June 2020

Lower Wapato Creek Habitat Project (LWCHP)

Port of Tacoma

Design Team:

- GeoEngineers
- Mott MacDonald
- SiteWorkshop
- WillametteCRA

Port of Tacoma

People. Partnership. Performance.

Background

- 2012 – Design
- 2014 – Permits (HPA, CAPO)
- 2014 – On hold / tribal coordination
- 2019 – Tribal support & conditions
- 2020 – Reinitiated design & permitting

Purpose

Restore Wapato Creek & Floodplain Wetlands:

- Diverse mosaic of interconnected stream channel, and estuary, emergent, and forested wetlands and riparian habitat
- Bridge & re-meandered channel

Generate advance compensatory mitigation:

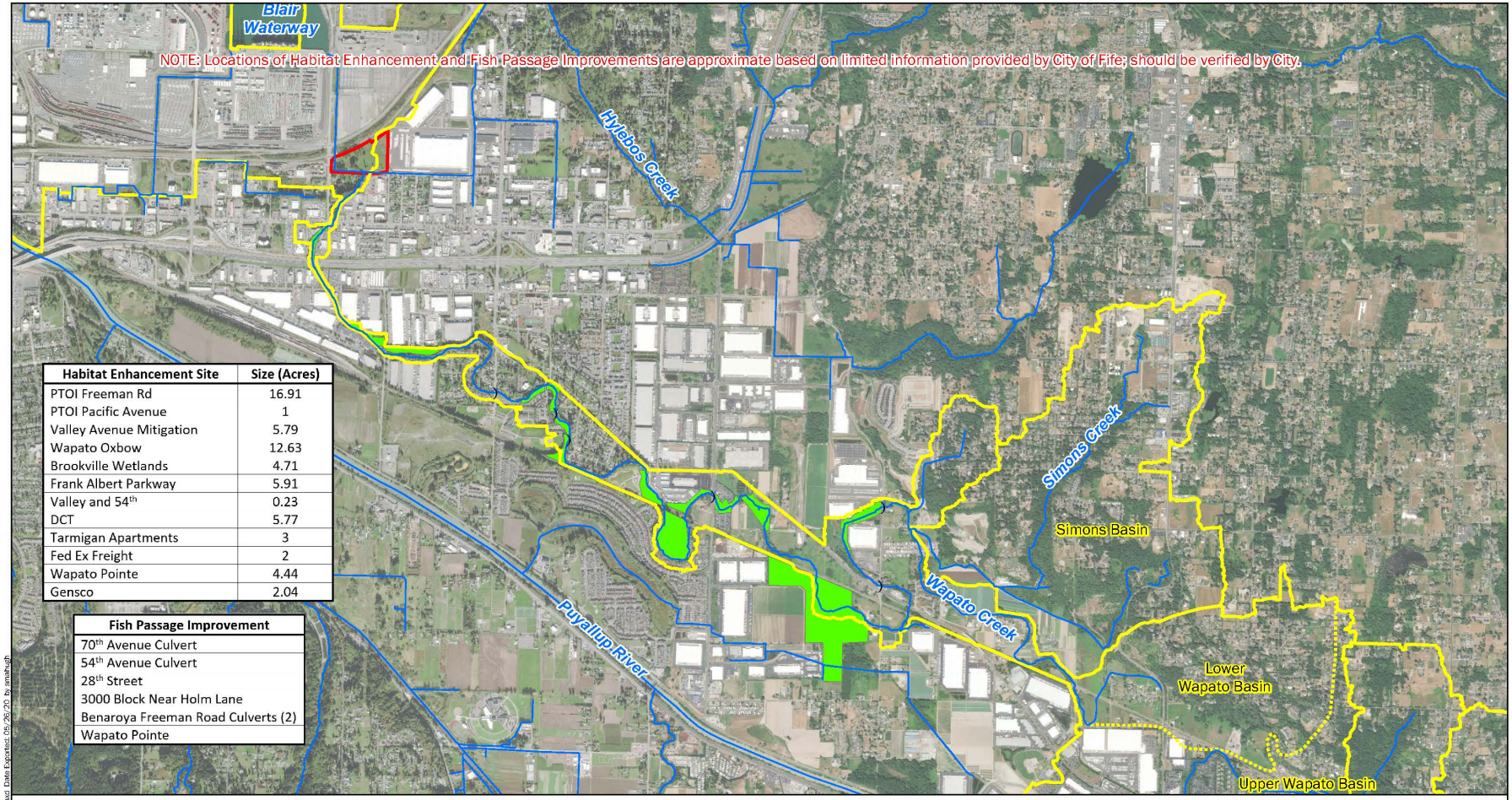
- Wetland credits
- non-ESA-listed fish habitat credit (Wapato Cr)

Experience / Site Selection / Location

Port of Tacoma

- 30-plus-yr history (over 20 sites, ~200 acres)
- Comm.Bay/Tideflats highly altered & lacking wetland and estuary habitat
- Last undeveloped & tidally influenced area on Wapato Cr & on CB Tideflats in general
- Improves Fish Passage, Floodplains, LWM, Pools, Side-Channels, Substrate, Riparian Habitat, WQ & Quantity, and habitat interspersion connectivity
- Adds substantially to Ex. Wapato Cr restoration

Wapato Creek & Project Area



Habitat Enhancement Site	Size (Acres)
PTOI Freeman Rd	16.91
PTOI Pacific Avenue	1
Valley Avenue Mitigation	5.79
Wapato Oxbow	12.63
Brookville Wetlands	4.71
Frank Albert Parkway	5.91
Valley and 54th	0.23
DCT	5.77
Tarmigan Apartments	3
Fed Ex Freight	2
Wapato Pointe	4.44
Gensco	2.04

Fish Passage Improvement
70th Avenue Culvert
54th Avenue Culvert
28th Street
3000 Block Near Holm Lane
Benaroya Freeman Road Culverts (2)
Wapato Pointe

Notes:
1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source: Basins and Watercourses obtained from Pierce County 2020

Projection: NAD 1983 StatePlane Washington South FIPS 4602 Feet

Legend
- Project Area
- Habitat Enhancement (Approximate)
- Fish Passage Improvement (Approximate)
- Watercourses
- Basins
- Approximate Lower Wapato Basin Boundary

2,000 0 2,000
Feet

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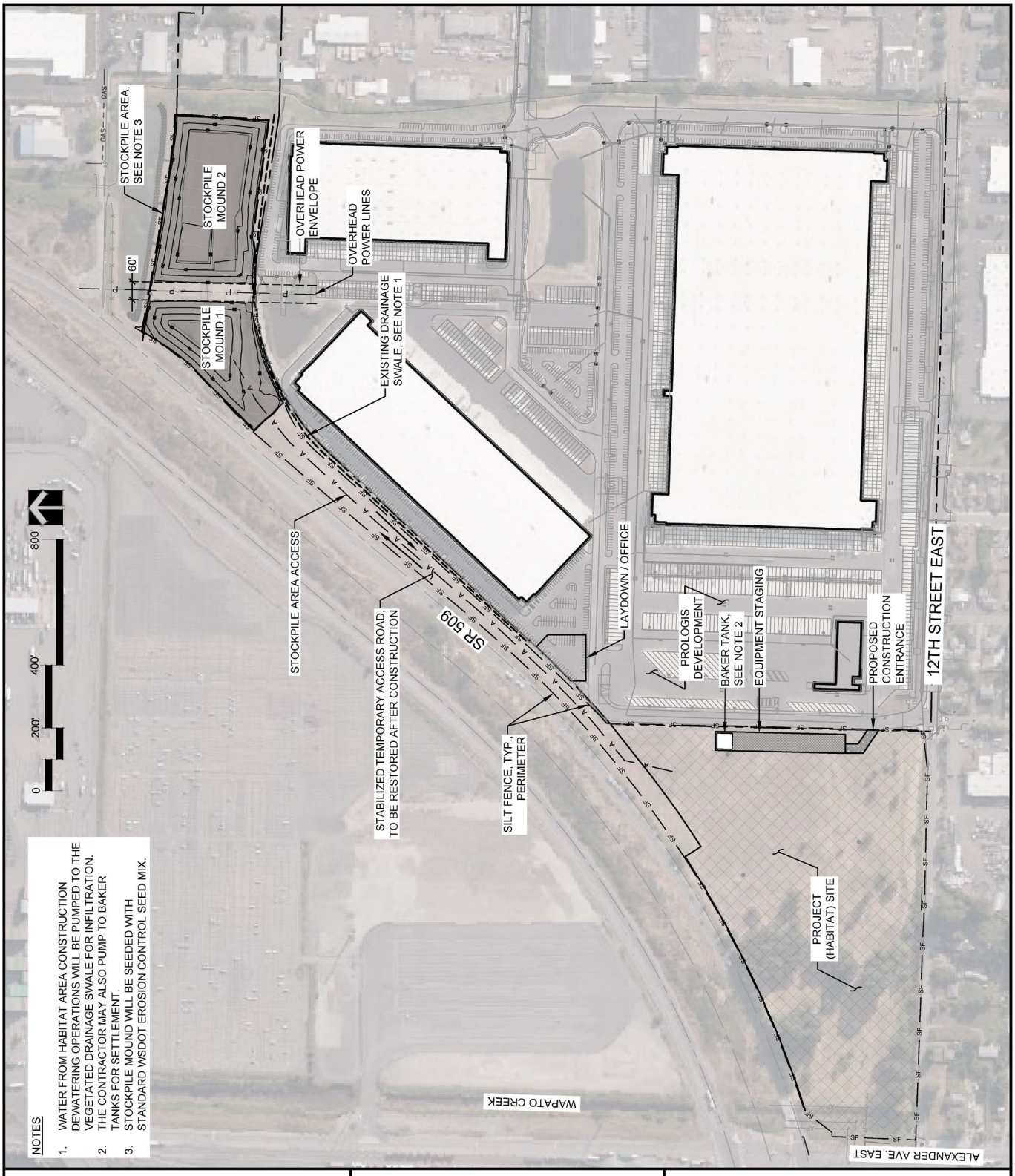


NOTES

1. WATER FROM HABITAT AREA CONSTRUCTION DEWATERING OPERATIONS WILL BE PUMPED TO THE VEGETATED DRAINAGE SWALE FOR INFILTRATION.
2. THE CONTRACTOR MAY ALSO PUMP TO BAKER TANKS FOR SETTLEMENT.
3. STOCKPILE MOUND WILL BE SEEDED WITH STANDARD WSDOT EROSION CONTROL SEED MIX.

PARCEL #: 0320011117, 03200130055, 0320013157, 0320013158, & 0320017003
DATUM: VERT. MLLW (PORT OF TACOMA TIDAL DATUM)
REFERENCE #: NWS 2020-457-WRD

ADJACENT PROPERTY OWNERS:
1. SEE JARPA APPLICATION

SITE LOCATION ADDRESS
NE CORNER OF ALEXANDER AVE. EAST AND 12TH STREET EAST

LOWER WAPATO CREEK HABITAT PROJECT

DISPOSAL SITE PLAN

APPLICANT: PORT OF TACOMA

PROPOSED: REPLACE CULVERTS & RESTORE STREAM, ESTUARY AND WETLANDS TO SECURE ADVANCE MITIGATION CREDIT
IN: WAPATO CREEK
AT: TACOMA/FIFE, WA
COUNTY: PIERCE

SHEET 4 OF 34 DATE: JUNE 1, 2020

Baseline Conditions – Wapato Creek

- Low quality & interrupted buffers (12th St E) as narrow as 10 ft, invasive vegetation
- Artificial, narrow, confined, ditched, and incised channel along roads
- Minimal LWM and limited habitat structure and complexity
- No connectivity to floodplain or wetlands
- Salt-water wedge present up to 12th St E

Baseline Conditions – Upland

- No floodplain or wetlands
- Small isolated forested areas (cottonwood) with invasive vegetation
- Dense invasive vegetation and monocultures (RCG, blkberry, ivy, hemlock, scotchbroom)

Baseline Conditions – Fish & Wildlife Use

- DNR Type F stream
- Steelhead*, Coho, and fall chum (*documented present, but assumed not currently present)
- Searun cutthroat and resident trout & other non-salmonid fish
- Red-tailed hawks, blue herons, waterfowl, and shorebirds
- Small mammals and beavers

Existing Conditions

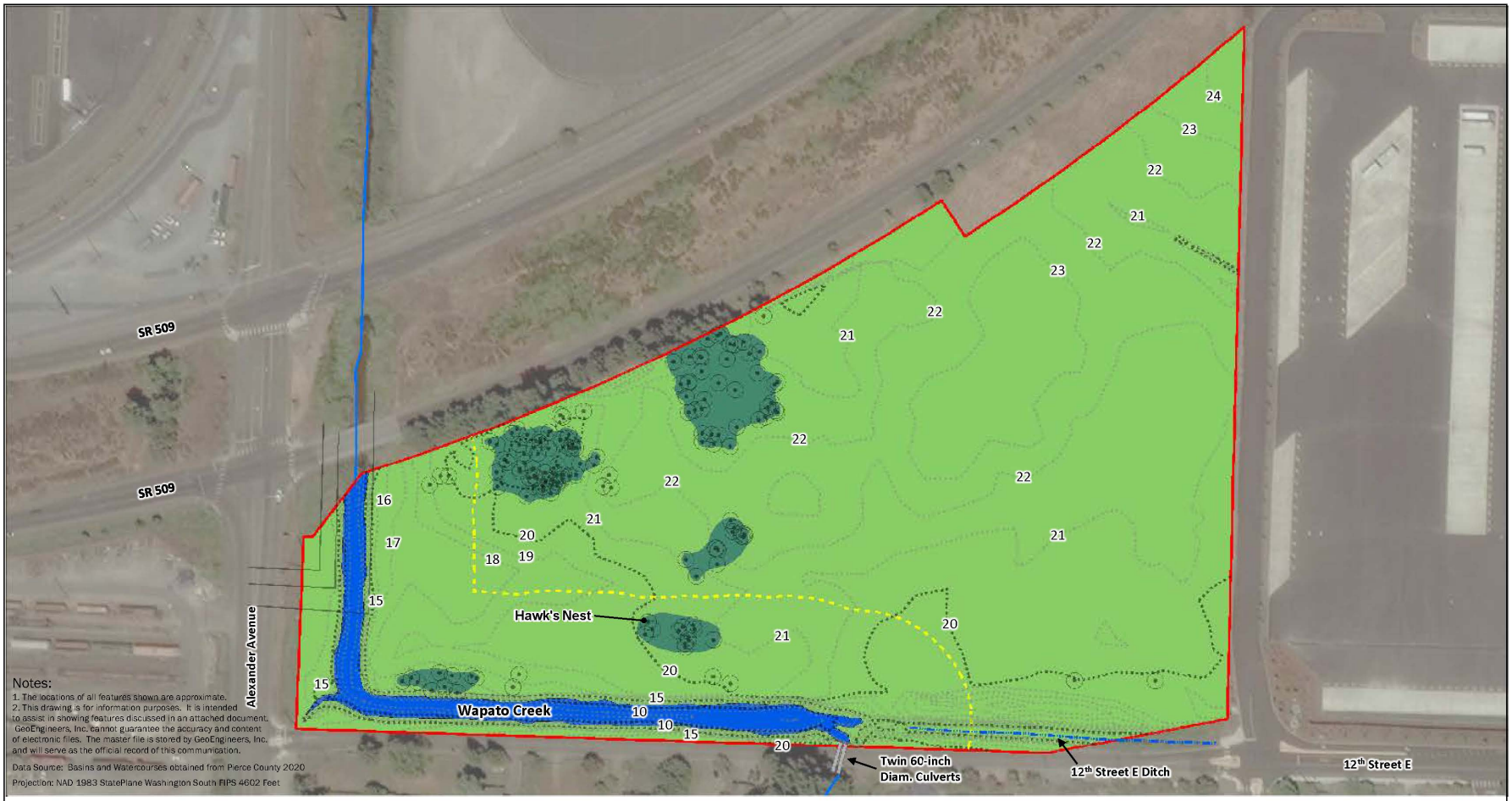


FIGURE 4. Existing Conditions

Lower Wapato Creek Habitat Project

Port of Tacoma

DATE: 6/1/2020

100 0 100
Feet

N W E S

Legend

- Project Area
- **Habitat Types**
  - Upland Grasses with Invasive
  - Upland Forested with Invasive Understory
  - Wapato Creek (Approx. OHW/HTL)
- 12th Street Ditch Centerline
- Wapato Creek 150' Buffer
- Existing Tree
- 1-Foot Contours
- 5-Foot Contours

Port of Tacoma

GeoEngineers

Mott MacDonald

SiteWorkshop Landscape Architecture

Schedule

- 2020 – Design, permitting, coordination
- Feb. 2021 – All permits received & advance mitigation agreement(s) completed
- Mar. 2021 – Grading & bridge work
- Fall 2021 – Deadline for grading (SR167)
- Sept.-Dec. 2022 – Planting work (bid Feb.)
- 2023-2024 – Warranty Plants / Irrigation
- 2023-2032 – Performance Monitoring

Restoration Goals & Objectives – Design Overview

Goals:

- Replace wetland acreage and functions that are lost or impacted by future Port projects.

- Offset impacts to fish habitat for non-ESA-listed fish species from future Port projects that impact Wapato Creek downstream of the LWCHP site.

Restoration Goals & Objectives – Design Overview

Objectives:

1: Restore to a meandering, tidally influenced channel with a functioning floodplain and in-stream habitat features

2: Re-establish intertidal mudflats and hydrologically connected estuarine emergent and palustrine forested wetlands;

3: Create dense forested upland buffer

4: Improve fish passage at 12th Street E

Restoration Actions (18.52 acres) – Design Overview

10.02 ac of creditable re-establishment

- 5.51 ac of PFO
- 2.35 ac of EEM
- 2.16 ac of stream channel/mudflat (1,040 LF converted to 1,875 LF of meandering creek)
- 8.50 ac of non-creditable area (buffer, ROW)

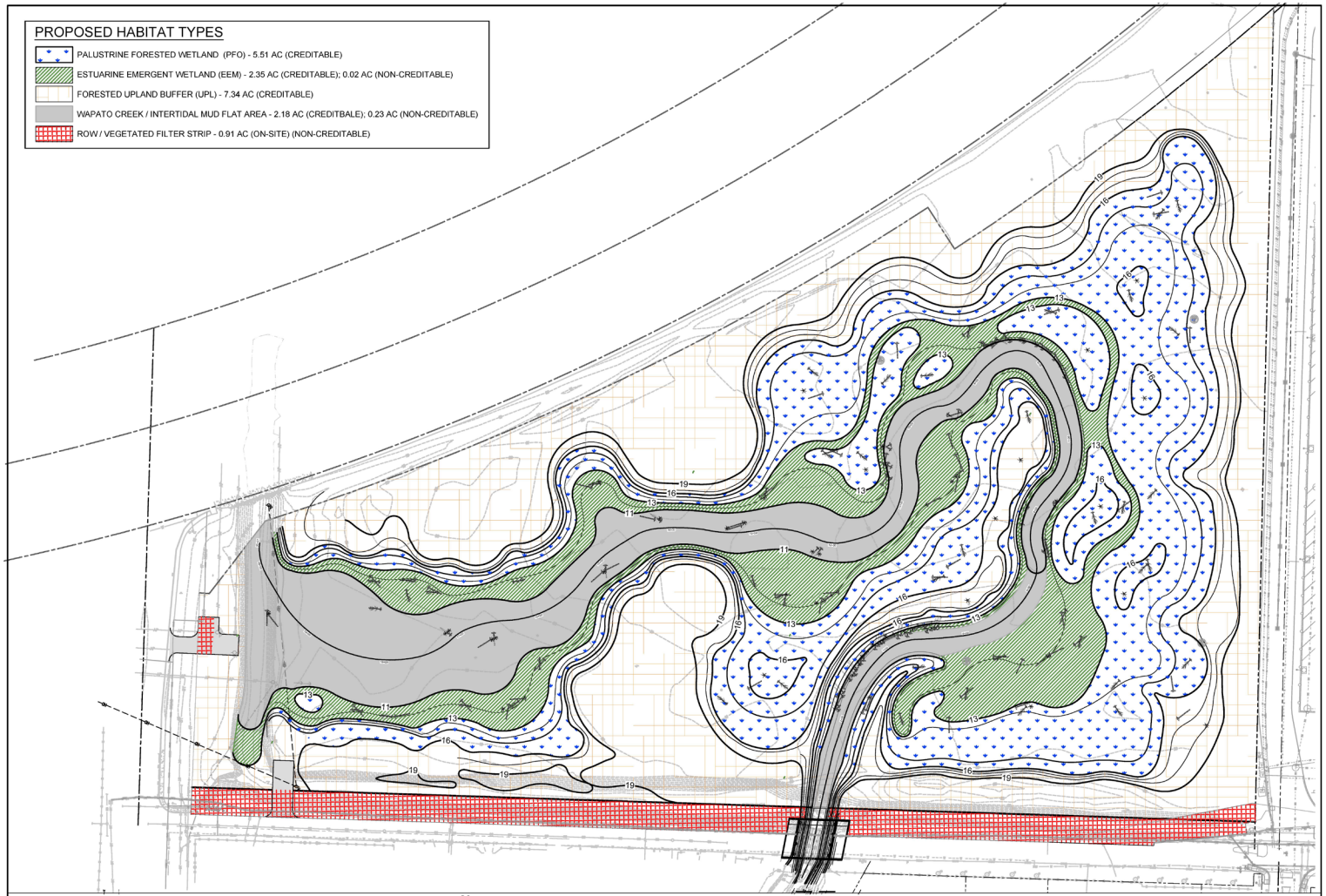
Restoration Actions (18.52 acres) – Fish Habitat Improvements

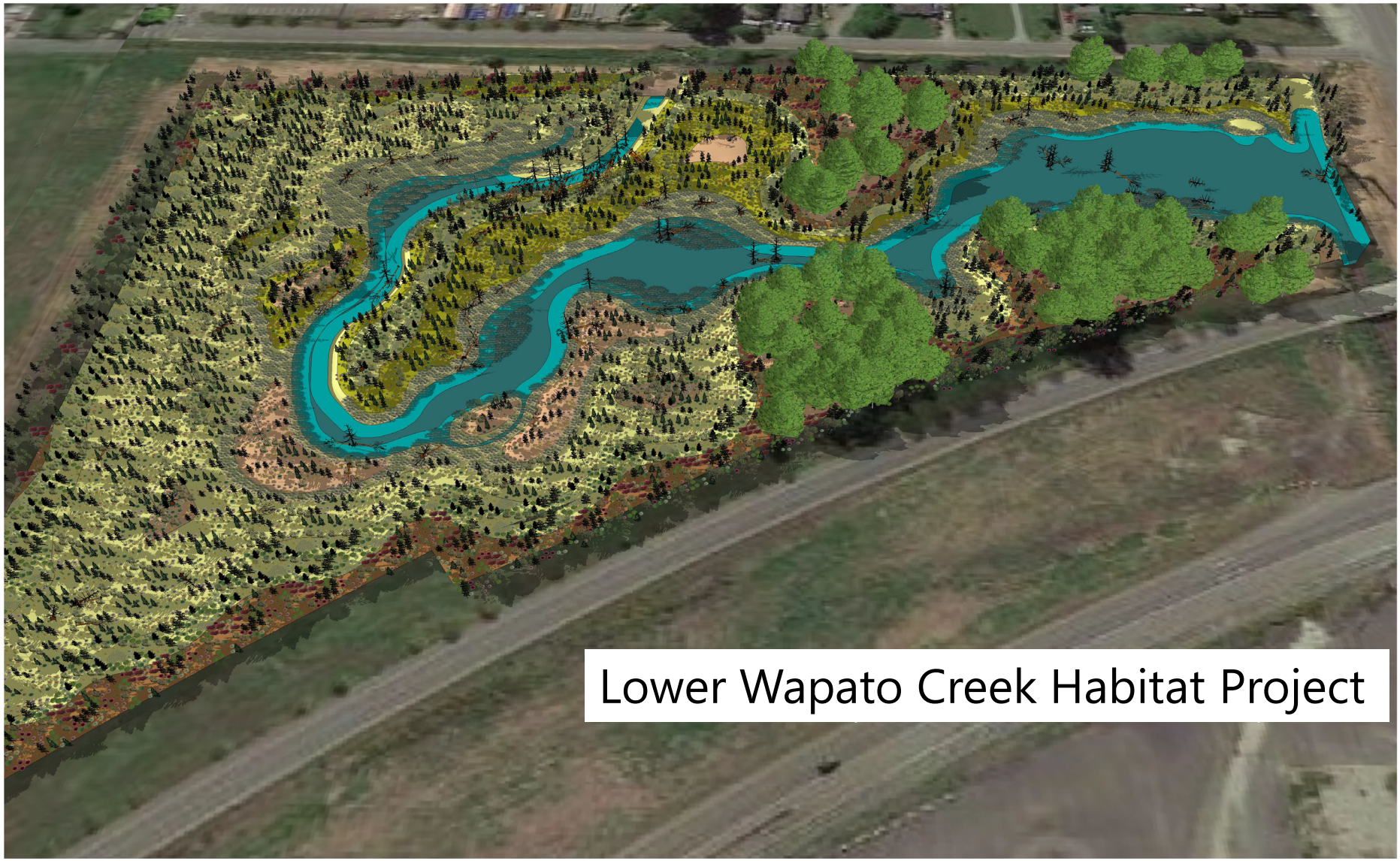
- Estuary/floodplain and creek channel fish habitat improvements
- Bridge stream substrate, which improves ecological functions compared to the current round, narrow, concrete culverts with no substrate.
- Improved fish passage, eliminates long, dark tunnels, reduces flow velocities, and improves natural tidal fluctuations under 12th St E

Design Overview (grading & LWM)


Port Habitat Strategy
Design Wetlands for FISH!

Design Overview (habitat types)




Lower Wapato Creek Habitat Project

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LOWER WAPATO CREEK HABITAT PROJECT

BRIDGE LAYOUT

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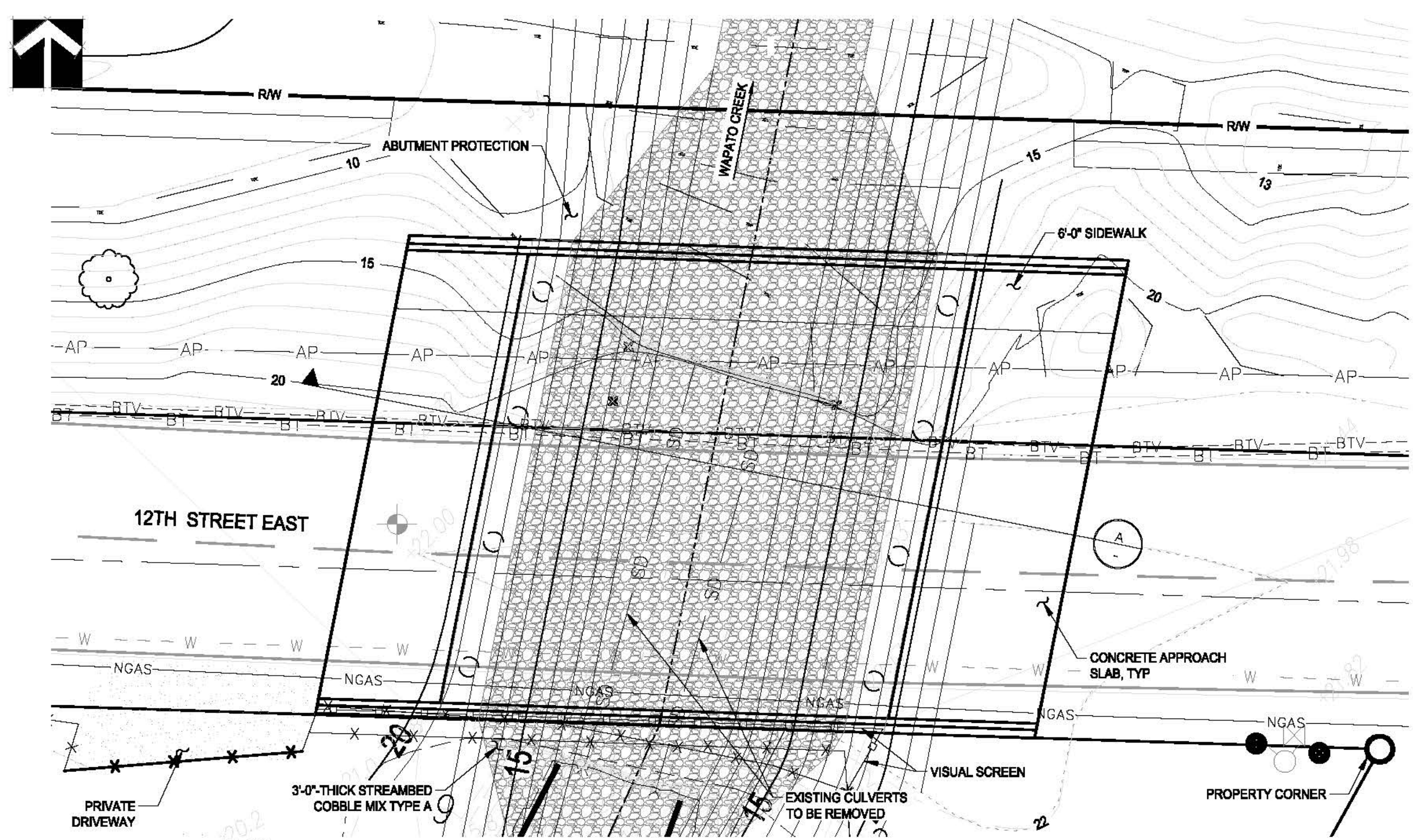
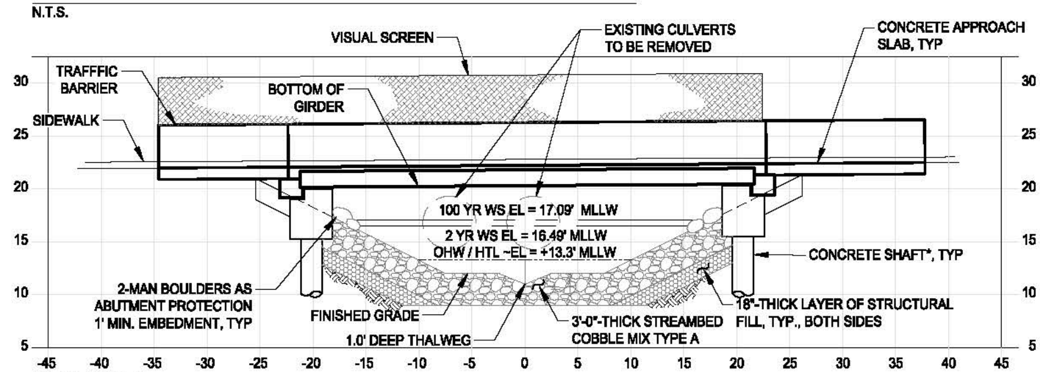
IN: WAPATO CREEK
AT: TACOMA/FIFE, WA
COUNTY: PIERCE
SHEET 24 OF 34
DATE: JUNE 1, 2020



PLAN
N.T.S.



SECTION A
1" = 15 '-0" FEET

* CONCRETE DRILLED SHAFT CONFIGURATION SHOWN. FOUNDATION MAY CHANGE TO BE DRIVEN PILES DURING FINAL DESIGN

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LOWER WAPATO CREEK HABITAT PROJECT

FOUNDATION PLAN

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IN: WAPATO CREEK
AT: TACOMA/FIFE, WA
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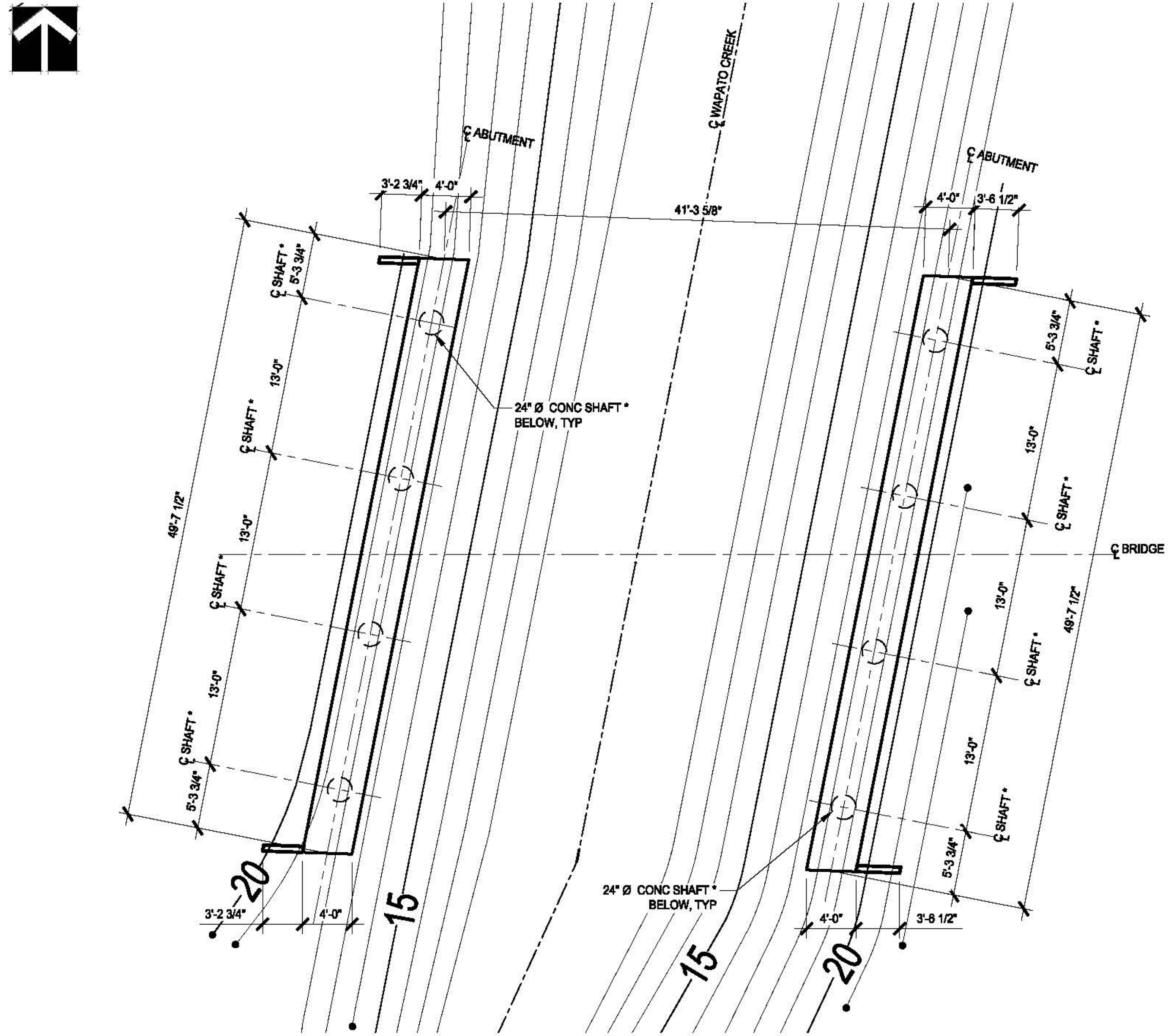
SHEET 25 OF 34
DATE: JUNE 1, 2020



FOUNDATION PLAN
N.T.S.

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LOWER WAPATO CREEK HABITAT PROJECT

STREAM PROFILE - BRIDGE CROSSING

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SHEET 26 OF 34
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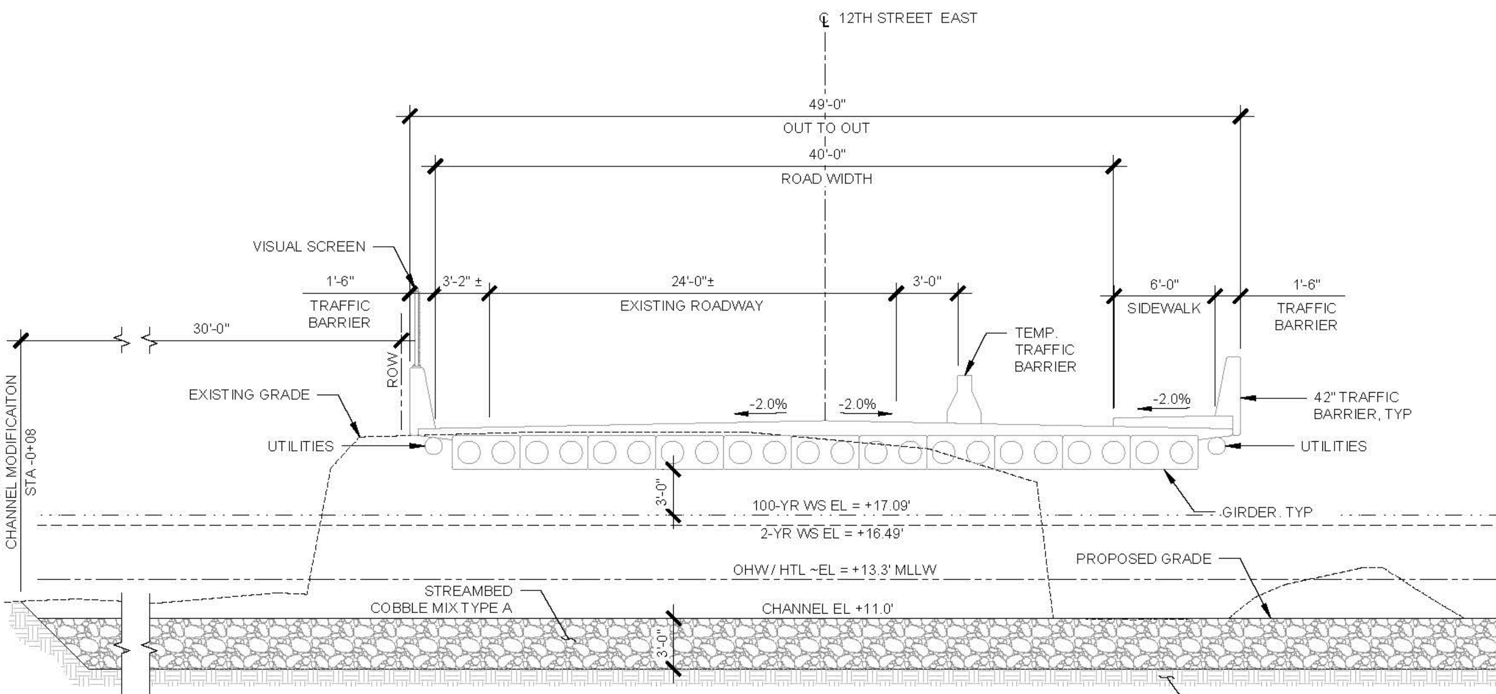
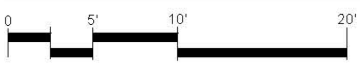


BRIDGE PROFILE



NOTES

1. CONSTRUCTION SPECIFICATIONS: MATERIALS, CONSTRUCTION AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE PROJECT PLANS AND SPECIFICATIONS.
2. MATERIALS:
   A. CONCRETE: SHALL CONFORM TO THE REQUIREMENTS OF SECTION 03 30 00 OF THE PROJECT SPECIFICATION
      - APPROACH SLAB = CLASS 4000A
      - BRIDGE DECK = CLASS 4000D
      - TRAFFIC BARRIER, ABUTMENTS = CLASS 4000
      - DRILLED SHAFTS = CLASS 5000P
      - PRECAST PRESTRESSED GIRDERS AT RELEASE = 5000
      - PRECAST PRESTRESSED GIRDERS AT 28 DAYS = CLASS 6000
      - SHAFT SPIRAL REINFORCING STEEL: ASTM A706, GRADE 60-WELDABLE
      - ALL OTHER REINFORCING STEEL: ASTM A615, GRADE 60
   B. PRESTRESSING STRANDS: AASHTO M203 GRADE 270 0.6" DIAMETER LOW RELAXATION 7-WIRE STRAND, Fpu = 270 KSI
   C. SELECT STRUCTURAL FILL AND BACKFILL: MATERIAL SHALL CONSIST OF WELL-GRADED SAND AND GRAVEL OR CRUSHED ROCK, EITHER NATURALLY OCCURRING OR PROCESSED. MATERIAL SHALL BE GRADED BETWEEN THE LIMITS SPECIFIED BELOW:

SIEVE SIZE	PERCENT PASSING (BY WEIGHT)
4-INCH	99-100
2-INCH	75-100
U.S. NO. 4	22-66
U.S. NO. 200	0-5

3. THICKNESS OF STREAMBED COBBLE MIX TYPE A WILL TRANSITION UPSTREAM AND DOWNSTREAM OF THE BRIDGE AT THE DIRECTION OF THE ENGINEER TO MAINTAIN A STABLE CREEK CHANNEL.

Performance Standards & Monitoring

- Performance Standards & Monitoring detailed in Adv Mit Plan (Sec. 8 & 9, respectively) for:
  - Wetlands / Hydrology
  - Vegetation (wetland, buffer, invasive)
  - Fish & Wildlife
- Ten years of performance monitoring

Credit Generation – Wetlands

- Adv Mit Plan (Section 7.1)

Table 15. Wetland Credit Generation

Advance Mitigation Activity	Area of Mitigation Activity (acres)	Credit Generation Ratio	Potential Wetland Credits (Acre-Credits)
Wetland Re-establishment	10.02	1:1[1]	**10.02**

[1]Proposed Credit Ratio is 1:1 because the area of mitigation activity (wetland re-establishment) is equal to one potential acre-credit.

Credit Generation – Fish Habitat

- Adv Mit Plan (Section 7.2 & 11.2)
- Generates separate non-ESA-listed fish habitat credit (fish habitat credit)
- Voluntary fish habitat improvements to generate advance mitigation credit
- Advance Mitigation Credit for the Port to construct future crossing(s) of Wapato Creek (up to 60 feet in total width, parallel to flow) downstream of the LWCHP site.
- Provides immediate improvements to fish aquatic area, habitat, and passage

Service Areas:
Wetlands & Fish Habitat

- Adv Mit Plan (Section 3)
- Wetlands - Port properties with similar wetland features/categories.
- Fish Habitat – Wapato Creek downstream of LWCHP

FIGURE 2 - Geographic Service Area

Lower Wapato Creek Habitat Project
Port of Tacoma
DATE: 5/29/2020

0 0.5 1 Miles

N W E S

Legend

Port Parcels
Habitat Sites

Wetland Category
I
II
III
IV

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Use of Credits & Accounting Ledger: Wetlands & Fish Habitat

- Wetland Credit

Table 16. Proposed Use Ratios Applied to Wetland Impact Categories

Category of Impact Wetland	Year 0 Mitigation Ratio (Concurrent Mitigation)	Year 1 Mitigation Ratio	Year 2+ Mitigation Ratio (Advance Mitigation)
Category I Forested	6:1	6:1	Case-by-case
Category I	4:1	4:1	Case-by-case
Category II	3:1	2:1	1.2:1
Category III	2:1	1.5:1	1:1
Category IV	1.5:1	1.2:1	0.85:1
Jurisdictional Ditches	1:1	0.85:1	0.5:1

Use of Credits & Accounting Ledger: Wetlands & Fish Habitat

- Wetland Credit

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Category II	3:1	2:1	1.2:1
Category III	2:1	1.5:1	1:1
Category IV	1.5:1	1.2:1	0.85:1
Jurisdictional Ditches	1:1	0.85:1	0.5:1

- Mitigation sequencing & permitting

Use of Credits & Accounting Ledger: Wetlands & Fish Habitat

Port of Tacoma

Table 17. Example LWCHP Credit Use Ledger

WETLAND CREDITS			
Transaction Date	**Location, Description, Agency/Permit Number**	**Debited Credits (Acre-Credits)**	**Remaining Credits (Acre-Credits)**
04/01/2022	Starting Value	-	10.02
08/11/2023	Fill of Cat. III Wetland at Port Parcel 35 Corps No. NWS-2023-XYZ	0.35	9.67
FISH HABITAT CREDITS (Wapato Creek Crossing Downstream of LWCHP Site)			
Transaction Date	**Location, Description, Agency/Permit Number**	**Debited Credits (Width [feet], Parallel to Flow)**	**Remaining Credits (Width [feet], Parallel to Flow)**
04/01/2022	Starting Value	-	60 feet
10/22/2024	Installation of bridge over Wapato Cr. at Port Parcel 15 WDFW HPA No. 2024-XYZ	20 feet	40 feet