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**NOTICE OF PUBLIC HEARINGS
TILLAMOOK COUNTY PLANNING COMMISSION
TILLAMOOK COUNTY BOARD OF COMMISSIONERS**

Date of Notice: September 10, 2026

Date of Planning Commission Hearing: October 8, 2026

Date of Board of County Commissioner Hearing: November 4, 2026

Public hearings will be held by the Tillamook County Planning Commission at 7:00pm on Thursday, October 8, 2026, at the Port of Tillamook Bay Conference Center, 4000 Blimp Boulevard, Tillamook, OR 97141 and at 9:45am on Wednesday, November 4, 2026, by the Tillamook County Board of Commissioners in the Board of County Commissioners Meeting Room 106 in the Tillamook County Courthouse, 201 Laurel Avenue, Tillamook, OR 97141 to consider the following:

Consolidated Review of the Sitka Sedge Tidal Wetland Restoration Project: Conditional Use request #851-26-000328-PLNG for approval of a tidal wetland restoration project to reconnect Beltz Marsh to tidal processes in Sand Lake Estuary including alterations to Beltz Dike, construction of a 140-foot-span pedestrian bridge over the dike breach to maintain recreational access for trail network connectivity, construction of an earthen setback dike embankment near the south end of Beltz Marsh, tidal marsh improvement activities (including filling and excavating new tidal channels), habitat restoration activities (installing large wooden structures), as well as replacement of culverts at Reneke Creek/Sandlake Road and Beltz Creek/Sandlake Road to improve fish habitat and future work consisting of No Name Creek culvert replacements, *together with* Estuary Floodplain Development Permit application #851-26-000326-PLNG, Dune Area Development Permit #851-26-000330-PLNG, Zone Change/Map Amendment request #851-26-000327-PLNG to rezone portions of Tax Lots 300 and 400 from Recreation Management and Small Farm and Woodlot 20-Acres (SFW-20) to Estuary Natural (EN), and Ordinance Amendment request #851-26-000329-PLNG to re-inventory and incorporate the Beltz Marsh area of Sitka Sedge State National Area into the Goal 16 Sand Lake Estuary Management Unit and Sand Lake Joint Management Program. Located north of Tierra Del Mar and north of the Unincorporated Community of Pacific City/Woods, the subject properties are accessed via Sandlake Road, a County road, and designated as Tax Lot 400 of Section 31, Township 3 South, Range 10 West, and Tax Lot 300 of Section 6, Township 4 South, Range 10 West, of the Willamette Meridian, Tillamook County, Oregon. Properties are zoned Recreation Management (RM), Estuary Natural (EN) and Small Farm and Woodlot 20-Acre (SFW-20). The Applicant is Tillamook Estuaries Partnership. The Property Owner is the State of Oregon Department of Parks and Recreation.

Notice of public hearing, a map of the request area, applicable specific request review criteria and a general explanation of the requirements for submission of testimony and the procedures for conduct of hearing has been mailed to all property owners within 750-feet of the exterior boundary of the subject properties for which application has been made at least 28 days prior to the date of the hearing.

Applicable criteria are contained within the Tillamook County Land Use Ordinance (TCLUO) Section 6.040: Conditional Use Review Criteria, TCLUO Section 3.530: Beach and Dune Overlay Zone, TCLUO Section 3.510: Flood Hazard Overlay

Zone, TCLUO Section 9.020: Map Amendment and Criteria and Section 9.030: Text Amendment Procedure. Only comments relevant to the approval criteria are considered relevant evidence.

The Planning Commission hearing will take place at the Port of Tillamook Bay Conference Center with an option for virtual participation. For instructions on how to provide oral testimony at the October 8, 2026, hearing and hearing protocol, please visit the Tillamook County Community Development Planning Commission page at <https://www.tillamookcounty.gov/bc-pc> or contact the Department at 503-842-3408. The virtual meeting link can be found at the bottom of the Community Development Department homepage as well as a dial in number for those who wish to participate via teleconference.

Written testimony may be submitted to the Tillamook County Department of Community Development, 1510-B Third Street, Tillamook, Oregon, 97141 prior to 4:00 p.m. on the date of the October 8, 2026, Planning Commission hearing. Testimony submitted by 4:00pm on Monday, October 28, 2026, will be included in the packet mailed to the Planning Commission the week prior to the October 8, 2026, hearing. Failure of an issue to be raised in a hearing, in person or by letter, or failure to provide sufficient specificity to afford the decision-maker an opportunity to respond to the issue precludes appeal to the Land Use Board of Appeals on that issue. Please contact the Department at 503-842-3408 as soon as possible if you wish to have your comments included in the staff report that will be presented to the Tillamook County Planning Commission.

The Board of County Commissioner hearing will take place at the Tillamook County Courthouse with an option for virtual participation. For instructions on how to provide oral testimony at the November 4, 2026, hearing and hearing protocol, please visit the Tillamook County Community Development Planning Commission page at <https://www.tillamookcounty.gov/bc-pc> or contact the Department at 503-842-3408. The virtual meeting link to the Board of County Commissioner hearing will be posted at the top of the Community Development Department homepage as well as a dial in number for those who wish to participate via teleconference the morning of the hearing.

Written testimony may be submitted to the Tillamook County Department of Community Development, 1510-B Third Street, Tillamook, Oregon, 97141 prior to 8:00am on the date of the November 4, 2026, Board of County Commissioner hearing. Testimony submitted by 4:00pm on Monday, October 26, 2026, will be included in the packet mailed to the Board of County Commissioner hearing the week prior to the November 4, 2026, hearing. Failure of an issue to be raised in a hearing, in person or by letter, or failure to provide sufficient specificity to afford the decision-maker an opportunity to respond to the issue precludes appeal to the Land Use Board of Appeals on that issue. Please contact the Department at 503-842-3408 as soon as possible if you wish to have your comments included in the staff report that will be presented to the Tillamook County Board of Commissioners.

Documents and submitted application are also available on the Tillamook County Department of Community Development website (<https://www.tillamookcounty.gov/commdev/landuseapps>) or at the Department of Community Development office located at 1510-B Third Street, Tillamook, Oregon, 97141. A copy of the application and related materials may be purchased from the Department of Community Development at a cost of 25 cents per page. The staff reports will be available for public inspection seven days prior to the hearings. Please contact the Department at 503-842-3408 for additional information.

In addition to the specific applicable review criteria, the Tillamook County Land Use Ordinance, Tillamook County Comprehensive Plan and Statewide Planning Goals which may contain additional regulations, policies, zones and standards that may apply to the request are also available for review at the Department of Community Development.

The Port of Tillamook Bay Conference Center and Tillamook County Courthouse are accessible to persons with disabilities. If special accommodations are needed for persons with hearing, visual, or manual impairments who wish to participate in the hearings, call 503-842-3408 at least 24 hours prior to the hearings so that the appropriate communications assistance can be arranged.

Tillamook County Department of Community Development



Sarah Absher, CFM, Director

Enc. Maps & Testimony Tips

TCLUO SECTION 6.040: CONDITIONAL USE REVIEW CRITERIA

Any CONDITIONAL USE authorized according to this Article shall be subject to the following criteria, where applicable:

- (1) The use is listed as a CONDITIONAL USE in the underlying zone, or in an applicable overlying zone.
- (2) The use is consistent with the applicable goals and policies of the Comprehensive Plan.
- (3) The parcel is suitable for the proposed use considering its size, shape, location, topography, existence of improvements and natural features.
- (4) The proposed use will not alter the character of the surrounding area in a manner which substantially limits, impairs or prevents the use of surrounding properties for the permitted uses listed in the underlying zone.
- (5) The proposed use will not have detrimental effect on existing solar energy systems, wind energy conversion systems or wind mills.
- (6) The proposed use is timely, considering the adequacy of public facilities and services existing or planned for the area affected by the use.

TCLUO SECTION 9.020: MAP AMENDMENT PROCEDURE AND CRITERIA

The Commission shall consider an AMENDMENT request at the earliest practicable public hearing after it is proposed. In hearing the request to establish a new zoning designation, the Commission shall consider all of the following criteria. A zone MAP AMENDMENT may be approved only if all five criteria can be met.

- (a) The proposed new zone is consistent with applicable Comprehensive Plan policies.
- (b) The proposed new zone shall not result in the conversion of resource lands to non-resource use without an approved exception to applicable state resource protection Goals.
- (c) The site under consideration is better suited to the purposes of the proposed zone than it is to the purposes of the existing zone.
- (d) Development anticipated to result from the proposed zone shall not impair the actual or the legally designated uses of surrounding properties.
- (e) The amendment must conform to Section 9.040 Transportations Planning Rule Compliance.

TCLUO SECTION 9.030: TEXT AMENDMENT CRITERIA

- (a) If the proposal involves an amendment to the Comprehensive Plan, the amendment must be consistent with the Statewide Planning Goals and relevant Oregon Administrative Rules;
- (b) The proposal must be consistent with the Comprehensive Plan. (The Comprehensive Plan may be amended concurrently with proposed changes in zoning);
- (c) The Board must find the proposal to be in the public interest with regard to community conditions; the proposal either responds to changes in the community, or it corrects a mistake or inconsistency in the subject plan or ordinance; and
- (d) The amendment must conform to Section 9.040 Transportations Planning Rule Compliance.

TCLUO SECTION 3.510: FLOOD HAZARD OVERLAY ZONE

- (1) The fill is not within a Coastal High Hazard Area.
- (2) Fill placed within the Regulatory Floodway shall not result in any increase in flood levels during the occurrence of the base flood discharge.
- (3) The fill is necessary for an approved use on the property.
- (4) The fill is the minimum amount necessary to achieve the approved use.
- (5) No feasible alternative upland locations exist on the property.
- (6) The fill does not impede or alter drainage or the flow of floodwaters.
- (7) If the proposal is for a new critical facility, no feasible alternative site is available.
- (8) For creation of new, and modification of, Flood Refuge Platforms, the following apply, in addition to (14)(a)(1-4) and (b)(1-5):

...

TCLUO SECTION 3.530: BEACH AND DUNE OVERLAY ZONE

- (A) The proposed development complies with the applicable requirements and standards of subsections (7), (8), (9), (10), and (13) of this section;

- (B) Any proposed foredune grading for site preparation cannot go below the Base Flood Elevation plus four feet; shall be the minimum area necessary for the construction of a structure; shall include plans for temporary and permanent stabilization of the site, including a re-vegetation plan of exposed sand areas; and shall conform with the requirements of subsection (11)(b) of this section. Additionally, all graded sand shall remain in the beach-foredune system;
- (C) The Geologic Hazard Report conforms to the standards for such reports set forth in subsection (6) of this section; and
- (D) The development plans for the application conform, or can be made to conform, with all recommendations and specifications contained in the Geologic Hazard Report.

Tillamook County Land Use Ordinance (TCLUO): Relevant Sections Outlined Below

<https://www.tillamookcounty.gov/commdev/page/land-use-ordinance-luo-zoning-ordinance>

- Section 3.006: Small Farm and Woodlot 20-Acre (SFW-20) Zone
- Section 3.040: Recreation Management (RM) Zone
- Section 3.106: Estuary Conservation 1 (EC1) Zone
- Section 3.120: Regulated Activities and Impacts Assessments
- Section 3.140: Estuary Development Standards
- Section 3.510: Flood Hazard Overlay (FH)
- Section 3.530: Beach and Dune Overlay (BD) Zone
- Section 3.545: Shoreland Overlay (SH) Zone
- Section 3.550: Freshwater Wetland Overlay (FW) Zone
- Section 4.130: Development Requirements for Geologic Hazard Areas
- Section 4.140: Requirements for Protection of Water Quality and Streambank Stabilization

Citizen Tips for Providing Testimony at a Planning Commission/Board of County Commissioner Hearing

Goal 1 of Oregon's Statewide Planning Goals recognizes the importance of citizen involvement "in all phases of the planning process." One of the principal ways for citizens to be involved is by testifying at local land use hearings. These citizen tips are designed to help citizens prepare and deliver testimony during Tillamook County land use hearing processes.

Know the Process

The Chair of the decision-making body will always read aloud the order of presentation and the process. Presentation is generally as follows:

- Planning Staff Presentation (generally 15 minutes)
 - Questions to Staff by the Decision-Maker
- Applicant's Presentation (generally 15 minutes)
 - Questions to Applicant by the Decision-Maker
- Public Comment Period
 - Generally limited to 3 minutes per person.
- Applicant Rebuttal & Final Statements
- Staff Final Statements
- Public Hearing Closed for Decision-Maker Deliberation
 - No further public testimony accepted.
- Decision-Maker may ask questions of staff.
- Decision-Makers vote on issue.
- Notice of Decision mailed to all parties.

The Board of County Commissioners are the decision-maker for this consolidated request. The role of the Tillamook County Planning Commission is to recommend to the Board of County Commissioners the land use applications associated with this project be approved or denied.

Understand the Issue

- Become familiar with the land use record (application, staff report and hearing materials) found on the Land Use Applications page under the Planning tab of the Community Development website.
- Become familiar with the relevant criteria (included in notice of public hearing).
- Prepare an outline of your testimony to use while testifying and focus testimony to the relevant criteria

- Decisions to approve or deny a request are based on the relevant criteria.
- Know when, where and who you are speaking to.
 - Tillamook County Planning Commission or Board of County Commissioners- depending on nature of request, application review process, and current phase of hearing process.
- Public testimony is generally limited to 3 minutes per person.
- Be sure to state your name and address for the record at the beginning of your testimony to ensure you receive notice of decision after hearing process has ended.

Check Department Website for Updates

- Visit the Land Use Applications page: <https://www.tillamookcounty.gov/commdev/landuseapps>
- Follow posted calendar dates for written testimony submittal opportunities if the hearing is ongoing.
- Review additional written testimony received during the open comment periods.
- Review hearing packets and agendas if hearing process is ongoing.
- Review Notice of Decision and remain informed on appeal dates.

Virtual Attendance Information

The link to the Planning Commission hearing is located at the bottom of the Community Development homepage: <https://www.tillamookcounty.gov/commdev>

to go.)

- Please allow 5 business days for property file and public record copy requests. Research fees and/or copy fees will be applied.

General Information

- [Division Contacts](#)

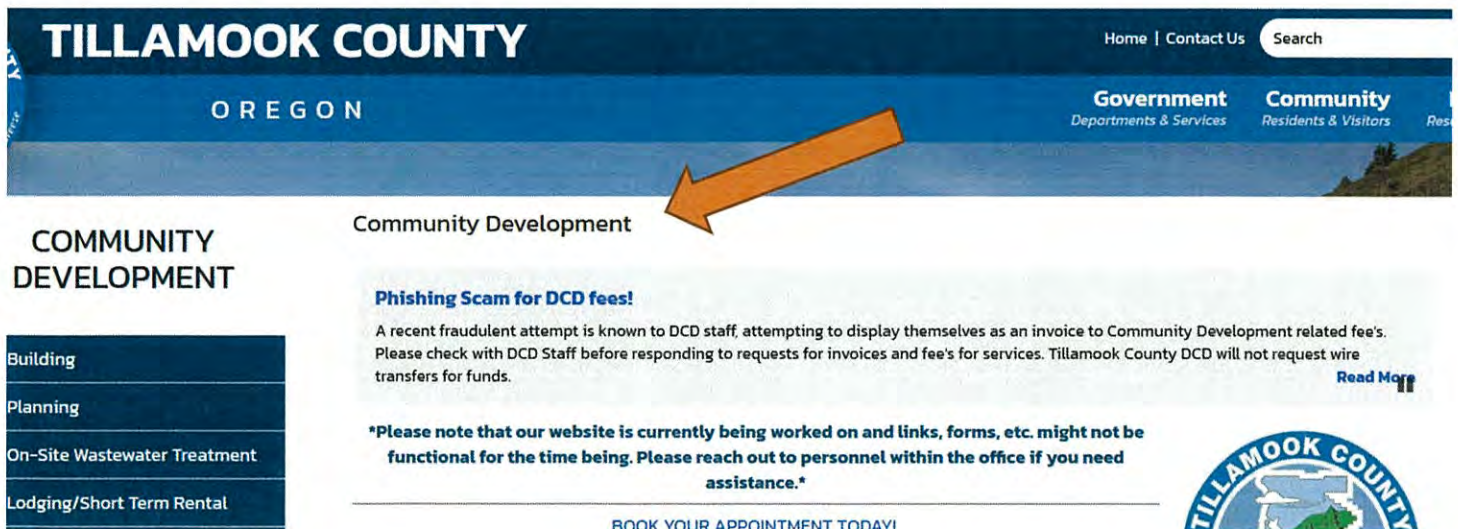
Virtual Link for Public Meetings

Planning Commission, Housing Commission, STR Committee, Public Meetings, Town Hall Meetings, etc. will meet using the following info:

Call in: 1-971-254-3149, Conference ID: 887 242 77#

[Virtual Teams Link](#)

The link to the Board of County Commissioners hearing will be posted the morning of the hearing at the top of the Community Development homepage the morning of the hearing: <https://www.tillamookcounty.gov/commdev>



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Phishing Scam for DCD fees!

A recent fraudulent attempt is known to DCD staff, attempting to display themselves as an invoice to Community Development related fee's. Please check with DCD Staff before responding to requests for invoices and fee's for services. Tillamook County DCD will not request wire transfers for funds.

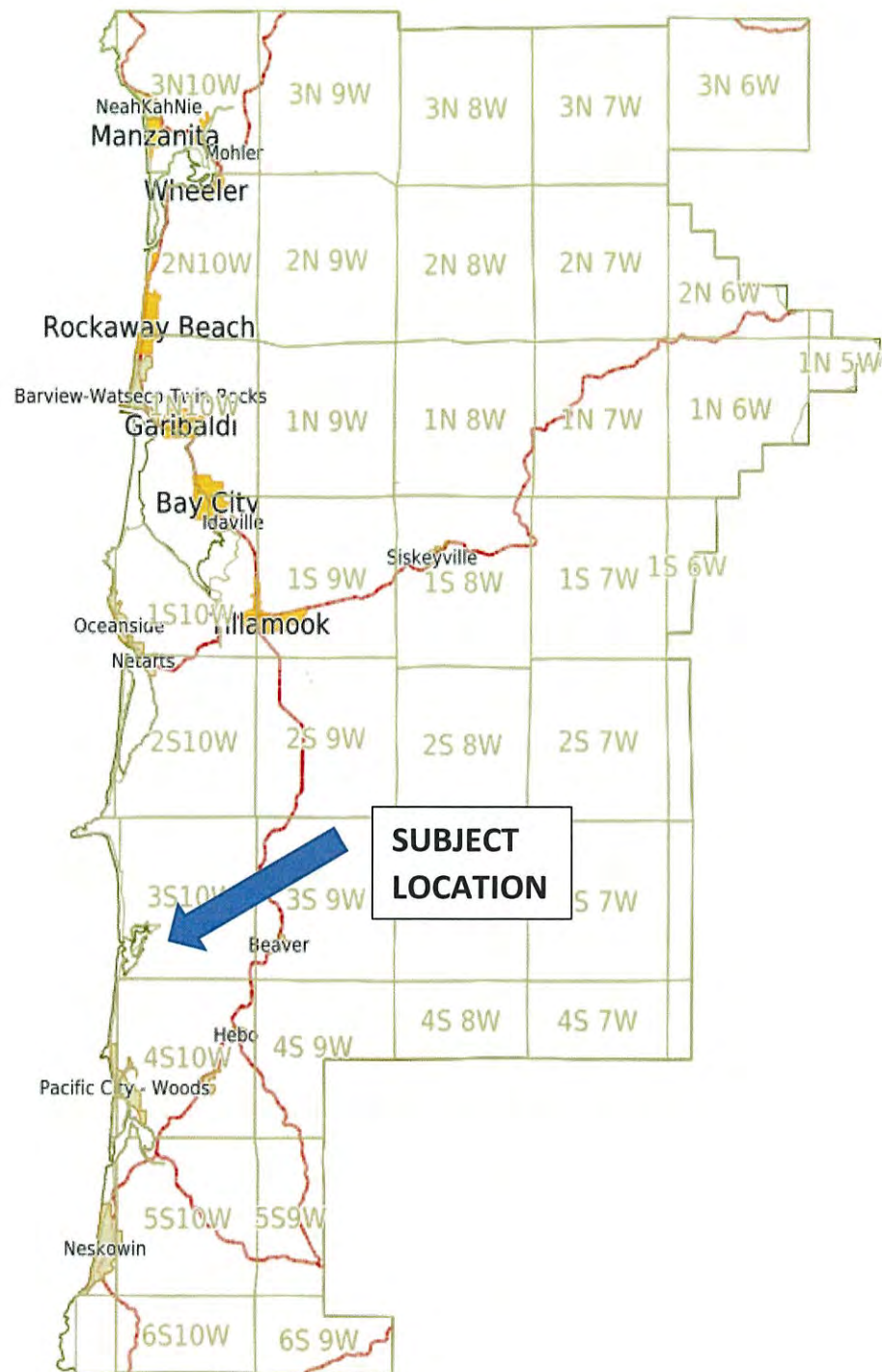
[Read More](#)

Please note that our website is currently being worked on and links, forms, etc. might not be functional for the time being. Please reach out to personnel within the office if you need assistance.

[BOOK YOUR APPOINTMENT TODAY!](#)

TILLAMOOK COUNTY

VICINITY MAP

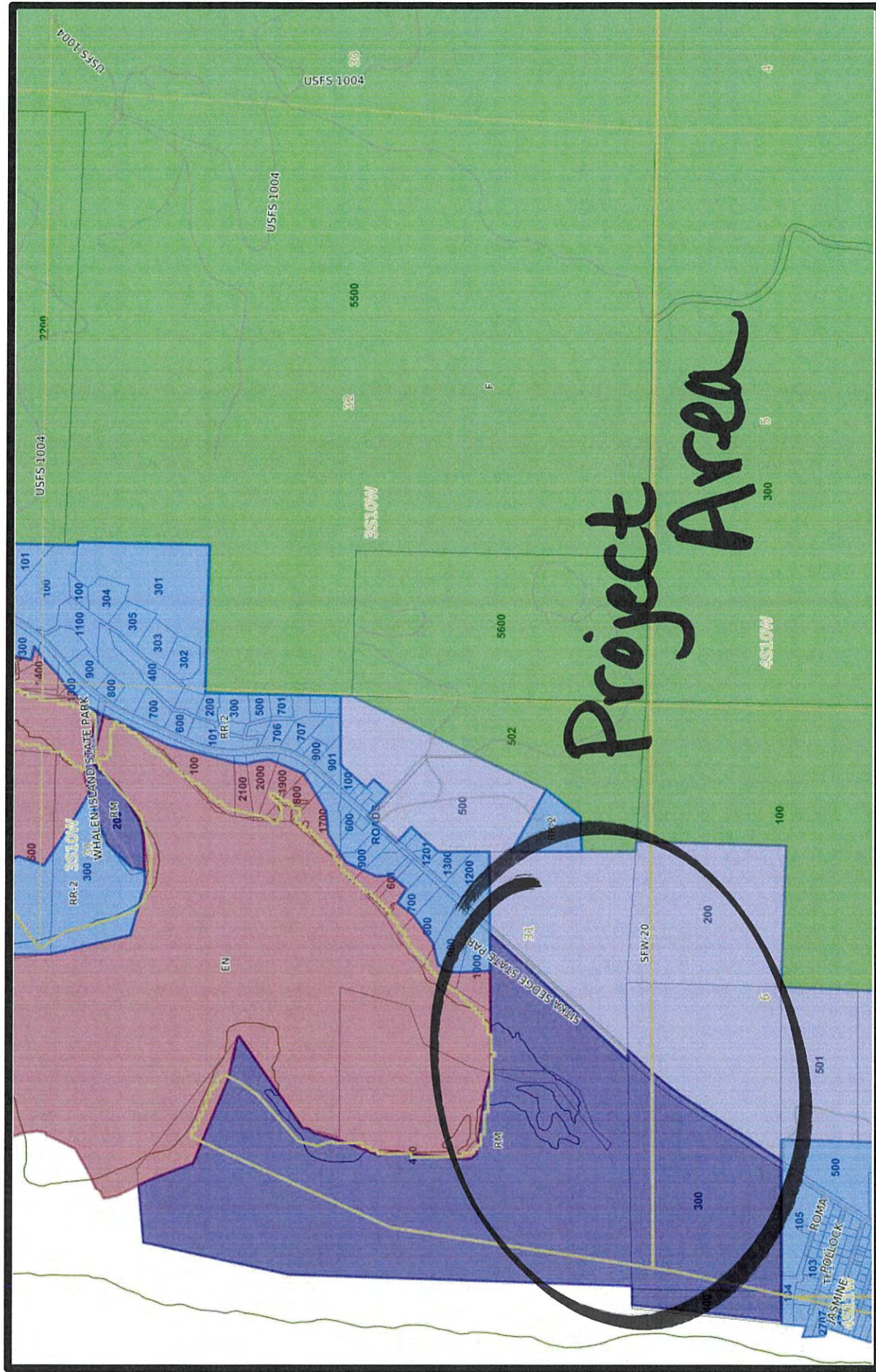


#851-26-000328-PLNG, et al:
SITKA SEDGE TIDAL WETLAND RESTORATION PROJECT

Map



Map



Project Area



DEVELOPMENT PERMIT

Applicant ☐ (Check Box if Same as Property Owner)

Name: Tillamook Estuaries Partnership (TEP) Phone: 503-322-2222

Address: PO Box 493 613 Commercial Street

City: Garibaldi State: OR Zip: 97118

Email: christer@tbnep.org

Property Owner

Name: Oregon Parks and Rec Dept Phone: 503-986-0707

Address: 725 Summer Street NE, Suite C

City: Salem State: OR Zip: 97301

Email: OPRD.SitkaSedge@.oregon.gov

OFFICE USE ONLY
Date Stamp JUN 30 2026 Counter-App-51
☐ Approved ☐ Denied
Received by:
Receipt #:
Fees: 1890.00
Permit No: 851-26-100326-PLNG

Description of Work: A Type III Floodplain Development Permit for an active restoration project that involves a dyke breach, installation of a pedestrian bridge, a new setback dike, culvert replacement, and span bridge over Reneke Creek within the Sandlake Road right-of-way.

Location:

Site Address: 26805 & 27340 Sandlake Rd. Cloverdale, OR 97112

Map Number: 3S & 4S	10W & 10W	31 & 06	3S10310000400, 4S10060000300
Township	Range	Section	Tax Lot(s)

Complete all applicable fields:

Regulatory Floodway: ☐	Estuary: ☒	Floodplain: ☒
New: ☐	Addition: ☐	Replacement: ☐
Remodel: ☐	Demolish: ☐	
Dwelling: NA	Accessory Structure: NA	
Culvert Diameter: 12x10' Box Culvert	Bridge Length: 49-foot span bridge	
Length:	Width:	
Fence Height: NA	Retaining Wall Height: NA	
Streambank Stabilization: natural riprap	Other: Setback Dike, Pedestrian Bridge	
Fill/Removal/Grading: 1000CY	Vegetation Removal: 1000 CY	

Structure/Damage \$:	5 Year Construction \$:
Substantial improvement/damage threshold 50% cost vs. value	

Flood Insurance Rate Map (FIRM) Panel Info

Tillamook County	Panel Number: 41057C0715F
Effective Date: 9/28/18	Property Flood Zone(s): Zone AE
Floodway: N	Project Flood Zone(s):
Stream/Waterbody Name: Sand Lake	

Elevation Data (NAVD 88)

Base Flood Elevation: 11.8'	First Habitable Floor: n/a
Lowest Floor/Horizontal Member: n/a	
Enclosed Area: n/a	Flood Vent Area:

Other Required Permits

404 Removal/Fill Permit, 401 WQC, 1200-C ESC Permit
ODFW Fish Passage Authorization

Authorization

This permit application does not assure permit approval. The applicant and/or property owner shall be responsible for obtaining any other necessary federal, state, and local permits. The applicant verifies that the information submitted is complete, accurate, and consistent with other information submitted with this application.

Eric Timmons

Digitally signed by Eric Timmons
Date: 2026.06.25 08:10:28 -07'00'

6/25/2026

Property Owner Signature (Required)

Christer LaBrecque

Digitally signed by Christer LaBrecque
Date: 2026.06.24 11:47:31 -07'00'

6/25/2026

Applicant Signature

Date

FLOODWAY "NO-RISE / NO-IMPACT" CERTIFICATION

This document is to certify that I am duly qualified engineer licensed to practice in the State of

Oregon

(State)

. It is to further certify that the attached technical data supports

the fact that proposed Sitka Sedge Tidal Wetland Restoration will not impact the base flood
(Name of Development)

elevations, floodway elevations, and floodway widths on Sand Lake at published
(Name of Stream)

cross sections in the Flood Insurance Study for, Tillamook County, OR, dated September 28, 2018
(Name of community) *(Date)*

and will not impact the base flood elevations, floodway elevations, and floodway widths at the

unpublished cross-sections in the area of the proposed development.

STAMP



RENEWAL DATE 06-30-28

March 9, 2025

SEAL, SIGNATURE AND DATE

Hunter White, P.E.

Name

Engineer / Hydrologist

Title

1615 SE 3rd Ave, Suite 400

Portland, OR 97214

Address

FOR COMMUNITY USE ONLY:

Community Approval

☐

Approved

☐

Disapproved

Community Official's Name

Community Official's Signature

Title



memorandum

date March 9, 2026

to Christer LeBrecque – Tillamook Estuaries Partnership

from Hunter White, P.E. and Elizabeth Schalo, P.E.

subject **Sitka Sedge Tidal Wetland Restoration – No-Rise Rationale Memorandum**

1.0 Introduction and Overview

Oregon Parks and Recreation Department (OPRD), in partnership with Tillamook Estuaries Partnership (TEP) and Tillamook County Public Works (TCPW), is working towards implementing a series of improvements and modifications to the infrastructure at Sitka Sedge State Natural Area (SSSNA) to restore tidal hydrology, aquatic organism passage, and habitat conditions in the area known as Beltz Marsh while maintaining equivalent or better flood protection for the community of Tierra Del Mar (TDM). The project is known as the Sitka Sedge Tidal Wetland (SSTW) Restoration project and is slated for construction beginning in Summer 2026 pending receipt of necessary permits and construction funding.

The primary goals of the Sitka Sedge Tidal Wetland project are to:

- Reconnect Beltz Marsh to tidal and estuarine processes in the adjacent Sand Lake Estuary,
- Improve fish passage conditions into Beltz Marsh and the three creeks (Reneke, Beltz, and No Name/East Marsh) to address limiting factors preventing recovery of ESA-listed Oregon Coast coho salmon and benefit other native fish species,
- Cause no negative impacts to neighboring properties in Tierra Del Mar (TDM) and, to the extent feasible, improve TDM's flood protection, drainage capacity, and resilience to climate change and sea-level rise, and
- Maintain or improve recreational access to the Sitka Sedge State Natural Area trail network.

In 2017-2019, OPRD contracted with consultants to perform a range of site assessments, develop preliminary restoration and infrastructure improvement alternatives, and conduct preliminary hydrologic analysis to select a preliminary preferred alternative including a dike breach to reconnect Beltz Marsh to Sand Lake, coupled with a setback dike near the south end of Beltz Marsh to maintain flood protection for the adjacent community of Tierra Del Mar and TCPW-owned Sandlake Road (PGG, 2019). In 2023-2024, ESA completed a detailed alternatives analysis, 2D hydrodynamic modeling, and 30% Design for the Sitka Sedge Tidal Wetland (SSTW) Restoration

project, with several presentations to technical advisory teams and at public townhall meetings. The methodology for development of the hydrologic and hydraulic models as well as analysis of model results of design alternatives are described in the *Sitka Sedge Tidal Wetland – Hydraulic Analysis Memorandum* (ESA, 2024) and *Sitka Sedge Tidal Wetland Restoration 30% Basis of Design* (ESA, 2025). The *Sitka Sedge Tidal Wetland – Hydraulic Analysis Memorandum* is included in the Appendix. **Figure 1** shows the project location.

ESA is currently contracted for the engineering and permitting services for the Final Design phase of the Sitka Sedge Tidal Wetland Restoration project. The project is currently at a 60%-Design stage, and the project team is utilizing the 60% Plans and project design details to apply for state, federal, and local permits. The hydraulic analysis and modeling have also been updated to reflect the 60% design configuration of the proposed dike breach and setback dike location.

The purpose of this memorandum is to provide evidence and rationale to prepare a No-Rise Certification for the proposed actions associated with the Sitka Sedge Tidal Wetland Restoration project. The following information demonstrates that the proposed project actions will not cause any rise to the Base Flood Elevation in the Sand Lake Estuary and will reduce peak water levels in the area south of the proposed setback dike.

2.0 No-Rise Criteria

Title 44 of the Code of Federal Regulations (CFR) 60.3(d)(3) states that a community shall,

“Prohibit encroachments, including fill, new construction, substantial improvements, and other development within the adopted regulatory floodway unless it has been demonstrated through hydrologic and hydraulic analyses performed in accordance with standard engineering practice that the proposed encroachment would not result in any increase in flood levels within the community during the occurrence of the base flood discharge.” Once a project is determined to be within a floodway, the next step is to demonstrate that the development will cause no rise in the base flood. This can be done through a hydraulic study, commonly called a no-rise or zero-rise analysis, and results in a no-rise certification (FEMA 2023).

Figure 2 is an excerpt of the FEMA Flood Insurance Rate Map (FIRM) of the project area. The FIRM demonstrates the project area is not located within a floodway. The project is located with a FEMA Zone AE without a floodway. The Base Flood Elevation (BFE) of 11.8' NAVD88.

Title 44 of the CFR 60.3(c)(10) states that a community shall,

“Require until a regulatory floodway is designated, that no new construction, substantial improvements, or other development (including fill) shall be permitted within Zones A1-30 and AE on the community's FIRM, unless it is demonstrated that the cumulative effect of the proposed development, when combined with all other existing and anticipated development, will not increase the water surface elevation of the base flood more than one foot at any point within the community.” Once a project is determined to be within an AE Zone, such as this project, the next step is to demonstrate that the development will not cause a rise in the base flood greater than 1 foot. This can be done through a hydraulic study, and may also be called a no-rise or zero-rise analysis, and results in a no-rise certification, although the project may increase base flood elevation up to one foot under federal regulations.

FEMA Region X published its *Procedures for “No-Rise” Certification For Proposed Development in the Regulatory Floodway* in 2013. It details the technical data that should support a “no-rise” certification as being “based upon hydraulic analyses that utilize the same model used to prepare the effective Flood Insurance Study (FIS) report and Flood Insurance Rate Map (FIRM) unless it is demonstrated that the ‘effective’ hydraulic model is unavailable or its use is inappropriate. If an alternative hydraulic model is used, the new model must be calibrated to reproduce the FIS profiles within 0.5 feet” (FEMA, 2013).

The project area is shown on the FIRM as a backwater of Sand Lake (FEMA, 2018a). The FIS for Tillamook County lists Sand Lake as having its Base Flood Elevation (BFE) as a non-coastal stillwater elevation (FEMA 2018b). However, the Tillamook Coastal Study, which informs the Tillamook County FIS, states the following:

“Sand Lake is one estuary which had not previously been subjected to detailed coastal or riverine analyses. This particular estuary is periodically influenced by coastal backwater flooding due to extreme coastal water levels. For the purposes of establishing a new BFE in the estuary, we used the still water level (SWL) to map the coastal backwater effect of the 1% and 0.2% flood events into Sand Lake (Figure 8-10).”

Figure 3 reproduces the study’s Figure 8-10. The Tillamook Coastal Study also notes the SWL is “the sum of the predicted astronomical tide listed in Tide Tables, plus the effects of processes such as an El Niño or storm surge that can elevate the measured tide above the predicted tide” (DOGAMI, 2014).

The Tillamook County Coastal Study demonstrates that the BFE for the project area is developed from solely coastal influences including the predicted astronomical tide and coastal storms. This project, or any amount of fill in Sand Lake, does not influence the predicted astronomical tide or coastal storm processes and therefore, cannot impact the BFE. Hydraulic modeling as described in the FEMA Region X *Procedures for “No-Rise” Certification For Proposed Development in the Regulatory Floodway* is not needed to demonstrate this further.

3.0 No-Rise Analysis

Although this project would not affect the BFE, it may affect other hydrologic conditions and scenarios. ESA has utilized its two-dimensional (2D) HEC-RAS hydraulic model to evaluate potential rise in a 1% flood event (ie 100-Year Event) as a result of the Project.

Four hydraulic models are typically developed for a No-Rise analysis (FEMA, 2013):

1. Duplicate Effective (DE) – The DE model is used to duplicate FEMA effective water surface elevation data. This model reflects the topography and inputs at the time the effective model was created, as a form of quality control for FEMA.
2. Corrected Effective (CE) – The CE model is used to correct errors in the duplicate effective model, add any additional cross sections, or incorporate more detailed topographic information than that used in the current effective model.
3. Existing Conditions (EC) – The EC model is used to reflect current topography, structure data (i.e., bridges and culverts), and hydraulic roughness.

4. Project Conditions (PC) – The PC model is used to reflect project conditions topography, structures, and hydraulic roughness.

As described in Section 2.0, the BFE in the project area was developed from solely coastal influences and not from riverine influences. Therefore, there is not a FEMA effective HEC-RAS (Hydrologic Engineering Center River Analysis System) model for the area. As such, ESA was not able to develop a Duplicate Effective or Corrected Effective model for the No-Rise Analysis. ESA created an Existing Conditions model with the best available data. ESA also developed a Project Conditions model to compare against the Existing Conditions model and draw conclusions for any potential rise.

Existing Conditions and Project Conditions Models

ESA developed and utilized a two-dimensional (2D) HEC-RAS hydraulic model to evaluate the site's existing condition, inform and evaluate alternative design concepts, and evaluate the preferred alternative for potential rise in water levels. 2D hydraulic models use a depth-averaged approach to represent flow patterns in the horizontal plane, producing maps of depth and velocity across the simulated landscape. HEC-RAS 2D was used for this project to represent the complex, multi-directional flows within Sand Lake, Beltz Marsh, flood-prone areas, and local infrastructure.

A series of hydrologic scenarios were developed for the site to calibrate the model and analyze design alternatives, including the 100-year storm event. Flooding is a concern for TDM and as such, project performance under flood conditions was a priority to analyze. As noted in the Tillamook Coastal Study, the project area had not previously been subjected to detailed riverine analyses. ESA developed hydrologic flows using a variety of methods depending on the contributing watershed. Streamflow inputs for the TDM drainage areas were developed utilizing the Santa Barbara Urban Hydrograph Method. Streamflow inputs for creek watersheds were developed utilizing USGS StreamStats, verified by a watershed scaling of the nearest gaged stream comparable to the project creek.

The downstream boundary of the model is located in Sand Lake approximately 2,000 feet downstream of Beltz Dike. This downstream boundary condition is tidal. The tides data used was water level data measured outside of the Beltz Dike February 1-13, 2017. This data is appropriate for use for the 100-year event scenario because of the high tide (11.9 ft NAVD) included in the dataset that is concurrent with the hydrograph peak and also near the published BFE (11.8 ft NAVD).

The 2D hydraulic model requires topography, hydrology, and roughness as inputs for the model, which are represented within the model mesh. Alternative design concepts were assessed with model depth, water level, and velocity outputs. These scenarios and model development are described in detail in the *Sitka Sedge Tidal Wetland – Hydraulic Analysis Memorandum* (ESA, 2024), which is in the Appendix.

4.0 No-Rise Results

Water surface elevations are compared between the Project Conditions model and Existing Conditions model for the 100-year flood event in Table 1. There are no FEMA cross sections or BFE lines in the project area. The water surface elevations were compared at two key locations: in the marsh behind the proposed setback dike (**Figure 4**) and outside of the existing dike in Sand Lake (**Figure 5**). As shown in Table 1 and Figures 4 and 5, the

hydraulic modeling predicts a flood reduction near TDM as a result of the project. 100-year water surface elevations are approximately 1 foot lower under project conditions than existing conditions in the marsh behind the project setback dike (Figure 4). This demonstrates the project is not anticipated to cause a rise in 100-year flood levels but rather, a reduction. Outside of the existing dike, in Sand Lake, the hydraulic model predicts no change in water level comparing the existing conditions to the project conditions.

TABLE 1. EXISTING AND PROJECT 100-YEAR FLOOD WSE COMPARISON

	FEMA BFE (feet NAVD88)	Existing Conditions (feet NAVD88)	Project Conditions (feet NAVD88)	Project minus Existing (feet)
Inside Project Setback Dike (Figure 4)	11.8	12.05	11.03	-1.02
Outside Existing Dike (Sand Lake) (Figure 5)	11.8	11.86	11.86	0.00

The results of these analyses demonstrate that the proposed Project will not cause an increase in 100-year flood event elevations in Sand Lake or Sitka Sedge Wetland relative to Existing Conditions. This conclusion is based on a comparison between Existing and Project Conditions model results, which shows no increase in water surface elevations under Project Conditions for the 100-year flood event. We therefore request that the County Floodplain Administrator approve this No-Rise certification.

5.0 References

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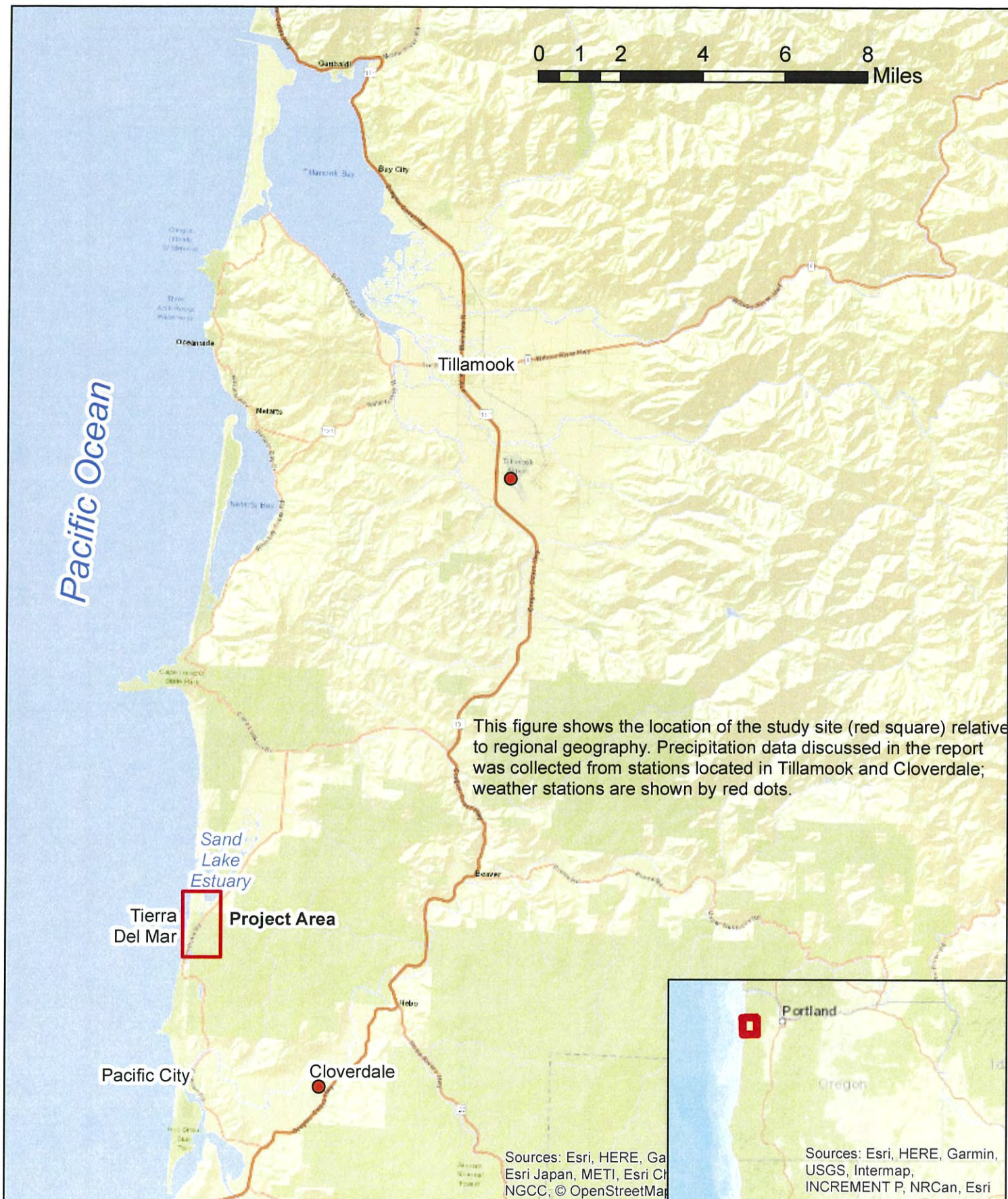
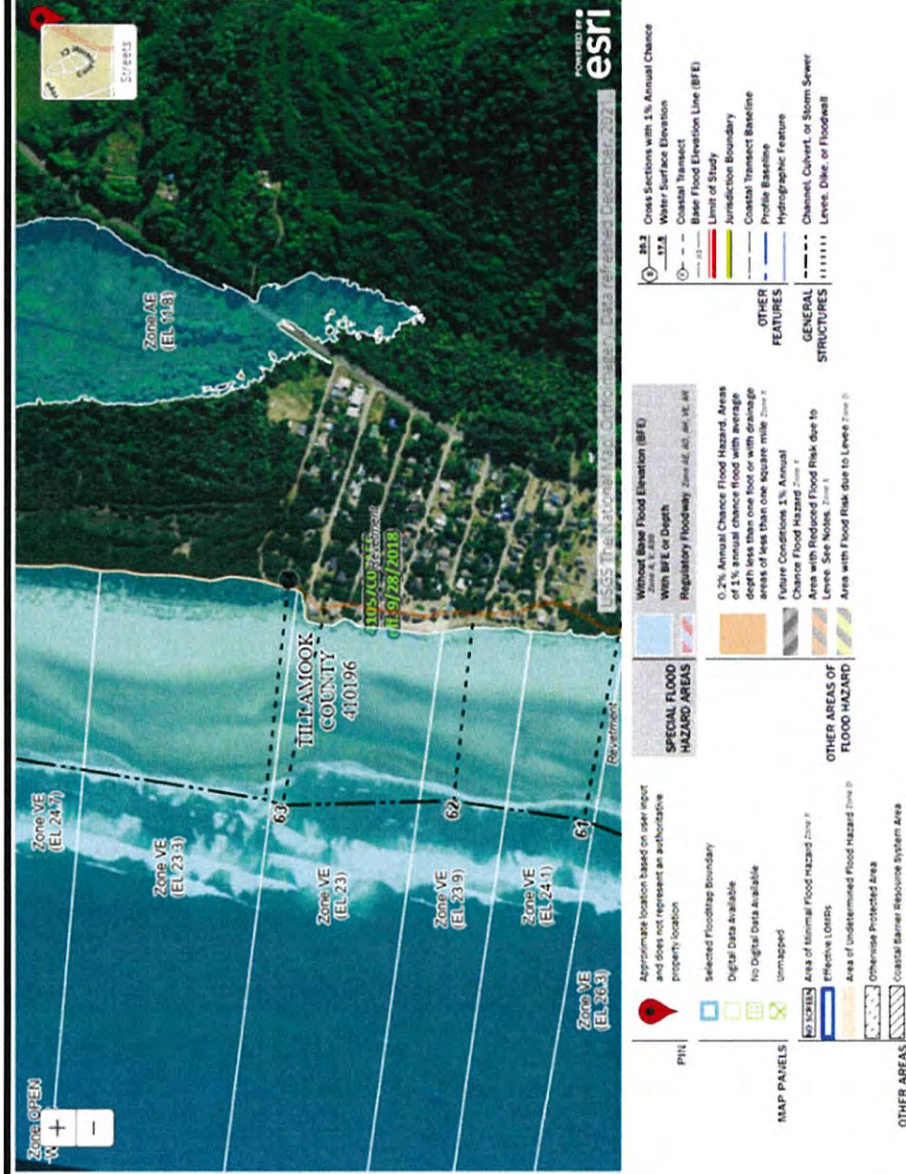


Figure 1
Project Location Map

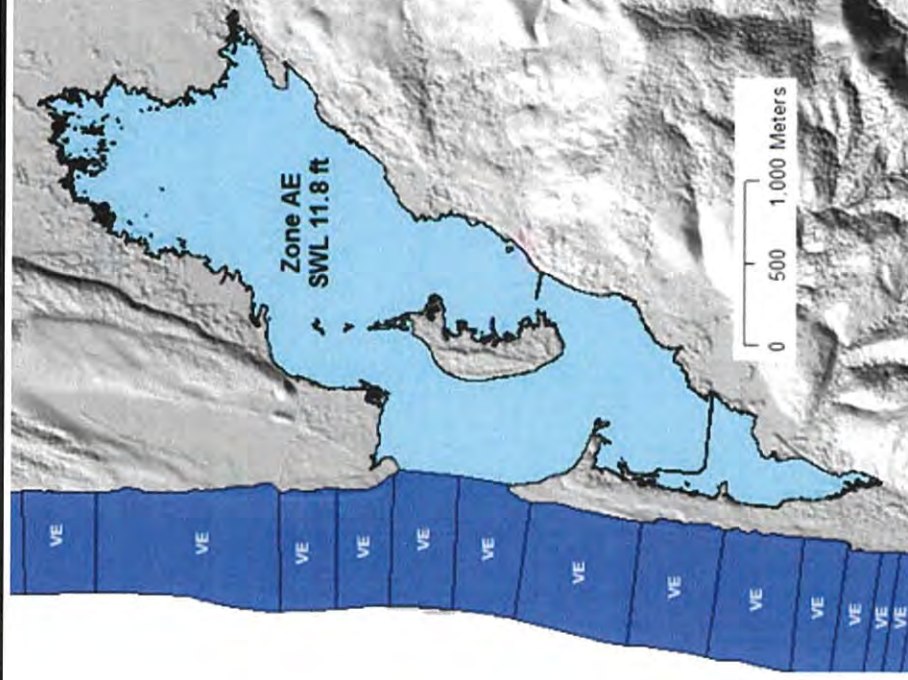


Note: This figure shows the FEMA Flood Insurance Rate Map of the project area, including the mapped 100-year floodplain boundary which inundates the lowest lying portions of Tierra Del Mar and overtops the low point in Sandlake Road at the East Marsh crossing. The road low point elevation is 11.6' NAVD88 compared to the 100-year floodplain elevation of 11.8'.

Figure 2
FEMA Flood Insurance Rate Map Excerpt from North End of TDM

Sitka Sedge Tidal Wetland Restoration
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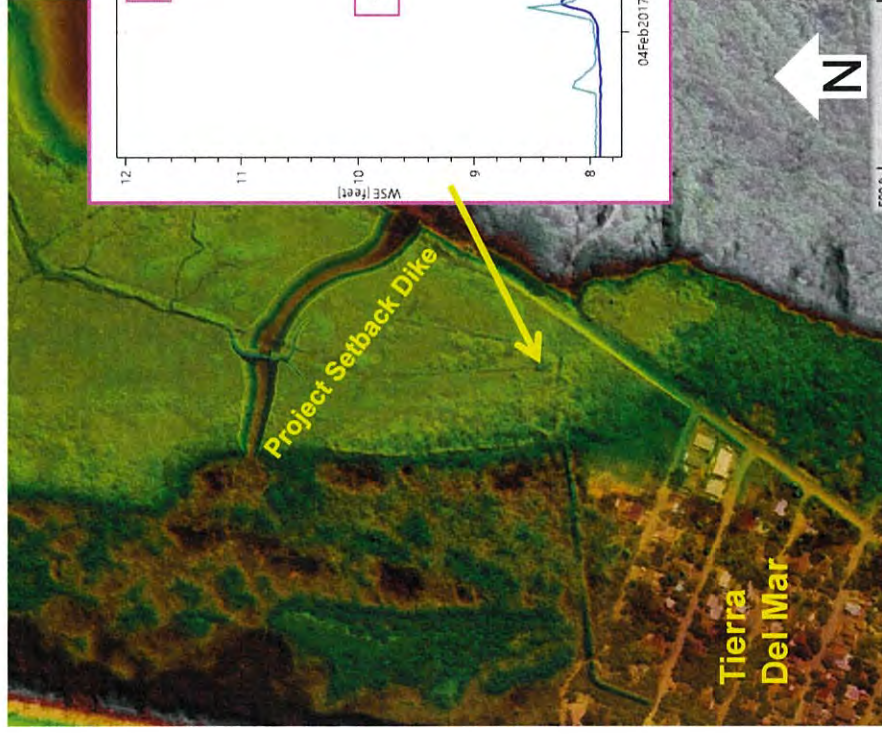


Note: This figure is recreated from the Coastal Flood Insurance Study, Tillamook County, Oregon, Figure 8- 10. It shows the FEMA floodplain in the project area is a backwater of Sand Lake and is a still water level (SWL) of 11.8 ft. The Tillamook Coastal Study notes the SWL is “the sum of the predicted astronomical tide listed in Tide Tables, plus the effects of processes such as an El Niño or storm surge that can elevate the measured tide above the predicted tide.”

Figure 3

Coastal backwater flooding mapped from SWLs for Sand Lake. The 0.2% chance flooding is too small to be visible at this scale. (DOGAMI, 2014)

Sitka Sedge Tidal Wetland Restoration
No-Rise Memorandum



Note: This figure shows the water surface elevations for a 100-year flood event concurrent with high winter tides. Existing Conditions results in a predicted peak WSE of approximately 12 ft. The Project Conditions is predicted to peak at 11 ft. This simulation shows the **Project is expected to reduce 100-year peak water levels, near Tierra Del Mar and significantly reduce the duration of high water inundation compared to existing conditions.**

Figure 4
Hydraulic Model Results – 100-Year Water Surface Elevation 60% Design vs Existing Conditions,
Inside Project Setback Dike
 Sitka Sedge Tidal Wetland Restoration
 No-Rise Memorandum

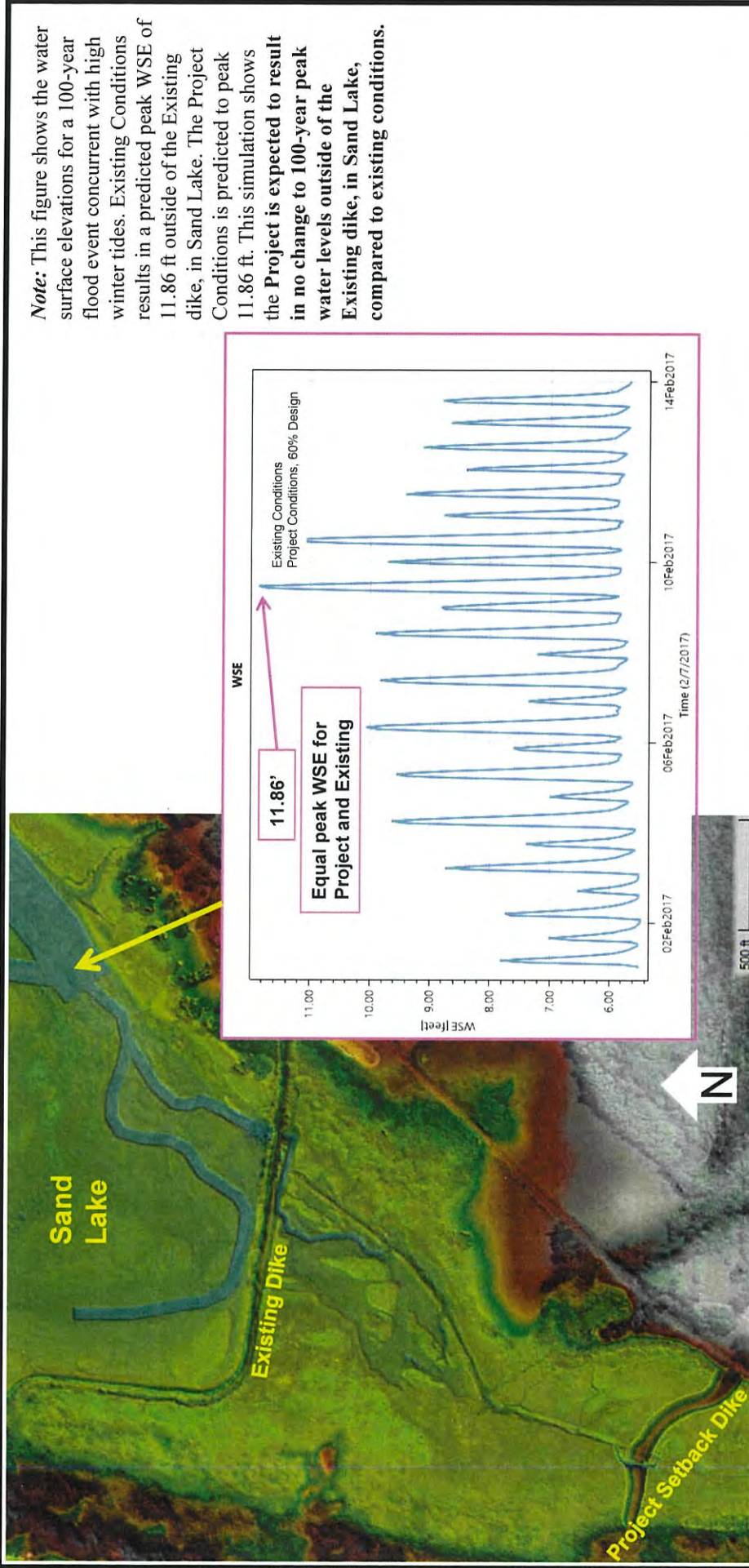


Figure 5
Hydraulic Model Results – 100-Year Water Surface Elevation 60% Design vs Existing Conditions, Outside of Existing Dike (Sand Lake)
Sitka Sedge Tidal Wetland Restoration
No-Rise Memorandum

Appendix

Sitka Sedge Tidal Wetland – Hydraulic Analysis Memorandum



memorandum

date April 30, 2024

to Christer LeBrecque – Tillamook Estuaries Partnership

from Hunter White, P.E. and Elizabeth Schalo, P.E.

subject **Sitka Sedge Tidal Wetland – Hydraulic Analysis Memorandum**

1.0 Introduction and Overview

Oregon Parks and Recreation Department (OPRD) is considering a series of improvements and modifications to the infrastructure at Sitka Sedge State Natural Area (SSSNA) to restore tidal hydrology, aquatic organism passage, and habitat conditions in the area known as Beltz Marsh. In 2017-2019, OPRD contracted with consultants to perform a range of site assessments, develop preliminary restoration and infrastructure improvement alternatives, and conduct preliminary hydrologic analysis to select a preliminary preferred alternative including a dike breach to reconnect Beltz Marsh to Sand Lake, coupled with a setback dike near the south end of Beltz Marsh to maintain flood protection for the adjacent community of Tierra Del Mar and Sandlake Road (PGG, 2019). At the conclusion of the 2019 study, ESA and PGG recommended additional site assessment, detailed hydrodynamic modeling, and design analysis to advance the design concepts toward implementation.

In 2022, TEP, in partnership with OPRD, contracted ESA for the Sitka Sedge Tidal Wetland Restoration Alternatives Analysis and Preliminary Design project. The current project phase utilizes 2D hydrodynamic modeling to perform a more detailed hydraulic analysis of the proposed design elements, as well as further developing the details of conceptual design elements, to refine the preferred alternative and advance the preferred alternative to a preliminary 30%-level design.

The purpose of this memorandum is to summarize the hydrologic and hydraulic analyses conducted in support for the Sitka Sedge Tidal Wetland project. Primary goals of the Sitka Sedge Tidal Wetland project are to:

- Reconnect Beltz Marsh to tidal and estuarine processes in the adjacent Sand Lake Estuary,
- Improve fish passage conditions into Beltz Marsh and the three creeks (Reneke, Beltz, and No Name/East Marsh) to address limiting factors preventing recovery of ESA-listed Oregon Coast coho salmon and benefit other native fish species,

- Cause no negative impacts to neighboring properties in Tierra Del Mar (TDM) and, to the extent feasible, improve TDM's flood protection, stormwater management, and resilience to climate change and sea-level rise,
- Maintain or improve recreational access to the Sitka Sedge State Natural Area trail network.

Modeling was performed to evaluate in-depth design alternatives. The methodology for development of the hydrologic and hydraulic models is detailed within as well as analysis of model results and design alternatives.

At the outset of the project phase, ESA worked with TEP and Environmental Protection Agency (EPA) to develop a Modeling Quality Assurance Plan (QAPP). ESA conducted the hydraulic modeling and analysis in accordance with the QAPP. Minor deviations from the QAPP are described at the end of this memorandum.

2.0 Existing Conditions

Site Overview and Topography

In 2014, OPRD acquired property north of Pacific City, including and adjacent to portions of Sand Lake Estuary. The property established as Sitka Sedge State Natural Area (SSSNA) consists of approximately 87 acres of marsh, including approximately 42 acres of tidal marsh, sand, and mudflats and approximately 12 acres of estuary altered by the half-mile long Beltz Dike which runs east/west across the property.) Tierra Del Mar (TDM) is a residential community located immediately south of Beltz Marsh (**Figure 1**). Relative to surrounding areas, TDM is flat, with elevations ranging from around 18 to 23 feet NAVD88. TDM is triangular in shape, narrowing to the south. The project area is surrounded by the Pacific Ocean and associated foredune to the west, additional vegetated dunes and Beltz Marsh to the north, and forested bedrock hills to the east. A marshy swale referred to as No Name Creek or "East Marsh" occurs between TDM and the bedrock hills to the east (PGG, 2019).

SSSNA includes a parking lot and trailhead located adjacent to Sandlake Road immediately north of the Reneke Creek area. The trailhead provides recreational access to a network of hiking trails and beach access via the Beltz Dike Trail situated on top of the earthen levee that separates Beltz Marsh from Sand Lake.

Prior to diking, Beltz Marsh was formerly a shallow embayment fully connected to the Sand Lake Estuary via tidal channels and mudflats. Topographic modifications including construction of the Beltz dike, ditching in the marsh, construction of Sandlake Road, quarry activities, and development of the Tierra Del Mar community continue to affect site hydrology (PGG, 2019).

Figure 2 includes an aerial photo of the project area identifying the key site features. **Figure 3** depicts an annotated site topography map derived from OPRD DEM (various dates). Key site features include the Beltz Dike, box culvert and tide gate, remnant tidal channel and ditch network, primary beaver dam in the marsh, Sandlake Road prism, Tierra Del Mar community ditches, east marsh complex, and dunes to the west of the marsh. Areas within the marsh having elevations below 5.0 ft NAVD88 remain inundated most of the time, while areas with elevations above 8.0 ft NAVD88 are rarely inundated. The low point in Sandlake Road has an elevation of approximately 11.6 ft NAVD88. Residential areas within Tierra Del Mar (TDM) have ground elevations ranging from 14.0 to 22.0 ft, or higher. The TDM ditch and culvert network flows north and discharges into the marsh above the direct influence of the tide (PGG, 2019).

FEMA Flood Insurance Rate Maps from the Tillamook County Flood Insurance Study show the 100-year floodplain elevation in Beltz Marsh and the Sandlake Rd/East Marsh crossing of 11.8' NAVD88 (**Figure 4**). This flood elevation inundates the low point in Sandlake Rd and the low-lying portions of two private properties within TDM. **Figure 5** provides a summary reference of elevations of key site features and water levels in the project area.

Surface Water Hydrology Characterization

Tides

Tides are the primary driver of surface water level fluctuations in Beltz Marsh. Tidal fluctuations in the Pacific Ocean are transmitted to the marsh via the shallow Sand Lake Estuary and communicated through the existing box culvert and tide gate. The tide gate has deteriorated over time and appears to be completely missing in 2023, but the undersized box culvert restricts flow into the marsh and mutes the tidal signal resulting in a reduction in peak tidal water levels.

Pacific Ocean tides are influenced by both astronomical (sun & moon) and meteorological factors (storms). Storms and other large-scale atmospheric phenomenon, such as El Niño, tend to elevate the tides above predicted levels during the winter season. These same storm events are also responsible for delivering heavy rain to the area that frequently corresponds with high tide events. Measurements of ocean tides in the immediate vicinity of Sand Lake Estuary are not available. Long-term measurements at South Beach in Newport, OR, and Garibaldi, OR (within Tillamook Bay), provide representative ocean tides offshore of Sand Lake Estuary. As ocean tides enter the Sand Lake Estuary they are affected by the shallow nature of the estuary, constantly changing sand bed forms near the mouth of Sand Lake, and a complex tidal channel network, resulting in a situation where water levels in the estuary near the Beltz Marsh never fully recede to match low tides in the adjacent ocean. Daily low tides are severely muted and never fall below elevation 5.3 ft NAVD88, while ocean tides regularly fall to 0.0 ft NAVD88 or lower.

Fluctuations behind the dike in Beltz Marsh are primarily controlled by the interaction of tides in Sand Lake with the box culvert and tide gate, and secondarily by inflow from creeks and local drainages. Measurements show that under existing conditions, the missing tide gate and undersized box culvert allows a muted tidal flux to fill the marsh on rising tides. Water passes through the box culvert and water levels behind the dike rise more slowly and lag behind those in Sand Lake due to the limited flow through the structure. Tides in Sand Lake peak and begin to fall before the marsh completely fills and as water levels equilibrate on the ebb tide the flow reverses and water slowly drains back into Sand Lake until the minimum low water elevation of ~5.3 ft NAVD88 is reached. In 2017 when the tide gate was still partially intact, high tide elevations behind the dike were approximately 1.9 feet lower than Sand Lake, as shown in **Figure 6**. In 2023, since the tide gate is completely missing, high tide water levels behind the dike are approximately 1.4 feet lower than Sand Lake and approximately 0.5 feet higher than in 2017, as shown in **Figure 7**.

In the absence of significant freshwater input, low tides behind the dike tend to be similar to those in Sand Lake but are slightly elevated (a few inches) and of longer duration as the marsh slowly drains. Freshwater inputs from creeks and local drainages that arrive on a rising tide accumulate within the marsh and contribute to elevated water levels behind the dike. Following heavy rainfall events, it can take multiple tidal cycles for accumulated freshwater to be discharged through the existing box culvert. The leaky/missing tide gate is no longer functional,

though the size of the box culvert itself limits flux through the dike and thereby causes lower water levels than in Sand Lake at high tide, and higher water levels than in Sand Lake at low tide and following intense rainfall events.

Existing tidal fluctuations in the south end of the marsh are further impeded by the existing beaver dam that impounds water in the ditches and wetlands near Sandlake Road. Water levels remain relatively constant in time at about elevation 8.0 ft NAVD88 during the wet season and drop down to elevation 7.0 ft during summer low flow period. The beaver dam is approximately 3.0 ft high, based on observations by ESA staff in February 2018. **Figure 8** depicts typical water level fluctuations in the project vicinity during the summer (no rainfall), and **Figure 9** depicts typical water level conditions in the winter during and after a storm event (PGG, 2019).

Freshwater Inputs

Frequent and intense rainfall is common along the Oregon coast, and in the vicinity of the project site. Mean annual rainfall is about 80 inches per year, with a 2-year peak 24-hour rainfall intensity of about 3 inches (USGS, 2018). Other rainfall records are available at Tillamook and Cloverdale, OR. Periods of intense rainfall correspond to both elevated water levels in Beltz Marsh and photographs of flooding provided by the TDM community from 2016-2017 (pers. com). Given the size of Beltz Marsh, direct rainfall in the marsh may contribute meaningful surface water inflow during high-intensity storm events.

Beltz Creek (0.5 square mile drainage) and Reneke Creek (0.9 square mile drainage) are the primary freshwater sources that discharge into Beltz Marsh under existing conditions. Neither of the creeks has been gaged and few streamflow measurements are available to describe the response of the creek drainages to rainfall events. Therefore, the current understanding of creek hydrology relies on limited observations, comparisons with nearby gaged streams (Tucca Creek), and scaling to approximate discharge from Beltz and Reneke Creeks (PGG, 2019).

Reneke Creek flows west toward Sandlake Road, where it encounters a blocked culvert and then diverts southwest along Sandlake Road. The creek then flows into a partially blocked 38-ft long, 2-ft diameter, culvert that passes beneath Sandlake Road into Beltz Marsh. The culvert invert elevations are low enough to be subject to tidal fluctuations in the marsh during extreme high tides and ESA observed what appeared to be salmonid fish in the pool immediately downstream of the culvert. Upon entering the riparian area west of Sandlake Road, the creek channel meanders through wetlands and then bifurcates into multiple smaller braided channels that separately discharge into the marsh. Signs of erosion and road overtopping indicate that the existing culvert is undersized and does not pass all creek flows beneath the road. Historic photos and ground observations indicate that Reneke Creek was formerly routed through the blocked culvert and then to the north along what is currently a dry swale (PGG, 2019).

Beltz Creek arrives at Sandlake Road at a higher elevation than Reneke Creek and passes beneath Sandlake Road through an angled 80-ft long, approximately 3-ft diameter, culvert. The downstream end of the culvert is perched about 2.5 ft above the adjacent creek channel and well above the influence of the tide. The creek channel then flows through the former rock quarry and splits into at least two smaller channels before entering the marsh and ditch network.

The primary drainage ditch from TDM (identified as the East Ditch or Sandlake Road Ditch) flows north through a series of small culverts that parallel Sandlake Road. The final culvert beneath Roma Ave. consists of a 40-foot long 12-inch diameter corrugated smooth interior wall HDPE pipe with an outlet invert elevation of 11.8 ft

NAVD88. The ditch continues north and connects with other ditch networks upstream of the existing beaver dam within the marsh. Flows through the ditch along Sandlake Road are limited by the capacity of the culverts and condition of the ditch. A secondary drainage swale within TDM (identified as the North Ditch in **Figure 3**) runs parallel to the dune line and flows northeast through TDM, including beneath roads and structures, before turning in an east-northeast direction north of Roma Ave.

Surface water ponding is a common problem in TDM as evidenced by photographs provided by property owners to OPRD. ESA reviewed these photos and LiDAR topography and found that much of this ponding can be attributed in part to topographic depressions that lack positive drainage. Such ponding likely is exacerbated when the soil becomes saturated with groundwater following heavy rains. **Figure 10** illustrates ESA's conceptual understanding of frequently ponded areas based on a review of topographic depressions that correlate well with site photographs following intense rainfall events. Ponding depths may vary from a few inches to more than one foot, depending on local topographic conditions (PGG, 2019). During the current project phase, TDM's drainage system was analyzed in more detail to identify specific deficiencies and potential improvements, as described in Section 5.2.

Finally, drainage from the East Marsh located on the east side of Sandlake Road and across from TDM, flows into the south end of Beltz Marsh via a 2-ft diameter culvert beneath Sandlake Road. The East Marsh watershed is approximately 202 acres or 0.32 square miles. Limited measurements in this marsh by OPRD in 2018 indicate that water levels in the immediate vicinity of Sandlake Road are controlled by the backwater created by the beaver dam in Beltz Marsh. Ground levels and surface water levels in the East Marsh continue to rise to the south, likely impounded by relic beaver dams and/or emergent vegetation. Observations by OPRD in spring of 2018 indicated water ponded approximately 1 ft above the ground surface throughout this marsh, with deeper water closer to the Sandlake Road culvert (PGG, 2019).

Groundwater discharge and upwelling likely also contribute surface water inputs to the marsh, particularly during the wet season. However, PGG indicated that groundwater discharge flows are likely quite small compared to peak runoff flows during extreme storm events (PGG, 2019).

Hydrologic Characterization Summary

- The Beltz dike tide gate no longer functions properly and allows water to flow into the marsh when water levels are higher in Sand Lake. Still, water levels at high tide are lower on the inside of the dike under existing conditions due to limited flux allowed in and out of the existing box culvert.
- The existing box culvert/tide gate is undersized to efficiently drain accumulated freshwater within the marsh following intense rainfall events and thus it currently takes multiple low tide cycles for water levels in Beltz Marsh to equilibrate with Sand Lake.
- The existing beaver dam at the south end of Beltz Marsh impounds water and creates a backwater area that causes water to pond along both sides of Sandlake Road and within the East Marsh.
- Reneke Creek's northern culvert is completely blocked by gravel, and the southern culvert is undersized for passing peak stream flows. This constriction moderates Reneke Creek flows through the culvert at moderate flows and causes overtopping of the roadway during peak streamflow events.

- The Beltz Creek culvert is perched above the downstream channel and is well above the influence of the tide.
- The upland drainage network in TDM has limited capability to drain TDM following intense rainfall events due to a combination of local topographic depressions with a lack of positive drainage, absence of a drainage network along residential roads, and limited capacity of the culverts along Sandlake Road to transmit flows.
- The East Marsh is affected by the backwater of the beaver dam in Beltz Marsh and is subject to tidal fluctuations during extreme high tides and storm events. Pounded water has been observed in the East Marsh well above the influence of the backwater from Beltz Marsh.
- **Figure 11** shows and describes the major hydraulic control features affecting surface water movement into, out of, and within Beltz Marsh, including the Beltz Dike, culvert and tide gate, and the main beaver dam in the marsh's interior.
- **Figure 5** summarizes elevations of key site features and water levels
- Groundwater hydrology characterization and alternatives modeling are covered in detail in the *Sitka Sedge State Natural Area Hydrologic Analysis Final Report* (PGG, 2019) Groundwater modeling of a dike breach scenario without a setback dike predicted insignificant changes in shallow groundwater elevations beneath TDM during average conditions and slightly reduced groundwater elevations during large storm events.

3.0 Hydrologic and Hydraulic Analysis

To evaluate the site's existing condition and inform and evaluate alternative design concepts, ESA developed and utilized a two-dimensional (2D) HEC-RAS hydraulic model. 2D hydraulic models use a depth-averaged approach to represent flow patterns in the horizontal plane, producing maps of depth and velocity across the simulated landscape. HEC-RAS 2D was used for this project to represent the complex, multi-directional flows within Sand Lake, Beltz Marsh, flood-prone areas, and local infrastructure.

A series of hydrologic scenarios were developed for the site to calibrate the model and analyze design alternatives. Flooding is a concern for TDM and as such, project performance under flood conditions was a priority to analyze. Streamflow inputs for the TDM drainage areas were developed utilizing the Santa Barbara Urban Hydrograph Method. Streamflow inputs for creek watersheds were developed utilizing USGS StreamStats, verified by a watershed scaling of the nearest gaged stream comparable to the project creek. The 2D hydraulic model requires topography, hydrology, and roughness as inputs for the model, which are represented within the model mesh. Alternative design concepts were assessed with model depth, water level, and velocity outputs.

Hydrologic Inputs for 2D Model

There are five hydrologic inputs into the Sitka Sedge marsh:

1. Reneke Creek Watershed

2. Beltz Creek Watershed
3. East Marsh Watershed
4. Tierra Del Mar stormwater subbasin 1 (Sandlake Rd Ditch Subbasin)
5. Tierra Del Mar stormwater subbasin 2 (TDM Northwest Ditch Subbasin)

Reneke Creek, Beltz Creek, and East Marsh watersheds do not have flow gages. A nearby gaged watershed, Tucca Creek watershed, was used to develop inflow hydrographs for these sources. The hydrographs for each watershed were scaled from the Tucca Creek hydrograph using watershed drainage area. (USGS, 2023)

Tierra Del Mar is a residential community south of the marsh. Its landcover is developed and consists mainly of single-family homes, commercial businesses, and roads. A total inflow hydrograph from this area was developed based on direct rainfall and a total surface area of 190,000 square meters. Rainfall data was filtered with backward-facing 2-day average to simulate the delay between instantaneous and eventual rainfall. The drainage area was then delineated into two subbasins, each draining into the marsh through a small culvert. An inflow hydrograph was scaled from the total hydrograph for each subbasin based on subbasin area. Inflow hydrographs for the February 2017 winter storm used in calibration are shown in **Figure 12**.

Two large statistical storm events were also developed as hydrologic scenarios: the 100-year and 50-year events. The 100-year and 50-year inflow hydrographs for Reneke, Beltz, and East Marsh watersheds were scaled from 100-year and 50-year hydrographs of Tucca Creek. The 100-year and 50-year hydrographs of Tucca Creek were developed by using a flood frequency analysis to find peak flows, following the procedures of Bulletin 17B. (Interagency Advisory Committee on Water Data 1982) The February 2017 Tucca Creek hydrograph was scaled to peak at the 100-year and 50-year peak flows, and the Reneke, Beltz, and East Marsh watershed hydrographs were scaled from that based on drainage area.

The 100-year and 50-year inflow hydrographs for the Tierra Del Mar subbasins were developed using the Santa Barbara Urban Hydrograph method and splicing in its 24-hour hydrograph into the February 2017 hydrograph. Inflow hydrographs for the 100-year and 50-year events are shown in **Figures 13 and 14**, respectively.

2D Hydraulic Model Development

Topography and Model Terrain Development

Topography for the hydraulic model was generated from the following sources in order of priority:

1. SWLS 1 foot. This surface was developed following a survey conducted on January 27, 2023, to support the project. It includes small areas around culvert structures. This survey also surveyed the culvert materials, shapes, and invert elevations. (SWLS, 2023)
2. PhoDAR. This DEM is a combination of a photogrammetrically derived model and LiDAR data with manual adjustments. The aerial photography used in the photogrammetrically derived model was taken on September 18, 2015. The LiDAR is dated to 2009. Manual adjustments were made in some areas of

dense vegetation. However, the PhoDAR includes some artificially elevated artifacts outside of the vegetation zone adjustments. (OPRD, 2017).

Additional terrain edits were performed in HEC-RAS to enforce low ground in channels as well as high ground elevations along roadways, the Beltz Diike, and alternative setback dikes.

Model Boundary Conditions

HEC-RAS requires flow as input at the upstream model boundaries and river stage at the downstream boundary. Streamflow estimates were developed as detailed in section 3.1. The downstream boundary of the model is located in Sand Lake approximately 2,000 feet downstream of Beltz Diike. This downstream boundary condition is tidal. The tides data used was water level data measured outside of the Beltz Diike February 1-13, 2017. This data is appropriate for use for all three hydrologic scenarios (Calibration, 100-year, and 50-year) because of the high tides (11.9 ft NAVD and 11.3 ft NAVD) included in the dataset that are concurrent with the hydrograph peak. Tidal water level data used is shown in **Figure 15**.

Model Layout

The full model extent, along with hydrologic inflow and boundary conditions locations, are shown in **Figure 16**. For 2D hydraulic models, the model domain is divided into a mesh composed of cells. In HEC-RAS, the water surface elevation is calculated at each model cell, and velocity is calculated at the faces between cells. As such, cell size and cell face orientation are important to consider to accurately represent flow patterns within channels and the floodplain. Break lines were added to the mesh to ensure that roads, berms, Beltz Diike, channels, and swales were properly captured within the model mesh. Additionally, the mesh resolution was assigned to 20 ft inside the Beltz Diike to appropriately capture flows within channels and across the floodplain. Existing culvert structures within the model domain were included using culvert materials, shapes, and invert elevations as surveyed by Statewide Land Surveying, Inc. (SWLS, 2023)

Roughness

HEC-RAS requires an estimation of the roughness of the landscape as characterized by the parameter Manning's n . For the 2D hydraulic model, the National Land Cover Database (NLCD) 2019 Land Cover was used (**Table 1**). (MRLC, 2021)

TABLE 1. ROUGHNESS CATEGORIES AND FINAL MANNING'S n VALUES

Type	Manning's n
Open Water	0.035
Barren Land Rock-Sand-Clay	0.03
Evergreen Forest	0.15
Developed, Open Space	0.035
Woody Wetlands	0.07
Developed, Low Intensity	0.08
Grassland-Herbaceous	0.04
Developed, Medium Intensity	0.12
Shrub-Scrub	0.05

Mixed Forest	0.12
Deciduous Forest	0.1
Emergent Herbaceous Wetlands	0.045
Developed, High Intensity	0.15
Pasture-Hay	0.045

Model Calibration

Model calibration requires on-site data to be compared against modeled outputs. Water levels are not regularly monitored in Sitka Sedge State Natural Area. Therefore, water level loggers were installed to record site data inside and outside of the Beltz Dike at the existing culvert. Water level was recorded from November 2016 to June 2017 and again from January 2023 to March 2023. During these periods, a representative winter storm that caused flooding occurred between February 1-13, 2017. This storm event was used to calibrate the existing conditions 2D model.

4.0 Alternatives Analysis

Alternatives Development

ESA developed a series of design alternatives for restoring tidal connectivity and fish passage between Sand Lake and Beltz Marsh, while maintaining or improving drainage and flood protection for Tierra Del Mar and Sandlake Road and maintaining recreational access to the trail network at SSSNA.

Hydraulic analysis of the design alternatives and variations focused on the following key project elements and considerations:

Dike Breach -

- the size, location, and number of dike breaches through Beltz Dike
- how different dike breach sizing or full dike removal would affect water levels, velocities, shear stresses, and circulation patterns in Beltz Marsh and Tierra Del Mar

Setback Dike -

- the optimum location of a setback dike for flood protection and storm drainage function balancing storage capacity with wetland impacts
- potential stormwater drainage improvements in TDM that would reduce flooding experienced by residents or improve the functionality of a setback dike

TDM Stormwater Drainage System Assessment

In order to understand how the SSTW project will affect the function of TDM's stormwater drainage system, specifically how a setback dike in a given location would perform, or how high tide levels could affect TDM's drainage, it is important to characterize the stormwater drainage network and facilities within TDM and the East

Marsh watershed. Most of the land in TDM sits above maximum tidal or flood levels of Sand Lake, but the flat terrain and depressional areas within TDM hold water during storm events due to a lack of positive drainage pathways for water to escape. While the ditch along Sandlake Road and an existing swale at the northwest end of TDM have some ability to convey water downstream to Beltz Marsh, many areas, particularly in the western half of TDM, have no drainage connection to these conveyance features. Furthermore, culverts and ditches along Sandlake Road have limited conveyance capacity and regularly clog with sediment and debris. These conditions lead to real drainage problems and exacerbate residents' perception of flooding in TDM and their concern that reconnection of Beltz Marsh could make these conditions worse. While reconnection of Beltz Marsh could influence drainage and flooding conditions in the lower portion of the TDM drainage system, much of the flooding experienced in TDM further away from the marsh is unrelated to conditions in the marsh and would not be affected by the proposed restoration actions.

This assessment of TDM's drainage system is aimed at:

- defining drainage patterns within TDM and estimating stormwater runoff rates and volumes that contribute to the East Marsh and Beltz Marsh for incorporation into the 2D HEC-RAS modeling,
- identifying the deficiencies within the system that cause or contribute to flooding and ponding of water within TDM,
- differentiating between flooding caused by stormwater drainage issues and flooding that could be influenced by restoration actions at SSSNA, and
- identifying potential drainage improvements in TDM that could alleviate flooding conditions experienced by residents or improve the functionality of the proposed setback dike system.

ESA used a combination of LiDAR and survey data, site reconnaissance and interviews with TDM residents, and winter-time storm observations and water level data to define drainage patterns/flow routing, sub-catchment areas, stormwater discharge points/connections to SSTW, and system deficiencies that could be improved. **Figures 17 and 18** show an overview of the existing TDM Drainage System with aerial photo and LiDAR backgrounds, respectively.

ESA's full assessment of TDM's drainage system, identified deficiencies, and potential improvements are described in detail in a separate memorandum, **Tierra Del Mar Stormwater Drainage System Assessment by ESA, May 2023**.

TDM Drainage System Interaction with Setback Dike

During large storm events, runoff from TDM and the East Marsh watershed would drain into the storage basin behind the setback dike. During high tides when the water level in Sand Lake and the reconnected portion of Beltz Marsh is elevated, the setback dike's tide gate would be closed, and runoff would accumulate to fill the storage basin and cause levels behind the dike to rise. When the tide recedes, or the inboard water level exceeds the outboard water level, the tide gate would open and allow the storage basin to drain out.

For analysis of the setback dike alternatives described in Section 5.4, it is important to understand the runoff and streamflow contributions that enter the south end of Beltz Marsh in the area that would be upstream of each

potential setback dike alternative alignment. Depending on the chosen location for the setback dike and potential re-routing of stormwater, some of the runoff could be routed to flow outside of the setback dike and therefore not occupy storage volume behind the setback dike.

ESA identified three separate drainage basins within TDM including:

- East Marsh/No Name Creek watershed – approximately 202 acres (0.315 square miles) including portions of TDM that lie east of Sandlake Road and the forested hillslopes east of TDM
- Sandlake Road Ditch subbasin – approximately 30 acres including most of the residential area of TDM that lies west of Sandlake Road. These areas generally drain toward the Sandlake Road ditch where water is conveyed through a series of culverts at each side street intersection.
- TDM Northwest Ditch subbasin – approximately 12 acres including a smaller portion of the TDM residential area situated between the Pacific Ocean foredune and a topographic rise that separates this area from the Sandlake Road Ditch subbasin to the east. This area drains northward through swales that have been partially blocked by infill development, becoming a channel that flows through culverts at Jasmine Ave, Pollock Ave, and Roma Ave and toward Beltz Marsh.

A setback dike located near the existing beaver dam would be downstream of all TDM and East Marsh runoff contribution points, and all runoff and streamflow from these areas would drain into the marsh upstream of the dike. Therefore, a setback dike in this location would need to include sufficient storage volume to contain all runoff from TDM and the East Marsh subbasin.

It could be possible to orient a new setback dike alignment such that the TDM Northwest Ditch would drain directly into Beltz Marsh downstream or outside of the setback dike. Furthermore, it could be possible to intercept flows from the TDM Northwest Ditch subbasin and reroute these flows to a new outfall on the beach. These actions could reduce the amount of runoff draining into the storage basin upstream of the proposed setback dike and could reduce the amount of storage capacity needed. These modifications were considered and analyzed as described in Section 5.4.3. However, the TDM Northwest Ditch subbasin contributes three times less runoff to Beltz Marsh than the Sandlake Road Ditch subbasin, and the East Marsh watershed is five times larger than both subbasins combined. Hydraulic modeling determined that re-routing flows from the Northwest Ditch subbasin to the outside of the setback dike would not substantially influence the performance of a setback dike or required storage volume. Capturing runoff within the TDM Northwest Ditch Subbasin and the west end of Austin Ave, and rerouting flows to a new outfall on the beach, could improve localized flooding in the subbasin by providing a more efficient way to drain water out of these flat depressional areas.

Dike Breach

Size, Location, and Number of Dike Breaches

During the 2019 hydrologic study, ESA estimated the minimum dike breach dimensions that would allow for full equilibration of tidal water levels between Sand Lake and Beltz Marsh based on a combination of Tidal Channel Design Guidelines (PWA, 1995), hydraulic geometry (Williams, 2002), and analysis of nearby reference tidal channels. Using the parameters of contributing marsh surface area and tidal prism volume (the potential volume

of water contained within the marsh between mean higher high water and mean lower low water datum elevations), ESA estimated the dike breach tidal channel should have a minimum bottom width of 37 feet, with a top width (at the top of the dike breach) of approximately 80 feet. However, a larger dike breach opening may be beneficial for:

- restoring more natural circulation patterns and sediment transport/accretion processes,
- reducing water velocities through the dike breach to reduce erosion and facilitate fish passage, and
- reducing shear stress on the banks of the dike breach channel to minimize potential for erosion at potential pedestrian bridge abutments.

Full removal of the earthen levee known as Beltz Dike would restore tidal connectivity closest to the conditions that would have existed prior to the construction of Beltz Dike allowing for unconstrained flow of tidal water across the marsh surface. However, if the dike were fully removed, the Beltz Dike Trail which provides access from the trailhead to the rest of the SSSNA trail network would be severed. An alternate trail connection could be provided by constructing a boardwalk across the marsh or by establishing a new trail around the perimeter of Beltz Marsh and across the south end of the marsh. These options for maintaining recreational access are discussed herein. TDM residents have also raised concerns about removing the full dike.

Number of Dike Breaches

ESA considered whether it would be beneficial to construct multiple dike breaches, or if it would be better to focus on a single dike breach. Multiple breaches could provide additional fish passage pathways between Sand Lake and Beltz Marsh. However, including multiple breaches would have several disadvantages including:

- requiring additional pedestrian bridges or culverts to maintain trail access,
- splitting tidal flow and tidal prism volume between multiple breaches/inlets, rather than focusing tidal prism volume through a single breach to help maintain the channel width and depth in the future,
- reducing predictability due to splitting of flow through multiple breaches that could evolve/enlarge over time and cause damage to bridges or culverts. For example, if one large breach and one small breach were constructed, it is possible that the larger breach could be blocked by sediment or other means, causing the smaller breach to enlarge and undermine bridge abutments. All breaches and associated access infrastructure would need to be sized to handle all flow in case it became the preferential flow path.

Additionally, natural tidal channel networks in similar settings along the Oregon Coast typically exhibit a fractal dendritic planform resembling a tree trunk that branches into many smaller channels. **Figure 19** shows an example of a dendritic tidal channel network where multiple small first-order channels combine to create a 2nd order channel, 2nd order channels combine to create a 3rd order channel, and 3rd order channels combine to create a 4th order channel, all funneling tidal flows to a single inlet/outlet point (Hughes, 2012). This dendritic channel network planform can be observed in the northeastern portion of the Sand Lake Estuary (**Figure 20**), and in many other locations along the Oregon Coast and low-gradient marshes across the world.

For these reasons, we recommend focusing on constructing a single dike breach that is generously sized large enough for flood conveyance capacity, fish passage, and to accommodate some channel adjustment in the future.

Location of Dike Breach

To determine the ideal location for a dike breach, ESA analyzed historical aerial photos along with current-day aerial photos and onsite observations of existing flow paths and relict channel features. In the oldest available historical aerial photo from 1939 shown in **Figure 21** (University of Oregon Libraries, 2020), two large channels appear near the midpoint of Beltz Dike, and it appears that the drainage structure was also near this location at the time. In the historical aerial, as well as recent aerial photos (**Figure 22**), it appears that these large central channels upstream of the dike generally align with the largest channel features downstream of the dike in Sand Lake. This central area appears to be the most logical location to construct a new dike breach channel to restore historical flow patterns and connect the prominent channel features observed upstream and downstream of the dike.

Two other potential locations were considered for a dike breach. A breach could be excavated near the current location of the existing concrete box culvert and tide gate, near the eastern end of the dike. However, while the existing culvert drains out into Sand Lake and into downstream channel forms, the upstream channel network within Beltz Marsh does not align well with this location. The existing box culvert has large scour holes upstream and downstream of the culvert. The upstream scour may be partially caused by the location of the culvert relative to the upstream channel, which causes water from Beltz Marsh to funnel into this area and form a large eddy. Allowing for more tidal exchange in this location could continue causing erosion of the adjacent banks and dike embankment. At the west end of Beltz Dike, a dike breach could be excavated to connect the northwestern lobe of Beltz Marsh to a small tidal subbasin observed outside of the dike. The 1939 aerial does not show any evidence of a historical channel connection in this location, and the small tidal subbasin observed today appears to have formed within the borrow ditch excavated outside of the dike.

These four potential dike breach locations considered are identified in **Figure 23**.

We recommend locating a new single dike breach near the midpoint of Beltz Dike to restore connectivity between the large channel features visible in historical and current aerial photos inboard and outboard of Beltz Dike.

Sizing a Dike Breach

ESA utilized the 2D model to analyze dike breach and removal alternatives including:

- 100-Foot Breach - A single dike breach with a 40-foot bottom width and 100-foot top width
- 200-Foot Breach – A single dike breach with a 200-foot top width allowing for a wider marshplain bench through the opening
- Full Dike Removal – Full removal of the entire Beltz Dike lowered to match the existing adjacent marsh plain elevations with a breach channel

Factors for evaluating the performance, benefits, and disadvantages of each dike breach or removal option include:

- Changes or differences in water levels in Beltz Marsh or behind a setback dike
- Circulation patterns of water moving between Sand Lake and Beltz Marsh, across the marshplain, and within channels
- Velocities and shear stresses through the dike breach openings, across the marsh, and within channels to inform fish passage, erosion potential, and sedimentation/accretion responses

Water Levels

Because the 100-foot breach is large enough to allow for full equilibration of water levels inside the marsh, the model showed no difference in water levels generated inside the marsh under the dike breach scenarios compared to the full dike removal alternative. The model also showed negligible differences in water levels behind the setback dike between the dike breach or full dike removal alternatives. **Figure 24** shows a comparison of modeled water levels behind a setback dike under a 100-foot dike breach or full dike removal compared to the existing dike configuration and water levels in Sand Lake.

Circulation Patterns

While there was no discernable difference in water levels modeled under the dike breach and full dike removal scenarios, there are differences in the circulation patterns of how water moves in, out, and across the marsh surface.

Under the dike breach scenarios, water moving between Sand Lake and Beltz Marsh is funneled to and concentrated through the dike breach opening. Low velocities are present on the marshplain, with relatively higher velocities in the concentrated flows within the channels. With full dike removal, tidal flux is distributed more evenly across the marsh and interface between Sand Lake and the marsh, particularly at higher water levels. During lower water levels under the full dike removal alternative, water is still generally funneled into the channel and the proposed dike breach location, concentrating flows with higher velocities observed in the channels.

100-foot dike breach compared to full dike removal – tidal circulation during high tide drain out: **Figure 25** shows a comparison of water circulation patterns and flow directions under the 100-foot dike breach and full dike removal alternatives during drain out while water levels are still high (above 9' NAVD88). **Figure 26** shows the same comparison after water levels have fallen below 9' NAVD88 and flows are concentrated in channels under both conditions.

Under the 100-foot dike breach condition, an eddy is visible in **Figure 25** just inside of the marsh near the dike breach. This eddy was not observed in modeling under the 200-foot dike breach condition. An eddy has potential to cause erosion on the banks of the dike breach if shear stresses are high enough to erode the soils and could require scour countermeasures such as armoring with rip rap or other means.

Velocity/Shear Stress

The 100-foot breach results in water velocities through the breach that are less than 2 feet per second (ft/sec) for most of the time (ODFW's threshold for fish passage peak velocities in fishway transport channels). Short-

duration peak velocities of approximately 3 ft/sec occur during peak drain out during the 100-year storm scenario. **Figure 27** shows modeled water velocities through the 100-foot breach throughout the 100-year storm hydrologic scenario compared to the 2 ft/sec fish passage velocity threshold. During the moments of peak velocity, the peak shear stress through the dike breach reaches approximately 0.19 pounds per square foot (lb/sf), which has the potential to erode medium to coarse gravels and may require light armoring to prevent erosion in the vicinity of potential bridge abutments. **Figure 28** shows a 2D model output of peak shear stress through the 100-foot dike breach compared to a table for limiting shear stress for uniform noncohesive sediments (Fischenich, 2011).

The 200-foot dike breach would result in even lower velocities through the dike breach opening with peak velocities across the breach at approximately 1 ft/sec. Slightly higher velocities occur in tidal channels near the breach. **Figure 29** shows a comparison of peak velocity through 100-foot and 200-foot dike breaches during the 100-year storm hydrologic scenario. The lower peak velocities and shear stresses through a 200-foot dike breach would likely not require any armoring to protect potential bridge abutments. For comparison, the nearby Whalen Island road bridge has an upstream contributing marsh area of 180 acres, more than twice that of the Beltz Marsh. The Whalen Island Bridge has an 80-foot span and channel opening, but the velocities and shear stresses through that bridge section require extensive rip rap armoring and deep sheet pile walls to protect the bridge abutments as seen in **Figure 30**.

It is unclear how these differences in circulation patterns and velocity distributions would influence sedimentation or accretion within Beltz Marsh. Once the marsh is fully reconnected to tidal flows, accretion rates may be more dependent on sediment supply within the water than peak tide circulation patterns. The remaining portions of the dike after breaching would act as berms which can slow water on the marshplain and increase sedimentation by reducing wind/wave erosion. The remnant dike may act as a ‘wave break berm’ and serve this function. However, areas where water is funneled back into channels and through the dike breach would likely experience more erosion than deposition.

Setback Dike

Following the 2019 hydrologic study, stakeholder coordination, and subsequent technical advisory committee meetings, OPRD selected a preferred alternative concept that included breaching the outer Beltz Dike while constructing a new setback dike closer to TDM to maintain or improve flood protection for the adjacent community and Sandlake Road. This alternative provided the compromise that best met all the diverse goals of the project (OPRD, 2020).

At this time, a setback dike was conceived to be located approximately at or near the location of the existing primary beaver dam, approximately 700 feet north of the TDM/SSSNA boundary. In 2019, ESA performed a preliminary feasibility assessment to determine if a setback dike located near the beaver dam could have sufficient storage volume upstream of the setback dike to contain stormwater runoff from a 100-year storm event without resulting in higher peak water levels than under existing conditions (**Figure 31**).

The current project phase aims to refine the location of a potential setback dike to provide sufficient stormwater runoff storage capacity while minimizing wetland impacts and maximizing the area of marsh that could be reconnected to the Sand Lake estuary.

Optimizing Location/Alignment of Setback Dike

Constructing a new setback dike across the south end of Beltz Marsh will result in wetland impacts including wetland fill within the footprint of the setback dike as well as limiting the area of marsh that can be reconnected to full tidal interaction with Sand Lake. The further south that a setback dike can be located, the smaller the dike's footprint would be and the smaller the portion of wetland remaining disconnected from Sand Lake would be. However, shifting the setback dike southward would also reduce the potential storage volume available to contain stormwater runoff from TDM during high tides when a new tide gate would be closed. **Figure 32** shows a conceptual cross section of a setback dike that would be applied at Sitka Sedge, with a minimum, long-term, top elevation of 15' NAVD88 to maintain approximately 3 feet of freeboard over the maximum observed water levels at the site. **Figure 33** shows a conceptual plan of potential setback dike locations relative to TDM, Sandlake Road, and the channels/ditches that would contribute runoff to the area behind a setback dike.

In an effort to minimize wetland impacts and maximize estuary restoration, while protecting upstream infrastructure and private property, ESA developed a series of four setback dike alignment alternatives for detailed hydraulic modeling and analysis including:

- **Alternative 1** – located at or near the existing primary beaver dam and approximately 700 feet north of TDM (similar to the preliminary setback dike location evaluated in 2019). This alternative would provide the greatest potential storage volume to contain stormwater runoff from TDM. If this storage volume was determined to be insufficient, additional setback dike alternative locations further north would be considered.
- **Alternative 2** – located approximately 300 feet south of the existing primary beaver dam and 300 feet north of TDM. This alternative would reduce runoff storage volume and wetland impacts.
- **Alternative 3** – located at the southern park boundary and configured to allow the TDM Northwest Ditch to flow directly to the marsh outside of the setback dike thereby not contributing runoff to the setback dike's upstream storage basin. This alternative would significantly reduce wetland impacts and runoff storage volume but would route a portion of TDM's runoff outside of the setback dike, possibly reducing the necessary storage capacity.
- **Alternative 4a** – located along Sandlake Road and Roma Avenue, raising these roadways to a minimum elevation of 15' NAVD88 to function as the setback dike with a new culvert and tide gate at the Sandlake Rd/East Marsh crossing. Under this scenario, the NW Ditch and Sandlake Rd Ditch would flow directly to the marsh, while the East Marsh and adjacent TDM properties would be protected from the highest tides, and the East Marsh would function as the runoff storage basin. This option would nearly eliminate wetland impacts associated with the project.
- **Alternative 4b** – similar to 4a but without a new tide gate at the Sandlake Rd/East Marsh crossing. This alternative would allow full peak tide levels at the south end of Beltz Marsh and in the East Marsh but not retain any stormwater runoff upstream of the elevated embankment. This alternative would essentially be a non-setback dike alternative while raising Sandlake Road and Roma Ave above current and expected future peak water levels. This alternative could maintain roadway access during the highest expected water levels but would expose portions of the lowest-lying private properties in TDM to increased frequency of tidal inundation.

All setback dike alternatives assume the setback dike would have a 12-foot span box culvert fitted with a tide gate controlled by a muted tidal regulator (MTR) system, and the MTR would be set to stay open until upstream water levels exceeded 8.0' NAVD88. All alternatives also assume that the culvert at the Sandlake Rd/East Marsh crossing is replaced with a 12-foot span box culvert so that the water levels behind the setback dike freely propagate upstream into the east marsh.

Figure 34 shows the approximate locations of Setback Dike Alternatives 1 through 4 as described above.

Hydraulic Performance of Setback Dike Alternatives

Using the 2D HEC-RAS Model setup discussed in Section 4, ESA evaluated the performance of each setback dike alternative under a range of hydrologic conditions. For the purposes of understanding how each setback dike alternative would affect water levels at the south end of the marsh/north end of Tierra Del Mar, this analysis focused on modeling combinations of high tides and large storm events, including:

- High tides ranging from average high tide levels of 7-8' NAVD88, to frequently occurring peak high tides of 10' NAVD88, to maximum observed high tides or King Tides reaching approximately 12' NAVD88.
- Stream flows ranging from wintertime base flow conditions to peak stream flows and stormwater runoff contributions under frequently occurring 2-year storm events and peak stream flows and stormwater runoff during an extreme 100-year storm event.

This full range of potential wintertime conditions were combined into a single 14-day hydrologic scenario that includes:

- 3 days of typical wintertime conditions with base flow from the East Marsh and no runoff from the TDM subbasins combined with average tide conditions,
- 5 days of a 'first storm' that includes 2-year peak stream flows and stormwater runoff rates, combined with high tides reaching 10' NAVD88, and
- 6 days of a 'second storm' that includes 100-year peak stream flows and stormwater runoff rates, combined with King Tides reaching 12' NAVD88.

This longer-duration hydrologic scenario is intended to allow for a single alternative model run to capture a wide range of anticipated wintertime conditions and provide a realistic but conservative starting point for the extreme tide/storm event (with water already in the system). Water level plots shown in the following sections may include the full 14-day hydrologic scenario or focus in on one of the three periods described above (typical wintertime conditions, first storm/2-year storm, and 100-year storm).

Modeled Water Levels Inside Beltz Dike:

As a baseline for understanding the water levels that would occur outside of the setback dike under a dike breach scenario, ESA used the 2D model to compare water levels inside Beltz Dike (north end of Beltz Marsh) after dike breaching to existing conditions. Confirming conclusions made during the 2019 hydrologic study, the 2D model

results show that after dike breaching, water levels in Beltz Marsh would match the water levels occurring in Sand Lake. During typical wintertime conditions, dike breaching would allow for higher, short-duration peak water levels that are higher than water levels under existing conditions. However, under existing conditions, the existing undersized box culvert prevents efficient drain out of water and leads to higher water levels that take several tide cycles to drain out. During multi-day storm events, stormwater accumulates behind Beltz Dike creating higher water levels with each successive high tide event. During the simulated extreme storm event of 100-year stream flows, 100-year stormwater runoff, and king tides, the existing condition results in the highest peak water level, and it takes more than five days for water levels in Beltz Marsh to drain out to pre-storm levels. These modeled water level conditions inside Beltz Marsh under the 100-year storm scenario are shown in **Figure 35**. The 2019 hydrologic study concluded that these prolonged elevated water levels would contribute more to elevated groundwater levels than the short-duration peak tide levels that would occur under a dike breach alternative (PGG, 2019).

If no setback dike were constructed, these modeled peak tides under the dike breach scenario would occur at the south end of the marsh/north end of TDM. However, due to the presence of the existing beaver dam, water levels at the south end of the marsh would never fall below approximately 8' NAVD88.

Modeled Water Levels at South End of Marsh Under Setback Dike Alternatives:

ESA utilized the 2D model to simulate water levels at the south end of Beltz Marsh (at the north end of TDM) under each setback dike alternative compared to existing conditions. **Figure 36** shows predicted water levels at the south end of the marsh during the 100-year storm hydrologic scenario. **Figure 37** zooms in on results from the 'first storm' (2-year flows with 10' tides), and **Figure 38** zooms in on the 100-year storm event (100-year flows with King Tides). As previously described, the existing conditions result in the highest peak water level and slow drain out of water leading to prolonged elevated water levels.

Setback Dike Alternative 1 has the largest upstream storage capacity of all setback dike alternatives and results in lower water levels than existing conditions during almost all points in the 14-day simulation period. Alternative 1 results in higher peak water levels than existing conditions during the first two high tides of the 2-year storm event, but these peaks are 8.5' and 8.9' NAVD88 respectively which would not be problematic. In addition to lower peak water levels, Alternative 1 also provides rapid drain out after the peak of high tide.

Setback Dike Alternative 2 similarly provides rapid drain out after the peak of high tides. However, the reduced storage capacity compared to Alternative 1 results in higher peak water levels than existing conditions during all high tides within the 2-year storm and only marginally reduces the peak water levels during the 100-year storm event.

Because Alternative 2 would generally be an improvement over existing conditions during large storm events but would not be as effective as Alternative 1, ESA tested a variation of rerouting flows from the TDM Northwest Ditch to a new outfall on the beach. This modification would reduce the amount of stormwater runoff entering the storage basin behind the setback dike and may result in lower water levels behind Setback Dike Alternative 2. However, model results show that this modification would have a negligible effect on water levels behind the setback dike because the relative proportion of runoff from the TDM Northwest Ditch subbasin is very small compared to the Sandlake Road Ditch subbasin (both of which are dwarfed by the streamflow contribution of No Name Creek/East Marsh watershed). These model results are shown in **Figure 39**. While this modification would

not improve the performance of a setback dike, rerouting flows from the Northwest Ditch subbasin would still be beneficial for relieving localized ponding in depressional areas within the subbasin such as at Austin Ave, Pier Ave, and Jasmine Ave.

Setback Dike Alternative 3 also provides rapid drain out, but because of the minimal storage capacity behind the setback dike, peak water levels are only marginally lower than unrestrained water levels in Sand Lake.

Setback Dike Alternative 4, which raises Sandlake Road and Roma Ave to function as the setback dike for areas upstream, would have no influence on water levels at the south end of Beltz Marsh. Under this alternative, peak water levels at the south end of the marsh would match water levels in Sand Lake. Because this alternative is coupled with dike breaching, this configuration would also provide rapid drain out after the peak of high tide and would also be an improvement compared to existing conditions during a 100-year storm event with King Tides.

Modeled Water Levels in the East Marsh/Upstream of Sandlake Road:

ESA also evaluated modeled water levels upstream of Sandlake Road in the East Marsh under all setback dike alternatives. Because Tillamook County Public Works and other stakeholders are planning to replace the existing culvert in this location, all modeled alternatives assume this culvert is upsized to a 12-foot span box culvert. This culvert upsizing generally results in similar water levels upstream of Sandlake Rd as are predicted downstream of Sandlake Rd for all setback dike alternatives. **Figure 40** shows modeled water levels in the East Marsh for all setback dike alternatives compared to existing conditions during the 2-year storm with 10' tides. **Figure 41** shows modeled water levels in the East Marsh during the 100-year storm with King Tides.

Setback Dike Alternatives 4a and 4b (with and without a tide gate, respectively) result in similar water levels within the East Marsh due to the minimal storage capacity available within the East Marsh.

5.0 Deviations from QAPP

At the outset of the project phase, ESA worked with TEP and Environmental Protection Agency (EPA) to develop a Modeling Quality Assurance Plan (QAPP). ESA conducted the hydraulic modeling and analysis in accordance with the QAPP. Minor deviations from the QAPP are described here. These deviations have not affected the selection of the preferred alternative described in the 30% Basis of Design Report.

In the next project phase, ESA and subconsultant team members will advance and refine the design of the preferred alternative elements based on an upcoming geotechnical investigation. During the final design phase, ESA will conduct additional hydraulic modeling of the final configuration to document anticipated hydraulic performance for stakeholder communication and permitting. Deviations from the QAPP during the alternatives analysis phase will be reconsidered for implementation in the next stage of hydraulic modeling.

5.1 – Field Data Collection

Water Level Monitoring

As planned, TEP and ESA conducted additional water level monitoring within the project area in 2022/2023. However, 2D modeling largely relied on hydrologic data from 2017-2019 for several reasons. Calibration of existing conditions 2D HEC-RAS model was conducted before new water level monitoring data was available.

Additionally, there were no significant rainfall storm events that coincided with King Tide events during the 2022-2023 monitoring period, so utilizing the newer water level data would not have provided any better storm/tide events to evaluate storm and extreme tide conditions.

2022/2023 water level monitoring data was used to evaluate how further deterioration of the existing tide gate has affected water levels in Beltz Marsh. In 2017 the tide gate was missing one or more boards, allowing water to flow into the marsh during high tide resulting in peak water levels approximately 1.4' higher than the outboard peak water level in Sand Lake, as shown in **Figure 7**. In 2022/2023, the tide gate boards are completely missing allowing more water in and resulting in inboard peak water levels approximately 1.9' higher than outboard water levels. Therefore, the further deterioration of the tide gate has resulted in peak tidal water levels in Beltz Marsh approximately 0.5' higher in 2023 than in 2017.

2022/2023 water level monitoring also included a water level logger located closer to the mouth of Sand Lake. During low tides, water levels at this 'estuary channel' location fell to approximately 3.0' NAVD88 (more than 2 feet lower than water levels immediately outside of Beltz Dike but still several feet higher than low tide water levels in the Ocean. This data confirmed our understanding that the bed features in Sand Lake retain water and prevent full tidal drain out of Sand Lake but provided evidence that this effect decreases closer to the mouth at the Pacific Ocean.

Topographic and Bathymetric Data

As planned, ESA generated a modeling terrain surface incorporating the PhoDAR surface and the SWLS 2023 survey data. Drone survey data was taken and developed in 2022, as detailed in the QAPP. However, the model calibration process demonstrated the PhoDAR data better represented the site conditions, with the exception of the Beltz Dike. ESA modified the PhoDAR-based model terrain to enforce the top of the Beltz Dike, as confirmed in the drone survey.

Although identified in the QAPP, ESA did not collect a significant amount of additional ground survey measurements for the purposes of incorporating vegetation-bias adjustments implemented in OPRD's PhoDAR dataset or bathymetry data. In the model calibration process, ESA effectively modified the Sand Lake and Beltz Marsh channel bathymetry in the vicinity of the dike, yielding water levels inside the dike within 0.5 feet of monitored levels, by burning in channels with a bottom elevation of 3 feet (NAVD88). Bathymetric adjustments in the southern portion of Beltz Marsh were not necessary because the existing beaver dam consistently maintains a ponded water level of 8 feet. Vegetation adjustment was not necessary because great care had already been taken during the previous hydrologic study to adjust the PhoDAR terrain model for vegetation conditions.

Calibration yields water levels within 0.5' of monitored water levels at peak flood levels, demonstrating representation of marsh water levels sufficient for 30% design effort. Additionally, modeled water levels are the same or higher than monitored water levels, showing slightly higher peaks (up to 0.5') and slightly slower drainage following flood peaks, as shown in **Figure 42**. This shows the modeling is slightly conservative under flood conditions.

5.2 – Hydrologic Scenarios

Streamflow hydrographs for each of the contributing streams/watersheds (Reneke Creek, Beltz Creek, and East Marsh watershed) were developed using a watershed scaling approach based on a nearby gaged stream (Tucca Creek). Using an actual streamflow hydrograph from Tucca Creek corresponding to the January 2017 storm event used for existing conditions model calibration, the proportional ratio of watershed area (contributing watershed/Tucca Creek watershed) was applied to generate streamflow hydrographs for each of the contributing watersheds. To develop streamflow hydrographs for the extreme storm/flood model scenarios, these hydrographs were again scaled up by a factor that would result in Tucca Creek's peak streamflow reaching the level expected for a 2-year, 50-year, and 100-year recurrence interval event. The resulting peak stream flows for Reneke Creek and Beltz Creeks were compared to USGS Streamstats peak flow estimates for these creeks. During model setup and upon a detailed review of previous streamflow hydrograph development methodology, streamflow hydrographs based on a watershed scaling approach were deemed sufficient for calibrating the existing conditions 2D model and for comparing the hydraulic performance of the proposed design alternatives. Additionally, the Tucca Creek watershed has a higher 24-hour rainfall depth than the project site according to available isopluvial maps (NOAA, 2001). Therefore, the scaled hydrographs from Tucca Creek are likely conservative. HEC-HMS was not used to develop streamflow hydrographs as described in the QAPP.

The QAPP also noted that ESA may use the 'rain-on-grid' feature in HEC-RAS to apply precipitation data directly onto the model terrain mesh to generate stormwater runoff. However, this method was not utilized due to increased model run times and instability caused by attempting this method. As planned and described in the QAPP, storm event stormwater runoff rates from the Tierra Del Mar drainage basins were developed using Santa Barbara Unit Hydrograph (SBUH) method.

Additional hydrologic analysis and hydraulic modeling will be conducted in subsequent design stages to further refine the design of the setback dike and its drainage structures. We will consider developing additional hydrologic input data using HEC-HMS or rain-on-grid method at that time.

The QAPP identified additional hydrologic scenarios including summertime periods for water quality considerations and future climate-change scenarios. This phase of project work focused on identifying a preferred project alternative. Typical winter tides, high tides and extreme flood events were the basis for this effort. Further design stages may include additional hydrologic analysis and modeling to consider water quality and climate change.

5.3 – Develop and Calibrate 2D Existing Conditions Model

As detailed in the QAPP, water levels were monitored in 2022-2023. The monitoring time did not include any extreme high tides or flood events. Therefore, the 2022-2023 data was deemed not suitable for calibration of the model's extreme flood scenarios. The model was calibrated to previously collected water level data and time-stamped site photos of problematic flooding within the project area.

5.4 – Proposed Conditions Modeling of Alternatives

ESA modeled the proposed alternatives features including the dike breach size, number, and location; and potential setback dike locations. Proposed restoration of historic tidal channels, filling linear drainage, and potential improvements to TDM's stormwater system were evaluated qualitatively (i.e., they were not incorporated in the Alternatives model geometries). These features are still being considered for inclusion in the design. While it is believed that adding sinuosity and complexity to the site's channel network, completing this earthwork would cause impacts to existing high-quality vegetation and disturbance to the marsh soils. Additional site reconnaissance and coordination will be needed to determine if the key stakeholders believe the impacts would be worth the improvements. If proposed for inclusion in the final design, the updated 2D hydraulic model will be modified to include these channel modifications to determine how these changes would affect site hydraulics and drainage/flood control performance in areas south of the setback dike.

6.0 References

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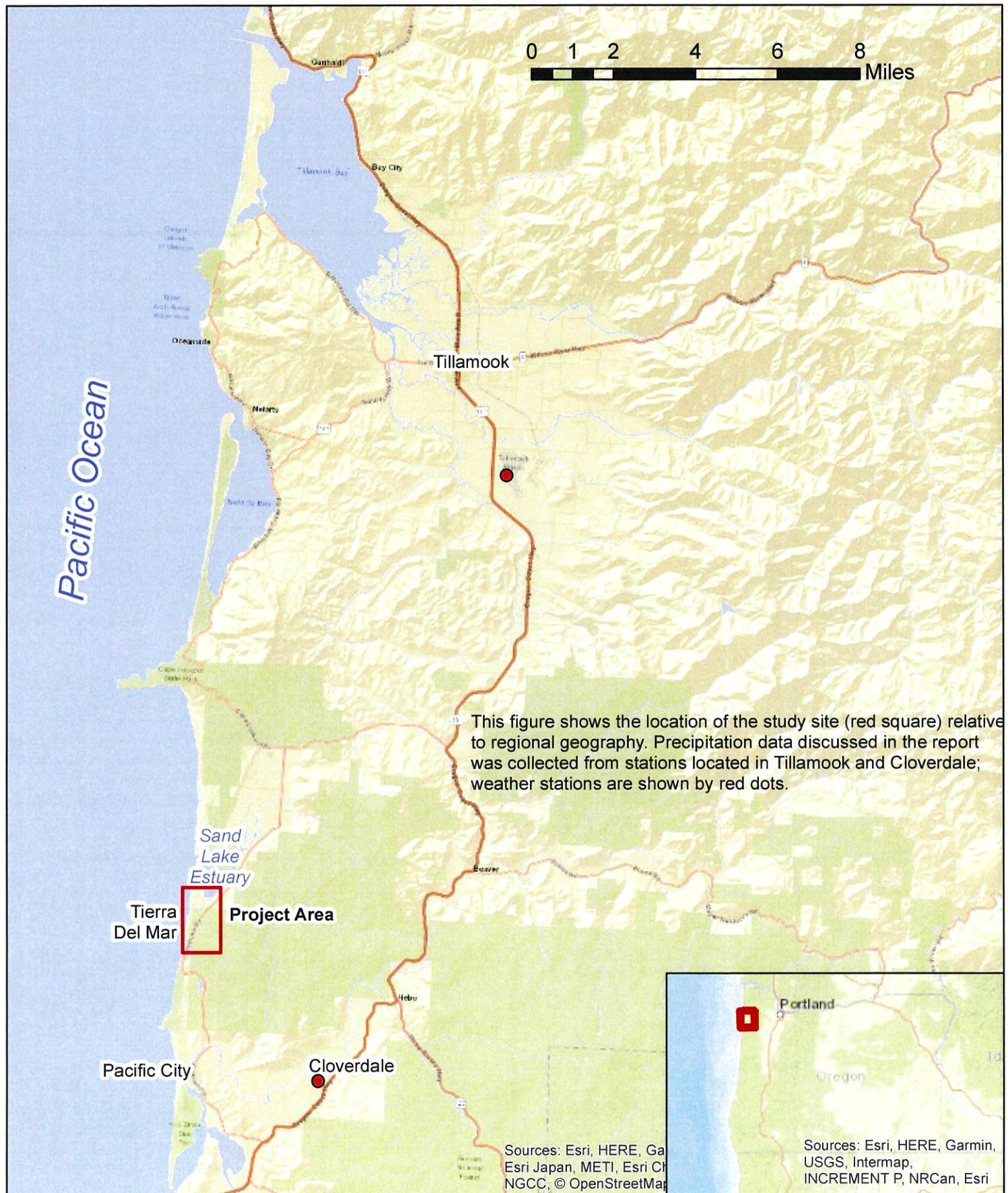
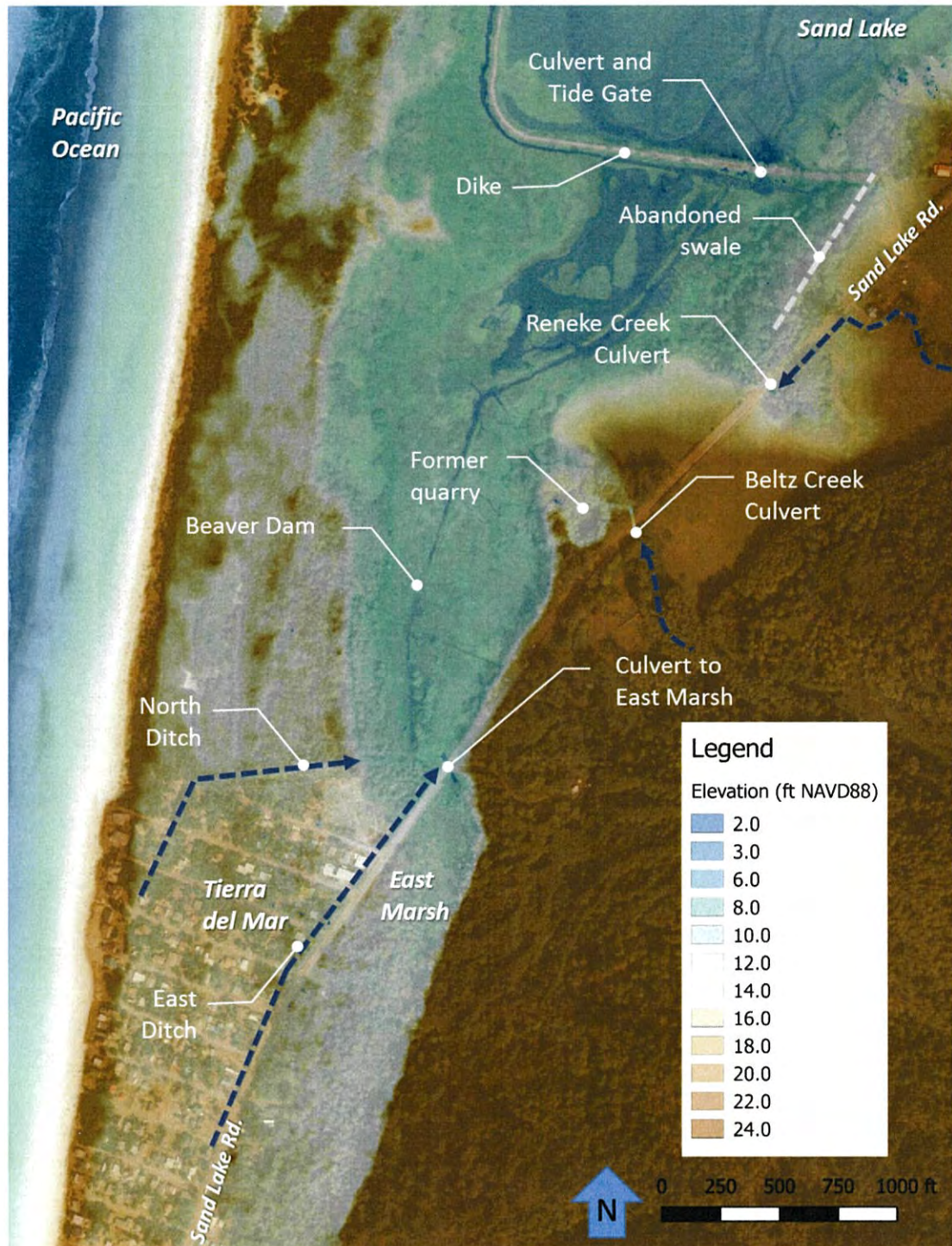


Figure 1
Project Location Map



Note: This figure is an aerial photo identifying key site features of the project area.

Figure 2
Annotated Site Map and Aerial Photo



Note: This figure is an aerial photo with a LiDAR elevation data overlay. Key site features are labeled for reference.

Figure 3
Annotated Site Topographic and Hydrologic Map

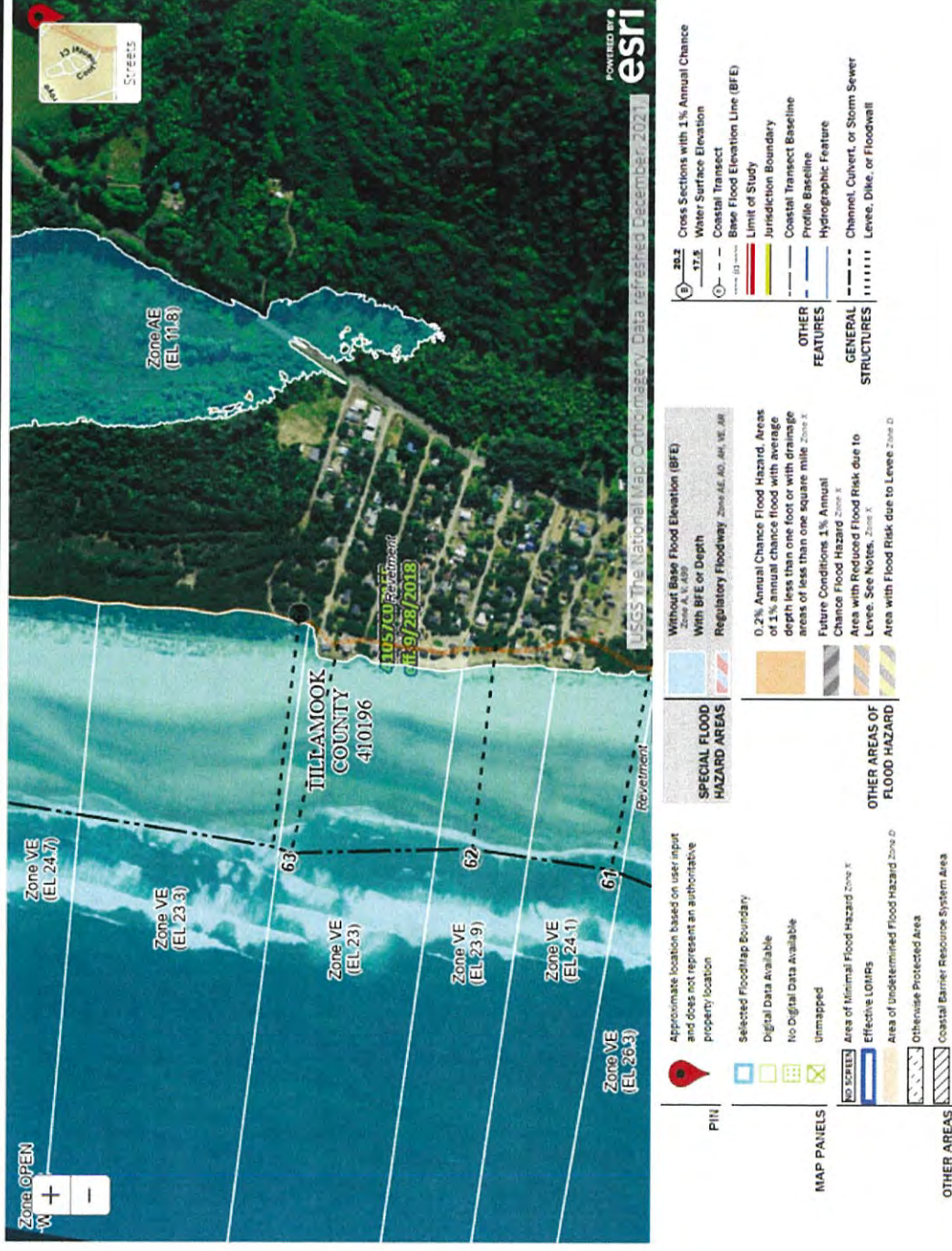
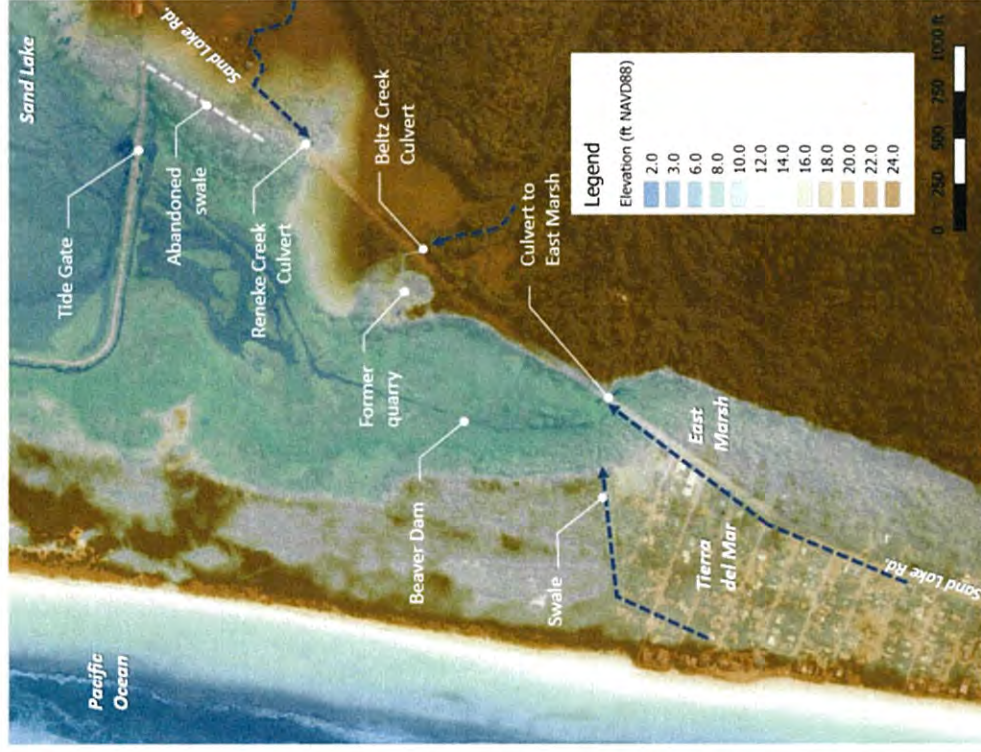


Figure 4
FEMA Flood Insurance Rate Map Excerpt from North End of TDM



FEMA Base Flood EL. +11.8 ft

Low top of Dike EL. +12.8 ft
Bottom of Tide Gate EL. +1.3 ft
Scour hole EL. -4.5 ft

Low tide in Sand Lake EL. +5.5 ft
MSL in Ocean EL. +3.8 ft

Reneke Ck. Culvert Invert. EL. +9.6 ft

Beltz Ck. Culvert Invert. EL. +20.7 ft

Top of Beaver Dam EL. ~8.0 ft

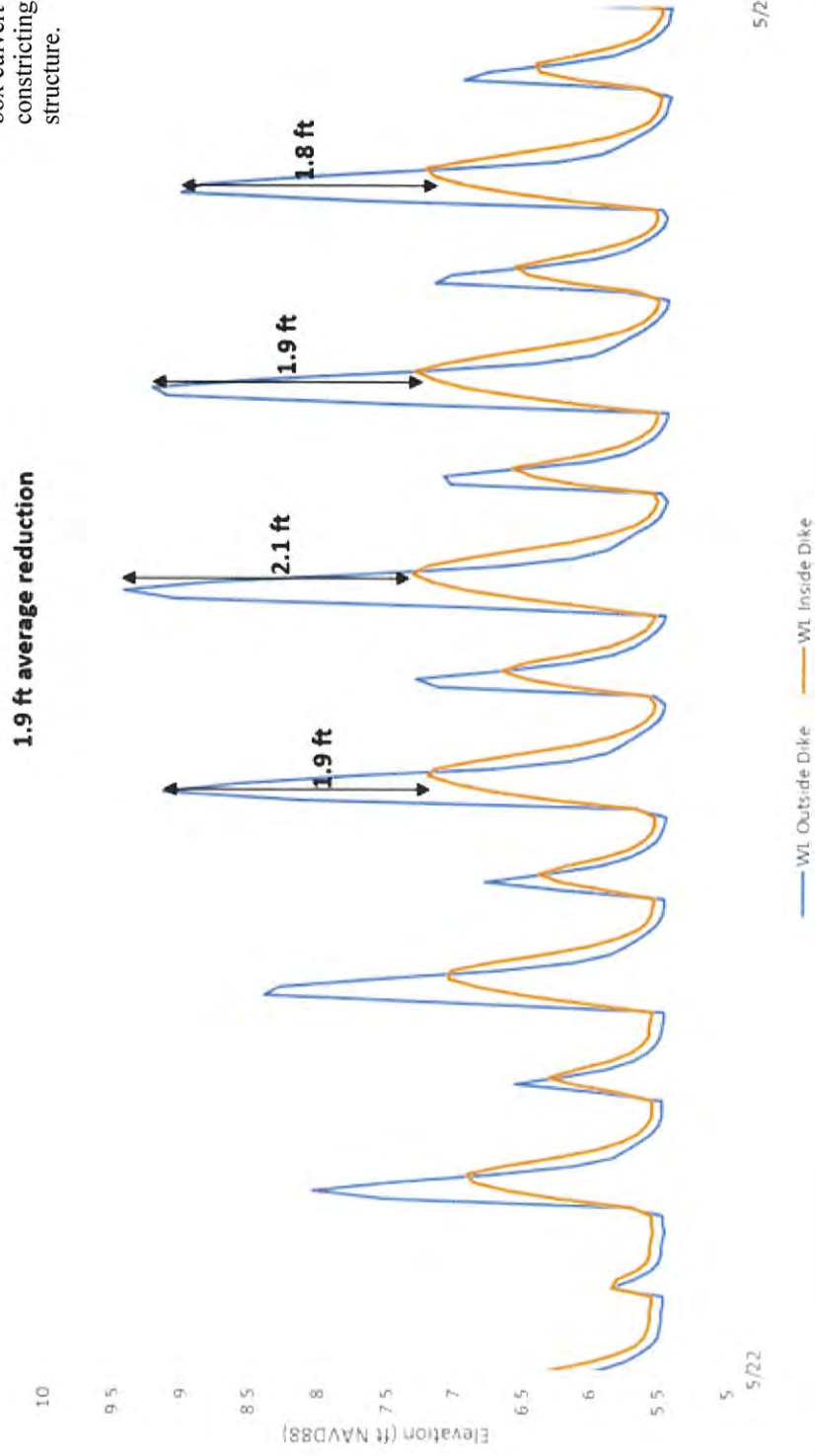
Culvert to East Marsh Invert EL. 5.15 ft
Low Point in Sand Lk. Rd EL. ~11.6 ft

Culvert Invert at Roma Ave = +11.7 ft
Land in Tierra del Mar EL. +14 to 22 ft

Note: This figure summarizes the elevations of key features within the project area. All elevations are referenced to North American Vertical Datum 1988 (NAVD88).

Figure 5
Elevations of Key Site Features and Water Levels (NAVD88)

2017 Water Level Data



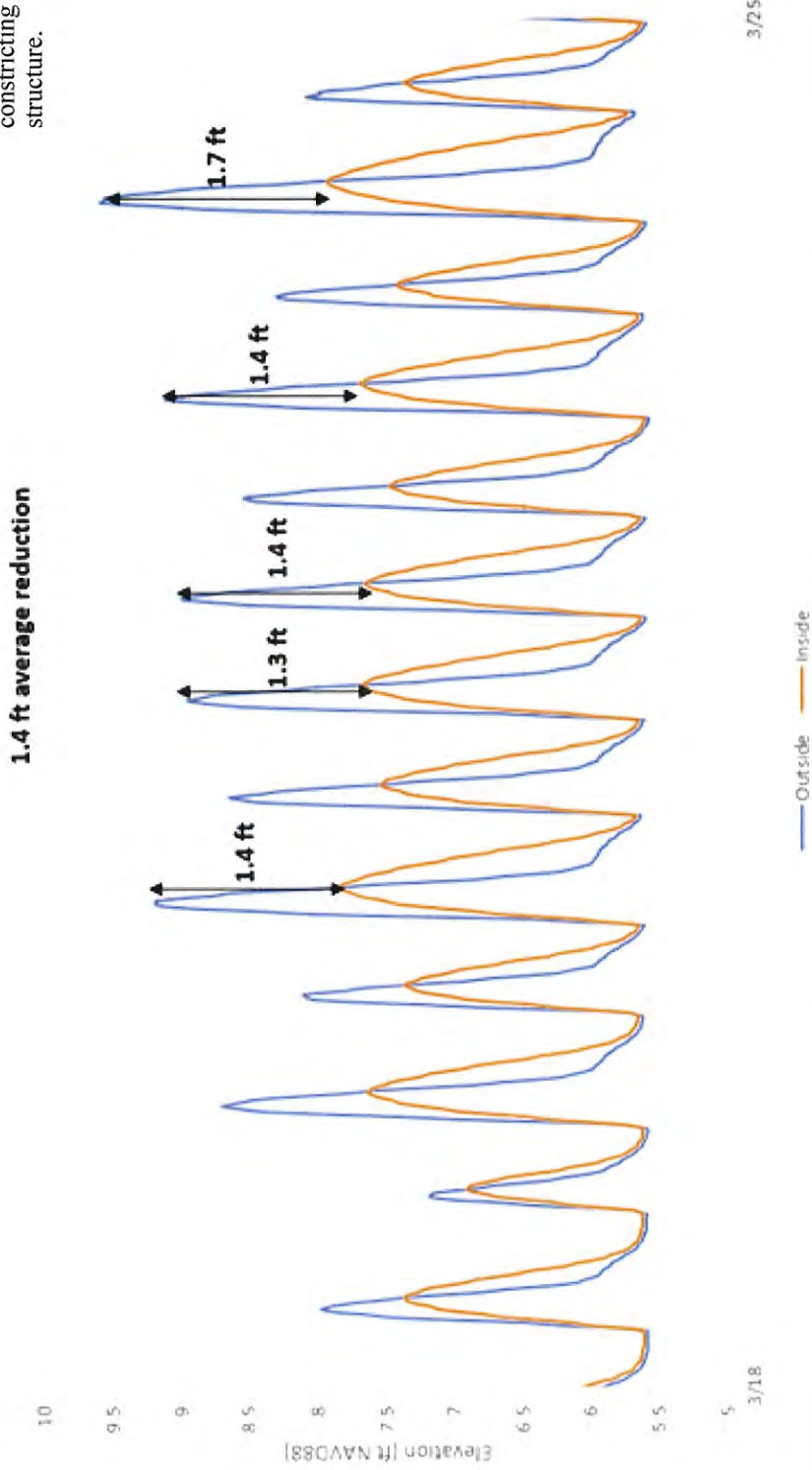
Note: This figure shows water level monitoring data inside and outside of Beltz Dike showing the typical reduction in peak tide levels caused by the muting effect of the undersized box culvert and partial tide gate constricting flow through the drainage structure.

Figure 6
2017 Water Level Data Inside and Outside of Beltz Dike

Sitka Sedge Tidal Wetland Restoration
Hydraulic Modeling Memo



2023 Water Level Data



Note: This figure shows water level monitoring data inside and outside of Beltz Dike showing the typical reduction in peak tide levels caused by the muting effect of the undersized box culvert and and partial tide gate constricting flow through the drainage structure.

Figure 7
2023 Water Level Data Inside and Outside of Beltz Dike

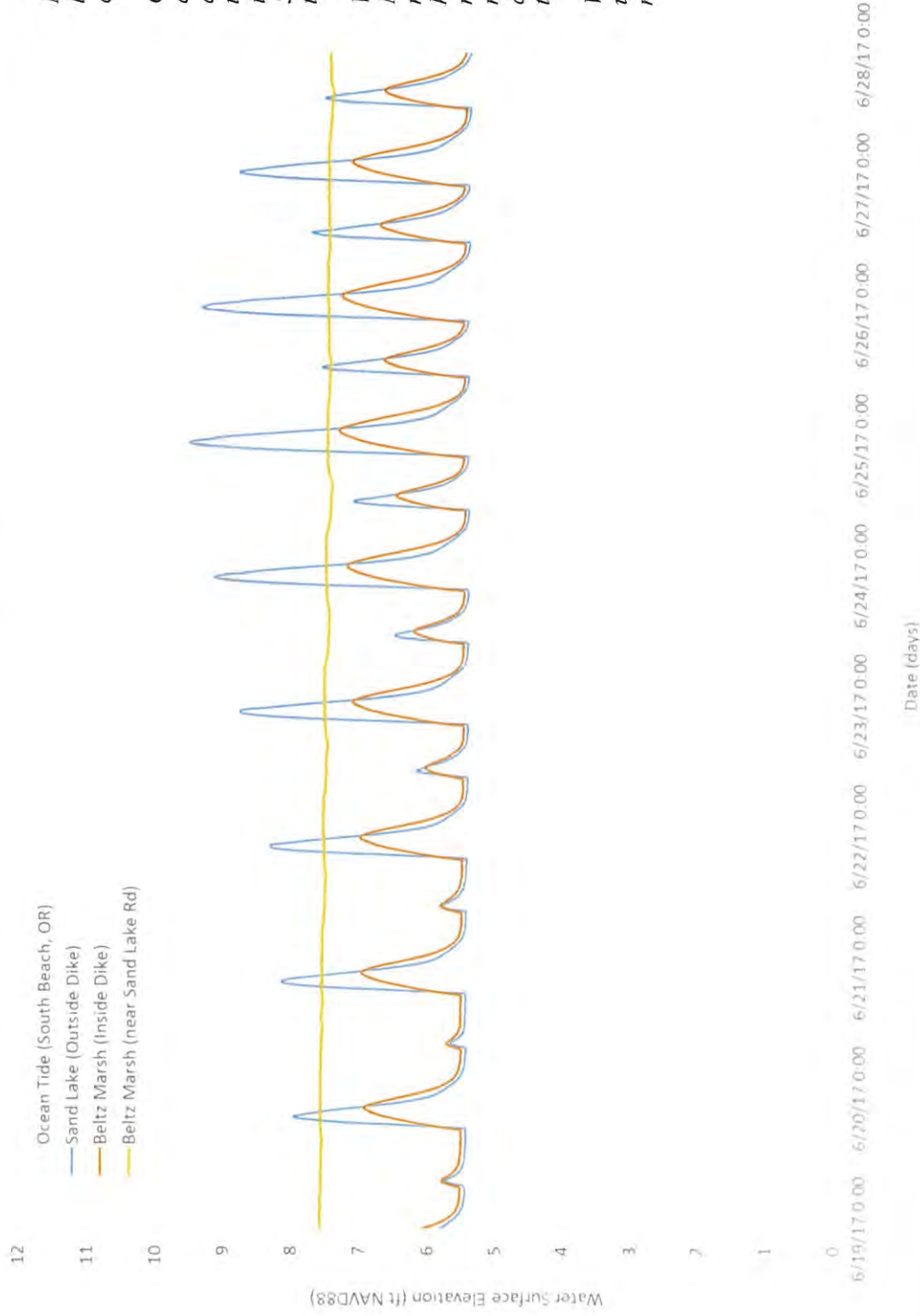


Figure 8
Typical Water Level Fluctuations in Beltz Marsh During the Dry Season

Sitka Sedge Tidal Wetland Restoration
 Hydraulic Modeling Memo



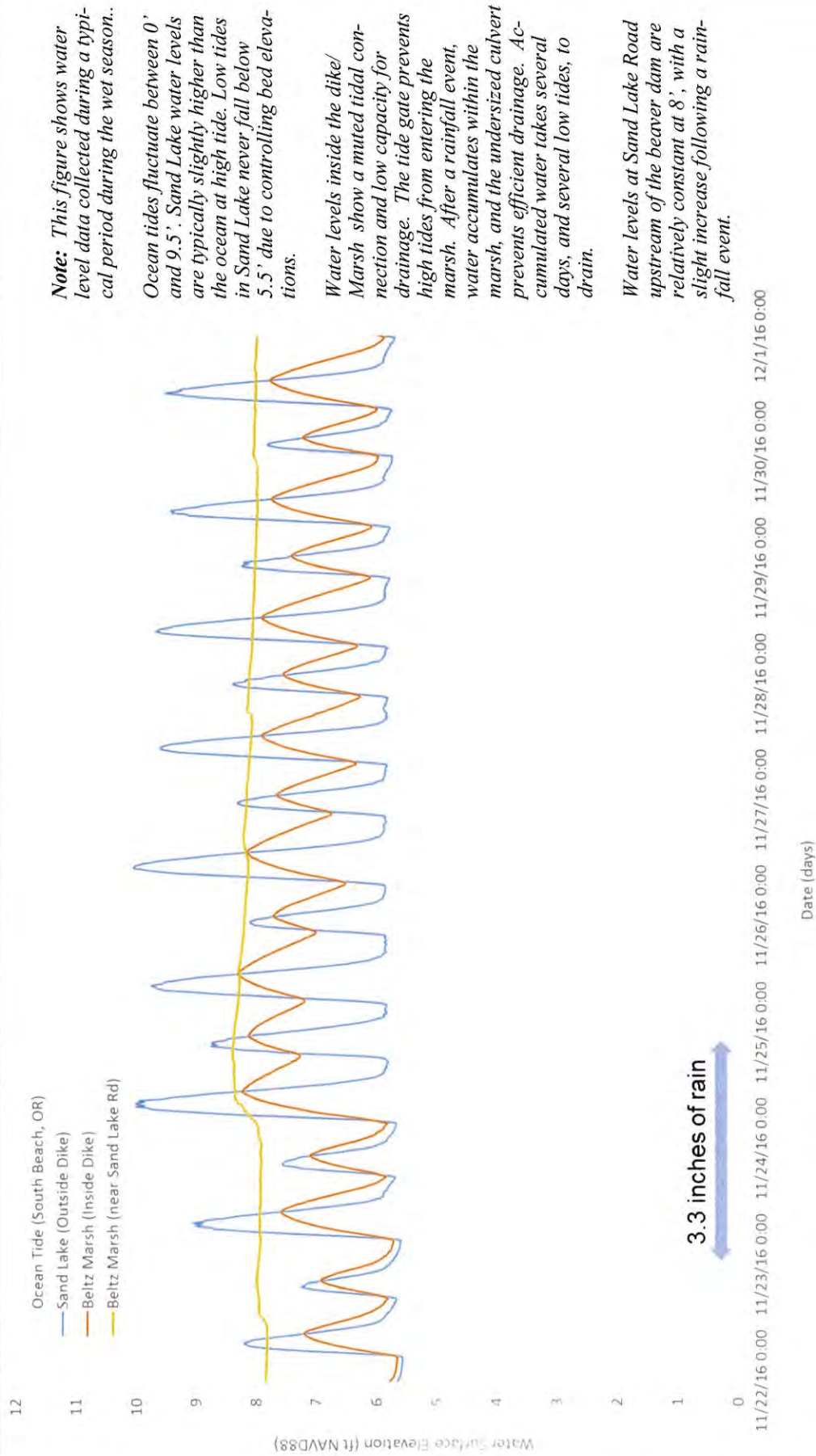


Figure 9
Typical Water Level Fluctuations in Beltz Marsh During the Wet Season



Recent Events	48-Hr Rainfall (inches)
Dec. 18, 2015	4.1
Nov. 24, 2016	3.3
Dec. 20, 2016	2.3
Feb. 9, 2017	3.1
Feb. 16-19, 2017	2.4 + 1.6
Mar. 7, 2017	1.3
Mar. 15, 2017	2.9

Note: This figure shows areas of surface-water ponding observed following rainfall events.

These ponded areas generally correspond to depression areas without positive drainage.

Figure 10
Areas of Surface-water Ponding in Tierra Del Mar

Sitka Sedge Tidal Wetland Restoration
 Hydraulic Modeling Memo



- Beltz Dike and tide gate
 - Limited tidal flux in/out of marsh
 - High tides behind dike are 1-2' lower than Sand Lake
 - Water still flowing into marsh when tides begin to fall
 - Culvert limits draining of marsh
 - Heavy rainfall events can take several tide cycles for freshwater to drain out of marsh
- Beaver Dam within marsh
 - About 3 feet tall
 - Limits tidal fluctuation at south end of marsh
 - Steady water levels 7 to 8' NAVD88
 - Backwater at culvert and east marsh
- Multiple Culverts (not shown)



Note: This figure provides summary information on the primary features that control surface-water movement into, out of, and within Beltz Marsh.

Figure 11
Hydraulic Control Features Affecting Surface-water Movement

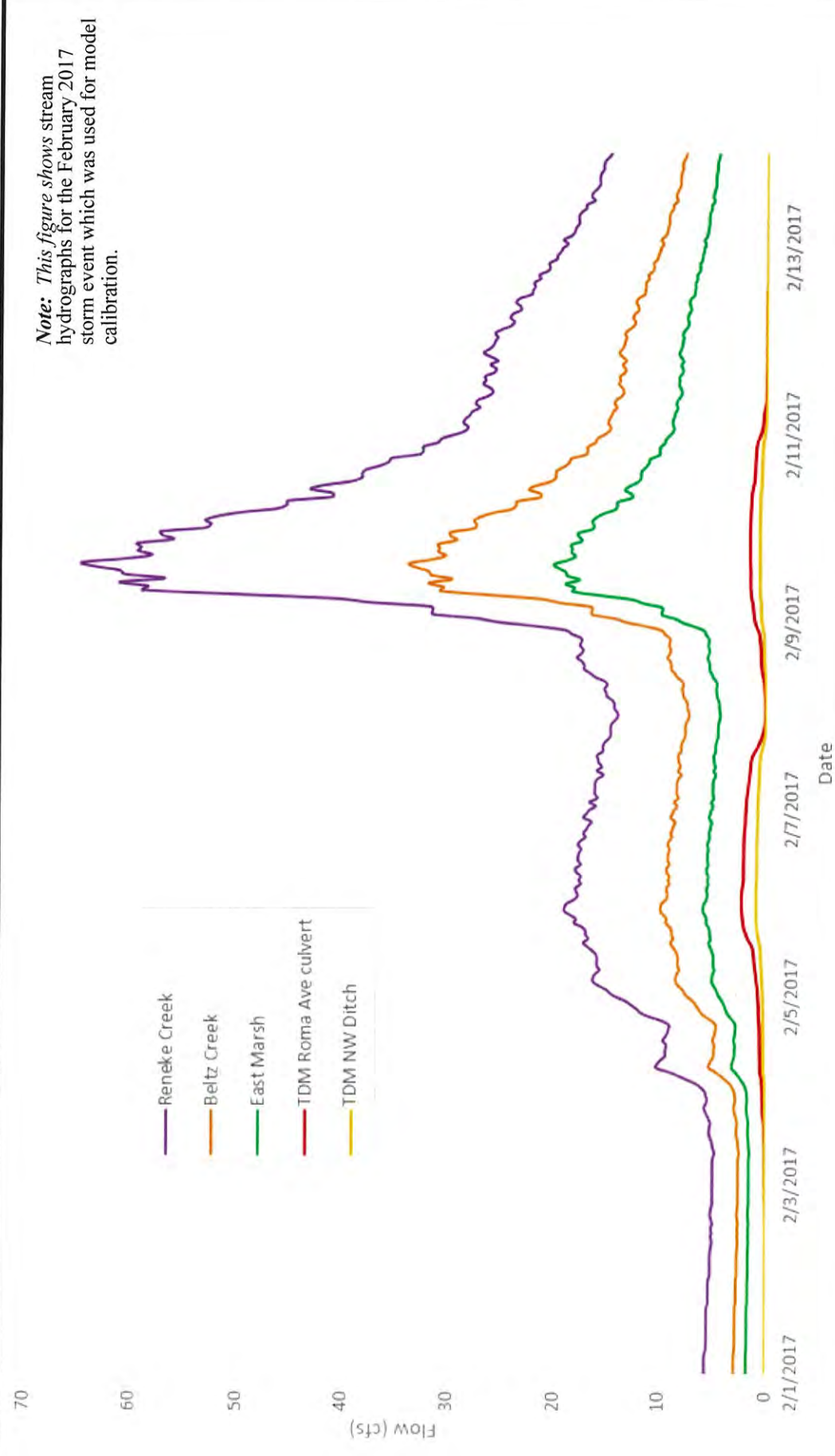


Figure 12
2D Model Inflow Hydrographs, February 2017 Calibration Event

Note: This figure shows stream inflow hydrographs scaled for a 14-day hydrologic scenario where streamflow peaks reach a 100-year storm event. TDM runoff rates use a Santa Barbara Unit Hydrograph method with 100-year rainfall intensity.

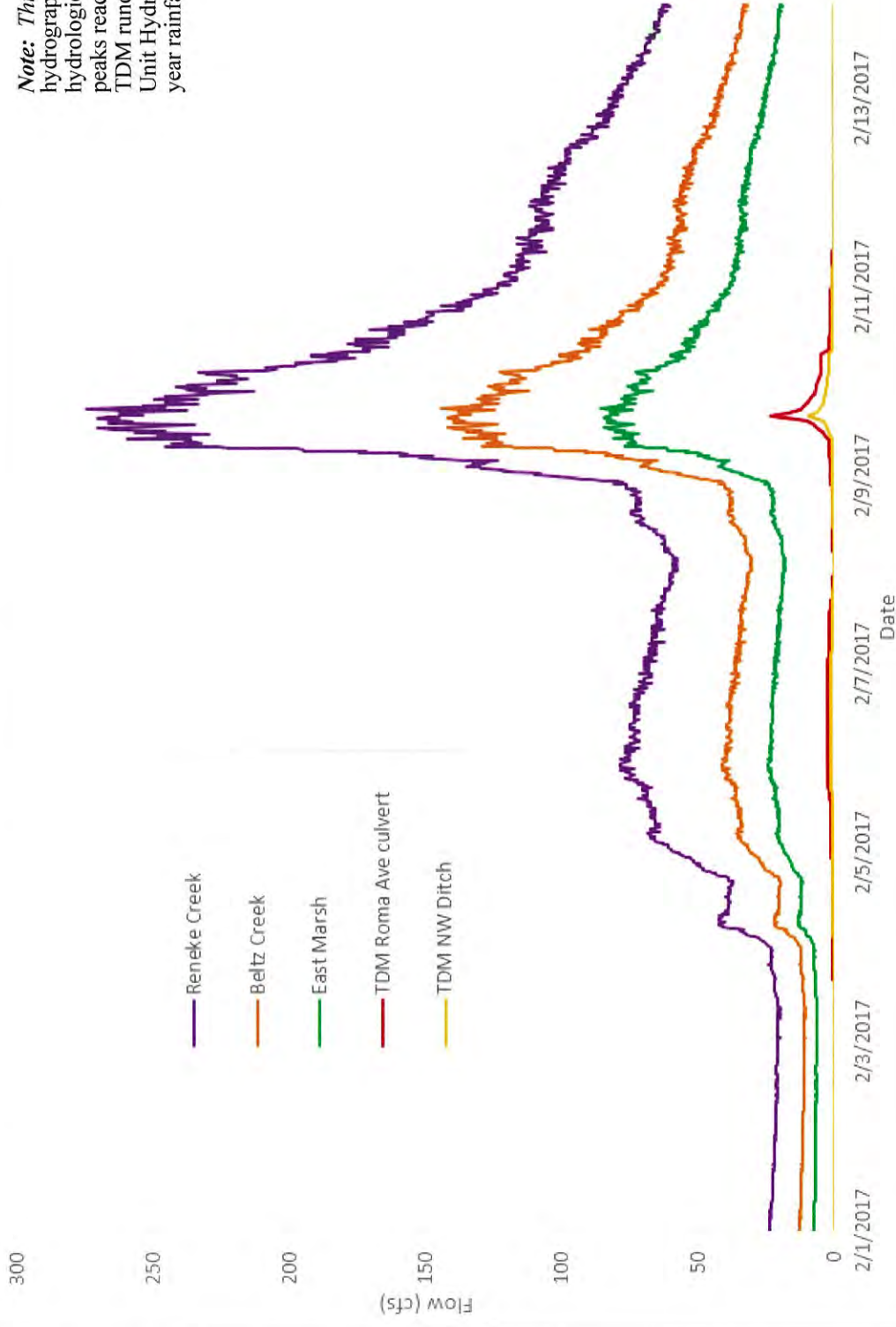


Figure 13
2D Model Inflow Hydrographs for the 100-year storm event

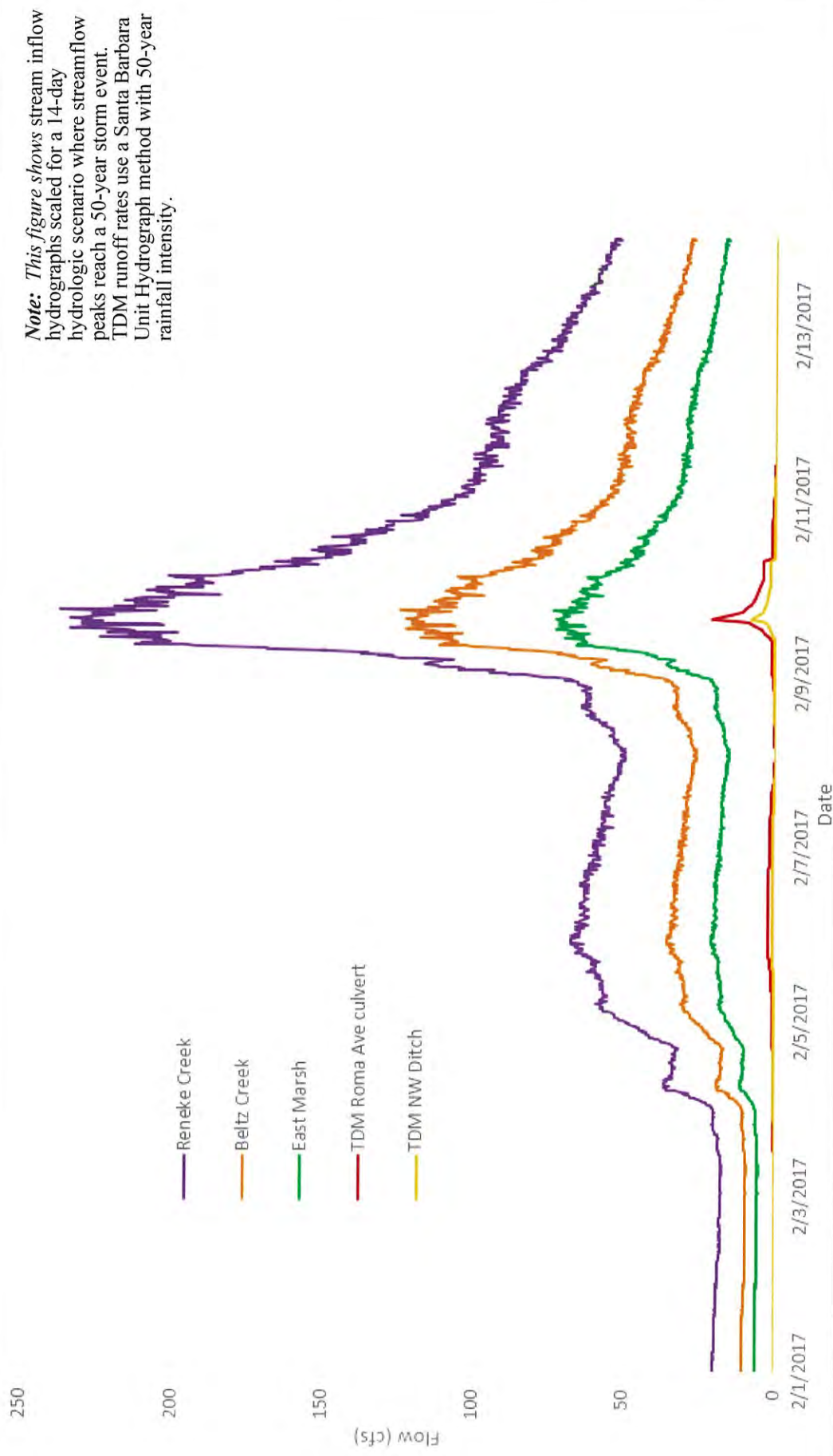


Figure 14
2D Model Inflow Hydrographs for the 50-year storm event

Water Level Outside of Beltz Dike

Note: This figure shows tidal water levels in Sand Lake outside of Beltz Dike used as the downstream boundary condition for the 2D Model.

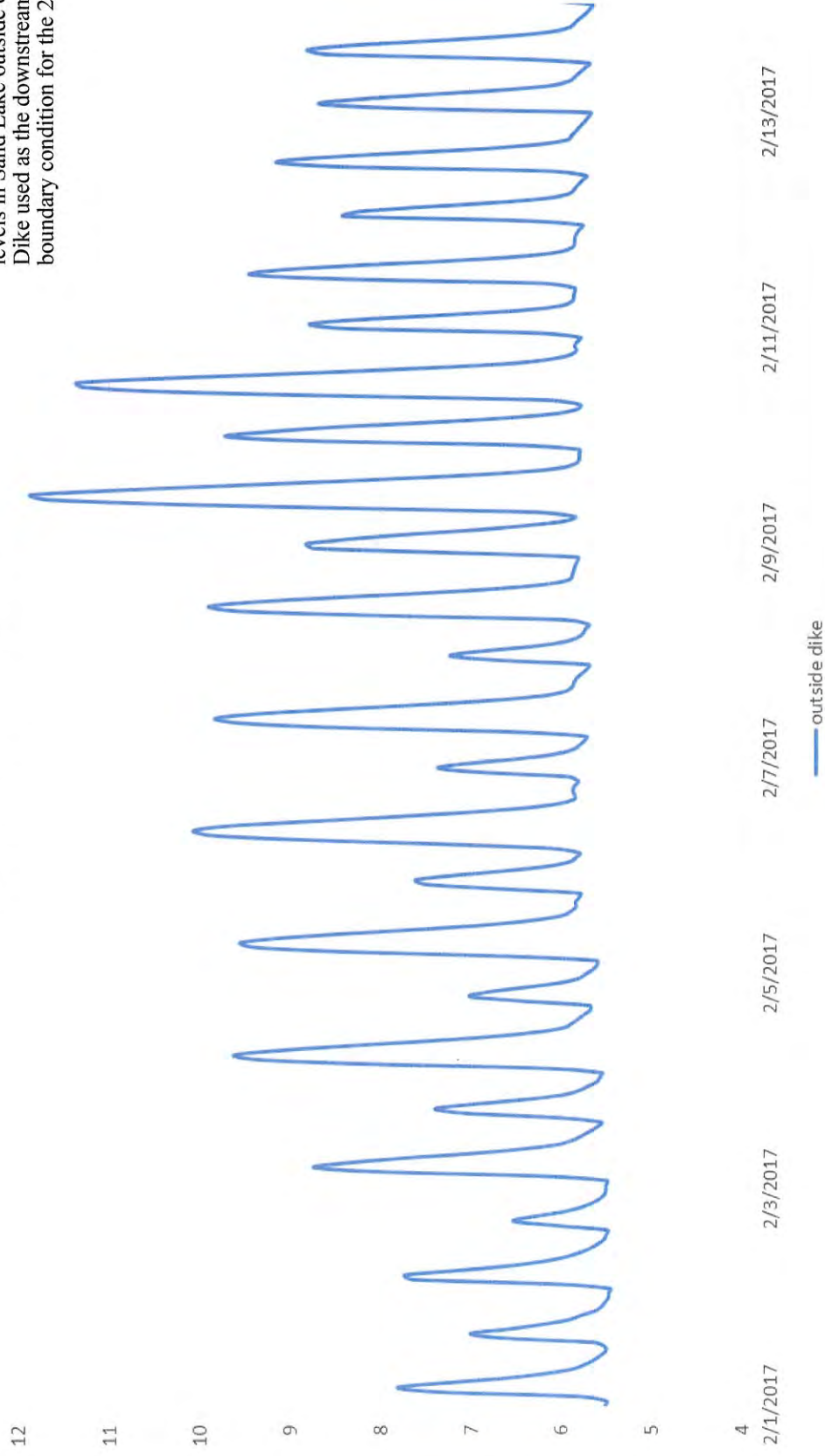
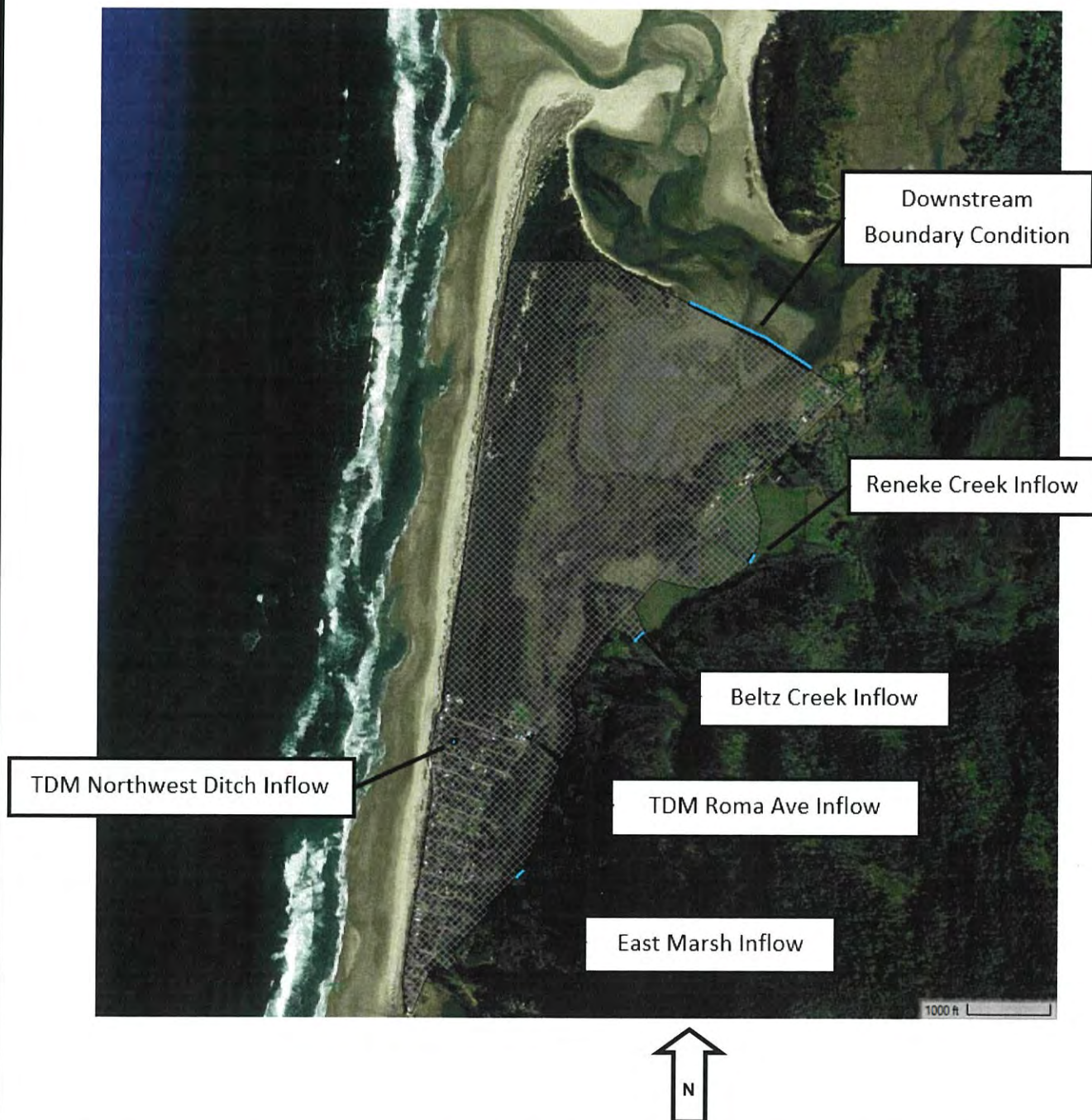


Figure 15
2D Model Downstream Boundary Condition

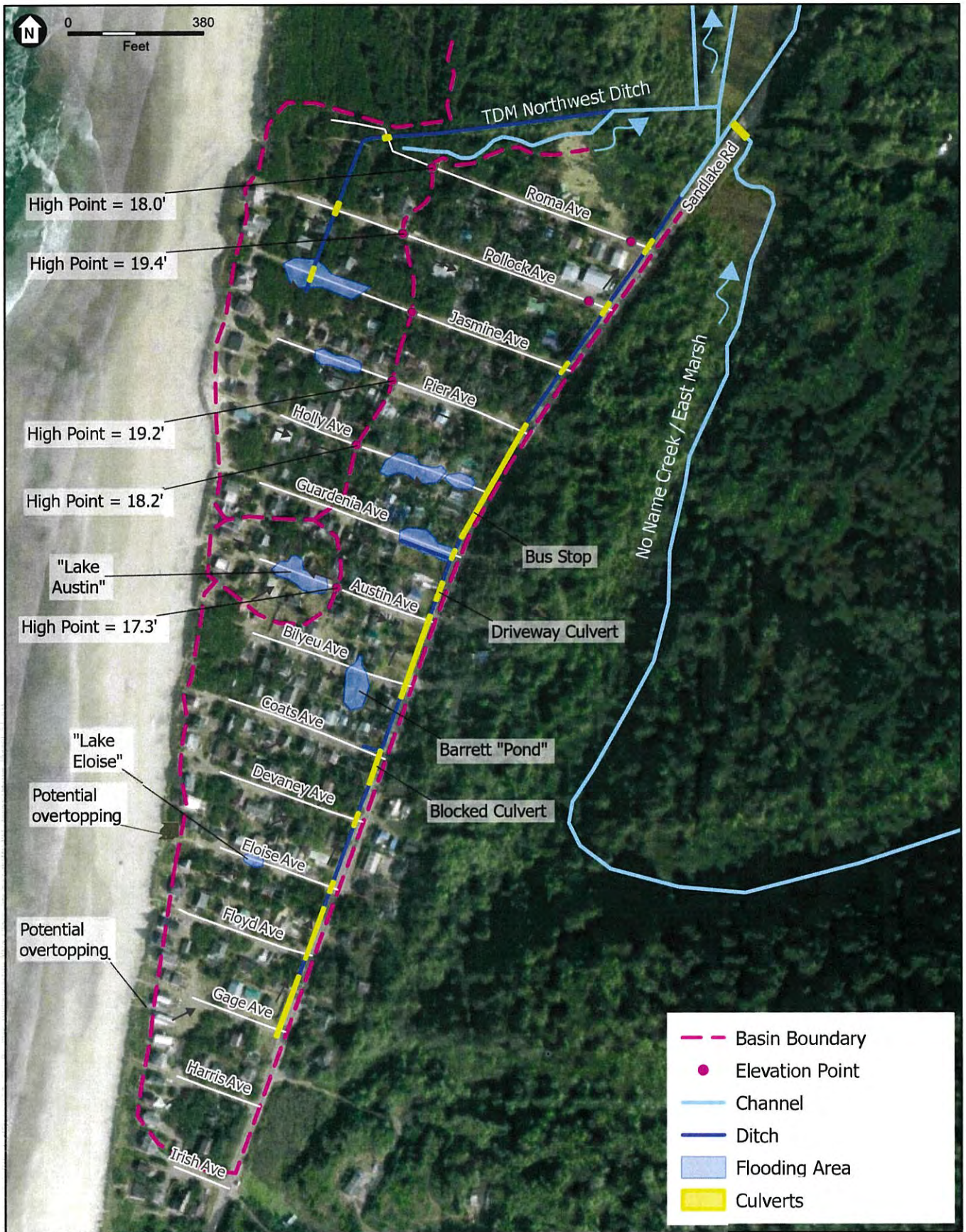
Sitka Sedge Tidal Wetland Restoration
Hydraulic Modeling Memo





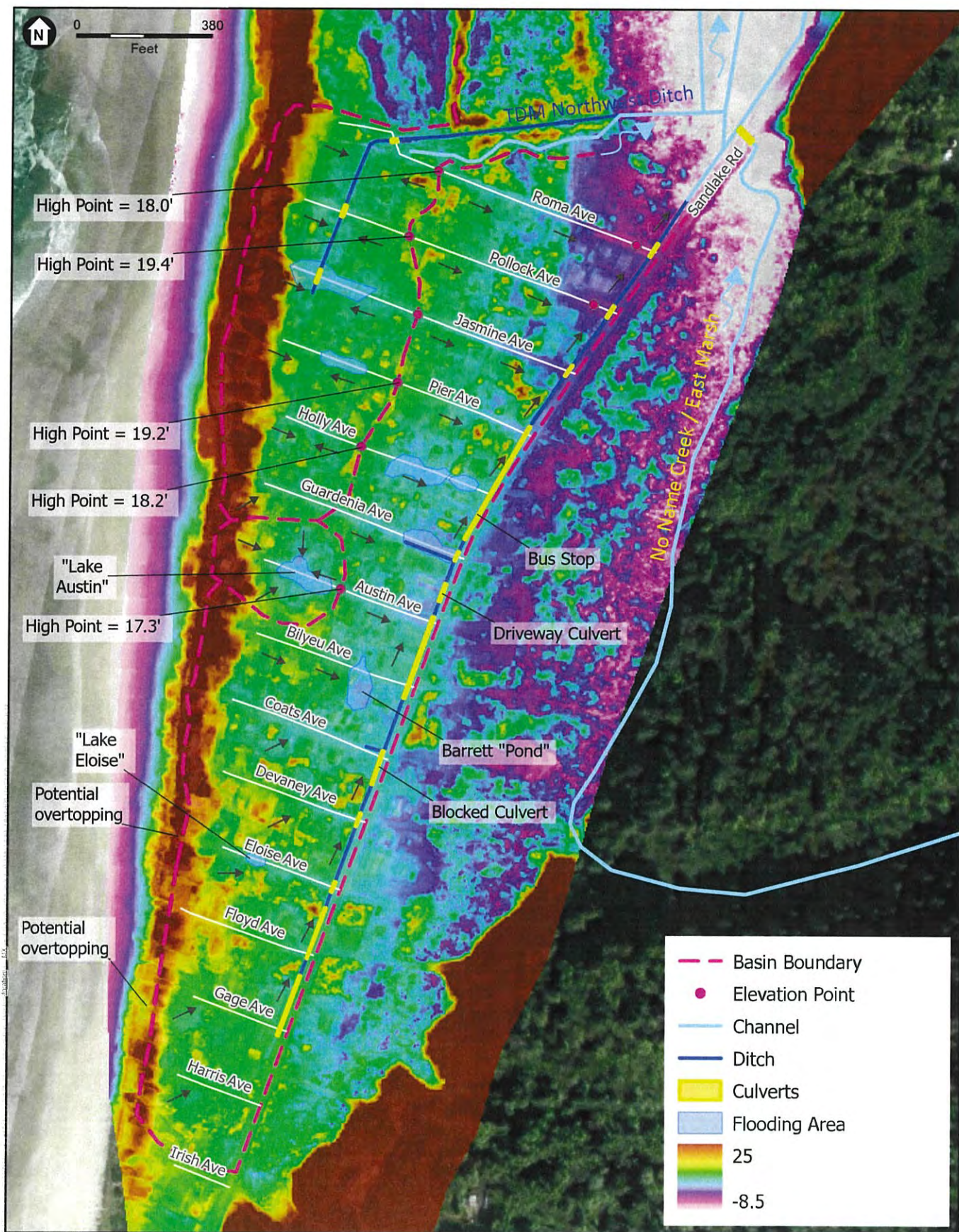
Note: This figure shows the extent of the 2D HEC-RAS Model, hydrologic inputs, and downstream boundary.

Figure 16
2D Model Extents, Downstream Boundary, and Hydrologic Inputs



SOURCE: Maxar, 2022; ESA, 2023

Figure 17
Tierra Del Mar Drainage System Analysis - Aerial Photo

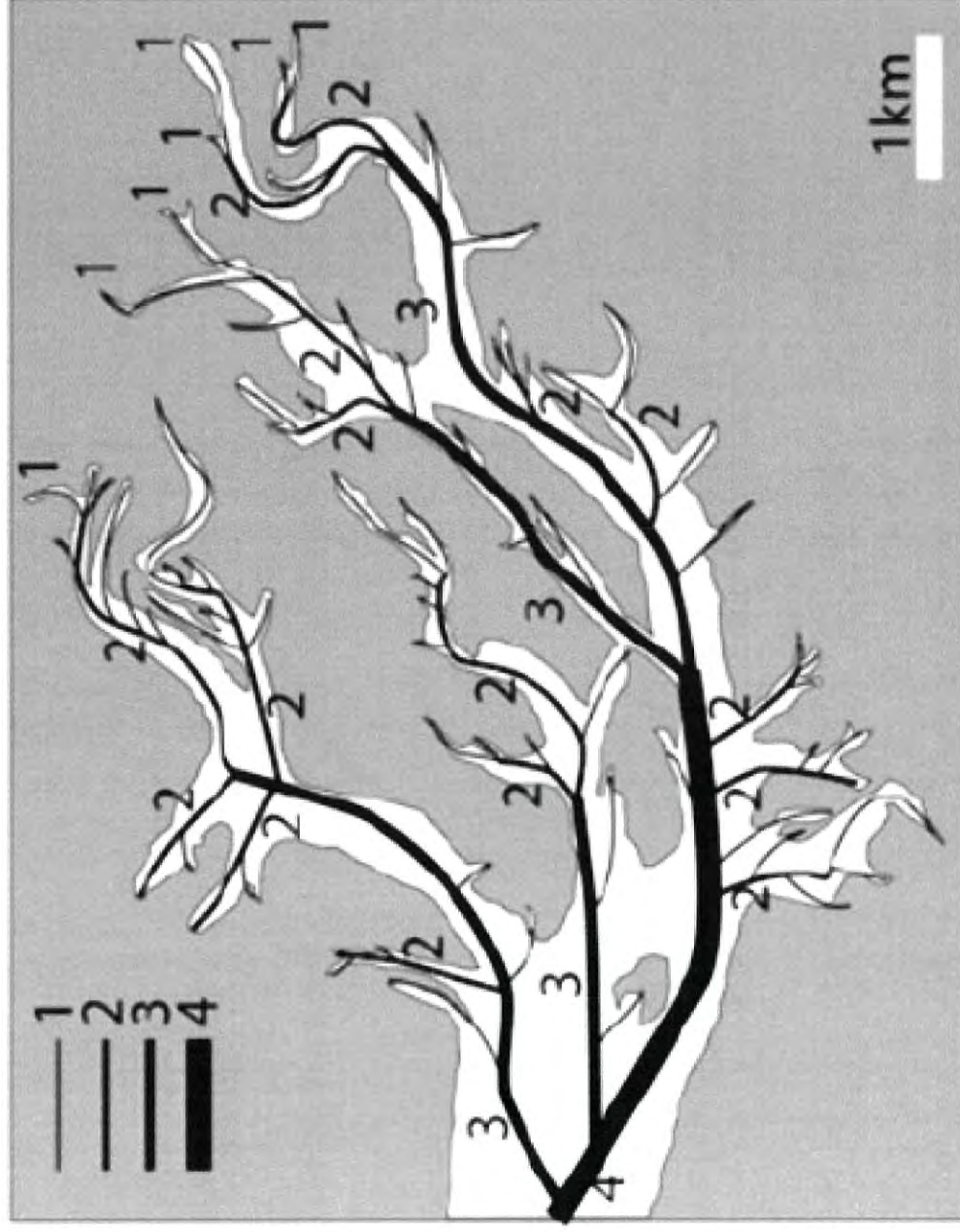


SOURCE: Maxar, 2022; ESA, 2023

Figure 18

Tierra Del Mar Drainage System Analysis - LiDAR





Note: This figure shows an example of a fractal, dendritic tidal channel network, a planform that commonly occurs in low-gradient tidal marshes where many small tidal channels drain individual subbasins and funnel water into progressively larger channels that all drain to a single outlet.

This typical tidal channel planform supports a justification to focus dike breaching on a single dike breach channel rather than multiple dike breaches.

Figure 19
Example of Dendritic Tidal Channel Network Draining to Single Outlet

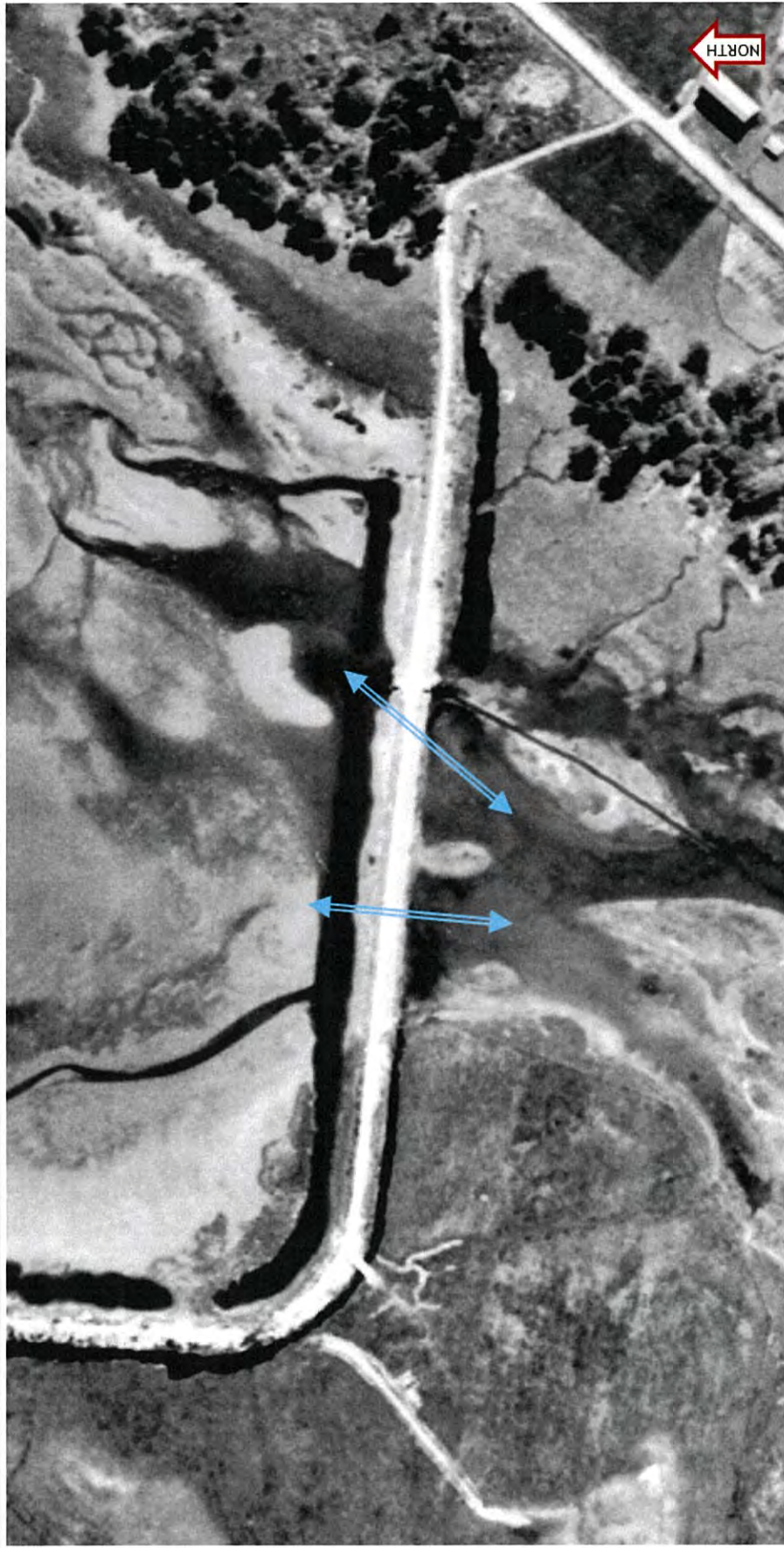
Sitka Sedge Tidal Wetland Restoration
Hydraulic Modeling Memo



Note: This figure shows an example of a dendritic tidal channel network that exists nearby in the northeastern portion of the Sand Lake Estuary, a planform that commonly occurs in low-gradient tidal marshes where many small tidal channels drain individual subbasins and funnel water into progressively larger channels that all drain to a single outlet.

This typical tidal channel planform supports a justification to focus dike breaching on a single dike breach channel rather than multiple dike breaches.

Figure 20
Example of Dendritic Tidal Channel Network in Sand Lake Estuary



Note: This figure shows a historical aerial photo from 1939 (UofO Libraries, 2020), highlighting the apparent location where two large tidal channel forms cross Beltz Dike. This analysis is used to identify the appropriate location for a dike breach to restore tidal connectivity between Sand Lake and Beltz Marsh.

Figure 21
1939 Aerial Photo of Beltz Dike and Large Tidal Channel Planforms

Sitka Sedge Tidal Wetland Restoration
 Hydraulic Modeling Memo

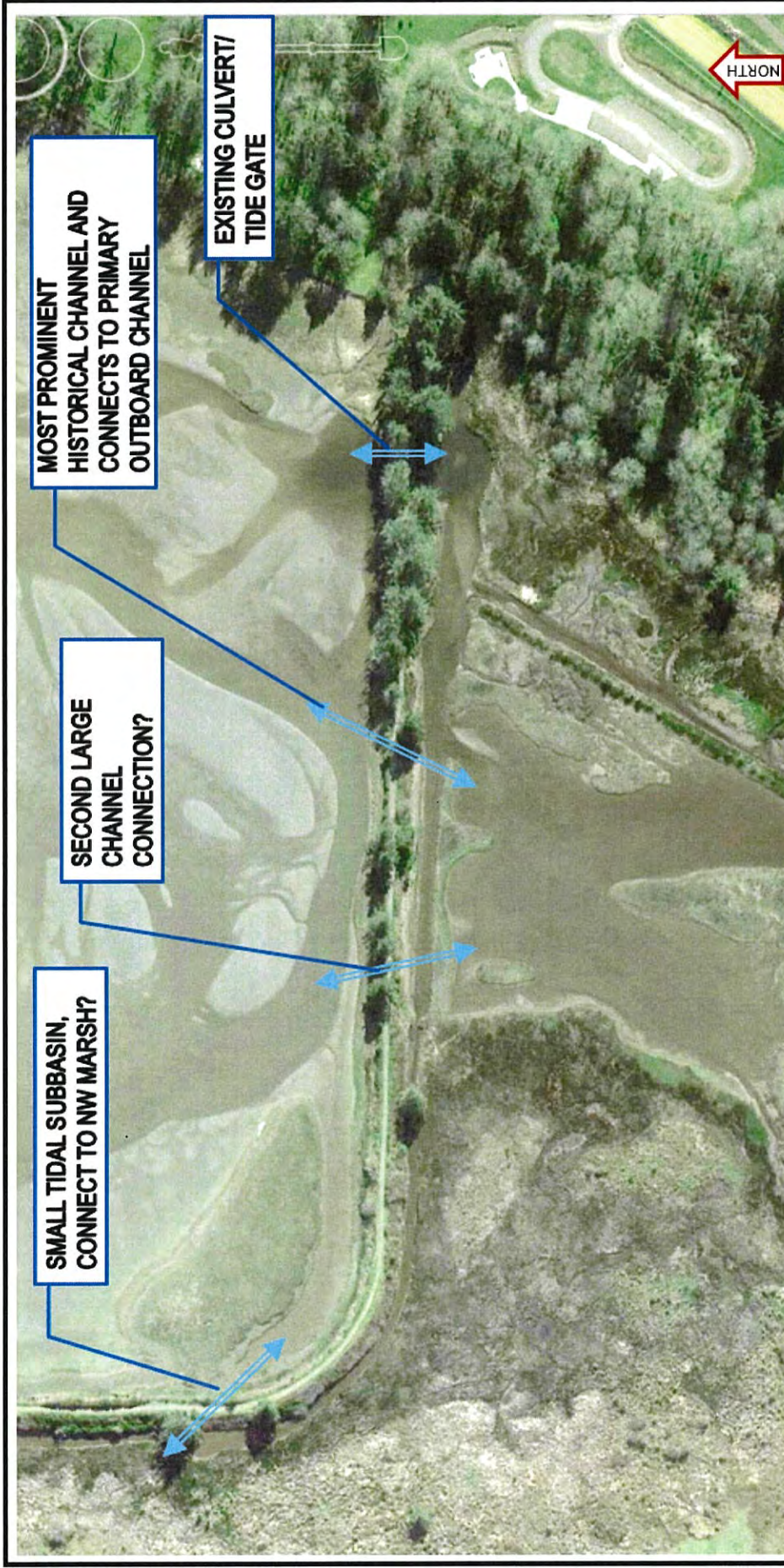


Note: This figure shows a current aerial photo (NS Consulting, 2022), showing the central historical flow path connecting channels inboard and outboard of Beltz Dike, as well as the existing box culvert/tide gate location which is not aligned with historical flow paths.

Figure 22

2022 Aerial Photo of Beltz Dike, Existing Culvert, and Historical Flow Path

Sitka Sedge Tidal Wetland Restoration
Hydraulic Modeling Memo



Note: This figure shows four potential dike breach locations under consideration.

Figure 23
Four Potential Dike Breach Locations Considered

100 year with Feb 2017 Tides - South End of Marsh
Comparing difference in Dike Breach (ALT 2) vs. Full Removal (ALT 5)

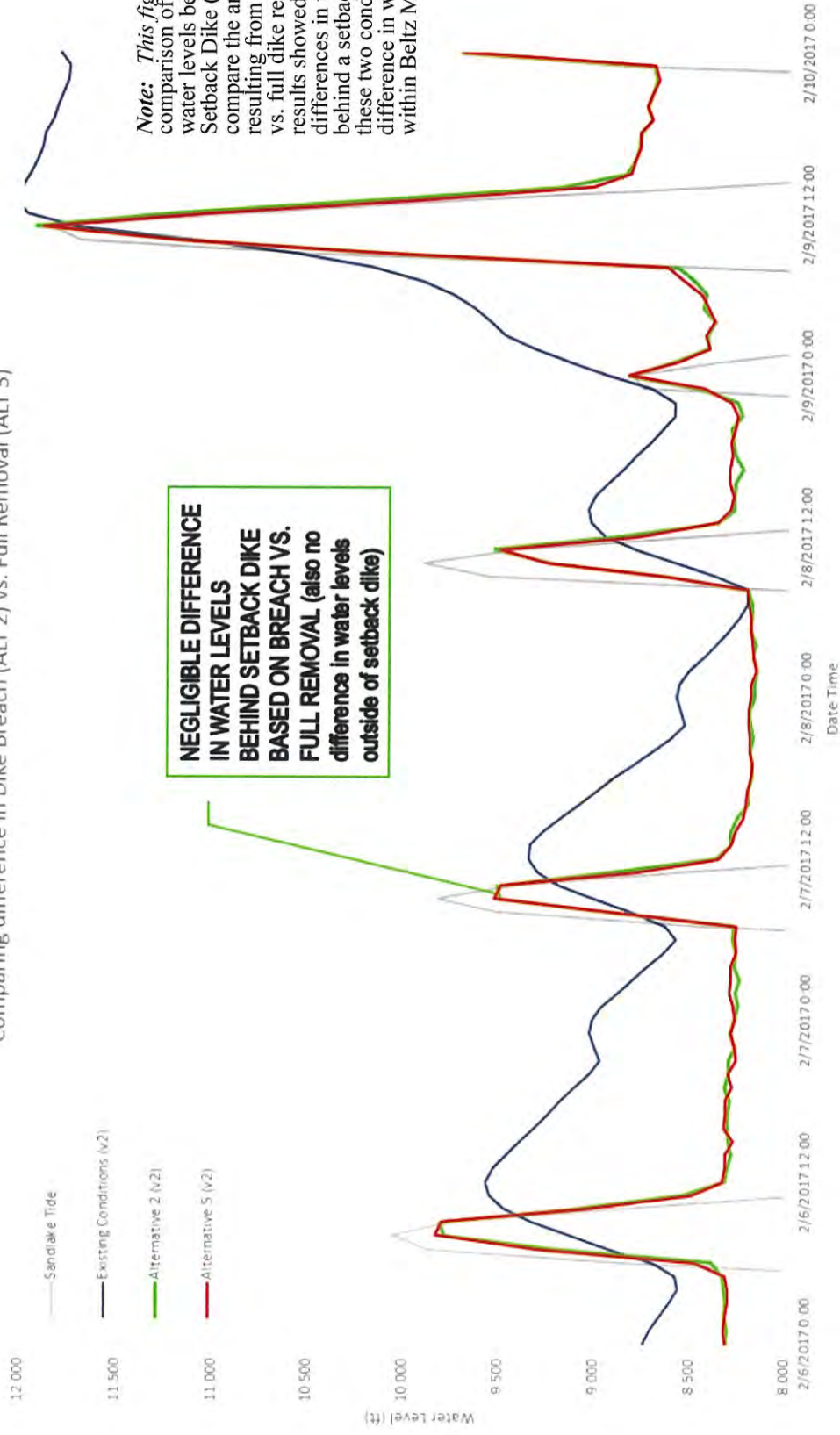
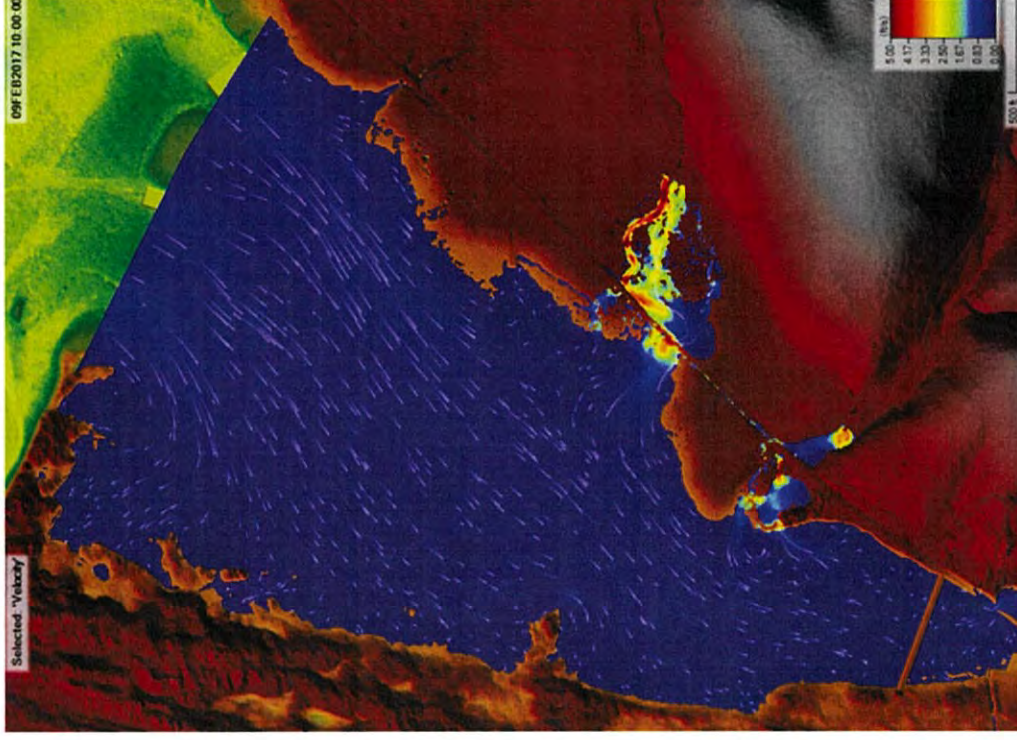
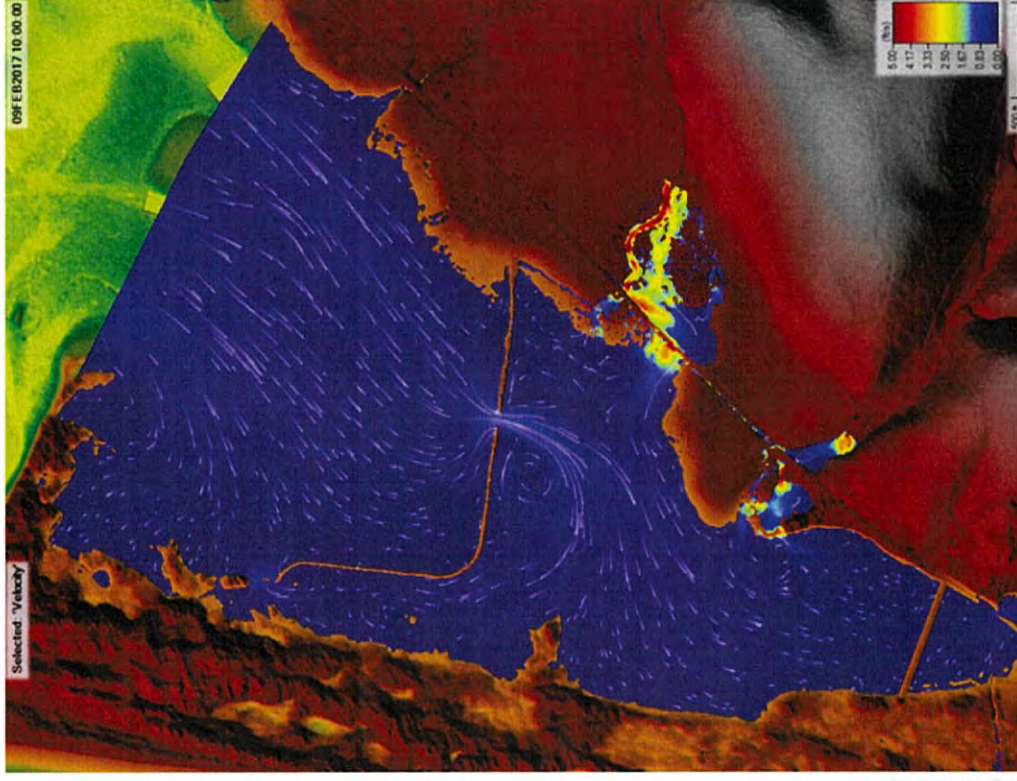


Figure 24

Comparison of Modeled Water Behind a Setback Dike Under Dike Breach and Full Dike Removal



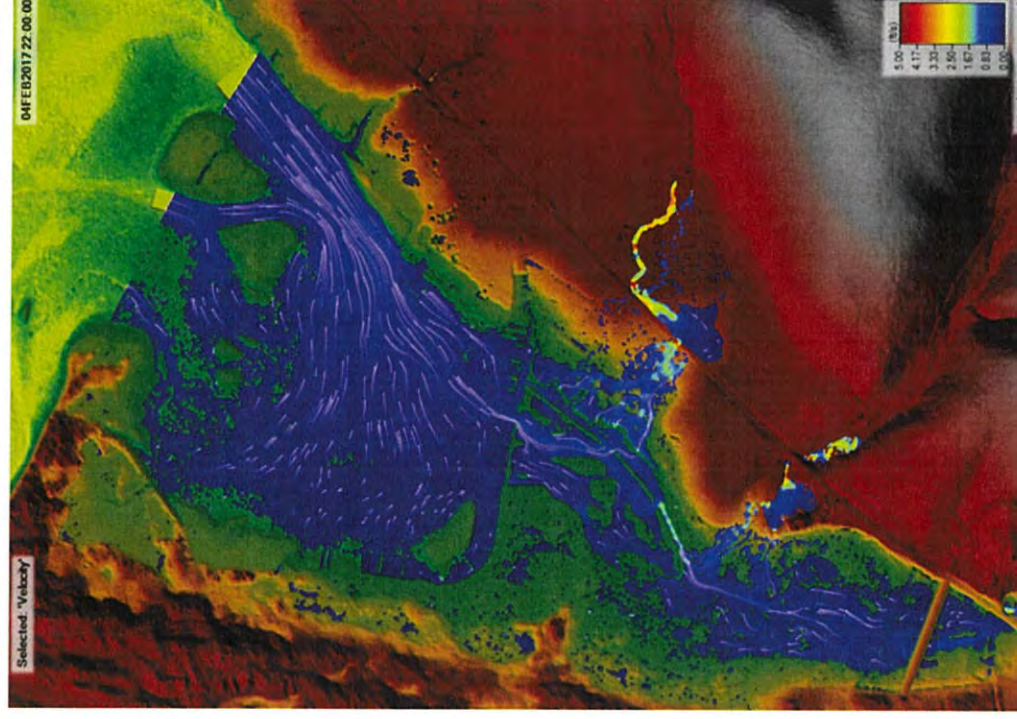
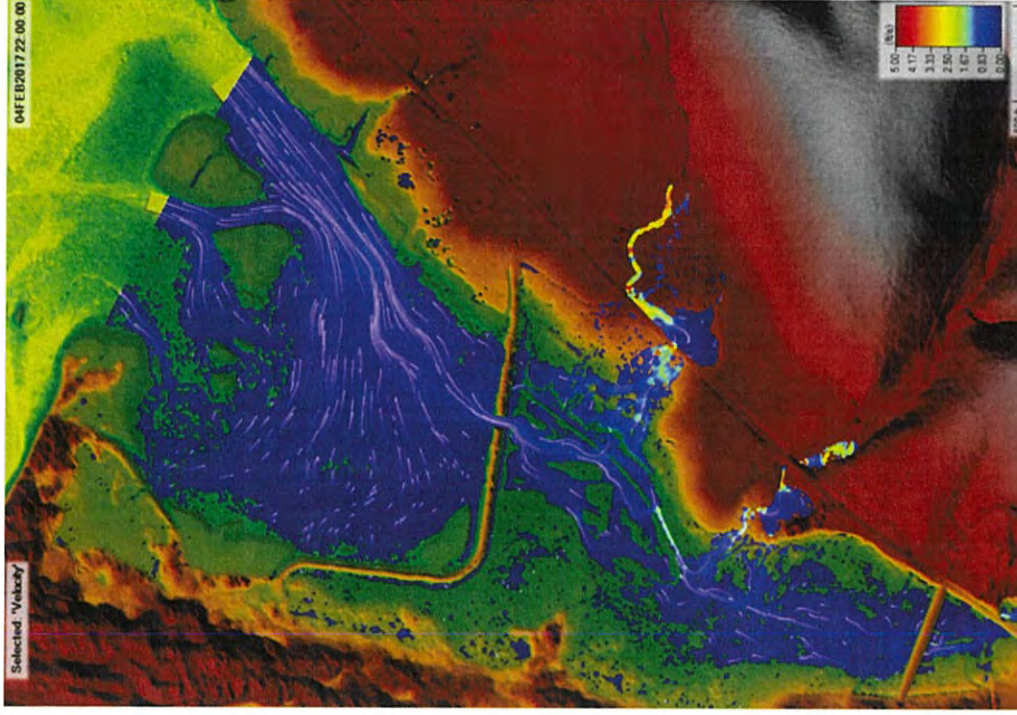
Note: This figure shows a comparison of water circulation patterns and flow directions under a dike breach vs. full dike removal during drain out while water levels are still high (above 9' NAVD88).

When water level are high, water in Beltz Marsh is funneled to the center of the marsh towards the dike breach where velocities are higher and a small eddy is visible upstream of the dike breach. Under full dike removal, water flux is evenly distributed across the marsh.

Figure 25

Comparison of Circulation Patterns Under Dike Breach Vs. Full Dike Removal (High Water)

Sitka Sedge Tidal Wetland Restoration
Hydraulic Modeling Memo



Note: This figure shows a comparison of water circulation patterns and flow directions under a dike breach vs. full dike removal during drain out after water levels have fallen below 9' NAVD88.

When water level are low, water in Beltz Marsh is funneled to the center of the marsh under both dike breach and full dike removal conditions, where water is more confined to the channels.

Figure 26

Comparison of Circulation Patterns Under Dike Breach Vs. Full Dike Removal (Low Water)

Sitka Sedge Tidal Wetland Restoration
Hydraulic Modeling Memo

PEAK VELOCITY DURING 100-YR STORM RUN (MAX TIDE SWING)

Peak velocity ~ 3ft/sec (short duration peak, majority of time is less than 2 ft/sec: fish passage velocity threshold)

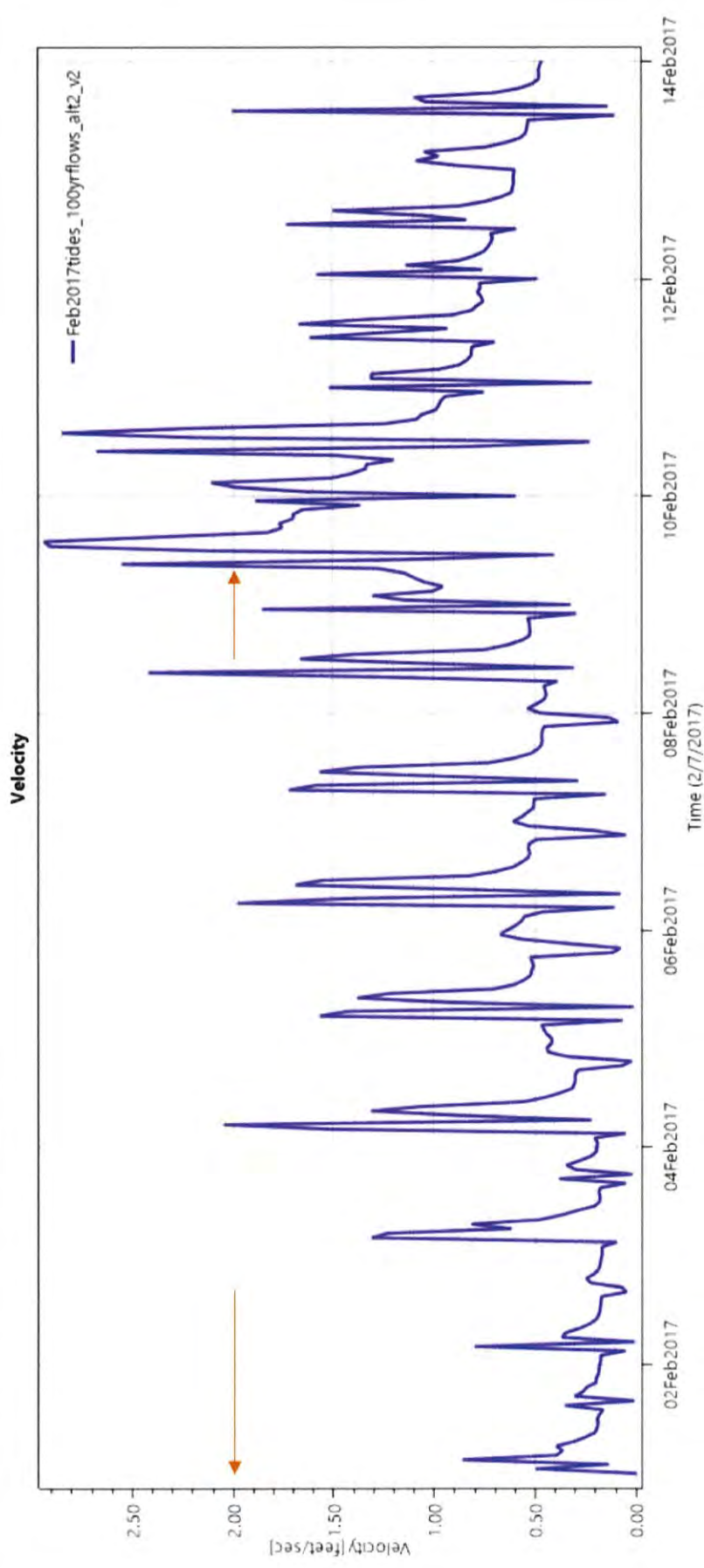


Figure 27
Water Velocity Through a 100-Foot Dike Breach During the 100-Year Hydrologic Scenario

100-Foot Dike Breach – Peak Shear Stress (lb/sf):

Alt 2 – 100-year run at the time step with the highest shear stress and velocity at the Beltz dike breach
Peak Shear Stress = 0.19 lb/sf (able to erode medium to coarse gravels. May need light armoring)



Table 1. Limiting Shear Stress and Velocity for Uniform Noncohesive Sediments

Class name	d_s (in)	ϕ (deg)	τ_c	τ_c (lb/sf)	V_c (ft/s)
Boulder					
Very large	>80	42	0.054	37.4	4.36
Large	>40	42	0.054	18.7	3.08
Medium	>20	42	0.054	9.3	2.20
Small	>10	42	0.054	4.7	1.54
Cobble					
Large	>5	42	0.054	2.3	1.08
Small	>2.5	41	0.052	1.1	0.75
Gravel					
Very coarse	>1.3	40	0.050	0.54	0.52
Coarse	>0.6	38	0.047	0.25	0.36
Medium	>0.3	36	0.044	0.12	0.24
Fine					
Very fine	>0.16	35	0.042	0.06	0.17
Sands					
Very coarse	>0.04	32	0.029	0.01	0.070
Coarse	>0.02	31	0.033	0.006	0.055
Medium	>0.01	30	0.048	0.004	0.045
Fine	>0.005	30	0.072	0.003	0.040
Very fine	>0.003	30	0.109	0.002	0.035
Silts					
Coarse	>0.002	30	0.165	0.001	0.030
Medium	>0.001	30	0.25	0.001	0.025

**Stability Thresholds for
Stream Restoration Materials**



by Craig Fischenich¹

May 2001

Figure 28

Peak Shear Stress Through 100-Foot Dike Breach Compared to Stability Thresholds of Sediments

Sitka Sedge Tidal Wetland Restoration
Hydraulic Modeling Memo



PEAK VELOCITY DURING 100-YR STORM RUN (MAX TIDE SWING)

100-Foot Breach : Peak velocity ~ 3ft/sec (short duration peak, majority of time is less than 2 ft/sec; fish passage velocity threshold)

200-Foot Breach: Peak velocity ~ 1ft/sec (slightly higher velocities in site's internal tidal channels)

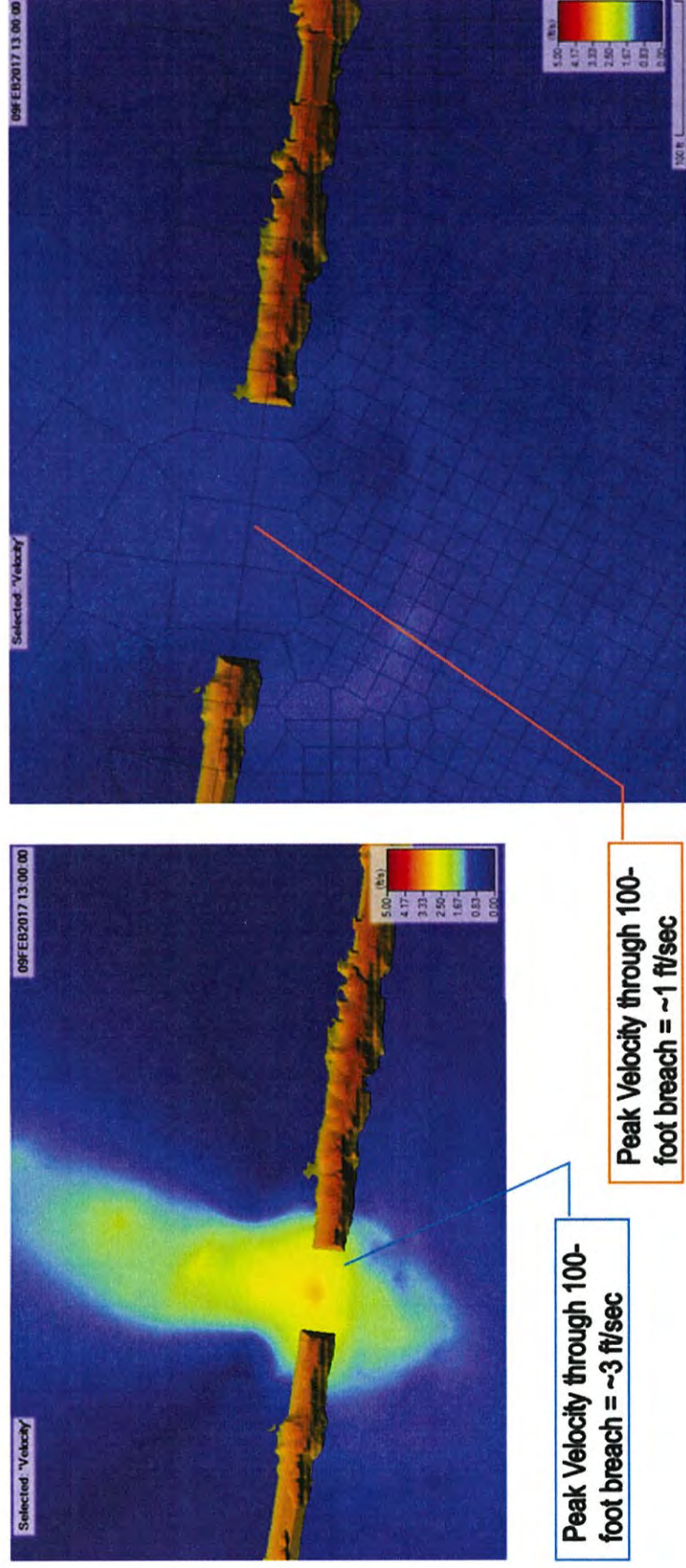


Figure 29

Comparison of Peak Velocity Through 100-Foot and 200-Foot Dike Breaches

Sitka Sedge Tidal Wetland Restoration
Hydraulic Modeling Memo

Whalen Island Rd Bridge

- 180-acre contributing marsh area (80 acres at Sitka Sedge)
- 80-foot span
- Heavily armored opening/banks with riprap

Note: This figure shows the nearby Whalen Island Road bridge as a point of comparison of span length compared to upstream contributing marsh area and required armoring due to constriction and high velocities/shear stresses.

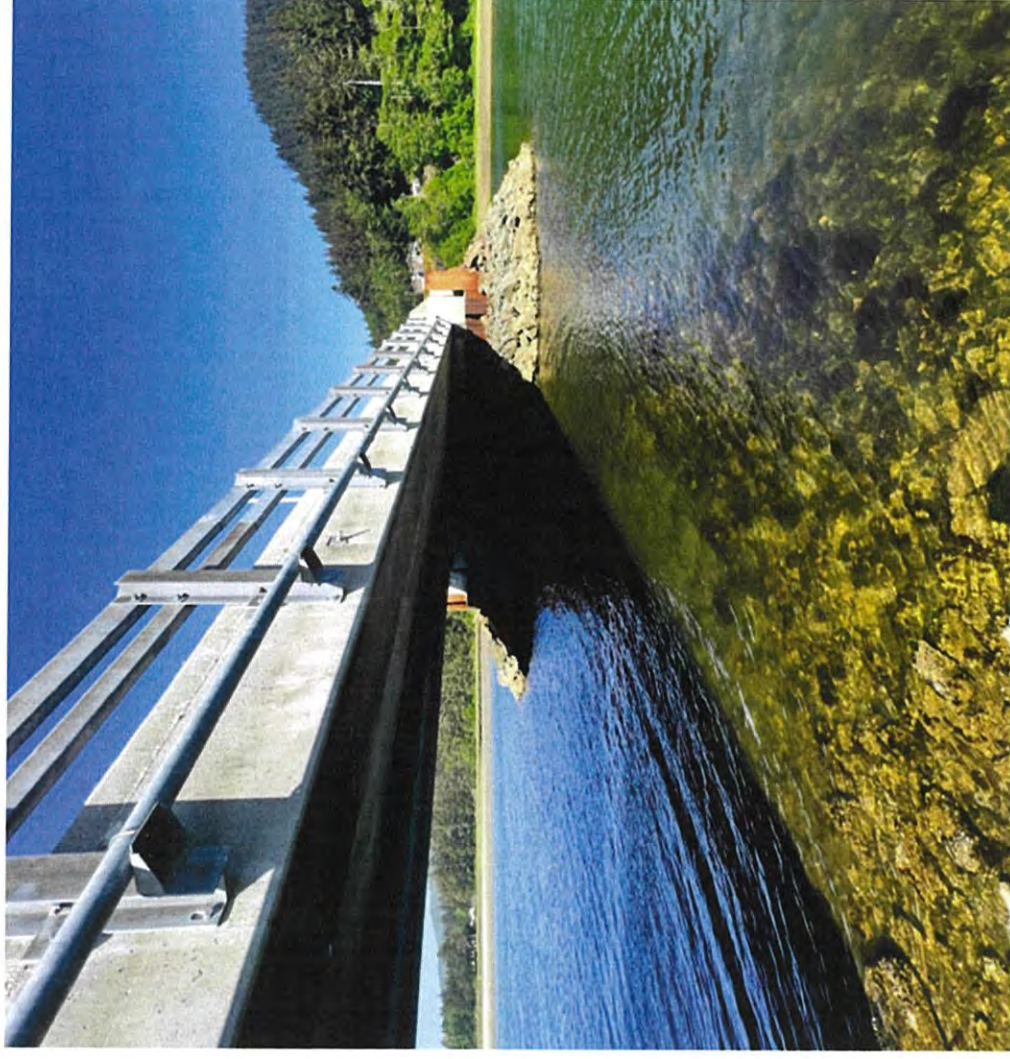
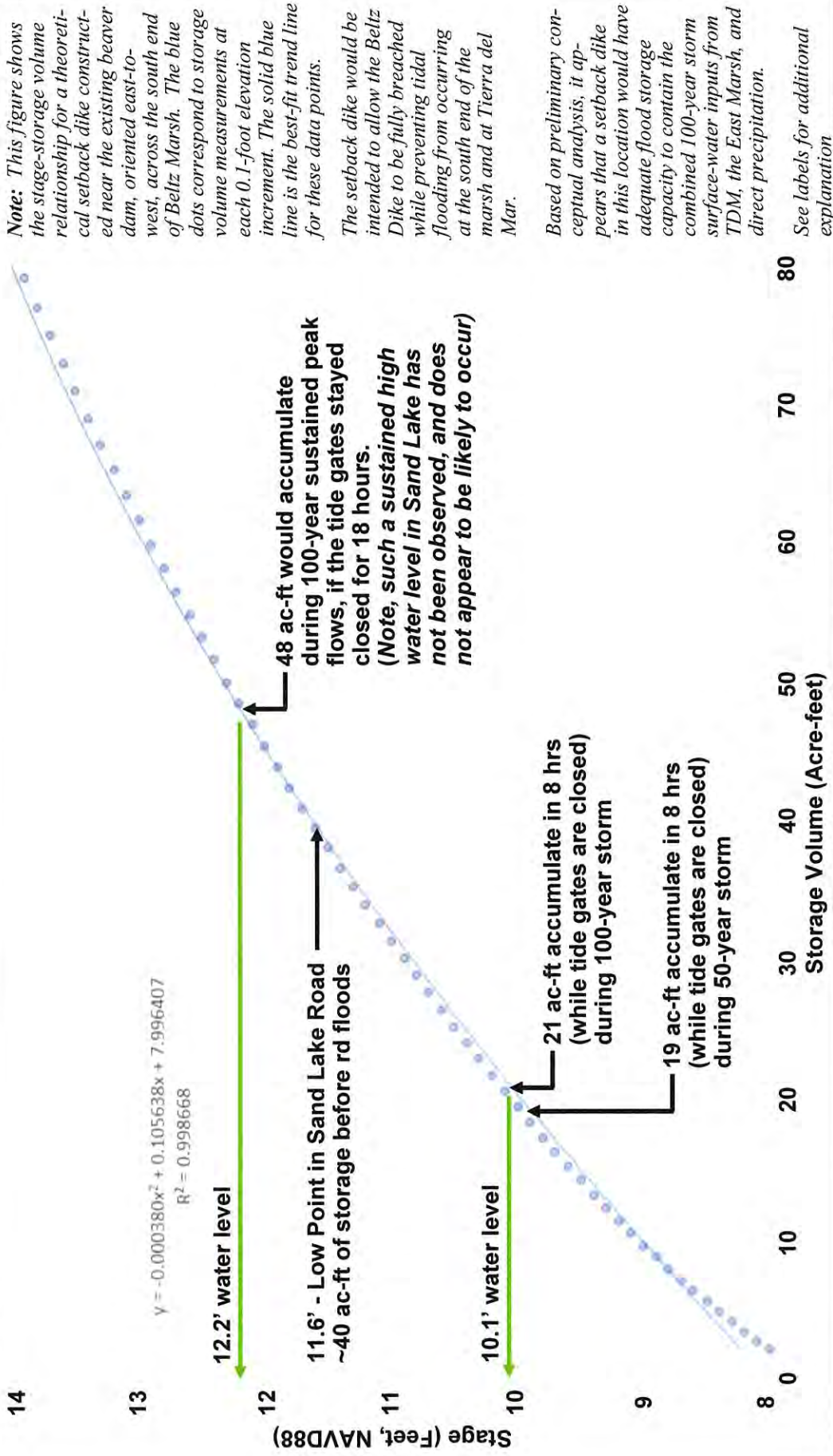


Figure 30

Whalen Island Bridge

Sitka Sedge Tidal Wetland Restoration
Hydraulic Modeling Memo



SOURCE: ESA derived stage-storage relationship based on PhoDAR terrain surface provided by OPRD.

Figure 31
Preliminary Feasibility Analysis of a Setback Dike from 2019 Study

Note: This figure shows a conceptual cross section of a setback dike that would likely be appropriate for the Sitka Sedge project, including a 12-foot minimum top width, 3:1 and 5:1 side slopes, resulting in a bottom width/footprint of 80 to 100 feet.

Setback dike dimensions, build height, and subgrade preparation/stabilization measures will be determined in subsequent design stages informed by a subsurface investigation and geotechnical engineering recommendations.

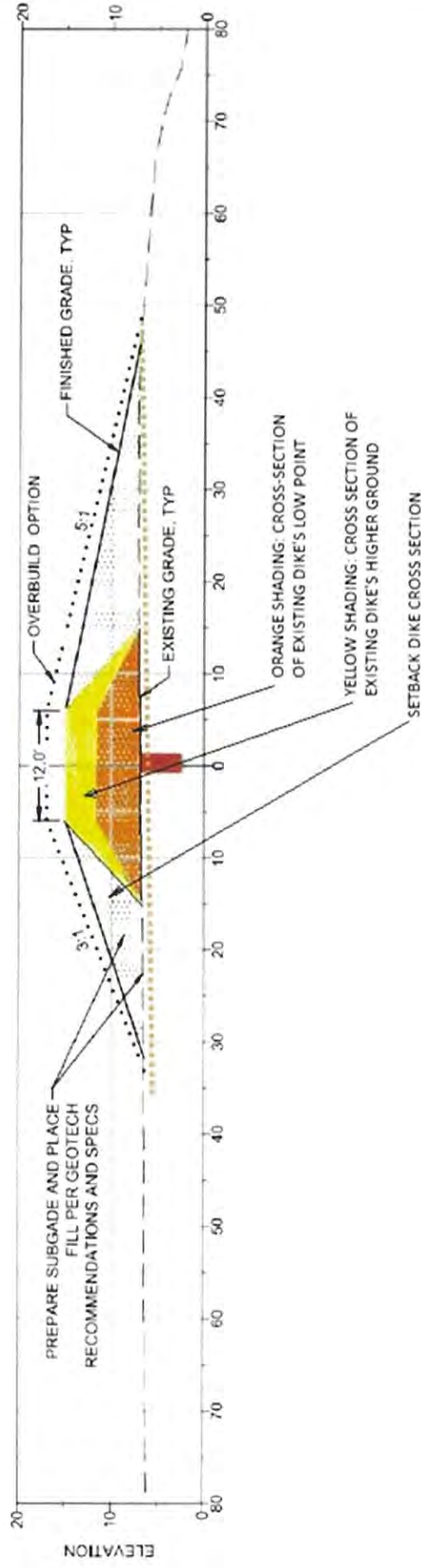


Figure 32
Conceptual Cross Section of a Setback Dike at Sitka Sedge

Note: This figure shows a concept plan for optimizing the setback dike location showing potential setback dike alternative alignments and flow contributions to the area behind a setback dike. (North is down in this image)

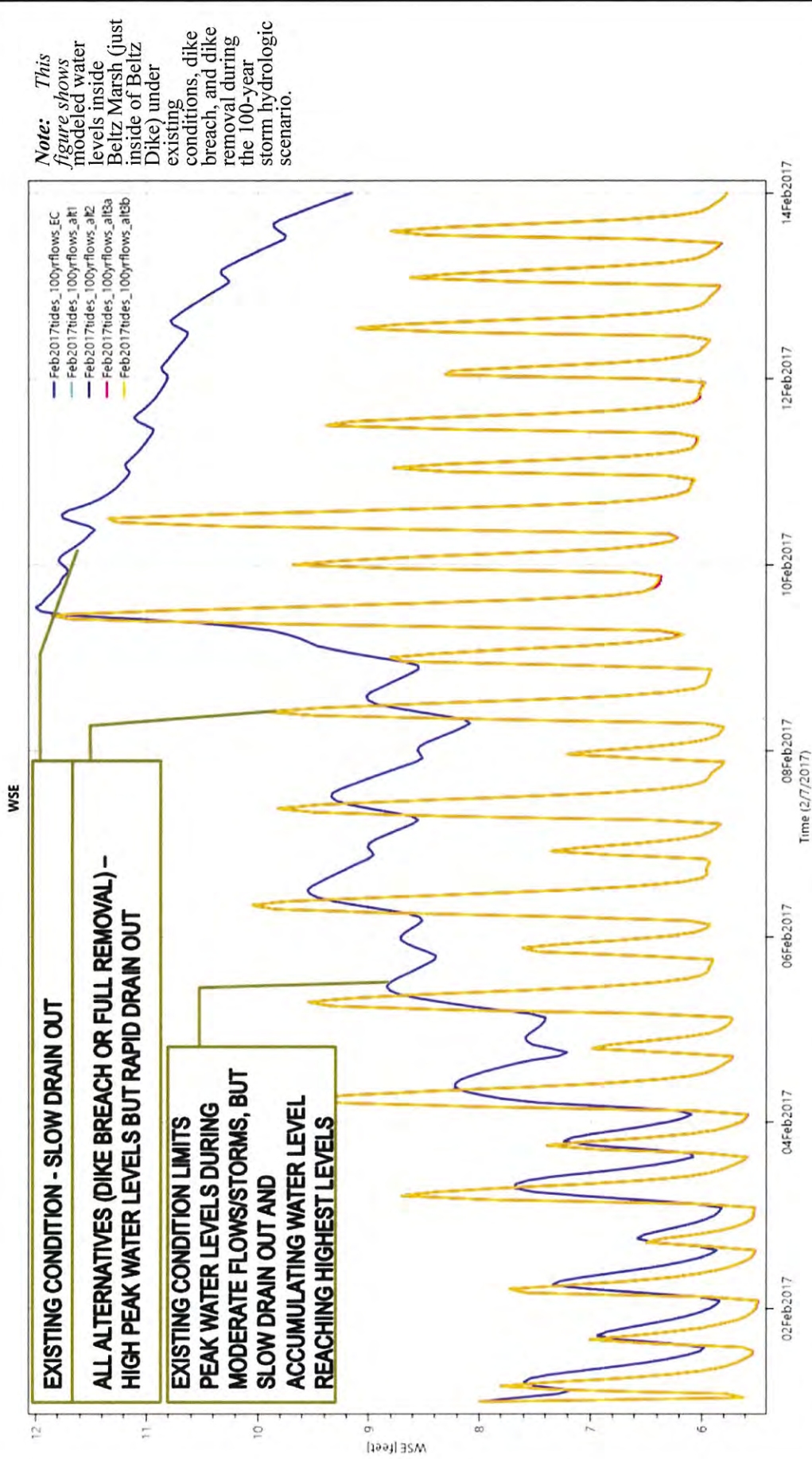


Figure 33
Concept Plan for Optimizing Location of Setback Dike



Note: This figure shows four alternative setback dike alignments.

Figure 34
Setback Dike Alternative Approximate Locations



Note: This figure shows modeled water levels inside Beltz Marsh (just inside of Beltz Dike) under existing conditions, dike breach, and dike removal during the 100-year storm hydrologic scenario.

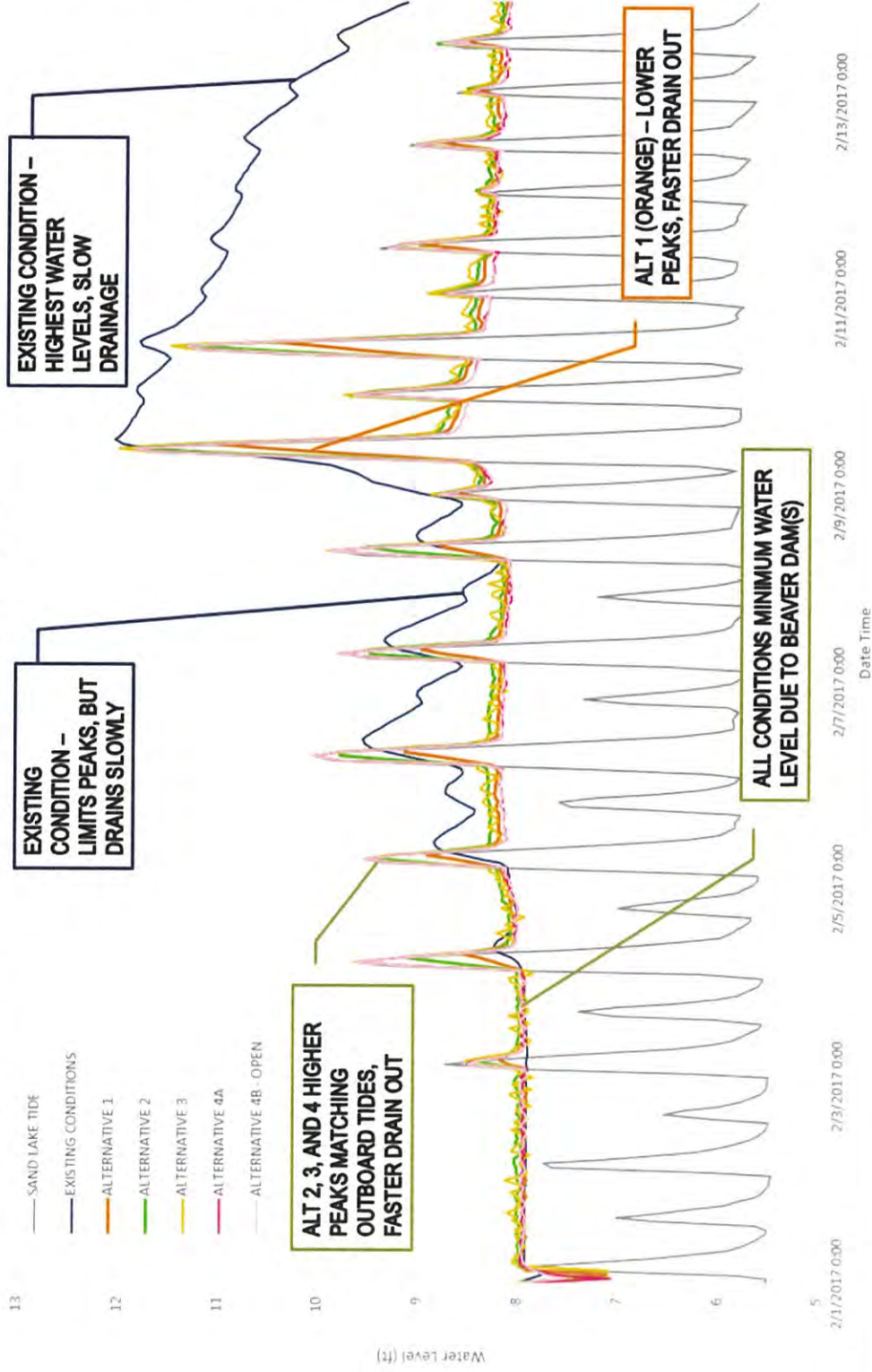
Figure 35

Modeled Water Levels Inside Beltz Marsh During 100-Year Storm Scenario under Dike Breach and Dike Removal vs. Existing Conditions

Sitka Sedge Tidal Wetland Restoration
Hydraulic Modeling Memo



100-Yr RUN with Feb 2017 Tides - SOUTH END OF MARSH



Note: This figure shows

modeled water levels at the south end of Beltz Marsh/North end of TDM for all setback dike alternatives and existing conditions.

This plot shows the full 14-day duration of the 100-year storm hydrologic scenario which includes a period of typical winter conditions, a first storm (2-year storm with 10' tides) and a second storm (100-year flows and 12' King Tides).

Figure 36

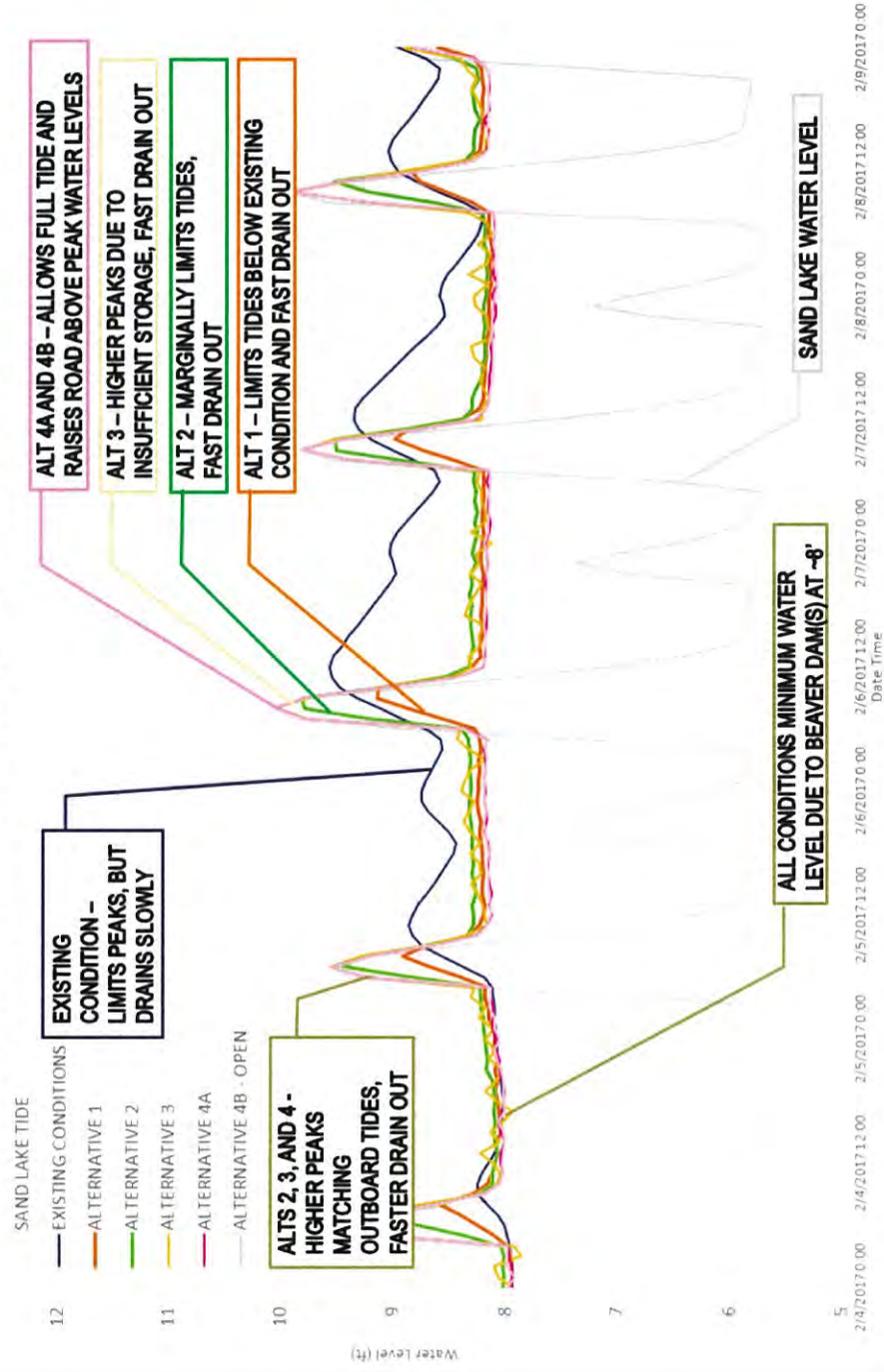
Modeled Water Levels at South End of Beltz Marsh During 100-Year Storm Scenario (Full Duration)

Sitka Sedge Tidal Wetland Restoration
Hydraulic Modeling Memo



2D MODEL RESULTS – 10' TIDES, 2-YR FLOWS

100-Year Run (FIRST STORM) - SOUTH END OF THE MARSH



Note: This figure shows modeled water levels at the south end of Beltz Marsh/North end of TDM for all setback dike alternatives and existing conditions.

This plot zooms in on the 'first storm' which includes 2-yearstream flows and runoff rates with moderately high tides reaching 10' NAVD88.

Figure 37

Modeled Water Levels at South End of Beltz Marsh - 2-Year Flows and 10' Tides (First Storm)

2D MODEL RESULTS – 100-YR FLOWS + KING TIDES

100-yr Run (100-YR FLOWS) KING TIDES - SOUTH END OF MARSH

Note: This figure shows modeled water levels at the south end of Beltz Marsh/ North end of TDM for all setback dike alternatives and existing conditions.

This plot zooms in on the 'second storm' which includes 100-year stream flows and runoff rates with King Tides reaching 12' NAVD88.

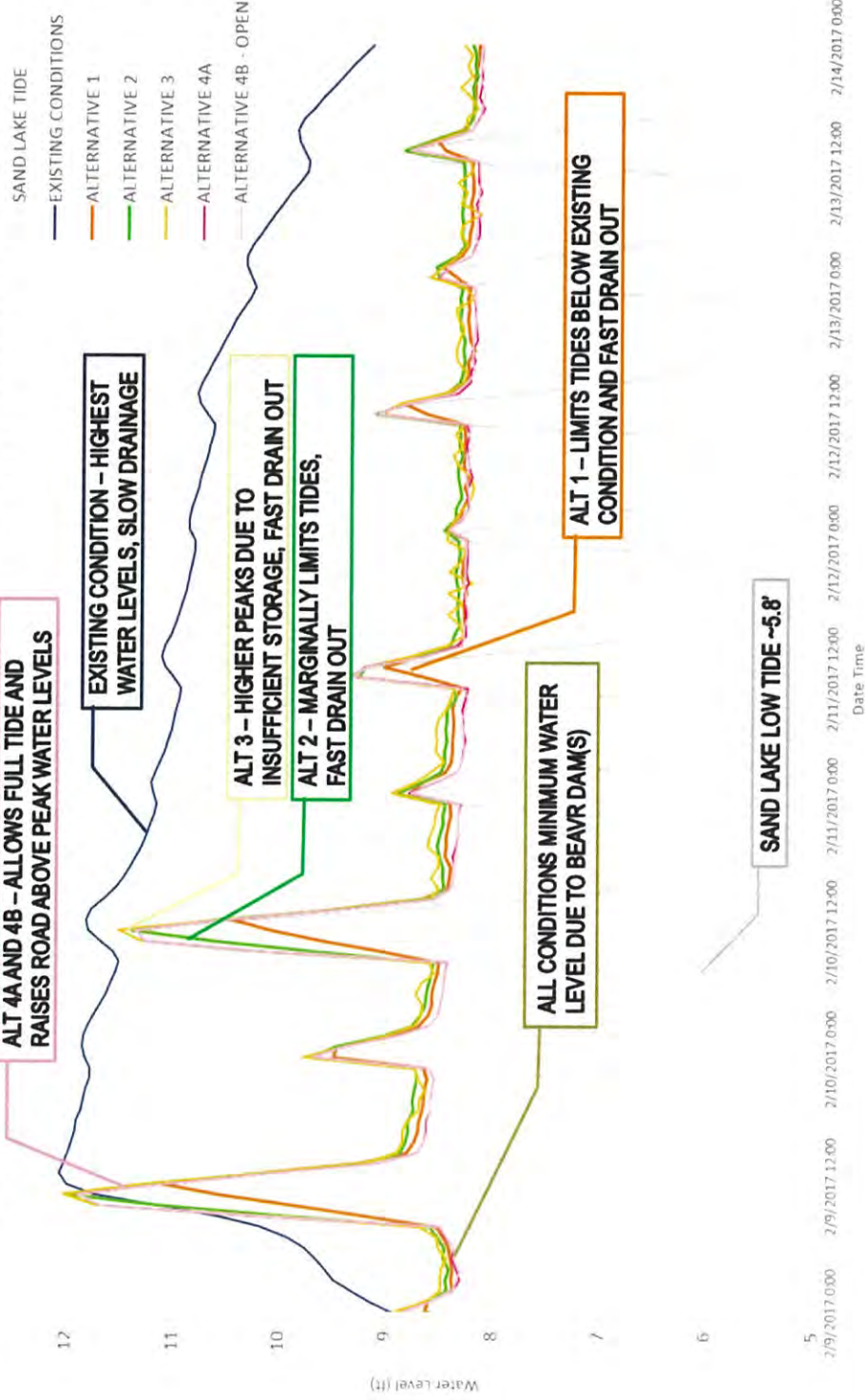


Figure 38

Modeled Water Levels at South End of Beltz Marsh - 100-Year Flows and King Tides

Sitka Sedge Tidal Wetland Restoration
Hydraulic Modeling Memo



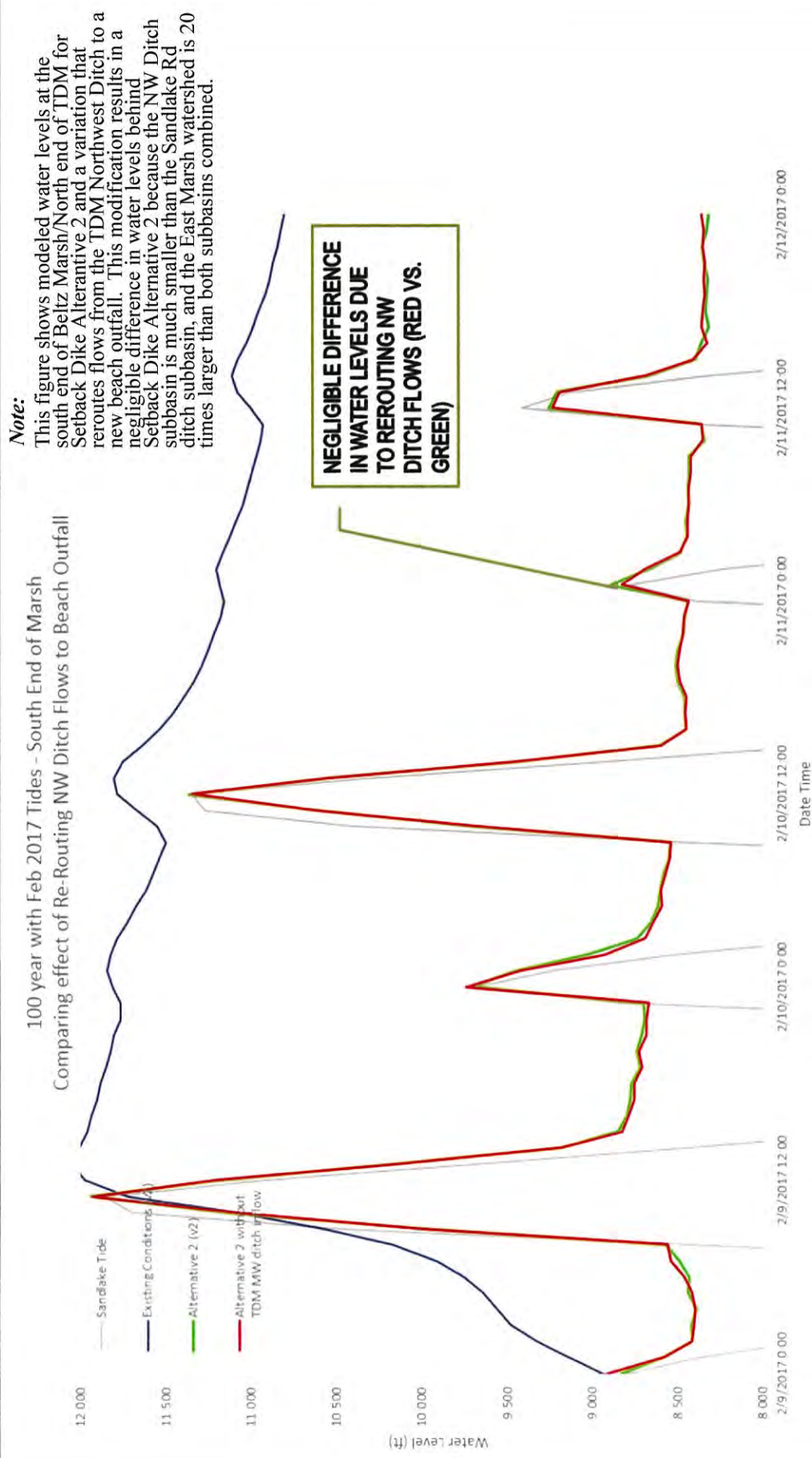


Figure 39
Model Results Testing Effect of Rerouting Flows from TDM NW Ditch to Beach Outfall

100-Yr RUN (FIRST STORM) - EAST MARSH

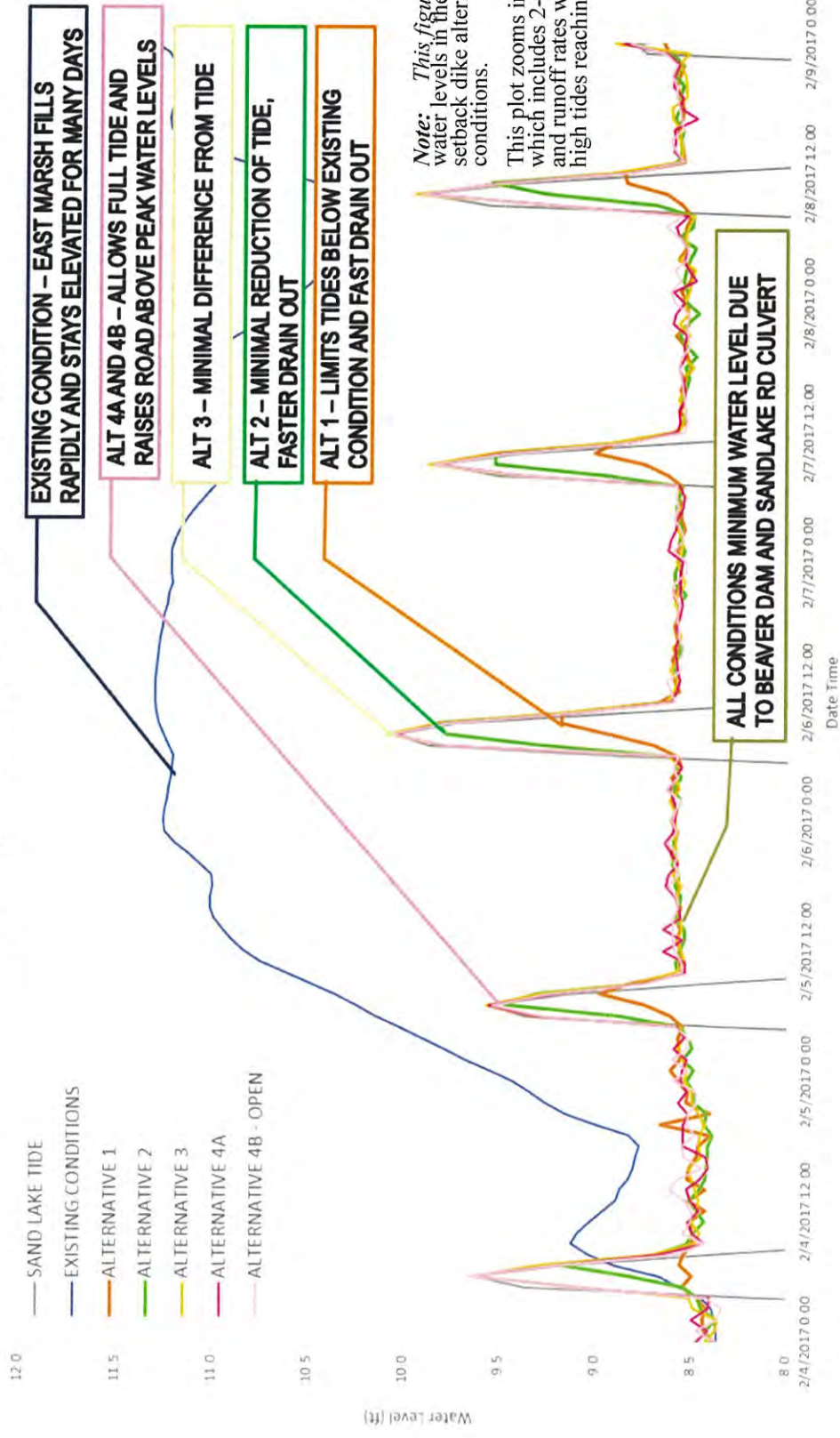


Figure 40
Modeled Water Levels in East Marsh - 2-Year Flows and 10' Tides (First Storm)

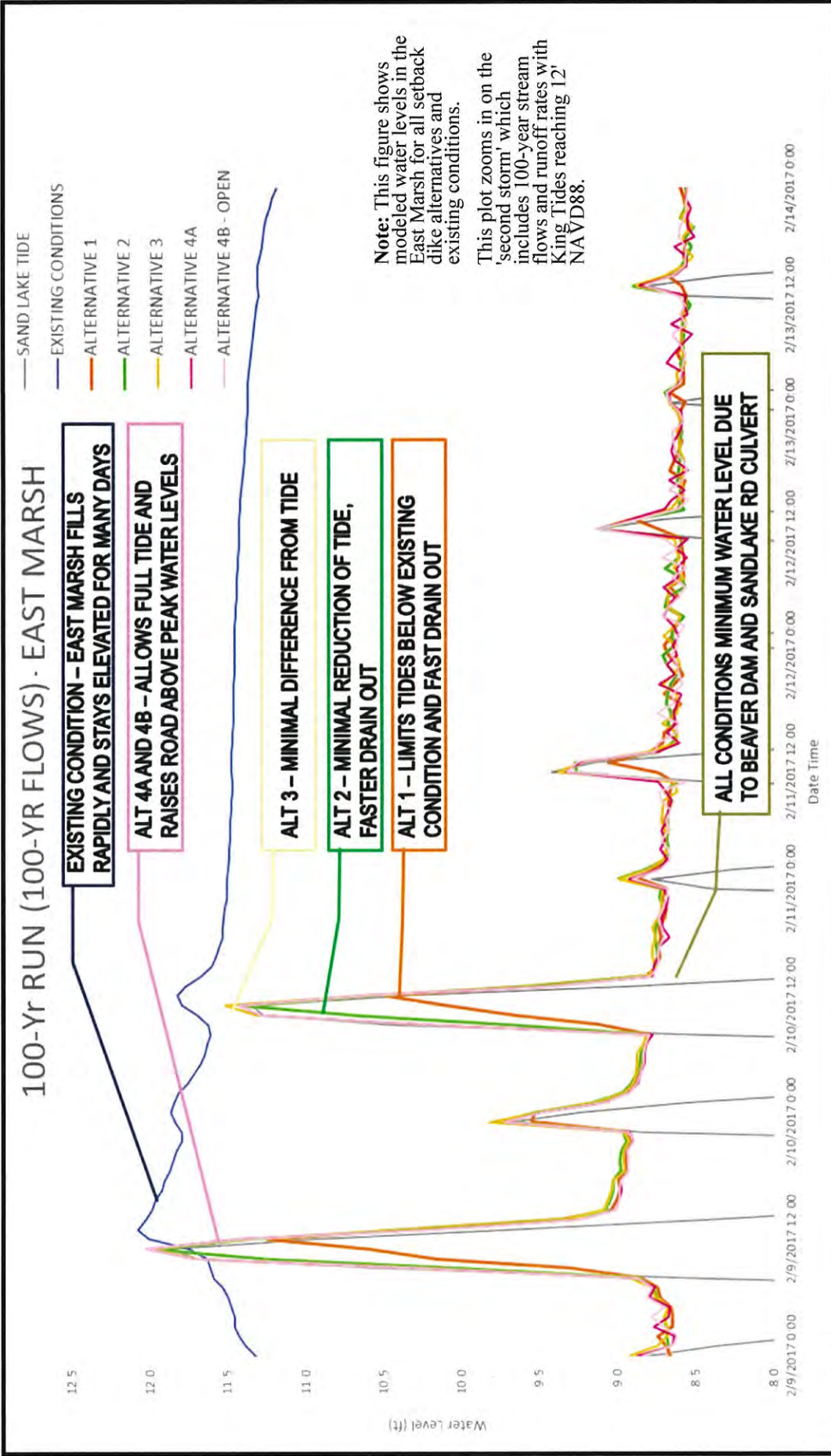
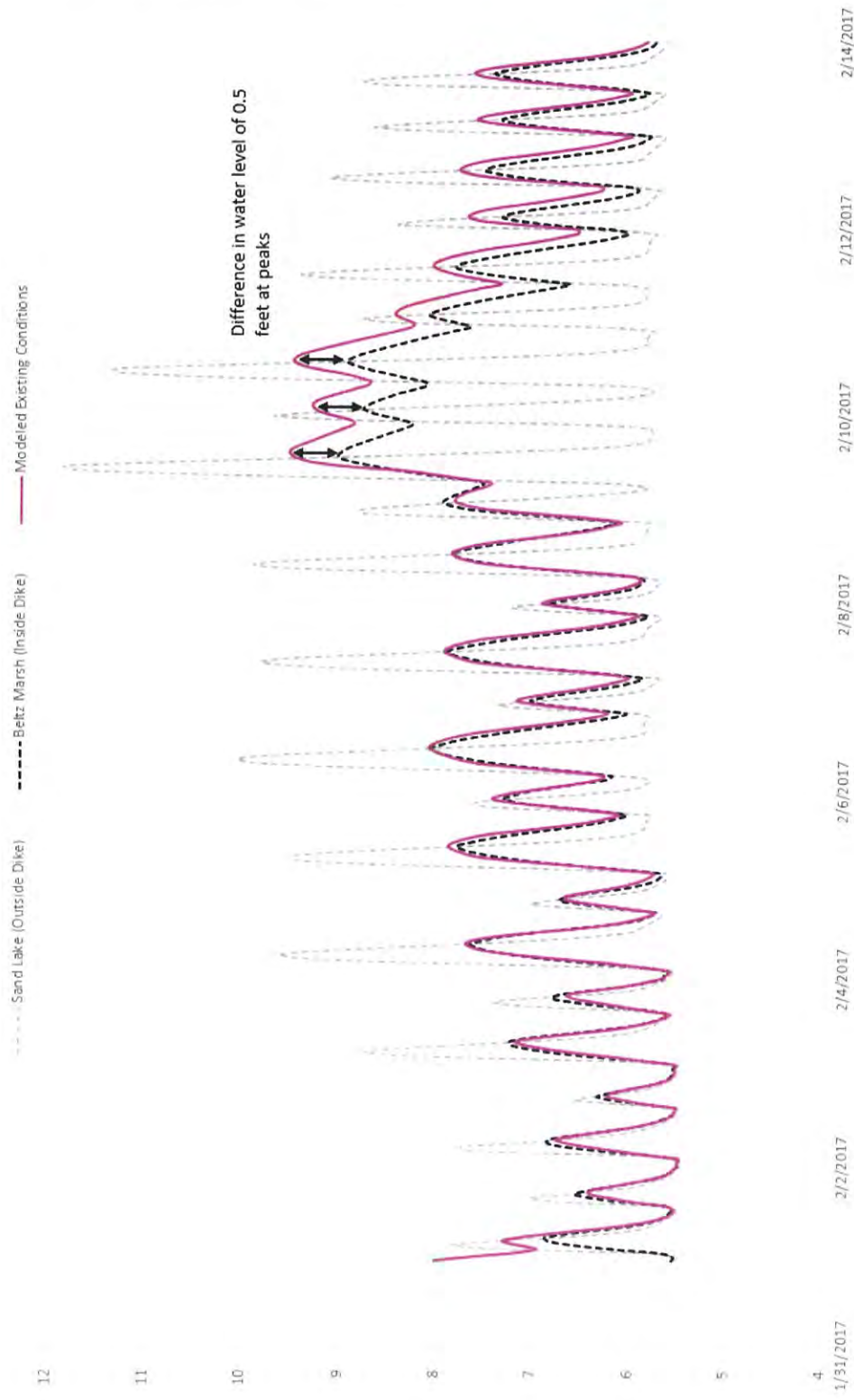


Figure 41
Modeled Water Levels in East Marsh - 100-Year Flows and King Tides



Note: This figure shows a comparison of modeled water levels to monitoring data during the 2017 storm event used for calibration. Modeled water levels generally match monitoring data very closely, except where the model predicts water levels 0.5' higher than the monitoring data, indicating the model is sufficiently calibrated and slightly conservative.

Figure 42
Model Calibration Comparison





PLANNING APPLICATION

Applicant ☐ (Check Box if Same as Property Owner)

Name: Tillamook Estuaries Partnership (TEP) Phone: 503-322-2222

Address: PO Box 493 613 Commercial Street

City: Garibaldi State: OR Zip: 97118

Email: christer@tbnep.org

Property Owner

Name: Oregon Parks and Rec Dept Phone: 503-986-0707

Address: 725 Summer Street NE, Suite C

City: Salem State: OR Zip: 97031

Email: OPRD.SitkaSedge@.oregon.gov

OFFICE USE ONLY

Date Stamp

JUN 30 2026

Counter-App-ss

☐ Approved ☐ Denied

Received by:

Receipt #:

Fees: 3,885.00

Permit No:

851-26-000327-PLNG

Request: A Type III Map Amendment (Rezoned) request to rezone tidally influenced land associated with the active restoration project.

Type II

- ☐ Farm/Forest Review
- ☐ Conditional Use Review
- ☐ Variance
- ☐ Exception to Resource or Riparian Setback
- ☐ Nonconforming Review (Major or Minor)
- ☐ Development Permit Review for Estuary Development
- ☐ Non-farm dwelling in Farm Zone
- ☐ Fore-dune Grading Permit Review
- ☐ Neskowin Coastal Hazards Area

Type III

- ☐ Detailed Hazard Report
- ☐ Conditional Use (As deemed by Director)
- ☒ Ordinance Amendment
- ☒ Map Amendment
- ☐ Goal Exception
- ☐ Nonconforming Review (As deemed by Director)
- ☐ Variance (As deemed by Director)

Type IV

- ☐ Ordinance Amendment
- ☐ Large-Scale Zoning Map Amendment
- ☐ Plan and/or Code Text Amendment

Location:

Site Address: 26805 & 27340 Sandlake Road, Cloverdale, OR, 97112

Map Number: 3S & 4S

10W & 10W

31 & 03

3S10310000400 & 4S10060000300

Township

Range

Section

Tax Lot(s)

Clerk's Instrument #: 2014-4572 & 2014-4572

Authorization

This permit application does not assure permit approval. The applicant and/or property owner shall be responsible for obtaining any other necessary federal, state, and local permits. The applicant verifies that the information submitted is complete, accurate, and consistent with other information submitted with this application.

Eric Timmons

Digitally signed by Eric Timmons
Date: 2026.06.25 07:53:05 -07'00'

6/25/26

Property Owner Signature (Required)

Christer LaBrecque

Digitally signed by Christer LaBrecque
Date: 2026.06.24 11:47:50 -07'00'

6/24/26

Applicant Signature

Date



PLANNING APPLICATION

Applicant ☐ (Check Box if Same as Property Owner)

Name: Tillamook Estuaries Partnership (TEP) Phone: 503-322-2222

Address: PO Box 493 613 Commercial Street

City: Garibaldi State: OR Zip: 97118

Email: christer@tbnep.org

Property Owner

Name: Oregon Parks and Rec Dept Phone: 503-986-0707

Address: 725 Summer Street NE, Suite C

City: Salem State: OR Zip: 97301

Email: OPRD.SitkaSedge@.oregon.gov

OFFICE USE ONLY

Date Stamp

JUN 30 2026

County-App-SV

☐ Approved ☐ Denied

Received by:

Receipt #:

Fees: 2100.00

Permit No:

851-26-00328-PLNG

Request: A Type III Conditional Use Permit for a proposed active tidal restoration project within the Estuary Natural (EN) Zone.

~~AS DEEMED BY DIRECTOR~~

~~+ TYPE III GEOLOGIC HAZARD REPORT~~

~~DUNE AREA DEVELOPMENT PERMIT~~

Type II

- ☐ Farm/Forest Review
- ☐ Conditional Use Review
- ☐ Variance
- ☐ Exception to Resource or Riparian Setback
- ☐ Nonconforming Review (Major or Minor)
- ☐ Development Permit Review for Estuary Development
- ☐ Non-farm dwelling in Farm Zone
- ☐ Fore-dune Grading Permit Review
- ☐ Neskowin Coastal Hazards Area

Type III

- ☐ Detailed Hazard Report
- ☒ Conditional Use (As deemed by Director)
- ☐ Ordinance Amendment
- ☐ Map Amendment
- ☐ Goal Exception
- ☐ Nonconforming Review (As deemed by Director)
- ☐ Variance (As deemed by Director)

Type IV

- ☐ Ordinance Amendment
- ☐ Large-Scale Zoning Map Amendment
- ☐ Plan and/or Code Text Amendment

Location:

Site Address: 26805 & 27340 Sandlake Rd. Cloverdale, OR 97112

Map Number: 03 South

10 West

31

3S10310000400 & 4S10060000300

Township

Range

Section

Tax Lot(s)

Clerk's Instrument #: 2014-4572 & 2014-4572

Authorization

This permit application does not assure permit approval. The applicant and/or property owner shall be responsible for obtaining any other necessary federal, state, and local permits. The applicant verifies that the information submitted is complete, accurate, and consistent with other information submitted with this application.

Eric Timmons

Digitally signed by Eric Timmons
Date: 2026.06.25 08:05:50 -07'00'

6/25/26

Property Owner Signature (Required)

Christer LaBrecque

Digitally signed by Christer LaBrecque
Date: 2026.06.24 11:46:44 -07'00'

6/24/26

Applicant Signature

Date

SITKA SEDGE TIDAL WETLAND RESTORATION PROJECT

Tillamook County Land Use Narrative and
Code Compliance

Prepared for
Tillamook Estuaries Partnership (TEP)

June 2026



Prepared for
Tillamook Estuaries Partnership (TEP)

June 2026

SITKA SEDGE TIDAL WETLAND RESTORATION PROJECT

Tillamook County Land Use Narrative and Code Compliance

Prepared for
Tillamook Estuaries Partnership (TEP)

June 2026

2863 NW Crossing Drive
Suite 100
Bend, OR 97701
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Bend	Pasadena	San Francisco
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Los Angeles	Petaluma	Santa Barbara
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Oakland	Rancho Cucamonga	Seattle
Orlando	Sacramento	Tampa
Palm Beach County	San Diego	Thousand Oaks

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Acronyms and Other Abbreviations

Abbreviation	Definition
ADA	Americans with Disabilities Act
BA	Biological Assessment
BD	Beach and Dune Overlay Zone
BFE	Base Flood Elevation
c.y. / CY	cubic yard(s)
CLOMR	Conditional Letter of Map Revision
Corps	U.S. Army Corps of Engineers
EMU	estuarine management unit
EN	Estuary Natural
ESA	Environmental Science Associates
FEMA	Federal Emergency Management Agency
FH	Flood Hazard Overlay Zone
FIRM	Flood Insurance Rate Map
GHR	Geologic Hazard Report
HMT	Highest Measured Tide
JMP	Joint Management Program
LOMR	Letter of Map Revision
MHHW	mean higher high water
NAVD88	North American Vertical Datum of 1988
NMFS	National Marine Fisheries Service
OAR	Oregon Administrative Rules
ODFW	Oregon Department of Fish and Wildlife
OPRD	Oregon Parks and Recreation Department
ORS	Oregon Revised Statutes
P.L.	Public Law
RM	Recreation Management
RR-2	Rural Residential
SFW-20	Small Farm Woodlot - 20
SLE	Sand Lake Estuary
SSSNA	Sitka Sedge State Natural Area
SSTW	Sitka Sedge Tidal Wetland

Abbreviation	Definition
TCLUO	Tillamook County Land Use Ordinance
TCPW	Tillamook County Public Works
TEP	Tillamook Estuaries Partnership
TPR	Transportation Planning Rule
USFWS	U.S. Fish and Wildlife Service

CHAPTER 1

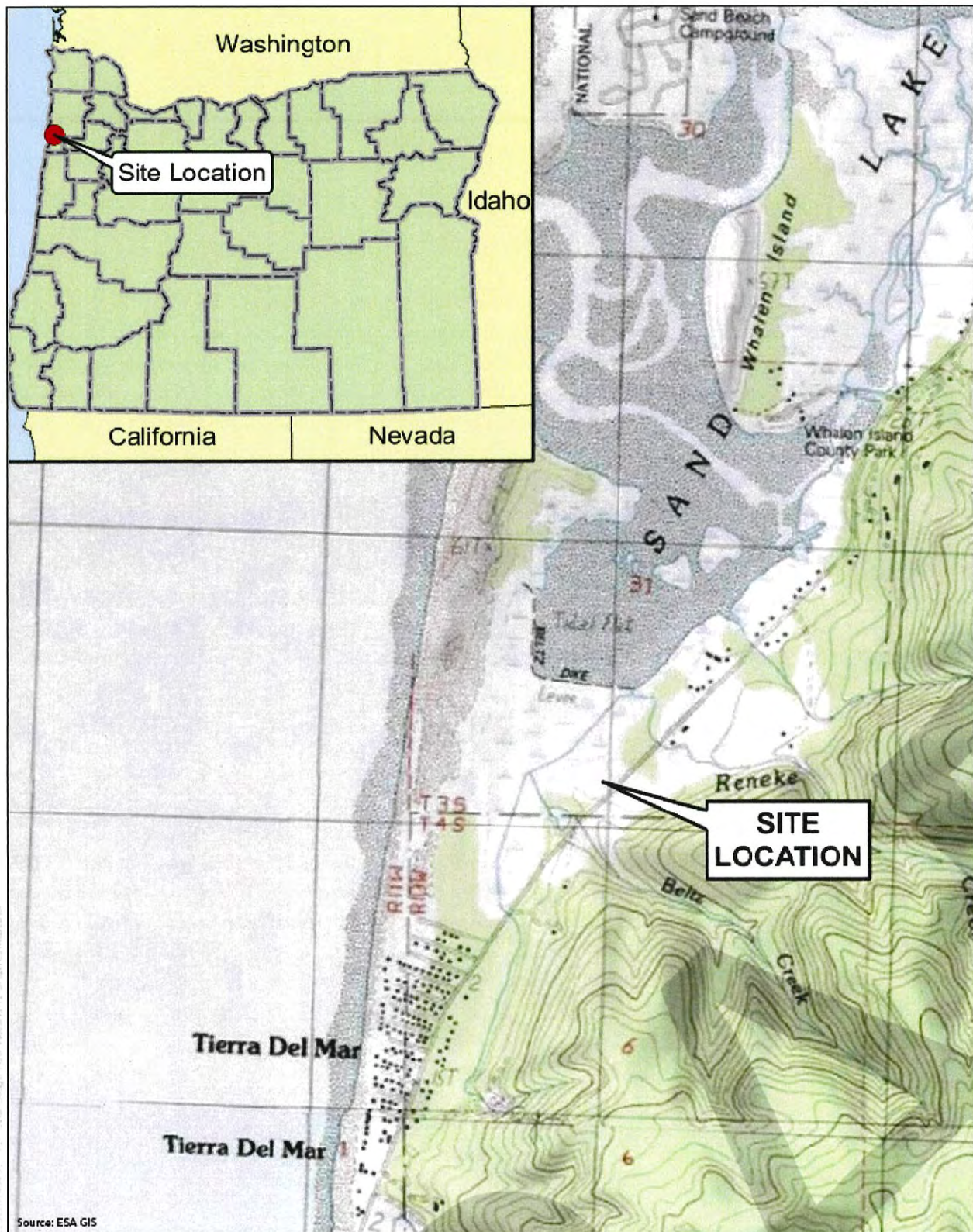
Introduction

1.1 Background Introduction

The Sitka Sedge State Natural Area (SSSNA) is located in Tillamook County, Oregon, at the southern end of Sand Lake Estuary and immediately north of the unincorporated community of Tierra Del Mar (**Figure 1**). The SSSNA encompasses 388 acres between the Pacific Ocean on its western edge and the forested foothills of the Coast Range mountains rising to the east. Approximately 276 acres are west of Sandlake Road, fronting the ocean and the Sand Lake Estuary. This portion of the property consists of approximately 102 acres of marshland (including approximately 70 acres of salt marsh/mudflats and 32 acres of freshwater marsh), and 22 acres of forest or shrubland swamp. Approximately 78 acres of historic estuary has been altered by Beltz Dike. There are 152 acres of dunes, beach, and uplands west of Sandlake Road. An un-maintained, half-mile long, artificial dike runs east/west through the northern third of the property separating the Beltz Marsh from Sand Lake Estuary. The remaining 113 acres of the property east of Sandlake Road is predominantly pasture and forest land. Sandlake Road roughly bisects the property, and a centrally located parking area provides public recreational access to the beach and a network of hiking trails via the Beltz Dike Trail, which is situated on top of the earthen levee. Three freshwater creeks, Reneke, Beltz, and an unnamed stream, drain into the Beltz Marsh at the southern end of the property, passing beneath Sandlake Road via undersized culverts, which impairs fish passage and can cause flooding and associated road closures.

The earthen levee known as Beltz Dike was constructed in the 1930s for the purposes of flood protection and agricultural production. The original tidal channels were filled in and drainage ditches were excavated to create pastures more conducive to grazing and growing crops. A single concrete box culvert currently provides the only drainage outlet through Beltz Dike. A top-hinged tide gate feature that once prevented tidal waters from entering the marsh through the culvert is no longer present, allowing water to flow in both directions. Over time erosion has occurred along the dike, particularly near the box culvert, threatening to undermine the drainage structure and breach the dike in an uncontrolled manner. The existing box culvert is also undersized for hydraulic capacity and fish passage, leading to prolonged elevated water levels in the marsh following large storm events and high tides, limiting fish passage into the marsh and upstream tributaries where they have traditionally spawned.

Figure 1 Project Location Map

Figure 1
Project Location Map

The Oregon Parks and Recreation Department (OPRD) and Tillamook Estuaries Partnership (TEP) propose to restore estuarine habitat conditions in the Beltz Marsh area of SSSNA by improving hydrologic connectivity through the dike and upstream across the road. Tillamook County Public Works Department is another project partner that will oversee improvements within the Sandlake Road right-of-way. The project team proposes to improve hydrologic connectivity by removing the undersized box culvert within Beltz Dike and the undersized culverts beneath Sandlake Road. Pedestrian and vehicular connectivity will be maintained and improved through the installation of appropriately sized bridges over the restored hydrologic channels. A setback dike will also be constructed at the south end of Beltz Marsh to provide flood protection for residents of Tierra Del Mar. The project ultimately aims to restore critical habitats within the SSSNA and enhance climate resilience for the local community, in alignment with Oregon's Coastal Management Program (OCMP) via Goal 16. The proposed Sitka Sedge Tidal Wetland Restoration Project requires several local land use permits, including a Conditional Use Permit (Chapter 4), Floodplain Development Permit (Chapter 5), and Dune Area Development Permit (Chapter 6).

This document addresses all relevant planning and permitting efforts and demonstrates project compliance with the Tillamook County Land Use Ordinance (TCLUO).

All elevations described in this document are referenced to the North American Vertical Datum of 1988 (NAVD88) unless otherwise noted.

1.2 Project Elements

The Sitka Sedge Tidal Wetland Restoration Project (the project) consists of the components described below. Refer to the submitted 90% Design Drawings for a depiction of existing and proposed conditions including staging, stockpiling, and erosion and sediment control measures. Pending permit approval and commitments for construction funding, the project is expected to begin construction in June 2027 and last at least 2 years through October 2028, with site revegetation implementation to follow.

The project elements are shown on **Figure 2** and include the following:

- Removing the box culvert and excavating a 140-foot-wide breach opening through the existing Beltz Dike to reconnect Beltz Marsh to tidal processes in Sand Lake, located to connect historical tidal channel alignments and minimize tree removal.
- Constructing a 140-foot-span pedestrian bridge over the dike breach to maintain recreational access along the Beltz Dike Trail to the rest of the SSSNA trail network.
- Constructing an earthen setback dike embankment near the south end of Beltz Marsh located approximately 50 feet north/downstream of the existing primary beaver dam to:
 - Prevent high tide water levels from reaching Tierra Del Mar.
 - Provide sufficient storage volume upstream/south of the setback dike to contain stormwater runoff without increasing water levels in Tierra Del Mar.
 - Maintain the existing beaver dam/lodge complex and freshwater habitat at the south end of Beltz Marsh to minimize potential beaver conflicts at the setback dike and associated tide gate structure.

- Filling linear drainage ditches and excavating new tidal channels in the marsh.
- Installing large wooden structures in channels and on the marsh plain for habitat complexity.
- Replacing the undersized culvert at Reneke Creek/Sandlake Road to improve fish passage including:
 - Raising approximately 800 feet of roadway to reduce roadway overtopping and constructing a 49-foot span vehicular bridge in place of the existing undersized culvert
 - Realigning the Reneke Creek channel to move the creek out of the roadside ditch and restore a historical channel flow path and alluvial fan/forested floodplain area.
- Replacing the undersized perched culvert at Beltz Creek/Sandlake Road to improve fish passage including:
 - Constructing a new 45-foot span bridge while maintaining the existing roadway profile and repaving the impacted section of roadway
 - Reconstructing the stream channel and streambed for approximately 180 feet beneath the proposed bridge and immediately upstream and downstream of the bridge.
- A future phase of this project will include the No Name Creek culvert replacements, which will primarily impact existing right-of-way.

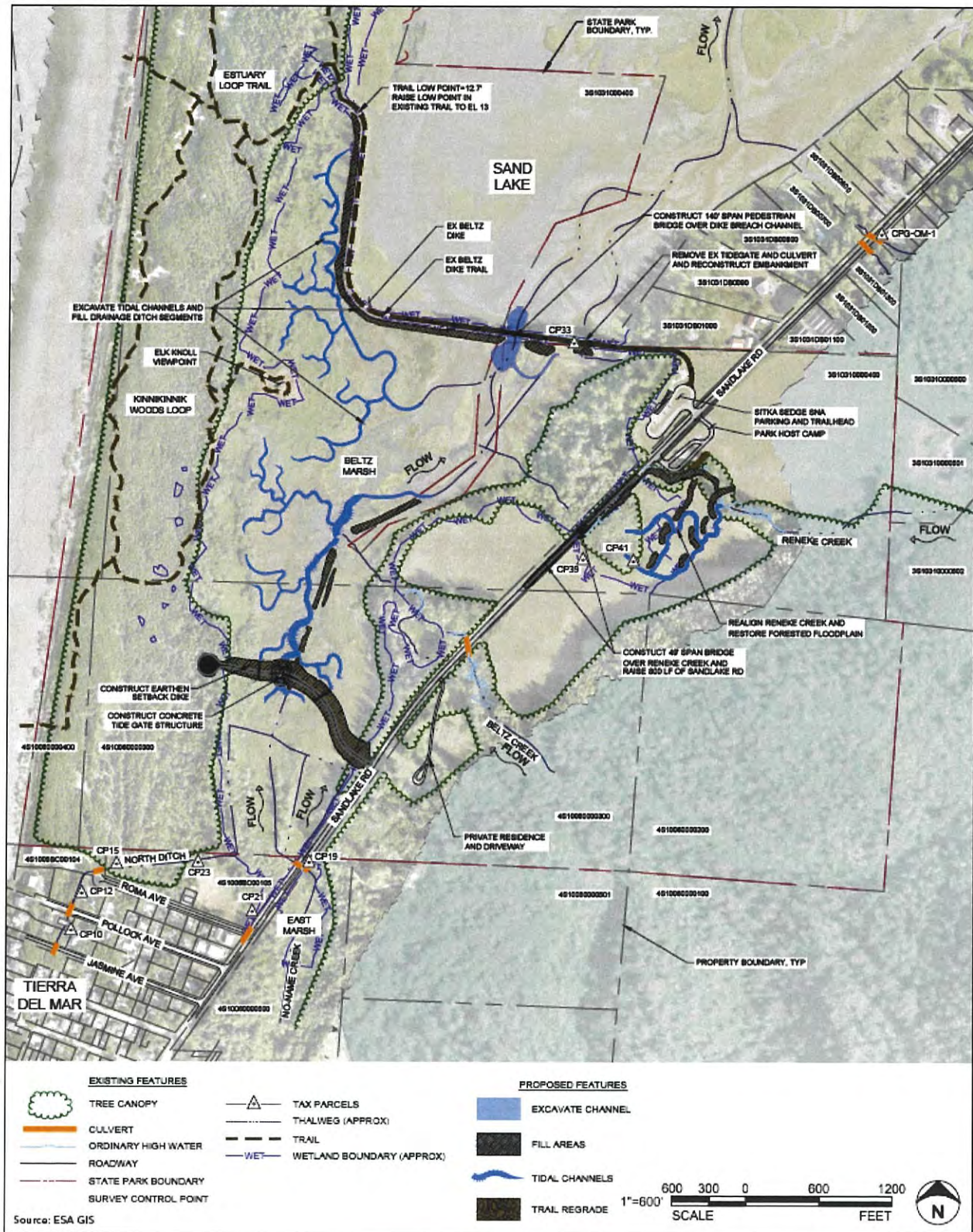
1.3 Land Use Permitting Summary

The SSSNA consists of four separate parcels, including Map and Tax lots 3S10310000400, 4S10060000300, 4S10060000200, and 4S10060000400. The zoning designations for each parcel, including split-zoning designations, are found in **Table 1** and Tillamook County zoning map provided below (Figure 4).

TABLE 1
EXISTING ZONING DESIGNATIONS

Tax Lot	Zoning Designation
3S10310000400	RM, EN, SFW-20
4S10060000300	RM, SFW-20
4S10060000200	SFW-20
4S10060000400	RM

Figure 2 Project Elements

Figure 2
Project Elements

The project is also located within several overlay zones: Flood Hazard Overlay (FH), Beach and Dune Overlay (BD), Shoreland Overlay (SH), and Tsunami Hazard Overlay (TH) Zones. Based on the underlying zoning districts and determined overlay zones, **Table 2** shows the land use applications required by the Tillamook County Planning Department as discussed during the pre-application meetings held on December 20, 2024, and April 13, 2026.

TABLE 2
REQUIRED LAND USE REVIEWS

Application	Type	Purpose	Addressed in Chapter
Comprehensive Plan (Text) Amendment	Type IV Legislative Decision	Re-inventory Beltz Marsh and sandspit from Goal 17, Coastal Shorelands, of the Comprehensive Plan to Goal 16, Estuarine Resources to proceed with the proposed restoration project of SSSNA.	2
Rezone (Map Amendment)	Type IV Legislative Decision	Rezone the tidally influenced portions of the Beltz Marsh property from Recreation Management (RM) to Estuary Natural (EN) Zone to move forward with the proposed restoration project, conditionally permitted in the EN Zone.	3
Conditional Use Permit (CUP)	Type III Quasi-Judicial Decision	Restoration projects in the EN Zone require a CUP.	4
Estuary Floodplain Development Permit	Type III Quasi-Judicial Decision	The project area is located within the Flood Hazard Overlay (FH) Zone.	5
Dune Area Development Permit	Type III Quasi-Judicial Decision	The project area is located within the Beach and Dune Overlay (BD) Zone.	6

1.4 Conclusion

As shown in Table 2, the proposed Sitka Sedge Tidal Wetland Restoration Project requires several local land use permits. This document outlines the project goals and demonstrates compliance with the applicable TCLUO code sections necessary for permit approval, including a Comprehensive Plan Amendment, Rezone, Conditional Use Permit, Floodplain Development Permit, and Dune Area Development Permit.

CHAPTER 2

Comprehensive Plan (Text) Amendment

2.1 Introduction

This section outlines the proposed amendment to the Tillamook County Comprehensive Plan to support implementation of the Sitka Sedge Tidal Wetland Restoration Project (the project). Historically, Beltz Marsh was disconnected from the Sand Lake estuary in the 1930s with the construction of a levee and tide gate to facilitate flood protection and agricultural use. As part of this conversion, tidal channels were filled and drainage ditches were installed to create pastureland. **Figure 3** presents maps of the existing and historical conditions at the project site.

The Beltz Farm property is currently inventoried under Comprehensive Plan under Goal 17 (Coastal Shorelands), with the Beltz sandspit designated as an exceptional aesthetic resource and the Beltz wetland recognized as a major marsh with significant habitat value. The property is also subject to the Coastal Shoreland overlay, which implements Goal 17 by regulating land use in areas adjacent to estuaries and other coastal water bodies. The overlay is intended to manage upland areas that influence or are influenced by nearby aquatic resources, with an emphasis on balancing resource protection and development. Goal 17 applies to lands adjacent to estuaries, coastal lakes, and shorelands, and is intended to protect these resources while allowing for appropriate development. In addition, the property is inventoried under Goal 8 (Recreational Needs) as a potential site for a future destination resort, reflecting its role in meeting the recreational needs of both Tillamook County residents and visitors to the Sitka Sedge State Natural Area.

The applicant is proposing a Text Amendment to the Tillamook County Comprehensive Plan to re-inventory the Beltz Farm property under Goal 16 Estuarine Resources and incorporate the Beltz Marsh area of Sitka Sedge State Natural Area into the Sand Lake Estuary Management Unit (EMU) and Sand Lake Joint Management Program (JMP). This amendment is warranted because the tide gate has failed and no longer prevents tidal inundation south of the levee, as a result, the current Goal 17 coastal shorelands inventory and the associated shoreland overlay no longer fully reflects existing estuarine conditions or the proposed tidal wetland restoration use. Goal 16 applies to estuarine waters, tidelands, tidal marshes, and submerged lands extending upstream to the head of tidewater, and requires inventories sufficient to identify estuarine resources, classify management units, and establish policies and use priorities for those units. Re-inventorying Beltz Marsh under Goal 16 would better align the Comprehensive Plan with existing site conditions and the proposed Sitka Sedge Tidal Wetland Restoration Project, which is intended to restore tidal hydrology, improve fish passage, and enhance estuarine habitat. It also establishes estuarine management units, emphasizes resource protection, and permits limited development in designated areas. The amendment would also support Goal 16's objective to protect, maintain, and, where appropriate, restore the long-term environmental, economic, and social

values, diversity, and benefits of Oregon's estuaries. The existing Sand Lake Estuary Management Unit (EMU) and Sand Lake Joint Management Program (JMP) would be expanded to include the Beltz Marsh area of SSSNA. Sand Lake EMU is a set of designated zones within the Sand Lake Estuary (SLE) that guides how the estuary is protected and managed, prioritizing conservation, ecological protection, and controlled use. The expanded EMU would emphasize protection of significant fish and wildlife habitat, biological productivity, and restoration of estuarine functions, while ensuring that any associated alterations are evaluated for consistency with resource capabilities and applicable Goal 16 implementation requirements.

The proposed project improvements at the SSSNA are designed to restore and reestablish tidal hydrology, aquatic organism passage, and estuarine functions within the Beltz Marsh, consistent with its re-inventory under Goal 16 (Estuarine Resources). Proposed project actions include removal of the existing box culvert and failed tide gate structure within the Beltz Dike, and excavation of a tidal channel to reconnect Beltz Marsh to Sand Lake. These elements will restore regular tidal exchange, reestablish estuarine hydrology, and allow the site to function as part of the Sand Lake estuarine system. The dike breach will incorporate a new pedestrian bridge to maintain continuity of the existing trail access.

To address flood risk and infrastructure protection while accommodating restored tidal influence, a new setback dike with tide gate system is proposed near the south end of Beltz Marsh. This feature is designed to provide flood protection for the adjacent community of Tierra Del Mar and Sandlake Road, which experience seasonal flooding events. Within the marsh, habitat enhancements will include tidal channel excavation, filling of legacy drainage ditches, and large wood placement to support estuarine habitat complexity and ecological function. Trail improvement within the project area will be focused primarily at areas disturbed by construction activities and will be designed to be compatible with the restored landscape.

Additional improvements to Sandlake Road are proposed to address flooding and improve fish passage between Beltz Marsh and upstream systems. The undersized culvert at Reneke Creek will be replaced with a new vehicular bridge, and the road will be raised and realigned away from the creek. Upstream from the bridge, the creek and riparian area will be restored to a more natural flow pattern. Tillamook County Public Works Department (the County) will oversee the roadway and crossing improvements as a project partner. The undersized culvert at Beltz Creek will be replaced with a new vehicular bridge while maintaining the existing roadway profile and embankment cross section. Approximately 180 feet of stream channel will be reconstructed to resolve the grade change at the perched culvert outlet. The project includes replacement of an additional culvert under Sandlake Road to improve fish passage and habitat connectivity between Beltz Marsh and upstream portions No Name Creeks. The Beltz Creek and No Name Creek Culvert replacement project elements will be constructed by the County in a future phase of this project. Collectively, these actions remove artificial constraints on tidal and fluvial processes and support the transition of the site from a diked agricultural landscape to a functioning component of the estuarine system.

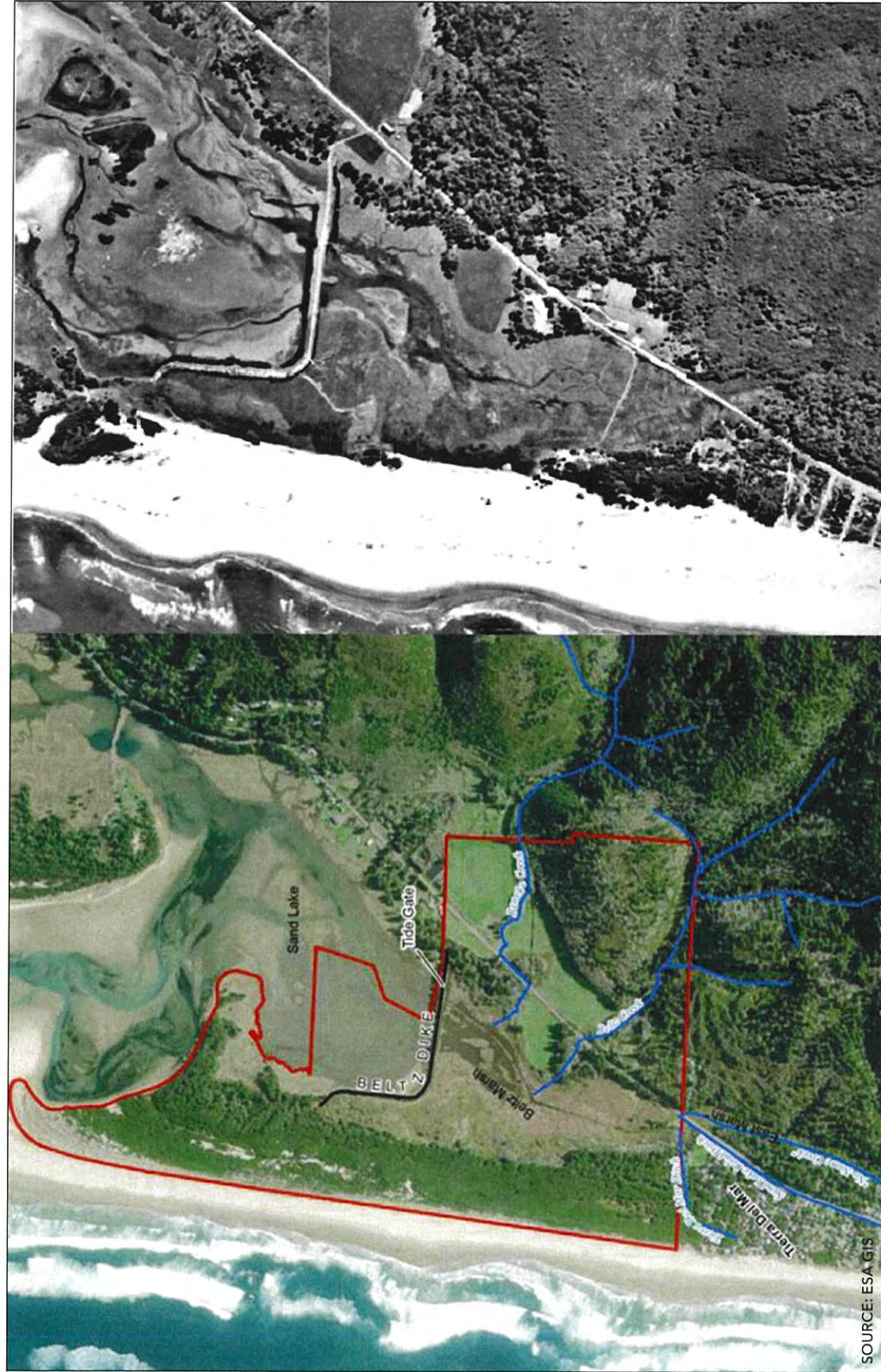


Figure 3

Existing vs Historical Conditions Map

2.2 Basis for Re-Inventory

This section provides the basis for re-inventorying the Beltz Marsh area from Goal 17 (Coastal Shorelands) to Goal 16 (Estuarine Resources) in the Tillamook County Comprehensive Plan by documenting how site conditions have changed such that the area now functions, and will continue to function, as part of the greater Sand Lake estuarine system. Under Statewide Planning Goal 2, land use decisions must be supported by an adequate factual base and must remain consistent with applicable statewide planning goals. The existing Goal 17 designation was based on historic conditions when Beltz Marsh was diked, drained, and functionally separated from the Sand Lake estuary for agricultural use.

The Sitka Sedge Tidal Wetland Restoration Project represents a transformative ecological and community investment in Tillamook County. Historically, Beltz Marsh was diked, drained, and disconnected from tidal influence for agricultural use, and was therefore appropriately inventoried under Goal 17 as a shoreland resource. However, the failure of the tide gate has reintroduced regular tidal inundation south of the levee, fundamentally altering site hydrology and ecological function. By reconnecting Beltz Marsh to the tidal and estuarine processes of the Sand Lake Estuary, the project will restore critical wetland functions, enhance fish habitat, and improve climate resilience. Current conditions reflect a system influenced by tidal exchange, with mapped National Wetlands Inventory (NWI) (Figure 6) classifications identifying the dominant habitat as estuarine and marine wetlands. These conditions indicate that the property now meets the definition of estuarine resources under Goal 16, which applies to tidal waters, marshes, and associated habitats subject to estuarine processes.

The Sitka Sedge Tidal Wetland Restoration Project represents a strategic and science-based effort to restore the ecological integrity of Beltz Marsh within the Sand Lake Estuary system. The proposed amendment recognizes this shift by updating the Comprehensive Plan inventory to reflect the site's existing and anticipated future conditions. Rather than a discrete project-driven change, this re-inventory aligns land use designations with on-the-ground conditions and the broader Sand Lake Estuary system, which is classified as a natural estuary under Goal 16. Incorporation of Beltz Marsh into the Sand Lake Estuary Management Unit (EMU) and Joint Management Program (JMP) will ensure that the area is managed consistent with statewide planning requirements that prioritize protection, conservation, and restoration of estuarine functions and habitats. Under Goal 16 and implementing rules (OAR 660-017), Natural estuaries are to be managed to preserve natural resources, protect habitat, and limit development to uses that are compatible with resource capabilities. Re-inventorying Beltz Marsh under Goal 16 is therefore necessary to apply the appropriate regulatory framework, including use priorities and impact assessment standards required for estuarine areas. The proposed amendment is further supported by the consistency requirement of Goal 2, as it aligns mapped designations, policy direction, and implementing measures with current physical conditions and the acknowledged estuary classification. The proposed restoration actions—including removal of barriers to tidal exchange, reconnection of historic channels, and reestablishment of estuarine hydrology—are consistent with Goal 16 policies that support maintenance and restoration of estuarine resources, particularly in areas where historic alterations have degraded natural functions. The current Goal 17 designation, including the associated coastal shoreland overlay, was established to manage lands adjacent to estuaries where development pressures must be balanced with protection of scenic, natural, and recreational resources. Shoreland overlays are intended to apply to upland areas that influence or are influenced by nearby water bodies but are not individually

functioning as part of the aquatic system. In contrast, Goal 16 applies directly to estuarine waters, tidelands, and marshes where tidal processes are the defining characteristic.

Proposed project action advance Oregon's climate adaptation goals (DLCD 2021) by improving flood resilience and protecting infrastructure for nearby communities. The project is located within Federal Emergency Management Agency (FEMA) Flood Zone AE (Figure 8), defined as the area that has a 1% annual chance of flooding (also known as the 100-year floodplain), reflecting its position within the active floodplain of the Sand Lake estuarine system. As such, resilient infrastructure and natural floodplain restoration are necessary. The proposed actions recognize and accommodate these floodplain dynamics by restoring tidal connectivity and reestablishing natural hydrologic processes, rather than continuing to rely on aging infrastructure designed to exclude tidal influence. Breaching the existing Beltz Dike and removing the failed tide gate will allow the site to function consistently with estuarine conditions, while installation of a new setback dike and tide gate system will provide targeted flood protection for adjacent developed areas, including the community of Tierra Del Mar and Sandlake Road. This approach shifts flood management from broad-scale exclusion of tidal processes to a more resilient framework that integrates natural floodplain function with strategic infrastructure protection. Improvements to Sandlake Road, a designated State Scenic Byway and critical lifeline route, will reduce flood vulnerability and improve public safety by addressing hydraulic constraints and elevational inadequacies. These design elements are informed by advanced hydrodynamic modeling to support the site's long-term resilience to sea-level rise and extreme weather events.

This amendment maintains consistency with other elements of the Comprehensive Plan, including Goal 8 (Recreation), as implemented through the coordinated land use planning of the Sand Lake Joint Management Program and the Sitka Sedge State Natural Area Master Plan. The amendment does not introduce conflicting land uses or preclude public use but instead ensures that recreational access and passive use are planned in a manner that is compatible with the long-term protection, conservation and restoration of estuarine resources.

Because Beltz Marsh is now subject to tidal inundation and exhibits estuarine wetland characteristics, continued application of Goal 17 shoreland policies and the associated shoreland overlay is no longer appropriate or sufficient to guide resource management. Re-inventorying the site under Goal 16—and adjusting the shoreland overlay accordingly—ensures that the property is governed by the correct regulatory framework, including estuarine management unit designations, use priorities, and resource protection standards that are specifically tailored to estuarine environments. Other key project benefits include the following:

- **Ecological Restoration and Species Recovery:**

The restoration project will address legacy impacts from diking, ditching, and draining (which have degraded habitat quality and hydrologic function) by reconnecting the tidal wetlands of the Beltz Marsh property to the SLE, restoring natural hydrology and habitat complexity. Restoring tidal connectivity and natural hydrology will support broader estuarine ecosystem health and biodiversity. The culvert replacements will remove barriers to support aquatic organism passage, improving access to Essential Salmonid habitat. More specifically, Oregon Coast coho salmon (a species listed as threatened under the Endangered Species Act) will benefit from the removal of fish barriers at Beltz Dike and at the Reneke Creek/Sandlake Road and Beltz Creek/ Sandlake Road crossings,

reconnecting more than 2 miles of upstream spawning and rearing habitats. The project will also enhance habitat for 17 federal and state species of concern, including migratory birds along the Pacific Flyway.

- **Climate Resilience and Flood Protection:**

This topic is discussed in further detail in the preceding paragraphs.

- **Community Engagement:**

OPRD and TEP have and will continue to participate in active engagement with local stakeholders and the community of Tierra Del Mar to understand and respond to community needs. TEP also has and will continue to engage Tribal partners, including the Confederated Tribes of Siletz Indians, to incorporate Traditional Ecological Knowledge and traditional use elements into project design for restoration. This collaborative approach builds trust and ensures that restoration actions align with local priorities. The restoration project will have a direct net positive impact for the community of Tierra Del Mar, Tillamook County, and recreation users of the SSSNA.

- **Recreational Access and Public Benefit:**

The restoration project will maintain and improve access to the SSSNA trail network by improving trail connectivity via a newly constructed pedestrian bridge, preserving recreational opportunities for residents and visitors while enhancing the natural experience through restored landscapes.

2.3 Appendix A 2023 Fish Passage Project Summary & Narrative (Attached)

Appendix A will be submitted as a supplemental review item to support the Comprehensive Plan Amendment for the Sitka Sedge Wetland Restoration Project. This document provides additional context regarding the project's purpose, scope, and anticipated public and ecological benefits, and is intended to enhance understanding of the proposal's alignment with local and statewide planning goals.

2.4 Code Compliance

TCLUO Article 9 - Amendment

SECTION 9.030: TEXT AMENDMENT PROCEDURE

- (3) Criteria. Commission review and recommendation, and Board approval, of an ordinance amending the Zoning Map, Development Code or Comprehensive Plan shall be based on all of the following criteria:

Applicant Response: *The proposed Comprehensive Plan Amendment to re-inventory the Beltz Marsh area of SSSNA under Goal 16 (Estuarine Resources) represents a strategic alignment of land use policy with the ecological function and restoration potential for the project area. While the Beltz Marsh is currently inventoried under Goal 17 (Coastal Shorelands), the site functions as a tidally influenced wetland system and its direct hydrological connection to the SLE make it more appropriately classified and managed under Goal 16. The Sitka Sedge Tidal Wetland Project directly supports the objectives of Goal 16, prioritizing the protection, conservation, and restoration of estuarine ecosystems.*

The proposed amendment is consistent with the Tillamook County Comprehensive Plan and applicable Statewide Planning Goals because it supports the protection, restoration, and long-term management of estuarine resources and habitat functions. The Sitka Sedge Tidal Wetland Restoration Project advances the objectives of Goal 16 by restoring natural tidal processes, improving estuarine habitat quality, enhancing water quality and ecological resilience, and supporting native fish and wildlife resources. The amendment serves the public interest by facilitating ecosystem restoration and coastal resilience objectives while remaining compatible with surrounding conservation and resource management uses. Accordingly, the proposed amendment satisfies the applicable criteria for Comprehensive Plan amendments under TCLUO Section 9.030.

- (a) If the proposal involves an amendment to the Comprehensive Plan, the amendment must be consistent with the Statewide Planning Goals and relevant Oregon Administrative Rules;

Applicant Response: *The proposed Comprehensive Plan Amendment is consistent with the applicable Statewide Planning Goals and relevant Oregon Administrative Rules because it re-inventories the estuarine portions of the Beltz Marsh area under the statewide planning framework most appropriate for the site's existing and restored ecological functions. The amendment is consistent with Goal 16 and associated administrative rules governing estuarine resource management because it supports the protection, conservation, and restoration of estuarine habitat and ecological functions. Re-inventorying the site under Goal 16 will facilitate inclusion within the Sand Lake Joint Management Program (JMP) and provide the appropriate regulatory framework for restoration of tidal hydrology, fish passage, wetland habitat, and estuarine processes.*

The amendment also supports the objectives of Goal 5 (Natural Resources) and Goal 7 (Areas Subject to Natural Hazards) by enhancing ecological resilience, improving flood storage and tidal connectivity, and supporting long-term climate adaptation and sea level rise resilience. The proposed amendment and subsequent restoration actions are informed by best available science, including hydrodynamic modeling, habitat assessments, and restoration planning analyses. The project will also provide substantial public benefits, including improved tidal flooding and stormwater management, enhanced habitat conditions for state and federally listed species, increased sea-level-rise protection for the community of Tierra Del Mar, protection of infrastructure along Sandlake Road, and continued recreational access within the SSNA.

- (b) The proposal must be consistent with the Comprehensive Plan. (The Comprehensive Plan may be amended concurrently with proposed changes in zoning);

Applicant Response: *The proposed Comprehensive Plan Amendment is consistent with the Tillamook County Comprehensive Plan because it aligns the land use inventory and policy framework with the existing and proposed estuarine functions of the Beltz Marsh area within the SSSNA. Although portions of the site are currently inventoried under Goal 17 (Coastal Shorelands), the project area functions as a tidally influenced estuarine wetland directly connected to the Sand Lake Estuary and is therefore more appropriately managed under Goal 16 (Estuarine Resources). The amendment supports Comprehensive Plan objectives related to estuarine resource protection, habitat restoration, water quality improvement, coastal resilience, and long-term natural resource stewardship. Re-inventorying the site under Goal 16 will facilitate implementation of the proposed tidal wetland restoration project and inclusion within the*

Sand Lake Joint Management Program (JMP), providing a regulatory framework that is more consistent with the site's ecological characteristics and restoration objectives.

Conformance with the Tillamook County Comprehensive Plan is addressed in Appendix B: Sitka Sedge Tidal Wetland Restoration Alignment with Comprehensive Plan Goal Review, including consistency with policies supporting conservation and restoration of estuarine ecosystems, flood and hazard resilience, fish and wildlife habitat enhancement, and coordinated coastal resource management. The associated proposed Map Amendment (Rezone) is addressed separately in Chapter 3 of this document.

- (c) The Board must find the proposal to be in the public interest with regard to community conditions; the proposal either responds to changes in the community, or it corrects a mistake or inconsistency in the subject plan or ordinance; and

Applicant Response: *The proposed Comprehensive Plan Amendment is in the public interest because it supports long-term ecological restoration, climate resilience, flood management, habitat enhancement, and coordinated coastal resource management objectives that benefit both the local community and the broader Sand Lake Estuary system. The collaborative planning process—engaging local stakeholders, Tribal partners, and public agencies—ensures that restoration efforts reflect community values and long-term stewardship goals. The proposal also responds to changing community conditions and evolving coastal management priorities related to climate adaptation, estuarine resilience, and restoration of degraded tidal wetlands. Since the original inventory designation, restoration science, hydrologic analysis, and resource management planning efforts have identified the Beltz Marsh area as functioning estuarine habitat that is more appropriately managed under Goal 16 (Estuarine Resources) rather than Goal 17 (Coastal Shorelands). Accordingly, the amendment corrects an inconsistency between the site's current Comprehensive Plan inventory designation and its existing and proposed ecological functions.*

This amendment represents a responsible and forward-looking land use decision that supports Tillamook County's commitment to ecological integrity, climate resilience, and coordinated coastal resource management. It is consistent with the Tillamook County Comprehensive Plan goals, Oregon's Statewide Planning Goals, the SSSNA Master Plan, the Tillamook County Estuarine Resilience Action Plan, and the Sand Lake JMP, positioning the property to serve its highest public and ecological value as a restored estuarine resource.

- (d) The amendment must conform to Section 9.040 Transportation Planning Rule Compliance.

Applicant Response: *Conformance with Section 9.040 Transportation Planning Rule is addressed below. As discussed therein, the proposed Comprehensive Plan Amendment and associated restoration project will not significantly affect transportation facilities pursuant to OAR 660-012-0060. The amendment does not authorize urban development or uses that would substantially increase traffic demand, alter transportation patterns, or reduce the performance of transportation facilities. Instead, the project includes transportation infrastructure improvements intended to improve roadway resilience and reduce recurring flooding impacts along Sandlake Road.*

SECTION 9.040: TRANSPORTATION PLANNING RULE COMPLIANCE

Proposals to amend the Comprehensive Plan, Zoning Map or Ordinance shall be reviewed to determine whether they significantly affect a transportation facility pursuant with Oregon Administrative Rule (OAR) 660-012-0060 (Transportation Planning Rule - TPR). Where the County, in consultation with the applicable roadway authority, finds that a proposed amendment would have a significant effect on a transportation facility, the County shall work with the roadway authority and applicant to modify the request or mitigate the impacts in accordance with the TPR and applicable law.

Applicant Response: *The proposed Comprehensive Plan Amendment to re-inventory Beltz Marsh under Goal 16 (Estuarine Resources) will not significantly affect County transportation facilities or systems. The amendment does not authorize increased development intensity, urban uses, or land uses that would substantially increase traffic volumes or alter existing transportation patterns within the project area. The proposed tidal wetland restoration project is resource restoration-oriented in nature and is not expected to generate significant new vehicle trips or adversely affect the capacity, safety, or function of County transportation facilities.*

The proposed project includes improvements to Sandlake Road where Reneke Creek and Beltz Creek crosses under the roadway to enter Beltz Marsh. The existing Reneke Creek culvert will be replaced with a 49-foot span bridge and approximately 800 feet of Sand Lake Road will be rebuilt and elevated to reduce seasonal flooding impacts and improve long-term roadway resilience. The Beltz Creek culvert will be replaced with a 45-foot span bridge while maintaining the existing roadway profile and embankment cross section. These improvements are expected to enhance, rather than degrade, transportation system performance. Accordingly, the proposal complies with Section 9.040 and applicable Transportation Planning Rule requirements.

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CHAPTER 3

Map AMENDMENT (Rezone)

3.1 Introduction

In conjunction with the proposed Comprehensive Plan Text Amendment, a Map Amendment (Rezone) is proposed to reflect the estuarine characteristics of the site. The rezone will better facilitate the Sitka Sedge Tidal Wetland Restoration Project and ultimately expand the Sitka Sedge EMU to align with the new Mean Higher High Water (MHHW).

The SSSNA comprises four tax lots: 3S10310000400, 4S10060000300, 4S10060000200, and 4S10060000400 that include three separate zoning designations: Estuary Natural (EN), Recreation Management (RM), and Small Farm Woodland Lot (SFW-20). Below, definitions for each zoning designation are provided:

- **Estuary Natural** – The purpose of the EN zone is to provide for preservation and protection of significant fish and wildlife habitats and other areas which make an essential contribution to estuarine productivity or fulfill scientific, research, or educational needs.
- **Recreation Management** – The purpose of the RM zone is to designate areas for public and private parks and day-use facilities, including such areas that contain significant natural or scenic values. The RM zone is intended to accommodate the type of recreational developments that preserve an area's natural values; it is not intended for intensive recreational developments that do not retain substantial open space on the property.
- **Small Farm Woodland Lot** – The purpose of the SFW-20 zone is to protect and promote farm and forest uses much in the same way as do the Farm and Forest zones, on lands which have resource value, but which are not suited for the F-1 or the F zones because of smaller parcel size, conflicting adjacent uses, adverse physical features or other limiting factors.

The restoration project is focused on the first two parcels: 3S10310000400 and 4S10060000300. As depicted on the current zoning map (**Figure 4**), Taxlot 3S10310000400 is split-zoned with three designations: EN, RM, and SFW-20. Taxlot 4S10060000300 is also split-zoned, designated as RM and SFW-20.

This application proposes to rezone the portions of Taxlots 3S10310000400 and 4S10060000300 that will become tidally influenced by the active restoration project (**Figure 5**). The EN zone will automatically extend to align with the new Mean Higher High Water (MHHW) of 8.75 feet. This change is necessary to reflect the site's ecological function, facilitate restoration permitting, and ensure compatibility with the proposed Comprehensive Plan Amendment and applicable land use goals.

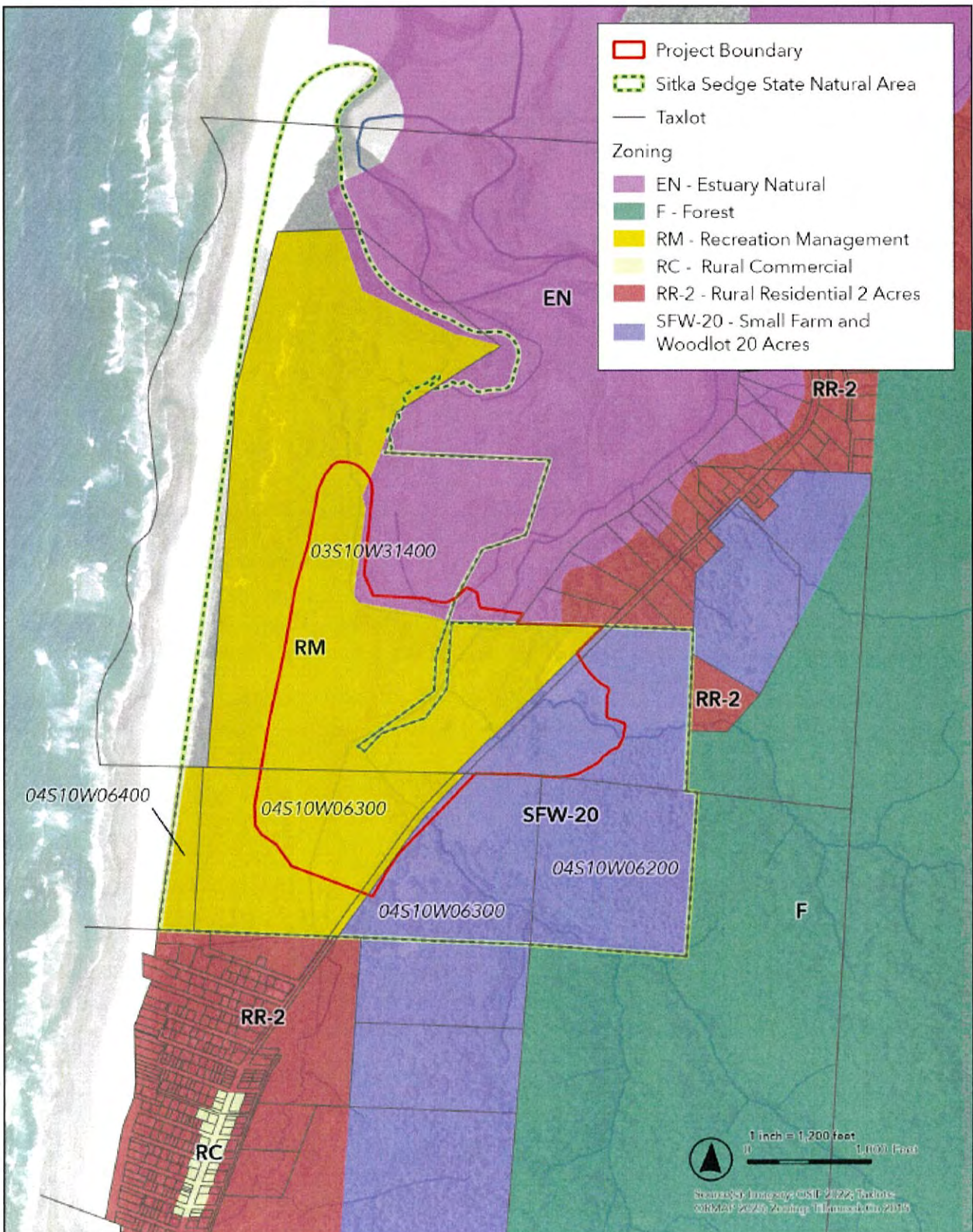
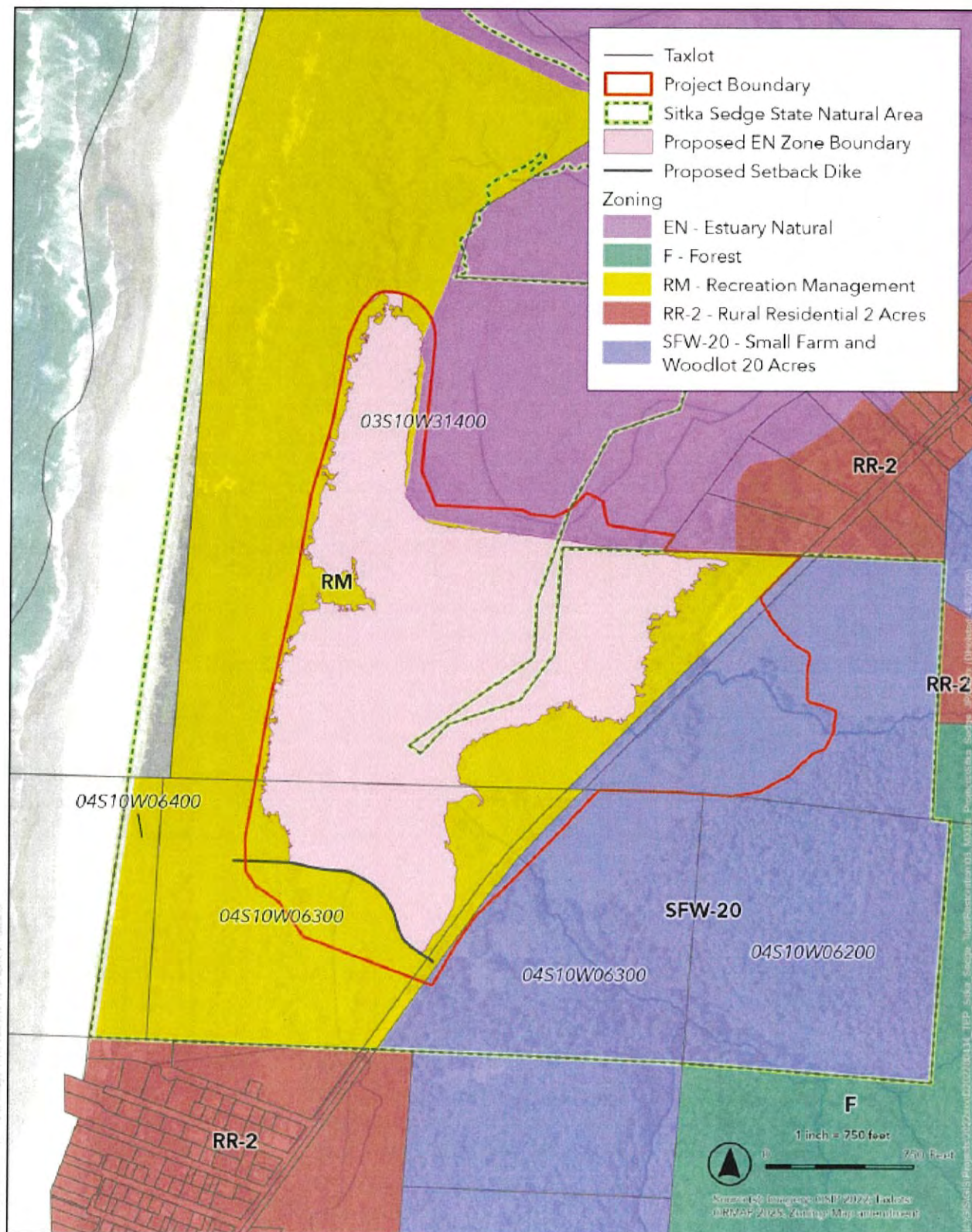
Figure 4 Existing Zoning Map**Figure 4**
Existing Zoning Map

Figure 5 Rezone Map Amendment**Figure 5**
Rezone Map Amendment

3.2 Code Compliance

Map amendment procedure and criteria are established in section 9.020 as part of Tillamook County Land Use Ordinance Article 9.

TCLUO Article 9 - Amendment

SECTION 9.020: MAP AMENDMENT PROCEDURE AND CRITERIA

The following provisions shall govern the consideration of a MAP AMENDMENT request:

- (1) Review procedures shall be determined pursuant to Section 10.040; notice of a proposed AMENDMENT shall be distributed according to the provisions of a Type III or Type IV review.
- (2) The applicant or, if County initiated, the Department shall prepare an analysis of the site and the surrounding area in the form of a map and report, considering the following factors:
 - (a) Size, shape and orientation of the subject parcel.

Applicant Response: *The SSSNA is a 388-acre coastal park located in unincorporated Tillamook County, owned and managed by OPRD. The natural area is composed of 4 parcels, primarily rectangular in shape, owned by OPRD bounded by the Pacific Ocean on the west, Sand Lake Estuary and residential parcels on the north, forested Coast Range foothills to the east, and a combination of forest and residential to the south. Sandlake Road travels roughly north-south along the estuary, bisecting two of the tax lots. The rezone will apply to the lowest elevation areas in the western portions of Taxlots 3S10310000400 and 4S10060000300, which are already subject to tidal influence.*

- (b) Surrounding parcel sizes.

Applicant Response: *The property is surrounded by a wide range of parcel sizes. Rural Residential (RR-2) parcels to the north and south generally range from 0.4 to 5 acres. Forest (F) parcels east of the site are 51 and 265 acres. A Small Farm Woodlot (SFW-20) parcel south of the site is 21 acres. See Figure 4 for surrounding parcel size and zoning.*

- (c) Topography, drainage, hazards, and other physical site characteristics.

Applicant Response: *The SSSNA includes approximately 388 acres. The site, a portion of which is already included in the Sand Lake Joint Management Program (JMP), is characterized by low-lying coastal topography with a mix of dunal environments, tidal wetlands, freshwater marshes, upland meadows and forests. The terrain is generally flat to gently sloping in the tidally influenced and marshy portions of the property, with distinct topographic breaks marking transitions between wetland and upland areas. The SSSNA property consists of approximately 102 acres of marshland (including approximately 70 acres of salt marsh/mudflats and 32 acres of freshwater marsh), and 22 acres of forest or shrubland swamp. Approximately 78 acres of historic estuary has been altered by Beltz Dike. There are 152 acres of dunes, beach, and uplands west of Sandlake Road. An un-maintained, half-mile long, artificial dike runs east/west through the northern third of the property. The remaining 113 acres of the property east of Sandlake Road*

is predominantly pasture and forest land. Three creeks, Reneke, Beltz, and an unnamed stream, flow into the southern portion of the property. This area is part of the Sand Lake watershed.

(d) Parcel ownership and current use.

Applicant Response: *The parcels included in this application are owned by Oregon Parks and Recreation Department. They combine to form the Sitka Sedge State Natural Area, which serves the community as a public park and natural area. Public access to SSSNA is provided through a day-use parking area on the west side of Sandlake Road, which connects visitors to restrooms, picnic areas, three miles of trails, and two beach access points. The area is managed for low-impact recreation and is a popular destination for hiking, birdwatching, photography, and nature observation. These activities occur within an estuarine environment characterized by tidal marshes, forested dunes, and scenic coastal views.*

As shown on the existing zoning map (Figure 4), the SSSNA consists of four separate parcels, including Taxlots 3S10310000400, 4S10060000300, 4S10060000200, and 4S10060000400. Taxlot 3S10310000400 is split-zoned with three designations: Estuary Natural (EN), Recreation Management (RM), and Small Farm Woodland Lot (SFW-20). Taxlot 4S10060000300 is also split-zoned with two designations: RM and SFW-20. Taxlot 4S10060000200 is zoned SFW-20 and Taxlot 4S10060000400 is zoned RM. The proposed Sitka Sedge Tidal Wetland Restoration Project will be limited to Taxlots 3S10310000400 and 4S10060000300. The applicant is proposing to rezone portions of the SSSNA properties south of the Beltz Dike and below the Mean Higher High Water (MHHW) EL 7.75 feet from RM to EN, including some portions of Taxlots 3S10310000400 and 4S10060000300 that are zoned RM and will become more tidally influenced as a result of the restoration project. The rezoned extent of the EN zone will be based on the MHHW elevation that will extend into Beltz Marsh after the dike is breached and will generally align with the EN zone north of the dike. The MHHW elevation at the project site is based on an interpolation between two the two nearest NOAA Tide Stations at South Beach (Newport), Oregon and Garibaldi, Oregon, and the 7.75' elevation of MHHW is confirmed to be appropriate based on analysis of onsite water level monitoring data.

(e) Economic and population data for the affected area that may be contained in the Comprehensive Plan.

Applicant Response: *The parcels associated with this application include one single family residence located on Tax Lot 4S10060000300 that will be retained. By replacing undersized and failing culverts with structures that meet fish passage and climate resilience standards, the project will enhance public safety and reduce economic disruption caused by flooding and road washouts. These improvements are especially critical for Sandlake Road, the primary access route for the SSSNA and Tierra Del Mar. This corridor serves as a tsunami evacuation route, a lifeline for emergency services, and a vital connector for commercial activities including timber and dairy operations. The existing transportation infrastructure is aging and vulnerable, with frequent overtopping of Sandlake Road during the winter. Sandlake Road is frequently closed during the winter and has been identified by Tillamook County Public Works Department as being at risk of total failure. These conditions pose risks to public safety, emergency response, and economic continuity. The restoration project will address these vulnerabilities in alignment with Section 9.040 Transportation Planning Rule Compliance by upgrading road-stream crossings and installing climate-resilient infrastructure*

(f) Traffic circulation.

Applicant Response: *The proposed rezone has no impact to local transportation planning. See Chapter 2 for additional information.*

(g) Zoning history of the subject parcel.

Applicant Response: *The parcels that make up the SSSNA are currently zoned Estuary Natural (EN), Recreation Management (RM), and Small Farm Woodland Lot (SFW-20), while adjacent properties include Rural Residential (RR-2) to the north and south along Sandlake Road, SFW-20 and Forest (F) to the east, and EN to the north. The unincorporated residential community of Tierra Del Mar borders the southern edge of SSSNA, and surrounding lands also include a mix of public and privately owned forest parcels.*

(h) Compatibility of the proposed new zone with the surrounding zoning and land uses.

Applicant Response: *The proposed rezone will not change the current land use of SSSNA, which already includes areas zoned as Estuary Natural, and therefore will not affect the zoning or land uses of the surrounding parcels. The rezone will amend the map to align with the current passive restoration trajectory and incorporate the proposed restoration project.*

(i) Availability and feasibility for development of nearby properties in the proposed zone.

Applicant Response: *The proposed rezone will only apply to the properties included in this application and will not affect feasibility for development of nearby properties.*

(j) Aesthetics.

Applicant Response: *The SSSNA contains one of Oregon's last remaining intact coastal estuaries and was initially secured by Ecotrust in 2014 for permanent conservation. The land is part of the traditional territory of the Nestucca group of Tillamook Indians and was included within the Siletz Reservation boundaries between 1855 and 1875. Beginning in the mid-20th century, the area, including what is now SSSNA, was converted for agricultural use. The Beltz Dike was constructed in 1936 to separate Beltz Marsh from the Sand Lake Estuary (SLE), and drainage ditches were excavated to create pastureland and manage flooding (Oregon Parks and Recreation Department n.d.). Currently, a single undersized 4-foot by 4-foot concrete box culvert serves as the only drainage outlet through the dike. These modifications significantly altered the natural tidal wetland functions, resulting in habitat degradation and impacts on sensitive species.*

Fish species of significance within the SSSNA include four populations of Pacific salmonids, including the threatened Oregon Coast Coho salmon, chum salmon, winter steelhead, and coastal cutthroat trout. The site is also located along the Pacific Migratory Flyway, providing indispensable habitat for diverse migratory bird species, including 17 federal and/or state species of concern, some of which include the marbled murrelet, northern spotted owl, and western snowy plover.

(k) Availability of public facilities and services.

Applicant Response: *The proposed rezone will only apply to the properties included in this application and will be contained within the western portions of Taxlots 3S10310000400 and 4S10060000300, which are already subject to tidal influence. The rezone will not extend east of Sandlake Road. The proposed project includes replacement of (3) culverts which convey Reneke, Beltz and No Name Creeks under Sandlake Road into Beltz Marsh. The Reneke Creek culvert is proposed for replacement with a 49-foot bridge, and approximately 800 feet of the road will be raised to reduce flood impacts to the road. The Beltz Creek culvert will be replaced with a 45-foot span bridge while maintaining the existing roadway profile and embankment cross section. These improvements will improve community access to public facilities and services but are the result of the proposed project and have no impact on the rezone.*

(l) Land use objectives of both the applicable and the proposed zoning.

Applicant Response: *The proposed active restoration project requires a partial zone change from Recreation Management (RM) to Estuary Natural (EN). According to Section 3.040(1) of the TCLUO, the purpose of the RM Zone “to designate areas for public and private parks and day-use facilities, including such areas that contain significant natural or scenic values. The RM zone is intended to accommodate the type of recreational developments that preserve an area's natural values; it is not intended for intensive recreational developments that do not retain substantial open space on the property”. The priority of the SFW-20 Zone, according to Section 3.006(1)(a) of the TCLUO, “to protect and promote farm and forest uses much in the same way as do the Farm and Forest zones, on lands which have resource value, but which are not suited for the F-1 or the F zones because of smaller parcel size, conflicting adjacent uses, adverse physical features or other limiting factors.” As outlined within this document, the zone change is necessary to conditionally permit the active restoration project, and to align the newly tidally influenced portions of the Beltz Marsh property with the SLE and the EN Zone, whose purpose, according to TCLUO 3.102(1), is “to provide for preservation and protection of significant fish and wildlife habitats and other areas which make an essential contribution to estuarine productivity or fulfill scientific, research or educational needs.”*

- (3) The Commission shall consider an AMENDMENT request at the earliest practicable public hearing after it is proposed. In hearing the request to establish a new zoning designation, the Commission shall consider all of the following criteria. A zone MAP AMENDMENT may be approved only if all five criteria can be met.

(a) The proposed new zone is consistent with applicable Comprehensive Plan policies.

Applicant Response: *The proposed zone change will facilitate the implementation of an active restoration project within the SSSNA, aligning more effectively with the intended land use and ecological function than the existing RM zone (see Figure 5). The current zoning designations emphasize recreational and agricultural uses, which are less compatible with the site's tidal influence, ecological sensitivity, and conservation objectives. In contrast, the EN Zone supports low-impact uses such as habitat restoration, scientific research, and environmental education, activities that are consistent with the long-term management goals for the SSSNA. This change is consistent with Statewide Planning Goal 16, which emphasizes the protection, conservation, and management of estuarine resources through the establishment of estuarine management units and the regulation of development within these areas. The proposed amendment will enable a large-scale tidal wetland restoration effort focused on reestablishing*

hydrologic connectivity, improving fish passage, and enhancing habitat conditions within Beltz Marsh. Specifically, the project will reconnect the marsh to Sand Lake by breaching the existing dike and expand the boundaries of the Sand Lake JMP to include the SSSNA. By breaching the existing dike and extending the tidal datum highest measured tide (HMT) tide line south of the existing dike, the EN Zone will automatically extend to match the Mean Higher High Water (MHHW). These outcomes align with Tillamook County's land use objectives and Goal 16 of the Comprehensive Plan, supporting equitable development, hazard mitigation, and environmental stewardship.

The physical and biological characteristics of the SSSNA, including low elevation, impaired drainage, flood hazards, sensitive wetland ecosystems, and legally designated critical habitat for Endangered Species Act threatened species and federal species of concern, demonstrate the need to partially rezone SSSNA parcels from RM to EN. This change will align zoning with the area's ecological function and restoration potential, support regulated restoration activities under Statewide Planning Goal 16, and ensure consistency with the Comprehensive Plan while delivering long-term environmental and socioeconomic benefits to Tillamook County.

- (b) The proposed new zone shall not result in the conversion of resource lands to non-resource use without an approved exception to applicable state resource protection Goals.

Applicant Response: *The proposed rezone will not result in the conversion of resource lands.*

- (c) The site under consideration is better suited to the purposes of the proposed zone than it is to the purposes of the existing zone.

Applicant Response: *As described throughout this narrative, Beltz Marsh is already experiencing muted tidal influence through the failed tide gate and reverting to its historic estuarine condition. The marsh is also identified as "Estuarine and Marine Wetland" as mapped on the NWI Map (Figure 6).*

- (d) Development anticipated to result from the proposed zone shall not impair the actual or the legally designated uses of surrounding properties.

Applicant Response: *The proposed rezone will not impair the actual or legally designated uses of surrounding properties. The rezone will amend the map to align with current passive restoration trajectory and incorporate the proposed restoration project.*

- (e) The amendment must conform to Section 9.040 Transportations Planning Rule Compliance.

Applicant Response: *The proposed rezone has no impact to local transportation planning. See Chapter 2 for additional information.*

- (4) The Director shall report the Commission's recommendation to the Board. The Board shall conduct a public hearing on an AMENDMENT to modify or change an existing zone on a zoning map subsequent to receiving the report and recommendation of the Planning Commission. Zone MAP AMENDMENTS shall be adopted by the Board of County Commissioners by Ordinance.
- (5) The Board's decision on a zone MAP AMENDMENT shall be final.
- (6) A copy of all zone MAP AMENDMENTS shall be forwarded to the County Assessor's office.

CHAPTER 4

Conditional Use Permit

4.1 Introduction

The SSSNA active restoration project is not permitted outright under current zoning. Therefore, to construct the project, a conditional use permit is required. The purpose of a conditional use is to provide for uses that are not allowed outright in a certain zone because of potentially adverse impacts on uses permitted in that zone. As stated in Article 6 Section 6.010 Purpose, “such uses may be made or deemed compatible through the review process contained in this Article, which subjects the proposed conditional use activity to specific requirements, criteria, and conditions” (Tillamook County 2015). In addition to addressing CUP specific code, this chapter will also address TCLUO sections that do not neatly fit under other code compliance chapters. Those code sections include TCLUO Sections 3.040 Recreation Management (RM) Zone, 3.006 Small Farm and Woodlot (SFW-20) Zone, 3.545 Shoreland (SH) Overlay Zone, 4.140 REQUIREMENTS FOR PROTECTION OF WATER QUALITY AND STREAMBANK STABILIZATION, and the Tsunami Hazard (TH) Overlay Zone.

4.2 Appendix B Comprehensive Plan Goal Review (Attached)

The Comprehensive Plan Goal Review was prepared to evaluate whether the proposed tidal wetland restoration project is consistent with the applicable Tillamook County Comprehensive Plan goals and policies. Because the project involves restoration activities within estuarine and coastal shoreland designations and follows a related Comprehensive Plan Amendment request to re-inventory the site under Goal 16 Estuarine Resources, a comprehensive review was necessary to document policy consistency and support the conditional use permit application.

The Comprehensive Plan Goal Review determined that the proposed Sitka Sedge State Natural Area tidal wetland restoration project is consistent with the applicable Comprehensive Plan goals and policies related to estuarine resources, habitat restoration, water quality, and coastal resilience. The review found that the project advances long-term ecological restoration objectives while remaining compatible with surrounding land uses and resource management priorities identified by Tillamook County and statewide planning goals.

Analysis of how the project complies with the Comprehensive Plan is included at the end of this document in the Appendices & Exhibits section as Appendix B: *Sitka Sedge Tidal Wetland Restoration Alignment with Comprehensive Plan Goal Review*.

4.3 Code Compliance

Article VI – Conditional Use Procedures and Criteria

TCLUO SECTION 6.040: REVIEW CRITERIA

Any CONDITIONAL USE authorized according to this Article shall be subject to the following criteria, where applicable:

- (1) The use is listed as a CONDITIONAL USE in the underlying zone, or in an applicable overlying zone.

Applicant Response: *The SSSNA consists of four separate parcels, including Map and Taxlots 3S10310000400, 4S10060000300, 4S10060000200, and 4S10060000400. The proposed restoration project will involve the first two Taxlots, 3S10310000400 and 4S10060000300. The zoning designation for 3S10310000400 is currently split-zoned with the western portion zoned Recreation Management (RM), the north-central portion containing Sand Lake zoned Estuary Natural (EN), and the eastern portion zoned Small Farm and Woodlot zone (SFW-20). Taxlot 4S10060000300 is also currently split-zoned, with the western portion zoned RM and the eastern portion zoned SFW-20. Taxlot 4S10060000200 is fully zoned SFW-20, and Taxlot 4S10060000400 is fully zoned RM. Portions of parcels 3S10310000400 and 4S10060000300 will be rezoned to EN as described in Chapter 3 as part of the restoration project. In addition to the underlying zoning designations identified above, the entirety of the project is also located within multiple overlay zones, including the Flood Hazard (FH), Beach and Dune (BD), Shoreland (SH), Freshwater Wetland (FW) and Tsunami Hazard (TH). These zoning designations are discussed in further detail below.*

Tillamook County Land Use Ordinance Section 3.102 identifies the uses permitted with standards, uses permitted conditionally, and regulated activities within the Estuary Natural (EN) zone (Tillamook County 1990). Uses that are permitted with standards and uses that are permitted conditionally are subject to the procedures of Section 3.120 and standards in Section 3.140. This project will comply with the procedures and standards, including following the criteria for local review and comment on State and Federal permit applications, which could potentially alter the integrity of the estuarine ecosystem (Section 3.120(1) and Estuary Development Standards (Section 3.140)). Further discussion of compliance with Sections 3.120 and 3.140 can be found below; see Chapter 5, Section 5.3.

Within the EN zone, active restoration and estuarine enhancement are conditionally permitted. While some elements of the active restoration project will remain RM due to their elevation above MHHW (pedestrian bridge and higher elevation portions of the bridge abutments and levee/dike), the majority of the project elements will be located in the area proposed for rezone from RM to EN.

Other project elements are conditionally allowed by Section 3.102(3)(c) and Section 3.102(3)(e): Installation of large wood/large structures in channels and on the marsh plain for habitat complexity would be allowed under Section 3.102(3)(c): “Riprap to protect unique natural resources, historical and archaeological values, public facilities and uses existing as of October 7, 1977; and uses allowed by the zone.”

Section 3.102(3)(e) permits use for “*active restorations and estuarine enhancement.*” Excavating a 140-foot-wide breach opening through the existing Beltz Dike to reconnect Beltz Marsh to tidal processes in Sand Lake is considered active restoration and estuarine enhancement under Section 3.102(3)(e). Construction of an earthen setback dike to prevent high tide water levels from reaching Tierra Del Mar, providing sufficient storage volume upstream/south of the setback dike to contain stormwater runoff without increasing water levels in Tierra Del Mar, and maintaining the existing beaver dam/lodge complex and freshwater habitat at the south end of Beltz Marsh to minimize potential beaver conflicts at the setback dike and associated tide gate structure would be considered active restoration under Section 3.120(3)(e).

Five overlay zones affect the subject parcels: the Flood Hazard Overlay zone (FH), Tsunami Hazard Overlay (TH), Freshwater Wetlands (FW), Shoreland Overlay (SH) and the Beach and Dune Overlay (BD). The Flood Hazard Overlay zone (FH) mirrors the FEMA FIRM Flood Map (Figure 8). (Tillamook County 2025b).

Requirements for the FH zone are included in Section 3.510 of the Tillamook County Land Use Ordinance (Tillamook County 2022). See Chapter 5, Section 5.3 below for further discussion of how the project complies with Section 3.510(5) General Standards.

The Beach and Dune Overlay (BD) establishes criteria and performance standards to direct and manage development and other activities in beach and dune areas as part of Section 3.530 of the Tillamook County Land Use Ordinance. See Chapter 6, Section 6.3 below for further discussion of how the project complies with Section 3.530.

Permitted and conditional uses for underlying zones and associated overlay zones that are not discussed in other chapters of this document can be found below, in compliance with this criterion.

TCLUO SECTION 3.040: RECREATION MANAGEMENT ZONE (RM)

- (1) **PURPOSE:** The purpose of the RM zone is to designate areas for public and private parks and day-use facilities, including such areas that contain significant natural or scenic values. The RM zone is intended to accommodate the type of recreational developments that preserve an area's natural values; it is not intended for intensive recreational developments that do not retain substantial open space on the property.
- (2) **USES PERMITTED OUTRIGHT:** In the RM zone, the following uses and their accessory uses are permitted outright, subject to all applicable supplementary regulations contained in this Ordinance:
 - (a) Maintenance and operation of existing structures and facilities.
 - (b) Recreational improvements and additions necessary to serve the same numbers and densities of visitors served by the existing facilities, provided that off-site impacts are not increased. Such facilities include picnic areas, playgrounds, pavilions, maintenance buildings, tennis courts, and swimming pools.
 - (c) Single- or multiple-unit dwellings or residential quarters for caretakers and staff members necessary to serve existing facilities.

- (d) Utility lines, excluding power transmission lines.
- (e) Signs, subject to Section 4.020.
- (f) Farm uses, including aquaculture, and forest uses.
- (g) Fish and game management.

Applicant Response: *The project is consistent with the purpose of the RM (Recreation Management) zone because it preserves and enhances the natural, scenic, and open space values of the Sitka Sedge State Natural Area while supporting low-intensity recreational and resource management uses. As outlined in previous code sections, the active restoration project requires a rezone for portions of the property that will become tidally influenced by reconnecting Beltz Marsh to the SLE. The project is not an intensive recreational development, does not increase recreational use, and will retain the substantial open space and natural character of the property, consistent with Section 3.040(1).*

The tidal wetland restoration project is specifically intended to restore estuarine habitat functions, improve ecological resilience, and enhance long-term stewardship of the site's natural resources. Following the rezone, project elements below the MHHW elevation of 7.75 feet will be zoned Estuary Natural (EN), and elements above the MHHW, including portions of the existing dike, the pedestrian bridge and bridge footings, and the setback dike, will remain within the RM zone.

The retained RM-zoned project elements are consistent with the uses permitted outright in Section 3.040(2). Existing and reconstructed access and infrastructure features constitute maintenance and operation of existing structures and facilities pursuant to Subsection (2)(a). In addition, the pedestrian access improvements and associated infrastructure are compatible with low-intensity recreational uses and recreational improvements permitted under Subsection (2)(b), as they support continued public access and recreational use of the Sitka Sedge State Natural Area without increasing visitor capacity or off-site impacts.

The project is also consistent with Subsection (2)(g), Fish and Game Management, because the restoration actions are specifically intended to improve tidal hydrology, fish passage, estuarine habitat quality, and habitat conditions for native fish and wildlife species. As noted in correspondence from Tillamook County staff dated January 12, 2026, project elements located within the remaining RM-zoned portions of the site are considered compatible recreational and resource management facilities associated with operations and public use of the Sitka Sedge State Natural Area.

- (3) **USES PERMITTED CONDITIONALLY:** In the RM zone, the following uses and their accessory uses are permitted subject to the provisions of Article 6 and the requirements of all applicable supplementary regulations contained in this Ordinance:
- (a) Recreation campgrounds, primitive campgrounds and group lodging facilities such as dormitories for visitors, but not including commercial motels, hotels, or group cottages.
 - (b) Meeting and recreational facilities that will increase visitor capacity or off-site impacts.
 - (c) Retail facilities, including eating establishments, that are designed primarily to serve those who visit nearby recreational developments.

- (d) Marinas or mooring areas.
- (e) Rock quarries.
- (f) Primary wood processing.
- (g) Water treatment facilities and sewage treatment plants.
- (h) Utility substations and power transmission lines.
- (i) Towers for communications, wind energy conversion systems, or structures having similar impacts.
- (j) Hydroelectric power generating facilities.
- (k) Golf courses.
- (l) A single-family residential structure on a legally created parcel that is at least 5 acres in size.

Applicant Response: *Although a CUP is required for the active restoration project elements located in the rezoned EN portion of the project area, the project elements located in the RM Zone are permitted outright. The proposed project does not include any of the conditional uses identified in Section 3.040(3) within the portions of the site that will remain zoned RM (Recreation Management).*

The project does not propose campgrounds, lodging facilities, retail uses, marinas, utility facilities, golf courses, or other intensive recreational or commercial developments identified as conditional uses within the RM zone. In addition, the project will not increase visitor capacity or create new off-site recreational impacts.

Portions of the project area that will become tidally influenced through restoration activities will be rezoned to EN (Estuary Natural), and the conditional use permit request applies to restoration-related activities within those EN-zoned areas. Project elements remaining within the RM zone—including portions of the existing dike, pedestrian bridge infrastructure, setback dike features, and associated access improvements—are considered outright permitted uses pursuant to Section 3.040(2) because they constitute maintenance and operation of existing facilities, fish and wildlife management activities, and low-intensity recreational improvements associated with Sitka Sedge State Natural Area operations and public access.

- (4) STANDARDS: Land divisions and development in the RM zone shall conform to the following standards, unless more restrictive supplemental regulations apply:
 - (a) Recreational developments shall retain substantial open space on the property.

Applicant Response: *The project involves active restoration within the SSSNA, currently developed with low-impact recreational uses. No new recreational development is proposed, and the restored marsh will continue to function as substantial open space on the property.*

- (b) Master plans for improvements in the RM zone may include any of the permitted or Conditional Uses listed in this zone. The Planning Department or Commission may approve such plans for a recreation area, according to the provisions of this Section, that plan for a period not to exceed ten

years. Such approvals would allow all uses provided in the plan except those that require further information or review due either to lack of plan detail or the applicability of additional Ordinance criteria or standards. Any changes to the plan which would not affect visitor capacity or increase off-site impacts may be approved by the Director. All other changes or amendments shall be reviewed as required by this Section.

Applicant Response: *No new recreational development is proposed with this project and no master plan is proposed. This standard does not apply. The only proposed recreational improvement is construction of a pedestrian bridge to retain pedestrian trail access across the proposed dike breach. The bridge will serve the same number and density of visitors as the current trail on the existing dike, in conformance with TCLUO 3.040, (2) (b) Uses permitted outright.*

- (c) The minimum lot size shall be 40 acres. The Director may approve a smaller lot size according to the provisions of Article VI, provided that forest resource values are maintained in the vicinity.

Applicant Response: *The parcels involved in the active restoration project far exceed the 40-acre minimum lot size required for the RM Zone. No land division or creation of new parcels is proposed. Therefore, the proposal complies with Section 3.040(4)(c).*

TCLUO SECTION 3.006 SFW-20* SMALL FARM AND WOODLOT ZONE

(1) PURPOSE

- (a) The purpose of the SFW-20 zone is to protect and promote farm and forest uses much in the same way as do the Farm and Forest zones, on lands which have resource value, but which are not suited for the F-1 or the F zones because of smaller parcel size, conflicting adjacent uses, adverse physical features or other limiting factors.

(2) RESIDENTIAL SITING

- (a) Pursuant to ORS 660-006-0050, the siting of a residential dwelling shall conform to either the standards contained in the Article 3.002 – Farm Zone (F-1), or the standards of Article 3.004 – Forest Zone (F), based on the predominant use of the tract on January 1, 1993.

(3) PERMITTED USES

- (a) Permitted uses in the SFW-20 zone include those permitted in Article 3.002 – Farm (F-1) Zone and Article 3.004 – Forest Zone, subject to the conditions and review described therein.

TCLUO SECTION 3.002 F-1 FARM

(15) USE TABLE

- (a) Table 1 identifies the uses permitted in the Farm Zone. This table applies to all new uses, expansions of existing uses, and changes of use when the expanded or changed use would require a Type 1, 2, or 3 review, unless otherwise specified on Table 1. All uses are subject to the general provisions, special conditions, additional restrictions and exceptions set forth in this ordinance.
- (b) Permitted uses and activities and their accessory buildings and uses are permitted subject to the general provisions set forth by this ordinance.

Table 1: Use Table for Farm Zones

HV = High value farmland A= Allowed 1 = Review Type 1 2 = Review Type 2 3 = Review Type 3 X = Prohibited

Use	HV Type	Non-HV Type	Subject to 3.002
Farm, Forest, and Natural Resource Uses			
Wetland restoration, enhancement or creation as defined in 3.002(2)(pp).	2	2	(5)
Reconstruction or modification of public roads and highways, including the placement of utility facilities overhead and in the subsurface of public roads and highways along the public right of way, but not including the addition of travel lanes, where no removal or displacement of buildings would occur, or no new land parcels result.	A	A	

Applicant Response: *The proposed project includes wetland restoration, which requires a Type 2 review and is subject to conditional use review, and public road modification which is allowed outright within the SFW-20 zone. This project will be reviewed through a Type 3 process.*

(2) DEFINITIONS

(rr) WETLAND RESTORATION, ENHANCEMENT OR CREATION: Wetlands creation, restoration or enhancement projects subject to this ordinance do not include the following:

1. For purposes related to a mitigation bank;
2. For reclamation of lands affected by surface mining;
3. If the wetlands are created, restored or enhanced for the purpose of meeting conditions necessary to comply with a National Pollutant Discharge Elimination System permit or water pollution control facility permit issued by the Department of Environmental Quality pursuant to ORS 468B.050;
4. For which construction had commenced, or required permits had been issued, prior to January 1, 2017; and 5. If the creation, restoration or enhancement of the wetlands only involves planting vegetation in a wetland or riparian area.
5. If the creation, restoration or enhancement of the wetlands only involves planting vegetation in a wetland or riparian area.

Applicant Response: *As shown on the proposed rezone map (Figure 5), a portion of Taxlot 03S10W31400 will remain SFW-20 (Small Farm and Woodlot). This portion encompasses the project area involving the Reneke Creek realignment and Sandlake Road vehicular bridge replacement. The project area remaining SFW-20 includes a Freshwater Forested and Emergent Wetland on USFWS's National Wetlands Inventory (NWI) Map (Figure 6), below. Although the project does not meet the definition outlined in TCLUO 3.002(2)(rr) above, the "active restoration" use falls under the uses*

labeled “uses to conserve soil, air, and water quality to provide for wildlife and fisheries resources” in TCLUO Section 3.004 F Forest, Table 1, below. In addition, the proposed Reneke Creek realignment and related wetland restoration is directly related to moving the creek back to its original alignment and reducing creek impacts on the public road. Review of historic aerial photos dating back to the late 1930s indicate that the existing wetland has been preserved in a forested condition and not farmed for decades. The proposed project will not change this condition. Riparian planting proposed around the existing wetland boundary is compliant with 3.002(2)(rr)5.

(5) CONDITIONAL USE REVIEW CRITERIA

An applicant for a use permitted in Table 1 must demonstrate compliance with the following criteria and with the Conditional Use Criteria in Article 6 Subsection 040, or in Article 6 Subsection 060 if the proposed use is for the restoration, enhancement or creation of a wetland as defined in 3.002(2).

- (a) The use will not force a significant change in accepted farm or forest practices on surrounding lands devoted to farm or forest use; and

Applicant Response: *The project will restore existing wetland habitats within the SSSNA. The surrounding parcels are zoned Estuary Natural (EN), Rural Residential (RR-2), Small Farm and Woodlot 20 Acres (SFW-20), and Forest (F). Restoring the wetland habitat by realigning Reneke Creek within the SSSNA will not substantially limit, impair, or prevent the farm or forest practices on the involved taxlot nor adjacent taxlots.*

- (b) The use will not significantly increase the cost of accepted farm or forest practices on surrounding lands devoted to farm or forest use.

Applicant Response: *The cost of accepted farm or forest practices on surrounding lands devoted to farm or forest use will not be impacted by the project.*

TCLUO SECTION 3.004 F Forest

(7) PUBLIC AND QUASI-PUBLIC USES

- (b) Public parks may include:

1. All uses allowed under Statewide Planning Goal 3;

Applicant Response: *In OAR Chapter 660-033-0120 which implements the Goal 3 Element, Natural Resource creation, restoration, or enhancement of wetlands is an allowed use.*

(13) USE TABLE

Table 1 identifies the uses permitted in the F zone. This table applies to all new uses, expansions of existing uses, and changes of use when the expanded or changed use would require a Type 1, 2, or 3 review, unless otherwise specified on Table 1. All uses are subject to the general provisions, special conditions, additional restrictions and exceptions set forth in this ordinance.

- (a) As used in Table 1:

1. The “Subject To” column identifies any specific provisions of to which the use is subject.

2. "N" means the use is not allowed.
3. "Permitted uses and activities and their accessory buildings and uses are permitted subject to the general provisions set forth by this ordinance.

Table 1: Use Table for Forest Zones**A= Allowed 1 = Review Type 1 2 = Review Type 2 3 = Review Type 3 N= Prohibited**

USE	REVIEW	SUBJECT TO 3.004
Forest, Farm and Natural Resource Uses		
Uses to conserve soil, air, and water quality to provide for wildlife and fisheries resources.	A	

Applicant Response: *The active restoration project aims to conserve soil, air, and water quality to provide for wildlife and fisheries resources. As shown in Table 1, this use is allowed in the F Zone and is therefore also allowed in the SFW-20 Zone.*

TCLUO SECTION 3.006 SFW-20* SMALL FARM AND WOODLOT ZONE Continued**(4) DEVELOPMENT STANDARDS**

- (a) The minimum lot width at the front building line for all uses except farm or forest uses shall be 100 feet.
- (b) The minimum lot depth for all uses except farm or forest uses shall be 100 feet.
- (c) The minimum front and rear yards shall be 20 feet.
- (d) The minimum side yard shall be 10 feet where adjacent to land in the F-1, F or SFW-20 zones. Otherwise the minimum side yard shall be 20 feet, except on a contiguous ownership of two acres or less, where the yard requirements shall be the same as in the Rural Residential (RR) zone, and where Article 5 Section 040 (1) (b) shall apply.
- (e) The maximum building height for all non-farm structures shall be 35 feet, except on ocean or bay frontage lots, where it shall be 24 feet. Higher structures may be permitted only according to the variance provisions of Article 8.
- (f) There are no restrictions on the location of livestock.

Applicant Response: *The project involves active restoration. No subdivisions or land divisions are proposed, and existing lot dimensions in compliance. Proposed structures include wood habitat structures and a construction berm. Both proposed elements will meet the front, rear, and side yard setback standards outlined in the above standards. No habitable structures are proposed. Therefore, the above standards are met.*

(5) LAND DIVISIONS

New land divisions shall conform to either the standards contained in Article 3.002 -- Farm Zone (F-1), or the standards of Article 3.004 -- Forest Zone (F), based on the predominant use of the tract on January 1, 1993.

Applicant Response: *No land divisions are proposed; therefore, this standard does not apply.*

TCLUO SECTION 3.545: SHORELAND OVERLAY (SH)

(1) PURPOSE: The purpose of the SHORELAND OVERLAY ZONE is to:

- (a) Provide for development, restoration, conservation of protection of coastal shorelands in a manner which is compatible with the resources and benefits of coastal shorelands and adjacent coastal water bodies.
- (b) Protect identified priority dredged material disposal and mitigation sites from uses which would prevent their ultimate use for dredged material disposal or mitigation;

Applicant Response: *The proposed restoration project is consistent with the purpose of the SH Overlay because it is specifically intended to restore, conserve, and protect coastal shoreland and estuarine resources in a manner compatible with the ecological functions and resource values of adjacent coastal water bodies.*

(2) AREAS INCLUDED: The SHORELAND OVERLAY ZONE is designated on the Tillamook County Zoning Maps. Included in this zone are:

- (a) Lands contiguous with the ocean estuaries and coastal lakes that contain the following features shown in the Coastal Shoreland Element of the Comprehensive Plan:
 - (1) Areas subject to ocean flooding and lands within 100 feet of the ocean shore or within 50 feet of an estuary or a coastal lake.
 - (2) Adjacent areas of geologic instability where the geologic instability is related to or will impact a coastal water body.
 - (3) Riparian vegetation or other natural or man-made riparian resources necessary for shoreline stabilization or water quality maintenance.
 - (4) Significant shoreland and wetland biological habitats.
 - (5) Areas necessary for water-dependent and water-related uses.
 - (6) Shoreland areas of exceptional aesthetic or scenic quality.
 - (7) Coastal headlands.
- (b) Priority Dredged Material Disposal (DMD-1) and Mitigation (MIT-1) sites.

Applicant Response: *The project area is located within the Shoreland Overlay (SH) zone due to its proximity and hydrologic relationship to the Sand Lake Estuary and the presence of estuarine-associated wetlands, riparian resources, flood-prone areas, and significant biological habitat.*

The project preserves the site's open space and natural character and supports coordinated coastal resource management objectives consistent with Section 3.545(1). The project area is not subject to the "Rural Shorelands in General" use limitations in Section 3.545(4)(a)(1). Rather, the site includes shorelands associated with significant estuarine and wetland habitat resources connected to the Sand Lake Estuary system.

- (3) CATEGORIES OF COASTAL SHORELANDS: There are two categories of coastal shorelands included in the SHORELAND OVERLAY ZONE.
- (a) Rural Shorelands are the first category of Coastal Shorelands. Rural Shorelands are those areas that are outside an urban growth boundary and do not fall within the second category of Coastal Shorelands.
 - (b) The second category are those shorelands identified in the Estuarine Element and Coastal Shorelands Element of the Comprehensive Plan as:
 - (1) Significant shoreland and wetland biological habitat.
 - (2) Exceptional aesthetic or scenic resources and coastal headlands.
 - (3) Priority dredged material disposal and priority mitigation sites.
 - (4) Beaches, active foredunes, conditionally stable foredunes that are subject to ocean undercutting or wave overtopping and interdune areas subject to ocean flooding.

Applicant Response: *The restoration project falls under the second category, outlined in TCLUO 3.545(3)(b) above, those shorelands identified in the Estuarine Element and Coastal Shorelands Element of the Comprehensive Plan. The project area involves significant shoreland and wetland biological habitat. The Beltz Farm Marsh is designated a major freshwater marsh within the coastal shorelands providing key biological habitat for salmonid species. Further, the Beltz Farm Sandspit is identified as an exceptional aesthetic resource and significant wildlife habitat for snowy plover nesting.*

- (4) USES PERMITTED: Uses authorized by the underlying zone as outright or conditional uses are permitted, except at locations identified in (3) above.
- (a) Rural Shorelands in General:
 - (1) Rural shorelands uses are limited to:
 - (a) Farm uses,
 - (b) Propagation and harvesting of forest products consistent with the Oregon Forest Practices Act,
 - (c) Aquaculture,
 - (d) Water-dependent recreational, industrial and commercial uses,
 - (e) Replacement, repair or improvement of existing state park facilities,

- (f) Other uses are allowed only upon a finding by the County that such uses satisfy a need which cannot be accommodated at any alternative upland location, except in the following cases:
 - (1) In built and committed exception shoreland areas, where all uses permitted in the underlying zone are permitted, and
 - (2) In the F-1, F, SFW-20, and RM zones, where the Other Uses listed in Sections 8.4.e, 8.4.f, 8.4.g and 8.5.e, respectively of the Coastal Shoreland Element, are permitted, if no suitable non-shoreland locations exist on the parcel.
- (b) Significant Shoreland and Wetland Biological Habitats (Identified in Section 3.2 of the Coastal Shorelands Element of the Comprehensive Plan).
 - (1) Only low intensity uses and developments such as hiking trails and platforms for wildlife viewing or similar types of educational, scientific or recreational uses may be permitted providing that such uses and developments will not act as a barrier to or result in major disturbances or displacement of fish or wildlife species. Maintenance of existing drainageways and drainage structures is permitted.
 - (2) In significant wetland biological habitats, no development is allowed except for the placement of a floating or pile supported dock or a boat ramp using less than 50 cubic yards of fill to allow boat access to a coastal lake providing that such developments are placed to minimize impacts on wetland habitats. Where dwellings are permitted in the underlying zone, the density of allowed development shall be determined by the size of the entire parcel providing the allowed development will not result in a major impact to adjacent significant wetland habitat.

Applicant Response: *The Beltz Farm property encompasses the Beltz Dike and the land south of it and is currently subject to the Shoreland Overlay (SH) standards applicable to Significant Shoreland and Wetland Biological Habitats. The Beltz Farm Sandspit is designated as an Exceptional Aesthetic Resource, and the Beltz Farm Wetland is identified as a major marsh with significant waterfowl habitat value, as identified in the Tillamook County Comprehensive Plan Goal 17 inventory. Section 3.545(4)(b)(1), permits low-intensity educational, scientific, and recreational uses in the SH Overlay zone, provided such uses do not act as barriers to or result in major disturbance or displacement of fish or wildlife species. The project is primarily an ecological restoration and habitat enhancement project intended to restore tidal hydrology, improve estuarine habitat quality, enhance fish passage, and support long-term ecological resilience within the Sand Lake Estuary system. Proposed project features such as limited pedestrian access improvements and associated infrastructure are low intensity in nature and will support continued educational, scientific, and passive recreational use of the SSSNA without substantially increasing visitor capacity or creating significant off-site impacts.*

The project is specifically intended to improve habitat conditions for fish, waterfowl, and other estuarine-dependent wildlife species and is not expected to result in major disturbance, displacement, or habitat fragmentation. Existing drainageways and hydrologic connections will be restored and improved, consistent with the resource protection intent of Section 3.545(4)(b)(1).

Section 3.545(4)(b)(2) generally prohibits development within significant shoreland and wetland biological habitats, except in limited circumstances. The proposed tidal wetland restoration project encompasses portions of the SFW-20 (Small Farm and Woodlot), RM (Recreation Management), and proposed EN (Estuary Natural) zoning designations. While project elements are permitted outright or conditionally within the applicable underlying zones, the SH Overlay standards supersede the underlying zoning standards where applicable.

Because portions of the active restoration project occur within areas currently inventoried under Goal 17 Significant Wetland Biological Habitat designations, the application includes a concurrent Comprehensive Plan Text Amendment to re-inventory the Beltz Farm Marsh area under Goal 16 Estuarine Resources and incorporate the property into the Sand Lake Estuary Management Unit (EMU) and Joint Management Program (JMP).

As outlined in Chapter 2 COMPREHENSIVE PLAN (TEXT) AMENDMENT, the applicant is proposing a Text Amendment to the Tillamook County Comprehensive Plan to re-inventory the Beltz Farm property under Goal 16 Estuarine Resources and incorporate the Beltz Farm Marsh area of SSSNA into the Sand Lake Estuary Management Unit (EMU) and Sand Lake Joint Management Program (JMP). The existing Goal 16 and Goal 17 inventories contain inconsistencies regarding the Beltz Farm property and current estuarine conditions. Goal 17 identifies portions of the property as exceptional aesthetic resources and significant wetland habitat, while Goal 16 acknowledges that the Beltz Dike has been breached and that Beltz Marsh has reverted to intertidal marsh conditions. Both Goal 16 and Goal 17 inventories were originally codified in 1982 and have not been comprehensively updated to reflect current hydrologic conditions, restoration science, or existing estuarine functions on the site.

The proposed Comprehensive Plan (Text) Amendment is intended to resolve these inconsistencies by updating the inventory to reflect current physical and ecological conditions and by establishing the appropriate Goal 16 estuarine management framework for the restoration area. Upon approval of the proposed amendment and corresponding inventory revisions, the restoration area would be regulated under the applicable Goal 16 estuarine management and EN zoning standards rather than the existing SH Overlay restrictions.

- (3) Dredging less than 50 cubic yards from a coastal lake to provide access to a public boat ramp or a public boat dock is allowed, subject to the approval of Tillamook County.

Applicant Response: *This standard is not applicable.*

- (4) Within the Neskowin Community Growth Boundary, only the following uses are allowed within significant shoreland and wetland biological habitat and within 25 feet of the upland edge of such habitat:
 - (a) Low-impact recreational uses consistent with Section 3.545(4)(b)(1);
 - (b) Existing park or golf course facilities which exist as of March 1, 1999, and maintenance of existing facilities. Improvements and additions, provided adverse impacts to shoreland and wetland habitat are not measurably increased, or are mitigated.

- (c) Repair, replacement or maintenance of existing structures and drainage facilities, provided that size or capacity is not increased (unless necessary for improved fish passage);
- (d) Bank stabilization;
- (e) Vegetation management of non-native plants;
- (f) maintenance and improvement of stream corridors for storm drainage purposes or for fish and wildlife enhancement;
- (g) Stormwater discharge;

Applicant Response: *The subject property is not within the Neskowin Community Growth Boundary; therefore, this standard does not apply.*

- (5) The 25-foot setback requirement of Section 3.545 (4)(b)(4) may be reduced through the provisions of Article VIII. In addition to the standard variance criteria, the variance request shall meet the following criterion: Encroachment on the shoreland or wetland biological habitat, along with any proposed mitigation, will not have negative impacts on the natural functions and values of the resource area.

Applicant Response: *The purpose of the project is to improve ecological habitat and restore the estuary, marsh and wetland to natural predevelopment conditions. The project is not intended to negatively impact natural functions or resource values. Restoring estuary connectivity into Beltz marsh will improve fish passage, fish rearing, water quality, and other ecological functions that will benefit the natural habitat.*

- (c) Exceptional Aesthetic or Scenic Resources and coastal Headlands (identified in Section 3.2 of the coastal Shorelands Element of the Comprehensive Plan).
- (1) Rock quarries, mining and mineral extraction, industrial uses, communication and energy generation towers other than wind energy conversion systems, power transmission lines, landfills and airports are not permitted.

Applicant Response: *No rock quarries, mining and mineral extraction, industrial uses, communication and energy generation towers other than wind energy conversion systems, power transmission lines, landfills or airports are proposed; therefore, this standard is met.*

- (2) In the Cascade Head Scenic Research Area, and the Oswald West, Nehalem Bay, Cape Meares, Cape Lookout, Cape Kiwanda and Nestucca Spit State Parks, forest uses shall be limited to those allowed by the respective management plans for these areas. In other exceptional aesthetic or scenic resource areas or on coastal headlands, forest uses are limited to fire, insect and disease control, reforestation and hazard tree removal as long as the resource remains substantially unaltered. Adopted May 27, 2015 Tillamook County Land Use Ordinance Article 3.500 59

Applicant Response: *The project area is not located within the Cascade Head Scenic Research Area; therefore, this standard does not apply.*

- (3) Buildings may be allowed only if they and the land preparation which precedes them preserves the natural topography and unique scenic features and does not substantially alter the scenic character or the natural vegetative cover of the area.

Applicant Response: *No buildings are proposed as part of the active restoration project; therefore, this standard does not apply.*

- (4) Signs shall be constructed of wood and shall be limited to interpretive and directional signs having an area no greater than 16 square feet.

Applicant Response: *No signs are proposed as part of the active restoration project; therefore, this standard does not apply.*

- (d) Priority Dredged Material Disposal and Priority Mitigation sites (identified by the symbols DMD1 and MIT-1 respectively on the Estuary Zoning Maps).
- (1) Uses shall not preclude the ultimate use of the site as a dredged material disposal or mitigation site.
- (2) Structures or other improvements shall be of a temporary nature, easily moved or of low value, so that demolition or removal of these structures can be easily accomplished in order to accommodate dredged material disposal or mitigation. On priority mitigation sites only structures or other improvements which can be completely removed from the site are allowed.
- (3) Fill is permitted only where it is necessary to maintain or repair existing structures and facilities such as dikes. In priority mitigation sites there shall be no land grading which will reduce the potential of using the site for mitigation.

Applicant Response: *No Priority Dredged Material Disposal and Priority Mitigation sites exist within the project area; therefore, these standards do not apply.*

(5) CONDITIONAL USES:

- (a) Aquatic and shoreland disposal of dredged material shall be allowed only at approved sites listed in the Comprehensive Plan, unless the disposal is part of an approved fill project. Dredged material disposal is subject to the standards of Section 3.140 (4).

Applicant Response: *No aquatic and shoreland disposal of dredged material is proposed as part of the active restoration project; therefore, these standards do not apply.*

- (b) Mitigation actions shall be allowed only at approved sites listed in the Comprehensive Plan, unless the mitigation is part of an approved dredge or fill project. Mitigation actions are subject to the standards of Section 3.140 (12).

Applicant Response: *No mitigation actions are proposed as part of the active restoration project; therefore, these standards do not apply.*

- (c) Estuarine restoration actions (as defined in Section 6.12 of the Estuarine Resources Element of the Comprehensive Plan) shall be allowed only at approved sites listed in the Comprehensive Plan, unless the restoration action is approved as part of a mitigation project. Restoration actions are subject to the standards of Section 3.140 (15).

Applicant Response: *As outlined under 4.4d Sand Lake Estuary of Goal 16 ESTUARINE RESOURCES of the Tillamook County Comprehensive Plan, the Beltz Farm property is not considered a suitable restoration site because “removal of the dike surrounding the Beltz Farm wetland would eliminate the existing freshwater marsh, which is a significant waterfowl habitat.”*

The project area, including the SLE and Beltz Marsh, exhibit physical conditions that differ from the descriptive language contained in the 1982 Goal 16 inventory, including sustained tidal influence resulting from documented dike and tide gate failure and the establishment of intertidal marsh vegetation and functions. While Goal 16 inventory language references landowner intent for future agricultural use and characterizes portions of the site as freshwater marsh, those descriptions do not reflect current site conditions. Based on current, site-specific information in the record, Beltz Marsh functions as part of the estuarine system. The proposed reconnection of Beltz Marsh to the Southern Lower Estuary restores and maintains estuarine ecosystem integrity and is therefore consistent with the purpose and intent of Goal 16 to recognize and protect the environmental, economic, and social values of Tillamook County's estuaries while allowing appropriate water-dependent uses. Beltz Marsh provides significant waterfowl habitat as an estuary as well as a freshwater marsh. Portions of the freshwater marsh will be preserved as a buffer above the highest measured tideline and south of the setback levee.

TCLUO Section 3.140(15) is discussed in further detail in Section 5.3 of this document.

- (6) STANDARDS: Uses within the SHORELAND OVERLAY ZONE are subject to the provisions and standards of the underlying zone and of this section. Where the standards of the SHORELANDS OVERLAY ZONE and the underlying zone conflict, the more restrictive provisions shall apply.
- (a) Riparian vegetation shall be protected and retained according to the provisions outlined in Section 4.140, REQUIREMENTS FOR PROTECTION OF WATER QUALITY AND STREAMBANK STABILIZATION.

Applicant Response: *TCLUO Section 4.140 REQUIREMENTS FOR PROTECTION OF WATER QUALITY AND STREAMBANK STABILIZATION addressed in the findings below.*

TCLUO SECTION 4.140: REQUIREMENTS FOR PROTECTION OF WATER QUALITY AND STREAMBANK STABILIZATION

- (1) The following areas of riparian vegetation are defined:
- (a) Fifty (50) feet from lakes and reservoirs of one acre or more, estuaries, and the main stems of the following rivers where the river channel is more than 15 feet in width; Nestucca, Little Nestucca, Three Rivers, Tillamook, Trask, Wilson, Kilchis, Miami, Nehalem and North and South Fork Nehalem River.
- (b) Twenty-five (25) feet from all other rivers and streams where the river or stream channel is greater than 15 feet in width.

- (c) Fifteen (15) feet from all perennial rivers and streams where the river or stream channel is 15 feet in width or less.

For estuaries, all measurements are horizontal and perpendicular from the mean high water line or the line of non-aquatic vegetation, whichever is most landward. Setbacks for rivers, streams, and coastal lakes shall be measured horizontal and perpendicular from the ordinary high water line.

- (2) All development shall be located outside of areas listed in (1) above, unless:

- (a) For a bridge crossing; or
- (b) Direct water access is required in conjunction with a water dependent use; or
- (c) Because of natural features such as topography, a narrower riparian area protects equivalent habitat values; or
- (d) A minimal amount of riparian vegetation is present and dense development in the general vicinity significantly degrades riparian habitat values.

Setbacks may be reduced under the provisions of (c) and (d) above only if the threat of erosion will not increase and a minimum 20-foot setback is maintained. Determinations of habitat values will be made by the Oregon Department of Fish and Wildlife.

Applicant Response: *The intention of the standards outlined above is to ensure that riparian vegetation is protected and maintained. The proposal is for a wetland restoration project that involves creek realignment, a pedestrian bridge crossing, and a vehicular bridge crossing. This work is proposed within 50 feet of an existing estuary and within 15 feet of a perennial stream (Reneke Creek) where the stream channel is 15 feet in width or less. Because the project is considered a water-dependent use requiring direct water access and no reasonable alternative exists, the above standards are deemed met.*

Further, all temporarily disturbed areas will be replanted with native wetland and riparian vegetation. Restoration planting plans were developed to match site-specific hydrology and soil conditions, promoting rapid recovery and reducing the risk of invasive species colonization. Riparian vegetation will be planted along the realigned Reneke Creek alignment. Trees are not able to be planted on the existing Beltz dike or the setback levee so that tree roots don't compromise the structural integrity.

- (3) Exemptions from (2) above and from the applicable setback requirement for the front or rear yard that is opposite the riparian area may be granted without a variance for uses on:
 - (a) Lots located in areas identified in the Comprehensive Plan's Goal 2 exception element as "built and committed" and which existed as of the date of adoption of this Ordinance, and single family residential "lots of record" as defined and used in Chapter 884 Oregon Laws 1981 as amended, with a depth measured according to (1) above that is; Amended May 27, 2015 Amended May 11, 2022 Amended September 3, 2025 Tillamook County Land Use Ordinance Article 4 17
 - i. Less than 95 feet in places where the area of riparian vegetation is 50 feet wide; or
 - ii. Less than 70 feet in places where the area of riparian vegetation is 25 feet wide.

- (b) Other lots in identified Abuilt and committed areas and other Alots of record $\cong$ where the combination of setbacks required by this section result in a buildable lot depth of less than 45 feet.

Exemptions from the riparian setback shall be the minimum necessary to accommodate the proposed use after the yard opposite the riparian area has been reduced to a width of no less than ten feet.

Applicant Response: *The subject parcels are publicly owned by Oregon Parks and Recreation Department and are part of the Sitka Sedge State Natural Area. The project does not involve residential development, creation of new lots, or development of constrained residential building sites contemplated by this section. However, portions of the proposed Reneke Creek restoration and crossing improvements are located within the applicable setback area associated with the creek corridor.*

The proposed encroachment is limited in scope and is necessary to accommodate restoration-related improvements, including replacement of the existing culvert crossing with a bridge structure and associated roadway improvements, and construction of a pedestrian bridge, both of which are allowed under TCLUO 4.140 (2)(a) above. The purpose of these improvements is to restore hydrologic connectivity, improve fish passage, and reduce flooding impacts. Project elements have been designed to minimize disturbance within setback areas to the extent practicable while maintaining the functional and safety requirements of the crossing improvements. The project is restoration-oriented in nature and is specifically intended to improve riparian, aquatic, and estuarine habitat functions within the Reneke Creek corridor.

To the extent the County determines that setback relief or an exemption is required for portions of the proposed crossing improvements, the encroachment represents the minimum necessary to accommodate the proposed restoration and infrastructure improvements while preserving the overall resource protection objectives of the applicable setback standards.

- (4) All trees and at least 50 percent of the understory vegetation shall be retained within areas listed in (1) above, with the following exceptions:
 - (a) Removal of trees that pose an erosion or safety hazard to existing uses allowed by the underlying zone.
 - (b) The mowing, planting, or maintenance of existing lawn and pasture, including the control of noxious weeds.
 - (c) Vegetation removal necessary in conjunction with an approved in-water project or to provide direct access for water-dependent use.
 - (d) Structural shoreland stabilization subject to the shoreline stabilization standards in Section 3.140.
 - (e) Vegetation removal for new bridge construction or routine repair, operation, or maintenance of bridges and highways.
 - (f) Vegetation removal necessary for maintenance of clear vision areas and the removal of roadside hazards.

- (g) Vegetation removal necessary for construction of a minor highway improvement within an existing right-of-way.

Forest operations for which notification is required by ORS 527.670 (2) shall be governed by the Oregon Forest Practices Act.

Applicant Response: *As shown on the submitted plan set, tree removal is proposed as part of the active restoration project. Trees proposed for removal are located in the area where the new setback dike and 100-foot diameter turnaround are proposed, along with the setback dike staging area and new driveway access from Sandlake Road in compliance with (c) above. Trees will also be removed along the existing Beltz Dike for the pedestrian bridge construction and dike reconstruction after removal of the existing tidegate in compliance with (2) and (c) above. No tree removal is proposed for the Reneke Creek realignment portion of the project. All removed trees will be salvaged to create wood habitat structures for the estuary restoration and creek realignment project areas. Riparian vegetation is also proposed to be removed as part of the in-water estuary restoration creek realignment work. Affected areas include the breached segment of the Beltz Dike, the area surrounding the proposed setback dike, tidal channel excavation within the Beltz Marsh, riverine channel excavation associated with the Reneke Creek realignment, and the vehicular bridge replacement within Sandlake Road. As outlined, the proposed tree and vegetation removal are associated with an in-water, water-dependent project and includes structural shoreland stabilization as outlined in TCLUO 3.140, which is addressed in further detail in Section 5.3 of this document. The vegetation removed in conjunction with the proposed vehicular bridge replacement project is in compliance with (g) above and will be evaluated under a future Tillamook County Public Works permit.*

TCLUO SECTION 3.545: SHORELAND OVERLAY (SH) Continued

Section 3.545(6)

- (b) Development in flood hazard areas shall meet the requirements of Section 3.510, FLOOD HAZARD OVERLAY ZONE.

Applicant Response: *Section 3.510 of the TCLUO is discussed in further detail in Chapter 5.3 of this document. This standard is met.*

- (c) Development in beach and dune and other geologic hazard areas shall meet the requirements of Section 3.085, BEACH AND DUNE OVERLAY ZONE and Section 4.130, DEVELOPMENT REQUIREMENTS FOR GEOLOGIC HAZARD AREAS.

Applicant Response: *Section 3.085 does not exist. The BEACH AND DUNE OVERLAY ZONE is captured under TCLUO Section 3.530 and is addressed along with Section 4.130 in Chapter 6.3 of this document. This standard is met.*

- (d) Forestry operations shall be consistent with the protection of the natural values of major marshes, significant wildlife habitat and riparian vegetation. A forest operation for which notification is required by ORS 527.670 (2) shall be governed by the Oregon Forest Practices Act and any supplemental agreements entered into by the Oregon State Board of Forestry and the Oregon State Fish and Wildlife Commission.

Applicant Response: *No forestry operations are proposed as part of the active restoration project; therefore, this standard does not apply.*

- (e) The productivity of resource land on Rural Shorelands shall be considered when determining the location of "Other Uses" within a given land parcel in the F-1, F, and SFW-20 zones. "Other Uses" within these zones shall be located so that the productivity of resource land is maintained.

Applicant Response: *The project area is not considered rural shorelands; therefore, this standard does not apply.*

- (f) Existing public ownerships, rights of way and similar public easements in coastal shorelands which provide access to or along coastal waters shall be retained or replaced if sold, exchanged or transferred. Rights of way may be vacated to permit redevelopment of shoreland areas provided public access across the affected site is retained.

Applicant Response: *The active restoration project will not impact existing public ownership, rights of way, or similar easements; therefore, this standard does not apply.*

TCLUO SECTION 3.550: FRESHWATER WETLAND OVERLAY (FW)

(1) **PURPOSE AND AREAS INCLUDED:** The purpose of this zone is to protect significant areas of freshwater wetlands, marshes and swamps from filling, drainage or other alteration which would destroy or reduce their biological value. Areas included in this zone are:

- (a) Significant Goal 5 Wetlands: wetlands identified as "significant" in the Goal 5 Element of the Comprehensive Plan;
- (b) Notification Wetlands: wetlands shown on the Statewide Wetland Inventory (discussed in the Goal 5 Element of the Comprehensive Plan).

Applicant Response: *As shown in Figure 6, below, National Wetlands Inventory Map, the project area does not contain Freshwater wetlands as defined in TCLUO 3.550, however the Beltz Marsh is inventoried as a significant freshwater marsh under Goal 17 Element of the Comprehensive Plan and regulated under the TCLUO 3.545 Shoreland Overlay Zone. As previously discussed, the proposed project will preserve portions of the freshwater marsh south of the setback levee and around the fringes of the estuary above the MHHW elevations. Therefore, important freshwater wetland habitat will be preserved and supplemented by the proposed marsh restoration project which will improve the existing estuary connection into the marsh and improve water quality and habitat quality in both the freshwater and estuarine portions of the marsh.*

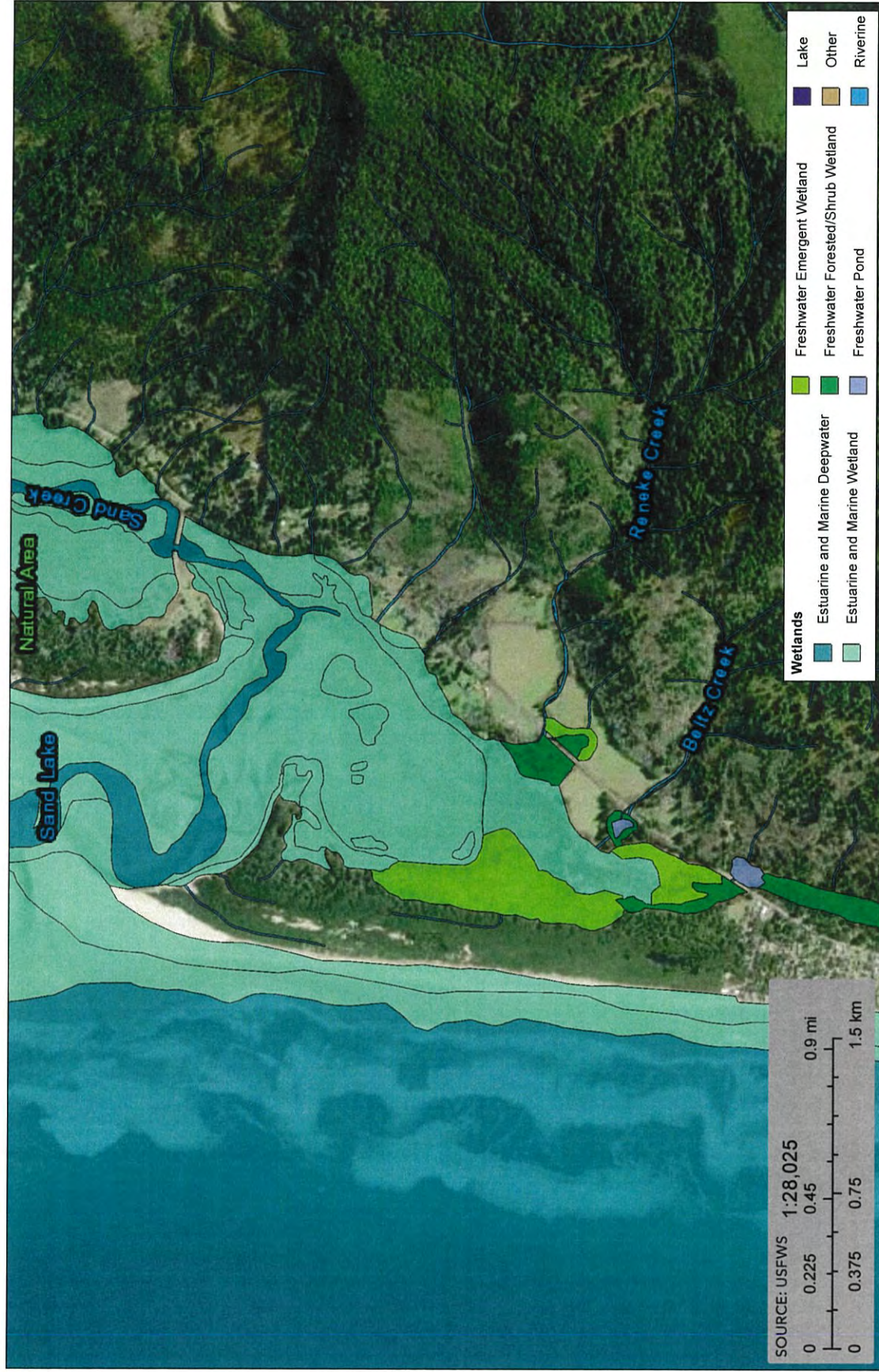


Figure 6
National Wetlands Inventory (NWI) Map

TCLUO SECTION 3.580 TSUNAMI HAZARD OVERLAY ZONE (TH)

- (1) **PURPOSE:** The purpose of the Tsunami Hazard Overlay Zone is to increase the resilience of the community to a local source (Cascadia Subduction Zone) tsunami by establishing standards, requirements, incentives, and other measures to be applied in the review and authorization of land use and development activities in areas subject to tsunami hazards. The standards established by this section are intended to limit, direct and encourage the development of land uses within areas subject to tsunami hazards in a manner that will:
- (a) Reduce loss of life;
 - (b) Reduce damage to private and public property;
 - (c) Reduce social, emotional, and economic disruptions; and
 - (d) Increase the ability of the community to respond and recover. Significant public and private investment has been made in development in areas which are now known to be subject to tsunami hazards. It is not the intent or purpose of this section to require the relocation of or otherwise regulate existing development within the Tsunami Hazard Overlay Zone. However, it is the intent of this section to control, direct and encourage new development and redevelopment such that, over time, the community's exposure to tsunami risk will be reduced. Adopted May 27, 2015
Tillamook County Land Use Ordinance Article 3.500 103
- (2) **APPLICABILITY:** All lands identified as subject to inundation from the XXL magnitude local source tsunami event as set forth on the applicable Tsunami Inundation Map(s) (TIM) published by the Oregon Department of Geology and Mineral Industries (DOGAMI) are subject to the requirements of this section. The boundary of the Tsunami Hazard Overlay Zone as depicted on the Tillamook County Zoning Map, including the Large (L) and Medium (M) inundation boundaries, shall not be modified after the date of adoption of this Section unless modified in accordance with the provisions in Article 10.
- (4) **USES:** In the Tsunami Hazard Overlay Zone, except for the prohibited uses set forth in subsection (5), uses authorized by the underlying zone as outright or conditional uses are permitted.
- (5) **PROHIBITED USES:** Unless authorized in accordance with subsection (6), the following uses are prohibited in the specified portions of the Tsunami Hazard Overlay Zone:
- (a) In areas identified as subject to inundation from the LARGE (L) magnitude local source tsunami event as set forth on the Tsunami Inundation Map (TIM), the following uses are prohibited:
 - (1) Hospitals and other medical facilities having surgery and emergency treatment areas.
 - (2) Fire and police stations.
 - (3) Structures and equipment in government communication centers and other facilities required for emergency response.
 - (4) Buildings with a capacity greater than 250 individuals for every public, private or parochial school through secondary level or child care centers.
 - (5) Buildings for colleges or adult education schools with a capacity of greater than 500 persons.
 - (6) Jails and detention facilities.

Applicant Response: *As shown in Figure 7 DOGAMI Tsunami Inundation Map located at the end of this chapter, LARGE (L) magnitude local source tsunami event exists within to project area; however, no prohibited uses are proposed as part of the active restoration project. Therefore, these standards are met.*

- (b) In areas identified as subject to inundation from the MEDIUM (M) magnitude local source tsunami event as set forth on the Tsunami Inundation Map (TIM), the following uses are prohibited:
 - (1) Tanks or other structures containing, housing or supporting water or fire- suppression materials or equipment required for the protection of essential or hazardous facilities or special occupancy structures.
 - (2) Emergency vehicle shelters and garages.
 - (3) Structures and equipment in emergency preparedness centers.
 - (4) Standby power generating equipment for essential facilities.
 - (5) Covered structures whose primary occupancy is public assembly with a capacity of greater than 300 persons.
 - (6) Medical facilities with 50 or more resident, incapacitated patients.

Applicant Response: *As shown on the DOGAMI Tsunami Inundation Map for Sand Lake, MEDIUM (M) magnitude local source tsunami event exists within to project area; however, no prohibited uses are proposed as part of the active restoration project. Therefore, these standards are met.*

- (c) Notwithstanding the provisions of Article 7, the requirements of this subsection shall not have the effect of rendering any lawfully established use or structure nonconforming.

Applicant Response: *The proposal involves a conditionally permitted active restoration project within an existing Oregon State Park. No lawfully established use or structure will be made nonconforming as part of this proposal; therefore, this standard is met.*

- (6) USE EXCEPTIONS: A use listed in subsection (5) of this section may be permitted upon authorization of a Use Exception in accordance with the following requirements:
 - (a) Public schools may be permitted upon findings that there is a need for the school to be within the boundaries of a school district and fulfilling that need cannot otherwise be reasonably accomplished.
 - (b) Fire or police stations may be permitted upon findings that there is a need for a strategic location.
 - (c) Other uses prohibited by subsection (4) of this section may be permitted upon the following findings:
 - (1) There are no reasonable, lower-risk alternative sites available for the proposed use; Adopted May 27, 2015 Tillamook County Land Use Ordinance Article 3.500 105
 - (2) Adequate evacuation measures will be provided such that life safety risk to building occupants is minimized; and,

- (3) The buildings will be designed and constructed in a manner to minimize the risk of structural failure during the design earthquake and tsunami event.

Applicant Response: *No use exceptions are necessary for the active restoration project; therefore, these standards do not apply.*

- (7) APPLICATIONS, REVIEW, DECISIONS, AND APPEALS for use exceptions authorized by this subsection shall be in accordance with the requirements for a Type III procedure as set forth in article 10.

Applicant Response: *No use exceptions are necessary for the proposed active restoration project; therefore, this standard does not apply.*

- (8) EVACUATION ROUTE IMPROVEMENT REQUIREMENTS: Except single family and two-family dwellings (attached or detached) on existing lots and parcels, all new development, substantial improvements and land divisions in the Tsunami Hazard Overlay Zone shall incorporate evacuation measures and improvements, including necessary vegetation management. Such measures shall include:

- (a) On-site improvements:

- (1) Improvements necessary to ensure adequate pedestrian access from the development site to designated evacuation routes in all weather and lighting conditions.
- (2) Frontage improvements to designated evacuation routes that are located on or contiguous to the proposed development site. Such improvements shall be proportional to the evacuation needs created by the proposed development.
- (3) Tsunami evacuation structure(s) of sufficient capacity to accommodate the evacuation needs of the proposed development where determined under a Type III review to be proportional to the evacuation needs created by the proposed development.

Applicant Response: *The project is proposed within the SSSNA, a State Park with existing pedestrian access to designated evacuation routes via the adjacent Sandlake Road right-of-way. No changes are proposed to the existing park access; however, improvements are proposed to Sandlake Road at the intersection of Reneke Creek. The undersized culvert will be removed and replaced with a 49-foot vehicular bridge. This work will also include raising approximately 800 feet of roadway to reduce roadway overtopping during storm events, improving this section of the tsunami evacuation route. The project does not include any new dwellings, or land divisions, and the restoration project is not substantial development that increases the visitor capacity or increases evacuation needs. The overall project will be reviewed under a Type III review but should not generate additional evacuation needs as outlined in Section 3.580 (8)(a)(3). No tsunami evacuation structures exist within Tillamook County. These standards are met as proposed.*

- (b) Off-site improvements: Improvements to portions of designated evacuation routes that are needed to serve, but are not contiguous to, the proposed development site. Such improvements shall be proportional to the evacuation needs created by the proposed development.

Applicant Response: *No off-site improvements of designated evacuation routes have been identified. As such, this standard is met as proposed.*

- (c) Evacuation route signage adequate to provide necessary evacuation information consistent with the proposed use of the site.

Applicant Response: *Evacuation route signage exists along the existing evacuation route. No additional signage needs have been identified; therefore, this standard is met as proposed.*

- (d) Evacuation route improvements and measures required by this subsection shall include, at a minimum, the following:
 - (1) Improved streets and/or all-weather surface paths of sufficient width and grade to ensure pedestrian access to designated evacuation routes in all lighting conditions; and
 - (2) Improved streets and paths shall provide and maintain horizontal clearances sufficient to prevent the obstruction of such paths from downed trees and structure failures likely to occur during a Cascadia earthquake.

Applicant Response: *As outlined in previous findings, the project is proposed within an existing state park (SSSNA) developed with pedestrian recreation uses. Street improvements within Sandlake Road, an identified evacuation route, include raising approximately 800 feet of roadway to reduce roadway overtopping and constructing a 49-foot span vehicular bridge in place of the existing undersized culvert. One pedestrian path within the SSSNA will be impacted due to the proposed dike breach through the existing Beltz Dike and constructing a 140-foot span bridge over the dike breach to maintain recreational access along the Beltz Dike Trail to the rest of the SSSNA trail network. All existing paths provide sufficient width and grade to ensure pedestrian access to designated evacuation routes in all lighting conditions. All streets and paths will provide and maintain horizontal clearances sufficient to prevent the obstruction of such paths from downed trees and structure failures likely to occur during a Cascadia earthquake. Therefore, these standards are met.*

(9) TSUNAMI EVACUATION STRUCTURES

- (a) All vertical tsunami evacuation structures shall be of sufficient height to place evacuees above the level of inundation for the XXL local source tsunami event.
- (b) Tsunami evacuation structures are not subject to the building height limitations of this ordinance.

Applicant Response: *Based on Tillamook County's website, no evacuation structures exist; therefore, this standard does not apply.*

Article VI – Conditional Use Procedures and Criteria

TCLUO SECTION 6.040: REVIEW CRITERIA CONTINUED

- (2) The use is consistent with the applicable goals and policies of the Comprehensive Plan.

Applicant Response: *See Appendix B: Sitka Sedge Tidal Wetland Restoration Alignment with Comprehensive Plan Goal Review for details on how the use is consistent with the applicable goals and policies of the Comprehensive Plan.*

- (3) The parcel is suitable for the proposed use considering its size, shape, location, topography, existence of improvements and natural features.

Applicant Response: *The parcel is suitable for the proposed use. The size of the parcel, shape, location, topography, existence of improvements and natural features make it suitable for a large-scale tidal wetland restoration project aimed at restoring hydrology, fish passage, and habitat conditions in Beltz Marsh. The project is consistent with the SSSNA Master Plan. Beltz Marsh is identified in Goal 16 of the Tillamook County Comprehensive Plan as one of two parcels there were converted from estuary to agriculture. Muted tidal connection has resumed through the damaged tidegate. The project will further this restoration trajectory by fully reconnecting the southern portion of Sand Lake to the rest of the Estuary.*

The parcel is suitable for the proposed use. The size of the parcel, shape, location, topography, existence of improvements and natural features make it suitable for a large-scale tidal wetland restoration project aimed at restoring hydrology, fish passage, and habitat conditions in Beltz Marsh. The project is consistent with the SSSNA Master Plan. Beltz Marsh is identified in Goal 16 of the Tillamook County Comprehensive Plan as one of two parcels there were converted from estuary to agriculture. Muted tidal connection has resumed through the damaged tidegate. The project will further this restoration trajectory by fully reconnecting the southern portion of Sand Lake to the rest of the Estuary.

- (4) The proposed use will not alter the character of the surrounding area in a manner which substantially limits, impairs or prevents the use of surrounding properties for the permitted uses listed in the underlying zone.

Applicant Response: *The proposed project aims to restore estuarine and wetland habitats within the SSSNA to improve ecological function, enhance climate resilience, and align land use with Oregon's coastal resource protection goals. The subject property currently consists of a diked tidal marsh between dunal areas and beach to the west and forested rising foothills of the Coast Range mountains to the east. The SSSNA encompasses approximately 388 acres, with approximately 87 acres of wetland, including approximately 42 acres of tidal marsh, sand, and mudflats and approximately 12 acres of estuary altered by the half-mile long Beltz Dike that runs east-west across the subject property.*

The surrounding parcels are zoned as Estuary Natural (EN), Rural Residential (RR-2), Small Farm and Woodlot 20 Acres (SFW-20), and Forest (F). Restoring the estuarine and wetland habitats within the SSSNA will not substantially limit, impair or prevent the use of surrounding properties.

- (5) The proposed use will not have detrimental effect on existing solar energy systems, wind energy conversion systems or wind mills.

Applicant Response: *There are no existing solar energy systems, wind energy conversion systems or wind mills near the SSSNA, therefore the proposed use will not have a detrimental effect.*

- (6) The proposed use is timely, considering the adequacy of public facilities and services existing or planned for the area affected by the use.

Applicant Response: *The proposed use is timely, and considers the adequacy of public facilities for the area affected by the use. The project is proposed by the Oregon Parks and Recreation Department (OPRD) and Tillamook Estuaries Partnership (TEP). The proposed project aims to restore estuarine and wetland habitats within the SSSNA to improve ecological function, enhance climate resilience, and align land use with Oregon's coastal resource protection goals. Restoration is needed to address legacy impacts from incompatible zoning and to support long-term conservation and public benefit. The project includes replacement of 3 culverts under Sandlake Road in coordination with Tillamook County Public Works. These culvert replacements will improve public facilities and community emergency access by elevating Sandlake Road and relieving flooding issues on the road, while facilitating fish passage from the marsh to habitat upstream.*

Figure 7 Tsunami Hazard Zone Map

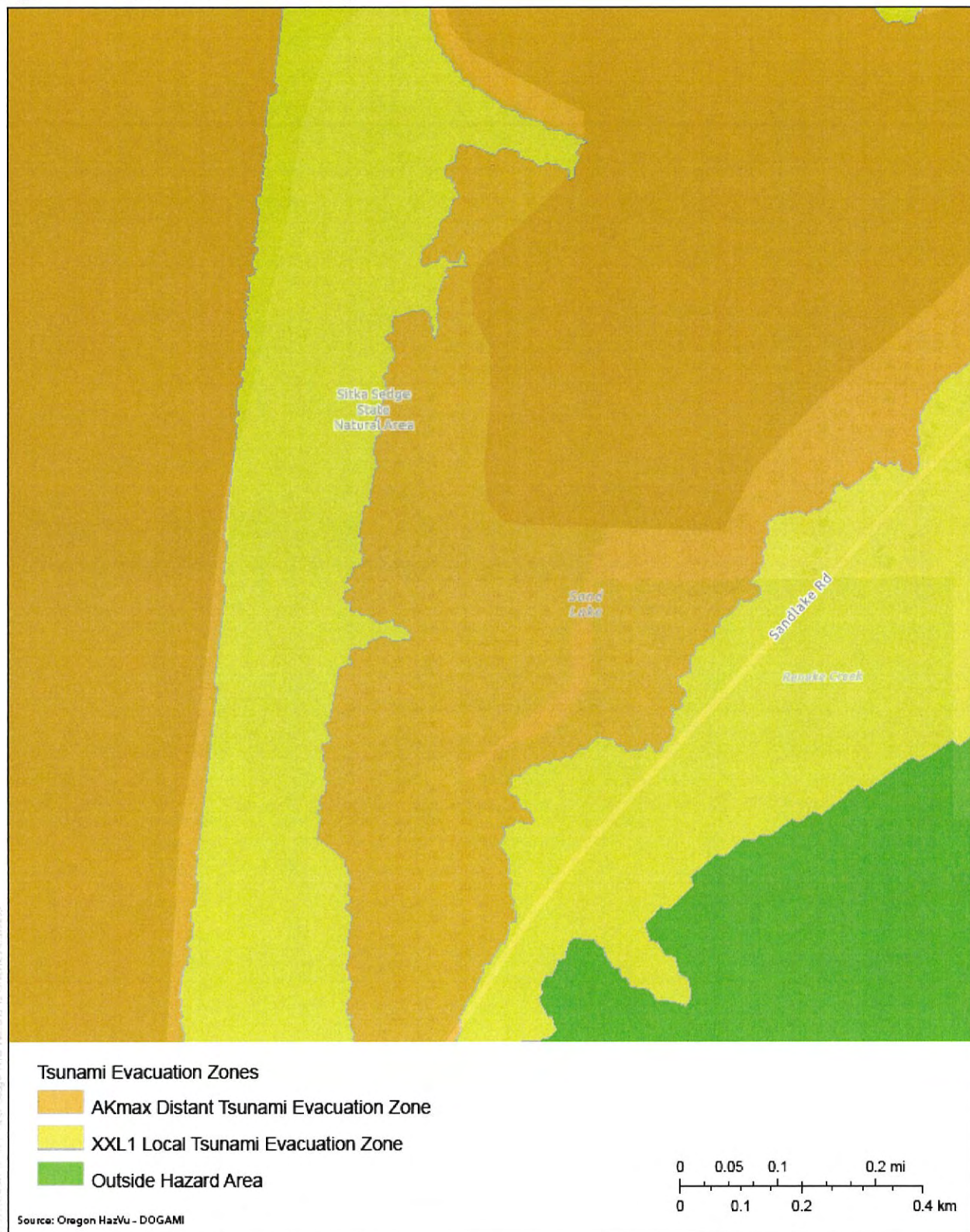


Figure 7
Tsunami Hazard Zone Map



CHAPTER 5

Floodplain Development Permit

5.1 Introduction

The proposed active restoration project is located within the SSSNA, and a portion of the project is within the Flood Hazard Overlay (FH) Zone. The project will restore natural tidal hydrology and ecological function by reconnecting the Beltz Marsh to the SLE, which were disconnected in the 1930s for the purposes of flood protection, agricultural production, and to create pastures. Those early alterations dramatically reduced floodplain connectivity and degraded critical estuarine and freshwater habitat. The existing tidegate has deteriorated over time and cannot be repaired due to modern fish passage laws. The restricted flow at the tidegate has resulted in slow drainage and extended periods of impoundment of stormwater and high seasonal tides in the southern marsh below the dike. High flow velocities through the tidegate have caused erosion on both sides of the dike and impact fish passage. The active restoration project is designed to address these issues while complying with the intent and standards of Section 3.510 of the TCLUO, which seeks to minimize public and private losses due to flooding, maintain natural floodplain functions, and avoid development that increases flood hazards.

Project elements located within the FH Zone include the excavation of a 140-foot-wide breach in the existing Beltz Dike to reconnect Beltz Marsh to tidal processes in Sand Lake. This breach is strategically located to align with historical tidal channel patterns and minimize tree removal. To maintain public access along the Beltz Dike Trail, a 140-foot-span pedestrian bridge will be constructed over the breach. Near the southern end of Beltz Marsh, an earthen setback dike will be constructed approximately 100 feet downstream of the existing primary beaver dam. This feature is designed to prevent high tide water levels from reaching Tierra Del Mar, provide sufficient upstream storage for stormwater runoff, and preserve the existing beaver dam and surrounding freshwater habitat to minimize potential conflicts with beaver activity and the proposed tide gate structure in the setback dike. Additional restoration actions include filling legacy linear drainage ditches, excavating new tidal channels to reestablish natural hydrologic patterns, and installing large wood structures to enhance habitat complexity.

Collectively, these actions are designed to reduce flood risk, enhance ecological resilience, improve aquatic organism/fish passage, and restore the natural functions of the floodplain in a manner consistent with the goals and requirements of the FH Zone. The project supports long-term flood mitigation, habitat restoration, and public safety while aligning with local, state, and federal conservation and hazard reduction objectives.

5.2 Code Compliance

TCLUO Article III - Zone Regulations

SECTION 3.510: FLOOD HAZARD OVERLAY ZONE (FH)

(5) GENERAL STANDARDS: In all areas of special flood hazards the following standards are required:

LETTER OF MAP REVISION

- (a) If hydrologic and hydraulic analysis indicates an increase in flood levels, the applicant shall obtain a Conditional Letter of Map Revision (CLOMR) from FEMA before any encroachment, including fill, new construction, substantial improvement, or other development is permitted.

Upon completion of the project, but no later than six months after project completion, a Letter of Map Revision (LOMR) shall be submitted to FEMA to reflect the changes on the Flood Insurance Rate Map (FIRM) and/or Flood Insurance Study. A LOMR is required only when the CLOMR documents an increase in flood levels during the occurrence of the base flood or where post-development conditions do not reflect what was proposed on the CLOMR.

Applicant Response: *As described in the project's submitted No-Rise Certification and Sitka Sedge Tidal Wetland – Hydraulic Analysis Memorandum (ESA, 2024) there will be no increase in flood levels. Therefore, no LOMR is required.*

Portions of the project area are within the 100-year floodplain. As shown on the FEMA Flood Insurance Rate Map (FIRM)(Figure 8) this area is within a backwater area of Sand Lake (FEMA, 2018a). The FIS for Tillamook County lists Sand Lake as having its Base Flood Elevation (BFE) as a non-coastal stillwater elevation (FEMA 2018b) of 11.8 feet NAVD88. As detailed in the Tillamook Coastal Study (DOGAMI, 2014) the still water level (SWL) used to map the coastal backwater effect in Sand Lake is based on astronomical tides, plus the effects of processes such as El Niño or storm surge. As confirmed with FEMA staff via email coordination (FEMA, 2025), this project, or any amount of fill in Sand Lake, does not influence the predicted astronomical tide or coastal storm processes and therefore cannot impact the Base Flood Elevation.

Additionally, ESA conducted 2-dimensional hydrodynamic modeling using HEC-RAS to model existing and proposed project conditions under a range of hydrologic conditions including 100-year stream flows coupled with tides including extreme high tides. In all locations of the model domain, including the area behind the proposed setback dike, the proposed conditions result in the same or lower water levels than under the existing conditions. The existing conditions configuration of the existing Beltz Dike and undersized 4'x4' box culvert result in the highest peak water levels behind the existing dike due to an inflow of stormwater from the contributing watersheds of Reneke Creek, Beltz Creek, No Name Creek, Tierra Del Mar, and direct precipitation. In periods of heavy precipitation, stormwater accumulates in the basin behind the existing Beltz Dike is unable to effectively drain out through the existing undersized culvert. This accumulated stormwater can rise to a peak elevation of nearly 12 feet NAVD88 and can take several days to fully drain out, particularly when coupled with seasonal high tides.

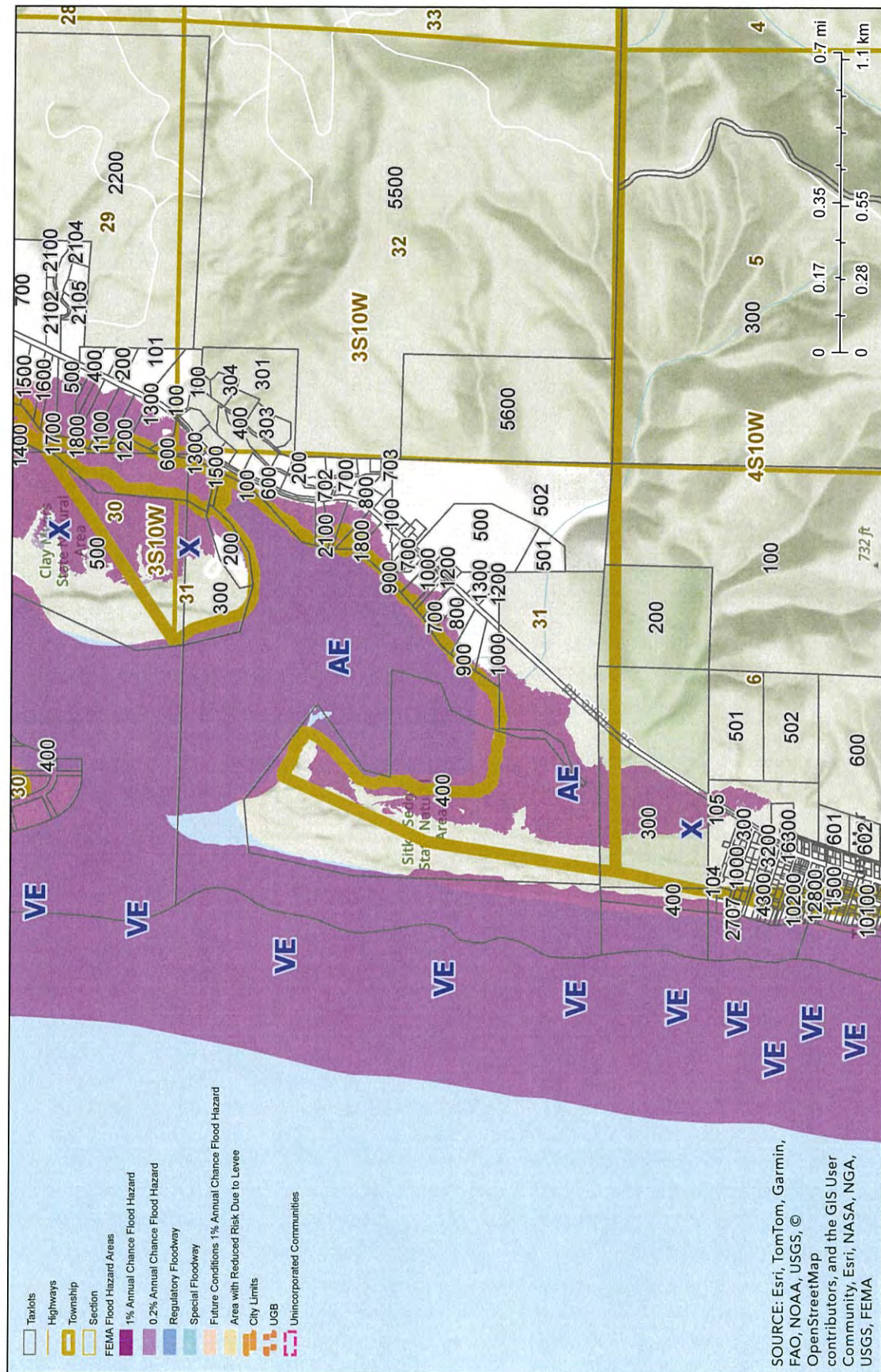


Figure 8
FEMA Flood Hazard Areas Map

The proposed condition will replace the existing undersized culvert with a 140-foot-wide breach in Beltz Dike, spanned by a pedestrian bridge to maintain recreational access. This much larger opening will allow for water levels north/downstream of the proposed setback dike to rise and fall matching the water surface elevation in Sand Lake, even during periods of heavy precipitation and high stream flows on the contributing creeks. This area will experience the full extent of high tide water surface elevations, but it will rapidly drain out when the tide recedes rather than staying full of stormwater for several days at a time.

The proposed setback dike and tide gate structure will prevent the highest tide levels (higher than 8 feet NAVD88) from reaching the area upstream/south of the setback dike. An existing prominent beaver dam located 100 feet south of the proposed setback dike impounds water at an elevation of approximately 7.5-8.0' NAVD88 throughout the year under existing conditions and is anticipated to remain after construction of the proposed conditions. The setback dike location was selected for multiple reasons that will reduce peak water levels south of the setback dike and at the adjacent town of Tierra Del Mar, including:

- to locate the setback dike south of Beltz Creek to allow Reneke Creek and Beltz Creek to flow directly to reconnected marsh providing maximum fish passage improvements and to allow the majority of creek flows to drain directly to Sand Lake and not contributing to stormwater inflows behind the setback dike,*
- to provide adequate storage capacity upstream of the setback dike to fully contain stormwater runoff generated from the No Name Creek watershed and Tierra Del Mar drainage basin while resulting in equal or lower water levels in all areas south of the setback dike.*

Furthermore, the proposed tide gate structure located at the setback dike (12'x10' box culvert with an 8'x10' tide gate with Muted Tidal Regulator controls) is sized to have hydraulic conveyance capacity to provide rapid drain out of accumulated stormwater when tide levels recede. A pair of 36-inch diameter backup drainage culverts with tide gates are also proposed to provide additional capacity to drain off peak water levels south of the setback dike and in the unanticipated event that the main tide gate structure is blocked for any reason, such as beaver activity. The tide gate structure will also include beaver exclusion measures to further prevent this condition from occurring. These combined features will result in lower peak water levels and shorter inundation durations than the existing conditions.

ALTERATION OF WATER COURSES

- (b) The flood carrying capacity within the altered or relocated portion of said watercourse shall be maintained. A maintenance plan for the altered or relocated portion of said watercourse shall be submitted to the Department to ensure that the flood carrying capacity is not diminished.

Applicant Response: *The project will alter three watercourses including the No Name Creek drainage pathway to Sand Lake, Beltz Creek, and Reneke Creek. The No Name Creek drainage pathways flow generally south to north from the east side of Sand Lake Road, crossing under the road and entering SSSNA at the north end of Tierra del Mar, then through a series of drainage ditch segments through the Beltz Marsh area. The drainage ditch network was excavated in the 1930s to 1950s in conjunction with construction of Beltz Dike to facilitate agricultural production. No Name Creek flows, combined with*

tributary inputs from Beltz Creek and Reneke Creek, drain out of Beltz Marsh to Sand Lake through a single 4'x4' concrete box culvert. The project will remove the existing box culvert and reconstruct the dike embankment in the immediate vicinity, while breaching Beltz Dike to the west to provide full tidal connection between the majority of Beltz Marsh and Sand Lake, while also providing a freely draining connection that will drastically increase the drainage conveyance capacity through the existing Beltz Dike embankment. Portions of the linear drainage ditches will be filled and remeandered in more naturally sinuous channels sized to provide an equivalent conveyance capacity to drain water out of the marsh. Where the No Name Creek channel will be crossed by the proposed setback dike, a new 12-foot-wide box culvert fitted with an 8'x10' side-hinged tide gate will prevent peak tides from reaching Tierra Del Mar while providing adequate conveyance capacity to drain stormwater runoff downstream/northward. The tide gate structure is sized to provide adequate drainage capacity on its own, and it will be supplemented with two 36-inch diameter culverts (with tide gates) designed to provide additional conveyance capacity to drain out water during peak water levels and in the event of a blockage at the main tide gate drainage structure. The tide gate drainage structure will be equipped with beaver exclusion measures including fencing to prevent beavers from accessing and blocking the tide gate structure. The project won't reduce flood carrying capacity as described in the prior section.

The Reneke Creek watercourse will also be altered under the proposed project conditions by realigning Reneke Creek away from its current location flowing down the roadside drainage ditch on the upstream/east side of Sandlake Road. The creek will be realigned into a new channel path southward through its historical floodplain area that drains southwestward to the low point in the area and the low point on Sandlake Road where Reneke Creek flows westward through a 24-inch diameter culvert. Although Reneke Creek is located entirely outside of the flood zone until it drops into the marsh, under existing conditions, this undersized culvert is frequently blocked with debris and/or overcome by high flows causing frequent overtopping and damage to the roadway embankment. Tillamook County Public Works has frequently removed blockages and repaired the roadway embankment in this location.

The project will decrease overtopping and damage to the roadway embankment by replacing this 24-inch diameter culvert with a new 49-foot span bridge for drastically increased conveyance capacity. The roadway low point will also be raised by 2 feet to provide 3 feet of freeboard beneath the bridge during 100-year flow conditions on Reneke Creek, sufficient to pass flood flows and debris. While this significantly increased conveyance capacity and freeboard is designed to minimize the need for maintenance, such as clearing blockages, Tillamook County Public Works (TCPW) will be responsible for maintaining conveyance capacity within the right-of-way and bridge crossing at Reneke Creek. The existing drainage ditch where Reneke Creek currently flows through will be filled with the roadway embankment side slope, while providing alternate drainage pathways for roadside runoff to drain to the wetland along Reneke Creek. The Reneke Creek channel will be realigned into a new channel that flows southwest to the low point within the remnant forest wetland upstream of the bridge crossing. A series of side channel flow paths will be established, and the broad floodplain area will provide room for the creek to evolve with the episodic sediment deposits that occur under current conditions. Historically, these sediment deposits have blocked culverts and filled in segments of the Reneke Creek channels, reducing function and/or requiring maintenance to remove deposited sediment.

The Beltz Creek watercourse will be altered under the proposed project conditions by replacing the existing perched 36-inch diameter culvert pipe with a new 45-foot span bridge. The creek channel will be

graded through the roadway embankment and realigned slightly by approximately 10 feet at the upstream side of the bridge to reduce the creek's skew to the roadway. Approximately 180 feet of stream channel will be reconstructed to resolve the grade change at the existing perched culvert outlet. The increased channel opening beneath the bridge will increase hydraulic capacity and alleviate the bottleneck that currently exists at the culvert. OPRD will be responsible for monitoring and maintaining the setback dike and its associated drainage structures. OPRD is committed to this responsibility and will provide staff and equipment to monitor the drainage system during and after storm events, as well as on a regular frequency of at least twice per year, to observe any blockages or erosive damage and remove debris as needed. OPRD will retain the tide gate manufacturer to inspect and maintain the Muted Tidal Regulator control system in proper working condition. The setback dike will have a gravel access road on top of the embankment to provide vehicular access, including a 24-foot-wide access road over top of the tide gate structure to facilitate equipment access to both sides of the structure and a vehicular turnaround at the western end of the setback dike to facilitate trucks and trailers needed for maintenance. OPRD will also be responsible for monitoring and maintaining the pedestrian bridge and dike breach channel. The dike breach will have a top width of 140 feet, and the bridge will be set to have approximately 3 feet of vertical freeboard above peak water levels to provide sufficient conveyance capacity to pass water and debris during peak flood conditions. In the unexpected event that this large opening was blocked in a manner that reduced conveyance capacity, OPRD would access the crossing location on the existing dike-top access road used as Beltz Dike trail. The pedestrian bridge is also being designed to handle vehicular loading that would allow vehicular and equipment access to both sides of the pedestrian bridge and dike breach channel.

ANCHORING

- (c) All new construction and substantial improvements shall be anchored to prevent flotation, collapse or lateral movement of the structure.

Applicant Response: *All newly constructed improvements will be anchored to prevent flotation, collapse, or lateral movement. The proposed project includes the following permanent structures and means of anchoring:*

- *The 140-foot-span pedestrian bridge over the breach in Beltz Dike will include a prefabricated steel truss bridge on a pile-supported foundation system anchored into the ground. As shown on the 90% Design Drawings, the foundation of the pedestrian bridge will include two concrete abutments, each supported by three 20-inch diameter pipe piles driven approximately 70 feet below the concrete abutments. The steel piles will be embedded into the steel-reinforced concrete bridge abutments, and the prefabricated bridge deck will rest upon and be bolted to the concrete abutments according to the manufacturer's instructions. The bridge foundation system is designed by structural engineers at David Evans and Associates, informed by geotechnical investigation and recommendations by Shannon & Wilson's geotechnical engineers.*
- *The 49-foot-span vehicular bridge over Reneke Creek at Sandlake Road is not located within the Flood Hazard Overlay zone and is therefore not addressed in this section.*
- *The 45-foot-span vehicular bridge over Beltz Creek at Sandlake Road is not located within the Flood Hazard Overlay zone and is therefore not addressed in this section.*

- *The proposed tide gate structure at the setback dike will include a cast-in-place concrete box culvert structure with concrete wingwalls and a slab foundation supported on a shallow-mat foundation of layered aggregate and synthetic geogrid. The foundation will include steel sheet pile cutoff walls beneath the upstream and downstream ends of the concrete slab, embedded into the concrete and extending a minimum of 20 feet below the footing. The concrete structure will be heavy enough to counteract buoyancy on its own, and it will be buried within the earthen setback dike embankment. The year before construction of the tide gate structure, the footprint of the structure will be preloaded and surcharged with a mound of fill to initiate settlement of the underlying soil in order to minimize the amount of settlement that would occur after the structure is completed. The structure and foundation system is being design by structural engineers at Precisions Structural Engineers, informed by geotechnical investigation and recommendations by Shannon & Wilson's geotechnical engineers.*

Additionally, wood habitat structures will be installed in channels and on the marsh plain and floodplain throughout the project area. As shown in the details on Sheet C4.1 of the 90% Design Drawings, the wood habitat structures will consist of logs with and without root wads, anchored in place by partial burial and interlocking with other logs. Portions of the logs will be embedded into the ground surface or banks of channels to provide anchoring and stability to resist the uplifting forces of buoyancy and horizontal drag forces of flowing water. Wood habitat structure configurations will be refined in subsequent design phases to fit the specific proposed wood habitat structure locations and configurations.

CONSTRUCTION MATERIALS AND METHODS

- (e) All new construction and substantial improvements shall be constructed with materials and utility equipment resistant to flood damage. [Adopted May 11, 2022 Tillamook County Land Use Ordinance 3.510 (FH) 10.]

Applicant Response: *All new construction will be constructed with materials resistant to flood damage, primarily including concrete and steel. The proposed bridges and drainage structures are designed to accommodate flood waters by conveyance capacity, freeboard/clearance to pass water and debris, and resist buoyancy and drag forces associated with elevated and flowing water. The project does not include any habitable structures. Roadway improvements will be located above the 100-year flood water surface elevation.*

- (f) All new construction and substantial improvements shall be constructed using methods and practices that minimize flood damage.

Applicant Response: *All new construction and improvements will be constructed using methods and practices that minimize flood damage.*

In addition to habitat restoration and fish passage, one of the primary goals and design criteria for the project is to maintain an equivalent or better level of flood protection for private properties and public infrastructure within the project area. The setback dike and tide gate system will provide an equivalent or better level of protection for the town of Tierra Del Mar from tidal water levels and will provide increased drainage capacity to allow flood waters to recede faster than under the existing conditions. The proposed setback dike would be built with a top elevation of 17' NAVD88 to accommodate up to two feet

of long-term settlement of the embankment while still providing approximately 3 feet of freeboard above current 100-year flood water levels and maximum observed tides. The existing Beltz Dike has a low point of 12' NAVD88, so the proposed setback dike will provide an equivalent of better level of flood protection against tidal water levels.

The project will result in equal or lower peak water levels across the project area and will reduce the inundation duration of peak water levels. Raising Sandlake Road and installing a new vehicular bridge at the Reneke Creek crossing will eliminate overtopping that occurs under existing conditions and cause repeated damage to the roadway embankment.

- (6) SPECIFIC STANDARDS FOR A ZONES (A, AE or A1-A30): In all areas of special flood hazards where base flood data has been provided as set forth in Section 3.510(2) or other base flood data are utilized, the following provisions are required.

NONRESIDENTIAL CONSTRUCTION

- (c) New construction and substantial improvement of any commercial, industrial or other nonresidential structure shall have either the lowest floor including basement elevated to three feet above the level of the base flood elevation or higher; or, together with attendant utility and sanitary facilities, shall:
- (1) Be floodproofed so that the portion of the structure that lies below the portion that is three feet or more above the base flood level is watertight with walls substantially impermeable to the passage of water. [Adopted May 11, 2022 Tillamook County Land Use Ordinance 3.510 (FH) 14.]
 - (2) Have structural components capable of resisting hydrostatic and hydrodynamic loads and effects of buoyancy.
 - (3) Be certified by a registered professional engineer or architect that the design and methods of construction are in compliance with accepted standards of practice for meeting provisions of this Subsection based on their development and/or review of the structural design, specifications and plans. Such certifications shall be provided to the Community Development Director.

Applicant Response: *As shown in Figure 8, FEMA Flood Hazard Area Map, much of the project area (excluding the work proposed on Reneke Creek east of Sandlake Road) is located within FEMA's AE Special Flood Hazard Area (Figure 8). This zone represents areas that have a 1% annual change of flooding – also known as the 100-year floodplain.*

As previously described, the new project elements include the 140-foot-span pedestrian bridge over the dike breach, a new 49-foot span vehicular bridge on Sandlake Road over Reneke Creek (within County road ROW, not within the FEMA AE zone), and a new earthen setback dike with a concrete tide gate/box culvert structure. All of these structures will be constructed with flood resistant materials and methods to withstand flooding. The pedestrian bridge will include pile-supported foundation systems with steel piles driven 60-70 feet below the ground surface to provide support and stability. The portions of the concrete abutments that will be below the Base Flood Elevation of 11.8' NAVD88 will be designed to withstand elevated and flowing water forces. The bridge structure will be elevated three feet above the base flood

elevation, over an opening sufficiently sized to convey water and pass debris during peak flood conditions. The concrete tide gate structure will be buried within the setback dike's earthen embankment and will be designed and constructed specifically function as drainage and conveyance during typical and peak flood conditions. All structures will be designed and constructed to be capable of resisting hydrostatic and hydrodynamic loads and effects of buoyancy

The project does not include any habitable structures or buildings with floors. No new utilities or sanitary facilities are proposed as part of the project.

(14) DEVELOPMENT PERMIT PROCEDURES:

- (a) Application for a development permit shall be made on forms furnished by the Community Development Director and shall include but not necessarily be limited to: plans in duplicate drawn to scale showing the nature, location, dimensions, and elevations of the area in question, existing or proposed structures, fill, storage of materials, drainage facilities, and the location of the foregoing. Specifically, the following information in 3.510(14)(a)(1)– (4) is required and Development Permits required under this Section are subject to the Review Criteria put forth in Section 3.510(14)(b):
 - (1) Elevation in relation to mean sea level of the lowest floor, including basement, of all structures as documented on an Elevation Certificate;
 - (2) Elevation in relation to mean sea level to which any proposed structure will be floodproofed as documented on an Elevation Certificate;
 - (3) If applicable, certification by a registered professional engineer or architect that the floodproofing methods for any nonresidential structure meet the floodproofing criteria in Subsection (6)(c)(3) of this Section; and
 - (4) Description of the extent to which any watercourse will be altered or relocated as a result of proposed development.

Applicant Response: *As previously described, the new project elements include the pedestrian bridge, culvert replacement, new setback dike with a concrete tide gate (and two 36" backup tide gates) , and log habitat structures. The project does not include any buildings or structures with floors or basements.*

The pedestrian bridge will have a low-chord elevation of 15.0' NAVD88, more than three feet above the Base Flood Elevation of 11.8'. The pedestrian bridge walkway will have an elevation of approximately 18 feet, depending on the final details and superstructure depth of the prefabricated bridge truss and decking. The pedestrian bridge's concrete abutments will have a top elevation of 17' and extend down to approximately 8', and the steel pipe piles will extend approximately 70 feet below the elevation of the abutments (to be determined based on required resistance at the time of pile driving). The bridge foundation that will be within reach of peak flood levels will be designed to withstand flood conditions.

The Reneke Creek vehicular bridge will have a low-chord elevation of 14.75', with a roadway surface elevation of 18' and a 3.25' deep bridge deck. This elevation provides approximately 3 feet of freeboard under peak flood levels and the Base Flood Elevation. The bridge's concrete abutments will have a top elevation of 14.75' and extend down to an elevation of 7', and the steel piles will extend approximately 65

feet below the elevation of the abutments (to be determined based on required resistance at the time of pile driving). The bridge foundation that will be within reach of peak flood levels will be designed to withstand flood conditions. The bridge deck will be above peak water levels but will also be designed to withstand submergence and overtopping if that condition were to occur. Riprap will be installed on the banks of the channel beneath the bridge to provide additional protection for the bridge abutments and piles.

The concrete tide gate structure and box culvert will have a bottom invert elevation of .0', slightly deeper than the existing channel invert elevation in the vicinity of the proposed structure. The 8'x10' tide gate opening will have a top elevation of 12', providing minimum freeboard during peak water levels at the Base Flood Elevation. The inside of the concrete box culvert will have an additional 2 feet of vertical clearance inside with a crown elevation of 14', with headwalls extending upward to approximately 17' at the top of the setback dike embankment. The tide gate structure will have sheet pile cutoff walls embedded below ground to an elevation of approximately -16'. This tide gate structure and box culvert are specifically designed to withstand inundation and convey water in both directions during typical conditions and peak flood conditions. The materials used to construct the tide gate structure are flood resistant, including concrete, steel, aggregate, synthetic geogrids, and aluminum tide gate system elements. In addition to the main tide gate structure, a pair of 36-inch diameter culverts with tide gates will be constructed through the setback dike to provide backup drainage capacity in the event that the main tide gate structure were to be blocked. These backup culverts would have invert elevations of 10.5' and the upstream end and 9.5' at the downstream end to function as overflow culverts if water levels behind the setback dike rose to these elevations.

The project will alter three watercourses including Reneke Creek, Beltz Creek, and No Name Creek (north of Sandlake Road crossing). All three watercourse alterations are designed to increase the conveyance capacity. The proposed dike breach will significantly increase the conveyance capacity and connectivity between Sand Lake and the majority of Beltz Marsh. The setback dike and associated tide gate drainage structure are designed to prevent peak tide water levels from reaching the south end of Beltz Marsh and Tierra Del Mar, while providing sufficient stormwater flood storage capacity to fully contain stormwater runoff from the upstream contributing drainage basins, and the box culvert is sized with conveyance capacity to rapidly drain accumulated stormwater when tides recede. This system will result in equal or lower water peak water levels upstream of the setback dike. OPRD will be responsible for monitoring and maintaining the pedestrian bridge, setback dike, and tide gate structure, including removing blockages if necessary to maintain conveyance capacity.

Reneke Creek will be altered by realigning the creek away from the roadside ditch it currently occupies, to flow through the historic flow channels in the forested wetland and more effectively convey flows to the low point in the landscape where Reneke Creek currently crosses Sandlake Road. The existing 24" diameter culvert is undersized and the low point in the roadway frequently overtops during flood events. The undersized culvert will be replaced with a 49-foot-span bridge and the roadway will be raised two feet to provide drastically increased conveyance capacity for water and debris. Tillamook County Public Works will be responsible for monitoring and maintaining the Reneke Creek bridge and removing blockages if necessary to maintain conveyance.

Beltz Creek will be altered by replacing the undersized 24-inch diameter culvert at Sandlake Road with a new 45-foot span bridge, significantly increasing the conveyance capacity at this road/stream crossing. The creek channel at the upstream end of the bridge will be realigned slightly, approximately 10 feet to the north to reduce the skew to the roadway. The roadway profile and embankment cross section will be maintained in this location. The roadway is elevated well above the stream channel in this location, and the new bridge would have approximately 10 feet of freeboard above 100-year stream flow water levels.

(b) Development Permit Review Criteria

(1) The fill is not within a Coastal High Hazard Area.

Applicant Response: *The project includes fill placement and removal of fill from areas within Zone AE (100-year floodplain). The most significant fill is the proposed setback dike which is necessary to facilitate breaching the existing Beltz Dike while providing an equivalent or better level of flood protection for the community of Tierra Del Mar, private properties, and public infrastructure within the project area. The fill is not located within a Coastal High Hazard Area.*

(2) Fill placed within the Regulatory Floodway shall not result in any increase in flood levels during the occurrence of the base flood discharge.

Applicant Response: *The fill and project are not within a Regulatory Floodway and also will not result in any increase in flood levels during the occurrence of the base flood discharge.*

(3) The fill is necessary for an approved use on the property.

Applicant Response: *The fill is necessary to achieve the project goals and meet design criteria for infrastructure improvement, flood protection, and habitat restoration. The setback dike is necessary to provide continued and improved flood protection for Tierra Del Mar while breaching the existing dike. As demonstrated through extensive and detailed hydrologic analysis and hydrodynamic modeling, the project's combined improvements for increasing conveyance capacity and providing adequate storage capacity to contain stormwater runoff will result in improved conditions during flood conditions compared to the existing conditions.*

(4) The fill is the minimum amount necessary to achieve the approved use.

Applicant Response: *The fill is the minimum amount necessary to achieve the approved use. The fill volumes are designed to provide adequate height of the setback dike and elevation of new bridges, including stable side slopes for longevity. Using less fill could result in steeper and less stable side slopes on the setback dike, or lower elevations of the proposed bridges. Fill used to fill linear drainage ditches will generally be comprised of fill materials excavated when creating new, more naturally sinuous channels to recreate conditions that likely existed prior to diking and draining the land.*

(5) No feasible alternative upland locations exist on the property.

Applicant Response: *No feasible alternative upland locations exist on the property. The location of the proposed setback dike was optimized during design to meet the project goals and minimize impacts within the wetland. No alternative that did not include fill within the wetland and floodplain were acceptable to project stakeholders or sufficient to meet the project's multiple goals and design criteria.*

- (6) The fill does not impede or alter drainage or the flow of floodwaters.

Applicant Response: *The fill does not impede or alter drainage or the flow of floodwaters. While the setback dike is oriented across and perpendicular to the flow direction of water draining towards Sand Lake, the setback dike location was designed and modeled to provide sufficient storage of stormwater runoff from the contributing drainage basins without increasing peak water levels. The associated drainage structure is designed with adequate conveyance capacity to rapidly drain accumulated stormwater when outboard tide levels recede. The hydraulic modeling demonstrates that the proposed setback dike and tide gate drainage structure will provide a significant improvement in managing flooding and increasing drainage in the area compared to the existing conditions.*

In other locations where fill is being placed, the fill does not impede flow or reduce conveyance capacity. Where old drainage ditches are being filled, parallel channels are being excavated to replicate natural tidal channels that likely once occupied these areas prior to ditching and draining the land. Where portions of the Reneke Creek channel and roadside drainage ditch are being filled, the creek is being realigned into newly excavated channels and broad floodplain areas that will provide equivalent conveyance capacity for creek flows. Fill placement for raising Sandlake Road in the vicinity of Reneke Creek will not impede flows due to the much larger hydraulic opening beneath the proposed 49-foot-span bridge compared to the 24" diameter culvert that currently conveys flows across Sandlake Road that overtops the roadway frequently.

- (7) If the proposal is for a new critical facility, no feasible alternative site is available.

Applicant Response: No elements of the project meet the definition for "critical facility" found in TCLUO Article 11.

- (8) For creation of new, and modification of, Flood Refuge Platforms, the following apply, in addition to (14)(a)(1-4) and (b)(1-5):
- i. The fill is not within a floodway, wetland, riparian area or other sensitive area regulated by the Tillamook County Land Use Ordinance.
 - ii. The property is actively used for livestock and/or farm purposes, Adopted May 11, 2022 Tillamook County Land Use Ordinance 3.510 (FH) 22
 - iii. Maximum platform size = 10 sq ft of platform surface per acre of pasture in use, or 30 sq ft per animal, with a 10-ft wide buffer around the outside of the platform,
 - iv. Platform surface shall be at least 1 ft above base flood elevation,
 - v. Slope of fill shall be no steeper than 1.5 horizontal to 1 vertical,
 - vi. Slope shall be constructed and/or fenced in a manner so as to prevent and avoid erosion.

Applicant Response: *Not applicable.*

3.100 ESTUARY ZONES

- (1) GENERAL USE PRIORITIES AND AREAS INCLUDED: General priorities, from highest to lowest, for uses within all ESTUARY ZONES shall be:
- (a) Uses which maintain the integrity of the estuarine ecosystem.
 - (b) Water-dependent uses requiring an estuarine location, as consistent with the overall Oregon Estuarine Classification.
 - (c) Water-related uses which do not degrade or reduce the natural estuarine resources and values.
 - (d) Non-dependent, non-related uses which do not alter, reduce or degrade the estuarine resources and values.

Applicant Response: *The active restoration project is in alignment with the general use priority to maintain the integrity and enhance the functionality of the estuarine ecosystem. The primary goal of the project is to restore natural estuarine processes to the majority of Beltz Marsh for the purpose of estuarine ecosystem benefits. This is described in further detail in the findings for the EN Zone below under TCLUO Section 3.102.*

- (2) USES PERMITTED OUTRIGHT (P): The following uses are permitted outright within all ESTUARY ZONES:
- (b) Dike maintenance and repair for:
 - (1) Existing serviceable dikes (including those that allow some seasonal inundation;
 - (2) Dikes that have been damaged by flooding, erosion or tidegate failure where the property has not reverted to estuarine habitat; and Adopted May 27, 2015 Tillamook County Land Use Ordinance Article 3.100 2; and
 - (3) Dikes that have been damaged by flooding, erosion or tidegate failure where the property has reverted to estuarine habitat only if the property is in the Farm, F-1 zone and it has been in agricultural use for 3 of the last 5 years and reversion to estuarine habitat has not occurred more than 5 years prior. Tillamook County will rely on the U.S. Army Corps of Engineers and the Division of State Lands to determine whether an area has reverted to estuarine habitat. For the purpose of this Subsection, agricultural use means using the area for pasture several months of the year or harvesting this area once a year.
 - (c) Low-intensity, water-dependent recreation, including but not limited to fishing, crabbing, clamming, wildlife observation, swimming and hunting.
 - (f) Fencing, provided that it is not placed across publicly-owned intertidal areas so as to restrict public access to, or recreational boating access across said lands and intertidal areas.

Applicant Response: *As outlined in Section 3 Rezone, above, portions of Taxlots 3S10310000400 and 4S10060000300 that will become tidally influenced by the active restoration project will be rezoned to the EN Zone concurrently with the submittal of the Estuary Floodplain Development Permit. Several*

elements of the active restoration are permitted in all estuary zones; however, EN Zone specific standards are outlined under TCLUO Section 3.102 below.

SECTION 3.102: ESTUARY NATURAL ZONE (EN)

- (1) **PURPOSE AND AREAS INCLUDED:** The purpose of the EN Zone is to provide for preservation and protection of significant fish and wildlife habitats and other areas which make an essential contribution to estuarine productivity or fulfill scientific, research or educational needs.

Except where a goal exception has been taken in the Tillamook County Comprehensive Plan, the EN Zone includes the following areas:

- (a) **Development and Conservation Estuaries:** Major tracts of tidal marsh, intertidal flats and seagrass and algae beds. The "major tract" determination is made through a consideration of all of the following four criteria: Size; habitat value; scarcity and degree of alteration.
 - (b) **Natural Estuaries:** The EN Zone includes all estuarine waters, intertidal areas, submerged or submersible lands and tidal wetland areas.
- (2) **USES PERMITTED WITH STANDARDS:** The following uses are permitted subject to the procedures of Section 3.120 and the standards in Section 3.140.
- (a) Maintenance and repair of existing structures or facilities involving a regulated activity.
 - (d) Tidegate installation in existing functional dikes.
 - (g) Bridge crossings and crossing support structures.

Applicant Response: *Although the project involves the installation of a new pedestrian bridge over the breached area of the existing Beltz Dike, the project is considered an active restoration project, and thus falls under TCLUO 3.102(3) Uses Permitted Conditionally, below.*

- (3) **USES PERMITTED CONDITIONALLY:** The following uses may be permitted subject to the procedures of Section 3.120 and Article 6 and the standards in Section 3.140.
- (e) Active restorations and estuarine enhancement.

Applicant Response: *The active restoration project is conditionally permitted in the EN Zone. A Type III Conditional Use Permit has been submitted in conjunction with the Floodplain Development Permit. As outlined under Section 1.2 of this document, the proposed elements of the active restoration project include the following:*

- *Excavating a 140-foot-wide breach opening through the existing Beltz Dike to reconnect Beltz Marsh to tidal processes in Sand Lake, located to connect historical tidal channel alignments and minimize tree removal.*
- *Constructing a 140-foot-span pedestrian bridge over the dike breach to maintain recreational access along the Beltz Dike Trail to the rest of the SSSNA trail network.*

- *Constructing an earthen setback dike embankment near the south end of Beltz Marsh located approximately 50 feet north/downstream of the existing primary beaver dam to:*
 - *Prevent high tide water levels from reaching Tierra Del Mar.*
 - *Provide sufficient storage volume upstream/south of the setback dike to contain stormwater runoff without increasing water levels in Tierra Del Mar.*
 - *Maintain the existing beaver dam/lodge complex and freshwater habitat at the south end of Beltz Marsh to minimize potential beaver conflicts at the setback dike and associated tide gate structure.*
- *Filling linear drainage ditches and excavating new sinuous tidal channels in the marsh.*
- *Installing large wood/log structures in channels and on the marsh plain for habitat complexity.*
- *Replacing the undersized culvert at Reneke Creek/Sandlake Road for improved fish passage including:*
 - *Constructing a new 49-foot-span vehicular bridge in the location of the undersized culvert*
 - *Raising approximately 650 feet of roadway to provide freeboard beneath the new bridge and reduce roadway overtopping.*
 - *Realigning the Reneke Creek channel to move the creek out of the roadside ditch and restore a historical channel flow path and alluvial fan/forested floodplain area.*

(4) REGULATED ACTIVITIES: The following Regulated Activities are permitted subject to the procedure of Section 3.120 and the standards of Section 3.140.

(a) Regulated activities for the purpose of on-site maintenance and repair of existing structures or facilities, limited to:

(1) Dredging for on-site maintenance of:

- a. Drainage tiles.
- b. Drainage ditches.
- c. Tidegates.
- d. Bridge crossing support structures.
- g. Outfills.

(2) Fill or riprap for on-site maintenance of:

- a. Dikes.
- b. Bridge crossing support structures or other land transportation facilities.

(b) Riprap for structural shoreline stabilization or protection of utility lines allowed by this zone.

(c) Piling installation for:

(4) Bridge crossing support structures.

(d) Dredging for installation of:

~~(4) Tidegates in existing functional dikes adjacent to EN zones.~~

(e) Regulated Activities in conjunction with an approved Active Restoration Estuarine Enhancement project.

(f) Regulated activities in conjunction with temporary alterations.

~~(g) Fill for installation of public boat ramps or bridge crossing support structures.~~

Applicant Response: *The active restoration project involves multiple regulated activities and are described in further detail under TCLUO Section 3.120 below.*

The project includes excavation within waters that may be considered dredging, including excavating new tidal channels and stream channels for the purposes of habitat improvement, connecting conveyance channels through proposed drainage structures and bridge openings. The project will fill segments of drainage ditches and excavate parallel channels with more natural planform.

The project will include installation of new riprap for the purposes of protecting proposed bridge abutments and the area around the proposed tide gate structure at the setback dike. The riprap is designed for stability under the anticipated hydraulic conditions and portions of riprap within active channel areas will be covered up with natural sediment and streambed materials to reduce the impact of using angular rock in these locations.

Piles will be installed in conjunction with bridge foundations (pile-supported concrete abutments), but all piles will be completely buried under ground or embedded in concrete. No above ground or in-water pilings or dolphins are proposed as part of the project.

SECTION 3.120: REVIEW OF REGULATED ACTIVITIES

(2) REGULATED ACTIVITIES: Regulated activities are those actions which require State and/or Federal permits and include the following:

(a) Fill (either fill in excess of 50 c.y. or fill of less than 50 c.y., which requires a Section 10 or Section 404 permit from the U.S. Army Corps of Engineers).

(b) Dredging (either dredging in excess of 50 c.y. within a 12 month period, or dredging of less than 50 coy, which requires a Section 10 permit from the U.S. Army Corps of Engineers).

(c) Dredged material disposal including flow lane disposal.

(d) Piling/dolphin installation.

(e) Shoreline stabilization, bank line or streamline alteration involving fill or dredging in excess of 50 c.y.

(f) In-water lot storage.

Applicant Response: *The project will include fill in excess of 50 cubic yards (CY) and more than 50 CY of excavation within waters (dredging). The project will obtain a Section 404 Permit for these fills and cuts.*

The project will include approximately 40,000 CY of fill within wetlands to construct the setback dike, fill linear drainage ditches, reconstruct the dike where the existing drainage culvert is removed. Additional materials including logs for habitat structures (approximately 3,000 CY of logs), riprap (approx. 800 CY of riprap), and concrete (approximately 250 CY of concrete) will be placed within wetlands. Additional fill outside of wetlands and above inundation levels include gravel roadway surfacing, road base aggregate and pavement, and bridge elements.

The project will include approximately 30,000 CY of excavation including tidal channel excavation, dike breaching, creek channel realignment, and excavation to construct the pedestrian bridge, vehicular bridge, and tide gate structure.

The project will include riprap placement for stabilization of banks in the immediate vicinity of the proposed pedestrian bridge, Reneke Creek/Sandlake Rd vehicular bridge, and the proposed tide gate structure at the setback dike. Approximately 800 CY of riprap will be installed in these three locations combined. Wood habitat structures (logs) will also be installed in several locations to stabilize banks of channels and provide fish habitat. In all other areas, disturbed soils and slopes will be stabilized using vegetation.

- (3) **PROCEDURE FOR REVIEWING REGULATED ACTIVITIES:** Review of State and Federal permit notices are an administrative function of the Planning Department. Regulated activities and any associated use or uses as a whole shall be reviewed according to the requirements of the zone(s) in which the proposed uses and activities are to be located (Section 3.100 to 3.110), standards relevant to the proposed uses and activities (Section 3.140), an impact assessment (Section 3.120 (6)), requirements for degradations or reductions of estuarine natural values where applicable (Section 3.120 (7)) and comments from State and Federal agencies having responsibility for permit review (Section 3.120 (8)). Based on this review, the Department will decide whether the proposed uses and activities comply with this Ordinance and will forward this decision to the appropriate permitting agencies and the permit applicant prior to the final date set for comments. Decisions of the Planning Department or Planning Commission may be appealed (Section 3.120 (9)).
- (4) **ZONE REQUIREMENTS:** Uses and activities shall be allowed only if they are allowed in the zones in which they are to be located. Accessory uses proposed for adjacent upland areas must be allowed in the upland zones in which they are to be located as well as the SHORELANDS OVERLAY ZONE (Section 3.090). Uses that are permitted with standards must comply with the standards of Section 3.140. Uses listed as Conditional Uses shall be reviewed according to the procedures of Article 6 and the standards of Section 3.140. If a Tillamook County Land Use Ordinance 3.120 2 Conditional Use review is required, the Planning Department shall notify the applicant and State and Federal permitting agencies and shall request an extension of the comment period.
- (5) **IMPACT ASSESSMENTS:** The Planning Department shall, with the assistance of affected State and Federal agencies, develop impact assessments for regulated activities. Federal Environmental Impact

Statements or Assessments may be substituted if made available to the Planning Department. The following considerations must be addressed in the impact assessment.

- (a) The type and extent of alterations expected.
 - (b) The type of resource(s) affected including, but not limited to aquatic life and habitats, riparian vegetation, water quality and hydraulic characteristics.
 - (c) The expected extent of impacts of the proposed alteration on water quality and other physical characteristics of the estuary, living resources, recreation and aesthetic use, navigation and other existing and potential uses of the estuary.
 - (d) The methods which could be employed to avoid or minimize adverse impacts.
- (6) REQUIREMENTS FOR RESOURCE CAPABILITY DETERMINATIONS: Uses and activities for which a resource capability determination is required by Section 3.140, shall be allowed only if they are found to be consistent with the resource capabilities of the management unit(s) and the purposes of the zone(s) in which they are to be located. An activity will be found to be consistent with the resource capabilities of a management unit (as described in Section 2 of the Estuarine Resources Element of the Tillamook County Comprehensive Plan) when either (1) the impacts of the use on estuarine species, habitats, biological productivity and water quality are not significant or; (2) that the resources of the area are able to assimilate the use and activity and their effects and continue to function in a manner consistent with the purposes of the zone. The resource capability determination shall be based on information generated by the impact assessment.
- (7) SIGNIFICANT DEGRADATIONS OR REDUCTIONS OF ESTUARINE NATURAL VALUES:
- (a) Definition: Significant degradations or reductions of estuarine natural values include dredging, fill, and other activities which will cause significant off site impacts as determined by the impact assessment (Section 3.120 (5)).
 - (b) Requirements: Dredging and fill must comply with the standards in Section 3.140 (Subsections (5) and (7) respectively). Other reductions and degradations of estuarine natural values shall be allowed only if:
 - (1) A need (i.e. a substantial public benefit) is demonstrated and the use or Tillamook County Land Use Ordinance 3.120 3 alteration does not unreasonably interfere with public trust rights; and
 - (2) No feasible alternative upland locations exist; and
 - (3) Adverse impacts are minimized as much as feasible.

Applicant Response: *As described in previous findings, the proposed active restoration project is specific to the Beltz Marsh, SLE, and the three creeks that drain into the SLE: Reneke, Beltz, and No Name creeks – all located within the SSSNA. No upland alternative locations exist. Further, there is a need with substantial public benefit for the proposed active restoration project. Reconnecting the Beltz Marsh and SLE; installing a new setback dike, culvert, and tide gate; and realigning Reneke and No Name creeks will maintain equivalent or better flood protection and drainage for the Tierra Del Mar community south of the project area, along with the flooding along Sandlake Road; an important road*

permitting evacuation during major storm events. As described previously, the project will submit for and obtain all required state and federal regulatory permits prior to commencing work.

SECTION 3.140: ESTUARY DEVELOPMENT STANDARDS

- (2) DIKING: Siting, design, construction, maintenance or expansion of dikes in estuary zones, shall be subject to the following standards:
- (a) Diking policy requirements in the Tillamook County Comprehensive Plan shall be met.
 - (b) Proposals for new dike construction or dike maintenance or repair shall be accompanied by a brief statement from the local Soil and Water Conservation Service or a certified engineer stating that:
 - (1) The project is in conformance with good engineering practices and any applicable rules and regulations set forth by the Oregon Division of State Lands and the U.S. Army Corps of Engineers.

Applicant Response: *The new setback dike is being designed by Hunter White, PE (civil and water resources engineer with ESA) in conjunction with geotechnical engineers with Shannon & Wilson. The setback dike is being designed in accordance with US Army Corps of Engineers Engineering Manual EM 1110-2-1913 – Engineering and Design – Design and Construction of Levees.*

- (2) Provides for suitable erosion protection for the dike face.

Applicant Response: *The outboard dike face will have a gentle side slope no steeper than 5H:1V, and the inboard dike face will have a side slope of no steeper than 3H:1V. The toes of the setback dike embankment will be at an elevation of approximately 8 feet NAVD88, well above the elevation where vegetation can be adequately established to stabilize the side slopes of the embankment. Riprap will be installed in the immediate vicinity of the proposed tide gate structure to stabilize the area around the structure and maintain a vegetation free zone for inspection, monitoring, and maintenance of the system. Dense herbaceous vegetation will be used on the setback dike side slopes and a clear zone will be maintained within 10 horizontal feet of the top of the dike's gravel access road. Shrub planting will be allowed outside of the clear zone and tide gate structure vicinity. No trees will be planted on the setback dike side slopes to prevent mature trees from falling over and creating holes or instabilities in the side slopes.*

- (3) Will produce no appreciable flood and erosion potential upstream or downstream of the proposed project. 12/18/2002 Tillamook County Land Use Ordinance 3.140 3.

Applicant Response: *The project will produce no appreciable flood and erosion potential upstream or downstream of the proposed project As described in the No-Rise Certification (ESA, 2025) and Sitka Sedge Tidal Wetland Hydraulic Analysis (ESA, 2024), the project will not cause a rise in peak water surface elevations or an increase in the Base Flood Elevation. The setback dike location and sizing of the proposed tide gate structure are designed to result in equal or lower peak water levels behind the setback dike compared to existing conditions, and the combination of improvements will improve drainage efficiency and conveyance capacity across the project area.*

- (c) When temporary dikes are constructed in intertidal areas or tidal wetlands, notice must be given to the D. S. L. within 24 hours following the start of such activity and their approval for continuation of the project must be obtained (ORS 541.615)

Applicant Response: *No temporary dikes are proposed for this project.*

- (4) Intertidal areas and tidal wetlands shall be restored by the sponsor of the dike to predike conditions after the removal of temporary dikes.
- (d) Fill, shoreline stabilization or other activities in conjunction with dike construction, maintenance or repair shall be subject to the respective standards for these activities.
- (e) Repair and maintenance of existing dikes, and construction of new dikes involving fill in intertidal areas and tidal wetlands are subject to the requirements of the State Fill and Removal Law (ORS 541.605 - 541.665) and the Clean Water Act of 1977 (P.L. 95217). (Applies to fill only).

Applicant Response: *The project includes construction of a new setback dike, excavation to breach an existing dike (Beltz Dike), and construction of a new pedestrian bridge spanning over the dike breach. While the Beltz Dike will no longer function as a flood control structure, the dike embankment will remain in place to maintain the dike-top trail and recreational access to the trail network to the west. The existing dike will be repaired in two locations, including reconstructing the embankment where the existing drainage culvert will be removed, and raising a low point in the dike/trail at the western end of the dike.*

The existing dike will also be used for construction access to excavate the dike breach and build the pedestrian bridge. In order to assemble and install the 140-foot-span pedestrian bridge, including pile driving and abutment construction, the existing dike will require improvements and accommodations including widening the access road/trail, removing existing trees on the dike side slopes, widening narrow portions of the dike embankment to accommodate vehicular loadings of construction equipment, and constructing temporary fill pads and access ramps/roads along the existing dike in the vicinity of the pedestrian bridge.

Construction of the project elements within the marsh and Sand Lake will also require temporary water management measures including temporary berms, sheet pile and/or sandbag coffer dams, dewatering systems, and sediment/turbidity control measures.

At the end of construction when the pedestrian bridge, dike breach, and channel excavation is complete, the site including intertidal areas and tidal wetlands will be restored to preconstruction conditions or better by removing temporary fill and access features, decompacting soil surfaces, and revegetating disturbed areas with native plant communities as shown in the 90% Design Drawings and described in the project specifications.

All work in intertidal areas and tidal wetlands will be conducted in accordance with regulations and permit conditions, and the project is obtaining Section 404 and Section 401 permits with Oregon Department of State Lands, Oregon Department of Environmental Quality, and US Army Corps of Engineers.

(5) DREDGING IN ESTUARINE WATERS, INTERTIDAL AREAS AND TIDAL

WETLANDS: These standards shall apply only to dredging in excess of 50 c.y. within a 12-month period or dredging of 50 c.y. or less which requires a Section 10 permit from the U.S. Army Corps of Engineers.

- (a) When dredging in estuarine waters, intertidal areas or tidal wetlands is proposed, evidence shall be provided by the applicant and findings made by the County that:
 - (1) The dredging is necessary for navigation or other water dependent uses that require an estuarine location, or is specifically allowed by the management unit or zone; and,
 - (2) A need (i.e. a substantial public benefit) is demonstrated and the use or alteration does not unreasonably interfere with public trust rights;
 - (3) If no feasible alternative upland locations exist; and,
 - (4) If adverse impacts are minimized.

Applicant Response: *The project will include more than 50 CY of excavation within waters and wetlands (dredging). The project will include approximately 30,000 CY of excavation including tidal channel excavation, dike breaching, creek channel realignment, and excavation to construct the pedestrian bridge, vehicular bridge, and tide gate structure. The channel excavation is necessary for connecting drainage and conveyance channels to the proposed dike breach, tide gate structure at the setback dike, and the Reneke Creek/Sandlake Road bridge crossing. The proposed excavated channels are part of a larger drainage, flood protection, fish passage, and estuary restoration design with detailed hydraulic modeling and extensive hydrologic analysis that has been presented to a diverse range of stakeholders to gain broad public support for the project. No feasible alternative upland locations exist that would achieve the project's goals and design criteria, and an extensive alternatives analysis process has been completed to select an alternative that would meet the project goals and minimize adverse impacts.*

- (b) Dredging projects shall meet all requirements of the State Fill and Removal Law (ORS 541.605 - 541.665), Section 10 of the Rivers and Harbors Act of 1899, and other applicable State and Federal laws. These requirements shall be enforced by State and Federal agencies with regulatory authority over dredging projects.

Applicant Response: *The project will obtain a Section 404 Permit and a Section 10 permit from the U.S. Army Corps of Engineers. All channel excavation/dredging will meet the requirements of State Fill and Removal Law, Section 10, and other applicable laws.*

- (c) Existing water quality, quantity and rate of flow shall be maintained or improved. Minimum stream flow requirements shall be maintained. Water Quality policies shall apply.

Applicant Response: *Water quality, quantity, and rate of flow will be maintained or improved through proposed project actions. As demonstrated through hydrologic analysis and hydraulic modeling, the project is designed to improve drainage efficiency and conveyance capacity by replacing undersized drainage structures. The dike breach, tidal channels, and proposed tide gate structure are designed to maintain and improve flushing capacity within the estuary. The Reneke Creek channel beneath the bridge*

is sized to convey flood flows and sediment, and the new bridge and roadway are being raised by 2 feet to provide additional freeboard beneath the bridge to pass water, sediment, and debris.

- (d) Flushing capacity of estuaries shall be maintained. A hydrologic report from a professional registered hydrologist or engineer may be required by the Planning Department to ensure that this standard has been met.

Applicant Response: *The dike breach, tidal channels, and proposed tide gate structure are designed to maintain and improve flushing capacity within the estuary. The proposed excavated channels are part of a larger drainage, flood protection, fish passage, and estuary restoration design with detailed hydraulic modeling and extensive hydrologic analysis. ESA's hydrologic analysis and hydraulic modeling is detailed in the Sitka Sedge Tidal Wetland – Hydraulic Analysis Report (ESA, 2024).*

- (e) Dredging shall be timed in order to minimize the effects of sedimentation and turbidity and to minimize impacts on fish, shellfish, and recreational and commercial fishery activities. The work periods specified in the Oregon Guidelines for Timing of In-Water Work to Protect Fish and Wildlife Resources (ODFW, 2000) shall be followed unless approval of alternative work periods has been obtained from the O.D.F.W.

Applicant Response: *Construction and excavation within waters and wetland will be conducted during the summer's drier conditions, during an approved in-water work window, timed and conducted in a manner to minimize the effects of sedimentation and turbidity and to minimize impacts on fish, shellfish, and fisheries activities. Construction will include temporary water management measures including work area isolation and dewatering, turbidity controls and monitoring, and erosion and sediment control measures. Fish salvage operations will be conducted by qualified biologists in accordance with ODFW fish salvage permits.*

- (f) Evidence shall be provided by the applicant and findings made by the County that projects requiring dredging are sited and designed so that initial and maintenance dredging are minimized.

Applicant Response: *Channels and hydraulic openings at channel/structure crossings are designed and sized to be self-sustaining and minimize the need for maintenance or future dredging. As demonstrated through hydrologic analysis and hydraulic modeling, the project is designed to improve drainage efficiency and conveyance capacity by replacing undersized drainage structures.*

- (g) Dredging proposals shall provide at least a five-year program for disposal of dredged materials. Programs for disposal of dredged material shall be consistent with Dredged Material Disposal standards.

Applicant Response: *Dredged/excavated materials will be reused onsite to fill unnecessary remnant drainage ditches, in the setback dike if suitable, or hauled offsite and disposed lawfully in uplands or in accordance with appropriate permits.*

- (h) Dredging proposals requiring mitigation shall include a mitigation plan consistent with Mitigation Standards.

Applicant Response: *The restoration project is self-mitigating, and therefore, no mitigation plan is required.*

- (j) When dredging for the purpose of on-site maintenance of existing facilities is proposed, evidence shall be presented by the applicant and findings made by the County that:
 - (1) The dredging is necessary to maintain proper operation of the facility.
 - (2) The amount of dredging proposed is confined to the geographic area of the existing facility, and is the minimum amount necessary to fulfill the need.

In cases where dredging or ditching for the purpose of tidegate or land drainage network maintenance is proposed, this findings requirement may be met by a brief statement from the local Soil and Water Conservation Service stating that:

- (1) Dredging or ditching is necessary to maintain proper operation of the tidegate and/or the associated land drainage network behind the dike.
- (2) The amount of dredging or ditching proposed is confined to the geographic area of the tidegate or drainage new work, and is the minimum amount necessary to fulfill the need.

Applicant Response: *The project will include more than 50 CY of excavation within waters and wetlands (dredging). The project will include approximately 30,000 CY of excavation including tidal channel excavation, dike breaching, creek channel realignment, and excavation to construct the pedestrian bridge, vehicular bridge, and tide gate structure. Channel excavation is necessary for connecting drainage and conveyance channels to the proposed dike breach, tide gate structure at the setback dike, and the Reneke Creek/Sandlake Road bridge crossing. The proposed excavated channels are part of a larger drainage, flood protection, fish passage, and estuary restoration design.*

- (k) Excavation to create new water surface area shall be subject to the standards listed above and to the following standards:
 - (1) Provision shall be made for stabilization of new bank lines prior to the connection of the new water body to existing water bodies. Excavation of as much as is practical of the new water body shall be completed before it is connected to existing water bodies.
 - (2) Toxic substances or other pollutants shall not leak into the water as a result of the excavation.
 - (3) Erosion of adjacent shoreland areas and excessive sedimentation and turbidity in adjacent aquatic areas shall be avoided.
 - (4) Excavation shall occur at a time that will minimize its impact on aquatic life.
 - (5) Excavated materials shall not be disposed of in estuarine waters, intertidal areas, or tidal wetlands, except as part of an approved fill project subject to fill standards.

Applicant Response: *The project will include excavation to create new water surface area, including the proposed dike breach, tidal channels, and Reneke Creek realignment. This work will be conducted in accordance with the required standards, including stabilization of new bank lines prior to connection of the new water bodies to existing water bodies. The project construction will implement stream diversion,*

work area isolation, dewatering, and working around tides to achieve these standards. Toxic substances and other pollutants will not be allowed to leak into water through proper handling, fueling, and containment measures. The project will require heavy equipment working within the wetlands to use biodegradable fluids to the extent feasible. Work will be conducted in a manner to avoid erosion of adjacent shoreland areas and excessive sedimentation and turbidity in adjacent aquatic areas. Excavation will occur at a time that will minimize its impact on aquatic life and be performed during an ODFW-approved in-water work window. Disposal or placement of excavated materials in estuarine waters, intertidal areas, or tidal wetlands as described in the project design and approved in the project permits. Such fill placement would include filling existing drainage ditches or placement in the setback dike side slopes if suitable.

- (I) Dredging for the purpose of bankline or stream alteration (i.e. realignment of a stream bank or the entire stream, either within or without its normal high water boundaries) shall be subject to the standards listed above and to following standards:
 - (1) Alignments should make maximum use of natural or existing deep water channels provided that pockets of stagnant water are not created.
 - (2) Erosion of adjacent shoreland areas and excessive sedimentation and turbidity in adjacent aquatic areas shall be avoided.
 - (3) Temporary stabilization (mulching or sodding), sediment basins or other performance equivalent structures may be required at the discretion of the Planning Department.
 - (4) Provision shall be made for stabilization of new banklines. Shoreline Stabilization standards shall apply.
 - (5) Adverse impacts on fish spawning, feeding, migration and transit routes and wildlife habitat shall be evaluated and minimized.

Applicant Response: *The project will include excavation for the purpose of stream alteration including realignment of entire stream channels, including realigning Reneke Creek away from its current alignment in the roadside ditch to flow through newly constructed channels that flow southwest across the broad floodplain area towards the area's low point and the proposed bridge crossing. Portions of the linear drainage ditch network within Beltz Marsh will also be filled and new sinuous channels will be excavated to recreate more natural tidal channels that likely existed in this location prior to ditching and draining the land.*

The Reneke Creek realignment design is intended to restore the natural alluvial fan geomorphic processes to the extent feasible within the available area, and connect into existing channels that are still present within the remnant forested wetland area that has remained intact since prior to 1939 (the earliest available aerial photo). In conjunction with breaching Beltz Dike, a new tidal channel inlet will be constructed that connects to the most prominent historical channel path visible in the 1939 aerial photo which is still present today.

Construction and excavation within waters and wetland will be conducted during the summer's drier conditions, during an approved in-water work window, timed and conducted in a manner to minimize the effects of sedimentation and turbidity and to minimize impacts on fish spawning, feeding, migration and

transit routes and wildlife habitat. Construction will include temporary water management measures including work area isolation and dewatering, turbidity controls and monitoring, and erosion and sediment control measures. Fish salvage operations will be conducted by qualified biologists in accordance with ODFW fish salvage permits.

New shorelines will generally be stabilized through vegetation or large wood habitat structure (logs). In select areas, in the immediate vicinity of the proposed pedestrian bridge, Reneke Creek bridge, and the proposed tide gate structure, riprap will be used to stabilize the banks and protect the structure foundations.

- (m) An impact assessment shall be conducted during local, State and Federal review of permit applications for dredging in estuarine waters, intertidal areas or tidal wetlands. The impact assessment shall follow the procedures outlined in Section 3.020. Identified adverse impacts shall be minimized to be consistent with the resource capabilities and purposes of the area.

Applicant Response: *An impact assessment is being conducted during local, State and Federal review of permit applications for dredging in estuarine waters, intertidal areas or tidal wetlands.*

(7) **FILL IN ESTUARINE WATERS, INTERTIDAL AREAS AND TIDAL WETLANDS:** These standards shall apply only to fill in excess of 50 c.y. or fill of less than 50 c.y. which requires a Section 10 or 404 Permit from the U.S. Army Corps of Engineers.

- (a) When fill in estuarine waters, intertidal areas or tidal wetlands is proposed, evidence shall be provided by the applicant and findings made by the County that:
 - (1) The fill is necessary for navigation or other water dependent uses that require an estuarine location, or is specifically allowed by the management unit or zone; and
 - (2) A need (i.e. a substantial public benefit) is demonstrated and the use or alteration does not unreasonably interfere with public trust rights; and,
 - (3) If no feasible alternative upland locations exist; and,
 - (4) If adverse impacts are minimized.

Applicant Response: *The project will include fill in excess of 50 cubic yards (CY) within waters and wetlands. The project will obtain a Section 404 Permit for the proposed fills.*

The project will include approximately 40,000 CY of fill within wetlands to construct the setback dike, fill linear drainage ditches, reconstruct the dike where the existing drainage culvert is removed. Additional materials including logs for habitat structures (approximately 3,000 CY of logs), riprap (approx. 800 CY of riprap), and concrete (approximately 250 CY of concrete) will be placed within wetlands. Additional fill outside of wetlands and above inundation levels include gravel roadway surfacing, road base aggregate and pavement, and bridge elements.

The fill is necessary to achieve the project goals of restoring estuarine processes to the majority of Beltz Marsh while maintaining flood protection for Tierra Del Mar through construction of the setback dike. Filling the linear drainage ditches, while excavating more natural sinuous tidal channels, is necessary to

restore the site to pre-development conditions to the extent feasible. No feasible alternative upland locations exist that would achieve the project goals, and an extensive alternatives analysis process has been completed to select an alternative that would meet the project goals and minimize adverse impacts.

(b) When fill for the purpose of on-site maintenance of existing facilities is proposed, evidence shall be provided by the applicant and findings made by the County that:

- (1) There are no alternatives to fill to maintain proper operation of the facility.
- (2) The amount of fill proposed is confined to the geographic area of the existing facility, and is the minimum amount necessary to fulfill the need.

Applicant Response: *Fill placed in the location where the existing dike's drainage culvert will be removed is necessary to repair the embankment where significant erosion has occurred so that the embankment can be used for the Beltz Dike Trail into the future. No feasible alternative upland location exists to achieve this goal. The amount of fill proposed is the minimum amount necessary and is confined to the approximate original footprint of the dike to match adjacent side slopes.*

(c) Where existing public access is reduced, suitable access as part of the development project shall be provided.

Applicant Response: *Public access will be maintained through proposed project actions by maintaining Beltz Dike Trail and constructing the pedestrian bridge over the dike breach to maintain recreational access to the rest of the trail network and beach access within the SSSNA.*

(d) The fill shall be placed at a time that will minimize sedimentation and turbidity. The work periods specified in the Oregon Guidelines for Timing of In-Water Work to Protect Fish and Wildlife Resources (ODFW, 1976) shall be followed unless approval of alternative work periods has been obtained from the ODFW.

Applicant Response: *Construction and fill within waters and wetland will be conducted during the summer's drier conditions, during an approved in-water work window, timed and conducted in a manner to minimize the effects of sedimentation and turbidity and to minimize impacts on fish spawning, feeding, migration and transit routes and wildlife habitat. Construction will include temporary water management measures including work area isolation and dewatering, turbidity controls and monitoring, and erosion and sediment control measures. Fish salvage operations will be conducted by qualified biologists in accordance with ODFW fish salvage permits.*

(e) Only non-polluted materials may be used for fill. Materials which would create water quality problems are not permitted.

Applicant Response: *Only non-polluted materials will be used for fill. Fill used for filling drainage ditches will generally be composed of onsite excavated soils from channel excavations. Imported fill for the setback dike will be clean fill meeting the specifications defined by the project's geotechnical engineer and engineer of record.*

- (f) The perimeters of the fill shall be provided with erosion prevention measures, consistent with Shoreline Stabilization standards.

Applicant Response: *The perimeters of fill will be provided with erosion prevention measures, including stabilization through appropriate BMPS and revegetation.*

- (g) Fills shall be placed so that adjacent or nearby property is not adversely impacted by increased erosion, shoaling or flooding produced by changes in littoral drift or other changes in water circulation patterns. An affidavit from a professional registered engineer or hydrologist may impact assessment required in Section 3.120.

Applicant Response: *Fills will be placed so that adjacent and nearby properties are not adversely impacted. Extensive hydrodynamic modeling has been conducted to simulate the existing and proposed conditions to evaluate potential for changes in water levels, circulation patterns, and erosive forces.*

- (h) Fill proposals requiring mitigation shall include a mitigation plan consistent with Mitigation standards.

Applicant Response: *The restoration project is self-mitigating, and therefore, no mitigation plan is required.*

- (i) Fill in estuarine waters, intertidal areas and tidal wetlands shall be subject to the requirements of the State Fill and Removal Law (ORS 541.605 - 541.665), The Rivers and Harbors Act of 1899, the Clean Water Act of 1977 (PL 95-217) and other applicable State and Federal laws. These requirements shall be enforced by State and Federal agencies with regulatory authority over fill projects.

Applicant Response: *The project is being permitted through state and federal agencies to satisfy permitting requirements including State Fill and Removal Law, The Rivers and Harbors Act of 1899, the Clean Water Act of 1977, and other applicable laws. An impact assessment is being conducted during local, State and Federal review of permit applications for dredging in estuarine waters, intertidal areas or tidal wetlands.*

- (j) An impact assessment shall be conducted during the local, State, and Federal review of permit applications for fill in estuarine waters, intertidal areas, or tidal wetlands according to the provisions outlined in Section 3.120. Identified adverse impacts shall be minimized to be consistent with the resource capabilities and purposes of the area.

Applicant Response: *An impact assessment is being conducted during local, State and Federal review of permit applications for dredging in estuarine waters, intertidal areas or tidal wetlands.*

(10) LAND TRANSPORTATION FACILITIES: Siting, design, construction and maintenance of bridges, roads or railroads in estuary zones shall be subject to the following standards:

- (a) Proposals for new County or State highways, or for railroads, shall provide an evaluation of the proposed project on the following:
 - (1) Land use patterns.
 - (2) Energy use.
 - (3) Air and water quality.
 - (4) Estuarine habitat, functions and processes.
 - (5) Existing transportation facilities.
 - (6) Physical and visual access to estuaries and shorelands.
- (b) Evidence shall be provided by the applicant and findings made by the County that the siting, design, construction and maintenance of land transportation facilities will be conducted to avoid mass soil wasting or excessive surface erosion.
- (c) Land transportation facility proposals shall include a rehabilitation plan specifying the method and timing of necessary site rehabilitation. Site rehabilitation plans shall provide for replacement of riparian vegetation.
- (d) Vegetated buffer strips shall be maintained, whenever practicable, along roadways to manage storm drainage runoff.
- (e) When culverts are used in association with bridge crossings, spring line natural bottom culverts are preferred over box culverts.
- (f) All bridge crossings and culverts shall be positioned and maintained to allow fish passage, avoid interference with anadromous fish runs and to prevent any constriction of natural streams which would result in increases in flood or erosion potential. When culverts are used, no fill shall be allowed in streams, rivers or estuaries.
- (g) When new bridge crossing support structures are proposed in Estuary Natural (EN) zones, evidence shall be provided by the applicant and findings made by the County that the proposed use is consistent with the resource capabilities and purposes of the area.
- (i) Dredging, fill, piling/dolphin installation, shoreline stabilization, dredged material disposal or other activities in conjunction with land transportation facilities shall be subject to the respective standards for these activities.

Applicant Response: *The project includes a new roadway bridge where Sandlake Road crosses Reneke Creek. The invert elevation of the existing culvert to be replaced, and proposed channel beneath the new bridge, is approximately 10' NAVD88 within the range of peak tide levels but above MHHW.*

The roadway improvements in the vicinity of the Reneke Creek bridge include raising Sandlake Road's low point by 2 feet and raising approximately 650 linear feet of roadway approaches to provide

freeboard beneath the new bridge and reduce roadway overtopping that occurs under existing conditions. The raised roadway embankment will require widening of the embankment side slopes.

The primary purposes for replacing the undersized culvert with a new bridge is to restore fish passage at the crossing and to increase conveyance capacity at the crossing to pass peak flows and debris without overtopping the roadway and requiring frequent maintenance by Tillamook County Public Works.

The siting, design, construction and future maintenance of the new bridge and roadway improvements will be conducted to avoid mass soil wasting or excessive surface erosion. The new bridge is sited at the low point in the immediate landscape at the location of the existing culvert where Reneke Creek crosses Sandlake Road. Side slopes of the roadway embankment are designed to be stable, and stream flows are being directed away from the roadside drainage ditch and road embankment to flow through a broad floodplain area that is part of the creek's historical alluvial fan floodplain. The proposed bridge crossing is positioned to allow fish passage, avoid interference with anadromous fish runs and to prevent any constriction of natural streams which would result in increases in flood or erosion potential. The new 49-foot span bridge replacing a 24-inch diameter culvert will be a drastic improvement for fish passage and conveyance capacity that will reduce roadway overtopping, roadway flooding, and erosion potential.

Construction of the bridge and roadway improvements will require some impacts to adjacent riparian vegetation. Impacted areas of riparian vegetation will be restored at the end of construction.

(14) **PILING/DOLPHIN INSTALLATION:** Piling/dolphin installation in estuary zones shall be subject to the following standards:

- (a) When piling or dolphin installation is proposed, evidence shall be provided by the applicant and findings made by the County that:
 - (1) The amount of estuarine surface area occupied is the minimum necessary to accomplish the proposed use.
 - (2) The project will not unduly interfere with the normal public use of fishery, recreation or water resources.
 - (3) The proposed project will not adversely impact adjacent or nearby property through increased erosion, shoaling or flooding produced by changes in littoral drift or other changes in water circulation patterns. An affidavit from a professional registered engineer or hydrologist may be required by the Planning Department as a result of the impact assessment required in Section 3.120.
- (b) When new piling or dolphin installation is proposed in Estuary Natural (EN), Estuary Conservation 2 (EC2) or Estuary Conservation 1 (EC1) zones, evidence shall be provided by the applicant and findings made by the County that the project is consistent with the resource capabilities of the area and the purposes of the management area.
- (c) When proposals for new piling or dolphin installation in conjunction with a nonwater-dependent or non-water-related use within Estuary Development (ED) zones are made, evidence shall be presented by the applicant and findings made by the County that the project is consistent with

the maintenance of navigation and other needed public, commercial and industrial water-dependent uses.

- (d) Piling/dolphin replacement and new installation shall meet all applicable U. S. Army Corps of Engineers engineering standards and permit requirements. The U. S. Army Corps of Engineers shall be responsible for determining that these engineering standards and permit requirements have been met.
- (e) An impact assessment shall be conducted during local, State and Federal review of permit applications for piling/dolphin installation. The impact assessment shall follow the procedure outlined in Section 3.120. Identified adverse impacts shall be minimized to be consistent with the resource capabilities and purposes of the area.

Applicant Response: *The project will include pile installation for the pile-supported bridge abutments of the proposed pedestrian bridge and the Reneke Creek vehicular bridge. All piles driven for the project will be below ground and embedded in concrete pile caps/abutments. No above ground pilings or dolphins are proposed as part of the project. These code sections are not applicable.*

(15) RESTORATION AND ENHANCEMENT: Restoration and enhancement projects in estuary zones, Water-Dependent Development (WDD) shoreland zones or other areas within the Shoreland Overlay zone shall be subject to the following standards:

- (a) Restoration and enhancement policy requirements in the Tillamook County Comprehensive Plan shall be met.

Applicant Response: The project is located within the SH Overlay; therefore, this standard applies. As outlined under 4.4d Sand Lake Estuary of Goal 16 ESTUARINE RESOURCES of the Tillamook County Comprehensive Plan, the Beltz Farm property is not considered a suitable restoration site because “removal of the dike surrounding the Beltz Farm wetland would eliminate the existing freshwater marsh, which is a significant waterfowl habitat.”

The project area, including the SLE and Beltz Marsh, exhibit physical conditions that differ from the descriptive language contained in the 1982 Goal 16 inventory, including sustained tidal influence resulting from documented dike and tide gate failure and the establishment of intertidal marsh vegetation and functions. While Goal 16 inventory language references landowner intent for future agricultural use and characterizes portions of the site as freshwater marsh, those descriptions do not reflect current site conditions. Based on current, site-specific information in the record, Beltz Marsh functions as part of the estuarine system. The proposed reconnection of Beltz Marsh to the Southern Lower Estuary restores and maintains estuarine ecosystem integrity and is therefore consistent with the purpose and intent of Goal 16 to recognize and protect the environmental, economic, and social values of Tillamook County’s estuaries while allowing appropriate water-dependent uses. Beltz Marsh provides significant waterfowl habitat as an estuary as well as a freshwater marsh. Portions of the freshwater marsh will be preserved as a buffer above the highest measured tideline and south of the setback levee.

- (b) Proposals for restoration projects shall present evidence that:
 - (1) The restored area is a shallow subtidal or an intertidal or tidal marsh area after alteration work is performed; and
 - (2) The restored area may not have been a functioning part of the estuarine system when alteration work begins; and

- (3) The restored area is revitalizing, returning or replacing original attributes and amenities which have been diminished or lost by past alterations, activities or catastrophic events.

Applicant Response: *Based on the Beaches and Dunes Overlay Map (Figure 9) and the National Wetlands Inventory (NWI) (Figure 6), the project area includes young stabilized dune, fluvial estuary deposit, wetland, wet deflation plain, and wet flood plain and in the NWI, the project area is considered estuarine and marine wetland, with freshwater emergent wetland on the eastern and western fringes, and freshwater forested wetland where Reneke Creek crosses Sandlake Road and enters the marsh.. As outlined in Section 2 Comprehensive Plan Amendment, above, the existing Beltz Dike was constructed in the 1930s to separate Beltz Marsh from the adjacent SLE for the purposes of flood protection and agricultural production. The original tidal channels became disconnected due to dike construction and drainage ditches were excavated to drain the land and create pastures. The proposed active restoration project will realign Reneke Creek to restore tidal hydrology, aquatic organism passage, and estuarine habitat conditions in the area known as Beltz Marsh.*

- (c) Estuarine enhancement project proposals shall identify:

- (1) The original conditions to be enhanced.
- (2) The cause of the loss or degradation.
- (3) The location and extent of actions necessary to achieve the enhancement objective.

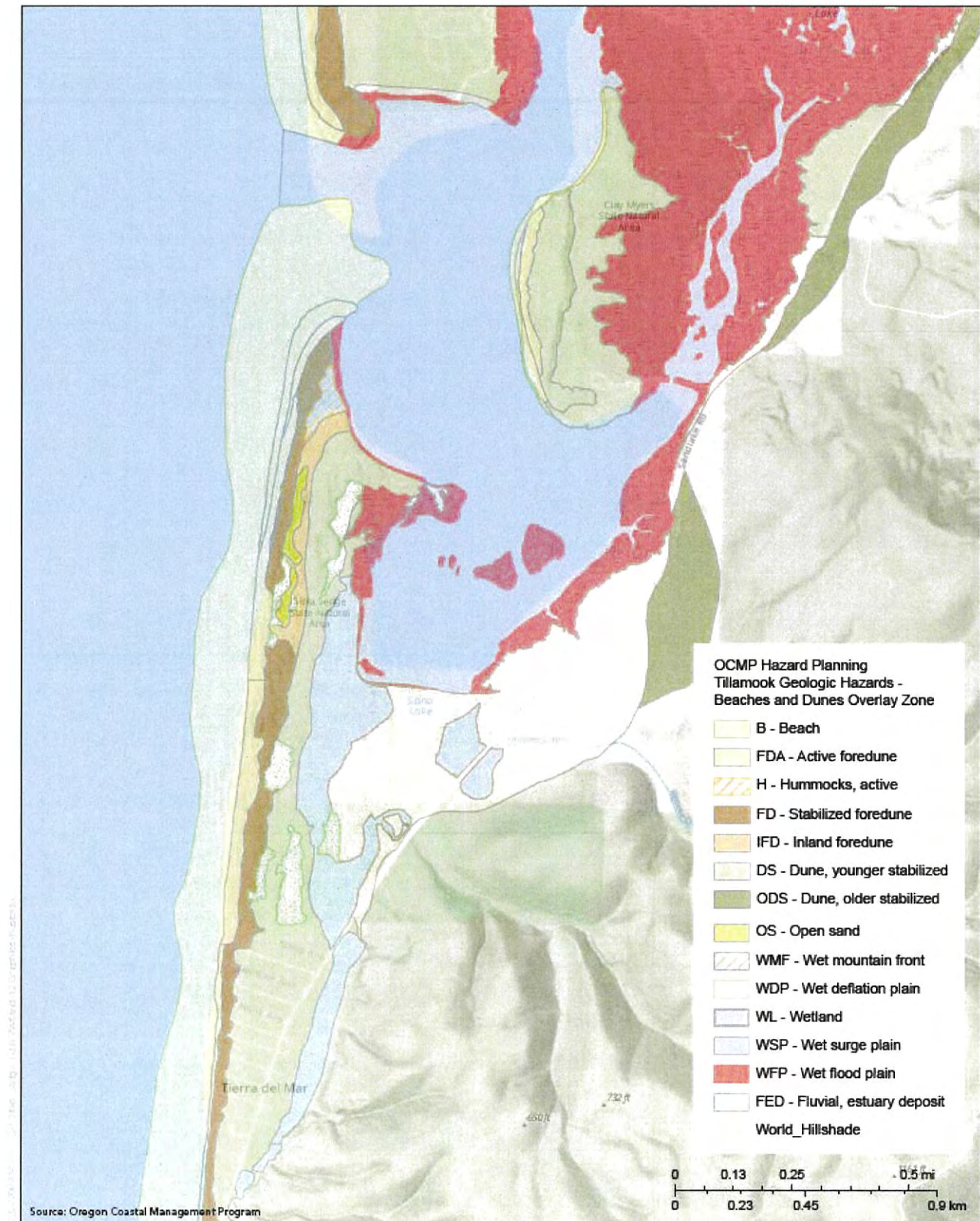
Applicant Response: *As outlined in previous findings, the proposed project area was originally part of the SLE prior to the installation of the Beltz Dike, which cut off the Beltz Marsh property from tidal influence. The project area and extent of actions are the minimum necessary to reconnect the marsh to the SLE in order to restore tidal hydrology.*

- (d) Estuarine enhancement project proposals shall present evidence that the project will result in an overall improvement in the cultural, historic, economic or navigation features of an estuary, which will outweigh any adverse impacts.

Applicant Response: *This criterion was addressed under Chapters 1 and 2, and also within Appendix B: Sitka Sedge Tidal Wetland Restoration Alignment with Comprehensive Plan Goal Review, submitted separately as a supplemental submittal item.*

- (e) When active restoration and enhancement projects are proposed in Estuary Natural (EN) or Estuary Conservation Aquaculture (ECA) zones, evidence shall be provided by the applicant and findings made by the County that the project is consistent with the protection of significant fish and wildlife habitats, biological productivity, and scientific, research and educational needs.

Applicant Response: *This criterion was addressed under Chapters 1 and 2, and also within Appendix B: Sitka Sedge Tidal Wetland Restoration Alignment with Comprehensive Plan Goal Review, submitted separately as a supplemental submittal item.*

Figure 9 Beaches and Dune Overlay Zone Map**Figure 9**
Beaches and Dunes Overlay Map

(17) **SHORELINE STABILIZATION:** Shoreline stabilization projects in estuary zones, Water-Dependent Development (WDD) shoreland zones or other areas within the Shoreland Overlay Zone shall be subject to the following standards:

- (a) Within estuarine waters, intertidal areas and tidal wetlands, and along Water Dependent Development Zones and other shoreland areas, general priorities for shoreline stabilization for erosion control are, from highest to lowest:
 - (1) Proper maintenance of existing riparian vegetation.
 - (2) Planting of riparian vegetation.
 - (3) Vegetated riprap.
 - (4) Non-vegetated riprap.
 - (5) Groins, bulkheads or other structural methods. Shoreline protection proposals shall include justification for the use of a lower priority method over a higher priority method.
- (b) Vegetative shoreline stabilization shall utilize native species, or non-native species approved by the Soil Conservation Service. Reference shall be made to the Inter-Agency Seeding Manual prepared by the Soil Conservation Service.
- (c) When structural shoreline stabilization methods are proposed, evidence shall be presented by the applicant and findings made by the County that:
 - (1) Flooding or erosion is threatening an established use on a subject property or a need (i.e. a substantial public benefit) is demonstrated in conjunction with navigation or a water dependent use, and
 - (2) Land use management practices or nonstructural solutions are inappropriate or will not meet the need, and
 - (3) The proposed structural stabilization method is the minimum size needed to accomplish the desired stabilization, and
 - (4) The proposed project will not restrict existing public access to publicly owned lands or interfere with navigation or the normal public use of fishery, recreation or water resources, and 12/18/2002 Tillamook County Land Use Ordinance 3.140 26
 - (5) The proposed project will not adversely impact adjacent aquatic areas or nearby property through increased erosion, sedimentation, shoaling or flooding produced by changes in littoral drift or other changes in water circulation patterns. An affidavit from a professional registered engineer, hydrologist, or geologist may be required by the Planning Department as a result of the impact assessment required in Section 3.120.
 - (6) A brief statement from the local Soil and Water Conservation Service may serve as evidence that standards (c) (2) and (c) (3) have been met.

Applicant Response: *The project will include stabilization of existing and created shorelines, primarily for the purposes of protecting infrastructure and minimizing erosion that would contribute sediment to adjacent waters.*

In general, proposed excavated channels will be stabilized with vegetation of native species. The project will include riprap placement for stabilization of banks in the immediate vicinity of the proposed pedestrian bridge, Reneke Creek/Sandlake Rd vehicular bridge, and the proposed tide gate structure at the setback dike. Approximately 800 CY of riprap will be installed in these three locations combined. Wood habitat structures (logs) will also be installed in several locations to stabilize banks of channels and provide fish habitat. In all other areas, disturbed soils and slopes will be stabilized using vegetation with native plant species.

In the three locations where riprap is proposed, the proposed riprap is the minimum size needed to accomplish the desired stabilization, and the riprap will not restrict existing public access to publicly owned lands or interfere with navigation or the normal public use of fishery, recreation or water resources. The shoreline stabilization measures will not adversely impact adjacent aquatic areas or nearby property through increased erosion, sedimentation, shoaling or flooding produced by changes in littoral drift or other changes in water circulation patterns.

- (d) Shoreline stabilization projects shall be timed to minimize impacts on aquatic life.

Applicant Response: *All work will be performed in accordance with in-water work windows to minimize impacts on aquatic life – with appropriate BMPs to minimize turbidity and maintain sediment control within permit conditions.*

- (e) Proposals for riprap shall include evidence that the rock to be used will be effective and provide justification for use of a slope steeper than 1 1/2 feet horizontal to one foot vertical.

Applicant Response: *The proposed riprap will include rock sized appropriately to be effective at stabilizing the banks beneath the bridges and around the proposed tide gate structure. Riprap slopes will be no steeper than 2 feet horizontal to one foot vertical.*

- (f) When bulkheads are proposed, evidence shall be provided by the applicant and findings made by the County that the other forms of structural stabilization are inappropriate or will not meet the need. Bulkheads should be designed to be permeable to ground water and runoff. Fill policies and standards shall apply to bulkhead projects which involve fill within estuarine waters, intertidal areas or tidal wetlands.

Applicant Response: *The project does not include any proposed bulkheads.*

- (g) When riprap is proposed in Estuary Natural (EN) zones, a resource capability determination shall be required for purposes other than the protection of unique natural resources, historical and archaeological values, public facilities and uses existing as of October 7, 1977.

Applicant Response: *The proposed riprap is for the purposes of protecting public facilities (the pedestrian bridge, Reneke Creek roadway bridge, and the proposed tide gate structure at the setback dike).*

- (h) When structural shoreline stabilization is proposed in Estuary Conservation Aquaculture (ECA), Conservation 1 (EC1) and Estuary Conservation 2 (EC2) zones, evidence shall be presented by

the applicant and findings made by the County that the project is consistent with the resource capabilities of the area and the long-term use of renewable resources, and does not cause a major alteration of the estuary.

Applicant Response: *The proposed shoreline stabilization for the project is very limited in nature, in the immediate vicinities of the proposed bridges and tide gate structure and will not cause a major alteration of the estuary. The riprap beneath the bridges will be buried with native streambed material and fine sediments to reduce the impact of using angular rock in these locations.*

- (k) An impact assessment shall be conducted during local, state and federal review of permit applications for structural shoreline stabilization seaward of the line of non-aquatic vegetation or the Mean Higher High Water (MHHW) line. The impact assessment shall follow the procedure outlined in Section 3.120. Identified adverse impacts shall be avoided or minimized to be consistent with the resource capabilities and purposes of the area

Applicant Response: *The project is being permitted through state and federal agencies to satisfy permitting requirements including State Fill and Removal Law, The Rivers and Harbors Act of 1899, the Clean Water Act of 1977, and other applicable laws. An impact assessment is being conducted during local, State and Federal review of permit applications for dredging in estuarine waters, intertidal areas or tidal wetlands.*

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CHAPTER 6

Dune Area Development Permit

6.1 Introduction

A portion of the Sitka Sedge State Natural Area (SSSNA) restoration project is located within the Beach and Dune Overlay (BD) Zone. The BD Zone applies to coastal areas that are inherently dynamic and subject to natural hazards, and is intended to direct and manage development and other activities in a manner that conserves, protects, and, where appropriate, restores the resources and benefits of beach and dune environments. The overlay also emphasizes reducing risks to life and property and ensuring that activities within these areas are consistent with Statewide Planning Goals 7 and 18 and the Hazards and Beaches and Dunes Elements of the Tillamook County Comprehensive Plan.

The proposed project seeks to reestablish natural tidal hydrology and ecological function by reconnecting Beltz Marsh to the Sand Lake Estuary (SLE). Beltz Marsh and the SLE were physically separated in the 1930s with construction of the Beltz Dike for flood control and agricultural purposes. The dike and associated tide gates disrupted historic tidal exchange and altered sediment transport and drainage patterns, resulting in degradation of dune formations and loss of estuarine habitat. The Beach and Dune Overlay mapping identifies wetland, wet floodplain, wet surge plain, wet deflation plain, fluvial estuary deposits, and young stabilized dune within the project area, reflecting the extent to which natural processes have historically shaped, and continue to influence, the site.

Restoration activities within the BD Zone include breaching a portion of the existing Beltz Dike to reconnect Beltz Marsh with tidal processes in Sand Lake, constructing a pedestrian bridge to maintain public access along the Beltz Dike Trail, installing an earthen setback dike near the southern end of Beltz Marsh, and implementing associated actions such as filling legacy drainage ditches, excavating tidal channels, and installing large wood. These actions are intended to restore natural functions within beach, dune, and floodplain environments that have been altered by prior development and land use practices. The following sections address the TCLUO for consistency with the criteria and standards of the Beach and Dune Overlay Zone.

6.2 Code Compliance

TCLUO Article III - Zone Regulations

SECTION 3.530: BEACH AND DUNE OVERLAY ZONE (BD)

- (3) **PERMITTED USES:** Within the Beach and Dune Overlay Zone, all uses permitted pursuant to the provisions of the underlying zone may be permitted, subject to the additional requirements and limitations of this section.

Applicant Response: *As outlined in previous sections, the proposed activities associated with the active restoration project are not permitted in the Recreation Management (RM) Zone; therefore, a rezoning application was submitted to change the zone from RM to Estuary Natural (EN) Zone, where the proposed use is conditionally permitted. The proposal is for an active restoration project, which is not permitted in the Recreation Management (RM) Zone. Although several elements of the proposal, including grading, filling, bridges, etc., are permitted in the RM Zone, a Map Amendment (rezoning) is required to conditionally permit the proposed active restoration project. The Map Amendment (Figure 5) requests to change the underlying zone of lands that will become tidally influenced by the active restoration project to Estuary Natural (EN). All elements of the project within their respective zones are permitted outright or conditionally, and also fall entirely within the BD Overlay Zone, and thus, are subject to the additional requirements and limitations of this section.*

- (4) **HABITAT RESTORATION & ENHANCEMENT:** Permits for the enhancement or restoration of beach and dune landforms for the purposes of wildlife and plant habitat are permitted in the Beach and Dune Overlay Zone subject to the following requirements:

- (a) Any proposed vegetation removal shall be the minimum extent necessary to carry out the purpose of the habitat restoration or enhancement project.

Applicant Response: *All proposed vegetation removal will be the minimum extent necessary to carry out the purpose of the active restoration project.*

- (b) Activities shall demonstrate compliance with the requirements of the Flood Hazard Overlay Zone, if applicable.

Applicant Response: *Requirements of the Flood Hazard Overlay Zone are addressed under Section 5.4 above.*

- (c) Activities shall be tied to an existing conservation plan, wildlife strategy, Endangered Species Act requirement, or other applicable document.

Applicant Response: *As part of this proposal, a Comprehensive Plan Amendment application was submitted to re-inventory the property from Goal 17 (Coastal Shorelands) to Goal 16 (Estuarine Resources). This would allow the proposed active restoration project to be included in the existing SLEJMP. Therefore, this standard will be met. A site-specific biological assessment was not included in this permit application package because the project is consistent with and qualifies for coverage under*

the *PROJECTS Programmatic Biological Opinion (USFWS 2015)*. (d) The permit application shall include a clear plan for what activities will be carried out, the timing of the activities, and include:

- (A) Temporary and permanent stabilization programs, sand contouring, and the planned maintenance of new and existing vegetation over at least a five-year period from completion of work;
- (B) Methods for protecting the surrounding area from any adverse effects of the restoration or enhancement activities; and
- (C) Minimize to insignificant levels hazards to life, public and private property, and the natural environment which may be caused by the proposed activities.

Applicant Response: *A construction schedule along with a stabilization and maintenance plan is submitted as part of this application package. The phased construction will last approximately two years. The first phase will include the initial construction of the setback dike, which will protect the surrounding area and the community south of the project area, Tiera del Mar. As described in the project's No-Rise Certification and Sitka Sedge Tidal Wetland – Hydraulic Analysis Memorandum (ESA, 2024) there will be no increase in flood levels associated with the construction activities.*

- (e) Application, review, decisions, and appeals for permits for habitat restoration or enhancement shall be a Type I procedure in accordance with Article 10.

Applicant Response: *The Dune Area Development permit has been elevated to a Type III Discretionary Review as per comment provided by Tillamook County.*

(5) DUNE AREA DEVELOPMENT PERMIT:

- (a) Except for activities identified in subsection (5)(b) as exempt, any new development, new construction, substantial improvement, shoreline alteration (including activities outside of OPRD's jurisdiction) or grading activity in an area subject to the provisions of this section shall require a Dune Area Development Permit. The Dune Area Development Permit may be applied for prior to or in conjunction with a building permit, grading permit, or any other permit or land use approval required by Tillamook County.
- (b) The following activities are exempt from the requirement for a Dune Area Development Permit:
 - (A) Maintenance, repair, or alterations to existing structures that do not alter the building footprint or foundation and do not constitute substantial improvement as defined in Article 11;
 - (B) Exploratory excavations under the direction of a certified engineering geologist or registered geotechnical engineer;
 - (C) Construction of structures for which a building permit is not required;
 - (D) An excavation which is less than two feet in depth, or which involves less than twenty-five cubic yards of volume;

- (E) Fill that is less than two feet in depth or that involves less than twenty-five cubic yards of volume;
 - (F) Yard area vegetation maintenance on slopes less than 20%;
 - (G) Removal of trees smaller than 8 inches dbh (diameter breast height);
 - (H) Removal of trees larger than 8 inches dbh provided the canopy area of the trees that are removed is any one-year period is less than 25% of the lot or parcel area;
 - (I) Forest operations subject to regulation under ORS 527 (the Oregon Forest Practices Act);
 - (J) Maintenance and reconstruction of public and private roads, streets, parking lots, driveways, and utility lines, provided the work does not extend outside the existing right-of-way boundary;
 - (K) Maintenance and repair of utility lines, and the installation of individual utility service connections;
 - (L) Emergency response activities intended to reduce or eliminate an immediate danger to life, property, or flood or fire hazard;
 - (M) Restoration, repair, or replacement of a lawfully established structure damaged or destroyed by fire or other casualty in accordance with subsection (15) of this section;
 - (N) Beachfront protective structures subject only to regulation by the Oregon Parks and Recreation Department under OAR Chapter 736, division 20;
 - (O) Remedial sand grading authorized by a Remedial Sand Grading Permit issued pursuant to subsection (11) of this section; and
 - (P) Foredune grading authorized by a Foredune Grading Permit issued pursuant to subsection (12) of this section.
 - (Q) Lots or parcels less than 20,000 square feet in size located on an Older Stabilized Dune where the average existing slope is less than 19% measured from the highest to lowest point of the property.
 - (P) Lots or parcels greater than 20,000 square feet in size located on an Older Adopted May 11, 2022 Tillamook County Land Use Ordinance 4 Stabilized Dune where the average existing slope of the building footprint or area to be disturbed measured from the highest to lowest point within the footprint or area to be disturbed is 29 percent or greater.
- (d) Application, review, decisions, and appeals for Dune Area Development Permits shall be a Type I procedure in accordance with Article 10.
- (f) A decision to approve a Dune Area Development Permit shall be based upon findings of compliance with the following standards:
- (A) The proposed development complies with the applicable requirements and standards of subsections (7), (8), (9), (10), and (13) of this section;

Applicant Response: *The standards of subsections (7), (8), (9), (10), and (13) of this section are addressed in the findings below.*

- (B) Any proposed foredune grading for site preparation cannot go below the Base Flood Elevation plus four feet; shall be the minimum area necessary for the construction of a structure; shall include plans for temporary and permanent stabilization of the site, including a re-vegetation plan of exposed sand areas; and shall conform with the requirements of subsection (11)(b) of this section. Additionally, all graded sand shall remain in the beach-foredune system;

Applicant Response: *No foredune grading is proposed as part of the active restoration project; therefore, this standard does not apply.*

- (C) The Geologic Hazard Report conforms to the standards for such reports set forth in subsection (6) of this section; and Adopted May 11, 2022 Tillamook County Land Use Ordinance 5.

Applicant Response: *The standards for the required Geologic Hazard Report, outlined in subsection (6) of this section are addressed in the findings below.*

- (D) The development plans for the application conform, or can be made to conform, with all recommendations and specifications contained in the Geologic Hazard Report.

Applicant Response: *The development plans for the proposed active restoration project will conform or will be made to conform with all recommendations and specifications contained within the Geologic Hazard Report.*

(6) GEOLOGIC HAZARD REPORT STANDARDS

- (a) For the purposes of Section 3.530, a Geologic Hazard Report refers to engineering geologic reports, geotechnical reports, and geotechnical engineering reports.
- (b) Geologic Hazard Reports required by this section shall be prepared consistent with standard geologic practices employing generally accepted scientific and engineering principles, and shall, at a minimum, contain the applicable provisions outlined in the Oregon State Board of Geologist Examiners publication "Guidelines for the Preparation of Engineering Geologic Reports", 2nd Edition, 5/30/2014 or other published best practice guidelines for engineering geologic or geotechnical engineering reports, consistent with current scientific and engineering principles. Reports shall reference the published guidelines upon which they are based
- (c) Geologic Hazard Reports required by this section shall include the following from the preparer(s) of the report:
 - (A) A statement that all the applicable content requirements of this subsection have been addressed or are not applicable to the review. An explanation shall be accompanied with any requirement identified as not applicable;
 - (B) A description of the qualifications of the professional(s) that prepared the report. If multiple licensed professionals contributed to the report, each professional shall individually sign and stamp their own work products and

- (C) A statement by the preparer(s) that they have the appropriate qualifications to have completed the report and all its contents.
- (d) All Geologic Hazard Reports are valid for purposes of meeting the requirements of this section for a period of five (5) years from the date of preparation. Such reports are valid only for the development plan addressed in the report. Tillamook County assumes no responsibility for the quality or accuracy of such reports. Within that five-year period, the Planning Director can require at their discretion an addendum by a qualified licensed geoprofessional certifying that site conditions have not changed from the original report. If site conditions have changed, a new Geologic Hazard Report will be required.
- (e) For development activities that are subject both to this section and Section 4.130: Development Requirements for Geologic Hazard Areas, one complete Geologic Hazard Report can be used for meeting the requirements of this section and Section 4.130. The report shall include requirements for both sections as applicable.
- (f) In addition to the requirements set forth in subsections (b) and (c), Geologic Hazard Reports for lots or parcels abutting the ocean shore shall, to the extent applicable and based on best available information, include the following information, analyses, and recommendations:
- (A) Site description:
- (i) The history of the site and surrounding areas, such as previous riprap or dune grading permits, erosion events, exposed trees on the beach, or other relevant local knowledge of the site.
 - (ii) Topography, including elevations and slopes on the property itself.
 - (iii) Vegetation cover.
 - (iv) Subsurface materials – the nature of the rocks and soils.
 - (v) Conditions of the seaward front of the property, particularly for sites having a sea cliff.
 - (vi) Presence of drift logs or other flotsam on or within the property.
 - (vii) Description of streams or other drainage that might influence erosion or locally reduce the level of the beach.
 - (viii) Proximity of nearby headlands or jetties which might block the longshore movement of beach sediments, thereby affecting the level of the beach in front of the property.
 - (ix) Description of any shore protection structures that may exist on the property or on nearby properties.
 - (x) Presence of pathways or stairs from the property to the beach.
 - (xi) Existing human impacts on the site, particularly that might alter the resistance to wave attack.
 - (xii) Location and condition of nearby beach access sites.

Applicant Response: *As outlined within the Draft GHR, the Sitka Sedge Tidal Wetland Restoration Project is located within the SSSNA and along Sandlake Road between the park entrance and Roma Avenue in Tillamook County, Oregon. Historically, the area was used for cattle grazing and dairy farming throughout the early to mid-1900s. In the 1930s, Beltz Dike was constructed to expand grazing land, and a concrete culvert with a tidal gate was installed to regulate tidal flows within the marsh. Over time, these structures, along with other dikes and levees in the region, have significantly altered tidal exchange and marshland hydrology.*

Topography within the project area varies from low-lying marsh elevations of approximately 7 to 9 feet, to 12 to 15 feet along Beltz Dike, and 17 to 32 feet along Sandlake Road. The Beltz Dike trailhead, formerly an access road, now serves as a hiking trail and exhibits side slopes ranging from 1H:1V to 2H:1V. Vegetation is abundant, with brush and large trees growing along the Beltz Dike trail and dense tree and shrub cover surrounding Sandlake Road. Subsurface conditions consist of six geotechnical units: roadway fill, embankment fill, marsh deposits, alluvial fan deposits, fluvial and estuarine deposits, and bedrock of the Alsea Formation composed of tuffaceous siltstone and sandstone. Intrusions of Grande Ronde Basalt occur in upland areas east of the site. Groundwater is assumed to fluctuate with tidal influence, with mean high water at approximately elevation 8.5 feet (NAVD88).

The project area lies within the SLE, bounded by Cape Lookout to the north and Pacific City to the south. These headlands influence sediment transport and estuary formation, though the report does not identify jetties or engineered shoreline structures affecting longshore sediment movement. No description of the ocean beach or sea cliffs is provided, as no construction is proposed on the beach or ocean shoreline. Similarly, the report does not mention drift logs, flotsam, or riprap. Three creeks, Reneke Creek, Beltz Creek, and No Name Creek, cross Sandlake Road and drain steep valleys in the Coast Range, contributing to erosion and flooding risks. Existing structures include Beltz Dike, its deteriorated box culvert and tidegate, and culverts for Reneke Creek, Beltz Creek, and No-name Creek. The Beltz Dike trail provides pedestrian access toward the beach, but no stairs or formal pathways are described. Human impacts include historic diking, levee construction, and fill placement for infrastructure, which have altered tidal flow and marshland conditions. The Sitka Sedge trail system offers beach access, though the report does not detail its condition.

(B) Description of the fronting beach:

- (i) Average widths of the beach during the summer and winter.
- (ii) Median grain size of beach sediment.
- (iii) Average beach slopes during the summer and winter.
- (iv) Elevations above mean sea level of the beach at the seaward edge of the property during summer and winter.
- (v) Presence of rip currents and rip embayments that can locally reduce the elevation of the fronting beach.
- (vi) Presence of rock outcrops and sea stacks, both offshore or within the beach zone.
- (vii) Information regarding the depth of beach sand down to bedrock at the seaward edge of the property.

Applicant Response: *As outlined within the Draft GHR no structures or construction activity are proposed on the beach or ocean shoreline area of the SSSNA, and the project area is protected by sand bars and dunes along the ocean shoreline creating a protective boundary between the beachfront and the estuarine project area.*

(C) Analyses of Erosion and Flooding Potential:

- (i) Analysis of DOGAMI beach monitoring data for the site or nearby area (if available).
- (ii) Analysis of human activities affecting shoreline erosion.
- (iii) Analysis of possible mass wasting, including weathering processes, land sliding or slumping.
- (iv) Calculation of wave run-up beyond mean water elevation that might result in erosion of the sea cliff or foredune (see Stockdon, 1996).
- (v) Evaluation of frequency that erosion-inducing processes could occur, considering the most extreme potential conditions of unusually high-water levels together with severe storm wave energy.
- (vii) For dune-backed shorelines, use established geometric model to assess the potential distance of property erosion and compare the results with direct evidence obtained during site visit, aerial photo analysis, or analysis of DOGAMI beach monitoring data.
- (viii) Description of expected local sea level rise over the next 50 years and impacts of that sea level change on the site, including during severe storm conditions.

Applicant Response: *As outlined within the Draft GHR, the project area is subject to flooding and erosion hazards due to its location within the SLE and proximity to steep Coast Range drainages. Heavy rainfall in the mountainous terrain east of the site can cause flooding and produce erosion or scour as floodwater from Reneke Creek and Beltz Creek is channeled out of the steep canyons and through the structures on Sandlake Road into the estuary). Field reconnaissance observed small areas of sloughing along the slope of the Beltz Dike embankment and slight scouring around the existing concrete culvert, where fill material around the sides of the culvert structure and portions of the embankment have been eroded and scoured away (Section 6). Similar slight scouring was noted around the culvert structure at Reneke Creek and erosion near the outfall of the Beltz Creek culvert (Section 6).*

The report states that each of the culvert structures and proposed bridge foundations will be susceptible to scour and erosion from stream and tidal flow. Monitoring of the structures during and after large rain events and flooding, and performing regular maintenance on the culvert and bridge structures, may help mitigate long-term scour of the structures from annual and isolated storm events. The bridge structures will be designed for scour under 100-year flood conditions (Section 7.1.2). Within estuaries and surrounding terrain, de-vegetated and over-steepened slopes are generally more susceptible to erosion, and scour of areas where structures are founded near or within stream and river channels is common (Section 5.4).

(D) Assessment of potential reactions to erosion episodes:

- (i) Determination of eligibility for beachfront protective structures as prescribed in subsection (13).

- (ii) Assessment of potential reactions to erosion events, under climate change conditions, addressing the need for future erosion control measures, building relocation, or building foundation and utility repairs.

Applicant Response: *As outlined within the Draft GHR, the project area includes multiple stream crossings and tidal zones that present a risk of erosion and scour to proposed structures. Field reconnaissance documented small areas of sloughing along the Beltz Dike embankment and slight scouring around the existing concrete culvert, where fill material and portions of the embankment have been eroded. Similar localized scour was observed at Reneke Creek and Beltz Creek culverts, indicating that structures founded within stream channels are vulnerable to progressive erosion under both normal and flood conditions.*

The report concludes that each proposed culvert and bridge foundation will be susceptible to scour and erosion from stream and tidal flow. Heavy rains in the mountainous terrain east of the site can cause flooding and produce erosion or scour as floodwaters from Reneke Creek and Beltz Creek are channeled through Sandlake Road into the estuary. To mitigate these risks, the report recommends monitoring structures during and after large rain events and flooding and performing regular maintenance on culvert and bridge structures to reduce long-term scour impacts. Bridge structures will be designed for scour under 100-year flood conditions. Additionally, erosion control means and methods should be addressed by the contractor and outlined by the project team prior to construction.

- (g) Geologic Hazard Reports for land divisions as deemed needed by the Director and for development requiring building permits, except for activities listed as exempt in subsection (5)(b), shall also include the following recommendations:
 - (A) Use results from the above analyses to establish setbacks (beyond any minimums set by this section), building techniques, or other mitigation to ensure an acceptable level of safety and compliance with all local requirements.
 - (B) Recommend a foundation design, or designs, that render the proposed structures ready moveable.
 - (C) Recommend a plan for preservation of vegetation and existing grade within the setback area, if appropriate.
 - (D) Include a consideration of a local variance process to reduce the building setback on the side of the property opposite the ocean, if this reduction helps to lessen the risk of erosion, flooding, bluff failure or other hazard.
 - (E) Recommend methods to control and direct water drainage away from the ocean (e.g., to an approved storm water system), or if not possible, to direct water in such a way so as to not cause erosion or visual impacts.

Applicant Response: *The proposed active restoration project does not include a land division; therefore, this section does not apply.*

- (h) Erosion Control Measures: All uses subject to a Dune Area Development Permit and Geologic Hazard Report shall address the following erosion control measure requirements, designed by a qualified licensed geoprofessional within the Geologic Hazard Report:
- (A) Stripping of vegetation, grading, or other soil disturbance shall be done in a manner which will minimize soil erosion, stabilize the soil as quickly as practicable, and expose the smallest practical area at any one-time during construction;
 - (B) Development plans shall minimize cut or fill operations so as to prevent off-site impacts;
 - (C) Temporary vegetation and/or mulching shall be used to protect exposed critical areas during development;
 - (D) Permanent plantings and any required structural erosion control and drainage measures shall be installed as soon as practical;
 - (E) Provisions shall be made to effectively accommodate increased runoff caused by altered soil and surface conditions during and after development. The rate of surface water runoff shall be structurally retarded where necessary;
 - (F) Provisions shall be made to prevent surface water from damaging the cut face of excavations or the sloping surface of fills by installation of temporary or permanent drainage across or above such areas, or by other suitable stabilization measures such as mulching, seeding, planting, or armoring with rolled erosion control products, stone, or other similar methods;
 - (G) All drainage provisions shall be designed to adequately carry existing and potential surface runoff from the twenty-year frequency storm to suitable drainageways such as storm drains, natural watercourses, or drainage swales. In no case shall runoff be directed in such a way that it significantly decreases the stability of known landslides or areas identified as unstable slopes prone to earth movement, either by erosion or increase of groundwater pressure;
 - (H) Where drainage swales are used to divert surface waters, they shall be vegetated or protected as necessary to prevent offsite erosion and sediment transport;
 - (I) Erosion and sediment control devices shall be required where necessary to prevent polluting discharges from occurring. Control devices and measures which may be required include, but are not limited to:
 - (i) Energy absorbing devices to reduce runoff water velocity;
 - (ii) Sedimentation controls such as sediment or debris basins. Any trapped materials shall be removed to an approved disposal site on an approved schedule;
 - (iii) Dispersal of water runoff from developed areas over large undisturbed areas.
 - (J) Disposed spoil material or stockpiled topsoil shall be prevented from eroding into streams or drainageways by applying mulch or other protective covering; or by location at a sufficient distance from streams or drainageways; or by other sediment reduction measures; and
 - (K) Such non-erosion pollution associated with construction such as pesticides, fertilizers, petrochemicals, solid wastes, construction chemicals, or wastewaters shall be prevented from leaving the construction site through proper handling, disposal, site monitoring and clean-up activities.

Applicant Response: *The Sitka Sedge Tidal Wetland Restoration Project will incorporate strategies to mitigate for erosion and scour hazards consistent with the Department of Environmental Quality (DEQ) standards. The Geologic Hazard Report (GHR) recommends that erosion control means and methods be implemented during construction and coordinated by the project team prior to commencement. While the report does not prescribe detailed measures such as temporary vegetation, mulching, or drainage swales, it emphasizes minimizing erosion through proper construction practices, monitoring, and maintenance. A detailed erosion and sediment control plan that incorporates findings from the GHR will be developed for and approved by the DEQ before construction commences, as required by the 401 Water Quality Certification permit and the National Pollution Discharge Elimination System (NPDES) 1200C permit.*

TCLUO Article IV Development Standards

SECTION 4.130: DEVELOPMENT REQUIREMENTS FOR GEOLOGIC HAZARD AREAS

4.130(4) Geologic Hazard Report Standards

- a) For the purposes of Section 4.130, a Geologic Hazard Report refers to engineering geologic reports, geotechnical reports, and geotechnical engineering reports.
- b) Geologic Hazard Reports required pursuant to this section shall be prepared consistent with standard geologic practices employing generally accepted scientific and engineering principles, and shall at a minimum contain the applicable provisions outlined in the Oregon State Board of Geologist Examiners publication "Guidelines for the Preparation of Engineering Geologic Reports," 2nd Edition, 5/30/2014 or other published best practice guidelines for engineering geologic or geotechnical engineering reports, consistent with current scientific and engineering principles. Reports shall reference the published guidelines upon which they are based. Adopted May 11, 2022 Tillamook County Land Use Ordinance 4
- c) For oceanfront property (lots or parcels abutting the ocean shore), Geologic Hazard Reports shall also address all the requirements of Section 3.530 (6)(f) to the extent applicable and based on best available information.
- d) Geologic Hazard Reports required by this section shall include the following from the preparer(s) of the report:
 - a. A statement that all the applicable content requirements of subsection 4.130(4) have been addressed or are not applicable to the review. An explanation shall be accompanied with any requirement identified as not applicable;
 - b. A description of the qualifications of the professional(s) that prepared the report. If multiple licensed professionals contributed to the report, each professional shall individually sign and stamp their own work products; and
 - c. A statement by the preparer(s) that they have the appropriate qualifications to have completed the report and all its contents.
- e) All Geologic Hazard Reports are valid for purposes of meeting the requirements of Section 4.130 for a period of five (5) years from the date of preparation. Such reports are valid only for the development plan addressed in the report. Tillamook County assumes no responsibility for the quality or accuracy of such reports. Within that five-year period, the Planning Director can

require at their discretion an addendum by a qualified licensed geoprofessional certifying that site conditions have not changed from the original report. If site conditions have changed, a new Geologic Hazard Report shall be required.

4.130(5) Decisions of Geological Assessment Reviews

A decision on a Geologic Hazard Assessment Review shall be based on findings of compliance with the following standards:

- a) The Geologic Hazard Report shall meet the content standards set forth in Section 4.130(4).
- b) In approving a Geologic Hazard Assessment Review, the decision maker may impose any conditions which are necessary to ensure compliance with the provisions of this section or with any other applicable provisions of the Tillamook County Land Use Ordinance.
- c) The development plans for the application conform, or can be made to conform, with all the recommendations and specifications contained in the Geologic Hazard Report.
- d) In the event the decision maker determines that additional review of the Geologic Hazard Report by a qualified licensed geoprofessional is necessary to determine compliance with this section, Tillamook County may retain the services of such a professional for this purpose. The applicant shall be responsible for all costs associated with the additional review. The results of that evaluation shall be considered in the decision of the Geologic Hazard Assessment Review.

4.130(6) Development Standards for Uses Subject to Review

In addition to the conditions, requirements and limitations imposed by a required Geologic Hazard Adopted May 11, 2022 Tillamook County Land Use Ordinance 5 Report, all uses subject to a Geologic Hazard Assessment Review shall conform to the following requirements:

- a) Hazard Disclosure Statement: All applications for new development or substantial improvements subject to Geologic Hazard Assessment Review shall provide a Hazard Disclosure Statement recorded with the Tillamook County Clerk's Office and signed by the property owner that acknowledges:
 1. The property is subject to potential natural hazards and that development thereon is subject to risk of damage from such hazards;
 2. The property owner has commissioned a Geologic Hazard Report for the subject property, a copy of which is on file with Tillamook County Department of Community Development, and that the property owner has reviewed the Geologic Hazard Report and has thus been informed and is aware of the type and extent of hazards present and the risks associated with development on the subject property;
 3. The property owner accepts and assumes all risks of damage from natural hazards associated with the development of the subject property.
 4. The property owners shall refrain from interfering with mitigation measures or improvements on the site and shall maintain them.

Applicant Response: *As outlined within the Draft GHR, the project area is subject to potential natural hazards and the proposed development is subject to risk of damage from such hazards. Those hazards are discussed in more detail in the findings above and the attached GHR. The property owner has reviewed the GHR and accepts and assumes all risks of damage from natural hazards associated with the development of the subject property. Further, the property owner will refrain from interfering with mitigation measures or improvements on the site and shall maintain them. A Hazard Disclosure Statement will be provided and recorded with the Tillamook County Clerk's Office and signed by the property owner.*

- b) Mitigation measures: Mitigation measures required to make the site suitable for the proposed development, including their design and construction specifications, shall be included in the Geologic Hazard Report and followed.

Applicant Response: *As outlined in the Draft GHR, the active restoration project requires targeted mitigation measures to address geologic hazards and ensure the site is suitable for the proposed development. The report identifies erosion and scour as primary concerns for culverts and bridge foundations located within stream channels and tidal zones. To reduce these risks, the proposed bridge structures will be designed to withstand scour under 100-year flood conditions. The report further recommends monitoring structures during and after major rain events and flooding, coupled with regular maintenance of culverts and bridges to prevent long-term scour damage. A detailed erosion and sediment control plan that incorporates findings from the GHR will be developed for and approved by the DEQ before construction commences, as required by the 401 Water Quality Certification permit and the NPDES) 1200C permit.*

Landslide and debris flow hazards are also noted near Beltz Creek and No Name Creek. While no additional foundation design changes are recommended for Beltz Creek Bridge, excavation near or into the toe of the mapped landslide at No Name Creek must be avoided to prevent destabilization. Construction activities should remain outside the mapped landslide extents. Oregon's Statewide Geohazard Landslide Hazard Map (Figure 10) has been added to the end of this section to supplement this chapter.

Seismic hazards associated with the Cascadia Subduction Zone present risks of soil liquefaction, settlement, and lateral spreading. The report specifies that a seismic ground motion and hazard evaluation will be performed, and mitigation measures for shallow and deep foundations will be incorporated into the forthcoming Geotechnical Engineering Report (GER). These measures will address seismic design parameters for bridge and culvert foundations. Oregon's Statewide Geohazard Earthquake Hazard Map (Figure 11) has been added to the end of this section to supplement this chapter. Tsunami hazards are acknowledged; however, structural mitigation for tsunami events will not be included in the GER, and awareness of inundation scenarios should inform emergency planning rather than design. Oregon's Statewide Geohazard Tsunami Hazard Map (Figure 7) can be found in Chapter 4.3, above.

These mitigation measures are essential to ensure the proposed structures perform safely under anticipated geologic and hydrologic conditions.

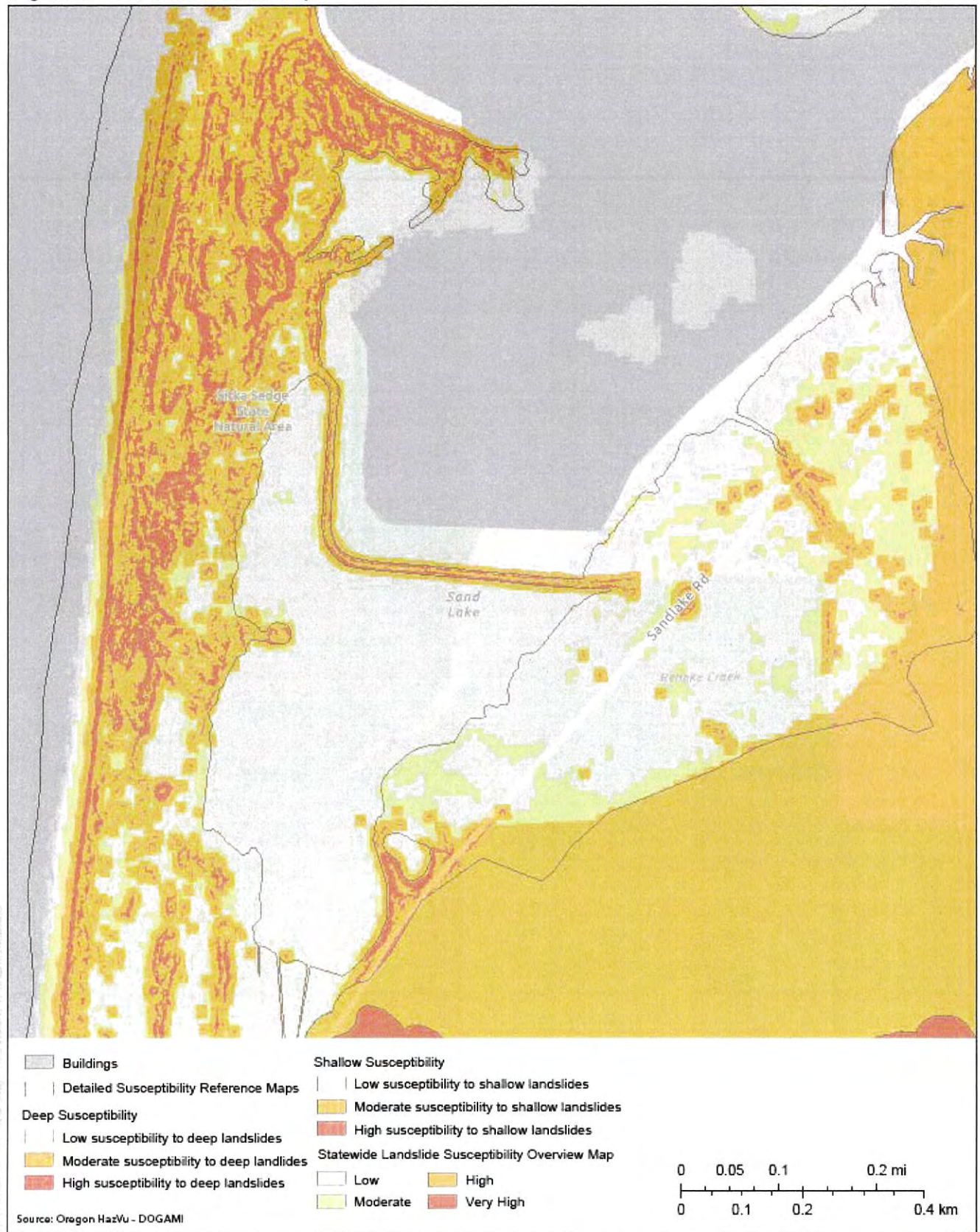
Figure 10 Landslide Hazard Map**Figure 10**
Landslide Hazard Map

Figure 11 Earthquake Hazard Map



Figure 11
Earthquake Hazard Map



- c) Safest site requirement: All new structures shall be limited to the recommendations contained in the Geologic Hazard Report; and
 - 1. Property owners should consider use of construction techniques that will render new buildings readily moveable in the event they need to be relocated; and
 - 2. Properties shall possess access of sufficient width and grade to permit new buildings to be relocated or dismantled and removed from the site.

Applicant Response: *The proposed active restoration project is specific to the Beltz Marsh, SLE, and Reneke and No Name creeks, all located within the SSSNA. No upland alternative locations exist, and no buildings are proposed. Therefore, this standard does not apply.*

- d) Minimum Oceanfront Setbacks: For oceanfront lots or parcels, the building footprint of all new development or substantial improvement subject to a Geologic Hazard Assessment Review shall also comply with the requirements of Section 3.530(8) Oceanfront Setbacks.

Applicant Response: *As outlined in the Draft GHR, the Sitka Sedge Tidal Wetland Restoration Project does not propose any structures or construction activity on the ocean shoreline or beach area of the SSSNA. As stated in the report, all proposed improvements, including the pedestrian bridge over Beltz Dike, two bridges and one culvert replacement along Sandlake Road, and the construction of a setback dike within Beltz Marsh, are located within the estuary and marshland areas, away from the oceanfront. No building footprints or structural elements are planned on oceanfront lots or parcels, and the project area does not include sea cliffs or direct ocean exposure. Because the proposed development is confined to inland estuarine and roadway areas, the requirements of Section 3.530(8) Oceanfront Setbacks are inherently satisfied. The project design avoids encroachment into oceanfront setback zones and maintains compliance by sitting all construction outside the beach and ocean shoreline area.*

- e) Erosion Control Measures: All uses subject to a Geologic Hazard Assessment Review shall address the following erosion control measure requirements, designed by a qualified licensed geoprofessional:
 - 1. Stripping of vegetation, grading, or other soil disturbance shall be done in a manner which will minimize soil erosion, stabilize the soil as quickly as practicable, and expose the smallest practical area at any one-time during construction;
 - 2. Development plans shall minimize cut or fill operations so as to prevent off-site impacts;
 - 3. Temporary vegetation and/or mulching shall be used to protect exposed critical areas during development; Adopted May 11, 2022 Tillamook County Land Use Ordinance 6
 - 4. Permanent plantings and any required structural erosion control and drainage measures shall be installed as soon as practical;
 - 5. Provisions shall be made to effectively accommodate increased runoff caused by altered soil and surface conditions during and after development. The rate of surface water runoff shall be structurally retarded where necessary;
 - 6. Provisions shall be made to prevent surface water from damaging the cut face of excavations or the sloping surface of fills by installation of temporary or permanent drainage across or

- above such areas, or by other suitable stabilization measures such as mulching, seeding, planting, or armoring with rolled erosion control products, stone, or other similar methods;
7. All drainage provisions shall be designed to adequately carry existing and potential surface runoff from the twenty-year frequency storm to suitable drainageways such as storm drains, natural watercourses, or drainage swales. In no case shall runoff be directed in such a way that it significantly decreases the stability of known landslides or areas identified as unstable slopes prone to earth movement, either by erosion or increase of groundwater pressure;
 8. Where drainage swales are used to divert surface waters, they shall be vegetated or protected as necessary to prevent offsite erosion and sediment transport;
 9. Erosion and sediment control devices shall be required where necessary to prevent polluting discharges from occurring. Control devices and measures which may be required include, but are not limited to:
 - i. Energy absorbing devices to reduce runoff water velocity;
 - ii. Sedimentation controls such as sediment or debris basins. Any trapped materials shall be removed to an approved disposal site on an approved schedule;
 - iii. Dispersal of water runoff from developed areas over large undisturbed areas.
 10. Disposed spoil material or stockpiled topsoil shall be prevented from eroding into streams or drainageways by applying mulch or other protective covering; or by location at a sufficient distance from streams or drainageways; or by other sediment reduction measures; and
 11. Such non-erosion pollution associated with construction such as pesticides, fertilizers, petrochemicals, solid wastes, construction chemicals, or wastewaters shall be prevented from leaving the construction site through proper handling, disposal, site monitoring and clean-up activities.

Applicant Response: *The Sitka Sedge Tidal Wetland Restoration Project will incorporate strategies to mitigate for erosion and scour hazards as required by the NPDES 1200C permit and the 401 Water Quality Certification administered by DEQ. The Geologic Hazard Report recommends that erosion control means and methods be implemented during construction and coordinated by the project team prior to commencement. While the report does not prescribe detailed measures such as temporary vegetation, mulching, or drainage swales, it emphasizes minimizing erosion through proper construction practices, monitoring, and maintenance. Bridge structures will be designed for scour under 100-year flood conditions, and contractors will be responsible for implementing erosion control measures to stabilize soils and prevent off-site impacts during development. These provisions align with the requirement that soil disturbance be minimized, stabilized promptly, and managed to prevent erosion and sediment transport.*

- f) Certification of compliance: Permitted development shall comply with the recommendations in the required Geologic Hazard Report. Certification of compliance shall be provided as follows:
 - a. Plan Review Compliance: Building, construction or other development plans shall be accompanied by a written statement from a certified engineering geologist or licensed

geotechnical engineer stating that the plans comply with the recommendations contained in the Geologic Hazard Report for the Geologic Hazard Assessment Review.

- b. Inspection Compliance: Upon the completion of any development activity for which the Geologic Hazard Report recommends an inspection or observation by a certified engineering geologist or licensed geotechnical engineer, the certified engineering geologist or licensed geotechnical engineer shall provide a written statement indicating that the development activity has been completed in accordance with the applicable Geologic Hazard Report recommendations.
- c. Final Compliance: No development requiring a Geologic Hazard Report shall receive final approval (e.g., certificate of occupancy, final inspection, etc.) until the department receives:
 - i. A written statement from a certified engineering geologist or licensed geotechnical engineer indicating that all performance, mitigation, and monitoring measures specified in the Geologic Hazard Report have been satisfied;
 - ii. If mitigation measures incorporate engineering solutions designed by a licensed professional engineer, a written statement of compliance by the design engineer;
 - iii. A written statement by the qualified licensed geoprofessional indicating that all erosion control measure requirements were met.

Applicant Response: *The Sitka Sedge Tidal Wetland Restoration Project will comply with the recommendations outlined in the Draft GHR prepared by Shannon & Wilson (October 2025). The report specifies mitigation measures for erosion and scour, landslide avoidance, and seismic hazard considerations, which will be incorporated into the final design and construction plans. These measures include designing bridge structures for scour under 100-year flood conditions, implementing erosion control methods during construction, avoiding excavation near the toe of the mapped landslide at No Name Creek, and integrating seismic design parameters for shallow and deep foundations.*

Development plans will include a written statement from a certified engineering geologist or licensed geotechnical engineer confirming that the plans conform to the recommendations in the Geologic Hazard Report. Upon completion of any development activity requiring observation or inspection, the certified engineering geologist or licensed geotechnical engineer will provide a written statement verifying that the work was completed in accordance with the report's recommendations. Prior to final approval, written statements will be submitted confirming that all performance, mitigation, and monitoring measures specified in the Geologic Hazard Report have been satisfied. If engineering solutions were incorporated, the design engineer will provide a compliance statement, and the licensed geoprofessional will certify that all erosion control requirements were met.

- g) Restoration and replacement of existing structures:
 - a. Notwithstanding any other provisions of this ordinance, application of the provisions of this section to an existing use or structure shall not have the effect of rendering such use or structure nonconforming as defined in Article 7.
 - b. Replacement, repair or restoration of a lawfully established building or structure subject to this section that is damaged or destroyed by fire, other casualty or natural disaster shall be

permitted, subject to all other applicable provisions of this ordinance, and subject to the following limitations:

- i. Replacement authorized by this subsection is limited to a building or structure not larger than the damaged/destroyed building.
- ii. Structures replaced pursuant to this subsection along the oceanfront shall be located no further seaward than the damaged structure being replaced.
- iii. Replacement or restoration authorized by this subsection shall commence within one year of the occurrence of the fire or other casualty which necessitates such replacement or restoration.
- c. A building permit application for replacement, repair, or restoration of a structure under the provisions of this subsection shall be accompanied by a Geologic Hazard Report prepared by a qualified licensed geoprofessional that adheres to the Geologic Hazard Report Standards outlined in Section 4.130(4). All recommendations contained in the report shall be followed.
- d. A building permit application for replacement, repair, or restoration authorized by this subsection shall be processed and authorized as Type I review pursuant to Section 10.020

Applicant Response: *The Draft GHR discusses the existing tide gate within the Beltz Dike, which has deteriorated from multiple storm events. Due to modern fish passage regulations, repairing the tide gate is not practicable; therefore, the dike will be breached and a pedestrian bridge installed. A new setback dike with a tide gate will be constructed in the southern portion of the Beltz Marsh to replace the functionality of the existing Beltz Dike tide gate. No buildings or structures damaged or destroyed by fire or by other casualties or natural disasters are proposed to be repaired or replaced as part of the active restoration project.*

SECTION 3.530: BEACH AND DUNE OVERLAY ZONE (BD) Continued

(7) ADDITIONAL DEVELOPMENT LIMITATIONS IN DUNE AREAS: In addition to the conditions, requirements, and limitations imposed by any required Geologic Hazard Report, all development subject to a Dune Area Development Permit shall conform to the following requirements:

- (b) Other development in these beach and dune areas shall be permitted only if adequate findings are provided to the County which demonstrate that the proposed development is adequately protected from any geologic hazards, wind erosion, undercutting, ocean flooding and storm waves; and is designed to minimize adverse environmental effects. In addition, findings shall be provided to address the following:
 - (A) The type of use proposed and the adverse effects it might have on the site and adjacent areas;
 - (B) Temporary and permanent stabilization programs and the planned maintenance of new and existing vegetation;
 - (C) Methods for protecting the surrounding area from any adverse effects of the development; and
 - (D) Hazards to life, public and private property, and the natural environment that may be caused by the proposed use.

Applicant Response: *The Project site is located within the Sand Lake Estuary and along Sandlake Road, and no structures or construction activity are proposed on the beach or ocean shoreline area of the Sitka Sedge. The Project site is not mapped within the coastal erosion hazard zone since the area is not considered within the beach or ocean shoreline. The Project consists of a proposed pedestrian bridge at Beltz Dike, construction of two bridges and one culvert replacement along Sandlake Road, and the construction of a setback dike within the southern portion of Beltz Marsh. Within estuaries and surrounding terrain, de-vegetated and over-steepened slopes are generally more susceptible to erosion and scour of areas where structures are founded near or within stream and river channels is common. Geologic hazard risks under general static conditions include landslides and debris flows, erosion and scour, and flooding. Geologic hazard risks under seismic conditions include soil liquefaction, settlement, lateral spreading, and tsunami inundation scenarios. In our opinion, we do not anticipate that the structures or associated construction activity will affect the mapped geologic hazards, including debris flows and landslides, assuming recommendations outlined in the Geologic Hazard Report and the Geotechnical Engineering Report are followed.*

- (d) Safest site requirement: All new construction or substantial improvements shall be located within the area most suitable for development based on the least exposure to risk from coastal hazards as determined by a qualified licensed geoprofessional as part of a Geologic Hazard Report prepared in accordance with subsection (6). Notwithstanding the provisions of the underlying zone, as necessary to comply with this requirement, any required yard or setback except for the Oceanfront Setback outlined in subsection (8) may be reduced by 10 feet or up to 50%, whichever is greater.

Applicant Response: *Based on the submitted Geologic Hazard Report (GHR) and as determined by a qualified licensed geoprofessional, the proposed construction sites represent the areas most suitable for development with the least exposure to coastal hazards.*

Therefore, the siting of new structures complies with the Safest Site Requirement, and no reduction in required yard or setback is necessary to meet this standard.

- (e) Building heights shall be measured from the existing (pre-construction) grade. Only in Foredune Management Areas shall additional fill be allowed on an oceanfront lot to achieve the required four feet plus Base Flood Elevation, consistent with the provisions of Section 3.510: Flood Hazard Overlay Zone. In this instance, building height shall be measured on the foredune grade from four feet plus Base Flood Elevation.

Applicant Response: *The proposed active restoration project is not located within a foredune area, nor are any new buildings proposed. Structural height for the pedestrian bridge and box culvert are discussed in the previous section pertaining to the Flood Hazard Overlay Zone.*

- (f) Accessory structures and on-site sewage disposal systems, which the Department determines are consistent with the purpose of this zone, may be permitted oceanward of the Oceanfront Setback Line, subject to the standards of this section and the following provisions:
 - (A) The location of accessory structures and on-site sewage disposal systems will be determined in each case based on site-specific information provided by a Geologic Hazard Report, prepared in accordance with subsection (6).

- (B) Any accessory structure higher than three feet as measured from existing grade will be subject to the variance procedure and criteria set forth in Article 8 of the Tillamook County Land Use Ordinance.
- (C) Accessory structures for on-site subsurface sewage disposal systems may not be located oceanward of the primary structure on the subject property unless the following provisions are met:
 - (i) The primary structure on the subject property is an authorized residential, commercial, or industrial structure in existence as of October 28, 1992;
 - (ii) The accessory structure is required for repair of an existing disposal system, and there is no viable alternative system or location landward of the primary structure; and
 - (iii) The owner of the subject property submits an affidavit to the Department acknowledging that the property owner has been informed a beachfront protective structure will not be authorized to protect the disposal system against erosion, and that the owner has sole responsibility for maintaining the disposal system and for notifying any purchaser of this condition prior to sale of the property.

Applicant Response: *The proposed active restoration project does not include accessory structures; therefore, this section does not apply.*

(g) Beach Access:

- (A) Non-structural, low-impact pedestrian footpaths to the beach, not to exceed four feet in width, shall be permitted in all dune areas, except where restricted in Foredune Management Areas.
- (B) Boardwalks and other structural pathways are subject to the requirements of 7(b) above.
- (C) Off-road recreational vehicle use in dune areas shall be permitted in Sand Lake Recreational Area. Motor vehicles registered to operate on public highways and roads shall be allowed to travel on beaches where posted by the Oregon Parks and Recreation Department (ORS 390.678). Operation of motor vehicles at other beach locations will require a permit from the Oregon Parks and Recreation Department.
- (D) In Foredune Management Areas, where heavy use of public easements or rights of way destabilizes dune areas on adjoining private property, signs may be placed at landward beach entrance points to encourage the use of alternative public access points. Signs shall be subject to review by the Foredune Management Authority, Tillamook County, and the Oregon Parks and Recreation Department.

Applicant Response: *The active restoration project does not propose new beach access. As shown on the submitted plans, two existing trails located within the subject property provides beach access. A pedestrian bridge is proposed to be constructed over a dike breach within the existing Beltz Dike, which will continue to provide access to the trails system within the SSSNA. The existing ORV use will not be impacted by the project. No impacts to Foredunes are proposed with this project. These standards are met.*

- (8) OCEANFRONT SETBACKS: As used in this section, “vegetation line” means the ocean shore state recreation area boundary as described in ORS 390.770 or the line of established upland shore vegetation, whichever is farther inland. In areas subject to the provisions of this section, all development, except for activities listed as exempt in subsection (5)(b), shall be set back from the vegetation line the greater of:
- (a) A distance specified in a required Geologic Hazard Report if it is more restrictive than the Oceanfront Setback Line; or
 - (b) A distance established through calculation of an Oceanfront Setback Line (OSL) as follows:
 - (A) On a lot or parcel where there are existing buildings located within 300 feet of the boundaries of the subject lot or parcel on both the north and the south, the OSL is a line drawn between the nearest building to the north and the nearest building to the south. The line shall be drawn between the most oceanward points of the two building footprints closest to the vegetation line.
 - (B) On a lot or parcel where there are buildings within 300 feet of the boundaries of the subject lot or parcel on one side only (north or south), the OSL is the average distance from the vegetation line of all such buildings. The measurement for calculating the average shall be made from the most oceanward point of the building footprints closest to the vegetation line.
 - (C) On a lot or parcel where there are no buildings within 300 feet north or south of the boundaries of the subject lot or parcel, the OSL is the average distance from the vegetation line of the nearest two buildings. The measurement for calculating the average shall be made from the most oceanward point of the building footprints closest to the vegetation line.
 - (D) For purposes of calculating the OSL, “building” means a lawfully established, permanent residential, commercial, public, or industrial structure within 500 feet of the vegetation line and located on a lot or parcel that abuts the vegetation line. It does not include detached accessory structures.
 - (E) For purposes of calculating the OSL, “closest point of a building” means the point on an exterior wall of a building that is closest to the vegetation line. It does not include decks, second story decks, other structural improvements above finished grade, unroofed porches or landings, walkways, or building projections such as cornices, eaves, canopies, sunshades, gutters, or chimney chases.
 - (c) In no case may any structure or other development be permitted west of the statutory vegetation line or line of actual vegetation, whichever is more landward, except as authorized by the Oregon Department of Parks and Recreation in accordance with OAR Chapter 736, division 20.
 - (e) On lots or parcels created prior to the effective date of this section, where the application of the minimum oceanfront setback, together with any other required yards and/or setbacks, results in a building footprint area of less than 1,500 square feet, the required yard setback opposite the oceanfront may be reduced as follows:
 - (A) The required yard setback opposite the oceanfront may be reduced by an amount necessary to provide a building footprint of not more than 1,500 square feet, or to a minimum of 10 feet, whichever is less.

- (B) If the reduction in setback permitted in subsection (A) results in a permissible building footprint of less than 1,500 square feet, the oceanfront setback may be reduced by an amount necessary to provide a building footprint of not more than 1,500 square feet.
- (f) Notwithstanding the above provisions, the Planning Director shall require a greater setback from the ocean where there is evidence of significant coastal, environmental, or geologic hazards as determined by a Geologic Hazard Report submitted pursuant to Section 3.530(6) or other information available to the Department. In making this determination, the Geologic Hazard Report and the Director shall consider evidence of recent and future beach erosion and whether the proposed development has been designed to adequately minimize and mitigate for any adverse environmental effects to the fullest extent required by law.

Applicant Response: *No project elements are proposed in proximity to the Oceanfront Setback Line, vegetation line or on the beach or ocean shoreline area, nor are any special setbacks recommended in the submitted Geologic Hazard Report.*

- (9) FOREDUNE BREACHING: When permitted, foredune breaching and restoration shall be conducted in a manner consistent with sound principles of conservation. Such breaching may be permitted only:
- (a) To replenish sand supply in interdune areas;
 - (b) On a temporary basis in an emergency, such as for fire control, hazard removal or clean up, draining farmlands, or alleviating flood hazards; or
 - (c) For other purposes only upon adoption of an exception to Statewide Planning Goal 18.

Applicant Response: *Based on the Oregon Coastal Management Program (OCMP) Hazard Planning Map (Figure 9) no foredunes exist within the project area; therefore, these standards do not apply.*

- (10) GROUNDWATER REQUIREMENTS: Applications for development which will utilize groundwater resources shall provide a hydrologic analysis which demonstrates that groundwater withdrawal will not:
- (a) Lead to the loss of stabilizing vegetation;
 - (b) Lead to a deterioration of water quality; and
 - (c) Result in the intrusion of salt water into water supplies.

Applicant Response: *The submitted GHR does not identify any planned use of groundwater resources for the project; therefore, this criterion does not apply.*

- (14) CERTIFICATION OF COMPLIANCE: Permitted development shall comply with the recommendations in the required Geologic Hazard Report. Certification of compliance shall be provided as follows:
- (a) Plan Review Compliance: Building, construction or other development plans shall be accompanied by a written statement from a certified engineering geologist or licensed geotechnical engineer stating that the plans comply with the recommendations contained in the Geologic Hazard Report for the approved Dune Area Development Permit.

- (b) **Inspection Compliance:** Upon the completion of any development activity for which the Geologic Hazard Report recommends an inspection or observation by a certified engineering geologist or licensed geotechnical engineer, the certified engineering geologist or licensed geotechnical engineer shall provide a written statement indicating that the development activity has been completed in accordance with the applicable Geologic Hazard Report recommendations.
- (c) **Final Compliance:** No development requiring a Geologic Hazard Report shall receive final approval (e.g., certificate of occupancy, final inspection, etc.) until the department receives:
 - (A) A written statement by a certified engineering geologist or licensed geotechnical engineer indicating that all performance, mitigation, and monitoring measures specified in the report have been satisfied, including confirmation of foredune restoration and implementation of temporary and permanent vegetation stabilization measures;
 - (B) If mitigation measures incorporate engineering solutions designed by a licensed professional engineer, a written statement of compliance by the design engineer.
 - (C) A written statement by the qualified licensed geoprofessional indicating that all erosion control measure requirements were met.

Applicant Response: *A written statement by a certified engineering geologist or a licensed geotechnical engineer will be provided proving conformance with (a), (b), and (c) above.*

CHAPTER 7

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Appendix A
**2023 Fish Passage Project
Summary & Narrative**

Project Summary

(1) *APPLICANT ORGANIZATION:* Tillamook Estuaries Partnership (TEP)

(2) *PROJECT TITLE:* Sitka Sedge Tidal Wetland Restoration - Phase II

(3) *SITE LOCATION:* Sitka Sedge Tidal Wetland (SSTW) is located at the 357-acre State Sitka Sedge Natural Area (SSSNA), which is owned and managed by the Oregon Parks & Recreation Department (OPRD). The entire project area is contained within the southern portion of the Sand Lake Estuary (SLE) in Tillamook County, Oregon. The approximate geographic center of the project is 45°15'40"N / 123°57'41"W. The unincorporated community of Tierra Del Mar (TDM), Oregon is located immediately south of the project area.

(4) *BRIEF PROJECT DESCRIPTION:*

(1) Tidal wetland access is a critical limiting factor in pursuit of healthy coastal watersheds. (2) Over 68% of Oregon's estuarine wetlands have been lost to conversion. (3) SLE loss is due to levee construction and draining in the early 1900s for agricultural purposes that altered tidal wetland function resulting in significant impact to sensitive species and habitats. (4) Currently, approximately 90 acres of tidal wetland in the SSSNA are hydrologically isolated from the greater SLE behind historic Beltz Dike. (5) The only existing tidal flow moves through a single four-foot diameter culvert with a broken, non-functional tide gate. (6) Lack of estuarine drainage due to the undersized culvert potentially contributes to chronic localized flooding problems in the adjacent community of Tierra Del Mar, Oregon (TDM). (7) Sand Lake Road, which is a critical lifeline county road for that area of Tillamook County borders the east edge of SLE adjacent to the tidal estuary and passes over three creeks, all with undersized fish passage barrier culverts that frequently flood and are all at risk of failing. The primary goals of this project are to:

- Remove the undersized culvert in the existing dike to allow for uninhibited tidal inundation of the tidal wetland behind Beltz Dike. Reconnect the existing trail system, which will be disconnected by the removal of the dike, with ADA-compliant bridge or other pathway configuration.
- Restore nearly 68 acres of high-quality estuarine habitat by removing historic agricultural drainage ditches followed by construction of naturally functioning tidal channels and installation of native plants to encourage development of target coastal brackish wetland ecotypes (specifically Sitka spruce swamp and coastal tidal wetland plant communities).
- Replace fish passage barrier culverts for three salmonid bearing creeks (Reneke Creek, Beltz Creek, and No Name Creek) that flow into SLE behind the dike with bridges that will also address potential failing points along Sand Lake Road. This fish passage project will improve the movement of fish within and between their spawning, rearing, and adult habitats by modifying or removing culverts, and other barriers that restrict their migration.
- Utilize chosen flood protection alternatives for the Tierra Del Mar (TDM) community to mitigate impacts of climate change and provide Tillamook County Public Works with 100% design plans to implement infrastructure improvements to address flooding problems that can geographically isolate this disadvantaged community.

SLE is critical habitat for ESA threatened OR Coast Coho salmon (ESU). NOAA's recovery plan states the primary limiting factor for recovery is access to intact rearing habitat in tidal wetland. SLE, one of Oregon's least developed estuaries, is located along the Pacific Migratory Flyway, providing indispensable habitat for diverse migratory bird species. The project area supports 17 federal and/or

2	Structural engineering - Beltz dike w/ bridge	
3	30% design complete - Beltz dike	
4	30% design - all stream crossings	
5	60% design - Beltz dike	
6	Structural engineering - all stream crossings	
7	60% design - all stream crossings	
8	90% design - Beltz dike	
9	90 % design - all stream crossings	
10	Final design - Beltz dike, all stream crossings	
11	Bid package development	
12	Permit development	
13	Cultural resources investigation (Section 106 compliance)	
14	Public outreach and stakeholder	

<i>coordination</i>		
1 Construction 5 (Phase I)		
1 Post-project 6 monitoring (will continue for 5 years)		
1 Construction 7 (Phase II)		

(6) FUNDING REQUEST:

			NOAA Removing Barriers for Fish Passage		
Task ID	Task/Activity	Approximate Cost	FY 2024	FY 2025	FY 2026
1	Geotechnical Investigation and Engineering Analysis	\$570,643	\$400,000	\$120,643	
2	30% Design	\$209,527	\$100,000	\$109,527	
3	60% Design	\$190,492		\$190,492	
4	90% Design	\$268,329		\$268,329	
5	Final Design - Beltz Dike, all creek crossings (Specs, Estimates, Bid Form)	\$103,072		\$85,000	\$18,072
6	SSTW Permitting	\$163,888		\$150,000	\$13,888
7	Personnel / Fringe	\$47,500	\$15,000	\$15,000	\$17,500
8	Indirect (10%)	\$155,345			

		Total:	\$1,708,796	\$515,000	\$938,991	\$49,460
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Project Narrative

(1) IMPORTANCE / RELEVANCE AND APPLICABILITY OF PROPOSAL TO THE PROGRAM GOALS

(a) Achieving measurable and lasting benefits for migratory fish populations and strengthening ecosystem resilience

Sand Lake estuary, one of only four bar-built estuaries in Oregon, has some of the highest levels of natural estuarine function of any on the Oregon Coast. Its restoration represents a significant opportunity to address key limiting factors preventing the recovery of Pacific Salmon including the federally threatened Oregon Coast Coho Salmon, an Evolutionary Significant Unit (ESU) of Coho salmon. Sand Lake Estuary supports at least five populations of Pacific Salmonid. The reconnection and restoration of SSTW's tidal wetlands will result in increased access to, and a net increase in, highly productive juvenile rearing habitat.

The Oregon Coast Coho salmon (ESU) is of primary importance. Sand Lake is legally designated as critical habitat for these Coho. NOAA's 2016 Recovery Plan for this species states the following in regard to successful Coho recovery: "the primary focus is to protect and restore freshwater and estuarine rearing habitats upon which egg-to-smolt survival, and overall productivity, depends, so the highest priorities are for strategies and actions related to rearing habitats". In other words, rearing habitat is a primary limiting factor for Coho, and the conservation and restoration of properties that support such habitats is critical to their recovery. This determination was based on observations that while there have been large fluctuations in spawning adult Coho since the year 2000, the number of smolts produced has stayed relatively consistent, leading to the determination that rearing habitat is limiting. SSTW provides a relatively rare opportunity to restore tidal wetland rearing habitat on land historically modified for agricultural use and under private ownership until recently.

SSTW is part of the 357-acre SSSNA acquired by OPRD in 2014. SSTW's restoration will restore a minimum of 68-acres of tidal wetland rearing habitat in the heart of a North Coast salmon stronghold. As an example of the potential at SSTW, a 2007 report focused on Tillamook Bay estimated the potential benefit to Coho rearing in tidal wetlands. In 2009, Bio-Surveys Inc. modeled the effects of restoring approximately 21 acres of Esther and Fagan Creek wetlands based on empirical data collected during juvenile Coho surveys. Bio-Surveys determined that the Coho rearing potential of these wetlands is 51,000 fish or 1.67 fish/square meter. If we extrapolate this number to SSTW, the proposed restoration could provide potential rearing opportunities to 164,782 juvenile Coho salmon annually. SSTW will move the needle for Sand Lake estuarine rearing habitat and thus benefit the North Coast's threatened Coho population. SSTW's restoration will most certainly benefit other salmonid and lamprey populations as well.

It should not be overlooked that there are a number of other estuarine dependent fish and other wildlife species that will benefit directly or indirectly from the reconnection and restoration of SSTW. These benefits will occur via reconnection of lost wetland habitat, enhanced structural complexity,

removal of invasive species, forage enhancement, and water quality improvements. Ensuring a complete, biodiverse, and multi-trophic species assemblage is restored at SSTW will certainly benefit salmon, but will include a myriad of other benefits for a multitude of different species.

This full design proposal will complete the site characterization and infrastructure analysis initiated in earlier phases. The proposal will accomplish the following: develop 100% designs, develop construction specifications, apply for all project permitting, and develop a full budget and bid package for implementation of the preferred infrastructure solutions and habitat restoration opportunities. This proposal also represents a critical first step in a larger landscape-scale project that includes upstream fish passage improvements on three salmon streams, floodplain wetland restoration, and large wood placement on Beltz and Reneke Creeks. Once completed, the Sitka Sedge Tidal Wetland project will reconnect over 5 miles of high-quality Coho spawning and rearing habitat and restore the natural ecological processes of over 68 acres of estuarine tidal wetland.

(b) Fostering regionally important habitat restoration

The Nestucca Sub-basin, including the SLE, represents some of the most significant potential for salmon and steelhead recovery anywhere on the Pacific coast. Each watershed within the Sub-basin ranks high for restoration potential across multiple species in the North American Salmon Stronghold designations. The Sub-basin is the core area for Oregon north coast salmon recovery, with large areas designated by the Wild Salmon Center as North Coast Salmon Anchor Habitat. The *US Fish and Wildlife Service Region 1 Fisheries Action Plan* identifies the Nestucca River Basins as a Tier 1 Focal Area for prioritizing and focusing service funding and conservation efforts.

The Sitka Sedge Tidal Wetland project is very important to the regional and watershed context because it will restore and reconnect estuarine and up-stream habitat. This kind of landscape-scale restoration will allow water and migratory species like salmon to move across the landscape uninhibited. The project will restore 68 acres of estuarine and tidal wetland habitat that provide rearing habitat and winter refugia for juvenile salmon. The SSTW project will also connect the restored tidal wetlands to 5 miles of upstream spawning habitat, meaning the project will benefit salmonid species at all life stages.

The Nestucca Sub-basin has a strong local commitment to salmon recovery. Watershed councils, Tillamook Estuary Partnership, Tillamook County, local land trusts, and state and federal agencies have a proven track record of improving fish habitat and addressing fish passage barriers. SSTW is consistent with and directly compliments a host of planning, assessment, and restoration directives and activities occurring on the North Coast. Below is a list identifying local and regional plans, assessments, and policies that SSTW addresses.

- *Tillamook Bay Comprehensive Conservation and Management Plan (TEP, 2019)*: Plan established long-range conservation management of Tillamook County's Estuaries. Sand Lake is one of five priority estuaries for TEP. Action items address habitat conservation, water quality improvement, and community engagement. SSTW will fulfill actions related to habitat assessment, estuarine/riparian/instream restoration, habitat connectivity, exotic species management, water quality, and community stewardship

- *Sand Lake Basin Limiting Factors Analysis and Restoration Prioritization (RDG, 2019)*: Analyzed existing conditions and provided recommendations for improving habitat for Oregon Coast Coho in the Sand Lake. It included existing information review, interpretation of water temperature and dissolved oxygen data, summary of aquatic inventory surveys, assessment of estuary modifications, habitats, and sea level rise effects, and new data collection and analysis. It illuminated limiting factors for recovery of coho and provided a prioritization of restoration opportunities in the Sand Lake. High priority actions NCS-8,18,19 call for altering Beltz dike/tide gate infrastructure to allow fish passage and wetland restoration.
- *Sitka Sedge State Natural Area Master Plan (OPRD, 2016)*: This plan laid the groundwork for the management and long-term stewardship of the 357-acre State Natural Area including the SSTW project area it provides resource assessments, visitor experience, opportunities/constraints, management directives, and stewardship. SSTW benefits greatly from the resource knowledge base put forth here and the restoration of Beltz Marsh is highlighted as a priority opportunity.
- *Sitka Sedge Natural Area: Hydrological Analysis Final Report (PGG, 2019)*: Investigated the feasibility of restoration of the Sand Lake Estuary (SSTW). It investigated how to address a failing tide gate in the Beltz dike and a potential breach to allow more natural tidal connectivity. Of particular focus was the effects of increased tide water in the marsh and on groundwater and stormwater drainage to the south in the community of Tierra Del Mar. The findings resulted in OPRD's decision to ultimately breach the dike and provide some form of setback flood protection to TDM against future SLR impacts. SSTW will expand upon this understanding and determine the scope and design of this exciting opportunity.
- *ESA Recovery Plan for Oregon Coast Coho Salmon (NOAA, 2016)*: Identified access to quality rearing habitat, like tidal wetlands as a primary limiting factor in Coho recovery. "Therefore the primary focus is to protect and restore freshwater and estuarine rearing habitats upon which egg-to-smolt survival, and overall productivity, depends, so the highest priorities are for strategies and actions related to rearing habitats". The restoration of prime rearing habitat at SSTW will specifically fulfill objective A2-2.6 among others.
- *Oregon Conservation Strategy (ODFW, 2005)*: Strategy identifies priorities for restoration of tidal areas. Estuary limiting factors identified and addressed by the SSTW include addressing blocked tidal flow, freshwater input alteration, water quality, invasive species, habitat complexity, and climate change.
- *Oregon Coast Coho Conservation Plan for the State of Oregon (ODFW, 2017)*: Restore processes that create and sustain high quality habitat. The goal is to significantly increase the productive capacity of coho salmon habitat in ESU. Lowland and estuary habitat like SSTW is prioritized in the plan for recovery of ESU. Rearing and over-winter habitat is identified as the predominant limiting factor across ESU.
- *OWEB Ecological Priorities for Land Acquisition by Basin (OWEB, 2004)*: Prioritizes land acquisition that secure conservation properties likely to undergo development transition, protects key habitats of larger landscapes, improve connectivity, and complement existing

networks of conserved areas. SSTW wetlands were acquired by OPRD with these objectives and will meet all of them.

- *Water Quality Status and Action Plan: North Coast Basin (DEQ, 2011)*: Summarizes water quality problems in project region and identifies strategies to improve habitat quality, increase shade and reduce sediment, bacteria and pollutants. Restoring SSTW tidal influence and a mosaic of native wetland types will improve water quality parameters including temperature, turbidity, nutrient load, and bacteria.
- *Oregon Plan: for Salmon and Watersheds (Oregon, 1997)*: Goal 6 aims to ensure the sufficient freshwater and estuarine habitat exists to support healthy populations of anadromous salmonids in coastal river basins. SSTW aligns with this goal.
- Section 104-297 (9) of the *Magnuson-Stevens Fishery Conservation and Management Act (NOAA, NMFS 2007)* states “One of the greatest long-term threats to the viability of commercial and recreational fisheries is the continuing loss of marine, estuarine, and other aquatic habitats. Habitat considerations should receive increased attention for the conservation and management of fishery resources of the United States.” The SSTW project will Sustain or help rebuild fish stocks managed under the Act, 16 U.S.C. 1801 et seq.
- *National Saltwater Recreational Fisheries Policy and Implementation Plans (NOAA, 2019)*: The west coast regional plan describes a thriving partnership with the recreational fishing community that fosters innovative science and management, economic vitality, sustainable fisheries, and healthy ecosystems. The partnership places a high priority on habitat restoration to rebuild fish stocks. These rehabilitated stocks are a benefit to both recreational and commercial fishing opportunities. The SSTW project is but one example of wider west coast fish habitat restoration efforts.
- *National Saltwater Recreational Angler Policy (NOAA, 2015)*: The policy states in Goal 1 that “Restoration and conservation of habitats that benefit recreational and other fish stocks” is significant. The SSTW project achieves this goal.

(c) Providing benefit to, and engaging with, underserved communities, including through partnerships with Indian tribes and other indigenous communities and enhancing community resilience to climate hazards

Future climate scenarios for the Oregon North Coast region predict increased likelihood of extreme precipitation and floods, warmer summers and winters, and longer duration summer low-flow periods. These conditions will exacerbate the potential for catastrophic failures, infrastructurally and ecologically, and increase the importance of access to thermal and hydraulic refugia for the long-term viability of aquatic organism populations in the initiative geography and throughout the Oregon North Coast.

The SSTW project will ultimately mitigate climate hazards by removing or improving aging infrastructure,

i.e., the non-functional tide gate and actively failing Beltz dike and the installation of a modern tide gate and new dike with modern engineering specifications.

To illustrate these climate extremes, the Pacific Northwest experienced record high temperatures in June 2021. Emergency fishing regulations were implemented for several Oregon rivers due to drought and temperature conditions. The North Oregon Coast has also experienced multiple flood events since the beginning of fall 2021, causing road washouts, emergency evacuations, and transportation disruptions.

TEP and partners, along with input from the community, conducted a Climate Change Vulnerability Assessment for Tillamook County in 2019. The following list of climate change stressors applicable to the Sitka Sedge were included in the 2019 assessment:

- *Changes in hydrology related to timing.* Stream flow is expected to peak earlier and have larger pulses in winter, potentially increasing erosion and sedimentation. Summer flows are expected to be lower than historical low flows.
- *Increased likelihood of extreme precipitation and floods.* Winter precipitation is expected to increase. The number of days per year with precipitation over 2 inches, as well as the amount of precipitation on the wettest day of the year, are both projected to increase throughout the century.
- *Increased coastal storm surge, wind, and wave height.* Sea level rise and stronger storms could lead to increased coastal storm surge, wind, and wave heights.
- *Coastal erosion, landslides, and inundation from sea level rise.* Sea level rise in the Tillamook area is expected to increase 2-9 feet by the end of the century, which could also cause inundation of important infrastructure and habitats, as well as erosion and landslides.
- *Change in abundance and distribution of habitat for aquatic and terrestrial wildlife.* Most species are closely linked to a specific “climate envelope” or suite of climatic conditions for which they are well adapted. As those climatic conditions shift on the landscape or within aquatic habitats, species are expected to experience population increases or declines, as well as dispersal to new areas.
- *Loss of wetlands and ecosystem services.* Higher temperatures, lower spring/summer precipitation, and inundation from sea level rise could result in loss of important wetlands and their associated ecosystem services. Wetlands act to filter pollutants, reduce downstream flood risk, and provide important habitat for biodiversity.

SSTW will result in cost effective short- and long-term socioeconomic benefits for the local community of TDM and the region as a whole, including reduced flooding and road failure that threaten public safety and interrupt commerce and recreation. The industries that form the backbone of Tillamook County’s economy - agriculture, timber, fishing, and tourism - all depend on healthy waterways and a reliable transportation system. Modeling work that is currently underway will consider the impacts of 50-year flooding, 100-year flooding, king tides, and future sea level rise on the community of TDM as

well as Sand Lake Road. This 2D modeling will inform the preferred alternatives for each element as the project moves through final design and permitting.

The [CDC Social Vulnerability Index](#) classifies Tillamook County as high vulnerability in housing and transportation. SSTW will improve the transportation system by upgrading road stream crossings, including along a priority one lifeline route, alternate Highway 101 routes, tsunami evacuation routes, and other critical infrastructure which improves daily access and safety of road conditions for local populations, the timber and dairy industry, and tourists. Much of the storm water infrastructure for TDM dates to the 1940s and 1950s and is generally inadequate at draining the 79" of annual rainfall that the area receives. Sand Lake Road, a county road which runs adjacent to the project area, has been sinking over the decades and has been identified as being at high risk of failure due to the aging culverts. This road is the primary connection for TDM residents and visitors to all amenities. Sand Lake Road is frequently cut off due to overtopping during winter months, resulting in isolating TDM residents for periods of time.

According to the [Climate and Economic Justice Screening Tool \(CEJST\)](#), south Tillamook County, where SSTW is located, is identified as disadvantaged in the categories of climate change, low income, higher education non-enrollment, expected building loss rate from natural hazards, and expected population loss rate from natural hazards.

TEP has developed an *Environmental Justice 40 and Equity Action Plan* (See Attachments) which has been approved by the EPA in August 2023. Utilizing the EPA's Environmental Justice Screening and Mapping Tool, it has been determined that all of Tillamook County is disadvantaged. In the areas surrounding the project area (1) the project vicinity ranks in the 61st percentile in the state for low income, (2) ranked very high for multiple health indicators, such as heart disease, asthma, cancer, and (3) has low broadband internet access.

(d) Providing benefit to underserved communities, including through partnerships with Tribe

By removing undersized and failing fish passage barrier culverts with structures designed to meet fish passage and climate standards while replacing inadequate and outdated storm water features, the Sitka Sedge Tidal Wetland project will build climate resilient infrastructure that increases public safety and provides economic benefits through job creation while reducing economic disruption due to flooding and road washouts.

Native Americans carry a wealth of Tribal Knowledge and Traditional Ecological Knowledge (TEK) about the native plant and animal communities that they have lived with and nurtured for millennia. Like Native Americans themselves, these wildlife communities have endured enormous negative impacts since European colonization of North America. Indeed, salmon has always been a first food and an important part of the identity of the people who have lived here time immemorial. As part of our efforts to restore the vitality of these native wildlife communities, it is critical that we learn from the immense body of knowledge and wisdom that Native Americans carry. Doing so ensures not only the most beneficial effort possible, but also ensures that the mutual connection and true interdependence between man and nature lives on, and maybe even reflects once again the relationship that existed before disturbance. Our work at SSTW is as much about people as it is about habitat, because they are

one in the same. The SSTW project recognizes the importance of indigenous peoples' traditional knowledge for understanding the environment, adapting to environmental change, and mitigating negative environmental impacts. SSTW project management is committed to making every effort possible to incorporate Native American knowledge and desire in the work we accomplish. To do so, TEP requested direct involvement from the Confederated Tribe of Siletz Indians staff and tribal members who wish to provide cultural knowledge and express specific elements they would like to see incorporated into the project. Their knowledge and insight are incredibly valuable to informing the best project habitat design and ecologically functional outcome for SLE.

Overall, the SSTW project will advance the Biden-Harris Administration's Justice40 Initiative's goals of "40 percent of the overall benefits of certain federal investments, such as climate, clean energy, and other areas, flow to disadvantaged communities that are marginalized and overburdened by pollution and underinvestment."

(2) TECHNICAL / SCIENTIFIC MERIT

(a) Project Methodology

This proposal has technical and scientific merit. The Sitka Sedge Technical Advisory team is composed of numerous technical experts with extensive experience conducting passage barrier replacement projects and infrastructure projects. This proposal includes elements that are: 1) grounded in scientific study and consistent with numerous management plans, 2) identified through a strategic planning process, 3) engineered using accepted design standards (including National Marine Fisheries Service fish passage guidelines) and will be constructed following today's construction best management practices, and 4) subject to considerable review and approvals. As a result, the proposed projects are feasible, and methodologies are state of the art.

TEP will engage members of the previously established Sitka Sedge Technical Advisory team to review all planning, design, and permitting deliverables associated with the SSTW project. These members are a collection of individuals with technical knowledge to specifically inform all aspects of the project alternatives and design including OPRD staff, engineers, local watershed councils, USFS hydrologists and biologists, USFWS biologists, planners for the Tillamook County Public Works Department, a DEQ Water Quality specialist, Oregon Department of Fish and Wildlife staff, and a Confederated Tribes of Siletz Indians fisheries biologist, and the regional director for the Department of Land Conservation and Development (DLCD). Additionally, TEP will engage members of the technical team for scoping and evaluation of project alternatives and the ultimate selection of a preferred alternative. The technical team, in consultation with TDM community members, have arrived at the conclusion that the construction of a new setback dike and a modern muted tide gate regulator (MTR) is the preferred alternative. Engineers are currently working with geotechnical experts to determine which of the three potential locations for this dike is the most beneficial to the recovery of salmonids in the Sand Lake Estuary and the sub-basin at large. TEP will also engage various regulatory partners that may not have participated in the Tech Team to ensure permitting input is included early on. The review team includes ecological experts, federal and state conservation professionals, and other key stakeholders. Utilizing input from this comprehensive team of reviewers, TEP in close coordination with OPRD will issue final approval for designs produced as part of this proposal. The technical team and project management will

also work closely with the Tierra Del Mar Community Association to determine the best design alternatives for providing community uplift and resilience.

Maintenance and long-term stewardship of SSTW will be necessary to ensure the desired condition is achieved and maintained. TEP and OPRD will follow guidelines set forth in an adaptive management plan that will be created for the site as a supplement to management activities already detailed in OPRD 2016 Master Plan for SSSNA. Activities anticipated include ecological performance monitoring including management “trigger points”, artificial debris cleanup, and invasive weed control as stated by the plan. This will be performed by SSTW managing partners (TEP, OPRD, NNSLWC) with assistance from the Sitka Sedge Collaborative and interested community members.

(b) Project Detail

Tidal wetland reconnections and restorations are highly complex projects. To achieve success, an ecologically defensible plan must be developed that takes into account ecological opportunities and constraints, engineered infrastructure, and stakeholder concerns. SSTW represents a prime opportunity to restore essential tidal wetland habitat in the context of a 357-acre state natural area.

SSTW Designs is inclusive of a larger project at SSSNA that includes upstream fish passage improvements on three salmon streams, floodplain wetland restoration, and large wood placement on Beltz and Reneke Creeks. To move the larger project forward, it is prudent that we demonstrate to our funders and regulatory partners that we have developed a preferred alternative for the breach of Beltz dike and associated low-impact setback flood protection that will achieve a high degree of connectivity and potential for tidal wetland restoration, while providing the community with infrastructure improvements. Once an effective tidal nexus and vision for tidal wetland restoration is clearly defined, we can bolster support from funders, stakeholders, and regulatory partners for all other elements and carry the entire watershed-scale project forward as a unit.

TEP and our management partners believe that the scope of work detailed in this proposal is the appropriate level of design to achieve partner support and streamline the design process with the bigger vision in mind. Since OPRD’s 2014 property acquisition, an enormous amount of technical work has gone into characterizing the existing conditions and opportunities at SSSNA. This proposal seeks to build upon that body of work strategically, and move the project towards implementation.

(c) Implementation Monitoring and Evaluation

This proposal is a funding request for 100% engineering design, permitting, and bid package for the following activities: breaching Beltz Dike, tidal wetland restoration work within the Sand Lake Estuary behind Beltz Dike, and replacements for fish passage barriers (failing or undersized culverts) on three creek crossings. However, a standardized monitoring plan will be developed during the design process, including gathering pre-implementation (baseline) data.

In addition to planning monitoring activities required under the various other funding agreements associated with projects in this portfolio, we will collect monitoring data consistent with NOAA Restoration Center, Tier I Implementation Monitoring standards to track projects and evaluate their success.

Monitoring will employ the following metrics:

1. *Site Passability*: channel width, channel slope, and jump height
2. *Presence of Target Fish Species*: presence/absence of target fish species/life stage limited by barrier
3. *Annual Operating and Maintenance Costs*: annual costs for five-year post construction period
4. *Safety Hazard*: describe hazard diminished or eliminated
5. *Community Enhancement*: changes to infrastructure

The attached Data Management Plan in Supplemental Information provides additional details about monitoring that will occur at the proposed project sites. In addition to the monitoring described above, SSTW will include effectiveness monitoring on all aspects of the project, utilizing the Aquatic Restoration Effectiveness Monitoring Program (AREMP) staff to collect post-implementation survey data.

(d) Socioeconomic Performance Measures

The SSTW project provides socioeconomic benefits to underserved communities. SSTW will employ metrics to capture the impact of the proposed work on community resilience, as well as other expected co-benefits such as public safety, infrastructure improvement, flood risk reduction, or removal of a physical hazard.

Job Creation/ Restoration Economy, maintenance costs: Sitka Sedge Tidal Wetlands Design will directly create jobs through the life of the project and support the local economy indirectly with long-term reduced road maintenance costs as evidenced through testimony of Tillamook County Public Works. TEP will track the number of jobs created by our projects as well as inputs in the restoration economy via purchases of materials and supplies. We will continue to estimate job creation using Table 4. in the 2017 NOAA technical memorandum NMFS-OHC; 1, "[Socioeconomic benefits of habitat restoration](#)". We will track any maintenance needed for five years post-project.

(3) *OVERALL QUALIFICATION OF APPLICANT*

(a) Restoration and Conservation Qualifications

The SSTW project partners consist of federal, state, and local government agencies with demonstrated education, experience, training, facilities, and resources to implement the projects within this proposal. Individual member organizations within the partnership and their staff have extensive experience implementing infrastructure improvement and passage barrier replacement projects. See key personnel descriptions in Supplemental Information.

While the Tillamook Estuaries Partnership (TEP) is providing Project Management and fundraising support, this project is part of the greater Salmon SuperHwy (SSH) effort in Tillamook County. Trout Unlimited (TU) is the overall coordinating organization for the SSH partnership, is a 501(c)3 non- profit organization with an annual budget of \$74 million and currently manages over 475 federally sourced grants. TEP is also a 501(c)3 non- profit organization with an annual operating budget of \$750,000. TEP is part of the National Estuaries Project, which falls under the umbrella of the EPA and is subject to all applicable audits and reporting.

(b) Management Capacity

Management of the proposed project will be provided by TEP, OPRD staff, and the Nestucca-Neskowin-Sand Lake Watershed Council. This project is included in the partner organization work plans and each organization has dedicated funding to support these staff. Further, each of these supporting partners have managed multiple past crossing replacement projects and have a record of successful projects and satisfied funders, partners, landowners, and community members. TEP employs multiple project managers who will also have access to project files and will be periodically briefed on the SSTW project should the need arise for a Deputy Project Manager to assist with carrying the project.

(4) *PROJECT COSTS*

Project costs will consist of (1) TEP staff time, (2) contracted services (design drawings, specifications, permitting document preparation, bid package development).

Sitka Sedge Final Design & Permitting - Scope of Work and Costs		
Task 1 - Modeling, Geotechnical, and Topographic Investigations		
1.1	2D hydraulic modeling and tech memo	\$91,558
1.2	Geotechnical investigation and designs for levee	\$41,692
1.3	Geotechnical laboratory testing	\$17,557
1.4	Drilling subcontractor	\$339,125
1.5	Geotechnical report preparation	\$14,190
1.6	Topographical Survey	\$40,811
1.7	Coordination and task management	\$25,710
Subtotal (hours)		\$570,643
Task 2 - 30% Engineered Design Plans		
2.1	Develop 30% design drawings and cost estimate	\$170,795
2.2	Preliminary design Report	\$18,545
2.3	Coordination and task management	\$20,187

Subtotal (hours)		\$209,527
Task 3 - 60% Engineered Design Plans		
3.1	Develop 60% design drawings and cost estimate	\$170,305
3.2	Coordination and task management	\$20,187
Subtotal (hours)		\$190,492
Task 4 - 90% Engineered Design Plans		
4.1	Develop 90% design drawings, cost estimate, and specifications	\$248,142
4.2	Coordination and task management	\$20,187
Subtotal (hours)		\$268,329
Task 5 - 100% Engineered Design Plans		
5.1	Develop 100% design drawings, cost estimate, and specifications	\$82,885
5.2	Coordination and task management	\$20,187
Subtotal (hours)		\$103,072
Task 6 - Complete Permit Documents		
6.1	County, Federal, and State agencies permits	\$123,174
6.2	Land use review	\$40,714
Subtotal (hours)		\$163,888
Task 7 - Personnel		
7.1	Tillamook Estuaries Partnership personnel	\$47,500
Subtotal (hours)		\$47,500
Task 8 - Indirect (10%)		

8.1	10% de minimus	\$155,345
	Subtotal	\$155,345
	Totals	\$1,708,796

(5) OUTREACH AND EDUCATION

(a) Stakeholder Support

The TEP partnership and Sitka Sedge Tidal Wetlands project includes representatives from federal, state and local governments, non-governmental organizations, businesses, and private individuals. Tribal representatives participate in SSTW Technical Team meetings when capacity allows. Letters of stakeholder support can be found in the Attachments section.

(b) Inclusive Engagement

For the contractual elements of the project, TEP will follow procurement standards set forth in 2 C.F.R. § 200.317-200.327. All RFPs and contracts issued and awarded for this project, as a condition of working with TEP are subject to the following clause:

“As a condition of receiving the award of a Contract Agreement with TEP, the contractor must certify that it has in place a policy and practice of preventing sexual harassment, sexual assault, and discrimination against employees who are members of a protected class. The policy and practice must include giving employees a written notice that the policy both prohibits, and prescribes disciplinary measures for, conduct that constitutes sexual harassment, sexual assault, or unlawful discrimination.”

For this final phase of design, RFPs will be advertised broadly to encourage a range of proposals. Selection criteria will be clearly outlined in the RFP and weighted by each firm’s expertise and ability to successfully complete the necessary work on time and on budget as is allowable under TEP’s fiscal policy. Additionally, TEP adheres to the policy that subcontracting should prioritize disadvantaged business enterprise, minority-owned business, woman-owned business, a business that a service-disabled veteran owns or an emerging small business.

(c) Community Outreach and Education

Beltz Dike tide gate, which is the barrier to be addressed in this request, is owned by OPRD and within the SSNA area which is classified as Oregon State Public Land. While the Tillamook Estuaries Partnership is providing Project Management oversight, the SSTW restoration project is being carried out with full cooperation of OPRD in all stages of planning, data collection, design, permitting, and community outreach. Additional modeling work, which will include project-adjacent land owners in TDM who have a

stake in flooding issues associated with stormwater, king tides, and sea level rise impacts will be directly included in data collection, modeling, and design work.

TEP and OPRD have been striving to continue to have meaningful engagement with the community. The greater community will be engaged throughout the design process via regularly scheduled, in-person and virtual Town Hall meetings, email and physical mail updates to the Sand Lake Community Working Group, educational hikes through the Explore Nature program, and providing publicly available electronic recordings of SSTW Technical Advisory Team meetings online.

Project managers are seeking additional grant funding specifically for Community Engagement for SSTW from the Oregon Watershed Enhancement Board and other federal sources.

Appendix B
**Sitka Sedge Tidal Wetland
Restoration Alignment with
Comprehensive Plan Goal Review**

Overview

The Sitka Sedge Tidal Wetland Restoration Project is an initiative designed to restore and enhance the ecological integrity of a rare and sensitive coastal wetland system located within the Sitka Sedge State Natural Area in Tillamook County, Oregon. This project seeks to reestablish native tidal marsh habitat, improve hydrologic connectivity, support fish and wildlife populations, and increase the area's resilience to climate change and coastal hazards.

As part of the land use permitting process, this summary demonstrates how the proposed restoration aligns with Oregon's Statewide Planning Goals, which serve as the foundation for land use planning and resource protection across the state. The goals addressed in this document include:

- Goal 5: Natural Resources, Scenic and Historic Areas, and Open Spaces
- Goal 6: Air, Water, and Land Resources Quality
- Goal 7: Areas Subject to Natural Hazards
- Goal 8: Recreational Needs
- Goal 11: Public Facilities and Services
- Goal 12: Transportation
- Goal 14: Urbanization
- Goal 16: Estuarine Resources
- Goal 17: Coastal Shoreland Goal 18: Beaches and Dunes

A text amendment is requested for Goal 17 (Coastal Shorelands) to reinventory Beltz Marsh as described in Chapter 2 above, although the project is designed to be consistent with the intent of that goal.

Goal 5: Natural Resources, Scenic and Historic Areas, and Open Spaces

"To protect natural resources and conserve scenic and historic areas and open spaces."

Resources inventoried in Goal 5 may also be inventoried in Goal 16 Estuarine Resources or Goal 17 Coastal Shorelands, in these cases the resource specific goals supersede Goal 5. The Sitka Sedge Wetland Restoration Project directly supports Goal 5 by restoring and enhancing significant wetland and riparian habitats, and essential salmonid habitat in the estuary south of the existing Beltz dike, Reneke and Beltz Creeks. Restoration activities are designed to improve ecological function while preserving open space values consistent with the Tillamook County Comprehensive Plan.

Open Space and Significant Natural Areas. The project area includes tidal marshes and Sitka spruce swamps, which are recognized as critical fish and wildlife habitats. The project is located within SSSNA, which is both an open space and natural area that complies with the policies for both categories.

Fish and Wildlife Habitat. Portions of the project area are inventoried as Peripheral Big Game Range for providing winter habitat and range. Big game known to occur in and adjacent to SSSNA include black bear, cougar, Roosevelt elk, and blacktail deer. The proposed project will not result in degradation or destruction of big game habitat. The project is anticipated to create a permanent improvement to habitat quality and diversity and may result in a temporary impact to big game during

construction due to noise and activity and a. The project does not increase the recreation levels or impacts to big game.

The project will result in temporary impacts to waterfowl habitat due to vegetation removal and grading, however the project will restore and enhance the area to improve habitat. The project will apply for and obtain all applicable Federal, State and Local agencies prior to commencing with work.

The primary goal of the project is to improve and restore fish habitat and fish passage by removing barriers at the existing failed tide gate and (3) creeks that provide habitat upstream of the estuary, crossing under Sandlake Road and extending into the adjacent hills. The project does not propose any identified adverse activities such as forestry, agriculture, residential, commercial or industrial development. As noted above the project will coordinate with all applicable agencies and obtain all necessary permits prior to commencing work.

A site-specific biological assessment was not included in this permit application package because the project is consistent with and qualifies for coverage under the PROJECTS Programmatic Biological Opinion (USFWS 2015). Scenic Views and Sites. A significant scenic resource, Beltz Farm Sandspit, within SSSNA in the vicinity of the proposed project is inventoried under Goal 17 and described in more detail below.

Historic and Cultural Resources. The project avoids impacts to inventoried historic or cultural resources and maintains the scenic character of the coastal landscape. A cultural resources survey has been conducted for the project and submitted to Federal, State and Tribal authorities. The project will secure authorization from applicable agencies as needed to authorize the work, while protecting any known or discovered resources.

Recreation Trails. The Oregon Coast Trail route passes through the project area within the Sandlake Road right-of-way. The project poses no permanent impacts to the trail.

Wetlands. There are no significant wetlands inventoried under Goal 5 within SSSNA. The project includes a significant marsh, Beltz Farm Marsh and Reneke Creek, which is inventoried under Goal 17 and described in more detail below.

There are no wild and scenic rivers, economic resources, water resources, or wilderness areas within the project areas.

Goal 6: Air, Water, and Land Resources Quality

"To maintain and improve the quality of the air, water and land resources of the state."

The project improves water quality by restoring natural tidal exchange and wetland filtration functions, reducing sedimentation and nutrient loading to adjacent estuarine waters. Proposed restoration activities will improve habitat conditions within the estuary and remove barriers for fish access between the estuary and the three streams that drain into the estuary within the project boundary. Riparian vegetation in the project will be preserved to the extent possible. Vegetation removal will be limited to areas directly adjacent to the project area to allow restoration work to proceed to preserve water quality. The project will have no adverse impacts to stream flows or water temperatures in Reneke, Beltz or No name Creeks. Water temperature within the Reneke Creek may improve after the project when the creek is rerouted through the existing forested wetland. Water temperature in the estuary portion of the project is likely to improve with the increase in tidal connectivity and exchange after the existing dike is breached. The project will obtain all required federal and state permits prior to construction. Erosion control measures will be implemented during construction, and all activities will comply with DEQ and Clean Water Act requirements. Land disturbance will be minimized and followed by revegetation with native species to stabilize the site after project completion and protect water quality. No adverse impacts to air quality are expected. The

proposed project will encourage recycling and reuse to the extent practicable. No adverse impacts to solid waste disposal are expected as a result of the project.

Goal 7: Areas Subject to Natural Hazards

"To protect people and property from natural hazards."

The Sitka Sedge site includes a number of known hazard types, including floodplain, tsunami, and landslide. The site is located in a coastal floodplain and is subject to tidal flooding. The restoration project is designed to enhance flood resilience restoring natural tidal hydrology to the majority of Beltz Marsh, while maintaining an equivalent or better level of flood protection for the community of Tierra Del Mar by providing adequate storage capacity and increased drainage capacity to reduce peak water levels at the south end of Beltz Marsh. No structures are proposed in high-risk areas, and the project complies with FEMA and County floodplain development standards. Floodplain requirements are addressed in further detail in Chapter 5 Floodplain Development Permit, which addresses the Flood Hazard Overlay (TCLUO 3.510). Geologic hazards including landslides, groundwater, erosion control, and soil bearing capacity are addressed in Chapter 6 Dune Area Development Permit addresses the Beach and Dune Hazard Overlay Zone (TCLUO 3.530). The Geologic Hazard Report is appended to this application and includes guidance on construction considerations and methods. Tsunami considerations related to the Tsunami Hazard Overlay (TCLUO 3.581) Zone are addressed in further detail in Chapter 4 above. The project does not increase risk to adjacent properties and supports hazard mitigation through nature-based solutions.

Goal 8: Recreational Needs

"To satisfy the recreational needs of the citizens of the state and visitors."

The site was developed as a State Natural Area by OPRD in 2018, providing beach access, trails, restrooms, interpretive signage, parking and other amenities for recreational purposes. The proposed project will breach the existing dike to restore wetlands, improve habitat quality, birdwatching opportunities, environmental education, and scenic enjoyment while maintaining recreational trail access with the proposed bridge. These improvements are consistent with the County's Goal 8 policies to support low-impact recreation that complement natural resource protection.

The Goal 8 destination resort designation identifies sites that meet criteria and could be eligible for development. It doesn't require development and is not an inventoried protected resource that requires a map change in the Comprehensive Plan. The site may have historically been identified as a potential for Destination Resort Development and/or been mapped under the Coast Resort overlay zone (TCLUO 3.525 related to Goal 8 Destination Resorts). Per the maps provided by Tillamook County Community Development, Beltz Marsh was removed from the Coast Resort (CR) overlay zone in March 1992. The site has likely changed substantially since the Comprehensive Plan was adopted in 1985. The tide gate that restricted tidal inundation south of Beltz Dike has failed allowing daily tidal fluctuations within the wetlands, making the site wetter and unsuitable for development. Destination resort development would likely have an adverse impact to natural resources protected by Federal and State agencies, and is in conflict with Comprehensive Plan Goals 5, 7, 16, and 17, and the TCLUO RM and EN zones.

Goal 11: Public Facilities and Services

"To plan and develop a timely, orderly and efficient arrangement of public facilities and services to serve as a framework for urban and rural development."

The project includes the construction of a new 49-foot span vehicular bridge within the Sandlake Road right-of-way in place of the existing undersized culvert and will raise approximately 800 feet of roadway to reduce roadway seasonal overtopping and flooding. This bridge addition will improve existing access for emergency public services such as police, fire and ambulance, and public transportation for the community of Tierra del Mar to the south. Access for construction and

maintenance will use existing roads and trails. The project supports efficient land use by restoring ecological functions without requiring urban-level services, consistent with rural development policies under Goal 11. The intake for the Tierra del Mar water supply is located on OPRD property east of Sandlake Road, upslope of the proposed project, and will not be affected. Stormwater runoff from Tierra del Mar has been accommodated in the project's design of the setback dike and tide gate structure to maintain flood protection from peak tidal water levels and improve drainage of stormwater runoff to result in lower anticipated water levels after the project is completed. The setback levee has been sited to minimize wetland impact while providing adequate storage capacity to contain runoff from winter storms that occur during high tides when the tide gate would be closed for up to 8 hours. The project will have no adverse effect on other public facilities and services included under this goal such as sewage treatment, solid waste disposal, public schools, utilities, energy.

Goal 12: Transportation

"To provide and encourage a safe, convenient and economic transportation system."

The project complies with general transportation policies, will not generate significant traffic or change existing level of use within the natural area, and will use existing access routes. Temporary construction activity will be managed to minimize impacts to traffic on Sandlake Road and avoid conflicts with recreational users. The project supports non-motorized access and enhances trail connectivity, consistent with Goal 12 objectives for multimodal and context-sensitive transportation planning.

The new bridge and road reconstruction will be built to County Transportation standards in coordination with Tillamook County Public Works. The project will not alter driveways, access points, or impact public, air, water or rail transportation.

Goal 14: Urbanization

"To provide for an orderly and efficient transition from rural to urban land use."

The Sitka Sedge project is rural land located outside any Urban Growth Boundary and does not involve urban development. It supports the County's rural land use policies by preserving open space and natural resource lands. The project does not require urban services and is consistent with the County's strategy to direct growth to designated urban areas while protecting rural and resource lands.

Goal 16: Estuarine Resources

"To recognize and protect the unique environmental, economic and social values of each estuary and associated wetlands; and to protect, maintain, where appropriate develop, and where appropriate restore the long-term environmental, economic, and social values, diversity and benefits of Oregon's estuaries."

The Sitka Sedge project is associated within the SLE and includes restoration of estuarine wetlands and tidal channels. The project complies with the Tillamook County Estuary Management Plan and supports the primary purpose of Estuary Natural and Conservation zones. Restoration activities are designed to enhance fish and wildlife habitat, improve water quality, and increase estuarine resilience to climate change. The project is consistent with Goal 16 policies encouraging restoration of diked and degraded estuarine lands. In addition to the project relevance to the Goal 16 Estuary Resource policies described below, the proposed Comprehensive Plan Text Amendment to reinventory Beltz Marsh from Goal 17 to Goal 16 discussed in detail in Chapter 2 above. The proposed project will comply with TCLUO 3.100-3.140 for Estuary Zones as described in Chapter 4 above.

"A use or activity is consistent with the resource capabilities of the area when either the impacts of the use on estuarine species, habitats, biological productivity and water quality are not significant or that the resources of the area are able to assimilate the use and activity and their effects and continue

to function in a manner to protect significant wildlife habitats, natural biological productivity, and values for scientific research and education.”

Beltz Marsh is described in Goal 16 as a one of two major historic alterations to the Sandlake Estuary, where 55 acres of historic tidal marsh was removed from tidal influence and subsequently converted to freshwater marsh, designated as major marsh and significant habitat in Goal 17, due to impoundment of the three creeks behind the tidegate in the dike. Since the time the Comprehensive Plan was written, the tide gate in the dike has failed, which has resulted in daily muted tidal influence returning to the marsh south of the dike. The development of the major marsh inventoried in goal 17 was the result of human intervention. The project proposes to reverse that and restore the historic tidal marsh to improve habitat function, connectivity and quality.

The project conforms with the Goal 16 Estuarine Resource policies that apply to the Estuary Natural zone. At the time Goal 16 of the Comprehensive Plan was adopted, Beltz Farm Wetland was not considered to be a viable restoration site because removal of the dike would impact the freshwater wetland. Today this transition to historic intertidal marsh conditions is already occurring. Replacing the failing tide gate with a new bridge, will serve dual functions of maintaining public recreation access to the beach and trails west of the marsh and reconnecting the marsh to the estuary to improve fish and wildlife habitat. Maintenance of existing dikes and tide gates are allowed within the estuary; the tide gate failure has resulted in portions of the marsh starting to revert to intertidal marsh. The tide gate has been open and allowing partial daily tidal influence south of the dike for the past 10 years. Flow is restricted through the open tide gate resulting in significant flow velocities that impair fish passage on both in- and outgoing tides. The high flow velocities are also resulting in erosion of the dike in the vicinity of the tide gate.

The project is in conformance with the policy to prioritize restoration of low-lying diked areas adjacent to estuarine wetland or tideland by either active or passive means for restoration of fish and wildlife habitat and improved water quality in the southern section of Sandlake estuary. The project will restore land to the EN2 management unit by breaching and removing fill in the historic dike footprint. New bridge footings will be excavated within the existing dike footprint and will not result in additional impacts to the estuary. The dike breach will result in further restoration of historic estuary land by improving tidal connectivity [restoration of fish and wildlife habitat water quality] and fish passage to the creeks and marsh south of the dike. The contractor will isolate the in-water construction area to prevent sediment from entering the estuary. The proposed project will comply with all Federal and State rules and requirements, including a Joint Removal Fill Permit from the USACE, DSL and DEQ. Excavation and dredging associated with the project are needed to achieve the goals of the restoration project. The project will provide for long term improvement to the estuarine environment by restoring historic tidal marsh, water quality in the marsh, improving fish habitat with improved water quality, fish passage through the dike, and access to spawning and rearing habitat upstream in Reneke and Beltz Creeks.

The site is not suitable for aquaculture, energy facilities, utilities, and forestry.

Goal 17: Shoreland

"To conserve, protect, where appropriate develop and where appropriate restore the resources and benefits of all coastal shorelands, recognizing their value for protection and maintenance of water quality, fish and wildlife habitat, water-dependent uses, economic resources, recreation and aesthetics."

Coastal shorelands include areas subject to ocean flooding, lands within 100 feet of the ocean shore or 50 feet of an estuary, as well as areas of exceptional aesthetic quality, significant biological habitats, and headlands, among other features. The project area includes two inventoried sites associated with the Shorelands Element, Beltz Farm Sandspit and Beltz Farm Marsh and Reneke Creek.

Beltz Farm Sandspit is identified as an exceptional aesthetic resource and significant wildlife habitat for snowy plover nesting habitat documented in the northwest portion of the spit. No construction activity is proposed in or near mapped snowy plover habitat. The proposed project will have minimal temporary impacts to limited areas on the east side of the sandspit to facilitate construction access. Restoration activity will be limited to the Beltz dike and marsh areas and will not impact the sandspit. A portion of the existing dike will be removed and replaced with a low profile pedestrian bridge, that will not create an adverse impact on the aesthetic resource of the spit.

Beltz Farm Marsh and Reneke Creek are inventoried as significant wildlife habitat. Beltz Farm wetland is described in the Goal 17 element, 3.1d, c. as a “nontidal emergent wetland” adjacent to the estuary. At the time this site was inventoried Beltz dike had a functioning tide gate and likely met this definition. Beltz Farm Marsh no longer meets this definition. The site is now tidally influenced due to the failed tidegate in the dike, which allows tidal inundation in the marsh daily to an estimated muted highest measured tide of approximately 10.5’. As described in the paragraph cited above, tidally influenced freshwater wetlands are included in the estuary boundary rather than the shoreland boundary. The proposed text amendment to reinventory Beltz Farm Marsh from Goal 17 Shoreland to Goal 16 Estuary is described in more detail in Chapter 2 of this application. The project proposes improvements to Reneke Creek to relocate the creek channel from the roadside channel back into a historic flow path through the forested wetland east of Sandlake Road and to replace the undersized culvert under the road with a 49-foot bridge. In addition, the proposed dike breach and pedestrian bridge will restore Reneke Creeks historic free flowing, direct connection to the estuary. The proposed work will improve fish passage through the existing dike, under the road, and to habitat upstream of the project. The project will improve fish and wildlife habitat both in the estuary and the creeks in the project area, consistent with Shoreland policies for protection of significant shoreland resources, wildlife habitat, and aesthetic resources. Post project, the natural area will continue to serve passive recreation uses such as hiking, birdwatching and photography at existing use levels. The proposed project will comply with TCLUO 3.545 for Shoreland Overlay as described in Chapter 4, above.

Goal 18: Beaches and Dunes

"To conserve, protect, where appropriate develop and where appropriate restore the resources and benefits of coastal beach and dune areas."

The project area includes stabilized dunes and interdunal wetlands. No development will occur on active foredunes. Restoration activities are designed to protect dune stability, enhance native vegetation, and avoid erosion. The project complies with Tillamook County’s dune hazard overlay standards and supports Goal 18 objectives to manage development in dune areas to avoid hazards and protect ecological values.



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Suite 400
Portland, OR 97214
503.274.2010 **phone**
503.274.2024 **fax**

esassoc.com

Memorandum

date June 15, 2026
to Christer LeBrecque, Tillamook Estuaries Partnership
cc Tillamook County Land Planning Department
from Hunter White, PE – Engineer of Record for Sitka Sedge Tidal Wetland Restoration
subject Hazard Disclosure Statement for Geologic Hazard Assessment

I am a Professional Civil Engineer licensed in Oregon (83882PE) and the Project Engineer of Record for the Sitka Sedge Tidal Wetland Restoration and Sandlake Road Culvert Replacements project. Pursuant to the requirements of the Tillamook County Dune Area Development Permit application, I certify that the Sitka Sedge Tidal Wetland Restoration Project proposed elements depicted in the Plans are designed in conformance with the development standards outlined in the Geologic Hazard Assessment (GHA).

ESA subcontracted Shannon & Wilson to provide geotechnical engineering services associated with the project, including the required GHA. The Geologic Hazard Report (GHR) was prepared by a Shannon & Wilson Oregon Certified Engineering Geologist (CEG) and Geotechnical Engineer (GE) in accordance with conditions and standards outlined in Tillamook County Land Use Ordinance (TLCO) 4.130, Development Requirements for Geologic Hazard Areas. The project area is located with the Sand Lake Estuary, Beltz Marsh, and Sandlake Road, and no structures or construction activity are proposed near or abutting the ocean shoreline. Applicable content has been addressed within this report for structures and construction activity, which is proposed within the mapped alluvial fan features as indicated by the Oregon Department of Geology and Mineral Industries (DOGAMI).

I verify that I have read the GHR and incorporated the development standards of the GHA into project design. David Evans and Associates, Inc. (DEA), as a subconsultant to ESA is providing structural and roadway engineering design services for the proposed pedestrian bridge and Sandlake Road bridges. PSE Consulting Engineers, as a subconsultant to ESA, is providing structural engineering services for the proposed concrete tide gate structure. Shannon & Wilson's geotechnical engineering staff will review ESA, DEA, and PSE design drawings at each stage advancing to final design for conformance to their geotechnical engineering recommendations and the development standards outlined in the GHA.

STAMP



June 1, 2026

Digitally Signed by Hunter White, PE (Oregon 83882PE)

Authenticated Digital Signature PDF available upon request.



DEVELOPMENT PERMIT

Applicant ☐ (Check Box if Same as Property Owner)

Name: Tillamook Estuaries Partnership (TEP) Phone: 503-322-2222

Address: PO Box 493 613 Commercial Street

City: Garibaldi State: OR Zip: 97118

Email: christer@tbnep.org

Property Owner

Name: Oregon Parks and Rec Dept Phone: 503-986-0707

Address: 725 Summer Street NE, Suite C

City: Salem State: OR Zip: 97301

Email: OPRD.SitkaSedge@oregon.gov

REQUEST: Oregon Parks and Recreation Department (OPRD) and Tillamook Estuaries Partnership are proposing improvements and modifications to infrastructure at Sitka Sedge State Natural Area (SSNA) to restore tidal hydrology, aquatic organism passage, and habitat conditions in the area known as Beltz Marsh. Proposed project elements include a dike breach to reconnect Beltz Marsh to Sand Lake, coupled with a setback dike near the south end of Beltz Marsh to maintain flood protection for the adjacent community of Tierra Del Mar and Sandlake Road. The project would also include improvements to the parking area and trails within the SSNA. Additionally, Tillamook County Public Works would lead the proposed replacement of three culverts at the stream crossings of Beltz, Reneke, and No Name Creeks along Sandlake Road within the project area. Type III Dune Area Development Permit and Geologic Hazard Review; Beach and Dune Overlay Zone

Location:

Site Address: 26805 & 27340 Sandlake Rd. Cloverdale, OR 97112

Map Number: 3S & 4S 10W & 10W 31 & 06 3S10310000400 & 4S10060000300&400
Township Range Section Tax Lot(s)

Complete all applicable fields:

Regulatory Floodway:	☐	Estuary:	☒	Floodplain:	☒
New:	☐	Addition:	☐	Replacement:	☐
Dwelling:	NA	Accessory Structure:	NA	Remodel:	☐
Culvert Diameter:	Box Culvert: 12'x10'	Bridge Length:	140'x10' pedestrian bridge	Demolish:	☐
Length:		Width:			
Fence Height:	NA	Retaining Wall Height:	NA		
Streambank Stabilization:	Natural, bu	Other:	NA		
Fill/Removal/Grading:	1000 CY	Vegetation Removal:	1000 CY		
33,000 CY fill, 21,000 CY Removal					
Structure/Damage \$:	5 Year Construction \$:				
Substantial improvement/damage threshold 50% cost vs. value					

Flood Insurance Rate Map (FIRM) Panel Info

Tillamook County	Panel Number: 41057C0715F
Effective Date: 9/28/18	Property Flood Zone(s): Zone AE
Floodway: N	Project Flood Zone(s):
Stream/Waterbody Name: Sand Lake	

Elevation Data (NAVD 88)

Base Flood Elevation: 11.8'	First Habitable Floor: n/a
Lowest Floor/Horizontal Member: n/a	
Enclosed Area: n/a	Flood Vent Area:

Other Required Permits

404 Removal/Fill Permit, 401 WQ Certification, 1200-C ESC Permit
ODFW Fish Passage Authorization

Authorization

This permit application does not assure permit approval. The applicant and/or property owner shall be responsible for obtaining any other necessary federal, state, and local permits. The applicant verifies that the information submitted is complete, accurate, and consistent with other information submitted with this application.

Eric Timmons

Digitally signed by Eric Timmons
Date: 2026.06.25 08:09:25 -07'00'

6/25/2026

Property Owner Signature (Required)

Christer LaBrecque

Digitally signed by Christer LaBrecque
Date: 2026.06.24 11:47:07 -07'00'

6/25/2026

Applicant Signature

Date

Date



SUBMITTED TO:
Environmental Science
Associates
819 SE Morrison Street,
Suite 310
Portland, OR 97214



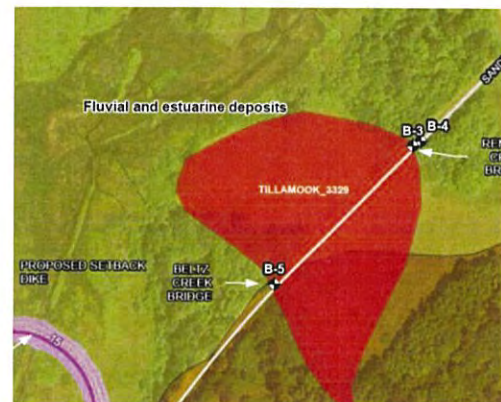
BY:
Shannon & Wilson
3990 Collins Way, Suite 100
Lake Oswego, OR 97035

(503) 210-4750
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GEOLOGIC HAZARD REPORT

Sitka Sedge Tidal Wetland Restoration

TILLAMOOK COUNTY, OREGON



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Submitted To: Environmental Science Associates
819 SE Morrison Street,
Suite 310
Portland, OR 97214
Attn: Hunter White

Subject: GEOLOGIC HAZARD REPORT, SITKA SEDGE TIDAL WETLAND
RESTORATION , TILLAMOOK COUNTY, OREGON

Shannon & Wilson prepared this Geologic Hazard Report and participated in this project as a subconsultant to Environmental Science Associates (ESA). Our scope of services was specified in the cost proposal for geotechnical engineering services delivered to ESA on August 15, 2025. This report presents our geologic hazard assessment and review for the Sitka Sedge Tidal Wetland Restoration project (the Project) and was prepared by the undersigned.

We appreciate the opportunity to be of service to you on this project. If you have questions concerning this report, or if we may be of further service, please contact us.

Sincerely,

SHANNON & WILSON



Exp. 12/31/2026

Seth Sonnier, CEG
Senior Engineering Geologist



Travis Nguyen, PE, GE
Senior Associate Geotechnical Engineer

SCS:TTN:CKS/lxr

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Important Information

ACRONYMS

bgs	below ground surface
CEG	Certified Engineering Geologist
CSZ	Cascadia Subduction Zone
DOGAMI	Oregon Department of Geology and Mineral Industries
ESA	Environmental Science Associates
GE	Geotechnical Engineer
GER	Geotechnical Engineering Report
GER	Geotechnical Engineering Report
H:V	Horizontal to Vertical
Mw	moment magnitudes
OPRD	Oregon Parks and Recreation Department
OSHA	Occupational Safety and Health Administration
PGG	Pacific Groundwater Group
ROE	right-of-entry
ROW	right-of-way
SLIDO	Statewide Landslide Information Database for Oregon
SPT	Standard Penetration Testing
TDM	Tierra Del Mar
TLCO	Tillamook County Land Use Ordinance
USCS	Unified Soil Classification System
USGS	United States Geological Survey
USGS	United States Geological Survey

1 INTRODUCTION

1.1 General

This report presents an assessment of geologic hazards within the Project area in Tillamook County, Oregon. As a subconsultant to ESA, Shannon & Wilson is providing geotechnical engineering services, including field explorations, laboratory testing, and preliminary engineering analysis and recommendations for the proposed structures included in the Project. The location of the Project site is shown on the Vicinity Map, Figure 1.

Shannon & Wilson is providing a separate Geotechnical Engineering Report (GER) to ESA for the Project, which will include design and construction recommendations after the field explorations and engineering design phases are completed. Specific recommendations for geotechnical engineering will be outlined within the GER.

1.2 Statement of Applicable Content and Qualifications

This Geologic Hazard Report was prepared by a Shannon & Wilson Oregon licensed Certified Engineering Geologist (CEG) and Geotechnical Engineer (GE) in accordance with conditions and standards outlined in Tillamook County Land Use Ordinance (TCLO) 4.130, Development Requirements for Geologic Hazard Areas. The project area is located within the Sand Lake Estuary, Beltz Marsh, and Sandlake Road, and no structures or construction activity are proposed near or abutting the ocean shoreline. Applicable content has been addressed within this report for structures and construction activity, which is proposed within the mapped alluvial fan features as indicated by the Oregon Department of Geology and Mineral Industries (DOGAMI). We found that requirements within TCLO 4.130 Section 6 (f) were not applicable within the GHR due to the location of the project area.

Seth Sonnier is an Oregon-licensed CEG with over 14 years of professional experience performing geologic field mapping, geotechnical site reconnaissance, subsurface exploration, and surface and subsurface characterization for large and small-scale civil engineering and mining projects. Seth also specializes in landslides and geologic hazards as a Senior Engineering Geologist working for Shannon & Wilson for over 11 years and has stamped geotechnical data and geotechnical engineering reports for multiple landslide characterization, mitigation, and monitoring projects within Oregon and Washington. Seth is also a project geologist at Shannon & Wilson for many other types of civil engineering projects, which include the design and construction for deep foundations, retaining walls, tunneling, horizontal directional drilling, levee improvement, and material source exploration and production.

Travis Nguyen is an Oregon-licensed GE with over 25 years of experience in geotechnical consulting and project management. Throughout his career, Travis has worked on many projects where he specialized in levee construction and improvement, slope stability, and seismic engineering within the state of Oregon.

It is our opinion that Seth Sonnier, CEG, and Travis Nguyen, PE, GE have the appropriate qualifications to complete this report and its contents.

1.3 Scope of Services

Shannon & Wilson's services were conducted in accordance with the Subcontractor Agreement with ESA dated August 25, 2025. The completed services for the preparation of this report consisted of the following tasks:

- Performing a data review of relevant publications from local, state, and national agencies, and a site reconnaissance to observe and document known geologic hazards; and
- Preparing this Geological Hazard Report summarizing data findings and observations from the site reconnaissance.

2 PROJECT UNDERSTANDING

2.1 Site Description

The Project site is located within the Sitka Sedge State Natural Area (Sitka Sedge) and along Sandlake Road between the entrance and Roma Avenue in Tillamook County, Oregon. The Sitka Sedge is generally located within the Sand Lake Estuary, with a separate area of the Beltz Marsh located south of the Beltz Dike. The area was used for cattle grazing and dairy farming throughout the early to mid-1900s. A dike embankment (Beltz Dike) runs east to west across the marsh area and was constructed in the 1930s to extend the limits of grazing land (Wilsey and Ham, Inc., 1974). A culvert and tidal gate were installed within the eastern portion of the dike to control tidal flows within the grazing lands. This original tidal gate over time failed and was replaced. Elevations within the Beltz marsh generally range between 7 and 9 feet, along Beltz Dike approximately 12 to 15 feet, and approximately 17 to 32 feet along the stretch of Sandlake Road within the Project area.

The Sitka Sedge trail across the dike was a dike access road now re-purposed as a hiking trail located on top of Beltz Dike through the northern portion of the project site, and extends west from Sandlake Road parking area across the marsh and to the trail system that provides beach access. The trail is approximately 8 to 15 feet wide at an approximate side slope gradient of 1 Horizontal to 1 V (1H:1V) to 2H:1V. Brush and large trees are growing

along the trail. South of Beltz Dike, the Beltz Marsh is generally flat with standing water and small inundated channel systems.

Sandlake Road within the project area runs southeast from the entrance of the Sitka Sedge to the parking area just north of Roma Avenue. Sandlake Road crosses three small creeks within this stretch, Reneke Creek, Beltz Creek, all of which are diverted under the road through concrete culverts. These creeks drain from valleys within the Coast Range Mountains, which rise steeply east of Sandlake Road. The area around Sandlake Road is heavily vegetated with trees and brush. Exhibits 2-1 through 2-8 present site photographs showing the proposed structure and construction sites. Locations of features referenced in this report, as well as the geotechnical explorations completed to date, are shown on Figure 2, Site and Exploration Plan.



Exhibit 2-1: View west within the trailhead on top of Beltz Dike near the site of the proposed pedestrian bridge.



Exhibit 2-2: View southeast over the Beltz Marsh and hills east of Sandlake Road.



Exhibit 2-3: View south showing the Beltz Marsh area south of the Beltz Dike.



Exhibit 2-4: View west showing the slope of the embankment of Beltz Dike.



Exhibit 2-5: View southeast along Sandlake Road within the area of Reneke Creek and the proposed bridge.



Exhibit 2-6: View northeast along Sandlake Road within the area of Beltz Creek and the proposed bridge.



Exhibit 2-7: View west showing wooded area west of Beltz Creek towards Beltz Marsh and Sitka Sedge.



Exhibit 2-8: View northeast along Sandlake Road near the location of the existing No Name Creek Culvert.

2.2 Project Description

The Project consists of a proposed pedestrian bridge at Beltz Dike, replacement of stream-crossing culverts with new bridges or culverts along Sandlake Road, and the construction of a setback dike within the southern portion of Beltz Marsh. The culvert replacements consist of proposed bridges at Reneke Creek and Beltz Creek and a box culvert at No Name Creek. The location of the construction activities for the project is within the Sand Lake Estuary, Beltz Marsh, and Sandlake Road, and no structures or construction activity are proposed on the beach or ocean shoreline area of the Sitka Sedge.

The tidal gate within Beltz Dike has deteriorated over time and no longer blocks incoming tides; rather, it restricts the tide as it runs in and out of the Beltz Marsh area. There is a high risk that the tidal gate will eventually fail, and mitigation and repair to the current tidal gate are not practical due to conditions within modern fish passage regulations. The proposed design includes construction of a setback dike and tidal gate in the southern portion of Beltz Marsh, which would replace the tidal control function of the existing Beltz Dike. Beltz Dike

is proposed to be breached, and a pedestrian bridge would be constructed over the breached zone of the dike. Replacement of the existing culverts of the tributary creeks is planned to further improve and preserve natural water flow into the marsh, as well as drainage and flood control of the immediate area around Sandlake Road, where those creeks intersect.

The existing culvert on Beltz Dike is a 4-foot x 4-foot concrete box culvert, which is missing a gate. This culvert will be removed and the dike will be breached in preparation to construct a pedestrian bridge over the breached portion of the dike. The proposed pedestrian bridge is approximately a 140-foot single-span pedestrian bridge and is located to the west of the existing culvert. A dike breach of approximately 15 feet deep and 140 feet wide is proposed to provide a fish-friendly wetland connection. The pedestrian bridge is proposed to include concrete abutment walls up to 4 feet tall with wing walls, and the existing trail embankment is not planned to be widened.

The existing culvert at Reneke Creek undercrossing Sandlake Road is a 24-inch diameter concrete pipe culvert. The existing culvert is proposed to be replaced by a 49-foot single-span bridge crossing Reneke Creek. We understand that integral abutments are being considered. The bridge is planned to include concrete abutment walls and wing walls up to 6 feet tall. We also understand that the wingwalls will be cantilevered from the bridge abutments and pile caps. Reneke Creek will be realigned to the south to the proposed bridge location.

The existing culvert at Beltz Creek undercrossing Sandlake Road at a skew is a 36-inch diameter concrete pipe culvert. The existing culvert is planned to be replaced with a box culvert or a 49-foot single-span bridge. The proposed culvert consists of a concrete box culvert approximately 78 feet long and up to 5 feet tall, with the bottom of the culvert up to 13 feet below the pavement surface. If the proposed 49-foot single span bridge is selected, the bridge will be similar to the Reneke Creek Bridge, described previously, with integral abutments and concrete abutment walls and wing walls up to 6 feet tall.

Construction of a setback dike is proposed in the southern portion of the Beltz Marsh, consisting of an approximately 10-foot-high levee embankment that crosses the marsh and connects to the roadway embankment of Sandlake Road approximately halfway between Beltz Creek and No Name Creek crossings of Sandlake Road. A box culvert with a muted tidal regulator will be installed within the setback dike, along with two 36-inch round culverts with tide gates and backups. Within some areas of Beltz Marsh, portions of some existing tidal channels will be excavated, and some existing channels will be filled to accompany the restoration of the wetland and design of the setback dike. The existing structures and proposed new structures are presented in Figure 2.

3 GEOLOGIC SETTING

3.1 Regional Geology

The Project site lies within the Coast Range physiographic province and within the estuary and wetland areas located between the mountains of the Coast Range and the shoreline of the Pacific Ocean. Basement rocks within the Coast Range consist of volcanic and sedimentary rocks of the Siletz Terrane. The Siletz Terrane is an exotic crustal block made up of rocks from an ocean island arc within the Pacific Ocean, which was accreted to the western edge of the North American continent approximately 51 to 49 million years ago (Wells and Others, 2014). Overlying the rocks of the Siletz Terrane is a series of sedimentary rocks deposited in shallow seas within the western continental shelf of North America throughout the late Eocene (55.8 to 33.9 million years ago), Oligocene (55.8 to 23 million years ago), and into the Miocene (23 to 5.2 million years ago) (Wells and others, 1994).

Tectonic uplift of the Coast Range from the Miocene into the Pleistocene (2.3 million to 11,700 years ago), combined with erosion, created the rugged coastline and bay inlets seen today as the rivers and streams flowing out of the Coast Range mountains carved large valleys and canyons, which were inundated as sea levels rose after the ice age. Sediments transported from inland, as well as from ocean currents and wind, accumulated within these inundated bay areas, creating wetlands and estuaries.

3.2 Site Geology

The Project site is located within the Sand Lake Estuary, which has formed between the coastal points of Pacific City to the south and Cape Lookout to the north. The surface geology of the greater Sand Lake area was mapped by Wells and others (1994) as Quaternary sediment, including fluvial and estuarine deposits of unconsolidated clay, silt, sand, and gravel deposited by rivers and streams, as well as tidal flat mud, sand, and peat. Wells and others (1994) mapped the bedrock of the uplands to the east as the Alsea Formation, consisting of Oligocene- and Miocene-age tuffaceous siltstone and sandstone. Intrusions of Grande Ronde Basalt, which erupted and flowed across Oregon and into the area approximately 15.6 to 16.5 million years ago and intruded into softer sediments when they reached the coast, are mapped within the sediments of the Alsea Formation within the upper portions of the hills in the southern portion of the project site (Wells and others, 1994).

The Sand Lake estuary was created within an inland bay constrained by Cape Lookout to the north, and the uplands of the Coast Range to the south and east. Multiple creek valleys now converge within the area of low topography of the estuary before draining into the

Pacific Ocean. The estuary area is protected due to long-shore transport of beach sediment, which developed sand bars and dunes along the ocean shoreline that partially shield Sand Lake, creating a boundary between the ocean and marshland. Large amounts of sediment have been deposited within this estuary through a combination of sources, including oceanic and tidal sediments deposited from long-shore currents and tidal activity, stream alluvium deposited from the creeks that drain from the Coast Range mountains, and eolian sediments deposited by the wind (Wilsey and Ham, Inc. 1974; Wells and others, 1994).

In recent history, the landscape of the Sand Lake Estuary has been further altered by human development, including the construction of dikes and levees, farming and grazing, and the placement of fill material for infrastructure. Three main dike structures have altered the tidal flow of the estuary. These dike structures include part of the county access road to Whalen Island, the Beltz Creek Dike, and a flood control dike located on the north shore of the Sandlake between Galloway Road and Sand Creek east of the recreation area. These dikes have constricted tidal flows and created significant increases in marsh areas within the bay (Wilsey and Ham, Inc., 1974). A geologic map of the project area is shown in Figure 3, Geologic Map.

4 GEOTECHNICAL EXPLORATIONS AND SUMMARY OF SUBSURFACE CONDITIONS

4.1 General

Shannon & Wilson previously explored subsurface conditions at the Project site with seven (7) geotechnical borings designated B-1 through B-7. Borings B-3 through B-7 were drilled within the roadway of Sandlake Road between May 24, 2025, and May 28, 2025. Borings B-1 and B-2 were drilled along Beltz Dike within the trailhead between March 31, 2025, and April 1, 2025. The boring locations were measured by handheld GPS in the field, and the approximate boring locations are shown in Figure 2. Explorations and laboratory testing were performed to evaluate geotechnical soil and groundwater conditions for the proposed structures. Additional geotechnical explorations are proposed for Fall or Winter of 2025/2026.

4.2 Geotechnical Soil Units

Shannon & Wilson grouped the materials encountered in our field explorations for the Project into six (6) geotechnical units, as described below. The geotechnical units are based on the explorations and regional geologic information from published sources. In the field, soil samples were described and identified visually in general accordance with ASTM

D2488, Standard Practice for Description and Identification of Soils (Visual-Manual Procedure). Laboratory testing was performed on selected samples. The subsurface geotechnical units are generally as follows:

- **Roadway Fill:** includes pavement and base aggregate sections, loose to medium dense, Silty Gravel (GM); very soft to soft, Elastic Silt with Sand (MH);
- **Embankment Fill:** very loose to loose, Poorly Graded Sand with Silt (SP-SM); cobbles and boulders possibly included in the construction of the levees;
- **Marsh Deposits:** very soft to soft, Organic Soil (OH);
- **Alluvial Fan Deposits:** loose to very dense, Silty Gravel to Silty Gravel with Sand (GM); soft to stiff, Elastic Silt to Elastic Silt with Sand (MH); medium dense, Silty Sand to Silty Sand with Gravel (SM);
- **Fluvial and Estuarian Deposits:** very loose to very dense, Poorly Graded Sand with Silt (SP-SP); very loose to very dense, Silty Sand to Silty Sand with Gravel (SM); very loose, Silty Gravel (GM); very soft to soft, Elastic Silt (MH); and
- **Alsea Formation:** Extremely weak to weak (R0-R2), slightly to moderately weathered, Siltstone/Sandstone; very weak to weak (R1-R2), slightly to moderately weathered, Siltstone.

5 SURFACE AND GROUNDWATER ANALYSES

Hydrological analysis for the Sitka Sedge Natural area was performed by Pacific Groundwater Group (PGG) and summarized in their Draft Final Report dated June 4, 2019, delivered to the Oregon Parks and Recreation Department (OPRD). PGG performed data collection and analyses to understand existing surface and groundwater conditions and provide assessments of the modification alternatives for the Beltz Dike. The scope of their report included data review, site characterization, groundwater modeling, and evaluation of future conditions and scenarios, and included:

- Detailed topographic and hydrologic characterization;
- Groundwater modeling to predict how changes in Beltz Marsh inundation would affect groundwater conditions in Tierra Del Mar (TDM) under scenarios of dike breach and replacement of the existing tide gate; and
- Hydrologic and hydraulic analysis to evaluate the feasibility of the setback dike alternative and analyze the culvert that drains the east marsh across Sand Lake Road, and characterize the protective value of Beltz Dike if overtopped by flooding in Sand Lake.

PGG performed a surface water study and drilled seven (7) subsurface wells in areas throughout the northern portion of TDM to collect groundwater data. Characterization of both surface and groundwater behavior was summarized after a period of monitoring and analysis. PGG then developed surface and groundwater models to test mitigation alternatives, including breaching of the Beltz Dike, and construction of the setback dike, using data collected from the surface and groundwater monitoring. The study generally centered on how modifications of the current Beltz Dike would affect surface and groundwater behavior within Beltz Marsh and to the south at TDM. More information is included in their report which was submitted to OPRD. Some of the relevant findings from the PGG study are summarized in the following sections.

5.1.1 Surface Water Hydrology

PGG (2019) concluded that surface water fluctuations behind the dike in Beltz marsh are primarily controlled by the interaction of tides in Sand Lake with the tide gate, and secondary inflow from creeks and drainages. Tidal fluctuations in the Pacific Ocean enter the marsh within the Sand Lake Estuary and pass through Beltz dike through the existing culvert and tide gate. The dike has an approximate crest elevation of 12 feet.

The existing tide gate does not function properly and allows large amounts of water to enter the marsh during high tides. The tide gate does not have capacity to fully drain water out of the marsh and during heavy rainfall events, water accumulates behind the dike leading to elevated water surface elevations in Beltz Marsh that are not fully released during outgoing tide. It takes multiple tidal cycles for accumulated water to drain and for water levels in the marsh to equilibrate with Sand Lake after significant rainfall events. This creates water retention behavior that can impact adjacent groundwater levels beneath TDM. Areas within the marsh below 5.0 feet elevation are commonly inundated, and areas above 8.0 feet elevation are rarely inundated. Sand Lake Road has a low point of approximately 11.6 feet elevation. TDM installed a drainage ditch and culvert network that flows north and discharges storm water into the marsh at an elevation above the direct influence of the tide. The drainage system used by TDM has limited capability to drain the area after heavy rainfall events.

5.1.2 Surface Water Modeling

PGG developed surface water models to understand how water levels in Beltz Marsh would be affected by alternatives to the existing tide gate. PGG developed a “worst case” hydrology scenario to use for predictive modeling scenarios. OPRD and the PGG/ESA team agreed on a 38-day hydrology scenario that incorporates a 28-day “wind-up period” with typical winter tide and runoff conditions from January 7 to February 4, and a 10-day ‘storm’ period from February 5 to February 14 based on precipitation and runoff scaled to

approximate a 50-year storm that occurs during an extreme “king” tide event in Sand Lake Estuary. The model was configured to address three different tide-gate configurations in the Beltz dike. These three configurations include the existing tide-gate configuration or existing conditions, a breached dike proposed alternative, or a modern tide gate system proposed alternative.

5.1.2.1 Existing Conditions (existing culvert and tide gate through dike):

- During the 28-day wind up period, water levels inside marsh ranged from 5.5 to 8.3 feet.
- During the 10-day storm period, water levels peaked at 12.0 to 12.5 feet.
- Flood levels in the marsh remained above 9 feet for more than 3 days because the existing tide gate is inefficient at draining Beltz Marsh.

5.1.2.2 Breached Dike:

- The breach is an efficient conveyance and water levels inside the marsh closely matched the water levels in Sand Lake at all times.
- During the 28-day wind up period, water levels inside marsh ranged from 5.5 to 11.2 feet.
- During the 10-day storm period, water levels briefly exceeded 12.0 feet.
- The much larger opening allows water to freely drain out of the marsh, so elevated water levels quickly fell as the tide receded and were not impounded behind the dike.

5.1.2.3 Modern Tide Gate:

- Peak daily water levels were lower than both the breached-dike and existing-tide-gate configurations because the tide gate closes when water levels inside the marsh reach 7.0 feet on a rising tide.
- During the 28-day wind up period, water levels inside marsh ranged from 5.5 to 7.5 feet.
- During storm conditions, water levels in the marsh were lower than both the breached-dike and existing-tide-gate configurations because of the limited tidal inflow and the efficient flow of water out of the marsh.

- During the 10-day storm period, water levels briefly exceeded 10.0 feet but quickly fell as the tide receded.
- The alternate 8.0-foot closure setting yielded interior marsh water levels peaking approximately 1 foot higher during typical winter conditions and moderate storms. During the height of the storm scenario peak water levels were only 0.1' to 0.2' higher when using the 8.0' closure setting compared to the 7.0' closure setting.

5.1.2.4 Setback Dike:

Evaluations from preliminary analyses were performed to provide data and information to consider for the feasibility of constructing a setback dike located south of Reneke and Beltz Creeks. Constructing a setback dike in this location would allow for full tidal reconnection of the majority of Beltz Marsh while maintaining flood protection for TDM. PGG listed the following which was indicated from their analysis:

- A setback dike constructed across the south end of Beltz Marsh, near the existing beaver dam, would have adequate storage volume capacity to contain rainfall and runoff from TDM and the East Marsh during a 100-year storm event.
- An estimated 35 acre-feet of water could be stored upstream of the setback dike in this location before water levels would inundate the low point in Sand Lake Road, which is 11.6 feet elevation. Under a 100-year flood event, the combined inflows from the East Marsh and TDM would accumulate a maximum of 21 acre-feet in any 8-hour period. This is likely the maximum duration that elevated water levels in Sand Lake would prevent drainage out of the setback dike.
- The setback dike configuration could result in lower peak and sustained water levels than the existing configuration, lower peak water levels than the breached dike configuration, and similar peak water levels to the modern tide gate configuration.

5.1.3 Groundwater Hydrology

Two separated aquifers underly TDM. A shallow unconfined aquifer with connectivity to the surface, and a deeper confined aquifer. PGG installed and screened wells in both aquifers collect data and compare their relative water level elevations. Soil within the aquifers consists of sandy sediments and separated by a clayey layer of soil that constricts water flow and acts as an aquitard. The clay soil layer was observed in subsurface borings in multiple locations within the study area. Groundwater observations indicated there is no tidal influence in the shallow aquifer and a slight tidal influence observed in the deep aquifer. Also, a subsurface groundwater flow divide was observed which diverts

groundwater flow into different directions depending on the specific location within the area.

Groundwater flooding at TDM occurs when the groundwater table rises above the ground surface. Flooding is most prevalent in the winter months and is generally observed when the area receives over 1-inch of rainfall within a 24-hour period. Water levels within the shallow water table are limited by the ability of the groundwater to flow towards discharge features.

5.1.4 Groundwater Modeling

The groundwater model covers a 442-acre area that extends west-to-east from the shoreline of the beach to the bedrock foothills, and north-to-south from Beltz Marsh to Sears Lake. PGG's model divides up the subsurface into three layers. The top layer represents the shallow aquifer, the middle layer represents the clay aquitard, and the bottom layer represents the deep aquifer. The top of the model is the ground surface, and the bottom is the estimated bedrock depth and surface that underlies the aquifers. PGG listed the following which was indicated from their analysis:

Relative to current tide gate configuration, the model predicted that a modern tide gate would reduce wet-season shallow groundwater elevations beneath TDM by very small amounts indicated as <0.01 feet = $<1/8$ inch during average conditions. During flood conditions, the model predicted water-level reduction of up to 0.17 feet (about 2 inches) in groundwater monitoring Well PGG-1i, which is located in the Shallow Aquifer adjacent to Beltz Marsh. This effect rapidly diminishes with distance from the marsh and is not predicted for any other Shallow-Aquifer monitoring Wells referenced in this report. Predicted reductions in groundwater elevations occur due to propagation of reduced surface-water elevations in Beltz Marsh that result from both: 1) more efficient drainage achieved by the modern tide gate, and 2) the tide gate design's prevention of incoming tide after water surface elevation outside the dike exceeds 7.5 feet.

During the king tide or 50-year storm event, surface water levels were predicted to be higher than the 7.0-foot closure setting scenario by 0.1 to 0.2ft (1.2 to 2.4 inches). This increase in surface-water level translated to a maximum groundwater level increase of 0.01 ft (less than $1/8$ inch) adjacent to Beltz Marsh in TDM Well PGG-1i.

Relative to existing conditions, the dike-breach simulations predicted insignificant change in shallow groundwater elevations beneath TDM during average conditions and reduced groundwater elevations during the storm event. During average conditions, water levels in Shallow-Aquifer monitoring well PGG-1i (located adjacent to Beltz Marsh) were predicted to exhibit increases up to 0.02 feet (or, $1/4$ inch). This minor increase occurs because the

breached dike allows more tidal exchange and supports higher peak surface-water elevations in Beltz Marsh. The increase is predicted to decay rapidly with distance from Beltz Marsh and is not predicted for any other Shallow-Aquifer monitoring wells referenced in this report. During storm conditions, Shallow-Aquifer groundwater level reductions are predicted to range from a maximum of 0.14 feet (1.7 inches) in Well PGG-1i (near Beltz Marsh), diminishing rapidly in monitoring wells located farther south. Reduced groundwater elevations during storm conditions arise because better drainage through the dike breach reduces the accumulation of stream inflows behind the dike causing less prolonged inundation.

6 GEOLOGIC HAZARDS

6.1 Landslides and Debris Flows

According to the Statewide Landslide Information Database for Oregon (SLIDO) and geologic hazard mapping performed by Calhoun and others (2020), a debris flow is mapped within portions of the proposed area of the Beltz Creek Bridge, as shown in Figure 3. The debris flow is identified as Tillamook_3329 and is designated as prehistoric and as occurring greater than 150 years ago (>150 years old) (Calhoun and others, 2020). The proposed Reneke Creek Bridge is located approximately 100 to 200 feet northeast of the mapped boundary of the Tillamook_3329 debris flow. Another prehistoric debris flow thought to have occurred greater than 150 years ago is designated Tillamook_4830; it's located northeast of Reneke Creek, encompassing portions of the parking lot and day use area of Sitka Sedge.

There is a landslide mapped on the east side of Sandlake Road up just northeast of the existing No Name Creek Culvert, which is located south of the project area. The landslide is designated Tillamook_4724 and is classified as a historic or having occurred less than 150 years ago (<150 years old). The landslide is described as a deep-seated complex landslide by Calhoun and others (2020). Landslide and debris flows mapped by SLIDO are shown on the Geologic Map in Figure 3. This landslide is located near, but outside of the official project boundary.

6.2 Seismic Setting and Earthquakes

Earthquakes in the Pacific Northwest occur largely as a result of the region's proximity to an active convergent plate boundary, the Cascadia Subduction Zone (CSZ). In the CSZ dense oceanic crust of the Explorer, Juan de Fuca, and Gorda Oceanic Plates are subducting beneath the overriding, less dense, westward-moving continental crust of the North American Plate. Oblique convergence of these plates not only results in east-west

compressive strain, but also in dextral shear, clockwise rotation, and north-south compression of accreted crustal blocks that form the leading edge of the North American Plate (Wells and others, 1998). The CSZ runs approximately parallel to the coastline for about 750 miles from northern California to southern British Columbia. Within the present understanding of the regional tectonic framework and historical seismicity, three broad seismogenic sources have been identified:

- A mega-thrust source at an interface between the North American and Juan de Fuca Plates in the CSZ;
- A deep subcrustal zone (intraslab) in the subducted Juan de Fuca Plate in the CSZ; and
- A shallow crustal zone within the North American Plate.

The following sections briefly describe the location, characteristics, and seismicity of each of the sources.

6.2.1 Cascadia Subduction Zone: Mega-Thrust Interface Source

CSZ mega-thrust earthquakes originate along the interface between the subducting Juan de Fuca and Gorda Oceanic Plates and the North American Plate. Because of the significant uncertainty of the landward extent of a potential rupture surface, estimates of the closest distance between the project site and potential rupture surfaces range from about 40 to 80 miles. Focal depths for mega-thrust earthquakes are commonly on the order of about 15 to 25 miles. Rupture of the interface could result in earthquakes with moment magnitudes (Mw) on the order of Mw 8.5 to over Mw 9.0, with strong shaking that lasts for several minutes. No large earthquakes have occurred in this zone during historic times (the last 170 years). However, geologic evidence suggests that coastal estuaries have experienced rapid subsidence at various times within the last 2,000 years (e.g., Atwater, 1987; Atwater and Hemphill-Haley, 1997). It appears that ruptures of this zone have occurred at irregular intervals that span from about 100 to more than 1,200 years, with an average recurrence interval of about 300 to 500 years (Atwater and Hemphill-Haley, 1997). Based on historical tsunami records in Japan (Satake and others, 1996), the most recent interplate event on the CSZ was a Mw 9.0 event on January 26, 1700.

6.2.2 Cascadia Subduction Zone: Intraslab Source

CSZ intraslab earthquakes originate from within the subducting Juan de Fuca and Gorda Oceanic Plates because of down-dip tensional forces and bending caused by mineralogical and density changes in the plates at depth. These earthquakes typically occur 28 to 37 miles beneath the surface. Because intraslab events involve high-angle normal faulting, the area of the rupture surface and magnitude are strongly dependent on the thickness of the subducting slab. Young subduction zones, such as the CSZ, generally have relatively thin

subducting slabs. Thermal modeling of the CSZ (Hyndman and Wang, 1993) and the observed geometry of the Wadati-Benioff Zone confirm the likelihood that the subducting slab is relatively thin.

Worldwide observations indicate that the largest intraslab earthquakes are on the order of Mw 8.0, with the twelve largest of these earthquakes occurring in older subducting slabs. The largest recorded intraslab earthquake beneath the Puget Lowland, the 1949 Olympia earthquake, was a surface wave magnitude 7.1 event. Ludwin and others (1991) estimate that the maximum magnitude from this source zone would be about 7.5.

At the Project site, ground shaking produced by intraslab earthquakes would generally be less intense and less prolonged than ground motions generated by large subduction zone interface earthquake events. Historic seismicity from this source zone includes the 1949 Mw 7.1 Olympia earthquake; the 1965 Mw 6.5 earthquake between Tacoma and Seattle; and the 2001 Mw 6.8 Nisqually earthquake. While intraslab events have occurred frequently in the Puget Sound area, they are historically rare in Oregon.

6.2.3 Shallow Crustal Source

Shallow crustal earthquakes within the North American Plate have historically occurred in a diffuse pattern within western Oregon, typically within the upper 4 to 19 miles of the continental crust. The largest known crustal earthquake in the Pacific Northwest is the 1872 North Cascades earthquake of Mw 6.8. Other examples include the 1993 Mw 5.6 Scotts Mill earthquake and the 1993 Mw 6.0 Klamath Falls earthquake.

6.2.4 Local Quaternary Faults and Folds

Quaternary faults and folds throughout Oregon and Washington have been located and characterized by the United States Geological Survey (USGS). The USGS provides approximate fault locations and a detailed summary of available fault information in the USGS Quaternary Fault and Fold Database (USGS, 2025). The database defines four categories of faults, Class A through D, based on evidence of tectonic movement known or presumed to be associated with large earthquakes during Quaternary time (within the last 2.6 million years). For Class A faults, geologic evidence demonstrates that a tectonic fault exists and that it has likely been active within the Quaternary period. For Class B faults, there is equivocal geologic evidence of Quaternary tectonic deformation, or the fault may not extend deep enough to be considered a source of significant earthquakes. Class C and D faults lack convincing geologic evidence of Quaternary tectonic deformation or have been studied carefully enough to determine that they are not likely to generate significant earthquakes.

According to the USGS Quaternary Fault and Fold Database, there are six (6) Class A features within approximately 30 miles of the project alignment. Their names, general locations relative to the site, and the time since their most recent deformation are summarized in Exhibit 5-1. The megathrust fault system of the CSZ lies approximately 65 to 75 miles west of the project site.

Exhibit 6-1: USGS Class A Faults Within an Approximate 30-Mile Radius of the Project Site

Fault Name	USGS Fault Number	Approximate Length	Approximate Distance and Direction from Project Site ¹	Slip Rate Category ²	Time Since Last Deformation ³
Unnamed Offshore Faults	785	174.0 miles	10.2 miles NW	1.0 to 5.0 mm/yr	< 15 ka
Stonewall Anticline	786	43.5 miles	24.7 miles SW	1.0 to 5.0 mm/yr	< 15 ka
Nehalem Bank Fault	789	62.8 miles	12.9 miles NW	1.0 to 5.0 mm/yr	< 15 ka
Tillamook Bay Fault Zone	881	19.8 miles	16.2 miles NE	< 0.2 mm/yr	< 1.6 Ma
Happy Camp Fault	882	1.9 miles	12.1 miles N	< 0.2 mm/yr	< 1.6 Ma
Siletz Bay Faults	883	6.2 miles	23.8 miles S	< 0.2 mm/yr	< 130 ka

NOTES:

- 1 Approximate distance between the Project site and the nearest extent of fault mapped at the ground surface.
- 2 mm = millimeters; yr = year.
- 3 Ma = "Mega-annum" or million years ago; ka = "Kilo-annum" or one thousand years ago.

6.3 Tsunamis

The Project area within the Oregon Coast lies adjacent to the Cascadia megathrust subduction zone, capable of producing tsunamis during an earthquake event. Information about previous tsunamis from studies of sedimentary deposits within the area has been used to quantify rates of earthquakes along the Oregon Coast, as mentioned in Section 5.2.1. Large tsunamis are also created by distant earthquakes in locations across the Pacific Ocean.

Coastal lowlands and estuaries are vulnerable to tsunami inundation. Numerical modeling by Priest and others (2013) has produced maps of tsunami wave propagation and inundation corresponding to different earthquake scenarios from a Cascadian megathrust earthquake for portions of the Oregon Coast, which include the coastal portion of Tillamook County. This data was compiled and mapped within the project area and is presented in Figure 4, Tsunami Inundation Scenarios. Parameters for each of the tsunami inundation scenarios by Priest and others (2013) are shown in Exhibit 5-2.

Exhibit 6-2: Estimated Earthquake Parameters for Tsunami Source Scenarios used in Oregon Tsunami Inundation Maps.

Tsunami Inundation Map (TIM Series) Scenario	Length (km)	Width (km)	Slip Deficit Time (years)	Maximum Slip (m)	Average Slip (m)	Moment Magnitude (Mw)
XXL1	1000	83	1,200	41	20	9.1
XL1	1000	83	1,050–1,200	41	20	9.1
L1	1000	83	650–800	27	13	9.0
M1	1000	83	425–525	18	9	8.9
SM1	1000	83	300	10	5	8.7

NOTES:

1 Table data from Priest and others (2013).

6.4 Erosion and Scour

The Project site is not mapped within the coastal erosion hazard zone since the area is not considered within the beach or ocean shoreline. Within estuaries and surrounding terrain, de-vegetated and over-steepened slopes are generally more susceptible to erosion. Scour of areas where structures are founded near or within stream and river channels is common, and significant erosion, scouring, and slope instability can be created due to large flood events. Scouring and erosion near structures founded near or within stream and river channels can also occur normally under base level conditions, when regular maintenance or monitoring is not performed for the structures.

7 GEOLOGIC HAZARD RECONNAISSANCE

A site reconnaissance was performed on September 5, 2025. The purpose of the reconnaissance was to observe the mapped geologic hazards near the project area and the possible effects these hazards could experience or pose from the proposed structures or construction activity. Areas of the proposed structures were also visited to observe existing slope conditions and erosion and scour susceptibility.

The Sitka Sedge trail on top of Beltz Dike spans the Sandlake Estuary east to west from the day-use area to the beach access portion of the park. The Beltz Dike is approximately 7 to 10 feet in height and appears to be capped with cobble-sized rock fill and soil at the surface. There are small areas of sloughing along the slope of the Beltz Dike embankment. There is slight scouring around the existing concrete culvert, where fill material around the sides of the culvert structure and portions of the embankment around the culvert have been eroded and scoured away. The Beltz Dike and the location of the proposed Beltz Dike Pedestrian

Bridge do not appear to be within a distance where they would be impacted by the mapped debris flow or landslide features. Exhibit 6-1 shows the existing culvert at the tidal gate within the northern side of the Beltz Dike.



Exhibit 7-1: View east, at the existing tidal gate within Beltz Dike.

Along Sandlake Road near the entrance to the Sitka Sedge Natural Area parking area, the terrain is cleared of vegetation, and the debris flow of Tillamook_4830 is visible to the northeast. The debris flow appears as a slight vertical rise or bulge in the terrain and is nearly indistinguishable in contrast to the high relief terrain to the east. Exhibit 6-2 presents a photograph of the debris flow east of the Sitka Sedge. The proposed Reneke Creek Bridge is located approximately 100 to 200 feet southwest of the debris flow, and the area around the existing culvert is generally flat with heavy brush around the existing culvert. Ditches are cut on each side of Sandlake Road. Slight scouring was observed around the culvert structure at Reneke Creek.



Exhibit 7-2: View northeast at the debris flow of Tillamook_4830.

Continuing southwest down Sandlake Road to the location of the proposed Beltz Creek Bridge, the debris flow of Tillamook_3329 is visible exiting the stream valley to the east. The area around the proposed Beltz Creek Bridge is heavily wooded and covered with brush. LiDAR imagery review indicates the current stream channel of Beltz Creek has eroded the southwestern portion of the debris flow, and the debris flow is not mapped within the existing creek channel. Beltz Creek flows west under Sandlake Road, through a wooded area, and into the estuary where it joins with No Name Creek and continues through the Sitka Sedge estuary. There is some erosion and slight scouring of the embankment above the outfall of the existing culvert. There is a large round basin with standing water near the creek culvert to the southwest. The eastern slope of the basin edges up to a portion of the road embankment approximately 20 feet west of Sandlake Road. Exhibit 6-2 shows a view of the debris flow of Tillamook_4830, and Exhibits 6-3 through 6-5 show portions of the debris flow of Tillamook_3329.



Exhibit 7-3: View west at the debris flow Tillamook_3329 (outlined in red) from Beltz Dike.



Exhibit 7-4: View southwest at the debris flow as it exits west out of the stream valley of Beltz Creek.



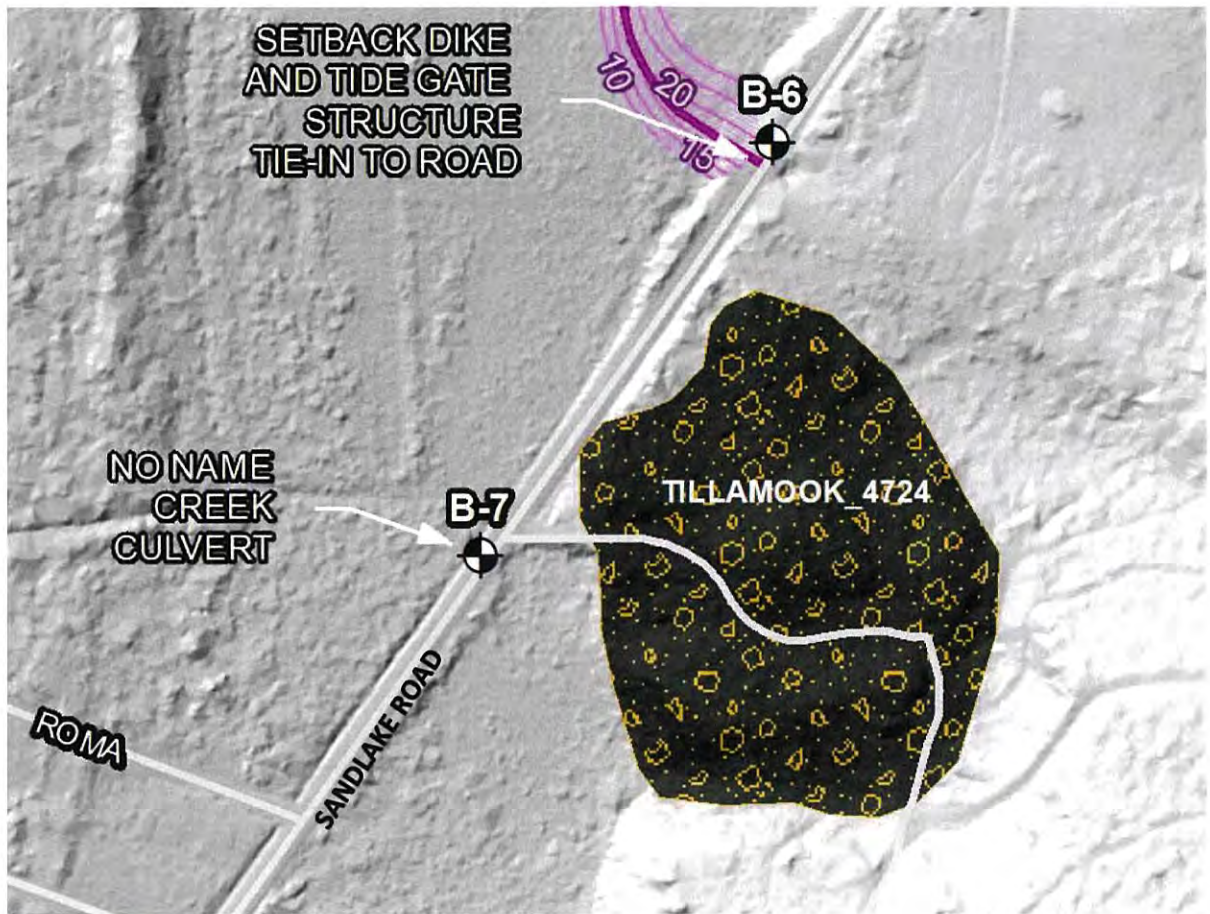
Exhibit 7-5: View southwest at the debris flow in the distance as it intercepts Sandlake Road. A slight rise in the roadway is shown near the northern boundary of the debris flow.

The mapped landslide designated Tillamook_4724 is located south of the project boundary and within private property. The landslide is located approximately 60 feet northeast of the existing No Name Creek Culvert. The area between the mapped landslide and No Name Creek is generally a flat marsh with heavy brush and standing water. From the public right-of-way (ROW), we did not observe features that would indicate the southern boundary of the project area is impacted by the landslide. Exhibit 6-6 presents a photograph showing the No Name Creek Culvert and standing water east of the culvert.



Exhibit 7-6: View southwest at the area of the No Name Creek Culvert.

LiDAR imagery review of the landslide indicates a well-developed headscarp and hummocky surface within the main body and toe. Large structures, which appear to be water tanks, are shown within the landslide body just below the headscarp. A gravel access road was graded upslope to the water tanks through the main body of the landslide. Sandlake Road is located just below the toe of the landslide. Exhibit 6-7 presents an image from SLIDO of the mapped landslide located upslope from Sandlake Road.



Landslide Deposits

Exhibit 7-7: LIDAR mage from SLIDO showing the landslide Tillamook_4724 located upslope of Sandlake Road and south of the location of the tie-in to the Setback Dike (SLIDO, 2024).

8 CONCLUSIONS AND RECOMMENDATIONS

8.1 Geologic Hazards

Geologic hazard risks under general static conditions for the proposed bridges and culvert at Reneke Creek, Beltz Creek, and No Name Creek include landslides and debris flows, erosion and scour, and flooding. Geologic hazard risks under general static conditions for the areas of the pedestrian bridge on Beltz Dike, and the proposed setback dike generally include flooding and possible storm surge.

8.1.1 Landslides and Debris Flows

The Beltz Creek Bridge site is located within the western portion of the debris flow designated Tillamook_3329. Based on observations from our site reconnaissance and data from the geotechnical borings, no additional design recommendations for bridge foundations and construction are recommended. However, according to mapping by Calhoun and others (2020), the Beltz Creek Bridge site is currently located within the path of an ancient debris flow from the valley of Beltz Creek to the east. This indicates the location may be impacted by a debris flow in large precipitation or snowmelt events or triggered by seismic activity.

The area of the Reneke Creek Bridge is located to the northeast of a mapped debris flow designated Tillamook_3329. Debris flow or alluvial fan deposits were not encountered in our geotechnical explorations. Similar to Beltz Creek Bridge, the location may be impacted by a debris flow in large precipitation or snowmelt events or triggered by seismic activity.

There is a mapped landslide designated Tillamook_4724, located upslope of and south of the location of the tie-in for the Setback Dike. Based on 30% design drawings provided by ESA, construction activity is not anticipated within the mapped landslide extents, and we recommend that no excavation be performed near or into the base (toe) of or within the mapped extents of the landslide.

8.1.2 Erosion and Scour

Each of the culvert structures and proposed bridge foundations will be susceptible to scour and erosion from stream and tidal flow. Heavy rains in the mountainous terrain east of the site could cause flooding and produce erosion or scour as the floodwater from Reneke Creek and Beltz Creek is channeled out of the steep canyons and through the structures on Sandlake Road into the estuary. Monitoring of the structures during and after large rain events and flooding, and performing regular maintenance on the culvert and bridge structures, may help mitigate long-term scour of the structures from annual and isolated storm events. We understand that the bridge structures will be designed for scour under 100-year flood conditions.

For the construction activities, we recommend that erosion control measures, when they are proposed and drafted, comply and are maintained to conditions listed in TCLO 4.130 Section 6 (h), Erosion Control Measures.

8.2 Seismic Hazards

The project Site is located within the vicinity of the Cascadia megathrust fault zone, and evidence for past large earthquakes within the area has been documented as discussed in Section 5.2. Other active Quaternary faults and folds have been mapped within a 30-mile radius of the Project site and pose a risk to the project structures. A seismic ground motion and hazard evaluation will be performed to provide mitigation for the shallow and deep foundations of the proposed bridges and culverts, and the results from these analyses will be provided in the GER. The setback dike and levees in the area do not include seismic design. Mitigation recommendations for tsunamis will also not be included within the GER.

Geologic hazard risks under seismic conditions and ground shaking for the proposed bridges and culvert at Reneke Creek, Beltz Creek, and No Name Creek, and the proposed pedestrian bridge include soil liquefaction, settlement, lateral spreading, and tsunamis.

8.2.1 Soil Liquefaction

During ground shaking, the Project area and structures would be susceptible to soil liquefaction. Parameters derived from the seismic hazard evaluation and analyses will be integrated into the seismic mitigation design and outlined within the GER to be submitted to ESA for the final engineering design.

8.2.2 Settlement

During ground shaking, the Project area and structures would be susceptible to settlement. Parameters derived from the seismic hazard evaluation and analyses will be integrated into the seismic mitigation design and outlined within the GER to be submitted to ESA for the final engineering design.

8.2.3 Lateral Spreading

During ground shaking, the Project area and structures would be susceptible to lateral spreading. Parameters derived from the seismic hazard evaluation and analyses will be integrated into the seismic mitigation design and outlined within the GER to be submitted to ESA for the final engineering design.

8.2.4 Tsunamis

According to tsunami inundation mapping by Priest and others (2013) for a Cascadian earthquake event (see Figure 4), a tsunami inundation scenario of SM1 would inundate areas up to elevations of approximately 15 to 20 feet, including the area of the Beltz Creek Dike and proposed pedestrian bridge, the proposed setback dike, and the area of the Reneke

Creek Bridge. A tsunami inundation scenario of SM2 to SM3 would inundate areas up to elevations of approximately 60 to 80 feet, including the Beltz Creek Bridge and near the tie-in for the setback dike, where it intercepts Sandlake Road.

9 DISCUSSION

The GER will provide recommendations for the mitigation of seismic hazard risks for the shallow and deep foundations for the bridge and culvert structures, and considerations for construction activity. The contractor is generally responsible for erosion control means and methods, which should be further discussed and outlined by the project team in later phases of the design and before construction. The Preliminary GER has not been submitted to ESA by Shannon & Wilson at the time of this Geologic Hazards Report.

In our opinion, we do not anticipate that the structures or associated construction activity will affect the mapped geologic hazards, including the debris flow near Beltz Creek Bridge, and the landslide near No Name Creek, assuming our recommendations above and within the GER are followed.

10 LIMITATIONS

This report was prepared for the exclusive use of ESA and Tillamook County. Within the limitations of scope, schedule, and budget, the assessment, recommendations, and conclusions presented in this report were prepared in accordance with generally accepted professional geological engineering principles and practice at the time this report was prepared. The data collection, assessment, conclusions, and recommendations contained in this report are based on currently available information and site conditions as they presently exist.

These conclusions and recommendations were based on our understanding of the project, as described in this report, and the surficial site conditions as observed at the time of our reconnaissance and field explorations. Unanticipated soil conditions are commonly encountered and cannot be fully determined by surficial observations. Such unexpected conditions frequently require that additional expenditures be made to acquire a better understanding of subsurface conditions. The evaluation of potential hazard risks in this report does not include hazard risks that could be the result of an isolated action or the general means and methods of a construction contractor that deviate from local, state, or federal laws and regulations, or geotechnical and other recommendations and considerations outlined in this Geologic Hazards Report or the final GER.

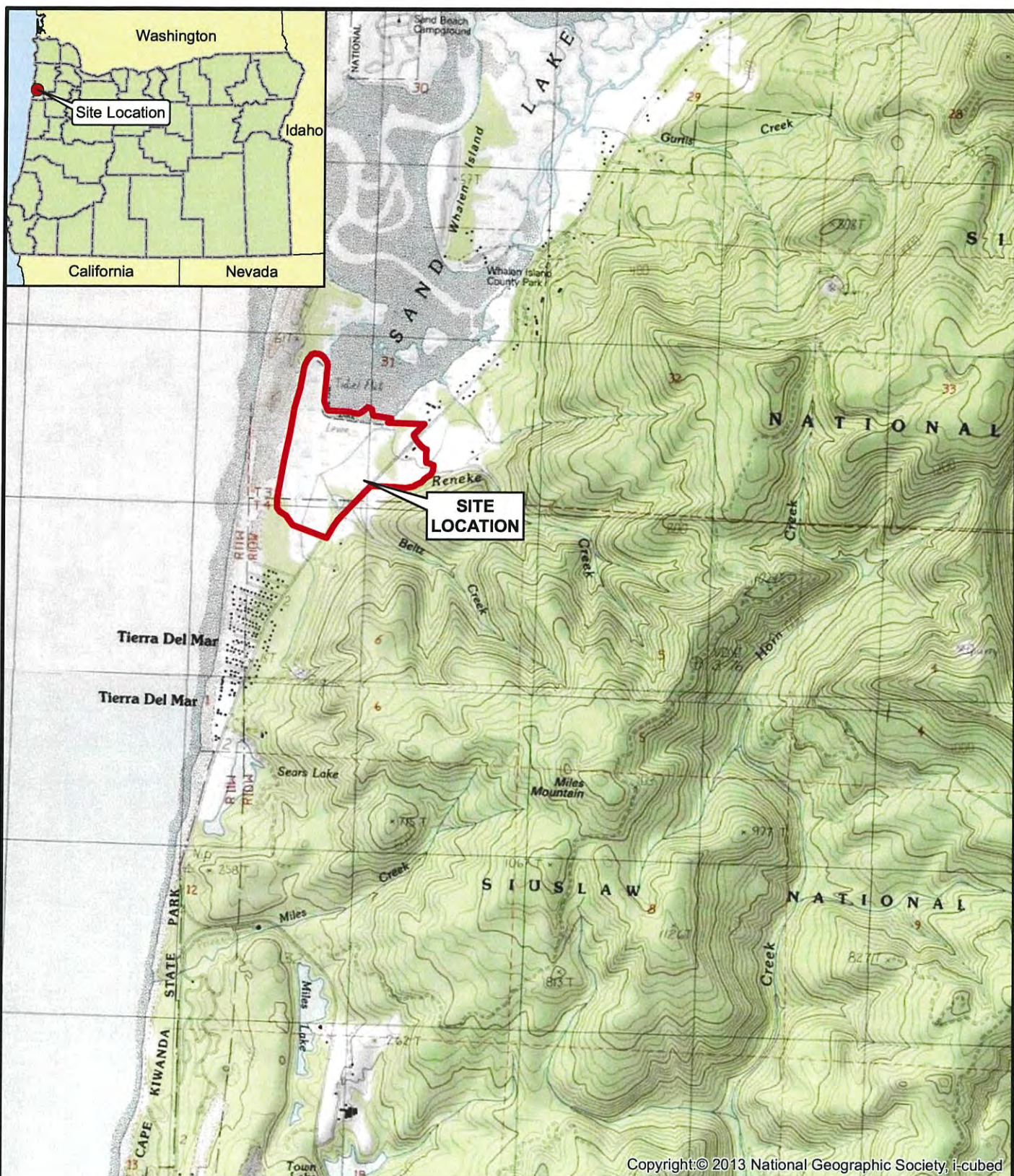
The scope of our present work did not include environmental assessments or evaluations regarding the presence or absence of wetlands, or hazardous or toxic substances in the soil, surface water, groundwater, or air, on or below or around this site, or for the evaluation or disposal of contaminated soils or groundwater should any be encountered. No hydraulic analysis of tidal or stream flow was performed within this scope.

Shannon & Wilson has prepared and included the attached "Important Information About Your Geotechnical/Environmental Report" to assist you and others in understanding the use and limitations of our reports in Attachment A.

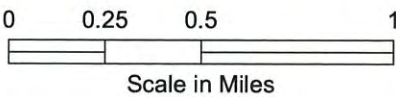
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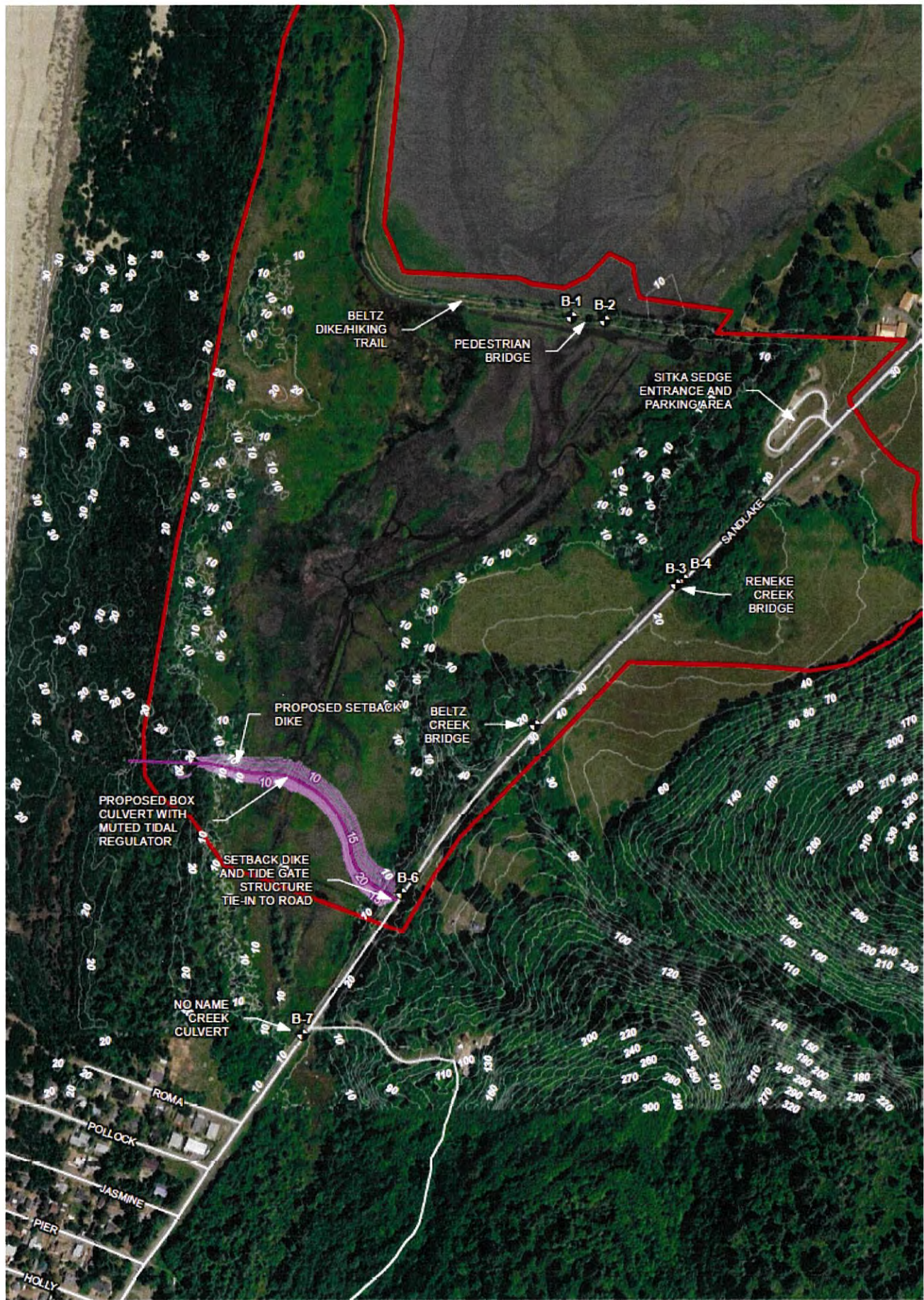
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Sitka Sedge Tidal Wetland Restoration Tillamook County, Oregon	
VICINITY MAP	
April 2026	112880
 SHANNON & WILSON	FIG. 1



LEGEND

- B-1 Designation and Approximate Location of Boring
- Project Boundary

0 175 350 700
Scale in Feet

NOTES

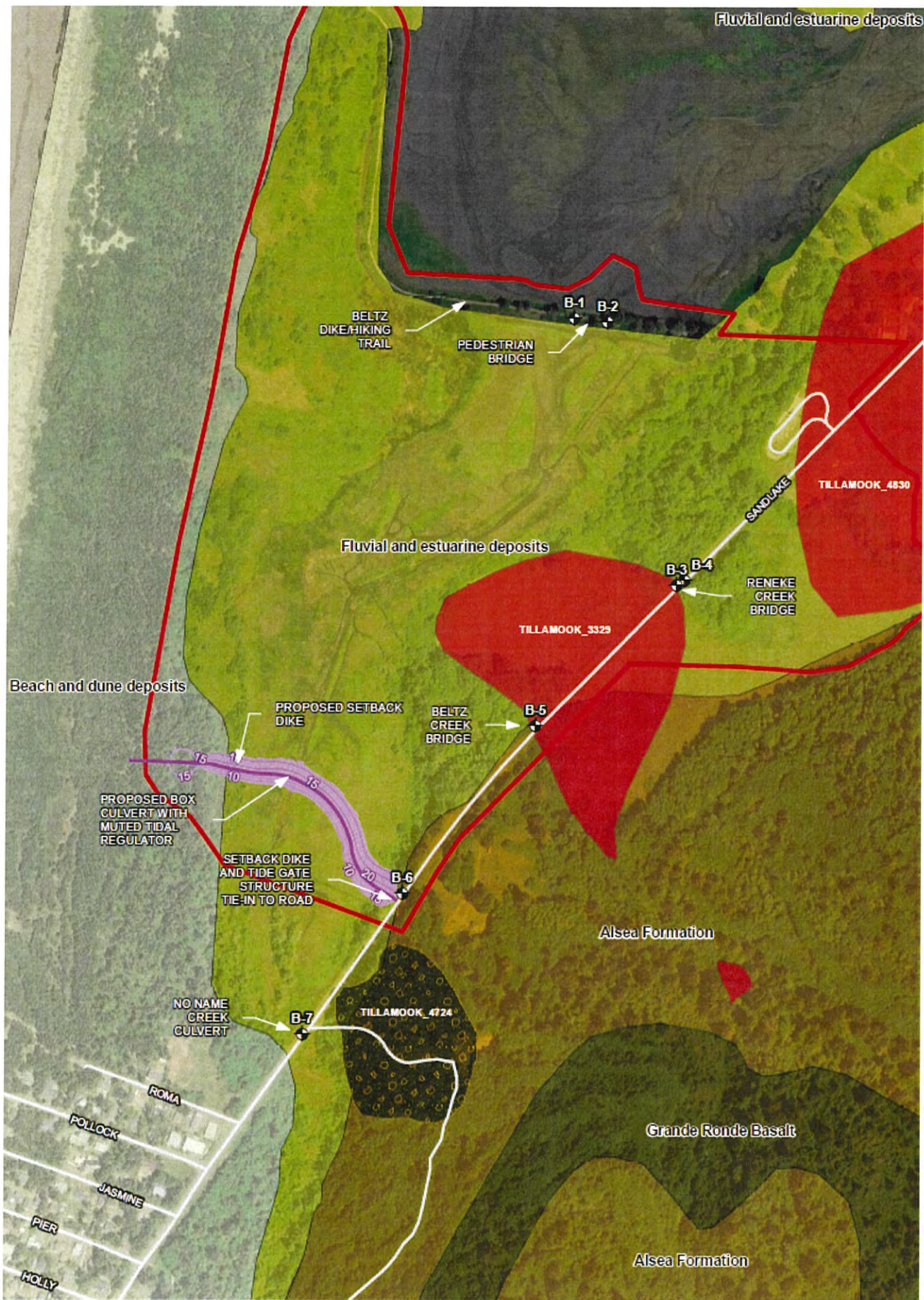
1. Aerial imagery obtained through Google Maps Satellite
2. Existing contours derived from

Sitka Sedge Tidal Wetland Restoration
Geologic Hazard Report
Tillamook County, Oregon

SITE AND EXPLORATION PLAN

April 2026

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LEGEND

B-1 Designation and Approximate Location of Boring

GEOLOGIC UNITS

- Alsea Formation
- Beach and dune deposits
- Fluvial and estuarine deposits

Project Boundary

MAPPED GEOLOGIC HAZARDS

- Debris Flow

0 175 350 700
Scale in Feet

NOTES

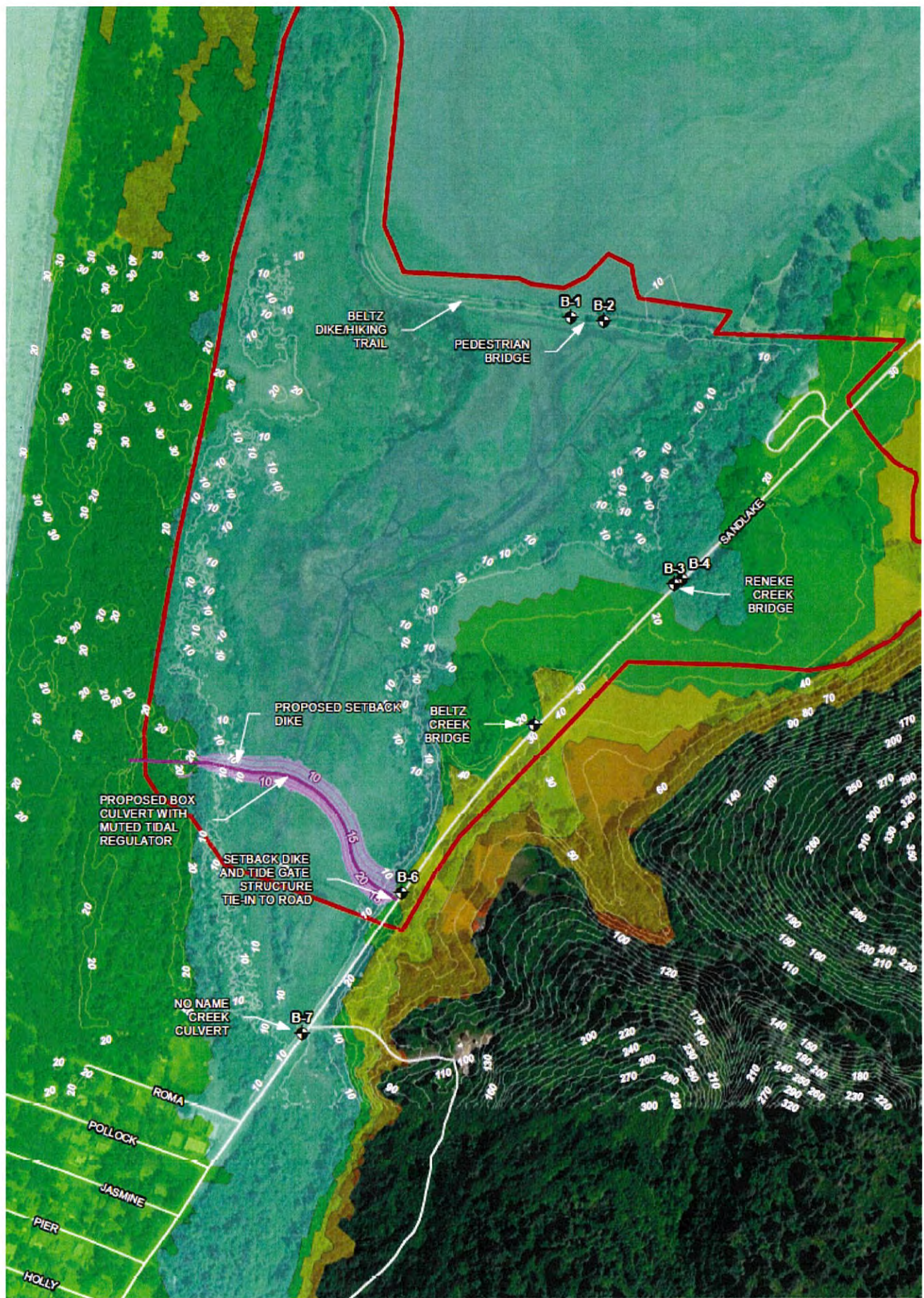
1. Aerial imagery obtained through Google Maps Satellite
2. Geologic map data from DOGAMI OGDB v.7.

Sitka Sedge Tidal Wetland Restoration
Geologic Hazard Report
Tillamook County, Oregon

GEOLOGIC MAP

April 2026

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LEGEND

- B-1 Designation and Approximate Location of Boring
- Project Boundary
- Tsunami Inundation Scenario (SM1)
- Tsunami Inundation Scenario (M1)
- Tsunami Inundation Scenario (L1)
- Tsunami Inundation Scenario (XL1)

0 175 350 700
Scale in Feet

NOTES

1. Aerial imagery obtained through Google Maps Satellite.
2. Tsunami inundation scenario data from DOGAMI Open-File-Report O-13-19.

Sitka Sedge Tidal Wetland Restoration
Geologic Hazard Report
Tillamook County, Oregon

TSUNAMI INUNDATION SCENARIOS

April 2026

112880

Important Information

Important Information

About Your Geotechnical/Environmental Report

IMPORTANT INFORMATION

IMPORTANT INFORMATION ABOUT YOUR GEOTECHNICAL/ENVIRONMENTAL REPORT

CONSULTING SERVICES ARE PERFORMED FOR SPECIFIC PURPOSES AND FOR SPECIFIC CLIENTS.

Consultants prepare reports to meet the specific needs of specific individuals. A report prepared for a civil engineer may not be adequate for a construction contractor or even another civil engineer. Unless indicated otherwise, your consultant prepared your report expressly for you and expressly for the purposes you indicated. No one other than you should apply this report for its intended purpose without first conferring with the consultant. No party should apply this report for any purpose other than that originally contemplated without first conferring with the consultant.

THE CONSULTANT'S REPORT IS BASED ON PROJECT-SPECIFIC FACTORS.

A geotechnical/environmental report is based on a subsurface exploration plan designed to consider a unique set of project-specific factors. Depending on the project, these may include the general nature of the structure and property involved; its size and configuration; its historical use and practice; the location of the structure on the site and its orientation; other improvements such as access roads, parking lots, and underground utilities; and the additional risk created by scope-of-service limitations imposed by the client. To help avoid costly problems, ask the consultant to evaluate how any factors that change subsequent to the date of the report may affect the recommendations. Unless your consultant indicates otherwise, your report should not be used (1) when the nature of the proposed project is changed (for example, if an office building will be erected instead of a parking garage, or if a refrigerated warehouse will be built instead of an unrefrigerated one, or chemicals are discovered on or near the site); (2) when the size, elevation, or configuration of the proposed project is altered; (3) when the location or orientation of the proposed project is modified; (4) when there is a change of ownership; or (5) for application to an adjacent site. Consultants cannot accept responsibility for problems that may occur if they are not consulted after factors that were considered in the development of the report have changed.

SUBSURFACE CONDITIONS CAN CHANGE.

Subsurface conditions may be affected as a result of natural processes or human activity. Because a geotechnical/environmental report is based on conditions that existed at the time of subsurface exploration, construction decisions should not be based on a report whose adequacy may have been affected by time. Ask the consultant to advise if additional tests are desirable before construction starts; for example, groundwater conditions commonly vary seasonally.

Construction operations at or adjacent to the site and natural events such as floods, earthquakes, or groundwater fluctuations may also affect subsurface conditions and, thus, the continuing adequacy of a geotechnical/environmental report. The consultant should be kept apprised of any such events and should be consulted to determine if additional tests are necessary.

MOST RECOMMENDATIONS ARE PROFESSIONAL JUDGMENTS.

Site exploration and testing identifies actual surface and subsurface conditions only at those points where samples are taken. The data were extrapolated by your consultant, who then applied judgment to render an opinion about overall subsurface conditions. The actual interface between materials may be far more gradual or abrupt than your report indicates. Actual conditions in areas not sampled may differ from those predicted in your report. While nothing can be done to prevent such situations, you and your consultant can work together to help reduce their impacts. Retaining your consultant to observe subsurface construction operations can be particularly beneficial in this respect.

A REPORT'S CONCLUSIONS ARE PRELIMINARY.

The conclusions contained in your consultant's report are preliminary, because they must be based on the assumption that conditions revealed through selective exploratory sampling are indicative of actual conditions throughout a site. Actual subsurface conditions can be discerned only during earthwork; therefore, you should retain your consultant to observe actual conditions and to provide conclusions. Only the consultant who prepared the report is fully familiar with the background information needed to determine whether or not the report's recommendations based on those conclusions are valid and whether or not the contractor is abiding by applicable recommendations. The consultant who developed your report cannot assume responsibility or liability for the adequacy of the report's recommendations if another party is retained to observe construction.

THE CONSULTANT'S REPORT IS SUBJECT TO MISINTERPRETATION.

Costly problems can occur when other design professionals develop their plans based on misinterpretation of a geotechnical/environmental report. To help avoid these problems, the consultant should be retained to work with other project design professionals to explain relevant geotechnical, geological, hydrogeological, and environmental findings, and to review the adequacy of their plans and specifications relative to these issues.

BORING LOGS AND/OR MONITORING WELL DATA SHOULD NOT BE SEPARATED FROM THE REPORT.

Final boring logs developed by the consultant are based upon interpretation of field logs (assembled by site personnel), field test results, and laboratory and/or office evaluation of field samples and data. Only final boring logs and data are customarily included in geotechnical/environmental reports. These final logs should not, under any circumstances, be redrawn for inclusion in architectural or other design drawings, because drafters may commit errors or omissions in the transfer process.

To reduce the likelihood of boring log or monitoring well misinterpretation, contractors should be given ready access to the complete geotechnical engineering/environmental report prepared or authorized for their use. If access is provided only to the report prepared for you, you should advise contractors of the report's limitations, assuming that a contractor was not one of the specific persons for whom the report was prepared, and that developing construction cost estimates was not one of the specific purposes for which it was prepared. While a contractor may gain important knowledge from a report prepared for another party, the contractor should discuss the report with your consultant and perform the additional or alternative work believed necessary to obtain the data specifically appropriate for construction cost estimating purposes. Some clients hold the mistaken impression that simply disclaiming responsibility for the accuracy of subsurface information always insulates them from attendant liability. Providing the best available information to contractors helps prevent costly construction problems and the adversarial attitudes that aggravate them to a disproportionate scale.

READ RESPONSIBILITY CLAUSES CLOSELY.

Because geotechnical/environmental engineering is based extensively on judgment and opinion, it is far less exact than other design disciplines. This situation has resulted in wholly unwarranted claims being lodged against consultants. To help prevent this problem, consultants have developed a number of clauses for use in their contracts, reports, and other documents. These responsibility clauses are not exculpatory clauses designed to transfer the consultant's liabilities to other parties; rather, they are definitive clauses that identify where the consultant's responsibilities begin and end. Their use helps all parties involved recognize their individual responsibilities and take appropriate action. Some of these definitive clauses are likely to appear in your report, and you are encouraged to read them closely. Your consultant will be pleased to give full and frank answers to your questions.

The preceding paragraphs are based on information provided by the Geoprofessional Business Association (<https://www.geoprofessional.org>)

SITKA SEDGE TIDAL WETLAND RESTORATION STORMWATER MANAGEMENT PLAN

Prepared for
TILLAMOOK ESTUARIES PARTNERSHIP

JUNE 2026



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Appendices

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1. OVERVIEW

Oregon Parks and Recreation Department (ORPD), in collaboration with Tillamook Estuaries Partnership (TEP) and Tillamook County Public Works (TCPW), is proposing a series of improvements and modifications to the infrastructure at Sitka Sedge State Natural Area (SSSNA) and adjacent Sandlake Road, to restore tidal hydrology, aquatic organism passage, and habitat conditions in the area known as Beltz Marsh.

This Stormwater Management Plan is intended to provide an explanation of the stormwater management considerations for the Sitka Sedge Tidal Wetland Restoration and Sandlake Road Culvert Replacements project in response to requirements in the Tillamook County Dune Area Development Permit application.

Details of the project's purpose, need, design rationale, and project elements are covered in other portions of the Land Use application submittal and are not covered in substantial detail within this plan. Previous reports documenting the design process, alternatives analysis, and hydraulic analysis include Sitka Sedge State Natural Area Hydrologic Analysis Final Report (PGG, 2019), Sitka Sedge Tidal Wetland Restoration Alternatives Analysis 30% Basis of Design (ESA, 2024), Sitka Sedge Tidal Wetland – Hydraulic Analysis Memorandum (ESA, 2024), Sitka Sedge Tidal Wetland Restoration No Rise Certification (ESA, 2026a) and Sitka Sedge Tidal Wetland Restoration 90% Design Plans (ESA, 2026b).

The project design maintains the site's existing drainage patterns, improves conveyance of runoff and streamflow through the project area, reduces flooding and roadway overtopping that occur under existing conditions, and will employ best management practices (BMPs) during construction to provide erosion and sediment control including managing stormwater during construction.

ESA has developed erosion and sediment control plans, notes, and details in preparation for submitting a 1200-C Permit application to Oregon Department of Environmental Quality (DEQ) and will obtain the 1200-C Permit prior to construction.

2. EXISTING CONDITIONS

2.1 Site Overview and Topography

In 2014, OPRD acquired property north of Pacific City, including and adjacent to portions of Sand Lake Estuary. The property established as Sitka Sedge State Natural Area (SSSNA) consists of approximately 87 acres of marsh, including approximately 42 acres of tidal marsh, sand, and mudflats and approximately 12 acres of estuary altered by the half-mile long Beltz Dike which runs east/west across the property.) Tierra Del Mar (TDM) is a residential community located immediately south of Beltz Marsh (**Figure 1**). Relative to surrounding areas, TDM is flat, with elevations ranging from around 18 to 23 feet NAVD88. TDM is triangular in shape, narrowing to the south. It is surrounded by the Pacific Ocean and associated foredune to the west, additional vegetated dunes and Beltz Marsh to the north, and forested bedrock hills to the east. A marshy swale referred to as No Name Creek or “East Marsh” occurs between TDM and the bedrock hills to the east (PGG, 2019).

SSSNA includes a parking lot and trailhead located adjacent to Sandlake Road immediately north of the Reneke Creek area. The trailhead provides recreational access to a network of hiking trails and beach access via the Beltz Dike Trail situated on top of the earthen levee that separates Beltz Marsh from Sand Lake.

Prior to diking, Beltz Marsh was formerly a shallow embayment fully connected to the Sand Lake Estuary via tidal channels and mudflats. Topographic modifications including construction of the Beltz dike, ditching in the marsh, construction of Sandlake Road, quarry activities, and development of the Tierra Del Mar community continue to affect site hydrology (PGG, 2019).

Figure 2 includes an aerial photo of the project area identifying the key site features. **Figure 3** depicts an annotated site topography map derived from OPRD DEM (various dates). Key site features include the Beltz Dike, box culvert and tide gate, remnant tidal channel and ditch network, primary beaver dam in the marsh, Sandlake Road prism, Tierra Del Mar community ditches, east marsh complex, and dunes to the west of the marsh. Areas within the marsh having elevations below 5.0 ft NAVD88 remain inundated most of the time, while areas with elevations above 8.0 ft NAVD88 are rarely inundated. The low point in Sandlake Road has an elevation of approximately 11.6 ft NAVD88. Residential areas within Tierra Del Mar (TDM) have ground elevations ranging from 14.0 to 22.0 ft, or higher. The TDM ditch and culvert network flows north and discharges into the marsh above the direct influence of the tide (PGG, 2019).

FEMA Flood Insurance Rate Maps from the Tillamook County Flood Insurance Study show the 100-year floodplain elevation in Beltz Marsh and the Sandlake Rd/East Marsh crossing of 11.8' NAVD88 (**Figure 4**). This flood elevation inundates the low point in Sandlake Rd and the low-lying portions of two private properties within TDM. **Figure 5** provides a summary reference of elevations of key site features and water levels in the project area.

2.2 Surface Water Hydrology Characterization and Drainage Patterns

2.2.1 Tides

Tides are the primary driver of surface water level fluctuations in Beltz Marsh. Tidal fluctuations in the Pacific Ocean are transmitted to the marsh via the shallow Sand Lake Estuary and communicated through the existing box culvert and tide gate. The tide gate has deteriorated over time and appears to be completely missing in 2023, but the undersized box culvert restricts flow into the marsh and mutes the tidal signal resulting in a reduction in peak tidal water levels.

Pacific Ocean tides are influenced by both astronomical (sun & moon) and meteorological factors (storms). Storms and other large-scale atmospheric phenomenon, such as El Niño, tend to elevate the tides above predicted levels during the winter season. These same storm events are also responsible for delivering heavy rain to the area that frequently corresponds with high tide events. Measurements of ocean tides in the immediate vicinity of Sand Lake Estuary are not available. Long-term measurements at South Beach in Newport, OR, and Garibaldi, OR (within Tillamook Bay), provide representative ocean tides offshore of Sand Lake Estuary. As ocean tides enter the Sand Lake Estuary they are affected by the shallow nature of the estuary, constantly changing sand bed forms near the mouth of Sand Lake, and a complex tidal channel network, resulting in a situation where water levels in the estuary near the Beltz Marsh never fully recede to match low tides in the adjacent ocean. Daily low tides are severely muted and never fall below elevation 5.3 ft NAVD88, while ocean tides regularly fall to 0.0 ft NAVD88 or lower.

Fluctuations behind the dike in Beltz Marsh are primarily controlled by the interaction of tides in Sand Lake with the box culvert and tide gate, and secondarily by inflow from creeks and local drainages. Measurements show that under existing conditions, the missing tide gate and undersized box culvert allows a muted tidal flux to fill the marsh on rising tides. Water passes through the box culvert and water levels behind the dike rise more slowly and lag behind those in Sand Lake due to the limited flow through the structure. Tides in Sand Lake peak and begin to fall before the marsh completely fills and as water levels equilibrate on the ebb tide the flow reverses and water slowly drains back into Sand Lake until the minimum low water elevation of ~5.3 ft NAVD88 is reached.

In the absence of significant freshwater input, low tides behind the dike tend to be similar to those in Sand Lake but are slightly elevated (a few inches) and of longer duration as the marsh slowly drains. Freshwater inputs from creeks and local drainages that arrive on a rising tide accumulate within the marsh and contribute to elevated water levels behind the dike. Following heavy rainfall events, it can take multiple tidal cycles for accumulated freshwater to be discharged through the existing box culvert. The leaky/missing tide gate is no longer functional, though the size of the box culvert itself limits flux through the dike and thereby causes lower water levels than in Sand Lake at high tide, and higher water levels than in Sand Lake at low tide and following intense rainfall events.

Existing tidal fluctuations in the south end of the marsh are further impeded by the existing beaver dam that impounds water in the ditches and wetlands near Sandlake Road. Water levels remain relatively constant in time at about elevation 8.0 ft NAVD88 during the wet season and drop down to elevation 7.0 ft during summer low flow period. The beaver dam is approximately 3.0 ft high, based on observations by ESA staff in February 2018. Freshwater Inputs

Frequent and intense rainfall is common along the Oregon coast, and in the vicinity of the project site. Mean annual rainfall is about 80 inches per year, with a 2-year peak 24-hour rainfall intensity of about 3 inches (USGS, 2018). Other rainfall records are available at Tillamook and Cloverdale, OR. Periods of intense rainfall correspond to both elevated water levels in Beltz Marsh and photographs of flooding provided by the TDM community from 2016-2017 (pers. com).

Beltz Creek (0.5 square mile drainage) and Reneke Creek (0.9 square mile drainage) are the primary freshwater sources that discharge into Beltz Marsh under existing conditions. Neither of the creeks has been gaged and few streamflow measurements are available to describe the response of the creek drainages to rainfall events. Therefore, the current understanding of creek hydrology relies on limited observations, comparisons with nearby gaged streams (Tucca Creek), and scaling to approximate discharge from Beltz and Reneke Creeks (PGG, 2019).

Reneke Creek flows west toward Sandlake Road, where it encounters a blocked culvert and then diverts southwest along Sandlake Road. The creek then flows into a partially blocked 38-ft long, 2-ft diameter, culvert that passes beneath Sandlake Road into Beltz Marsh. The culvert invert elevations are low enough to be subject to tidal fluctuations in the marsh during extreme high tides and ESA observed what appeared to be salmonid fish in the pool immediately downstream of the culvert. Upon entering the riparian area west of Sandlake Road, the creek channel meanders through wetlands and then bifurcates into multiple smaller braided channels that separately discharge into the marsh. Signs of erosion and road overtopping indicate that the existing culvert is undersized and does not pass all creek flows beneath the road. Historic photos and ground observations indicate that Reneke Creek was formerly routed through the blocked culvert and then to the north along what is currently a dry swale (PGG, 2019).

Beltz Creek arrives at Sandlake Road at a higher elevation than Reneke Creek and passes beneath Sandlake Road through a skewed 80-ft long, approximately 3-ft diameter, culvert. The downstream end of the culvert is perched about 2.5 ft above the adjacent creek channel and well above the influence of the tide. The creek channel then flows through the former rock quarry and splits into at least two smaller channels before entering the marsh and ditch network.

The primary drainage ditch from TDM (identified as the East Ditch or Sandlake Road Ditch) flows north through a series of small culverts that parallel Sandlake Road. The final culvert beneath Roma Ave. consists of a 40-foot long 12-inch diameter corrugated smooth interior wall HDPE pipe with an outlet invert elevation of 11.8 ft NAVD88. The ditch continues north and connects with other ditch networks upstream of the existing beaver dam within the marsh. Flows through the ditch along Sandlake Road are limited by the capacity of the culverts and condition of the ditch. A secondary drainage swale within TDM (identified as the North Ditch in **Figure 3**)

runs parallel to the dune line and flows northeast through TDM, including beneath roads and structures, before turning in an east-northeast direction north of Roma Ave.

Finally, drainage from the East Marsh located on the east side of Sandlake Road and across from TDM, flows into the south end of Beltz Marsh via a 2-ft diameter culvert beneath Sandlake Road. The East Marsh watershed is approximately 202 acres or 0.32 square miles. Limited measurements in this marsh by OPRD in 2018 indicate that water levels in the immediate vicinity of Sandlake Road are controlled by the backwater created by the beaver dam in Beltz Marsh. Ground levels and surface water levels in the East Marsh continue to rise to the south likely impounded by relic beaver dams and/or emergent vegetation. Observations by OPRD in spring of 2018 indicated water ponded approximately 1 ft above the ground surface throughout this marsh, with deeper water closer to the Sandlake Road culvert (PGG, 2019).

Groundwater discharge and upwelling likely also contribute surface water inputs to the marsh, particularly during the wet season. However, PGG indicated that groundwater discharge flows are likely quite small compared to peak runoff flows during extreme storm events (PGG, 2019).

2.2.2 Hydrologic Characterization Summary

- The Beltz dike tide gate no longer functions properly and allows water to flow into the marsh when water levels are higher in Sand Lake. Still, water levels at high tide are lower on the inside of the dike under existing conditions due to limited flux allowed in and out of the existing box culvert.
- The existing box culvert/tide gate is undersized to efficiently drain accumulated freshwater within the marsh following intense rainfall events and thus it currently takes multiple low tide cycles for water levels in Beltz Marsh to equilibrate with Sand Lake.
- The existing beaver dam at the south end of Beltz Marsh impounds water and creates a backwater area that causes water to pond along both sides of Sandlake Road and within the East Marsh.
- Reneke Creek's northern culvert is completely blocked by gravel, and the southern culvert is undersized for passing peak stream flows. This constriction moderates Reneke Creek flows through the culvert at moderate flows and causes overtopping of the roadway during peak streamflow events.
- The Beltz Creek culvert is perched above the downstream channel and is well above the influence of the tide.
- The upland drainage network in TDM has limited capability to drain TDM following intense rainfall events due to a combination of local topographic depressions with a lack of positive drainage, absence of a drainage network along residential roads, and limited capacity of the culverts along Sandlake Road to transmit flows.

- The East Marsh is affected by the backwater of the beaver dam in Beltz Marsh and is subject to tidal fluctuations during extreme high tides and storm events. Pondered water has been observed in the East Marsh well above the influence of the backwater from Beltz Marsh.
- Groundwater hydrology characterization and alternatives modeling are covered in detail in the *Sitka Sedge State Natural Area Hydrologic Analysis Final Report* (PGG, 2019) Groundwater modeling of a dike breach scenario without a setback dike predicted insignificant changes in shallow groundwater elevations beneath TDM during average conditions and slightly reduced groundwater elevations during large storm events.

2.3 Soil/Infiltration Characteristics

Eleven soil map units are mapped within the Study Area, including six soil map units that are adjacent to areas with proposed or modified impervious surfaces **Figure 6** [NRCS 2025b]). **Table 1** lists the relevant soil map units with associated Hydrologic Soil Group, drainage characteristics, and drainage/infiltration capacity. Figure 6 also shows the approximate location of the proposed new or modified impervious surfaces relative to the soil map units. Soils within the project area range from excessively and well-drained soils with high to very high infiltration capacities, to very poorly drained soils with very low drainage capacities.

TABLE 1
MAPPED SOIL UNITS IN THE PROJECT STUDY AREA NEAR IMPERVIOUS SURFACES¹

Map Unit	Map Unit Name	Percent of Study Area	Component Landform	Hydrologic Soil Group, Drainage Class	Drainage Capacity
9B	Waldport fine sand, 0 to 5 percent slopes	4.7	Dunes on marine terraces	A, Excessively drained	High to very high - 5.95 to 19.98 in/hr
14A	Heceta fine sand, 0 to 3 percent slopes	35.4	Depressions on interdunes formed from Eolian sands	A/D, poorly drained	High to very high - 5.95 to 19.98 in/hr
20E	Kloutchie-Necanicum complex, 30 to 60 percent slopes	6.9	<u>Kloutchie and Necanicum</u> - Mountain slopes formed from colluvium and residuum derived from igneous rock and tuff	B, well drained	Moderately high to high - 0.57 to 1.98 in/hr
45B	Hebo silty clay loam, 0 to 5 percent slopes	5.1	Drainageways on fluvio-marine terraces, depressions on stream terraces derived from mixed alluvium and/or fluvio-marine deposits derived from sedimentary rock	D, poorly drained	Very low to moderately low - 0.00 to 0.06 in/hr
57C	Condorbridge gravelly medial loam, 3 to 15 percent slopes	6.4	Alluvial fans derived from alluvium and/or debris flow deposits derived from igneous and sedimentary rock	C, Well drained	Moderately high to high - 0.20 to 1.98 in/hr

Map Unit	Map Unit Name	Percent of Study Area	Component Landform	Hydrologic Soil Group, Drainage Class	Drainage Capacity
59B	Chitwood-Knappa medial silt loams, 0 to 7 percent slopes	11.0	Stream terraces, fluvio-marine terraces formed from mixed alluvium and/or fluvio-marine deposits derived from sedimentary rock	C/D, Somewhat Poorly Drained	0.06 to 0.20 in/hr
102A	Fluvaquents-Histosols complex, 0 to 1 percent slopes, diked	20.3	<u>Fluvaquents</u> - Tidal marshes formed from estuarine deposits <u>Histosols</u> - Tidal marshes formed from organic materials overlying alluvium or estuarine deposits; stratified organic materials and alluvium; organic materials throughout	B/D, very poorly drained	Moderately high to high - 0.20 to 1.98 in/hr

SOURCE: NRCS 2025b

1. See Appendix A, Figure 6

3. PROPOSED CONDITIONS, RUNOFF ANALYSIS, AND STORMWATER STRATEGY

This section described the proposed conditions that include new or modified impervious surfaces, the estimated increases in runoff generated from these areas, and the strategy for managing the stormwater runoff in these locations. In general, stormwater runoff from new or modified impervious surfaces will be managed through sheet flow dispersion, using crowned gravel or asphalt roadway surfaces to evenly distribute runoff to adjacent densely vegetated areas without concentrating flow.

Treatment of runoff will be provided by dispersion through vegetated filter strips with dense groundcover vegetation. Detention of stormwater is not necessary in this location for multiple reasons. These modest increases in runoff rates and storm volume are dwarfed by site's existing runoff rates and peak stream flows of the receiving water bodies. Downstream channels have more than adequate capacity to accept these small amounts of additional runoff without causing flooding or erosion, and the proposed bridges and drainage structures are sized to significantly increase conveyance through the drainage system and alleviate flooding that occurs inside of Beltz Dike and over Sandlake Road. As demonstrated in the Sitka Sedge Tidal Wetland Restoration – No Rise Rationale Memo and No Rise Certification (ESA, 2026a), the based flood elevation for the project area is developed solely from coastal influences including the predicted astronomical tide and coastal storms. This project's additional runoff from new and modified impervious surfaces do not influence the predicted astronomical tide or coastal storm processes and therefore, cannot impact the BFE.

Santa Barbara Unit Hydrograph (SBUH) 24-hour storm analysis was used to estimate the increase in the runoff rate and volume of stormwater generated from the new or modified impervious surface during a Water Quality design storm of 1.38 inches per 24-hour storm, a 10-year storm of 3.2 inches per 24-hour storm, and a 100-year storm of 4.4 inches per 24-hour storm, using a SCS Type 1A storm distribution.

The proposed conditions include three project locations with new or modified impervious surfaces:

- **A new earthen setback dike constructed across the south end of the marsh, with a gravel surfaced access road on top of the dike (Figure 7).** This gravel surface would be considered partially impervious (Curve Number = 96 conservatively applied due to underlying soil group D and specified compaction) with an area of 22,697 square feet. During the Water Quality Storm, this gravel surface is estimated to generate a peak runoff rate of 0.17 cubic feet per second (cfs) and a total runoff volume of 2,198 cubic feet (cf). During a 10-year storm, this gravel surface is estimated to generate a peak runoff rate of 0.43 cfs and total runoff volume of 5,613 cf. During a 100-year storm, this

gravel surface is estimated to generate a peak runoff rate of 0.60 cfs and total runoff volume of 7,876 cf.

The runoff from this gravel surfacing would be managed through sheet flow dispersion and treated by adjacent densely vegetated areas. The gravel access road will be crowned to evenly distribute runoff to the edges of the gravel access road without concentrating flow, where it will be directed down the 5H:1V side slopes. The side slopes will be densely vegetated with native grasses and ground cover providing 100% ground coverage, with additional shrub plantings. At the base of the setback dike side slopes, the adjacent areas are densely vegetated wetland of emergent marsh and scrub-shrub wetland. These areas are hydrologically connected to a network of existing and proposed channels that will drain directly to Sand Lake. The downstream channels and connection to Sand Lake have more than adequate conveyance capacity to accept this additional runoff without causing flooding or erosion.

- **Raising an 800-foot section of Sandlake Road at the approaches to the proposed bridge over Reneke Creek, while slightly widening the paved roadway surface to meet current design criteria for shoulder width (Figure 8).** The existing pavement in this area is approximately 15,306 square feet, and the proposed pavement in this location is approximately 20,452 square feet for a net increase of 5,146 square feet. During the Water Quality Storm, this additional paved surface is estimated to generate a peak runoff rate of 0.04 cfs and a total runoff volume of 498 cf. During a 10-year storm, this additional paved surface is estimated to generate a peak runoff rate of 0.10 cfs and total runoff volume of 1,273 cf. During a 100-year storm, this additional paved surface is estimated to generate a peak runoff rate of 0.14 cfs and total runoff volume of 1,786 cf.

The runoff from these paved roadway surfaces would be managed through sheet flow dispersion and treated by adjacent densely vegetated areas. Consistent with the existing roadway drainage patterns, this paved roadway road will be crowned to evenly distribute runoff to the edges of the road without concentrating flow. Runoff will be directed into adjacent densely vegetated areas. Ground disturbances along the roadway caused by construction will be seeded with native grasses and ground covers to provide 100% coverage, with additional tree and shrub plantings. These areas are hydrologically connected to Reneke Creek (which has a 100-year peak discharge of approximately 250 cfs), and the new bridge opening is sized to pass this peak flow with two feet of freeboard. Reneke Creek drains to Beltz Marsh and ultimately to Sand Lake. The downstream channels and connection to Sand Lake have more than adequate conveyance capacity to accept this additional runoff without causing flooding or erosion.

- **Repaving a small section of Sandlake Road in the vicinity of the proposed bridge over Beltz Creek, while slightly widening the paved roadway surface to meet current design criteria for shoulder width (Figure 9).** The existing pavement in this area is approximately 5,303 square feet, and the proposed pavement in this location is approximately 7,121 square feet for a net increase of 1,818 square feet. During the Water Quality Storm, this additional paved surface is estimated to generate a peak runoff

rate of 0.01 cfs and a total runoff volume of 176 cf. During a 10-year storm, this additional paved surface is estimated to generate a peak runoff rate of 0.03 cfs and total runoff volume of 450 cf. During a 100-year storm, this additional paved surface is estimated to generate a peak runoff rate of 0.05 cfs and total runoff volume of 631 cf.

The runoff from these paved roadway surfaces would be managed through sheet flow dispersion and treated by adjacent densely vegetated areas. Consistent with the existing roadway drainage patterns, this paved roadway road will be crowned to evenly distribute runoff to the edges of the road without concentrating flow. Runoff will be directed into adjacent densely vegetated areas. Ground disturbances along the roadway caused by construction will be seeded with native grasses and ground covers to provide 100% coverage, with additional tree and shrub plantings. These areas are hydrologically connected to Beltz Creek (which has a 100-year peak discharge of approximately 145 cfs), and the new bridge opening is sized to pass this peak flow with more than three feet of freeboard. Beltz Creek drains to Beltz Marsh and ultimately to Sand Lake. The downstream channels and connection to Sand Lake have more than adequate conveyance capacity to accept this additional runoff without causing flooding or erosion.

4. EROSION CONTROL

ESA has developed erosion and sediment control (ESC) plans, notes, and details in preparation for submitting a 1200-C Permit application to Oregon Department of Environmental Quality (DEQ) and will obtain the 1200-C Permit prior to construction. The project will also obtain Section 404 removal/fill permits from Oregon Department of State Lands (DSL) for work in wetlands and below Ordinary High Water, and a Section 401 Water Quality Certification from DEQ that will include turbidity monitoring requirements during turbidity generating activities.

These ESC Plans are included in the Sitka Sedge Tidal Wetland Restoration 90% Design Plans (ESA, 2026). The project will employ best management practices (BMPs) during construction to provide erosion and sediment control including managing stormwater during construction.

The ESC BMPs include but are not limited to:

- gravel construction entrances at all site ingress/egress points to prevent sediment from leaving the site's work and staging areas and prevent tracking of sediment on the nearby roadways
- sediment fence and/or straw wattles at the perimeter and downslope edges of work areas and staging areas to trap sediment and prevent sediment from entering adjacent wetland and waterways
- maintaining existing vegetation where possible to provide vegetated buffers between ground disturbances and adjacent wetlands and waterways.
- Turbidity curtains, work area isolation, working around tides, and dewatering to conduct work in or adjacent to waterways while minimizing turbidity in accordance with permit conditions.
- Controlling dust during construction by watering or other approved methods.
- Stabilizing disturbed areas through temporary and permanent seeding and straw mulch, as well as emergency methods including plastic sheeting, straw bales, and covering stockpiles.

A full set of BMPs proposed through each phase of work is included on Sheet EC1.0 of the 90% Plans, along with a set of DEQ Standard 1200-C permit construction notes and requirements for managing sediment and erosion control measures.

The project's management team and hired construction contractor will be required to perform ESC inspections periodically throughout the project duration and after storm events, and BMPs will be replaced, repaired, or modified to maintain compliance with permit conditions.

In areas of sandy or highly erodible soils, extra care will be given to prevent erosion. The setback dike's western end ties into the existing forested dune where sandy soils are present. Ground disturbance in this area will be limited to the footprint of the setback dike tie-in and permanent vehicular turnaround feature. This turnaround will be established early in the project's construction and will be stabilized through use of geotextile fabric and gravel surfacing to allow this area to be used for staging of equipment and materials while preventing erosion of the sandy soil. Sediment fence and tree protection fencing (orange construction fencing) will be installed around the perimeter of this area to protect trees and prevent access or disturbance beyond the intended extent. No work is planned near steep dunes or bluff areas.

5. OUTFALL DESIGN

Runoff from new or modified impervious surfaces will be managed through sheet flow dispersion, avoiding concentration of flow or the need for stormwater outfalls. However, runoff at the ends of bridges where limited concentration of flows may occur will be intercepted by aggregate or riprap to prevent erosion in these locations and direct runoff to the adjacent waterway without causing erosion. Underdrains associated with the setback dike's tide gate structure will include perforated drain pipes that will be discharged onto riprap surfaces immediately adjacent to the tide gate structure. These underdrains are intended to minimize water pressure at the back of the headwalls but are not anticipated to convey large amounts of water, and the riprap sized to protect the wingwalls and adjacent banks will be more than adequate to prevent erosion at these small 4-inch perforated pipe outfalls.

The proposed setback dike design includes two backup culvert pipes that will be perched above the adjacent marsh surface to convey water through the setback dike in the event that the tide gate structure was blocked with debris or beaver dam material. The outfalls of these backup pipes will include concrete headwall/wing walls with a concrete splash apron and Class 100 Riprap and outfall dissipation basins to receive the discharged water, dissipate energy, and prevent erosion in the flow path at the base of the setback dike and downstream drainage channel. These backup culvert pipes are being designed in accordance with United States Army Corps of Engineers (USACE) EM 1110-2-1913 Design and Construction of Levees (USACE, 2000).

6. SETBACKS AND HAZARD INTEGRATION

Shannon & Wilson, geotechnical engineering subconsultant to ESA, has conducted geotechnical engineering investigations at the project site to inform the design of the proposed bridges, setback dike, and tide gate structure. Shannon & Wilson prepared a Geologic Hazard Report (Shannon & Wilson, 2026), as well as Preliminary Geotechnical Engineering Reports. Shannon & Wilson is reviewing ESA's 90% Design Plans and Specifications and will provide review comments to ensure their geotechnical engineering recommendations are implemented in the project's final design.

In the Geologic Hazard Report, Shannon & Wilson concluded that they do not anticipate that the structures or associated construction activity will affect the mapped geologic hazards, including the debris flow near Beltz Creek Bridge, the landslide near No Name Creek, or the coastal dune. The Geotechnical Engineering Reports provide recommendations for mitigating seismic hazard risks for shallow and deep foundations for the bridge and culvert structures. The Geotechnical Engineering Report also provide recommendations for constructing the new setback dike, including a recommendation for benching the subgrade where fill placement will occur on existing slopes steeper than 5H:1V. This work will be observed in the field by the geotechnical engineer and the construction approach will be adjusted if slope stability issues are observed during construction.

The construction contractor will generally be responsible for erosion control means and methods, in accordance with permit conditions. Shannon & Wilson will provide geotechnical engineering oversight during construction, and ESA will provide general engineering oversight and environmental compliance assistance to TEP and OPRD.

7. REFERENCES

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Appendix A. Figures

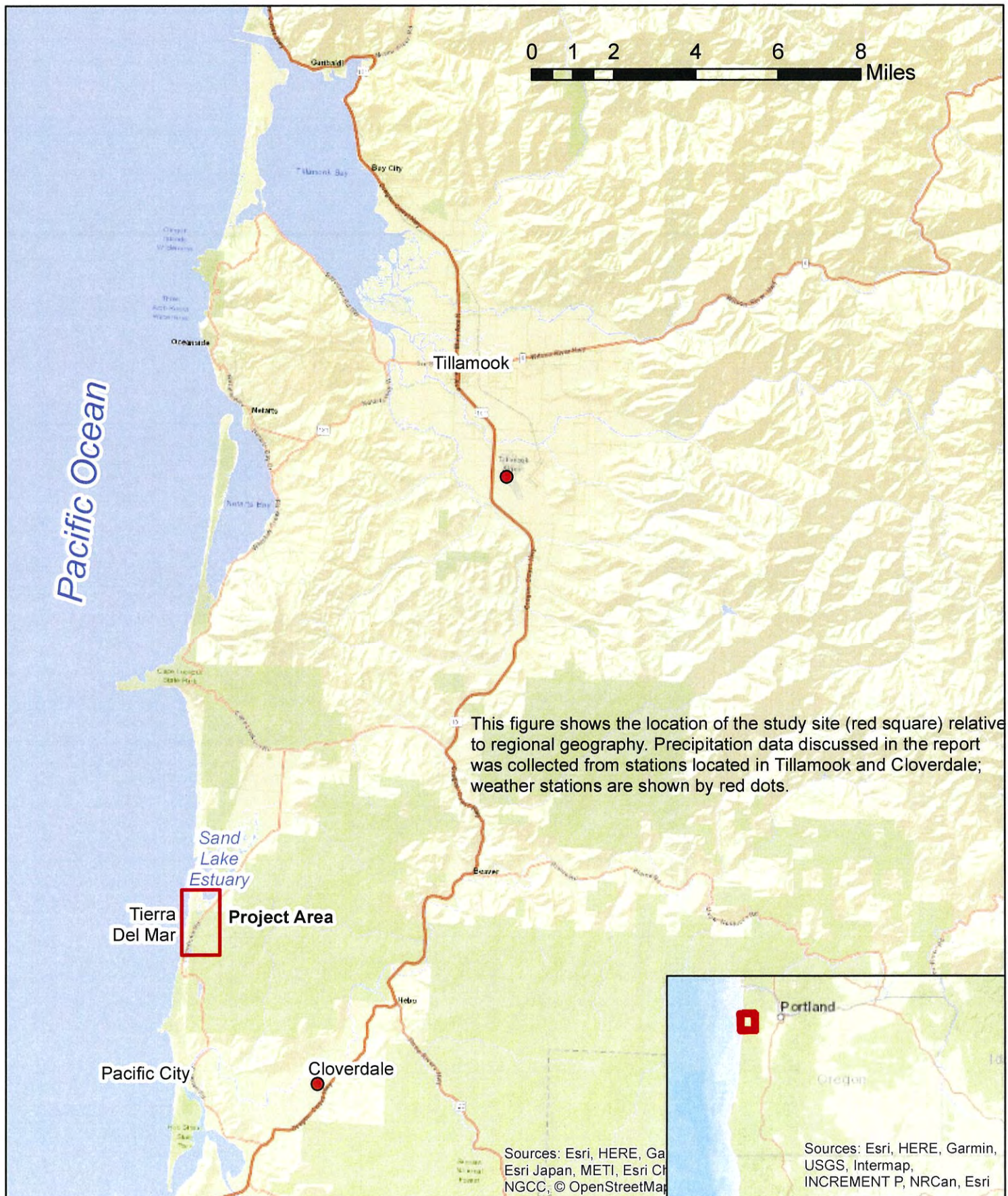
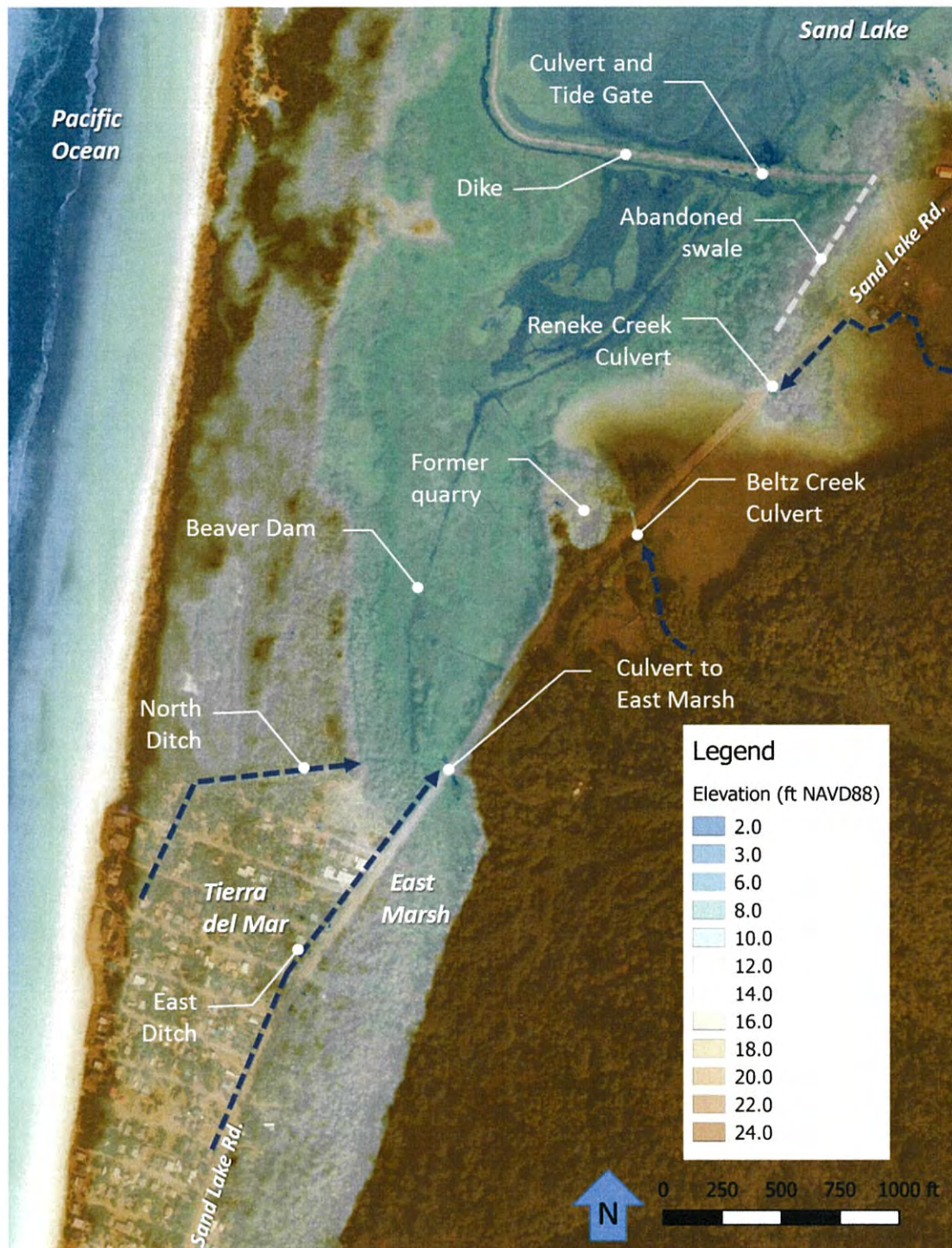


Figure 1
Project Location Map

Sitka Sedge Tidal Wetland Restoration





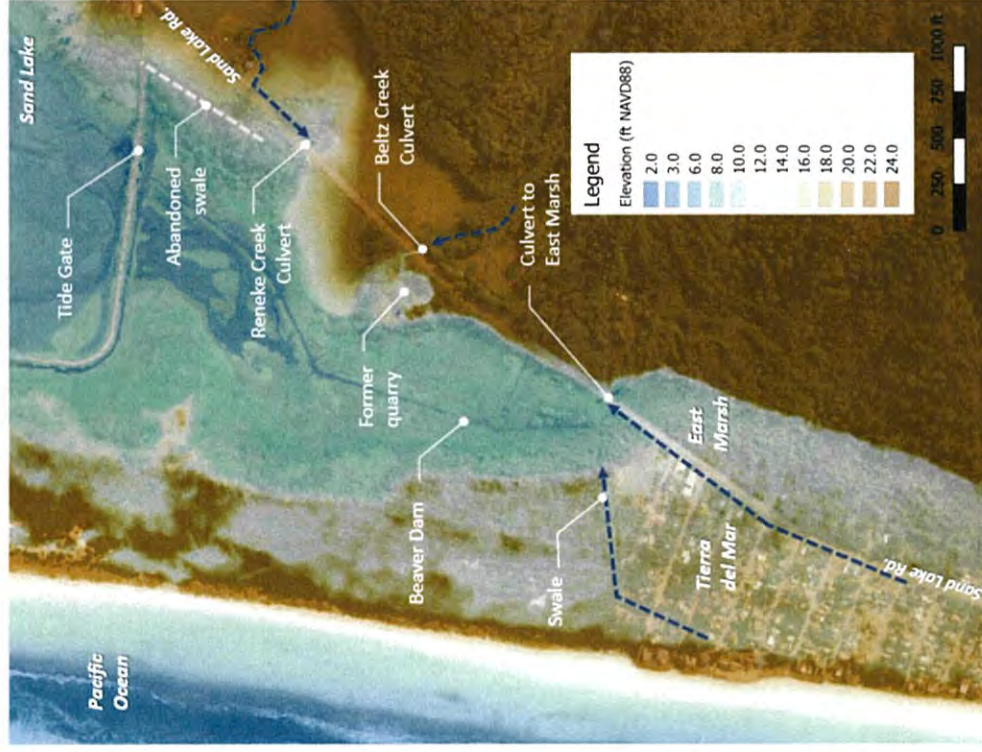
Note: This figure is an aerial photo with a LiDAR elevation data overlay. Key site features are labeled for reference.

Figure 3
Annotated Site Topographic and Hydrologic Map

Sitka Sedge Tidal Wetland Restoration







FEMA Base Flood EL. +11.8 ft

Low top of Dike EL. +12.8 ft

Bottom of Tide Gate EL. +1.3 ft

Scour hole EL. -4.5 ft

Low tide in Sand Lake EL. +5.5 ft

MSL in Ocean EL. +3.8 ft

Reneke Ck. Culvert Invert. EL. +9.6 ft

Beltz Ck. Culvert Invert. EL. +20.7 ft

Top of Beaver Dam EL. ~8.0 ft

Culvert to East Marsh Invert EL. 5.15 ft

Low Point in Sand Lk. Rd EL. ~11.6 ft

Culvert Invert at Roma Ave = +11.7 ft

Land in Tierra del Mar EL. +14 to 22 ft

Note: This figure summarizes the elevations of key features within the project area. All elevations are referenced to North American Vertical Datum 1988 (NAVD88).

Figure 5
Elevations of Key Site Features and Water Levels (NAVD88)

Sitka Sedge Tidal Wetland Restoration



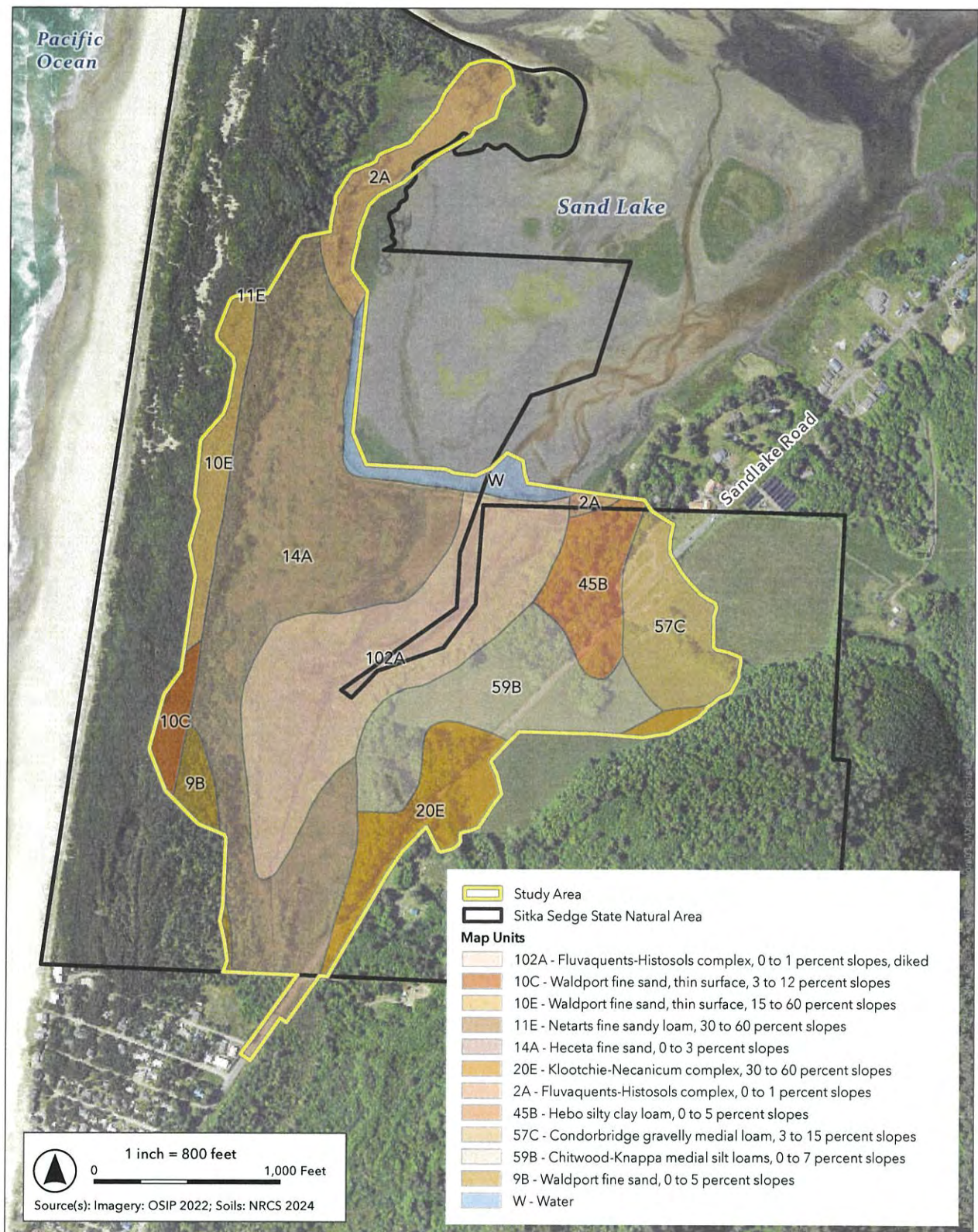


Figure 6
NRCS Soils Map

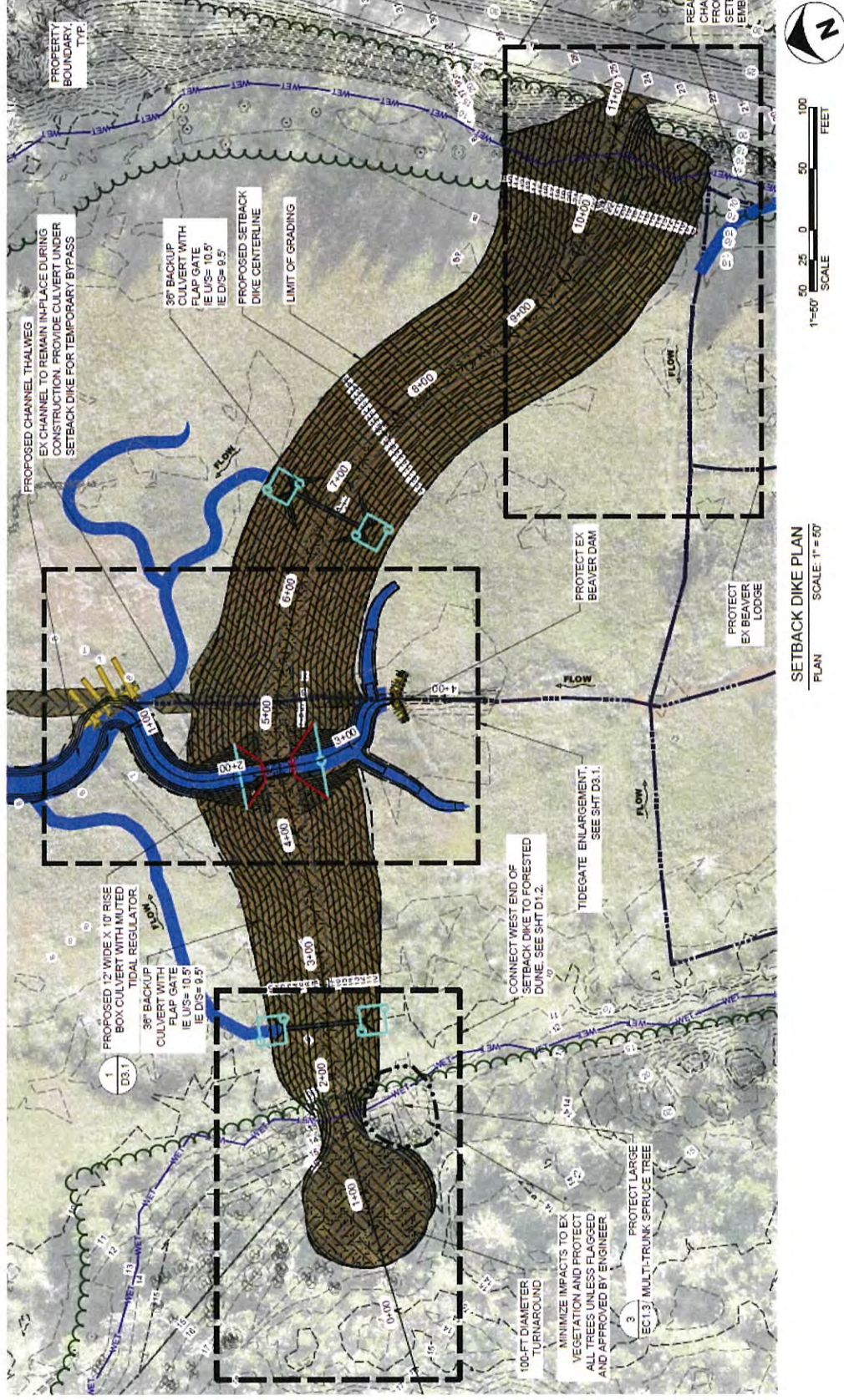


Figure 7
Setback Dike Proposed Impervious Surface

Sitka Sedge Tidal Wetland Restoration



Sitka Sedge Tidal Wetland Restoration



PLANNING APPLICATION

Applicant ☐ (Check Box if Same as Property Owner)

Name: Tillamook Estuaries Partnership (TEP) Phone: 503-322-2222
Address: PO Box 493 613 Commercial Street
City: Garibaldi State: OR Zip: 97118
Email: christer@tbnep.org

Property Owner

Name: Oregon Parks and Rec Dept Phone: 503-986-0707
Address: 725 Summer Street NE, Suite C
City: Salem State: OR Zip: 97031
Email: OPRD.SitkaSedge@.oregon.gov

OFFICE USE ONLY	
Date Stamp	JUN 30 2026 Comdr - Art - SS
☐ Approved	☐ Denied
Received by:	
Receipt #:	
Fees: 3475.00	
Permit No: 851-26-000329-PLNG	

Request: A Type IV Comprehensive Plan Amendment Request to re-inventory the Beltz Farm and Marsh property, part of the greater Sitka Sedge State Natural Area (SSNA), under Goal 16 Estuarine Resources from Goal 17 Coastal Shorelands with the goal of permitting a subsequent tidal wetland restoration project.

Type II

- ☐ Farm/Forest Review
- ☐ Conditional Use Review
- ☐ Variance
- ☐ Exception to Resource or Riparian Setback
- ☐ Nonconforming Review (Major or Minor)
- ☐ Development Permit Review for Estuary Development
- ☐ Non-farm dwelling in Farm Zone
- ☐ Fore-dune Grading Permit Review
- ☐ Neskowin Coastal Hazards Area

Type III

- ☐ Detailed Hazard Report
- ☐ Conditional Use (As deemed by Director)
- ☐ Ordinance Amendment
- ☐ Map Amendment
- ☐ Goal Exception
- ☐ Nonconforming Review (As deemed by Director)
- ☐ Variance (As deemed by Director)

Type IV

- ☐ Ordinance Amendment
- ☐ Large-Scale Zoning Map Amendment
- ☒ Plan and/or Code Text Amendment

Location:

Site Address: 26805 & 27340 Sandlake Rd. Cloverdale, OR

Map Number: 3S & 4S	10W & 10W	31 & 06	3S10310000400 & 4S10060000300
Township	Range	Section	Tax Lot(s)

Clerk's Instrument #: 2014-4572 & 2014-4572

Authorization

This permit application does not assure permit approval. The applicant and/or property owner shall be responsible for obtaining any other necessary federal, state, and local permits. The applicant verifies that the information submitted is complete, accurate, and consistent with other information submitted with this application.

Eric Timmons

Digitally signed by Eric Timmons
Date: 2026.06.25 07:57:15 -07'00'

6/25/26

Property Owner Signature (Required)

Christer LaBrecque

Digitally signed by Christer LaBrecque
Date: 2026.06.24 11:45:35 -07'00'

Date
6/24/26

Applicant Signature

Date



Tillamook County Department of Community Development
1510-B Third Street, Tillamook, OR 97141 | Tel: 503-842-3408 Fax: 503-842-1819
www.co.tillamook.or.us

PLANNING APPLICATION

Applicant ☐ (Check Box if Same as Property Owner)

Name: Tillamook Estuaries Phone: 503-322-2222

Partnership (TEP)

Address: 613 Commercial Street

City: Garibaldi State: OR Zip: 97118

Email:

Property Owner

Name: Oregon Parks and Recreation Department Phone: 503-986-0707

Address: 725 Summer St NE Suite C

City: Salem State: OR Zip: 97301

Email:

OFFICE USE ONLY	
Date Stamp	
RECEIVED	
JUL 13 2026	
BY: _____	
☐ Approved	☐ Denied
Received by: _____	
Receipt #: _____	
Fees: _____	
Permit No: 851 <u>26</u> - <u>000330</u> -PLNG	

Request: A Type I Beach and Dune Hazard Report Review associated with the Sitka Sedge Tidal Wetland Restoration Project.

Type I

- ☒ Beach and Dune Hazard Report Review
- ☐ Extension of Time Review
- ☐ Final Plat Approval
- ☐ Geologic Hazard Report Review
- ☐ Land Use Compatibility Statement
- ☐ Land Use Verification Letter
- ☐ Preliminary Plat Time Extension
- ☐ Replacement Dwelling in Resource Zone
- ☐ Review for Dwelling in Resource Zone

Location:

Site Address: 26805 & 27340 Sandlake Road, Cloverdale, OR, 97112

Map Number:	03S	10W	31	3S10310000400 & 4S10060000300&400
	Township	Range		Section Tax Lot(s)

Clerk's Instrument #: 2014-4572 & 2014-4572

Authorization

This permit application does not assure permit approval. The applicant and/or property owner shall be responsible for obtaining any other necessary federal, state, and local permits. The applicant verifies that the information submitted is complete, accurate, and consistent with other information submitted with this application.

Eric Timmons OPRD

Eric Timmons
Eric Timmons (Jul 10, 2026 10:27:40 PDT)

07/10/26

Property Owner Signature (Required)

Date

Christer LaBrecque

Christer LaBrecque

07/10/2026

Applicant Signature

Date

TILLAMOOK ESTUARIES PARTNERSHIP

SITKA SEDGE TIDAL WETLAND RESTORATION

DRAFT 90% DESIGN - PRELIMINARY- NOT FOR CONSTRUCTION

PROJECT LOCATION: TIERRA DEL MAR, OREGON

SHEET LIST

Sheet Number	Sheet Title		
G1.0	COVER	BR01	PEDESTRIAN BRIDGE PLAN AND ELEVATION
G1.1	GENERAL NOTES, LEGENDS, AND ABBREVIATIONS	BR02	PEDESTRIAN BRIDGE GENERAL NOTES
G2.0	EXISTING CONDITIONS AND SURVEY CONTROL	BR03	PEDESTRIAN BRIDGE FOUNDATION PLAN
G2.1	SITE PLAN AND OVERVIEW	BR04	PEDESTRIAN BRIDGE BENT DETAILS
G2.2	ACCESS, STAGING, DEMO, AND PROTECTION	BR05	PEDESTRIAN BRIDGE WINGWALL DETAILS
G3.0	RENEKE CREEK EXSTING CONDITIONS & SURVEY CONTROL	D1.0	SETBACK DIKE TYPICAL SECTION
G4.1	CONSTRUCTION LOGISTICS - PEDESTRIAN BRIDGE	D1.1	SETBACK DIKE PLAN & PROFILE
G4.2	CONSTRUCTION LOGISTICS - SETBACK DIKE	D1.2	SETBACK DIKE TIE-IN ENLARGEMENTS
G4.3	CONSTRUCTION LOGISTICS - RENEKE CREEK	D2.1	SETBACK DIKE SECTIONS
C1.1	DIKE BREACH PLAN AND SECTION	D3.1	TIDE GATE STRUCTURE PLAN AND PROFILE
C1.2	DIKE BREACH CHANNEL PROFILE	D3.2	TIDEGATE DETAIL
C1.3	CHANNEL AND DITCH GRADING ENLARGEMENT - 1	D4.1	BEAVER EXCLUSION SYSTEM DETAILS
C1.4	CHANNEL AND DITCH GRADING ENLARGEMENT - 2	EC1.1	1200-C ESC COVER
C2.1	CHANNEL GRADING SECTIONS AND DETAILS	EC1.2	EROSION & SEDIMENT CONTROL PLAN OVERVIEW
C3.1	RENEKE CREEK GRADING PLAN	EC1.3	EROSION CONTROL DETAILS - 1
C3.2	RENEKE CREEK CHANNEL PROFILES	EC1.4	EROSION CONTROL DETAILS - 2
C3.3	RENEKE CREEK GRADING SECTIONS	L1.0	REVEGETATION NOTES
C4.1	HABITAT DETAILS	L2.0	REVEGETATION SHEET OVERVIEW
B01	RENEKE BRIDGE PLAN AND ELEVATION	L2.1	REVEGETATION AREA 1
B02	RENEKE BRIDGE NOTES AND TYPICAL SECTIONS	L2.2	REVEGETATION AREA 2
B03	RENEKE BRIDGE CONSTRUCTION STAGING	L2.3	REVEGETATION AREA 3
B04	RENEKE BRIDGE CONSTRUCTION STAGING DETAILS - 1	L3.0	PLANTING SCHEDULES
B05	RENEKE BRIDGE CONSTRUCTION STAGING DETAILS - 2	L3.1	PLANTING SCHEDULES
B07	RENEKE PRECAST SLAB DETAILS	L3.2	PLANTING SCHEDULES
B08	RENEKE BENT DETAILS	L4.0	TYPICAL PLANTING PROFILES
B09	RENEKE WINGWALL DETAILS	L5.0	PLANTING DETAILS
B10	RENEKE BRIDGE MISCELLANEOUS DETAILS	L5.1	PLANTING DETAILS
BA-01	TYPICAL SECTION	S1.0	GENERAL STRUCTURAL NOTES
C-01	PLAN AND PROFILE	S2.0	CULVERT FOUNDATION PLAN
T-01	TRAFFIC CONTROL PLAN	S2.1	CULVERT CROSS SECTIONS & DETAILS
T-02	TRAFFIC CONTROL PLAN	S2.2	WING WALL DETAILS
T-03	TRAFFIC CONTROL PLAN	BZ1.1	BELTZ CREEK EXISTING CONDITIONS
		BZ2.1	BELTZ CREEK STREAM PLAN
		BZ2.2	BELTZ CREEK STREAM PROFILE AND SECTIONS
		BZ2.3	BELTZ CREEK STREAM DETAILS 1
		BZ2.4	BELTZ CREEK STREAM DETAILS 2
		BZ2.5	BELTZ CREEK STREAM HABITAT DETAILS
		BZ3.1	BELTZ CREEK BRIDGE PLAN AND ELEVATION

*Beltz Creek Fish Passage Project Sheets are 30%-Level Design awaiting funding to advance to final design



VICINITY MAP

PLAN

SCALE: NTS



PROJECT TEAM

PROJECT SPONSOR:

CHRISTER LABRECQUE
TILLAMOOK ESTUARIES PARTNERSHIP
P.O. BOX 493
613 COMMERCIAL STREET
GARIBALDI, OREGON
OFFICE: 503-322-222

PROJECT ENGINEER:

HUNTER WHITE, PE
ENVIRONMENTAL SCIENCE ASSOCIATES
1615 SE 3RD AVE, SUITE 400
PORTLAND, OR 97214
OFFICE: (503) 274-2010

PROPERTY OWNER:

NOEL BACHELLER
OREGON PARKS AND RECREATION DEPARTMENT
725 SUMMER STREET NE, SUITE C
SALEM, OR 97301
OFFICE: (503) 986-6949

ROADWAY / RIGHT-OF-WAY OWNER:

CHRIS LAITY, PE
TILLAMOOK COUNTY PUBLIC WORKS
503 MAROLF LOOP ROAD
TILLAMOOK, OR 97141
OFFICE: (503) 842-3419

STRUCTURAL ENGINEERING:

JOSH GOODALL, PE
DAVID EVANS AND ASSOCIATES, INC.
5121 SKYLINE VILLAGE LOOP S, SUITE 200
SALEM, OR 97306
OFFICE: 541-788-5830

GEOTECHNICAL ENGINEERING:

TRAVIS NGUYEN, PE, GE
SHANNON & WILSON
3990 COLLINS WAY, SUITE 100
LAKE OSWEGO, OR 97035
OFFICE: 503-210-475030

NOTICE TO EXCAVATORS:
ATTENTION: OREGON LAW REQUIRES YOU TO FOLLOW RULES ADOPTED BY THE OREGON UTILITY NOTIFICATION CENTER. THOSE RULES ARE SET FORTH IN OAR 952-001-0010 THROUGH OAR 952-001-0090. YOU MAY OBTAIN COPIES OF THE RULES BY CALLING THE CENTER.
(NOTE: THE TELEPHONE NUMBER FOR THE OREGON UTILITY NOTIFICATION CENTER IS (503)-232-1987).

POTENTIAL UNDERGROUND FACILITY OWNERS

Dig Safely.

Call the Oregon One-Call Center
1-800-332-2344



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RENEWAL DATE 06-30-28

CLIENT



TILLAMOOK ESTUARIES
PARTNERSHIP

SITKA SEDGE TIDAL
WETLAND RESTORATION

TIERRA DEL MAR, OREGON

PROJECT NAME

REVISIONS

DATE DESCRIPTION

DESIGNED HLW

DRAWN KCN

CHECKED HLW

IN CHARGE HLW

83882

PROJECT NUMBER 202200434

ISSUE DATE 06/19/2026

SCALE IS AS SHOWN WHEN
PLOTTED TO FULL SIZE (22"x34")

PHASE

DRAFT 90% DESIGN

SHEET TITLE

COVER

SHEET NUMBER

G1.0

SHEET --- OF ###

FILE: P:01 CAD\2022\xxxx\202200434.00 - TEP Sitka Sedge Tidal Wetland Restoration\DWG\G1.1 GENERAL NOTES, LEGENDS, AND ABBREVIATIONS.dwg PLOT DATE: 6/22/2026 9:53:03 AM PLOTTED BY: OLIVIA PEREYRA

GENERAL CONSTRUCTION

1. ALL WORK SHALL CONFORM TO THE CURRENT VERSION OF TILLAMOOK COUNTY CONSTRUCTION STANDARDS, THE OREGON DEPARTMENT OF TRANSPORTATION (ODOT) STANDARD SPECIFICATIONS, AND ALL OTHER APPLICABLE CODES AND STANDARDS UNLESS SPECIFICALLY INDICATED OTHERWISE BY THESE PLANS. IN CASE OF A CONFLICT BETWEEN THE REGULATORY STANDARDS OR SPECIFICATIONS, THE MORE STRINGENT REQUIREMENT SHALL PREVAIL.
2. A COPY OF THE APPROVED PLANS SHALL BE ONSITE DURING CONSTRUCTION AT ALL TIMES.
3. THE CONTRACTOR SHALL NOT COMMENCE WORK UNTIL WRITTEN AUTHORIZATION TO PROCEED HAS BEEN PROVIDED BY CONTRACTING AGENCY.
4. THE CONTRACTOR SHALL OBTAIN ANY AND ALL REQUIRED CONSTRUCTION EASEMENTS AND PERMITS PRIOR TO STARTING CONSTRUCTION.
5. APPROVAL OF THESE PLANS DOES NOT CONSTITUTE AN APPROVAL OF ANY OTHER CONSTRUCTION NOT SPECIFICALLY SHOWN. THESE PLANS ARE FOR STANDARD ROAD, BRIDGE, STREAM CHANNEL, DRAINAGE, AND UTILITY IMPROVEMENTS ONLY.
6. CONSTRUCTION NOISE SHALL BE LIMITED IN ACCORDANCE WITH LOCAL CODE.
7. ATTENTION EXCAVATORS: OREGON LAW REQUIREMENTS YOU TO FOLLOW RULES ADOPTED BY THE OREGON UTILITY NOTIFICATION CENTER. THOSE RULES ARE SET FORTH IN OAR 952-001-0010 THROUGH OAR 952-001-0090. YOU MAY OBTAIN COPIES OF THESE RULES FROM THE CENTER BY CALLING [503.232.1987]. IF YOU HAVE ANY QUESTIONS ABOUT THE RULES, YOU MAY CONTACT THE CALL CENTER. YOU MUST NOTIFY THE CENTER AT LEAST 2 BUSINESS DAYS, BUT NOT MORE THAN 10 BUSINESS DAYS, BEFORE COMMENCING AN EXCAVATION. CALL 1.800.332.2344.
8. CONTACT THE OWNER IMMEDIATELY IF UNANTICIPATED CONTAMINATION IS ENCOUNTERED DURING CONSTRUCTION. THE CONTRACTOR OR IT'S AGENT SHALL PROVIDE THE OWNER WITH COPIES OF ALL DISPOSAL PERMITS FROM THE PERMITTED DISPOSAL FACILITY, ANALYTICAL RESULTS USED TO GAIN ACCEPTANCE OF THE CONTAMINATED MEDIA, AND DISPOSAL RECEIPTS/DAILY WEIGHT SLIPS. DAILY WEIGH SLIP AMOUNTS AHALL BE CHECKED AGAINST INSPECTOR'S DAILY REPORTS. THE CONTRACTOR MUST USE AN OREGON FACILTY FOR DISPOSAL OF THE CONTAMINATED MEDIA.
9. ALL UTILITIES SHOWN ARE APPROXIMATE AND SHOWN FOR REFERENCE ONLY. CONTRACTOR IS RESPONSIBLE FOR LOCATING AND PROTECTING ALL UTILITIES.
10. REMOVE ALL OTHERWISE UNUSED MATERIALS EXCAVATED FROM WORK IN THE RIGHT-OF-WAY AND DISPOSE OF IN A LEGAL MANNER.

SITE WORK

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ADEQUATE SAFEGUARDS, SAFETY DEVICES,PROTECTIVE EQUIPMENT, FLAGGERS, AND ANY OTHER NEEDED ACTIONS TO PROTECT THE LIFE, HEALTH, AND SAFETY OF THE PUBLIC, AND TO PROTECT PROPERTY IN CONNECTION WITH THE PERFORMANCE OF WORK COVERED BY THE CONTRACTOR.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR SITE SECURITY INCLUDING PROTECTION OF WORK AND SITE AGAINST VANDALISM, THEFT, AND UNAUTHORIZED ACCESS.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING THE INTEGRITY OF ADJACENT UTILITIES WHICH MAY INCLUDE, BUT ARE NOT LIMITED TO, WATER, POWER, COMMUNICATIONS.
4. THE CONTRACTOR SHALL NOTIFY RESIDENTS AND BUSINESSES 48 HOURS IN ADVANCE OF ANY WORK AFFECTING ACCESS OR SERVICE AND SHALL MINIMIZE INTERRUPTIONS TO DRIVEWAYS FOR RESIDENTS AND BUSINESSES ADJACENT TO THE PROJECT.
5. ALL LAWN AND VEGETATED AREAS DISTURBED WILL BE RESTORED TO ORIGINAL CONDITION. ANY
6. DISTURBANCE OR DAMAGE TO OTHER PROPERTY ON ADJACENT PARCELS OR IN THE PUBLIC RIGHT OF WAY SHALL ALSO BE REPAIRED OR RESTORED TO ORIGINAL CONDITION.
7. THE CONTRACTOR SHALL PERFORM, PROTECT, AND REPLACE (IF NECESSARY) ALL NECESSARY CONSTRUCTION STAKING.
8. TRENCH EXCAVATIONS SHALL NOT BE LEFT OPEN OVERNIGHT.
9. CONNECT NEW CONSTRUCTION TO EXISTING AS SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER.
10. PROTECT ALL TREES WITHIN THE WORK AREA THAT ARE NOT SHOWN AS BEING REMOVED ON THE PLANS.
11. MAXIMUM DENSITY AND OPTIMUM MOISTURE FOR ALL GRANULAR MATERIALS SHALL BE DETERMINED BY ASTM D-1557 TEST METHOD.

TIMING FOR IN-WATER WORK

1. THE CONTRACTOR SHALL MAINTAIN COMPLIANCE WITH PROJECT PERMITS AND THE PUBLISHED ODFW IN-WATER WORK WINDOW FOR SAND LAKE - ITS ESTUARY, AND ITS TRIBUTARIES:
- SAND LAKE ESTUARY: NOVEMBER 1ST - FEBRUARY 15TH
- SAND LAKE TRIBUTARIES: JULY 1ST - SEPTEMBER 15TH
- IN-WATER WORK OUTSIDE OF THESE PERIODS SHALL BE IN ACCORDANCE WITH AN IN-WATER WORK WINDOW VARIANCE APPROVED BY ODFW AND OTHER NECESSARY PERMITTING AGENCIES.

ABBREVIATIONS

APPROX.	APPROXIMATE
ACW	ACTIVE CHANNEL WIDTH
AVE	AVENUE
BMP	BEST MANAGEMENT PRACTICE
COMM	COMMUNICATIONS
CONC	CONCRETE
CP	CONTROL POINT
DBH	DIAMETER AT BREAST HEIGHT
DEQ	DEPARTMENT OF ENVIRONMENTAL QUALITY
D/S	DOWNSTREAM
EX	EXISTING
ESC	EROSION & SEDIMENT CONTROL
ESM	ENGINEERED STREAMBED MATERIAL/MIX
EG	EXISTING GRADE
EL	ELEVATION
FG	FINISHED GRADE
FT	FEET
NAVD88	NORTH AMERICAN VERTICAL DATUM OF 1988
TYP	TYPICAL
IE	INVERT ELEVATION
IN	INCHES
MHHW	MEAN HIGHER HIGH WATER
MIN	MINIMUM
MLLW	MEAN LOWER LOW WATER
NE	NORTH EAST
ODFW	OREGON DEPARTMENT OF FISH AND WILDLIFE
OPRD	OREGON PARKS AND RECREATION DEPARTMENT
PCMS	PORTABLE CHANGEABLE MESSAGE SIGN
RCP	REINFORCED CONCRETE PIPE
RD	ROAD
SHT	SHEET
SNA	SCENIC NATURAL AREA
SSTW	SITKA SEDGE TIDAL WETLAND
STA	STATION
TBD	TO BE DETERMINED
TCPW	TILLAMOOK COUNTY PUBLIC WORKS
TOB	TOP OF BANK
UG	UNDERGROUND
U/S	UPSTREAM
VIF	VERIFY IN FIELD
W	WATER



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83882 PE



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RENEWAL DATE 06-30-28

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TILLAMOOK ESTUARIES
PARTNERSHIP

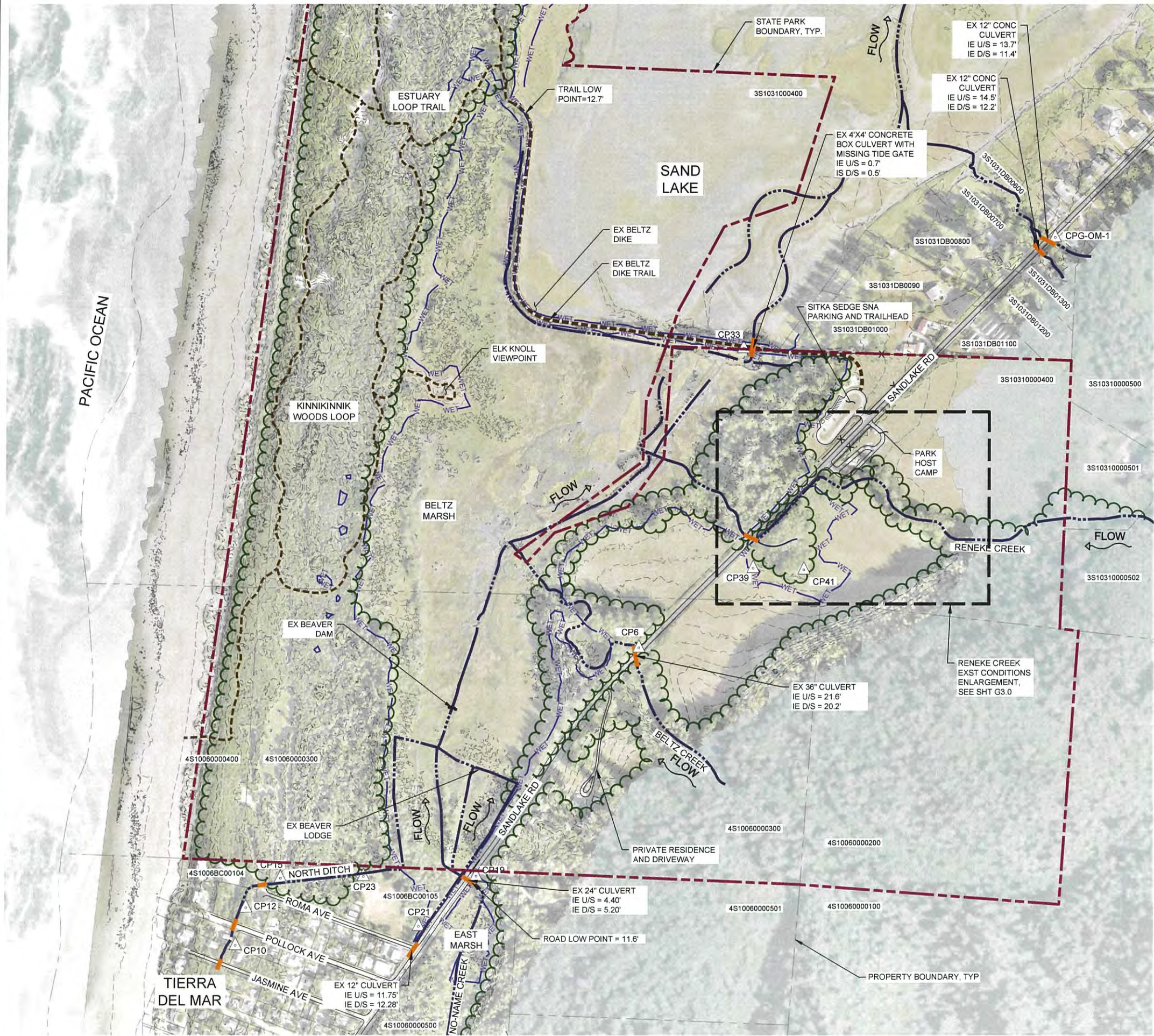
PROJECT NAME

SITKA SEDGE TIDAL
WETLAND RESTORATION

TIERRA DEL MAR, OREGON

REVISIONS		
#	DATE	DESCRIPTION
DESIGNED	KCN	
DRAWN	KCN	
CHECKED	HLW	
IN CHARGE	HLW 83882	
PROJECT NUMBER	202200434	
ISSUE DATE	06/19/2026	
SCALE IS AS SHOWN WHEN PLOTTED TO FULL SIZE (22"x34")		
PHASE	DRAFT 90% DESIGN	
SHEET TITLE	GENERAL NOTES, LEGENDS, AND ABBREVIATIONS	
SHEET NUMBER	G1.1	
SHEET	----	OF ###

FILE: P:\01 CAD\2022\XXXX\202200434.00 - TEP Sitka Sedge Tidal Wetland Restoration\DWG\G2.0 EXISTING CONDITIONS AND SURVEY CONTROL.dwg PLOT DATE: 6/22/2026 9:57:44 AM PLOTTED BY: OLIVIA PEREIRA



EXISTING CONDITIONS AND SURVEY CONTROL
PLAN
SCALE: 1"= 250'

NOTES

- EXISTING CONDITIONS MAPPING IS BASED ON SURVEYS BY STATEWIDE LAND SURVEYING 2025. AREAS OUTSIDE OF SWLS SURVEY EXTENTS ARE SUPPLEMENTED WITH A 2017 PHODAR SURFACE, DERIVED FROM 2016 NOAA LIDAR AND ADJUSTED TO CORRECT VEGETATION BIAS, PROVIDED BY OPRD IN 2017.
- UTILITY LOCATIONS ALONG SANDLAKE ROAD ARE APPROXIMATE.
- ESTUARY CONDITIONS CHANGE FREQUENTLY. THE BATHYMETRIC AND TOPOGRAPHIC SURVEY IS REPRESENTATIVE OF CONDITIONS AS THEY EXISTED AT THE TIME OF THE SURVEY ONLY. THE CONTRACTOR SHALL NOTIFY THE ENGINEER OF ANY CHANGED CONDITIONS THAT IMPACT THE WORK SHOWN IN THESE PLANS.
- THE CONTRACTOR IS RESPONSIBLE FOR PROTECTION, COORDINATION FOR TEMPORARY RELOCATION OF OVERHEAD POWER AS REQUIRED FOR SITE WORK.
- THE VERTICAL DATUM FOR THIS PROJECT IS NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).
- THE HORIZONTAL DATUM FOR THIS PROJECT IS OREGON STATE PLANE (NORTH ZONE) INTERNATIONAL FOOT.
- AERIAL PHOTO IS PROVIDED BY NS CONSULTING, 2022.
- PROPERTY LINES ARE APPROXIMATE BASED ON TILLAMOOK COUNTY GIS ONLINE MAP SERVICES.
- SITE CONTROL WAS ESTABLISHED BY STATEWIDE LAND SURVEYING INC. IN JANUARY 2023 AND MARCH 2025.
- WETLAND BOUNDARIES DELINEATED BY ESA AND SUBMITTED TO DSL IN AUGUST 2025, PENDING CONCURRENCE.

CONTROL POINT TABLE

POINT	NORTHING	EASTING	ELEVATION	DESCRIPTION
CP6	599823.946	7311952.049	32.510	NAIL SPIKE
CP10	598384.918	7309997.976	17.601	NAIL SPIKE
CP12	598566.655	7310048.142	17.850	NAIL SPIKE
CP15	598709.920	7310216.249	16.130	NAIL SPIKE
CP19	598709.575	7311148.941	10.670	NAIL SPIKE
CP21	598477.681	7310855.029	14.809	NAIL SPIKE
CP23	598718.668	7310617.735	17.358	NAIL SPIKE
CP33	601273.106	7312480.436	14.303	NAIL SPIKE
CP39	600217.427	7312510.679	13.817	NAIL SPIKE
CP41	600202.026	7312751.086	17.491	NAIL SPIKE
CPG_OM_1	601811.547	7313966.389	21.929	NAIL SPIKE

LEGEND

EXISTING FEATURES	
	EX TREE CANOPY
	SURVEY CONTROL POINT
	STATE PARK BOUNDARY
	EX TRAIL
	EX WETLAND BOUNDARY (ESA, 2025)
	EX CULVERT
	EX THALWEG (APPROX.)
	EX FENCE
	EX ROAD
	EX PROPERTY BOUNDARY
	EX BEAVER STRUCTURE
	EX MAJOR CONTOUR
	EX MINOR CONTOUR



ESA
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WWW.ESASSOC.COM



PROJECT NAME
**SITKA SEDGE TIDAL
WETLAND RESTORATION**
TIERRA DEL MAR, OREGON

REVISIONS		
#	DATE	DESCRIPTION
DESIGNED	HLW	
DRAWN	KCN	
CHECKED	HLW	
IN CHARGE	HLW	83882

PROJECT NUMBER 202200434
ISSUE DATE 06/19/2026

SCALE IS AS SHOWN WHEN
PLOTTED TO FULL SIZE (22"x34")
1"= 1'

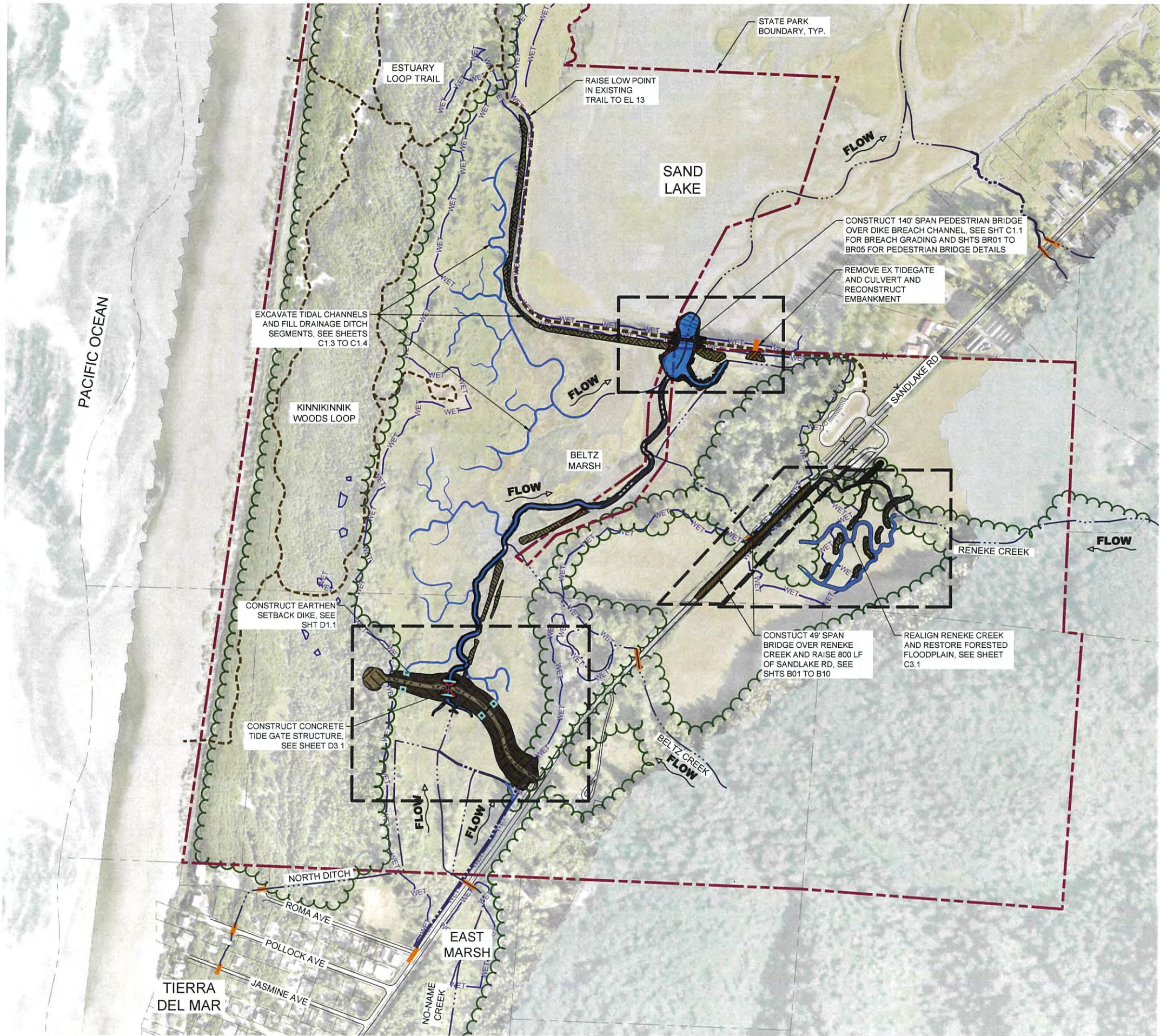
PHASE
DRAFT 90% DESIGN

SHEET TITLE

EXISTING
CONDITIONS AND
SURVEY CONTROL

SHEET NUMBER
G2.0
SHEET --- OF ###

FILE: P:\01 CAD\2022\XXXX\202200434.00 - TEP Sitka Sedge Tidal Wetland Restoration\DWG\G2.1 SITE PLAN AND OVERVIEW.dwg PLOT DATE: 6/22/2026 9:58:47 AM PLOTTED BY: OLIVIA PEREYRA



SITE PLAN AND OVERVIEW
PLAN SCALE: 1" = 250'

NOTES

1. THIS SHEET DEPICTS AN OVERVIEW OF PROPOSED SITE WORK. REFER TO ADDITIONAL SHEETS AS NOTED FOR MORE DETAIL IN EACH LOCATION.

LEGEND

EXISTING FEATURES	
	EX TREE CANOPY
	STATE PARK BOUNDARY
	EX TRAIL
	EX WETLAND BOUNDARY (ESA, 2025)
	EX CULVERT
	EX THALWEG (APPROX.)
	EX FENCE
	EX ROAD
	EX PROPERTY BOUNDARY
	EX BEAVER STRUCTURE
PROPOSED FEATURES	
	PROPOSED TIDAL CHANNELS
	PROPOSED MAJOR CONTOUR
	PROPOSED MINOR CONTOUR
	TRAIL REGRADE
	PEDESTRIAN BRIDGE
	EXCAVATE CHANNEL
	PROPOSED FILL AREA
	ROADWAY IMPACT

1"=250'
SCALE FEET



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ENGINEER
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RENEWAL DATE 06-30-28

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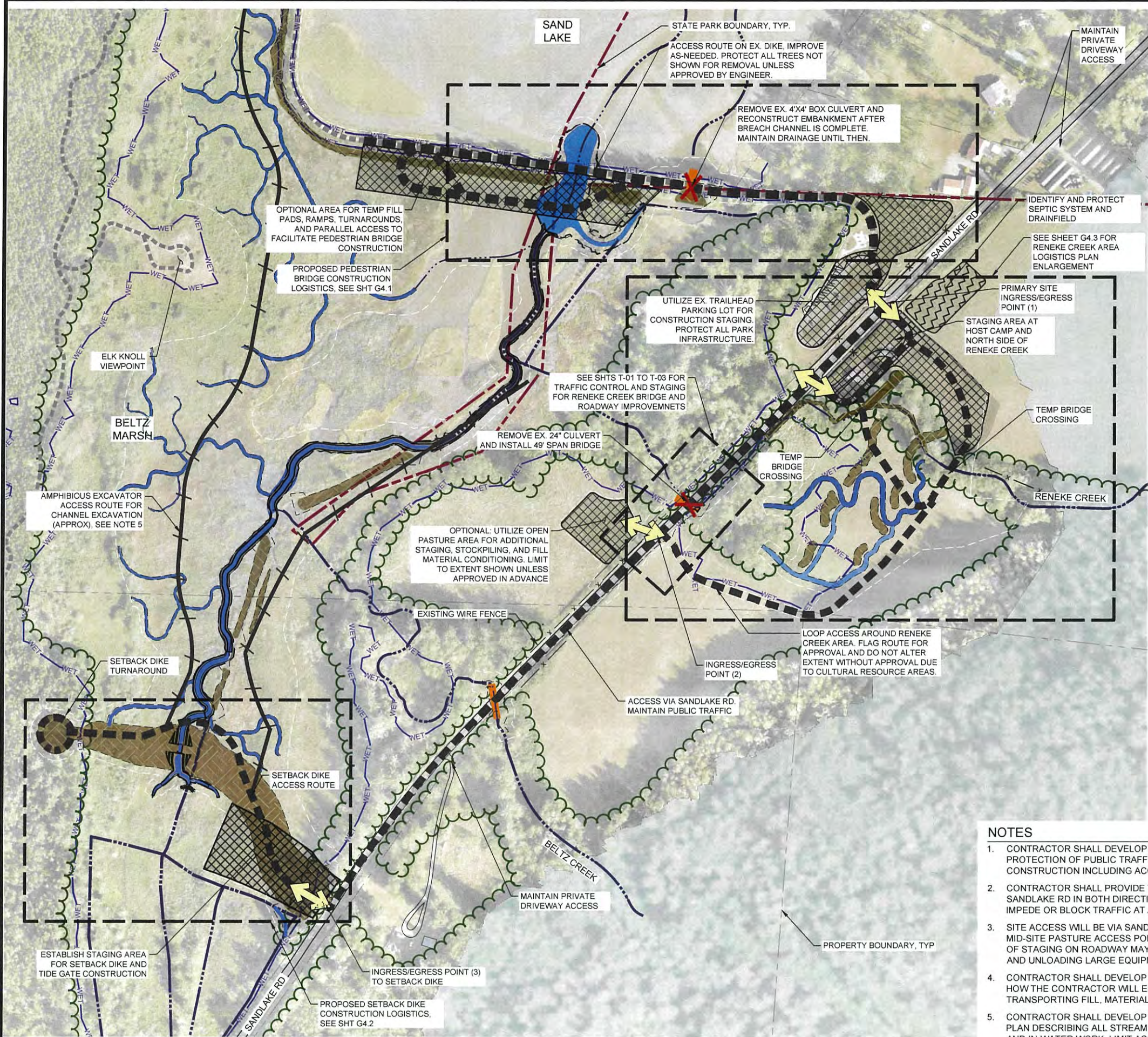
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TIERRA DEL MAR, OREGON

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PHASE DRAFT 90% DESIGN		
SHEET TITLE		
SITE PLAN AND OVERVIEW		
SHEET NUMBER		
G2.1		
SHEET --- OF ###		

FILE: P:\01 CAD\2022\0000\202200434_00 - TEP Sitka Sedge Tidal Wetland Restoration\DWG\G2.2 ACCESS, STAGING, DEMO, AND PROTECTION.dwg PLOT DATE: 6/22/2026 9:59:13 AM PLOTTED BY: OLIVIA PEREYRA

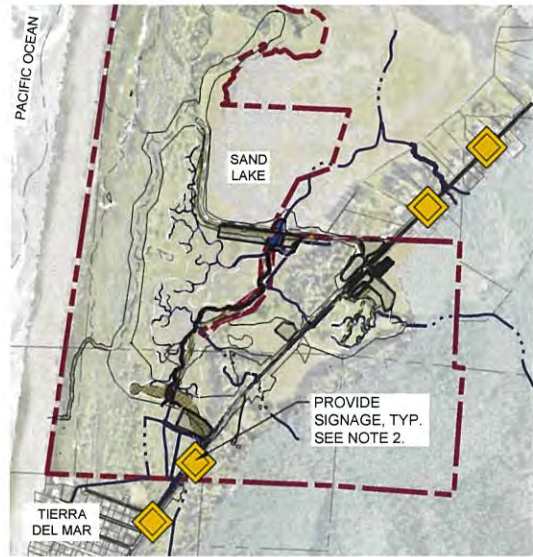


ACCESS, STAGING, DEMO, AND PROTECTION
PLAN
SCALE: 1" = 150'



1"=150'
SCALE
150 75 0 150 300
FEET

TEMPORARY WORK ZONE TRAFFIC CONTROL PLAN



1"=1000'
SCALE
1000 500 0 1000 2000
FEET



LEGEND

EXISTING FEATURES	
	EX TREE CANOPY
	STATE PARK BOUNDARY
	EX TRAIL
	EX WETLAND BOUNDARY (ESA, 2025)
	EX CULVERT
	EX THALWEG (APPROX.)
	EX FENCE
	EX ROAD
	EX PROPERTY BOUNDARY
	EX SEPTIC SYSTEM AND DRAIN FIELD
CONSTRUCTION/DEMO FEATURES	
	POINT OF INGRESS/EGRESS
	ACCESS ROUTE
	AMPHIBIOUS EXCAVATOR ACCESS ROUTE
	STAGING AREA
	TEMPORARY FILL PAD
	FILL AREAS
	DEMOLISH STRUCTURE
	SIGNAGE

NOTES

- CONTRACTOR SHALL DEVELOP AND SUBMIT A TRAFFIC CONTROL PLAN (TCP) FOR MANAGING MAINTENANCE AND PROTECTION OF PUBLIC TRAFFIC FOR APPROVAL BY ENGINEER, TCPW, AND OPRD. COVER ALL STAGES/YEARS OF CONSTRUCTION INCLUDING ACCESS POINTS, STAGING AREAS, AND IMPACTS TO TRAFFIC DURING EACH STAGE.
- CONTRACTOR SHALL PROVIDE TRAFFIC CONTROL SIGNAGE FOR 'TRUCKS ENTERING AND LEAVING ROADWAY' ON SANDLAKE RD IN BOTH DIRECTIONS AT SPACING PER ODOT STANDARDS. CONTRACTOR MAY NOT OTHERWISE IMPEDE OR BLOCK TRAFFIC AT ANY TIME EXCEPT AS APPROVED BY TCPW IN APPROVED TCP.
- SITE ACCESS WILL BE VIA SANDLAKE ROAD IN MULTIPLE LOCATIONS INCLUDING THE SSSNA EXISTING DRIVEWAYS, MID-SITE PASTURE ACCESS POINTS, AND AT THE PROPOSED SETBACK DIKE CONNECTION. LIMITED DURATION USE OF STAGING ON ROADWAY MAY BE ALLOWED DURING INITIAL ESTABLISHMENT OF ACCESS POINTS OR LOADING AND UNLOADING LARGE EQUIPMENT AND MATERIALS.
- CONTRACTOR SHALL DEVELOP AND SUBMIT A TEMPORARY WORK ACCESS AND CONTAINMENT PLAN DESCRIBING HOW THE CONTRACTOR WILL EFFECTIVELY MANAGE SITE INGRESS/EGRESS, CIRCULATION, AND WORKFLOW OF TRANSPORTING FILL, MATERIALS, AND EQUIPMENT IN AND OUT OF THE WORK AREAS.
- CONTRACTOR SHALL DEVELOP AND SUBMIT A WORK AREA ISOLATION AND TEMPORARY WATER MANAGEMENT PLAN DESCRIBING ALL STREAM DIVERSIONS, COFFER DAMS, CHANNEL CROSSINGS, DEWATERING OPERATIONS, AND IN-WATER WORK. LIMIT ACCESS IN THE WETTEST AREAS OF THE SITE AND UTILIZE LOW-GROUND PRESSURE AND/OR AMPHIBIOUS CONSTRUCTION EQUIPMENT AND WORK MATS TO MINIMIZE IMPACT TO MARSH SURFACE.
- SEE SHTS T-01 TO T-03 FOR TRAFFIC CONTROL, TRAFFIC BYPASS, AND STAGING/PHASING FOR RENEKE CREEK BRIDGE AND ROADWAY IMPROVEMENTS.



RENEWAL DATE 06-30-28

CLIENT



TILLAMOOK ESTUARIES
PARTNERSHIP

PROJECT NAME
**SITKA SEDGE TIDAL
WETLAND RESTORATION**
TIERRA DEL MAR, OREGON

REVISIONS

DATE DESCRIPTION

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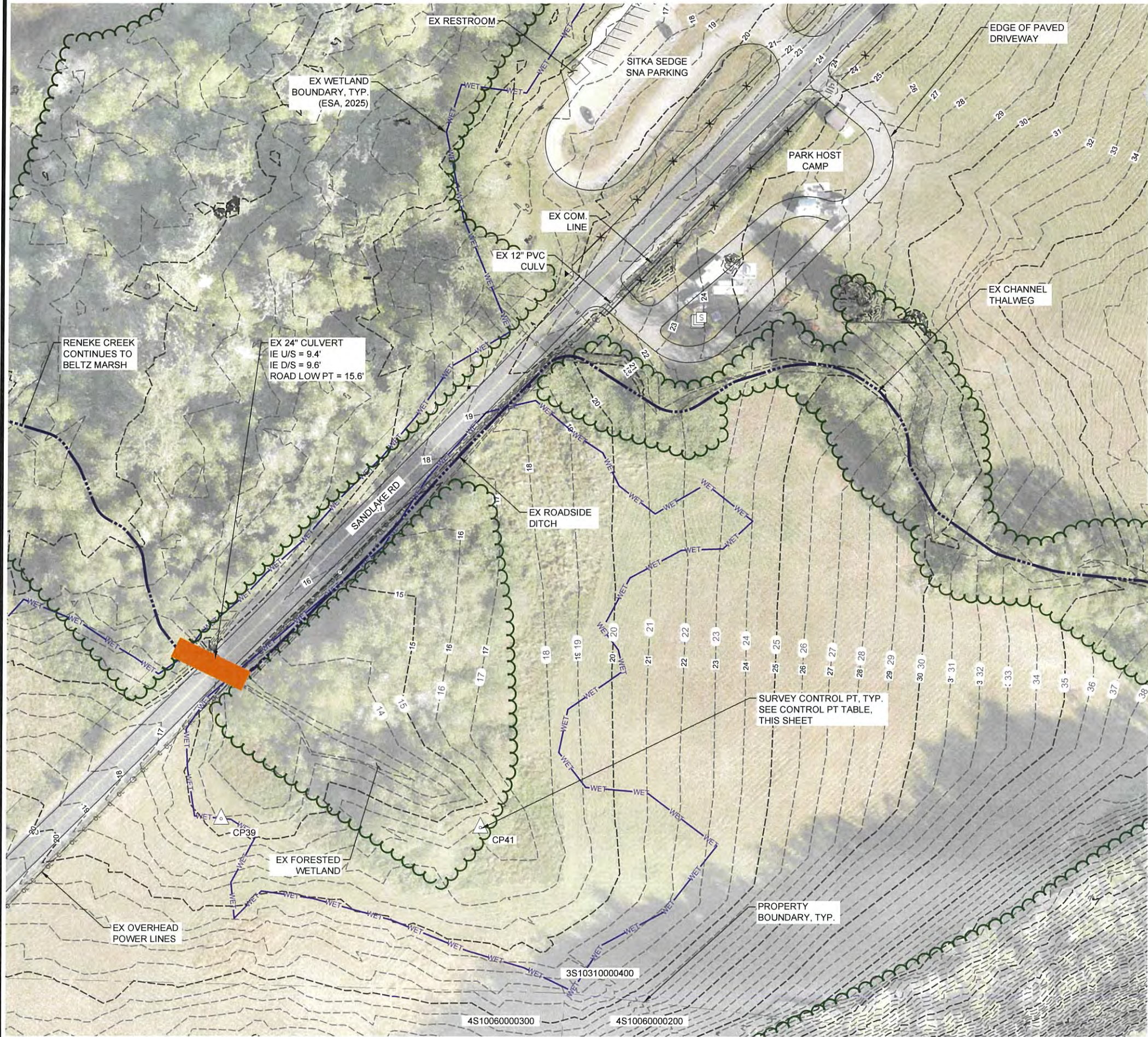
ACCESS, STAGING,
DEMO, AND
PROTECTION

SHEET NUMBER

G2.2

SHEET --- OF ###

FILE: P:\01 CAD\2022\XXXX\DWG\RENEKE\G3.0 RENEKE EXST COND AND SURVEY CONTROL.dwg PLOT DATE: 6/22/2026 10:00:58 AM PLOTTED BY: OLIVIA PEREYRA



NOTES

1. EXISTING CONDITIONS MAPPING IS BASED ON SURVEYS BY STATEWIDE LAND SURVEYING 2025. AREAS OUTSIDE OF SWLS SURVEY EXTENTS ARE SUPPLEMENTED WITH A 2017 PHODAR SURFACE, DERIVED FROM 2016 NOAA LIDAR AND ADJUSTED TO CORRECT VEGETATION BIAS, PROVIDED BY OPRD IN 2017.
2. UTILITY LOCATIONS ALONG SANDLAKE ROAD ARE APPROXIMATE.
3. THE BATHYMETRIC AND TOPOGRAPHIC SURVEY IS REPRESENTATIVE OF CONDITIONS AS THEY EXISTED AT THE TIME OF THE SURVEY ONLY. THE CONTRACTOR SHALL NOTIFY THE ENGINEER OF ANY CHANGED CONDITIONS THAT IMPACT THE WORK SHOWN IN THESE PLANS.
4. THE CONTRACTOR IS RESPONSIBLE FOR PROTECTION, COORDINATION AND TEMPORARY RELOCATION OF OVERHEAD POWER AS REQUIRED FOR SITE WORK.
5. THE VERTICAL DATUM FOR THIS PROJECT IS NORTH AMERICAN VERTICAL DATUM OF 1988 (NAV88).
6. THE HORIZONTAL DATUM FOR THIS PROJECT IS OREGON STATE PLANE (NORTH ZONE 3601) INTERNATIONAL FOOT.
7. AERIAL PHOTO IS PROVIDED BY NS CONSULTING, 2022.
8. PROPERTY LINES ARE APPROXIMATE BASED ON TILLAMOOK COUNTY GIS ONLINE MAP SERVICES.
9. SITE CONTROL WAS ESTABLISHED BY STATEWIDE LAND SURVEYING INC. IN JANUARY 2023.

CONTROL POINT TABLE

POINT	NORTHING	EASTING	ELEVATION	DESCRIPTION
CP39	600217.427	7312510.679	13.817	NAIL SPIKE
CP41	600202.026	7312751.086	17.491	NAIL SPIKE

LEGEND

- EX TREE CANOPY
- EX WETLAND BOUNDARY (ESA, 2025)
- SURVEY CONTROL POINT
- EX CULVERT
- EX THALWEG (APPROX.)
- EX FENCE
- EX ROAD
- EX PROPERTY BOUNDARY
- EX SEPTIC TANK
- EX SIGN
- OVERHEAD UTILITY
- UNDERGROUND UTILITY - COMMUNICATION
- UNDERGROUND UTILITY - STORM LINE
- UNDERGROUND UTILITY - WATER
- WATER IRRIGATION
- UTILITY POLE
- EX MAJOR CONTOUR
- EX MINOR CONTOUR

ESA

819 SE MORRISON STREET,
STE. 310
PORTLAND, OR 97214
OFFICE - 503.274.2010
WWW.ESASSOC.COM

STAMP

REGISTERED PROFESSIONAL
LAND SURVEYOR
STATE OF OREGON
NO. 12345
EXPIRATION DATE 12/31/2026

NO. 12345
EXPIRATION DATE 12/31/2026

CONTRACTOR

RENEWAL DATE 06-30-24

CLIENT



PROJECT NAME
**RENEKE CREEK
BRIDGE AND STREAM
RESTORATION**
SANDLAKE ROAD, CLOVERDALE OREGON 97112

REVISIONS		
#	DATE	DESCRIPTION

DESIGNED	HLW
DRAWN	KCN
CHECKED	HLW
IN CHARGE	HLW 83882

PROJECT NUMBER D202200434

ISSUE DATE 08/29/2025

SCALE IS AS SHOWN WHEN
PLOTTED TO FULL SIZE (22"x34")
1" = 50'

PHASE
60% DESIGN

SHEET TITLE

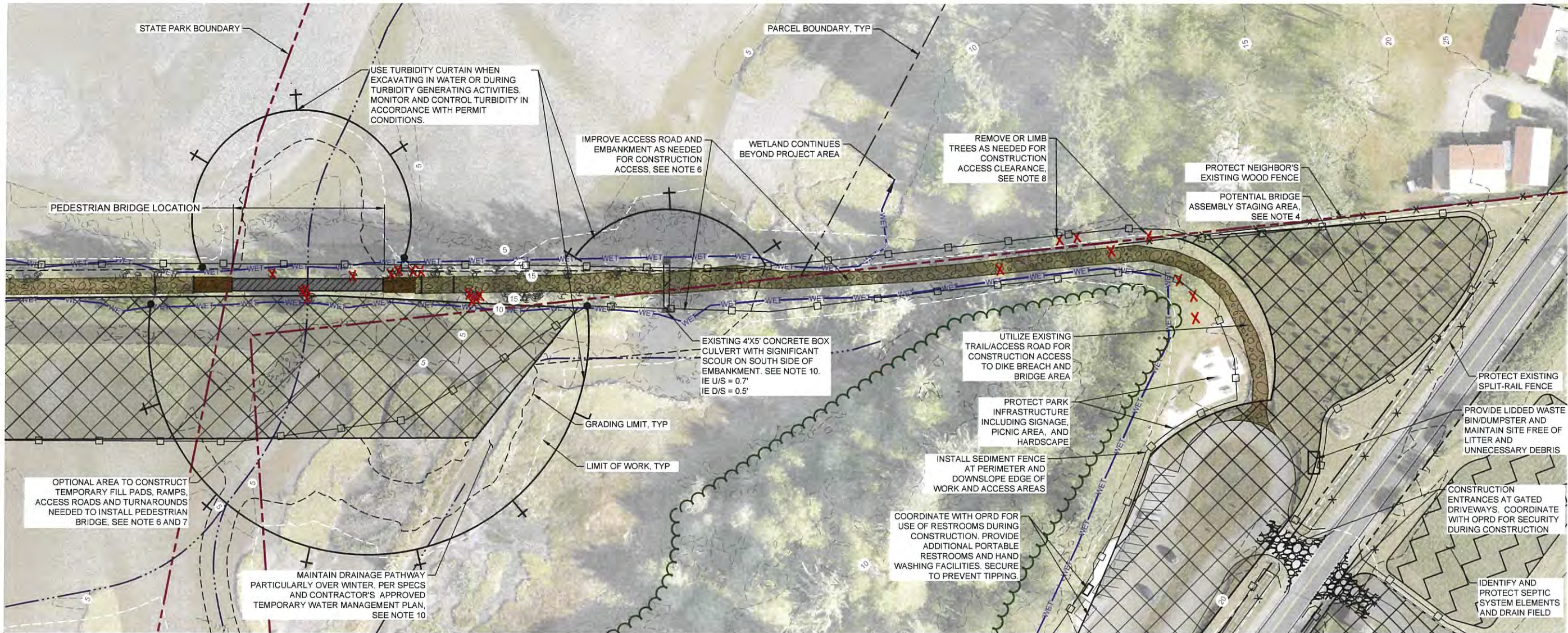
**RENEKE CREEK
EXSTING
CONDITIONS &
SURVEY CONTROL**

SHEET NUMBER

G3.0

SHEET --- OF ###

FILE: P:\01 CAD\2022\0000\0202200434-00-1 TEP Sitka Sedge Tidal Wetland Restoration\DWG\G4.1 CONSTRUCTION SEQUENCING- PED BRIDGE.dwg PLOT DATE: 6/22/2026 10:01:26 AM PLOTTED BY: OLIVIA PEREYRA



CONSTRUCTION SEQUENCING AND LOGISTICS - PEDESTRIAN BRIDGE

PLAN

NOTES

- SEE SHEET C1.1 FOR DIKE BREACH CHANNEL GRADING AND SHEET BR01-BR05 FOR PEDESTRIAN BRIDGE INFORMATION. THIS SHEET FOCUSES ON CONSTRUCTION STAGING, ACCESS, SEQUENCING, AND LOGISTICS ASSOCIATED WITH DIKE BREACH AND PEDESTRIAN BRIDGE AREA. THIS AREA MAY ALSO BE UTILIZED DURING OTHER PHASES OF THE CONSTRUCTION PROJECT IN YEAR 1 AS APPROVED IN CONTRACTOR'S TEMPORARY WORK ACCESS AND CONTAINMENT PLAN, TEMPORARY WATER MANAGEMENT PLAN, CONSTRUCTION SCHEDULE AND SEQUENCING PLAN, AND CONTRACTOR'S TRAFFIC CONTROL PLAN.
- CONTRACTOR SHALL EVALUATE THE SITE CONDITIONS AND DEVELOP A PLAN AND PROPOSED IMPROVEMENTS TO ACCOMMODATE THEIR WORK APPROACH AND ASSOCIATED EQUIPMENT. THE DIKE EMBANKMENT AND TRAIL SURFACING SHALL BE RESTORED AT THE END OF THE PROJECT TO EQUAL OR BETTER CONDITION IN ACCORDANCE WITH SPECS AND REVEGETATION PLAN.
- ACCESS SITE VIA THE SSSNA TRAILHEAD PARKING LOT AND EXISTING BELTZ DIKE TRAIL. INSTALL GRAVEL CONSTRUCTION ENTRANCE OR TRACKOUT MAT TO PREVENT SEDIMENT FROM EXISTING THE SITE, AND SWEEP ROADWAY IF NEEDED TO CLEAN SEDIMENT TRACKING FROM ROAD. PROTECT ALL PARK INFRASTRUCTURE INCLUDING SIGNAGE, HARDSCAPE, AND LANDSCAPING UNLESS APPROVED IN ADVANCE. REPAIR OR REPLACE ANY DAMAGE TO PARK INFRASTRUCTURE AND SURFACES BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER.
- CONTRACTOR MAY UTILIZE THE AREA NORTH OF THE PARKING LOT AND EAST OF THE DIKE ENTRANCE FOR STAGING AND ASSEMBLY OF THE PEDESTRIAN BRIDGE. COORDINATE WITH OWNER FOR SALVAGING SHRUBS AND TREES IN THIS AREA (PLANTED IN 2020). TRANSPLANT SALVAGABLE TREES AND SHRUBS AS DIRECTED AND RESTORE THIS STAGING AREA AT THE END OF CONSTRUCTION IN ACCORDANCE WITH REVEGETATION PLAN AND SPECS TO OWNER'S SATISFACTION AND ENGINEER APPROVAL.
- CONTRACTOR MAY ELECT TO ASSEMBLE THE PEDESTRIAN BRIDGE AT THE STAGING AREA AND TRANSPORT THE ASSEMBLED BRIDGE TO THE BRIDGE SITE VIA THE DIKE-TOP TRAIL, OR TRANSPORT BRIDGE PARTS ALONG THE TRAIL, OR BY OTHER APPROVED METHODS, AND ASSEMBLE AT THE BRIDGE SITE. THE CONTRACTOR MAY CONSTRUCT TEMPORARY FILL PADS, CRANE PADS, RAMPS, TURNAROUNDS, AND PARALLEL ACCESS ROADS ALONG THE EXISTING DIKE EMBANKMENT TO FACILITATE ACCESS AND BRIDGE CONSTRUCTION.
- DEPENDING ON CONTRACTOR'S PROPOSED METHODS AND EQUIPMENT, IT MAY BE NECESSARY TO WIDEN THE DIKE TOP SURFACE, ENHANCE OR STABILIZE SIDE SLOPES, PROVIDE TEMPORARY BRIDGING OR REINFORCING OVER THE EXISTING DRAINAGE CULVERT, REMOVE OR LIMB TREES FOR HORIZONTAL AND VERTICAL CLEARANCE. CONTRACTOR IS RESPONSIBLE DETERMINING THE NECESSARY IMPROVEMENTS AND FOR COMPLETING ANY IMPROVEMENTS TO THE EXISTING TRAIL AND DIKE EMBANKMENT TO SUPPORT CONSTRUCTION EQUIPMENT AND MATERIALS. CONTRACTOR SHALL RESTORE THE TRAIL AND SURFACING TO THE MINIMUM WIDTHS AND ELEVATIONS OF THE EXISTING TRAIL, REPAIRING ANY DAMAGE TO THE EMBANKMENT, TRAIL, TRAIL HEAD INFRASTRUCTURE, OR PARKING LOT CAUSED BY CONSTRUCTION ACCESS AND STAGING.
- CONTRACTOR MAY IMPORT FILL FOR USE IN BUILDING THESE TEMPORARY ACCOMMODATIONS, OR SEQUENCE WORK INCLUDING DESIGNED CHANNEL EXCAVATION AND DITCH FILL TO UTILIZE ONSITE EXCAVATED SOILS FOR TEMPORARY ACCESS IMPROVEMENTS.
- THESE PLANS AND ASSOCIATED PERMITTING IS INTENDED TO PROVIDE THE CONTRACTOR WITH MAXIMUM FLEXIBILITY IN THE APPROACH TO ASSEMBLING AND INSTALLING THE PEDESTRIAN BRIDGE. NOT ALL WORK AREAS IDENTIFIED MAY BE NEEDED, AND NOT ALL TREES SHOWN FOR REMOVAL MAY BE NECESSARY. CONTRACTOR SHALL MAKE REASONABLE ATTEMPTS TO MINIMIZE IMPACTS TO EXISTING TREES AND NATIVE VEGETATION ALONG THE TRAIL AND FLAG ALL TREES FOR APPROVAL PRIOR TO REMOVAL. SALVAGE REMOVED TREES AND USE IN WHS.
- THE PEDESTRIAN BRIDGE SHALL BE INSTALLED DURING YEAR 2 OF CONSTRUCTION. DO NOT EXCAVATE DIKE BREACH CHANNEL CONNECTION TO SAND LAKE UNTIL SETBACK DIKE IS COMPLETED AND TIDE GATE STRUCTURE IS OPERATIONAL. IN YEAR TWO, THE CONTRACTOR MAY LOWER THE DIKE EMBANKMENT WITHIN THE PED BRIDGE AREA TO FACILITATE BRIDGE INSTALLATION, WHILE MAINTAINING HEIGHT SUFFICIENT TO PREVENT OVER TOPPING DURING HIGH TIDES ANTICIPATED DURING CONSTRUCTION WINDOW.
- MAINTAIN EXISTING DRAINAGE CULVERT AND FLOW PATHS FOR DRAINAGE AND EGRESS FISH PASSAGE DURING CONSTRUCTION. ISOLATE AND DEWATER WORK AREAS AS NEEDED TO COMPLETE WORK IN ACCORDANCE WITH PERMIT CONDITIONS AND APPROVED TWMP. ONCE BREACH CHANNEL IS CONNECTED, REMOVE EXISTING CULVERT AND RECONSTRUCT EMBANKMENT PER PLANS AND SPECS.

TREE DEMO		TREE DEMO		TREE DEMO		TREE DEMO	
TYPE	DIA (IN)	TYPE	DIA (IN)	TYPE	DIA (IN)	TYPE	DIA (IN)
EVERGREEN	14	EVERGREEN	9	EVERGREEN	12	DECIDUOUS	24
EVERGREEN	12	EVERGREEN	4	DECIDUOUS	10	DECIDUOUS	14
EVERGREEN	12	EVERGREEN	5	DECIDUOUS	10	DECIDUOUS	10
EVERGREEN	14	DECIDUOUS	8	DECIDUOUS	30	DECIDUOUS	12
EVERGREEN	14	DECIDUOUS	10	EVERGREEN	14	DECIDUOUS	12
EVERGREEN	12	DECIDUOUS	9	EVERGREEN	16	EVERGREEN	10
EVERGREEN	12	DECIDUOUS	10	EVERGREEN	20	DECIDUOUS	12
EVERGREEN	12	DECIDUOUS	10	EVERGREEN	18	DECIDUOUS	18
EVERGREEN	12	DECIDUOUS	12	DECIDUOUS	12	DECIDUOUS	9
EVERGREEN	9	DECIDUOUS	12	DECIDUOUS	24	DECIDUOUS	9
EVERGREEN	18	DECIDUOUS	16	DECIDUOUS	18	DECIDUOUS	16
EVERGREEN	10	EVERGREEN	30	DECIDUOUS	14	EVERGREEN	30
EVERGREEN	10	EVERGREEN	30	DECIDUOUS	18	EVERGREEN	18
EVERGREEN	10	EVERGREEN	12	DECIDUOUS	18	DECIDUOUS	10
EVERGREEN	9	EVERGREEN	12	DECIDUOUS	24	DECIDUOUS	16
EVERGREEN	10	EVERGREEN	14	DECIDUOUS	24	DECIDUOUS	10
EVERGREEN	10	EVERGREEN	10	DECIDUOUS	12	DECIDUOUS	12
EVERGREEN	12	EVERGREEN	14	DECIDUOUS	24	DECIDUOUS	12
EVERGREEN	18	EVERGREEN	6	DECIDUOUS	18	EVERGREEN	26
EVERGREEN	14	EVERGREEN	20	EVERGREEN	36	DECIDUOUS	18
EVERGREEN	12	EVERGREEN	40	DECIDUOUS	24	EVERGREEN	36
EVERGREEN	14	EVERGREEN	14	EVERGREEN	30	DECIDUOUS	9
EVERGREEN	14	EVERGREEN	8	DECIDUOUS	8	DECIDUOUS	12
EVERGREEN	14	EVERGREEN	8	DECIDUOUS	8	EVERGREEN	16
EVERGREEN	14	EVERGREEN	7	DECIDUOUS	7	DECIDUOUS	14
EVERGREEN	12	EVERGREEN	12	DECIDUOUS	6	DECIDUOUS	10
DECIDUOUS	12	EVERGREEN	18	DECIDUOUS	6	DECIDUOUS	16
DECIDUOUS	6	DECIDUOUS	9	EVERGREEN	12	EVERGREEN	12

LEGEND



EXISTING FEATURES

EX TREE CANOPY



EX WETLAND BOUNDARY (ESA, 2025)



EX THALWEG (APPROX.)



EX CULVERT



EX ROAD



EX PROPERTY BOUNDARY



EX FENCE



EX TRAIL



EX MAJOR CONTOUR



EX MINOR CONTOUR



EX DECIDUOUS TREES



EX EVERGREEN TREES



PROTECT SEPTIC SYSTEM

PROPOSED FEATURES

TREE REMOVAL

TRAIL REGRADE

PEDESTRIAN BRIDGE

STAGING AREA

REVISIONS		
#	DATE	DESCRIPTION

DESIGNED	HLW
DRAWN	KCN
CHECKED	HLW
IN CHARGE	HLW 83882

PROJECT NUMBER 202200434

ISSUE DATE 06/19/2026

SCALE IS AS SHOWN WHEN
PLOTTED TO FULL SIZE (22"x34")

1" = 1'

PHASE
DRAFT 90% DESIGN

SHEET TITLE

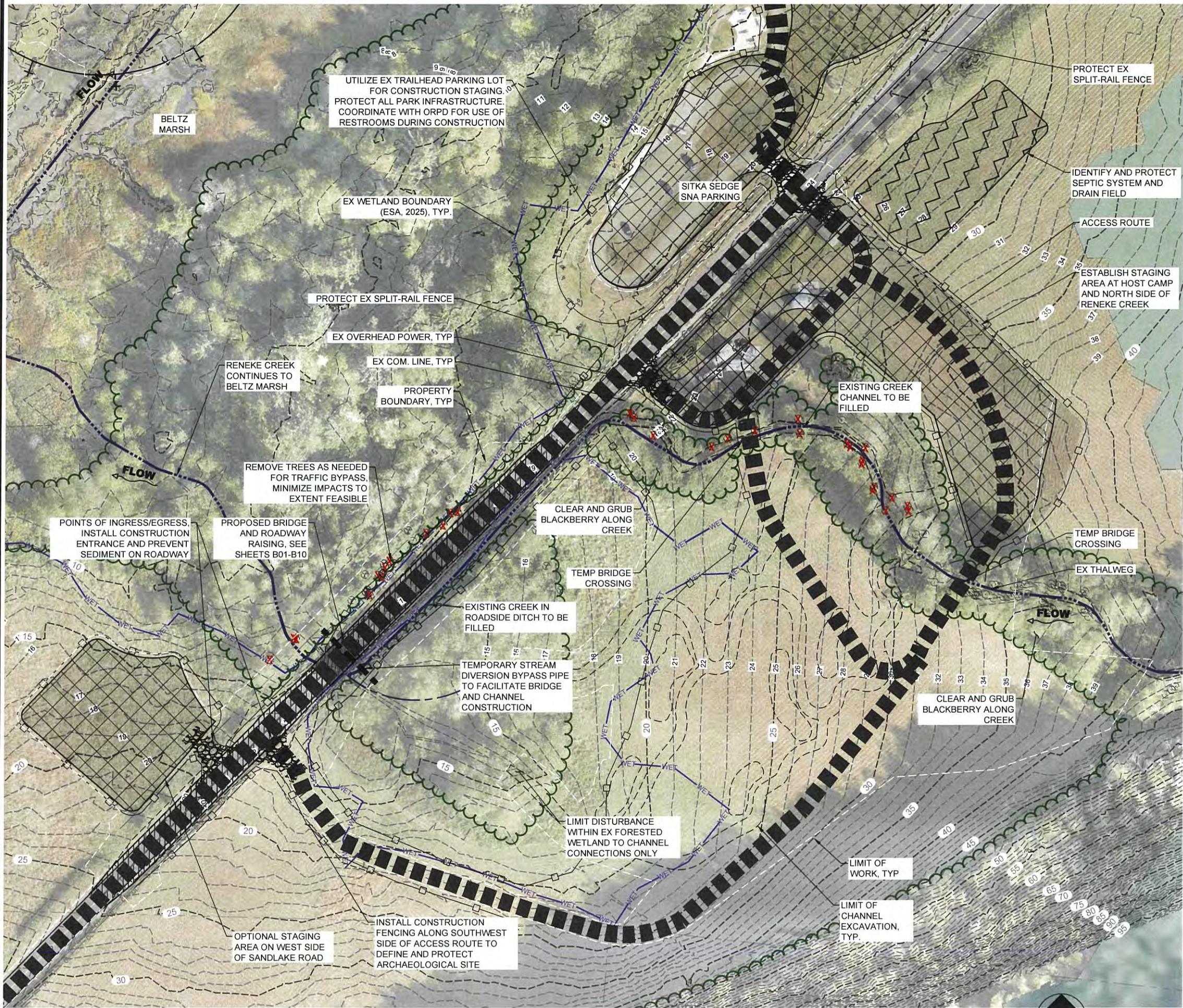
**CONSTRUCTION
LOGISTICS -
PEDESTRIAN
BRIDGE**

SHEET NUMBER

G4.1

SHEET --- OF ###

FILE: P:\01 CAD\2022\00000\202200434_00 - TEP Sitka Sedge Tidal Wetland Restoration\DWG\RENEKE\G4.3.dwg PLOT DATE: 6/22/2026 10:02:45 AM PLOTTED BY: OLIVIA PEREYRA



CONSTRUCTION LOGISTICS - RENEKE CREEK
PLAN
SCALE: 1" = 60'



NOTES

1. THIS SHEET FOCUSES ON CONSTRUCTION STAGING, ACCESS, SEQUENCING, AND LOGISTICS ASSOCIATED WITH THE RENEKE CREEK CULVERT REPLACEMENT AND STREAM RESTORATION AREA. SEE SHEET C3.1 TO C3.3 FOR RENEKE CREEK STREAM REALIGNMENT GRADING PLANS AND SHEETS B01 TO B10 FOR RENEKE CREEK BRIDGE AND ROADWAY IMPROVEMENTS.
2. PENDING AVAILABLE FUNDING AND APPROVAL OF THE CONTRACTOR'S PROPOSED CONSTRUCTION SCHEDULE, CONSTRUCT RENEKE CREEK AREA IMPROVEMENTS DURING YEAR 1 OF CONSTRUCTION.
3. ENTER WORK AREA VIA EXISTING DRIVEWAY ENTRANCES FROM SANDLAKE ROAD TO THE PARK HOST CAMP AREA. AN ALTERNATE ACCESS POINT FROM SANDLAKE ROAD SOUTH OF THE CULVERT CROSSING MAY BE USED IF APPROVED BY SHPO AND ARCHAEOLOGICAL SITE PROTECTION AND MONITORING IS PERFORMED IN ACCORDANCE WITH PERMIT CONDITIONS.
4. UTILIZE EXISTING PARK HOST CAMP AREA, TRAILHEAD PARKING LOT, AND ADDITIONAL STAGING AREAS SHOWN HERE AS NEEDED AND APPROVED BY ORPD.
5. IDENTIFY EXISTING SEPTIC SYSTEM AND DRAINFIELD COMPONENTS IN VICINITY OF PARK HOST AREA AND PROTECT FROM DAMAGE DURING CONSTRUCTION. ANY DAMAGE TO BE REPAIRED AT NO COST TO OWNER.
6. CROSS RENEKE CREEK WITH TEMPORARY BRIDGES, OR IN ACCORDANCE WITH THE CONTRACTOR'S APPROVED TEMPORARY WORK ACCESS AND CONTAINMENT PLAN AND TEMPORARY WATER MANAGEMENT AND WORK AREA ISOLATION PLAN.
7. MAINTAIN STREAMFLOW AND DOWNSTREAM FISH PASSAGE DURING CONSTRUCTION WHILE COMPLETING THE WORK SHOWN BY UTILIZING COFFER DAMS, BYPASS PIPING, TEMPORARY OPEN CHANNELS, OR OTHER APPROVED MEANS FOR STREAM DIVERSION. ONCE NEW RENEKE CREEK MAIN CHANNEL IS COMPLETE, STREAM FLOWS MAY BE RELEASED INTO THE NEW CHANNEL. COORDINATE WITH TEP TO CONDUCT FISH SALVAGE OPERATIONS AND ASSIST BY UTILIZING PUMPING AND ISOLATION MEASURES TO FACILITATE FISH SALVAGE.
8. CONTRACTOR MAY SALVAGE USABLE STREAMBED MATERIAL FROM EXISTING RENEKE CREEK CHANNEL FOR USE IN NEW CHANNELS IF DONE IN ACCORDANCE WITH WORK AREA ISOLATION PLAN AND PERMIT CONDITIONS. IMPORTED STREAMBED MATERIAL WILL BE REQUIRED TO SUPPLEMENT EXISTING ONSITE SOURCE, OR IF CONTRACTOR'S PREFERRED SEQUENCING IS FACILITATED BY UTILIZING MORE IMPORTED COBBLED AND GRAVELS FOR ESM. NO SEPARATE PAYMENT FOR IMPORTING VS. USING SALVAGED STREAMBED MATERIAL.
9. REMOVE TREES AS NECESSARY ALONG CREEK CHANNEL TO BE FILLED AND ALONG SAND LAKE ROAD TO CONSTRUCT TEMPORARY TRAFFIC BYPASS MEASURES. CONTRACTOR SHALL MINIMIZE TREE IMPACTS TO THE EXTENT FEASIBLE AND UTILIZE ALL REMOVED TREES IN WHS AS SHOWN OR DIRECTED BY ENGINEER.
10. INSTALL SEDIMENT FENCE AT THE PERIMETER OF ALL STAGING AREAS AND ACCESS ROADS, ESPECIALLY WHERE WATER OR WETLAND IS PRESENT DOWNSLOPE. RELOCATE BMPs TO FACILITATE ACCESS INTO STREAM AND WETLAND WORK AREAS AND AS STREAM SEGMENTS ARE DEWATERED.

LEGEND

EXISTING FEATURES	
	EX TREE CANOPY
	STATE PARK BOUNDARY
	EX WETLAND BOUNDARY (ESA, 2025)
	EX CULVERT
	EX THALWEG (APPROX.)
	EX EVERGREEN TREES
	EX DECIDUOUS TREES
	EX SEPTIC SYSTEM AND DRAIN FIELD
CONSTRUCTION/DEMO FEATURES	
	POINT OF INGRESS/EGRESS
	ACCESS ROUTE
	STAGING AREA
	TREE REMOVAL
	BRIDGE

ESA
819 SE MORRISON STREET,
STE. 310
PORTLAND, OR 97214
OFFICE - 503.274.2010
WWW.ESASSOC.COM



RENEWAL DATE 06-30-24

CLIENT



PROJECT NAME

**RENEKE CREEK
BRIDGE AND STREAM
RESTORATION**

SANDLAKE ROAD, CLOVERDALE OREGON 97112

REVISIONS

#	DATE	DESCRIPTION

DESIGNED	HLW
DRAWN	KCN
CHECKED	HLW
IN CHARGE	HLW 83882

PROJECT NUMBER D202200434

ISSUE DATE 08/29/2025

SCALE IS AS SHOWN WHEN
PLOTTED TO FULL SIZE (22"x34")
1" = 60'

PHASE
60% DESIGN

SHEET TITLE

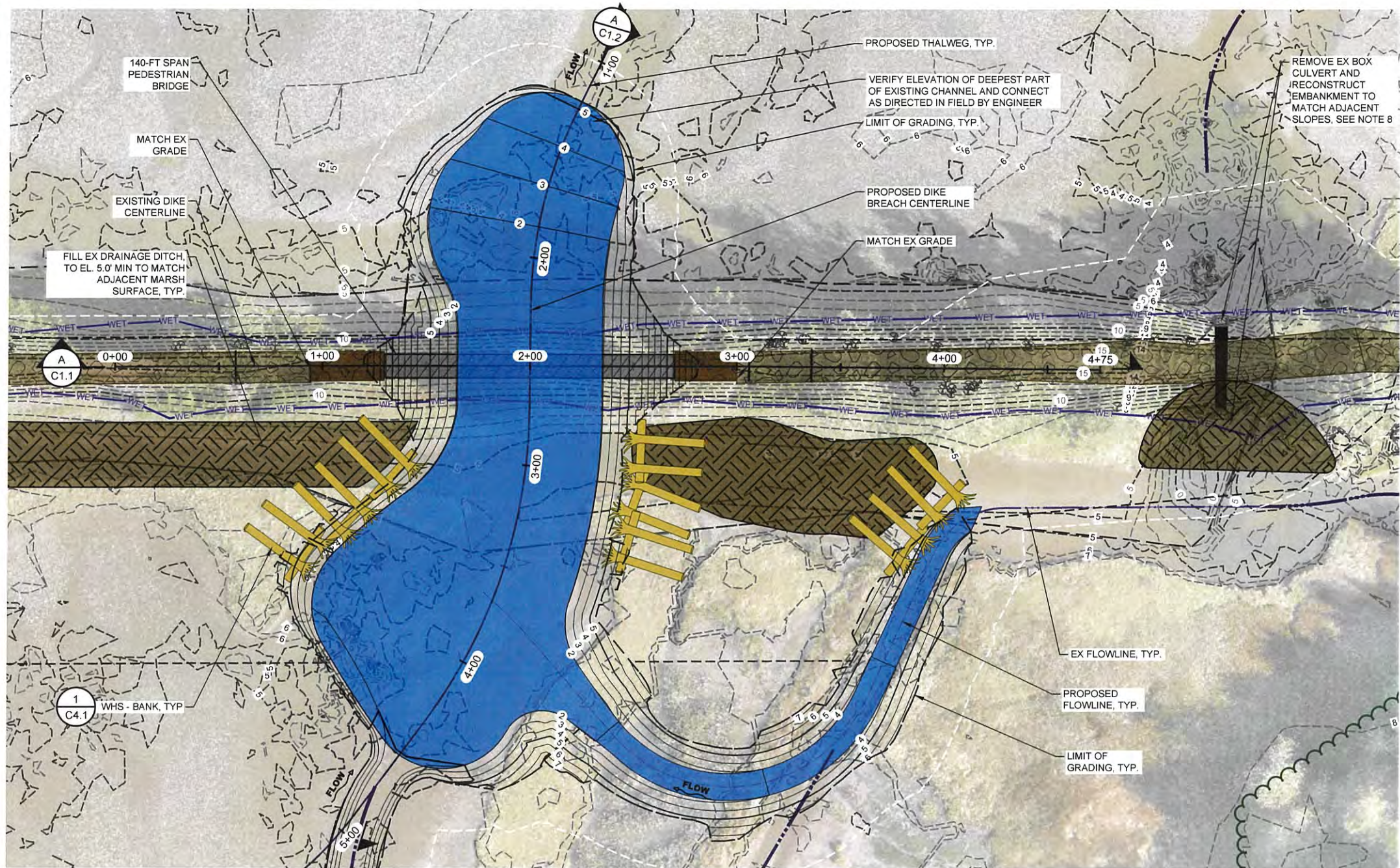
**CONSTRUCTION
LOGISTICS -
RENEKE CREEK**

SHEET NUMBER

G4.3

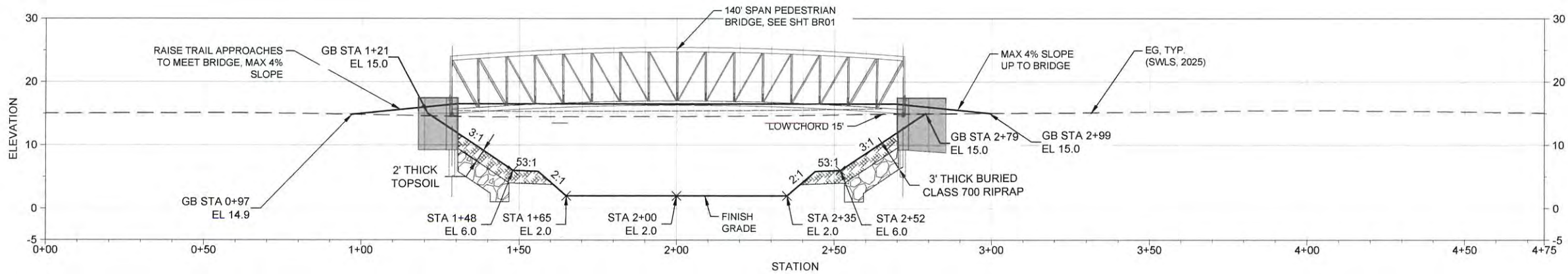
SHEET ---- OF ###

FILE: P:\01 CAD\2022\0000\202200434.00 - TEP Sitka Sedge Tidal Wetland Restoration\DWG\C1.1 DIKE BREACH PLAN AND SECTION.dwg PLOT DATE: 6/22/2026 10:03:22 AM PLOTTED BY: OLIVIA PEREYRA



DIKE BREACH PLAN

PLAN SCALE: 1" = 30'



DIKE BREACH SECTION
C1.1 PROFILE

HORIZONTAL SCALE: 1" = 20'
VERTICAL SCALE: 1" = 10'

NOTES

- THIS SHEET SHOWS THE PROPOSED DIKE BREACH CHANNEL GRADING AND PROPOSED PEDESTRIAN BRIDGE TO MAINTAIN TRAIL ACCESS OVER THE BREACH CHANNEL.
- SEE SHEETS BR01 TO BR05 FOR PEDESTRIAN BRIDGE DETAILS DESIGNED BY DEA, SPECS, AND GEOTECH REPORT BY SHANNON & WILSON FOR ADDITIONAL RELEVANT INFO.
- SEE SHEET G4.1 FOR CONSTRUCTION LOGISTICS CONSIDERATIONS FOR ASSEMBLING AND INSTALLING THE PEDESTRIAN BRIDGE.
- CONSTRUCT PEDESTRIAN BRIDGE IN YEAR 2 OF CONSTRUCTION AND DO NOT BREACH DIKE UNTIL SETBACK DIKE AND TIDE GATE STRUCTURE ARE COMPLETE AND READY FOR SERVICE.
- SEE SHEETS C1.3 TO C1.4 FOR ADDITIONAL CHANNEL AND DITCH GRADING AND WOOD HABITAT STRUCTURES.
- RAISE TRAIL APPROACHES TO MEET THE ENDS OF THE NEW PEDESTRIAN BRIDGE, MAX 4% LONGITUDINAL SLOPE.
- REPAIR DAMAGE TO EXISTING TRAIL AND EMBANKMENT CAUSED BY CONSTRUCTION INCLUDING TRAIL SURFACING AT END OF PROJECT.
- MAINTAIN EXISTING DRAINAGE CULVERT FOR DRAINAGE THROUGH CONSTRUCTION UNTIL PEDESTRIAN BRIDGE AND BREACH GRADING IS COMPLETE. THEN REMOVE BOX CULVERT AND RECONSTRUCT EMBANKMENT TO MATCH ADJACENT SIDE SLOPES PER SPECS. FILL UPSTREAM SCOUR HOLE AND GRADE TO MATCH MARSHPLAIN BENCH.

LEGEND

EXISTING FEATURES	
	EX TRAIL
	EX CULVERT
	EX THALWEG (APPROX.)
	EX WETLAND BOUNDARY (ESA, 2025)
	EX MAJOR CONTOUR
	EX MINOR CONTOUR
	EX EVERGREEN TREES
	EX DECIDUOUS TREES
PROPOSED FEATURES	
	PROPOSED MAJOR CONTOUR
	PROPOSED MINOR CONTOUR
	WOOD HABITAT STRUCTURES
	TRAIL REGRADE
	PEDESTRIAN BRIDGE
	EXCAVATE CHANNEL
	PROPOSED FILL AREA

PROJECT NAME

SITKA SEDGE TIDAL WETLAND RESTORATION

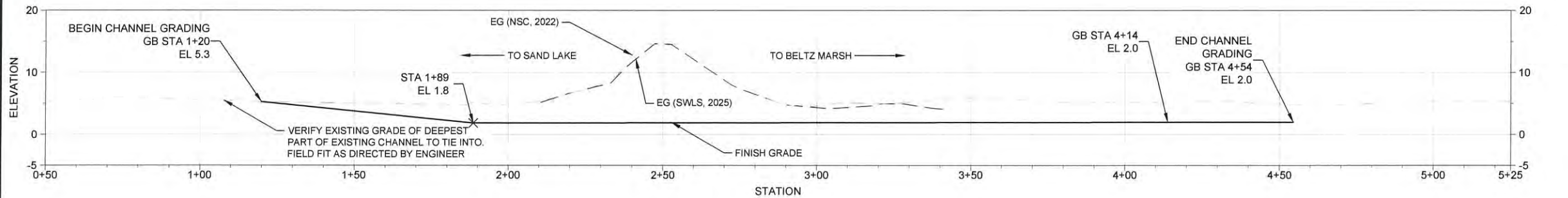
TIERRA DEL MAR, OREGON

REVISIONS		
#	DATE	DESCRIPTION
DESIGNED	KCN	
DRAWN	KCN	
CHECKED	HLW	
IN CHARGE	HLW	83882
PROJECT NUMBER	202200434	
ISSUE DATE	06/19/2026	
SCALE IS AS SHOWN WHEN PLOTTED TO FULL SIZE (22"x34")		
PHASE	DRAFT 90% DESIGN	

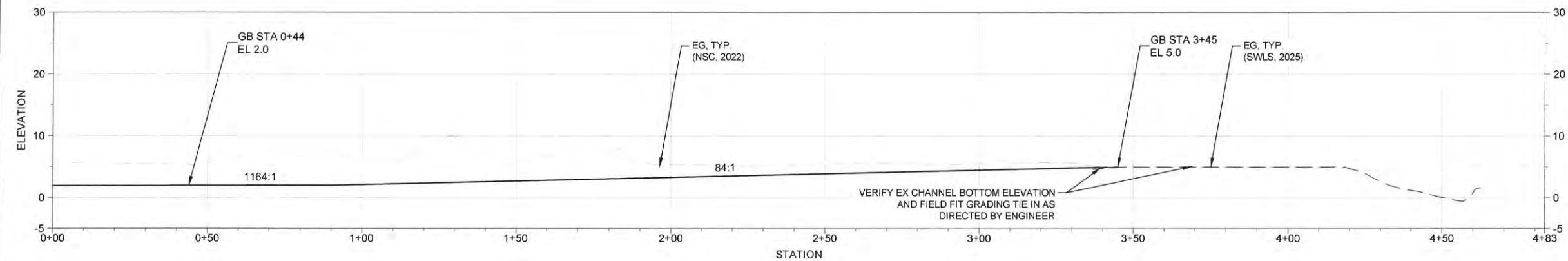
SHEET TITLE
**DIKE BREACH PLAN
AND SECTION**

SHEET NUMBER
C1.1
SHEET --- OF ###

FILE: P:\01 CAD\2022\xxxx\202200434.00 - TEP Sitka Sedge Tidal Wetland Restoration\DWG\C1.1 DIKE BREACH PLAN AND SECTION.dwg PLOT DATE: 8/22/2026 10:03:30 AM PLOTTED BY: OLIVIA PEREYRA



DIKE BREACH CHANNEL PROFILE
SECTION C1.1
HORIZONTAL SCALE: 1" = 20'
VERTICAL SCALE: 1" = 10'



SIDE CHANNEL PROFILE
SECTION C1.1
HORIZONTAL SCALE: 1" = 20'
VERTICAL SCALE: 1" = 10'

NOTES

1. THIS SHEET SHOWS PROPOSED DIKE BREACH GRADING TO CONNECT AN EXISTING CHANNEL INSIDE BELTZ MARSH TO A PROMINENT EXISTING CHANNEL IN SAND LAKE.

REVISIONS		
#	DATE	DESCRIPTION

DESIGNED	KCN
DRAWN	KCN
CHECKED	HLW
IN CHARGE	HLW 83882

PROJECT NUMBER	202200434
ISSUE DATE	06/19/2026

SCALE IS AS SHOWN WHEN
PLOTTED TO FULL SIZE (22"x34")
1" = 1"

PHASE	DRAFT 90% DESIGN
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SHEET TITLE

**DIKE BREACH
CHANNEL PROFILE**

SHEET NUMBER

C1.2

SHEET --- OF ###

FILE: P:\01 CAD\2022\XXXX\202200434.00 - TEP Sitka Sedge Tidal Wetland Restoration\DWG\C1.3 CHANNEL AND DITCH GRADING PLAN.dwg PLOT DATE: 6/22/2026 10:04:00 AM PLOTTED BY: OLIVIA PEREYRA



CHANNEL AND DITCH GRADING ENLARGEMENT - 1
PLAN

SCALE: 1" = 50'

NOTES

1. THIS SHEET PROVIDES CHANNEL IDENTIFICATION AND THALWEG (CHANNEL BOTTOM) ELEVATIONS ALONG THE PROPOSED CENTRAL CHANNEL REALIGNMENT AND TIDAL CHANNEL NETWORKS. GRADING SURFACES/CHANNEL PROFILES WILL BE PROVIDED TO THE CONTRACTOR FOR CONSTRUCTION GRADE VERIFICATIONS/GPS SYSTEMS.
2. SEE SHEET C1.2 FOR TIDAL CHANNEL AND DITCH FILL TYPICAL DETAILS. SEE SHEET C1.1 FOR DETAILED CHANNEL GRADING IN THE DIKE BREACH AREA AND D3.1 FOR DETAILED CHANNEL GRADING IN THE TIDE GATE AREA.

LEGEND

- EXISTING FEATURES**
- EX TREE CANOPY
 - EX TRAIL
 - EX WETLAND BOUNDARY (ESA, 2025)
 - EX THALWEG (APPROX.)
 - EX PROPERTY BOUNDARY
 - EX MAJOR CONTOUR
 - EX MINOR CONTOUR
 - EX EVERGREEN TREES
 - EX DECIDUOUS TREES
- PROPOSED FEATURES**
- EXCAVATE CHANNEL
 - PROPOSED FILL AREA
 - WOOD HABITAT STRUCTURES
 - PROPOSED TIDAL CHANNELS



ESA

1615 SE 3RD AVENUE,
SUITE 400
PORTLAND, OR 97214
OFFICE - 503.274.2010
WWW.ESASSOC.COM

STAMP
REGISTERED PROFESSIONAL
PRELIMINARY
OREGON
NOT FOR
CONSTRUCTION
RENEWAL DATE 06-30-28

CLIENT
**TILLAMOOK ESTUARIES
PARTNERSHIP**

PROJECT NAME
**SITKA SEDGE TIDAL
WETLAND RESTORATION**
TIERRA DEL MAR, OREGON

REVISIONS		
#	DATE	DESCRIPTION
DESIGNED	KCN	
DRAWN	KCN	
CHECKED	HLW	
IN CHARGE	HLW	83882

PROJECT NUMBER 202200434
ISSUE DATE 06/19/2026

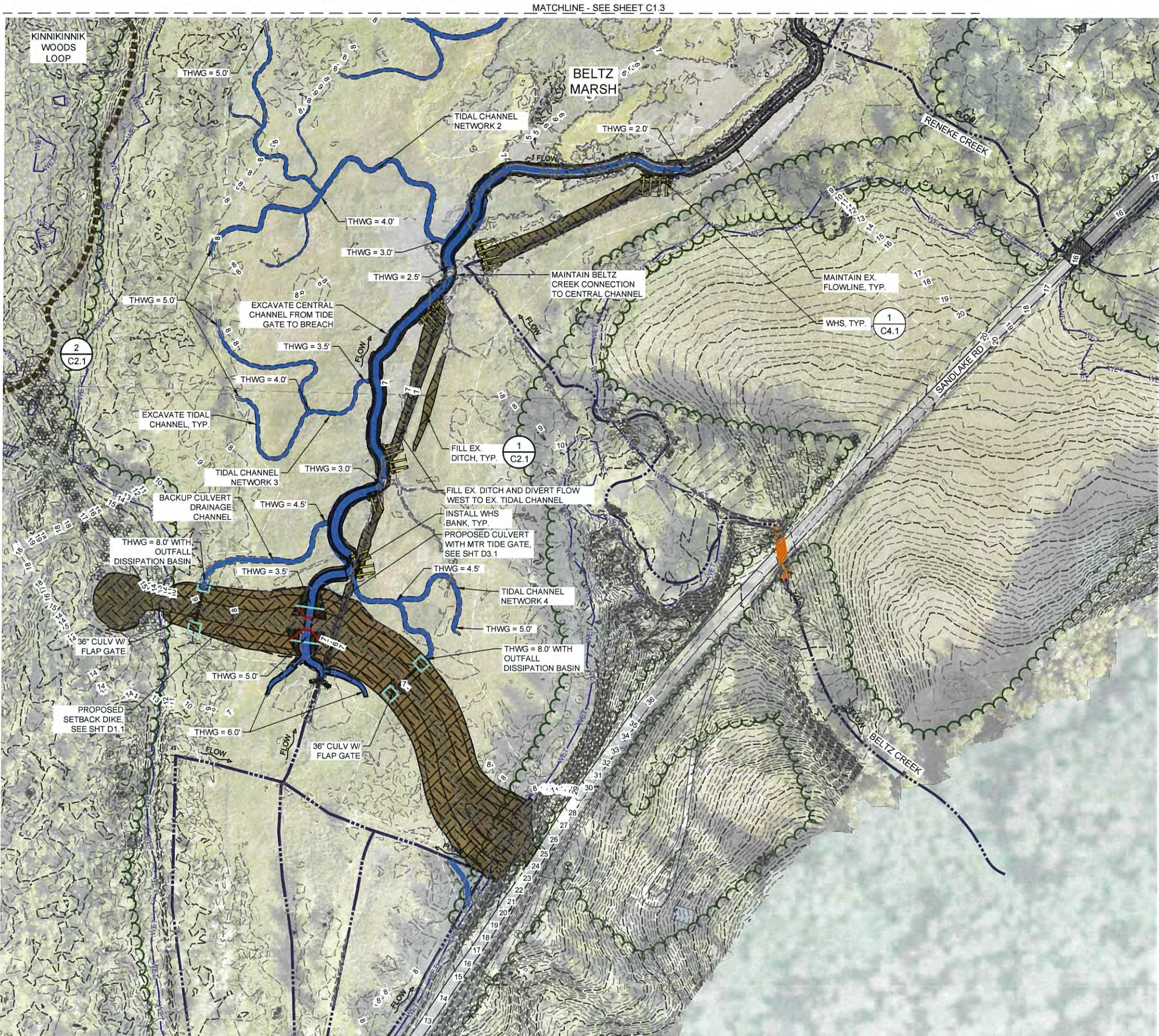
SCALE IS AS SHOWN WHEN
PLOTTED TO FULL SIZE (22"x34")
1" = 100'

PHASE
DRAFT 90% DESIGN

SHEET TITLE
**CHANNEL AND
DITCH GRADING
ENLARGEMENT - 1**

SHEET NUMBER
C1.3
SHEET --- OF ###

FILE: P:\01 CAD\2022\0000\20220043\00 - TEP Sitka Sedge Tidal Wetland Restoration\DWG\C1.3 CHANNEL AND DITCH GRADING PLAN.dwg PLOT DATE: 6/22/2026 10:04:13 AM PLOTTED BY: OLIVIA PEREYRA



CHANNEL AND DITCH GRADING ENLARGEMENT - 2
PLAN

SCALE: 1" = 50'

NOTES

1. THIS SHEET PROVIDES CHANNEL IDENTIFICATION AND THALWEG (CHANNEL BOTTOM) ELEVATIONS ALONG THE PROPOSED CENTRAL CHANNEL REALIGNMENT AND TIDAL CHANNEL NETWORKS. GRADING SURFACES/CHANNEL PROFILES WILL BE PROVIDED TO THE CONTRACTOR FOR CONSTRUCTION GRADE VERIFICATIONS/GPS SYSTEMS.
2. SEE SHEET C1.2 FOR TIDAL CHANNEL AND DITCH FILL TYPICAL DETAILS. SEE SHEET C1.1 FOR DETAILED CHANNEL GRADING IN THE DIKE BREACH AREA AND D3.1 FOR DETAILED CHANNEL GRADING IN THE TIDE GATE AREA.

LEGEND

EXISTING FEATURES	
	EX TREE CANOPY
	EX TRAIL
	EX WETLAND BOUNDARY (ESA, 2025)
	EX CULVERT
	EX THALWEG (APPROX.)
	EX ROAD
	EX PROPERTY BOUNDARY
	EX EVERGREEN TREES
	EX DECIDUOUS TREES
	EX BEAVER STRUCTURES
	EX MAJOR CONTOUR
	EX MINOR CONTOUR
PROPOSED FEATURES	
	CULVERT AND TIDE GATE
	PROPOSED TIDAL CHANNELS
	WOOD HABITAT STRUCTURES
	PROPOSED MAJOR CONTOUR
	PROPOSED MINOR CONTOUR
	GRAVEL ACCESS ROAD
	BRIDGE
	PROPOSED FILL AREA



1615 SE 3RD AVENUE,
SUITE 400
PORTLAND, OR 97214
OFFICE - 503.274.2010
WWW.ESASSOC.COM

STAMP

RENEWAL DATE 06-30-28

CLIENT

TILLAMOOK ESTUARIES
PARTNERSHIP

SITKA SEDGE TIDAL
WETLAND RESTORATION
TIERRA DEL MAR, OREGON

REVISIONS		
#	DATE	DESCRIPTION
DESIGNED	KCN	
DRAWN	KCN	
CHECKED	HLW	
IN CHARGE	HLW	83882

PROJECT NUMBER 202200434
ISSUE DATE 06/19/2026

SCALE IS AS SHOWN WHEN
PLOTTED TO FULL SIZE (22"x34")
1" = 1'

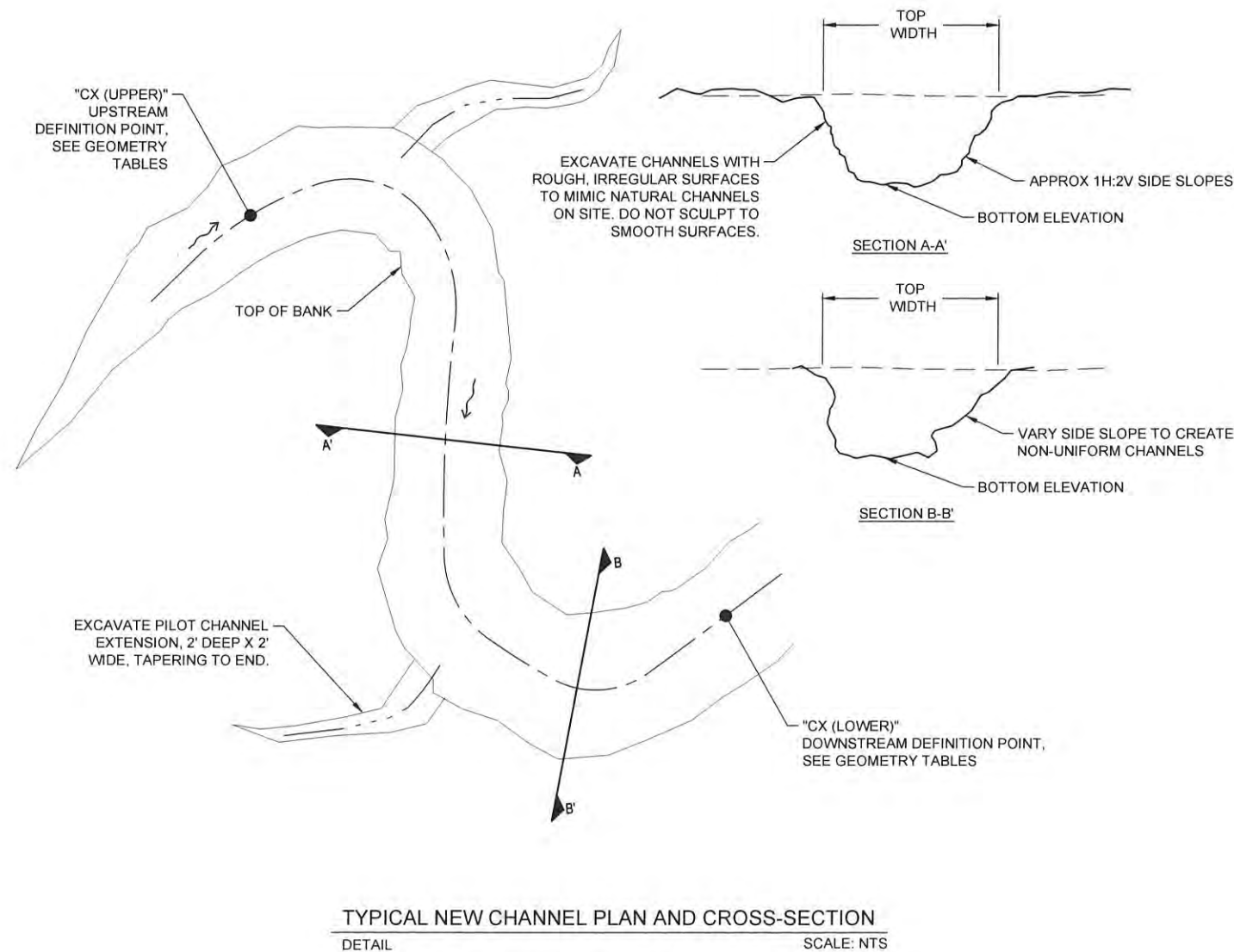
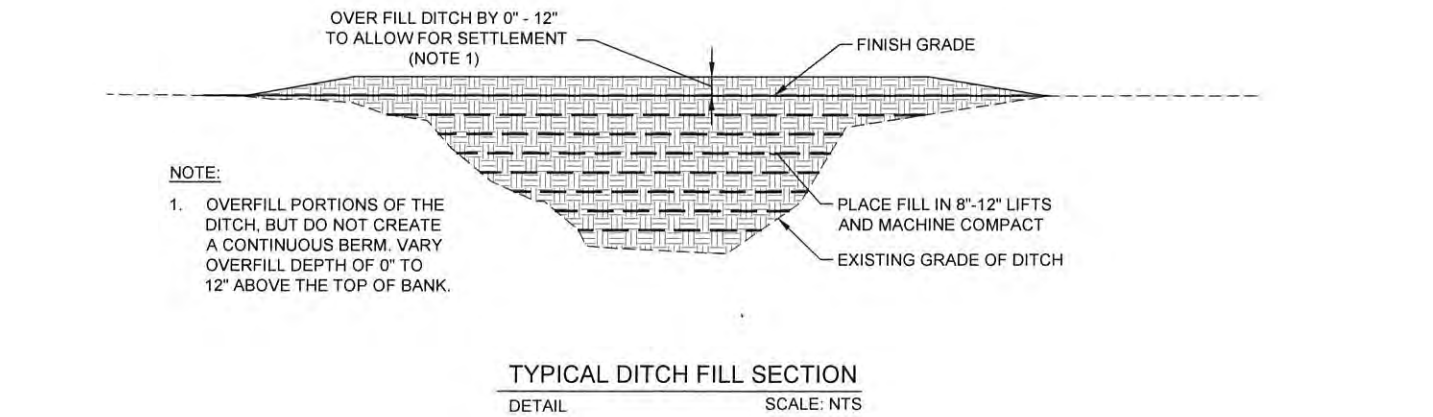
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DRAFT 90% DESIGN

SHEET TITLE

CHANNEL AND
DITCH GRADING
ENLARGEMENT - 2

SHEET NUMBER
C1.4
SHEET --- OF ###

FILE: P:\01 CAD\2022\xxxx\202200434.00 - TEP Sitka Sedge Tidal Wetland Restoration\DWG\C2.1 CHANNEL GRADING SECTIONS AND DETAILS.dwg PLOT DATE: 6/22/2026 10:04:18 AM PLOTTED BY: OLIVIA PEREYRA



REVISIONS		
#	DATE	DESCRIPTION

DESIGNED	KCN
DRAWN	KCN
CHECKED	HLW
IN CHARGE	HLW 83882

PROJECT NUMBER 202200434

ISSUE DATE 06/19/2026

SCALE IS AS SHOWN WHEN
PLOTTED TO FULL SIZE (22"x34")

1" = 1'

PHASE
DRAFT 90% DESIGN

SHEET TITLE

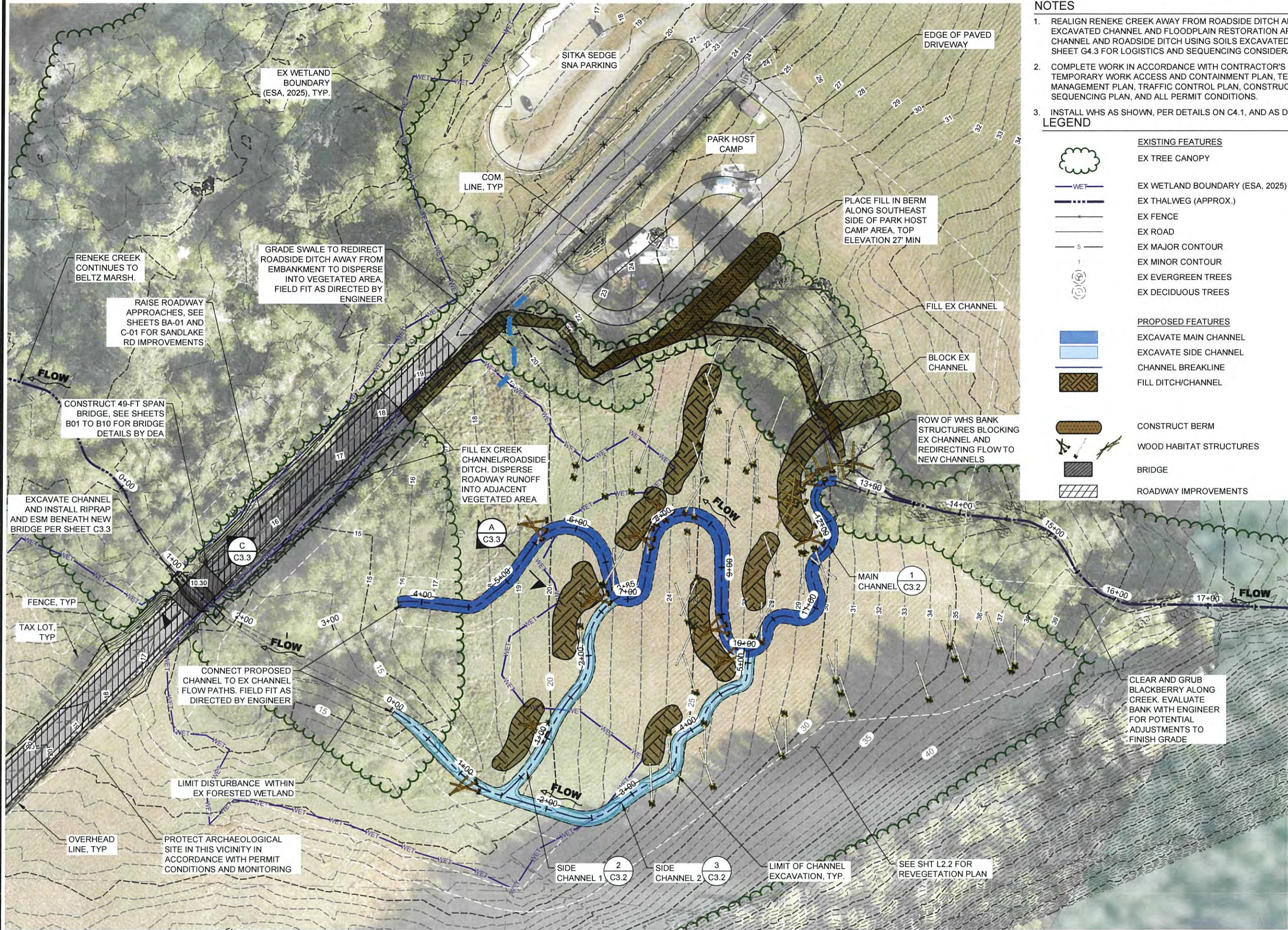
CHANNEL GRADING
SECTIONS AND
DETAILS

SHEET NUMBER

C2.1

SHEET --- OF ###

FILE: P:\01 CAD\2022\000000\00 - TEP Sitka Sedge Tidal Wetland Restoration\DWG\RENEKEC3.1 RENEKE CREEK GRADING PLAN.dwg PLOT DATE: 6/22/2026 10:04:47 AM PLOTTED BY: OLIVIA PEREYRA



NOTES

- REALIGN RENEKE CREEK AWAY FROM ROADSIDE DITCH AND INTO NEWLY EXCAVATED CHANNEL AND FLOODPLAIN RESTORATION AREA. FILL EXISTING CHANNEL AND ROADSIDE DITCH USING SOILS EXCAVATED FROM ONSITE. SEE SHEET G4.3 FOR LOGISTICS AND SEQUENCING CONSIDERATIONS.
- COMPLETE WORK IN ACCORDANCE WITH CONTRACTOR'S APPROVED TEMPORARY WORK ACCESS AND CONTAINMENT PLAN, TEMPORARY WATER MANAGEMENT PLAN, TRAFFIC CONTROL PLAN, CONSTRUCTION SCHEDULE AND SEQUENCING PLAN, AND ALL PERMIT CONDITIONS.
- INSTALL WHS AS SHOWN, PER DETAILS ON C4.1, AND AS DIRECTED BY ENGINEER.

LEGEND



EXISTING FEATURES

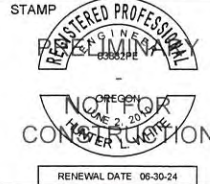
- EX TREE CANOPY
- EX WETLAND BOUNDARY (ESA, 2025)
- EX THALWEG (APPROX.)
- EX FENCE
- EX ROAD
- EX MAJOR CONTOUR
- EX MINOR CONTOUR
- EX EVERGREEN TREES
- EX DECIDUOUS TREES



PROPOSED FEATURES

- EXCAVATE MAIN CHANNEL
- EXCAVATE SIDE CHANNEL
- CHANNEL BREAKLINE
- FILL DITCH/CHANNEL
- CONSTRUCT BERM
- WOOD HABITAT STRUCTURES
- BRIDGE
- ROADWAY IMPROVEMENTS

1"=50'
SCALE
50 25 0 50 100
FEET



PROJECT NAME
**RENEKE CREEK
BRIDGE AND STREAM
RESTORATION**
SANDLAKE ROAD, CLOVERDALE OREGON 97112

REVISIONS		
#	DATE	DESCRIPTION

DESIGNED	HLW
DRAWN	KCN
CHECKED	HLW
IN CHARGE	HLW 83882

PROJECT NUMBER D202200434

ISSUE DATE 08/29/2025

SCALE IS AS SHOWN WHEN
PLOTTED TO FULL SIZE (22"x34")
1"=50'

PHASE
60% DESIGN

SHEET TITLE

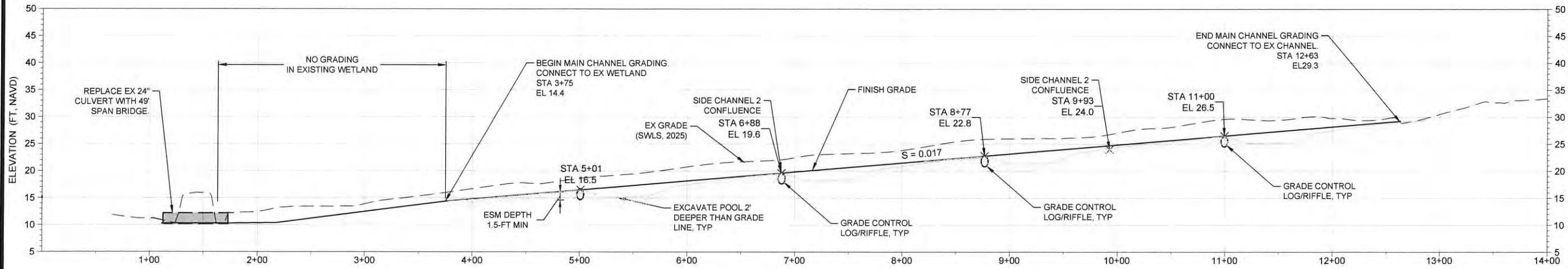
**RENEKE CREEK
GRADING PLAN**

SHEET NUMBER

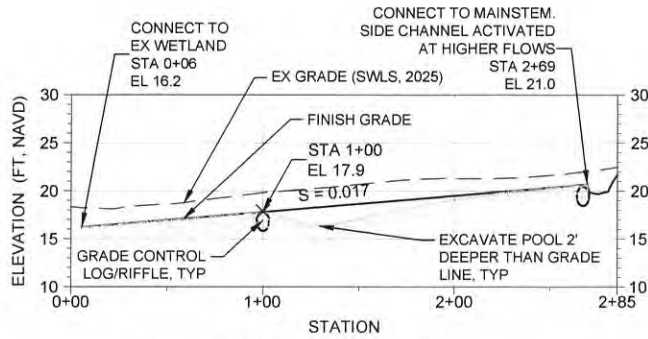
C3.1

SHEET --- OF ###

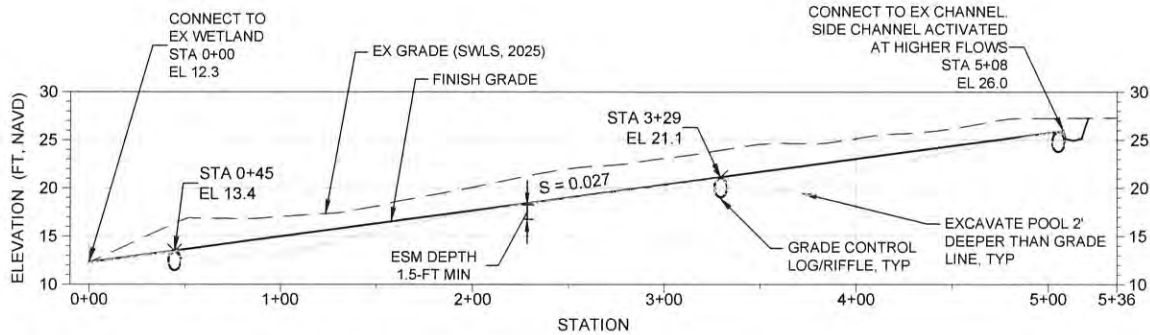
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1
C3.1 PROFILE MAIN CHANNEL PROFILE
HORIZONTAL SCALE: 1" = 50'
VERTICAL SCALE: 1" = 5'



2
C3.1 PROFILE SIDE CHANNEL 1 PROFILE
HORIZONTAL SCALE: 1" = 50'
VERTICAL SCALE: 1" = 5'



3
C3.1 PROFILE SIDE CHANNEL 2 PROFILE
HORIZONTAL SCALE: 1" = 50'
VERTICAL SCALE: 1" = 5'



REVISIONS		
#	DATE	DESCRIPTION
DESIGNED	HLW	
DRAWN	KCN	
CHECKED	HLW	
IN CHARGE	HLW	
	83882	

PROJECT NUMBER D202200434
ISSUE DATE 08/29/2025

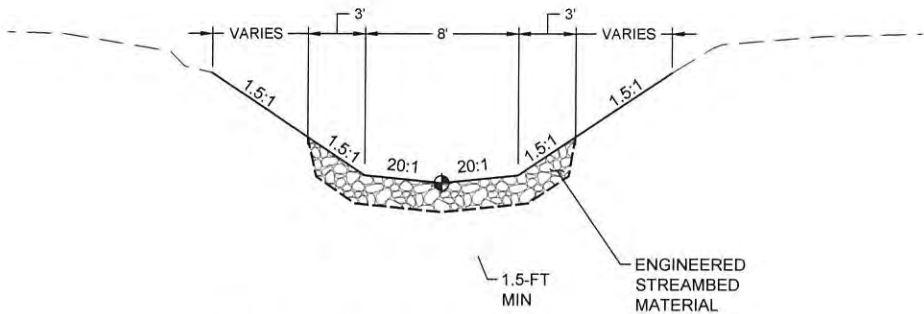
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PLOTTED TO FULL SIZE (22"x34")
1" = 1'

PHASE
60% DESIGN

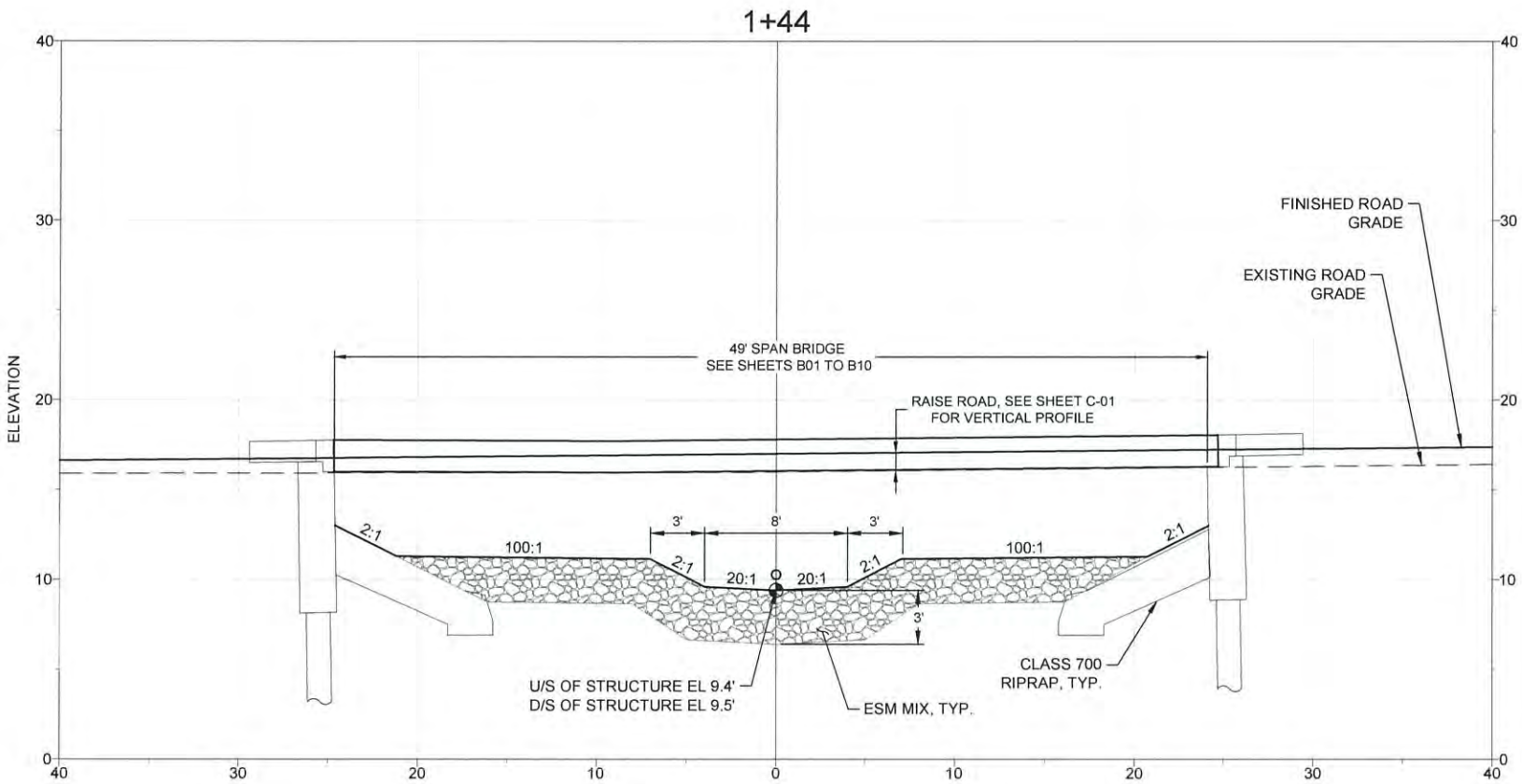
SHEET TITLE
**RENEKE CREEK
CHANNEL PROFILES**

SHEET NUMBER
C3.2
SHEET --- OF ###

FILE: P:\01 CAD\2022\XXXX\202200434.00 - TEP Silka Sedge Tidal Wetland Restoration\DWG\RENEKE\3.3 RENEKE GRADING SECTIONS.dwg PLOT DATE: 6/22/2025 10:05:01 AM PLOTTED BY: OLIVIA PEREYRA



A
C3.1
RENEKE CREEK CHANNEL TYPICAL SECTION
HORIZONTAL SCALE: 1" = 5'
VERTICAL SCALE: 1" = 1'



C
C3.1
PROPOSED 49-FT SPAN BRIDGE
SECTION
SCALE: NTS

ESA
819 SE MORRISON STREET,
STE. 310
PORTLAND, OR 97214
OFFICE - 503.274.2010
WWW.ESASSOC.COM

STAMP
REGISTERED PROFESSIONAL
ENGINEER
TILLAMOOK COUNTY
NO. 10000
DATE 2-20-10
RENEWAL DATE 06-30-24



PROJECT NAME
**RENEKE CREEK
BRIDGE AND STREAM
RESTORATION**
SANDLAKE ROAD, CLOVERDALE OREGON 97112

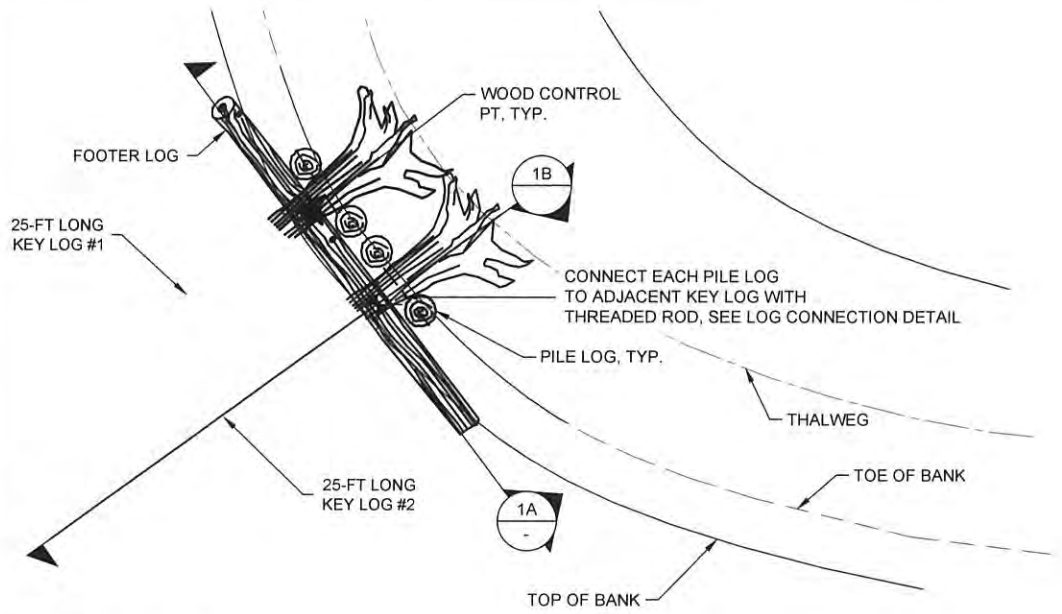
REVISIONS		
#	DATE	DESCRIPTION
DESIGNED	KCN	
DRAWN	KCN	
CHECKED	HLW	
IN CHARGE	HLW	
	83882	
PROJECT NUMBER D202200434		
ISSUE DATE 08/29/2025		
SCALE IS AS SHOWN WHEN PLOTTED TO FULL SIZE (22"x34")		

PHASE
60% DESIGN

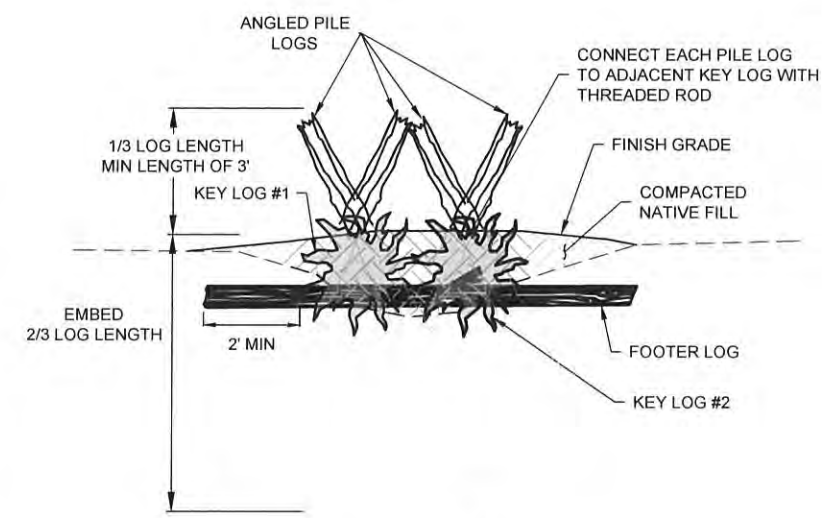
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**RENEKE CREEK
GRADING SECTIONS**

SHEET NUMBER
C3.3
SHEET --- OF ###

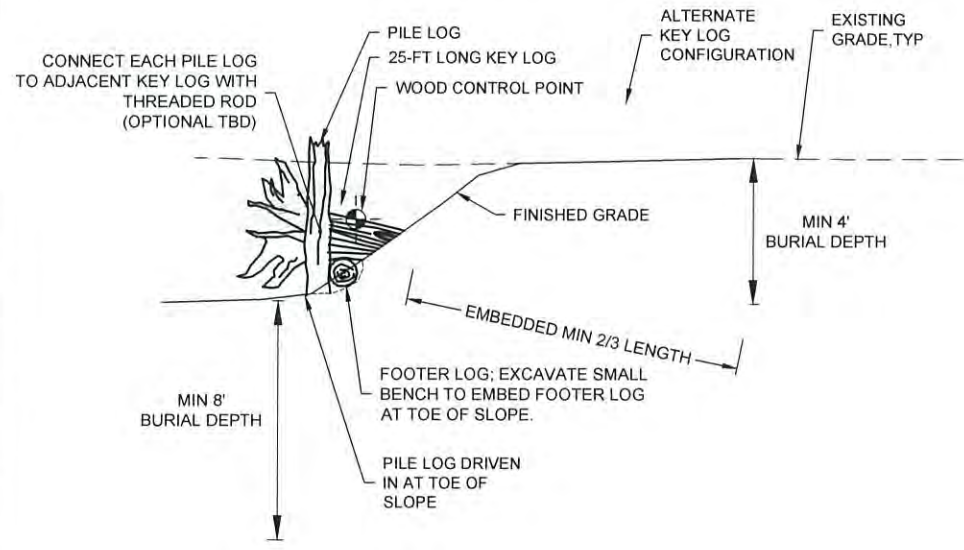
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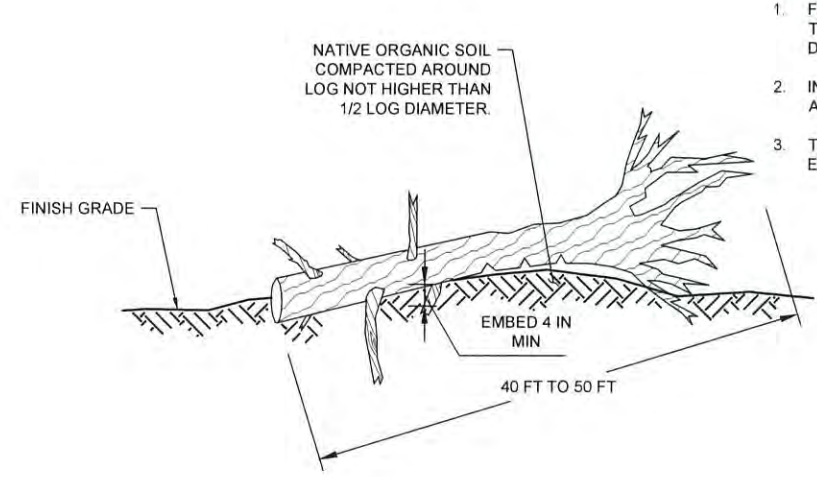
1 WHS - BANK
DETAIL
SCALE: NTS



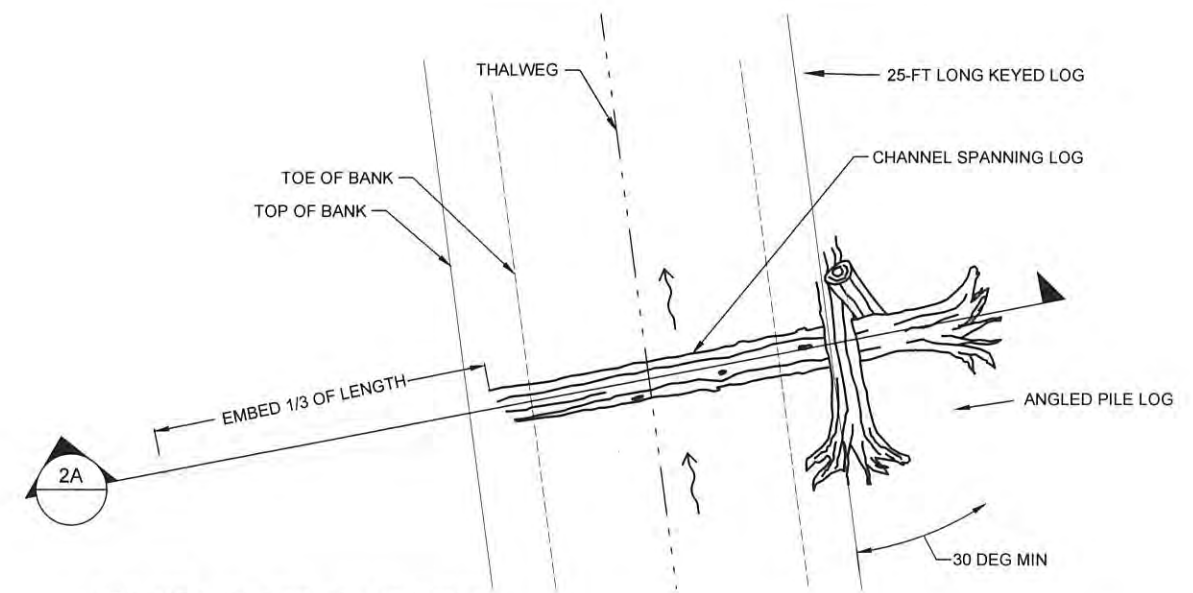
SECTION 1A



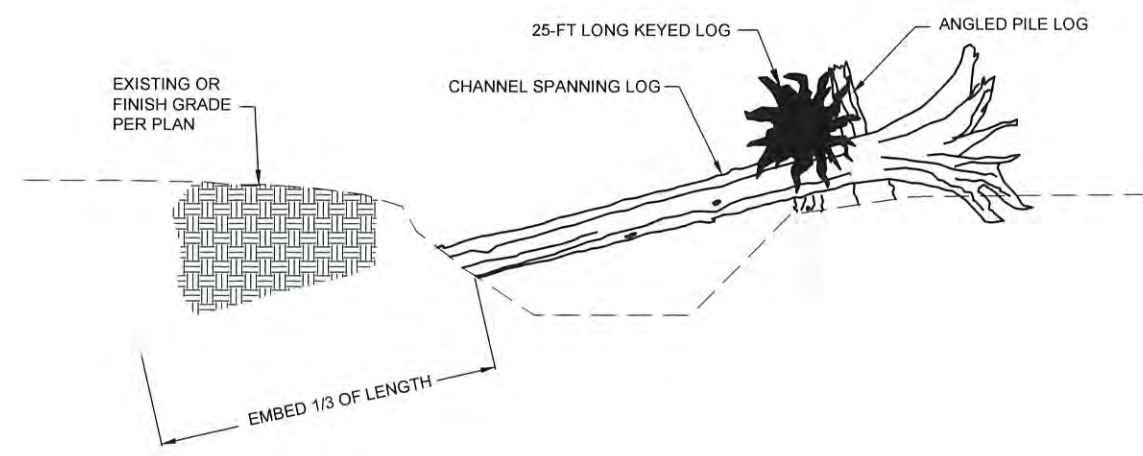
SECTION 1B



3 FIELD-FIT LOG
DETAIL
SCALE: NTS



2 WHS - CHANNEL SPANNING
DETAIL
SCALE: NTS



SECTION 2A

- NOTES:
1. FIELD-FIT LOGS SHALL BE PLACED AT THE DISCRETION OF THE ENGINEER DURING CONSTRUCTION.
 2. INCLUDE MAJOR BRANCHES, BARK, AND ROOT WAD.
 3. TAMP LOG WITH MACHINERY TO ENSURE SECURE PLACEMENT.

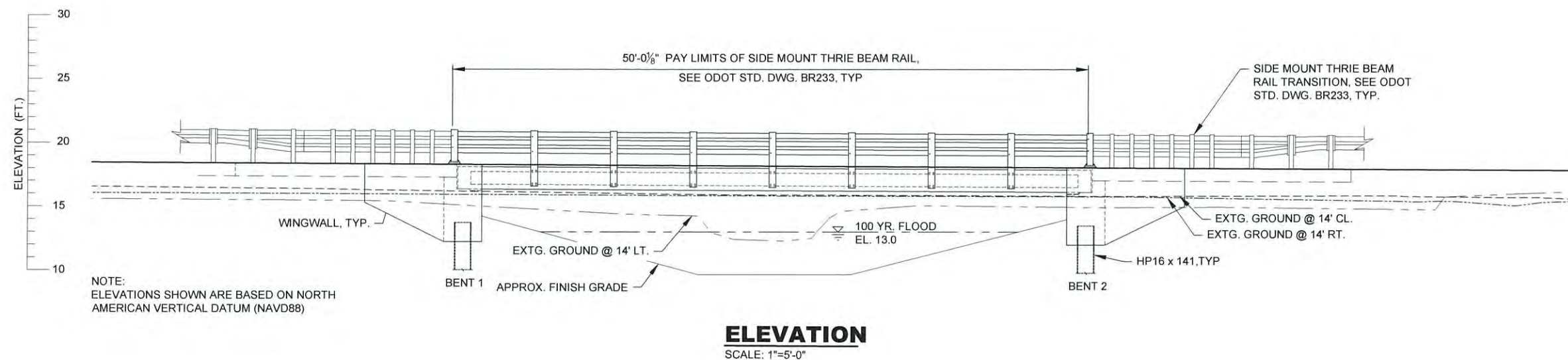
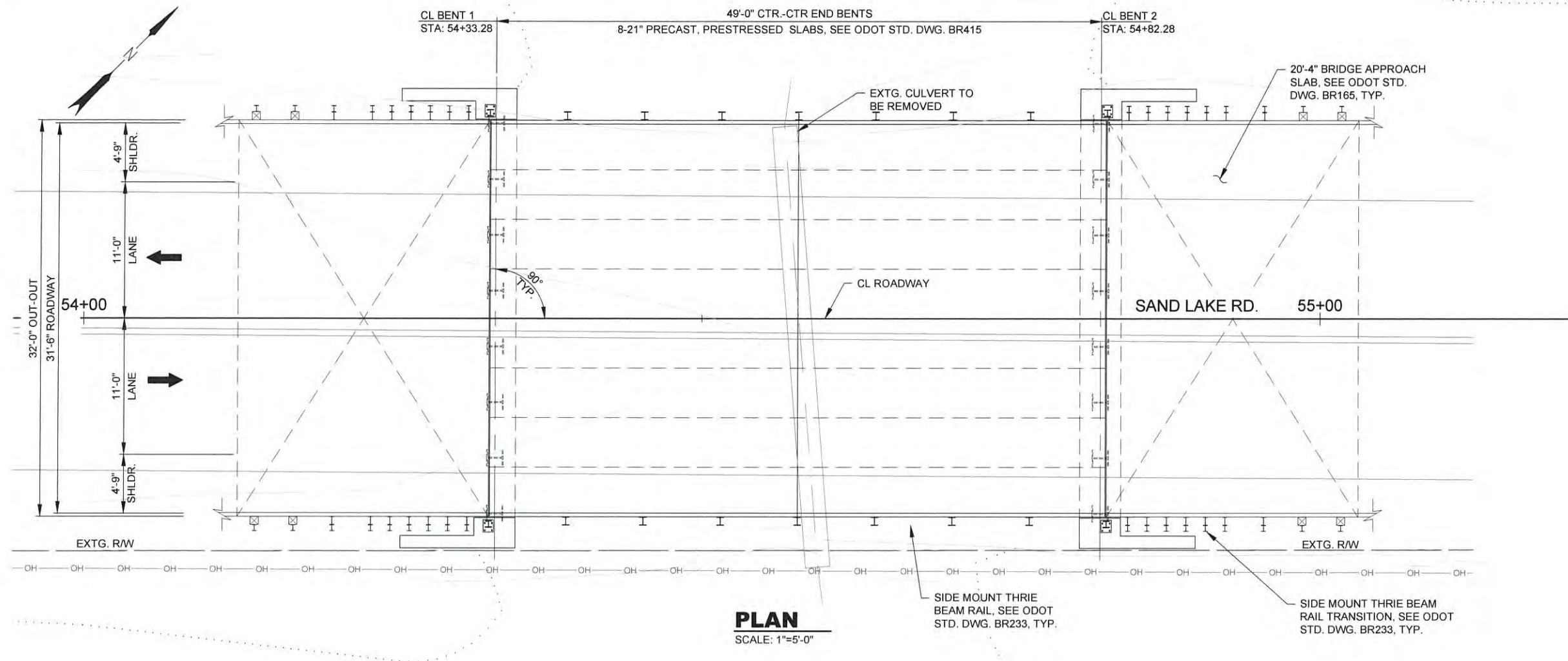
- NOTES
1. CONSTRUCT WOOD HABITAT STRUCTURE (WHS) CONFIGURATIONS AS SHOWN HERE OR AS DIRECTED IN THE FIELD BY THE ENGINEER. ENGINEER SHALL APPROVE ALL LOG PLACEMENT AND MAY DIRECT ADJUSTMENTS TO MEET DESIGN INTENT.

REVISIONS		
#	DATE	DESCRIPTION
DESIGNED	KCN	
DRAWN	KCN	
CHECKED	HLW	
IN CHARGE	HLW	83882
PROJECT NUMBER	202200434	
ISSUE DATE	06/19/2026	
SCALE IS AS SHOWN WHEN PLOTTED TO FULL SIZE (22"x34")		
1" = 1'		

PHASE
DRAFT 90% DESIGN

SHEET TITLE

HABITAT DETAILS



REVISIONS		
#	DATE	DESCRIPTION
DESIGNED	N. Peek	
DRAWN	D. Altenburg	
CHECKED	J. Goodall	
IN CHARGE	J. Goodall	

PROJECT NUMBER ESCI0000005
ISSUE DATE 06/05/26

SCALE IS AS SHOWN WHEN
PLOTTED TO FULL SIZE (22"x34")
1" = 1'

PHASE
90% PS&E
SUBMITTAL

SHEET TITLE

PLAN
AND
ELEVATION

SHEET NUMBER
B01

SHEET 1 OF ###

PROVIDE ALL MATERIALS AND PERFORM ALL WORK ACCORDING TO THE "OREGON STANDARD SPECIFICATIONS FOR CONSTRUCTION 2024".

SERVICE AND STRENGTH-I LIMIT STATES:
HL-93: DESIGN TRUCK (OR TRUCKS PER LRFD 3.6.1.3) OR THE DESIGN TANDEMS AND THE
DESIGN LANE LOAD.

STRENGTH-II LIMIT STATE:
 ODOT TYPE EV3 PERMIT TRUCK
 ODOT TYPE STP-5BW PERMIT TRUCK
 ODOT TYPE STP-4E PERMIT TRUCK

SEISMIC DESIGN IS PERFORMED IN ACCORDANCE WITH THE "AASHTO GUIDE SPECIFICATIONS FOR LRFD SEISMIC BRIDGE DESIGN" ("AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS") AS MODIFIED BY THE MAY 2021 EDITION OF THE "ODOT BRIDGE DESIGN MANUAL". THE HORIZONTAL PEAK GROUND ACCELERATION COEFFICIENTS (PGA) FOR 1000-YEAR RETURN (LIFE SAFETY) AND CASCADIA SUBDUCTION ZONE EARTHQUAKE (OPERATIONAL) ARE 0.487G AND 0.335G RESPECTIVELY, BASED ON 2014 USGS SEISMIC HAZARD MAPS. THE BRIDGE SITE IS DEFINED AS A SITE CLASS D WITH SITE FACTOR (FPGA) OF 1.20.

PROVIDE ALL REINFORCING STEEL ACCORDING TO ASTM SPECIFICATION A706, OR AASHTO 31 (ASTM A615) GRADE 60. PROVIDE FIELD BENT BARS ACCORDING TO ASTM SPECIFICATION A706. USE THE FOLLOWING SPLICE LENGTHS (UNLESS SHOWN OTHERWISE).

REINFORCING SPLICE LENGTHS (CLASS B) GRADE 60 F'C = 4.0 KSI, $\lambda_{RC} = 0.4$, 2" MIN. CL. COVER											
BAR SIZE	#3	#4	#5	#6	#7	#8	#9	#10	#11	#14	#18
UNCOATED	1'-4"	1'-7"	2'-0"	2'-5"	2'-9"	3'-2"	3'-7"	4'-0"	4'-5"	NOT PERMITTED	

INCREASE ALL SPLICE LENGTHS 30% FOR HORIZONTAL OR NEARLY HORIZONTAL BARS SO PLACED THAT MORE THAN 12" OF FRESH CONCRETE IS CAST BELOW THE BAR.

SPLICE REINFORCING STEEL AT ALTERNATE BARS, STAGGERED AT LEAST ONE SPLICE LENGTH OR AS FAR AS POSSIBLE, UNLESS SHOWN OTHERWISE.

ALL REINFORCING SHALL HAVE 2" OF CONCRETE COVER UNLESS SHOWN OTHERWISE.

ALL REINFORCING SPACING IS INTENDED TO BE MAXIMUM UNLESS SHOWN OTHERWISE.

PROVIDE CONCRETE AND PRESTRESSING STEEL IN PRECAST PRESTRESSED UNITS ACCORDING TO DETAIL PLANS.

PROVIDE A $\frac{3}{4}$ " CHAMFER ON ALL EXPOSED CONCRETE EDGES UNLESS NOTED OTHERWISE.

PROVIDE CLASS 4000 - 1½", 1", OR ¾" CONCRETE FOR ALL CONCRETE.

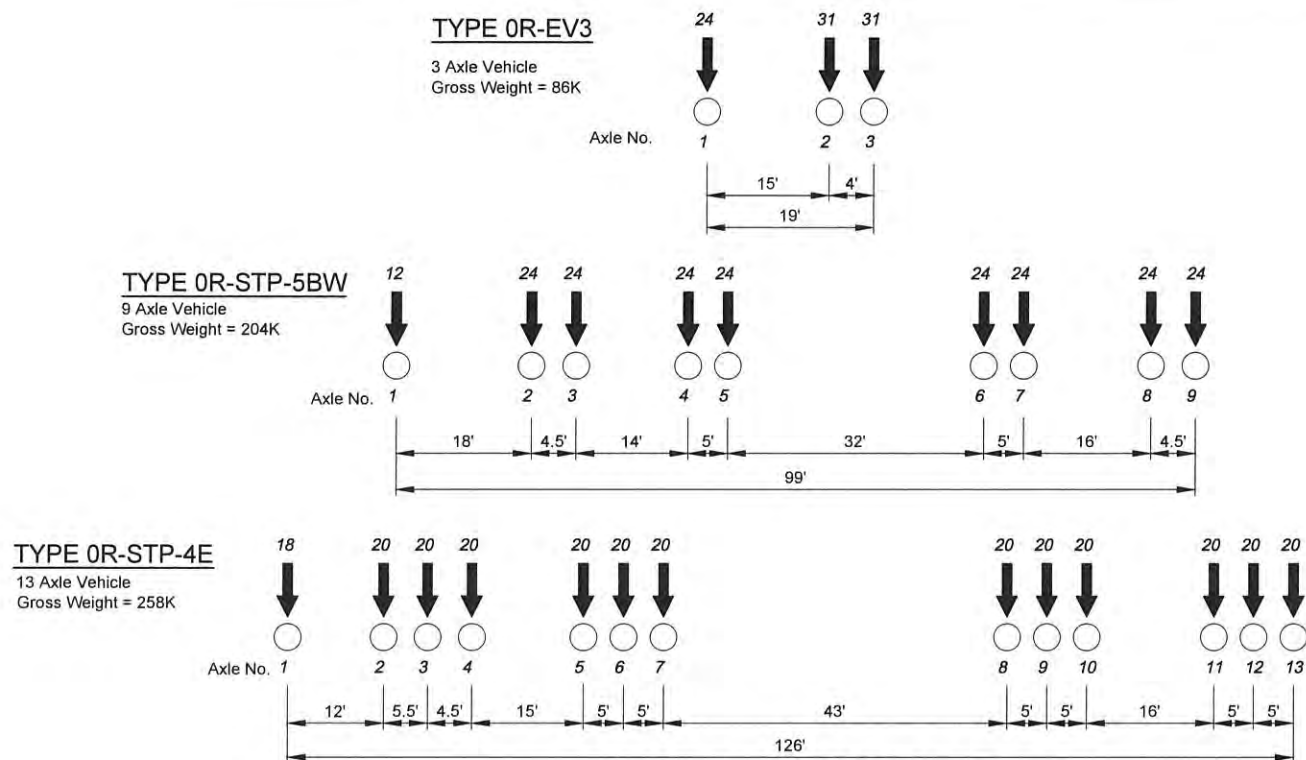
SEE FOUNDATION PLAN FOR FOUNDATION DESIGN NOTES.

CONTRACTOR TO FIELD VERIFY ALL DIMENSIONS AND ELEVATIONS PRIOR TO BEGINNING WORK.

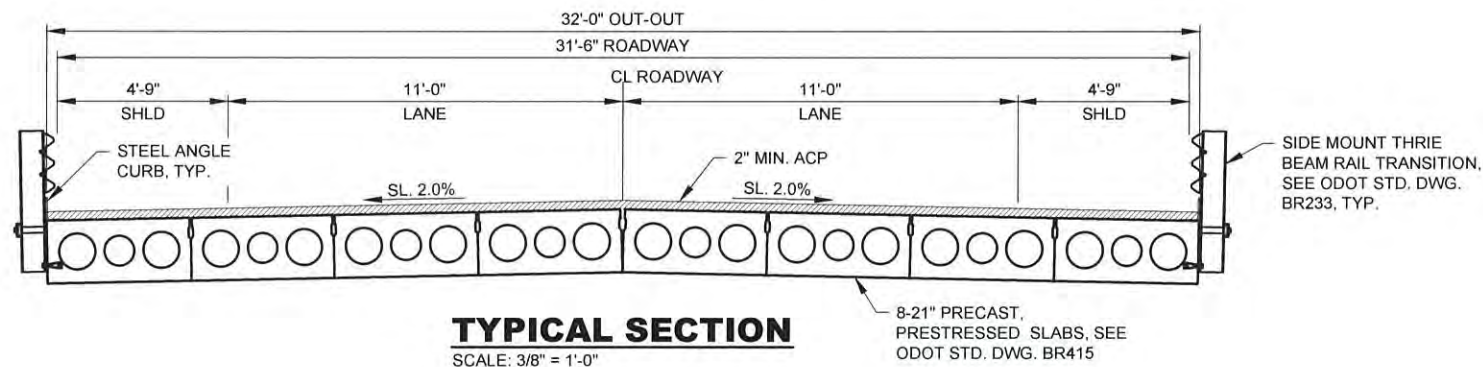
REMOVE ENTIRE EXISTING CULVERT.

LEGEND

ACP = ASPHALTIC CONCRETE PAVEMENT
EF = EACH FACE
EW = EACH WAY

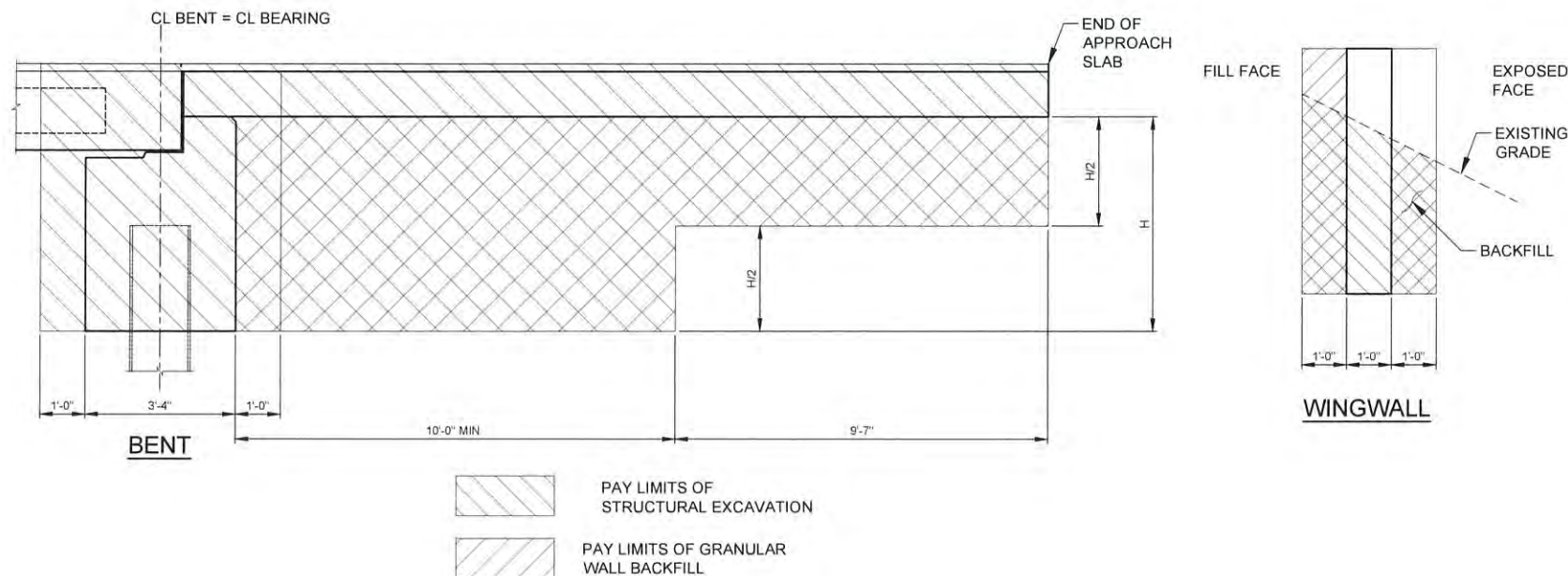


NO SCALE



TYPICAL SECTION

SCALE: 3/8" = 1'-0"



EXCAVATION/BACKFILL DIAGRAM

NO SCALE



STAMP

PRELIMINARY

NOT FOR
CONSTRUCTION

CLIENT



PROJECT NAME

RENEKE CREEK
REALIGNMENT AND
BRIDGE REPLACEMENT

REVISIONS

#	DATE	DESCRIPTION

DESIGNED	N. Peek
DRAWN	D. Allent
CHECKED	J. Gooda
IN CHARGE	J. Gooda

PROJECT NUMBER ESCI0000005

ISSUE DATE 06/05/26

SCALE IS AS SHOWN WHEN
PLOTTED TO FULL SIZE (22"x34")

1"

PHASE
90% PS&E
SUBMITTAL

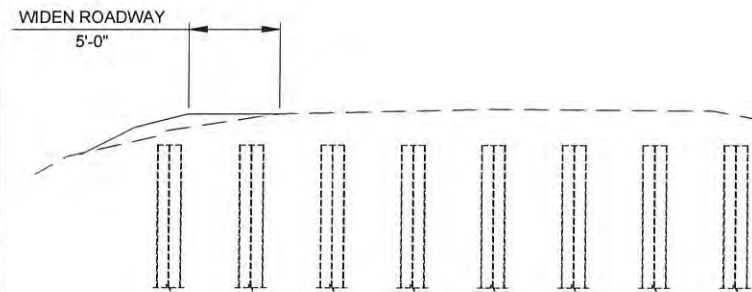
SHEET TITLE

GENERAL NOTES AND TYPICAL SECTION

SHEET NUMBER

B02

SHEET 2 OF ###

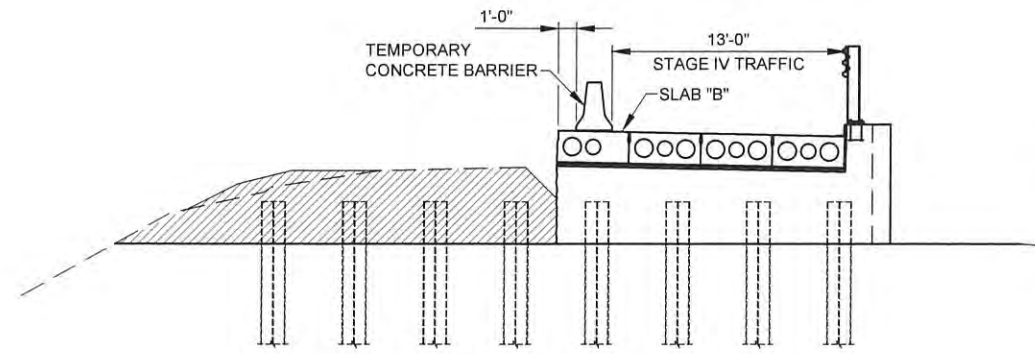


SINGLE LANE CLOSURES UNDER FLAGGING

STAGE I
NO SCALE

STAGE I NOTES

1. DRIVE PILES 1'-0" BELOW FINISH GRADE.
2. SURVEY PILE POSITIONS.
3. PLACE TEMPORARY PAVEMENT OVER PILES.
4. PLACE CULVERT WIDENING MIN LENGTH 12'-0" DOWNSTREAM.
5. WIDEN SOUTH BOUND LANE 5'-0"

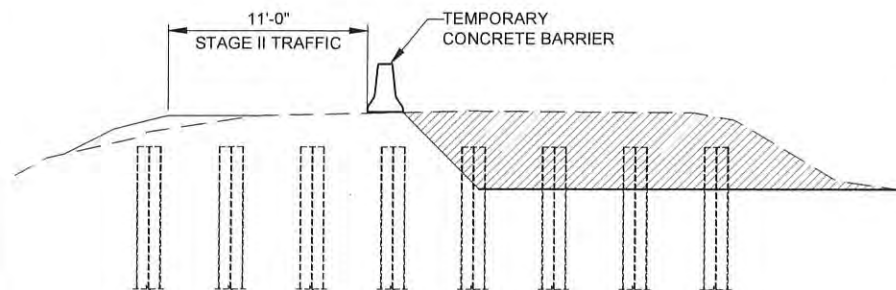


SOUTH BOND LANE CLOSURE

STAGE IV
NO SCALE

STAGE IV NOTES

1. PLACE AND SECURE TEMPORARY CONCRETE BARRIER TO EXTERIOR SLAB B AND INSTALL TRAFFIC CONTROL DEVICES.
2. REMOVE TEMPORARY CONCRETE BARRIER FROM EXISTING ROADWAY.
3. SHIFT TRAFFIC TO A SINGLE LANE ON COMPLETED PC/PS CONCRETE SLAB PORTION OF BRIDGE.
4. REMOVE REMAINDER OF EXISTING ROADWAY (WEST BOUND LANE AND SHOULDER).

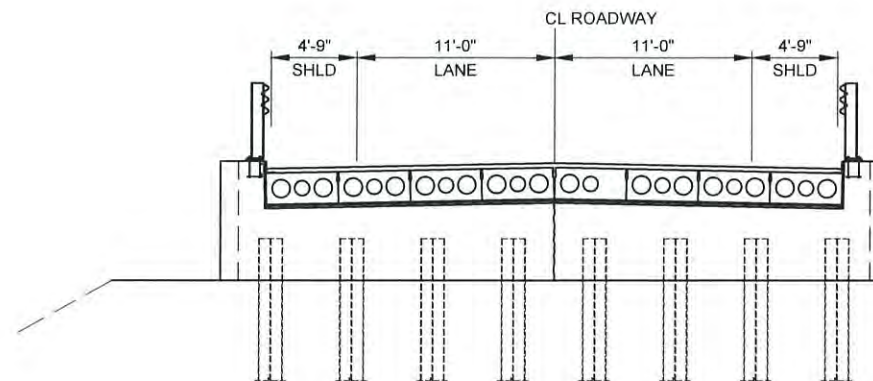


WEST BOUND LANE CLOSURE

STAGE II
NO SCALE

STAGE II NOTES

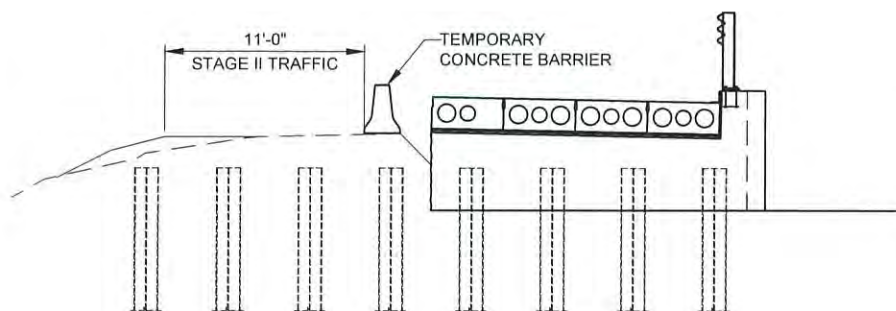
1. PLACE TEMPORARY CONCRETE BARRIER AND INSTALL TRAFFIC CONTROL DEVICES.
2. SHIFT TRAFFIC TO SINGLE LANE ON WIDENED SOUTH BOUND LANE.
3. EXCAVATE EAST OF TEMPORARY CONCRETE BARRIER (NORTH BOUND LANE AND SHOULDER)



STAGE V
NO SCALE

STAGE V NOTES

1. BUILD STAGE V BENT CAPS.
2. PLACE PC/PS CONCRETE SLABS, POST TENSION TRANSVERSE TIE RODS (INCLUDING RODS BETWEEN STAGE III AND STAGE V SLABS), AND PLACE KEYWAY GROUT.
3. PLACE BRIDGE APPROACH SLABS AT EACH BENT.
4. CAST TYPE "F" RAIL.
5. REMOVE TEMPORARY CONCRETE BARRIER FROM EXTERIOR SLAB B.
6. PLACE ACP ON THE BRIDGE AND APPROACH SLABS.



STAGE III
NO SCALE

STAGE III NOTES

1. BUILD STAGE III BENT CAPS
2. PLACE PC/PS CONCRETE SLABS, POST TENSION TRANSVERSE TIE RODS, AND PLACE KEYWAY GROUT. EXTEND TIE RODS FROM EXTERIOR SLAB "B" AS NECESSARY TO ATTACH A MECHANICAL COUPLER.
3. PLACE BRIDGE APPROACH SLABS AT EACH BENT.



DAVID EVANS
AND ASSOCIATES INC.
5121 Skyline Village Loop S, Suite 200
Salem Oregon 97306
Phone: 503.361.8655

STAMP

PRELIMINARY

NOT FOR
CONSTRUCTION

CLIENT



PROJECT NAME
**RENEKE CREEK
REALIGNMENT AND
BRIDGE REPLACEMENT**
SANDLAKE ROAD, CLOVERDALE OREGON 97112

REVISIONS
DATE DESCRIPTION

DESIGNED N. Peek
DRAWN D. Altenburg
CHECKED J. Goodall
IN CHARGE J. Goodall

PROJECT NUMBER ESCI0000005

ISSUE DATE 06/05/26

SCALE IS AS SHOWN WHEN
PLOTTED TO FULL SIZE (22"x34")
1" = 1'

PHASE
90% PS&E
SUBMITTAL

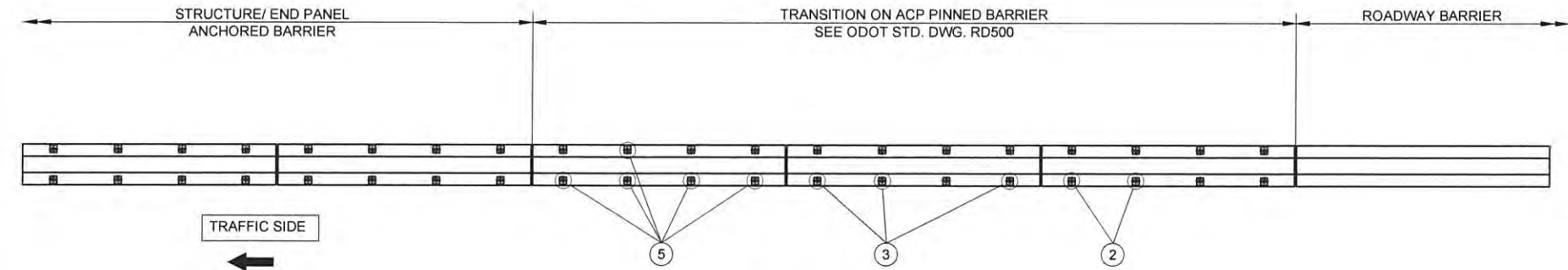
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**CONSTRUCTION
STAGING**

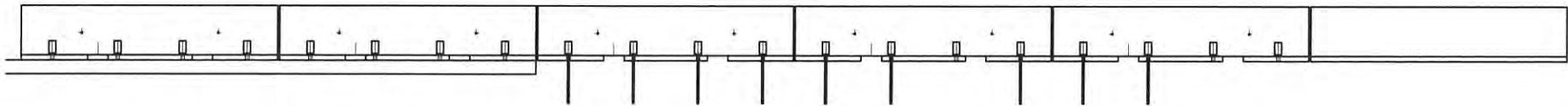
SHEET NUMBER

B03

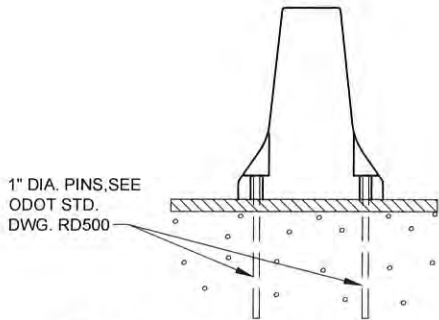
SHEET 3 OF ###



RAIL PLAN
NO SCALE



RAIL ELEVATION
NO SCALE



PINNED BARRIER SECTION
NO SCALE

GENERAL NOTES:

PROVIDE ALL MATERIALS AND PERFORM ALL WORK ACCORDING TO THE OREGON STANDARD SPECIFICATIONS FOR CONSTRUCTION 2024.

TEMPORARY BARRIER IS DESIGNED FOR NCHRP350 TL-3 LOADS IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS 4TH EDITION 2007 WITH 2009 INTERIM REVISIONS, SECTION 13.

ALL BARRIER IS PRECAST PIN AND LOOP TYPE. SEE DWG. DET3296.

PROVIDE ALL REINFORCING STEEL ACCORDING TO ASTM A706, OR AASHTO M31 (ASTM A615) GRADE 60.

PROVIDE CLASS 5000- 1½, 1 OR ¾ CONCRETE IN PRECAST BARRIER SEGMENTS.

PROVIDE 1" DIAMETER GRADE 36 ANCHOR BOLTS, NUTS AND WASHERS ACCORDING TO ODOT SPECIFICATION 02560.30.

PROVIDE PLATE WASHERS ACCORDING TO AASHTO M270 (ASTM A709) GRADE 36.

PROVIDE AND INSTALL 1" DIAMETER GRADE 36 RESIN BONDED ANCHORS ACCORDING TO ODOT SPECIFICATION 00535.

PROVIDE THE FOLLOWING MINIMUM DESIGN RESISTANCES FOR 1" DIAMETER RESIN BONDED ANCHORS:
TENSION 22,600 LB., SHEAR 14,000 LB.

BOLT-DOWN BARRIER SHOULD NOT BE INSTALLED ON AC WEARING SURFACE, DUE TO EXCESSIVE BOLT BENDING IN AN IMPACT.

REMOVAL OF ANCHOR BOLTS:
UPON REMOVAL OR RELOCATION OF BARRIER UNITS, REMOVE ALL ANCHOR BOLTS AND COMPLETELY FILL THE REMAINING HOLES IN BRIDGE DECKS AND APPROACH SLABS WITH AN APPROVED PATCHING MATERIAL FROM THE QPL. IF ACP OVERLAY IS PRESENT AND IS TO REMAIN, COMPLETELY FILL THE REMAINING HOLES WITH HOT OR COLD PATCH ASPHALT MATERIAL.

ANCHOR REQUIREMENTS

ON STRUCTURE:
ANCHORED BARRIER:
4 ANCHORS PER BARRIER SEGMENT ON TRAFFIC SIDE, THROUGH BOLTED OR RESIN BONDED.

ON AC SURFACING:
THREE BARRIER SEGMENTS, 1" DIA. VERTICAL PINS PER STD. DWG. RD500, NUMBERS AND LOCATIONS AS SHOWN.

(N) "N" = NUMBER OF ANCHORS OR PINS PER BARRIER SEGMENT, AT LOCATIONS SHOWN.

DAVID EVANS
AND ASSOCIATES INC.
5121 Skyline Village Loop S, Suite 200
Salem Oregon 97308
Phone: 503.361.8655

STAMP

PRELIMINARY

NOT FOR
CONSTRUCTION

CLIENT

TILLAMOOK COUNTY
Land of Clusters, Trees and Ocean Breezes

PROJECT NAME

RENEKE CREEK
REALIGNMENT AND
BRIDGE REPLACEMENT
SANDLAKE ROAD, CLOVERDALE OREGON 97112

REVISIONS

#	DATE	DESCRIPTION

DESIGNED N. Peek

DRAWN D. Altenburg

CHECKED J. Goodall

IN CHARGE J. Goodall

PROJECT NUMBER ESC10000005

ISSUE DATE 06/05/26

SCALE IS AS SHOWN WHEN
PLOTTED TO FULL SIZE (22"x34")

1" = 1'

PHASE

90% PS&E
SUBMITTAL

SHEET TITLE

CONSTRUCTION
STAGING
DETAILS

SHEET NUMBER

B04

SHEET --- OF ###



NOT FOR
CONSTRUCTION



Seal of Tillamook County, Oregon, featuring a ship, a tree, and a sun, with the text "TILLAMOOK COUNTY" and "Land of Clatsop, Trees and Ocean Breeze".

PROJECT NAME: RENEKE CREEK
REALIGNMENT AND
BRIDGE REPLACEMENT
SANDLAKE ROAD, CLOVERDALE OREGON 97112

PROJECT NAME

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DRAWN	D. Altenburg	
CHECKED	J. Goodall	
IN CHARGE	J. Goodall	

PROJECT NUMBER ESCI0000005

ISSUE DATE 06/05/26

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1"

PHASE

90% PS&E

SUBMITTAL

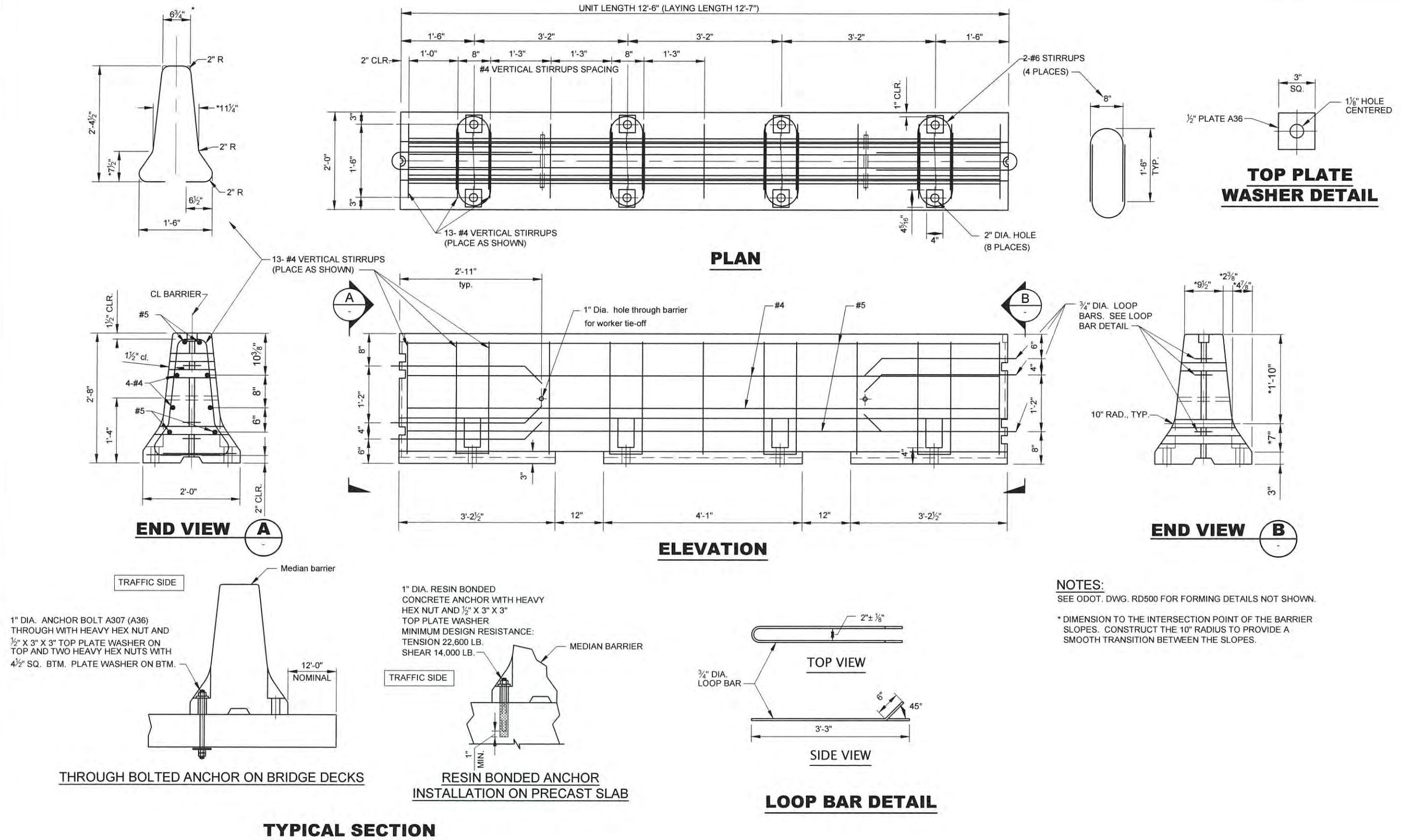
SHEET TITLE

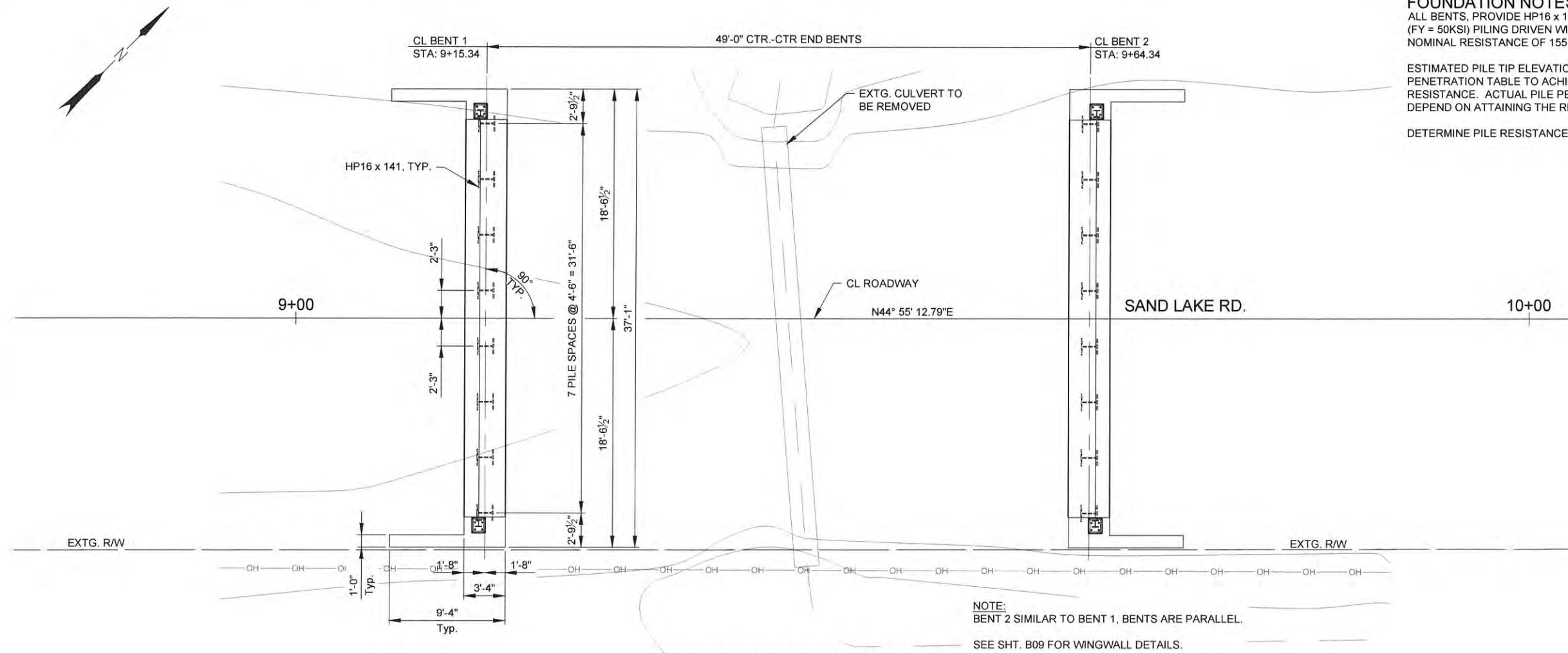
CONSTRUCTION STAGING DETAILS

SHEET NUMBER

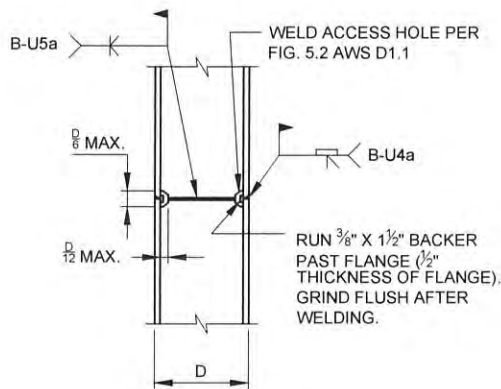
B05

SHEET 5 OF ###





FOUNDATION PLAN
SCALE: 1"=5'-0"



H-PILE SPLICE DETAIL
NO SCALE

FOUNDATION NOTES:
ALL BENTS, PROVIDE HP16 x 141, ASTM A572, GRADE (FY = 50KSI) PILING DRIVEN WITH REINFORCED PILE TIPS, TO A NOMINAL RESISTANCE OF 155 KIPS PER PILE.

ESTIMATED PILE TIP ELEVATIONS ARE PROVIDED IN PILE PENETRATION TABLE TO ACHIEVE THE REQUIRED NOMINAL RESISTANCE. ACTUAL PILE PENETRATION MAY VARY AND WILL DEPEND ON ATTAINING THE REQUIRED DRIVING RESISTANCE.

DETERMINE PILE RESISTANCE USING THE FHWA GATES EQUATION.

PILE PENETRATION TABLE					
BENT	TYPE	MINIMUM TIP ELEVATION (FT.)	ESTIMATED TIP ELEVATION (FT.)	AS-CONST. TIP EL. (FT.)	AVERAGE CUT-OFF ELEVATION (FT.)
1	HP16 x 141	-49.0	-51.0	-	14.52
2	HP16 x 141	-49.0	-51.0	-	14.03

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1" = 1'

PHASE
**90% PS&E
SUBMITTAL**

SHEET TITLE

**FOUNDATION
PLAN**

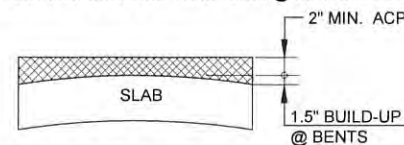
SHEET NUMBER

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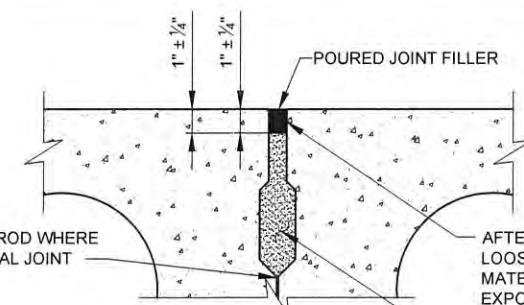
SHEET 6 OF ###

SLAB TYPE		NO. SLABS REQUIRED		SPAN NO.		HORIZONTAL LENGTH O.O AT SLAB , FT. (AFTER SHORTENING)						SKEW ANGLE								ESTIMATED MIDSPAN DEFLECTION							
A	B	7	1	1	1	49'-10 $\frac{1}{4}$ "	0	0	28	2	4.31	3.26	6.0		4.2	31.0	13 $\frac{1}{16}$ "	13 $\frac{1}{8}$ "	-	1 $\frac{1}{8}$ "	1 $\frac{1}{8}$ "	5 $\frac{1}{16}$ "					
B	1	1	1	1	1	49'-10 $\frac{1}{4}$ "	0	0	28	2	4.31	3.26	6.0		4.2	31.0	13 $\frac{1}{16}$ "	13 $\frac{1}{8}$ "	-	1 $\frac{1}{8}$ "	1 $\frac{1}{8}$ "	5 $\frac{1}{16}$ "					

MIN. ACP	2"
ANTICIPATED CAMBER @ 4 MOS	1.37
DOWNWARD DUE TO SIDL	0.1"
VERTICAL CURVE CORRECTION	0.0"
CONSTRUCTION TOLERANCE	0.5"
WEARING SURFACE THICKNESS @ BENTS	3.5"



NO SCALE



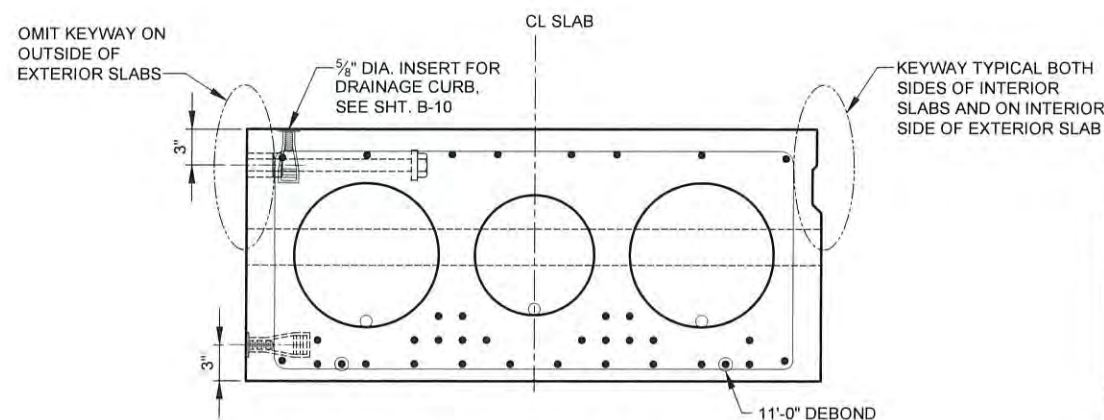
NOTE:
AFTER FORMS ARE REMOVED FROM SLABS,
SAND BLAST KEYWAYS TO REMOVE RESIDUAL
FORM OIL AND OTHER FOREIGN MATERIAL.

— AFTER POURING KEYWAY GROUT, LOOSE GROUT AND OTHER FOREIGN MATERIAL SHALL BE CLEANED FROM EXPOSED KEYWAY

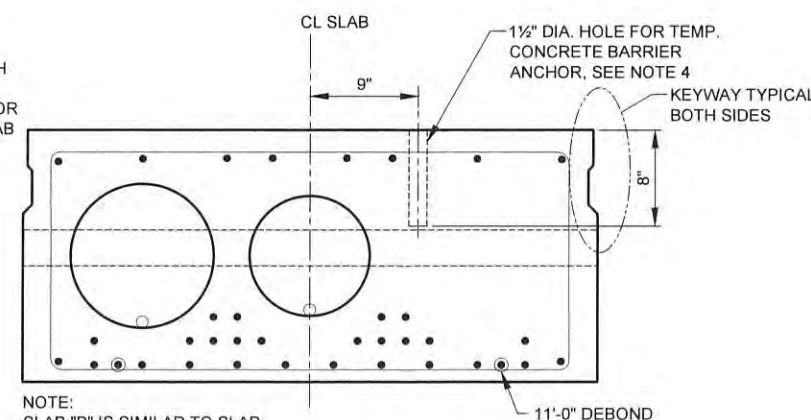
NON-SHRINK OR EXPANDING GROUT.
KEEP KEYWAYS MOIST FOR 24
HOURS PRIOR TO PLACING GROUT.
AFTER PLACING GROUT,
WATER-CURE KEYWAY FOR 72
HOURS OR UNTIL THE GROUT
REACHES DESIGN STRENGTH,
WHICHEVER IS GREATER.

NO SCALE

1. SHOP PLANS SHALL SHOW THE SIZE AND LOCATION OF ALL CAST-IN-HOLES. TO PREVENT DAMAGE TO PRESTRESSING STRAND AND PREFORMED VOIDS, ONLY THE 1½" DIA. HOLE FOR TEMP. CONCRETE BARRIER ANCHOR MAY BE FIELD DRILLED. NO OTHER FIELD DRILLED HOLES ARE PERMITTED IN THE PRESTRESSED SLABS.
2. NO VEHICULAR TRAFFIC SHALL BE ALLOWED ON THE STRUCTURE UNTIL THE KEYWAY GROUT HAS ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI.
3. SEE ODOT STD. DWG. BR233 FOR ANCHOR DEVICE GEOMETRY AND HARDWARE. INSTALL AT EACH RAIL POST.
4. TO FACILITATE INSTALLATION OF TEMPORARY CONCRETE BARRIER AS SHOWN ON SHT. B-04 & B-05, PROVIDE HOLE FOR CONCRETE ANCHORS IN SLAB "B" ONLY. SPACE HOLES TO AVOID CONFLICT WITH DOWELS AND DIAPHRAGMS.
5. CLEARLY MARK EACH END OF SLAB "B". IF 1½" DIA. HOLE FOR TEMP. CONCRETE BARRIER IS FIELD DRILLED, CONFIRM CORRECT SLAB ORIENTATION PRIOR TO DRILLING.

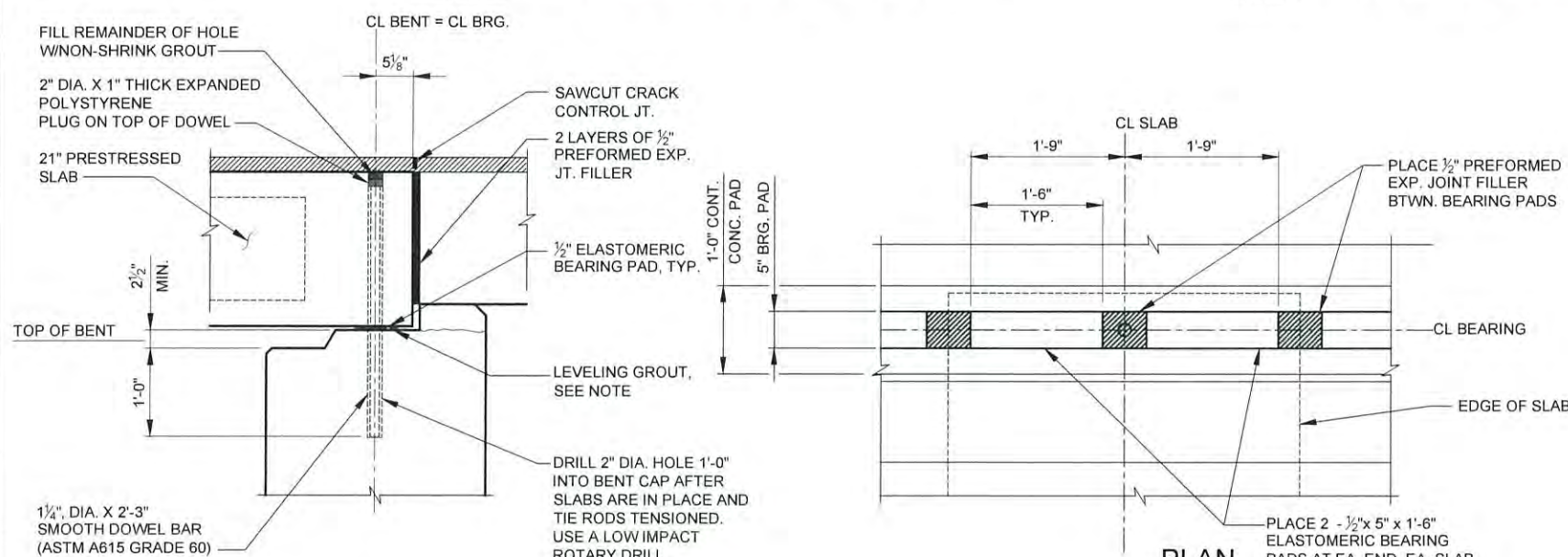


NO SCALE



NOTE:
SLAB "B" IS SIMILAR TO SLAB
"A" EXCEPT AS SHOWN.

NO SCALE



SCALE: 1"=1'-0"

SCALE: 1"=1'-0"

NOTE:
FORM 1½" CONCRETE PAD INTEGRALLY WITH BENT. ALLOW CONCRETE TO CURE 3 DAYS OR UNTIL CONCRETE OBTAINS DESIGN STRENGTH. PLACE ½" GROUT LAYER IMMEDIATELY BEFORE PLACING SLABS. PLACE ELASTOMERIC BEARING PADS, PREFORMED EXPANSION JOINT FILLER AND PRESTRESSED SLABS BEFORE GROUT IS SET TO ENSURE UNIFORM BEARING ACROSS FULL WIDTH OF SLAB. IF UNIFORM BEARING IS NOT ACHIEVED, LIFT SLAB AND REPEAT PROCEDURE. ANY EXCESS GROUT PROTRUDING ABOVE BOTTOM OF BEARING PADS SHALL BE REMOVED IMMEDIATELY AFTER PLACING SLABS.

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REVISIONS

#	DATE	DESCRIPTION
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DESIGNED

DESIGNED
DRAWN

DRAWN
CHECKED

CHECKED

PROJECT NUMBER ESCI0000005

ISSUE DATE 06/05/26

SCALE IS AS SHOWN WHEN
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PHASE

90% PS&E

SUBMITTAL

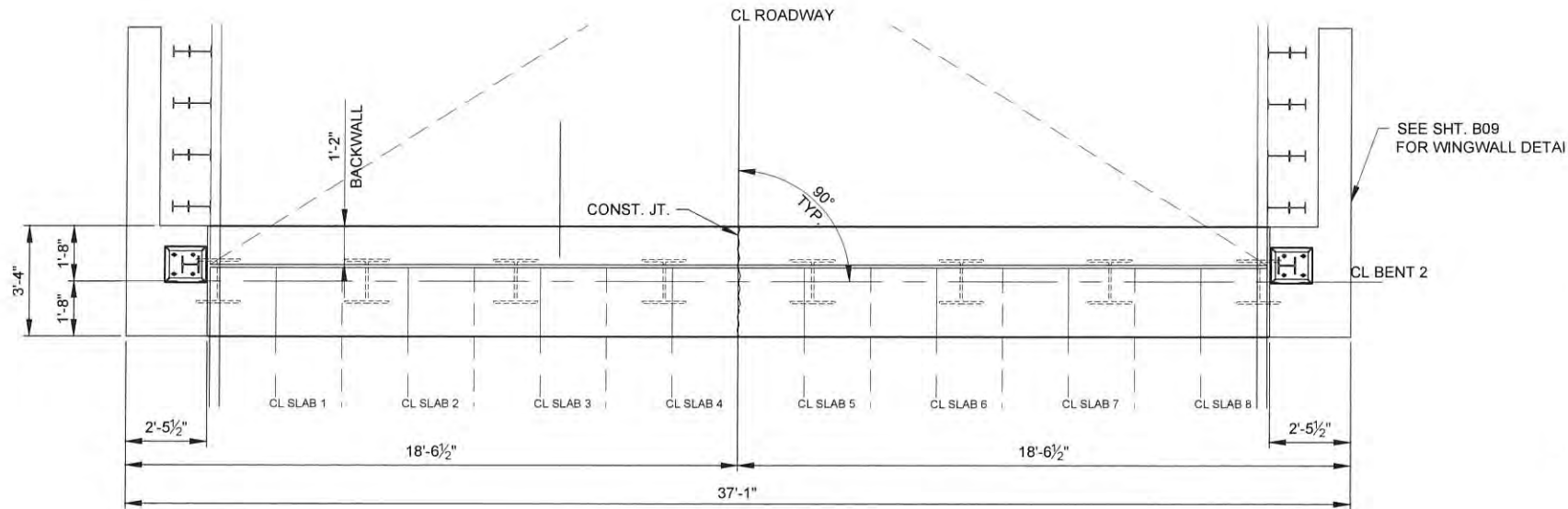
SHEET TITLE

PRECAST SLAB DETAILS

SHEET NUMBER

B07

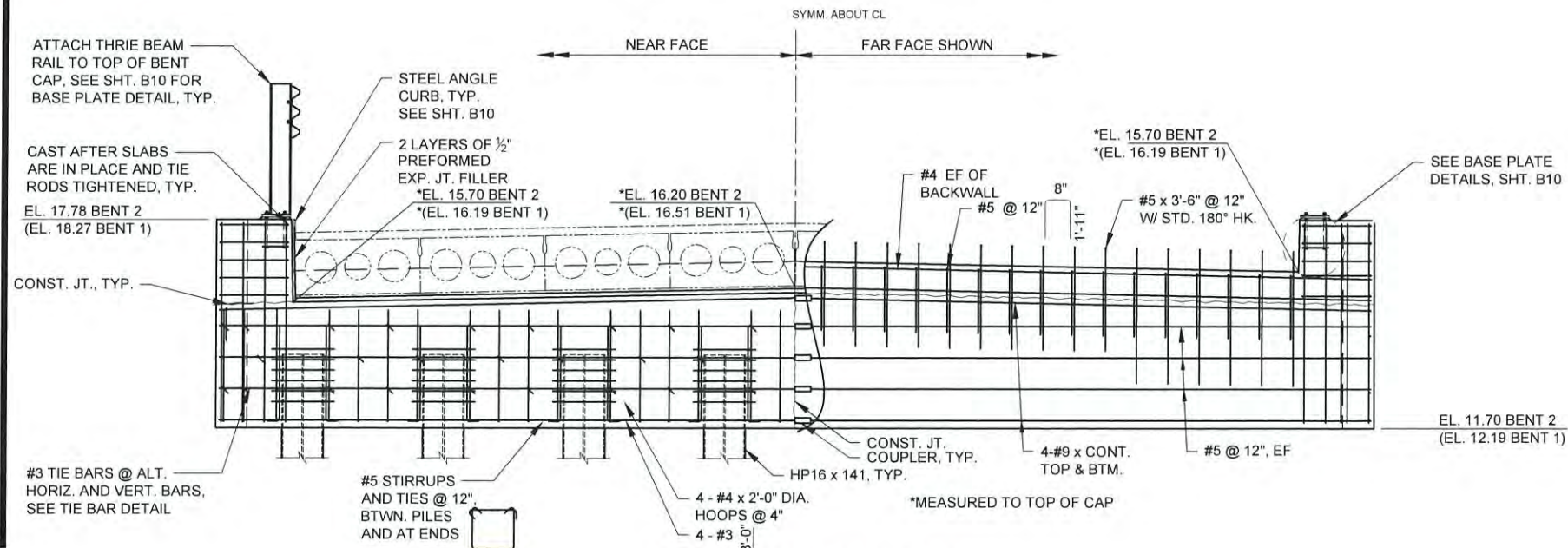
SHEET 7 OF ###



NOTE:
END PANEL, SLABS, AND RAIL
NOT SHOWN FOR CLARITY.

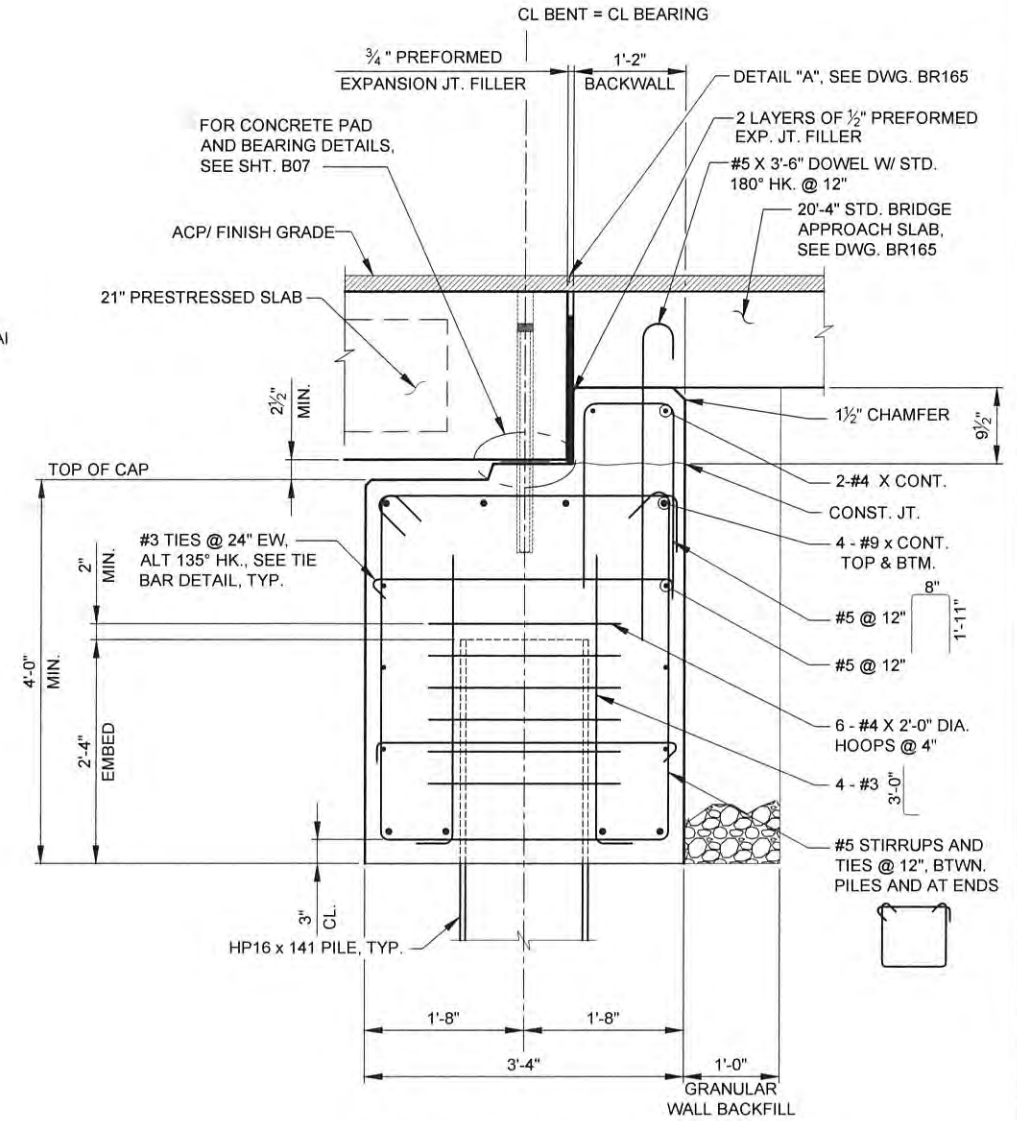
BENT 2 PLAN

SCALE: 3/8"=1'-0"
(BENT 1 SIMILAR, OPPOSITE HAND)



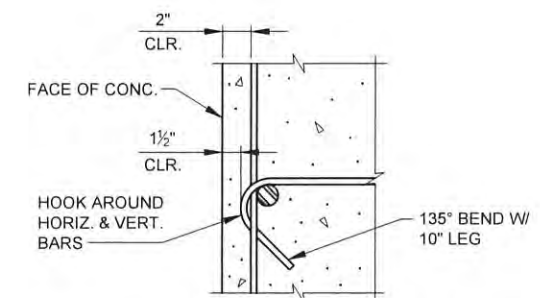
BENT 2 ELEVATION

SCALE: 3/8"=1'-0"
(BENT 1 SIMILAR, OPPOSITE HAND)



TYPICAL BENT SECTION

SCALE: 1"=1'-0"



TIE BAR DETAIL

NO SCALE

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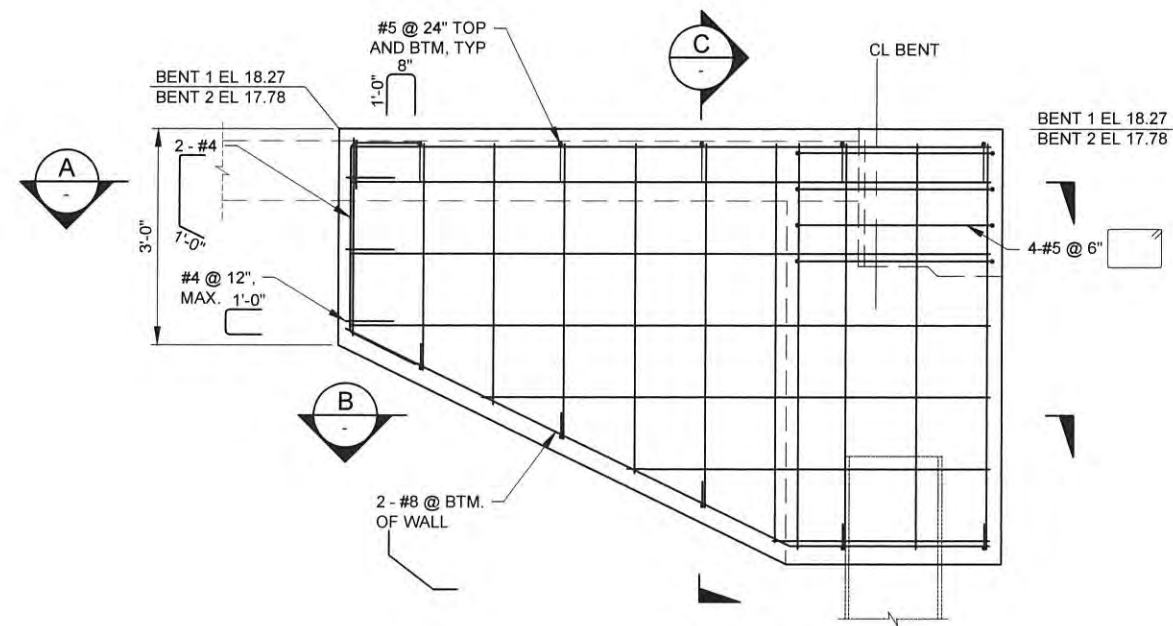
**BENT
DETAILS**

SHEET NUMBER

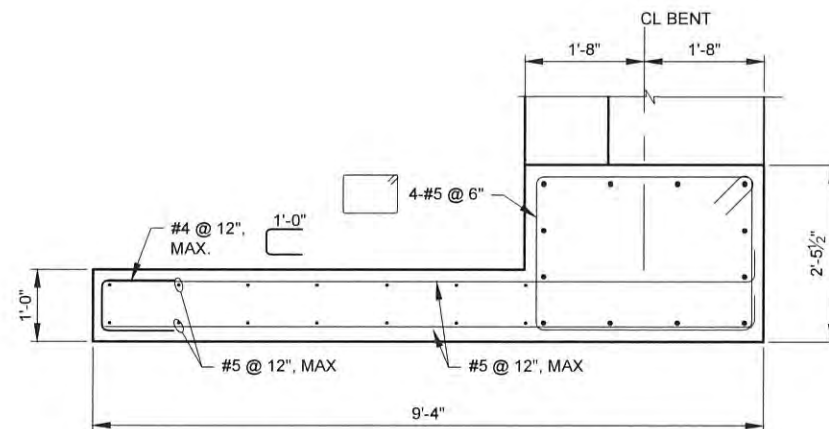
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SHEET 8 OF ###

ODOT B.D.S. NUMBER 8

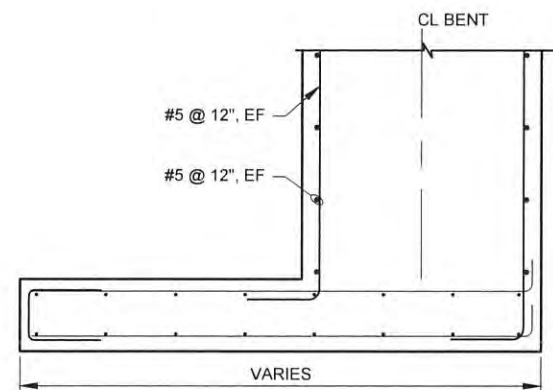


TYPICAL WINGWALL ELEVATION
SCALE: 3/4"=1'-0"



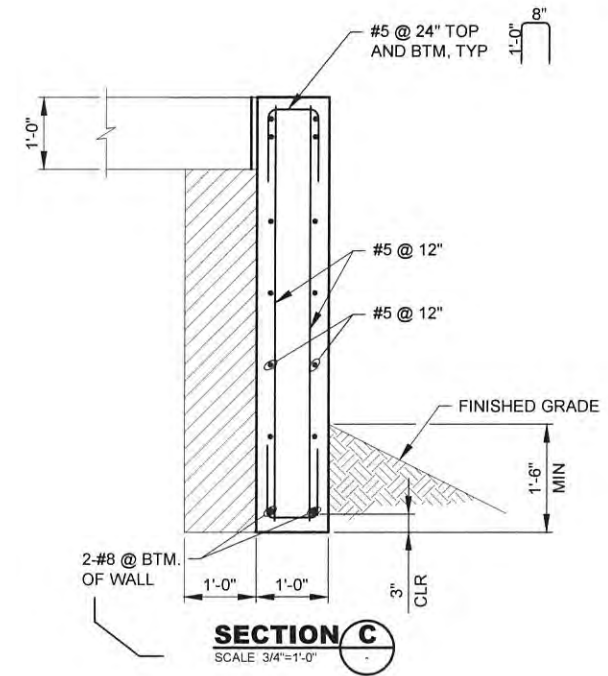
SECTION A
SCALE 3/4"=1'-0"

NOTE: PILE CAP REINFORCING NOT SHOWN FOR CLARITY.



SECTION B
SCALE 3/4"=1'-0"

NOTE: SEE SECTION A FOR DETAILS NOT SHOWN



SECTION C
SCALE 3/4"=1'-0"



DAVID EVANS
AND ASSOCIATES INC.
5121 Skyline Village Loop S, Suite 200
Salem Oregon 97308
Phone: 503 361 8655

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SHEET TITLE

**WINGWALL
DETAILS**

SHEET NUMBER

B09

SHEET 9 OF ###

ODOT B.D.S. NUMBER 9



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**RENEKE CREEK
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DRAWN	D. Altenburg	
CHECKED	J. Goodall	
IN CHARGE	J. Goodall	

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1" ———→

PHASE
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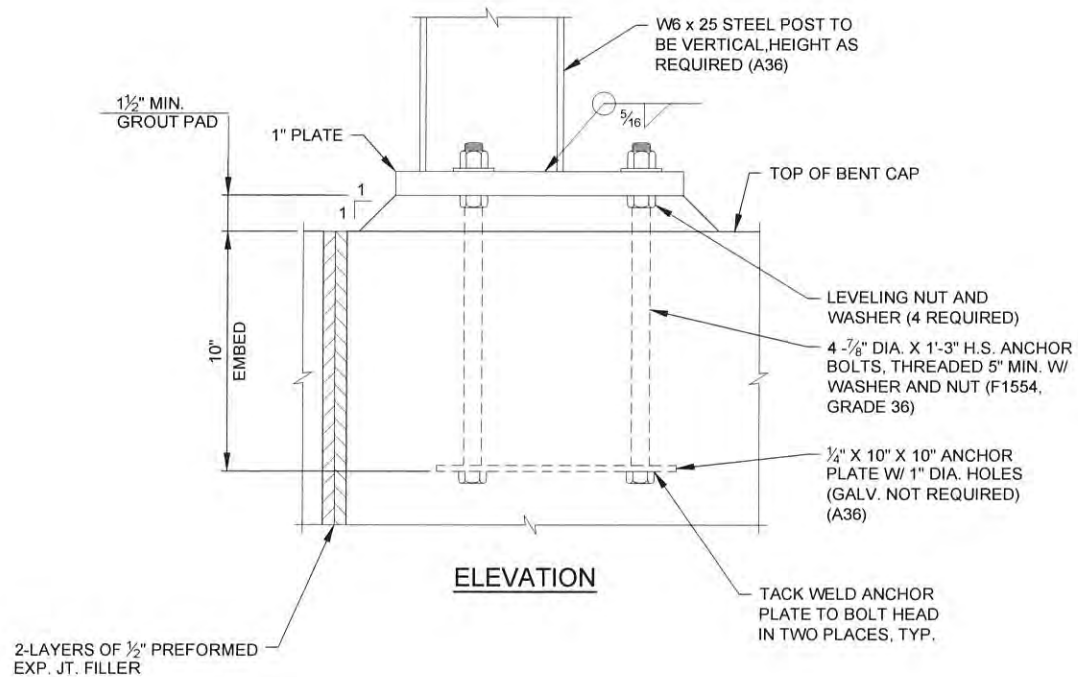
SHEET TITLE

MISCELLANEOUS DETAILS

SHEET NUMBER

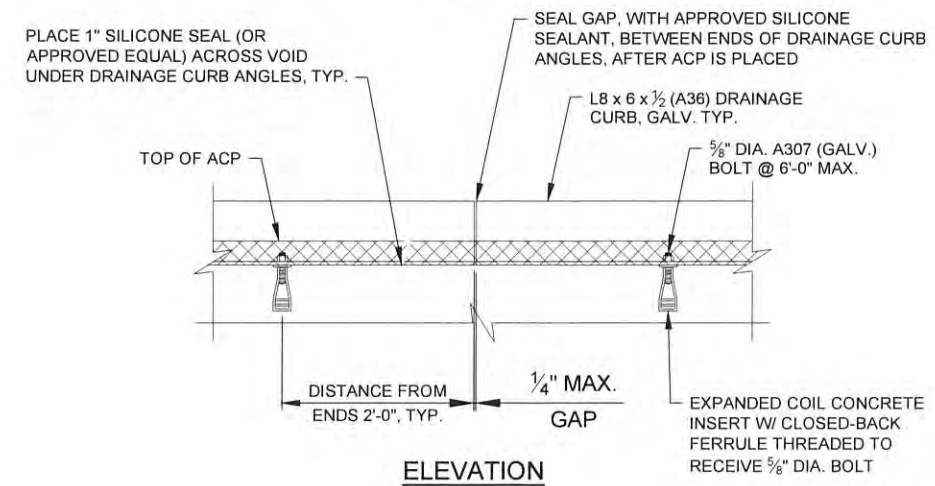
B10

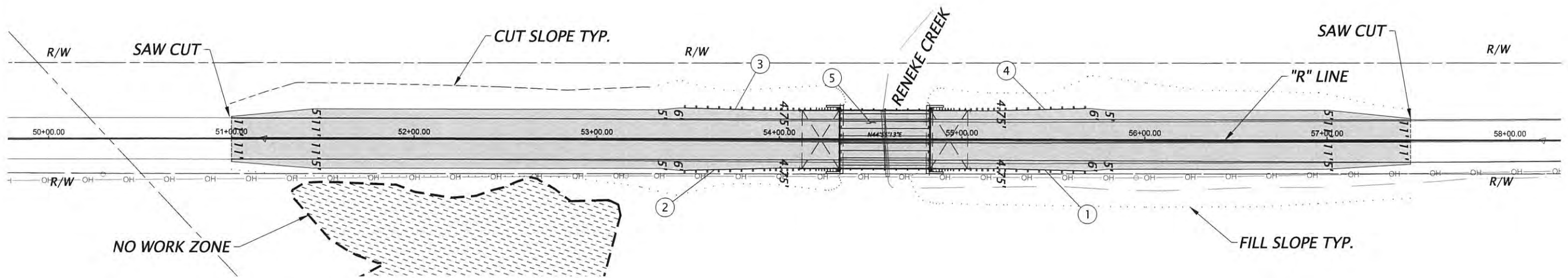
SHEET 10 OF ###



RAIL POST BASE PLATE DETAILS

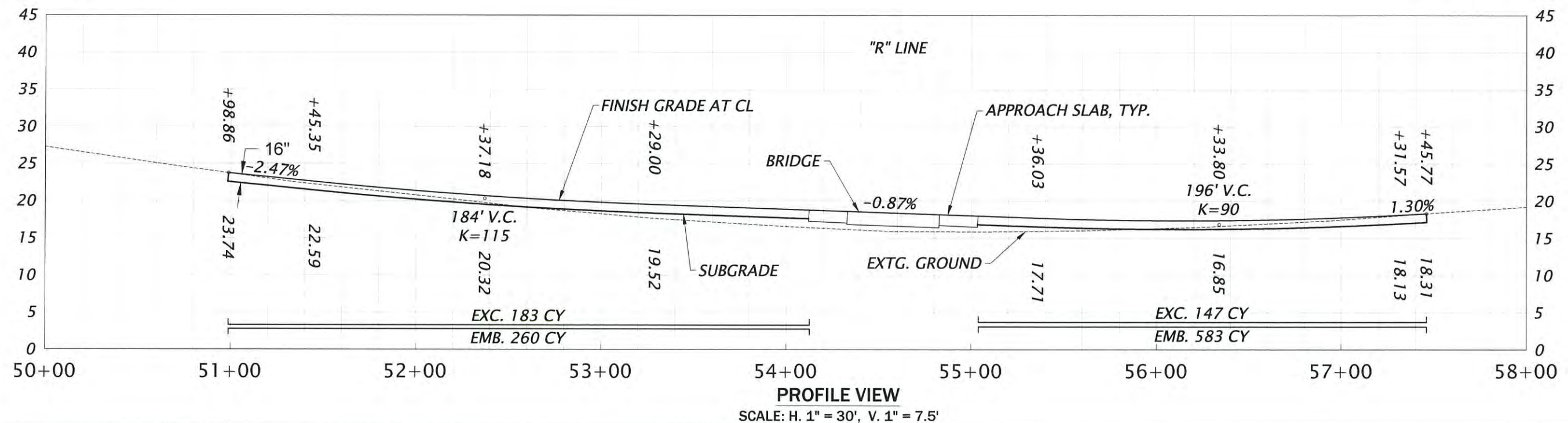
SCALE: 3"=1'-0"





- ① CONST. GUARDRAIL - 12.5' (TYPE 3)
 CONST. GUARDRAIL TO BRIDGE RAIL TRANSITION
 CONST. GUARDRAIL TERMINAL, NON-FLARED
 TEST LEVEL - 3
 W=1, E=0
 (SEE DWG. NOS. BR203, RD402, RD407, RD410, RD416, RD419, RD420, RD442A, RD442B & RD482)
- ② CONST. GUARDRAIL - 12.5' (TYPE 3)
 CONST. GUARDRAIL TO BRIDGE RAIL TRANSITION
 CONST. GUARDRAIL TERMINAL, NON-FLARED
 TEST LEVEL - 3
 W=1, E=0
- ③ CONST. GUARDRAIL - 12.5' (TYPE 3)
 CONST. GUARDRAIL TO BRIDGE RAIL TRANSITION
 CONST. GUARDRAIL TERMINAL, NON-FLARED
 TEST LEVEL - 3
 W=1, E=0

- ④ CONST. GUARDRAIL - 12.5' (TYPE 3)
 CONST. GUARDRAIL TO BRIDGE RAIL TRANSITION
 CONST. GUARDRAIL TERMINAL, NON-FLARED
 TEST LEVEL - 3
 W=1, E=0
- ⑤ REMOVE EXTG. CULVERT
 CONST. STRUCTURE - 49'
 RDWY. WIDTH - 32'
 STRUCTURE NO. ----
 (FOR DETAILS, SEE SHT B-01)



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**RENEKE CREEK
 REALIGNMENT AND
 CULVERT REPLACEMENT**
 SANDLAKE ROAD, CLOVERDALE OREGON 97112

PROJECT NAME

REVISIONS
 # DATE DESCRIPTION

DESIGNED T. DeFord
 DRAWN T. DeFord
 CHECKED S. Sinclair
 IN CHARGE J. Goodall

PROJECT NUMBER ESCI0000005

ISSUE DATE

SCALE IS AS SHOWN WHEN
 PLOTTED TO FULL SIZE (22"x34")

PHASE
 90% PS&E
 SUBMITTAL

SHEET TITLE

**PLAN AND
 PROFILE**

SHEET NUMBER

C-01

SHEET OF ###



PRELIMINARY

NOT FOR
CONSTRUCTION

PROJECT NAME
RENEKE CREEK
REALIGNMENT AND
CULVERT REPLACEMENT
SANDLAKE ROAD, CLOVERDALE OREGON 97112

PROJECT NAME

#	DATE	DESCRIPTION
---	------	-------------

DESIGNED: T. DeFord

DESIGNED	T. DeFord
DRAWN	T. DeFord

DRAWN	T. DeFord
CHECKED	S. Sinclair

CHECKED	S. Sinclair
IN CHARGE	J. Goodall

IN CHARGE J. Goodall

PROJECT NUMBER: EC210000005

PROJECT NUMBER ESCI00000005

ISSUE DATE

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PLACE _____

90% PS&E

SUBMITTAL

SUBMITTAL

SHEET TITLE

1000

TYPICAL

SECTION

SECTION

100

100

SHEET NUMBER

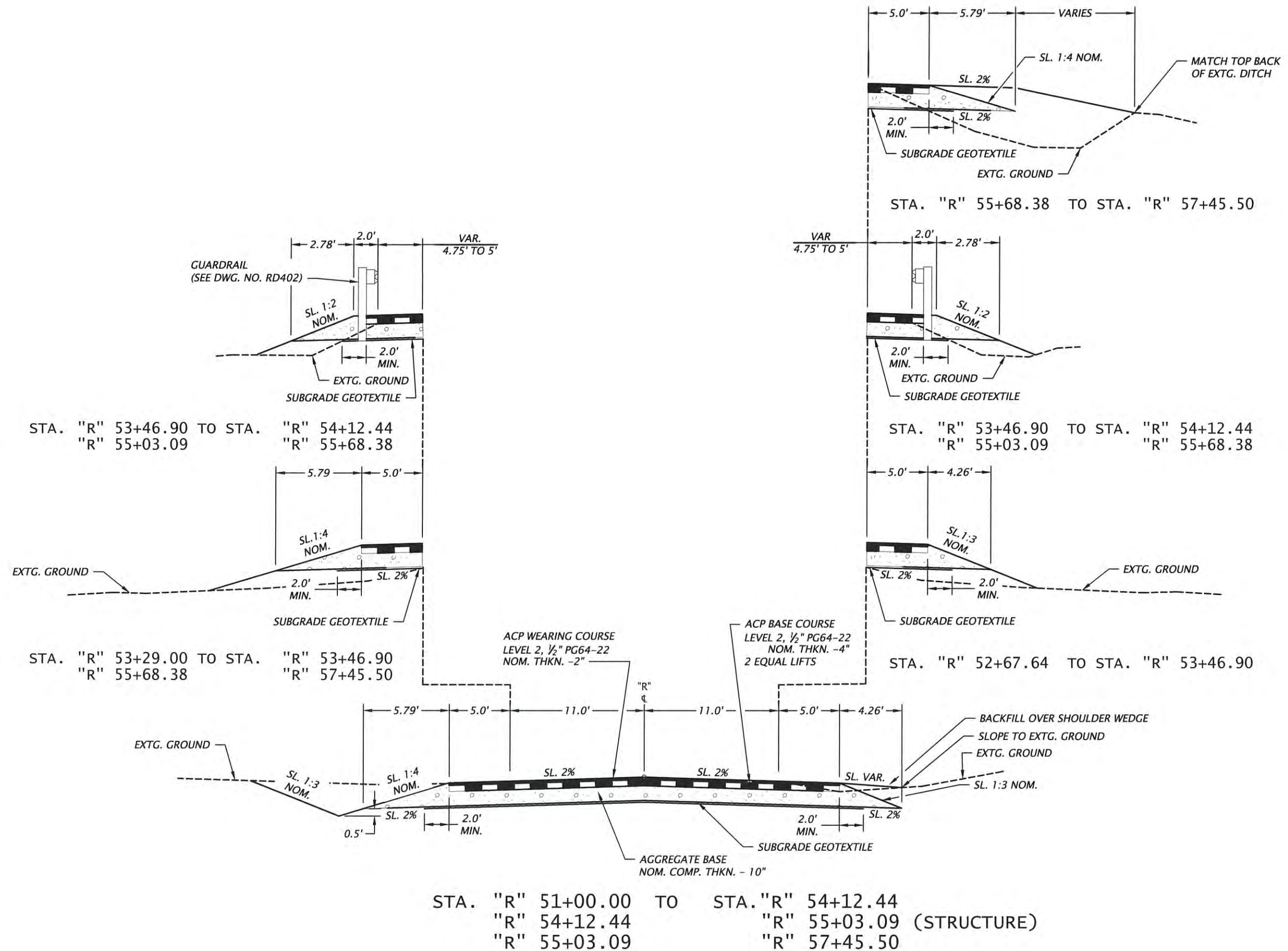
Discussion

BA-01

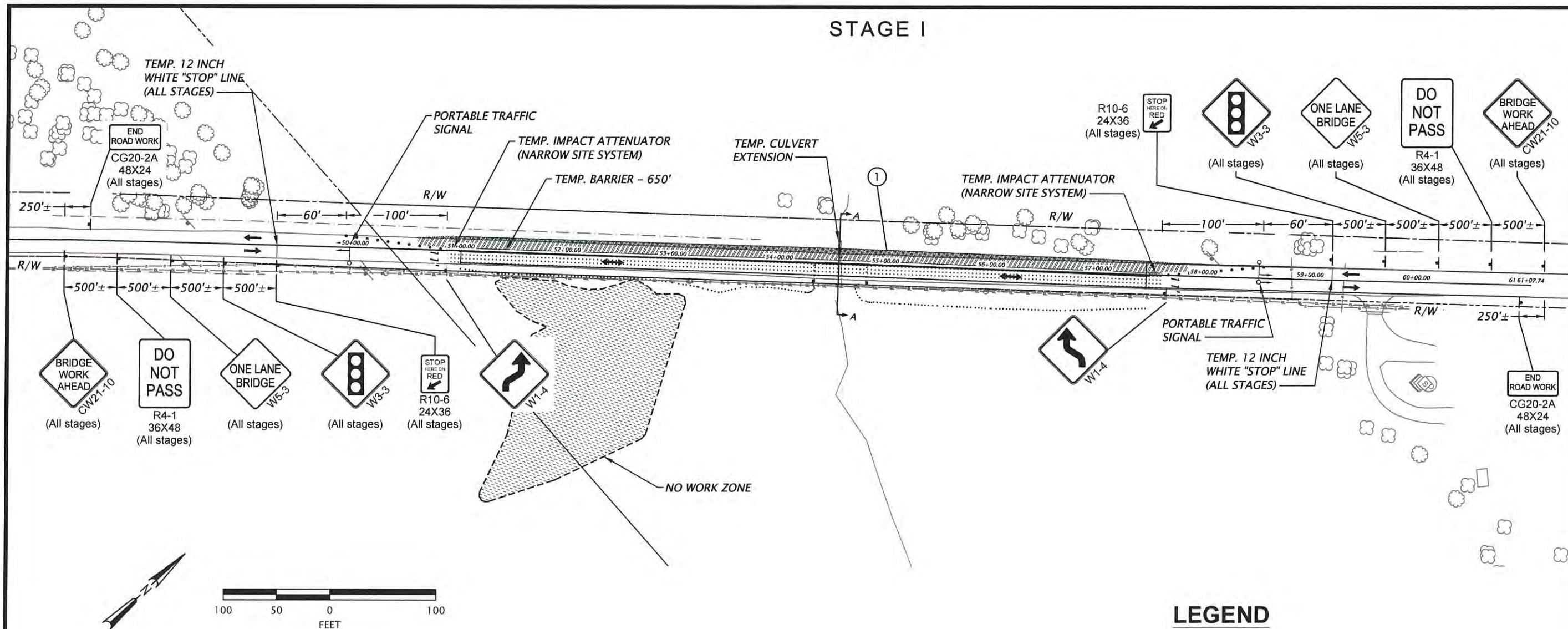
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PAGE 05 OF 000

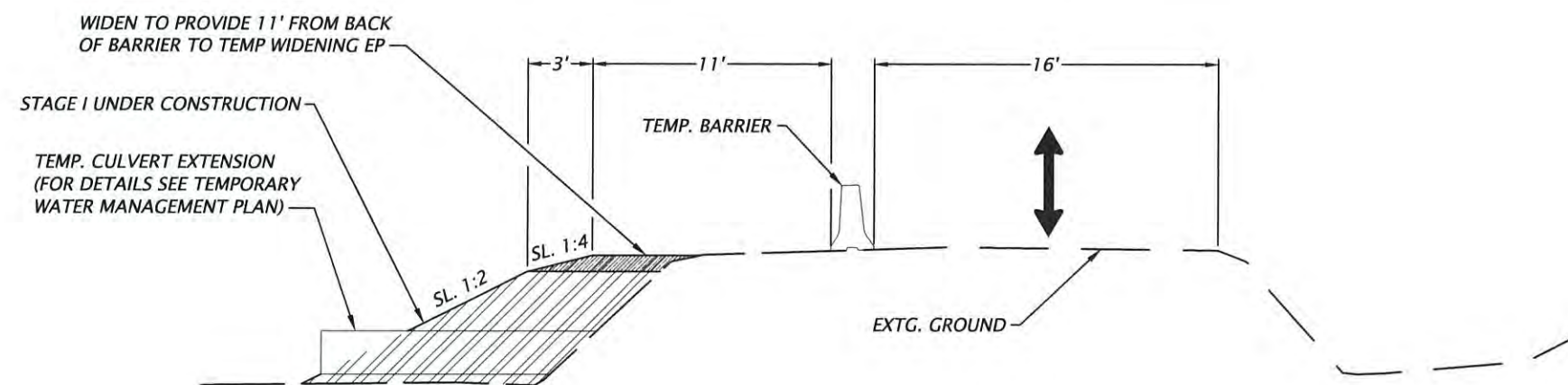
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STAGE 1

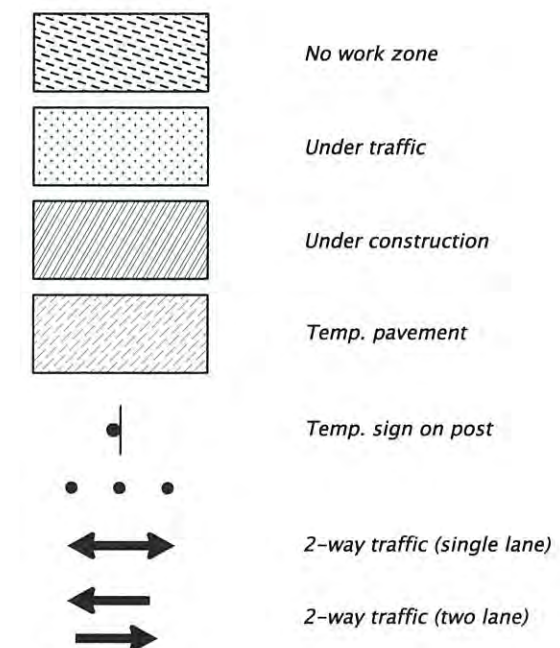


① CONST. TEMP. PAVEMENT WIDENING - 2457 SQ. FT.
TEMP ACP - NOM. THKN. - 3"
TEMP AGGREGATE BASE - NOM. COMP. THKN. - 6"



SECTION A-A

LEGEND



**DAVID EVANS
AND ASSOCIATES INC.**
5121 Skyline Village Loop S, Suite 200
Salem Oregon 97306
Phone: 503.361.8655

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NOT FOR
CONSTRUCTION

CLIENT



ECT NAME

REVISIONS		
#	DATE	DESCRIPTION
DESIGNED	T. DeFord	
DRAWN	T. DeFord	
CHECKED	S. Sinclair	
IN CHARGE	J. Goodall	

PROJECT NUMBER ESCI0000005

ISSUE DATE

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PHASE
90% PS&E
SUBMITTAL

SHEET TITLE

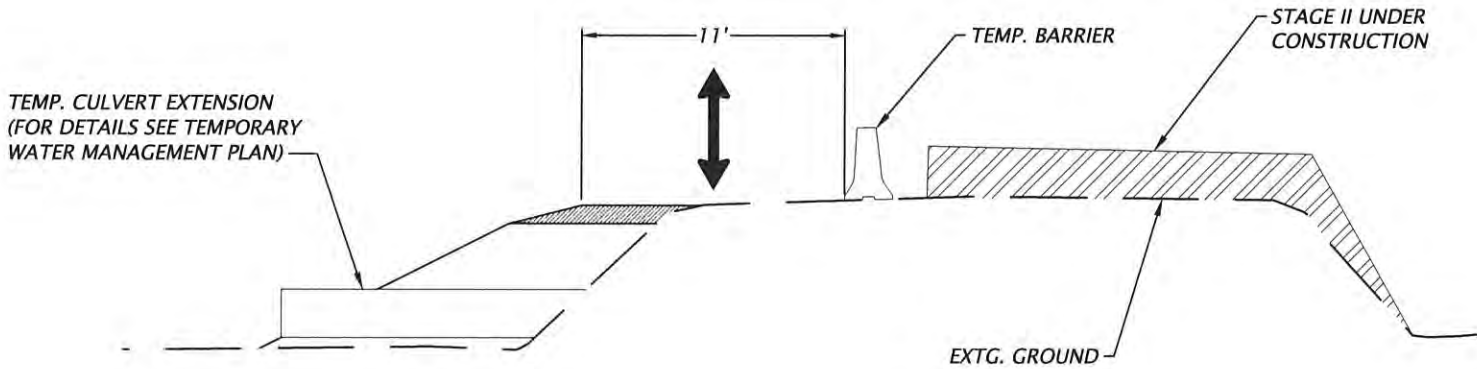
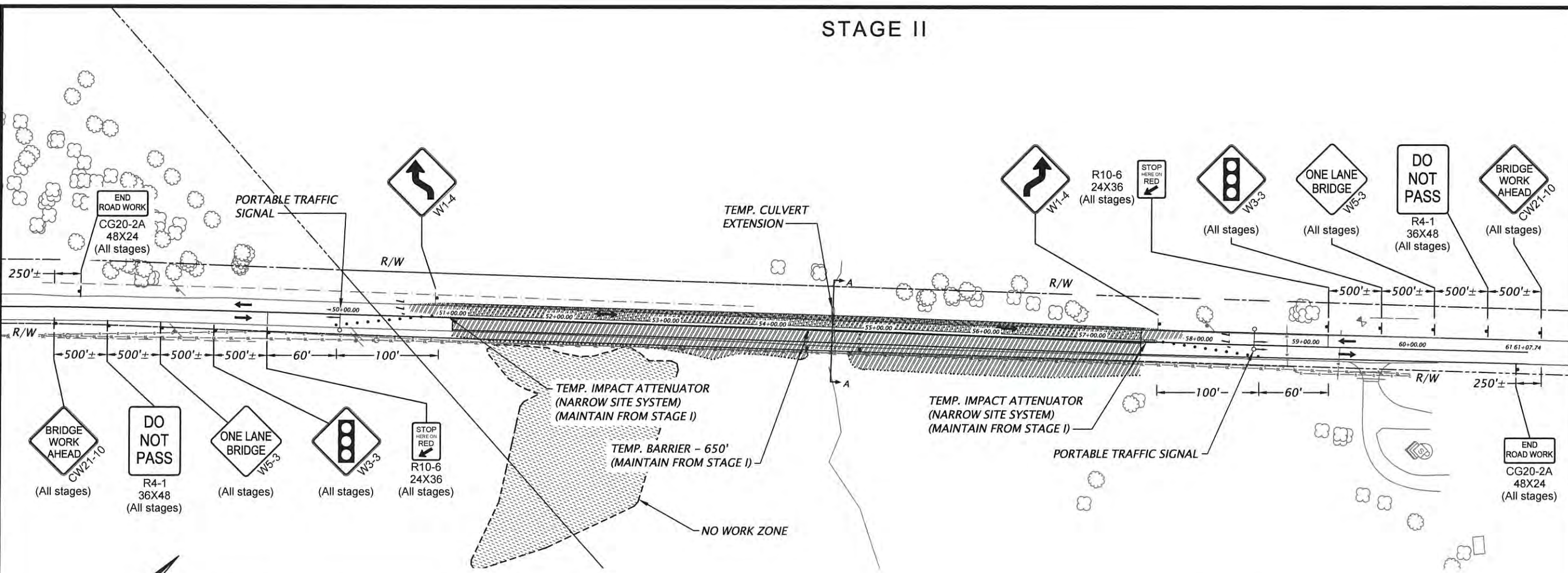
TRAFFIC CONTROL PLAN

SHEET NUMBER

T-01

SHEET OF ###

STAGE II



LEGEND

- No work zone
- Under traffic
- Under construction
- Temp. pavement
- Temp. sign on post
- 2-way traffic (single lane)
- 2-way traffic (two lane)

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AND ASSOCIATES INC.
5121 Skyline Village Loop S, Suite 200
Salem, Oregon 97306
Phone: 503.361.8655

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CLIENT

TILLAMOOK COUNTY
Seal of Tillamook County, Oregon

PROJECT NAME

RENEKE CREEK
REALIGNMENT AND
CULVERT REPLACEMENT

SANDLAKE ROAD, CLOVERDALE OREGON 97112

REVISIONS

#	DATE	DESCRIPTION

DESIGNED T. DeFord

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PHASE

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SHEET TITLE

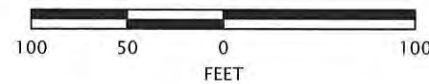
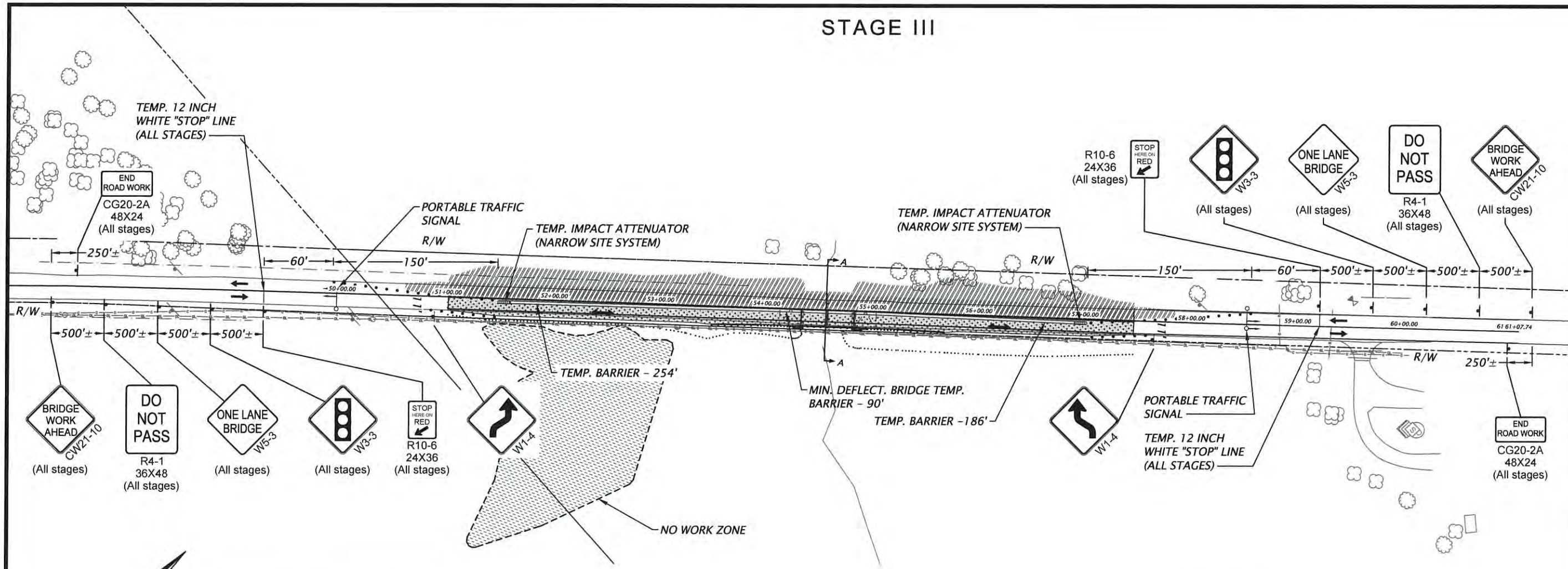
TRAFFIC
CONTROL
PLAN

SHEET NUMBER

T-02

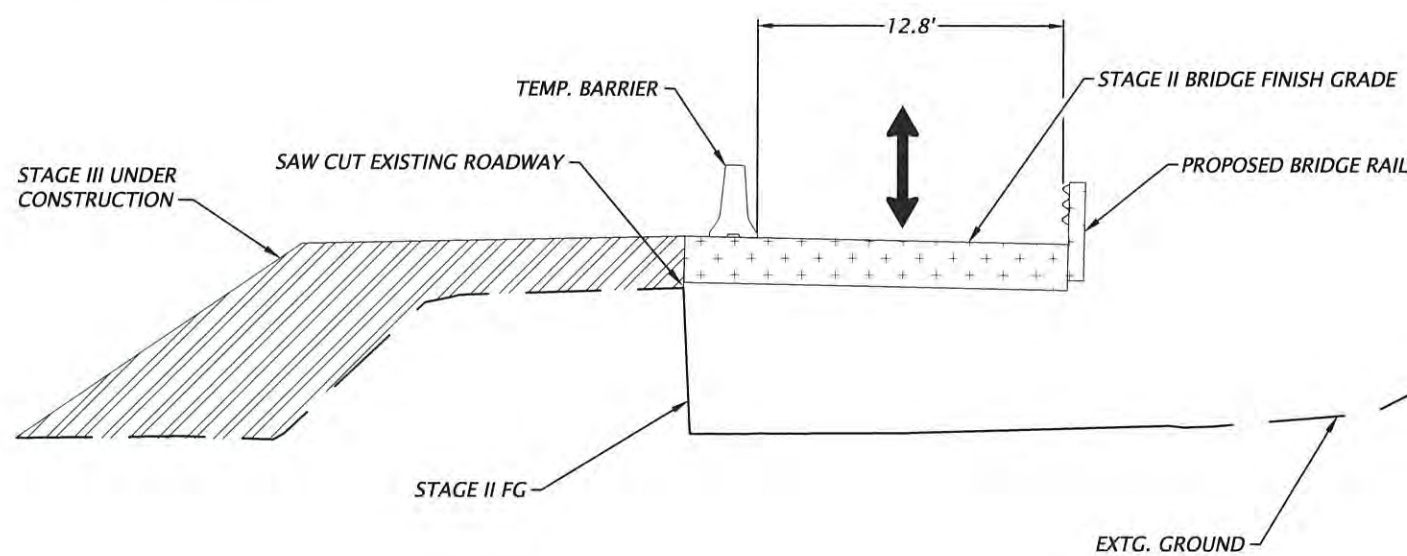
SHEET OF ###

STAGE III



LEGEND

	No work zone
	Under traffic
	Under construction
	Temp. pavement
	Temp. sign on post
	2-way traffic (single lane)
	2-way traffic (two lane)



SECTION A-A



STAMP
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PROJECT NAME
**RENEKE CREEK
REALIGNMENT AND
CULVERT REPLACEMENT**
SANDLAKE ROAD, CLOVERDALE OREGON 97112

REVISIONS		
#	DATE	DESCRIPTION
DESIGNED	T. DeFord	
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CHECKED	S. Sinclair	
IN CHARGE	J. Goodall	

PROJECT NUMBER ESCI0000005

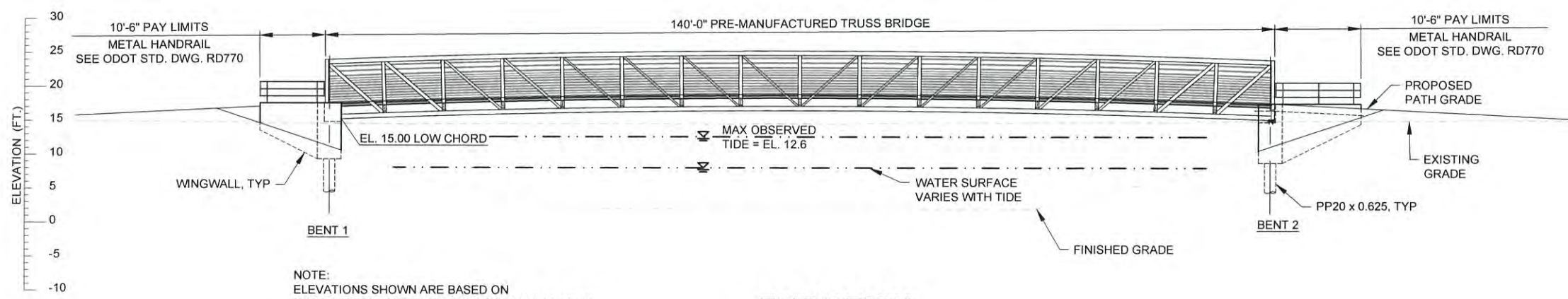
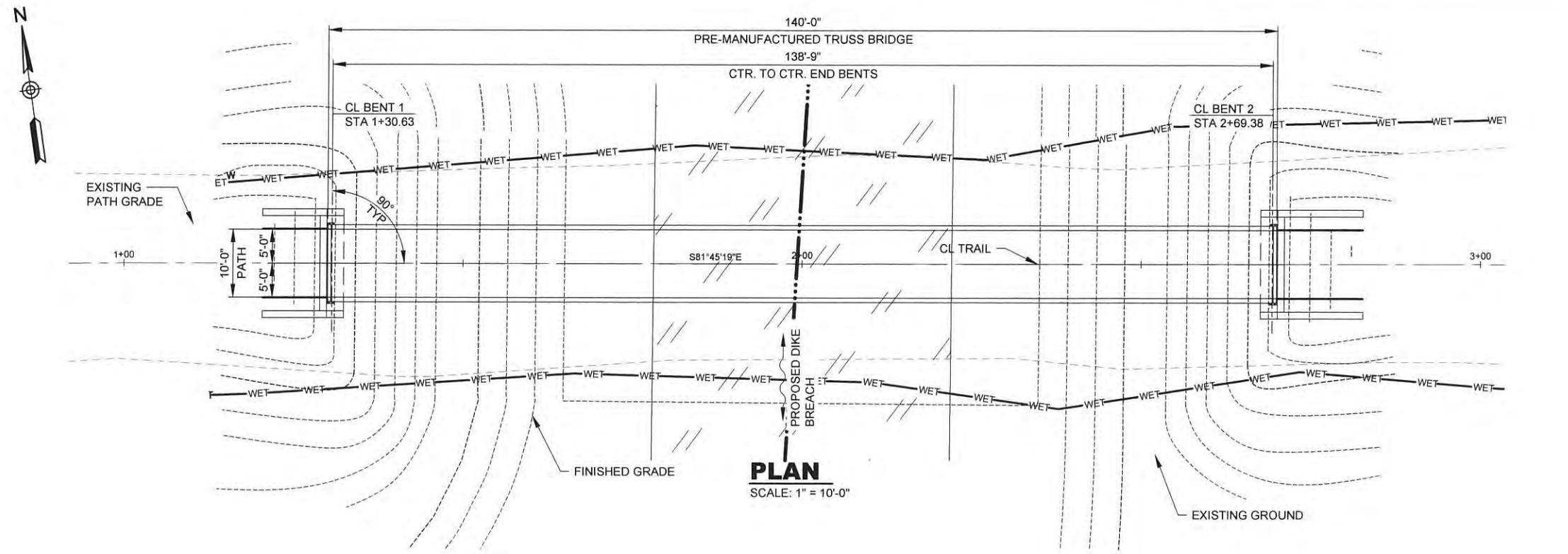
ISSUE DATE

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PHASE
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SUBMITTAL

SHEET TITLE
**TRAFFIC
CONTROL
PLAN**

SHEET NUMBER
T-03
SHEET OF ###



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PRELIMINARY
NOT FOR
CONSTRUCTION



PROJECT NAME
SITKA SEDGE
PEDESTRIAN BRIDGE
SANDLAKE ROAD, CLOVERDALE OREGON 97112

REVISIONS		
#	DATE	DESCRIPTION
DESIGNED	C. DIEHL	
DRAWN	D. ALTENBURG	
CHECKED	J. GOODALL	
IN CHARGE	J. GOODALL	

PROJECT NUMBER ESCI0000005
ISSUE DATE 06/05/26
SCALE IS AS SHOWN WHEN
PLOTTED TO FULL SIZE (22"x34")
1" = 10'-0"

PHASE
90% PS&E
SUBMITTAL

SHEET TITLE
PLAN AND
ELEVATION

SHEET NUMBER
BR01

GENERAL NOTES:

PROVIDE ALL MATERIALS AND PERFORM ALL WORK ACCORDING TO THE "OREGON STANDARD SPECIFICATIONS FOR CONSTRUCTION 2024".

BRIDGE IS DESIGNED IN ACCORDANCE WITH THE 9TH EDITION OF THE "AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS (INCLUDING INTERIM REVISIONS)".

SERVICE AND STRENGTH-I LIMIT STATES:
THE GREATER OF H10 LOAD OR 90PSF PEDESTRIAN LOAD

SEISMIC DESIGN IS PERFORMED IN ACCORDANCE WITH THE "AASHTO GUIDE SPECIFICATIONS FOR LRFD SEISMIC BRIDGE DESIGN" ("AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS"). THE HORIZONTAL PEAK GROUND ACCELERATION COEFFICIENTS (PGA) FOR 1000-YEAR RETURN (NO COLLAPSE) EARTHQUAKE IS 0.755G, BASED ON 2023 USGS SEISMIC HAZARD MAPS. THE BRIDGE SITE IS DEFINED AS A SITE CLASS E WITH SITE FACTOR (FPGA) OF 1.10.

PROVIDE GFRP REINFORCING ACCORDING TO ASTM SPECIFICATIONS D7957 AND D8505, MINIMUM GUARANTEED ULTIMATE TENSILE STRENGTH OF 110KSI. PROVIDE GFRP REINFORCING CONFORMING TO THE MINIMUM STANDARDS SHOWN IN THE TABLE BELOW.

FIBER MASS CONTENT	MOISTURE ABSORPTION IN 24 H AT 50°C [122°F]	MOISTURE ABSORPTION TO SATURATION 50°C [122°F]	ELASTIC MODULUS		MEAN GLASS TRANSITION TEMPERATURE (DSC)		MEAN APPARENT HORIZONTAL SHEAR		MEAN TRANSVERSE SHEAR STRENGTH	
%	%	%	GPa	ksi	°F	°C	psi	MPa	ksi	MPa
≥75	≤0.1	<0.5	60	8700	≥212	≥100	≥6525	≥45	≥26.1	≥180

ALL REINFORCING SPACING IS INTENDED TO BE MAXIMUM UNLESS SHOWN OTHERWISE.

PROVIDE A 3⁄4" CHAMFER ON ALL EXPOSED CONCRETE EDGES UNLESS NOTED OTHERWISE.

PROVIDE CLASS 4000 - 1½", 1", OR ¾" CONCRETE FOR ALL CONCRETE.

SEE FOUNDATION PLAN FOR FOUNDATION DESIGN NOTES.

CONTRACTOR TO FIELD VERIFY ALL DIMENSIONS AND ELEVATIONS PRIOR TO BEGINNING WORK.

WELDING NOTES:

PRODUCE WELDS ACCORDING TO THE LATEST EDITION OF "AWS D 1.5 BRIDGE WELDING CODE".

BOLTING NOTES:

PROVIDE 7⁄8" DIAMETER TYPE 3 WEATHERING HIGH-STRENGTH BOLTS AT STRUCTURAL CONNECTIONS ACCORDING TO ASTM SPECIFICATION F3125 GR A325 UNLESS SHOWN OTHERWISE.

ALL STRUCTURAL STEEL CONNECTIONS ARE SLIP CRITICAL CONNECTIONS WITH CLASS B FAYING SURFACES UNLESS SHOWN OTHERWISE. (BOLT THREADS SHALL BE EXCLUDED FROM SHEAR PLANE.)

TIGHTEN ALL HIGH-STRENGTH BOLTS USING THE "TURN-OF-NUT TIGHTENING" METHOD.

RESIN BONDED ANCHOR NOTES:

PROVIDE AND INSTALL 1¼" DIAMETER GRADE 105 RESIN BONDED ANCHORS WITH HIGH STRENGTH RESIN FROM THE QPL. THE MINIMUM PULLOUT STRENGTH IS 55,000 LBS WITH A MINIMUM EMBEDMENT OF 12IN. INSTALL ANCHORS ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS AND THE SPECIAL PROVISIONS.

PLASTIC LUMBER NOTES:

PROVIDE 2" X 12" OR 2" X 10" PLASTIC LUMBER WITH WOOD GRAIN TEXTURE.

STRUCTURAL STEEL NOTES:

PROVIDE ASTM A572 GRADE 50 STRUCTURAL STEEL PLATES AND SHAPES UNLESS OTHERWISE NOTED.

ALTERNATE MATERIAL DESIGNATIONS ACCEPTABLE UPON APPROVAL BY ENGINEER.

STEEL DIMENSIONS SHOWN ON THE PLANS ARE FOR NET STRUCTURAL STEEL DIMENSIONS. CONTRACTOR SHALL ADJUST GAPS AND SPACINGS AS NECESSARY TO ALLOW FOR THICKNESS OF COATINGS.

STEEL COATING NOTES:

PAINT AND GALVANIZE PREFABRICATED BRIDGE STRUCTURAL STEEL ACCORDING TO SPECIFICATION 00594.

PRODUCE FINISH COAT ON BRIDGE AND RAIL ACCORDING TO FEDERAL COLOR STANDARDS XXX.

COAT PEDESTRIAN RAIL AND ATTACHED STEEL WITH 3-COAT SYSTEM PER SPECIFICATION 00594.

CONSTRUCTION SEQUENCE:

- CONSTRUCT NEW BRIDGE BENTS AND WINGWALLS.
- ERECT NEW BRIDGE.
- INSTALL BRIDGE DECK.

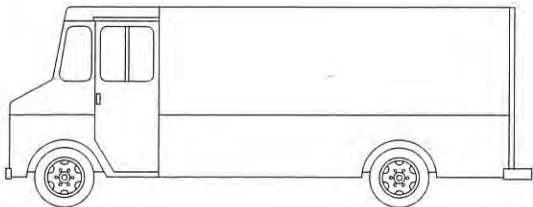
PRE-MANUFACTURED TRUSS BRIDGE NOTES:

PROVIDE A PRE-MANUFACTURED TRUSS BRIDGE MEETING THE FOLLOWING LOAD REQUIREMENTS:

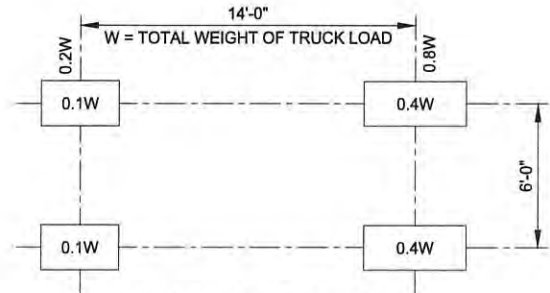
DEAD LOAD (MAX): 42.8 KIP STRENGTH I LIMIT STATE
WIND LOAD (MAX): 29.2 KIP STRENGTH III LIMIT STATE

LOADS ARE PER BENT AND INCLUDE ALL FORCES DUE TO LOADS FROM OR ON THE BRIDGE TRUSS MEMBERS, FLOORBEAMS, STRINGERS, RAILING, DECKING, AND ANY OTHER ELEMENTS DESCRIBED IN THE TYPICAL SECTION SHOWN ON THIS PAGE.

REFER TO THE PROJECT SPECIAL PROVISIONS SECTION 00590 FOR ADDITIONAL REQUIREMENTS AND MATERIAL STANDARDS.

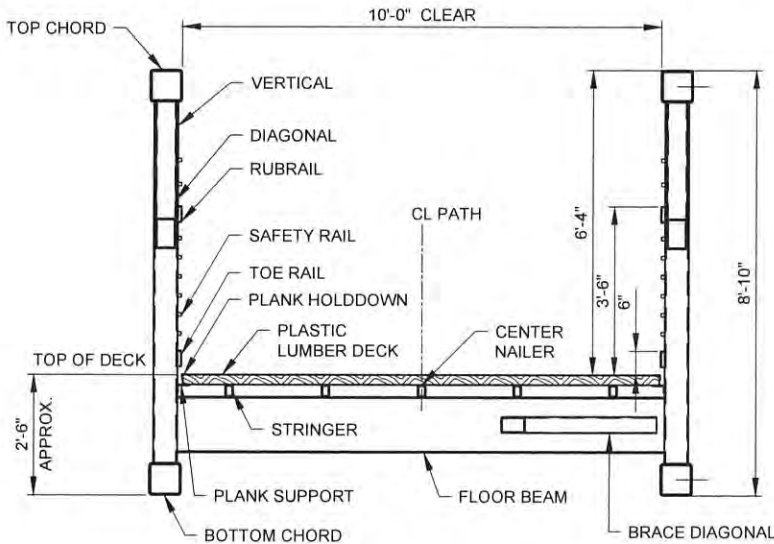


H10 4.0 kips 16.0 kips



H10 TRUCK LOADING

2 Axle Vehicle
Gross Weight = 20K



TYPICAL SECTION

SCALE: 1/2" = 1'-0"



DAVID EVANS
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Phone: 503.361.8655

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CLIENT



PROJECT NAME

SITKA SEDGE
PEDESTRIAN BRIDGE

SANDLAKE ROAD, CLOVERDALE OREGON 97112

REVISIONS

DATE DESCRIPTION

DESIGNED C. DIEHL

DRAWN D. ALTENBURG

CHECKED J. GOODALL

IN CHARGE J. GOODALL

PROJECT NUMBER ESCI0000005

ISSUE DATE 06/05/26

SCALE IS AS SHOWN WHEN
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1" = 1'

PHASE

90% PS&E
SUBMITTAL

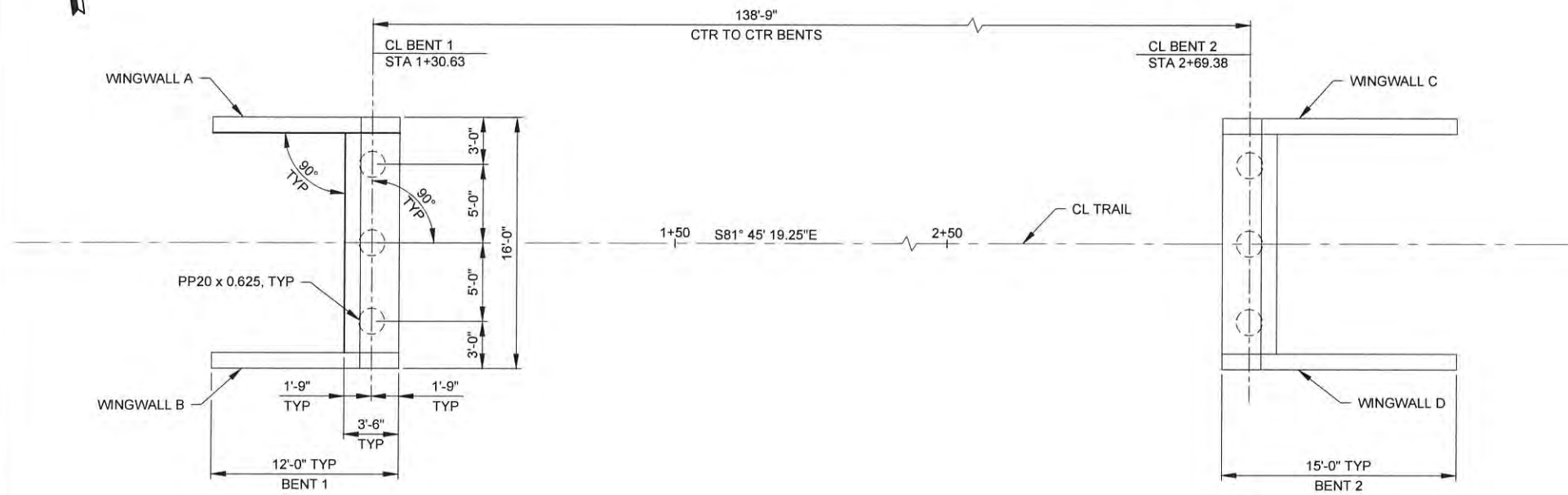
SHEET TITLE

GENERAL
NOTES

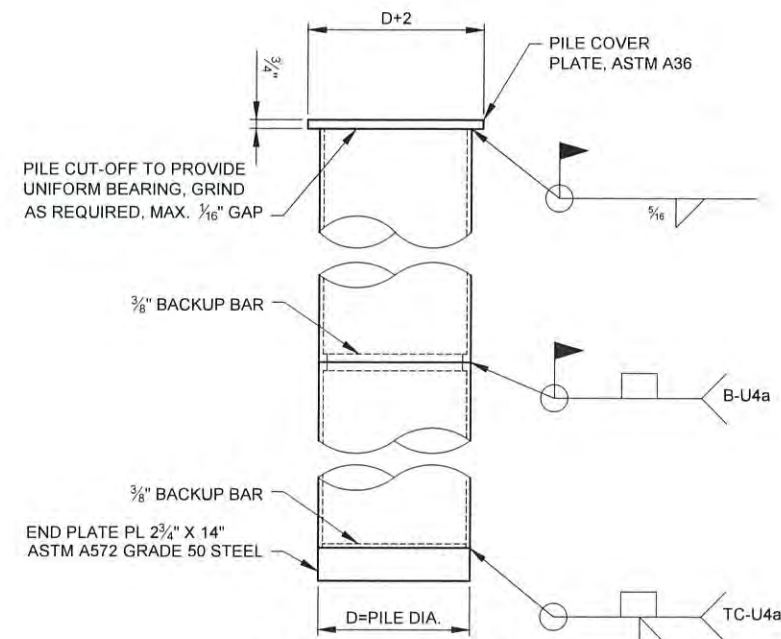
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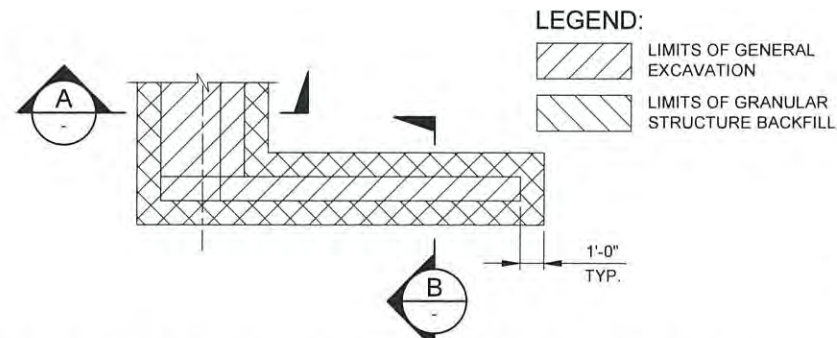
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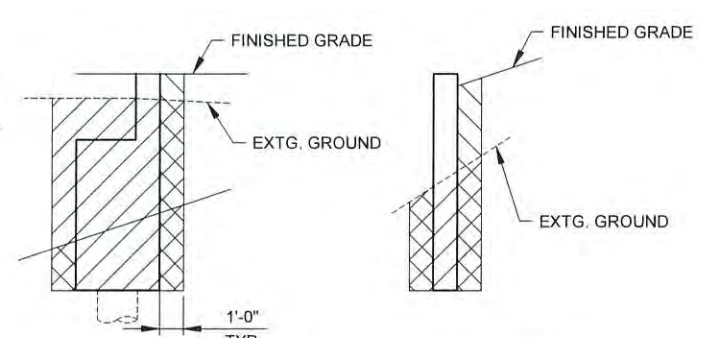
FOUNDATION PLAN
SCALE: 1"=5'-0"



PIPE PILE DETAIL
NO SCALE



EXCAVATION AND BACKFILL DEAGRAM
NO SCALE



SECTION A
NO SCALE

SECTION B
NO SCALE

FOUNDATION NOTES

ALL BENTS, PROVIDE PP20 X 0.5, ASTM A252, GRADE 3. PILING DRIVEN WITH REINFORCED PILE TIPS. DRIVE TO NOMINAL RESISTANCE OF 170 KIPS PER PILE.

ESTIMATED PILE TIP ELEVATIONS ARE PROVIDED IN PILE PENETRATION TABLE TO ACHIEVE THE REQUIRED NOMINAL RESISTANCE. ACTUAL PILE PENETRATION MAY VARY AND WILL DEPEND ON ATTAINING THE REQUIRED DRIVING RESISTANCE.

DETERMINE PILE RESISTANCE USING THE GATES ANALYSIS.

PREBORE HOLES TO MINIMUM TIP ELEVATIONS PRIOR TO DRIVING PILE.

PILE PENETRATION TABLE					
LOCATION	TYPE	MINIMUM TIP ELEVATION (FT.)	ESTIMATED TIP ELEVATION (FT.)	AS CONST. TIP ELEVATION	CUT-OFF ELEVATION
BENT 1	PP20 x 0.625	-60.0	-60.0	-	11.0
BENT 2	PP20 x 0.625	-60.0	-60.0	-	11.0

COAT TOP 15'-0" OF PILES WITH 3-COAT SYSTEM PER SPECIFICATION 00594.

PILE COATING MUST EXTEND TO OR BELOW ELEVATION -2.00.



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SITKA SEDGE
PEDESTRIAN BRIDGE

SANDLAKE ROAD, CLOVERDALE OREGON 97112

PROJECT NAME

REVISIONS
DATE DESCRIPTION

DESIGNED C. DIEHL
DRAWN D. ALTENBURG
CHECKED J. GOODALL
IN CHARGE J. GOODALL

PROJECT NUMBER ESC10000005

ISSUE DATE 06/05/26

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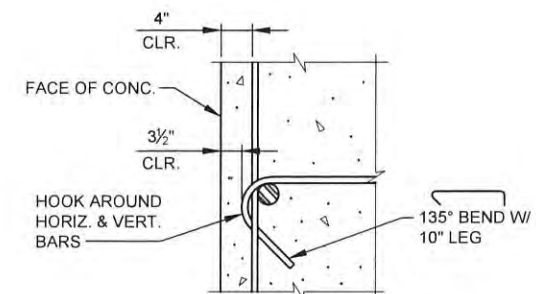
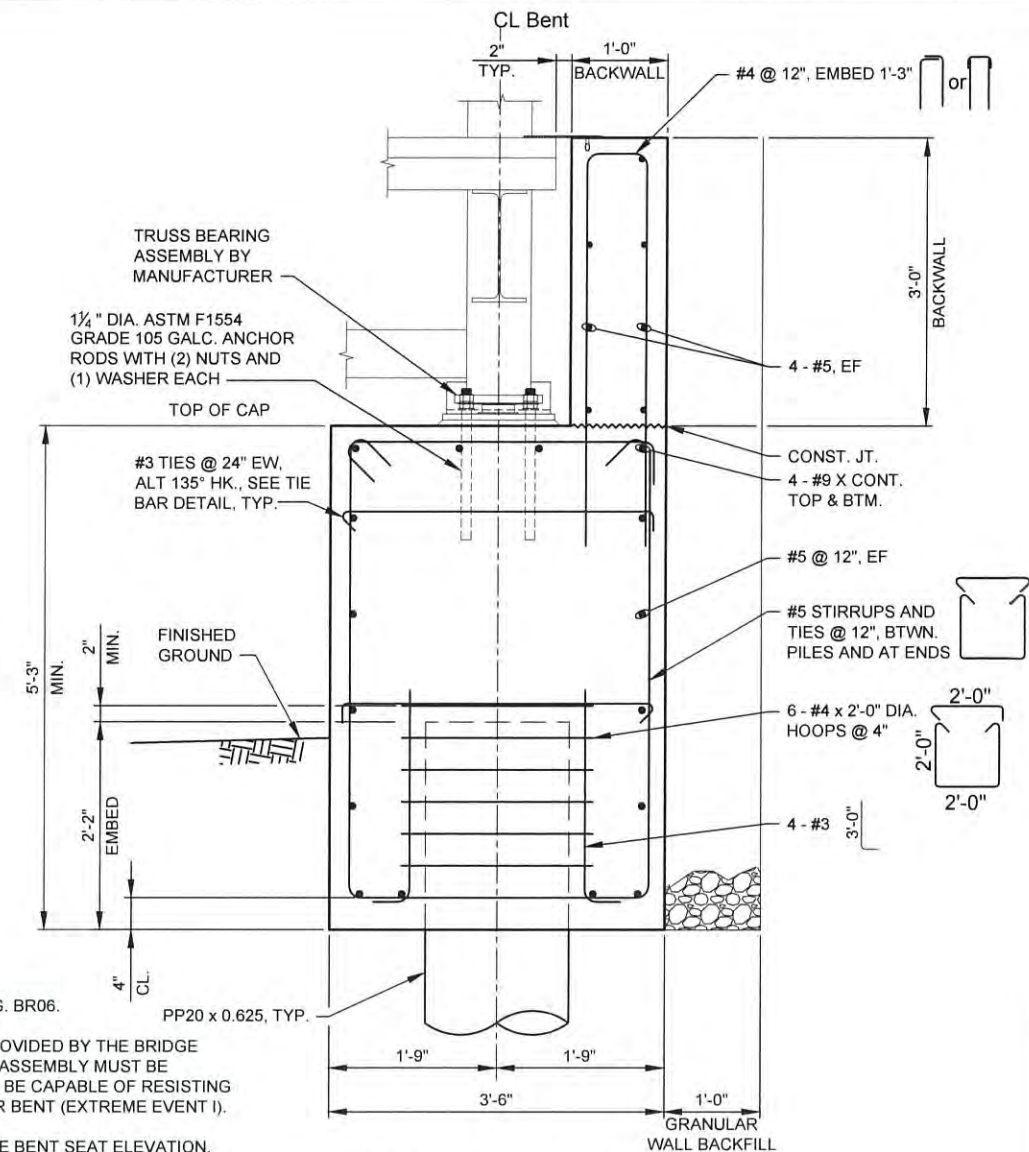
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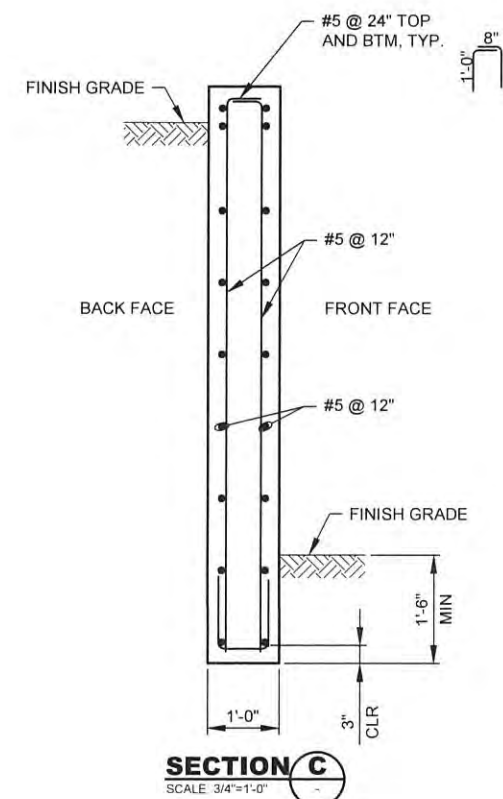
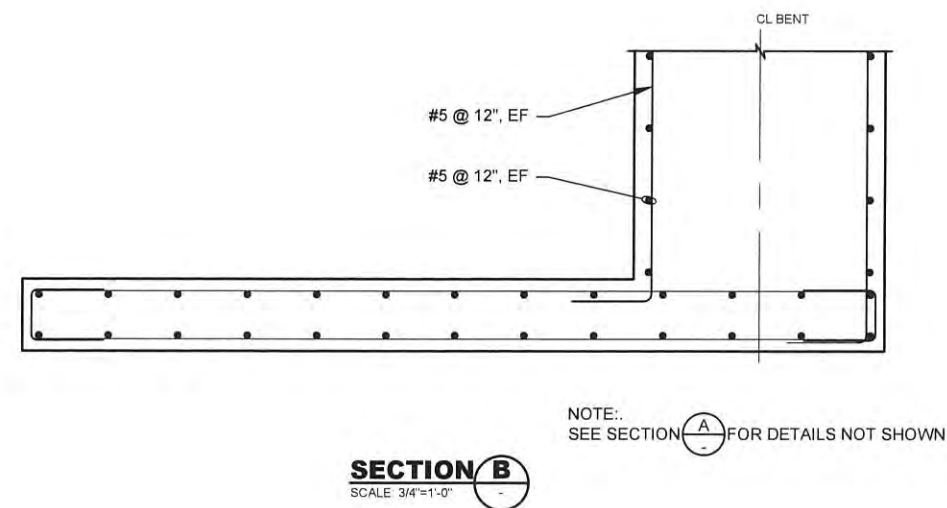
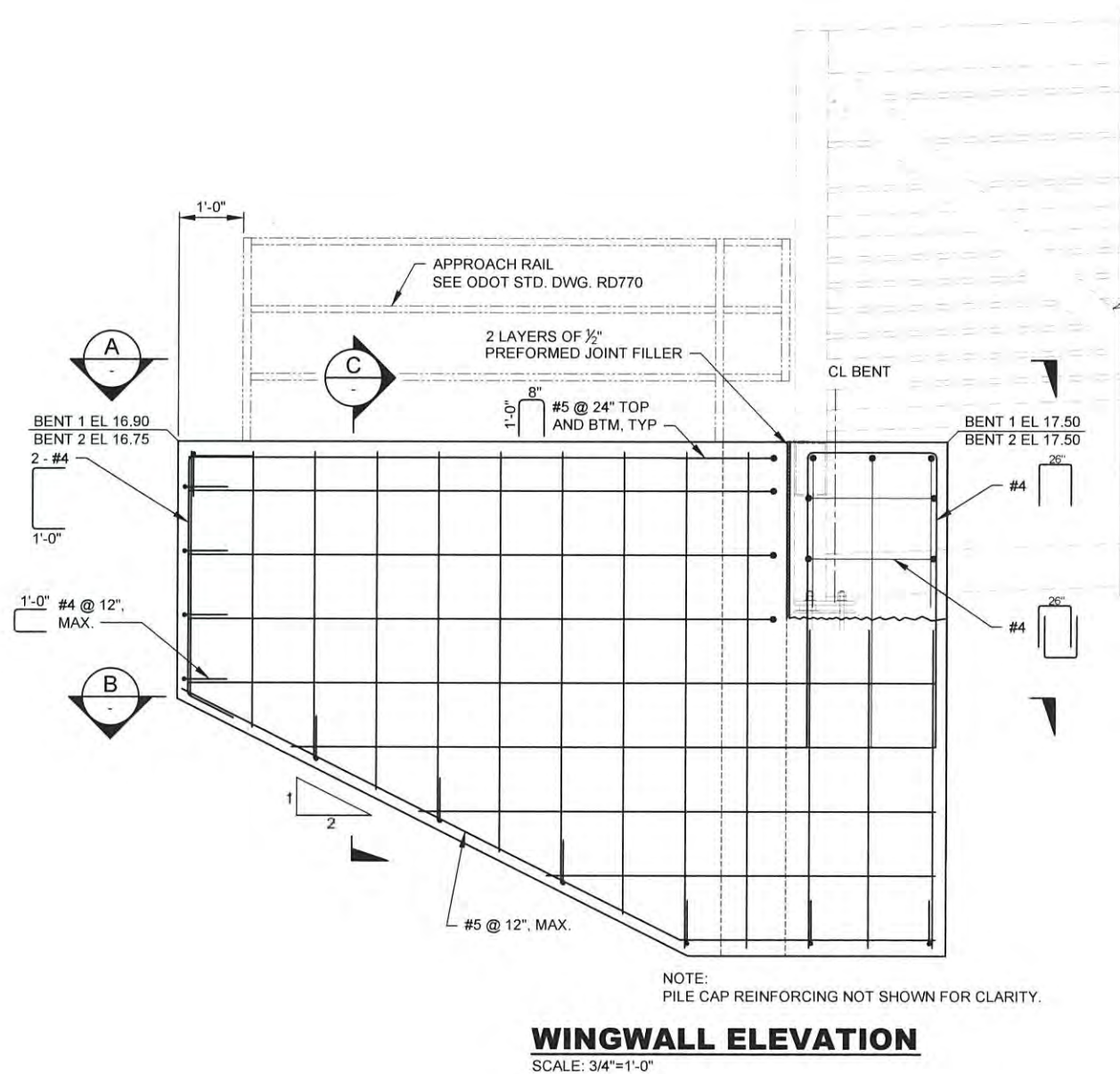
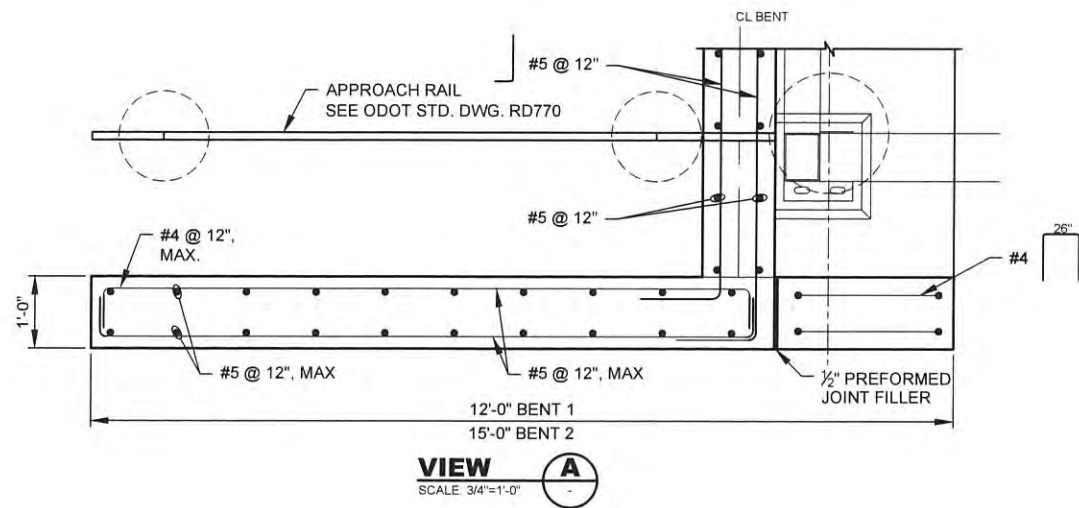
**FOUNDATION
PLAN**

SHEET NUMBER

BR03

SHEET 3 OF 5





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AND ASSOCIATES INC.
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CLIENT

TILLAMOOK COUNTY
County of Clatsop, Tillamook and Ocean Counties

PROJECT NAME

SITKA SEDGE
PEDESTRIAN BRIDGE

SANDLAKE ROAD, CLOVERDALE OREGON 97112

REVISIONS

#	DATE	DESCRIPTION

DESIGNED C. DIEHL
DRAWN D. ALTENBURG
CHECKED J. GOODALL
IN CHARGE J. GOODALL

PROJECT NUMBER ESCI0000005

ISSUE DATE 06/05/26

SCALE IS AS SHOWN WHEN PLOTTED TO FULL SIZE (22"x34")

PHASE 90% PS&E SUBMITTAL

SHEET TITLE

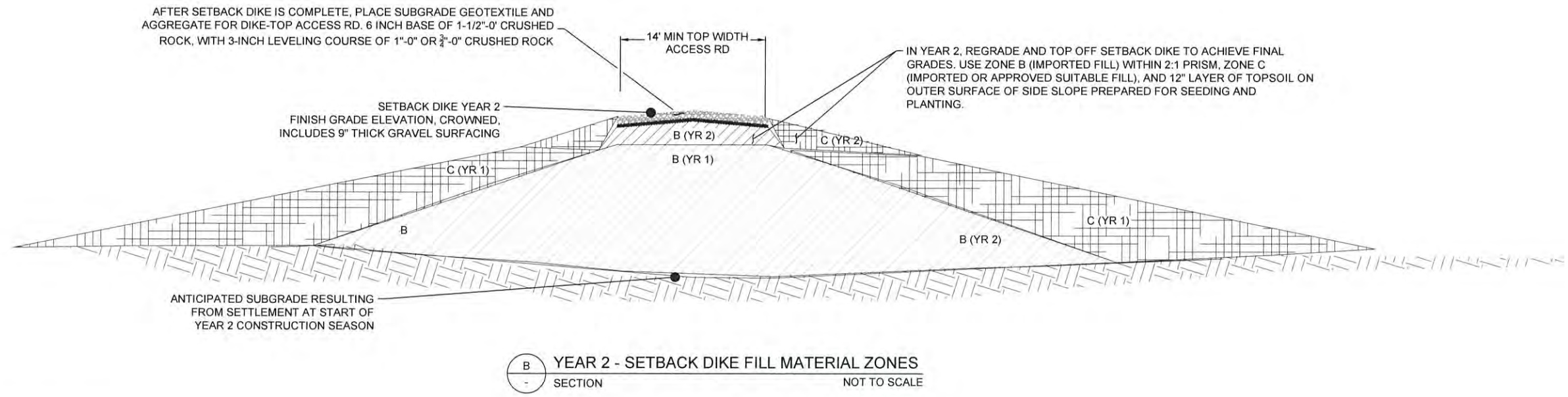
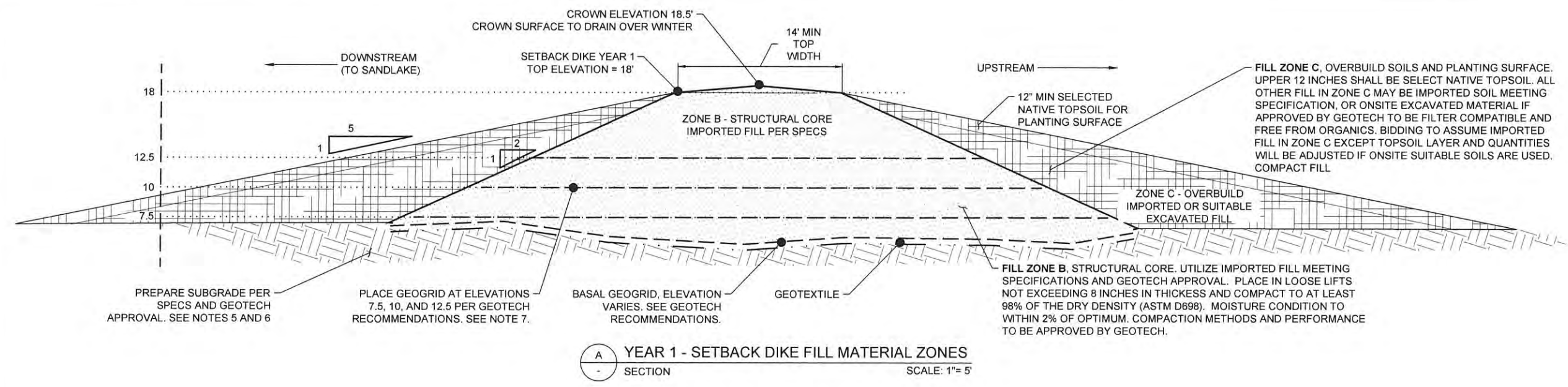
WINGWALL DETAILS

SHEET NUMBER

BR05

SHEET 5 OF 5

FILE: P:\01 CAD\2022\xxxxx\DWG\01 0 SETBACK DIKE TYPICAL SECTION.dwg PLOT DATE: 6/22/2026 10:05:10 AM PLOTTED BY: OLIVIA PEREYRA



SETBACK DIKE CONSTRUCTION NOTES:

1. CONSTRUCT SETBACK DIKE USING IMPORTED FILL AND NATIVE SOIL FROM ONSITE EXCAVATIONS. BIDDING QUANTITIES ASSUME ALL OF ZONE B WILL BE IMPORTED FILL, AND ALL OF ZONE C WILL BE IMPORTED FILL EXCEPT THE 12" LAYER OF TOPSOIL ON OUTER SURFACE OF SIDE SLOPES. IF ONSITE EXCAVATED MATERIAL IS SUITABLE FOR USE IN ZONE C, QUANTITIES WILL BE ADJUSTED ACCORDINGLY.
2. SETBACK DIKE CONSTRUCTION WILL OCCUR OVER TWO YEARS DUE TO ANTICIPATED SETTLEMENT. IN AREAS OF THICK FILL PLACEMENT, SETTLEMENT OF UP TO 2 FEET MAY OCCUR WITHIN THE FIRST 6 MONTHS. GEOTECHNICAL INVESTIGATION REPORTS BY FOUNDATION ENGINEERING ARE AVAILABLE.
3. CONTRACTOR SHALL PROVIDE OPPORTUNITY FOR GEOTECHNICAL ENGINEER TO REVIEW SUBGRADE CONDITIONS, APPROVE SUBGRADE AND SUBGRADE STABILIZATION MEASURES, EVALUATE EXCAVATED SOILS AND IMPORTED FILL SOURCES TO CHARACTERIZE OR VERIFY SOIL CHARACTERISTICS, OBSERVE COMPACTION METHODS AND RESULTS, ANALYZE SETTLEMENT MONITORING DATA, AND UPDATE GEOTECHNICAL RECOMMENDATIONS FOR YEAR 2 OF CONSTRUCTION BASED ON SETTLEMENT DATA AND CONDITIONS.
4. CONTRACTOR SHOULD EXAMINE GROUND CONDITIONS AND TEST ITS ABILITY TO SUPPORT CONSTRUCTION EQUIPMENT PRIOR TO MOBILIZING EQUIPMENT TO THE SITE. LOW-GROUND PRESSURE EQUIPMENT MAY BE REQUIRED IN WET AND SOFT AREAS OF THE SITE, INCLUDING WITHIN THE SETBACK DIKE FOOTPRINT. GEOTECHNICAL RECOMMENDATIONS SUGGEST COMPLETING EARTHWORK DURING DRY SUMMER AND EARLY FALL MONTHS (TYPICALLY JULY-OCTOBER) TO ENCOUNTER DRIER SOILS AND FACILITATE AERATING AND MOISTURE CONDITIONING OF FILL MATERIALS.
5. CLEARING, GRUBBING, AND STRIPPING: AREAS TO RECEIVE FILL SHALL BE STRIPPED TO A DEPTH THAT IS SUFFICIENT TO REMOVE EXISTING SURFACE VEGETATION AND

- ORGANIC SOIL, TRUCK, STUMP, ROOT BALL, ROOTS GREATER THAN 1/2 INCH DIAMETER AND ANY OTHER DELETERIOUS MATERIALS. THE RESULTING VOIDS SHOULD BE BACKFILLED WITH DIKE EMBANKMENT MATERIALS AND COMPACTED TO A DENSITY EQUAL TO THE SURROUNDING SOIL. PRIOR TO BACKFILL AREAS SHOULD BE FREE OF STANDING WATER. STRIPPING DEPTHS OF UP TO 12 INCHES ARE ANTICIPATED IN HEAVILY VEGETATED AREAS. STRIPPED ORGANIC SOILS WILL NOT BE SUITABLE FOR DIKE EMBANKMENT, BUT MAY BE REUSED AS TOPSOIL WHERE SHOWN.
6. SUBGRADE PREPARATION: AFTER CLEARING, GRUBBING, AND STRIPPING, THE SUBGRADE WITHIN THE SETBACK DIKE FOOTPRINT SHOULD BE ROLLED AND COMPACTED USING A TAMPING FOOT ROLLER TO BREAK UP SEEPAGE PATHWAYS. HAVE SUBGRADE EVALUATED BY GEOTECH. AREAS THAT PUMP, HEAVE, OR APPEAR SOFT OR MUDDY SHOULD BE SCARIFIED, DRIED, AND COMPACTED, OR ELSE OVER-EXCAVATED TO AND ENGINEER APPROVED SUBGRADE AND BACKFILLED WITH DIKE EMBANKMENT MATERIALS. LIMIT OVER-EXCAVATION TO A DEPT OF 2 FEET BELOW THE SURFACE OF STRIPPED SUBGRADE.
7. INSTALL MULTIPLE LAYERS OF GEOGRID (MIRAGRID 5XT OR EQUIVALENT) IN SETBACK DIKE EMBANKMENT INCLUDING A BASAL LAYER ON THE PREPARED SUBGRADE SURFACE, OR BOTTOM OF OVEREXCAVATION (IF PERFORMED), AS WELL AS AT ELEVATIONS 7.5', 10', AND 12.5 IN THE DIKE PRISM. THE BASAL LAYER OF GEOGRID SHOULD COVER THE ENTIRE DIKE FOOTPRINT (ZONES B AND C) AND WILL VARY IN ELEVATION DEPENDING ON THE ELEVATION OF PREPARED SUBGRADE. ADDITIONAL LAYERS OF GEOGRID CAN BE LIMITED TO THE EXTENT OF ZONE B (2:1 INTERNAL PRISM). IN AREAS WHERE THE BASAL GEOGRID IS WITHIN 6 INCHES VERTICALLY OF THE NEXT HORIZONTAL GEOGRID, THE HORIZONTAL GEOGRID MAY BE OMITTED. SEE SPECS AND GEOTECH REPORT FOR ADDITIONAL CRITERIA FOR GEOGRID PLACEMENT.
8. UTILIZE FILL MATERIAL SOURCES BASED ON SOIL TYPE AND CHARACTERISTICS, IN THE CROSS-SECTIONAL FILL ZONES IDENTIFIED ON THIS PLAN.

- 8.1. FILL ZONE B, STRUCTURAL CORE (2:1 SLOPE PRISM). UTILIZE IMPORTED FILL MEETING SPECIFICATIONS AND GEOTECH APPROVAL. PLACE IN LOOSE LIFTS NOT EXCEEDING 8 INCHES IN THICKNESS AND COMPACT TO AT LEAST 98% OF THE DRY DENSITY (ASTM D698). MOISTURE CONDITION TO WITHIN 2% OF OPTIMUM. COMPACTION METHODS AND PERFORMANCE TO BE APPROVED BY GEOTECH.
- 8.2. FILL ZONE C, OVERBUILD SOILS AND PLANTING SURFACE. UPPER 12 INCHES SHALL BE SELECT NATIVE TOPSOIL GENERATED FROM ONSITE EXCAVATIONS. ALL OTHER FILL IN ZONE C MAY BE IMPORTED SOIL MEETING SPECIFICATION, OR ONSITE EXCAVATED MATERIAL IF APPROVED BY GEOTECH TO BE FILTER COMPATIBLE AND FREE FROM ORGANICS. BIDDING TO ASSUME IMPORTED FILL IN ZONE C EXCEPT TOPSOIL LAYER AND QUANTITIES WILL BE ADJUSTED IF ONSITE SUITABLE SOILS ARE USED.
9. DURING YEAR 1, BUILD SETBACK DIKE EMBANKMENT TO INITIAL HEIGHT, INCLUDING MINIMUM DIMENSIONS OF TIDE GATE PRELOADING FILL MOUND. INCORPORATE SETTLEMENT MONITORING PLATES AND SURVEY PER SPECS. APPROXIMATELY 2 FEET OF SETTLEMENT MAY BE ANTICIPATED IN AREAS OF DEEP FILL. PROVIDE SETTLEMENT MONITORING DATA TO ENGINEER FOR GEOTECH REVIEW AND USE IN UPDATING LONG-TERM SETTLEMENT PREDICTIONS
10. AT THE START OF YEAR 2, REMOVE TIDE GATE PRELOADING MOUND FILL AND CONSTRUCT CONCRETE STRUCTURE. ONCE COMPLETE, BACKFILL TIDE GATE STRUCTURE TO FINISH GRADE PER SPECS. REGRADE AND TOP OFF SETBACK DIKE EMBANKMENT TO FINISH GRADES AS SHOWN. ONCE THE MAJORITY OF TRUCK HAULING IS COMPLETE, INSTALL GRAVEL ACCESS ROAD ON TOP OF SETBACK DIKE AND OVER TIDE GATE STRUCTURE. (SUBGRADE GEOTEXTILE, 6-INCH OF 1-1/2" MINUS, AND 3-INCH LEVELING COURSE OF 1" OR 3/4" MINUS CRUSHED ROCK.



1615 SE 3RD AVENUE,
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STAMP

CLIENT

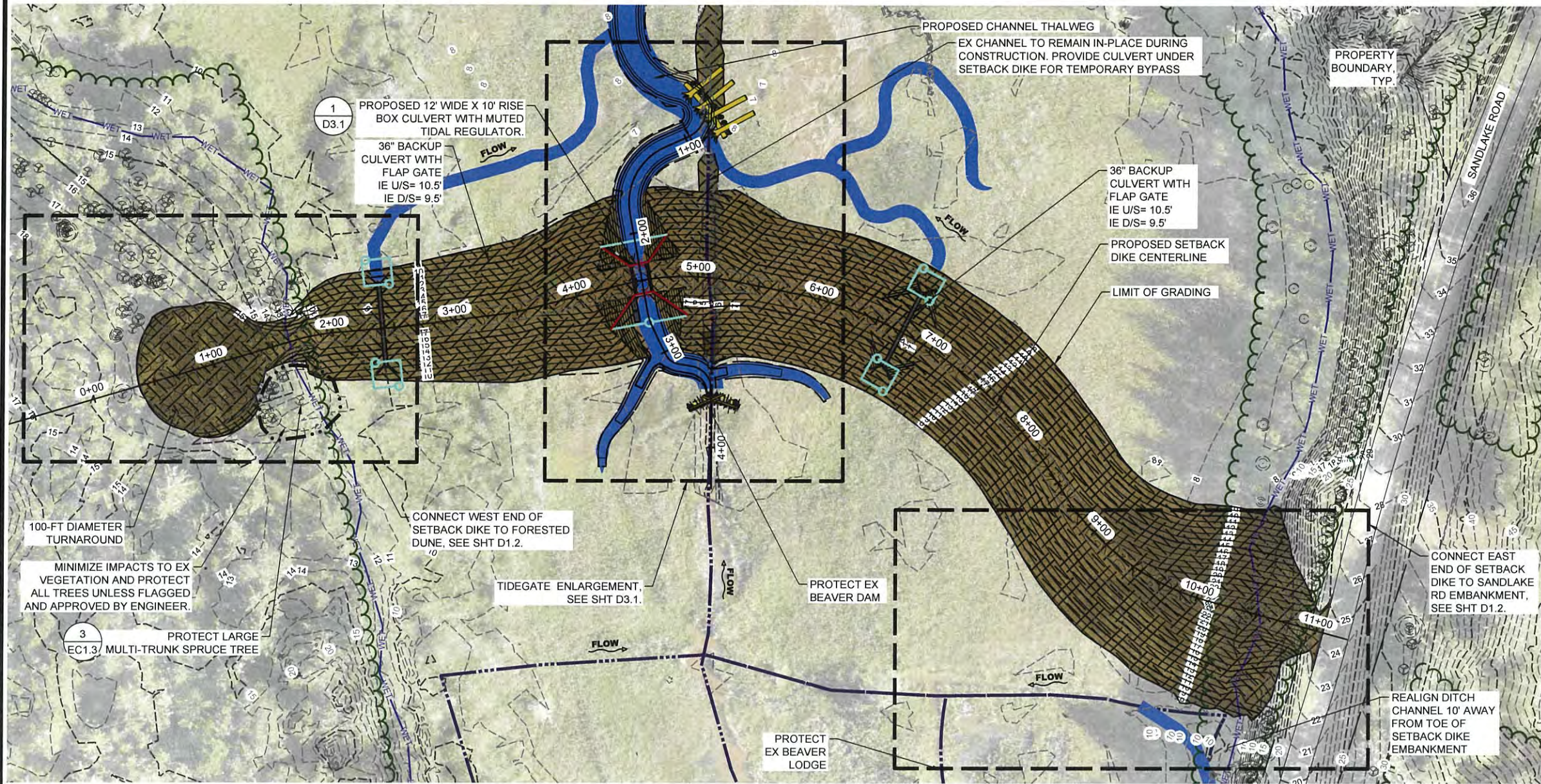
PROJECT NAME

SITKA SEDGE TIDAL
WETLAND RESTORATION

TIERRA DEL MAR, OREGON

REVISIONS		
#	DATE	DESCRIPTION
DESIGNED	HLW	
DRAWN	KCN	
CHECKED	HLW	
IN CHARGE	HLW	
	83882	
PROJECT NUMBER 202200434		
ISSUE DATE 06/19/2026		
SCALE IS AS SHOWN WHEN PLOTTED TO FULL SIZE (22"x34")		
1" = 5'		
PHASE DRAFT 90% DESIGN		
SHEET TITLE		
SETBACK DIKE TYPICAL SECTION		
SHEET NUMBER		
D1.0		
SHEET --- OF ###		

FILE: P:01 CAD\2022\0000\202200434.00 - TEP Sitka Sedge Tidal Wetland Restoration\DWG\D1.1 SETBACK DIKE PLAN & PROFILE.dwg PLOT DATE: 6/22/2026 10:05:46 AM PLOTTED BY: OLIVIA PEREYRA



SETBACK DIKE PLAN

PLAN SCALE: 1" = 50'

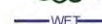
1"=50'
SCALE 50 25 0 50 100
FEET

LEGEND



EXISTING FEATURES

- EX TREE CANOPY
- EX WETLAND BOUNDARY (ESA, 2025)
- EX THALWEG (APPROX.)
- EX BEAVER STRUCTURE
- EX EVERGREEN TREES
- EX DECIDUOUS TREES
- EX ROAD
- PROPERTY BOUNDARY
- EX MAJOR CONTOUR
- EX MINOR CONTOUR

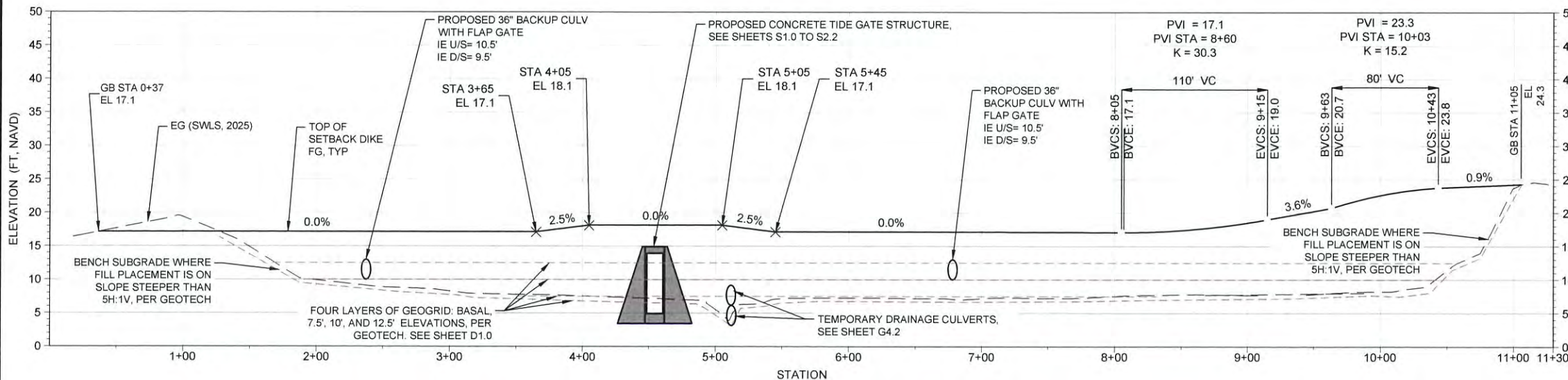


PROPOSED FEATURES

- TREE PROTECTION FENCE
- PROPOSED MAJOR CONTOUR
- PROPOSED MINOR CONTOUR
- CULVERT AND TIDE GATE
- PROPOSED TIDAL CHANNELS
- PROPOSED FILL AREA



- GRAVEL ACCESS ROAD
- WOOD HABITAT STRUCTURES



SETBACK DIKE PROFILE

PROFILE HORIZONTAL SCALE: 1" = 50'
VERTICAL SCALE: 1" = 10'

NOTES

- SEE SHT D1.2 FOR SETBACK DIKE GRADING TIE-IN ENLARGEMENTS.
- SEE SHT D2.1 FOR SETBACK DIKE SECTIONS.
- THIS SHEET DEPICTS THE PRELIMINARY DESIGN FOR THE SETBACK DIKE AND ASSOCIATED DRAINAGE STRUCTURE AND TIDE GATE SYSTEM. THIS DESIGN WILL BE REFINED AT 90% DESIGN FOLLOWING A SUBSURFACE INVESTIGATION AND GEOTECHNICAL ENGINEERING RECOMMENDATIONS.
- ESA WILL COORDINATE WITH ODFW ON BEAVER EXCLUSION MEASURES.



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REGISTERED PROFESSIONAL
ENGINEER
NO. 53882
STATE OF OREGON
RENEWAL DATE 06-30-28

CLIENT



TILLAMOOK ESTUARIES
PARTNERSHIP

SITKA SEDGE TIDAL
WETLAND RESTORATION

TIERRA DEL MAR, OREGON

PROJECT NAME

REVISIONS

DATE DESCRIPTION

DESIGNED	KCN
DRAWN	KCN
CHECKED	HLW
IN CHARGE	HLW
	83882

PROJECT NUMBER 202200434

ISSUE DATE 06/19/2026

SCALE IS AS SHOWN WHEN PLOTTED TO FULL SIZE (22"x34")

1" = 1'

PHASE

DRAFT 90% DESIGN

SHEET TITLE

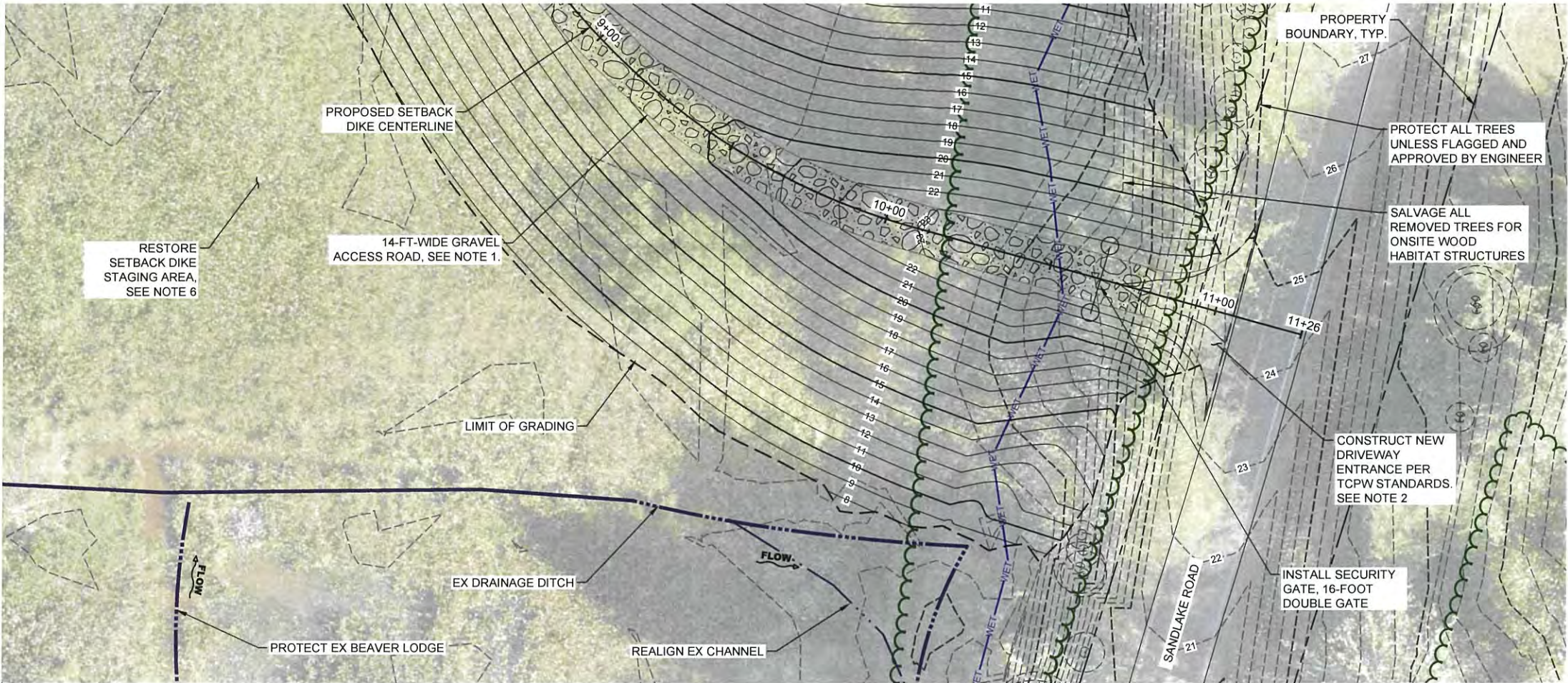
SETBACK DIKE PLAN
& PROFILE

SHEET NUMBER

D1.1

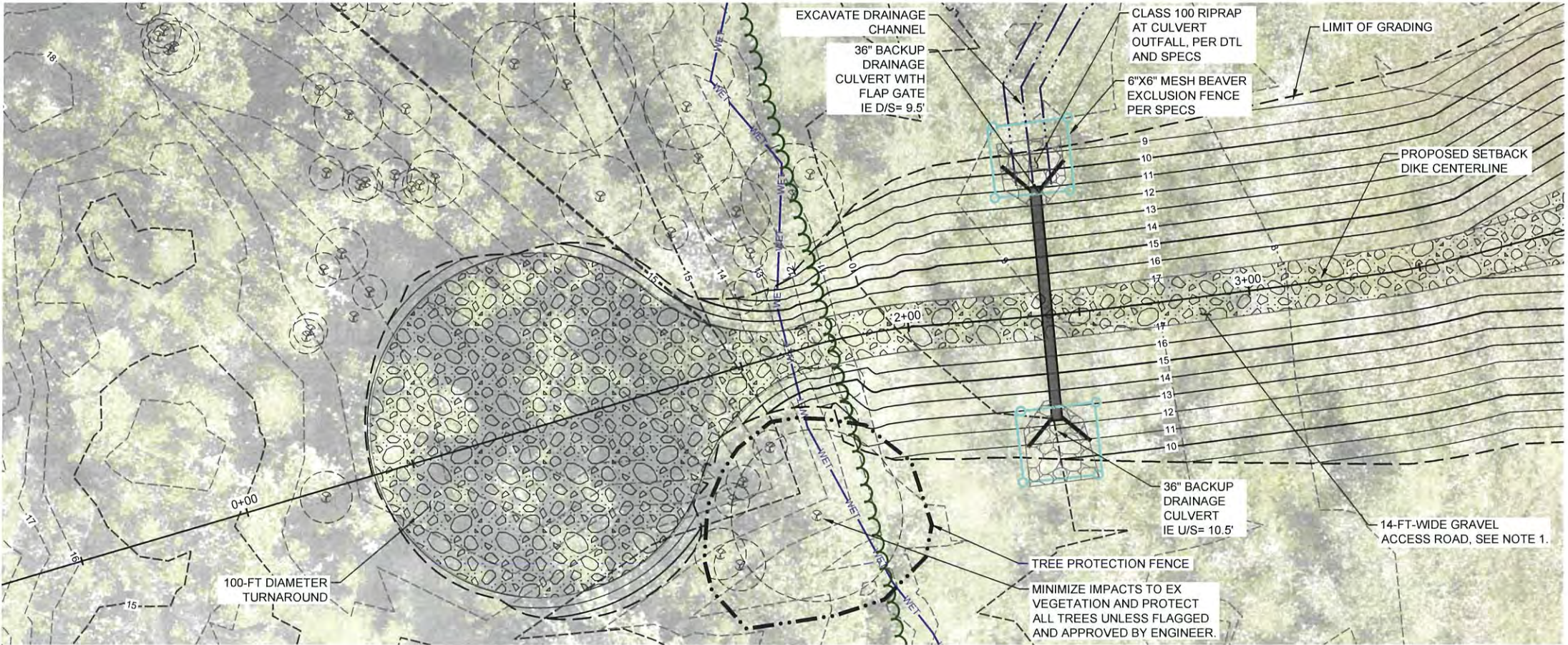
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SETBACK DIKE GRADING PLAN - EAST TIE-IN
PLAN

SCALE: 1" = 20'



SETBACK DIKE GRADING PLAN - WEST TIE-IN
PLAN

SCALE: 1" = 20'

NOTES

1. ONCE SETBACK DIKE IS FULLY CONSTRUCTED AND APPROVED AND THE MAJORITY OF TRUCKING AND HEAVY EQUIPMENT TRAFFIC IS COMPLETE, INSTALL GRAVEL ACCESS ROAD SURFACING ON TOP OF SETBACK DIKE FOR FULL LENGTH OF DIKE (SUBGRADE GEOTEXTILE, 6-INCH OF 1-1/2" MINUS, AND A 3 INCH LEVELING COURSE OF 1" OR 3/4" MINUS CRUSHED ROCK).
2. CONNECT EARTHEN SETBACK DIKE TO ROADWAY EMBANKMENT PER GEOTECHNICAL ENGINEERING REPORT. FILL PLACEMENT ON EXISTING SLOPES STEEPER THAN 5H:1V SHALL BE KEYED INTO EXISTING SLOPE BY BENCHING SLOPE. CUT BENCHES BETWEEN 1 FOOT AND 2 FEET HIGH, OF SUFFICIENT WIDTH TO ACCOMODATE COMPACTION EQUIPMENT (PENETRATING EX SLOPE AT LEAST 3 FEET).
3. CONSTRUCT NEW DRIVEWAY ENTRANCE PER TCPW STANDARDS.
4. EXCAVATE TO SHIFT EXISTING DITCH AWAY FROM SETBACK DIKE TOE. ISOLATE WORK AREA AND CONTROL TURBIDITY IN ACCORDANCE WITH PERMIT CONDITIONS.
5. RESTORE SETBACK DIKE STAGING AREA BY REMOVING TEMPORARY FILL, GEOTEXTILE, AND GRAVEL, DECOMPACTING SOIL, AND SEEDING PER REVEG PLAN.

LEGEND

EXISTING FEATURES	
	EX TREE CANOPY
	EX WETLAND BOUNDARY (ESA, 2025)
	EX THALWEG (APPROX.)
	EX EVERGREEN TREES
	EX DECIDUOUS TREES
	EX ROAD
	PROPERTY BOUNDARY
	EX MAJOR CONTOUR
	EX MINOR CONTOUR
PROPOSED FEATURES	
	TREE PROTECTION FENCE
	PROPOSED MAJOR CONTOUR
	PROPOSED MINOR CONTOUR
	CULVERT AND TIDE GATE
	GRAVEL ACCESS ROAD



PROJECT NAME
**SITKA SEDGE TIDAL
WETLAND RESTORATION**
TIERRA DEL MAR, OREGON

REVISIONS		
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DESIGNED	KCN
DRAWN	KCN
CHECKED	HLW
IN CHARGE	HLW
	83882

PROJECT NUMBER 202200434

ISSUE DATE 06/19/2026

SCALE IS AS SHOWN WHEN
PLOTTED TO FULL SIZE (22"x34")
1" = 20'

PHASE
DRAFT 90% DESIGN

SHEET TITLE

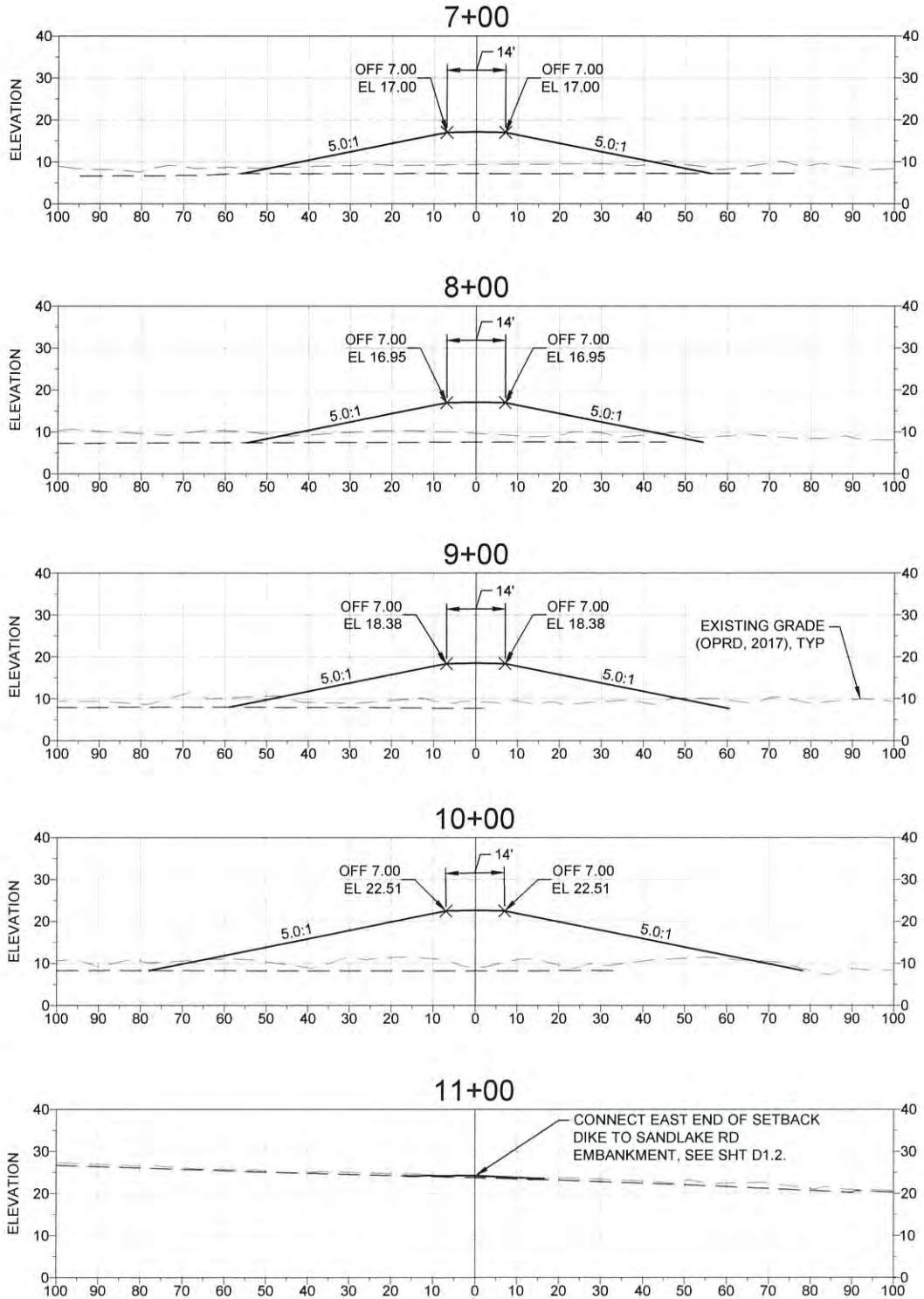
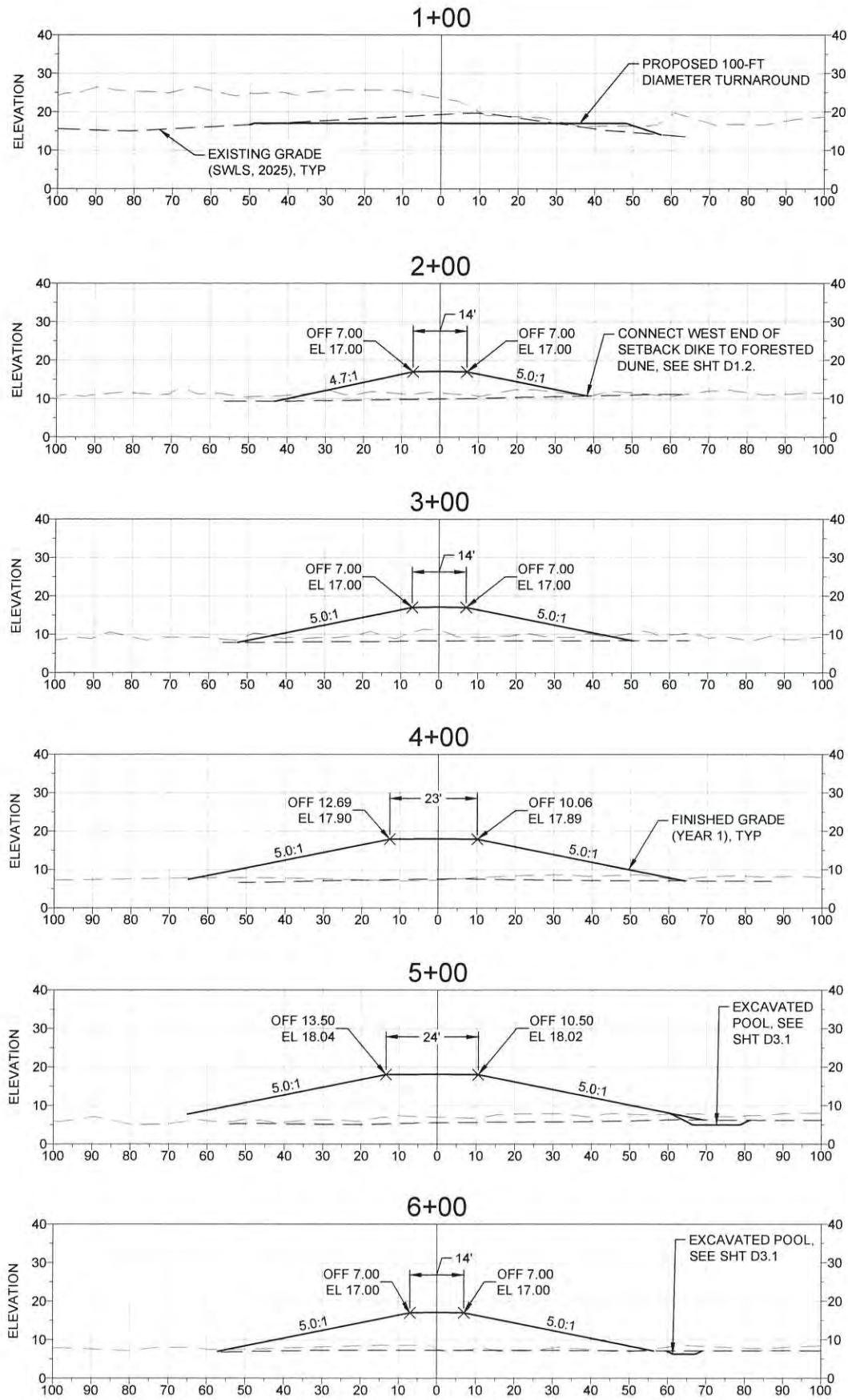
**SETBACK DIKE
TIE-IN
ENLARGEMENTS**

SHEET NUMBER

D1.2

SHEET ---- OF ###

FILE: P:\01 CAD\2022\0000\202200434.00 - TEP Sitka Sedge Tidal Wetland Restoration\DWG\02.1 SETBACK DIKE SECTIONS.dwg PLOT DATE: 6/22/2026 10:06:34 AM PLOTTED BY: OLIVIA PEREYRA



PROPOSED SETBACK DIKE
SECTIONS SCALE: 1" = 10'

NOTES
1. SEE SHT D1.1 FOR SETBACK DIKE PLAN & PROFILE.

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83882 PE
PRELIMINARY
NOT FOR
CONSTRUCTION
RENEWAL DATE 06-30-28

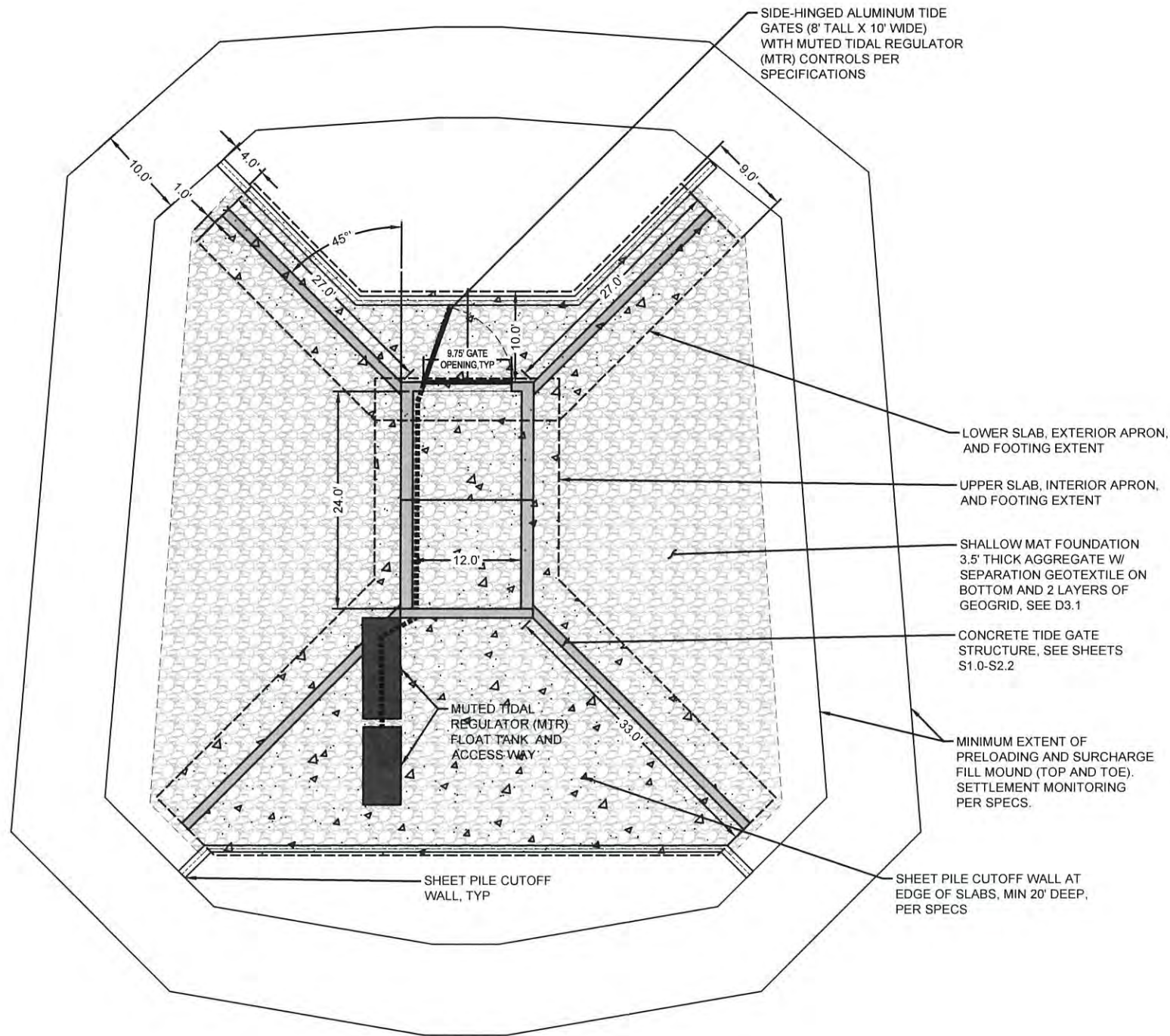
CLIENT

TILLAMOOK ESTUARIES
PARTNERSHIP

PROJECT NAME
SITKA SEDGE TIDAL
WETLAND RESTORATION
TIERRA DEL MAR, OREGON

REVISIONS		
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DRAWN	KCN	
CHECKED	HLW	
IN CHARGE	HLW	83882
PROJECT NUMBER	202200434	
ISSUE DATE	06/19/2026	
SCALE IS AS SHOWN WHEN PLOTTED TO FULL SIZE (22"x34")		
PHASE	DRAFT 90% DESIGN	
SHEET TITLE	SETBACK DIKE SECTIONS	
SHEET NUMBER	D2.1	
SHEET	----	OF ###

FILE: P:\01 CAD\2022\xxxx\02022004\00 - TEP Sitka Sedge Tidal Wetland Restoration\DWG\03.2 TIDEGATE DETAIL.dwg PLOT DATE: 6/22/2026 10:07:04 AM PLOTTED BY: OLIVIA PEREYRA



NOTES

1. REFER TO STRUCTURAL SHEETS S1.0 TO S2.2 PREPARED BY PSE CONSULTING ENGINEERS FOR TIDE GATE STRUCTURE DETAILS.
2. THIS SHEET PROVIDES STRUCTURE LAYOUT AND EXTENTS OF SHALLOW MAT FOUNDATION GEOGRID AND AGGREGATE AND SHEET PILE.



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**SITKA SEDGE TIDAL
WETLAND RESTORATION**
TIERRA DEL MAR, OREGON

REVISIONS		
#	DATE	DESCRIPTION
DESIGNED	HLW	
DRAWN	KCN	
CHECKED	HLW	
IN CHARGE	HLW	
	83882	
PROJECT NUMBER	202200434	
ISSUE DATE	06/19/2026	
SCALE IS AS SHOWN WHEN PLOTTED TO FULL SIZE (22"x34")		
1" = 1'		

PHASE
DRAFT 90% DESIGN

SHEET TITLE

TIDEGATE DETAIL

SHEET NUMBER
D3.2
SHEET --- OF ###

FILE: P:\01 CAD\2022\xxxx\202200434_00 - TEP Sitka Sedge Tidal Wetland Restoration\DWG\EC1.1 1200-C ESC COVER.dwg PLOT DATE: 6/22/2026 10:07:26 AM PLOTTED BY: OLIVIA PEREYRA

SHEET LIST

G4.1	CONSTRUCTION LOGISTICS - PEDESTRIAN BRIDGE
G4.2	CONSTRUCTION LOGISTICS - SETBACK DIKE
G4.3	CONSTRUCTION LOGISTICS - RENEKE CREEK
EC1.1	1200-C ESC COVER
EC1.2	EROSION & SEDIMENT CONTROL PLAN OVERVIEW
EC1.3	EROSION CONTROL DETAILS - 1
EC1.4	EROSION CONTROL DETAILS - 2

ATTENTION EXCAVATORS:
OREGON LAW REQUIRES YOU TO FOLLOW RULES ADOPTED BY THE OREGON UTILITY NOTIFICATION CENTER. THOSE RULES ARE SET FORTH IN OAR 952-001-0010 THROUGH OAR 952-001-0090. YOU MAY OBTAIN COPIES OF THESE RULES FROM THE CENTER BY CALLING 503-232-1987. IF YOU HAVE ANY QUESTIONS ABOUT THE RULES, YOU MAY CONTACT THE CENTER. YOU MUST NOTIFY THE CENTER AT LEAST TWO BUSINESS DAYS, BEFORE COMMENCING AN EXCAVATION. CALL 503-246-6699.

PROJECT ADMINISTRATOR

CHRISTER LABREQUE
TILLAMOOK ESTUARIES PARTNERSHIP
P.O. BOX 493
613 COMMERCIAL STREET
GARIBALDI, OREGON
OFFICE: (503) 322-222

ENGINEERING FIRM

ENVIRONMENTAL SCIENCE ASSOCIATES
CONTACT: HUNTER WHITE, PE.
1615 SE 3RD AVENUE, SUITE 400
PORTLAND, OR 97214
PHONE: (503) 274-2010

NARRATIVE DESCRIPTIONS

EXISTING SITE CONDITIONS

*EXISTING GRASSLAND, DIKE, EXISTING DITCHES, AND HISTORIC TIDAL CHANNELS.

DEVELOPED CONDITIONS

*TIDAL RECONNECTION OF MARSH BY BREACHING EXISTING DIKE, DITCH FILL, CHANNEL EXCAVATION, SETBACK DIKE AND TIDEGATE STRUCTURE, ROADWAY AND BRIDGE IMPROVEMENTS.

SITE SOIL CLASSIFICATION:

102A - FLUVAQUENTS-HISTOSOLS COMPLEX, 0 TO 1 PERCENT SLOPES, DIKED
10C - WALDPOR FINE SAND, THIN SURFACE, 3 TO 12 PERCENT SLOPES
10E - WALDPOR FINE SAND, THIN SURFACE, 15 TO 60 PERCENT SLOPES
11E - NETARTS FINE SANDY LOAM, 30 TO 60 PERCENT SLOPES
14A - HECETA FINE SAND, 0 TO 3 PERCENT SLOPES
20E - KLOOTCHIE-NECANICUM COMPLEX, 30 TO 60 PERCENT SLOPES
2A - FLUVAQUENTS-HISTOSOLS COMPLEX, 0 TO 1 PERCENT SLOPES
45B - HEBO SILTY CLAY LOAM, 0 TO 5 PERCENT SLOPES
57C - CONDORBRIDGE GRAVELLY MEDIAL LOAM, 3 TO 15 PERCENT SLOPES
59B - CHITWOOD-KNAPPA MEDIAL SILT LOAMS, 0 TO 7 PERCENT SLOPES
9B - WALDPOR FINE SAND, 0 TO 5 PERCENT SLOPES

ON-SITE SOILS HAVE MODERATE TO HIGH EROSION POTENTIAL.

PERMITTEE'S SITE INSPECTOR: DAVID GOLTZ, CESCL

COMPANY/AGENCY: ESA
PHONE: (218) 348-8061
FAX: (503) 274 2024
E-MAIL: DGOLTZ@ESASSOC.COM
DESCRIPTION OF EXPERIENCE:
CERTIFIED EROSION AND SEDIMENT CONTROL LEAD
CESCL # CTWA - 171773808

INSPECTION FREQUENCY:

SITE CONDITION	MINIMUM FREQUENCY
1. ACTIVE PERIOD	ON INITIAL DATE THAT LAND DISTURBANCE ACTIVITIES COMMENCE. WITHIN 24 HOURS OF ANY STORM EVENT, INCLUDING RUNOFF FROM SNOW MELT, THAT RESULTS IN DISCHARGE FROM THE SITE. AT LEAST ONCE EVERY 14 DAYS, REGARDLESS OF WHETHER STORMWATER RUNOFF IS OCCURRING.
3. INACTIVE PERIODS GREATER THAN FOURTEEN (14) CONSECUTIVE CALENDAR DAYS	THE INSPECTOR MAY REDUCE THE FREQUENCY OF INSPECTIONS IN ANY AREA OF THE SITE WHERE THE STABILIZATION STEPS IN SECTION 2.2.20 HAVE BEEN COMPLETED TO TWICE PER MONTH FOR THE FIRST MONTH, NO LESS THAN 14 CALENDAR DAYS APART, THEN ONCE PER MONTH.
3. PERIODS DURING WHICH THE SITE IS INACCESSIBLE DUE TO INCLEMENT WEATHER	IF SAFE, ACCESSIBLE AND PRACTICAL, INSPECTIONS MUST OCCUR DAILY AT A RELEVANT DISCHARGE POINT OR DOWNSTREAM LOCATION OF THE RECEIVING WATERBODY.
4. PERIODS DURING WHICH CONSTRUCTION ACTIVITIES ARE SUSPENDED AND RUNOFF IS UNLIKELY DUE TO FROZEN CONDITIONS.	VISUAL MONITORING INSPECTIONS MAY BE TEMPORARILY SUSPENDED. IMMEDIATELY RESUME MONITORING UPON THAWING, OR WHEN WEATHER CONDITIONS MAKE DISCHARGES LIKELY.
5. PERIODS DURING WHICH CONSTRUCTION ACTIVITIES ARE CONDUCTED AND RUNOFF IS UNLIKELY DURING FROZEN CONDITIONS.	VISUAL MONITORING INSPECTIONS MAY BE REDUCED TO ONCE A MONTH. IMMEDIATELY RESUME MONITORING UPON THAWING, OR WHEN WEATHER CONDITIONS MAKE DISCHARGES LIKELY.



VICINITY MAP
NOT TO SCALE

RAIN GAUGE INFORMATION:

OR01 - CLVO3, 00351682
N45°12'18", W123°53'33", NEAR THE CLOVERDALE
WATER DISTRICT
CLOVERDALE, OREGON

AUTHORIZED DISCHARGES

1. TEMPORARY STREAM BYPASS

LIST OF POLLUTANT GENERATING MATERIALS

1. FUEL
2. CONCRETE
3. CURING COMPOUNDS
4. ASPHALT

DEPARTMENT OF ENVIRONMENTAL QUALITY 303(d)
RECEIVING WATER BODIES LIST OF IMPAIRMENTS:

Sand Lake - 303(d) listed (Category 5) for Enterococci.
The Impaired beneficial use is Water Contact Recreation.

WATER BODIES:

WATER BODIES WITHIN 1 MILE RADIUS OF PROJECT SITE:

RECEIVING WATER BODIES:

- NO NAME CREEK
- BELTZ CREEK
- RENEKE CREEK
- SAND LAKE

SITE OVERVIEW

TOTAL SITE AREA = 16,937,719 SF = 389 ACRES

TOTAL DISTURBED AREA = 2,466,784 SF = 53 ACRES

PROJECT TEAM

PROJECT SPONSOR:

CHRISTER LABREQUE
TILLAMOOK ESTUARIES PARTNERSHIP
P.O. BOX 493
613 COMMERCIAL STREET
GARIBALDI, OREGON
OFFICE: (503) 322-222

PROJECT ENGINEER:

HUNTER WHITE, PE
ENVIRONMENTAL SCIENCE ASSOCIATES
1615 SE 3RD AVENUE, SUITE 400
PORTLAND, OR 97214
OFFICE: (503) 274-2010

STRUCTURAL ENGINEERING:

JOSH GOODALL, PE
DAVID EVANS AND ASSOCIATES, INC.
5121 SKYLINE VILLAGE LOOP S, SUITE 200
SALEM, OR 97306
OFFICE: (541) 788-5830

GEOTECHNICAL ENGINEERING:

TRAVIS NGUYEN, PE, GE
SHANNON & WILSON
3990 COLLINS WAY, SUITE 100
LAKE OSWEGO, OR 97035
OFFICE: (503) 210-475030

THE PERMITTEE IS REQUIRED TO MEET ALL THE CONDITIONS OF THE 1200C PERMIT. THIS ESCP AND GENERAL CONDITIONS HAVE BEEN DEVELOPED TO FACILITATE COMPLIANCE WITH THE 1200C PERMIT REQUIREMENTS. IN CASES OF DISCREPANCIES OR OMISSIONS, THE 1200C PERMIT REQUIREMENTS SUPERCEDE REQUIREMENTS OF THIS PLAN.

- ONCE KNOWN, INCLUDE A LIST OF ALL CONTRACTORS THAT WILL ENGAGE IN CONSTRUCTION ACTIVITIES ON SITE, AND THE AREAS OF THE SITE WHERE THE CONTRACTOR(S) WILL ENGAGE IN CONSTRUCTION ACTIVITIES. REVISE THE LIST AS APPROPRIATE UNTIL PERMIT COVERAGE IS TERMINATED (SECTION 4.4.C.I). IN ADDITION, INCLUDE A LIST OF ALL PERSONNEL (BY NAME AND POSITION) THAT ARE RESPONSIBLE FOR THE DESIGN, INSTALLATION AND MAINTENANCE OF STORMWATER CONTROL MEASURES (E.G. ESCP DEVELOPER, BMP INSTALLER (SEE SECTION 4.10), AS WELL AS THEIR INDIVIDUAL RESPONSIBILITIES. (SECTION 4.4.C.II)
- VISUAL MONITORING INSPECTION REPORTS MUST BE MADE IN ACCORDANCE WITH DEQ 1200-C PERMIT REQUIREMENTS. (SECTION 6.5)
- INSPECTION LOGS MUST BE KEPT IN ACCORDANCE WITH DEQ'S 1200-C PERMIT REQUIREMENTS. (SECTION 6.5.Q)
- RETAIN A COPY OF THE ESCP AND ALL REVISIONS ON SITE AND MAKE IT AVAILABLE ON REQUEST TO DEQ, AGENT, OR THE LOCAL MUNICIPALITY. (SECTION 4.7)
- THE PERMIT REGISTRANT MUST IMPLEMENT THE ESCP. FAILURE TO IMPLEMENT ANY OF THE CONTROL MEASURES OR PRACTICES DESCRIBED IN THE ESCP IS A VIOLATION OF THE PERMIT. (SECTIONS 4 AND 4.1.1)
- THE ESCP MUST BE ACCURATE AND REFLECT SITE CONDITIONS. (SECTION 4.8)
- SUBMISSION OF ALL ESCP REVISIONS IS NOT REQUIRED. SUBMITTAL OF THE ESCP REVISIONS IS ONLY UNDER SPECIFIC CONDITIONS. SUBMIT ALL NECESSARY REVISION TO DEQ OR AGENT WITHIN 10 DAYS. (SECTION 4.9)
- SEQUENCE CLEARING AND GRADING TO THE MAXIMUM EXTENT PRACTICAL TO PREVENT EXPOSED INACTIVE AREAS FROM BECOMING A SOURCE OF EROSION. (SECTION 2.2.2)
- CREATE SMOOTH SURFACES BETWEEN SOIL SURFACE AND EROSION AND SEDIMENT CONTROLS TO PREVENT STORMWATER FROM BYPASSING CONTROLS AND PONDING. (SECTION 2.2.3)
- IDENTIFY, MARK, AND PROTECT (BY CONSTRUCTION FENCING OR OTHER MEANS) CRITICAL RIPARIAN AREAS AND VEGETATION INCLUDING IMPORTANT TREES AND ASSOCIATED ROOTING ZONES, AND VEGETATION AREAS TO BE PRESERVED. IDENTIFY VEGETATIVE BUFFER ZONES BETWEEN THE SITE AND SENSITIVE AREAS (E.G., WETLANDS), AND OTHER AREAS TO BE PRESERVED, ESPECIALLY IN PERIMETER AREAS. (SECTION 2.2.1)
- PRESERVE EXISTING VEGETATION WHEN PRACTICAL AND RE-VEGETATE OPEN AREAS. RE-VEGETATE OPEN AREAS WHEN PRACTICABLE BEFORE AND AFTER GRADING OR CONSTRUCTION. IDENTIFY THE TYPE OF VEGETATIVE SEED MIX USED. (SECTION 2.2.5)
- MAINTAIN AND DELINEATE ANY EXISTING NATURAL BUFFER WITHIN THE 50-FEET OF WATERS OF THE STATE. (SECTION 2.2.4)
- INSTALL PERIMETER SEDIMENT CONTROL, INCLUDING STORM DRAIN INLET PROTECTION AS WELL AS ALL SEDIMENT BASINS, TRAPS, AND BARRIERS PRIOR TO LAND DISTURBANCE. (SECTIONS 2.1.3)
- CONTROL BOTH PEAK FLOW RATES AND TOTAL STORMWATER VOLUME, TO MINIMIZE EROSION AT OUTLETS AND DOWNSTREAM CHANNELS AND STREAMBANKS. (SECTIONS 2.1.1. AND 2.2.16)
- CONTROL SEDIMENT AS NEEDED ALONG THE SITE PERIMETER AND AT ALL OPERATIONAL INTERNAL STORM DRAIN INLETS AT ALL TIMES DURING CONSTRUCTION, BOTH INTERNALLY AND AT THE SITE BOUNDARY. (SECTIONS 2.2.6 AND 2.2.13)
- ESTABLISH CONCRETE TRUCK AND OTHER CONCRETE EQUIPMENT WASHOUT AREAS BEFORE BEGINNING CONCRETE WORK. (SECTION 2.2.14)
- APPLY TEMPORARY AND/OR PERMANENT SOIL STABILIZATION MEASURES IMMEDIATELY ON ALL DISTURBED AREAS AS GRADING PROGRESSES. TEMPORARY OR PERMANENT STABILIZATIONS MEASURES ARE NOT REQUIRED FOR AREAS THAT ARE INTENDED TO BE LEFT UNVEGETATED, SUCH AS DIRT ACCESS ROADS OR UTILITY POLE PADS.(SECTIONS 2.2.20 AND 2.2.21)
- ESTABLISH MATERIAL AND WASTE STORAGE AREAS, AND OTHER NON-STORMWATER CONTROLS. (SECTION 2.3.7)
- KEEP WASTE CONTAINER LIDS CLOSED WHEN NOT IN USE AND CLOSE LIDS AT THE END OF THE BUSINESS DAY FOR THOSE CONTAINERS THAT ARE ACTIVELY USED THROUGHOUT THE DAY. FOR WASTE CONTAINERS THAT DO NOT HAVE LIDS, PROVIDE EITHER (1) COVER (E.G., A TARP, PLASTIC SHEETING, TEMPORARY ROOF) TO PREVENT EXPOSURE OF WASTES TO PRECIPITATION, OR (2) A SIMILARLY EFFECTIVE MEANS DESIGNED TO PREVENT THE DISCHARGE OF POLLUTANTS (E.G., SECONDARY CONTAINMENT). (SECTION 2.3.7)
- PREVENT TRACKING OF SEDIMENT ONTO PUBLIC OR PRIVATE ROADS USING BMPS SUCH AS: CONSTRUCTION ENTRANCE, GRAVELED (OR PAVED) EXITS AND PARKING AREAS, GRAVEL ALL UNPAVED ROADS LOCATED ONSITE, OR USE AN EXIT TIRE WASH. THESE BMPS MUST BE IN PLACE PRIOR TO LAND- DISTURBING ACTIVITIES. (SECTION 2.2.7)
- WHEN TRUCKING SATURATED SOILS FROM THE SITE, EITHER USE WATER-TIGHT TRUCKS OR DRAIN LOADS ON SITE. (SECTION 2.2.7.F)
- CONTROL PROHIBITED DISCHARGES FROM LEAVING THE CONSTRUCTION SITE, I.E., CONCRETE WASH-OUT, WASTEWATER FROM CLEANOUT OF STUCCO, PAINT AND CURING COMPOUNDS. (SECTIONS 1.5 AND 2.3.9)
- ENSURE THAT STEEP SLOPE AREAS WHERE CONSTRUCTION ACTIVITIES ARE NOT OCCURRING ARE NOT DISTURBED. (SECTION 2.2.10)

SITKA SEDGE
TIDAL WETLAND RESTORATION
1200-C PERMIT

BMP MATRIX FOR CONSTRUCTION PHASES

REFER TO DEQ GUIDANCE MANUAL FOR A COMPREHENSIVE LIST OF AVAILABLE BMPS

YEAR:		2027					2028				
BMPs	MONTH #:	JUNE	JULY	AUG	SEPT	OCT	JUNE	JULY	AUG	SEPT	OCT
PIPE SLOPE DRAINS											
ENERGY DISSIPATERS											
TEMPORARY DIVERSION DIKES											
CHECK DAMS		X	X	X	X	X					
TEMPORARY SEEDING AND PLANTING											
PERMANENT SEEDING AND PLANTING									X	X	X
MYCORRHIZAE / BIOFERTILIZERS											
MULCHES (SPECIFY TYPE)											
CONSTRUCTION ENTRANCE		X	X	X	X	X	X	X	X	X	X
COMPOST BLANKETS											
COMPOST SOCKS		X	X	X	X	X	X	X	X	X	X
COMPOST BERM											
SOIL TACKIFIERS											
SODDING VEGETATIVE BUFFER STRIPS											
PLASTIC SHEETING											
SEDIMENT FENCING		X	X	X	X	X	X	X	X	X	X
EROSION CONTROL BLANKETS & MATS (SPECIFY TYPE)											
EARTH DIKES (STABILIZED)											
DRAINAGE SWALES											
ROCK OUTLET PROTECTION											
SEDIMENT TRAP		X	X	X	X	X	X	X	X	X	X
STRAW WATTLES (LOOSE COMPACTION RICE STRAW)		X	X	X	X	X	X	X	X	X	X
STORM DRAIN INLET PROTECTION											
TEMPORARY OR PERMANENT SEDIMENTATION BASINS											
UNPAVED ROADS GRAVELED OR OTHER BMP ON THE ROAD		X	X	X	X	X	X	X	X	X	X
DEWATERING (TREATMENT LOCATION, SCHEMATIC, & SAMPLING PLAN REQUIRED)		X	X	X	X	X	X	X	X	X	X
PAVING OPERATIONS CONTROLS											
CONCRETE TRUCK WASHOUT											

*DEWATERING PUMP DISCHARGE HOSE SHALL BE DIRECTED TO A SEDIMENT BAG, OR OTHER APPROVED PUMP DISCHARGE SEDIMENT CENTRAL SYSTEM AS SHOWN ON SHT EC1.2 OR IN ANOTHER PLANNED LOCATION TO PERFORM TURBIDITY MONITORING IN ACCORDANCE WITH PERMIT CONDITIONS.

STANDARD EROSION AND SEDIMENT CONTROL PLAN DRAWING NOTES:

- PREVENT SOIL COMPACTION IN AREAS WHERE POST-CONSTRUCTION INFILTRATION FACILITIES ARE TO BE INSTALLED. (SECTION 2.2.12)
- USE BMPS TO PREVENT OR MINIMIZE STORMWATER EXPOSURE TO POLLUTANTS FROM SPILLS; VEHICLE AND EQUIPMENT FUELING, MAINTENANCE, AND STORAGE; OTHER CLEANING AND MAINTENANCE ACTIVITIES; AND WASTE HANDLING ACTIVITIES. THESE POLLUTANTS INCLUDE FUEL, HYDRAULIC FLUID, AND OTHER OILS FROM VEHICLES AND MACHINERY, AS WELL AS DEBRIS, FERTILIZER, PESTICIDES AND HERBICIDES, PAINTS, SOLVENTS, CURING COMPOUNDS AND ADHESIVES FROM CONSTRUCTION OPERATIONS. (SECTIONS 2.2.15 AND 2.3)
- PROVIDE PLANS FOR SEDIMENTATION BASINS THAT HAVE BEEN DESIGNED PER SECTION 2.2.17 AND STAMPED BY AN OREGON PROFESSIONAL ENGINEER. (SEE SECTION 2.2.17.A)
- IF ENGINEERED SOILS ARE USED ON SITE, A SEDIMENTATION BASIN/IMPOUNDMENT MUST BE INSTALLED. (SEE SECTIONS2.2.17 AND 2.2.18)
- PROVIDE A DEWATERING PLAN FOR ACCUMULATED WATER FROM PRECIPITATION AND UNCONTAMINATED GROUNDWATER SEEPAGE DUE TO SHALLOW EXCAVATION ACTIVITIES. (SEE SECTION 2.4)
- IMPLEMENT THE FOLLOWING BMPS WHEN APPLICABLE: WRITTEN SPILL PREVENTION AND RESPONSE PROCEDURES, EMPLOYEE TRAINING ON SPILL PREVENTION AND PROPER DISPOSAL PROCEDURES, SPILL KITS IN ALL VEHICLES, REGULAR MAINTENANCE SCHEDULE FOR VEHICLES AND MACHINERY, MATERIAL DELIVERY AND STORAGE CONTROLS, TRAINING AND SIGNAGE, AND COVERED STORAGE AREAS FOR WASTE AND SUPPLIES. (SECTION 2.3)
- USE WATER, SOIL-BINDING AGENT OR OTHER DUST CONTROL TECHNIQUE AS NEEDED TO AVOID WIND-BLOWN SOIL. (SECTION 2.2.9)
- THE APPLICATION RATE OF FERTILIZERS USED TO REESTABLISH VEGETATION MUST FOLLOW MANUFACTURER'S RECOMMENDATIONS TO MINIMIZE NUTRIENT RELEASES TO SURFACE WATERS. EXERCISE CAUTION WHEN USING TIME-RELEASE FERTILIZERS WITHIN ANY WATERWAY RIPARIAN ZONE. (SECTION 2.3.5)
- IF AN ACTIVE TREATMENT SYSTEM (FOR EXAMPLE, ELECTRO-COAGULATION, FLOCCULATION, FILTRATION, ETC.) FOR SEDIMENT OR OTHER POLLUTANT REMOVAL IS EMPLOYED, SUBMIT AN OPERATION AND MAINTENANCE PLAN (INCLUDING SYSTEM SCHEMATIC, LOCATION OF SYSTEM, LOCATION OF INLET, LOCATION OF DISCHARGE, DISCHARGE DISPERSION DEVICE DESIGN, AND A SAMPLING PLAN AND FREQUENCY) BEFORE OPERATING THE TREATMENT SYSTEM. OBTAIN ENVIRONMENTAL MANAGEMENT PLAN APPROVAL FROM DEQ BEFORE OPERATING THE TREATMENT SYSTEM. OPERATE AND MAINTAIN THE TREATMENT SYSTEM ACCORDING TO MANUFACTURER'S SPECIFICATIONS. (SECTION 1.2.9)
- TEMPORARILY STABILIZE SOILS AT THE END OF THE SHIFT BEFORE HOLIDAYS AND WEEKENDS, IF NEEDED. THE REGISTRANT IS RESPONSIBLE FOR ENSURING THAT SOILS ARE STABLE DURING RAIN EVENTS AT ALL TIMES OF THE YEAR. (SECTION 2.2)
- AS NEEDED BASED ON WEATHER CONDITIONS, AT THE END OF EACH WORKDAY SOIL STOCKPILES MUST BE STABILIZED OR COVERED, OR OTHER BMPS MUST BE IMPLEMENTED TO PREVENT DISCHARGES TO SURFACE WATERS OR CONVEYANCE SYSTEMS LEADING TO SURFACE WATERS. (SECTION 2.2.8)
- SEDIMENT FENCE: REMOVE TRAPPED SEDIMENT BEFORE IT REACHES ONE THIRD OF THE ABOVE GROUND FENCE HEIGHT AND BEFORE FENCE REMOVAL. (SECTION 2.1.5.B)
- OTHER SEDIMENT BARRIERS (SUCH AS BIOBAGS): REMOVE SEDIMENT BEFORE IT REACHES TWO INCHES DEPTH ABOVE GROUND HEIGHT AND BEFORE BMP REMOVAL. (SECTION 2.1.5.C)
- CATCH BASINS: CLEAN BEFORE RETENTION CAPACITY HAS BEEN REDUCED BY FIFTY PERCENT. SEDIMENT BASINS AND SEDIMENT TRAPS: REMOVE TRAPPED SEDIMENTS BEFORE DESIGN CAPACITY HAS BEEN REDUCED BY FIFTY PERCENT AND AT COMPLETION OF PROJECT. (SECTION 2.1.5.D)
- WITHIN 24 HOURS, SIGNIFICANT SEDIMENT THAT HAS LEFT THE CONSTRUCTION SITE, MUST BE REMEDIATED. INVESTIGATE THE CAUSE OF THE SEDIMENT RELEASE AND IMPLEMENT STEPS TO PREVENT A RECURRENCE OF THE DISCHARGE WITHIN THE SAME 24 HOURS. ANY IN-STREAM CLEAN-UP OF SEDIMENT SHALL BE PERFORMED ACCORDING TO THE OREGON DEPARTMENT OF STATE LANDS REQUIRED TIMEFRAME. (SECTION 2.2.19.A)
- THE INTENTIONAL WASHING OF SEDIMENT INTO STORM SEWERS OR DRAINAGE WAYS MUST NOT OCCUR. VACUUMING OR DRY SWEEPING AND MATERIAL PICKUP MUST BE USED TO CLEANUP RELEASED SEDIMENTS. (SECTION 2.2.19)
- DOCUMENT ANY PORTION(S) OF THE SITE WHERE LAND DISTURBING ACTIVITIES HAVE PERMANENTLY CEASED OR WILL BE TEMPORARILY INACTIVE FOR 14 OR MORE CALENDAR DAYS. (SECTION 6.5.F.)
- PROVIDE TEMPORARY STABILIZATION FOR THAT PORTION OF THE SITE WHERE CONSTRUCTION ACTIVITIES CEASE FOR 14 DAYS OR MORE WITH A COVERING OF BLOWN STRAW AND A TACKIFIER, LOOSE STRAW, OR AN ADEQUATE COVERING OF COMPOST MULCH UNTIL WORK RESUMES ON THAT PORTION OF THE SITE. (SECTION 2.2.20)
- DO NOT REMOVE TEMPORARY SEDIMENT CONTROL PRACTICES UNTIL PERMANENT VEGETATION OR OTHER COVER OF EXPOSED AREAS IS ESTABLISHED. ONCE CONSTRUCTION IS COMPLETE AND THE SITE IS STABILIZED, ALL TEMPORARY EROSION CONTROLS AND RETAINED SOILS MUST BE REMOVED AND DISPOSED OF PROPERLY, UNLESS NEEDED FOR LONG TERM USE FOLLOWING TERMINATION OF PERMIT COVERAGE. (SECTION 2.2.21)



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STAMP



RENEWAL DATE 06-30-28

CLIENT



TILLAMOOK ESTUARIES
PARTNERSHIP

SITKA SEDGE TIDAL
WETLAND RESTORATION

TIERRA DEL MAR, OREGON

PROJECT NAME

REVISIONS

#	DATE	DESCRIPTION

DESIGNED	AMF
DRAWN	KCN
CHECKED	HLW
IN CHARGE	HLW
	83882

PROJECT NUMBER 202200434

ISSUE DATE 06/19/2026

SCALE IS AS SHOWN WHEN
PLOTTED TO FULL SIZE (22"x34")

1" = 1'

PHASE

DRAFT 90% DESIGN

SHEET TITLE

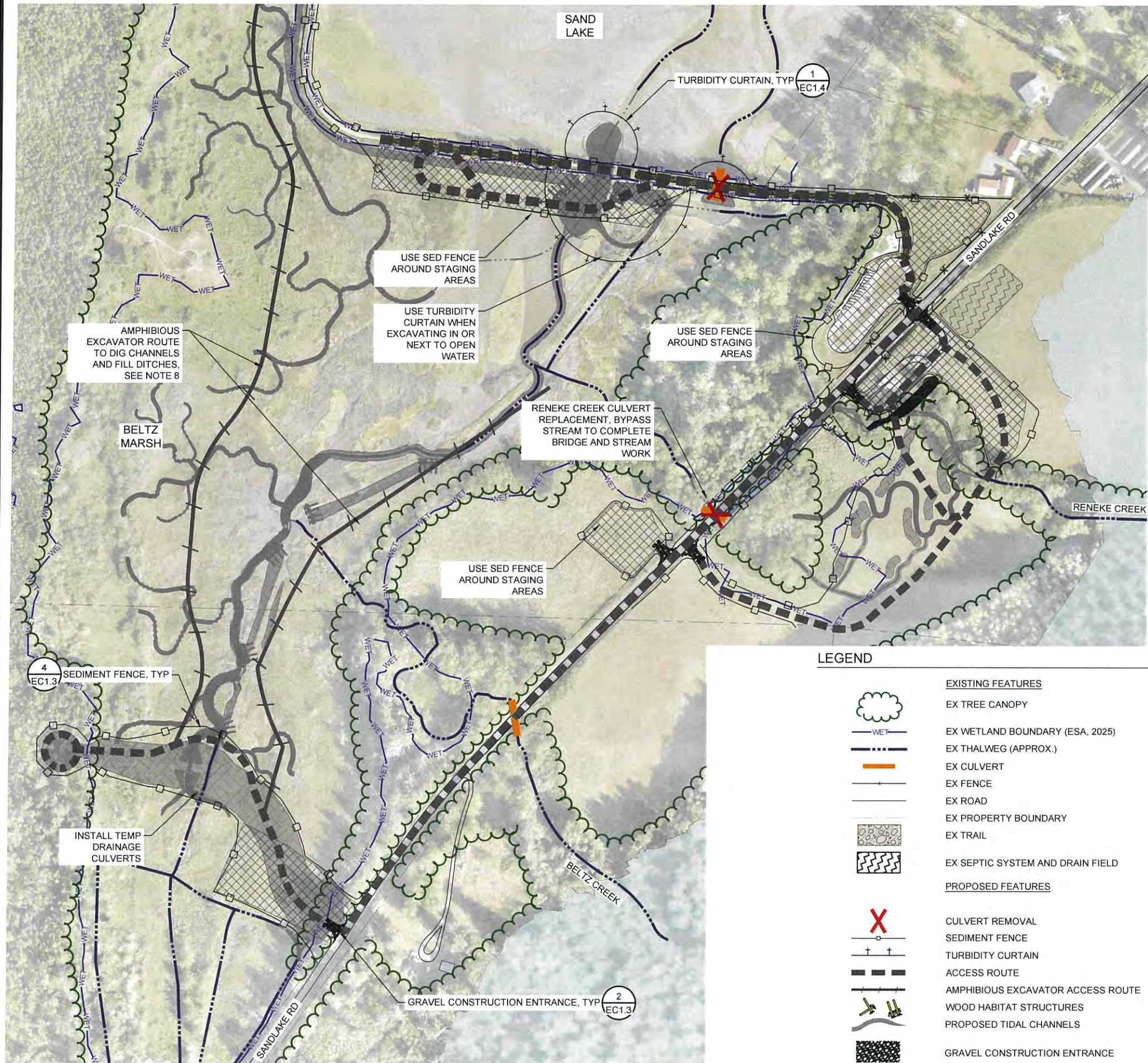
1200-C ESC COVER

SHEET NUMBER

EC1.1

SHEET ---- OF ###

FILE: P:\01 CAD\2022\xxxx\202200434.00 - TEP Sitka Sedge Tidal Wetland Restoration\DWG\EC1.2 EROSION & SEDIMENT CONTROL PLAN.dwg PLOT DATE: 6/22/2026 10:07:46 AM PLOTTED BY: OLIVIA PEREYRA



EROSION & SEDIMENT CONTROL PLAN OVERVIEW
PLAN SCALE: 1" = 250'

ESCP NARRATIVE / SITE SPECIFIC ESC NOTES:

1. SEE SHEETS EC1.3 AND EC1.4 FOR EROSION AND SEDIMENT CONTROL DETAILS.
2. SEE SHEETS G4.1 TO G4.3 FOR ENLARGEMENTS OF EACH WORK AREA SHOWING CONSTRUCTION SEQUENCING , LOGISTICS, AND ESC BMPs IN MORE DETAIL. SEE CHANNEL GRADING PLANS ON SHEETS C1.1 TO C3.3 AND SETBACK DIKE GRADING ON SHEETS D1.0 TO D3.1.
3. LAND BASED ACCESS TO THE SITE IS VIA SANDLAKE RD. ESC MEASURES ARE REQUIRED IN THESE UPLAND AREAS IN ACCORDANCE WITH DEQ 1200-C PERMIT REQUIREMENTS. MANY WORK AREAS OF THE SITE ARE WITHIN A WETLAND OR BELOW MHHW AND SHALL BE MANAGED IN ACCORDANCE WITH REMOVAL/FILL PERMIT. THIS PROJECT WILL RECEIVE BOTH CWA SECTION 404 PERMIT AND A SECTION 401 WATER QUALITY CERTIFICATE.
4. IN ALL STAGING AREAS, PREVENT SEDIMENT FROM ENTERING WETLANDS AND WATERWAYS BY INSTALLING PERIMETER BMPs INCLUDING SEDIMENT FENCE AND STRAW WATTLES. ADJUST AS NEEDED FOR ACCESS TO ADJACENT PERMITTING WORK AREAS. PRESERVE AND PROTECT EX NATIVE VEGETATION AND RETAIN STRIPS OF VEGETATION BETWEEN DISTURBANCE AREAS AND WATERWAYS TO TRAP SEDIMENT.
5. THE MAJORITY OF PROJECT SITE IS SEPARATED FROM SAND LAKE BY AN EXISTING DIKE WITH A SINGLE DRAINAGE OUTLET THROUGH A 4'X4' CONCRETE BOX CULVERT WITH A BROKEN TIDE GATE. THREE CREEK CHANNELS DRAIN INTO THE AREA BEHIND THE EXISTING DIKE AND WILL REQUIRE INDIVIDUAL TEMPORARY STREAM DIVERSIONS TO MAINTAIN CONVEYANCE AND DOWNSTREAM FISH PASSAGE THROUGH ALL PHASES OF THE PROJECT AND DURING THE WINTER BETWEEN CONSTRUCTION SEASONS.
6. USE BMPs INCLUDING SEDIMENT FENCE, STRAW WATTLES, TURBIDITY CURTAINS, TO PREVENT SEDIMENT FROM LEAVING SITE OR ENTERING WATERS AND WETLANDS. CONTROL SEDIMENT AND TURBIDITY PER PERMIT CONDITIONS.
7. CONTRACTOR SHALL WORK AROUND TIDES AND IMPLEMENT WORK AREA ISOLATION MEASURES TO PROTECT WORK FROM INUNDATION, PREVENT SEDIMENT FROM ENTERING WATERWAYS, AND CONTROL TURBIDITY WITHIN PERMIT CONDITIONS. DEWATER WORK AREAS AND DIVERT STREAM FLOWS AS NEEDED TO COMPLETE THE WORK IN ACCORDANCE WITH AN APPROVED TEMPORARY WATER MANAGEMENT PLAN AND FISH SALVAGE PERMIT.
8. WORK WITHIN THE LOWEST LYING AREAS OF THE SITE WILL REQUIRE THE USE OF LOW GROUND PRESSURE (LGP) AND/OR AMPHIBIOUS EXCAVATION EQUIPMENT OR THE USE OF WORK MATS TO SAFELY COMPLETE WORK AND MINIMIZE DISTURBANCE AND COMPACTION OF THE MARSH SURFACE. CONTRACTOR TO OBSERVE WORK AREAS PRIOR TO BIDDING TO UNDERSTAND THE EQUIPMENT REQUIRED TO COMPLETE SPECIALIZED IN-WATER WORK.
9. PROVIDE TREE PROTECTION AT THE PERIMETER OF WORK AREAS AND WHERE SHOWN TO PROTECT TREES. SEED ALL DISTURBED AREAS ABOVE MHHW PER REVEG PLAN AND SPECS.
10. INSTALL SEDIMENT FENCE AT DOWNSLOPE EDGE OF WORK AREAS AND STAGING AREAS THAT ARE WITHIN 50 FEET OF A WETLAND OR WATERWAY.
11. USE TURBIDITY CURTAIN WHEN WORKING IN WATER, INCLUDING EXCAVATING DIKE BREACH CHANNEL, REMOVING EXISTING BOX CULVERT AND RECONSTRUCTING EMBANKMENT, AND CONNECTING EXCAVATED CHANNELS OR DITCH FILLS TO OPEN WATER AREAS.
12. INSTALL GRAVEL CONSTRUCTION ENTRANCES OR APPROVED TRACKOUT MATS AT ALL ENTRANCES TO SANDLAKE ROAD AS NEEDED TO PREVENT TRACKING SEDIMENT ON ROADWAY. CONTRACTOR SHALL BE PREPARED TO REMOVE SEDIMENT TRACKING FROM ROADWAY AND IMPLEMENT WHEEL WASH IF ENTRANCE BMPs ARE NOT EFFECTIVE.
13. CONTROL DUST BY WATER TRUCK OR OTHER APPROVED MEANS.

DEWATERING PLAN:

1. SOME ACTIVITIES WILL REQUIRE IN-WATER WORK AREA ISOLATION AND DEWATERING, INCLUDING SETBACK DIKE AND TIDE GATE STRUCTURE SUBGRADE EXCAVATIONS, DIKE BREACH AND CHANNEL EXCAVATION, FOUNDATION EXCAVATIONS, AND DITCH FILLS.
2. CONTRACTOR IS RESPONSIBLE FOR DEVELOPING A TEMPORARY WATER MANAGEMENT PLAN INCLUDING PROPOSED DEWATERING AND WORK AREA ISOLATION FOR ALL IN-WATER WORK ACTIVITIES AND STREAM DIVERSIONS. INCLUDING HOW TO MANAGE PUMP DISCHARGE WATER AND MEET PERMIT REQUIREMENTS FOR TURBIDITY MONITORING. THESE METHODS MAY INCLUDE COFFER DAMS, PUMPS WITH APPROPRIATE FISH SCREENS, DISCHARGE HOSES, PUMP DISCHARGE SEDIMENT CONTROL SYSTEM (PDSCS) OR EQUIVALENT METHOD OF REMOVING SEDIMENT FROM TURBID DISCHARGE WATER. DISCHARGE WATER TO DENSELY VEGETATED UPLAND AREAS OR PROVIDE A TREATMENT SYSTEM TO REMOVE SEDIMENT PRIOR TO DISCHARGING TO VEGETATED WETLANDS. MANAGE OUTLET AREA TO PREVENT EROSION.
3. FINAL METHODS OF THE WORK AREA ISOLATION AND DEWATERING SYSTEMS ARE THE CONTRACTOR'S RESPONSIBILITY TO DESIGN AND IMPLEMENT TO COMPLY WITH PERMIT CONDITIONS.
4. CONTRACTOR SHALL MONITOR AREAS DOWNSTREAM OR DOWNSLOPE OF TURBIDITY GENERATING ACTIVITIES, AND ADJUST DEWATERING SYSTEM, DISCHARGE METHOD, AND TREATMENT TECHNIQUES AS NECESSARY TO MINIMIZE SEDIMENT ENTERING WETLANDS AND WATERS AND COMPLY WITH TURBIDITY MONITORING REQUIREMENTS.



PROJECT NAME
**SITKA SEDGE TIDAL
WETLAND RESTORATION**
TIERRA DEL MAR, OREGON

REVISIONS		
#	DATE	DESCRIPTION

DESIGNED	HLW
DRAWN	KCN
CHECKED	HLW
IN CHARGE	HLW 83882

PROJECT NUMBER 202200434
ISSUE DATE 06/19/2026

SCALE IS AS SHOWN WHEN
PLOTTED TO FULL SIZE (22"x34")
1" = 1'

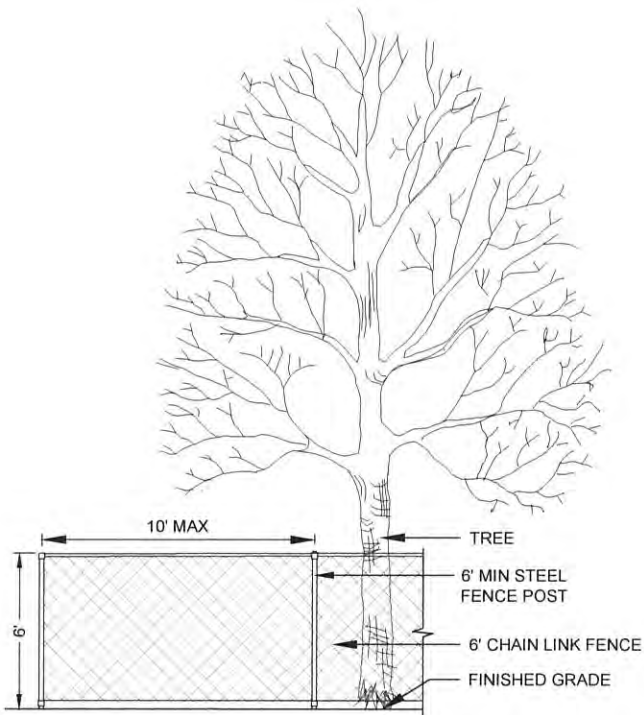
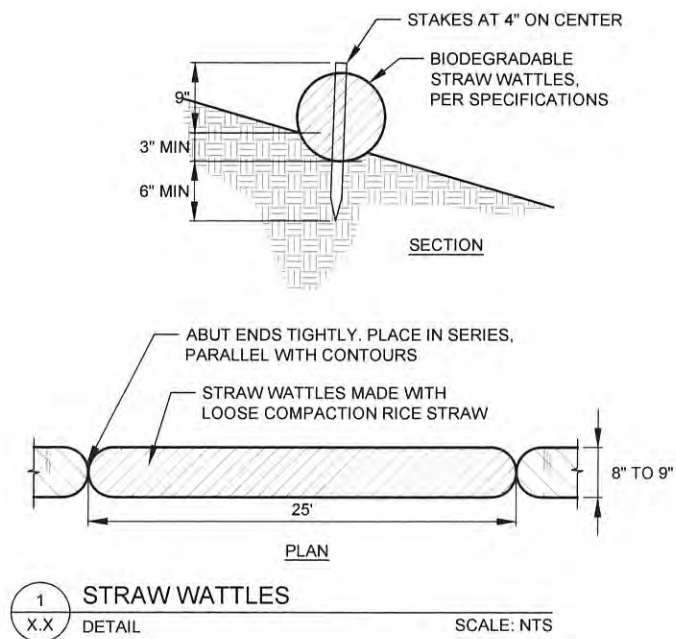
PHASE
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SHEET TITLE

**EROSION &
SEDIMENT
CONTROL PLAN
OVERVIEW**

SHEET NUMBER
EC1.2
SHEET --- OF ###

FILE: P:\01 CAD\2022\22000434-00 - TEP Sitka Sedge Tidal Wetland Restoration\DWG\EC1.3 EROSION CONTROL DETAILS - 1.dwg PLOT DATE: 8/22/2026 10:07:51 AM PLOTTED BY: OLIVIA PEREYRA



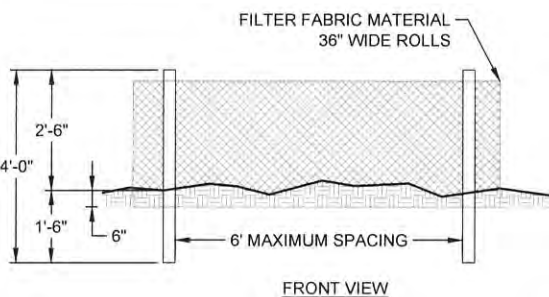
NOTES:

1. INSTALL FENCING IN LOCATIONS AS SHOWN ON PLANS.
2. LOCATE POSTS TO AVOID SEVERING OR DAMAGING LARGE ROOTS.
3. CONTRACTOR IS RESPONSIBLE TO MAINTAIN TREE PROTECTION FENCING THROUGH DURATION OF CONSTRUCTION AND MAKE NECESSARY REPAIRS AS NEEDED.

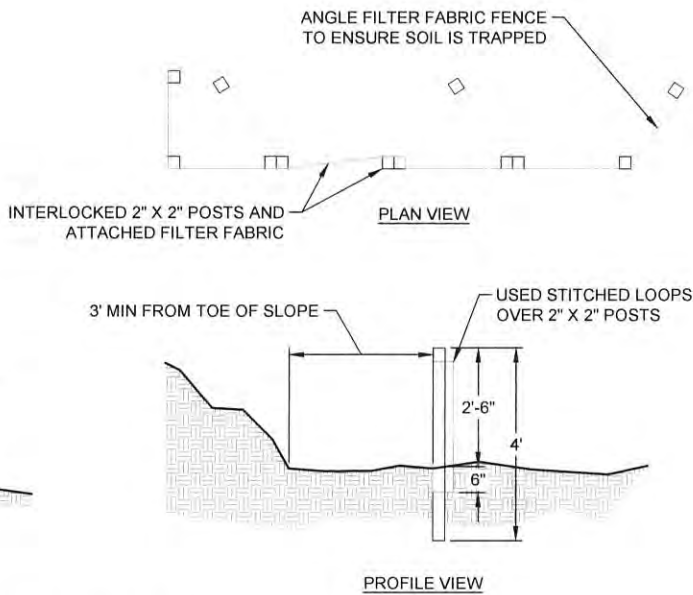
3 TREE PROTECTION FENCE
X.X. DETAIL SCALE: NTS

NOTES:

1. BURY BOTTOM OF FILTER FABRIC 6" VERTICALLY BELOW FINISHED GRADE.
2. 2"x2" FIR, PINE OR STEEL FENCE POSTS.
3. POSTS TO BE INSTALLED ON UPHILL SIDE OF SLOPE.
4. COMPACT BOTH SIDES OF FILTER FABRIC TRENCH.
5. WHEN JOINING TWO OR MORE SEDIMENT FENCES TOGETHER, JOIN THE TWO END STAKES BY WRAPPING THE TWO ENDS AT LEAST ONE AND ONE HALF TURNS AND DRIVING THE JOINED STAKES INTO THE GROUND TOGETHER.



4 SEDIMENT FENCE
X.X. DETAIL SCALE: NTS



REVISIONS		
#	DATE	DESCRIPTION

DESIGNED	AMF
DRAWN	KCN
CHECKED	HLW
IN CHARGE	HLW 83882

PROJECT NUMBER 202200434

ISSUE DATE 06/19/2026

SCALE IS AS SHOWN WHEN
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1" = 1'

PHASE
DRAFT 90% DESIGN

SHEET TITLE

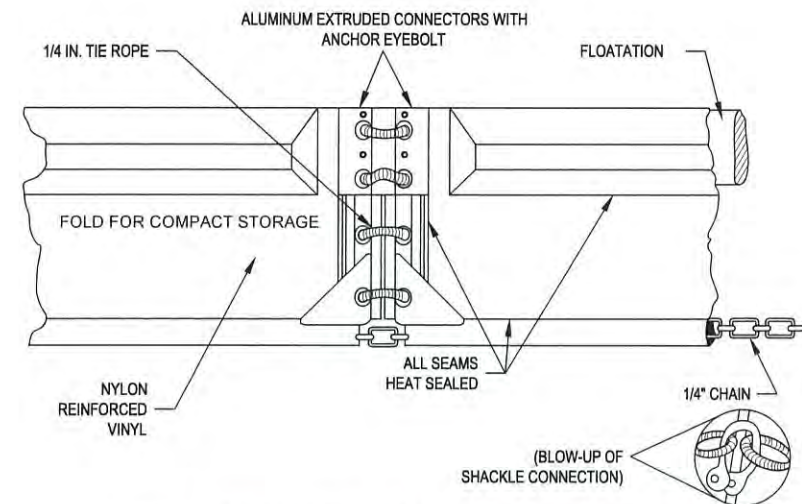
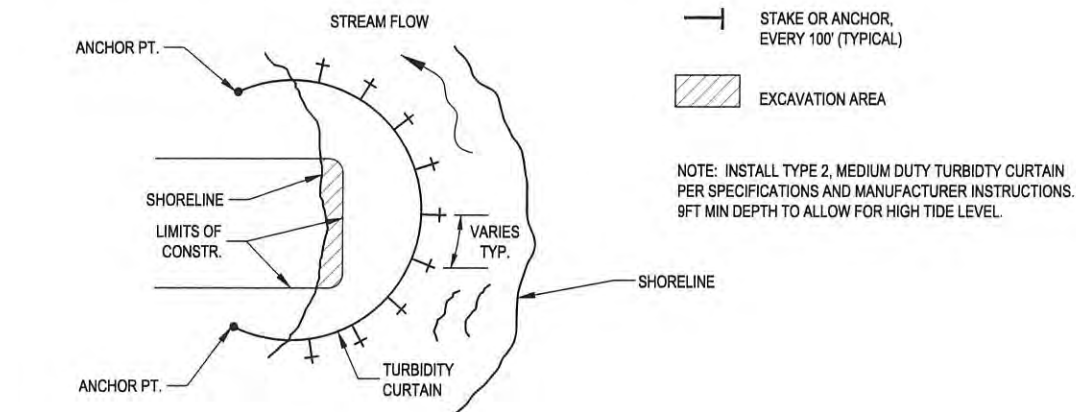
EROSION CONTROL
DETAILS - 1

SHEET NUMBER

EC1.3

SHEET ---- OF ###

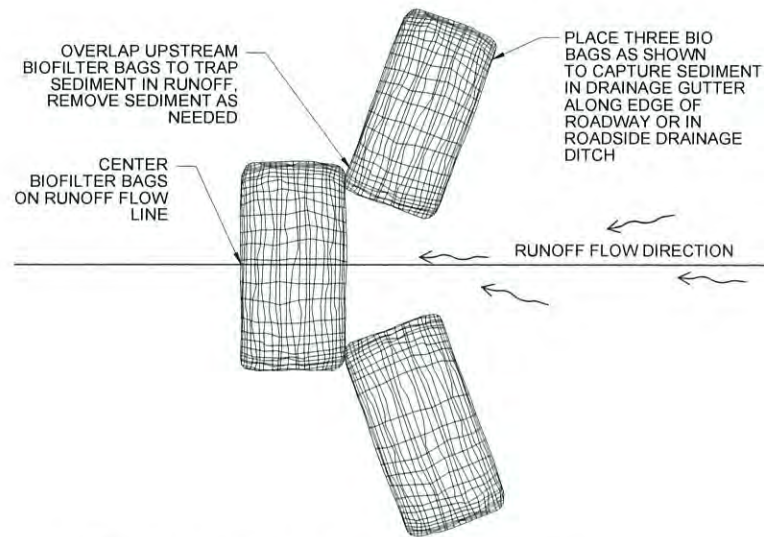
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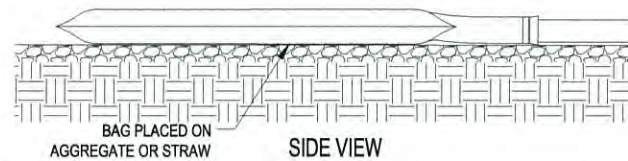
1 TURBIDITY CURTAIN
X.X DETAIL SCALE: NTS

NOTES:

- BIO FILTER BAGS SHALL BE 18"x6"x10" (MIN. SIZE) PLASTIC MESH BAGS WITH 1/2-INCH OPENINGS FILLED WITH APPROXIMATELY 45 POUNDS OF CLEAN, NON-TOXIC 100 PERCENT RECYCLED WOOD PRODUCT WASTE CONTAINING NO FINE MATERIALS OR SEDIMENTS.
- CONTRACTOR SHALL MAINTAIN BIOFILTER BAGS., REMOVING SEDIMENT AS NECESSARY, AND RELOCATING BIOFILTER BAGS TO MAXIMIZE SEDIMENT CAPTURE OR AS DIRECTED BY THE OWNER.

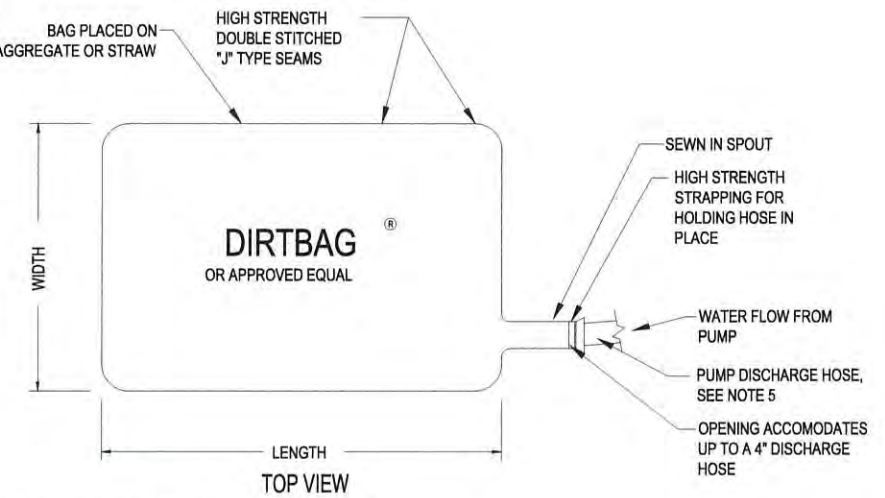


3 BIO FILTER BAG
X.X DETAIL SCALE: NTS



NOTES

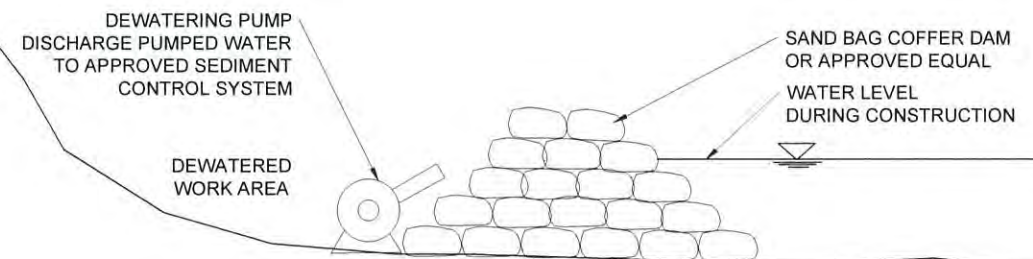
- THE GEOTEXTILE BAG SHALL BE ATTACHED TO THE EFFLUENT PIPE FROM THE DEWATERING PUMP. THE PLACEMENT OF THE GEOTEXTILE BAG SHALL BE INCLUDED IN THE CONTRACTOR'S DEWATERING PLAN.
- AVOID PLACEMENT OF THE GEOTEXTILE BAG ABOVE STEEP SLOPES OR WHERE SATURATED SOIL CONDITIONS MAY CAUSE SOIL INSTABILITY.
- INSTALL THE GEOTEXTILE BAG ON A MILD SLOPE SO INCOMING WATER FLOWS DOWNHILL THROUGH THE BAG. DISPOSE OF CAPTURED SEDIMENT IN FILL MOUNDS.
- THE GEOTEXTILE BAG IS FULL WHEN IT NO LONGER CAN EFFICIENTLY FILTER SEDIMENT OR PASS WATER AT A REASONABLE RATE. DISPOSE OF THE GEOTEXTILE BAG AS DIRECTED BY THE ENGINEER.
- THE GEOTEXTILE BAG AND OUTLET SHALL NOT BE LOCATED IN THE EXCLUSION ZONE, HOWEVER THE CONTRACTOR MAY ENTER THE EXCLUSION ZONE ON FOOT IN ORDER TO ROUTE THE DEWATERING DISCHARGE HOSE THROUGH THE EXCLUDED AREA. THE FINAL DISCHARGE LOCATION MUST BE SUBMITTED FOR REVIEW BY THE ENGINEER AS PART OF THE WORK CONTAINMENT AND DEWATERING PLAN.



4 PUMP DISCHARGE SEDIMENT CONTROL SYSTEM
X.X DETAIL SCALE: NTS

NOTES:

- WORK AROUND TIDES TO THE MAXIMUM EXTENT FEASIBLE.
- WHEN NECESSARY TO COMPLETE FILL OR ROCK PLACEMENT, ISOLATE WORK AREA AND PERFORM FISH SALVAGE IN ACCORDANCE WITH PERMIT CONDITIONS PRIOR TO DEWATERING. IF ISOLATION SYSTEM IS OVERTOPPED BY TIDES, FISH SALVAGE MUST BE PERFORMED AGAIN.
- USE SANDBAG COFFER DAM, PORTADAM, OR OTHER MEANS OF ISOLATION.
- UTILIZE PUMPS WITH APPROPRIATE FISH SCREENS TO DEWATER WORK AREA, AND DISCHARGE PUMPED WATER TO AN UPLAND LOCATION AND/OR APPROVED SEDIMENT CONTROL SYSTEM.



5 DEWATERING SYSTEM
X.X DETAIL SCALE: NTS



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PROJECT NAME
**SITKA SEDGE TIDAL
WETLAND RESTORATION**
TIERRA DEL MAR, OREGON

REVISIONS		
#	DATE	DESCRIPTION
DESIGNED	AMF	
DRAWN	KCN	
CHECKED	HLW	
IN CHARGE	HLW	83882

PROJECT NUMBER 202200434

ISSUE DATE 06/19/2026

SCALE IS AS SHOWN WHEN
PLOTTED TO FULL SIZE (22"x34")
1" = 1'

PHASE
DRAFT 90% DESIGN

SHEET TITLE

EROSION CONTROL
DETAILS - 2

SHEET NUMBER

EC1.4

SHEET ---- OF ###

FILE: P:\01 CAD\2022\xxxx\20200434.dwg TEP Sitka Sedge Tidal Wetland Restoration\DWG\1.0 REVEGETATION NOTES.dwg PLOT DATE: 6/22/2026 10:08:10 AM PLOTTED BY: OLIVIA PEREYRA

NOTES

GENERAL NOTES:

1. ANY DISCREPANCY BETWEEN PERMITS AND DESIGN DRAWINGS SHALL BE IMMEDIATELY REPORTED TO OWNER'S REPRESENTATIVE FOR RESOLUTION PRIOR TO AFFECTED WORK BEING PREFORMED. CONTRACTOR SHALL REVIEW DESIGN DRAWINGS PRIOR TO MOBILIZATION AND SHALL ALLOW ENOUGH TIME FOR ANY IDENTIFIED POTENTIAL PERMIT ISSUES TO BE RESOLVED WITHOUT IMPACTING CONSTRUCTION SCHEDULE.
2. PRIOR TO ANY GROUND DISTURBANCE, CONTRACTOR SHALL LOCATE ALL CASTINGS AND UNDERGROUND AND OVERHEAD UTILITIES IN ACCORDANCE WITH SPECIFICATIONS AND STATE LAW SHALL CONTACT THE UNDERGROUND UTILITIES LOCATOR SERVICE (1-800-424-5555) AT LEAST 72 HOURS PRIOR TO CONSTRUCTION. UPON LEARNING OF THE EXISTENCE AND/OR LOCATIONS OF ANY UNDERGROUND UTILITIES NOT SHOWN OR SHOWN INACCURATELY ON THE PLANS OR NOT PROPERLY MARKED BY THE UTILITY OWNER, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE UTILITY OWNER BY TELEPHONE OR IN WRITING.
3. CONTRACTOR SHALL HAVE COPIES OF THE APPROVED PLANS AND SPECIFICATIONS ON SITE AND READILY AVAILABLE AT ALL TIMES.

INVASIVES MANAGEMENT:

4. INVASIVES REMOVAL AND MANAGEMENT ACTIVITIES SHALL:

a. COMPLY WITH ALL APPLICABLE OREGON PARKS AND RECREATION (OPRD) STANDARDS AND POLICIES.

b. FOLLOW APPLICABLE OREGON STATE REGULATIONS, INCLUDING THE REQUIREMENTS OF THE OREGON INVASIVE SPECIES COUNCIL AND OREGON DEPARTMENT OF AGRICULTURE.

c. WHERE APPLICABLE, COORDINATE WITH TILLAMOOK COUNTY REGULATIONS, PROVIDED THEY DO NOT CONFLICT WITH STATE OR OPRD GUIDELINES.
5. THE CONTRACTOR SHALL SUBMIT AN INVASIVES MANAGEMENT PLAN INDICATING ALL PROPOSED ACTIVITIES AND OBTAIN APPROVAL BY THE OPRD REPRESENTATIVE PRIOR TO COMMENCEMENT OF ANY INVASIVE SPECIES REMOVAL. INVASIVE SPECIES REMOVAL SHALL INCLUDE, BUT NOT BE LIMITED TO, ANY AREAS OF PHALARIS ARUNDINACEA, REED CANARYGRASS (RCG) AND RUBUS ARMENICACUS, HIMALAYAN BLACKBERRY WITHIN REVEGETATION AREAS.
6. INVASIVE SPECIES REMOVAL METHODS MAY INCLUDE MANUAL, MECHANICAL, OR SELECT AQUATIC APPROVED HERBICIDE APPLICATION AS APPROVED BY THE OPRD REPRESENTATIVE.

a. AQUATIC HERBICIDE USE MUST BE PRE-APPROVED BY THE OPRD REPRESENTATIVE AND APPLIED ONLY BY LICENSED APPLICATORS IN COMPLIANCE WITH STATE AND FEDERAL REGULATIONS.

b. RCG IN AREAS THAT WILL RECEIVE A MINIMUM OF 5 FEET OF CLEAN FILL AND REMAIN UNDISTURBED FOR AT LEAST 5 YEARS MAY BE LEFT IN PLACE, SUBJECT TO OPRD APPROVAL.

c. ALL METHODS MUST MINIMIZE DISTURBANCE TO NATIVE VEGETATION AND SENSITIVE HABITAT AREAS.
7. ALL EQUIPMENT, TOOLS, CLOTHING AND FOOTWEAR MUST BE CLEANED BEFORE ENTERING AND AFTER LEAVING SITE AREAS TO PREVENT THE INTRODUCTION OR SPREAD OF INVASIVE SPECIES TO OTHER ON- OR OFF-SITE AREAS.

a. CLEANING SHALL INCLUDE THOROUGH REMOVAL OF SEEDS, SOIL, AND PLANT MATERIAL.
8. ALL REMOVED INVASIVE MATERIAL SHALL BE BAGGED OR SECURED AND TRANSPORTED OFF-SITE TO AN APPROVED DISPOSAL FACILITY.

a. ON-SITE COMPOSTING OF INVASIVE MATERIAL IS NOT PERMITTED UNLESS SPECIFICALLY APPROVED BY OPRD.
9. THE CONTRACTOR SHALL AVOID DISTURBANCE TO NATIVE PLANT COMMUNITIES, WETLANDS, AND WILDLIFE HABITATS.
10. EROSION CONTROL AND SEDIMENT MANAGEMENT MUST BE IMPLEMENTED AS SPECIFIED AND AS NECESSARY TO PROTECT WATER QUALITY.
11. THE CONTRACTOR SHALL DOCUMENT ALL INVASIVE SPECIES REMOVAL ACTIVITIES INCLUDING, BUT NOT LIMITED TO, DATES, METHODS USED, APPROXIMATE QUANTITIES REMOVED, AND DISPOSAL METHOD.

BEAVER RESILIENCE PLANTING STRATEGY:

12. INCORPORATE A MIX OF STRATEGIES FOR INCREASED PLANT DENSITY, RESPROUTING SPECIES, HORIZONTAL PLANTING, SPECIES FEATHERING BETWEEN ZONES, AND A COMBINATION OF STANDARD AND SHORT STAKE INSTALLATION WHERE APPLICABLE.
13. INSTALL TEMPORARY PROTECTION CAGES OR FENCING AROUND NEW AND EXISTING VEGETATION AS DIRECTED BY THE OPRD REPRESENTATIVE OR PROJECT BIOLOGIST OR LANDSCAPE ARCHITECT IN HIGH BEAVER BROWSE REVEGETATION AREAS.

a. PRIOR TO COMMENCEMENT OF CONSTRUCTION ACTIVITIES, OPRD STAFF WILL CONDUCT AN ON-SITE ASSESSMENT TO FIELD VERIFY AND IDENTIFY INDIVIDUAL TREES AND/OR VEGETATIVE GROUPINGS TO RECEIVE PROTECTION CAGES OR FENCING WITHIN EXISTING NATIVE TREE AND SHRUB STANDS IN AREAS OF HIGH ANTICIPATED BEAVER ACTIVITY.

PLANTING NOTES:

14. PROTECT ALL EXISTING NATIVE VEGETATION AND WILDLIFE HABITAT FEATURES UNLESS FLAGGED FOR REMOVAL.
15. TREE AND OTHER VEGETATION REMOVAL ALONG THE EXISTING PUBLIC TRAIL SHALL BE COMPLETED AS APPROVED BY OPRD. A TREE RISK ASSESSMENT QUALIFIED (TRAQ) CERTIFIED ARBORIST SHALL PERFORM AN ON-SITE ASSESSMENT OF ALL TREES TO REMAIN THAT ARE WITHIN FALL DISTANCE OF PUBLIC TRAILS. RECOMMENDATIONS FOR PRUNING, MITIGATION, OR ADDITIONAL REMOVAL SHALL BE IMPLEMENTED BASED ON THIS ASSESSMENT FOR PUBLIC SAFETY AND TO PRESERVE HEALTHY VEGETATION.
16. CONTRACTOR SHALL USE IDENTIFIED, APPROVED ACCESS ROUTES AND MINIMIZE GROUND DISTURBANCE OUTSIDE THE LIMIT OF WORK AREA.
17. EXCAVATE, PERFORM WEED MANAGEMENT, AND PREPARE PLANTING SOIL AS COORDINATED IN THE INVASIVES MANAGEMENT PLAN AND PER PLANT SCHEDULES AND SPECIFICATIONS (PROVIDED IN LATER DESIGN PHASES). SOIL AMENDMENTS TO BE COORDINATED AND DETERMINED DURING LATER DESIGN PHASES.
18. DO NOT COMPACT SOIL IN PLANTING ZONES. LOOSEN EXISTING SOILS TO REMAIN TO A MINIMUM 12-INCH DEPTH PRIOR TO PLANTING, ESPECIALLY IN MECHANICALLY GRADED AREAS.
19. IN AREAS RECEIVING IMPORTED CLEAN FILL AND/OR TOPSOIL, INSTALL IN LIFTS AS SPECIFIED BY THE GEOTECHNICAL ENGINEER.
20. PLANTING SHALL OCCUR BETWEEN OCTOBER 1 AND MARCH 15 UNLESS OTHERWISE APPROVED BY OPRD OR THE PROJECT LANDSCAPE ARCHITECT OR BIOLOGIST.
21. EXACT LOCATIONS OF PLANTS MAY BE MODIFIED IN THE FIELD AS APPROVED BY OPRD OR THE PROJECT LANDSCAPE ARCHITECT OR BIOLOGIST.

22. PLANTS SHALL BE INSTALLED PER DETAILS AND AS SPECIFIED. PLANTS SHALL BE BACKFILLED AND WATER-SETTLED. NO COMPACTION IS PERMITTED AROUND THE PLANT.
23. ALL PLANTS SHALL BE WATERED THOROUGHLY IMMEDIATELY FOLLOWING INSTALLATION.
24. NO TREES OR SHRUBS SHALL BE PLANTED IN STANDING WATER UNLESS EXPLICITLY SPECIFIED OTHERWISE.
25. ALL GROUND DISTURBED AREAS SHALL BE PLANTED OR SEEDED WITH THE SPECIFIED SPECIES OR SEED MIX, WITHIN THE LIMIT OF WORK AREA UNLESS NOTED OTHERWISE. REFER TO APPLICABLE PLANT OR SEED SCHEDULES.
26. DO NOT DISTURB EXISTING BEAVER DAMS OR LODGES UNLESS AUTHORIZED OR DIRECTED OTHERWISE BY OPRD. WORK WITHIN BEAVER DAM OR LODGE LOCATIONS SHALL BE COMPLETED UNDER SUPERVISION BY AN OPRD REPRESENTATIVE OR PROJECT BIOLOGIST.

IRRIGATION NOTES:

27. INSTALL TEMPORARY IRRIGATION, EITHER ELEVATED ROTOR HEAD OR POINT SOURCE DRIP EMITTER, OR OTHER SUPPLEMENTAL WATERING METHOD AS NECESSARY IN AREAS WHERE SOIL MOISTURE CONTENT IS SUBJECT TO REACHING PERMANENT WILTING POINT DURING DRY SUMMER MONTHS TO ENSURE PLANT ESTABLISHMENT.

a. IRRIGATION SHALL PROVIDE SUFFICIENT MOISTURE TO SUPPORT PLANT ESTABLISHMENT, WITH ADJUSTMENTS BASED ON SEASONAL WEATHER CONDITIONS.

b. AREAS OF ADEQUATE SOIL MOISTURE IN THE ROOT MASS ZONE MAY NOT REQUIRE IRRIGATION. EXTENTS OF TEMPORARY IRRIGATION COVERAGE TO BE COORDINATED AND DETERMINED IN LATER DESIGN PHASES.
28. THE IRRIGATNION SYSTEM SHALL BE MONITORED REGULARLY AND ADJUSTED TO ENSURE ADEQUATE SOIL MOISTURE WITHOUT OVER-SATURATION.
29. TEMPORARY IRRIGATION LAYOUT, DETAILS, AND SPECIFICATIONS TO BE PROVIDED IN LATER DESIGN PHASES.
30. CONTRACTOR SHALL VERIFY THE WATER SOURCE AND OBTAIN ANY REQUIRED APPROVALS OR TEMPORARY WATER USE PERMITS OR CONTRACTS PRIOR TO INSTALLATION.
31. IRRIGATION SYSTEM COMPONENTS SHALL BE INSTALLED TO AVOID DAMAGE TO EXISTING VEGETATION, TREE ROOT ZONES, AND WETLAND FEATURES, AND ALLOW FOR EASE OF REMOVAL AT THE END OF THE ESTABLISHMENT PERIOD.
32. REMOVE ALL TEMPORARY IRRIGATION COMPONENTS AT THE END OF THE ESTABLISHMENT PERIOD UNLESS DIRECTED OTHERWISE BY OPRD OR THE PROJECT LANDSCAPE ARCHITECT OR BIOLOGIST.

MONITORING NOTES:

33. PERCENT COVER BY AREA OF NATIVE SHRUBS, BOTH INSTALLED AND VOLUNTEER:

a. YEAR 1: AS INSTALLED IN YEAR 1 (100% SURVIVAL OF INSTALLED STOCK)

b. YEAR 2: > 40%

c. YEAR 3: > 60%

d. YEAR 4: > 70%

e. YEAR 5: > 80%
34. PERCENT COVER OF NOXIOUS WEEDS WITHIN AN AREAS SHALL BE < 10%.
35. REFER TO INVASIVES MANAGEMENT NOTES.
36. MONITOR PLANT SURVIVAL IN HIGH-BEAVER ACTIVITY AREAS AND IMPLEMENT ADAPTIVE MANAGEMENT STRATEGIES, SUCH AS SPECIES SUBSTITUTION OR ADDITIONAL PROTECTION, AS NEEDED.
37. MONITORING PROTOCOL INCLUDING PHOTO DOCUMENTATION AND MAINTENANCE SCHEDULE TO BE DEVELOPED IN LATER DESIGN PHASES.



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TILLAMOOK ESTUARIES
PARTNERSHIP

PROJECT NAME

SITKA SEDGE TIDAL
WETLAND RESTORATION

TIERRA DEL MAR, OREGON

REVISIONS

#	DATE	DESCRIPTION
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DESIGNED	T.F
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DRAWN	OP
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CHECKED	T.F
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IN CHARGE	HLW 83882
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PROJECT NUMBER	202200434
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ISSUE DATE	06/19/2026
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SCALE IS AS SHOWN WHEN
PLOTTED TO FULL SIZE (22"x34")
1" = 1'

PHASE

DRAFT 90% DESIGN

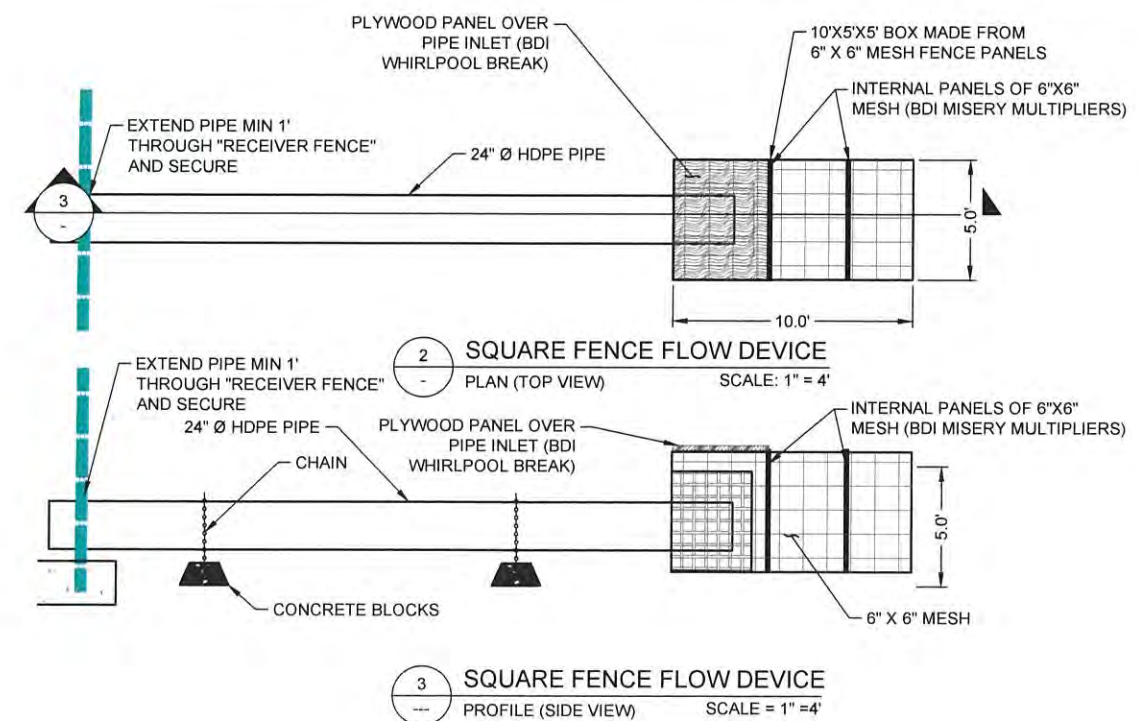
SHEET TITLE

REVEGETATION
NOTES

SHEET NUMBER

L1.0

SHEET --- OF ###



1. BEAVER MANAGEMENT SYSTEM INCLUDING EXCLUSION FENCING AND FLOW DEVICE ARE DESIGNED THROUGH COORDINATION WITH BEAVER DECEIVERS INTERNATIONAL (BDI) AND ODFW.
2. THE BEAVER EXCLUSION FENCING SYSTEM INCLUDES:
 - 2.1. 4' TALL CHAIN LINK FENCE (CL-4R, BROWN VINYL COATED) ALONG THE TOP OF THE CONCRETE HEADWALLS AND WING WALLS, WITH THREE 6' WIDE GATES TO PROVIDE ACCESS TO THE MTR AND INTO THE FENCED AREA.
 - 2.2. 8' TO 10' TALL, 6" X 6" MESH WELDED WIRE FENCING (AKA CATTLE PANEL FENCING OR MODIFIED WILDLIFE FENCE) PER SPECS, ACROSS THE CHANNEL UPSTREAM AND DOWNSTREAM OF THE TIDE GATE STRUCTURE, WITH A MINIMUM TOP ELEVATION OF 13'.
 - 2.3. A "SQUARE FENCE" FLOW DEVICE BOX MADE FROM 6"X6" MESH PANELS, INCLUDING THREE INTERNAL 6"X6" MESH BAFFLES (BDI MISERY MULTIPLIERS) TO PREVENT BLOCKAGE OF THE BYPASS PIPE.
 - 2.4. A 24" DIA HDPE PIPE THAT CONVEYS WATER FROM THE "SQUARE FENCE" THROUGH THE "RECEIVER FENCE" TO MAINTAIN FLOW IF RECEIVER FENCE IS BLOCKED BY BEAVER DAMMING OR DEBRIS.
3. THE 6"X6 MESH SPACING OF ALL INSTREAM FENCING IS SELECTED TO MEET ODFW FISH PASSAGE DESIGN CRITERIA FOR STREAMS THAT SUPPORT CUTTHROAT TROUT ONLY STREAMS (NOT EXPECTED TO SUPPORT ADULT SALMON USE).
4. CONTRACTOR TO INSTALL CHAIN LINK FENCE AND GATES, SURFACE MOUNTED ALONG THE TOP OF CONCRETE WALLS PER SPECS. CONTRACTOR TO INSTALL 6"X6" MESH WELDED WIRE FENCING (RECEIVER FENCE AND DOWNSTREAM BEAVER EXCLUSION FENCE). BDI TO FABRICATE AND INSTALL SQUARE FENCE FLOW DEVICE AND CONNECTION PIPE, PER SPECS. CONTRACTOR TO FACILITATE BDI'S INSTALLATION OF THESE ELEMENTS WITH ACCESS, WORK AREA ISOLATION, AND DEWATERING AS NEEDED.
5. THE UPSTREAM FENCE ACROSS THE CHANNEL (RECEIVER FENCE) SHALL BE MOUNTED ON METAL POSTS DESIGNED TO WITHSTAND DEBRIS LOADING, ON FOOTINGS INTEGRATED INTO THE CONCRETE SLAB AND MEETING MINIMUM REQUIREMENTS OF ODOT STANDARD DETAILS AND SPECS FOR WILDLIFE FENCING. DOWNSTREAM BEAVER EXCLUSION FENCE SHALL BE ON METAL POSTS WITH INDIVIDUAL CONCRETE FOOTINGS PER ODOT STANDARD DETAIL DR840. EXTEND ADDITIONAL 6"X6" MESH FENCE PANEL BENEATH THE CHANNEL BOTTOM IN THE AREA BETWEEN THE FENCE AND THE SLAB (TO PREVENT BEAVER DIGGING BENEATH THE FENCE).
6. ANCHOR SQUARE FENCE FLOW DEVICE AND 24" DIA HDPE BYPASS PIPE IN PLACE, SECURED TO CHANNEL BOTTOM USING CONCRETE BLOCKS AND CHAIN PER SPECS, OR OTHERWISE APPROVED BY ENGINEER.
7. WHEN TIDE GATE STRUCTURE IS COMPLETE AND READY FOR SERVICE, INCLUDING MTR SYSTEM AND BEAVER MANAGEMENT SYSTEM, CONNECT TO NEW DRAINAGE CHANNELS, REMOVE TEMPORARY DRAINAGE ACCOMMODATIONS, AND FINISH SETBACK DIKE OVER STRUCTURE. CONFIRM SEQUENCING AND TIMING WITH ENGINEER FOR APPROVAL.
8. MUTED TIDAL REGULATOR (MTR) ARE SHOWN HERE DIAGRAMMATICALLY FOR INFORMATIONAL PURPOSED ONLY. PRIOR TO FENCING AND MTR SYSTEM INSTALLATION, CONTRACTOR TO VERIFY COMPATIBILITY AND CLEARANCES REQUIRED BETWEEN FENCE AND MTR ELEMENTS INCLUDING FLOAT/WEIGHT TANK.



FILE: P:\01 CAD\2022\xxxx\202200434.00 - TEP Sitka Sedge Tidal Wetland Restoration\DWG\L1.1 OVERVIEW.dwg PLOT DATE: 6/22/2026 10:08:25 AM PLOTTED BY: OLIVIA PEREYRA

PACIFIC OCEAN

TIERRA DEL MAR

NORTH DITCH
ROMA AVE
POLLOCK AVE
JASMINE AVE

EAST MARSH

DISTURBED AREA

BELTZ MARSH

ESTUARY LOOP TRAIL

REVEGETATION SHEET OVERVIEW
PLAN

SCALE: 1" = 250'

SAND LAKE

FLOW

FLOW

STAGING AREA

BELTZ CREEK
FLOW

REVEGETATION AREA 3,
SEE SHEET L2.3

EX TREE CANOPY
(APPROX.), TYP, VIF

TAX LOT BOUNDARY, TYP

REVEGETATION AREA 1,
SEE SHEET L2.1

STAGING AREA

FLOW

REVEGETATION AREA 2,
SEE SHEET L2.2

EX THALWEG
(APPROX.)

RENEKE CREEK

FLOW

250 125 0 250 500
1"=250' SCALE FEET



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TILLAMOOK ESTUARIES
PARTNERSHIP

PROJECT NAME
**SITKA SEDGE TIDAL
WETLAND RESTORATION**
TIERRA DEL MAR, OREGON

REVISIONS		
#	DATE	DESCRIPTION
DESIGNED	T.F	
DRAWN	OP	
CHECKED	T.F	
IN CHARGE	HLW 83882	

PROJECT NUMBER 202200434
ISSUE DATE 06/19/2026

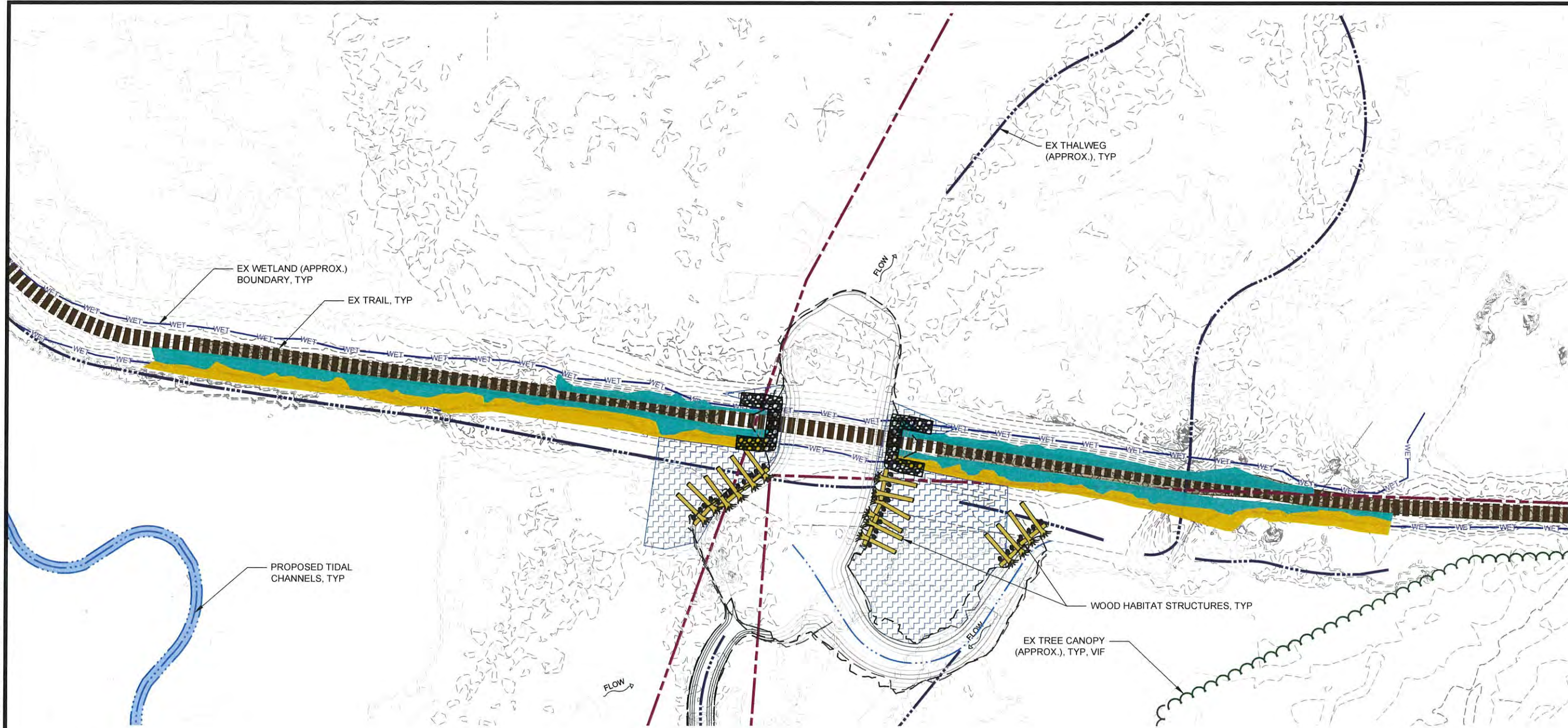
SCALE IS AS SHOWN WHEN
PLOTTED TO FULL SIZE (22"x34")
1" = 1'

PHASE
DRAFT 90% DESIGN

SHEET TITLE
**REVEGETATION
SHEET OVERVIEW**

SHEET NUMBER
L2.0
SHEET --- OF ###

FILE: P:01 CAD:202200000D202200434.00 - TEP Sitka Sedge Tidal Wetland Restoration\DWG\L2 X REVEG-ENLARGEMENTS.dwg PLOT DATE: 6/22/2026 10:09:21 AM PLOTTED BY: OLIVIA PEREYRA



- NOTES
- SEE SHEET L1.0 FOR REVEGETATION NOTES
 - PLANTING AREAS MEASURED IN ACRES FOR SEED ONLY APPLICATIONS AND IN SQUARE FEET FOR MIXED VEGETATION PLANTINGS.

PLANTING LEGEND	
	SETBACK DIKE SHRUBS - LOWER
	SETBACK DIKE SHRUBS - UPPER
	TIDAL MARSH



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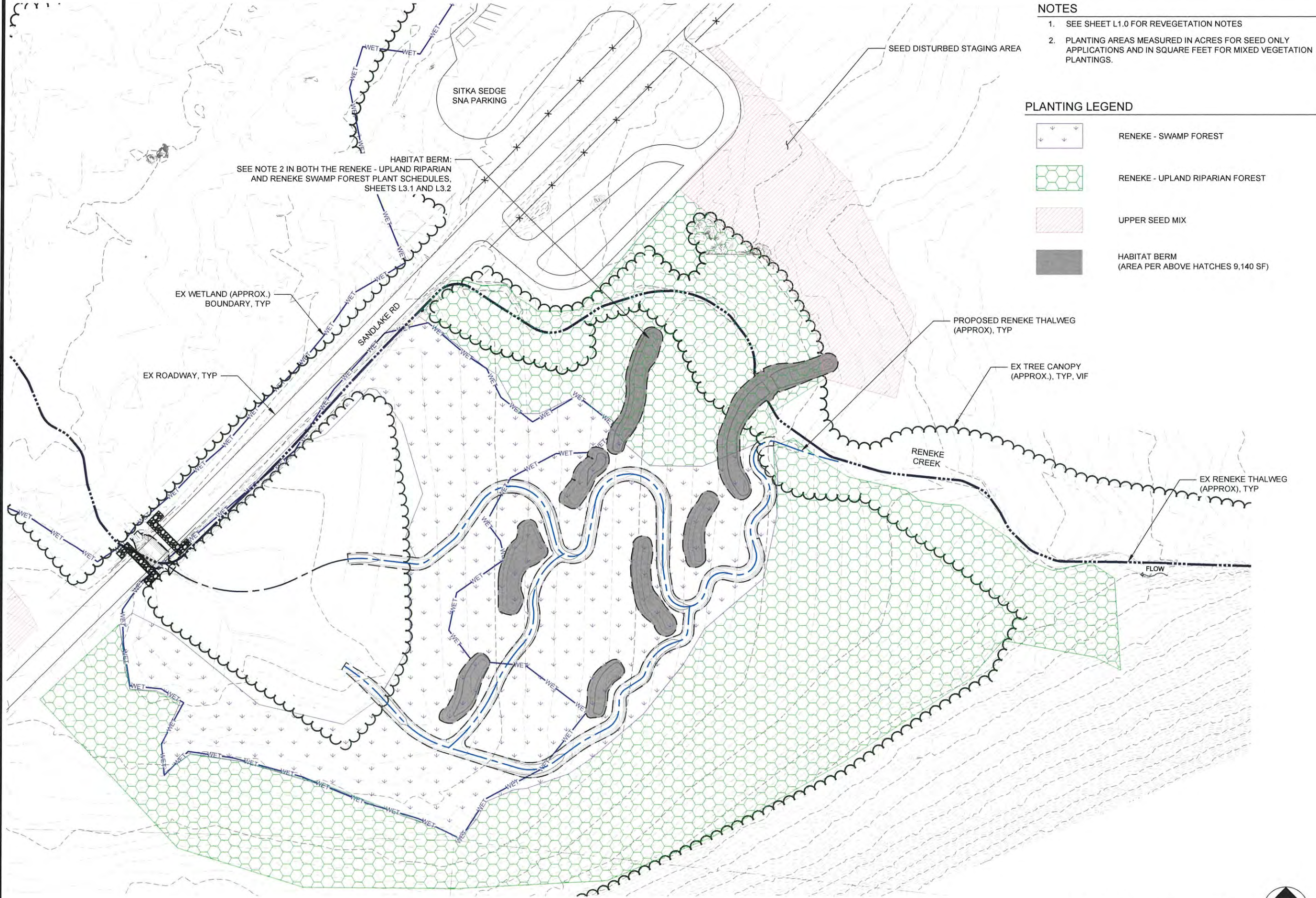
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WETLAND RESTORATION**
TIERRA DEL MAR, OREGON

REVISIONS		
#	DATE	DESCRIPTION
DESIGNED	T.F	
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IN CHARGE	HLW 83882	
PROJECT NUMBER	202200434	
ISSUE DATE	06/19/2026	
SCALE IS AS SHOWN WHEN PLOTTED TO FULL SIZE (22"x34") 1" = 50'		
PHASE		
DRAFT 90% DESIGN		

SHEET TITLE
**REVEGETATION
AREA 1**

SHEET NUMBER
L2.1
SHEET --- OF ###

FILE: P:\01 CAD\2022\0000\0202200434.00 - TER Sitka Sedge Tidal Wetland Restoration\DWG\L2.X REVEG-ENLARGEMENTS.dwg PLOT DATE: 6/22/2026 10:09:37 AM PLOTTED BY: OLIVIA PEREYRA



NOTES

1. SEE SHEET L1.0 FOR REVEGETATION NOTES
2. PLANTING AREAS MEASURED IN ACRES FOR SEED ONLY APPLICATIONS AND IN SQUARE FEET FOR MIXED VEGETATION PLANTINGS.

PLANTING LEGEND

- RENEKE - SWAMP FOREST
- RENEKE - UPLAND RIPARIAN FOREST
- UPPER SEED MIX
- HABITAT BERM (AREA PER ABOVE HATCHES 9,140 SF)



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PROJECT NAME
**SITKA SEDGE TIDAL
WETLAND RESTORATION**
TIERRA DEL MAR, OREGON

REVISIONS
DATE DESCRIPTION

DESIGNED T.F
DRAWN OP
CHECKED T.F
IN CHARGE HLW
83882

PROJECT NUMBER 202200434

ISSUE DATE 06/19/2026

SCALE IS AS SHOWN WHEN
PLOTTED TO FULL SIZE (22"x34")
1" = 50'

PHASE
DRAFT 90% DESIGN

SHEET TITLE

REVEGETATION
AREA 2

SHEET NUMBER

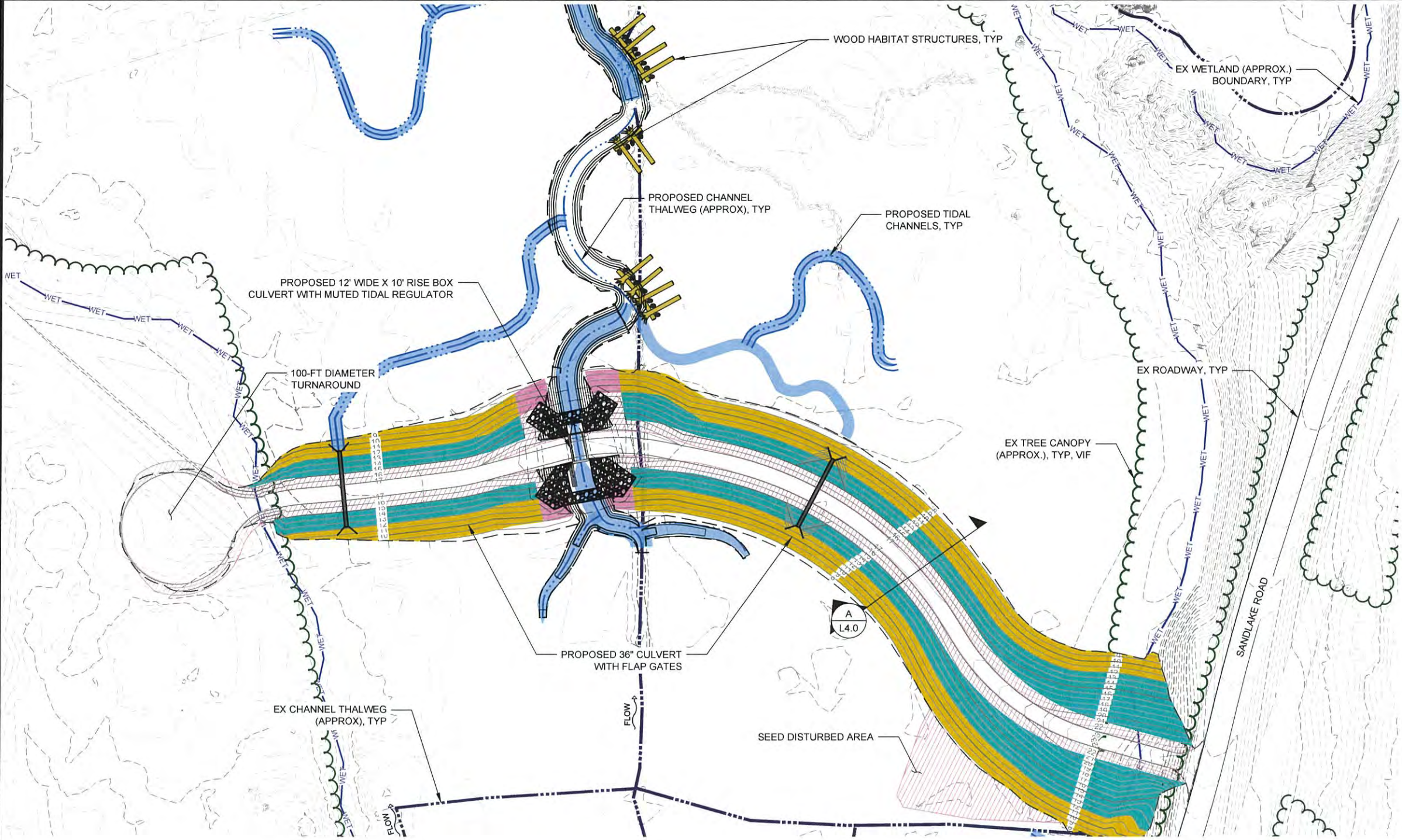
L2.2

SHEET --- OF ###

1"=50'
50 25 0 50 100
SCALE FEET



FILE: P:01 CAD:2022xxxxx\202200434.00 - TEP Sitka Sedge Tidal Wetland Restoration\DWG\L2.X REVEG-ENLARGEMENTS.dwg PLOT DATE: 8/22/2026 10:09:57 AM PLOTTED BY: OLIVIA PEREYRA



NOTES

1. SEE SHEET L1.0 FOR REVEGETATION NOTES
2. PLANTING AREAS MEASURED IN ACRES FOR SEED ONLY APPLICATIONS AND IN SQUARE FEET FOR MIXED VEGETATION PLANTINGS.

PLANT LEGEND

	UPPER SEED MIX
	SETBACK DIKE - LOWER SEED MIX
	SETBACK DIKE SHRUBS - UPPER
	SETBACK DIKE SHRUBS - LOWER



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PROJECT NAME
SITKA SEDGE TIDAL
WETLAND RESTORATION
TIERRA DEL MAR, OREGON

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IN CHARGE	HLW	
	83882	
PROJECT NUMBER	202200434	
ISSUE DATE	06/19/2026	

SCALE IS AS SHOWN WHEN
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1" = 1'

PHASE
DRAFT 90% DESIGN

SHEET TITLE
REVEGETATION
AREA 3

SHEET NUMBER
L2.3
SHEET --- OF ###

FILE: P:01_CAD:2022xxxxxD202200434_00 - TER Sitka Sedge Tidal Wetland Restoration\DWG\L2.X REVEG-SCHED.dwg PLOT DATE: 6/22/2026 10:10:06 AM PLOTTED BY: OLIVIA PEREYRA

SETBACK DIKE SHRUBS - UPPER (12.0'-15.0' NAVD88)										AREA (SF) = 48,329
SYMBOL	TYPE	BOTANICAL NAME	COMMON NAME	STOCK TYPE	SIZE	SPACING OC	WETLAND	SALINITY TOLERANCE	DISTRIBUTION	QUANTITY
	SHRUBS	BACCHARIS PILULARIS	COYOTE BRUSH	CONTAINER	1-GAL	6' O.C.	FACU	NONE	10%	155
		GAULTHERIA SHALLON	SALAL	CONTAINER	1-GAL	6' O.C.	FACU	NONE	10%	155
		HOLODISCUS DISCOLOR	OCEANSPRAY	CONTAINER	1-GAL	6' O.C.	FACU	LOW	5%	78
		LONICERA INVOLUCRATA	TWINBERRY HONEYSUCKLE	CONTAINER	1-GAL	6' O.C.	FAC	MODERATE	10%	155
		POLYSTICHUM MUNITUM	SWORD FERN	CONTAINER	1-GAL	6' O.C.	FACU	NONE	10%	155
		ROSA NUTKANA	NOOTKA ROSE	CONTAINER	1-GAL	6' O.C.	FAC	LOW	10%	155
		RUBUS SPECTABILIS	SALMONBERRY	CONTAINER	1-GAL	6' O.C.	FAC	MODERATE	10%	155
		RUBUS URSINUS	TRAILING BLACKBERRY	CONTAINER	1-GAL	6' O.C.	FACU	NONE	10%	155
		SALIX SCOULERIANA	SCOULER'S WILLOW	STAKE		12' O.C.	FAC	LOW	15%	58
		SAMBUCUS RACEMOSA	RED ELDERBERRY	CONTAINER	1-GAL	6' O.C.	FACU	LOW	10%	155
PLANTING AREA PREPARATION:			TBD							
SOIL:			TBD							
MULCH:			TBD							
SEED:			SETBACK DIKE - UPPER SEED MIX, SEE SCHEDULE THIS SHEET							
NOTES:			1. SEED MIX ONLY, NO SHRUBS, IN UPPER 10 FOOT HORIZONTAL CLEAR ZONE.							

SETBACK DIKE SHRUBS - LOWER (8.0'-12.0' NAVD88)									AREA (SF) =	41,512
SYMBOL	TYPE	BOTANICAL NAME	COMMON NAME	STOCK TYPE	SIZE	SPACING OC	WETLAND	SALINITY TOLERANCE	DISTRIBUTION	QUANTITY
	SHRUBS	LONICERA INVOLUCRATA	TWINBERRY HONEYSUCKLE	CONTAINER	1-GAL	6' O.C.	FAC	MODERATE	20%	266
		SALIX HOOKERIANA	HOOKER'S WILLOW	STAKE		12' O.C.	OBL	MODERATE TO HIGH	30%	100
		SALIX SITCHENSIS	SITKA WILLOW	STAKE		12' O.C.	FACW	MODERATE TO HIGH	25%	83
		ROSA PISOCARPA	SWAMP ROSE	CONTAINER	1-GAL	6' O.C.	FAC	LOW TO MODERATE	5%	67
		ROSA NUTKANA	NOOTKA ROSE	CONTAINER	1-GAL	6' O.C.	FAC	LOW	10%	133
		RUBUS SPECTABILIS	SALMONBERRY	CONTAINER	1-GAL	6' O.C.	FAC	MODERATE TO HIGH	10%	133
		PLANTING AREA PREPARATION:		TBD						
		SOIL:		TBD						
		MULCH:		NONE						
		SEED:		SETBACK DIKE - LOWER SEED MIX, SEE SCHEDULE THIS SHEET						
		NOTES:		1. THIS PLANT PALETTE APPLIES TO THE MARSH TRANSITION ZONE, AT THE VEGETATION SHIFT BETWEEN TIDAL MARSH TO UPLAND. 2. INSTALL ROSA AND RUBUS SPECIES IN THE 10-12' ELEVATION BAND ONLY, NOT AT LOWER ELEVATIONS.						

		UPPER SEED MIX (12.0'-17.0' NAVD88)			AREA (AC) = 3	
SYMBOL	TYPE	BOTANICAL NAME	COMMON NAME	WETLAND	DISTRIBUTION BY SEED COUNT	APPLICATION RATE
	SEED	ACHILLEA MILLEFOLIUM	COMMON YARROW	FACU	TBD	TBD
		AGROSTIS EXARATA	SPIKE BENTGRASS	FAC	TBD	TBD
		DELPHINIUM TROLLIIFOLIUM	COLUMBIAN LARKSPUR	FACU	TBD	TBD
		DESCHAMPSIA ELONGATA	SLENDER HAIRGRASS	FACW	TBD	TBD
		ELYMUS GLAUCUS	BLUE WILDRYE	FACU	TBD	TBD
		EPILOBIUM ANGUSTIFOLIUM	FIREWEED	FACU	TBD	TBD
		FESTUCA ROEMERI	ROEMER'S FESCUE	UPL	TBD	TBD
		LUPINUS RIVULARIS	STREAMBANK LUPINE	FAC	TBD	TBD
		SOLIDAGO CANADENSIS	CANADA GOLDENROD	FACU	TBD	TBD
		SYMPHYOTRICHUM SUBSPICATUM	DOUGLAS ASTER	FACU	TBD	TBD
	PLANTING AREA PREPARATION:		TBD			
	SOIL:		TBD			
	MULCH:		NONE			

SETBACK DIKE - LOWER SEED MIX (8.0'-12.0' NAVD88)								AREA (AC) = 0.05	
SYMBOL	TYPE	BOTANICAL NAME	COMMON NAME	WETLAND	AT-RISK	SALINITY TOLERANCE	DISTRIBUTION BY SEED COUNT	APPLICATION RATE	
	SEED	BOLBOSCHOENUS MARITIMUS	SEA CLUBRUSH	OBL		HIGH	TBD	TBD	
		CAREX LYNGBYEI	LYNGBY'S SEDGE	OBL		MODERATE	TBD	TBD	
		CAREX OBNUPTA	SLOUGH SEDGE	OBL		MODERATE	TBD	TBD	
		DESCHAMPSIA CESPITOSA	TUFTED HAIRGRASS	FACW		LOW	TBD	TBD	
		HORDEUM BRACHYANTHERUM	MEADOW BARLEY	FACW		LOW	TBD	TBD	
		POTENTILLA ANSERINA	PACIFIC SILVERWEED	FACW		MODERATE	TBD	TBD	
		STELLARIA HUMIFUSA	SALTMARSH STARWORT	OBL	YES	LOW	TBD	TBD	
		SYMPHYOTRICHUM SUBSPICATUM	DOUGLAS ASTER	FACW		LOW	TBD	TBD	
	PLANTING AREA PREPARATION:		TBD						
	SOIL:		TBD						
	MULCH:		NONE						

NOTES

1. THE PLANT PALETTES PRESENTED INCLUDE A BROAD RANGE OF SPECIES INTENDED FOR PRELIMINARY DISCUSSION. FINAL SPECIES SELECTION WILL BE REFINED FOLLOWING COORDINATION WITH THE OPRD REVIEW TEAM.
2. PLANTING AREAS AND ASSOCIATED PLANT QUANTITIES ARE SCHEMATIC AND PROVIDED FOR INITIAL PRICING PURPOSES ONLY, AND ARE SUBJECT TO REVISION DURING LATER DESIGN PHASES BASED ON FEEDBACK FROM THE OPRD REVIEW TEAM.
3. TBD = PLANT STOCK TYPES AND SIZES ARE DEPENDENT ON PREFERRED SUPPLIER AVAILABILITY. FURTHER COORDINATION WITH THE OPRD TEAM IS NEEDED TO DETERMINE PREFERRED SOURCING STRATEGIES. SEED DISTRIBUTION BY WEIGHT AND APPLICATION RATE TO BE DEVELOPED UPON FINALIZING SEED MIX.
4. AT RISK COLUMN RELATES TO THE SPECIES OUTLINED IN THE VEGETATION INVENTORY AND BOTANICAL RESOURCE ASSESSMENT FOR SITKA SEDGE STATE NATURAL AREA REPORT (SEPTEMBER 2016).



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ENGINEER
53682 PE



NOT FOR
CONSTRUCTION

RENEWAL DATE 06-30-28

CLIENT



TILLAMOOK ESTUARIES
PARTNERSHIP

PROJECT NAME

SITKA SEDGE TIDAL
WETLAND RESTORATION

TIERRA DEL MAR, OREGON

REVISIONS

#	DATE	DESCRIPTION

DESIGNED

T.F

DRAWN

OP

CHECKED

T.F

IN CHARGE

HLW
83882

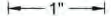
PROJECT NUMBER

202200434

ISSUE DATE

06/19/2026

SCALE IS AS SHOWN WHEN
PLOTTED TO FULL SIZE (22"x34")



PHASE

DRAFT 90% DESIGN

SHEET TITLE

PLANTING
SCHEDULES

SHEET NUMBER

L3.0

SHEET

OF

###

FILE: P:\01 CAD\2022\00000\202200434_00 - TER Sitka Sedge Tidal Wetland Restoration\DWG\L2.X REVISED SCHED.dwg PLOT DATE: 6/22/2026 10:10:07 AM PLOTTED BY: OLIVIA PEREYRA

TIDAL MARSH (6.0'-8.0' NAVD88)									AREA (SF) = 27,944	
SYMBOL	TYPE	BOTANICAL NAME	COMMON NAME	STOCK TYPE	SPACING OC	WETLAND	SALINITY TOLERANCE	AT-RISK	DISTRIBUTION	QUANTITY
	SEED	CAREX LYNGBYEI	LYNGBYE'S SEDGE	HARVEST	3' O.C.	OBL	HIGH		20%	717
		DESCHAMPSIA CESPITOSA	TUFTED HAIRGRASS	HARVEST	3' O.C.	FACW	HIGH		5%	179
		DISTICHLIS SPICATA	SALTGRASS	HARVEST	3' O.C.	FACW	HIGH		12%	430
		GRINDELIA STRICTA	OREGON GUMWEED	HARVEST	3' O.C.	FACW	MODERATE		5%	179
		HORDEUM BRACHYANTHERUM	MEADOW BARLEY	SEED	3' O.C.	FAC	MODERATE		5%	179
		JUNCUS BALTICUS	BALTIC RUSH	HARVEST	3' O.C.	FACW	MODERATE TO HIGH		5%	179
		PLANTAGO MARITIMA	SEA PLANTAIN	HARVEST	3' O.C.	FACW	MODERATE TO HIGH		10%	359
		POTENTILLA ANSERINA	SILVERWEED CINQUEFOIL	HARVEST	3' O.C.	FACW	MODERATE		10%	359
		SCHOENOPLECTUS PUNGENS	COMMON THREESQUARE	HARVEST	3' O.C.	OBL	MODERATE		10%	359
		STELLARIA HUMIFUSA	SALTMARSH STARWORT	SEED	3' O.C.	OBL	HIGH	YES	3%	108
		TRIGLOCHIN MARITIMA	SEASIDE ARROWGRASS	HARVEST	3' O.C.	OBL	HIGH		15%	538
		PLANTING AREA PREPARATION:		TBD						
SOIL:		TBD								
MULCH:		NONE								
SEED:		TBD								
NOTES:		1. INSTALL USING SEED / NATIVE SOIL HYDROSEED SLURRY. ROUGHEN, DECOMPACT DISTURBED SEED AREA AS FEASIBLE.								

RENEKE - UPLAND RIPARIAN FOREST								AREA (SF) = 248,883		
SYMBOL	TYPE	BOTANICAL NAME	COMMON NAME	STOCK TYPE	SIZE	SPACING OC	WETLAND	DISTRIBUTION	QUANTITY	
	TREES	ACER MACROPHYLLUM	BIGLEAF MAPLE	CONTAINER	1-GAL	24' O.C.	FACU	10%	57	
		ALNUS RUBRA	RED ALDER	CONTAINER	1-GAL	24' O.C.	FAC	20%	114	
		FRANGULA PURSHIANA	CASCARA	CONTAINER	1-GAL	24' O.C.	FAC	20%	114	
		PICEA SITCHENSIS	SITKA SPRUCE	BR		24' O.C.	FAC	30%	171	
		TSUGA HETEROPHYLLA	WESTERN HEMLOCK	CONTAINER	1-GAL	24' O.C.	FACU	20%	114	
		CORYLUS CORNUTA	BEAKED HAZELNUT	CONTAINER	1-GAL	12' O.C.	FACU	10%	143	
	SHRUBS	GAUTHERIA SHALLON	SALAL	CONTAINER	1-GAL	6' O.C.	FACU	10%	741	
		HOLODISCUS DISCOLOR	OCEANSPRAY	CONTAINER	1-GAL	12' O.C.	FACU	5%	71	
		LONICERA INVOLUCRATA	TWINBERRY HONEYSUCKLE	CONTAINER	1-GAL	6' O.C.	FAC	10%	741	
		MAHONIA AQUIFOLIUM	TALL OREGON GRAPE	CONTAINER	1-GAL	6' O.C.	FACU	10%	741	
		RUBUS SPECTABILIS	SALMONBERRY	CONTAINER	1-GAL	6' O.C.	FAC	10%	741	
		SALIX SCOULERIANA	SCOULER'S WILLOW	STAKE		12' O.C.	FAC	5%	71	
		SAMBUCUS RACEMOSA	RED ELDERBERRY	CONTAINER	1-GAL	12' O.C.	FACU	10%	143	
		SYMPHORICARPOS ALBUS	COMMON SNOWBERRY	CONTAINER	1-GAL	6' O.C.	FACU	10%	741	
		VACCINIUM OVATUM	EVERGREEN HUCKLEBERRY	CONTAINER	1-GAL	6' O.C.	FACU	10%	741	
		VACCINIUM PARVIFLORUM	RED HUCKLEBERRY	CONTAINER	1-GAL	6' O.C.	FACU	10%	741	
	SEED	TYPE	BOTANICAL NAME	COMMON NAME	WETLAND	DISTRIBUTION BY SEED COUNT		APPLICATION RATE		
		ACHILLEA MILLEFOLIUM	COMMON YARROW	FACU	TBD		TBD			
		BROMUS SITCHENSIS	ALASKA BROME	FACU	TBD		TBD			
		CLAYTONIA PERFOLIATA	MINER'S LETTUCE	FAC	TBD		TBD			
		DELPHINIUM TROLLIIFOLIUM	COLUMBIAN LARKSPUR	FACU	TBD		TBD			
		ELYMUS GLAUCUS	BLUE WILD RYE	FACU	TBD		TBD			
		FESTUCA SUBULATA	BEARDED FESCUE	FACU	TBD		TBD			
		LUPINUS RIVULARIS	STREAMBANK LUPINE	FAC	TBD		TBD			
		PLANTING AREA PREPARATION:			TBD					
		SOIL:			TBD					
		MULCH:			MULCH RINGS PER DETAIL					
		SEED:			RENEKE UPLAND SEED MIX, SEE SCHEDULE					
		NOTES:			1. PLANTING AREA IS BASED ON WETLAND BOUNDARY DELINEATION AND ANTICIPATED RESTORATION AREA, ~ 16-20' NAVD88. 2. INSTALL A SELECTION OF THE ABOVE RENEKE UPLAND RIPARIAN FOREST SPECIES (FAC AND FACU) IN THE PROPOSED HABITAT BERM AREAS THAT OVERLAP THIS HATCH AREA. INSTALL FULL SUN SPECIES AT THE FRINGE. OTHER AREAS INSTALL A MIX OF SHRUBS SPECIES. OVERSEED THE ENTIRE AREA WITH SPECIFIED SEED MIX.					

NOTES

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4. AT RISK COLUMN RELATES TO THE SPECIES OUTLINED IN THE VEGETATION INVENTORY AND BOTANICAL RESOURCE ASSESSMENT FOR SITKA SEDGE STATE NATURAL AREA REPORT (SEPTEMBER 2016).



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STAMP

REGISTERED PROFESSIONAL
LANDSCAPE ARCHITECT
OREGON
NO. 2002
53882 PE
NOT FOR
CONSTRUCTION

RENEWAL DATE 06-30-28

CLIENT



TILLAMOOK ESTUARIES
PARTNERSHIP

PROJECT NAME

SITKA SEDGE TIDAL
WETLAND RESTORATION

TIERRA DEL MAR, OREGON

REVISIONS

#	DATE	DESCRIPTION

DESIGNED T.F
DRAWN OP
CHECKED T.F
IN CHARGE HLW 83882

PROJECT NUMBER 202200434
ISSUE DATE 06/19/2026

SCALE IS AS SHOWN WHEN
PLOTTED TO FULL SIZE (22"x34")
1"=1'

PHASE
DRAFT 90% DESIGN

SHEET TITLE

PLANTING
SCHEDULES

SHEET NUMBER
L3.1

SHEET ---- OF ###

FILE: P:\01_CAD\2022\xxxx\0202200434_00 - TEP Sitka Sedge Tidal Wetland Restoration\DWG\L3.2.X\REVEG-SCHED.dwg PLOT DATE: 6/22/2026 10:10:07 AM PLOTTED BY: OLIVIA PEREYRA

RENEKE - SWAMP FOREST								AREA (SF) = 151,009	
SYMBOL	TYPE	BOTANICAL NAME	COMMON NAME	STOCK TYPE	SIZE	SPACING OC	WETLAND	DISTRIBUTION	QUANTITY
	TREES	ALNUS RUBRA	RED ALDER	CONTAINER	1-GAL	24' O.C.	FAC	30%	104
		FRANGULA PURSHIANA	CASCARA	CONTAINER	1-GAL	24' O.C.	FAC	15%	52
		MALUS FUSCA	OREGON CRABAPPLE	CONTAINER	1-GAL	24' O.C.	FACW	20%	69
		PICEA SITCHENSIS	SITKA SPRUCE	BR		24' O.C.	FAC	30%	104
		THUJA PLICATA	WESTERN REDCEDAR	CONTAINER	1-GAL	24' O.C.	FAC	5%	17
	SHRUBS	CORNUS SERICEA	REDOSIER DOGWOOD	CONTAINER	1-GAL	6' O.C.	FACW	20%	900
		LONICERA INVOLUCRATA	TWINBERRY HONEYSUCKLE	CONTAINER	1-GAL	6' O.C.	FAC	20%	900
		PHYSOCARPUS CAPITATUS	PACIFIC NINEBARK	CONTAINER	1-GAL	12' O.C.	FAC	15%	130
		SALIX HOOKERIANA	HOOKE'S WILLOW	STAKE		12' O.C.	OBL	13%	112
		SALIX SITCHENSIS	SITKA WILLOW	STAKE		12' O.C.	FACW	12%	104
		RUBUS SPECTABILIS	SALMONBERRY	CONTAINER	1-GAL	6' O.C.	FAC	20%	900
	TYPE	BOTANICAL NAME	COMMON NAME	WETLAND	DISTRIBUTION BY SEED COUNT		APPLICATION RATE		
	SEED	CAREX OBNUPTA	SLOUGH SEDGE	OBL	TBD		TBD		
		DESCHAMPSIA CESPITOSA	TUFTED HAIRGRASS	FACW	TBD		TBD		
		GLYCERIA STRIATA	FOWL MANNAGRASS	OBL	TBD		TBD		
		JUNCUS ENSIFOLIUS	SWORDLEAF RUSH	FACW	TBD		TBD		
		HORDEUM BRACHYANTHERUM	MEADOW BARLEY	FACW	TBD		TBD		
		POTENTILLA ANSERINA	PACIFIC SILVERWEED	FACW	TBD		TBD		
		SCIRPUS MICROCARPUS	PANICLED BULRUSH	OBL	TBD		TBD		
		SYMPHYOTRICHUM SUBSPICATUM	DOUGLAS ASTER	FACW	TBD		TBD		
	PLANTING AREA PREPARATION:		TBD						
	SOIL:		TBD						
	MULCH:		NONE						
	SEED:		RENEKE SWAMP SEED MIX, SEE SCHEDULE						
	NOTES:		1. PLANTING AREA IS BASED ON WETLAND BOUNDARY DELINEATION AND ANTICIPATED RESTORATION AREA. 2. INSTALL A SELECTION OF THE ABOVE RENEKE SWAMP FOREST SPECIES (FAC AND FACW) IN THE PROPOSED HABITAT BERM AREAS THAT OVERLAP THIS HATCH AREA. INSTALL A MIX OF HERBACEOUS AND SHRUBS SPECIES AND OVERSEED THE ENTIRE AREA.						

NOTES

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OREGON
LICENSE NO. 83882
NOT FOR
CONSTRUCTION

RENEWAL DATE 06-30-28

CLIENT



TILLAMOOK ESTUARIES
PARTNERSHIP

PROJECT NAME

SITKA SEDGE TIDAL
WETLAND RESTORATION

TIERRA DEL MAR, OREGON

REVISIONS

#	DATE	DESCRIPTION

DESIGNED T.F
DRAWN OP
CHECKED T.F
IN CHARGE HLW 83882

PROJECT NUMBER 202200434
ISSUE DATE 06/19/2026

SCALE IS AS SHOWN WHEN PLOTTED TO FULL SIZE (22"x34")
1" = 1'

PHASE
DRAFT 90% DESIGN

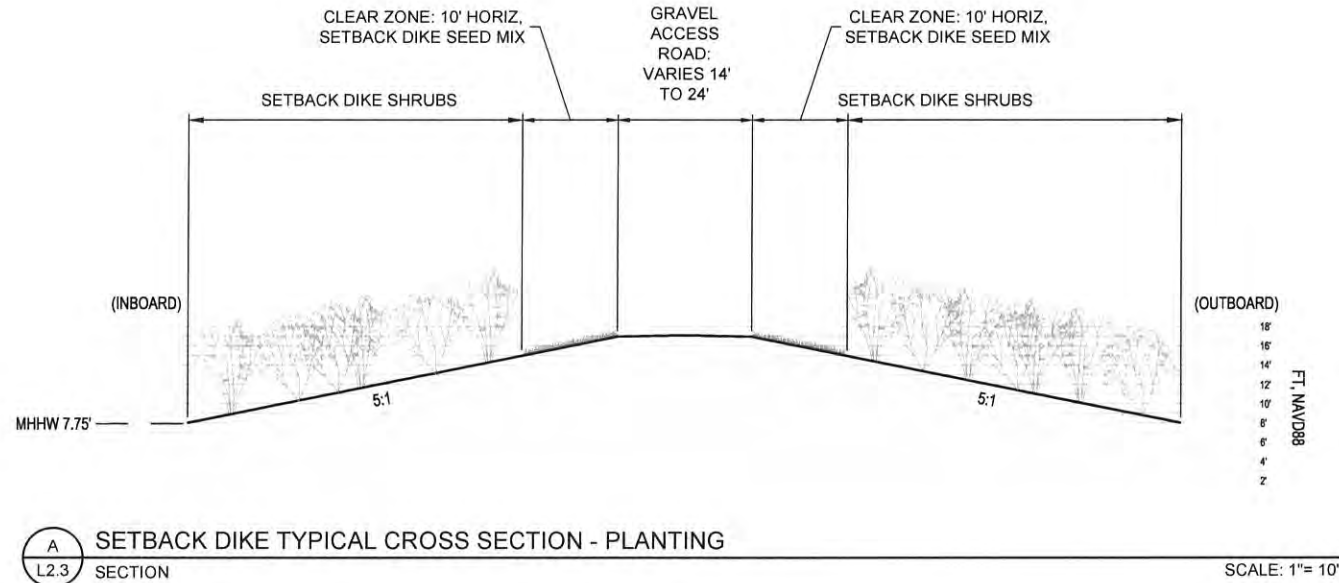
SHEET TITLE

PLANTING
SCHEDULES

SHEET NUMBER
L3.2

SHEET --- OF ###

FILE: P:01 CAD:2022xxxxxD202200434.00 - TEP Sitka Sedge Tidal Wetland Restoration\DWG\LX PLANTING SECTIONS.dwg PLOT DATE: 6/22/2026 10:10:14 AM PLOTTED BY: OLIVIA PEREYRA



- NOTES
- SEE SHEET L1.0 FOR REVEGETATION NOTES
 - SETBACK DIKE SEED UPPER: EL12-17'
 - SETBACK DIKE SEED LOWER: EL BELOW 12'



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PRELIMINARY

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TILLAMOOK ESTUARIES
PARTNERSHIP

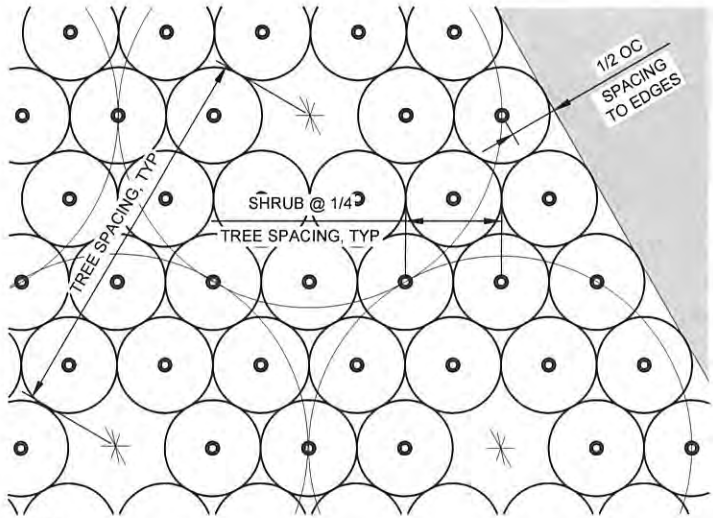
PROJECT NAME

SITKA SEDGE TIDAL
WETLAND RESTORATION

TIERRA DEL MAR, OREGON

REVISIONS		
#	DATE	DESCRIPTION
DESIGNED	T.F	
DRAWN	OP	
CHECKED	T.F	
IN CHARGE	HLW 83882	
PROJECT NUMBER 202200434		
ISSUE DATE 06/19/2026		
SCALE IS AS SHOWN WHEN PLOTTED TO FULL SIZE (22"x34")		
1" = 10'		
PHASE		
DRAFT 90% DESIGN		
SHEET TITLE		
TYPICAL PLANTING PROFILES		
SHEET NUMBER		
L4.0		
SHEET --- OF ###		

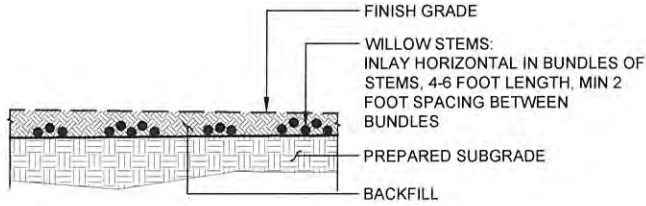
FILE: P:01 CAD:2022xxxxx0202200434 00 - TEP Sitka Sedge Tidal Wetland Restoration\DWG\L5.0 PLANTING DETAILS.dwg PLOT DATE: 6/22/2026 10:10:23 AM PLOTTED BY: OLIVIA PEREYRA



NOTES:

1. PLANTING LAYOUT IS CONCEPTUAL AND INTENDED TO SHOW GROUPINGS OF SIMILAR SPECIES OF PLANTS. SPACING PER PLANT SCHEDULE.
3. GROUP EACH SPECIES IN ODD-NUMBERED CLUSTERS OF 3 TO 9 EXCEPT WHERE NOTED OTHERWISE.
4. PLANT LAYOUT AND TRIANGULAR SPACING MAY BE ADJUSTED TO MEET FIELD CONDITIONS WITH THE ACCEPTANCE OF THE PROJECT LANDSCAPE ARCHITECT OR BIOLOGIST.
5. INFILL AROUND EACH TREE WITH UNDERSTORY SHRUB/FORB PLANTINGS.

1 TRIANGULAR PLANT SPACING SCALE: NTS

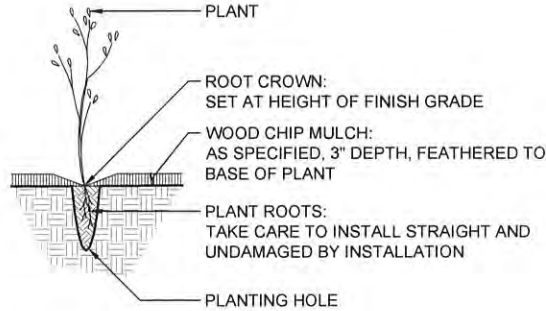


SECTION

NOTES:

1. SEE PLANT SCHEDULES FOR BACKFILL SOIL MIX.
2. EACH STEM SHALL HAVE A MIN OF 3 NODES BURIED FOR ROOTING.
3. COVER WITH 2-4 INCHES OF SOIL WITH SUFFICIENT SOIL CONTACT AT EACH STEM FOR ROOT ESTABLISHMENT.
3. LIGHTLY HAND TAMP BACKFILL TO ENSURE ADEQUATE SOIL CONTACT AROUND BURIED STEMS.
4. TIE BUNDLES LOOSELY TOGETHER WITH BIODEGRADABLE TWINE IN SLOPE AREAS STEEPER THAN 8:1 GRADIENT OR IN AREAS SUBJECT TO EROSION OR WATER MOVEMENT.
5. ALIGN BUNDLES PERPENDICULAR TO THE CONTOUR WHERE LOCATED ALONG THE BANKS OF DEEP PONDS AND WATER CHANNELS.
6. INSTALL COIR FABRIC AND STAKING OVERLAY AT SURFACE IN AREAS STEEPER THAN 8:1 GRADIENT. DETAIL TO BE DEVELOPED IN LATER DESIGN PHASES.

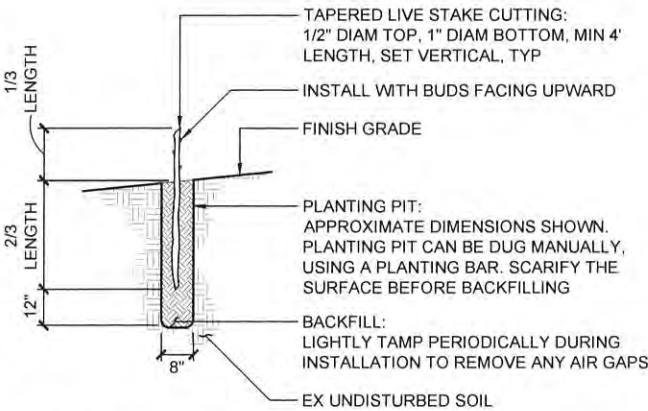
2 HORIZONTAL PLANTING DETAIL NTS



NOTES:

1. OPEN PLANTING HOLE LARGE ENOUGH TO ACCOMMODATE ROOTS. COVER ROOTS LIGHTLY WITH BACKFILL SOIL MIX, LIGHTLY TAMP PERIODICALLY DURING INSTALLATION TO REMOVE ANY AIR GAPS.
2. WOOD CHIP MULCH TO ONLY BE ADDED ABOVE MHHW, 7.75'.

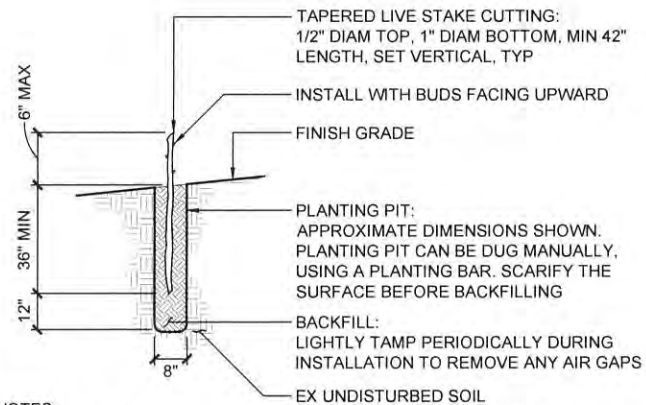
3 PLUG OR BAREROOT PLANTING DETAIL SCALE: NTS



NOTES:

1. BACKFILL SOIL PER PLANT SCHEDULE, PRE-MIXED PRIOR TO BACKFILL.

4 LIVE STAKE PLANTING - STANDARD DETAIL NTS



NOTES:

1. BACKFILL SOIL PER PLANT SCHEDULE, PRE-MIXED PRIOR TO BACKFILL.

5 LIVE STAKE PLANTING - SHORT DETAIL NTS

STAMP

PRELIMINARY
NOT FOR
CONSTRUCTION

CLIENT



SITKA SEDGE TIDAL
WETLAND RESTORATION
TIERRA DEL MAR, OREGON

REVISIONS

#	DATE	DESCRIPTION

DESIGNED	T.F
DRAWN	OP
CHECKED	T.F
IN CHARGE	HLW 83882

PROJECT NUMBER 202200434

ISSUE DATE 06/19/2026

SCALE IS AS SHOWN WHEN
PLOTTED TO FULL SIZE (22"x34")
1" = 1'

PHASE
DRAFT 90% DESIGN

SHEET TITLE

PLANTING DETAILS

SHEET NUMBER

L5.1

SHEET OF ###

Structural details for this project are for illustration only. They are not drawn to scale unless noted otherwise. Contractor must verify all dimensions before fabrication or construction. Do not scale drawings.



250 Main St. Suite A
Klamath Falls, OR 97601
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Phone: (541) 850-6300
info@structure1.com

Project:

Sitka Sedge Tidal Wetland Restoration

Tierra Del Mar, OR

Owner:

Tillamook
Estuaries
Partnership

Client:

ESA
Environmental
Science Assoc.

Stamp:

Stamp:

[illegible]

DRAWN BY:	R.H.
DESIGNED BY:	R.H.
CHECKED BY:	R.H.
Date:	06-04-2026
Project #:	

ESA Env. 224-001

Title:
CROSS SECTIONS &
DETAILS

Page:

S2.1



250 Main St. Suite A
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www.structure1.com
Phone: (541) 850-6300
info@structure1.com

Project:

Sitka Sedge Tidal Wetland Restoration

Tierra Del Mar, OR

Owner:

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Partnership

Client:

ESA
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Science Assoc.

Stamp:

stamp:

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PROGRESS SET
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[illegible]

DRAWN BY: R.H.
DESIGNED BY: R.H.
CHECKED BY: R.H.
Date: 06-04-2026

Project #:

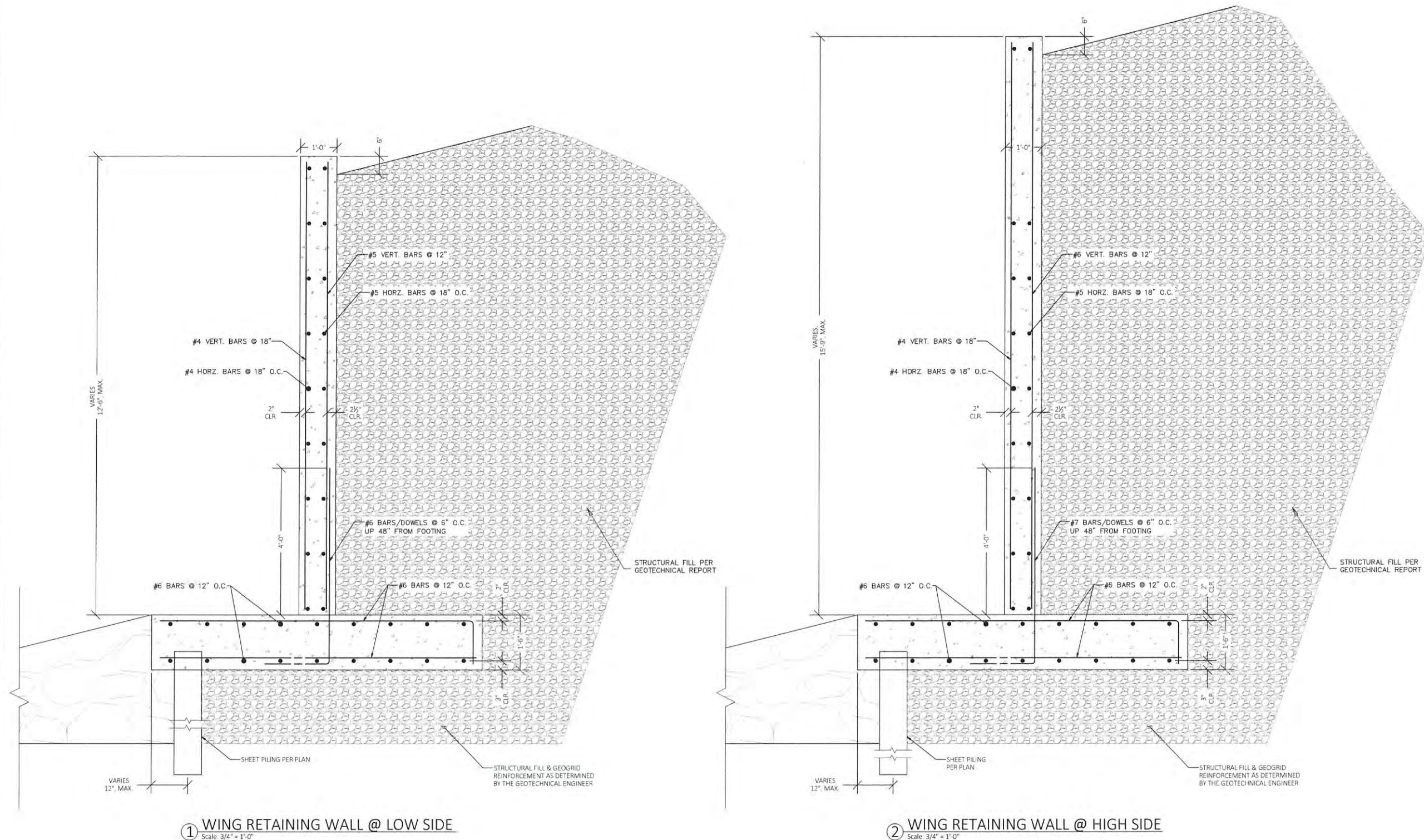
ESA Env. 224-001

Title:

WING WALL DETAILS

Page:

S2.2



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FILE: P:\01 CAD\2022\22xxxx\ID20220434.00 - TEP Silka Sedge Tidal Wetland Restoration\DWG\BELTZ CREEK\1.3 EXISTING CONDITIONS.dwg PLOT DATE: 4/10/2026 11:25:10 AM PLOTTED BY: OLIVIA PEREYRA



BELTZ CREEK PROFILE

PROFILE

SCALE: 1"= 20'

NOTES

1. EXISTING CONDITIONS MAPPING IS BASED ON TOPOGRAPHY SURVEY COMPLETED BY STATEWIDE LAND SURVEYING IN JANUARY 2023.
2. UTILITY LOCATIONS ALONG SANDLAKE ROAD ARE APPROXIMATE.
3. THE VERTICAL DATUM FOR THIS PROJECT IS NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).
4. THE HORIZONTAL DATUM FOR THIS PROJECT IS OREGON STATE PLANE (NORTH ZONE) INTERNATIONAL FOOT.
5. PROPERTY LINES ARE APPROXIMATE BASED ON TILLAMOOK COUNTY GIS ONLINE MAP SERVICES.
6. PRIOR TO INITIATION OF THE SITE WORK, HIGHLY VISIBLE MARKERS SUCH AS BRIGHT ORANGE BARRIER FENCING SHALL BE USED TO IDENTIFY THE WORK / CONSTRUCTION LIMITS.
7. THE CONTRACTOR IS RESPONSIBLE FOR PROTECTING ALL PRIVATE AND PUBLIC PROPERTY OUTSIDE THE WORK LIMITS AND SHALL BARE ALL COSTS TO REPLACE DAMAGE TO THE APPROVAL OF THE OWNER.
8. THE CONTRACTOR SHALL COORDINATE THE RELOCATION FOR ALL MATERIALS FROM THE SITE WITH THEIR OWNER AS DESCRIBED IN THE CONTRACT DOCUMENTS.
9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE VERIFICATION OF EXISTING UTILITY LOCATIONS WHETHER OR NOT THESE UTILITIES ARE SHOWN ON THE PLANS. THE CONTRACTOR SHALL EXERCISE CARE TO AVOID DAMAGE TO ANY UTILITY. IF CONFLICTS WITH EXISTING UTILITIES ARISE DURING CONSTRUCTION, THE CONTRACTOR SHALL NOTIFY THE ENGINEER.



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TILLAMOOK ESTUARIES
PARTNERSHIP

PROJECT NAME

BELTZ CREEK FISH
PASSAGE PROJECT

SANDLAKE ROAD, CLOVERDALE OREGON 97112

REVISIONS

#	DATE	DESCRIPTION
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DESIGNED	MFN
DRAWN	OP
CHECKED	HLW
IN CHARGE	HLW
	### ###

PROJECT NUMBER D202200434

ISSUE DATE 04/07/2026

SCALE IS AS SHOWN WHEN
PLOTTED TO FULL SIZE (22"x34")
1"= 20'

PHASE
30% CONSTRUCTION
DOCUMENTATION

SHEET TITLE

BELTZ CREEK
EXISTING
CONDITIONS

SHEET NUMBER

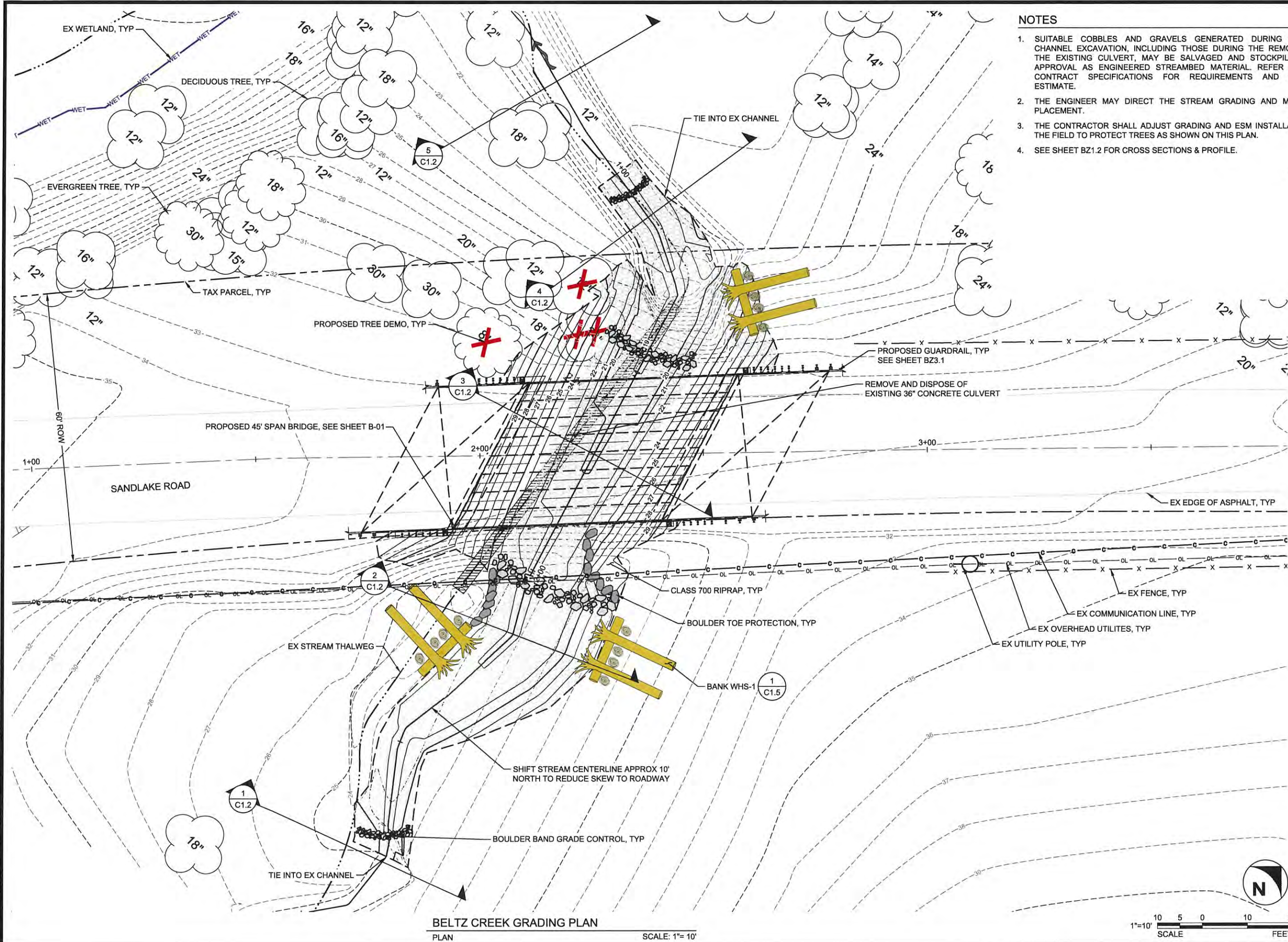
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SHEET - OF -



20 10 0 20 40
1"=20'
SCALE FEET

FILE: P:\01 CAD\2022\0000\0202200434.00 - TEP Silka Sedga Tidal Wetland Restoration\DWG\BELTZ CREEK\BELTZ CREEK STREAM PLAN AND PROFILE.dwg PLOT DATE: 4/10/2026 11:25:27 AM PLOTTED BY: OLIVIA PEREYRA



NOTES

1. SUITABLE COBBLES AND GRAVELS GENERATED DURING STREAM CHANNEL EXCAVATION, INCLUDING THOSE DURING THE REMOVAL OF THE EXISTING CULVERT, MAY BE SALVAGED AND STOCKPILED FOR APPROVAL AS ENGINEERED STREAMBED MATERIAL. REFER TO THE CONTRACT SPECIFICATIONS FOR REQUIREMENTS AND VOLUME ESTIMATE.
2. THE ENGINEER MAY DIRECT THE STREAM GRADING AND MATERIAL PLACEMENT.
3. THE CONTRACTOR SHALL ADJUST GRADING AND ESM INSTALLATION IN THE FIELD TO PROTECT TREES AS SHOWN ON THIS PLAN.
4. SEE SHEET BZ1.2 FOR CROSS SECTIONS & PROFILE.



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TILLAMOOK ESTUARIES
PARTNERSHIP

PROJECT NAME

BELTZ CREEK FISH
PASSAGE PROJECT

SANDLAKE ROAD, CLOVERDALE OREGON 97112

REVISIONS

DATE DESCRIPTION

DESIGNED MFN

DRAWN OP

CHECKED HLW

IN CHARGE HLW

###

PROJECT NUMBER D202200434

ISSUE DATE 04/07/2026

SCALE IS AS SHOWN WHEN
PLOTTED TO FULL SIZE (22"x34")

1"=10'

PHASE

30% CONSTRUCTION

DOCUMENTATION

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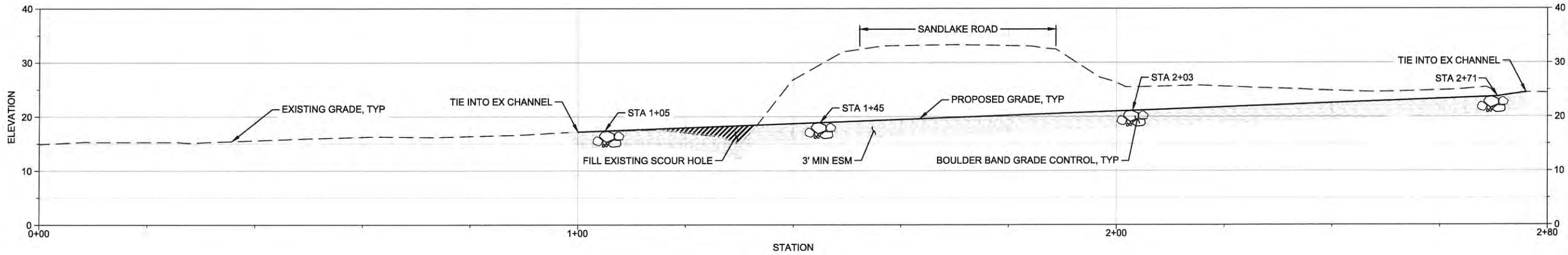
BELTZ CREEK
STREAM PLAN

SHEET NUMBER

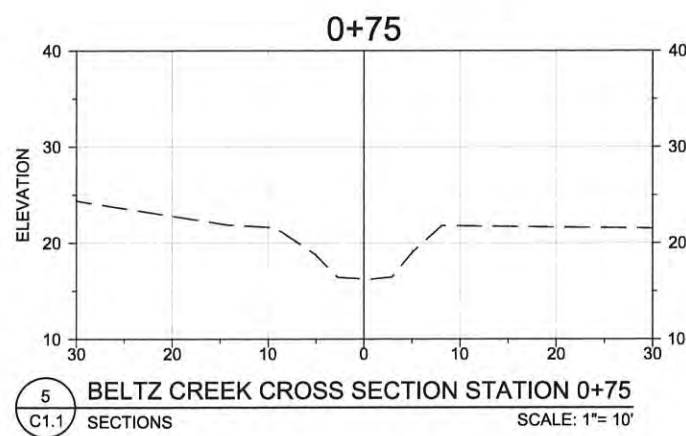
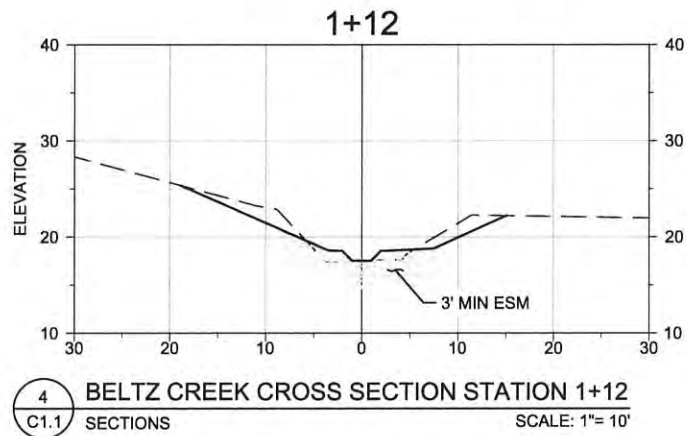
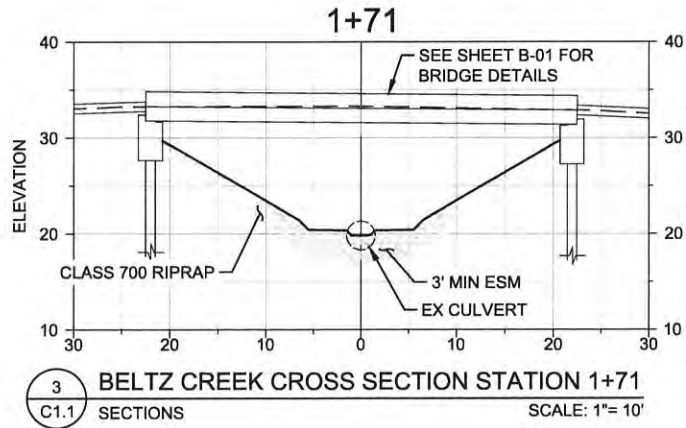
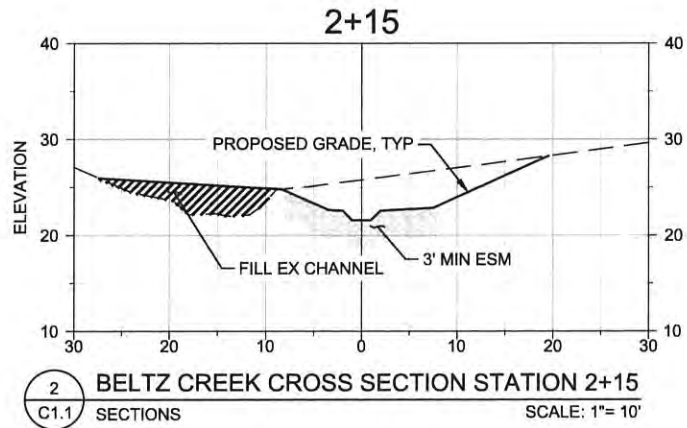
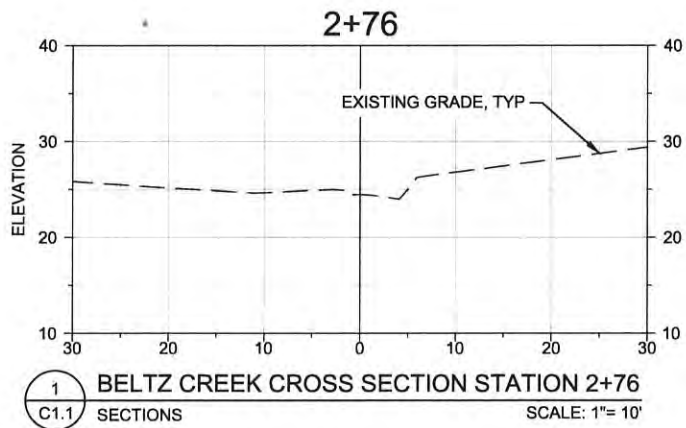
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SHEET OF

FILE: P:\01 CAD\2022\Beltz Creek\Beltz Creek Stream Profile and Sections.dwg PLOT DATE: 4/10/2026 11:35:21 AM PLOTTED BY: OLIVIA PEREYRA



BELTZ CREEK PROFILE
PROFILE SCALE: 1"= 10'



- NOTES
1. SECTIONS ARE ORIENTED LOOKING DOWNSTREAM, LEFT TO RIGHT BANK.
 2. SECTIONS DEPICT FINISHED GRADE. THE CONTRACTOR SHALL OVER-EXCAVATE TO INSTALL ENGINEERED STREAMBED MATERIAL TO THE REQUIREMENTS OF SHEET C1.3 AND C1.4.
 3. SIDE SLOPES SHALL BE 2H:1V MAX.
 4. 9" THICK GRAVEL FILTER BLANKET TO BE PLACED BENEATH ALL RIPRAP.

1"=10'
SCALE 10 5 0 10 20
FEET



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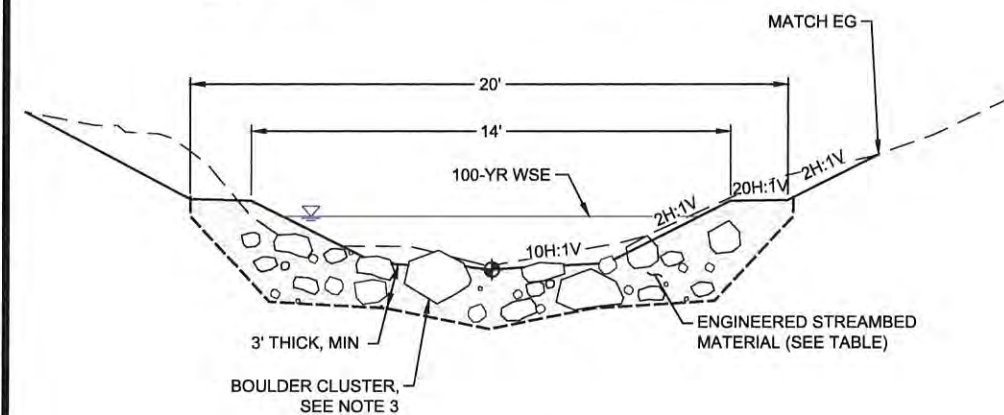
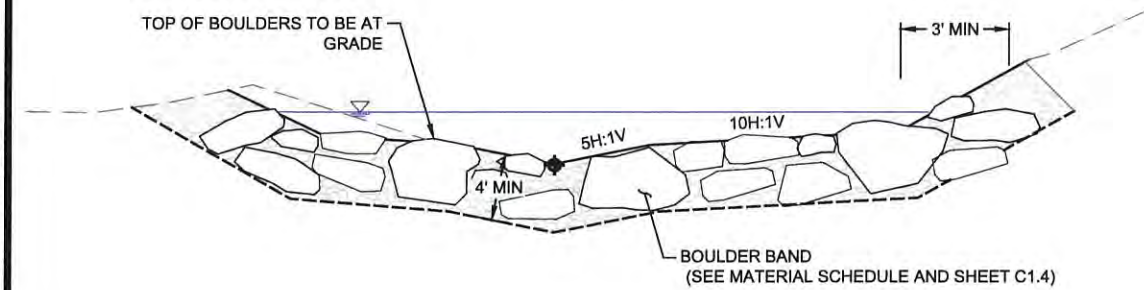
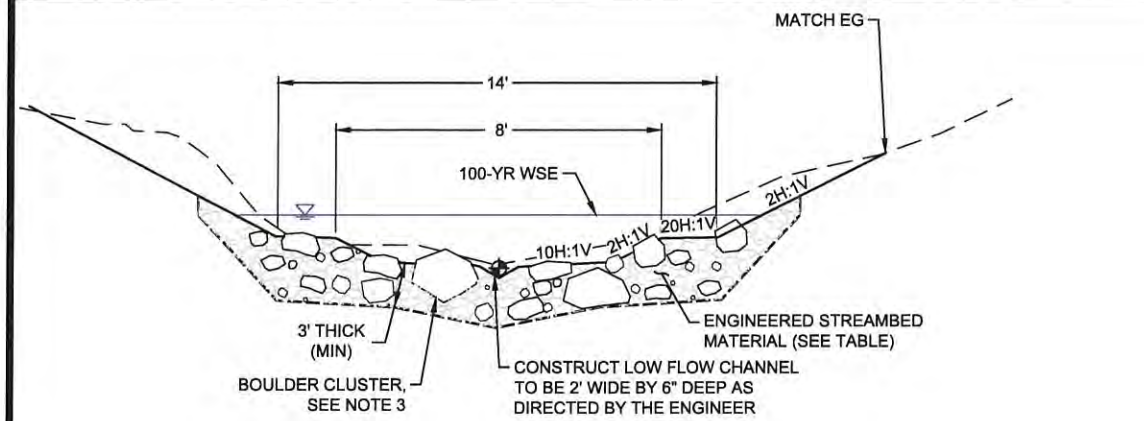
PROJECT NAME
BELTZ CREEK FISH
PASSAGE PROJECT
SANDLAKE ROAD, CLOVERDALE OREGON 97112

REVISIONS		
#	DATE	DESCRIPTION
DESIGNED	MFN	
DRAWN	OP	
CHECKED	HLW	
IN CHARGE	HLW	83882
PROJECT NUMBER	D202200434	
ISSUE DATE	04/07/2026	
SCALE IS AS SHOWN WHEN PLOTTED TO FULL SIZE (22"x34")		

PHASE
30% CONSTRUCTION
DOCUMENTATION
SHEET TITLE

BELTZ CREEK
STREAM PROFILE
AND SECTIONS

SHEET NUMBER
BZ2.2
SHEET 8 OF 17



- ## NOTES

1. SEE STREAMBED INSTALLATION NOTES ON SHEET C1.4.
2. SEE SHEETS C1.2 AND C1.3 FOR POOL THALWEG STATIONS AND ELEVATIONS.
3. BOULDER CLUSTERS TO BE COMPRISED OF 2-3 STREAMBED BOULDERS AND PLACED RANDOMLY WITHIN THE ACTIVE CHANNEL AT THE DIRECTION OF THE ENGINEER.



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TILLAMOOK ESTUARIES
PARTNERSHIPBELTZ CREEK FISH
PASSAGE PROJECT

SANDLAKE ROAD, CLOVERDALE OREGON 97112

PROJECT NAME

REVISIONS

#	DATE	DESCRIPTION
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DESIGNED	MFN
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CHECKED	HLW
IN CHARGE	HLW 83882

PROJECT NUMBER D202200434

ISSUE DATE 04/07/2026

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PHASE
30% CONSTRUCTION
DOCUMENTATION

SHEET TITLE

BELTZ CREEK
STREAM DETAILS 1

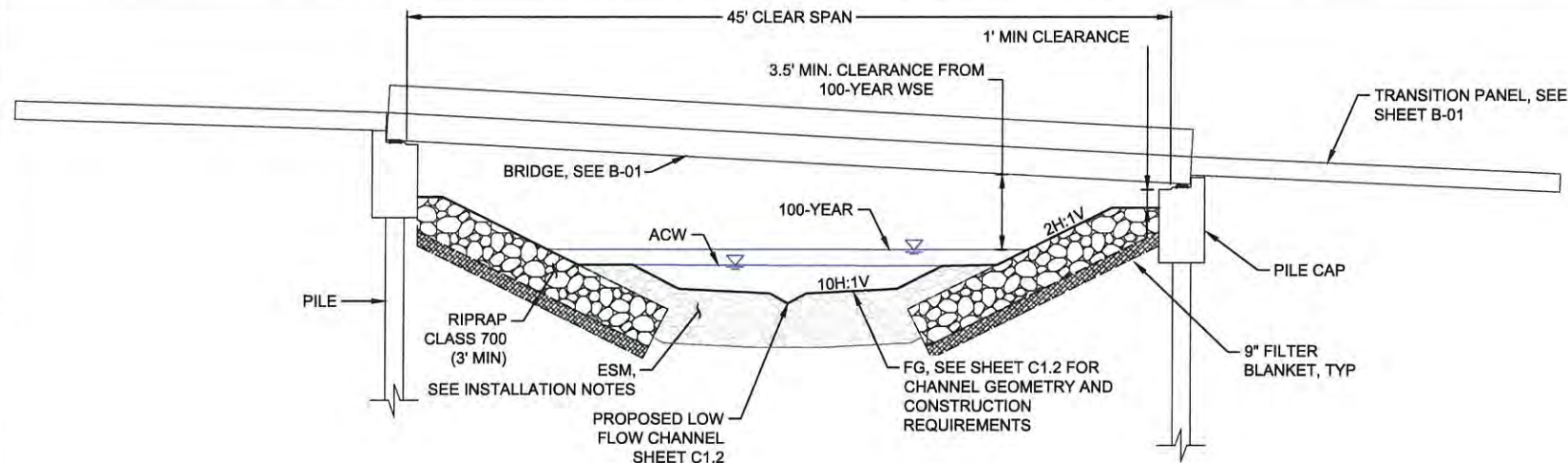
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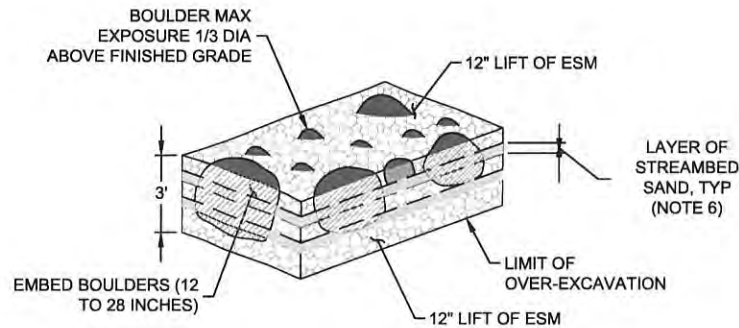
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FILE: P:\01 CAD\2022xxxx\ID202200434.00 - TEP Silka Sedge Tidal Wetland Restoration\DWG\BELTZ CREEK\BELTZ CREEK STREAM DETAILS 2.dwg PLOT DATE: 4/10/2026 11:26:21 AM PLOTTED BY: OLIVIA PEREYRA

FILE: P:\01 CAD\2022\Beltz Creek\Beltz Creek Stream Details 2.dwg PLOT DATE: 4/10/2026 11:26:37 AM PLOTTED BY: OLIVIA PEREYRA



1 TYPICAL BRIDGE SECTION
DETAIL SCALE: 1" = 5'



2 STREAMBED LIFT/LAYERING DETAIL
ISOMETRIC SCALE: NTS

STREAMBED INSTALLATION NOTES

- ALL IMPORTED STREAMBED MATERIALS SHALL BE INSPECTED AT THE OFFSITE SOURCE. THE ENGINEER SHALL PROVIDE WRITTEN APPROVAL BEFORE DELIVERY TO THE PROJECT SITE. THE ENGINEER SHALL VISUALLY INSPECT THE MATERIAL AND MAY REQUIRE THE CONTRACTOR TO DUMP INDIVIDUAL LOADS ONTO A FLAT SURFACE AT THE PROJECT SITE FOR MEASUREMENT AND APPROVAL.
- STREAMBED COBBLES AND GRAVELS AND FINES SHALL BE MIXED INTO A SINGLE STOCKPILE PRIOR TO INSTALLATION USING THE RATIOS PROVIDED ON THIS SHEET AND THE CONTRACT SPECIFICATIONS. THE ENGINEER MAY REQUIRE THE CONTRACTOR TO RE-MIX THE MATERIAL TO ACHIEVE DESIRED GRADATION.
- BOULDERS SHALL BE INDIVIDUALLY PLACED AND BACKFILLED WITH ESM TO FORM COARSE BANDS. ENGINEER MAY DIRECT CONTRACTOR TO ADJUST BOULDER PLACEMENT.
- BOULDER CLUSTERS SHALL BE PLACED TO AS DIRECTED BY THE ENGINEER. BOULDERS ARE INTENDED TO APPEAR AS THOUGH RANDOMLY PROTRUDING ABOVE THE FINISHED GRADE OF THE CHANNEL TO CREATE A COMPLEX ROUGH SURFACE WITH A LOW-FLOW CHANNEL GEOMETRY AS SHOWN ON THE CONTRACT PLANS.
- MATERIALS SHALL BE INSTALLED IN 12-INCH LIFTS TO THE DIMENSIONS AND THICKNESS SHOWN IN THESE PLANS. THICKNESS IS MEASURED PERPENDICULAR TO FINISHED GRADE.
- AFTER EACH LIFT IS PLACED, THE CONTRACTOR SHALL USE WATER TO WASH ADDITIONAL 'STREAMBED SAND' INTO THE VOID SPACES TO CREATE A SEALED BED. THE LIFT SHALL BE CONSIDERED COMPLETE WHEN WATER FLOWS OVER THE SURFACE AS APPROVED BY THE ENGINEER.
- WATER SHALL BE APPLIED TO THE STREAMBED AT A MINIMUM OF 30 GPM.
- THE ENGINEER MAY APPROVE FINES GENERATED ON-SITE TO BE USED TO FILL VOIDS. STREAMBED SAND IS DEFINED IN THE SPECIFICATIONS AND THIS PLAN.
- THE CONTRACTOR SHALL NOT ALLOW GRAVELS AND FINES TO ACCUMULATE SUCH THAT A SUBSEQUENT LIFTS OF BOULDERS REST ON THE FINE SEDIMENT ACCUMULATION. THE ENGINEER SHALL APPROVE EACH LIFT BEFORE SUBSEQUENT LIFTS CAN BE PERFORMED. THE ENGINEER MAY REQUIRE THE CONTRACTOR TO REMOVE ACCUMULATED FINE SEDIMENT BEFORE PLACING ADDITIONAL LIFTS.
- AFTER FINAL LIFT IS PLACED, THE CONTRACTOR SHALL DEMONSTRATE WATER FLOWS OVER THE TOP OF THE CONSTRUCTED STREAMBED AND APPROVED BY THE ENGINEER. IF WATER FLOWS SUBSURFACE, THE ENGINEER MAY REQUIRE ADDITIONAL HAND WORKING OR WASHING OF STREAMBED SEDIMENT INTO VOID SPACES AT NO ADDITIONAL COST TO THE OWNER. AFTER APPROVAL STREAM FLOW WILL BE GRADUALLY REINTRODUCED.
- STREAMBED SAND SHALL BE STOCKPILED SEPARATELY FROM ESM AND STREAMBED BOULDER MATERIALS.

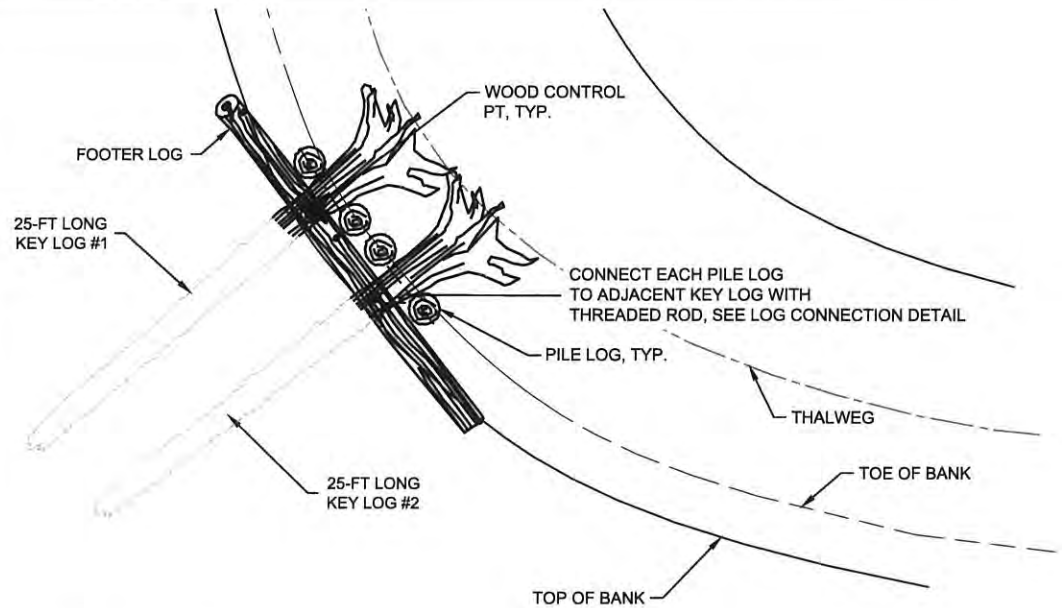
ENGINEERED STREAMBED MATERIAL (ESM) - GRADATION		
FILL MATERIAL	DIAMETER RANGE (IN)	PERCENT BY WEIGHT
2-MAN STREAMBED BOULDERS	18"-28"	10%
1-MAN STREAMBED BOULDERS	12"-18"	30%
STREAMBED COBBLES (12-INCH)	5"-12"	25%
GRAVELS AND FINES	NO. 200 - 2.5"	35%

BOULDER BAND - GRADATION		
FILL MATERIAL	DIAMETER RANGE (IN)	PERCENT BY WEIGHT
3-MAN STREAMBED BOULDERS	28"-36"	5%
2-MAN STREAMBED BOULDERS	18"-28"	45%
1-MAN STREAMBED BOULDERS	12"-18"	50%

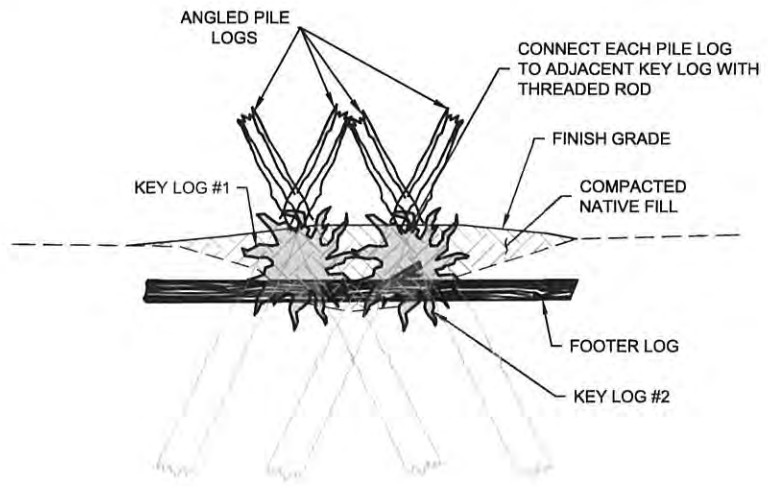
BOULDER CLUSTER - GRADATION		
FILL MATERIAL	DIAMETER RANGE (IN)	QUANTITY
2-MAN STREAMBED BOULDERS	18"-28"	1
1-MAN STREAMBED BOULDERS	12"-18"	1

ROCK SIZING TO BE REFINED IN SUBSEQUENT DESIGN PHASE.

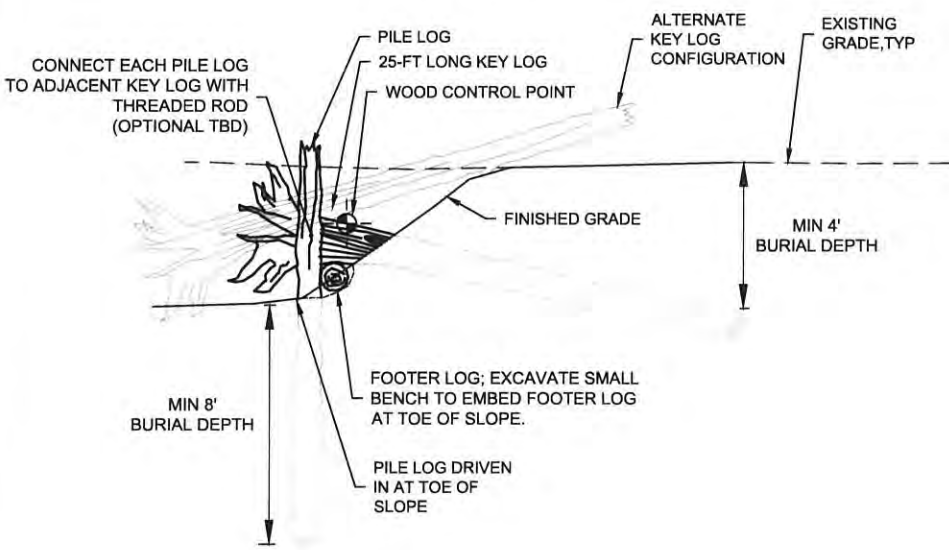
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1 WHS - BANK
C1.1 DETAIL
SCALE: NTS



SECTION 1A



SECTION 1B

NOTES

1. THIS SHEET DEPICTS PRELIMINARY WOOD HABITAT STRUCTURE (WHS) CONFIGURATION. THESE STRUCTURES WILL BE REFINED IN SUBSEQUENT DESIGN PHASES TO FIT PROPOSED WHS LOCATIONS.

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TILLAMOOK ESTUARIES
PARTNERSHIP

PROJECT NAME
**BELTZ CREEK FISH
PASSAGE PROJECT**
SANDLAKE ROAD, CLOVERDALE OREGON 97112

REVISIONS		
#	DATE	DESCRIPTION

DESIGNED	OP
DRAWN	OP
CHECKED	HLW
IN CHARGE	HLW 83882

PROJECT NUMBER D202200434

ISSUE DATE 04/07/2026

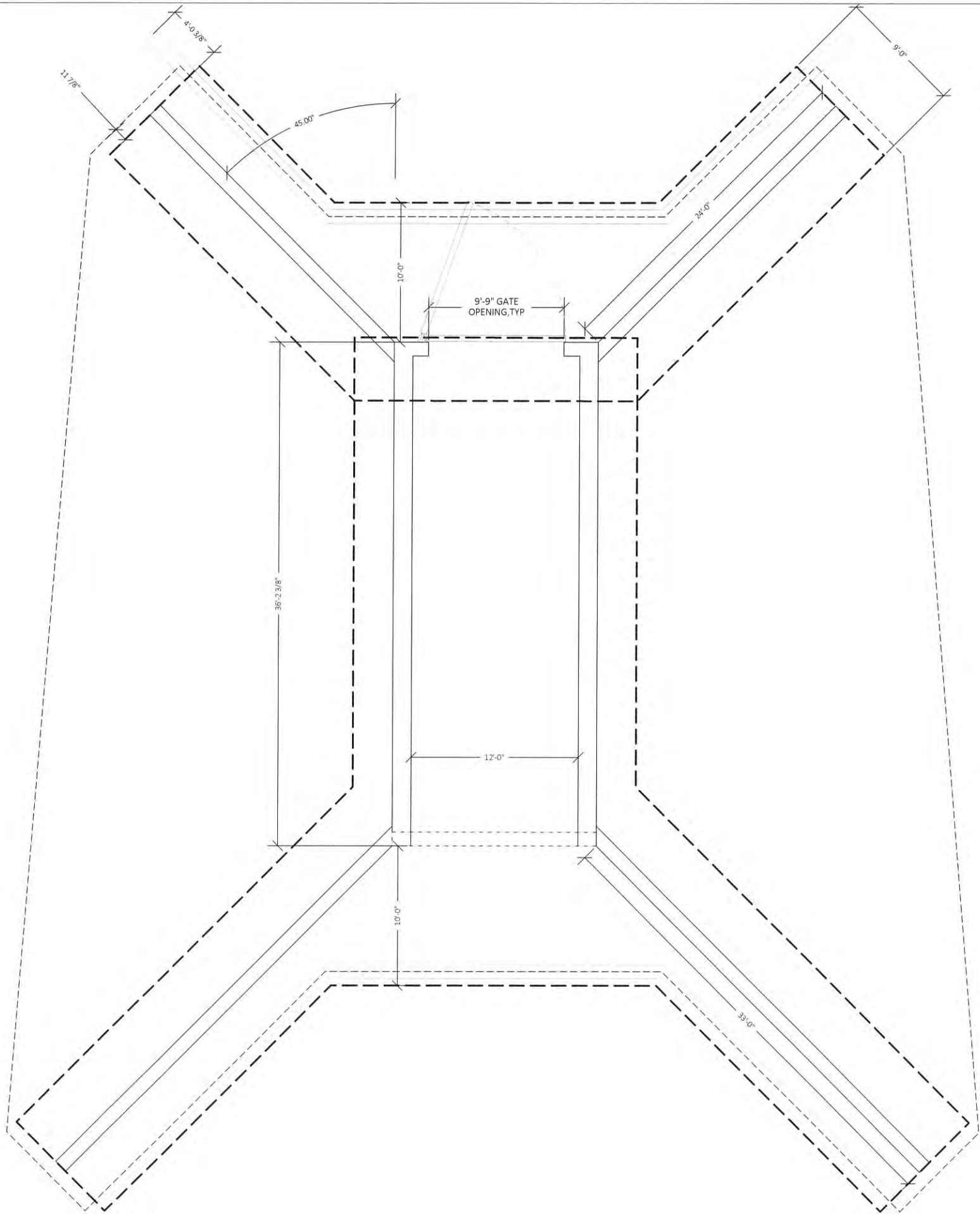
SCALE IS AS SHOWN WHEN
PLOTTED TO FULL SIZE (22"x34")

PHASE
30% CONSTRUCTION
DOCUMENTATION

SHEET TITLE

**BELTZ CREEK
STREAM HABITAT
DETAILS**

SHEET NUMBER
BZ2.5
SHEET 11 OF 17



**PSE
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MARK	REVISION TABLE		DATE
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CHECKED BY: R.H.
Date: 06-04-2026

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ESA Env. 224-001

Title:

FOUNDATION PLAN

Page:

S2.0