

Assessed Water/Sediment
Water
Category 4A

DEPARTMENT OF ECOLOGY State of Washington

Washington State Water Quality Assessment 303(d)/305(b) List

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Back To Results

Water Quality Listing Policy

Listing ID: 6576

Main Listing Information

Listing ID: 6576
Current Category: 4A
Waterbody Name: DESCHUTES RIVER
View Category History
Medium: Water
Parameter: Temperature
WQI Project: Deschutes River, Percival Creek and Budd Inlet Tributaries Multi-parameter TMDL
Designated Use: Aquatic Life - Salmonid Spawning, Rearing, and Migration

Assessment Unit

Assessment Unit ID: 17110016000007_001_001
County: Thurston
Size: 4.855 Kilometers
WRIA: Deschutes
Associated Components(s): Reach: 17110016000007 0% - 100%, Type: Rivers/Streams

Basis Table

Assessment Year
2018

Sampling Year	Excursion Count	Sample Count	Criterion/Threshold	Aggregate	Calculated Value
2017	11	361	17.5 deg C	7-DADMax	19.71

Basis Statement

Location ID: 13A060 -- In 2010, between 1/1/2010 and 9/22/2010, the 7-day mean of daily maximum values (7DADmax) exceeded the criterion for this waterbody (17.5°C) on 26 of 265 days (10%); The maximum exceedance during this period was 18.74°C for the 7-day period centered on 8/15/2010; (External Data Source: Thurston County Health Database)

Location ID: 13A060 -- In 2009, between 10/10/2009 and 12/31/2009, the 7-day mean of daily maximum values (7DADmax) exceeded the criterion for this waterbody (17.5°C) on 0 of 83 days (0%); (External Data Source: Thurston County Health Database)

Location ID: 13A060 -- In 2008, between 7/14/2008 and 9/30/2008, the 7-day mean of daily maximum values (7DADmax) exceeded the criterion for this waterbody (17.5°C) on 14 of 79 days (18%); The maximum exceedance during this period was 18.46°C for the 7-day period centered on 8/15/2008; (External Data Source: Thurston County Health Database)

Assessed Water/Sediment

Water

Category 4A

DEPARTMENT OF ECOLOGY State of Washington

Washington State Water Quality Assessment 303(d)/305(b) List

Approved WQ Assessment | Candidate List | Contact Us | WQ Atlas

Back To Results

Water Quality Listing Policy

Listing ID: 10894

Main Listing Information

Listing ID: 10894

Waterbody Name: DESCHUTES RIVER

Medium: Water

Parameter: Dissolved Oxygen

WQI Project: Deschutes River, Percival Creek and Budd Inlet Tributaries Multi-parameter TMDL

Designated Use: Aquatic Life - Salmonid Spawning, Rearing, and Migration

Current Category: 4A

View Category History

Assessment Unit

Assessment Unit ID: 17110016000007_001_001

Size: 4.855 Kilometers

Associated Components(s): Reach: 17110016000007 0% - 100%, Type: Rivers/Streams

County: Thurston

WRIA: Deschutes

Basis Table

Assessment Year

2018

Sampling Year	Excursion Count	Sample Count	Criterion/Threshold	Aggregate	Calculated Value
2017	0	12	8.0 mg/L	Daily Minimum	9.8

Basis Statement

HISTORICAL INFORMATION

Location ID [13A060] -- In 2005, 12 samples showed no excursions of the criterion for this waterbody, (criterion = 8.0 mg/L).

Location ID [13-DES-00.5] -- In 2004, 4 of 39 samples (10.3%) showed an excursion of the criterion for this waterbody, (criterion = 8.0 mg/L).

Location ID [13-DES-02.7] -- In 2004, 24 samples showed no excursions of the criterion for this waterbody, (criterion = 8.0 mg/L).

Location ID [13-DES-00.5] -- In 2003, 9 samples showed no excursions of the criterion for this waterbody, (criterion = 8.0 mg/L).

Assessed Water/Sediment

Water

Category 1

DEPARTMENT OF ECOLOGY State of Washington

Washington State Water Quality Assessment 303(d)/305(b) List

Approved WQ Assessment | Candidate List | Contact Us | WQ Atlas

Back To Results

Water Quality Listing Policy

Listing ID: 10893

Main Listing Information

Listing ID: 10893

Waterbody Name: DESCHUTES RIVER

Medium: Water

Parameter: Ammonia-N

WQI Project: None

Designated Use: Aquatic Life - Toxics

Current Category: 1

View Category History

Assessment Unit

Assessment Unit ID: 17110016000007_001_001

Size: 4.855 Kilometers

Associated Components(s): Reach: 17110016000007 0% - 100%, Type: Rivers/Streams

County: Thurston

WRIA: Deschutes

Basis Table

Assessment Year

2018

Sampling Year	Excursion Count	Sample Count	Criterion/Threshold	Aggregate	Calculated Value
2017	0	11	Calculated	Toxic aquatic 4-day mean exceedance factor	
2016	0	11	Calculated	Toxic aquatic 4-day mean exceedance factor	
2015	0	11	Calculated	Toxic aquatic 4-day mean exceedance factor	
2014	0	9	Calculated	Toxic aquatic 4-day mean exceedance factor	
2013	0	11	Calculated	Toxic aquatic 4-day mean exceedance factor	
2012	0	12	Calculated	Toxic aquatic 4-day mean exceedance factor	
2011	0	11	Calculated	Toxic aquatic 4-day mean exceedance factor	
2010	0	12	Calculated	Toxic aquatic 4-day mean exceedance factor	
2009	0	12	Calculated	Toxic aquatic 4-day mean exceedance factor	
2008	0	12	Calculated	Toxic aquatic 4-day mean exceedance factor	
2007	0	12	Calculated	Toxic aquatic 4-day mean exceedance factor	
2006	0	11	Calculated	Toxic aquatic 4-day mean exceedance factor	

Assessed Water/Sediment

Water

Category 1

DEPARTMENT OF ECOLOGY State of Washington

Washington State Water Quality Assessment 303(d)/305(b) List

Approved WQ Assessment | Candidate List | Contact Us | WQ Atlas

Back To Results

Water Quality Listing Policy

Listing ID: 53217

Main Listing Information

Listing ID: 53217

Waterbody Name: DESCHUTES RIVER

Medium: Water

Parameter: Arsenic

WQI Project: None

Designated Use: Aquatic Life - Toxics

Current Category: 1

View Category History

Assessment Unit

Assessment Unit ID: 17110016000007_001_001

Size: 4.855 Kilometers

Associated Components(s): Reach: 17110016000007 0% - 100%, Type: Rivers/Streams

County: Thurston

WRIA: Deschutes

Basis Table

Assessment Year

2018

Sampling Year	Excursion Count	Sample Count	Criterion/Threshold	Aggregate	Calculated Value
2017	0	4	190 ug/L	Toxic aquatic 4-day average	

Basis Statement

HISTORICAL INFORMATION

Location ID(s) [13A060] -- In 2005, 6 of 6 sample event(s) did not exceed Washington's Aquatic Life Acute and Chronic criteria.

Location ID(s) [13A060] -- In 2004, 6 of 6 sample event(s) did not exceed Washington's Aquatic Life Acute and Chronic criteria.

Location ID(s) [13A060] -- In 2003, 2 of 2 sample event(s) did not exceed Washington's Aquatic Life Acute and Chronic criteria.

Location ID(s) [13A060] -- In 2002, 4 of 4 sample event(s) did not exceed Washington's Aquatic Life Acute and Chronic criteria.

Assessed Water/Sediment

Water

Category 1

DEPARTMENT OF ECOLOGY State of Washington

Washington State Water Quality Assessment 303(d)/305(b) List

Approved WQ Assessment | Candidate List | Contact Us | WQ Atlas

Back To Results

Water Quality Listing Policy

Listing ID: 75944

Main Listing Information

Listing ID: 75944

Waterbody Name: DESCHUTES RIVER

Medium: Water

Parameter: Silver

WQI Project: None

Designated Use: Aquatic Life - Toxics

Current Category: 1

View Category History

Assessment Unit

Assessment Unit ID: 17110016000007_001_001

Size: 4.855 Kilometers

Associated Components(s): Reach: 17110016000007 0% - 100%, Type: Rivers/Streams

County: Thurston

WRIA: Deschutes

Basis Table

Assessment Year

2018

Sampling Year	Excursion Count	Sample Count	Criterion/Threshold	Aggregate	Calculated Value
2017	0	4	Calculated	Toxic aquatic 1-day exceedence factor	

Basis Statement

HISTORICAL INFORMATION

Location ID(s) [13A060] -- In 2005, 6 of 6 sample event(s) did not exceed Washington's Aquatic Life Acute criterion.

Location ID(s) [13A060] -- In 2004, 6 of 6 sample event(s) did not exceed Washington's Aquatic Life Acute criterion.

Location ID(s) [13A060] -- In 2003, 2 of 2 sample event(s) did not exceed Washington's Aquatic Life Acute criterion.

Location ID(s) [13A060] -- In 2002, 4 of 4 sample event(s) did not exceed Washington's Aquatic Life Acute criterion.

Assessed Water/Sediment

Water

Category 1

DEPARTMENT OF ECOLOGY State of Washington

Washington State Water Quality Assessment 303(d)/305(b) List

Approved WQ Assessment | Candidate List | Contact Us | WQ Atlas

Back To Results

Water Quality Listing Policy

Listing ID: 76380

Main Listing Information

Listing ID: 76380

Waterbody Name: DESCHUTES RIVER

Medium: Water

Parameter: Lead

WQI Project: None

Designated Use: Aquatic Life - Toxics

Current Category: 1

View Category History

Assessment Unit

Assessment Unit ID: 17110016000007_001_001

Size: 4.855 Kilometers

Associated Components(s): Reach: 17110016000007 0% - 100%, Type: Rivers/Streams

County: Thurston

WRIA: Deschutes

Basis Table

Assessment Year

2018

Sampling Year	Excursion Count	Sample Count	Criterion/Threshold	Aggregate	Calculated Value
2017	0	4	Calculated	Toxic aquatic 4-day mean exceedence factor	

Basis Statement

HISTORICAL INFORMATION

Location ID(s) [13A060] -- In 2005, 6 of 6 sample event(s) did not exceed Washington's Aquatic Life Acute and Chronic criteria.

Location ID(s) [13A060] -- In 2004, 6 of 6 sample event(s) did not exceed Washington's Aquatic Life Acute and Chronic criteria.

Location ID(s) [13A060] -- In 2003, 2 of 2 sample event(s) did not exceed Washington's Aquatic Life Acute and Chronic criteria.

Location ID(s) [13A060] -- In 2002, 4 of 4 sample event(s) did not exceed Washington's Aquatic Life Acute and Chronic criteria.

Assessed Water/Sediment
Water
Category 1

DEPARTMENT OF ECOLOGY State of Washington

Washington State Water Quality Assessment 303(d)/305(b) List

Approved WQ Assessment | Candidate List | Contact Us | WQ Atlas

Back To Results

Water Quality Listing Policy

Listing ID: 76689

Main Listing Information

Listing ID: 76689
Waterbody Name: DESCHUTES RIVER
Medium: Water
Parameter: Chromium
WQI Project: None
Designated Use: Aquatic Life - Toxics

Current Category: 1

View Category History

Assessment Unit

Assessment Unit ID: 17110016000007_001_001
Size: 4.855 Kilometers
Associated Components(s): Reach: 17110016000007 0% - 100%, Type: Rivers/Streams

County: Thurston
WRIA: Deschutes

Basis Table

Assessment Year

2018

Sampling Year	Excursion Count	Sample Count	Criterion/Threshold	Aggregate	Calculated Value
2017	0	4	Calculated	Toxic aquatic 4-day mean exceedence factor	

Basis Statement

HISTORICAL INFORMATION

Location ID(s) [13A060] -- In 2005, 6 of 6 sample event(s) did not exceed Washington's Aquatic Life Acute and Chronic criteria.

Location ID(s) [13A060] -- In 2004, 6 of 6 sample event(s) did not exceed Washington's Aquatic Life Acute and Chronic criteria.

Location ID(s) [13A060] -- In 2003, 2 of 2 sample event(s) did not exceed Washington's Aquatic Life Acute and Chronic criteria.

Location ID(s) [13A060] -- In 2002, 4 of 4 sample event(s) did not exceed Washington's Aquatic Life Acute and Chronic criteria.

Assessed Water/Sediment

Water

Category 1

DEPARTMENT OF ECOLOGY State of Washington

Washington State Water Quality Assessment 303(d)/305(b) List

Approved WQ Assessment | Candidate List | Contact Us | WQ Atlas

Back To Results

Water Quality Listing Policy

Listing ID: 78277

Main Listing Information

Listing ID: 78277

Waterbody Name: DESCHUTES RIVER

Medium: Water

Parameter: Copper

WQI Project: None

Designated Use: Aquatic Life - Toxics

Current Category: 1

View Category History

Assessment Unit

Assessment Unit ID: 17110016000007_001_001

Size: 4.855 Kilometers

Associated Components(s): Reach: 17110016000007 0% - 100%, Type: Rivers/Streams

County: Thurston

WRIA: Deschutes

Basis Table

Assessment Year

2018

Sampling Year	Excursion Count	Sample Count	Criterion/Threshold	Aggregate	Calculated Value
2017	0	4	Calculated	Toxic aquatic 4-day mean exceedence factor	

Basis Statement

HISTORICAL INFORMATION

Location ID(s) [13A060] -- In 2005, 6 of 6 sample event(s) did not exceed Washingtons Aquatic Life Acute and Chronic criteria.

Location ID(s) [13A060] -- In 2004, 6 of 6 sample event(s) did not exceed Washingtons Aquatic Life Acute and Chronic criteria.

Location ID(s) [13A060] -- In 2003, 2 of 2 sample event(s) did not exceed Washingtons Aquatic Life Acute and Chronic criteria.

Location ID(s) [13A060], [SRIW1301] -- In 2002, 5 of 5 sample event(s) did not exceed Washingtons Aquatic Life Acute and Chronic criteria.

Assessed Water/Sediment
Water
Category 1

DEPARTMENT OF ECOLOGY State of Washington

Washington State Water Quality Assessment 303(d)/305(b) List

Approved WQ Assessment | Candidate List | Contact Us | WQ Atlas

Back To Results

Water Quality Listing Policy

Listing ID: 78486

Main Listing Information

Listing ID: 78486
Waterbody Name: DESCHUTES RIVER
Medium: Water
Parameter: Zinc
WQI Project: None
Designated Use: Aquatic Life - Toxics
Current Category: 1
View Category History

Assessment Unit

Assessment Unit ID: 17110016000007_001_001
Size: 4.855 Kilometers
Associated Components(s): Reach: 17110016000007 0% - 100%, Type: Rivers/Streams
County: Thurston
WRIA: Deschutes

Basis Table

Assessment Year
2018

Sampling Year	Excursion Count	Sample Count	Criterion/Threshold	Aggregate	Calculated Value
2017	0	4	Calculated	Toxic aquatic 4-day mean exceedence factor	

Basis Statement

HISTORICAL INFORMATION

Location ID(s) [13A060] -- In 2005, 6 of 6 sample event(s) did not exceed Washington's Aquatic Life Acute and Chronic criteria.

Location ID(s) [13A060] -- In 2004, 6 of 6 sample event(s) did not exceed Washington's Aquatic Life Acute and Chronic criteria.

Location ID(s) [13A060] -- In 2003, 2 of 2 sample event(s) did not exceed Washington's Aquatic Life Acute and Chronic criteria.

Location ID(s) [13A060], [SRIW1301] -- In 2002, 5 of 5 sample event(s) did not exceed Washington's Aquatic Life Acute and Chronic criteria.

Assessed Water/Sediment

Water

Category 1

DEPARTMENT OF ECOLOGY State of Washington

Washington State Water Quality Assessment 303(d)/305(b) List

Approved WQ Assessment | Candidate List | Contact Us | WQ Atlas

Back To Results

Water Quality Listing Policy

Listing ID: 78873

Main Listing Information

Listing ID: 78873

Waterbody Name: DESCHUTES RIVER

Medium: Water

Parameter: Nickel

WQI Project: None

Designated Use: Aquatic Life - Toxics

Current Category: 1

View Category History

Assessment Unit

Assessment Unit ID: 17110016000007_001_001

Size: 4.855 Kilometers

Associated Components(s): Reach: 17110016000007 0% - 100%, Type: Rivers/Streams

County: Thurston

WRIA: Deschutes

Basis Table

Assessment Year

2018

Sampling Year	Excursion Count	Sample Count	Criterion/Threshold	Aggregate	Calculated Value
2017	0	4	Calculated	Toxic aquatic 4-day mean exceedence factor	

Basis Statement

HISTORICAL INFORMATION

Location ID(s) [13A060] -- In 2005, 6 of 6 sample event(s) did not exceed Washington's Aquatic Life Acute and Chronic criteria.

Location ID(s) [13A060] -- In 2004, 6 of 6 sample event(s) did not exceed Washington's Aquatic Life Acute and Chronic criteria.

Location ID(s) [13A060] -- In 2003, 2 of 2 sample event(s) did not exceed Washington's Aquatic Life Acute and Chronic criteria.

Location ID(s) [13A060] -- In 2002, 4 of 4 sample event(s) did not exceed Washington's Aquatic Life Acute and Chronic criteria.

Assessed Water/Sediment

Water

Category 1

DEPARTMENT OF ECOLOGY State of Washington

Washington State Water Quality Assessment 303(d)/305(b) List

Approved WQ Assessment | Candidate List | Contact Us | WQ Atlas

Back To Results

Water Quality Listing Policy

Listing ID: 79301

Main Listing Information

Listing ID: 79301

Waterbody Name: DESCHUTES RIVER

Medium: Water

Parameter: Cadmium

WQI Project: None

Designated Use: Aquatic Life - Toxics

Current Category: 1

View Category History

Assessment Unit

Assessment Unit ID: 17110016000007_001_001

Size: 4.855 Kilometers

Associated Components(s): Reach: 17110016000007 0% - 100%, Type: Rivers/Streams

County: Thurston

WRIA: Deschutes

Basis Table

Assessment Year

2018

Sampling Year	Excursion Count	Sample Count	Criterion/Threshold	Aggregate	Calculated Value
2017	0	4	Calculated	Toxic aquatic 4-day mean exceedence factor	

Basis Statement

HISTORICAL INFORMATION

Location ID(s) [13A060] -- In 2005, 6 of 6 sample event(s) did not exceed Washington's Aquatic Life Acute and Chronic criteria.

Location ID(s) [13A060] -- In 2004, 6 of 6 sample event(s) did not exceed Washington's Aquatic Life Acute and Chronic criteria.

Location ID(s) [13A060] -- In 2003, 2 of 2 sample event(s) did not exceed Washington's Aquatic Life Acute and Chronic criteria.

Location ID(s) [13A060] -- In 2002, 4 of 4 sample event(s) did not exceed Washington's Aquatic Life Acute and Chronic criteria.

Water Quality Standards
All Standards

DEPARTMENT OF ECOLOGY State of Washington

Water Quality Atlas Standards

Home

Water Quality Standards for Surface Waters of the State of Washington

Disclaimer: The Department of Ecology continues to improve the mapped depiction of the Surface Water Quality Standards. However, the map may contain errors and the information displayed does not replace the official rules available in Chapter 173-201A of the Washington Administrative Code.

USE DESIGNATIONS

WAC:	173-201A-600 (1)
Description:	All surface waters of the state not named in Table 602 are to be protected for the designated uses of: Salmonid spawning, rearing, and migration; primary contact recreation; domestic, industrial, and agricultural water supply; stock watering; wildlife habitat; harvesting; commerce and navigation; boating; and aesthetic values.
Aquatic life use:	Salmonid spawning, rearing, and migration
Recreation use:	Primary contact recreation
Water supply uses:	Domestic, Industrial, Agricultural, Stock
Miscellaneous uses:	Wildlife Habitat, Harvesting, Commerce and Navigation, Boating, Aesthetics

CRITERION

Brackish Water Exceptions: None

Temperature: 17.5°C (63.5°F)

Supplemental spawning: None

Dissolved Oxygen (DO): 8.0 mg/L

pH: pH shall be within the range of 6.5 to 8.5, with a human-caused variation within the above range of less than 0.5 units

Turbidity: 5 NTU over background when the background is 50 NTU or less; or

A 10 percent increase in turbidity when the background turbidity is more than 50 NTU

Bacteria: E. coli and fecal coliform criteria are expressed as colony forming units (CFU) or most probable number (MPN).

To protect recreational use:

- E.coli organism levels must not exceed a geometric mean value of 100 CFU or MPN per 100 mL, with not more than 10 percent of all samples(or any single sample when less than ten sample points exist) obtained for calculating the geometric mean value exceeding 320 CFU or MPN per 100 mL.
- Fecal coliform organism levels must not exceed a geometric mean value of 100 CFU or MPN per 100 mL, with not more than 10 percent of all samples(or any single sample when less than ten sample points exist) obtained for calculating the geometric mean value exceeding 200 CFU or MPN per 100 mL. (The use of fecal coliform organism levels to determine compliance will expire December 31, 2020.)

Other requirements:

- A minimum of three samples is required to calculate a geometric mean for comparison to the geometric mean criteria. Sample collection dates shall be well distributed throughout the averaging period so as not to mask noncompliance periods.
- When averaging bacteria sample values for comparison to the geometric mean criteria, it is preferable to average by season. The averaging period of bacteria sample data shall be ninety days or less.

Exhibit 3B – NRCS Soil Report

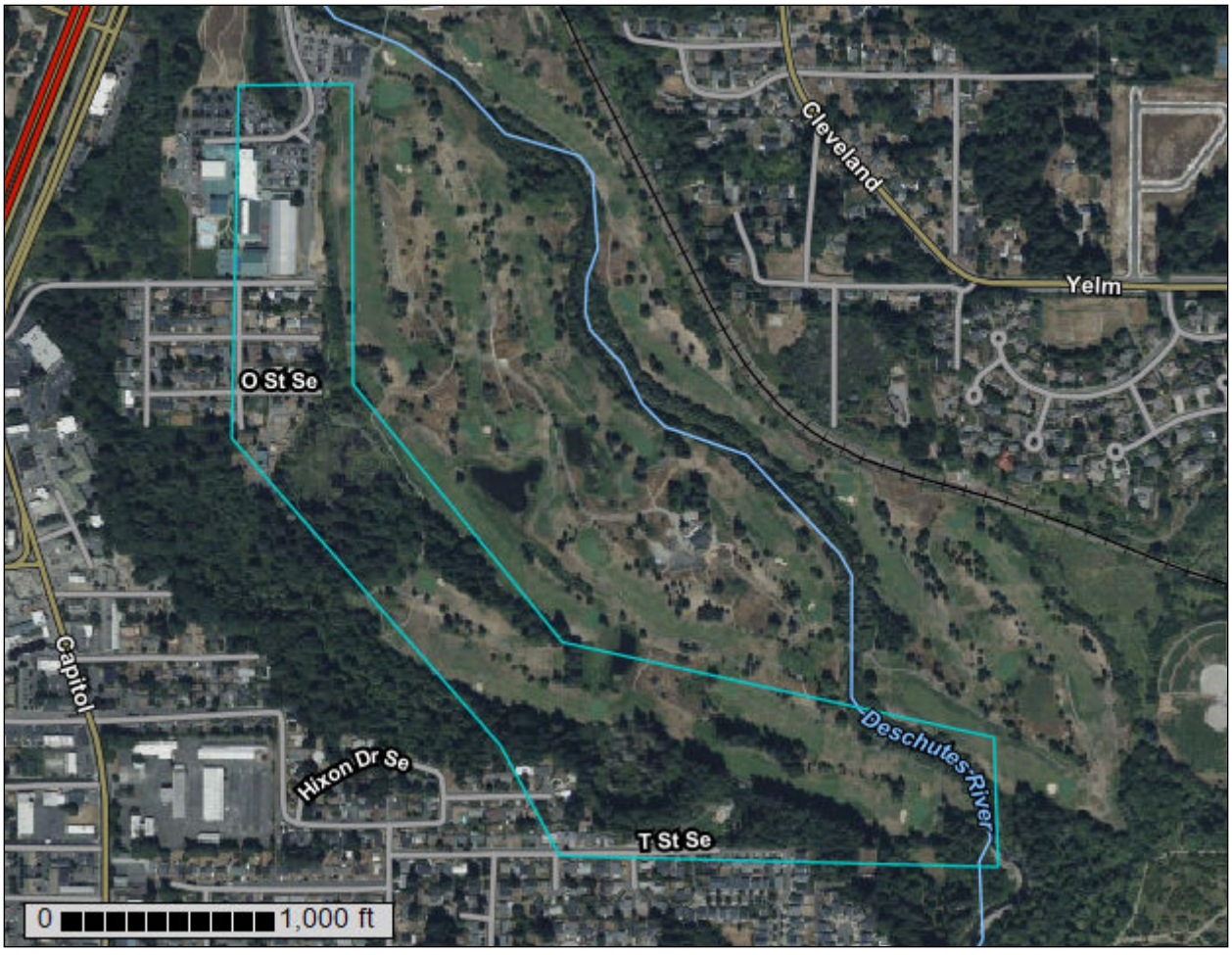
United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Thurston County Area, Washington



December 26, 2025

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

Preface.....2
How Soil Surveys Are Made.....5
Soil Map.....8
Soil Map.....9
Legend.....10
Map Unit Legend.....11
Map Unit Descriptions.....11
Thurston County Area, Washington.....13
20—Cagey loamy sand.....13
33—Everett very gravelly sandy loam, 8 to 15 percent slopes.....14
46—Indianola loamy sand, 0 to 5 percent slopes.....15
48—Indianola loamy sand, 15 to 30 percent slopes.....17
76—Norma silt loam.....18
89—Puyallup silt loam.....19
125—Xerorthents, 0 to 5 percent slopes.....21
129—Water.....21
References.....23

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



Map Scale: 1:8,480 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 100 200 400 600

Feet: 0 400 800 1600 2400

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Thurston County Area, Washington
Survey Area Data: Version 19, Aug 28, 2025

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: May 26, 2023—Aug 14, 2023

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
20	Cagey loamy sand	1.8	2.2%
33	Everett very gravelly sandy loam, 8 to 15 percent slopes	7.0	8.5%
46	Indianola loamy sand, 0 to 5 percent slopes	8.3	10.0%
48	Indianola loamy sand, 15 to 30 percent slopes	4.9	5.9%
76	Norma silt loam	25.5	30.9%
89	Puyallup silt loam	14.0	16.9%
125	Xerorthents, 0 to 5 percent slopes	17.4	21.0%
129	Water	3.8	4.6%
Totals for Area of Interest		**82.6**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not

mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Thurston County Area, Washington

20—Cagey loamy sand

Map Unit Setting

National map unit symbol: 2nd8d
Elevation: 330 to 980 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 50 degrees F
Frost-free period: 165 to 195 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Cagey and similar soils: 85 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cagey

Setting

Landform: Terraces
Parent material: Sandy glacial drift

Typical profile

H1 - 0 to 6 inches: loamy sand
H2 - 6 to 28 inches: loamy sand
H3 - 28 to 60 inches: fine sand

Properties and qualities

Slope: 0 to 4 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: A
Ecological site: F002XA005WA - Puget Lowlands Moist Forest
Forage suitability group: Seasonally Wet Soils (G002XS201WA)
Other vegetative classification: Seasonally Wet Soils (G002XS201WA)
Hydric soil rating: No

Minor Components

Mckenna

Percent of map unit: 5 percent
Landform: Depressions
Other vegetative classification: Wet Soils (G002XS101WA)
Hydric soil rating: Yes

33—Everett very gravelly sandy loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2t62b
Elevation: 30 to 900 feet
Mean annual precipitation: 35 to 91 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 180 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Everett and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Everett

Setting

Landform: Moraines, eskers, kames
Landform position (two-dimensional): Shoulder, footslope
Landform position (three-dimensional): Base slope, crest
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Sandy and gravelly glacial outwash

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A - 1 to 3 inches: very gravelly sandy loam
Bw - 3 to 24 inches: very gravelly sandy loam
C1 - 24 to 35 inches: very gravelly loamy sand
C2 - 35 to 60 inches: extremely cobbly coarse sand

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: A
Ecological site: F002XA004WA - Puget Lowlands Forest
Forage suitability group: Droughty Soils (G002XS401WA), Droughty Soils (G002XN402WA), Droughty Soils (G002XF403WA)

Other vegetative classification: Droughty Soils (G002XS401WA), Droughty Soils (G002XN402WA), Droughty Soils (G002XF403WA)
Hydric soil rating: No

Minor Components

Alderwood
Percent of map unit: 10 percent
Landform: Hills, ridges
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Nose slope, talf
Down-slope shape: Convex, linear
Across-slope shape: Convex
Hydric soil rating: No

Indianola
Percent of map unit: 10 percent
Landform: Terraces, kames, eskers
Landform position (three-dimensional): Riser
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

46—Indianola loamy sand, 0 to 5 percent slopes

Map Unit Setting
National map unit symbol: 2t62k
Elevation: 0 to 980 feet
Mean annual precipitation: 30 to 81 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 170 to 210 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition
Indianola and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Indianola

Setting
Landform: Kames, terraces, eskers
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy glacial outwash

Typical profile
Oi - 0 to 1 inches: slightly decomposed plant material
A - 1 to 6 inches: loamy sand
Bw1 - 6 to 17 inches: loamy sand

Bw2 - 17 to 27 inches: sand
BC - 27 to 37 inches: sand
C - 37 to 60 inches: sand

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 99.90 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.9 inches)

Interpretive groups

Land capability classification (irrigated): 4s
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: A
Ecological site: F002XA004WA - Puget Lowlands Forest
Forage suitability group: Droughty Soils (G002XF403WA), Droughty Soils (G002XN402WA), Droughty Soils (G002XS401WA), Droughty Soils (G002XV402WA)
Other vegetative classification: Droughty Soils (G002XF403WA), Droughty Soils (G002XN402WA), Droughty Soils (G002XS401WA), Droughty Soils (G002XV402WA)
Hydric soil rating: No

Minor Components

Alderwood

Percent of map unit: 5 percent
Landform: Ridges, hills
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Crest, talf
Down-slope shape: Linear, convex
Across-slope shape: Convex
Hydric soil rating: No

Everett

Percent of map unit: 5 percent
Landform: Eskers, moraines, kames
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve, crest
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Norma

Percent of map unit: 5 percent
Landform: Depressions, drainageways
Landform position (three-dimensional): Dip
Down-slope shape: Concave, linear
Across-slope shape: Concave
Hydric soil rating: Yes

48—Indianola loamy sand, 15 to 30 percent slopes

Map Unit Setting

National map unit symbol: 2t639
Elevation: 0 to 980 feet
Mean annual precipitation: 30 to 81 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 170 to 210 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Indianola and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Indianola

Setting

Landform: Terraces, kames, eskers
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy glacial outwash

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A - 1 to 6 inches: loamy sand
Bw1 - 6 to 17 inches: loamy sand
Bw2 - 17 to 27 inches: sand
BC - 27 to 37 inches: sand
C - 37 to 60 inches: sand

Properties and qualities

Slope: 15 to 30 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 99.90 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.9 inches)

Interpretive groups

Land capability classification (irrigated): 6e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Ecological site: F002XA004WA - Puget Lowlands Forest

Forage suitability group: Droughty Soils (G002XS401WA), Droughty Soils (G002XN402WA)
Other vegetative classification: Droughty Soils (G002XS401WA), Droughty Soils (G002XN402WA)
Hydric soil rating: No

Minor Components

Alderwood
Percent of map unit: 8 percent
Landform: Hills, ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Nose slope, side slope, talf
Down-slope shape: Convex, linear
Across-slope shape: Convex
Hydric soil rating: No

Everett
Percent of map unit: 5 percent
Landform: Moraines, eskers, kames
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Norma
Percent of map unit: 2 percent
Landform: Drainageways, depressions
Landform position (three-dimensional): Dip
Down-slope shape: Linear, concave
Across-slope shape: Concave
Hydric soil rating: Yes

76—Norma silt loam

Map Unit Setting
National map unit symbol: 2ndcc
Elevation: 0 to 1,000 feet
Mean annual precipitation: 35 to 60 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 150 to 200 days
Farmland classification: Prime farmland if drained

Map Unit Composition
Norma, silt loam, and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Norma, Silt Loam

Setting

Landform: Depressions, drainageways
Parent material: Alluvium

Typical profile

H1 - 0 to 8 inches: silt loam
H2 - 8 to 30 inches: sandy loam
H3 - 30 to 60 inches: sandy loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Available water supply, 0 to 60 inches: Moderate (about 8.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: B/D
Ecological site: F002XA007WA - Puget Lowlands Wet Hemlock Forest
Forage suitability group: Wet Soils (G002XS101WA)
Other vegetative classification: Wet Soils (G002XS101WA)
Hydric soil rating: Yes

Minor Components

Norma, fine sandy loam

Percent of map unit: 5 percent
Landform: Depressions
Other vegetative classification: Wet Soils (G002XS101WA)
Hydric soil rating: Yes

Alderwood

Percent of map unit: 5 percent
Hydric soil rating: No

89—Puyallup silt loam

Map Unit Setting

National map unit symbol: 2nd9z
Elevation: 70 to 1,970 feet
Mean annual precipitation: 35 to 60 inches
Mean annual air temperature: 50 degrees F
Frost-free period: 170 to 200 days

Farmland classification: All areas are prime farmland

Map Unit Composition

Puyallup and similar soils: 85 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Puyallup

Setting

Landform: Terraces, flood plains
Parent material: Alluvium

Typical profile

H1 - 0 to 10 inches: silt loam
H2 - 10 to 19 inches: fine sandy loam
H3 - 19 to 60 inches: sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 14 to 20 inches to strongly contrasting textural stratification
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.2 inches)

Interpretive groups

Land capability classification (irrigated): 3w
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: B
Ecological site: F002XA008WA - Puget Lowlands Riparian Forest
Forage suitability group: Droughty Soils (G002XS401WA)
Other vegetative classification: Droughty Soils (G002XS401WA)
Hydric soil rating: No

Minor Components

Newberg

Percent of map unit: 5 percent
Hydric soil rating: No

Semiahmoo, undrained

Percent of map unit: 3 percent
Landform: Depressions
Other vegetative classification: Wet Soils (G002XS101WA)
Hydric soil rating: Yes

Sultan

Percent of map unit: 2 percent
Hydric soil rating: No

125—Xerorthents, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: 2nd87
Elevation: 0 to 2,620 feet
Mean annual precipitation: 30 to 60 inches
Mean annual air temperature: 39 to 50 degrees F
Frost-free period: 150 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Xerorthents and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Xerorthents

Setting

Landform: Tidal flats
Parent material: Sandy and loamy cut and fill material

Typical profile

H1 - 0 to 60 inches: variable

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Depth to water table: About 24 inches
Frequency of flooding: None
Frequency of ponding: None

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydric soil rating: No

129—Water

Map Unit Composition

Water: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Water

Setting

Landform: Alluvial cones

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Exhibit 3C – Draft Geotechnical Report

SAGE GEOTECHNICAL

DRAFT TECHNICAL MEMORANDUM

TO: Patrick Holm, PE, Principal, SCJ Alliance

FROM: Calvin McCaughan, PE, and Lance Levine, PE

DATE: March 10, 2026

RE: Summary of Geotechnical Engineering Services
Tumwater Deschutes Valley Trail
Segment C and Deschutes Valley Park Spur
Tumwater, Washington
SCJ Project No. 25-000313, Phase 03
Sage Project No. 027019

INTRODUCTION

This memorandum summarizes the results of geotechnical engineering services provided by Sage Geotechnical, LLC (Sage), in support of the Deschutes Valley Trail project in Tumwater, Washington (site). The conclusions and recommendations herein apply specifically to Segment C and the Deschutes Valley Park Spur. Services were provided in accordance with the scope outlined in the October 7, 2025, subconsultant agreement between Sage and SCJ Alliance (civil engineer).

PROJECT UNDERSTANDING

Segment C of the City of Tumwater's (project owner) proposed Deschutes Valley Trail system will include an approximately 10-foot (ft)-wide pathway surfaced with asphalt concrete pavement. A fence canopy will be installed along the majority of the trail segment.

Much of the trail segment will wrap along the southern and western boundaries of the Tumwater Valley Golf Club, sharing an alignment with an existing cart path (Figure 1). Along the shared alignment (shared-use path), the total width of the trail will increase to approximately 20 ft.

The trail spur will branch off the southern portion of Segment C and climb a steep slope between the Tumwater Valley Golf Club and Deschutes Valley Park. Cut-and-fill grading will be required to achieve the proposed trail grade. The area that will require the largest cuts and fills is shown on Figure 5; with the exception of a few local low points, other portions of the trail will match existing grades.

A small pedestrian bridge will be constructed over the Palermo Waterway crossing (Bridge 1). Bridge 1 will be designed and constructed in general accordance with the seismic design requirements for single-span bridges in the *AASHTO* (American Association of State Highway and Transportation Officials) *LRFD* (Load and Resistance Factor Design) *Bridge Design*

Specifications (2024). Per AASHTO's simplified seismic design approach and Sage's discussions with the City of Tumwater, seismically induced bridge and abutment damage is acceptable, and the bridge may need to be rebuilt following a seismic event.

Sage understands that the trail will be designed and constructed in accordance with the shared-use path criteria in the Washington State Department of Transportation's (WSDOT) *Design Manual* (2024). Sage's geotechnical recommendations conform to the appropriate WSDOT standards.

SURFACE CONDITIONS

Trail Segment C runs along the southern and western boundaries of the Tumwater Valley Golf Club and is surfaced with grass and asphalt concrete pavement. Portions of the trail segment pass through wooded areas.

The trail spur climbs a steep slope between the Tumwater Valley Golf Club and Deschutes Valley Park. This area is vegetated with coniferous trees that have reached maturation and with younger deciduous trees and brush. The slope is inclined between 25 and 30 degrees. Sage reconnoitered the slope and did not observe any indicators of instability, e.g., pistol-butted trees, landslide scarps, groundwater seepage, sloughing, or erosion. Additional details about the slope reconnaissance are provided in Attachment 1.

Wet Surface Conditions

A portion of trail Segment C will wrap along the southern and western boundaries of the golf club. Of this portion, approximately 80 percent[1] is too water saturated between November and April to support minor vehicle traffic, i.e., traffic from golf carts and mowing equipment.

Cart Path Conditions

The cart path was constructed in 1998 and consists of 0.17 ft of Class B asphalt concrete pavement and 0.50 ft of crushed surfacing base course (CSBC) over soil stabilization fabric.

GEOLOGIC REVIEW

Geologic information for the site and the surrounding area was obtained from the *Geologic Map of the Tumwater 7.5-minute Quadrangle, Thurston County, Washington* (Walsh et al. 2003). Elevated portions of the site (Deschutes Valley Park Spur and vicinity) are underlain by Vashon-age recessional outwash, a unit that consists of sand, silt, gravel, and cobbles deposited during the Holocene glacial retreat. The valley is underlain by a thin veneer of alluvium, a unit that consists of silt, sand, and gravel deposited by the Deschutes River.

[1] This percentage does not include the existing cart path or an elevated area near Hole #14.

The subsurface conditions observed in Sage's explorations were generally consistent with the mapped geology; however, fill material, placed during construction of the Tumwater Valley Golf Club, was also observed in the explorations. Sage interprets the majority of the soils encountered in the valley to be recessional outwash rather than alluvium.

Critical areas are addressed in Attachment 1.

SUBSURFACE EXPLORATIONS

In November 2025 and January 2026, Sage's drilling subcontractor advanced ten geotechnical borings along the proposed trail/spur alignment. The boreholes extended 16.5 ft to 101.5 ft below ground surface (bgs). Groundwater monitoring wells were constructed in borings SB-6W and SB-13W. Summary boring logs are provided in Attachment 2.

Between 2012 and 2014, others explored subsurface conditions along the proposed alignment; copies of their exploration logs are provided in Attachment 3.

The locations of all explorations—current and historical—are shown on Figures 2 through 4.

Subsurface Soil Conditions

The materials encountered in the current and historical explorations were categorized as follows:

- **Pavement Section:** Explorations advanced along the edges of existing pavement sections encountered CSBC with occasional cobbles. Filter fabric was observed in low areas that are expected to be seasonally saturated.
- **Sod/Topsoil:** Explorations encountered a layer of sod over organic topsoil. The sod/topsoil layer was generally 0.15 to 2.0 ft thick.
- **Forest Duff:** Explorations in forested areas with limited ground cover encountered a layer of forest duff that included pine needles, leaf matter, roots, and other organics. The forest duff layer was generally 0.7 to 1.4 ft thick.
- **Fill:** Fill was encountered along the existing cart path and in other developed areas of the proposed trail alignment. The fill typically consisted of loose to medium dense, silty sand or of sand with silt and variable gravel and organic content. The fill layer was generally 1.0 to 10.0 ft thick.
- **Marsh Deposits:** Explorations encountered marsh deposits that typically consisted of loose, silty sand or of soft silt with sand and variable organic content. Sage interprets this material to derive from historical wetlands and/or floodplains that have since been infilled. The layer of marsh deposits was generally 1.5 to 4.2 ft.
- **Alluvium:** Alluvium was encountered in one exploration, historical hand auger boring HA-17. The alluvium extended from 2 to 5.1 ft bgs and consisted of medium dense, silty sand.

- **Recessional Outwash:** Explorations encountered recessional outwash that typically consisted of medium dense to dense[2] sand with variable silt and gravel content or of medium dense to dense gravel with silt and sand. Where observed, the recessional outwash extended to the maximum depth explored.

Groundwater Conditions – Lowland

A shallow water table was encountered in most of the explorations advanced in the valley, with groundwater levels ranging from 1.1 to 9.0 ft bgs.

Previous grading activities have created a complex groundwater system, in which trapped groundwater perches along the southern and western boundaries of the golf club.

Groundwater levels are likely influenced by perched irrigation water and the surface elevation of the nearby Deschutes River. Sage anticipates that groundwater levels will fluctuate seasonally, with the water table rising within 2 ft of ground surface during the wet season (mid-October to late April).

Groundwater Conditions – Upland

A deeper groundwater table was encountered in the upland portion of the site, along the Deschutes Valley Park Spur. Groundwater levels at the crest of the steep slope ranged from approximately 50 to 60 ft bgs,[3] while groundwater levels at the toe of the slope ranged from 12 to 15 ft bgs.[4]

Sage is collecting groundwater monitoring data using the wells installed in borings SB-6W and SB-13W. The final memorandum will be updated to include the additional groundwater data.

Seismic Survey

Global Geophysics, LLC, completed microtremor array measurement and multichannel analysis of surface waves (MASW) surveys of Bridge 1. A copy of the survey report is provided in Attachment 4.

Laboratory Testing

During the November 2025 and January 2026 field investigations, representative soil samples were collected from the boreholes and transported to Sage's geotechnical laboratory for further examination and testing. Test results are provided in Attachment 2.

The results of historical laboratory tests completed by others are provided in Attachment 3.

[2] With occasional loose layers.
[3] Approximate ground elevation 165 ft; groundwater elevation 115 to 105 ft (Figure 5).
[4] Approximate ground elevation 122 ft; groundwater elevation 110 to 107 ft (Figure 5).

CONCLUSIONS AND RECOMMENDATIONS

The soil conditions observed in the current and historical explorations are suitable for the proposed improvements. Sage does not anticipate any major design challenges related to site soils.

A shallow water table was observed in the valley; still, the cart path is located in the same general area and has performed well for more than 25 years.

Civil Design Input

The civil engineer may use the geotechnical design recommendations in the following sections to prepare the project plans and specifications.

Deschutes Valley Park Spur Cut-and-Fill Slopes

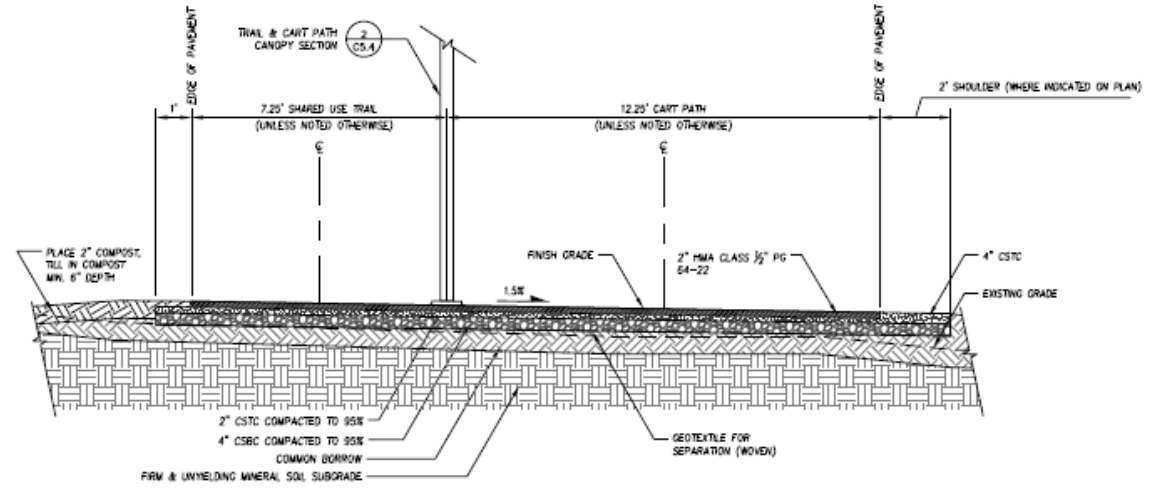
Sage recommends establishing 2 horizontal to 1 vertical (2H:1V) permanent slopes along the trail spur. To prevent erosion, the slopes should be covered with an 18-inch-thick layer of armor rock. Armor rock specifications and thickness will be updated in the final memorandum. Additional details are provided in Attachment 1.

Embankment Settlement

Provided that embankment fill is placed and compacted in accordance with the recommendations herein, Sage estimates that embankments will experience less than 2 inches of settlement. Settlement along the majority of the proposed trail alignment should be complete within about 2 weeks of embankment construction.

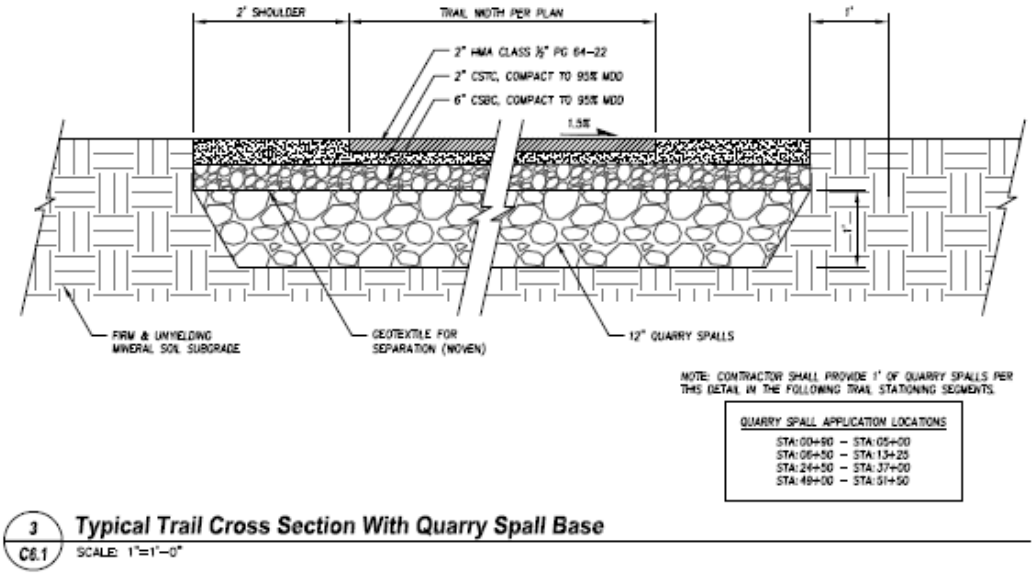
Pavement Design

WSDOT does not provide design criteria for a minimum pavement section for shared-use paths. The preliminary design drawings include a typical pavement section.



2 C6.1 **Typical Trail & Cart Path Cross Section**
SCALE: ½"=1'-0"

Areas of the proposed trail alignment are known to be underlain by wet or soft soils, the result of local drainage patterns. The pavement section for these areas includes an improved quarry spall subbase.



Sage concludes that the proposed pavement sections included in the preliminary design drawings are adequate for the proposed trail and shared-use path. Pavement design assumptions will be revisited during final design.

Stormwater Design

Stormwater infiltration facilities will be installed at the intersection of the Deschutes Valley Park Spur and trail Segment C. The intersection sits approximately 10 ft above the valley floor and is underlain by recessional outwash deposits. In Sage's opinion, stormwater in the area can be infiltrated using the preliminary rates provided in Table 1.

Table 1. Factored Infiltration Rates

Exploration	Depth Interval (ft)	Factored Infiltration (in/hr)	Soil Type	Depth to Groundwater (ft)
SB-06W	1.0–15.0	16.1	SP	14.26
SB-09	0.5–2.5	3.4	SP-SM	7.38
	2.5–5.5	0.1	ML	
	5.5–10.0	0.7	SM	

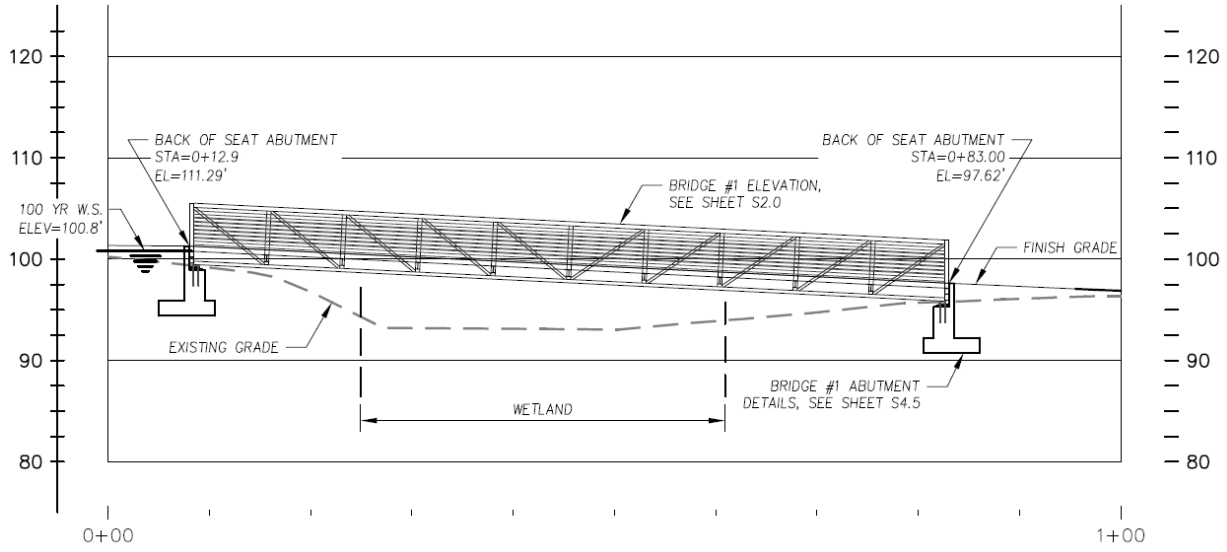
Exploration	Depth Interval (ft)	Factored Infiltration (in/hr)	Soil Type	Depth to Groundwater (ft)
SB-10	0.5–5.5	12.7	SP	8.31
	5.0–5.5	0.7	SM	
	5.5–6.5	0.1	ML	

ft = foot/feet
in/hr = inches per hour

The stormwater infiltration rates in Table 1 were developed in accordance with the grain size methods in the City of Tumwater's 2022 *Drainage Design and Erosion Control Manual*. During final design, the infiltration rates may be updated to account for the results of pilot infiltration tests or shape modification factors.

Structural Design Input

Bridge 1 should be supported on driven piles to limit excavation and dewatering quantities in an area of environmental concern.[5] Although the bridge layout has not been finalized, the preliminary design drawings indicate that the ends of the bridge will sit at different grades.



Pile Foundation Design

Sage evaluated the axial capacity of driven steel pipe piles in general accordance with the methods described in the *AASHTO LRFD Bridge Design Specifications* (2024). The

[5] The proposed bridge location is adjacent to a lagoon associated with the Palermo Wellfield Superfund Site.

Nordlund/Thurman method was used to estimate the axial pile capacity; recommendations are provided on the diagrams below.

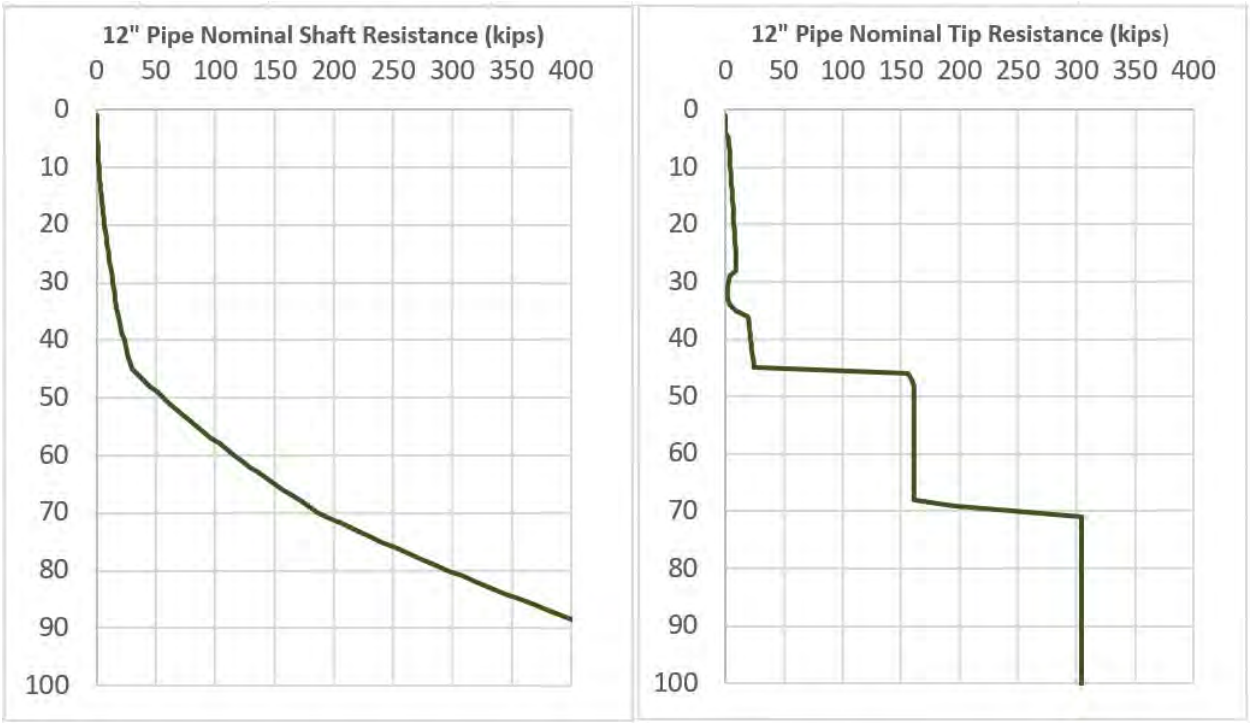


Diagram 1. Axial Resistance of 12-inch-diameter Driven Pipe Piles

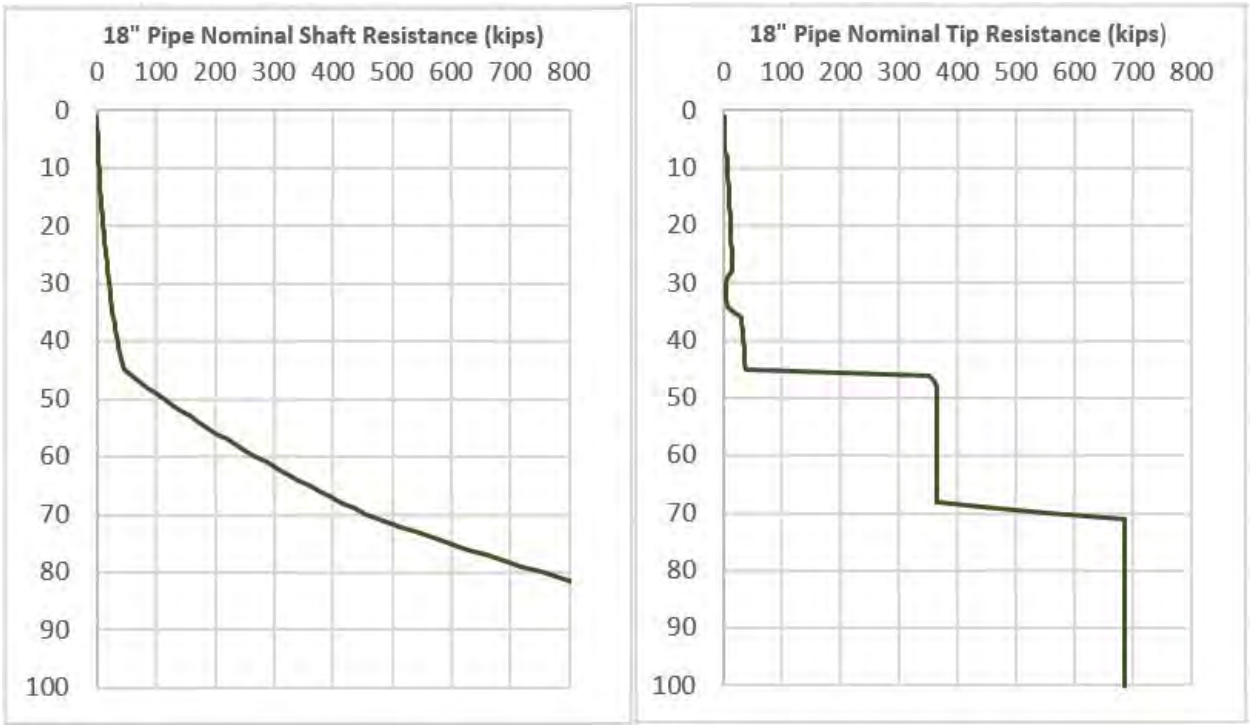


Diagram 2. Axial Resistance of 18-inch-diameter Driven Pipe Piles

The nominal bearing capacity is the sum of the shaft and tip resistances shown on Diagrams 1 and 2. Uplift resistance should be calculated using the shaft resistance diagrams only. The following resistance factors (RFs) should be applied in accordance with the *AASHTO LRFD Bridge Design Specifications* (2024):

- Nominal bearing of single piles (shaft and tip), RF = 0.45.
- Uplift resistance of single piles (shaft), RF = 0.35.
- Group uplift, RF = 0.5.

Lateral Design Parameters

The p-y springs in Table 2 should be used to design deep foundations.

Table 2. P-Y Springs for Deep Foundation Design

Elevation Range	P-Y Spring Model	Model Parameters
95–65 ft	Reese (Sand)	γ' = 62 pcf, φ = 32°, k = 25 pci
65–60 ft	Reese (Sand)	γ' = 43 pcf, φ = 28°, k = 15 pci
60–25 ft	Reese (Sand)	γ' = 67 pcf, φ = 34°, k = 50 pci
25–0 ft	Reese (Sand)	γ' = 73 pcf, φ = 36°, k = 75 pci

Reese, L.C., W.R. Cox, and F.D. Koop. 1974. “Analysis of Laterally Loaded Piles in Sand.” Offshore Technology in Civil Engineering Hall of Fame Papers from the Early Years. 95–10.5
φ = soil friction angle
ft = foot/feet
k = spring modulus
pcf = pounds per cubic foot
pci = pounds per cubic inch
γ' = effective unit weight

For piles spaced less than three diameters apart, P-multipliers should be used in accordance with the requirements in Section 8.12.2.3 of the *Geotechnical Design Manual* (WSDOT 2022). Lateral resistance can be provided by passive resistance acting along the opposite abutment, in accordance with Section 4.2.11.2.3 of the *Bridge Design Manual* (WSDOT 2025).

Abutment Wall Design

The soil parameters in Table 3 should be used to design the abutment walls for Bridge 1.

Table 3. Abutment Wall Design Parameters

Parameter	Value	
	Level Backslope	3H:1V Backslope
Backfill soil unit weight (pcf)	125	
Backfill soil submerged unit weight (pcf)	63	
Backfill soil internal angle of friction (degrees)	36	
Foundation soil internal angle of friction (degrees)	32	
Active earth pressure coefficient (K_a)	0.30	0.39
At-rest earth pressure coefficient (K_0)	0.48	0.57
Passive pressure coefficient (K_p)	3.85	
Ultimate coefficient of sliding	Cast-in-place: 0.57 Precast: 0.46	

H:V = horizontal to vertical
pcf = pounds per cubic foot

Pole Foundations

Pole foundations for the fence canopy may be designed using an average allowable soil bearing pressure of 1,500 pounds per square foot and a soil friction angle of 32 degrees. These recommendations are based on the average N-values collected across trail Segment C. Additional information is provided in Section 17.2.1 of the *Geotechnical Design Manual* (WSDOT 2022).

Structural Earth Walls

A final layout will be required to complete geotechnical design of the structural earth wall. The following information for typical lowland walls is included as a placeholder.

(January 3, 2011)
The following geotechnical design parameters shall be used for the design of the structural earth wall(s):

Wall Name or No.: Seg C Typical

Soil Properties	Wall Backfill	Retained Soil	Foundation Soil
Unit Weight (pcf)	135	125	125
Friction Angle (deg)	36	32	32
Cohesion (psf)	0	0	0

For the Service Limit State, the wall shall be designed to accommodate a differential settlement of 2 inches per 100 feet of wall length.

For the Extreme Event I Limit State, the wall shall be designed for a horizontal seismic acceleration coefficient k_h of 0.3 g and a vertical seismic acceleration coefficient k_v of 0.0 g.

Seismic Design

Sage understands that seismic design will be completed in accordance with the *AASHTO LRFD Bridge Design Specifications* (2024). Sage recommends using seismic Site Class D/E to develop the design response spectrum, in accordance with the results of the MASW survey. Seismic design parameters are provided in Attachment 4.

Earthwork Construction

The following key points should be considered when developing project plans and specifications:

- **Wet weather earthwork:** Site soils are moisture sensitive, and a shallow water table was encountered in the valley/lowlands of the site. To the extent possible, earthwork activities should be completed during the dry season. The golf club should pause or otherwise limit irrigation in areas adjacent to active construction.

  Disturbance of near-surface soils and increased construction costs should be expected if earthwork is completed during periods of wet weather.

- **Stripping:** Sod, topsoil, forest duff, vegetation, and other organics should be stripped from areas designated for development. Stripped soils are not suitable for reuse as structural fill.

- **Temporary excavations:** Temporary excavations should be completed in accordance with the requirements in Section 3-03 of WSDOT's 2026 *Standard Specifications for Road, Bridge, and Municipal Construction* (hereinafter, *2026 WSDOT Standard Specifications*). The contractor should be responsible for actual excavation configurations and the maintenance of safe working conditions, including temporary excavation stability.

  Temporary excavations in excess of 4 ft should be shored or sloped in accordance with the requirements in Safety Standards for Construction Work, Part N (Chapter 296-155 of the Washington Administrative Code). Type C soil is likely to be exposed in the excavation sidewalls. The maximum allowable excavation inclination in Type C soils is 1.5H:1V.

- **Dewatering:** Groundwater seepage and surface water encountered during construction should be managed with sumps, pumps, cutoff walls, and/or diversion systems. The contractor should select, design, and implement the dewatering system(s).

- **Subgrade preparation:** The subgrade should be scarified; moisture-conditioned; and compacted to a firm, unyielding condition. The prepared subgrade should be proof rolled in the presence of a qualified geotechnical engineer, who is familiar with the site and can check for soft/disturbed areas. Areas of limited access can be evaluated with a steel T-probe. If probing or proof-rolling reveals loose and/or disturbed subgrades, additional moisture conditioning and compaction should be completed to produce a firm, unyielding subgrade. Alternatively, unsuitable subgrade soils can be overexcavated and replaced with compacted structural fill or quarry spalls.

- **Hillside terrace:** Before rock armor is placed, subgrades along the 2H:1V cut-and-fill embankment slopes shall be prepared in accordance with the requirements for hillside terrace in Section 3-03.3(14) of the *2026 WSDOT Standard Specifications.*
- **Reuse of site soil:** The topsoil/sod, forest duff, and marsh deposit soils should not be reused as structural fill. All other materials encountered in the explorations may be considered for reuse as structural fill; such materials should only be reused during periods of dry weather.

  Recessional outwash sands and gravels will likely be used to construct the fill embankments along the Deschutes Valley Park Spur.
- **Import structural fill:** The following are suitable sources of import structural fill so long as they conform to the requirements in the *2026 WSDOT Standard Specifications:*
  - Gravel Borrow per Standard 9-03.14(1) – for use in sitewide earthwork.
  - Gravel Backfill for Walls per Standard 9-03.12(2) – for backfill of bridge abutment walls.
  - Gravel Borrow for Structural Earth Walls per Standard 9-03.14(4) – for backfill of structural earth walls.
  - Crushed Surfacing per Standard 9-03.9(3) – for pavement base course.
  - Quarry Spalls per Standard 9-13.1(5) – for armor rock placed on cut-and-fill slopes and for improvement of pavement subbase.
  - Foundation Material Class B per Standard 9-03.17 – for foundation improvement beneath walls, where required.
  - Rock for Erosion and Scour Protection, Class A per Standard 9-13.4(2) – alternate rock armor material for cut-and-fill slopes.
- **Fill placement and compaction:** Structural fill should be placed on approved subgrades and compacted in accordance with the requirements in Section 3-03.3(14)C of the *2026 WSDOT Standard Specifications.* Method B should be used for embankment construction. Method A should be used within the limits of structure excavations.
- **Embankments:** Trail embankments should be constructed in accordance with the requirements in Section 3-03 of the *2026 WSDOT Standard Specifications.* Sage recommends a maximum allowable inclination of 2H:1V and long-term erosion protection, e.g., armor or vegetation, for permanent slopes.
- **Pile driving:** Pile driving should be performed in accordance with the requirements in Section 6-05 of the *2026 WSDOT Standard Specifications.* The pile-driving hammer should have a rated energy that meets the requirements in Section 6-05.3(9)B. Driving criteria can be determined in accordance with the formula in Section 6-05.3(12). The criteria should be applied in end-of-driving conditions only; they are not appropriate for use after pile setup.

USE OF THIS TECHNICAL MEMORANDUM

Sage Geotechnical, LLC, has prepared this technical memorandum for the exclusive use of SCJ Alliance, the City of Tumwater, and their authorized representatives for specific application to the Tumwater Deschutes Valley Trail project (Segment C and the Deschutes Valley Spur) in Tumwater, Washington. No other party is entitled to rely on the information, conclusions, and recommendations included in this document without the express written consent of Sage Geotechnical. Reuse of the information, conclusions, and recommendations provided herein for extensions of the project or for any other project, without review and authorization by Sage Geotechnical, shall be at the user's sole risk.

Sage Geotechnical warrants that, within the limitations of scope, schedule, and budget, its services have been provided in a manner consistent with that level of skill and care ordinarily exercised by members of the profession currently practicing in the same locality and under similar conditions. Sage Geotechnical makes no other warranty, either express or implied.

CLOSING

We trust that this memorandum provides you with the information needed to proceed with the project. If you have questions or comments, or if we can be of further service, please contact Calvin McCaughan at calvinm@sagegeotechnical.com.

SAGE GEOTECHNICAL, LLC

Calvin McCaughan, PE
Principal Engineer

Lance Levine, PE
Senior Engineer

CAM/LGL/MCS
[HTTPS://SAGEGEOTECHNICAL.SHAREPOINT.COM/SITES/SAGEGEOTECHNICAL/SHARED DOCUMENTS/PROJECTS/027 SCJ ALLIANCE/019 DESCHUTES VALLEY TRAIL/R/SEG C/DVT (SEG C AND DVP SPUR) DRAFT TECHNICAL MEMORANDUM 3.10.2026.DOCX]

Attachments: Figure 1. Vicinity Map
Figures 2–4. Site and Exploration Location Plans
Figure 5. DVP Spur Proposed Grading
Attachment 1. Critical Areas Assessment
Attachment 2. 2026 Subsurface and Laboratory Data
Attachment 3. Historical Subsurface and Laboratory Data
Attachment 4. Seismic Design Parameters and Survey Results

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Source: ESRI 2025

Vicinity Map

Deschutes Valley Trail - Segment C and DVP Spur

Tumwater, Washington

Figure 1

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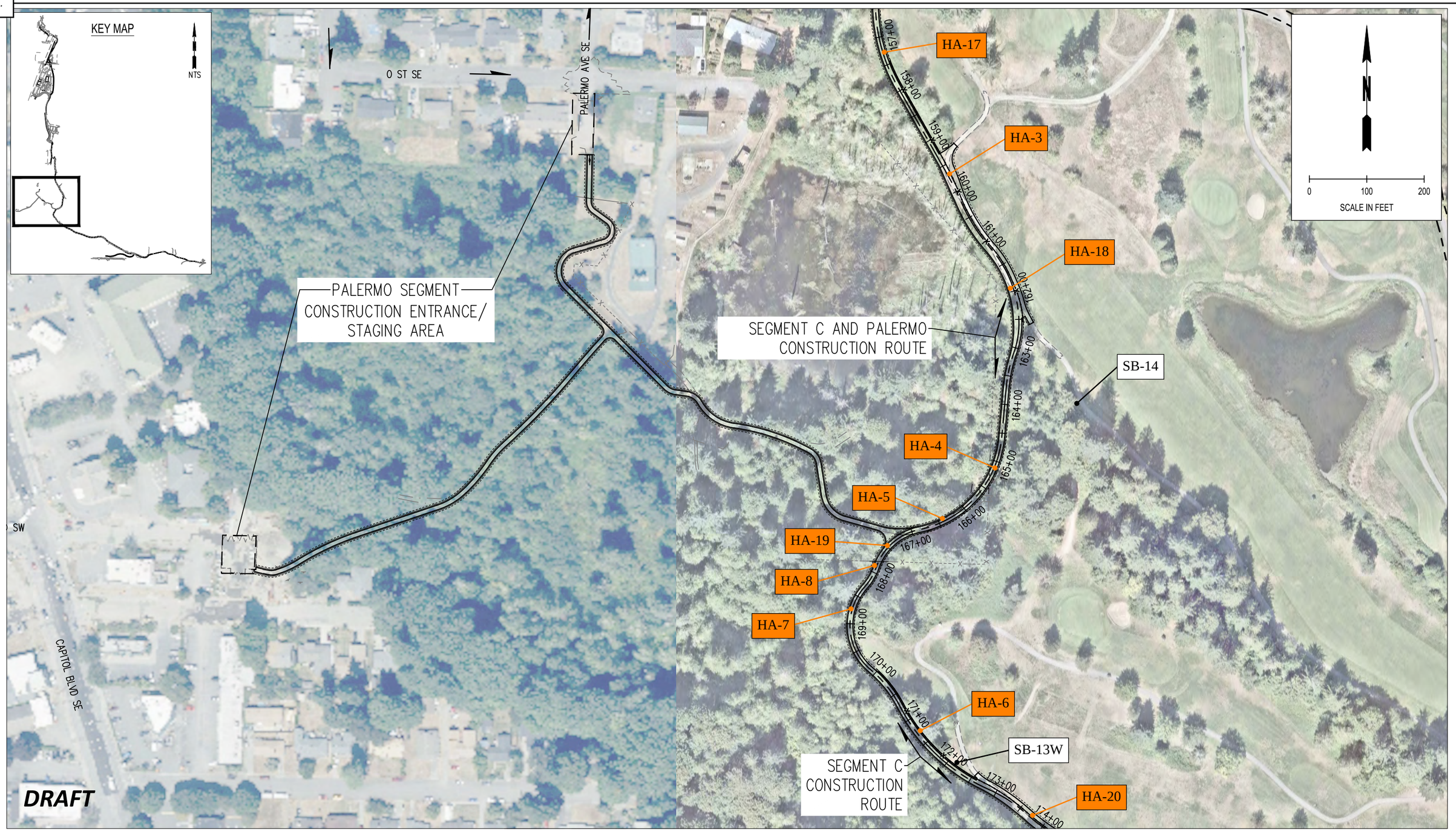
SB-17 — 2025 & 2026 Borings (see Attachment 2)

HA-2 — Historical Explorations by Others (See Attachment 3)

Source: SCJ Alliance 2026

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Site and Exploration Location Plan	
Deschutes Valley Trail - Segment C and DVP Spur	
Tumwater, Washington	Figure 2



SB-14 — 2025 & 2026 Borings (see Attachment 2)

HA-3 — Historical Explorations by Others (See Attachment 3)

Source: SCJ Alliance 2026

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Site and Exploration Location Plan	
Deschutes Valley Trail - Segment C and DVP Spur	
Tumwater, Washington	Figure 3



SB-6W — 2025 & 2026 Borings (see Attachment 2)

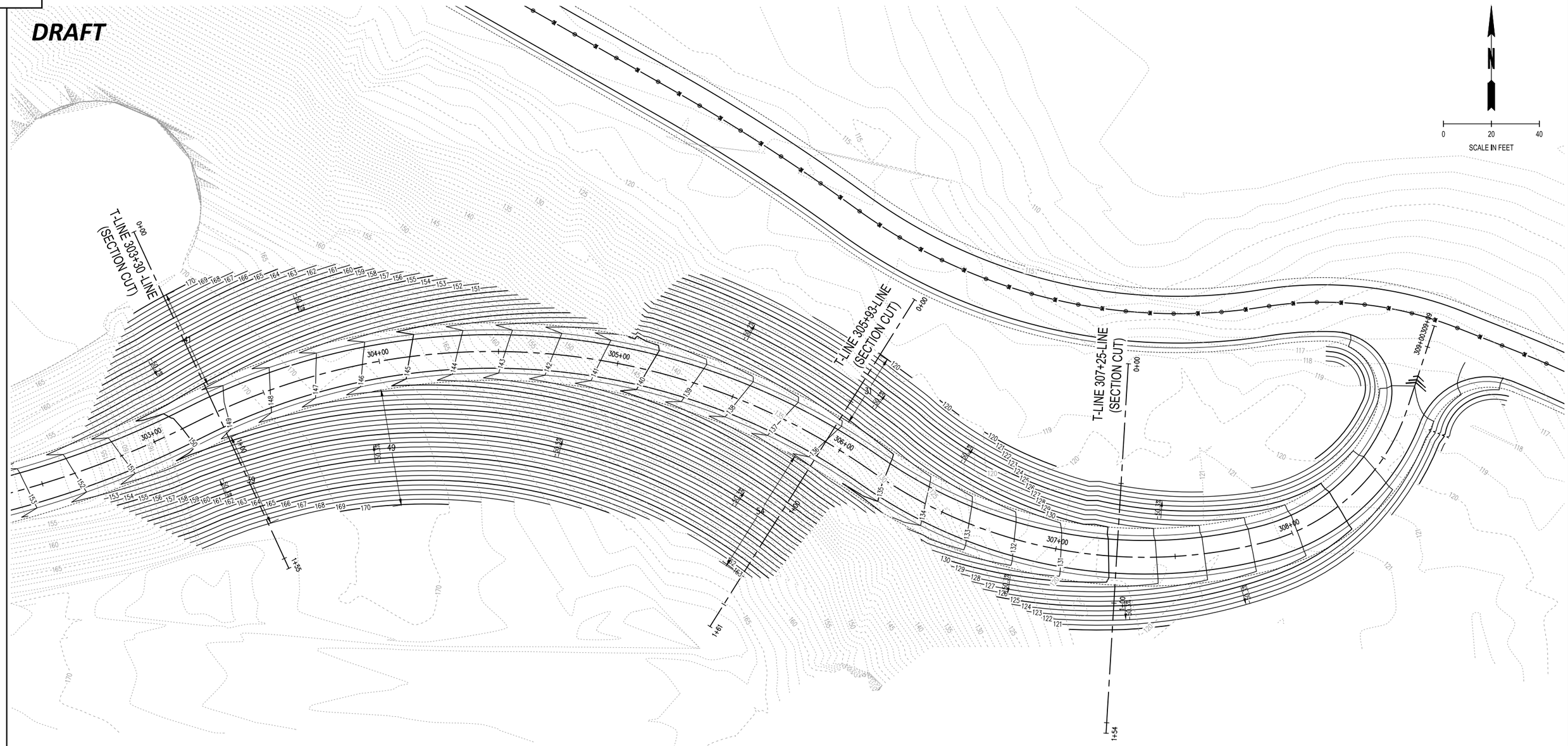
B-1 — Historical Explorations by Others (See Attachment 3)

Source: SCJ Alliance 2026

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Site and Exploration Location Plan	
Deschutes Valley Trail - Segment C and DVP Spur	
Tumwater, Washington	Figure 4

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Source: SCJ Alliance 2026

DVP Spur Proposed Grading	
Deschutes Valley Trail - Segment C and DVP Spur	
Tumwater, Washington	Figure 5

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ATTACHMENT 1

Critical Areas Assessment

ATTACHMENT 1.
CRITICAL AREAS ASSESSMENT

Slope Conditions

In November 2025, Sage reconnoitered the steep slope between the Tumwater Valley Golf Club and Deschutes Valley Park. The slope has a gradient of 47 to 58 percent and a vertical relief of approximately 50 feet (ft). During its reconnaissance, Sage did not observe any indicators of slope instability, e.g., pistol-butted trees, landslide scarps, groundwater seepage, sloughing, or erosion.

The slope and the surrounding area are vegetated with coniferous trees that have reached maturation and with younger deciduous trees and brush.

Critical Areas Assessment

Chapter 16.20 of the *Tumwater Municipal Code* outlines four categories of geologically hazardous areas: landslide hazards, erosion hazards, seismic hazards, and volcanic hazards. Sage assessed the site for each.

Landslide Hazard Area

Section 16.20.045.B of the *Tumwater Municipal Code* lists eight criteria for identifying landslide hazard areas (LHAs). Based on Sage's desktop review and slope reconnaissance, the site does not meet LHA criteria one through seven; however, most of the slope between Deschutes Valley Park and the Tumwater Valley Golf Club qualifies as an LHA, as it is more than 10 ft tall and steeper than 40 percent.

No current or historical landslides are mapped at, or in the immediate vicinity of, the site (DNR, accessed March 2, 2026), and no evidence of current or historical slope instability was observed during Sage's November 2025 reconnaissance. The slope consists of well-draining glacial outwash (sand and gravel). In Sage's opinion, there is a low risk that deep-seated landslides will occur at the site.

Erosion Hazard Area

Section 16.20.045.A of the *Tumwater Municipal Code* defines erosion hazard areas (EHAs) as areas where soil is at risk of erosion if disturbed, including areas identified by the U.S. Department of Agriculture's Natural Resources Conservation Service as "moderate to severe," "severe," or "very severe" erosion risks. Site soils do not meet these criteria; therefore, the site does not classify as an EHA (USDA NRCS, accessed March 6, 2026).

Seismic Hazard Area

Section 16.20.045.C of the *Tumwater Municipal Code* defines seismic hazard areas (SHAs) as "areas subject to severe risk of damage as a result of earthquake-induced ground shaking, slope failure, settlement, soil liquefaction, lateral spreading, or surface faulting." In Sage's opinion, there is a moderate risk that soils in the valley or lowlands of the site will experience seismically induced soil liquefaction. There is also a moderate risk that the aforementioned steep slope will experience shallow instability following a design-level earthquake. Such hazards are common for trail projects that cross steep slopes and valleys. Sage concludes that there is not a severe risk of seismic damage; therefore, proposed trail Segment C and the Deschutes Valley Park Spur are not considered SHAs.

Volcanic Hazard Area

Section 16.20.045.D of the *Tumwater Municipal Code* defines volcanic hazard areas (VHAs) as "areas subject to pyroclastic flows, lava flows, debris avalanche, inundation by debris flows, lahars, mudflows, or related flooding resulting from volcanic activity." The site is not subject to any of these hazards and is not considered a VHA.

Conclusions

The proposed Deschutes Valley Park Spur crosses a landslide hazard area with a slope taller than 10 ft and steeper than 40 percent. The slope consists of well-draining sand and gravel outwash. No seeps, springs, or other indicators of recent or historical instability were observed.

Sage used the limit-equilibrium software Slide2 (Rocscience) to analyze the global stability of the proposed cuts and fills shown on Figure 5. Based on the results of its analysis, Sage concludes that the proposed 2 horizontal to 1 vertical cut-and-fill slopes will have a static factor of safety of 1.3 to 1.6. This exceeds the typical 1.25 factor of safety threshold used to design roadway and trail embankments.

The proposed cut-and-fill slopes in the LHA will be faced with rock armor to mitigate erosion potential. The project civil engineer is preparing grading and drainage plans intended to collect and control stormwater runoff. Sage recommends that disturbed areas outside of the rock armor and asphalt concrete-paved trail are revegetated in a manner appropriate to the surrounding topography and canopy.

Sage concludes that the project satisfies the "Alterations of Geologically Hazardous Areas" standards in Section 16.20.055 of the *Tumwater Municipal Code.* The proposed improvements will not increase the threat of the geological hazard to adjacent properties beyond predevelopment conditions and will not adversely impact other critical areas. The improvements are and will be designed so that any hazard is mitigated equal to predevelopment conditions. They are and will be certified as safe as designed and under anticipated conditions by a qualified engineer, licensed in the State of Washington.

References

City of Tumwater. 2025. *Tumwater Municipal Code.* Title 16. Environment. Chapter 16.20 Geologically Hazardous Areas. Last updated November 18.

DNR. "Washington Geologic Information Portal." Washington Department of Natural Resources. Accessed March 2, 2026. Available online at: https://geologyportal.dnr.wa.gov/.

USDA NRCS. "Web Soil Survey." U.S. Department of Agriculture Natural Resources Conservation Service. Accessed March 6, 2026. Available online at: https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx.

ATTACHMENT 2

2026 Subsurface and Laboratory Data

Project: **Deschutes Valley Trail**
Project Location: **Tumwater, Washington**
Project Number: **027019**

Key to Boring Logs

Sheet 1 of 1

Elevation (feet)	Depth (feet)	Sample Type	Sample Number	Sampling Resistance, blows/ft	Material Type	Graphic Log	MATERIAL DESCRIPTION	REMARKS AND OTHER TESTS
1	2	3	4	5	6	7	8	9

COLUMN DESCRIPTIONS

1. Elevation (feet): Elevation (MSL, feet).
2. Depth (feet): Depth in feet below the ground surface.
3. Sample Type: Type of soil sample collected at the depth interval shown.
4. Sample Number: Sample identification number.
5. Sampling Resistance, blows/ft: Number of blows to advance driven sampler one foot (or distance shown) beyond seating interval using the hammer identified on the boring log.
6. Material Type: Type of material encountered.
7. Graphic Log: Graphic depiction of the subsurface material encountered.
8. MATERIAL DESCRIPTION: Description of material encountered. May include consistency, moisture, color, and other descriptive text.
9. REMARKS AND OTHER TESTS: Comments and observations regarding drilling or sampling made by driller or field personnel.

FIELD AND LABORATORY TEST ABBREVIATIONS

CHEM: Chemical tests to assess corrosivity
COMP: Compaction test
CONS: One-dimensional consolidation test
LL: Liquid Limit, percent
PI: Plasticity Index, percent
GS: Grain size analysis
w: Gravimetric water content
-200: Wash sieve (percent passing No. 200 Sieve)

MATERIAL GRAPHIC SYMBOLS

- Silty GRAVEL (GM)
- Poorly graded GRAVEL (GP)
- Poorly graded GRAVEL with Silt (GP-GM)
- SILT, SILT w/SAND, SANDY SILT (MH)
- SILT, SILT w/SAND, SANDY SILT (ML)
- Silty SAND (SM)
- Poorly graded SAND (SP)
- Poorly graded SAND with Silt (SP-SM)

TYPICAL SAMPLER GRAPHIC SYMBOLS

- Auger sampler
- Bulk Sample
- 3-inch-OD California w/ brass rings
- CME Sampler
- Drill-stem core barrel
- 3.25" OD split spoon (Dames & Moore) w/o liners
- Grab Sample
- 2.5-inch-OD Modified California w/ brass liners
- Pitcher Sample
- 2-inch-OD unlined split spoon (SPT)
- Shelby Tube (Thin-walled, fixed head)

OTHER GRAPHIC SYMBOLS

- Water level (at time of drilling, ATD)
- Water level (after waiting, AW)
- Minor change in material properties within a stratum
- Inferred/gradational contact between strata
- Queried contact between strata

GENERAL NOTES

1: Soil classifications are based on the Unified Soil Classification System. Descriptions and stratum lines are interpretive, and actual lithologic changes may be gradual. Field descriptions may have been modified to reflect results of lab tests.
2: Descriptions on these logs apply only at the specific boring locations and at the time the borings were advanced. They are not warranted to be representative of subsurface conditions at other locations or times.

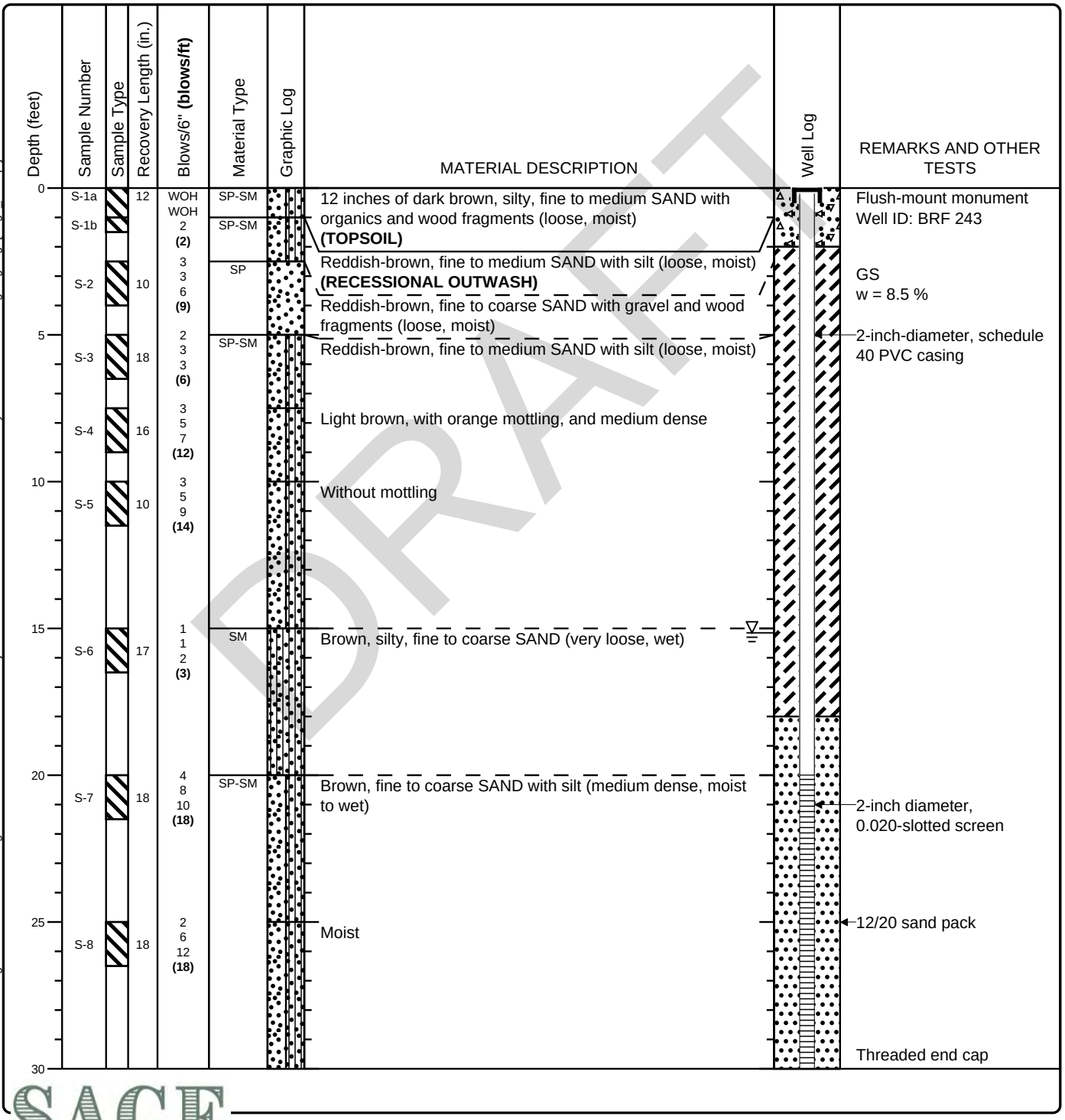
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Figure 2-1

Project: **Deschutes Valley Trail**
Project Location: **Tumwater, Washington**
Project Number: **027019**

Log of Boring SB-6W
Sheet 1 of 2

Date(s) Drilled **11/20/2025**	Logged By **KAM**	Checked By **LGL**
Drilling Method **Hollow-Stem Auger**	Drill Bit Size/Type **8 inches**	Total Depth of Borehole **33.0 ft bgs**
Drill Rig Type **Diedrich D90 Turbo**	Drilling Contractor **Holocene Acquisition Company, LLC**	Approximate Surface Elevation **Not Measured**
Groundwater Level and Date Measured **15.15 ft bgs**	Sampling Method(s) **SPT**	Hammer Data **140 lb./30 in. Drop**
Borehole Backfill **Bentonite**	Approximate Location **46.99650, -122.89433**	



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SAGE GEOTECHNICAL

Figure 2-2

Project: **Deschutes Valley Trail**
Project Location: **Tumwater, Washington**
Project Number: **027019**

Log of Boring SB-6W
Sheet 2 of 2

Depth (feet)	Sample Number	Sample Type	Recovery Length (in.)	Blows/6" **(blows/ft)**	Material Type	Graphic Log	MATERIAL DESCRIPTION	Well Log	REMARKS AND OTHER TESTS
30	S-9		10	9 14 25 **(39)**			Dense		Bentonite chips
							Total Depth = 33.0 ft bgs Refusal due to heave		
35									
40									
45									
50									
55									
60									
65									

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SAGE GEOTECHNICAL

Figure 2-2

Project: **Deschutes Valley Trail**
Project Location: **Tumwater, Washington**
Project Number: **027019**

Log of Boring SB-7
Sheet 1 of 2

Date(s) Drilled **1/22/2025**	Logged By **KAM**	Checked By **LGL**
Drilling Method **Hollow-Stem Auger**	Drill Bit Size/Type **7 inches**	Total Depth of Borehole **56.5 ft bgs**
Drill Rig Type **Diedrich D50 Turbo**	Drilling Contractor **Holocene Acquisition Company, LLC**	Approximate Surface Elevation **Not Measured**
Groundwater Level and Date Measured **51.2 ft bgs**	Sampling Method(s) **SPT**	Hammer Data **140 lb./30 in. Drop**
Borehole Backfill **Bentonite**	Location **46.99668, -122.89493**	

Depth (feet)	Sample Type	Sample Number	Sampling Resistance, blows/ft	Material Type	Graphic Log	MATERIAL DESCRIPTION	REMARKS AND OTHER TESTS
0				SP-SM		20 inches of dark brown, fine to coarse SAND with silt, organics, and wood (loose, moist) **(TOPSOIL)**	
				SP-SM		Brown, fine to coarse SAND with silt (loose, moist) **(RECESSIONAL OUTWASH)**	
		S-1	1 1 2 **(3)**				
5		S-2	1 1 WOH **(1)**	SM		Light brown, with orange mottling, and very loose Light brown, silty, fine to coarse SAND (very loose, moist)	GS w = 19.7 %
		S-3	4 9 8 **(17)**			Medium dense and with orange mottling	
10		S-4	16 18 15 **(33)**	SP-SM		Brown, gravelly, fine to coarse SAND with silt (dense, moist)	GS w = 4.4 %
15		S-5	7 7 8 **(15)**	SP		Light brown, gravelly, fine to coarse SAND (medium dense, moist)	GS w = 2.0 %
20		S-6	6 9 12 **(21)**	SP-SM		Light brown, fine to coarse SAND with silt (medium dense, moist)	GS w = 5.3 %
25		S-7	8 9 21 **(30)**			With gravel	
30		S-8	9 16 21 **(37)**			Without gravel and dense	
35							

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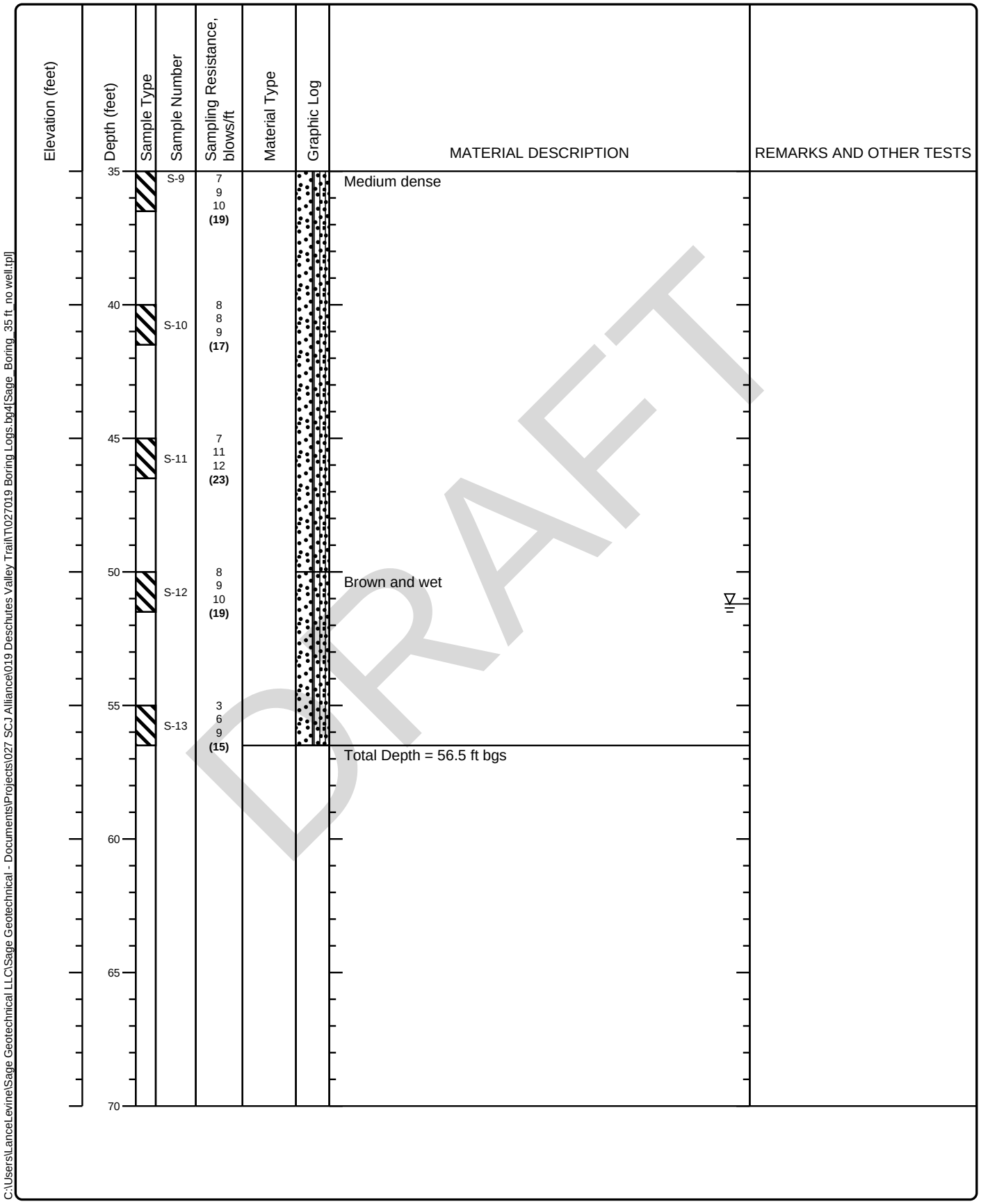
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Figure 2-3

Project: **Deschutes Valley Trail**
Project Location: **Tumwater, Washington**
Project Number: **027019**

Log of Boring SB-7

Sheet 2 of 2



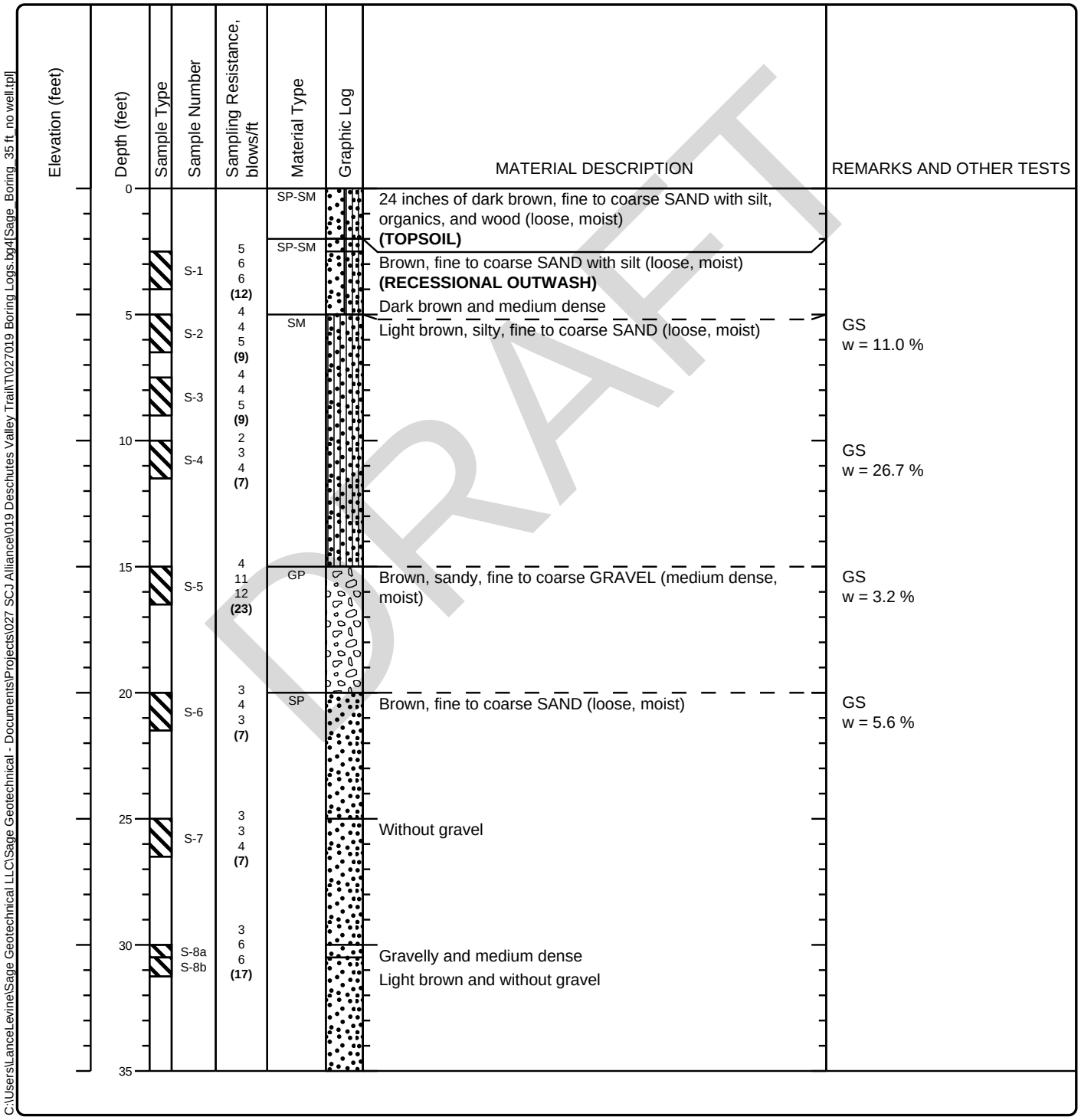
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Figure 2-3

Project: **Deschutes Valley Trail**
Project Location: **Tumwater, Washington**
Project Number: **027019**

Log of Boring SB-8
Sheet 1 of 2

Date(s) Drilled **1/22/2025**	Logged By **KAM**	Checked By **LGL**
Drilling Method **Hollow-Stem Auger**	Drill Bit Size/Type **7 inches**	Total Depth of Borehole **41.5 ft bgs**
Drill Rig Type **Diedrich D50 Turbo**	Drilling Contractor **Holocene Acquisition Company, LLC**	Approximate Surface Elevation **Not Measured**
Groundwater Level and Date Measured **Not Observed**	Sampling Method(s) **SPT**	Hammer Data **140 lb./30 in. Drop**
Borehole Backfill **Bentonite**	Location **46.99659,-122.89332**	



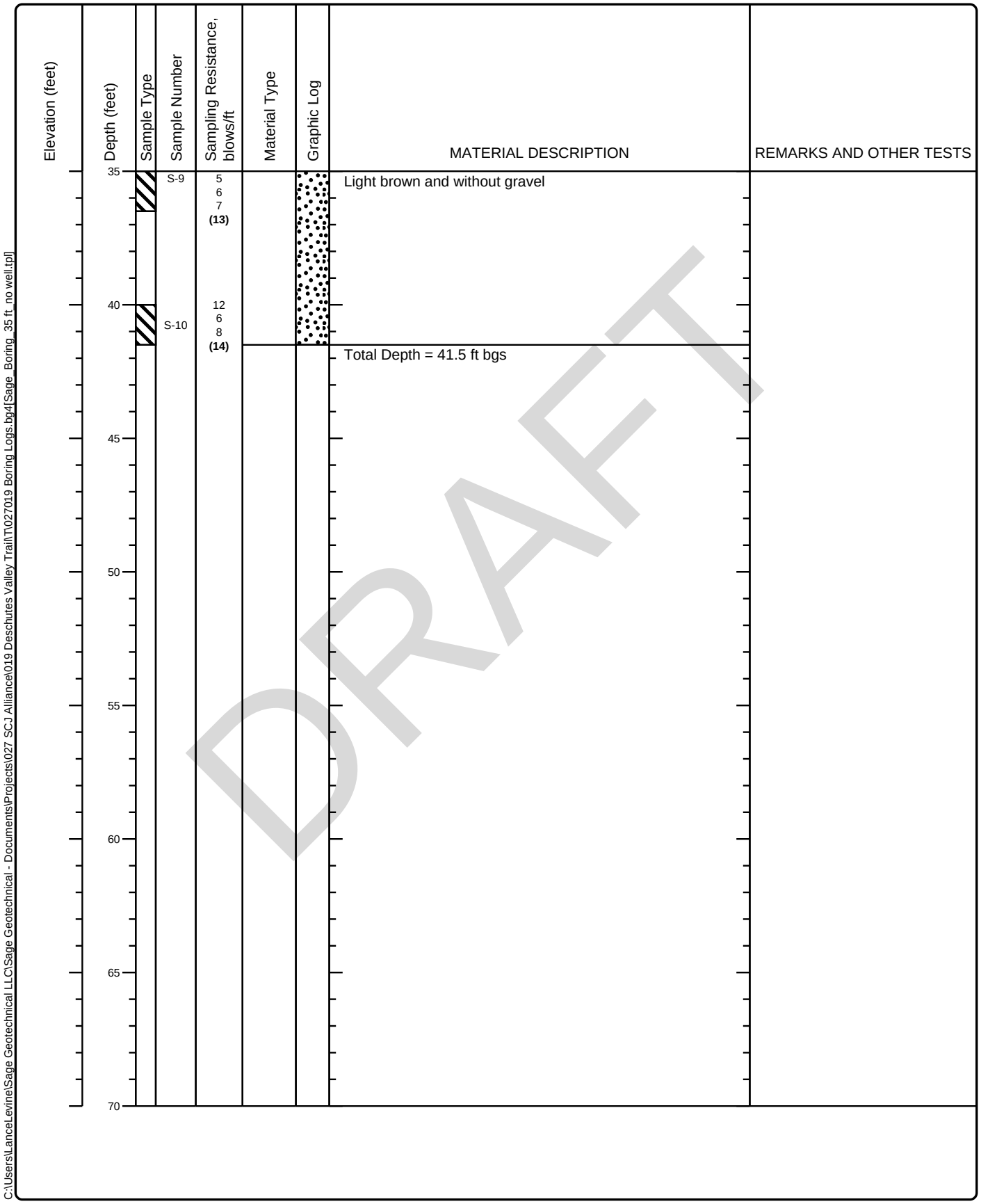
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Figure 2-4

Project: **Deschutes Valley Trail**
Project Location: **Tumwater, Washington**
Project Number: **027019**

Log of Boring SB-8

Sheet 2 of 2



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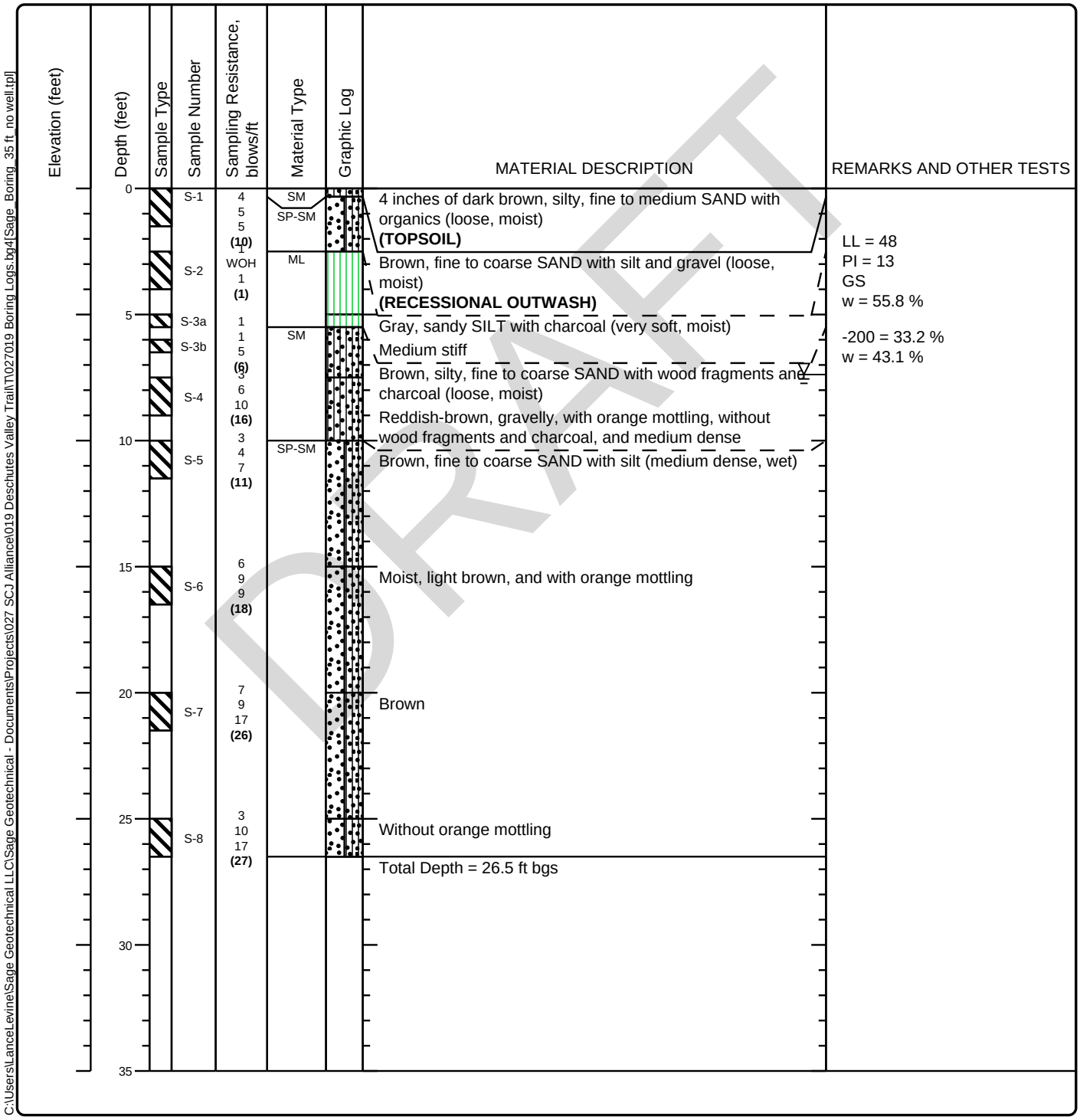
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Figure 2-4

Project: **Deschutes Valley Trail**
Project Location: **Tumwater, Washington**
Project Number: **027019**

Log of Boring SB-9
Sheet 1 of 1

Date(s) Drilled **11/20/2025**	Logged By **KAM**	Checked By **LGL**
Drilling Method **Hollow-Stem Auger**	Drill Bit Size/Type **8 inches**	Total Depth of Borehole **26.5 ft bgs**
Drill Rig Type **Diedrich D90 Turbo**	Drilling Contractor **Holocene Acquisition Company, LLC**	Approximate Surface Elevation **Not Measured**
Groundwater Level and Date Measured **7.38 ft bgs**	Sampling Method(s) **SPT**	Hammer Data **140 lb./30 in. Drop**
Borehole Backfill **Bentonite**	Location **46.99667, -122.89302**	



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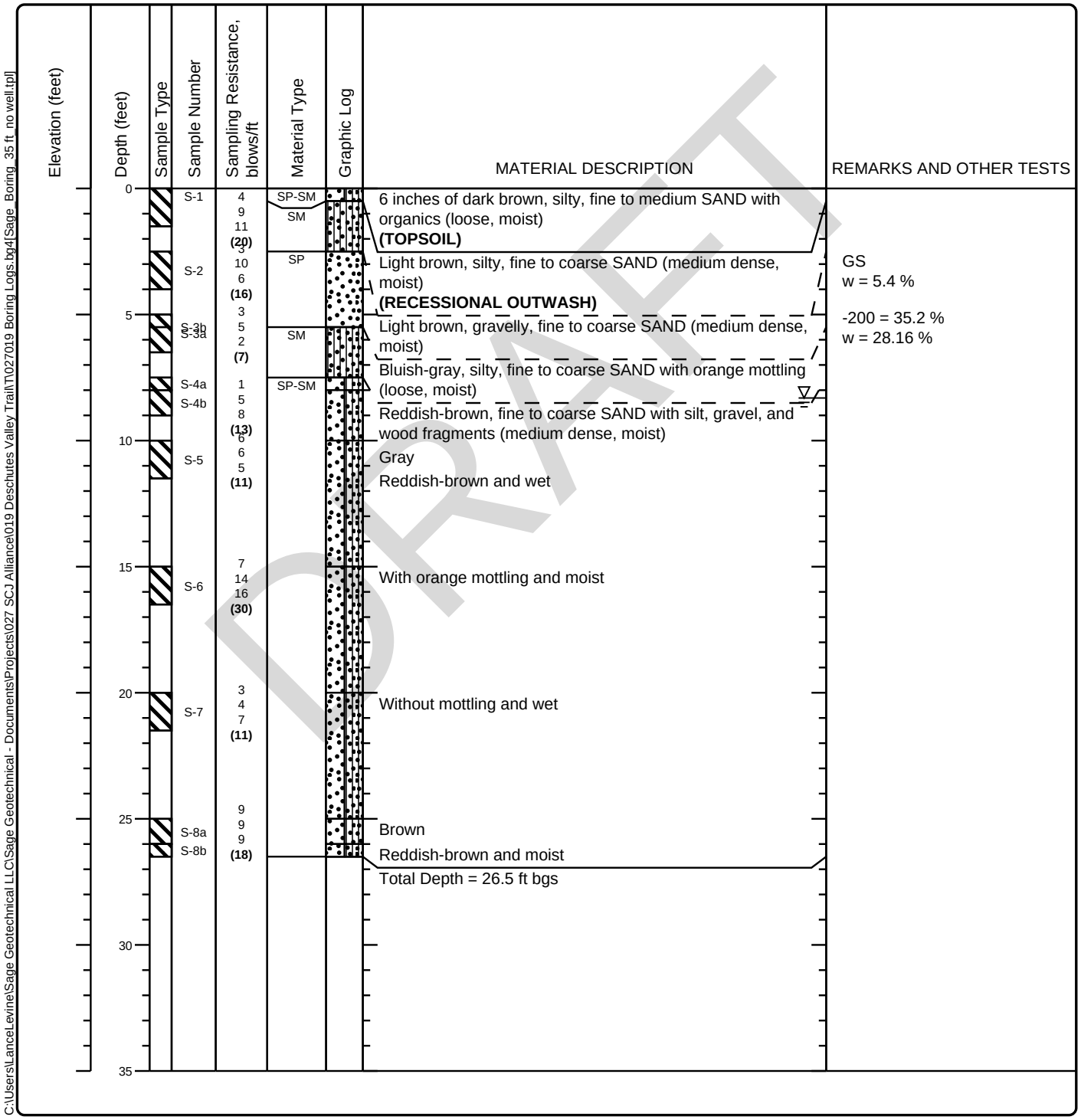
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Figure 2-5

Project: **Deschutes Valley Trail**
Project Location: **Tumwater, Washington**
Project Number: **027019**

Log of Boring SB-10
Sheet 1 of 1

Date(s) Drilled **11/21/2025**	Logged By **KAM**	Checked By **LGL**
Drilling Method **Hollow-Stem Auger**	Drill Bit Size/Type **8 inches**	Total Depth of Borehole **26.5 ft bgs**
Drill Rig Type **Diedrich D90 Turbo**	Drilling Contractor **Holocene Acquisition Company, LLC**	Approximate Surface Elevation **Not Measured**
Groundwater Level and Date Measured **8.31 ft bgs**	Sampling Method(s) **SPT**	Hammer Data **140 lb./30 in. Drop**
Borehole Backfill **Bentonite**	Location **46.996827, -122.893827**	



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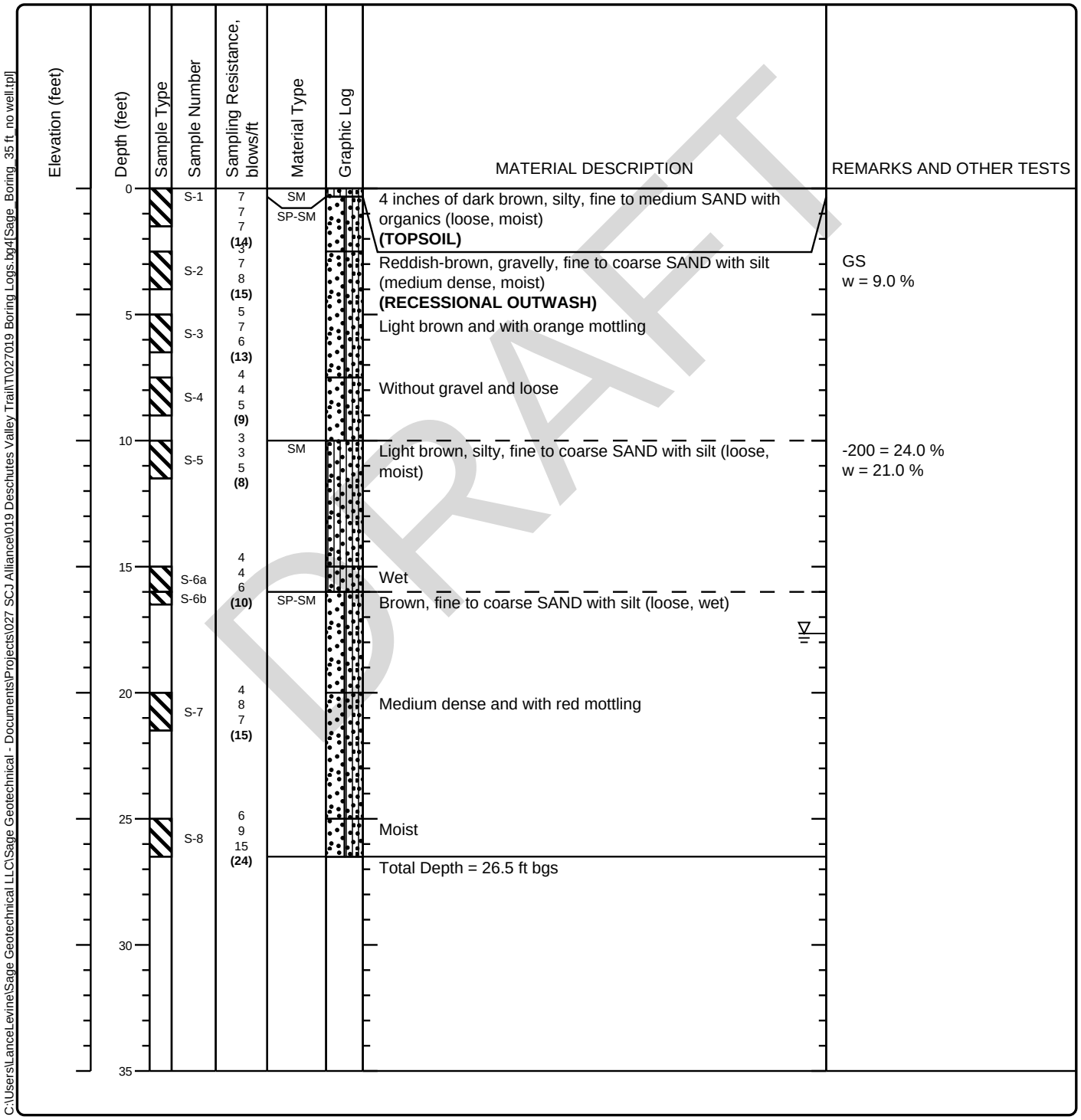
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Figure 2-6

Project: **Deschutes Valley Trail**
Project Location: **Tumwater, Washington**
Project Number: **027019**

Log of Boring SB-11
Sheet 1 of 1

Date(s) Drilled **11/21/2025**	Logged By **KAM**	Checked By **LGL**
Drilling Method **Hollow-Stem Auger**	Drill Bit Size/Type **8 inches**	Total Depth of Borehole **26.5 ft bgs**
Drill Rig Type **Diedrich D90 Turbo**	Drilling Contractor **Holocene Acquisition Company, LLC**	Approximate Surface Elevation **Not Measured**
Groundwater Level and Date Measured **17.65 ft bgs**	Sampling Method(s) **SPT**	Hammer Data **140 lb./30 in. Drop**
Borehole Backfill **Bentonite**	Location **46.99729, -122.89587**	



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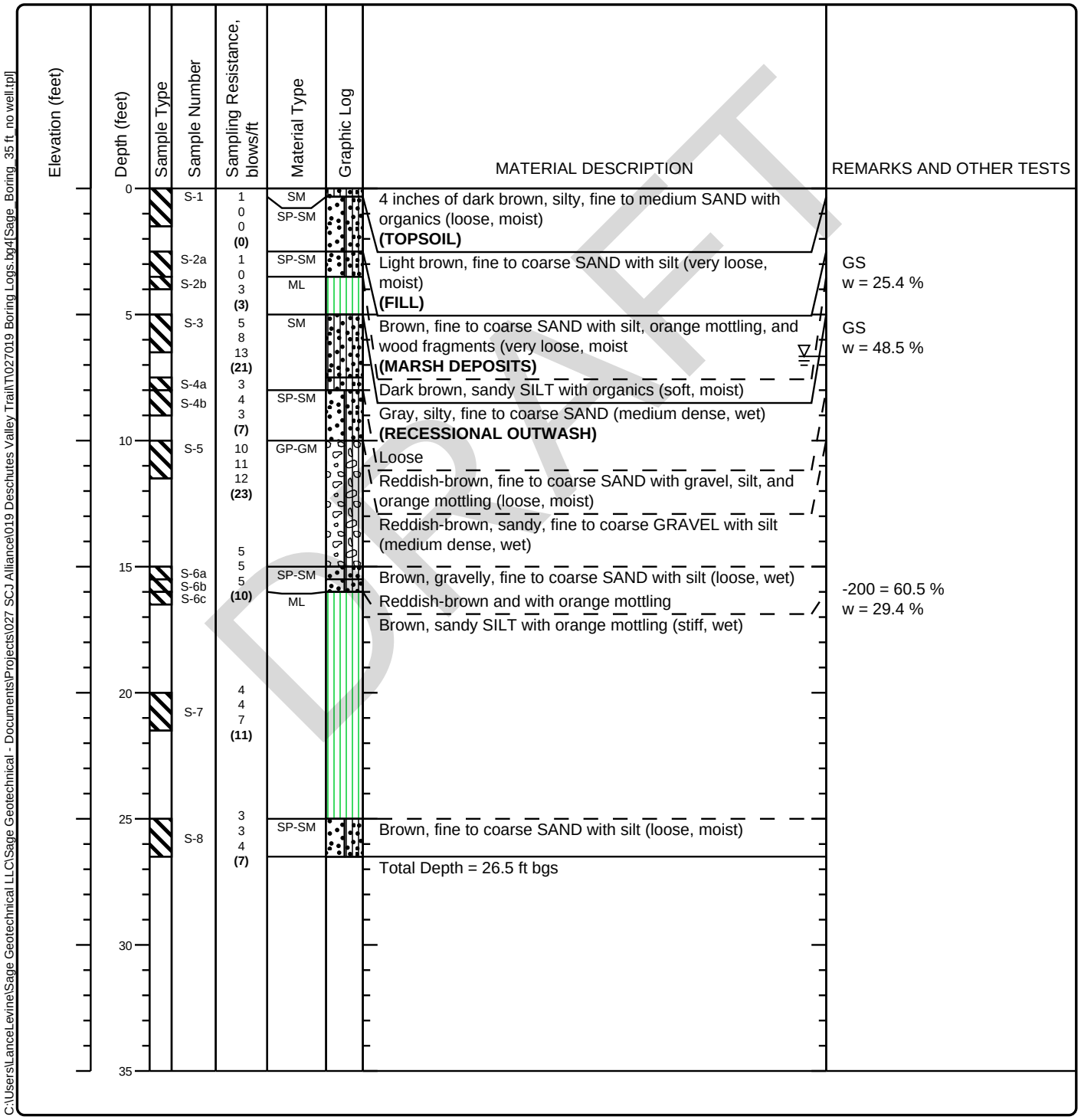
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Figure 2-7

Project: **Deschutes Valley Trail**
Project Location: **Tumwater, Washington**
Project Number: **027019**

Log of Boring SB-12
Sheet 1 of 1

Date(s) Drilled **11/21/2025**	Logged By **KAM**	Checked By **LGL**
Drilling Method **Hollow-Stem Auger**	Drill Bit Size/Type **8 inches**	Total Depth of Borehole **26.5 ft bgs**
Drill Rig Type **Diedrich D90 Turbo**	Drilling Contractor **Holocene Acquisition Company, LLC**	Approximate Surface Elevation **Not Measured**
Groundwater Level and Date Measured **6.66 ft bgs**	Sampling Method(s) **SPT**	Hammer Data **140 lb./30 in. Drop**
Borehole Backfill **Bentonite**	Location **46.99758, -122.89661**	



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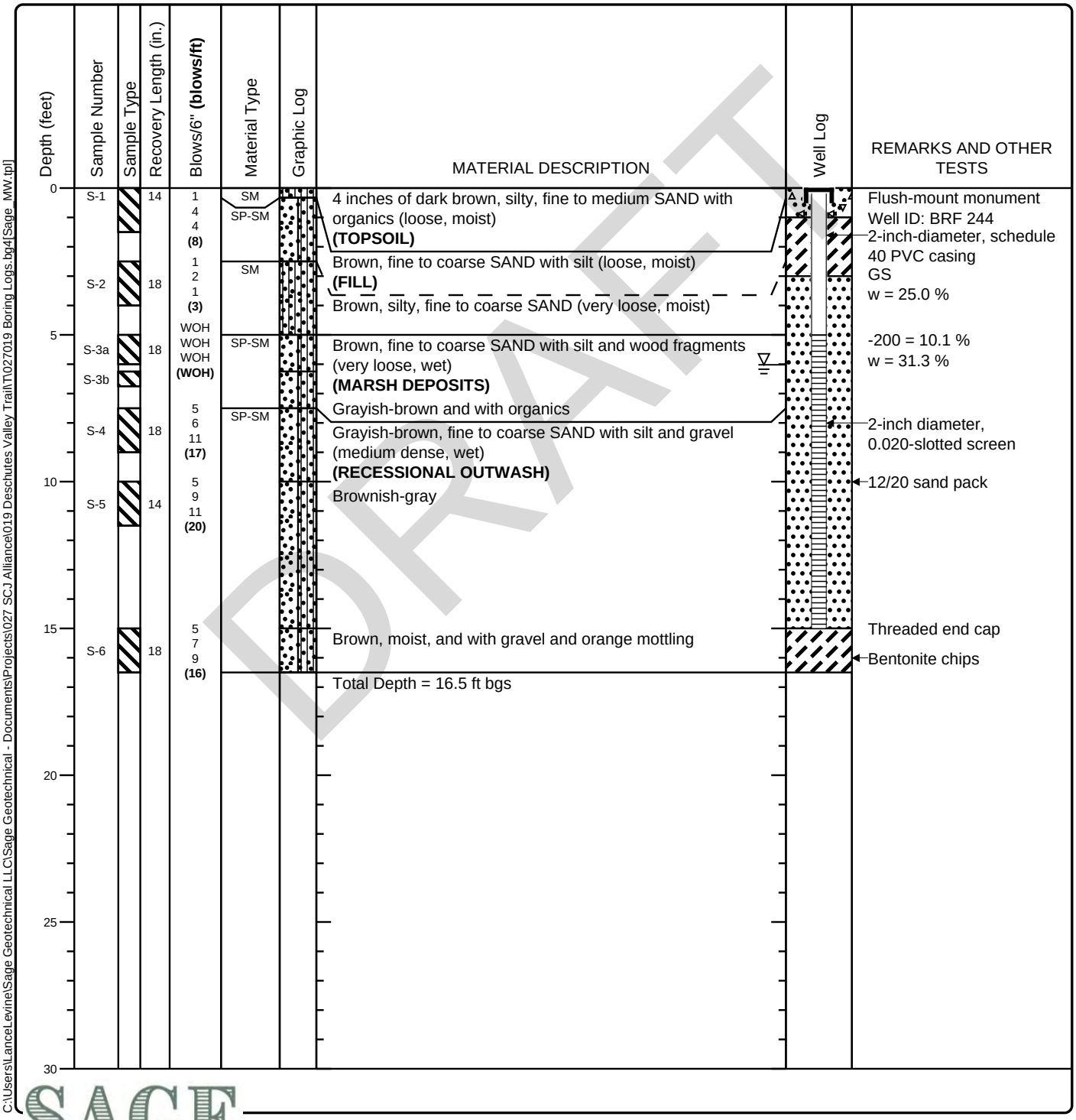
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Figure 2-8

Project: **Deschutes Valley Trail**
Project Location: **Tumwater, Washington**
Project Number: **027019**

Log of Boring SB-13W
Sheet 1 of 1

Date(s) Drilled **11/21/2025**	Logged By **KAM**	Checked By **LGL**
Drilling Method **Hollow-Stem Auger**	Drill Bit Size/Type **8 inches**	Total Depth of Borehole **16.5 ft bgs**
Drill Rig Type **Diedrich D90 Turbo**	Drilling Contractor **Holocene Acquisition Company, LLC**	Approximate Surface Elevation **Not Measured**
Groundwater Level and Date Measured **6.02 ft bgs**	Sampling Method(s) **SPT**	Hammer Data **140 lb./30 in. Drop**
Borehole Backfill **Bentonite**	Approximate Location **46.99900, -122.90234**	



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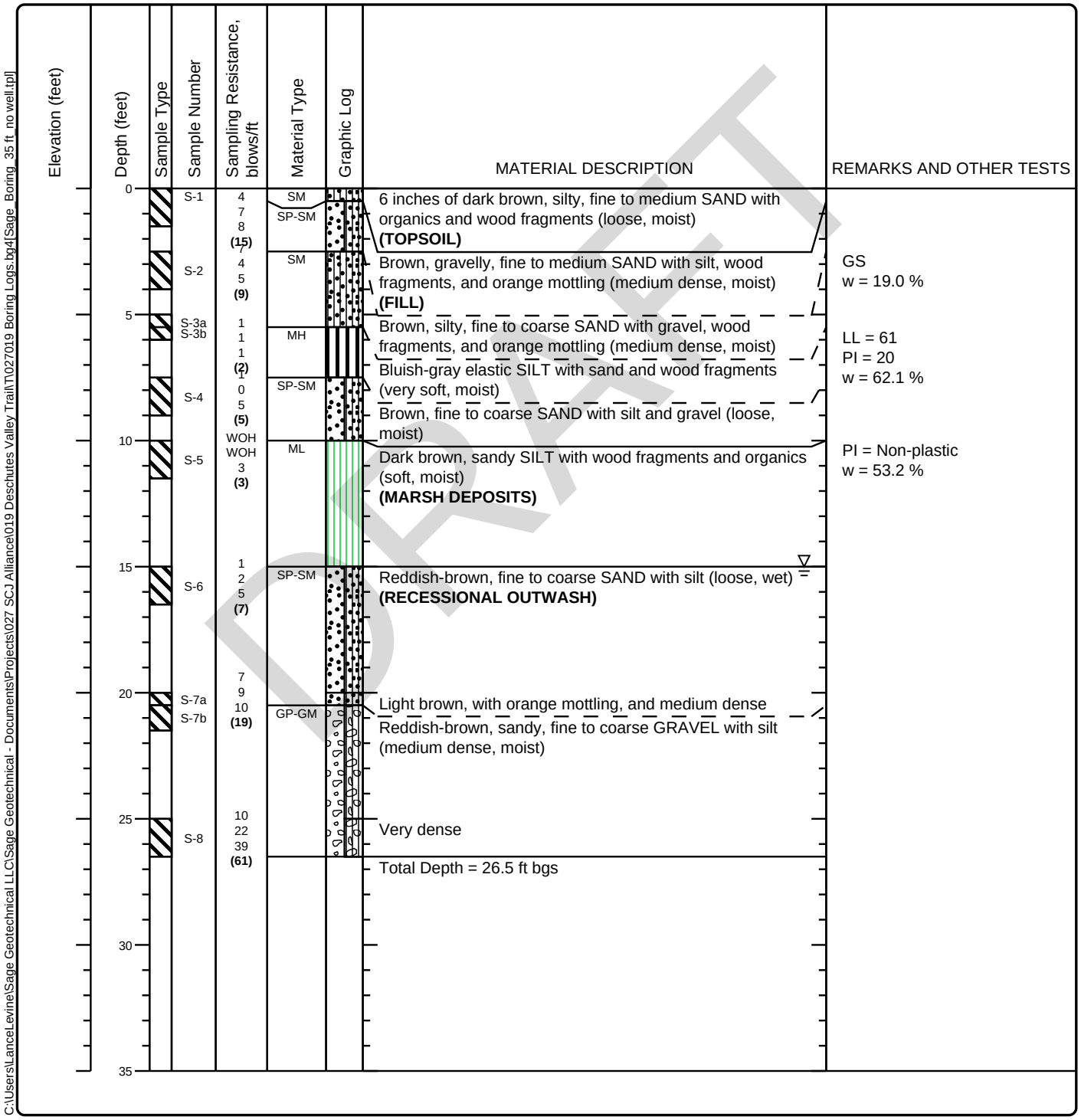
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Figure 2-9

Project: **Deschutes Valley Trail**
Project Location: **Tumwater, Washington**
Project Number: **027019**

Log of Boring SB-14
Sheet 1 of 1

Date(s) Drilled **11/21/2025**	Logged By **KAM**	Checked By **LGL**
Drilling Method **Hollow-Stem Auger**	Drill Bit Size/Type **8 inches**	Total Depth of Borehole **26.5 ft bgs**
Drill Rig Type **Diedrich D90 Turbo**	Drilling Contractor **Holocene Acquisition Company, LLC**	Approximate Surface Elevation **Not Measured**
Groundwater Level and Date Measured **15.0 ft bgs**	Sampling Method(s) **SPT**	Hammer Data **140 lb./30 in. Drop**
Borehole Backfill **Bentonite**	Location **47.000715, -122.901633**	



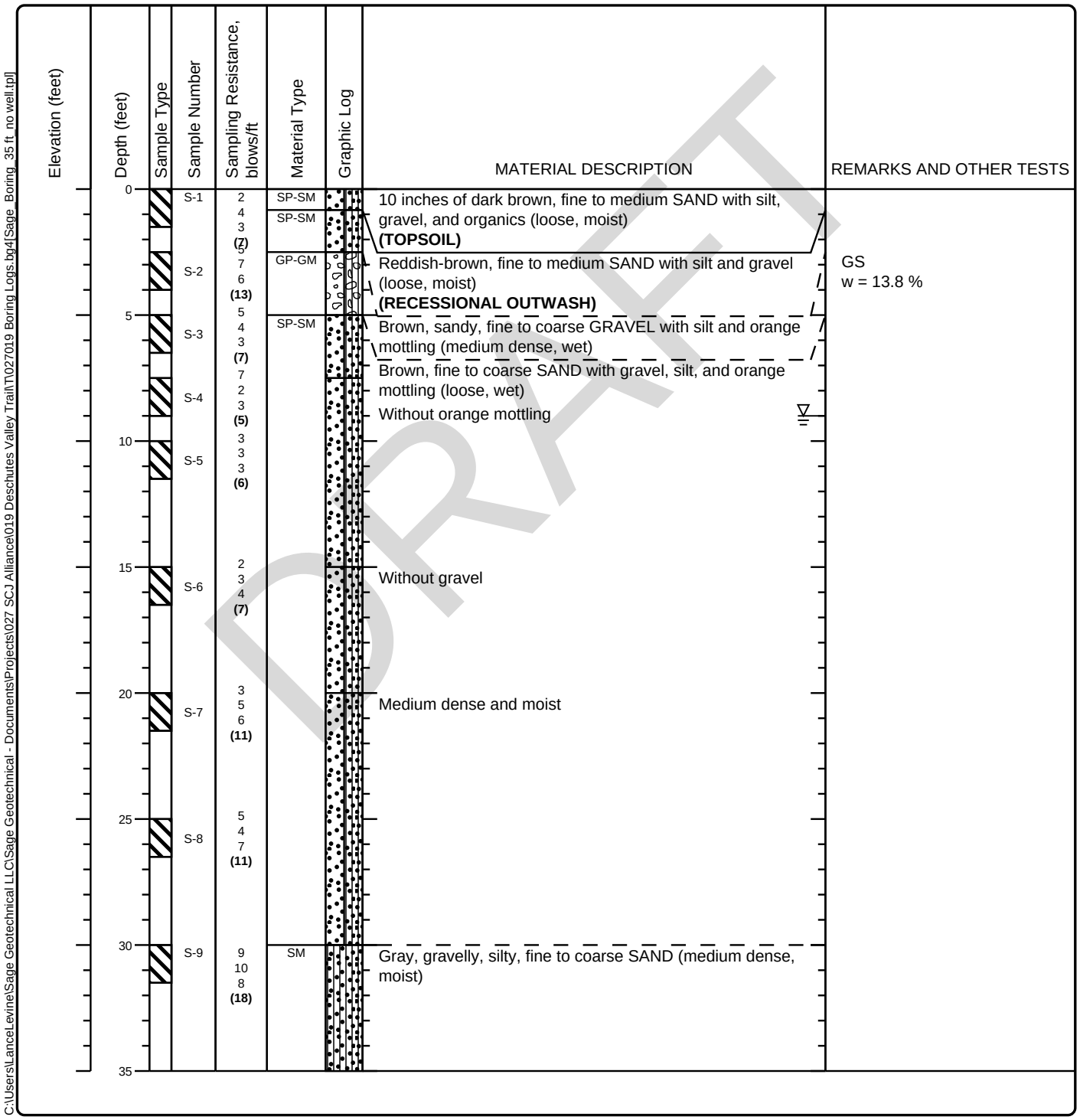
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Figure 2-10

Project: **Deschutes Valley Trail** Project Location: **Tumwater, Washington** Project Number: **027019**	Log of Boring SB-17 **Sheet 1 of 3**

Date(s) Drilled **11/17/2025**	Logged By **KAM**	Checked By **LGL**
Drilling Method **Mud Rotary**	Drill Bit Size/Type **7 inches**	Total Depth of Borehole **101.5 ft bgs**
Drill Rig Type **Diedrich D90 Turbo**	Drilling Contractor **Holocene Acquisition Company, LLC**	Approximate Surface Elevation **Not Measured**
Groundwater Level and Date Measured **9.0 ft bgs**	Sampling Method(s) **SPT**	Hammer Data **140 lb./30 in. Drop**
Borehole Backfill **Bentonite**	Location **47.004099, -122.903517**	



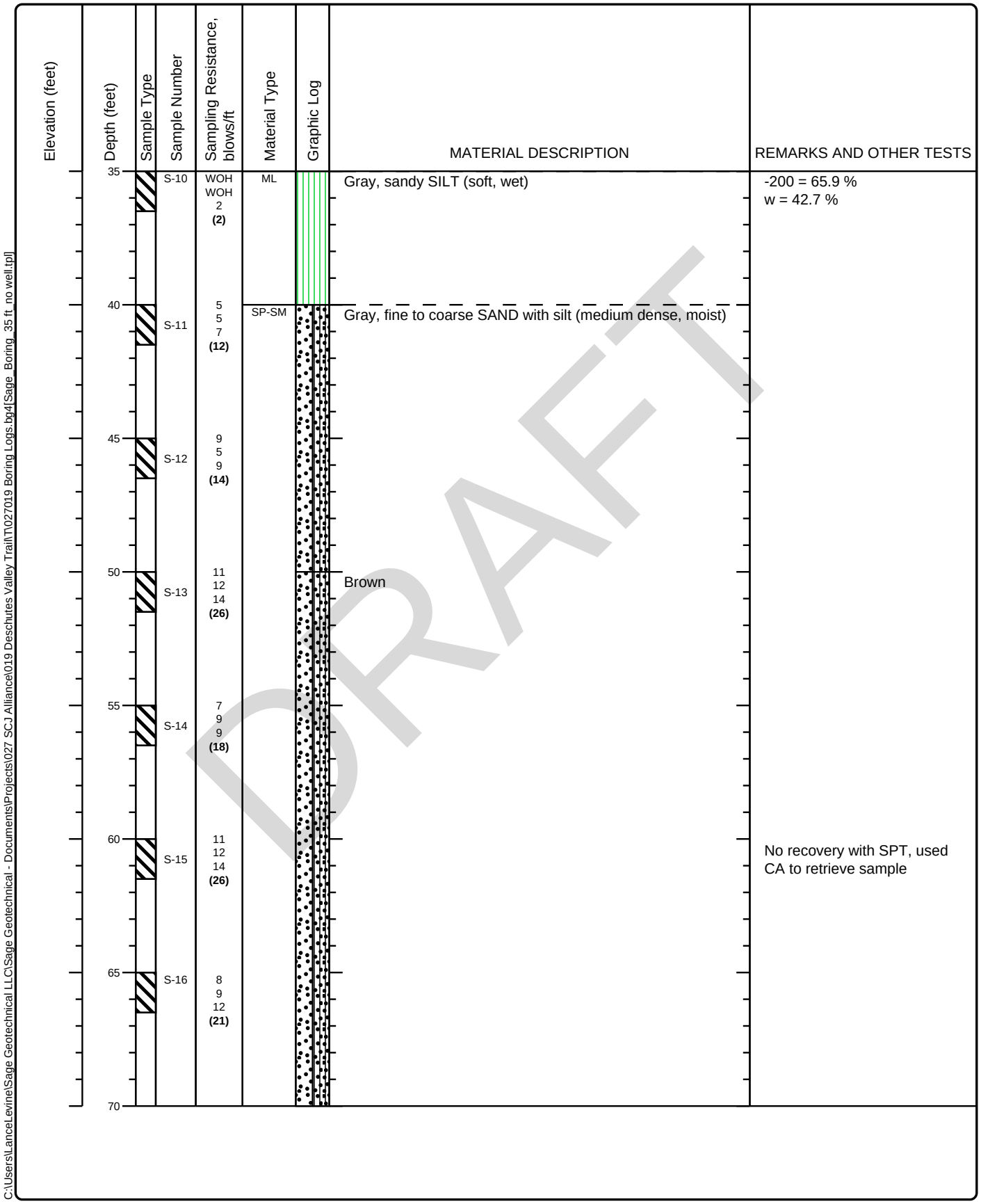
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Figure 2-11

Project: **Deschutes Valley Trail**
Project Location: **Tumwater, Washington**
Project Number: **027019**

Log of Boring SB-17
Sheet 2 of 3



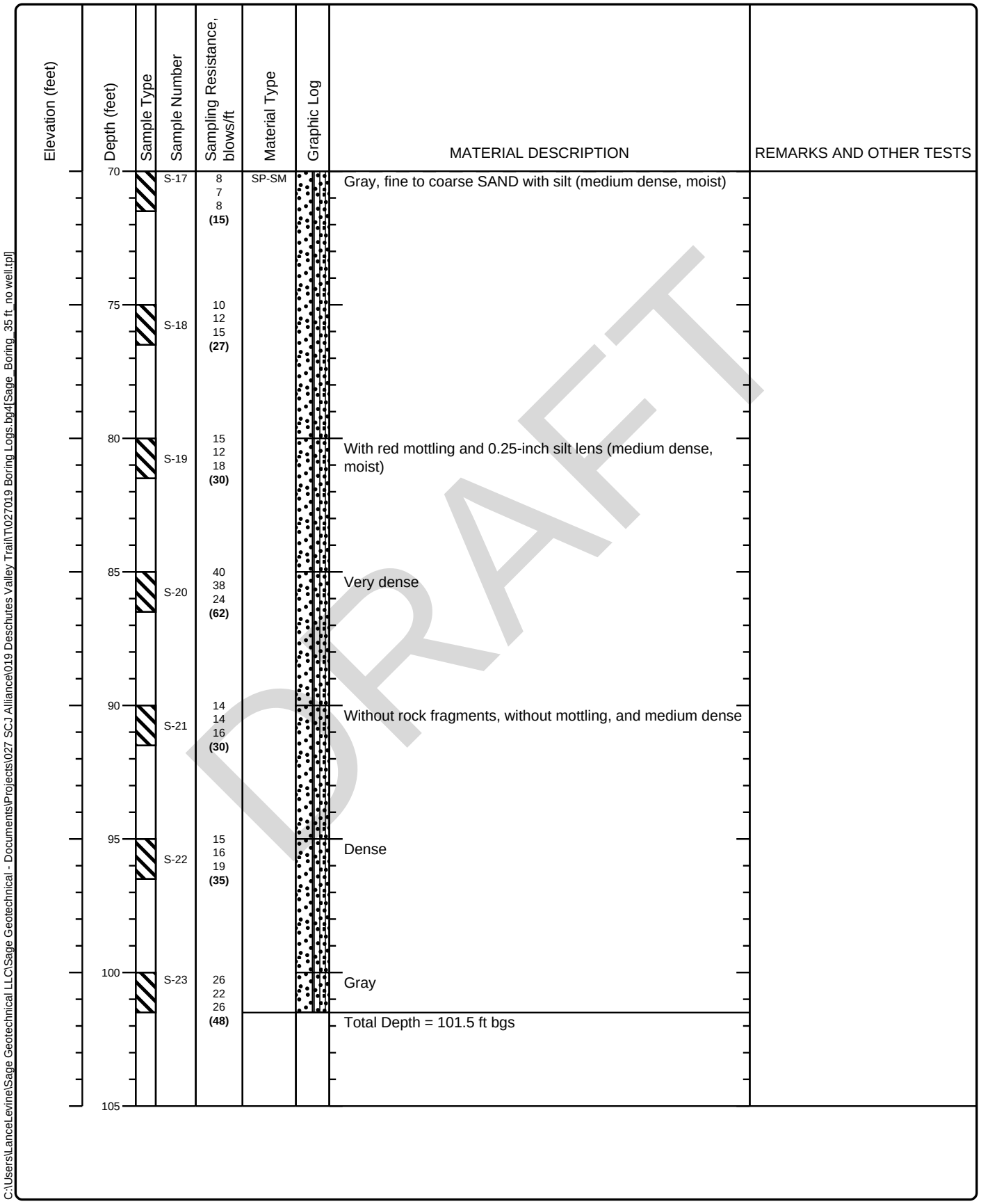
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Figure 2-11

Project: **Deschutes Valley Trail**
Project Location: **Tumwater, Washington**
Project Number: **027019**

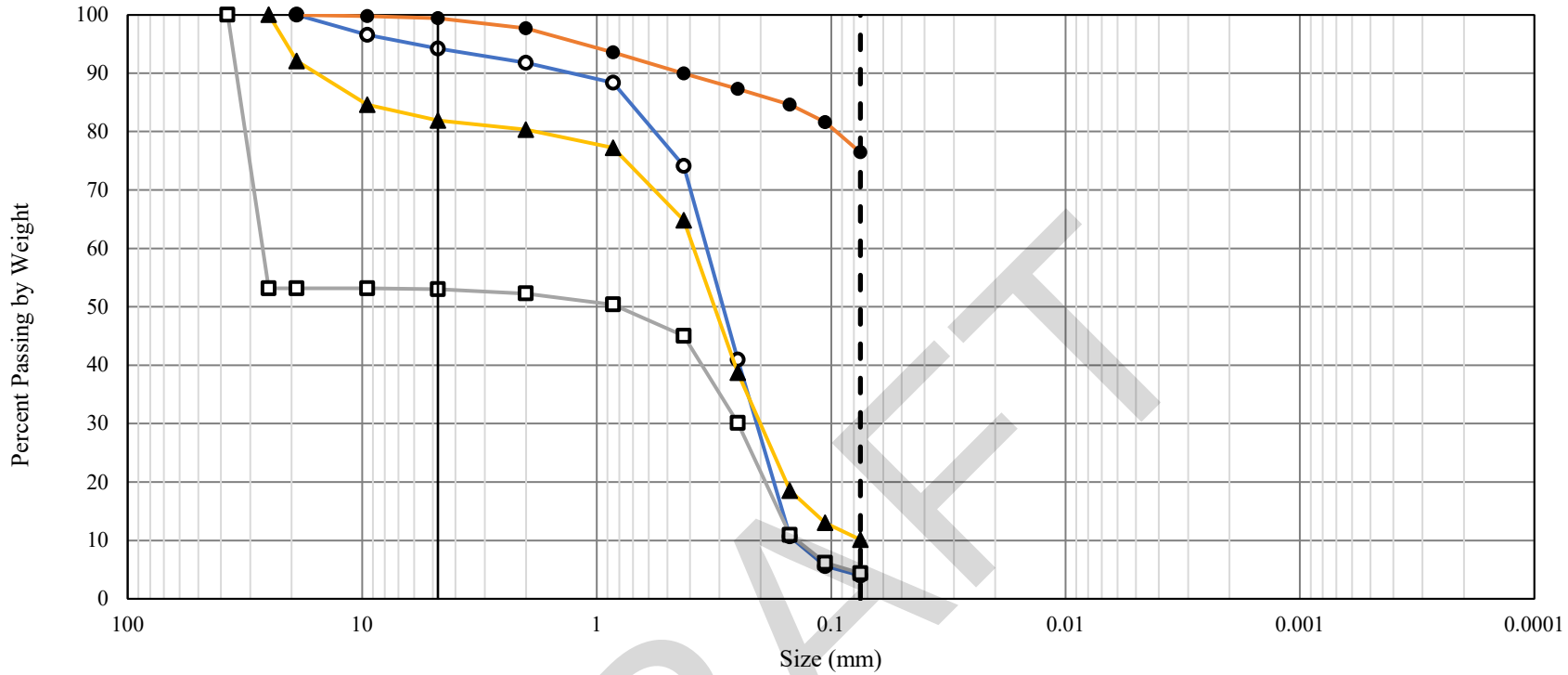
Log of Boring SB-17
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Figure 2-11



	Depth	w	D90	D60	D30	D10	Cu	Cc	% G	% S	% F	USCS
	(ft)	(%)	(mm)	(mm)	(mm)	(mm)	-	-	(%)	(%)	(%)	-
SB-06W S-2	2.5	8.5%	1.28	0.34	0.21	0.14	2.4	0.9	5.8	90.3	4.0	SP
SB-09 S-2	2.5	55.8%	0.43	-	-	-	-	-	0.6	23.0	76.4	ML
SB-10 S-2	2.5	5.4%	34.39	26.52	0.25	0.14	189.3	0.02	47.0	48.6	4.4	SP
SB-11 S-2	2.5	9.0%	15.69	0.39	0.20	-	-	-	18.1	71.8	10.1	SP-SM

DRAFT

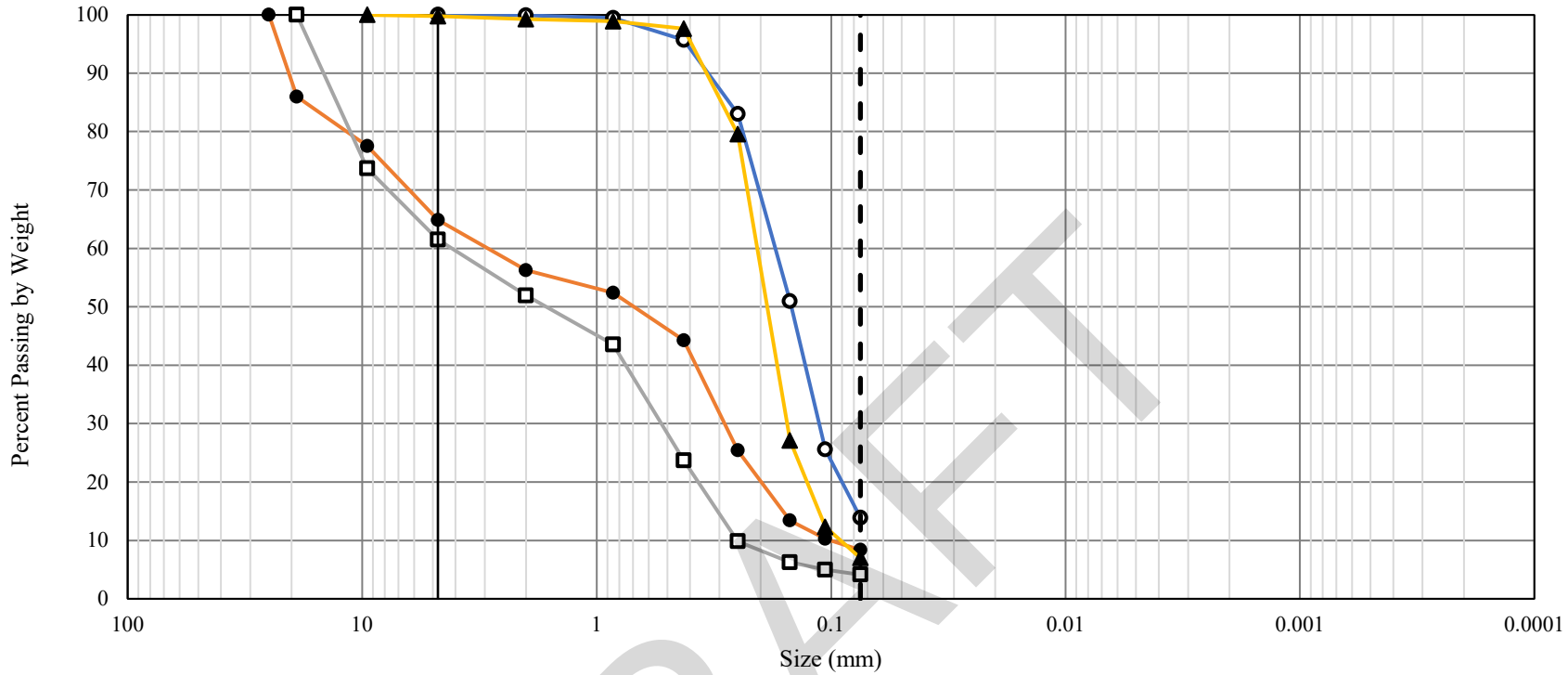
w = as-received moisture content
% G = percent gravel and larger
% S = percent sand
% F = percent fines
USCS = Unified Soil Classification System group symbol
To be well-graded: 1 < Cc < 3, Cu > 4 for GW, Cu > 6 for SW

SAGE GEOTECHNICAL

Grain Size Analysis Results
ASTM D422

Deschutes Valley Trail

Tumwater, Washington | Figure 2-12



	Depth	w	D90	D60	D30	D10	Cu	Cc	% G	% S	% F	USCS
	(ft)	(%)	(mm)	(mm)	(mm)	(mm)	-	-	(%)	(%)	(%)	-
SB-7 S-2	5.0	19.7%	0.33	0.17	0.11	-	-	-	0.0	86.1	13.9	SM
SB-7 S-4	10.0	4.4%	20.55	2.92	0.28	0.10	28.9	0.3	35.2	56.5	8.4	SP-SM
SB-7 S-5	15.0	2.0%	14.60	4.15	0.53	0.25	16.5	0.3	38.5	57.4	4.1	SP
SB-7 S-6	20.0	5.3%	0.34	0.21	0.15	0.09	2.3	1.3	0.3	92.7	7.0	SP-SM

DRAFT

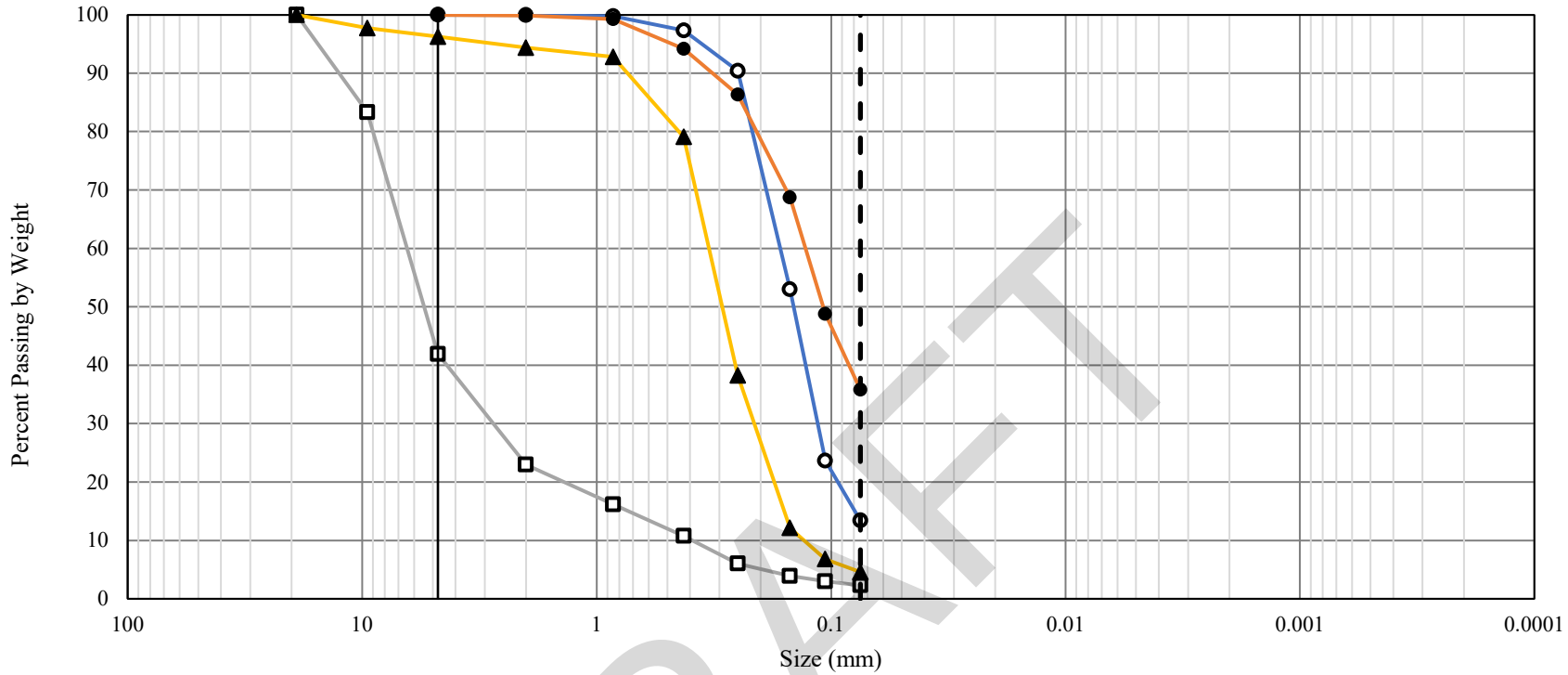
w = as-received moisture content
% G = percent gravel and larger
% S = percent sand
% F = percent fines
USCS = Unified Soil Classification System group symbol
To be well-graded: 1 < Cc < 3, Cu > 4 for GW, Cu > 6 for SW

SAGE GEOTECHNICAL

Grain Size Analysis Results
ASTM D422

Deschutes Valley Trail

Tumwater, Washington | Figure 2-13



	Depth	w	D90	D60	D30	D10	Cu	Cc	% G	% S	% F	USCS
	(ft)	(%)	(mm)	(mm)	(mm)	(mm)	-	-	(%)	(%)	(%)	-
SB-8 S-2	5.0	11.0%	0.25	0.17	0.11	-	-	-	0.0	86.6	13.4	SM
SB-8 S-4	10.0	26.7%	0.32	0.13	-	-	-	-	0.0	64.2	35.8	SM
SB-8 S-5	15.0	3.2%	12.53	6.43	2.76	0.39	16.5	3.03	58.1	39.6	2.3	GP
SB-8 S-6	20.0	5.6%	0.74	0.33	0.21	0.13	2.5	1.04	3.7	91.7	4.6	SP

DRAFT

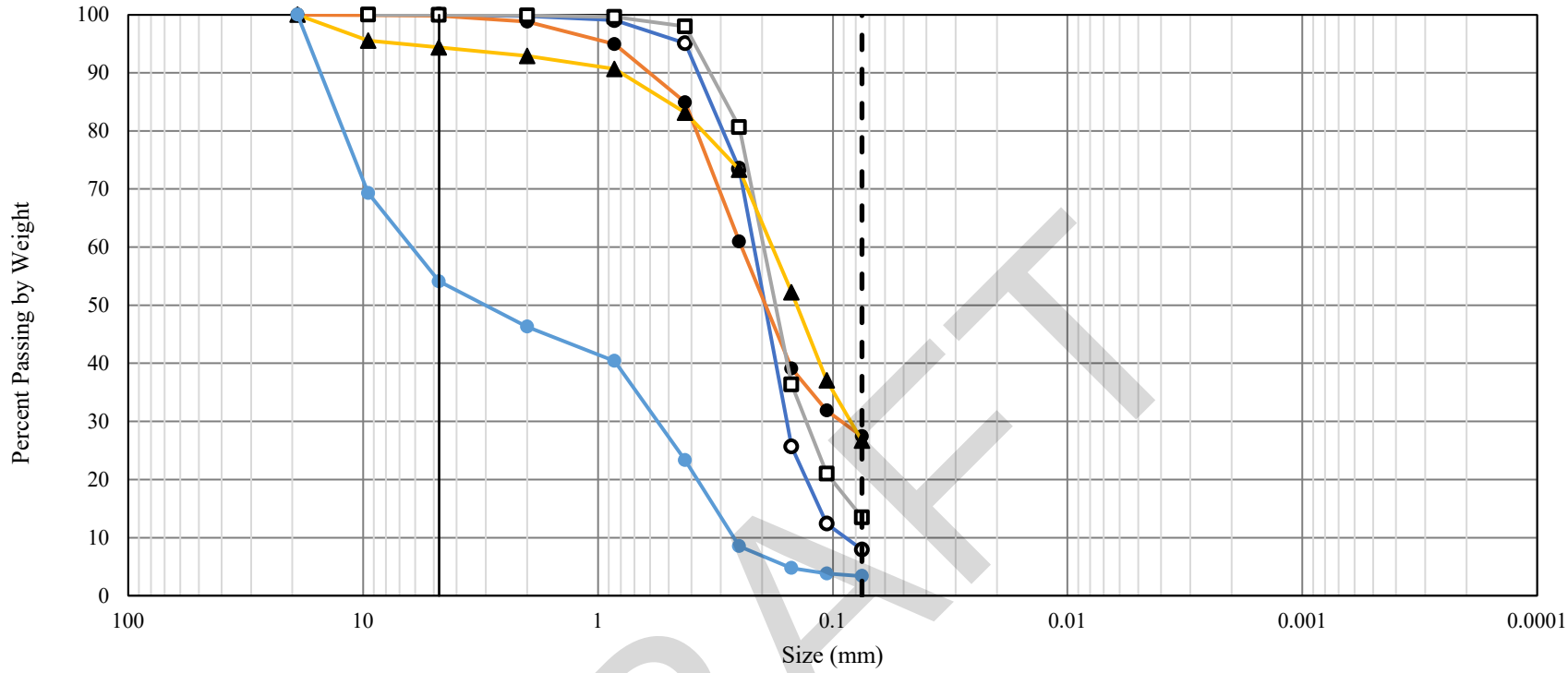
w = as-received moisture content
% G = percent gravel and larger
% S = percent sand
% F = percent fines
USCS = Unified Soil Classification System group symbol
To be well-graded: 1 < Cc < 3, Cu > 4 for GW, Cu > 6 for SW

SAGE GEOTECHNICAL

Grain Size Analysis Results
ASTM D422

Deschutes Valley Trail

Tumwater, Washington | Figure 2-14



DRAFT

	Depth	w	D90	D60	D30	D10	Cu	Cc	% G	% S	% F	USCS
	(ft)	(%)	(mm)	(mm)	(mm)	(mm)	-	-	(%)	(%)	(%)	-
SB-12 S-2a	2.5	25.4%	0.38	0.22	0.16	0.09	2.5	1.3	0.0	92.1	7.9	SP-SM
SB-12 S-2b	3.5	48.5%	0.60	0.24	0.09	-	-	-	0.2	72.4	27.4	SM
SB-13W S-2	2.5	25.0%	0.33	0.20	0.13	-	-	-	0.0	86.5	13.5	SM
SB-14 S-2	2.5	19.0%	0.80	0.18	0.08	-	-	-	5.6	67.7	26.67	SM
SB-17 S-2	2.5	13.8%	15.16	6.22	0.56	0.26	23.6	0.2	45.9	50.7	3.4	SP

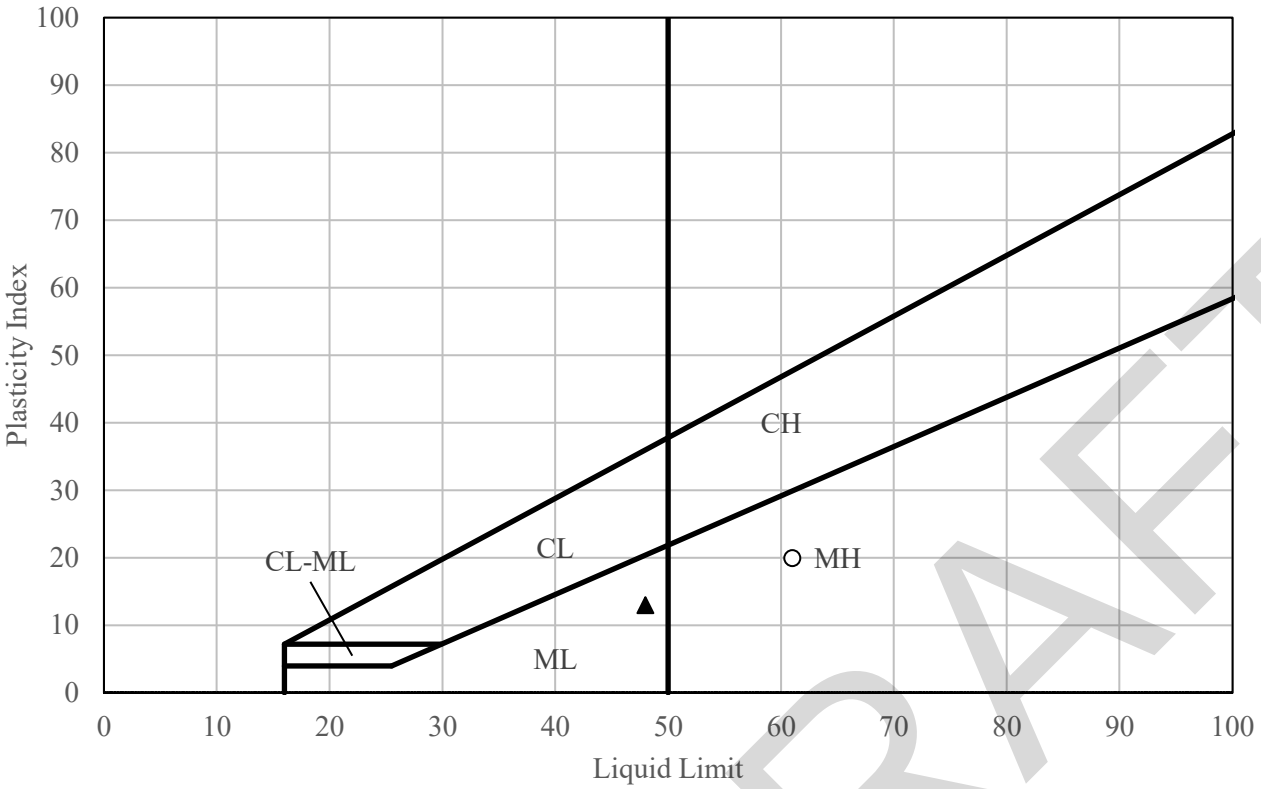
w = as-received moisture content
% G = percent gravel and larger
% S = percent sand
% F = percent fines
USCS = Unified Soil Classification System group symbol
To be well-graded: 1 < Cc < 3, Cu > 4 for GW, Cu > 6 for SW

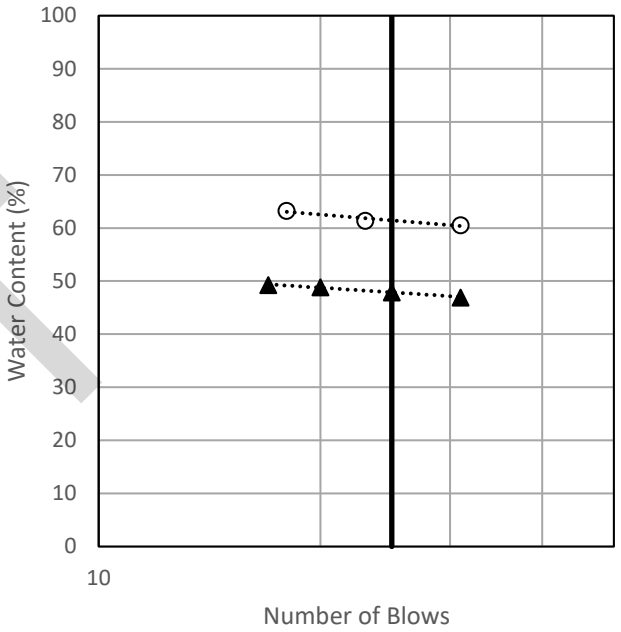
SAGE GEOTECHNICAL

Grain Size Analysis Results
ASTM D422

Deschutes Valley Trail

Tumwater, Washington | Figure 2-15





DRAFT

	Depth (ft)	w (%)	LL ( )	PL ( )	PI ( )
▲SB-09 S-2	2.5	55.8	48	35	13
○SB-14 S-3b	5.5	62.1	61	41	20

SAGE GEOTECHNICAL

w = as-received moisture content
LL = liquid limit
PL = plastic limit
PI = plasticity index

Atterberg Limits Results		
Deschutes Valley Trail		
Tumwater, Washington	Figure	2-16

ATTACHMENT 3

Historical Subsurface and Laboratory Data

Soil Classification System

MAJOR DIVISIONS			GRAPHIC SYMBOL	USCS LETTER SYMBOL[1]	TYPICAL DESCRIPTIONS [2][3]
COARSE-GRAINED SOIL (More than 50% of material is larger than No. 200 sieve size)	GRAVEL AND GRAVELLY SOIL (More than 50% of coarse fraction retained on No. 4 sieve)	CLEAN GRAVEL (Little or no fines)		GW	Well-graded gravel; gravel/sand mixture(s); little or no fines
				GP	Poorly graded gravel; gravel/sand mixture(s); little or no fines
		GRAVEL WITH FINES (Appreciable amount of fines)		GM	Silty gravel; gravel/sand/silt mixture(s)
				GC	Clayey gravel; gravel/sand/clay mixture(s)
	SAND AND SANDY SOIL (More than 50% of coarse fraction passed through No. 4 sieve)	CLEAN SAND (Little or no fines)		SW	Well-graded sand; gravelly sand; little or no fines
				SP	Poorly graded sand; gravelly sand; little or no fines
		SAND WITH FINES (Appreciable amount of fines)		SM	Silty sand; sand/silt mixture(s)
				SC	Clayey sand; sand/clay mixture(s)
FINE-GRAINED SOIL (More than 50% of material is smaller than No. 200 sieve size)	SILT AND CLAY (Liquid limit less than 50)			ML	Inorganic silt and very fine sand; rock flour; silty or clayey fine sand or clayey silt with slight plasticity
				CL	Inorganic clay of low to medium plasticity; gravelly clay; sandy clay; silty clay; lean clay
				OL	Organic silt; organic, silty clay of low plasticity
	SILT AND CLAY (Liquid limit greater than 50)			MH	Inorganic silt; micaceous or diatomaceous fine sand
				CH	Inorganic clay of high plasticity; fat clay
				OH	Organic clay of medium to high plasticity; organic silt
	HIGHLY ORGANIC SOIL			PT	Peat; humus; swamp soil with high organic content

OTHER MATERIALS	GRAPHIC SYMBOL	LETTER SYMBOL	TYPICAL DESCRIPTIONS
PAVEMENT		AC or PC	Asphalt concrete pavement or Portland cement pavement
ROCK		RK	Rock (See Rock Classification)
WOOD		WD	Wood, lumber, wood chips
DEBRIS		DB	Construction debris, garbage

Notes:
1. USCS letter symbols correspond to symbols used by the Unified Soil Classification System and ASTM classification methods. Dual letter symbols (e.g., SP-SM for sand or gravel) indicate soil with an estimated 5-15% fines. Multiple letter symbols (e.g., ML/CL) indicate borderline or multiple soil classifications.
2. Soil descriptions are based on the general approach presented in the Standard Practice for Description and Identification of Soils (Visual-Manual Procedure), outlined in ASTM D 2488. Where laboratory index testing has been conducted, soil classifications are based on the Standard Test Method for Classification of Soils for Engineering Purposes, as outlined in ASTM D 2487.
3. Soil description terminology is based on visual estimates (in the absence of laboratory test data) of the percentages of each soil type and is defined as follows:

Primary Constituent:	> 50% - "GRAVEL," "SAND," "SILT," "CLAY," etc.
Secondary Constituents:	> 30% and ≤ 50% - "very gravelly," "very sandy," "very silty," etc.
	> 15% and ≤ 30% - "gravelly," "sandy," "silty," etc.
Additional Constituents:	> 5% and ≤ 15% - "with gravel," "with sand," "with silt," etc.
	≤ 5% - "with trace gravel," "with trace sand," "with trace silt," etc., or not noted.

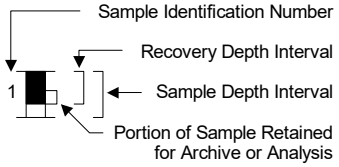
4. Soil density or consistency descriptions are based on judgement using a combination of sampler penetration blow counts, drilling or excavating conditions, field tests, and laboratory tests, as appropriate.

Drilling and Sampling Key

SAMPLER TYPE

Code	Description
a	3.25-inch O.D., 2.42-inch I.D. Split Spoon
b	2.00-inch O.D., 1.50-inch I.D. Split Spoon
c	Shelby Tube
d	Grab Sample
e	Single-Tube Core Barrel
f	Double-Tube Core Barrel
g	2.50-inch O.D., 2.00-inch I.D. WSDOT
h	3.00-inch O.D., 2.375-inch I.D. Mod. California
i	Other - See text if applicable
1	300-lb Hammer, 30-inch Drop
2	140-lb Hammer, 30-inch Drop
3	Pushed
4	Vibrocore (Rotosonic/Geoprobe)
5	Other - See text if applicable

SAMPLE NUMBER & INTERVAL



Field and Lab Test Data

Code	Description
PP = 1.0	Pocket Penetrometer, tsf
TV = 0.5	Torvane, tsf
PID = 100	Photoionization Detector VOC screening, ppm
W = 10	Moisture Content, %
D = 120	Dry Density, pcf
-200 = 60	Material smaller than No. 200 sieve, %
GS	Grain Size - See separate figure for data
AL	Atterberg Limits - See separate figure for data
GT	Other Geotechnical Testing
CA	Chemical Analysis

Groundwater

▽ Approximate water level at time of drilling (ATD)

▼ Approximate water level at time other than ATD

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Deschutes Valley Trail
Tumwater, Washington

Soil Classification System and Key

Figure A-1

B-1

LAI Project No: 1444001.010

SAMPLE DATA | **SOIL PROFILE**

Drilling Method: Hollow-Stem Auger
Ground Elevation (ft): 165
Drilled By: Holocene Drilling Inc.
Logged By: CAM Date: 08/06/12

Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol	Soil Description	Groundwater
0	165	S-1 4	b2					14" of Forest Duff **(TOPSOIL/SOD/DUFF)**	
							SP-SM	Brown, fine to medium SAND with silt (medium dense, moist) **(RECESSIONAL OUTWASH)**	
5	160	S-2	b2	12	-200 = 11 W = 8				
10	155	S-3	b2	16	-200 = 13 W = 9			-grades to gray	
15	150	S-4	b2	14	GS -200 = 12 W = 9				
							SP	Gray, very gravelly SAND (very dense, moist)	
20	145	S-5	b2	60	GS -200 = 4 W = 5			-density over stated due to rock in sampler tip	
25	140	S-6	b2	28				-grades to medium dense	
30	135	S-7	b2	24	W = 6			-gravel content decreases	
							SP-SM	Gray, gravelly SAND with silt (dense, moist)	
35	130								

Moisture Content (%) — Plastic Limit — Liquid Limit
10 20 30 40
▲ SPT N-Value ▲
△ Non-Standard N-Value △
10 20 30 40
× Fines Content (%) ×
10 20 30 40

60

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

1444001.01 7/8/14 Y:\1444\001.010\T\1444001.010.GPJ SOIL BORING LOG WITH GRAPH

LANDAU ASSOCIATES

Deschutes Valley Trail
Tumwater, Washington

Log of Boring B-1

Figure
A-2
(1 of 2)

B-1

LAI Project No: 1444001.010

SAMPLE DATA | **SOIL PROFILE**

Drilling Method: Hollow-Stem Auger
Ground Elevation (ft): 165
Drilled By: Holocene Drilling Inc.
Logged By: CAM Date: 08/06/12

Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol	Soil Description	Groundwater
35	130	S-8 3	b2		-200 = 12 W = 9		SP-SM	Gray, gravelly SAND with silt (dense, moist)	
							GP-GM	Gray, sandy GRAVEL with silt (dense, moist)	
40	125	S-9	b2	47					
45	120	S-10	b2	42				-grades to include fine to medium sand seams	
							SM	Brown, silty SAND (medium dense, moist)	
50	115	S-11	b2	27	-200 = 23 W = 13				
55	110	S-12	b2	32				-grades to dense, includes iron-stained lenses	▽ 59.2 ft ATD
60	105	S-13	b2	45	W = 28			-grades to wet	
65									
70									

Moisture Content (%) — Plastic Limit — Liquid Limit
10 20 30 40

▲ SPT N-Value ▲
△ Non-Standard N-Value △
10 20 30 40

× Fines Content (%) ×
10 20 30 40

Boring Completed 08/06/12
Total Depth of Boring = 61.5 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

1444001.01 7/8/14 Y:\1444\001.010\T\1444001.010.GPJ SOIL BORING LOG WITH GRAPH

LANDAU ASSOCIATES

Deschutes Valley Trail
Tumwater, Washington

Log of Boring B-1

Figure
A-2
(2 of 2)

B-2

LAI Project No: 1444001.010

Drilling Method: Hollow-Stem Auger
Ground Elevation (ft): 170
Drilled By: Holocene Drilling Inc.
Logged By: CAM Date: 08/06/12

Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol	Soil Profile	Groundwater
0	170	S-1 4	b2				SM	11" of Forest Duff **(TOPSOIL/SOD/DUFF)**	Groundwater Not Encountered
								Brown, silty, fine to medium SAND (medium dense, moist) **(RECESSIONAL OUTWASH)**	
5	165	S-2	b2	10					
10	160	S-3	b2	18	GS -200 = 13 W = 9			-grades to gray, includes silty sand seams	
15	155	S-4	b2	48				-grades to dense, includes trace gravel	
20	150	S-5	b2	16			GP-GM	Gray, sandy GRAVEL with silt (medium dense, moist)	
25	145	S-6	b2	32				-grades to dense	
30									
35									

Moisture Content (%)
Plastic Limit — Liquid Limit
10 20 30 40

▲ SPT N-Value ▲
△ Non-Standard N-Value △
10 20 30 40

× Fines Content (%) ×
10 20 30 40

Boring Completed 08/06/12
Total Depth of Boring = 26.5 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

1444001.01 7/8/14 Y:\1444\001.010\T\1444001.010.GPJ SOIL BORING LOG WITH GRAPH

LANDAU ASSOCIATES

Deschutes Valley Trail
Tumwater, Washington

Log of Boring B-2

Figure A-3

B-3

LAI Project No: 1444001.010

SAMPLE DATA | **SOIL PROFILE**

Drilling Method: Mud Rotary
Ground Elevation (ft): 102
Drilled By: Holocene Drilling Inc.
Logged By: CAM Date: 08/06/12

Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol	Soil Description
0		S-1 3	b2				SM	5" of Topsoil/Sod **(TOPSOIL/SOD/DUFF)**
	100							Dark brown, silty SAND with organics (loose, moist) **(FILL)**
		S-2	b2	3	W = 44		MH/ PT	Dark brown SILT with sand and peat (soft, wet) **(MARSH DEPOSITS)**
5		S-3	b2	3	W = 65			
	95						GM	Gray, silty, sandy GRAVEL (dense, wet) **(RECESSIONAL OUTWASH)**
		S-4	b2	36				
10								
	90							
		S-5	b2	19	-200 = 21 W = 15			-grades to medium dense
15								
	85						SM	Gray, silty SAND (loose, wet)
		S-6	b2	8				
20								
25								
30								
35								

Groundwater: ▽ 3.1 ft ATD

Moisture Content (%) — Plastic Limit — Liquid Limit
10 20 30 40

▲ SPT N-Value ▲
△ Non-Standard N-Value △
10 20 30 40

× Fines Content (%) ×
10 20 30 40

Boring Completed 08/06/12
Total Depth of Boring = 19.0 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

1444001.01 7/8/14 Y:\1444\001.010\T\1444001.010.GPJ SOIL BORING LOG WITH GRAPH

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Deschutes Valley Trail
Tumwater, Washington

Log of Boring B-3

Figure A-4

B-4

LAI Project No: 1444001.010

Drilling Method: Mud Rotary
Ground Elevation (ft): 95
Drilled By: Holocene Drilling Inc.
Logged By: CAM Date: 08/06/12

Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol	Soil Description
0	95	S-1	b2			PT / GP		3" of Topsoil/Sod **(TOPSOIL/SOD/DUFF)**
								Brown, sandy GRAVEL (loose, moist) **(FILL)**
		S-2	b2	10				-grades to medium dense
5	90	S-3	b2	11	-200 = 7 W = 22		SP-SM	Gray, fine to medium SAND with silt and gravel (medium dense, moist) **(RECESSIONAL OUTWASH)**
		S-4	b2	12	-200 = 7 W = 27			-grades to wet
10	85	S-5	b2	8	-200 = 10 W = 33			-grades to loose
15	80	S-6	b2	13				-grades to medium dense
20	75	S-7	b2	20	-200 = 8 W = 28			-grades to trace gravel (medium dense, moist)
								-grades to gray-brown
25	70	S-8	b2	19				
30	65	S-9	b2	6	-200 = 94 W = 39		ML	Gray SILT with sand (medium stiff, moist to wet)
35	60							

Groundwater: ▽ 6.3 ft ATD

Moisture Content (%) — Plastic Limit — Liquid Limit
10 20 30 40

▲ SPT N-Value ▲
△ Non-Standard N-Value △
10 20 30 40

× Fines Content (%) ×
10 20 30 40

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

1444001.01 7/8/14 Y:\1444\001.010\T\1444001.010.GPJ SOIL BORING LOG WITH GRAPH

LANDAU ASSOCIATES

Deschutes Valley Trail
Tumwater, Washington

Log of Boring B-4

Figure
A-5
(1 of 2)

B-4

LAI Project No: 1444001.010

SAMPLE DATA | **SOIL PROFILE** | Groundwater | Moisture Content (%) Plastic Limit – Liquid Limit

Drilling Method: Mud Rotary
Ground Elevation (ft): 95
Drilled By: Holocene Drilling Inc.
Logged By: CAM Date: 08/06/12

Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol	Soil Description
35	60						ML	Gray SILT with sand (medium stiff, moist to wet)
		S-10	b2					-grades to stiff
40	55						SM	Dark gray, very silty SAND (medium dense, wet)
		S-11	b2	20	-200 = 40 W = 30			
45	50							
		S-12	b2	35				-grades to dense
50	45							
		S-13	b2	27				-grades to gray-brown, medium dense
55	40							
		S-14	b2	31				-grades to dense
60								
65								
70								

▲ SPT N-Value ▲
△ Non-Standard N-Value △
× Fines Content (%) ×
10 20 30 40

Boring Completed 08/06/12
Total Depth of Boring = 59.0 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

1444001.01 7/8/14 Y:\1444\001.010\T\1444001.010.GPJ SOIL BORING LOG WITH GRAPH

LANDAU ASSOCIATES

Deschutes Valley Trail
Tumwater, Washington

Log of Boring B-4

Figure
A-5
(2 of 2)

HA-01

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol	Excavation Method: Hand Auger Ground Elevation (ft): 98 Excavated By: Bay Townes Geotechnical Logged By: CAM	
0	98			SP-		SM	3" of Topsoil/Sod **(TOPSOIL/SOD/DUFF)** Brown-gray, fine to medium SAND with silt (medium dense, moist) **(FILL)**	Groundwater not encountered.
				-200 = 9 W = 5				
2	96							
				Hand Auger Boring Completed 07/30/12 Total Depth of Hand Auger Boring = 2.8 ft.				
4								
6								

HA-02

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol	Excavation Method: Hand Auger Ground Elevation (ft): 96 Excavated By: Bay Townes Geotechnical Logged By: CAM	
0	96						7" of Topsoil/Sod **(TOPSOIL/SOD/DUFF)**	Groundwater not encountered.
				-200 = 9 W = 4		SP-SM	Brown-gray, fine to medium SAND with silt (medium dense, moist) **(FILL)**	
2	94			W = 22		SM	Dark brown, silty SAND with organics (loose, moist) **(MARSH DEPOSITS)**	
				Hand Auger Boring Completed 07/30/12 Total Depth of Hand Auger Boring = 3.1 ft.			-grades to bright gray	
4								
6								

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

1444001.01 7/8/14 Y:\1444\001.010\T\1444001.010.GPJ TEST PIT LOG W/ ELEVATION

LANDAU ASSOCIATES

Deschutes Valley Trail
Tumwater, Washington

Log of Hand Auger Borings

Figure A-9

HA-03

SAMPLE DATA					SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol	Excavation Method: Hand Auger Ground Elevation (ft): 98 Excavated By: Bay Townes Geotechnical Logged By: CAM	
0	98			AC		GW	2" of Asphalt concrete pavement	
				W = 4		SM	Crushed surfacing base course (dense, moist) **(FILL)**	
2	96			GS -200 = 25 W = 20		SM	Filter fabric layer under CSBC Dark brown, very silty SAND with trace organics (loose, moist) **(MARSH DEPOSITS)**	
4	94			W = 19		SM	Bright gray, silty SAND with trace organics (loose, moist) Dark gray, fine to medium SAND with silt (loose, wet)	▽ Groundwater seepage encountered at 4.1 ft.
6								

Hand Auger Boring Completed 07/30/12
Total Depth of Hand Auger Boring = 4.5 ft.

HA-04

SAMPLE DATA					SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol	Excavation Method: Hand Auger Ground Elevation (ft): 109 Excavated By: Bay Townes Geotechnical Logged By: CAM	
0						SP-SM	3" of Topsoil/Sod **(TOPSOIL/SOD/DUFF)**	Groundwater not encountered.
	108						Brown-gray, fine to medium sand with silt (medium dense, moist) **(RECESSIONAL OUTWASH)**	
2	106						-grades to gray, includes gravel	
4								
6								

Hand Auger Boring Completed 07/30/12
Total Depth of Hand Auger Boring = 3.4 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

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Deschutes Valley Trail
Tumwater, Washington

Log of Hand Auger Borings

Figure
A-10

HA-05

SAMPLE DATA					SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol	Excavation Method: Hand Auger Ground Elevation (ft): 109 Excavated By: Bay Townes Geotechnical Logged By: CAM	
0	108			GW		SP-SM	2" of Topsoil/Sod **(TOPSOIL/SOD/DUFF)** Crushed surfacing base course (dense, moist) **(FILL)**	Groundwater not encountered.
2							Gray, fine to coarse SAND with silt and gravel (medium dense, moist) **(RECESSIONAL OUTWASH)**	
4								
6								

Hand Auger Boring Completed 07/31/12
Total Depth of Hand Auger Boring = 2.1 ft.

HA-06

SAMPLE DATA					SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol	Excavation Method: Hand Auger Ground Elevation (ft): 115 Excavated By: Bay Townes Geotechnical Logged By: CAM	
0	114			W = 39		SM	Brown, silty SAND with trace organics (loose, moist) **(MARSH DEPOSITS)**	▽ Groundwater seepage encountered at 1.3 ft.
2	112			-200 = 31 W = 30		SM	Gray, very silty, fine to medium SAND (loose, wet) **(RECESSIONAL OUTWASH)**	
4								
6								

Hand Auger Boring Completed 07/31/12
Total Depth of Hand Auger Boring = 3.1 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

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Deschutes Valley Trail
Tumwater, Washington

Log of Hand Auger Borings

Figure A-11

HA-07

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol	Excavation Method: Hand Auger Ground Elevation (ft): 110 Excavated By: Bay Townes Geotechnical Logged By: CAM	
0	110						14" of Forest Duff **(TOPSOIL/SOD/DUFF)**	
				SP-		SM	Gray, fine to medium SAND with silt (medium dense, moist to wet) **(RECESSIONAL OUTWASH)**	▽ Groundwater seepage encountered at 1.9 ft.
2	108							
							Hand Auger Boring Completed 07/31/12 Total Depth of Hand Auger Boring = 2.4 ft.	
4								
6								

HA-08

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol	Excavation Method: Hand Auger Ground Elevation (ft): 109 Excavated By: Bay Townes Geotechnical Logged By: CAM	
0							16" of Forest Duff **(TOPSOIL/SOD/DUFF)**	
	108							
						SP-SM	Gray, fine to medium SAND with silt (medium dense, moist to wet) **(RECESSIONAL OUTWASH)**	▽ Groundwater seepage encountered at 2.1 ft.
2								
							Hand Auger Boring Completed 07/31/12 Total Depth of Hand Auger Boring = 2.6 ft.	
4								
6								

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

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Deschutes Valley Trail
Tumwater, Washington

Log of Hand Auger Borings

Figure
A-12

HA-09

SAMPLE DATA					SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol	Excavation Method: Hand Auger Ground Elevation (ft): 116 Excavated By: Bay Townes Geotechnical Logged By: CAM	
0	116						6" of Topsoil/Sod **(TOPSOIL/SOD/DUFF)**	
				SM			Gray, silty SAND (medium dense, moist) **(FILL)**	▽ Groundwater seepage encountered at 1.5 ft.
2	114			-200 = 22 W = 22		SM	Gray, silty, fine to medium SAND (medium dense, wet) **(RECESSIONAL OUTWASH)**	
4							Hand Auger Boring Completed 07/31/12 Total Depth of Hand Auger Boring = 3.6 ft.	
6								

HA-10

SAMPLE DATA					SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol	Excavation Method: Hand Auger Ground Elevation (ft): 108 Excavated By: Bay Townes Geotechnical Logged By: CAM	
0	108					AC	2" of Asphalt concrete pavement	
						GW		
						SP-SM	Crushed surfacing base course, includes small uncrushed cobble (dense, moist) **(FILL)**	
2	106			-200 = 7 W = 9			Filter fabric layer under CSBC Brown, fine to medium SAND with silt (medium dense, moist to wet)	▽ Groundwater seepage encountered at 3.4 ft.
4	104			W = 45		MH/PT	Bright gray SILT with sand and peat lenses (soft, wet) **(MARSH DEPOSITS)**	
						SP-SM	Dark gray, fine to medium SAND with silt (loose, wet) **(RECESSIONAL OUTWASH)**	
6							Hand Auger Boring Completed 08/07/12 Total Depth of Hand Auger Boring = 5.5 ft.	

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

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Deschutes Valley Trail
Tumwater, Washington

Log of Hand Auger Borings

Figure
A-13

HA-11

SAMPLE DATA					SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol	Excavation Method: Hand Auger Ground Elevation (ft): 115 Excavated By: Bay Townes Geotechnical Logged By: CAM	
0							2" of Topsoil/Sod **(TOPSOIL/SOD/DUFF)**	
	114			SP- -200 = 10 W = 7		SM	Orange-brown, fine to coarse SAND with silt, gravel and cobble (medium dense, moist) **(RECESSIONAL OUTWASH)**	Groundwater not encountered.
2								
							Hand Auger Boring Completed 08/07/12 Total Depth of Hand Auger Boring = 2.8 ft.	
4								
6								

HA-12

SAMPLE DATA					SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol	Excavation Method: Hand Auger Ground Elevation (ft): 106 Excavated By: Bay Townes Geotechnical Logged By: CAM	
0	106					AC	2" of Asphalt concrete pavement	
						GW	Crushed surfacing base course, includes round cobble (dense, moist) **(FILL)**	Groundwater not encountered.
				-200 = 8 W = 6		SP-SM		
2	104						Orange-brown, fine to coarse SAND with silt, gravel and cobble (medium dense, moist) **(RECESSIONAL OUTWASH)**	
							Hand Auger Boring Completed 08/07/12 Total Depth of Hand Auger Boring = 2.7 ft.	
4								
6								

Notes:
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3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

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Deschutes Valley Trail
Tumwater, Washington

Log of Hand Auger Borings

Figure A-14

HA-13

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol	Excavation Method: Hand Auger Ground Elevation (ft): 174 Excavated By: Bay Townes Geotechnical Logged By: CAM	
0	174						10" of Forest Duff **(TOPSOIL/SOD/DUFF)**	Groundwater not encountered.
				SP- -200 = 8 W = 6		SM	Brown, fine SAND with silt and trace gravel (loose, moist) **(RECESSIONAL OUTWASH)**	
2	172							
4								
6								

Hand Auger Boring Completed 08/20/12
Total Depth of Hand Auger Boring = 3.1 ft.

HA-14

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol	Excavation Method: Hand Auger Ground Elevation (ft): 174 Excavated By: Bay Townes Geotechnical Logged By: CAM	
0	174						11" of Forest duff **(TOPSOIL/SOD/DUFF)**	Groundwater not encountered.
						SP- SM	Brown, fine SAND with silt and trace gravel (loose, moist) **(RECESSIONAL OUTWASH)**	
				-200 = 8 W = 8				
2	172							
4	170							
6								

Hand Auger Boring Completed 08/20/12
Total Depth of Hand Auger Boring = 4.0 ft.

Notes:
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2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

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Deschutes Valley Trail
Tumwater, Washington

Log of Hand Auger Borings

Figure
A-15

HA-15

SAMPLE DATA					SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol	Excavation Method: Hand Auger Ground Elevation (ft): 173 Excavated By: Bay Townes Geotechnical Logged By: CAM	
0							10" of Forest Duff **(TOPSOIL/SOD/DUFF)**	Groundwater not encountered.
	172			SP-		SM	Brown, fine SAND with silt and trace gravel (loose, moist) **(RECESSIONAL OUTWASH)**	
2				-200 = 8 W = 8				
	170							
4								
6								

Hand Auger Boring Completed 08/20/12
Total Depth of Hand Auger Boring = 4.2 ft.

HA-16

SAMPLE DATA					SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol	Excavation Method: Hand Auger Ground Elevation (ft): 98 Excavated By: Bay Townes Geotechnical Logged By: CAM	
0	98						3" of Topsoil/Sod **(TOPSOIL/SOD/DUFF)**	Groundwater not encountered.
						SP-SM	Brown, fine SAND with silt (loose, moist) **(FILL)**	
2	96							
				-200 = 17 W = 17		SM	Brown-gray, silty SAND (medium dense, moist) **(RECESSIONAL OUTWASH)**	
4	94							
6								

Hand Auger Boring Completed 08/20/12
Total Depth of Hand Auger Boring = 4.9 ft.

Notes:
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3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

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Deschutes Valley Trail
Tumwater, Washington

Log of Hand Auger Borings

Figure
A-16

HA-17

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol	Excavation Method: Hand Auger Ground Elevation (ft): 99 Excavated By: Bay Townes Geotechnical Logged By: CAM	
0	98			SP-		SM	4" of Topsoil/Sod **(TOPSOIL/SOD/DUFF)** Brown, fine to medium SAND with silt (loose, moist) **(FILL)**	Groundwater not encountered.
2	96			-200 = 19 W = 20		SM	Gray, silty SAND (medium dense, moist) **(ALLUVIUM)**	
4	94							
6								

Hand Auger Boring Completed 08/20/12
Total Depth of Hand Auger Boring = 5.1 ft.

HA-18

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol	Excavation Method: Hand Auger Ground Elevation (ft): 98 Excavated By: Bay Townes Geotechnical Logged By: CAM	
0	98					SP-SM	4" of Topsoil/Sod **(TOPSOIL/SOD/DUFF)**	▽ Groundwater seepage encountered at 1.1 ft.
2	96			W = 72		MH/PT	Brown, fine to medium SAND with silt and trace gravel (medium dense, moist) **(FILL)** Dark brown PEAT with silt seams (soft, wet) **(MARSH DEPOSITS)**	
4	94					SM	Bright gray, silty fine SAND with peat seams (very loose, wet)	
6								

Hand Auger Boring Completed 08/20/12
Total Depth of Hand Auger Boring = 5.2 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

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Deschutes Valley Trail
Tumwater, Washington

Log of Hand Auger Borings

Figure A-17

HA-19

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol	Excavation Method: Hand Auger Ground Elevation (ft): 109 Excavated By: Bay Townes Geotechnical Logged By: CAM	
0							11" of Forest Duff **(TOPSOIL/SOD/DUFF)**	
	108			SP- GS -200 = 8 W = 21		SM	Brown, fine to medium SAND with silt and trace gravel (medium dense, moist) **(RECESSIONAL OUTWASH)**	
2								
	106					SM	Orange-brown and gray, silty SAND with trace gravel (medium dense, wet)	▽ Groundwater seepage encountered at 3.1 ft.
4								
	104							

Hand Auger Boring Completed 08/20/12
Total Depth of Hand Auger Boring = 5.1 ft.

6

HA-20

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol	Excavation Method: Hand Auger Ground Elevation (ft): 115 Excavated By: Bay Townes Geotechnical Logged By: CAM	
0							3" of Topsoil **(TOPSOIL/SOD/DUFF)**	
	114			GS -200 = 11 W = 15		SP- SM	Brown, fine to medium SAND with silt (medium dense, moist) **(FILL)**	
2								
	112					SM	Gray-black, silty SAND with trace organics (loose, moist to wet) **(MARSH DEPOSITS)**	
4				W = 21				▽ Groundwater seepage encountered at 4.2 ft.
	110							

Hand Auger Boring Completed 08/20/12
Total Depth of Hand Auger Boring = 5.0 ft.

6

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

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Deschutes Valley Trail
Tumwater, Washington

Log of Hand Auger Borings

Figure
A-18

HA-21

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol	Excavation Method: Hand Auger Ground Elevation (ft): 115 Excavated By: Bay Townes Geotechnical Logged By: CAM	
0	115			SM			3" of Topsoil **(TOPSOIL/SOD/DUFF)** Brown, silty SAND (loose, moist) **(FILL)**	Groundwater not encountered.
2	113					ML	Gray, sandy SILT with organics (loose, moist) **(MARSH DEPOSITS)**	
4	111			W = 70				
	110						Hand Auger Boring Completed 08/20/12 Total Depth of Hand Auger Boring = 5.0 ft.	
6								

HA-22

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol	Excavation Method: Hand Auger Ground Elevation (ft): 105 Excavated By: Bay Townes Geotechnical Logged By: CAM	
0	105					SP-SM	3" of Topsoil/Sod **(TOPSOIL/SOD/DUFF)** Brown, fine to medium SAND with silt (loose, moist) **(FILL)**	Groundwater not encountered.
2	103					MH/PT	Dark brown SILT with sand and peat lenses (soft, moist) **(MARSH DEPOSITS)**	
4	101			W = 64				
	100						Hand Auger Boring Completed 08/20/12 Total Depth of Hand Auger Boring = 5.2 ft.	
6								

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

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Deschutes Valley Trail
Tumwater, Washington

Log of Hand Auger Borings

Figure A-19

HA-23

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol	Excavation Method: Hand Auger Ground Elevation (ft): 130 Excavated By: Bay Townes Geotechnical Logged By: CAM	
0	130						9" of Forest duff **(TOPSOIL/SOD/DUFF)**	Groundwater not encountered.
				SP- -200 = 6 W = 9		SM	Brown, fine to medium SAND with silt and gravel (loose, moist) **(RECESSIONAL OUTWASH)**	
2	128							
4	126							

Hand Auger Boring Completed 08/20/12
Total Depth of Hand Auger Boring = 4.1 ft.

6

HA-24

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol	Excavation Method: Hand Auger Ground Elevation (ft): 121 Excavated By: Bay Townes Geotechnical Logged By: CAM	
0	120						8" of Forest Duff **(TOPSOIL/SOD/DUFF)**	Groundwater not encountered.
				GS -200 = 4 W = 6		SP-SM	Brown, very gravelly SAND (loose, moist) **(RECESSIONAL OUTWASH)** -grades to medium dense	
2	118							
4								

Hand Auger Boring Completed 08/20/12
Total Depth of Hand Auger Boring = 4.2 ft.

6

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

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Deschutes Valley Trail
Tumwater, Washington

Log of Hand Auger Borings

Figure
A-20

HA-25

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol	Excavation Method: Hand Auger Ground Elevation (ft): 96 Excavated By: Landau Associates Logged By: BJF	
0	96	S-1		GP W = 2			3" of Topsoil/Sod **(TOPSOIL/SOD/DUFF)** Brown, sandy GRAVEL with cobbles (quarry spalls) and organics (medium dense, moist) **(FILL)**	
2	94	S-2				SP	Brown, gravelly fine to coarse SAND (medium dense, moist)	
4	92	S-3				SP	Brown, fine to medium SAND (loose, wet) **(RECESSIONAL OUTWASH)**	▽ Groundwater seepage encountered at 5.0 ft.
6	90							

Hand Auger Boring Completed 06/25/14

Refusal at 6.5 ft on Possible Bedrock

HA-26

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol	Excavation Method: Hand Auger Ground Elevation (ft): 95 Excavated By: Landau Associates Logged By: JTM	
0	94	S-1		W = 8 -200 = 2		GP	2" of Topsoil/Sod **(TOPSOIL/SOD/DUFF)** Brown, sandy GRAVEL with trace organics (medium dense, moist) **(FILL)**	Groundwater not encountered.
2	92	S-2				SP-SM	Brown, fine to medium SAND with silt (medium dense, moist) **(RECESSIONAL OUTWASH)** -grades to brown-gray with mottling, moist to wet -gray sand layer	
4							**Refusal at 3.2 ft on Possible Bedrock**	
6								

Hand Auger Boring Completed 06/24/14
Total Depth of Hand Auger Boring = 3.2 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

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Deschutes Valley Trail
Tumwater, Washington

Log of Hand Auger Borings

Figure
A-21

HA-27

SAMPLE DATA					SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol	Excavation Method: Hand Auger Ground Elevation (ft): 95 Excavated By: Landau Associates Logged By: BJF	
0							12" of Topsoil/Sod **(TOPSOIL/SOD/DUFF)**	Groundwater not encountered.
	94			SM			Orange/brown, silty SAND (medium dense, moist) **(RECESSIONAL OUTWASH)**	
2		S-1		W = 19 -200 = 27			-Charcoal/burnt wood at 2.5' to 2.8'	
	92	S-2		W = 20 -200 = 28			-grades to brown (medium dense, moist)	
		S-3		W = 18 -200 = 14		SP-SM	Brown gravelly SAND with silt (medium dense, moist to wet)	
4							**Refusal at 4.0 ft on Possible Bedrock**	
6								

Hand Auger Boring Completed 06/24/14
Total Depth of Hand Auger Boring = 4.0 ft.

HA-28

SAMPLE DATA					SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol	Excavation Method: Hand Auger Ground Elevation (ft): 110 Excavated By: Landau Associates Logged By: BJF	
0	110	S-1		W = 13 -200 = 12		SM	3" of Topsoil/Sod **(TOPSOIL/SOD/DUFF)**	Groundwater not encountered.
		S-2		W = 4 -200 = 3		SP	Brown, silty SAND (medium dense, moist) **(FILL)**	
2	108						Orange/brown, fine to medium SAND with gravel (medium dense, moist) **(RECESSIONAL OUTWASH)**	
		S-3		W = 8 -200 = 3		SP	Brown, fine to coarse SAND with gravel (medium dense, wet)	
4	106						**Refusal at 4.0 ft on Possible Bedrock**	
6								

Hand Auger Boring Completed 06/25/14
Total Depth of Hand Auger Boring = 4.0 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

1444001.01 7/8/14 Y:\1444\001.010\T\1444001.010.GPJ TEST PIT LOG W/ ELEVATION

LANDAU ASSOCIATES

Deschutes Valley Trail
Tumwater, Washington

Log of Hand Auger Borings

Figure
A-22

HA-29

SAMPLE DATA					SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol	Excavation Method: Hand Auger Ground Elevation (ft): 113 Excavated By: Landau Associates Logged By: BJF	
0				SP			3" of Topsoil/Sod **(TOPSOIL/SOD/DUFF)**	
	112	S-1		W = 4 -200 = 3			Orange/brown, gravelly, fine to medium SAND (medium dense, moist) **(RECESSIONAL OUTWASH)**	
2								
	110	S-2						
4								▽ Groundwater seepage encountered at 4.5 ft.
	108	S-3		W = 21 -200 = 31		SM	Orange/brown, very silty, fine to medium SAND (medium dense, wet)	
		S-4					-grades to with gravel (medium dense, wet)	
6								

Hand Auger Boring Completed 06/25/14
Total Depth of Hand Auger Boring = 6.0 ft.

HA-30

SAMPLE DATA					SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol	Excavation Method: Hand Auger Ground Elevation (ft): 107 Excavated By: Landau Associates Logged By: JTM	
0						SP-SM	Brown, fine to medium SAND with silt and gravel (medium dense, moist)	
	106					SP-SM	**(FILL)**	
		S-1		W = 15 -200 = 9			Brown, fine to medium SAND with silt and gravel (medium dense, moist) **(RECESSIONAL OUTWASH)**	
2								
	104	S-2						
4		S-3					-grades to wet	▽ Groundwater seepage encountered at 3.8 ft.
							Refusal at 4.3 ft on Possible Bedrock	
6								

Hand Auger Boring Completed 06/25/14
Total Depth of Hand Auger Boring = 4.2 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

1444001.01 7/8/14 Y:\1444\001.010\T\1444001.010.GPJ TEST PIT LOG W/ ELEVATION

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Deschutes Valley Trail
Tumwater, Washington

Log of Hand Auger Borings

Figure
A-23

HA-31

SAMPLE DATA					SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol	Excavation Method: Hand Auger Ground Elevation (ft): 101 Excavated By: Landau Associates Logged By: BJF	
0				SP-		SM	2" of Organic Topsoil **(TOPSOIL/SOD/DUFF)**	Groundwater not encountered.
	100	S-1		W = 8 -200 = 9			Brown, fine to medium SAND with silt and trace organics (medium dense, moist) **(FILL)**	
2							-grades to without organics	
	98	S-2						
		S-3					-grades to orange/brown	
4								
	96							
		S-4					-grades to brown	
6							**Refusal at 5.7 ft on Possible Bedrock**	

Hand Auger Boring Completed 06/25/14
Total Depth of Hand Auger Boring = 5.7 ft.

HA-32

SAMPLE DATA					SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol	Excavation Method: Hand Auger Ground Elevation (ft): 106 Excavated By: Landau Associates Logged By: BJF	
0	106					SP-SM	3" of Organic Topsoil **(TOPSOIL/SOD/DUFF)**	Groundwater not encountered.
		S-1					Brown, fine to medium SAND with silt and trace organics (loose, moist) **(FILL)**	
2	104	S-2					-grades to medium dense, without organics	
4	102							
		S-3						
6	100						**Refusal at 6.1 ft on Weathered Bedrock**	

Hand Auger Boring Completed 06/27/14
Total Depth of Hand Auger Boring = 6.1 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

1444001.01 7/8/14 Y:\1444\001.010\T\1444001.010.GPJ TEST PIT LOG W/ ELEVATION

LANDAU ASSOCIATES

Deschutes Valley Trail
Tumwater, Washington

Log of Hand Auger Borings

Figure
A-24

HA-33

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol	Excavation Method: Hand Auger Ground Elevation (ft): 98 Excavated By: Landau Associates Logged By: BJF	
0	98						4" of Organic Topsoil **(TOPSOIL/SOD/DUFF)**	
		S-1		W = 33		SM	Brown, silty SAND with trace organics (medium dense, moist) **(FILL)**	
2	96							▽ Groundwater seepage encountered at 2.8 ft.
		S-2		W = 30		SM	Orange/brown, silty, fine to medium SAND (medium dense, wet) **(RECESSIONAL OUTWASH)**	
4							**Refusal at 3.9 ft on Weathered Bedrock**	
6								

Hand Auger Boring Completed 06/27/14
Total Depth of Hand Auger Boring = 3.9 ft.

HA-34

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol	Excavation Method: Hand Auger Ground Elevation (ft): 110 Excavated By: Landau Associates Logged By: BJF	
0	110					SP-SM	2" of Topsoil/Sod **(TOPSOIL/SOD/DUFF)**	Groundwater not encountered.
		S-1				SP-SM	Brown, fine to coarse SAND with silt, gravel, and organics (dense, moist) **(FILL)**	
		S-2				GP	Brown, fine to medium SAND with gravel and trace organics (medium dense, moist)	
2	108	S-3					Brown, cobbly GRAVEL with sand (dense, moist)	
4							**Refusal on Roadway Ballast at 3.1 ft**	
6								

Hand Auger Boring Completed 06/27/14
Total Depth of Hand Auger Boring = 3.1 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

1444001.01 7/8/14 Y:\1444\001.010\T\1444001.010.GPJ TEST PIT LOG W/ ELEVATION

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Deschutes Valley Trail
Tumwater, Washington

Log of Hand Auger Borings

Figure A-25

HA-35

SAMPLE DATA					SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol	Excavation Method: Hand Auger Ground Elevation (ft): Not Measured Excavated By: Landau Associates Logged By: BJF	
0		S-1		W = 9 SP-		SM	2" of Topsoil/Sod **(TOPSOIL/SOD/DUFF)**	Groundwater not encountered.
							Brown, gravelly, fine to medium SAND with silt (medium dense, moist) **(RECESSIONAL OUTWASH)**	
2							-becoming cobbly at 1.2 ft	
							Refusal on Weathered Bedrock at 1.2 ft	
4								
6								

Hand Auger Boring Completed 06/25/14
Total Depth of Hand Auger Boring = 1.2 ft.

HA-36

SAMPLE DATA					SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol	Excavation Method: Hand Auger Ground Elevation (ft): Not Measured Excavated By: Landau Associates Logged By: BJF	
0							9" of Topsoil/Sod **(TOPSOIL/SOD/DUFF)**	Groundwater not encountered.
						SP- SM	Brown, fine to medium SAND with silt and gravel (medium dense, moist) **(RECESSIONAL OUTWASH)**	
2		S-1						
4							**Refusal on Bedrock or Possible Utility at 3.5 ft**	
6								

Hand Auger Boring Completed 06/27/14
Total Depth of Hand Auger Boring = 3.5 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

1444001.01 7/8/14 Y:\1444\001.010\T\1444001.010.GPJ TEST PIT LOG W/ ELEVATION

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Deschutes Valley Trail
Tumwater, Washington

Log of Hand Auger Borings

Figure
A-26

HA-37

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Sample Number & Interval	Sampler Type	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol	Excavation Method: Hand Auger Ground Elevation (ft): Not Measured Excavated By: Landau Associates Logged By: BJF	
0	S-1		SP- W = 9		SM	2" of Topsoil/Sod **(TOPSOIL/SOD/DUFF)** Brown, fine to medium SAND with silt, gravel, and trace organics (medium dense, moist) **(FILL)**	Groundwater not encountered.
2							
						Hand Auger Boring Completed 06/25/14 Total Depth of Hand Auger Boring = 3.0 ft.	**Refusal at 3.0 ft on Bedrock**
4							
6							

HA-38

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Sample Number & Interval	Sampler Type	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol	Excavation Method: Hand Auger Ground Elevation (ft): Not Measured Excavated By: Landau Associates Logged By: BJF	
0					SP-SM	3" of Organic Topsoil **(TOPSOIL/SOD/DUFF)**	Groundwater not encountered.
	S-1					Brown, fine to medium SAND with silt, gravel, and trace organics (medium dense, moist) **(FILL)**	
2	S-2		W = 25 -200 = 39		SM	Mottled gray/brown, very silty, fine to medium SAND (medium dense, moist) **(RECESSIONAL OUTWASH)**	
	S-3					-grades to with gravel	
4							
						Hand Auger Boring Completed 06/26/14 Total Depth of Hand Auger Boring = 4.3 ft.	**Refusal at 4.3 ft on Bedrock**
6							

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

1444001.01 7/8/14 Y:\1444\001.010\T\1444001.010.GPJ TEST PIT LOG W/ ELEVATION

LANDAU ASSOCIATES

Deschutes Valley Trail
Tumwater, Washington

Log of Hand Auger Borings

Figure
A-27

HA-39

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol	Excavation Method: Hand Auger Ground Elevation (ft): Not Measured Excavated By: Landau Associates Logged By: BJF	
0							2" of Topsoil/Sod **(TOPSOIL/SOD/DUFF)**	
		S-1		GP- W = 6		GM	Brown, sandy GRAVEL with silt (medium dense, moist) **(RECESSIONAL OUTWASH)**	Groundwater not encountered.
2		S-2				SP	Brown, fine to medium SAND with gravel (medium dense, moist)	
4								
							Refusal at 4.7 ft on Bedrock	
6								

Hand Auger Boring Completed 06/26/14
Total Depth of Hand Auger Boring = 4.7 ft.

HA-40

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol	Excavation Method: Hand Auger Ground Elevation (ft): Not Measured Excavated By: Landau Associates Logged By: BJF	
0							2" of Organic Topsoil **(TOPSOIL/SOD/DUFF)**	
						SP- SM	Brown, fine to medium SAND with silt and gravel (medium dense, moist) **(FILL)**	Groundwater not encountered.
2								
		S-1						
4								
6								

Hand Auger Boring Completed 06/26/14
Total Depth of Hand Auger Boring = 5.1 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

1444001.01 7/8/14 Y:\1444\001.010\T\1444001.010.GPJ TEST PIT LOG W/ ELEVATION

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Deschutes Valley Trail
Tumwater, Washington

Log of Hand Auger Borings

Figure
A-28

APPENDIX B
PHYSICAL SOIL TESTING

Soil samples obtained from the geotechnical borings were taken to our laboratory for further examination and testing. Laboratory tests were performed on representative soil samples to characterize certain engineering and index properties of the site soil. The laboratory testing program included visual inspection to confirm our field soil descriptions, determination of natural moisture content, grain size analysis, and determination of fines fraction (percent passing the U.S. Standard No. 200 sieve). A description of the testing performed is presented below.

NATURAL MOISTURE CONTENT

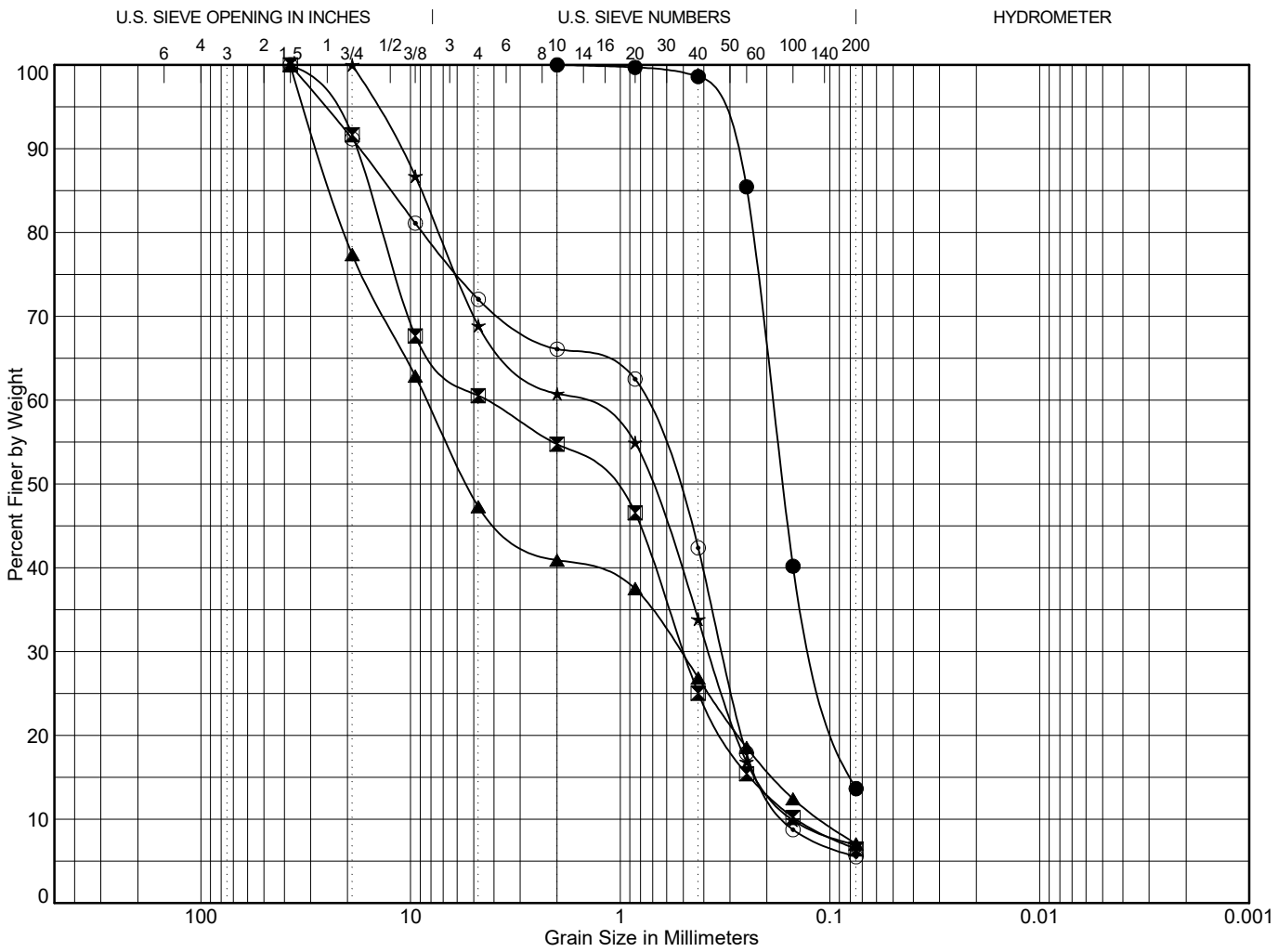
The natural moisture contents of selected soil samples obtained from the explorations were determined in general accordance with International ASTM (ASTM) D 2216 test method. The results from the moisture content determinations are indicated on the summary logs presented in Appendix A, adjacent to the corresponding sample.

GRAIN SIZE ANALYSES

Sieve analyses were conducted on representative soil samples obtained from the explorations in accordance with ASTM test method D422 to provide an indication of the grain size distribution of the onsite soil. Samples selected for grain size analyses are designated with a "GS" in the column labeled "Test Data" on the summary boring logs in Appendix A. The results of the grain size analyses are presented in the form of grain size distribution curves on Figures B-1 through B-4 in this appendix.

FINES FRACTION

The fines fraction (percent passing the U.S. Standard No. 200 sieve) of select soil samples was determined in general accordance with ASTM D 422 test procedures. The test results are indicated on the summary logs presented in Appendix A, adjacent to the corresponding sample.



Cobbles	Gravel		Sand			Silt or Clay
	coarse	fine	coarse	medium	fine	

Point		Depth	Classification	LL	PL	PI	C_c	C_u
●	B-5	3.0	Fine, SAND with silt (SP-SM)					
⊠	B-5	8.0	Very gravelly, SAND with silt (SP-SM)				0.39	30.46
▲	B-5	10.0	Very sandy, GRAVEL with silt (GP-GM)				0.30	76.35
★	B-5	35.5	Very gravelly, SAND with silt (SP-SM)				0.52	11.80
⊙	B-5	40.5	Gravelly, SAND with silt (SP-SM)				0.84	4.85

Point		Depth	D_{100}	D_{60}	D_{50}	D_{30}	D_{10}	%Coarse Gravel	% Fine Gravel	% Coarse Sand	% Medium Sand	% Fine Sand	% Fines
●	B-5	3.0	2	0.188	0.168	0.115		0.0	0.0	0.0	1.4	85.0	13.7
⊠	B-5	8.0	37.5	4.382	1.218	0.499	0.144	8.3	31.1	5.8	29.7	18.6	6.4
▲	B-5	10.0	37.5	8.362	5.36	0.522	0.11	22.6	30.1	6.4	14.1	19.8	7.1
★	B-5	35.5	19	1.787	0.723	0.377	0.151	0.0	31.1	8.1	26.9	26.9	6.9
⊙	B-5	40.5	37.5	0.779	0.552	0.325	0.161	8.8	19.2	5.9	23.7	36.8	5.5

$C_c = D_{30}^2/(D_{60} * D_{10})$
$C_u = D_{60}/D_{10}$

To be well graded: $1 < C_c < 3$ and $C_u > 4$ for GW or $C_u > 6$ for SW

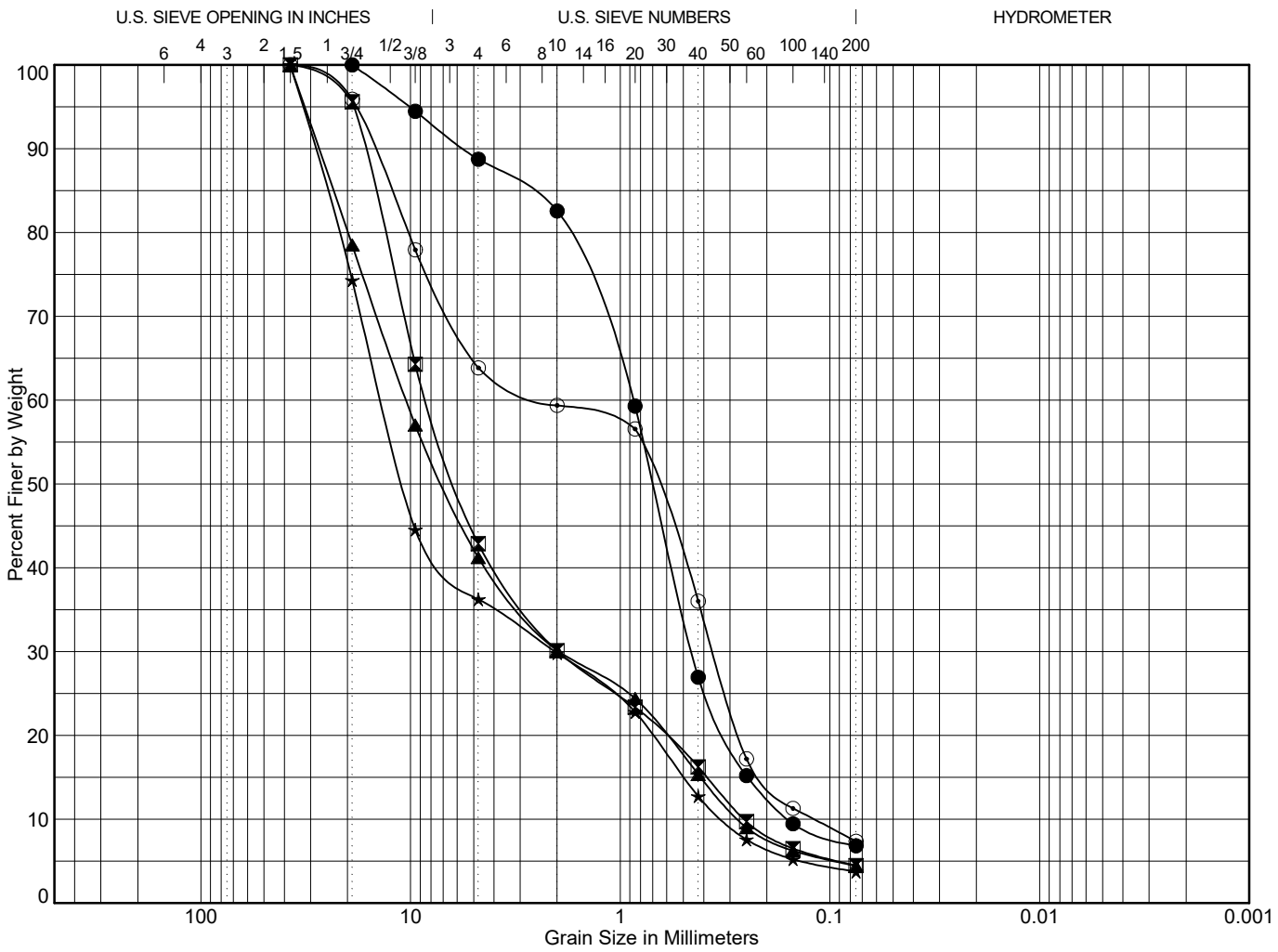
1444001.01 7/8/14 Y:\1444\001.010\T\1444001.010.GPJ GRAIN SIZE W/STATS

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Deschutes Valley Trail
Tumwater, Washington

Grain Size Test Data

Figure
B-1



Cobbles	Gravel		Sand			Silt or Clay
	coarse	fine	coarse	medium	fine	

Point		Depth	Classification	LL	PL	PI	C_c	C_u
●	B-5	50.5	SAND with silt and gravel (SP-SM)				1.50	5.54
⧓	B-6	8.0	Very sandy GRAVEL (GP)				1.85	32.30
▲	B-6	10.0	Very sandy GRAVEL (GP)				1.35	38.49
★	B-7	30.0	Very sandy GRAVEL (GP)				0.96	42.44
⊙	B-7	80.0	Very gravelly, fine to medium SAND with silt (SP-SM)				0.48	18.90

Point		Depth	D_{100}	D_{60}	D_{50}	D_{30}	D_{10}	%Coarse Gravel	% Fine Gravel	% Coarse Sand	% Medium Sand	% Fine Sand	% Fines
●	B-5	50.5	19	0.872	0.697	0.454	0.157	0.0	11.3	6.2	55.6	20.1	6.8
⧓	B-6	8.0	37.5	8.271	5.984	1.977	0.256	4.4	52.7	12.8	13.8	11.8	4.5
▲	B-6	10.0	37.5	10.452	6.979	1.957	0.272	21.5	37.3	11.1	14.8	10.9	4.4
★	B-7	30.0	37.5	13.613	10.785	2.049	0.321	25.7	38.1	6.4	17.1	9.0	3.7
⊙	B-7	80.0	37.5	2.258	0.681	0.359	0.119	4.1	32.1	4.5	23.4	28.7	7.4

$C_c = D_{30}^2/(D_{60} * D_{10})$ To be well graded: $1 < C_c < 3$ and

$C_u = D_{60}/D_{10}$ $C_u > 4$ for GW or $C_u > 6$ for SW

1444001.01 7/8/14 Y:\1444\001.010\T\1444001.010.GPJ GRAIN SIZE W/STATS

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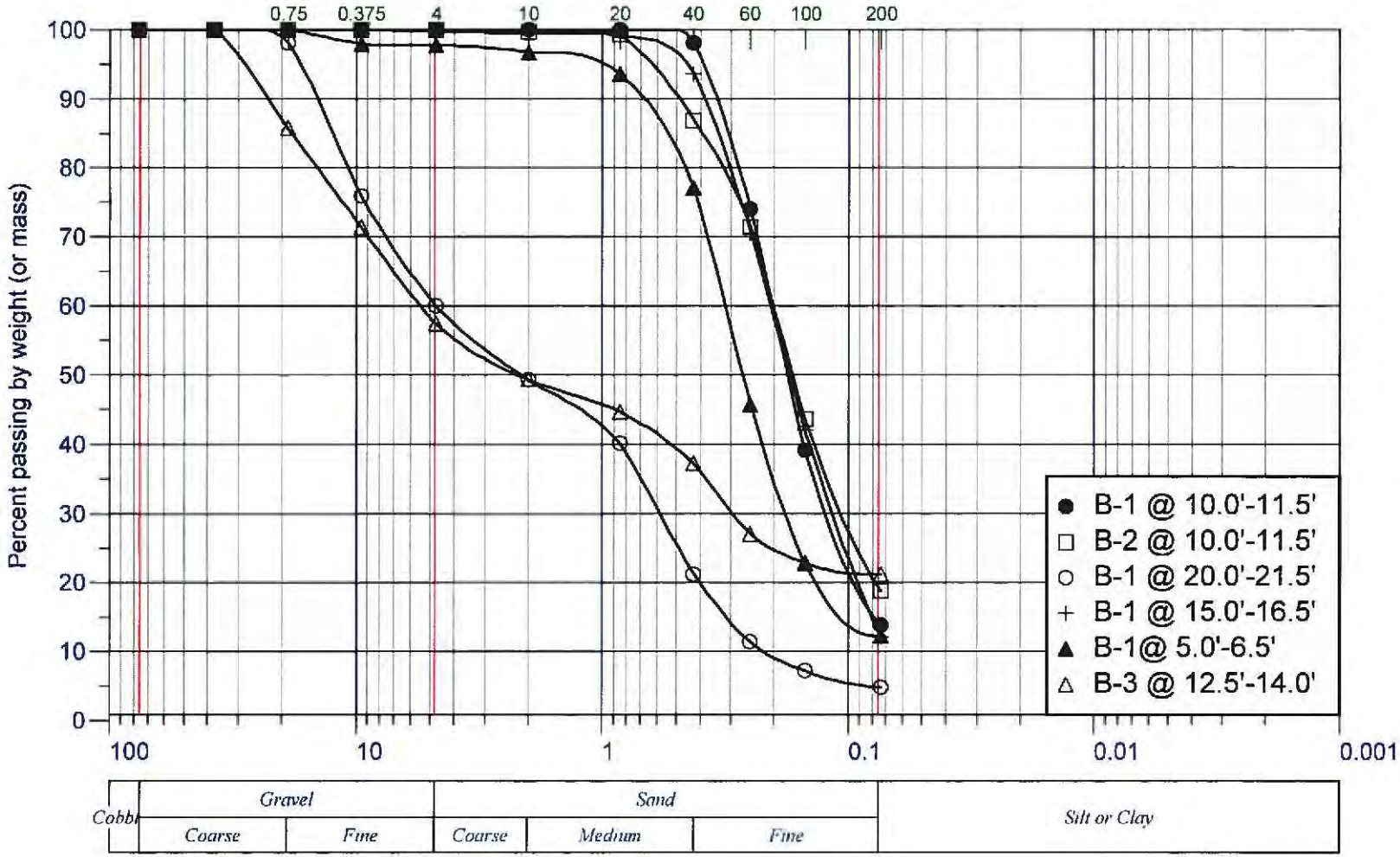
Deschutes Valley Trail
Tumwater, Washington

Grain Size Test Data

Figure
B-2

LANDAU ASSOCIATES, INC. | G:\Projects\1444\001\010\011\TrailPlans\Appendix B3_B4 GrainSize.dwg (A) "Figure B-3" 7/8/2014

Grain Size Distribution (ASTM D422)

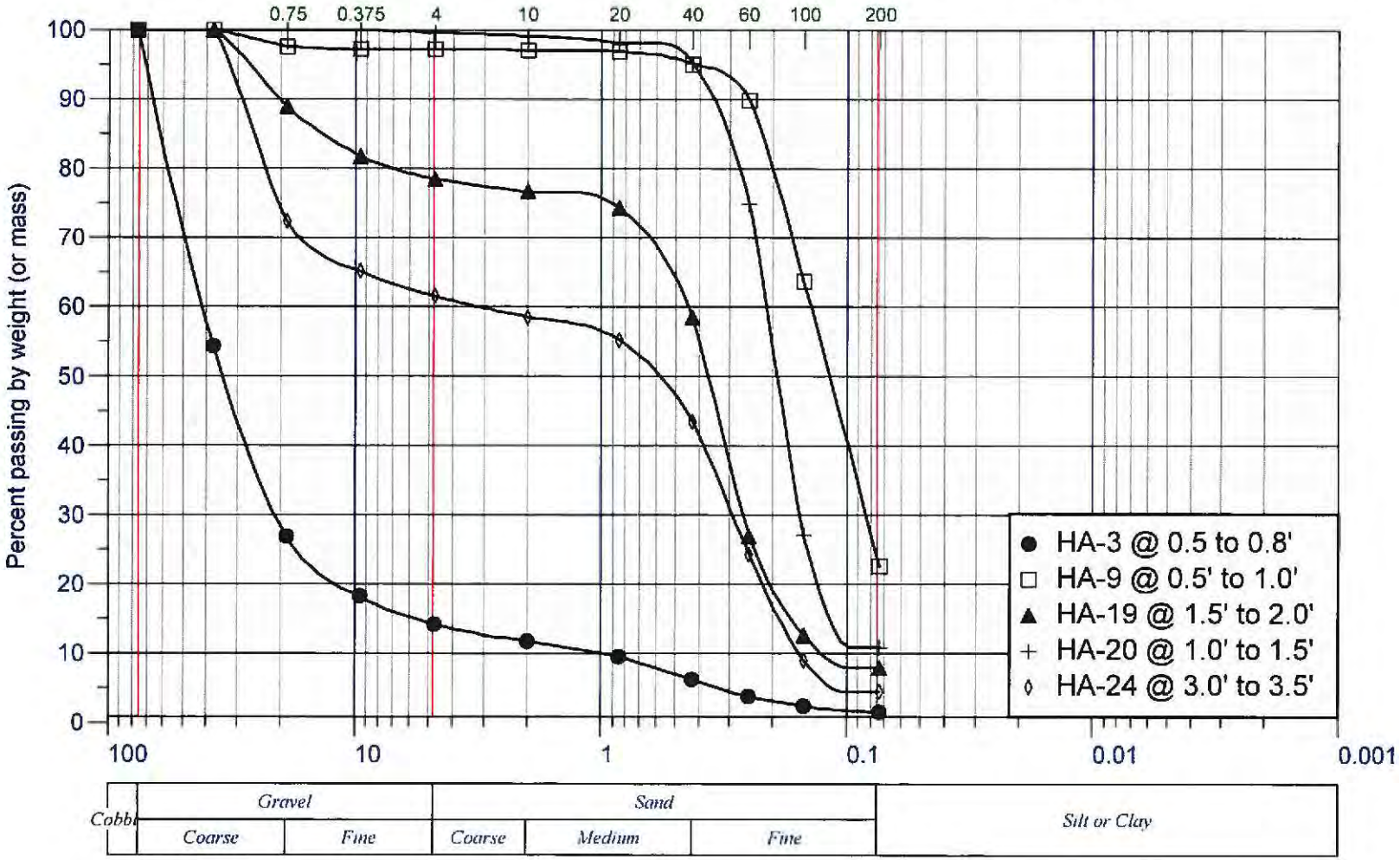


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Deschutes Valley Trail Tumwater, WA	**Grain Size Profile**	Figure B-3

LANDAU ASSOCIATES, INC. | G:\Projects\1444\001\010\011\TrailPlans\Appendix B3_B4 GrainSize.dwg (A) "Figure B-4" 7/8/2014

Grain Size Distribution (ASTM D422)



LANDAU ASSOCIATES

Deschutes Valley Trail Tumwater, WA	**Grain Size Profile**	Figure B-4

ATTACHMENT 4

Seismic Design Parameters and Survey Results

Seismic Design Parameters
***AASHTO LRFD Bridge Design Specifications* (10th Edition)**

Period (s)	Spectral Acceleration (g)
0	0.608
0.01	0.609
0.02	0.623
0.03	0.642
0.05	0.689
0.075	0.841
0.1	1.04
0.15	1.23
0.2	1.33
0.25	1.34
0.3	1.38
0.4	1.37
0.5	1.26
0.75	1.01
1	0.804
1.5	0.586
2	0.449
3	0.29
4	0.213
5	0.164
7.5	0.0964
10	0.0733

Abbreviations and Acronyms:

AASHTO = American Association of State Highway and Transportation Officials

LRFD = Load and Resistance Factor Design

g = force of gravity

s = seconds

Global Geophysics

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Report on 1D MASW and MAM Surveys

4833 Tumwater Valley Dr SE, Olympia, WA 98501

Global Geophysics Project No. 116-0112.000

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January 20, 2026

CONTENTS

1. Objective 3
2. Introduction 3
3. Methodology and Instrumentation 4
3.1 Microtremor Array Measurements (MAM) Method 4
3.2 Surface Wave Dispersion Curve Modeling 5
4. Instruments and Equipment 5
4.1 MAM 5
5. Procedures 7
5.1 Field Deployment 7
5.2 Quality Control and Data Processing 7
5.2.1 Quality Control 7
5.2.2 Data Processing 7
6. Results 8
7. Analysis 12
8. Limitations of the Geophysical Method 13
9. References 14

1. OBJECTIVE

Global Geophysics, LLC conducted two passive MAM surveys near 4833 Tumwater Valley Dr SE, Olympia, WA 98501 on January 16, 2026. The goal of this investigation was to determine the average shear wave velocity to a depth of 100 feet. This report provides the methods, instrumentation, data collection and processing procedures, results, and analysis of this investigation.

2. INTRODUCTION

Surface waves are a special type of seismic wave whose propagation is confined to the near surface medium. The depth of subsurface penetration of a surface wave is directly proportional to its wavelength. In a non-homogeneous medium, surface waves are dispersive, i.e. each wavelength has a characteristic velocity stemming from subsurface variations in the soils and rocks. The velocity that the surface waves' wavelengths propagate through the subsurface is related to the shear wave (S-Wave) velocity of the subsurface. If the S-Wave velocity varies with depth, so will the surface wave's wavelength velocity. Analysis of how the wavelength varies, or dispersion, allows us to estimate the S-Wave velocity as it passes through the subsurface. The S-Wave velocity of the subsurface can then be used to infer useful characteristics such as the rock/soil type, stratigraphy, and soil conditions.

Average S-Wave velocities to a depth of 100ft (30m) are known as V_{S100} (V_{S30}) and are sorted into classes by the International Building Code (IBC) to provide valuable earthquake engineering design information. These classes are shown here:

Class Name	**Ground Description**	**V_{S100}**	**V_{S30}**
A	Hard Rock	>5000ft/s	>1500m/s
B	Rock	5000ft/s to 2500ft/s	1500m/s to 760m/s
C	Dense Soil or Soft Rock	2500ft/s to 1200ft/s	760m/s to 360m/s
D	Stiff Soil	1200ft/s to 600ft/s	360m/s to 180m/s
E	Soft Soil	<600ft/s	<360m/s
F	Needs site specific evaluation	NA	NA

Surface waves can be utilized in both active and passive deployments. Multichannel Analysis of Surface Waves (MASW) comprises most active deployments while Microtremor Array Measurements (MAM) are the primary method to collect passive data. MASW arrays are typically linear while MAM arrays can be linear (often known as refraction microtremor, or ReMi, when linear) but generally perform better when deployed in 2D orientations (triangular, circular, T-shaped, or L-shaped arrays). Another passive method employed is the Horizontal over Vertical Spectral Ratio (HVSR) which utilizes a single geophone sensitive to motion in three directions (vertical, east-west, and north-south).

For this project, seismic surveys were deployed at each of the locations shown on Fig. 1.



Figure 1. Site Plan

3. METHODOLOGY AND INSTRUMENTATION

3.1 Microtremor Array Measurements (MAM) Method

A detailed description of the MAM method can be found in Okada, 2003. MAM arrays generally have a greater degree of flexibility with their design and in addition to linear arrays, can be deployed in 2D arrays such as the circular, triangular, T and L arrays. Since this is a passive survey, the ambient vibrations of the surroundings are utilized rather than deliberately generated. These passive sources can come from all directions and include traffic, ocean waves, cultural noise, and construction. MAM arrays should utilize an array size equal to or greater than the depth of investigation (Geometrics, 2009) and record the ambient vibrations for a minimum of 30 seconds and collect a minimum of 10 minutes of data.

Wireless sensors, such as the SmartSolo IGU-16 or the Geometrics Atom enable passive arrays to be deployed to sizes much larger than wired arrays. Wireless MAM arrays can span several hundred, or even several thousand feet; enabling much deeper investigations into the subsurface.

3.2 Surface Wave Dispersion Curve Modeling

Dispersion curves are useful for determining S-Wave velocities of the subsurface and are generated with the help of specialized software. Data files are added to the software and their traces displayed by location versus time, showing the seismic waves that arrive at each geophone over the course of the record.

For MAM surveys, the data are transformed with a fast Fourier transform to the frequency domain. Then the coherence (or similarity between traces or waveforms) is calculated. If the coherences are averaged over a long period of time or over many data blocks, the data are considered to be Spatially Auto-Correlated (SPAC) ((Aki, 1957). From here, the phase velocity can be calculated from each frequency and fundamental and higher modes can be picked. From the fundamental mode, the dispersion curve can be created and edited (Roesset, 1991). The dispersion curve is used to create an inversion model that displays the S-Wave velocities at the desired range of depths (Xia, Miller, & Park, 1999). Theoretical dispersion curves are generated via a matrix method (Saito & Kabasawa, 1993) and compared against the observed dispersion curve. The model is updated until the observed and theoretical dispersion curves converge. The resulting model is the delivered S-Wave velocity model for the array.

4. INSTRUMENTS AND EQUIPMENT

4.1 MAM

For this investigation, Global Geophysics used 24 4.5 Hz SmartSolo IGU-16 wireless sensors (Figure 2). Data were downloaded via the Smartsolo All-in-One (AIO) box (Figure 3). Data processing was done with Geometrics SeisImager software package.



Figure 2. SmartSolo IGU-16 wireless sensor



Figure 3. SmartSolo All-in-One (AIO) box

5. PROCEDURES

5.1 Field Deployment

MAM Sounding

The MAM Soundings were linear 10 ft spaced 24 sensor long arrays. Sensor deployments can be found in Figure 4. Data were recorded for approximately 20 min.

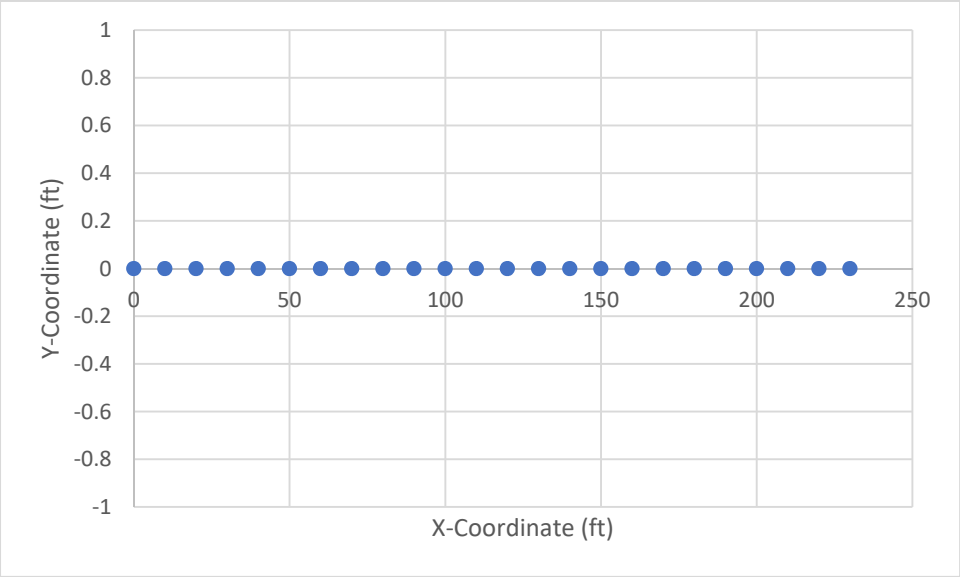


Figure 4. S-1 MAM Sounding Wireless Sensor Deployment

5.2 Quality Control and Data Processing

5.2.1 Quality Control

Wireless MAM Arrays

Data were recorded for 20 minutes to record enough vibrations at various frequencies.

5.2.2 Data Processing

Wireless MAM Arrays

Data were opened in the Surface Wave Analysis Wizard within SeisImager using the Passive Source (Microtremor) tool. A dispersion curve is generated from the data and the fundamental mode is picked with the assistance of the software. Uncertain data at high and low frequencies are clipped. The dispersion curve is inverted with the Wave EQ program within SeisImager and an initial model is generated. The model is improved by using a Least Square Method inversion with at least 5 iterations.

6. RESULTS

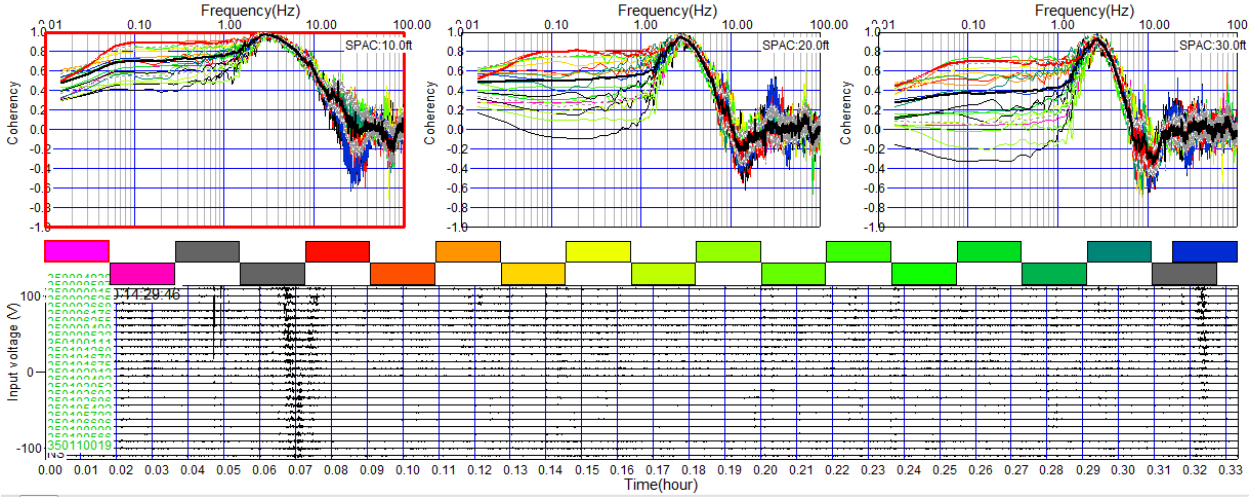


Figure 5. S-1 MAM Sounding Coherency

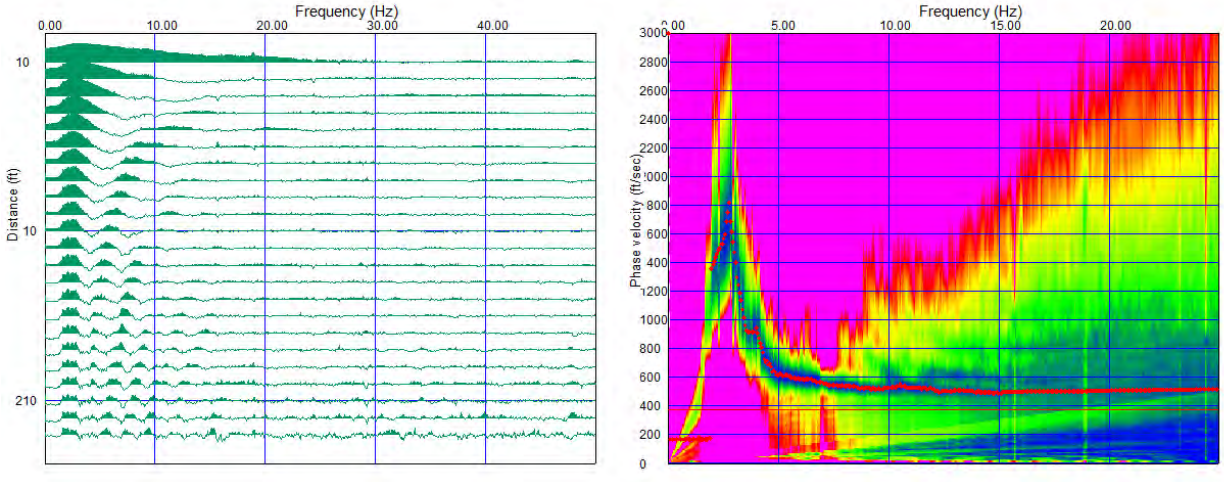


Figure 6. S-1 MAM Sounding Dispersion Curve

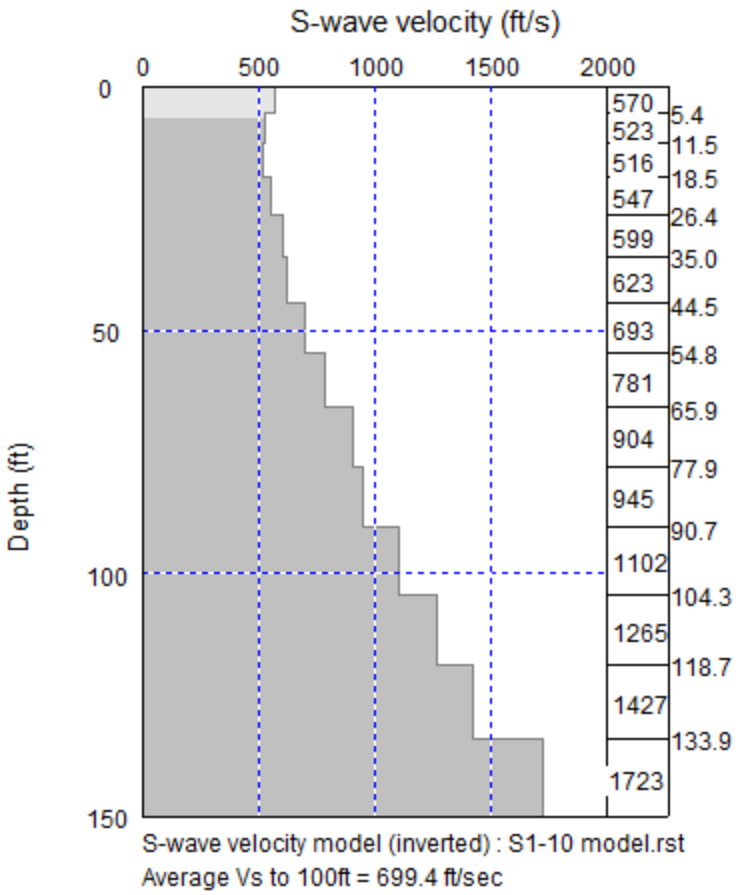


Figure 7. S-1 MAM S-Wave Model

Depth(ft)	S-wave velocity (ft/sec)
0	571
5	524
12	516
19	548
26	599
35	623
45	694
55	781
66	904
78	946
91	1103
104	1266
119	1427
134	1724
150	1723

Table 1. S-1 S-Wave Velocities at Specific Depths

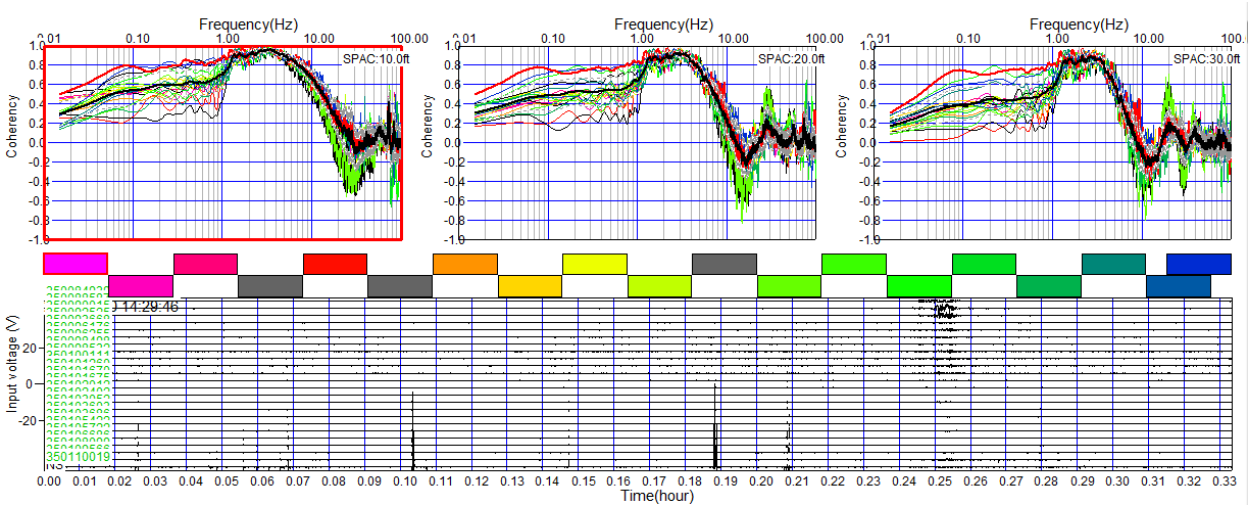


Figure 8. S-2 MAM Sounding Coherency

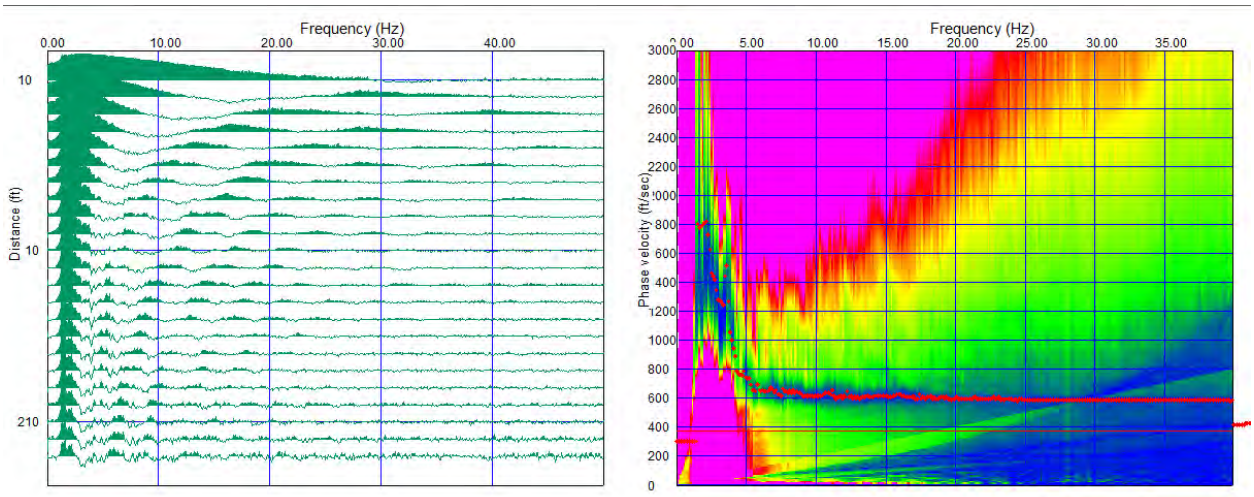


Figure 9. S-2 MAM Sounding Dispersion Curve

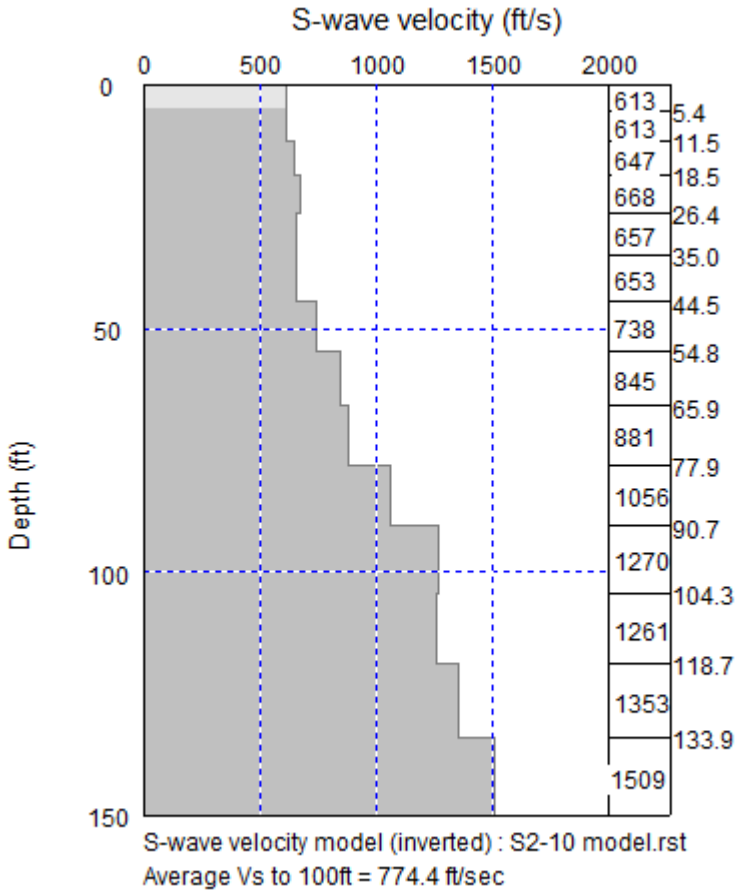


Figure 10. S-2 MAM S-Wave Model

Depth(ft)	S-wave velocity (ft/sec)
0	613
5	614
12	648
19	668
26	657
35	653
45	738
55	846
66	882
78	1057
91	1271
104	1261
119	1354
134	1510
150	1509

Table 2. S-2 S-Wave Velocities at Specific Depths

7. ANALYSIS

Figure 5 shows the S-1 sounding coherency. Figure 6 shows the S-1 sounding dispersion curve with the fundamental mode picked in red. Figure 7 shows the S-1 shear wave velocity profiles for the MAM sounding. Table 1 shows the modeled shear wave velocities of the subsurface at specific depths for S-1. Figure 8 shows the S-2 sounding coherency. Figure 9 shows the S-21 sounding dispersion curve with the fundamental mode picked in red. Figure 10 shows the S-2 shear wave velocity profiles for the MAM sounding. Table 2 shows the modeled shear wave velocities of the subsurface at specific depths for S-2.

The V_{S100} value for S-1 is 699.4 ft/s.

The V_{S100} value for S-2 is 774.4 ft/s.

8. LIMITATIONS OF THE GEOPHYSICAL METHOD

Global Geophysics' services are conducted in a manner consistent with the level of care and skill ordinarily exercised by other members of the geophysical community currently practicing under similar conditions and are subject to the time limits, financial and physical constraints applicable to the services. MAM and 1D MASW are remote sensing geophysical methods that may not detect all subsurface conditions due to the limitations of the method, soil conditions, size of features, and their depths.

Sincerely,

Global Geophysics, LLC.

Evangeline Johnston
Field Operation Manager

John Liu, Ph.D., R.G.
Principal Geophysicist

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NEXT DOCUMENT

Draft
Geotechnical Engineering Report
Deschutes Valley Trail
Tumwater, Washington

July 9, 2014

Prepared for

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TABLE OF CONTENTS

		Page
1.0	INTRODUCTION	1-1
	1.1 PROJECT UNDERSTANDING	1-1
	1.2 SCOPE OF SERVICES	1-2
2.0	SITE CONDITIONS	2-1
	2.1 SURFACE CONDITIONS	2-1
	2.1.1 WET SURFACE CONDITIONS	2-2
	2.1.2 CART PATH CONDITIONS	2-2
	2.2 GEOLOGY REVIEW	2-2
	2.3 SUBSURFACE EXPLORATIONS	2-3
	2.3.1 SUBSURFACE CONDITIONS	2-3
	2.3.1.1 General	2-3
	2.3.2 Valley Subsurface Conditions Summary	2-4
	2.3.3 Upland Subsurface Condition Summary	2-5
	2.3.4 Groundwater Conditions	2-5
	2.4 LABORATORY TESTING	2-6
3.0	ENGINEERING STUDIES AND RECOMMENDATIONS	3-1
	3.1 GENERAL	3-1
	3.2 STABILITY ANALYSES OF PROPOSED CUT SLOPES AND FILL EMBANKMENTS	3-1
	3.3 EMBANKMENT SETTLEMENT	3-2
	3.4 PAVEMENT DESIGN	3-3
	3.5 SEISMIC DESIGN CONSIDERATIONS	3-4
	3.5.1 Spectral Acceleration Parameters	3-4
	3.5.2 Soil Liquefaction	3-4
	3.5.3 Lateral Spreading	3-5
	3.6 BRIDGE ABUTMENT SHALLOW FOUNDATION SUPPORT	3-5
	3.6.1 General	3-5
	3.6.2 Deschutes River Bridge Shallow Foundation Seismic Design Considerations	3-5
	3.6.3 Shallow Foundation Design Parameters	3-6
	3.7 BRIDGE ABUTMENT DEEP FOUNDATION SUPPORT	3-7
	3.7.1 General	3-7
	3.7.2 Axial Capacity	3-7
	3.7.3 Lateral Spreading Loads	3-8
	3.7.4 Lateral Capacity	3-9
4.0	EARTHWORK AND CONSTRUCTION RECOMMENTATIONS	4-1
	4.1 GENERAL	4-1
	4.2 CLEARING AND STRIPPING	4-1
	4.3 SUBGRADE PREPARATION	4-1
	4.3.1 General	4-1
	4.3.2 Bridge Abutments	4-2
	4.4 TEMPORARY EXCAVATIONS	4-2
	4.5 DEEP FOUNDATION INSTALLATION	4-3

DRAFT

	4.5.1	Driven Piles	4-3
	4.5.2	Drilled Shafts	4-3
4.6		GROUNDWATER HANDLING	4-4
4.7		WET WEATHER EARTHWORK	4-4
4.8		STRUCTURAL FILL	4-5
	4.8.1	General	4-5
	4.8.2	Onsite Soil	4-5
	4.8.3	Placement and Compaction	4-5
5.0		OUTSTANDING FINAL DESIGN ISSUES	5-1
6.0		REFERENCES	6-1

FIGURES

Figure	Title
1	Site Map
2	Vicinity Map
3	Site and Exploration Plan
4	Site and Exploration Plan
5	Site and Exploration Plan
6	Site and Exploration Plan
7	Geologic Profile A-A'
8	Axial Shaft Capacity Service and Strength Limit States
9	Axial Shaft Capacity Extreme Event Limit State
10	Axial Pile Capacity Service and Strength Limit States
11	Axial Pile Capacity Extreme Event Limit State

TABLES

Table	Title
1	Slope Stability Analyses Results
2	AASHTO Seismic Parameters
3	Resistance Factors for Single Shafts
4	Resistance Factors for Driven Piles
5	L-Pile Soil Parameters
6	P-Multipliers for Group Effects

APPENDICES

Appendix	Title
A	Subsurface Explorations
B	Laboratory Test Results

DRAFT

1.0 INTRODUCTION

Landau Associates is pleased to present this report of our geotechnical engineering services in support of the proposed Deschutes Valley Trail project located in Tumwater, Washington. Our services have been completed in general accordance with our July 31, 2012 and February 26, 2014 signed agreements for the project. Our 2012 services were provided by Bay Townes Geotechnical (now Landau Associates). This standalone report incorporates the 2012 Bay Townes Geotechnical findings under the name Landau Associates.

1.1 PROJECT UNDERSTANDING

Our project understanding is based on conversations with Robert W. Droll Landscape Architect, PS personnel and information provided. The proposed trail extends from Tumwater Historical Park to Pioneer Park. The overall project location is shown on the Site Map on Figure 1. Additional details are provided on Figures 2 through 6.

We understand that the trail will be approximately 19 feet (ft) wide and paved with asphalt concrete pavement (ACP). A significant portion of the trail alignment is common with the existing golf cart path (cart path) along the west side of the Tumwater Valley Golf Course. We understand that the cart path pavement surface will likely be removed, and the base course materials left in place will be incorporated into the new pavement section. The northern-most portion of the proposed trail will utilize an existing paved trail.

Trail Spur #3 ascends a steep slope prior to connecting to T Street. We understand that significant cut and fill grading will be required in this area to meet 5 percent trail grade requirements. The larger cut and fill sections could be as thick as 20 ft. We understand that proposed grades for the remaining portions of the project will typically match existing grades, with the exception of regrading a few local low points.

The proposed trail includes three new bridge crossings: 1) the Palermo Waterway Bridge, 2) the Deschutes River Bridge and 3) the Deschutes River Slough Bridge. Preliminary estimates for the maximum bridge span are 60 ft, 120 ft, and 80 ft, respectively. The City of Tumwater has requested shallow foundation support for the Palermo Waterway Bridge. Based on our experience, we also anticipate that shallow foundations will be utilized for the Deschutes River Slough Bridge. These are both simple span pedestrian structures, and we anticipate that the structural bridge design will follow the simplified seismic design requirements for single span bridges presented in the American Association of State Highway and Transportation Officials (AASHTO) Load and Resistance Factor Design (LRFD) Bridge Design Specifications. Under this simplified seismic design approach, bridge and abutment damage is acceptable as the result of a seismic event.

DRAFT

The Deschutes River Bridge will include a span of approximate 120 ft to cross the Deschutes River (River), as well as approach structures or embankments. However, embankments could be unfeasible due to permitting limitations on grading within floodplains. At this preliminary design level, both shallow and deep foundations are being considered for support of the Deschutes River Bridge. The final selection on foundation type for this structure will need to consider the City of Tumwater's seismic performance expectations and collapse prevention objectives as determined by the structural engineer (MC-Squared) utilizing the information presented in this report. Preliminary loading information presented by MC-Squared includes a maximum of 50 kips live load and 120 kips dead load at each abutment.

We understand that the trail will be designed as a shared-use path in general accordance with the criteria presented in Chapter 1515 of the Washington State Department of Transportation (WSDOT) Design Manual M 22-01.09. Accordingly, our geotechnical recommendations in this report are presented in general accordance with the appropriate WSDOT standards.

1.2 SCOPE OF SERVICES

The objective of our scope of services was to explore the subsurface site conditions as a basis for developing geotechnical recommendations for the proposed trail development. Our specific scope of services included the following tasks:

- Review available information for the site, including geologic maps and previous geotechnical information provided by others.
- Walk the trail alignment with Tumwater Valley Golf Course personnel to help establish an understanding of the site conditions during the wetter times of the year.
- Coordinate the location and clearance of underground utilities in the area of our proposed subsurface explorations.
- Explore the subsurface site conditions using a combination of drilled borings and hand augers. Our exploration program included:
  - Eight drilled borings to depths of between 19.0 and 101.5 ft BGS in the area of the proposed bridges and along the top of the steep slope at Trail Spur #3. The purpose of the borings was to assess bridge foundation support and site slope stability.
  - Forty hand augers to depths of not more than 6.1 ft below ground surface (BGS) along the proposed trail alignment. The purpose of the hand augers was to assess pavement support characteristics and identify areas of soft or organic soils.
    - The borings were completed with track- and truck-mounted drilling equipment under subcontract to Landau Associates. Standard Penetration Test samples were taken at intervals of 5 ft or less during drilling. Landau Associates' personnel completed the hand augers and monitored the borings on a full-time basis.

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- Perform geotechnical laboratory testing on selected samples. Our laboratory testing program consisted of grain-size distribution analyses (sieves), moisture content determinations, and fines content determinations (percent passing the No. 200 sieve).
- Provide geotechnical construction recommendations for earthwork and grading of the trail. Our recommendations include estimated stripping depth, subgrade preparation, structural fill and placement and compaction, temporary and permanent cut and fill slope inclinations, the potential for reuse of on-site materials as structural fill and design pavement sections.
- Provide seismic design parameters (spectral acceleration coefficients and Site Class) for the proposed bridge structure using map-based methods in accordance with AASHTO criteria. We also evaluate the potential risk for seismically-induced soil liquefaction, lateral spreading, slope instability, and surface rupture.
- Provide a slope stability assessment for the southernmost portion of the trail alignment
- Provide geotechnical recommendations for shallow foundation support of the bridge structures. We provide recommendations for foundation subgrade preparation, allowable soil bearing capacity, minimum footing width and depth, lateral pressures acting on abutment walls, and lateral resistance criteria. We also provide short-term, long-term and seismic settlement estimates.
- Provide preliminary recommendations for deep foundation support of the Deschutes River Bridge. We provide axial pile capacity recommendations and a lateral pile support soil profile for driven steel pipe piles and drilled shafts.
- Provide a discussion of bridge foundation support construction considerations.
- Prepare a geotechnical engineering report that presents our conclusions and recommendations along with supporting data.

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2.0 SITE CONDITIONS

The following sections describe the existing surface conditions observed during completion of field explorations, a description of the geologic setting, a brief description of the field explorations, a summary of the subsurface soil and groundwater conditions observed in the borings, and the laboratory testing program.

2.1 SURFACE CONDITIONS

Trail Segment A extends from E Street to the Capitol Lake Trail. This segment is typically located 20 to 40 ft in elevation above the River. The majority of Segment A will be common with existing grades. A portion of Segment A is on a historical railroad grade that is situated along a steep eastern facing slope. Bedrock (Basalt) is exposed on the steep slopes on either side of the railroad grade. The ground surface in Segment A is typically covered by pavement, grass, or grass and moss overlying railroad ballast. One portion of Segment A is within a fenced, abandoned Puget Sound Energy right of way that is covered by concrete slabs. Details of the Segment A alignment are shown on Figure 3.

Trail Segment B extends from Tumwater Valley Drive to E Street, generally paralleling Tumwater Valley Drive. The Segment B alignment is typically vegetated with grass and brush outside of the existing pavement areas. A small portion of Segment B will require cut and fill grading to situate the trail into an existing side slope. Segment B details are shown on Figure 4.

Trail Segments C and D run along the west side of the Tumwater Valley Golf Course (Golf Course). The proposed trail alignment within these segments is typically surfaced by grass and the cart path. The cart path is surfaced with ACP. Small portions of Segments C and D cut through wooded areas. The wooded areas typically include mature conifer trees and brush. Horsetails and other plants indicative of excess moisture in the soil are periodically present along the western side of the cart path and in the general area of the trail through the golf course. Details of Segments C and D are provided on Figures 4 through 6.

Trail Spur #3 ascends a steep slope located between the golf course and upland neighborhoods along T Street. Trail Spur #3 is typically vegetated with mature conifer trees and smaller deciduous trees and brush. The section of the steep slope that the trail ascends is typically inclined at between 24 and 29 degrees. We did not observe any slope instability indicators during our reconnaissance of the slope. The slope instability indicators we investigated for included pistol-butt trees, landslide scarps, groundwater seepage, and sloughing and erosion. Trail Spur 3 is shown on Figure 6.

Trail Segment E connects Pioneer Park to the Golf Course. This segment is typically flat and surfaced with grass and brush. Trail Segment E also crosses a potential wetland near the location of the

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Deschutes River Slough Bridge. The wetland area and banks of the Deschutes River are vegetated with blackberries, small conifer trees, horsetails, and other plants indicative of excess moisture in the soil. Trail Segment E is shown on Figure 6.

2.1.1 WET SURFACE CONDITIONS

On August 16, 2012, we traveled the proposed trail alignment with the Golf Course Superintendent Dwayne Erich. The purpose of this meeting was to help us gain an understanding of the seasonal wet surface conditions along the Golf Course.

During the meeting, Mr. Erich identified areas alongside the existing cart path that are seasonally saturated, areas that typically include ponding water, and areas that are not mowed due to soft ground conditions in the winter. A summary of the information gained through our meeting with Mr. Erich is as follows: excluding an elevated portion of Hole #14, about 80 percent of the trail alignment within the Golf Course is typically too saturated for cart traffic or mowing equipment between the months of November and April. This excludes the cart path itself.

2.1.2 CART PATH CONDITIONS

Based on conversations with the City of Tumwater, we understand that the existing cart path was constructed in 1998. During the field reconnaissance, it was generally observed that the cart path pavement was in a fair to good condition. We understand from conversations with the City of Tumwater, that the cart path has not experienced any damage from maintenance vehicle traffic, including occasional wintertime traffic. We also understand that the path has not experienced any damage related to freeze-thaw cycles.

We were provided with a set of drawings entitled "City of Tumwater – Typical Path Sections." These drawings show the typical cart path pavement section to comprise:

- 0.17 ft of ACP Class B
- 0.50 ft crushed surfacing base course (CSBC)
- Soil stabilization fabric when required
- Undisturbed "native" soil.

We understand from conversations with the City of Tumwater that this design pavement section was used for the construction of the existing path.

2.2 GEOLOGY REVIEW

Our geology review included The Geologic Map of the Tumwater 7.5-minute Quadrangle, Thurston County, Washington (Walsh et al. 2003) and The Geologic Map of the Maytown 7.5-minute

Quadrangle, Thurston County, Washington (Logan et al. 2009). Our geology review indicates that the upland portions of the site (Segment A, the north half of Segment B, and Trail Spur #3) is mapped as Vashon-age recessional outwash (soil units Qgos and Qgok). Both of these soil units were deposited during the retreat of the most recent glaciation period in the Puget Sound and are not glacially consolidated. The portion of Trail Segment A within Tumwater Falls Park and Tumwater Historical Park is mostly mapped as Crescent formation basalt (soil unit Evc). This soil unit is described as basalt with local inclusions of diabase and gabbro.

Our geology review indicates that the valley portion of the site (southern portion of Segment B and Segments C through E) is mapped as alluvium (soil unit Qa). This unit is described as silt, sand and/or gravel deposited by streams. In the case of this site, the alluvium was mostly deposited by the Deschutes River. The alluvium unit post-dates glaciation in the area and is not glacially consolidated.

In general, we consider our geology review to be consistent with the findings in our subsurface explorations. However, we understand from conversations with City of Tumwater personnel that grading activities to build the Golf Course in the late 1960s included significant fill grading. Based on density and grain size, we interpret the majority of the soils encountered in our borings within the valley to be recessional outwash rather than alluvium. We did not observe an appreciable thickness of loose to very loose soils that would be consistent with post glacial alluvium. With the exception of a groundwater table, the observed density of the soils at depth in the valley is relatively consistent with that observed in the borings in the upland areas.

2.3 SUBSURFACE EXPLORATIONS

We explored the subsurface site conditions between July 30 and August 20, 2012, and again between June 2 and June 27, 2014 by advancing 8 drilled borings and 40 hand augers. Our exploration locations are shown on Figures 3 through 6.

2.3.1 SUBSURFACE CONDITIONS

This section provides a summary of the subsurface soil and groundwater conditions encountered in our explorations. More detailed information, including summary exploration logs and laboratory test results, are provided in Appendix A and B.

2.3.1.1 General

We characterize the materials encountered in our explorations into eight general groups:

- **Pavement Section** – Three of our explorations were advanced along the edge of the cart path to expose the existing pavement section. The pavement section we observed is similar to the

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design pavement section described in Section 2.1.2 of this report. We observed that filter fabric was included in most low areas of the pavement section. These are areas that we wouldexpect to be seasonally saturated. We also note that there were occasional cobbles mixed in with the CSBC material.

- **Sod/Topsoil** – Typically consists of sod overlying organic topsoil. The thickness at our exploration locations is generally between 0.15 and 0.6 ft.
- **Forest Duff** – Typically consists of pine needles, leaf matter, roots and other organics. Duff was encountered within the wooded portions of the site where ground cover is limited. The thickness at our exploration locations is generally between 0.7 and 1.4 ft.
- **Fill** – Typically consists of loose to medium dense, silty sand, or sand with silt with variable gravel and organic content. We did not observe appreciable debris or organics within the fill. In general, the fill is granular soil that likely derived from nearby recessional outwash sources. The thickness at our exploration locations is generally between 1.0 and 4.0 ft. Fill was typically present at ground surface along the existing cart path and other developed portions of the trail alignment.
- **Marsh Deposits** – Typically consists of loose, silty sand, or soft silt with sand, with variable organic content. In some instances, abundant peat layers are present. We interpret this material to derive from historic wetlands and/or floodplains that have since been filled over. The thickness at our exploration locations is typically between 1.5 to 4.2 ft. However, explorations HA-2, HA-18, HA-20 and HA-22 were terminated within the marsh deposits. We consider the marsh deposits to be compressible when subjected to new loading. Laboratory test results indicate that the moisture content of this soil unit is typically between 25 and 70 percent.
- **Alluvium** – Typically consists of loose to medium dense sand with variable silt and gravel content deposited by the River. Where present, alluvium is typically located in the upper 10 ft of the soil profile and underlies fill soils or marsh deposits.
- **Recessional Outwash** – Typically consists of medium dense to dense sand with variable silt and gravel content. Occasional loose layers are present. Recessional outwash also includes medium dense to dense gravel with silt and sand. All explorations that encountered recessional outwash were terminated within the material. Below near surface soils, we interpret the majority of the project area to be underlain by recessional outwash.
- **Bedrock** – Typically consists of weathered to unweathered basalt. Where weathered, the bedrock is orange-brown and is silty/clayey. Where unweathered, bedrock is gray to black and difficult to break using a breaker bar. Several hand auger explorations were terminated on bedrock within Trail Segment A and the northern portion of Trail Segment B. Where encountered in our explorations, depth to bedrock is 1.2 to 6.5 ft.

2.3.2 VALLEY SUBSURFACE CONDITIONS SUMMARY

Underlying the surficial topsoil/sod, forest duff, or the cart path pavement section, our explorations in the valley generally encountered near-surface granular soil consisting of fine to medium sand with silt, or silty, fine sand. The gradation of the near-surface soils in the valley is relatively consistent, even though the materials can come from three different deposition processes (fill, alluvium,

or recessional outwash). At depths greater than 5 to 15 ft, our explorations generally encountered recessional outwash extending to the maximum depth explored at 101.5 ft BGS.

Marsh deposits were encountered in explorations B-3, and HA-2, HA-3, HA-6, HA-10, HA-18, HA-20, HA-21, and HA-22. The marsh deposits were typically buried beneath granular fill soils. Exploration HA-6 exposed marsh deposits at ground surface. We note that the area around HA-6 included abundant horsetail vegetation. Marsh deposits were not encountered in borings at the proposed abutment locations for the Deschutes River Bridge or Deschutes River Slough Bridge.

2.3.3 Upland Subsurface Condition Summary

Our explorations along Trail Spur #3 typically encountered recessional outwash underlying forest duff, and extending to the depths explored. Our explorations along Segment A and the northern portion of Segment B typically encountered fill or recessional outwash to the depths explored, or were terminated on bedrock underlying those materials.

2.3.4 Groundwater Conditions

Groundwater was encountered in the majority of our explorations in the valley at depths ranging between 1.1 and 9.0 feet BGS. We interpret the groundwater conditions in our explorations to comprise both perched irrigation water and the groundwater table associated with the River. In general, it appears that previous filling activity at the site created a complicated groundwater regime, where groundwater becomes trapped and perched along the west side of the Golf Course. We anticipate that the groundwater in the valley will fluctuate seasonally and be essentially at ground surface over much of the project area in the valley during the winter.

Groundwater was encountered in the upland portion of the site at Trail Spur #3 at approximately 59.2 ft BGS in exploration B-1. We interpret the groundwater encountered in B-1 to be the regional groundwater table within the recessional outwash soil. Based on our experience with groundwater fluctuation in upland portions of Tumwater, we estimate that the upland groundwater table fluctuation is on the order of a few feet or less.

Perched groundwater was encountered at the contact between soil and bedrock at several of our upland explorations within Segment A and Segment B. We anticipate perched groundwater will be present at this geologic contact throughout most of the wet season and after significant precipitation events.

2.4 LABORATORY TESTING

We completed gradation analyses consisting of moisture content determinations, percent passing the No. 200 sieve, and grain size distribution analysis. A detailed description of our laboratory testing program is contained in Appendix B.

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3.0 ENGINEERING STUDIES AND RECOMMENDATIONS

The following sections present the results of our engineering studies and recommendations in support of corresponding project elements. Construction recommendations are presented in Section 4.0 of this report.

3.1 GENERAL

We completed engineering studies to develop geotechnical recommendations in support of the design and construction of the proposed trail and bridge structures. Our recommendations were developed in general accordance with the guidance provided in the WSDOT Geotechnical Design Manual (GDM) M-46 03 (WSDOT GDM). Our engineering studies were completed to address the following issues:

- Cut slopes and fill embankments
- Embankment settlement
- Pavement design section
- Seismic design considerations
- Shallow foundation support of the three bridges
- Deep foundation support considerations for the Deschutes River Bridge.

3.2 STABILITY ANALYSES OF PROPOSED CUT SLOPES AND FILL EMBANKMENTS

We preformed limit equilibrium slope stability analyses to determine the factor of safety (FS) against slope failure for cut and fill areas along Trail Spur #3. Based on site grading plans, we anticipate that the soils that will be exposed/used in cut and fill areas will mostly include recessional outwash sand with silt and silty sand. This conceptual grading concept is illustrated on Figure 7.

We completed deep-seated slope stability analyses using the computer program SLIDE 6.0 (Rocscience, Inc. 2010). SLIDE 6.0 evaluates the stability of numerous trial failure surfaces using a vertical slice limit-equilibrium method. We selected the Spencer method for computation of our safety factors. We also completed analyses of shallow, surficial slides using the infinite slope method described in Chapter 7 of the WSDOT GDM.

The WSDOT GDM requires a FS of 1.25 for permanent cut and fill slopes under static conditions. The FS reflects the ratio of driving forces to resisting forces within a slope. For example, a FS of 1.0 indicates a marginally unstable slope. Seismic design criteria are not considered for slopes associated with non-critical structures (such as the proposed trail and bridge). The results of our slope stability analyses are provided on Table 1.

DRAFT

TABLE 1
SLOPE STABILITY ANALYSES RESULTS

Slope Condition	Shallow Slides FS	Deep Slides FS
Existing Slope (2H:1V)	1.32	1.60
Cut 2H:1V	1.32	1.60
Cut 1.9H:1V	1.28	1.55
Cut 1.8H:1V	1.21	1.51
Fill 2H:1V	1.32	1.60
Fill 1.9H:1V	1.28	1.55
Fill 1.8H:1V	1.21	1.51

Based on information presented in Chapter 7 of the WSDOT GDM, if the FS for shallow slides is near or below 1.15, severe erosion or shallow slumping is likely. On this basis, and considering the results of our analyses presented in Table 1, we recommend a maximum cut slope inclination of 1.8H:1V (horizontal to vertical). We also recommend a maximum fill embankment slope inclination of 1.8H:1V. Temporary erosion protection should be provided on the slopes until new vegetation is established. Using 2H:1V slopes for design would provide a slight advantage over 1.8H:1V slopes from an erosion control perspective.

3.3 EMBANKMENT SETTLEMENT

The most significant fill embankment for the project is the bottom section, Trail Spur #3 (schematically shown on Figure 7). We anticipate that this embankment fill could be up to about 20 ft thick. Based on our understanding of grading plans, this embankment would land on sand and gravel recessional outwash soils; compressible soils are not present at this location. Provided that this embankment fill is compacted in accordance with the recommendations of this report, we anticipate that the embankment settlement will be less than 2 inches. We also anticipate that settlement would be complete within about two weeks of the embankment construction and that the overall effect of this settlement would be negligible.

We understand that some of the low areas along the existing cart path will likely be raised to meet trail grade requirements. In areas where marsh deposits are present, the placement of fill will likely result in settlement. Based on the organic and moisture content of the marsh deposits encountered in our explorations, we estimate that about 1 to 2 inches of long-term settlement could be encountered for each foot of fill placed in some areas of the site. Landau Associates should review the final grading plans to determine if this will be a relevant design issue. We anticipate that settlement mitigation techniques could entail: 1) waiting one season after initial earthwork construction to pave in certain fill areas or 2) soil preloading certain fill areas at the beginning of construction.

DRAFT

3.4 PAVEMENT DESIGN

WSDOT 1515 does not provide recommendations for a minimum pavement section for shared-use paths; rather, the publication recommends that paths be designed in the same manner as highways, considering the specific traffic loading conditions. WSDOT 1515 also states, "design the pavement structural section as recommended by the Region Materials Engineer." Specific traffic loading information was not available at the time this report was prepared. In general, we understand that the traffic conditions will include foot and bicycle traffic, with occasional maintenance and emergency vehicles.

We completed an initial pavement design analysis using the AASHTO 91 Flexible Pavement Design methodology. However, because the vehicle loading conditions were essentially insignificant, minimum thickness pavement sections resulted from our analyses. We contacted several pavement engineers at WSDOT to discuss the minimum pavement thickness that would typically be acceptable for a shared-use path. Based on these discussions, we understand that the minimum acceptable pavement section is typically between 0.18 and 0.25 ft of AC overlying 0.33 ft of CSBC.

Based on our experience and judgment, our discussions with WSDOT, and our understanding of the existing cart path performance, we recommend the following pavement sections for a 20-year design life:

Standard-duty AC Pavement (Upland Areas and Elevated Portion of Hole 14).

- 2 inches of hot mix asphalt [(HMA) Class ½'', PG 64-22, WSDOT Section 5-04].
- 4 inches of CSBC (WSDOT Standard Specification 9-03.9(3)).
- A woven geotextile that meets the requirements for Soil Separation provided in Table 3 of Section 9-33 of the 2010 WSDOT *Standard Specification.* Please note that the woven geotextile is not required on the portion of the trail that follows the existing railroad grade in Segment A.
- Approved subgrade prepared as described.

Heavy-duty AC Pavement (Valley Areas)

- 2.5 inches of HMA (HMA Class ½'', PG 64-22, WSDOT Section 5-04)
- 6 inches of CSBC (WSDOT Standard Specification 9-03.9(3))
- A woven geotextile that meets the requirements for Soil Separation provided in Table 3 of Section 9-33 of the 2010 WSDOT *Standard Specifications*
- Approved subgrade prepared as described.

We understand that the cart path base course materials are proposed for reuse in-kind. It is our opinion that the majority of these materials will be suitable for reuse.

DRAFT

3.5 SEISMIC DESIGN CONSIDERATIONS

3.5.1 SPECTRAL ACCELERATION PARAMETERS

AASHTO bridge design parameters for seismic design category, site class, acceleration coefficient, and spectral acceleration coefficients are presented in Table 2 below. These parameters are in accordance with the Fifth Edition of the AASHTO LRFD Bridge Design Specifications (2010). The specification recommends a 7 percent probability of exceedance in 75 years (nominal 1,000-year earthquake) design event for development of a design spectrum for bridges.

TABLE 2
AASHTO SEISMIC PARAMETERS

AASHTO Seismic Parameter	Recommended Value
Site Class	D
Effective Peak Ground Acceleration Coefficient $A_s = F_{pga}PGA = (1.116)(0.384)$	0.429
Design Spectral Acceleration Coefficient at 0.2 second period $S_{DS} = F_aS_s = (1.164)(0.840)$	0.978
Design Spectral Acceleration Coefficient at 1.0 second period $S_{D1} = F_vS_1 = (1.776)(0.312)$	0.554

3.5.2 SOIL LIQUEFACTION

Liquefaction refers to the condition by which vibration or shaking of the ground, usually from earthquake forces, results in the development of excess pore pressures in saturated soils, with subsequent loss of strength. In general, soils that are susceptible to liquefaction include saturated, very loose to medium dense, clean to silty sands and some non-plastic silts.

Liquefaction can result in a temporary reduction of bearing capacity, which can cause settlement of structures that are supported on foundations within or above the liquefied soils. Liquefaction can also cause a temporary reduction of lateral support for structures supported on deep foundations.

We evaluated the liquefaction potential of the site soil using the Simplified Procedure (Youd et al. 2001). Based on our liquefaction analyses, we estimate that there is the potential for up to about 5 inches of liquefaction settlement at the proposed Palermo Waterway Bridge as the result of an AASHTO design level earthquake. Our analyses indicate that there is the potential for 3 to 4 inches of liquefaction settlement at the proposed Deschutes River Bridge and Deschutes River Slough Bridge as the result of a design level earthquake. The potentially liquefiable soil zones are discontinuous and inconsistent in depth across our exploration locations. Potentially liquefiable soil zones are typically 5 ft or less in thickness and most commonly encountered in the upper 25 ft across the bridge sites. The deepest soil zone was encountered around 70 ft BGS in exploration B-7.

DRAFT

We interpret the soil conditions underlying the project site at depth as recessional outwash. Based on its depositional history, we consider the liquefaction risk of these soils to be low to moderate when compared to areas with a severe to high risk, such as the Port of Olympia, Port of Tacoma, and other local areas with widespread deposits of very loose to loose recent alluvium. We understand that mitigating (with piles) for 4 to 5 inches of potential liquefaction settlement is not likely within the design objectives of the Palermo Waterway Bridge or the Deschutes River Slough Bridge.

3.5.3 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 significant grade changes are present. Based on the risk for soil liquefaction at the project site, it is our opinion that there is a slight risk for lateral spreading at the bridge sites. We understand that mitigating for lateral spreading is not likely within the design objectives of the Palermo Waterway Bridge or the Deschutes River Slough Bridge.

3.6 BRIDGE ABUTMENT SHALLOW FOUNDATION SUPPORT

3.6.1 GENERAL

It is our opinion that the proposed bridge abutments can be supported on shallow foundations from a static loading perspective. The pedestrian bridge structures are relatively lightly loaded and deep or widespread compressible soils were not encountered in our explorations. To reduce the potential for post-construction differential settlement, we recommend an overexcavation and replacement of organic marsh deposits that were encountered at the location of the eastern abutment of the Palermo Waterway Bridge (exploration B-3). We estimate that the required overexcavation depth will be about 7 ft. Because the exact abutment locations for the Deschutes River Bridge and Deschutes River Slough Bridge have not been defined, we recommend that the project plans allow for a contingency for 2 ft of overexcavation and replacement of unsuitable soil for these abutments, even though unsuitable soils were not encountered in our explorations in these areas. Additional information is provided in Section 5.0.

3.6.2 DESCHUTES RIVER BRIDGE SHALLOW FOUNDATION SEISMIC DESIGN CONSIDERATIONS

If the Deschutes River Bridge can be structurally isolated from approach structures or embankments, we anticipate the simplified seismic design requirements for single span bridges presented in AASHTO LRFD could be applicable. This should be verified by the structural engineer. Under this seismic design approach, bridge and abutment damage is acceptable, within limits, as the result of a

design level earthquake. This design approach is allowed because there is typically a low probability of occupancy during a design level earthquake for this type of recreational/pedestrian use structure. However, it is also possible that the City of Tumwater would like a specific level of seismic performance for the design level earthquake (possibly because of bridge construction cost and/or difficult access for post-earthquake repairs).

Based on our analysis, we recommend the following conditions be used by the structural engineer for initial seismic evaluations related to soil deformation and loading:

- Liquefaction induced settlement – 4 inches (total and differential over short distances)
- Lateral spreading loads – an equivalent fluid density of 325 pounds per cubic foot (pcf) acting on each bridge abutment for foundation depths of 7 ft BGS or less. Under this scenario, an ultimate passive resistance of the same amount is available along the opposite abutment if the bridge can be rigidly designed to transfer the load. A resistance factor of 1.0 should be used for this extreme limit state.

We anticipate additional discussions between the design team and the City of Tumwater on this topic after the initial structural evaluation of the bridge has been completed.

3.6.3 SHALLOW FOUNDATION DESIGN PARAMETERS

Our recommendations for soil loading conditions, soil resistance parameters, and resistance factors for the structural design of the bridge abutment foundations are provided below. Our recommendations are in accordance with the Fifth Edition of the AASHTO LRFD Bridge Design Specifications (2010).

- **Bearing Resistance** - Ultimate bearing resistance of 7 kips per square foot (ksf) for a 2-ft-wide footing, 9 ksf for a 4-ft-wide footing and 11 ksf for an 8-ft-wide footing. Resistance factors of 0.45 and 1.0 should be used for the strength and extreme limit states, respectively. For the service limit state, we recommend bearing resistances of 5 ksf, 4 ksf, and 3 ksf for a 2-ft-wide, 4-ft-wide, and 8-ft-wide footings, respectively. Service limit state is for 1-inch or less of foundation settlement under static loading. Intermediate capacities/footing sizes can be interpolated.
- **Active Lateral Earth Pressure** - 81 pounds per cubic foot (pcf) (includes hydrostatic)
- **At-rest Lateral Earth Pressure** - 100 pcf (includes hydrostatic)
- **Rectangular Seismic Surcharge Pressure** - If required, 9H pounds per square foot (psf), where H is the height of the wall. This pressure is based on the Mononobe-Okabe procedure using ½ of the peak ground acceleration for the site.
- **Coefficient of Base Friction** - Ultimate values of 0.60 and 0.49 for cast-in-place and precast concrete, respectively. For the strength limit state, resistance factors of 0.8 and 0.9 should be used for cast-in-place and precast concrete, respectively. A resistance factor of 0.9 should be used for the extreme limit state.
- **Passive Resistance** - Ultimate passive resistance of 195 pcf (assumes submerged conditions). For the strength limit state, a resistance factor of 0.5 should be used when calculating the

passive portion of the sliding resistance. A resistance factor of 1.0 should be used for the extreme limit state.

3.7 BRIDGE ABUTMENT DEEP FOUNDATION SUPPORT

3.7.1 GENERAL

We anticipate that deep foundations would be utilized if the design approach/objectives discussed in Section 3.62 cannot be achieved using shallow foundations. Based on our experience and conversations with the structural engineer, we anticipate that driven steel pipe piles or drilled shafts would be the preferred deep foundation type.

It is our opinion that friction piles or shafts could be used to reduce the potential magnitude of liquefaction induced settlement at the bridge abutments to about 2 inches or less. Based on our experience, we anticipate that applicable foundation diameters include 12-inch and 18-inch driven piles and 24-inch drilled shafts. Friction piles or shafts would need to extend below the minimum depth for lateral fixity. For planning and discussion purposes, we recommend this embedment depth be assumed at 40 ft. Under seismic design conditions (Extreme Limit State), we also recommend that the upper 25 ft of soil resistance be ignored to account for isolated zones of soil liquefaction that are more common in the upper 25 ft than at depth; we also recommend the use of a downdrag load along the upper 25 ft of the pile.

If piles or shafts are designed to mitigate for liquefaction induced settlement in strict accordance with AASHTO and the WSDOT GDM (the same approach that would be used for a highway bridge), these foundation elements would need to extend below the deepest liquefiable layer that is located within the upper 80 ft BGS (70 ft BGS in the case of this project) in order to overcome downdrag loads. For cost and construction feasibility purposes, we recommend that this depth be assumed at 100 ft if using the AASHTO WSDOT GDM approach. Detailed geotechnical recommendations for 100 ft deep foundations are not provided in this draft report. We recommend that the minimum diameter of a 100-ft shaft be 3-ft and the minimum diameter of a 100-ft driven pile be 24-inches. These diameters are based on constructability and slenderness considerations, and should be verified by the structural engineer.

We also discussed a concept with the structural engineer that includes designing the bridge abutments on shallow foundations sized for the anticipated static loading, but then adding piles as an extra safety measure to qualitatively reduce the risk for liquefaction settlement. Although this foundation design approach is not specifically described by AASHTO or WSDOT, we believe it is a practical approach for a pedestrian bridge.

3.7.2 AXIAL CAPACITY

We evaluated axial capacity of driven steel pipe piles and drilled shafts in general accordance with the methods described in the 2012 AASHTO LRFD Bridge Design Specifications and the WSDOT

GDM. We used the Nordlund/Thurman method to estimate axial capacity of driven piles and the O'Neill and Reese method to estimate the capacity of drilled shafts. We used a generalized soil profile for our analysis that considers the profile across the Deschutes River Bridge and Deschutes River Slough Bridge sites. Slight revisions could be required if deep foundations are selected for final design.

The results of our drilled shaft static and seismic analyses (24-inch-diameter shafts) are presented on Figures 8 and 9, respectively. The resistance factors presented in Table 3 should be used along with these figures. Please note that downdrag load are listed on Figure 9.

TABLE 3
RESISTANCE FACTORS FOR SINGLE SHAFTS

Loading	Service Limit	Strength Limit(a)	Extreme Limit
Compression	1.0	0.55 (Side) 0.50 (Tip)	1.0
Uplift	1.0	0.45 (Side)	0.8

(a) O'Neill and Reese 1999

The results of our static and seismic driven pile analysis (12-inch and 18-inch-diameter steel pipe piles) are presented on Figures 10 and 11, respectivly. The resistance factors presented in Table 4 should be used along with these figures. Please note that downdrag loads are provided on Figure 11.

TABLE 4
RESISTANCE FACTORS FOR DRIVEN PILES

Loading	Service Limit	Strength Limit				Extreme Limit
		Dynamic Testing	WSDOT Driving Formula	Wave Equation Analysis	Nominal Resistance (a)	
Compression	1.0	0.65 (Single Piles or Pile Groups)	0.55 (Single Piles or Pile Groups)	0.50 (Single Piles or Pile Groups)	0.45 (Single Piles or Pile Groups)	1.0
Uplift[1]	1.0	0.50 (Single Piles) 0.50 (Pile Groups)	0.35 (Single Piles) 0.50 (Pile Groups)	0.35 (Single Piles) 0.50 (Pile Groups)	0.35 (Single Piles) 0.50 (Pile Groups)	0.8

(a) Nordlund/Thurman

3.7.3 LATERAL SPREADING LOADS

We recommend that pile supported bridge abutments consider the following lateral spreading loads:

- 0 to 7 ft BGS: 325 pcf

- 7 to 15 ft BGS: 20H, where H is the depth BGS.

If the bridge can be designed as a ridged structure, equivalent lateral resistance is available at the opposite abutment. Lateral spreading loads should be applied over the full abutment/pile cap width and over 2 pile diameters below the cap.

3.7.4 LATERAL CAPACITY

The lateral response of a pile or shaft will depend on the density and composition of the soil, the ground slope inclination, the pile spacing, the flexural stiffness of the pile, the structural loads, and other factors. Table 5 provides our recommended soil profile (L-PILE parameters), in terms of embedment depth, to be used in lateral pile capacity evaluations for the project. These parameters are based on our experience and on published sources.

TABLE 5
L-PILE SOIL PARAMETERS

Soil Unit	Model Type	Effective Unit Weight (pci)	k (pci)	Friction Angle, □ (deg)	P-multiplier	
					Static	Seismic
0 to 25 ft BGS Loose to Medium Dense SAND and GRAVEL	SAND[(a)]	0.028	20	32	1.0	0.3
25 ft to 50 ft BGS Medium Dense SAND and GRAVEL	SAND[(a)]	0.031	50	33	1.0	0.7
Deeper than 50 ft BGS Medium Dense to Dense SAND and GRAVEL	SAND[(a)]	0.034	75	34	1.0	1.0

(a) = (Reese et al. 1974)
pci = pounds per cubic inch

For static loading conditions, L-PILE parameters should be modified to account for group effects. Our recommendations for P-multipliers to account for group effects are provided in Table 6.

TABLE 6
P-MULTIPLIERS FOR GROUP EFFECTS

Pile Spacing (in direction of loading)	Row 1	Row 2	Row 3 (and higher)
2D	0.45	0.33	0.25
3D	0.80	0.40	0.30
5D	1.00	0.85	0.70

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4.0 EARTHWORK AND CONSTRUCTION RECOMMENTATIONS

4.1 GENERAL

We anticipate that site development earthwork will include stripping and clearing, preparing subgrades, excavating for the trail, excavating for the bridge abutments, possibly driving piles or installing drilled shafts, and placing and compacting structural fill. We expect that the majority of site grading can be accomplished with conventional earthmoving equipment in proper working order. However, bedrock (basalt) is present at a shallow depth along much of Segment A and the northern half/upland portion of Segment B.

We understand that site grading plans will be developed to avoid cutting into bedrock. The depth at which our hand auger explorations were refused on bedrock is provided on the bottom of the exploration logs in Appendix A.

4.2 CLEARING AND STRIPPING

Clearing and stripping should consist of removing surface and subsurface deleterious materials including the existing pavement, sod/topsoil, forest duff, trees, brush, debris, and any other unsuitable loose/soft or organic materials. Stripping and clearing should extend at least 5 ft beyond all structures and areas to receive structural fill.

We estimate that an average stripping depth of about 0.4 ft will be required to remove sod/topsoil from the portions of the trail that are within developed areas. We estimate that an average stripping depth of about 1.0 ft will be required to remove the forest duff from the wooded areas. Additional stripping will be required in areas where trees are removed. We recommend that trees be removed by overturning so that a majority of the roots are removed.

4.3 SUBGRADE PREPARATION

4.3.1 GENERAL

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 uniformly unyielding condition. The upper 12 inches should be compacted to a soil density of at least 95 percent of the ASTM International D1557 Modified Proctor maximum dry density (MDD). The exposed subgrade should then be proof-rolled using loaded, rubber-tired, heavy equipment. An experienced geotechnical professional should 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

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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.

Subgrade preparation in areas of sloping ground should include constructing level keyways or benches. We recommend that the keyways or benches be completed in accordance with Section 1-03.3(14) of the 2012 WSDOT *Standard Specifications,* with the exception that we recommend a maximum step height of 3 ft.

4.3.2 BRIDGE ABUTMENTS

Our explorations encountered organic marsh deposits at the eastern Palermo Waterway Slough Bridge abutment extending to approximately 7.0 ft BGS. We consider the marsh deposits to be unsuitable foundation material due to their consolidation settlement potential. Accordingly, we recommend that the marsh deposits be overexcavated and replaced with structural fill at the location of the eastern bridge abutment.

Our explorations for the Deschutes River Bridge and Deschutes River Slough Bridge did not encounter unsuitable foundation material. Still, we recommend a minimal contingency be included in the project cost estimates to allow for 2 ft of overexcavation and replacement at the other bridge abutments. This is because the abutment locations have not been finalized.

Removal and replacement of unsuitable foundation material should be completed in accordance with Section 7-08.3(1)A of the 2012 WSDOT *Standard Specifications*. A woven geotextile should be placed in the bottom of the overexcavation and extended up the excavation sidewalls. We recommend a woven geotextile that meets the requirements for Soil Separation provided in Table 3 of Section 9-33 of the 2012 WSDOT *Standard Specifications*. The foundation replacement material should meet the requirements of Foundation Material Class A presented in Section 9-03.17 of the 2012 WSDOT *Standard Specifications*. Quarry Spalls as described in Section 9-13 of the 2012 WSDOT *Standard Specifications* is an acceptable alternative material, provided that the surface is fine-graded with Foundation Material Class A to allow for placement of foundation concrete.

4.4 TEMPORARY EXCAVATIONS

We anticipate that temporary excavations for the project will be mostly limited to the bridge abutment foundation excavations. We recommend that the bridge abutment excavations be completed in accordance with Section 2-09 of the 2012 WSDOT *Standard Specifications*. Actual excavation trench configurations and the maintenance of safe working conditions, including temporary excavation stability, is the responsibility of the contractor. Temporary excavations in excess of 4 ft should be shored or sloped

in accordance with Safety Standards for Construction Work, Part N, located in Chapter 296-115 of the Washington Administrative Code (WAC). The soil conditions that will be exposed in the bridge abutment excavations should be considered Type C soils.

4.5 DEEP FOUNDATION INSTALLATION

The following sections present geotechnical construction considerations for driven piles and drilled shafts, if selected for bridge foundation support.

4.5.1 DRIVEN PILES

We anticipate that open-ended steel pipe piles can be driven to depths of 40 to 100 ft BGS using an impact hammer. The minimum pile wall thickness, minimum hammer energy, and preliminary refusal criteria should be selected during final design, based on the results of our pile drivability and wave equation analysis for piles that will be specific to the selected pile diameters and lengths. Based on our experience, we estimate that a ½ inch wall could be appropriate for shallow friction piles, whereas a ¾ inch wall could be required to drive piles to 100 ft without damage.

For planning purposes, piles should be driven to the estimated design tip elevations determined by the structural engineer and shown on project plans. Actual pile embedment/tip elevations will be based on driving criteria, which are dependent upon the driving hammer characteristics, resistance required, group action, and other factors. The geotechnical engineer should review the contractor's hammer submittal and develop refusal criteria prior to pile installation. We expect that the actual pile lengths will vary and the contractor should be prepared to furnish longer piles in the event that actual pile penetrations exceed the estimates shown on plans. The contractor should also be prepared to cut and remove sections of the piles that are below minimum embedment for fixity, but meet practical refusal short of the estimated tip embedment

4.5.2 DRILLED SHAFTS

We interpret the soils at the site to have a high to severe potential for caving during drilled shaft installation. Caving soils should be anticipated. We recommend the use of a temporary steel casing in order to reduce the potential for caving. Since the shafts would be installed below the groundwater table, a positive head (water or drilling mud) should be maintained in the casing as the shaft is advanced in order to limit the potential for heave in the base of the shaft excavation, and loss of ground around the shaft perimeter during installation.

4.6 GROUNDWATER HANDLING

The project site includes high groundwater throughout most of the valley. We did not observe appreciable groundwater within the upland portions of the site except where perched on top of shallow bedrock. We anticipate that groundwater will be essentially at ground surface in the valley throughout much of the wet season. Based on our understanding of the proposed grading plans, we do not recommend performing earthwork construction in the valley during the wet season; controlling groundwater, as required to prepare firm and unyielding subgrades, would likely be cost-prohibitive.

We anticipate that any shallow, perched groundwater encountered during construction can be handled adequately with sumps, pumps, and/or diversion ditches. Groundwater handling needs will 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.

4.7 WET WEATHER EARTHWORK

The near surface soils at the site typically contain between 5 and 20 percent fines. When the moisture content of this soil is more than a few percent above the optimum moisture content, the soil will become unstable, and it will be difficult 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, our conversations with Golf Course personnel suggest that much of the proposed trail area in the valley is wet between November and April. 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
- Measures are taken to prevent onsite 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 to 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-ft-thick layer of quarry spalls be used to protect subgrade soils from disturbance in high traffic areas
- Contingencies are included in the project schedule and budget to allow for the above elements.

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4.8 STRUCTURAL FILL

4.8.1 GENERAL

Any inorganic material with a maximum particle size of 3 inches can be considered for use as structural fill provided that it can be moisture conditioned and compacted as recommended. 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. Gravel Borrow, as described in Section 9-03.14(1) of the 2012 WSDOT *Standard Specifications*, is a suitable source for structural 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.

4.8.2 ONSITE SOIL

The topsoil/sod, forest duff, and marsh deposit soil units should not be considered for reuse as structural fill. All other materials encountered in our explorations may be considered for reuse as structural fill during periods of extended dry weather. We note that the onsite soils typically consist of silty, fine sand and fine sand with silt. These materials are typically poorly-graded and difficult to compact to the specified MDD; thin lifts and significant moisture conditioning can be required to meet the specified compaction criteria.

4.8.3 PLACEMENT AND COMPACTION

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 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 4 inches for hand operated equipment and 8 inches for heavy equipment. We recommend that structural fill in the proposed trail areas be compacted as described in Section 2-03.3(14)C, Method B, of the 2012 WSDOT *Standard Specifications*. In general, this method specifies 95 percent compaction within 2 ft of pavement surfaces and 90 percent compaction below. Recommendations for structural fill placement beneath the bridge abutments are presented in Section 4.3.2 of this report.

5.0 OUTSTANDING FINAL DESIGN ISSUES

The flowing geotechnical related items are anticipated after the date of this draft report, prior to the design being finalized:

- Complete a deep boring at the western Deschutes River Bridge Abutment
- Complete hand augers for any approachment structures associated with the Deschutes River Bridge, after their configuration has been established, to evaluate the potential presence of compressible soil
- Provide support to R.W. Droll on Helical anchor supported walkway concepts for the E Street undercrossing, if applicable.

* * * * *

We appreciate the opportunity to be of service to you on this project. Please contact us if you have questions or require additional information.

LANDAU ASSOCIATES, INC.

Calvin A. McCaughan, P.E.
Senior Associate

CAM/bar

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6.0 REFERENCES

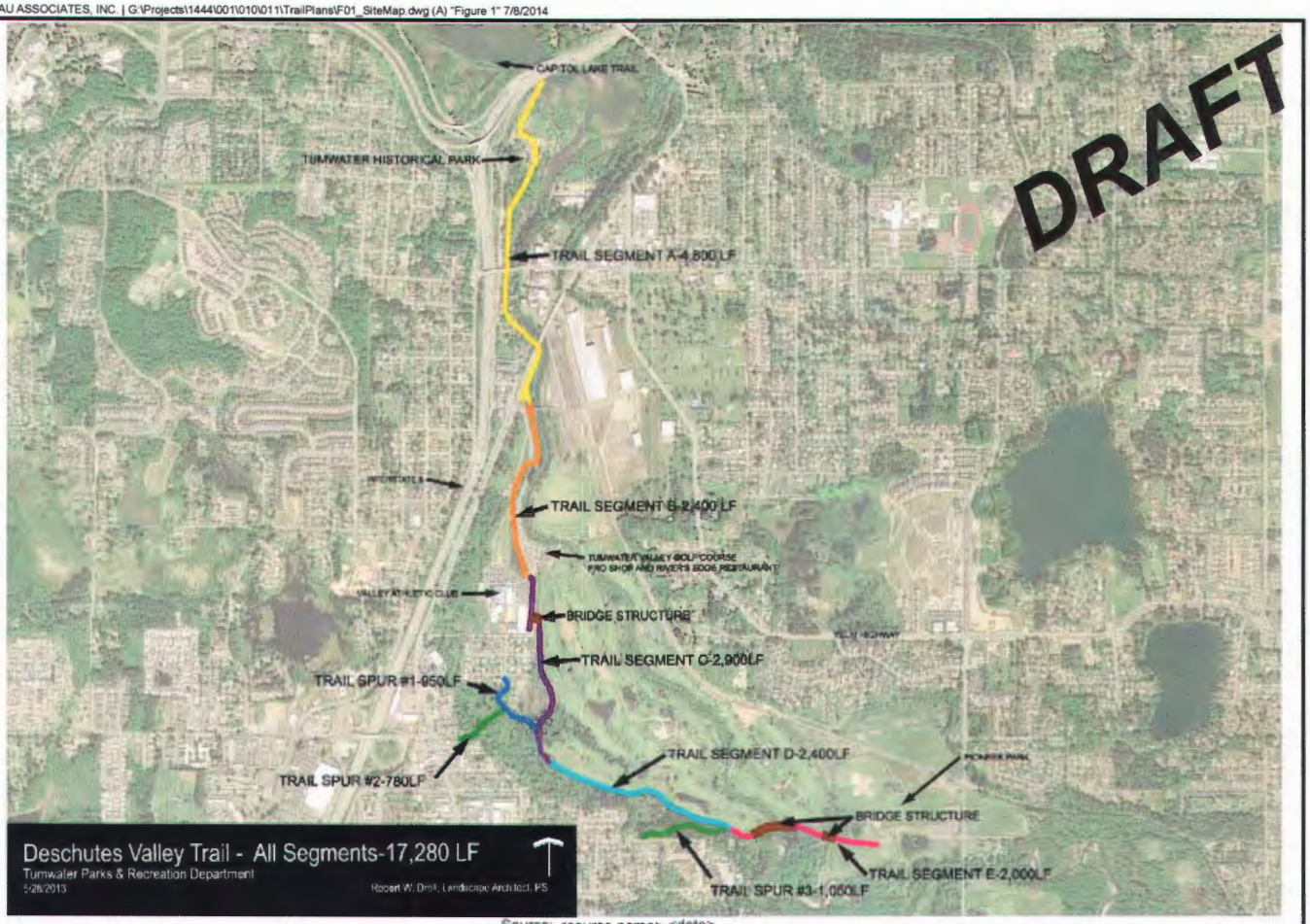
WSDOT. 2012. *Standard Specifications for Road, Bridge, and Municipal Construction.* Washington State Department of Transportation.

WSDOT. 2012. *Design Manual M 22-01.09.* Washington State Department of Transportation.

WSDOT. 2010. *Geotechnical Design Manual M 46-03.02.* Washington State Department of Transportation.

Rocscience Inc. 2012. Engineering Drawing: *Cross section of Deschutes Valley Trail.* Slide 6.018. August 30.

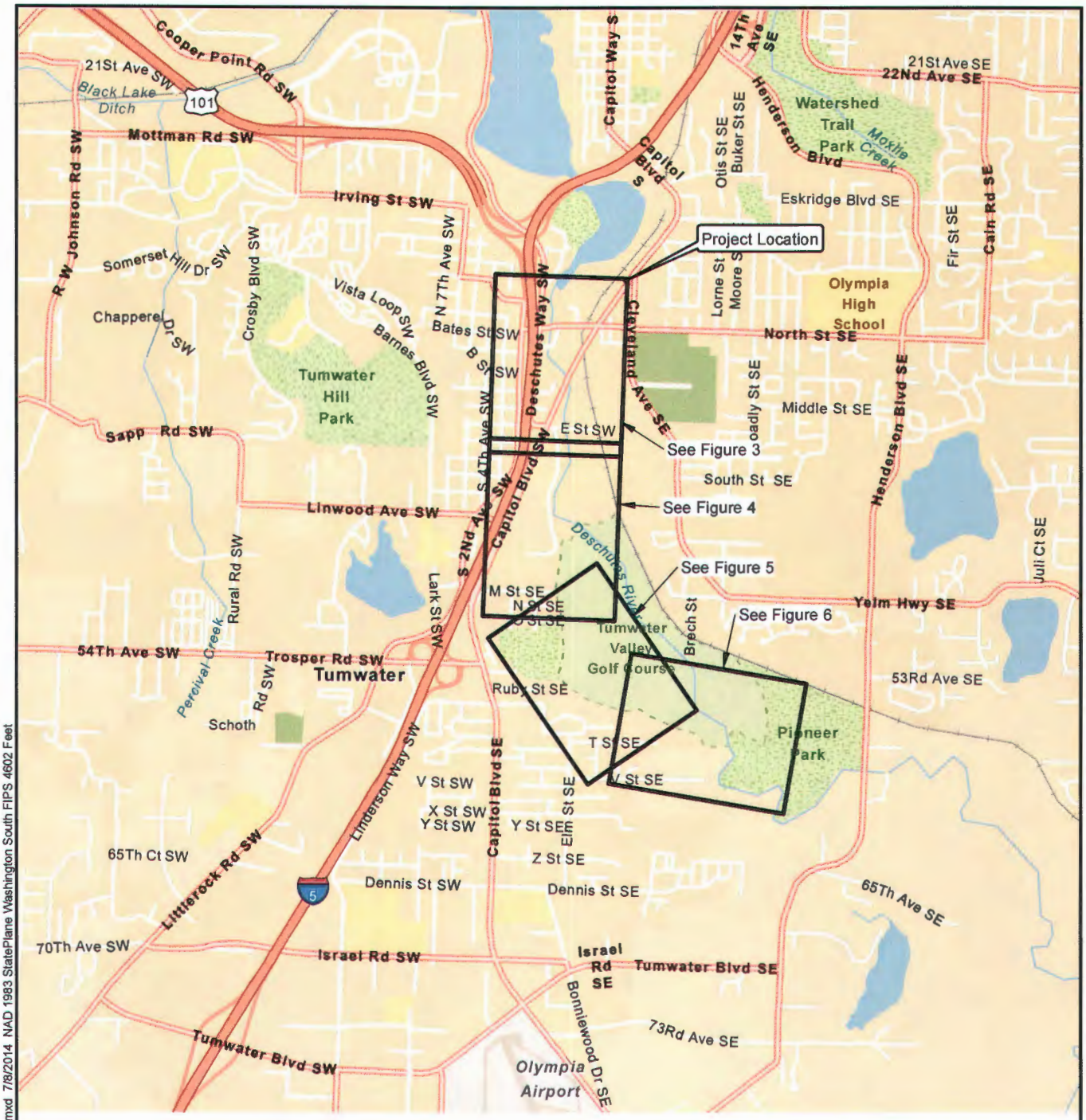
LANDAU ASSOCIATES, INC. | G:\Projects\1444\001\010\011\TrailPlans\F01_SiteMap.dwg (A) "Figure 1" 7/8/2014



Source: <source name> <date>

LANDAU ASSOCIATES	Deschutes Valley Trail Tumwater, WA	**Site Map**

Figure
1



Data Source: Esri 2012

G:\Projects\1444\001\010\011\TrailPlans\F02\VicMap.mxd 7/8/2014 NAD 1983 StatePlane Washington South FIPS 4602 Feet

LANDAU ASSOCIATES

Deschutes Valley Trail Tumwater, WA	**Vicinity Map**	Figure 2



Legend

- Boring Number and Approximate Location
- Hand Auger Number and Approximate Location
- Approximate Trail Alignment (See Project Plans for Actual Alignment)

0 400 800

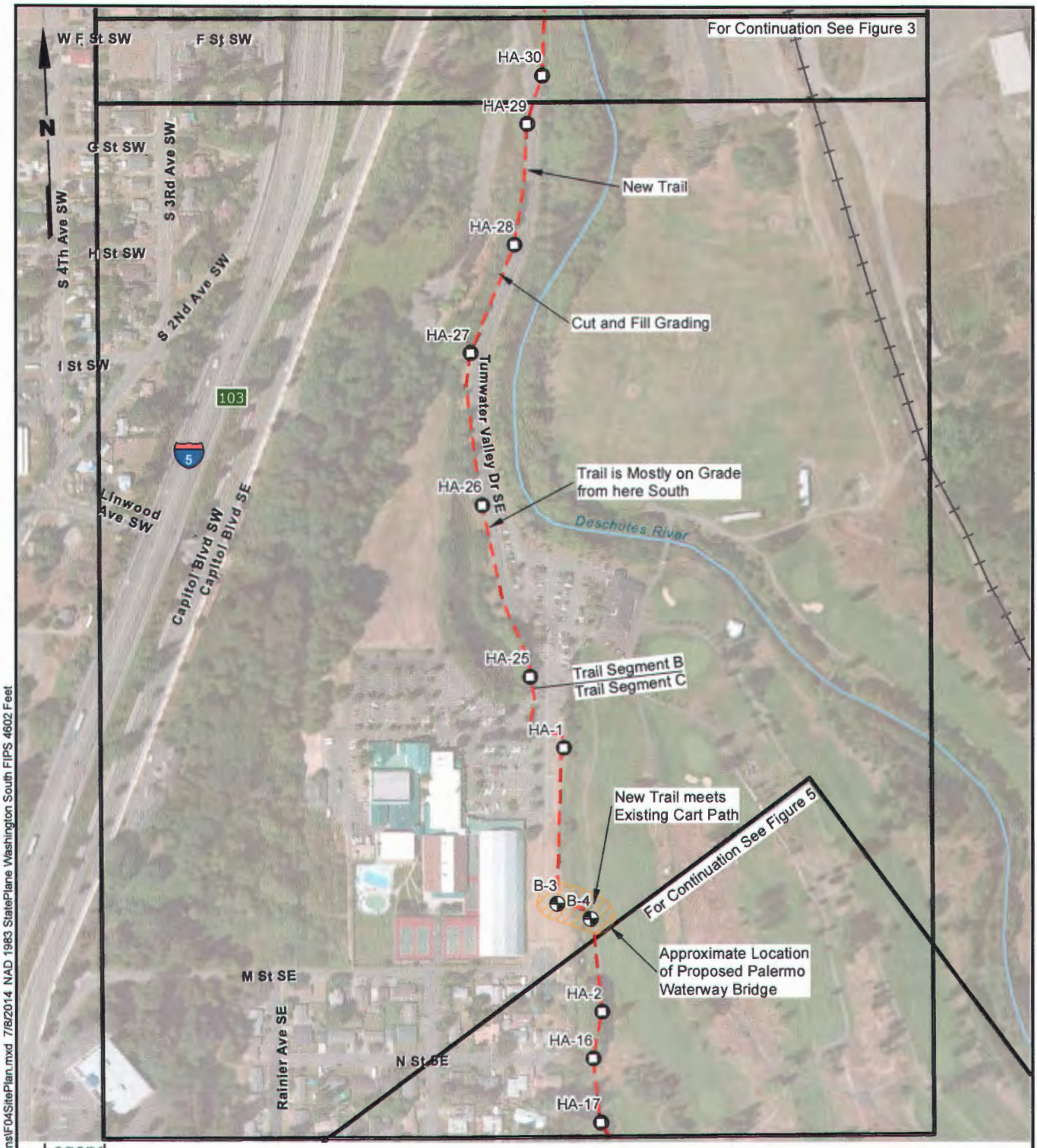
Feet

Data Source: Esri 2012

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Deschutes Valley Trail Tumwater, WA	**Site and Exploration Plan**	Figure 3



Legend

- Boring Number and Approximate Location
- Hand Auger Number and Approximate Location
- Approximate Trail Alignment (See Project Plans for Actual Alignment)

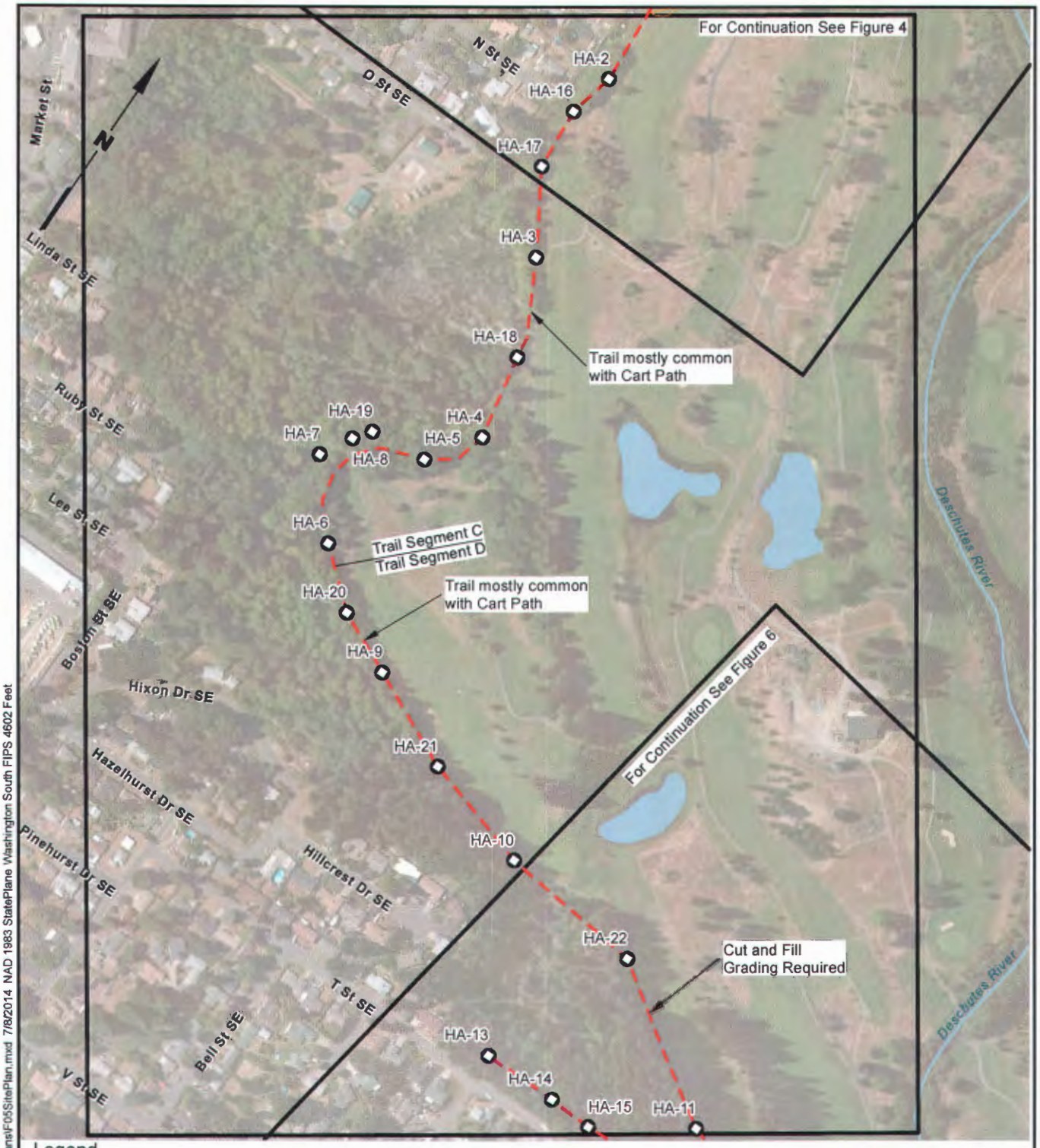
0 400 800
Feet

Data Source: Esri 2012

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Deschutes Valley Trail Tumwater, WA	**Site and Exploration Plan**	Figure 4



Legend

- Boring Number and Approximate Location
- Hand Auger Number and Approximate Location
- Approximate Trail Alignment (See Project Plans for Actual Alignment)

0 400 800

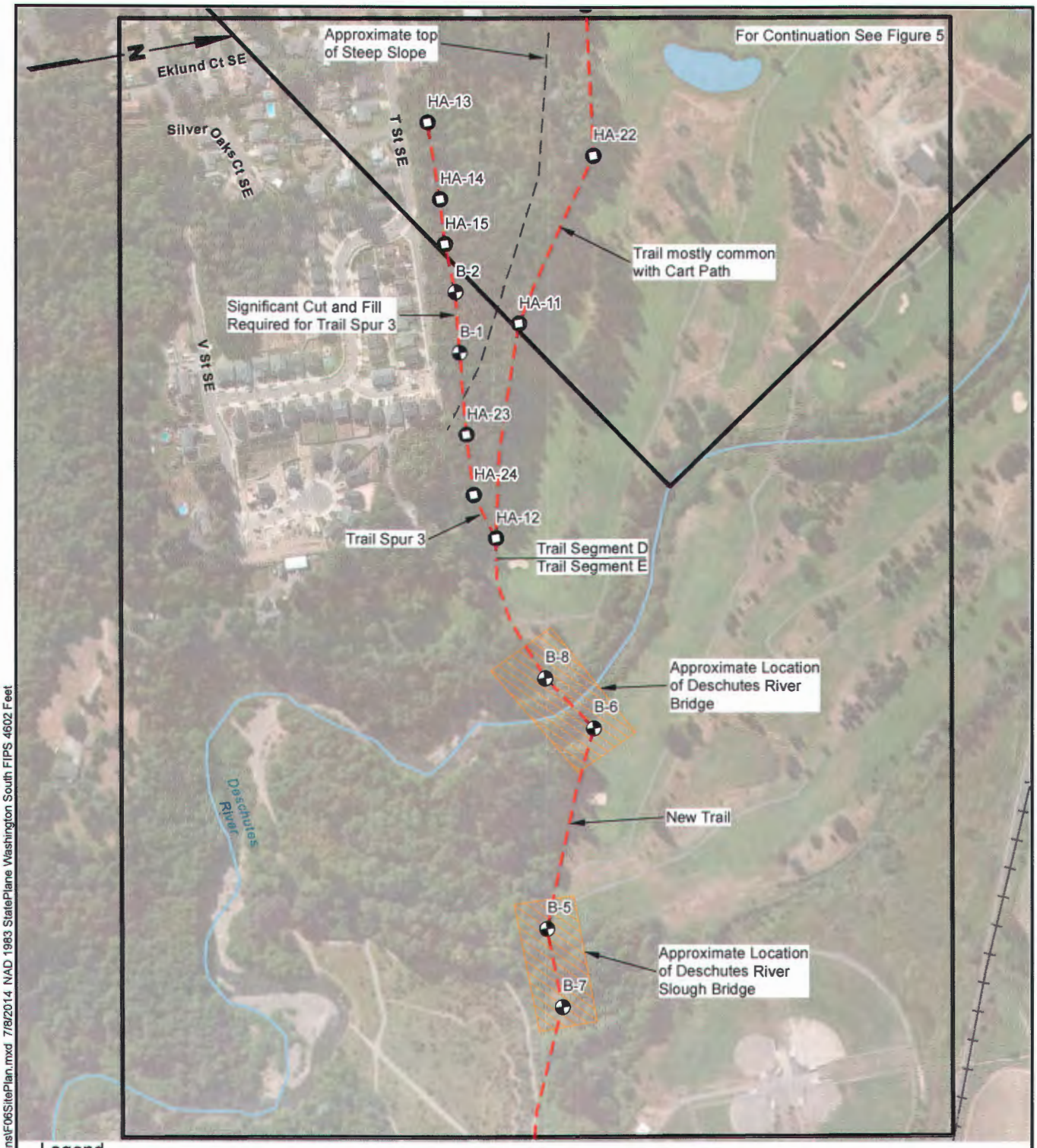
Feet

Data Source: Esri 2012

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LANDAU ASSOCIATES

Deschutes Valley Trail Tumwater, WA	**Site and Exploration Plan**	Figure 5

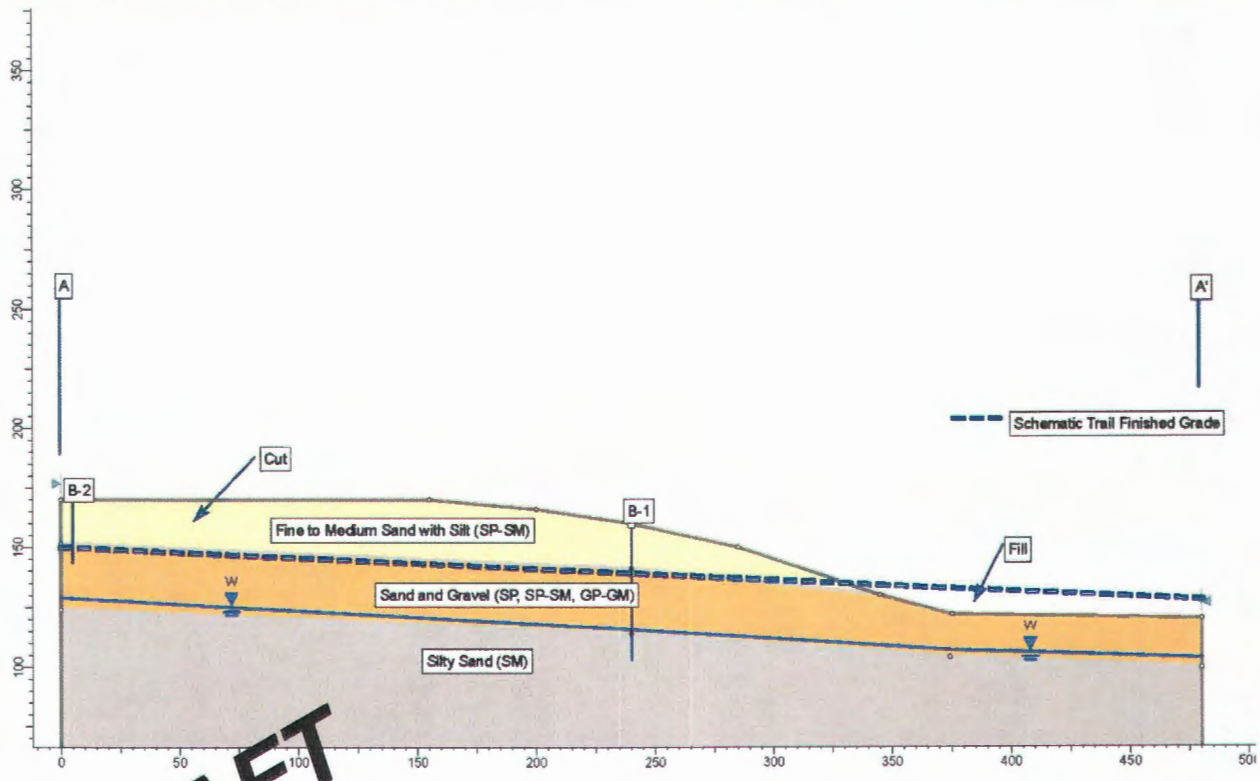


G:\Projects\1444\001\010\011\TrailPlans\F06SitePlan.mxd 7/8/2014 NAD 1983 StatePlane Washington South FIPS 4602 Feet

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Deschutes Valley Trail Tumwater, WA	**Site and Exploration Plan**	Figure 6

LANDAU ASSOCIATES, INC. | G:\Projects\1444\001\010\011\TrailPlans\F07Section.dwg (A) "Figure 7" 7/8/2014



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Note

1. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

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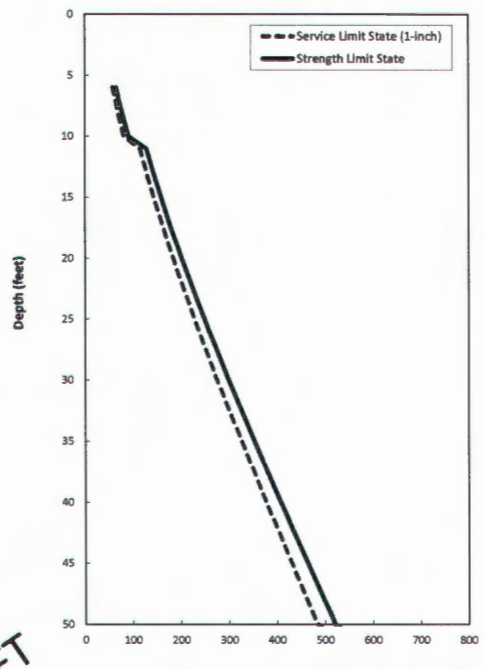
0 60 100
Horizontal Scale in Feet

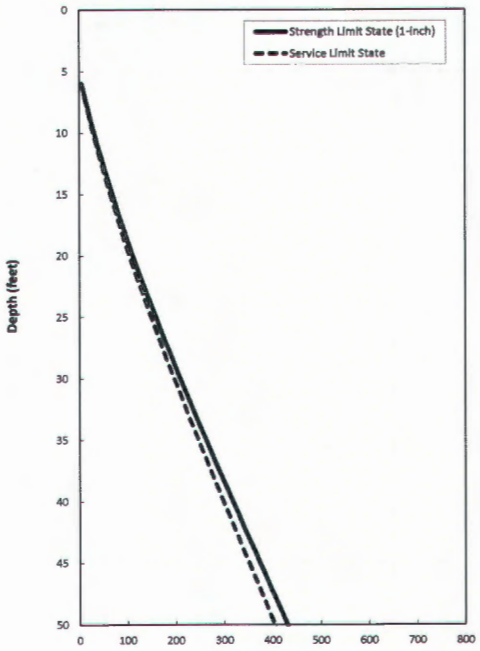
Deschutes Valley Trail
Tumwater, Washington

Geologic Profile A-A'

Figure
7

2-ft Diameter Drilled Shafts





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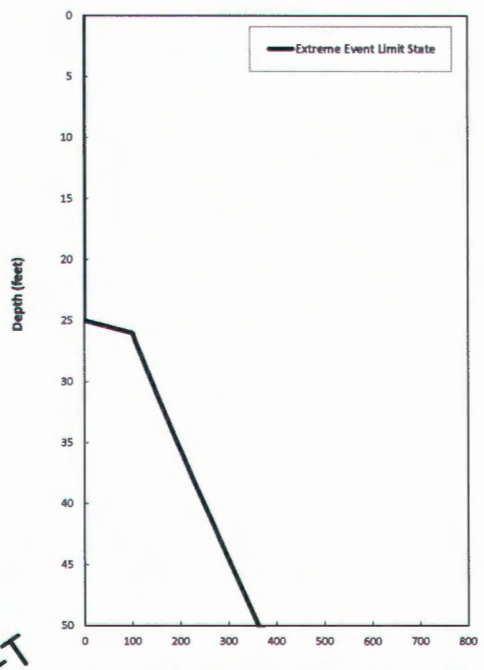
Notes:
1. Unfactored axial capacity estimates are based upon O'Neill and Reese method (1999), as discussed in 2012 AASHTO LRFD Bridge Design Specifications and upon local geotechnical engineering experience. Factored load resistance should be computed using appropriate resistance factors for side friction and end-bearing, which may differ.
2. The net weight of the shaft should be treated as a load applied to the top of the shaft. This load is not accounted for in these charts.
3. Recommended resistance factors are shown in the report text.
4. Capacities computed are for single drilled shafts.

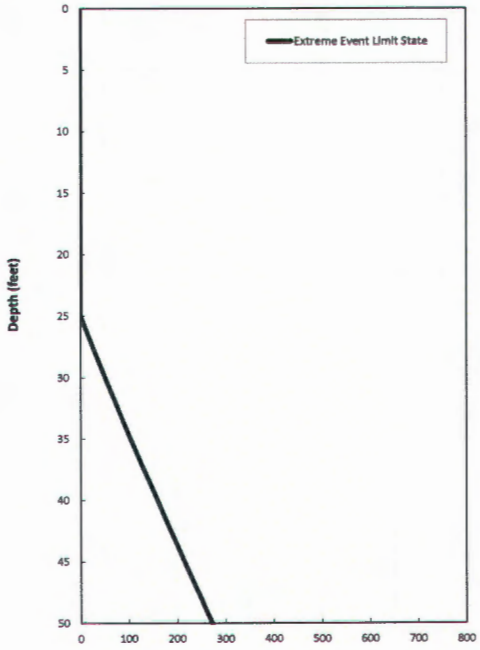
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Deschutes Valley Trail Tumwater, Washington	**Axial Shaft Capacity Service and Strength Limit States**	Figure 8

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2-ft Diameter Drilled Shafts





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Notes:

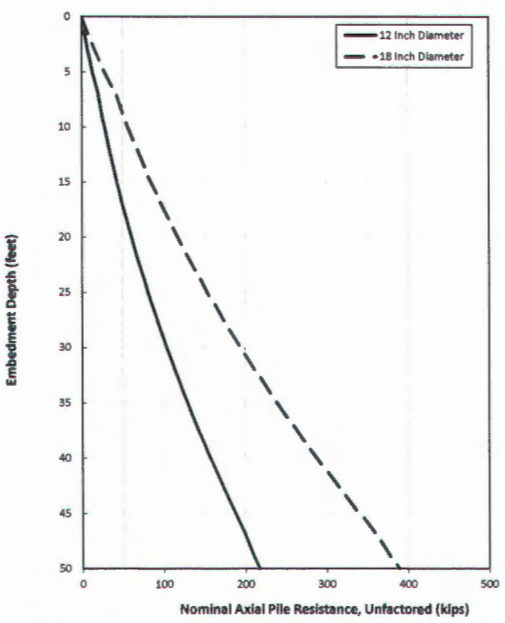
1. Unfactored axial capacity estimates are based upon O'Neill and Reese method (1999), as discussed in 2012 AASHTO LRFD Bridge Design Specifications and upon local geotechnical engineering experience. Factored load resistance should be computed using appropriate resistance factors for side friction and end-bearing, which may differ. The net weight of the shaft should be treated as a load applied to the top of the shaft. This load is not accounted for in these charts.
2. The net weight of the shaft should be treated as a load applied to the top of the shaft. This load is not accounted for in these charts.
3. Liquefaction-induced downdrag loads are 150 kips for the 2-ft diameter shafts.
4. Recommended resistance factors are shown in the report text.

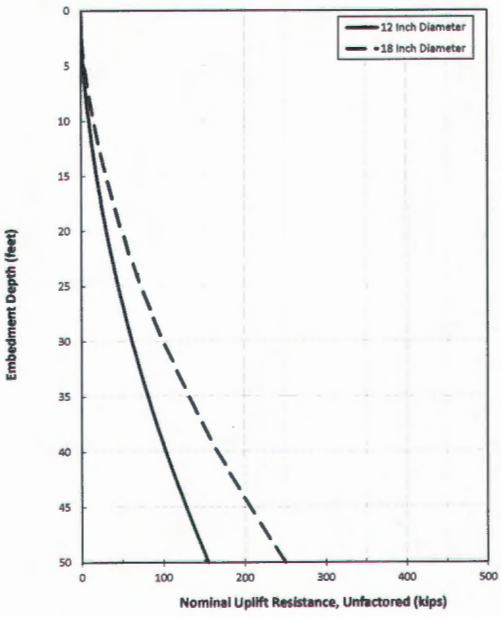
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Deschutes Valley Trail Tumwater, Washington	**Axial Shaft Capacity** **Extreme Event Limit State**	Figure 9

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Open-end Steel Pipe Piles (Service and Strength Limit States)





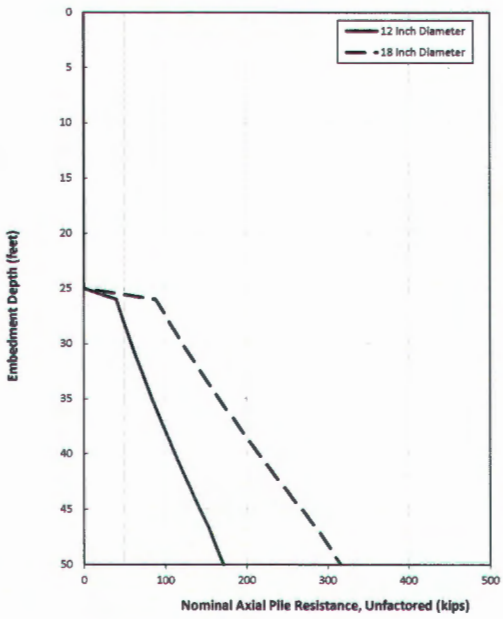
Notes:
1. The plots above present the nominal resistance as determined by the Nordlund/Thurman Method as described in 2012 AASHTO LRFD Bridge Design Specifications.
2. Nominal pile axial pile resistance assumes the piles are impact driven
3. Resistance Factors must be applied to the values above based upon the Limit State under consideration. Please see the main text of the report for the resistance factors.
4. A group reduction factor may be appropriate depending upon group geometry and pile loading considerations, as discussed in the text of the report.

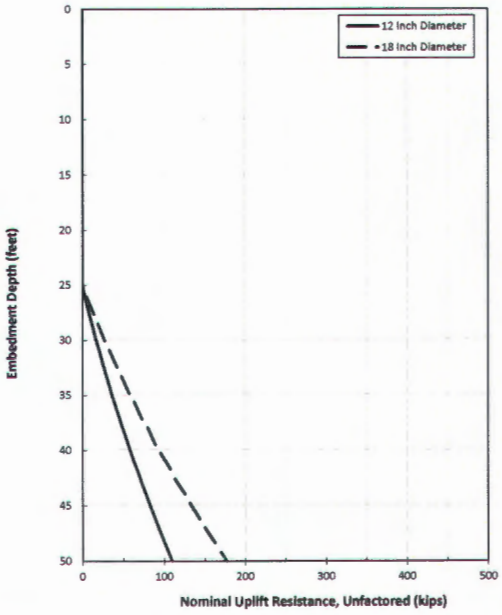
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Deschutes Valley Trail Tumwater, Washington	Axial Pile Capacity Service and Strength Limit States	Figure 10

Open-end Steel Pipe Piles (Extreme Event Limit State)





Notes:
1. The plots above present the nominal resistance as determined by the Nordlund/Thurman Method as described in 2012 AASHTO LRFD Bridge Design Specifications.
2. Nominal pile axial pile resistance assumes the piles are impact driven.
3. Resistance Factors must be applied to the values above based upon the Limit State under consideration. Please see the main text of the report for the resistance factors.
4. A group reduction factor may be appropriate depending upon group geometry and pile loading considerations, as discussed in the text of the report.
5. Liquefaction-induced downdrag loads are 45 kips and 75 kips for the12-inch and 18-inch diameter pipe piles, respectively.

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Deschutes Valley Trail Tumwater, Washington	**Axial Pile Capacity Extreme Event Limit State**	Figure 11

APPENDIX A

Subsurface Explorations

APPENDIX A
SUBSURFACE EXPLORATIONS

This appendix provides information about the subsurface exploration methods employed for the Deschutes Valley Trail project. Results of our subsurface exploration program and interpretation of the subsurface data is discussed in the main text of this report. The field exploration program consisted of seven borings advanced using truck- and track-mounted drilling equipment (designated B-1 through B-7) and 40 hand-auger borings (designated HA-1 through HA-40).

The field explorations were coordinated and monitored by representatives from our firmwho also obtained representative soil samples, maintained a detailed record of observed subsurface soil and groundwater conditions, and described the soil encountered by visual and textural examination. Each representative soil type observed was described using the soil classification system shown on Figure A-1, in general accordance with ASTM International D 2488, *Standard Recommended Practice for Description of Soils (Visual-Manual Procedure)*. Logs of our explorations are presented on Figures A-2 through A-28. These logs represent our interpretation of subsurface conditions identified during the geotechnical explorations. The stratigraphic contacts shown on the individual logs represent the approximate boundaries between soil types; actual transitions may be more gradual. Information presented on the summary logs depicts subsurface conditions only at the specified location on the date designated on the logs. Soil and groundwater conditions at other locations may differ from conditions observed at the exploration locations.

The explorations were located in the field by hand taping and pacing from existing physical features. The ground surface elevations shown on the logs were interpreted from topographic contours indicated on the site survey by MTN2COAST Surveying. The reported elevations should be considered approximate.

Disturbed samples of the soil in the borings were obtained at selected intervals using a 2.0-inch outside diameter split-spoon sampler. The sampler was driven into the undisturbed soil ahead of the auger bit with a 140-pound automatic hammer falling a distance of about 30 inches. The number of blows required to drive the sampler for the final 1 foot of soil penetration, or part thereof, is noted in the boring logs adjacent to the appropriate sample notation. Disturbed grab samples were obtained from the hand-auger borings either by hand or from the blades of the auger.

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Soil Classification System

MAJOR DIVISIONS			GRAPHIC SYMBOL	USCS LETTER SYMBOL[1]	TYPICAL DESCRIPTIONS[2][3]
COARSE-GRAINED SOIL (More than 50% of material is larger than No. 200 sieve size)	GRAVEL AND GRAVELLY SOIL (More than 50% of coarse fraction retained on No. 4 sieve)	CLEAN GRAVEL (Little or no fines)		GW	Well-graded gravel; gravel/sand mixture(s); little or no fines
				GP	Poorly graded gravel; gravel/sand mixture(s); little or no fines
		GRAVEL WITH FINES (Appreciable amount of fines)		GM	Silty gravel; gravel/sand/silt mixture(s)
				GC	Clayey gravel; gravel/sand/clay mixture(s)
	SAND AND SANDY SOIL (More than 50% of coarse fraction passed through No. 4 sieve)	CLEAN SAND (Little or no fines)		SW	Well-graded sand; gravelly sand; little or no fines
				SP	Poorly graded sand; gravelly sand; little or no fines
		SAND WITH FINES (Appreciable amount of fines)		SM	Silty sand; sand/silt mixture(s)
				SC	Clayey sand; sand/clay mixture(s)
FINE-GRAINED SOIL (More than 50% of material is smaller than No. 200 sieve size)	SILT AND CLAY (Liquid limit less than 50)			ML	Inorganic silt and very fine sand; rock flour; silty or clayey fine sand or clayey silt with slight plasticity
				CL	Inorganic clay of low to medium plasticity; gravelly clay; sandy clay; silty clay; lean clay
				OL	Organic silt; organic, silty clay of low plasticity
	SILT AND CLAY (Liquid limit greater than 50)			MH	Inorganic silt; micaceous or diatomaceous fine sand
				CH	Inorganic clay of high plasticity; fat clay
				OH	Organic clay of medium to high plasticity; organic silt
	HIGHLY ORGANIC SOIL			PT	Peat; humus; swamp soil with high organic content

OTHER MATERIALS	GRAPHIC SYMBOL	LETTER SYMBOL	TYPICAL DESCRIPTIONS
PAVEMENT		AC or PC	Asphalt concrete pavement or Portland cement pavement
ROCK		RK	Rock (See Rock Classification)
WOOD		WD	Wood, lumber, wood chips
DEBRIS		DB	Construction debris, garbage

Notes:
1. USCS letter symbols correspond to symbols used by the Unified Soil Classification System and ASTM classification methods. Dual letter symbols (e.g., SP-SM for sand or gravel) indicate soil with an estimated 5-15% fines. Multiple letter symbols (e.g., ML/CL) indicate borderline or multiple soil classifications.
2. Soil descriptions are based on the general approach presented in the Standard Practice for Description and Identification of Soils (Visual-Manual Procedure), outlined in ASTM D 2488. Where laboratory index testing has been conducted, soil classifications are based on the Standard Test Method for Classification of Soils for Engineering Purposes, as outlined in ASTM D 2487.
3. Soil description terminology is based on visual estimates (in the absence of laboratory test data) of the percentages of each soil type and is defined as follows:

Primary Constituent:	> 50% - "GRAVEL," "SAND," "SILT," "CLAY," etc.
Secondary Constituents:	> 30% and ≤ 50% - "very gravelly," "very sandy," "very silty," etc.
	> 15% and ≤ 30% - "gravelly," "sandy," "silty," etc.
Additional Constituents:	> 5% and ≤ 15% - "with gravel," "with sand," "with silt," etc.
	≤ 5% - "with trace gravel," "with trace sand," "with trace silt," etc., or not noted.

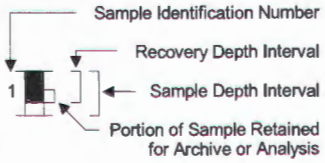
4. Soil density or consistency descriptions are based on judgement using a combination of sampler penetration blow counts, drilling or excavating conditions, field tests, and laboratory tests, as appropriate.

Drilling and Sampling Key

SAMPLER TYPE

Code	Description
a	3.25-inch O.D., 2.42-inch I.D. Split Spoon
b	2.00-inch O.D., 1.50-inch I.D. Split Spoon
c	Shelby Tube
d	Grab Sample
e	Single-Tube Core Barrel
f	Double-Tube Core Barrel
g	2.50-inch O.D., 2.00-inch I.D. WSDOT
h	3.00-inch O.D., 2.375-inch I.D. Mod. California
i	Other - See text if applicable
1	300-lb Hammer, 30-inch Drop
2	140-lb Hammer, 30-inch Drop
3	Pushed
4	Vibrocore (Rotosonic/Geoprobe)
5	Other - See text if applicable

SAMPLE NUMBER & INTERVAL



Field and Lab Test Data

Code	Description
PP = 1.0	Pocket Penetrometer, tsf
TV = 0.5	Torvane, tsf
PID = 100	Photoionization Detector VOC screening, ppm
W = 10	Moisture Content, %
D = 120	Dry Density, pcf
-200 = 60	Material smaller than No. 200 sieve, %
GS	Grain Size - See separate figure for data
AL	Atterberg Limits - See separate figure for data
GT	Other Geotechnical Testing
CA	Chemical Analysis

Groundwater

▽ Approximate water level at time of drilling (ATD)

▼ Approximate water level at time other than ATD

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Deschutes Valley Trail
Tumwater, Washington

Soil Classification System and Key

Figure A-1

B-1

LAI Project No: 1444001.010

Drilling Method: Hollow-Stem Auger
Ground Elevation (ft): 165
Drilled By: Holocene Drilling Inc.
Logged By: CAM Date: 08/06/12

Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol	Soil Profile	Groundwater
0	165	S-1	b2	4				14" of Forest Duff **(TOPSOIL/SOD/DUFF)**	
							SP-SM	Brown, fine to medium SAND with silt (medium dense, moist) **(RECESSIONAL OUTWASH)**	
5	160	S-2	b2	12	-200 = 11 W = 8				
10	155	S-3	b2	16	-200 = 13 W = 9			-grades to gray	
15	150	S-4	b2	14	GS -200 = 12 W = 9				
							SP	Gray, very gravelly SAND (very dense, moist)	
20	145	S-5	b2	60	GS -200 = 4 W = 5			-density over stated due to rock in sampler tip	
25	140	S-6	b2	28				-grades to medium dense	
30	135	S-7	b2	24	W = 6			-gravel content decreases	
							SP-SM	Gray, gravelly SAND with silt (dense, moist)	
35	130								

Moisture Content (%) — Plastic Limit — Liquid Limit
10 20 30 40

▲ SPT N-Value ▲
△ Non-Standard N-Value △
10 20 30 40

× Fines Content (%) ×
10 20 30 40

60

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

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1444001.01 7/8/14 Y:\1444\001.010\T\1444001.010.GPJ SOIL BORING LOG WITH GRAPH

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Deschutes Valley Trail
Tumwater, Washington

Log of Boring B-1

Figure A-2 (1 of 2)

B-1

LAI Project No: 1444001.010

SAMPLE DATA / SOIL PROFILE

Drilling Method: Hollow-Stem Auger
Ground Elevation (ft): 165
Drilled By: Holocene Drilling Inc.
Logged By: CAM Date: 08/06/12

Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol	Soil Description
35	130	S-8	b2	38	-200 = 12 W = 9		SP-SM	Gray, gravelly SAND with silt (dense, moist)
							GP-GM	Gray, sandy GRAVEL with silt (dense, moist)
40	125	S-9	b2	47				
45	120	S-10	b2	42				-grades to include fine to medium sand seams
							SM	Brown, silty SAND (medium dense, moist)
50	115	S-11	b2	27	-200 = 23 W = 13			
55	110	S-12	b2	32				-grades to dense, includes iron-stained lenses
60	105	S-13	b2	45	W = 28			-grades to wet
65								
70								

Groundwater: ▽ 59.2 ft ATD

Moisture Content (%) — Plastic Limit — Liquid Limit
10 20 30 40

▲ SPT N-Value ▲
△ Non-Standard N-Value △
10 20 30 40

× Fines Content (%) ×
10 20 30 40

Boring Completed 08/06/12
Total Depth of Boring = 61.5 ft.

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Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

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Deschutes Valley Trail Tumwater, Washington	Log of Boring B-1	Figure A-2 (2 of 2)

B-2

LAI Project No: 1444001.010

SAMPLE DATA | **SOIL PROFILE**

Drilling Method: Hollow-Stem Auger
Ground Elevation (ft): 170
Drilled By: Holocene Drilling Inc.
Logged By: CAM Date: 08/06/12

Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol	Soil Description	Groundwater
0	170	S-1	b2	4			SM	11" of Forest Duff **(TOPSOIL/SOD/DUFF)**	Groundwater Not Encountered
								Brown, silty, fine to medium SAND (medium dense, moist) **(RECESSIONAL OUTWASH)**	
5	165	S-2	b2	10					
10	160	S-3	b2	18	GS -200 = 13 W = 9			-grades to gray, includes silty sand seams	
15	155	S-4	b2	48				-grades to dense, includes trace gravel	
20	150	S-5	b2	16			GP-GM	Gray, sandy GRAVEL with silt (medium dense, moist)	
25	145	S-6	b2	32				-grades to dense	
30									
35									

Moisture Content (%) — Plastic Limit — Liquid Limit
10 20 30 40

▲ SPT N-Value ▲
△ Non-Standard N-Value △
10 20 30 40

× Fines Content (%) ×
10 20 30 40

Boring Completed 08/06/12
Total Depth of Boring = 26.5 ft.

DRAFT

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

1444001.01 7/8/14 Y:\1444\001.010\T\1444001.010.GPJ SOIL BORING LOG WITH GRAPH

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Deschutes Valley Trail
Tumwater, Washington

Log of Boring B-2

Figure A-3

B-3

LAI Project No: 1444001.010

Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol	Soil Profile
								Drilling Method: Mud Rotary Ground Elevation (ft): 102 Drilled By: Holocene Drilling Inc. Logged By: CAM Date: 08/06/12
0	100	S-1	b2	3			SM	5" of Topsoil/Sod **(TOPSOIL/SOD/DUFF)** Dark brown, silty SAND with organics (loose, moist) **(FILL)**
		S-2	b2	3	W = 44		MH/PT	Dark brown SILT with sand and peat (soft, wet) **(MARSH DEPOSITS)**
5	95	S-3	b2	3	W = 65			
		S-4	b2	36			GM	Gray, silty, sandy GRAVEL (dense, wet) **(RECESSIONAL OUTWASH)**
10	90	S-5	b2	19	-200 = 21 W = 15			-grades to medium dense
15	85						SM	Gray, silty SAND (loose, wet)
		S-6	b2	8				
20								
25								
30								
35								

Groundwater: ▽ 3.1 ft ATD

Moisture Content (%) — Plastic Limit — Liquid Limit
10 20 30 40

▲ SPT N-Value ▲
△ Non-Standard N-Value △
10 20 30 40

× Fines Content (%) ×
10 20 30 40

Boring Completed 08/06/12
Total Depth of Boring = 19.0 ft.

DRAFT

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

1444001.01 7/8/14 Y:\1444\001.010\T\1444001.010.GPJ SOIL BORING LOG WITH GRAPH

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Deschutes Valley Trail
Tumwater, Washington

Log of Boring B-3

Figure A-4

B-4

LAI Project No: 1444001.010

Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol	Soil Profile	Groundwater
0	95	S-1	b2	8			PT / GP	3" of Topsoil/Sod (TOPSOIL/SOD/DUFF)	
								Brown, sandy GRAVEL (loose, moist) (FILL)	
		S-2	b2	10				-grades to medium dense	
5	90	S-3	b2	11	-200 = 7 W = 22		SP-SM	Gray, fine to medium SAND with silt and gravel (medium dense, moist) (RECESSIONAL OUTWASH)	▽ 6.3 ft ATD
		S-4	b2	12	-200 = 7 W = 27			-grades to wet	
10	85								
		S-5	b2	8	-200 = 10 W = 33			-grades to loose	
15	80								
		S-6	b2	13				-grades to medium dense	
20	75							-grades to trace gravel (medium dense, moist)	
		S-7	b2	20	-200 = 8 W = 28			-grades to gray-brown	
25	70								
		S-8	b2	19					
30	65								
							ML	Gray SILT with sand (medium stiff, moist to wet)	
35	60	S-9	b2	6	-200 = 94 W = 39				

Drilling Method: Mud Rotary
Ground Elevation (ft): 95
Drilled By: Holocene Drilling Inc.
Logged By: CAM Date: 08/06/12

Moisture Content (%) — Plastic Limit — Liquid Limit
10 20 30 40

▲ SPT N-Value ▲
△ Non-Standard N-Value △
10 20 30 40

× Fines Content (%) ×
10 20 30 40

DRAFT

Notes:
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3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

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Deschutes Valley Trail
Tumwater, Washington

Log of Boring B-4

Figure A-5 (1 of 2)

B-4

LAI Project No: 1444001.010

SAMPLE DATA / SOIL PROFILE

Drilling Method: Mud Rotary
Ground Elevation (ft): 95
Drilled By: Holocene Drilling Inc.
Logged By: CAM Date: 08/06/12

Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol	Soil Description	Groundwater
35	60						ML	Gray SILT with sand (medium stiff, moist to wet)	
		S-10	b2	10				-grades to stiff	
40	55						SM	Dark gray, very silty SAND (medium dense, wet)	
		S-11	b2	20	-200 = 40 W = 30				
45	50								
		S-12	b2	35				-grades to dense	
50	45								
		S-13	b2	27				-grades to gray-brown, medium dense	
55	40								
		S-14	b2	31				-grades to dense	
60									
65									
70									

Boring Completed 08/06/12
Total Depth of Boring = 59.0 ft.

Moisture Content (%) (Plastic Limit – Liquid Limit)
10 20 30 40

▲ SPT N-Value ▲
△ Non-Standard N-Value △
10 20 30 40

× Fines Content (%) ×
10 20 30 40

DRAFT

Notes:
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2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

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Deschutes Valley Trail
Tumwater, Washington

Log of Boring B-4

Figure
A-5
(2 of 2)

B-5

LAI Project No: 1444001.010

SAMPLE DATA / SOIL PROFILE

Drilling Method: Hollow-Stem Auger
Ground Elevation (ft): 110
Drilled By: Holocene Drilling Inc.
Logged By: DAR Date: 06/02/14

Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol	Soil Description	Groundwater
0	110						SP	3" of Topsoil/Sod **(TOPSOIL/SOD/DUFF)**	
								Brown, fine to medium SAND (loose, moist) **(FILL)**	
		S-1	b2	9	W = 13 GS		SP-SM	Brown, fine SAND with silt (loose, moist) **(ALLUVIUM)**	
5	105	S-2	b2	8	W = 22 -200 = 14				▽ 7.0 ft ATD
		S-3	b2	14	W = 11 GS		SP-SM	Brown, very gravelly SAND with silt (medium dense, wet) **(RECESSIONAL OUTWASH)**	
10	100	S-4	b2	14	W = 12 GS		GP-GM	Brown, very sandy GRAVEL with silt (medium dense, wet)	
15	95	S-5	b2	23			GP	Gray, fine to coarse GRAVEL with sand (medium dense, wet)	
20	90	S-6	b2	25			SM	Gray, silty SAND (medium dense, wet)	
25	85	S-7	b2	21	W = 31 -200 = 26		SP-SM	Gray, very gravelly SAND with silt (medium dense, wet)	
30	80	S-8	b2	24	W = 8 -200 = 6				
35	75								

Moisture Content (%) — Plastic Limit — Liquid Limit
10 20 30 40
▲ SPT N-Value ▲
△ Non-Standard N-Value △
10 20 30 40
× Fines Content (%) ×
10 20 30 40

DRAFT

Notes:
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3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

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Deschutes Valley Trail
Tumwater, Washington

Log of Boring B-5

Figure A-6 (1 of 3)

B-5

LAI Project No: 1444001.010

Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol	SOIL PROFILE	Groundwater	Moisture Content (%) / SPT N-Value / Fines Content (%)
								Drilling Method: Hollow-Stem Auger Ground Elevation (ft): 110 Drilled By: Holocene Drilling Inc. Logged By: DAR Date: 06/02/14		Plastic Limit 10 20 30 40 Liquid Limit ▲ SPT N-Value ▲ (△ Non-Standard N-Value △) 10 20 30 40 × Fines Content (%) × 10 20 30 40
35	75	S-9	b2	24	W = 13 GS		SP-SM	Gray, very gravelly SAND with silt (medium dense, wet)		
							SP-SM	Gray, gravelly SAND with silt (dense, wet)		
40	70	S-10	b2	39	W = 13 GS					
45	65	S-11	b2	25				-grades to medium dense		
50	60	S-12	b2	27	W = 16 GS			-grades to with gravel		
55	55	S-13	b2	42				-grades to dense		
60	50	S-14	b2	48						
65	45	S-15	b2	57				-grades to very dense		57
70	40									

DRAFT

Notes:
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3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

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Deschutes Valley Trail
Tumwater, Washington

Log of Boring B-5

Figure A-6 (2 of 3)

B-5

LAI Project No: 1444001.010

SAMPLE DATA						SOIL PROFILE				
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol	Drilling Method: Hollow-Stem Auger Ground Elevation (ft): 110 Drilled By: Holocene Drilling Inc. Logged By: DAR Date: 06/02/14	Groundwater	Moisture Content (%) Plastic Limit / Liquid Limit 10 20 30 40 ▲ SPT N-Value ▲ △ Non-Standard N-Value △ 10 20 30 40 × Fines Content (%) × 10 20 30 40
70	40	S-16	b2	28	W = 23 -200 = 6		SP-SM	Gray, gravelly SAND with silt (dense, wet) -grades to medium dense		× ● ▲
75	35	S-17	b2	40				-grades to dense		▲

Boring Completed 06/02/14
Total Depth of Boring = 76.5 ft.

80 85 90 95 100 105

DRAFT

Notes:
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3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

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Deschutes Valley Trail
Tumwater, Washington

Log of Boring B-5

Figure A-6 (3 of 3)

B-6

LAI Project No: 1444001.010

SAMPLE DATA / SOIL PROFILE

Drilling Method: Mud Rotary
Ground Elevation (ft): 105.5
Drilled By: Holocene Drilling Inc.
Logged By: DAR Date: 06/03/14

Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol	Soil Description
0	105						PT	7" of Topsoil/Sod
							SP-SM	**(TOPSOIL/SOD/DUFF)**
		S-1	b2	2	W = 15 -200 = 10			Brown, fine to medium SAND with silt (loose, moist) **(FILL)**
5	100	S-2	b2	26	W = 8 -200 = 5		GP-GM	Brown, sandy GRAVEL with silt (medium dense, moist) **(RECESSIONAL OUTWASH)**
		S-3	b2	28	W = 8 GS		GW	Gray, very sandy GRAVEL (medium dense, wet)
10	95	S-4	b2	41	W = 11 GS			-grades to gray, dense
		S-5	b2	32				
15	90						SP	Gray, fine to medium SAND with gravel (medium dense, wet)
		S-6	b2	22				
20	85							-grades to loose, without gravel
		S-7	b2	7				
25	80							
		S-8	b2	9				
30	75							-grades to medium dense, with gravel
		S-9	b2	19				
35								

Groundwater: ▽ 8.0 ft ATD

Moisture Content (%) — Plastic Limit — Liquid Limit
10 20 30 40

▲ SPT N-Value ▲
△ Non-Standard N-Value △
10 20 30 40

× Fines Content (%) ×
10 20 30 40

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

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Deschutes Valley Trail
Tumwater, Washington

Log of Boring B-6

Figure A-7 (1 of 2)

B-6

LAI Project No: 1444001.010

SAMPLE DATA						SOIL PROFILE				
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol	Drilling Method: Mud Rotary Ground Elevation (ft): 105.5 Drilled By: Holocene Drilling Inc. Logged By: DAR Date: 06/03/14	Groundwater	Moisture Content (%) Plastic Limit / Liquid Limit 10 20 30 40 ▲ SPT N-Value ▲ △ Non-Standard N-Value △ 10 20 30 40 × Fines Content (%) × 10 20 30 40
35	70						GP	Gray, sandy GRAVEL (medium dense, wet)		
		S-10	b2	28						
40	65						SP	Gray, gravelly SAND (medium dense, wet)		
		S-11	b2	23						
45										
50										
55										
60										
65										
70										

Boring Completed 06/03/14
Total Depth of Boring = 44.0 ft.

DRAFT

Notes:
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3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

1444001.01 7/8/14 Y:\1444\001.010\T\1444001.010.GPJ SOIL BORING LOG WITH GRAPH

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Deschutes Valley Trail
Tumwater, Washington

Log of Boring B-6

Figure A-7 (2 of 2)

B-7

LAI Project No: 1444001.010

Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol	Soil Profile	Groundwater
								Drilling Method: Mud Rotary Ground Elevation (ft): 107.5 Drilled By: Holocene Drilling Inc. Logged By: JTM Date: 06/26/14	
0	105						SM	Brown, silty SAND with organics (medium dense, moist) **(FILL)**	
5	100	S-1	b2	24	W = 8 -200 = 4		GP	Gray-Brown, sandy GRAVEL (medium dense, wet) **(RECESSIONAL OUTWASH)**	▽ 9.0 ft ATD
10	95		b2	16			SP	Gray, fine to medium SAND (dense, wet)	
15	90	S-2 S-3	b2	51			GP	Gray, sandy GRAVEL (dense, wet)	
							GP	Gray, very sandy GRAVEL (medium dense, wet)	
20	85	S-4	b2	12					
25	80	S-5	b2	16					
30	75	S-6	b2	41	W = 11 GS			-grades to dense	
35									

Moisture Content (%) — Plastic Limit — Liquid Limit
10 20 30 40

▲ SPT N-Value ▲
△ Non-Standard N-Value △
10 20 30 40

× Fines Content (%) ×
10 20 30 40

51

DRAFT

Notes:
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3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

1444001.01 7/8/14 Y:\1444\001.010\T\1444001.010.GPJ SOIL BORING LOG WITH GRAPH

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Deschutes Valley Trail
Tumwater, Washington

Log of Boring B-7

Figure
A-8
(1 of 3)

B-7

LAI Project No: 1444001.010

SAMPLE DATA | **SOIL PROFILE**

Drilling Method: Mud Rotary
Ground Elevation (ft): 107.5
Drilled By: Holocene Drilling Inc.
Logged By: JTM Date: 06/26/14

Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol	Soil Description	Groundwater
35	70						SP	Gray, gravelly SAND (medium dense to dense, wet)	
40	65							-gravel content decreases per driller	
45	60		b2	50/ 3"					
50	55							-gravel content increases per driller	
55	50								
60	45							-mostly sand per driller	
65	40								
70									

Moisture Content (%) — Plastic Limit — Liquid Limit
10 20 30 40

▲ SPT N-Value ▲
△ Non-Standard N-Value △
10 20 30 40

× Fines Content (%) ×
10 20 30 40

50/ 3" ▲

DRAFT

Notes:
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1444001.01 7/8/14 Y:\1444\001.010\T\1444001.010.GPJ SOIL BORING LOG WITH GRAPH

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Deschutes Valley Trail
Tumwater, Washington

Log of Boring B-7

Figure A-8 (2 of 3)

B-7

LAI Project No: 1444001.010

Drilling Method: Mud Rotary
Ground Elevation (ft): 107.5
Drilled By: Holocene Drilling Inc.
Logged By: JTM Date: 06/26/14

Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol	Soil Profile	Groundwater
70	35	S-7	b2	13			SP	Gray, gravelly SAND (medium dense to dense, wet) -grades to fine to medium SAND with gravel (medium dense, wet) -grades to very gravelly, very dense	
75	30	S-8	b2	52					
80	25	S-9	b2	45	W = 13 GS				
							SP	Gray, fine to medium SAND (dense, wet)	
85	20	S-10	b2	47					
90	15	S-11	b2	40					
95	10	S-12	b2	54				-grades to very dense	
100		S-13	b2	37				-grades to dense	
105									

Moisture Content (%) — Plastic Limit — Liquid Limit
10 20 30 40

▲ SPT N-Value ▲
△ Non-Standard N-Value △
10 20 30 40

× Fines Content (%) ×
10 20 30 40

52
54

Boring Completed 06/26/14
Total Depth of Boring = 101.5 ft.

Notes:
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3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

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Deschutes Valley Trail
Tumwater, Washington

Log of Boring B-7

Figure A-8 (3 of 3)

HA-01

SAMPLE DATA					SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol	Excavation Method: Hand Auger Ground Elevation (ft): 98 Excavated By: Bay Townes Geotechnical Logged By: CAM	
0	98					SP-SM	3" of Topsoil/Sod **(TOPSOIL/SOD/DUFF)**	Groundwater not encountered.
				-200 = 9 W = 5			Brown-gray, fine to medium SAND with silt (medium dense, moist) **(FILL)**	
2	96							
							Hand Auger Boring Completed 07/30/12 Total Depth of Hand Auger Boring = 2.8 ft.	
4								
6								

HA-02

SAMPLE DATA					SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol	Excavation Method: Hand Auger Ground Elevation (ft): 96 Excavated By: Bay Townes Geotechnical Logged By: CAM	
0	96					SP-SM	7" of Topsoil/Sod **(TOPSOIL/SOD/DUFF)**	Groundwater not encountered.
				-200 = 9 W = 4			Brown-gray, fine to medium SAND with silt (medium dense, moist) **(FILL)**	
2	94			W = 22		SM	Dark brown, silty SAND with organics (loose, moist) **(MARSH DEPOSITS)**	
							-grades to bright gray	
							Hand Auger Boring Completed 07/30/12 Total Depth of Hand Auger Boring = 3.1 ft.	
4								
6								

DRAFT

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

1444001.01 7/8/14 Y:\1444\001.010\T\1444001.010.GPJ TEST PIT LOG W/ ELEVATION

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Deschutes Valley Trail
Tumwater, Washington

Log of Hand Auger Borings

Figure A-9

HA-03

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol	Excavation Method: Hand Auger Ground Elevation (ft): 98 Excavated By: Bay Townes Geotechnical Logged By: CAM	
0	98					AC	2" of Asphalt concrete pavement	
				W = 4		GW SM	Crushed surfacing base course (dense, moist) **(FILL)**	
2	96			GS -200 = 25 W = 20		SM	Filter fabric layer under CSBC Dark brown, very silty SAND with trace organics (loose, moist) **(MARSH DEPOSITS)**	
				W = 19			Bright gray, silty SAND with trace organics (loose, moist)	
4	94					SM	Dark gray, fine to medium SAND with silt (loose, wet)	▽ Groundwater seepage encountered at 4.1 ft.
6								

Hand Auger Boring Completed 07/30/12
Total Depth of Hand Auger Boring = 4.5 ft.

HA-04

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol	Excavation Method: Hand Auger Ground Elevation (ft): 109 Excavated By: Bay Townes Geotechnical Logged By: CAM	
0	108					SP-SM	3" of Topsoil/Sod **(TOPSOIL/SOD/DUFF)**	Groundwater not encountered.
2	106						Brown-gray, fine to medium sand with silt (medium dense, moist) **(RECESSIONAL OUTWASH)** -grades to gray, includes gravel	
4								
6								

Hand Auger Boring Completed 07/30/12
Total Depth of Hand Auger Boring = 3.4 ft.

DRAFT

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

1444001.01 7/8/14 Y:\1444\001.010\T\1444001.010.GPJ TEST PIT LOG W/ ELEVATION

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Deschutes Valley Trail
Tumwater, Washington

Log of Hand Auger Borings

Figure
A-10

HA-05

SAMPLE DATA					SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol	Excavation Method: Hand Auger Ground Elevation (ft): 109 Excavated By: Bay Townes Geotechnical Logged By: CAM	
0	108					GW	2" of Topsoil/Sod **(TOPSOIL/SOD/DUFF)**	Groundwater not encountered.
						SP-SM	Crushed surfacing base course (dense, moist) **(FILL)**	
2							Gray, fine to coarse SAND with silt and gravel (medium dense, moist) **(RECESSIONAL OUTWASH)**	
4								
6								

Hand Auger Boring Completed 07/31/12
Total Depth of Hand Auger Boring = 2.1 ft.

HA-06

SAMPLE DATA					SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol	Excavation Method: Hand Auger Ground Elevation (ft): 115 Excavated By: Bay Townes Geotechnical Logged By: CAM	
0	114			W = 39		SM	Brown, silty SAND with trace organics (loose, moist) **(MARSH DEPOSITS)**	▽ Groundwater seepage encountered at 1.3 ft.
2	112			-200 = 31 W = 30		SM	Gray, very silty, fine to medium SAND (loose, wet) **(RECESSIONAL OUTWASH)**	
4								
6								

Hand Auger Boring Completed 07/31/12
Total Depth of Hand Auger Boring = 3.1 ft.

DRAFT

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

1444001.01 7/8/14 Y:\1444\001.010\T\1444001.010.GPJ TEST PIT LOG W/ ELEVATION

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Deschutes Valley Trail
Tumwater, Washington

Log of Hand Auger Borings

Figure A-11

HA-07

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol	Excavation Method: Hand Auger Ground Elevation (ft): 110 Excavated By: Bay Townes Geotechnical Logged By: CAM	
0	110						14" of Forest Duff **(TOPSOIL/SOD/DUFF)**	
2	108					SP-SM	Gray, fine to medium SAND with silt (medium dense, moist to wet) **(RECESSIONAL OUTWASH)**	▽ Groundwater seepage encountered at 1.9 ft.

Hand Auger Boring Completed 07/31/12
Total Depth of Hand Auger Boring = 2.4 ft.

4

6

HA-08

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol	Excavation Method: Hand Auger Ground Elevation (ft): 109 Excavated By: Bay Townes Geotechnical Logged By: CAM	
0	109						16" of Forest Duff **(TOPSOIL/SOD/DUFF)**	
2	107					SP-SM	Gray, fine to medium SAND with silt (medium dense, moist to wet) **(RECESSIONAL OUTWASH)**	▽ Groundwater seepage encountered at 2.1 ft.

Hand Auger Boring Completed 07/31/12
Total Depth of Hand Auger Boring = 2.6 ft.

4

6

DRAFT

Notes:
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3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

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Deschutes Valley Trail
Tumwater, Washington

Log of Hand Auger Borings

Figure A-12

HA-09

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol	Excavation Method: Hand Auger Ground Elevation (ft): 116 Excavated By: Bay Townes Geotechnical Logged By: CAM	
0	116						6" of Topsoil/Sod **(TOPSOIL/SOD/DUFF)**	
						SM	Gray, silty SAND (medium dense, moist) **(FILL)**	▽ Groundwater seepage encountered at 1.5 ft.
2	114			-200 = 22 W = 22		SM	Gray, silty, fine to medium SAND (medium dense, wet) **(RECESSIONAL OUTWASH)**	
4							Hand Auger Boring Completed 07/31/12 Total Depth of Hand Auger Boring = 3.6 ft.	
6								

HA-10

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol	Excavation Method: Hand Auger Ground Elevation (ft): 108 Excavated By: Bay Townes Geotechnical Logged By: CAM
0	108					AC	2" of Asphalt concrete pavement
						GW	Crushed surfacing base course, includes small uncrushed cobble (dense, moist) **(FILL)**
						SP-SM	Filter fabric layer under CSBC Brown, fine to medium SAND with silt (medium dense, moist to wet)
2	106			-200 = 7 W = 9			▽ Groundwater seepage encountered at 3.4 ft.
4	104			W = 45		MH/PT	Bright gray SILT with sand and peat lenses (soft, wet) **(MARSH DEPOSITS)**
						SP-SM	Dark gray, fine to medium SAND with silt (loose, wet) **(RECESSIONAL OUTWASH)**
6							Hand Auger Boring Completed 08/07/12 Total Depth of Hand Auger Boring = 5.5 ft.

DRAFT

Notes:
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Deschutes Valley Trail
Tumwater, Washington

Log of Hand Auger Borings

Figure A-13

HA-11

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol		
0	114			-200 = 10 W = 7		SP-SM	2" of Topsoil/Sod **(TOPSOIL/SOD/DUFF)** Orange-brown, fine to coarse SAND with silt, gravel and cobble (medium dense, moist) **(RECESSIONAL OUTWASH)**	Groundwater not encountered.
2								
4								
6								

Excavation Method: Hand Auger
Ground Elevation (ft): 115
Excavated By: Bay Townes Geotechnical
Logged By: CAM

Hand Auger Boring Completed 08/07/12
Total Depth of Hand Auger Boring = 2.8 ft.

HA-12

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol		
0	106			-200 = 8 W = 6		AC	2" of Asphalt concrete pavement	Groundwater not encountered.
						GW	Crushed surfacing base course, includes round cobble (dense, moist) **(FILL)**	
2	104					SP-SM	Orange-brown, fine to coarse SAND with silt, gravel and cobble (medium dense, moist) **(RECESSIONAL OUTWASH)**	
4								
6								

Excavation Method: Hand Auger
Ground Elevation (ft): 106
Excavated By: Bay Townes Geotechnical
Logged By: CAM

Hand Auger Boring Completed 08/07/12
Total Depth of Hand Auger Boring = 2.7 ft.

DRAFT

Notes:
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Deschutes Valley Trail
Tumwater, Washington

Log of Hand Auger Borings

Figure A-14

HA-13

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol	Excavation Method: Hand Auger Ground Elevation (ft): 174 Excavated By: Bay Townes Geotechnical Logged By: CAM	
0	174						10" of Forest Duff **(TOPSOIL/SOD/DUFF)**	Groundwater not encountered.
2	172			-200 = 8 W = 6		SP-SM	Brown, fine SAND with silt and trace gravel (loose, moist) **(RECESSIONAL OUTWASH)**	
4								
6								

Hand Auger Boring Completed 08/20/12
Total Depth of Hand Auger Boring = 3.1 ft.

HA-14

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol	Excavation Method: Hand Auger Ground Elevation (ft): 174 Excavated By: Bay Townes Geotechnical Logged By: CAM	
0	174						11" of Forest duff **(TOPSOIL/SOD/DUFF)**	Groundwater not encountered.
2	172			-200 = 8 W = 8		SP-SM	Brown, fine SAND with silt and trace gravel (loose, moist) **(RECESSIONAL OUTWASH)**	
4	170							
6								

Hand Auger Boring Completed 08/20/12
Total Depth of Hand Auger Boring = 4.0 ft.

DRAFT

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Deschutes Valley Trail
Tumwater, Washington

Log of Hand Auger Borings

Figure A-15

HA-15

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol	Excavation Method: Hand Auger Ground Elevation (ft): 173 Excavated By: Bay Townes Geotechnical Logged By: CAM	
0							10" of Forest Duff **(TOPSOIL/SOD/DUFF)**	Groundwater not encountered.
	172			-200 = 8 W = 8		SP-SM	Brown, fine SAND with silt and trace gravel (loose, moist) **(RECESSIONAL OUTWASH)**	
2								
	170							
4								

Hand Auger Boring Completed 08/20/12
Total Depth of Hand Auger Boring = 4.2 ft.

6

HA-16

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol	Excavation Method: Hand Auger Ground Elevation (ft): 98 Excavated By: Bay Townes Geotechnical Logged By: CAM	
0	98					SP-SM	3" of Topsoil/Sod **(TOPSOIL/SOD/DUFF)**	Groundwater not encountered.
2	96						Brown, fine SAND with silt (loose, moist) **(FILL)**	
				-200 = 17 W = 17		SM	Brown-gray, silty SAND (medium dense, moist) **(RECESSIONAL OUTWASH)**	
4	94							

Hand Auger Boring Completed 08/20/12
Total Depth of Hand Auger Boring = 4.9 ft.

6

DRAFT

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Deschutes Valley Trail
Tumwater, Washington

Log of Hand Auger Borings

Figure
A-16

HA-17

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol		
0	98					SP-SM	4" of Topsoil/Sod **(TOPSOIL/SOD/DUFF)** Brown, fine to medium SAND with silt (loose, moist) **(FILL)**	Groundwater not encountered.
2	96			-200 = 19 W = 20		SM	Gray, silty SAND (medium dense, moist) **(ALLUVIUM)**	
4	94							
6								

Excavation Method: Hand Auger
Ground Elevation (ft): 99
Excavated By: Bay Townes Geotechnical
Logged By: CAM

Hand Auger Boring Completed 08/20/12
Total Depth of Hand Auger Boring = 5.1 ft.

HA-18

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol		
0	98					SP-SM	4" of Topsoil/Sod **(TOPSOIL/SOD/DUFF)**	▽ Groundwater seepage encountered at 1.1 ft.
2	96			W = 72		MH/PT	Brown, fine to medium SAND with silt and trace gravel (medium dense, moist) **(FILL)** Dark brown PEAT with silt seams (soft, wet) **(MARSH DEPOSITS)**	
4	94					SM	Bright gray, silty fine SAND with peat seams (very loose, wet)	
6								

Excavation Method: Hand Auger
Ground Elevation (ft): 98
Excavated By: Bay Townes Geotechnical
Logged By: CAM

Hand Auger Boring Completed 08/20/12
Total Depth of Hand Auger Boring = 5.2 ft.

DRAFT

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Deschutes Valley Trail
Tumwater, Washington

Log of Hand Auger Borings

Figure A-17

HA-19

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol	
				Excavation Method: Hand Auger Ground Elevation (ft): 109 Excavated By: Bay Townes Geotechnical Logged By: CAM			
0				11" of Forest Duff **(TOPSOIL/SOD/DUFF)**			
	108					SP-SM	Brown, fine to medium SAND with silt and trace gravel (medium dense, moist) **(RECESSIONAL OUTWASH)**
2				GS -200 = 8 W = 21			
	106					SM	Orange-brown and gray, silty SAND with trace gravel (medium dense, wet)
4							▽ Groundwater seepage encountered at 3.1 ft.
	104						
				Hand Auger Boring Completed 08/20/12 Total Depth of Hand Auger Boring = 5.1 ft.			
6							

HA-20

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol	
				Excavation Method: Hand Auger Ground Elevation (ft): 115 Excavated By: Bay Townes Geotechnical Logged By: CAM			
0				3" of Topsoil **(TOPSOIL/SOD/DUFF)**		SP-SM	Brown, fine to medium SAND with silt (medium dense, moist) **(FILL)**
	114			GS -200 = 11 W = 15			
2						SM	Gray-black, silty SAND with trace organics (loose, moist to wet) **(MARSH DEPOSITS)**
	112						
4				W = 21			▽ Groundwater seepage encountered at 4.2 ft.
	110						
				Hand Auger Boring Completed 08/20/12 Total Depth of Hand Auger Boring = 5.0 ft.			
6							

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Deschutes Valley Trail
Tumwater, Washington

Log of Hand Auger Borings

Figure
A-18

HA-21

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol	Excavation Method: Hand Auger Ground Elevation (ft): 115 Excavated By: Bay Townes Geotechnical Logged By: CAM	
0	115					SM	3" of Topsoil (TOPSOIL/SOD/DUFF) Brown, silty SAND (loose, moist) (FILL)	Groundwater not encountered.
2	113					ML	Gray, sandy SILT with organics (loose, moist) (MARSH DEPOSITS)	
4	111			W = 70				
6	109							

Hand Auger Boring Completed 08/20/12
Total Depth of Hand Auger Boring = 5.0 ft.

HA-22

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol	Excavation Method: Hand Auger Ground Elevation (ft): 105 Excavated By: Bay Townes Geotechnical Logged By: CAM	
0	105					SP-SM	3" of Topsoil/Sod (TOPSOIL/SOD/DUFF) Brown, fine to medium SAND with silt (loose, moist) (FILL)	Groundwater not encountered.
2	103					MH/PT	Dark brown SILT with sand and peat lenses (soft, moist) (MARSH DEPOSITS)	
4	101			W = 64				
6	99							

Hand Auger Boring Completed 08/20/12
Total Depth of Hand Auger Boring = 5.2 ft.

DRAFT

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Deschutes Valley Trail
Tumwater, Washington

Log of Hand Auger Borings

Figure A-19

HA-23

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol	Excavation Method: Hand Auger Ground Elevation (ft): 130 Excavated By: Bay Townes Geotechnical Logged By: CAM	
0	130						9" of Forest duff **(TOPSOIL/SOD/DUFF)**	Groundwater not encountered.
2	128			-200 = 6 W = 9		SP-SM	Brown, fine to medium SAND with silt and gravel (loose, moist) **(RECESSIONAL OUTWASH)**	
4	126							
6								

Hand Auger Boring Completed 08/20/12
Total Depth of Hand Auger Boring = 4.1 ft.

HA-24

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol	Excavation Method: Hand Auger Ground Elevation (ft): 121 Excavated By: Bay Townes Geotechnical Logged By: CAM	
0	120						8" of Forest Duff **(TOPSOIL/SOD/DUFF)**	Groundwater not encountered.
2	118			GS -200 = 4 W = 6		SP-SM	Brown, very gravelly SAND (loose, moist) **(RECESSIONAL OUTWASH)** -grades to medium dense	
4								
6								

Hand Auger Boring Completed 08/20/12
Total Depth of Hand Auger Boring = 4.2 ft.

DRAFT

Notes:
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Deschutes Valley Trail
Tumwater, Washington

Log of Hand Auger Borings

Figure
A-20

HA-25

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol	
0	96	S-1		W = 2		GP	3" of Topsoil/Sod **(TOPSOIL/SOD/DUFF)**
2	94						Brown, sandy GRAVEL with cobbles (quarry spalls) and organics (medium dense, moist) **(FILL)**
		S-2				SP	Brown, gravelly fine to coarse SAND (medium dense, moist)
4	92	S-3				SP	Brown, fine to medium SAND (loose, wet) **(RECESSIONAL OUTWASH)**
6	90						▽ Groundwater seepage encountered at 5.0 ft.

Excavation Method: Hand Auger
Ground Elevation (ft): 96
Excavated By: Landau Associates
Logged By: BJF

Hand Auger Boring Completed 06/25/14

Refusal at 6.5 ft on Possible Bedrock

HA-26

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol	
0	95	S-1		W = 8 -200 = 2		GP	2" of Topsoil/Sod **(TOPSOIL/SOD/DUFF)**
	94	S-2				SP-SM	Brown, sandy GRAVEL with trace organics (medium dense, moist) **(FILL)**
2	92						Brown, fine to medium SAND with silt (medium dense, moist) **(RECESSIONAL OUTWASH)**
4							-grades to brown-gray with mottling, moist to wet -gray sand layer
6							Groundwater not encountered.

Excavation Method: Hand Auger
Ground Elevation (ft): 95
Excavated By: Landau Associates
Logged By: JTM

Hand Auger Boring Completed 06/24/14
Total Depth of Hand Auger Boring = 3.2 ft.

Refusal at 3.2 ft on Possible Bedrock

DRAFT

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Deschutes Valley Trail
Tumwater, Washington

Log of Hand Auger Borings

Figure A-21

HA-27

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol		
0							Excavation Method: Hand Auger Ground Elevation (ft): 95 Excavated By: Landau Associates Logged By: BJF	
							12" of Topsoil/Sod **(TOPSOIL/SOD/DUFF)**	Groundwater not encountered.
	94					SM	Orange/brown, silty SAND (medium dense, moist) **(RECESSIONAL OUTWASH)**	
2		S-1		W = 19 -200 = 27			-Charcoal/burnt wood at 2.5' to 2.8'	
	92	S-2		W = 20 -200 = 28			-grades to brown (medium dense, moist)	
		S-3		W = 18 -200 = 14		SP-SM	Brown gravelly SAND with silt (medium dense, moist to wet)	
4							**Refusal at 4.0 ft on Possible Bedrock**	
6								

Hand Auger Boring Completed 06/24/14
Total Depth of Hand Auger Boring = 4.0 ft.

HA-28

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol		
0	110						Excavation Method: Hand Auger Ground Elevation (ft): 110 Excavated By: Landau Associates Logged By: BJF	
		S-1		W = 13 -200 = 12		SM	3" of Topsoil/Sod **(TOPSOIL/SOD/DUFF)**	Groundwater not encountered.
		S-2		W = 4 -200 = 3		SP	Brown, silty SAND (medium dense, moist) **(FILL)**	
2	108						Orange/brown, fine to medium SAND with gravel (medium dense, moist) **(RECESSIONAL OUTWASH)**	
		S-3		W = 8 -200 = 3		SP	Brown, fine to coarse SAND with gravel (medium dense, wet)	
4	106						**Refusal at 4.0 ft on Possible Bedrock**	
6								

Hand Auger Boring Completed 06/25/14
Total Depth of Hand Auger Boring = 4.0 ft.

DRAFT

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Deschutes Valley Trail
Tumwater, Washington

Log of Hand Auger Borings

Figure A-22

HA-29

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol	Excavation Method: Hand Auger Ground Elevation (ft): 113 Excavated By: Landau Associates Logged By: BJF	
0						SP	3" of Topsoil/Sod **(TOPSOIL/SOD/DUFF)**	
	112	S-1		W = 4 -200 = 3			Orange/brown, gravelly, fine to medium SAND (medium dense, moist) **(RECESSIONAL OUTWASH)**	
2	110	S-2						
4	108	S-3		W = 21 -200 = 31		SM	Orange/brown, very silty, fine to medium SAND (medium dense, wet) -grades to with gravel (medium dense, wet)	▽ Groundwater seepage encountered at 4.5 ft.
6		S-4						

Hand Auger Boring Completed 06/25/14
Total Depth of Hand Auger Boring = 6.0 ft.

HA-30

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol	Excavation Method: Hand Auger Ground Elevation (ft): 107 Excavated By: Landau Associates Logged By: JTM	
0						SP-SM	Brown, fine to medium SAND with silt and gravel (medium dense, moist) **(FILL)**	
	106	S-1		W = 15 -200 = 9		SP-SM	Brown, fine to medium SAND with silt and gravel (medium dense, moist) **(RECESSIONAL OUTWASH)**	
2	104	S-2						
4		S-3					-grades to wet **Refusal at 4.3 ft on Possible Bedrock**	▽ Groundwater seepage encountered at 3.8 ft.
6								

Hand Auger Boring Completed 06/25/14
Total Depth of Hand Auger Boring = 4.2 ft.

DRAFT

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Deschutes Valley Trail
Tumwater, Washington

Log of Hand Auger Borings

Figure
A-23

HA-31

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol		
0	101						Excavation Method: Hand Auger Ground Elevation (ft): 101 Excavated By: Landau Associates Logged By: BJF	
						SP-SM	2" of Organic Topsoil **(TOPSOIL/SOD/DUFF)**	Groundwater not encountered.
	100	S-1		W = 8 -200 = 9			Brown, fine to medium SAND with silt and trace organics (medium dense, moist) **(FILL)**	
2							-grades to without organics	
	98	S-2						
		S-3					-grades to orange/brown	
4	96							
		S-4					-grades to brown	
6							**Refusal at 5.7 ft on Possible Bedrock**	

Hand Auger Boring Completed 06/25/14
Total Depth of Hand Auger Boring = 5.7 ft.

HA-32

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol		
0	106						Excavation Method: Hand Auger Ground Elevation (ft): 106 Excavated By: Landau Associates Logged By: BJF	
						SP-SM	3" of Organic Topsoil **(TOPSOIL/SOD/DUFF)**	Groundwater not encountered.
		S-1					Brown, fine to medium SAND with silt and trace organics (loose, moist) **(FILL)**	
2	104	S-2					-grades to medium dense, without organics	
4	102							
6	100	S-3					**Refusal at 6.1 ft on Weathered Bedrock**	

Hand Auger Boring Completed 06/27/14
Total Depth of Hand Auger Boring = 6.1 ft.

DRAFT

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

1444001.01 7/8/14 Y:\1444\001.010\T\1444001.010.GPJ TEST PIT LOG W/ ELEVATION

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Deschutes Valley Trail
Tumwater, Washington

Log of Hand Auger Borings

Figure
A-24

HA-33

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol	Excavation Method: Hand Auger Ground Elevation (ft): 98 Excavated By: Landau Associates Logged By: BJF	
0	98						4" of Organic Topsoil (TOPSOIL/SOD/DUFF)	
		S-1		W = 33		SM	Brown, silty SAND with trace organics (medium dense, moist) (FILL)	
2	96							▽ Groundwater seepage encountered at 2.8 ft.
		S-2		W = 30		SM	Orange/brown, silty, fine to medium SAND (medium dense, wet) (RECESSIONAL OUTWASH)	
4							Refusal at 3.9 ft on Weathered Bedrock	
6								

Hand Auger Boring Completed 06/27/14
Total Depth of Hand Auger Boring = 3.9 ft.

HA-34

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol	Excavation Method: Hand Auger Ground Elevation (ft): 110 Excavated By: Landau Associates Logged By: BJF	
0	110					SP-SM	2" of Topsoil/Sod (TOPSOIL/SOD/DUFF)	Groundwater not encountered.
		S-1				SP-SM	Brown, fine to coarse SAND with silt, gravel, and organics (dense, moist) (FILL)	
		S-2				GP	Brown, fine to medium SAND with gravel and trace organics (medium dense, moist)	
2	108	S-3					Brown, cobbly GRAVEL with sand (dense, moist)	
4							Refusal on Roadway Ballast at 3.1 ft	
6								

Hand Auger Boring Completed 06/27/14
Total Depth of Hand Auger Boring = 3.1 ft.

DRAFT

1444001.01 7/8/14 Y:\1444\001.010\T\1444001.010.GPJ TEST PIT LOG W/ ELEVATION

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

LANDAU ASSOCIATES

Deschutes Valley Trail
Tumwater, Washington

Log of Hand Auger Borings

Figure A-25

HA-35

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol		
0		S-1		W = 9		SP-SM	2" of Topsoil/Sod (TOPSOIL/SOD/DUFF)	Groundwater not encountered.
2							Brown, gravelly, fine to medium SAND with silt (medium dense, moist) (RECESSIONAL OUTWASH) -becoming cobbly at 1.2 ft	
4							**Refusal on Weathered Bedrock at 1.2 ft**	
6								

Excavation Method: Hand Auger
Ground Elevation (ft): Not Measured
Excavated By: Landau Associates
Logged By: BJF

Hand Auger Boring Completed 06/25/14
Total Depth of Hand Auger Boring = 1.2 ft.

HA-36

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol		
0		S-1				SP-SM	9" of Topsoil/Sod (TOPSOIL/SOD/DUFF)	Groundwater not encountered.
2							Brown, fine to medium SAND with silt and gravel (medium dense, moist) (RECESSIONAL OUTWASH)	
4							**Refusal on Bedrock or Possible Utility at 3.5 ft**	
6								

Excavation Method: Hand Auger
Ground Elevation (ft): Not Measured
Excavated By: Landau Associates
Logged By: BJF

Hand Auger Boring Completed 06/27/14
Total Depth of Hand Auger Boring = 3.5 ft.

DRAFT

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

1444001.01 7/8/14 Y:\1444\001.010\T\1444001.010.GPJ TEST PIT LOG W/ ELEVATION

LANDAU ASSOCIATES

Deschutes Valley Trail
Tumwater, Washington

Log of Hand Auger Borings

Figure A-26

HA-37

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol		
0							Excavation Method: Hand Auger Ground Elevation (ft): Not Measured Excavated By: Landau Associates Logged By: BJF	
		S-1		W = 9		SP-SM	2" of Topsoil/Sod **(TOPSOIL/SOD/DUFF)** Brown, fine to medium SAND with silt, gravel, and trace organics (medium dense, moist) **(FILL)**	Groundwater not encountered.
2								
							Hand Auger Boring Completed 06/25/14 Total Depth of Hand Auger Boring = 3.0 ft.	**Refusal at 3.0 ft on Bedrock**
4								
6								

HA-38

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol		
0							Excavation Method: Hand Auger Ground Elevation (ft): Not Measured Excavated By: Landau Associates Logged By: BJF	
						SP-SM	3" of Organic Topsoil **(TOPSOIL/SOD/DUFF)** Brown, fine to medium SAND with silt, gravel, and trace organics (medium dense, moist) **(FILL)**	Groundwater not encountered.
		S-1						
2		S-2		W = 25 -200 = 39		SM	Mottled gray/brown, very silty, fine to medium SAND (medium dense, moist) **(RECESSIONAL OUTWASH)**	
		S-3					-grades to with gravel	
4							Hand Auger Boring Completed 06/26/14 Total Depth of Hand Auger Boring = 4.3 ft.	**Refusal at 4.3 ft on Bedrock**
6								

DRAFT

1444001.01 7/8/14 Y:\1444\001.010\T\1444001.010.GPJ TEST PIT LOG W/ ELEVATION

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

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Deschutes Valley Trail
Tumwater, Washington

Log of Hand Auger Borings

Figure A-27

HA-39

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol		
0							Excavation Method: Hand Auger Ground Elevation (ft): Not Measured Excavated By: Landau Associates Logged By: BJF	
		S-1		W = 6		GP-GM	2" of Topsoil/Sod **(TOPSOIL/SOD/DUFF)** Brown, sandy GRAVEL with silt (medium dense, moist) **(RECESSIONAL OUTWASH)**	Groundwater not encountered.
2		S-2				SP	Brown, fine to medium SAND with gravel (medium dense, moist)	
4								
6							**Refusal at 4.7 ft on Bedrock**	

Hand Auger Boring Completed 06/26/14
Total Depth of Hand Auger Boring = 4.7 ft.

HA-40

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Remarks and Laboratory Tests	Graphic Symbol	USCS Symbol		
0							Excavation Method: Hand Auger Ground Elevation (ft): Not Measured Excavated By: Landau Associates Logged By: BJF	
						SP-SM	2" of Organic Topsoil **(TOPSOIL/SOD/DUFF)** Brown, fine to medium SAND with silt and gravel (medium dense, moist) **(FILL)**	Groundwater not encountered.
2								
		S-1						
4								
6								

Hand Auger Boring Completed 06/26/14
Total Depth of Hand Auger Boring = 5.1 ft.

DRAFT

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

1444001.01 7/8/14 Y:\1444\001.010\T\1444001.010.GPJ TEST PIT LOG W/ ELEVATION

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Deschutes Valley Trail
Tumwater, Washington

Log of Hand Auger Borings

Figure A-28

APPENDIX B

Physical Soil Testing

APPENDIX B
PHYSICAL SOIL TESTING

Soil samples obtained from the geotechnical borings were taken to our laboratory for further examination and testing. Laboratory tests were performed on representative soil samples to characterize certain engineering and index properties of the site soil. The laboratory testing program included visual inspection to confirm our field soil descriptions, determination of natural moisture content, grain size analysis, and determination of fines fraction (percent passing the U.S. Standard No. 200 sieve). A description of the testing performed is presented below.

NATURAL MOISTURE CONTENT

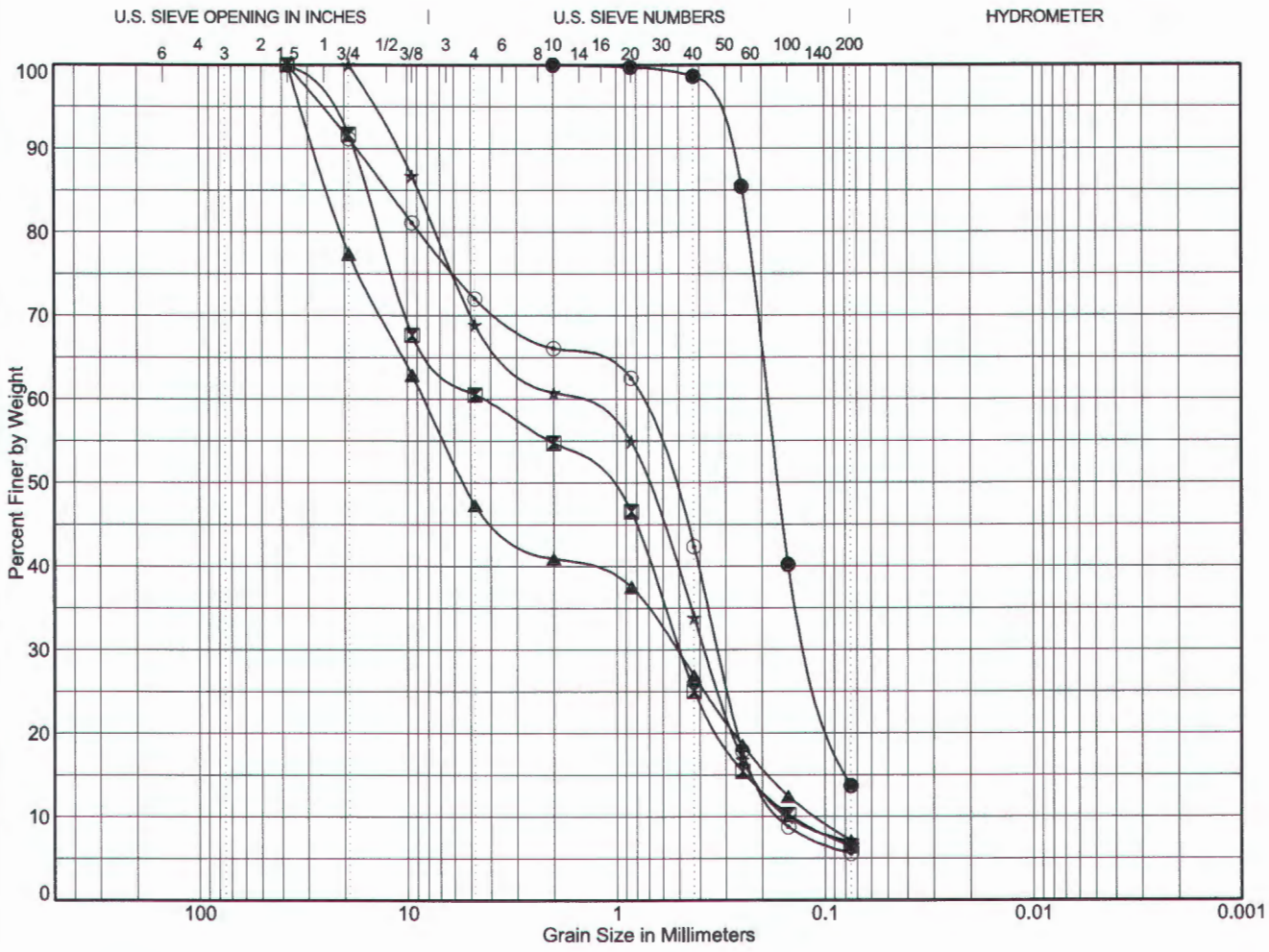
The natural moisture contents of selected soil samples obtained from the explorations were determined in general accordance with International ASTM (ASTM) D 2216 test method. The results from the moisture content determinations are indicated on the summary logs presented in Appendix A, adjacent to the corresponding sample.

GRAIN SIZE ANALYSES

Sieve analyses were conducted on representative soil samples obtained from the explorations in accordance with ASTM test method D422 to provide an indication of the grain size distribution of the onsite soil. Samples selected for grain size analyses are designated with a "GS" in the column labeled "Test Data" on the summary boring logs in Appendix A. The results of the grain size analyses are presented in the form of grain size distribution curves on Figures B-1 through B-4 in this appendix.

FINES FRACTION

The fines fraction (percent passing the U.S. Standard No. 200 sieve) of select soil samples was determined in general accordance with ASTM D 422 test procedures. The test results are indicated on the summary logs presented in Appendix A, adjacent to the corresponding sample.



Cobbles	Gravel		Sand			Silt or Clay
	coarse	fine	coarse	medium	fine	

	Point	Depth	Classification	LL	PL	PI	C_c	C_u
●	B-5	3.0	Fine, SAND with silt (SP-SM)					
⊠	B-5	8.0	Very gravelly, SAND with silt (SP-SM)				0.39	30.46
▲	B-5	10.0	Very sandy, GRAVEL with silt (GP-GM)				0.30	76.35
★	B-5	35.5	Very gravelly, SAND with silt (SP-SM)				0.52	11.80
⊙	B-5	40.5	Gravelly, SAND with silt (SP-SM)				0.84	4.85

	Point	Depth	D_{100}	D_{60}	D_{50}	D_{30}	D_{10}	%Coarse Gravel	% Fine Gravel	% Coarse Sand	% Medium Sand	% Fine Sand	% Fines
●	B-5	3.0	2	0.188	0.168	0.115		0.0	0.0	0.0	1.4	85.0	13.7
⊠	B-5	8.0	37.5	4.382	1.218	0.499	0.144	8.3	31.1	5.8	29.7	18.6	6.4
▲	B-5	10.0	37.5	8.362	5.36	0.522	0.11	22.6	30.1	6.4	14.1	19.8	7.1
★	B-5	35.5	19	1.787	0.723	0.377	0.151	0.0	31.1	8.1	26.9	26.9	6.9
⊙	B-5	40.5	37.5	0.779	0.552	0.325	0.161	8.8	19.2	5.9	23.7	36.8	5.5

$C_c = D_{30}^2/(D_{60} * D_{10})$
$C_u = D_{60}/D_{10}$

To be well graded: $1 < C_c < 3$ and $C_u > 4$ for GW or $C_u > 6$ for SW

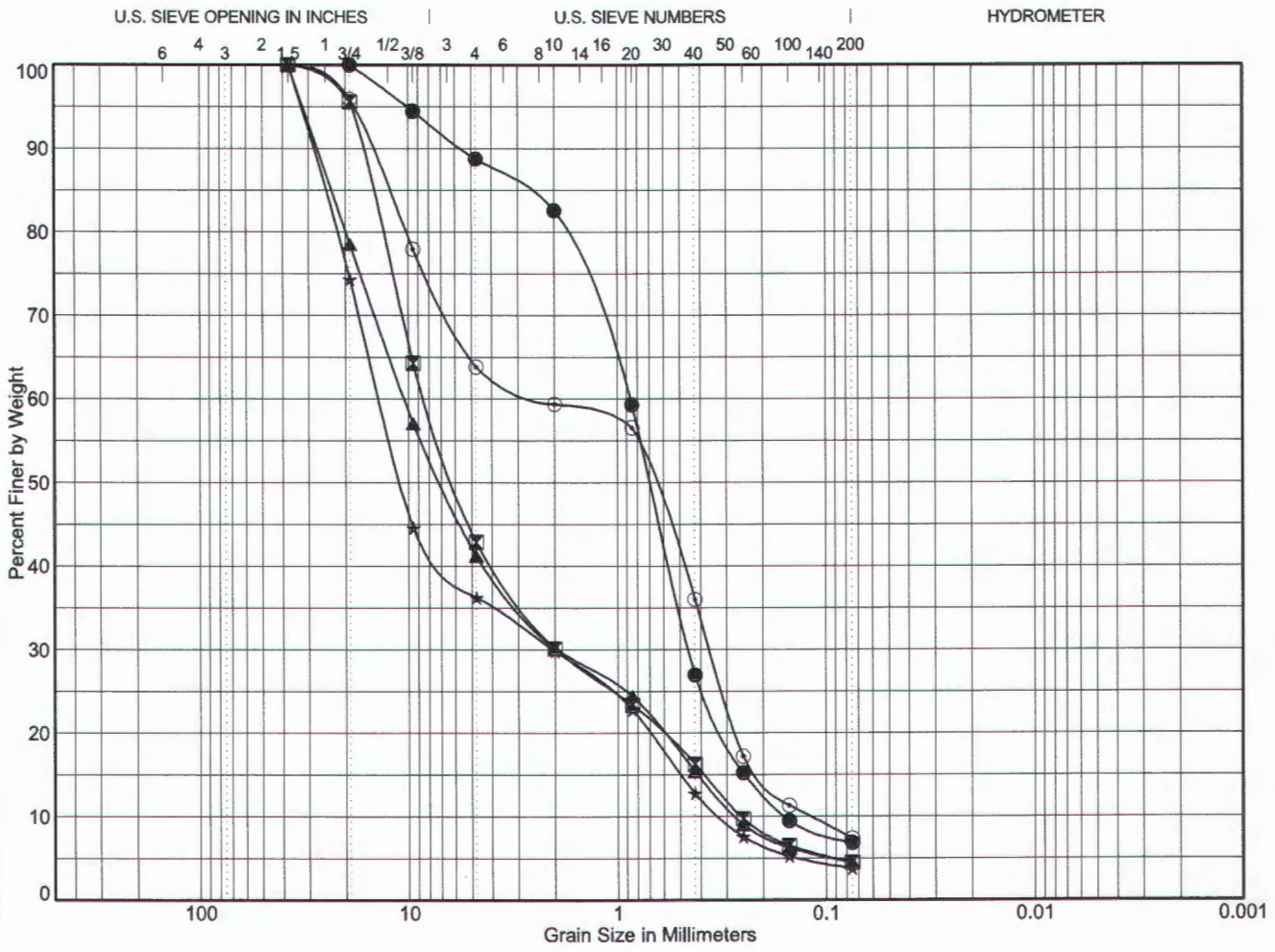
1444001.01 7/8/14 Y:\1444\001.010\T\1444001.010.GPJ GRAIN SIZE W/STATS

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Deschutes Valley Trail
Tumwater, Washington

Grain Size Test Data

Figure B-1



Cobbles	Gravel		Sand			Silt or Clay
	coarse	fine	coarse	medium	fine	

	Point	Depth	Classification	LL	PL	PI	C_c	C_u
●	B-5	50.5	SAND with silt and gravel (SP-SM)				1.50	5.54
⊠	B-6	8.0	Very sandy GRAVEL (GP)				1.85	32.30
▲	B-6	10.0	Very sandy GRAVEL (GP)				1.35	38.49
★	B-7	30.0	Very sandy GRAVEL (GP)				0.96	42.44
⊙	B-7	80.0	Very gravelly, fine to medium SAND with silt (SP-SM)				0.48	18.90

	Point	Depth	D_{100}	D_{60}	D_{50}	D_{30}	D_{10}	%Coarse Gravel	% Fine Gravel	% Coarse Sand	% Medium Sand	% Fine Sand	% Fines
●	B-5	50.5	19	0.872	0.697	0.454	0.157	0.0	11.3	6.2	55.6	20.1	6.8
⊠	B-6	8.0	37.5	8.271	5.984	1.977	0.256	4.4	52.7	12.8	13.8	11.8	4.5
▲	B-6	10.0	37.5	10.452	6.979	1.957	0.272	21.5	37.3	11.1	14.8	10.9	4.4
★	B-7	30.0	37.5	13.613	10.785	2.049	0.321	25.7	38.1	6.4	17.1	9.0	3.7
⊙	B-7	80.0	37.5	2.258	0.681	0.359	0.119	4.1	32.1	4.5	23.4	28.7	7.4

$C_c = D_{30}^2/(D_{60} * D_{10})$

$C_u = D_{60}/D_{10}$

To be well graded: $1 < C_c < 3$ and $C_u > 4$ for GW or $C_u > 6$ for SW

1444001.01 7/8/14 Y:\1444\001.010\T\1444001.010.GPJ GRAIN SIZE W/STATS

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Deschutes Valley Trail
Tumwater, Washington

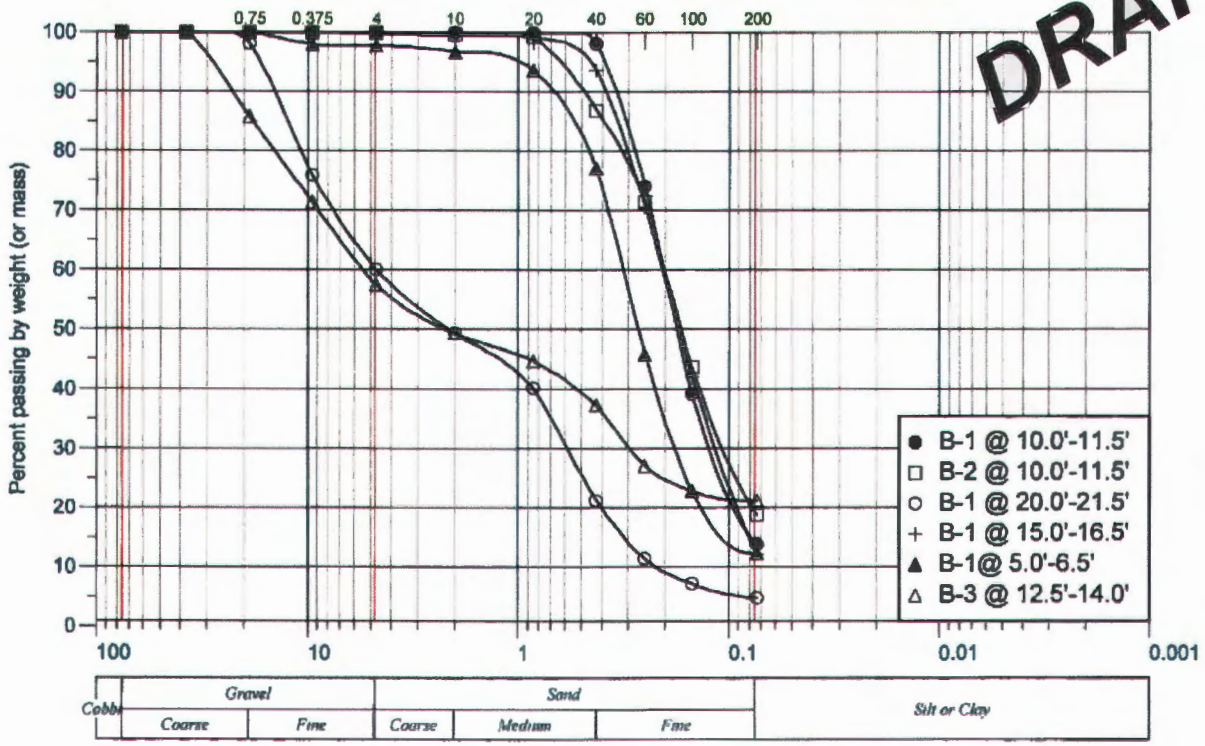
Grain Size Test Data

Figure B-2

LANDAU ASSOCIATES, INC. | G:\Projects\1444\001\010\011\TrailPlans\Appendix B3_B4 GrainSize.dwg (A) "Figure B-3" 7/8/2014

DRAFT

Grain Size Distribution (ASTM D422)



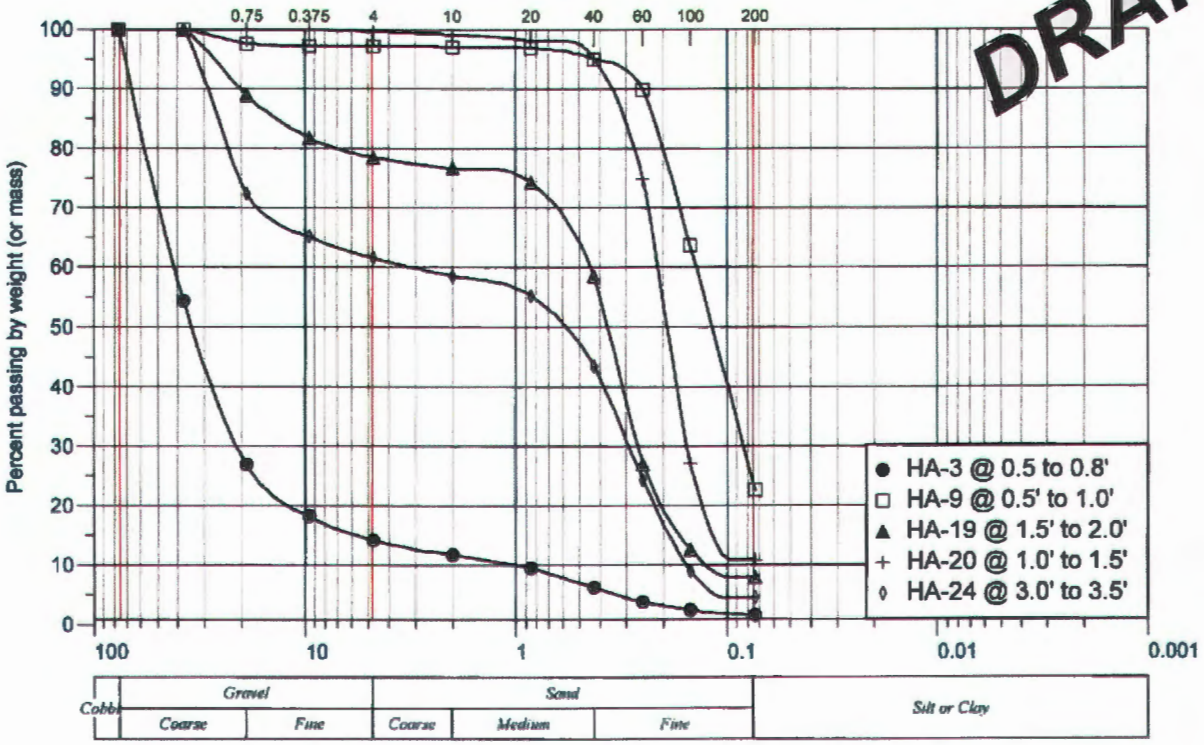
LANDAU ASSOCIATES

Deschutes Valley Trail Tumwater, WA	**Grain Size Profile**	Figure B-3

LANDAU ASSOCIATES, INC. | G:\Projects\1444\001\010\011\TrailPlans\Appendix B3_B4 GrainSize.dwg (A) "Figure B-4" 7/8/2014

Grain Size Distribution (ASTM D422)

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Deschutes Valley Trail Tumwater, WA	**Grain Size Profile**	Figure **B-4**

Appendix 4
Maps and Area Takeoffs

Exhibit 4A – Minimum Requirements Flow Chart

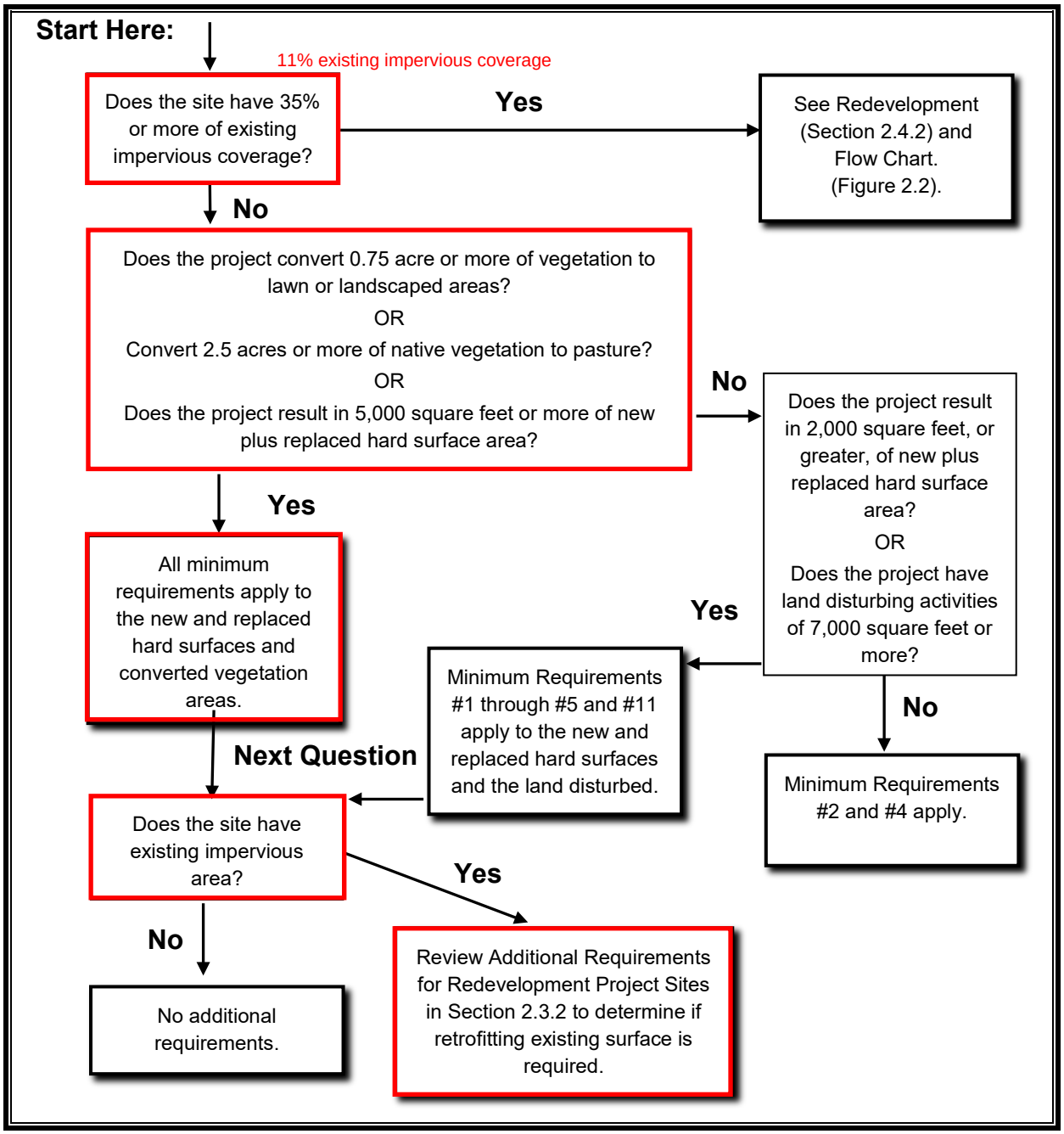


Figure 2.1. Flow Chart for Determining Requirements for New Development.

NEXT DOCUMENT

Figure I-3.2: Flow Chart for Determining Requirements for Redevelopment

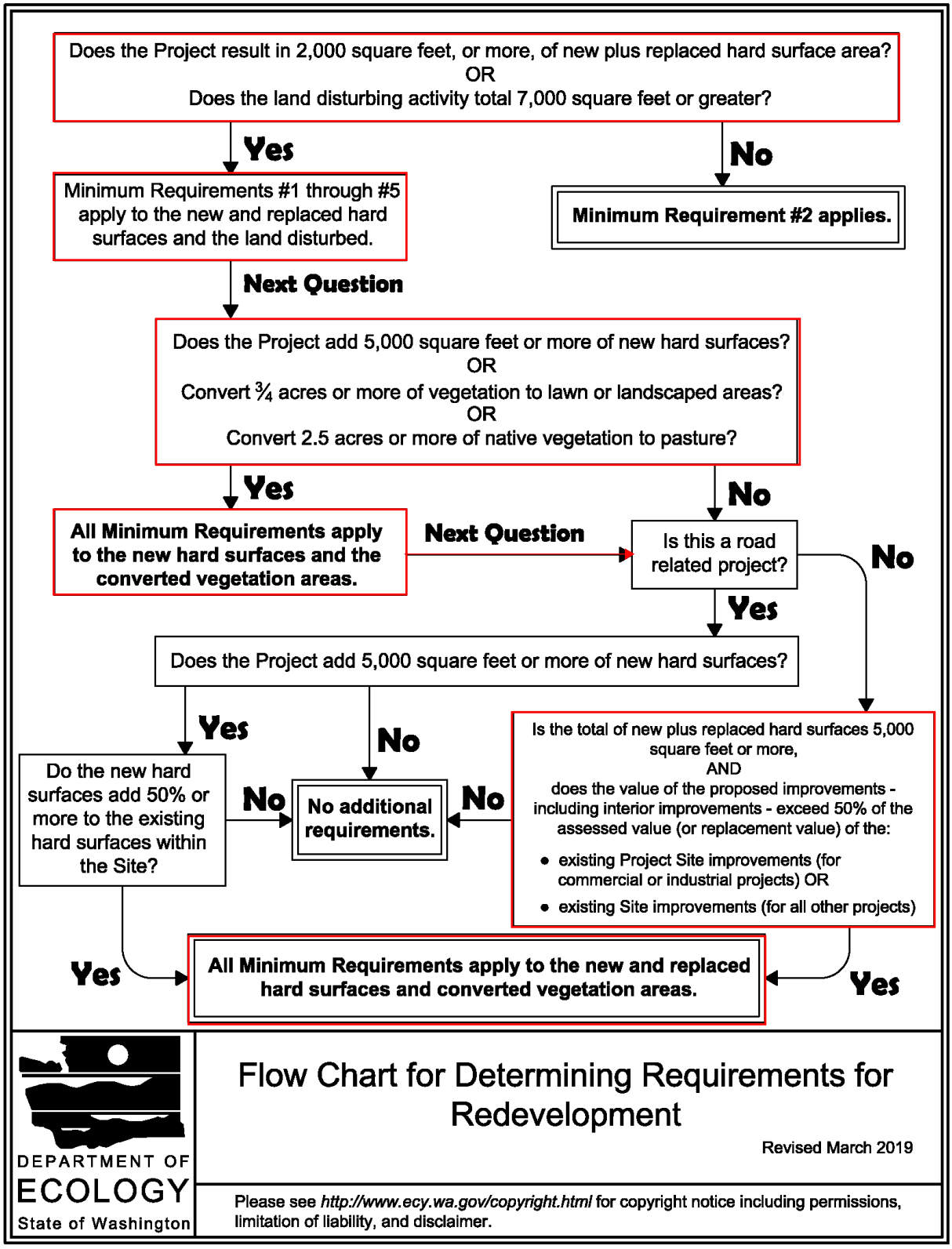
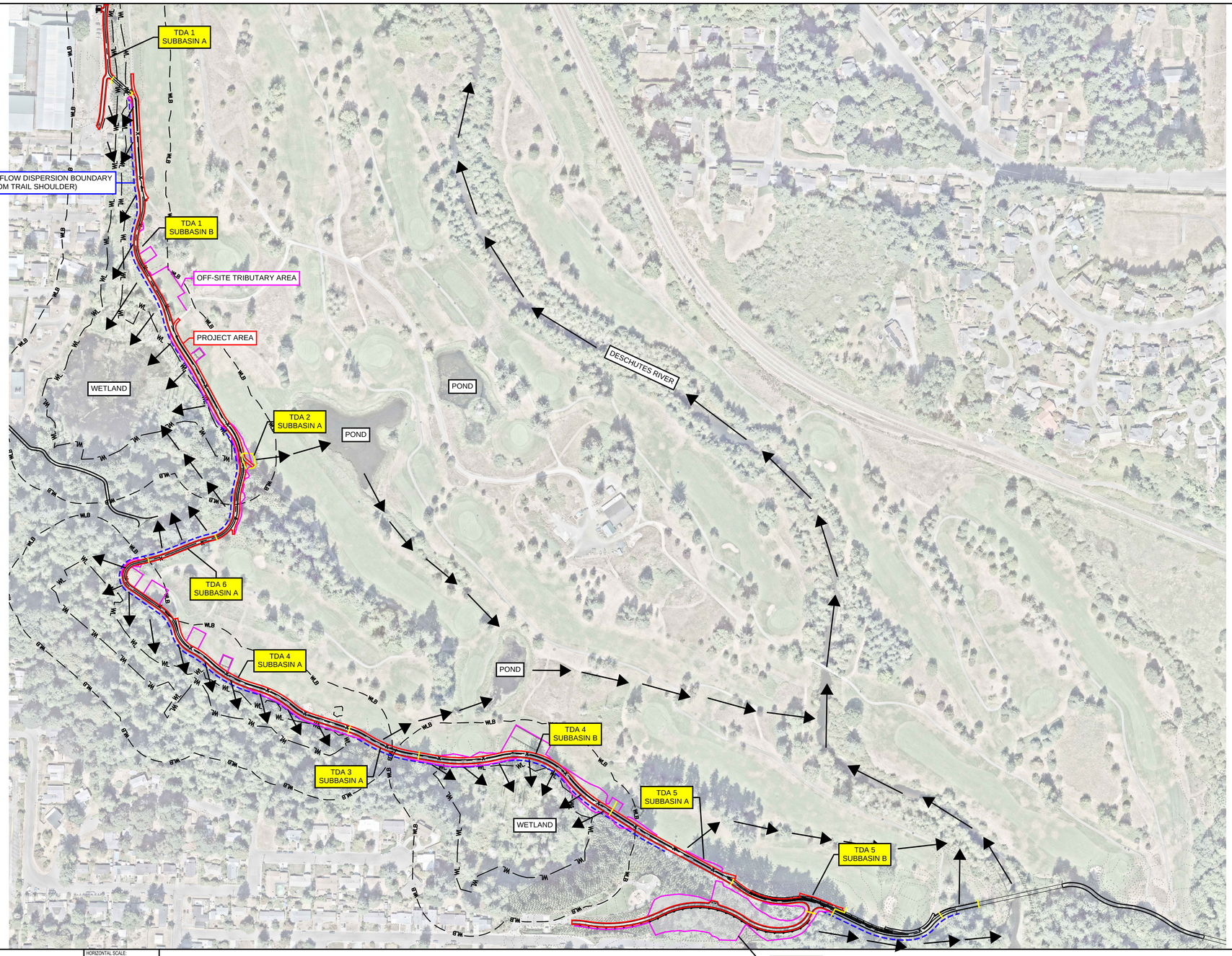


Exhibit 4B – Basin Map



SCJ ALLIANCE
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HORIZONTAL SCALE:	AS SHOWN
DATE:	MARCH 2026
JOB No.:	SCJ #25-000313
DRAWING FILE No.:	-

BASIN MAP

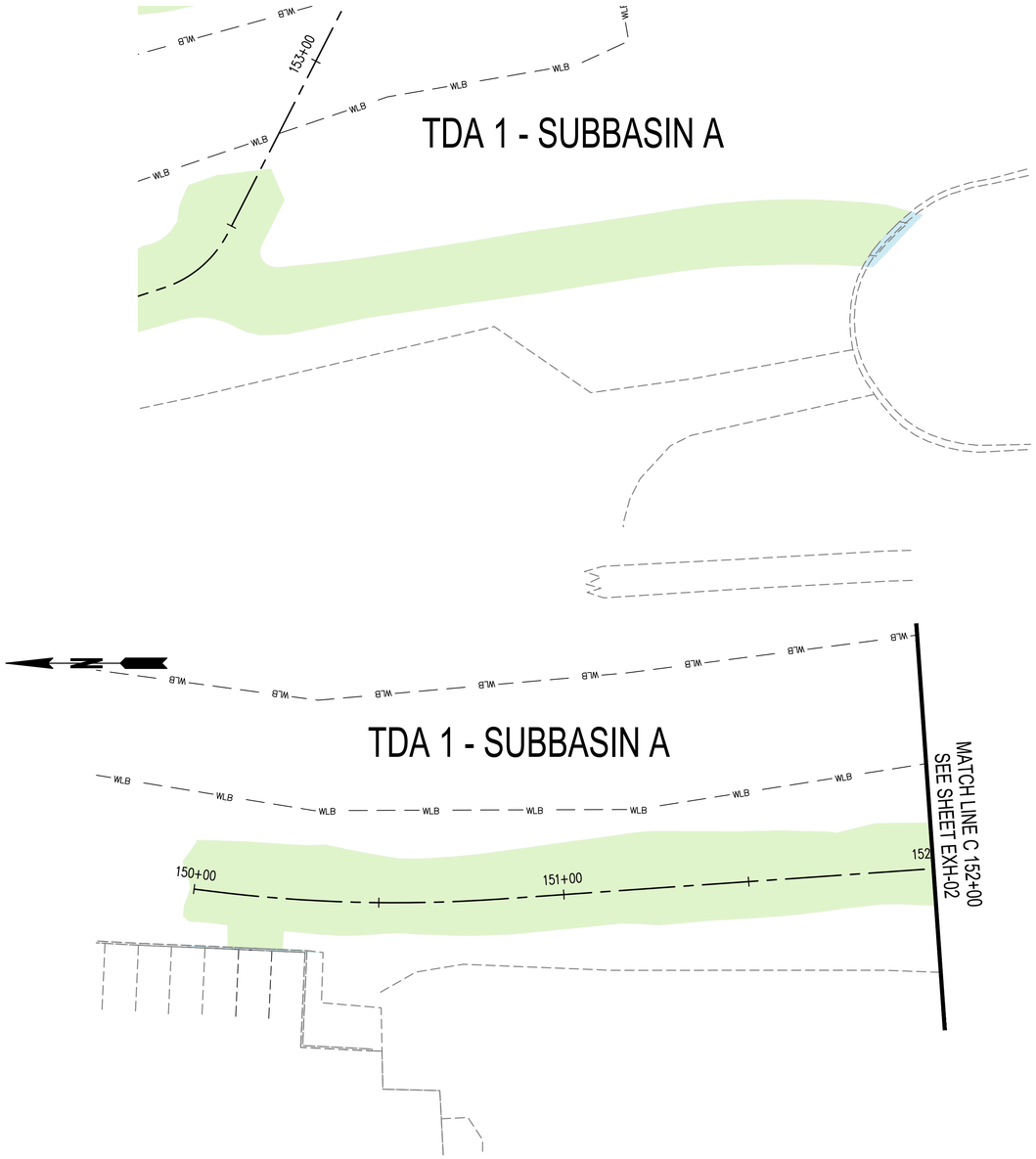
DESCHUTES VALLEY TRAIL - SEGMENT C

EXHIBIT No: **EX-01**

SHEET No: **01**

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Exhibit 4C – Work Map



TDA 1 EXISTING BASIN AREAS:

	SUBBASIN A	SUBBASIN B
PERVIOUS:	8862 SF	34509 SF
NPGIS:	61 SF	8382 SF
TOTAL:	8923 SF	42891 SF

0 20 40
SCALE IN FEET

TDA 2 EXISTING BASIN AREAS:

	SUBBASIN A
PERVIOUS:	1230 SF
NPGIS:	592 SF
TOTAL:	1822 SF

TDA 3 EXISTING BASIN AREAS:

	SUBBASIN A
PERVIOUS:	5291 SF
NPGIS:	1648 SF
TOTAL:	6939 SF

TDA 4 EXISTING BASIN AREAS:

	SUBBASIN A	SUBBASIN B
PERVIOUS:	21683 SF	36035 SF
NPGIS:	4100 SF	4491 SF
TOTAL:	25783 SF	40526 SF

TDA 5 EXISTING BASIN AREAS:

	SUBBASIN A	SUBBASIN B	SUBBASIN C
PERVIOUS:	11682 SF	9627 SF	64918 SF
NPGIS:	3995 SF	1304 SF	168 SF
TOTAL:	15677 SF	10931 SF	65086 SF

TDA 6 EXISTING BASIN AREAS:

	SUBBASIN A
PERVIOUS:	5847 SF
NPGIS:	0 SF
TOTAL:	5847 SF

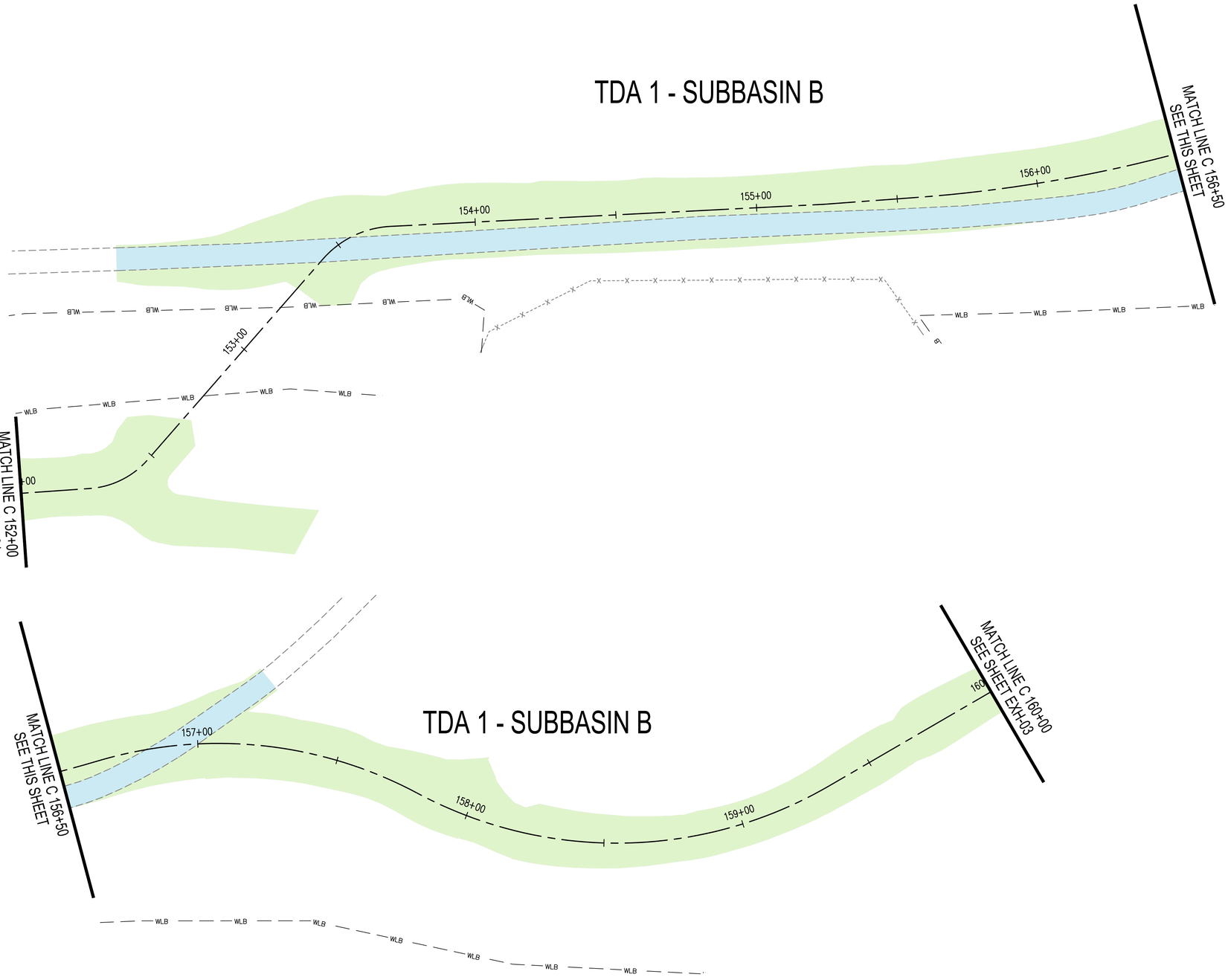
SCJ ALLIANCE
CONSULTING SERVICES
8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
P: 360.352.1465
SCJALLIANCE.COM

HORIZONTAL SCALE: AS SHOWN
DATE: JUNE 2026
JOB No.: 25-000313
DRAWING FILE No.: AREA TAKEOFFS EXHIBIT

STORMWATER AREA TAKEOFFS
DESCHUTES VALLEY TRAIL - SEGMENT C

EXHIBIT No: EXH-01
SHEET No: 01

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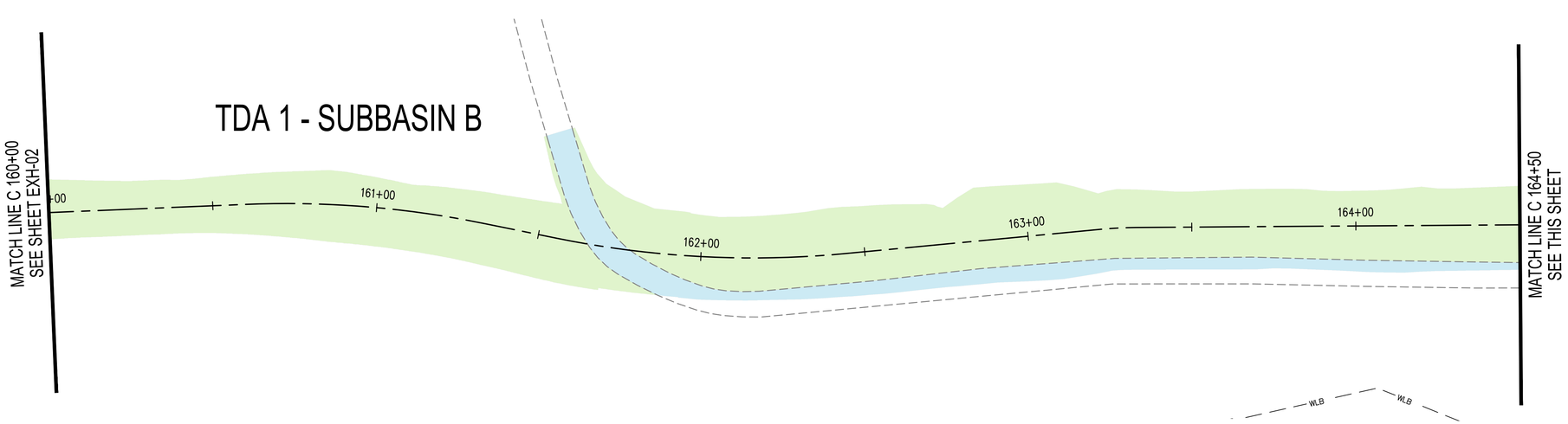
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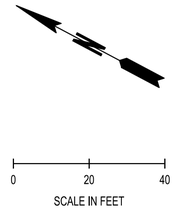
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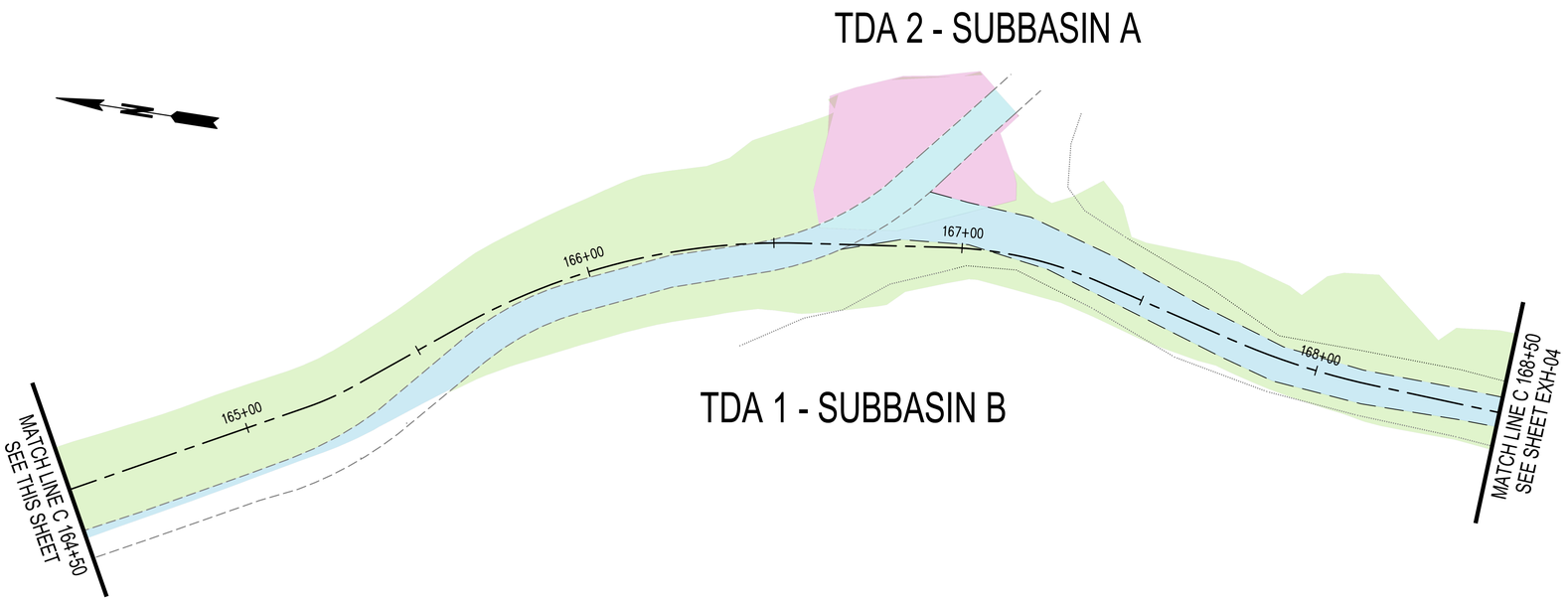
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DESCHUTES VALLEY TRAIL - SEGMENT C

EXHIBIT No: **EXH-02**
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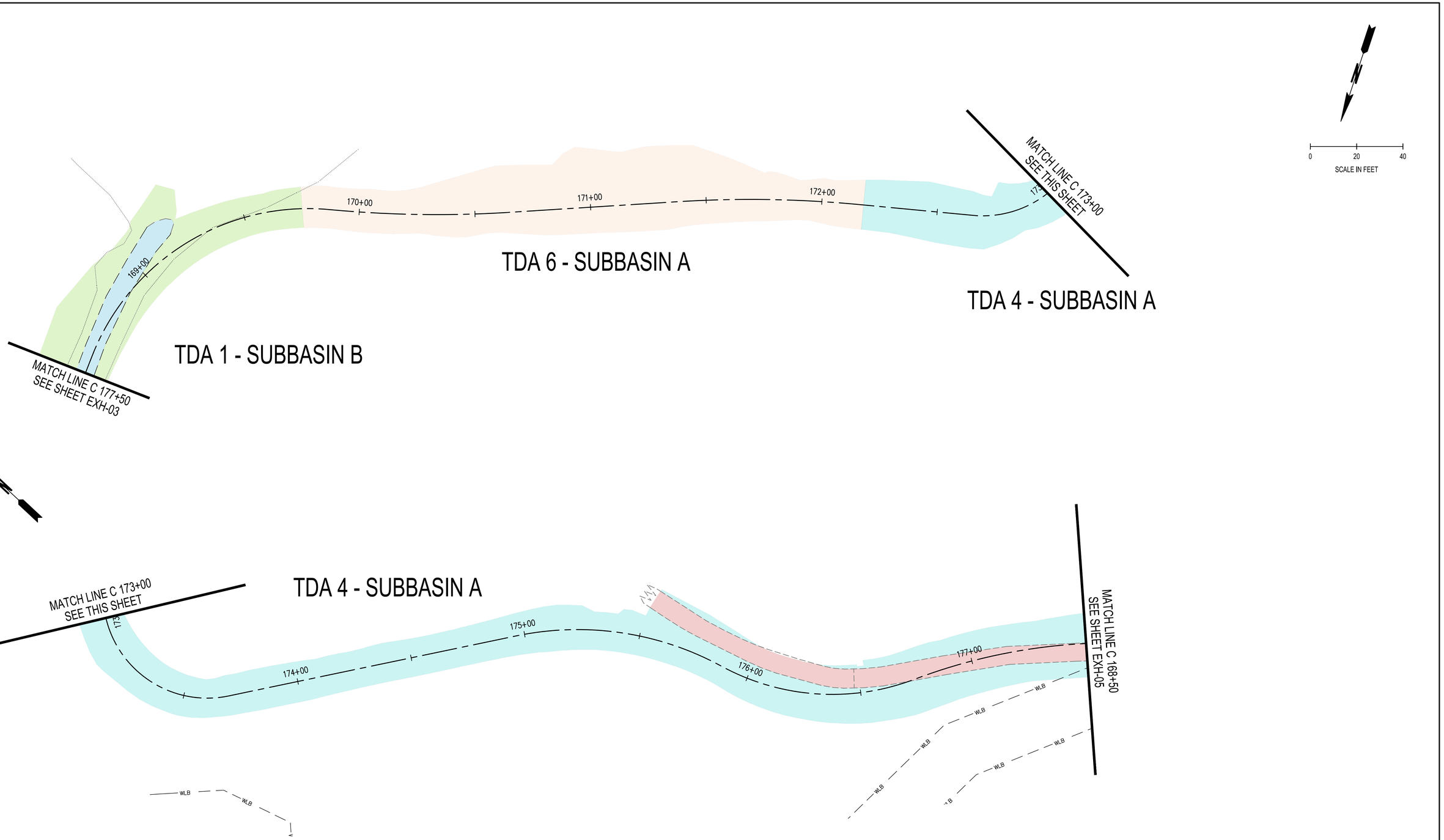
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STORMWATER AREA TAKEOFFS
DESCHUTES VALLEY TRAIL - SEGMENT C

EXHIBIT No: **EXH-03**

SHEET No: **03**

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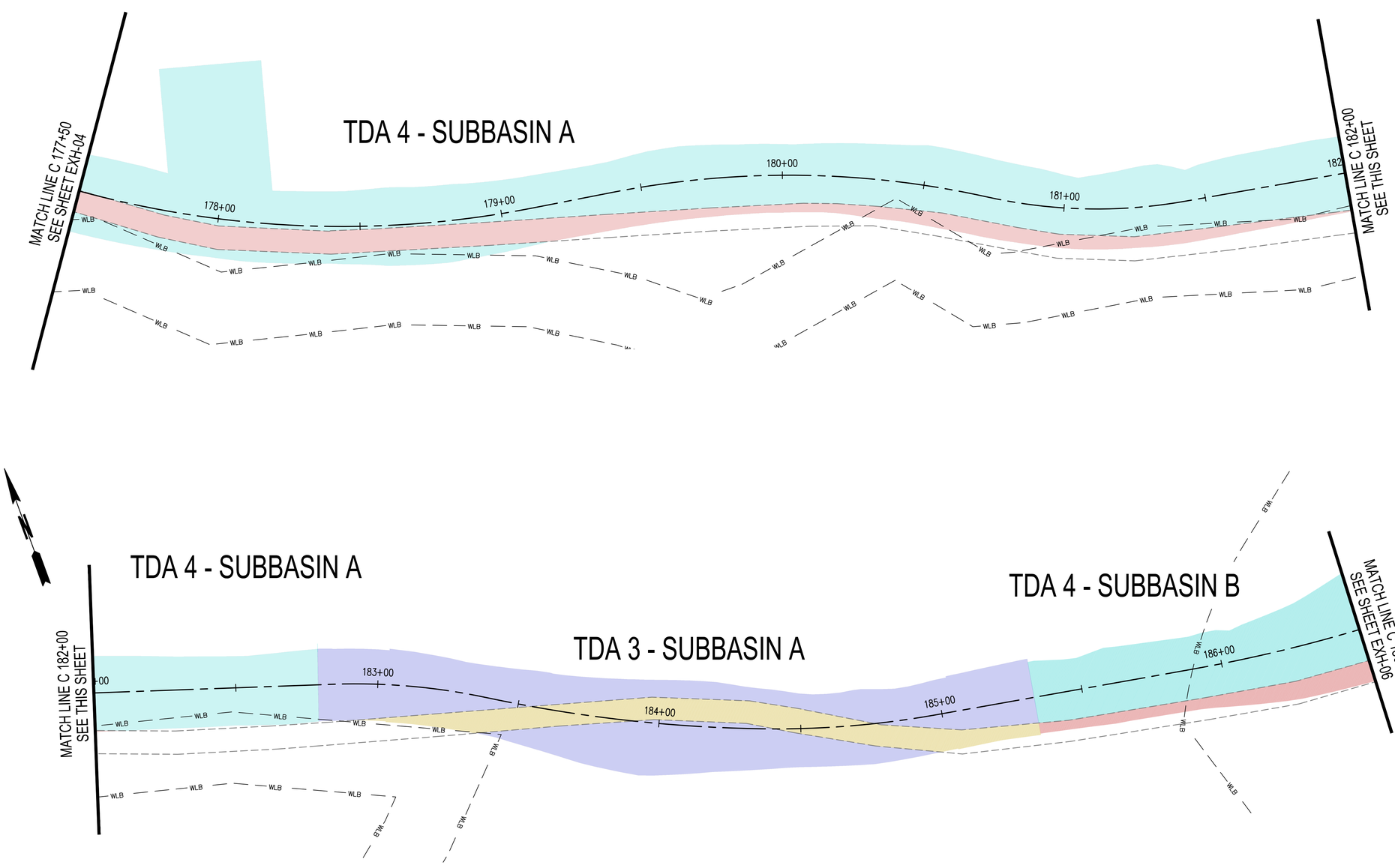
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DRAWING FILE No.:	AREA TAKEOFFS EXHIBIT

STORMWATER AREA TAKEOFFS
DESCHUTES VALLEY TRAIL - SEGMENT C

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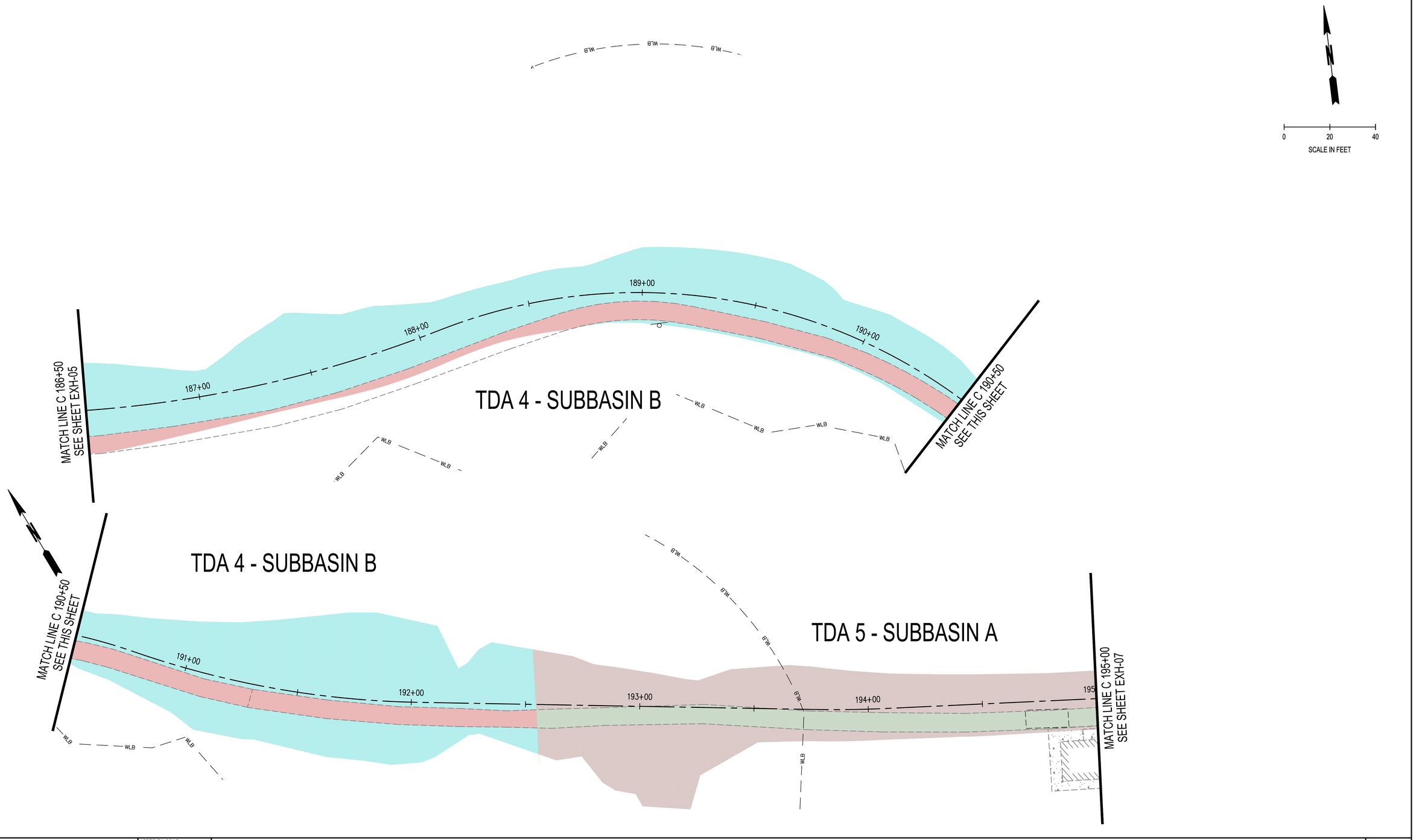
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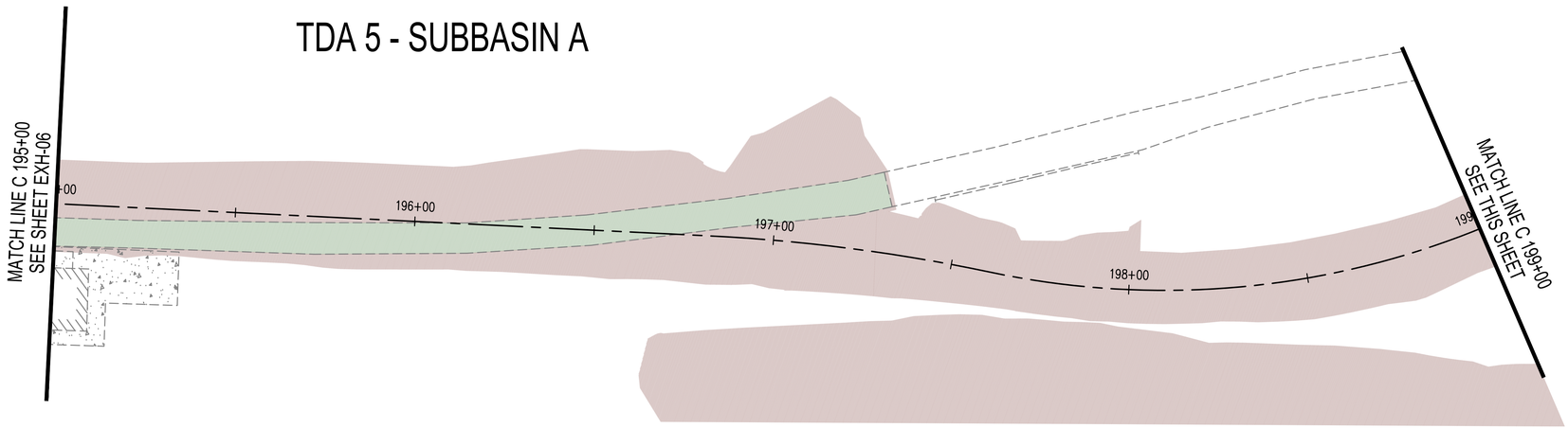
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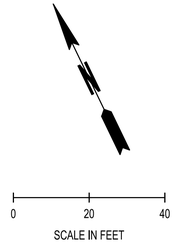
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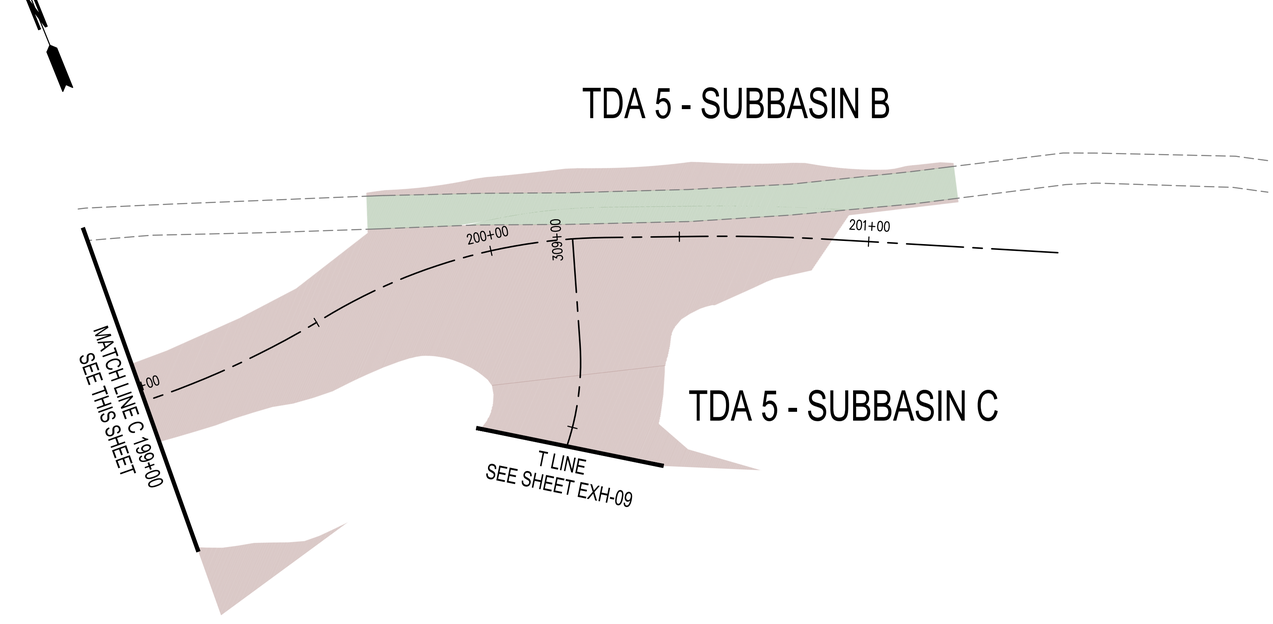
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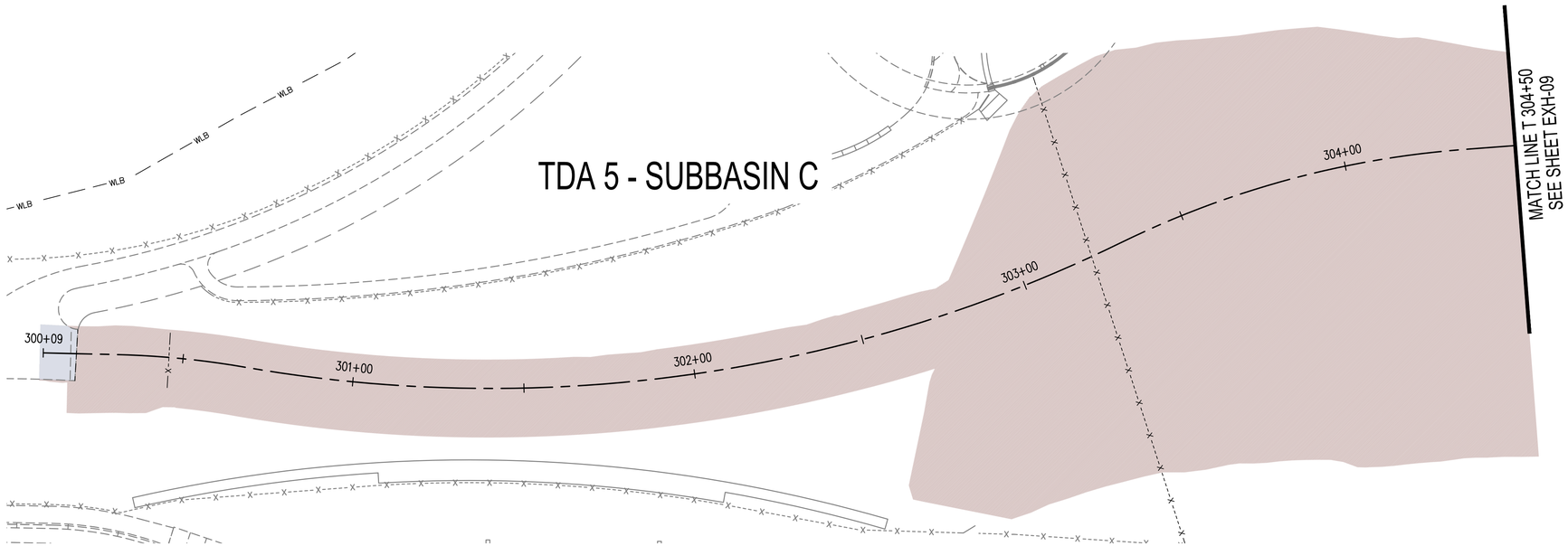


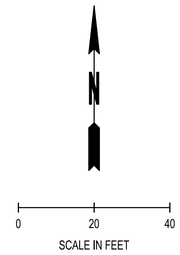
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STORMWATER AREA TAKEOFFS

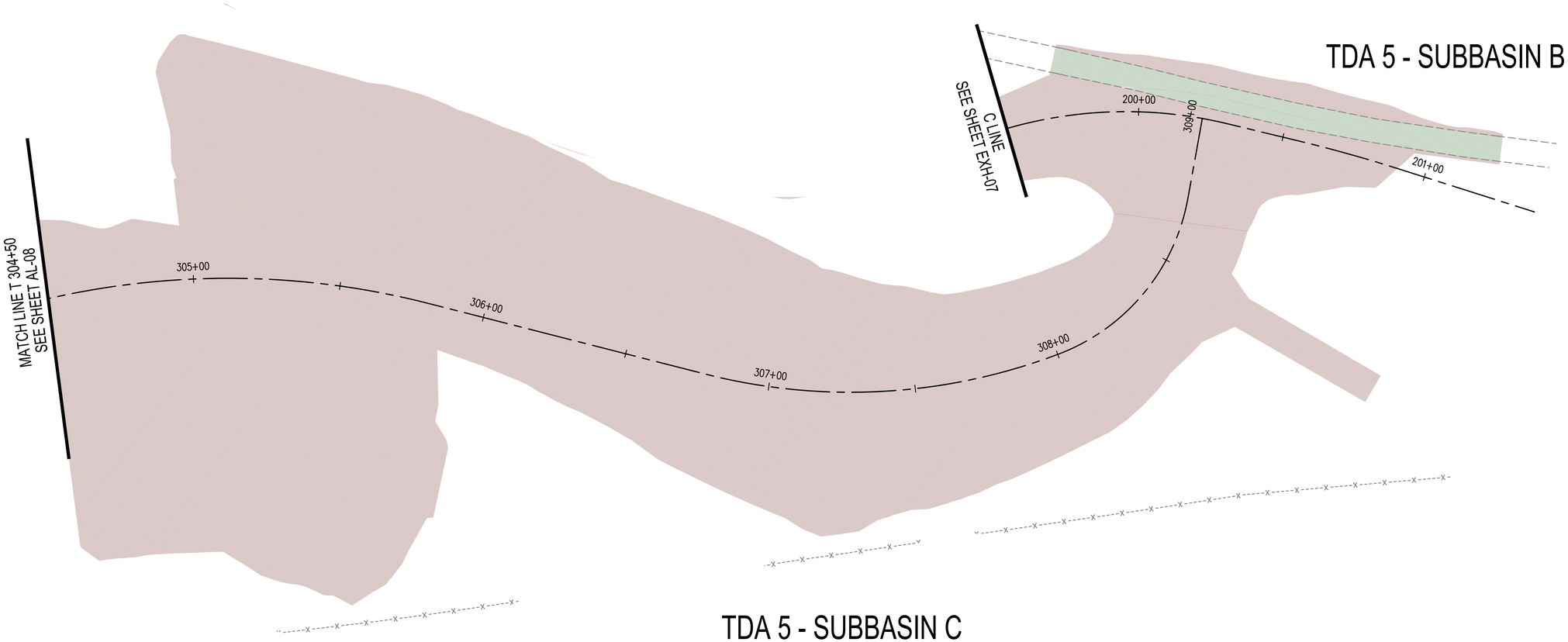
DESCHUTES VALLEY TRAIL - SEGMENT C

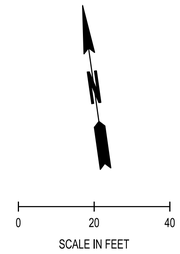
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TDA 5 - SUBBASIN B





TDA 5 - SUBBASIN C

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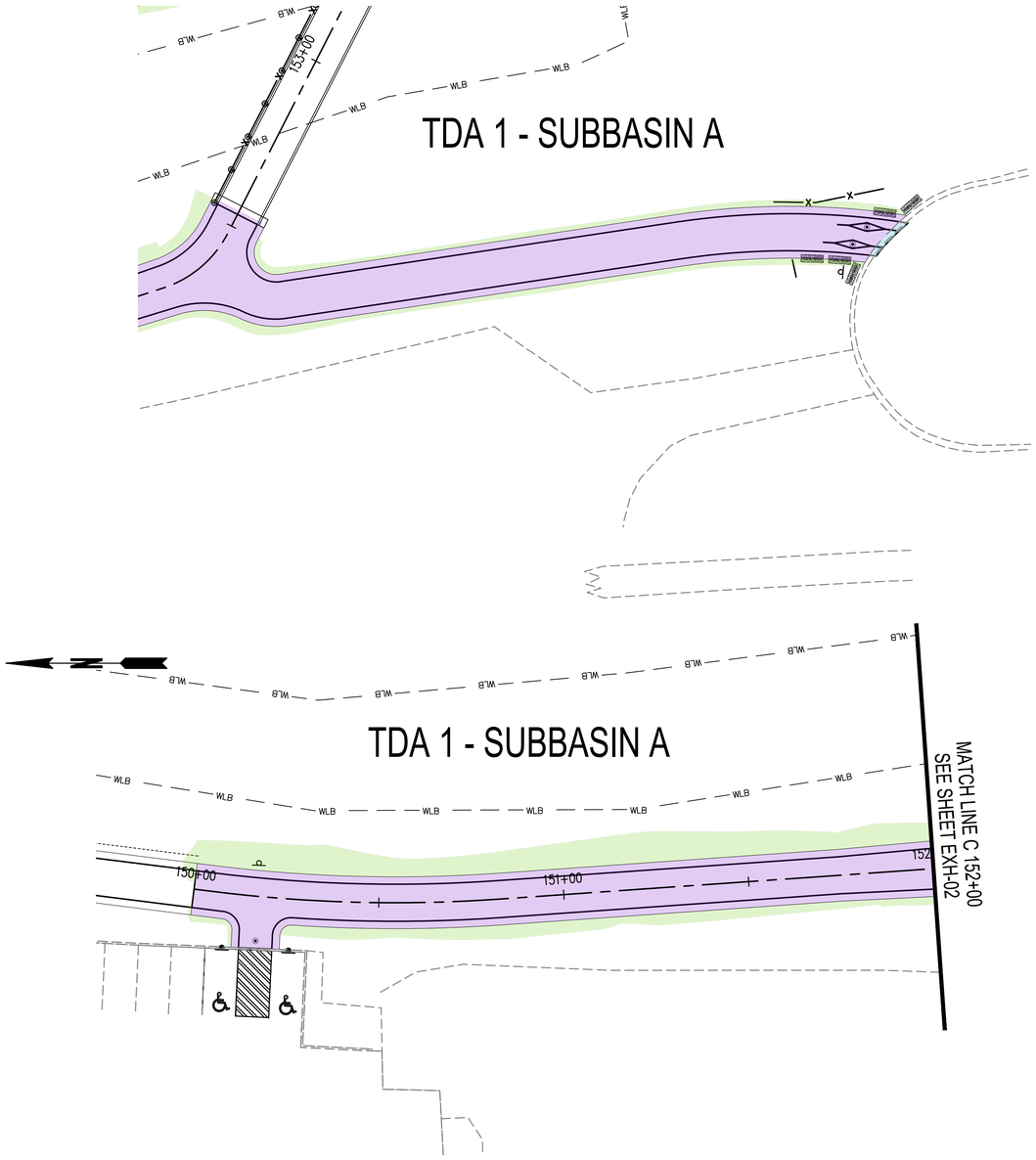
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DESCHUTES VALLEY TRAIL - SEGMENT C

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SHEET No: **09**

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NEXT DOCUMENT



TDA 1 PROPOSED BASIN AREAS:

	SUBBASIN A	SUBBASIN B
PERVIOUS:	2612 SF	10719 SF
NPGIS (NEW)	6311 SF	24147 SF
NPGIS (REPLACED)	0 SF	8025 SF
TOTAL:	8923 SF	42891 SF

0 20 40
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TDA 2 PROPOSED BASIN AREAS:

	SUBBASIN A
PERVIOUS:	1148 SF
NPGIS (NEW):	86 SF
NPGIS (REPLACED):	588 SF
TOTAL	1822 SF

TDA 3 PROPOSED BASIN AREAS:

	SUBBASIN A
PERVIOUS:	1476 SF
NPGIS (NEW):	3921 SF
NPGIS (REPLACED):	1542 SF
TOTAL:	6939 SF

TDA 4 PROPOSED BASIN AREAS:

	SUBBASIN A	SUBBASIN B
PERVIOUS:	6173 SF	25020 SF
NPGIS (NEW):	16109 SF	12254 SF
NPGIS (REPLACED):	3501 SF	3252 SF
TOTAL:	25783 SF	40526 SF

TDA 5 PROPOSED BASIN AREAS:

	SUBBASIN A	SUBBASIN B	SUBBASIN C
PERVIOUS:	5269 SF	3086 SF	52911 SF
NPGIS (NEW):	6466 SF	7815 SF	12175 SF
NPGIS (REPLACED):	3942 SF	30 SF	0 SF
TOTAL:	15677 SF	10931 SF	65086 SF

TDA 6 PROPOSED BASIN AREAS:

	SUBBASIN A
PERVIOUS:	2450 SF
NPGIS (NEW):	3397 SF
NPGIS (REPLACED):	0 SF
TOTAL	5847 SF

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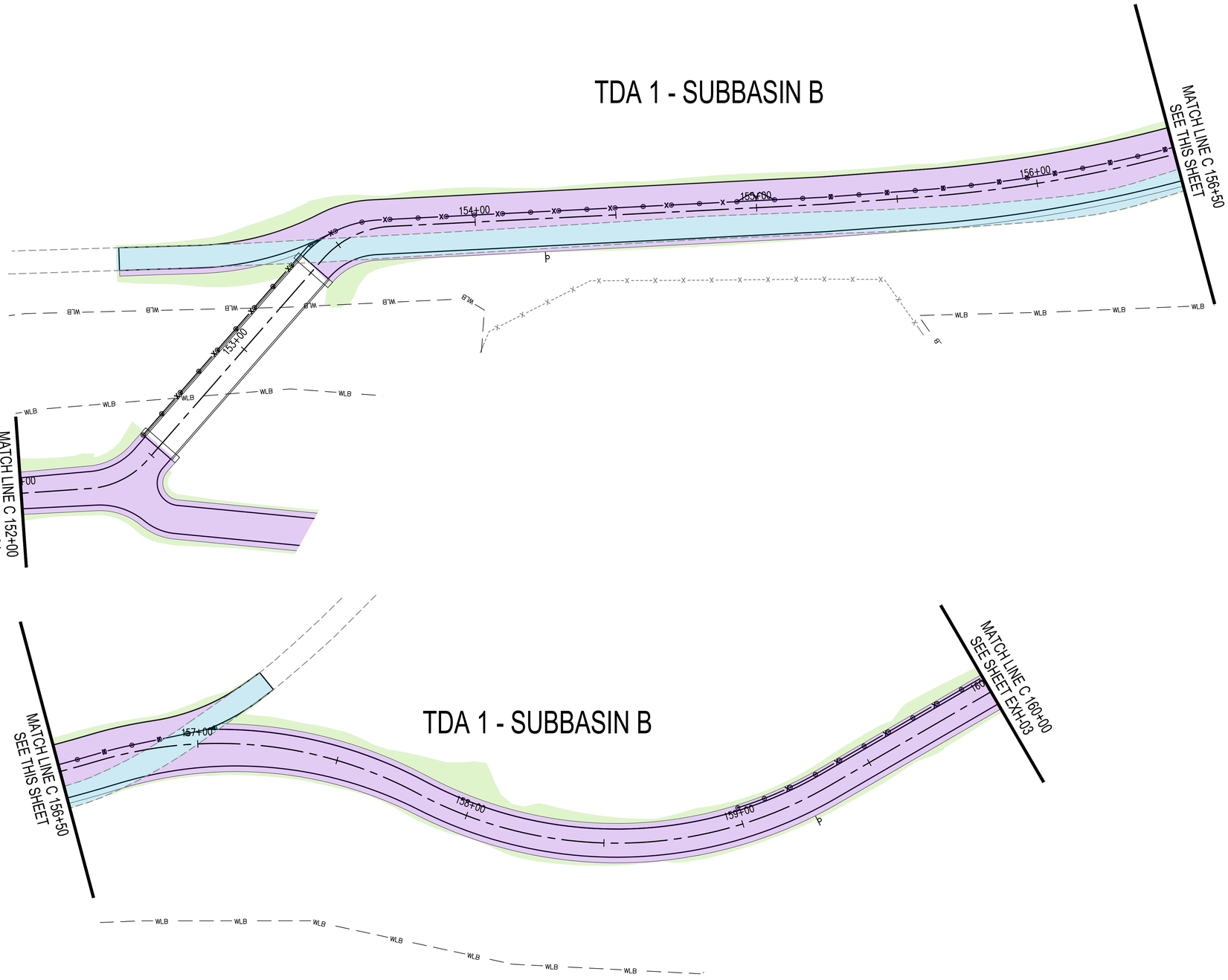
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DESCHUTES VALLEY TRAIL - SEGMENT C

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TDA 1 - SUBBASIN B



TDA 1 - SUBBASIN B

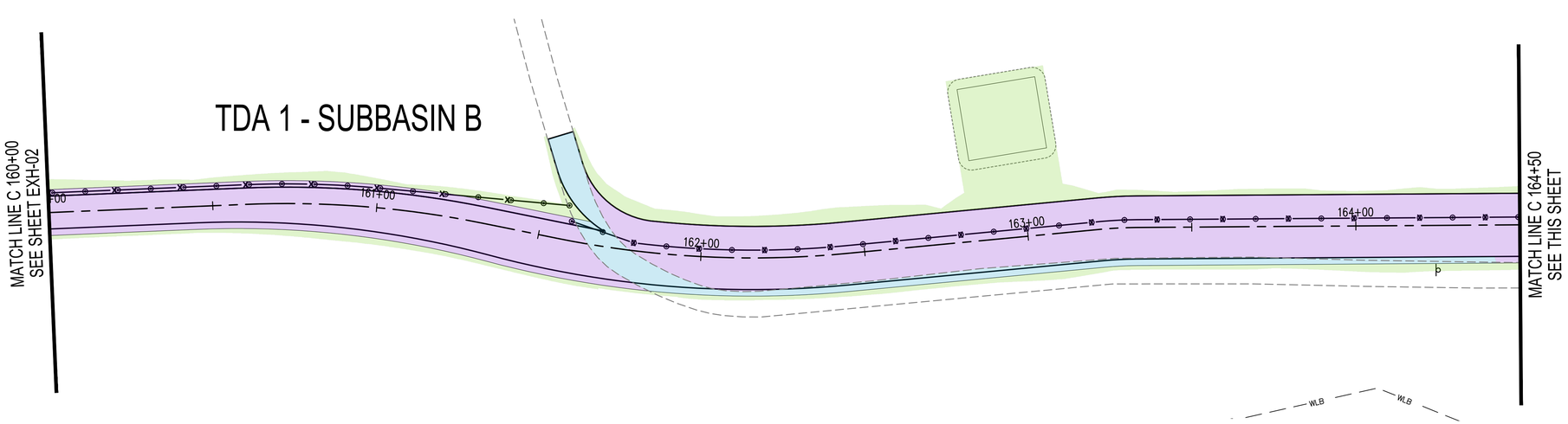
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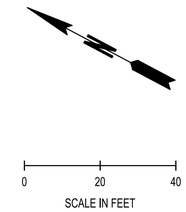
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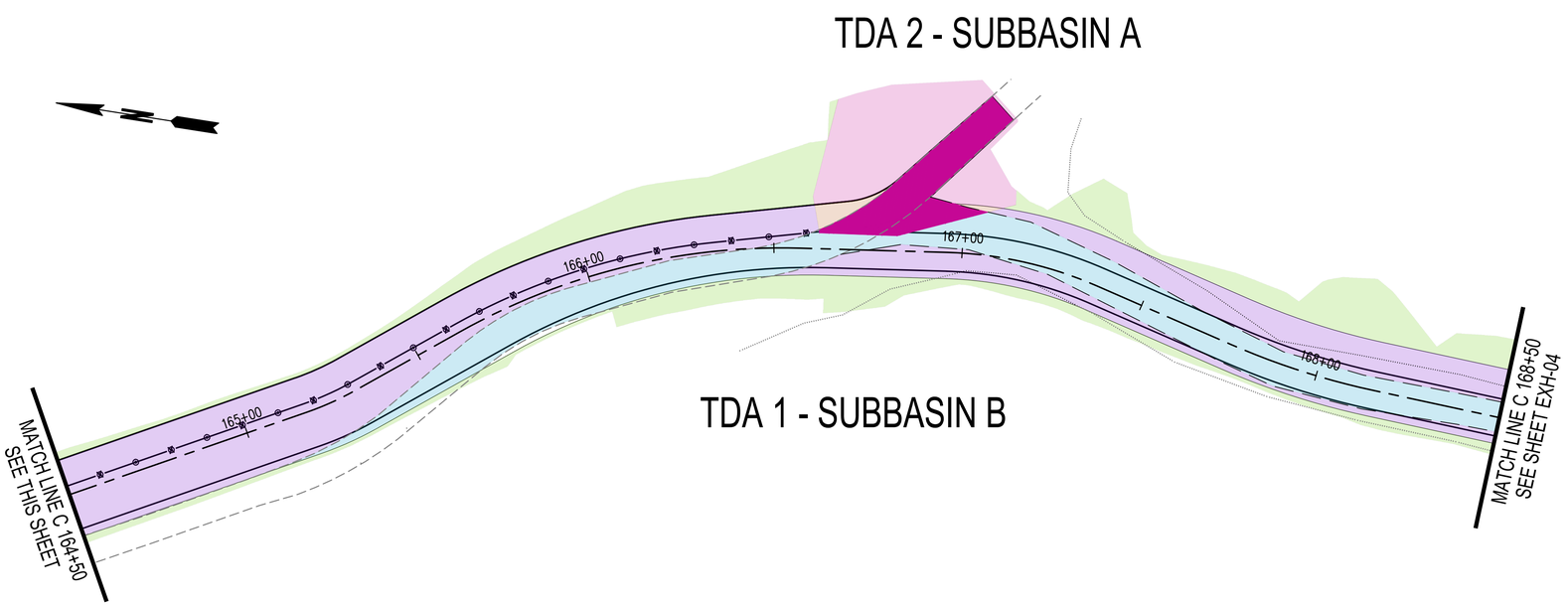
STORMWATER AREA TAKEOFFS
DESCHUTES VALLEY TRAIL - SEGMENT C

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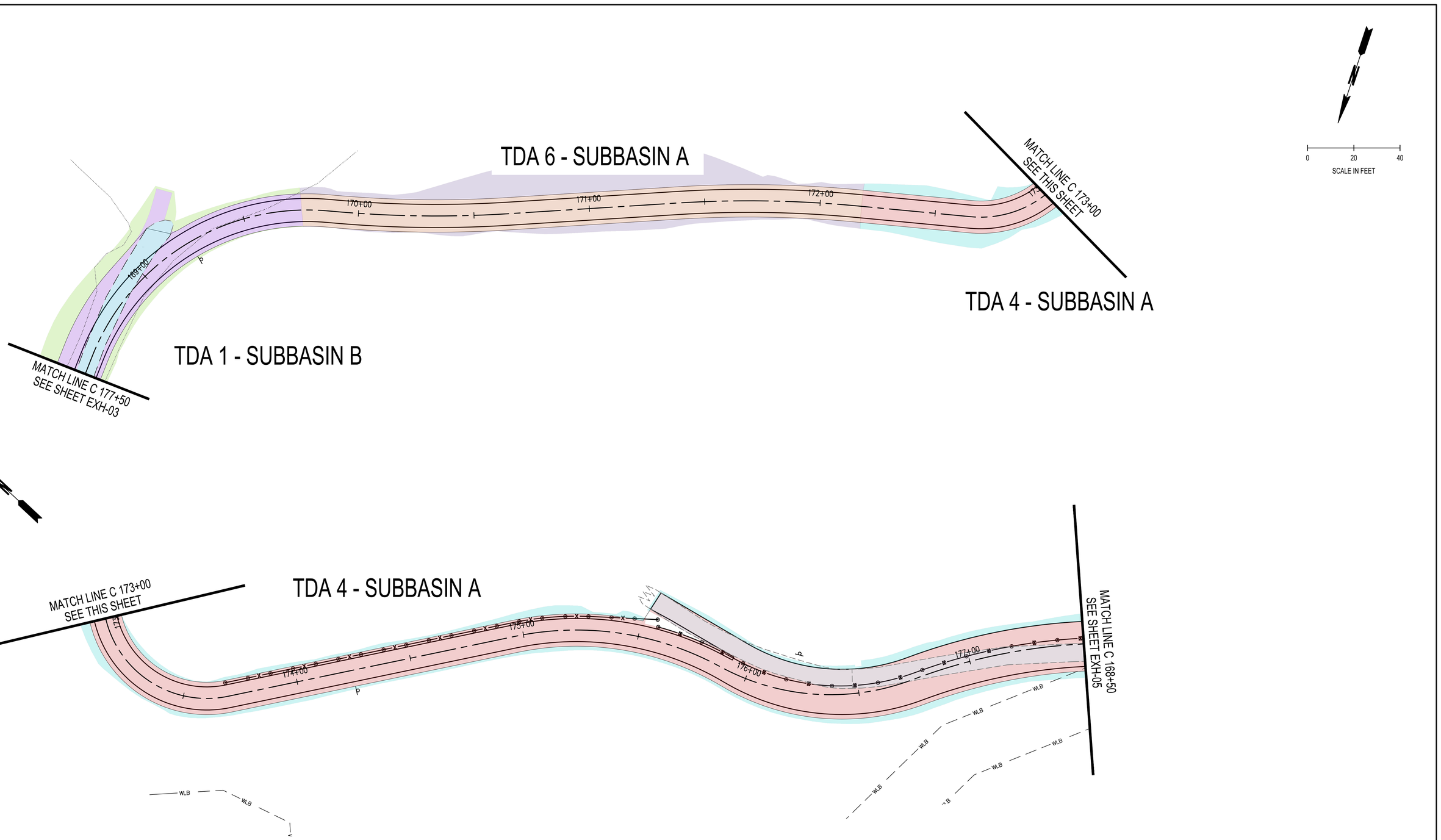
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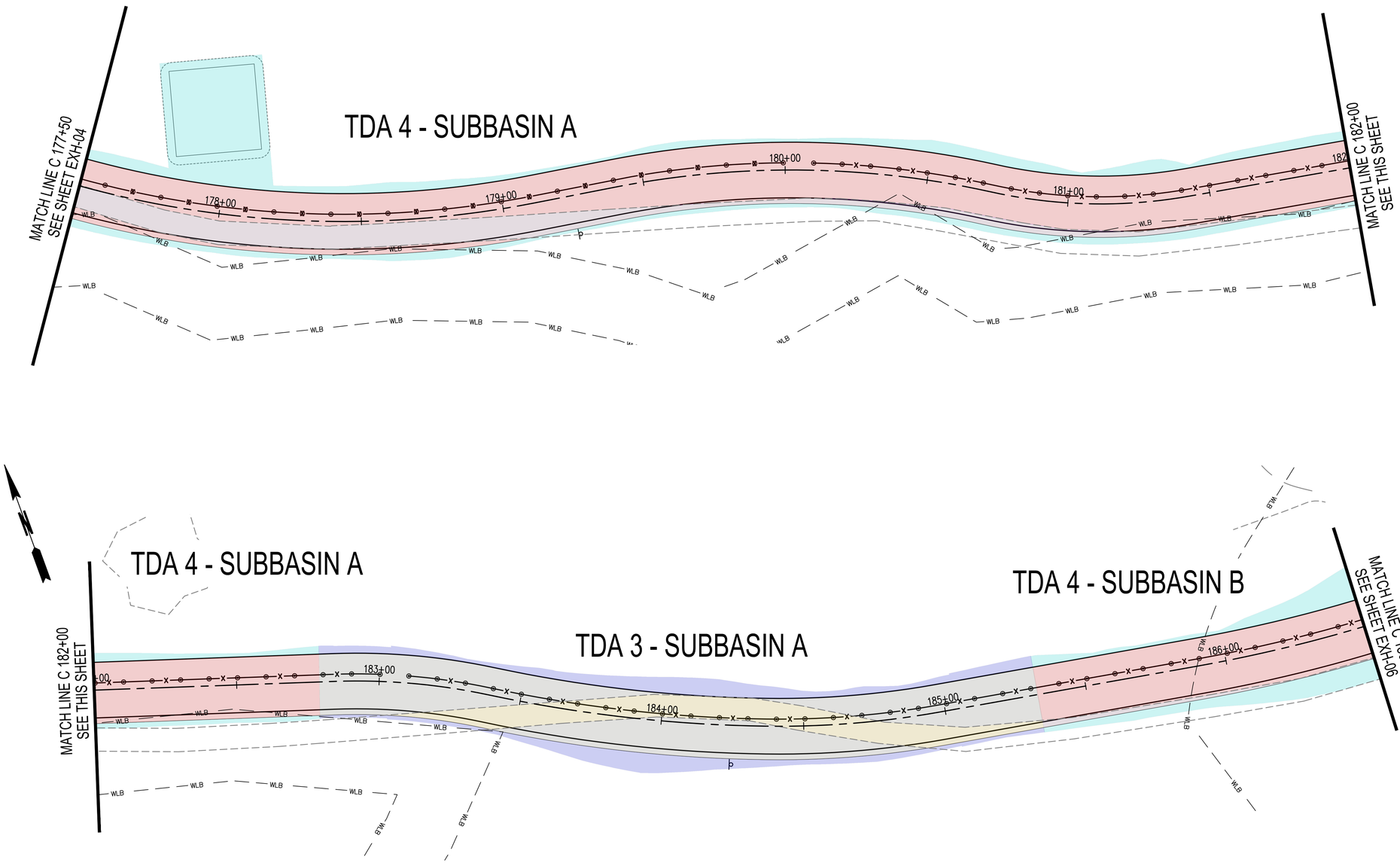
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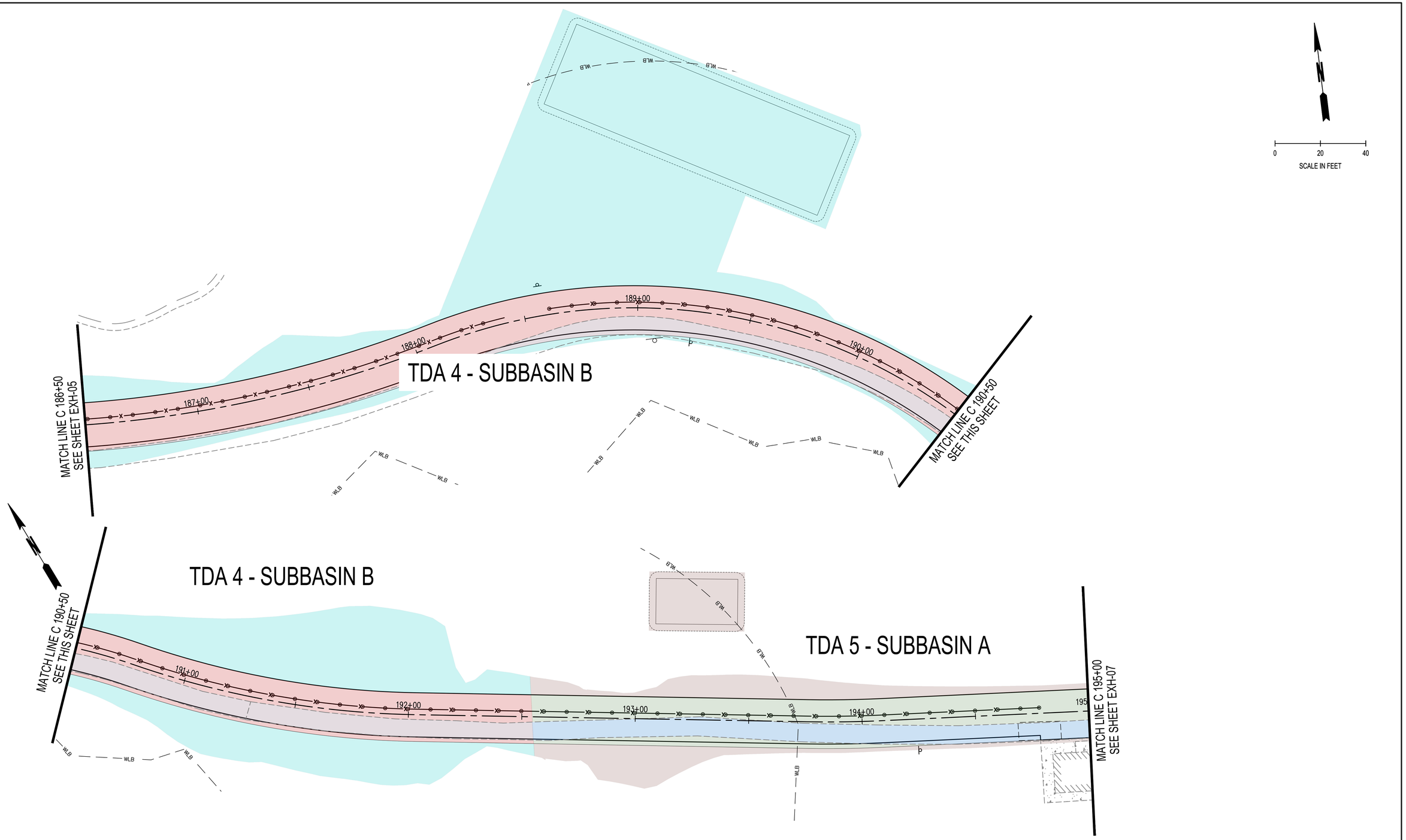
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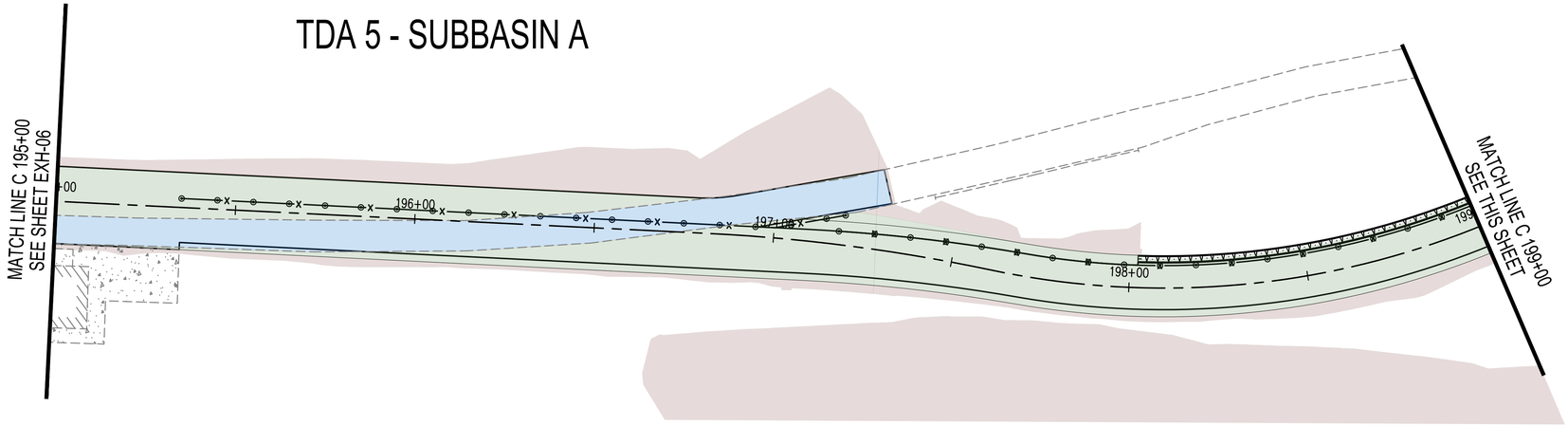
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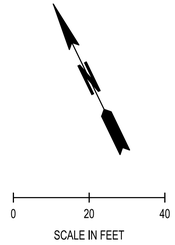
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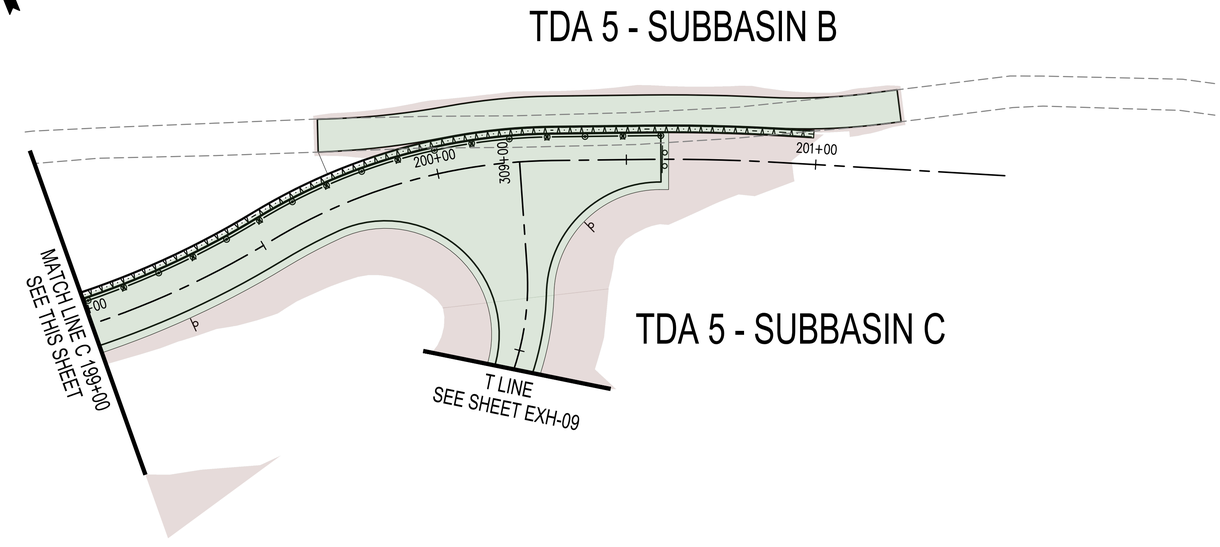
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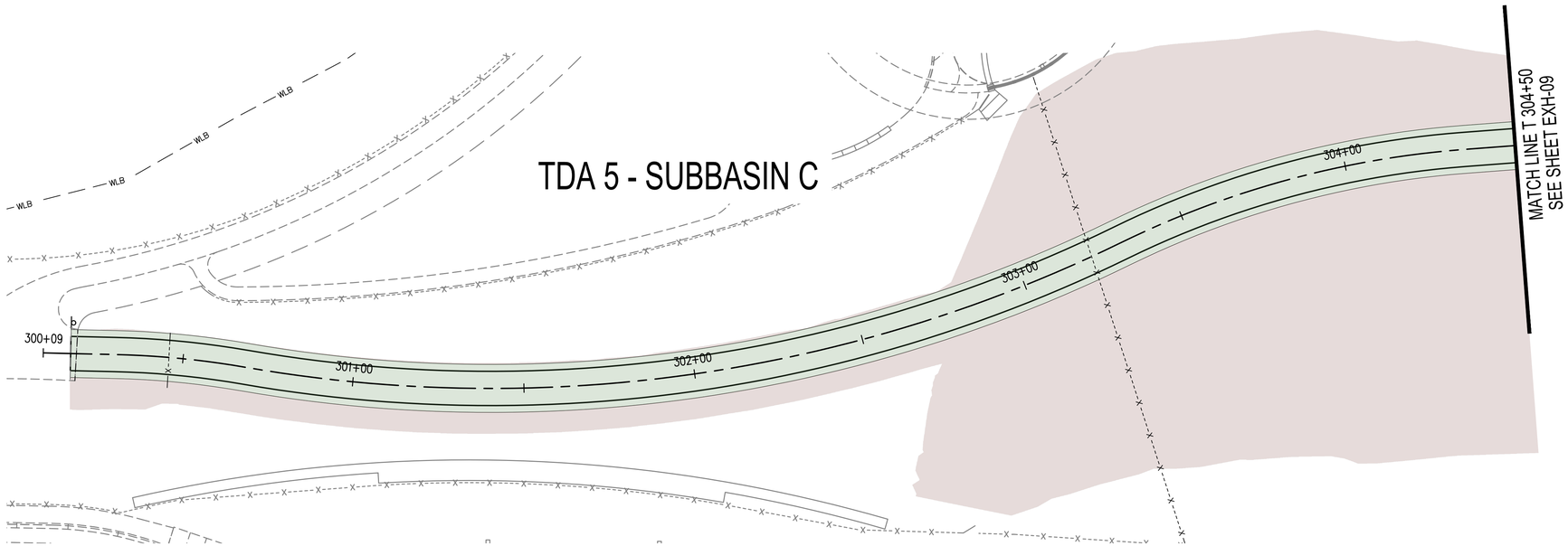
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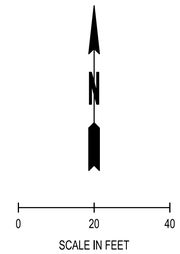
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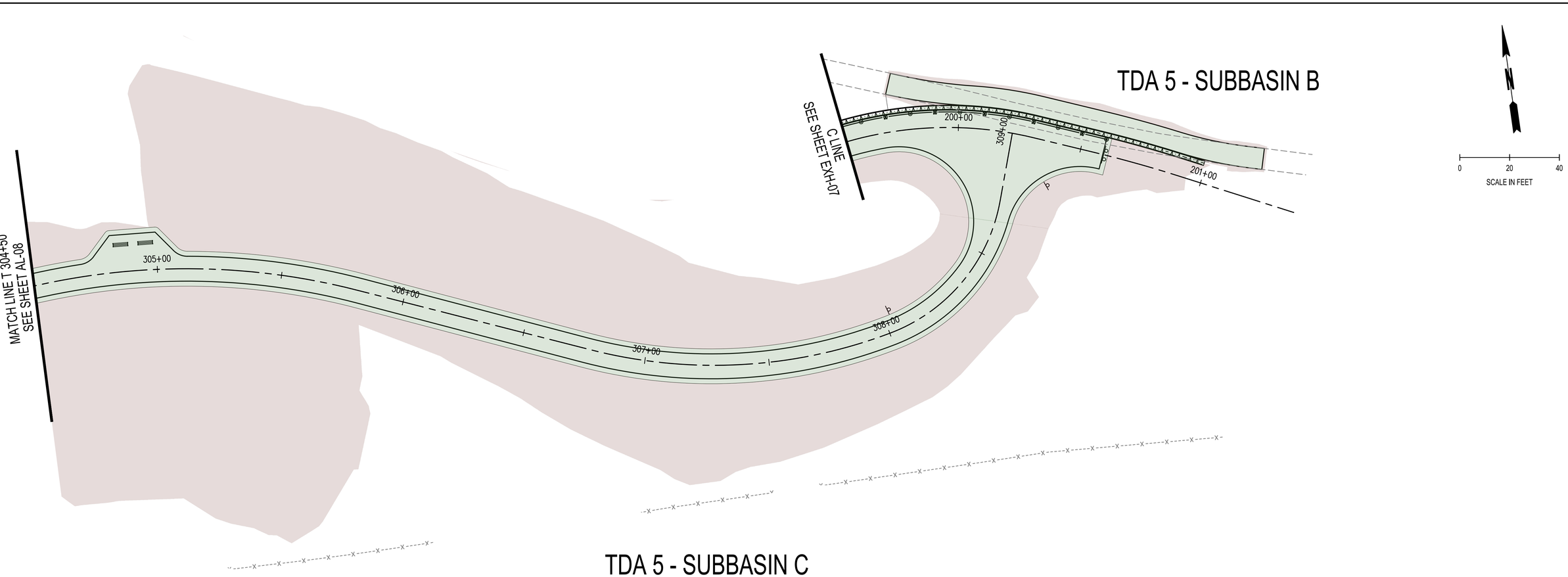
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EXHIBIT No: **EXH-09**

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Appendix 5
Construction SWPPP

Construction Stormwater Pollution Prevention Plan (SWPPP)

Deschutes Valley Trail – Segment C
City of Tumwater

Prepared For:
City of Tumwater

Prepared By:
SCJ Alliance
8730 Tallon Ln NE, Ste 200
Lacey, WA 98516
360.352.1465

May 2026

SCJ ALLIANCE
CONSULTING SERVICES

Project Information

Project:	Deschutes Valley Trail – Segment C
Prepared for:	City of Tumwater Jared VerHey Capital Projects Manager

Reviewing Agency

Jurisdiction:	City of Tumwater

Project Representative

Prepared by:	SCJ Alliance 8730 Tallon Ln NE, Ste 200 Lacey, WA 98516 360.352.1465 scjalliance.com
Contact:	Whitney Holm, PE whitney.holm@scjalliance.com
Project Reference:	SCJ #23-000313

Signature

I hereby state that this Construction Stormwater Pollution Prevention Plan for Deschutes Valley Trail – Segment C has been prepared by me or under my supervision and meets the standard of care and expertise which is usual and customary in this community for professional engineers. I understand that the City of Tumwater does not and will not assume liability for the sufficiency, suitability, or performance of Construction SWPPP BMPs prepared by me.

Tova Beck

Prepared by Tova Beck, EIT

Whitney Holm, PE

Approved by Whitney Holm, PE

This SWPPP shall be on site at all times and shall be updated as necessary.

Certified Erosion and Sediment Control Lead (CESCL)

Name	Organization	Contact Phone Number
TBD	TBD	TBD

SWPPP Preparation Date

April / 10 / 2026

Project Construction Dates

Activity / Phase	Start Date	End Date
-	TBD	TBD

Prepared for:

The Washington State Department of Ecology

Olympic Region

Permittee / Owner	Developer	Operator / Contractor
City of Tumwater	City of Tumwater	TBD

Table of Contents

1 General Information 1

1.1 Project Contacts 1
1.2 Project Description 1
1.3 Existing Site Conditions 3
1.4 Adjacent Areas 3
1.5 Critical Areas 3
1.6 Soil 3
1.7 Potential Erosion Problem Areas 4

2 Thirteen Elements 5

2.1 Element 1: Preserve Vegetation / Mark Clearing Limits 5
2.2 Element 2: Establish Construction Access 6
2.3 Element 3: Control Flow Rates 6
2.4 Element 4: Install Sediment Controls 7
2.5 Element 5: Stabilize Soils 8
2.6 Element 6: Protect Slopes 9
2.7 Element 7: Protect Drain Inlets 10
2.8 Element 8: Stabilize Channels and Outlets 10
2.9 Element 9: Control Pollutants 11
2.10 Element 10: Control Dewatering 12
2.11 Element 11: Maintain BMPs 13
2.12 Element 12: Manage the Project 13
2.13 Element 13: Protect Low Impact Development BMPs 15

3 Construction Phasing 15

4 Construction Schedule 16

5 Engineering Calculations 16

6 Pollution Prevention Team 16

6.1 Roles and Responsibilities 16
6.2 Team Members 17

7 Site Inspections and Monitoring 17

7.1 Site Inspection 17
7.2 Site Inspection Frequency 18
7.3 Site Inspection Documentation 18

Table of Contents

8 Stormwater Quality Monitoring 18

8.1 Turbidity 18
8.2 pH 19

9 Recordkeeping 19

9.1 Site Log Book 19
9.2 Records Retention 19
9.3 Access to Plans and Records 19
9.4 Updating the SWPPP 19

10 Reporting 20

10.1 Notification of Noncompliance 20

List of Figures

Figure 1 Site Vicinity Map..... **Error! Bookmark not defined.**

List of Appendices

Appendix A – Upstream Tributaries

Appendix B – Critical Areas

Appendix C – Soil Information

Appendix D – Site Log Book

1 General Information

1.1 Project Contacts

Table 1. Team Members

Title	Name(s)	Organization	Phone Number
Consultant Engineer	Whitney Holm, PE Patrick Holm, PE	SCJ Alliance	360-352-1465
Owner Contact / City Engineer	Jared Verhey, PE	City of Tumwater	360-754-4140
Contractor	TBD		

1.2 Project Description

The Deschutes Valley Trail Project – Segment C is located in Tumwater, Washington within the public right-of-way. The Deschutes Valley Trail Project begins at the recently completed Deschutes Valley Trail Segment A1 at Brewery Park and runs southeast along the perimeter of the Tumwater Valley Golf Course for 2 miles to Pioneer Park. Segment C begins at the Valley Athletic Club parking lot and extends to the Deschutes Valley Spur. The goal of Segment C is to complete a missing link in the existing trail by providing a paved, non-motorized trail along the edge of the existing Valley Golf Course. Project improvements include a 10-foot to 12-foot wide HMA trail with 1-2 foot gravel shoulders and the replacement of segments of existing cart paths. The Segment C trail alignment is approximately 5,150 LF and the Deschutes Valley Park Spur adds an additional 950 LF. See **Table 2** for a description of project areas and **Figure 1** for a map of the project area.

Table 2. Project Areas

Description	Area/Volume	Notes
Total Project Area	6.88 ACRES	Includes project improvements and clearing and grubbing areas, extending to the limits of the full dispersion area.
New NPGIS	113,216 SF	Trail, shoulder, and cart path.
New PGIS	0 SF	
Effective Impervious Surface	0 SF	Impervious surface that is not 100% infiltrated through full dispersion.
Area Disturbed	5.01 ACRES	Includes project improvements, extending to the clearing and grubbing limits.
Total Cut	6,892 CY	Significant cut volumes along the Deschutes Valley spur due to steep grades.
Total Fill	3,415 CY	Significant fill volumes at the South end of the project and along the Deschutes Valley Spur due to steep grades.

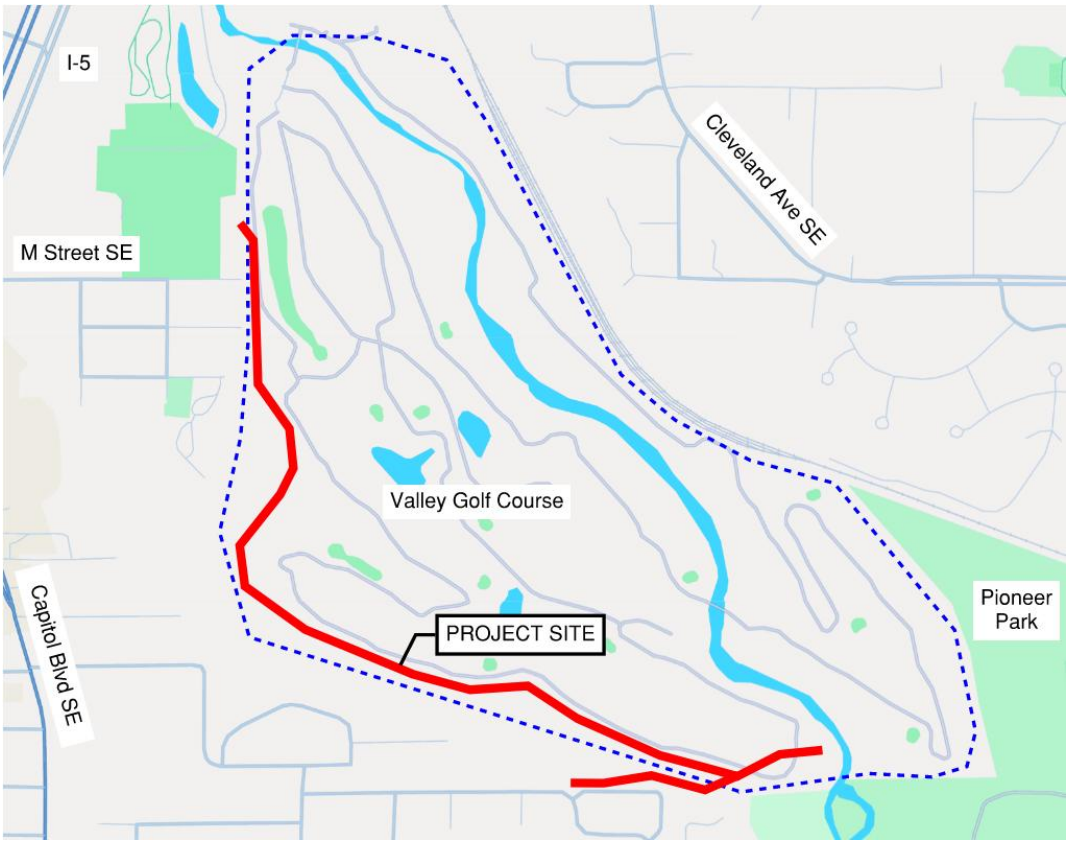


Figure 1 – Site Vicinity Map

1.3 Existing Site Conditions

The existing site consists of undeveloped land within the City of Tumwater property and portions of existing cart path near the boundary of the Valley Golf Course. Most of the surfaces within the project area consist of open grassy slopes and forested areas. However, there are 8-foot-wide HMA cart paths for approximately 2,600 LF of the proposed trail footprint. The area of existing hard surface is approximately 24,800 SF.

In existing conditions, stormwater infiltrates in the grass and treed areas or sheet flows from the HMA cart path and infiltrates in nearby vegetation. The site is composed of five distinct threshold discharge areas (TDAs). In TDA 1, stormwater flows through native vegetation to a low point on the west side of the proposed trail and discharges into a wetland. In TDA 2, stormwater flows east across the golf course and enters a pond. In TDA 3, stormwater flows east across the golf course and enters a second pond. In TDA 4, stormwater flows west and discharges into a wetland. In TDA 5, stormwater flows east and northeast across the golf course before discharging into the Deschutes River, and on the south side of the proposed path stormwater will flow eastward into a flow dispersion trench. In TDA 6, stormwater flows north to a depression where it will infiltrate in the forest floor.

1.4 Adjacent Areas

Land use surrounding the project site includes parks/open space (Valley Golf Course), General Commercial (The Valley Athletic Club, Serendipity Children's Center, and Tumwater Valley Physical Therapy), and low-density single-family developments. Wetland areas are located on the west side of the improvements and there are three ponds east of the improvements that collect site stormwater. The Deschutes River runs south to north along the east side of the Valley Golf Course, east of the project site. Storm flows from the site eventually make their way to the Deschutes River and are conveyed north to Capitol Lake and Puget Sound. Upstream areas tributary to the project site are minor because the improvements are located along the top of a grassy slope, with downward sloping topography on either side of the site. See **Appendix A** for a map of upstream tributary areas and a graphic of downstream drainage leading to the Deschutes River.

1.5 Critical Areas

There are no City of Tumwater maps for the following types of critical areas; the information provided below is based on Thurston County maps included as **Appendix B**.

- Geologic Hazard Areas
    - There are no known landslide and no volcanic hazard areas within the project site.

- Known Areas of Soil or Groundwater Concern
    - There are no known areas of soil or groundwater concern within the project site.

- High Groundwater Hazard Areas
    - There are three ponds north of the project improvements that have a high groundwater hazard. Construction activities will not affect these areas.

- Flood Zones

  - The northern section of the project is located within the 100-year flood zone.

- Critical Aquifer Recharge Areas
  - The project improvements are in a moderate-to-high class aquifer recharge area. Per the City of Tumwater DDECM and Section 16.24.050 of the Municipal Code, the project does not involve storage of hazardous materials and therefore does not trigger any additional requirements for the aquifer recharge area.

- Wetlands
  - The northern section of the project is adjacent to a designated category II wetland A. Along the central western portion of the trail category III wetland B resides. The southern section of the project is adjacent to a designated category II wetland C. Approximately half of the project improvements are within 300 feet of a wetland area.
  - The existing cart path stretches within these wetland boundaries, and the planned improvements are designed to follow the existing path closely. Additional impervious surface is expected to be minimal and stretched across the several basins on the project site. See *section 4.1.9* for further descriptions of each wetland.

- Wellhead Protection Areas
  - Wellhead No. 89700 is located west of the project site and project improvements are located within the 6-month - 5-year travel times. Since new impervious surfaces on the project are non-pollution-generating and the project does not fall under any of the prohibited uses listed in Section 16.26.040 of the City of Tumwater Municipal Code, no additional requirements are triggered.

- Washington State Department of Ecology Water Quality Atlas Map
  - The site is in the Budd/Deschutes Watershed, Water Resource Inventory Area (WRIA) 13 and the Deschutes River Basin (see **Appendix B**).
  - The Deschutes River is designated as a Category 5 Assessed Water - 303(d) (see **Appendix B**) specifically for:
    - Bacteria - fecal coliform, and
    - Benthic Macroinvertebrates Bioassessments.
  - At the time the City of Tumwater DDECM was written, a Water Quality Improvement Report and Implementation Plan (also known as a TMDL) had been developed for the Deschutes River, Percival Creek, and Budd Inlet Tributaries for Temperature, Fecal Coliform Bacteria, Dissolved Oxygen, pH, and Fine Sediment Total Maximum Daily Load (see **Appendix B**). The plan lists nine specific actions the City of Tumwater implemented via additional water quality mitigation requirements included in City of Tumwater DDECM, Volume I, Section 4.3.5 to meet requirements of the TMDL.

1.6 Soil

A draft geotechnical report evaluating soil and groundwater conditions was prepared by Sage Geotechnical on March 10th, 2026.

Based on the geology review completed by Sage Geotechnical, soils in Segment C are comprised of post-glaciation sand, silt, and gravel alluvium deposits from the Deschutes River. Recessional outwash was also found to be present given due to the significant fill material involved in grading the golf course. Subsurface conditions were analyzed based on 4 drilled borings and 40 hand augers. Soils discovered include sod/topsoil between depths of 0.15 and 2 feet, forest duff between depths of 0.7 and 1.4 feet in wooded areas, fill between depths of 0.25 and 4.5 feet in developed portions of the site, marsh deposits between depths of 1 and 10 feet in historic wetland areas, alluvium between depths of 2 and 5.1 feet, and recessional outwash between the surface soils and the full depth of exploration.

The existing groundwater level is located between 1.1 and 9.0 feet below the ground surface, including perched irrigation water and the groundwater table associated with the Deschutes River. Fill grading activities at the site created a complicated groundwater regime, trapping and perching groundwater along the west side of the golf course. It is anticipated that groundwater in the valley fluctuates seasonally and is near the ground surface over most of the project site during the winter. Refer to **Appendix C** for the draft geotechnical report.

Soil data from the NRCS web soil survey is consistent with findings from the geotechnical report, confirming that soils are composed primarily of Xerorthents fill material, Everett very gravelly sandy loam, Norma silt loam, Indianola loamy sand, and Puyallup silt loam. The groundwater data is also consistent with the geotechnical report, confirming a variable depth to the water table from 0-6.6 feet below the existing ground surface. Refer to **Appendix C** for the NRCS Soil Report.

The geotechnical report by Sage Geotechnical has yielded infiltration rates for TDA 5 and soil types for the entire project area; refer to **Appendix C**.

1.7 Potential Erosion Problem Areas

Per Section 1.5 of this report, there are no erosion hazard areas within the project site.

2 Thirteen Elements

The following section explains measures to be taken on site to control erosion and sedimentation problems. The SWPPP is a guideline to follow during construction to prevent erosion and sedimentation. Erosion control measures are not limited to those shown in this SWPPP. Measures shall be installed as necessary to meet the Department of Ecology's (DOE) and the City of Tumwater's guidelines for stormwater pollution prevention and the requirements of the DOE National Pollutant Discharge Elimination System (NPDES) permit. The SWPPP shall be updated by the contractor as necessary.

2.1 Element 1: Preserve Vegetation / Mark Clearing Limits

- Before beginning any land-disturbing activities, including clearing and grading, clearly mark all clearing limits, sensitive areas and their buffers, and trees that are to be preserved within the construction area to prevent damage and offsite impacts. Mark clearing limits both in the field and on the plans.
- Retain the duff layer, native topsoil, and natural vegetation in an undisturbed state to the maximum degree practicable.
- Plastic, metal, fabric fence, or other physical barriers may be used to mark the clearing limits.

The BMP(s) proposed to meet this element are:

☒ BMP C101: Preserving Natural Vegetation
☒ BMP C102: Buffer Zones
☒ BMP C103: High-Visibility Fence
☒ BMP C233: Silt Fence
☐ Other:

2.2 Element 2: Establish Construction Access

- Limit construction vehicle ingress and egress to one route, if possible.
- Stabilize access points with a pad of quarry spalls, crushed rock, or other equivalent BMPs to minimize tracking of sediment.
- Locate wheel wash or tire baths on site if other measures fail to control sediment from leaving the site.
- No tracking of sediment offsite is allowed. If sediment is tracked offsite, offsite areas (including roadways) shall be thoroughly and immediately cleaned by shoveling or pickup sweeping.
- Keep streets clean at ALL times. Clean tracked sediment immediately.
- Washing of sediment into the stormwater system is not allowed.

The BMP(s) proposed to meet this element are:

☒ BMP C105: Stabilized Construction Access
☒ BMP C106: Wheel Wash
☐ BMP C107: Construction Road/Parking Area Stabilization
☐ Other:

2.3 Element 3: Control Flow Rates

- Protect downstream properties, receiving waters, and conveyance systems from erosion and other damage due to increases in the velocity and peak volumetric flowrate of stormwater from the project site. A quantitative downstream analysis may be required to ensure no damage to the downstream conveyance system during construction.
- Where necessary, construct flow control facilities as one of the first steps in grading.
- Flow control facilities shall be functional prior to construction of site improvements (e.g., impervious surfaces). It may be necessary to install temporary flow control facilities to meet flow control requirements during construction.
- Control structures designed for permanent flow control BMPs are not appropriate for use during construction without modification. If used during construction, modify the control structure to allow for long-term storage of runoff and enable sediments to settle. Verify that the BMP is sized appropriately for this purpose. Restore BMPs to their original design dimensions, remove sediment, and install a final control structure at completion of the project.
- Velocity of water leaving the site shall not exceed 3 feet/second if the discharge is to a stream or ditch.

- Permanent infiltration facilities shall not be used for flow control during construction unless lined. The bottom of the facility shall be scarified to ensure any compaction that occurred during construction is mitigated.

The BMP(s) proposed to meet this element are:

☐ BMP C203: Water Bars
☐ BMP C207: Check Dams
☐ BMP C209: Outlet Protection
☐ BMP C235: Wattles
☐ BMP C240: Sediment Trap
☐ BMP C241: Temporary Sediment Pond
☐ Other:

2.4 Element 4: Install Sediment Controls

- Design, install, and maintain effective erosion controls and sediment controls to minimize the discharge of pollutants.
- Construct sediment control BMPs as one of the first steps in grading. These BMPs shall be functional before other land disturbing activities take place.
- Minimize sediment discharges from the site. The design, installation and maintenance of erosion and sediment controls must address factors such as the amount, frequency, intensity and duration of precipitation, the nature of resulting stormwater, and soil characteristics, including the range of soil particle sizes expected to be present on the site.
- Prior to leaving a construction site or prior to discharge into an infiltration facility, stormwater from disturbed areas shall pass through a sediment removal BMP.
- Locate BMPs in a manner to avoid interference with the movement of juvenile salmonids attempting to enter off-channel areas or conveyance channels.
- Provide and maintain natural buffers around surface waters, direct stormwater to vegetated areas to increase sediment removal and maximize infiltration, where feasible.
- Seed and mulch earthen structures such as dams, dikes, and diversions according to the timing indicated in Element 5.
- Design outlet structures to withdraw impounded stormwater from the surface to avoid discharging sediment that is still suspended lower in the water column. If installing a floating pump structure, include a stopper to prevent the pump basket from hitting the bottom of the pond.
- Full stabilization includes concrete or asphalt paving; quarry spalls used as ditch lining; or the use of rolled erosion products, a bonded fiber matrix product, or vegetative cover in a manner that will fully prevent soil erosion.

The BMP(s) proposed to meet this element are:

☐ BMP C231: Brush Barrier
☐ BMP C232: Gravel Filter Berm
☒ BMP C233: Silt Fence

☐ BMP C234: Vegetated Strip
☐ BMP C235: Wattles
☐ BMP C240: Sediment Trap
☐ BMP C241: Sediment Pond (Temporary)
☐ BMP C250: Construction Stormwater Chemical Treatment
☐ BMP C251: Construction Stormwater Filtration
☐ Other:

2.5 Element 5: Stabilize Soils

- Stabilize exposed and unworked soils by application of effective BMPs that prevent erosion. Soils shall be stabilized at the end of the shift before a holiday or weekend if needed based on the weather forecast.
    - From October 1 through April 30, no soils shall remain exposed and unworked for more than 2 days.
    - From May 1 to September 30, no soils shall remain exposed and unworked for more than 7 days.
- Select appropriate soil stabilization measures for the time of year, site conditions, estimated duration of use, and the potential water quality impacts that stabilization agents may have on downstream waters or groundwater.
- Control stormwater volume and velocity on site to minimize soil erosion.
- Control stormwater discharges, including peak volumetric flowrates and total stormwater volume, to minimize erosion at outlets and to minimize downstream channel and stream bank erosion.
- Minimize the amount of soil exposed during construction activity.
- Minimize the disturbance of steep slopes.
- Minimize soil compaction and, unless infeasible, preserve topsoil.
- Ensure the gravel base used for stabilization is clean and does not contain fines or sediment.

The BMP(s) proposed to meet this element are:

☒ BMP C120: Temporary and Permanent Seeding
☒ BMP C121: Mulching
☐ BMP C122: Nets and Blankets
☐ BMP C123: Plastic Covering
☐ BMP C124: Sodding
☐ BMP C125: Topsoiling / Composting
☐ BMP C126: Polyacrylamide (PAM) for Soil Erosion Protection
☒ BMP C130: Surface Roughening
☐ BMP C131: Gradient Terraces
☒ BMP C140: Dust Control
☐ Other:

2.6 Element 6: Protect Slopes

- Design and construct cut-and-fill slopes in a manner to minimize erosion. Applicable practices include, but are not limited to, reducing the continuous lengths of slopes with terracing and diversions, reducing slope steepness, and roughening slope surfaces (for example, track walking).
- Divert offsite stormwater, run-on, or groundwater away from slopes and disturbed areas with interceptor dikes and/or swales. Manage offsite stormwater separately from stormwater generated on the site.
- At the top of the slopes, collect stormwater in pipe slope drains or protected channels to prevent erosion. Size temporary pipe slope drains to convey either:
    - The peak volumetric flowrate calculated using a 10-minute time step from a Type 1A, 10-year, 24-hour frequency storm using a single event model, or
    - The 10-year peak flow rate, indicated by an Ecology-approved continuous simulation model with a 15-minute time step.
- Use the existing land cover condition for predicting flow rates from tributary areas outside the project limits. For tributary areas on the project site, use the temporary or permanent project land cover condition, whichever will produce the highest flow rate. If using a continuous simulation model, model bare soils as landscaped areas.
- Provide temporary or permanent conveyance to remove groundwater seepage from the slope surface of exposed soil areas.
- Place excavated material on the uphill side of trenches, consistent with safety and space considerations.
- Place check dams at regular intervals within channels that are cut down a slope.
- Stabilize soils on slopes, as specified in Element 5.

The BMP(s) proposed to meet this element are:

☒ BMP C120: Temporary and Permanent Seeding
☒ BMP C121: Mulching
☐ BMP C122: Nets and Blankets
☐ BMP C123: Plastic Covering
☐ BMP C124: Sodding
☒ BMP C130: Surface Roughening
☐ BMP C131: Gradient Terraces
☐ BMP C200: Interceptor Dike and Swale
☐ BMP C201: Grass-Lined Channels
☐ BMP C203: Water Bars
☐ BMP C204: Pipe Slope Drains
☐ BMP C205: Subsurface Drains
☐ BMP C206: Level Spreader
☐ BMP C207: Check Dams
☐ BMP C208: Triangular Silt Dike (TSD)
☒ Other: Grading tie-in slopes shall be 3H:1V where practicable.

2.7 Element 7: Protect Drain Inlets

- Protect all stormwater system inlets that are operable during construction so that stormwater does not enter the conveyance system without first being filtered or treated to remove sediment.
- Clean or remove and replace inlet protection devices when sediment has filled 1/3 of the available storage (unless a different standard is specified by the product manufacturer).
- Keep all approach roads clean. Do not allow sediment and street wash water to enter storm drains without prior and adequate treatment, unless treatment is provided before the storm drain discharges to waters of the State.
- Storm drain inlets should be inspected weekly at a minimum and daily during storm events.

The BMP(s) proposed to meet this element are:

☒ BMP C220: Stormwater System Inlet Protection
☐ Other:

2.8 Element 8: Stabilize Channels and Outlets

- Design, construct, and stabilize all temporary conveyance channels on site to prevent erosion from either:
  - The peak volumetric flow rate calculated using a 10-minute time step from a Type 1A, 10-year, 24-hour frequency storm using a single event model, or
  - The 10-year return period flow rate, indicated by an Ecology-approved continuous simulation model with a 15-minute time step.
- Use the existing land cover condition for predicting flow rates from tributary areas outside the project limits. For tributary areas on the project site, use the temporary or permanent project land cover condition, whichever will produce the highest flow rate. If using the Western Washington Hydrology Model (WWHM) to predict flows, bare soil areas should be modeled as "lawn" area.
- Provide stabilization, including armoring material, adequate to prevent erosion of outlets, adjacent stream banks, slopes, and downstream reaches at the outlets of all conveyance systems.

The BMP(s) proposed to meet this element are:

☐ BMP C122: Nets and Blankets
☐ BMP C202: Riprap Channel Lining
☐ BMP C207: Check Dams
☐ BMP C209: Outlet Protection
☒ Other: This element is not applicable to the project because the stormwater management strategy is full dispersion. There are no outlets of concentrated flow on the project.

2.9 Element 9: Control Pollutants

- Design, install, implement and maintain effective pollution prevention measures to minimize the discharge of pollutants. The project proponent must:
    - Handle and dispose of all pollutants, including waste materials and demolition debris that occur on site in a manner that does not cause contamination of stormwater.
    - Provide cover, containment, and protection from vandalism for all chemicals, liquid products, petroleum products, and other materials that have the potential to pose a threat to human health and the environment. Provide secondary containment for tanks holding pollutants including on site fueling tanks. Secondary containment means placing tanks or containers within an impervious structure capable of containing 110% of the volume contained in the largest tank within the containment structure. Double-walled tanks do not require additional secondary containment.
    - Conduct maintenance, fueling, and repair of heavy equipment and vehicles using spill prevention and control measures. Clean contaminated surfaces immediately following any spill incident.
    - Conduct oil changes, hydraulic system drain down, solvent and degreasing cleaning operations, fuel tank drain down and removal, and other activities, which may result in discharge or spillage of pollutants to the ground or into stormwater using spill prevention measures, such as drip pans.
    - Discharge wheel wash or tire bath wastewater to a separate on site treatment system that prevents discharge to surface water. Alternatively, discharge wheel wash or tire bath wastewater to the wastewater system (only allowed with local sewer district approval).
    - Apply fertilizers and pesticides in a manner and at application rates that will not result in loss of chemicals to stormwater. Follow manufacturer recommendations for application rates and procedures.
    - Use BMPs to prevent or treat contamination of stormwater by pH-modifying sources. These sources include, but are not limited to, recycled concrete stockpiles, bulk cement, kiln dust, fly ash, new concrete washing and curing waters, waste streams generated from concrete grinding and sawing, exposed aggregate processes, dewatering concrete vaults, and concrete pumping and mixer washout waters.
    - Adjust the pH of stormwater if necessary to prevent violations of water quality standards.
    - Manage concrete washout appropriately. Washout concrete truck drums or concrete handling equipment in on site or offsite designated concrete washout areas only. Do not washout concrete truck drums or concrete handling equipment onto streets, the stormwater system, receiving waterbodies, or the ground.
        - Washout of small concrete handling equipment may be disposed of in formed areas awaiting concrete where it will not contaminate stormwater and surface water or groundwater.
        - Do not use upland land applications for discharging wastewater from concrete washout areas.
        - Do not dump excess concrete on site, except in designated concrete washout areas.
        - Do not washout anything contaminated with concrete into formed areas awaiting infiltration BMPs.

    - Concrete spillage or concrete discharge directly to groundwater or surface waters of the state is prohibited.
- Written approval from the Department of Ecology is required prior to using chemical treatment other than CO2, dry ice, or food grade vinegar to adjust pH.
- Clean contaminated surfaces immediately following any discharge or spill incident.
- Uncontaminated water from water-only based shaft drilling for construction of building, road, and bridge foundations may be infiltrated provided the wastewater is managed in a way that prohibits discharge to surface waters. Prior to infiltration, water from water-only based shaft drilling that comes into contact with curing concrete must be neutralized until pH is in the range of 6.5 to 8.5.

The BMP(s) proposed to meet this element are:

☒ BMP C151: Concrete Handling
☒ BMP C152: Sawcutting and Surfacing Pollution Prevention
☒ BMP C153: Material Delivery, Storage, and Containment
☒ BMP C154: Concrete Washout Area
☐ BMP C250: Construction Stormwater Chemical Treatment
☐ BMP C251: Construction Stormwater Filtration
☐ BMP C252: Treating and Disposing of High pH Water
☐ Other

2.10 Element 10: Control Dewatering

- Discharge foundation, vault, and trench dewatering water that has similar characteristics to stormwater runoff at the site, into a controlled conveyance system prior to discharge to a sediment trap or temporary sediment pond. Stabilize channels as specified in Element 8.
- Clean, non-turbid dewatering water, such as well-point groundwater, can be discharged to systems tributary to state surface waters, as specified in Element 8, provided the dewatering flow does not cause erosion or flooding of receiving waters. Do not route clean dewatering water through TESC BMPs.
- Handle highly turbid or contaminated dewatering water separately from stormwater.

The BMP(s) proposed to meet this element are:

☐ BMP C203: Water Bars
☐ BMP C236: Vegetative Filtration
☒ Other: Dewatering shall be transported off site in a vehicle for legal disposal in a manner that does not pollute state waters. Other options include Ecology-approved on-site chemical treatment or other suitable treatment technologies, or sanitary or combined sewer discharge with local sewer district approval. Infiltration is not an option.

2.11 Element 11: Maintain BMPs

- Maintain and repair as needed all temporary and permanent erosion and sediment control BMPs to assure continued performance of their intended function. Conduct maintenance and repairs in accordance with BMP specifications.
- Remove temporary erosion and sediment control BMPs within 30 days after final site stabilization is achieved or after the temporary BMPs are no longer needed. Trapped sediment shall be removed or stabilized on site. Permanently stabilize disturbed soil resulting from removal of BMPs or vegetation.

The BMP(s) proposed to meet this element are:

☐ BMP C150: Materials on Hand
☒ BMP C160: Erosion and Sediment Control Lead
☐ Other:

2.12 Element 12: Manage the Project

Phasing of Construction:

- Phase projects to prevent soil erosion and the transport of sediment from the project site during construction, unless the Erosion and Sediment Control Lead can demonstrate that construction phasing is infeasible. Revegetation of exposed areas and maintenance of that vegetation shall be an integral part of the clearing activities for any phase.

Seasonal Work Limitations:

- From October 1 through April 30, clearing, grading, and other soil disturbing activities shall only be permitted if shown to the satisfaction of the City that silt-laden stormwater will be prevented from leaving the site through a combination of the following:
  - Site conditions (including existing vegetative coverage, slope, soil type, and proximity to receiving waters)
  - Limitations on activities and the extent of disturbed areas
  - Proposed erosion and sediment control measures
- Based on the information provided and local weather conditions, the City may expand or restrict the seasonal limitation on site disturbance. The following activities are exempt from the seasonal clearing and grading limitations:
  - Routine maintenance and necessary repair of erosion and sediment control BMPs
  - Routine maintenance of public facilities or existing utility structures that do not expose the soil or result in the removal of the vegetative cover to soil.
  - Activities where there is one hundred percent infiltration of stormwater within the site in approved and installed erosion and sediment control facilities.

Inspection and Monitoring:

- Inspect, maintain, and repair all BMPs as needed to assure continued performance of their intended function. Projects regulated under the Construction Stormwater General Permit (CSWGP) must conduct site inspections and monitoring in accordance with Special Condition S4 of the CSWGP.
- Projects that disturb one or more acres must have site inspections conducted by a Certified Erosion and Sediment Control Lead (CESCL) or Certified Professional in Erosion and Sediment Control (CPESC).
- Projects disturbing less than one acre must have an Erosion Sediment Control (ESC) Lead conduct inspections. The ESC Lead does not have to have CESCL or CPESC certification.
- The CESCL, CPESC, or ESC Lead shall be identified in the SWPPP and shall be on site or on call at all times.
- The CESCL, CPESC, or ESC Lead must examine stormwater visually for the presence of suspended sediment, turbidity, discoloration, and oil sheen and evaluate the effectiveness of BMPs to determine if it is necessary to install, maintain, or repair BMPs.
- The CESCL, CPESC, or ESC Lead must inspect all areas disturbed by construction activities, all BMPs, and all locations where stormwater leaves the site at least once every calendar week and within 24 hours of any discharge from the site. (Individual discharge events that last more than one day do not require daily inspections). The CESCL, CPESC, or ESC Lead may reduce the inspection frequency for temporary stabilized, inactive sites to once every calendar month.
- Construction site operators must correct any problems identified by the CESCL, CPESC, or ESC Lead by:
    - Reviewing the SWPPP for compliance with the 13 construction SWPPP elements and making appropriate revisions within 7 days of the inspection.
    - Fully implementing and maintaining appropriate source control and/or treatment BMPs as soon as possible but correcting the problem within 10 days.
    - Documenting BMP implementation and maintenance in the site log book. (Required for sites larger than 1 acre but recommended for all sites).
    - Sampling and analysis of the stormwater discharges from a construction site may be necessary on a case-by-case basis to ensure compliance with standards. Ecology or the City will establish these monitoring and associated reporting requirements.
- Responsible Party – For all projects, a 24-hour responsible party shall be listed in the SWPPP, along with that person's telephone number and email address.

Maintaining an Updated Construction SWPPP:

- Keep the Construction SWPPP on site or within reasonable access to the site. Modify the SWPPP whenever there is a change in the design, construction, operation, or maintenance at the construction site that has, or could have, a significant effect on the discharge of pollutants to waters of the state.
- Modify the SWPPP if, during inspections or investigations conducted by the owner/operator, City staff, or by local or state officials, it is determined that the SWPPP is ineffective in eliminating or significantly minimizing pollutants in stormwater discharges from the site. Modify the SWPPP as necessary to include additional or modified BMPs designed to correct problems identified. Complete revisions to the SWPPP within seven (7) days following the inspection.

The BMP(s) proposed to meet this element are:

☐ BMP C150: Materials on Hand
☒ BMP C160: Erosion and Sediment Control Lead
☒ BMP C162: Scheduling
☐ Other:

2.13 Element 13: Protect Low Impact Development BMPs

- Protect all permanent, or LID BMPs from sedimentation through installation and maintenance of erosion and sediment control BMPs on portions of the site that drain to the BMPs. Restore all BMPs to their fully functioning condition if they accumulate sediment during construction. Sediment-impacting Best Management Practices shall be removed before system start-up. Restoring the BMP shall include removal of all sediment and full replacement of treatment media.
- Prevent compacting infiltration facilities by excluding construction equipment and foot traffic.
- Keep all heavy equipment away from native soils under infiltration BMPs that have been excavated to final grade to retain the infiltration rate of the soils.
- Protect lawn and landscaped areas from compaction due to construction equipment and material stockpiles.
- Do not allow muddy construction equipment on the base material of permeable pavement or on the permeable pavement section.
- Do not allow sediment-laden runoff onto permeable pavements or base materials of permeable pavements.
- Permeable pavements fouled with sediment or that can no longer pass an initial infiltration test must be cleaned prior to final acceptance.

The BMP(s) proposed to meet this element are:

☐ BMP C102: Buffer Zones
☒ BMP C103: High-Visibility Fence
☐ BMP C200: Interceptor Dike and Swale
☐ BMP C201: Grass-Lined Channels
☐ BMP C207: Check Dams
☐ BMP C208: Triangular Silt Dike (TSD)
☐ BMP C231: Brush Barrier
☒ BMP C233: Silt Fence
☐ BMP C234: Vegetated Filter Strip
☐ Other:

3 Construction Phasing

Describe the intended sequence and timing of construction activities, as well as any proposed construction phasing.

The construction schedule has not yet been determined. When the construction schedule is developed, it shall adhere to the following requirements unless approval is granted by the appropriate local authority:

- No soils exposed and unworked for more than two (2) days from October 01 through April 30
- No soils exposed and unworked for more than seven (7) days from May 01 to September 30
- Clearing, grading, and other soil disturbing activities are prohibited from November 01 to February 28

4 Construction Schedule

Describe the construction schedule. If the schedule extends into the wet season, describe what activities will continue during the wet season and how the transport of sediment from the construction site to receiving waters will be prevented. Describe the intended sequence and timing of construction activities and any proposed construction phasing. Refer to Element #12 for seasonal work considerations that should be reflected in the Construction SWPPP.

The construction schedule has not yet been determined.

5 Engineering Calculations

Engineering calculations relating to the design of swales, dispersions, waterways, and stormwater detention were not applicable to this project and therefore are not included in this document.

6 Pollution Prevention Team

6.1 Roles and Responsibilities

The pollution prevention team consists of personnel responsible for implementation of the SWPPP, including the following:

- Certified Erosion and Sediment Control Lead – Primary contractor contact, responsible for site inspections (BMPs, visual monitoring, sampling, etc.); to be called upon in case of failure of any ESC measures.
- Project Engineer – For projects with engineered structures only (sediment pond/traps, sand filters, etc.): site representative for the owner that is the project's supervising engineer responsible for inspections and issuing instructions and drawings to the contractor's site supervisor or representative.
- Emergency Owner Contact – Individual that is the site owner or representative of the site owner to contacted in the case of an emergency.
- Monitoring Personnel – Personnel responsible for conducting water quality monitoring; for most sites this person is also the CESCL.

6.2 Team Members

Title	Name (s)	Phone Number
Certified Erosion and Sedimentation Control Lead (CESCL)	TBD	
General Contractor	TBD	
Project Engineer	Whitney Holm – SCJ Alliance	360.352.1465
Emergency Owner Contact	TBD	
Emergency Ecology Contact	Southwest Regional Office	360.407.6300
Non-Emergency Ecology Contact	Jacob Neuharth	360.742.9751
Monitoring Personnel	See CESCL	

7 Site Inspections and Monitoring

Monitoring includes visual inspection, monitoring for water quality parameters of concern and documentation of the inspection and monitoring findings in a site log book. A site log book will be maintained for all on-site construction activities and will include:

- A record of the implementation of the SWPPP and other permit requirements
- Site inspections; and,
- Stormwater quality monitoring.

For convenience, the inspection form and water quality monitoring forms included in this SWPPP include the required information for the site log book. This SWPPP may function as the site log book if desired, or the forms may be separated and included in a separate site log book. However, if separated, the site log book must be maintained on site or within reasonable access to the site and be made available upon request to Ecology or the local jurisdiction.

7.1 Site Inspection

All BMPs will be inspected, maintained, and repaired as needed to ensure continued performance of their intended function. The inspector will be a CESCL per BMP C160. The name and contact information for the CESCL is provided in Section 6.2 of this SWPPP.

Site inspection will occur in all areas disturbed by construction activities and at all potential stormwater discharge points. Stormwater will be examined for the presence of suspended sediment, turbidity, discoloration, and oily sheen.

The site inspector will evaluate and document the effectiveness of the installed BMPs and determine if it is necessary to repair or replace any of the BMPs to improve the quality of the stormwater discharges.

All maintenance and repairs will be documented in the site log book or forms provided in this document. All new BMPs or design changes will be documented in the SWPPP as soon as possible.

7.2 Site Inspection Frequency

Site inspected will be conducted at least once a week and within 24 hours following any discharge from the site. For sites with temporary stabilization measures, the site inspection frequency will be reduced to once every month.

7.3 Site Inspection Documentation

The site inspector will record each site inspection using the site log inspection forms provided in **Appendix D**. The site inspection log forms may be separated from this SWPPP document, but will be maintained on site or within reasonable access to the site and be made available upon request to Ecology, the local jurisdiction and the Engineer.

8 Stormwater Quality Monitoring

8.1 Turbidity

Turbidity sampling and monitoring will be conducted during the entire construction phase of the project. Samples will be collected weekly at the discharge point nearest the current phase of the project work. If there is no flow at the discharge point, the attempt to sample will be recorded in the site log book and reported to Ecology in the monthly Discharge Monitoring Report (DMR) as “No Discharge”. Samples will be analyzed for turbidity using the Hach 2100Q Turbidimeter.

The key benchmark turbidity value is 25 nephelometric turbidity units (NTU) for the downstream receiving water body. If the 25 NTU benchmark is exceeded in any sample collected, the following steps will be conducted:

1. Ensure all BMPs specified in this SWPPP are installed and functioning as intended.
2. Assess whether additional BMPs should be implemented, and document modified BMPs in the SWPPP as necessary.
3. Sample discharge daily until the discharge is 25 NTU or lower.

If the turbidity exceeds 250 NTU at any time, the following steps will be conducted:

1. Notify ecology by phone within 24 hours of analysis (see Section 6.2 of this SWPPP for contact information).
2. Continue sampling daily until the discharge is 25 NTU or lower. Initiate additional treatment BMPs such as off-site treatment, infiltration, filtration and chemical treatment within 24 hours, and implement those additional treatment BMPs as soon as possible, but within a minimum of 7 days.
3. Describe inspection results and remedial actions taken in the site log book and in monthly discharge monitoring reports described in Section 9 of this SWPPP.

8.2 pH

Sampling and monitoring of pH occurs if significant concrete work (> 1,000 cubic yards throughout the life of the project) or use of engineered soils (e.g., cement-treated base) is anticipated. No significant concrete work or engineered soils is planned for this project; therefore , no pH testing will be conducted.

9 Recordkeeping

9.1 Site Log Book

A site log book will be maintained for all on-site construction activities and will include:

- A record of the implementation of the SWPPP and other permit requirements;
- Site inspections; and,
- Stormwater quality monitoring.

For convenience, the inspection form included in this SWPPP include the required information for the site log book.

9.2 Records Retention

Records of all monitoring information (site log book, inspection reports/checklists, etc.), this Stormwater Pollution Prevention Plan, and any other documentation of compliance with permit requirements will be retained during the life of the construction project and for a minimum of three years following the termination of permit coverage in accordance with permit condition S5.C.

9.3 Access to Plans and Records

All applicable documentation, including but not limited to the SWPPP, General Permit, Notice of Authorization letter, and Site Log Book will be retained on site or within reasonable access to the site and will be made immediately available upon request to Ecology or the local jurisdiction. A copy of this SWPPP will be provided to Ecology within 14 days of receipt of written request for the SWPPP from Ecology. Any other information requested by Ecology will be submitted within a reasonable time. A copy of the SWPPP or access to the SWPPP will be provided to the public when requested in writing in accordance with the general permit condition S5.G.

9.4 Updating the SWPPP

In accordance with conditions S3, S4.B, and S.B.3 of the General Permit, this SWPPP will be modified if the SWPPP is ineffective in eliminating of significantly minimizing pollutants in stormwater discharges from the site or there has been a change in design, construction, operation, or maintenance at the site that has a significant effect on the discharge, or potential for discharge, of pollutants to the waters of the State. The SWPPP will be modified within seven days of determination based on inspection(s) that additional or modified BMPs are necessary to correct problems identified, and an updated timeline for BMP implementation will be prepared.

10 Reporting

10.1 Notification of Noncompliance

If any of the terms and conditions of this permit are not met, and it causes a threat to human health or the environment, the following steps will be taken in accordance with permit section S5.F:

1. Ecology will be immediately notified of the failure to comply.
2. Immediate action will be taken to control the noncompliance issue and to correct the problem. If applicable, sampling and analysis of any noncompliance will be repeated immediately and submitted to Ecology within five days of becoming aware of the violation.
3. A detailed report describing the noncompliance will be submitted to Ecology within five days, unless requested earlier by Ecology.

Appendix A
Upstream Tributaries

February 27, 2026

Water Quality Atlas Map



WQ Improvement Projects

- TMDL - Approved
- 4B - Approved
- STI - Approved
- ARP - Approved
- TMDL - In Development
- STI - In Development
- ARP - In Development

Miles
0 0.1 0.2 0.4

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https://apps.ecology.wa.gov/waterqualityatlas/wqa/map

Deschutes River, Percival Creek, & Budd Inlet tributaries

Parts of the Deschutes River and its tributary creeks do not meet state clean water standards. To return these waters to a healthy condition, we are working with local governments and other groups to implement a total maximum daily load (TMDL) project.

Water quality issues

The Deschutes River is under pressure from growth, resulting in many small, uncontrolled sources of pollution that enter the river. Local city, county, and state government agencies monitor and protect water quality. In the Deschutes, water quality monitoring revealed that levels of pH, dissolved oxygen, temperature, fine sediment, and fecal coliform did not meet state standards. We began the TMDL process to address these problems.

What is being done

With the help of an advisory group of affected stakeholders, special interest groups, and interested residents, we developed a TMDL plan to solve the river's pollution problems. The Deschutes River, Percival Creek, and Budd Inlet Tributaries Water Quality Improvement Plan (also known as a TMDL) assigns the amount of pollution the water bodies can receive and still meet water quality standards. Any additional amount needs to be eliminated to achieve clean water.

This plan provides a framework for how stakeholders will track, monitor, and implement the water cleanup plan. It outlines what is needed, establishes a schedule, and guides corrective actions with adaptive management practices.

We gathered public comments on the draft plan in 2015. We held two public meetings to provide a broad overview of the project and findings. In 2018, EPA approved some elements of the TMDL plan and disapproved others. See our 2018 Letter to Stakeholders for details.

On August 10, 2020, EPA finalized the replacement of the TMDL elements that were disapproved. They were open for public comment until October 7, 2020 and can be found on EPA's Deschutes River TMDLs web page.

We are also continuing to work with the Department of Enterprise Services on the Deschutes Estuary Restoration Project, which will clean and restore Capitol Lake by returning the Deschutes Estuary to a tidal salt marsh habitat.

Why this matters

Water must be of high quality to support fish and wildlife.

Dissolved oxygen — oxygen dissolved in healthy water — is vital for the survival of fish and aquatic life. It is more difficult to transfer oxygen from water to blood than it is to transfer oxygen from air to blood. Therefore, it is critical that an adequate amount of oxygen is maintained in the water for this transfer to take place efficiently and sustain aquatic life. Oxygen is also necessary to help decompose organic matter in the water and bottom sediments as well as for other biological and chemical processes.

Fecal coliform is a type of bacteria common in human and animal waste. It can make people sick and cause the closure of shellfish harvesting beds. Bacteria can get into waters from untreated or partially treated discharges from wastewater treatment plants, from improperly functioning septic systems, and from livestock, pets, and wildlife.

People can help keep bacteria out of the water. Properly collect, bag, and trash dog poop. Check your on-site sewage system to make sure it is maintained and working properly. Use proper storage, management, and disposal practices for livestock manure.

pH is a measure of the acidity or alkalinity of the water. pH can affect the solubility of nutrients and metal compounds. By affecting the solubility of nutrients, it can change the amount of nutrients available for plant growth. If too many nutrients are available, aquatic plants can grow out of control. When these plants decompose, they can deplete the water of oxygen. The solubility of many metal compounds also changes greatly with pH. When more metals are dissolved in the water, aquatic animals may absorb them faster. Therefore, a lower pH may make these metals more toxic to aquatic life.

Water temperature influences what types of organisms can live in a water body. Cooler water holds more dissolved oxygen that fish and other aquatic life need to breathe. Warmer water holds less dissolved oxygen. Threatened and endangered salmon need cold, clean water to survive. Removing streamside vegetation tends to raise water temperature to a level that may be harmful to fish, other aquatic animals, and insects.

Finally, too much **sediment** in the water can irritate fish gills and make it difficult for them to breathe.

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Publication Summary

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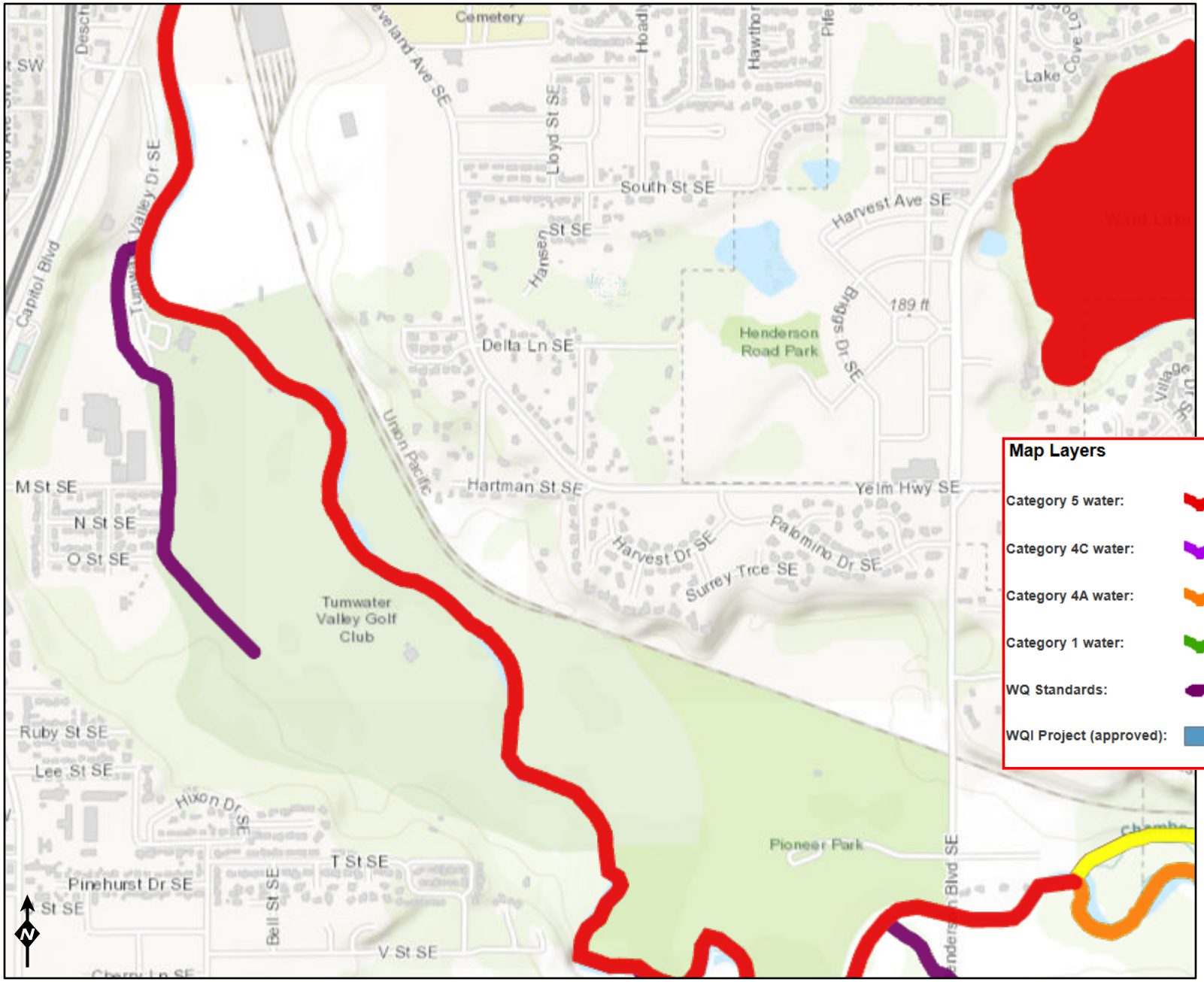
TITLE	**Deschutes River, Percival Creek, and Budd Inlet Tributaries Temperature, Fecal Coliform Bacteria, Dissolved Oxygen, pH, and Fine Sediment TMDL: Water Quality Improvement Report and Implementation Plan**
	Publication number: 15-10-012 | Date Published: April 2015 | Date Revised: July 2018
VIEW NOW	Deschutes River, Percival Creek, and Budd Inlet Tributaries Temperature, Fecal Coliform Bacteria, Dissolved Oxygen, pH, and Fine Sediment TMDL: Water Quality Improvement Report and Implementation Plan (Number of pages: 335) (Publication Size: 14292KB) Trouble viewing? Try these free options. • Get the latest Adobe Reader for PDFs. • For Excel or Word viewing get Open Office, Microsoft OneDrive, DropBox Basic or a mobile app at your favorite app store.
AUTHOR(S)	Wagner, Lydia, Bilhimer, Dustin
DESCRIPTION	Portions of the Deschutes River, Percival Creek, and Budd Inlet tributaries do not meet water quality standards and are on the Clean Water Act Section 303(d) list for one or more of the following parameters: fecal coliform bacteria, temperature, dissolved oxygen (DO), pH, or fine sediment. This Total Maximum Daily Load (TMDL) report sets the load and wasteload reductions needed to meet Washington State water quality standards, and describes implementation actions to achieve those reductions.
REQUEST A COPY	The mission of the Department of Ecology is to protect, preserve, and enhance Washington's environment. To help us meet that goal, please consider the environment before you print or request a copy. **ADA Accessibility** The Department of Ecology is committed to providing people with disabilities access to information and services by meeting or exceeding the requirements of the Americans with Disabilities Act (ADA), Section 504 and 508 of the Rehabilitation Act, and Washington State Policy #188. Visit Ecology's website for more information.

	• Water Quality Order Form
CONTACT	Leanne Weiss at 360-407-0243 or leanne.weiss@ecy.wa.gov
KEYWORDS	water quality improvement plan, Deschutes River, water cleanup plan, Total Maximum Daily Load
WEB PAGE	Deschutes River watershed area: Budd Inlet
WATERSHED	Water Resource Inventory Area 13 Deschutes
DATA	Environmental Information Management (EIM) #MROB0001
RELATED PUBLICATIONS	Title: Budd Inlet Total Maximum Daily Load for Dissolved Oxygen Deschutes River, Capitol Lake, and Budd Inlet Total Maximum Daily Load Study: Supplemental Modeling Scenarios Deschutes River, Capitol Lake, and Budd Inlet Temperature, Fecal Coliform Bacteria, Dissolved Oxygen, pH, and Fine Sediment Total Maximum Daily Load Technical Report: Water Quality Study Findings Assessment of Surface Water / Groundwater Interactions and Associated Nutrient Fluxes in the Deschutes River and Percival Creek Watersheds, Thurston County Quality Assurance Project Plan: Deschutes River, Capitol Lake, and Budd Inlet Temperature, Fecal Coliform Bacteria, Dissolved Oxygen, pH, and Fine Sediment Total Maximum Daily Load Study

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February 27, 2026

Water Quality Atlas Map



Assessed Water/Sediment

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

Water Quality Standards

- All Standards

Map Layers

Category 5 water:	2 listings found
Category 4C water:	1 listing found
Category 4A water:	2 listings found
Category 1 water:	9 listings found
WQ Standards:	1 water quality standard found
WQI Project (approved):	Deschutes River, Percival Creek, and Budd Inlet Tributaries TMDL

Miles 0 0.1 0.2 0.4

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https://apps.ecology.wa.gov/waterqualityatlas/wqa/map

Assessed Water/Sediment

Water

Category 5 - 303d

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Washington State Water Quality Assessment 303(d)/305(b) List

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Back To Results

Water Quality Listing Policy

Listing ID: 16722

Main Listing Information

Listing ID: 16722

Waterbody Name: DESCHUTES RIVER

Medium: Water

Parameter: Bacteria - Fecal coliform

WQI Project: None

Designated Use: Recreation - Primary Contact

Current Category: 5

View Category History

Assessment Unit

Assessment Unit ID: 17110016000007_001_001

Size: 4.855 Kilometers

Associated Components(s): Reach: 17110016000007 0% - 100%, Type: Rivers/Streams

County: Thurston

WRIA: Deschutes

Basis Table

Assessment Year

2018

Sampling Year	Excursion Count	Sample Count	Criterion/Threshold	Aggregate	Calculated Value	Criterion 2	Aggregate 2	Calculated Value 2
2016	1	14	200 #col/100ml	Highest daily average	280	100 #col/100ml	Three-month geometric mean	137

Assessed Water/Sediment

Water

Category 5 - 303d

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Washington State Water Quality Assessment 303(d)/305(b) List

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Back To Results

Water Quality Listing Policy

Listing ID: 70194

Main Listing Information

Listing ID: 70194

Current Category: 5

Waterbody Name: DESCHUTES RIVER

View Category History

Medium: Other

Parameter: Benthic Macroinvertebrates Bioassessments

WQI Project: None

Designated Use: Aquatic Life - General

Assessment Unit

Assessment Unit ID: 17110016000007_001_001

County: Thurston

Size: 4.855 Kilometers

WRIA: Deschutes

Associated Components(s): Reach: 17110016000007 0% - 100%, Type: Rivers/Streams

Basis Table

sessment Year

2018

Sampling Year	Excursion Count	Sample Count	Criterion/Threshold	Aggregate	Calculated Value	Fine Sediment Biotic Index Score	FSB Threshold	Hilsenhoff Biotic Index Score	HBI Threshold	Metals Tolerance Index Score	MTI Threshold
2012; 2015	3	3	65 (Puget Lowland)	Average BIBI score	56.7	46.2	89	4.84	>5.5	2.8	>4.0

Assessed Water/Sediment

Water

Category 4C

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Back To Results

Water Quality Listing Policy

Listing ID: 6195

Main Listing Information

Listing ID: 6195

Waterbody Name: DESCHUTES RIVER

Medium: Habitat

Parameter: Instream Flow

WQI Project: None

Designated Use: Aquatic Life - General

Current Category: 4C

View Category History

Assessment Unit

Assessment Unit ID: 17110016000007_001_001

Size: 4.855 Kilometers

Associated Components(s): Reach: 17110016000007 0% - 100%, Type: Rivers/Streams

County: Thurston

WRIA: Deschutes

Basis Table

See Basis Statement field.

Basis Statement

USGS flow data collected at RM 3.4 between 1990 and 1995 (submitted by Jeff Dickison on 2/27/96) are consistently below minimum flows established in WAC 173-513-030.

USGS and Thurston County flow data (submitted by Jeff Dickison on 2/27/96) show intensified peak flows likely due to silvicultural activities in the upper watershed (Thurston County, 1995).

The following references document characteristic uses: Squaxin Island Tribal data (submitted by Jeff Dickison on 2/27/96) show numbers of Coho salmon stock.

Baranski, 1996 SASSI Update shows that Coho are reclassified to depressed.

Remarks

This listing was on the 1998 303(d) list, but has been moved to the new Category 4C (impaired by a non-pollutant) based on EPA Guidance for preparing the 2004 Integrated Report.

Assessed Water/Sediment
Water
Category 4A

DEPARTMENT OF ECOLOGY State of Washington

Washington State Water Quality Assessment 303(d)/305(b) List

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Back To Results

Water Quality Listing Policy

Listing ID: 6576

Main Listing Information

Listing ID: 6576
Waterbody Name: DESCHUTES RIVER
Medium: Water
Parameter: Temperature
WQI Project: Deschutes River, Percival Creek and Budd Inlet Tributaries Multi-parameter TMDL
Designated Use: Aquatic Life - Salmonid Spawning, Rearing, and Migration

Current Category: 4A
View Category History

Assessment Unit

Assessment Unit ID: 17110016000007_001_001
Size: 4.855 Kilometers
Associated Components(s): Reach: 17110016000007 0% - 100%, Type: Rivers/Streams

County: Thurston
WRIA: Deschutes

Basis Table

Assessment Year
2018

Sampling Year	Excursion Count	Sample Count	Criterion/Threshold	Aggregate	Calculated Value
2017	11	361	17.5 deg C	7-DADMax	19.71

Basis Statement

Location ID: 13A060 -- In 2010, between 1/1/2010 and 9/22/2010, the 7-day mean of daily maximum values (7DADmax) exceeded the criterion for this waterbody (17.5°C) on 26 of 265 days (10%); The maximum exceedance during this period was 18.74°C for the 7-day period centered on 8/15/2010; (External Data Source: Thurston County Health Database)

Location ID: 13A060 -- In 2009, between 10/10/2009 and 12/31/2009, the 7-day mean of daily maximum values (7DADmax) exceeded the criterion for this waterbody (17.5°C) on 0 of 83 days (0%); (External Data Source: Thurston County Health Database)

Location ID: 13A060 -- In 2008, between 7/14/2008 and 9/30/2008, the 7-day mean of daily maximum values (7DADmax) exceeded the criterion for this waterbody (17.5°C) on 14 of 79 days (18%); The maximum exceedance during this period was 18.46°C for the 7-day period centered on 8/15/2008; (External Data Source: Thurston County Health Database)

Assessed Water/Sediment

Water

Category 4A

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Back To Results

Water Quality Listing Policy

Listing ID: 10894

Main Listing Information

Listing ID: 10894

Waterbody Name: DESCHUTES RIVER

Medium: Water

Parameter: Dissolved Oxygen

WQI Project: Deschutes River, Percival Creek and Budd Inlet Tributaries Multi-parameter TMDL

Designated Use: Aquatic Life - Salmonid Spawning, Rearing, and Migration

Current Category: 4A

View Category History

Assessment Unit

Assessment Unit ID: 17110016000007_001_001

Size: 4.855 Kilometers

Associated Components(s): Reach: 17110016000007 0% - 100%, Type: Rivers/Streams

County: Thurston

WRIA: Deschutes

Basis Table

Assessment Year

2018

Sampling Year	Excursion Count	Sample Count	Criterion/Threshold	Aggregate	Calculated Value
2017	0	12	8.0 mg/L	Daily Minimum	9.8

Basis Statement

HISTORICAL INFORMATION

Location ID [13A060] -- In 2005, 12 samples showed no excursions of the criterion for this waterbody, (criterion = 8.0 mg/L).

Location ID [13-DES-00.5] -- In 2004, 4 of 39 samples (10.3%) showed an excursion of the criterion for this waterbody, (criterion = 8.0 mg/L).

Location ID [13-DES-02.7] -- In 2004, 24 samples showed no excursions of the criterion for this waterbody, (criterion = 8.0 mg/L).

Location ID [13-DES-00.5] -- In 2003, 9 samples showed no excursions of the criterion for this waterbody, (criterion = 8.0 mg/L).

Assessed Water/Sediment

Water

Category 1

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Back To Results

Water Quality Listing Policy

Listing ID: 10893

Main Listing Information

Listing ID: 10893

Waterbody Name: DESCHUTES RIVER

Medium: Water

Parameter: Ammonia-N

WQI Project: None

Designated Use: Aquatic Life - Toxics

Current Category: 1

View Category History

Assessment Unit

Assessment Unit ID: 17110016000007_001_001

Size: 4.855 Kilometers

Associated Components(s): Reach: 17110016000007 0% - 100%, Type: Rivers/Streams

County: Thurston

WRIA: Deschutes

Basis Table

Assessment Year

2018

Sampling Year	Excursion Count	Sample Count	Criterion/Threshold	Aggregate	Calculated Value
2017	0	11	Calculated	Toxic aquatic 4-day mean exceedance factor	
2016	0	11	Calculated	Toxic aquatic 4-day mean exceedance factor	
2015	0	11	Calculated	Toxic aquatic 4-day mean exceedance factor	
2014	0	9	Calculated	Toxic aquatic 4-day mean exceedance factor	
2013	0	11	Calculated	Toxic aquatic 4-day mean exceedance factor	
2012	0	12	Calculated	Toxic aquatic 4-day mean exceedance factor	
2011	0	11	Calculated	Toxic aquatic 4-day mean exceedance factor	
2010	0	12	Calculated	Toxic aquatic 4-day mean exceedance factor	
2009	0	12	Calculated	Toxic aquatic 4-day mean exceedance factor	
2008	0	12	Calculated	Toxic aquatic 4-day mean exceedance factor	
2007	0	12	Calculated	Toxic aquatic 4-day mean exceedance factor	
2006	0	11	Calculated	Toxic aquatic 4-day mean exceedance factor	

Assessed Water/Sediment

Water

Category 1

DEPARTMENT OF ECOLOGY State of Washington

Washington State Water Quality Assessment 303(d)/305(b) List

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Back To Results

Water Quality Listing Policy

Listing ID: 53217

Main Listing Information

Listing ID: 53217

Waterbody Name: DESCHUTES RIVER

Medium: Water

Parameter: Arsenic

WQI Project: None

Designated Use: Aquatic Life - Toxics

Current Category: 1

View Category History

Assessment Unit

Assessment Unit ID: 17110016000007_001_001

Size: 4.855 Kilometers

Associated Components(s): Reach: 17110016000007 0% - 100%, Type: Rivers/Streams

County: Thurston

WRIA: Deschutes

Basis Table

Assessment Year

2018

Sampling Year	Excursion Count	Sample Count	Criterion/Threshold	Aggregate	Calculated Value
2017	0	4	190 ug/L	Toxic aquatic 4-day average	

Basis Statement

HISTORICAL INFORMATION

Location ID(s) [13A060] -- In 2005, 6 of 6 sample event(s) did not exceed Washington's Aquatic Life Acute and Chronic criteria.

Location ID(s) [13A060] -- In 2004, 6 of 6 sample event(s) did not exceed Washington's Aquatic Life Acute and Chronic criteria.

Location ID(s) [13A060] -- In 2003, 2 of 2 sample event(s) did not exceed Washington's Aquatic Life Acute and Chronic criteria.

Location ID(s) [13A060] -- In 2002, 4 of 4 sample event(s) did not exceed Washington's Aquatic Life Acute and Chronic criteria.

Assessed Water/Sediment

Water

Category 1

DEPARTMENT OF ECOLOGY State of Washington

Washington State Water Quality Assessment 303(d)/305(b) List

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Back To Results

Water Quality Listing Policy

Listing ID: 75944

Main Listing Information

Listing ID: 75944

Waterbody Name: DESCHUTES RIVER

Medium: Water

Parameter: Silver

WQI Project: None

Designated Use: Aquatic Life - Toxics

Current Category: 1

View Category History

Assessment Unit

Assessment Unit ID: 17110016000007_001_001

Size: 4.855 Kilometers

Associated Components(s): Reach: 17110016000007 0% - 100%, Type: Rivers/Streams

County: Thurston

WRIA: Deschutes

Basis Table

Assessment Year

2018

Sampling Year	Excursion Count	Sample Count	Criterion/Threshold	Aggregate	Calculated Value
2017	0	4	Calculated	Toxic aquatic 1-day exceedence factor	

Basis Statement

HISTORICAL INFORMATION

Location ID(s) [13A060] -- In 2005, 6 of 6 sample event(s) did not exceed Washington's Aquatic Life Acute criterion.

Location ID(s) [13A060] -- In 2004, 6 of 6 sample event(s) did not exceed Washington's Aquatic Life Acute criterion.

Location ID(s) [13A060] -- In 2003, 2 of 2 sample event(s) did not exceed Washington's Aquatic Life Acute criterion.

Location ID(s) [13A060] -- In 2002, 4 of 4 sample event(s) did not exceed Washington's Aquatic Life Acute criterion.

Assessed Water/Sediment

Water

Category 1

DEPARTMENT OF ECOLOGY State of Washington

Washington State Water Quality Assessment 303(d)/305(b) List

Approved WQ Assessment | Candidate List | Contact Us | WQ Atlas

Back To Results

Water Quality Listing Policy

Listing ID: 76380

Main Listing Information

Listing ID: 76380

Waterbody Name: DESCHUTES RIVER

Medium: Water

Parameter: Lead

WQI Project: None

Designated Use: Aquatic Life - Toxics

Current Category: 1

View Category History

Assessment Unit

Assessment Unit ID: 17110016000007_001_001

Size: 4.855 Kilometers

Associated Components(s): Reach: 17110016000007 0% - 100%, Type: Rivers/Streams

County: Thurston

WRIA: Deschutes

Basis Table

Assessment Year

2018

Sampling Year	Excursion Count	Sample Count	Criterion/Threshold	Aggregate	Calculated Value
2017	0	4	Calculated	Toxic aquatic 4-day mean exceedence factor	

Basis Statement

HISTORICAL INFORMATION

Location ID(s) [13A060] -- In 2005, 6 of 6 sample event(s) did not exceed Washington's Aquatic Life Acute and Chronic criteria.

Location ID(s) [13A060] -- In 2004, 6 of 6 sample event(s) did not exceed Washington's Aquatic Life Acute and Chronic criteria.

Location ID(s) [13A060] -- In 2003, 2 of 2 sample event(s) did not exceed Washington's Aquatic Life Acute and Chronic criteria.

Location ID(s) [13A060] -- In 2002, 4 of 4 sample event(s) did not exceed Washington's Aquatic Life Acute and Chronic criteria.

Assessed Water/Sediment
Water
Category 1

DEPARTMENT OF ECOLOGY State of Washington

Washington State Water Quality Assessment 303(d)/305(b) List

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Back To Results

Water Quality Listing Policy

Listing ID: 76689

Main Listing Information

Listing ID: 76689
Waterbody Name: DESCHUTES RIVER
Medium: Water
Parameter: Chromium
WQI Project: None
Designated Use: Aquatic Life - Toxics

Current Category: 1

View Category History

Assessment Unit

Assessment Unit ID: 17110016000007_001_001
Size: 4.855 Kilometers
Associated Components(s): Reach: 17110016000007 0% - 100%, Type: Rivers/Streams

County: Thurston
WRIA: Deschutes

Basis Table

Assessment Year

2018

Sampling Year	Excursion Count	Sample Count	Criterion/Threshold	Aggregate	Calculated Value
2017	0	4	Calculated	Toxic aquatic 4-day mean exceedence factor	

Basis Statement

HISTORICAL INFORMATION

Location ID(s) [13A060] -- In 2005, 6 of 6 sample event(s) did not exceed Washington's Aquatic Life Acute and Chronic criteria.

Location ID(s) [13A060] -- In 2004, 6 of 6 sample event(s) did not exceed Washington's Aquatic Life Acute and Chronic criteria.

Location ID(s) [13A060] -- In 2003, 2 of 2 sample event(s) did not exceed Washington's Aquatic Life Acute and Chronic criteria.

Location ID(s) [13A060] -- In 2002, 4 of 4 sample event(s) did not exceed Washington's Aquatic Life Acute and Chronic criteria.

Assessed Water/Sediment

Water

Category 1

DEPARTMENT OF ECOLOGY State of Washington

Washington State Water Quality Assessment 303(d)/305(b) List

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Back To Results

Water Quality Listing Policy

Listing ID: 78277

Main Listing Information

Listing ID: 78277

Waterbody Name: DESCHUTES RIVER

Medium: Water

Parameter: Copper

WQI Project: None

Designated Use: Aquatic Life - Toxics

Current Category: 1

View Category History

Assessment Unit

Assessment Unit ID: 17110016000007_001_001

Size: 4.855 Kilometers

Associated Components(s): Reach: 17110016000007 0% - 100%, Type: Rivers/Streams

County: Thurston

WRIA: Deschutes

Basis Table

Assessment Year

2018

Sampling Year	Excursion Count	Sample Count	Criterion/Threshold	Aggregate	Calculated Value
2017	0	4	Calculated	Toxic aquatic 4-day mean exceedence factor	

Basis Statement

HISTORICAL INFORMATION

Location ID(s) [13A060] -- In 2005, 6 of 6 sample event(s) did not exceed Washingtons Aquatic Life Acute and Chronic criteria.

Location ID(s) [13A060] -- In 2004, 6 of 6 sample event(s) did not exceed Washingtons Aquatic Life Acute and Chronic criteria.

Location ID(s) [13A060] -- In 2003, 2 of 2 sample event(s) did not exceed Washingtons Aquatic Life Acute and Chronic criteria.

Location ID(s) [13A060], [SRIW1301] -- In 2002, 5 of 5 sample event(s) did not exceed Washingtons Aquatic Life Acute and Chronic criteria.

Assessed Water/Sediment
Water
Category 1

DEPARTMENT OF ECOLOGY State of Washington

Washington State Water Quality Assessment 303(d)/305(b) List

Approved WQ Assessment | Candidate List | Contact Us | WQ Atlas

Back To Results

Water Quality Listing Policy

Listing ID: 78486

Main Listing Information

Listing ID: 78486
Waterbody Name: DESCHUTES RIVER
Medium: Water
Parameter: Zinc
WQI Project: None
Designated Use: Aquatic Life - Toxics

Current Category: 1

View Category History

Assessment Unit

Assessment Unit ID: 17110016000007_001_001
Size: 4.855 Kilometers
Associated Components(s): Reach: 17110016000007 0% - 100%, Type: Rivers/Streams

County: Thurston
WRIA: Deschutes

Basis Table

Assessment Year

2018

Sampling Year	Excursion Count	Sample Count	Criterion/Threshold	Aggregate	Calculated Value
2017	0	4	Calculated	Toxic aquatic 4-day mean exceedence factor	

Basis Statement

HISTORICAL INFORMATION

Location ID(s) [13A060] -- In 2005, 6 of 6 sample event(s) did not exceed Washington's Aquatic Life Acute and Chronic criteria.

Location ID(s) [13A060] -- In 2004, 6 of 6 sample event(s) did not exceed Washington's Aquatic Life Acute and Chronic criteria.

Location ID(s) [13A060] -- In 2003, 2 of 2 sample event(s) did not exceed Washington's Aquatic Life Acute and Chronic criteria.

Location ID(s) [13A060], [SRIW1301] -- In 2002, 5 of 5 sample event(s) did not exceed Washington's Aquatic Life Acute and Chronic criteria.

Assessed Water/Sediment

Water

Category 1

DEPARTMENT OF ECOLOGY State of Washington

Washington State Water Quality Assessment 303(d)/305(b) List

Approved WQ Assessment | Candidate List | Contact Us | WQ Atlas

Back To Results

Water Quality Listing Policy

Listing ID: 78873

Main Listing Information

Listing ID: 78873

Waterbody Name: DESCHUTES RIVER

Medium: Water

Parameter: Nickel

WQI Project: None

Designated Use: Aquatic Life - Toxics

Current Category: 1

View Category History

Assessment Unit

Assessment Unit ID: 17110016000007_001_001

Size: 4.855 Kilometers

Associated Components(s): Reach: 17110016000007 0% - 100%, Type: Rivers/Streams

County: Thurston

WRIA: Deschutes

Basis Table

Assessment Year

2018

Sampling Year	Excursion Count	Sample Count	Criterion/Threshold	Aggregate	Calculated Value
2017	0	4	Calculated	Toxic aquatic 4-day mean exceedence factor	

Basis Statement

HISTORICAL INFORMATION

Location ID(s) [13A060] -- In 2005, 6 of 6 sample event(s) did not exceed Washington's Aquatic Life Acute and Chronic criteria.

Location ID(s) [13A060] -- In 2004, 6 of 6 sample event(s) did not exceed Washington's Aquatic Life Acute and Chronic criteria.

Location ID(s) [13A060] -- In 2003, 2 of 2 sample event(s) did not exceed Washington's Aquatic Life Acute and Chronic criteria.

Location ID(s) [13A060] -- In 2002, 4 of 4 sample event(s) did not exceed Washington's Aquatic Life Acute and Chronic criteria.

Assessed Water/Sediment

Water

Category 1

DEPARTMENT OF ECOLOGY State of Washington

Washington State Water Quality Assessment 303(d)/305(b) List

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Back To Results

Water Quality Listing Policy

Listing ID: 79301

Main Listing Information

Listing ID: 79301

Waterbody Name: DESCHUTES RIVER

Medium: Water

Parameter: Cadmium

WQI Project: None

Designated Use: Aquatic Life - Toxics

Current Category: 1

View Category History

Assessment Unit

Assessment Unit ID: 17110016000007_001_001

Size: 4.855 Kilometers

Associated Components(s): Reach: 17110016000007 0% - 100%, Type: Rivers/Streams

County: Thurston

WRIA: Deschutes

Basis Table

Assessment Year

2018

Sampling Year	Excursion Count	Sample Count	Criterion/Threshold	Aggregate	Calculated Value
2017	0	4	Calculated	Toxic aquatic 4-day mean exceedence factor	

Basis Statement

HISTORICAL INFORMATION

Location ID(s) [13A060] -- In 2005, 6 of 6 sample event(s) did not exceed Washington's Aquatic Life Acute and Chronic criteria.

Location ID(s) [13A060] -- In 2004, 6 of 6 sample event(s) did not exceed Washington's Aquatic Life Acute and Chronic criteria.

Location ID(s) [13A060] -- In 2003, 2 of 2 sample event(s) did not exceed Washington's Aquatic Life Acute and Chronic criteria.

Location ID(s) [13A060] -- In 2002, 4 of 4 sample event(s) did not exceed Washington's Aquatic Life Acute and Chronic criteria.

Water Quality Standards
All Standards

DEPARTMENT OF ECOLOGY State of Washington

Water Quality Atlas Standards

Home

Water Quality Standards for Surface Waters of the State of Washington

Disclaimer: The Department of Ecology continues to improve the mapped depiction of the Surface Water Quality Standards. However, the map may contain errors and the information displayed does not replace the official rules available in Chapter 173-201A of the Washington Administrative Code.

USE DESIGNATIONS

WAC:	173-201A-600 (1)
Description:	All surface waters of the state not named in Table 602 are to be protected for the designated uses of: Salmonid spawning, rearing, and migration; primary contact recreation; domestic, industrial, and agricultural water supply; stock watering; wildlife habitat; harvesting; commerce and navigation; boating; and aesthetic values.
Aquatic life use:	Salmonid spawning, rearing, and migration
Recreation use:	Primary contact recreation
Water supply uses:	Domestic, Industrial, Agricultural, Stock
Miscellaneous uses:	Wildlife Habitat, Harvesting, Commerce and Navigation, Boating, Aesthetics

CRITERION

Brackish Water Exceptions: None

Temperature: 17.5°C (63.5°F)

Supplemental spawning: None

Dissolved Oxygen (DO): 8.0 mg/L

pH: pH shall be within the range of 6.5 to 8.5, with a human-caused variation within the above range of less than 0.5 units

Turbidity: 5 NTU over background when the background is 50 NTU or less; or

A 10 percent increase in turbidity when the background turbidity is more than 50 NTU

Bacteria: E. coli and fecal coliform criteria are expressed as colony forming units (CFU) or most probable number (MPN).

To protect recreational use:

- E.coli organism levels must not exceed a geometric mean value of 100 CFU or MPN per 100 mL, with not more than 10 percent of all samples(or any single sample when less than ten sample points exist) obtained for calculating the geometric mean value exceeding 320 CFU or MPN per 100 mL.
- Fecal coliform organism levels must not exceed a geometric mean value of 100 CFU or MPN per 100 mL, with not more than 10 percent of all samples(or any single sample when less than ten sample points exist) obtained for calculating the geometric mean value exceeding 200 CFU or MPN per 100 mL. (The use of fecal coliform organism levels to determine compliance will expire December 31, 2020.)

Other requirements:

- A minimum of three samples is required to calculate a geometric mean for comparison to the geometric mean criteria. Sample collection dates shall be well distributed throughout the averaging period so as not to mask noncompliance periods.
- When averaging bacteria sample values for comparison to the geometric mean criteria, it is preferable to average by season. The averaging period of bacteria sample data shall be ninety days or less.

Appendix B
Critical Areas

Thurston County

Critical Aquifer Recharge Areas & McAllister Springs Geological Sensitive Area

Aquifer Recharge Classes*
- Extreme
- High
- Moderate

Geological Sensitive Area
- McAllister Springs

PROJECT SITE

Cities | Urban Growth Are

0 Miles

*Thurston County Critical Area Ordinance Chapter 24.10; Appendix B:
Table 24.10-3 Critical Aquifer Recharge Areas Geologic Features.
Table 24.10-4 Critical Aquifer Recharge Area soil series.

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THURSTON COUNTY

Map Exported on 12/20/2025
PDF:Library/APRX/Environmental Health/Water.aprx\Aquifer Recharge(54x30)

Thurston County
Drainage Basins

Military Bases
Native American Reservations
Public Forests
Cities
Urban Growth Areas

PROJECT SITE

TUMWATER

OLYMPIA

TENINO

BUCODA

TRAILS END

HARSTINE ISLAND

McNEIL ISLAND

ANDERSON ISLAND

NISQUALLY REACH

BALCH PASSAGE

DRAYTON PASSAGE

HENDERSON INLET

CASE INLET

TOTTEN INLET

BUDD INLET

OYSTER BAY

SQUAXIN ISLAND

R4W R3W R2W R1W R1E R2E R3E R4E R5E

T20N T19N T18N T17N T16N T15N

Miles

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THURSTON COUNTY

Map Exported on 12/20/2025
PDF:Library/APRX/Planning/NaturalResources.aprx!Basins(54x35)

Thurston County

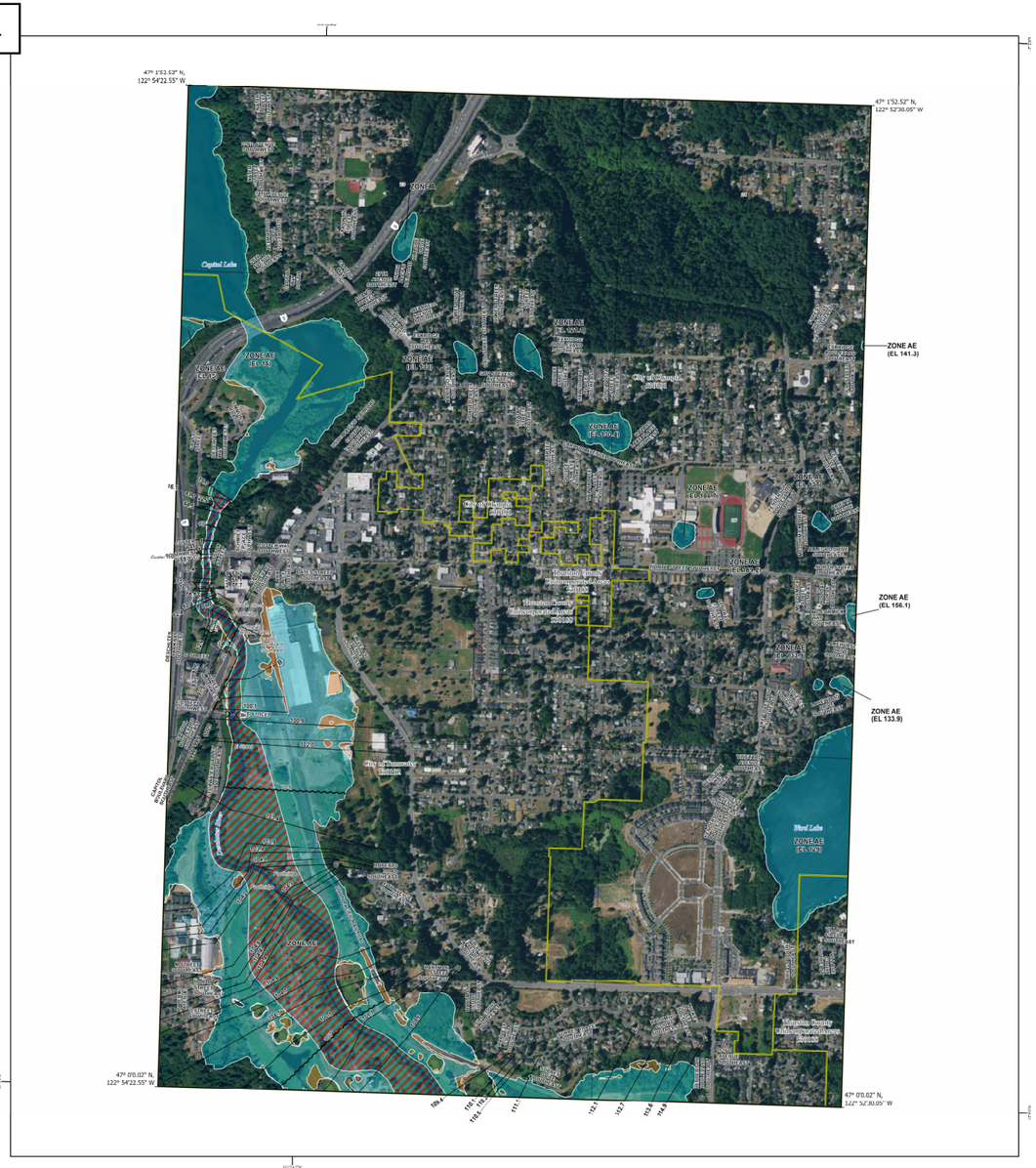
100 Year & 500 Year Flood Zones
1996 Historical Flood

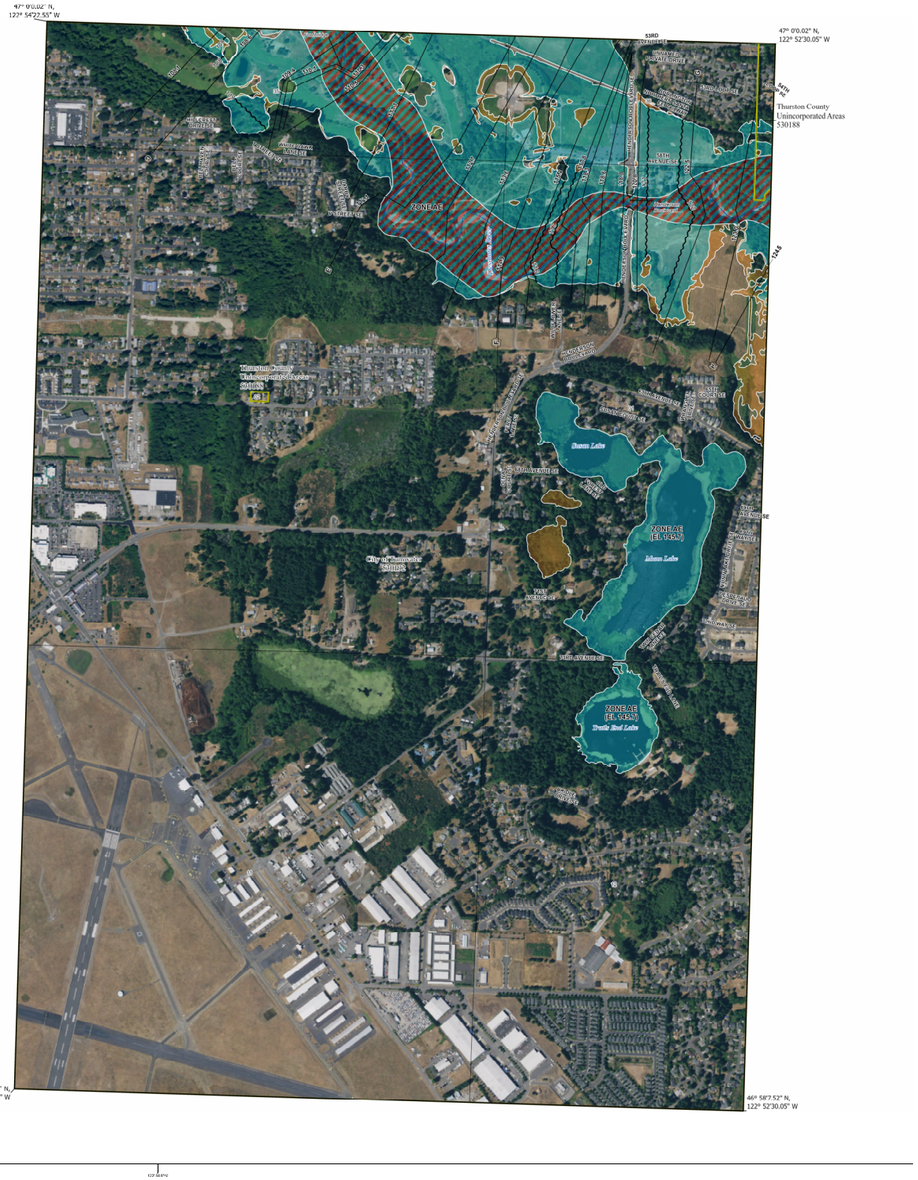
100 Year Flood Zone

500 Year Flood Zone

Flood of 1996

PROJECT SITE


47° 1'52.63" N,
122° 54'22.55" W
47° 1'52.52" N,
122° 52'30.05" W
47° 0'0.02" N,
122° 54'22.55" W
47° 0'0.02" N,
122° 52'30.05" W
ZONE AE
ZONE AE (EL 141.3)
ZONE AE (EL 166.1)
ZONE AE (EL 133.9)
Capitol Lake
West Lake
ZONE AE (EL 141.3)
ZONE AE (EL 133)
ZONE AE (EL 133.2)
ZONE AE (EL 139.2)
ZONE AE (EL 139.9)
ZONE AE (EL 133.9)
ZONE AE (EL 166.1)
ZONE AE (EL 141.3)
City of Olympia Jurisdiction
Thurston County Unincorporated Area Jurisdiction
City of Tumwater Jurisdiction
Thurston County Unincorporated Areas
ZONE AE
ZONE AE (EL 141.3)
ZONE AE (EL 133.9)
ZONE AE (EL 166.1)
ZONE AE (EL 133.9)
ZONE AE (EL 141.3)
ZONE AE (EL 133.9)
ZONE AE (EL 133.9)
ZONE AE (EL 133.9



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT HTTPS://MSC.FEMA.GOV

SPECIAL FLOOD HAZARD AREAS	Without Base Flood Elevation (BFE) Zone A, V, A99
	With BFE or Depth Zone AE, AO, AH, VE, AR
	Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD	0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
	Future Conditions 1% Annual Chance Flood Hazard Zone X
	Area with Reduced Flood Risk due to Levee See Notes Zone X
	Area with Flood Risk due to Levee Zone D
OTHER AREAS	NO SCREEN Area of Minimal Flood Hazard Zone X
	Area of Undetermined Flood Hazard Zone D
GENERAL STRUCTURES	Channel, Culvert, or Storm Sewer
	Levee, Dike, or Floodwall
	20.2 Cross Sections with 1% Annual Chance
	17.5 Water Surface Elevation
	Coastal Transect
	Coastal Transect Baseline
	Profile Baseline
	Hydrographic Feature
	Base Flood Elevation Line (BFE)
OTHER FEATURES	Limit of Study
	Jurisdiction Boundary

NOTES TO USERS

For information and questions about this Flood Insurance Rate Map (FIRM), available effective flood hazard information for your community, or the National Flood Insurance Program (NFIP) in general, please call the FEMA Mapping and Insurance Information eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Flood Map Service Center website at https://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website. Users should be aware that adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM Index. These may be acquired directly from the Flood Map Service Center at the website listed above.

For community and countywide map dates refer to the Flood Insurance Study Report for this jurisdiction.

To determine if flood insurance is available in this community, contact your Insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

Basemap information shown on this FIRM was provided in digital format by the United States Geological Survey (USGS). The basemap shown is the USGS National Map: Orthoimagery. Last refreshed October, 2020.

Note: Some Special Flood Hazard Areas with elevations may not appear with elevation labels if the Base Flood Elevation or Cross-section line which communicates the elevation for the location appears on the adjacent panel. Please see the Panel Locator Diagram on this map panel to determine the adjacent panel and find the elevation feature there, or alternatively use the Flood Insurance Study report for detailed elevations by flood source.

SCALE

1 inch = 500 feet 1:6,000

N

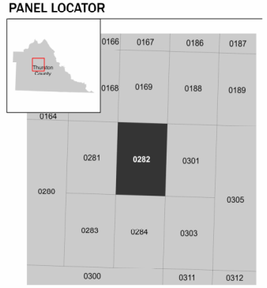
0 250 500 1,000 1,500 2,000 feet

0 50 100 200 300 400 meters

Map Projection:
NAD 1983 StatePlane Washington South FIPS 4602 Feet

Vertical Datum: NAVD88

PANEL LOCATOR





NATIONAL FLOOD INSURANCE PROGR

FLOOD INSURANCE RATE MAP

THURSTON COUNTY WASHINGTON AND INCORPORATED AREAS

Panel Contains:

COMMUNITY	NUMBER	PANEL	S
THURSTON COUNTY (UNINCORPORATED AREAS	530188	0282	G
CITY OF TUMWATER	530193	0282	G

MAP NUM
53067C02
EFFECTIVE
May 08, 2

Thurston County

Geologic Hazard Areas

Landslide Hazard Area

Volcanic Hazard Area - Case 1

PROJECT SITE

Cities **Urban Growth Areas**

0 5

Miles

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NORTH

Map Exported on 12/25/2025
PDP:\Library\APROX\Planning\CriticalAreas.aprx\Geologic Hazard(54x36)

Thurston County

High Groundwater Hazard Areas

- Salmon Creek Basin
- High Groundwater Hazard
- High Groundwater Hazard - 300' Buffer
- Salmon Creek Basin High Groundwater Hazard
- Salmon Creek High Groundwater Hazard - 300' Buffer

PROJECT SITE

- Cities
- Urban Growth Areas

0 5
Miles

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THURSTON COUNTY GEODATA CENTER

NORTH

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P:\PLibrary\APRX\Planning\Critical\Areas aprx\HighGroundwater(54x36)

Thurston County

Known Areas of Soil or Groundwater Concern

THIS MAP IS BASED ON DATA THAT IS NOT ALWAYS FULLY CONCLUSIVE AND IS INTENDED MAINLY AS A GUIDE TO AREAS WHERE FURTHER MONITORING IS APPROPRIATE. IT IS A MAP OF SUSPECTED OR CONFIRMED GROUNDWATER QUALITY PROBLEMS.



AREAS OF PESTICIDE CONTAMINATION
Includes EDB, DBCP, 1.2 DCP and others

ELEVATED CHLORIDE AREAS
Areas containing significant numbers of wells with chloride levels exceeding 4 parts/million

ELEVATED NITRATE AREAS
Areas containing significant numbers of wells with nitrate levels exceeding 4 parts/million (1999-2003)

AREAS OF VERY LIMITED GROUNDWATER
Volcanic bedrock unlikely to produce enough water for any type of well

AREAS OF LIMITED GROUNDWATER
Sedimentary bedrock that may produce enough water for low-yield wells

SITES OF CONCERN

1 . EDB 1 Thurston County
2 . Restover Truck Stop
3 . Cascade Pole Inc McFarland
4 . The Ostrom Company
5 . Weyerhaeuser Co Box Plant
6 . Cedar Creek Corrections DNR
7 . Citflor Inc
8 . Puget Sound Power & Light
9 . Rhodes Chemical Co
10 . Rhodes Chemical Co Barn
11 . Pattison Lake EDB
12 . Lacey Valve Grinding
13 . Lacey Laundromat
14 . Black Lake Grocery
15 . West Olympia Landfill Former
16 . Warehouse One Port
17 . Industrial Petroleum Distributors
18 . US West Capitol Peak
19 . Unocal Service Station 0266
20 . Tumwater City N 5th & Bates
21 . Puget Power Eld Inlet Substation
22 . Olympia Dry Cleaners
23 . Boulevard Nursery
24 . Clarke Residence
25 . Franks Property
26 . Former Mervyns Westifeld Capital Mall
27 . Tumwater Falls Park Reclaimed Water Lines
28 . Former WSDOT Materials Testing Facility
29 . The Evergreen State College
30 . J & J Salvage Drums
31 . Faber & Sons Recycling Rochester
32 . Arrowood Subdivision Property
33 . Stacey Property
34 . Meridian Campus
35 . Chestnut Street ROW
36 . Pacific Pride Marvin Rd
37 . Tri Way Properties
38 . PSE ROW Lot 140 9101 Steilacoom Rd
39 . Port Of Olympia Texaco Bulk Storage Facility
40 . SR8, MP 18 Westbound Spill
41 . Kemp Property
42 . Steilacoom Ridge
43 . PSE Olympia Switching Substation
44 . LOTT Construction Project ROW Martin Way
45 . Vacant Property Rochester
46 . WA DFW Fishery Resource Management
47 . Lacey Gateway
48 . Peranzi Property
49 . WA State Dept Information Svcs Office Bldg
50 . Carlyon Beach Homeowners Assn Shop
51 . North Thurston Middle School #5
52 . WA Dept Of Fish & Wildlife Print Shop
53 . Old Sears Building
54 . Franklin Street Row
55 . WA Dept Of Fish & Wildlife Parking Lot
56 . 2040 Mottman Rd
57 . Capital City Studios
58 . Phoenix Inn
59 . Arco 4435
60 . Lacey Fuel
61 . Evergreen Sportsman Club
62 . WA DOT E I5 Milepost 87.5
63 . 1515 Division Nursery
64 . 318 State Ave NE Olympia
65 . Budd Inlet Sediment
66 . Taco Bell/Former Chevron 96801
67 . Haumann Property
68 . WA GA Olympia
69 . 8th & Capitol Investigation
70 . Gallagher Cove LLC
71 . 5th & Columbia St Parking Lot
72 . 7 Eleven Food Store 230325983H
73 . Gull Harbor Mercantile
74 . Diamond Parking/Chevron 9-0292
75 . East Bay Redevelopment
76 . Old Brewhouse Former Paint Shop
77 . WA DNR Triangle Pit
78 . PSE Blumauer Substation
79 . Buckeye Court Gasoline Spill
80 . Valentine Fyrst Property
81 . North Thurston School Dist Transp Dept
82 . 1203 Edison St NE
83 . City Of Olympia 4th & Sylvester Utility Corridor
84 . WA DNR Webster Nursery
85 . Eighth Avenue Park
86 . Lacey Market Square
87 . Handy Pantry
88 . WA Grange Parking Lot Chevron
89 . Jacks Auto Repair
90 . Zittle's Johnson Point
91 . Eastside Laundry/Allisons Norge Village
92 . WA DNR Marine Research Cntr
93 . Intercity Transit/Treasure Chest
94 . Low Ronts Wost Inc
95 . Howards Cleaners
96 . LOTT Wastewater Treatment Plant
97 . Tacoma Smelter Plume Thurston County
98 . Olympic Pipeline Co Olympia Station
99 . MJMG Group Llc
100 . Shell Oil Co Black Lake Blvd
101 . Port Of Olympia Warehouse 2
102 . City Of Olympia-Heritage Park
103 . Olympia City Sewer Pump Station
104 . Jackpot Station #371
105 . Olympia School District Bus Barn
106 . Shop Fast
107 . Briggs Nursery
108 . Littlerock Grocery
109 . Acme Fuel Bulk Plant 305
1'0 . Summit Lake BP
1'1 . Stop N Go
1'2 . Premier Auto Detail
1'3 . Performance Corner
1'4 . Intercity Transit
1'5 . 6110 Olympia Chevron
1'6 . Fast Fuel 1
1'7 . WA St CB&G Steamplant
1'8 . Circle K 5497/BP 01690
1'9 . Darigold Site Former
120 . Kens Tire
121 . Pearson Air Inc
122 . U S West Capital Peak Radio 070585
123 . Lacey Food Mart
124 . Palermo Wellfield
125 . Western Pacific Cleaners
126 . Secured Safe Storage
127 . Johns Auto Wrecking
128 . Evergreen Shores Grocery
129 . Northwest Pipeline GP Olympia M/S
130 . Olympia City Public Works 7th Ave
131 . Martin Way Shell
132 . PHO Olympia Restaurant Utility Pole
133 . Puget Power Olympia Serv Center
134 . McMahans Furniture
135 . Mos Mini Mart
136 . BMT Northwest AKA Reliable Steel
137 . Pit Stop Olympia
138 . Tenino Blumaer Substation
139 . Massoth Machine
140 . Tenino Corner Grocery
141 . Jackpot Station 372
142 . Tanglewilde Chevron
143 . Phil Wall & Sons Inc
144 . Great Western Soil
145 . Capital Plumbing And Heating
146 . 4th Ave Shell Texaco Station 120948
147 . Jack Wilmarth Triangle General Store
148 . Flintstone Fuel Inc
149 . Jiffy Lube 2071
150 . Olympia Fuel & Asphalt Inc Tumwater
151 . City Of Olympia-Miller Central
152 . US West Martin Way SOC
153 . Arnolds Texaco Service
154 . Columbia Square Properties
155 . West Bay Marina
156 . Solid Wood Inc
157 . Astro Western 617
158 . Old Tumwater City Hall/2nd Ave
159 . Union Oil Station

PROJECT SITE

Cities Urban Growth Are

0
Miles

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THURSTON COUNTY

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Thurston County
Watersheds

- BLACK RIVER
- BUDD/DESCHUTES
- CHEHALIS RIVER
- ELD INLET
- HENDERSON INLET
- NISQUALLY RIVER
- SKOOKUMCHUCK RIVER
- TOTTEN INLET
- WEST CAPITOL FOREST

PROJECT SITE

Cities | Urban Growth Are

0 Miles

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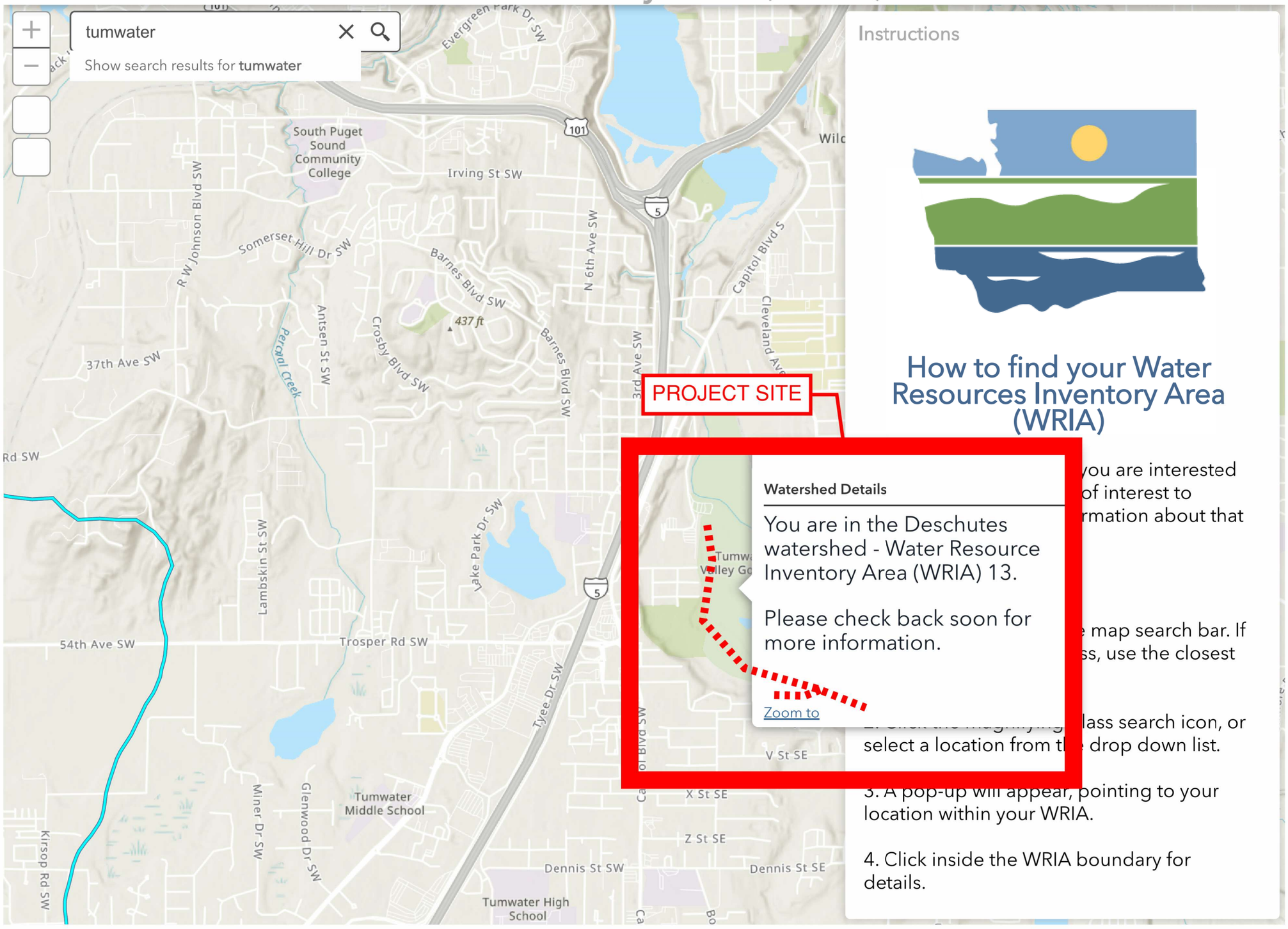
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THURSTON COUNTY

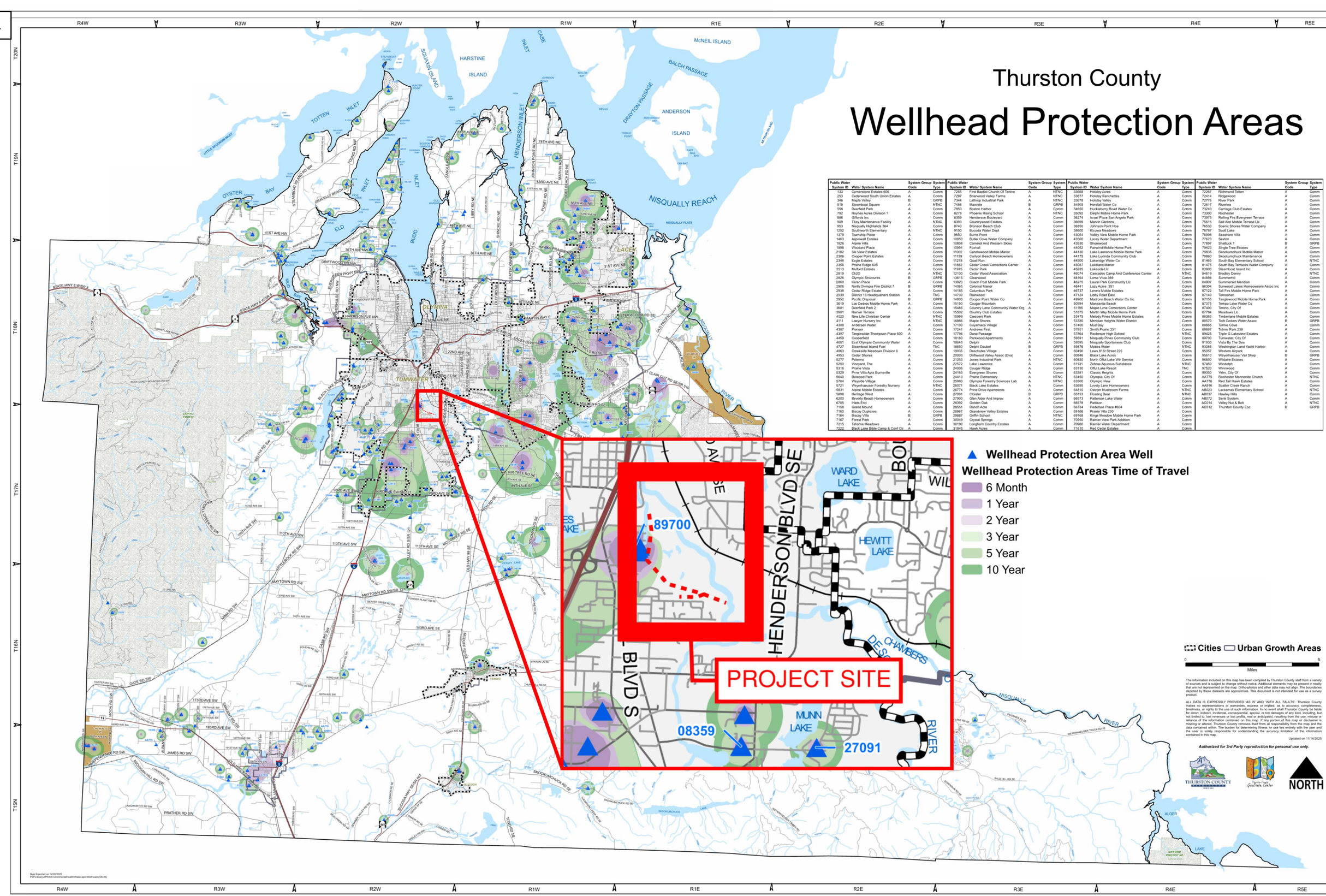
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PDF/Library/APRX\Planning\NaturalResources.aprx\Watersheds(54x36)

Find Your Water Resources Inventory Area (WRIA)



Thurston County
Wellhead Protection Areas

Public Water System ID	Water System Name	System Group Code	System Type
133	Cornerstone Estates 606	A	Comm
253	Cedarwood South Union Estates	A	Comm
346	Maple Valley	B	GRPB
519	Steamboat Square	A	NTNC
558	Deerfield Park	A	Comm
782	Haynes Acres Division 1	A	Comm
886	Giffords Inc	A	Comm
909	Tilley Maintenance Facility	A	NTNC
953	Nisqually Highlands 364	A	Comm
1252	Southworth Elementary	A	NTNC
1379	Township Place	A	Comm
1463	Aspinwall Estates	A	Comm
1826	Alpine Hills	A	Comm
1898	Woodard Place	A	Comm
2182	Ski-View Estates	A	Comm
2306	Cooper Point Estates	A	Comm
2348	Eagle Estates	A	Comm
2356	Prairie Ridge 605	A	Comm
2513	Mulford Estates	A	Comm
2819	CIQO	A	NTNC
2826	Olympic Structures	B	GRPB
2860	Koren Place	A	Comm
2906	North Olympia Fire District 7	B	GRPB
2938	Cedar Ridge Estate	A	Comm
2939	District 13 Headquarters Station	A	TNC
2952	Pacific Disposal	B	GRPB
3619	Los Cedros Mobile Home Park	A	Comm
3681	Deerfield Park 2	A	Comm
3901	Rainier Terrace	A	Comm
4020	New Life Christian Center	A	NTNC
4111	Lawyer Nursery Inc	A	NTNC
4308	Ar-bersen Water	A	Comm
4387	Pioneer	A	Comm
4397	Tanglewilde-Thompson Place 600	A	Comm
4459	Cooperfield	A	Comm
4601	East Olympia Community Water	A	Comm
4727	Steamboat Island Fuel	A	TNC
4863	Creekside Meadows Division Ii	A	Comm
4953	Cedar Shores	A	Comm
5277	Palermo	A	Comm
5290	Vineyard, The	A	Comm
5316	Prairie Vista	A	Comm
5329	Prine Villa Apts Burnsville	A	Comm
5640	Belwood Park	A	Comm
5704	Wayside Village	A	Comm
5721	Weyerhaeuser Forestry Nursery	A	NTNC
5831	Alpine Mobile Estates	A	Comm
5898	Heritage West	A	Comm
6200	Beverly Beach Homeowners	A	Comm
6705	Inlets End	A	Comm
7158	Grand Mound	A	Comm
7160	Biscay Duplexes	A	Comm
7164	Biscay Villa	B	GRPB
7167	Forest Park	A	Comm
7215	Tahoma Meadows	A	Comm
7222	Black Lake Bible Camp & Conf Ctr	A	Comm
7255	First Baptist Church Of Tenino	A	Comm
7297	Briarwood Valley Farms	A	Comm
7344	Lathrop Industrial Park	A	Comm
7486	Maxvale	A	Comm
7850	Boston Harbor	A	Comm
8278	Phoenix Rising School	A	NTNC
8359	Henderson Boulevard	A	Comm
8393	Countrywood Estates	A	Comm
8740	Bronson Beach Club	A	Comm
9100	Bucoda Water Dept	A	Comm
9650	Burns Point	A	Comm
10050	Butler Cove Water Company	A	Comm
10808	Camelot And Western Skies	A	Comm
10991	Foxhall	A	Comm
11002	Candlewood Mobile Manor	A	Comm
11159	Carlyon Beach Homeowners	A	Comm
11278	Quail Run	A	Comm
11882	Cedar Creek Corrections Center	A	Comm
11975	Cedar Park	A	Comm
12100	Cedar Wood Association	A	Comm
13615	Clearwood	A	Comm
13923	Coach Post Mobile Park	A	Comm
14065	Colonial Manor	A	Comm
14185	Columbus Park	A	Comm
14730	Rainwood	A	Comm
14800	Cooper Point Water Co	A	Comm
15150	Cougar Mountain	A	Comm
15485	Country Lane Community Water Org	A	Comm
15502	Country Club Estates	A	Comm
15999	Crescent Park	A	Comm
16866	Maple Shores	A	Comm
17100	Cuyamaca Village	A	Comm
17241	Andrews First	A	Comm
17784	Dana Passage	A	Comm
18160	Parkwood Apartments	A	Comm
18643	Delphi Dr	A	Comm
18650	Delphi Daubel	B	GRPB
19035	Deschutes Village	A	Comm
20003	Driftwood Valley Assoc (Dva)	A	Comm
21253	Jones Industrial Park	A	NTNC
22572	Lake Lawrence	A	Comm
24006	Cougar Ridge	A	Comm
24163	Evergreen Shores	A	Comm
24413	Prairie Elementary	A	NTNC
25980	Olympia Forestry Sciences Lab	A	NTNC
26071	Black Lake Estates	A	Comm
26774	Prine Drive Apartments	A	Comm
27091	Cloister	B	GRPB
27900	Glen Alder And Improv	A	Comm
28392	Golden Oak	A	Comm
28551	Ranch Acre	A	Comm
28967	Grandview Valley Estates	A	Comm
29887	Griffin School	A	NTNC
30049	Crystal Springs	A	Comm
30190	Longhorn Country Estates	A	Comm
31845	Hawk Acres	A	Comm
33668	Holiday Acres	A	Comm
33677	Holiday Ranchettes	A	Comm
33678	Holiday Valley	A	Comm
34505	Horsfall Water Co	A	Comm
34650	Huckleberry Road Water Co	A	Comm
35092	Delphi Mobile Home Park	A	Comm
36274	Israel Place San Angelo Park	A	Comm
36899	Marvin Gardens	A	Comm
36850	Johnson Point Hoa	A	Comm
38600	Kcuwa Meadows	A	Comm
43054	Valley View Mobile Home Park	A	Comm
43500	Lacey Water Department	A	Comm
43530	Shorewood	A	Comm
44052	Fairwind Mobile Home Park	A	Comm
44130	Lake Lawrence Mobile Home Park	A	Comm
44175	Lake Lucinda Community Club	A	Comm
44500	Lakeridge Water Co	A	Comm
45087	Lakeland Manor	A	Comm
45285	Lakeside Llc	A	Comm
46074	Cascade Camp And Conference Center	A	NTNC
46164	Loma Vista 369	A	Comm
46274	Laurel Park Community Llc	A	Comm
46441	Lazy Acres 351	A	Comm
46737	Lenets Mobile Estates	A	Comm
47124	Libby Road East	A	Comm
49900	Madrona Beach Water Co Inc	A	Comm
50994	Manzanita Beach	A	Comm
51195	Maple Lane Corrections Center	A	Comm
51875	Martin Way Mobile Home Park	A	Comm
53475	Melody Pines Mobile Home Estates	A	Comm
53780	Meridian Heights Water District	A	Comm
57400	Mud Bay	A	Comm
57851	Smith Prairie 251	A	Comm
57864	Rochester High School	A	NTNC
59591	Nisqually Pines Community Club	A	Comm
59595	Nisqually Sportsmens Club	A	Comm
59876	Mobbs Water	A	NTNC
60490	Lacey 6119 Street 225	A	Comm
60846	Black Lake Acres	A	Comm
60850	North Offut Lake Wtr Service	A	Comm
61131	Zebras Aqueous Substance	A	NTNC
63130	Offut Lake Resort	A	TNC
63381	Classic Heights	A	Comm
63450	Olympia, City Of	A	Comm
63500	Olympic View	A	Comm
63695	Lovely Lane Homeowners	A	Comm
64810	Oslrons Mushroom Farms	A	NTNC
65153	Floating Bear	A	NTNC
66573	Patterson Lake Water	A	Comm
66578	Pattison	A	Comm
66734	Pederson Place #604	A	Comm
69166	Prairie Villa 230	A	Comm
69168	Kings Meadow Mobile Home Park	A	Comm
70950	Rainier View Park Addition	A	Comm
70980	Rainier Water Department	A	Comm
71610	Red Cedar Estates	A	Comm
72267	Richmond Totten	A	Comm
72414	Ridgewood	A	Comm
72776	River Park	A	Comm
72817	Riverlea	A	Comm
73240	Carriage Club Estates	A	Comm
73300	Rochester	A	Comm
73975	Rolling Firs Evergreen Terrace	A	Comm
75616	Salt Aire Mobile Terrace Llc	A	Comm
76530	Scenic Shores Water Company	A	Comm
76787	Scott Lake	A	Comm
76998	Seashore Villa	A	Comm
77670	Sexton	A	Comm
77897	Shattuck 1	B	GRPB
79423	Single Tree Estates	A	Comm
79835	Skookumchuck Mobile Manor	A	Comm
79860	Skookumchuck Maintenance	A	Comm
81465	South Bay Elementary School	A	NTNC
81475	South Bay Terraces Water Company	A	Comm
83900	Steamboat Island Inc	A	Comm
84074	Bradley Denny	A	NTNC
84898	Summerhill	A	Comm
84907	Summerset Meridian	A	Comm
86304	Sunwood Lakes Homeowners Assoc Inc	A	Comm
87122	Tall Firs Mobile Home Park	A	Comm
87140	Tamoshan	A	Comm
87155	Tanglewood Mobile Home Park	A	Comm
87375	Tempo Lake Water Co	A	Comm
87400	Tenino, City Of	A	Comm
87784	Meadows Llc	A	Comm
88383	Timberlane Mobile Estates	A	Comm
88570	Todt Cedars Water Assoc	B	GRPB
88665	Tolmie Cove	A	Comm
88667	Tolmie Park 239	A	Comm
89425	Toplo O Lakeview Estates	A	Comm
89700	Tumwater, City Of	A	Comm
91930	Valley By The Sea	A	Comm
93085	Washington Land Yacht Harbor	A	Comm
95057	Western Airpark	A	Comm
95610	Weyerhaeuser Vail Shop	B	GRPB
96850	Wildaire Estates	A	Comm
97450	Windolph	A	Comm
97520	Winwood	A	Comm
99350	Yelm, City Of	A	Comm
AA775	Rochester Mennonite Church	A	NTNC
AA776	Red Tail Hawk Estates	A	Comm
AA916	Scatter Creek Ranch	A	Comm
AB023	Lackamas Elementary School	A	NTNC
AB037	Hawley Hills	A	Comm
AB072	Senk System	A	Comm
AC014	Valley Nut & Bolt	A	NTNC
AC512	Thurston County Eoc	B	GRPB



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Thurston County

Wetlands & 300 Foot Wetland Buffer

Wetlands

300 Foot Wetlands Buffer

PROJECT SITE

Cities **Urban Growth Areas**

0 5

Miles

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THURSTON COUNTY GEODATA CENTER

NORTH

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February 27, 2026

Water Quality Atlas Map



WQ Improvement Projects

- TMDL - Approved
- 4B - Approved
- STI - Approved
- ARP - Approved
- TMDL - In Development
- STI - In Development
- ARP - In Development

Miles
0 0.1 0.2 0.4

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https://apps.ecology.wa.gov/waterqualityatlas/wqa/map

Deschutes River, Percival Creek, & Budd Inlet tributaries

Parts of the Deschutes River and its tributary creeks do not meet state clean water standards. To return these waters to a healthy condition, we are working with local governments and other groups to implement a total maximum daily load (TMDL) project.

Water quality issues

The Deschutes River is under pressure from growth, resulting in many small, uncontrolled sources of pollution that enter the river. Local city, county, and state government agencies monitor and protect water quality. In the Deschutes, water quality monitoring revealed that levels of pH, dissolved oxygen, temperature, fine sediment, and fecal coliform did not meet state standards. We began the TMDL process to address these problems.

What is being done

With the help of an advisory group of affected stakeholders, special interest groups, and interested residents, we developed a TMDL plan to solve the river's pollution problems. The Deschutes River, Percival Creek, and Budd Inlet Tributaries Water Quality Improvement Plan (also known as a TMDL) assigns the amount of pollution the water bodies can receive and still meet water quality standards. Any additional amount needs to be eliminated to achieve clean water.

This plan provides a framework for how stakeholders will track, monitor, and implement the water cleanup plan. It outlines what is needed, establishes a schedule, and guides corrective actions with adaptive management practices.

We gathered public comments on the draft plan in 2015. We held two public meetings to provide a broad overview of the project and findings. In 2018, EPA approved some elements of the TMDL plan and disapproved others. See our 2018 Letter to Stakeholders for details.

On August 10, 2020, EPA finalized the replacement of the TMDL elements that were disapproved. They were open for public comment until October 7, 2020 and can be found on EPA's Deschutes River TMDLs web page.

We are also continuing to work with the Department of Enterprise Services on the Deschutes Estuary Restoration Project, which will clean and restore Capitol Lake by returning the Deschutes Estuary to a tidal salt marsh habitat.

Why this matters

Water must be of high quality to support fish and wildlife.

Dissolved oxygen — oxygen dissolved in healthy water — is vital for the survival of fish and aquatic life. It is more difficult to transfer oxygen from water to blood than it is to transfer oxygen from air to blood. Therefore, it is critical that an adequate amount of oxygen is maintained in the water for this transfer to take place efficiently and sustain aquatic life. Oxygen is also necessary to help decompose organic matter in the water and bottom sediments as well as for other biological and chemical processes.

Fecal coliform is a type of bacteria common in human and animal waste. It can make people sick and cause the closure of shellfish harvesting beds. Bacteria can get into waters from untreated or partially treated discharges from wastewater treatment plants, from improperly functioning septic systems, and from livestock, pets, and wildlife.

People can help keep bacteria out of the water. Properly collect, bag, and trash dog poop. Check your on-site sewage system to make sure it is maintained and working properly. Use proper storage, management, and disposal practices for livestock manure.

pH is a measure of the acidity or alkalinity of the water. pH can affect the solubility of nutrients and metal compounds. By affecting the solubility of nutrients, it can change the amount of nutrients available for plant growth. If too many nutrients are available, aquatic plants can grow out of control. When these plants decompose, they can deplete the water of oxygen. The solubility of many metal compounds also changes greatly with pH. When more metals are dissolved in the water, aquatic animals may absorb them faster. Therefore, a lower pH may make these metals more toxic to aquatic life.

Water temperature influences what types of organisms can live in a water body. Cooler water holds more dissolved oxygen that fish and other aquatic life need to breathe. Warmer water holds less dissolved oxygen. Threatened and endangered salmon need cold, clean water to survive. Removing streamside vegetation tends to raise water temperature to a level that may be harmful to fish, other aquatic animals, and insects.

Finally, too much **sediment** in the water can irritate fish gills and make it difficult for them to breathe.

DEPARTMENT OF ECOLOGY
State of Washington
http://www.ecy.wa.gov

Publication Summary

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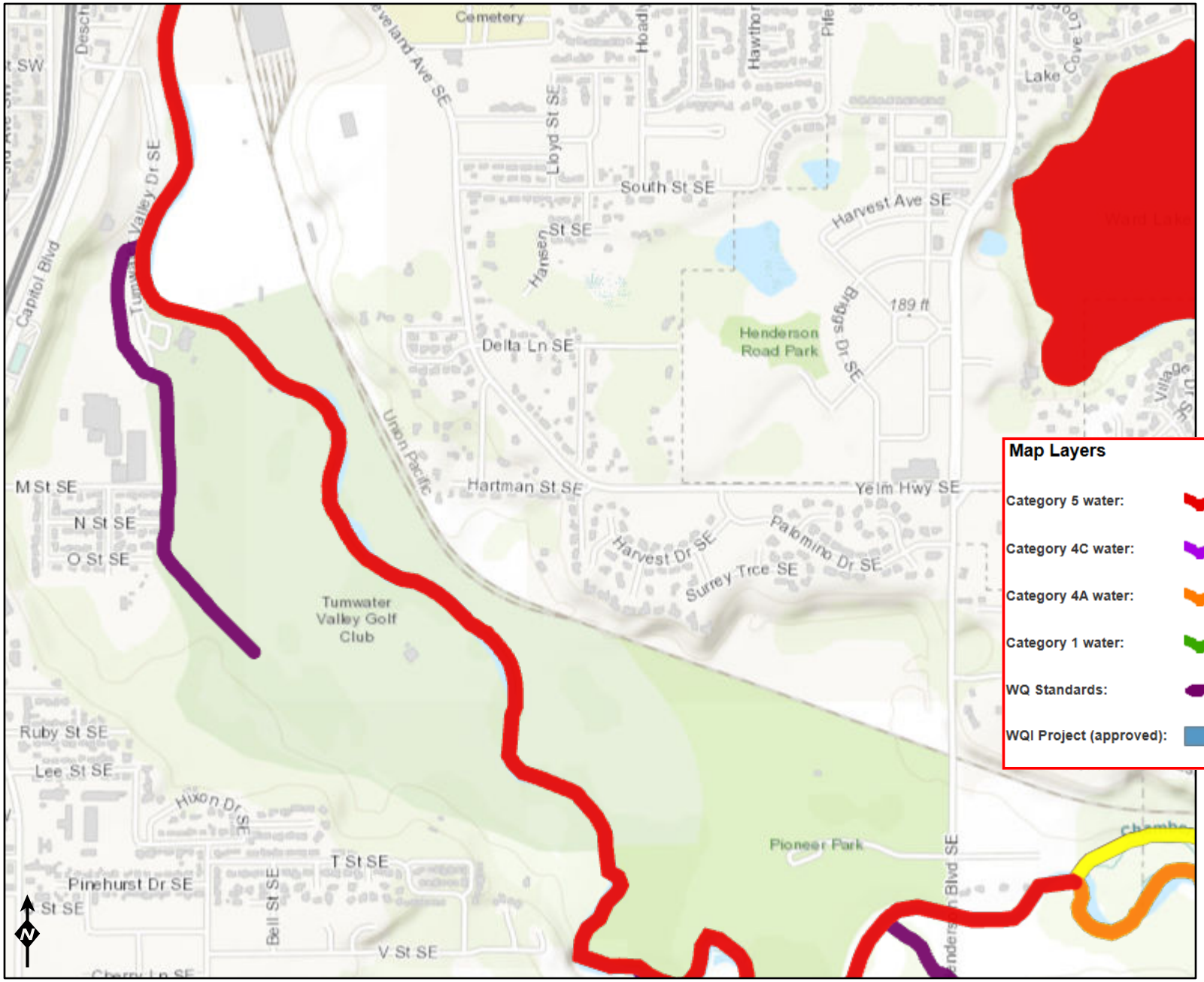
TITLE	**Deschutes River, Percival Creek, and Budd Inlet Tributaries Temperature, Fecal Coliform Bacteria, Dissolved Oxygen, pH, and Fine Sediment TMDL: Water Quality Improvement Report and Implementation Plan**
	Publication number: 15-10-012 | Date Published: April 2015 | Date Revised: July 2018
VIEW NOW	Deschutes River, Percival Creek, and Budd Inlet Tributaries Temperature, Fecal Coliform Bacteria, Dissolved Oxygen, pH, and Fine Sediment TMDL: Water Quality Improvement Report and Implementation Plan (Number of pages: 335) (Publication Size: 14292KB) Trouble viewing? Try these free options. • Get the latest Adobe Reader for PDFs. • For Excel or Word viewing get Open Office, Microsoft OneDrive, DropBox Basic or a mobile app at your favorite app store.
AUTHOR(S)	Wagner, Lydia, Bilhimer, Dustin
DESCRIPTION	Portions of the Deschutes River, Percival Creek, and Budd Inlet tributaries do not meet water quality standards and are on the Clean Water Act Section 303(d) list for one or more of the following parameters: fecal coliform bacteria, temperature, dissolved oxygen (DO), pH, or fine sediment. This Total Maximum Daily Load (TMDL) report sets the load and wasteload reductions needed to meet Washington State water quality standards, and describes implementation actions to achieve those reductions.
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	• Water Quality Order Form
CONTACT	Leanne Weiss at 360-407-0243 or leanne.weiss@ecy.wa.gov
KEYWORDS	water quality improvement plan, Deschutes River, water cleanup plan, Total Maximum Daily Load
WEB PAGE	Deschutes River watershed area: Budd Inlet
WATERSHED	Water Resource Inventory Area 13 Deschutes
DATA	Environmental Information Management (EIM) #MROB0001
RELATED PUBLICATIONS	Title: Budd Inlet Total Maximum Daily Load for Dissolved Oxygen Deschutes River, Capitol Lake, and Budd Inlet Total Maximum Daily Load Study: Supplemental Modeling Scenarios Deschutes River, Capitol Lake, and Budd Inlet Temperature, Fecal Coliform Bacteria, Dissolved Oxygen, pH, and Fine Sediment Total Maximum Daily Load Technical Report: Water Quality Study Findings Assessment of Surface Water / Groundwater Interactions and Associated Nutrient Fluxes in the Deschutes River and Percival Creek Watersheds, Thurston County Quality Assurance Project Plan: Deschutes River, Capitol Lake, and Budd Inlet Temperature, Fecal Coliform Bacteria, Dissolved Oxygen, pH, and Fine Sediment Total Maximum Daily Load Study

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February 27, 2026

Water Quality Atlas Map



Assessed Water/Sediment

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

Water Quality Standards
- All Standards

Map Layers

Category 5 water:	2 listings found
Category 4C water:	1 listing found
Category 4A water:	2 listings found
Category 1 water:	9 listings found
WQ Standards:	1 water quality standard found
WQI Project (approved):	Deschutes River, Percival Creek, and Budd Inlet Tributaries TMDL

Miles 0 0.1 0.2 0.4

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Assessed Water/Sediment

Water

Category 5 - 303d

DEPARTMENT OF ECOLOGY State of Washington

Washington State Water Quality Assessment 303(d)/305(b) List

Approved WQ Assessment | Candidate List | Contact Us | WQ Atlas

Back To Results

Water Quality Listing Policy

Listing ID: 16722

Main Listing Information

Listing ID: 16722

Waterbody Name: DESCHUTES RIVER

Medium: Water

Parameter: Bacteria - Fecal coliform

WQI Project: None

Designated Use: Recreation - Primary Contact

Current Category: 5

View Category History

Assessment Unit

Assessment Unit ID: 17110016000007_001_001

Size: 4.855 Kilometers

Associated Components(s): Reach: 17110016000007 0% - 100%, Type: Rivers/Streams

County: Thurston

WRIA: Deschutes

Basis Table

Assessment Year

2018

Sampling Year	Excursion Count	Sample Count	Criterion/Threshold	Aggregate	Calculated Value	Criterion 2	Aggregate 2	Calculated Value 2
2016	1	14	200 #col/100ml	Highest daily average	280	100 #col/100ml	Three-month geometric mean	137

Assessed Water/Sediment

Water

Category 5 - 303d

DEPARTMENT OF ECOLOGY State of Washington

Washington State Water Quality Assessment 303(d)/305(b) List

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Back To Results

Water Quality Listing Policy

Listing ID: 70194

Main Listing Information

Listing ID: 70194

Current Category: 5

Waterbody Name: DESCHUTES RIVER

View Category History

Medium: Other

Parameter: Benthic Macroinvertebrates Bioassessments

WQI Project: None

Designated Use: Aquatic Life - General

Assessment Unit

Assessment Unit ID: 17110016000007_001_001

County: Thurston

Size: 4.855 Kilometers

WRIA: Deschutes

Associated Components(s): Reach: 17110016000007 0% - 100%, Type: Rivers/Streams

Basis Table

sessment Year

2018

Sampling Year	Excursion Count	Sample Count	Criterion/Threshold	Aggregate	Calculated Value	Fine Sediment Biotic Index Score	FSB Threshold	Hilsenhoff Biotic Index Score	HBI Threshold	Metals Tolerance Index Score	MTI Threshold
2012; 2015	3	3	65 (Puget Lowland)	Average BIBI score	56.7	46.2	89	4.84	>5.5	2.8	>4.0

Assessed Water/Sediment

Water

Category 4C

DEPARTMENT OF ECOLOGY State of Washington

Washington State Water Quality Assessment 303(d)/305(b) List

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Back To Results

Water Quality Listing Policy

Listing ID: 6195

Main Listing Information

Listing ID: 6195

Waterbody Name: DESCHUTES RIVER

Medium: Habitat

Parameter: Instream Flow

WQI Project: None

Designated Use: Aquatic Life - General

Current Category: 4C

View Category History

Assessment Unit

Assessment Unit ID: 17110016000007_001_001

Size: 4.855 Kilometers

Associated Components(s): Reach: 17110016000007 0% - 100%, Type: Rivers/Streams

County: Thurston

WRIA: Deschutes

Basis Table

See Basis Statement field.

Basis Statement

USGS flow data collected at RM 3.4 between 1990 and 1995 (submitted by Jeff Dickison on 2/27/96) are consistently below minimum flows established in WAC 173-513-030.

USGS and Thurston County flow data (submitted by Jeff Dickison on 2/27/96) show intensified peak flows likely due to silvicultural activities in the upper watershed (Thurston County, 1995).

The following references document characteristic uses: Squaxin Island Tribal data (submitted by Jeff Dickison on 2/27/96) show numbers of Coho salmon stock.

Baranski, 1996 SASSI Update shows that Coho are reclassified to depressed.

Remarks

This listing was on the 1998 303(d) list, but has been moved to the new Category 4C (impaired by a non-pollutant) based on EPA Guidance for preparing the 2004 Integrated Report.

Assessed Water/Sediment
Water
Category 4A

DEPARTMENT OF ECOLOGY State of Washington

Washington State Water Quality Assessment 303(d)/305(b) List

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Back To Results

Water Quality Listing Policy

Listing ID: 6576

Main Listing Information

Listing ID: 6576
Waterbody Name: DESCHUTES RIVER
Medium: Water
Parameter: Temperature
WQI Project: Deschutes River, Percival Creek and Budd Inlet Tributaries Multi-parameter TMDL
Designated Use: Aquatic Life - Salmonid Spawning, Rearing, and Migration

Current Category: 4A

View Category History

Assessment Unit

Assessment Unit ID: 17110016000007_001_001
Size: 4.855 Kilometers
Associated Components(s): Reach: 17110016000007 0% - 100%, Type: Rivers/Streams

County: Thurston
WRIA: Deschutes

Basis Table

Assessment Year

2018

Sampling Year	Excursion Count	Sample Count	Criterion/Threshold	Aggregate	Calculated Value
2017	11	361	17.5 deg C	7-DADMax	19.71

Basis Statement

Location ID: 13A060 -- In 2010, between 1/1/2010 and 9/22/2010, the 7-day mean of daily maximum values (7DADmax) exceeded the criterion for this waterbody (17.5°C) on 26 of 265 days (10%); The maximum exceedance during this period was 18.74°C for the 7-day period centered on 8/15/2010; (External Data Source: Thurston County Health Database)

Location ID: 13A060 -- In 2009, between 10/10/2009 and 12/31/2009, the 7-day mean of daily maximum values (7DADmax) exceeded the criterion for this waterbody (17.5°C) on 0 of 83 days (0%); (External Data Source: Thurston County Health Database)

Location ID: 13A060 -- In 2008, between 7/14/2008 and 9/30/2008, the 7-day mean of daily maximum values (7DADmax) exceeded the criterion for this waterbody (17.5°C) on 14 of 79 days (18%); The maximum exceedance during this period was 18.46°C for the 7-day period centered on 8/15/2008; (External Data Source: Thurston County Health Database)

Assessed Water/Sediment

Water

Category 4A

DEPARTMENT OF ECOLOGY State of Washington

Washington State Water Quality Assessment 303(d)/305(b) List

Approved WQ Assessment | Candidate List | Contact Us | WQ Atlas

Back To Results

Water Quality Listing Policy

Listing ID: 10894

Main Listing Information

Listing ID: 10894

Waterbody Name: DESCHUTES RIVER

Medium: Water

Parameter: Dissolved Oxygen

WQI Project: Deschutes River, Percival Creek and Budd Inlet Tributaries Multi-parameter TMDL

Designated Use: Aquatic Life - Salmonid Spawning, Rearing, and Migration

Current Category: 4A

View Category History

Assessment Unit

Assessment Unit ID: 17110016000007_001_001

Size: 4.855 Kilometers

Associated Components(s): Reach: 17110016000007 0% - 100%, Type: Rivers/Streams

County: Thurston

WRIA: Deschutes

Basis Table

Assessment Year

2018

Sampling Year	Excursion Count	Sample Count	Criterion/Threshold	Aggregate	Calculated Value
2017	0	12	8.0 mg/L	Daily Minimum	9.8

Basis Statement

HISTORICAL INFORMATION

Location ID [13A060] -- In 2005, 12 samples showed no excursions of the criterion for this waterbody, (criterion = 8.0 mg/L).

Location ID [13-DES-00.5] -- In 2004, 4 of 39 samples (10.3%) showed an excursion of the criterion for this waterbody, (criterion = 8.0 mg/L).

Location ID [13-DES-02.7] -- In 2004, 24 samples showed no excursions of the criterion for this waterbody, (criterion = 8.0 mg/L).

Location ID [13-DES-00.5] -- In 2003, 9 samples showed no excursions of the criterion for this waterbody, (criterion = 8.0 mg/L).

Assessed Water/Sediment

Water

Category 1

DEPARTMENT OF ECOLOGY State of Washington

Washington State Water Quality Assessment 303(d)/305(b) List

Approved WQ Assessment | Candidate List | Contact Us | WQ Atlas

Back To Results

Water Quality Listing Policy

Listing ID: 10893

Main Listing Information

Listing ID: 10893

Waterbody Name: DESCHUTES RIVER

Medium: Water

Parameter: Ammonia-N

WQI Project: None

Designated Use: Aquatic Life - Toxics

Current Category: 1

View Category History

Assessment Unit

Assessment Unit ID: 17110016000007_001_001

Size: 4.855 Kilometers

Associated Components(s): Reach: 17110016000007 0% - 100%, Type: Rivers/Streams

County: Thurston

WRIA: Deschutes

Basis Table

Assessment Year

2018

Sampling Year	Excursion Count	Sample Count	Criterion/Threshold	Aggregate	Calculated Value
2017	0	11	Calculated	Toxic aquatic 4-day mean exceedance factor	
2016	0	11	Calculated	Toxic aquatic 4-day mean exceedance factor	
2015	0	11	Calculated	Toxic aquatic 4-day mean exceedance factor	
2014	0	9	Calculated	Toxic aquatic 4-day mean exceedance factor	
2013	0	11	Calculated	Toxic aquatic 4-day mean exceedance factor	
2012	0	12	Calculated	Toxic aquatic 4-day mean exceedance factor	
2011	0	11	Calculated	Toxic aquatic 4-day mean exceedance factor	
2010	0	12	Calculated	Toxic aquatic 4-day mean exceedance factor	
2009	0	12	Calculated	Toxic aquatic 4-day mean exceedance factor	
2008	0	12	Calculated	Toxic aquatic 4-day mean exceedance factor	
2007	0	12	Calculated	Toxic aquatic 4-day mean exceedance factor	
2006	0	11	Calculated	Toxic aquatic 4-day mean exceedance factor	

Assessed Water/Sediment

Water

Category 1

DEPARTMENT OF ECOLOGY State of Washington

Washington State Water Quality Assessment 303(d)/305(b) List

Approved WQ Assessment | Candidate List | Contact Us | WQ Atlas

Back To Results

Water Quality Listing Policy

Listing ID: 53217

Main Listing Information

Listing ID: 53217

Waterbody Name: DESCHUTES RIVER

Medium: Water

Parameter: Arsenic

WQI Project: None

Designated Use: Aquatic Life - Toxics

Current Category: 1

View Category History

Assessment Unit

Assessment Unit ID: 17110016000007_001_001

Size: 4.855 Kilometers

Associated Components(s): Reach: 17110016000007 0% - 100%, Type: Rivers/Streams

County: Thurston

WRIA: Deschutes

Basis Table

Assessment Year

2018

Sampling Year	Excursion Count	Sample Count	Criterion/Threshold	Aggregate	Calculated Value
2017	0	4	190 ug/L	Toxic aquatic 4-day average	

Basis Statement

HISTORICAL INFORMATION

Location ID(s) [13A060] -- In 2005, 6 of 6 sample event(s) did not exceed Washington's Aquatic Life Acute and Chronic criteria.

Location ID(s) [13A060] -- In 2004, 6 of 6 sample event(s) did not exceed Washington's Aquatic Life Acute and Chronic criteria.

Location ID(s) [13A060] -- In 2003, 2 of 2 sample event(s) did not exceed Washington's Aquatic Life Acute and Chronic criteria.

Location ID(s) [13A060] -- In 2002, 4 of 4 sample event(s) did not exceed Washington's Aquatic Life Acute and Chronic criteria.

Assessed Water/Sediment

Water

Category 1

DEPARTMENT OF ECOLOGY State of Washington

Washington State Water Quality Assessment 303(d)/305(b) List

Approved WQ Assessment | Candidate List | Contact Us | WQ Atlas

Back To Results

Water Quality Listing Policy

Listing ID: 75944

Main Listing Information

Listing ID: 75944

Waterbody Name: DESCHUTES RIVER

Medium: Water

Parameter: Silver

WQI Project: None

Designated Use: Aquatic Life - Toxics

Current Category: 1

View Category History

Assessment Unit

Assessment Unit ID: 17110016000007_001_001

Size: 4.855 Kilometers

Associated Components(s): Reach: 17110016000007 0% - 100%, Type: Rivers/Streams

County: Thurston

WRIA: Deschutes

Basis Table

Assessment Year

2018

Sampling Year	Excursion Count	Sample Count	Criterion/Threshold	Aggregate	Calculated Value
2017	0	4	Calculated	Toxic aquatic 1-day exceedence factor	

Basis Statement

HISTORICAL INFORMATION

Location ID(s) [13A060] -- In 2005, 6 of 6 sample event(s) did not exceed Washington's Aquatic Life Acute criterion.

Location ID(s) [13A060] -- In 2004, 6 of 6 sample event(s) did not exceed Washington's Aquatic Life Acute criterion.

Location ID(s) [13A060] -- In 2003, 2 of 2 sample event(s) did not exceed Washington's Aquatic Life Acute criterion.

Location ID(s) [13A060] -- In 2002, 4 of 4 sample event(s) did not exceed Washington's Aquatic Life Acute criterion.

Assessed Water/Sediment

Water

Category 1

DEPARTMENT OF ECOLOGY State of Washington

Washington State Water Quality Assessment 303(d)/305(b) List

Approved WQ Assessment | Candidate List | Contact Us | WQ Atlas

Back To Results

Water Quality Listing Policy

Listing ID: 76380

Main Listing Information

Listing ID: 76380

Waterbody Name: DESCHUTES RIVER

Medium: Water

Parameter: Lead

WQI Project: None

Designated Use: Aquatic Life - Toxics

Current Category: 1

View Category History

Assessment Unit

Assessment Unit ID: 17110016000007_001_001

Size: 4.855 Kilometers

Associated Components(s): Reach: 17110016000007 0% - 100%, Type: Rivers/Streams

County: Thurston

WRIA: Deschutes

Basis Table

Assessment Year

2018

Sampling Year	Excursion Count	Sample Count	Criterion/Threshold	Aggregate	Calculated Value
2017	0	4	Calculated	Toxic aquatic 4-day mean exceedence factor	

Basis Statement

HISTORICAL INFORMATION

Location ID(s) [13A060] -- In 2005, 6 of 6 sample event(s) did not exceed Washington's Aquatic Life Acute and Chronic criteria.

Location ID(s) [13A060] -- In 2004, 6 of 6 sample event(s) did not exceed Washington's Aquatic Life Acute and Chronic criteria.

Location ID(s) [13A060] -- In 2003, 2 of 2 sample event(s) did not exceed Washington's Aquatic Life Acute and Chronic criteria.

Location ID(s) [13A060] -- In 2002, 4 of 4 sample event(s) did not exceed Washington's Aquatic Life Acute and Chronic criteria.

Assessed Water/Sediment

Water

Category 1

DEPARTMENT OF ECOLOGY State of Washington

Washington State Water Quality Assessment 303(d)/305(b) List

Approved WQ Assessment | Candidate List | Contact Us | WQ Atlas

Back To Results

Water Quality Listing Policy

Listing ID: 76689

Main Listing Information

Listing ID: 76689

Waterbody Name: DESCHUTES RIVER

Medium: Water

Parameter: Chromium

WQI Project: None

Designated Use: Aquatic Life - Toxics

Current Category: 1

View Category History

Assessment Unit

Assessment Unit ID: 17110016000007_001_001

Size: 4.855 Kilometers

Associated Components(s): Reach: 17110016000007 0% - 100%, Type: Rivers/Streams

County: Thurston

WRIA: Deschutes

Basis Table

Assessment Year

2018

Sampling Year	Excursion Count	Sample Count	Criterion/Threshold	Aggregate	Calculated Value
2017	0	4	Calculated	Toxic aquatic 4-day mean exceedence factor	

Basis Statement

HISTORICAL INFORMATION

Location ID(s) [13A060] -- In 2005, 6 of 6 sample event(s) did not exceed Washington's Aquatic Life Acute and Chronic criteria.

Location ID(s) [13A060] -- In 2004, 6 of 6 sample event(s) did not exceed Washington's Aquatic Life Acute and Chronic criteria.

Location ID(s) [13A060] -- In 2003, 2 of 2 sample event(s) did not exceed Washington's Aquatic Life Acute and Chronic criteria.

Location ID(s) [13A060] -- In 2002, 4 of 4 sample event(s) did not exceed Washington's Aquatic Life Acute and Chronic criteria.

Assessed Water/Sediment

Water

Category 1

DEPARTMENT OF ECOLOGY State of Washington

Washington State Water Quality Assessment 303(d)/305(b) List

Approved WQ Assessment | Candidate List | Contact Us | WQ Atlas

Back To Results

Water Quality Listing Policy

Listing ID: 78277

Main Listing Information

Listing ID: 78277

Waterbody Name: DESCHUTES RIVER

Medium: Water

Parameter: Copper

WQI Project: None

Designated Use: Aquatic Life - Toxics

Current Category: 1

View Category History

Assessment Unit

Assessment Unit ID: 17110016000007_001_001

Size: 4.855 Kilometers

Associated Components(s): Reach: 17110016000007 0% - 100%, Type: Rivers/Streams

County: Thurston

WRIA: Deschutes

Basis Table

Assessment Year

2018

Sampling Year	Excursion Count	Sample Count	Criterion/Threshold	Aggregate	Calculated Value
2017	0	4	Calculated	Toxic aquatic 4-day mean exceedence factor	

Basis Statement

HISTORICAL INFORMATION

Location ID(s) [13A060] -- In 2005, 6 of 6 sample event(s) did not exceed Washingtons Aquatic Life Acute and Chronic criteria.

Location ID(s) [13A060] -- In 2004, 6 of 6 sample event(s) did not exceed Washingtons Aquatic Life Acute and Chronic criteria.

Location ID(s) [13A060] -- In 2003, 2 of 2 sample event(s) did not exceed Washingtons Aquatic Life Acute and Chronic criteria.

Location ID(s) [13A060], [SRIW1301] -- In 2002, 5 of 5 sample event(s) did not exceed Washingtons Aquatic Life Acute and Chronic criteria.

Assessed Water/Sediment
Water
Category 1

DEPARTMENT OF ECOLOGY State of Washington

Washington State Water Quality Assessment 303(d)/305(b) List

Approved WQ Assessment | Candidate List | Contact Us | WQ Atlas

Back To Results

Water Quality Listing Policy

Listing ID: 78486

Main Listing Information

Listing ID: 78486
Waterbody Name: DESCHUTES RIVER
Medium: Water
Parameter: Zinc
WQI Project: None
Designated Use: Aquatic Life - Toxics

Current Category: 1

View Category History

Assessment Unit

Assessment Unit ID: 17110016000007_001_001
Size: 4.855 Kilometers
Associated Components(s): Reach: 17110016000007 0% - 100%, Type: Rivers/Streams
County: Thurston
WRIA: Deschutes

Basis Table

Assessment Year

2018

Sampling Year	Excursion Count	Sample Count	Criterion/Threshold	Aggregate	Calculated Value
2017	0	4	Calculated	Toxic aquatic 4-day mean exceedence factor	

Basis Statement

HISTORICAL INFORMATION

Location ID(s) [13A060] -- In 2005, 6 of 6 sample event(s) did not exceed Washington's Aquatic Life Acute and Chronic criteria.

Location ID(s) [13A060] -- In 2004, 6 of 6 sample event(s) did not exceed Washington's Aquatic Life Acute and Chronic criteria.

Location ID(s) [13A060] -- In 2003, 2 of 2 sample event(s) did not exceed Washington's Aquatic Life Acute and Chronic criteria.

Location ID(s) [13A060], [SRIW1301] -- In 2002, 5 of 5 sample event(s) did not exceed Washington's Aquatic Life Acute and Chronic criteria.

Assessed Water/Sediment

Water

Category 1

DEPARTMENT OF ECOLOGY State of Washington

Washington State Water Quality Assessment 303(d)/305(b) List

Approved WQ Assessment | Candidate List | Contact Us | WQ Atlas

Back To Results

Water Quality Listing Policy

Listing ID: 78873

Main Listing Information

Listing ID: 78873

Waterbody Name: DESCHUTES RIVER

Medium: Water

Parameter: Nickel

WQI Project: None

Designated Use: Aquatic Life - Toxics

Current Category: 1

View Category History

Assessment Unit

Assessment Unit ID: 17110016000007_001_001

Size: 4.855 Kilometers

Associated Components(s): Reach: 17110016000007 0% - 100%, Type: Rivers/Streams

County: Thurston

WRIA: Deschutes

Basis Table

Assessment Year

2018

Sampling Year	Excursion Count	Sample Count	Criterion/Threshold	Aggregate	Calculated Value
2017	0	4	Calculated	Toxic aquatic 4-day mean exceedence factor	

Basis Statement

HISTORICAL INFORMATION

Location ID(s) [13A060] -- In 2005, 6 of 6 sample event(s) did not exceed Washington's Aquatic Life Acute and Chronic criteria.

Location ID(s) [13A060] -- In 2004, 6 of 6 sample event(s) did not exceed Washington's Aquatic Life Acute and Chronic criteria.

Location ID(s) [13A060] -- In 2003, 2 of 2 sample event(s) did not exceed Washington's Aquatic Life Acute and Chronic criteria.

Location ID(s) [13A060] -- In 2002, 4 of 4 sample event(s) did not exceed Washington's Aquatic Life Acute and Chronic criteria.

Assessed Water/Sediment

Water

Category 1

DEPARTMENT OF ECOLOGY State of Washington

Washington State Water Quality Assessment 303(d)/305(b) List

Approved WQ Assessment | Candidate List | Contact Us | WQ Atlas

Back To Results

Water Quality Listing Policy

Listing ID: 79301

Main Listing Information

Listing ID: 79301

Waterbody Name: DESCHUTES RIVER

Medium: Water

Parameter: Cadmium

WQI Project: None

Designated Use: Aquatic Life - Toxics

Current Category: 1

View Category History

Assessment Unit

Assessment Unit ID: 17110016000007_001_001

Size: 4.855 Kilometers

Associated Components(s): Reach: 17110016000007 0% - 100%, Type: Rivers/Streams

County: Thurston

WRIA: Deschutes

Basis Table

Assessment Year

2018

Sampling Year	Excursion Count	Sample Count	Criterion/Threshold	Aggregate	Calculated Value
2017	0	4	Calculated	Toxic aquatic 4-day mean exceedence factor	

Basis Statement

HISTORICAL INFORMATION

Location ID(s) [13A060] -- In 2005, 6 of 6 sample event(s) did not exceed Washington's Aquatic Life Acute and Chronic criteria.

Location ID(s) [13A060] -- In 2004, 6 of 6 sample event(s) did not exceed Washington's Aquatic Life Acute and Chronic criteria.

Location ID(s) [13A060] -- In 2003, 2 of 2 sample event(s) did not exceed Washington's Aquatic Life Acute and Chronic criteria.

Location ID(s) [13A060] -- In 2002, 4 of 4 sample event(s) did not exceed Washington's Aquatic Life Acute and Chronic criteria.

Water Quality Standards
All Standards

DEPARTMENT OF ECOLOGY State of Washington

Water Quality Atlas Standards

Home

Water Quality Standards for Surface Waters of the State of Washington

Disclaimer: The Department of Ecology continues to improve the mapped depiction of the Surface Water Quality Standards. However, the map may contain errors and the information displayed does not replace the official rules available in Chapter 173-201A of the Washington Administrative Code.

USE DESIGNATIONS

WAC:	173-201A-600 (1)
Description:	All surface waters of the state not named in Table 602 are to be protected for the designated uses of: Salmonid spawning, rearing, and migration; primary contact recreation; domestic, industrial, and agricultural water supply; stock watering; wildlife habitat; harvesting; commerce and navigation; boating; and aesthetic values.
Aquatic life use:	Salmonid spawning, rearing, and migration
Recreation use:	Primary contact recreation
Water supply uses:	Domestic, Industrial, Agricultural, Stock
Miscellaneous uses:	Wildlife Habitat, Harvesting, Commerce and Navigation, Boating, Aesthetics

CRITERION

Brackish Water Exceptions: None

Temperature: 17.5°C (63.5°F)

Supplemental spawning: None

Dissolved Oxygen (DO): 8.0 mg/L

pH: pH shall be within the range of 6.5 to 8.5, with a human-caused variation within the above range of less than 0.5 units

Turbidity: 5 NTU over background when the background is 50 NTU or less; or

A 10 percent increase in turbidity when the background turbidity is more than 50 NTU

Bacteria: E. coli and fecal coliform criteria are expressed as colony forming units (CFU) or most probable number (MPN).

To protect recreational use:

- E.coli organism levels must not exceed a geometric mean value of 100 CFU or MPN per 100 mL, with not more than 10 percent of all samples(or any single sample when less than ten sample points exist) obtained for calculating the geometric mean value exceeding 320 CFU or MPN per 100 mL.
- Fecal coliform organism levels must not exceed a geometric mean value of 100 CFU or MPN per 100 mL, with not more than 10 percent of all samples(or any single sample when less than ten sample points exist) obtained for calculating the geometric mean value exceeding 200 CFU or MPN per 100 mL. (The use of fecal coliform organism levels to determine compliance will expire December 31, 2020.)

Other requirements:

- A minimum of three samples is required to calculate a geometric mean for comparison to the geometric mean criteria. Sample collection dates shall be well distributed throughout the averaging period so as not to mask noncompliance periods.
- When averaging bacteria sample values for comparison to the geometric mean criteria, it is preferable to average by season. The averaging period of bacteria sample data shall be ninety days or less.

Appendix C
Soil Information

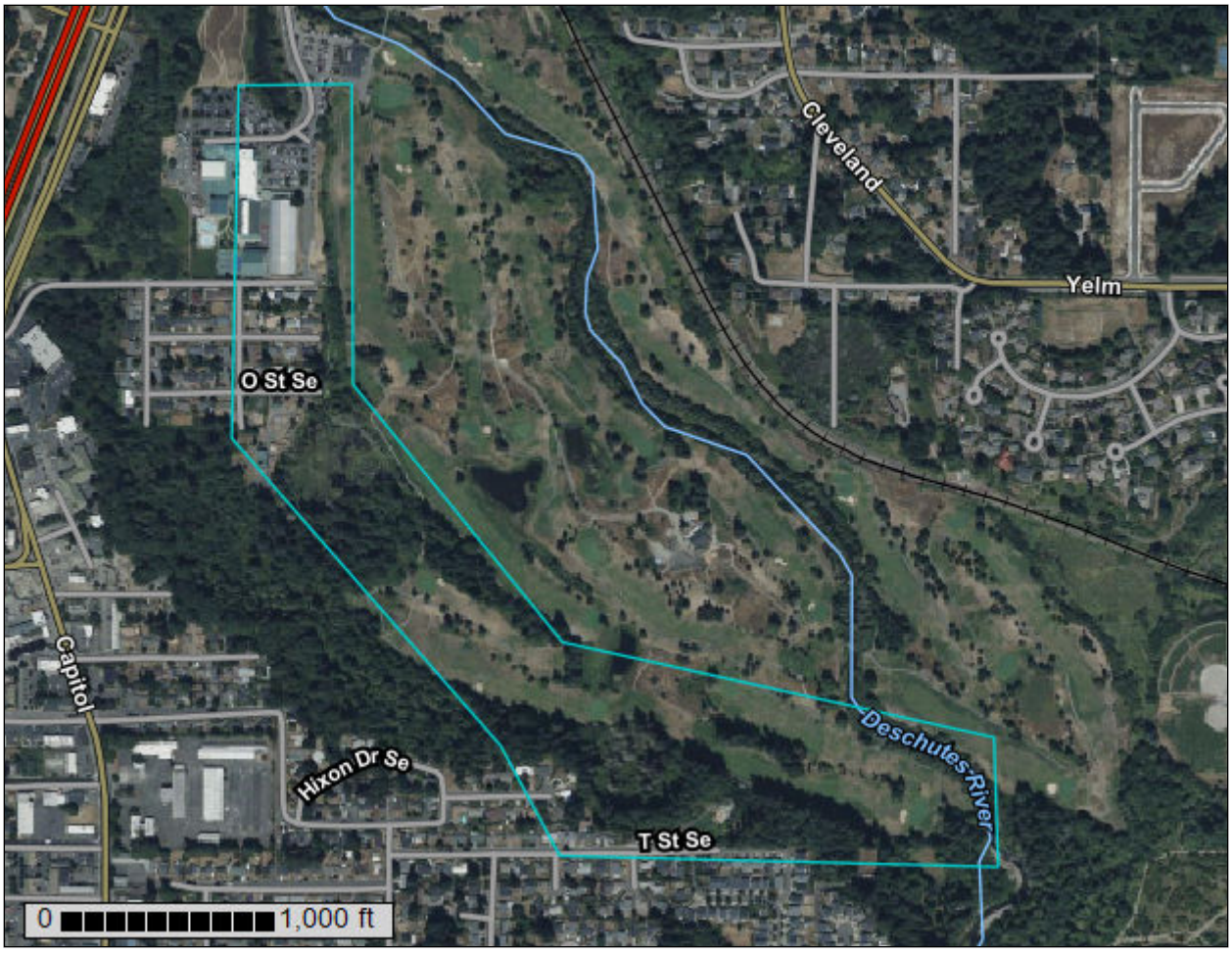
United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Thurston County Area, Washington



December 26, 2025

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

Preface.....2
How Soil Surveys Are Made.....5
Soil Map.....8
Soil Map.....9
Legend.....10
Map Unit Legend.....11
Map Unit Descriptions.....11
Thurston County Area, Washington.....13
20—Cagey loamy sand.....13
33—Everett very gravelly sandy loam, 8 to 15 percent slopes.....14
46—Indianola loamy sand, 0 to 5 percent slopes.....15
48—Indianola loamy sand, 15 to 30 percent slopes.....17
76—Norma silt loam.....18
89—Puyallup silt loam.....19
125—Xerorthents, 0 to 5 percent slopes.....21
129—Water.....21
References.....23

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Thurston County Area, Washington
Survey Area Data: Version 19, Aug 28, 2025

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: May 26, 2023—Aug 14, 2023

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
20	Cagey loamy sand	1.8	2.2%
33	Everett very gravelly sandy loam, 8 to 15 percent slopes	7.0	8.5%
46	Indianola loamy sand, 0 to 5 percent slopes	8.3	10.0%
48	Indianola loamy sand, 15 to 30 percent slopes	4.9	5.9%
76	Norma silt loam	25.5	30.9%
89	Puyallup silt loam	14.0	16.9%
125	Xerorthents, 0 to 5 percent slopes	17.4	21.0%
129	Water	3.8	4.6%
Totals for Area of Interest		**82.6**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not

mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Thurston County Area, Washington

20—Cagey loamy sand

Map Unit Setting

National map unit symbol: 2nd8d
Elevation: 330 to 980 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 50 degrees F
Frost-free period: 165 to 195 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Cagey and similar soils: 85 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cagey

Setting

Landform: Terraces
Parent material: Sandy glacial drift

Typical profile

H1 - 0 to 6 inches: loamy sand
H2 - 6 to 28 inches: loamy sand
H3 - 28 to 60 inches: fine sand

Properties and qualities

Slope: 0 to 4 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: A
Ecological site: F002XA005WA - Puget Lowlands Moist Forest
Forage suitability group: Seasonally Wet Soils (G002XS201WA)
Other vegetative classification: Seasonally Wet Soils (G002XS201WA)
Hydric soil rating: No

Minor Components

Mckenna

Percent of map unit: 5 percent
Landform: Depressions
Other vegetative classification: Wet Soils (G002XS101WA)
Hydric soil rating: Yes

33—Everett very gravelly sandy loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2t62b
Elevation: 30 to 900 feet
Mean annual precipitation: 35 to 91 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 180 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Everett and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Everett

Setting

Landform: Moraines, eskers, kames
Landform position (two-dimensional): Shoulder, footslope
Landform position (three-dimensional): Base slope, crest
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Sandy and gravelly glacial outwash

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A - 1 to 3 inches: very gravelly sandy loam
Bw - 3 to 24 inches: very gravelly sandy loam
C1 - 24 to 35 inches: very gravelly loamy sand
C2 - 35 to 60 inches: extremely cobbly coarse sand

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: A
Ecological site: F002XA004WA - Puget Lowlands Forest
Forage suitability group: Droughty Soils (G002XS401WA), Droughty Soils (G002XN402WA), Droughty Soils (G002XF403WA)

Other vegetative classification: Droughty Soils (G002XS401WA), Droughty Soils (G002XN402WA), Droughty Soils (G002XF403WA)
Hydric soil rating: No

Minor Components

Alderwood
Percent of map unit: 10 percent
Landform: Hills, ridges
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Nose slope, talf
Down-slope shape: Convex, linear
Across-slope shape: Convex
Hydric soil rating: No

Indianola
Percent of map unit: 10 percent
Landform: Terraces, kames, eskers
Landform position (three-dimensional): Riser
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

46—Indianola loamy sand, 0 to 5 percent slopes

Map Unit Setting
National map unit symbol: 2t62k
Elevation: 0 to 980 feet
Mean annual precipitation: 30 to 81 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 170 to 210 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition
Indianola and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Indianola

Setting
Landform: Kames, terraces, eskers
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy glacial outwash

Typical profile
Oi - 0 to 1 inches: slightly decomposed plant material
A - 1 to 6 inches: loamy sand
Bw1 - 6 to 17 inches: loamy sand

Bw2 - 17 to 27 inches: sand
BC - 27 to 37 inches: sand
C - 37 to 60 inches: sand

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 99.90 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.9 inches)

Interpretive groups

Land capability classification (irrigated): 4s
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: A
Ecological site: F002XA004WA - Puget Lowlands Forest
Forage suitability group: Droughty Soils (G002XF403WA), Droughty Soils (G002XN402WA), Droughty Soils (G002XS401WA), Droughty Soils (G002XV402WA)
Other vegetative classification: Droughty Soils (G002XF403WA), Droughty Soils (G002XN402WA), Droughty Soils (G002XS401WA), Droughty Soils (G002XV402WA)
Hydric soil rating: No

Minor Components

Alderwood

Percent of map unit: 5 percent
Landform: Ridges, hills
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Crest, talf
Down-slope shape: Linear, convex
Across-slope shape: Convex
Hydric soil rating: No

Everett

Percent of map unit: 5 percent
Landform: Eskers, moraines, kames
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve, crest
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Norma

Percent of map unit: 5 percent
Landform: Depressions, drainageways
Landform position (three-dimensional): Dip
Down-slope shape: Concave, linear
Across-slope shape: Concave
Hydric soil rating: Yes

48—Indianola loamy sand, 15 to 30 percent slopes

Map Unit Setting

National map unit symbol: 2t639
Elevation: 0 to 980 feet
Mean annual precipitation: 30 to 81 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 170 to 210 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Indianola and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Indianola

Setting

Landform: Terraces, kames, eskers
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy glacial outwash

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A - 1 to 6 inches: loamy sand
Bw1 - 6 to 17 inches: loamy sand
Bw2 - 17 to 27 inches: sand
BC - 27 to 37 inches: sand
C - 37 to 60 inches: sand

Properties and qualities

Slope: 15 to 30 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 99.90 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.9 inches)

Interpretive groups

Land capability classification (irrigated): 6e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Ecological site: F002XA004WA - Puget Lowlands Forest

Forage suitability group: Droughty Soils (G002XS401WA), Droughty Soils (G002XN402WA)
Other vegetative classification: Droughty Soils (G002XS401WA), Droughty Soils (G002XN402WA)
Hydric soil rating: No

Minor Components

Alderwood
Percent of map unit: 8 percent
Landform: Hills, ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Nose slope, side slope, talf
Down-slope shape: Convex, linear
Across-slope shape: Convex
Hydric soil rating: No

Everett
Percent of map unit: 5 percent
Landform: Moraines, eskers, kames
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Norma
Percent of map unit: 2 percent
Landform: Drainageways, depressions
Landform position (three-dimensional): Dip
Down-slope shape: Linear, concave
Across-slope shape: Concave
Hydric soil rating: Yes

76—Norma silt loam

Map Unit Setting
National map unit symbol: 2ndcc
Elevation: 0 to 1,000 feet
Mean annual precipitation: 35 to 60 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 150 to 200 days
Farmland classification: Prime farmland if drained

Map Unit Composition
Norma, silt loam, and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Norma, Silt Loam

Setting

Landform: Depressions, drainageways
Parent material: Alluvium

Typical profile

H1 - 0 to 8 inches: silt loam
H2 - 8 to 30 inches: sandy loam
H3 - 30 to 60 inches: sandy loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Available water supply, 0 to 60 inches: Moderate (about 8.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: B/D
Ecological site: F002XA007WA - Puget Lowlands Wet Hemlock Forest
Forage suitability group: Wet Soils (G002XS101WA)
Other vegetative classification: Wet Soils (G002XS101WA)
Hydric soil rating: Yes

Minor Components

Norma, fine sandy loam

Percent of map unit: 5 percent
Landform: Depressions
Other vegetative classification: Wet Soils (G002XS101WA)
Hydric soil rating: Yes

Alderwood

Percent of map unit: 5 percent
Hydric soil rating: No

89—Puyallup silt loam

Map Unit Setting

National map unit symbol: 2nd9z
Elevation: 70 to 1,970 feet
Mean annual precipitation: 35 to 60 inches
Mean annual air temperature: 50 degrees F
Frost-free period: 170 to 200 days

Farmland classification: All areas are prime farmland

Map Unit Composition

Puyallup and similar soils: 85 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Puyallup

Setting

Landform: Terraces, flood plains
Parent material: Alluvium

Typical profile

H1 - 0 to 10 inches: silt loam
H2 - 10 to 19 inches: fine sandy loam
H3 - 19 to 60 inches: sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 14 to 20 inches to strongly contrasting textural stratification
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.2 inches)

Interpretive groups

Land capability classification (irrigated): 3w
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: B
Ecological site: F002XA008WA - Puget Lowlands Riparian Forest
Forage suitability group: Droughty Soils (G002XS401WA)
Other vegetative classification: Droughty Soils (G002XS401WA)
Hydric soil rating: No

Minor Components

Newberg

Percent of map unit: 5 percent
Hydric soil rating: No

Semiahmoo, undrained

Percent of map unit: 3 percent
Landform: Depressions
Other vegetative classification: Wet Soils (G002XS101WA)
Hydric soil rating: Yes

Sultan

Percent of map unit: 2 percent
Hydric soil rating: No

125—Xerorthents, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: 2nd87
Elevation: 0 to 2,620 feet
Mean annual precipitation: 30 to 60 inches
Mean annual air temperature: 39 to 50 degrees F
Frost-free period: 150 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Xerorthents and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Xerorthents

Setting

Landform: Tidal flats
Parent material: Sandy and loamy cut and fill material

Typical profile

H1 - 0 to 60 inches: variable

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Depth to water table: About 24 inches
Frequency of flooding: None
Frequency of ponding: None

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydric soil rating: No

129—Water

Map Unit Composition

Water: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Water

Setting

Landform: Alluvial cones

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United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

Appendix D
Site Log Book

Construction Stormwater Site Inspection Form

Project Name _____ Permit # _____ Inspection Date _____ Time _____

Name of Certified Erosion Sediment Control Lead (CESCL) or qualified inspector if *less than one acre*
Print Name: _____

Approximate rainfall amount since the last inspection (in inches): _____

Approximate rainfall amount in the last 24 hours (in inches): _____

Current Weather Clear ☐ Cloudy ☐ Mist ☐ Rain ☐ Wind ☐ Fog ☐

A. Type of inspection: Weekly ☐ Post Storm Event ☐ Other ☐

B. Phase of Active Construction (*check all that apply*):

Pre Construction/installation of erosion/sediment controls	☐	Clearing/Demo/Grading	☐	Infrastructure/storm/roads	☐
Concrete pours	☐	Vertical Construction/buildings	☐	Utilities	☐
Offsite improvements	☐	Site temporary stabilized	☐	Final stabilization	☐

C. Questions:

1. Were all areas of construction and discharge points inspected? Yes ___ No ___
2. Did you observe the presence of suspended sediment, turbidity, discoloration, or oil sheen Yes ___ No ___
3. Was a water quality sample taken during inspection? (*refer to permit conditions S4 & S5*) Yes ___ No ___
4. Was there a turbid discharge 250 NTU or greater, or Transparency 6 cm or less?* Yes ___ No ___
5. If yes to #4 was it reported to Ecology? Yes ___ No ___
6. Is pH sampling required? pH range required is 6.5 to 8.5. Yes ___ No ___

If answering yes to a discharge, describe the event. Include when, where, and why it happened; what action was taken, and when.

_____

_____

_____

_____

*If answering yes to # 4 record NTU/Transparency with continual sampling daily until turbidity is 25 NTU or less/ transparency is 33 cm or greater.

Sampling Results: Date: _____

Parameter	Method (circle one)	Result			Other/Note
		NTU	cm	pH	
Turbidity	tube, meter, laboratory				
pH	Paper, kit, meter				

Construction Stormwater Site Inspection Form

D. Check the observed status of all items. Provide "Action Required "details and dates.

Element #	Inspection	BMPs Inspected			BMP needs maintenance	BMP failed	Action required (describe in section F)
		yes	no	n/a			
1 Clearing Limits	Before beginning land disturbing activities are all clearing limits, natural resource areas (streams, wetlands, buffers, trees) protected with barriers or similar BMPs? (high visibility recommended)						
2 Construction Access	Construction access is stabilized with quarry spalls or equivalent BMP to prevent sediment from being tracked onto roads?						
	Sediment tracked onto the road way was cleaned thoroughly at the end of the day or more frequent as necessary.						
3 Control Flow Rates	Are flow control measures installed to control stormwater volumes and velocity during construction and do they protect downstream properties and waterways from erosion?						
	If permanent infiltration ponds are used for flow control during construction, are they protected from siltation?						
4 Sediment Controls	All perimeter sediment controls (e.g. silt fence, wattles, compost socks, berms, etc.) installed, and maintained in accordance with the Stormwater Pollution Prevention Plan (SWPPP).						
	Sediment control BMPs (sediment ponds, traps, filters etc.) have been constructed and functional as the first step of grading.						
	Stormwater runoff from disturbed areas is directed to sediment removal BMP.						
5 Stabilize Soils	Have exposed un-worked soils been stabilized with effective BMP to prevent erosion and sediment deposition?						

Construction Stormwater Site Inspection Form

Element #	Inspection	BMPs Inspected			BMP needs maintenance	BMP failed	Action required (describe in section F)
		yes	no	n/a			
5 Stabilize Soils Cont.	Are stockpiles stabilized from erosion, protected with sediment trapping measures and located away from drain inlet, waterways, and drainage channels?						
	Have soils been stabilized at the end of the shift, before a holiday or weekend if needed based on the weather forecast?						
6 Protect Slopes	Has stormwater and ground water been diverted away from slopes and disturbed areas with interceptor dikes, pipes and or swales?						
	Is off-site storm water managed separately from stormwater generated on the site?						
	Is excavated material placed on uphill side of trenches consistent with safety and space considerations?						
	Have check dams been placed at regular intervals within constructed channels that are cut down a slope?						
7 Drain Inlets	Storm drain inlets made operable during construction are protected.						
	Are existing storm drains within the influence of the project protected?						
8 Stabilize Channel and Outlets	Have all on-site conveyance channels been designed, constructed and stabilized to prevent erosion from expected peak flows?						
	Is stabilization, including armoring material, adequate to prevent erosion of outlets, adjacent stream banks, slopes and downstream conveyance systems?						
9 Control Pollutants	Are waste materials and demolition debris handled and disposed of to prevent contamination of stormwater?						
	Has cover been provided for all chemicals, liquid products, petroleum products, and other material?						
	Has secondary containment been provided capable of containing 110% of the volume?						
	Were contaminated surfaces cleaned immediately after a spill incident?						
	Were BMPs used to prevent contamination of stormwater by a pH modifying sources?						

Construction Stormwater Site Inspection Form

Element #	Inspection	BMPs Inspected			BMP needs maintenance	BMP failed	Action required (describe in section F)
		yes	no	n/a			
9 Cont.	Wheel wash wastewater is handled and disposed of properly.						
10 Control Dewatering	Concrete washout in designated areas. No washout or excess concrete on the ground.						
	Dewatering has been done to an approved source and in compliance with the SWPPP.						
	Were there any clean non turbid dewatering discharges?						
11 Maintain BMP	Are all temporary and permanent erosion and sediment control BMPs maintained to perform as intended?						
12 Manage the Project	Has the project been phased to the maximum degree practicable?						
	Has regular inspection, monitoring and maintenance been performed as required by the permit?						
	Has the SWPPP been updated, implemented and records maintained?						
13 Protect LID	Is all Bioretention and Rain Garden Facilities protected from sedimentation with appropriate BMPs?						
	Is the Bioretention and Rain Garden protected against over compaction of construction equipment and foot traffic to retain its infiltration capabilities?						
	Permeable pavements are clean and free of sediment and sediment laden-water runoff. Muddy construction equipment has not been on the base material or pavement.						
	Have soiled permeable pavements been cleaned of sediments and pass infiltration test as required by stormwater manual methodology?						
	Heavy equipment has been kept off existing soils under LID facilities to retain infiltration rate.						

E. Check all areas that have been inspected. ✔

All in place BMPs ☐ All disturbed soils ☐ All concrete wash out area ☐ All material storage areas ☐
All discharge locations ☐ All equipment storage areas ☐ All construction entrances/exits ☐

Construction Stormwater Site Inspection Form

F. Elements checked "Action Required" (section D) describe corrective action to be taken. List the element number; be specific on location and work needed. Document, initial, and date when the corrective action has been completed and inspected.

Element #	Description and Location	Action Required	Completion Date	Initials

Attach additional page if needed

Sign the following certification:

"I certify that this report is true, accurate, and complete, to the best of my knowledge and belief"

Inspected by: (print) _____ (Signature) _____ Date: _____

Title/Qualification of Inspector: _____

Appendix 6
Wetlands Requirements

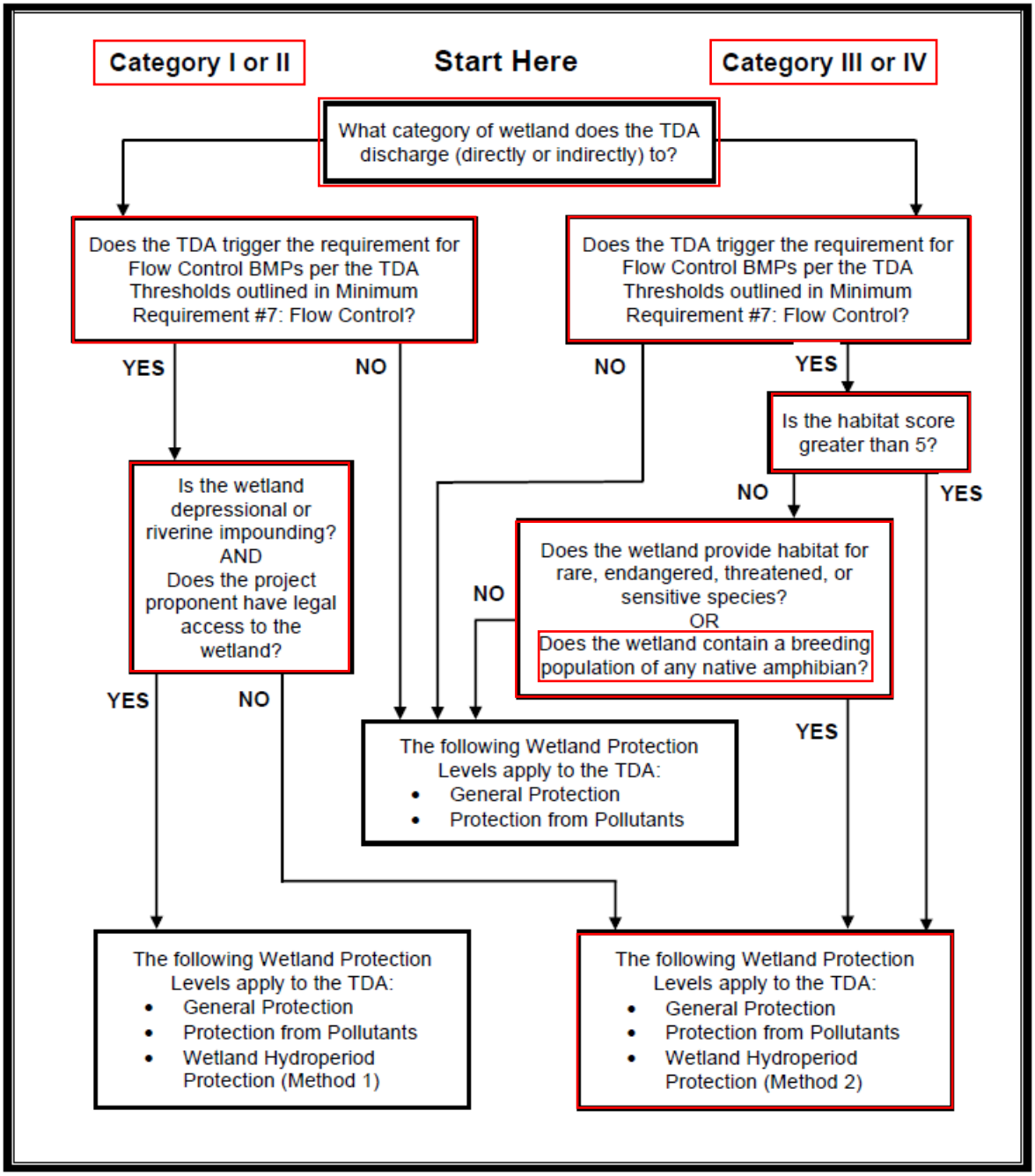


Figure 2.4. Flow Chart for Determining Wetland Protection Level Requirements

Additional Requirements

Stormwater treatment and flow control facilities shall not be built within a natural vegetated buffer, except for:

- Necessary conveyance systems as approved by the City of Tumwater.

EXHIBIT 11

City of Tumwater
Deschutes Valley Trail
Mazama Pocket Gopher Absence Report

Prepared for:

City of Tumwater
10.20.2025

Land Services Northwest
Alex Callender MS, PWS
120 State Ave NE PMB 190, Olympia, WA, 98501
360.481.4208

1.0 INTRODUCTION

This report is the result of a Mazama Pocket Gopher Survey 0947005100, 12835320200, and 1283543000 found within the bounds of the proposed Deschutes Valley Trail **(Figure 1):**



The Purpose of this report is to provide a study of the presence or absence of indicators of the Mazama Pocket Gopher (*Thomomys Mazama*) (MPG) for ESA compliance and compliance with the City of Tumwater Critical Areas Code (TMC 16.32 Fish and Wildlife Habitat Protection).

This study should allow the reader to assess whether the Mazama pocket gopher is likely to be found on site and what the implications of its presence or absence may have with regard to permits.

Mazama Pocket Gopher

Four subspecies of Mazama pocket gophers found in Thurston City are listed as threatened under the Endangered Species Act (ESA). Impacts to Mazama pocket gophers should be avoided or addressed through USFWS permitting processes**.** The presence of this species on a property may have regulatory implications that may limit the amount or type of development that can occur on a property in order to avoid "take" of the species. Take is defined under the ESA as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect any threatened or endangered species.

2.0 METHODS

2.1 Review of Existing Information

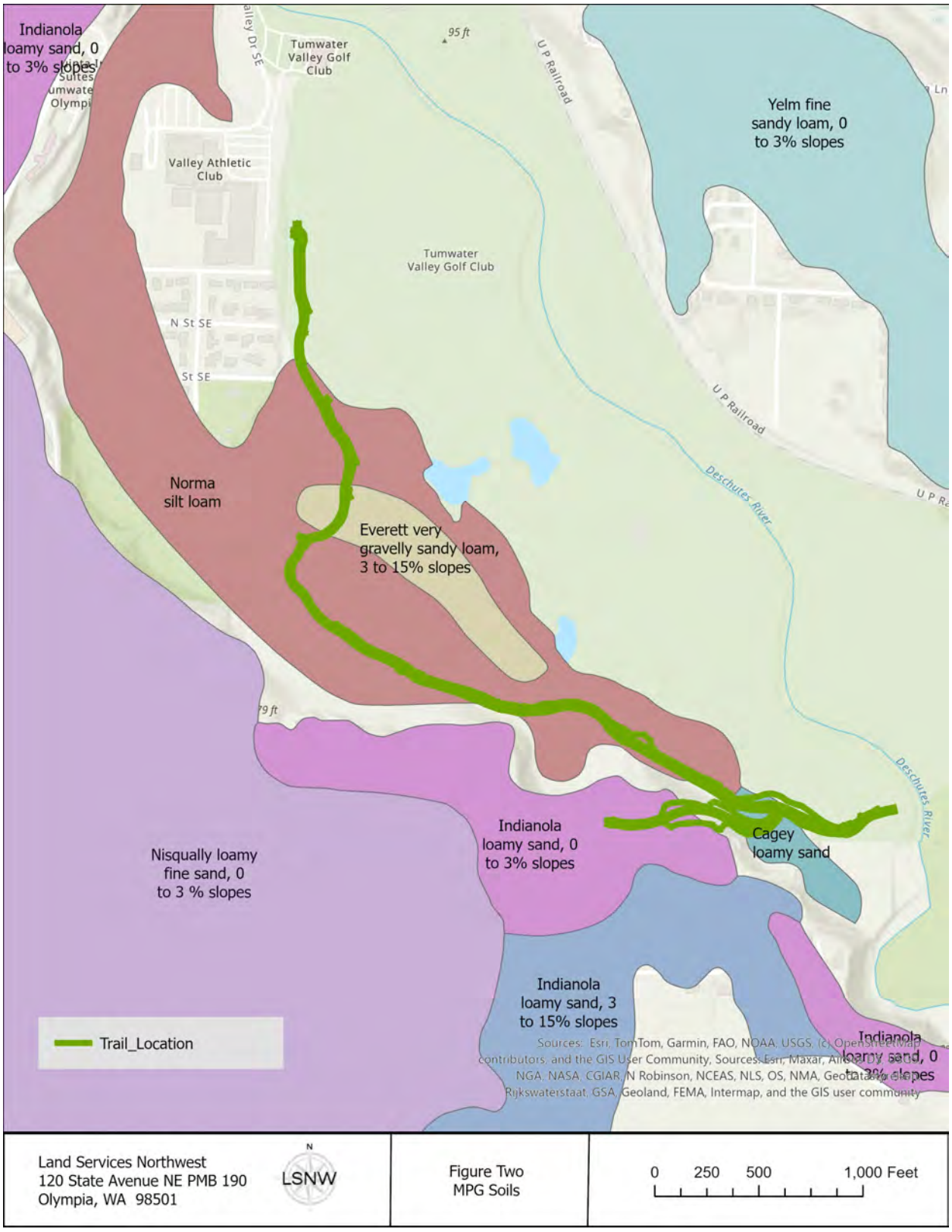
Background Review

Background information on the subject property was reviewed prior to field investigations and included the following:

- Thurston City Geodata Mazama Pocket Gopher Soils Shapefiles
- WDFW Priority Habitats and Species Information
- USFWS species list information
- WDFW species information

2.2 Summary of Existing Information

The existing information shows Everett very gravelly sandy loam 3 to 15 percent slopes, Norma silt loam, Nisqually loamy fine sand, and Cagey loamy sand, which are more and less preferred by the MPG (**Figure 2) and (Attachment A).**


Indianola loamy sand, 0 to 3% slopes
Tumwater Valley Golf Club
95 ft
U P Railroad
Yelm fine sandy loam, 0 to 3% slopes
Valley Athletic Club
Tumwater Valley Golf Club
N St SE
St SE
U P Railroad
Deschutes River
Norma silt loam
Everett very gravelly sandy loam, 3 to 15% slopes
Deschutes River
Indianola loamy sand, 0 to 3% slopes
Cagey loamy sand
Nisqually loamy fine sand, 0 to 3 % slopes
Indianola loamy sand, 3 to 15% slopes
Indianola loamy sand, 0 to 3% slopes
Trail_Location
Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, (c) OpenStreetMap contributors, and the GIS User Community, Sources: Esri, Maxar, Airbus DS, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap, and the GIS user community
Land Services Northwest
120 State Avenue NE PMB 190
Olympia, WA 98501
N
LSNW
Figure Two
MPG Soils
0 250 500 1,000 Feet

Attachment A

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

The WDFW Priority Habitats and Species Map ***does not show*** the presence of the MPG within 600 feet of the subject property (**Appendix C**).

2.3 2025 Mazama Pocket Gopher Protocol

A. General Information – 2025 Approach
1. The MPG review season will run June 1-October 31, 2025.

2. The protocol described in this memorandum will only apply to properties not known to be occupied by MPG since April 2014, the date of the federal listing.

3. Negative determinations will be valid for the length of the underlying City permit or approval, per City code.

4. Qualified consultants may perform field reviews and submit results for City evaluation, per the CAO. Consultants must have received training from USFWS at one of the two trainings offered in May/June 2018 and is certified to conduct these surveys.

Alex Callender is qualified as a consultant as he received training and certification during the May 2018 class conducted by the United States Fish and Wildlife Service.

B. In-Office Procedures
1. Staff will review land use applications to determine if the MPG field screening protocols described in this memorandum must be initiated for the following:

a. Within 600 feet of a site known to have positive MPG occurrence; or

b. On or within 300 feet of a soil type known to be associated with MPG occupancy.

The existing information shows Everett very gravelly sandy loam 3 to 15 percent slopes, Norma silt loam, and Nisqually loamy fine sand ,and Cagey loamy sand, which are more and less preferred by the MPG. No occurrence of the MPG was found in the PHS Information.

8. Tumwater landowners who know or learn that Mazama pocket gophers are present on their property can move forward with their proposed development by: 1) proposing mitigation to the City as directed in the City's Critical Areas Ordinance (Title 16); or 2) contacting USFWS directly to discuss the review, assessment, and mitigation process most appropriate for their site(s) and proposed activities,

No MPG mounds were found on the parcel.

C. Preliminary Assessment

As land use applications are received, properties mapped with or within 300 feet of gopher and/or prairie soils undergo the following preliminary assessment in-office.

1. For properties or project areas that appear to meet City criteria below, an internal review is conducted by staff biologist to determine if the project may be released from the full gopher review process. The following criteria may release a project from further gopher review:

*The properties **do not meet** the internal review criterial listed below and require two gopher surveys to meet* ESA compliance and with the City of Tumwater Critical Areas Code (TMC 16.32 Fish and Wildlife Habitat Protection). *The surveys were conducted on September 16, 2025 and October 16, 2025.*

- Locations west of the Black River, or on the Steamboat Island or Cooper Point peninsulas.
- Sites submerged for 30 consecutive days or more since October 31, 2017.
- Sites covered with impervious surfaces (as defined in CAO Chapter 17.15 and Title 24).
- Fully forested (>30%) sites with shrub and fern understory.
- Sites that consist of slopes greater than 40 percent, or that contain landslide hazard areas (per existing City regulations).

- Sites on less preferred MPG soils north of Interstate 5.
- Building to take place in the footprint of an existing structure (also mobile home replacements in the same footprint).
- Mobile home replacements in existing lots in an existing mobile home park.
- Heating oil tank removal
- Foundation repair
- Projects which lie >300 feet from mapped gopher soils.

In order to ensure the review process runs efficiently, the following measures will be implemented as part of the 2025 screening approach. These are intended to reduce costs and staff time, and ensure that MPG screening requests, especially those associated with building permit applications, are screened during the screening season.

1. No soil verification will be required in conjunction with MPG field screening.

2. Site mowing or brushing will be required to initiate first site visits, where necessary and feasible, and completed two to four weeks in advance of the site visit.

3. No further screening will be conducted in 2025 following the detection of MPG mounds on a property. The city will notify landowners that MPG evidence has been detected within two weeks.

No MGP were found.

4. At the end of the 2025 season, City staff will provide data regarding MPG occupancy to USFWS.

5. No additional site visit will be required if indeterminate mounds are detected, if the full number of required visits has been completed.

6. The City will prioritize project specific applications over non-project applications. This will help ensure that applicants that have projects ready for construction will receive necessary permits and may initiate construction in a timely manner.

E. Site Visit Overview

Hired consultants will conduct field observations to determine MPG presence on sites with potential habitat. These site visits will be conducted as follows:

1. All valid site visits must be conducted from June 1 through October 31, 2025. Site visits outside that survey window will not be considered valid.

Site visits were conducted on September 16 and October 16, 2025.

2. A site or parcel is considered to be the entire property, not just the footprint of the proposed project.

The Mazama pocket gopher surveys were conducted on the portions of the parcel #'s 0947005100, 12835320200 and 12835430000 found within the bounds of the proposed Deschutes Valley Trail along

the Tumwater Valley Golf Course (parcels 12835430000 and 09470051000) and a park (parcel 12835320200. The parcels are a mix of a golf course grassy fields, forest and wetlands.

3. Sites with less preferred soils (see Attachment A) will be visited two (2) times, at least 30 days apart.

The surveys were conducted according to the protocol.

4. Sites with more preferred soils (see Attachment A) will be visited two (2) times, at least 30 days apart.

The surveys were conducted according to the protocol.

5. Site conditions must be recorded on a data sheet or similar information documented in narrative form. A template data sheet can be found on the city website at http://www.co.thurston.wa.us/permitting/gopher-reviews/index.html

The data sheets are provided in Appendix B.

6. Document and describe which areas of the parcel cannot be screened due to limited accessibility and/or dense understory. This should be depicted on an aerial or site plan submitted to the city.

A portion of the parcel is forested with a shrub and fern layer and is excluded from the survey. The excluded area is shown on the transect maps in Appendix B.

7. The ground must be easily visible to ensure mound observation and identification. Request mowing if necessary to ensure visibility. Wait two to three weeks after mowing before beginning screening.

The ground was visible.

http://www.co.thurston.wa.us/permitting/gopher-reviews/index.html F. Detailed Field Methodology

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.

The surveys were conducted according to the protocol.

5. At each mound found, stop and identify it as an MPG or mole mound. If it is an MPG mound, identify it as a singular mound or a group (3 mounds or more) on a data sheet to be submitted to the city. (City has developed data sheets for your use on http://www.co.thurston.wa.us/permitting/gopher-reviews/index.html)

   No signs of gopher or likely gopher mounds were found.

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 City GPS data instruction for each MPG mound. Submit GPS data in a form acceptable to the city. City GPS Data instruction can be found at http://www.co.thurston.wa.us/permitting/gopher-reviews/index.html

   No signs of gopher or likely gopher mounds were found.

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.

   No MPG mounds were found during the survey.

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 City:
   - At least one up-close photo to depict mound characteristics
     No MPG mounds were found.
   - At least one photo depicting groups of mounds as a whole (when groups are encountered).
     No MPG mounds were found.
   - At least one photo depicting gopher mounds with recognizable landscape features in the background, at each location where mounds are detected on a property
     No MPG mounds were found.
   - Photos can be taken with the GPS unit or a separate, camera, preferably a camera with locational features (latitude, longitude)
     No MPG mounds were found.
   - Photo point description or noteworthy landscape or other features to aid in relocation. Additional photos to be considered.
     No MPG mounds were found.
   - The approximate building footprint location from at least two cardinal directions.
     No MPG mounds were found.
   - Landscape photos to depict habitat type and in some cases to indicate why not all portions of a property require gopher screening.

Landscape photos are located in Appendix A.

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.

The parcels were surveyed within the bounds of the proposed Deschutes Valley Trail.

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.

No MPG mounds were found. *The mounds found on site were typical of mole mounds with clumpy soils in a linear fashion.*

11. In order for the city to accurately review Critical Area Reports submitted in lieu of City field inspections the information collected in the field (GPS, data sheets, field notes, transect representations on aerial, etc.) shall be filed with the City. GPS

No mounds were found, the information was submitted in an acceptable format.

3.0 CURRENT CONDITIONS AND METHODS

Land Services Northwest conducted surveys on September 16 and October 16, 2025.

Appendix A – Photos

September 17, 2025






Tumwater Trail
Tumwater Trail
09.16.2025 10:33 AM
47.00555, -122.90320
4839 Tumwater Valley Dr SE, Tumwater, WA 98501


Tumwater Trail
Tumwater Trail
09.16.2025 10:34 AM
47.00513, -122.90321
4833 Tumwater Valley Dr SE, Olympia, WA 98501


Tumwater Trail
Tumwater Trail
09.16.2025 10:35 AM
47.00465, -122.90332
4833 Tumwater Valley Dr SE, Olympia, WA 98501


Tumwater Trail
Tumwater Trail
09.16.2025 10:38 AM
47.00307, -122.90298
316 N St SE, Tumwater, WA 98501


Tumwater Trail
Tumwater Trail
09.16.2025 10:39 AM
47.00285, -122.90281
310 O St SE, Tumwater, WA 98501


Tumwater Trail
Tumwater Trail
09.16.2025 10:40 AM
47.00281, -122.90294
315 N St SE, Tumwater, WA 98501


Tumwater Trail
Tumwater Trail
09.16.2025 10:40 AM
47.00281, -122.90297
315 N St SE, Tumwater, WA 98501


Tumwater Trail
Tumwater Trail
09.16.2025 10:40 AM
47.00272, -122.90301
315 N St SE, Tumwater, WA 98501


Tumwater Trail
Tumwater Trail
09.16.2025 10:47 AM
47.00168, -122.90261
310 O St SE, Tumwater, WA 98501


Tumwater Trail
Tumwater Trail
09.16.2025 10:47 AM
47.00167, -122.90262
310 O St SE, Tumwater, WA 98501


Tumwater Trail
Tumwater Trail
09.16.2025 10:49 AM
47.00175, -122.90255
310 O St SE, Tumwater, WA 98501


Tumwater Trail
Tumwater Trail
09.16.2025 10:53 AM
47.00168, -122.90250
310 O St SE, Tumwater, WA 98501


Tumwater Trail
Tumwater Trail
09.16.2025 10:55 AM
47.00112, -122.90200
309 O St SE, Tumwater, WA 98501


Tumwater Trail
Tumwater Trail
09.16.2025 10:59 AM
47.00065, -122.90167
305 O St SE, Tumwater, WA 98501


Tumwater Trail
Tumwater Trail
09.16.2025 10:59 AM
47.00063, -122.90171
305 O St SE, Tumwater, WA 98501


Tumwater Trail
Tumwater Trail
09.16.2025 11:00 AM
47.00064, -122.90171
305 O St SE, Tumwater, WA 98501


Tumwater Trail
Tumwater Trail
09.16.2025 11:00 AM
47.00063, -122.90177
305 O St SE, Tumwater, WA 98501


Tumwater Trail
Tumwater Trail
09.16.2025 11:03 AM
47.00087, -122.90205
305 O St SE, Tumwater, WA 98501


Tumwater Trail
Tumwater Trail
09.16.2025 11:06 AM
47.00096, -122.90256
305 O St SE, Tumwater, WA 98501


Tumwater Trail
Tumwater Trail
09.16.2025 11:07 AM
47.00011, -122.90317
305 O St SE, Tumwater, WA 98501


Tumwater Trail
Tumwater Trail
09.16.2025 11:07 AM
46.99999, -122.90304
230 Ruby St SE, Tumwater, WA 98501


Tumwater Trail
Tumwater Trail
09.16.2025 11:11 AM
46.99963, -122.90217
230 Ruby St SE, Tumwater, WA 98501


Tumwater Trail
Tumwater Trail
09.16.2025 11:12 AM
46.99951, -122.90277
231 Ruby St SE, Tumwater, WA 98501


Tumwater Trail
Tumwater Trail
09.16.2025 11:12 AM
46.99951, -122.90287
231 Ruby St SE, Tumwater, WA 98501


Tumwater Trail
Tumwater Trail
09.16.2025 11:12 AM
46.99950, -122.90287
231 Ruby St SE, Tumwater, WA 98501


Tumwater Trail
Tumwater Trail
09.16.2025 11:20 AM
46.99878, -122.90188
324 Hixon Dr SE, Tumwater, WA 98501


Tumwater Trail
Tumwater Trail
09.16.2025 11:23 AM
46.99818, -122.90032
404 Hillcrest Dr SE, Tumwater, WA 98501


Tumwater Trail
Tumwater Trail
09.16.2025 11:24 AM
46.99811, -122.89987
408 Hillcrest Dr SE, Tumwater, WA 98501


Tumwater Trail
Tumwater Trail
09.16.2025 11:32 AM
46.99672, -122.89350
787 T St SE, Tumwater, WA 98501


Tumwater Trail
Tumwater Trail
09.16.2025 11:39 AM
46.99684, -122.89154
787 T St SE, Tumwater, WA 98501


Tumwater Trail
Tumwater Trail
09.16.2025 11:39 AM
46.99683, -122.89154
787 T St SE, Tumwater, WA 98501


Tumwater Trail
Tumwater Trail
09.16.2025 11:40 AM
46.99681, -122.89137
787 T St SE, Tumwater, WA 98501


Tumwater Trail
Tumwater Trail
09.16.2025 12:35 PM
46.99645, -122.89720


Tumwater Trail
Tumwater Trail
09.16.2025 12:37 PM
46.99655, -122.89576
711 White Hawk Ln SE, Tumwater, WA 98501


Tumwater Trail
Tumwater Trail
09.16.2025 12:39 PM
46.99655, -122.89576
711 White Hawk Ln SE, Tumwater, WA 98501

October 16, 2025




Tumwater
Tumwater
10.16.2025 11:28 AM
47.00253, -122.90300
315 N St SE, Tumwater, WA 98501


Tumwater
Tumwater
10.16.2025 11:28 AM
47.00228, -122.90279
315 N St SE, Tumwater, WA 98501


Tumwater
Tumwater
10.16.2025 11:29 AM
47.00222, -122.90274
315 N St SE, Tumwater, WA 98501


Tumwater
Tumwater
10.16.2025 11:31 AM
47.00186, -122.90804
315 N St SE, Tumwater, WA 98501


Tumwater
Tumwater
10.16.2025 11:32 AM
47.00190, -122.90295
310 O St SE, Tumwater, WA 98501


Tumwater
Tumwater
10.16.2025 11:36 AM
47.00149, -122.90233
310 O St SE, Tumwater, WA 98501


Tumwater
Tumwater
10.16.2025 11:50 AM
47.00010, -122.90324
305 O St SE, Tumwater, WA 98501


Tumwater
Tumwater
10.16.2025 11:53 AM
46.99963, -122.90208
231 Ruby St SE, Tumwater, WA 98501


Tumwater
Tumwater
10.16.2025 11:54 AM
46.99952, -122.90273
231 Ruby St SE, Tumwater, WA 98501


Tumwater
Tumwater
10.16.2025 11:54 AM
46.99950, -122.90287
231 Ruby St SE, Tumwater, WA 98501


Tumwater
Tumwater
10.16.2025 12:01 PM
46.99862, -122.90117
231 Ruby St SE, Tumwater, WA 98501


Tumwater
Tumwater
10.16.2025 12:04 PM
46.99806, -122.89943
408 Hillcrest Dr SE, Tumwater, WA 98501


Tumwater
Tumwater
10.16.2025 12:15 PM
46.99628, -122.89416
772 White Hawk Ln SE, Tumwater, WA 98501


Tumwater
Tumwater
10.16.2025 12:16 PM
46.99631, -122.89417
772 White Hawk Ln SE, Tumwater, WA 98501



Land Services Northwest
120 State Avenue NE PMB 190
mpia, WA 98501

LSNW

Tumwater Trail Map
Survey 1
9/16/2025

0 187.5 375 750 Feet



Land Services Northwest
120 State Avenue NE PMB 190
mpia, WA 98501

983

N
LSNW

Tumwater Trail Map
Survey 2
10/16/2025

0 187.5 375 750 Feet

2021 Thurston County Mazama Pocket Gopher Screening Field Form **Site Visit Date:** 9.16.25

Site Name and Parcel #	**Parcel #:** 09470051000, 128353202000 and 12835430000 **Project #:** _____ **Site/Landowner:** City of Tumwater
How were the data collected? (circle the method for each)	**Transect:** Trimble **Garmin** Aerial **Mounds** Trimble Garmin Aerial **Notes:** _____
Field Team Personnel: **(Indicate all staff present, CIRCLE who filled out form)**	**Name:** Alex Callender **Name:** Susan Callender **Name:**
Others onsite (name/affiliation)	
Site visit # **(CIRCLE all that apply)**	**1st** 2nd Unable to screen **Notes:**
Do onsite conditions preclude the need for further visits?	Yes **No** **Dense woody cover that encompasses the entire site (trees/shrubs) that appears to preclude any potential MPG use.** Impervious Compacted Graveled Flooded Other _____ **Notes:**
Describe visibility for mound detection:	Poor Fair **Good** **Notes:**
Request mowing? **(CIRCLE and DESCRIBE WHERE MOWING IS NEEDED and SHOW ON AERIAL PHOTO**	Yes **No** N/A **Notes:**

Page 1 of 2

Mounds observed over the whole site are characteristic of:	MPG Mounds	Likely MPG Mounds	Indeterminate	Likely Mole Mounds	Mole Mounds
Quantify or describe amount of each type and approx. # of mounds *Group = 3 mounds or more*	0	0	0	100+	100+
	No MPG mounds (circle)				
MPG mounds in GPS? (CIRCLE and DESCRIBE) If MPG mounds present, entered in GPS?	None All Most Some Notes: Yes No N/A				
Does woody vegetation onsite match aerial photo?	Yes No - describe differences and show on parcel map/aerial:				
What portion(s) of the property was screened? (CIRCLE and DESCRIBE)	All Part - describe and show on parcel map/aerial: The Mazama pocket gopher surveys were conducted on the portions of the parcel #'s 0947005100, 128353202000 and 12835430000 found within the bounds of the proposed Deschutes Valley Trail along the Tumwater Valley Golf Course (parcels 12835430000 and 09470051000) and a park (parcel 12835320200.				
Notes -	Describe, and show on parcel map/aerial if applicable:				
Team reviewed and agreed to data recorded on form? (CIRCLE, and EXPLAIN if "No")	Yes No Reviewed by initials: AC SC ____ ____ Notes:				

Information provided by Thurston County Government Page 2 of 2

2021 Thurston County Mazama Pocket Gopher Screening Field Form **Site Visit Date:** 10.16.25

Site Name and Parcel #	**Parcel #:** 09470051000, 128353202000 and 12835430000 **Project #:** _____ **Site/Landowner:** City of Tumwater
How were the data collected? (circle the method for each)	**Transect:** Trimble **Garmin** Aerial **Mounds** Trimble Garmin Aerial **Notes:** _____
Field Team Personnel: **(Indicate all staff present, CIRCLE who filled out form)**	**Name:** Alex Callender **Name:** Susan Callender **Name:**
Others onsite (name/affiliation)	
Site visit # **(CIRCLE all that apply)**	**1st** 2nd Unable to screen **Notes:**
Do onsite conditions preclude the need for further visits?	Yes **No** **Dense woody cover that encompasses the entire site (trees/shrubs) that appears to preclude any potential MPG use.** Impervious Compacted Graveled Flooded Other _____ **Notes:**
Describe visibility for mound detection:	Poor Fair **Good** **Notes:**
Request mowing? **(CIRCLE and DESCRIBE WHERE MOWING IS NEEDED and SHOW ON AERIAL PHOTO**	Yes **No** N/A **Notes:**

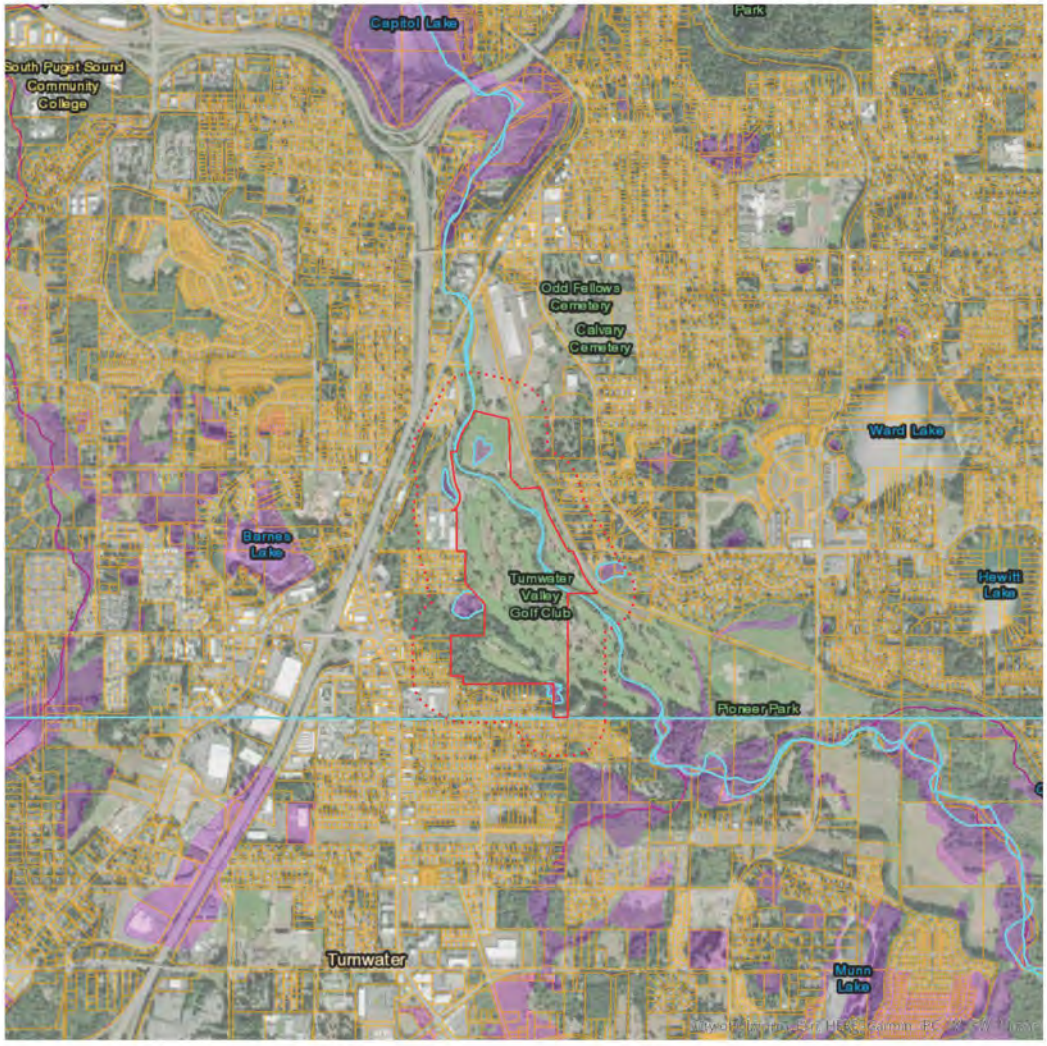
Page 1 of 2

Mounds observed over the whole site are characteristic of:	MPG Mounds	Likely MPG Mounds	Indeterminate	Likely Mole Mounds	Mole Mounds
Quantify or describe amount of each type and approx. # of mounds *Group = 3 mounds or more*	0	0	0	100+	100+
	No MPG mounds (circle)				
MPG mounds in GPS? (CIRCLE and DESCRIBE) If MPG mounds present, entered in GPS?	None All Most Some Notes: Yes No N/A				
Does woody vegetation onsite match aerial photo?	Yes No - describe differences and show on parcel map/aerial:				
What portion(s) of the property was screened? (CIRCLE and DESCRIBE)	All Part - describe and show on parcel map/aerial: The Mazama pocket gopher surveys were conducted on the portions of the parcel #'s 0947005100, 128353202000 and 12835430000 found within the bounds of the proposed Deschutes Valley Trail along the Tumwater Valley Golf Course (parcels 12835430000 and 09470051000) and a park (parcel 12835320200.				
Notes -	Describe, and show on parcel map/aerial if applicable:				
Team reviewed and agreed to data recorded on form? (CIRCLE, and EXPLAIN if "No")	Yes No Reviewed by initials: AC SC ____ ____ Notes:				

Information provided by Thurston County Government Page 2 of 2

Appendix C-PHS

Priority Habitats and Species on the Web



Buffer radius: 600 Feet

Report Date: 09/09/2025, Parcel ID: 09470051000

PHS Species/Habitats Overview:

Occurence Name	Federal Status	State Status	Sensitive Location
Fall Chinook	N/A	N/A	No
Coho	N/A	N/A	No
Cutthroat	Not Warranted	N/A	No
Fall Chum	N/A	N/A	No
Winter Steelhead	N/A	N/A	No
Coho	Candidate	N/A	No
Steelhead	Threatened	N/A	No
Snag-rich Areas	N/A	N/A	No
Freshwater Emergent Wetland	N/A	N/A	No
Freshwater Forested/Shrub Wetland	N/A	N/A	No
Big brown bat			Yes
Little Brown Bat			Yes
myotis spp			Yes
Yuma myotis			Yes
Townsend's Big-eared Bat		Candidate	Yes

EXHIBIT 12

Community Development
555 Israel Road SW
Tumwater, WA 98501-6515
Phone: 360-754-4180

CERTIFICATION OF PUBLIC NOTICE

I, Sam Hunter, Associate Planner for the City of Tumwater hereby certify that public notice for the Project # TUM-26-1184; Deschutes Valley Trail Segment C was given as follows:

APPLICATION

Notice of Application Published in Olympian:	September 18, 2026
Notice of Application Uploaded to Website:	September 18, 2026
Notice of Application Mailed:	September 18, 2026
Notice of Application Posted:	September 18, 2026
Posting Locations:	One sign facing T Street SE & one sign facing Tumwater Valley Drive
Environmental Determination Published:	July 24, 2026
Environmental Determination Uploaded to Website:	July 24, 2026
Environmental Determination Mailed:	July 24, 2026
Environmental Determination Posted:	July 24, 2026
Posting Locations:	One sign facing T Street SE & one sign facing Tumwater Valley Drive

HEARING

Notice of Application Published in Olympian:	September 18, 2026
Notice of Application Uploaded to Website:	September 18, 2026
Notice of Application Mailed:	September 18, 2026
Notice of Application Posted:	September 18, 2026
Posting Locations:	One sign facing T Street SE & one sign facing Tumwater Valley Drive

The above is an accurate accounting of the public notice provided for the project.

Sam Hunter, Associate Planner	September 18, 2026
NAME, TITLE	Date