

# **SR 167 Completion Project**

**Technical Memorandum:  
SR 167 Completion Project,  
Stage 2: SR 167/I-5 to SR 161 –  
New Expressway Project**

**Floodplain Impacts and Mitigation  
in the City of Puyallup**

**August 2023**

**Note:**

Some pages in this document have been purposely skipped or blank pages inserted so that this document will print correctly when duplexed.



# SR 167 Completion Project

## SR 167 Completion Project, Stage 2: SR 167/I 5 to SR 161 – New Expressway Project

### Floodplain Impacts and Mitigation in the City of Puyallup

**Correspondence No. 167-0297**

**Date:** August 4, 2023  
**To:** Mark Higginson, Hans Hunger, and Chris Beale, City of Puyallup  
**Copy to:** Steve Fuchs and Courtney Soderquist, WSDOT  
Aaron Fieser, WSP and Vivian Erickson, HNTB  
**From:** Mark Ewbank, Herrera

---

Submitted by:  
**Washington State Department of Transportation**  
**Megaprograms**  
**Puget Sound Gateway Program | SR 167 Completion Project**

Through:  
**WSP USA**  
**1001 Fourth Avenue, Suite 3100 | Seattle, Washington 98154 | 206-382-5200**

Prepared by:  
**Herrera Environmental Consultants, Inc.**  
**2200 Sixth Avenue, Suite 1100 | Seattle, Washington 98121 | 206-441-9080**

**This page intentionally left blank**

## Revision History

Date	Revision
October 17, 2022	Initial draft submittal
November 22, 2022	2nd draft, addressing project team comments
March 1, 2023	Final for submittal to City, addressing project team comments
August 4, 2023	Revised final, addressing City of Puyallup comments

**This page intentionally left blank**

## Introduction

The Washington State Department of Transportation (WSDOT) plans to complete the State Route (SR) 167 highway by building approximately 4 miles of a new four-lane highway as part of the SR 167 Completion Project (hereafter referred to as the Project). The SR 167 Completion Project is one of two large projects comprising WSDOT's Puget Sound Gateway Program. The new facility will begin at the current terminus in Puyallup at SR 161, extend westward through the Puyallup River Valley, and connect to Interstate 5 (I-5) near the existing Wapato Way East crossing over I-5. The Project also includes a new highway segment approximately 2 miles long. Defined as the SR 509 Spur, this new segment will extend from SR 509 near the Port of Tacoma (Port) to a new diverging diamond interchange at I-5 and SR 167.

The Project will be constructed in three stages, through sequential design-build contracts. The Stage 2 portion of the Project, known as the SR 167/I-5 to SR 161 – New Expressway Project (hereafter referred to as Stage 2) is the third construction contract of the Project's "Phase 1 Improvements," which encompass the entire 6-mile corridor. Previous construction stages are referred to as Stage 1a and Stage 1b.

The Stage 2 project area contains low-lying terrain that is subject to flooding associated with Wapato Creek, the Puyallup River, and small tributary streams within the city of Puyallup. This memorandum describes the estimated volumes of fill to be placed in regulated floodplain and associated floodway areas in Puyallup and the proposed mitigation for those impacts to satisfy Puyallup Municipal Code (PMC) requirements. Figure 1 shows the proposed Stage 2 project improvements overlain on existing mapped floodplain areas in Puyallup.

## Regulatory Background

This section describes regulations pertaining to development within a floodplain including the PMC.

### Puyallup Municipal Code

Chapter 21.07.060(1) (General Standards) requires the proposed Stage 2 project to meet the following requirement for placement of fill within regulated floodplain areas ("areas of special flood hazard"):

- f. Compensatory storage (for displaced flood storage).
  - (A) Provide equivalent elevations to that displaced;
  - (B) Be hydraulically connected to the source of flooding;
  - (C) Be provided in the same construction season and before the flood season begins on September 30th;
  - (D) Occur on site or off site if legal arrangements can be made to assure that the effective compensatory storage volume will be preserved over time; and

- (E) Be supported by a detailed hydraulic analysis that is prepared by a licensed professional engineer.

Chapter 21.07.060(3) (Floodways) requires the proposed Stage 2 project to satisfy the following requirement:

- (a) Prohibit encroachments, including fill, new construction, substantial improvements, and other development unless certification by a registered professional engineer is provided demonstrating through hydrologic and hydraulic analyses performed in accordance with standard engineering practice that the proposed encroachment shall not result in any increase in flood levels during the occurrence of the base flood discharge.

Chapter 21.07.050 PMC requires WSDOT to obtain a development permit before construction or development begins within any area of special flood hazard established in PMC 21.07.040(2). The permit shall be for all structures and for all development, including fill and other activities as defined in PMC 21.07.030. Applicable parts of PMC 21.07.050(1)(b) for the Stage 2 development permit application include:

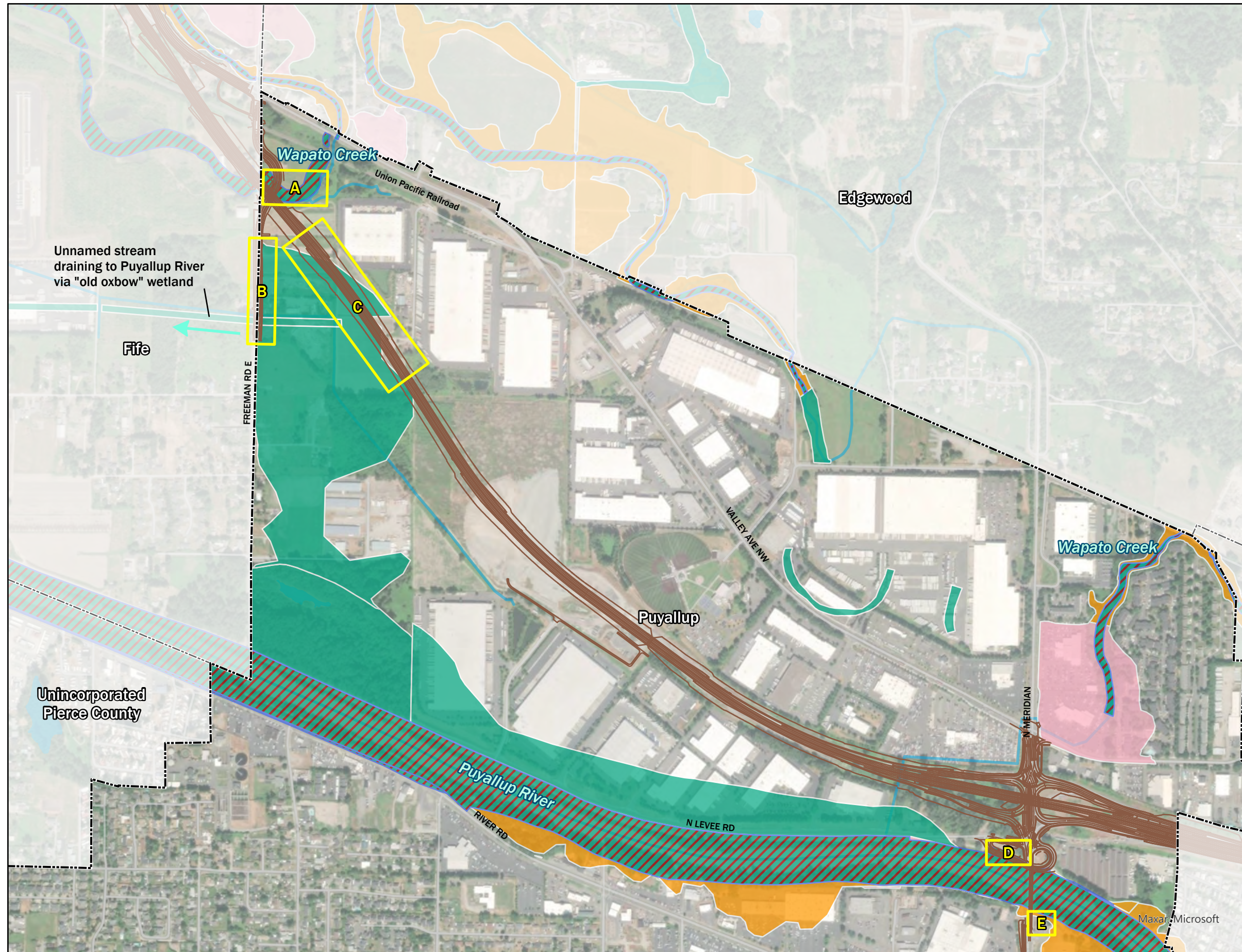
- iv. Description of the extent to which a watercourse will be altered or relocated as a result of proposed development;
- v. Where development is proposed in a floodway, an engineering analysis indicating no rise of the base flood elevation; and
- vi. Any other information that may be reasonably required by the floodplain administrator in order to review the application.

Chapter 21.07.040(2) PMC states that the City may utilize the following sources of flood hazard data for floodplain boundaries, regulatory floodway boundaries, base flood elevations or cross sections when determining a flood hazard area:

- (A) Flood Insurance Rate Maps;
- (B) Flood Insurance Studies;
- (C) Preliminary Flood Insurance Rate Maps;
- (D) Preliminary Flood Insurance Studies;
- (E) Letter of map amendments;
- (F) Letter of map revisions;
- (G) Historical flood hazard information; and
- (H) Any other available data that accurately classifies and delineates the flood hazard area or base flood elevation and has been prepared by the U.S. Army Corps of Engineers, or any other qualified person or agency with expertise.

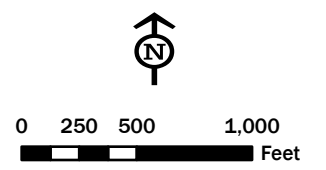


Figure 1. Overview of SR 167/I-5 to SR 161 - New Expressway (Stage 2 Project) Impacts to Existing Floodplain Areas in Puyallup.



**Legend**

- Stage 2 Project
  - Proposed Floodplain Fill Area (Stage 2 Project)
  - Streams
  - Lakes
  - Jurisdictional boundaries
- Flood Hazard Zone**
- Zone A 1% Annual Chance Floodplain (no BFE)
  - Zone AE 1% Annual Chance Floodplain (with BFE)
  - Zone AH Floodplain
  - Regulatory Floodway



**This page intentionally left blank**

## Analysis

Methods for determining fill volumes below the 100-year floodplain elevations (defined as frequently flooded areas in the city of Puyallup and “base flood” elevations on FEMA flood insurance rate maps) are described below, followed by a discussion of proposed mitigation for the displaced flood storage.

### Floodplain Fill Calculations

Floodplain fill volume was calculated in AutoCAD Civil3D and Bentley Microstation InRoads software using the existing project area terrain compared to proposed terrain with new roadway and shared-use paths accounted for, and then applying a 100-year peak flood water surface to define the upper elevation limit to complete the calculation. The current FEMA Flood Insurance Rate Maps (FIRMs) were georeferenced to create a base flood elevation surface for Zone A and Zone AE floodplain areas in Puyallup. In Zone A areas the base flood elevation is not defined, as it is in Zone AE areas. In Zone AE areas the base flood elevations between “contours” in the peak water surface were interpolated. The Stage 2 project will involve placement of fill in the following mapped floodplain locations, designated with letters A–E for clarity in the respective locations shown in Figure 1:

- Wapato Creek Basin
  - Area A: New SR 167 mainline, Freeman Road East, and shared-use path bridge abutments that will unavoidably extend into the floodplain of Wapato Creek
- Puyallup River Basin (via Old Oxbow Wetland)
  - Area B: Minor widening of Freeman Road East south of Wapato Creek
  - Area C: Highway embankments and shared-use path embankment east of Freeman Road East and south of Wapato Creek
- Puyallup River Basin (at Meridian Avenue)
  - Area D: New shared-use path and North Levee Road modifications at north end of Meridian Avenue bridge
  - Area E: New shared-use path embankment at south end of Meridian Avenue bridge where it connects to the Riverwalk Trail

There is a Zone A floodplain area south of Wapato Creek and east of Freeman Road East that the City of Puyallup recognizes (Figure 1), though it is not included in the currently published FIRM panel for this area. The peak 100-year flood water levels in this Zone A floodplain area were estimated based on a draft working map prepared by Pierce County in 2009 associated with Puyallup River overflow to the north. For all of the other locations where the project will result in fill in mapped Zone AE floodplain areas in Puyallup the current FIRMs define the corresponding 100-year flood water surface elevations used by the City of Puyallup in enforcing its code requirements.

There is a mapped Zone AH floodplain area in upper Wapato Creek east of North Meridian Avenue, at and near the intersection with Valley Avenue East (upstream of the inlet to a piped diversion system that discharges to the river; Figure 1) that will not be affected by the Stage 2 project. The project proposes ADA ramp and signal improvements in this floodplain area but no fill placement.

Table 1 summarizes the calculated volumes of displaced flood storage in each of the areas mentioned above. Attachment A provides a representative cross-section illustrating the calculation of floodplain fill for each of the five areas listed in the table.

<b>Location</b>	<b>Flood Storage Volume Displaced by Fill</b>	<b>Compensatory Flood Storage Volume</b>
A: Abutments for SR 167 mainline, realigned Freeman Road East, and shared-use path bridges at Wapato Creek	495 CY	1,280 CY in East Wapato RRP Mitigation Site
B: Widening of Freeman Road East	117 CY	117 CY in Freeman Road Mitigation Site
C: East of Freeman Road East and south of Wapato Creek	1,711 CY	~48,000 CY in Freeman Road Mitigation Site
D: North Levee Road widening and shared-use path—north side of river near Meridian Avenue bridge	142 CY	142 CY via lowering North Levee Road adjacent to shared-use path
E: Shared-use path—south side of river near Meridian Avenue bridge	104 CY	106 CY via lowering North Levee Road adjacent to shared-use path on opposite side of the river

CY = cubic yards

## **Mitigation for Displaced Flood Storage and Floodway Encroachment**

Attachment B provides representative cross-sections illustrating the calculations of fill that will displace existing flood storage and excavation that will provide compensatory flood storage for each of Areas A, B, C, D, and E. The following discussion elaborates on the approach to satisfy City of Puyallup code requirements at all five floodplain impact areas.

### **Wapato Creek (Area A)**

The Stage 2 project design includes a wetland mitigation site on WSDOT-owned land east of Freeman Road East, south of the Union Pacific Railroad (called the East Wapato RRP mitigation site in the project’s permit application documentation; see Figure 4). The ground surface will be lowered amid this mitigation site, and sloped to drain to the Wapato Creek channel, creating 1,280 CY of flood storage beneath the base flood elevation.

Results of hydraulic modeling indicate that the Stage 2 project will also slightly reduce the peak 100-year flood water level east and west of Freeman Road East south of the Union Pacific Railroad, where there is a mapped floodway, compared to existing conditions (Herrera 2023). Because the Stage 2 project will result in a slight decrease in flood levels during the occurrence of the base flood discharge in this area, it will satisfy Chapter 21.07.060(3) PMC regarding the Wapato Creek floodway. Attachment C contains a letter justifying a “no-rise” certification in this floodway area, with a figure illustrating hydraulic model results comparing simulated 100-year flood water surface elevations in Wapato Creek in proposed (post-project) conditions to existing conditions.

### **Puyallup River – Unnamed Tributary Stream via Old Oxbow Wetland (Areas B and C)**

Minor widening of Freeman Road East (Area B) and construction of the highway and shared-use path embankments (Area C) within the Zone A floodplain area shown in Figures 1 and 2 are associated with an unnamed stream that drains west to “old oxbow wetland” in Fife. Outflows from this wetland enter the Puyallup River. Compensatory storage for the combined fill will be provided in the nearby Freeman Road mitigation site (Figure 2) located between Freeman Road East and the new SR 167 mainline, greatly exceeding the volume of displaced flood storage (117 CY + 1,711 CY = 1,828 CY), where excavations will provide flood water storage sloped to drain to the unnamed stream in a slightly lower elevation range than the fill will be placed in, meeting the intent of Chapter 21.07.060(1) PMC.

### **Puyallup River (Areas D and E)**

None of the proposed fill in the mapped Puyallup River floodplain will occur below the ordinary high water mark (OHWM) of the river on its north and south banks, which is depicted in Figure 3.

North Levee Road (the loop road part of it) will be slightly lowered near the north side of the Meridian Avenue bridge to offset fill in the existing ditch on the north side of the road for shared-use path construction. The proposed grading will result in a net increase of 88 cubic yards in flood water storage in that area (Area D) below the mapped base flood elevation (see Table 1, Figure 3, and Attachment B). The shared-use path construction on the opposite (south) side of the river will result in a net decrease of 86 cubic yards in flood storage beneath the base flood elevation (Area E; see Table 1, Figure 3, and Attachment B). While the shared-use path work on the south side of the river will displace flood storage, that impact will be offset by a slightly greater amount of flood storage creation due to roadway lowering and shared-use path construction work on the north side of the river, with the flood storage created on the north side of the river being at a slightly lower elevation in the river’s floodplain than the elevation of the fill for the shared-use path on the north side of the river. This will assure that the compensatory flood storage can be occupied by river flood water when flood water cannot occupy ground space that is available in the pre-project condition on the south side of the river.

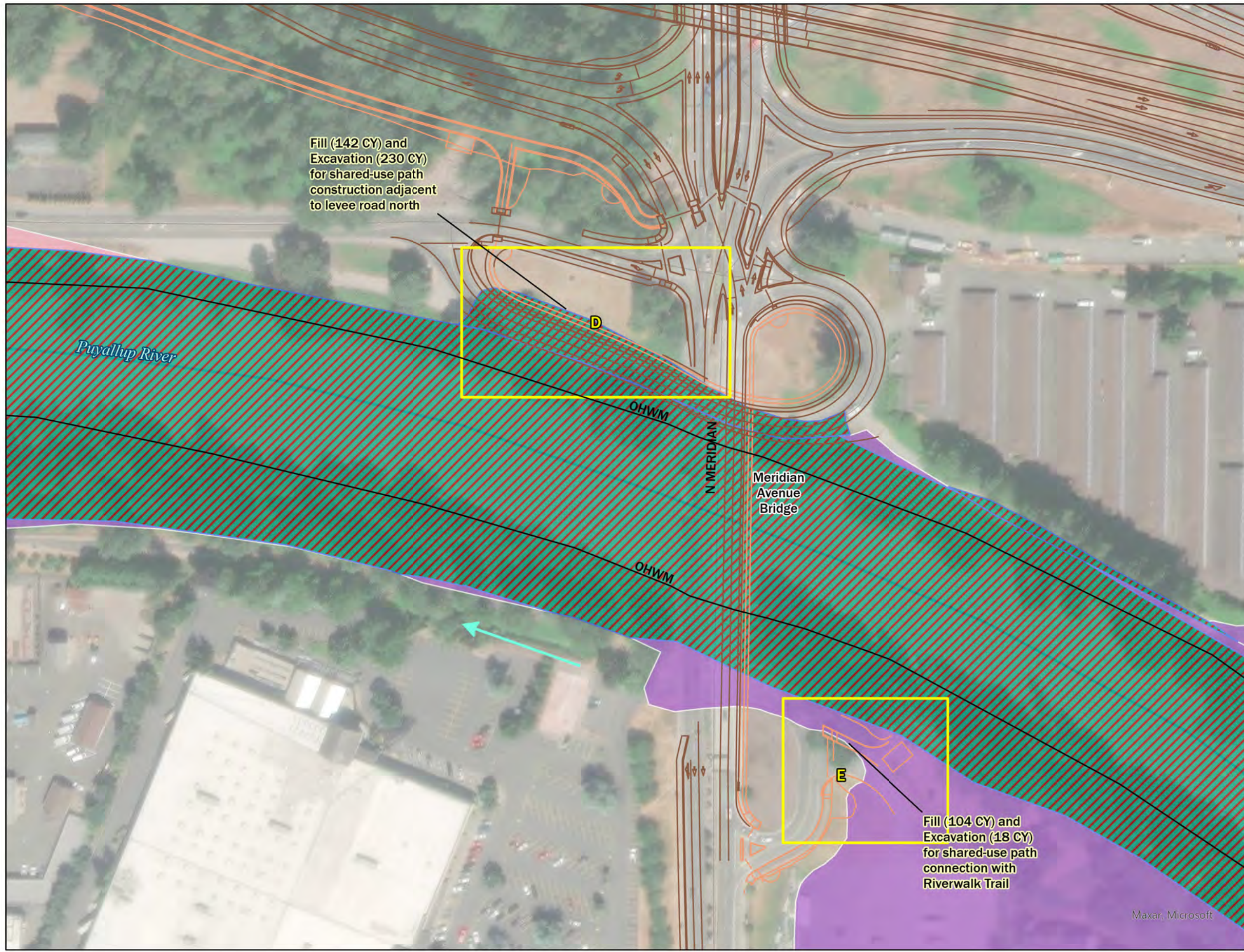
The impacted floodplain area on the north side of the river is coincident with a mapped floodway. Attachment D contains a letter providing justification for a no-rise certification in this floodway area.

**This page intentionally left blank**



**This page intentionally left blank**





**Figure 3.**  
**Fill in Puyallup River Floodplain and**  
**Compensatory Flood Storage**  
**Mitigation Near the Meridian Avenue**  
**Bridge.**

**Legend**

- Proposed Floodplain Fill Area (Stage 2 Project)
  - Jurisdictional boundaries
  - Stage 2 Project
  - Stage 2 Shared Used Path
  - ~ Streams
  - ~ Puyallup River OHWM
- Flood Hazard Zone**
- Zone A 1% Annual Chance Floodplain (no BFE)
  - Zone AE 1% Annual Chance Floodplain (with BFE)
  - Zone AH Floodplain
  - Regulatory Floodway



0 40 80 160  
 Feet



Esri, Aerial

Maxar, Microsoft

**This page intentionally left blank**

## Conclusions

Stage 2 project construction will involve placing fill in five different floodplain areas regulated by the City of Puyallup (defined as Areas A, B, C, D, and E in this memo), associated with Wapato Creek, the Puyallup River, and Puyallup River floodplain overflow that would eventually drain west back into the river via an unnamed stream and old oxbow wetland. The project design includes compensatory flood storage proximate to the locations where existing flood storage will be displaced in the Wapato Creek (Area A), unnamed Puyallup River tributary stream (Areas B and C), and Puyallup River (Areas D and E) basins, with corresponding volumes of created flood storage greater than the volume of displaced flood storage. The compensatory flood storage will be at similar or lower elevation ranges compared to the fill that displaces existing flood storage, and will be designed to drain to the source of flood water so that the entire flood storage volume is available for subsequent flood events. Each of the compensatory flood storage areas will therefore satisfy PMC requirements.

The areas of the Stage 2 project that involve fill placement in a mapped floodway in the city of Puyallup are at Wapato Creek upstream of Freeman Road East (Area A) and on the north and south sides of the Puyallup River near the Meridian Avenue bridge (Areas D and E). Hydraulic modeling indicates that the peak 100-year flood water surface elevation will be slightly lowered compared to existing conditions through the area where the proposed Freeman Road East and shared-use path bridge abutments will encroach on the Wapato Creek floodway, and therefore the design addresses PMC requirements for floodway protection. The letter in Attachment C includes a figure illustrating hydraulic model results supporting this conclusion. Proposed fill within the floodway of the Puyallup River near the Meridian Avenue bridge will be offset by increasing flood storage and flood flow conveyance within the floodway on the north side of the river, satisfying PMC requirements for floodway protection. Attachments C and D contain “zero rise” certifications for these impacted floodway locations, respectively.

## References

Herrera. 2023. Hydraulic Modeling of Wapato Creek and Tributaries – Proposed Conditions (draft). Prepared for Washington State Department of Transportation Megaprograms by Herrera Environmental Consultants, Inc., Seattle, Washington. May.

**This page intentionally left blank**



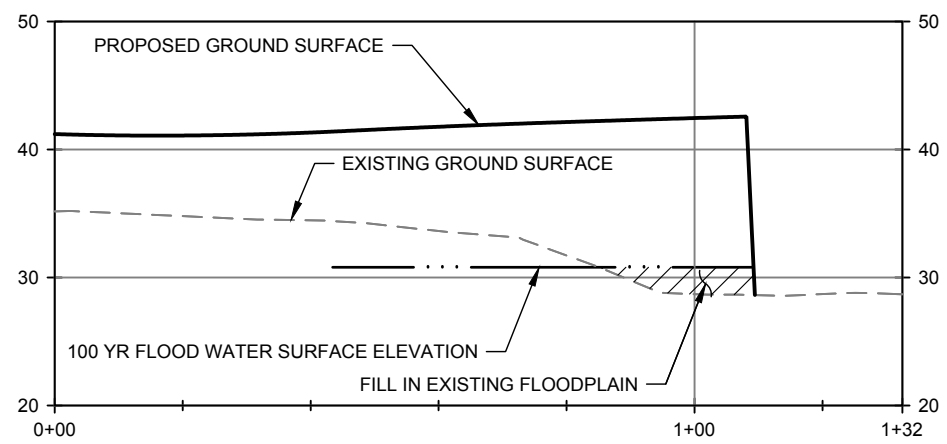
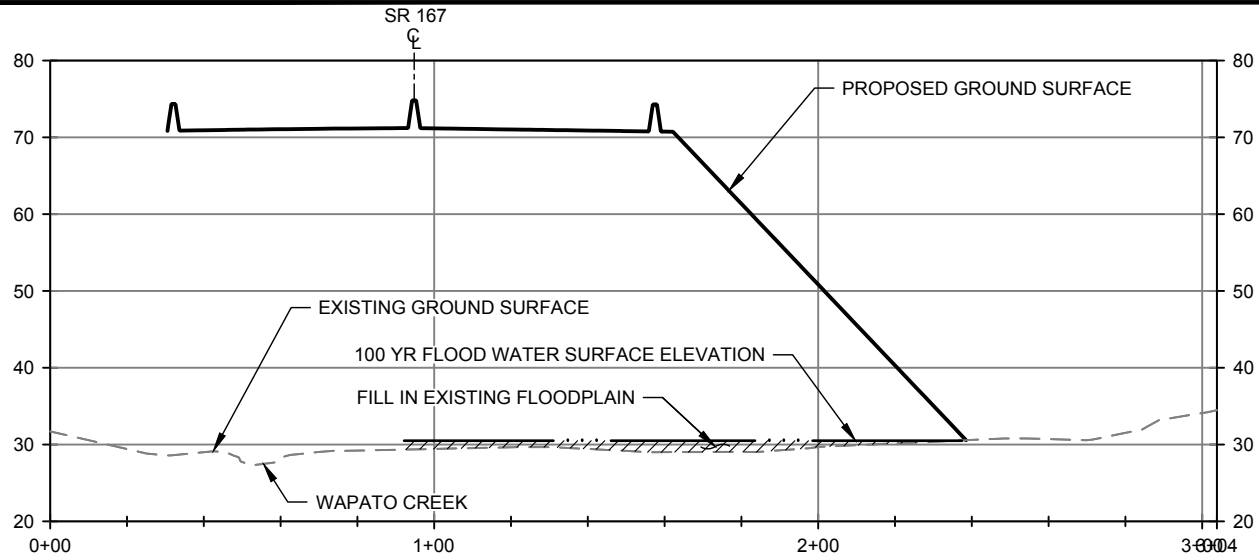
# Attachment A

---

## Representative Cross-Sections of Floodplain Fill Impacts

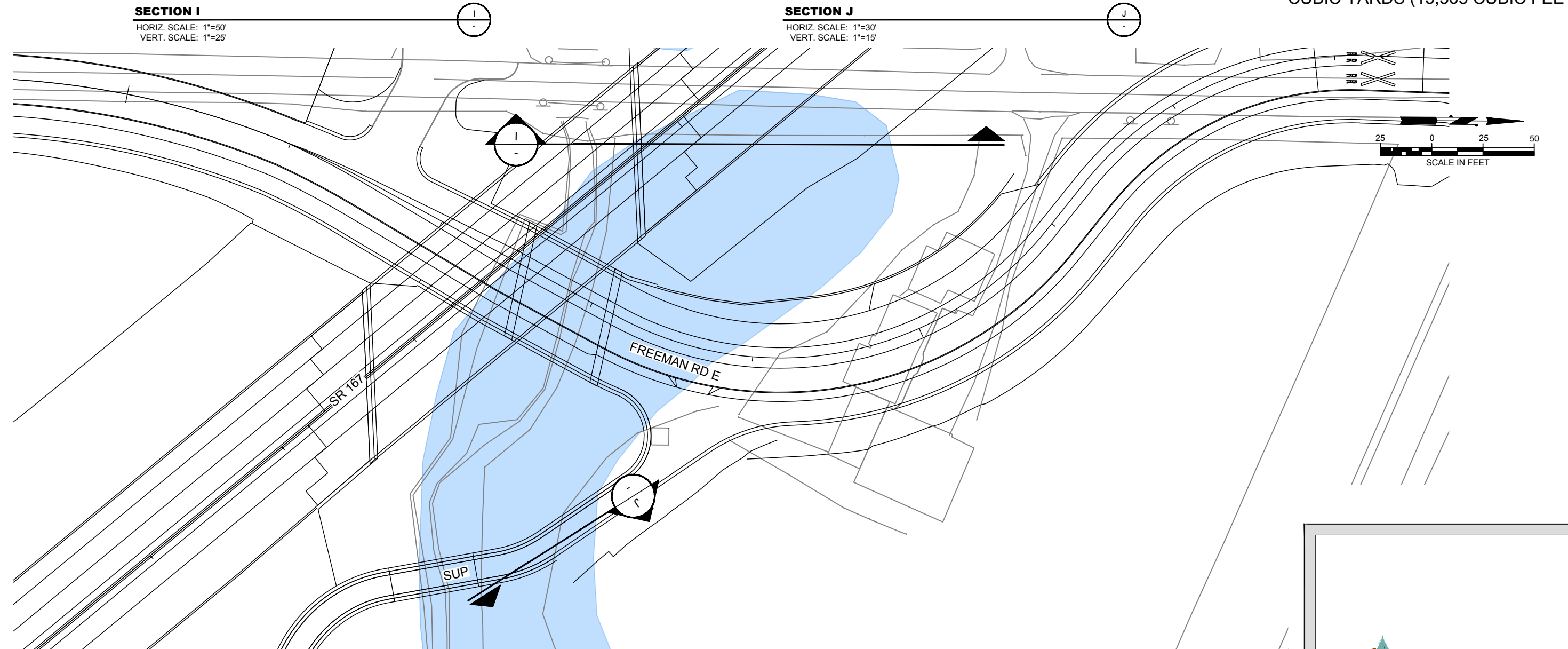
**This page intentionally left blank**

**City of Puyallup Floodplain Impacts Area A**



- LEGEND:**
- EXISTING 100 YR FLOODPLAIN IN PLAN VIEW
  - EXISTING 100 YR FLOODPLAIN IN CROSS-SECTION VIEW

**FILL VOLUME BELOW 100 YR FLOOD WATER SURFACE = 495 CUBIC YARDS (13,365 CUBIC FEET)**

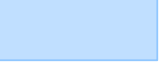
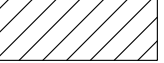


**REPRESENTATIVE CROSS-SECTIONS OF DISPLACED FLOOD STORAGE AT AREA A**

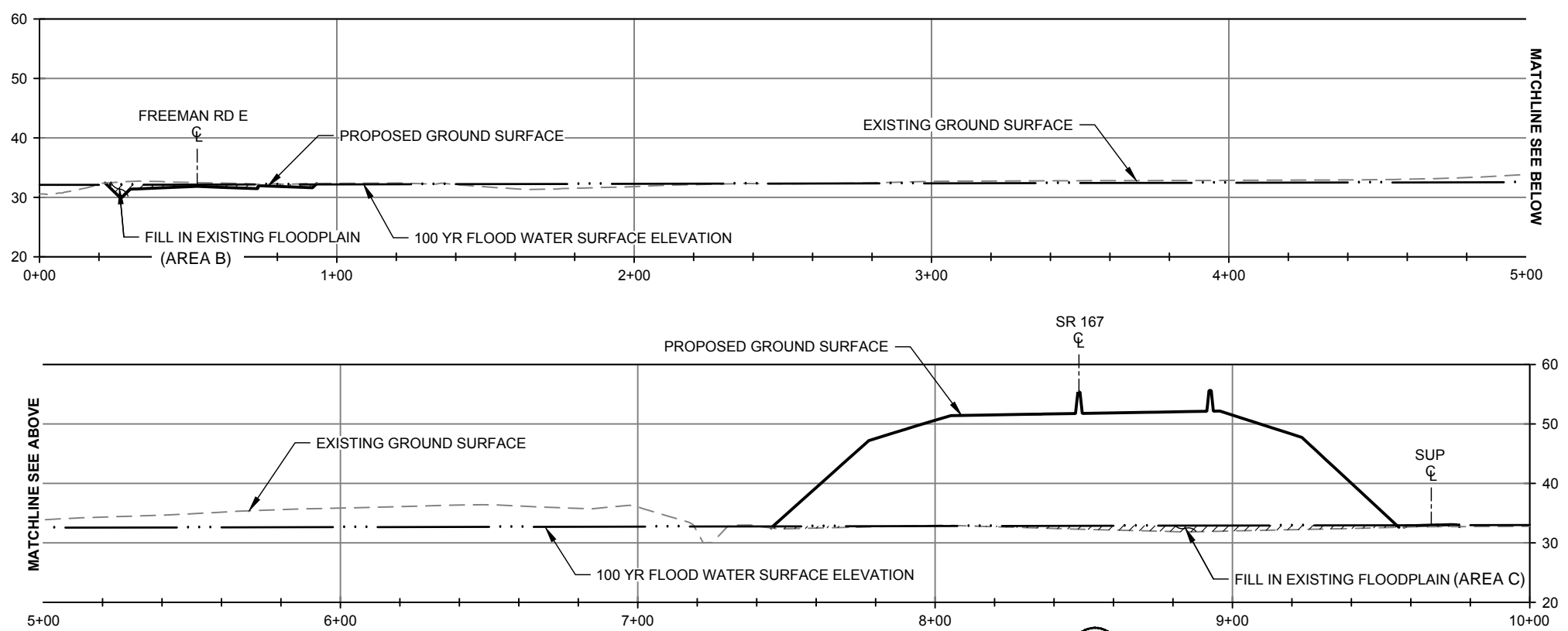


**City of Puyallup Floodplain Impacts Area B**

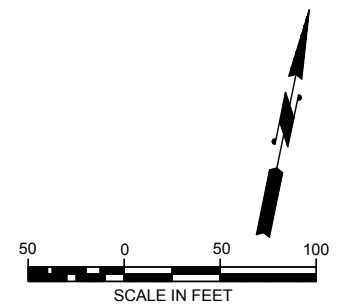
**LEGEND:**

-  EXISTING 100 YR FLOODPLAIN IN PLAN VIEW
-  EXISTING 100 YR FLOODPLAIN IN CROSS-SECTION VIEW

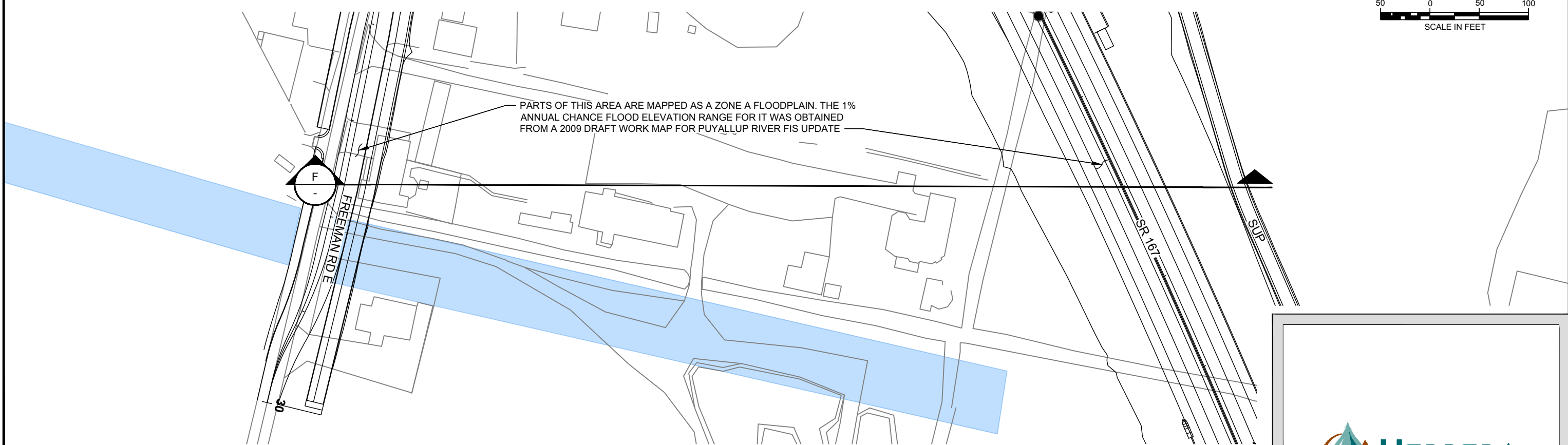
**100 YR FLOOD WATER DISPLACEMENT = 117 CUBIC YARDS (3,159 CUBIC FEET)**



**SECTION F**  
 HORIZ. SCALE: 1"=50"  
 VERT. SCALE: 1"=25'



PARTS OF THIS AREA ARE MAPPED AS A ZONE A FLOODPLAIN. THE 1% ANNUAL CHANCE FLOOD ELEVATION RANGE FOR IT WAS OBTAINED FROM A 2009 DRAFT WORK MAP FOR PUYALLUP RIVER FIS UPDATE



**REPRESENTATIVE CROSS-SECTION OF DISPLACED FLOOD STORAGE AT AREA B**



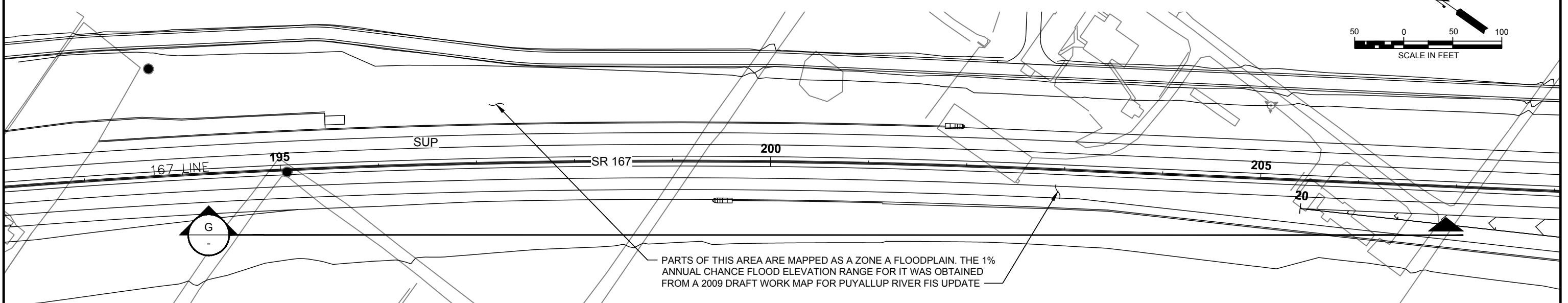
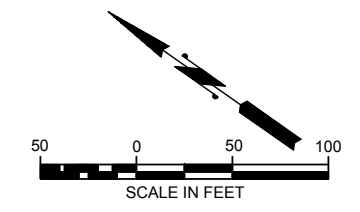
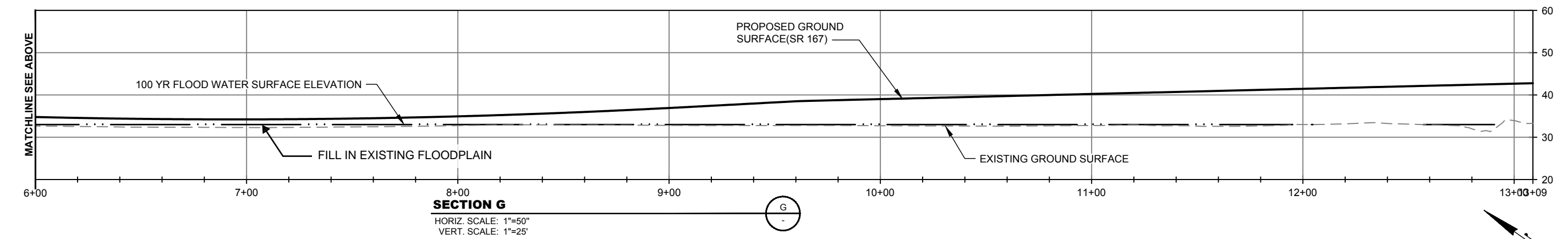
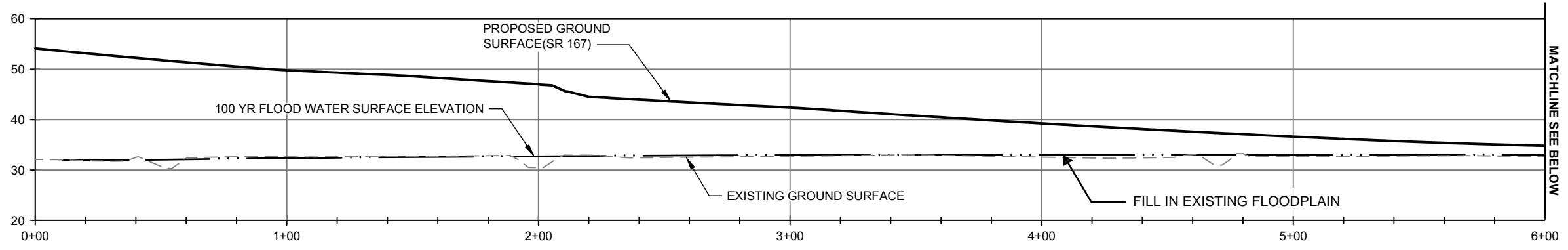


**City of Puyallup Floodplain  
Impacts Area C**

**LEGEND:**

 EXISTING 100 YR FLOODPLAIN

FILL VOLUME BELOW 100 YR  
FLOOD WATER SURFACE = 1,171  
CUBIC YARDS (46,197 CUBIC FEET)

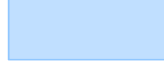



**REPRESENTATIVE CROSS-SECTION OF DISPLACED FLOOD  
STORAGE AT AREA C**

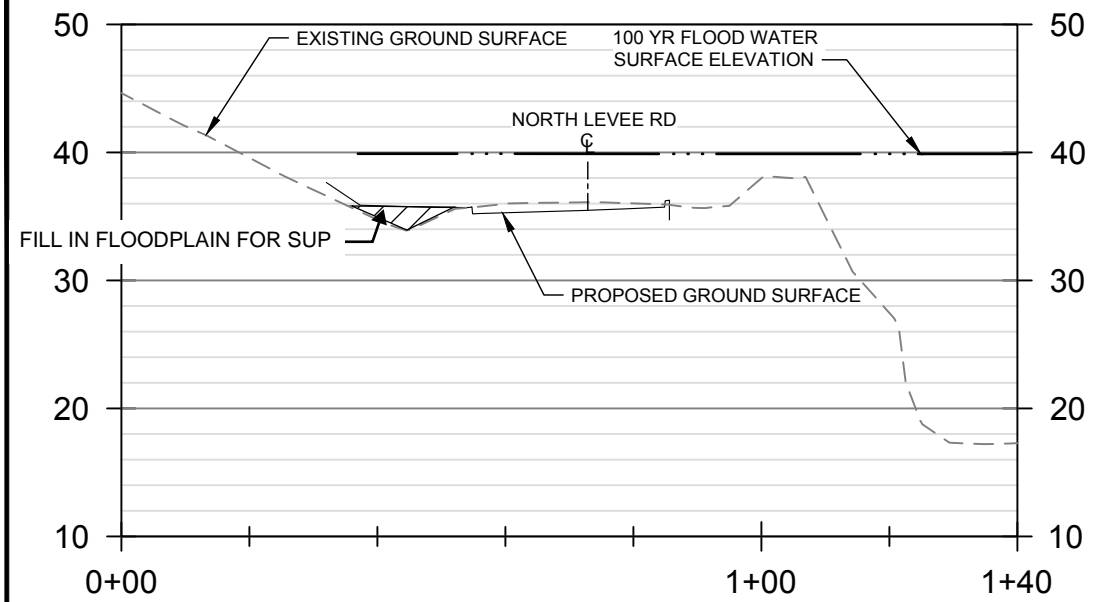


**City of Puyallup Floodplain  
Impacts Area D**

**LEGEND:**

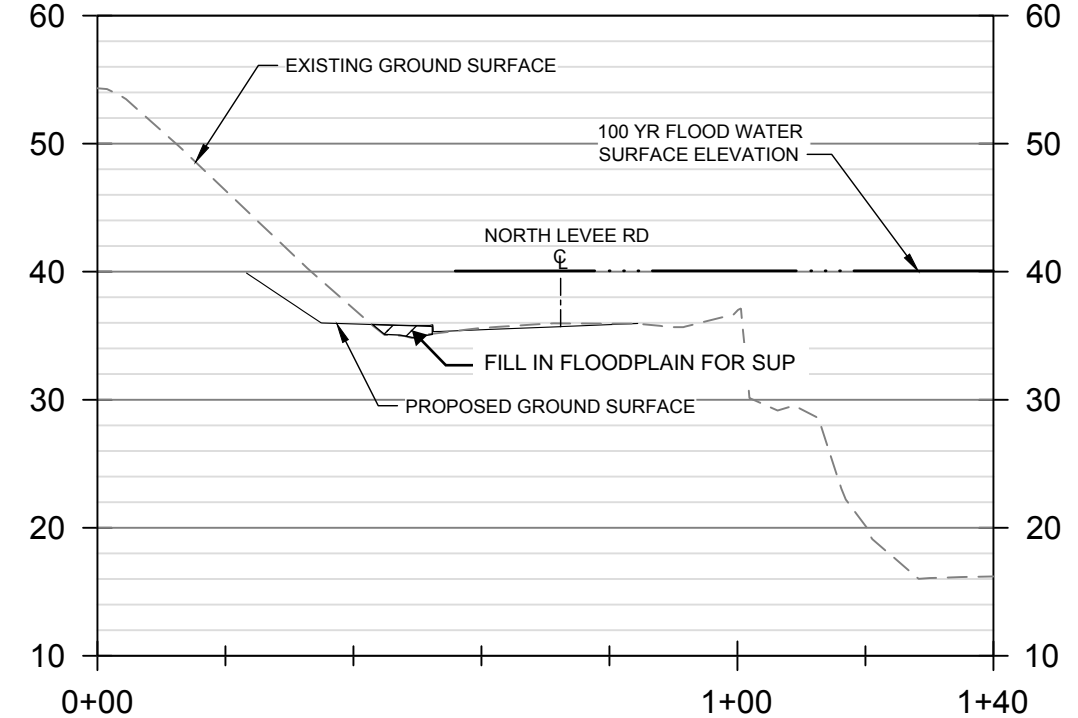
-  EXISTING 100 YR FLOODPLAIN IN PLAN VIEW
-  FILL IN 100 YR FLOODPLAIN IN CROSS-SECTION VIEW

FILL VOLUME BELOW 100 YR FLOOD WATER SURFACE = 142 CUBIC YARDS



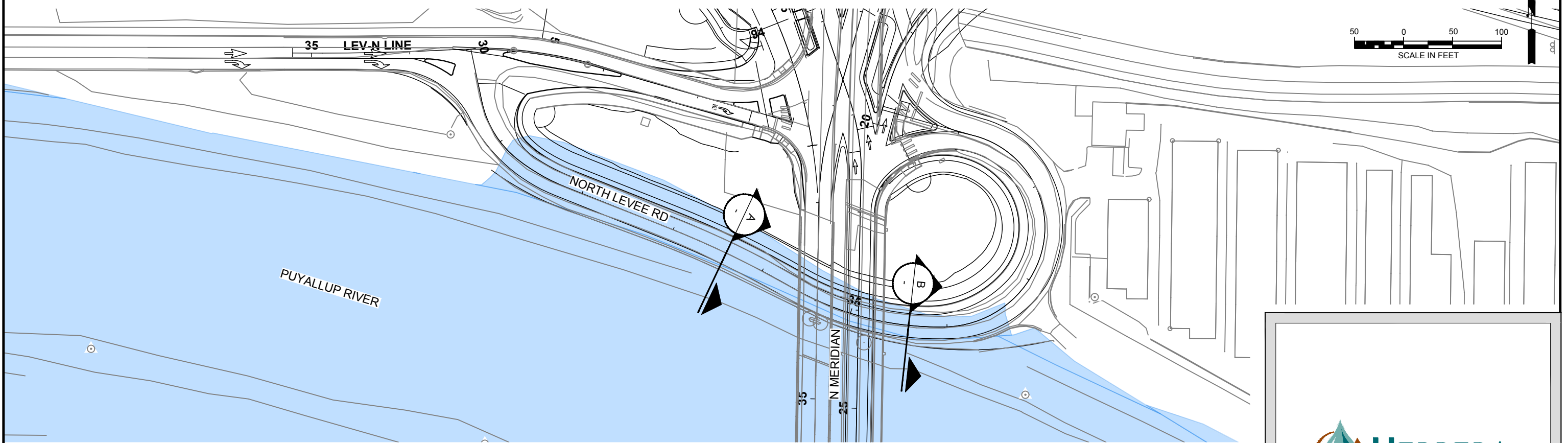
**SECTION A**

HORIZ. SCALE: 1"=15'  
VERT. SCALE: 1"=15'



**SECTION B**

HORIZ. SCALE: 1"=15'  
VERT. SCALE: 1"=15'

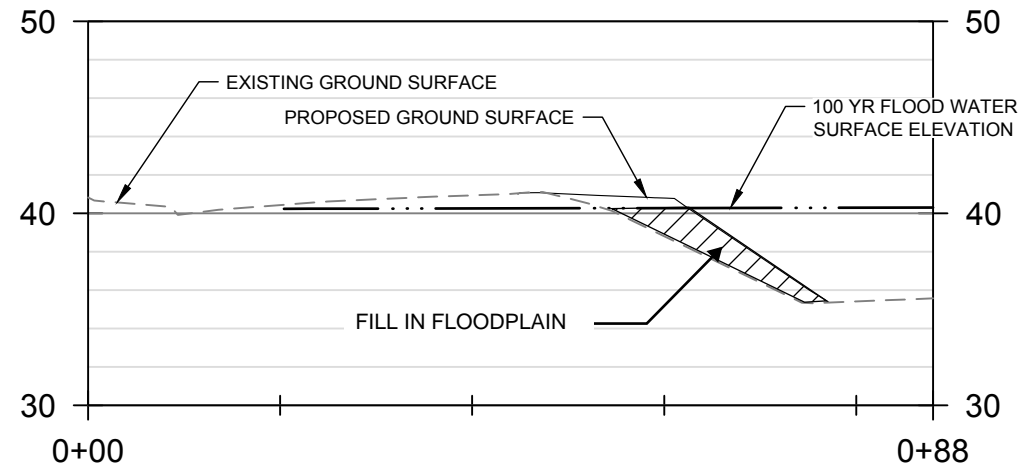


**REPRESENTATIVE CROSS-SECTIONS OF DISPLACED FLOOD STORAGE AT NORTH LEVEE ROAD / AREA D**



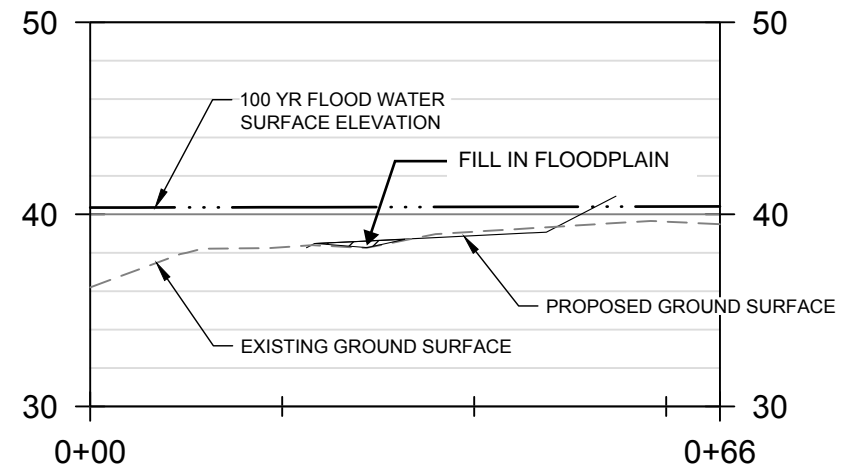
O:\proj\Y2016\16-06277-000\CAD\Exhibits\Floodplain\Floodplain Report Area 8 and 9.dwg

**City of Puyallup Floodplain Impacts Area E**



**SECTION A**

HORIZ. SCALE: 1"=20"  
VERT. SCALE: 1"=10'



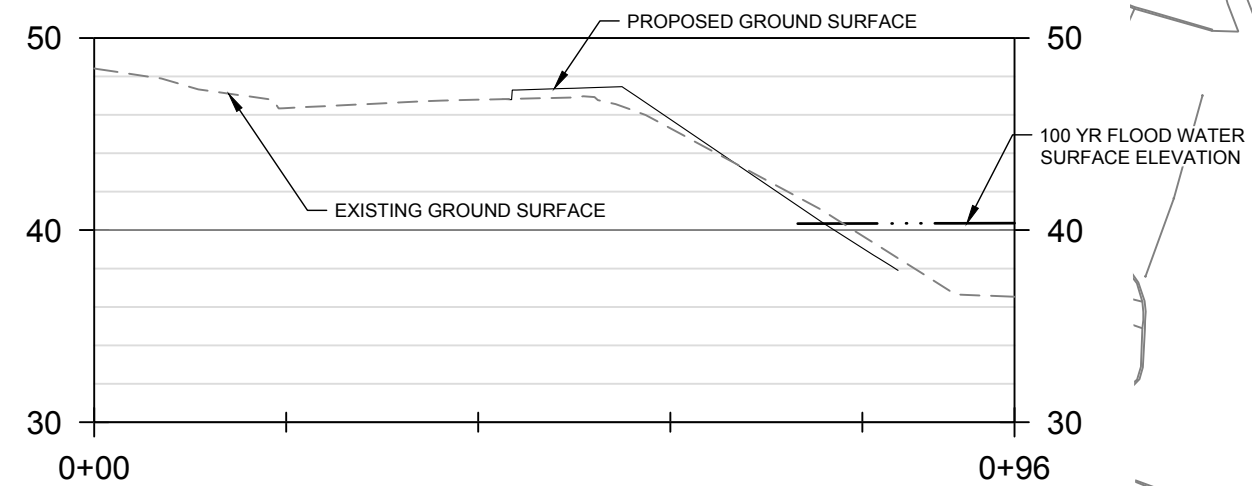
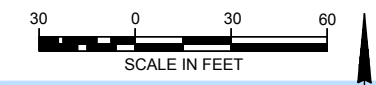
**SECTION B**

HORIZ. SCALE: 1"=20"  
VERT. SCALE: 1"=10'

**LEGEND:**

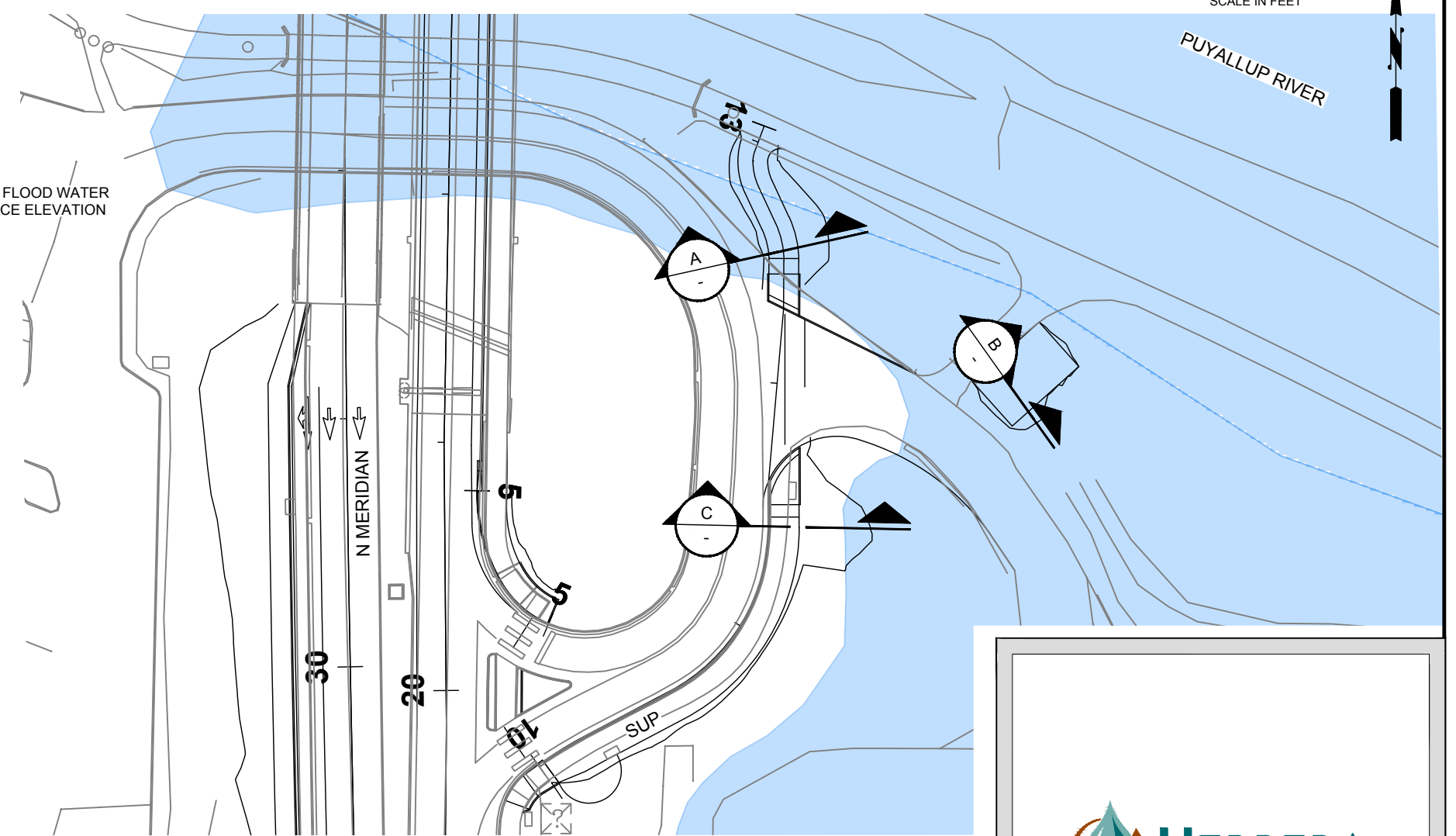
- EXISTING 100 YR FLOODPLAIN IN PLAN VIEW
- FILL IN 100 YR FLOODPLAIN IN CROSS-SECTION VIEW

**FILL VOLUME BELOW 100 YR FLOOD WATER SURFACE = 104 CUBIC YARDS**



**SECTION C**

HORIZ. SCALE: 1"=20"  
VERT. SCALE: 1"=10'



**REPRESENTATIVE CROSS-SECTIONS OF DISPLACED FLOOD STORAGE AT SUP CONNECTION TO RIVERWALK TRAIL / AREA E**



O:\proj\Y2016\16-06277-000\CAD\Exhibits\Floodplain\Floodplain Report Area 8 and 9.dwg

**This page intentionally left blank**

## **Attachment B**

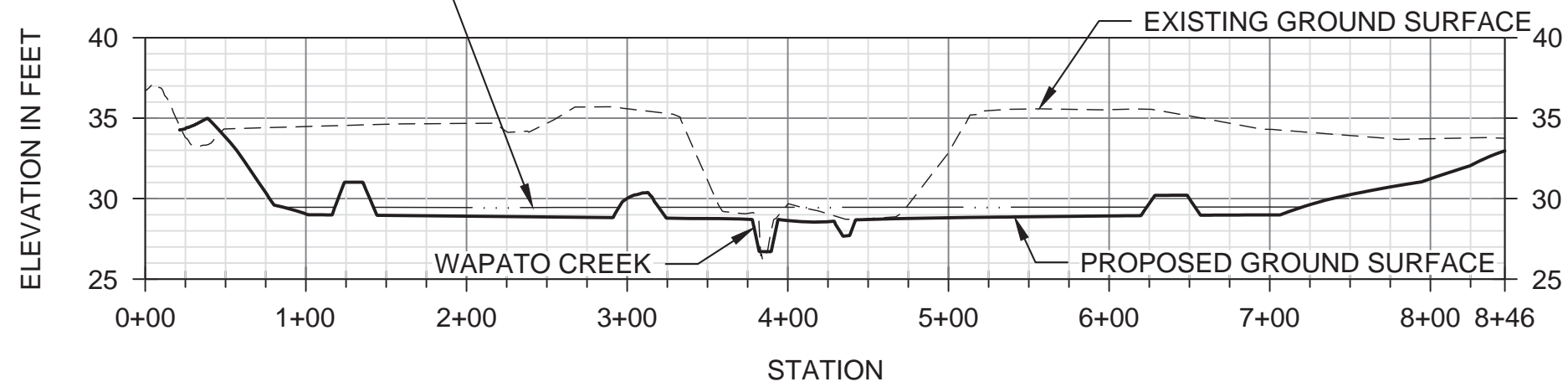
---

### **Representative Cross-Sections of Compensatory Flood Storage**

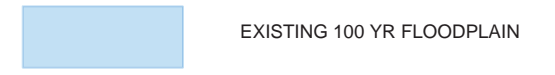
**This page intentionally left blank**

City of Puyallup Floodplain Mitigation for Fill in Area A

100 YR FLOOD WATER SURFACE ELEVATION

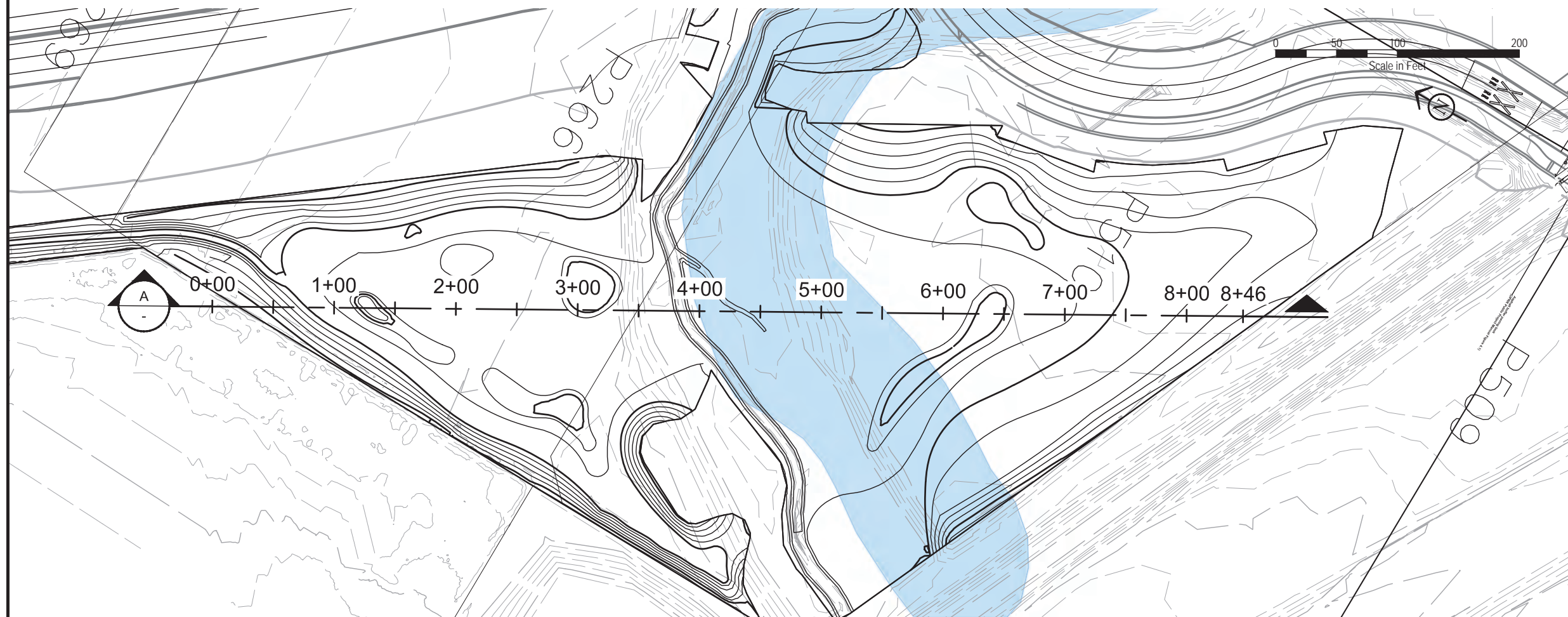


LEGEND:



SECTION A  
 HORIZ. SCALE: 1"=100'  
 VERT. SCALE: 1"=10'

EXCAVATION VOLUME BELOW  
 100 YR FLOOD WATER  
 SURFACE = 1,280 CUBIC YARDS



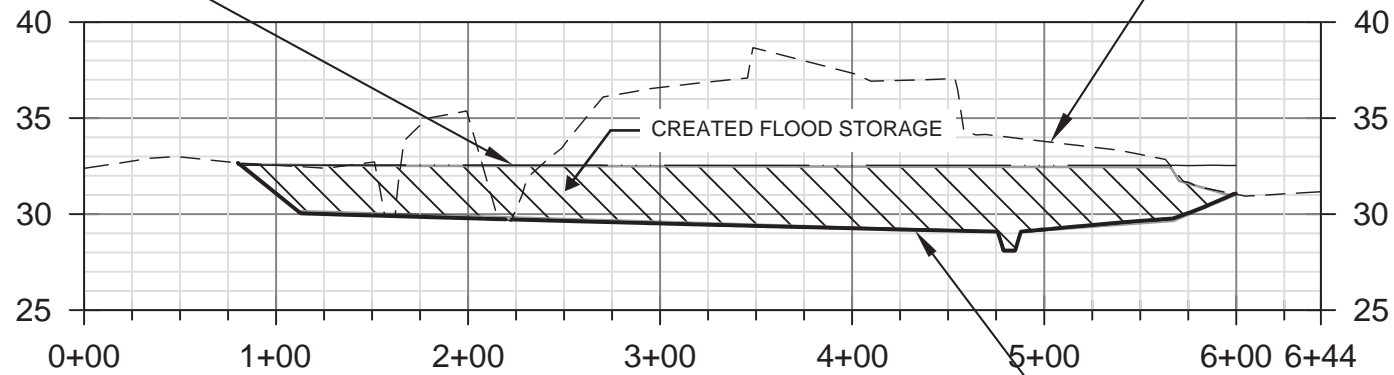
REPRESENTATIVE CROSS-SECTION OF COMPENSATORY FLOOD STORAGE AT EAST WAPATO RRP MITIGATION SITE



City of Puyallup Floodplain Mitigation for Fill in Areas B and C

100 YR FLOOD WATER SURFACE ELEVATION

ELEVATION IN FEET



EXISTING GROUND SURFACE

STATION

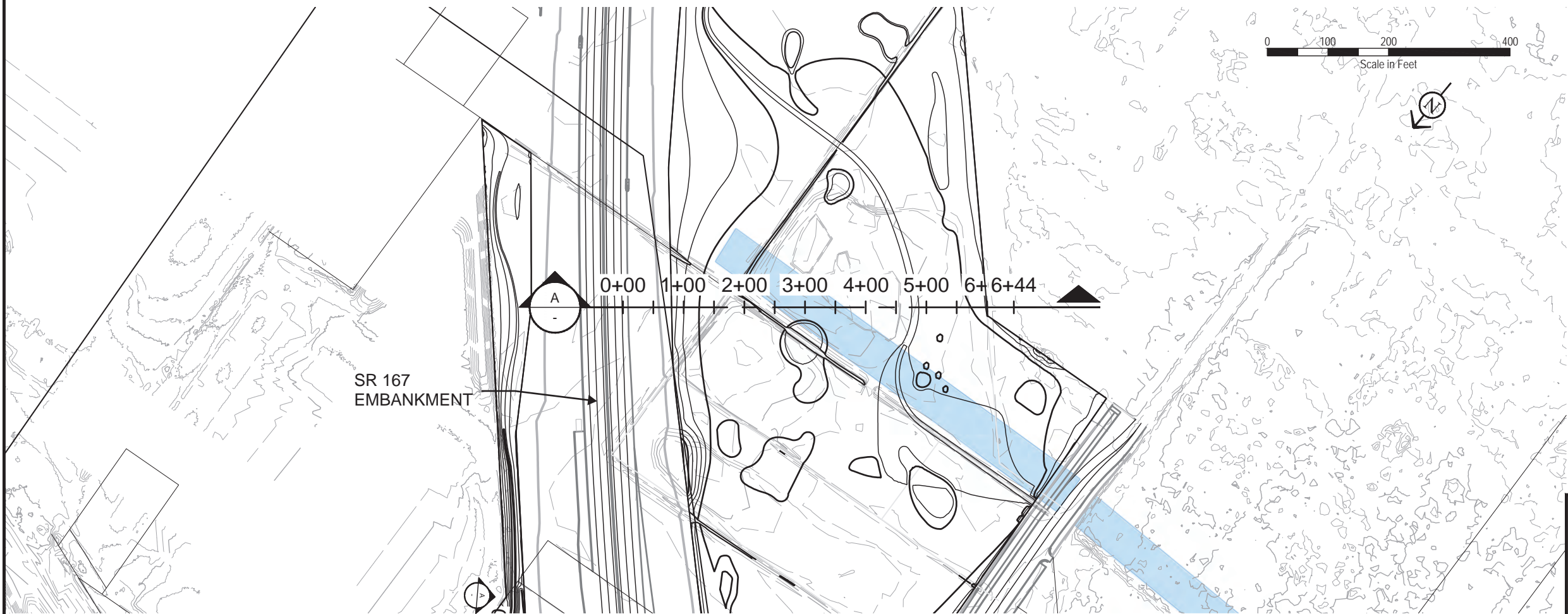
PROPOSED GROUND SURFACE

 CUT BELOW 100 YR FLOOD ELEVATION IN SECTION VIEW

EXCAVATION VOLUME BELOW 100 YR FLOOD WATER SURFACE = 48,883 CUBIC YARDS

PROFILE

HORIZ. SCALE: 1"=100'  
VERT. SCALE: 1"=10'





REPRESENTATIVE CROSS-SECTION OF COMPENSATORY FLOOD STORAGE AT FREEMAN ROAD MITIGATION SITE



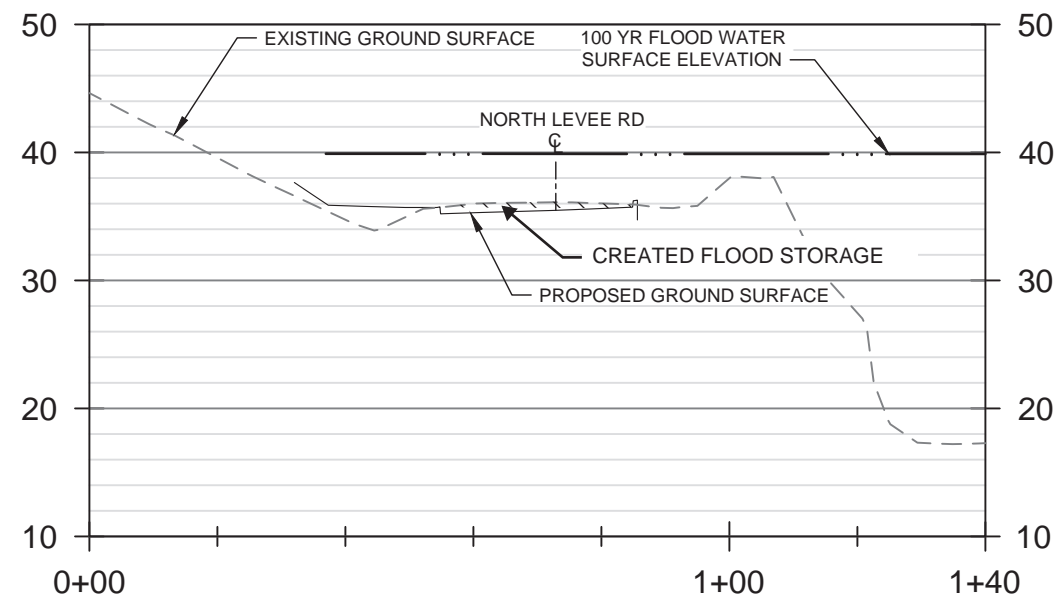


**City of Puyallup Floodplain Mitigation for Fill in Areas D and E**

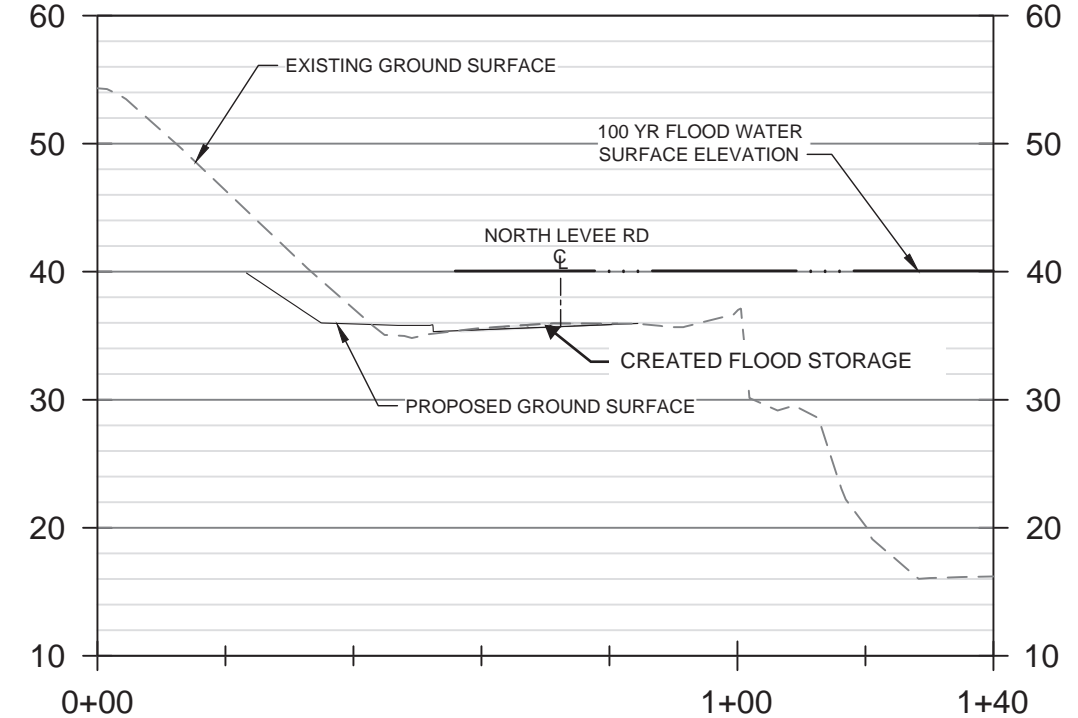
**LEGEND:**

-  EXISTING 100 YR FLOODPLAIN
-  CUT BELOW 100-YEAR FLOOD ELEVATION IN SECTION VIEW

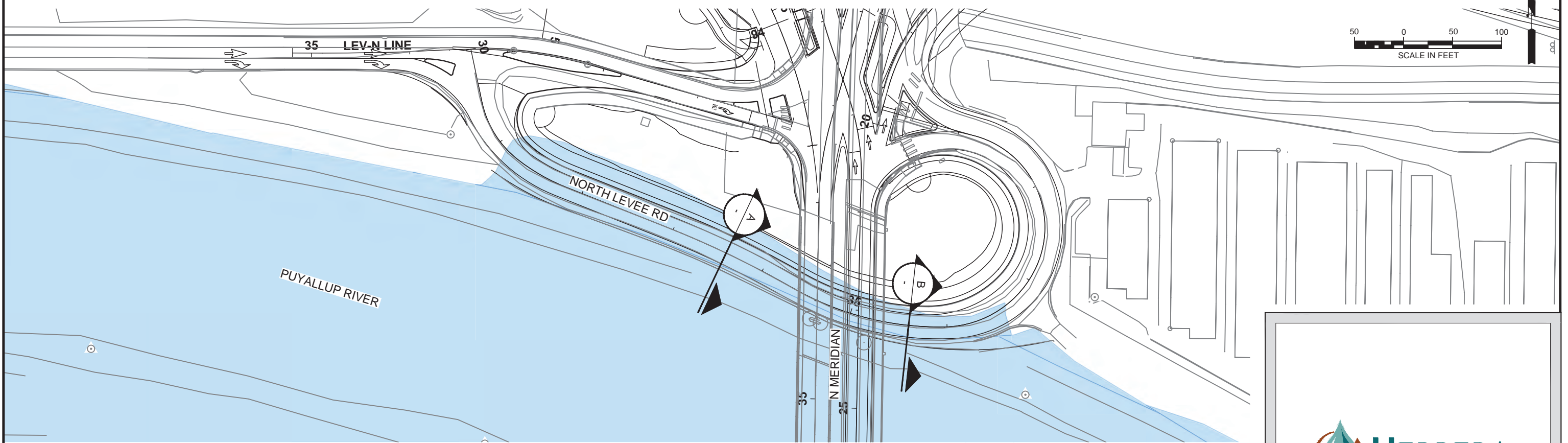
EXCAVATION VOLUME BELOW 100 YR FLOOD WATER SURFACE ELEVATION = 230 CUBIC YARDS  
(COMPENSATING FOR ALL FILL IN AREA D AND MOST OF FILL IN AREA E)



SECTION A  
HORIZ. SCALE: 1"=15'  
VERT. SCALE: 1"=15'



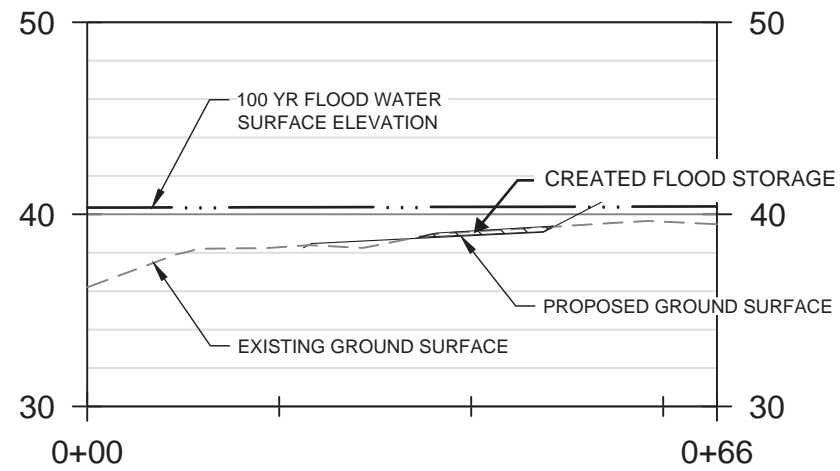
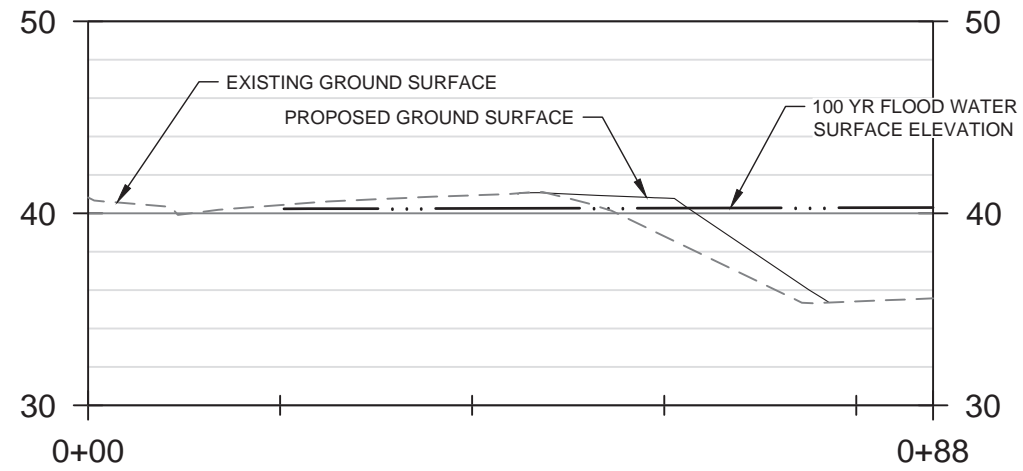
SECTION B  
HORIZ. SCALE: 1"=15'  
VERT. SCALE: 1"=15'



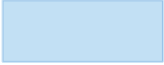

REPRESENTATIVE CROSS-SECTIONS OF COMPENSATORY FLOOD STORAGE AT NORTH LEVEE ROAD / **AREA D**



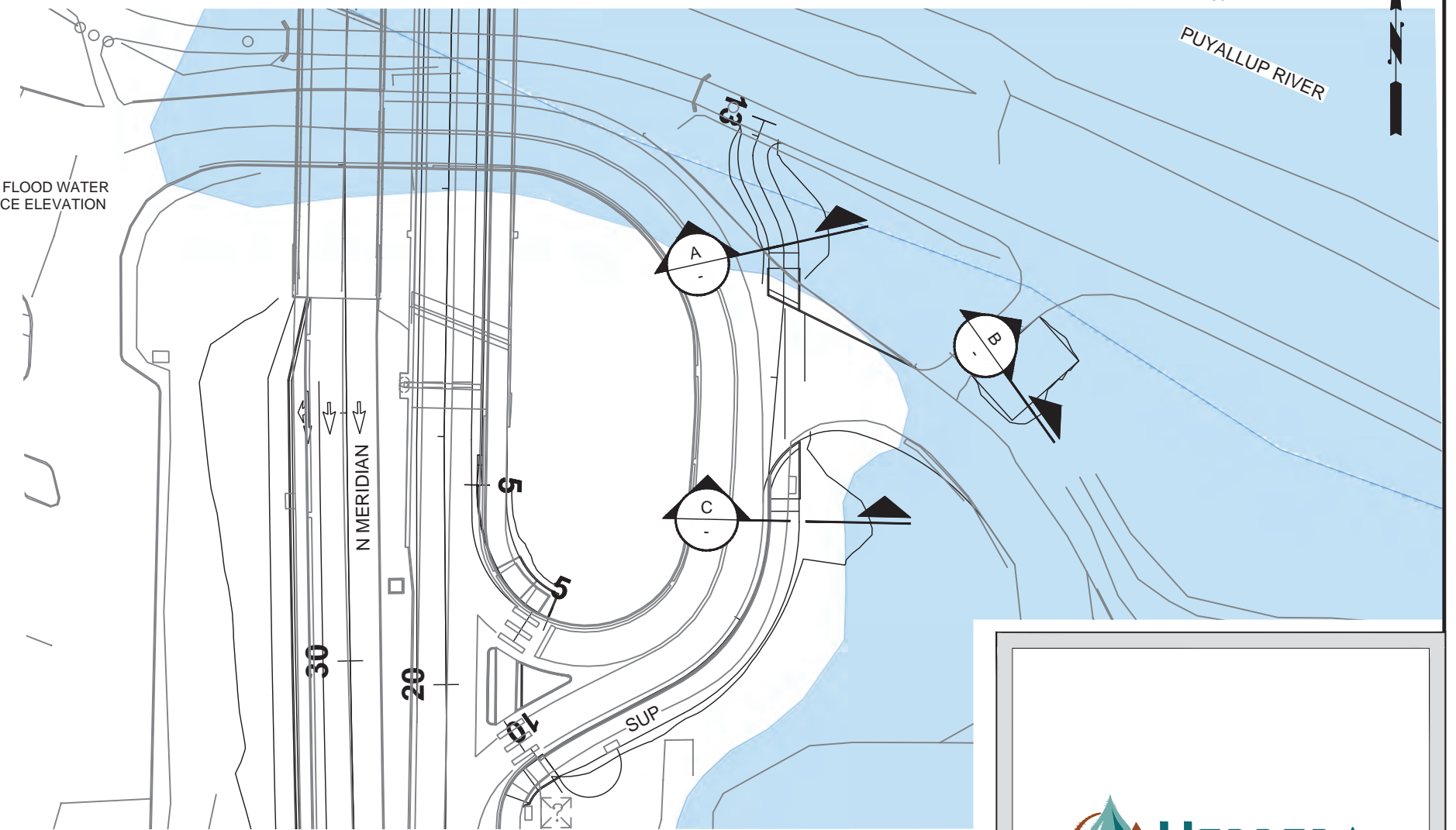
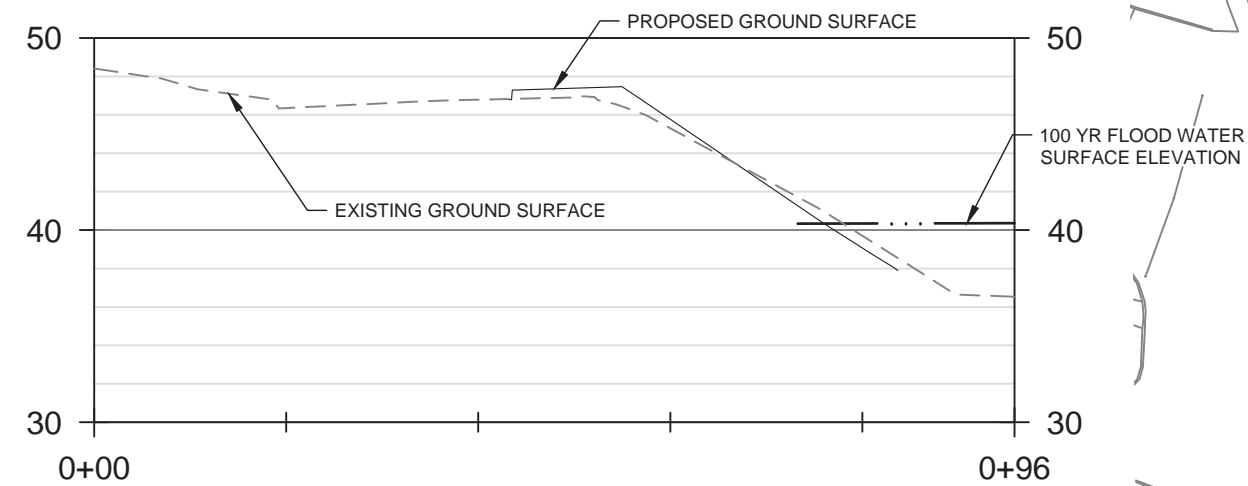
**City of Puyallup Floodplain Mitigation for Fill in Area E**



**LEGEND:**

-  EXISTING 100 YR FLOODPLAIN
-  CUT BELOW 100-YEAR FLOOD ELEVATION IN CROSS-SECTION

**EXCAVATION VOLUME BELOW 100 YR FLOOD WATER SURFACE = 18 CUBIC YARDS**



**REPRESENTATIVE CROSS-SECTIONS OF COMPENSATORY FLOOD STORAGE AT SUP CONNECTION TO RIVERWALK TRAIL / AREA E**





## Attachment C

---

### No-Rise Certification for Wapato Creek Floodway near Freeman Road East

**This page intentionally left blank**



August 3, 2023

City of Puyallup  
Development and Permitting Services Department  
333 S. Meridian  
Puyallup, Washington 98371

Subject: WSDOT State Route (SR) 167 Completion Project No-Rise Certification for Wapato Creek Floodplain and Floodway

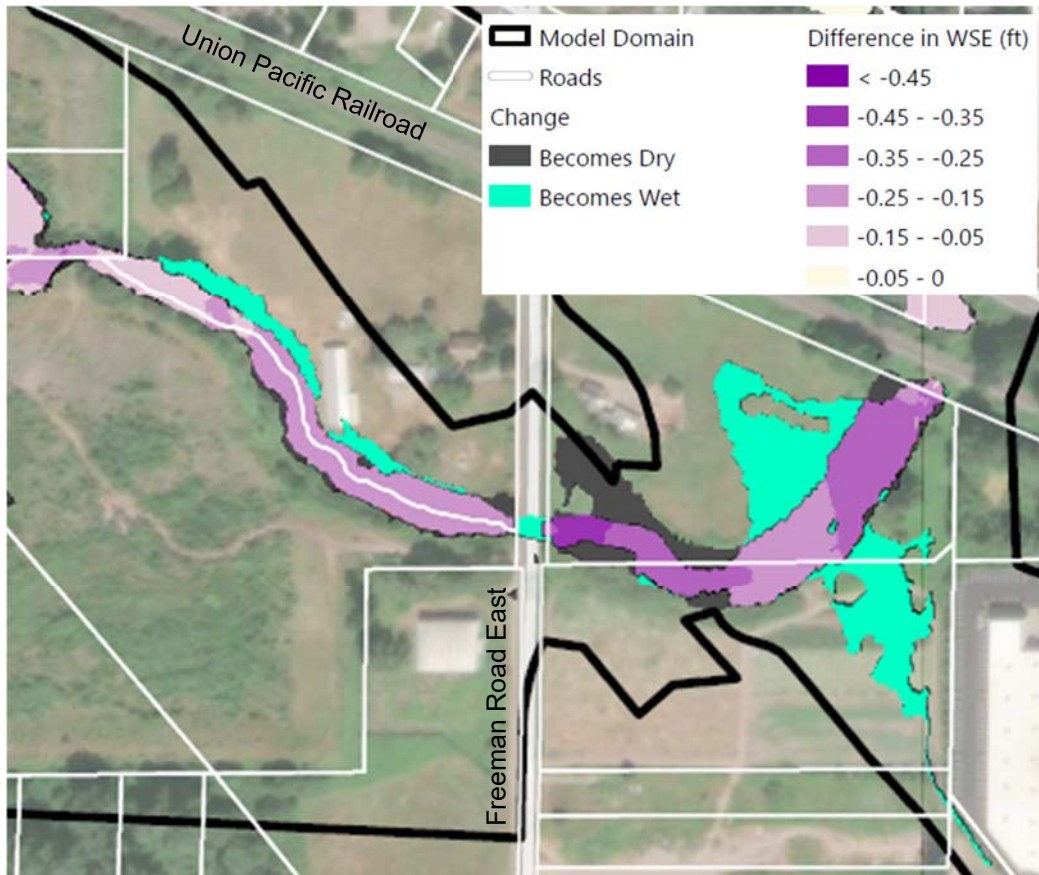
To Whom it May Concern:

This letter presents justification for a zero-rise certification for the subject project's anticipated effects on the existing floodplain and floodway of Wapato Creek within City of Puyallup jurisdiction. The project will construct new bridges for Freeman Road East, a shared-use path, and mainline SR 167 over the creek, with associated abutment fill placement within the mapped floodplain of the creek. The current FEMA flood insurance rate map (FIRM) for this area includes a floodway within the creek's banks.

The Washington State Department of Transportation's (WSDOT's) project team developed a two-dimensional hydraulic model of the creek and its floodplain areas to use for project design and permitting, using SRH-2D software. Modeling of existing conditions was completed first, to provide a basis to compare proposed hydraulic conditions in a range of flood events. The existing conditions hydraulic model was validated via replicating observed flooding conditions in a major flood that occurred in February 1996 using available information provided by the City of Fife, as well as flooding extents indicated on current FIRM panels 53053C0327E and 53053C0329E (Herrera 2023a). Modeling of proposed conditions represented removal of existing culverts beneath Freeman Road East and removal of the surrounding road prism, construction of the three new bridges over the creek at and upstream of the existing Freeman Road East crossing, and excavation to increase streamflow connectivity with the Wapato Creek floodplain. The same streamflow rates entering the project area from upstream were incorporated in the modeling of proposed conditions, along with proposed stormwater runoff discharges to the creek within the project corridor. Documentation of the proposed conditions modeling work is provided in a separate memorandum (Herrera 2023b).

Figure 1 shows the simulated water surface elevations in a 100-year flood event following project construction compared to simulated water surface elevations in existing conditions (with estimated changes in water levels calculated as proposed conditions water levels minus existing conditions water levels). As can be seen in this figure, no increase in 100-year (base flood) water level is predicted following project

construction within Puyallup city limits, except where expanded floodplain area allows inundation that cannot currently occur (“becomes wet”).

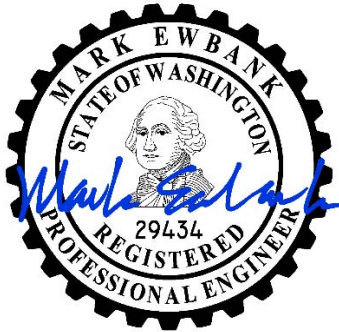


**Figure 1. Simulated Water Surface Elevations in Wapato Creek in Post-Project Conditions Compared to Pre-Project Conditions.**

## ENGINEERING “NO-RISE” CERTIFICATION

This is to certify that I am a duly qualified engineer licensed to practice in the State of Washington. It is to further certify that the SR 167 Completion Project (specifically Stage 2 of the project) will not cause a rise in base flood elevations, including within the regulatory floodway, in Wapato Creek within the city of Puyallup, based upon the results of detailed two-dimensional hydraulic modeling performed by engineers working under my supervision.

If the City of Puyallup seeks more documentation supporting this certification (i.e., reports documenting hydraulic modeling of existing and proposed conditions cited in this letter) I can furnish it upon request.



Mark Ewbank, P.E., CFM  
Principal Engineer  
Herrera Environmental Consultants, Inc.

Date: August 3, 2023

cc: Aaron Fieser, WSP and Vivian Erickson, HNTB

**This page intentionally left blank**





## Attachment D

---

### No-Rise Certification for Puyallup River Floodway near Meridian Avenue Bridge

**This page intentionally left blank**

August 3, 2023

City of Puyallup  
Development and Permitting Services Department  
333 S. Meridian  
Puyallup, WA 98371

Subject: WSDOT State Route (SR) 167 Completion Stage 2 Project No-Rise Certification for Puyallup River Floodplain and Floodway

To Whom it May Concern:

This letter presents justification for a zero-rise certification for the subject project's anticipated effects on the existing floodplain and floodway of the Puyallup River within City of Puyallup jurisdiction. The only Stage 2 project work that is proposed within the river's mapped floodplain is at the north and south ends of the Meridian Avenue bridge in relation to shared-use path construction. The project will not alter the existing bridge and its abutments, nor construct anything protruding into the river channel beyond the existing banks of the river. The current FEMA flood insurance rate map (FIRM) for this area (panel #53053C0333E) includes a floodway that spans the entire bank-to-bank river channel width plus a portion of North Levee Road where it passes under the bridge and connects to North Levee Road to the west of the bridge crossing. The floodway also extends on to Riverwalk Trail under and adjacent to the south side of the bridge.

Because the project design plans involve relatively minor grading at the edge of the floodplain the City has provided direction that a hydraulic model of the river is not necessary to support this assessment of the potential for causing an increase ("rise") in the base flood elevation (M. Higginson personal communication, email dated January 26, 2023).

The proposed grading specifically involves the following:

- On the north side of the river, the surface of North Levee Road will be lowered slightly, and the new shared-use path will be constructed adjacent to the road shoulder on the north side, with path subgrade and paving material filling in an existing shallow ditch. Most of this work will be within the regulatory floodway. This work will result in an excavation volume below the base flood water level of 230 cubic yards and fill volume below the base flood water level of 142 cubic yards, yielding a net increase in flood storage of 88 cubic yards.
- On the south side of the river, the new shared-use path will be constructed on the eastern edge of 4<sup>th</sup> Street Northeast and will connect to the existing Riverwalk Trail. The northern part of this shared-use path segment will be within the river's floodplain, and

also within the floodway, and a concrete pad for trail amenity purposes will be built further to the east, also within the floodplain and floodway. This work will result in an excavation volume below the base flood water level of 18 cubic yards and fill volume below the base flood water level of 104 cubic yards, yielding a net decrease in flood storage of 86 cubic yards.

The combination of these adjustments in the finished ground surface on both sides of the river will result in a small increase in flood storage volume compared to existing conditions (2 cubic yards net increase). The compensatory flood storage to be provided for both of these impact areas will be on the north side of the river, in an elevation range that is equivalent to and slightly lower than the elevation range of the fill to be placed for shared-use path construction, and thus will be reliably available when extreme flooding occurs in this vicinity along the river.

### **ENGINEERING “NO-RISE” CERTIFICATION**

This is to certify that I am a duly qualified engineer licensed to practice in the State of Washington. It is to further certify that the SR 167 Completion Project (specifically Stage 2 of the project) will not cause a rise in base flood elevations, including within the regulatory floodway, in the Puyallup River within the city of Puyallup, based upon proposed compensatory flood storage to meet Puyallup Municipal Code requirements.



Mark Ewbank, P.E., CFM  
Principal Engineer  
Herrera Environmental Consultants, Inc.

Date: August 3, 2023

cc: Aaron Fieser, WSP and Vivian Erickson, HNTB