Development Services Department
Environmental Coordinator
450 110th Avenue NE
Bellevue, WA 98009-9012

DETERMINATION OF NON-SIGNIFICANCE

PROPOSAL NAME:	COBU Factoria Conveyance Improvements
LOCATION:	Factoria Blvd from SE 36th St – SE 38th St
FILE NUMBERS:	20-109547-LO
PROPONENT:	Birol Shaha

DESCRIPTION OF PROPOSAL:

Replacement of an existing stormwater conveyance trunk line, 30" storm drain and outfalls with a 9'x4' concrete box conveyance; a 5'x2' box storm drain; a set (24-inch and 30-inch) ductile iron pipes; and a new outfall. The proposal also includes improvements to two storm drain crossings, new inlets, and various inlet improvements along Factoria Blvd SE. Native mitigation planting is proposed to be installed in the steep slope and riparian below the new outfall.

The Environmental Coordinator of the City of Bellevue has determined that this proposal does not have a probable significant adverse impact upon the environment. An Environmental Impact Statement (EIS) is not required under RCW 43.21C.030(2)(C). This decision was made after the Bellevue Environmental Coordinator reviewed the completed environmental checklist and information filed with the Land Use Division of the Development Services Department. This information is available to the public on request.

This DNS is issued after using the optional DNS process in WAC 197-11-355. There is no further comment period on the DNS. There is a 14-day appeal period. Only persons who submitted written comments before the DNS was issued may appeal the decision.

DATE ISSUED: 3/24/2022

APPEAL DATE: 4/7/2022

A written appeal must be filed in the City Clerk's Office by 5 p.m. on the appeal date noted above.

This DNS may be withdrawn at any time if the proposal is modified so as to have significant adverse environmental impacts; if there is significant new information indicating a proposals probable significant adverse environmental impacts (unless a non-exempt license has been issued if the proposal is a private project) or if the DNS was procured by misrepresentation or lack of material disclosure.

Issued By: ***Reilly Pittman Acting Planning Manager*** **for** **Date:** March 24, 2022
Elizabeth Stead, Environmental Coordinator
Development Services Department

City of Bellevue
Development Services Department
Land Use Staff Report

Proposal Name:	COBU Factoria Conveyance Improvements
Proposal Address:	Factoria Boulevard from SE 36th - SE 38th St
Proposal Description:	Critical Areas Land Use Permit replace an existing stormwater conveyance trunk line, 30" storm drain and outfalls with a 9'x4' concrete box conveyance; a 5'x2' box storm drain; a set (24-inch and 30-inch) ductile iron pipes; and a new outfall. The proposal includes improvements to two storm drain crossings, new inlets, and various inlet improvements along Factoria Blvd SE. The proposal is supported by a mitigation plan for permanent impacts to Richards Creek, a Critical Areas Report, and geotechnical analysis.
File Number:	20-109547-LO
Applicant:	Birol Shaha
Decisions Included:	Process II
Planner:	David Wong, Land Use Planner
State Environmental Policy Act Threshold Determination:	**Determination of Non-Significance** ***Reilly Pittman*** ***Acting Planning Manager*** Elizabeth Stead, Environmental Coordinator Development Services Department
Department Decision:	**Approval with Conditions** ***Reilly Pittman*** ***Acting Planning Manager*** Elizabeth Stead, Land Use Director Development Services Department

Application Date:	June 1, 2020
Notice of Application Publication Date:	June 25, 2020
Decision Publication Date:	March 24, 2022
Appeal Deadline:	April 7, 2022

For information on how to appeal a proposal, visit Development Services Center at City Hall or call (425) 452-6800. Appeal of the Decision must be received in the City's Clerk's Office by 5 PM on the date noted for appeal of the decision.

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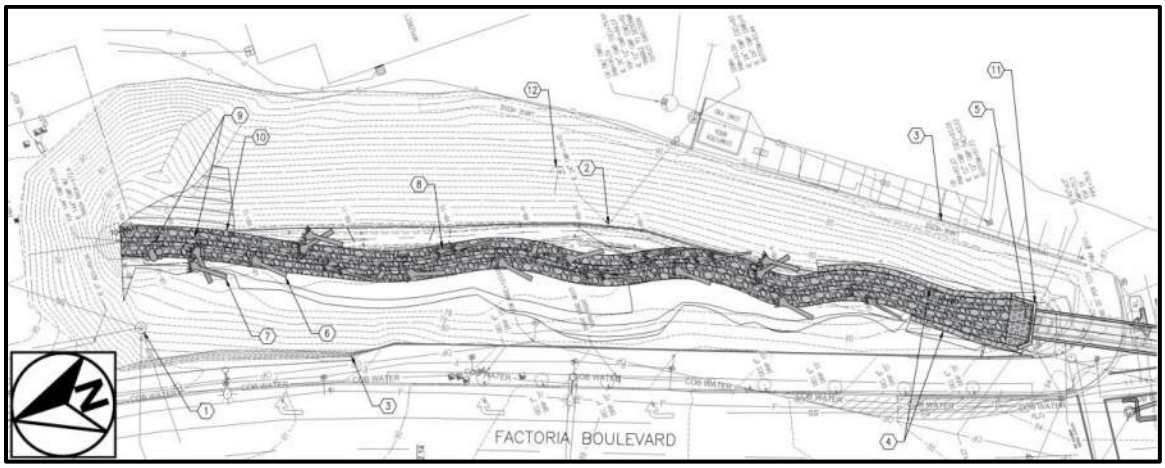
Attachments

1. Site Plan
2. Mitigation, Restoration, Enhancement Plan
3. Critical Areas Report – WSP USA
4. Geotechnical Design Report – Aspect Consulting

I. Request & Review Process

The applicant has requested a Critical Areas Land Use Permit approval to replace an existing stormwater conveyance trunk line, 30" storm drain and outfalls to Richards Creek at Factoria Village with 413 feet of 9'x4' concrete box conveyance; 229 feet of 5'x2' box storm drain; a set (24-inch and 30-inch) ductile iron pipes; and new outfall and wing walls to address recurrent flooding issues in and around Factoria Blvd SE. Outfall improvements will occur above and below the Richards Creek OHWM and will include channel and riparian enhancements within the Richards Creek channel. See Figure 1 for proposed channel enhancement.

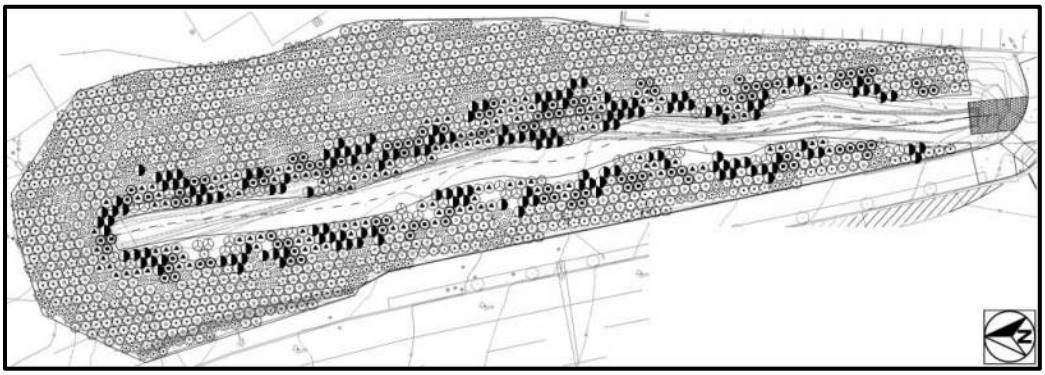
Figure 1



The project includes 15 added inlets and improvements to eight (8) existing inlets along Factoria Blvd SE, as well as storm drain crossings at two (2) locations (3711 and 3625) consisting of two (2) and five (5) 18-inch pipes, respectively. Temporary relocation of existing utilities within and adjacent to Factoria Blvd SE may be necessary to accommodate construction.

Mitigation to enhance areas downstream of the outfall is proposed, and will consist of native replanting and non-native, invasive species removal and control. See Figure 2 for downstream vegetation enhancement.

Figure 2



Proposals to improve public flood protection measures and to conduct vegetation management within a Type-F stream, steep slope, and their associated buffers require the approval of a Critical Areas Land Use Permit (CALUP) and are subject to the requirements of LUC 20.25H and 20.30P, including but not limited to those sections governing allowed uses, streams, steep slopes, and mitigation.

II. Site Context & Description

A. Site Context

The project site is located within the right-of-way along Factoria Blvd SE between SE 36th St and SE 38th St and includes a portion of the open stream channel for Richards Creek to the south of SE 36th St. The project limits also include areas within the Factoria Village parcel (3600 Factoria Blvd SE). The properties on the east and west sides of Factoria Blvd. SE are developed with commercial uses and improvements, with the exception of the above ground portion of Richards Creek and adjacent riparian area.

See Figure 2 below for the current site conditions**.**

Figure 2

B. Zoning & Subarea

The site is zoned CB (Community Business) and is located within the Factoria subarea of the City's Comprehensive Plan. See Figure 3 for zoning map and Figure 4 for subarea information.

Figure 3

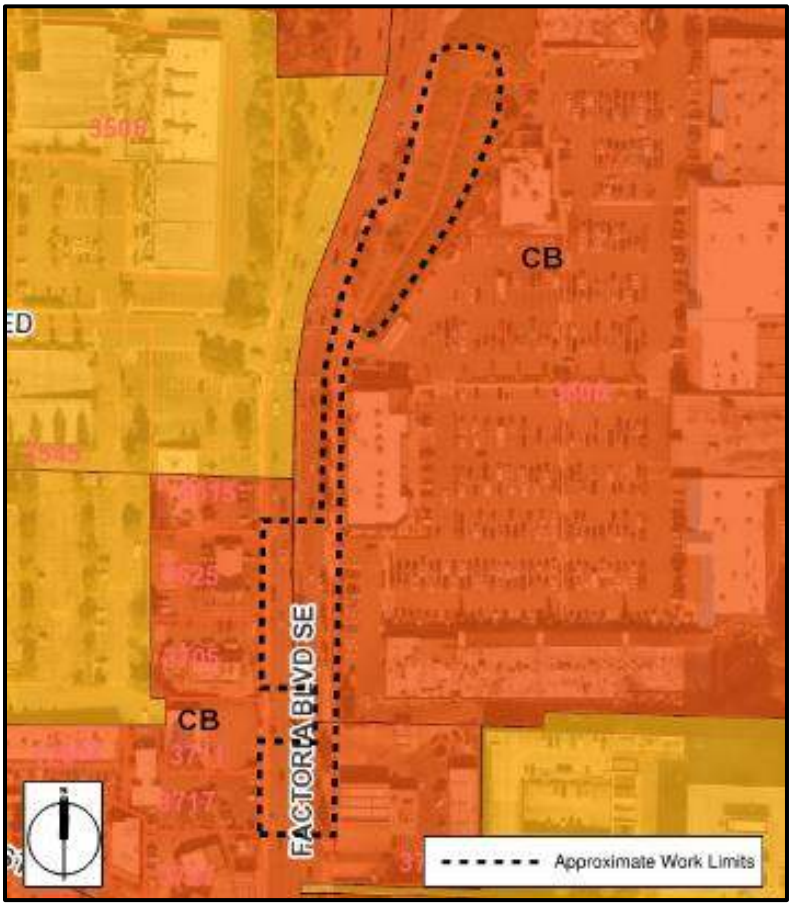
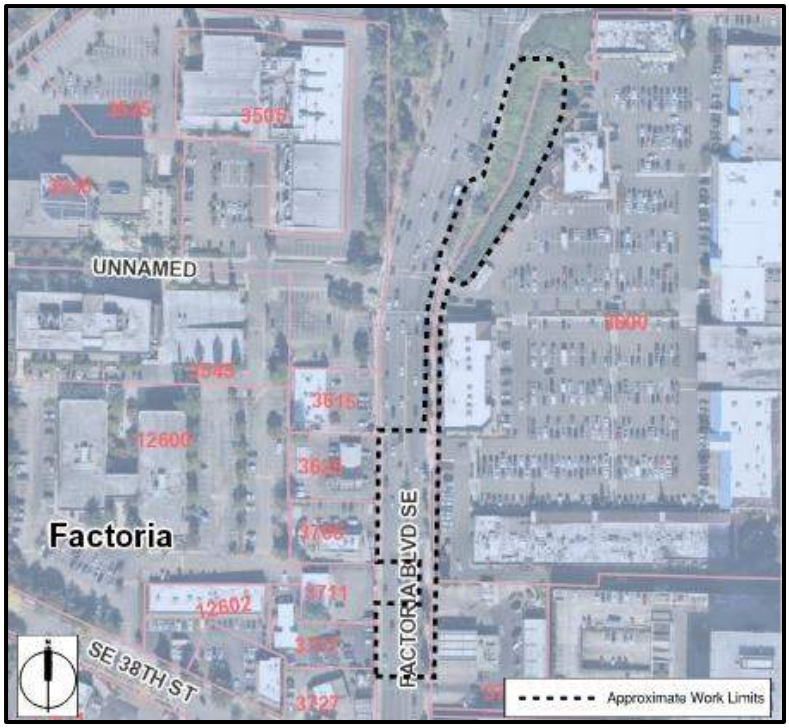


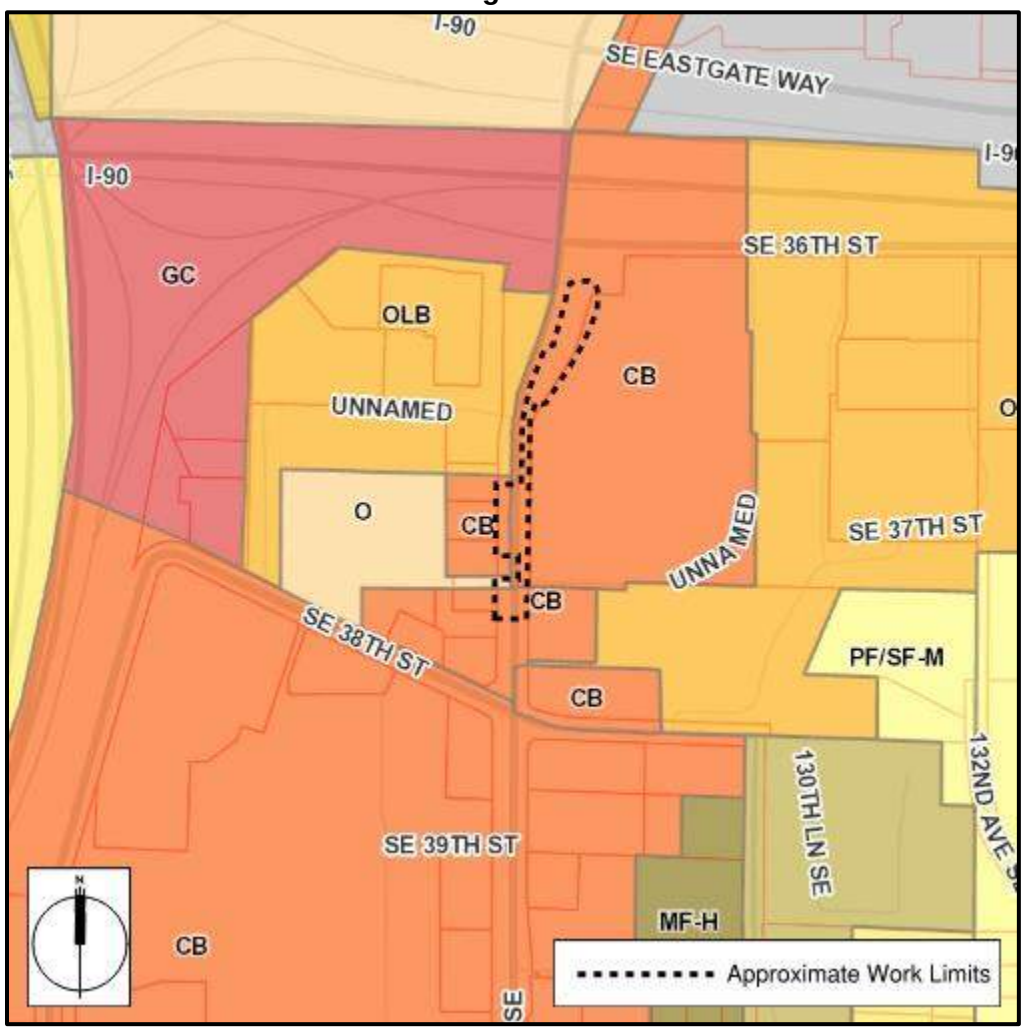
Figure 4



C. Land Use Context

The site has a Comprehensive Plan designation of CB (Community Business) and O (Office). The site is adjacent to commercial uses to the north, south, and west. See Figure 5 for Comprehensive Plan designation.

Figure 5



D. Critical Areas Functions and Values

i. Streams and Riparian Areas

Most of the elements necessary for a healthy aquatic environment rely on processes sustained by dynamic interaction between the stream and the adjacent riparian area (Naiman et al., 1992). Riparian vegetation in floodplains and along stream banks provides a buffer to help mitigate the impacts of urbanization (Finkenbine et al., 2000 in Bolton and Shellberg, 2001). Riparian areas support healthy stream conditions.

Riparian vegetation, particularly forested riparian areas, affect water temperature by providing shade to reduce solar exposure and regulate high ambient air temperatures, slowing or preventing increases in water temperature (Brazier and Brown, 1973; Corbett

and Lynch, 1985).

Upland and wetland riparian areas retain sediments, nutrients, pesticides, pathogens, and other pollutants that may be present in runoff, protecting water quality in streams (Ecology, 2001; City of Portland 2001). The roots of riparian plants also hold soil and prevent erosion and sedimentation that may affect spawning success or other behaviors, such as feeding.

Both upland and wetland riparian areas reduce the effects of flood flows. Riparian areas and wetlands reduce and desynchronize peak crests and flow rates of floods (Novitzki, 1979; Verry and Boelter, 1979 in Mitsch and Gosselink, 1993). Upland and wetland areas can infiltrate floodflows, which in turn, are released to the stream as baseflow

Stream riparian areas, or buffers, can be a significant factor in determining the quality of wildlife habitat. For example, buffers comprised of native vegetation with multi- canopy structure, snags, and down logs provide habitat for the greatest range of wildlife species (McMillan, 2000). Vegetated riparian areas also provide a source of large woody debris that helps create and maintain diverse in-stream habitat, as well as create woody debris jams that store sediments and moderate flood velocities.

Sparsely vegetated or vegetated buffers with non-native species may not perform the needed functions of stream buffers. In cases where the buffer is not well vegetated, it is necessary to either increase the buffer width or require that the standard buffer width be restored or revegetated (May 2003). Until the newly planted buffer is established the near-term goals for buffer functions may not be attained.

Riparian areas often have shallow groundwater tables, as well as areas where groundwater and surface waters interact. Groundwater flows out of riparian wetlands, seeps, and springs to support stream baseflows. Surface water that flows into riparian areas during floods or as direct precipitation infiltrates into groundwater in riparian areas and is stored for later discharge to the stream (Ecology, 2001; City of Portland, 2001).

ii. Geologic Hazard Areas

Geologic hazards pose a threat to the health and safety of citizens when commercial, residential, or industrial development is inappropriately sited in areas of significant hazard. Some geologic hazards can be reduced or mitigated by engineering, design, or modified construction practices. When technology cannot reduce risks to acceptable levels, building in geologically hazardous areas is best avoided (WAC 365-190).

Steep slopes may serve several other functions and possess other values for the City and its residents. Several of Bellevue's remaining large blocks of forest are located in steep slope areas, providing habitat for a variety of wildlife species and important linkages between habitat areas in the City. These steep slope areas also act as conduits for groundwater, which drains from hillsides to provides a water source for the City's wetlands and stream systems. Vegetated steep slopes also provide a visual amenity in

the City, providing a "green" backdrop for urbanized areas enhancing property values and buffering urban development.

iii. Habitat Associated with Species of Local Importance

Urbanization, the increase in human settlement density and associated intensification of land use, has a profound and lasting effect on the natural environment and wildlife habitat (McKinney 2002, Blair 2004, Marzluff 2005, Munns 2006), is a major cause of native species local extinctions (Czech et al 2000), and is likely to become the primary cause of extinctions in the coming century (Marzluff et al. 2001a). Cities are typically located along rivers, on coastlines, or near large bodies of water. The associated floodplains and riparian systems make up a relatively small percentage of land cover in the western United States, yet they provide habitat for rich wildlife communities (Knopf et al. 1988), which in turn provide a source for urban habitat patches or reserves. Consequently, urban areas can support rich wildlife communities. In fact, species richness peaks for some groups, including songbirds, at an intermediate level of development (Blair 1999, Marzluff 2005). Protected wild areas alone cannot be depended on to conserve wildlife species. Impacts from catastrophic events, environmental changes, and evolutionary processes (genetic drift, inbreeding, colonization) can be magnified when a taxonomic group or unit is confined to a specific area, and no one area or group of areas is likely to support the biological processes necessary to maintain biodiversity over a range of geographic scales (Shaughnessy and O'Neil 2001). As well, typological approaches to taxonomy or the use of indicators present the risk that evolutionary potential will be lost when depending on reserves for preservation (Rojas 2007). Urban habitat is a vital link in the process of wildlife conservation in the U.S.

III. Consistency with Land Use Code Requirements:

A. Zoning Requirements:

The site is located within the Community Business (CB) zoning district. Review of the proposal found the only notable impact to zoning requirements were related to potential temporary impacts to required landscaping within Factoria Village (3600 Factoria Blvd SE) in order to address permanent and temporary impacts to utility infrastructure. The proposal includes in-kind replacement and restoration of required landscaping within the private property. <u>See Section X for conditions of approval related to required restoration landscaping</u>.

B. Consistency with Land Use Code Critical Areas Performance Standards:

i. Public Flood Protection Measures – 20.25H.055.C.2 & C.3.c

Public flood protection measures within a stream critical area or stream buffer are an allowed used pursuant LUC 20.25H.055, provided the proposal complies with all performance standards listed in the allowed use table of LUC 20.25H.055. As part of this project, the applicant has provided reporting published by WSP USA and Aspect Consulting, qualified professionals, that indicate no feasible alternatives exist to alleviate

recurrent flooding in the immediate area of Factoria Blvd SE. Utility infrastructure cannot be relocated from its existing alignment and work above and below the Richards Creek ordinary high water mark is necessary to connect new stormwater infrastructure, stabilize the stream, provide erosion protection. The report findings note the proposed improvements *"will not negatively impact overall aquatic area flow peaks, duration, volume of flood storage capacity, or hydroperiod.*" (Attachment 3, pg. 10). The design also incorporates mitigation, restoration, and enhancement to improve the Richards Creek stream channel and riparian vegetation to improve stream, slope, and buffer functions and values through improved habitat and stormwater quality.

ii. Stream Performance Standards – 20.25H.080

Development on sites with a type S or F stream or associated critical area buffer shall incorporate the following performance standards in design of the development, as applicable:

1. **Lights shall be directed away from the stream.**
   No lighting is included in this proposal.

2. **Activity that generates noise such as parking lots, generators, and residential uses shall be located away from the stream or any noise shall be minimized through use of design and insulation techniques.**
   No increase in intensity or activity is proposed over the current commercial uses. Native vegetation within the steep slope and stream bank will provide sound attenuation from the commercial use adjacent to Richards Creek.

3. **Toxic runoff from new impervious area shall be routed away from the stream.**
   No new impervious surfaces are proposed.

4. **Treated water may be allowed to enter the stream critical area buffer.**
   The project does not increase impervious area of the site and no additional discharge beyond what presently occurs is anticipated.

5. **The outer edge of the stream critical area buffer shall be planted with dense vegetation to limit pet or human use.**
   Dense planting of native vegetation of the stream buffer is proposed. The proposed mitigation, restoration, and enhancement planting will improve degraded conditions around the stream and within the stream buffer by removing non-native, invasive species coverage; increasing native species diversity; improving habitat potential; and improving stormwater quality.

6. **Use of pesticides, insecticides and fertilizers within 150 feet of the edge of the stream critical area buffer shall be in accordance with the City of Bellevue's "Environmental Best Management Practices," now or as hereafter amended.**
   No pesticide use is proposed to establish and maintain mitigation planting.

7. **All applicable standards of Chapter 24.06 BCC, Storm and Surface Water Utility Code, are met.**
   Utilities Division review has determined all applicable standards have been met through this proposal.

iii. Modification of a Stream Channel Performance Standards – 20.25H.080.B

Modification is allowed for the purposes of public flood control measures and a Critical Areas Report (Attachment 3) has been provided by WSP USA.

C. Steep Slope Performance Standards – 20.25H.125

In addition to generally applicable performance standards set forth in LUC 20.25H.055 and 20.25H.065, development within a landslide hazard or steep slope critical area or the critical area buffers of such hazards shall incorporate the following additional performance standards in design of the development, as applicable. The requirement for long-term slope stability shall exclude designs that require regular and periodic maintenance to maintain their level of function.

1. **Structures and improvements shall minimize alterations to the natural contour of the slope, and foundations shall be tiered where possible to conform to existing topography;**
   No changes are proposed of the natural contours.

2. **Structures and improvements shall be located to preserve the most critical portion of the site and its natural landforms and vegetation;**
   Improvements have been minimized to preserve the steep slope area adjacent to Richards Creek and are limited to stormwater utility infrastructure such as wing walls to control erosion and stabilize the stream bank. Non-native blackberry (*Rubus bifrons*) will be removed and replaced with native plants suitable to for steep slope riparian areas.

3. **The proposed development shall not result in greater risk or a need for increased buffers on neighboring properties;**
   As noted in the geotechnical report, the project *"…can be completed as proposed, provided the considerations presented in this report are incorporated into project planning, design, and construction."* (Attachment 4, pg. 10).

4. **The use of retaining walls that allow the maintenance of existing natural slope area is preferred over graded artificial slopes where graded slopes would result in increased disturbance as compared to use of retaining wall;**
   Wing walls are proposed on both sides of the outfall to protect the existing stream bank and maintain existing contours to the greatest extent possible. No free-standing retaining walls or rockeries are proposed.

5. **Development shall be designed to minimize impervious surfaces within the critical area and critical area buffer;**

No new impervious surfaces are proposed in the steep slope or steep slope buffer.

6. **Where change in grade outside the building footprint is necessary, the site retention system should be stepped and regrading should be designed to minimize topographic modification. On slopes in excess of 40 percent, grading for yard area may be disallowed where inconsistent with this criteria;**
   No changes in grade are proposed.

7. **Building foundation walls shall be utilized as retaining walls rather than rockeries or retaining structures built separately and away from the building wherever feasible. Freestanding retaining devices are only permitted when they cannot be designed as structural elements of the building foundation;**
   No buildings are proposed, and no foundations are necessary.

8. **On slopes in excess of 40 percent, use of pole-type construction which conforms to the existing topography is required where feasible. If pole-type construction is not technically feasible, the structure must be tiered to conform to the existing topography and to minimize topographic modification;**
   No development over slope is proposed.

9. **On slopes in excess of 40 percent, piled deck support structures are required where technically feasible for parking or garages over fill-based construction types; and**
   No new parking or parking structures are proposed to be located in or over the steep slope or buffer.

10. **Areas of new permanent disturbance and all areas of temporary disturbance shall be mitigated and/or restored pursuant to a mitigation and restoration plan meeting the requirements of LUC 20.25H.210. (Ord. 5680, 6-26-06, § 3)**
    A mitigation, restoration, and enhancement plan (Attachment 2) consisting of the removal of non-native, invasive vegetation and the replanting of native slope riparian plantings is included with this application.

D. Consistency with Critical Areas Report LUC 20.25.230.

The applicant supplied a complete critical areas report prepared by WSP USA, a qualified professional (Attachment 3). The report met the minimum requirements in LUC 20.25H.250.

IV. Public Notice and Comment

Application Date:	June 1, 2020
Public Notice (500 feet):	June 25, 2020
Minimum Comment Period:	July 9, 2020

The Notice of Application for this project was published in the City of Bellevue weekly permit

bulletin on June 25, 2020. It was mailed to property owners within 500 feet of the project site. One comment has been received at the time of writing this staff report.

Summary of Comments

The project will affect a very busy bus stop with a variety of amenities. Please work with King County Metro in the design process and in advance of construction to redesign and replace the stop with temporary and permanent measures the same or similar to those provided.

Response: The City is working with King County Metro on relocations and restoration of existing stops that will be affected by this project and plans are in development to address the noted impacts.

V. Summary of Technical Reviews

Clearing and Grading:
The Clearing and Grading Division of the Development Services Department has reviewed the proposed development for compliance with Clearing and Grading codes and standards. The Clearing and Grading staff found no issues with the proposed development. Due to the proximity of the on-site stream and steep slope, clearing and grading work is restricted during the rainy season or October 1st through April 30th. See Section X for Conditions of Approval related to rainy season restrictions.

Utilities:
City of Bellevue Utilities staff has reviewed the proposed development for compliance with City of Bellevue Utilities codes and standards. Utilities staff found no issues with the proposed development.

VI. State Environmental Policy Act (SEPA)

The applicant has provided a complete SEPA checklist supported by detailed analysis for review in demonstrating no significant adverse environmental impact. Staff has reviewed the checklist, analysis, and supporting documentation and has determined that, for the proposed action, environmental review indicates no probability of significant adverse environmental impacts provided that applicable city codes and standards are implemented. Therefore, issuance of a Determination of Non-Significance pursuant to WAC 197-11-340 and Bellevue City Code (BCC) 22.02.034 is appropriate.

A. Earth and Water

A temporary erosion and sedimentation control plan is included in the project plans, and addresses all requirements for erosion and sedimentation management practices. Erosion and sediment control best management practices include the installation of silt fencing around the work area and covering exposed soils to prevent migration of soils off-site. Erosion control is regulated and will be reviewed in accordance with the requirements of BCC 23.76. See Section X for Conditions of Approval related to rainy season restrictions.

B. Plants

A mitigation plan is in included in the project plans, and will off-set native non-native vegetation removed under this proposal. The proposal has been designed to provide greater native species diversity than what currently exists. See Section X for Conditions of Approval related to mitigation plans.

C. Animals

The site contains the head waters of Richards Creek (Type-F stream), which is vital to a number of fish, bird, and mammal species. The site is also located along the Pacific Flyway, a major north-south flyway for migratory birds. The proposal has been designed to improve on-site habitat conditions within the stream and stream buffer that have been degraded through establishment of non-native, invasive species.

VII. Changes to Proposal as a Result of City Review

No significant changes were requested by City staff during the review of this proposal.

VIII. Decision Criteria

A. Critical Areas Report Decision Criteria - General LUC 20.25H.255.A

Except for the proposals described in subsection B of this section, the Director may approve, or approve with modifications, the proposed modification where the applicant demonstrates:

1. **The modifications and performance standards included in the proposal lead to levels of protection of critical area functions and values at least as protective as application of the regulations and standards of this code;**

   Finding: The modifications and performance standards of this proposal are in accordance with standards for new and allowed uses, public flood protection measures, streams, stream channel modification, and steep slopes, and are designed to increase the function and values of the stream, stream buffer, and steep slope. This will occur through the improvement the habitat opportunities of Richards Creek; removing a large area of non-native, invasive blackberry from within the stream buffer; and installing a dense mix of native plant specimens throughout the unimproved stream buffer area.

2. **Adequate resources to ensure completion of any required mitigation and monitoring efforts;**

   Finding: The proposal includes a 3-year monitoring program and contingency plan, in accordance with restoration requirements of LUC 20.25H.220. Final details related mitigation, restoration, enhancement, maintenance, monitoring, and contingencies will be conducted under the construction permitting required for this proposal. See Section X for conditions of approval related to mitigation, restoration, and enhancement; maintenance and monitoring; and required permits.

3. **The modifications and performance standards included in the proposal are not detrimental to the functions and values of critical area and critical area buffers off-site; and**

   Finding: The proposal has been designed to meet Land Use Code performance standards for allowed uses (new or expanded); public flood protection measures; streams and buffers; modifications of stream channels; and steep slopes. The proposal has been designed to improve critical area and critical area buffer functions and values, specifically of the Richards Creek stream channel and riparian area, while also addressing recurrent flooding along Factoria Blvd SE.

4. **The resulting development is compatible with other uses and development in the same land use district.**

   Finding: No change in use is proposed for this site or the adjacent sites. The proposed development is intended to help support the site and adjacent sites to address recurrent flooding issues. Temporary impacts may occur through landscaping areas within Factoria Village, and in-kind or better restoration will be required for these areas. The review of any required restoration will occur under the construction permit applications. <u>See Section X for conditions of approval related to landscape restoration</u>.

B. Critical Areas Land Use Permit Decision Criteria 20.30P

The Director may approve or approve with modifications an application for a critical areas land use permit if:

1. **The proposal obtains all other permits required by the Land Use Code;**

Finding: The applicant will be required to apply for a Clearing and Grading Permit after the approval of the Critical Areas Land Use Permit. <u>See Section X for Conditions of Approval related to construction permit requirements</u>.

2. The proposal utilizes to the maximum extent possible the best available construction, design and development techniques which result in the least impact on the critical area and critical area buffer;

Finding: The proposal has been designed and located to minimize impacts and improve critical area and buffer functions. The proposed stormwater infrastructure improvements are located within the same alignment as the existing infrastructure and has the least impact on the stream and stream buffer while addressing recurrent flooding of Factoria Blvd SE. The design includes stream channel improvements; non-native species removal; and installation of native plant species commonly found within the Richards Creek stream buffers.

3. The proposal incorporates the performance standards of Part 20.25H to the maximum extent applicable, and ;

Finding: As discussed in Section III.B of this report, the proposal incorporates the performance standards of Part 20.25H to the maximum extent applicable.

4. The proposal will be served by adequate public facilities including street, fire protection, and utilities; and;

Finding: The site is currently served by adequate public facilities and no additional need is anticipated with this proposal. The proposal is intended to improve public facilities stormwater utility service and address recurrent flooding issues.

5. The proposal includes a mitigation or restoration plan consistent with the requirements of LUC Section 20.25H.210; and

Finding: The proposal includes a preliminary mitigation plan that provides native planting consistent with LUC 20.25H.210. The plan also contains a five-year maintenance and monitoring plan to ensure successful establishment of installed planting. See Section X for Conditions of Approval related to maintenance, monitoring, and mitigation.

6. The proposal complies with other applicable requirements of this code.

Finding: As discussed in Section III and V of this report, the proposal complies with all other applicable requirements of the Land Use Code.

IX. Conclusion and Decision

After conducting the various administrative reviews associated with this proposal, including Land Use Code consistency, SEPA, City Code and Standard compliance reviews, the Director of the Development Services Department does hereby **approve with conditions** the proposal to construct new stormwater infrastructure and associated improvements as shown on the proposed plans (Attachment 1).

Note- Expiration of Approval: In accordance with LUC 20.30P.150 a Critical Areas Land Use Permit automatically expires and is void if the applicant fails to file for a Building Permit or other necessary development permits within one year of the effective date of the approval.

X. Conditions of Approval

The applicant shall comply with all applicable Bellevue City Codes and Ordinances including but not limited to:

Applicable Ordinances	Contact Person
Clearing and Grading Code - BCC 23.76	Savina Uzunow, 425-452-7860
Utilities Code - BCC 24	Jeremy Rosenlund, 425-452-4855
Land Use Code - BCC 20	David Wong, 425-452-4828
Noise Code – BCC 9.18	David Wong. 425-452-4282

The following conditions are imposed under the Bellevue City Code or SEPA authority referenced:

1. Clearing & Grading Permit Required: Approval of this Critical Areas Land Use Permit does not constitute an approval of a development permit. A Clearing & Grading Permit shall be required and approved. Plans consistent with those submitted as part of this permit application shall be included in the Clearing & Grading Permit application.

Authority: Land Use Code 20.30P.140
Reviewer: David Wong, Land Use

2. Mitigation, Restoration, and Enhancement Plan: A final mitigation, restoration, and enhancement plan in accordance with the conceptual plan (Attachment 2) provided under this application shall be submitted for review and approval by the City of Bellevue prior to issuance of the Clearing & Grading Permit. The plan shall include details such as location, quantity, size, and species of all native planting, and document the total area of new critical area buffer planting. The plans shall be consistent with the guidance provided in the City's Critical Areas Handbook.

Authority: Land Use Code 20.25H.220
Reviewer: David Wong, Land Use

3. Landscape Restoration Plan: A restoration plan for on and off-site, including but not limited to the Factoria Blvd SE. right-of-way and Factoria Village, landscape impacts shall be submitted for review and approval prior to issuance of the Clearing & Grading Permit. The plans shall include details such as location, quantity, size, and species of all replacement landscaping. The plans shall also be in accordance with any landscaping required through prior development approval.

Authority: Land Use Code 20.20.520
Reviewer: David Wong, Land Use

4. Maintenance and Monitoring: A maintenance and monitoring plan in conformance with the plan submitted under this application shall be submitted for review and approval by the City of Bellevue prior to issuance of the Building Permit. The mitigation plan shall be maintained and monitored for a minimum of three (3) years. Annual reporting shall be submitted at the end of each growing season or by December 1 for each of the five years

this plan is applicable. All reporting shall be submitted by email to **dwong@bellevuewa.gov**. or by mail to:

Environmental Planning Manager
Development Services Department
City of Bellevue
PO Box 90012
Bellevue, WA 98009-9012

Authority: Land Use Code 20.25H.220
Reviewer: David Wong, Land Use

5. Rainy Season restrictions: Due to the proximity to a steep slope and stream critical areas, no clearing and grading activity may occur during the rainy season, which is defined as October 1 through April 30 without written authorization of the Development Services Department. Should approval be granted for work during the rainy season, increased erosion and sedimentation measures, representing the best available technology must be implemented prior to beginning or resuming site work.

Authority: Bellevue City Code 23.76.093.A,
Reviewer: Savina Uzunow, Clearing & Grading

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CITY OF BELLEVUE

FACTORIA BLVD STORM CONVEYANCE IMPROVEMENTS PROJECT
C.I.P. XXX
BID #XXXXX

60% SUBMITTAL

MAYOR
JOHN CHELMINIAK

DEPUTY MAYOR
LYNNE ROBINSON

CITY MANAGER
BRAD MIYAKE

DIRECTOR OF UTILITIES
NAV OTAL

CITY COUNCIL
JOHN CHELMINIAK
LYNNE ROBINSON
CONRAD LEE
JARED NIEUWENHUIS
JENNIFER ROBERTSON
JOHN STOKES
JANICE ZAHN

DRAWING INDEX

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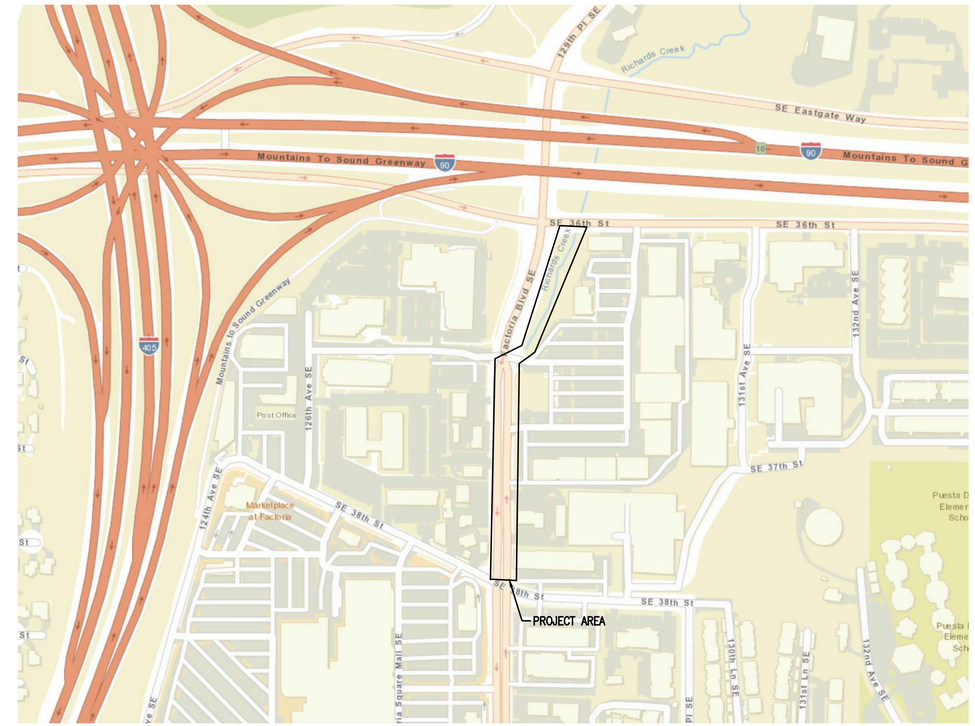

PLAN
LOCATION MAP
SCALE: NTS

CALL 72 HOURS
BEFORE YOU DIG
1-800-424-5555

* NOT INCLUDED IN 60%

G1

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Approved By

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CHECKED BY 8/10/21 DATE

City of Bellevue
UTILITIES

FACTORIA BOULEVARD STORM
CONVEYANCE IMPROVEMENTS PROJECT
COVER SHEET
DRAWING INDEX, LOCATION MAP & VICINITY MAP

SEC 27, T 25N, R 5E

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GENERAL NOTES

1. A PUBLIC INFORMATION SIGN LISTING 24–HOUR EMERGENCY PHONE NUMBERS FOR THE CITY AND THE CONTRACTOR WILL BE PROVIDED TO THE CONTRACTOR. THE CONTRACTOR MUST POST THE SIGN AT THE PROJECT SITE IN FULL VIEW OF THE PUBLIC, AND IT MUST REMAIN POSTED UNTIL THE FINAL SIGN–OFF BY THE ENGINEER.
2. ALL LOCATIONS OF EXISTING UTILITIES HAVE BEEN OBTAINED FROM AVAILABLE RECORDS AND SHOULD, THEREFORE, BE CONSIDERED ONLY APPROXIMATE AND NOT NECESSARILY COMPLETE. IT IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO INDEPENDENTLY VERIFY THE ACCURACY OF ALL UTILITY LOCATIONS AND TO DISCOVER AND AVOID ANY OTHER UTILITIES NOT SHOWN WHICH MAY BE AFFECTED BY THE IMPLEMENTATION OF THIS PLAN. ALL WORK ASSOCIATED WITH ADJUSTING DESIGN TO AVOID UTILITIES AND TEMPORARY PROTECTION AND SUPPORT OF UTILITIES WITHIN EXCAVATION SHALL BE INCIDENTAL TO OTHER ITEMS.
3. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH APPLICABLE LOCAL, STATE, AND FEDERAL LAWS. ALL WORK SHALL CONFORM TO THE STANDARD SPECIFICATIONS AND DETAILS OF THE CITY OF BELLEVUE AS AMENDED BY THE PROJECT SPECIAL PROVISIONS OR CONTRACT DRAWINGS. SPECIFICATIONS AND DETAILS SHALL BE THE CITY OF BELLEVUE SPECIFICATIONS AND DETAILS IN EFFECT ON THE DATE OF APPROVAL OF THESE CONSTRUCTION DRAWINGS.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING ALL EXISTING UNDERGROUND UTILITIES. CALL UNDERGROUND UTILITY LOCATE SERVICE AT TELEPHONE NUMBER 1–800–424–5555 A MINIMUM OF THREE (3) WORKING DAYS PRIOR TO ANY EXCAVATION.
6. OVERHEAD ELECTRICAL POWER, TELEPHONE, CABLE TV, AND OTHER OVERHEAD LINES MAY NOT BE SHOWN. DETERMINE THE EXTENT OF HAZARDS OR IMPACTS ON CONSTRUCTION ACTIVITIES CREATED BY OVERHEAD OR UNDERGROUND ELECTRICAL POWER, TELEPHONE, CABLE TV, AND OTHER LINES IN ALL AREAS, AND FOLLOW PROCEDURES DURING CONSTRUCTION AS REQUIRED BY LAW AND REGULATIONS. TAKE WHATEVER PRECAUTIONS AND REMEDIAL MEASURES THAT MAY BE REQUIRED TO PROTECT PERSONS AND PROPERTY AND TO AVOID DISRUPTION OF SERVICE.
7. MATERIALS REQUIRED FOR FILL, BACKFILL, AND OTHER WORK WILL BE SECURED BY THE CONTRACTOR FROM A SITE MEETING ALL OF THE REQUIREMENTS IN SHOWN ON THESE PLANS AND LOCAL, STATE, AND FEDERAL REGULATIONS REQUIRED FOR HEALTH, SAFETY, AND THE PUBLIC WELFARE.
8. THE CONTRACTOR SHALL PREPARE A TRAFFIC CONTROL PLAN FOR APPROVAL BY THE ENGINEER THAT SHOWS HOW THE WORK SHALL BE ACCOMPLISHED WHILE MAINTAINING TRAFFIC AND PEDESTRIAN ACCESS PER PROJECT REQUIREMENTS AT ALL TIMES.
9. FLAGGERS, UNIFORMED OFFICERS, AND/OR TEMPORARY PORTABLE SIGNALIZED TRAFFIC LIGHTS SHALL BE USED TO CONTROL TRAFFIC THROUGH THE PROJECT SITE.
10. ANY WORK WITHIN THE RIGHT–OF–WAY THAT INVOLVES CROSSING STREETS OR IMPEDING THE FLOW OF TRAFFIC WILL REQUIRE 48 HOURS ADVANCE NOTIFICATION, EXCEPT IN THE EVENT OF AN EMERGENCY, TO ALL OF THE FOLLOWING:

FIRE DEPARTMENT:	425–452–6892
POLICE DEPARTMENT:	425–452–6917
DEVELOPMENT SERVICES, GENERAL:	425–452–6800
DEVELOPMENT SERVICES, CLEARING AND GRADING:	425–452–2019
KING COUNTY METRO (24–HR):	206–684–1705 OR 206–296–8100
BELLEVUE SCHOOL DISTRICT:	425–456–4000

WATER GENERAL NOTES

1. ALL WORK SHALL CONFORM TO THE 2021 CITY OF BELLEVUE WATER ENGINEERING STANDARDS AND THE DEVELOPER EXTENSION AGREEMENT.
2. ALL PIPE SHALL BE DUCTILE IRON CLASS 52 UNLESS OTHERWISE SHOWN.
3. ALL PIPE AND FITTINGS NOT TO BE DISINFECTED IN PLACE PER AWWA C651 SHALL BE SWABBED WITH 1% AVAILABLE CHLORINE SOLUTION PRIOR TO INSTALLATION.
4. THE NEW WATER MAIN SHALL BE CONNECTED TO THE EXISTING SYSTEM ONLY AFTER NEW MAIN IS PRESSURE TESTED, FLUSHED, DISINFECTED AND SATISFACTORY BACTERIOLOGICAL SAMPLE RESULTS ARE OBTAINED AND RECEIVED BY THE CITY'S INSPECTOR. SEE STANDARD DETAIL W–9.
5. AFTER DISINFECTING THE WATER MAIN, DISPOSE OF CHLORINATED WATER BY DISCHARGING TO THE NEAREST OPERATING SANITARY SEWER.
6. WATER MAIN SHUT–DOWNS SHALL BE COORDINATED WITH THE WATER OPERATIONS DECISION FOR PREFERRED TIMING DURING FLOW CONTROL CONDITIONS. WATER MAIN SHUTDOWNS SHALL NOT BE SCHEDULED TO TAKE PLACE ON FRIDAYS, OR ON THE FIVE DAYS BEFORE NOR ONE DAY AFTER A CITY HOLIDAY, UNLESS OTHERWISE APPROVED BY THE UTILITY.
7. THE LOCATIONS OF ALL EXISTING UTILITIES SHOWN HEREON HAVE BEEN ESTABLISHED BY FIELD SURVEY OR OBTAINED FROM AVAILABLE RECORDS AND SHOULD THEREFORE BE CONSIDERED APPROXIMATE ONLY AND NOT NECESSARILY COMPLETE. IT IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO INDEPENDENTLY VERIFY THE ACCURACY OF ALL UTILITY LOCATIONS SHOWN, AND TO FURTHER DISCOVER AND AVOID ANY OTHER UTILITIES NOT SHOWN HEREON WHICH MAY BE AFFECTED BY THE IMPLEMENTATION OF THIS PLAN.
8. DEFLECT THE WATER MAIN ABOVE OR BELOW EXISTING UTILITIES AS REQUIRED TO MAINTAIN 3 FT. MINIMUM COVER AND 12–INCH MINIMUM VERTICAL CLEARANCE BETWEEN UTILITIES UNLESS OTHERWISE SPECIFIED.
9. WRAP ALL DUCTILE IRON PIPE AND ADJACENT VALVES AND FITTING WITH 8–MIL. POLYETHYLENE CONFORMING TO AWWA C105.
10. THE WATER MAIN SHALL BE INSTALLED ONLY AFTER THE ROADWAY SUBGRADE IS BACKFILLED, GRADED AND COMPACTED IN CUT AND FILL AREAS.
11. TRENCH BACKFILL AND SURFACE RESTORATION OF EXISTING ASPHALT PAVEMENT SHALL BE AS REQUIRED BY THE RIGHT–OF–WAY USE PERMIT.
12. ALL FITTINGS SHALL BE BLOCKED PER STANDARD DETAILS UNLESS OTHERWISE SPECIFIED.
13. ALL SERVICES SHALL BE 1" X 1" PER STANDARD DETAILS UNLESS OTHERWISE SPECIFIED. ADAPTERS FOR 3/4" METERS SHALL BE USED WHERE APPLICABLE.
14. WHEN WORKING WITH ASBESTOS CEMENT PIPE, THE CONTRACTOR IS REQUIRED TO MAINTAIN WORKERS' EXPOSURE TO ASBESTOS MATERIAL AT OR BELOW THE LIMIT PRESCRIBED BY WAC 296–62–07705.
15. CALL 1–800–424–5555 OR, 811 72 HOURS BEFORE CONSTRUCTION UTILITY LOCATIONS.
17. THE CONTRACTOR SHALL USE A VACUUM STREET SWEEPER TO REMOVE DUST AND DEBRIS FROM PAVEMENT AREAS AS DIRECTED BY THE ENGINEER. FLUSHING OF STREETS SHALL NOT BE PERMITTED WITHOUT PRIOR CITY APPROVAL.
18. BEFORE COMMENCEMENT OF TRENCHING, THE CONTRACTOR SHALL PROVIDE CATCH BASIN INSERTS FOR ALL CATCH BASINS THAT WILL RECEIVE RUNOFF FROM THE PROJECT SITE. THE CONTRACTOR SHALL PERIODICALLY INSPECT THE CONDITION OF INSERTS AND REPLACE AS NECESSARY.
20. WHERE THE NEW UTILITY LINE CROSSES BELOW AN EXISTING AC MAIN, THE AC PIPE SHALL BE REPLACED WITH DI PIPE TO 3 FEET PAST EACH SIDE OF THE TRENCH AS SHOWN ON STANDARD DETAIL W–8. WRAP DI PIPE AND COUPLINGS WITH 8–MIL POLYETHYLENE CONFORMING TO AWWA C105. ALTERNATIVELY, WHERE DIRECTED BY THE ENGINEER, THE TRENCH SHALL BE BACKFILLED WITH CONTROLLED DENSITY FILL (CDF, AKA FLOWABLE FILL) FROM BOTTOM OF TRENCH TO THE INVERT OF THE AC MAIN.
21. AVOID CROSSING WATER OR SEWER MAINS AT HIGHLY ACUTE ANGLES. THE SMALLEST ANGLE MEASURE BETWEEN UTILITIES SHOULD BE 45 TO 90 DEGREES.
22. WHERE WATER MAIN CROSSES ABOVE OR BELOW SANITARY SEWER, ON FULL LENGTH OF WATER PIPE SHALL BE CENTERED FOR MAXIMUM JOINT SEPARATION.
23. AT POINTS WHERE EXISTING THRUST BLOCKING IS FOUND, MINIMUM CLEARANCE BETWEEN THE CONCRETE BLOCKING AND OTHER BURIED UTILITIES OR STRUCTURES SHALL BE 5 FEET.
24. WORKERS MUST FOLLOW CONFINED SPACE REGULATIONS AND PROCEDURES WHEN ENTERING OR DOING WORK IN COB OWNED CONFINED SPACES. COMPLETED PERMIT MUST BE GIVE TO THE UTILITIES INSPECTOR PRIOR TO ENTRY.
25. MANHOLES, CATCH BASINS AND VAULTS ARE CONSIDERED TO BE PERMIT–REQUIRED CONFINED SPACES. ENTRY INTO THESE SPACES SHALL BE IN ACCORDANCE WITH CHAPTER 296–809 WAC.
26. WHEN WORK IS TO OCCUR IN EASEMENT, THE CONTRACTOR SHALL NOTIFY THE EASEMENT GRANTOR AND BELLEVUE UTILITIES IN WRITING A MINIMUM OF 48 HOURS IN ADVANCE OF BEGINNING OF WORK (NOT INCLUDING WEEKENDS OR HOLIDAYS). FAILURE TO NOTIFY GRANTOR AND BELLEVUE UTILITIES WILL RESULT IN STOP WORK ORDER BEING POSTED UNTIL THE MATTER IS RESOLVED TO THE SATISFACTION OF BELLEVUE UTILITIES. A WRITTEN RELEASE FROM THE EASEMENT GRANTOR SHALL BE FURNISHED TO THE UTILITIES INSPECTOR PRIOR TO PERMIT SIGNOFF.
27. THE CONTRACTOR SHALL RESTORE THE RIGHT–OF–WAY AND EXISTING PUBLIC UTILITY EASEMENT(S) AFTER CONSTRUCTION TO A CONDITION EQUAL OR BETTER THAN CONDITION PRIOR TO ENTRY. CONTRACTOR SHALL FURNISH A SIGNED RELEASE FROM ALL AFFECTED PROPERTY OWNERS AFTER RESTORATION HAS BEEN COMPLETED.

ABBREVIATIONS

ø	DIAMETER
AB	ANCHOR BOLT
AC	ACRE(S), ASBESTOS CONCRETE
ACP	ASBESTOS CONCRETE PIPE
APPROX	APPROXIMATE
AVE	AVENUE
AVG	AVERAGE
ASPH	ASPHALT
BMP	BEST MANAGEMENT PRACTICE
BOT	BOTTOM
CB	CATCH BASIN
CC	CENTER TO CENTER
CCA	CHROMATED COPPER ARSENATE
CESCL	CONTRACTOR EROSION SEDIMENT CONTROL LEAD
CFS	CUBIC FEET PER SECOND
CG	CURB AND GUTTER
CH, CHAN	CHANNEL
CLF	CHAIN LINK FENCE
CLR	CLEAR, CLEARANCE
℄	CENTERLINE
CMP	CORRUGATED METAL PIPE
COB	CITY OF BELLEVUE
CONC	CONCRETE
CSBC	CRUSHED SURFACING BASE COURSE
CSTC	CRUSHED SURFACING TOP COURSE
CSW	CONCRETE SIDEWALK
CSWPPP	CONTAMINATED STORMWATER POLLUTION PREVENTION PLAN
CTR	CENTER
CY	CUBIC YARD(S)
DECID	DECIDUOUS
DI	DUCTILE IRON
DIA, DIAM	DIAMETER
DIM	DIMENSION
DVD	DIGITAL VIDEO DISC
DW	DRIVEWAY
DWG	DRAWING
E	EAST, EASTING
EC	EROSION CONTROL
EFP	EQUIVALENT FLUID PRESSURE
EL, ELEV	ELEVATION
EMB	EMBEDMENT
EOP	EDGE OF PAVEMENT
EX, EXIST	EXISTING
FT	FOOT, FEET
G	GAS
GERM	GERMINATION
GPS	GLOBAL POSITIONING SYSTEM
GV	GAS VALVE
GAL	GALLON(S)
H	HIGH
HMA	HOT MIX ASPHALT
HORIZ	HORIZONTAL
ID	INNER DIAMETER
IE	INVERT ELEVATION
IPS	IRON PIPE SIZE
L	LENGTH
LB	POUND
LF	LINEAR FOOT/FEET
MAX	MAXIMUM
MH	MANHOLE
MID	MIDPOINT, MIDDLE
MIN	MINIMUM
MISC	MISCELLANEOUS
MON	MONUMENT
N	NORTH, NORTHING
NAD	NORTH AMERICAN DATUM
NAVD	NORTH AMERICAN VERTICAL DATUM
NE	NORTHEAST
NO	NUMBER
NTS	NOT TO SCALE
NW	NORTHWEST
OC	ON CENTER
OD	OUTSIDE DIAMETER
OH	OVERHEAD POWER LINE
OHW	ORDINARY HIGH WATER
OHWM	ORDINARY HIGH WATER MARK
P	POWER
PCCP	PORTLAND CEMENT CONCRETE PAVEMENT
PCF	POUNDS PER CUBIC FOOT
PG	PEA GRAVEL
PSF	POUNDS PER SQUARE FOOT
PL	PLACE, PLATE
PROP	PROPOSED
PP	POWER POLE
PVC	POLYVINYL CHLORIDE
R	RADIUS
RD	ROAD
RMJ	RESTRAINED MECHANICAL JOINT
ROW	RIGHT OF WAY
S	SOUTH, SLOPE
SD	STORM DRAIN
SE	SOUTHEAST
SF	SQUARE FOOT/FEET
SHT	SHEET
SP	SPACING
SPEC	SPECIFICATION
SS	SANITARY SEWER
SSMH	SANITARY SEWER MANHOLE
SST	STAINLESS STEEL
ST	STREET
STD	STANDARD
STA	STATION
STW	STEEL WELD PIPE
SW	SOUTHWEST
T	TELECOMMUNICATIONS
TBD	TO BE DETERMINED
TEMP	TEMPORARY
TESC	TEMPORARY EROSION AND SEDIMENT CONTROL
TYP	TYPICAL
V, VERT	VERTICAL
VEG	VEGETATION
W	WEST, WATER, WIDE/WIDTH
W/	WITH
WAC	WASHINGTON ADMINISTRATIVE CODE
WM	WATER METER, WILLIAMETTE MERIDIAN
WSDOT	WASHINGTON STATE DEPARTMENT OF TRANSPORTATION
WSEL	WATER SURFACE ELEVATION
WV	WATER VALVE
YR	YEAR

CALL 72 HOURS BEFORE YOU DIG 1-800-424-5555

LEGEND

SYMBOL	DESCRIPTION
EXISTING	
	QUARTER CORNER
312604900	TAX LOT / PARCEL NUMBER
	WHEEL CHAIR RAMP
	SIGN
	POLE
	TRAFFIC SIGNAL CABINET
	STREET LIGHT W/ ARM
	POST OR BOLLARD
	DECIDUOUS TREE
	CONIFEROUS TREE
W	WATER MANHOLE
WV	WATER VALVE
WM	WATER METER
	FIRE HYDRANT
S	SEWER MANHOLE
D	STORM DRAIN MANHOLE
D	STORM DRAIN VAULT
	STORM CATCH BASIN
	STORM CULVERT
E	ELECTRIC MANHOLE
E	ELECTRIC VAULT
T	TELEPHONE MANHOLE
TR	TELEPHONE RISER
GV	GAS VALVE
	CONSTRUCTION/CLEARING LIMITS
	GRADING LIMITS
	ROAD CENTERLINE
	STREAM FLOW LINE
	ORDINARY HIGH WATER MARK
	WETLAND BOUNDARY
	EDGE OF GRAVEL OR DIRT
	TRAFFIC STRIPING
	ROCKERY
x x x	FENCE LINE (TYPE AS NOTED)
	TREE/VEGETATION LINE
	EASEMENT LINE
	PROPERTY LINE
	QUARTER SECTION LINE
	EXISTING RIGHT–OF–WAY LINE
	WATTLE
	GEOTEXTILE (SECTION)
	TEMPORARY DIVERSION PIPE
SS	SANITARY SEWER
G	NATURAL OR PETROLEUM GAS
PSE GAS (IP)	PSE GAS (IP)
PSE GAS (HP)	PSE GAS (HP)
OPL GAS	OPL GAS
W	DOMESTIC WATER
COB WATER	COB WATER
SPU WATER	SPU WATER
P	UNDERGROUND POWER
OP	OVERHEAD POWER
COB POWER	COB POWER
PSE POWER	PSE POWER
SD	STORM DRAIN
T	UNDERGROUND TELEPHONE
COB FO	COB FIBER OPTIC
ZAYO	ZAYO (COMM)
CENT	CENTURY LINK (COMM)

G2

NO	DATE	BY	APPR	REVISIONS
1				60% DESIGN - NOT FOR CONSTRUCTION

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TEL: 206-357-5600
FAX: 206-357-5601

60% SUBMITTAL

Approved By

DESIGN MANAGER DATE

PROJECT MANAGER DATE

ABHISHEK MISHRA	8/10/21
DESIGNED BY	DATE
ABHISHEK MISHRA	8/10/21
DRAWN BY	DATE
JON W CAMMERMEYER	8/10/21
CHECKED BY	DATE

City of Bellevue
UTILITIES

FACTORIA BOULEVARD STORM CONVEYANCE IMPROVEMENTS PROJECT

LEGEND, ABBREVIATIONS, AND GENERAL NOTES

SEC 27, T 25N, R 5E

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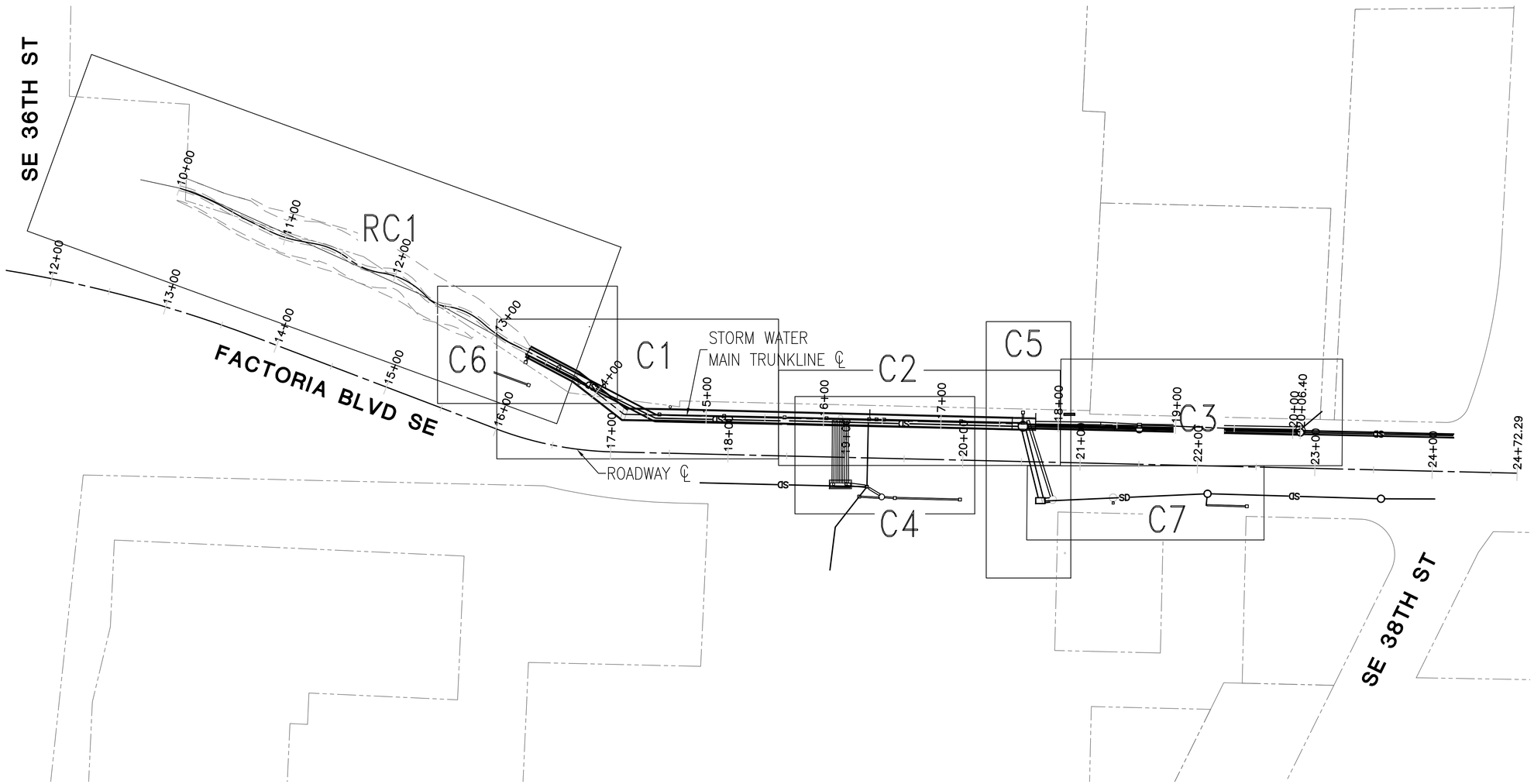

PLAN
KEY MAP
SCALE: 1"=50'

SURVEY NOTES

1. COORDINATES PROVIDED BY CITY OF BELLEVUE FOR HORIZONTAL CONTROL POINTS 1421 AND 2745:

   1421 – N=214222.993 E=1310785.620
   2745 – N=213902.295 E=1310687.399

   ADDITIONAL CONTROL POINTS ESTABLISHED BY CLOSED TRAVERSE. ELEVATIONS ESTABLISHED BY CLOSED LEVEL LOOP.

2. THE UTILITIES SHOWN HEREON ARE BASED ON OBSERVATION OF SURFACE FEATURES, RECORD UTILITY MAPS AND BY PAINT MARKS SET BY A UTILITY LOCATING COMPANY. FIELD LOCATIONS MUST BE VERIFIED PRIOR TO ANY CONSTRUCTION.

3. FIELD SURVEY WAS PERFORMED APRIL 26–MAY 5, 2016. FIELD BOOK 823F, PAGES 38–53 BY REID MIDDLETON, WITH SUPPLEMENTAL SURVEY BY PARAMETRIX IN OCTOBER, 2019.

DATUMS:

HORIZONTAL DATUM: NAD 83/11 WA NORTH

VERTICAL DATUM: NAVD 88

PROJECT BENCHMARK: COB BENCHMARK NO. 693
ELEVATION = 92.502

1"=50' 50 25 0 50 100
Scale Feet

CALL 72 HOURS
BEFORE YOU DIG
1-800-424-5555

G3

NO	DATE	BY	APPR	REVISIONS
1				60% DESIGN - NOT FOR CONSTRUCTION

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DRAWN BY	DATE
JON W CAMMERMEYER	8/10/21
CHECKED BY	DATE

City of Bellevue
UTILITIES

FACTORIA BOULEVARD STORM
CONVEYANCE IMPROVEMENTS PROJECT
KEY MAP, SURVEY INFORMATION, AND
ALIGNMENT CONTROL

SEC 27, T 25N, R 5E

SHEET 3 OF 93

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CITY OF BELLEVUE STANDARD EROSION CONTROL NOTES

1. ALL CLEARING & GRADING CONSTRUCTION MUST BE IN ACCORDANCE WITH CITY OF BELLEVUE (COB) CLEARING & GRADING CODE, CLEARING & GRADING DEVELOPMENT STANDARDS, LAND USE CODE, UNIFORM BUILDING CODE, PERMIT CONDITIONS AND ALL OTHER APPLICABLE CODES, ORDINANCES AND STANDARDS. THE DESIGN ELEMENTS WITHIN THESE PLANS HAVE BEEN REVIEWED ACCORDING TO THESE REQUIREMENTS. ANY VARIANCE FROM ADOPTED EROSION CONTROL STANDARDS IS NOT ALLOWED UNLESS SPECIFICALLY APPROVED BY THE CITY OF BELLEVUE DEVELOPMENT SERVICES DEPARTMENT PRIOR TO CONSTRUCTION. IT SHALL BE THE SOLE RESPONSIBILITY OF THE APPLICANT AND THE PROFESSIONAL CIVIL ENGINEER TO CORRECT ANY ERROR, OMISSION OR VARIATION FROM THE ABOVE REQUIREMENTS FOUND IN THESE PLANS. ALL CORRECTIONS SHALL BE AT NO ADDITIONAL COST OR LIABILITY TO THE CITY OF BELLEVUE.
2. APPROVAL OF THIS EROSION/SEDIMENTATION CONTROL (ESC) PLAN DOES NOT CONSTITUTE AN APPROVAL OF PERMANENT ROAD OR DRAINAGE DESIGN (E.G. SIZE AND LOCATION OF ROADS, PIPES, RESTRICTERS, CHANNELS, RETENTION FACILITIES, UTILITIES, ETC.).
3. A COPY OF THE APPROVED PLANS AND DRAWINGS MUST BE ON SITE DURING CONSTRUCTION. THE APPLICANT IS RESPONSIBLE FOR OBTAINING ANY OTHER REQUIRED OR RELATED PERMITS PRIOR TO BEGINNING CONSTRUCTION.
4. THE IMPLEMENTATION OF THESE ESC PLANS AND THE CONSTRUCTION, MAINTENANCE, REPLACEMENT AND UPGRADING OF THESE ESC FACILITIES IS THE RESPONSIBILITY OF THE APPLICANT/CONTRACTOR UNTIL ALL CONSTRUCTION IS COMPLETED AND APPROVED AND VEGETATION/LANDSCAPING IS ESTABLISHED.
5. THE ESC FACILITIES SHOWN ON THIS PLAN MUST BE CONSTRUCTED IN CONJUNCTION WITH ALL CLEARING AND GRADING ACTIVITIES, AND IN SUCH A MANNER AS TO INSURE THAT SEDIMENT AND SEDIMENT LADEN WATER DO NOT ENTER THE DRAINAGE SYSTEM OR ROADWAYS, OR VIOLATE APPLICABLE WATER STANDARDS.
6. THE ESC FACILITIES SHOWN ON THIS PLAN ARE THE MINIMUM REQUIREMENTS FOR ANTICIPATED SITE CONDITIONS. DURING THE CONSTRUCTION PERIOD, THESE ESC FACILITIES SHALL BE UPGRADED AS NEEDED FOR UNEXPECTED STORM EVENTS AND TO ENSURE THAT SEDIMENT AND SEDIMENT-LADEN WATER DO NOT LEAVE THE SITE.
7. ALL LOCATIONS OF EXISTING UTILITIES HAVE BEEN ESTABLISHED BY FIELD SURVEY OR OBTAINED FROM AVAILABLE RECORDS AND SHOULD, THEREFORE, BE CONSIDERED ONLY APPROXIMATE AND NOT NECESSARILY COMPLETE. IT IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO INDEPENDENTLY VERIFY THE ACCURACY OF ALL UTILITY LOCATIONS AND TO DISCOVER AND AVOID ANY OTHER UTILITIES NOT SHOWN WHICH MAY BE AFFECTED BY THE IMPLEMENTATION OF THIS PLAN.
8. THE BOUNDARIES OF THE CLEARING LIMITS SHOWN ON THIS PLAN SHALL BE CLEARLY FLAGGED IN THE FIELD PRIOR TO CONSTRUCTION. DURING THE CONSTRUCTION PERIOD, NO DISTURBANCE BEYOND THE FLAGGED CLEARING LIMITS SHALL BE PERMITTED. THE FLAGGING SHALL BE MAINTAINED BY THE APPLICANT/CONTRACTOR FOR THE DURATION OF CONSTRUCTION.
9. CLEARING SHALL BE LIMITED TO THE AREAS WITHIN THE APPROVED DISTURBANCE LIMITS. EXPOSED SOILS MUST BE COVERED AT THE END OF EACH WORKING DAY WHEN WORKING FROM OCTOBER 1 THROUGH APRIL 30. FROM MAY 1 THROUGH SEPTEMBER 30, EXPOSED SOILS MUST BE COVERED AT THE END OF EACH CONSTRUCTION WEEK AND ALSO AT THE THREAT OF RAIN.
10. AT NO TIME SHALL MORE THAN ONE FOOT OF SEDIMENT BE ALLOWED TO ACCUMULATE WITHIN A TRAPPED CATCH BASIN. ALL CATCH BASINS AND CONVEYANCE LINES SHALL BE CLEANED PRIOR TO PAVING. THE CLEANING OPERATION SHALL NOT FLUSH SEDIMENT LADEN WATER INTO THE DOWNSTREAM SYSTEM.
11. STABILIZED CONSTRUCTION ENTRANCES SHALL BE INSTALLED AT THE BEGINNING OF CONSTRUCTION AND MAINTAINED FOR THE DURATION OF THE PROJECT.
12. THE CONTRACTOR MUST MAINTAIN A SWEEPER ON SITE DURING EARTHWORK AND IMMEDIATELY REMOVE SOIL THAT HAS BEEN TRACKED ONTO PAVED AREAS AS RESULT OF CONSTRUCTION.
13. THE ESC FACILITIES SHALL BE INSPECTED DAILY BY THE APPLICANT/CONTRACTOR AND MAINTAINED AS NECESSARY TO ENSURE THEIR CONTINUED FUNCTIONING.
14. ANY EXCAVATED MATERIAL REMOVED FROM THE CONSTRUCTION SITE AND DEPOSITED ON PROPERTY WITHIN THE CITY LIMITS MUST BE DONE IN COMPLIANCE WITH A VALID CLEARING & GRADING PERMIT. LOCATIONS FOR THE MOBILIZATION AREA AND STOCKPILED MATERIAL MUST BE APPROVED BY THE CLEARING & GRADING INSPECTOR AT LEAST 24 HOURS IN ADVANCE OF ANY STOCKPILING.
15. THE ESC FACILITIES ON INACTIVE SITES SHALL BE INSPECTED AND MAINTAINED A MINIMUM OF ONCE A MONTH OR WITHIN THE 48 HOURS FOLLOWING A MAJOR STORM EVENT.
16. FINAL SITE GRADING MUST DIRECT DRAINAGE AWAY FROM ALL BUILDING STRUCTURES AT A MINIMUM 5% SLOPE, PER THE INTERNATIONAL RESIDENTIAL CODE (IRC) R401.3.

LEGEND SYMBOL	DESCRIPTION
	CONSTRUCTION/CLEARING LIMITS
	GRADING LIMITS
	SD CENTERLINE
	STREAM FLOW LINE
	ORDINARY HIGH WATER MARK
	WETLAND BOUNDARY
SF	SILT FENCE
SB	STRAW BALES/WATTLES

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GENERAL EROSION AND SEDIMENT CONTROL NOTES

1. THESE GENERAL EROSION AND SEDIMENT CONTROL NOTES, TOGETHER WITH EROSION CONTROL PLANS, CONSTITUTE A CONCEPTUAL TEMPORARY EROSION AND SEDIMENT CONTROL (TESC) PLAN. THE CONTRACTOR IS REQUIRED TO SUBMIT A DETAILED CONSTRUCTION STORMWATER POLLUTION AND PREVENTION PLAN (CSWPPP) MEETING CITY REQUIREMENTS. THE TESC MEASURES SHALL THEN BE IMPLEMENTED CONSISTENT WITH THE CSWPPP.
2. THE ESC FACILITIES SHOWN ON THIS PLAN MUST BE CONSTRUCTED PRIOR TO OR IN CONJUNCTION WITH ALL CLEARING AND GRADING SO AS TO ENSURE THAT THE TRANSPORT OF SEDIMENT TO SURFACE WATERS, DRAINAGE SYSTEMS, AND ADJACENT PROPERTIES IS MINIMIZED.
3. THE ESC FACILITIES SHALL BE INSPECTED DAILY BY THE APPLICANT/ESC SUPERVISOR AND MAINTAINED TO ENSURE CONTINUED PROPER FUNCTIONING. WRITTEN RECORDS SHALL BE KEPT OF WEEKLY REVIEWS OF THE ESC FACILITIES DURING THE WET SEASON (OCT. 1 TO APRIL 30) AND OF MONTHLY REVIEWS DURING THE DRY SEASON (MAY 1 TO SEPT. 30).
4. ANY AREA NEEDING ESC MEASURES NOT REQUIRING IMMEDIATE ATTENTION SHALL BE ADDRESSED WITHIN FIFTEEN (15) DAYS.
5. THE ESC FACILITIES ON INACTIVE SITES SHALL BE INSPECTED AND MAINTAINED A MINIMUM OF ONCE A MONTH OR WITHIN FORTY-EIGHT (48) HOURS FOLLOWING A STORM EVENT.
6. WHERE STRAW MULCH FOR TEMPORARY EROSION CONTROL IS REQUIRED, IT SHALL BE APPLIED AT A MINIMUM THICKNESS OF 3 INCHES.
7. NO STOCKPILING/STAGING WILL BE CONDUCTED WITHIN THE RIGHT OF WAY OR CITY OWNED SITE UNLESS EXPLICITLY SHOWN IN THESE PLANS. CONTRACTOR IS RESPONSIBLE FOR OBTAINING ITS OWN STOCKPILE/STAGING AREAS.
8. PUBLIC STREETS, PRIVATE DRIVEWAYS, AND PARKING LOTS SHALL BE CLEANED ONCE PER DAY OR AS DIRECTED BY THE CITY. FLUSHING OF STREETS WITH WATER WILL NOT BE ALLOWED.
9. IN ACCORDANCE WITH THE DEPARTMENT OF ECOLOGY REQUIREMENTS, WASTEWATER FROM CEMENT CONCRETE, MASONRY, OR ASPHALT CONCRETE CUTTING, OR POURING OPERATIONS SHALL NOT BE DISCHARGED INTO STORM DRAINAGE SYSTEMS OR SURFACE WATERS. IMPERVIOUS SURFACES CONTAMINATED WITH SEDIMENT FROM GRIT AND CUTTING, PLANING OR PULVERIZING OPERATIONS SHALL BE VACUUM-CLEANED TO PREVENT CONTAMINANTS FROM ENTERING THE STORM DRAINAGE SYSTEM OR SURFACE WATERS.
10. KEEP PUBLIC AND PRIVATE ROADWAYS/PARKING LOTS, SIDEWALKS, AND TRAILS FREE OF DEBRIS AND SEDIMENT.
11. CONSTRUCT TEMPORARY STORMWATER BYPASSES AS NEEDED DURING CONSTRUCTION TO DIVERT STORM WATER AROUND TRENCHING, EXCAVATION, STORM PIPE, CATCH BASIN, AND STORM BOX TRUNK INSTALLATION ACTIVITIES AND MAINTAIN DRAINAGE OF UPSTREAM STORMWATER. CONTRACTOR IS RESPONSIBLE FOR DESIGN OF STORM DRAIN BYPASS PLAN. UNLESS OTHERWISE NOTED, BYPASSES ARE TO BE DESIGNED TO HANDLE THE VOLUME AND PEAK FLOWS OF THE 2-YEAR STORM EVENT AT A MINIMUM. SUBMIT AS PART OF WATER CONTROL PLAN. STORM DRAIN BYPASS PLAN SHALL ALSO ADDRESS THE DOWNSTREAM SYSTEM AND PREVENTION OF STORMWATER ENTERING THE WORK AREA BY BACKING UP FROM DOWNSTREAM. CONTRACTOR IS ADVISED THAT PORTIONS OF THE EXISTING PIPE SYSTEM CONVEY BASE FLOWS THAT MUST BE BYPASSED.
12. NEW STORM DRAINAGE PIPES MAY ONLY BE PLACED INTO SERVICE FOLLOWING TESTING AND ACCEPTANCE BY THE CITY.
13. ALL DEWATERING WATER AND RUNOFF WITHIN CONSTRUCTION AREAS SHALL BE TREATED VIA SEDIMENTATION, FILTRATION THROUGH VEGETATION IN APPROVED AREAS, OR PORTABLE FILTRATION SYSTEMS (UTILIZING TANKS AND FILTERS), AS NEEDED, PRIOR TO DISCHARGE TO DOWNSTREAM SYSTEM IN ORDER TO MEET ALL APPLICABLE LOCAL, STATE AND FEDERAL WATER QUALITY REGULATIONS. CONTRACTOR MAY ALSO DISCHARGE TO THE SANITARY SEWER SYSTEM AFTER OBTAINING APPLICABLE PERMITS AND MEETING PRETREATMENT REQUIREMENTS.
14. PROJECT ESC REQUIREMENTS SHALL ALSO APPLY TO CONTRACTOR ABTAINED STAGING/STOCKPILE AREAS. THIS SHALL INCLUDE THE FOLLOWING IN ADDITION TO THE THE PROJECT GENERAL TESC REQUIREMENTS.
   a. INSTALL SILT FENCING OR WATTLES AROUND ENTIRE STAGING/STOCKPILE AREAS PER COB BMP-C233.
   b. TEMPORARY SEDIMENTATION POND MAY BE REQUIRED IN CONTRACTOR STAGING/STOCKPILE AREA IF THE SILT FENCING IS NOT ADEQUATE.
   c. INSTALL INLET PROTECTION ON GRATED STORM INLETS WITHIN OR RECEIVING FLOW FROM STAGING/STOCKPILE AREA.

PRELIMINARY CONSTRUCTION SEQUENCE

A PRELIMINARY CONSTRUCTION SEQUENCE WAS DEVELOPED AS PART OF THE PROJECT PERMIT SUBMITTAL. THE CONTRACTOR IS RESPONSIBLE FOR DEVELOPING ITS OWN MORE DETAILED PHASED CONSTRUCTION SEQUENCE TO COMPLETE THE WORK, SATISFY ALL PERMIT REQUIREMENTS, AND COMPLETE THE WORK WITHIN THE WORKING DAYS IDENTIFIED IN THE SPECIFICATIONS. CONTRACTOR SHALL SUBMIT A DETAILED SEQUENCE SHOWING DURATIONS OF ACTIVITIES FOR ENGINEER'S APPROVAL. THE SEQUENCE SHALL DEMONSTRATE ABILITY TO COMPLETE THE ALL IN-WATER WORK WITHIN THE PERMITTED FISH WINDOW. THE SEQUENCE SHALL CLEARLY SHOW INTERRELATIONSHIPS OF KEY PROJECT ELEMENTS INCLUDING:

- TRAFFIC CONTROL LANE CLOSER PHASING
- CITY UTILITY RELOCATIONS
- DRIVEWAY ACCESS RESTRICTIONS
- FRANCHISE UTILITY RELOCATIONS (IF ANY)
- IN-WATER WORK MEETING PERMIT REQUIREMENTS
- PROCUREMENT TIMES OF KEY COMPONENTS IF WORK BEGINS BEFORE PROCURING ALL MATERIALS

1. SUBMIT REQUIRED CONSTRUCTION SUBMITTALS PER THE SCOPE OF PROJECT INCLUDING BUT NOT LIMITED TO PROJECT SCHEDULE, PRECONSTRUCTION PHOTOS, ESC INFORMATION, AND MATERIAL SUBMITTALS.
2. ATTEND PRE-CONSTRUCTION CONFERENCE.
3. PLACE CONSTRUCTION SIGNAGE.
4. BEGIN TEMPORARY TRAFFIC CONTROL MEASURES AND ADJUST MEASURES AS NEEDED FOR SPECIFIC WORK AREAS.
5. INSTALL TESC MEASURES FOR ALL AREAS WHERE WORK WILL BE PERFORMED. TESC MEASURES SHALL BE PHASED AND ADVANCED AS WORK PROGRESSES.
6. POTHOLE UTILITIES AND PROVIDE INFORMATION TO CITY.
7. INSTALL STORM DRAIN DIVERSIONS AS NEEDED.
8. STREAM WORK.
   8A. PERFORM NON-INWATER SITE PREPARATION AND OTHER ACTIVITIES THAT CAN BE ACCOMPLISHED PRIOR THE TO THE FISH WINDOW THAT WILL FACILITY THE OVERALL SCHEDULE. SUCH ACTIVITIES MAY INCLUDE STABILIZED CONSTRUCTION ACCESS AND BYPASS PIPE LINE SET UP.
   8B. PRIOR TO THE TIME THE STREAM IS BYPASSED, PERFORM FISH EXCLUSION WITH A QUALIFIED BIOLOGIST. COMPLETE TEMPORARY STREAM BYPASS INCLUDING COFFER DAMS, PUMPS (IF NEEDED), AND TEMPORARY PIPING.
   8C. COMPLETE ANY NEEDED DEWATERING ACTIVITIES.
   8D. COMPLETE STREAM SITE IMPROVEMENTS INCLUDING EXCAVATION, PLACEMENT OF MATERIALS, LWM'S, AND OTHER RESTORATION BELOW THE OHWM.
9. RETURN STREAM TO IMPROVED CHANNEL AND REMOVE TEMPORARY BYPASS MATERIALS.
10. COMPLETE ROADWAY RESTORATION.
11. COMPLETE CURB, GUTTER, SIDEWALK, ADA RAMP, AND LANDSCAPE IMPROVEMENTS.
12. RESTORE CHANNELIZATION AND PAVEMENT MARKINGS.
13. REMOVE EROSION CONTROL MEASURES AFTER APPROVAL OF WORK AND WITH CITY APPROVAL.

EC1

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Approved By

DESIGN MANAGER DATE
PROJECT MANAGER DATE

ABHISHEK MISHRA	8/10/21
DESIGNED BY	DATE
ABHISHEK MISHRA	8/10/21
DRAWN BY	DATE
JON W CAMMERMEYER	8/10/21
CHECKED BY	DATE

City of Bellevue
UTILITIES

FACTORIA BOULEVARD STORM
CONVEYANCE IMPROVEMENTS PROJECT

EROSION CONTROL PLAN

SEC 27, T 25N, R 5E

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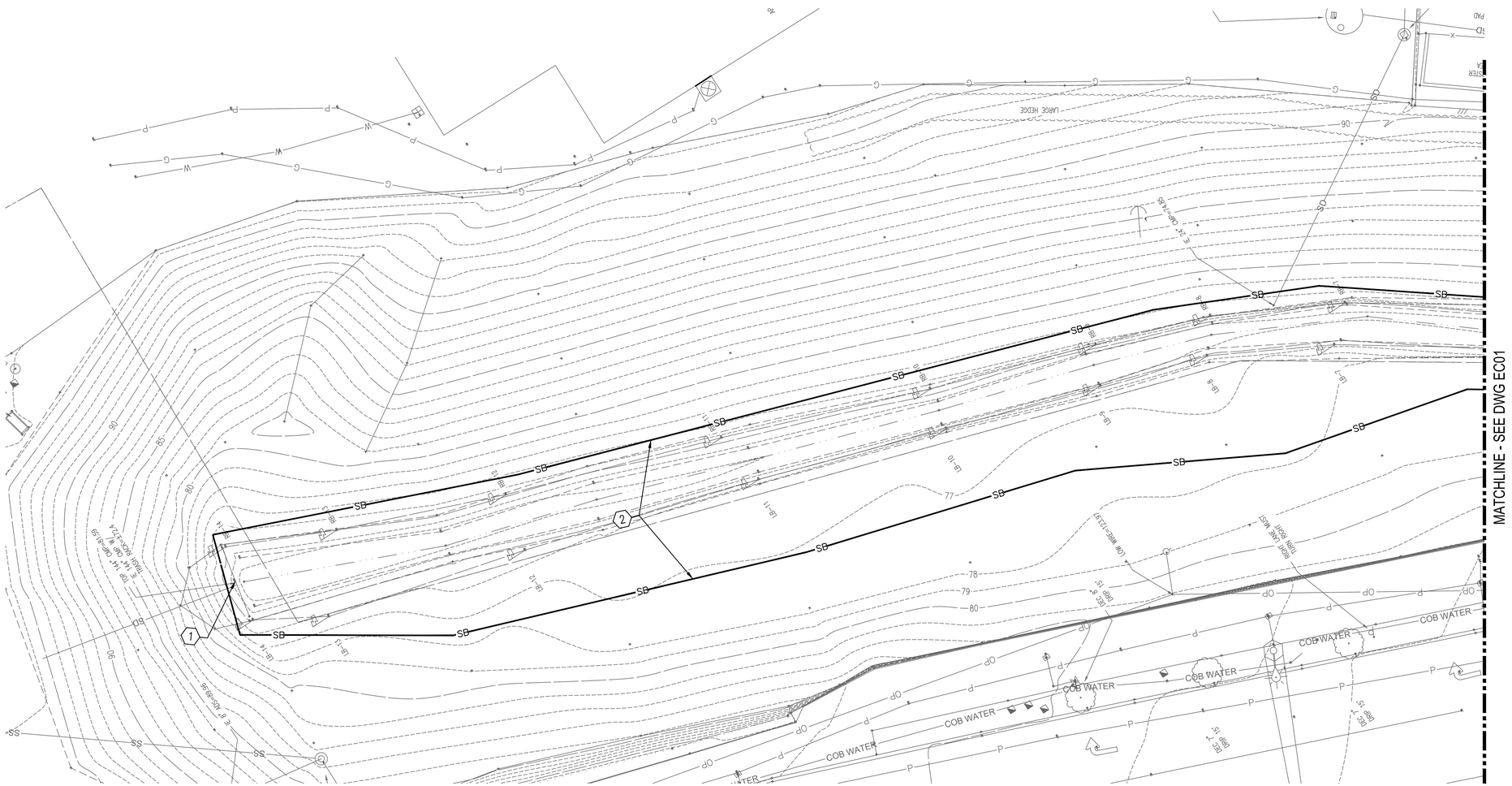

PLAN

TESC PLAN
SCALE: 1"=10'

1"=10' 10 5 0 10 20
Scale Feet

GENERAL NOTES

1. REFER TO GENERAL NOTES SHOWN ON DWG EC01.

TESC NOTES

1. INSTALL TEMPORARY COFFER DAM AT CULVERT INLET AND EXTEND TEMPORARY STORM DRAIN PAST COFFER DAM.
2. INSTALL WATTLES AROUND THE CLEARING AND GRADING LIMITS.

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EC2

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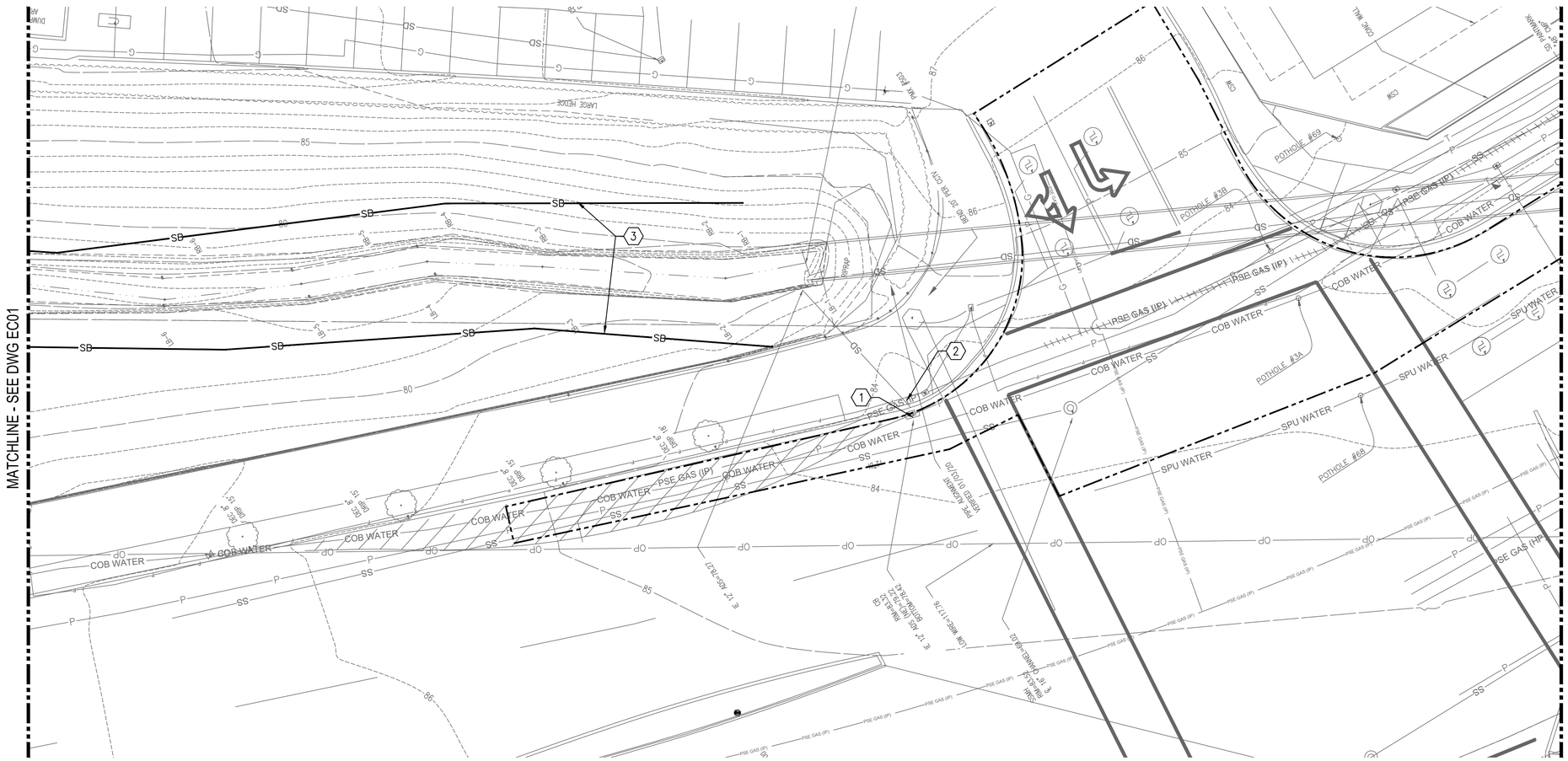

PLAN

TESC PLAN
SCALE: 1"=10'

1"=10' 10 5 0 10 20
Scale Feet

GENERAL NOTES

1. REFER TO GENERAL NOTES SHOWN ON DWG EC01.

TESC NOTES

1. PROVIDE AND INSTALL CATCH BASIN INLET PROTECTION PER COB BMP C220.
2. EXISTING SD CONTAINS BASE FLOWS. TEMPORARY BYPASS SYSTEM SHALL BE PROVIDED BEFORE CONNECTING PROPOSED DRAINAGE TO THIS SYSTEM.
3. INSTALL WATTLES AROUND THE CLEARING AND GRADING LIMITS.

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EC3

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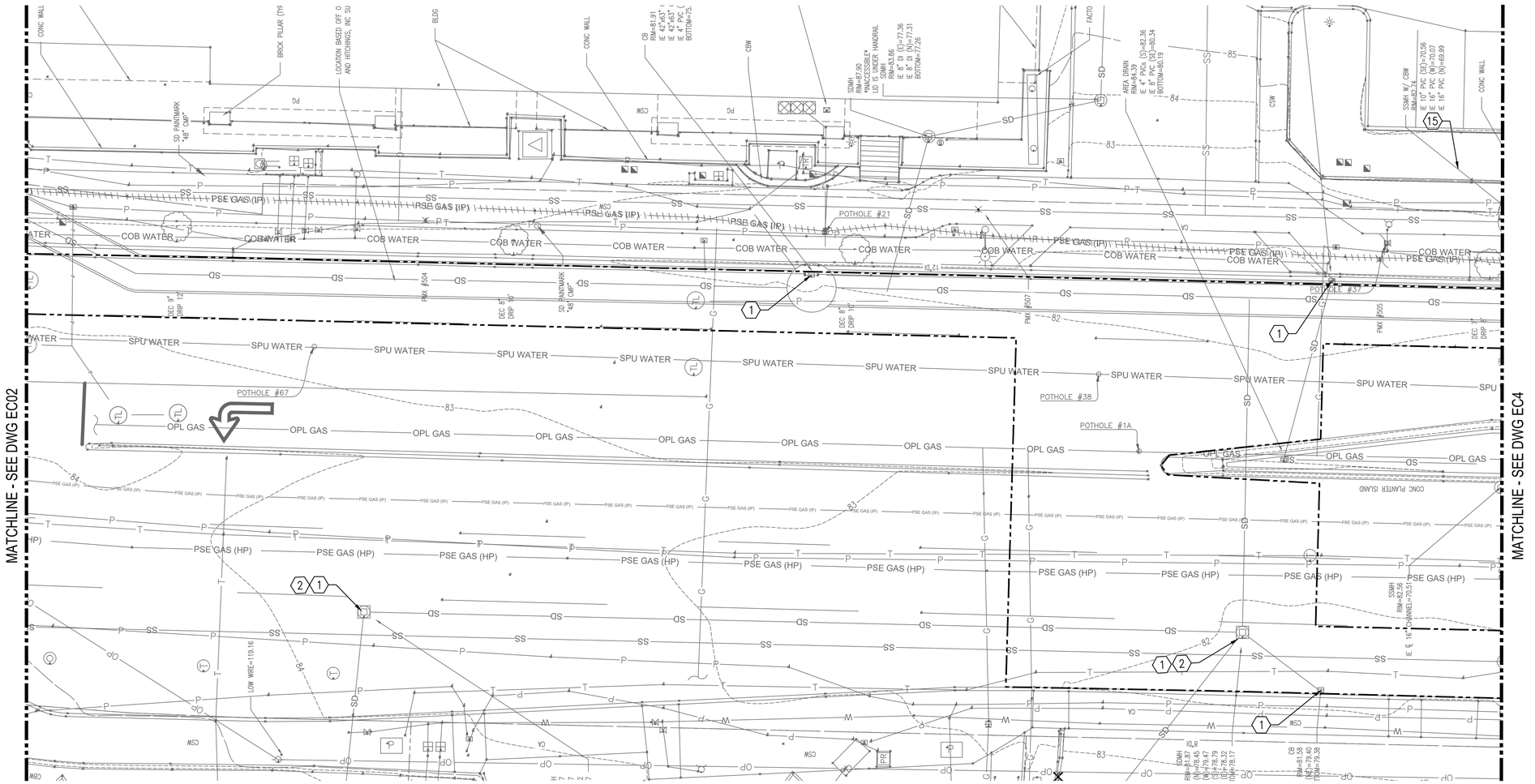

PLAN

TESC PLAN
SCALE: 1"=10'

1"=10' 10 5 0 10 20 Scale Feet

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FACTORIA BOULEVARD STORM CONVEYANCE IMPROVEMENTS PROJECT

EROSION CONTROL PLAN

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EC4

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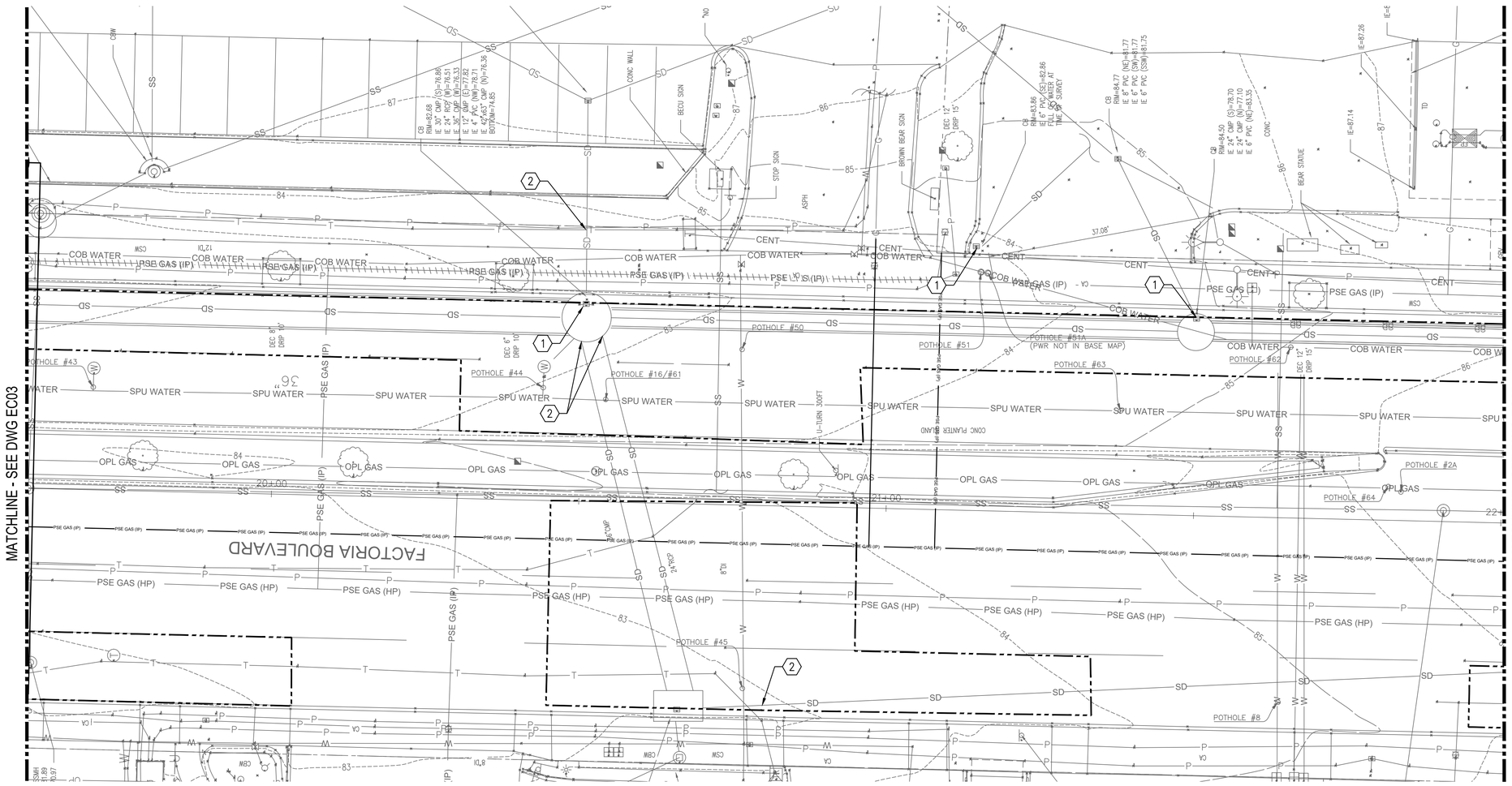

PLAN

TESC PLAN
SCALE: 1"=10'

1"=10' 10 5 0 10 20
Scale Feet

GENERAL NOTES

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TESC NOTES

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2. EXISTING SD CONTAINS BASE FLOWS. TEMPORARY BYPASS SYSTEM SHALL BE PROVIDED BEFORE CONNECTING PROPOSED DRAINAGE TO THIS SYSTEM.

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City of Bellevue
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EROSION CONTROL PLAN

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SHEET 13 OF 93

EC5

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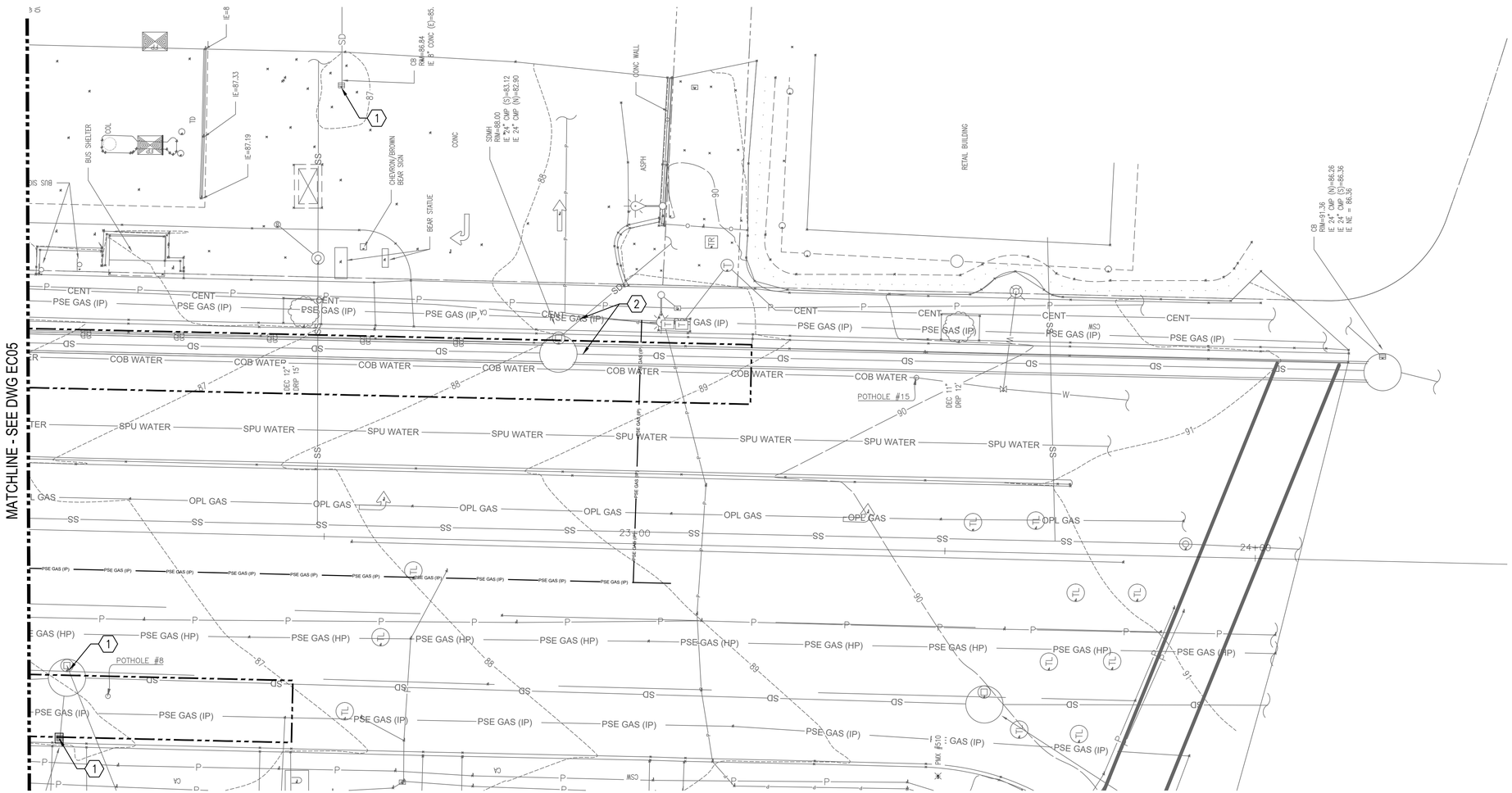

PLAN

STORM SYSTEM IMPROVEMENTS
SCALE: 1"=10'

1"=10' 10 5 0 10 20
Scale Feet

GENERAL NOTES

1. REFER TO GENERAL NOTES SHOWN ON DWG EC01.

TESC NOTES

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EC6

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FACTORIA BOULEVARD STORM
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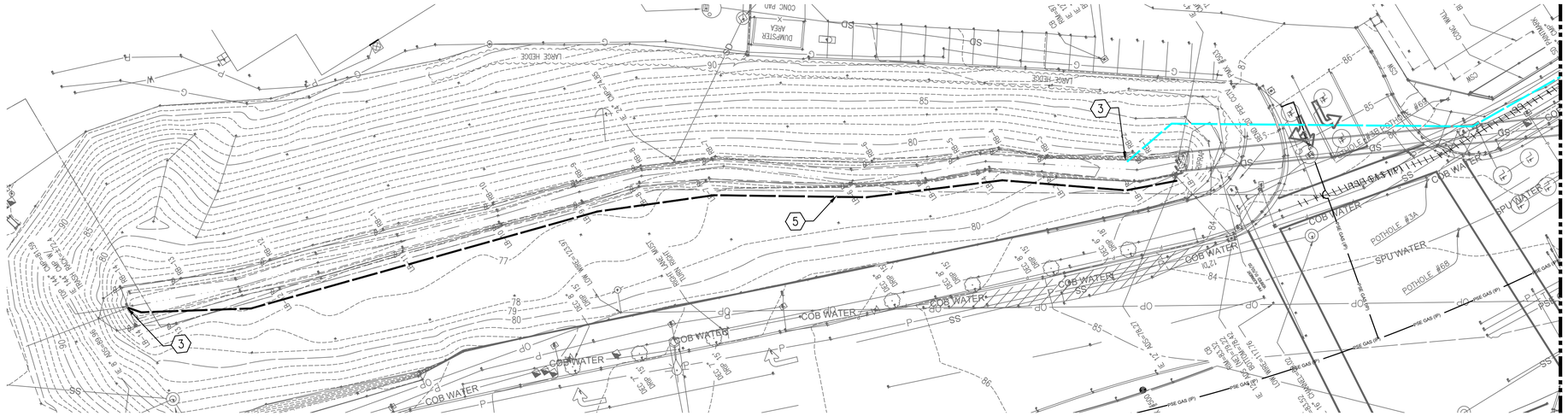

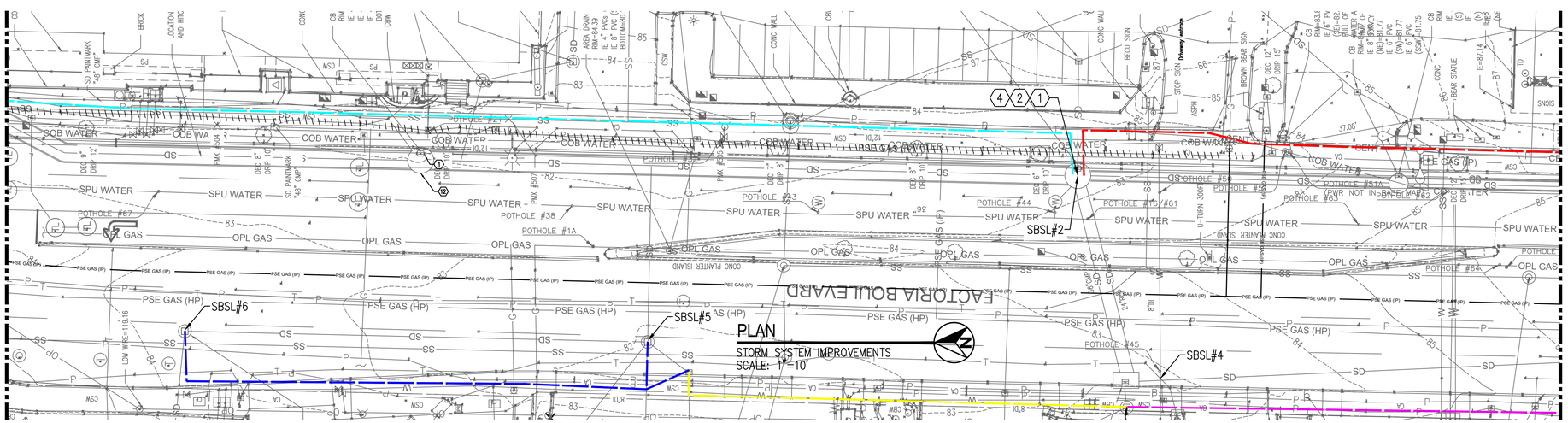

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GENERAL NOTES

1. CONTRACTOR IS RESPONSIBLE FOR THE TEMPORARY STORM BYPASS SYSTEM. THE BYPASS SYSTEM SHALL BE PART OF WATER CONTROL PLANS. THE TEMPORARY BYPASS SYSTEM SHALL INCLUDE, BUT NOT LIMITED TO, BYPASS PUMP, TEMPORARY BYPASS PIPE SIZE, AND ENERGY DISSIPATER AT THE OUTFALL.
2. SEE GENERAL STORMWATER NOTES ON DWG G2.
3. SEE EROSION CONTROL NOTES ON DWG EC01.
4. PROVIDE TEMPORARY CONNECTION BETWEEN EXISTING UPSTREAM STORM STRUCTURE AND NEW INSTALLED DOWNSTREAM TRUNK LINE AT THE END OF EACH WORK DAY.
5. LIMIT DISTURBANCE TO ONLY THOSE AREAS NECESSARY FOR CONSTRUCTING THE PROPOSED IMPROVEMENTS.
6. PROTECT TEMPORARY BYPASS FROM VEHICLE AT DRIVEWAYS AND ROAD INTERSECTION.
7. STORMWATER BYPASS STRUCTURE LOCATIONS (SBSL) SHOWN IN THIS PLAN IS CONCEPTUAL AND CAN BE MODIFIED ACCORDING TO THE CONSTRUCTION STAGES.
8. MAINTAIN GRAVITY FLOW IN THE TEMPORARY PIPE.
9. SEE EROSION CONTROL DWG EC02–EC06 FOR TEMPORARY EROSION CONTROL MEASURES.

CONSTRUCTION NOTES

1. INSTALL SUBMERSIBLE PUMP AND INTAKE SYSTEM IN MANHOLE. PROVIDE REMOVABLE PIPE PLUG AT THE PUMP OUTLET. CONNECT TEMPORARY REMOVABLE PIPE TO THE PUMP OUTLET.
2. PROVIDE PLASTIC LINED SANDBAGS.
3. INSTALL TEMPORARY ROCKPAD OR EQUIVALENT AT OUTFALL.
4. PROVIDE TEMPORARY CONNECTION BETWEEN EXISTING UPSTREAM STORM STRUCTURE AND NEW INSTALLED DOWNSTREAM TRUNK LINE AT THE END OF EACH WORK DAY.
5. PROVIDE TEMPORARY BYPASS PIPE DURING IN–STREAM RESTORATION.

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DESIGN MANAGER DATE

PROJECT MANAGER DATE

ABHISHEK MISHRA	8/10/21
DESIGNED BY	DATE
ABHISHEK MISHRA	8/10/21
DRAWN BY	DATE
JON W CAMMERMEYER	8/10/21
CHECKED BY	DATE

City of Bellevue UTILITIES

FACTORIA BOULEVARD STORM CONVEYANCE IMPROVEMENTS PROJECT

TEMPORARY STORM WATER BYPASS

SEC 27, T 25N, R 5E

SHEET 15 OF 93

EC7

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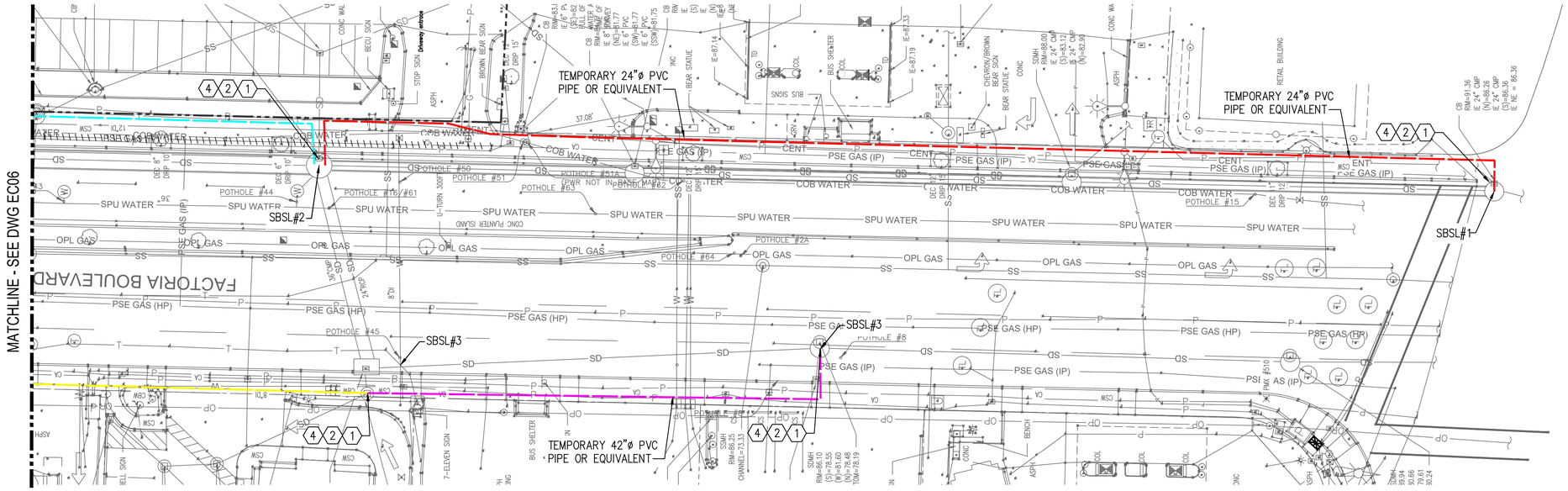

PLAN

STORM BYPASS SYSTEM
SCALE: 1"=20'

GENERAL NOTES

1. CONTRACTOR IS RESPONSIBLE FOR THE TEMPORARY STORM BYPASS SYSTEM. THE BYPASS SYSTEM SHALL BE PART OF WATER CONTROL PLANS. THE TEMPORARY BYPASS SYSTEM SHALL INCLUDE, BUT NOT LIMITED TO, BYPASS PUMP, TEMPORARY BYPASS PIPE SIZE, AND ENERGY DISSIPATER AT THE OUTFALL.
2. SEE GENERAL STORMWATER NOTES ON DWG G2.
3. SEE EROSION CONTROL NOTES ON DWG EC01.
4. PROVIDE TEMPORARY CONNECTION BETWEEN EXISTING UPSTREAM STORM STRUCTURE AND NEW INSTALLED DOWNSTREAM TRUNK LINE AT THE END OF EACH WORK DAY.
5. LIMIT DISTURBANCE TO ONLY THOSE AREAS NECESSARY FOR CONSTRUCTING THE PROPOSED IMPROVEMENTS.
6. PROTECT TEMPORARY BYPASS FROM VEHICLE AT DRIVEWAYS AND ROAD INTERSECTION.
7. STORMWATER BYPASS STRUCTURE LOCATIONS (SBSL) SHOWN IN THIS PLAN IS CONCEPTUAL AND CAN BE MODIFIED ACCORDING TO THE CONSTRUCTION STAGES.
8. MAINTAIN GRAVITY FLOW IN THE TEMPORARY PIPE.

CONSTRUCTION NOTES

1. INSTALL SUBMERSIBLE PUMP AND INTAKE SYSTEM IN MANHOLE. PROVIDE REMOVABLE PIPE PLUG AT THE PUMP OUTLET. CONNECT TEMPORARY REMOVABLE PIPE TO THE PUMP OUTLET.
2. PROVIDE PLASTIC LINED SANDBAGS.
3. INSTALL TEMPORARY ROCKPAD OR EQUIVALENT AT OUTFALL.
4. PROVIDE TEMPORARY CONNECTION BETWEEN EXISTING UPSTREAM STORM STRUCTURE AND NEW INSTALLED DOWNSTREAM TRUNK LINE AT THE END OF EACH WORK DAY.

1"=20' 20 10 0 20 40
Scale Feet

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EC8

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City of Bellevue
UTILITIES

FACTORIA BOULEVARD STORM CONVEYANCE IMPROVEMENTS PROJECT

TEMPORARY STORM WATER BYPASS

SEC 27, T 25N, R 5E

SHEET 16 OF 93

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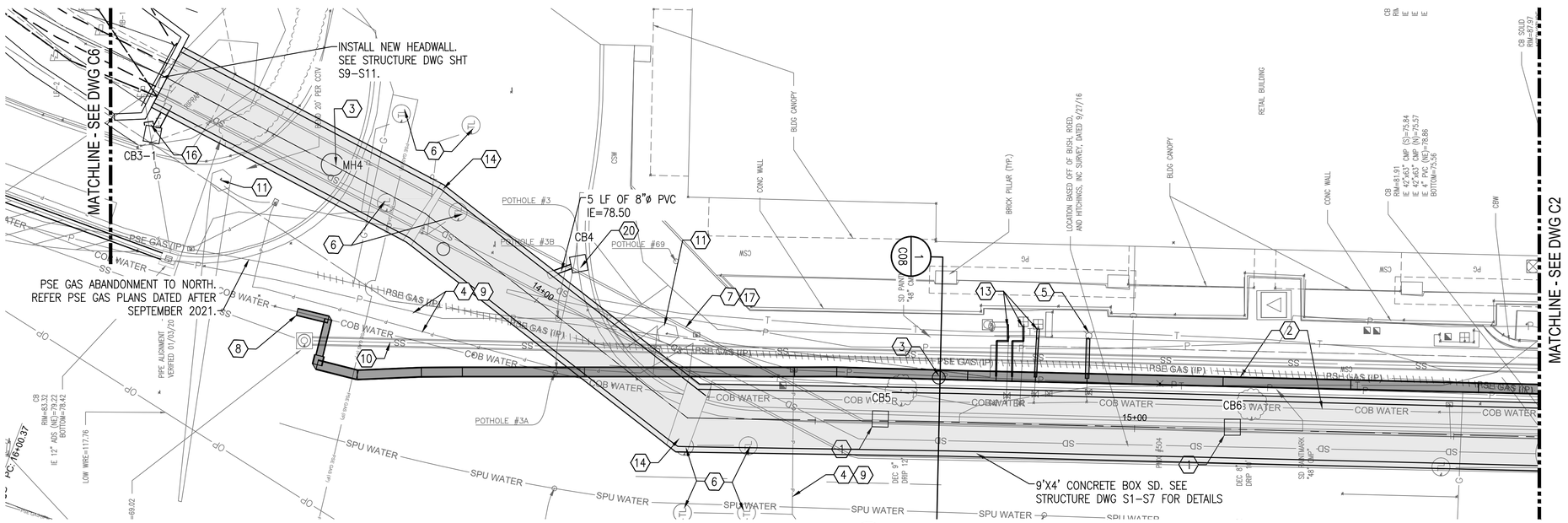
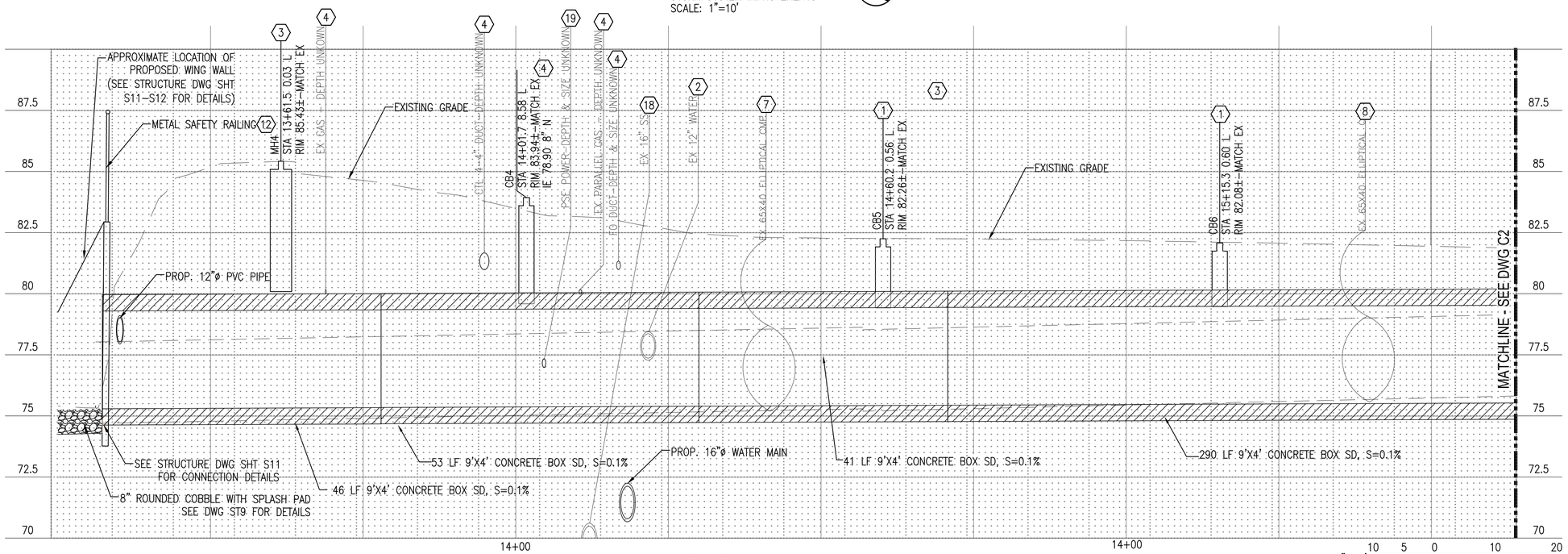


PLAN

STORM SYSTEM IMPROVEMENTS
SCALE: 1"=10'



PROFILE

STA 3+06.8 TO 5+45.8
HORIZ SCALE: 1"=10'
VERT SCALE: 1"=2.5'

1"=10' 10 5 0 10 20 Scale Feet

1"=2.5' 2.5 1.25 0 2.5 5 Scale Feet

GENERAL NOTES

1. SEE GENERAL PROJECT NOTES ON DWG G2.
2. CONTRACTOR IS RESPONSIBLE FOR LOCATING AND POTHOLING ALL UTILITIES WITHIN EXCAVATION LIMITS, WHICH SHALL BE INCIDENTAL TO OTHER BID ITEMS. WHERE ADDITIONAL SITE SPECIFIC POTHOLING IS REQUIRED BY THE PLANS OR REQUESTED BY ENGINEER, IT SHALL BE PAID FOR BY "ENGINEER REQUESTED UTILITY POTHOLES" BID ITEM.
3. SEE DWG C09 FOR UTILITY POTHOLE DATA.
4. SEE DWG C09 FOR STORM STRUCTURE DATA.
5. STATION/OFFSET LOCATION CALLOUTS AND RIM ELEVATIONS PROVIDED ARE AT THE CENTER OF THE DRAINAGE STRUCTURE UNLESS OTHERWISE NOTED.
6. LIMIT DISTURBANCE TO ONLY THOSE AREAS NECESSARY FOR CONSTRUCTING THE PROPOSED IMPROVEMENTS.
7. NOT ALL EXISTING TELECOM, POWER, AND CABLE LINES (FIBER OPTIC, COPPER, AND CONDUIT) ARE SHOWN IN PROFILES.
8. SEE DWG SP01-SP05 (IN PROGRESS) FOR UTILITY PROTECTION AND REMOVAL DETAILS.
9. EXISTING GRADE LINE SHOWN IS ALONG THE CENTER OF STRUCTURE ON MAIN TRUNKLINE.

CONSTRUCTION NOTES

1. INSTALL COMBINATION INLET AND CONNECT TO BOX CULVERT PER DETAIL 1 ON DWG C10.
2. REMOVE EXISTING 12" WATER MAIN AFTER TEMPORARY WATER SYSTEM IS OPERATIONAL. REPLACE WITH 16" DI WATER MAIN AS SHOWN ON DWG WA01-WA03.
3. INSTALL 48" ACCESS MANHOLE ON BOX CULVERT PER DETAIL 2 ON DWG C10.
4. EXISTING FRANCHISE UTILITY TO BE RELOCATED BY OTHERS.
5. REPLACE FIRE HYDRANT ASSEMBLY PER COB STD DTL W-13. SEE DWG WA01-WA03 FOR DETAILS.
6. CONTRACTOR TO RESTORE TRAFFIC LOOP IN KIND.
7. REMOVE AND DISPOSE OF EXISTING STORM PIPE.
8. SEE DWG WA01-WA03 FOR 16" ø WATER MAIN CONNECTION.
9. PARALLEL UTILITY NOT SHOWN ON PROFILE FOR CLARITY.
10. NEW TEMPORARY SSMH AND CASED 16" DIAMETER SEWER. SEE DWG SS01-SS02 FOR DETAILS.
11. REMOVE AND REPLACE TRAFFIC SIGNAL POLE AND MAST ARM. SEE DWG TSG01 FOR DETAILS.
12. INSTALL METAL SAFETY RAILING PER COB STD DTL RS-120-1.
13. SEE DWG WA01-WA03 FOR WATER SERVICE CONNECTION DETAIL.
14. SEE STRUCTURE DETAIL SHEET S2-S5 FOR STORM BOX JOINT LOCATION AND DETAILS.
15. SEE STRUCTURE DETAILS SHEET S6 FOR STORM DRAIN PIPE PENETRATION DETAILS.
16. REMOVE APPROX. 4-7 LF OF EXIST. 12" STORM DRAIN FOR WALL CONSTRUCTION. FILL AND ABANDON ANY REMAINING 12" STORM DRAIN BETWEEN NEW CATCH BASIN AND WALL. SEE DWG C6 FOR DETAILS.
17. ALIGNMENT OF EXISTING 42" X 63" CMP STORM PIPE BETWEEN FACTORIA BLVD SE AND OUTFALL IS UNKNOWN. ALIGNMENT SHOWN ON PLANS MAY NOT BE ACCURATE IN THIS VICINITY.
18. EXISTING 16" SEWER TO BE REPLACED WITH NEW 16" SEWER IN CASING. SEE DWG SS1-SS2.
19. EXISTING UTILITY TO BE ADJUSTED, SUPPORTED, AND PROTECTED BY CONTRACTOR DURING CONSTRUCTION. RESET DISTURBED UTILITY PER PROJECT REQUIREMENTS.
20. PROVIDE AND INSTALL CATCH BASIN TYPE 1-L WITH A THROUGH CURB INLET FRAME AND VANED GRATE PER COB STD. DWG. NO. D-3, D-6, D-10, AND D-11.

C1

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City of Bellevue
UTILITIES

FACTORIA BOULEVARD STORM CONVEYANCE IMPROVEMENTS PROJECT
STORMWATER TRUNK PLAN AND PROFILE
STA 13+30 TO STA 15+63

SEC 27, T 25N, R 5E

SHEET 17 OF 93

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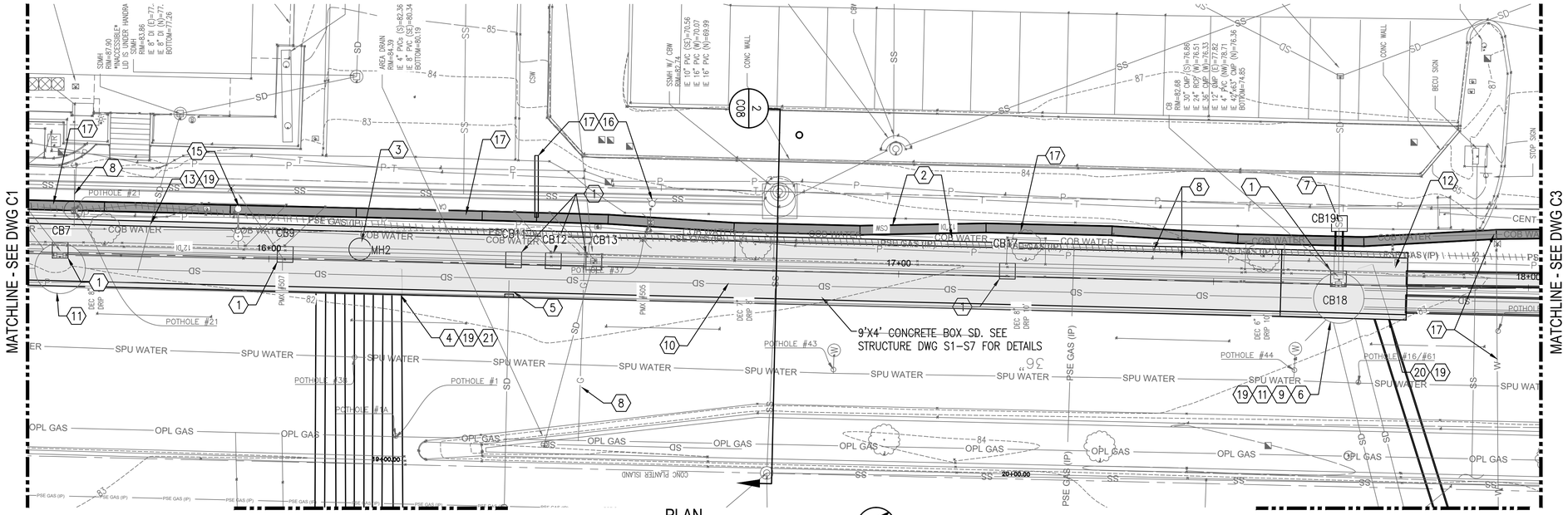
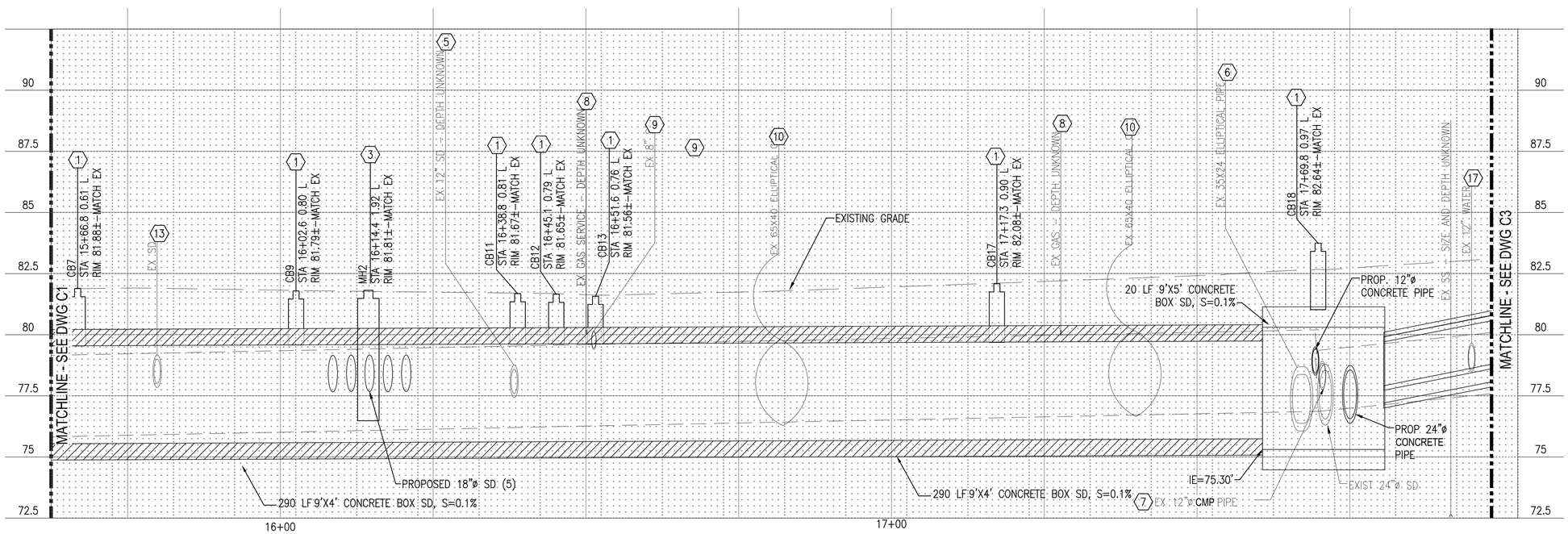


PLAN

STORM SYSTEM IMPROVEMENTS
SCALE: 1"=10'



PROFILE

STA 5+45.8 TO 7+86.9
HORIZ SCALE: 1"=10'
VERT SCALE: 1"=2.5'

1"=10' Scale 10 5 0 10 20 Feet

1"=2.5' Scale 2.5 1.25 0 2.5 5 Feet

GENERAL NOTES

1. SEE GENERAL PROJECT NOTES ON DWG G2.
2. CONTRACTOR IS RESPONSIBLE FOR LOCATING AND POTHOLING ALL UTILITIES WITHIN EXCAVATION LIMITS, WHICH SHALL BE INCIDENTAL TO OTHER BID ITEMS. WHERE ADDITIONAL SITE SPECIFIC POTHOLING IS REQUIRED BY THE PLANS OR REQUESTED BY ENGINEER, IT SHALL BE PAID FOR BY "ENGINEER REQUESTED UTILITY POTHOLES" ITEM.
3. SEE DWG C09 FOR UTILITY POTHOLE DATA.
4. SEE DWG C09 FOR STORM STRUCTURE DATA.
5. STATION/OFFSET LOCATION CALLOUTS AND RIM ELEVATIONS PROVIDED ARE AT THE CENTER OF THE DRAINAGE STRUCTURE UNLESS OTHERWISE NOTED.
6. LIMIT DISTURBANCE TO ONLY THOSE AREAS NECESSARY FOR CONSTRUCTING THE PROPOSED IMPROVEMENTS.
7. NOT ALL EXISTING TELECOM, POWER, AND CABLE LINES (FIBER OPTIC, COPPER, AND CONDUIT) ARE SHOWN IN PROFILES.
8. SEE DWG SP01–SP05 (IN PROGRESS) FOR UTILITY PROTECTION AND REMOVAL DETAILS.
9. EXISTING GRADE LINE SHOWN IS ALONG THE CENTER OF STRUCTURE ON MAIN TRUNKLINE.

CONSTRUCTION NOTES

1. INSTALL COMBINATION INLET AND CONNECT TO BOX SD PER DETAIL 1 ON DWG C10.
2. REMOVE EXISTING 12" WATER MAIN. REPLACE WITH 16" DI WATER MAIN DWG WA01–WA03..
3. INSTALL 48" ACCESS MANHOLE ON BOX SD PER DETAIL 2 ON DWG C10.
4. CONNECT (5) NEW 18" SD TO NEW BOX SD.
5. PROVIDE CONNECTION TO NEW BOX. ONCE NEW NORTH CROSSING IS INSTALLED THEN FILL EXISTING SD WITH CDF AND ABANDON IN PLACE.
6. EXTEND EXISTING 24" AND 35X24" ELLIPTICAL SD TO CONNECT TO NEW BOX SD.
7. INSTALL NEW CATCH BASIN. CONNECT EXISTING 12"(E) TO NEW CATCH BASIN. REMOVE APPROX. 10 LF OF EXIST. 12" (W) AND REPLACE WITH NEW 12" SD PIPE. CONTRACTOR TO VERIFY LOCATION OF CONNECTION. SEE DWG C05 FOR DETAILS.
8. EXISTING FRANCHISE UTILITY TO BE RELOCATED BY OTHERS.
9. CORE DRILL AND EXTEND TO CONNECT TO NEW BOX CULVERT. SEE DWG C4 FOR DETAILS.
10. REMOVE AND DISPOSE OF EXISTING STORM DRAIN PIPE.
11. REMOVE AND DISPOSE OF EXISTING STORM STRUCTURE.
12. INSTALL APPROXIMATELY 20 LF SECTION OF 9'X5' CONCRETE BOX SD TO ALLOW CLEARANCE FOR EXISTING STORM DRAIN CONNECTIONS.
13. TRIM AS NEEDED AND CONNECT EXISTING STORM DRAIN TO NEW BOX SD. SIZE AND DEPTH UNKNOWN, CONTRACTOR TO CONFIRM.
14. PARALLEL UTILITY NOT SHOWN ON PROFILE FOR CLARITY.
15. REMOVE AND REPLACE STREET LIGHT.
16. REPLACE FIRE HYDRANT ASSEMBLY PER COB STD DTL W–13.
17. REMOVE EXISTING 12" WATER MAIN. REPLACE WITH 16" DI WATER MAIN. SEE DWG WA01–WA03 FOR 16" ø WATER SERVICE CONNECTION.
18. EXTEND AND CONNECT EXISTING DRAIN LINE FROM SPU MANHOLE. CONTRACTOR TO CONFIRM SIZE AND DEPTH.
19. SEE STRUCTURE DETAILS SHEET S6 FOR STORM DRAIN PIPE PENETRATION DETAILS.
20. NEW 24" SD PIPE. SEE SHEET C5 FOR ADDITIONAL DETAILS.
21. SEE SHEET C4 FOR ADDITIONAL DETAILS

C2

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City of Bellevue
UTILITIES

FACTORIA BOULEVARD STORM CONVEYANCE IMPROVEMENTS PROJECT
STORMWATER TRUNK PLAN AND PROFILE
STA 15+63 TO STA 18+02

SEC 27, T 25N, R 5E | SHEET 18 OF 93

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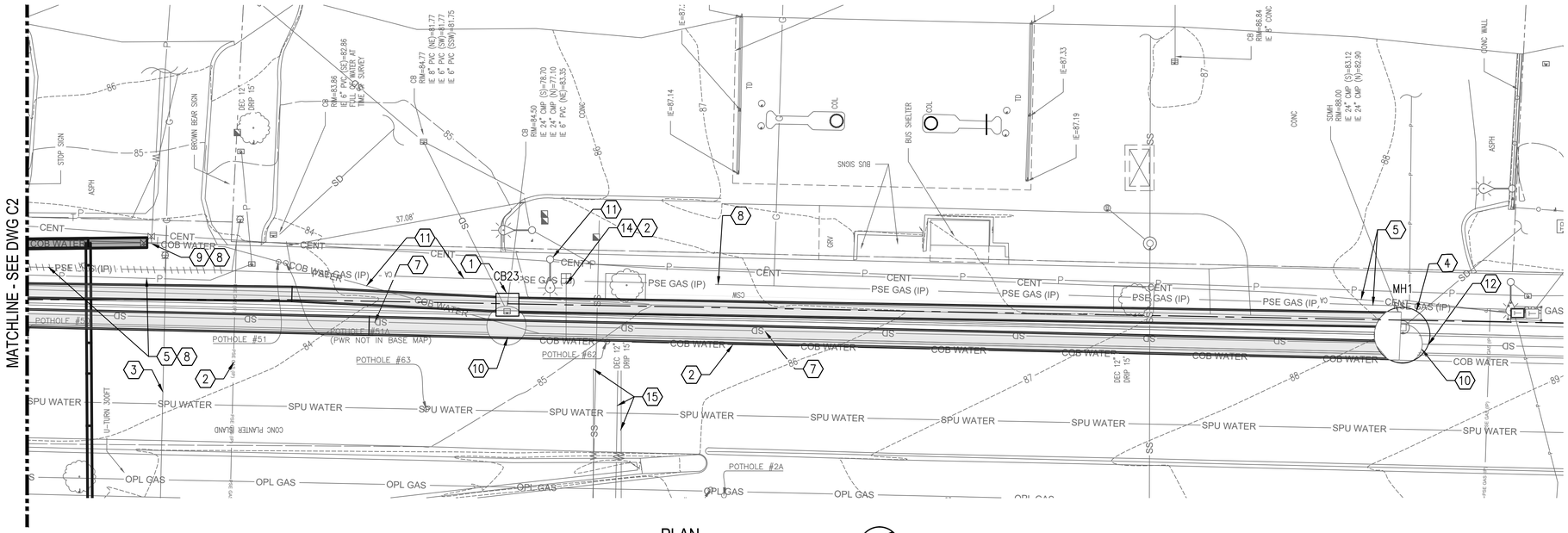
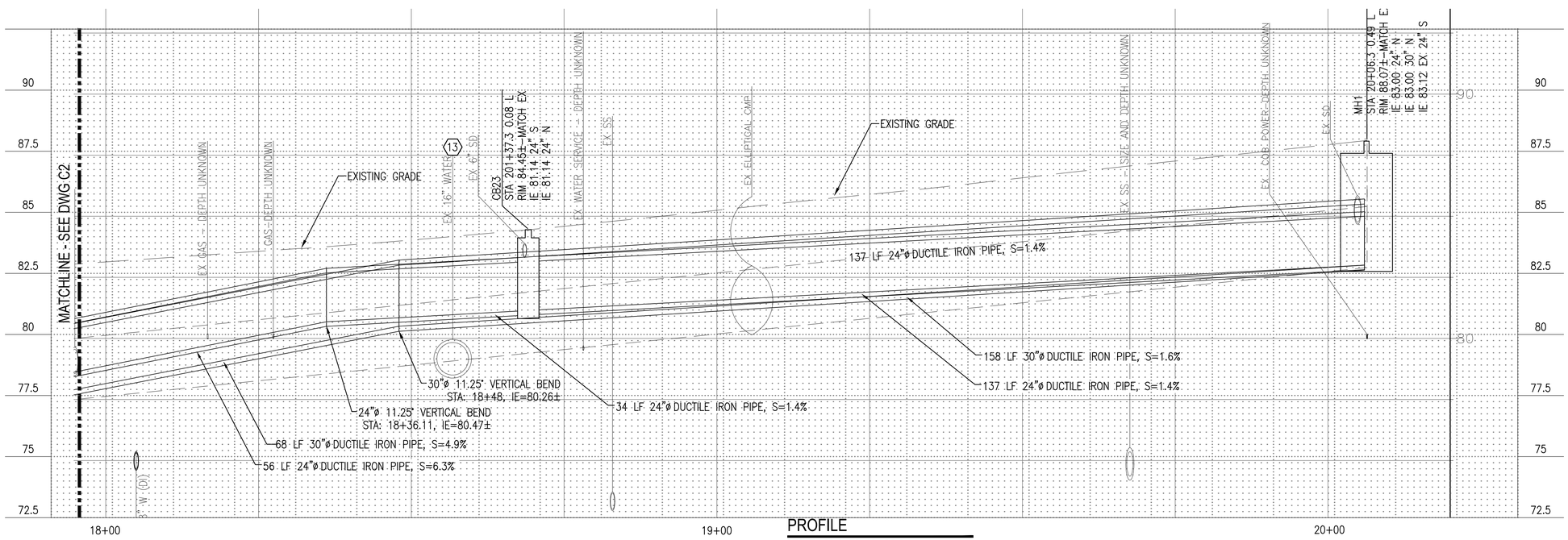


PLAN

STORM SYSTEM IMPROVEMENTS
SCALE: 1"=10'



PROFILE

STA 7+86.9 TO 10+26.9
HORIZ SCALE: 1"=10'
VERT SCALE: 1"=2.5'

GENERAL NOTES

1. SEE GENERAL PROJECT NOTES ON DWG G2.
2. CONTRACTOR IS RESPONSIBLE FOR LOCATING AND POTHOLING ALL UTILITIES WITHIN EXCAVATION LIMITS, WHICH SHALL BE INCIDENTAL TO OTHER BID ITEMS. WHERE ADDITIONAL SITE SPECIFIC POTHOLING IS REQUIRED BY THE PLANS OR REQUESTED BY ENGINEER, IT SHALL BE PAID FOR BY "ENGINEER REQUESTED UTILITY POTHOLES" BID ITEM.
3. SEE DWG C09 FOR UTILITY POTHOLE DATA.
4. SEE DWG C09 FOR STORM STRUCTURE DATA.
5. STATION/OFFSET LOCATION CALLOUTS AND RIM ELEVATIONS PROVIDED ARE AT THE CENTER OF THE DRAINAGE STRUCTURE UNLESS OTHERWISE NOTED.
6. LIMIT DISTURBANCE TO ONLY THOSE AREAS NECESSARY FOR CONSTRUCTING THE PROPOSED IMPROVEMENTS.
7. NOT ALL EXISTING TELECOM, POWER, AND CABLE LINES (FIBER OPTIC, COPPER, AND CONDUIT) ARE SHOWN IN PROFILES.
8. SEE DWG SP01–SP05 (IN PROGRESS) FOR UTILITY PROTECTION AND REMOVAL DETAILS.
9. EXISTING GRADE LINE SHOWN IS AT THE GUTTER LINE.

CONSTRUCTION NOTES

1. INSTALL CB PER STANDARD DETAIL DWG C10. CONNECT TO EXISTING 6" PVC (NE). CONTRACTOR TO VERIFY LOCATION
2. PROTECT AND PROVIDE TEMPORARY SUPPORT DURING CONSTRUCTION. CONTRACTOR TO POTHOLE EVERY 25 FEET TO CONFIRM NO CONFLICT.
3. EXISTING GAS TO BE RELOCATED.
4. INSTALL TYPE 2 84" ø SD MANHOLE. CONNECT TO EXISTING 24" SD TO THE SOUTH. CONNECT MANHOLE TO EXISTING STORM DRAIN ON SOUTH EAST. CONTRACTOR TO VERIFY THE LOCATION AND SIZE OF EXISTING STORM DRAIN ON SOUTH–EAST.
5. EXISTING UTILITY TO BE RELOCATED BY OTHERS.
6. RELOCATE EXISTING WATER SERVICE ABOVE BOX SD.
7. REMOVE AND DISPOSE OF EXISTING STORM PIPE.
8. PARALLEL UTILITY NOT SHOWN ON PROFILE FOR CLARITY.
9. CONNECT NEW WATER AT EXISTING TEE. SEE DWG WA01–WA03 FOR DETAILS.
10. REMOVE AND DISPOSE OF EXISTING STORM STRUCTURE.
11. PROTECT EXISTING STREET LIGHT.
12. CONTRACTOR TO POTHOLE EXISTING SD AND CONNECT TO MANHOLE MH1.
13. INSTALL ETHAFOAM PAD BETWEEN WATER AND STORM.
14. EXIST FRANCHISEE UTILITY CROSSING TO BE RELOCATED BY OTHERS.
15. EXIST WATER CROSSING TO BE PROTECTED IN PLACE.

1"=10' 10 5 0 10 20 Scale Feet

1"=2.5' 2.5 1.25 0 2.5 5 Scale Feet

C3

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City of Bellevue
UTILITIES

FACTORIA BOULEVARD STORM CONVEYANCE IMPROVEMENTS PROJECT
STORMWATER TRUNK PLAN AND PROFILE
STA 18+02 TO STA 20+06

SEC 27, T 25N, R 5E

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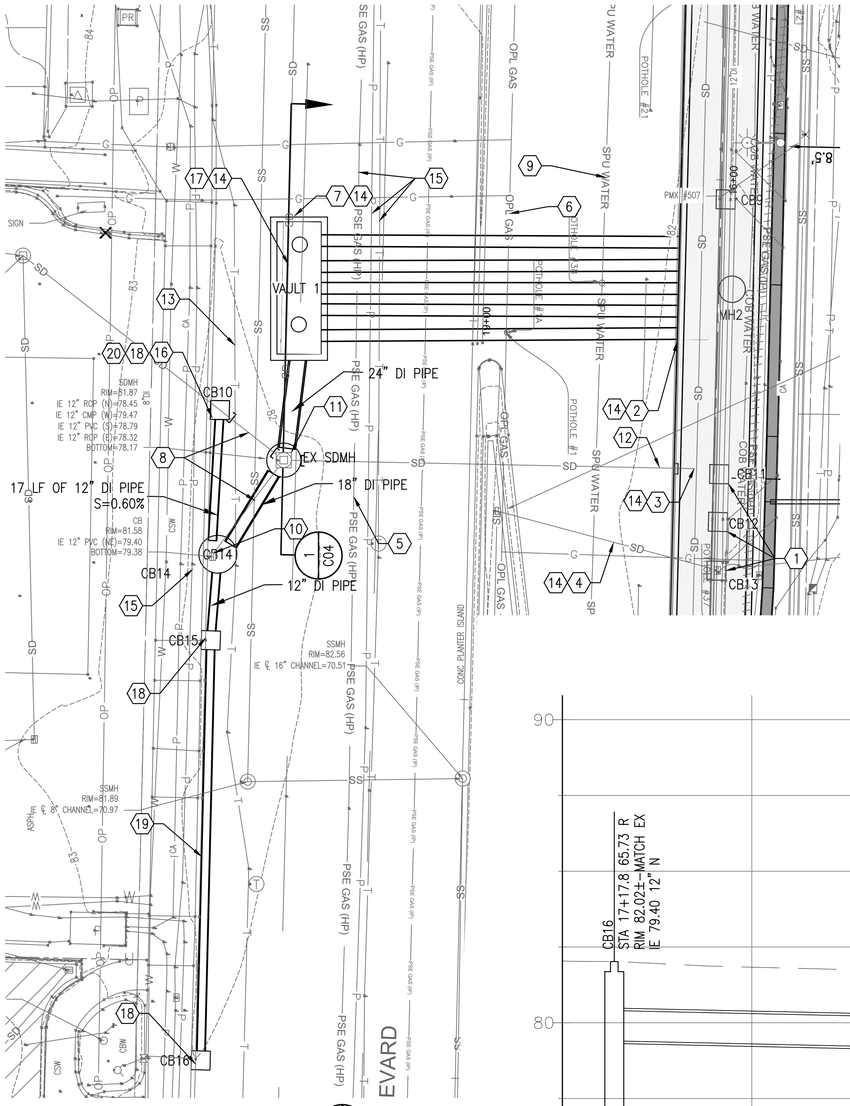
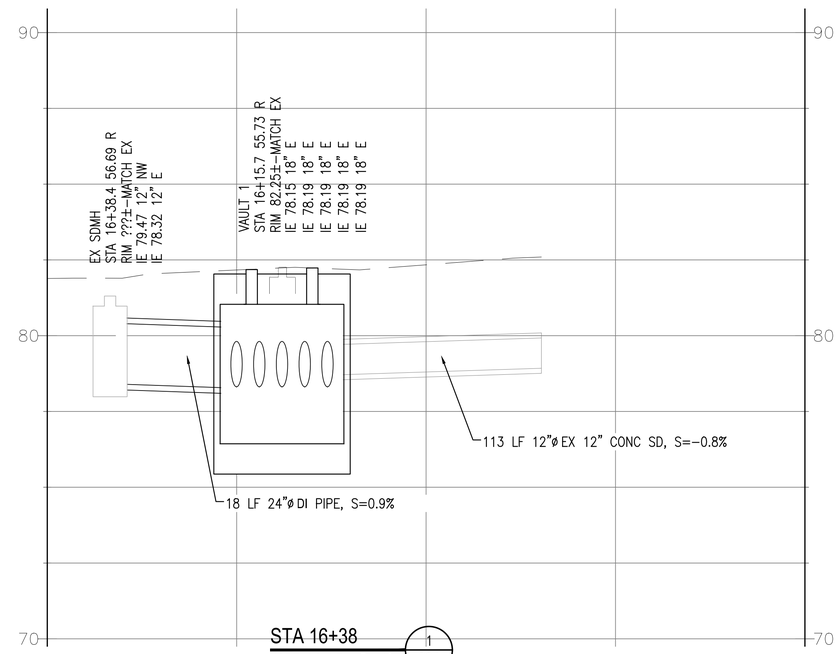


PLAN

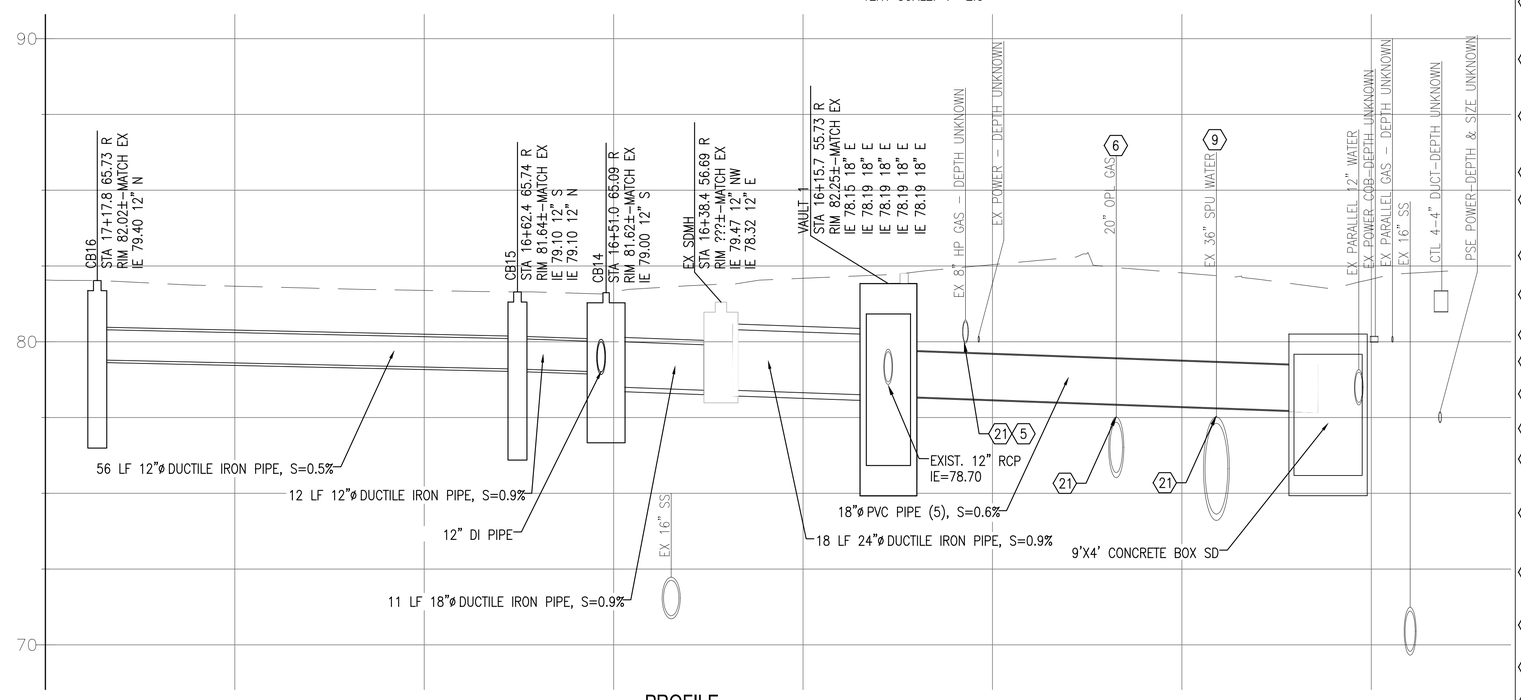
STORM SYSTEM IMPROVEMENTS
SCALE: 1"=10'



STA 16+38

HORZ SCALE: 1"=10'
VERT SCALE: 1"=2.5'

1 / C04



PROFILE

LATERAL 1 – APPROX STA 6+00
HORIZ SCALE: 1"=10'
VERT SCALE: 1"=2.5'

1"=10' 10 5 0 10 20 Scale Feet

1"=2.5' 2.5 1.25 0 2.5 5 Scale Feet

GENERAL NOTES

1. SEE GENERAL PROJECT NOTES ON DWG G2.
2. CONTRACTOR IS RESPONSIBLE FOR LOCATING AND POTHOLING ALL UTILITIES WITHIN EXCAVATION LIMITS, WHICH SHALL BE INCIDENTAL TO OTHER BID ITEMS. WHERE ADDITIONAL SITE SPECIFIC POTHOLING IS REQUIRED BY THE PLANS OR REQUESTED BY ENGINEER, IT SHALL BE PAID FOR BY "ENGINEER REQUESTED UTILITY POTHOLES" BID ITEM.
3. SEE DWG C09 FOR UTILITY POTHOLE DATA.
4. SEE DWG C09 FOR STORM STRUCTURE DATA.
5. STATION/OFFSET LOCATION CALLOUTS AND RIM ELEVATIONS PROVIDED ARE AT THE CENTER OF THE DRAINAGE STRUCTURE UNLESS OTHERWISE NOTED.
6. LIMIT DISTURBANCE TO ONLY THOSE AREAS NECESSARY FOR CONSTRUCTING THE PROPOSED IMPROVEMENTS.
7. NOT ALL EXISTING TELECOM, POWER, AND CABLE LINES (FIBER OPTIC, COPPER, AND CONDUIT) ARE SHOWN IN PROFILES.
8. SEE DWG SP01–SP05 (IN PROGRESS) FOR UTILITY PROTECTION AND REMOVAL DETAILS.

CONSTRUCTION NOTES

1. INSTALL COMBINATION INLET AND CONNECT TO BOX CULVERT PER DETAIL 1 ON DWG C10.
2. CONNECT (5) NEW 18" SD PIPES TO BOX CULVERT.
3. EXISTING 12" SD TO REMAIN. CORE DRILL AND EXTEND TO CONNECT TO NEW BOX CULVERT. CONTRACTOR TO CONFIRM ELEVATION PRIOR TO CONSTRUCTION.
4. CORE DRILL AND EXTEND TO CONNECT TO NEW BOX CULVERT. CONTRACTOR TO CONFIRM ELEVATION PRIOR TO CONSTRUCTION AND ADJUST IF NECESSARY.
5. EXISTING 8" HIGH PRESSURE GAS. CONTRACTOR TO PROTECT AND PROVIDE TEMPORARY SUPPORT DURING CONSTRUCTION. USE EXTREME CAUTION DUE TO SAFETY HAZARD.
6. EXISTING 20" OPL GAS LINE. CONTRACTOR TO PROTECT AND PROVIDE TEMPORARY SUPPORT DURING CONSTRUCTION. USE EXTREME CAUTION DUE TO SAFETY HAZARD.
7. CONNECT EXISTING PIPE TO NORTH TO NEW VAULT 1. REMOVE APPROX. 31 LF OF PIPE TO SOUTH AS NEEDED FOR CONSTRUCTION.
8. REMOVE EXISTING STORM DRAIN.
9. EXISTING 36" SPU WATER MAIN. CONTRACTOR TO PROTECT AND AVOID DISTURBANCE TO PIPE AND BEDDING DURING CONSTRUCTION.
10. REMOVE AND REPLACE EXISTING CATCH BASIN.
11. EXIST. MANHOLE TO REMAIN. CORE DRILL TO CONNECT PROPOSED STORM DRAIN PIPES.
12. FILL PIPE WITH CDF AND ABANDON.
13. EXISTING FRANCHISEE UTILITY TO BE RELOCATED BY OTHERS.
14. SEE STRUCTURE DETAILS SHEET S6 FOR STORM WATER PENETRATION DETAILS.
15. PROTECT EXISTING FRANCHISEE UTILITY IN PLACE.
16. EXISTING 12" SD PIPE TO REMAIN. CORE DRILL AND CONNECT EXISTING SD PIPE TO CATCH BASIN. CONTRACTOR TO CONFIRM THE ELEVATION.
17. INSTALL NEW VAULT 1. SEE STRUCTURE DWG S5–S7 FOR DETAILS. REMOVE EXISTING MANHOLE AND STORM DRAIN AS NEEDED.
18. PROVIDE AND INSTALL CATCH BASIN TYPE 1–L WITH A THROUGH CURB INLET FRAME AND VANED GRATE PER COB STD DWG. NO. D–3, D–6, D–10, AND D–11
19. PROVIDE AND INSTALL 12" DI STORM SEWER PIPE PER COB STD. DWG. NO. D–25 & D–46.
20. CONNECT NEW STRUCTURE/PIPE TO EXISTING STRUCTURE PIPE.
21. INSTALL ETHAFOAM PAD BETWEEN STORM AND UTILITY.

C4

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City of Bellevue
UTILITIES

FACTORIA BOULEVARD STORM CONVEYANCE IMPROVEMENTS PROJECT

STORMWATER LATERALS PLAN AND PROFILE

SEC 27, T 25N, R 5E

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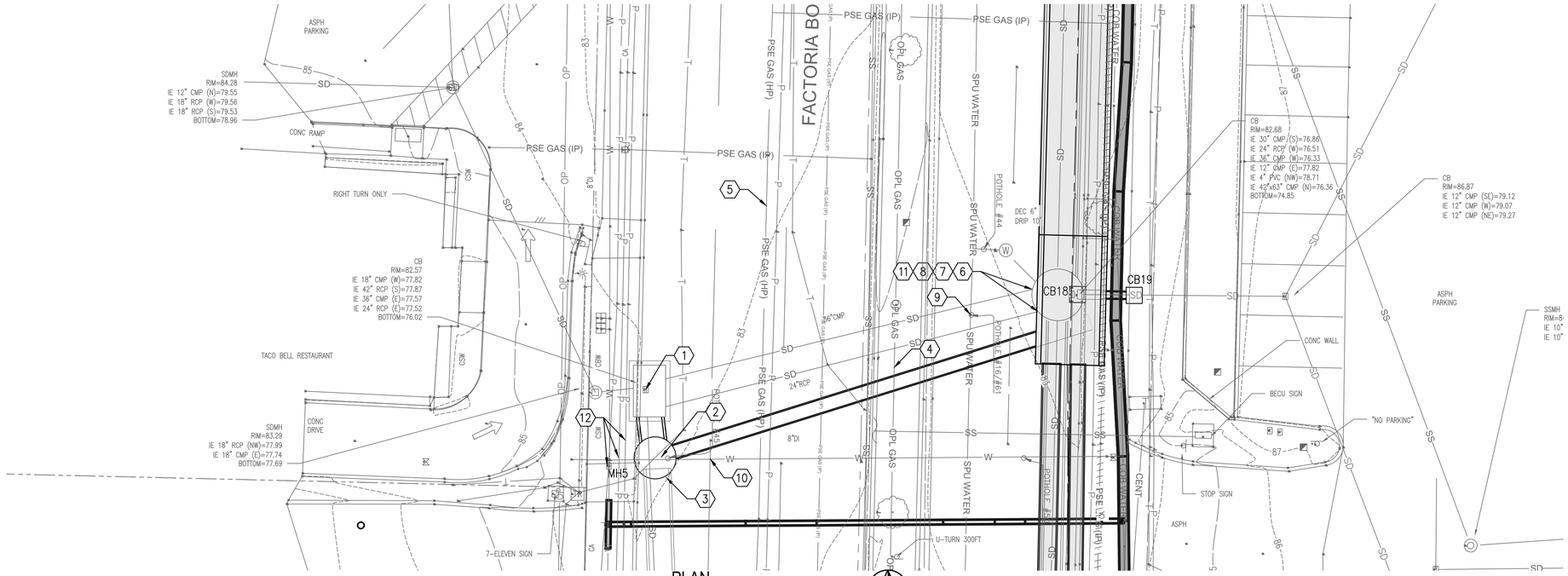
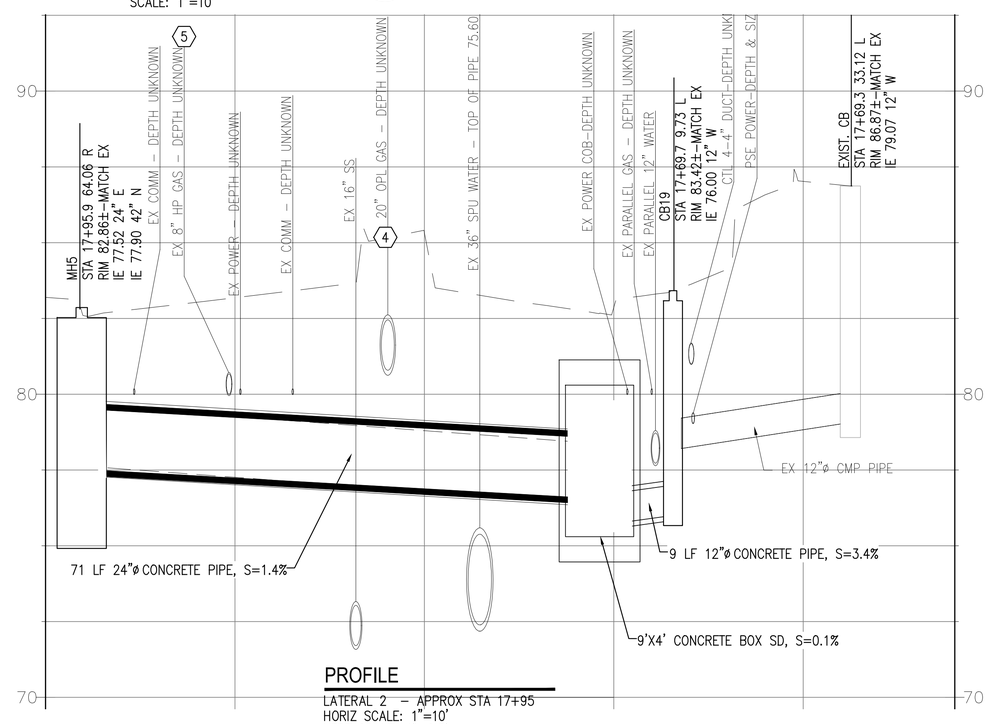


PLAN

STORM SYSTEM IMPROVEMENTS
SCALE: 1"=10'



PROFILE

LATERAL 2 - APPROX STA 17+95
HORIZ SCALE: 1"=10'
VERT SCALE: 1"=2.5'

GENERAL NOTES

1. SEE GENERAL PROJECT NOTES ON DWG G2.
2. CONTRACTOR IS RESPONSIBLE FOR LOCATING AND POTHOLING ALL UTILITIES WITHIN EXCAVATION LIMITS, WHICH SHALL BE INCIDENTAL TO OTHER BID ITEMS. WHERE ADDITIONAL SITE SPECIFIC POTHOLING IS REQUIRED BY THE PLANS OR REQUESTED BY ENGINEER, IT SHALL BE PAID FOR BY "ENGINEER REQUESTED UTILITY POTHOLES" BID ITEM.
3. SEE DWG C09 FOR UTILITY POTHOLE DATA.
4. SEE DWG C09 FOR STORM STRUCTURE DATA.
5. STATION/OFFSET LOCATION CALLOUTS AND RIM ELEVATIONS PROVIDED ARE AT THE CENTER OF THE DRAINAGE STRUCTURE UNLESS OTHERWISE NOTED.
6. LIMIT DISTURBANCE TO ONLY THOSE AREAS NECESSARY FOR CONSTRUCTING THE PROPOSED IMPROVEMENTS.
7. NOT ALL EXISTING TELECOM, POWER, AND CABLE LINES (FIBER OPTIC, COPPER, AND CONDUIT) ARE SHOWN IN PROFILES.
8. SEE DWG SP01-SP05 (IN PROGRESS) FOR UTILITY PROTECTION AND REMOVAL DETAILS.

CONSTRUCTION NOTES

1. PROTECT EXISTING VAULT AND INLETS.
2. INSTALL NEW TYPE 2 72"ø MANHOLE STRUCTURE. CONNECT EXISTING 42"(S) TO NEW MANHOLE. REMOVE APPROX. 8 LF OF 42" TO NORTH AND REPLACE WITH NEW 42".
3. CONNECT NEW MH5 TO EXISTING 42" STORM DRAIN. CONTRACTOR TO VERIFY THE LOCATION.
4. EXISTING 20" OPL GAS LINE. CONTRACTOR TO PROTECT AND PROVIDE TEMPORARY SUPPORT DURING CONSTRUCTION. USE EXTREME CAUTION DUE TO SAFETY HAZARD.
5. EXISTING 8" HIGH PRESSURE GAS. CONTRACTOR TO PROTECT AND PROVIDE TEMPORARY SUPPORT DURING CONSTRUCTION. USE EXTREME CAUTION DUE TO SAFETY HAZARD.
6. EXTEND EXISTING 24" AND 36" SD TO CONNECT TO NEW BOX SD.
7. CONTRACTOR TO VERIFY LOCATIONS OF EXISTING SD PIPES PRIOR TO CONSTRUCTING STORM IMPROVEMENTS.
8. REMOVE AND DISPOSE OF EXISTING STORM STRUCTURE.
9. ELEVATION OF SPU WATER MAIN SHOWN IS BASED ON POTHOLE 16. THIS ELEVATION SHOWS IT TO BE IN CONFLICT WITH EXISTING STORM PIPE. DEPTH WILL NEED TO BE VERIFIED WITH ADDITIONAL POTHOLES.
10. EXISTING WATER IS RELOCATED TO SOUTH. SEE DWG WA01-WA03 FOR DETAILS.
11. SEE STRUCTURE DETAILS SHEET S6 FOR STORM DRAIN PIPE PENETRATION DETAILS.
12. PROTECT EXISTING FRANCHISE UTILITY IN PLACE.

1"=10' 10 5 0 10 20 Scale Feet

1"=2.5' 2.5 1.25 0 2.5 5 Scale Feet

C5

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Approved By

DESIGN MANAGER DATE
PROJECT MANAGER DATE

ABHISHEK MISHRA	8/10/21
DESIGNED BY	DATE
ABHISHEK MISHRA	8/10/21
DRAWN BY	DATE
JON W CAMMERMEYER	8/10/21
CHECKED BY	DATE

City of Bellevue
UTILITIES

FACTORIA BOULEVARD STORM CONVEYANCE IMPROVEMENTS PROJECT

STORMWATER LATERALS PLAN AND PROFILE

SEC 27, T 25N, R 5E

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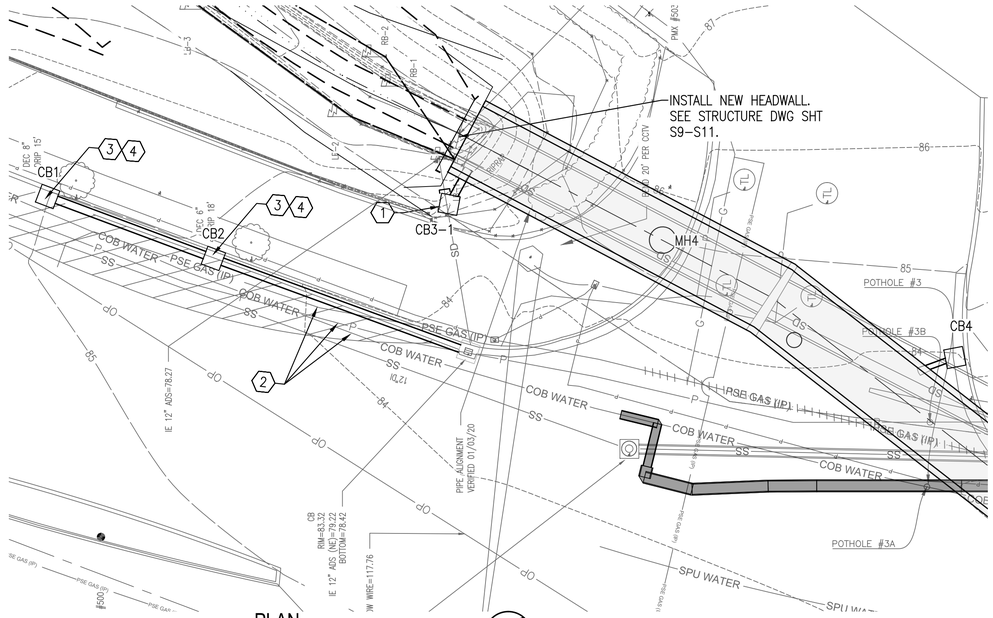
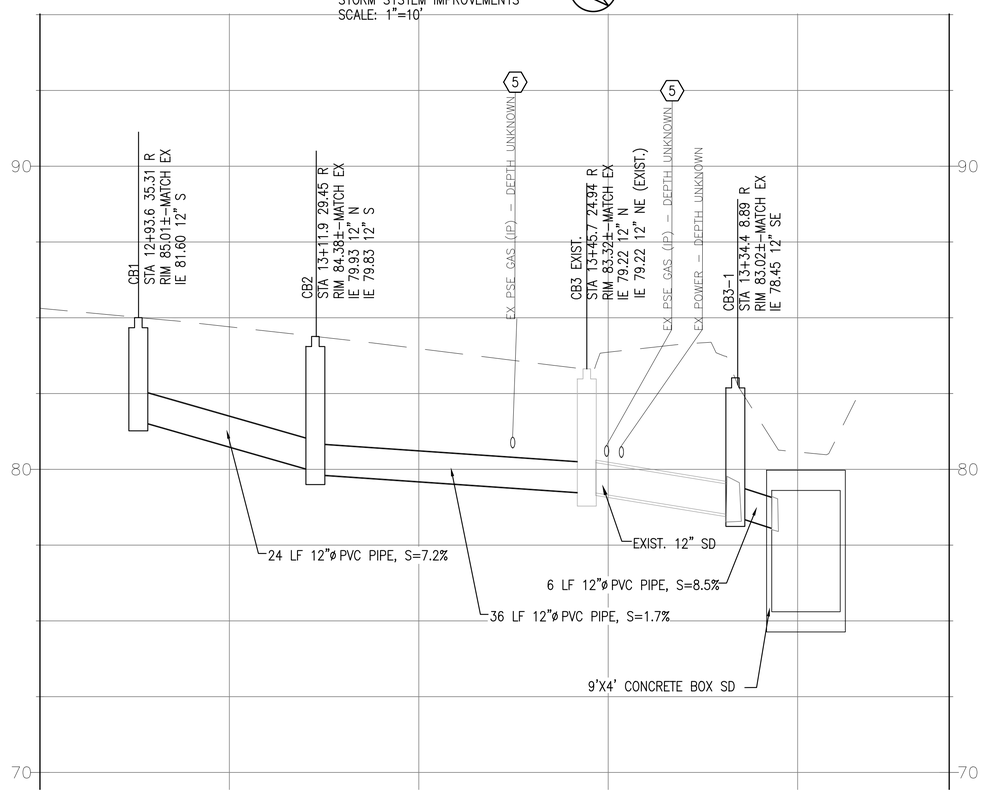


PLAN

STORM SYSTEM IMPROVEMENTS
SCALE: 1"=10'



PROFILE

NORTH END INLET IMPROVEMENTS
HORIZ SCALE: 1"=10'
VERT SCALE: 1"=2.5'

GENERAL NOTES

1. SEE GENERAL PROJECT NOTES ON DWG G2.
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3. SEE DWG C09 FOR UTILITY POTHOLE DATA.
4. SEE DWG C09 FOR STORM STRUCTURE DATA.
5. STATION/OFFSET LOCATION CALLOUTS AND RIM ELEVATIONS PROVIDED ARE AT THE CENTER OF THE DRAINAGE STRUCTURE UNLESS OTHERWISE NOTED.
6. LIMIT DISTURBANCE TO ONLY THOSE AREAS NECESSARY FOR CONSTRUCTING THE PROPOSED IMPROVEMENTS.
7. NOT ALL EXISTING TELECOM, POWER, AND CABLE LINES (FIBER OPTIC, COPPER, AND CONDUIT) ARE SHOWN IN PROFILES.
8. SEE DWG SP01-SP05 (IN PROGRESS) FOR UTILITY PROTECTION AND REMOVAL DETAILS.

CONSTRUCTION NOTES

1. INSTALL NEW CATCH BASIN. CONNECT TO EXISTING STORM DRAIN TO SOUTH-WEST. REMOVE APPROX. 6 LF OF EXISTING STORM DRAIN TO EAST. CONNECT NEW 12" SD BETWEEN NEW CATCH BASIN AND CONCRETE BOX.
2. EXISTING POWER, GAS, WATER, AND WATER LINES TO BE PROTECTED IN PLACE.
3. OPL IN THE VICINITY OF PROPOSED CATCH BASIN. CONTRACTOR TO CONFIRM THE LOCATION BEFORE STARTING THE STORM WATER IMPROVEMENTS.
4. PROVIDE AND INSTALL CATCH BASIN TYPE 1 WITH THROUGH CURB INLET FRAME AND VANED GRATE PER COB STD DWG D-6 AND D-11.
5. EXISTING PSE GAS WILL BE REMOVED IN THIS LOCATION. REFER PSE PLANS DATED AFTER SEPTEMBER 2021.

1"=10' 10 5 0 10 20 Scale Feet

1"=2.5' 2.5 1.25 0 2.5 5 Scale Feet

C6

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JON W CAMMERMEYER	8/10/21
CHECKED BY	DATE

City of Bellevue
UTILITIES

FACTORIA BOULEVARD STORM
CONVEYANCE IMPROVEMENTS PROJECT

STORMWATER LATERALS PLAN AND PROFILE

SEC 27, T 25N, R 5E

SHEET 22 OF 93

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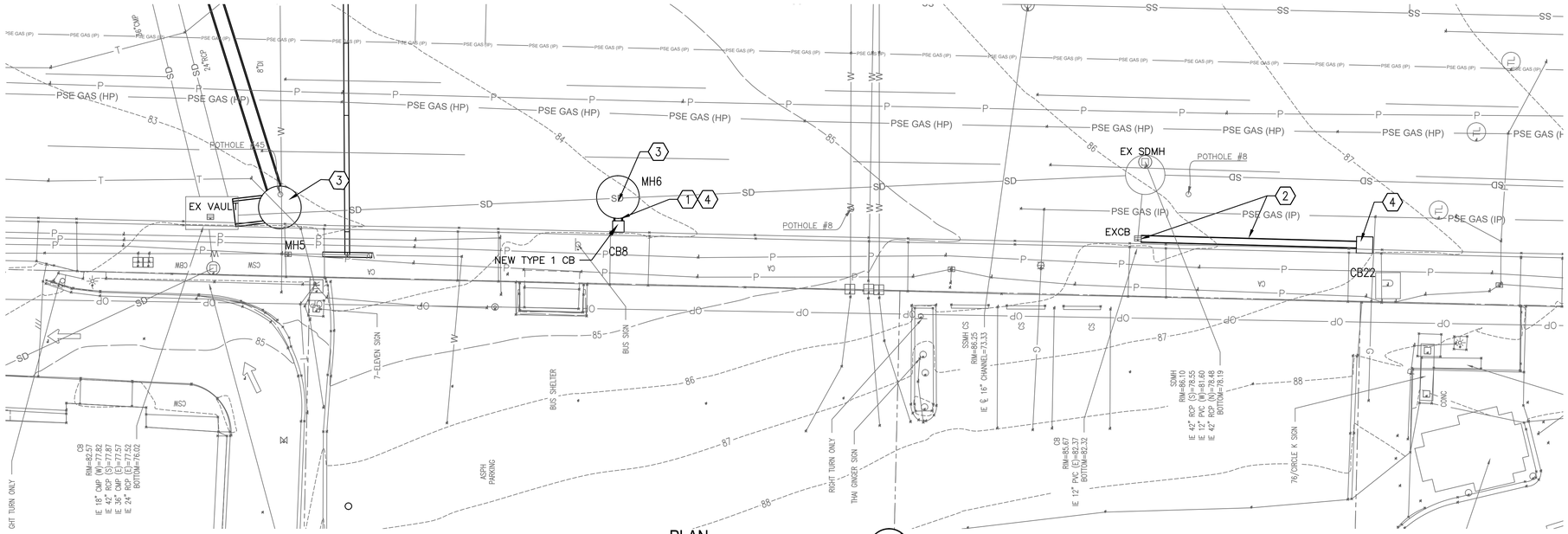
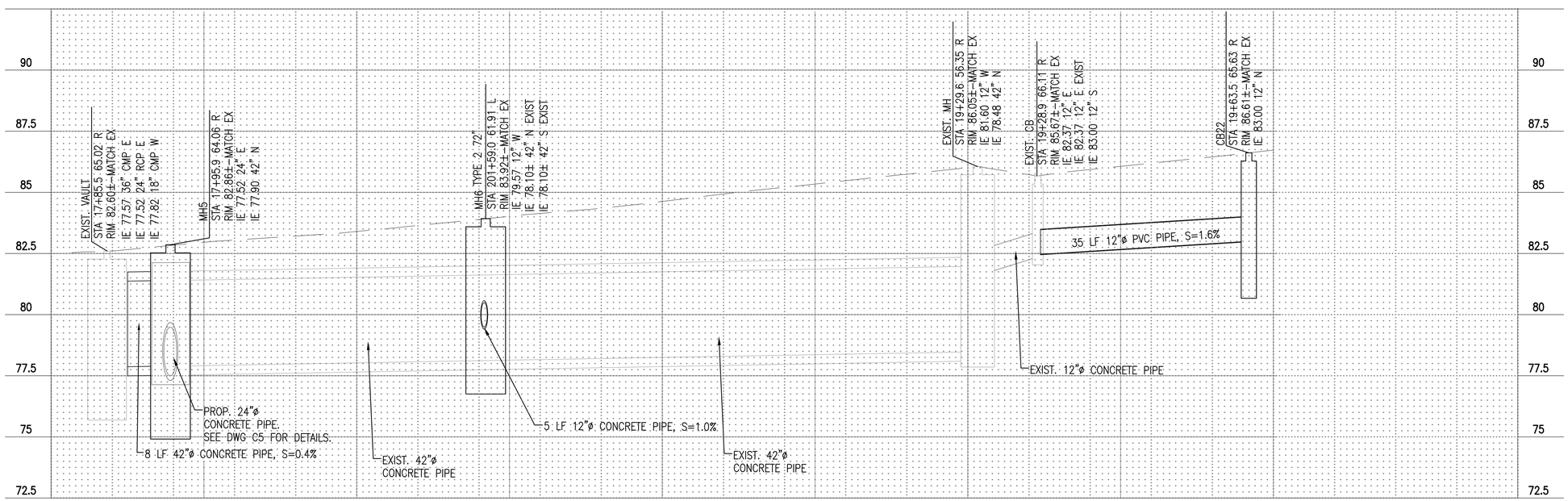


PLAN

SOUTH END INLET IMPROVEMENTS
SCALE: 1"=10'



GENERAL NOTES

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2. CONTRACTOR IS RESPONSIBLE FOR LOCATING AND POTHOLING ALL UTILITIES WITHIN EXCAVATION LIMITS, WHICH SHALL BE INCIDENTAL TO OTHER BID ITEMS. WHERE ADDITIONAL SITE SPECIFIC POTHOLING IS REQUIRED BY THE PLANS OR REQUESTED BY ENGINEER, IT SHALL BE PAID FOR BY "ENGINEER REQUESTED UTILITY POTHOLES" BID ITEM.
3. SEE DWG C09 FOR UTILITY POTHOLE DATA.
4. SEE DWG C09 FOR STORM STRUCTURE DATA.
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CONSTRUCTION NOTES

1. CONNECT CB08 TO MH6 WITH 5 LF 12" CONCRETE SD, IE 78.57.
2. INSTALL 35 LF 12" PVC PIPE BETWEEN CB22 AND EXISTING CATCH BASIN. CONTRACTOR TO VERIFY THE KNOCKOUT LOCATION IN EXISTING CB.
3. INSTALL TYPE 2 72" MANHOLE. REMOVE EXISTING SD AS NECESSARY TO INSTALL NEW MH. CONNECT EXISTING 42" SD TO NEW MH. CONTRACTOR TO VERIFY KNOCKOUT LOCATION PRIOR TO CONSTRUCTING STORM IMPROVEMENTS. CONTRACTOR MAY USE "SADDLE TYPE" MANHOLE.
4. PROVIDE AND INSTALL CATCH BASIN TYPE 1 WITH THROUGH CURB INLET FRAME AND VANED GRATE PER COB STD DWG. D–6 AND D–11.

NOTE TO CITY REVIEWER: FOR MH6, WOULD CITY ALLOW A DIRECT CONNECTION USING "INSERTA–TEE" TO AVOID NEW LARGE MANHOLE.

1"=10' 10 5 0 10 20 Scale Feet

1"=5' 5 2.5 0 5 10 Scale Feet

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JON W CAMMERMEYER	8/10/21
CHECKED BY	DATE

City of Bellevue
UTILITIES

FACTORIA BOULEVARD STORM CONVEYANCE IMPROVEMENTS PROJECT

STORMWATER LATERALS PLAN AND PROFILE

SEC 27, T 25N, R 5E

C7

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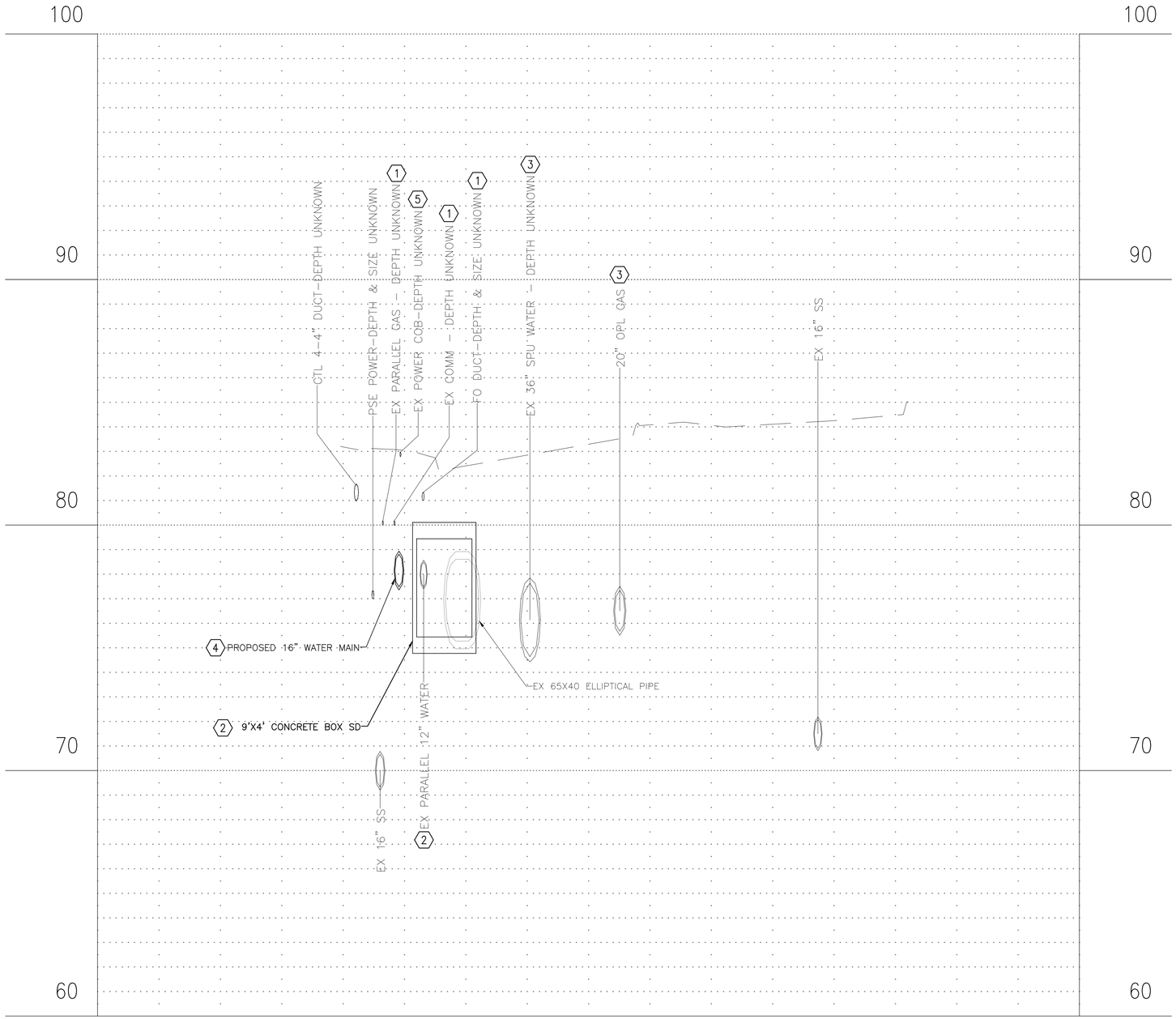

STA 14+70 (1 / C01)
HORZ SCALE: 1"=10'
VERT SCALE: 1"=2.5'

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CONSTRUCTION NOTES

1. EXISTING FRANCHISEE UTILITY TO BE RELOCATED BY OTHERS.
2. EXISTING COB UTILITIES TO BE REMOVED & RELOCATED.
3. EXISTING UTILITY TO BE REMAIN IN PLACE AND BE PROTECTED/SUPPORTED.
4. NEW COB WATER LOCATION
5. NEW COB TRAFFIC LIGHTS AND POWER

NOTE TO CITY REVIEWER– THE FONTS ON THIS SHEET WILL BE FIXED FOR 90% SUBMITTAL.

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CHECKED BY	DATE

City of Bellevue
UTILITIES

FACTORIA BOULEVARD STORM
CONVEYANCE IMPROVEMENTS PROJECT

CROSS SECTIONS
SHEET 1 of 3

SEC 27, T 25N, R 5E

SHEET 24 OF 93

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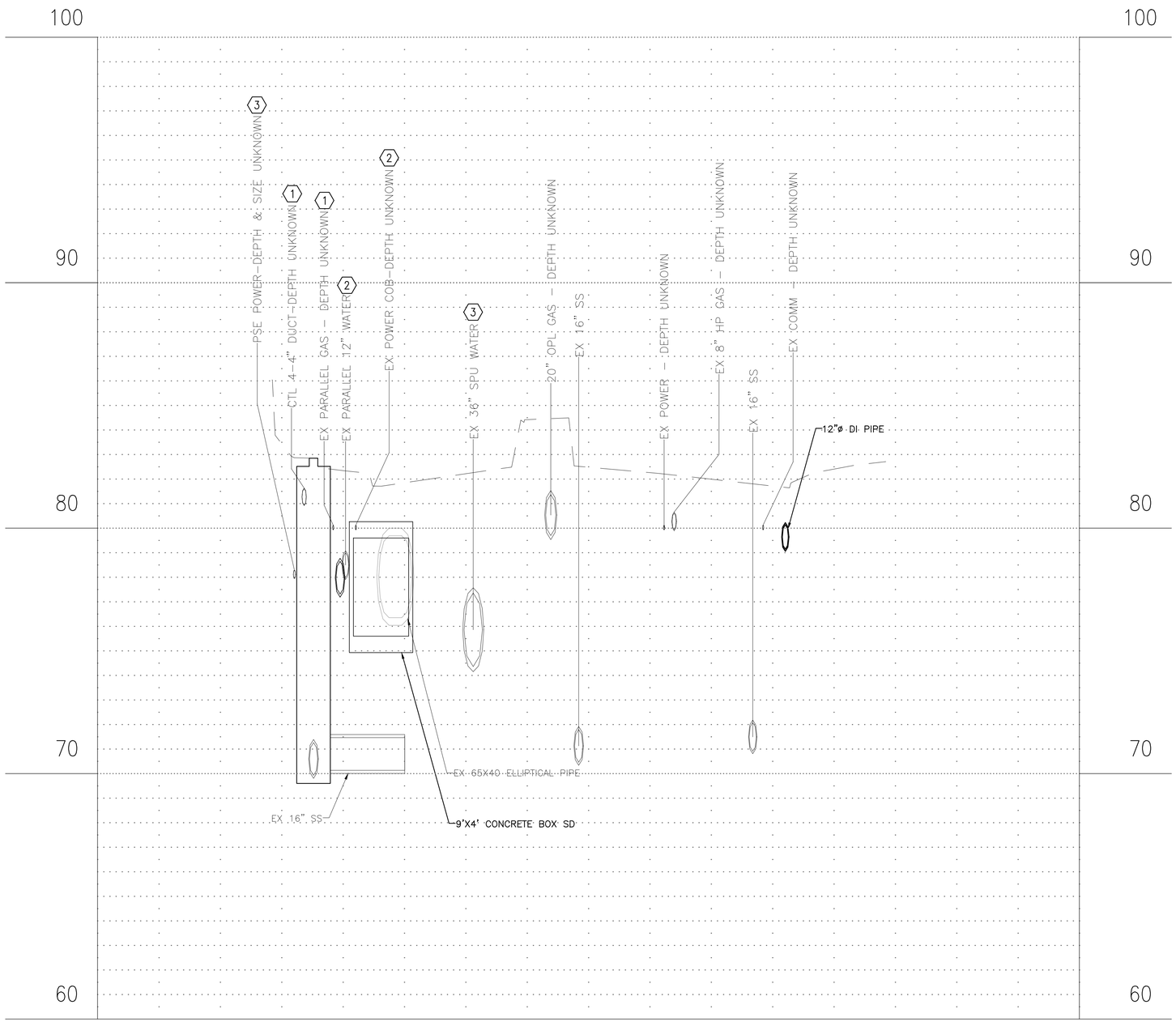

STA 16+80 (2 / C02)
HORZ SCALE: 1"=10'
VERT SCALE: 1"=2.5'

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CONSTRUCTION NOTES

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2. EXISTING COB UTILITIES TO BE REMOVED & RELOCATED.
3. EXISTING UTILITY TO BE REMAIN IN PLACE AND BE PROTECTED/SUPPORTED.
4. NEW COB WATER LOCATION
5. NEW COB TRAFFIC LIGHTS AND POWER

NOTE TO CITY REVIEWER– THE FONTS ON THIS SHEET WILL BE FIXED FOR 90% SUBMITTAL.

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City of Bellevue
UTILITIES

FACTORIA BOULEVARD STORM
CONVEYANCE IMPROVEMENTS PROJECT

CROSS SECTIONS
SHEET 2 OF 3

SEC 27, T 25N, R 5E

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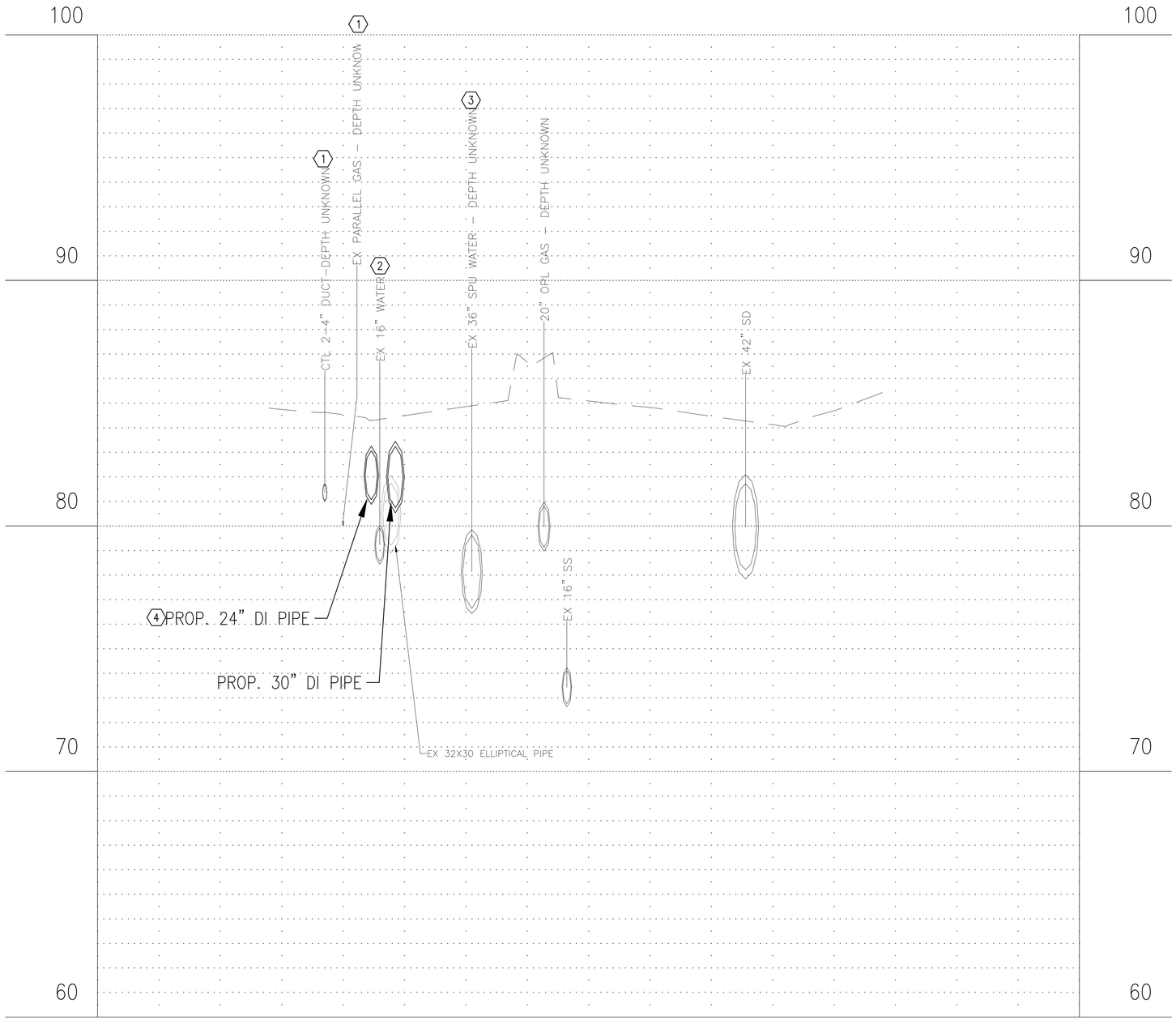

STA 18+60 (3 / C02)
HORZ SCALE: 1"=10'
VERT SCALE: 1"=2.5'

GENERAL NOTES

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3. EXISTING UTILITY TO BE REMAIN IN PLACE AND BE PROTECTED/SUPPORTED.
4. NEW COB WATER LOCATION.
5. NEW COB TRAFFIC LIGHTS AND POWER.

NOTE TO CITY REVIEWER– THE FONTS ON THIS SHEET WILL BE FIXED FOR 90% SUBMITTAL.

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CHECKED BY	JON W CAMMERMEYER	8/10/21

City of Bellevue
UTILITIES

FACTORIA BOULEVARD STORM CONVEYANCE IMPROVEMENTS PROJECT

CROSS SECTIONS
SHEET 3 OF 3

SEC 27, T 25N, R 5E

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STORM AND SANITARY STRUCTURE SCHEDULE

NO.	CENTER OF STRUCTURE NORTHING	CENTER OF STRUCTURE EASTING	STRUCTURE TYPE, DETAIL REFERENCE	FRAME & LID/GRATE TYPE, DETAIL REFERENCE	NOTES
VAULT 1	213588.3078	1310626.7579	2'X16' CONCRETE VAULT, SEE DETAIL _ ON DWG _	TWO (2) CIRCULAR FRAMES (RINGS) AND COVERS. SEE COB STD PLAN D-21	SUMP DEPTH TO BE BETWEEN 1 AND 2 FT BELOW LOWEST STORM DRAIN INVERT
MH1	213196.4537	1310672.7915	TYPE 2, 96"-SEE COB STD PLAN D-4	CIRCULAR FRAME (RING) AND COVER, SEE COB STD PLAN D-21	
MH2	213587.7305	1310688.9883	ACCESS RISER, 36" - SEE DETAIL 2 ON DWG C10	CIRCULAR FRAME (RING) AND COVER, SEE COB STD PLAN D-21	
MH4	213811.4063	1310712.5072	ACCESS RISER, 36" - SEE DETAIL 2 ON DWG C10	RECTANGULAR VANED GRATE, SEE COB STD PLAN D-6	
MH5	213407.5121	1310614.2774	TYPE 2, 72" - SEE COB STD PLAN D-4	CIRCULAR FRAME (RING) AND COVER, SEE COB STD PLAN D-21	
MH6	213355.9428	1310615.8493	TYPE 2, 72" - SEE COB STD PLAN D-4	CIRCULAR FRAME (RING) AND COVER, SEE COB STD PLAN D-21	
CB1	213909.3329	1310732.3191	CATCH BASIN TYPE 1, SEE COB STD PLAN D-2	THROUGH-CURB INLET W/ VANED GRATE, SEE COB STD PLANS D-6 AND D-11	
CB2	213887.4521	1310724.1450	CATCH BASIN TYPE 1, SEE COB STD PLAN D-2	THROUGH-CURB INLET W/ VANED GRATE, SEE COB STD PLANS D-6 AND D-11	
C3-1	213856.9338	1310731.4543	CATCH BASIN TYPE 1, SEE COB STD PLAN D-2	RECTANGULAR FRAME W/ SOLID COVER , SEE COB STD PLANS D-8 AND D-9	
CB4	213785.1294	1310699.5902	CATCH BASIN TYPE 1-L, SEE COB STD PLAN D-3	THROUGH-CURB INLET W/ VANED GRATE, SEE COB STD PLANS D-6 AND D-11	
CB5	213742.3868	1310686.7818	CONCRETE INLET - SEE DETAIL 1 ON DWG C10	THROUGH-CURB INLET W/ VANED GRATE, SEE COB STD PLANS D-6 AND D-11	
CB6	213687.2616	1310685.4899	CONCRETE INLET - SEE DETAIL 1 ON DWG C10	THROUGH-CURB INLET W/ VANED GRATE, SEE COB STD PLANS D-6 AND D-11	
CB7	213635.7553	1310684.2618	CONCRETE INLET - SEE DETAIL 1 ON DWG C10	THROUGH-CURB INLET W/ VANED GRATE, SEE COB STD PLANS D-6 AND D-11	
CB8	213355.8780	1310611.3580	CATCH BASIN TYPE 1, SEE COB STD PLAN D-2	THROUGH-CURB INLET W/ VANED GRATE, SEE COB STD PLANS D-6 AND D-11	
CB9	213600.0276	1310683.5894	CONCRETE INLET - SEE DETAIL 1 ON DWG C10	THROUGH-CURB INLET W/ VANED GRATE, SEE COB STD PLANS D-6 AND D-11	
CB10	213572.2316	1310616.8296	CATCH BASIN TYPE 1-L, SEE COB STD PLAN D-3	THROUGH-CURB INLET W/ VANED GRATE, SEE COB STD PLANS D-6 AND D-11	
CB11	213563.7656	1310682.7228	CONCRETE INLET - SEE DETAIL 1 ON DWG C10	THROUGH-CURB INLET W/ VANED GRATE, SEE COB STD PLANS D-6 AND D-11	
CB12	213557.4663	1310682.5562	CONCRETE INLET - SEE DETAIL 1 ON DWG C10	THROUGH-CURB INLET W/ VANED GRATE, SEE COB STD PLANS D-6 AND D-11	
CB13	213551.0330	1310682.3701	CONCRETE INLET - SEE DETAIL 1 ON DWG C10	THROUGH-CURB INLET W/ VANED GRATE, SEE COB STD PLANS D-6 AND D-11	
CB14	213553.1942	1310616.5570	CATCH BASIN TYPE 2 54", SEE COB STD PLAN D-4	THROUGH-CURB INLET W/ VANED GRATE, SEE COB STD PLANS D-6 AND D-11	OFFSET PIPE ALIGNMENTS AS NEEDED TO OBTAIN REQUIRED KNOCKOUT SEPERATION
CB15	213541.8445	1310615.6261	CATCH BASIN TYPE 1, SEE COB STD PLAN D-2	THROUGH-CURB INLET W/ VANED GRATE, SEE COB STD PLANS D-6 AND D-11	
CB16	213486.3997	1310614.3019	CATCH BASIN TYPE 1, SEE COB STD PLAN D-2	THROUGH-CURB INLET W/ VANED GRATE, SEE COB STD PLANS D-6 AND D-11	
CB17	213485.3741	1310680.9321	CONCRETE INLET - SEE DETAIL 1 ON DWG C10	THROUGH-CURB INLET W/ VANED GRATE, SEE COB STD PLANS D-6 AND D-11	
CB18	213432.8225	1310679.7310	CONCRETE INLET - SEE DETAIL 1 ON DWG C10	THROUGH-CURB INLET W/ VANED GRATE, SEE COB STD PLANS D-6 AND D-11	
CB19	213432.6186	1310688.6077	CATCH BASIN TYPE 1-L, SEE COB STD PLAN D-3	RECTANGULAR FRAME W/ SOLID COVER , SEE COB STD PLANS D-8 AND D-9	USE RISERS FOR ADDITIONAL DEPTH
CB22	213242.0584	1310608.5563	CATCH BASIN TYPE 2 72", SEE COB STD PLAN D-4	THROUGH-CURB INLET W/ VANED GRATE, SEE COB STD PLANS D-6 AND D-11	
CB23	213332.6609	1310677.9519	CATCH BASIN TYPE 1-L, SEE COB STD PLAN D-3	THROUGH-CURB INLET W/ VANED GRATE, SEE COB STD PLANS D-6 AND D-11	

EXISTING UTILITY POTHOLE DATA

POTHOLE ID NO.	UTILITY TYPE	SIZE	MATERIAL	GROUND EL.	TOP EL.	BOTTOM EL.	PAVEMENT DEPTH AND TYPE
1	GAS	20"	STEEL	82.43	77.35	75.68	16" ASPHALT
2	GAS	20"	STEEL	86.17	80.20	78.83	15" ASPHALT
3A	WATER	12"	DI	83.20	78.37	77.37	15" ASPHALT
3B	POWER	(3) 2"	PVC	83.20	80.20	80.03	15" ASPHALT
7	GAS	24"		85.19			SOIL OVER CONCRETE SLAB
8	WATER	8"	DI	84.72	79.55	78.89	
15	WATER	12"	DI	89.70	84.03	83.03	13" ASPHALT
16	WATER	36"	CONC	83.17	77.58	74.58	18" ASPHALT
21	GAS	2"	PE	82.79	79.71	79.54	
37	WATER	12"	DI	83.20	80.12	79.12	
38	WATER	36"	CONC	82.02	77.52	74.52	12" ASPHALT
43	WATER			82.31			14.5" ASPHALT
44	WATER		STEEL	82.82	72.99		16.5" ASPHALT
45	WATER	8"	DI	82.80	77.63	76.63	8" ASPHALT
50	WATER	12"	DI	83.06	78.56	77.56	11" ASPHALT
51	WATER	16"	DI	83.72	79.72	78.39	6.5" CONCRETE
55	WATER			83.51			7" CONCRETE
61	WATER	36"	CONC	83.24	76.74		15" ASPHALT
62	WATER	16"	DI	84.96	80.46	78.79	13" ASPHALT
63	WATER	36"	CONC	84.68	79.85	76.85	11" ASPHALT
64	GAS	20"	STEEL	86.02	80.10	78.44	10" ASPHALT
67	WATER	36"	CONC	82.80	77.88	74.88	15" ASPHALT
68	WATER	36"	CONC	83.60	77.93	74.93	15" ASPHALT
69A	STORM	63"X42"	CMP	83.95	78.37	74.37	
70				82.62			

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C9

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ABHISHEK MISHRA	8/10/21
DESIGNED BY	DATE
ABHISHEK MISHRA	8/10/21
DRAWN BY	DATE
JON W CAMMERMEYER	8/10/21
CHECKED BY	DATE

City of Bellevue
UTILITIES

FACTORIA BOULEVARD STORM
CONVEYANCE IMPROVEMENTS PROJECT
STORM AND SANITARY STRUCTURE
SCHEDULE AND POTHOLE DATA

SEC 27, T 25N, R 5E

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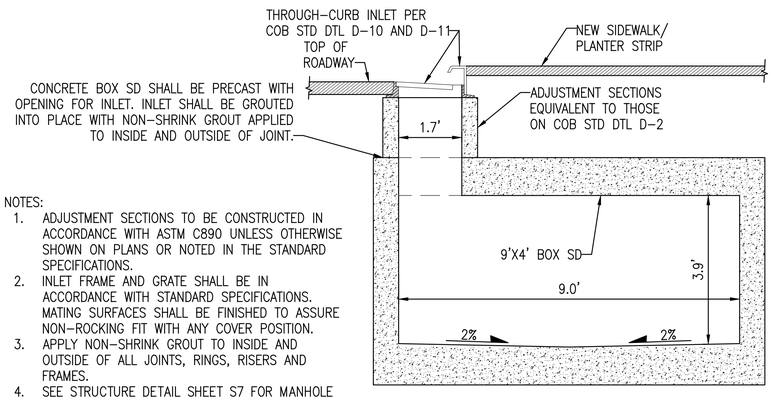
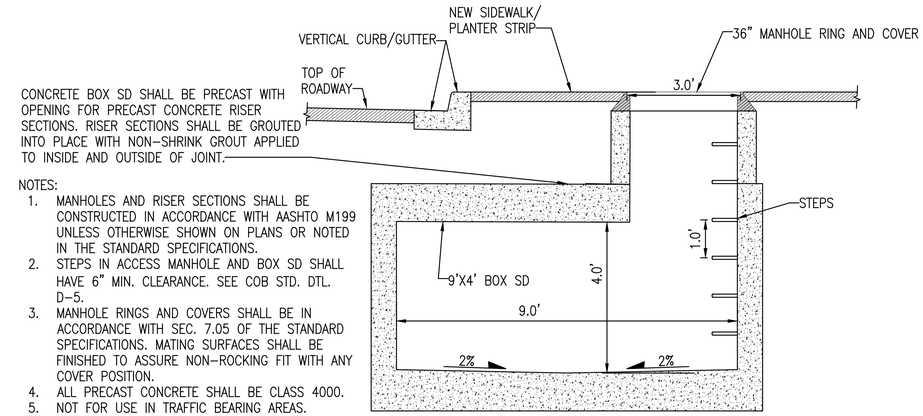


NOTES:
1. ADJUSTMENT SECTIONS TO BE CONSTRUCTED IN ACCORDANCE WITH ASTM C890 UNLESS OTHERWISE SHOWN ON PLANS OR NOTED IN THE STANDARD SPECIFICATIONS.
2. INLET FRAME AND GRATE SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATIONS. MATING SURFACES SHALL BE FINISHED TO ASSURE NON-ROCKING FIT WITH ANY COVER POSITION.
3. APPLY NON-SHRINK GROUT TO INSIDE AND OUTSIDE OF ALL JOINTS, RINGS, RISERS AND FRAMES.
4. SEE STRUCTURE DETAIL SHEET S7 FOR MANHOLE PENETRATION.
5. THE LOCATION OF RISER AND CB INLET VARIES ALONG TOP OF STRUCTURE. SEE DWG C9 FOR LOCATION COORDINATES. PROVIDE SHOP DRAWING DEMONSTRATING THAT INLET ALIGNS WITH CURB FOR COB APPROVAL.

DETAIL 1

THROUGH-CURB INLET ON BOX SD
SCALE: NTS



NOTES:
1. MANHOLES AND RISER SECTIONS SHALL BE CONSTRUCTED IN ACCORDANCE WITH AASHTO M199 UNLESS OTHERWISE SHOWN ON PLANS OR NOTED IN THE STANDARD SPECIFICATIONS.
2. STEPS IN ACCESS MANHOLE AND BOX SD SHALL HAVE 6" MIN. CLEARANCE. SEE COB STD. DTL. D-5.
3. MANHOLE RINGS AND COVERS SHALL BE IN ACCORDANCE WITH SEC. 7.05 OF THE STANDARD SPECIFICATIONS. MATING SURFACES SHALL BE FINISHED TO ASSURE NON-ROCKING FIT WITH ANY COVER POSITION.
4. ALL PRECAST CONCRETE SHALL BE CLASS 4000.
5. NOT FOR USE IN TRAFFIC BEARING AREAS.
6. APPLY NON-SHRINK GROUT TO INSIDE AND OUTSIDE OF ALL JOINTS, RISERS, RINGS AND FRAMES.
7. SEE STRUCTURE DETAIL SHEET S7 FOR MANHOLE PENETRATION.

DETAIL 2

ACCESS MANHOLE
SCALE: NTS

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JON W CAMMERMEYER	8/10/21
CHECKED BY	DATE

City of Bellevue
UTILITIES

FACTORIA BOULEVARD STORM CONVEYANCE IMPROVEMENTS PROJECT

STORM INLET AND STRUCTURE DETAILS

SEC 27, T 25N, R 5E

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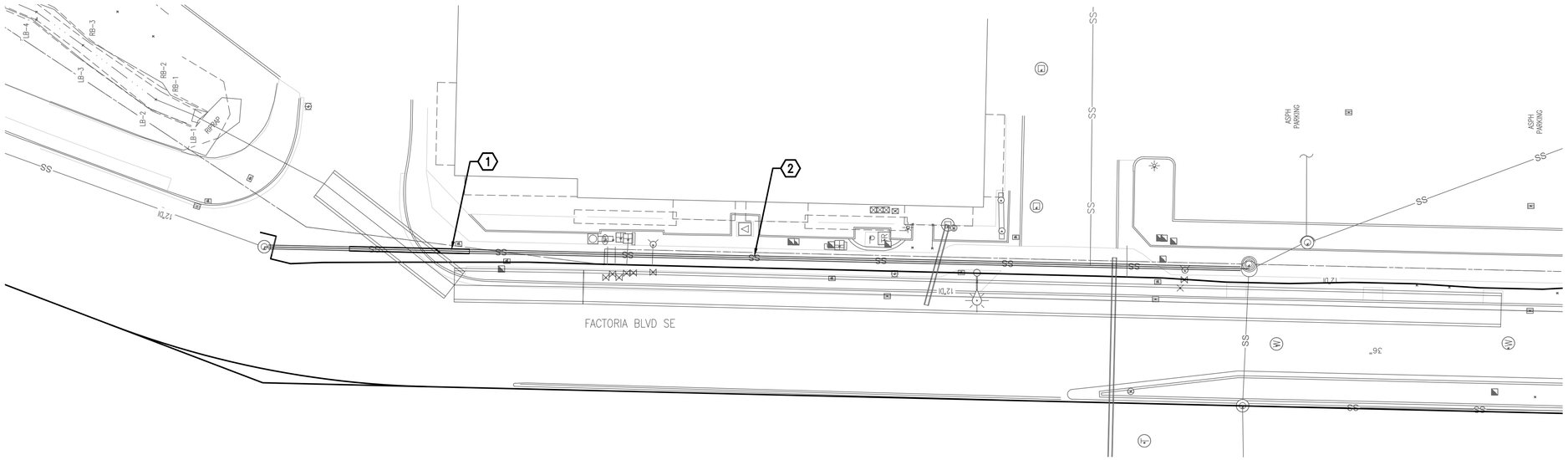
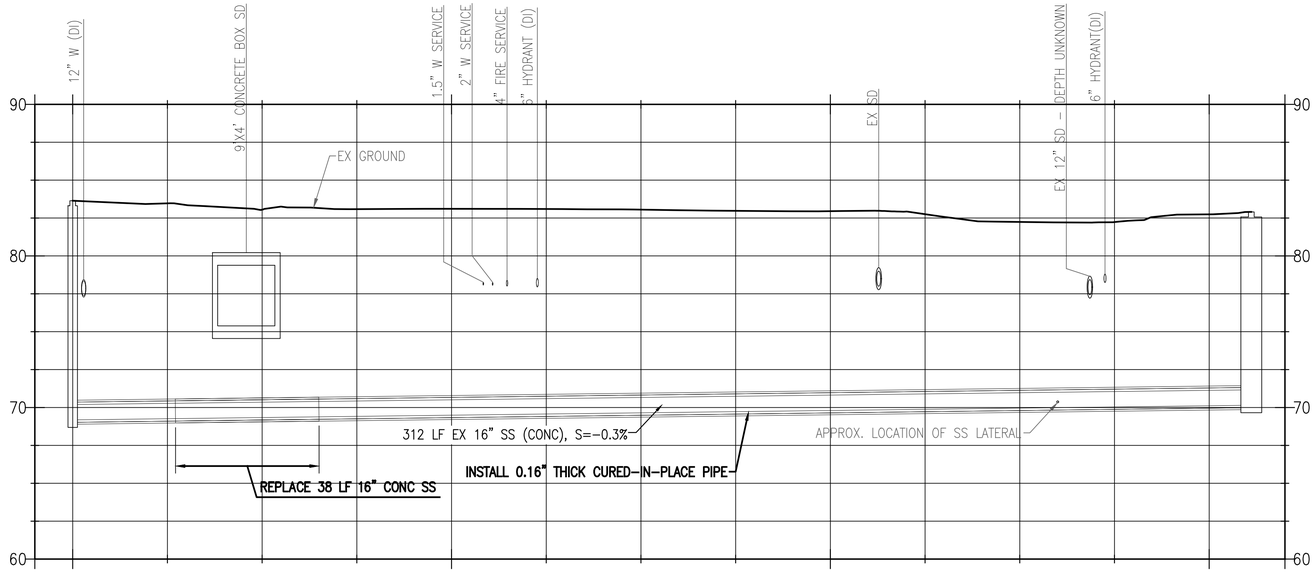


PLAN

SEWER SYSTEM IMPROVEMENTS
SCALE: 1"=20'



PROFILE

STA X+XX.X TO X+XX.X
HORIZ SCALE: 1"=20'
VERT SCALE: 1"=5'

GENERAL NOTES

CONSTRUCTION NOTES

1. REPLACE 16" SS PIPE (CONC)
2. INSTALL 0.16" THICK CURED-IN-PLACE PIPE

1"=20' 20 10 0 20 40 Scale Feet

1"=5' 5 2.5 0 5 10 Scale Feet

SS1

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DRAWN BY	DATE
DAN SHAFAR	8/10/21
CHECKED BY	DATE

City of Bellevue
UTILITIES

FACTORIA BOULEVARD STORM CONVEYANCE IMPROVEMENTS PROJECT

SANITARY SEWER PROFILE

SEC 27, T 25N, R 5E

SHEET 27 OF 93

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DETAIL 1

XXX
SCALE: X"=X'

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SS2

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DAN SHAFAR	8/10/21
CHECKED BY	DATE

City of Bellevue
UTILITIES

FACTORIA BOULEVARD STORM
CONVEYANCE IMPROVEMENTS PROJECT

SANITARY SEWER DETAILS

SEC 27, T 25N, R 5E

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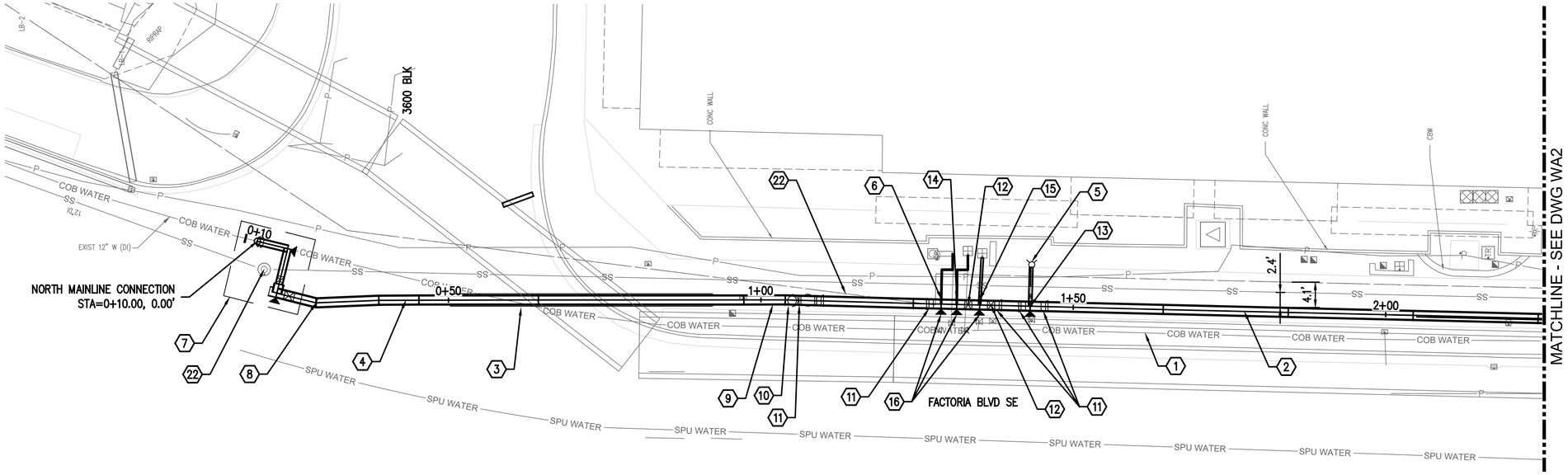
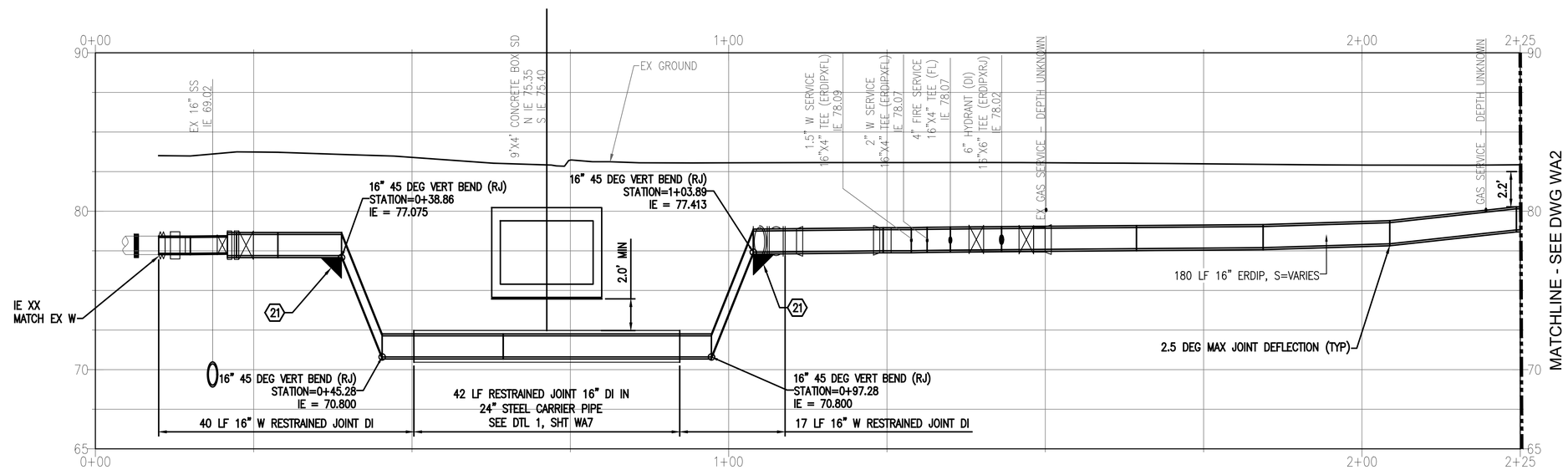


PLAN

WATER SYSTEM IMPROVEMENTS
SCALE: 1"=10'



PROFILE

STA 0+00.0 TO 2+25.0
HORIZ SCALE: 1"=10'
VERT SCALE: 1"=4'

GENERAL NOTES

1. SEE GENERAL WATER NOTES ON DWG G2.
2. CONTRACTOR IS RESPONSIBLE FOR LOCATING AND POTHOLING ALL UTILITIES NOT PREVIOUSLY POTHOLED WITHIN EXCAVATION LIMITS, WHICH SHALL BE INCIDENTAL TO PIPE BID ITEMS. WHERE ADDITIONAL SITE SPECIFIC POTHOLING IS REQUIRED BY THE PLANS OR REQUESTED BY ENGINEER, IT SHALL BE PAID FOR BY "SITE SPECIFIC POTHOLING".
3. SEE DWG ST8 FOR UTILITY POTHOLE DATA.
4. SEE DWG ST8 FOR STORM STRUCTURE DATA.
5. STATION/OFFSET LOCATION CALLOUTS AND RIM ELEVATIONS PROVIDED ARE AT THE CENTER OF THE DRAINAGE STRUCTURE UNLESS OTHERWISE NOTED.
6. LIMIT DISTURBANCE TO ONLY THOSE AREAS NECESSARY FOR CONSTRUCTING THE PROPOSED IMPROVEMENTS.
7. EXISTING TELECOMM AND CABLE LINES (FIBER OPTIC, COPPER, AND CONDUIT) NOT SHOWN IN PROFILES. TO BE RELOCATED BY OTHERS PRIOR TO CONSTRUCTION.

CONSTRUCTION NOTES

1. REMOVE EXIST 12" WATER MAIN
2. INSTALL 16" ERDIP WATER MAIN, SEE COB STD DTL W-6 FOR TRENCHING AND BACKFILL
3. ENCASE 16" DIA WATER (DI) WITH 24" STEEL CASING UNDER NEW STORM DRAIN. SEE DTL 1, SHT WA7
4. INSTALL 16" RESTRAINED JOINT DI WATER MAIN
5. REPLACE FIRE HYDRANT ASSEMBLY SEE DTL 3, SHT WA7
6. REPLACE 1.5" COPPER TUBING, TYPE K, SERVICE CONNECTION UP TO EXIST METER PER COB STD DTL W-26 W/ 16"X4" TEE (ERDIPXFL)
7. NORTH WATER CONNECTION SEE DTL 1, SHT WA5
8. INSTALL 16" 11.25 DEG HORIZ BEND (RJ)
9. INSTALL 16" BALL JOINT (FL)
10. INSTALL 16" DIA EXPANSION JOINT (FL)
11. INSTALL 16" ERDIP ADAPTER (FLXBELL)
12. INSTALL 16" BUTTERFLY VALVE (FL), SEE COB STD DTL W-11
13. INSTALL 16"X6" TEE (ERDIPXRJ)
14. REPLACE 2" COPPER TUBING, TYPE K, SERVICE CONNECTION UP TO EXIST METER PER COB STD DTL W-30 W/ 16"X4" TEE (ERDIPXFL)
15. REPLACE 4" (DI) FIRE CONNECTION UP TO EXIST PIV W/ 16"X4" TEE (FL)
    (1) 4" GATE VALVE (FL)
    (2) 8" GATE VALVES (FL)
16. INSTALL HORIZONTAL THRUST BLOCK SEE DTL 2, SHT WA6
21. INSTALL VERTICAL THRUST BLOCK SEE DTL 2, SHT WA7
22. PROTECT EXIST UTILITIES AND STRUCTURES IN PLACE

1"=10' 10 5 0 10 20 Scale Feet

1"=4' 4 2 0 4 8 Scale Feet

WA1

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DESIGN MANAGER DATE
PROJECT MANAGER DATE

SARAH MERRILL	8/10/21
DESIGNED BY	DATE
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DRAWN BY	DATE
DAN SHAFAR	8/10/21
CHECKED BY	DATE

City of Bellevue
UTILITIES

FACTORIA BOULEVARD STORM CONVEYANCE IMPROVEMENTS PROJECT

WATER MAIN PLAN AND PROFILE

SEC 27, T 25N, R 5E

SHEET 29 OF 93

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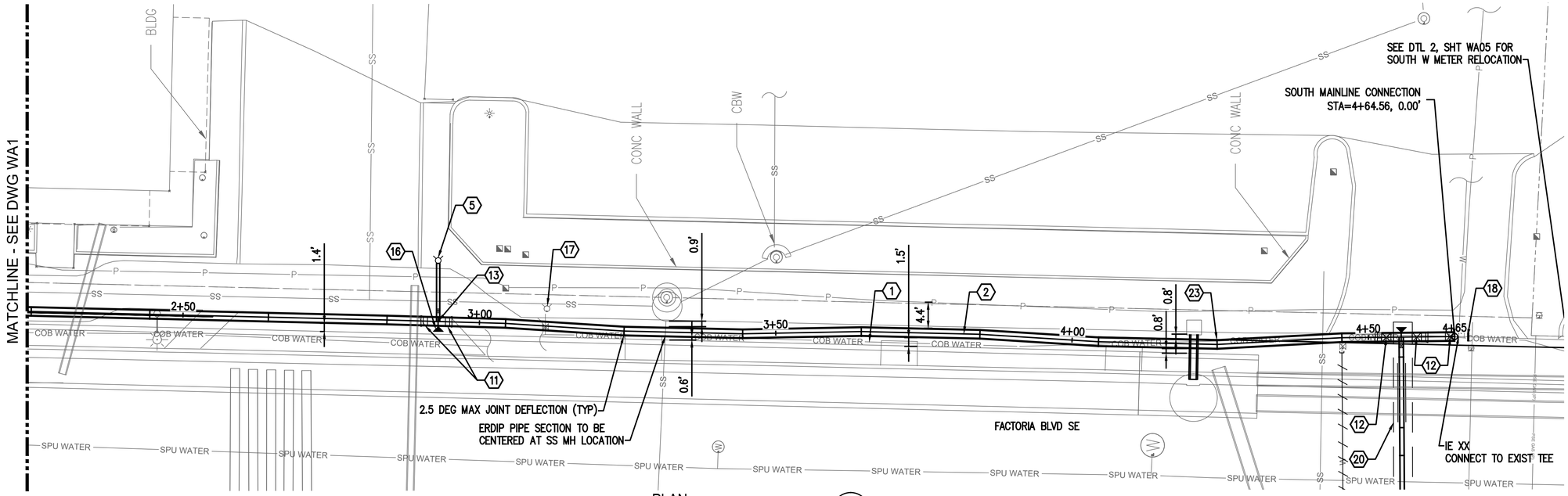
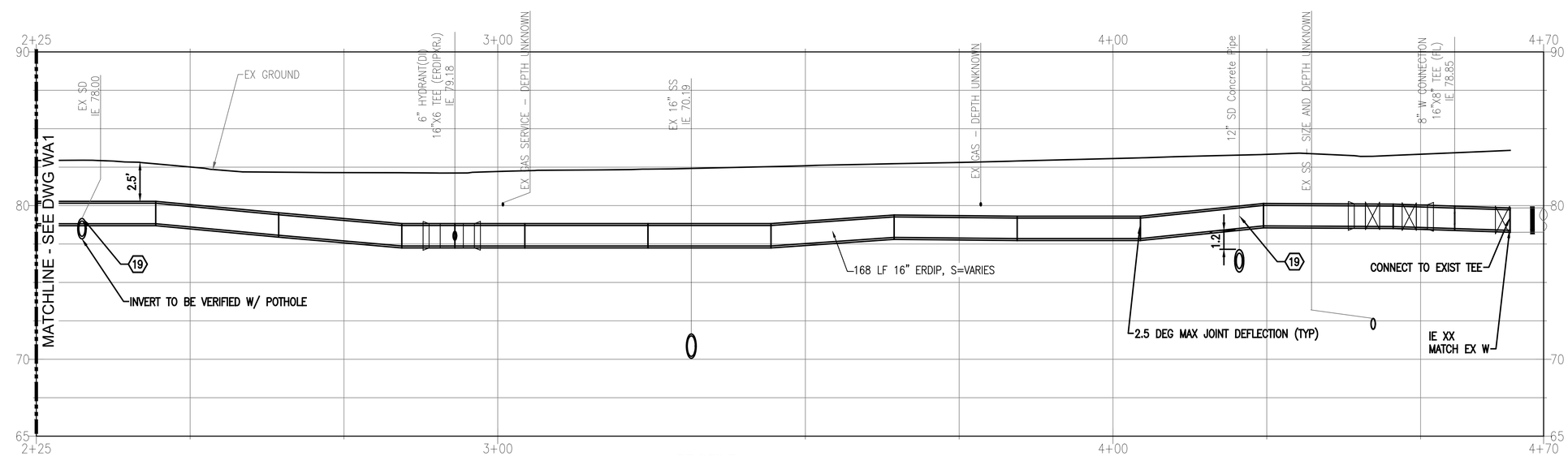


PLAN

WATER SYSTEM IMPROVEMENTS
SCALE: 1"=10'



PROFILE

STA 2+25.0 TO 4+64.5
HORIZ SCALE: 1"=10'
VERT SCALE: 1"=4'

GENERAL NOTES

1. SEE GENERAL WATER NOTES ON DWG G2.
2. CONTRACTOR IS RESPONSIBLE FOR LOCATING AND POTHOLING ALL UTILITIES NOT PREVIOUSLY POTHOLED WITHIN EXCAVATION LIMITS, WHICH SHALL BE INCIDENTAL TO PIPE BID ITEMS. WHERE ADDITIONAL SITE SPECIFIC POTHOLING IS REQUIRED BY THE PLANS OR REQUESTED BY ENGINEER, IT SHALL BE PAID FOR BY "SITE SPECIFIC POTHOLING".
3. SEE DWG ST8 FOR UTILITY POTHOLE DATA.
4. SEE DWG ST8 FOR STORM STRUCTURE DATA.
5. STATION/OFFSET LOCATION CALLOUTS AND RIM ELEVATIONS PROVIDED ARE AT THE CENTER OF THE DRAINAGE STRUCTURE UNLESS OTHERWISE NOTED.
6. LIMIT DISTURBANCE TO ONLY THOSE AREAS NECESSARY FOR CONSTRUCTING THE PROPOSED IMPROVEMENTS.
7. EXISTING TELECOMM AND CABLE LINES (FIBER OPTIC, COPPER, AND CONDUIT) NOT SHOWN IN PROFILES. TO BE RELOCATED BY OTHERS PRIOR TO CONSTRUCTION.

CONSTRUCTION NOTES

- (1) REMOVE EXIST 12" WATER MAIN
- (2) INSTALL 16" ERDIP WATER MAIN, SEE COB STD DTL W-6 FOR TRENCHING AND BACKFILL
- (5) REPLACE FIRE HYDRANT ASSEMBLY SEE DTL 3, SHT WA7
- (11) INSTALL 16" ERDIP ADAPTER (FLXBELL)
- (12) INSTALL 16" BUTTERFLY VALVE (FL), SEE COB STD DTL W-11
- (13) INSTALL 16"X6" TEE (ERDIPXRJ)
- (16) INSTALL HORIZONTAL THRUST BLOCK SEE DTL 2, SHT WA6
- (17) REMOVE FIRE HYDRANT ASSEMBLY
- (18) INSTALL THRUST COLLAR SEE DTL 1, SHT WA6
- (19) INSTALL ETHAFOAM BETWEEN W AND SD PIPES
- (20) 8" W MAIN REPLACEMENT DTL SEE DTL 1, SHT WA3
- (23) INSTALL 16" DIA 5.625 DEG BEND (ERDIP)

1"=10' 10 5 0 10 20 Scale Feet

1"=4' 4 2 0 4 8 Scale Feet

WA2

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DAN SHAFAR	8/10/21
CHECKED BY	DATE

City of Bellevue
UTILITIES

FACTORIA BOULEVARD STORM CONVEYANCE IMPROVEMENTS PROJECT

WATER MAIN PLAN AND PROFILE

SEC 27, T 25N, R 5E

SHEET 30 OF 93

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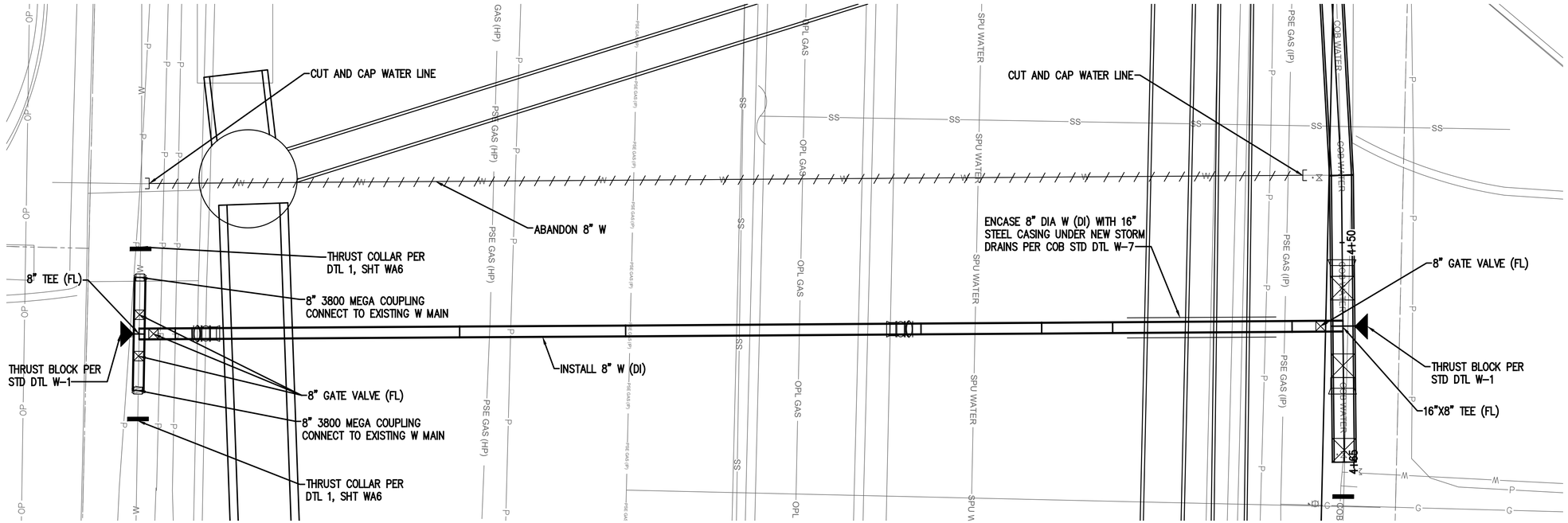
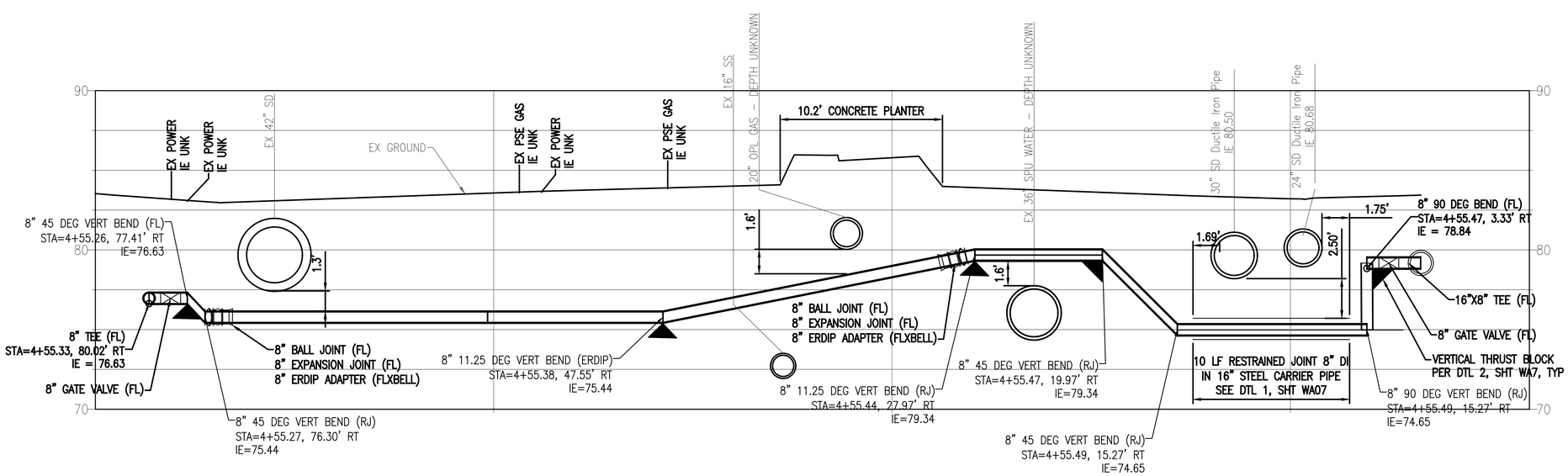


DETAIL 1 PLAN

8" WATER CONNECTION (W)
SCALE: 1"=4'



DETAIL 1 PROFILE

STA 4+55.5 TO 4+55.3, 80.0' RT
HORIZ SCALE: 1"=4'
VERT SCALE: 1"=4'

1"=4' 4 2 0 4 8 Scale Feet

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WA3

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SARAH MERRILL	8/10/21
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FACTORIA BOULEVARD STORM CONVEYANCE IMPROVEMENTS PROJECT

WATER MAIN PLAN AND PROFILE

SEC 27, T 25N, R 5E

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DETAIL 1

TEMPORARY MAIN CONNECTION
SCALE: 1"=XX'

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FACTORIA BOULEVARD STORM
CONVEYANCE IMPROVEMENTS PROJECT

TEMPORARY WATER MAIN CONNECTION

SEC 27, T 25N, R 5E

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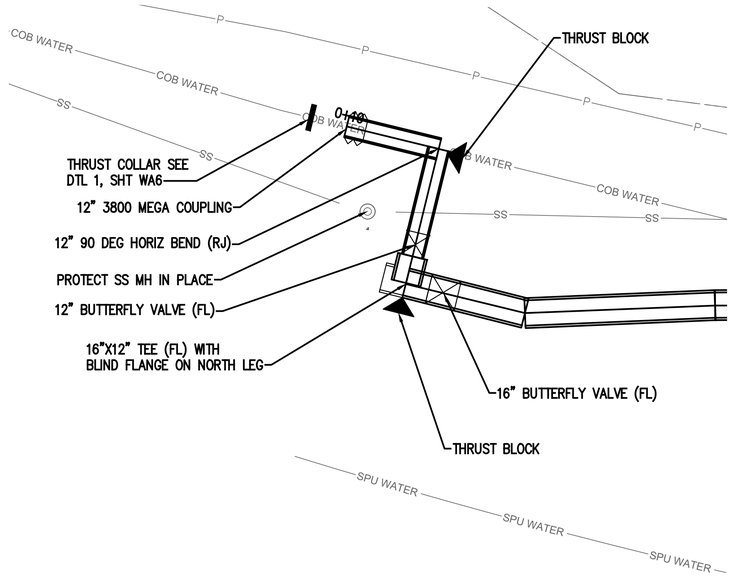
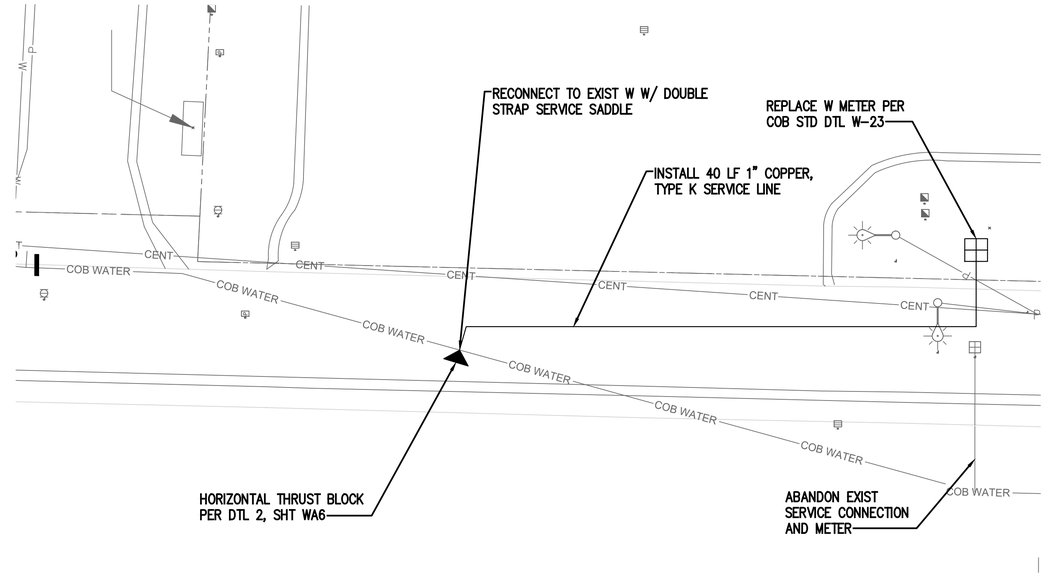


DETAIL 1
NORTH WATER CONNECTION
SCALE: 1"=4'



DETAIL 2
SOUTH WATER METER RELOCATION
SCALE: 1"=5'

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WA5

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1301 Fifth Avenue
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Seattle, WA 98101-2677
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Approved By

DESIGN MANAGER DATE

PROJECT MANAGER DATE

SARAH MERRILL	8/10/21
DESIGNED BY	DATE
SARAH MERRILL	8/10/21
DRAWN BY	DATE
DAN SHAFAR	8/10/21
CHECKED BY	DATE

City of Bellevue
UTILITIES

FACTORIA BOULEVARD STORM CONVEYANCE IMPROVEMENTS PROJECT

WATER MAIN & SERVICE DETAILS

SEC 27, T 25N, R 5E

SHEET 33 OF 93

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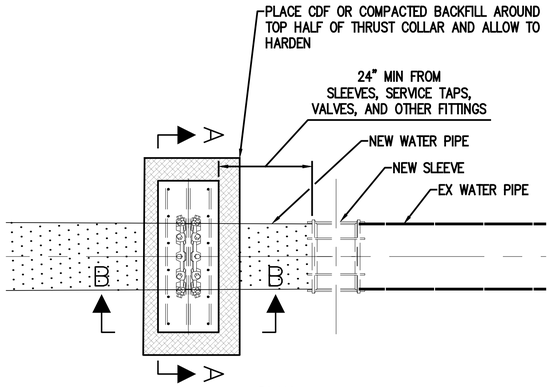
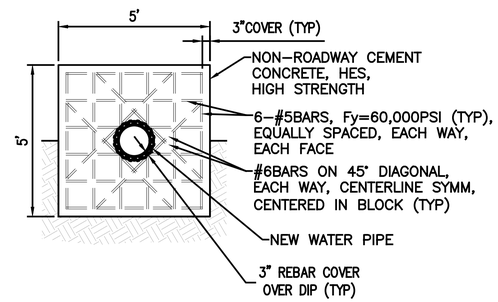


PLAN
NTS



DETAIL
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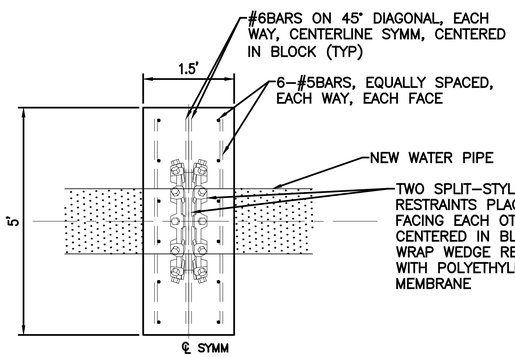
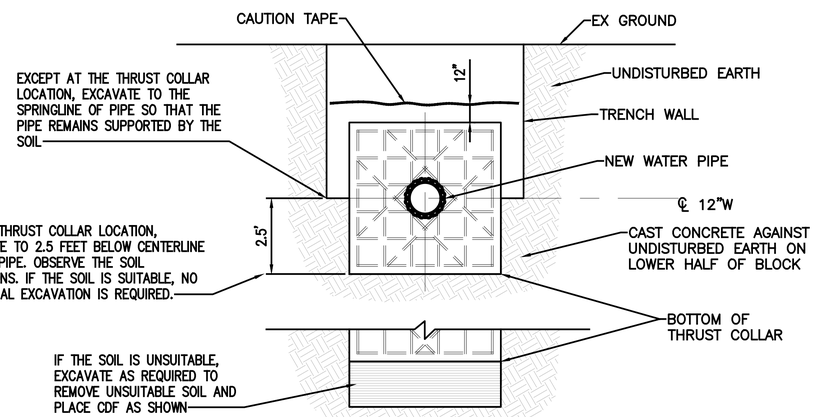


ELEVATION B-B
NTS



ELEVATION A-A
NTS

CONSTRUCTION SEQUENCING NOTE
THRUST COLLARS MUST BE CONSTRUCTED BEFORE THE VALVES ARE OPERATED (CLOSED).

DETAIL 1
THRUST COLLAR
SCALE: NTS

DETAIL 2
HORIZONTAL THRUST BLOCK
SCALE: 1"=X'

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City of Bellevue
UTILITIES

FACTORIA BOULEVARD STORM CONVEYANCE IMPROVEMENTS PROJECT

WATER MAIN & SERVICE DETAILS

SEC 27, T 25N, R 5E

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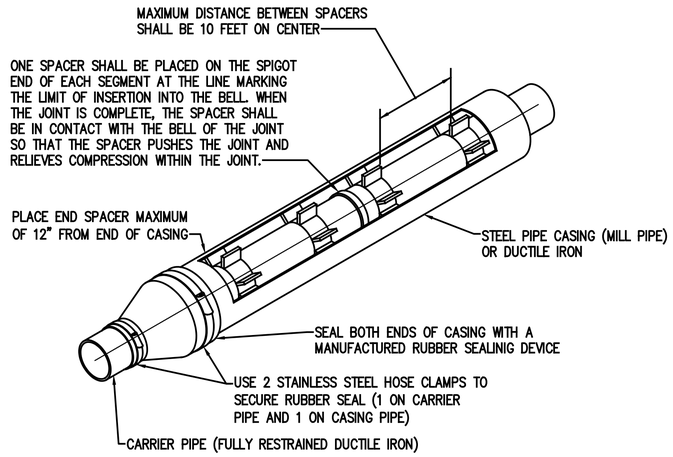


CASING SPACERS (SEE APPROVED MATERIALS LIST)

CARRIER PIPE DIAMETER	3"	4"	6"	8"	10"	12"	16"
CASING DIAMETER (PUSH-ON JOINT CARRIER PIPE)	8"	10"	12"	14"	16"	20"	–
CASING DIAMETER (MJ/MEGALAUG JOINT CARRIER PIPE)	12"	14"	16"	18"	20"	22"	24"
STEEL CASING THICKNESS	0.25"	0.25"	0.25"	0.25"	0.25"	0.25"	0.25"
SPACER BAND WIDTH	8"	8"	8"	8"	8"	8"	8"

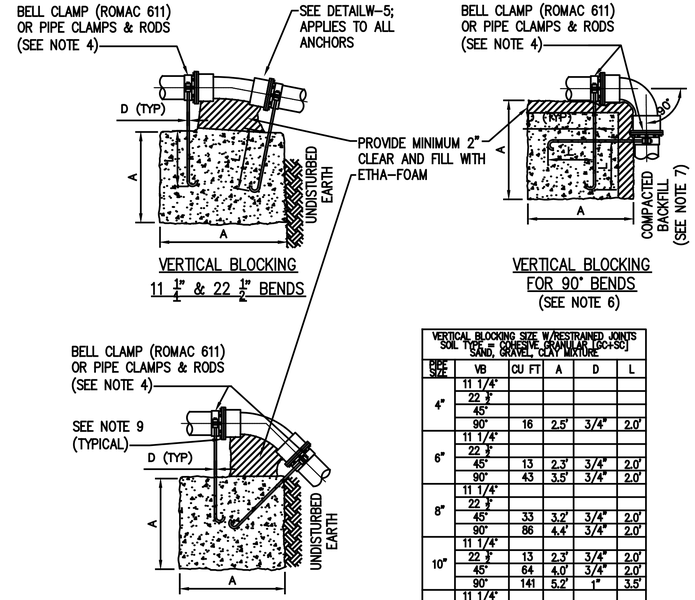
* 24" FOR DUCTILE IRON CASING

NOTES

1. CASING SPACERS SHALL BE "CENTER POSITIONING" TYPE.
2. MINIMUM RUNNER WIDTH SHALL BE 2" INCHES.
3. RUNNER HEIGHT SHALL BE SIZED TO PROVIDE:
   3.A. MINIMUM 0.75" BETWEEN CARRIER PIPE BELL AND CASING PIPE WALL AT ALL TIMES
   3.B. MINIMUM 1" CLEARANCE BETWEEN RUNNERS AND TOP OF CASING WALL TO PREVENT JAMMING DURING INSTALLATION
4. STEEL CASING DIAMETERS ARE "OUTSIDE DIAMETER" FOR 16" AND LARGER.
5. SPACER BAND WIDTH SHALL BE 12" FOR CARRIER PIPES THAT ARE 36" DIAMETER OR GREATOR.
6. CASING FOR SERVICE LINES 2" OR LESS IN DIAMETER PER WATER STANDARDS.
7. FOR STEEL CASING, PROVIDE SHOP-APPLIED ANTI-CORROSIVE COATING ON CASING EXTERIOR CONFORMING TO AWWA C210. MINIMUM COATING THICKNESS 16 MILS DFT (DO NOT EXCEED MANUFACTURER'S MAXIMUM THICKNESS). PRODUCT SHALL BE EQUAL TO TNEMEC HI-BUILD TNEME-TAR SERIES 46H-413.

DETAIL 1

CASING INSTALLATION
SCALE: NTS



VERTICAL BLOCKING SIZE W/RESTRAINED JOINTS
SOIL TYPE - COHESIVE GRANULAR [GC+SC] SAND, GRAVEL, CLAY MIXTURE

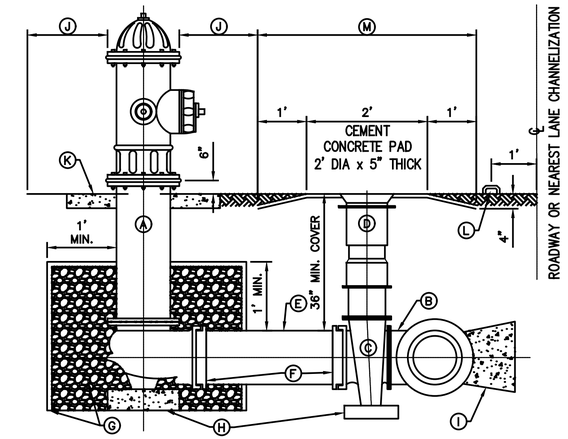
PIPE SIZE	VB	CU FT	A	D	L
4"	11 1/4°				
	22 1/2°				
	45°				
	90°	16	2.5'	3/4"	2.0'
6"	11 1/4°				
	22 1/2°				
	45°	13	2.3'	3/4"	2.0'
	90°	43	3.5'	3/4"	2.0'
8"	11 1/4°				
	22 1/2°				
	45°	33	3.2'	3/4"	2.0'
	90°	86	4.4'	3/4"	2.0'
10"	11 1/4°				
	22 1/2°	13	2.3'	3/4"	2.0'
	45°	64	4.0'	3/4"	2.0'
	90°	141	5.2'	1"	3.5'
12"	11 1/4°				
	22 1/2°	20	2.7'	3/4"	2.0'
	45°	111	4.8'	3/4"	2.0'
	90°	206	5.9'	1 1/8"	4.0'
16"	45°				

NOTES

1. NO CHANGE IN PIPE DIRECTION OR DIAMETER SHALL OCCUR WITHIN 36 FEET OF THE VERTICAL BEND, TEES, REDUCERS, ETC. BEYOND THE 36 LIMIT SHALL RESTRAINED BY STANDARD CONCRETE BLOCKING PER STD DTL W1 & W-3.
2. CONCRETE BLOCKING BASED ON:
   2.1. 36 FEET OF PIPE RESTRAINED EACH SIDE OF BEND.
   2.2. THRUST BLOCK AREAS BASED ON SAFE BEARING LOAD OF 1,000 PSF.
   2.3. 2,500 PSI CONCRETE.
   2.4. MINIMUM 3 FEET OF COVER.
   2.5. PIPE THRUST BASED ON 200 PSI PRESSURE.
   2.6. PIPE INCASED IN POLYETHYLENE.
   2.7. VERTICAL BLOCK SIZE BASED ON CONCRETE WEIGHT OF 150 POUNDS PER CUBIC FEET.
   2.8. TRENCH CONDITIONS BASED ON TYPE 2, FLAT BOTTOM TRENCH WITH LIGHTLY CONSOLIDATED BACKFILL, PER ANSI/AWWA C150/A21.50.
   2.9. FACTOR OF SAFETY IS 1.5.
   2.10. SOIL FRICTIONAL RESISTANCE BASED ON COHESIVE GRANULAR SOIL TYPE (GC+SC) SAND, GRAVEL, CLAY MIXTURE.
3. BLOCKING DESIGN MUST BE ADJUSTED FOR OTHER SIZE PIPE, PRESSURES AND SOIL CONDITION.
4. PIPE CLAMP (HOT DIPPED GALVANIZED) RODS (STAINLESS STEEL ALL-THREAD 316SS)
5. LINE SHALL NOT BE PRESSURIZED UNTIL ALL TRENCHING WITHIN 100 FEET OF VERTICAL BEND IS BACKFILLED AND COMPACTED TO A MINIMUM COVER OF 3 FEET OVER PIPE.
6. 90 DEGREE VERTICAL BENDS SHALL ONLY BE INSTALLED WHERE GIVEN PRIOR APPROVAL BY THE UTILITY.
7. BACKFILL TRENCH BEYOND 90° VERTICAL BLOCK WITH CRUSHED SURFACING TOP COURSE MATERIAL COMPACTED TO 95% MAXIMUM DENSITY. CRUSHED BACKFILL SHALL EXTEND 20 FEET BEYOND BLOCK OR TO FIRM BEARING TRENCH WALL, WHICHEVER IS LESS.
8. LEAVE BLOCK OPEN OR SHEETED 24 HOURS MINIMUM.
9. JOINT RESTRAINT SEE APPROVED MATERIALS LIST.

DETAIL 2

VERTICAL THRUST BLOCK
SCALE: NTS



NOTES

A. 1-5 ¼" M.V.O. HYDRANT WITH 2-2 ½" N.S.T. AND 1-4" PUMPER PORTS, CITY OF SEATTLE STANDARD THREAD-M.J. INLET, WITH LUGS, BRASS TO BRASS SUB-SEAT WITH FL HYDRANT SHOE. FIRE HYDRANT TO BE PAINTED WITH TWO COATS OF "SAFETY YELLOW" RUSTOLEUM, KRYLON, SHERWIN WILLIAMS, OR EQUAL. PUMPER PORT TO FACE STREET, OR AS DIRECTED BY THE FIRE DEPARTMENT.

B. 6" FLANGE OUTLET ON CAST OR DUCTILE IRON TEE.

C. 1-AUXILIARY GATE VALVE: 6" AWWA C509, RESILIENT SEAT, FLxFL WITH LUGS.

D. 1-TWO-PIECE CAST IRON VALVE BOX EQUAL TO RICH SEATTLE TYPE #045 WITH RECESSED HANDLE LID.

E. 1-6 DUCTILE IRON CLASS 52 CEMENT-LINED PIPE, LENGTH TO FIT. WHERE MORE THAN ONE LENGTH OF PIPE IS REQUIRED, CONNECT PIPES WITH RJ SLEEVE.

F. CONNECT WITH FLxRJ ADAPTER.

G. ½ YARD WASHED DRAIN ROCK (3" TO ⅜"), MIN. 1' ABOVE BOOT FLANGE PACE 8 MIL POLYETHYLENE FILM AROUND TOP AND SIDES OF GRAVEL DO NOT BLOCK DRAIN HOLES.

H. 16"x8"x4" MIN. SIZE CONCRETE BLOCK UNDER HYDRANT AND VALVE.

I. CONCRETE BLOCKING PER DETAIL X, SHEET WAOX.

J. 3' MIN. RADIUS OF LEVEL GROUND AROUND OUTSIDE OF HYDRANT.

K. IN UNIMPROVED AREAS INSTALL 2' RADIUS BY 4" THICK CONCRETE PAD. PAD IS NOT REQUIRED IN AREAS WITH MOWED TURF, BEAUTY BARK, CRUSHED ROCK SURFACE, CONCRETE, OR ASPHALT.

L. INSTALL A BLUE, RAISED TYPE 2 PAVEMENT MARKER ON THE SAME SIDE OF ROAD AS THE HYDRANT, ONE FOOT OFF THE ROADWAY CENTERLINE, OR NEAREST LANE CHANNELIZATION.

M. RESTORE SIDEWALK PER COB STD DTL SW-110-1.

DETAIL 3

FIRE HYDRANT ASSEMBLY
SCALE: NTS

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PROJECT MANAGER DATE

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DAN SHAFAR	8/10/21
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City of Bellevue
UTILITIES

FACTORIA BOULEVARD STORM CONVEYANCE IMPROVEMENTS PROJECT

WATER MAIN & SERVICE DETAILS

SEC 27, T 25N, R 5E

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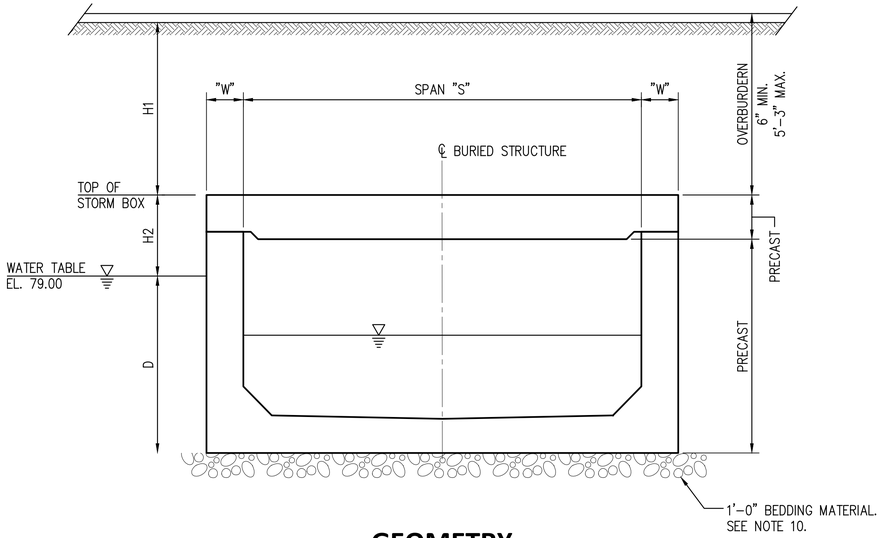
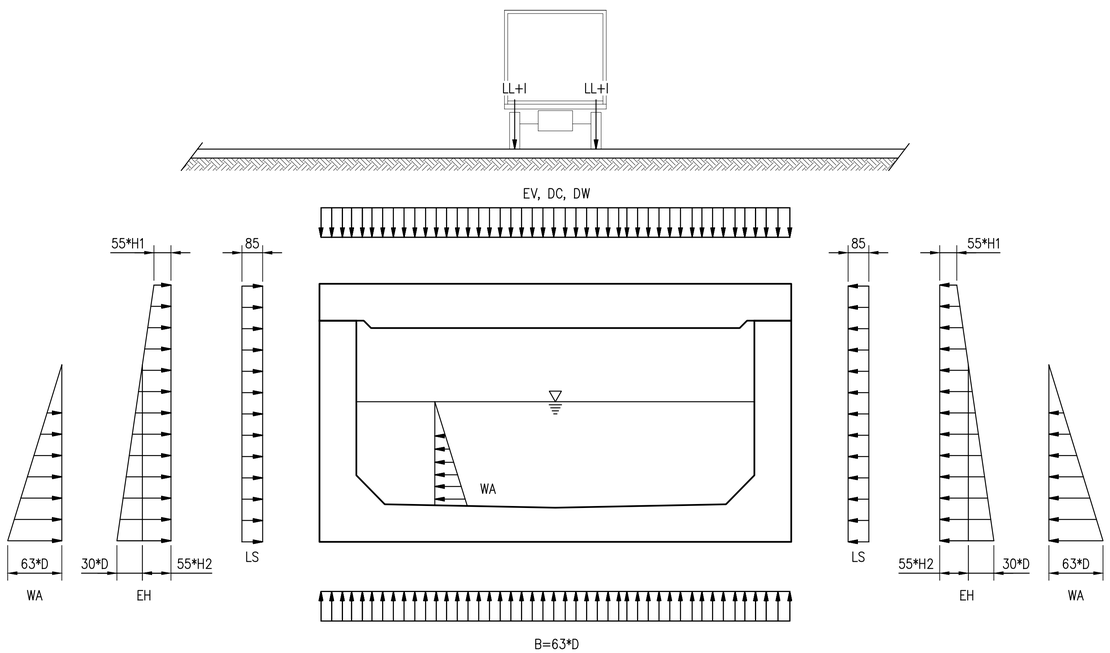


GEOMETRY

SEE SHEET S2



LOADING DIAGRAMS

ALL LOADS IN PSF UNITS

GENERAL NOTES

1. ALL MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR ROAD, BRIDGE, AND MUNICIPAL CONSTRUCTION DATED 2021, AND AMENDMENTS.
2. THE STORM BOX TO BE DESIGNED IN ACCORDANCE WITH THE REQUIREMENTS OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS 9TH EDITION 2020.
3. THE STORM BOX SHALL BE DESIGNED FOR SCOUR PER HYDRAULIC REPORT.
4. THE PRECAST STORM BOX SHALL BE DESIGNED AS A PIN CONNECTION BETWEEN TOP AND BOTTOM UNITS. THE CONNECTION BETWEEN TOP AND BOTTOM UNITS SHALL BE DESIGNED PER LOADING DEFINED BELOW.
5. THE PRECAST CONCRETE SHALL BE CLASS 5000, 6000, OR 7000 SELF CONSOLIDATING CONCRETE (SCC). OTHER CONCRETE SHALL BE CLASS 4000.
6. THE FABRICATOR SHALL DESIGN FOR LIFTING AND TRANSPORTING FOR SUBMITTAL PER STD. SPEC. SECTION 7-02.3(6)A2.
7. ALL STEEL PLATES AND SHAPES SHALL BE ASTM A36 OR ASTM A 992. ALL BOLTS, NUTS AND WASHERS (UNLESS NOTED OTHERWISE) SHALL BE ASTM A 307 AND COMPLY WITH STD. SPEC. SECT. 9-16.3(4), AND RESIN BONDED ANCHORS SHALL BE ASTM A 193 GRADE B7, OR ASTM A 449. ALL STEEL PLATES SHALL BE GALVANIZED IN ACCORDANCE WITH AASHTO M 111 AFTER FABRICATION. BOLTS AND HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH AASHTO M 232.
8. UNLESS OTHERWISE SHOWN IN THE PLANS, CONCRETE COVER MEASURED FROM THE FACE OF CONCRETE TO THE FACE OF ANY REINFORCING STEEL SHALL BE 2" AT THE TOP OF THE ROOF DECK, 1½" AT THE BOTTOM OF THE ROOF DECK, 3" AT THE BOTTOM OF FOOTINGS, AND 2" AT ALL OTHER LOCATIONS.
9. THE BACKFILL ON BOTH SIDES OF THE STORM BOX TO BE PLACED IN SEQUENCE AND COMPACTED IN ACCORDANCE TO THE STD. SPEC. 2-09.3(1)E. THE MAXIMUM FIELD HEIGHT DIFFERENCE MEASURED FROM SIDE TO SIDE NO MORE 2'-0".
10. BEDDING MATERIAL SHALL BE PERMEABLE BALLAST CONFORMING TO STD. SPEC. SECTION 9-03.9(2) OR CRUSHED SURFACE BASE COURSE CONFORMING TO 9-03.9(3) W/ ADDED RESTRICTION OF <5% PASSING #200 SIEVE.

LOAD COMBINATIONS

THE BURIED STRUCTURES TO BE DESIGNED WITH THE LIMIT STATES SHOWN BELOW:

STRENGTH I = γp DC + γp DW+ 1.35/0.90 EH + 1.35/0.90 EV + 1.50/0.75 ES +1.75 LS + 1.75 (L+I) + 1.00 WA + 1.00 B + 0.50/1.20 TU

SERVICE = 1.00 DC + 1.00 DW + 1.00 EH + 1.00 EV + 1.00 ES + 1.00 LS + 1.00 (L+I) + 1.00 WA + 1.00 B +1.00/1.20 TU

DC = WEIGHT OF SUPERSTRUCTURE	γp FOR DC = 1.25 MAX./0.90 MIN.
EH = EARTH PRESSURE *	γp FOR DW = 1.50 MAX./0.65 MIN.
EV = VERTICAL EARTH PRESSURE	ϕ = 0.90 FOR FLEXURE (CIP)
LL + I = LIVE LOAD PLUS IMPACT	ϕ = 0.85 FOR SHEAR (CIP)
LS = LIVE LOAD SURCHARGE	
WA = HYDRO-STATIC PRESSURE	ϕ = 1.00 FOR FLEXURE (PRECAST)
B = BUOYANCY	ϕ = 0.90 FOR SHEAR (PRECAST)

* Ko SHOULD BE USED FOR ALL LIMIT STATES, UNLESS OTHERWISE NOTED BY GEOTECHNICAL ENGINEER.

NOTE: EXTREME I LIMIT STATE FOR EARTHQUAKE LOADING NEED NOT BE CONSIDERED PER WSDOT BDM SECTION 8.3.3H

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YELIZ FIRAT	8/10/21
CHECKED BY	DATE

City of Bellevue
UTILITIES

FACTORIA BOULEVARD STORM CONVEYANCE IMPROVEMENTS PROJECT

GENERAL STRUCTURAL NOTES

SEC 27, T 25N, R 5E

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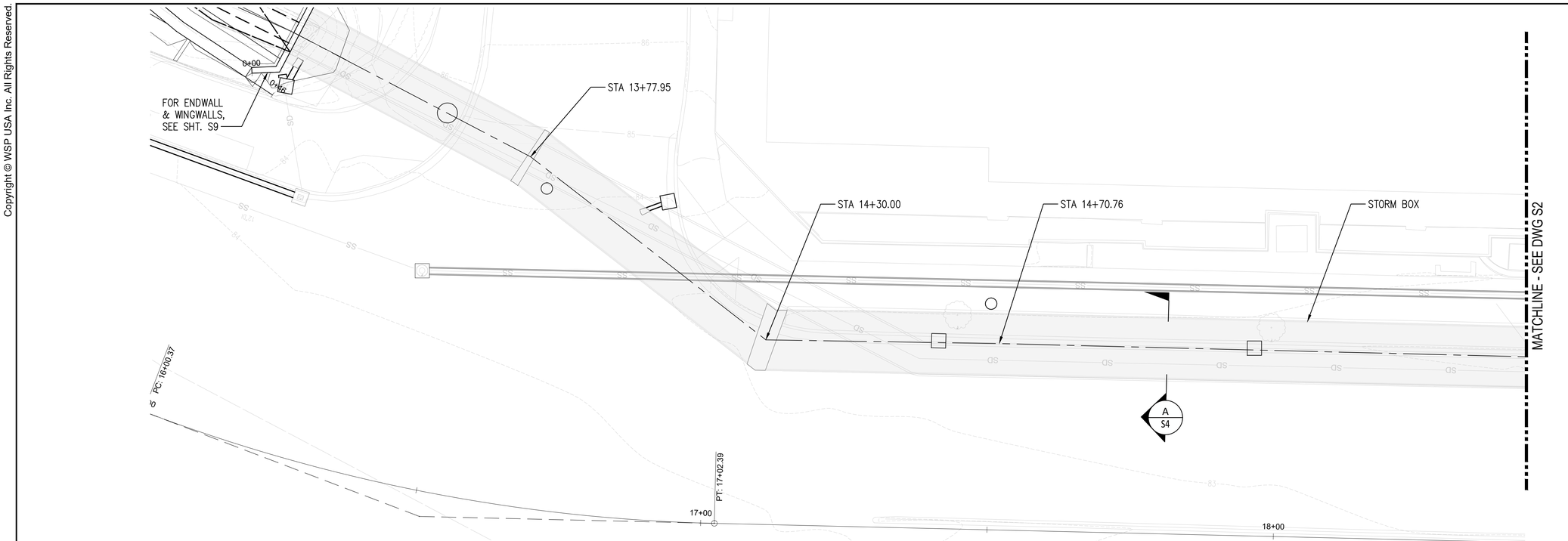
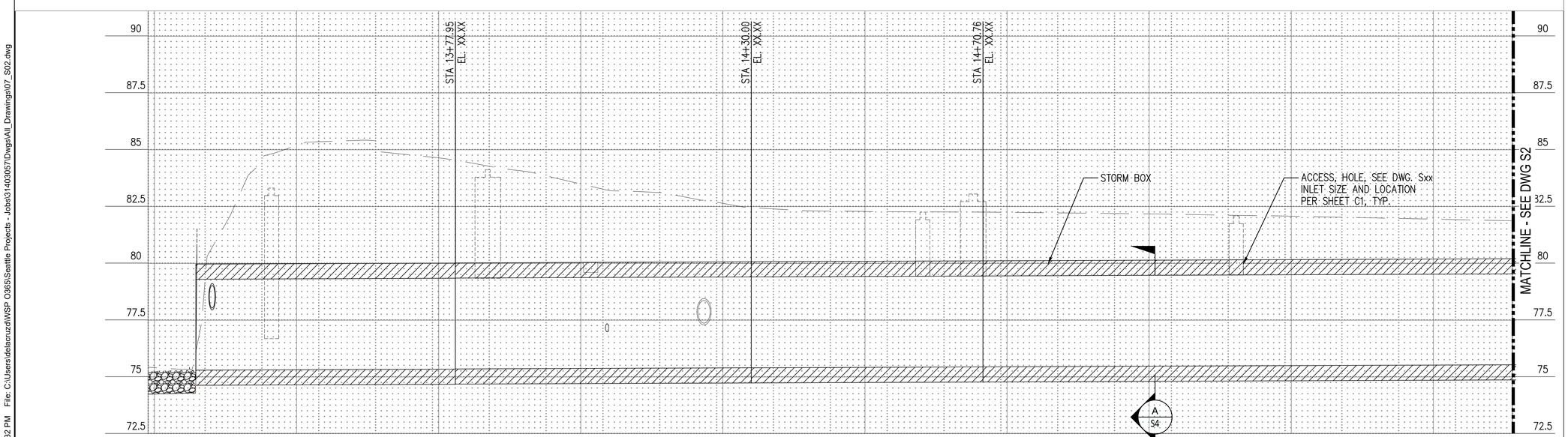


PLAN

STORM SYSTEM IMPROVEMENTS
SCALE: 1"=10'



PROFILE

STA 3+06.8 TO 5+45.8
HORIZ SCALE: 1"=10'
VERT SCALE: 1"=2.5'

GENERAL NOTES

1. LOCATIONS OF PENETRATIONS SHALL BE FIELD VERIFIED BY THE CONTRACTOR PRIOR TO FABRICATION OF PRECAST ELEMENTS.
2. FINAL PLACEMENT OF JOINTS BETWEEN PRECAST CULVERT SEGMENTS SHALL BE DETERMINED BY THE CONTRACTOR AS NEEDED TO PROVIDE MINIMUM CLEARANCE BETWEEN JOINTS AND PENETRATION BLOCKOUTS.

1"=10' 10 5 0 10 20 Scale Feet

1"=2.5' 2.5 1.25 0 2.5 5 Scale Feet

S2

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FACTORIA BOULEVARD STORM
CONVEYANCE IMPROVEMENTS PROJECT

STORM BOX PLAN AND PROFILE - SHEET 1

SEC 27, T 25N, R 5E

SHEET 37 OF 93

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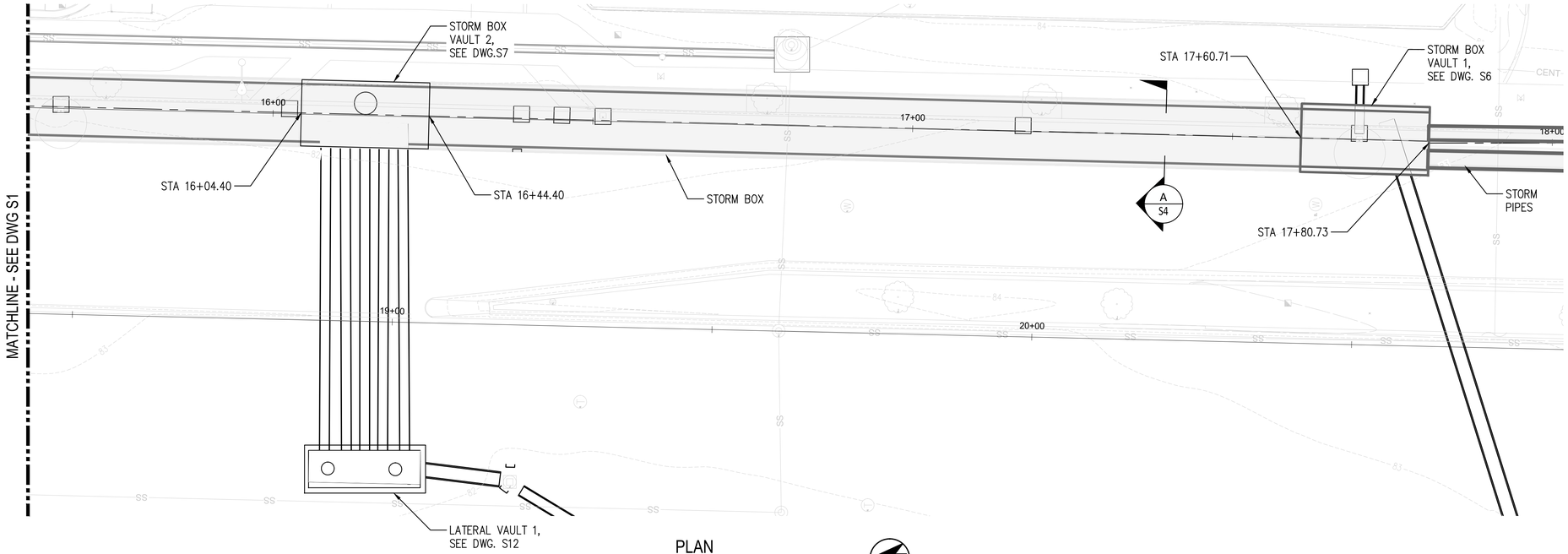
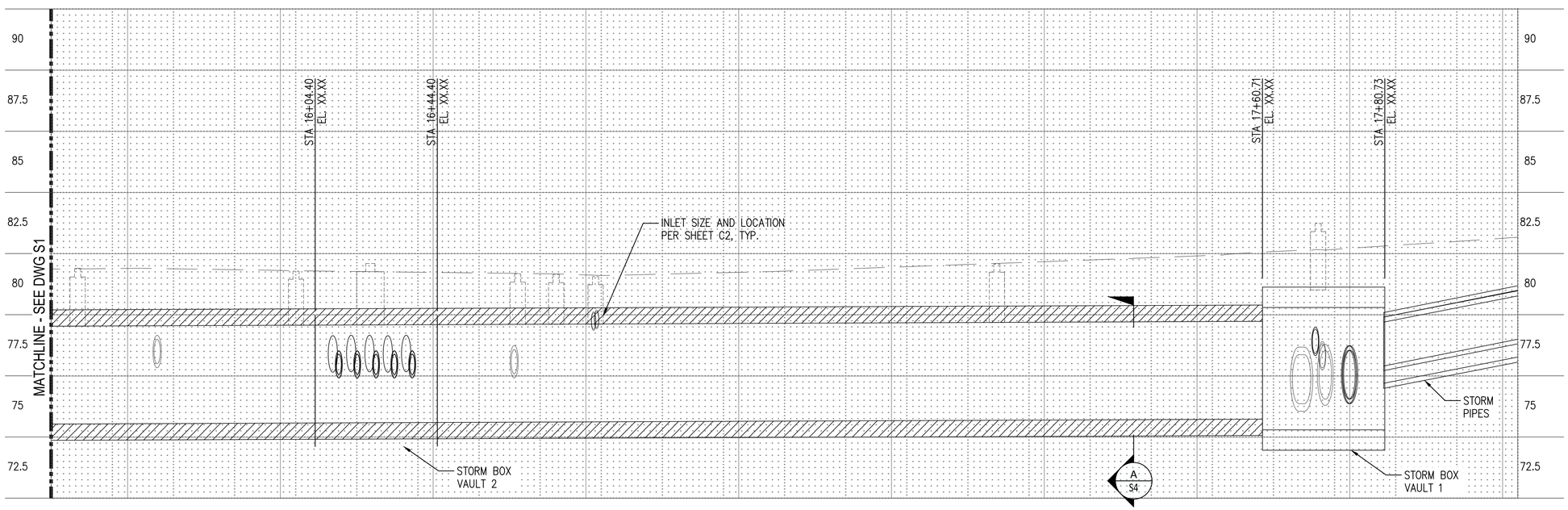


PLAN

STORM SYSTEM IMPROVEMENTS
SCALE: 1"=10'



PROFILE

STA 5+45.8 TO 7+86.9
HORIZ SCALE: 1"=10'
VERT SCALE: 1"=2.5'

GENERAL NOTES

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2. FINAL PLACEMENT OF JOINTS BETWEEN PRECAST CULVERT SEGMENTS SHALL BE DETERMINED BY THE CONTRACTOR AS NEEDED TO PROVIDE MINIMUM CLEARANCE BETWEEN JOINTS AND PENETRATION BLOCKOUTS.

1"=10' 10 5 0 10 20 Scale Feet

1"=2.5' 2.5 1.25 0 2.5 5 Scale Feet

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CONVEYANCE IMPROVEMENTS PROJECT

STORM BOX PLAN AND PROFILE - SHEET 2

SEC 27, T 25N, R 5E

S3

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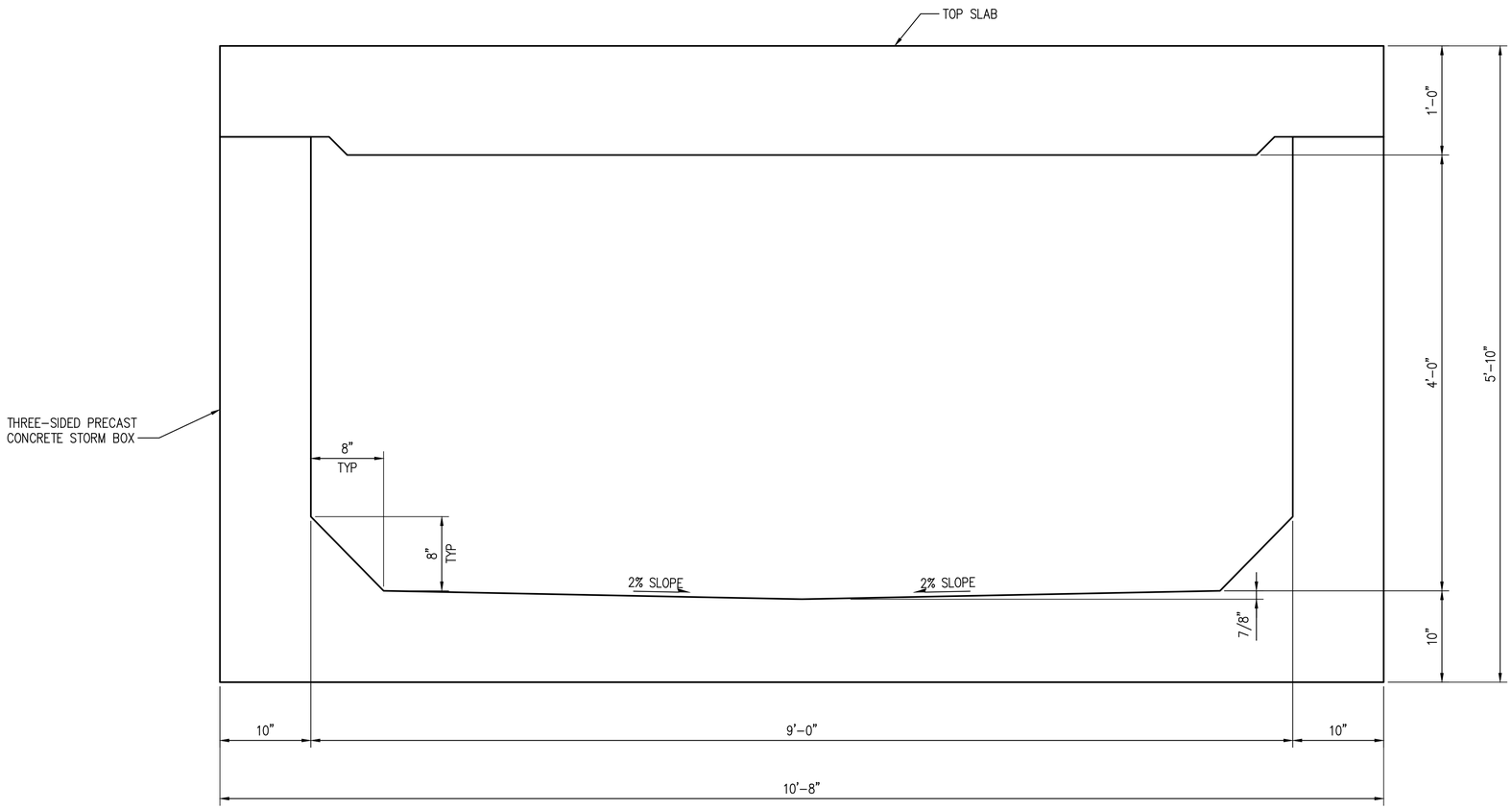
NOTES:

1. PRECAST STORM BOX WALL THICKNESS SHOWN ON THIS DRAWING ARE FOR BID PURPOSED ONLY.
2. CONTRACTOR IS RESPONSIBLE FOR THE ACTUAL DESIGN, FABRICATION, AND INSTALLATION OF THE STORM BOX IN ACCORDANCE WITH THE REQUIREMENTS OF SPECIAL PROVISIONS.



TYPICAL STORM BOX SECTION

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DESIGN MANAGER DATE

PROJECT MANAGER DATE

AUSTIN DENNIS	8/10/21
DESIGNED BY	DATE
PAVEL LAVOCHIN	8/10/21
DRAWN BY	DATE
YELIZ FIRAT	8/10/21
CHECKED BY	DATE

City of Bellevue
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FACTORIA BOULEVARD STORM CONVEYANCE IMPROVEMENTS PROJECT

TYPICAL STORM BOX SECTION

SEC 27, T 25N, R 5E

SHEET 39 OF 93

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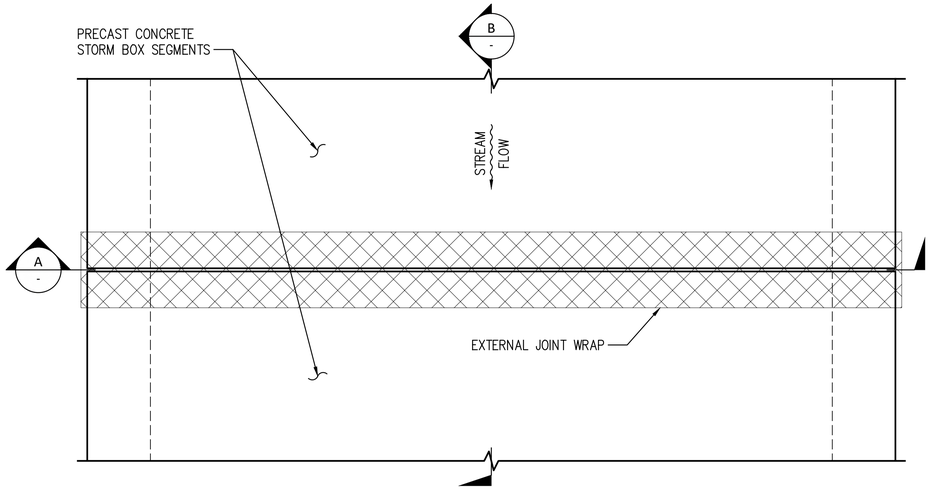

PLAN
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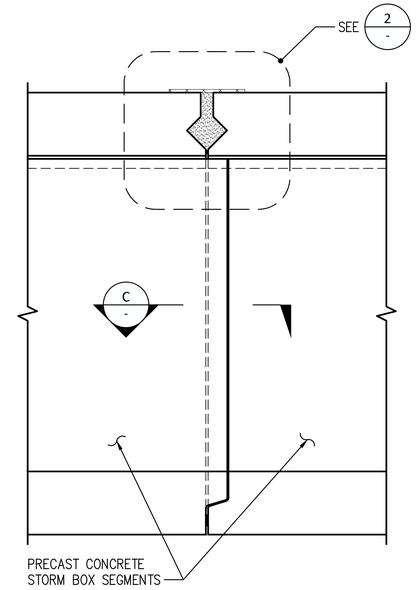

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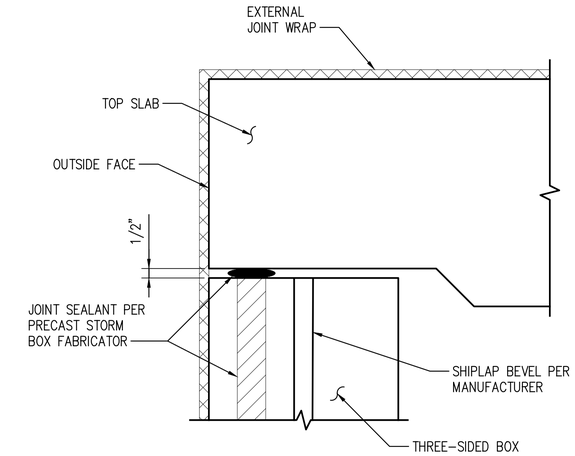

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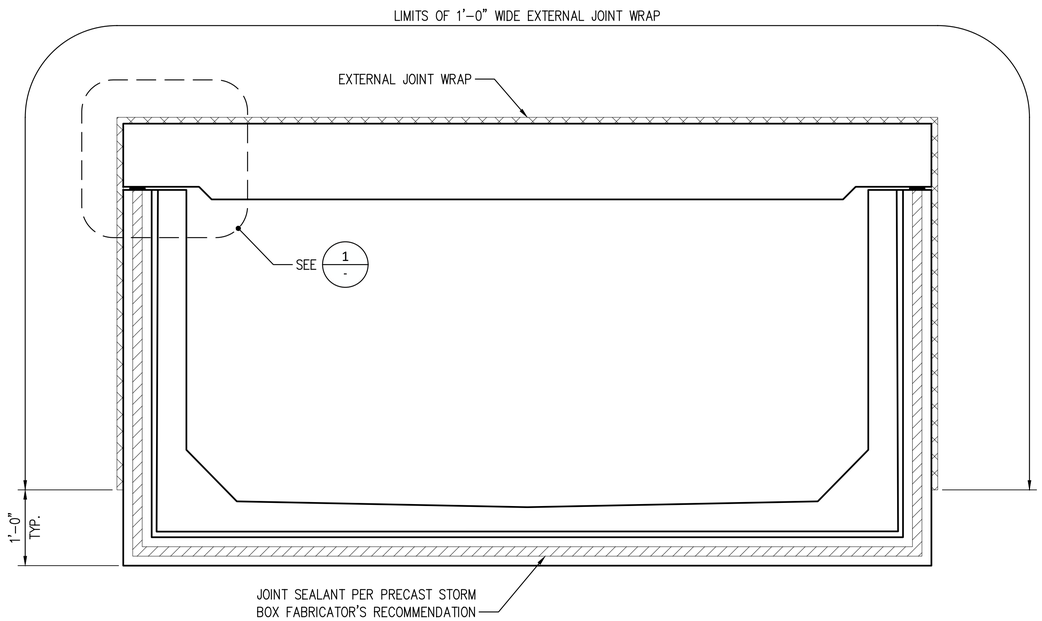

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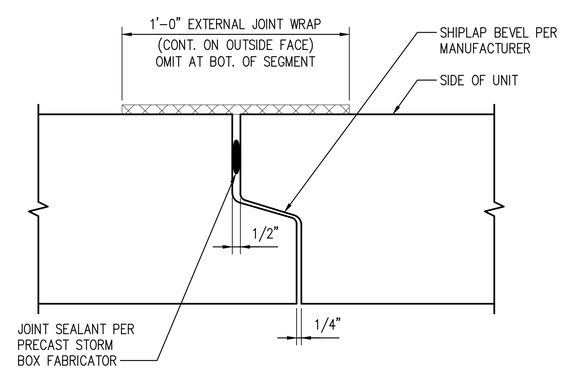

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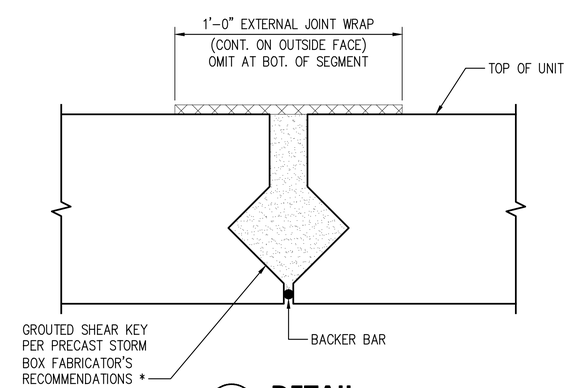

2 - **DETAIL**

* SHEAR KEY GEOMETRY SHOWN IS CONCEPTUAL ONLY. SHEAR KEY SHAL BE DESIGNED BY THE PRECAST STORM BOX FABRICATOR.

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FACTORIA BOULEVARD STORM
CONVEYANCE IMPROVEMENTS PROJECT
STORM BOX AND STORK TRUNK VAULT DETAILS - SHEET 1

SEC 27, T 25N, R 5E

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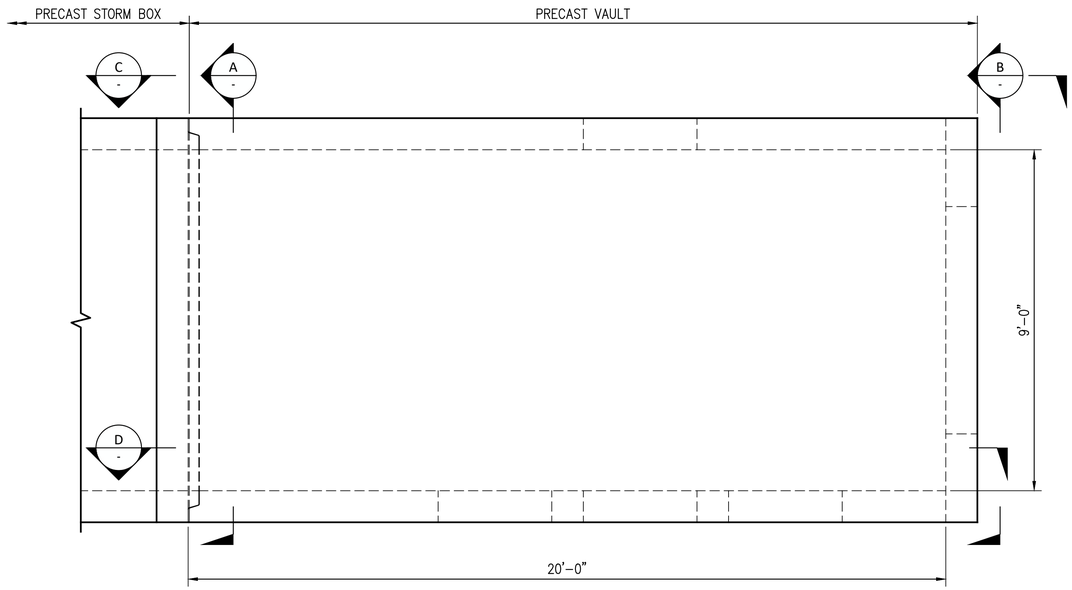
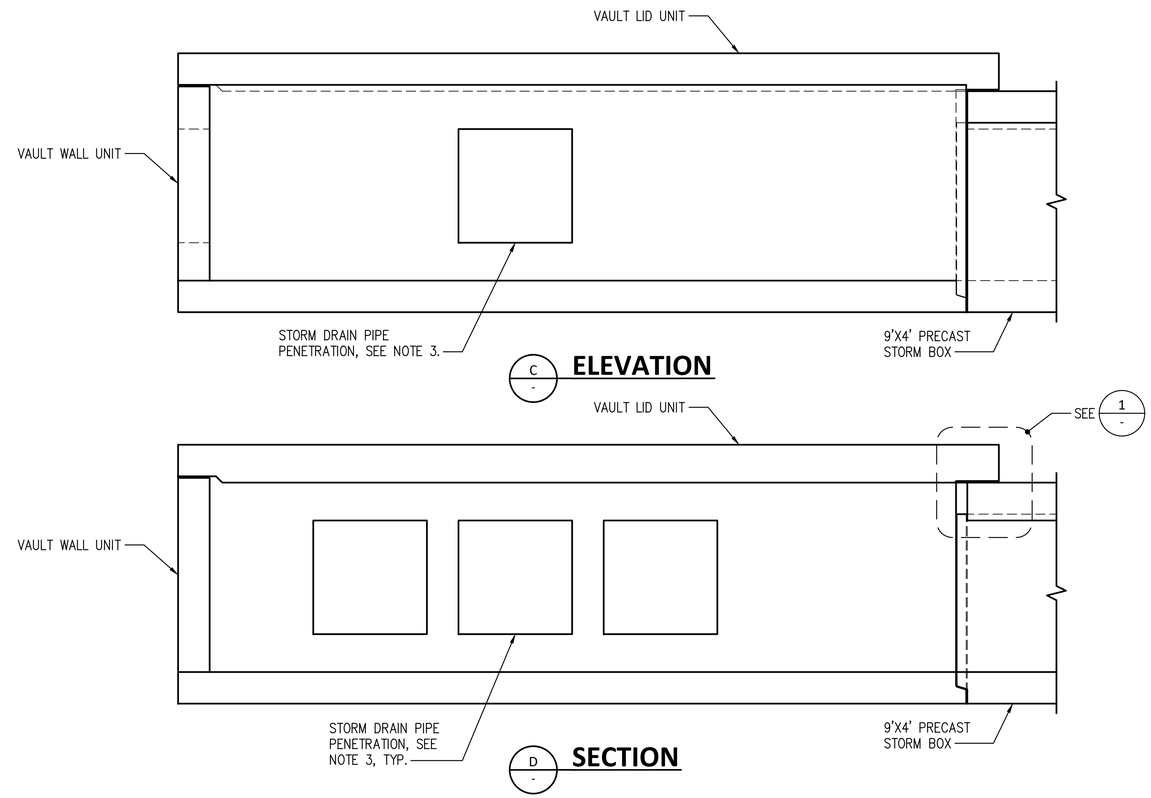


PLAN - STORM TRUNK VAULT 1



NOTES:

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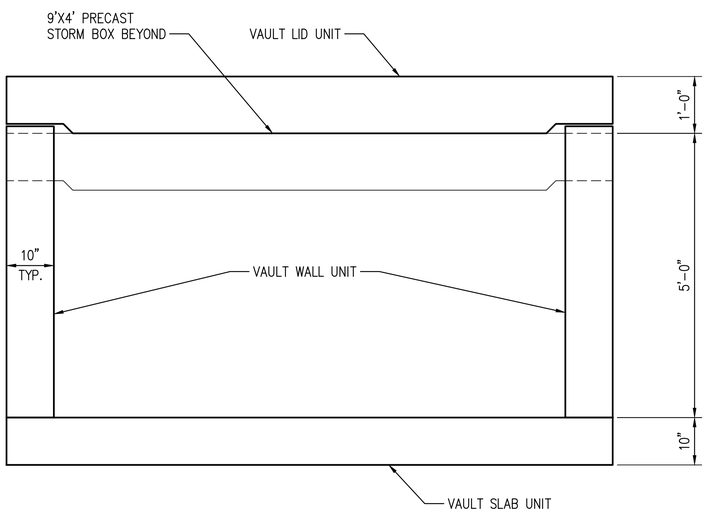

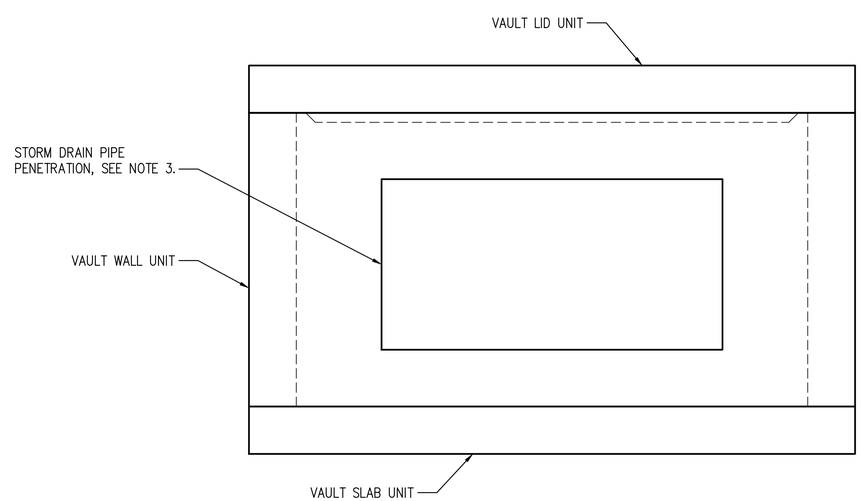

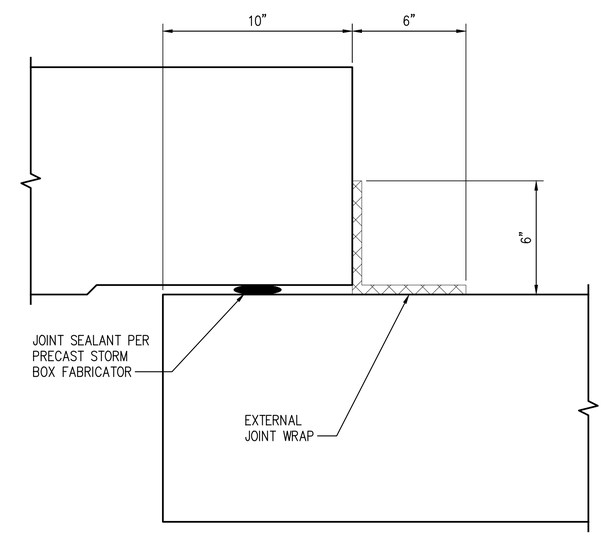

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FACTORIA BOULEVARD STORM CONVEYANCE IMPROVEMENTS PROJECT
STORM BOX AND STORK TRUNK VAULT DETAILS - SHEET 2

SEC 27, T 25N, R 5E

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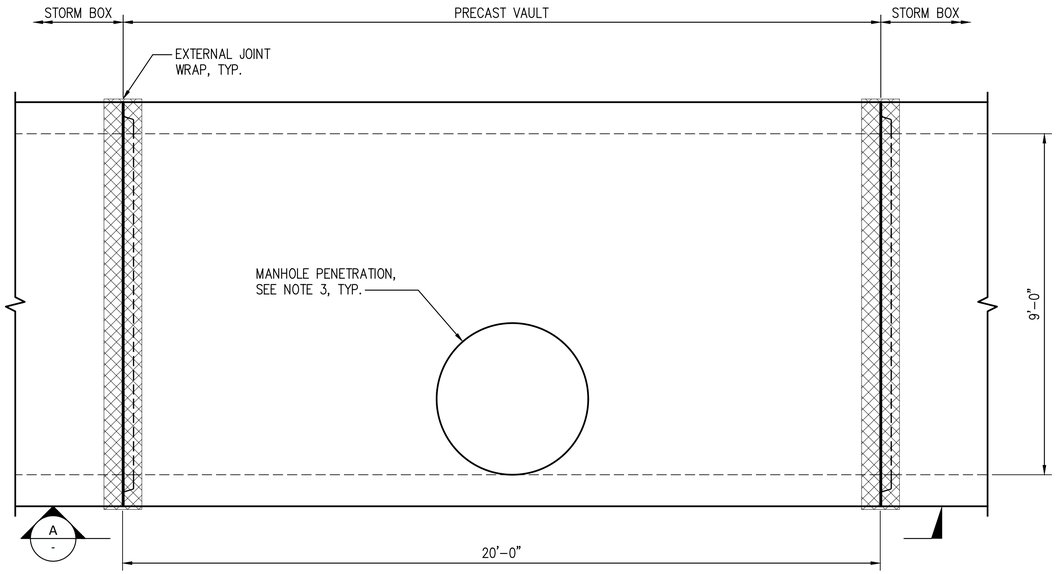

PLAN - STORM TRUNK VAULT 2

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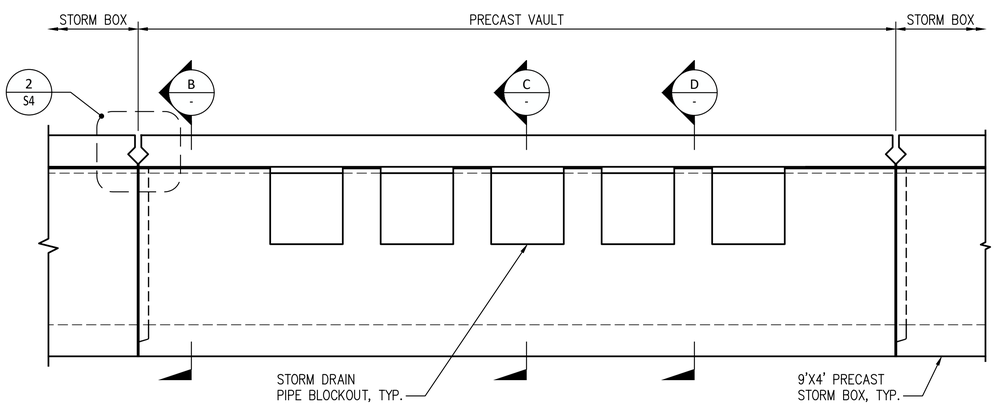

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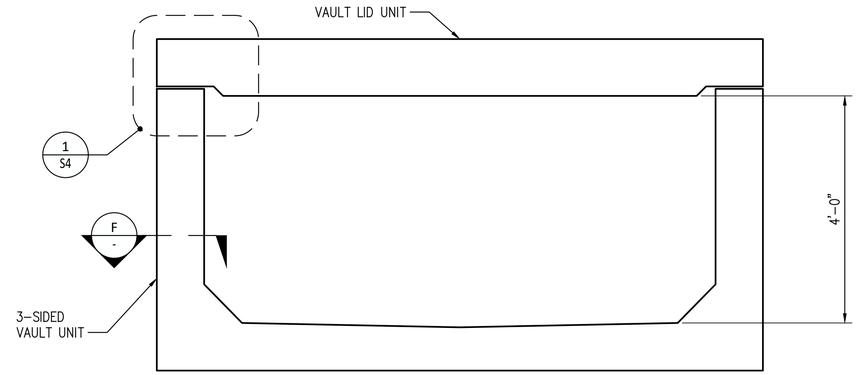
EXTERNAL JOINT WRAP NOT SHOWN FOR CLARITY



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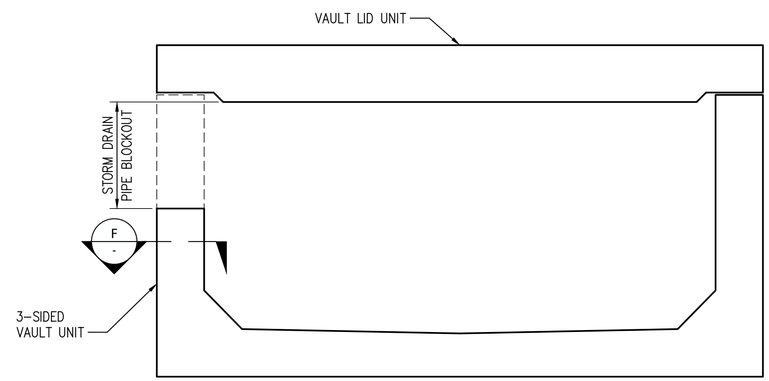

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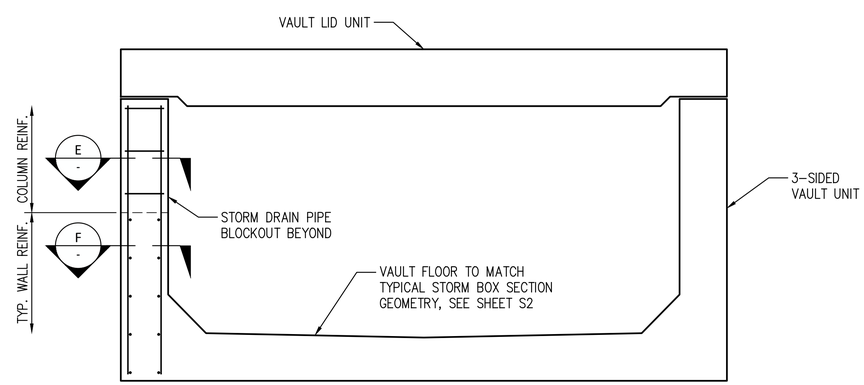

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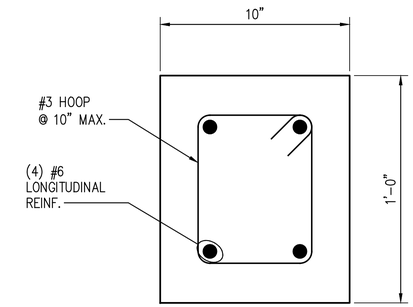

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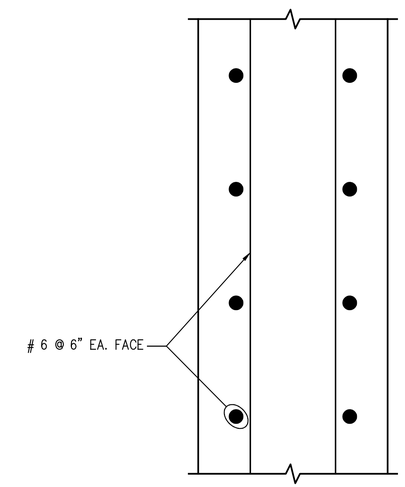

F - **SECTION**

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CHECKED BY	DATE

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FACTORIA BOULEVARD STORM CONVEYANCE IMPROVEMENTS PROJECT
STORM BOX AND STORK TRUNK VAULT DETAILS - SHEET 3

SEC 27, T 25N, R 5E

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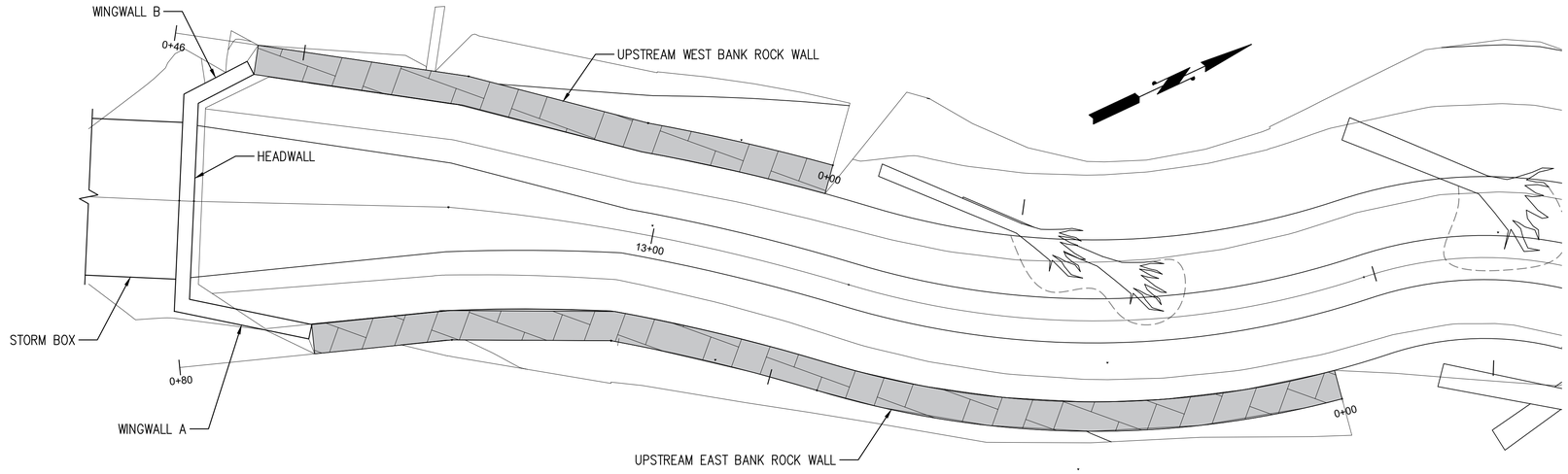
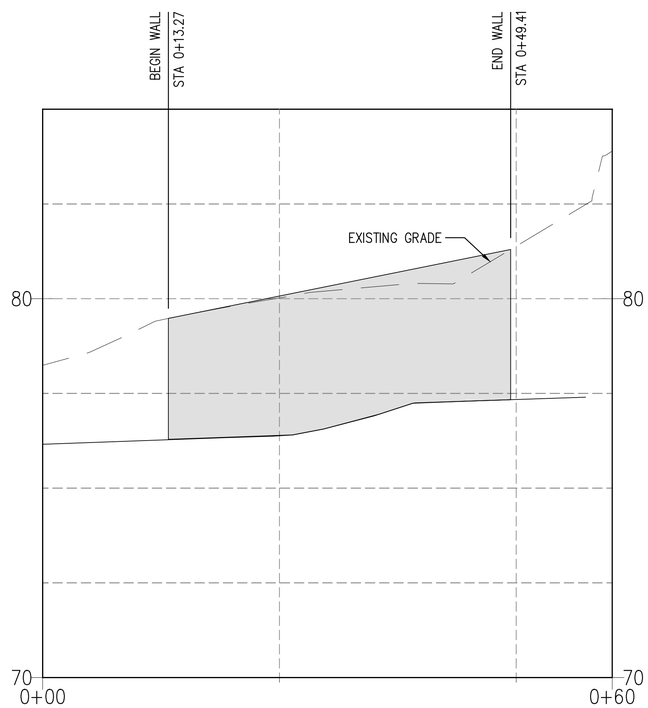
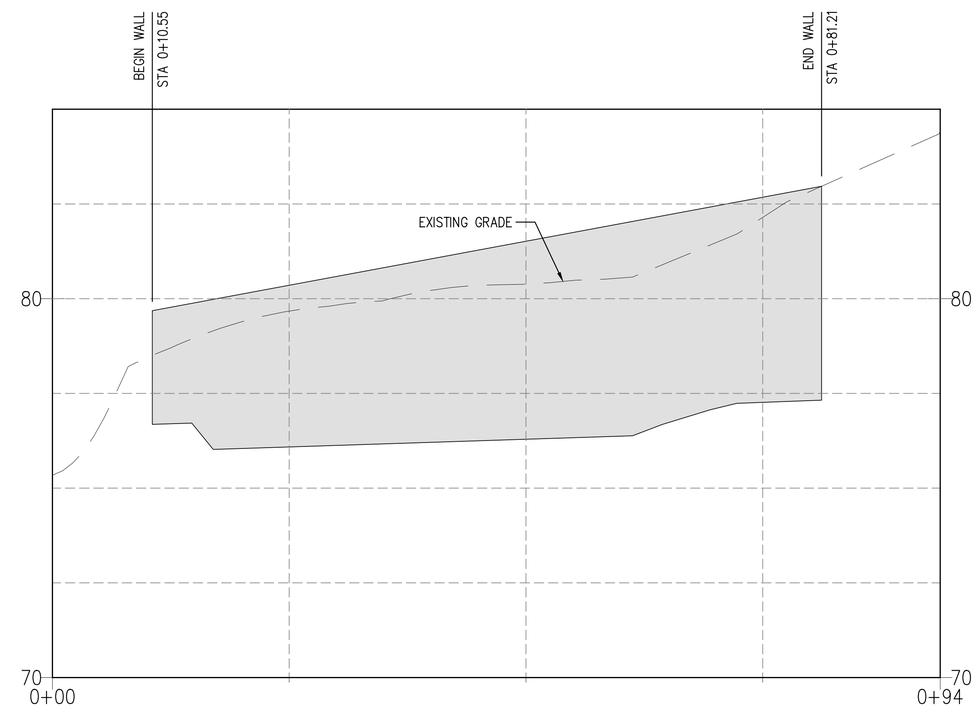


PLAN



UPSTREAM WEST BANK ROCK WALL



UPSTREAM EAST BANK ROCK WALL

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FACTORIA BOULEVARD STORM
CONVEYANCE IMPROVEMENTS PROJECT

WALL PLAN AND PROFILES - SHEET 1

SEC 27, T 25N, R 5E

SHEET 43 OF 93

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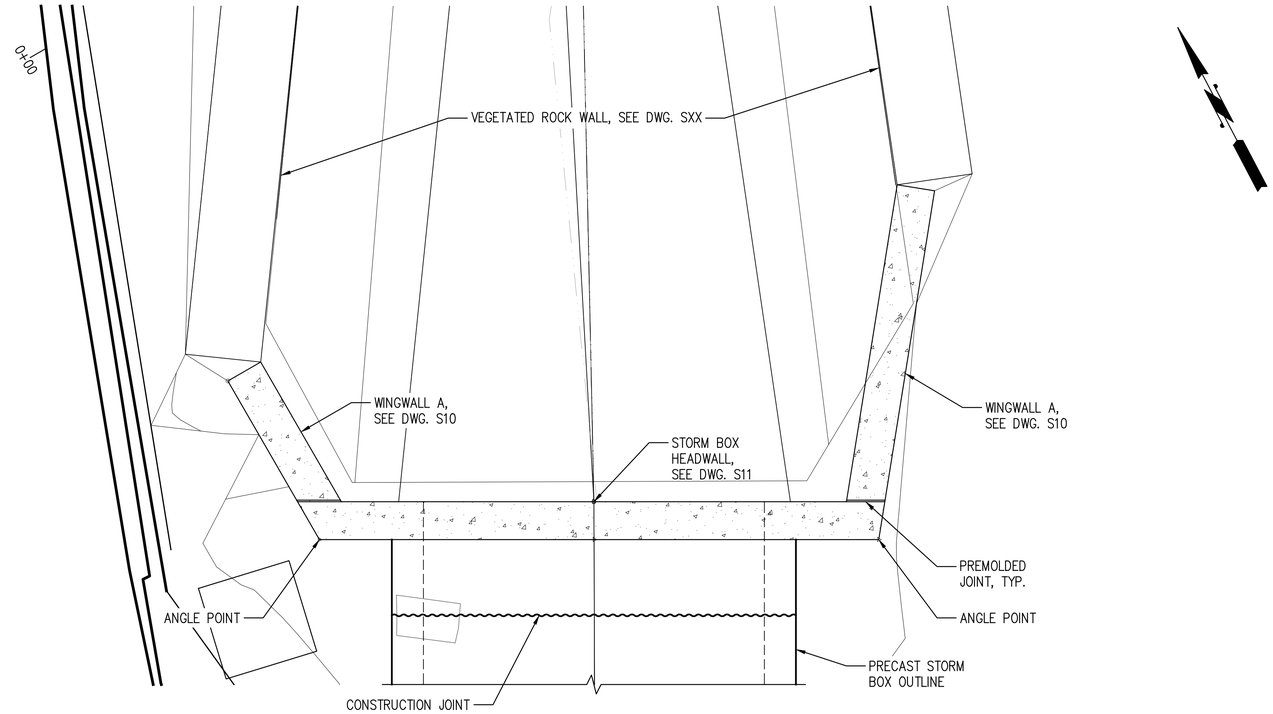
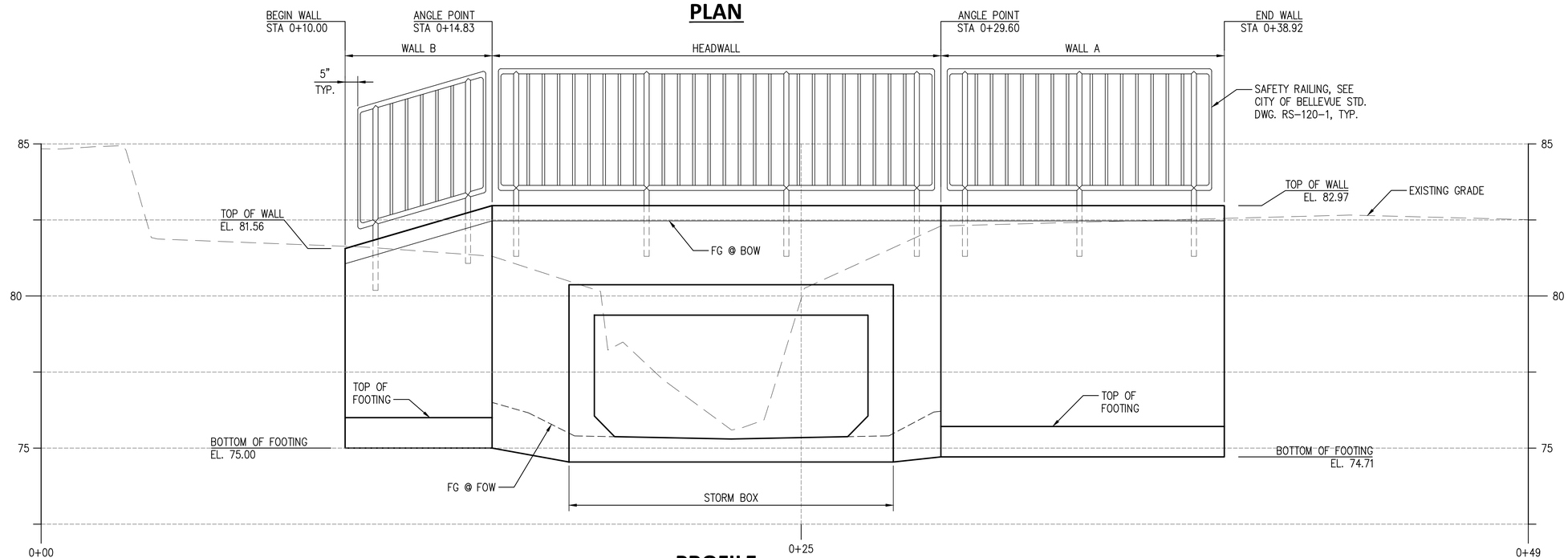


PLAN



PROFILE

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FACTORIA BOULEVARD STORM CONVEYANCE IMPROVEMENTS PROJECT

WALL PLAN AND PROFILES - SHEET 2

SEC 27, T 25N, R 5E

SHEET 44 OF 93

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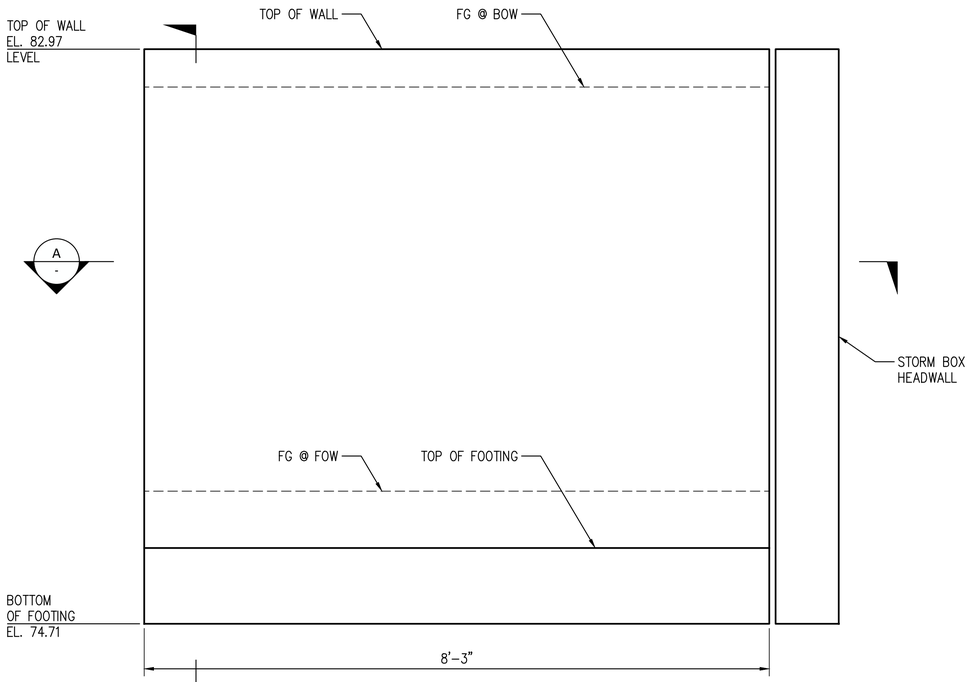
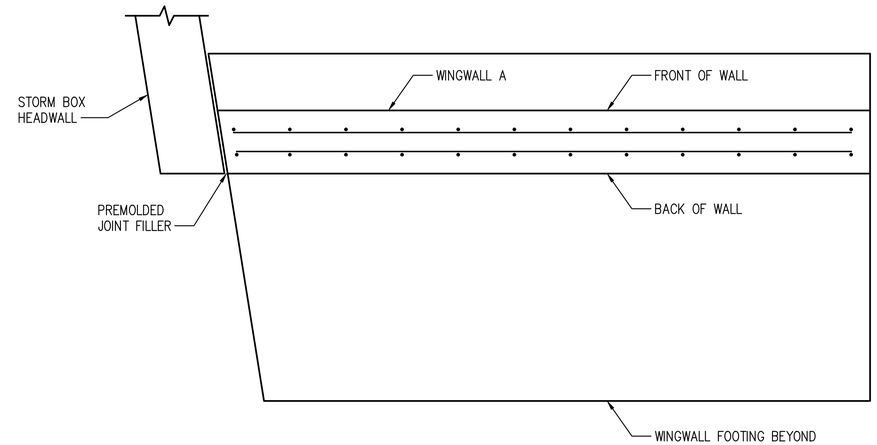
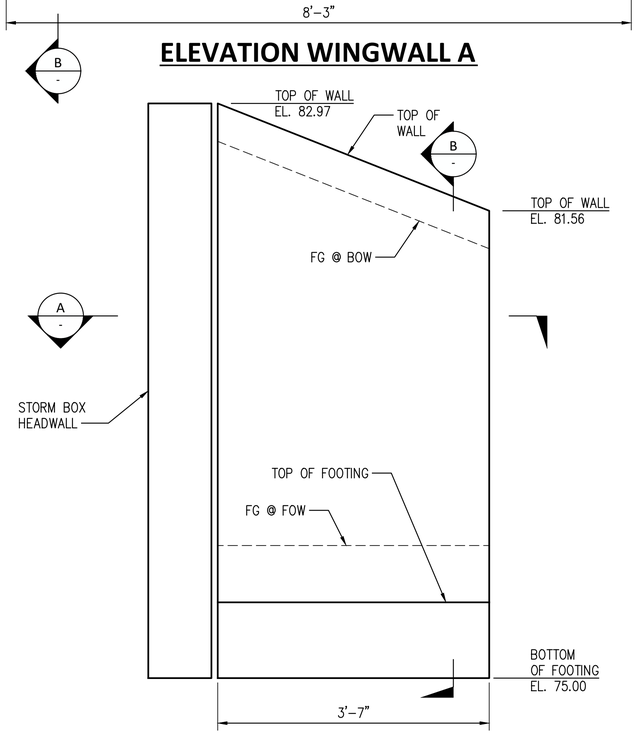


ELEVATION WINGWALL A

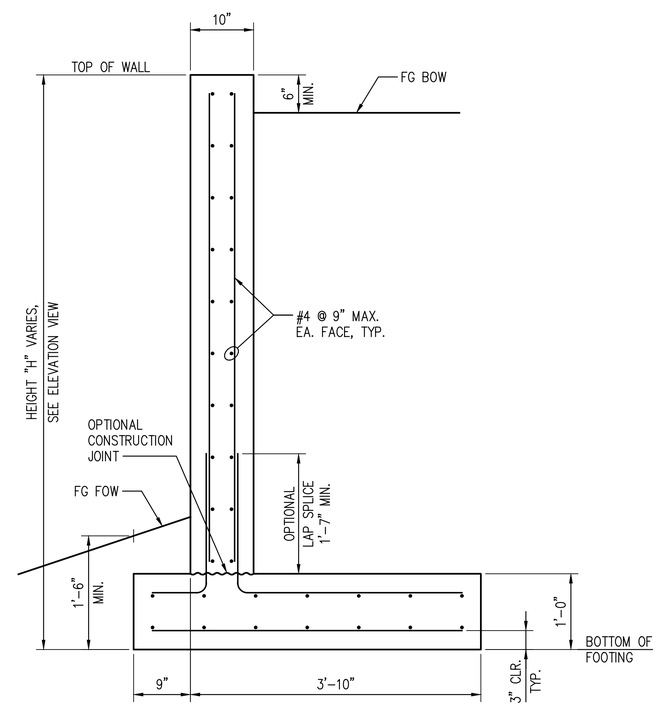


A - **SECTION**

WINGWALL A SHOWN,
WINGWALL B SIMILAR



ELEVATION WINGWALL B



B - **SECTION**

WINGWALL A SHOWN,
WINGWALL B SIMILAR

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FACTORIA BOULEVARD STORM
CONVEYANCE IMPROVEMENTS PROJECT

WALL SECTION AND DETAILS - SHEET 1

SEC 27, T 25N, R 5E

SHEET 45 OF 93

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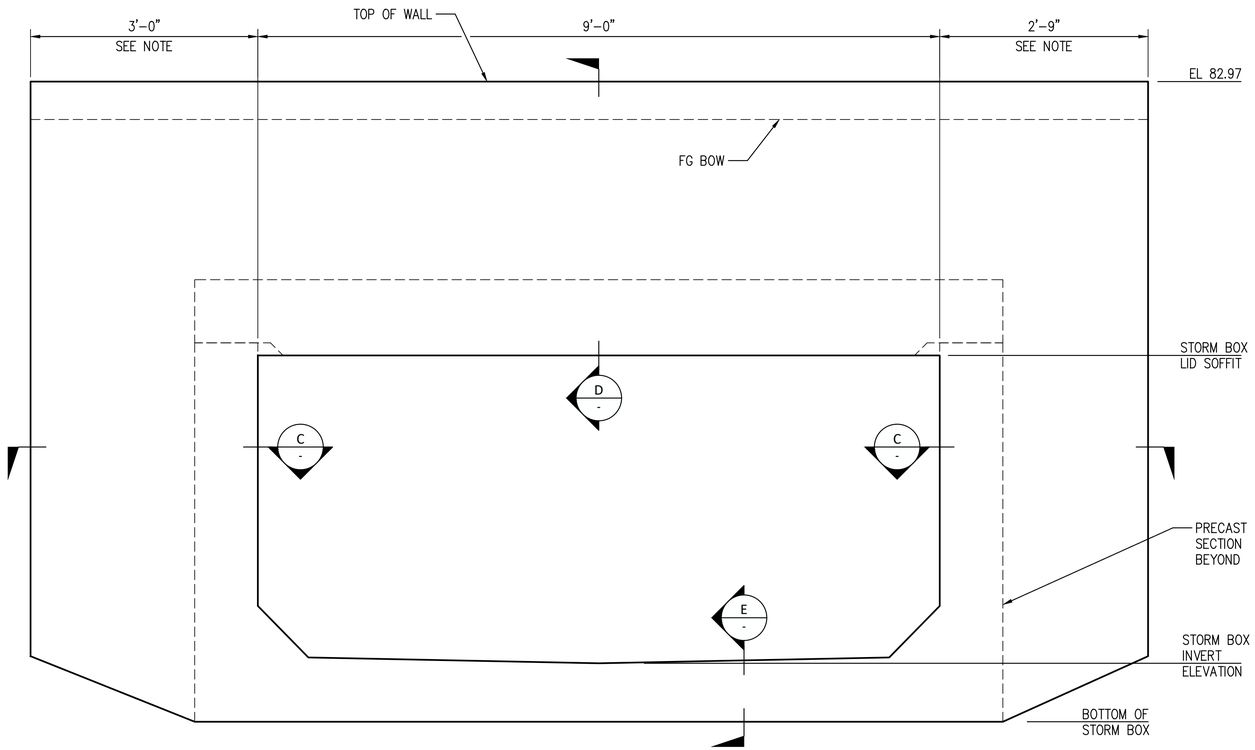
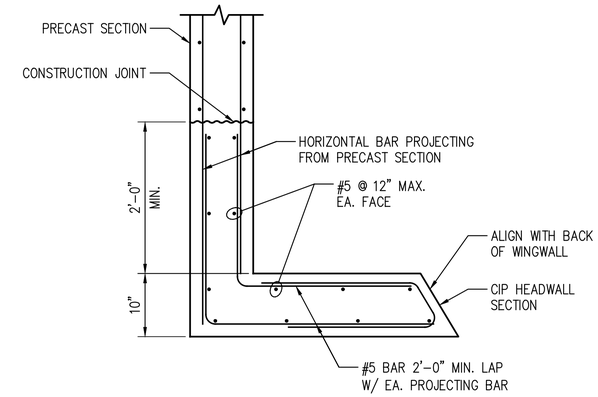


ELEVATION STORM BOX HEADWALL

NOTE: DISTANCE MEASURED AT FRONT OF WALL



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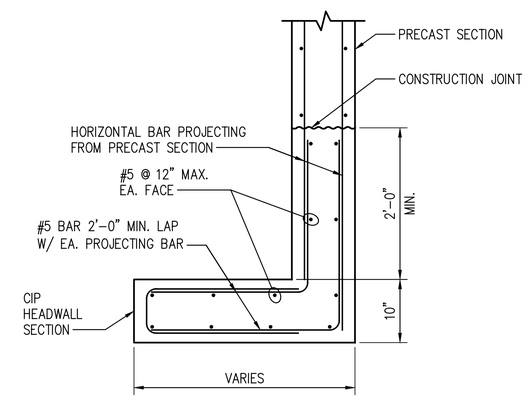

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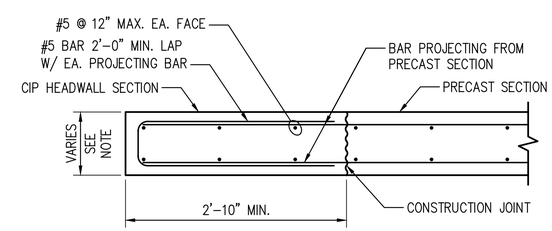

E - **SECTION**

NOTE: MATCH STORM BOX SLAB THICKNESS

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CONVEYANCE IMPROVEMENTS PROJECT

WALL SECTION AND DETAILS - SHEET 2

SEC 27, T 25N, R 5E

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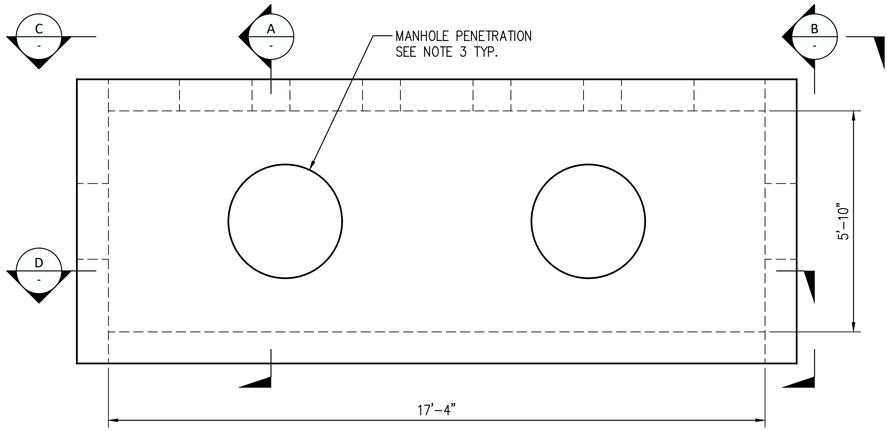
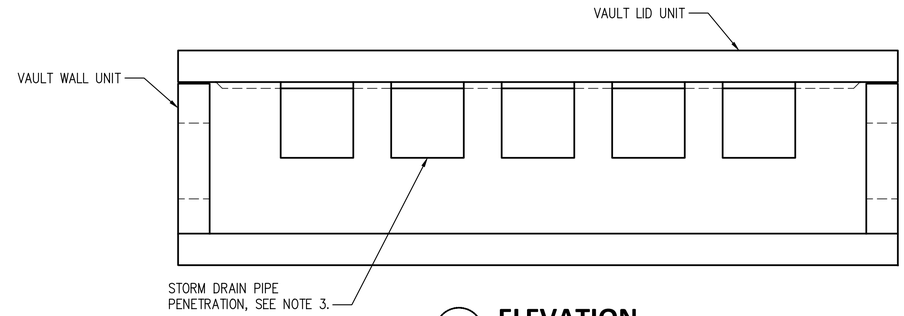
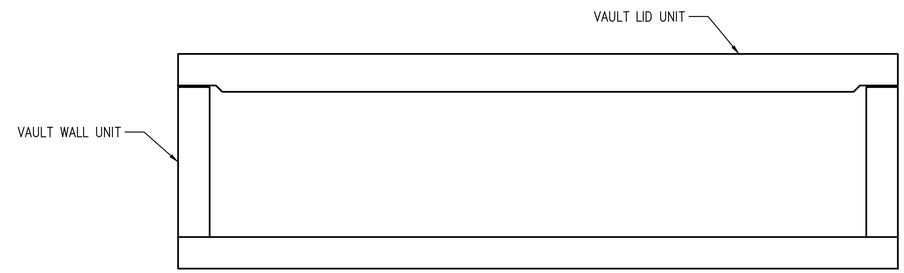


PLAN - LATERAL VAULT 1



C - ELEVATION



D - SECTION

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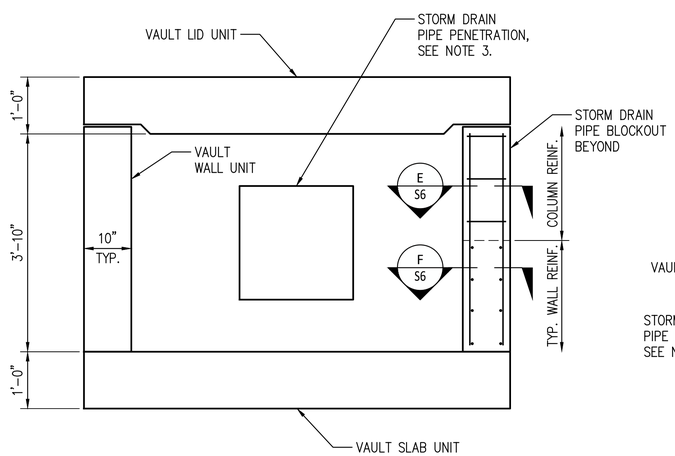

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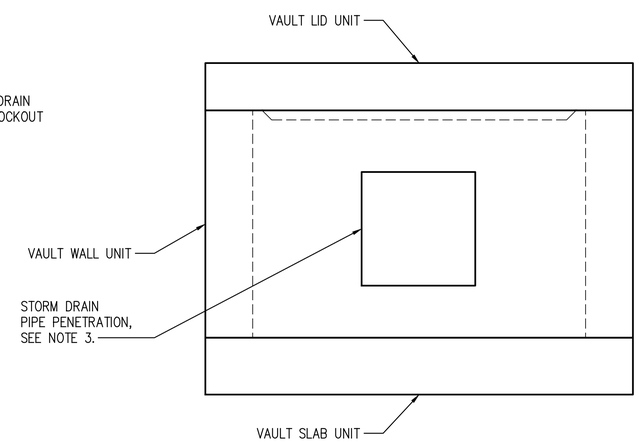

B - ELEVATION

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DESIGN MANAGER DATE

PROJECT MANAGER DATE

AUSTIN DENNIS	8/10/21
DESIGNED BY	DATE
PAVEL LAVOCHIN	8/10/21
DRAWN BY	DATE
YELIZ FIRAT	8/10/21
CHECKED BY	DATE

City of Bellevue
UTILITIES

FACTORIA BOULEVARD STORM
CONVEYANCE IMPROVEMENTS PROJECT

LATERAL VAULT 1 PLAN AND SECTIONS

SEC 27, T 25N, R 5E

SHEET 47 OF 93

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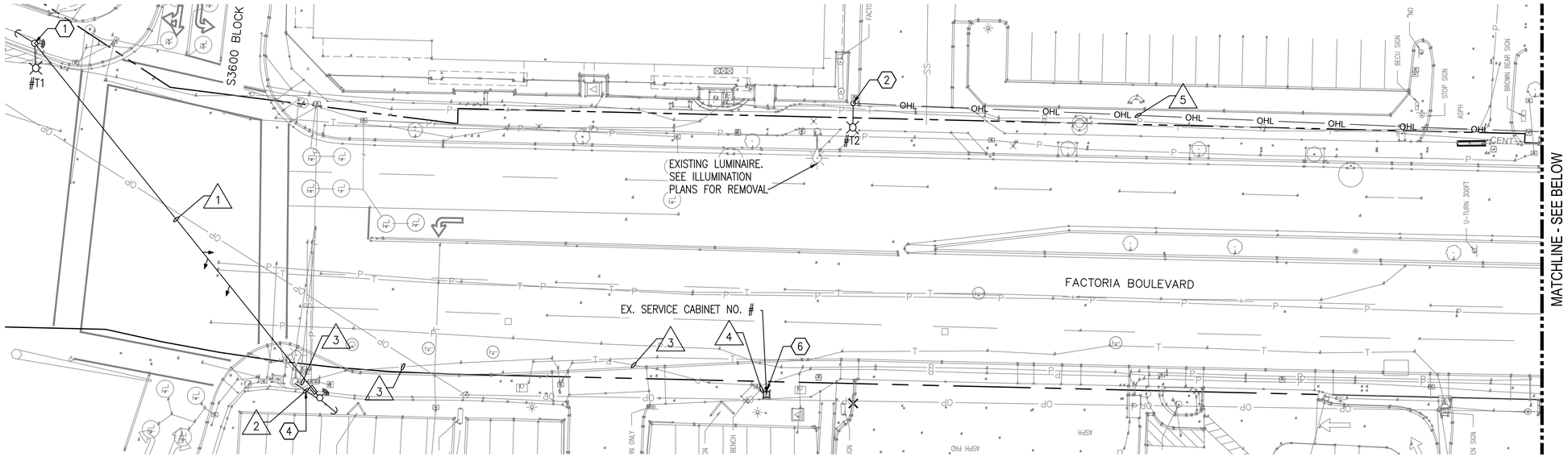

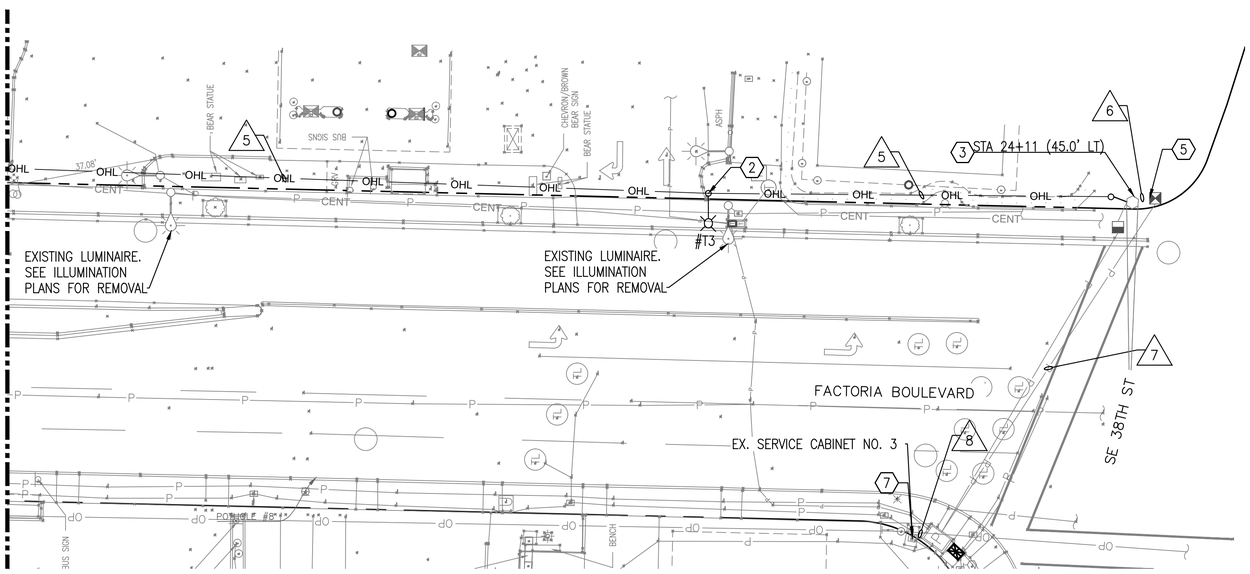

PLAN
LOCATION MAP
SCALE: 1"=20'

GENERAL NOTES

1. SEE IL01 FOR ILLUMINATION PLANS.
2. SEE SG02 FOR LEGEND.
3. SALVAGE OR DISPOSE REMOVED ITEMS PER SPECIAL PROVISIONS.

CONSTRUCTION NOTES

1. INSTALL LUMINAIRE ARM, LUMINAIRE, AND WIRING ON TIMBER POLE. PROVIDE SUPPLEMENTAL GROUNDING. SEE TEMPORARY SIGNAL PLANS FOR TIMBER POLE INSTALLATION.
2. INSTALL 40-FOOT CLASS 5 TIMBER LIGHT STANDARD, LUMINAIRE ARM, LUMINAIRE, AND WIRING. PROVIDE SUPPLEMENTAL GROUNDING. SEE WSDOT STD. PLAN J-15.10.01.
3. INSTALL 40-FOOT TIMBER POLE. SEE WSDOT STANDARD PLAN J-15.10-01. PROVIDE 2" CONDUIT RISER/WEATHERHEAD.
4. INSTALL TEMPORARY ILLUMINATION WIRES ON MESSENGER CABLE (SEE TEMPORARY SIGNAL PLANS) AND RUN THE WIRES THROUGH THE SIGNAL POLE HANDHOLE AND EXISTING ILLUMINATION CONDUIT BACK TO THE SERVICE CABINET.
5. INSTALL NEW CONDUIT INTO EXISTING JUNCTION BOX.
6. CONNECT TEMPORARY ILLUMINATION WIRING TO SPARE CIRCUIT # IN SERVICE CABINET.
7. DISCONNECT AND COIL EXISTING CIRCUIT 2 ILLUMINATION WIRING IN SERVICE CABINET. CONNECT TEMPORARY ILLUMINATION WIRING TO CIRCUIT 2 IN SERVICE CABINET.

WIRE/CONDUIT NOTES

1. ALL CONDUITS CONTAINING CONDUCTORS SHALL INCLUDE GROUND WIRE. GROUND WIRE SIZE SHALL MATCH THE LARGEST CONDUCTOR (MIN. #8 UNLESS OTHERWISE NOTED).

WIRE SCHEDULE

△ NO.	RACEWAY/ CONDUIT SIZE	CONDUCTORS	COMMENTS
1	SPAN WIRE	#4 AWG TRIPLEX	TEMPORARY ILLUMINATION. SEE TEMPORARY SIGNAL PLANS FOR SIGNAL CONDUCTORS.
2	2" RISER	2-#8 (ILLUM), 1#8 (GND)	TEMPORARY ILLUMINATION. SEE TEMPORARY SIGNAL PLANS FOR SIGNAL CONDUCTORS.
3	EX. 2"	EX. 2-#6, 2-#8 (ILLUM), EX. 1#6 (GND)	EXISTING & TEMPORARY ILLUMINATION
4	EX. 2"	EX. 2-#6, 2-#8 (ILLUM), EX. 1#6 (GND)	EXISTING & TEMPORARY ILLUMINATION
	EX. 2" SPARE		
5	AERIAL	#4 AWG TRIPLEX	TEMPORARY ILLUMINATION
6	2" RISER	2-#8 (ILLUM), 1#8 (GND)	TEMPORARY ILLUMINATION
7	EX. 2"	EX. 4-#6, 2-#8 (ILLUM), EX. 1#6 (GND)	EXISTING & TEMPORARY ILLUMINATION
8	EX. 2"	EX. 4-#6, 2-#8 (ILLUM), EX. 1#6 (GND)	EXISTING & TEMPORARY ILLUMINATION
	EX. 2" SPARE		

NOTES:
1. CONTRACTOR TO VERIFY EXISTING CONDUCTORS.

TEMPORARY LUMINAIRE SCHEDULE

POLE NO.	LIGHTING CIRCUIT NO.	STATION (OFFSET)	LIGHT SPECIFICATION	MOUNTING HEIGHT	ARM LENGTH	POLE TYPE	COMMENTS
T1	TBD	STA 16+01 (48.5' LT)	LEOTEK GCL1-80J-MV-40K-3R-GY-190S (123W)	40'	10'	TIMBER	STRAIN POLE INSTALLED ON TEMPORARY SIGNAL PLANS SERVICE CABINET NO. #
T2	2	STA 18+87 (49.5' LT)	LEOTEK GCL1-80J-MV-40K-3R-GY-190S (123W)	40'	10'	TIMBER	SERVICE CABINET NO. 3 @ FACTORIA/SE 38TH ST
T3	2	STA 22+98 (43.3' LT)	LEOTEK GCL1-80J-MV-40K-3R-GY-190S (123W)	40'	10'	TIMBER	SERVICE CABINET NO. 3 @ FACTORIA/SE 38TH ST

1"=20' 10 5 0 10 20
Scale Feet

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NO	DATE	BY	APPR	REVISIONS
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DESIGN MANAGER DATE
PROJECT MANAGER DATE

DAVID NYUGEN 8/10/21
DESIGNED BY DATE
DAVID NYUGEN 8/10/21
DRAWN BY DATE
JARED NAKAMOTO 8/10/21
CHECKED BY DATE

City of Bellevue
UTILITIES

FACTORIA BOULEVARD STORM
CONVEYANCE IMPROVEMENTS PROJECT

TEMPORARY ILLUMINATION PLAN

SEC 27, T 25N, R 5E

TIL1

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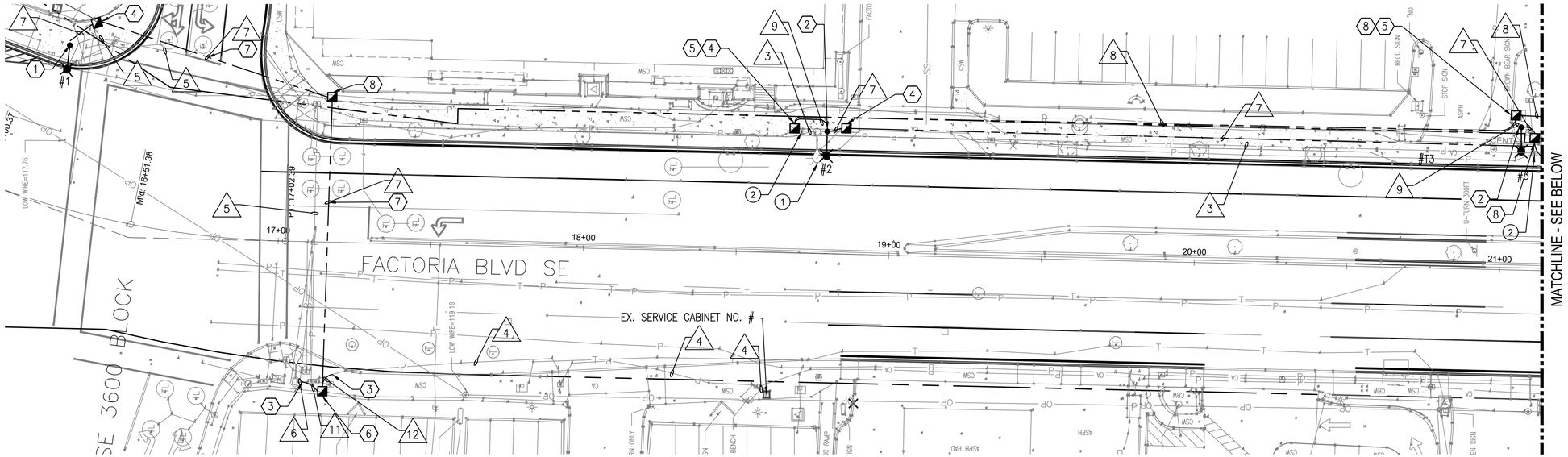

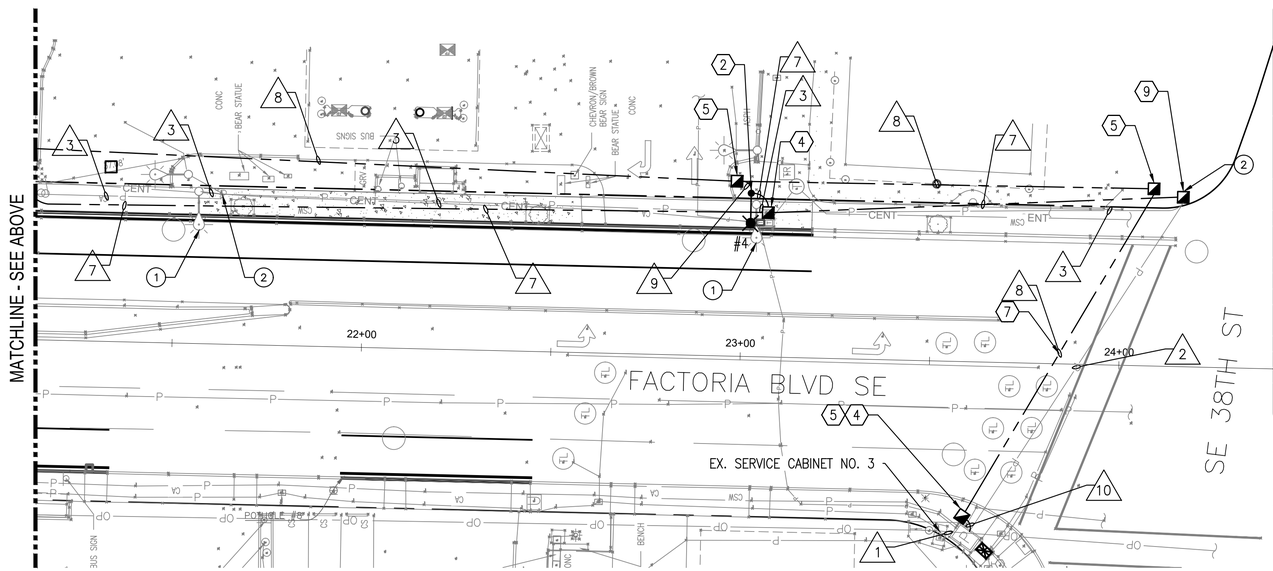

GENERAL NOTES

1. SEE TIL01 FOR TEMPORARY ILLUMINATION PLANS.
2. SEE SG02 FOR LEGEND.
3. SALVAGE OR DISPOSE REMOVED ITEMS PER SPECIAL PROVISIONS.

CONSTRUCTION NOTES

1. INSTALL LUMINAIRE ON SIGNAL POLE. SEE SIGNAL PLANS FOR POLE DATA.
2. CONSTRUCT LIGHT STANDARD FOUNDATION AND INSTALL LIGHT STANDARD AND LUMINAIRE. CONSTRUCT FOUNDATION PER CITY OF BELLEVUE STD. PLAN SL-105-1. INSTALL LIGHT STANDARD AND LUMINAIRE PER LUMINAIRE SCHEDULE.
3. INTERCEPT EXISTING ILLUMINATION CONDUIT AND EXTEND INTO NEW JUNCTION BOX.
4. INSTALL NON-SKID LID ON NEW JUNCTION BOX.
5. INSTALL COMMUNICATION JUNCTION BOX PER CITY OF BELLEVUE STD. PLAN SL-180-1.
6. SPLICE NEW CONDUCTORS TO EXISTING CIRCUIT # CONDUCTORS IN NEW JUNCTION BOX.
7. DIRECTIONAL BORE NEW CONDUIT CROSS ROADWAY. COORDINATE DIRECTIONAL BORING WITH SIGNAL PLANS.
8. INSTALL JUNCTION BOX WITH NON-SKID LID AND CONCRETE APRON PER CITY OF BELLEVUE STD. PLAN SL-160-1.
9. REPLACE EXISTING JUNCTION BOX WITH NEW JUNCTION BOX.

REMOVAL NOTES

1. REMOVE FOUNDATION AND SALVAGE EXISTING LUMINAIRE POLE PER PROJECT SPECIFICATIONS.
2. REMOVE EXISTING JUNCTION BOX.

WIRE/CONDUIT NOTES

1. ALL CONDUITS CONTAINING CONDUCTORS SHALL INCLUDE GROUND WIRE. GROUND WIRE SIZE SHALL MATCH THE LARGEST CONDUCTOR (MIN. #8 UNLESS OTHERWISE NOTED).
2. ALL EMPTY/SPARE CONDUITS SHALL CONTAIN TONEABLE MULE TAPE.

WIRE SCHEDULE

△ NO.	RACEWAY/ CONDUIT SIZE	CONDUCTORS	COMMENTS
1	EX. 2"	EX. 2-#6, 2-#6 (R), 2-#8 (ILLUM), EX. 1#6 (GND)	REMOVE EXISTING CIRCUIT 2 ILLUMINATION CONDUCTORS
	EX. 2" SPARE		
2	EX. 2"	EX. 2-#6, 2-#6 (R), 2-#8 (ILLUM), EX. 1#6 (GND)	REMOVE EXISTING CIRCUIT 2 ILLUMINATION CONDUCTORS
3	EX. 2"	EX. 3-#6 (R)	CAP AND ABANDON CONDUIT
4	EX. 2"	EX. 2-#6 (ILLUM), EX. 1#6 (GND)	
	EX. 2" SPARE		
5	EX. 2"	EX. 3-#8 (R)	CAP AND ABANDON CONDUIT
6	EX. 2"	EX. 3-#8 (ILLUM), EX. 6-#12 (INTC)	
7	2"	2-#8 (ILLUM), 1#8 (GND)	
8	3"		FUTURE SWF COMMUNICATION
	2"		FUTURE SWF POWER
9	2"		FUTURE SWF
10	3"		FUTURE SWF
11	2"	EX. 3-#8 (ILLUM), EX. 6-#12 (INTC)	
12	2"	EX. 2-#6 (ILLUM), EX. 1#6 (GND)	
	2" SPARE		

NOTES:
1. CONTRACTOR TO VERIFY EXISTING CONDUCTORS AND CONDUIT SIZES.
2. (R) - REMOVE
3. (ILLUM) - ILLUMINATION
4. (GND) - GROUND
5. (SWF) - SMALL WIRELESS FACILITY
6. (INTC) - INTERCONNECT

LUMINAIRE SCHEDULE

COB POLE NO.*	POLE NO.	LIGHTING CIRCUIT NO.	STATION (OFFSET)	LIGHT SPECIFICATION	POLE HEIGHT	ARM LENGTH	POLE TYPE	COMMENTS
	1	TBD	STA 16+14 (51.8' LT)	LEOTEK GCL1-80J-MV-40K-3R-GY-190S (123W)	40'	6'	SIGNAL	REFER TO SIGNAL PLANS FOR POLE DATA SERVICE CABINET NO. #
	2	2	STA 18+79 (40.1' LT)	LEOTEK GCL1-80J-MV-40K-3R-GY-190S (123W)	35'	8'	ROADWAY LIGHTING POLE	SERVICE CABINET NO. 3 @ FACTORIA/SE 38TH ST
	3	2	STA 21+06 (46.8' LT)	LEOTEK GCL1-80J-MV-40K-3R-GY-190S (123W)	35'	8'	ROADWAY LIGHTING POLE	SERVICE CABINET NO. 3 @ FACTORIA/SE 38TH ST
	4	2	STA 23+02 (43.1' LT)	LEOTEK GCL1-80J-MV-40K-3R-GY-190S (123W)	35'	8'	ROADWAY LIGHTING POLE	SERVICE CABINET NO. 3 @ FACTORIA/SE 38TH ST

* ASSIGNED BY C.O.B. SIGNAL & LIGHTING ENGINEER

PLAN
LOCATION MAP
SCALE: 1"=20'

1"=20' 10 5 0 10 20
Scale Feet

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NO	DATE	BY	APPR	REVISIONS
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DESIGN MANAGER DATE
PROJECT MANAGER DATE

DAVID NYUGEN	8/10/21
DESIGNED BY	DATE
DAVID NYUGEN	8/10/21
DRAWN BY	DATE
JARED NAKAMOTO	8/10/21
CHECKED BY	DATE

City of Bellevue
UTILITIES

FACTORIA BOULEVARD STORM CONVEYANCE IMPROVEMENTS PROJECT

ILLUMINATION PLAN

SEC 27, T 25N, R 5E

IL1

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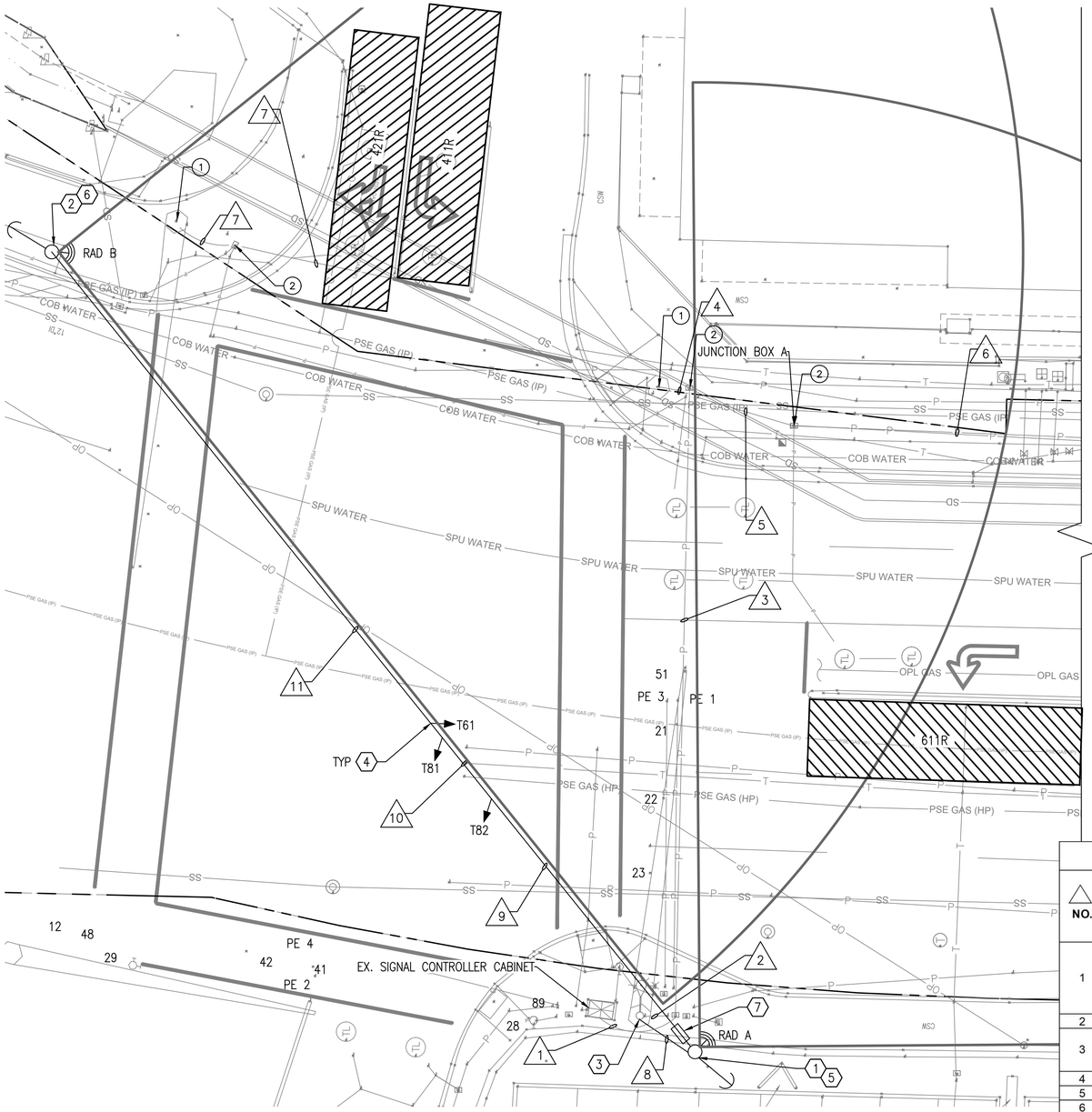

PLAN

LOCATION MAP
SCALE: 1"=10'

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PHASE DIAGRAM

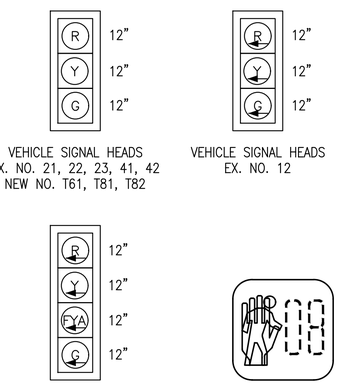
ø1	NOT USED		ø5
ø2			ø6
ø3	NOT USED	NOT USED	ø7
ø4			ø8

PROTECTED VEHICLE MOVEMENT
PERMISSIVE VEHICLE MOVEMENT
PEDESTRIAN MOVEMENT

PRE-EMPTION SCHEDULE

EVP	PHASES
EX. 1	1 + 6
EX. 2	8
EX. 3	2 + 5
EX. 4	4

SIGNAL HEAD DISPLAYS



VEHICLE SIGNAL HEADS
EX. NO. 21, 22, 23, 41, 42
NEW NO. T61, T81, T82

VEHICLE SIGNAL HEADS
EX. NO. 12

VEHICLE SIGNAL HEADS
EX. NO. 51

PEDESTRIAN SIGNAL HEADS
EX. NO. 28, 29, 48, 89

SIGNAL NOTES

1. SEE SG01 FOR SIGNAL PLANS.
2. SEE SG02 FOR GENERAL NOTES AND LEGEND.
3. SALVAGE OR DISPOSE REMOVED ITEMS PER SPECIAL PROVISIONS.
4. SEE WZ1–WZ7 FOR WORK ZONE PLANS.

CONSTRUCTION NOTES

1. INSTALL 45–FOOT TIMBER STRAIN POLE WITH DOWN GUY PER WSDOT STANDARD PLAN J–15.15–02. INSTALL SPAN WIRE AND TETHER ON POLE. INSTALL MESSENGER CABLE ON POLE AND ATTACH SIGNAL CONDUCTORS TO MESSENGER CABLE.
2. INSTALL 45–FOOT TIMBER STRAIN POLE WITH DOWN GUY PER WSDOT STANDARD PLAN J–15.15–02. INSTALL SPAN WIRE AND TETHER ON POLE.
3. INSTALL MESSENGER CABLE ON TO EXISTING SIGNAL POLE. RUN TEMPORARY SIGNAL WIRES THROUGH THE POLE HANDHOLE AND EXISTING SIGNAL CONDUIT BACK TO THE CONTROLLER CABINET.
4. INSTALL VEHICLE SIGNAL HEAD ON SPAN WIRE (TYPE P MOUNT).
5. INSTALL RADAR DETECTOR WITH SIDE–MOUNT BRACKET TO PROVIDE VEHICLE DETECTION ZONE 611R AS SHOWN ON THIS SHEET.
6. INSTALL RADAR DETECTOR WITH SIDE–MOUNT BRACKET TO PROVIDE VEHICLE DETECTION ZONE 411R AND 421R AS SHOWN ON THIS SHEET.
7. INSTALL AERIAL TERMINAL COMPARTMENT ASSEMBLY ON SPAN WIRE.

REMOVAL NOTES

1. REMOVE MAST ARM SIGNAL POLE, FOUNDATION, AND ALL ASSOCIATED EQUIPMENT INCLUDING WIRING BACK TO THE CONTROLLER CABINET.
2. REMOVE EXISTING JUNCTION BOX.

WIRING SCHEDULE

△ NO.	RACEWAY/ CONDUIT SIZE	VEH HEAD 5C	PED HEAD 5C	PED DETECT 2C(SH)	VEH DETECT 2C(SH)	E. V. DETECT 3C(SH)	LOOP 2-#14 TWP	RADAR DETECT CABLE	POWER #8	POWER #6	REMARKS
1	EX. 4"	EX. 4, EX. 4 (R), 2	EX. 4, EX. 4 (R)			EX. 4					
	EX. 3"			EX. 4, EX. 4 (R)	EX. 9, EX. 7 (R)			2			
2	EX. 3"	EX. 2, 2				EX. 2		2			
3	EX. 4"	EX. 4 (R)	EX. 4 (R)	EX. 4 (R)	EX. 7 (R)						
	EX. 2" SPARE										
	EX. 2" SPARE										
4	EX.	EX. 2 (R)	EX. 2 (R)	EX. 2 (R)							CAP AND ABANDON CONDUIT
5	EX.				EX. 5 (R)						CAP AND ABANDON CONDUIT
6	EX.				EX. 2 (R)						CAP AND ABANDON CONDUIT
7	EX.	EX. 2 (R)	EX. 2 (R)	EX. 2 (R)	EX. 2 (R)						CAP AND ABANDON CONDUIT
8	AERIAL	2						2			
9	SPAN WIRE	3						1			
10	SPAN WIRE	2						1			
11	SPAN WIRE							1			

NOTES:
1. (SH) – SHIELDED CABLE
2. C – MULTI–CONDUCTOR CABLE
3. (R) – REMOVE

RADAR DETECTION ZONES

RADAR UNIT	INPUT	DETECTION ZONE	PHASE	DESCRIPTION	DISTANCE (FT)*
A	1	611R	6	NBT STOP BAR	0-40
B	2	411R	4	WBLT STOP BAR	0-40
		421R	4	WBT/RT STOP BAR	0-40

*MEASURED FROM STOP BAR

1"=10' 10 5 0 10 20
Scale Feet

TSG1

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DESIGN MANAGER DATE
PROJECT MANAGER DATE

DAVID NYUGEN	8/10/21
DESIGNED BY	DATE
DAVID NYUGEN	8/10/21
DRAWN BY	DATE
JARED NAKAMOTO	8/10/21
CHECKED BY	DATE

City of Bellevue
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FACTORIA BOULEVARD STORM CONVEYANCE IMPROVEMENTS PROJECT

TEMPORARY SIGNAL PLAN

SEC 27, T 25N, R 5E

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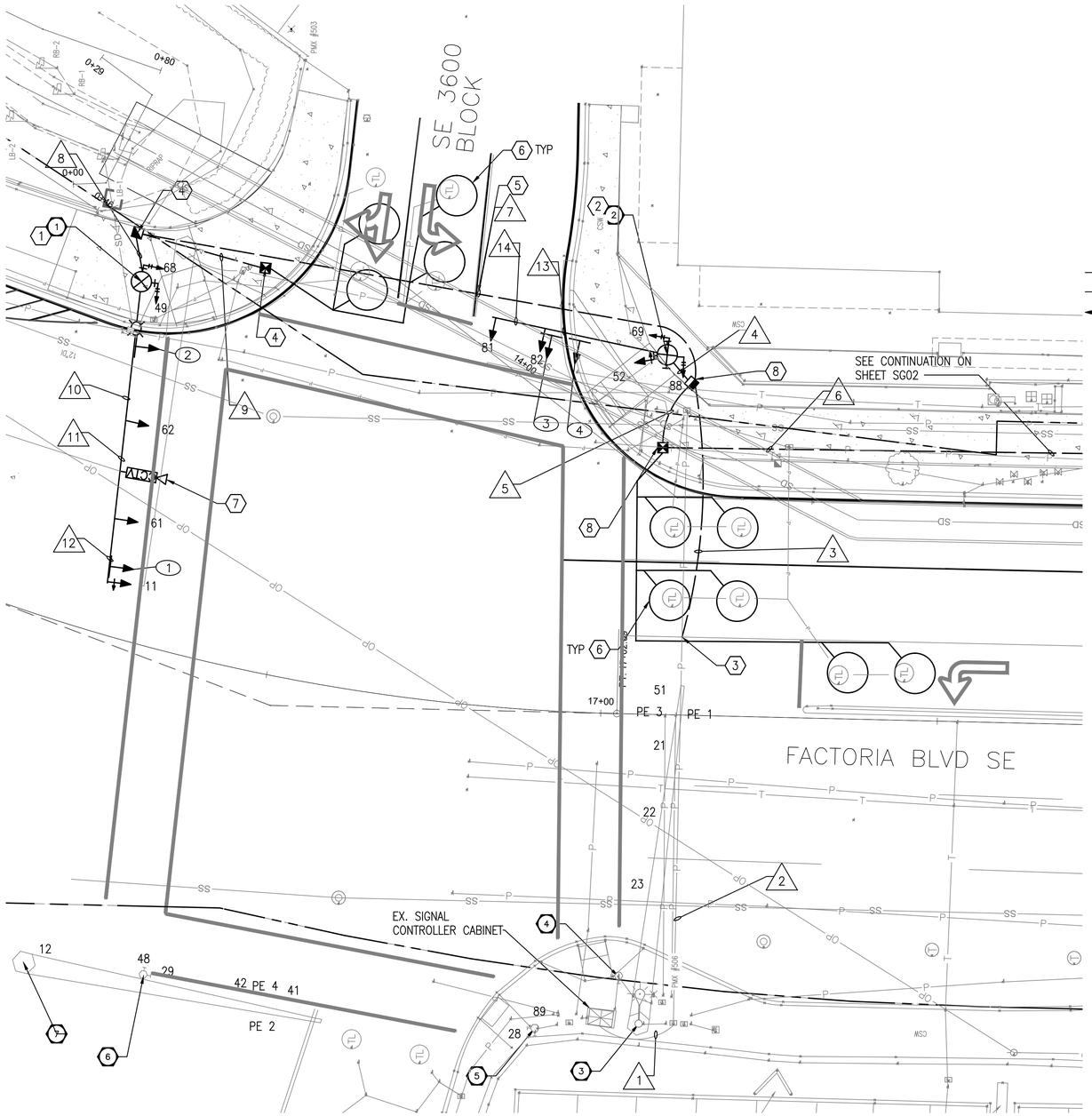

PLAN

TRAFFIC SIGNAL PLAN
SCALE: 1"=10'

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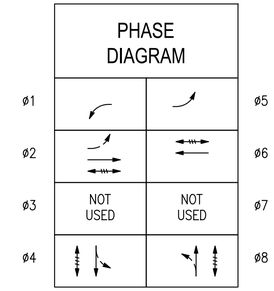
PHASE DIAGRAM

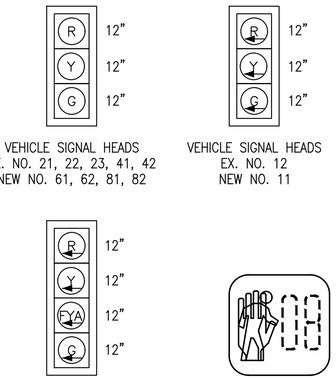


PROTECTED VEHICLE MOVEMENT
PERMISSIVE VEHICLE MOVEMENT
PEDESTRIAN MOVEMENT

PRE-EMPTION SCHEDULE

EVP	PHASES
EX. 1	1 + 6
EX. 2	8
EX. 3	2 + 5
EX. 4	4

SIGNAL HEAD DISPLAYS



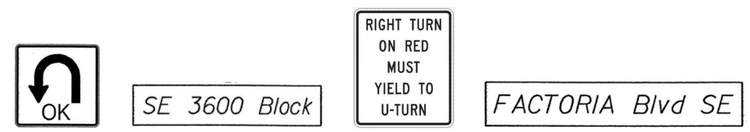
VEHICLE SIGNAL HEADS
EX. NO. 21, 22, 23, 41, 42
NEW NO. 61, 62, 81, 82

VEHICLE SIGNAL HEADS
EX. NO. 12
NEW NO. 11

VEHICLE SIGNAL HEADS
EX. NO. 51
NEW NO. 52

PEDESTRIAN SIGNAL HEADS
EX. NO. 28, 29, 48, 89
NEW NO. 49, 68, 69, 88

SIGN DISPLAYS



SIGN NUMBER 1
30" X 30"

SIGN NUMBER 2
VARIES X 18"

SIGN NUMBER 3
30" X 36"

SIGN NUMBER 4
VARIES X 18"

WIRING SCHEDULE

NO.	RACEWAY/ CONDUIT SIZE	VEH HEAD 5C	PED HEAD 5C	PED DETECT 2C(SH)	VEH DETECT 2C(SH)	E. V. DETECT 3C(SH)	LOOP LEAD-IN 3PR(SH)	LOOP 2-#14 TWP	CCTV CABLE	POWER #8	POWER #6	REMARKS
1	EX. 4"	EX. 4, 4	EX. 4, 4			EX. 4						
	EX. 3"			EX. 4, 4	EX. 9		3		1			
2	EX. 4"	4	4	4			3		1			
	EX. 2" SPARE											
	EX. 2" SPARE											
3	4"	4	4	4			3		1			
	2" SPARE											
	2" SPARE											
4	3"	2	2	2								
5	2"						2					
6	2"						1					
7	3"	2	2	2			1		1			
	3" SPARE											
8	3"	2	2	2					1			
9	2"						1					
10	MAST ARM	3										
11	MAST ARM	2										
12	MAST ARM	1										
13	MAST ARM	2										
14	MAST ARM	1										

NOTES:
1. (SH) - SHIELDED CABLE
2. C - MULTI-CONDUCTOR CABLE

SIGNAL NOTES

1. SEE SG02 FOR DETECTOR PLAN, GENERAL NOTES, AND LEGEND.
2. SEE SG03 FOR WIRE TERMINATION DIAGRAM.
3. SEE SG04 FOR POLE CHART.
4. SEE TEMPORARY SIGNAL PLANS FOR TEMPORARY SIGNAL DETAILS.
5. SALVAGE OR DISPOSE REMOVED ITEMS PER SPECIAL PROVISIONS.

CONSTRUCTION NOTES

1. CONSTRUCT SIGNAL STANDARD FOUNDATION PER WSDOT STANDARD PLAN J-26.10-03. INSTALL TYPE III SIGNAL STANDARD. INSTALL VEHICLE SIGNAL HEADS (TYPE M MOUNT) AND SIGNS ON MAST ARM. INSTALL PEDESTRIAN SIGNAL HEADS (TYPE E MOUNT), APS PUSHBUTTON ASSEMBLIES, AND TERMINAL CABINET ON SIGNAL POLE. INSTALL LUMINAIRE ARM AND LUMINAIRE PER ILLUMINATION PLANS.
2. CONSTRUCT SIGNAL STANDARD FOUNDATION PER WSDOT STANDARD PLAN J-26.10-03. INSTALL TYPE II SIGNAL STANDARD. INSTALL VEHICLE SIGNAL HEADS (TYPE M MOUNT) AND SIGNS ON MAST ARM. INSTALL VEHICLE SIGNAL HEAD (TYPE K MOUNT), PEDESTRIAN SIGNAL HEADS (TYPE E MOUNT), APS PUSHBUTTON ASSEMBLIES, AND ONE TERMINAL CABINET ON SIGNAL POLE.
3. INTERCEPT EXISTING CONDUITS AND EXTEND INTO NEW JUNCTION BOX.
4. INSTALL NON-SKID LID ON NEW JUNCTION BOX.
5. DIRECTIONAL BORE NEW CONDUITS ACROSS ROADWAY. COORDINATE DIRECTIONAL BORING WITH ILLUMINATION PLANS.
6. INSTALL 6-FT DIAMETER ROUND VEHICLE LOOP DETECTOR PER CITY OF BELLEVUE STD. PLAN SL-290-1 THROUGH SL-330-1.
7. INSTALL SALVAGED CCTV ON NEW SIGNAL MAST ARM.
8. INSTALL JUNCTION BOX WITH NON-SKID LID AND CONCRETE APRON PER CITY OF BELLEVUE STD. PLAN SL-160-1.

1"=10' 10 5 0 10 20
Scale Feet

SG1

NO	DATE	BY	APPR	REVISIONS
1				60% DESIGN - NOT FOR CONSTRUCTION

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City of Bellevue
UTILITIES

FACTORIA BOULEVARD STORM CONVEYANCE IMPROVEMENTS PROJECT

SIGNAL PLAN

SEC 27, T 25N, R 5E

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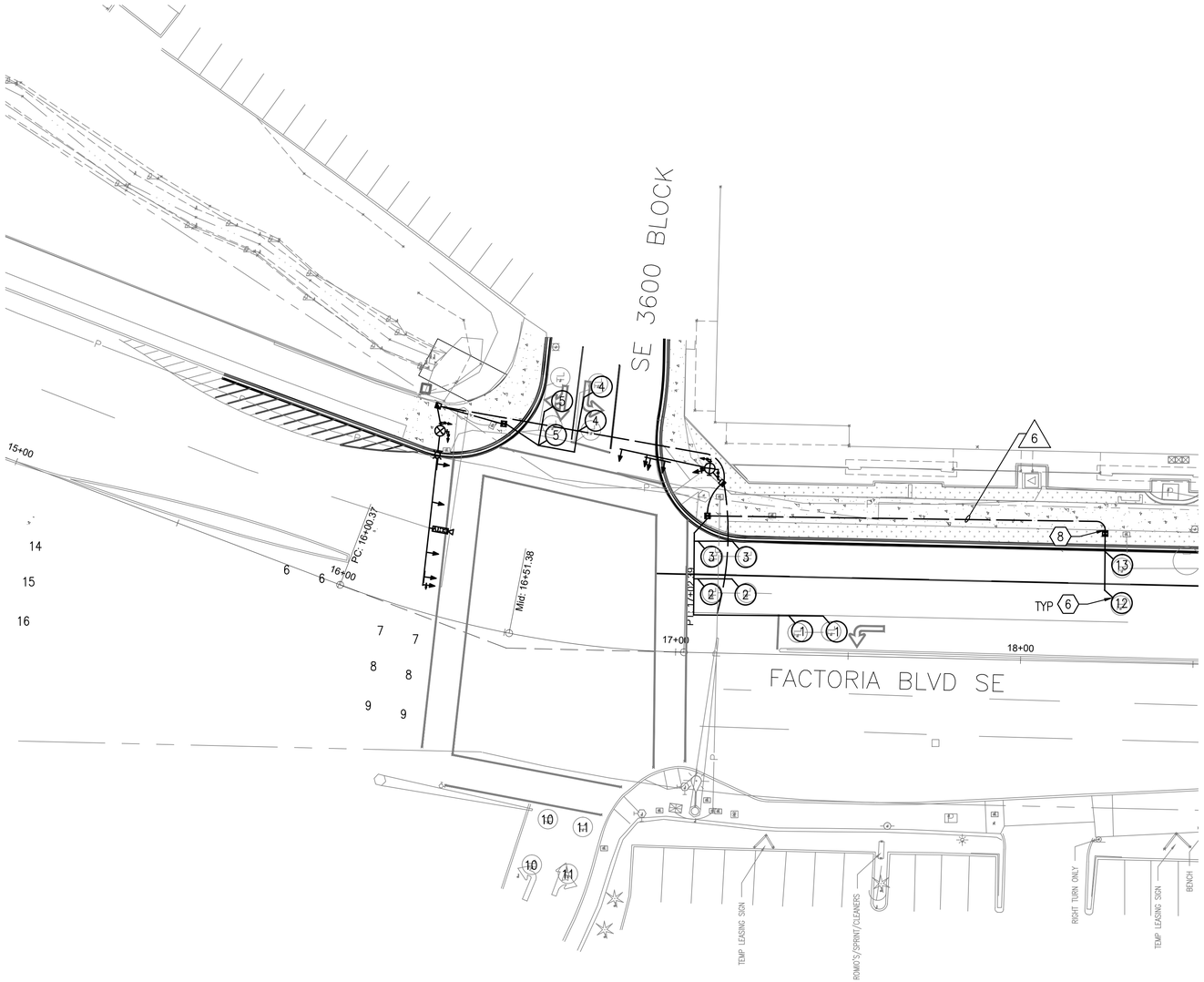

LEGEND

- SIGNAL CONTROLLER CABINET
- SERVICE CABINET
- CONDUIT
- OHL — OVERHEAD ELECTRICAL
- TYPE III SIGNAL POLE
- TYPE II SIGNAL POLE
- TYPE PS POLE
- TIMBER STRAIN POLE
- TIMBER STRAIN POLE W/ DOWN GUY
- LUMINAIRE POLE
- TIMBER LUMINAIRE POLE
- 6-IN X 6-IN WOOD POST
- VEHICLE SIGNAL HEAD
- PEDESTRIAN SIGNAL HEAD
- PEDESTRIAN PUSHBUTTON ASSEMBLY
- EMERGENCY PRE-EMPTION DETECTOR
- CCTV CAMERA
- RADAR DETECTOR
- MAST ARM MOUNTED SIGN
- TYPE 1 JUNCTION BOX
- TYPE 2 JUNCTION BOX
- TYPE 8 JUNCTION BOX
- LOOP DETECTOR
- SIGNAL POLE NUMBER
- CONSTRUCTION NOTE
- WIRE NOTE
- SIGN NUMBER

GENERAL NOTES

1. ALL UNDERGROUND UTILITIES SHALL BE LOCATED PRIOR TO EXCAVATION. CALL 1-800-424-5555 48 HOURS PRIOR TO EXCAVATION. COORDINATE ALL WORK WITH UTILITY COMPANIES TO ELIMINATE CONFLICTS.
2. ALL MATERIALS AND WORKMANSHIP SHALL CONFORM TO THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS AND THE CITY OF BELLEVUE PROJECT SPECIAL PROVISIONS.
3. CONDUITS SHALL BE PLACED IN COMMON TRENCHES WHEN POSSIBLE.
4. ALL CONDUIT RUNS AND JUNCTION BOX LOCATIONS ARE APPROXIMATE. JUNCTION BOXES SHALL NOT BE INSTALLED WITHIN CURB RAMPS, WINGS OR LANDING AREAS. JUNCTION BOX LIDS SHALL BE NON-SKID AND MATCH FINAL SIDEWALK GRADES. FINAL LOCATIONS MAY BE ADJUSTED TO AVOID CONFLICTS AND FOR EASE OF CONSTRUCTION AND SHALL BE APPROVED BY THE ENGINEER PRIOR TO INSTALLATION.
5. ALL FINAL WIRING TERMINATIONS IN THE CONTROLLER CABINET SHALL BE PERFORMED BY THE CONTRACTOR.
6. ALL VEHICLE SIGNAL HEADS SHALL BE COMPLETE WITH TUNNEL VISORS AND BACKPLATES.
7. ALL POLES, TERMINAL CABINETS, SIGNAL HEADS, LUMINAIRES, MOUNTINGS AND BACKS OF MAST ARM SIGNS SHALL BE POWDER COATED BLACK.

SIGNAL NOTES

1. SEE SG01 FOR TRAFFIC SIGNAL PLAN AND CONSTRUCTION NOTES.
2. SEE SG03 FOR WIRE TERMINATION DIAGRAM.
3. SEE SG04 FOR POLE CHART.
4. SEE TEMPORARY SIGNAL PLANS FOR TEMPORARY SIGNAL DETAILS AND REMOVAL NOTES.
5. SALVAGE OR DISPOSE REMOVED ITEMS PER SPECIAL PROVISIONS.

WIRE/CONDUIT NOTES

1. ALL CONDUITS CONTAINING CONDUCTORS SHALL INCLUDE GROUND WIRE. GROUND WIRE SIZE SHALL MATCH THE LARGEST CONDUCTOR (MIN. #8 UNLESS OTHERWISE NOTED).
2. ALL EMPTY/SPARE CONDUITS SHALL CONTAIN TONEABLE MULE TAPE.

PLAN

DETECTOR PLAN
SCALE: 1"=20'

1"=20' 10 5 0 10 20
Scale Feet

CALL 72 HOURS
BEFORE YOU DIG
1-800-424-5555

SG2

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Approved By

DESIGN MANAGER DATE
PROJECT MANAGER DATE

DAVID NYUGEN	8/10/21
DESIGNED BY	DATE
DAVID NYUGEN	8/10/21
DRAWN BY	DATE
JARED NAKAMOTO	8/10/21
CHECKED BY	DATE

City of Bellevue
UTILITIES

FACTORIA BOULEVARD STORM
CONVEYANCE IMPROVEMENTS PROJECT

SIGNAL DETECTION PLAN

SEC 27, T 25N, R 5E

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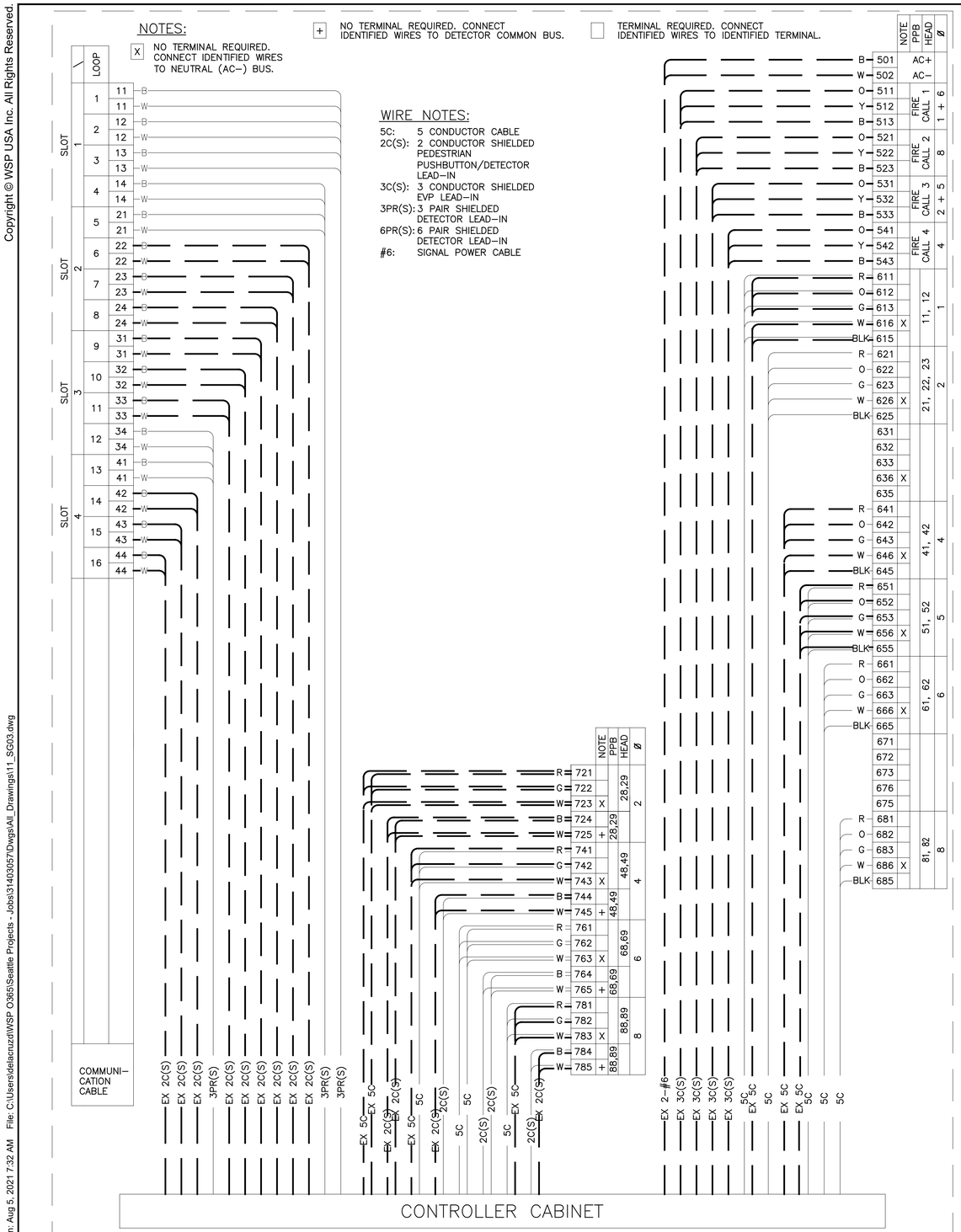

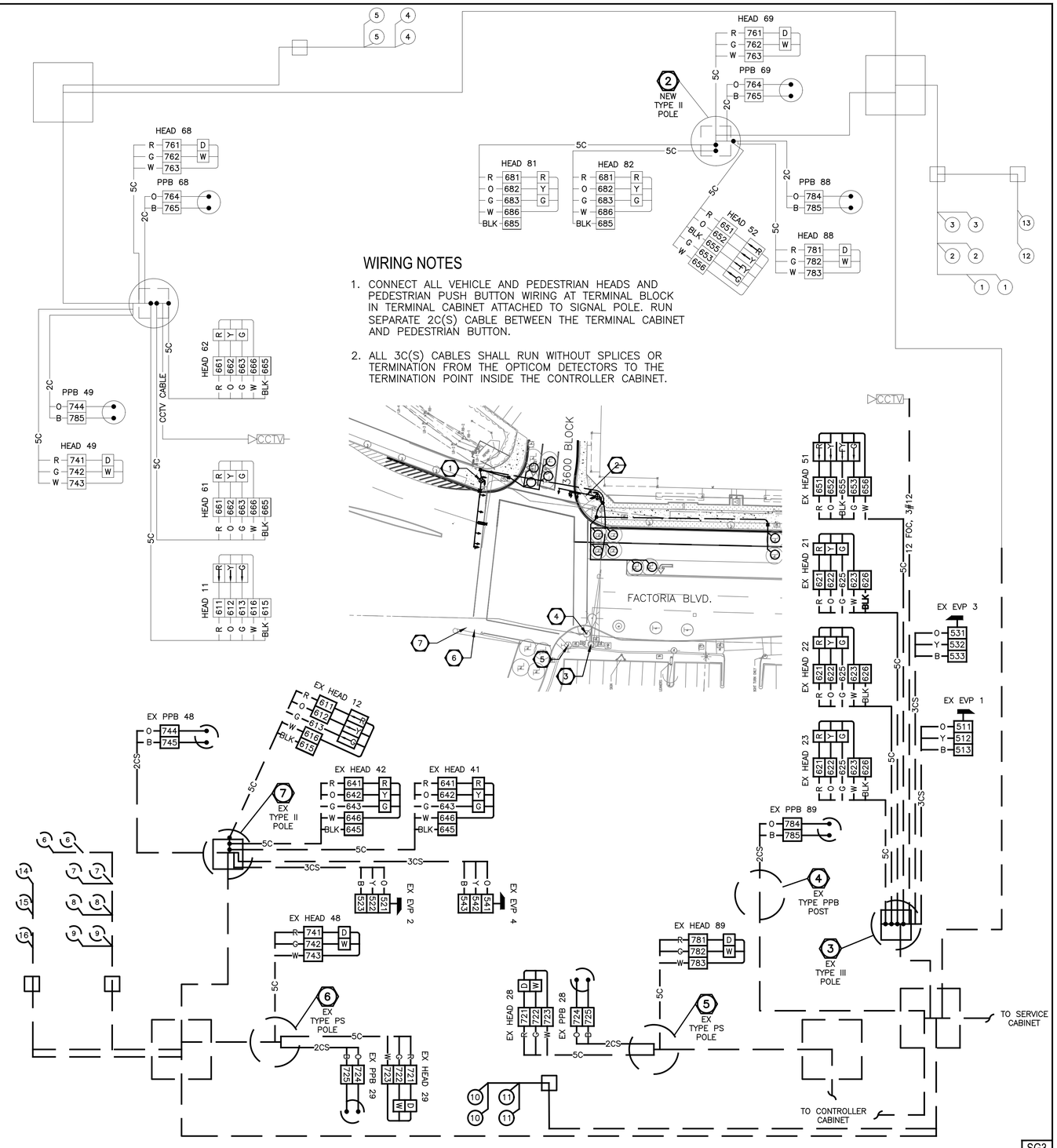

WIRING NOTES

1. CONNECT ALL VEHICLE AND PEDESTRIAN HEADS AND PEDESTRIAN PUSH BUTTON WIRING AT TERMINAL BLOCK IN TERMINAL CABINET ATTACHED TO SIGNAL POLE. RUN SEPARATE 2C(S) CABLE BETWEEN THE TERMINAL CABINET AND PEDESTRIAN BUTTON.
2. ALL 3C(S) CABLES SHALL RUN WITHOUT SPLICES OR TERMINATION FROM THE OPTICOM DETECTORS TO THE TERMINATION POINT INSIDE THE CONTROLLER CABINET.

SG3

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FACTORIA BOULEVARD STORM CONVEYANCE IMPROVEMENTS PROJECT

SIGNAL WIRING DIAGRAM

SEC 27, T 25N, R 5E

SHEET 54 OF 93

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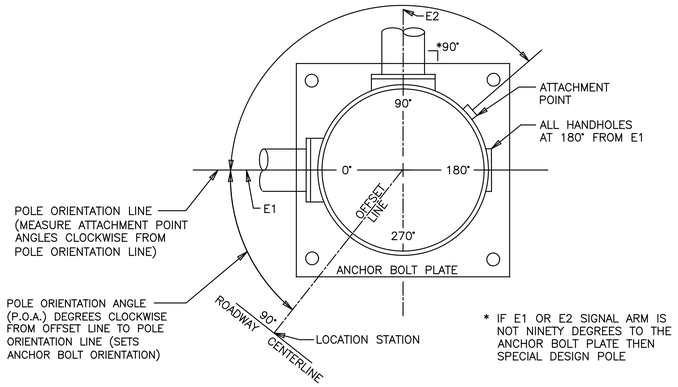
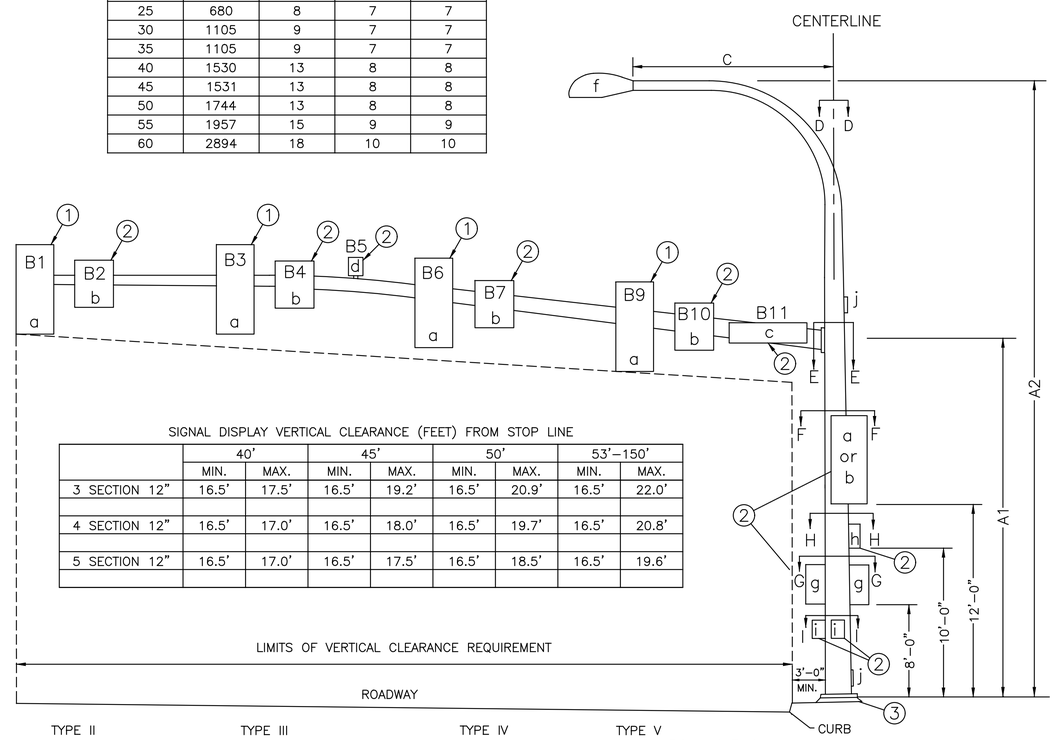


* IF E1 OR E2 SIGNAL ARM IS NOT NINETY DEGREES TO THE ANCHOR BOLT PLATE THEN SPECIAL DESIGN POLE

POLE ORIENTATION AND ATTACHMENT POINT DETAIL

NOT TO SCALE

MASTARM LENGTH (FT)	MAX XYZ (FT)³	LATERAL BEARING PRESSURE = 1500 PSF & Ø = 30°		
		FOUNDATION DEPTHS (FT)		
		3' RD.	3' SQ.	4' RD.
25	680	8	7	7
30	1105	9	7	7
35	1105	9	7	7
40	1530	13	8	8
45	1531	13	8	8
50	1744	13	8	8
55	1957	15	9	9
60	2894	18	10	10



SIGNAL DISPLAY VERTICAL CLEARANCE (FEET) FROM STOP LINE

	40'		45'		50'		53'–150'	
	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.
3 SECTION 12"	16.5'	17.5'	16.5'	19.2'	16.5'	20.9'	16.5'	22.0'
4 SECTION 12"	16.5'	17.0'	16.5'	18.0'	16.5'	19.7'	16.5'	20.8'
5 SECTION 12"	16.5'	17.0'	16.5'	17.5'	16.5'	18.5'	16.5'	19.6'

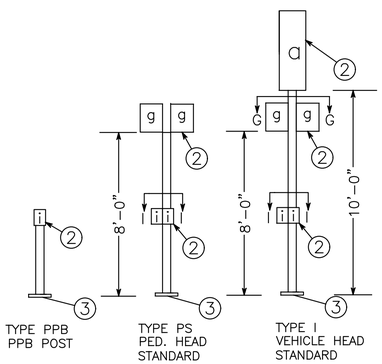
NOTES

1. MOUNTING COUPLING INSTALLED AT OFFSET DISTANCE INDICATED IN CHART.
2. FIELD INSTALLED.
3. FOR FOUNDATION DETAILS, DEPTH TABLE, AND IDENTIFICATION TAGS, SEE WSDOT STANDARD PLANS

ALTERNATE NOTE 1 FOR TYPE N MOUNT ONLY:
DRILL 1" HOLE IN MAST ARM AND INSTALL PLASTIC SPLIT BUSHING FOR CABLE ENTRANCE.

LEGEND

a. Vehicle Display
b. Sign
c. Street Name Sign
d. Pre–Empt Detector
e. Deleted (10/22/90)
f. Luminaire
g. Pedestrian Display
h. Cabinet
i. PPB–M
j. Handhole



TYPE II MAST ARM SIGNAL STANDARD

TYPE III COMBINATION LIGHTING AND MAST ARM SIGNAL STANDARD

TYPE IV STRAIN POLE STANDARD

TYPE V COMBINATION LIGHTING AND STRAIN POLE STANDARD

TYPE SD SPECIAL DESIGN STANDARD

SIGNAL STANDARD DETAIL CHART

STD. No.	FIELD LOCATION					POLE TYPE	MOUNTING HEIGHT (FT)		MAST ARM LENGTH (FT)	SIGNAL MAST ARM DATA: OFFSET DISTANCES (FT) (Z) (POLE ℄ TO ATTACHMENT POINT)									SIGNAL MAST ARM DATA: WINDLOAD AREAS (FT)² (X)(Y)								(X)(Y)(Z) WINDLOAD TOTAL (FT)³	LUMINAIRE ARM (FT)	POLE ATTACHMENT POINT ANGLES (deg)									FOUNDATION DEPTHS (FT)				REMARKS
	STATION	OFFSET	LT.	RT.	P.O.A.		A1	A2	(FT)	B1	B2	B3	B4	B5	B6	B7	B9	B11	B1	B2	B3	B4	B6	B7	B9	B11		C	D	E1	E2	F	G1	G2	H	I1**	I2	1.5'SQ.	2'RD.	3'RD.	4'RD.	
1	STA 16+14	51.8'	X		12°	III	17	40	45	44.9	42.6	35.4			20.7			11	9.2	6.25	9.2		9.2			15	1381	6		12			175	269	180	175	269			13	8	
2	STA 17+00	53.6'	X		250°	II	17		20	18.3		10.8	9.6					11	9.2		9.2	7.5				15	505			250		237	171	270	180	171	270			8	7	
3	STA 17+07	EX.		X	EX.	III	EX.	EX.	EX.	EX.		EX.		EX.	EX.		EX.	EX.	EX.		EX.		EX.		EX.	EX.	EX.	EX.		EX.		EX.			EX.				EX.	EX.	EXISTING TYPE III POLE
4	STA 17+04	EX.		X		PPB																														EX.						EXISTING TYPE PPB POLE
5	STA 16+93	EX.		X		PS																											EX.	EX.		EX.						EXISTING TYPE PS POLE
6	EX.	EX.		X		PS																											EX.	EX.		EX.						EXISTING TYPE PS POLE
7	EX.	EX.		X	EX.	II	EX.		EX.	EX.		EX.		EX.				EX.	EX.		EX.					EX.	EX.			EX.		EX.			EX.	EX.			EX.	EX.	EXISTING TYPE II POLE

*INSTALLED ON BACK SIDE OF MAST ARM USING TYPE N MOUNT

** FIELD VERIFY PUSHBUTTON IS PARALLEL TO CROSSWALK PRIOR TO INSTALLATION.

SG4

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JARED NAKAMOTO	8/10/21
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City of Bellevue
UTILITIES

FACTORIA BOULEVARD STORM CONVEYANCE IMPROVEMENTS PROJECT

SIGNAL POLE CHART

SEC 27, T 25N, R 5E

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STAGE 1 (WZ1 - WZ2)

1. TEMPORARY CONSTRUCTION AND RELATED ACTIVITIES TO BE DONE DURING NIGHT TIME. ALL OTHER CONSTRUCTION AND RELATED ACTIVITIES TO BE DONE DURING DAY AND NIGHT TIME.
2. SIDE WALK IN CONFLICT WITH WORK ZONE TO BE CLOSED AT FACTORIA VILLAGE MALL.
2. DRIVEWAY ACCESS IN CONFLICT WITH WORK ZONE TO BE CLOSED – SEE PLANS.
3. TEMPORARY SIGNALS AND ASSOCIATED EQUIPMENT TO BE INSTALLED AND CONSTRUCTED.

STAGE 2 (WZ3 - WZ4)

1. CONSTRUCTION AND RELATED ACTIVITIES TO BE DONE DURING DAY AND NIGHT TIME.
2. DRIVEWAY ACCESS IN CONFLICT WITH WORK ZONE TO BE CLOSED – SEE PLANS.
3. BOXCULVERT, CATCH BASINS, PIPES, SIDE WALK, CURB AND GUTTER, LIGHTING AND LANDSCAPE TO BE CONSTRUCTED.

STAGE 3 (WZ5)

1. CONSTRUCTION AND RELATED ACTIVITIES TO BE DONE DURING DAY AND NIGHT TIME.
2. DRIVEWAY ACCESS EAST OF SE 38TH ST IN CONFLICT WITH WORK ZONE TO BE CLOSED – SEE PLANS.
3. BOXCULVERT, CATCH BASINS, PIPES, SIDE WALK, CURB AND GUTTER, LIGHTING AND LANDSCAPE TO BE CONSTRUCTED.

STAGE 4 (WZ6)

1. CONSTRUCTION AND RELATED ACTIVITIES TO BE DONE DURING DAY AND NIGHT TIME.
2. DRIVEWAY ACCESS IN CONFLICT WITH WORK ZONE TO BE CLOSED – SEE PLANS.
3. BOXCULVERT, CATCH BASINS, PIPES, SIDE WALK, CURB AND GUTTER, LIGHTING AND LANDSCAPE TO BE CONSTRUCTED.

STAGE 5 (WZ7)

1. CONSTRUCTION AND RELATED ACTIVITIES TO BE DONE DURING DAY AND NIGHT TIME.
2. CONSTRUCT STORM CROSSING, VAULT AND MANHOLES.

STAGE 6 (WZ8)

1. CONSTRUCTION AND RELATED ACTIVITIES TO BE DONE DURING DAY AND NIGHT TIME.
2. PERFORM CLEARING, GRUBBING AND CHANNEL GRADING.
3. CONSTRUCT HABITAT STRUCTURES, PLANT VEGETATION. PERFORM ASSOCIATED LANDSCAPING AND PLACE PERMANENT EROSION CONTROL MEASURES.

GENERAL NOTES (ALL STAGES)

1. THE CONSTRUCTION ACTIVITIES LISTED ARE AN APPROXIMATE ORDER OF WORK AND ARE NOT COMPREHENSIVE OF ALL CONSTRUCTION ACTIVITIES.
2. THESE WORK ZONE PLANS ARE NOT INTENDED TO ADDRESS TRAFFIC CONTROL. SEE TRAFFIC CONTROL PLANS.
3. CLOSURES AND MAINTENANCE OF DRIVEWAY ACCESS TO BE COORDINATED WITH THE COB AND AFFECTED BUSINESS OWNERS.
4. THESE WORK ZONE PLANS WERE DEVELOPED TO SHOW ONE POSSIBLE SEQUENCE OF CONSTRUCTION. THE CONTRACTOR MAY DEVELOP AND USE OTHER SEQUENCING PLANS IF THE PROJECT GOALS AND SPECIFICATIONS ARE MET AND APPROVED BY THE ENGINEER.

LEGEND

NIGHT WORK AREA

WORK AREA

CALL 72 HOURS
BEFORE YOU DIG
1-800-424-5555

WZ1

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City of Bellevue
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FACTORIA BOULEVARD STORM
CONVEYANCE IMPROVEMENTS PROJECT

WORK ZONE NOTES & LEGEND

SEC 27, T 25N, R 5E

SHEET 56 OF 93

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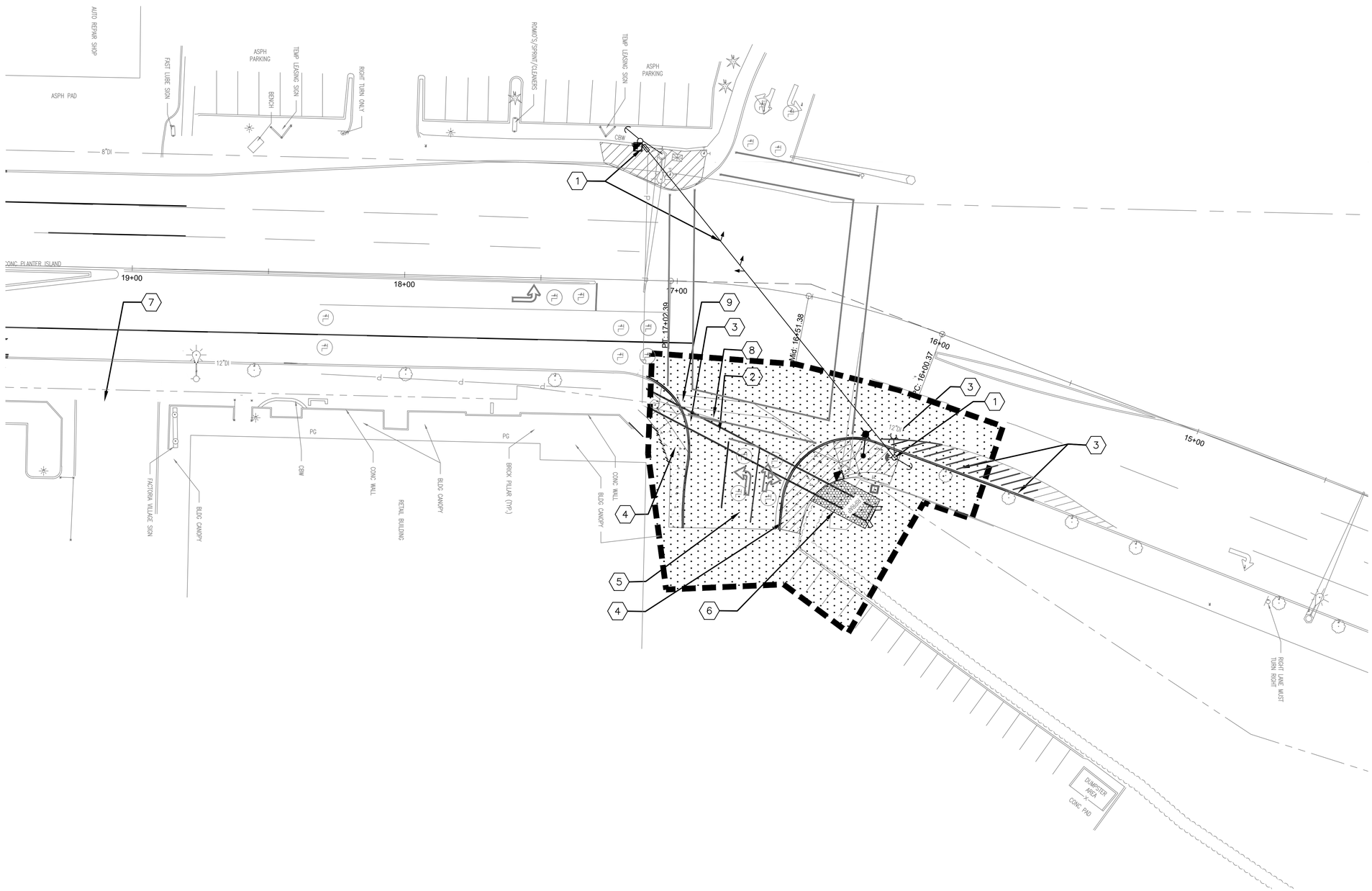

PLAN

WORK ZONE PLAN
SCALE: 1"=20'

NOTES

1. SEE WZ01 FOR GENERAL NOTES AND LEGEND,
2. SEE TCP PLANS FOR TEMPORARY TRAFFIC CONTROL, CONSTRUCTION DURATIONS AND OTHER ASSOCIATED DETAILS.

CONSTRUCTION ACTIVITIES

1. CCONSTRUCT TEMPORARY SIGNAL AND ASSOCIATED EQUIPMENT.
2. CONSTRUCT BOX CULVERT AND CONNECT TO EXISTING STORM.
3. INSTALL CATCH BASIN AND PIPES.
4. CONSTRUCT SIDEWALK, CURB AND GUTTER.
5. REHABILITATE PAVEMENT AND ASSOCIATED PAVEMENT MARKINGS.
6. PLACE RIPRAP.
7. DRIVEWAY ACCESS TO NE MAINTAINED.
8. DRIVE ACCESS TO BE CLOSED.
9. SIDEWALK CLOSED.

1"=20' 10 5 0 10 20
Scale Feet

CALL 72 HOURS
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WZ2

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City of Bellevue
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FACTORIA BOULEVARD STORM
CONVEYANCE IMPROVEMENTS PROJECT

WORK ZONE PLAN STAGE 1

SEC 27, T 25N, R 5E

SHEET 57 OF 93

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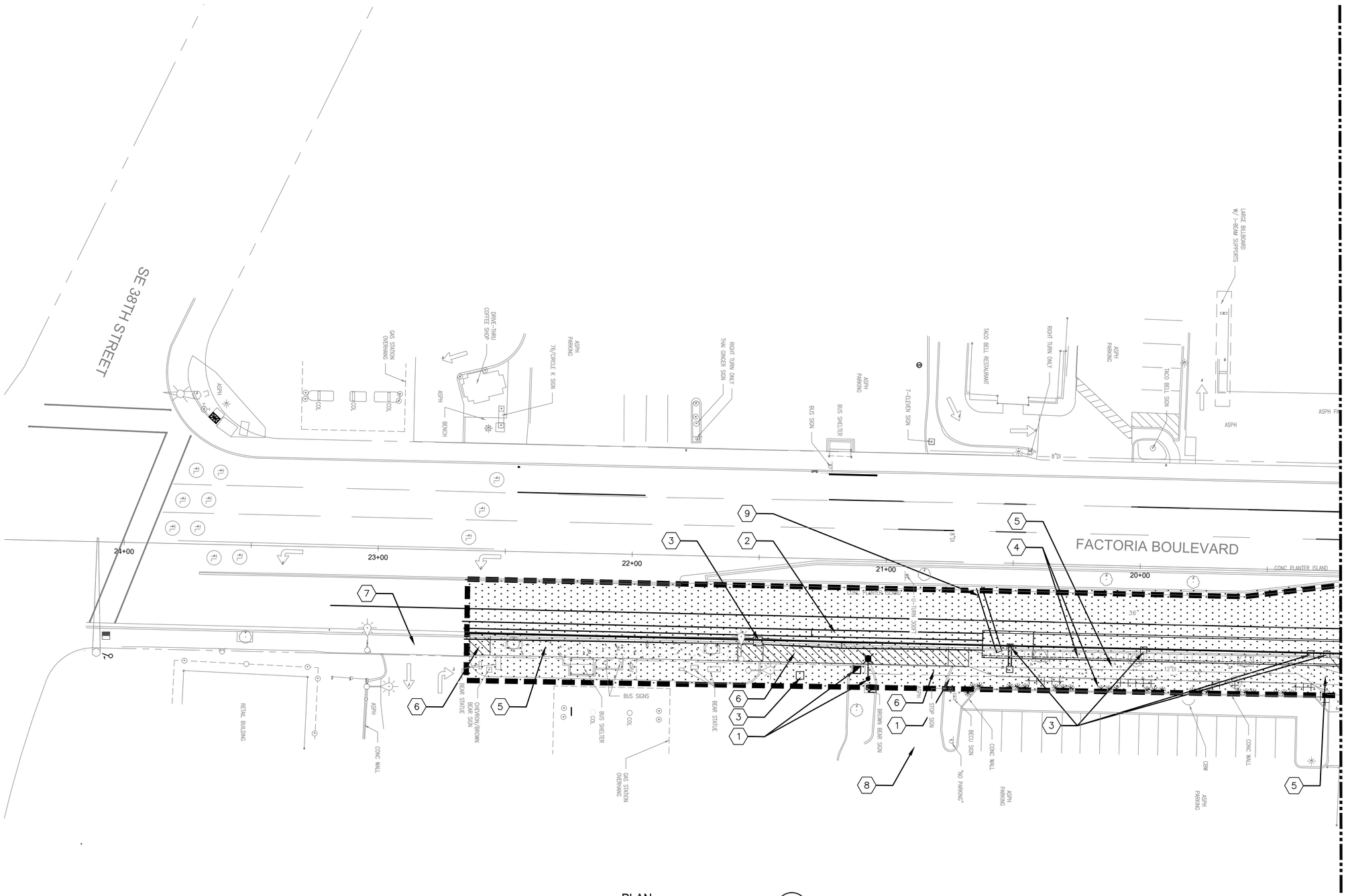

PLAN

WORK ZONE PLAN
SCALE: 1"=20'

NOTES

1. SEE WZ01 FOR GENERAL NOTES AND LEGEND,
2. SEE TCP PLANS FOR TEMPORARY TRAFFIC CONTROL, CONSTRUCTION DURATIONS AND OTHER ASSOCIATED DETAILS.

CONSTRUCTION ACTIVTIES

1. CONSTRUCT LUMINAIRE AND ASSOCIATED EQUIPMENT.
2. CONSTRUCT BOX CULVERT AND CONNECT TO EXISTING STORM.
3. INSTALL CATCH BASIN, PIPES AND GUTTER LINE.
4. PLANT VEGETATION AND ASSOCIATED LANDSCAPE WORK.
5. CONSTRUCT SIDEWALK, CURB AND GUTTER.
6. CONSTRUCT DRIVEWAY.
7. MAINTAIN DRIVEWAY ACCESS.
8. DRIVE ACCESS TO BE CLOSED.
9. CONSTRUCT STORM CROSSING, VAULT AND MANHOLES.

1"=20' 10 5 0 10 20
Scale Feet

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WZ3

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WORK ZONE PLAN STAGE 2

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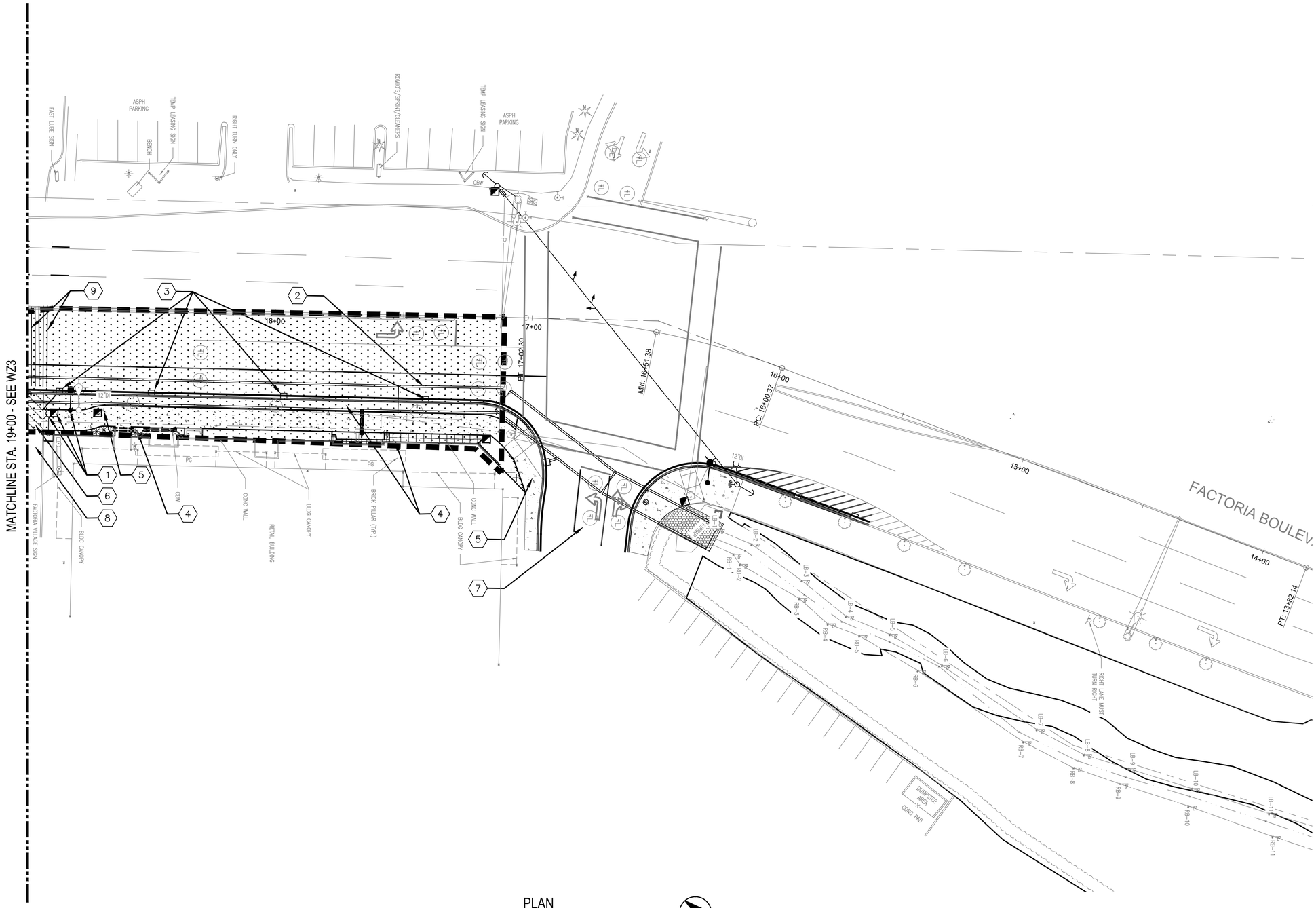

PLAN

WORK ZONE PLAN
SCALE: 1"=20'

NOTES

1. SEE WZ01 FOR GENERAL NOTES AND LEGEND,
2. SEE TCP PLANS FOR TEMPORARY TRAFFIC CONTROL, CONSTRUCTION DURATIONS AND OTHER ASSOCIATED DETAILS.

CONSTRUCTION ACTIVTIES

1. CONSTRUCT LUMINAIRE AND ASSOCIATED EQUIPMENT.
2. CONSTRUCT BOX CULVERT AND CONNECT TO EXISTING STORM.
3. INSTALL CATCH BASIN, PIPES AND GUTTER LINE.
4. PLANT VEGETATION AND ASSOCIATED LANDSCAPE WORK.
5. CONSTRUCT SIDEWALK, CURB AND GUTTER.
6. CONSTRUCT DRIVEWAY.
7. MAINTAIN DRIVEWAY ACCESS.
8. DRIVE ACCESS TO BE CLOSED.
9. CONSTRUCT STORM CROSSING, VAULT AND MANHOLES.

1"=20' 10 5 0 10 20
Scale Feet

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WORK ZONE PLAN STAGE 2

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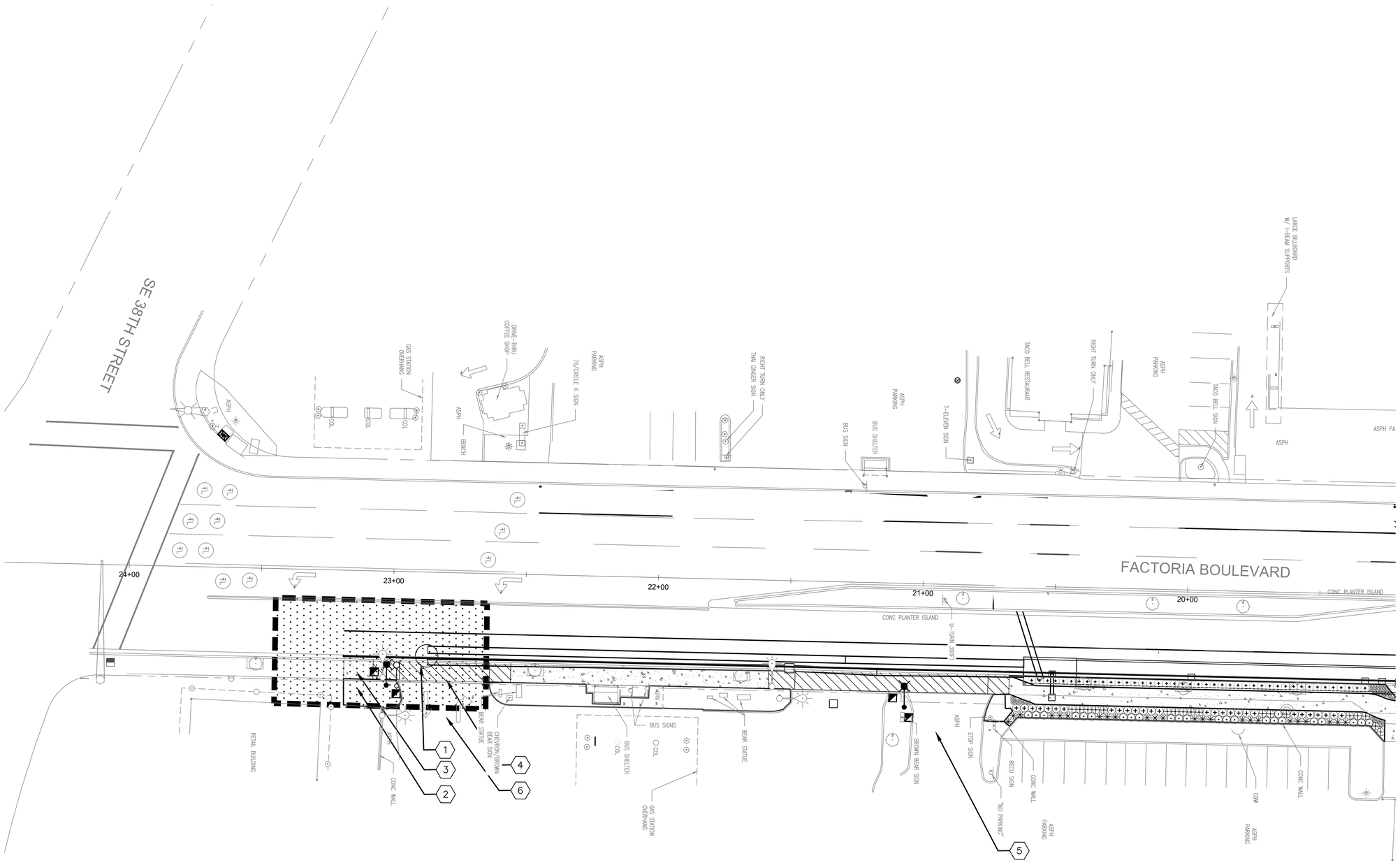

PLAN

WORK ZONE PLAN
SCALE: 1"=20'

NOTES

1. SEE WZ01 FOR GENERAL NOTES AND LEGEND,
2. SEE TCP PLANS FOR TEMPORARY TRAFFIC CONTROL, CONSTRUCTION DURATIONS AND OTHER ASSOCIATED DETAILS.

CONSTRUCTION ACTIVTIES

1. CONSTRUCT MANHOLE AND CONNECT TO EXISTING STORM.
2. PLANT VEGETATION AND ASSOCIATED LANDSCAPE WORK.
3. CONSTRUCT SIDEWALK, CURB AND GUTTER.
4. CONSTRUCT DRIVEWAY.
5. MAINTAIN DRIVEWAY ACCESS.
6. DRIVE ACCESS TO BE CLOSED.

1"=20' 10 5 0 10 20
Scale Feet

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Approved By

DESIGN MANAGER DATE
PROJECT MANAGER DATE

WILSON DSOUZA	8/10/21
DESIGNED BY	DATE
WILSON DSOUZA	8/10/21
DRAWN BY	DATE
JARED NAKAMOTO	8/10/21
CHECKED BY	DATE

City of Bellevue
UTILITIES

FACTORIA BOULEVARD STORM CONVEYANCE IMPROVEMENTS PROJECT

WORK ZONE PLAN STAGE 3

SEC 27, T 25N, R 5E

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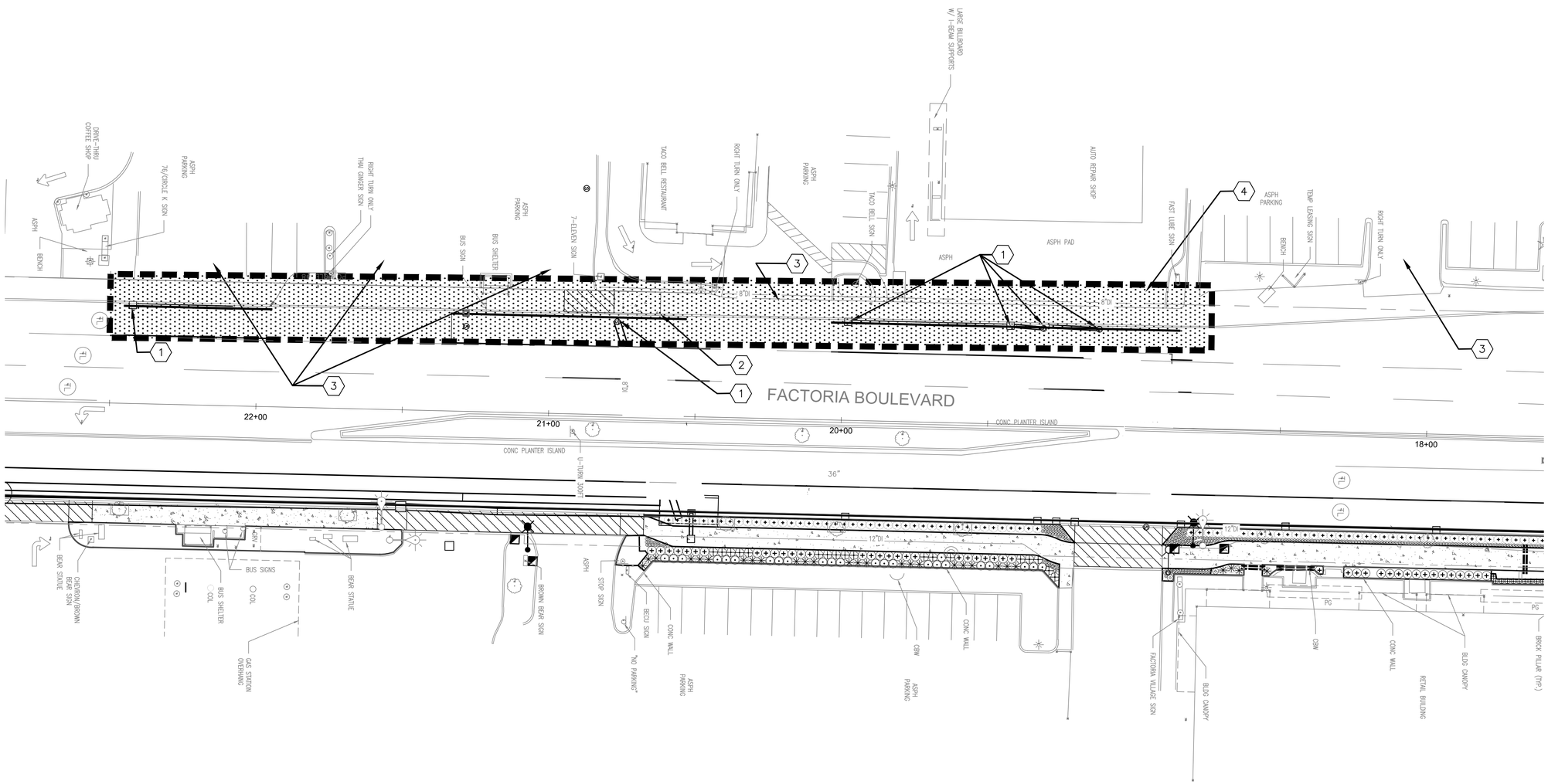

PLAN

WORK ZONE PLAN
SCALE: 1"=20'

NOTES

1. SEE WZ01 FOR GENERAL NOTES AND LEGEND,
2. SEE TCP PLANS FOR TEMPORARY TRAFFIC CONTROL, CONSTRUCTION DURATIONS AND OTHER ASSOCIATED DETAILS.

CONSTRUCTION ACTIVTIES

1. CONSTRUCT CATCH BASIN, PIPES AND GUTTER LINE.
2. CONSTRUCT SIDEWALK, CURB AND GUTTER.
3. MAINTAIN DRIVEWAY ACCESS.
4. DRIVE ACCESS TO BE CLOSED.

1"=20' 10 5 0 10 20
Scale Feet

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City of Bellevue
UTILITIES

FACTORIA BOULEVARD STORM CONVEYANCE IMPROVEMENTS PROJECT

WORK ZONE PLAN STAGE 4

SEC 27, T 25N, R 5E

SHEET 61 OF 93

WZ6

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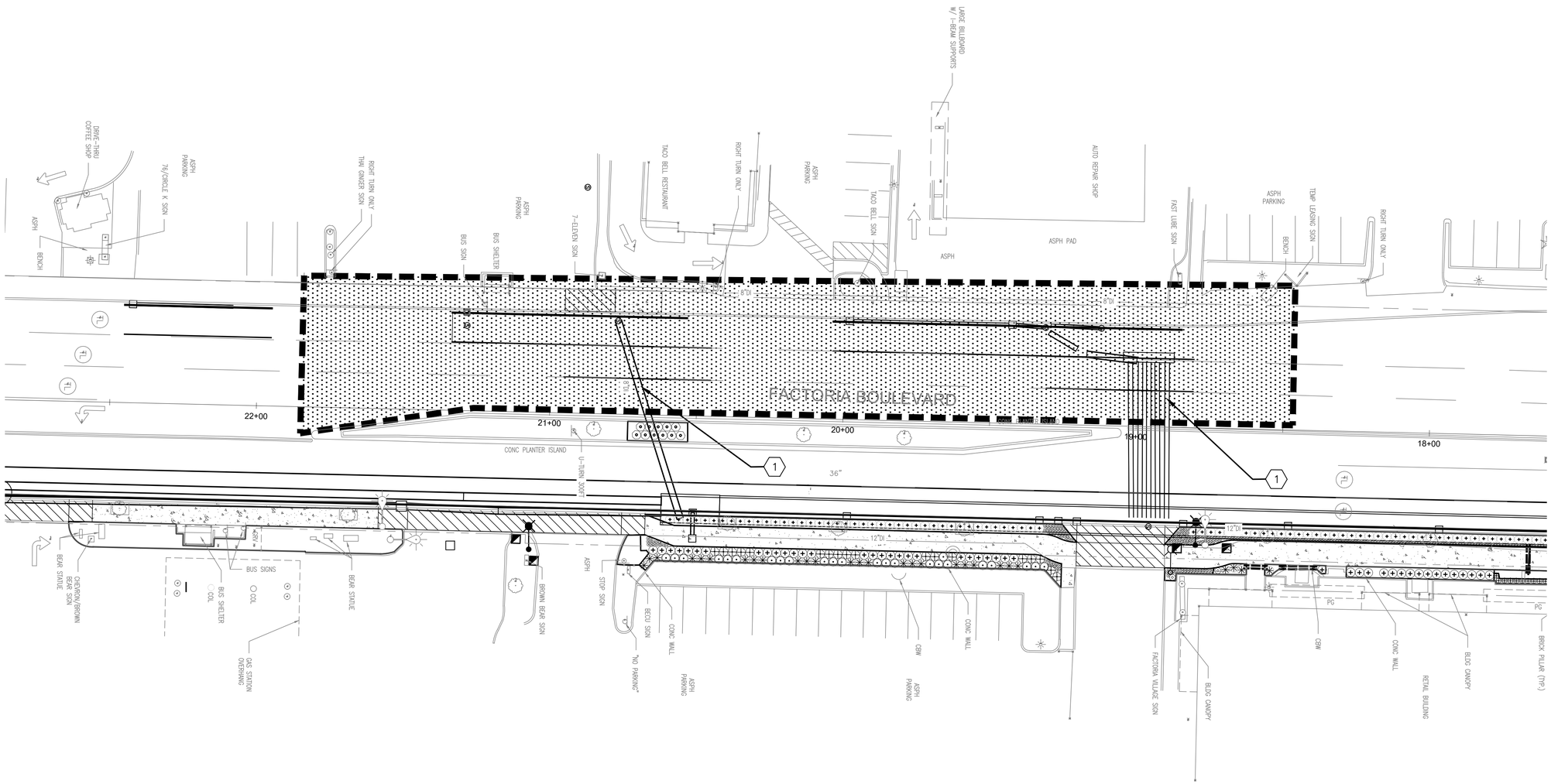

PLAN

WORK ZONE PLAN
SCALE: 1"=20'

NOTES

1. SEE WZ01 FOR GENERAL NOTES AND LEGEND,
2. SEE TCP PLANS FOR TEMPORARY TRAFFIC CONTROL, CONSTRUCTION DURATIONS AND OTHER ASSOCIATED DETAILS.

CONSTRUCTION ACTIVTIES

(1) CONSTRUCT STORM CROSSING, VAULT AND MANHOLES.

1"=20' 10 5 0 10 20
Scale Feet

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FACTORIA BOULEVARD STORM CONVEYANCE IMPROVEMENTS PROJECT

WORK ZONE PLAN STAGE 5

SEC 27, T 25N, R 5E

WZ7

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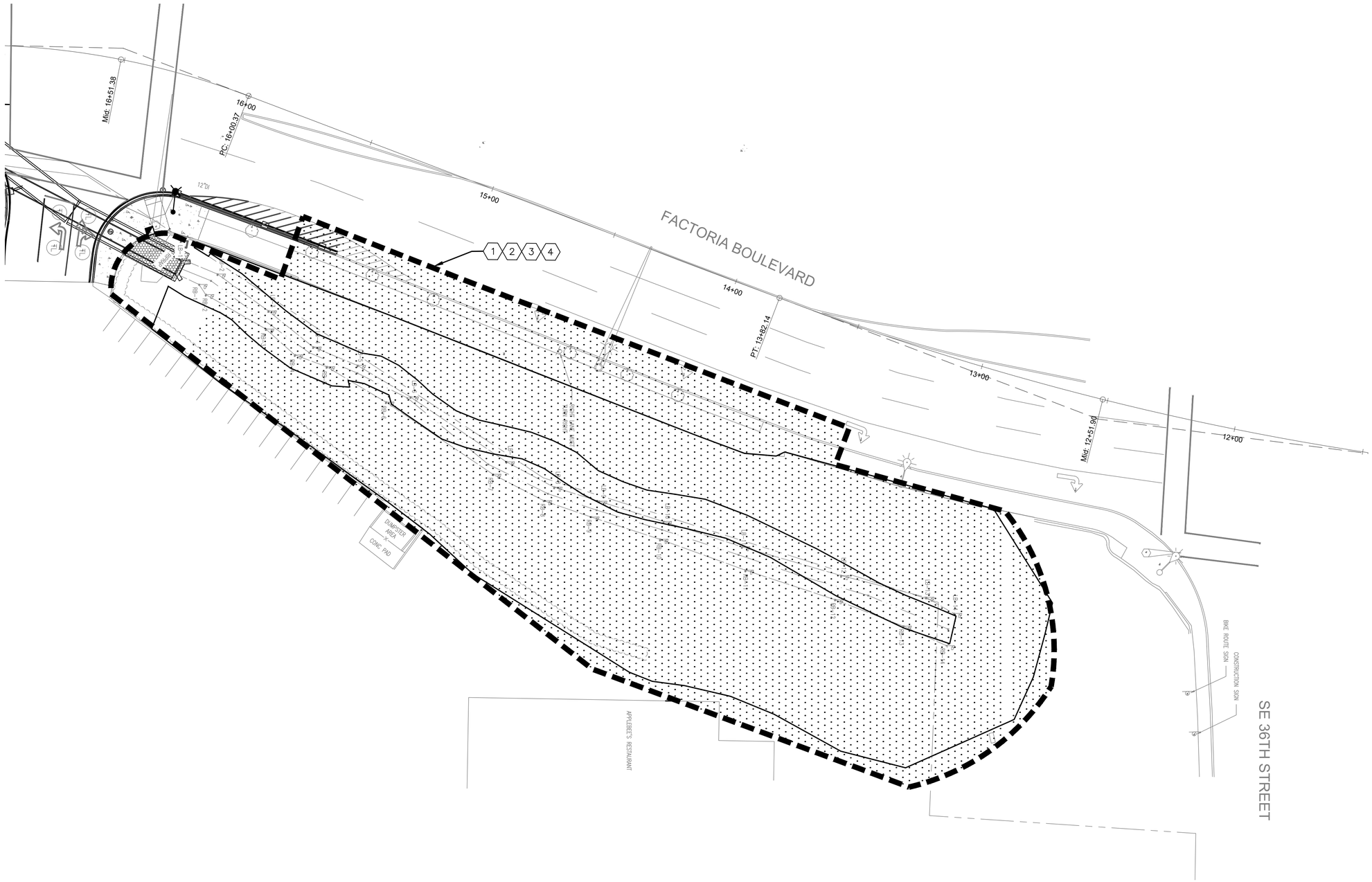

PLAN

WORK ZONE PLAN
SCALE: 1"=20'

NOTES

1. SEE WZ01 FOR GENERAL NOTES AND LEGEND,
2. SEE TCP PLANS FOR TEMPORARY TRAFFIC CONTROL, CONSTRUCTION DURATIONS AND OTHER ASSOCIATED DETAILS.

CONSTRUCTION ACTIVITIES

1. PERFORM CLEARING AND GRUBBING.
2. PERFORM CHANNEL GRADING, CONSTRUCT VEGETATED WALL, PLACE CHANNEL MATERIAL AND HABITAT STRUCTURES.
3. PLANT VEGETATION AND PERFORM ASSOCIATED LANDSCAPING.
4. PLACEMENT OF PERMANENT EROSION CONTROL MEASURE.

1"=20' 10 5 0 10 20
Scale Feet

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WZ8

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City of Bellevue
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FACTORIA BOULEVARD STORM
CONVEYANCE IMPROVEMENTS PROJECT

WORK ZONE PLAN STAGE 6

SEC 27, T 25N, R 5E

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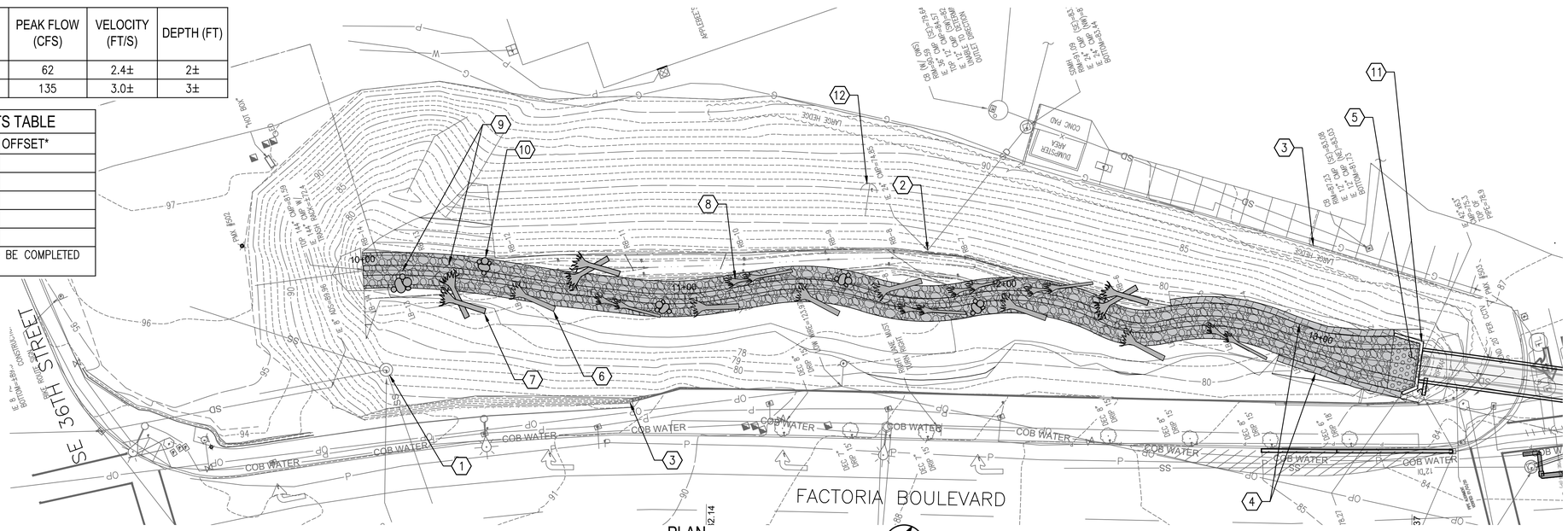
STORM FREQUENCY	PEAK FLOW (CFS)	VELOCITY (FT/S)	DEPTH (FT)
2–YEAR	62	2.4±	2±
100–YEAR	135	3.0±	3±

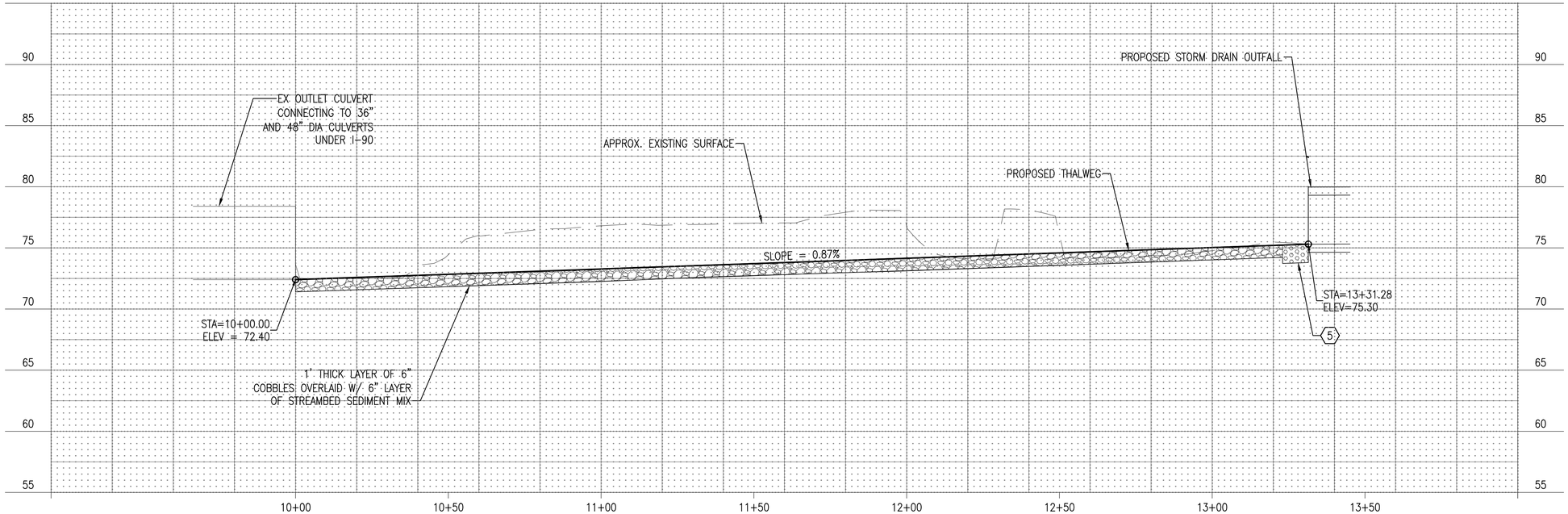
GRADING LIMITS TABLE		
ID #	STATION*	OFFSET*
GL–1		
GL–2		
GL–3		
GL–4		
GL–5		

*GRADING LIMITS TABLE TO BE COMPLETED IN 90% SUBMITTAL.



PLAN

RICHARDS CREEK CHANNEL RESTORATION
SCALE: 1"=20'



SECTION

RICHARDS CREEK CHANNEL RESTORATION
HORIZ SCALE: 1"=20'
VERT SCALE: 1"=5'

GENERAL NOTES

1. EXISTING EAST BANK OF RICHARDS CREEK INCLUDES SIGNIFICANT ROCK. CONTRACTOR TO AVOID DISTURBING EAST BANK. ANY DISTURBANCE SHALL BE APPROVED BY ENGINEER.
2. LIMIT DISTURBANCE TO ONLY THOSE AREAS NECESSARY FOR CONSTRUCTING THE PROPOSED IMPROVEMENTS.
3. CONTOURS REPRESENT FINAL GRADE. REFER TO DETAILS AND CROSS SECTIONS TO DETERMINE FULL DEPTH OF EXCAVATION.

CONSTRUCTION NOTES

1. PROTECT EXISTING SANITARY MANHOLE.
2. PROTECT EXISTING STORM DRAIN OUTFALL.
3. PROPOSED WORK ACCESS LOCATION.
4. INSTALL VEGETATED ROCK WALL PER DETAIL 1 ON DWG RC5.
5. INSTALL 2' THICK SPLASH PAD OF 8–INCH COBBLES.
6. LWM TYPE A PER DETAIL 1 ON DWG RC4 (TYP).
7. LWM TYPE B PER DETAIL 2 ON DWG RC4 (TYP).
8. LWM TYPE C PER DETAIL 3 ON DWG RC4 (TYP).
9. SCOUR POOL (TYP).
10. BOULDER CLUSTER PER DETAIL 3 ON DWG RC5 (TYP).
11. WINGWALL PER ELEVATIONS AND DETAILS ON DWG S11.
12. CAUTION. POWERPOLE GUY WIRES IN VICINITY. COORDINATE WITH POWER UTILITY OWNER FOR EITHER PROTECTION OR TEMPORARY REMOVAL.

1"=20' 20 10 0 20 40 Scale Feet

1"=5' 5 2.5 0 5 10 Scale Feet

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MIKE GISEBURT	8/10/21
CHECKED BY	DATE

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FACTORIA BOULEVARD STORM CONVEYANCE IMPROVEMENTS PROJECT

RICHARD'S CREEK PLAN AND PROFILE

SEC 27, T 25N, R 5E

RC1

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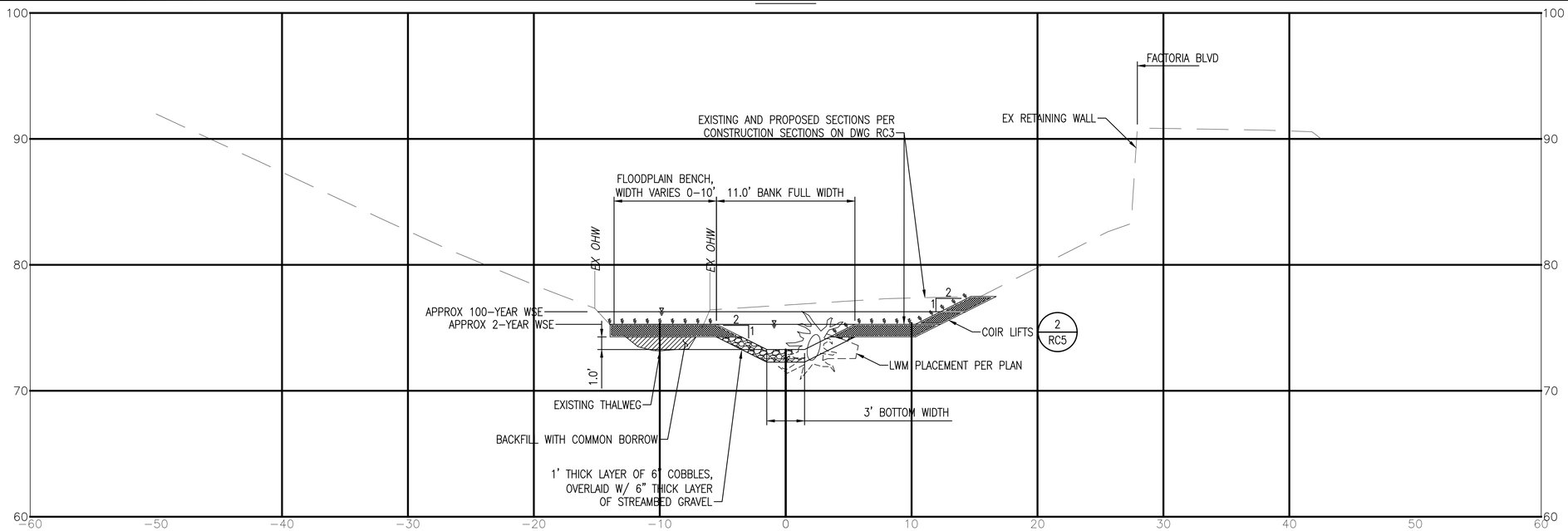
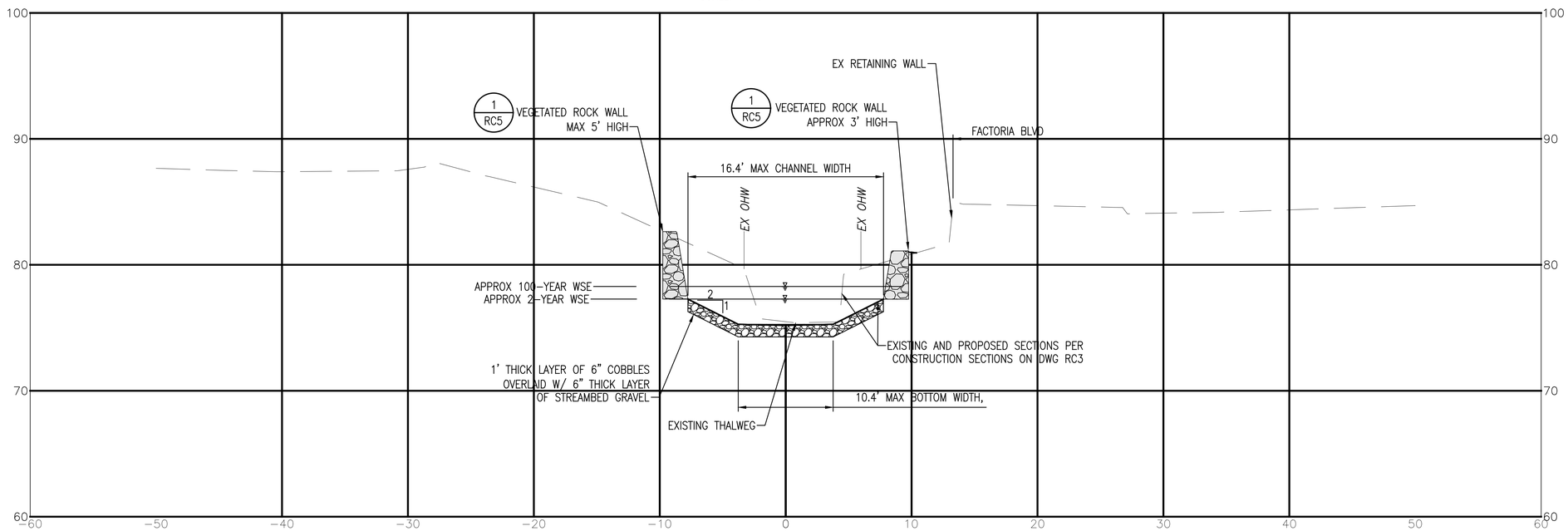


SECTION

RICHARDS CREEK TYPICAL CHANNEL SECTION
SCALE: 1"=5'



SECTION

RICHARDS CREEK TYPICAL CHANNEL SECTION
WITH VEGETATED ROCK WALL
SCALE: 1"=5'

1"=5' 5 2.5 0 5 10
Scale Feet

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RC2

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MIKE GISEBURT	8/10/21
CHECKED BY	DATE

City of Bellevue
UTILITIES

FACTORIA BOULEVARD STORM CONVEYANCE IMPROVEMENTS PROJECT

RICHARD'S CREEK CROSS SECTIONS

SEC 27, T 25N, R 5E

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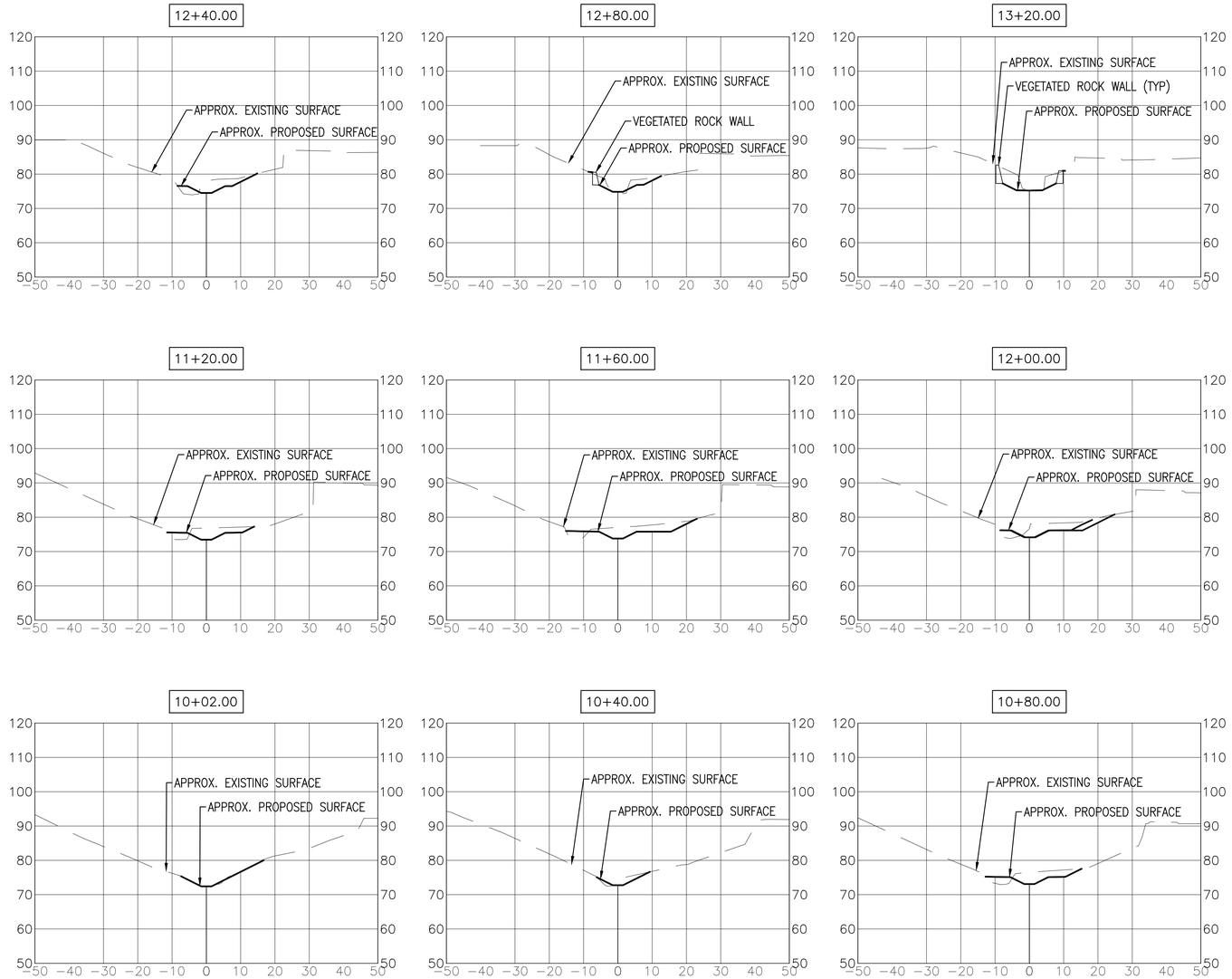

SECTION

RICHARDS CREEK CHANNEL CONSTRUCTION SECTIONS
SCALE: 1"=20'

NOTE: ALL SECTIONS LOOKING UPSTREAM.

1"=20' 20 10 0 20 40
Scale Feet

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RC3

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FACTORIA BOULEVARD STORM
CONVEYANCE IMPROVEMENTS PROJECT

RICHARD'S CREEK CROSS SECTIONS

SEC 27, T 25N, R 5E

SHEET 66 OF 93

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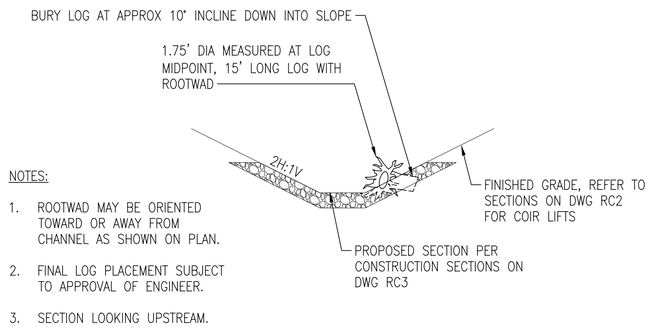
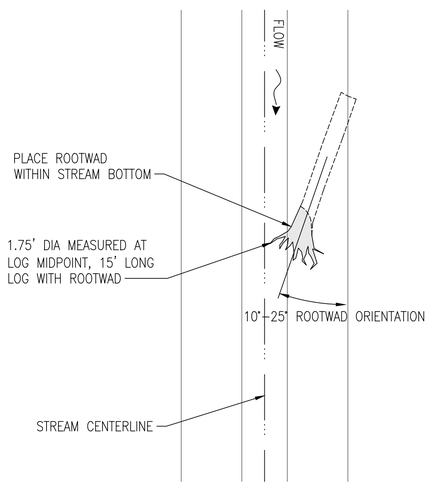


NOTES:

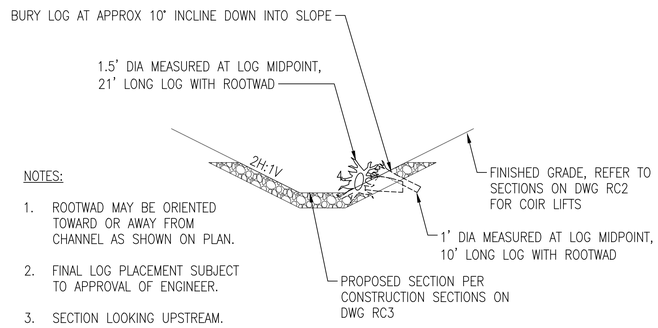
1. ROOTWAD MAY BE ORIENTED TOWARD OR AWAY FROM CHANNEL AS SHOWN ON PLAN.
2. FINAL LOG PLACEMENT SUBJECT TO APPROVAL OF ENGINEER.
3. SECTION LOOKING UPSTREAM.

SECTION



PLAN

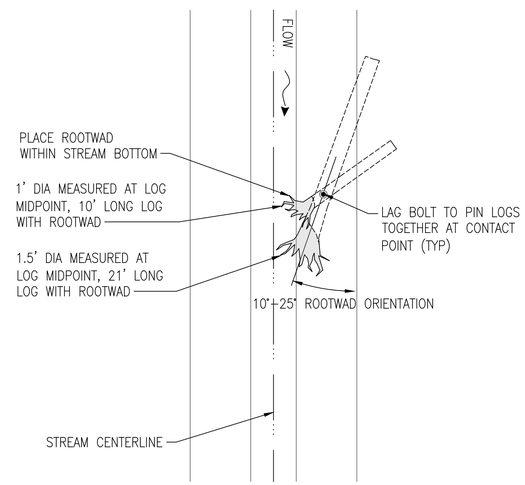
1 RC01 **LWM TYPE A**
SCALE: NTS



NOTES:

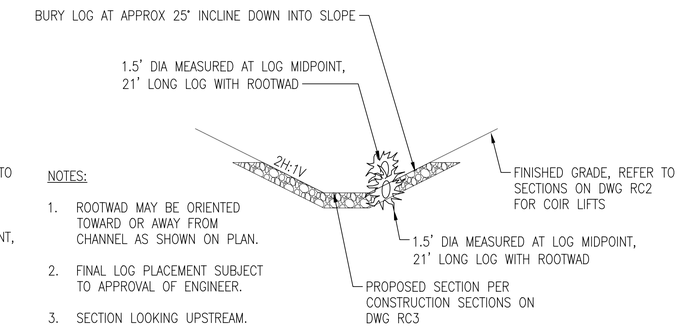
1. ROOTWAD MAY BE ORIENTED TOWARD OR AWAY FROM CHANNEL AS SHOWN ON PLAN.
2. FINAL LOG PLACEMENT SUBJECT TO APPROVAL OF ENGINEER.
3. SECTION LOOKING UPSTREAM.

SECTION



PLAN

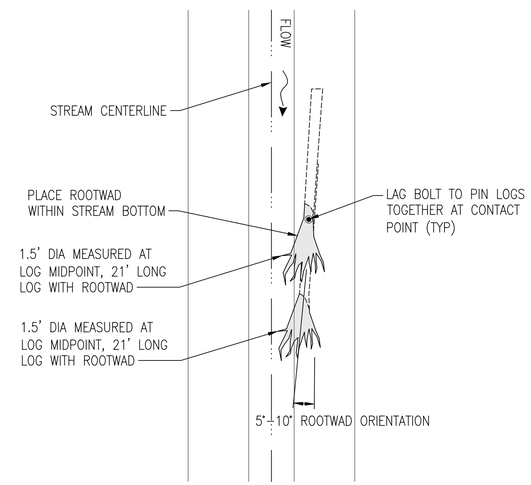
2 RC01 **LWM TYPE B**
SCALE: NTS



NOTES:

1. ROOTWAD MAY BE ORIENTED TOWARD OR AWAY FROM CHANNEL AS SHOWN ON PLAN.
2. FINAL LOG PLACEMENT SUBJECT TO APPROVAL OF ENGINEER.
3. SECTION LOOKING UPSTREAM.

SECTION



PLAN

3 RC01 **LWM TYPE C**
SCALE: NTS

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PROJECT MANAGER DATE

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WESTON E. BRYANT	8/10/21
DRAWN BY	DATE
MIKE GISEBURT	8/10/21
CHECKED BY	DATE

City of Bellevue
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FACTORIA BOULEVARD STORM CONVEYANCE IMPROVEMENTS PROJECT

RICHARD'S CREEK HABITAT STRUCTURE DETAILS

SEC 27, T 25N, R 5E

RC4

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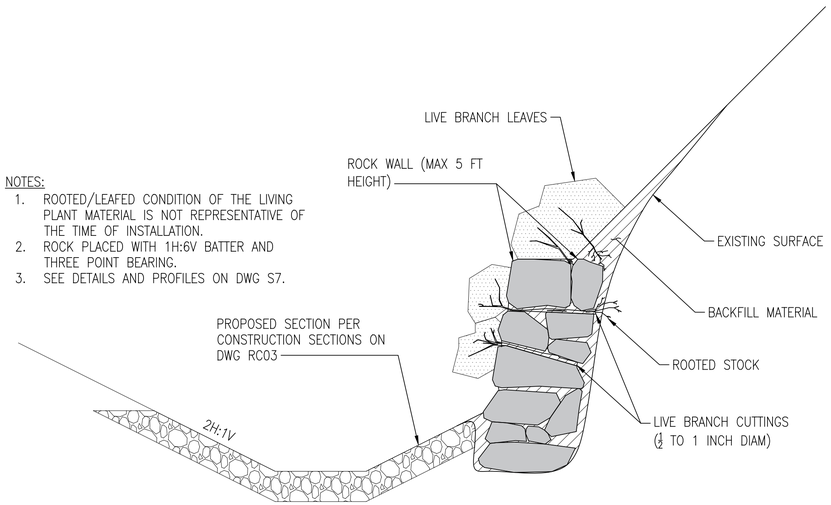
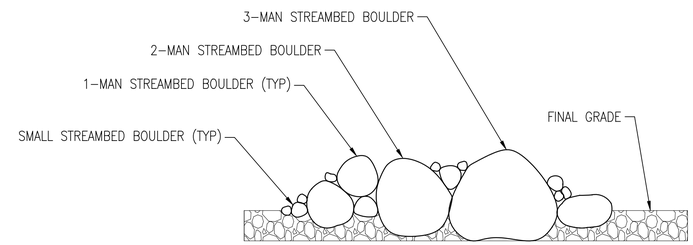
NOTES:
1. ROOTED/LEAFED CONDITION OF THE LIVING PLANT MATERIAL IS NOT REPRESENTATIVE OF THE TIME OF INSTALLATION.
2. ROCK PLACED WITH 1H:6V BATTER AND THREE POINT BEARING.
3. SEE DETAILS AND PROFILES ON DWG S7.

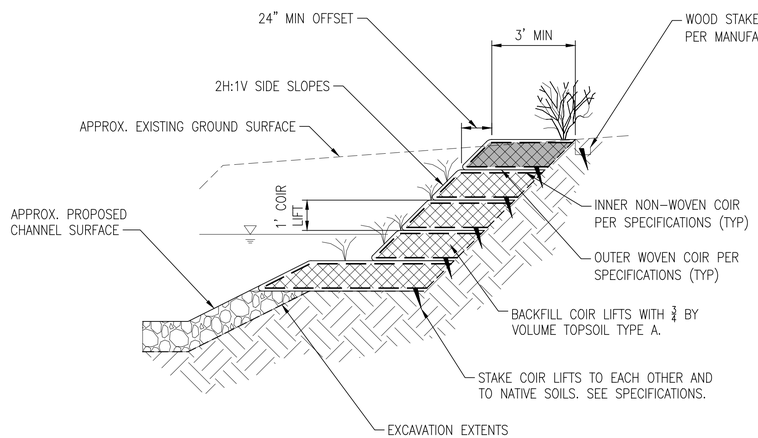


1 RC1 VEGETATED ROCK WALL
SCALE: NTS



PLACE STREAMBED BOULDERS 20–60% ABOVE STREAMBED SURFACE.

3 RC1 BOULDER CLUSTER
SCALE: NTS



COIR WRAP PREPARATION
(SEE SPECIFICATIONS)

STEP 1
- OVEREXCAVATE TO PLACE COIR WRAP SOIL LIFTS
- PROTECT SUBGRADE FROM FOOT TRAFFIC AND CONSTRUCTION ACTIVITIES THAT COULD CAUSE SOIL DISTURBANCE OR BANK SETTLEMENT PRIOR TO COIR PLACEMENT

STEP 2
- PLACE OUTER WOVEN COIR FOR THE BOTTOM OF THE LIFT
- PLACE INNER NON-WOVEN COIR
- STAKE COIR FABRIC TO NATIVE SOIL BELOW LIFT

STEP 3
- INSTALL FORM (IF CONTRACTOR CHOOSES) TO HOLD COIR WRAP AND SOIL TO DESIGN DIMENSIONS
- PLACE 12" HIGH LAYER OF SOIL COMPOSED OF TOPSOIL TYPE D AMENDED WITH ALLUVIUM AND COMPACT PER SPECIFICATIONS

STEP 4
- PLACE SEED MIX PER PLANTING PLAN AND SPECIFICATIONS

STEP 5
- WRAP OUTER WOVEN COIR AND INNER NON-WOVEN COIR AROUND SOIL LIFT TO ENCASE THE LIFT

STEP 6
- STAKE PER COIR MANUFACTURER'S RECOMMENDATION

2 RC1 TYPICAL COIR WRAP EMBANKMENT
SCALE: NTS

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FACTORIA BOULEVARD STORM CONVEYANCE IMPROVEMENTS PROJECT

RICHARD'S CREEK CHANNEL DETAILS

SEC 27, T 25N, R 5E

RC5

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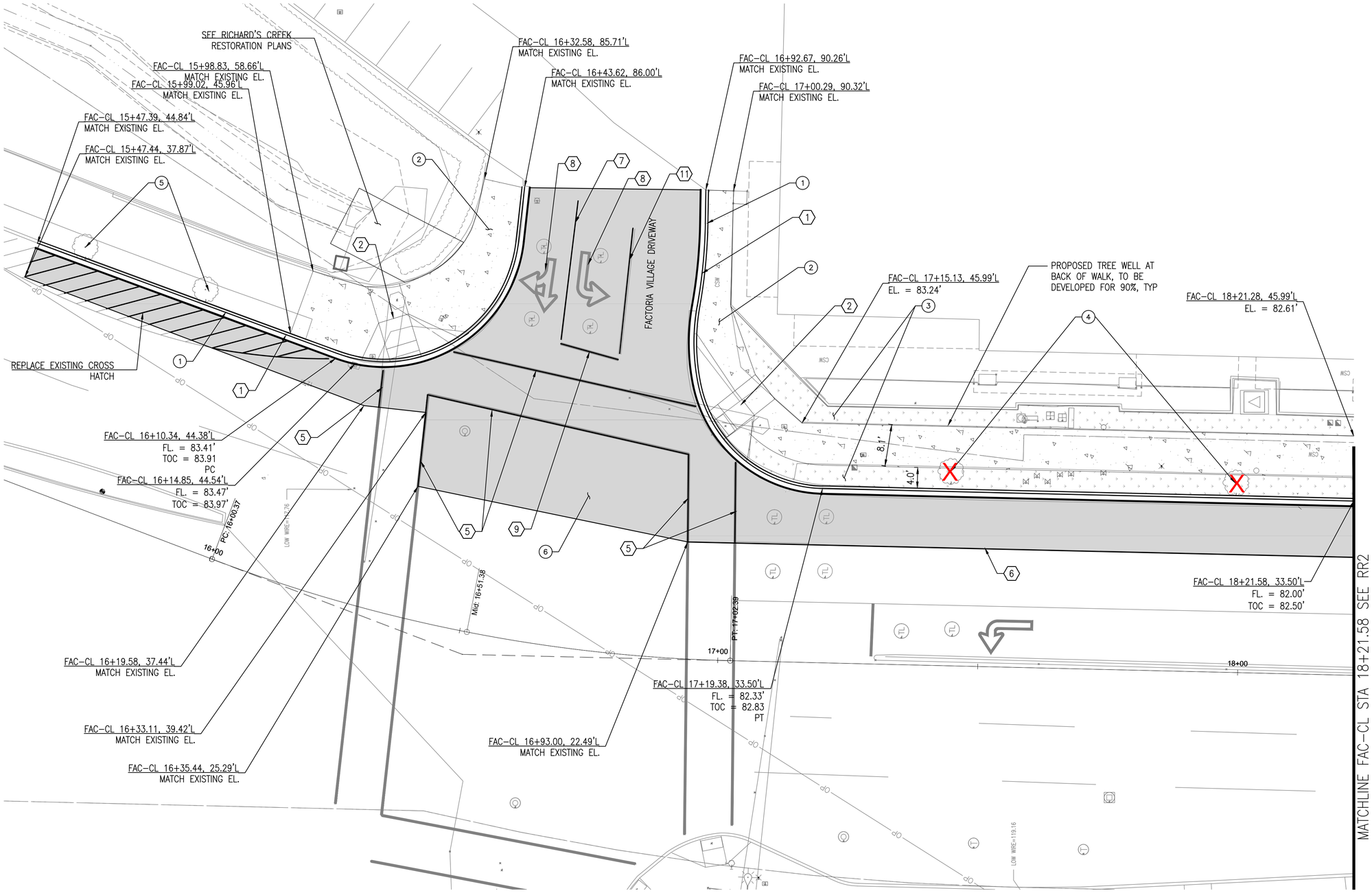

PLAN

LOCATION MAP
SCALE: 1"=10'

GENERAL NOTES

1. SEE SHEET RR 4 FOR TYPICAL SECTIONS
2. SEE SHEET RR 5 FOR CURB RAMP GRADING AND CORNER GEOMETRY
3. FOR UTILITY TRENCH RESTORATION SEE TYPICAL SECTIONS AND COB DWG RC-190-1
4. ADJUST ALL UTILITIES TO FINAL GRADE
5. SAWCUT AT ALL FULL DEPTH HMA RESTORATION LIMITS

CONSTRUCTION NOTES

1. CEMENT CONCRETE CURB AND GUTTER. SEE COB DWG SW-100-1 AND COB DWG RC-240-1
2. PERPENDICULAR CEMENT CONCRETE CURB RAMP A (TYPE 1). SEE COB DWG SW-230-1
3. DRIVEWAY (OPTION 2). SEE COB DWG SW-150-1
4. DRIVEWAY (OPTION 4). SEE COB DWG SW-170-1
5. REPLACE EXISTING CROSSWALK PARALLEL BAR MARKING. SEE COB DWG CW-100-1
6. REPLACE EXISTING BROKEN LANE LINE. SEE COB DWG CH-100-1.
7. REPLACE EXISTING SOLID LANE LINE. SEE COB DWG CH-100-1
8. REPLACE PAVEMENT ARROW MARKINGS. SEE COB DWG CH-170-1.
9. REPLACE EXISTING STOP BAR
10. LOW PROFILE BARRIER
11. REPLACE EXISTING DOUBLE CENTER LINE. SEE COB DWG CH-170-1
12. DRIVEWAY CURB AND GUTTER MATCH EXISTING CURB HEIGHT, SEE COB DWG SW-170-1 DETAIL 1

FULL DEPTH HMA RESTORATION (15"). SEE SHEET RR4 FOR FULL CROSS SECTION.

2" GRIND AND OVERLAY. SEE SHEET RR4 FOR FULL CROSS SECTION.

SIDEWALK. MATCH NEAREST EXISTING JOINT. SEE COB DWG SW-110-1.

LANDSCAPING. SEE LANDSCAPING PLANS

DRIVEWAY. SEE CONSTRUCTION NOTES FOR TYPE.

REMOVAL NOTES

1. REMOVE CONCRETE CURB AND GUTTER TO NEAREST JOINT LINE
2. REMOVE SIDEWALK TO NEAREST JOINT LINE
3. CLEARING AND GRUBBING
4. REMOVE TREE
5. PROTECT IN PLACE
6. REMOVE ASPHALT PAVEMENT
7. REMOVE CONCRETE BARRIER

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RR1

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DRAWN BY	DATE
KYLE WILLIAMS	8/10/21
CHECKED BY	DATE

City of Bellevue
UTILITIES

FACTORIA BOULEVARD STORM CONVEYANCE IMPROVEMENTS PROJECT

ROADWAY RESTORATION PLANS

SEC 27, T 25N, R 5E

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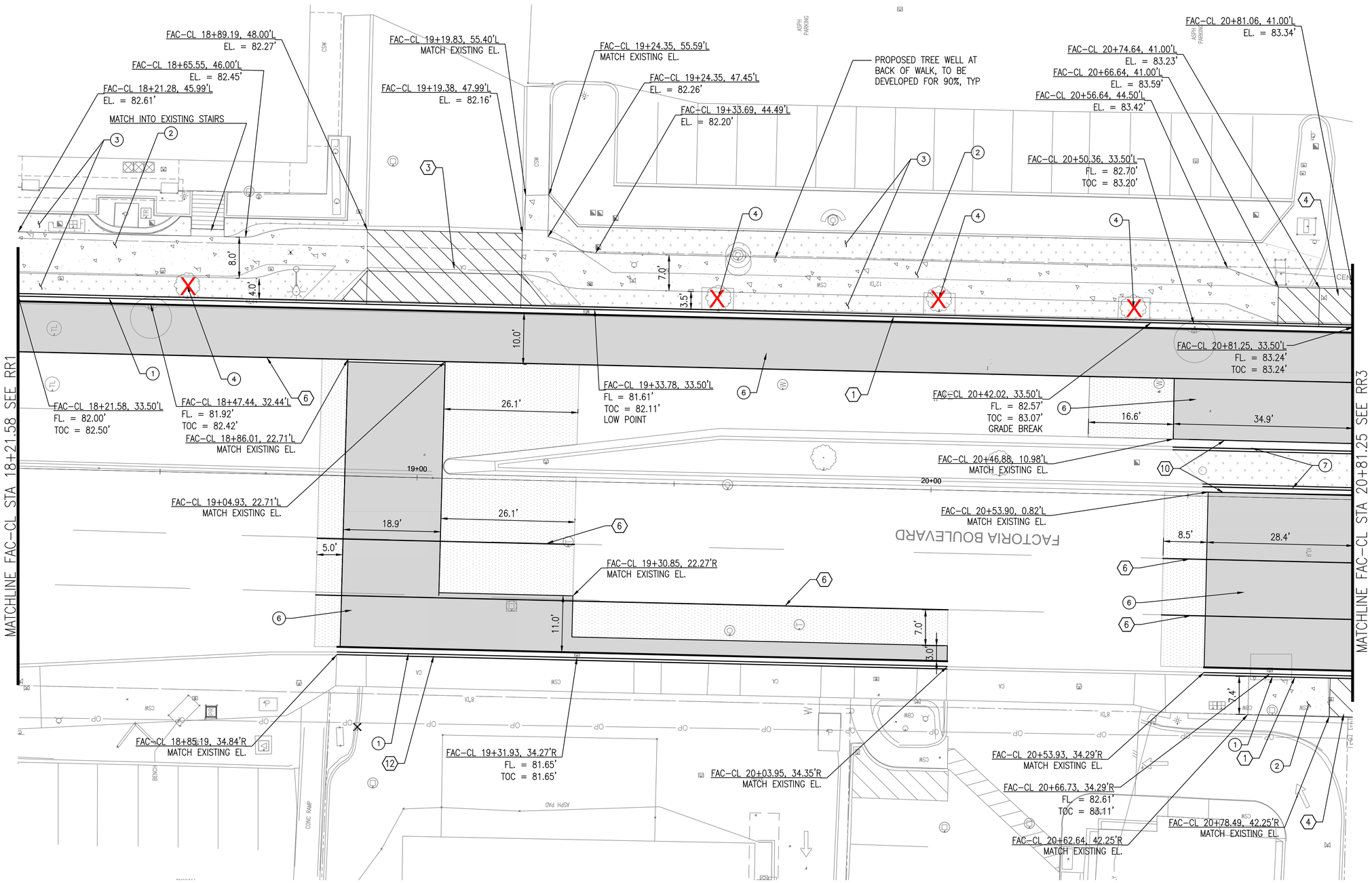

PLAN

LOCATION MAP
SCALE: 1"=10'

GENERAL NOTES

1. SEE SHEET RR 4 FOR TYPICAL SECTIONS
2. SEE SHEET RR 5 FOR CURB RAMP GRADING AND CORNER GEOMETRY
3. FOR UTILITY TRENCH RESTORATION SEE TYPICAL SECTIONS AND COB DWG RC-190-1
4. ADJUST ALL UTILITIES TO FINAL GRADE
5. SAWCUT AT ALL FULL DEPTH HMA RESTORATION LIMITS

CONSTRUCTION NOTES

1. CEMENT CONCRETE CURB AND GUTTER. SEE COB DWG SW-100-1 AND COB DWG RC-240-1
2. PERPENDICULAR CEMENT CONCRETE CURB RAMP A (TYPE 1). SEE COB DWG SW-230-1
3. DRIVEWAY (OPTION 2). SEE COB DWG SW-150-1
4. DRIVEWAY (OPTION 4). SEE COB DWG SW-170-1
5. REPLACE EXISTING CROSSWALK PARALLEL BAR MARKING. SEE COB DWG CW-100-1
6. REPLACE EXISTING BROKEN LANE LINE. SEE COB DWG CH-100-1.
7. REPLACE EXISTING SOLID LANE LINE. SEE COB DWG CH-100-1
8. REPLACE PAVEMENT ARROW MARKINGS. SEE COB DWG CH-170-1.
9. REPLACE EXISTING STOP BAR
10. LOW PROFILE BARRIER
11. REPLACE EXISTING DOUBLE CENTER LINE. SEE COB DWG CH-170-1
12. DRIVEWAY CURB AND GUTTER MATCH EXISTING CURB HEIGHT, SEE COB DWG SW-170-1 DETAIL 1

- FULL DEPTH HMA RESTORATION (15"). SEE SHEET RR4 FOR FULL CROSS SECTION.
- 2" GRIND AND OVERLAY. SEE SHEET RR4 FOR FULL CROSS SECTION.
- SIDEWALK. MATCH NEAREST EXISTING JOINT. SEE COB DWG SW-110-1.
- LANDSCAPING. SEE LANDSCAPING PLANS
- DRIVEWAY. SEE CONSTRUCTION NOTES FOR TYPE.

REMOVAL NOTES

1. REMOVE CONCRETE CURB AND GUTTER TO NEAREST JOINT LINE
2. REMOVE SIDEWALK TO NEAREST JOINT LINE
3. CLEARING AND GRUBBING
4. REMOVE TREE
5. PROTECT IN PLACE
6. REMOVE ASPHALT PAVEMENT
7. REMOVE CONCRETE BARRIER

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RR2

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1				60% DESIGN - NOT FOR CONSTRUCTION

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Approved By

DESIGN MANAGER DATE
PROJECT MANAGER DATE

DILLON H ZANG	8/10/21
DESIGNED BY	DATE
DILLON H ZANG	8/10/21
DRAWN BY	DATE
KYLE WILLIAMS	8/10/21
CHECKED BY	DATE

City of Bellevue
UTILITIES

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ROADWAY RESTORATION PLANS

SEC 27, T 25N, R 5E

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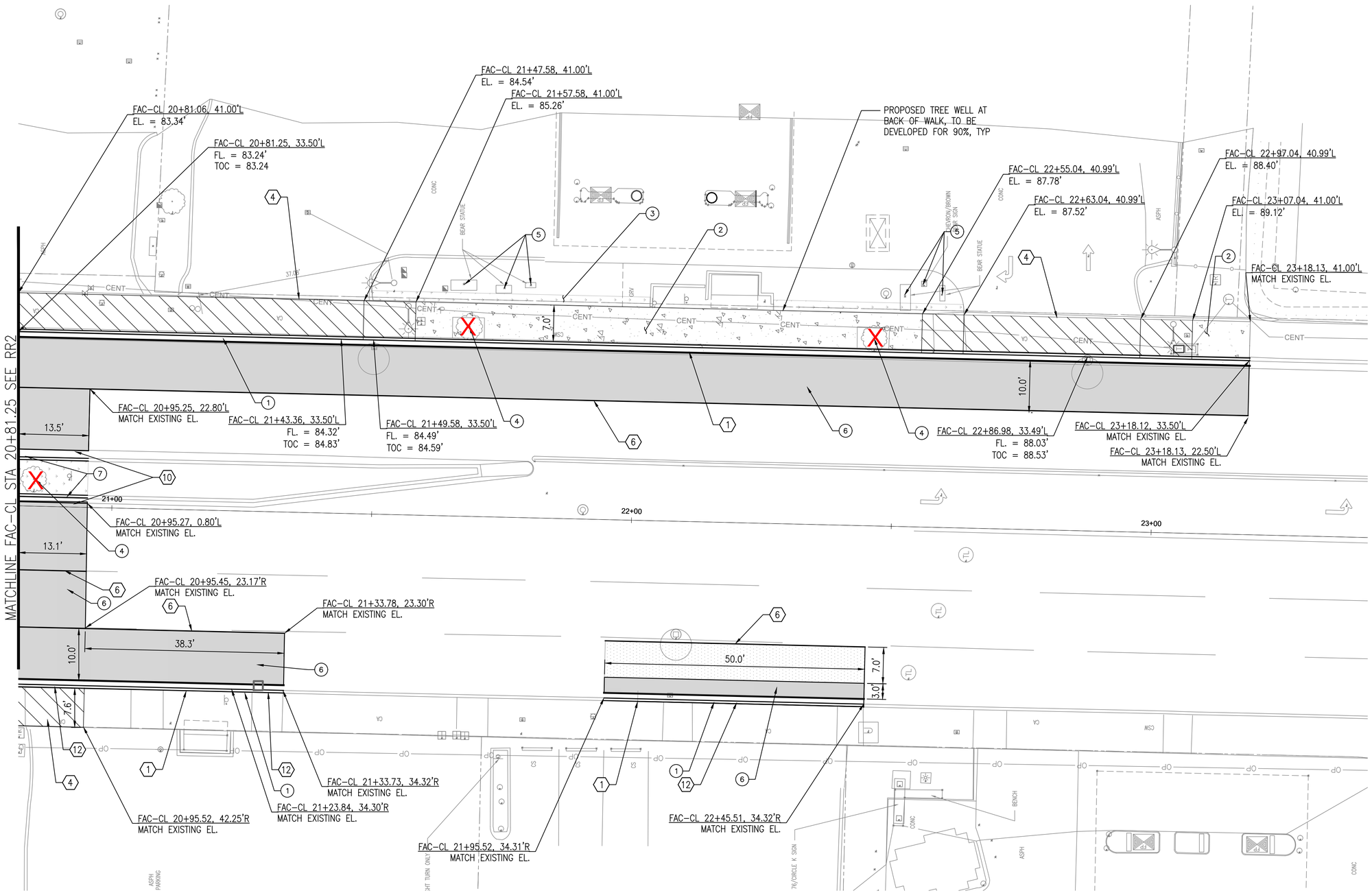

PLAN

LOCATION MAP
SCALE: 1"=10'

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GENERAL NOTES

1. SEE SHEET RR 4 FOR TYPICAL SECTIONS
2. SEE SHEET RR 5 FOR CURB RAMP GRADING AND CORNER GEOMETRY
3. FOR UTILITY TRENCH RESTORATION SEE TYPICAL SECTIONS AND COB DWG RC-190-1
4. ADJUST ALL UTILITIES TO FINAL GRADE
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CONSTRUCTION NOTES

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2" GRIND AND OVERLAY. SEE SHEET RR4 FOR FULL CROSS SECTION.

SIDEWALK. MATCH NEAREST EXISTING JOINT. SEE COB DWG SW-110-1.

LANDSCAPING. SEE LANDSCAPING PLANS

DRIVEWAY. SEE CONSTRUCTION NOTES FOR TYPE.

REMOVAL NOTES

1. REMOVE CONCRETE CURB AND GUTTER TO NEAREST JOINT LINE
2. REMOVE SIDEWALK TO NEAREST JOINT LINE
3. CLEARING AND GRUBBING
4. REMOVE TREE
5. PROTECT IN PLACE
6. REMOVE ASPHALT PAVEMENT
7. REMOVE CONCRETE BARRIER

RR3

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PROJECT MANAGER — DATE

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KYLE WILLIAMS	8/10/21
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FACTORIA BOULEVARD STORM CONVEYANCE IMPROVEMENTS PROJECT

ROADWAY RESTORATION PLANS

SEC 27, T 25N, R 5E

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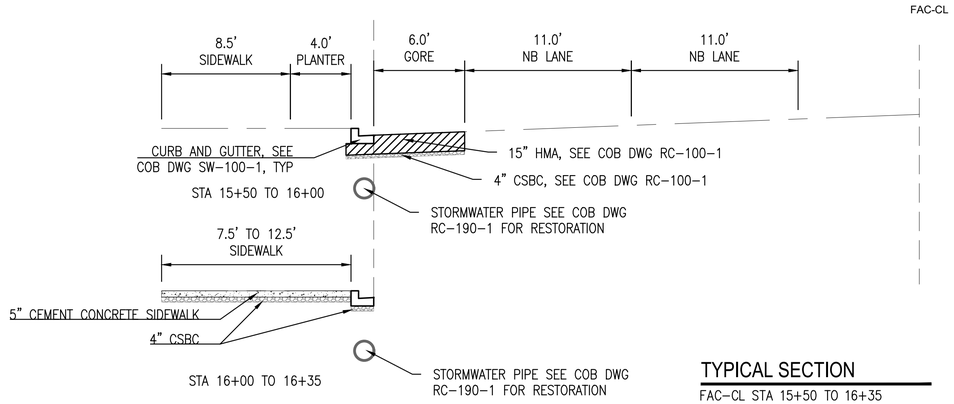
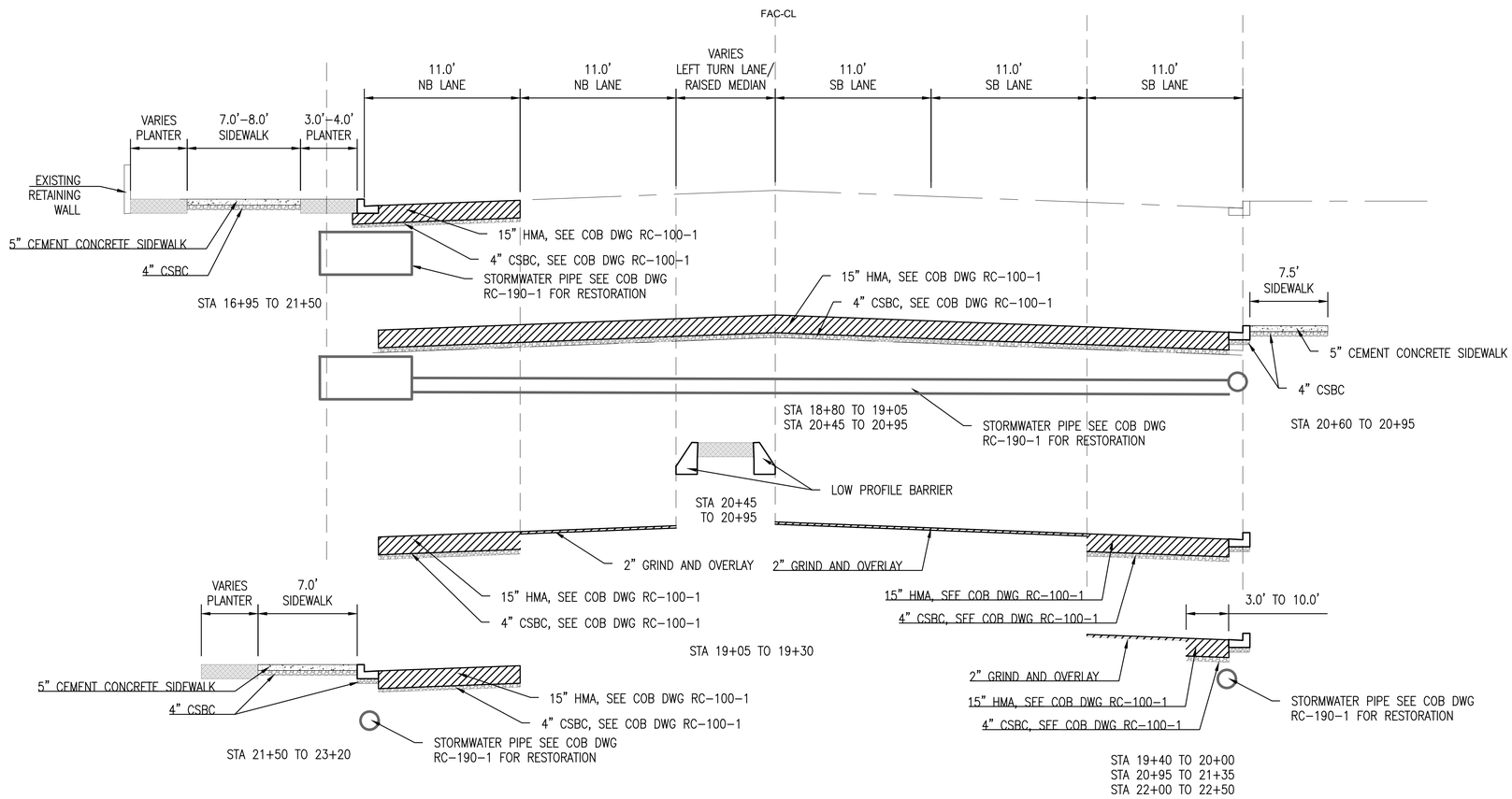


TYPICAL SECTION

FAC-CL STA 15+50 TO 16+35
NTS



TYPICAL SECTION

FAC-CL STA 16+90 TO 22+50
NTS

GENERAL NOTES

1. STATIONS ARE APPROXIMATE SEE RR1-3 FOR EXACT LOCATIONS
2. SEE ST SHEETS FOR STORMWATER PIPE LOCATIONS AND DEPTHS

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FACTORIA BOULEVARD STORM CONVEYANCE IMPROVEMENTS PROJECT

ROADWAY RESTORATION TYPICAL SECTIONS

SEC 27, T 25N, R 5E

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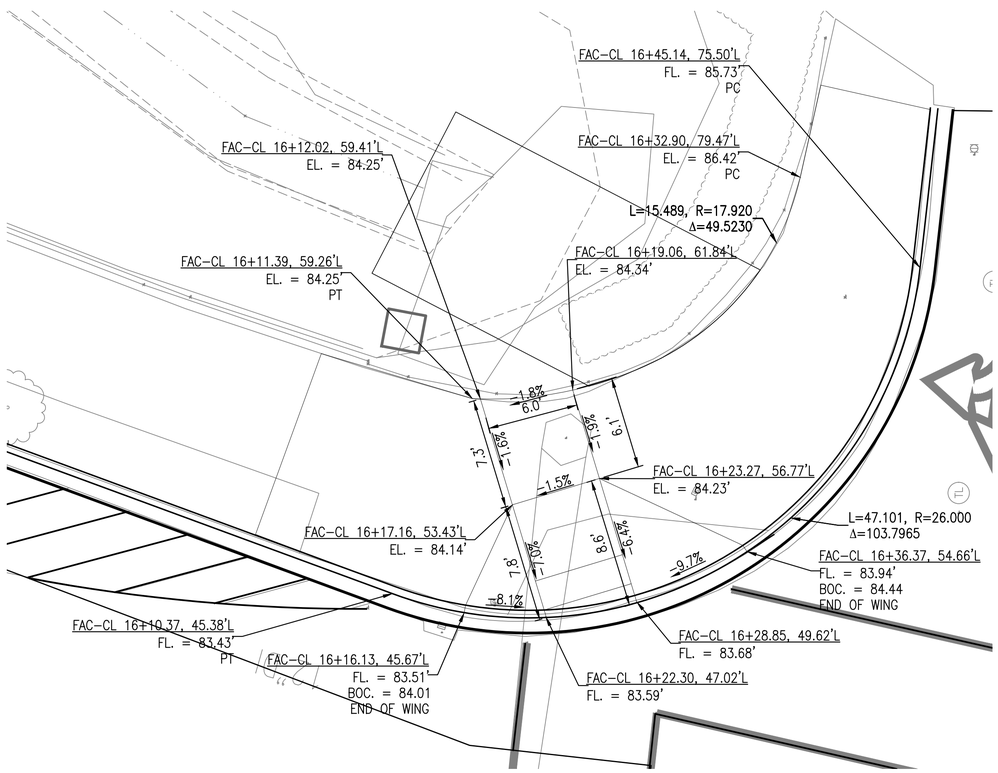
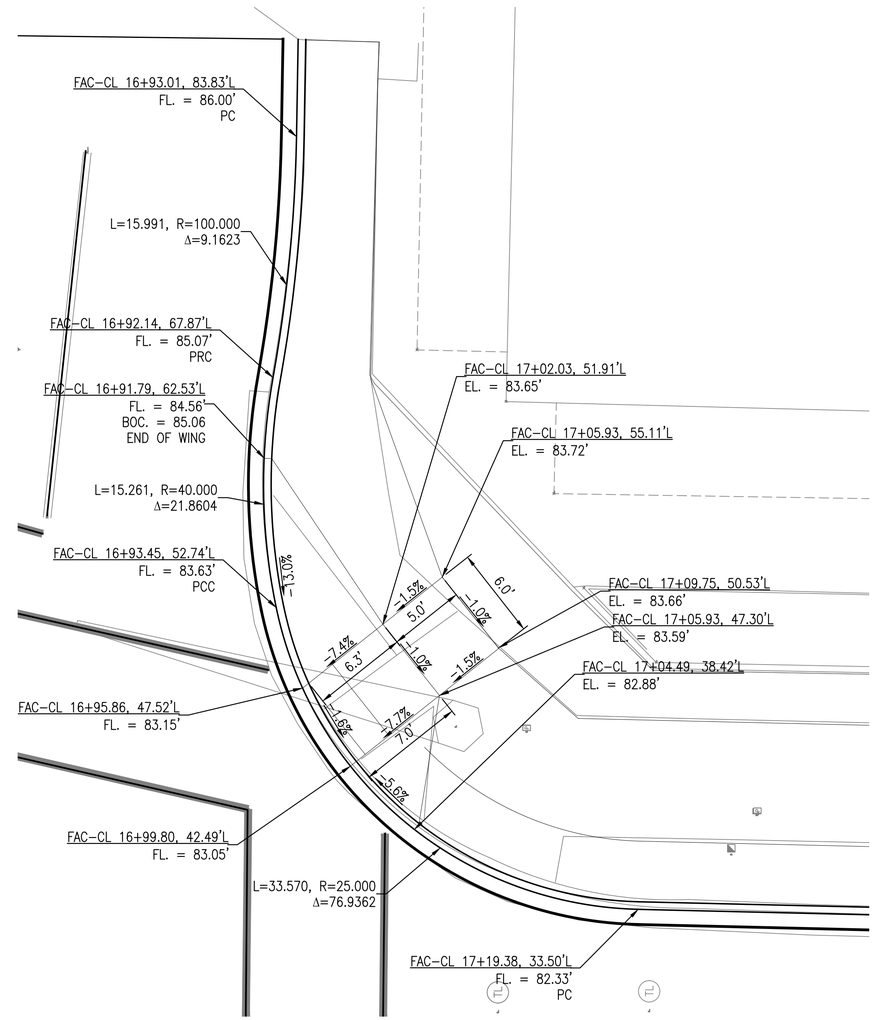


CURB RAMP DETAIL

NW CORNER
SCALE: 1"=10'



CURB RAMP DETAIL

SW CORNER
SCALE: 1"=10'

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CONVEYANCE IMPROVEMENTS PROJECT

ROADWAY RESTORATION CURB RAMP DETAILS

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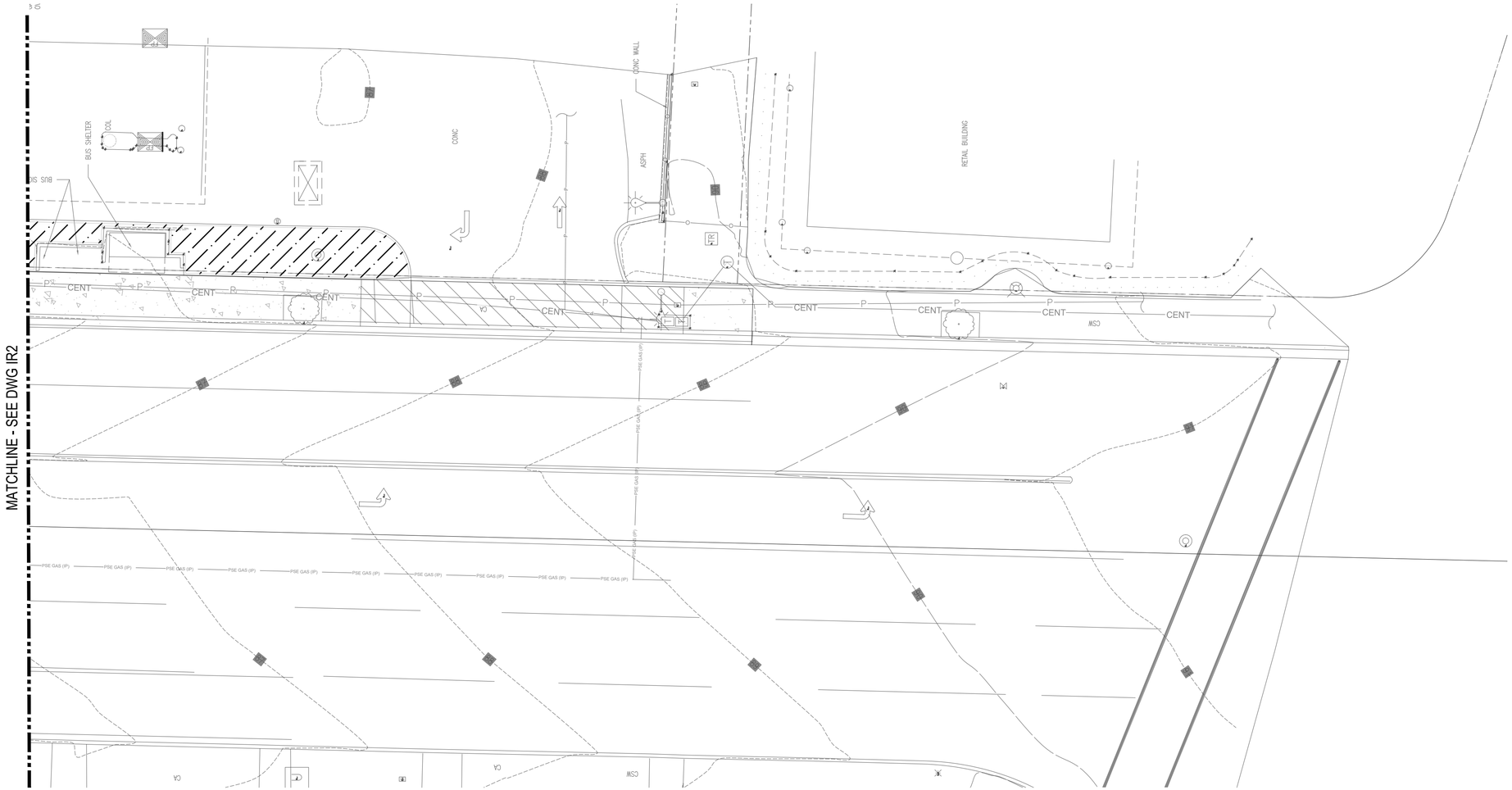

GENERAL NOTES

1. SEE IRRIGATION SCHEDULE, NOTES AND DETAILS ON DWGS IR6, IR7 AND IR8.
2. SEE PLANTING PLAN ON DRAWING LA1.

LEGEND

RESTORE EXISTING IRRIGATION IN KIND TO MATCH EXISTING

PLAN

IRRIGATION IMPROVEMENTS
SCALE: 1"=10'

1"=10' 10 5 0 10 20
Scale Feet

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IR1

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EARL J CHRISTIAN	8/10/21
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City of Bellevue
UTILITIES

FACTORIA BOULEVARD STORM
CONVEYANCE IMPROVEMENTS PROJECT

IRRIGATION PLAN

SEC 27, T 25N, R 5E

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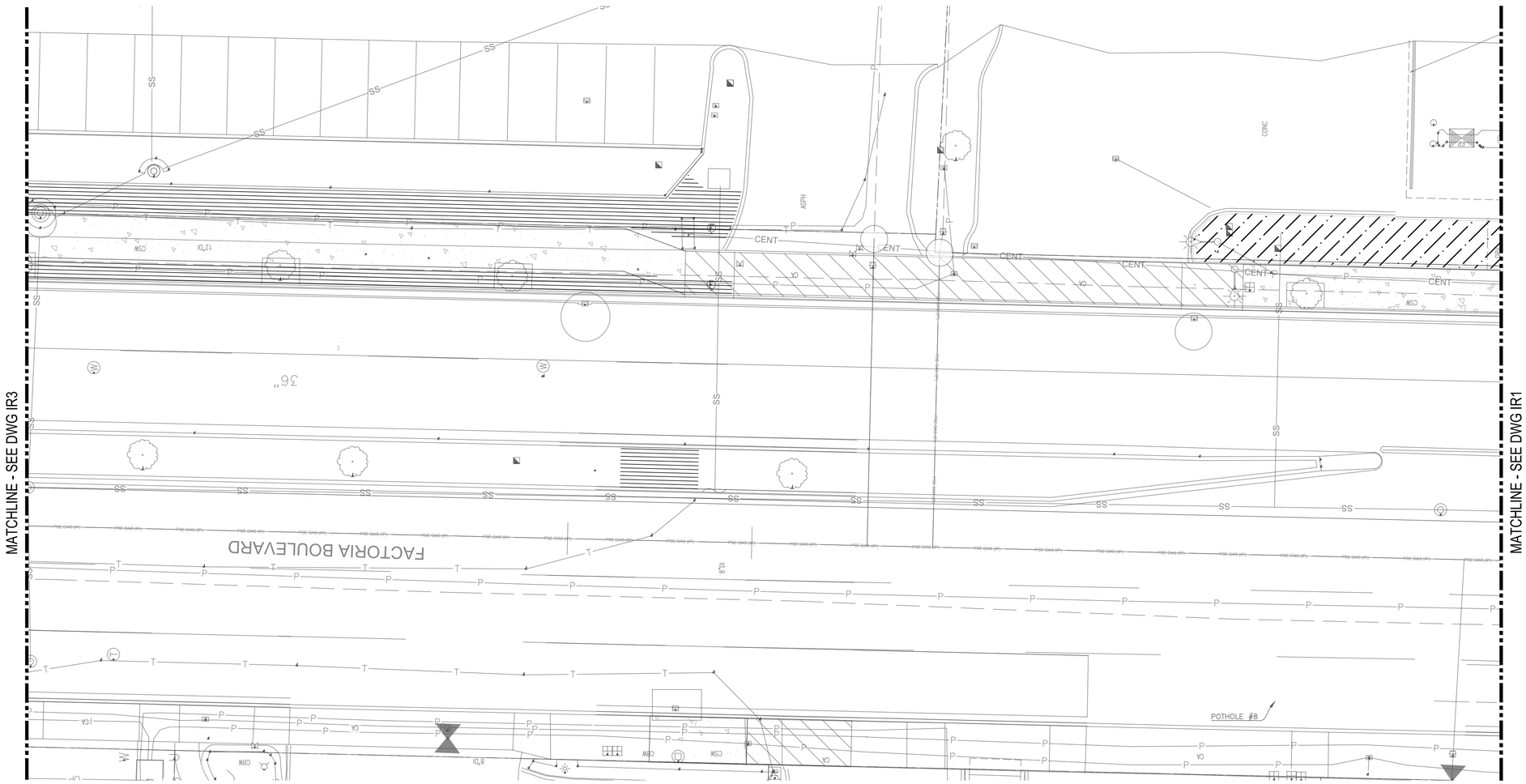

PLAN

IRRIGATION IMPROVEMENTS
SCALE: 1"=10'

1"=10' 10 5 0 10 20
Scale Feet

GENERAL NOTES

1. SEE IRRIGATION SCHEDULE, NOTES AND DETAILS ON DWGS IR6, IR7 AND IR8.
2. SEE PLANTING PLAN ON DRAWING LA2.

LEGEND

RESTORE EXISTING IRRIGATION IN KIND TO MATCH EXISTING

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FACTORIA BOULEVARD STORM
CONVEYANCE IMPROVEMENTS PROJECT

IRRIGATION PLAN

SEC 27, T 25N, R 5E

IR2

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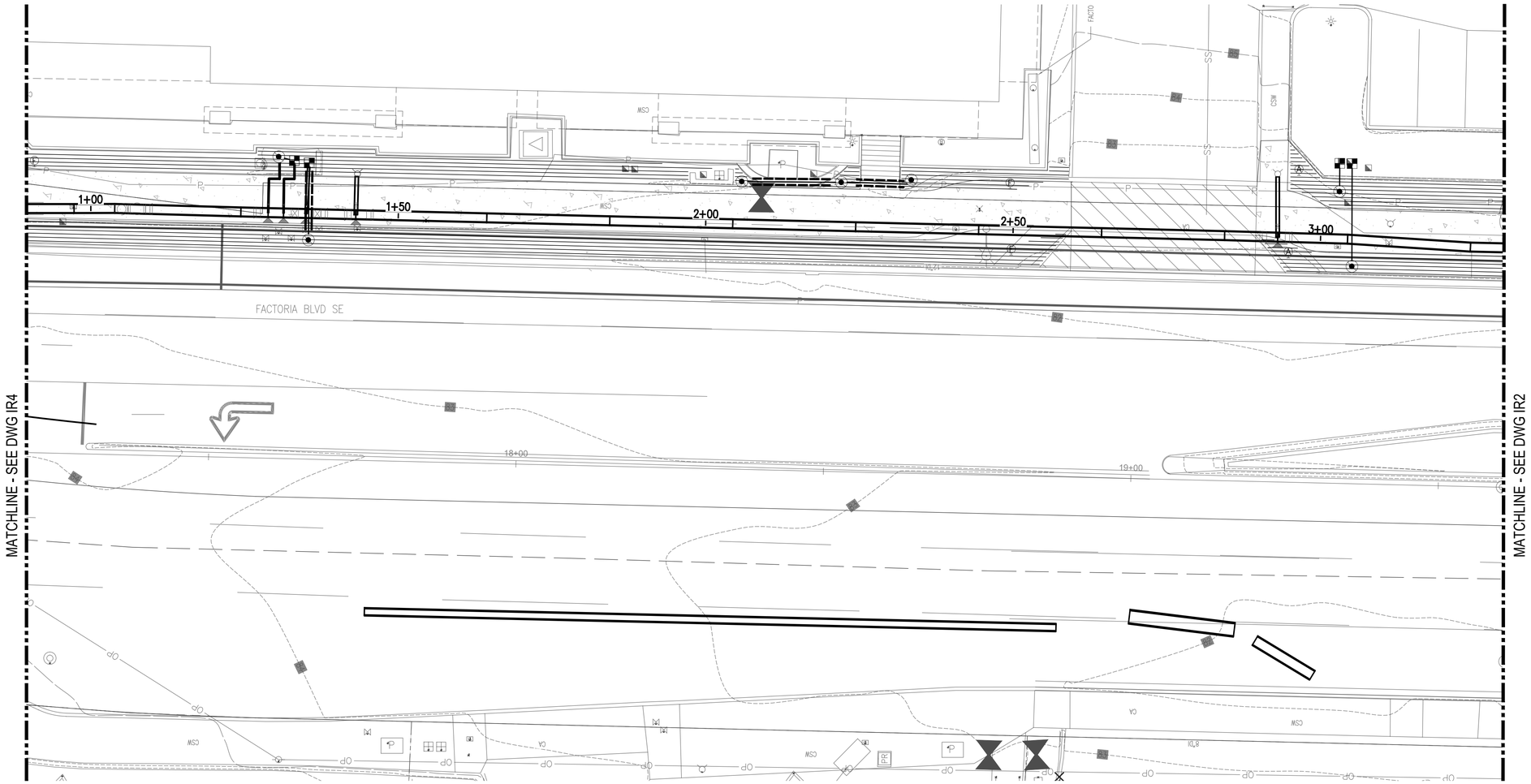

PLAN
IRRIGATION IMPROVEMENTS
SCALE: 1"=10'

1"=10' 10 5 0 10 20
Scale Feet

GENERAL NOTES

1. SEE IRRIGATION SCHEDULE, NOTES AND DETAILS ON DWGS IR6, IR7 AND IR8.
2. SEE PLANTING PLAN ON DWG LA3.

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CONVEYANCE IMPROVEMENTS PROJECT

IRRIGATION PLAN

SEC 27, T 25N, R 5E

IR3

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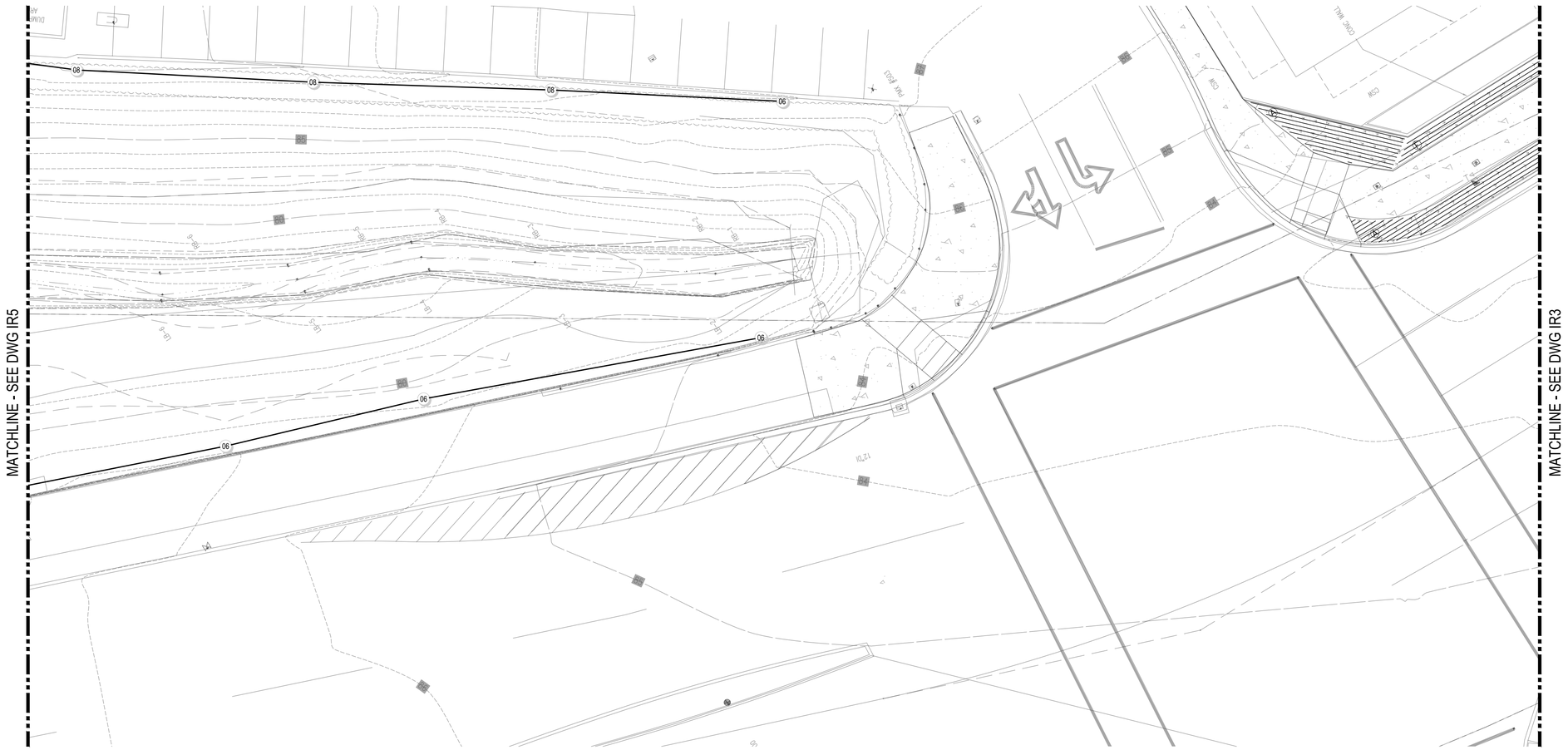

PLAN

IRRIGATION IMPROVEMENTS
SCALE: 1"=10'

1"=10' 10 5 0 10 20
Scale Feet

GENERAL NOTES

1. SEE IRRIGATION SCHEDULE, NOTES AND DETAILS ON DWGS IR6, IR7 AND IR8.
2. SEE PLANTING PLAN ON DWG LA4.

CALL 72 HOURS
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IR4

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City of Bellevue
UTILITIES

FACTORIA BOULEVARD STORM
CONVEYANCE IMPROVEMENTS PROJECT

IRRIGATION PLAN

SEC 27, T 25N, R 5E

SHEET 82 OF 93

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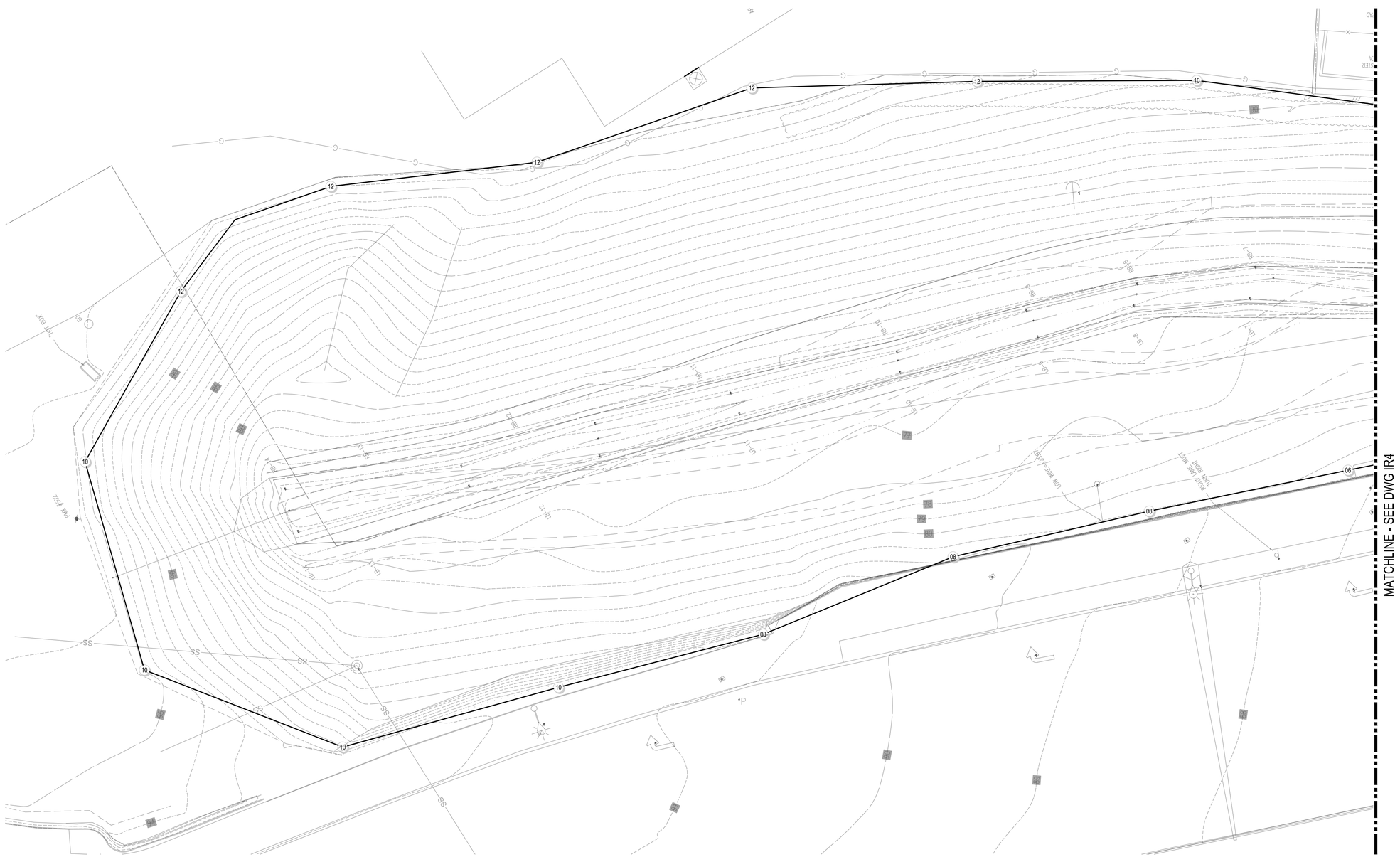

PLAN
IRRIGATION IMPROVEMENTS
SCALE: 1"=10'

1"=10' 10 5 0 10 20
Scale Feet

GENERAL NOTES

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2. SEE PLANTING PLAN ON DWG LA5.

CALL 72 HOURS
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IR5

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CONVEYANCE IMPROVEMENTS PROJECT

IRRIGATION PLAN

SEC 27, T 25N, R 5E

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IRRIGATION NOTES

1. COORDINATE WORK SHOWN ON THIS DRAWING WITH OTHER EXISTING OR PROPOSED SITE WORK AND VERIFY LIMITS OF WORK.
2. CONTRACTOR SHALL FIELD VERIFY LOCATIONS OF ALL UTILITIES PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL CALL UTILITY LOCATE SERVICE (811) 72 HOURS PRIOR TO CONSTRUCTION. CONTRACTOR SHALL EXERCISE CARE TO PROTECT UNDERGROUND UTILITIES AND AVOID DISTURBING OR DAMAGING THEM. ANY DAMAGE RESULTING FROM THIS WORK SHALL BE RESTORED AT THE CONTRACTOR'S EXPENSE.
3. QUANTITIES SHOWN ARE INTENDED TO ASSIST CONTRACTOR IN EVALUATING THEIR OWN TAKE OFFS AND ARE NOT GUARANTEED AS ACCURATE REPRESENTATIONS OF REQUIRED MATERIALS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR HIS BID QUANTITIES AS REQUIRED BY THE PLANS AND SPECIFICATIONS.
4. COORDINATE IRRIGATION INSTALLATION WITH INSTALLATION OF LANDSCAPE PLANTING AND DRAINAGE SYSTEMS.
5. CONTRACTOR SHALL NOT INSTALL IRRIGATION WITHIN CLOSE PROXIMITY TO UTILITY VAULTS OR FIRE HYDRANTS. KEEP 5'-0" CLEARANCE FROM ALL HYDRANTS AND UTILITY VAULTS UNLESS OTHERWISE NOTED IN PLANS.
6. PLACE IRRIGATION MAINLINE AND LATERAL LINES BETWEEN SIDEWALK AND BACK OF CURB ONLY. IRRIGATION LINES SHOWN UNDER SIDEWALK FOR VISUAL CLARITY ONLY. DO NOT INSTALL IRRIGATION LINES UNDER THE SIDEWALK EXCEPT FOR SLEEVE/CROSSINGS.
7. LANDSCAPE MAINTENANCE PERIOD BEGINS IMMEDIATELY AFTER THE COMPLETION OF ALL PLANTING AND IRRIGATION INSTALLATION AND WRITTEN NOTIFICATION TO THE OWNER. MAINTAIN IRRIGATION UNTIL FINAL ACCEPTANCE.
8. IRRIGATION VALVES ARE SHOWN DIAGRAMMATICALLY. CONTRACTOR SHALL INSTALL VALVE BOXES IN AN AREA WHERE THEY WILL NOT FILL UP WITH WATER AND CAN DRAIN EASILY. DO NOT INSTALL VALVE BOXES IN BOTTOM OF SWALE OR DEPRESSIONS. INSTALL NEAR EDGE OF SIDEWALK AND FLUSH TO GRADE. IMPROPERLY INSTALLED VALVE BOXES SHALL BE RE-INSTALLED BY THE CONTRACTOR AT NO ADDITIONAL COST TO OWNER.

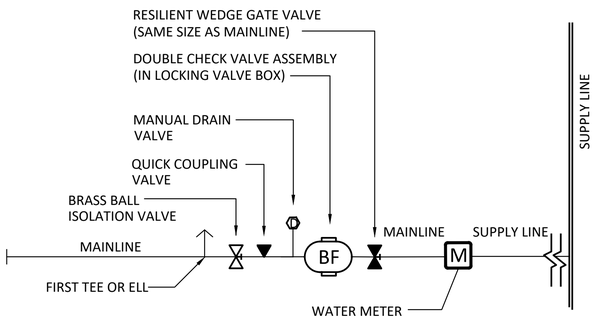
IRRIGATION SCHEDULE

SYMBOL	MANUFACTURER/MODEL/DESCRIPTION	QTY	PSI	GPM	RADIUS
06	RAIN BIRD 2045-PJ-08 06 SHRUB IMPACT, ADJUSTABLE AND FULL CIRCLE ARC, 1/2" MALE THREADED INLET, PRECIPITATION RATE (MPR) NOZZLES. PRECISION JET TUBE MINIMIZES SIDE SPLASH.	5	35	2.00	37'
08	RAIN BIRD 2045-PJ-08 08 SHRUB IMPACT, ADJUSTABLE AND FULL CIRCLE ARC, 1/2" MALE THREADED INLET, PRECIPITATION RATE (MPR) NOZZLES. PRECISION JET TUBE MINIMIZES SIDE SPLASH.	6	35	3.30	38'
10	RAIN BIRD 2045-PJ-08 10 SHRUB IMPACT, ADJUSTABLE AND FULL CIRCLE ARC, 1/2" MALE THREADED INLET, PRECIPITATION RATE (MPR) NOZZLES. PRECISION JET TUBE MINIMIZES SIDE SPLASH.	5	35	4.80	41'
12	RAIN BIRD 2045-PJ-08 12 SHRUB IMPACT, ADJUSTABLE AND FULL CIRCLE ARC, 1/2" MALE THREADED INLET, PRECIPITATION RATE (MPR) NOZZLES. PRECISION JET TUBE MINIMIZES SIDE SPLASH.	5	35	6.30	42'

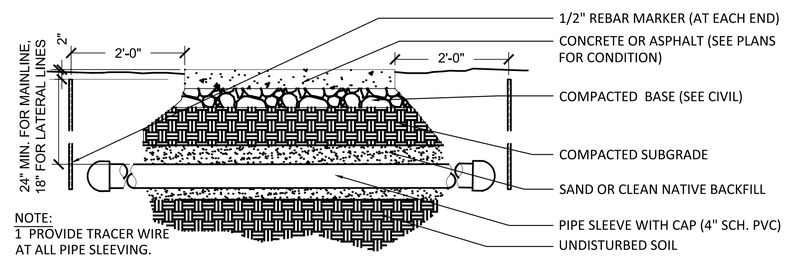
SYMBOL	MANUFACTURER/MODEL/DESCRIPTION	QTY
	HUNTER ICZ-101-25 1" DRIP CONTROL ZONE KIT. 1" ICV GLOBE VALVE WITH 1" HY100 FILTER SYSTEM. PRESSURE REGULATION: 25PSI. FLOW RANGE: 2 GPM TO 20 GPM. 150 MESH STAINLESS STEEL SCREEN.	4
	PIPE TRANSITION POINT IN DRIP BOX PIPE TRANSITION POINT FROM PVC LATERAL TO DRIP TUBING WITH RISER IN 6" (150MM) DRIP BOX.	7
F	HUNTER PLD-BV MANUAL FLUSH/SHUT OFF VALVE, BARBED INSERT. TYPICALLY INSTALLED IN 10" BOX, WITH ADEQUATE BLANK TUBING TO EXTEND VALVE OUT OF VALVE BOX. USE WITH HDL OR OTHER 3/4" DRIPLINE.	5
A	HUNTER PLD-AVR 3/4" PLD-AVR ALLOWS FOR AIR TO ESCAPE A RESIDENTIAL DRIP IRRIGATION SYSTEM TO PREVENT BLOCKAGE AND WATER HAMMERING. 1/2" MPT CONNECTION WITH 80 PSI MAXIMUM RATING.	4
	AREA TO RECEIVE DRIPLINE NETAFIM TLDL-04-12 TECHLINE PRESSURE COMPENSATING LANDSCAPE DRIPLINE. 0.4 GPH EMITTERS AT 12" O.C. DRIPLINE LATERALS SPACED AT 12" APART, WITH EMITTERS OFFSET FOR TRIANGULAR PATTERN. SURFACE AND SUB SURFACE INSTALLATIONS. UV RESISTANT.	2,372 L.F.

SYMBOL	MANUFACTURER/MODEL/DESCRIPTION	QTY
	IRRIGATION LATERAL LINE: PVC SCHEDULE 40	853.5 L.F.
	PIPE SLEEVE: PVC CLASS 200 SDR 21	29.3 L.F.

Valve Callout
Valve Number
Valve Flow
Valve Size

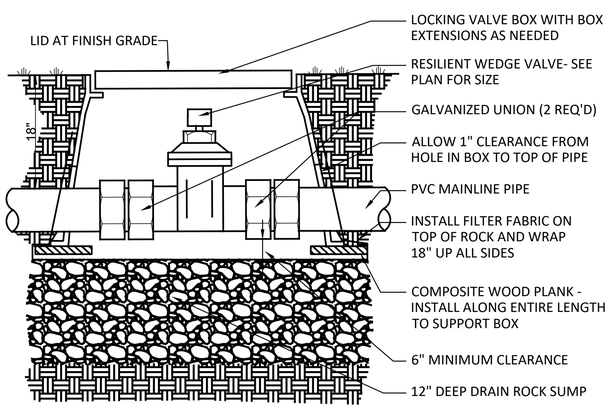


1 P.O.C. GENERAL
1" = 1'-0"

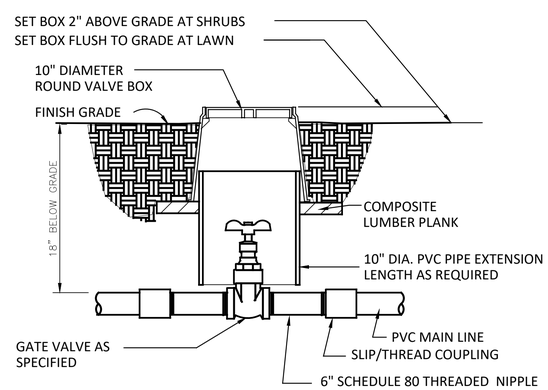


NOTE:
1 PROVIDE TRACER WIRE AT ALL PIPE SLEEVING.

2 PIPE SLEEVING
3/4" = 1'-0"



3 MANUAL WEDGE GATE VALVE
1" = 1'-0"



4 GATE VALVE
1 1/2" = 1'-0"

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CHECKED BY	DATE

City of Bellevue
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FACTORIA BOULEVARD STORM CONVEYANCE IMPROVEMENTS PROJECT

IRRIGATION SCHEDULE, NOTES AND DETAILS

SEC 27, T 25N, R 5E

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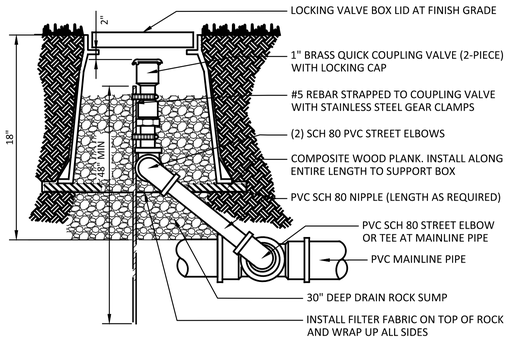
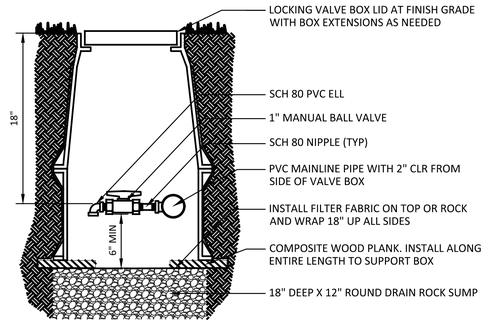


NOTES:
1. ALL THREADED MAINLINE FITTINGS SHALL BE SCH. 80 FITTINGS.
2. WRAP ALL THREADED FITTINGS W/ 3 WRAPS OF TEFLON TAPE.
3. SWING JOINT SIZE SHALL BE SAME SIZE AS VALVE BOTTOM INLET.

1 QUICK COUPLER VALVE

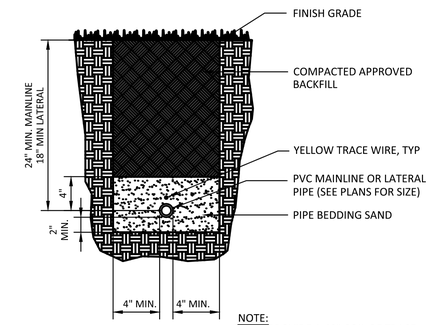
1 1/2" = 1'-0"



NOTE:
1. ALL THREADED MAINLINE FITTINGS SHALL BE SCH. 80 FITTINGS.
2. WRAP ALL THREADED FITTINGS W/ 3 WRAPS OF TEFLON TAPE.
3. CONTRACTOR RESPONSIBLE FOR LOCATING DRAIN VALVE AT LOWEST POINT(S) OF MAINLINE TO ENSURE POSITIVE DRAINAGE.
4. ALLOW FOR 1" CLEARANCE FROM HOLE IN BOX TO TOP OF PIPE.

2 MANUAL DRAIN VALVE

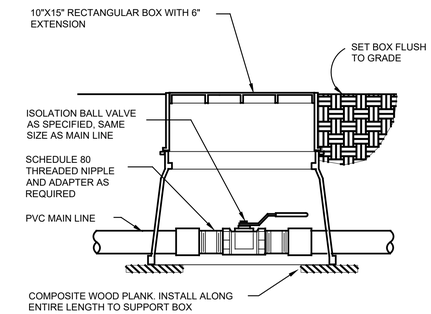
1 1/2" = 1'-0"



NOTE:
1. PROVIDE A 48" COIL OF TRACE WIRE IN EACH VALVE BOX.

3 TRENCHING

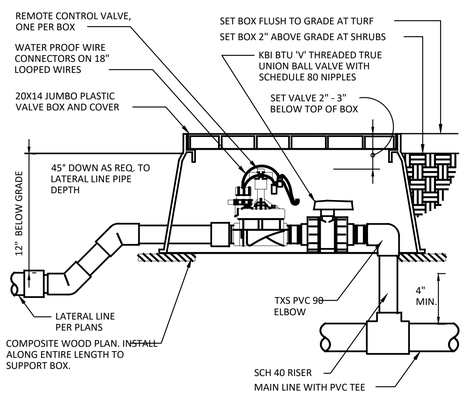
1 1/2" = 1'-0"



4 BRASS BALL ISOLATION VALVE

1 1/2" = 1'-0"

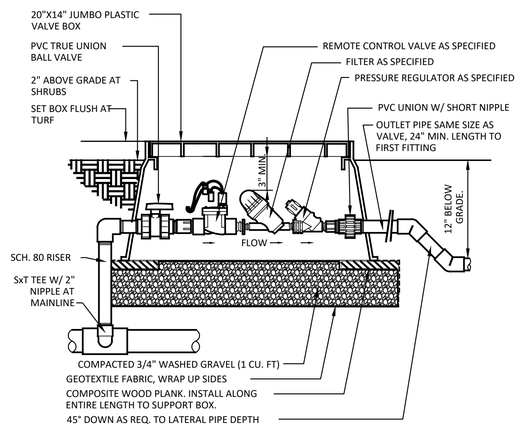
P-TY-24



5 REMOTE CONTROL VALVE WITH UNION S.O.V.

1 1/2" = 1'-0"

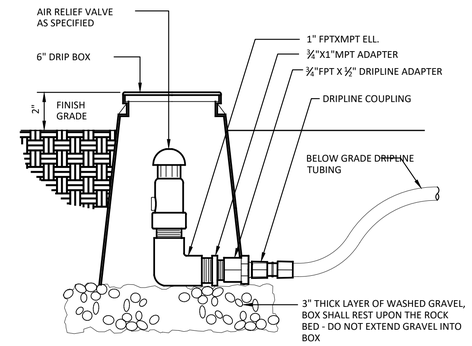
328406.13-09



6 DRIP REMOTE CONTROL VALVE W/FILT., PRES. RED.

1 1/2" = 1'-0"

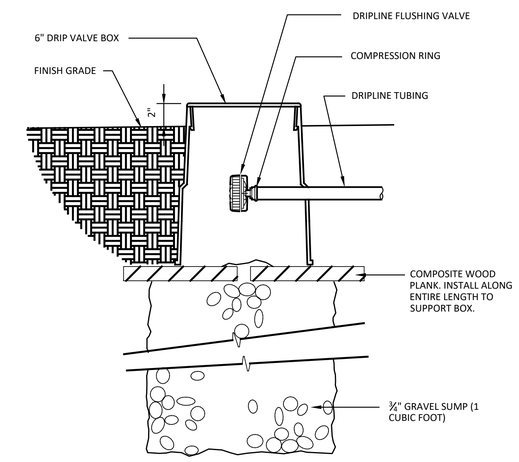
328406.13-10



7 DRIP AIR RELIEF VALVE IN BOX

3" = 1'-0"

P-TY-10



8 DRIPLINE FLUSH VALVE

3" = 1'-0"

P-TY-09

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City of Bellevue
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FACTORIA BOULEVARD STORM CONVEYANCE IMPROVEMENTS PROJECT

IRRIGATION DETAILS

SEC 27, T 25N, R 5E

SHEET 85 OF 93

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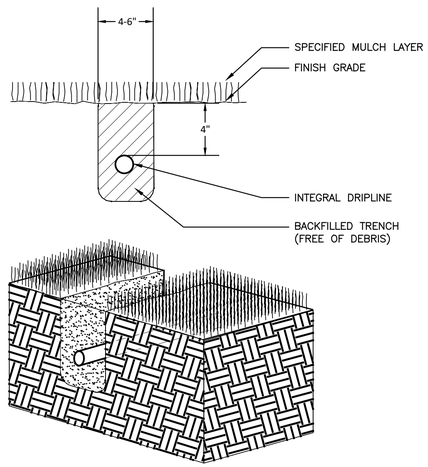
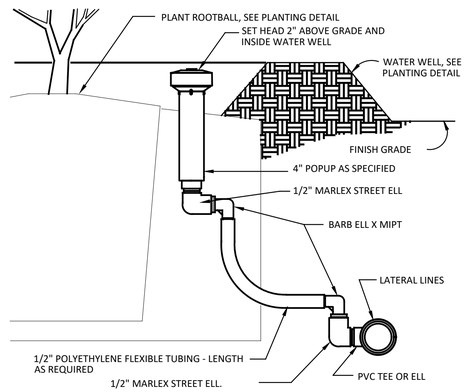


1 DRIPLINE TRENCHING

1" = 1"

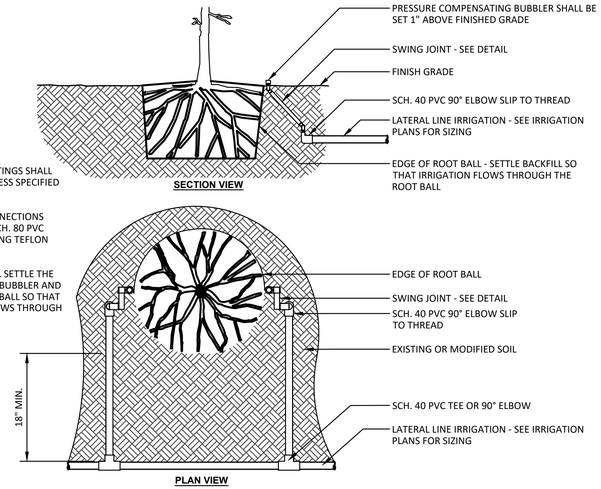


2 POPUP BUBBLER AT PLANT PIT

3" = 1'-0"

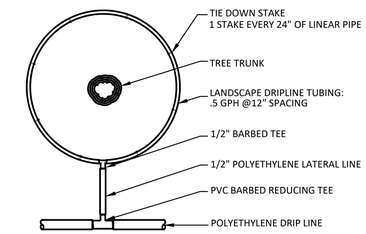
P-TY-16

NOTES:
1. ALL IRRIGATION FITTINGS SHALL BE SCH. 40 PVC UNLESS SPECIFIED OTHERWISE.
2. ALL THREADED CONNECTIONS FROM SCH. 40 TO SCH. 80 PVC SHALL BE MADE USING TEFLON TAPE.
3. CONTRACTOR SHALL SETTLE THE AREA AROUND THE BUBBLER AND EDGE OF THE ROOT BALL SO THAT ALL IRRIGATION FLOWS THROUGH THE ROOT BALL.



3 IRRIGATION BUBBLER LAYOUT AT TREE

3/4" = 1'-0"

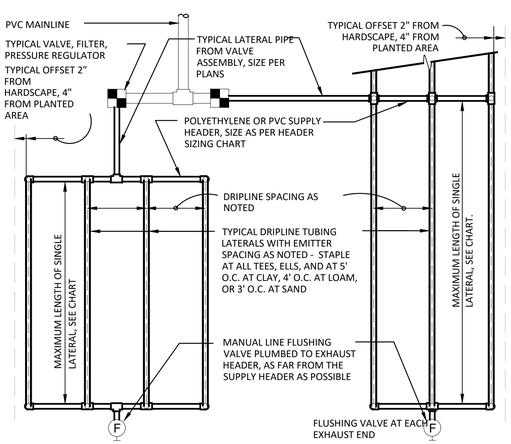


NOTES:
1. ALL TREES LOCATED WITHIN SHRUB BEDS WITH MULCH, SHALL HAVE THE DRIPPER LINE LOCATED ABOVE THE FINISHED GRADE WITH 3" OF MULCH COVERING THE DRIPPER LINE.
2. ALL TREE RINGS SHALL UTILIZE **.5 GPH** DRIP LINE @ 12" SPACING AND BE SIZED 3'-10" IN DIAMETER WITH A 12' CIRCUMFERENCE, AND CONTAIN 12 INTERNAL EMITTERS.

4 DRIP TREE RING

1/4" = 1'-0"

P-TY-57



MAXIMUM LENGTH OF SINGLE LATERAL (FEET) - CONFIRM WITH MANUF.

DRIPPER SPACING			12"				18"				24"	
DRIPPER FLOW RATE (GPH)			0.26	0.4	0.6	0.9	0.26	0.4	0.6	0.9	0.6	0.9
INLET PRESSURE (PSI)		15	127	109	86	65	177	151	120	91	152	116
		25	427	325	256	194	604	459	361	274	458	348
		35	539	409	322	244	763	579	456	346	580	440
		45	618	469	369	280	877	664	523	397	666	506

FLOW PER 100 FEET - CONFIRM WITH MANUFACTURER

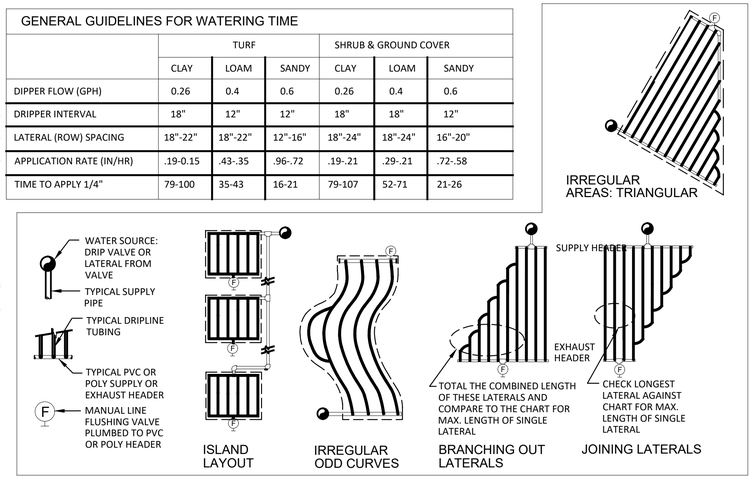
DRIPPER SPACING	0.26 GPH DRIPPER		0.4 GPH DRIPPER		0.6 GPH DRIPPER		0.9 GPH DRIPPER	
	GPH	GPM	GPH	GPM	GPH	GPM	GPH	GPM
12"	26.40	0.44	40.00	0.67	61.00	1.02	92.00	1.53
18"	17.58	0.29	26.67	0.44	41.00	0.68	61.00	1.02
24"	N/A	N/A	N/A	N/A	31.00	0.51	46.00	0.77

SUPPLY AND EXHAUST HEADER SIZING CHART (UNLESS NOTED ON PLANS)

STEP 1: ADD LENGTH OF ALL DRIPLINE LATERAL TUBING CONNECTED TO THE HEADER.
STEP 2: DIVIDE THIS TOTAL LENGTH BY 100 TO INDICATE THE LENGHT IN UNITS OF 100.
STEP 3: LOCATE THE GPM THAT APPLIES FOR EACH UNIT OF 100 FEET LENGTH ON THE CHART "FLOW PER 100 FEET". MULTIPLY THIS GPM NUMBER TIMES THE UNITS OF 100 FEET FOR THE TOTAL GPM AT THIS HEADER.
STEP 4: SIZE THE HEADER WITH THE FOLLOWING:
1 TO 6 GPM: 3/4" HEADER. 6 TO 10 GPM: 1" HEADER.
10 TO 20 GPM: 1 1/4" HEADER. 20 TO 30 GPM: 1 1/2" HEADER.

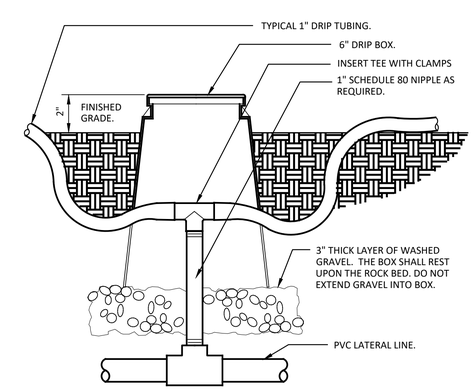
GENERAL GUIDELINES FOR WATERING TIME

	TURF			SHRUB & GROUND COVER		
	CLAY	LOAM	SANDY	CLAY	LOAM	SANDY
DIPPER FLOW (GPH)	0.26	0.4	0.6	0.26	0.4	0.6
DRIPPER INTERVAL	18"	12"	12"	18"	18"	12"
LATERAL (ROW) SPACING	18"-22"	18"-22"	12"-16"	18"-24"	18"-24"	16"-20"
APPLICATION RATE (IN/HR)	.19-0.15	.43-.35	.96-.72	.19-.21	.29-.21	.72-.58
TIME TO APPLY 1/4"	79-100	35-43	16-21	79-107	52-71	21-26



5 TYPICAL DRIPLINE REQUIREMENTS

N.T.S.



6 PIPE TRANSITION POINT

3" = 1'-0"

P-TY-07

P-TY-35

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IR8

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EARL J CHRISTIAN	8/10/21
CHECKED BY	DATE

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FACTORIA BOULEVARD STORM
CONVEYANCE IMPROVEMENTS PROJECT

IRRIGATION DETAILS

SEC 27, T 25N, R 5E

SHEET 86 OF 93

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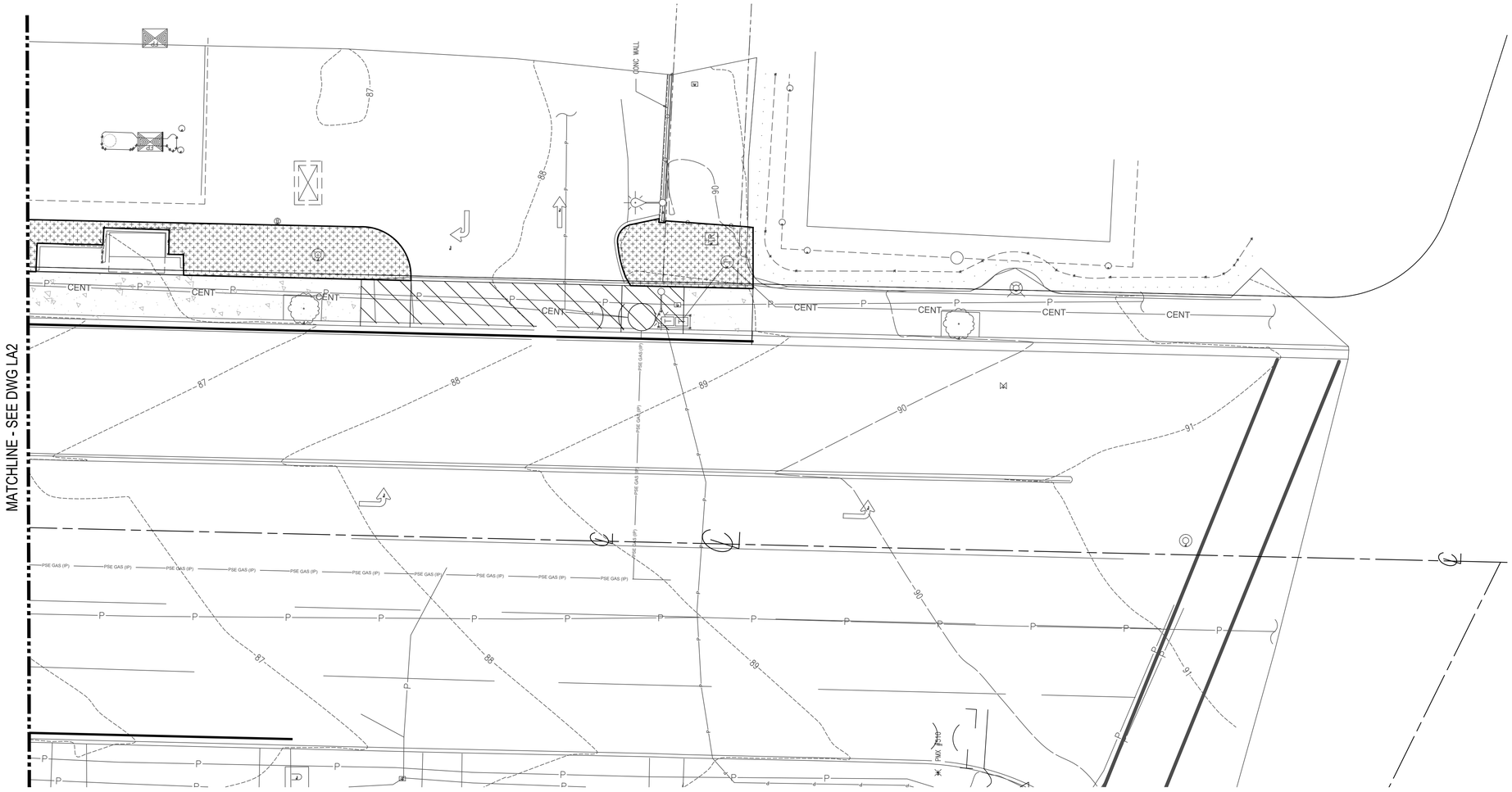

GENERAL NOTES

1. SEE PLANTING SCHEDULE, NOTES AND DETAILS ON DWG LA6.
2. SEE IRRIGATION PLAN ON DWG IR1.

LEGEND

RESTORE EXISTING LANDSCAPE IN KIND TO MATCH EXISTING

PLAN

LANDSCAPE IMPROVEMENTS
SCALE: 1"=10'

1"=10' 10 5 0 10 20
Scale Feet

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LA1

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CONVEYANCE IMPROVEMENTS PROJECT

PLANTING PLAN

SEC 27, T 25N, R 5E

SHEET 87 OF 93

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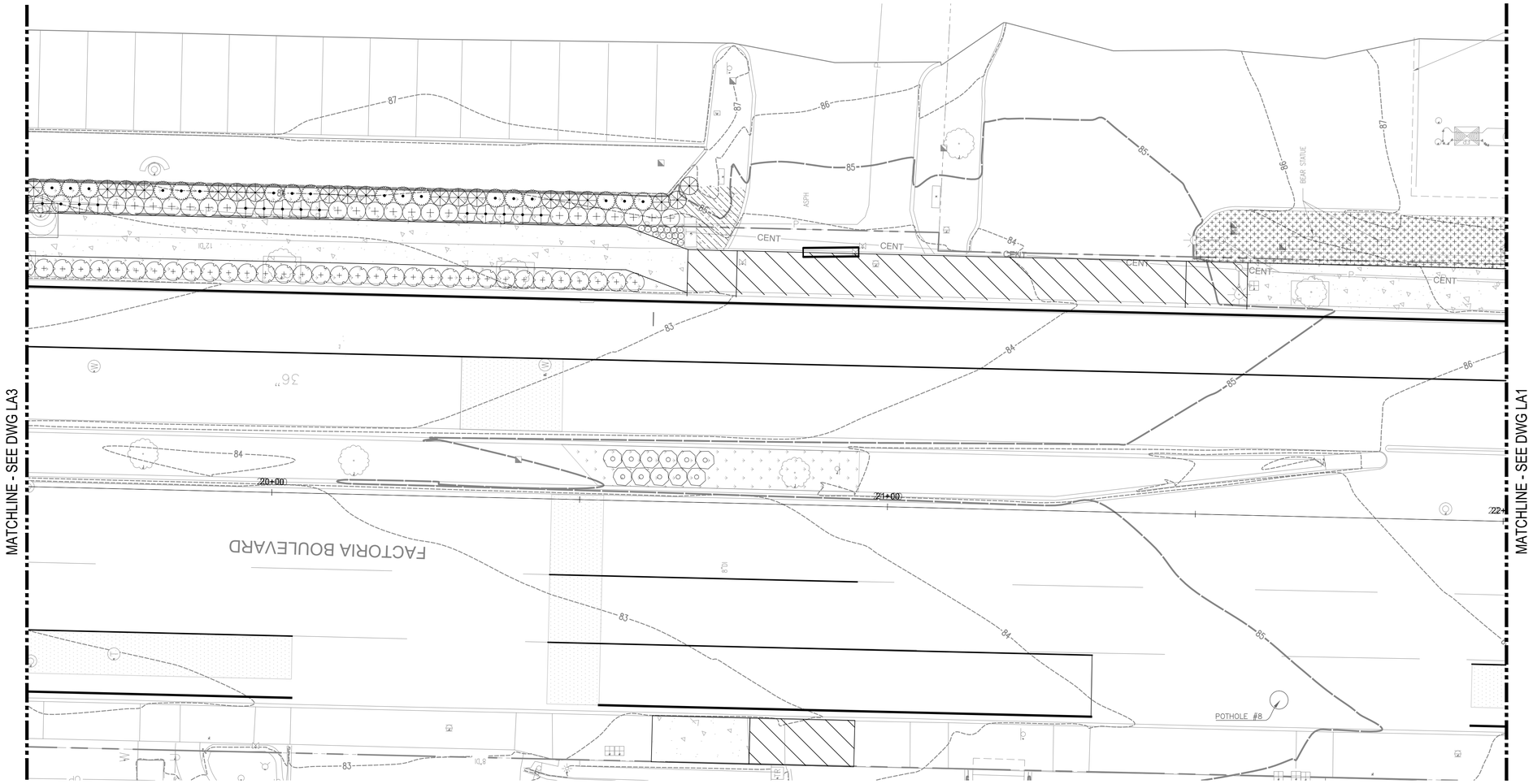

PLAN

LANDSCAPE IMPROVEMENTS
SCALE: 1"=10'

1"=10' 10 5 0 10 20
Scale Feet

GENERAL NOTES

1. SEE PLANTING SCHEDULE, NOTES AND DETAILS ON DWG LA6.
2. SEE IRRIGATION PLAN ON DWG IR2.

LEGEND

RESTORE EXISTING LANDSCAPE IN KIND TO MATCH EXISTING

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PLANTING PLAN

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SHEET 88 OF 93

LA2

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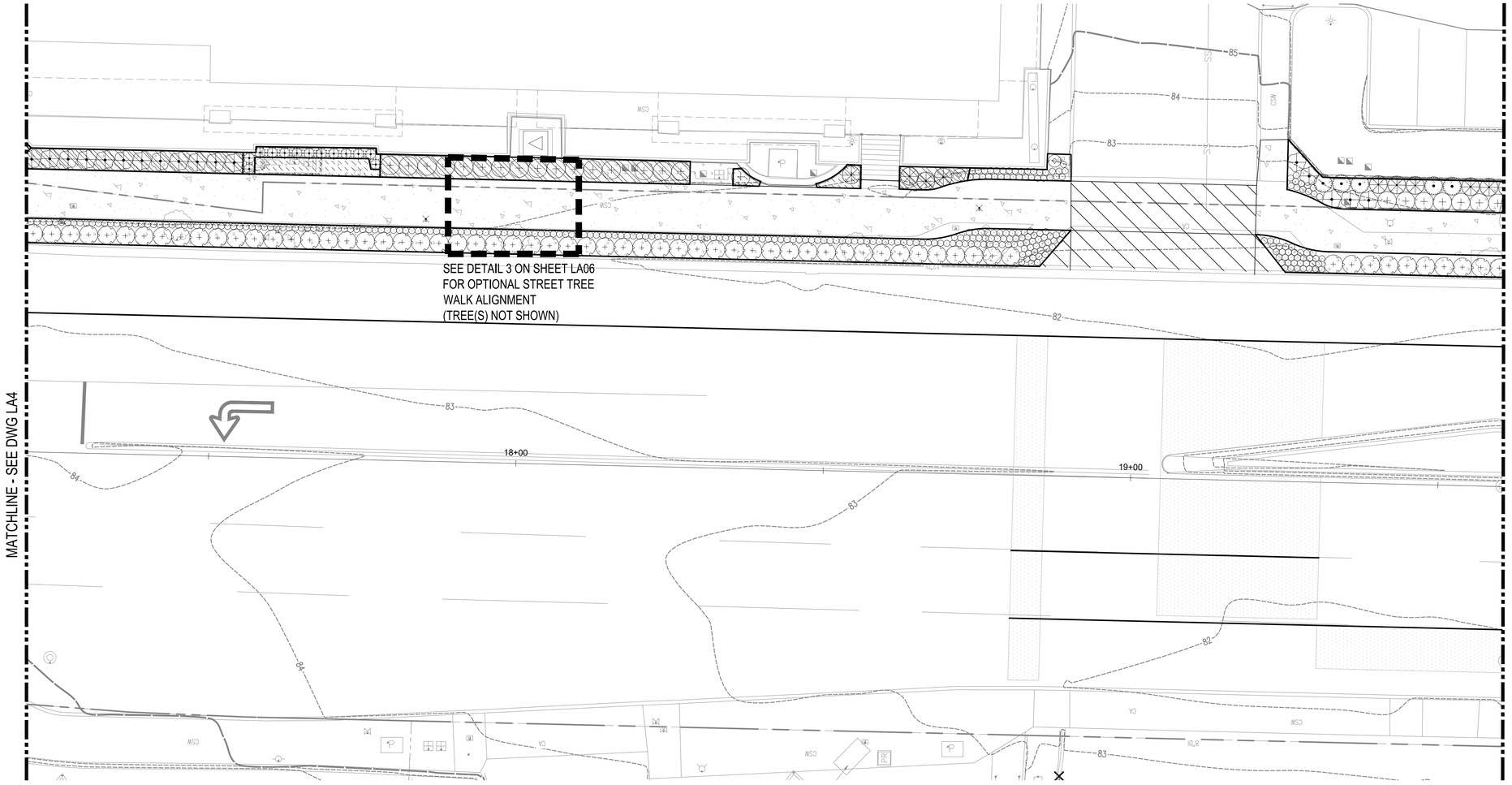

PLAN

LANDSCAPE IMPROVEMENTS
SCALE: 1"=10'

1"=10' 10 5 0 10 20
Scale Feet

GENERAL NOTES

1. SEE PLANTING SCHEDULE, NOTES AND DETAILS ON DWG LA6.
2. SEE IRRIGATION PLAN ON DWG IR3.

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PLANTING PLAN

SEC 27, T 25N, R 5E

SHEET 89 OF 93

LA3

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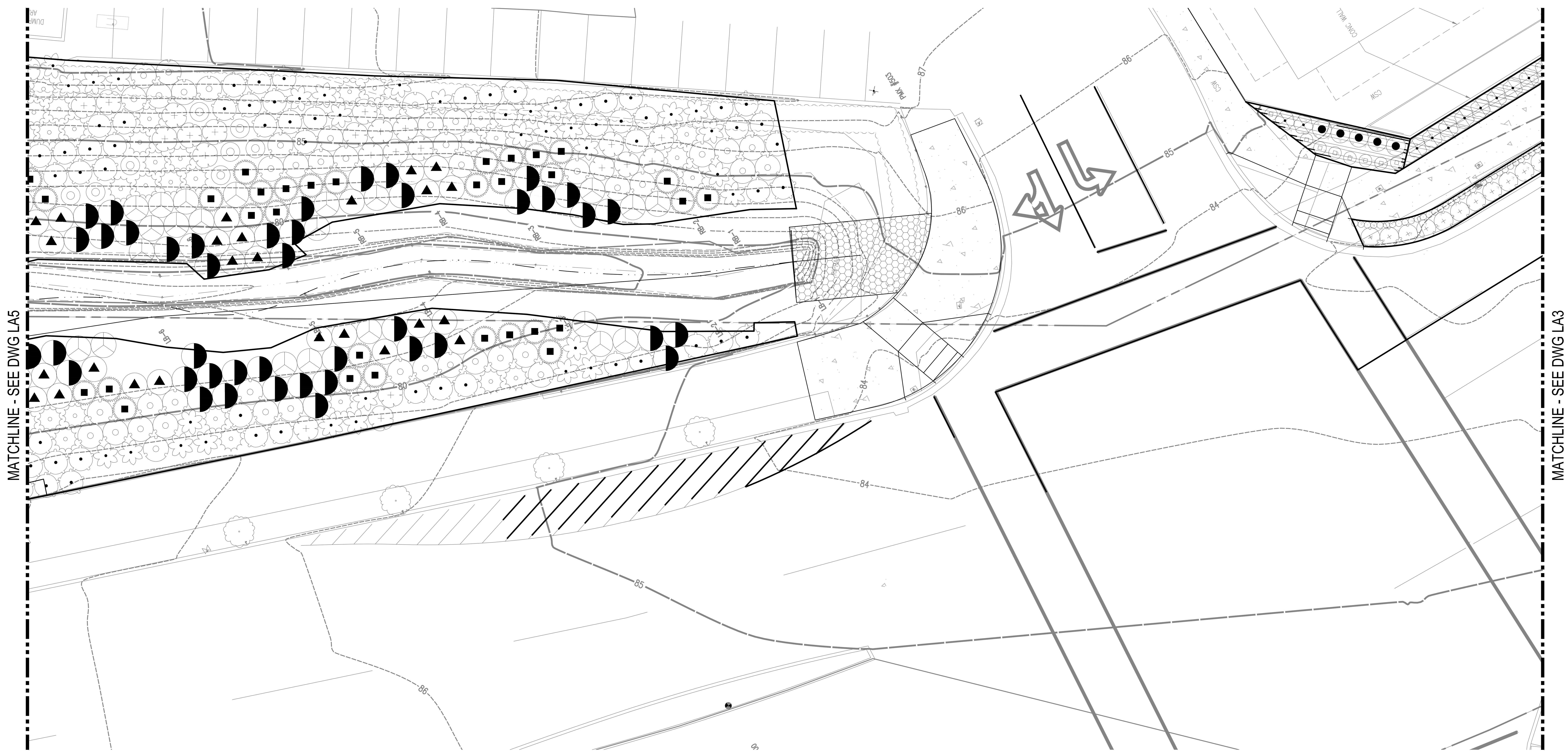
GENERAL NOTES

1. SEE PLANTING SCHEDULE, NOTES AND DETAILS ON DWG LA6 AND RICHARD'S CREEK RESTORATION PLANTING SCHEDULE, NOTES AND DETAILS ON LA7.
2. SEE IRRIGATION PLAN AND TEMPORARY IRRIGATION PLAN FOR RICHARD'S CREEK RESTORATION ON DWG IR4.



PLAN
LANDSCAPE IMPROVEMENTS
SCALE: 1"=10'

1"=10' 10 5 0 10 20 Scale Feet

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PLANTING AND RICHARD'S CREEK RESTORATION PLAN

LA4

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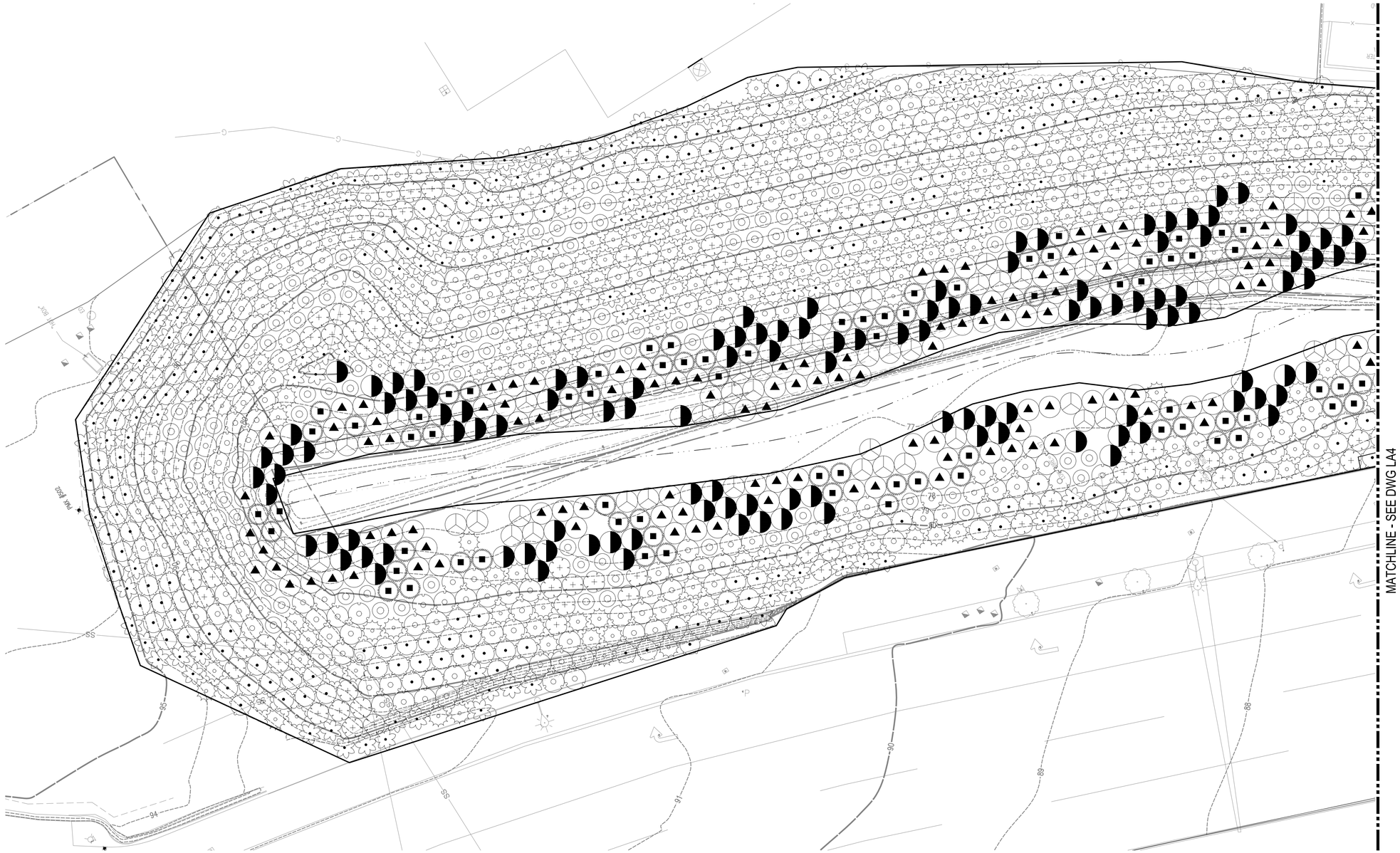

PLAN
LANDSCAPE IMPROVEMENTS
SCALE: 1"=10'

GENERAL NOTES

1. SEE RICHARD'S CREEK RESTORATION PLANTING SCHEDULE, NOTES AND DETAILS ON LA7.
2. SEE TEMPORARY IRRIGATION PLAN ON DWG IR5.

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LA5

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CONVEYANCE IMPROVEMENTS PROJECT

RICHARD'S CREEK RESTORATION PLAN

SEC 27, T 25N, R 5E

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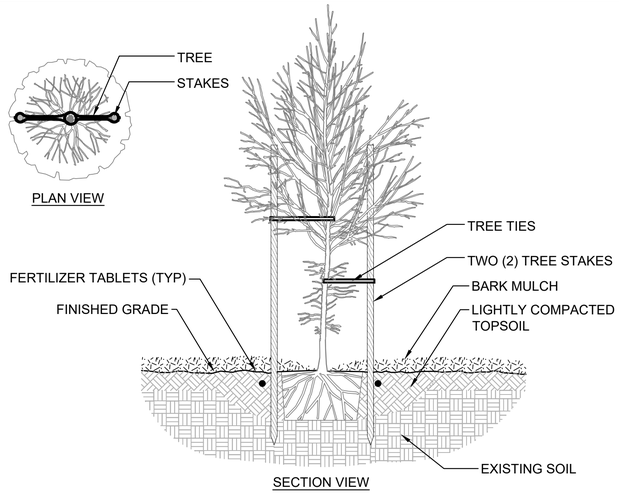
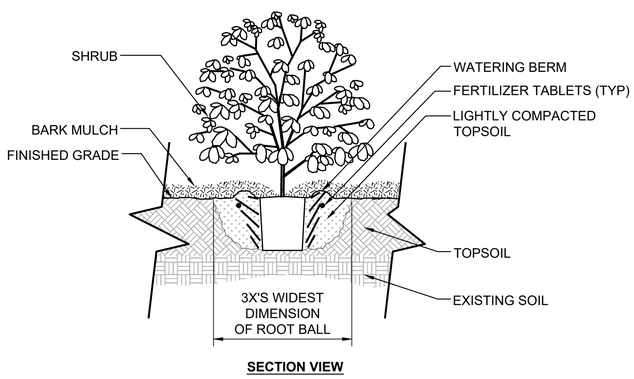


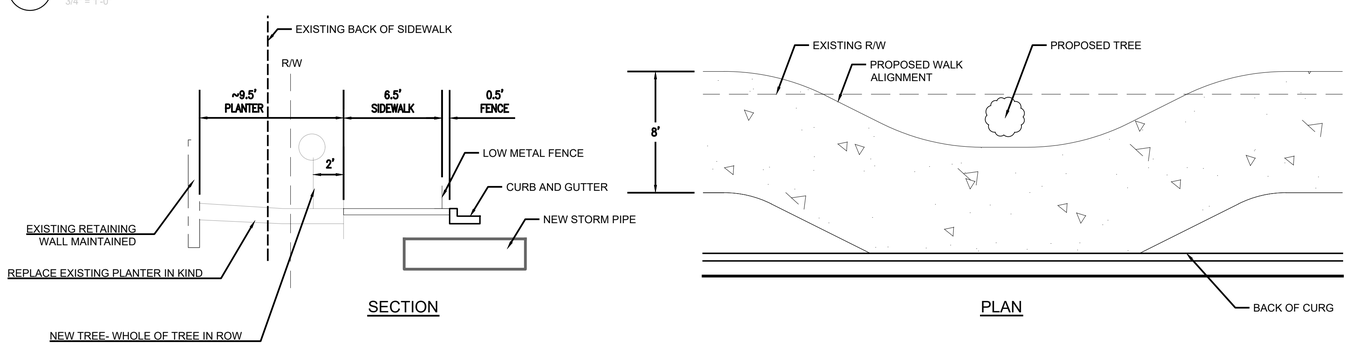
1 TREE PLANTING AND STAKING

1/2" = 1'-0"



2 SHRUB AND GROUND COVER PLANTING

3/4" = 1'-0"



3 OPTIONAL STREET TREE WALK ALIGNMENT

NOT TO SCALE

CALL 72 HOURS BEFORE YOU DIG 1-800-424-5555

PLANT SCHEDULE STREETSCAPE PLANT SCHEDULE

SHRUBS	CODE	QTY	BOTANICAL NAME	COMMON NAME	SIZE
	AH	28	AZALEA X 'GIRARD'S HOT SHOT'	GIRARD'S HOT SHOT AZALEA	2 GAL.
	CK	11	CORNUS SERICEA 'KELSEYI'	KELSEY'S DWARF RED TWIG DOGWOOD	2 GAL.
	HW	5	HYDRANGEA QUERCIFOLIA 'PEE WEE'	PEE WEE OAKLEAF HYDRANGEA	---
	LM	102	LONICERA PILEATA 'MOSS GREEN'	MOSS GREEN HONEYSUCKLE	2 GAL.
	PO	45	PRUNUS LAUROCERASUS 'OTTO LUYKEN'	OTTO LUYKEN ENGLISH LAUREL	2 GAL.
	VD	32	VIBURNUM DAVIDII	DAVID VIBURNUM	2 GAL.

GRASSES	CODE	QTY	BOTANICAL NAME	COMMON NAME	SIZE
	CE	10	CAREX OSHIMENSIS 'EVERGOLD'	EVERGOLD JAPANESE SEDGE	1 GAL.
	FO	327	FESTUCA OVINA GLAUCA 'ELIJAH BLUE'	ELIJAH BLUE FESCUE	1 GAL.
	PA	24	PENNISETUM ALOPECUROIDES	FOUNTAIN GRASS	2 GAL.

PERENNIALS	CODE	QTY	BOTANICAL NAME	COMMON NAME	SIZE
	HO	13	HEMEROCALLIS X 'STELLA DE ORO'	STELLA DE ORO DAYLILY	1 GAL.

GROUND COVERS	CODE	QTY	BOTANICAL NAME	COMMON NAME	SIZE
	AE	22	ARCTOSTAPHYLOS X 'EMERALD CARPET'	EMERALD CARPET MANZANITA	1 GAL.
	ES	9	ERICA CARNEA 'SPRINGWOOD PINK'	SPRINGWOOD PINK WINTER HEATH	2 GAL.
	FS	23	FRAGARIA X 'LIPSTICK'	LIPSTICK ORNAMENTAL STRAWBERRY	1 GAL.

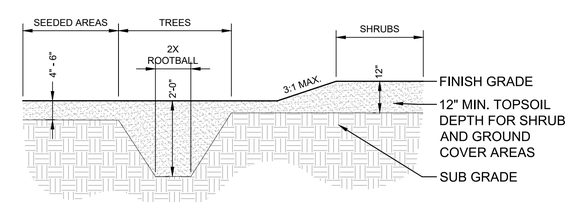
EXISTING PLANT MATERIAL	CODE	QTY	BOTANICAL NAME	COMMON NAME	SIZE
	RE	1,024 SF	RESTORE EXISTING PLANT MATERIAL IN-KIND		---

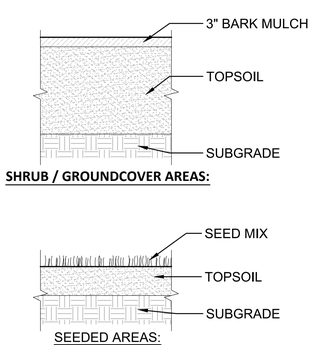
LANDSCAPE NOTES

1. COORDINATE WORK SHOWN ON THIS DRAWING WITH INSTALLATION OF UNDERGROUND IRRIGATION AND ALL OTHER EXISTING OR PROPOSED SITE WORK.
2. CONTRACTOR IS TO VERIFY WITH PROJECT MANAGER AND UTILITY COMPANIES THE LOCATIONS OF ALL UTILITIES PRIOR TO CONSTRUCTION, TO DETERMINE IN THE FIELD THE ACTUAL LOCATIONS AND DEPTH OF ALL EXISTING UTILITIES. THE CONTRACTOR SHALL CALL 811 UTILITY PROTECTION SERVICE 72 HOURS PRIOR TO CONSTRUCTION. CONTRACTOR IS TO REFER TO UTILITY SHEETS AND EXERCISE CARE TO PROTECT AND AVOID DISTURBING OR DAMAGING THEM. ANY DAMAGE RESULTING FROM THIS WORK SHALL BE RESTORED AT THE CONTRACTOR'S EXPENSE.
3. CONTRACTOR IS TO OBTAIN WRITTEN APPROVAL FOR ALL PLANT MATERIAL SUBSTITUTIONS FROM THE PROJECT MANAGER PRIOR TO INSTALLATION. PLANT SUBSTITUTIONS WITHOUT PRIOR WRITTEN APPROVAL THAT DO NOT COMPLY WITH THE DRAWINGS AND SPECIFICATIONS MAY BE REJECTED BY THE OWNERS REPRESENTATIVE AT NO COST TO THE OWNER. THESE ITEMS MAY BE REQUIRED TO BE REPLACED WITH PLANT MATERIALS THAT ARE IN COMPLIANCE WITH THE DRAWINGS.
4. CONTRACTOR IS TO EXAMINE FINISH SURFACE, GRADES, TOPSOIL QUALITY AND DEPTH. CONTRACTOR TO NOTIFY PROJECT MANAGER OF ANY CONDITIONS WHICH MAY BE HARMFUL TO PLANT LIFE, SUCH AS POOR DRAINAGE, HAZARDOUS MATERIALS, ETC. THE CONTRACTOR SHALL MAKE A RECOMMENDATION TO ADDRESS THE SPECIFIC SITUATION. DO NOT CONTINUE ANY WORK UNTIL UNSATISFACTORY CONDITIONS HAVE BEEN CORRECTED.
5. CONTRACTOR IS TO RE-SEED AND RESTORE STAGING AREAS AND ALL OTHER ADJACENT AREAS DISTURBED DURING CONSTRUCTION.
6. CONTRACTOR IS TO FINE GRADE AND ROCK-HOUND ALL SEEDED AND PLANTING AREAS TO PROVIDE A SMOOTH AND CONTINUAL SURFACE, FREE OF IRREGULARITIES (BUMPS OR DEPRESSIONS) & EXTRANEOUS MATERIAL OR DEBRIS. ROCK AND DEBRIS (LARGER THAN 1" DIAMETER) IN SEEDED LAWN AND PLANTING AREAS IS TO BE REMOVED.
7. LANDSCAPE EDGE TO BE NO LESS THAN 12" AND NO MORE THAN 18" FROM OUTER EDGE OF PLANT MATERIAL BRANCHING. WHERE GROUNDCOVER OCCURS, PLANT TO LIMITS OF AREA AS SHOWN.
8. CONTRACTOR IS TO MAINTAIN POSITIVE DRAINAGE IN LANDSCAPE BEDS AND LAWN AREAS.
9. CONTRACTOR IS RESPONSIBLE FOR HIS BID QUANTITIES AS REQUIRED BY THE PLANS AND SPECIFICATIONS. IF THERE IS A DISCREPANCY BETWEEN THE NUMBER LABELED ON THE PLANT LEGEND AND THE QUANTITY OF GRAPHIC SYMBOLS SHOWN, THE GRAPHIC SYMBOL QUANTITY SHALL GOVERN.
10. WITH THE EXCEPTION OF GROUND COVER PLANT MATERIAL, CONTRACTOR IS TO KEEP PLANTS A MIN. 5'-0" CLEAR FROM HYDRANTS AND UTILITY VAULTS UNLESS OTHERWISE NOTED ON PLANS.
11. LANDSCAPE MAINTENANCE PERIOD BEGINS IMMEDIATELY AFTER THE COMPLETION OF ALL PLANTING OPERATIONS AND WRITTEN NOTIFICATION TO THE OWNER. MAINTAIN TREES, SHRUBS, LAWNS AND OTHER PLANTS UNTIL FINAL ACCEPTANCE OF 90 DAYS AFTER NOTIFICATION AND ACCEPTANCE, WHICHEVER IS LONGER.
12. CONTRACTOR IS RESPONSIBLE TO SECURE ALL PLANT MATERIAL IN THE SIZE SPECIFIED ON PLANS PRIOR TO INSTALLATION.

NOTES:

1. CONTRACTOR SHALL SCARIFY SUBGRADE SURFACE PRIOR TO INSTALLING TOPSOIL.
2. TOPSOIL DEPTH SHALL BE AS FOLLOWS FOR THE DIFFERENT SEED TYPES:
   - LAWN - 6"
   - WETLAND RESTORATION - 6"
   - ROADSIDE RESTORATION - 4"





4 TYPICAL TOPSOIL DEPTHS

1/2" = 1'-0"

LA6

NO	DATE	BY	APPR	REVISIONS
1				60% DESIGN - NOT FOR CONSTRUCTION

WSP USA Inc.
1301 Fifth Avenue
Suite 1200
Seattle, WA 98101-2677
TEL: 206-357-5600
FAX: 206-357-5601

60% SUBMITTAL

Approved By

DESIGN MANAGER — DATE

PROJECT MANAGER — DATE

DAN E WOJTALA	8/10/21
DESIGNED BY	DATE
DAN E WOJTALA	8/10/21
DRAWN BY	DATE
EARL J CHRISTIAN	8/10/21
CHECKED BY	DATE

City of Bellevue
UTILITIES

FACTORIA BOULEVARD STORM CONVEYANCE IMPROVEMENTS PROJECT

PLANTING SCHEDULE, NOTES AND DETAILS

SEC 27, T 25N, R 5E

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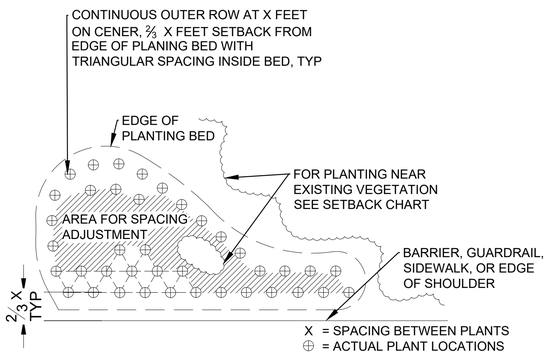
PLANT MATERIAL SETBACK CHART

PLANT TYPE	GUARDRAIL BARRIER	EDGE OF ROADWAY	WALL	FENCE	SIGNS	EX. TREE TRUNK	EX. VEG. MASS
EVERGREEN TREE	10'	10'	10'	10'	15'	15'	10'
DECIDUOUS TREE	10'	10'	10'	10'	15'	15'	10'
SHRUB	5'	10'	5'	6'	6'	10'	10'

TYPICAL SETBACKS FOR PLANT MATERIAL UNLESS OTHERWISE DIRECTED BY THE ENGINEER DURING LAYOUT AND STAKING OF PLANT LOCATIONS DISTANCE NOTED IS TO STEM OR TRUNK OF PLANT.



DETAIL

TYPICAL PLANTING AREA LAYOUT
SCALE: NTS

PLANT SCHEDULE RESTORATION PLANT SCHEDULE

STREAM RESTORATION UPLAND AREA	CODE	QTY	BOTANICAL NAME	COMMON NAME	SIZE	REMARKS
	HOL DIS	146	HOLODISCUS DISCOLOR	OCEAN-SPRAY	2 GAL.	4' O.C.
	RS	257	RIBES SANGUINEUM	RED FLOWERING CURRANT	2 GAL.	4' O.C.
	RN	258	ROSA NUTKANA	NOOTKA ROSE	2 GAL.	4' O.C.
	SAL SCO	105	SALIX SCOULERIANA	SCOULER`S WILLOW	2 GAL.	4' O.C.
	SAM RED	204	SAMBUCUS RACEMOSA	RED ELDERBERRY	2 GAL.	4' O.C.
	SYM ALB	174	SYMPHORICARPOS ALBUS	COMMON WHITE SNOWBERRY	2 GAL.	4' O.C.

STREAM RESTORATION WIDENED CHANNEL	CODE	QTY	BOTANICAL NAME	COMMON NAME	SIZE	REMARKS
	COR STO	162	CORNUS SERICEA	RED TWIG DOGWOOD	2 GAL.	4' O.C.
	PHY CAP	105	PHYSOCARPUS CAPITATUS	PACIFIC NINEBARK	2 GAL.	4' O.C.
	SAL LUC	83	SALIX LUCIDA	PACIFIC WILLOW	2 GAL.	4' O.C.
	SAL SIT	141	SALIX SITCHENSIS	SITKA WILLOW	2 GAL.	4' O.C.

RESTORATION PLANTING NOTES

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2. CONTRACTOR IS TO OBTAIN WRITTEN APPROVAL FOR ALL PLANT MATERIAL SUBSTITUTIONS FROM THE PROJECT MANAGER PRIOR TO INSTALLATION. PLANT SUBSTITUTIONS WITHOUT PRIOR WRITTEN APPROVAL THAT DO NOT COMPLY WITH THE DRAWINGS AND SPECIFICATIONS MAY BE REJECTED BY THE OWNERS REPRESENTATIVE AT NO COST TO THE OWNER. THESE ITEMS MAY BE REQUIRED TO BE REPLACED WITH PLANT MATERIALS THAT ARE IN COMPLIANCE WITH THE DRAWINGS.
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4. PRIOR TO CONSTRUCTION A LICENSED SURVEYOR SHALL SURVEY, STAKE, AND FLAG LIMITS OF WORK AND WETLAND BOUNDARIES AS SHOWN ON THE PLANS.
5. SELECTIVELY CLEAR AND GRUB INFILL PLANTING AREAS AS DEFINED BY THE CLEARING LIMITS. FIELD ADJUST PLANTING ADJACENT TO EXISTING VEGETATION AS NECESSARY. WETLAND BIOLOGIST/LANDSCAPE ARCHITECT SHALL APPROVE FINAL LAYOUT IN FIELD.
6. PLANTING AREAS SHALL RECEIVE AN 8" DEPTH OF TOPSOIL TYPE A. REFER TO CIVIL PLANS FOR LIMITS.
7. INSTALL PLANTS PER DETAILS AND INSTALL 3" DEPTH OF HOG FUEL BETWEEN PLANTS.
8. PROVIDE TWO ORGANIC SLOW-RELEASE FERTILIZER TABLETS FOR EACH CONTAINERIZED PLANT.
9. SHRUBS SHALL BE PLANTED IN CLUSTERS OF THE SAME SPECIES AND BE DISTRIBUTED RANDOMLY TO CREATE A NATURAL ENVIRONMENT.
10. ALL PLANTINGS SHALL RECEIVE DRIWATER GEL OR APPROVED EQUAL. PLANTS SHALL BE MANUALLY WATERED (E.G. WATERING TRUCK) BY THE CONTRACTOR DURING THE PLANT ESTABLISHMENT PERIOD. CONTRACTOR SHALL SUBMIT IRRIGATION METHOD FOR APPROVAL BY OWNERS REPRESENTATIVE. ALL PLANTS SHALL BE WATERED AS REQUIRED TO MAINTAIN PLANT HEALTH DURING INSTALLATION AND THROUGHOUT THE GROWING SEASON (MARCH 15 TO OCTOBER 31).
11. PLANTING DATES: OCTOBER 1 THROUGH APRIL 15.
12. CONTRACTOR IS TO RE-SEED AND RESTORE STAGING AREAS AND ALL OTHER ADJACENT AREAS DISTURBED DURING CONSTRUCTION.
13. CONTRACTOR IS TO FINE GRADE AND ROCK-HOUND ALL SEEDED AND PLANTING AREAS TO PROVIDE A SMOOTH AND CONTINUAL SURFACE, FREE OF IRREGULARITIES (BUMPS OR DEPRESSIONS) & EXTRANEOUS MATERIAL OR DEBRIS. ROCK AND DEBRIS (LARGER THAN 1" DIAMETER) IN SEEDED LAWN AND PLANTING AREAS IS TO BE REMOVED.
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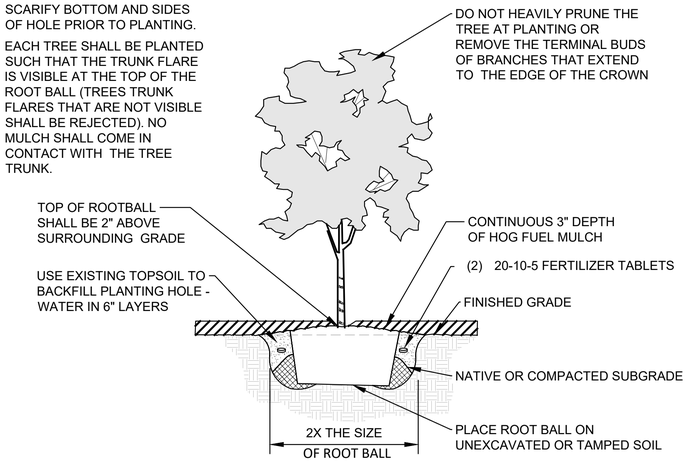
16. CONTRACTOR IS RESPONSIBLE TO SECURE ALL PLANT MATERIAL IN THE SIZE SPECIFIED ON PLANS PRIOR TO INSTALLATION.

NOTES:

1. SCARIFY BOTTOM AND SIDES OF HOLE PRIOR TO PLANTING.
2. EACH TREE SHALL BE PLANTED SUCH THAT THE TRUNK FLARE IS VISIBLE AT THE TOP OF THE ROOT BALL (TREES TRUNK FLARES THAT ARE NOT VISIBLE SHALL BE REJECTED). NO MULCH SHALL COME IN CONTACT WITH THE TREE TRUNK.

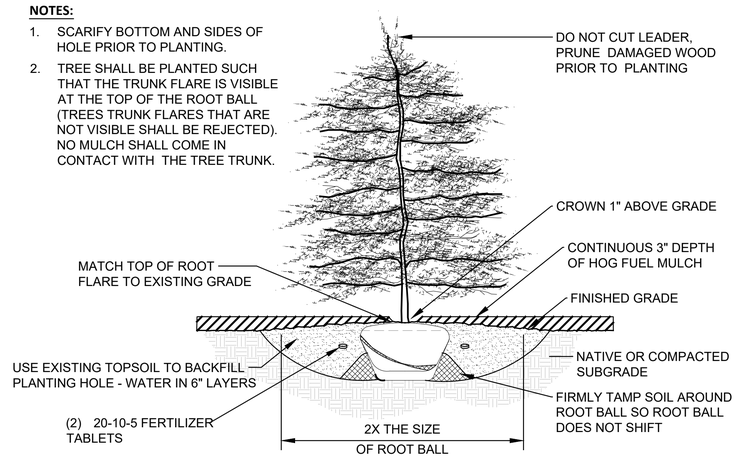


DETAIL

NATIVE DECIDUOUS TREE PLANTING
SCALE: NTS

NOTES:

1. SCARIFY BOTTOM AND SIDES OF HOLE PRIOR TO PLANTING.
2. TREE SHALL BE PLANTED SUCH THAT THE TRUNK FLARE IS VISIBLE AT THE TOP OF THE ROOT BALL (TREES TRUNK FLARES THAT ARE NOT VISIBLE SHALL BE REJECTED). NO MULCH SHALL COME IN CONTACT WITH THE TREE TRUNK.

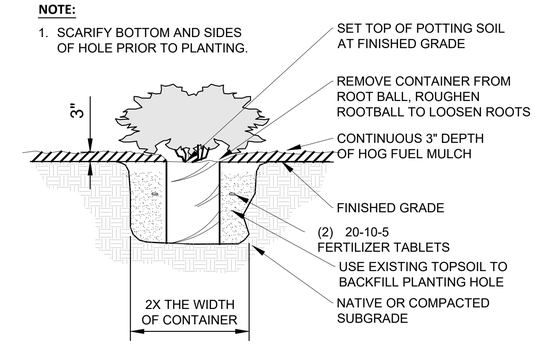


DETAIL

NATIVE EVERGREEN TREE PLANTING
SCALE: NTS

NOTE:

1. SCARIFY BOTTOM AND SIDES OF HOLE PRIOR TO PLANTING.



DETAIL

SHRUB PLANTING
SCALE: NTS

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LA7

NO	DATE	BY	APPR	REVISIONS
1				60% DESIGN - NOT FOR CONSTRUCTION

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60% SUBMITTAL

Approved By

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PROJECT MANAGER DATE

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EARL J CHRISTIAN	8/10/21
CHECKED BY	DATE

City of Bellevue
UTILITIES

FACTORIA BOULEVARD STORM CONVEYANCE IMPROVEMENTS PROJECT
RESTORATION PLANTING SCHEDULE, NOTES AND DETAILS

SEC 27, T 25N, R 5E

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Memorandum

Date:	October 12, 2021
Subject:	Factoria Boulevard Storm Conveyance Improvements Project – Conceptual Mitigation Plan
To:	Birol Shaha – City of Bellevue Utilities
From:	Brandon Stimac, Dan Roscoe – WSP
CC:	Jay Cammermeyer – WSP

The City of Bellevue Utilities Department is developing a capital project to construct stormwater conveyance improvements to reduce the risks of flooding during high intensity storm events in the City's Factoria-Richards Creek drainage basin. The project proposes to replace an existing 3.3 feet x 5.3 feet stormwater conveyance pipe running along the east side Factoria Boulevard SE with a larger capacity stormwater conveyance pipe that flows into the inlet channel of Richards Creek adjacent to Factoria Village commercial area just south of I-90 (Figure 1).

The City is currently completing preliminary design of the project and has initiated early outreach with State and Federal agencies, including the U.S. Army Corps of Engineers (USACE) [1], Washington Department of Fish and Wildlife (WDFW), and the Muckleshoot Indian Tribe (MIT). The purpose of the outreach has been to present the project and obtain preliminary feedback on the project and to determine likely permitting requirements.

Recent communications with the MIT and WDFW have centered on the classification of the existing stormwater outfall into the open channel at Factoria Village and the existing piped conveyance network upstream of the outfall. WDFW and the MIT have indicated that the head water of Richards Creek may have been up to SE 38th Street and that the historic fish habitat and stream channel have been impacted by urbanization of the area. Based on discussions with WDFW and MIT, the City is currently assuming that these entities view the replacement of the existing storm conveyance with a new storm conveyance as an impact to a piped historic stream channel and, therefore, requires mitigation that benefits fish access to habitat and/or improves quality of habitat. It is recognized that creating new open stream channel within the project area, which is heavily urbanized, is impractical, and that the mitigation efforts should focus on

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[1] As of the date of this memorandum, the USACE has declined to participate in preliminary discussions. The USACE will engage when the project is formally presented through a permit application to the USACE.

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Federal Way, WA 98003-2600
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restoring access to habitat or improving fish passage downstream of the project or in nearby stream basins. Daylighting of confined stream segments and removing man-made barriers/constrictions were particularly attractive mitigation approaches from the Tribe's point of view.

The purpose of this memorandum is to document the existing basin conditions and opportunities for mitigation within the Richards Creek basin to address project impacts. This memo summarizes characteristics and the current conditions of the upper Richards Creek basin as related to the possible opportunities to enhance aquatic habitat both and downstream of the outfall. This conceptual mitigation plan found that enhancement of aquatic habitat in the segment downstream of the outfall is the most feasible and practicable mitigation instrument available.

Once finalized, this memo will be used to prepare a formal mitigation plan for regulatory agency review and approval.

The proposed project is an outfall replacement and has been evaluated in terms of the current WDFW requirements for permitting outfalls under the Hydraulic Code regulations. These regulations require fish exclusion techniques to be placed on stormwater outfalls to prevent fish from entering piped systems. The project impacts (permanent and temporary) from replacing the outfall will require mitigation. Additionally, installation of fish exclusion where it currently does not exist creates a loss of access and has been considered in the mitigation concept.

This memo is organized into the following sections:

- Project Description
- Richards Creek Basin Analysis
- Project Impact Analysis
- Conceptual Mitigation Plan

PROJECT DESCRIPTION

The purpose of this project is to construct improvements to alleviate recurrent flooding issues occurring along Factoria Boulevard SE in south Bellevue associated with high-intensity rainfall events. The project goal is to minimize risk of street flooding and road closures within this area during high intensity storm events. From an alternative analysis completed in 2018, it was determined that existing storm conveyance along Factoria Boulevard is under capacity to convey storm water runoff during high intensity storm events, and it needs to be upsized between SE 36th Street and SE 38th Street.

The proposed project includes storm drain improvements, replacement and addition of storm inlets, and replacement of the existing outfall. Attachment C includes a map of the project area and selected sheets of the preliminary design plans to give an overview of the project and accompany the discussion of the project descriptions. A brief description of each project element is described below:

Storm Conveyance Replacement

The stormwater conveyance along the north bound lanes of Factoria Boulevard SE is currently a 3.3-foot by 5.3-foot pipe arch storm drain (in front of Factoria Village) and 30" diameter storm drain (in front of a Brown Bear car wash); the total replacement will be approximately 640 feet. The first approximately 410 feet of the replacement will be with a 9-foot-wide by 4-foot-high box storm drain from the outfall southward. The remaining approximately 230 feet of conveyance line will be replaced with two parallel 24" and 30" diameter storm pipes.

Lateral Improvements

The project also proposes improvements to two storm drain crossings that run perpendicular across Factoria Boulevard SE. The proposed lateral near Formula-1 Fast Lube will consist of five new 18-inch pipes and the lateral to the south near the 7-11 store will add a single 24-inch pipe in addition to the existing 24-inch and 36-inch pipes currently located at this lateral.

Inlet Improvements

The project is proposing 15 new inlets and 8 improvements to existing inlets along Factoria Boulevard SE. Many of the new structures will be combination inlets with both curb openings and flat vaned grates in the gutter. Those inlets occurring above the new conveyance line will not have sumps as the runoff will drop directly into the underlying storm conveyance.

Outfall Replacement

The existing storm drain conveys storm water runoff to a 5.3-foot by 3.3-foot pipe arch outfall that is currently semi-submerged and extends into Richards Creek near Factoria Village. At the proposed outfall of the 9-foot-wide by 4-foot-high box storm drain a rock splash pad/transition zone and wing walls are proposed to reduce scour and erosive potential during high flows. The proposed outfall may include fish exclusion depending on the outcome of negotiations between the City and WDFW.

RICHARDS CREEK BASIN

The 1,380-acre Richards Creek watershed is located entirely within the city of Bellevue, Washington. Richards Creek flows into Kelsey Creek, which shortly becomes Mercer Slough and flows into Lake Washington. There are two tributaries that flow into Richards Creek, East Creek located to the northeast of Factoria Boulevard and Sunset Creek, also located to the northeast of the project area. Much like Richards Creek, both tributaries are fed by stormwater runoff from impervious surface and are primarily stormwater conveyance pipes. The creek's headwater begins in the open channel adjacent to Factoria Village and is largely fed by impervious surface runoff from approximately 283-acre area south of I-90.

For the purpose of this memo, the Richards Creek Basin described below includes the area south of the Interstate 90 (I-90) culverts. This was done as the project limits, including mitigation, will be from the upstream end of the I-90 culverts south down Factoria Boulevard. The existing and historical context of that section of the upper Richards Creek basin is described below.

Existing Conditions

Richards Creek's basin is mostly located in a highly urbanized environment and its riparian buffers are nonexistent for a majority of its length. Urban runoff captured by approximately 17.7 miles of storm drain systems that convey surface runoff to the outfall at Richards Creek adjacent to Factoria Boulevard at Factoria Village, which is currently considered the headwater for Richards Creek. Approximately 5-miles of the17-mile pipe conveyance system is owned and maintained by the City under the MS4 permit. The remaining 12-miles are private stormwater conveyances that drain privately owned commercial businesses and their associated parking areas. Within the project area along Factoria Boulevard there is over 90% impervious surface that is owned by the aforementioned private commercial businesses.

The Richards Creek channel extends from the inlet to the I-90 culverts upstream approximately 320 feet south to the outfall associated with the proposed project. The rest of the drainage network in the upper basin is composed of the City's stormwater conveyance system and private drainage features. Approximately 94 percent of the drainage network is contained within the existing stormwater conveyance (piped) system (Figure 2). There are three segments that are currently not piped. These segments total approximately 490 linear feet (LF) of the approximately 7,600 LF of the upper basin studied. These segments include approximately 320 LF open channel of Richards Creek, and 170 LF from two roadside ditches at Southeast 42nd Street. These ditches convey flows from Newport High School into the piped conveyances near Factoria Mall. An analysis of the basin conditions draining to the outfall was also reviewed and is summarized (Figure 3). Photographs 1 and 2 below show pictures of the channel taken in 2019.

Photo 1: View of Existing Outfall and Riparian Conditions Looking South.

Photo 2: Existing Conditions in Richards Creek looking north through the channel.

Historic Conditions

A review of historic aerial photos and topographic maps help determining the potential historic extent of Richards Creek along the present day Factoria Boulevard. The 1950 USGS topographic map indicates a stream channel terminating near the intersection of the present day Factoria Boulevard and Southeast 38th Street (Figure 4).

PROJECT IMPACTS

Hydraulic Impacts:

The proposed improvements are sized to accommodate 100-year 24-hour storm event. As part of the project, existing and proposed storm system was simulated for a 100-year storm event in a hydraulic/hydrologic model to determine impacts in terms of peak flow rates and velocities. The results from this modeling at both the Factoria Village outfall and the outfall of the I-90 culverts are shown below in Table 1.

Table 1. 100-Year 24-hr Storm Event Modeling Results

Location	Existing Flowrate (CFS)	Proposed Flowrate (CFS)	Percent Increase	Existing Water Velocity (ft/s)	Proposed Water Velocity (ft/s)	Percent Increase
Outfall at Inlet Channel (Factoria Village)	126.2	134.3	**-0.1%**	4.77	3.77	**-27%**
Downstream of I-90 Culverts	143.4	142.5	**-0.6%**	1.70	1.69	**-1%**

There will be no additional impacts from the proposed improvements during design 100-year storm. The new outfall will decrease the peak flow rates by 0.1 and 0.6 percent at the Factoria Village stormwater outfall and the I-90 culverts, respectively. There will also be a decrease in velocity at both locations at 27 and 1 percent, respectively. There is decreased potential for erosion and subsequent degradation of the habitat downstream (north) of the I-90 culverts, however, the slight decrease in flow and velocity are not expected to measurably impact channel configurations and distribution of aquatic habitat (pool riffle complex). A minimization measure will be employed at the Factoria Village outfall that reduces the erosion potential, this was achieved by the addition of a splash pad and wingwalls that will act as an energy dissipator and bank stabilizer respectively.

Construction Impacts:

The direct impacts from the major elements of the project are summarized below and include the impacts associated from the proposed outfall replacement and the loss of access from the fish exclusion measures associated with the proposed design of the new outfall. The proposed project does not preclude future stream restoration in this location. Any future restoration would be initiated by a third party and require coordination with multiple commercial landowners from Factoria Village to the Brown Bear Car Wash property.

Outfall Replacement

During the outfall replacement, work will be conducted below the OHWM to outlet, rock pad, and associated wingwalls. This will result in approximately 50 square feet of permanent impact to the open channel of Richards Creek and approximately 100 square feet of permanent impact to the stream buffer. Temporary construction limits will have an approximate impact to 75 square feet of the channel and 500 square feet to the riparian buffer.

Storm Conveyance Replacement and Other Improvements

The approximately 640 feet of storm conveyance will be replaced within road right-of-way (ROW) along Factoria Blvd and does not directly impact any natural stream habitat.

The lateral improvements and new inlets will be constructed within road ROW along Factoria Boulevard SE from the 3600 block through the 3700 block. These improvements are designed to convey stormwater runoff from surface streets into the municipal conveyance system and minimize localized flooding on surface streets. No impacts are expected to occur from inlet construction.

MITIGATION ANALYSIS

Mitigation Sequencing

All projects need to consider avoidance and minimization of impacts to aquatic resources under federal, state, and local regulations. Impacts that remain unavoidable must then be compensated through mitigation. Federal regulations follow guidance provided by the USACE for issuance of a Clean Water Act permit. The Washington DFW administers the hydraulic code requirements through issuance of a hydraulic project approval. The City allows for the "Repair and maintenance of utility facilities, utility systems, stormwater facilities, and essential public facilities" within a critical area and its buffer under Land Use Code (LUC) 20.25H.055. The City requires mitigation sequence for these activities is referenced within LUC 20.25H.215. The follows section describes the measures that have been incorporated into the project design to comply with avoidance and minimization of project impacts.

Complete avoidance of aquatic resource impacts is infeasible with this project as the replacement outfall will be constructed below the OHWM of Richards Creek.

The project minimized the unavoidable impacts to Richards Creek and its riparian buffer by determining the smallest construction footprint necessary to replace the outfall.

The unavoidable impacts requiring compensatory mitigation are associated with the outfall replacements temporary construction impacts, permanent impacts to stream buffer from the new outfall, wingwalls and splash pad and the possible loss of access if fish exclusion is included in the project. These impacts are unavoidable as previously identified due to the existing undersized outfall being located below OHWM and WDFW stormwater outfalls requirements for fish exclusion measures.

Mitigation Framework

Compensatory mitigation is required to offset the unavoidable losses resulting from project activities in Richards Creek described above. These activities are regulated, authorized, and permitted by various government entities described in the previous section. Each of these agencies follows a no net loss of values and functions of existing aquatic resources. Their preferred alternative for mitigation does differ and is discussed below.

Federal and State agencies acceptable mitigation approaches are as follows (in order of preference).

1. **Mitigation banks and in-lieu fee programs.** These mitigation approaches are preferred because they consolidate resources and involve more financial planning and scientific expertise, reducing the risk of failed mitigation projects.

2. **Permittee-responsible mitigation.** Under this approach the permittee performs the mitigation and is responsible for its implementation and success through monitoring activities. Mitigation sites can be located on site or off site within the same watershed.

The City of Bellevue outlines their preferences for mitigation activities related to stream and stream critical area buffers in their Land Use Code (LUC) 20.25H.085. Their preferred mitigation approach is as follows.

1. On site, through replacement of lost critical area or buffer
2. On site, through enhancement of the functions and values of remaining critical area or buffer
3. Off site, through replacement or enhancement in the same subdrainage basin
4. Off site, through replacement or enhancement out of the subdrainage basin but in the same drainage basin

The proposed project took into consideration the mitigation approaches described above by determining the feasibility of each method for mitigating project impacts. There are no mitigation banks with a service area that covers the project area deeming this approach not applicable. The King County Mitigation Preserves is an approved in-lieu fee program that covers projects within King County. The King County program does not have any current receiving sites within the same watershed as the project. For this reason, it is not considered to be a suitable approach for project mitigation.

The remaining method for mitigating project impacts is the permittee-responsible approach. This strategy also follows City preference as dictated by the previously cited code that mitigation should start with on-site opportunities. If on-site mitigation does not adequately compensate for project impacts, the City will consider potential off-site mitigation opportunities to fully mitigate the impacts.

CONCEPTUAL MITIGATION PLAN

The City is proposing to mitigate for project impacts described previously by constructing on-site channel and riparian enhancements within and adjacent to Richards Creek. This approach has been selected to compensate for permanent impacts associated with the outfall structure footprint, temporary impacts associated with the construction activities, and the loss of access from the required fish exclusion mechanism (if that becomes part of the project based on the outcome of negotiations in late 2021 between the City and WDFW). The proposed mitigation consists of stream and riparian enhancements to approximately 320 LF of Richards Creek and

approximately 25,500 square feet of riparian buffer. Construction of the channel and riparian enhancements will occur during the subsequent construction season due to limitations from the in-water work window and redundant impacts to Richards Creek.

Overall, the proposed enhancements for the Richards Creek channel aim to increase the available habitat for salmonid and steelhead species known to occur downstream of the I-90 culverts. The current lack of structural diversity and riparian vegetation communities will be enhanced into a well-shaded, structurally diverse community. The streambed will be widened and amended to a cobbled bed with medium and large woody debris on the banks in contact with water, to increase the complexity and diversity of the stream and restore natural stream conditions within this section of Richards Creek. New pool habitat will be created to provide low velocity resting habitat where it was previously not present in Richards Creek.

Existing Stream Conditions

The approximately 320-LF section of Richards Creek is currently a channelized ditch that lacks meanders, riffles, pools, and downed woody debris. There is siltation throughout the channel, and it lacks typical streambed substrate that is used by spawning salmonids.

The riparian buffer consists almost exclusively of invasive Himalayan Blackberry (*Rubus armenicus*), lacking diversity and a native riparian vegetation community. In part, this is due to the buffer being constrained by Factoria Boulevard to the west, the outfall to the south, the parking lot and commercial buildings to the east, and the existing I-90 culverts to the north. Overall, the channel is a degraded environment for fish habitat. Exhibits of the existing conditions are shown in Photographs 1 and 2 of this document.

Proposed Stream Enhancements

- Streambed and Floodplain:

  The existing channel will be excavated to create an approximate 9- to 12-foot-wide, meandering stream. Approximately 3,700 square feet of streambed will be enhanced through the addition a 1-foot thick layer of well graded 6-inch rounded cobble fill laid into the streambed with a streambed sediment mix to increase the available habitat for spawning and aquatic macroinvertebrates. The widening and meandering of the stream will slow flows and decrease the erosive potential within the channel. The proposed stream enhancements are shown in Attachment A.

- Stream Habitat and Floodplain Bench:

  The banks of the stream will have medium and large woody debris (up to 18 inches DBH) with some root wads anchored on the banks and channel edge; this is done to help impound water and creates pooling areas with plunges. They also provide excellent cover for fish, stabilize the banks, create flow complexity, and reduce the erosive potential of the stream.

A floodplain bench will be created between the 2- and 100-year water surface elevation and will be planted with native riparian vegetation consisting of red twig dogwood (*Cornus Sericea*), sitka willow (*Salix sitchensis*), Pacific willow (*Salix lucida*), and Pacific ninebark (*Pysocarpus capitatus*). Increased shading and structure of the stream channel will encourage aquatic macroinvertabrates to populate this segment of stream. The preliminary drawings attached as Attachment A contains an exhibit of the proposed enhancements.

- Riparian Buffer:

  The upland area consisting of the existing riparian buffer will be cleared of Himalayan blackberry and revegetated with native shrubs and trees. The vegetation will consist of red flowering currant (*Ribes sanguineum*), nootka rose (*Rosa nutkana*), Scouler's willow (*Salix scouleriana*), snowberry (*Symphoricarpos albus*), and red elderberry (*Sambucus racemosa*). These plant additions will increase the vegetation diversity, increase the shading of the enhanced stream channel, and provide the opportunity for recruitment of woody debris into the channel.

Proposed Monitoring

A monitoring plan for both the stream channel and riparian enhancement will be conducted for five years after construction. This will follow the City's LUC 20.25H.220 and will involve three to five years of active monitoring and a passive long-term management plan. The key components of the monitoring will be tied to performance standards that will follow City guidelines and be flushed out in the final mitigation plan. A few examples of performance criteria include the following. A complete monitoring plan will be provided in the final mitigation plan.

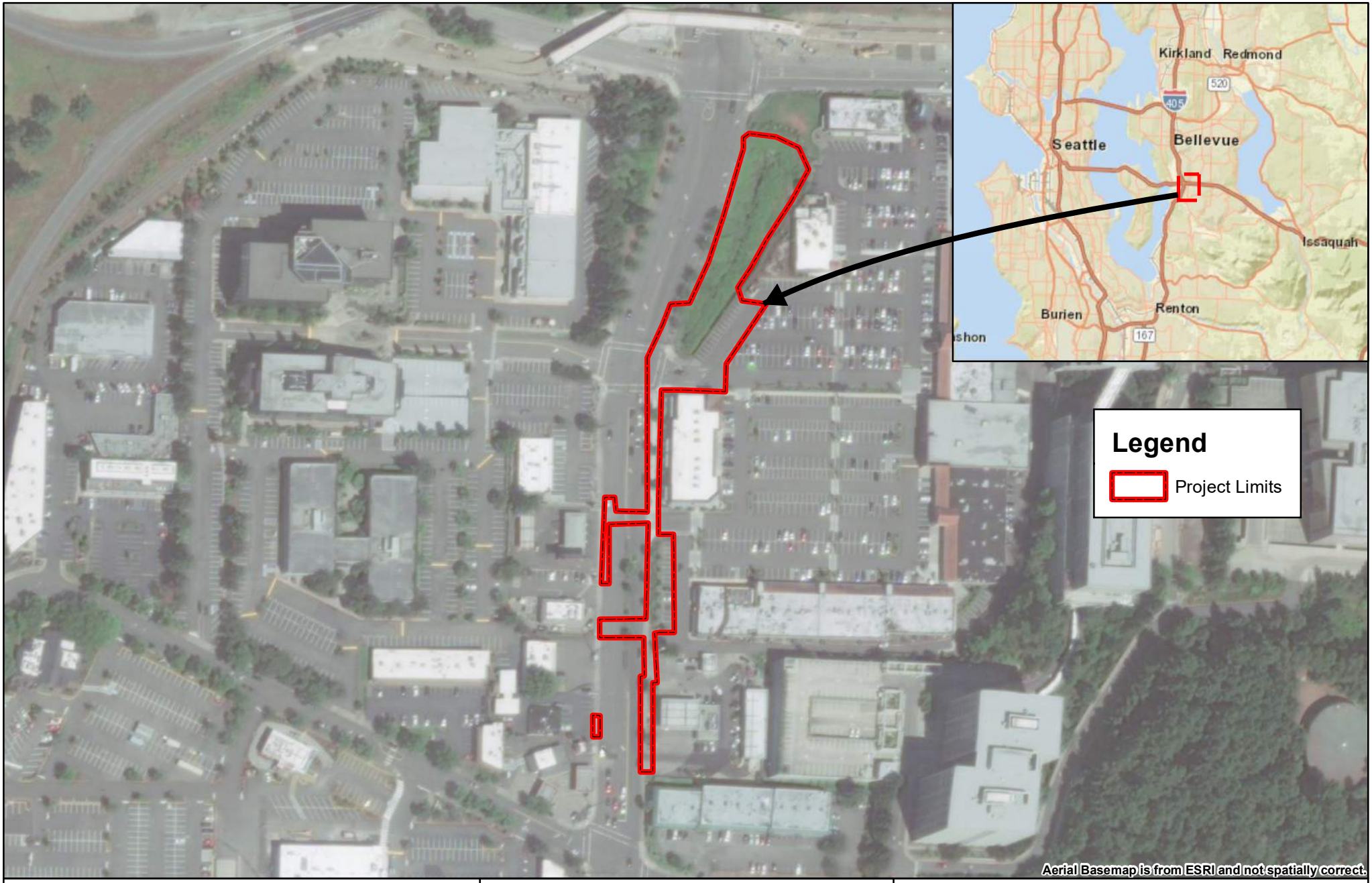
- Plant survival
- High percentage of native plant cover
- Low percentage of non-native species cover
- Stream bank stabilization
- Documented fish usage
- Observations of aquatic macroinvertebrates

<u>List of Attachments</u>:
Figures
Attachment A – Proposed Channel Mitigation Plan – Plan, Section and Details

DR:BS:JC
October 12, 2021

FIGURES

WSP USA
Suite 300
33301 Ninth Avenue South
Federal Way, WA 98003-2600
+1 206-431-2300
wsp.com



Conceptual Mitigation Plan

Project Name:
Factoria Stormwater Conveyance Improvement Project

In: City of Bellevue
At: 47°34'43.71"N 122°10'7.86"W
County of: King State of: Washington

Figure 1: Vicinity Map

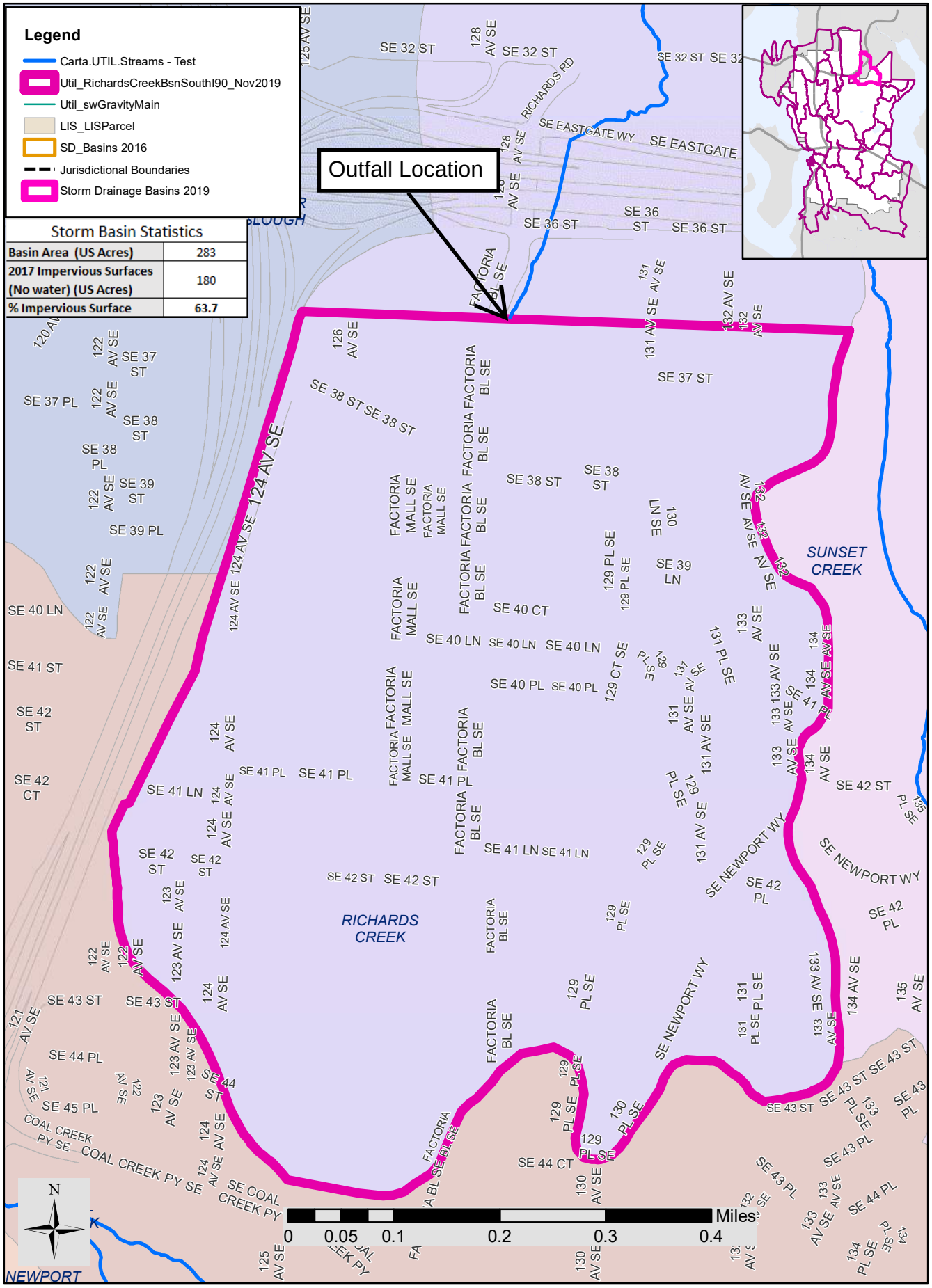
List of Figures: Figure 1 of 4

N

0 100 200 300 400 Feet

Figure 2: Richards Creek Existing Basin Conditions

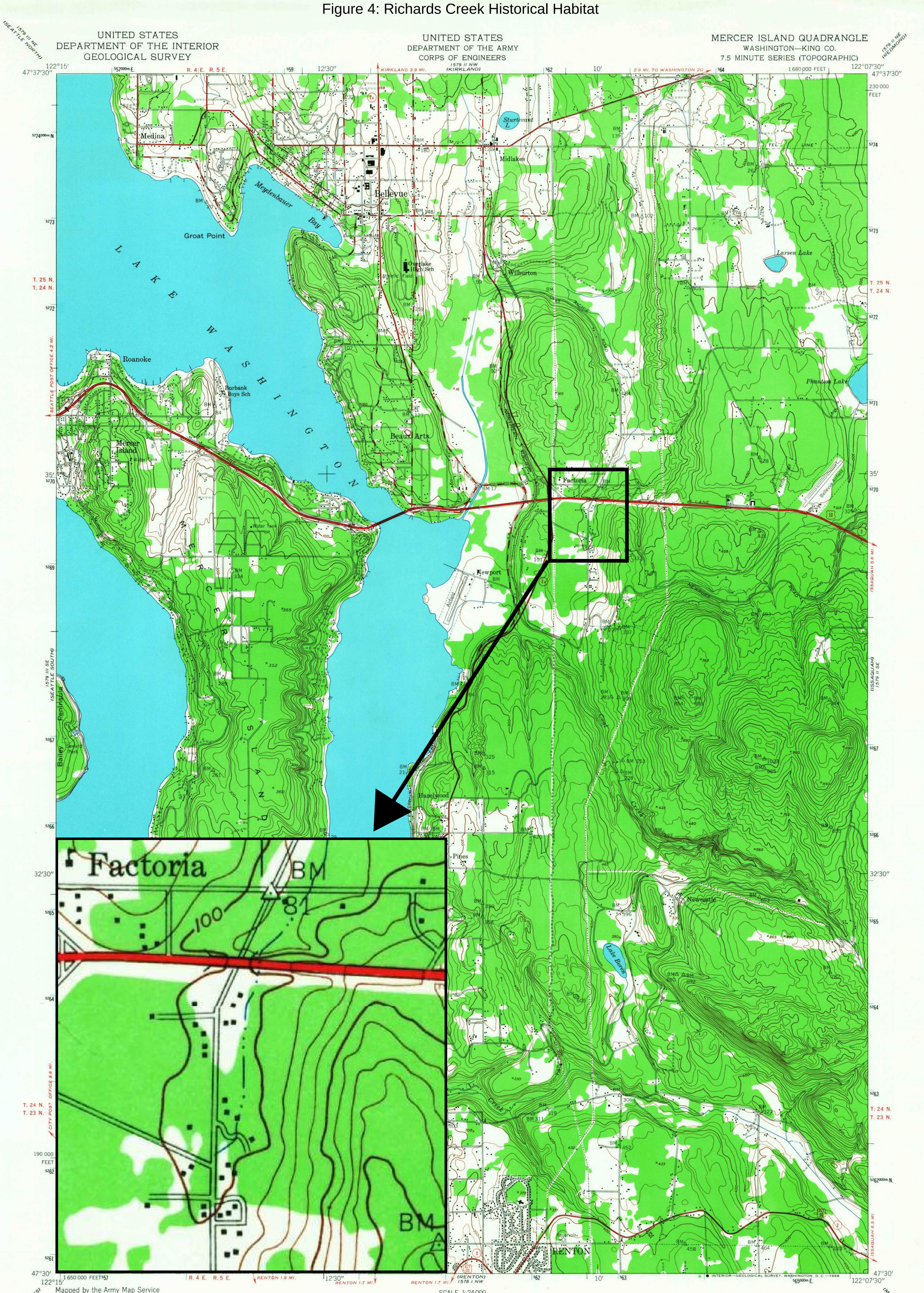
Figure 3: Richards Creek Basin Conditions Draining to Outfall.



Storm Basin Statistics	
Basin Area (US Acres)	283
2017 Impervious Surfaces (No water) (US Acres)	180
% Impervious Surface	63.7

Date: 12/5/2019 Document Path: V:\Utilities\ArcGIS\Storm\BasinMaps\RichardsCreekSouthI90Stats\RichardCreekSouthI90Stats_Nov2019Working.mxd

Figure 4: Richards Creek Historical Habitat



Mapped by the Army Map Service
Published for civil use by the Geological Survey

Control by USC&GS, USCE, and King County Engineer office

Topography from aerial photographs by multiplex methods
Aerial photographs taken 1943. Field check 1950

Polyconic projection. 1927 North American datum
10,000-foot grid based on Washington coordinate system, north zone

Red tint indicates area in which only landmark buildings are shown

No distinction is made between barns, dwellings, commercial and industrial buildings

Unchecked elevations are shown in brown

Dashed land lines indicate approximate locations

1000-meter Universal Transverse Mercator grid ticks, zone 10, shown in blue

UTM GRID AND 1950 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

SCALE 1:24000

CONTOUR INTERVAL 25 FEET
DATUM IS MEAN SEA LEVEL

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U. S. GEOLOGICAL SURVEY, DENVER, COLORADO 80225 OR WASHINGTON, D. C. 20242
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

ROAD CLASSIFICATION
Heavy-duty — 4 LANE | 6 LANE — Light-duty
Medium-duty — 4 LANE | 6 LANE — Unimproved dirt
U. S. Route — State Route

QUADRANGLE LOCATION

USGS
Historical File
Topographic Division

MERCER ISLAND, WASH.
N4730—W12207.5/7.5
1950
AMS 1579 II SW—SERIES V891

U.S.G.S.
FILE COPY
TOPOGRAPHIC DIVISION

3865
MAR 26 1968

ATTACHMENT A

PROPOSED CHANNEL MITIGATION PLAN – PLAN, SECTION AND DETAILS

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Suite 300
33301 Ninth Avenue South
Federal Way, WA 98003-2600
+1 206-431-2300
wsp.com

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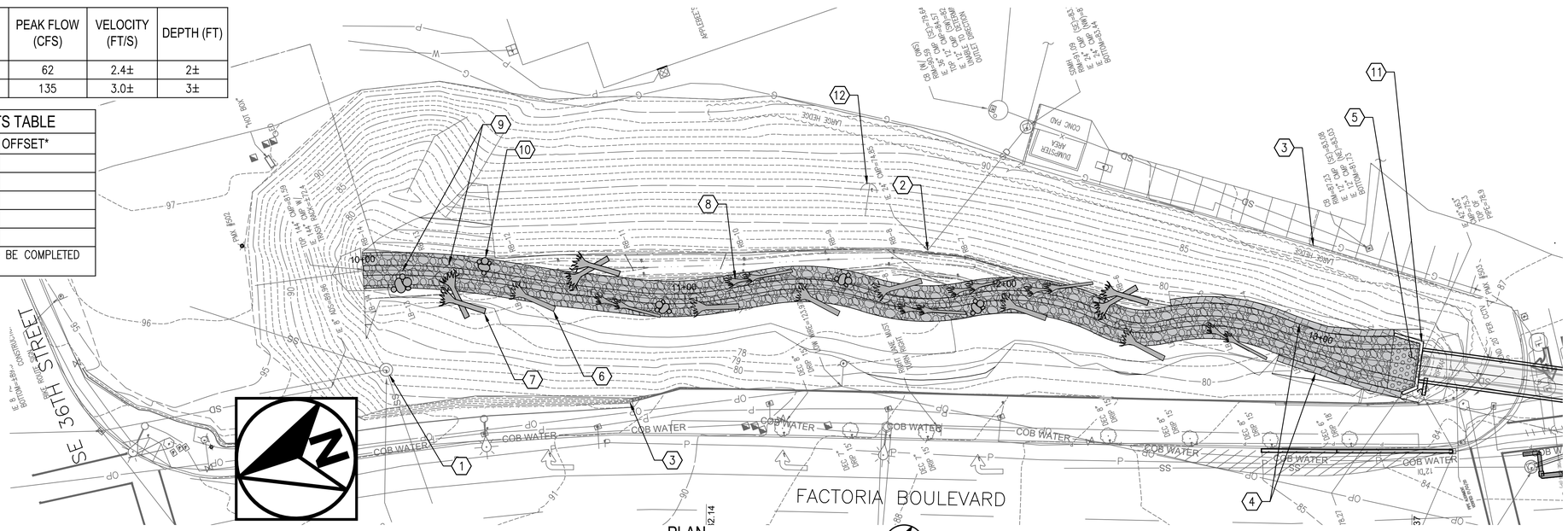
STORM FREQUENCY	PEAK FLOW (CFS)	VELOCITY (FT/S)	DEPTH (FT)
2–YEAR	62	2.4±	2±
100–YEAR	135	3.0±	3±

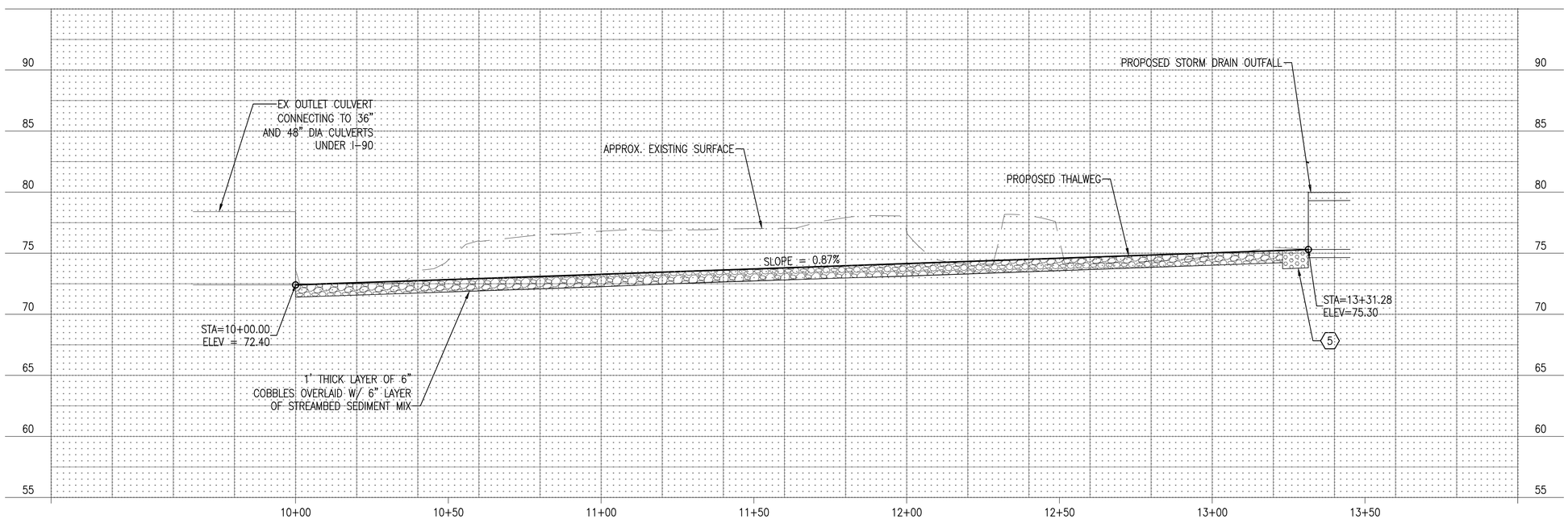
GRADING LIMITS TABLE		
ID #	STATION*	OFFSET*
GL–1		
GL–2		
GL–3		
GL–4		
GL–5		

*GRADING LIMITS TABLE TO BE COMPLETED IN 90% SUBMITTAL.



PLAN

RICHARDS CREEK CHANNEL RESTORATION
SCALE: 1"=20'



SECTION

RICHARDS CREEK CHANNEL RESTORATION
HORIZ SCALE: 1"=20'
VERT SCALE: 1"=5'

GENERAL NOTES

1. EXISTING EAST BANK OF RICHARDS CREEK INCLUDES SIGNIFICANT ROCK. CONTRACTOR TO AVOID DISTURBING EAST BANK. ANY DISTURBANCE SHALL BE APPROVED BY ENGINEER.
2. LIMIT DISTURBANCE TO ONLY THOSE AREAS NECESSARY FOR CONSTRUCTING THE PROPOSED IMPROVEMENTS.
3. CONTOURS REPRESENT FINAL GRADE. REFER TO DETAILS AND CROSS SECTIONS TO DETERMINE FULL DEPTH OF EXCAVATION.

CONSTRUCTION NOTES

1. PROTECT EXISTING SANITARY MANHOLE.
2. PROTECT EXISTING STORM DRAIN OUTFALL.
3. PROPOSED WORK ACCESS LOCATION.
4. INSTALL VEGETATED ROCK WALL PER DETAIL 1 ON DWG RC5.
5. INSTALL 2' THICK SPLASH PAD OF 8–INCH COBBLES.
6. LWM TYPE A PER DETAIL 1 ON DWG RC4 (TYP).
7. LWM TYPE B PER DETAIL 2 ON DWG RC4 (TYP).
8. LWM TYPE C PER DETAIL 3 ON DWG RC4 (TYP).
9. SCOUR POOL (TYP).
10. BOULDER CLUSTER PER DETAIL 3 ON DWG RC5 (TYP).
11. WINGWALL PER ELEVATIONS AND DETAILS ON DWG S11.
12. CAUTION. POWERPOLE GUY WIRES IN VICINITY. COORDINATE WITH POWER UTILITY OWNER FOR EITHER PROTECTION OR TEMPORARY REMOVAL.

1"=20' 20 10 0 20 40 Scale Feet

1"=5' 5 2.5 0 5 10 Scale Feet

CALL 72 HOURS BEFORE YOU DIG
1-800-424-5555

NO	DATE	BY	APPR	REVISIONS
1				60% DESIGN - NOT FOR CONSTRUCTION

WSP USA Inc.
1301 Fifth Avenue
Suite 1200
Seattle, WA 98101-2677
TEL: 206-357-5600
FAX: 206-357-5601

60% SUBMITTAL

Approved By

DESIGN MANAGER DATE
PROJECT MANAGER DATE

JAMES ELLIS	8/10/21
DESIGNED BY	DATE
WESTON E. BRYANT	8/10/21
DRAWN BY	DATE
MIKE GISEBURT	8/10/21
CHECKED BY	DATE

City of Bellevue
UTILITIES

FACTORIA BOULEVARD STORM CONVEYANCE IMPROVEMENTS PROJECT

RICHARD'S CREEK PLAN AND PROFILE

SEC 27, T 25N, R 5E

RC1

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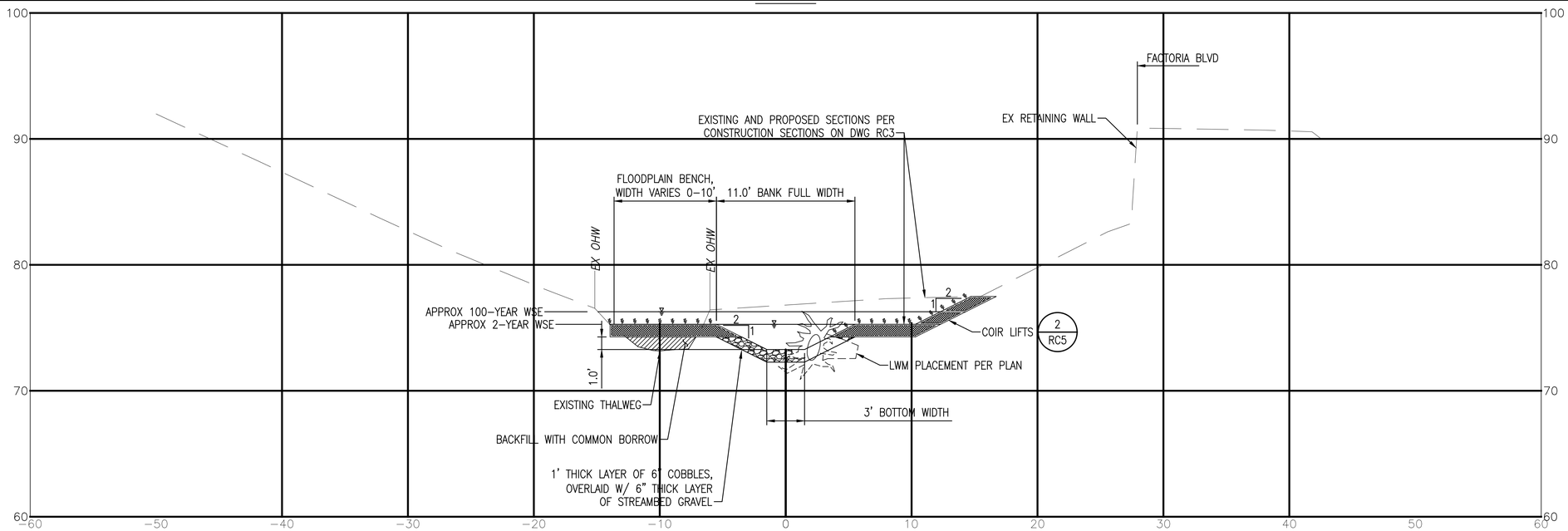
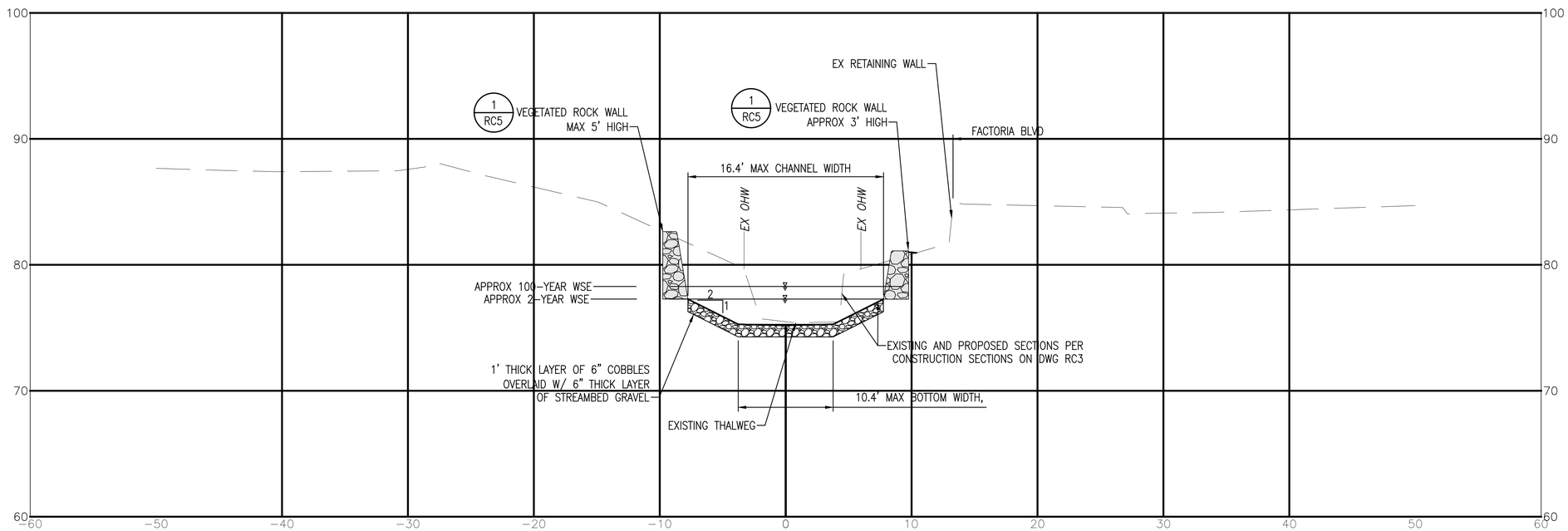


SECTION

RICHARDS CREEK TYPICAL CHANNEL SECTION
SCALE: 1"=5'



SECTION

RICHARDS CREEK TYPICAL CHANNEL SECTION
WITH VEGETATED ROCK WALL
SCALE: 1"=5'

1"=5' 5 2.5 0 5 10
Scale Feet

CALL 72 HOURS BEFORE YOU DIG
1-800-424-5555

RC2

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WESTON E. BRYANT	8/10/21
DRAWN BY	DATE
MIKE GISEBURT	8/10/21
CHECKED BY	DATE

City of Bellevue
UTILITIES

FACTORIA BOULEVARD STORM CONVEYANCE IMPROVEMENTS PROJECT

RICHARD'S CREEK CROSS SECTIONS

SEC 27, T 25N, R 5E

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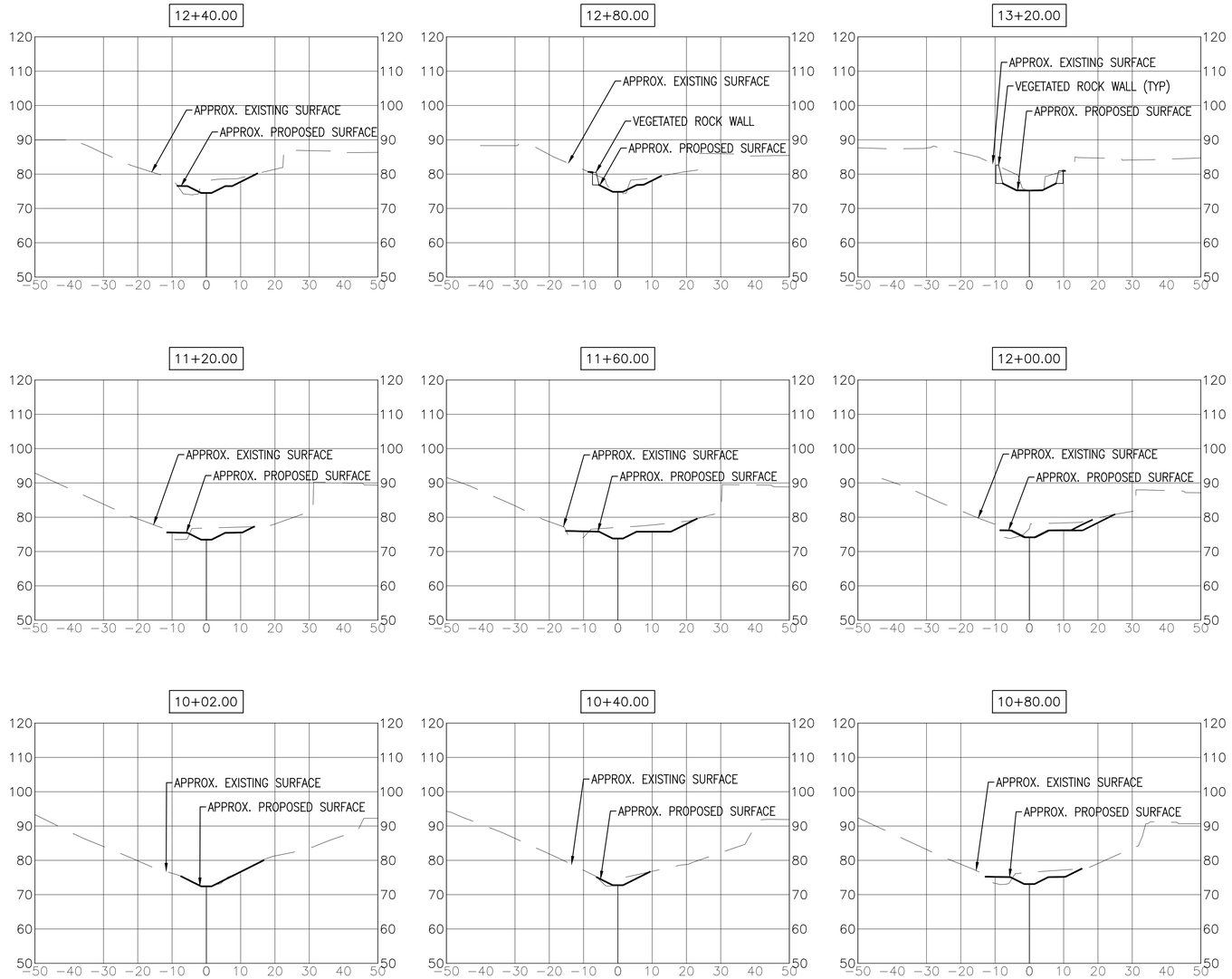

SECTION

RICHARDS CREEK CHANNEL CONSTRUCTION SECTIONS
SCALE: 1"=20'

NOTE: ALL SECTIONS LOOKING UPSTREAM.

1"=20' 20 10 0 20 40
Scale Feet

CALL 72 HOURS
BEFORE YOU DIG
1-800-424-5555

RC3

NO	DATE	BY	APPR	REVISIONS
1				60% DESIGN - NOT FOR CONSTRUCTION

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Seattle, WA 98101-2677
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FAX: 206-357-5601

60% SUBMITTAL

Approved By

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PROJECT MANAGER DATE

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DESIGNED BY	DATE
WESTON E. BRYANT	8/10/21
DRAWN BY	DATE
MIKE GISEBURT	8/10/21
CHECKED BY	DATE

City of Bellevue
UTILITIES

FACTORIA BOULEVARD STORM
CONVEYANCE IMPROVEMENTS PROJECT

RICHARD'S CREEK CROSS SECTIONS

SEC 27, T 25N, R 5E

SHEET 66 OF 93

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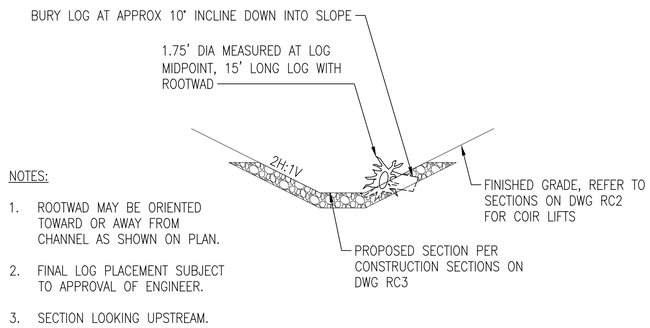
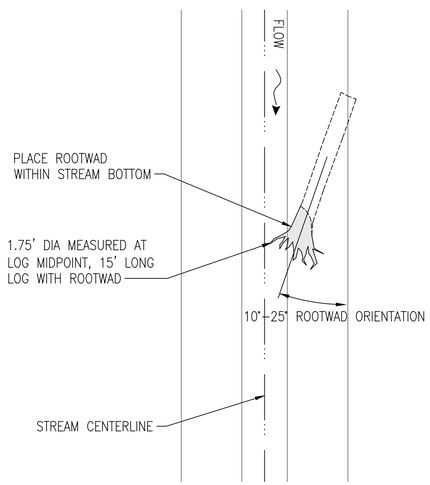


NOTES:

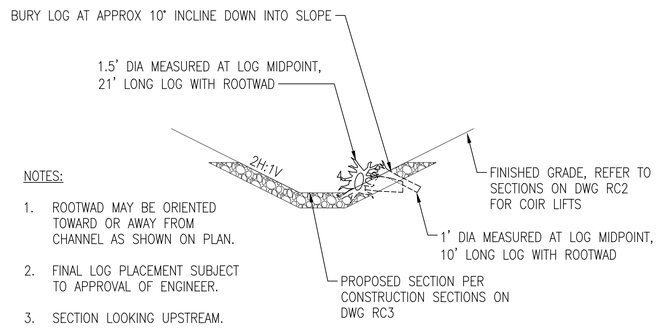
1. ROOTWAD MAY BE ORIENTED TOWARD OR AWAY FROM CHANNEL AS SHOWN ON PLAN.
2. FINAL LOG PLACEMENT SUBJECT TO APPROVAL OF ENGINEER.
3. SECTION LOOKING UPSTREAM.

SECTION



PLAN

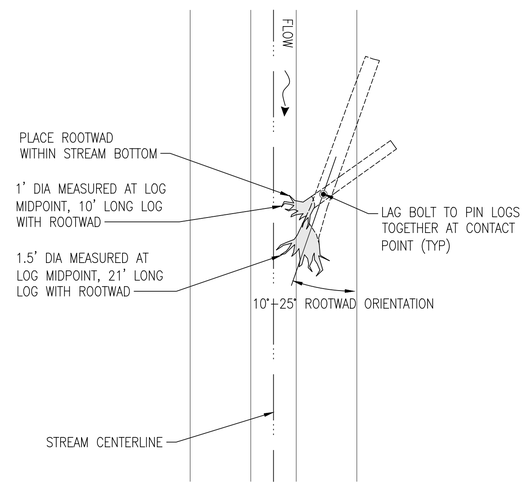
1 RC01 **LWM TYPE A**
SCALE: NTS



NOTES:

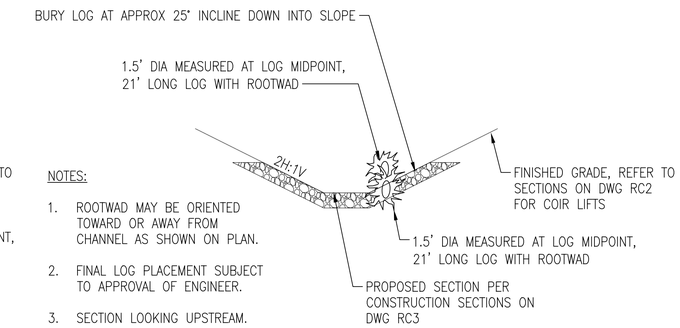
1. ROOTWAD MAY BE ORIENTED TOWARD OR AWAY FROM CHANNEL AS SHOWN ON PLAN.
2. FINAL LOG PLACEMENT SUBJECT TO APPROVAL OF ENGINEER.
3. SECTION LOOKING UPSTREAM.

SECTION



PLAN

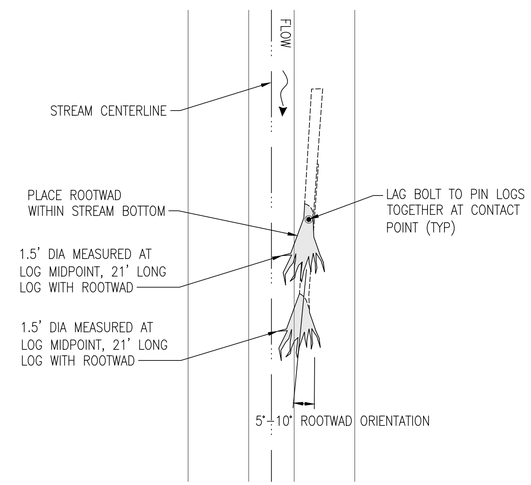
2 RC01 **LWM TYPE B**
SCALE: NTS



NOTES:

1. ROOTWAD MAY BE ORIENTED TOWARD OR AWAY FROM CHANNEL AS SHOWN ON PLAN.
2. FINAL LOG PLACEMENT SUBJECT TO APPROVAL OF ENGINEER.
3. SECTION LOOKING UPSTREAM.

SECTION



PLAN

3 RC01 **LWM TYPE C**
SCALE: NTS

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1				60% DESIGN - NOT FOR CONSTRUCTION

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Suite 1200
Seattle, WA 98101-2677
TEL: 206-357-5600
FAX: 206-357-5601

60% SUBMITTAL

Approved By

DESIGN MANAGER DATE

PROJECT MANAGER DATE

JAMES ELLIS	8/10/21
DESIGNED BY	DATE
WESTON E. BRYANT	8/10/21
DRAWN BY	DATE
MIKE GISEBURT	8/10/21
CHECKED BY	DATE

City of Bellevue
UTILITIES

FACTORIA BOULEVARD STORM CONVEYANCE IMPROVEMENTS PROJECT

RICHARD'S CREEK HABITAT STRUCTURE DETAILS

SEC 27, T 25N, R 5E

RC4

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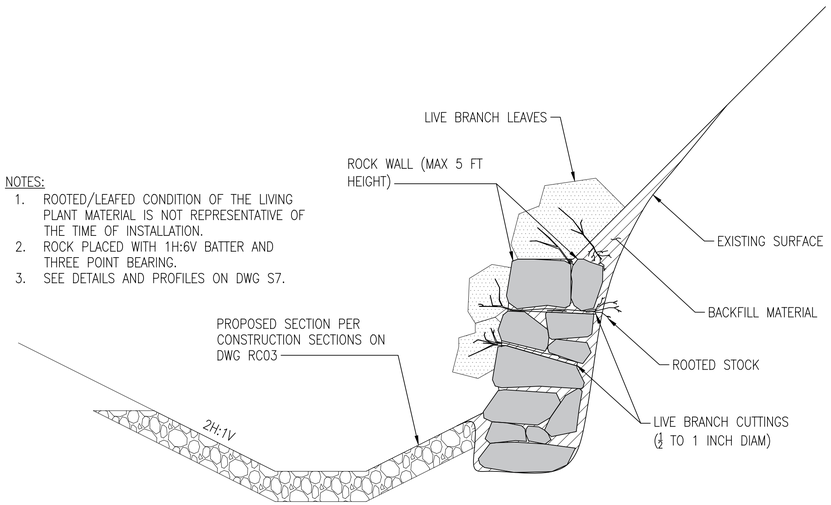
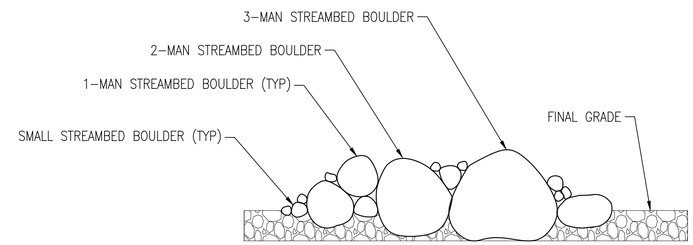
NOTES:
1. ROOTED/LEAFED CONDITION OF THE LIVING PLANT MATERIAL IS NOT REPRESENTATIVE OF THE TIME OF INSTALLATION.
2. ROCK PLACED WITH 1H:6V BATTER AND THREE POINT BEARING.
3. SEE DETAILS AND PROFILES ON DWG S7.

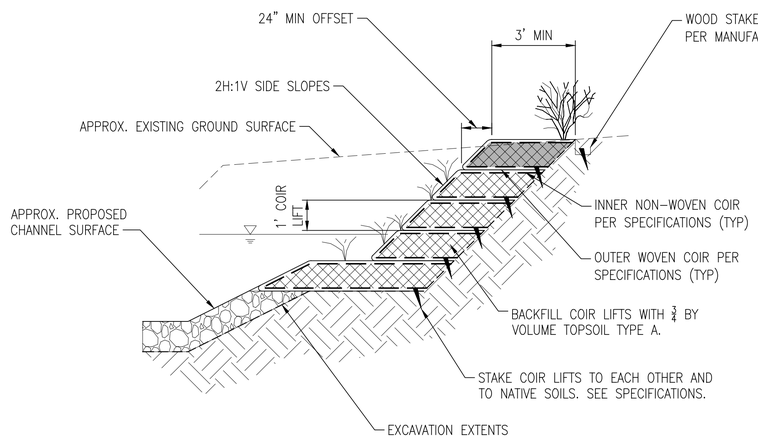


1 RC1 VEGETATED ROCK WALL
SCALE: NTS



PLACE STREAMBED BOULDERS 20–60% ABOVE STREAMBED SURFACE.

3 RC1 BOULDER CLUSTER
SCALE: NTS



COIR WRAP PREPARATION
(SEE SPECIFICATIONS)

STEP 1
- OVEREXCAVATE TO PLACE COIR WRAP SOIL LIFTS
- PROTECT SUBGRADE FROM FOOT TRAFFIC AND CONSTRUCTION ACTIVITIES THAT COULD CAUSE SOIL DISTURBANCE OR BANK SETTLEMENT PRIOR TO COIR PLACEMENT

STEP 2
- PLACE OUTER WOVEN COIR FOR THE BOTTOM OF THE LIFT
- PLACE INNER NON-WOVEN COIR
- STAKE COIR FABRIC TO NATIVE SOIL BELOW LIFT

STEP 3
- INSTALL FORM (IF CONTRACTOR CHOOSES) TO HOLD COIR WRAP AND SOIL TO DESIGN DIMENSIONS
- PLACE 12" HIGH LAYER OF SOIL COMPOSED OF TOPSOIL TYPE D AMENDED WITH ALLUVIUM AND COMPACT PER SPECIFICATIONS

STEP 4
- PLACE SEED MIX PER PLANTING PLAN AND SPECIFICATIONS

STEP 5
- WRAP OUTER WOVEN COIR AND INNER NON-WOVEN COIR AROUND SOIL LIFT TO ENCASE THE LIFT

STEP 6
- STAKE PER COIR MANUFACTURER'S RECOMMENDATION

2 RC1 TYPICAL COIR WRAP EMBANKMENT
SCALE: NTS

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1-800-424-5555

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Approved By

DESIGN MANAGER DATE
PROJECT MANAGER DATE

JAMES ELLIS	8/10/21
DESIGNED BY	DATE
WESTON E. BRYANT	8/10/21
DRAWN BY	DATE
MIKE GISEBURT	8/10/21
CHECKED BY	DATE

City of Bellevue
UTILITIES

FACTORIA BOULEVARD STORM CONVEYANCE IMPROVEMENTS PROJECT

RICHARD'S CREEK CHANNEL DETAILS

SEC 27, T 25N, R 5E

RC5

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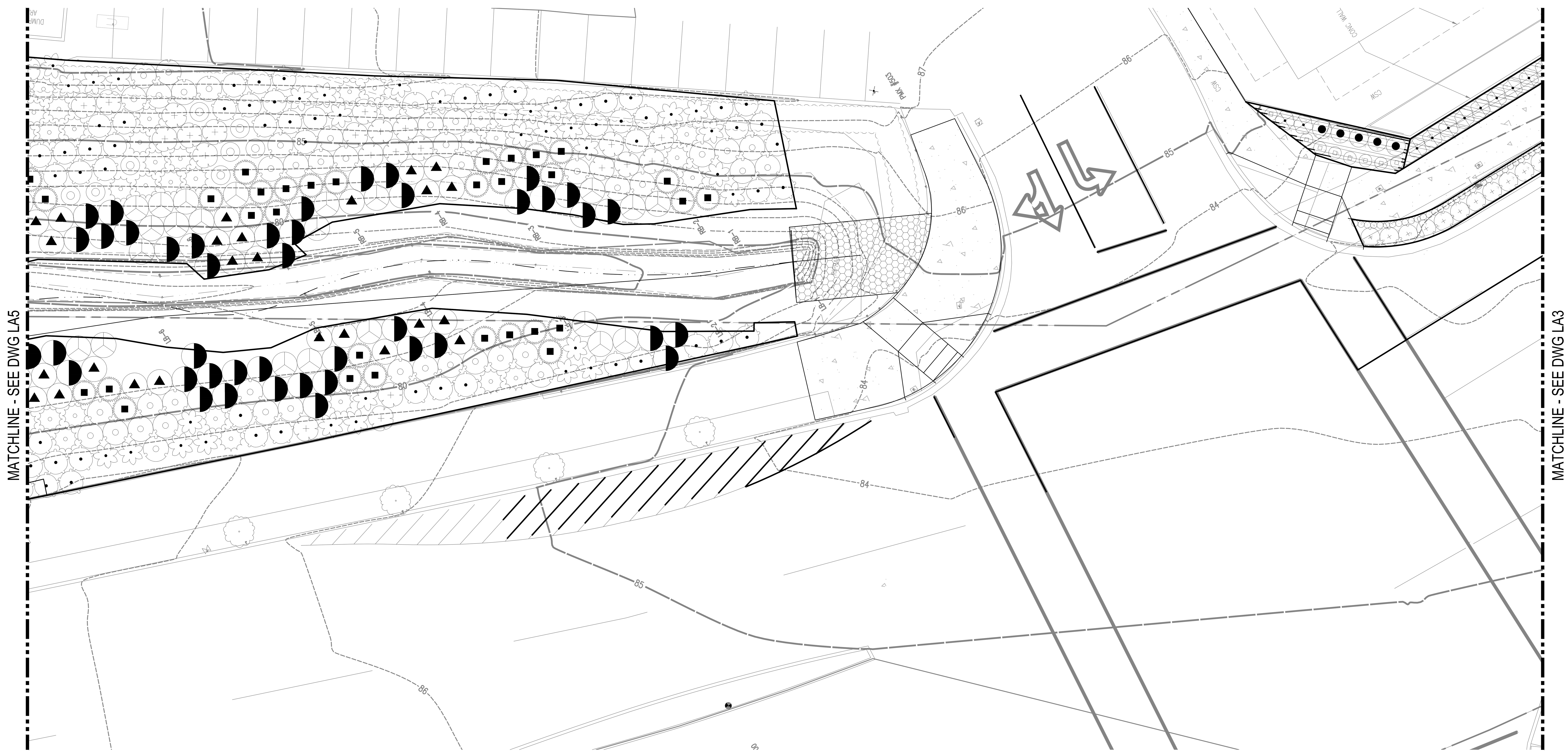
GENERAL NOTES

1. SEE PLANTING SCHEDULE, NOTES AND DETAILS ON DWG LA6 AND RICHARD'S CREEK RESTORATION PLANTING SCHEDULE, NOTES AND DETAILS ON LA7.
2. SEE IRRIGATION PLAN AND TEMPORARY IRRIGATION PLAN FOR RICHARD'S CREEK RESTORATION ON DWG IR4.



PLAN
LANDSCAPE IMPROVEMENTS
SCALE: 1"=10'

1"=10' 10 5 0 10 20 Scale Feet

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DESIGNED BY	DATE
DAN E WOJTALA	8/10/21
DRAWN BY	DATE
EARL J CHRISTIAN	8/10/21
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City of Bellevue
UTILITIES

LA4

FACTORIA BOULEVARD STORM CONVEYANCE IMPROVEMENTS PROJECT
PLANTING AND RICHARD'S CREEK RESTORATION PLAN

SEC 27, T 25N, R 5E

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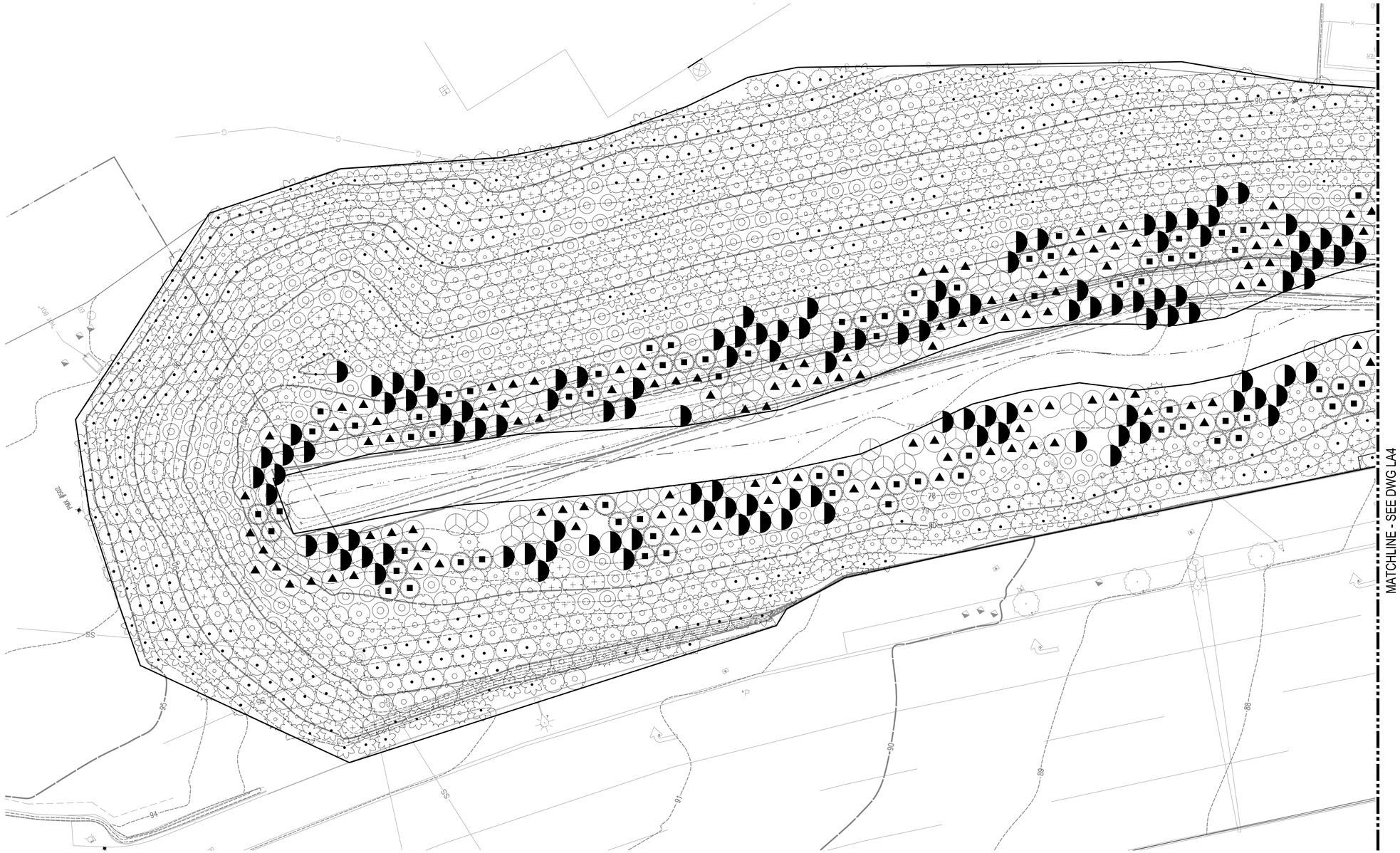

PLAN
LANDSCAPE IMPROVEMENTS
SCALE: 1"=10'

GENERAL NOTES

1. SEE RICHARD'S CREEK RESTORATION PLANTING SCHEDULE, NOTES AND DETAILS ON LA7.
2. SEE TEMPORARY IRRIGATION PLAN ON DWG IR5.

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LA5

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FACTORIA BOULEVARD STORM
CONVEYANCE IMPROVEMENTS PROJECT

RICHARD'S CREEK RESTORATION PLAN

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SHEET 91 OF 93

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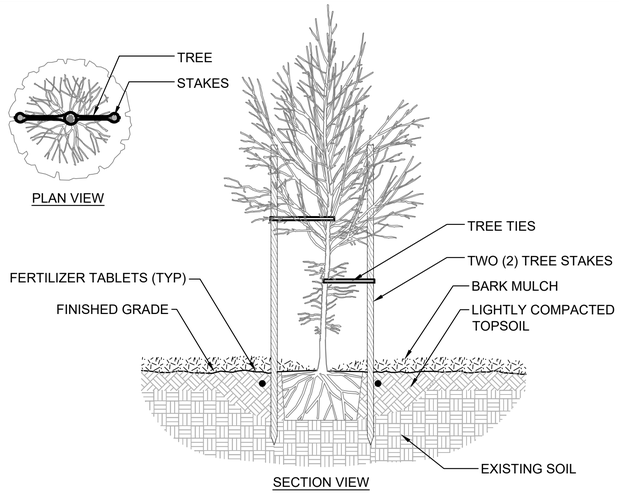
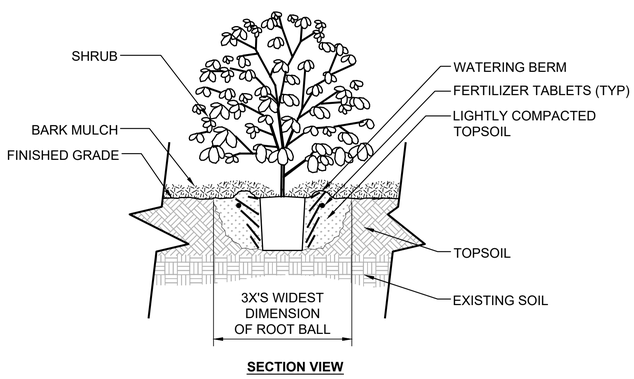


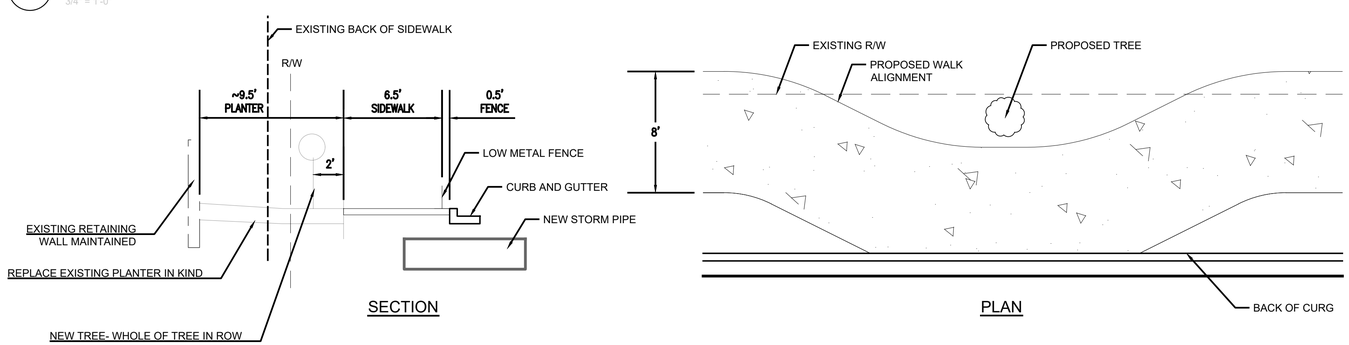
1 TREE PLANTING AND STAKING

1/2" = 1'-0"



2 SHRUB AND GROUND COVER PLANTING

3/4" = 1'-0"



3 OPTIONAL STREET TREE WALK ALIGNMENT

NOT TO SCALE

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PLANT SCHEDULE STREETSCAPE PLANT SCHEDULE

SHRUBS	CODE	QTY	BOTANICAL NAME	COMMON NAME	SIZE
	AH	28	AZALEA X 'GIRARD'S HOT SHOT'	GIRARD'S HOT SHOT AZALEA	2 GAL.
	CK	11	CORNUS SERICEA 'KELSEYI'	KELSEY'S DWARF RED TWIG DOGWOOD	2 GAL.
	HW	5	HYDRANGEA QUERCIFOLIA 'PEE WEE'	PEE WEE OAKLEAF HYDRANGEA	---
	LM	102	LONICERA PILEATA 'MOSS GREEN'	MOSS GREEN HONEYSUCKLE	2 GAL.
	PO	45	PRUNUS LAUROCERASUS 'OTTO LUYKEN'	OTTO LUYKEN ENGLISH LAUREL	2 GAL.
	VD	32	VIBURNUM DAVIDII	DAVID VIBURNUM	2 GAL.

GRASSES	CODE	QTY	BOTANICAL NAME	COMMON NAME	SIZE
	CE	10	CAREX OSHIMENSIS 'EVERGOLD'	EVERGOLD JAPANESE SEDGE	1 GAL.
	FO	327	FESTUCA OVINA GLAUCA 'ELIJAH BLUE'	ELIJAH BLUE FESCUE	1 GAL.
	PA	24	PENNISETUM ALOPECUROIDES	FOUNTAIN GRASS	2 GAL.

PERENNIALS	CODE	QTY	BOTANICAL NAME	COMMON NAME	SIZE
	HO	13	HEMEROCALLIS X 'STELLA DE ORO'	STELLA DE ORO DAYLILY	1 GAL.

GROUND COVERS	CODE	QTY	BOTANICAL NAME	COMMON NAME	SIZE
	AE	22	ARCTOSTAPHYLOS X 'EMERALD CARPET'	EMERALD CARPET MANZANITA	1 GAL.
	ES	9	ERICA CARNEA 'SPRINGWOOD PINK'	SPRINGWOOD PINK WINTER HEATH	2 GAL.
	FS	23	FRAGARIA X 'LIPSTICK'	LIPSTICK ORNAMENTAL STRAWBERRY	1 GAL.

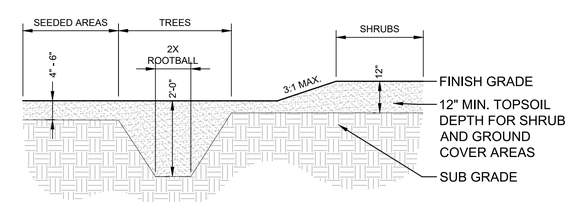
EXISTING PLANT MATERIAL	CODE	QTY	BOTANICAL NAME	COMMON NAME	SIZE
	RE	1,024 SF	RESTORE EXISTING PLANT MATERIAL IN-KIND		---

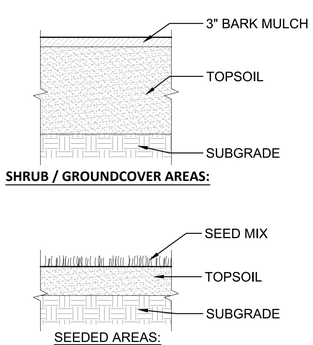
LANDSCAPE NOTES

1. COORDINATE WORK SHOWN ON THIS DRAWING WITH INSTALLATION OF UNDERGROUND IRRIGATION AND ALL OTHER EXISTING OR PROPOSED SITE WORK.
2. CONTRACTOR IS TO VERIFY WITH PROJECT MANAGER AND UTILITY COMPANIES THE LOCATIONS OF ALL UTILITIES PRIOR TO CONSTRUCTION, TO DETERMINE IN THE FIELD THE ACTUAL LOCATIONS AND DEPTH OF ALL EXISTING UTILITIES. THE CONTRACTOR SHALL CALL 811 UTILITY PROTECTION SERVICE 72 HOURS PRIOR TO CONSTRUCTION. CONTRACTOR IS TO REFER TO UTILITY SHEETS AND EXERCISE CARE TO PROTECT AND AVOID DISTURBING OR DAMAGING THEM. ANY DAMAGE RESULTING FROM THIS WORK SHALL BE RESTORED AT THE CONTRACTOR'S EXPENSE.
3. CONTRACTOR IS TO OBTAIN WRITTEN APPROVAL FOR ALL PLANT MATERIAL SUBSTITUTIONS FROM THE PROJECT MANAGER PRIOR TO INSTALLATION. PLANT SUBSTITUTIONS WITHOUT PRIOR WRITTEN APPROVAL THAT DO NOT COMPLY WITH THE DRAWINGS AND SPECIFICATIONS MAY BE REJECTED BY THE OWNERS REPRESENTATIVE AT NO COST TO THE OWNER. THESE ITEMS MAY BE REQUIRED TO BE REPLACED WITH PLANT MATERIALS THAT ARE IN COMPLIANCE WITH THE DRAWINGS.
4. CONTRACTOR IS TO EXAMINE FINISH SURFACE, GRADES, TOPSOIL QUALITY AND DEPTH. CONTRACTOR TO NOTIFY PROJECT MANAGER OF ANY CONDITIONS WHICH MAY BE HARMFUL TO PLANT LIFE, SUCH AS POOR DRAINAGE, HAZARDOUS MATERIALS, ETC. THE CONTRACTOR SHALL MAKE A RECOMMENDATION TO ADDRESS THE SPECIFIC SITUATION. DO NOT CONTINUE ANY WORK UNTIL UNSATISFACTORY CONDITIONS HAVE BEEN CORRECTED.
5. CONTRACTOR IS TO RE-SEED AND RESTORE STAGING AREAS AND ALL OTHER ADJACENT AREAS DISTURBED DURING CONSTRUCTION.
6. CONTRACTOR IS TO FINE GRADE AND ROCK-HOUND ALL SEEDED AND PLANTING AREAS TO PROVIDE A SMOOTH AND CONTINUAL SURFACE, FREE OF IRREGULARITIES (BUMPS OR DEPRESSIONS) & EXTRANEOUS MATERIAL OR DEBRIS. ROCK AND DEBRIS (LARGER THAN 1" DIAMETER) IN SEEDED LAWN AND PLANTING AREAS IS TO BE REMOVED.
7. LANDSCAPE EDGE TO BE NO LESS THAN 12" AND NO MORE THAN 18" FROM OUTER EDGE OF PLANT MATERIAL BRANCHING. WHERE GROUNDCOVER OCCURS, PLANT TO LIMITS OF AREA AS SHOWN.
8. CONTRACTOR IS TO MAINTAIN POSITIVE DRAINAGE IN LANDSCAPE BEDS AND LAWN AREAS.
9. CONTRACTOR IS RESPONSIBLE FOR HIS BID QUANTITIES AS REQUIRED BY THE PLANS AND SPECIFICATIONS. IF THERE IS A DISCREPANCY BETWEEN THE NUMBER LABELED ON THE PLANT LEGEND AND THE QUANTITY OF GRAPHIC SYMBOLS SHOWN, THE GRAPHIC SYMBOL QUANTITY SHALL GOVERN.
10. WITH THE EXCEPTION OF GROUND COVER PLANT MATERIAL, CONTRACTOR IS TO KEEP PLANTS A MIN. 5'-0" CLEAR FROM HYDRANTS AND UTILITY VAULTS UNLESS OTHERWISE NOTED ON PLANS.
11. LANDSCAPE MAINTENANCE PERIOD BEGINS IMMEDIATELY AFTER THE COMPLETION OF ALL PLANTING OPERATIONS AND WRITTEN NOTIFICATION TO THE OWNER. MAINTAIN TREES, SHRUBS, LAWNS AND OTHER PLANTS UNTIL FINAL ACCEPTANCE OF 90 DAYS AFTER NOTIFICATION AND ACCEPTANCE, WHICHEVER IS LONGER.
12. CONTRACTOR IS RESPONSIBLE TO SECURE ALL PLANT MATERIAL IN THE SIZE SPECIFIED ON PLANS PRIOR TO INSTALLATION.

NOTES:

1. CONTRACTOR SHALL SCARIFY SUBGRADE SURFACE PRIOR TO INSTALLING TOPSOIL.
2. TOPSOIL DEPTH SHALL BE AS FOLLOWS FOR THE DIFFERENT SEED TYPES:
   - LAWN - 6"
   - WETLAND RESTORATION - 6"
   - ROADSIDE RESTORATION - 4"





4 TYPICAL TOPSOIL DEPTHS

1/2" = 1'-0"

LA6

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City of Bellevue
UTILITIES

FACTORIA BOULEVARD STORM CONVEYANCE IMPROVEMENTS PROJECT

PLANTING SCHEDULE, NOTES AND DETAILS

SEC 27, T 25N, R 5E

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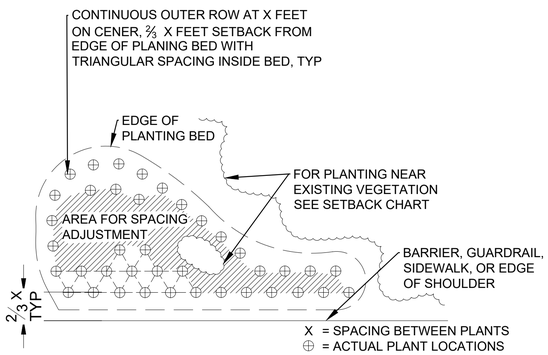
PLANT MATERIAL SETBACK CHART

PLANT TYPE	GUARDRAIL BARRIER	EDGE OF ROADWAY	WALL	FENCE	SIGNS	EX. TREE TRUNK	EX. VEG. MASS
EVERGREEN TREE	10'	10'	10'	10'	15'	15'	10'
DECIDUOUS TREE	10'	10'	10'	10'	15'	15'	10'
SHRUB	5'	10'	5'	6'	6'	10'	10'

TYPICAL SETBACKS FOR PLANT MATERIAL UNLESS OTHERWISE DIRECTED BY THE ENGINEER DURING LAYOUT AND STAKING OF PLANT LOCATIONS DISTANCE NOTED IS TO STEM OR TRUNK OF PLANT.



DETAIL

TYPICAL PLANTING AREA LAYOUT
SCALE: NTS

PLANT SCHEDULE RESTORATION PLANT SCHEDULE

STREAM RESTORATION UPLAND AREA	CODE	QTY	BOTANICAL NAME	COMMON NAME	SIZE	REMARKS
	HOL DIS	146	HOLODISCUS DISCOLOR	OCEAN-SPRAY	2 GAL.	4' O.C.
	RS	257	RIBES SANGUINEUM	RED FLOWERING CURRANT	2 GAL.	4' O.C.
	RN	258	ROSA NUTKANA	NOOTKA ROSE	2 GAL.	4' O.C.
	SAL SCO	105	SALIX SCOULERIANA	SCOULER`S WILLOW	2 GAL.	4' O.C.
	SAM RED	204	SAMBUCUS RACEMOSA	RED ELDERBERRY	2 GAL.	4' O.C.
	SYM ALB	174	SYMPHORICARPOS ALBUS	COMMON WHITE SNOWBERRY	2 GAL.	4' O.C.

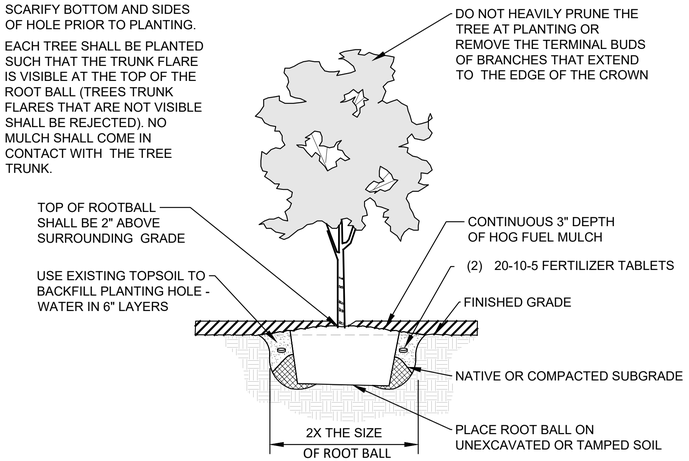
STREAM RESTORATION WIDENED CHANNEL	CODE	QTY	BOTANICAL NAME	COMMON NAME	SIZE	REMARKS
	COR STO	162	CORNUS SERICEA	RED TWIG DOGWOOD	2 GAL.	4' O.C.
	PHY CAP	105	PHYSOCARPUS CAPITATUS	PACIFIC NINEBARK	2 GAL.	4' O.C.
	SAL LUC	83	SALIX LUCIDA	PACIFIC WILLOW	2 GAL.	4' O.C.
	SAL SIT	141	SALIX SITCHENSIS	SITKA WILLOW	2 GAL.	4' O.C.

RESTORATION PLANTING NOTES

1. COORDINATE WORK SHOWN ON THIS DRAWING WITH INSTALLATION OF UNDERGROUND IRRIGATION AND ALL OTHER EXISTING OR PROPOSED SITE WORK.
2. CONTRACTOR IS TO OBTAIN WRITTEN APPROVAL FOR ALL PLANT MATERIAL SUBSTITUTIONS FROM THE PROJECT MANAGER PRIOR TO INSTALLATION. PLANT SUBSTITUTIONS WITHOUT PRIOR WRITTEN APPROVAL THAT DO NOT COMPLY WITH THE DRAWINGS AND SPECIFICATIONS MAY BE REJECTED BY THE OWNERS REPRESENTATIVE AT NO COST TO THE OWNER. THESE ITEMS MAY BE REQUIRED TO BE REPLACED WITH PLANT MATERIALS THAT ARE IN COMPLIANCE WITH THE DRAWINGS.
3. CONTRACTOR IS TO EXAMINE FINISH SURFACE, GRADES, TOPSOIL QUALITY AND DEPTH. CONTRACTOR TO NOTIFY PROJECT MANAGER OF ANY CONDITIONS WHICH MAY BE HARMFUL TO PLANT LIFE, SUCH AS POOR DRAINAGE, HAZARDOUS MATERIALS, ETC. THE CONTRACTOR SHALL MAKE A RECOMMENDATION TO ADDRESS THE SPECIFIC SITUATION. DO NOT CONTINUE ANY WORK UNTIL UNSATISFACTORY CONDITIONS HAVE BEEN CORRECTED.
4. PRIOR TO CONSTRUCTION A LICENSED SURVEYOR SHALL SURVEY, STAKE, AND FLAG LIMITS OF WORK AND WETLAND BOUNDARIES AS SHOWN ON THE PLANS.
5. SELECTIVELY CLEAR AND GRUB INFILL PLANTING AREAS AS DEFINED BY THE CLEARING LIMITS. FIELD ADJUST PLANTING ADJACENT TO EXISTING VEGETATION AS NECESSARY. WETLAND BIOLOGIST/LANDSCAPE ARCHITECT SHALL APPROVE FINAL LAYOUT IN FIELD.
6. PLANTING AREAS SHALL RECEIVE AN 8" DEPTH OF TOPSOIL TYPE A. REFER TO CIVIL PLANS FOR LIMITS.
7. INSTALL PLANTS PER DETAILS AND INSTALL 3" DEPTH OF HOG FUEL BETWEEN PLANTS.
8. PROVIDE TWO ORGANIC SLOW-RELEASE FERTILIZER TABLETS FOR EACH CONTAINERIZED PLANT.
9. SHRUBS SHALL BE PLANTED IN CLUSTERS OF THE SAME SPECIES AND BE DISTRIBUTED RANDOMLY TO CREATE A NATURAL ENVIRONMENT.
10. ALL PLANTINGS SHALL RECEIVE DRIWATER GEL OR APPROVED EQUAL. PLANTS SHALL BE MANUALLY WATERED (E.G. WATERING TRUCK) BY THE CONTRACTOR DURING THE PLANT ESTABLISHMENT PERIOD. CONTRACTOR SHALL SUBMIT IRRIGATION METHOD FOR APPROVAL BY OWNERS REPRESENTATIVE. ALL PLANTS SHALL BE WATERED AS REQUIRED TO MAINTAIN PLANT HEALTH DURING INSTALLATION AND THROUGHOUT THE GROWING SEASON (MARCH 15 TO OCTOBER 31).
11. PLANTING DATES: OCTOBER 1 THROUGH APRIL 15.
12. CONTRACTOR IS TO RE-SEED AND RESTORE STAGING AREAS AND ALL OTHER ADJACENT AREAS DISTURBED DURING CONSTRUCTION.
13. CONTRACTOR IS TO FINE GRADE AND ROCK-HOUND ALL SEEDED AND PLANTING AREAS TO PROVIDE A SMOOTH AND CONTINUAL SURFACE, FREE OF IRREGULARITIES (BUMPS OR DEPRESSIONS) & EXTRANEOUS MATERIAL OR DEBRIS. ROCK AND DEBRIS (LARGER THAN 1" DIAMETER) IN SEEDED LAWN AND PLANTING AREAS IS TO BE REMOVED.
14. CONTRACTOR IS RESPONSIBLE FOR HIS BID QUANTITIES AS REQUIRED BY THE PLANS. IF THERE IS A DISCREPANCY BETWEEN THE NUMBER LABELED ON THE PLANT LEGEND AND THE QUANTITY OF GRAPHIC SYMBOLS SHOWN, THE GRAPHIC SYMBOL QUANTITY SHALL GOVERN.
15. LANDSCAPE MAINTENANCE PERIOD BEGINS IMMEDIATELY AFTER THE COMPLETION OF ALL PLANTING OPERATIONS AND WRITTEN NOTIFICATION TO THE OWNER. MAINTAIN TREES, SHRUBS AND GRASS RESTORATION AREAS UNTIL FINAL ACCEPTANCE OF 90 DAYS AFTER NOTIFICATION AND ACCEPTANCE, WHICHEVER IS LONGER.
16. CONTRACTOR IS RESPONSIBLE TO SECURE ALL PLANT MATERIAL IN THE SIZE SPECIFIED ON PLANS PRIOR TO INSTALLATION.

NOTES:

1. SCARIFY BOTTOM AND SIDES OF HOLE PRIOR TO PLANTING.
2. EACH TREE SHALL BE PLANTED SUCH THAT THE TRUNK FLARE IS VISIBLE AT THE TOP OF THE ROOT BALL (TREES TRUNK FLARES THAT ARE NOT VISIBLE SHALL BE REJECTED). NO MULCH SHALL COME IN CONTACT WITH THE TREE TRUNK.

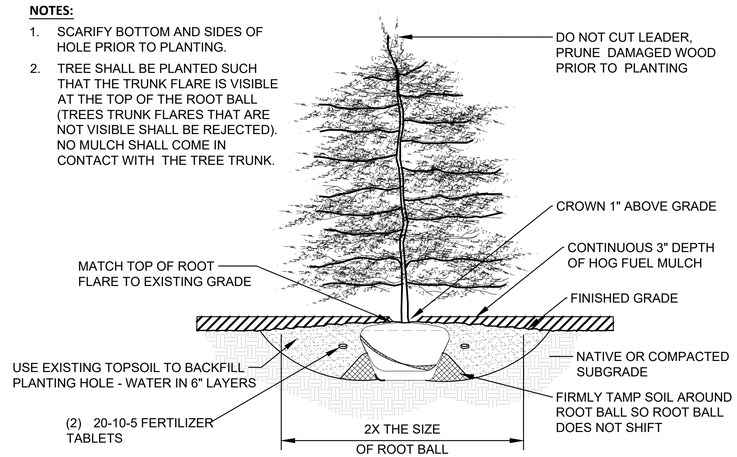


DETAIL

NATIVE DECIDUOUS TREE PLANTING
SCALE: NTS

NOTES:

1. SCARIFY BOTTOM AND SIDES OF HOLE PRIOR TO PLANTING.
2. TREE SHALL BE PLANTED SUCH THAT THE TRUNK FLARE IS VISIBLE AT THE TOP OF THE ROOT BALL (TREES TRUNK FLARES THAT ARE NOT VISIBLE SHALL BE REJECTED). NO MULCH SHALL COME IN CONTACT WITH THE TREE TRUNK.

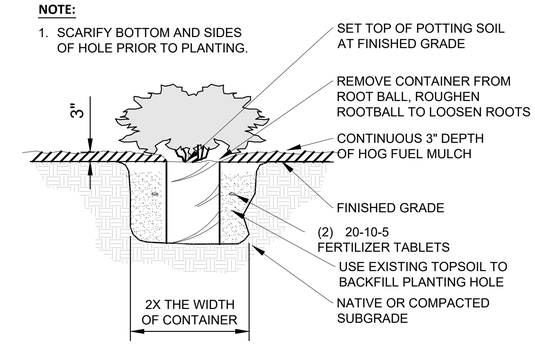


DETAIL

NATIVE EVERGREEN TREE PLANTING
SCALE: NTS

NOTE:

1. SCARIFY BOTTOM AND SIDES OF HOLE PRIOR TO PLANTING.



DETAIL

SHRUB PLANTING
SCALE: NTS

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LA7

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City of Bellevue
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FACTORIA BOULEVARD STORM CONVEYANCE IMPROVEMENTS PROJECT
RESTORATION PLANTING SCHEDULE, NOTES AND DETAILS

SEC 27, T 25N, R 5E

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Critical Areas Report

City of Bellevue
Factoria Boulevard Storm Conveyance Improvements

Submitted to

City of Bellevue
Bellevue, Washington

October 2021

Submitted by

WSP USA
33301 Ninth Avenue South, Suite 300
Federal Way, Washington 98003-2600

31403057

CITY OF BELLEVUE
FACTORIA BOULEVARD STORM CONVEYANCE IMPROVEMENTS

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1.0 INTRODUCTION

The City of Bellevue (City) has experienced recurrent flooding along Factoria Boulevard south of SE 36th Street. In response to the flooding, the City initiated engineering studies to determine the cause of the flooding and identify a preferred solution. The recommended solution for storm drain improvements include the replacement of an existing outfall in Richards Creek, main trunk line, and addition of storm inlets near Factoria Village (Richards Creek). The project was reviewed by the City's Utilities Capital Improvement Program (CIP) Cabinet on December 5, 2018 and was approved to proceed to Preliminary Design. The project design was started 2018, with initial permit applications submitted in mid-2020 along with the final 30% design. This report encompasses design updates from the 60% design completed in 2021.

The project will involve improvements to the storm conveyance system alongside and below Factoria Boulevard. The existing outfall will be reconfigured and expanded to discharge flows to Richards Creek adjacent to Factoria Boulevard. Work below the ordinary high-water mark (OHWM) of Richards Creek are anticipated to replace the outfall. Mitigation for the aforementioned outfall impacts will be done through restoration of temporary construction impacts and through channel and riparian enhancements within the Richards Creek channel.

In preparation for the proposed project, the City contracted with WSP to investigate the existence of critical areas as defined and regulated under Chapter 20.25H Critical Areas Overlay District of the Bellevue Municipal Code (BMC).

The approximately 0.6-acre study area consists of a portion of Richards Creek just southeast of the intersection of Factoria Boulevard SE and SE 36th Street in Bellevue, Washington. The study area is located in Section 9 of Township 24 North, Range 5 East, of the Willamette Meridian. A vicinity map is attached as Figure 1; all figures are included as Appendix A).

2.0 PROJECT DESCRIPTION

The City of Bellevue Utilities Department is pursuing a capital project to construct stormwater conveyance improvements to reduce the risks of flooding in the City's Factoria-Richards Creek drainage basin during high-intensity storms. A City water line and PSE gas line may need to be relocated due to conflicts with the proposed improvements in the project area. The project is currently at the preliminary design phase with construction scheduled to begin in 2022. The main project elements are described below.

2.0 OUTFALL IMPROVEMENTS

The existing outfall is the terminus of the 3.3 foot by 5.3-foot trunk line near Factoria Village and has no fish exclusion device. It will be replaced to accommodate the trunk line improvements. The proposed outfall may include fish exclusion per current

regulations and guidance under the Hydraulic Code administered by the Washington Department of Fish and Wildlife (WDFW) depending on the outcome of current negotiations between the City and WDFW. The proposed outfall will consist of the conveyance trunk outlet (trunk described below), rock splash pad/transition zone constructed with cobbles, and concrete wing walls. This is proposed to reduce scour and erosive potential during high flows.

2.1 CONVEYANCE TRUNK LINE

The stormwater conveyance trunk line along the eastern flank of Factoria Boulevard SE is currently a 3.3-foot by 5.3-foot pipe arch storm drain (in front of Factoria Village) and 30" diameter storm drain (in front of a Brown Bear car wash); the total replacement will be 642 feet. The first 413 feet of the replacement will be with a 9-foot-wide by 4-foot-high box storm drain from the outfall southward. The remaining 229 feet of trunk line will be replaced with a set of parallel 24" diameter and 30" diameter ductile iron pipes.

2.2 LATERAL IMPROVEMENTS

The project proposes improvements to two storm drain crossings that run across Factoria Boulevard SE. The proposed crossing near Formula-1 Fast Lube will consist of five new 18-inch diameter pipes and the crossing to the south near the 7-11 store will add a single 24-inch pipe in addition to the existing 24-inch and 36-inch pipes currently located at this location.

2.3 INLET IMPROVEMENTS

The project is proposing 15 new inlets and improvements to 8 existing inlets along Factoria Boulevard SE. Many of the new structures will be combination inlets with both curb openings and flat vaned grates in the gutter. Those inlets occurring above the new trunk line will not have sumps as the runoff will drop directly into the underlying storm trunk.

3.0 METHODS

This critical areas report has been prepared consistent with the submittal requirements of BMC 20.25H.250 – Critical Areas Report – Submittal Requirements. In order to assess the presence or absence of critical areas and the project's potential impacts, WSP scientists analyzed the site and reviewed pertinent reports, information, and available data. The scientist conducted a site investigation on 19 and 21 June 2017. Resources used during their investigation of critical areas included the following.

- City of Bellevue Critical Hazards Maps – GIS online database
- King County iMap – GIS online database
- Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM), King County, Washington, Map Number 53011C0658K
- StreamNet Fish Data for the Northwest – online mapper

- U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) – online database
- WDFW SalmonScape – online database

3.0 REGULATED ACTIVITIES AND REQUIRED PERMITS

The project area is within the jurisdiction of the City and will be subject to the City's critical areas ordinance (BMC 20.25H). BMC 20.25H.050.A.1 states that the uses established by LUC 20.10.440 for the applicable land use district may be undertaken in the Critical Areas Overlay District as allowed for in the underlying land use district. All development associated with the use shall comply with the provisions of this part. The City of Bellevue Zoning Designations Map indicates that the site is zone Community Business (CB). BMC Chart 20.10.440 Uses in Land Use Districts – Transportation and Utilities – Non-residential Districts indicates that local utility systems are a permitted use in community business districts.

BMC 20.25H.050.B.1 indicates that the seismic hazard areas, coal mine hazard areas, and habitat associated with species of local importance designated as critical areas by this part do not include absolute restrictions on development or activity. Instead, uses allowed under the section may be undertaken in such critical areas, so long as the individual performance standards of each of these specific critical areas, are satisfied. BMC 20.25H.050.B.2 goes on to state that land use alteration or other activity within critical areas are to be located outside of the critical area and/or buffer unless use or development is allowed pursuant to BMC 20.25H.055 (Uses and development allowed within critical areas – Performance standards) and those regulations applicable to individual critical areas, modifications allowed through a critical area report, reasonable use exemptions, or variances.

The site contains streams (BMC 20.25H.075) and habitats associated with species of local importance (BMC 20.25H.150). There are no wetlands (BMC 20.25H.095), geologically hazardous areas (BMC 20.25H.120) or frequently flooded areas (BMC 20.25H.175) within the project area. The critical areas regulated by the City for this project are listed below:

- BMC 20.25H.095 defines wetlands as those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas. Wetlands do not include those artificial wetlands intentionally created from non-wetland sites, including, but not limited to, irrigation and drainage ditches, grass-lined swales, canals, detention facilities, wastewater treatment facilities, farm ponds, and landscape amenities, or those wetlands created after July 1, 1990 that were unintentionally created as a result of the construction of a road, street, or highway. Wetlands may include those artificial wetlands intentionally created

from non-wetland areas to mitigate the conversion of wetlands. There are no regulated wetlands present within the project area, and these critical areas are not discussed further in this report.

- BMC 20.25H.075.B designates "Type F water" as all segments of waters that are not type S waters, and that contain fish or fish habitat, including waters diverted for use by a federal, state, or tribal fish hatchery from the point of diversion for 1,500 feet or the entire tributary if the tributary is highly significant for protection of downstream water quality. Richards Creek, which flows through the project area, meets this definition and is regulated as a Type F streams.
- BMC 20.25H.120 designates the following geologic hazard areas

1. Landslide Hazards. Areas of slopes of 15 percent or more with more than 10 feet of rise, which also display any of the following characteristics:

    a. Areas of historic failures, including those areas designated as quaternary slumps, earthflows, mudflows, or landslides. The project area has no areas of historic failures or these designations.

    b. Areas that have shown movement during the Holocene Epoch (past 13,500 years) or that are underlain by landslide deposits. There are no areas within the project area that exhibit these characteristics.

    c. Slopes that are parallel or subparallel to planes of weakness in subsurface materials. The slopes in the stream channel are perpendicular to the Seattle Fault Zone which runs west-east through the north end of the Richards Creek channel.

    d. Slopes exhibiting geomorphological features indicative of past failures, such as hummocky ground and back-rotated benches on slopes. No slopes on-site exhibit these features.

    e. Areas with seeps indicating a shallow ground water table on or adjacent to the slope face. Ground water is within 10 feet of the surface in the project area but no seeps were noted in the Richards Creek channel.

    f. Areas of potential instability because of rapid stream incision, stream bank erosion, and undercutting by wave action. There is moderate erosion potential along the inlet channel of Richards Creek but there is no instability potential.

2. Steep Slopes. Slopes of 40 percent or more that have a rise of at least 10 feet and exceed 1,000 square feet in area. There are steep slopes of 40 percent or

more, but they do not rise 10 feet, so these critical areas are not addressed further in this report.

3. Coal Mine Hazards. Areas designated on the Coal Mine Area Maps or in the City's coal mine area regulations, LUC 20.25H.130, as potentially affected by abandoned coal mines; provided, that compliance with the coal mine area regulations shall constitute compliance with the requirements of this chapter in regard to coal mines. There are no coal mine hazards within the project area, and this critical area is not discussed further in this report.

4. Seismic Hazards. Areas of known faults or Holocene displacement, based on the most up-to-date information, or areas mapped areas of "moderate to high" or "high" hazard liquefaction susceptibility by the Washington Department of Natural Resources Liquefaction Susceptibility Map of King County, Washington, 2004, as amended. City of Bellevue Critical Hazards Maps show that the project area is designated as having a low to moderate liquefaction susceptibility, and thus these geologic hazards are not present within the project site and are not addressed further in this report.

- BMC 20.25H.150.A provides a list of 23 species designated as species of local importance, and BMC 20.25H.150.B designates habitats associated with these species as regulated critical areas. Species presence within the project area is discussed in section 5.3 below. Additionally, BMC 20.25H.150.C designates naturally occurring ponds of under 20 acres as critical areas; however, no ponds meeting this definition are present within the project area, and thus they are not addressed further in this document.
- Per BMC 20.25H.175.A, the City defines frequently flooded areas as:

1. The land in the floodplain subject to the flood having a one percent chance or greater of being equaled or exceeded in any given year as determined by customary methods of statistical analysis defined in the City of Bellevue Storm and Surface Water Engineering Standards.

2. Those areas identified by the Federal Insurance Administration in a scientific and engineering report entitled "The Flood Insurance Study for King County" dated April 19, 2005, with an accompanying flood insurance map(s) and any revisions thereto.

According to FEMA rate map number 53033C0658 K dated April 9, 2005, areas directly adjacent to Richards Creek, including the project area, are not within the 100-year floodplain, and therefore the project area is not designated and regulated as a frequently flooded area. These critical areas are not addressed further in this report.

Individual performance standards for applicable critical areas, and rationale for how the project will meet those performance standards is provided in Section 8.0 below.

3.1 CONSTRUCTION SCHEDULE

The project is currently at the final design phase with construction scheduled to begin in 2022.

4.0 EXISTING CONDITIONS

The approximately 1.8-acre project area is located just southeast of the intersection of Factoria Boulevard SE and SE 36th Street, southeast of the Highway 90/Highway 405 interchange. The project area is associated with approximately 320-foot portion of open channel of Richards Creek and approximately 650 feet of stormwater conveyance system. The stormwater conveyance trunk from the outfall to SE 38th Street was historically part of Richards Creek that has been piped and used for conveyance under the City's municipal stormwater permit. The storm drainage discharges from a culvert at the south end of the open channel of Richards Creek, flows north, and enters a culvert flowing beneath SE 36th Street and Highway 90. The project area is situated within a highly developed portion of the City; surrounding land uses consist of commercial and industrial uses, and the landscape is nearly entirely paved and constrained by infrastructure.

In the immediate vicinity of the project area, vegetation consists entirely of the invasive species Himalayan blackberry (*Rubus armeniacus*). In the greater area, vegetation is extremely limited, and generally consists of landscaping and ornamental varieties of trees and shrubs. Habitat is also limited. Because of the lack of vegetation in the area, there is limited habitat availability for foraging, nesting, rearing, or breeding. It is likely that the area only supports species adapted to urban environments such as common songbirds, squirrels, and raccoons. According to the WDFW database SalmonScape, downstream of Interstate 90 (north of the project area), Richards Creek supports salmon and steelhead. However, SalmonScape also indicates that the culvert at the downstream end of the project area is a partial barrier to fish passage, and the stormwater outfall on the upstream end prevents fish passage entirely (WDFW 2021).

Overall, topography in the area is generally flat at street level. Richards Creek is situated below street level and there are steeper slopes from the edge of pavement down to the creek (Figure 2).

The study area is situated within WRIA 8 Cedar- Sammamish, and the Lake Washington watershed and is shown in Figure 3. Richard's Creek originates in the project area and flows north to Kelsey Creek.

5.0 CRITICAL AREAS

The following sections provide discussion of critical areas present within the study area and the critical areas present on-site are shown in Figure 4.

5.0 STREAMS

As previously discussed, Richards Creek flows north through the project area. As indicated on the WDFW database SalmonScape, the culvert on the downstream end of the project area creates a partial fish passage barrier; however, Richards Creek is known to support salmon and steelhead species downstream of the project area, and it is feasible that the portion of Richards Creek within the study area provides habitat for other fish species. Therefore, Richards Creek is a designated Type F stream.

The value of habitat provided by this portion of the creek is limited. The channel is incised, and adjacent paving and development limit the potential for the creek to meander or provide complex habitat features. Vegetation consists of a monoculture of Himalayan blackberry and does not provide the structural diversity that would otherwise provide additional habitat availability for local species. While the blackberry does not provide any significant level of habitat function for terrestrial species, it may provide some limited function as riparian vegetation by shading the stream and providing nutrient input in the form of leaf litter. However, while the existing vegetation may provide some limited level of these functions, a structurally and biologically diverse mix of native species would provide a much greater level of riparian habitat function than is currently provided at the site.

BMC 20.25H.075.C.1 designates stream-critical area buffers. Buffer widths are determined based on the stream type and whether a stream is situated within a developed or undeveloped site. Developed sites are those that contain a primary structure. The project site is located within a parcel that houses commercial development and land uses, including buildings and parking lots, and would be considered a developed site. Per BMC 20.25H.075.C.1.a.ii Type F streams on developed sites require a 50-foot stream buffer. The stream buffer would end However, BMC 20.25H.075.C.1.b states that regardless of type, closed stream segments, in this particular case the downstream I-90 culverts, do not have a critical area buffer but should have the structure setback by 10 feet established in BMC 20.25H.075.D.2.b. Figure 4 shows the critical area buffer extending 50 feet north, where Richards Creek enters the I-90 culverts. The 50 foot buffer also ends at the edge of improved right of way along Factoria Boulevard under BMC 20.25H.075.C.2.b.

5.1 HABITAT ASSOCIATED WITH SPECIES OF LOCAL IMPORTANCE

Of the 23 designated species of local importance in BMC 20.25H.150.A two species—Chinook salmon (*Oncorhynchus tshawytscha*) and coho salmon (*Oncorhynchus kisutch*)—have been documented in Richards Creek (Hart Crowser 2015). Additionally, western brook lamprey has been documented in the creek,

indicating that there may be suitable habitat for river lamprey; however, this species has not been documented in the creek. Because of the highly developed nature of the project site and surrounding area, it is unlikely that any other of the 20 designated species of local importance occur within or near the project area.

The habitat present in Richards Creek is non-functioning because of the factors discussed below. The streambed itself is lacking pools and woody debris, is open to direct sunlight, and has deposited fines from the stormwater runoff entering the channel. The riparian area surrounding Richards Creek has a monoculture of non-native, invasive vegetation cover, which does not provide even minor shade to the creek and lacks the diversity to support an array of wildlife.

6.0 IMPACTS

Although it is the overall goal of the project to avoid impacts to critical areas, some impacts are unavoidable because of the nature of the project. The following includes discussion of the proposed impacts to critical areas within the project area. Only those critical areas that are present within the project area are addressed.

Updates to the stormwater system are necessary for the safety and well-being of area residents and to improve the necessary infrastructure in the area. The replacement of the outfall will temporarily impact the stream, temporarily and permanently impact its associated riparian buffer, and affect habitat of local importance. There will be approximately 50 square feet of permanent impacts under OHWM and 100 square feet of riparian buffer; with approximately 75 square feet of temporary impacts under the OHWM and 500 square feet of riparian buffer from the construction of the new outfall, splash pad and wing walls.

The proposed project is by definition, described as an outfall, this includes replacing an existing 3.3-foot by 5.3-foot outfall with an outfall that has fish exclusion per WAC 220-660-260; however, this outfall may or may not have fish exclusion, depending on the outcome of current negotiations between the City and WDFW. This is based on the whether the loss of fish access to the conveyance system will be considered a habitat loss.

Section 7.0 details the restoration and enhancement activities that will compensate for impacts within the stream and its riparian buffer.

7.0 MITIGATION AND MONITORING

7.0 MITIGATION PLAN

The project includes mitigating activities set forth in BMC 20.25H.085 A.2. that will offset the permanent and temporary impacts from construction detailed in Section 6.0. This will be done through the enhancement of the existing stream and riparian buffer.

The proposed mitigation includes widening and enhancing the streambed of the Richards Creek to provide greater habitat for the fish species of local importance and macroinvertebrates. Widening of the channel will consist of approximately 2,550 square feet of excavation below the ordinary high-water mark (OHWM) of Richards Creek as well as invasive vegetation removal and native species planting in the approximately 24,300 square feet of remaining riparian buffer.

The new stream channel will be constructed with meanders that will increase the complexity of aquatic habitat and create new aquatic habitat. This will result in a transfer of approximately 1200 square feet of stream buffer into a Type "F" stream designation. The wider meandering channel will also allow for more natural channel migration/adjustment over time. Additionally, large woody debris will be placed within the new stream channel, creating pools, regulating flow to help prevent channel incision, and will create additional habitat complexity.

The banks of the stream channel will be graded and sloped to allow for planting of a variety of native species. Currently, vegetation within the project area consists nearly entirely of Himalayan blackberry, with no species diversity or structural complexity. Once completed, approximately 0.6 acres of native vegetation will be planted within the Richards Creek buffer and will consist of a multi-layered vegetative community that will provide a much greater level of habitat availability, opportunities for foraging, nesting and rearing, breeding, and escape. This new vegetative community will also provide improvements to water quality. The diversity of species will provide reduce flow velocities during high water events, allowing sediments greater opportunity to settle out of the water column and improve downstream water quality. Variability in plant height and structure will provided improved shading of the stream channel throughout the day, cooling water, and providing improved water quality conditions for native aquatic species.

The project is currently at the preliminary design phase; however, Table 1 includes a list of species proposed for planting in restored areas which complies with the City of Bellevue Utilities plant lists.

Table 1. Planting Plan

Common Name	Scientific Name	Spacing
Channel		
Red twig dogwood	*Cornus sericea*	4'
Pacific Willow	*Salix lucida*	4'
Sitka Willow	*Salix sitchensis*	4'
Pacific Ninebark	*Pysocarpus capitatus*	4'
Upland		
Red flowering currant	*Ribes sanguineum*	4'
Ocean-Spray	*Holodiscus discolor*	4'

Common Name	Scientific Name	Spacing
Nootka rose	*Rosa nutkana*	4’
Scouler’s willow	*Salis scouleriana*	4’
Snowberry	*Symphoricarpos albus*	4’
Red elderberry	*Sambucus racemosa*	4’

7.1 MONITORING PLAN

The project will enter a minimum of three years of monitoring as defined under 20.25H.220.D and is included with the mitigation plan for this project. These plans will be developed alongside the final design of this project.

8.0 COMPLIANCE WITH PERFORMANCE STANDARDS

The following sections discuss how the project complies with the applicable performance standards for critical areas consistent with BMC 20.25H.

8.0 GENERAL CRITICAL AREAS PERFORMANCE STANDARDS – 20.25H.055.C

8.0.1 Repair and Maintenance and/or Construction Staging - 20.25H.055.C.1

a. Work shall be consistent with all applicable City of Bellevue codes and standards;

b. Removal of significant trees is prohibited;

“Significant tree” is defined by the Bellevue code as a healthy evergreen or deciduous tree, eight inches in diameter or greater, measured four feet above existing grade. No trees meeting this definition are present within the project area, and none will be removed as part of proposed project activities.

c. Areas of temporary disturbance associated with the work shall be restored to pre-project conditions, pursuant to a restoration plan meeting the requirements of LUC 20.25H.210.

The projects temporary disturbance from the outfall replacement will be restored to a condition at or enhanced from the existing conditions and the areas within the channel are described in Section 7.1. Areas of temporary impact to paved surfaces, sidewalks or vegetated mediums will be restored to pre-existing conditions and sidewalks will be Americans with Disabilities Act compliant.

8.0.2 New and Expanded Uses or Development - 20.25H.055C.2

a. New or expanded facilities and systems are allowed within the critical area or critical area buffer only where no technically feasible alternative with less impact on the critical area or critical area buffer exists.

The project is site specific and involves storm conveyance improvements to reduce the potential for flooding at the project location. There is no feasible

alternative for siting the project due to the constraints from the highly developed adjacent land uses.

b. If the applicant demonstrates that no technically feasible alternative with less impact on the critical area or critical area buffer exists, then the applicant shall comply with the following:

i. Location and design shall result in the least impacts on the critical area or critical area buffer;

The project has been designed to avoid and minimize impacts to critical areas and their buffers to the greatest extent feasible. Best management practices (BMPs) located in Section 9.2 will be employed throughout construction to avoid incidental impacts to critical areas.

ii. Disturbance of the critical area and critical area buffer, including disturbance of vegetation and soils, shall be minimized;

Disturbance of soils will be minimized to the greatest extent feasible. Existing vegetation consists of the invasive species Himalayan blackberry, and while disturbance to vegetation in unavoidable, the area will be replanted with native species and will result in improved vegetative functions at the project site.

iii. Disturbance shall not occur in habitat used for salmonid rearing or spawning or by any species of local importance unless no other technically feasible location exists;

As stated previously, there are no other feasible locations for this project, as it is site specific. Construction will occur during an approved in-water work window to minimize potential impacts to salmonids, and BMPs located in Section 9.2 will be employed to avoid impacts to habitat and water quality within the project area and downstream.

iv. Any crossing over of a wetland or stream shall be designed to minimize critical area and critical area buffer coverage and critical area and critical area buffer disturbance, for example by use of bridge, boring, or open cut and perpendicular crossings, and shall be the minimum width necessary to accommodate the intended function or objective; provided, that the Director may require that the facility be designed to accommodate additional facilities where the likelihood of additional facilities exists, and one consolidated corridor would result in fewer impacts to the critical area or critical area buffer than multiple intrusions into the critical area or critical area buffer;

The project does not include stream or wetland crossings. This performance standard is not applicable.

v. All work shall be consistent with applicable City of Bellevue codes and standards;

All work will comply with the applicable codes and standards as provided by the City.

vi. The facility or system shall not have a significant adverse impact on overall aquatic area flow peaks, duration or volume or flood storage capacity, or hydroperiod;

The project has been designed and is proposed to reduce the risk of flooding in the immediate area. It will not negatively impact overall aquatic area flow peaks, duration, volume of flood storage capacity, or hydroperiod.

vii. Associated parking and other support functions, including, for example, mechanical equipment and maintenance sheds, must be located outside critical area or critical area buffer except where no feasible alternative exists; and

There are no associated parking or other support functions included as part of the proposed project.

viii. Areas of new permanent disturbance and all areas of temporary disturbance shall be mitigated and/or restored pursuant to a mitigation and restoration plan meeting the requirements of LUC 20.25H.210.

The project will mitigate all permanent and temporary impacts by enhancing the existing Richards Creek stream channel. See Section 7.1 for disturbance areas and proposed mitigation for the permanent and temporary disturbances of this project.

8.0.3 Instream Structures – 20.25H.C.3.d

Instream structures may be permitted only in accordance with a design prepared by a qualified professional and where the applicant demonstrates measurable benefits, such as decreased erosion, peak flow reduction, improved water quality, stream stabilization or improved habitat from the proposal. The applicant shall obtain any required state or federal permits prior to undertaking development.

All applicable required state and federal permits will be obtained for the project. The project has been designed by a qualified professional.

8.0.4 Vegetation Management - 20.25H.055.C.3.i

Modification of vegetation in a critical area or critical area buffer that is not considered routine maintenance under subsection C.3.h of this section may be allowed if it meets the requirements of this section. Except where otherwise noted, a Critical Areas Land Use Permit is required. The following activities may also require a Clearing and Grading Permit, Chapter 23.76 BCC and/or SEPA review and must comply with all other Land Use Code provisions related to tree preservation and landscaping, including but not limited to LUC 20.20.520 and 20.20.900.

i. Noxious Species. The removal of the following vegetation will be done with hand labor and hand-operated equipment from a critical area buffer, or from a geologic hazard critical area, is allowed without requiring a Critical Areas Land Use Permit or a Vegetation Management Plan:

(A) Invasive and noxious weeds;
(B) English ivy (*Hedera helix*);
(C) Himalayan blackberry; and
(D) Evergreen blackberry (*Rubus laciniatus*).

Vegetation within the project area consists entirely of Himalayan blackberry.

ii. Hazard Trees. The removal of trees from the critical area or critical area buffer that are hazardous, posing a threat to public safety, or posing an imminent risk of damage to an existing structure, public or private road or sidewalk, or other permanent improvement, is allowed without requiring a Critical Areas Land Use Permit or a Vegetation Management Plan;

There are no hazard trees within the project area; this performance standard is not applicable.

iii. Forest Health. Measures to control a fire or halt the spread of disease or damaging insects; provided, that the removed vegetation shall be replaced pursuant to a restoration plan meeting the requirements of LUC 20.25H.210.

Not applicable. The project does not involve activities within a forested area.

iv. Fire Safety. Where required pursuant to the International Fire Code, Section 304.1.2, as adopted and amended by the City of Bellevue, vegetation may be removed from the critical area or critical area buffer; provided, that the removed vegetation shall be replaced pursuant to a restoration plan meeting the requirements of LUC 20.25H.210.

This performance standard is not applicable to the project. Vegetation removal for the purposes of fire safety are not proposed as part of project activities.

v. Vegetation Management Plan – Maintenance for Utility, Transportation, Parks and Public Facility Projects. Vegetation may be periodically removed from the critical area or critical area buffer as part of an ongoing routine maintenance plan for utility, transportation, park and other public facility projects allowed pursuant to subsection B of this section. Such removal shall be pursuant to a Vegetation Management Plan meeting the requirements of this subsection.

Not applicable. The project is not part of an on-going routine maintenance plan.

vi. Vegetation Management Plan – Other Uses. The Director may approve proposals for vegetation replacement in a critical area buffer, or within a

geologic hazard critical area, pursuant to a Vegetation Management Plan. The Vegetation Management Plan may also include a description of proposed vegetation pruning, including pruning techniques and timing and extent of proposed pruning; provided, that proposals to prune vegetation within geologic hazard areas and geologic hazard area buffers may be undertaken without a Critical Areas Land Use Permit or a Vegetation Management Plan in accordance with subsection C.3.i.vii of this section. The Vegetation Management Plan shall satisfy the requirements of subsection C.3.i.v (B) of this section, except that the following replaces subsection C.3.i.v (B) (8):

A vegetation management plan will be developed consistent with existing management practices conducted by the city in the Critical Areas Handbook. The plan will consider neighborhood covenants related to view preservation or vegetation management.

8. Short- and long-term management prescriptions, including characterization of trees and vegetation to be removed, and restoration and revegetation plans with native species, including native species with a lower growth habit. Such restoration and revegetation plans shall demonstrate that the proposed Vegetation Management Plan will not significantly diminish the functions and values of the critical area or alter the forest and habitat characteristics of the site over time.

   The management prescriptions for vegetation will be developed consistently with existing management practices conducted by the city.

   Trees and vegetation may not be removed pursuant to this subsection if removal would result in a significant impact to habitat associated with species of local importance, unless the impacted function can be replaced elsewhere within the management area subject to the plan. In no event may a tree or vegetation which is an active nest site for a species of local importance be removed pursuant to this subsection.

   Removal of the existing vegetation will not have a negative impact on habitats associated with species of local importance because the existing vegetation consists entirely of the invasive species Himalayan blackberry, and upon completion of the project, areas subject to vegetation removal will be replanted with native species. There are no trees or vegetation that are active nest sites for species of local importance within the project area, and none will be removed as part of proposed project activities.

   In determining whether the vegetation management plan should be approved, the Director shall take into consideration any applicable neighborhood restrictive covenants that address view preservation or vegetation management if so requested in writing. The existence of and provisions of neighborhood

restrictive covenants shall not be entitled to any more or less weight than other reports and materials in the record.

vii. Select Vegetation Pruning. Pruning of existing trees and vegetation within a geologic hazard critical area or geologic hazard critical area buffer, with hand labor and hand-operated equipment in accordance with this subsection is allowed without requiring a Critical Areas Land Use Permit or a Vegetation Management Plan, so long as the area is not included within a Native Growth Protection Area (NGPA) or Native Growth Protection Area Easement (NGPE). A Clearing and Grading Permit, Chapter 23.76 BCC, and SEPA review may still be required. The pruning allowed by this subsection shall be performed in accordance with guidelines established by the Director for each of the following pruning techniques: canopy reduction; canopy cleaning; canopy thinning; canopy raising or lifting; structural pruning; and canopy restoration. Where vegetation has been consistently managed by topping or other pruning methods, nothing in this part shall preclude the continuation of such practices. Pruning shall be performed in a manner that ensures continued survival of the vegetation.

Project implementation does not involve pruning of existing vegetation within the project area.

In no event may a tree or vegetation which is an active nest site for a species of local importance be pruned pursuant to this subsection.

There are no trees or vegetation that are active nest sites for species of local importance within the project area, and none will be removed as part of proposed project activities.

8.1 STREAMS PERFORMANCE STANDARDS – 20.25H.080

8.1.1 General Performance Standards - 20.25H.080.A

Development on sites with a type S or F stream or associated critical area buffer shall incorporate the following performance standards in design of the development, as applicable:

1. Lights shall be directed away from the stream.

   Not applicable; there are no lights proposed as part of the project design.

2. Activity that generates noise such as parking lots, generators, and residential uses shall be located away from the stream or any noise shall be minimized through use of design and insulation techniques.

   Not applicable. There are no noise-generating activities associated with the project design after completion of construction.

3. Toxic runoff from new impervious area shall be routed away from the stream.

   The new impervious surfaces proposed as part of the project design is all sidewalk for Americans with Disabilities Act compliance and is a non-pollution-generating impervious surface.

4. Treated water may be allowed to enter the stream critical area buffer.

   This standard will be followed if necessary.

5. The outer edge of the stream critical area buffer shall be planted with dense vegetation to limit pet or human use.

   The project is currently in the preliminary design phase and a detailed planting plan has not been established for the project; however, the vegetative buffer will be planted consistent with City of Bellevue requirements.

6. Use of pesticides, insecticides and fertilizers within 150 feet of the edge of the stream critical area buffer shall be in accordance with the City of Bellevue's "Environmental Best Management Practices," now or as hereafter amended.

   Vegetation management and the use of pesticides, insecticides, and fertilizers within 150 feet of the edge of the stream critical area buffer will be managed in accordance with established BMPs employed by the City.

7. All applicable standards of Chapter 24.06 BCC, Storm and Surface Water Utility Code, are met.

   These standards will be met with the proposed project.

8.1.2 Modification of Stream Channel - 20.25H.080.B

1. When Allowed. A stream channel shall not be modified by relocating the open channel, or by closing the channel through pipes or culverts unless in connection with the following uses allowed under LUC 20.25H.055:

   a. A new or expanded utility facility or system;

   b. A new or expanded essential public facility;

   c. Public flood control measures;

   d. In-stream structures;

   e. New or expanded public right-of-way, private roads, access easements or driveways;

   f. Habitat improvement project; or

   g. Reasonable use exception; provided, that a modification may be allowed under this section for a reasonable use exception only where the applicant

demonstrates that no other alternative exists to achieve the allowed development.

A critical areas report may not be used to modify the uses set forth in this subsection B.1.

BMC 20.25H.080.B.1 establishes uses for which the modifications resulting in the relocation of a stream channel may be acceptable. Included are a new or expanded utility facility systems and instream structures. Design of the project does not include significant relocation of the stream channel; however, the purpose of the project is to improve an existing outfall and stormwater conveyance to reduce flooding problems and thus is applicable to the provisions of this standard.

2. Critical Areas Report Required. Any proposal to modify a stream channel under this section may be approved only through a critical areas report.

   The purpose of this report is to meet the requirements of critical areas reporting as identified in the City's code.

3. Relocation of Closed Stream Channel. Any proposal to relocate an existing closed stream channel may be approved only through a critical areas report.

   The proposed project does not include relocation of an existing closed-stream channel; this performance standard is not applicable.

8.1.3 Mitigation and monitoring – Additional provisions.

This project will meet BMC 20.25H.085 A.2. whereby the selected mitigation preference will be on-site mitigation through enhancement of the functions and values of the remaining critical area buffer. This is the chosen alternative because of the inability to replace the critical area buffer lost due to neighboring roads and businesses.

8.1.4 Critical areas report – Additional provisions.

These provisions are met with the current project design plans.

8.2 HABITAT FOR SPECIES OF LOCAL IMPORTANCE PERFORMANCE STANDARDS

8.2.1 Performance Standards for Habitats Associated with Species of Local Importance – 20.25H.160

BMC 20.25H.160 states that if habitat associated with species of local importance will be impacted by a proposal, the proposal shall implement the wildlife management plan developed by the Department of Fish and Wildlife for such species.

Department of Fish and Wildlife (WDFW) does not have a wildlife management plan specific to salmonids, as they are regulated by the National Oceanic and Atmospheric

Administration Fisheries; however, the project will comply with WDFW mitigation guidelines provided for Hydraulic Permit Approvals and the Washington State Aquatic Habitat Guidelines Program's Stream Habitat Restoration Guidelines.

9.0 MITIGATION SEQUENCING – 20.25H.215

BMC 20.25H215 states that applicants shall demonstrate that all reasonable efforts have been examined with the intent to avoid and minimize impacts to the critical area and/or critical area buffer. When an alteration to a critical area is proposed, such alteration shall be avoided, minimized, or compensated for in the following order of preference:

9.0 AVOID IMPACTS – 20.25H.215.A

BMC 20.25H.215.A Avoiding the impact altogether by not taking a certain action or parts of an action.

The project team has, to the greatest extent feasible, designed the project to avoid impacts to critical area; however, because of the site-specific nature of the project, total avoidance is not feasible.

9.1 MINIMIZE IMPACTS – BMC 20.25H.215.B

Minimizing impacts by limiting the degree or magnitude of the action and its implementation, by using appropriate technology, or by taking affirmative steps, such as project redesign, relocation, or timing, to avoid or reduce impacts;

To avoid and minimize impacts, all stages of construction will employ the following BMPs.

- Checking equipment for leaks and other problems that could result in the discharge of petroleum-based products or other material into critical areas.
- Taking corrective actions in the event of any discharge of oil, fuel, or chemicals into the water, including:
  - *In the event of a spill, beginning containment and cleanup efforts will occur immediately and will be completed expeditiously according to all local, state, and federal regulations, ensuring they take precedence over ordinary work. Cleanup will include proper disposal of any spilled material and used cleanup material.*
  - *The cause of the spill will be ascertained, and appropriate action taken to prevent further incidents or environmental damage.*
  - *Spills will be reported to the Washington State Department of Ecology's (Ecology) Southwest Regional Spill Response Office at 360-407-6300.*

- Preventing the disposal or abandonment of excess or waste materials waterward of the OHWM or allowing these materials to enter waters of the state.
- Disposing of waste materials in an appropriate landfill.
- Keeping oil-absorbent materials present on site for use in the event of a spill or if any oil product is observed in critical areas.
- Employment of erosion and sediment control measures including, but not limited to:

  – *Using filter fabric, silt fence, plastic covering, sodding, sediment bags, mulching, and/or soil stabilization.*

  – *Hand seeding, hydro-seeding, live staking.*

  – *Employing inlet protection, sandbags, silt mat, straw bale barriers and vegetative buffers.*

  – *Sweeping area roadways and parking lots after construction.*

9.2 COMPENSATORY MITIGATION – BMC 20.25H.215.C

Performing the following types of mitigation (listed in order of preference):

1. Rectifying the impact by repairing, rehabilitating, or restoring the affected environment;
2. Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; or
3. Compensating for the impact by replacing, enhancing, or providing substitute resources or environments;

   The project will rectify impacts by restoring impacted areas and enhancing stream and riparian buffer values. See Section 7.0

9.3 MONITORING – BMC 20.25H.215.D

Monitoring the hazard or other required mitigation and taking remedial action when necessary.

10.0 MITIGATION AND RESTORATION PLAN REQUIREMENTS – 20.25H.220

10.0 PLAN PHASES - 20.25H.220.A

Where an applicant is seeking modifications to this part through a critical areas report pursuant to LUC 20.25H.230, the mitigation plan required for the proposal may be submitted in phases. A conceptual plan shall be submitted as part of the critical areas report and approved with the land use approval for the proposal. A detailed plan shall

be approved prior to or with approval of the first permit or other approval required to perform work associated with the proposal.

See Section 7.0 for the proposed mitigation plan.

10.1 RESTORATION AND MITIGATION PROJECT DETAILS - 20.25H.220.B

The plan shall be prepared by a qualified professional and shall at minimum include the content identified in this section. Additional requirements may be found for specific critical areas in LUC 20.25H.085 (streams); 20.25H.105 (wetlands); and 20.25H.135 (geologic hazard areas). Additional detail about the contents of restoration and mitigation plans may be developed by the Director in submittal requirements. The Director may waive any of the plan requirements where, in the Director's discretion, the information is not necessary to develop a mitigation or restoration plan that addresses the impacts of the proposed action.

1. A written report identifying environmental goals and objectives of the restoration or compensation proposed, based on replacing or restoring the critical area and critical area buffer functions and values impacted by the proposal;

   See Section 7.0

2. Measurable specific criteria for evaluating whether or not the goals and objectives of the mitigation or restoration project have been successfully attained and whether or not the requirements of this part have been met; and

   See Section 7.0

3. Written specifications and descriptions of the restoration or mitigation proposed.

   See Section 7.0

   a. When the mitigation plan is submitted as a single-phase, or for the detailed plan phase when submitted in two phases, these written specifications shall be accompanied by detailed site diagrams, scaled cross sectional drawings, topographic maps showing slope percentage and final grade elevations, and any other drawings appropriate to show construction techniques or anticipated final outcome.

   b. When the mitigation plan is submitted in phases pursuant to subsection A of this section, the written specifications may be general in nature for the conceptual phase, including general identification of areas for work, planting species, size and number. The more precise details may be provided in the detailed plan phase. The planting plan will also comply with the City of Bellevue Utilities plant lists.

10.2 TIMING OF WORK - 20.25H.220.C

Unless a different time period is established in another section of this part, or is established by the Director in the approval for a specific project, all work required in a mitigation or restoration plan shall be completed prior to final inspection or issuance of a temporary certificate of occupancy or certificate of occupancy, as applicable, for the development.

The site will be restored through restoration of impacted areas, and a planting plan is included as part of the project design within the currently available Conceptual Mitigation Plan. See Section 7.0

10.3 MONITORING PROGRAM - 20.25H.220.D

The plan shall include a program for monitoring construction of the mitigation project and for assessing a completed project. The mitigation project shall be monitored for a period necessary to establish that performance standards have been met, but not for a period less than five years. The required monitoring period for a plan involving restoration only shall be reduced to a period of not less than three years.

The project involves restoration and enhancements and therefore will be monitored for a minimum period of three years.

10.4 CONTINGENCY PLANS - 20.25H.220.E

The mitigation plan shall include identification of potential courses of action, and any corrective measures to be taken if monitoring or evaluation indicates project performance standards are not being met and such failure would result in significant impact on the critical area or buffer. A plan involving restoration only is not required to include a contingency plan.

The project involves restoration and enhancements; therefore, a contingency plan is necessary and will be included in the final Mitigation Plan.

10.5 MITIGATION FOR CITY PARK PROJECTS- 20.25H.220.F

The Director may require assurance devices in compliance with LUC 20.40.490 to ensure that the approved mitigation, monitoring program, contingency plan and any conditions of approval are fully implemented.

The project is not part of a city park project.

10.6 RESTORATION FOR AREAS OF TEMPORARY DISTURBANCE- 20.25H.220.G

The Director may impose conditions for the restoration of areas of temporary disturbance included as part of an approved Critical Areas Land Use Permit or use or development allowed under LUC 20.25H.055, without requiring the restoration plan and other measures described in this section, so long as the following requirements are satisfied:

1. All areas of temporary disturbance shall be identified in the plans approved with the Critical Areas Land Use Permit or allowed use or development and shall be the minimum necessary to allow the completion of the approved use or development. For uses and development involving the repair or renovation of existing structures that can be accessed from non-critical area or critical area buffer, the minimum necessary area of temporary disturbance shall be no greater than 10 feet around the perimeter of the existing structure. Proposals involving areas of greater disturbance shall require a full restoration plan under this section. The Director may impose conditions requiring areas of temporary disturbance to be marked in the field using markers, fencing, or other means;
2. The condition of the areas of temporary disturbance existing prior to undertaking any development activity shall be documented with the proposal. The Director may require photographic evidence, site plans showing the size, location and type of existing vegetation, or other materials to document existing conditions;
3. The Director shall impose a condition that the area be restored to existing conditions prior to final approval of the work performed, or within 30 days following completion of the work if no final approval is required; and
4. The Director shall impose a condition requiring monitoring of the restored area and additional restoration to achieve existing conditions, consistent with subsection D of this section; provided, that the Director may reduce the monitoring period to not less than one year from completion of the original restoration. (Ord. 6417, 5-21-18, § 47; Ord. 5680, 6-26-06, § 3)

11.0 CONCLUSION

This report documents the presence of two regulated critical area on the project site, Richards Creek, which is a Type “F” designated stream and the habitat associated with species of local importance within Richards Creek. Due to the unavoidable impacts associated with the outfall replacement there will be in kind mitigation through restoration and enhancements to the Richards Creek streambed and riparian area. The project will have established windows under which in-water work can commence. Upon completion of the stream restoration project, the monitoring of the project will commence until approved after a minimum of three years.

12.0 REFERENCES

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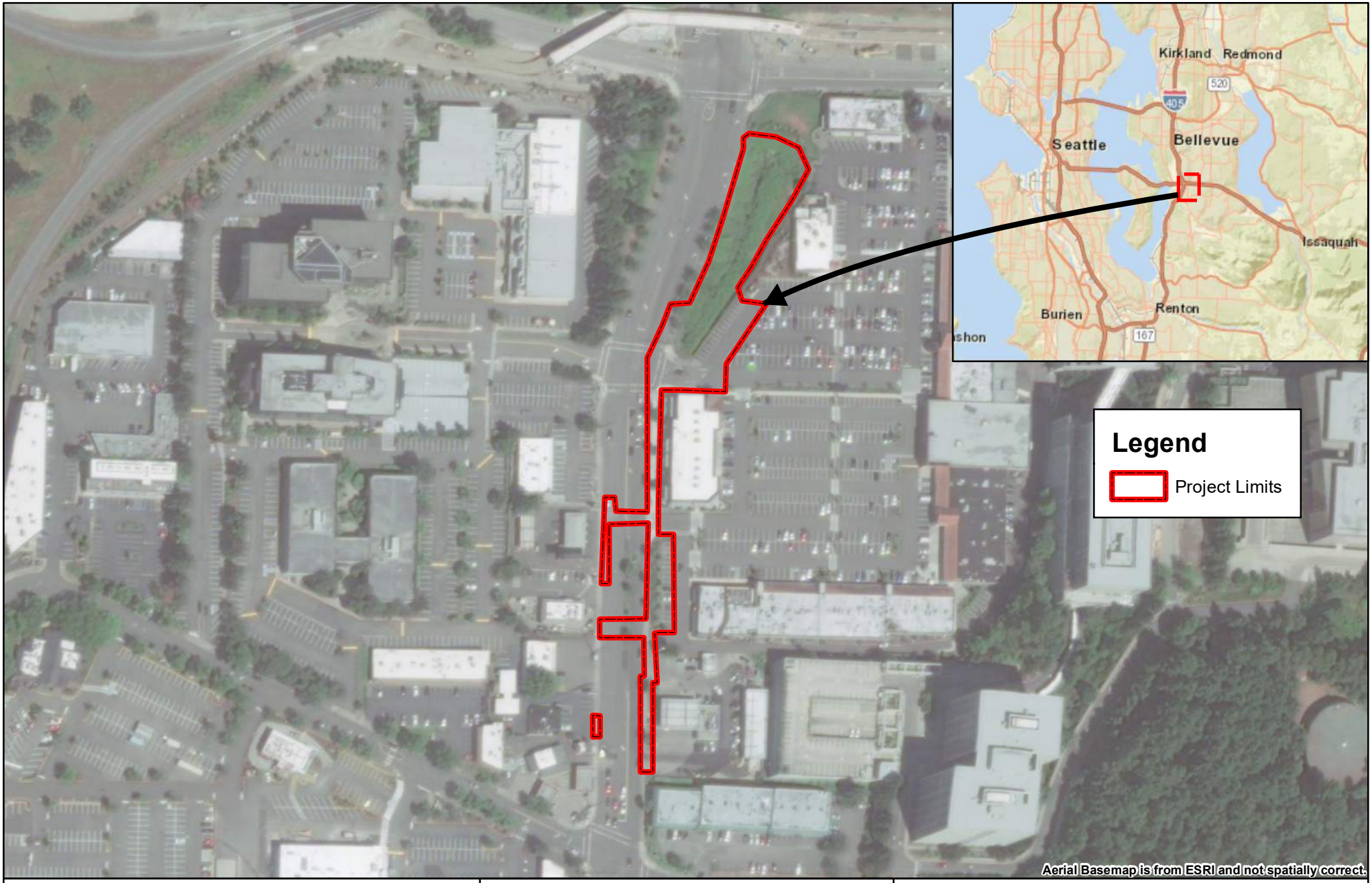
ATTACHMENT A

LIST OF FIGURES



Critical Areas Report

Project Name:
Factoria Stormwater Conveyance Improvement Project

In: City of Bellevue
At: 47°34'43.71"N 122°10'7.86"W
County of: King State of: Washington

Figure 1: Vicinity Map

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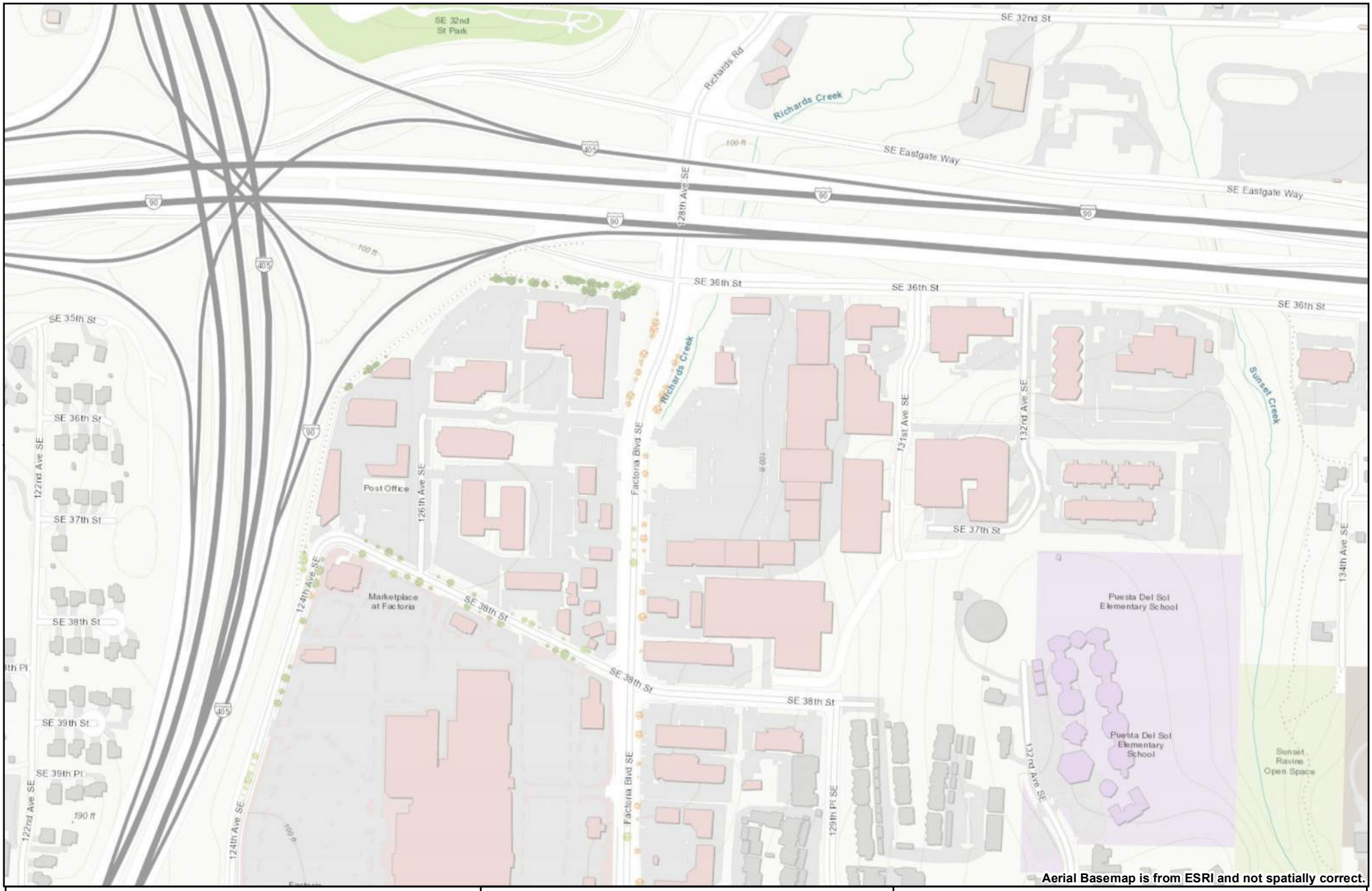
N

0 100 200 300 400 Feet



Aerial Basemap is from ESRI and not spatially correct.

Critical Areas Report

Project Name:
Factoria Stormwater Conveyance Improvement Project

In: City of Bellevue
At: 47°34'43.71"N 122°10'7.86"W
County of: King State of: Washington

Figure 2: Topographic Map

List of Figures: Figure 2 of 4

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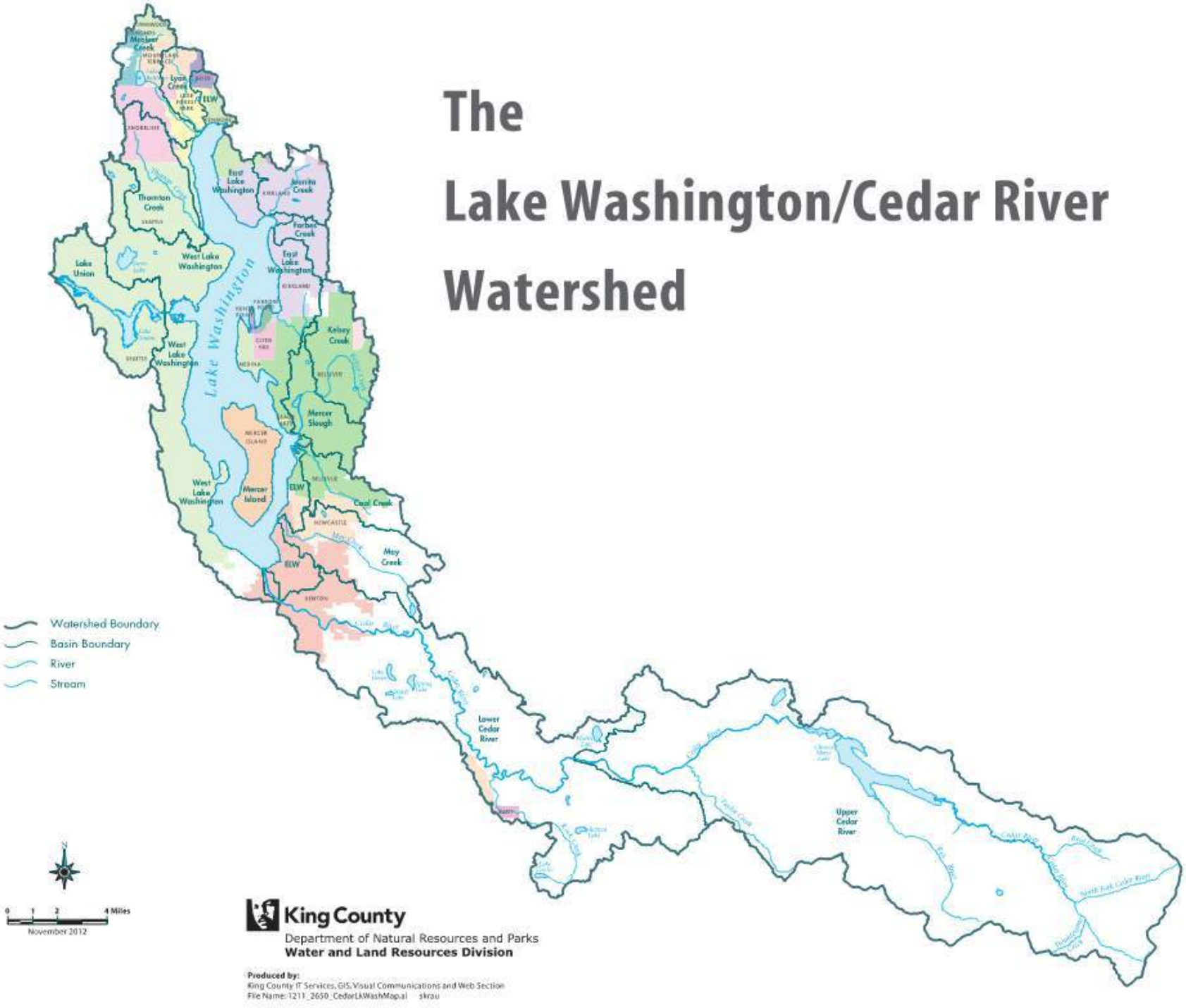
Figure 3: WRIA 8 Map



Critical Areas Report

Project Name:
Factoria Stormwater Conveyance Improvement Project

In: City of Bellevue
At: 47°34'43.71"N 122°10'7.86"W
County of: King State of: Washington

Figure 4: Critical Areas Overview

List of Figures: Figure 4 of 4

N

0 50 100 150 200 Feet

GEOTECHNICAL DESIGN REPORT

Factoria Boulevard Stormwater Conveyance Improvements Project

Prepared for: WSP, Tetra Tech, and City of Bellevue

Project No. 190545-B • October 7, 2021 DRAFT

earth + water

Aspect CONSULTING

GEOTECHNICAL DESIGN REPORT

Factoria Boulevard Stormwater Conveyance Improvements Project

Prepared for: WSP, Tetra Tech, and City of Bellevue

Project No. 190545-B • October 7, 2021 DRAFT

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1 Construction Monitoring Program

Acronyms

AASHTO	American Association of State Highway and Transportation Officials
ADT	average daily traffic
AMEC	AMEC Earth & Environmental, Inc.
ASCE	American Society of Civil Engineers
Aspect	Aspect Consulting, LLC
ASTM	ASTM International
BDM	Bridge Design Manual
BDS	Bridge Design Specifications
bgs	below ground surface
BMPs	best management practices
CIP	cast-in-place
CMP	corrugated metal pipe
CPT	cone penetration test
CRR	cyclic resistance rate
CSBC	crushed surfacing base course
CSR	cyclic stress ratio
CSTC	crushed surfacing top course
CSWGP	Construction Stormwater General Permit
CSZ	Cascadia Subduction Zone
ESAL	Equivalent Single Axle Load
FOG	Fats, Oils, and Grease
FS	Factor of Safety
ft/day	feet per day
gpm	gallons per minute
HMA	hot mix asphalt
IBC	International Building Code
KCIW	King County Industrial Waste

ksf	kips per square foot
lb/ft	pounds per foot
lb/in	pounds per inch
oz/sq yd	ounces per square yard
LRFD	Load Resistance Factor Design
MDD	maximum dry density
mg/L	milligrams per liter
µg/L	micrograms per liter
NAVD88	North American Vertical Datum 1988
OSHA	Occupation Safety and Health Administration
PBA	peak bedrock acceleration
pcf	pounds per cubic foot
pci	pounds per cubic inch
PGA	peak ground acceleration
PPV	peak particle velocity
psf	pounds per square foot
psi	pounds per square inch
QC	quality control
RSF	reinforced soil foundation
SFZ	Seattle fault zone
SN	structural number
SWL	static water level
Tetra Tech	Tetra Tech, Inc.
USGS	U.S. Geological Survey
VOC	volatile organic compound
WAC	Washington Administrative Code
WSDOT	Washington State Department of Transportation

1 Introduction

This report presents the results of a geotechnical engineering study performed by Aspect Consulting, LLC (Aspect) for the Factoria Boulevard Stormwater Conveyance Improvements project (Project). Our services were provided to support engineering design being performed by WSP and Tetra Tech, Inc. (Tetra Tech) for the City of Bellevue (City).

The Project is located in the Factoria neighborhood of Bellevue, Washington, along Factoria Boulevard SE (Factoria Blvd) between SE 38th Street to the south and SE 36th Street to the north (Site), as shown on Figures 1 and 2. The purpose of the Project is to replace the existing culvert storm conveyance beneath Factoria Blvd with a larger concrete box conveyance structure to reduce the risks of flooding in the Factoria-Richards Creek drainage basin. The Project will also involve modification of the Richards Creek Inlet channel (Inlet Channel).

This report summarizes the results of the completed field explorations by Aspect and others, and presents Aspect's geotechnical engineering conclusions and recommendations.

Aspect provided an Environmental Assessment Summary (Aspect, 2021), which evaluated the presence, likely presence, or potential for hazardous substances that could affect Project design and construction. This work has been prepared under separate cover.

1.1 Project Description

The existing stormwater conveyance culvert (existing culvert) that directs stormwater from the Factoria drainage basin under paved Factoria Blvd is a 63-inch-wide by 42-inch-tall, corrugated metal pipe (CMP) that extends approximately 770 feet across the Site. The existing culvert is located under the Factoria Blvd roadway and runs in the south-to-north direction. The depth to the invert level of the existing culvert is approximately 5.5 to 8 feet. We understand the existing culvert is undersized to accommodate flow from a 100-year flood event.

The existing culvert is proposed to be replaced with approximately 450 feet of a 9-foot-wide by 4-foot-tall concrete box conveyance structure and approximately 230 feet of two ductile iron (DI) pipes (one 24-inch diameter and one 30-inch diameter) that will accommodate 100-year flood-event flows. We understand the base of the new box conveyance structure will be placed at approximately Elevation 75 feet[1] along its alignment, which represents a depth of about 8 to 9 feet below the Factoria Blvd roadway. As discussed in detail herein, the northern portion of the new box conveyance structure will be supported by a reinforced soil foundation (RSF) to address weak

[1] Project vertical datum is North American Vertical Datum of 1988 (NAVD 88) and is the basis for references to "Elevations" contained herein.

foundation soils. The remainder of the structure will be supported on conventional bedding.

Additional improvements will be made to underground utilities within the Factoria Blvd right-of-way, including new storm-drain laterals, manholes, and a section of sanitary sewer. We understand that the storm-drain laterals will require similar excavation depths as the box conveyance structure. We also understand that a portion of existing sanitary sewer line will be replaced, and a portion will be cased, requiring a deeper trench excavation to approximately Elevation 68 feet, which represents a depth of about 15 feet below the Factoria Blvd roadway.

Improvements to the Inlet Channel are proposed along approximately 330 feet of its length before the creek enters a CMP at the northern end of the channel. Cast-in-place (CIP) concrete wing walls are proposed at the outfall of the box conveyance to the Inlet Channel, and vegetated rock walls will be installed downstream of the CIP concrete wing walls to accommodate grade changes from the regraded channel slope to the proposed in-channel floodplain benching. Reconstructed bank slopes within the Inlet Channel are proposed with inclination angles varying from 2H:1V (horizontal:vertical) to 5H:1V. The reconstructed creek bed will include streambed gravels.

For the purposes of this study, we assume that design and construction of the improvements will be in accordance with City Storm and Surface Water Engineering Standards (City of Bellevue, 2018) and the American Association of State Highway and Transportation Officials (AASHTO) *Bridge Design Specifications* (BDS; AASHTO, 2020) and/or Washington State Department of Transportation (WSDOT) *Bridge Design Manual* (BDM; WSDOT, 2020).

1.2 Purpose and Scope

The purpose of our services is to explore subsurface conditions along the project alignment and develop detailed geotechnical criteria and recommendations for final design of the project.

Our geotechnical engineering services were completed in accordance with Work Order No. 2, dated June 3, 2021, as Attachment A under Tetra Tech Professional Services Agreement No. A-SWOC364-03-21 between Tetra Tech and Aspect, dated March 4, 2021, and Amendment 1, which includes the scope of work for our subsurface investigation and has yet to be finalized as of October 1, 2021. As requested by the City, Aspect provided a scope and budget and received preliminary notice to proceed from the City on August 31, 2021, for the Subsurface Investigation task from the Amendment 1 scope of work. Aspect was also provided with preliminary notice to proceed from the City on October 5, 2021, for our Analysis and Design and Geotechnical Design Report subtasks under Task 330.1 from Amendment 1.

2 Site Conditions

Most of the Project is located within the right-of-way of Factoria Blvd. The alignment of the existing culvert extends about 700 feet from the intersection of Factoria Blvd and SE 38th Street north to the Inlet Channel. The Inlet Channel to Richards Creek extends about another 330 feet to the north until the creek enters an existing culvert south of SE 36th Street that runs beneath Interstate 90. North of SE 32nd Street, Richards Creek daylights and eventually flows through the Mercer Slough into Lake Washington. Figure 1 shows the general project location. The existing stormwater conveyance alignment and Inlet Channel are shown in relation to existing features on Figure 2.

This section presents the Site conditions, including geologic and seismic setting, Site-area topography, subsurface conditions, and aquifer characterization. This information provides context for the discussion of types and distribution of the geologic soil units, and a basis for anticipating the conditions that will be encountered during construction of the Project elements.

2.1 Topography

The Factoria Blvd roadway and the surrounding paved areas outside of the Inlet Channel are generally flat. The ground surface along Factoria Blvd slopes down gently to the north from SE 38th Street to the north driveway entrance to Factoria Village. Roadway surface elevations vary from about Elevation 91 feet at SE 38th Street to about Elevation 83 feet at the north driveway entrance.

The Inlet Channel varies from about 15 to 25 feet in depth. The side slopes of the channel are generally inclined at about 2H:1V. Topography at the Site is shown on Figure 2.

2.2 Surface Conditions

Surface conditions at the Site generally consist of an asphalt paved roadway over the existing culvert and other buried utilities. Commercial properties flank both sides of Factoria Blvd and the Inlet Channel. The Factoria Village shopping center (shown on Figure 2) is less than 15 feet east of the Project alignment and was constructed using a combination of spread footings on the east half of the building and pin pile-supported foundations on the west half, based on as-built drawings provided by WSP. The surface parking areas for the Factoria Village shopping center along the east side of Factoria Blvd are generally 4 feet above the level of Factoria Blvd.

Numerous underground and overhead utilities exist along the alignment. These include water supply, stormwater drainage, sanitary sewer, gas, petroleum product, communications, and power lines. Landscaped areas and sidewalks are present along both sides of Factoria Blvd. Low CIP concrete and segmental block retaining walls flank the sidewalk along the east side of Factoria Blvd.

The Inlet Channel is currently heavily vegetated with ivy and brambles growing along the banks of the creek. There are some areas of bare soil and exposed rip-rap revetment. An existing concrete retaining wall with a height ranging from 2 to 8 feet extends along the east side of Factoria Blvd and along the top of the west slope of the Inlet Channel. During

our Site investigation, we explored the soil conditions at the toe of the wall using hand tools and attempted to determine the depth to the footing. Due to the riprap at the toe of the wall, we were only able to advance our hand exploration to a depth of about 2.5 feet. We did not encounter the footing or the bottom of the wall at this depth; therefore, we assume the footing is at Elevation 79 feet or lower. We observed flowing water in the bottom of the Inlet Channel at the time we completed our field explorations (September 2021). Figure 2 shows relevant surface features at the Site.

2.3 Geologic Setting

The Puget Lowland is located within an area of repeated glaciations in a complex tectonic environment with active seismicity. Starting about 25 million years ago, the geologic evolution of western Washington has been dominated by the subduction of the Juan de Fuca oceanic plate beneath the North American continental plate. This convergence of plates has created the Puget Trough, which is flanked by the Olympic Mountains to the west and the Cascade Range to the east. The Project will be constructed within the Puget Trough. The Tertiary and Quaternary deposits in the Puget Trough are estimated to be up to 4 miles thick.

Northward-directed compression of the Puget Trough has resulted in formation of a chain of sedimentary basins that extend from the Chehalis area of Washington northward past the Canadian border. These sedimentary basins are separated by fold-and-thrust belts that occur as broad zones of active thrust faults, strike-slip faults, folds, and uplifted and deformed bedrock and sediments.

The Site lies within the Seattle fault zone (SFZ), the fold-and-thrust belt that divides the Seattle basin to the north from the Tacoma basin to the south. The broad area of uplifted and deformed strata associated with the SFZ is called the Seattle uplift, and the Site lies within this uplifted zone. Bedrock is shallow in much of the Seattle Uplift, and bedrock crops out at ground surface about 1 mile east of the Site.

The present-day land surface in the Project area reflects deposition of postglacial sediments that lie above glacial and nonglacial sediments that were deposited during the Quaternary Period (within the last 2.6 million years). These sediments lie above Oligocene (22 to 36 million years before present) Blakeley Formation sedimentary bedrock. Only the late Quaternary and Holocene (within the last 11,600 years) deposits are exposed in the Project area at ground surface or are present within relevant depths for the Project.

The Quaternary geologic history of the Puget Sound region is dominated by multiple continental glaciations and intervening interglacial periods. Many of the glacial and interglacial cycles appeared to have resulted from a similar sequence of events. Between periods of glaciation, depositional processes were similar to those of the predevelopment Puget Sound lowlands, with forested uplands separating broad river valleys with meandering low-energy rivers, floodplains, and wetlands. Deposits in the Site area associated with these interglacial climates are called nonglacial deposits and include sandy to gravelly river channel-bed deposits, silty to fine sandy floodplain deposits, silty to clayey lake deposits, and organic-rich wetland deposits.

During episodes of cooler mean global temperatures, continental ice sheets originating in Canada advanced southward covering much of the Puget Lowland with glacial ice over a mile thick in places, and up to about 3,000 feet thick in the Site area. Glacial ice and meltwater from the glaciers and glacially impounded Puget Lowland rivers deposited sequences of clayey and silty to sandy glaciolacustrine (glacial lake) deposits in glacially impounded areas, broad sheets of outwash sand and gravel, glacial tills and diamicts (poorly sorted deposits), and sandy to gravelly recessional outwash.

Much of the sculpting of the Site-area hills and carving of Puget Sound waterways, river valleys, and deeper lakes occurred during glaciations by subglacial meltwater flow that created deep channels cut into previously deposited soils. The deep channels and the hills between them were then smoothed by flowing ice to create the sculpted and fluted glacial drumlins that form the hills of Bellevue and the valleys between. Thus, the landscape of Bellevue and the Project area is a result of these repeated periods of deposition during interglacial periods, and glaciations. The hills contain accumulated sediments from multiple glacial and interglacial events, and the hills and valleys were scoured and sculpted by subglacial erosion into the elongate hills and ridges we see today.

Lake Washington is a product of this subglacial meltwater scour and erosion. The flanks of the hills above the lake were then modified by normal slope erosion processes, including landslides and incision by ravines and drainages from the uplands.

The Project area is in the southern portion of the Richards Creek drainage basin that collects water from Richards Creek and East Creek as they flow through hills of older glacial and nonglacial soils to Lake Washington.

The last phase of geologic development is associated with regional development. Logging of the uplands and slopes was followed by mining of coal in the headwaters of Coal Creek, and other development as the surrounding area grew. This regional development triggered increased runoff and stormwater flow into the Site area.

We reviewed published geologic information for the project area, which includes a United States Geological Survey (USGS) map, *Geologic Map of Surficial Deposits in the Seattle 30' by 60' Quadrangle, Washington* (Yount, et al., 1993). Along Factoria Blvd, fill deposits associated with past grading for the existing roadway, utilities, and adjacent urban development are underlain by soft, fine-grained alluvial deposits. The mapped surficial geologic unit in the Project area includes recessional outwash deposits (Qvr), which exist beneath the alluvial deposits. The recessional outwash is mapped along and adjacent to Factoria Blvd and consists primarily of loose to medium dense stratified sand and gravel with varying percentages of silt and clay.

2.4 Seismicity

The Site lies within an area of active tectonic forces associated with the interaction of tectonic plates, and subduction zone earthquakes. Earthquakes from these sources present the possibility of causing significant hazards, including ground shaking, liquefaction and subsequent effects, and surficial ground rupture. The SFZ is mapped as extending west to east across the northern part of the Inlet Channel.

2.5 Subsurface Conditions

Our interpretation of the subsurface conditions at the Site was developed based on the soil explorations completed at the Site, our understanding of the geologic setting, and our experience with other projects in the Factoria neighborhood and similar settings. The geologic soil units that comprise the Site subsurface are described in more detail in the sections below.

2.6 Subsurface Explorations

2.6.1 Previous Explorations

Multiple subsurface investigations were completed by others at the Site prior to the initiation of Aspect's involvement with the Project. Previous explorations reviewed for this report and used for geotechnical analyses include:

- Two soil borings with groundwater monitoring well installations, designated GEI 1-19 and GEI 3-19; one soil boring, designated GEI 2-19; and five hand-auger explorations, designated HA-1 through HA-5, completed by GeoEngineers Inc. (GeoEngineers) in 2019 (GeoEngineers, 2019)
- One soil boring, designated GEI I-2, completed by GeoEngineers in 2015.
- Three soil borings, designated AMEC B-6 through AMEC B-8, completed by AMEC Earth & Environmental, Inc. (AMEC) in 2001 (AMEC, 2001)
- Three soil borings, designated B-1 through B-3, completed by Terracon Consultants, Inc. (Terracon) in 2015 (Terracon, 2015)

The approximate locations of these previous on-Site explorations are shown on Figure 2. Boring logs created by others and utilized for our analyses are provided in Appendix A.

2.6.2 Cone Penetration Testing

Three cone penetration tests (CPTs) with occasional pore pressure dissipation testing, designated ACPT-01 through ACPT-03, were completed by Aspect in September 2021. The CPTs were completed by a subcontractor using a truck-mounted CPT rig. The explorations were observed full time by an Aspect geotechnical engineer who documented soil and groundwater conditions observed during the field work. A 2-inch-diameter PVC casing with a 0.01-inch slotted screen was temporarily installed in ACPT-02 to collect groundwater samples for analytical laboratory testing to support our dewatering discharge feasibility evaluation. The approximate locations of Aspect's explorations are shown on Figure 2. Summary logs created by ConeTec for the CPTs, and more detailed descriptions of the CPT methodology, are provided in Appendix B.

2.6.3 Soil Units

Along the Project alignment beneath the Factoria Blvd pavement surface, the Site is underlain by crushed rock base course, fill, alluvial deposits, and recessional outwash deposits. Within the Inlet Channel, the Site is underlain by a surficial layer of topsoil over fill and alluvial deposits to the depths explored. The soil units are described in more detail below.

Topsoil
A thin topsoil layer ranging from 8 to 12 inches thick mantles the ground surface within the inlet channel at the locations of hand-auger explorations HA-2 through HA-4.

Crushed Rock Base Course
A base course layer of crushed rock ranging from approximately 3 to 12 inches thick was encountered below the asphalt pavement surfacing of Factoria Blvd.

Fill
Fill was observed in most of the subsurface explorations underlying either a surficial layer of topsoil or crushed rock base course. The fill was generally observed to consist of overlying loose to medium dense sand, sand with silt, and silty sand with gravel to a depth of up to 10 feet below ground surface (bgs). Fill associated with existing underground utilities is also present along the Project alignment. The composition and degree of compaction of the existing utility trench bedding and backfill could vary widely, and caving of these materials could occur during trench excavation for the Project, particularly if the soils are saturated. It has been a practice in the past to backfill around utility structures and pipes with pea gravel, which typically becomes saturated and tends to flow when encountered in excavations. We anticipate fill thickness will be greatest near the existing culvert and sanitary sewer main.

The fill exhibits relatively low shear strength, moderate elastic compressibility characteristics, and is moisture sensitive, meaning that the soil would be difficult to grade and compact in a wet condition.

Alluvial Deposits
Alluvial deposits were encountered below the fill in the CPTs, borings, and in several of the hand-auger holes. These deposits consist of soft to medium stiff silt and clay, and occasional thin layers of loose to medium dense silty sand. The alluvial deposits extend up to a depth of about 16 feet bgs near the northern extent of the Project and about 10 feet bgs near the southern extent. The proposed trench excavation is expected to extend beneath the alluvium in the southern and central portion of the Project alignment, but will terminate within the alluvial deposits in the northern portion of the alignment.

In general, the alluvial deposits exhibit very low shear strength and high compressibility potential under new loads. The silt and clay materials with moderate to high plasticity within this unit are not considered susceptible to liquefaction during a strong seismic event. The thin layers of loose silty sand that are below the groundwater level are susceptible to liquefaction during a strong seismic event. The alluvial deposits are moisture sensitive.

Recessional Outwash Deposits
Recessional outwash deposits were encountered below the alluvial deposits and generally consist of medium dense to dense sand, silty sand, and gravelly sand. The recessional outwash deposits extend to the depths explored. The proposed trench excavation is expected to terminate within the recessional outwash deposits in the southern portion of the Project alignment.

Recessional outwash deposits were deposited by glacial meltwaters and have not been fully glacially overridden, although some deposits have experienced moderate ice loading resulting in a medium dense to dense material state. The recessional outwash deposits exhibit moderate shear strength, moderate permeability, and low compressibility.

2.6.4 Groundwater

Groundwater levels were observed and recorded at time of drilling in Aspect's CPTs and in the previous soil borings completed by others. The groundwater conditions observed during CPT advancement, soil boring drilling, and hand-auger excavation are presented on the exploration logs. Groundwater conditions observed while completing subsurface explorations represent a short-term condition and may not necessarily be representative of the long-term groundwater conditions at the Site.

Static groundwater levels have been monitored by Aspect beginning in June 2021 in the existing monitoring wells (GEI 1-19 and GEI 3-19). In September 2021, when groundwater levels would be at or near the seasonal low, the depth to water was measured at about 8.5 feet in both wells, which corresponds to approximately Elevation 78.5 feet. Similar measurements were made by GeoEngineers in August and October 2019. Groundwater monitoring will continue through the winter of 2021–2022 when groundwater levels would be expected to be at or near the seasonal high. Based on the currently available groundwater measurements, we have assumed a design static groundwater level equal to Elevation 80 feet, compared to the anticipated bottom of the trench excavations at Elevation 68 to 73 feet. We expect the trench excavations will encounter groundwater and saturated soil at a depth of about 3 to 5 feet below the existing roadway surface along Factoria Blvd. We expect groundwater levels to fluctuate seasonally with precipitation and the level of the water in the Inlet Channel. In addition, groundwater may be present within the backfill and bedding materials for existing utilities along the Project alignment and may be encountered during trench excavation for this Project.

2.7 Hydrogeologic Testing

The following section documents the hydrogeologic field testing and analyses completed for the Project to estimate potential groundwater inflows and dewatering requirements to support the installation of the box conveyance structure and sanitary sewer lines beneath Factoria Blvd. The planned improvements will require trench excavation that extends beneath the water table and will therefore require a dewatering assessment to evaluate the need for potential dewatering solutions. Preliminary dewatering considerations and recommendations are presented below in Section 3.6.

Details of the hydrogeologic testing are as follows.

2.7.1 Field Testing

Hydrogeologic field testing consisting of slug tests was performed by an Aspect field representative at the two existing groundwater monitoring wells that were installed by GeoEngineers in 2019 (GeoEngineers, 2019). Monitoring well GEI 1-19 is located near the north end of the Project alignment and GEI 3-19 is located approximately 415 feet to the south (See Figure 2).

Both monitoring wells are screened across the shallow aquifer with variable thicknesses of clay, silt, sand, and silty sand, interpreted to be present as alluvial and recessional outwash deposits. Clay makes up approximately half of each well screen interval; therefore, the slug test results will represent a bulk rate, including the clay and silty sand units. Since the clay unit is noted in both wells it is assumed to extend across the entire Project area. In addition, the sandpack in GEI 3-19 is constructed to extend down into a sand unit below the bottom of the screen and likely impacts the slug test results at this well.

Slug tests involve rapidly changing the water level within a well and then measuring the rate of return to the static water level (SWL). The water level data are used to calculate the hydraulic conductivity of the water-bearing zone in the vicinity of the well screen using standardized analytical procedures. Testing procedures and results are summarized below.

Procedures

Prior to completing the slug tests, both monitoring wells were redeveloped by Aspect using surging and pumping techniques to ensure the test results were representative of groundwater conditions and not biased by sedimentation or clogging in the well screen or surrounding gravel pack. Redevelopment was determined to be necessary because turbid water was observed during environmental sampling at the wells and there is no available information on well development procedures after well construction.

A slug rod (a solid cylinder of known volume) was used to perform the slug tests. During the falling head test, the slug rod was rapidly submerged in the water, causing the water level to rise rapidly before falling back to the SWL over time. Upon completion of the falling head test, a rising head test was performed by rapidly removing the slug rod from the water, causing the water level to rapidly fall before rising back to the SWL over time. To test the results for dependency on hydraulic head, the rising and falling head tests were performed with two slug rods of different volumes (i.e., lengths) in each well.

The water levels in the wells during testing were measured using a vented pressure transducer (15 pounds per square inch [psi] range) and collected electronically on a data logger set to a nearly continuous time interval (1 second or less). Manual water level measurements were also collected using a sounding tape to confirm depth to water.

Results

After reviewing the slug test data, the Bouwer and Rice (1976) method was selected to estimate the hydraulic conductivity (K). The testing and analyses produced similar results at each well, but the results were variable between the wells. The geometrical averages indicate a K value of 2 feet per day (ft/day) at GEI-1-19 and 49 ft/day at GEI-3-19. The higher K value estimate in GEI-3-19 is likely due to the screen and sandpack exposure to higher conductivity soils. Therefore, these estimates are consistent with the soils described in the well logs.

Table 1 summarizes the well parameters, resulting K estimates, and geometrical averages for each well. The test data are shown on Figures 4 and 5.

3 Conclusions and Recommendations

3.1 General

Based on the results of our explorations, review of previous explorations by others, hydrogeologic field testing, and environmental laboratory testing, our geotechnical and hydrogeologic analyses, and our previous experience with similar subsurface conditions in the Bellevue area, we conclude the Project can be successfully completed as proposed, provided the considerations presented in this report are incorporated into project planning, design, and construction.

Seismic design considerations are presented in Section 3.2. General recommendations for Site preparation are presented in Section 3.3. Loose and soft soils and groundwater seepage will be encountered in the trench excavations for the new stormwater box conveyance and other utilities. Temporary shoring and active dewatering should be incorporated into the design documents to control seepage and protect adjacent structures during construction. Recommendations for trench excavations and temporary shoring are presented in Sections 3.4 and 3.5, respectively. A preliminary assessment of dewatering construction requirements and considerations for the future detailed dewatering design by the Contractor are presented in Section 3.6.

The proposed box conveyance structure will impose additional load onto the soils below, requiring special design and construction considerations where compressible alluvial soil deposits exist below the structure. Otherwise, introduction of additional loading would likely result in excessive settlement of the box conveyance, the roadway above, and potentially nearby utilities. Section 3.7 presents estimated postconstruction settlements and suggested mitigation measures using an RSF below the northern portion of the box conveyance. Section 3.7 also presents recommendations for subgrade preparation, general foundation support, and lateral design of walls for the box conveyance structure.

Recommendations for general pipe support, conventional CIP walls at the outfall, and vegetated rock walls within the Inlet Channel are presented in Sections 3.8, 3.10, and 3.11, respectively. Project-specific recommendations and construction considerations for general Site earthwork are presented in Section 3.12. Recommendations for structural fill materials, pavement design, and corrosion potential are presented in Sections 3.13, 3.14, and 3.15, respectively.

3.2 Seismic Design Considerations

The Site is located within the Puget Lowland physiographic province, an area of active seismicity that is subject to earthquakes on shallow crustal faults and deeper subduction zone earthquakes. The Site area lies close to the SFZ, which consists of shallow crustal tectonic structures that are considered active (evidence for movement within the Holocene [since about 15,000 years ago]) and is believed to be capable of producing earthquakes of magnitude 7.3 or greater. The recurrence interval of earthquakes on this fault zone is believed to be on the order of 1,000 years or more. The most recent large earthquake on the Seattle fault occurred about 1,100 years ago (Pratt et al., 2015). There are also several other shallow crustal faults in the region capable of producing earthquakes and strong ground shaking.

The Site area also lies within the zone of strong ground shaking from earthquakes associated with the Cascadia Subduction Zone (CSZ). Subduction-zone earthquakes occur due to rupture between the subducting oceanic plate and the overlying continental plate. The CSZ can produce earthquakes up to magnitude 9.3 and the recurrence interval is thought to be on the order of about 500 years. A recent study estimates the most recent subduction zone earthquake occurred around 1700 (Atwater et al., 2015).

Deep intraslab earthquakes, which occur from tensional rupture of the sinking oceanic plate, are also associated with the CSZ. An example of this type of seismicity is the 2001 Nisqually earthquake. Deep intraslab earthquakes typically are magnitude 7.5 or less and occur approximately every 10 to 30 years.

The following sections present descriptions of seismic design considerations for the Project.

3.2.1 Ground Response

Seismic design for the Project will be in accordance with the 2020 AASHTO BDS. The AASHTO BDS response spectra for design are based on local seismicity and Site soil conditions. The seismicity is represented by the peak bedrock acceleration (PBA) based on established seismic risk models. The 7 percent probability of exceedance in the 75-year design event (approximately 1,000-year recurrence interval) is the design seismic event for this Project.

The effects of Site-specific subsurface conditions on the design ground motion at the ground surface are determined based on the “Site Class.” The Site Class can be correlated to the average standard penetration resistance (N-value), average shear wave velocity, or average undrained strength (for fine-grained soils) in the upper 100 feet of the soil profile. Based on the average N-value from the available subsurface explorations, we conclude the Site soil profile can be classified as Site Class D (Stiff Soil).

The design spectral response acceleration parameters adjusted for Site Class D in accordance with the 2020 AASHTO BDS and 2020 WSDOT BDM are presented in Table 2.

Table 2. Seismic Design Parameters

Design Parameter	Recommended Value
Site Class	D
Peak Ground Acceleration (PGA)	0.421[(1)]
Short Period Spectral Acceleration (S_s)	0.956g
1-Second Period Spectral Acceleration (S_1)	0.277g
Site Coefficient (F_a)	1.117
Site Coefficient (F_v)	2.046
Design Short Period Spectral Acceleration (S_{DS})	1.069g
Design 1-Second Period Spectral Acceleration (S_{D1})	0.567g

Notes:

1. g = gravitational force
   Based on the latitude and longitude of the Site: 47.577326°N, 122.169204°W, World Geodetic System 1984 (WGS84).
   The risk category used was II.

   Based on the American Society of Civil Engineers (ASCE) hazard tool (ASCE, 2018) or Based on the Spectra ground motion software tool in the BridgeLink BEToolbox application using USGS 2014 Seismic hazard maps (USGS, 2014).

3.2.2 Surficial Ground Rupture

A trace of an east-west trending thrust fault zone (SFZ) projects through Bellevue, with the nearest fault trace mapped as extending west to east across the northern part of the Inlet Channel within the Site, according to the City of Bellevue Critical Hazard Map. The SFZ is a 2- to 4-mile-wide, east-west trending zone consisting of at least three fault splays. The Seattle Fault is a south-dipping reverse thrust fault and is believed to have last ruptured about 1,100 years ago. This most recent event caused broad uplift and subsidence on both sides of the fault.

Due to the suspected long recurrence interval and thickness of the sediments below the Site, the potential for surficial ground rupture at the Site is considered low during the expected life of the Project.

3.2.3 Liquefaction

Liquefaction occurs when loose, saturated, and relatively cohesionless soil deposits develop high pore water pressure, temporarily lose shear strength, and undergo matrix rearrangement due to seismic shaking. This strength loss is followed by a reduction in bulk volume of the liquefied soils. The effects of liquefaction can include the loss of bearing capacity below foundations, settlement in level ground, large horizontal deformations of relatively level ground with an unconfined vertical face (referred to as lateral spreading) and instability in areas of sloping ground (also known as flow sliding).

The primary factors controlling the onset of liquefaction include intensity and duration of strong ground motion, characteristics of subsurface soil, *in situ* stress conditions, and the depth to groundwater. The procedure for evaluating liquefaction potential is empirical and is based on data and observations at sites that have, and have not, liquefied during an earthquake. In the procedure, the capacity of the soil to resist liquefaction is expressed as the cyclic resistance ratio (CRR). The seismic demand is a function of the anticipated peak ground acceleration (PGA) at the Site and is termed the cyclic stress ratio (CSR). The potential for liquefaction was assessed at each sample (or CPT measurement interval) depth in terms of a Factor of Safety (FS). This FS is defined as the CRR divided by the CSR generated by the design ground motion. A potential for liquefaction was interpreted to exist at each subsurface layer where the FS against liquefaction is less than 1.1. Settlement in each layer where the FS was less than 1.1 was then calculated using empirical correlations of the liquefaction potential to volumetric strain.

Liquefaction evaluations were conducted using CLiq, a liquefaction analysis software program for CPTs developed by GeoLogismiki, in collaboration with Gregg Drilling and Dr. Peter Robertson. The software uses the tip resistance and sleeve friction obtained from the CPT soundings to interpret soil type, relative density/consistency, and other properties to calculate the FS against liquefaction and assess secondary effects. The CLiq program uses the updated procedures in Boulanger and Idriss (2014) for liquefaction triggering and the calibrated procedures for estimating liquefaction-induced ground settlement by Zhang et al., (2002).

The liquefaction evaluations are based on data collected from the three CPTs Aspect completed at the Site. We evaluated liquefaction potential based on the design event summarized above. The analysis results generally indicate thin (less than 1-foot-thick) layers of saturated alluvial silty sands are potentially susceptible to liquefaction during the design seismic event. Much of the alluvial deposits are expected to exhibit clay-like behavior under seismic loading and should not be susceptible to liquefaction. ACPT-01 and ACPT-02 both contain an approximately 3-foot-thick layer of liquefiable material; however, this layer is entirely within the depths to be excavated and replaced by the proposed trenching for the box conveyance.

Based on the subsurface soil and groundwater conditions encountered in the explorations, and our liquefaction analyses, there is a low to moderate risk of the stormwater conveyance improvements experiencing impacts from liquefaction during the design seismic event. We estimate between 0.5 and 1 inch of ground settlement below the box conveyance may occur due to liquefaction in the alluvial deposits and recessional outwash deposits. The proposed RSF and 12-inch-thick crushed rock or permeable ballast layer that are recommended to be placed below the box conveyance structure in the north and south, respectively, will help mitigate differential settlements resulting from liquefaction.

3.3 Site Preparation

The existing fill and native soils contain a significant percentage of fines (particles passing the U.S. Standard No. 200 sieve) and are highly moisture sensitive and susceptible to disturbance, especially when wet. Ideally, site preparation, earthwork, and

pipe/box conveyance structure installation should be undertaken during extended periods of dry weather (June through September) when the surficial soils will be less susceptible to disturbance and provide better support for construction equipment. Also, seepage quantities in excavations and the channel flow will be lower, and, therefore, easier to handle.

3.3.1 Erosion and Sediment Control

Temporary erosion control measures should be implemented to prevent the migration of soil, dust, and turbid water off the Site or into stormwater systems. Although the erosion potential for soils within the trench excavations is relatively low, the erosion potential for exposed soils on the slopes of the Inlet Channel is high. Temporary erosion control measures should include:

- Scheduling grading activities to reduce soil exposure.
- Retaining existing surfacing for as long as possible.
- Directing surface runoff away from cleared areas and exposed soils.
- Minimizing the length and steepness of slopes with exposed soils.
- Installing silt fences at the Site boundary to contain sediment within the Site.
- Installing straw wattles (or similar) on slopes to reduce runoff velocities.
- Installing silt sock inserts in nearby catch basins.
- Wetting exposed soil during dry periods.
- Placing quarry spalls, rumble pads, and/or wheel wash stations at truck and equipment exits.
- Regular cleaning of adjacent paved areas.

Vegetation should be established on newly constructed slopes as soon as possible after completion of grading. Temporary covering, such as plastic sheeting, flash coating, tarps, or erosion-control blankets could be used to temporarily protect the slopes during periods of heavy rainfall.

Permanent erosion protection should primarily be provided by reestablishing vegetation. Final grading should be completed in a manner that will avoid concentrated runoff onto unprotected slopes. Surface water should be diverted away from the top of slopes.

Until permanent erosion protection is established, and the Site is stabilized, erosion control monitoring should be performed by qualified personnel to evaluate the effectiveness of the erosion control measures and repair and/or modify them as appropriate. Erosion and sedimentation control measures should be installed and maintained in accordance with the requirements of the City.

3.3.2 Clearing and Grubbing

Project construction will require removal of existing pavement and sidewalks along the storm conveyance alignment and removal of vegetation within the Inlet Channel. Existing underground utilities within the new pipe and box conveyance structure alignment will

need to be removed or relocated. Construction of the outfall wing walls, vegetated rock walls, and channel improvements will require clearing, grubbing, and stripping.

Graded areas should be stripped of topsoil and other surficial organic soils. Based on the hand-auger explorations in the Inlet Channel, we estimate the depth of stripping will typically be about 12 inches, although greater depths of stripping might be required locally where the vegetation root system is thicker.

Topsoil removed during stripping can be stockpiled and used later for landscaping purposes or may be spread over disturbed areas following completion of grading. If spread out, the topsoil should not be placed more than 1 foot in thickness, should not be placed on slopes greater than 3H:1V, and should be track rolled to a uniformly compacted condition. Materials that cannot be used for landscaping or protection of disturbed areas should be removed from the Site.

3.4 Trench Excavations

Excavation along the Project alignment will include trenching to construct the pipe and box conveyance structure segments and related structures. A trench box, slide rail system, or other type of shoring will be needed for the required excavation depth of the new box conveyance structure, as described in Section 3.5 below. All excavations should be fully dewatered. It will likely be necessary to provide temporary support of adjacent utilities during excavation for the new box conveyance structure segments.

The trenching and related structure excavations will likely encounter fill and bedding soils related to existing underground utilities where they cross or closely parallel the Project alignment. The degree of compaction of existing utility trench backfill and pipe bedding materials could vary widely, and some caving could and should be expected to occur where these materials are encountered.

3.5 Temporary Shoring

Based on the proposed design and excavation depths for the box conveyance structure, temporary shoring for the trench excavations will be required. Depending on actual excavation depths, we anticipate the temporary shoring will consist of conventional shoring methods, such as trench boxes, a braced system, or a slide rail system.

In general, temporary shoring lateral deflections should be kept to less than 1 inch to avoid adverse impacts to adjacent structures, utilities, and sidewalks. Currently, based on our understanding of the Site conditions, we consider a slide rail system to be the most feasible shoring system for the Project.

A slide rail system is constructed by installing vertical steel piles and then placing steel sheets between the piles that slide downward as the trench is excavated. The space behind the steel sheeting should be filled with soil as soon as practicable, at least within the same day as excavation. Placement of the backfill material will help reduce the risk of voids developing behind the shoring and will reduce movement and settlement behind the shoring wall. If voids develop behind the steel sheeting, they should be backfilled immediately with controlled-density fill or lean concrete. Material used as backfill in voids located behind the steel sheeting should not cause buildup of hydrostatic pressure

behind the shoring wall. A suitable drainage system should be installed to prevent the buildup of hydrostatic groundwater pressures behind the shoring wall.

Ground vibrations associated with installation of temporary shoring should be evaluated for potential impact to nearby existing structures such as store buildings within Factoria Village. Vibrations could be caused, for example, by impact or vibratory driving of slide rail panels or steel piles. Refer to Attachment 1 for additional vibration monitoring details.

Design and construction recommendations for the temporary shoring system are presented below. Aspect should be on the Site to observe and document the installation of the temporary shoring system to verify conformance with the design assumptions and recommendations.

3.5.1 Lateral Pressures for Shoring Walls

A temporary shoring wall system must be designed to resist lateral forces exerted by retained soil and other surcharges imposed on the wall from traffic, equipment, or stockpiles. Lateral load resistance can be mobilized using braces, tiebacks, anchor blocks, and passive pressure on members extending below the bottom of the excavation. Temporary shoring used to support trench excavations typically includes internal bracing, such as hydraulic shoring or trench boxes. Seismic earth pressures are not included in temporary shoring wall design.

Lateral earth pressures for the design of the shoring walls depend on the wall's ability to deform and proximity to settlement-sensitive elements (roads, utilities, and structures). If the top of the wall is allowed to yield on the order of approximately 0.001H, where H is the retained height, the wall may be designed for active earth pressures. Alternatively, if the wall stiffness does not allow lateral deformation, or if settlement-sensitive elements are located within the zone of potential movement, then the walls should be designed using at-rest earth pressures.

In developing earth pressures for all temporary shoring walls for the Site, we make the following additional assumptions and recommendations:

- The temporary shoring should be design according to the earth pressure diagram presented on Figure 6 and the recommendations below.
- The maximum exposed temporary shoring wall height will be approximately 11 feet for the box conveyance trench excavation and 15 feet for the sanitary sewer trench excavation.
- The shoring walls will yield slightly to invoke an active earth pressure condition.
- A generally level backslope will exist behind the shoring wall.
- A traffic surcharge to account for street loads, small equipment, and small material stockpiles should be added to the earth pressure distributions. See Figure 8 for recommended methodologies for determining lateral surcharge pressures from other loads such as heavy mobile cranes, and/ or construction equipment.

We recommend yielding shoring walls retaining loose to medium-dense fill and native soils be designed using an equivalent fluid density of 40 pounds per cubic foot (pcf) for horizontal ground surfaces in accordance with Figure 6. For nonyielding (braced) systems, we recommend the shoring be designed for a uniform lateral pressure of 30H in pounds per square foot (psf), where H is the depth of the planned excavation in feet below a level ground surface. These values assume the ground behind the shoring has been dewatered such that the groundwater level is at or slightly below the base of the excavation.

The above lateral soil pressures do not include traffic, structure or typical construction surcharges that should be added separately, if appropriate. Shoring should be designed for a traffic influence equal to a uniform lateral pressure of 85 psf acting over the depth of the trench. For a construction vertical surcharge load of 500 psf, a uniform lateral pressure of 165 psf should be used. More conservative pressure values should be used if the designer deems them appropriate. Other surcharge loads, such as cranes, construction equipment or construction staging areas, should be considered on a case-by-case basis in accordance with the recommendations presented on Figure 8, Recommended Surcharge Pressure.

The steel sheet lagging for the slide rail system should be designed for the full lateral earth pressure provided on Figure 6, and any adjacent surcharge loads evaluated using Figure 8.

3.5.2 Excavation and Temporary Shoring Monitoring

Excavation and temporary shoring performance should be monitored by implementing a monitoring program consisting of a preconstruction survey before excavation to document preexisting cracks, and frequent readings of optical survey points to measure horizontal and vertical movements of the shoring, surrounding streets, adjacent buildings, and utilities during construction. Locations of the survey points should be established once the final shoring design is complete. Refer to Attachment 1 for additional shoring monitoring details. The Contractor should develop a construction monitoring plan based on our recommendations and the details provided in Attachment 1. The geotechnical engineer should review the monitoring plan and resulting data in coordination with appropriate members of the design team.

3.6 Dewatering Considerations

Installation of the proposed below-ground improvements will involve excavating below groundwater, with anticipated excavation depths up to 15 feet. This excavation will require construction dewatering to control groundwater inflow, reduce instability and erosion of the side slopes, and reduce hydrostatic pressures and subgrade instability at the base of the excavation.

The dewatering effort required for the Project will depend upon magnitude of groundwater inflow, the dewatering method, the size of the excavation and the time of year during which construction is completed. We anticipate the groundwater level could vary throughout the seasons of the year. In addition, groundwater may be present within the backfill and bedding materials for existing utilities along the project alignment and may be encountered during box conveyance structure and pipe trench excavation. We

recommend construction be completed in the late summer or early fall months when the groundwater level is typically at its lowest elevation.

We recommend the Project specifications require the Contractor to submit a dewatering plan prepared by a Washington State-licensed Hydrogeologist for review by the design team. The information provided below is for use by the owner and the design team and should not be interpreted to mean Aspect is assuming responsibility for the Contractor/owner's dewatering design, actions, or site safety.

3.6.1 Preliminary Assessment of Dewatering Requirements

Aspect recently completed a preliminary dewatering evaluation to assess likely rates of groundwater inflow and to support selection and design of appropriate dewatering methods during construction. This evaluation relied on the aquifer hydraulic parameters estimated from slug tests completed in existing monitoring wells on the Site. Refer to Section 2.7 for a detailed description of the hydrogeologic testing.

The rate of groundwater inflow into the excavation is directly proportional to the aquifer properties,[2] and temporary construction dewatering is a function of the groundwater inflows and the amount of groundwater drawdown required to facilitate construction.

Preliminary estimates of construction dewatering requirements were developed using analytical groundwater inflow model (Powers, 1992) and a wellfield drawdown interference model that is based on the Theis solution (Theis, 1935). Groundwater inflow rates were approximated by applying a combination of two analytical approaches: the Unconfined Flow to a Drainage Trench approach outlined in Powers (1992) for horizontal flow through the excavation face, and the plug flow equation derived from Darcy's Law to account for vertical flow through the floor of the trench.

Based on preliminary design drawings provided by WSP, we understand the maximum trench excavation depth for the box conveyance is to an elevation of about 72 feet within the RSF Area. The following assumptions were made to facilitate the predictions:

- Design groundwater elevation of at 80 feet based on static water levels measured at 78.5 feet in July 2021 (see section below for additional discussion on static water levels).
- We understand the stormwater excavations will extend to approximately Elevation 72 feet, resulting in a target water level elevation during excavation/construction of approximately 70 feet (2 feet below the bottom of the excavation). A drawdown requirement of approximately 9 feet (from the static water level of 80 feet) was assumed for the stormwater trench excavations.
- We understand that another trench will be excavated deeper, to an elevation of approximately 68 feet, to case an existing sanitary sewer line and install a section of new pipe, resulting in a target water level elevation of 66 feet. A drawdown requirement of approximately 13 feet was assumed for the sanitary sewer trench excavation.

[2] Horizontal transmissivity determined from the hydraulic conductivity estimates from the slug testing and the length of saturated well screen. A storage coefficient of 0.2 was assumed.

- A flat water table (i.e., no gradient) at a conservative design elevation was assumed, since there is limited available data for this parameter.

Based on these assumptions, the estimated dewatering requirement for the main trunk and lateral excavation under steady-state conditions range from about 0.2 to 0.4 gallons per minute (gpm) per foot of open trench. We recommend assuming a conservative excavation inflow rate of up to 0.5 gpm per foot for drainage conditions along the trench excavation, and laterals including the sanitary sewer line. This estimate incorporates a factor of safety to account for variability in Site conditions, including uncertainty with respect to seasonal fluctuations in groundwater elevations and potential variability in soil permeability across the Site.

In addition to using temporary sumps and submersible pumps (as deemed necessary by the Contractor), dewatering can be managed by a combination of mitigation techniques:

- Excavating the main trunk and lateral trenches in phases to reduce the size of the excavation open at one time and reduce the total inflow of groundwater, and/or
- Installing a series of vacuum-assist well-points along the alignment to draw the groundwater down to 2 feet below the base of excavation.

Based on our understanding of the hydrogeologic conditions, we recommend the Contractor would propose to mitigate groundwater inflow into the box conveyance trench using a system of vacuum well-points along the shoring wall. In addition, the Contractor may choose to supplement the well-points and/or temporarily dewater shallow excavations using localized sump pumping within the trench excavations. Sumps should be designed to produce discharge that is free of sediment or high levels of turbidity. Using a “trash pump” directly in the excavation (open sumping) to remove groundwater typically mobilizes sediment, produces very turbid discharge, and should be prohibited. Discharge from the temporary dewatering system should be collected and disposed of in accordance with discharge permit requirements as described below in Section 3.6.2.

Construction dewatering, and the design of the dewatering system, should be the responsibility of the Contractor. The Contractor should be required to use the services of a Washington State-licensed Hydrogeologist experienced in the design and construction of dewatering systems. Aspect assumes no liability in the performance of the Contractor’s final construction dewatering design.

Uncertainties

While no wet-season groundwater maximum level has been recorded at the Site, the observed groundwater elevation at the Property was at 78.5 feet in July 2021.

The estimate discussed above assumes a design groundwater elevation of 80 feet; however, seasonal groundwater levels could rise during the wet season, which would increase groundwater flow into the excavation. Also, the estimate does not account for potential stormwater (from precipitation) entering the excavation.

The bulk of the water production is expected to be from the silty sand soils, with minimal production from finer-grained silt or clay layers. The bulk permeability of the soil was only estimated at two wells near the planned excavation and may vary across the Site. If

coarser deposits along the portions of alignment are present, this could also increase groundwater flow into the excavation.

3.6.2 Water Management

Sources of water to be managed include the excavation dewatering system and stormwater generated within the Project Site. The point of discharge can be to the sanitary sewer under a King County Industrial Waste (KCIW) Wastewater Discharge Authorization, if approved by KCIW and the local sewer authority (City), or to surface water via stormwater infrastructure. Discharging to surface water requires coverage under a construction stormwater general permit (CSWGP) obtained from the Washington State Department of Ecology (Ecology) if the clearing, grading, and/or excavating results in the disturbance of one or more acres, or if Ecology determines the construction activity would be a significant contributor of pollutants or violate water quality standards.

The KCIW discharge authorizations generally require monitoring of discharge volume; discharge rate; settleable solids; pH; Fats, Oils, and Grease (FOG); volatile organic compounds (VOCs); metals; and cyanide to ensure compliance with their discharge limitations. In anticipation of potential discharge to sewer, groundwater samples were collected from monitoring wells GEI 1-19 and GEI 3-19 in June 2021 prior to slug testing and were analyzed for the following parameters to determine if KCIW limits were achievable at this Project without pretreatment other than tankage for settling of solids:

- pH
- FOG
- VOCs
- Metals
- Cyanide

The results of the laboratory testing are included in Appendix C, and the KCIW general monitoring requirements are included in Appendix D.

The results of the groundwater testing indicated that groundwater within the Project alignment complies with KCIW's instantaneous maximum limits and daily average limits for each of the parameters above, except for cyanide at GEI 3-19. The cyanide result at GEI 3-19 was 2.34 milligrams per liter (mg/L), which is below the instantaneous maximum limit of 3.0 mg/L, but above the daily average limit of 2.0 mg/L. Cyanide was not detected[3] in the groundwater sample from GEI 1-19. The laboratory report's quality control (QC) information for the cyanide analyses indicates a high recovery of cyanide in laboratory-spiked QC samples, which they attributed to "a possible matrix effect." The implication of a high spike recovery is that the associated sample results may be biased high and not representative of actual concentrations in the sample. There is no known source of cyanide in the Project vicinity based on our Environmental Assessment Summary, prepared under separate cover (Aspect, 2021).

Given the anomalous cyanide result, GEI 3-19 was resampled in September 2021, and a grab groundwater sample was collected from ACPT-02 to provide another data point

[3] At a reporting limit of 0.05 mg/L

along the Project alignment (Figure 2). The samples were analyzed for the same parameters listed above, and the groundwater samples were not field filtered prior to running metals analysis. The results of this groundwater testing were nondetect for cyanide at both sampling locations indicating that, with the lack of a known source for cyanide in the Project vicinity, the initial anomalously high result from GEI 3-19 was an artifact of the laboratory analysis and not representative of groundwater quality.

All other parameters tested in GEI 3-19 and ACPT-02 were below KCIW's instantaneous maximum limits and daily average limits. The relatively high total metals concentrations detected in the ACPT-02 grab groundwater sample (65 micrograms per liter [µg/L] arsenic, 176 µg/L lead, 1230 µg/L chromium) exceed state surface water quality standards; however, the metals concentrations are likely attributable to suspended solids in the unfiltered sample; therefore, are overstated relative to dissolved metals concentrations in the groundwater. This is supported by the very low metals concentrations detected in groundwater samples collected from the monitoring wells installed along the Project alignment.

The CSWGP requirements for discharge to surface water are also included in Appendix D. The CSWGP generally requires monitoring of discharge volume, turbidity, transparency, and pH. To gain coverage under the CSWGP, the applicant must submit a Notice of Intent (NOI) to Ecology, publish a public notice, and comply with standards summarized in the general permit. However, if it is anticipated that contaminated materials will be handled during the project, Ecology will likely issue a project-specific Administrative Order on the CSGWP that requires monitoring of additional "indicator parameters" and imposes additional requirements on materials management.
We anticipate that, based on the groundwater metals concentrations detected in the ACPT-02 grab groundwater sample, Ecology would likely determine that an Administrative Order would be required for discharge to surface waters.

At a minimum, groundwater collected through dewatering will likely need to be treated to remove suspended sediment before it is discharged to the sanitary sewer under a KCIW Wastewater Discharge Authorization.

3.6.3 Dewatering-Induced Settlement

Dewatering of the unconfined aquifer is accomplished by physically draining groundwater from the pore space within the sediment. This process requires lowering of the water table, by pumping, which induces groundwater flow by gravity towards the area of lowered water table. Dewatering of the unconfined aquifer will result in settlement due to the decrease in water pressure and subsequent increase in effective stress. Adjacent improvements, such as streets, buildings, and utilities can be impacted by the settlement resulting from construction dewatering.

Our analyses indicate that dewatering-induced depression of groundwater levels could potentially reach up to a few hundred feet away. Assuming the hydrogeologic parameters discussed above and that dewatering efforts at each trench excavation segment last up to 2 weeks, groundwater drawdown could be as much as 6 inches at a distance of 200 feet from the trench. Because the Project Site is not well characterized, this value should be

considered approximate and may change based on subsurface conditions and Project specifics.

As a result, ground surface settlement in the area surrounding the Site could be on the order of 0.5 to 1 inch. Settlement would be greatest near the trench excavation, but could potentially impact areas up to 100 feet away. For instance, the Factoria Village shopping center is well within the zone of influence and could potentially be impacted by dewatering-induced settlement. The risk of significant settlement of the building foundation is reduced due to the nearest half of the structure being supported by pin piles; however, the grade-supported eastern half of the foundation is susceptible to damage from settlement. The final construction dewatering design should further evaluate potential settlement impacts prior to construction.

A settlement-monitoring program should be implemented to confirm that dewatering-induced settlements do not impact existing facilities. Settlement monitoring can be combined with the optical survey monitoring of the temporary shoring. It is important to note that there may be settlement due to shoring deformation in addition to settlement related to temporary dewatering.

Settlement monitoring points should be placed on sensitive features within the adjacent properties and within the right-of-way. We also recommend establishing action thresholds in the Project specifications with appropriate courses of action if the thresholds are exceeded. Refer to Attachment 1 for additional settlement monitoring details and suggested thresholds.

3.7 Box Conveyance Structure

The existing CMP culvert is proposed to be replaced by a 9-foot-wide by 4-foot-tall precast concrete box conveyance structure. We understand this structure will be a three-sided box with a separate precast lid and will run relatively level along its alignment with the base at approximately Elevation 75 feet. Based on the subsurface explorations, we anticipate the southern portion of the box conveyance structure alignment will bear on recessional outwash soils, whereas the northern approximately 250 feet of the alignment (see Figure 3) will bear on compressible alluvial soils overlying recessional outwash soils and will require foundation support consisting of an RSF to mitigate settlement. This northern portion of the box conveyance alignment requiring implementation of the RSF is herein referred to as the RSF Area. The following sections provide design recommendations for the proposed precast concrete box conveyance structure.

3.7.1 Box Conveyance Foundation Support

Loading

We recommend a soil unit weight of 130 pcf be used to estimate soil cover loads on the top of the box conveyance structure. Traffic surcharge loads should be added to the weight of the soil cover loads.

Resistance Factors

Using the subsurface explorations and assuming the foundation subgrade configuration described in Section 3.12.2, we analyzed the nominal bearing resistance for the Strength and Service limits states for use in design of foundations. Service limit state resistances

were computed using shallow footing settlement methods presented in AASHTO Load Resistance Factor Design (LRFD; AASHTO, 2020). The corresponding LRFD resistance factors for each of the limit states are provided in Table 3.

Table 3. LRFD Resistance Factors for Shallow Foundations

Limit State	Bearing Resistance	Shear Resistance to Sliding	Passive Pressure Resistance to Sliding
Strength	0.45	0.9[1] / 0.8[2]	0.5
Service	1.0	1.0	1.0

Notes:

1 Assumes shallow foundation is precast concrete.

2 Assumes shallow foundation is cast in place.

Values based on Table 10.5.5.2.2-1 in the AASHTO LRFD BDS.

Vertical Bearing Resistance

Section 10.6.3.1 of the AASHTO LRFD Bridge Design Specifications, Fourth Edition, provides recommendations for the development of nominal bearing resistance (qn) using semiempirical or analytical procedures for the strength limit state. For the box conveyance structure bearing on either the RSF or at least 12 inches of compacted crushed rock placed directly over medium dense to dense recessional outwash soils, the foundations may be designed using a nominal bearing resistance of 20 kips per square foot (ksf). Using a resistance factor of 0.45 from Table 3, this results in a factored bearing capacity of 9 ksf.

The recommended bearing resistance for the service limit state is based on a limited foundation settlement of less than 1 inch. The design of spread footings is frequently controlled by movement at the service limit state. Based on settlement estimates described below, we recommend using a service limit state bearing resistance of 3.6 ksf for design of box conveyance foundations bearing on the RSF, and 4.5 ksf for foundations bearing on at least 12 inches of compacted crushed rock placed directly over medium dense to dense recessional outwash soils.

A coefficient of subgrade reaction of 100 pounds per cubic inch (pci) may be used for design of the base slab supported on the crushed rock base layer.

Settlement Estimates

Provided all the recommendations are followed under Section 3.12.2. Subgrade Preparation, we estimate the total settlement of box conveyance structure foundations placed over the RSF will be less than 2 inches due to primary consolidation of the underlying compressible soil. Differential settlement along a 50-foot section of continuous box conveyance structure over the RSF should be less than 1.5 inches. We estimate more settlement will occur closest to the outfall where the remaining compressible soils below the box conveyance are thickest. More than 50 percent of this primary consolidation settlement will be complete within several weeks of fill placement, 90 percent within a several months of construction, and 100 percent within a year. We

expect areas of settlement will be localized to the area where fill is placed and not likely affect nearby properties and structures. We do not anticipate long-term secondary compression and biodegradation settlement within the compressible soils.

Subsurface layers of soft clay are compressible when subjected to increased net vertical pressure from removing and replacing *in situ* soils with heavier structural fill. Removal and replacement of *in situ* soils with structural fill will be completed within the relatively narrow trench/shored excavations for the box conveyance and other utilities. The cumulative effect of this earthwork will trigger settlement at the roadway and beneath utilities.

The estimated settlements could eventually result in a grade differential between sections of the box conveyance structure and/or gradual bumps or waviness of the roadway surface along the Project alignment. We recommend the joints between box sections be designed to tolerate the estimated differential settlement. This may require detailing of structural connections between the precast concrete sections.

Delaying final paving and returning to the Site to repave/relevel uneven areas after construction and earthwork will mitigate deformations in the roadway surfacing to some degree. Several repaving/releveling efforts may be needed over the design life of the Project.

Total settlement of box conveyance structure foundations outside the RSF Area bearing on at least 12 inches of compacted crushed rock placed directly over medium dense to dense recessional outwash soils will be less than 1 inch due to immediate settlement. Differential settlement along a 50-foot section of continuous box conveyance structure outside the RSF Area should be less than 0.5 inches.

Reinforced Soil Foundation

In areas where it is not feasible to remove all compressible soils due to excavation depth constraints, an RSF will be required to support the box conveyance structure and reduce differential settlement between the precast concrete segments. Based on the subsurface explorations, we anticipate this to apply to approximately the northern 250 feet of the box conveyance alignment (RSF Area). Outside the RSF Area, the box conveyance should be founded on 12 inches of compacted crushed rock as described below in Section 3.12.2. Subgrade Preparation.

An RSF is an economical settlement mitigation solution that replaces a portion of the compressible soils with stronger granular fill reinforced with geosynthetics. The resulting composite zone (reinforced soil mass) improves the load carrying capacity of the supported foundation by providing better pressure distribution across the underlying weak soils and reducing settlements.

Within the RSF Area, we recommend first placing a layer of Quarry Spalls (WSDOT Standard Specification 9-13.6) below the RSF base level to stiffen the subgrade soils and provide a stronger working platform to construct the RSF. The quarry spalls should be tamped into place with the bucket of a large excavator in lifts not exceeding 6 inches thick.

The RSF is a geosythetically reinforced graded aggregate pad constructed below the box conveyance structure to provide settlement mitigation and uniform bearing pressure to the foundations. The RSF should be at least 2.5 feet thick and extend at least 2 feet beyond the east and west edges of the box conveyance foundation. The RSF should be fully encapsulated in nonwoven separation geotextile per WSDOT Standard Specification 9-33.2(1), Table 3 (WSDOT, 2018). The separation geotextile shall be placed with a 3-foot minimum overlap at the edges between adjacent sheets. The overlaps in the geotextile should face downstream.

The interior of the RSF should consist of alternating layers of compacted backfill and four equally spaced layers of geosynthetic reinforcement. The RSF backfill shall consist of crushed surfacing base course (CSBC) per WSDOT Standard Specification 9-03.9(3) (WSDOT, 2018). The CSBC should be compacted to a minimum density of 95 percent of the maximum dry density (MDD) as determined by ASTM International (ASTM) test method ASTM D1557 (Modified Proctor).

The function of the geosynthetic reinforcement within the RSF is to provide lateral confinement of the aggregate and to enhance soil arching over soft subgrade soils. The tensile load in the reinforcement is estimated based on tension membrane theory and is a function of the amount of strain in the reinforcement. The initial strain of the reinforcement was limited to 2 percent in design. A minimum of four layers of Tensar Biaxial Geogrid BX-1100 geosynthetic reinforcement (or equivalent) should be installed with a vertical spacing of 6 inches. Table 4 below provides additional geogrid reinforcement requirements.

Table 4. Geogrid Reinforcement Requirements for the RSF

Property	Value	Test Method
Ultimate tensile strength (both directions)	850 lb/ft	ASTM D6637-10 A
Tensile strength at 5%	580 lb/in	ASTM D6637-10 A
Mass/unit area	Min. 8 oz/sq.yd	ASTM D5261
Aperture size	1.0 inch	ASTM D4759-02
Resistance to long-term and UV degradation	100%	EPA 9090 and ASTM D4355-05

Notes: lb/ft – pounds per foot, lb/in – pounds per inch, oz/sq.yd – ounces per square yard

Lateral Resistance

Lateral loads can be resisted by a combination of friction between the bottom of the footings and the supporting soil, and by the passive lateral resistance of the soil surrounding the box conveyance walls or embedded portions of footings.

Sliding resistance is developed from the friction occurring between the bottom of the foundation and the soil, and the passive resistance developed from the soil around the foundation. For foundations that are precast concrete set atop compacted structural fill, we recommend using a coefficient of sliding (ϕ_f) of 0.45 applied to vertical dead load

forces to calculate sliding resistance. For foundations that are CIP concrete set atop compacted structural fill, we recommend using a coefficient of sliding (ϕ_f) of 0.60.

We anticipate the box conveyance structure will be designed for undrained conditions (permanent wall drainage will not be provided); accordingly, we recommend the allowable passive resistance be calculated using a passive pressure of 160 pcf, assuming backfill with structural fill compacted to at least 95 percent of the MDD. The undrained conditions should be based on a groundwater level at Elevation 80 feet or at the 100-year flood level in the Inlet Channel, whichever is higher. Should the structure need to be designed for drained conditions, we recommend a passive pressure value of 300 pcf be used.

If soils adjacent to foundations are disturbed during construction, the disturbed soils must be recompacted; otherwise, the lateral passive resistance value must be reduced.

3.7.2 Box Conveyance Wall Design

The box conveyance structure walls should be designed to adequately resist lateral earth pressures imparted from retained soils considering the Strength and Service LRFD limit state conditions in accordance with AASHTO LRFD (AASHTO, 2020). For box conveyance walls that are restrained from yielding at the top and supporting horizontal backfill, we recommend using lateral soil pressures based on an equivalent fluid density of 55 pcf above the design ground water level and 30 pcf below the groundwater level. Hydrostatic pressures equal to 62.4 pcf should be added to the soil pressures below a design groundwater level at approximately Elevation 80 feet.

For seismic loading conditions acting on the box conveyance structure walls, a rectangular earth pressure equal to 8H psf, where H is the height of the wall, should be added to the at-rest pressures presented above. The wall design parameters described above are shown on Figure 7.

The earth pressures presented on Figure 7 includes the loading from a typical traffic surcharge (equal to a uniform lateral pressure of 85 psf) acting over the depth of the excavation. For a vertical surcharge load of 500 psf, a uniform lateral pressure of 165 psf should be used. Other surcharge loads should be considered on a case-by-case basis in accordance with the recommendations presented on Figure 8.

3.8 Pipe Support

We anticipate that the alluvial and recessional outwash soils at subgrade elevations along the stormwater CMPs and other underground utility alignments are expected to provide adequate support for the proposed pipe segments, provided soft and loose soils are removed prior to placing the bedding and the bedding is placed as recommended in Section 3.13.2. If the bottom of pipe trenching exposes loose, soft, or otherwise unsuitable soils, we recommend the soft materials be removed down to firm soil, if possible.

3.9 Light and Signal Pole Foundations

Light and signal poles will be located along the Project alignment. In general, for pole foundations embedded in compacted structural fill and native soils, we recommend using

the WSDOT Traffic Signal Standard Foundation – Standard Plan J-26.10-03 to design for a vertical bearing pressure of 2,000 psf and a lateral bearing pressure of 1,000 psf., provided the following separation criteria are met.

These values assume the ground surface around the pole foundation is 3H:1V flatter, or the centerline of the foundation is located a distance greater than 1B (where B is the foundation width) from the crest of adjacent slope that is steeper than 3H:1V. Please consult us for special cases that fall outside these scenarios.

3.10 Conventional Cast-In-Place Walls at Outfall

We understand CIP concrete walls will be constructed at the outfall to the Inlet Channel to Richards Creek. The walls will be between 6.5 and 8 feet tall. Based on the 60% design drawings provided by WSP, it appears that the proposed location of the western CIP wing wall is in conflict with the existing concrete retaining wall along the east side of Factoria Blvd. We recommend the proposed western CIP wing wall be relocated or reoriented so that the temporary excavation to place the wall footing does not encroach on or destabilize the existing concrete retaining wall. The temporary excavation should maintain at least a 1.5H:1V slope from the toe of the existing concrete retaining wall. If a steeper slope inclination is required due to horizontal constraints in the channel, we recommend extending the temporary shoring into the Inlet Channel or underpinning the existing concrete retaining wall prior to excavation.

3.10.1 Lateral Earth Pressures

Conventional CIP retaining walls for the outfall to the channel should be designed for active lateral soil pressures based on an equivalent fluid density of 40 pcf, assuming a level ground surface behind the wall, the ability of the top of the wall to move laterally a distance at least one thousandth the height of the wall, and wall backfill consisting of structural fill. The equivalent fluid density should be increased to 60 pcf for a back slope of 2H:1V above the wall. Walls that are restrained from movement during backfilling should be designed for at-rest lateral earth pressure corresponding to an equivalent fluid density of 55 pcf for a level backslope and to 85 pcf for a 2H:1V backslope.

Hydrostatic pressures of 62.4 pcf based on the groundwater level at the 100-year water level in the channel should be added to the soil pressures for design. The wall design should include a seismic surcharge pressure of 8H psf (rectangular distribution), where H equals the exposed height of the wall

These values apply to wall backfill placed and compacted as recommended below. Care should be taken not to overcompact the backfill against the walls.

3.10.2 Wall Foundations

We recommend footings for the outfall walls be supported on a pad of crushed rock fill having a thickness of at least 12 inches. The crushed rock layer should consist of Permeable Ballast conforming to Section 9-03.9(2) of the 2018 WSDOT Standard Specifications, or CSBC conforming to Section 9-03.9(3) with the added restriction that less than 5 percent should pass the U.S. No. 200 sieve.

We recommend the crushed rock fill extend horizontally out from the edges of the footing by at least 1 foot. Subgrade soils below wall foundations should be evaluated and recompacted, as necessary, prior to placing footings. We recommend an Aspect representative observe footing excavations before placement of structural backfill.

The wall footings should be founded at least 18 inches below the lowest adjacent finished grade. Continuous strip footings for the walls should be at least 18 inches wide and should be designed for the strength limit state with a factored bearing resistance of 8 ksf, using a resistance factor of 0.45 from Table 3. This value may be increased by one-third when considering earthquake or wind loads. Wall footings should be designed for a service limit state bearing resistance of 3 ksf.

We estimate postconstruction settlements for wall footings could be on the order of 1 inch, depending on the final footing size. Differential settlements of up to half the total settlement may be experienced along the length of the outfall walls.

Lateral loads on the wall footings can be resisted by passive resistance on the sides of footings and other below-grade structural elements and by friction on the base of footings. A factored passive equivalent fluid density of 160 pcf can be used, assuming the footings and below-grade elements are backfilled with structural fill compacted to at least 95 percent of the MDD. A factored base and side friction coefficient of 0.45 can be used for the walls. These design values include resistance factors from Table 3. The upper 2 feet of passive resistance should be ignored if the surface is not protected by permanent pavement or slab.

3.10.3 Wall Drainage

Drainage behind CIP retaining walls should be provided by placing a minimum 24-inch-wide drainage curtain of Gravel Backfill for Walls, WSDOT Section 9-03.12(2). A slotted or perforated drainpipe should be installed at the base of the wall to collect and convey water to a suitable outlet. The drainpipe should be surrounded by at least 6 inches of Gravel Backfill for Drains, WSDOT Section 9-03.12(4), or an alternative approved by Aspect. The drainage material should be wrapped with a geotextile filter fabric meeting the requirements of construction geotextile for underground drainage, WSDOT Standard Specification 9-33. The wall drainpipe should be connected to a header pipe and routed to a sump or gravity drain. Appropriate cleanouts for drainpipe maintenance should be installed. A larger-diameter pipe will allow for easier maintenance of drainage systems. Alternatively, weep pipes could be installed through the face of the walls to provide drainage of water collected by the drainpipe.

3.11 Vegetated Rock Walls within the Inlet Channel

We understand vegetated rock walls will be constructed adjacent to the outfall within the Inlet Channel to Richards Creek. The vegetated rock walls will be installed downstream of the CIP concrete wing walls at the outfall to accommodate grade changes from the regraded channel slope to the proposed in-channel benching. We understand the walls will be about 5 feet tall and will be designed following the guidelines of the National Engineering Handbook Technical Supplement 14M (210–VI–NEH, August 2007).

To evaluate the global slope stability of the proposed regraded channel slope and vegetated rock walls, we completed a static slope stability analysis using two-

dimensional limit equilibrium methods and the software program SLIDE by RocScience. We used wall location and slope topography data from cross sections provided by WSP. The location of the analyzed cross section is shown on Figure 3. We have assumed the vegetated rock walls will have a maximum exposed height of about 5 feet with an embedment of at least 2 feet. Subsurface exploration data within and near the Inlet Channel were used to determine engineering properties of native soils within the channel slopes. The wall backfill was modeled to consist of properly compacted Gravel Borrow for Walls. The wall foundation subgrade was modeled to consist of compacted structural fill (CBSC) overlying medium dense to dense recessional outwash (bearing layer). The groundwater was assumed to be at Elevation 80 feet, with the understanding that the groundwater level may be higher during the wet season and during extreme high-water events. Under this assumed scenario, the 5-foot-high vegetated rock wall has an adequate static overall slope stability factor of safety of about 1.7. We recommend Aspect be present during excavation of the cut slopes for the vegetated rock walls to observe and document exposed subgrade soils.

3.12 Earthwork Considerations

3.12.1 General

Based on the explorations performed on the Site and our understanding of the proposed Project, it is our opinion that basic excavation and grading can generally be completed with standard construction equipment. We anticipate debris or oversized particles, such as cobbles and large boulders in the fill or native soil, may be encountered—the Contractor should be prepared to deal with them during shoring installation and mass excavation.

We anticipate groundwater will be encountered during excavation and dewatering will be required. Shallow groundwater conditions and very soft/loose soils will require planning, careful excavation strategies, and reduced excavation side-slope inclinations. The Contractor should be aware of the potential for wide variation in the composition and degree of compaction of the existing utility trench bedding and backfill. Caving of these materials when encountered in excavations should be expected. Placement of a working pad consisting of quarry spalls beneath large equipment should be considered on soft ground.

Appropriate erosion control measures should be implemented prior to beginning earthwork activities in accordance with the City’s Best Management Practices (BMPs).

3.12.2 Subgrade Preparation

We recommend an Aspect representative observe exposed subgrade areas prior to foundation construction, structural fill placement, and subgrade protection to evaluate preparation and subsurface conditions. The box conveyance structure segment subgrade should be cut using an excavator with a smooth-edge bucket. Subgrade soils exposed in the excavation will likely be wet due to the presence of groundwater. Exposed subgrade soils should be evaluated using a steel probe rod. These subgrade preparation recommendations assume the box conveyance structure excavation will be adequately dewatered to prevent deterioration of the crushed rock layer during foundation construction.

We recommend protecting exposed bearing surfaces with a layer of gravel or a 2- to 4-inch-thick mud slab to help preserve the subgrade. If gravel is used to protect the bearing surfaces, it should generally meet the requirements for Permeable Ballast conforming to Section 9-03.9(2) of the WSDOT Standard Specifications. Lean concrete should be used for mud slabs.

Outside the RSF Area

Outside of the RSF Area, box conveyance foundation subgrades should be firm and unyielding, and be clear of any loose, disturbed soil, organic material, or standing water prior to foundation construction. If soft, loose, or otherwise unsuitable soils are encountered in the box conveyance structure subgrade outside of the RSF area, we recommend these soils be removed and replaced with crushed rock fill.

We recommend the box conveyance structure be supported on a base layer of crushed rock or permeable ballast having a thickness of at least 12 inches for uniform support. The base layer should consist of Permeable Ballast conforming to Section 9-03.9(2) of the WSDOT Standard Specifications, or CSBC conforming to Section 9-03.9(3) with the added restriction that less than 5 percent should pass the U.S. No. 200 sieve.

It may be necessary to line the base of the box conveyance structure excavation with a geotextile fabric to separate the crushed rock zone from underlying soils. The fabric should meet the criteria outlined in WSDOT Standard Specification 9-33.1, Table 3, “Separation.” The fabric should extend up at least 1 foot vertically on each side of the excavation. The need for a geotextile fabric should be evaluated during construction.

Within the RSF Area

We recommend subgrade preparation below the RSF include placement of a layer of quarry spalls conforming to Section 9-13.1(5) of the WSDOT Standard Specifications. The quarry spalls should be tamped into the underlying soft clay soils to provide additional stiffness prior to placement of the RSF. Inclusion of quarry spalls below the RSF will increase compaction densities within the first lift of the RSF and has been assumed in design to allow for an optimized RSF thickness. More details on the RSF recommendations and construction considerations are presented in Section 3.7.1

3.12.3 Temporary Excavation Slopes

Contract documents should include provisions stating that maintenance of safe working conditions, including temporary excavation stability, is the responsibility of the Contractor. All temporary cuts in excess of 4 feet in height that are not protected by trench boxes or otherwise shored, should be sloped in accordance with Part N of Washington Administrative Code (WAC) 296-155 (WAC, 2009).

In general, the soils across the Site classify as Occupational Safety and Health Administration (OSHA) Soil Classification Type C. Temporary excavation side slopes are anticipated to stand no steeper than 1.5H:1V. The cut-slope inclinations should be considered preliminary estimates at this stage and may require additional shallowing of side-slope angle based on field observations during construction.

With time and the presence of seepage and/or precipitation, the stability of temporary unsupported cut slopes can be significantly reduced. Therefore, all temporary slopes should be protected from erosion by installing a surface water diversion ditch or berm at

the top of the slope. The contract documents should include provisions stating that the Contractor is responsible for stability of the temporary cut slopes, and adjust the construction schedule and slope inclination accordingly. Vibrations created by traffic and construction equipment may cause caving and raveling of the temporary slopes. In such an event, the contract document should include provisions stating that the Contractor should provide lateral support for the temporary slopes to prevent loss of ground support.

3.12.4 Permanent Slopes

Permanent slopes for the Project should be constructed at inclinations of 2H:1V or flatter. Where practical, slopes of 3H:1V or flatter should be used for ease in landscaping and maintenance. Fill slopes should be blended into existing slopes with smooth transitions.

Fill placed on existing slopes steeper than 5H:1V should be properly benched and keyed into the existing slope surface. This can be done by constructing the fill in a series of 4- to 6-foot-wide benches cut into the slope. We recommend cuts for the benches have a vertical height no greater than 3 feet. The benches should be constructed in accordance with Section 2-03.3(14) of the 2018 WSDOT Standard Specifications, and should be compacted to a firm, nonyielding condition prior to placing new fill soils. The horizontal portion of each bench should be sloped such that surface water runoff is directed downslope.

Structural fill for the new slopes should be overbuilt by at least 2 feet and then cut back to the design grade prior to placing landscaping materials. Planting vegetation on cut slopes inclined between 3H:1V and 2H:1V can be accomplished by tilling the exposed soil and amending it with compost. Also, track rolling with the tracks oriented along contours will help to reduce erosion until the vegetation becomes established.

3.13 Structural Fill

3.13.1 General

In general, suitable structural fill material for the Project is fill placed within 3 percent of its optimum moisture content, per ASTM D1557 (ASTM, 2018; Modified Proctor test) and does not contain deleterious materials, greater than 5 percent organics, or particles larger than 3 inches in diameter.

In general, the on-Site soils generally have a high fines content that cause them to be very moisture sensitive and difficult to compact and maintain stability in wet conditions. We also observed the on-Site soils contain variable amounts of organic material that is not suitable for structural fill. In our opinion, the on-Site soils should not be considered for reuse as structural fill for these reasons, and import of structural fill should be assumed.

For trench backfill, in accordance with the City's Utilities Technical Specifications, we recommend using imported material meeting the criteria for Gravel Borrow, as specified in Section 9-03.14(1) of the WSDOT Standard Specifications. For transverse trenches (perpendicular to the roadway centerline) in paved areas, trench backfill should consist of Crushed Surfacing Top Course (CSTC), as specified in Section 9-03.9(3). For longitudinal trenches (parallel to the centerline of the roadway) in paved areas, trench backfill 4 feet and deeper below finish grade may consist of Gravel Borrow. The top 4 feet of backfill in longitudinal trenches should consist of CSTC. Alternatively, the entire

longitudinal trench could be backfilled with CSTC to avoid having multiple trench-backfill materials.

For retaining wall backfill, we recommend using material meeting the criteria for Gravel Backfill for Walls, as specified in WSDOT Section 9-03.12(2). Structural fill placed around CIP wall drains should meet the requirements of Gravel Backfill for Drains, WSDOT Section 9-03.12(4).

The contract documents should require that all fill stockpiles be covered and maintained with plastic sheeting if they will be used as structural fill.

3.13.2 Pipe Bedding

Structural fill materials placed directly below (bedding), around, and above (cover) utility pipes should consist of Gravel Backfill for Pipe Zone Bedding, as described in Section 9.03.12(3) of the WSDOT Standard Specifications (WSDOT, 2018). The pipe bedding materials should be placed in accordance with WSDOT Standard Specification 7-08.3(1)C and the pipe manufacturer's specifications. Where soft or loose soils are encountered below the pipe alignment, we recommend they be removed to a depth of 12 inches, or to firm material, as directed by the Engineer. Utility pipe bedding and cover should be at least 6 and 12 inches thick, respectively. Care should be taken not to damage the pipe utility during placement and compaction of structural fill, including limiting use of large, dynamic compaction equipment until at least 2 feet of structural fill has been placed over the top of the pipe.

3.13.3 Placement and Compaction

The procedure to achieve the specified minimum relative compaction depends on the size and type of compacting equipment, the number of passes, the thickness of the layer being compacted, and certain soil properties. When the size of the excavation restricts the use of heavy equipment, smaller walk-behind equipment can be used, but the soil must be placed in thin-enough lifts to achieve the required compaction.

Structural fill should be mechanically compacted to a firm, unyielding condition and should be placed in loose lifts not exceeding 12 inches in thickness if using heavy compactors, and 6 inches if using hand-operated compaction equipment. Each lift should be conditioned to the proper moisture content and compacted to the specified density before placing subsequent lifts. Structural fill should be compacted to the following criteria and the criteria indicated on the City's Department of Transportation Drawing Number RC-190-0, Typical Trench Right-of-Way:

1. Structural fill placed within pipe trenches and within the roadway should be compacted to at least 95 percent of the MDD in general accordance with ASTM Standard Practices Test Method D1557 (ASTM, 2018).
2. Structural fill in unpaved areas and within City right-of-way should be compacted to 95 percent of the MDD (ASTM D1557).
3. Structural fill placed as crushed rock base and top course below pavements should be compacted to 95 percent of the MDD (ASTM D1557).

4. Structural fill placed to restore slopes in the inlet channel for Richards Creek should be compacted to at least 90 percent of the MDD (ASTM D1557).
5. Structural fill placed below or around foundations should be compacted to at least 95 percent of the MDD (ASTM D1557).
6. Structural fill placed against subgrade or retaining walls, within a distance equal to the height of the wall, should be compacted to between 90 and 92 percent. Care should be taken when compacting fill against subsurface walls to avoid overcompaction and overstressing the walls. Within a lateral distance of 3 feet of any wall, smaller, possibly hand-operated equipment should be used in conjunction with thinner soil lifts to achieve the required compaction so as not to damage the structure.

We recommend a geotechnical engineer be present during placement of structural fill. In-place moisture-density testing should be completed in the fill to evaluate whether the work is being done in accordance with the compaction specifications. The geotechnical engineer should advise on any modifications to the compaction procedure that may be appropriate for the prevailing conditions.

3.13.4 Wet Weather Construction

As previously discussed, the existing soils throughout the project area contain significant fines (particles passing the U.S. No. 200 sieve) and are, therefore, moisture sensitive. If Site work is completed during wet weather, earthwork and construction operations should be planned to reduce the exposure of subgrade areas to wet weather and construction traffic.

The wet weather season in western Washington generally begins in October and continues through May; however, periods of wet weather may occur during any month of the year. The optimum earthwork period for these types of soils is typically June through September. We recommend the following considerations during wet weather:

- The ground surface in and around the work area should be sloped so that surface water is directed away from the work area. The ground surface should be graded such that areas of ponded water do not develop. The contract documents should require that surface water be prevented from collecting in excavations and trenches. Measures should be implemented to remove surface water from the work area.
- Slopes with exposed soils should be covered with plastic sheeting or similar means.
- The site soils should not be left uncompacted and exposed to moisture. Sealing the surficial soils by rolling with a smooth-drum roller prior to periods of precipitation will reduce the extent to which these soils become wet or unstable.
- Earthwork activities should not take place during periods of heavy precipitation.
- The contract documents should require that measures be implemented to prevent on-Site soils and soils to be used as fill from becoming wet or unstable. These

measures may include the use of plastic sheeting, sumps with pumps, and grading.

- Construction traffic should be restricted to specific areas of the Site, preferably areas that are surfaced with materials not susceptible to wet weather disturbance.
- Construction activities should be scheduled so that the length of time the soils are left exposed to moisture is reduced to the extent practical.

3.14 Pavement Design

3.14.1 Subgrade Preparation

All pavement subgrades should be carefully prepared. Prior to placing base course and pavement, all standard pavement subgrades should be proof-rolled with a fully loaded 10-cubic-yard dump truck or equivalent. An Aspect geotechnical engineer or engineering geologist should observe and evaluate the proof rolling operation. Any soft areas detected by the proof-rolling or other methods should be compacted in place or overexcavated to firm ground and backfilled with compacted structural fill to the design subgrade elevation. To provide for quality construction practices and materials, we recommend all pavement work and mix-design considerations conform to WSDOT standards. During wet weather, the exposed subgrade should be probed to identify the extent of soft soils. If zones of soft or pumping soil are identified, they should be removed and replaced with structural fill to the depth recommended by the Engineer.

3.14.2 New Hot-Mix Asphalt Pavements

We recommend new pavement sections be designed in accordance with the City requirements, as presented in the City's Transportation Design Manual (City of Bellevue, 2017). We recommend the pavement restoration section along Factoria Blvd include appropriate thicknesses of hot mix asphalt (HMA) and CSBC. CSBC should conform to WSDOT Standard Specification 9-03.9(3). The base course should be compacted to at least 95 percent of the MDD (ASTM D1557). The HMA should be compacted to an average of 92 percent of the reference maximum density in accordance with WSDOT 5-04.3(10) and as determined by the WSDOT Field Operating Procedures for AASHTO 209 Test (City of Bellevue Transportation Design Manual 2017).

Drainage is an essential aspect of pavement performance. All paved areas should be graded so that surface drainage is directed to appropriate catch basins. We recommend providing all paved areas with positive drainage to remove surface water and water within the base course. This will be particularly important in cut sections or at low points within the paved areas, such as at catch basins.

Pavement design based on the *1993 AASHTO Guide for Design of Pavement Structures* (AASHTO, 1993) includes many variables and is largely based on traffic loading and subgrade properties. We have discussed traffic loading with WSP to make reasonable assumptions for bus, fire truck, and heavy truck traffic. We have relied on the results of our Site explorations, previous geotechnical laboratory testing, and our engineering experience to select subgrade properties and other required inputs needed for pavement design per AASHTO (1993). The details of our pavement section analysis and design recommendations are presented below.

Traffic Loading

Average daily traffic (ADT) data and traffic classification volumes for Factoria Blvd were provided by the City. Based on the data provided, we estimate traffic loading (typically expressed as ADT and percent bus and heavy truck) for the northbound lanes of Factoria Blvd at 16,713 ADT. We have assumed each travel lane is subjected to about 8,357 ADT, equal to about half of the total ADT for all northbound lanes, where the Project is located.

Based on the nearest available traffic classification volumes (for Richards Road, which is the same roadway as Factoria Blvd, but further north), we have estimated the bus and heavy truck traffic as a percentage of the ADT shown below in Table 5. The percent bus and truck values should be reviewed by WSP and the City to verify they are realistic and reasonable for design. If needed, adjustments to the traffic loading data and pavement design can be made in the final geotechnical design report.

Table 5 also presents the calculated Equivalent 18-kip Single Axle Loads (ESALs) based on the ADT, percent bus and heavy truck assumptions. We assumed a value of 2.5 ESALs per bus and fire truck, 1.5 ESALs per heavy truck, 0.001 ESALs per passenger vehicle, and an average annual traffic growth of 2 percent over a 20-year design period to calculate total ESALs.

Table 5. Traffic Loading Data

Average Daily Traffic (ADT) per travel lane	% Passenger[1] Vehicle	% Bus and Fire Truck[1]	% Heavy Truck[1]	Equivalent 18-kip Single Axle Loads (ESALs)
8,357	92.5	0.8	6.6	8,963,000

[1] 1.0 equates to 2,736 passenger vehicles, 86 bus and fire truck (combined), and 29 heavy truck per day in each travel lane.

Pavement Section Design

Pavement section design recommendations were developed for the following input parameters:

- Design ESALs = 8,963,000
- Reliability = 85 percent
- Initial Serviceability = 4.5
- Terminal Serviceability = 3.0
- Overall Standard Deviation = 0.5
- Design Subgrade Resilient Modulus = 8,000 pounds per psi

We calculate that a structural number (SN) of 4.85 is required to accommodate the assumed traffic loading. We recommend that new pavement sections consist of a minimum of 10 inches of HMA overlying 4 inches of CSBC, which is equivalent to the

City's Standard section for Primary Arterials and Collectors as shown in Drawing RC-100-1. This section is calculated to provide an SN of 4.96.

At your request, we are available to evaluate other alternative traffic loading scenarios to determine the required SN, or alternative pavement sections to determine if the minimum required SN of 4.85 (as calculated above) is met.

3.15 Corrosion Potential

GeoEngineers previously completed limited laboratory testing on soil samples along the alignment to evaluate factors related to corrosion, as described in Appendix B. The test results indicate all samples tested had a resistivity greater than 6,000 ohm-centimeters and pH greater than 6.4. These values indicate a low potential for corrosion. If further evaluation of corrosion is required, we recommend engaging a corrosion engineer.

3.16 Recommended Additional Geotechnical Services

We are available to discuss our recommendations with the design team. We recommend Aspect review the final Project plans and specifications to verify that our geotechnical engineering recommendations were properly interpreted and implemented.

During construction, we recommend that Aspect be contracted to review Contractor submittals and requests for information related to geotechnical items, including the temporary shoring design, the dewatering system design, and the construction monitoring plan. We should be on the Site to observe, evaluate, and document the following construction activities:

- Temporary and permanent drainage and erosion control measures
- Temporary shoring installation and trench excavation
- Grading of temporary cut slopes
- Subgrade preparation for pipe, box conveyance, and retaining wall support
- Installation of the RSF
- Dewatering, settlement, shoring deflection, and vibration monitoring
- Structural and common fill placement and compaction
- Other geotechnical issues that may arise on the Site

The purpose of the construction support services described above is to confirm the subsurface conditions are consistent with those observed in the explorations, to provide recommendations for design changes should the conditions encountered during construction differ from those anticipated, and to evaluate whether construction activities are completed in accordance with our recommendations.

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Limitations

Work for this project was performed for Tetra Tech (Client), and this report was prepared consistent with recognized standards of professionals in the same locality and involving similar conditions, at the time the work was performed. No other warranty, expressed or implied, is made by Aspect Consulting, LLC (Aspect).

Recommendations presented herein are based on our interpretation of site conditions, geotechnical engineering calculations, and judgment in accordance with our mutually agreed-upon scope of work. Our recommendations are unique and specific to the project, site, and Client. Application of this report for any purpose other than the project should be done only after consultation with Aspect.

Variations may exist between the soil and groundwater conditions reported and those actually underlying the site. The nature and extent of such soil variations may change over time and may not be evident before construction begins. If any soil conditions are encountered at the site that are different from those described in this report, Aspect should be notified immediately to review the applicability of our recommendations.

Risks are inherent with any site involving slopes and no recommendations, geologic analysis, or engineering design can assure slope stability. Our observations, findings, and opinions are a means to identify and reduce the inherent risks to the Client.

It is the Client's responsibility to see that all parties to this project, including the designer, contractor, subcontractors, and agents, are made aware of this report in its entirety. At the time of this report, design plans and construction methods have not been finalized, and the recommendations presented herein are based on preliminary project information. If project developments result in changes from the preliminary project information, Aspect should be contacted to determine if our recommendations contained in this report should be revised and/or expanded upon.

The scope of work does not include services related to construction safety precautions. Site safety is typically the responsibility of the Contractor, and our recommendations are not intended to direct the Contractor’s site safety methods, techniques, sequences, or procedures. The scope of our work also does not include the assessment of environmental characteristics, particularly those involving potentially hazardous substances in soil or groundwater.

All reports prepared by Aspect for the Client apply only to the services described in the Agreement(s) with the Client. Any use or reuse by any party other than the Client is at the sole risk of that party, and without liability to Aspect. Aspect’s original files/reports shall govern in the event of any dispute regarding the content of electronic documents furnished to others.

Please refer to Appendix F titled “Report Limitations and Guidelines for Use” for additional information governing the use of this report.

We appreciate the opportunity to perform these services. If you have any questions please call Spencer Ambauen, PE, Project Geotechnical Engineer, 206.838.6589.

TABLES

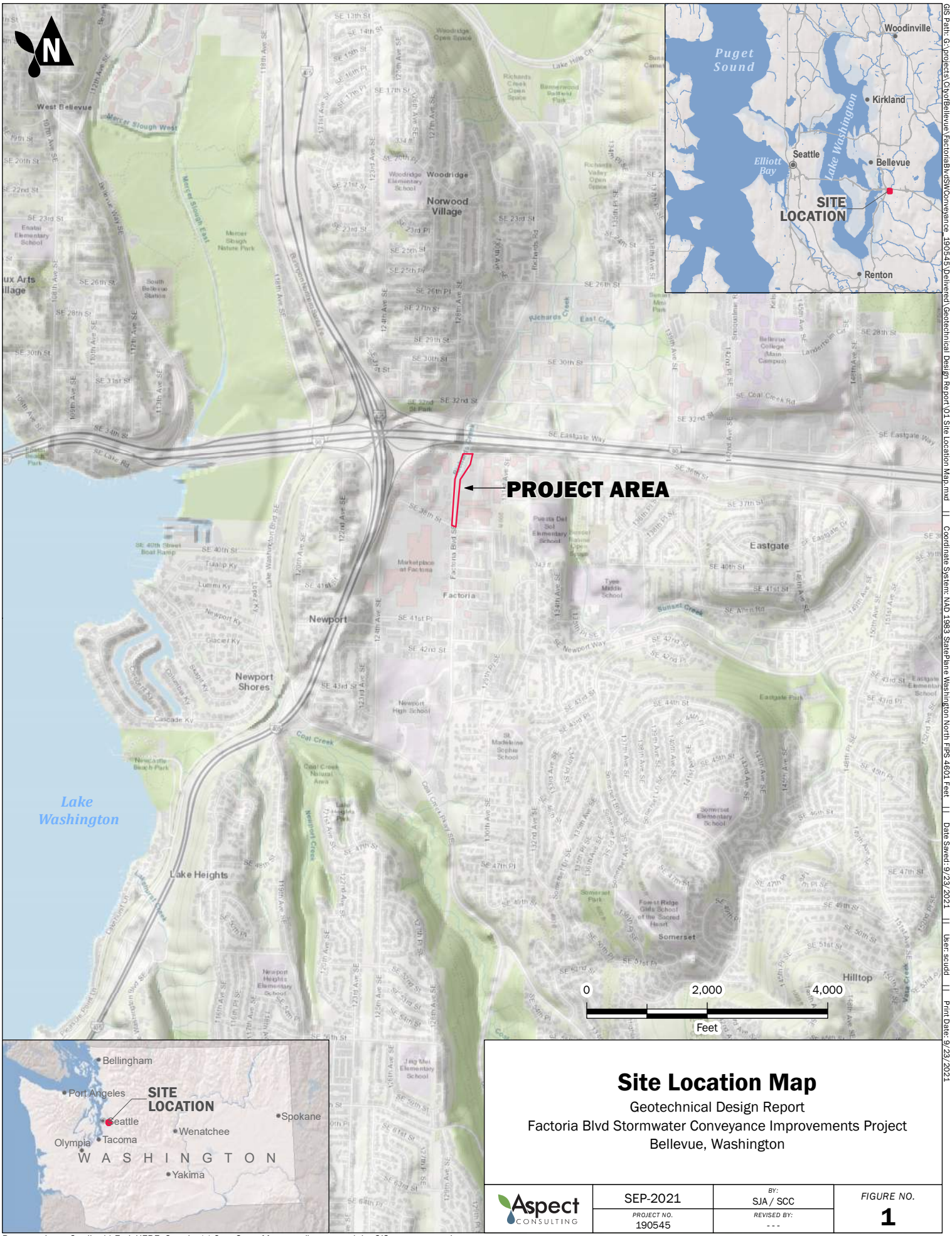
Table 1. Hydraulic Conductivity Estimates from Slug Tests

190545-B, Factoria Boulevard Storm Conveyance Improvement Project

Monitoring Well	GEI-1-19			GEI-3-19		
Well Depth in Feet	25.0			20.0		
Screen Length in Feet	10.0			10.0		
Depth to Screen in Feet	15.0			10.0		
Depth to Aquitard in Feet	30			30		
Depth to Water in Feet	7.95			8.17		
Depth to Sandpack in Feet	13.0			7.0		
Slug Displacement (Ho) in Feet	0.68	1.43	1.37	0.54	1.02	1.16
Porosity (n)	0.30			0.30		
Radius of Casing (rc) in Feet	0.08			0.08		
Radius of Borehole (rw) in Feet	0.35			0.35		
Saturated Aquifer Thickness (H) in Feet	**22.1**			**21.8**		
Saturated Well Thickness (Lw) in Feet	**17.1**			**11.8**		
Effective Radius (reff) in Feet	**0.083**			**0.206**		
Effective Screen Length (Le) in Feet	**10.0**			**10.0**		
Slug Size	*1' x1"*	*3' x1"*	*3' x1"*	*1' x1"*	*3' x1"*	*3' x1"*
Rising/Falling Head Test	*Falling*	*Rising*	*Rising*	*Rising*	*Rising*	*Rising*
Fully Submerged Sandpack	*Yes*	*Yes*	*Yes*	*No*	*No*	*No*
Transiently Exposed Sandpack	*No*	*No*	*No*	*Yes*	*Yes*	*Yes*
Transiently Exposed Screen	*No*	*No*	*No*	*No*	*No*	*No*
Partially Submerged Screen	*No*	*No*	*No*	*No*	*No*	*No*
Bouwer and Rice Analysis Parameters						
Normalized Head at t1 (y1) in Feet	**0.41**	**0.40**	**0.40**	**0.27**	**0.28**	**0.28**
Time - t1 in Seconds	**16**	**19**	**20**	**7**	**7**	**6**
Normalized Head at t2 (y2) in Feet	**0.20**	**0.20**	**0.20**	**0.10**	**0.09**	**0.12**
Time - t2 in Seconds	**36**	**41**	**43**	**15**	**16**	**13**
Le/rw	**28.2**			**28.2**		
Calculated K in cm/sec	**9.5E-04**	**8.0E-04**	**8.0E-04**	**1.7E-02**	**1.8E-02**	**1.7E-02**
Calculated K in ft/day	**2.7**	**2.3**	**2.3**	**49.5**	**49.8**	**48.9**
Geometric Mean K in ft/day	**2**			**49**		
Screened Interval Soil Type	CH + SM			CL + SP-SM + SP		

Notes:
Data analysis by method of Bouwer and Rice (1976; 1989) or Butler-Garnett (2000).
Bold values are entered from field data and other values are calculated.
All depths are below ground surface
[a] The Bouwer and Rice A, B, and C coefficients are calculated using regression equations of Van Rooy (1988).
[b] R^e/r^w is the effective radial distance over which y is dissipated, divided by the radial distance of well development.

FIGURES



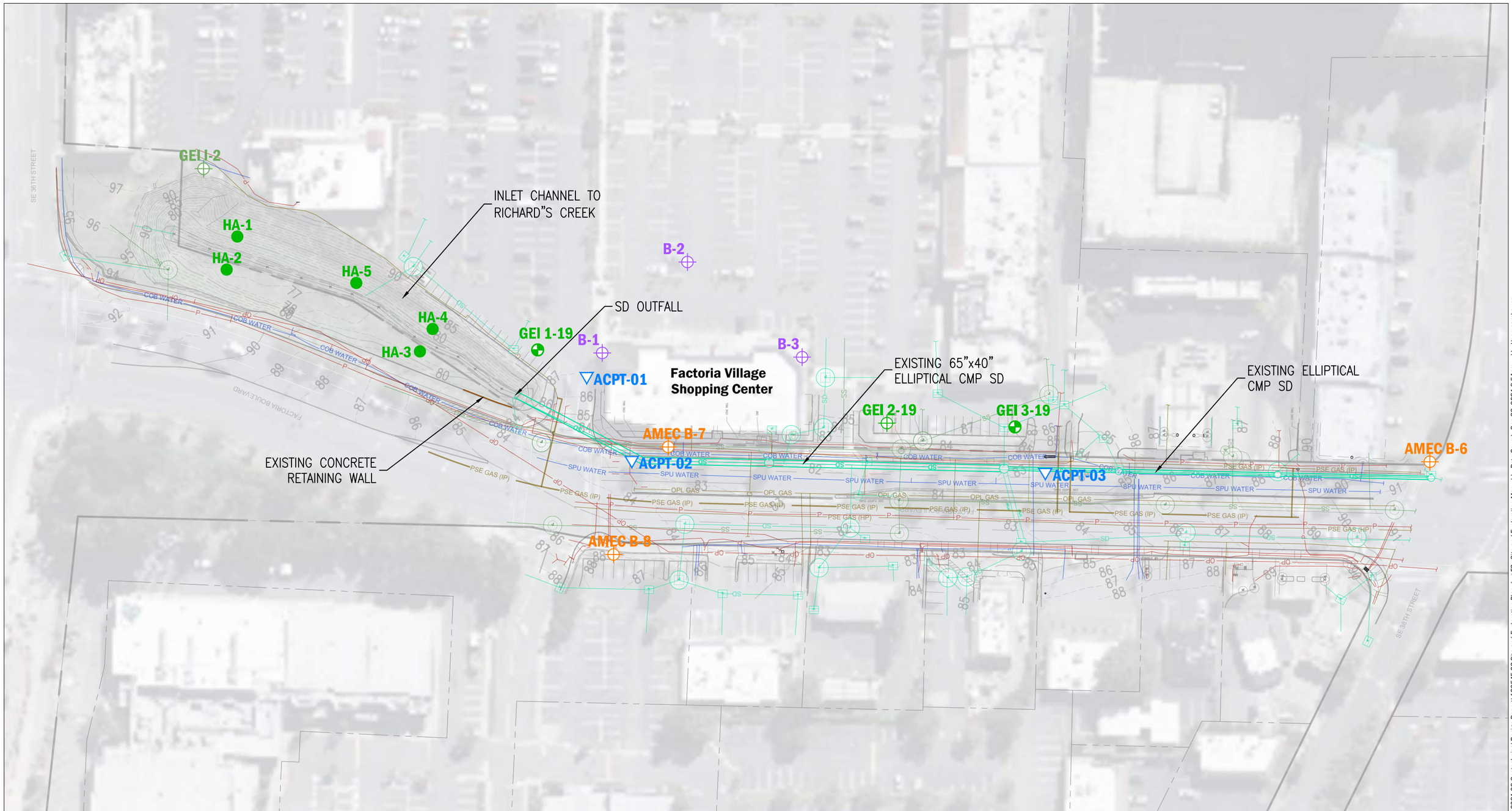
Site Location Map

Geotechnical Design Report
Factoria Blvd Stormwater Conveyance Improvements Project
Bellevue, Washington

Aspect CONSULTING	SEP-2021	BY: SJA / SCC	FIGURE NO.
	PROJECT NO. 190545	REVISED BY: - - -	1

Basemap Layer Credits || Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

GIS Path: G:\projects\CityofBellevue\FactoriaBlvdSWConveyance_190545\Delivered\Geotechnical Design Report\01 Site Location Map.mxd || Coordinate System: NAD 1983 StatePlane Washington North FIPS 4601 Feet || Date Saved: 9/23/2021 || User: scudd || Print Date: 9/23/2021



Legend

- Boring Location
- Hand Auger Location
- Monitoring Well Location
- Cone Penetrometer Test (CPT) Location
- King County Parcel Lines

Aspect Consulting (2021)
GeoEngineers (2015)
GeoEngineers (2019)
AMEC (2001)
Terracon (2015)

Note: Symbol color indicates consultant and year completed.

- SD — Storm Drain Line
- SS — Sanitary Sewer Line
- P — Power Line
- W — Water Line
- GAS — Gas Line
- Catch Basin
- Stormwater Manhole
- Sanitary Sewer Manhole

DRAFT

Notes
1. Survey base map data provided by Parametrix 01-2021.
2. Select explorations shown here were used for geotechnical analyses.

0 80 160 Feet

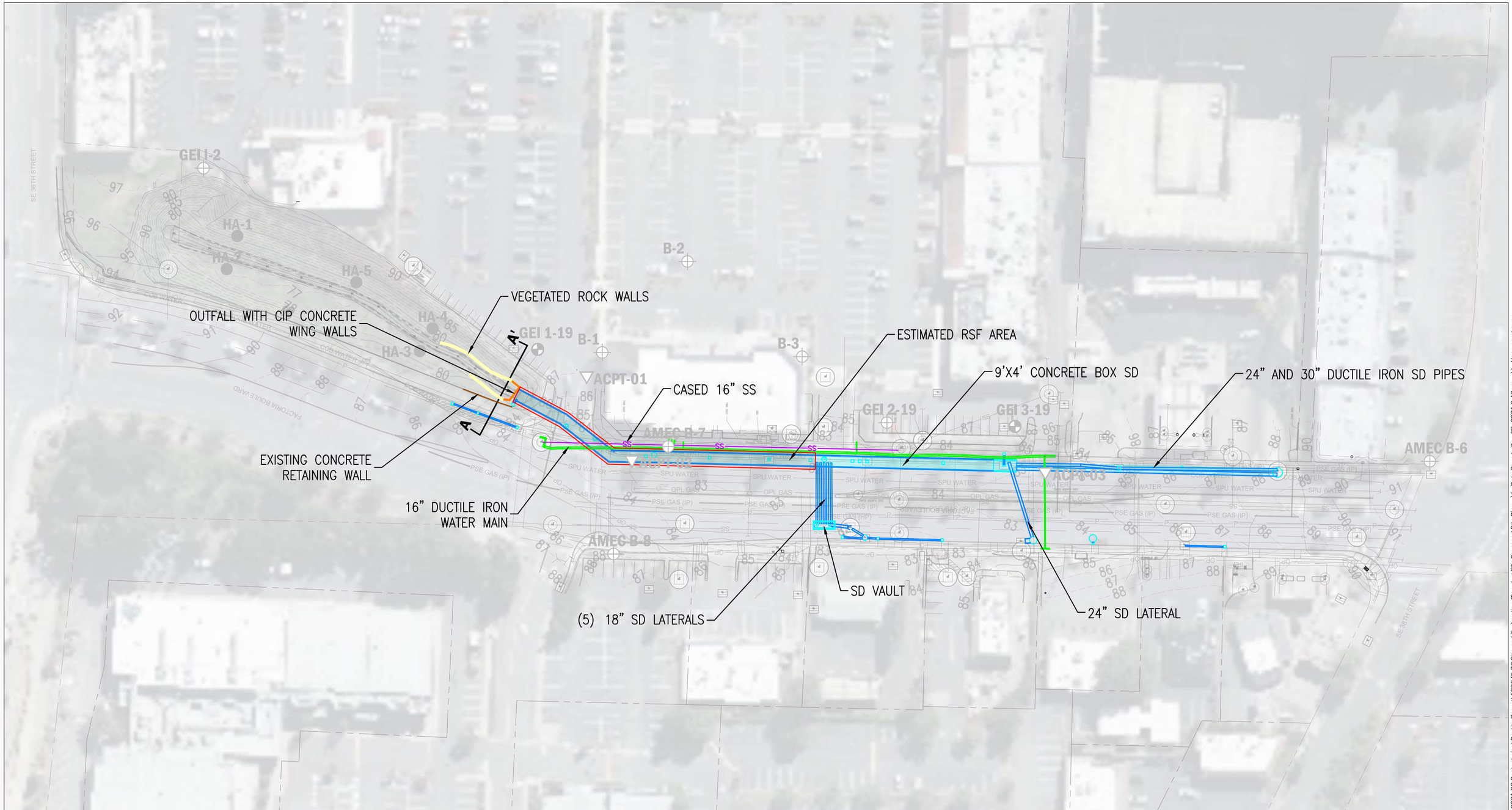
Site and Exploration Map

Factoria Blvd Stormwater Conveyance Improvements Project
Bellevue, Washington

Aspect CONSULTING

Sep-2021	BY: SJA	FIGURE NO.
PROJECT NO. 190545	REVISED BY: -	2

CAD Path: Q:\City of Bellevue\190545 Factoria Blvd\2021-09 Geotechnical Design Report\190545-02 Site and Exploration Plan.dwg F2 - Site and Exploration Map || Date Saved: Sep 29, 2021 9:54pm || User: sambauen



Legend

- Boring Location
- Hand Auger Location
- Monitoring Well Location
- Cone Penetrometer Test (CPT) Location
- A — A' Slope Stability Cross Section Location

- SD — Storm Drain Line
- SS — Sanitary Sewer Line
- P — Power Line
- W — Water Line
- GAS — Gas Line
- Catch Basin
- Stormwater Manhole
- Sanitary Sewer Manhole

Notes
1. Survey base map data provided by Parametrix 01-2021.
2. Select explorations shown here were used for geotechnical analyses.

DRAFT

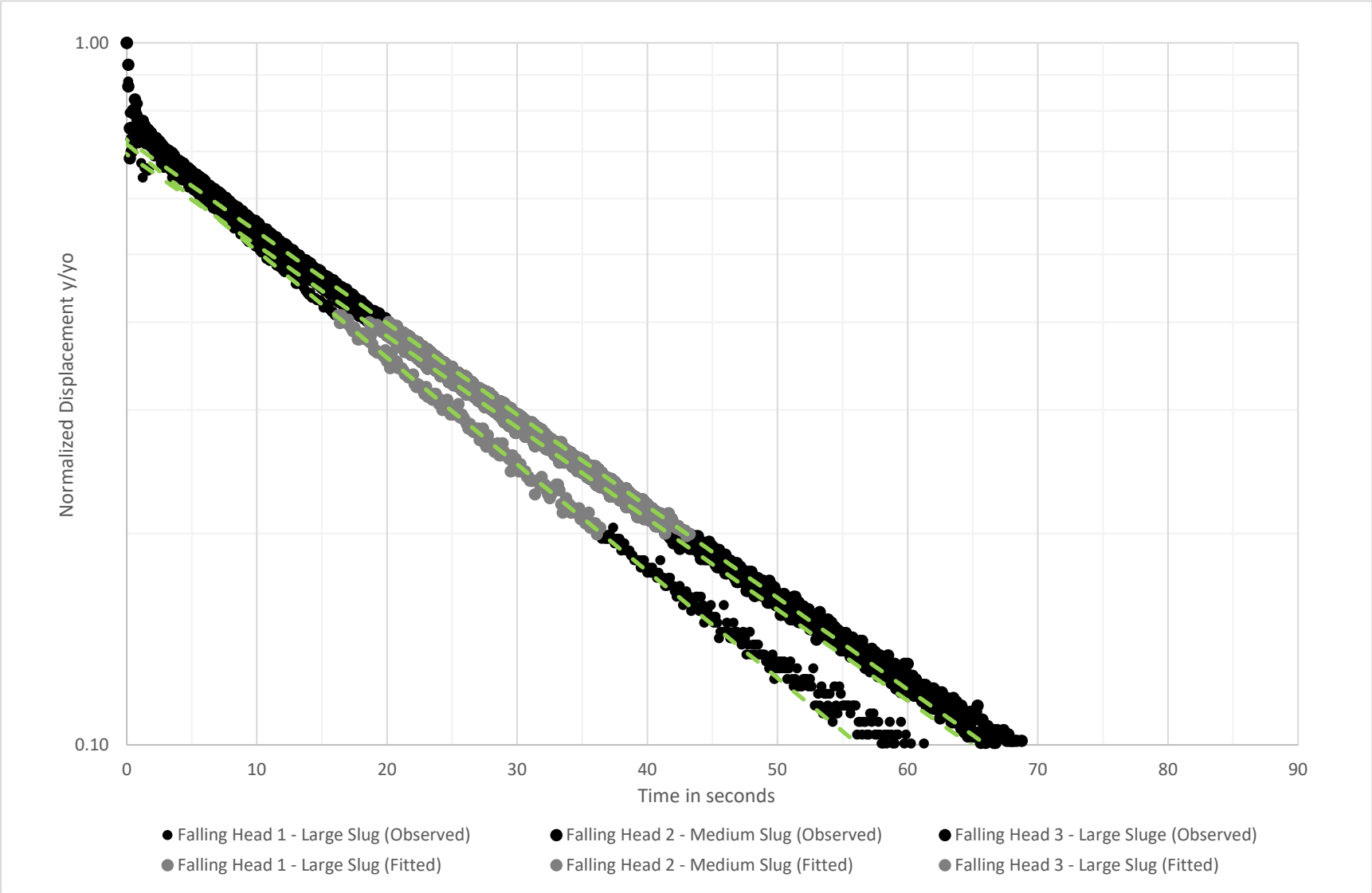
0 80 160 Feet

Proposed Site Plan

Factoria Blvd Stormwater Conveyance Improvements Project
Bellevue, Washington

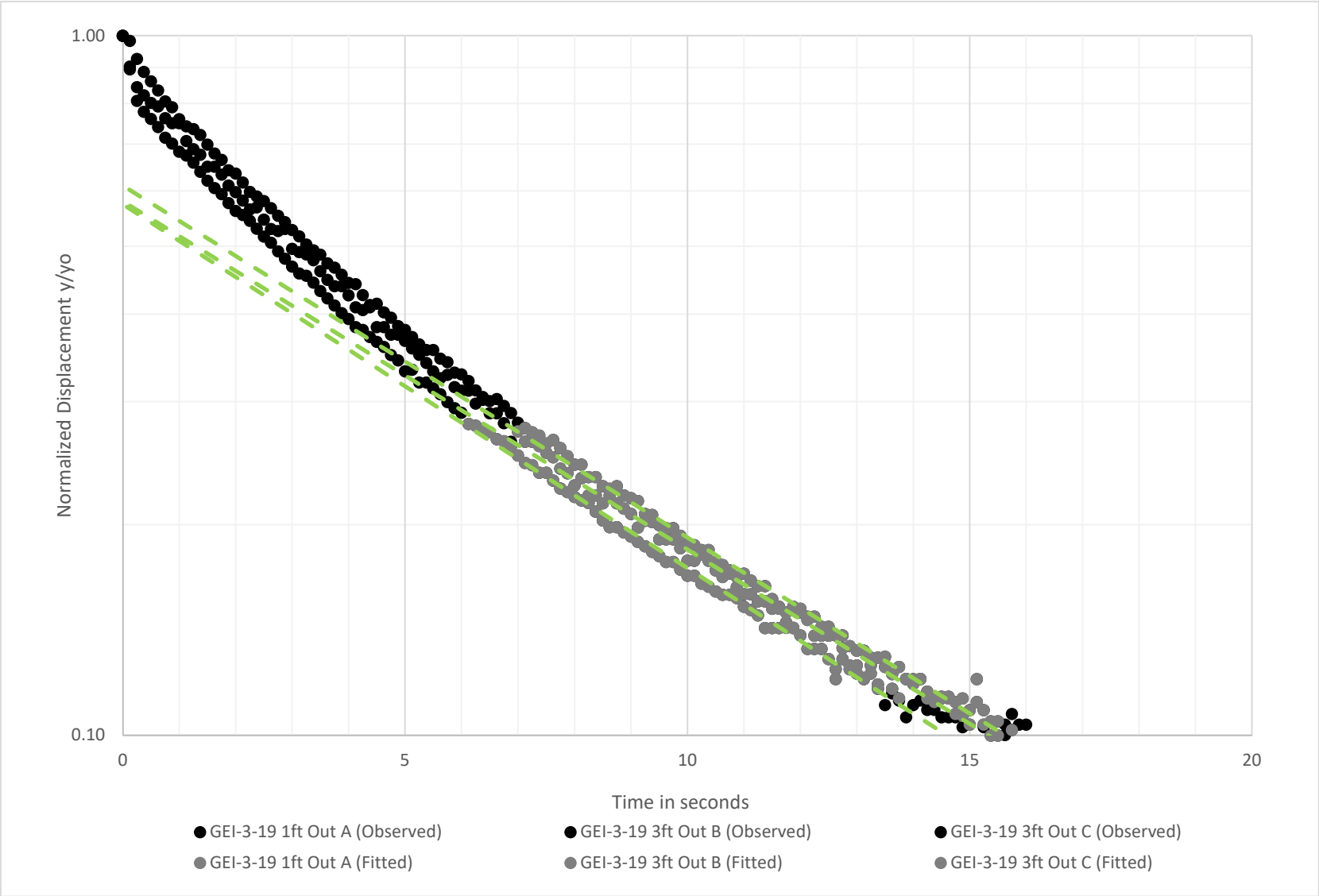
Aspect CONSULTING	Sep-2021	BY: SJA	FIGURE NO.
	PROJECT NO. 190545	REVISED BY: -	3

CAD Path: Q:\City of Bellevue\190545 Factoria Blvd\2021-09 Geotechnical Design Report\190545-02 Site and Exploration Plan.dwg F3 - Proposed Site Plan || Date Saved: Sep 29, 2021 9:40pm || User: sambauen



Aspect Consulting
06/23/2021
\\seafps\Projects\City of Bellevue\Factoria Blvd Storm Conveyance\Report Drafts\Geotechnical Design Report

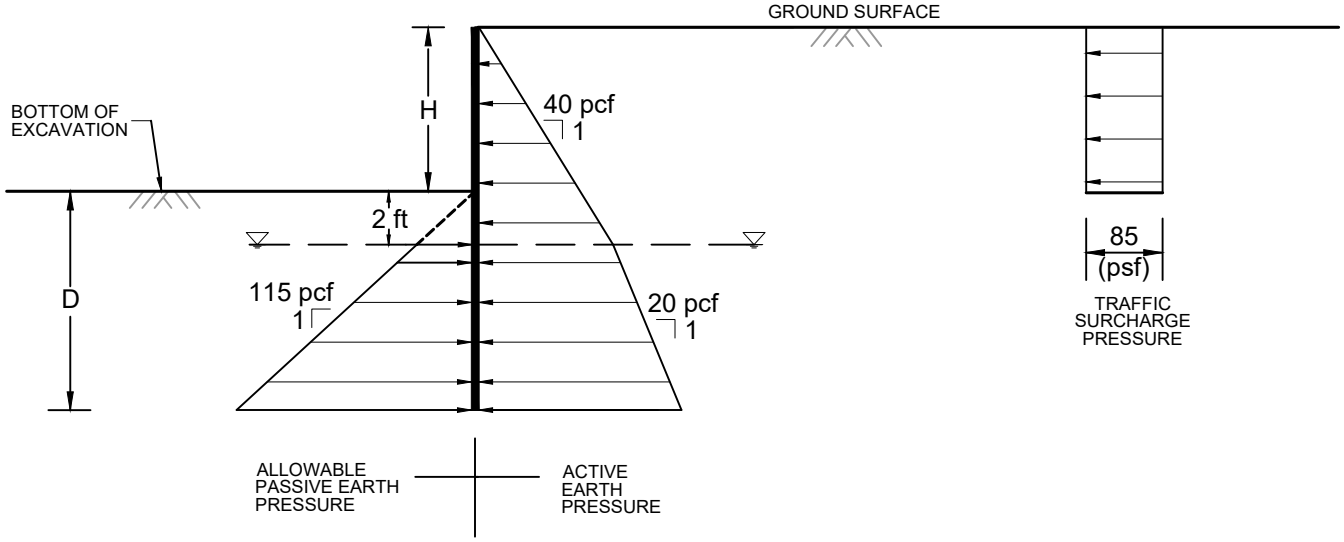
Figure 4
GEI 1-19 Slug Response
190545-B The City of Bellevue



Aspect Consulting
6/23/2021
\\seafps\Projects\City of Bellevue\Factoria Blvd Storm Conveyance\Report Drafts\Geotechnical Design Report

Figure 5
GEI 3-19 Slug Response
190545-B The City of Bellevue

EARTH PRESSURES FOR TEMPORARY SHORING WALLS



NOT TO SCALE

NOTES

1. EARTH PRESSURES ARE SHOWN AS EQUIVALENT FLUID DENSITIES IN POUNDS PER CUBIC FOOT (PCF), LINEAR DIMENSIONS IN FEET (FT). SURCHARGE PRESSURES ARE SHOWN IN POUNDS PER SQUARE FOOT (PSF).
2. AN EXCAVATION DEPTH, H, OF UP TO 15 FT AND LEVEL GROUND CONDITIONS ARE ASSUMED.
3. EARTH PRESSURES ASSUME EXCAVATION AND SHORING METHODS THAT RESULT IN THE ACTIVE EARTH PRESSURE CONDITION.
4. PASSIVE RESISTANCE SHOULD BE NEGLECTED WITHIN 2 FT OF THE BASE OF EXCAVATION.
5. EARTH PRESSURES ASSUME CONSTRUCTION DEWATERING TO A DEPTH OF 2 FEET BELOW BASE OF EXCAVATION.
6. ALLOWABLE PASSIVE EARTH PRESSURE INCLUDES A FACTOR OF SAFETY OF 1.5.
7. REFER TO TEXT FOR ADDITIONAL TEMPORARY SHORING CONSIDERATIONS AND DETAILS.
8. EARTH PRESSURES ARE APPROPRIATE FOR TEMPORARY CANTILEVERED (UNBRACED) SHORING WALLS.
9. SURCHARGE LOADING BEYOND STANDARD TRAFFIC LOADS (INCLUDED ABOVE) SHOULD BE DETERMINED ON A CASE BY CASE BASIS USING FIGURE 8.

Legend

H = Height of Excavation (Feet)
D = Shoring Embedment Below Excavation (Feet)

DRAFT

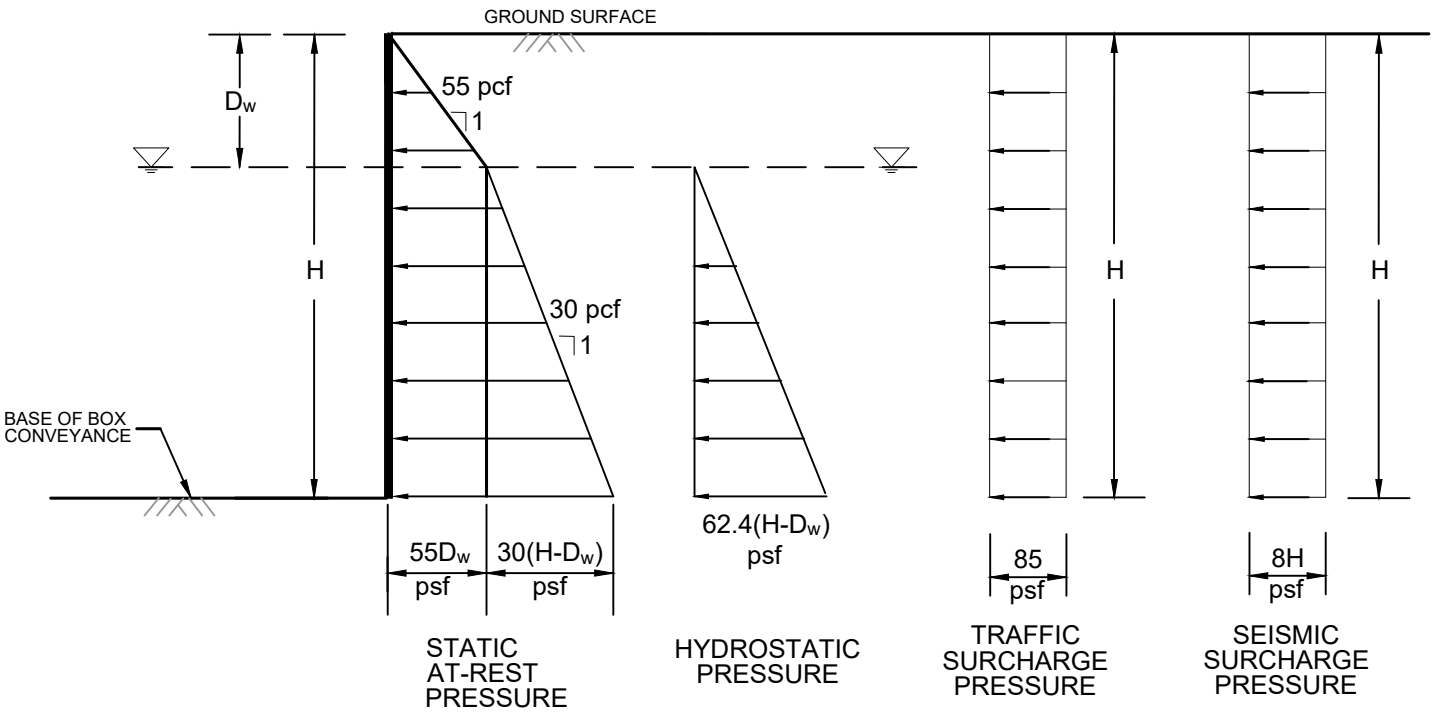
Temporary Shoring Walls
Earth Pressure Diagram

Factoria Boulevard Stormwater Conveyance Improvements Project
Bellevue, Washington

Aspect CONSULTING	Oct-2021	BY: SJA	FIGURE NO.
	PROJECT NO. 190545	REVISED BY: -	6

CAD Path: S:\City of Bellevue\Factoria Blvd Storm Conveyance\Data\Analyses\Lateral Earth Pressures\Temp Shoring and Box Wall EPD_2021.10.01.dwg 06 - Temp Shoring Wall || Date Saved: Oct 01, 2021 11:13pm || User: sambauen

EARTH PRESSURES FOR BOX CONVEYANCE STRUCTURE WALLS



NOT TO SCALE

NOTES

1. EARTH PRESSURES ARE IN POUNDS PER SQUARE FOOT (PSF), LINEAR DIMENSIONS IN FEET (FT).
2. A DEPTH, H, OF UP TO 12 FT AND LEVEL GROUND CONDITIONS ARE ASSUMED.
3. EARTH PRESSURES ASSUME AT-REST EARTH PRESSURE CONDITIONS.
4. DESIGN GROUNDWATER LEVEL IS ASSUMED TO BE ELEVATION 80 FEET.
5. REFER TO TEXT FOR ADDITIONAL BOX CONVEYANCE STRUCTURE WALL CONSIDERATIONS AND DETAILS.
6. SURCHARGE LOADING BEYOND STANDARD TRAFFIC LOADS SHOULD BE DETERMINED ON A CASE BY CASE BASIS USING FIGURE 8.

Legend

H = Height of Permanent Basement Wall (Feet)
D_w = Depth to Groundwater (Feet)

DRAFT

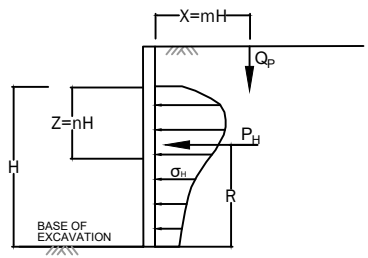
Box Conveyance Structure Walls
Earth Pressure Diagram

Factoria Boulevard Stormwater
Conveyance Improvements Project
Bellevue, Washington

Aspect CONSULTING	Oct-2021	BY: SJA	FIGURE NO.
	PROJECT NO. 190545	REVISED BY: -	7

CAD Path: S:\City of Bellevue\Factoria Blvd Storm Conveyance\Data\Analyses\Lateral Earth Pressures\Temp Shoring and Box Wall EPD_2021.10.01.dwg 07_Box Conveyance Walls || Date Saved: Oct 01, 2021 11:13pm ||
User: sambauen

LATERAL EARTH PRESSURE FROM POINT LOAD, Q_P (SPREAD FOOTING)



FOR $m \le 0.4$

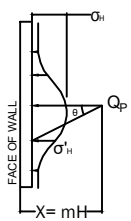
$$\sigma_H = \frac{0.28\, Q_P\, n^2}{H^2\,(0.16 + n^2)^3}$$

FOR $m > 0.4$

$$\sigma_H = \frac{1.77\, Q_P\, m^2\, n^2}{H^2\,(m^2 + n^2)^3}$$

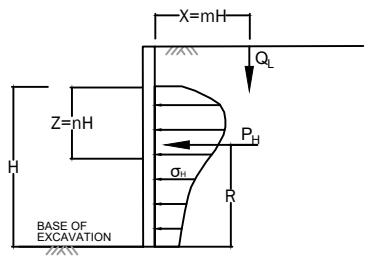
$$\sigma'_H = \sigma_H \cos^2(1.1\,\theta)$$

M	$P_H\left(\frac{H}{Q_P}\right)$	R
0.2	0.78	0.59H
0.4	0.78	0.59H
0.6	0.45	0.48H



Pressures from Point Load Q_P

LATERAL EARTH PRESSURE FROM LINE LOAD, Q_L (CONTINUOUS WALL FOOTING)



FOR $m \le 0.4$

$$\sigma_H = \frac{0.2\, Q_L\, n}{H\,(0.16 + n^2)^2}$$

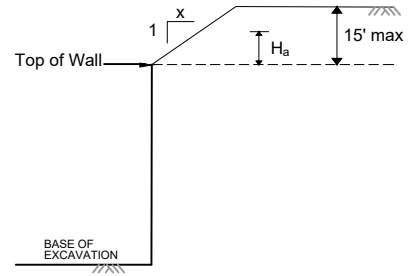
FOR $m > 0.4$

$$\sigma_H = \frac{1.28\, Q_L\, m^2\, n}{H\,(m^2 + n^2)^2}$$

RESULTANT $P_H = \dfrac{0.64\, Q_L}{(m^2 + 1)}$

M	R
0.1	0.60H
0.3	0.60H
0.5	0.56H
0.7	0.48H

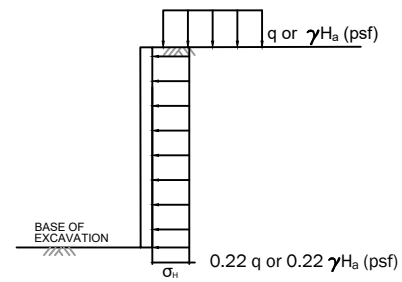
EFFECTIVE HEIGHT, H_a, FOR SLOPED CUTS ABOVE WALL



x	Slope Height, ft 5	10	15
1	5	9	12
1 1/2	4	7	9

Values of H_a

UNIFORM SURCHARGES, q
(FLOOR LOADS, LARGE FOUNDATION ELEMENTS)



σ_H = LATERAL SURCHARGE PRESSURE FROM UNIFORM SURCHARGE

NOTES

1. Procedures for estimating surcharge pressures shown above are based on Manual 7.02 Naval Facilities Engineering Command, September 1986 (NAVFAC DM 7.02).
2. Lateral earth pressures from surcharge should be added to the earth pressures recommended in Figures 6 and 7 on a case-by-case basis..
3. See report text for where surcharge pressures are appropriate.

DRAFT

Legend

Q_P	=	Point load (lbs)	R	=	Distance from base of excavation to resultant lateral force (ft)
Q_L	=	Line load (lbs/ft)			
H	=	Excavation height below footing (ft)	X	=	Resultant lateral force acting on wall (lbs)
σ_H	=	Lateral earth pressure from surcharge (psf)	Z	=	Depth of σ_H to be evaluated below the bottom of Q_P or Q_L (ft)
q	=	Surcharge pressure (psf)			
θ	=	Radians	m	=	Ratio of X to H
σ'_H	=	Distribution of σ_H in plan view	n	=	Ratio of Z to H
P_H	=	Resultant lateral force acting on wall (lbs)			

Recommended Surcharge Pressures

Factoria Boulevard Stormwater
Conveyance Improvements Project
Bellevue, Washington

Aspect CONSULTING	Oct-2021	BY: SJA	FIGURE NO.
	PROJECT NO. 190545	REVISED BY: -	8

APPENDIX A

Previous Explorations

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS MORE THAN 50% RETAINED ON NO. 200 SIEVE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS
				SP	POORLY-GRADED SANDS, GRAVELLY SAND
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS MORE THAN 50% PASSING NO. 200 SIEVE	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS, ROCK FLOUR, CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS AND SILTS OF MEDIUM TO HIGH PLASTICITY
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: Multiple symbols are used to indicate borderline or dual soil classifications

ADDITIONAL MATERIAL SYMBOLS

SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
	AC	Asphalt Concrete
	CC	Cement Concrete
	CR	Crushed Rock/ Quarry Spalls
	SOD	Sod/Forest Duff
	TS	Topsoil

Groundwater Contact

Measured groundwater level in exploration, well, or piezometer

Measured free product in well or piezometer

Graphic Log Contact

Distinct contact between soil strata

Approximate contact between soil strata

Material Description Contact

Contact between geologic units

Contact between soil of the same geologic unit

Sampler Symbol Descriptions

- 2.4-inch I.D. split barrel
- Standard Penetration Test (SPT)
- Shelby tube
- Piston
- Direct-Push
- Bulk or grab
- Continuous Coring

Blowcount is recorded for driven samplers as the number of blows required to advance sampler 12 inches (or distance noted). See exploration log for hammer weight and drop.

"P" indicates sampler pushed using the weight of the drill rig.

"WOH" indicates sampler pushed using the weight of the hammer.

Laboratory / Field Tests

%F	Percent fines
%G	Percent gravel
AL	Atterberg limits
CA	Chemical analysis
CP	Laboratory compaction test
CS	Consolidation test
DD	Dry density
DS	Direct shear
HA	Hydrometer analysis
MC	Moisture content
MD	Moisture content and dry density
Mohs	Mohs hardness scale
OC	Organic content
PM	Permeability or hydraulic conductivity
PI	Plasticity index
PL	Point lead test
PP	Pocket penetrometer
SA	Sieve analysis
TX	Triaxial compression
UC	Unconfined compression
VS	Vane shear

Sheen Classification

NS	No Visible Sheen
SS	Slight Sheen
MS	Moderate Sheen
HS	Heavy Sheen

NOTE: The reader must refer to the discussion in the report text and the logs of explorations for a proper understanding of subsurface conditions. Descriptions on the logs apply only at the specific exploration locations and at the time the explorations were made; they are not warranted to be representative of subsurface conditions at other locations or times.

DRAFT

Key to Exploration Logs

GEOENGINEERS

Figure A-1

Drilled	Start 8/19/2019	End 8/19/2019	Total Depth (ft)	26.5	Logged By / Checked By	CAH / HRP	Driller	Advance Drill Technologies, Inc.	Drilling Method	Hollow-stem Auger

Hammer Data	Autohammer 140 (lbs) / 30 (in) Drop	Drilling Equipment	Diedrich D-50 Turbo track-mounted drill rig
Surface Elevation (ft) Vertical Datum	86.99 NAVD88	Top of Casing Elevation (ft)	86.66
Latitude Longitude	47° 34' 42.2364" -122° 10' 08.292"	Horizontal Datum	WA State Plane North NAD83 (feet)

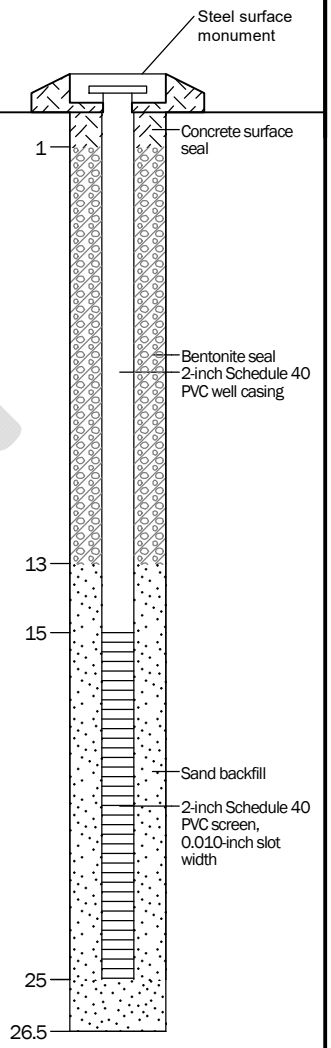
DOE Well I.D.: BKU 959
A 2-in well was installed on 8/19/2019 to a depth of 25 ft.

Groundwater Date Measured	Depth to Water (ft)	Elevation (ft)
10/24/2019	8.02	78.64

Notes:

Elevation (feet)	Depth (feet)	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name / Testing	Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)
	0								AC	Asphalt concrete pavement, 3 inches thick		
									CR	Crushed rock base course, 3 inches thick		
85									SM	Brown silty fine to medium sand with gravel (medium dense, moist) (fill)		
		X	14	20		1			SP	Gray fine to medium sand (medium dense, moist)		
	5	X	10	14		2			SP-SM	Dark gray fine to medium sand with silt and gravel (medium dense, moist)		
80							▼					
	10	X	18	5		3 / AL			CH	Light gray fat clay (medium stiff, moist) (alluvial deposits)	47	
75												
	15	X	18	3		4 / %F			CH	Brown and gray fat clay with interbeds of fine sand (soft, wet)	30	78
70												
	20	X	18	31		5 / SA			SM	Brown silty fine to medium sand (medium dense to dense, wet) (recessional outwash)	16	17
65												
	25	X	18	26		6						

WELL LOG



Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on October 2019 survey by Parametrix. Vertical approximated based on October 2019 survey by Parametrix.

DRAFT

Log of Monitoring Well GEI 1-19

GeoEngineers

Project: Factoria Boulevard Storm Conveyance Improvement Project
Project Location: Bellevue, Washington
Project Number: 0526-224-00

Figure A-2
Sheet 1 of 1

Date:11/12/19 Path:P:\0\0526224\GINT\052622400 T2302.GPJ DBLibrary/Library:GEOENGINEERS_DF_STD_US_JUNE_2017.GLB/GEI8_GEOTECH_WELL_%F

Drilled	Start 8/19/2019	End 8/19/2019	Total Depth (ft) 26.5	Logged By CAH / Checked By HRP	Driller Advance Drill Technologies, Inc.	Drilling Method Hollow-stem Auger
Surface Elevation (ft) / Vertical Datum	87 NAVD88		Hammer Data	Autohammer 140 (lbs) / 30 (in) Drop	Drilling Equipment	Diedrich D-50 Turbo track-mounted drill rig
Latitude / Longitude	47° 52' 38.1108" -122° 10' 09.1668"		System Datum	WA State Plane North NAD83 (feet)	See "Remarks" section for groundwater observed	

Notes:

Elevation (feet)	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name / Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
	0						AC	Asphalt concrete pavement, 5 inches thick			
85							SM	Dark brown silty fine to coarse sand with gravel (medium dense, moist) (fill)			
		18	68*		1						*Blow count not representative due to driving on gravel
	5	18	17		2		ML	Dark brown-gray sandy silt (very stiff, moist)			
80							SP	Brown fine to medium sand with silt (medium dense, moist)			
							CL	Dark brown sandy lean clay with organic matter (very stiff, moist) (alluvial deposits)			
	10	18	7		3 MC; DIPRA		SM	Light gray-brown silty fine to medium sand (loose, moist to wet)	25		
75											
	15	18	18		4 DIPRA		SP-SM	Brown fine to medium sand with silt interbeds (medium dense, wet)			Groundwater seepage encountered at 15½ feet below ground surface during drilling
70											
	20	18	25		5 SA		SP	Brown fine to medium sand (medium dense to dense, wet) (recessional outwash)	18	5	
65											
	25	18	36		6						

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on October 2019 survey by Parametrix. Vertical approximated based on October 2019 survey by Parametrix.

DRAFT

Log of Boring GEI 2-19

GeoEngineers

Project: Factoria Boulevard Storm Conveyance Improvement Project
Project Location: Bellevue, Washington
Project Number: 0526-224-00

Figure A-3
Sheet 1 of 1

Date:11/12/19 Path:P:\0\0526224\GINT\052622400 T2302.GPJ DBLibrary/Library:GEOENGINEERS_DF_STD_US_JUNE_2017.GLB/GEI8_GEOTECH_STANDARD_%F_NO_GW

Drilled	Start 8/19/2019	End 8/19/2019	Total Depth (ft) 26.5	Logged By CAH / Checked By HRP	Driller Advance Drill Technologies, Inc.	Drilling Method Hollow-stem Auger

Hammer Data	Autohammer 140 (lbs) / 30 (in) Drop	Drilling Equipment	Diedrich D-50 Turbo track-mounted drill rig
Surface Elevation (ft) Vertical Datum	87.59 NAVD88	Top of Casing Elevation (ft)	87.25
Latitude Longitude	47° 34' 38.096" -122° 10' 09.1812"	Horizontal Datum	WA State Plane North NAD83 (feet)

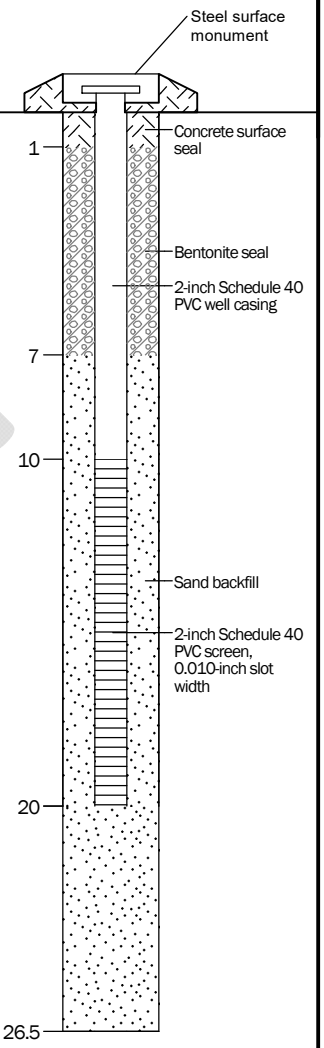
DOE Well I.D.: BKU 960
A 2-in well was installed on 8/19/2019 to a depth of 20 ft.

Groundwater Date Measured	Depth to Water (ft)	Elevation (ft)
10/24/2019	8.16	79.09

Notes:

Elevation (feet)	Depth (feet)	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name / Testing	Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)
	0								AC	Asphalt concrete pavement, 2½ inches thick		
									SP-SM	Brown fine to medium sand with silt and occasional gravel (loose to medium dense, moist) (fill)		
85		☒	18	12		1						
	5	☒	18	4		2						
80							▼		CL	Orange, brown and gray sandy lean clay (soft to medium stiff, moist) (alluvial deposits)		
	10	☒	18	4		3 AL; DIPRA					46	
75												
	15	☒	18	4		4 DIPRA			SP-SM	Brown fine to medium sand with silt (loose, wet)		
70												
	20	☒	18	27		5 %F			SP	Brown fine to medium sand (medium dense, wet) (recessional outwash)	21	3
65												
	25	☒	18	52		6			SM	Brown silty fine to medium sand with occasional gravel (very dense, moist)		

WELL LOG



Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on October 2019 survey by Parametrix. Vertical approximated based on October 2019 survey by Parametrix.

DRAFT

Log of Monitoring Well GEI 3-19

GeoEngineers

Project: Factoria Boulevard Storm Conveyance Improvement Project
Project Location: Bellevue, Washington
Project Number: 0526-224-00

Figure A-4
Sheet 1 of 1

Date:11/12/19 Path:P:\0\0526224\GINT\052622400 T2302.GPJ DBLibrary/Library:GEOENGINEERS_DF_STD_US_JUNE_2017.GLB/GEI8_GEOTECH_WELL_%F

Date Excavated 8/19/2019	Total Depth (ft) 2	Logged By CAH Checked By HRP	Excavator Equipment Hand auger	Groundwater not observed Caving not observed
Surface Elevation (ft) 82 Vertical Datum NAVD88		Latitude Longitude		Coordinate System Horizontal Datum

Elevation (feet)	Depth (feet)	SAMPLE Testing Sample	SAMPLE Sample Name / Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
81	1		1		SP-SM	Light brown fine to medium sand with silt, occasional gravel and organic matter (loose, moist) (fill)			
80	2		2 MC				11		

Hand auger terminated at approximately 2 feet in three different locations; hand auger encountered cobble/boulder

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on Google Earth. Vertical approximated based on interpolation from topographic contours.

DRAFT

Log of Hand Auger HA-1

GeoEngineers

Project: Factoria Boulevard Storm Conveyance Improvement Project
Project Location: Bellevue, Washington
Project Number: 0526-224-00

Figure A-5
Sheet 1 of 1

Date:9/17/19 Path:P:\0\0526224\GINT\05262400 T2302.GPJ DBLibrary/Library:GEOENGINEERS_DF_STD_US_JUNE_2017.GLB/GEI8_TESTPIT_1P_GEOTEC_%F

Date Excavated 8/19/2019	Total Depth (ft) 8	Logged By CAH Checked By HRP	Excavator Equipment Hand auger	See "Remarks" section for groundwater observed Caving not observed
Surface Elevation (ft) 77 Vertical Datum NAVD88		Latitude Longitude		Coordinate System Horizontal Datum

Elevation (feet)	Depth (feet)	Testing Sample	Sample Name / Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
			1		SM	Dark brown silty fine to medium sand with gravel and roots (loose, moist) (topsoil)			
76	1		2		SP	Brown fine to medium sand (loose, moist) (alluvial deposits)			
75	2				ML	Dark brown sandy silt with organic matter and lenses of peat (soft to medium stiff, wet)	76		
74	3		3 MC						Groundwater seepage observed at 3 feet during excavation
73	4		4						
72	5								
71	6								
70	7								
69	8								

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on Google Earth. Vertical approximated based on interpolation from topographic contours.

DRAFT

Log of Hand Auger HA-2

GeoEngineers

Project: Factoria Boulevard Storm Conveyance Improvement Project
Project Location: Bellevue, Washington
Project Number: 0526-224-00

Figure A-6
Sheet 1 of 1

Date:9/17/19 Path:P:\0\0526224\GINT\05262400 T2302.GPJ DBLibrary/Library:GEOENGINEERS_DF_STD_US_JUNE_2017.GLB/GEI8_TESTPIT_1P_GEOTEC_%F

Date Excavated 8/19/2019	Total Depth (ft) 8	Logged By CAH Checked By HRP	Excavator Equipment Hand auger	See "Remarks" section for groundwater observed Caving not observed
Surface Elevation (ft) 78 Vertical Datum NAVD88		Latitude Longitude		Coordinate System Horizontal Datum

Elevation (feet)	Depth (feet)	SAMPLE Testing Sample	SAMPLE Sample Name / Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
					ML	Brown sandy silt with roots (medium stiff, moist) (topsoil)			
77	1		1 MC				28		
					ML	Brown sandy silt with organic matter (medium stiff, moist) (alluvial deposits)			
76	2								
75	3		2 MC				29		
74	4		3		CL	Gray and light orange-brown lean clay (stiff, wet)			Groundwater seepage observed at 3½ feet during excavation
73	5				CL	Gray lean clay (medium stiff, wet)			
72	6		4						
71	7								
70	8		5						

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on Google Earth. Vertical approximated based on interpolation from topographic contours.

DRAFT

Log of Hand Auger HA-3

GeoEngineers

Project: Factoria Boulevard Storm Conveyance Improvement Project
Project Location: Bellevue, Washington
Project Number: 0526-224-00

Figure A-7
Sheet 1 of 1

Date:9/17/19 Path:P:\0\0526224\GINT\052622400 T2302.GPJ DBLibrary/Library:GEOENGINEERS_DF_STD_US_JUNE_2017.GLB/GEI8_TESTPIT_1P_GEOTEC_%F

Date Excavated 8/30/2019	Total Depth (ft) 10	Logged By CAH Checked By HRP	Excavator Equipment Hand auger	See "Remarks" section for groundwater observed Caving not observed
Surface Elevation (ft) 80 Vertical Datum NAVD88		Latitude Longitude	Coordinate System Horizontal Datum	

Elevation (feet)	Depth (feet)	SAMPLE Testing Sample	SAMPLE Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
					SM	Dark brown silty fine sand with roots (loose, moist) (topsoil)			
79	1				SP-SM	Brown fine to medium sand with silt (loose, moist) (alluvial deposits)			
78	2		1						
77	3				CL	Gray and light brown lean clay with sand (medium stiff, moist)			
76	4		2						
75	5								
74	6		3						
73	7								
72	8		4		SM	Gray silty sand (loose, wet)			
71	9				CH	Gray fat clay (medium stiff, wet)			
70	10		5						Groundwater seepage observed at 10 feet during excavation

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on Google Earth. Vertical approximated based on interpolation from topographic contours.

DRAFT

Date:9/17/19 Path:P:\0\0526224\GINT\052622400 T2302.GPJ DBLibrary/Library:GEOENGINEERS_DF_STD_US_JUNE_2017.GLB/GEI8_TESTPIT_1P_GEOTEC_%F

Log of Hand Auger HA-4

GEOENGINEERS

Project: Factoria Boulevard Storm Conveyance Improvement Project
Project Location: Bellevue, Washington
Project Number: 0526-224-00

Figure A-8
Sheet 1 of 1

Date Excavated 8/30/2019	Total Depth (ft) 3	Logged By CAH Checked By HRP	Excavator Equipment Hand auger	Groundwater not observed Caving not observed
Surface Elevation (ft) 80 Vertical Datum NAVD88		Latitude Longitude		Coordinate System Horizontal Datum

Elevation (feet)	Depth (feet)	SAMPLE Testing Sample	SAMPLE Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
					SM	Brown silty fine sand with roots (loose, moist) (topsoil)			
79	1				SM	Brown silty fine to medium sand (loose, moist) (fill)			
78	2		1						
77	3								

Hand auger terminated at 1 and 3 feet in two different locations; hand auger encountered cobble/boulder

DRAFT

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on Google Earth. Vertical approximated based on interpolation from topographic contours.

Log of Hand Auger HA-5

GEOENGINEERS

Project: Factoria Boulevard Storm Conveyance Improvement Project
Project Location: Bellevue, Washington
Project Number: 0526-224-00

Figure A-9
Sheet 1 of 1

Date:9/17/19 Path:P:\0\0526224\GINT\05262400 T2302.GPJ DBLibrary/Library:GEOENGINEERS_DF_STD_US_JUNE_2017.GLB/GEI8_TESTPIT_1P_GEOTEC_%F

Drilled Start 11/19/2015 End 11/19/2015	Total Depth (ft) 51.5	Logged By NLP Checked By NLT	Driller Geologic Drill Inc.	Drilling Method Hollow-stem Auger
Surface Elevation (ft) Vertical Datum 97		Hammer Data Auto 140 (lbs) / 30 (in) Drop		Drilling Equipment D50 Track Rig
Latitude Longitude		System Datum Geographic		Groundwater: Date Measured / Depth to Water (ft) / Elevation (ft) — See Remarks
Notes: Field screening was completed to a depth of 15 feet; no sheen was observed.				

Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample / Sample Name Testing	Group Classification	MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
0				AC	4-inches hot mix pavement			
				CR	6-inches crushed surface base course			
				SM	Gray silty fine to medium sand with gravel and cobbles (loose, moist) (fill)			
5	12	5	1 p, pH					p = 11,000 ohm-cm, pH = 7.6
10	14	7	2					
				SM	Gray silty fine to medium sand (loose to medium dense, moist)			
15	8	14	3 DS					
	8	7	4					
				CL	Mottled gray clay (medium stiff, moist to wet)			
20	16	9	5 Dipra					Dipra = 1 Groundwater encountered at approximately 21 feet at time of drilling
					With lenses of sand			
				SP-SM	Brown fine to medium sand with silt (loose, wet)			
25	18	2	6	CL	Blue-gray clay (soft, moist to wet)			
				CL	Mottled gray clay with silt (medium stiff, wet)			
				SP	Gray fine to medium sand (loose to medium dense, wet)			
30	18	9	7					Heave
				ML	Light brown silty clay (medium stiff, wet)			
				SP	Gray fine to medium sand (medium dense to dense, moist to wet)			
35	18	28	8 SA			17	5	
40	18	38	9					
45	18	46	10					
				SM	Gray silty fine to medium sand with lenses of sand (very dense, wet)			
50	18	63	11					

Note: Please see Figure A-1 for explanation of symbols

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Log of Boring I-2

GEOENGINEERS

Project: PSE Energize Eastside Phase II Project
Project Location: Bellevue, Washington
Project Number: 0186-871-05

Figure A-5
Sheet 1 of 1

Redmond: Date:4/15/16 Path:P:\0\0186871\GINT\0186871\05.GPJ DBTemplate\LibTemplate:GEOENGINEERS8.GDT/GEI8_GEOTECH_STANDARD_%F

PROJECT: *Factoria Boulevard Improvements* W.O. *1-91M-14133-0* BORING No. *B- 6*

Location: Dirt area, next to retaining wall
Approximate ground surface elevation: ~100 ft

DEPTH (feet)	Soil Description	USCS/USGS GRAPHICS	SAMPLE TYPE	SAMPLE NUMBER	GROUND WATER	PENETRATION RESISTANCE (▲ Standard, ### Blows over inches, △ Other; Blows per foot 0 10 20 30 40 50)	Page 1 of 1 TESTING
0	Medium dense, damp, tan to gray with some oxidation mottling, alternating layers of silty fine SAND and fine to medium SAND.			S-1			
5	Medium dense, damp to saturated, tan, fine to medium SAND.			S-2			
				S-3			
10				S-4	ATD		
15	Blow count overstated due to heaving sand, rod pushed up 10 inches.		no sample	S-5		△	
20	Blow count overstated due to heaving sand, rod pushed up 10 inches.		no sample	S-6		54 △	
25	Boring terminated at 21.5 feet due to heaving sand.						
30							

LEGEND

2.00-inch OD split-spoon sampler

ATD Groundwater level at time of drilling

0 20 40 60 80 100
Plastic Limit — Moisture Content — Liquid Limit

amec
11335 N.E. 122nd Way Suite 100
Kirkland, Washington 98034-6913

Drilling Method: HSA Hammer type: Cathead Date drilled: *August 21, 2001* Logged By: *JdLC*

4IN1 FTORUA2.GPJ WA4IN1.GDT 8/28/01

DRAFT

PROJECT: *Factoria Boulevard Improvements* W.O. *1-91M-14133-0* BORING No. *B-7*

DEPTH (feet)	Soil Description Location: Planter area, 1.0 ft. above sidewalk. Approximate ground surface elevation: ~100 ft	USCS/USGS GRAPHICS	SAMPLE TYPE	SAMPLE NUMBER	GROUND WATER	PENETRATION RESISTANCE (▲ Standard, ▭ Blows over inches, △ Other; Blows per foot 0–50)	Page 1 of 1 TESTING
0	Loose to medium dense, damp, tan-gray, gravelly SAND covered by a 6 inch layer of topsoil and beauty bark (Fill).				N/E		
	Loose to medium dense, moist, tan, fine to medium SAND (Fill).			S-1			
5	Scattered thin lenses of clayey SILT are present.			S-2			
	poorly-graded fine GRAVEL with some sand (Fill).						
	Boring terminated at 7 feet due to refusal on unkown object.						
10							
15							
20							
25							
30							

Plastic Limit — Moisture Content — Liquid Limit (0, 20, 40, 60, 80, 100)

LEGEND

2.00-inch OD split-spoon sampler

N/E No groundwater encountered

DRAFT

amec
11335 N.E. 122nd Way Suite 100
Kirkland, Washington 98034-6913

Drilling Method: HSA Hammer type: Cathead Date drilled: *August 21, 2001* Logged By: *JdLC*

PROJECT: *Factoria Boulevard Improvements* W.O. *1-91M-14133-0* BORING No. *B- 8*

Page 1 of 1

Location: Landscaped area, next to curb
Approximate ground surface elevation: ~100 ft

DEPTH (feet)	Soil Description	SAMPLE NUMBER	GROUND WATER
0	Very loose to loose, damp to wet, tan, silty gravelly SAND (Till Fill).	S-1	
5	Soft to medium stiff, moist to wet, gray with oxidation mottling, clayey SILT with scattered lenses of sand.	S-2	
	Soft to medium stiff, moist to wet, gray, clayey SILT/silty CLAY.	S-3	
10		S-4	ATD
	Medium dense?, saturated, tan, medium SAND with some gravel.		
15	Blow count overstated due to heaving sand.	S-5	
20	heaving sand		
	Boring terminated at 21 feet due to heaving sand.		
25			
30			

USCS/USGS GRAPHICS

SAMPLE TYPE

PENETRATION RESISTANCE
▲ Standard — Blows over inches (#/#) — △ Other
Blows per foot: 0, 10, 20, 30, 40, 50

TESTING

0 20 40 60 80 100
Plastic Limit — Moisture Content — Liquid Limit

LEGEND

2.00-inch OD split-spoon sampler

ATD Groundwater level at time of drilling

DRAFT

amec
11335 N.E. 122nd Way Suite 100
Kirkland, Washington 98034-6913

Drilling Method: HSA Hammer type: Cathead Date drilled: *August 21, 2001* Logged By: *JdLC*

BORING LOG NO. B-1

PROJECT: Factoria Village

CLIENT: Panos Properties, LLC
Seattle, Washington

SITE: 3600 Factoria Blvd SE
Bellevue, Washington

LOCATION See Exhibit A-2

Latitude: 47.5782° Longitude: -122.1689°

Approximate Surface Elev: 88 (Ft.) +/-

DEPTH	ELEVATION (Ft.)	Description
0.2	88+/-	**2 inches ASPHALT**
2.0	86+/-	**SILTY GRAVELLY SAND (SM)**, trace cobbles, gray, medium dense, moist (POSSIBLE FILL)
		SAND (SW-SM), with silt, trace gravel, gray, dense, moist
		grades to medium dense
		grades to very loose, wet
		grades to medium dense
14.0	74+/-	
		SAND (SP-SM), with silt, trace gravel, gray, medium dense, wet
16.5	71.5+/-	
		Boring Terminated at 16.5 Feet

DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	SAMPLE NUMBER	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
			12	13-17-20 N=37	S-1	10		
5			12	8-10-9 N=19	S-2	8		12
	▽		11	2-2-1 N=3	S-3			
10			12	6-9-10 N=19	S-4			
15			9	8-8-9 N=17	S-4			

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Rope & Cathead

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Borings backfilled with bentonite chips upon completion

See Exhibit A-3 for description of field procedures.
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

▽ *8.5' While Drilling*

Terracon
21905 64th Ave. W, Suite 100
Mountlake Terrace, Washington

Boring Started: 9/2/2015
Boring Completed: 9/2/2015
Drill Rig: XL
Driller: Geologic
Project No.: 81155046
Exhibit: A-4

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 81155046 BORING LOGS 9-2-15.GPJ TERRACON2015.GDT 9/23/15

BORING LOG NO. B-2

PROJECT: Factoria Village

CLIENT: Panos Properties, LLC
Seattle, Washington

SITE: 3600 Factoria Blvd SE
Bellevue, Washington

LOCATION See Exhibit A-2

Latitude: 47.578° Longitude: -122.1687°

Approximate Surface Elev: 88 (Ft.) +/-

DEPTH	ELEVATION (Ft.)	Description
0.2	88+/-	**2 inches ASPHALT**
2.0	86+/-	**SAND (SP-SM)**, with silt, trace gravel, brown, medium dense, moist (FILL)
9.5	78.5+/-	**SAND (SW-SM)**, with silt, trace gravel, gray, dense, moist 2" SANDY SILT interbeds, trace organics from 5.5 to 6.5 feet
14.0	74+/-	**SANDY SILT (ML)**, trace organics, gray with orange mottling, medium stiff, wet
16.5	71.5+/-	**SILT (ML)**, with 2" SILTY SAND interbeds, gray, medium stiff, wet
		Boring Terminated at 16.5 Feet

DEPTH (Ft.)	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	SAMPLE NUMBER	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
		13	7-18-22 N=40	S-1	7		12
5		12	4-17-27 N=44	S-2	11		
		12	10-19-17 N=36	S-3	10		
10		13	4-6-7 N=13	S-4	29		
15		13	7-6-7 N=13	S-4			

WATER LEVEL OBSERVATIONS: ▽ 14' While Drilling

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Rope & Cathead

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Borings backfilled with bentonite chips upon completion

See Exhibit A-3 for description of field procedures.
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS
14' While Drilling

Terracon
21905 64th Ave. W, Suite 100
Mountlake Terrace, Washington

Boring Started: 9/2/2015 | Boring Completed: 9/2/2015
Drill Rig: XL | Driller: Geologic
Project No.: 81155046 | Exhibit: A-5

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 81155046 BORING LOGS 9-2-15.GPJ TERRACON2015.GDT 9/23/15

BORING LOG NO. B-3

PROJECT: Factoria Village

CLIENT: Panos Properties, LLC
Seattle, Washington

SITE: 3600 Factoria Blvd SE
Bellevue, Washington

LOCATION See Exhibit A-2

Latitude: 47.5778° Longitude: -122.169°

Approximate Surface Elev: 88 (Ft.) +/-

DEPTH	ELEVATION (Ft.)	DESCRIPTION
0.2	88+/-	**2 inches ASPHALT**
		SAND (SP-SM), with silt, trace gravel, brown, dense, moist (POSSIBLE FILL)
7.0	81+/-	**SILTY SAND (SM)**, trace gravel and organics, gray, medium dense, moist to wet
16.5	71.5+/-	***Boring Terminated at 16.5 Feet***

DEPTH (Ft.)	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	SAMPLE NUMBER	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
		13	17-21-21 N=42	S-1	5		
5		12	12-21-23 N=44	S-2			
		12	3-6-7 N=13	S-3	15		23
10		12	7-12-7 N=19	S-4	18		
15		9	3-5-7 N=12	S-4			

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Rope & Cathead

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Borings backfilled with bentonite chips upon completion

See Exhibit A-3 for description of field procedures.
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

15' While Drilling

Terracon
21905 64th Ave. W, Suite 100
Mountlake Terrace, Washington

Boring Started: 9/2/2015
Boring Completed: 9/2/2015
Drill Rig: XL
Driller: Geologic
Project No.: 81155046
Exhibit: A-6

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 81155046 BORING LOGS 9-2-15.GPJ TERRACON2015.GDT 9/23/15

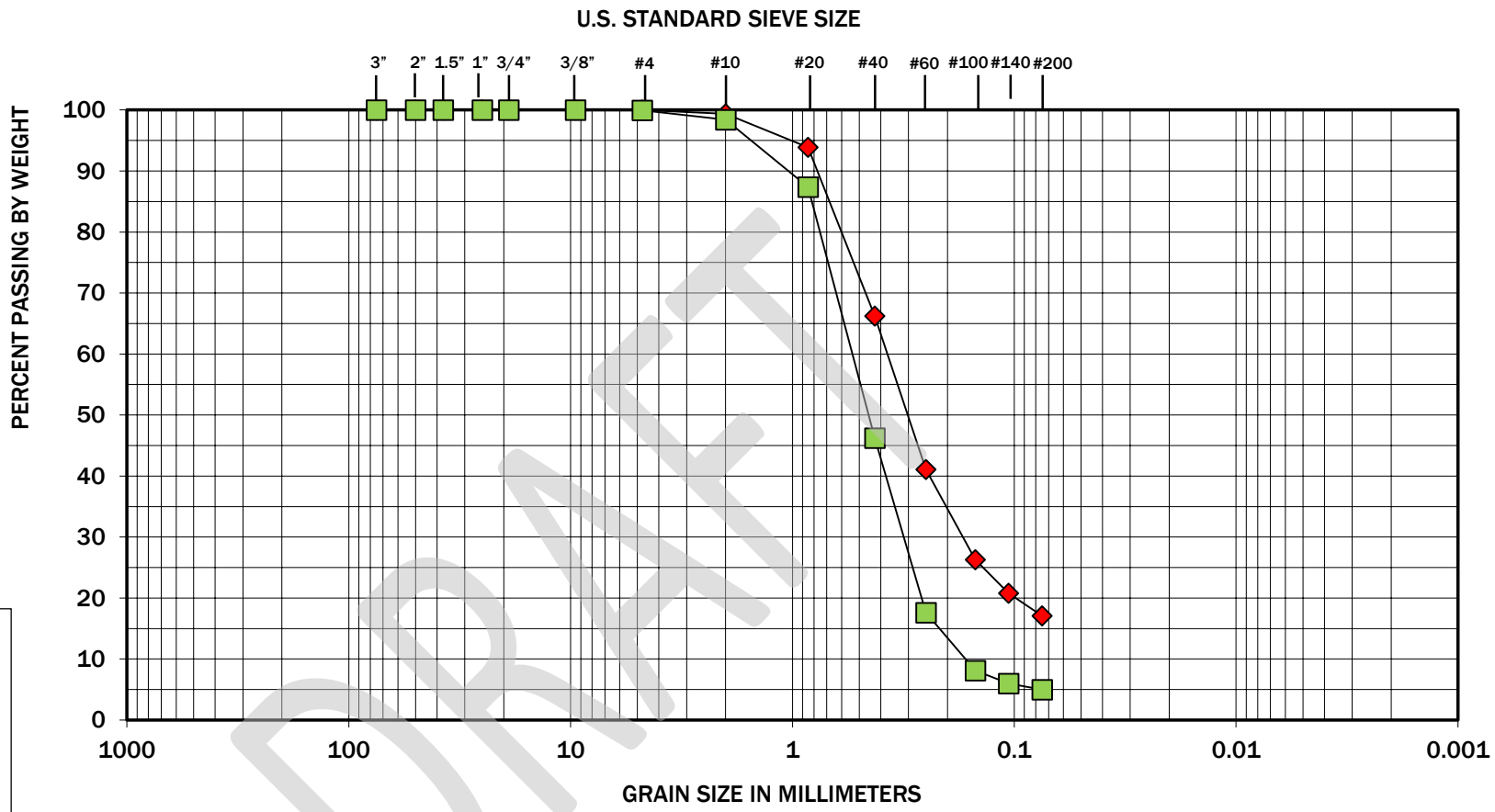
APPENDIX B

Previous Geotechnical Laboratory Testing

TABLE B-1. CORROSION EVALUATION TEST DATA

Boring	Sample	Depth (feet)	Resistivity (Ohm-cm)	pH	Redox Potential (millivolts)	Sulfides
GEI 1-19	3	10½	6,400	8.5	238	Negative
GEI 2-19	4	15	15,000	7.0	282	Negative
GEI 3-19	3	10	6,500	6.8	329	Negative
GEI 3-19	4	15	7,600	6.4	325	Negative

DRAFT



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Symbol	Boring Number	Depth (feet)	Moisture (%)	Soil Description
◆	GEI 1-19	20	16	Silty fine to medium sand (SM)
■	GEI 2-19	20	18	Fine to medium sand (SP)

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The grain size analysis results were obtained in general accordance with ASTM D 6913. GeoEngineers 17425 NE Union Hill Road Ste 250, Redmond, WA 98052

AASHTO ACCREDITED

DRAFT

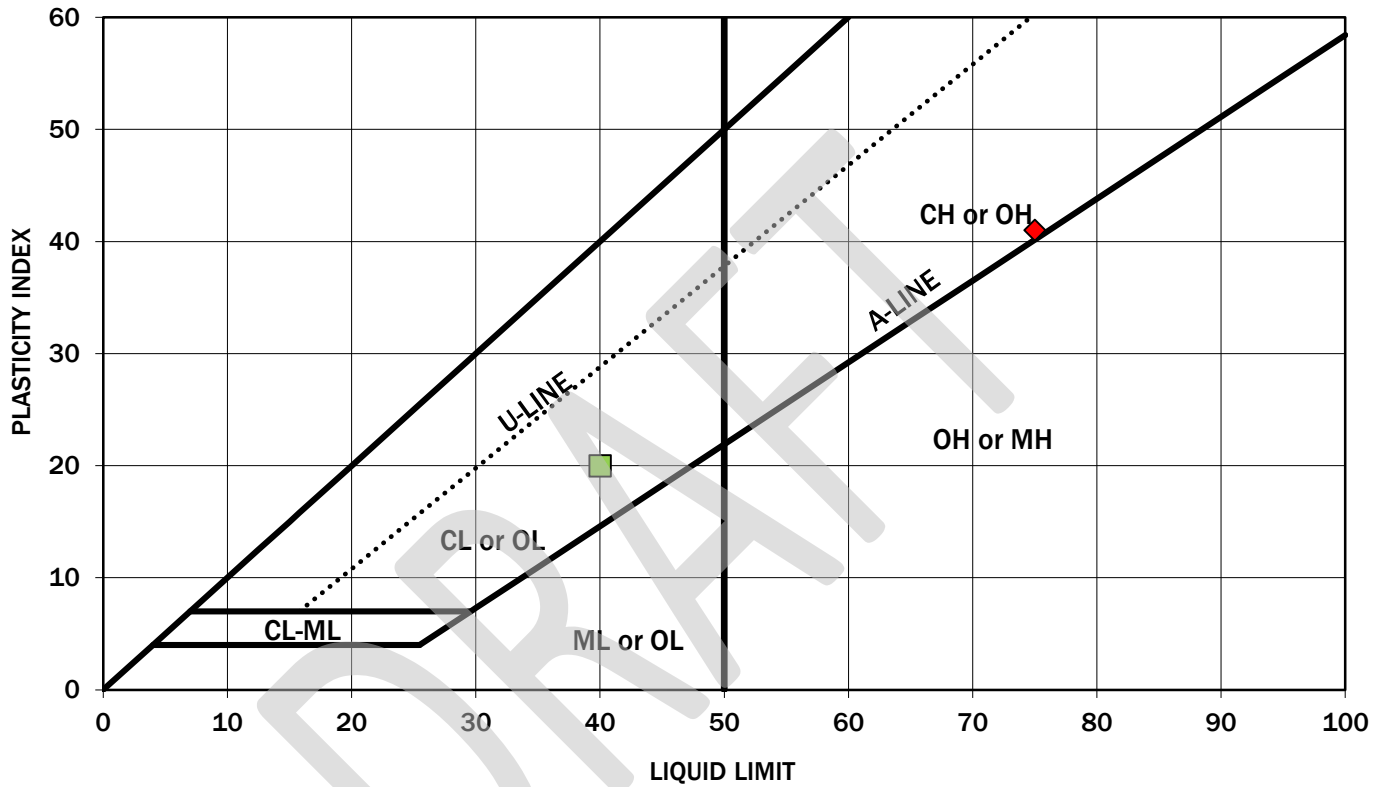
GEOENGINEERS

Figure B-1

Factoria Boulevard Storm Conveyance Improvement Project
Bellevue, Washington

Sieve Analysis Results

PLASTICITY CHART



Symbol	Boring Number	Depth (feet)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Soil Description
◆	GEI 1-19	10½	47	75	41	Fat clay (CH)
■	GEI 3-19	10	46	40	20	Sandy lean clay (CL)

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Atterberg Limits Test Results

Factoria Boulevard Storm Conveyance Improvement Project
Bellevue, Washington

GEOENGINEERS

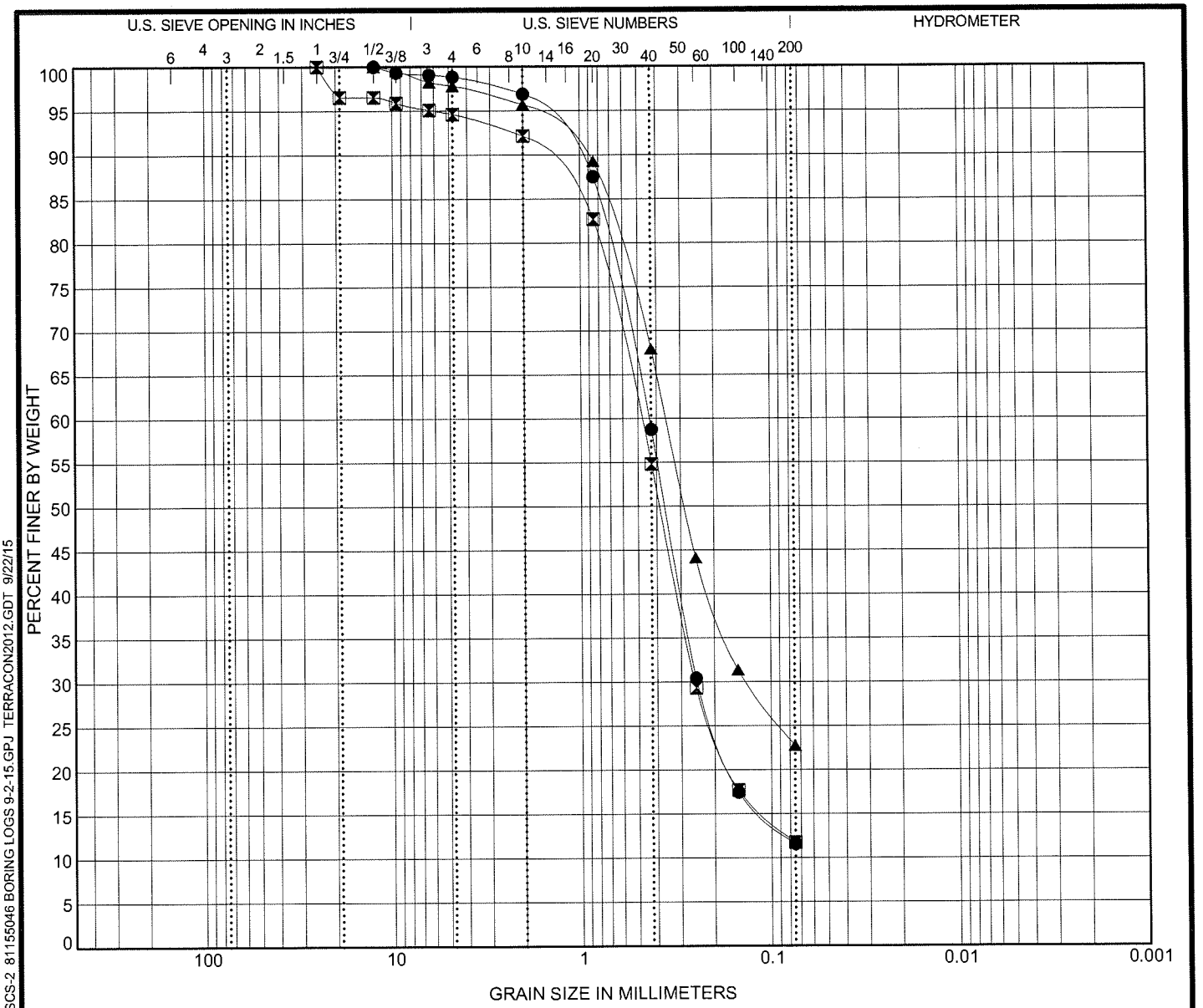
Figure B-2

DRAFT

0526-224-00 Date Exported: 8/27/19

GRAIN SIZE DISTRIBUTION

ASTM D422



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Boring ID	Depth	USCS Classification	LL	PL	PI	Cc	Cu
●	B-1	5 - 6.5	SAND (SW-SM), with silt, trace gravel				2.22	7.04
⧗	B-2	2.5 - 4	SAND (SW-SM), with silt, trace gravel				2.18	7.92
▲	B-3	7.5 - 9	SILTY SAND (SM), trace gravel					

	Boring ID	Depth	D_{100}	D_{60}	D_{30}	D_{10}	%Gravel	%Sand	%Fines
●	B-1	5 - 6.5	12.5	0.438	0.246		1.2	87.3	11.6
⧗	B-2	2.5 - 4	25	0.483	0.253		5.4	82.8	11.8
▲	B-3	7.5 - 9	12.5	0.356	0.134		2.2	75.0	22.8

PROJECT: Factoria Village

SITE: 3600 Factoria Blvd SE
Bellevue, Washington

Terracon
21905 64th Ave. W, Suite 100
Mountlake Terrace, Washington

PROJECT NUMBER: 81155046

CLIENT: Panos Properties, LLC
Seattle, Washington

EXHIBIT: B-2

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GRAIN SIZE: USCS-2 81155046 BORING LOGS 9-2-15.GPJ TERRACON2012.GDT 9/22/15

APPENDIX C

Presentation of Site Investigation Results

C. Presentation of Site Investigation Results

CPT Data Report by ConeTec

On September 7, 2021, Aspect completed three cone penetration tests (CPTs), designated ACPT-01, ACPT-02, and ACPT-03, to depths of up to 26 feet below grade. The CPTs were completed using a C20-30Ton Truck Rig operated by subcontractor ConeTec in accordance with ASTM International (ASTM) D-5778-07, Standard Test Method for Electronic Friction Cone and Piezocone Penetration Testing of Soils (ASTM, 2018)

The cone penetrometer was fitted with an instrumented tip that collected tip resistance (resistance to soil penetration developed at the cone tip), friction resistance (resistance to soil penetration developed along the friction sleeve), and pore water pressure behind the cone tip, as the cone was advanced through the subsurface. The data collected provides information by which the density/consistency and soil type may be correlated. A detailed CPT investigation data report with explorations logs and raw data generated by the CPT probes is presented in this appendix.

PRESENTATION OF SITE INVESTIGATION RESULTS

Factoria Blvd Storm Conveyance

Prepared for:

Aspect Consulting, LLC

last three figures labeled "Equinox Redevelopment", FYI

ConeTec Job No: 21-59-22979

Project Start Date: 07-SEP-2021
Project End Date: 08-SEP-2021
Report Date: 10-SEP-2021

Prepared by:

ConeTec Inc.
1508 O Street SW, Unit 103-104
Auburn, WA 98001

Tel: (253) 397-4861

ConeTecWA@conetec.com
www.conetec.com
www.conetecdataservices.com

Introduction

The enclosed report presents the results of the site investigation program conducted by ConeTec Inc. for Aspect Consulting, LLC. near 3628 Factoria Blvd SE, Bellevue WA 98006. The program consisted of cone penetration tests.

Project Information

Project	
Client	Aspect Consulting, LLC
Project	Factoria Blvd Storm Conveyance
ConeTec project number	21-59-22979

An aerial overview from Google Earth including the CPTu test locations is presented below.

Rig Description	Deployment System	Test Type
C20-30Ton Truck Rig	Integrated Push Cylinders	CPTu

Coordinates		
Test Type	Collection Method	EPSG Number
CPTu	Consumer grade GPS	4326

Cone Penetrometers Used for this Project						
Cone Description	Cone Number	Cross Sectional Area (cm^2)	Sleeve Area (cm^2)	Tip Capacity (bar)	Sleeve Capacity (bar)	Pore Pressure Capacity (bar)
780:T1500F15U35	EC780	15	225	1500	15	35
Cone 780 was used for all CPTu soundings.						

Cone Penetration Test (CPTu)	
Depth reference	Depths are referenced to the existing ground surface at the time of each test.
Tip and sleeve data offset	0.1 meter This has been accounted for in the CPT data files.
Additional plots	• Advanced plots with Ic, Su, phi and N(60)/N1(60) • Soil Behaviour Type (SBT) scatter plots

Calculated Geotechnical Parameter Tables	
Additional information	The Normalized Soil Behaviour Type Chart based on Q_{tn} (SBT Q_{tn}) (Robertson, 2009) was used to classify the soil for this project. A detailed set of calculated CPTu parameters have been generated and are provided in Excel format files in the release folder. The CPTu parameter calculations are based on values of corrected tip resistance (q_t) sleeve friction (f_s) and pore pressure (u_2). Effective stresses are calculated based on unit weights that have been assigned to the individual soil behaviour type zones and the assumed equilibrium pore pressure profile.

Limitations

This report has been prepared for the exclusive use of Aspect Consulting, LLC (Client) for the project titled "Factoria Blvd Storm Conveyance". The report's contents may not be relied upon by any other party without the express written permission of ConeTec Inc. (ConeTec). ConeTec has provided site investigation services, prepared the factual data reporting and provided geotechnical parameter calculations consistent with current best practices. No other warranty, expressed or implied, is made.

The information presented in the report document and the accompanying data set pertain to the specific project, site conditions and objectives described to ConeTec by the Client. In order to properly understand the factual data, assumptions and calculations, reference must be made to the documents provided and their accompanying data sets, in their entirety.

Cone penetration tests (CPTu) are conducted using an integrated electronic piezocone penetrometer and data acquisition system manufactured by Adara Systems Ltd., a subsidiary of ConeTec.

ConeTec's piezocone penetrometers are compression type designs in which the tip and friction sleeve load cells are independent and have separate load capacities. The piezocones use strain gauged load cells for tip and sleeve friction and a strain gauged diaphragm type transducer for recording pore pressure. The piezocones also have a platinum resistive temperature device (RTD) for monitoring the temperature of the sensors, an accelerometer type dual axis inclinometer and two geophone sensors for recording seismic signals. All signals are amplified and measured with minimum sixteen-bit resolution down hole within the cone body, and the signals are sent to the surface using a high bandwidth, error corrected digital interface through a shielded cable.

ConeTec penetrometers are manufactured with various tip, friction and pore pressure capacities in both 10 cm^2 and 15 cm^2 tip base area configurations in order to maximize signal resolution for various soil conditions. The specific piezocone used for each test is described in the CPT summary table presented in the first appendix. The 15 cm^2 penetrometers do not require friction reducers as they have a diameter larger than the deployment rods. The 10 cm^2 piezocones use a friction reducer consisting of a rod adapter extension behind the main cone body with an enlarged cross sectional area (typically 44 millimeters diameter over a length of 32 millimeters with tapered leading and trailing edges) located at a distance of 585 millimeters above the cone tip.

The penetrometers are designed with equal end area friction sleeves, a net end area ratio of 0.8 and cone tips with a 60 degree apex angle.

All ConeTec piezocones can record pore pressure at various locations. Unless otherwise noted, the pore pressure filter is located directly behind the cone tip in the "u_2" position (ASTM Type 2). The filter is six millimeters thick, made of porous plastic (polyethylene) having an average pore size of 125 microns (90-160 microns). The function of the filter is to allow rapid movements of extremely small volumes of water needed to activate the pressure transducer while preventing soil ingress or blockage.

The piezocone penetrometers are manufactured with dimensions, tolerances and sensor characteristics that are in general accordance with the current ASTM D5778 standard. ConeTec's calibration criteria also meets or exceeds those of the current ASTM D5778 standard. An illustration of the piezocone penetrometer is presented in Figure CPTu.

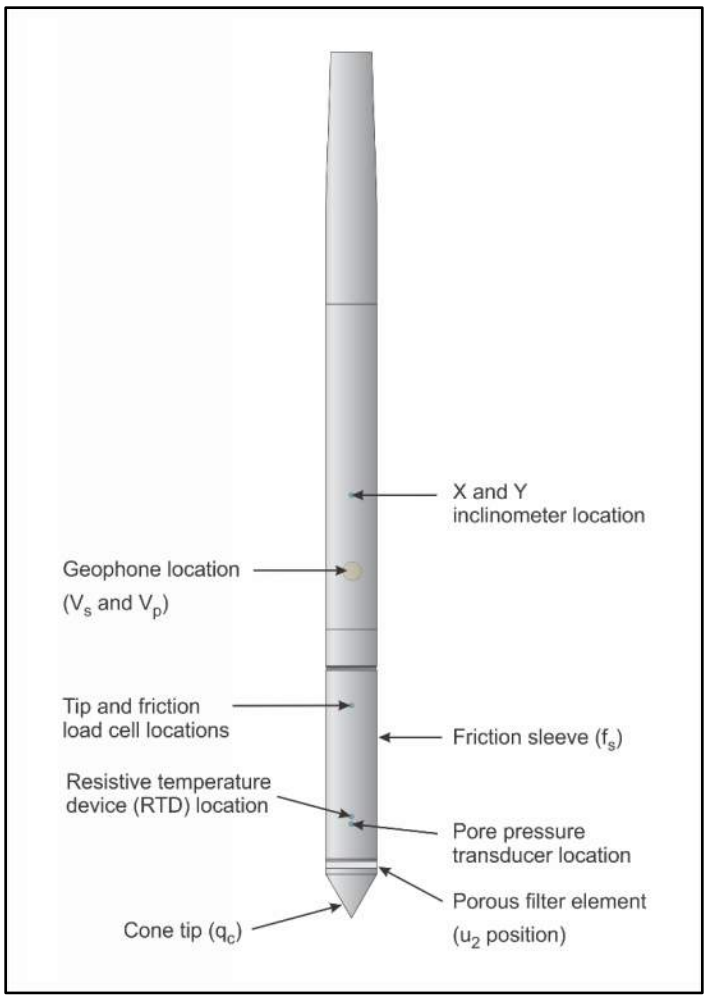


Figure CPTu. Piezocone Penetrometer (15 cm^2)

The ConeTec data acquisition systems consist of a Windows based computer and a signal interface box and power supply. The signal interface combines depth increment signals, seismic trigger signals and the downhole digital data. This combined data is then sent to the Windows based computer for collection and presentation. The data is recorded at fixed depth increments using a depth wheel attached to the push cylinders or by using a spring loaded rubber depth wheel that is held against the cone rods. The typical recording interval is 2.5 centimeters; custom recording intervals are possible.

The system displays the CPTu data in real time and records the following parameters to a storage media during penetration:

- Depth
- Uncorrected tip resistance (q_c)
- Sleeve friction (f_s)
- Dynamic pore pressure (u)
- Additional sensors such as resistivity, passive gamma, ultra violet induced fluorescence, if applicable

All testing is performed in accordance to ConeTec's CPTu operating procedures which are in general accordance with the current ASTM D5778 standard.

Prior to the start of a CPTu sounding a suitable cone is selected, the cone and data acquisition system are powered on, the pore pressure system is saturated with silicone oil and the baseline readings are recorded with the cone hanging freely in a vertical position.

The CPTu is conducted at a steady rate of two centimeters per second, within acceptable tolerances. Typically one meter length rods with an outer diameter of 1.5 inches (38.1 millimeters) are added to advance the cone to the sounding termination depth. After cone retraction final baselines are recorded.

Additional information pertaining to ConeTec's cone penetration testing procedures:

- Each filter is saturated in silicone oil under vacuum pressure prior to use
- Baseline readings are compared to previous readings
- Soundings are terminated at the client's target depth or at a depth where an obstruction is encountered, excessive rod flex occurs, excessive inclination occurs, equipment damage is likely to take place, or a dangerous working environment arises
- Differences between initial and final baselines are calculated to ensure zero load offsets have not occurred and to ensure compliance with ASTM standards

The interpretation of piezocone data for this report is based on the corrected tip resistance (q_t), sleeve friction (f_s) and pore water pressure (u). The interpretation of soil type is based on the correlations developed by Robertson et al. (1986) and Robertson (1990, 2009). It should be noted that it is not always possible to accurately identify a soil behavior type based on these parameters. In these situations, experience, judgment and an assessment of other parameters may be used to infer soil behavior type.

The recorded tip resistance (q_c) is the total force acting on the piezocone tip divided by its base area. The tip resistance is corrected for pore pressure effects and termed corrected tip resistance (q_t) according to the following expression presented in Robertson et al. (1986):

$$q_t = q_c + (1-a) \bullet u_2$$

where: q_t is the corrected tip resistance
q_c is the recorded tip resistance
u_2 is the recorded dynamic pore pressure behind the tip (u_2 position)
a is the Net Area Ratio for the piezocone (0.8 for ConeTec probes)

The sleeve friction (f_s) is the frictional force on the sleeve divided by its surface area. As all ConeTec piezocones have equal end area friction sleeves, pore pressure corrections to the sleeve data are not required.

The dynamic pore pressure (u) is a measure of the pore pressures generated during cone penetration. To record equilibrium pore pressure, the penetration must be stopped to allow the dynamic pore pressures to stabilize. The rate at which this occurs is predominantly a function of the permeability of the soil and the diameter of the cone.

The friction ratio (R_f) is a calculated parameter. It is defined as the ratio of sleeve friction to the tip resistance expressed as a percentage. Generally, saturated cohesive soils have low tip resistance, high friction ratios and generate large excess pore water pressures. Cohesionless soils have higher tip resistances, lower friction ratios and do not generate significant excess pore water pressure.

A summary of the CPTu soundings along with test details and individual plots are provided in the appendices. A set of files with calculated geotechnical parameters were generated for each sounding based on published correlations and are provided in Excel format in the data release folder. Information regarding the methods used is also included in the data release folder.

For additional information on CPTu interpretations and calculated geotechnical parameters, refer to Robertson et al. (1986), Lunne et al. (1997), Robertson (2009), Mayne (2013, 2014) and Mayne and Peuchen (2012).

The cone penetration test is halted at specific depths to carry out pore pressure dissipation (PPD) tests, shown in Figure PPD-1. For each dissipation test the cone and rods are decoupled from the rig and the data acquisition system measures and records the variation of the pore pressure (u) with time (t).

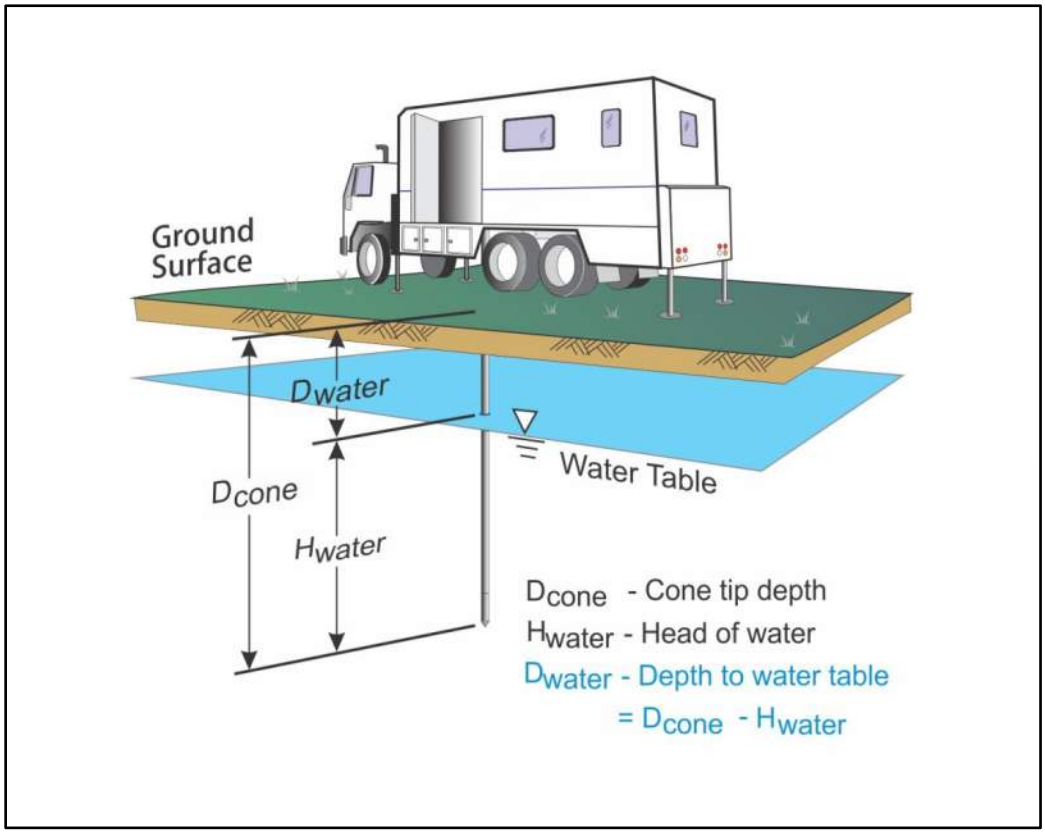


Figure PPD-1. Pore pressure dissipation test setup

Pore pressure dissipation data can be interpreted to provide estimates of ground water conditions, permeability, consolidation characteristics and soil behavior.

The typical shapes of dissipation curves shown in Figure PPD-2 are very useful in assessing soil type, drainage, in situ pore pressure and soil properties. A flat curve that stabilizes quickly is typical of a freely draining sand. Undrained soils such as clays will typically show positive excess pore pressure and have long dissipation times. Dilative soils will often exhibit dynamic pore pressures below equilibrium that then rise over time. Overconsolidated fine-grained soils will often exhibit an initial dilatory response where there is an initial rise in pore pressure before reaching a peak and dissipating.

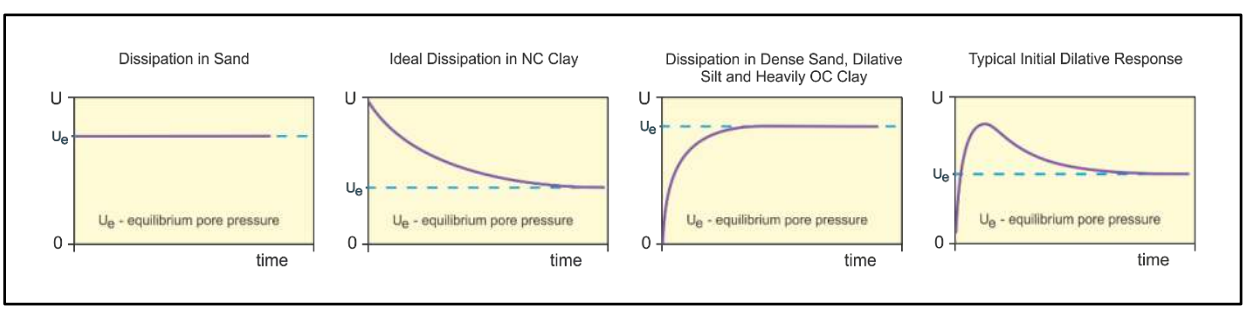


Figure PPD-2. Pore pressure dissipation curve examples

In order to interpret the equilibrium pore pressure (u_{eq}) and the apparent phreatic surface, the pore pressure should be monitored until such time as there is no variation in pore pressure with time as shown for each curve in Figure PPD-2.

In fine grained deposits the point at which 100% of the excess pore pressure has dissipated is known as t_{100}. In some cases this can take an excessive amount of time and it may be impractical to take the dissipation to t_{100}. A theoretical analysis of pore pressure dissipations by Teh and Houlsby (1991) showed that a single curve relating degree of dissipation versus theoretical time factor (T*) may be used to calculate the coefficient of consolidation (c_h) at various degrees of dissipation resulting in the expression for c_h shown below.

$$c_h = \frac{T^* \cdot a^2 \cdot \sqrt{I_r}}{t}$$

Where:

T* is the dimensionless time factor (Table Time Factor)

a is the radius of the cone

I_r is the rigidity index

t is the time at the degree of consolidation

Table Time Factor. T* versus degree of dissipation (Teh and Houlsby (1991))

Degree of Dissipation (%)	20	30	40	50	60	70	80
T* (u_2)	0.038	0.078	0.142	0.245	0.439	0.804	1.60

The coefficient of consolidation is typically analyzed using the time (t_{50}) corresponding to a degree of dissipation of 50% (u_{50}). In order to determine t_{50}, dissipation tests must be taken to a pressure less than u_{50}. The u_{50} value is half way between the initial maximum pore pressure and the equilibrium pore pressure value, known as u_{100}. To estimate u_{50}, both the initial maximum pore pressure and u_{100} must be known or estimated. Other degrees of dissipations may be considered, particularly for extremely long dissipations.

At any specific degree of dissipation the equilibrium pore pressure (u at t_{100}) must be estimated at the depth of interest. The equilibrium value may be determined from one or more sources such as measuring the value directly (u_{100}), estimating it from other dissipations in the same profile, estimating the phreatic surface and assuming hydrostatic conditions, from nearby soundings, from client provided information, from site observations and/or past experience, or from other site instrumentation.

For calculations of c_h (Teh and Houlsby (1991)), t_{50} values are estimated from the corresponding pore pressure dissipation curve and a rigidity index (I_r) is assumed. For curves having an initial dilatory response in which an initial rise in pore pressure occurs before reaching a peak, the relative time from the peak value is used in determining t_{50}. In cases where the time to peak is excessive, t_{50} values are not calculated.

Due to possible inherent uncertainties in estimating I_r, the equilibrium pore pressure and the effect of an initial dilatory response on calculating t_{50}, other methods should be applied to confirm the results for c_h.

Additional published methods for estimating the coefficient of consolidation from a piezocone test are described in Burns and Mayne (1998, 2002), Jones and Van Zyl (1981), Robertson et al. (1992) and Sully et al. (1999).

A summary of the pore pressure dissipation tests and dissipation plots are presented in the relevant appendix.

ASTM D5778-12, 2012, "Standard Test Method for Performing Electronic Friction Cone and Piezocone Penetration Testing of Soils", ASTM International, West Conshohocken, PA. DOI: 10.1520/D5778-12.

Burns, S.E. and Mayne, P.W., 1998, "Monotonic and dilatory pore pressure decay during piezocone tests", Canadian Geotechnical Journal 26 (4): 1063-1073. DOI: 1063-1073/T98-062.

Burns, S.E. and Mayne, P.W., 2002, "Analytical cavity expansion-critical state model cone dissipation in fine-grained soils", Soils & Foundations, Vol. 42(2): 131-137.

Jones, G.A. and Van Zyl, D.J.A., 1981, "The piezometer probe: a useful investigation tool", Proceedings, 10th International Conference on Soil Mechanics and Foundation Engineering, Vol. 3, Stockholm: 489-495.

Lunne, T., Robertson, P.K. and Powell, J. J. M., 1997, "Cone Penetration Testing in Geotechnical Practice", Blackie Academic and Professional.

Mayne, P.W., 2013, "Evaluating yield stress of soils from laboratory consolidation and in-situ cone penetration tests", Sound Geotechnical Research to Practice (Holtz Volume) GSP 230, ASCE, Reston/VA: 406-420. DOI: 10.1061/9780784412770.027.

Mayne, P.W. and Peuchen, J., 2012, "Unit weight trends with cone resistance in soft to firm clays", Geotechnical and Geophysical Site Characterization *4,* Vol. 1 (Proc. ISC-4, Pernambuco), CRC Press, London: 903-910.

Mayne, P.W., 2014, "Interpretation of geotechnical parameters from seismic piezocone tests", CPT'14 Keynote Address, Las Vegas, NV, May 2014.

Robertson, P.K., Campanella, R.G., Gillespie, D. and Greig, J., 1986, "Use of Piezometer Cone Data", Proceedings of InSitu 86, ASCE Specialty Conference, Blacksburg, Virginia.

Robertson, P.K., 1990, "Soil Classification Using the Cone Penetration Test", Canadian Geotechnical Journal, Volume 27: 151-158. DOI: 10.1139/T90-014.

Robertson, P.K., Sully, J.P., Woeller, D.J., Lunne, T., Powell, J.J.M. and Gillespie, D.G., 1992, "Estimating coefficient of consolidation from piezocone tests", Canadian Geotechnical Journal, 29(4): 539-550. DOI: 10.1139/T92-061.

Robertson, P.K., 2009, "Interpretation of cone penetration tests – a unified approach", Canadian Geotechnical Journal, Volume 46: 1337-1355. DOI: 10.1139/T09-065.

Sully, J.P., Robertson, P.K., Campanella, R.G. and Woeller, D.J., 1999, "An approach to evaluation of field CPTU dissipation data in overconsolidated fine-grained soils", Canadian Geotechnical Journal, 36(2): 369-381. DOI: 10.1139/T98-105.

Teh, C.I., and Houlsby, G.T., 1991, "An analytical study of the cone penetration test in clay", Geotechnique, 41(1): 17-34. DOI: 10.1680/geot.1991.41.1.17.

The appendices listed below are included in the report:

- Cone Penetration Test Summary and Standard Cone Penetration Test Plots
- Advanced Cone Penetration Test Plots with Ic, Su(Nkt), Phi and N(60)Ic/N1(60)Ic
- Soil Behavior Type (SBT) Scatter Plots
- Pore Pressure Dissipation Summary and Pore Pressure Dissipation Plots

Cone Penetration Test Summary and Standard Cone Penetration Test Plots

CONETEC

Job No:	21-59-22979
Client:	Aspect Consulting, LLC
Project:	Factoria Blvd Storm Conveyance
Start Date:	07-Sep-2021
End Date:	08-Sep-2021

CONE PENETRATION TEST SUMMARY

Sounding ID	File Name	Date	Cone	Assumed Phreatic Surface[2] (ft)	Final Depth (ft)	Latitude[1] (deg)	Longitude[1] (deg)
ACPT-01	21-59-22979_CP01	08-Sep-2021	780:T1500F15U35	9.6	26.7	47.57823	-122.16910
ACPT-02	21-59-22979_CP02	07-Sep-2021	780:T1500F15U35	5.0	25.2	47.57813	-122.16928
ACPT-03	21-59-22979_CP03	07-Sep-2021	780:T1500F15U35	5.8	21.1	47.57717	-122.16930
Totals	3 soundings				72.9		

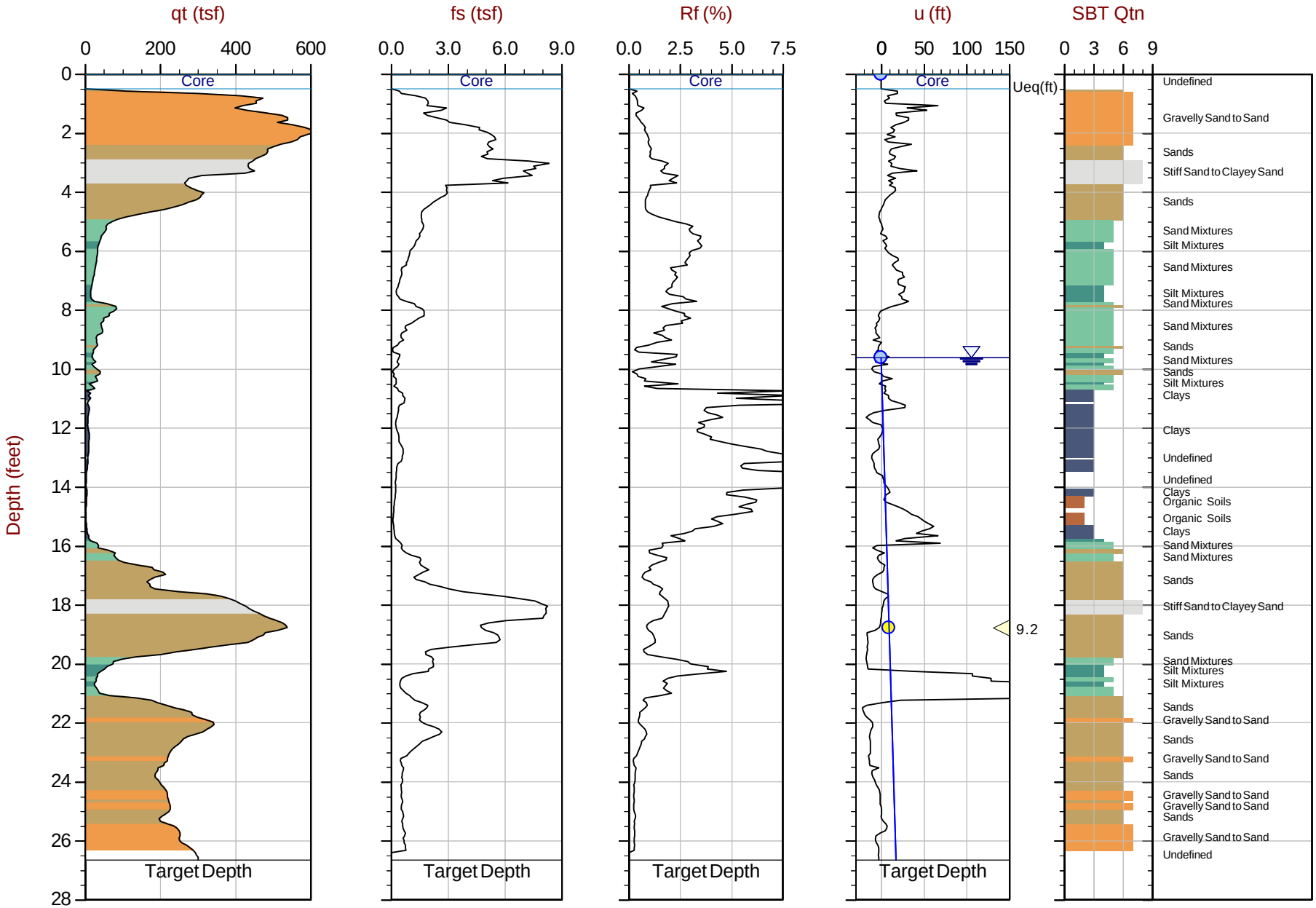
1. Coordinates were collected using a handheld GPS - WGS 84 Lat/Long
2. Phreatic surface based on pore pressure dissipation test unless otherwise noted. Hydrostatic profile applied to interpretation tables

CONETEC

Aspect Consulting

Job No: 21-59-22979
Date: 2021-09-08 00:16
Site: Factoria Blvd Storm Conveyance

Sounding: ACPT-01
Cone: 780:T1500F15U35



Max Depth: 8.125 m / 26.66 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 21-59-22979_CP01.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Lat: 47.57823 Long: -122.16910

Equilibrium Pore Pressure (Ueq) | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Hydrostatic Line

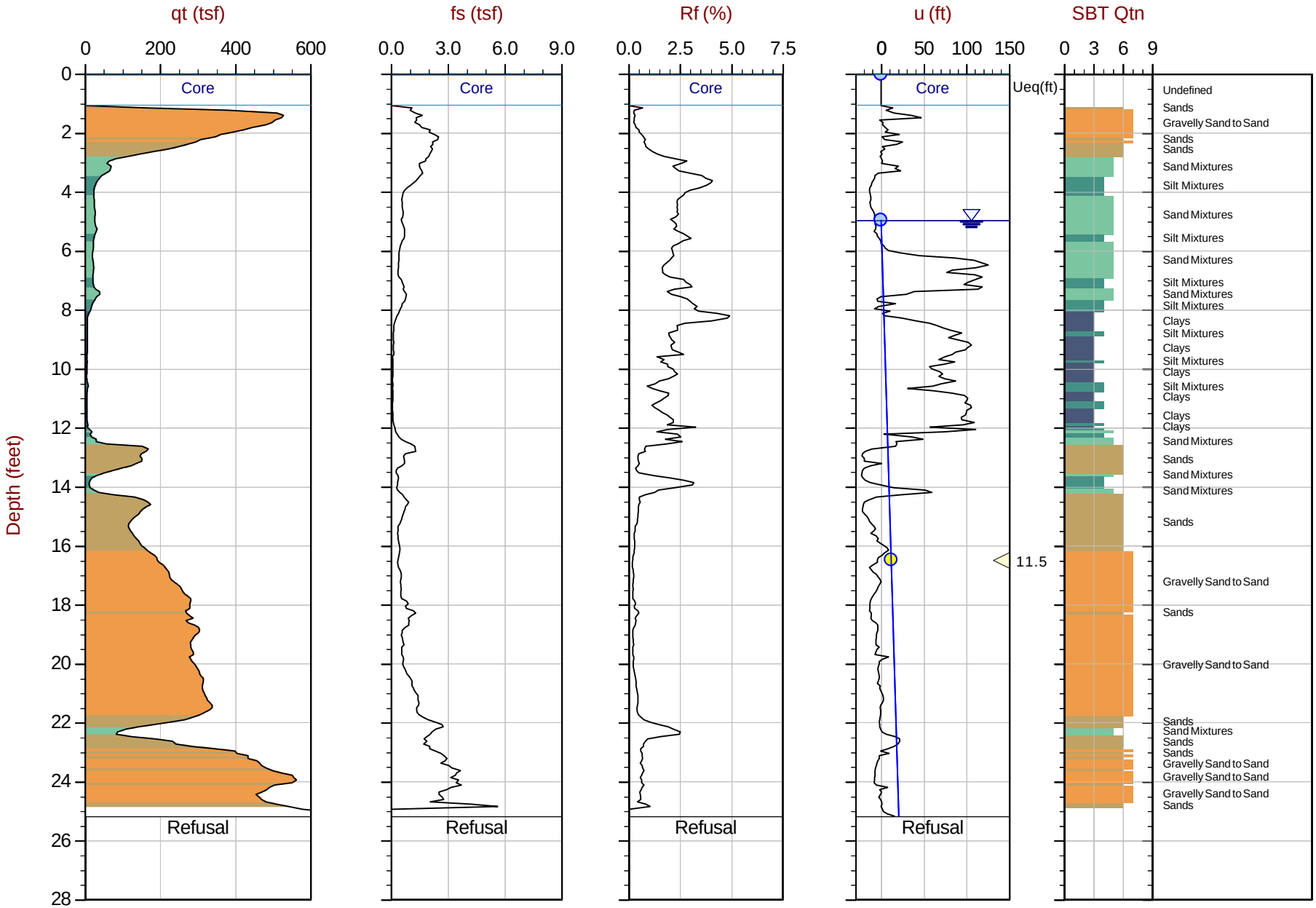
The reported coordinates were acquired from hand-held GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

Aspect Consulting

Job No: 21-59-22979
Date: 2021-09-07 23:02
Site: Factoria Blvd Storm Conveyance

Sounding: ACPT-02
Cone: 780:T1500F15U35



Max Depth: 7.675 m / 25.18 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 21-59-22979_CP02.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Lat: 47.57813 Long: -122.16928

Equilibrium Pore Pressure (Ueq) | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Hydrostatic Line

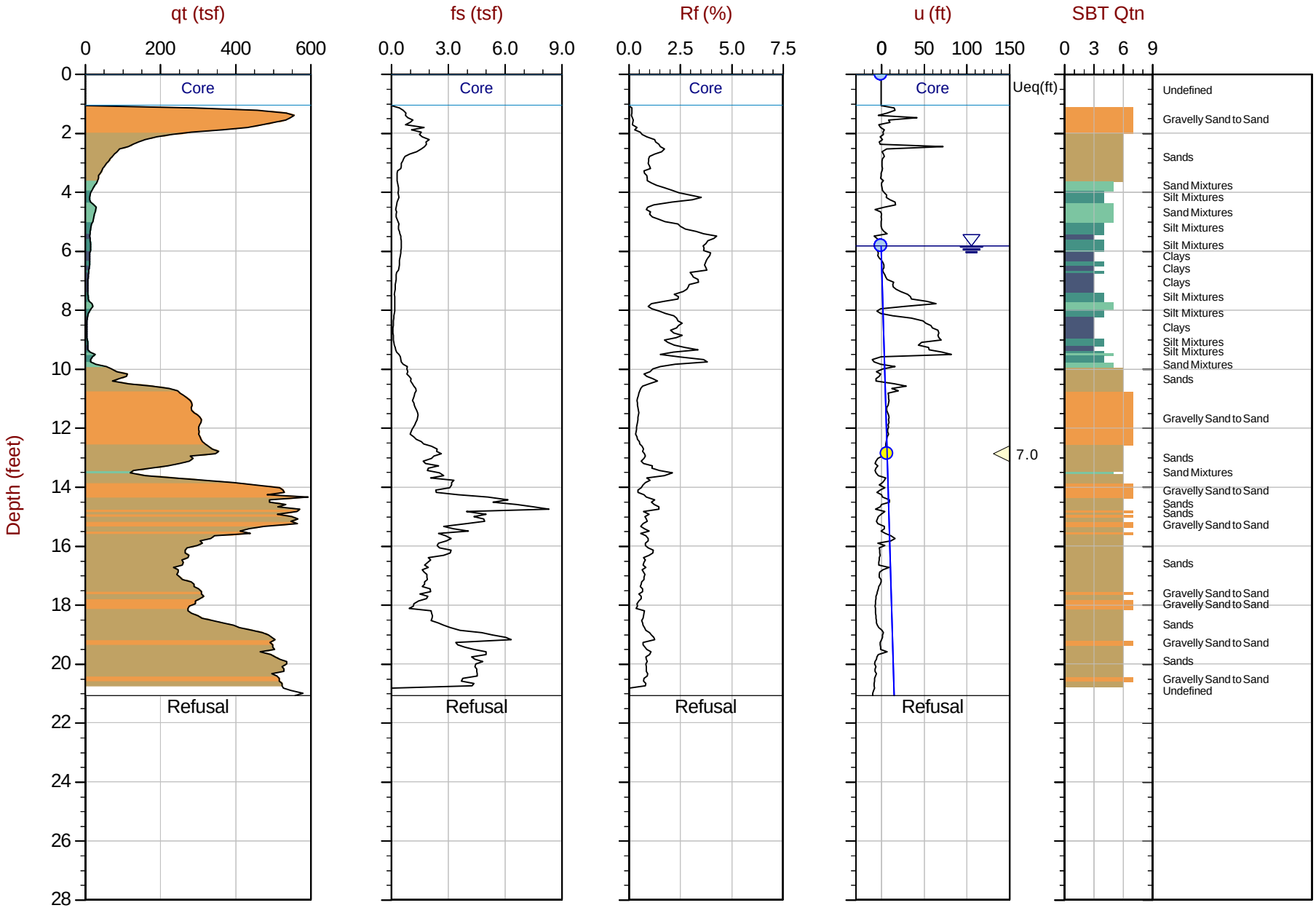
The reported coordinates were acquired from hand-held GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

Aspect Consulting

Job No: 21-59-22979
Date: 2021-09-07 22:04
Site: Factoria Blvd Storm Conveyance

Sounding: ACPT-03
Cone: 780:T1500F15U35



Max Depth: 6.425 m / 21.08 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 21-59-22979_CP03.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Lat: 47.57717 Long: -122.16930

Equilibrium Pore Pressure (Ueq) | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Hydrostatic Line

The reported coordinates were acquired from hand-held GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

Advanced Cone Penetration Test Plots with Ic, Su, Phi and N(60)/N1(60)

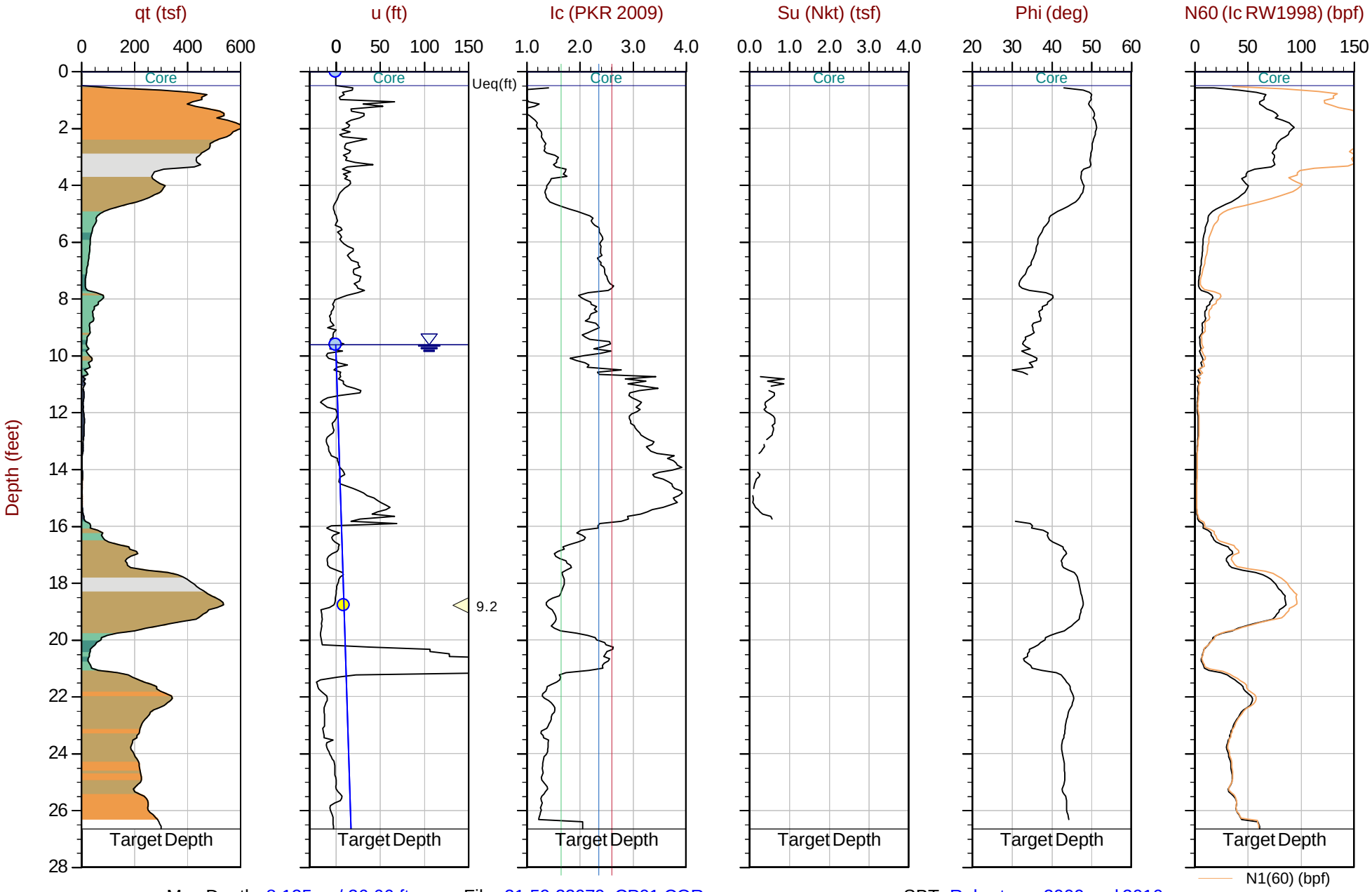
CONETEC

CONETEC

Aspect Consulting

Job No: 21-59-22979
Date: 2021-09-08 00:16
Site: Factoria Blvd Storm Conveyance

Sounding: ACPT-01
Cone: 780:T1500F15U35



Max Depth: 8.125 m / 26.66 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 21-59-22979_CP01.COR
Unit Wt: SBTQtn (PKR2009)
Su Nkt: 15.0

SBT: Robertson, 2009 and 2010
Coords: Lat: 47.57823 Long: -122.16910

Equilibrium Pore Pressure (Ueq) | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Hydrostatic Line

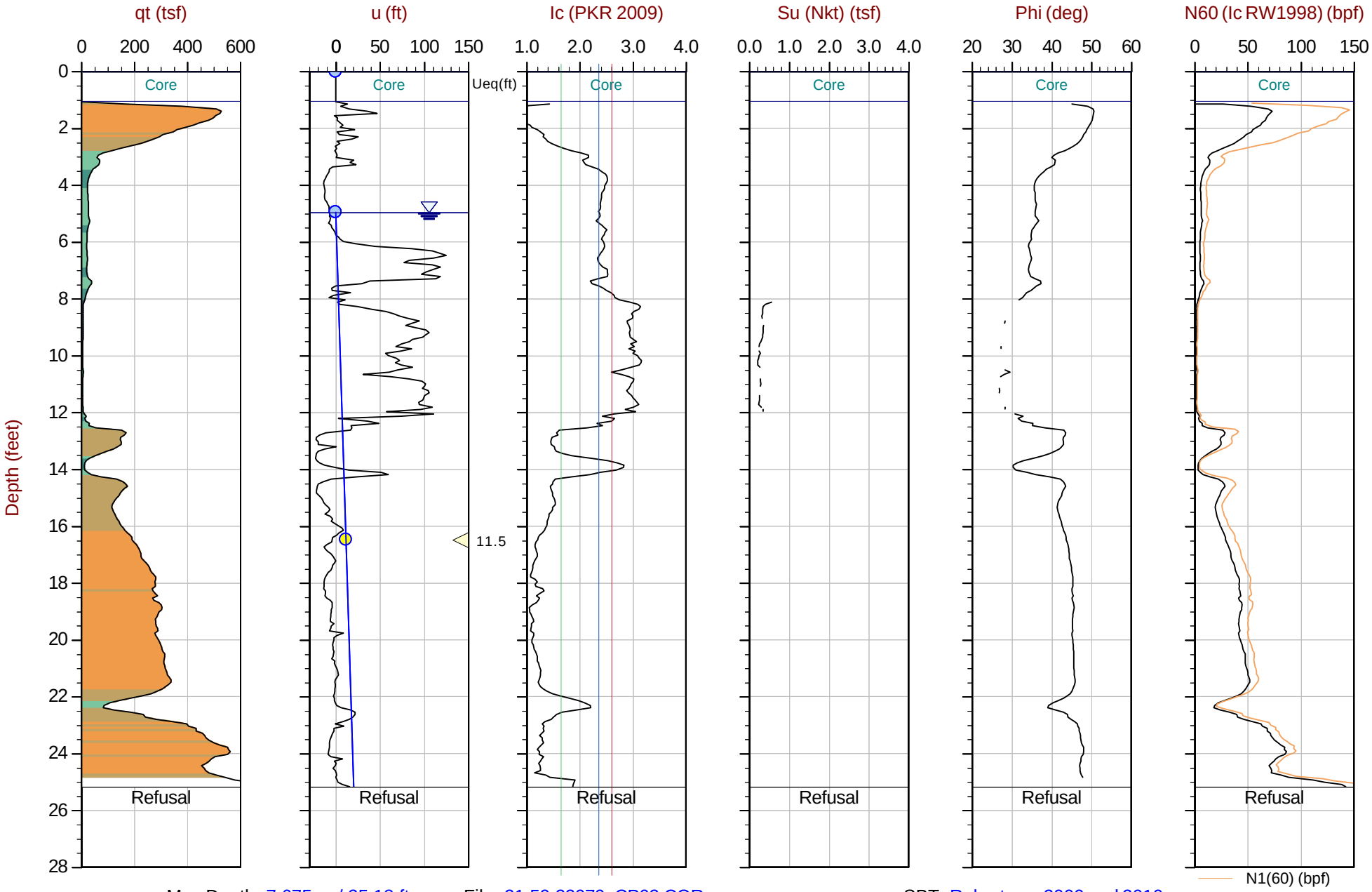
The reported coordinates were acquired from hand-held GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

Aspect Consulting

Job No: 21-59-22979
Date: 2021-09-07 23:02
Site: Factoria Blvd Storm Conveyance

Sounding: ACPT-02
Cone: 780:T1500F15U35



Max Depth: 7.675 m / 25.18 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 21-59-22979_CP02.COR
Unit Wt: SBTQtn (PKR2009)
Su Nkt: 15.0

SBT: Robertson, 2009 and 2010
Coords: Lat: 47.57813 Long: -122.16928

Equilibrium Pore Pressure (Ueq) | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Hydrostatic Line

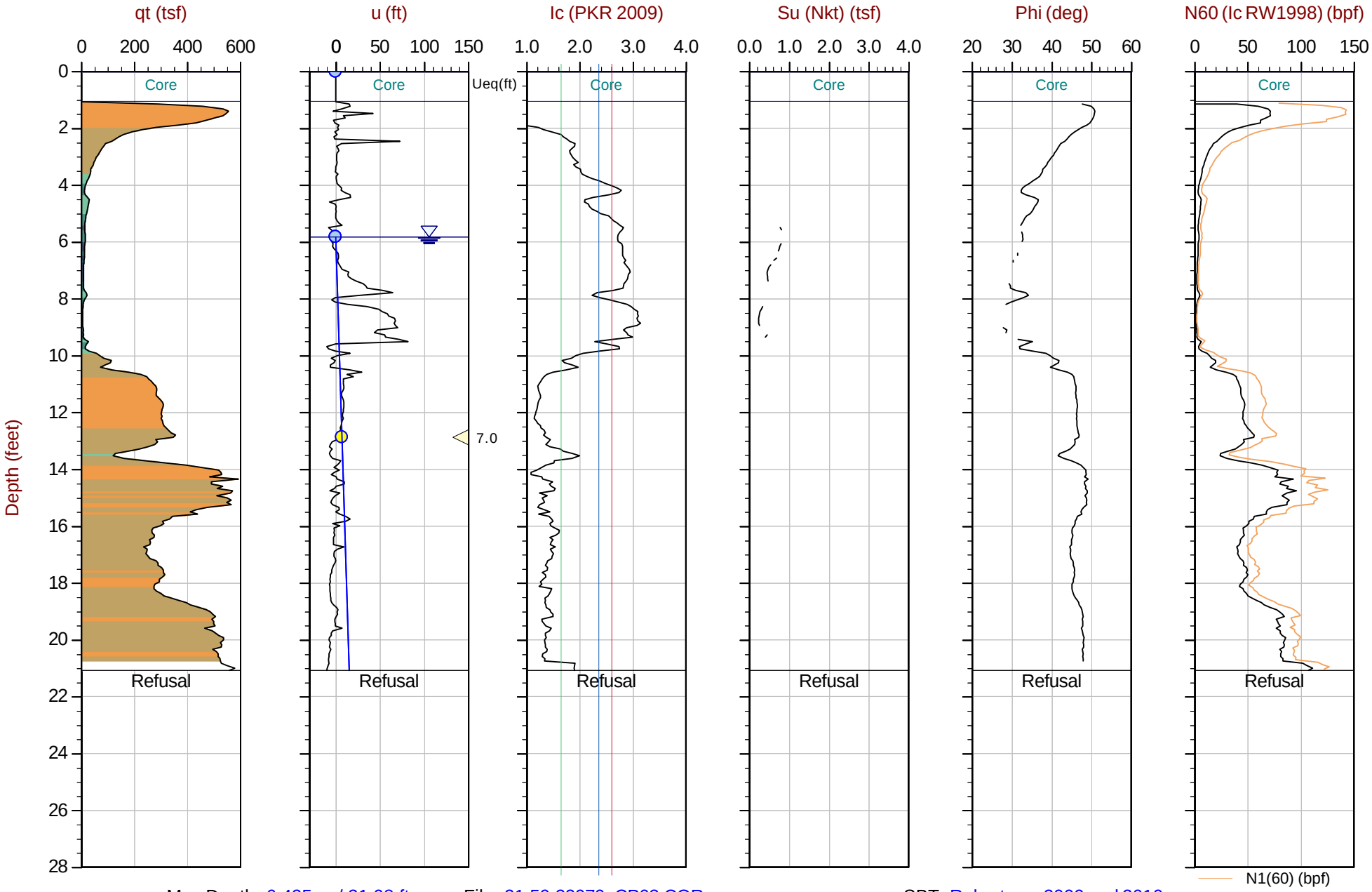
The reported coordinates were acquired from hand-held GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

Aspect Consulting

Job No: 21-59-22979
Date: 2021-09-07 22:04
Site: Factoria Blvd Storm Conveyance

Sounding: ACPT-03
Cone: 780:T1500F15U35



Max Depth: 6.425 m / 21.08 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 21-59-22979_CP03.COR
Unit Wt: SBTQtn (PKR2009)
Su Nkt: 15.0

SBT: Robertson, 2009 and 2010
Coords: Lat: 47.57717 Long: -122.16930

Equilibrium Pore Pressure (Ueq) | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Hydrostatic Line

The reported coordinates were acquired from hand-held GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

Soil Behavior Type (SBT) Scatter Plots

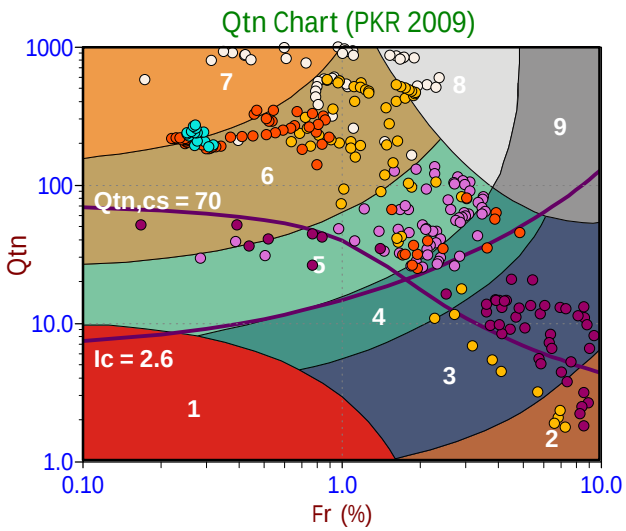
CONETEC

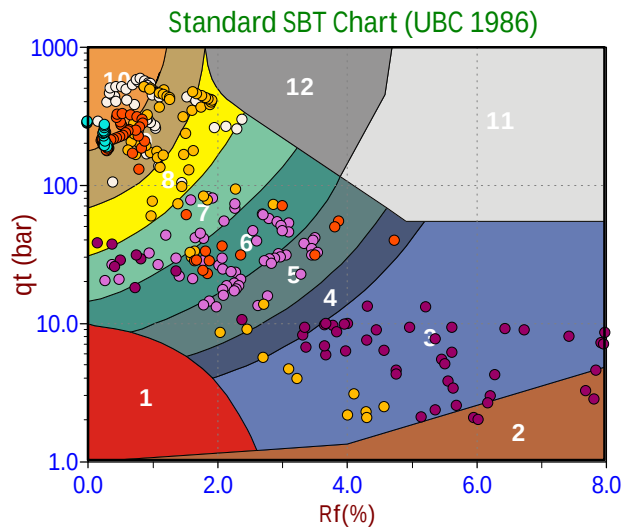
CONETEC

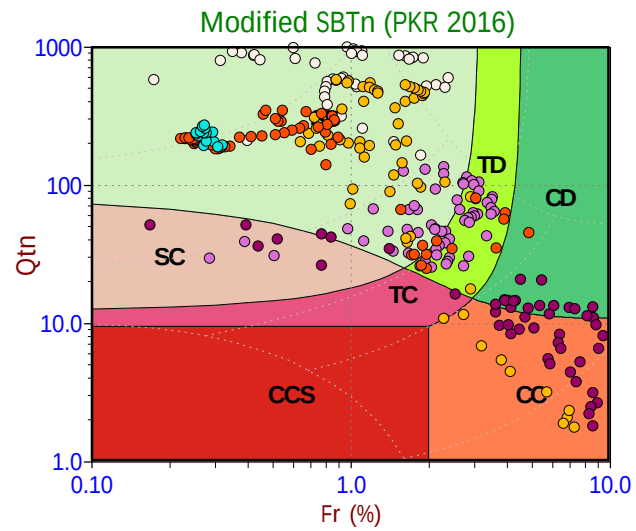
Aspect Consulting

Job No: 21-59-22979
Date: 2021-09-08 00:16
Site: Factoria Blvd Storm Conveyance

Sounding: ACPT-01
Cone: 780:T1500F15U35







Depth Ranges
- >0.0 to 5.0 ft
- >5.0 to 10.0 ft
- >10.0 to 15.0 ft
- >15.0 to 20.0 ft
- >20.0 to 25.0 ft
- >25.0 to 30.0 ft
- >30.0 to 35.0 ft
- >35.0 to 40.0 ft
- >40.0 to 45.0 ft
- >45.0 to 50.0 ft
- >50.0 ft

Legend
- Sensitive, Fine Grained
- Organic Soils
- Clays
- Silt Mixtures
- Sand Mixtures
- Sands
- Gravelly Sand to Sand
- Stiff Sand to Clayey Sand
- Very Stiff Fine Grained

Legend
- Sensitive Fines
- Organic Soil
- Clay
- Silty Clay
- Clayey Silt
- Silt
- Sandy Silt
- Silty Sand/Sand
- Sand
- Gravelly Sand
- Stiff Fine Grained
- Cemented Sand

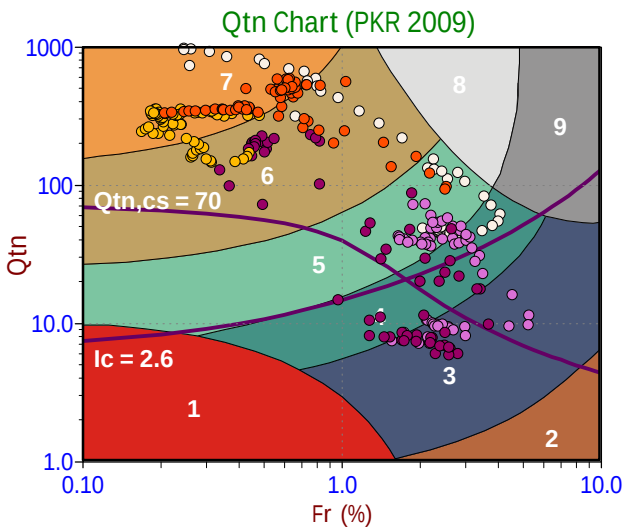
Legend
- CCS (Cont. sensitive clay like)
- CC (Cont. clay like)
- TC (Cont. transitional)
- SC (Cont. sand like)
- CD (Dil. clay like)
- TD (Dil. transitional)
- SD (Dil. sand like)

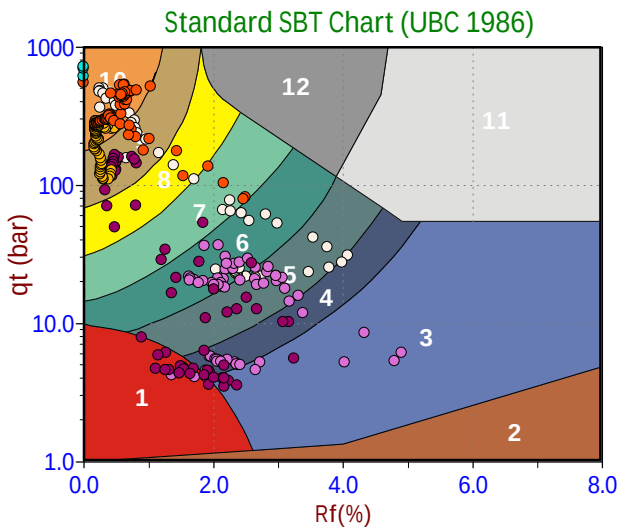
CONETEC

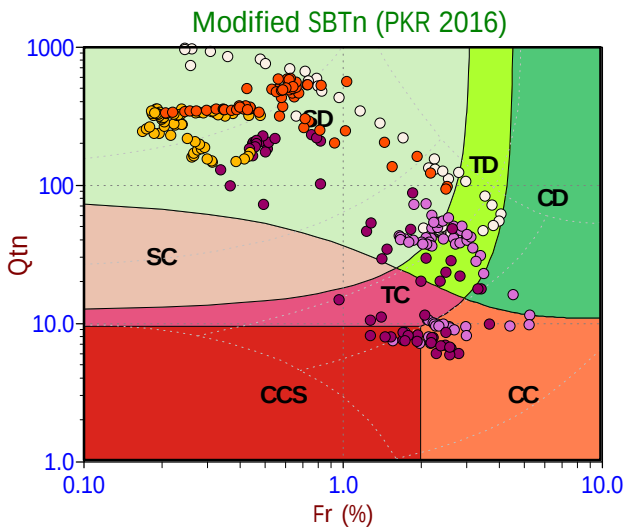
Aspect Consulting

Job No: 21-59-22979
Date: 2021-09-07 23:02
Site: Factoria Blvd Storm Conveyance

Sounding: ACPT-02
Cone: 780:T1500F15U35







Depth Ranges
- >0.0 to 5.0 ft
- >5.0 to 10.0 ft
- >10.0 to 15.0 ft
- >15.0 to 20.0 ft
- >20.0 to 25.0 ft
- >25.0 to 30.0 ft
- >30.0 to 35.0 ft
- >35.0 to 40.0 ft
- >40.0 to 45.0 ft
- >45.0 to 50.0 ft
- >50.0 ft

Legend
- Sensitive, Fine Grained
- Organic Soils
- Clays
- Silt Mixtures
- Sand Mixtures
- Sands
- Gravelly Sand to Sand
- Stiff Sand to Clayey Sand
- Very Stiff Fine Grained

Legend
- Sensitive Fines
- Organic Soil
- Clay
- Silty Clay
- Clayey Silt
- Silt
- Sandy Silt
- Silty Sand/Sand
- Sand
- Gravelly Sand
- Stiff Fine Grained
- Cemented Sand

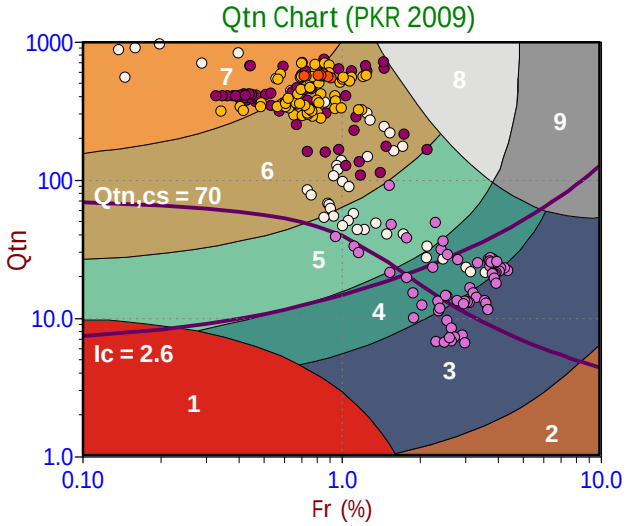
Legend
- CCS (Cont. sensitive clay like)
- CC (Cont. clay like)
- TC (Cont. transitional)
- SC (Cont. sand like)
- CD (Dil. clay like)
- TD (Dil. transitional)
- SD (Dil. sand like)

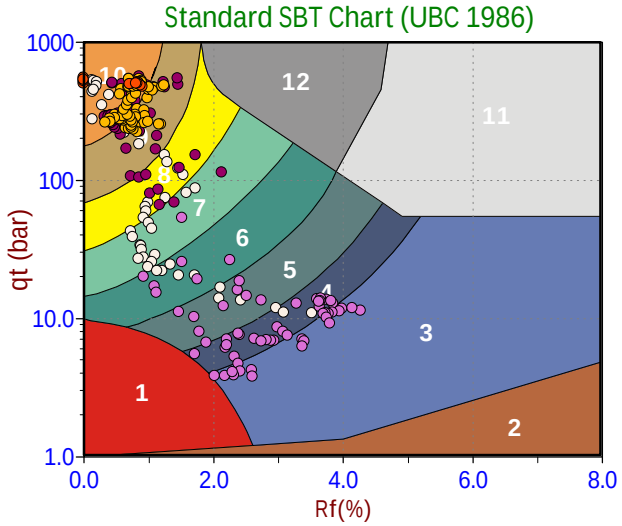
CONETEC

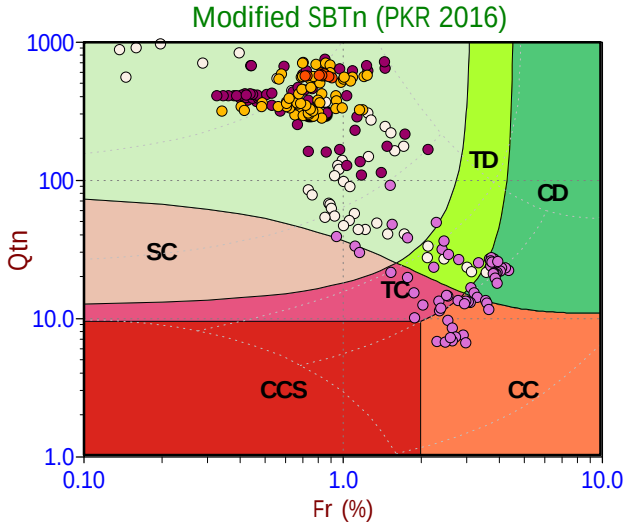
Aspect Consulting

Job No: 21-59-22979
Date: 2021-09-07 22:04
Site: Factoria Blvd Storm Conveyance

Sounding: ACPT-03
Cone: 780:T1500F15U35







Depth Ranges
- >0.0 to 5.0 ft
- >5.0 to 10.0 ft
- >10.0 to 15.0 ft
- >15.0 to 20.0 ft
- >20.0 to 25.0 ft
- >25.0 to 30.0 ft
- >30.0 to 35.0 ft
- >35.0 to 40.0 ft
- >40.0 to 45.0 ft
- >45.0 to 50.0 ft
- >50.0 ft

Legend
- Sensitive, Fine Grained
- Organic Soils
- Clays
- Silt Mixtures
- Sand Mixtures
- Sands
- Gravelly Sand to Sand
- Stiff Sand to Clayey Sand
- Very Stiff Fine Grained

Legend
- Sensitive Fines
- Organic Soil
- Clay
- Silty Clay
- Clayey Silt
- Silt
- Sandy Silt
- Silty Sand/Sand
- Sand
- Gravelly Sand
- Stiff Fine Grained
- Cemented Sand

Legend
- CCS (Cont. sensitive clay like)
- CC (Cont. clay like)
- TC (Cont. transitional)
- SC (Cont. sand like)
- CD (Dil. clay like)
- TD (Dil. transitional)
- SD (Dil. sand like)

Pore Pressure Dissipation Summary and Pore Pressure Dissipation Plots

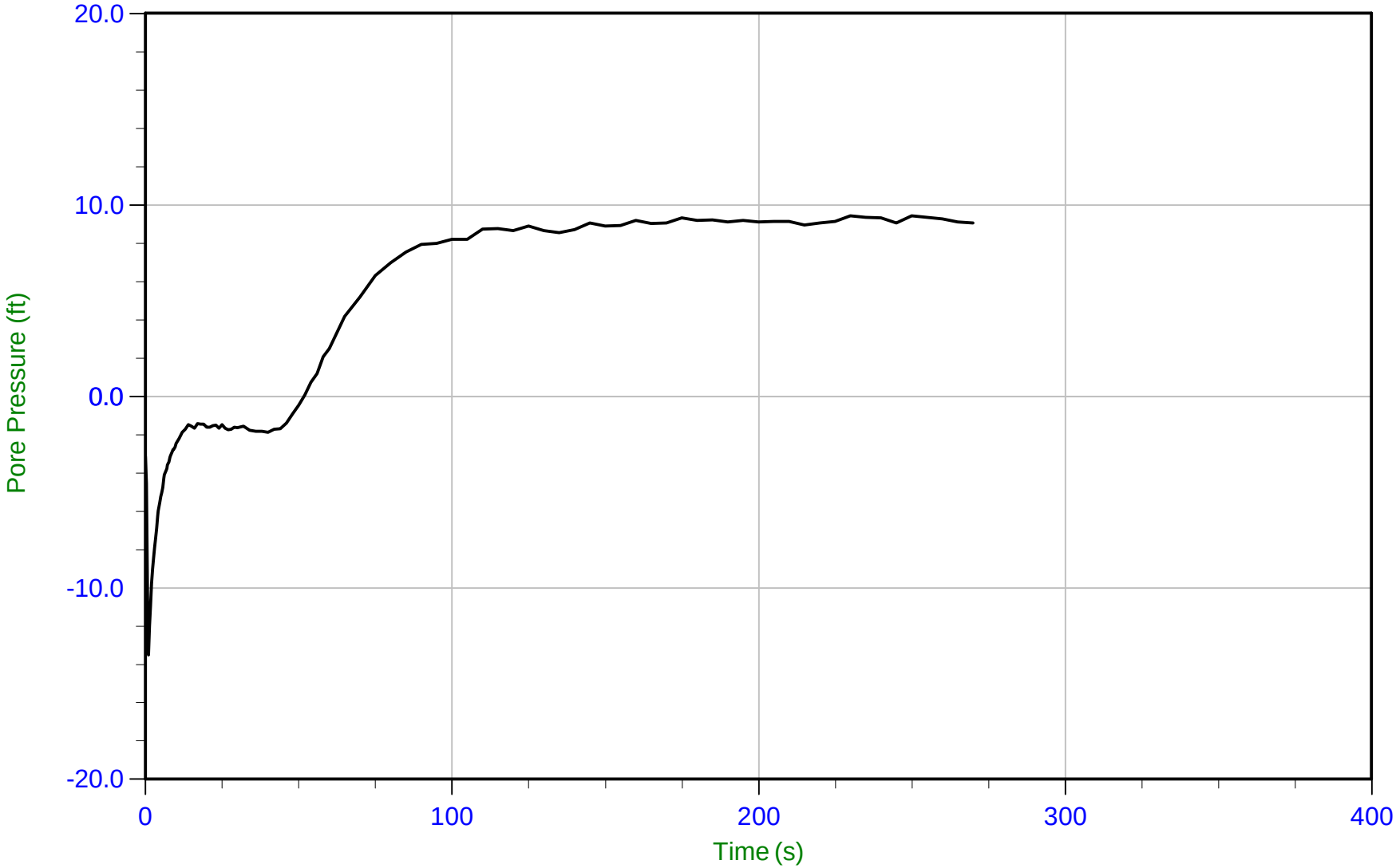
CONETEC

Job No:	21-59-22979
Client:	Aspect Consulting, LLC
Project:	Factoria Blvd Storm Conveyance
Start Date:	07-Sep-2021
End Date:	08-Sep-2021

CPTu PORE PRESSURE DISSIPATION SUMMARY

Sounding ID	File Name	Cone Area (cm^2)	Duration (s)	Test Depth (ft)	Estimated Equilibrium Pore Pressure U_{eq} (ft)	Calculated Phreatic Surface (ft)
ACPT-01	21-59-22979_CP01.ppd2	15	270	18.8	9.2	9.6
ACPT-02	21-59-22979_CP02.ppd2	15	445	16.5	11.5	5.0
ACPT-03	21-59-22979_CP03.ppd2	15	255	12.9	7.1	5.8
Total Duration			16.2 mins			

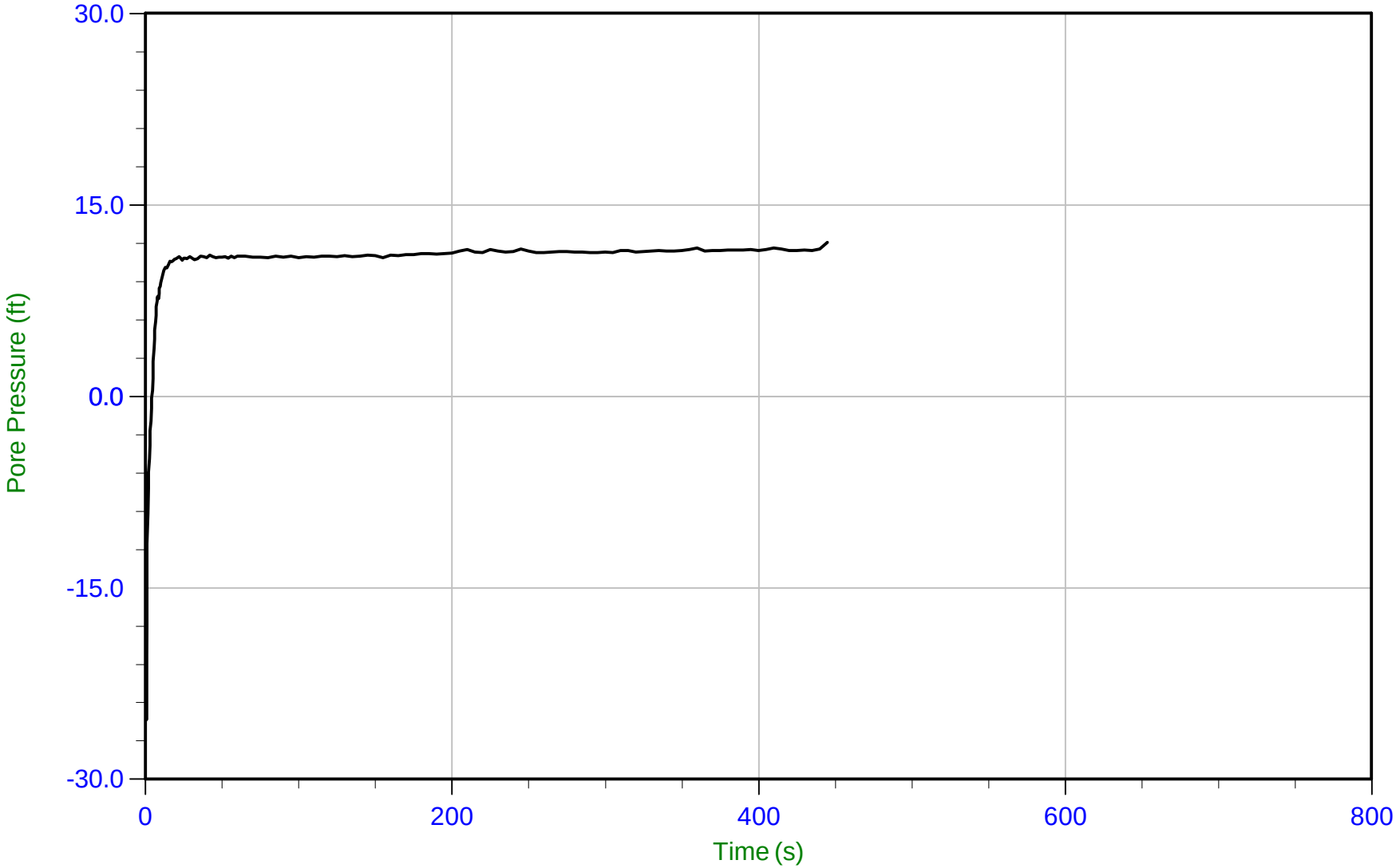
CONETEC	Aspect Consulting	Job No: 21-59-22979 Date: 09/08/2021 00:16 Site: Equinox Redevelopment	Sounding: ACPT-01 Cone: 780:T1500F15U35 Area=15 cm²



Trace Summary:

Filename: 21-59-22979_CP01.ppd2	u Min: -13.5 ft	WT: 2.934 m / 9.625 ft
Depth: 5.725 m / 18.783 ft	u Max: 9.4 ft	Ueq: 9.2 ft
Duration: 270.0 s	u Final: 9.1 ft	

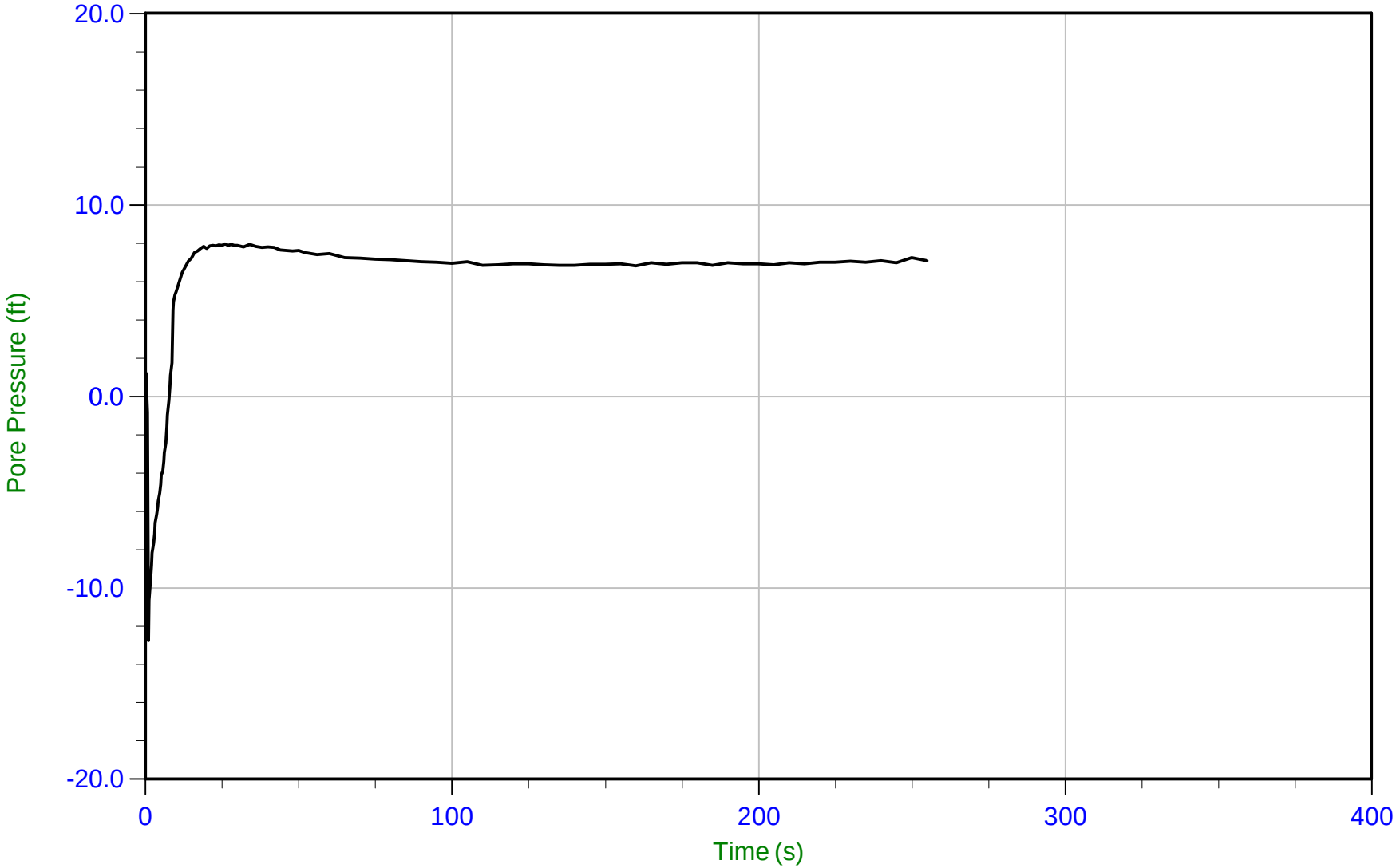
CONETEC	Aspect Consulting	Job No: 21-59-22979 Date: 09/07/2021 23:02 Site: Equinox Redevelopment	Sounding: ACPT-02 Cone: 780:T1500F15U35 Area=15 cm²



Trace Summary:

Filename: 21-59-22979_CP02.ppd2	u Min: -25.4 ft	WT: 1.512 m / 4.960 ft
Depth: 5.025 m / 16.486 ft	u Max: 12.1 ft	Ueq: 11.5 ft
Duration: 445.0 s	u Final: 12.1 ft	

CONETEC	Aspect Consulting	Job No: 21-59-22979 Date: 09/07/2021 22:04 Site: Equinox Redevelopment	Sounding: ACPT-03 Cone: 780:T1500F15U35 Area=15 cm²



Trace Summary:

Filename: 21-59-22979_CP03.ppd2	u Min: -12.7 ft	WT: 1.775 m / 5.825 ft
Depth: 3.925 m / 12.877 ft	u Max: 8.0 ft	Ueq: 7.1 ft
Duration: 255.0 s	u Final: 7.1 ft	

APPENDIX D

Groundwater Laboratory Data

D. Groundwater Laboratory Data

- Groundwater Lab Data Report by Friedman & Bruya, Inc. June 24, 2021
- Groundwater Lab Data Report by Fremont Analytical June 24, 2021
- Groundwater Lab Data Report by Friedman & Bruya, Inc. September 15, 2021
- Groundwater Lab Data Report by Fremont Analytical September 10, 2021

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

June 24, 2021

Amy Tice, Project Manager
Aspect Consulting, LLC
710 2nd Ave S, Suite 550
Seattle, WA 98104

Dear Ms Tice:

Included are the results from the testing of material submitted on June 16, 2021 from the Factoria Blvd, F&BI 106275 project. There are 15 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Aspect Data
ASP0624R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on June 16, 2020 by Friedman & Bruya, Inc. from the Aspect Consulting, LLC Factoria Blvd, F&BI 106275 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Aspect Consulting, LLC
106275 -01	GEI3-19-061621
106275 -02	GEI1-19-061621

The samples were sent to Fremont Analytical for cyanide analysis. The report will be forwarded upon receipt.

All quality control requirements were acceptable.

Date of Report: 06/24/21
Date Received: 06/16/21
Project: Factoria Blvd, F&BI 106275
Date Extracted: NA
Date Analyzed: 06/17/21

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR pH USING EPA METHOD 150.2

Sample ID Laboratory ID	pH
GEI3-19-061621 106275-01	6.7
GEI1-19-061621 106275-02	6.7

Analysis For Total Metals By EPA Method 6020B

Client ID:	GEI3-19-061621	Client:	Aspect Consulting, LLC
Date Received:	06/16/21	Project:	Factoria Blvd, F&BI 106275
Date Extracted:	06/17/21	Lab ID:	106275-01
Date Analyzed:	06/17/21	Data File:	106275-01.070
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	2.91
Barium	94.6
Cadmium	<1
Chromium	7.53
Lead	1.10
Mercury	<1
Selenium	<1
Silver	<1

Analysis For Total Metals By EPA Method 6020B

Client ID:	GEI1-19-061621	Client:	Aspect Consulting, LLC
Date Received:	06/16/21	Project:	Factoria Blvd, F&BI 106275
Date Extracted:	06/17/21	Lab ID:	106275-02
Date Analyzed:	06/17/21	Data File:	106275-02.121
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	1.61
Barium	33.2
Cadmium	<1
Chromium	4.52
Lead	<1
Mercury	<1
Selenium	<1
Silver	<1

Analysis For Total Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Aspect Consulting, LLC
Date Received:	Not Applicable	Project:	Factoria Blvd, F&BI 106275
Date Extracted:	06/17/21	Lab ID:	I1-380 mb
Date Analyzed:	06/17/21	Data File:	I1-380 mb.068
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	<1
Barium	<1
Cadmium	<1
Chromium	<1
Lead	<1
Mercury	<1
Selenium	<1
Silver	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	GEI3-19-061621	Client:	Aspect Consulting, LLC
Date Received:	06/16/21	Project:	Factoria Blvd, F&BI 106275
Date Extracted:	06/18/21	Lab ID:	106275-01
Date Analyzed:	06/18/21	Data File:	061813.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	95	85	117
Toluene-d8	95	88	112
4-Bromofluorobenzene	99	90	111

Compounds:	Concentration ug/L (ppb)	Compounds:	Concentration ug/L (ppb)
Dichlorodifluoromethane	<1	1,3-Dichloropropane	<1
Chloromethane	<10	Tetrachloroethene	<1
Vinyl chloride	<0.2	Dibromochloromethane	<1
Bromomethane	<5	1,2-Dibromoethane (EDB)	<1
Chloroethane	<1	Chlorobenzene	<1
Trichlorofluoromethane	<1	Ethylbenzene	<1
Acetone	<50	1,1,1,2-Tetrachloroethane	<1
1,1-Dichloroethene	<1	m,p-Xylene	<2
Hexane	<5	o-Xylene	<1
Methylene chloride	<5	Styrene	<1
Methyl t-butyl ether (MTBE)	<1	Isopropylbenzene	<1
trans-1,2-Dichloroethene	<1	Bromoform	<5
1,1-Dichloroethane	<1	n-Propylbenzene	<1
2,2-Dichloropropane	<1	Bromobenzene	<1
cis-1,2-Dichloroethene	<1	1,3,5-Trimethylbenzene	<1
Chloroform	<1	1,1,2,2-Tetrachloroethane	<1
2-Butanone (MEK)	<20	1,2,3-Trichloropropane	<1
1,2-Dichloroethane (EDC)	<1	2-Chlorotoluene	<1
1,1,1-Trichloroethane	<1	4-Chlorotoluene	<1
1,1-Dichloropropene	<1	tert-Butylbenzene	<1
Carbon tetrachloride	<1	1,2,4-Trimethylbenzene	<1
Benzene	<0.35	sec-Butylbenzene	<1
Trichloroethene	<1	p-Isopropyltoluene	<1
1,2-Dichloropropane	<1	1,3-Dichlorobenzene	<1
Bromodichloromethane	<1	1,4-Dichlorobenzene	<1
Dibromomethane	<1	1,2-Dichlorobenzene	<1
4-Methyl-2-pentanone	<10	1,2-Dibromo-3-chloropropane	<10
cis-1,3-Dichloropropene	<1	1,2,4-Trichlorobenzene	<1
Toluene	<1	Hexachlorobutadiene	<1
trans-1,3-Dichloropropene	<1	Naphthalene	<1
1,1,2-Trichloroethane	<1	1,2,3-Trichlorobenzene	<1
2-Hexanone	<10		

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	GEI1-19-061621	Client:	Aspect Consulting, LLC
Date Received:	06/16/21	Project:	Factoria Blvd, F&BI 106275
Date Extracted:	06/18/21	Lab ID:	106275-02
Date Analyzed:	06/18/21	Data File:	061814.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	107	85	117
Toluene-d8	104	88	112
4-Bromofluorobenzene	101	90	111

Compounds:	Concentration ug/L (ppb)	Compounds:	Concentration ug/L (ppb)
Dichlorodifluoromethane	<1	1,3-Dichloropropane	<1
Chloromethane	<10	Tetrachloroethene	<1
Vinyl chloride	<0.2	Dibromochloromethane	<1
Bromomethane	<5	1,2-Dibromoethane (EDB)	<1
Chloroethane	<1	Chlorobenzene	<1
Trichlorofluoromethane	<1	Ethylbenzene	<1
Acetone	<50	1,1,1,2-Tetrachloroethane	<1
1,1-Dichloroethene	<1	m,p-Xylene	<2
Hexane	<5	o-Xylene	<1
Methylene chloride	<5	Styrene	<1
Methyl t-butyl ether (MTBE)	<1	Isopropylbenzene	<1
trans-1,2-Dichloroethene	<1	Bromoform	<5
1,1-Dichloroethane	<1	n-Propylbenzene	<1
2,2-Dichloropropane	<1	Bromobenzene	<1
cis-1,2-Dichloroethene	<1	1,3,5-Trimethylbenzene	<1
Chloroform	<1	1,1,2,2-Tetrachloroethane	<1
2-Butanone (MEK)	<20	1,2,3-Trichloropropane	<1
1,2-Dichloroethane (EDC)	<1	2-Chlorotoluene	<1
1,1,1-Trichloroethane	<1	4-Chlorotoluene	<1
1,1-Dichloropropene	<1	tert-Butylbenzene	<1
Carbon tetrachloride	<1	1,2,4-Trimethylbenzene	<1
Benzene	<0.35	sec-Butylbenzene	<1
Trichloroethene	<1	p-Isopropyltoluene	<1
1,2-Dichloropropane	<1	1,3-Dichlorobenzene	<1
Bromodichloromethane	<1	1,4-Dichlorobenzene	<1
Dibromomethane	<1	1,2-Dichlorobenzene	<1
4-Methyl-2-pentanone	<10	1,2-Dibromo-3-chloropropane	<10
cis-1,3-Dichloropropene	<1	1,2,4-Trichlorobenzene	<1
Toluene	<1	Hexachlorobutadiene	<1
trans-1,3-Dichloropropene	<1	Naphthalene	<1
1,1,2-Trichloroethane	<1	1,2,3-Trichlorobenzene	<1
2-Hexanone	<10		

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	Method Blank	Client:	Aspect Consulting, LLC
Date Received:	Not Applicable	Project:	Factoria Blvd, F&BI 106275
Date Extracted:	06/18/21	Lab ID:	01-1223 mb
Date Analyzed:	06/18/21	Data File:	061805.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	107	85	117
Toluene-d8	104	88	112
4-Bromofluorobenzene	99	90	111

Compounds:	Concentration ug/L (ppb)	Compounds:	Concentration ug/L (ppb)
Dichlorodifluoromethane	<1	1,3-Dichloropropane	<1
Chloromethane	<10	Tetrachloroethene	<1
Vinyl chloride	<0.2	Dibromochloromethane	<1
Bromomethane	<5	1,2-Dibromoethane (EDB)	<1
Chloroethane	<1	Chlorobenzene	<1
Trichlorofluoromethane	<1	Ethylbenzene	<1
Acetone	<50	1,1,1,2-Tetrachloroethane	<1
1,1-Dichloroethene	<1	m,p-Xylene	<2
Hexane	<5	o-Xylene	<1
Methylene chloride	<5	Styrene	<1
Methyl t-butyl ether (MTBE)	<1	Isopropylbenzene	<1
trans-1,2-Dichloroethene	<1	Bromoform	<5
1,1-Dichloroethane	<1	n-Propylbenzene	<1
2,2-Dichloropropane	<1	Bromobenzene	<1
cis-1,2-Dichloroethene	<1	1,3,5-Trimethylbenzene	<1
Chloroform	<1	1,1,2,2-Tetrachloroethane	<1
2-Butanone (MEK)	<20	1,2,3-Trichloropropane	<1
1,2-Dichloroethane (EDC)	<1	2-Chlorotoluene	<1
1,1,1-Trichloroethane	<1	4-Chlorotoluene	<1
1,1-Dichloropropene	<1	tert-Butylbenzene	<1
Carbon tetrachloride	<1	1,2,4-Trimethylbenzene	<1
Benzene	<0.35	sec-Butylbenzene	<1
Trichloroethene	<1	p-Isopropyltoluene	<1
1,2-Dichloropropane	<1	1,3-Dichlorobenzene	<1
Bromodichloromethane	<1	1,4-Dichlorobenzene	<1
Dibromomethane	<1	1,2-Dichlorobenzene	<1
4-Methyl-2-pentanone	<10	1,2-Dibromo-3-chloropropane	<10
cis-1,3-Dichloropropene	<1	1,2,4-Trichlorobenzene	<1
Toluene	<1	Hexachlorobutadiene	<1
trans-1,3-Dichloropropene	<1	Naphthalene	<1
1,1,2-Trichloroethane	<1	1,2,3-Trichlorobenzene	<1
2-Hexanone	<10		

Date of Report: 06/24/21
Date Received: 06/16/21
Project: Factoria Blvd, F&BI 106275
Date Extracted: 06/17/21
Date Analyzed: 06/18/21

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR OIL AND GREASE USING EPA METHOD 1664

Results Reported as mg/L (ppm)

Sample ID Laboratory ID	Oil and Grease
GEI3-19-061621 106275-01	<3
GEI1-19-061621 106275-02	<3
Method Blank	<3

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 06/24/21
Date Received: 06/16/21
Project: Factoria Blvd, F&BI 106275

QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR pH BY METHOD 150.2

Laboratory Code: 106275-02 (Duplicate)

Analyte	Sample Result	Duplicate Result	Relative Percent Difference	Acceptance Criteria
pH	6.7	6.7	0	0-20

Date of Report: 06/24/21
Date Received: 06/16/21
Project: Factoria Blvd, F&BI 106275

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL METALS USING EPA METHOD 6020B

Laboratory Code: 106275-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Arsenic	ug/L (ppb)	10	2.70	91	88	75-125	3
Barium	ug/L (ppb)	50	85.2	104	103	75-125	1
Cadmium	ug/L (ppb)	5	<1	96	94	75-125	2
Chromium	ug/L (ppb)	20	6.64	89	88	75-125	1
Lead	ug/L (ppb)	10	1.15	83	82	75-125	1
Mercury	ug/L (ppb)	5	<1	88	89	75-125	1
Selenium	ug/L (ppb)	5	<1	95	91	75-125	4
Silver	ug/L (ppb)	5	<1	91	88	75-125	3

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	ug/L (ppb)	10	97	80-120
Barium	ug/L (ppb)	50	95	80-120
Cadmium	ug/L (ppb)	5	94	80-120
Chromium	ug/L (ppb)	20	93	80-120
Lead	ug/L (ppb)	10	89	80-120
Mercury	ug/L (ppb)	5	91	80-120
Selenium	ug/L (ppb)	5	102	80-120
Silver	ug/L (ppb)	5	106	80-120

Date of Report: 06/24/21
Date Received: 06/16/21
Project: Factoria Blvd, F&BI 106275

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260D

Laboratory Code: 106315-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Dichlorodifluoromethane	ug/L (ppb)	10	<1	87	10-172
Chloromethane	ug/L (ppb)	10	<10	83	25-166
Vinyl chloride	ug/L (ppb)	10	<0.2	84	36-166
Bromomethane	ug/L (ppb)	10	<5	95	47-169
Chloroethane	ug/L (ppb)	10	<1	85	46-160
Trichlorofluoromethane	ug/L (ppb)	10	<1	104	44-165
Acetone	ug/L (ppb)	50	<50	53	10-182
1,1-Dichloroethene	ug/L (ppb)	10	<1	92	58-142
Hexane	ug/L (ppb)	10	<5	83	38-152
Methylene chloride	ug/L (ppb)	10	<5	79	50-145
Methyl t-butyl ether (MTBE)	ug/L (ppb)	10	<1	86	61-136
trans-1,2-Dichloroethene	ug/L (ppb)	10	<1	93	61-136
1,1-Dichloroethane	ug/L (ppb)	10	<1	87	63-135
2,2-Dichloropropane	ug/L (ppb)	10	<1	101	36-154
cis-1,2-Dichloroethene	ug/L (ppb)	10	<1	93	63-134
Chloroform	ug/L (ppb)	10	<1	91	61-135
2-Butanone (MEK)	ug/L (ppb)	50	<20	76	10-129
1,2-Dichloroethane (EDC)	ug/L (ppb)	10	<1	91	48-149
1,1,1-Trichloroethane	ug/L (ppb)	10	<1	92	60-146
1,1-Dichloropropene	ug/L (ppb)	10	<1	92	69-133
Carbon tetrachloride	ug/L (ppb)	10	<1	91	56-152
Benzene	ug/L (ppb)	10	<0.35	91	57-135
Trichloroethene	ug/L (ppb)	10	<1	94	66-135
1,2-Dichloropropane	ug/L (ppb)	10	<1	91	59-136
Bromodichloromethane	ug/L (ppb)	10	<1	92	61-150
Dibromomethane	ug/L (ppb)	10	<1	96	66-141
4-Methyl-2-pentanone	ug/L (ppb)	50	<10	95	10-185
cis-1,3-Dichloropropene	ug/L (ppb)	10	<1	89	52-147
Toluene	ug/L (ppb)	10	<1	99	50-137
trans-1,3-Dichloropropene	ug/L (ppb)	10	<1	96	53-142
1,1,2-Trichloroethane	ug/L (ppb)	10	<1	100	68-131
2-Hexanone	ug/L (ppb)	50	<10	103	10-185
1,3-Dichloropropane	ug/L (ppb)	10	<1	100	60-135
Tetrachloroethene	ug/L (ppb)	10	<1	101	10-226
Dibromochloromethane	ug/L (ppb)	10	<1	96	52-145
1,2-Dibromoethane (EDB)	ug/L (ppb)	10	<1	104	62-135
Chlorobenzene	ug/L (ppb)	10	<1	103	63-130
Ethylbenzene	ug/L (ppb)	10	<1	102	60-133
1,1,1,2-Tetrachloroethane	ug/L (ppb)	10	<1	104	56-143
m,p-Xylene	ug/L (ppb)	20	<2	103	69-135
o-Xylene	ug/L (ppb)	10	<1	101	60-140
Styrene	ug/L (ppb)	10	<1	100	60-133
Isopropylbenzene	ug/L (ppb)	10	<1	98	65-142
Bromoform	ug/L (ppb)	10	<5	93	54-148
n-Propylbenzene	ug/L (ppb)	10	<1	105	58-144
Bromobenzene	ug/L (ppb)	10	<1	109	61-130
1,3,5-Trimethylbenzene	ug/L (ppb)	10	<1	104	59-134
1,1,2,2-Tetrachloroethane	ug/L (ppb)	10	<1	111	51-154
1,2,3-Trichloropropane	ug/L (ppb)	10	<1	109	53-150
2-Chlorotoluene	ug/L (ppb)	10	<1	105	66-127
4-Chlorotoluene	ug/L (ppb)	10	<1	104	65-130
tert-Butylbenzene	ug/L (ppb)	10	<1	104	65-137
1,2,4-Trimethylbenzene	ug/L (ppb)	10	<1	103	59-146
sec-Butylbenzene	ug/L (ppb)	10	<1	104	64-140
p-Isopropyltoluene	ug/L (ppb)	10	<1	103	65-141
1,3-Dichlorobenzene	ug/L (ppb)	10	<1	107	60-131
1,4-Dichlorobenzene	ug/L (ppb)	10	<1	106	60-129
1,2-Dichlorobenzene	ug/L (ppb)	10	<1	104	60-130
1,2-Dibromo-3-chloropropane	ug/L (ppb)	10	<10	100	32-164
1,2,4-Trichlorobenzene	ug/L (ppb)	10	<1	103	52-138
Hexachlorobutadiene	ug/L (ppb)	10	<1	103	60-143
Naphthalene	ug/L (ppb)	10	<1	107	44-164
1,2,3-Trichlorobenzene	ug/L (ppb)	10	<1	105	69-148

Date of Report: 06/24/21
Date Received: 06/16/21
Project: Factoria Blvd, F&BI 106275

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260D

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Dichlorodifluoromethane	ug/L (ppb)	10	84	87	25-158	4
Chloromethane	ug/L (ppb)	10	85	84	45-156	1
Vinyl chloride	ug/L (ppb)	10	84	86	50-154	2
Bromomethane	ug/L (ppb)	10	103	100	55-143	3
Chloroethane	ug/L (ppb)	10	85	86	58-146	1
Trichlorofluoromethane	ug/L (ppb)	10	102	104	50-150	2
Acetone	ug/L (ppb)	50	53	53	22-155	0
1,1-Dichloroethene	ug/L (ppb)	10	91	94	67-136	3
Hexane	ug/L (ppb)	10	62	64	57-137	3
Methylene chloride	ug/L (ppb)	10	97	96	19-178	1
Methyl t-butyl ether (MTBE)	ug/L (ppb)	10	87	88	64-147	1
trans-1,2-Dichloroethene	ug/L (ppb)	10	92	93	68-128	1
1,1-Dichloroethane	ug/L (ppb)	10	88	89	74-135	1
2,2-Dichloropropane	ug/L (ppb)	10	105	105	55-143	0
cis-1,2-Dichloroethene	ug/L (ppb)	10	92	95	74-136	3
Chloroform	ug/L (ppb)	10	93	94	74-134	1
2-Butanone (MEK)	ug/L (ppb)	50	77	78	37-150	1
1,2-Dichloroethane (EDC)	ug/L (ppb)	10	91	93	66-129	2
1,1,1-Trichloroethane	ug/L (ppb)	10	94	95	74-142	1
1,1-Dichloropropene	ug/L (ppb)	10	91	94	77-129	3
Carbon tetrachloride	ug/L (ppb)	10	92	91	75-158	1
Benzene	ug/L (ppb)	10	92	93	69-134	1
Trichloroethene	ug/L (ppb)	10	92	96	67-133	4
1,2-Dichloropropane	ug/L (ppb)	10	92	93	71-134	1
Bromodichloromethane	ug/L (ppb)	10	90	92	66-126	2
Dibromomethane	ug/L (ppb)	10	97	96	68-132	1
4-Methyl-2-pentanone	ug/L (ppb)	50	98	99	65-138	1
cis-1,3-Dichloropropene	ug/L (ppb)	10	91	93	74-140	2
Toluene	ug/L (ppb)	10	99	99	72-122	0
trans-1,3-Dichloropropene	ug/L (ppb)	10	99	99	80-136	0
1,1,2-Trichloroethane	ug/L (ppb)	10	101	102	75-124	1
2-Hexanone	ug/L (ppb)	50	102	103	60-136	1
1,3-Dichloropropane	ug/L (ppb)	10	100	102	76-126	2
Tetrachloroethene	ug/L (ppb)	10	98	100	76-121	2
Dibromochloromethane	ug/L (ppb)	10	101	100	84-133	1
1,2-Dibromoethane (EDB)	ug/L (ppb)	10	104	105	82-115	1
Chlorobenzene	ug/L (ppb)	10	104	103	83-114	1
Ethylbenzene	ug/L (ppb)	10	101	100	77-124	1
1,1,1,2-Tetrachloroethane	ug/L (ppb)	10	103	105	84-127	2
m,p-Xylene	ug/L (ppb)	20	101	102	81-112	1
o-Xylene	ug/L (ppb)	10	101	99	81-121	2
Styrene	ug/L (ppb)	10	100	100	84-119	0
Isopropylbenzene	ug/L (ppb)	10	98	99	80-117	1
Bromoform	ug/L (ppb)	10	100	99	69-121	1
n-Propylbenzene	ug/L (ppb)	10	103	104	74-126	1
Bromobenzene	ug/L (ppb)	10	109	112	80-121	3
1,3,5-Trimethylbenzene	ug/L (ppb)	10	103	104	78-123	1
1,1,2,2-Tetrachloroethane	ug/L (ppb)	10	109	110	66-126	1
1,2,3-Trichloropropane	ug/L (ppb)	10	108	111	67-124	3
2-Chlorotoluene	ug/L (ppb)	10	106	106	77-127	0
4-Chlorotoluene	ug/L (ppb)	10	103	104	78-128	1
tert-Butylbenzene	ug/L (ppb)	10	105	105	80-123	0
1,2,4-Trimethylbenzene	ug/L (ppb)	10	101	103	79-122	2
sec-Butylbenzene	ug/L (ppb)	10	101	103	80-116	2
p-Isopropyltoluene	ug/L (ppb)	10	100	102	81-123	2
1,3-Dichlorobenzene	ug/L (ppb)	10	104	106	83-113	2
1,4-Dichlorobenzene	ug/L (ppb)	10	103	105	81-112	2
1,2-Dichlorobenzene	ug/L (ppb)	10	106	105	84-112	1
1,2-Dibromo-3-chloropropane	ug/L (ppb)	10	102	103	57-141	1
1,2,4-Trichlorobenzene	ug/L (ppb)	10	100	100	72-130	0
Hexachlorobutadiene	ug/L (ppb)	10	97	96	53-141	1
Naphthalene	ug/L (ppb)	10	108	107	64-133	1
1,2,3-Trichlorobenzene	ug/L (ppb)	10	106	104	65-136	2

Date of Report: 06/24/21
Date Received: 06/16/21
Project: Factoria Blvd, F&BI 106275

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR OIL AND GREASE USING EPA METHOD 1664

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 11)
Oil and Grease	mg/L (ppm)	40	96	95	78-114	1

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

106275

SAMPLE CHAIN OF CUSTODY

ME 06/16/21 VW1/AI5

Page # 1 of 1

Report To: Amy Tice

Company: Aspect Consulting

Address: 710 2nd Ave #550

City, State, ZIP: Seattle, WA 98104

Phone: 206-413-5411 Email: atice@aspectconsulting.com

SAMPLERS (signature):

PROJECT NAME: Factoria Blvd

PO #:

REMARKS:

Project specific RLs? - Yes / No

INVOICE TO:

TURNAROUND TIME
- X Standard turnaround
- ☐ RUSH
- Rush charges authorized by:

SAMPLE DISPOSAL
- ☐ Archive samples
- ☐ Other
- Default: Dispose after 30 days

ANALYSES REQUESTED

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	Fats/Oils/Grease	volatile org. compounds	Total Metals	Cyanide, pH	Notes
GEI 3-14-061621	01 A→G	6/16/2021	1055	AQ	7					X			X	X	X	X	RCRA Metals per
GEI 1-14-061621	02 A→G	6/16/2021	1335	AQ	7					X			X	X	X	X	AT 6/17/21 ME

Samples received at 10 °C

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	J. Bode McCosby	Aspect Consulting	6/16/2021	17:03
Received by:	Yelena Aravkina	F&B	6/16/21	17:05
Relinquished by:				
Received by:				

KP

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282

3600 Fremont Ave. N.
Seattle, WA 98103
T: (206) 352-3790
F: (206) 352-7178
info@fremontanalytical.com

Friedman & Bruya
Michael Erdahl
3012 16th Ave. W.
Seattle, WA 98119

RE: 106275
Work Order Number: 2106326

June 24, 2021

Attention Michael Erdahl:

Fremont Analytical, Inc. received 2 sample(s) on 6/17/2021 for the analyses presented in the following report.

Cyanide by SM 4500-CN C, E

This report consists of the following:

- Case Narrative
- Analytical Results
- Applicable Quality Control Summary Reports
- Chain of Custody

All analyses were performed consistent with the Quality Assurance program of Fremont Analytical, Inc. Please contact the laboratory if you should have any questions about the results.

Thank you for using Fremont Analytical.

Sincerely,

Brianna Barnes
Project Manager

Date: *06/24/2021*

CLIENT: Friedman & Bruya
Project: 106275
Work Order: 2106326

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
2106326-001	GEI 3-14-061621	06/16/2021 10:55 AM	06/17/2021 1:51 PM
2106326-002	GEI 1-14-061621	06/16/2021 1:35 PM	06/17/2021 1:51 PM

Note: If no "Time Collected" is supplied, a default of 12:00AM is assigned

Case Narrative

WO#: **2106326**

Date: **6/24/2021**

CLIENT: Friedman & Bruya

Project: 106275

I. SAMPLE RECEIPT:
Samples receipt information is recorded on the attached Sample Receipt Checklist.

II. GENERAL REPORTING COMMENTS:
Results are reported on a wet weight basis unless dry-weight correction is denoted in the units field on the analytical report ("mg/kg-dry" or "ug/kg-dry").

Matrix Spike (MS) and MS Duplicate (MSD) samples are tested from an analytical batch of "like" matrix to check for possible matrix effect. The MS and MSD will provide site specific matrix data only for those samples which are spiked by the laboratory. The sample chosen for spike purposes may or may not have been a sample submitted in this sample delivery group. The validity of the analytical procedures for which data is reported in this analytical report is determined by the Laboratory Control Sample (LCS) and the Method Blank (MB). The LCS and the MB are processed with the samples and the MS/MSD to ensure method criteria are achieved throughout the entire analytical process.

III. ANALYSES AND EXCEPTIONS:
Exceptions associated with this report will be footnoted in the analytical results page(s) or the quality control summary page(s) and/or noted below.

Qualifiers:

* - Flagged value is not within established control limits
B - Analyte detected in the associated Method Blank
D - Dilution was required
E - Value above quantitation range
H - Holding times for preparation or analysis exceeded
I - Analyte with an internal standard that does not meet established acceptance criteria
J - Analyte detected below Reporting Limit
N - Tentatively Identified Compound (TIC)
Q - Analyte with an initial or continuing calibration that does not meet established acceptance criteria
S - Spike recovery outside accepted recovery limits
ND - Not detected at the Reporting Limit
R - High relative percent difference observed

Acronyms:

%Rec - Percent Recovery
CCB - Continued Calibration Blank
CCV - Continued Calibration Verification
DF - Dilution Factor
DUP - Sample Duplicate
HEM - Hexane Extractable Material
ICV - Initial Calibration Verification
LCS/LCSD - Laboratory Control Sample / Laboratory Control Sample Duplicate
MCL - Maximum Contaminant Level
MB or MBLANK - Method Blank
MDL - Method Detection Limit
MS/MSD - Matrix Spike / Matrix Spike Duplicate
PDS - Post Digestion Spike
Ref Val - Reference Value
REP - Sample Replicate
RL - Reporting Limit
RPD - Relative Percent Difference
SD - Serial Dilution
SGT - Silica Gel Treatment
SPK - Spike
Surr - Surrogate

Analytical Report

Work Order: **2106326**
Date Reported: **6/24/2021**

Client: Friedman & Bruya
Collection Date: 6/16/2021 10:55:00 AM
Project: 106275
Lab ID: 2106326-001
Matrix: Water
Client Sample ID: GEI 3-14-061621

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Cyanide by SM 4500-CN C, E				Batch ID: 32756		Analyst: LB
Cyanide, Total	2.34	0.500	D	mg/L	10	6/24/2021 2:47:00 PM

Analytical Report

Work Order: **2106326**
Date Reported: **6/24/2021**

Client: Friedman & Bruya
Project: 106275
Lab ID: 2106326-002
Client Sample ID: GEI 1-14-061621

Collection Date: 6/16/2021 1:35:00 PM
Matrix: Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Cyanide by SM 4500-CN C, E				Batch ID: 32756		Analyst: LB
Cyanide, Total	ND	0.0500		mg/L	1	6/24/2021 2:51:00 PM

Date: *6/24/2021*

Work Order: 2106326
CLIENT: Friedman & Bruya
Project: 106275

QC SUMMARY REPORT

Cyanide by SM 4500-CN C, E

Sample ID: **MB-32756** SampType: **MBLK** Units: **mg/L** Prep Date: **6/23/2021** RunNo: **68199**
Client ID: **MBLKW** Batch ID: **32756** Analysis Date: **6/24/2021** SeqNo: **1376680**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Cyanide, Total	ND	0.0500									

Sample ID: **LCS-32756** SampType: **LCS** Units: **mg/L** Prep Date: **6/23/2021** RunNo: **68199**
Client ID: **LCSW** Batch ID: **32756** Analysis Date: **6/24/2021** SeqNo: **1376681**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Cyanide, Total	0.300	0.0500	0.2500	0	120	77.6	124				

Sample ID: **2106308-001ADUP** SampType: **DUP** Units: **mg/L** Prep Date: **6/23/2021** RunNo: **68199**
Client ID: **BATCH** Batch ID: **32756** Analysis Date: **6/24/2021** SeqNo: **1376683**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Cyanide, Total	0.0713	0.0500						0.06350	11.6	20	

Sample ID: **2106308-001AMS** SampType: **MS** Units: **mg/L** Prep Date: **6/23/2021** RunNo: **68199**
Client ID: **BATCH** Batch ID: **32756** Analysis Date: **6/24/2021** SeqNo: **1376684**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Cyanide, Total	0.417	0.0500	0.2500	0.06350	141	56	140				S

NOTES:
S - Outlying spike recovery observed. A duplicate analysis was performed with similar results indicating a possible matrix effect.

Sample ID: **2106308-001AMSD** SampType: **MSD** Units: **mg/L** Prep Date: **6/23/2021** RunNo: **68199**
Client ID: **BATCH** Batch ID: **32756** Analysis Date: **6/24/2021** SeqNo: **1376685**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Cyanide, Total	0.798	0.0500	0.2500	0.06350	294	56	140	0.4172	62.6	30	RS

NOTES:
S,R - Outlying spike recovery/RPD observed. Results indicate a possible matrix effect.

Sample Log-In Check List

Client Name:	**FB**	Work Order Number:	**2106326**
Logged by:	**Clare Griggs**	Date Received:	**6/17/2021 1:51:00 PM**

Chain of Custody

1.	Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
2.	How was the sample delivered?	Client		

Log In

3.	Coolers are present?	Yes ☑	No ☐	NA ☐
4.	Shipping container/cooler in good condition?	Yes ☑	No ☐	
5.	Custody Seals present on shipping container/cooler? (Refer to comments for Custody Seals not intact)	Yes ☐	No ☐	Not Present ☑
6.	Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
7.	Were all items received at a temperature of >2°C to 6°C *	Yes ☑	No ☐	NA ☐
8.	Sample(s) in proper container(s)?	Yes ☑	No ☐	
9.	Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
10.	Are samples properly preserved?	Yes ☑	No ☐	
11.	Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
12.	Is there headspace in the VOA vials?	Yes ☐	No ☐	NA ☑
13.	Did all samples containers arrive in good condition(unbroken)?	Yes ☑	No ☐	
14.	Does paperwork match bottle labels?	Yes ☑	No ☐	
15.	Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
16.	Is it clear what analyses were requested?	Yes ☑	No ☐	
17.	Were all holding times able to be met?	Yes ☑	No ☐	

Special Handling (if applicable)

18.	Was client notified of all discrepancies with this order?	Yes ☐	No ☐	NA ☑

Person Notified: _____ Date: _____

By Whom: _____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person

Regarding: _____

Client Instructions: _____

19. Additional remarks:

Item Information

Item #	Temp ºC
Sample	5.4

* Note: DoD/ELAP and TNI require items to be received at 4°C +/- 2°C

SUBCONTRACT SAMPLE CHAIN OF CUSTODY 21063216

Page # 1 of 1

Send Report To Michael Erdahl

Company Friedman and Bruya, Inc.

Address 3012 16th Ave W

City, State, ZIP Seattle, WA 98119

Phone # (206) 285-8282 merdahl@friedmanandbruya.com

SUBCONTRACTER Fremont

PROJECT NAME/NO. 106275

PO # B-293

REMARKS

Please Email Results Aspect EDD

TURNAROUND TIME

☑ Standard TAT

☐ RUSH

Rush charges authorized by:

SAMPLE DISPOSAL

☐ Dispose after 30 days

☐ Return samples

☐ Will call with instructions

Sample ID	Lab ID	Date Sampled	Time Sampled	Matrix	# of jars	Dioxins/Furans	EPH	VPH	Cyanide							Notes
GEI 3-14-061621		6/16/21	1055	water					x							
GEI 1-14-061621		6/16/21	1335	water					x							

ANALYSES REQUESTED

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:		Michael Erdahl	Friedman & Bruya	6/17/21	0830
Received by:		Clare Griggs	FBI	6/17/21	1351
Relinquished by:					
Received by:					

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

September 15, 2021

Amy Tice, Project Manager
Aspect Consulting, LLC
710 2nd Ave S, Suite 550
Seattle, WA 98104

Dear Ms Tice:

Included are the results from the testing of material submitted on September 8, 2021 from the Factoria Blvd SW 190545, F&BI 109129 project. There are 19 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Aspect Data
ASP0915R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on September 8, 2021 by Friedman & Bruya, Inc. from the Aspect Consulting, LLC Factoria Blvd SW 190545, F&BI 109129 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Aspect Consulting, LLC
109129 -01	GEI3-19-20210907
109129 -02	ACPT-2-20210907
109129 -03	Trip Blank

Samples GEI3-19-20210907 and ACPT-2-20210907 were sent to Fremont Analytical for cyanide analysis. The report is enclosed.

The 8260D laboratory control sample duplicate exceeded the acceptance criteria for trichlorofluormethane The compound was not detected, therefore the data were acceptable.

All other quality control requirements were acceptable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 09/15/21
Date Received: 09/08/21
Project: Factoria Blvd SW 190545, F&BI 109129
Date Extracted: NA
Date Analyzed: 09/08/21

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR pH USING EPA METHOD 150.2

Sample ID Laboratory ID	pH
GEI3-19-20210907 109129-01	6.4
ACPT-2-20210907 109129-02	6.3

Analysis For Total Metals By EPA Method 6020B

Client ID:	GEI3-19-20210907	Client:	Aspect Consulting, LLC
Date Received:	09/08/21	Project:	190545, F&BI 109129
Date Extracted:	09/09/21	Lab ID:	109129-01
Date Analyzed:	09/09/21	Data File:	109129-01.041
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	<1
Barium	66.7
Cadmium	<1
Chromium	<1
Lead	<1
Mercury	<1
Selenium	<1
Silver	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	ACPT-2-20210907	Client:	Aspect Consulting, LLC
Date Received:	09/08/21	Project:	190545, F&BI 109129
Date Extracted:	09/09/21	Lab ID:	109129-02
Date Analyzed:	09/09/21	Data File:	109129-02.063
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	64.7
Cadmium	3.81
Selenium	<1
Silver	5.11

Analysis For Total Metals By EPA Method 6020B

Client ID:	ACPT-2-20210907	Client:	Aspect Consulting, LLC
Date Received:	09/08/21	Project:	190545, F&BI 109129
Date Extracted:	09/09/21	Lab ID:	109129-02 x5
Date Analyzed:	09/13/21	Data File:	109129-02 x5.090
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Lead	176
Mercury	<5

Analysis For Total Metals By EPA Method 6020B

Client ID:	ACPT-2-20210907	Client:	Aspect Consulting, LLC
Date Received:	09/08/21	Project:	190545, F&BI 109129
Date Extracted:	09/09/21	Lab ID:	109129-02 x10
Date Analyzed:	09/09/21	Data File:	109129-02 x10.085
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Barium	3,360

Analysis For Total Metals By EPA Method 6020B

Client ID:	ACPT-2-20210907	Client:	Aspect Consulting, LLC
Date Received:	09/08/21	Project:	190545, F&BI 109129
Date Extracted:	09/09/21	Lab ID:	109129-02 x100
Date Analyzed:	09/10/21	Data File:	109129-02 x100.041
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Chromium	1,230

Analysis For Total Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Aspect Consulting, LLC
Date Received:	Not Applicable	Project:	190545, F&BI 109129
Date Extracted:	09/09/21	Lab ID:	I1-566 mb
Date Analyzed:	09/09/21	Data File:	I1-566 mb.036
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	<1
Barium	<1
Cadmium	<1
Chromium	<1
Lead	<1
Mercury	<1
Selenium	<1
Silver	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	GEI3-19-20210907	Client:	Aspect Consulting, LLC
Date Received:	09/08/21	Project:	190545, F&BI 109129
Date Extracted:	09/13/21	Lab ID:	109129-01
Date Analyzed:	09/13/21	Data File:	091318.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	104	85	117
Toluene-d8	100	88	112
4-Bromofluorobenzene	101	90	111

Compounds:	Concentration ug/L (ppb)	Compounds:	Concentration ug/L (ppb)
Dichlorodifluoromethane	<1	1,3-Dichloropropane	<1
Chloromethane	<10	Tetrachloroethene	<1
Vinyl chloride	<0.02	Dibromochloromethane	<0.5
Bromomethane	<5	1,2-Dibromoethane (EDB)	<1
Chloroethane	<1	Chlorobenzene	<1
Trichlorofluoromethane	<1	Ethylbenzene	<1
Acetone	<50	1,1,1,2-Tetrachloroethane	<1
1,1-Dichloroethene	<1	m,p-Xylene	<2
Hexane	<5	o-Xylene	<1
Methylene chloride	<10	Styrene	<1
Methyl t-butyl ether (MTBE)	<1	Isopropylbenzene	<1
trans-1,2-Dichloroethene	<1	Bromoform	<5
1,1-Dichloroethane	<1	n-Propylbenzene	<1
2,2-Dichloropropane	<1	Bromobenzene	<1
cis-1,2-Dichloroethene	<1	1,3,5-Trimethylbenzene	<1
Chloroform	<1	1,1,2,2-Tetrachloroethane	<0.2
2-Butanone (MEK)	<20	1,2,3-Trichloropropane	<1
1,2-Dichloroethane (EDC)	<0.2	2-Chlorotoluene	<1
1,1,1-Trichloroethane	<1	4-Chlorotoluene	<1
1,1-Dichloropropene	<1	tert-Butylbenzene	<1
Carbon tetrachloride	<0.5	1,2,4-Trimethylbenzene	<1
Benzene	<0.35	sec-Butylbenzene	<1
Trichloroethene	<0.5	p-Isopropyltoluene	<1
1,2-Dichloropropane	<1	1,3-Dichlorobenzene	<1
Bromodichloromethane	<0.5	1,4-Dichlorobenzene	<1
Dibromomethane	<1	1,2-Dichlorobenzene	<1
4-Methyl-2-pentanone	<10	1,2-Dibromo-3-chloropropane	<10
cis-1,3-Dichloropropene	<0.4	1,2,4-Trichlorobenzene	<1
Toluene	<1	Hexachlorobutadiene	<0.5
trans-1,3-Dichloropropene	<0.4	Naphthalene	<1
1,1,2-Trichloroethane	<0.5	1,2,3-Trichlorobenzene	<1
2-Hexanone	<10		

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	ACPT-2-20210907	Client:	Aspect Consulting, LLC
Date Received:	09/08/21	Project:	190545, F&BI 109129
Date Extracted:	09/13/21	Lab ID:	109129-02
Date Analyzed:	09/13/21	Data File:	091319.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	98	85	117
Toluene-d8	98	88	112
4-Bromofluorobenzene	103	90	111

Compounds:	Concentration ug/L (ppb)	Compounds:	Concentration ug/L (ppb)
Dichlorodifluoromethane	<1	1,3-Dichloropropane	<1
Chloromethane	<10	Tetrachloroethene	<1
Vinyl chloride	<0.02	Dibromochloromethane	<0.5
Bromomethane	<5	1,2-Dibromoethane (EDB)	<1
Chloroethane	<1	Chlorobenzene	<1
Trichlorofluoromethane	<1	Ethylbenzene	<1
Acetone	<50	1,1,1,2-Tetrachloroethane	<1
1,1-Dichloroethene	<1	m,p-Xylene	<2
Hexane	<5	o-Xylene	<1
Methylene chloride	<10	Styrene	<1
Methyl t-butyl ether (MTBE)	<1	Isopropylbenzene	<1
trans-1,2-Dichloroethene	<1	Bromoform	<5
1,1-Dichloroethane	<1	n-Propylbenzene	<1
2,2-Dichloropropane	<1	Bromobenzene	<1
cis-1,2-Dichloroethene	<1	1,3,5-Trimethylbenzene	<1
Chloroform	<1	1,1,2,2-Tetrachloroethane	<0.2
2-Butanone (MEK)	<20	1,2,3-Trichloropropane	<1
1,2-Dichloroethane (EDC)	<0.2	2-Chlorotoluene	<1
1,1,1-Trichloroethane	<1	4-Chlorotoluene	<1
1,1-Dichloropropene	<1	tert-Butylbenzene	<1
Carbon tetrachloride	<0.5	1,2,4-Trimethylbenzene	<1
Benzene	<0.35	sec-Butylbenzene	<1
Trichloroethene	<0.5	p-Isopropyltoluene	<1
1,2-Dichloropropane	<1	1,3-Dichlorobenzene	<1
Bromodichloromethane	<0.5	1,4-Dichlorobenzene	<1
Dibromomethane	<1	1,2-Dichlorobenzene	<1
4-Methyl-2-pentanone	<10	1,2-Dibromo-3-chloropropane	<10
cis-1,3-Dichloropropene	<0.4	1,2,4-Trichlorobenzene	<1
Toluene	<1	Hexachlorobutadiene	<0.5
trans-1,3-Dichloropropene	<0.4	Naphthalene	<1
1,1,2-Trichloroethane	<0.5	1,2,3-Trichlorobenzene	<1
2-Hexanone	<10		

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	Trip Blank	Client:	Aspect Consulting, LLC
Date Received:	09/08/21	Project:	190545, F&BI 109129
Date Extracted:	09/13/21	Lab ID:	109129-03
Date Analyzed:	09/13/21	Data File:	091316.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	85	117
Toluene-d8	98	88	112
4-Bromofluorobenzene	103	90	111

Compounds:	Concentration ug/L (ppb)	Compounds:	Concentration ug/L (ppb)
Dichlorodifluoromethane	<1	1,3-Dichloropropane	<1
Chloromethane	<10	Tetrachloroethene	<1
Vinyl chloride	<0.02	Dibromochloromethane	<0.5
Bromomethane	<5	1,2-Dibromoethane (EDB)	<1
Chloroethane	<1	Chlorobenzene	<1
Trichlorofluoromethane	<1	Ethylbenzene	<1
Acetone	<50	1,1,1,2-Tetrachloroethane	<1
1,1-Dichloroethene	<1	m,p-Xylene	<2
Hexane	<5	o-Xylene	<1
Methylene chloride	<10	Styrene	<1
Methyl t-butyl ether (MTBE)	<1	Isopropylbenzene	<1
trans-1,2-Dichloroethene	<1	Bromoform	<5
1,1-Dichloroethane	<1	n-Propylbenzene	<1
2,2-Dichloropropane	<1	Bromobenzene	<1
cis-1,2-Dichloroethene	<1	1,3,5-Trimethylbenzene	<1
Chloroform	<1	1,1,2,2-Tetrachloroethane	<0.2
2-Butanone (MEK)	<20	1,2,3-Trichloropropane	<1
1,2-Dichloroethane (EDC)	<0.2	2-Chlorotoluene	<1
1,1,1-Trichloroethane	<1	4-Chlorotoluene	<1
1,1-Dichloropropene	<1	tert-Butylbenzene	<1
Carbon tetrachloride	<0.5	1,2,4-Trimethylbenzene	<1
Benzene	<0.35	sec-Butylbenzene	<1
Trichloroethene	<0.5	p-Isopropyltoluene	<1
1,2-Dichloropropane	<1	1,3-Dichlorobenzene	<1
Bromodichloromethane	<0.5	1,4-Dichlorobenzene	<1
Dibromomethane	<1	1,2-Dichlorobenzene	<1
4-Methyl-2-pentanone	<10	1,2-Dibromo-3-chloropropane	<10
cis-1,3-Dichloropropene	<0.4	1,2,4-Trichlorobenzene	<1
Toluene	<1	Hexachlorobutadiene	<0.5
trans-1,3-Dichloropropene	<0.4	Naphthalene	<1
1,1,2-Trichloroethane	<0.5	1,2,3-Trichlorobenzene	<1
2-Hexanone	<10		

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	Method Blank	Client:	Aspect Consulting, LLC
Date Received:	Not Applicable	Project:	190545, F&BI 109129
Date Extracted:	09/14/21	Lab ID:	01-2021 mb
Date Analyzed:	09/13/21	Data File:	091307.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	96	85	117
Toluene-d8	96	88	112
4-Bromofluorobenzene	101	90	111

Compounds:	Concentration ug/L (ppb)	Compounds:	Concentration ug/L (ppb)
Dichlorodifluoromethane	<1	1,3-Dichloropropane	<1
Chloromethane	<10	Tetrachloroethene	<1
Vinyl chloride	<0.02	Dibromochloromethane	<0.5
Bromomethane	<5	1,2-Dibromoethane (EDB)	<1
Chloroethane	<1	Chlorobenzene	<1
Trichlorofluoromethane	<1	Ethylbenzene	<1
Acetone	<50	1,1,1,2-Tetrachloroethane	<1
1,1-Dichloroethene	<1	m,p-Xylene	<2
Hexane	<5	o-Xylene	<1
Methylene chloride	<10	Styrene	<1
Methyl t-butyl ether (MTBE)	<1	Isopropylbenzene	<1
trans-1,2-Dichloroethene	<1	Bromoform	<5
1,1-Dichloroethane	<1	n-Propylbenzene	<1
2,2-Dichloropropane	<1	Bromobenzene	<1
cis-1,2-Dichloroethene	<1	1,3,5-Trimethylbenzene	<1
Chloroform	<1	1,1,2,2-Tetrachloroethane	<0.2
2-Butanone (MEK)	<20	1,2,3-Trichloropropane	<1
1,2-Dichloroethane (EDC)	<0.2	2-Chlorotoluene	<1
1,1,1-Trichloroethane	<1	4-Chlorotoluene	<1
1,1-Dichloropropene	<1	tert-Butylbenzene	<1
Carbon tetrachloride	<0.5	1,2,4-Trimethylbenzene	<1
Benzene	<0.35	sec-Butylbenzene	<1
Trichloroethene	<0.5	p-Isopropyltoluene	<1
1,2-Dichloropropane	<1	1,3-Dichlorobenzene	<1
Bromodichloromethane	<0.5	1,4-Dichlorobenzene	<1
Dibromomethane	<1	1,2-Dichlorobenzene	<1
4-Methyl-2-pentanone	<10	1,2-Dibromo-3-chloropropane	<10
cis-1,3-Dichloropropene	<0.4	1,2,4-Trichlorobenzene	<1
Toluene	<1	Hexachlorobutadiene	<0.5
trans-1,3-Dichloropropene	<0.4	Naphthalene	<1
1,1,2-Trichloroethane	<0.5	1,2,3-Trichlorobenzene	<1
2-Hexanone	<10		

Date of Report: 09/15/21
Date Received: 09/08/21
Project: Factoria Blvd SW 190545, F&BI 109129
Date Extracted: 09/09/21
Date Analyzed: 09/10/21

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR OIL AND GREASE USING EPA METHOD 1664

Results Reported as mg/L (ppm)

Sample ID Laboratory ID	Oil and Grease
GEI3-19-20210907 109129-01	<3
ACPT-2-20210907 109129-02	<3
Method Blank	<3

Date of Report: 09/15/21
Date Received: 09/08/21
Project: Factoria Blvd SW 190545, F&BI 109129

QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR pH BY METHOD 150.2

Laboratory Code: 109129-02 (Duplicate)

Analyte	Sample Result	Duplicate Result	Relative Percent Difference	Acceptance Criteria
pH	6.3	6.3	0	0-20

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 09/15/21
Date Received: 09/08/21
Project: Factoria Blvd SW 190545, F&BI 109129

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL METALS USING EPA METHOD 6020B

Laboratory Code: 109129-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Arsenic	ug/L (ppb)	10	<1	100	97	75-125	3
Barium	ug/L (ppb)	50	66.7	99	94	75-125	5
Cadmium	ug/L (ppb)	5	<1	98	94	75-125	4
Chromium	ug/L (ppb)	20	<1	105	101	75-125	4
Lead	ug/L (ppb)	10	<1	89	86	75-125	3
Mercury	ug/L (ppb)	5	<1	102	97	75-125	5
Selenium	ug/L (ppb)	5	<1	104	103	75-125	1
Silver	ug/L (ppb)	5	<1	93	89	75-125	4

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	ug/L (ppb)	10	97	80-120
Barium	ug/L (ppb)	50	102	80-120
Cadmium	ug/L (ppb)	5	103	80-120
Chromium	ug/L (ppb)	20	104	80-120
Lead	ug/L (ppb)	10	98	80-120
Mercury	ug/L (ppb)	5	107	80-120
Selenium	ug/L (ppb)	5	101	80-120
Silver	ug/L (ppb)	5	100	80-120

Date of Report: 09/15/21
Date Received: 09/08/21
Project: Factoria Blvd SW 190545, F&BI 109129

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260D

Laboratory Code: 109115-17 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Dichlorodifluoromethane	ug/L (ppb)	10	<1	97	50-150
Chloromethane	ug/L (ppb)	10	<10	98	50-150
Vinyl chloride	ug/L (ppb)	10	<0.02	103	16-176
Bromomethane	ug/L (ppb)	10	<5	131	10-193
Chloroethane	ug/L (ppb)	10	<1	96	50-150
Trichlorofluoromethane	ug/L (ppb)	10	<1	135	50-150
Acetone	ug/L (ppb)	50	<50	69	15-179
1,1-Dichloroethene	ug/L (ppb)	10	<1	108	50-150
Hexane	ug/L (ppb)	10	<5	83	49-161
Methylene chloride	ug/L (ppb)	10	10	29 b	40-143
Methyl t-butyl ether (MTBE)	ug/L (ppb)	10	<1	70	50-150
trans-1,2-Dichloroethene	ug/L (ppb)	10	<1	95	50-150
1,1-Dichloroethane	ug/L (ppb)	10	<1	91	50-150
2,2-Dichloropropane	ug/L (ppb)	10	<1	59	10-335
cis-1,2-Dichloroethene	ug/L (ppb)	10	<1	97	50-150
Chloroform	ug/L (ppb)	10	<1	96	50-150
2-Butanone (MEK)	ug/L (ppb)	50	<20	69	34-168
1,2-Dichloroethane (EDC)	ug/L (ppb)	10	<0.2	99	50-150
1,1,1-Trichloroethane	ug/L (ppb)	10	<1	93	50-150
1,1-Dichloropropene	ug/L (ppb)	10	<1	94	50-150
Carbon tetrachloride	ug/L (ppb)	10	<0.5	88	50-150
Benzene	ug/L (ppb)	10	<0.35	90	50-150
Trichloroethene	ug/L (ppb)	10	<0.5	92	43-133
1,2-Dichloropropane	ug/L (ppb)	10	<1	91	50-150
Bromodichloromethane	ug/L (ppb)	10	<0.5	95	50-150
Dibromomethane	ug/L (ppb)	10	<1	96	50-150
4-Methyl-2-pentanone	ug/L (ppb)	50	<10	104	50-150
cis-1,3-Dichloropropene	ug/L (ppb)	10	<0.4	88	48-145
Toluene	ug/L (ppb)	10	<1	97	50-150
trans-1,3-Dichloropropene	ug/L (ppb)	10	<0.4	79	37-152
1,1,2-Trichloroethane	ug/L (ppb)	10	<0.5	98	50-150
2-Hexanone	ug/L (ppb)	50	<10	77	50-150
1,3-Dichloropropane	ug/L (ppb)	10	<1	94	50-150
Tetrachloroethene	ug/L (ppb)	10	4.1	92 b	50-150
Dibromochloromethane	ug/L (ppb)	10	<0.5	93	33-164
1,2-Dibromoethane (EDB)	ug/L (ppb)	10	<1	93	50-150
Chlorobenzene	ug/L (ppb)	10	<1	95	50-150
Ethylbenzene	ug/L (ppb)	10	<1	93	50-150
1,1,1,2-Tetrachloroethane	ug/L (ppb)	10	<1	96	50-150
m,p-Xylene	ug/L (ppb)	20	<2	91	50-150
o-Xylene	ug/L (ppb)	10	<1	92	50-150
Styrene	ug/L (ppb)	10	<1	94	50-150
Isopropylbenzene	ug/L (ppb)	10	<1	90	50-150
Bromoform	ug/L (ppb)	10	<5	90	23-161
n-Propylbenzene	ug/L (ppb)	10	<1	88	50-150
Bromobenzene	ug/L (ppb)	10	<1	100	50-150
1,3,5-Trimethylbenzene	ug/L (ppb)	10	<1	93	50-150
1,1,2,2-Tetrachloroethane	ug/L (ppb)	10	<0.2	107	10-235
1,2,3-Trichloropropane	ug/L (ppb)	10	<1	103	33-151
2-Chlorotoluene	ug/L (ppb)	10	<1	96	50-150
4-Chlorotoluene	ug/L (ppb)	10	<1	94	50-150
tert-Butylbenzene	ug/L (ppb)	10	<1	84	50-150
1,2,4-Trimethylbenzene	ug/L (ppb)	10	<1	90	50-150
sec-Butylbenzene	ug/L (ppb)	10	<1	81	46-139
p-Isopropyltoluene	ug/L (ppb)	10	<1	82	46-140
1,3-Dichlorobenzene	ug/L (ppb)	10	<1	97	50-150
1,4-Dichlorobenzene	ug/L (ppb)	10	<1	95	50-150
1,2-Dichlorobenzene	ug/L (ppb)	10	<1	96	50-150
1,2-Dibromo-3-chloropropane	ug/L (ppb)	10	<10	97	50-150
1,2,4-Trichlorobenzene	ug/L (ppb)	10	<1	90	50-150
Hexachlorobutadiene	ug/L (ppb)	10	<0.5	88	42-150
Naphthalene	ug/L (ppb)	10	<1	101	50-150
1,2,3-Trichlorobenzene	ug/L (ppb)	10	<1	92	44-155

Date of Report: 09/15/21
Date Received: 09/08/21
Project: Factoria Blvd SW 190545, F&BI 109129

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260D

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Dichlorodifluoromethane	ug/L (ppb)	10	100	114	70-130	13
Chloromethane	ug/L (ppb)	10	100	116	70-130	15
Vinyl chloride	ug/L (ppb)	10	100	113	70-130	12
Bromomethane	ug/L (ppb)	10	140	166	28-182	17
Chloroethane	ug/L (ppb)	10	95	103	70-130	8
Trichlorofluoromethane	ug/L (ppb)	10	120	141 vo	70-130	16
Acetone	ug/L (ppb)	50	61	61	42-155	0
1,1-Dichloroethene	ug/L (ppb)	10	102	116	70-130	13
Hexane	ug/L (ppb)	10	91	104	50-161	13
Methylene chloride	ug/L (ppb)	10	99	116	29-192	16
Methyl t-butyl ether (MTBE)	ug/L (ppb)	10	74	81	70-130	9
trans-1,2-Dichloroethene	ug/L (ppb)	10	92	104	70-130	12
1,1-Dichloroethane	ug/L (ppb)	10	85	95	70-130	11
2,2-Dichloropropane	ug/L (ppb)	10	72	81	70-130	12
cis-1,2-Dichloroethene	ug/L (ppb)	10	93	106	70-130	13
Chloroform	ug/L (ppb)	10	94	106	70-130	12
2-Butanone (MEK)	ug/L (ppb)	50	68	79	50-157	15
1,2-Dichloroethane (EDC)	ug/L (ppb)	10	97	110	70-130	13
1,1,1-Trichloroethane	ug/L (ppb)	10	94	103	70-130	9
1,1-Dichloropropene	ug/L (ppb)	10	95	109	70-130	14
Carbon tetrachloride	ug/L (ppb)	10	94	106	70-130	12
Benzene	ug/L (ppb)	10	89	101	70-130	13
Trichloroethene	ug/L (ppb)	10	91	103	70-130	12
1,2-Dichloropropane	ug/L (ppb)	10	90	101	70-130	12
Bromodichloromethane	ug/L (ppb)	10	97	110	70-130	13
Dibromomethane	ug/L (ppb)	10	92	106	70-130	14
4-Methyl-2-pentanone	ug/L (ppb)	50	100	114	70-130	13
cis-1,3-Dichloropropene	ug/L (ppb)	10	100	111	70-130	10
Toluene	ug/L (ppb)	10	95	102	70-130	7
trans-1,3-Dichloropropene	ug/L (ppb)	10	90	93	70-130	3
1,1,2-Trichloroethane	ug/L (ppb)	10	96	103	70-130	7
2-Hexanone	ug/L (ppb)	50	75	81	69-130	8
1,3-Dichloropropane	ug/L (ppb)	10	96	103	70-130	7
Tetrachloroethene	ug/L (ppb)	10	96	103	70-130	7
Dibromochloromethane	ug/L (ppb)	10	101	106	63-142	5
1,2-Dibromoethane (EDB)	ug/L (ppb)	10	96	102	70-130	6
Chlorobenzene	ug/L (ppb)	10	93	101	70-130	8
Ethylbenzene	ug/L (ppb)	10	93	100	70-130	7
1,1,1,2-Tetrachloroethane	ug/L (ppb)	10	96	103	70-130	7
m,p-Xylene	ug/L (ppb)	20	93	99	70-130	6
o-Xylene	ug/L (ppb)	10	93	100	70-130	7
Styrene	ug/L (ppb)	10	94	101	70-130	7
Isopropylbenzene	ug/L (ppb)	10	93	101	70-130	8
Bromoform	ug/L (ppb)	10	99	102	50-157	3
n-Propylbenzene	ug/L (ppb)	10	88	96	70-130	9
Bromobenzene	ug/L (ppb)	10	97	103	70-130	6
1,3,5-Trimethylbenzene	ug/L (ppb)	10	90	98	52-150	9
1,1,2,2-Tetrachloroethane	ug/L (ppb)	10	99	109	70-130	10
1,2,3-Trichloropropane	ug/L (ppb)	10	96	102	70-130	6
2-Chlorotoluene	ug/L (ppb)	10	95	102	70-130	7
4-Chlorotoluene	ug/L (ppb)	10	93	100	70-130	7
tert-Butylbenzene	ug/L (ppb)	10	84	92	70-130	9
1,2,4-Trimethylbenzene	ug/L (ppb)	10	91	98	70-130	7
sec-Butylbenzene	ug/L (ppb)	10	84	91	70-130	8
p-Isopropyltoluene	ug/L (ppb)	10	85	93	70-130	9
1,3-Dichlorobenzene	ug/L (ppb)	10	95	102	70-130	7
1,4-Dichlorobenzene	ug/L (ppb)	10	93	100	70-130	7
1,2-Dichlorobenzene	ug/L (ppb)	10	94	101	70-130	7
1,2-Dibromo-3-chloropropane	ug/L (ppb)	10	93	102	70-130	9
1,2,4-Trichlorobenzene	ug/L (ppb)	10	90	96	70-130	6
Hexachlorobutadiene	ug/L (ppb)	10	88	95	70-130	8
Naphthalene	ug/L (ppb)	10	95	104	70-130	9
1,2,3-Trichlorobenzene	ug/L (ppb)	10	89	97	69-143	9

Date of Report: 09/15/21
Date Received: 09/08/21
Project: Factoria Blvd SW 190545, F&BI 109129

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR OIL AND GREASE USING EPA METHOD 1664

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 11)
Oil and Grease	mg/L (ppm)	40	96	93	78-114	3

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

109129

SAMPLE CHAIN OF CUSTODY

09-08-21

VW1/AJ1/ED3

Page # 1 of 1

Report To Amy Tice

Company atice@asphaltconsulting.com

Address

City, State, ZIP

Phone Email

SAMPLERS (signature) NM

PROJECT NAME: Factoria Bld SW

PO #: 190545

REMARKS

Project specific RLs? - Yes / No

INVOICE TO

TURNAROUND TIME
☒ Standard turnaround
☐ RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
☐ Archive samples
☐ Other
Default: Dispose after 30 days

ANALYSES REQUESTED

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	pH	Cyanide	FOG	RCRA-8	✓ - per AT Notes 9/10
GEI3-19-20210907	01 A-b	9/7/21	2100	W	7					✓			✓	✓	✓	✓	
ACPT-2-20210907	02 ↓	9/7/21	2300	W	7					✓			✓	✓	✓	✓	
Trip Blank	03 AB				2					✓			~~✓~~	~~✓~~	~~✓~~	~~✓~~	Added at lab AMB 9/8
													EPA 8				

Samples received at 20 °C

	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:					
Received by:	[signature]	Khan Phan	FEBI	9/8/21	1240
Relinquished by:					
Received by:					

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282

3600 Fremont Ave. N.
Seattle, WA 98103
T: (206) 352-3790
F: (206) 352-7178
info@fremontanalytical.com

Friedman & Bruya
Michael Erdahl
3012 16th Ave. W.
Seattle, WA 98119

RE: 109129
Work Order Number: 2109103

September 10, 2021

Attention Michael Erdahl:

Fremont Analytical, Inc. received 2 sample(s) on 9/8/2021 for the analyses presented in the following report.

Cyanide by SM 4500-CN C, E

This report consists of the following:

- Case Narrative
- Analytical Results
- Applicable Quality Control Summary Reports
- Chain of Custody

All analyses were performed consistent with the Quality Assurance program of Fremont Analytical, Inc. Please contact the laboratory if you should have any questions about the results.

Thank you for using Fremont Analytical.

Sincerely,

Brianna Barnes
Project Manager

Date: *09/10/2021*

CLIENT: Friedman & Bruya
Project: 109129
Work Order: 2109103

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
2109103-001	GEI3-19-20210907	09/07/2021 9:00 PM	09/08/2021 2:17 PM
2109103-002	ACPT-2-20210907	09/07/2021 11:00 PM	09/08/2021 2:17 PM

Note: If no "Time Collected" is supplied, a default of 12:00AM is assigned

Original

Case Narrative

WO#: **2109103**

Date: **9/10/2021**

CLIENT: Friedman & Bruya

Project: 109129

I. SAMPLE RECEIPT:
Samples receipt information is recorded on the attached Sample Receipt Checklist.

II. GENERAL REPORTING COMMENTS:
Results are reported on a wet weight basis unless dry-weight correction is denoted in the units field on the analytical report ("mg/kg-dry" or "ug/kg-dry").

Matrix Spike (MS) and MS Duplicate (MSD) samples are tested from an analytical batch of "like" matrix to check for possible matrix effect. The MS and MSD will provide site specific matrix data only for those samples which are spiked by the laboratory. The sample chosen for spike purposes may or may not have been a sample submitted in this sample delivery group. The validity of the analytical procedures for which data is reported in this analytical report is determined by the Laboratory Control Sample (LCS) and the Method Blank (MB). The LCS and the MB are processed with the samples and the MS/MSD to ensure method criteria are achieved throughout the entire analytical process.

III. ANALYSES AND EXCEPTIONS:
Exceptions associated with this report will be footnoted in the analytical results page(s) or the quality control summary page(s) and/or noted below.

Qualifiers:

* - Flagged value is not within established control limits
B - Analyte detected in the associated Method Blank
D - Dilution was required
E - Value above quantitation range
H - Holding times for preparation or analysis exceeded
I - Analyte with an internal standard that does not meet established acceptance criteria
J - Analyte detected below Reporting Limit
N - Tentatively Identified Compound (TIC)
Q - Analyte with an initial or continuing calibration that does not meet established acceptance criteria
S - Spike recovery outside accepted recovery limits
ND - Not detected at the Reporting Limit
R - High relative percent difference observed

Acronyms:

%Rec - Percent Recovery
CCB - Continued Calibration Blank
CCV - Continued Calibration Verification
DF - Dilution Factor
DUP - Sample Duplicate
HEM - Hexane Extractable Material
ICV - Initial Calibration Verification
LCS/LCSD - Laboratory Control Sample / Laboratory Control Sample Duplicate
MCL - Maximum Contaminant Level
MB or MBLANK - Method Blank
MDL - Method Detection Limit
MS/MSD - Matrix Spike / Matrix Spike Duplicate
PDS - Post Digestion Spike
Ref Val - Reference Value
REP - Sample Replicate
RL - Reporting Limit
RPD - Relative Percent Difference
SD - Serial Dilution
SGT - Silica Gel Treatment
SPK - Spike
Surr - Surrogate

Analytical Report

Work Order: **2109103**
Date Reported: **9/10/2021**

CLIENT: Friedman & Bruya
Project: 109129

Lab ID: 2109103-001 **Collection Date:** 9/7/2021 9:00:00 PM
Client Sample ID: **GEI3-19-20210907** **Matrix:** Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Cyanide by SM 4500-CN C, E				Batch ID: 33648		Analyst: CH
Cyanide, Total	ND	0.0500		mg/L	1	9/9/2021 1:49:00 PM

Lab ID: 2109103-002 **Collection Date:** 9/7/2021 11:00:00 PM
Client Sample ID: **ACPT-2-20210907** **Matrix:** Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Cyanide by SM 4500-CN C, E				Batch ID: 33648		Analyst: CH
Cyanide, Total	ND	0.0500		mg/L	1	9/9/2021 1:52:00 PM

Date: *9/10/2021*

Work Order: 2109103
CLIENT: Friedman & Bruya
Project: 109129

QC SUMMARY REPORT

Cyanide by SM 4500-CN C, E

Sample ID: **MB-33648** SampType: **MBLK** Units: **mg/L** Prep Date: **9/9/2021** RunNo: **69804**
Client ID: **MBLKW** Batch ID: **33648** Analysis Date: **9/9/2021** SeqNo: **1415224**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Cyanide, Total	ND	0.0500									

Sample ID: **LCS-33648** SampType: **LCS** Units: **mg/L** Prep Date: **9/9/2021** RunNo: **69804**
Client ID: **LCSW** Batch ID: **33648** Analysis Date: **9/9/2021** SeqNo: **1415225**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Cyanide, Total	0.297	0.0500	0.2500	0	119	80	138				

Sample ID: **2109094-002ADUP** SampType: **DUP** Units: **mg/L** Prep Date: **9/9/2021** RunNo: **69804**
Client ID: **BATCH** Batch ID: **33648** Analysis Date: **9/9/2021** SeqNo: **1415229**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Cyanide, Total	ND	0.0500						0		20	

Sample ID: **2109094-002AMS** SampType: **MS** Units: **mg/L** Prep Date: **9/9/2021** RunNo: **69804**
Client ID: **BATCH** Batch ID: **33648** Analysis Date: **9/9/2021** SeqNo: **1415230**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Cyanide, Total	0.261	0.0500	0.2500	0	104	55.9	149				

Sample ID: **2109094-002AMSD** SampType: **MSD** Units: **mg/L** Prep Date: **9/9/2021** RunNo: **69804**
Client ID: **BATCH** Batch ID: **33648** Analysis Date: **9/9/2021** SeqNo: **1415232**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Cyanide, Total	0.274	0.0500	0.2500	0	110	55.9	149	0.2607	5.12	30	

Sample Log-In Check List

Client Name:	**FB**	Work Order Number:	**2109103**
Logged by:	**Gabrielle Coeuille**	Date Received:	**9/8/2021 2:17:00 PM**

Chain of Custody

1.	Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
2.	How was the sample delivered?	Client		

Log In

3.	Coolers are present?	Yes ☑	No ☐	NA ☐
4.	Shipping container/cooler in good condition?	Yes ☑	No ☐	
5.	Custody Seals present on shipping container/cooler? (Refer to comments for Custody Seals not intact)	Yes ☐	No ☐	Not Present ☑
6.	Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
7.	Were all items received at a temperature of >2°C to 6°C *	Yes ☑	No ☐	NA ☐
8.	Sample(s) in proper container(s)?	Yes ☑	No ☐	
9.	Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
10.	Are samples properly preserved?	Yes ☑	No ☐	
11.	Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
12.	Is there headspace in the VOA vials?	Yes ☐	No ☐	NA ☑
13.	Did all samples containers arrive in good condition(unbroken)?	Yes ☑	No ☐	
14.	Does paperwork match bottle labels?	Yes ☑	No ☐	
15.	Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
16.	Is it clear what analyses were requested?	Yes ☑	No ☐	
17.	Were all holding times able to be met?	Yes ☑	No ☐	

Special Handling (if applicable)

18.	Was client notified of all discrepancies with this order?	Yes ☐	No ☐	NA ☑

Person Notified: _____ Date: _____

By Whom: _____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person

Regarding: _____

Client Instructions: _____

19. Additional remarks:

Item Information

Item #	Temp ºC
Sample 1	1.8

* Note: DoD/ELAP and TNI require items to be received at 4°C +/- 2°C

SUBCONTRACT SAMPLE CHAIN OF CUSTODY

2109103

Page # _____ of _____

Send Report To Michael Erdahl

Company Friedman and Bruya, Inc.

Address 3012 16th Ave W

City, State, ZIP Seattle, WA 98119

Phone # (206) 285-8282 merdahl@friedmanandbruya.com

SUBCONTRACTER: FREMONT

PROJECT NAME/NO.: 109129

PO #: B-404

REMARKS

TURNAROUND TIME
- ☐ Standard TAT
- ☐ RUSH
- Rush charges authorized by:

SAMPLE DISPOSAL
- ☐ Dispose after 30 days
- ☐ Return samples
- ☐ Will call with instructions

Sample ID	Lab ID	Date Sampled	Time Sampled	Matrix	# of jars	Dioxins/Furans	EPH	VPH	Cyanide							Notes
GEI 3-19-20210907		9/7/21	2100	W	1				✓							
ACPT-2-20210907		9/7/21	2300	W	1				✓							

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	~~Michael Erdahl~~ Eric Young	Friedman & Bruya	9/8	1200
Received by: Justine Mantz	Justine Mantz	FAI	9/8/21	14:17
Relinquished by:				
Received by:				

APPENDIX E

Dewatering Discharge Requirements

Issuance Date: November 18, 2020
Effective Date: January 1, 2021
Expiration Date: December 31, 2025

CONSTRUCTION STORMWATER GENERAL PERMIT

National Pollutant Discharge Elimination System (NPDES) and State Waste Discharge General Permit for Stormwater Discharges Associated with Construction Activity

State of Washington
Department of Ecology
Olympia, Washington 98504

In compliance with the provisions of
Chapter 90.48 Revised Code of Washington
(State of Washington Water Pollution Control Act)
and
Title 33 United States Code, Section 1251 et seq.
The Federal Water Pollution Control Act (The Clean Water Act)

Until this permit expires, is modified, or revoked, Permittees that have properly obtained coverage under this general permit are authorized to discharge in accordance with the special and general conditions that follow.

Vincent McGowan, P.E.
Water Quality Program Manager
Washington State Department of Ecology

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SUMMARY OF PERMIT REPORT SUBMITTALS

Refer to the Special and General Conditions within this permit for additional submittal requirements. Appendix A provides a list of definitions. Appendix B provides a list of acronyms.

Table 1 Summary of Required Submittals

Permit Section	Submittal	Frequency	First Submittal Date
S5.A and S8	High Turbidity/Transparency Phone Reporting	As Necessary	Within 24 hours
S5.B	Discharge Monitoring Report	Monthly*	Within 15 days following the end of each month
S5.F and S8	Noncompliance Notification – Telephone Notification	As necessary	Within 24 hours
S5.F	Noncompliance Notification – Written Report	As necessary	Within 5 Days of non-compliance
S9.D	Request for Chemical Treatment Form	As necessary	Written approval from Ecology is required prior to using chemical treatment (with the exception of dry ice, CO_2 or food grade vinegar to adjust pH)
G2	Notice of Change in Authorization	As necessary	
G6	Permit Application for Substantive Changes to the Discharge	As necessary	
G8	Application for Permit Renewal	1/permit cycle	No later than 180 days before expiration
S2.A	Notice of Permit Transfer	As necessary	
G19	Notice of Planned Changes	As necessary	
G21	Reporting Anticipated Non-compliance	As necessary	

NOTE: *Permittees must submit electronic Discharge Monitoring Reports (DMRs) to the Washington State Department of Ecology monthly, regardless of site discharge, for the full duration of permit coverage. Refer to Section S5.B of this General Permit for more specific information regarding DMRs.

Table 2 Summary of Required On-site Documentation

Document Title	Permit Conditions
Permit Coverage Letter	See Conditions S2, S5
Construction Stormwater General Permit (CSWGP)	See Conditions S2, S5
Site Log Book	See Conditions S4, S5
Stormwater Pollution Prevention Plan (SWPPP)	See Conditions S5, S9
Site Map	See Conditions S5, S9

SPECIAL CONDITIONS

S1. PERMIT COVERAGE

A. Permit Area

This Construction Stormwater General Permit (CSWGP) covers all areas of Washington State, except for federal operators and Indian Country as specified in Special Condition S1.E.3 and 4.

B. Operators Required to Seek Coverage Under this General Permit

1. Operators of the following construction activities are required to seek coverage under this CSWGP:

    a. Clearing, grading and/or excavation that results in the disturbance of one or more acres (including off-site disturbance acreage related to construction-support activity as authorized in S1.C.2) and discharges stormwater to surface waters of the State; and clearing, grading and/or excavation on sites smaller than one acre that are part of a larger common plan of development or sale, if the common plan of development or sale will ultimately disturb one acre or more and discharge stormwater to surface waters of the State.

        i. This category includes forest practices (including, but not limited to, class IV conversions) that are part of a construction activity that will result in the disturbance of one or more acres, and discharge to surface waters of the State (that is, forest practices that prepare a site for construction activities); and

    b. Any size construction activity discharging stormwater to waters of the State that the Washington State Department of Ecology (Ecology):

        i. Determines to be a significant contributor of pollutants to waters of the State of Washington.

        ii. Reasonably expects to cause a violation of any water quality standard.

2. Operators of the following activities are not required to seek coverage under this CSWGP (unless specifically required under Special Condition S1.B.1.b, above):

    a. Construction activities that discharge all stormwater and non-stormwater to groundwater, sanitary sewer, or combined sewer, and have no point source discharge to either surface water or a storm sewer system that drains to surface waters of the State.

    b. Construction activities covered under an Erosivity Waiver (Special Condition S1.F).

    c. Routine maintenance that is performed to maintain the original line and grade, hydraulic capacity, or original purpose of a facility.

C. Authorized Discharges

1. ***Stormwater Associated with Construction Activity.*** Subject to compliance with the terms and conditions of this permit, Permittees are authorized to discharge stormwater associated with construction activity to surface waters of the State or to a storm sewer system that drains to surface waters of the State. (Note that "surface waters of the

State" may exist on a construction site as well as off site; for example, a creek running through a site.)

2. ***Stormwater Associated with Construction Support Activity.*** This permit also authorizes stormwater discharge from support activities related to the permitted construction site (for example, an on-site portable rock crusher, off-site equipment staging yards, material storage areas, borrow areas, etc.) provided:

    a. The support activity relates directly to the permitted construction site that is required to have an NPDES permit; and

    b. The support activity is not a commercial operation serving multiple unrelated construction projects, and does not operate beyond the completion of the construction activity; and

    c. Appropriate controls and measures are identified in the Stormwater Pollution Prevention Plan (SWPPP) for the discharges from the support activity areas.

3. ***Non-Stormwater Discharges.*** The categories and sources of non-stormwater discharges identified below are authorized conditionally, provided the discharge is consistent with the terms and conditions of this permit:

    a. Discharges from fire-fighting activities.

    b. Fire hydrant system flushing.

    c. Potable water, including uncontaminated water line flushing.

    d. Hydrostatic test water.

    e. Uncontaminated air conditioning or compressor condensate.

    f. Uncontaminated groundwater or spring water.

    g. Uncontaminated excavation dewatering water (in accordance with S9.D.10).

    h. Uncontaminated discharges from foundation or footing drains.

    i. Uncontaminated or potable water used to control dust. Permittees must minimize the amount of dust control water used.

    j. Routine external building wash down that does not use detergents.

    k. Landscape irrigation water.

The SWPPP must adequately address all authorized non-stormwater discharges, except for discharges from fire-fighting activities, and must comply with Special Condition S3. At a minimum, discharges from potable water (including water line flushing), fire hydrant system flushing, and pipeline hydrostatic test water must undergo the following: dechlorination to a concentration of 0.1 parts per million (ppm) or less, and pH adjustment to within 6.5 – 8.5 standard units (su), if necessary.

D. Prohibited Discharges

The following discharges to waters of the State, including groundwater, are prohibited:

1. Concrete wastewater
2. Wastewater from washout and clean-up of stucco, paint, form release oils, curing compounds and other construction materials.
3. Process wastewater as defined by 40 Code of Federal Regulations (CFR) 122.2 (See Appendix A of this permit).
4. Slurry materials and waste from shaft drilling, including process wastewater from shaft drilling for construction of building, road, and bridge foundations unless managed according to Special Condition S9.D.9.j.
5. Fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance.
6. Soaps or solvents used in vehicle and equipment washing.
7. Wheel wash wastewater, unless managed according to Special Condition S9.D.9.
8. Discharges from dewatering activities, including discharges from dewatering of trenches and excavations, unless managed according to Special Condition S9.D.10.

E. Limits on Coverage

Ecology may require any discharger to apply for and obtain coverage under an individual permit or another more specific general permit. Such alternative coverage will be required when Ecology determines that this CSWGP does not provide adequate assurance that water quality will be protected, or there is a reasonable potential for the project to cause or contribute to a violation of water quality standards.

The following stormwater discharges are not covered by this permit:

1. Post-construction stormwater discharges that originate from the site after completion of construction activities and the site has undergone final stabilization.
2. Non-point source silvicultural activities such as nursery operations, site preparation, reforestation and subsequent cultural treatment, thinning, prescribed burning, pest and fire control, harvesting operations, surface drainage, or road construction and maintenance, from which there is natural runoff as excluded in 40 CFR Subpart 122.
3. Stormwater from any federal operator.
4. Stormwater from facilities located on ***Indian Country*** as defined in 18 U.S.C.§1151, except portions of the Puyallup Reservation as noted below.

   Indian Country includes:

   a. All land within any Indian Reservation notwithstanding the issuance of any patent, and, including rights-of-way running through the reservation. This includes all federal, tribal, and Indian and non-Indian privately owned land within the reservation.

   b. All off-reservation Indian allotments, the Indian titles to which have not been extinguished, including rights-of-way running through the same.

   c. All off-reservation federal trust lands held for Native American Tribes.

Puyallup Exception: Following the *Puyallup Tribes of Indians Land Settlement Act of 1989*, 25 U.S.C. §1773; the permit does apply to land within the Puyallup Reservation except for discharges to surface water on land held in trust by the federal government.

5. Stormwater from any site covered under an existing NPDES individual permit in which stormwater management and/or treatment requirements are included for all stormwater discharges associated with construction activity.

6. Stormwater from a site where an applicable Total Maximum Daily Load (TMDL) requirement specifically precludes or prohibits discharges from construction activity.

F. Erosivity Waiver

Construction site operators may qualify for an Erosivity Waiver from the CSWGP if the following conditions are met:

1. The site will result in the disturbance of fewer than five (5) acres and the site is not a portion of a common plan of development or sale that will disturb five (5) acres or greater.

2. Calculation of Erosivity "R" Factor and Regional Timeframe:

   a. The project's calculated rainfall erosivity factor ("R" Factor) must be less than five (5) during the period of construction activity, (See the CSWGP homepage http://www.ecy.wa.gov/programs/wq/stormwater/construction/index.html for a link to the EPA's calculator and step by step instructions on computing the "R" Factor in the *EPA Erosivity Waiver Fact Sheet*). The period of construction activity starts when the land is first disturbed and ends with final stabilization. In addition:

   b. The entire period of construction activity must fall within the following timeframes:

      i. For sites west of the Cascades Crest: June 15 – September 15.

      ii. For sites east of the Cascades Crest, excluding the Central Basin: June 15 – October 15.

      iii. For sites east of the Cascades Crest, within the Central Basin: no timeframe restrictions apply. The Central Basin is defined as the portions of Eastern Washington with mean annual precipitation of less than 12 inches. For a map of the Central Basin (Average Annual Precipitation Region 2), refer to: http://www.ecy.wa.gov/programs/wq/stormwater/construction/resourcesguidance.html.

3. Construction site operators must submit a complete Erosivity Waiver certification form at least one week before disturbing the land. Certification must include statements that the operator will:

   a. Comply with applicable local stormwater requirements; and

   b. Implement appropriate erosion and sediment control BMPs to prevent violations of water quality standards.

4. This waiver is not available for facilities declared significant contributors of pollutants as defined in Special Condition S1.B.1.b or for any size construction activity that could

reasonably expect to cause a violation of any water quality standard as defined in Special Condition S1.B.1.b.ii.

5. This waiver does not apply to construction activities which include non-stormwater discharges listed in Special Condition S1.C.3.

6. If construction activity extends beyond the certified waiver period for any reason, the operator must either:

   a. Recalculate the rainfall erosivity "R" factor using the original start date and a new projected ending date and, if the "R" factor is still under 5 *and* the entire project falls within the applicable regional timeframe in Special Condition S1.F.2.b, complete and submit an amended waiver certification form before the original waiver expires; *or*

   b. Submit a complete permit application to Ecology in accordance with Special Condition S2.A and B before the end of the certified waiver period.

S2. APPLICATION REQUIREMENTS

A. Permit Application Forms

1. *Notice of Intent Form*

a. Operators of new or previously unpermitted construction activities must submit a complete and accurate permit application (Notice of Intent, or NOI) to Ecology.

b. Operators must apply using the electronic application form (NOI) available on Ecology's website (http://ecy.wa.gov/programs/wq/stormwater/construction/index.html). Permittees unable to submit electronically (for example, those who do not have an internet connection) must contact Ecology to request a waiver and obtain instructions on how to obtain a paper NOI.

Department of Ecology
Water Quality Program - Construction Stormwater
PO Box 47696
Olympia, Washington 98504-7696

c. The operator must submit the NOI at least 60 days before discharging stormwater from construction activities and must submit it prior to the date of the first public notice (See Special Condition S2.B, below, for details). The 30-day public comment period begins on the publication date of the second public notice. Unless Ecology responds to the complete application in writing, coverage under the general permit will automatically commence on the 31st day following receipt by Ecology of a *completed* NOI, or the issuance date of this permit, whichever is later; unless Ecology specifies a later date in writing as required by WAC173-226-200(2). See S8.B for Limits on Coverage for New Discharges to TMDL or 303(d)-Listed Waters.

d. If an applicant intends to use a Best Management Practice (BMP) selected on the basis of Special Condition S9.C.4 ("demonstrably equivalent" BMPs), the applicant must notify Ecology of its selection as part of the NOI. In the event the applicant selects BMPs after submission of the NOI, the applicant must provide notice of the

selection of an equivalent BMP to Ecology at least 60 days before intended use of the equivalent BMP.

e. Applicants must notify Ecology if they are aware of contaminated soils and/or groundwater associated with the construction activity. Provide detailed information with the NOI (as known and readily available) on the nature and extent of the contamination (concentrations, locations, and depth), as well as pollution prevention and/or treatment BMPs proposed to control the discharge of soil and/or groundwater contaminants in stormwater. Examples of such detail may include, but are not limited to:

   i. List or table of all known contaminants with laboratory test results showing concentration and depth,

   ii. Map with sample locations,

   iii. Related portions of the Stormwater Pollution Prevention Plan (SWPPP) that address the management of contaminated and potentially contaminated construction stormwater and dewatering water,

   iv. Dewatering plan and/or dewatering contingency plan.

2. ***Transfer of Coverage Form***

The Permittee can transfer current coverage under this permit to one or more new operators, including operators of sites within a Common Plan of Development, provided:

   i. The Permittee submits a complete Transfer of Coverage Form to Ecology, signed by the current and new discharger and containing a specific date for transfer of permit responsibility, coverage and liability (including any Administrative Orders associated with the permit); and

   ii. Ecology does not notify the current discharger and new discharger of intent to revoke coverage under the general permit. If this notice is not given, the transfer is effective on the date specified in the written agreement.

When a current discharger (Permittee) transfers a portion of a permitted site, the current discharger must also indicate the remaining permitted acreage after the transfer. Transfers do not require public notice.

3. ***Modification of Coverage Form***

Permittees must notify Ecology regarding any changes to the information provided on the NOI by submitting an Update/Modification of Permit Coverage form in accordance with General Conditions G6 and G19. Examples of such changes include, but are not limited to:

   i. Changes to the Permittee's mailing address,

   ii. Changes to the on-site contact person information, and

   iii. Changes to the area/acreage affected by construction activity.

B. Public Notice

For new or previously unpermitted construction activities, the applicant must publish a public notice at least one time each week for two consecutive weeks, at least 7 days apart, in a newspaper with general circulation in the county where the construction is to take place. The notice must be run after the NOI has been submitted and must contain:

1. A statement that "*The applicant is seeking coverage under the Washington State Department of Ecology's Construction Stormwater NPDES and State Waste Discharge General Permit*."
2. The name, address, and location of the construction site.
3. The name and address of the applicant.
4. The type of construction activity that will result in a discharge (for example, residential construction, commercial construction, etc.), and the total number of acres to be disturbed over the lifetime of the project.
5. The name of the receiving water(s) (that is, the surface water(s) to which the site will discharge), or, if the discharge is through a storm sewer system, the name of the operator of the system and the receiving water(s) the system discharges to.
6. The statement: *Any persons desiring to present their views to the Washington State Department of Ecology regarding this application, or interested in Ecology's action on this application, may notify Ecology in writing no later than 30 days of the last date of publication of this notice. Ecology reviews public comments and considers whether discharges from this project would cause a measurable change in receiving water quality, and, if so, whether the project is necessary and in the overriding public interest according to Tier II antidegradation requirements under WAC 173-201A-320. Comments can be submitted to: Department of Ecology, PO Box 47696, Olympia, Washington 98504-7696 Attn: Water Quality Program, Construction Stormwater*.

S3. COMPLIANCE WITH STANDARDS

A. Discharges must not cause or contribute to a violation of surface water quality standards (Chapter 173-201A WAC), groundwater quality standards (Chapter 173-200 WAC), sediment management standards (Chapter 173-204 WAC), and human health-based criteria in the Federal water quality criteria applicable to Washington. (40 CFR Part 131.45) Discharges that are not in compliance with these standards are prohibited.

B. Prior to the discharge of stormwater and non-stormwater to waters of the State, the Permittee must apply All Known, Available, and Reasonable methods of prevention, control, and Treatment (AKART). This includes the preparation and implementation of an adequate SWPPP, with all appropriate BMPs installed and maintained in accordance with the SWPPP and the terms and conditions of this permit.

C. Ecology presumes that a Permittee complies with water quality standards unless discharge monitoring data or other site-specific information demonstrates that a discharge causes or contributes to a violation of water quality standards, when the Permittee complies with the following conditions. The Permittee must fully:

1. Comply with all permit conditions, including; planning, sampling, monitoring, reporting, and recordkeeping conditions.

2. Implement stormwater BMPs contained in stormwater management manuals published or approved by Ecology, or BMPs that are demonstrably equivalent to BMPs contained in stormwater management manuals published or approved by Ecology, including the proper selection, implementation, and maintenance of all applicable and appropriate BMPs for on-site pollution control. (For purposes of this section, the stormwater manuals listed in Appendix 10 of the *Phase I Municipal Stormwater Permit* are approved by Ecology.)

D. Where construction sites also discharge to groundwater, the groundwater discharges must also meet the terms and conditions of this CSWGP. Permittees who discharge to groundwater through an injection well must also comply with any applicable requirements of the Underground Injection Control (UIC) regulations, Chapter 173-218 WAC.

S4. MONITORING REQUIREMENTS, BENCHMARKS, AND REPORTING TRIGGERS

A. Site Log Book

The Permittee must maintain a site log book that contains a record of the implementation of the SWPPP and other permit requirements, including the installation and maintenance of BMPs, site inspections, and stormwater monitoring.

B. Site Inspections

Construction sites one (1) acre or larger that discharge stormwater to surface waters of the State must have site inspections conducted by a Certified Erosion and Sediment Control Lead (CESCL). Sites less than one (1) acre may have a person without CESCL certification conduct inspections. (See Special Conditions S4.B.3 and B.4, below, for detailed requirements of the Permittee's CESCL.)

Site inspections must include all areas disturbed by construction activities, all BMPs, and all stormwater discharge points under the Permittee's operational control.

1. The Permittee must have staff knowledgeable in the principles and practices of erosion and sediment control. The CESCL (sites one acre or more) or inspector (sites less than one acre) must have the skills to assess the:

    a. Site conditions and construction activities that could impact the quality of stormwater; and

    b. Effectiveness of erosion and sediment control measures used to control the quality of stormwater discharges. The SWPPP must identify the CESCL or inspector, who must be present on site or on-call at all times. The CESCL (sites one (1) acre or more) must obtain this certification through an approved erosion and sediment control training program that meets the minimum training standards established by Ecology. (See BMP C160 in the manual, referred to in Special Condition S9.C.1 and 2.)

2. The CESCL or inspector must examine stormwater visually for the presence of suspended sediment, turbidity, discoloration, and oil sheen. BMP effectiveness must be evaluated to

determine if it is necessary to install, maintain, or repair BMPs to improve the quality of stormwater discharges.

Based on the results of the inspection, the Permittee must correct the problems identified, by:

a. Reviewing the SWPPP for compliance with Special Condition S9 and making appropriate revisions within 7 days of the inspection.

b. Immediately beginning the process of fully implementing and maintaining appropriate source control and/or treatment BMPs, within 10 days of the inspection. If installation of necessary treatment BMPs is not feasible within 10 days, Ecology may approve additional time when an extension is requested by a Permittee within the initial 10-day response period.

c. Documenting BMP implementation and maintenance in the site log book.

3. The CESCL or inspector must inspect all areas disturbed by construction activities, all BMPs, and all stormwater discharge points at least once every calendar week and within 24 hours of any discharge from the site. (For purposes of this condition, individual discharge events that last more than one (1) day do not require daily inspections. For example, if a stormwater pond discharges continuously over the course of a week, only one (1) inspection is required that week.) Inspection frequency may be reduced to once every calendar month for inactive sites that are temporarily stabilized.

4. The Permittee must summarize the results of each inspection in an inspection report or checklist and enter the report/checklist into, or attach it to, the site log book. At a minimum, each inspection report or checklist must include:

a. Inspection date and time.

b. Weather information.

c. The general conditions during inspection.

d. The approximate amount of precipitation since the last inspection.

e. The approximate amount of precipitation within the last 24 hours.

f. A summary or list of all implemented BMPs, including observations of all erosion/sediment control structures or practices.

g. A description of:

i. BMPs inspected (including location).

ii. BMPs that need maintenance and why.

iii. BMPs that failed to operate as designed or intended, and

iv. Where additional or different BMPs are needed, and why.

h. A description of stormwater discharged from the site. The Permittee must note the presence of suspended sediment, turbidity, discoloration, and oil sheen, as applicable.

i. Any water quality monitoring performed during inspection.

j. General comments and notes, including a brief description of any BMP repairs, maintenance, or installations made following the inspection.

k. An implementation schedule for the remedial actions that the Permittee plans to take if the site inspection indicates that the site is out of compliance. The remedial actions taken must meet the requirements of the SWPPP and the permit.

l. A summary report of the inspection.

m. The name, title, and signature of the person conducting the site inspection, a phone number or other reliable method to reach this person, and the following statement: *I certify that this report is true, accurate, and complete to the best of my knowledge and belief.*

Table 3 Summary of Primary Monitoring Requirements

Size of Soil Disturbance[1]	Weekly Site Inspections	Weekly Sampling w/ Turbidity Meter	Weekly Sampling w/ Transparency Tube	Weekly pH Sampling[2]	CESCL Required for Inspections?
Sites that disturb less than 1 acre, but are part of a larger Common Plan of Development	Required	Not Required	Not Required	Not Required	No
Sites that disturb 1 acre or more, but fewer than 5 acres	Required	Sampling Required – either method[3]		Required	Yes
Sites that disturb 5 acres or more	Required	Required	Not Required[4]	Required	Yes

[1] Soil disturbance is calculated by adding together all areas that will be affected by construction activity. Construction activity means clearing, grading, excavation, and any other activity that disturbs the surface of the land, including ingress/egress from the site.

[2] If construction activity results in the disturbance of 1 acre or more, and involves significant concrete work (1,000 cubic yards of concrete or recycled concrete placed or poured over the life of a project) or the use of engineered soils (soil amendments including but not limited to Portland cement-treated base [CTB], cement kiln dust [CKD], or fly ash), and stormwater from the affected area drains to surface waters of the State or to a storm sewer stormwater collection system that drains to other surface waters of the State, the Permittee must conduct pH sampling in accordance with Special Condition S4.D.

[3] Sites with one or more acres, but fewer than 5 acres of soil disturbance, must conduct turbidity or transparency sampling in accordance with Special Condition S4.C.4.a or b.

[4] Sites equal to or greater than 5 acres of soil disturbance must conduct turbidity sampling using a turbidity meter in accordance with Special Condition S4.C.4.a.

C. Turbidity/Transparency Sampling Requirements

1. Sampling Methods

    a. If construction activity involves the disturbance of five (5) acres or more, the Permittee must conduct turbidity sampling per Special Condition S4.C.4.a, below.

    b. If construction activity involves one (1) acre or more but fewer than five (5) acres of soil disturbance, the Permittee must conduct either transparency sampling *or* turbidity sampling per Special Condition S4.C.4.a or b, below.

2. Sampling Frequency

    a. The Permittee must sample all discharge points at least once every calendar week when stormwater (or authorized non-stormwater) discharges from the site or enters any on-site surface waters of the state (for example, a creek running through a site); sampling is not required on sites that disturb less than an acre.

    b. Samples must be representative of the flow and characteristics of the discharge.

    c. Sampling is not required when there is no discharge during a calendar week.

    d. Sampling is not required outside of normal working hours or during unsafe conditions.

    e. If the Permittee is unable to sample during a monitoring period, the Permittee must include a brief explanation in the monthly Discharge Monitoring Report (DMR).

    f. Sampling is not required before construction activity begins.

    g. The Permittee may reduce the sampling frequency for temporarily stabilized, inactive sites to once every calendar month.

3. Sampling Locations

    a. Sampling is required at all points where stormwater associated with construction activity (or authorized non-stormwater) is discharged off site, including where it enters any on-site surface waters of the state (for example, a creek running through a site).

    b. The Permittee may discontinue sampling at discharge points that drain areas of the project that are fully stabilized to prevent erosion.

    c. The Permittee must identify all sampling point(s) in the SWPPP and on the site map and clearly mark these points in the field with a flag, tape, stake or other visible marker.

    d. Sampling is not required for discharge that is sent directly to sanitary or combined sewer systems.

    e. The Permittee may discontinue sampling at discharge points in areas of the project where the Permittee no longer has operational control of the construction activity.

4. Sampling and Analysis Methods

   a. The Permittee performs turbidity analysis with a calibrated turbidity meter (turbidimeter) either on site or at an accredited lab. The Permittee must record the results in the site log book in nephelometric turbidity units (NTUs).

   b. The Permittee performs transparency analysis on site with a 1¾ inch diameter, 60 centimeter (cm)-long transparency tube. The Permittee will record the results in the site log book in centimeters (cm).

Table 4 Monitoring and Reporting Requirements

Parameter	Unit	Analytical Method	Sampling Frequency	Benchmark Value
Turbidity	NTU	SM2130	Weekly, if discharging	25 NTUs
Transparency	Cm	Manufacturer instructions, or Ecology guidance	Weekly, if discharging	33 cm

5. Turbidity/Transparency Benchmark Values and Reporting Triggers

   The benchmark value for turbidity is 25 NTUs. The benchmark value for transparency is 33 centimeters (cm). Note: Benchmark values do not apply to discharges to segments of water bodies on Washington State's 303(d) list (Category 5) for turbidity, fine sediment, or phosphorus; these discharges are subject to a numeric effluent limit for turbidity. Refer to Special Condition S8 for more information and follow S5.F – Noncompliance Notification for reporting requirements applicable to discharges which exceed the numeric effluent limit for turbidity.

   a. Turbidity 26 – 249 NTUs, or Transparency 32 – 7 cm:

      If the discharge turbidity is 26 to 249 NTUs; or if discharge transparency is 32 to 7 cm, the Permittee must:

      i. Immediately begin the process to fully implement and maintain appropriate source control and/or treatment BMPs, and no later than 10 days of the date the discharge exceeded the benchmark. If installation of necessary treatment BMPs is not feasible within 10 days, Ecology may approve additional time when the Permittee requests an extension within the initial 10-day response period.

      ii. Review the SWPPP for compliance with Special Condition S9 and make appropriate revisions within 7 days of the date the discharge exceeded the benchmark.

      iii. Document BMP implementation and maintenance in the site log book.

   b. Turbidity 250 NTUs or greater, or Transparency 6 cm or less:

      If a discharge point's turbidity is 250 NTUs or greater, or if discharge transparency is less than or equal to 6 cm, the Permittee must complete the reporting and adaptive

management process described below. For discharges which are subject to a numeric effluent limit for turbidity, see S5.F – Noncompliance Notification.

i. Within 24 hours, telephone or submit an electronic report to the applicable Ecology Region's Environmental Report Tracking System (ERTS) number (or through Ecology's Water Quality Permitting Portal [WQWebPortal] – Permit Submittals when the form is available), in accordance with Special Condition S5.A.

- **Central Region** (Okanogan, Chelan, Douglas, Kittitas, Yakima, Klickitat, Benton): (509) 575-2490
- **Eastern Region** (Adams, Asotin, Columbia, Ferry, Franklin, Garfield, Grant, Lincoln, Pend Oreille, Spokane, Stevens, Walla Walla, Whitman): (509) 329-3400
- **Northwest Region** (Kitsap, Snohomish, Island, King, San Juan, Skagit, Whatcom): (425) 649-7000
- **Southwest Region** (Grays Harbor, Lewis, Mason, Thurston, Pierce, Clark, Cowlitz, Skamania, Wahkiakum, Clallam, Jefferson, Pacific): (360) 407-6300

These numbers and a link to the ERTS reporting page are also listed at the following website: http://www.ecy.wa.gov/programs/wq/stormwater/construction/index.html.

ii. Immediately begin the process to fully implement and maintain appropriate source control and/or treatment BMPs as soon as possible, addressing the problems within 10 days of the date the discharge exceeded the benchmark. If installation of necessary treatment BMPs is not feasible within 10 days, Ecology may approve additional time when the Permittee requests an extension within the initial 10-day response period.

iii. Sample discharges daily until:

a) Turbidity is 25 NTUs (or lower); or

b) Transparency is 33 cm (or greater); or

c) The Permittee has demonstrated compliance with the water quality standard for turbidity:

1) No more than 5 NTUs over background turbidity, if background is less than 50 NTUs, or

2) No more than 10% over background turbidity, if background is 50 NTUs or greater; or

*Note: background turbidity in the receiving water must be measured immediately upstream (upgradient) or outside of the area of influence of the discharge.

d) The discharge stops or is eliminated.

iv. Review the SWPPP for compliance with Special Condition S9 and make appropriate revisions within seven (7) days of the date the discharge exceeded the benchmark.

v. Document BMP implementation and maintenance in the site log book.

Compliance with these requirements does not relieve the Permittee from responsibility to maintain continuous compliance with permit benchmarks.

D. pH Sampling Requirements – Significant Concrete Work or Engineered Soils

If construction activity results in the disturbance of 1 acre or more, *and* involves significant concrete work (significant concrete work means greater than 1000 cubic yards placed or poured concrete or recycled concrete used over the life of a project) or the use of engineered soils (soil amendments including but not limited to Portland cement-treated base [CTB], cement kiln dust [CKD], or fly ash), and stormwater from the affected area drains to surface waters of the State or to a storm sewer system that drains to surface waters of the State, the Permittee must conduct pH sampling as set forth below. Note: In addition, discharges to segments of water bodies on Washington State's 303(d) list (Category 5) for high pH are subject to a numeric effluent limit for pH; refer to Special Condition S8.

1. The Permittee must perform pH analysis on site with a calibrated pH meter, pH test kit, or wide range pH indicator paper. The Permittee must record pH sampling results in the site log book.

2. During the applicable pH monitoring period defined below, the Permittee must obtain a representative sample of stormwater and conduct pH analysis at least once per week.

    a. For sites with significant concrete work, the Permittee must begin the pH sampling period when the concrete is first placed or poured and exposed to precipitation, and continue weekly throughout and after the concrete placement, pour and curing period, until stormwater pH is in the range of 6.5 to 8.5 (su).

    b. For sites with recycled concrete where monitoring is required, the Permittee must begin the weekly pH sampling period when the recycled concrete is first exposed to precipitation and must continue until the recycled concrete is fully stabilized with the stormwater pH in the range of 6.5 to 8.5 (su).

    c. For sites with engineered soils, the Permittee must begin the pH sampling period when the soil amendments are first exposed to precipitation and must continue until the area of engineered soils is fully stabilized.

3. The Permittee must sample pH in the sediment trap/pond(s) or other locations that receive stormwater runoff from the area of significant concrete work or engineered soils before the stormwater discharges to surface waters.

4. The benchmark value for pH is 8.5 standard units. Anytime sampling indicates that pH is 8.5 or greater, the Permittee must either:

    a. Prevent the high pH water (8.5 or above) from entering storm sewer systems or surface waters of the state; *or*

    b. If necessary, adjust or neutralize the high pH water until it is in the range of pH 6.5 to 8.5 (su) using an appropriate treatment BMP such as carbon dioxide (CO_2) sparging, dry ice or food grade vinegar. The Permittee must obtain written approval from Ecology before using any form of chemical treatment other than CO_2 sparging, dry ice or food grade vinegar.

S5. REPORTING AND RECORDKEEPING REQUIREMENTS

A. High Turbidity Reporting

Anytime sampling performed in accordance with Special Condition S4.C indicates turbidity has reached the 250 NTUs or more (or transparency less than or equal to 6 cm), high turbidity reporting level, the Permittee must notify Ecology within 24 hours of analysis either by calling the applicable Ecology Region's Environmental Report Tracking System (ERTS) number by phone or by submitting an electronic ERTS report (through Ecology's Water Quality Permitting Portal (WQWebPortal) – Permit Submittals when the form is available). See the CSWGP website for links to ERTS and the WQWebPortal. (http://www.ecy.wa.gov/programs/wq/stormwater/construction/index.html) Also, see phone numbers in Special Condition S4.C.5.b.i.

B. Discharge Monitoring Reports (DMRs)

Permittees required to conduct water quality sampling in accordance with Special Conditions S4.C (Turbidity/Transparency), S4.D (pH), S8 (303[d]/TMDL sampling), and/or G12 (Additional Sampling) must submit the results to Ecology.

Permittees must submit monitoring data using Ecology's WQWebDMR web application accessed through Ecology's Water Quality Permitting Portal.

Permittees unable to submit electronically (for example, those who do not have an internet connection) must contact Ecology to request a waiver and obtain instructions on how to obtain a paper copy DMR at:

Department of Ecology
Water Quality Program - Construction Stormwater
PO Box 47696
Olympia, WA 98504-7696

Permittees who obtain a waiver not to use WQWebDMR must use the forms provided to them by Ecology; submittals must be mailed to the address above. Permittees must submit DMR forms to be received by Ecology within 15 days following the end of each month.

If there was no discharge during a given monitoring period, all Permittees must submit a DMR as required with "no discharge" entered in place of the monitoring results. DMRs are required for the full duration of permit coverage (from the first full month following the effective date of permit coverage up until Ecology has approved termination of the coverage). For more information, contact Ecology staff using information provided at the following website: www.ecy.wa.gov/programs/wq/permits/paris/contacts.html.

C. Records Retention

The Permittee must retain records of all monitoring information (site log book, sampling results, inspection reports/checklists, etc.), Stormwater Pollution Prevention Plan, copy of the permit coverage letter (including Transfer of Coverage documentation) and any other documentation of compliance with permit requirements for the entire life of the construction project and for a minimum of five (5) years following the termination of permit coverage. Such information must include all calibration and maintenance records, and records of all data used to complete the application for this permit. This period of retention must be extended during

the course of any unresolved litigation regarding the discharge of pollutants by the Permittee or when requested by Ecology.

D. Recording Results

For each measurement or sample taken, the Permittee must record the following information:

1. Date, place, method, and time of sampling or measurement.
2. The first and last name of the individual who performed the sampling or measurement.
3. The date(s) the analyses were performed.
4. The first and last name of the individual who performed the analyses.
5. The analytical techniques or methods used.
6. The results of all analyses.

E. Additional Monitoring by the Permittee

If the Permittee samples or monitors any pollutant more frequently than required by this permit using test procedures specified by Special Condition S4 of this permit, the sampling results for this monitoring must be included in the calculation and reporting of the data submitted in the Permittee's DMR.

F. Noncompliance Notification

In the event the Permittee is unable to comply with any part of the terms and conditions of this permit, and the resulting noncompliance may cause a threat to human health or the environment (such as but not limited to spills or fuels or other materials, catastrophic pond or slope failure, and discharges that violate water quality standards), or exceed numeric effluent limitations (see S8 – Discharges to 303(d) or TMDL Waterbodies), the Permittee must, upon becoming aware of the circumstance:

1. Notify Ecology within 24 hours of the failure to comply by calling the applicable Regional office ERTS phone number (refer to Special Condition S4.C.5.b.i, or go to https://ecology.wa.gov/About-us/Get-involved/Report-an-environmental-issue to find contact information for the regional offices.)
2. Immediately take action to prevent the discharge/pollution, or otherwise stop or correct the noncompliance, and, if applicable, repeat sampling and analysis of any noncompliance immediately and submit the results to Ecology within five (5) days of becoming aware of the violation (See S5.F.3, below, for details on submitting results in a report).
3. Submit a detailed written report to Ecology within five (5) days of the time the Permittee becomes aware of the circumstances, unless requested earlier by Ecology. The report must be submitted using Ecology's Water Quality Permitting Portal (WQWebPortal) – Permit Submittals, unless a waiver from electronic reporting has been granted according to S5.B. The report must contain a description of the noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and the steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

The Permittee must report any unanticipated bypass and/or upset that exceeds any effluent limit in the permit in accordance with the 24-hour reporting requirement contained in 40 C.F.R. 122.41(l)(6).

Compliance with these requirements does not relieve the Permittee from responsibility to maintain continuous compliance with the terms and conditions of this permit or the resulting liability for failure to comply. Upon request of the Permittee, Ecology may waive the requirement for a written report on a case-by-case basis, if the immediate notification is received by Ecology within 24 hours.

G. Access to Plans and Records

1. The Permittee must retain the following permit documentation (plans and records) on site, or within reasonable access to the site, for use by the operator or for on-site review by Ecology or the local jurisdiction:

    a. General Permit

    b. Permit Coverage Letter

    c. Stormwater Pollution Prevention Plan (SWPPP)

    d. Site Log Book

    e. Erosivity Waiver (if applicable)

2. The Permittee must address written requests for plans and records listed above (Special Condition S5.G.1) as follows:

    a. The Permittee must provide a copy of plans and records to Ecology within 14 days of receipt of a written request from Ecology.

    b. The Permittee must provide a copy of plans and records to the public when requested in writing. Upon receiving a written request from the public for the Permittee's plans and records, the Permittee must either:

        i. Provide a copy of the plans and records to the requester within 14 days of a receipt of the written request; *or*

        ii. Notify the requester within 10 days of receipt of the written request of the location and times within normal business hours when the plans and records may be viewed; and provide access to the plans and records within 14 days of receipt of the written request; *or*

        Within 14 days of receipt of the written request, the Permittee may submit a copy of the plans and records to Ecology for viewing and/or copying by the requester at an Ecology office, or a mutually agreed location. If plans and records are viewed and/or copied at a location other than at an Ecology office, the Permittee will provide reasonable access to copying services for which a reasonable fee may be charged. The Permittee must notify the requester within 10 days of receipt of the request where the plans and records may be viewed and/or copied.

S6. PERMIT FEES

The Permittee must pay permit fees assessed by Ecology. Fees for stormwater discharges covered under this permit are established by Chapter 173-224 WAC. Ecology continues to assess permit fees until the permit is terminated in accordance with Special Condition S10 or revoked in accordance with General Condition G5.

S7. SOLID AND LIQUID WASTE DISPOSAL

The Permittee must handle and dispose of solid and liquid wastes generated by construction activity, such as demolition debris, construction materials, contaminated materials, and waste materials from maintenance activities, including liquids and solids from cleaning catch basins and other stormwater facilities, in accordance with:

A. Special Condition S3, Compliance with Standards.

B. WAC 173-216-110.

C. Other applicable regulations.

S8. DISCHARGES TO 303(d) OR TMDL WATERBODIES

A. Sampling and Numeric Effluent Limits For Certain Discharges to 303(d)-Listed Water Bodies

1. Permittees who discharge to segments of water bodies listed as impaired by the State of Washington under Section 303(d) of the Clean Water Act for turbidity, fine sediment, high pH, or phosphorus, must conduct water quality sampling according to the requirements of this section, and Special Conditions S4.C.2.b-f and S4.C.3.b-d, and must comply with the applicable numeric effluent limitations in S8.C and S8.D.

2. All references and requirements associated with Section 303(d) of the Clean Water Act mean the most current listing by Ecology of impaired waters (Category 5) that exists on January 1, 2021, or the date when the operator's complete permit application is received by Ecology, whichever is later.

B. Limits on Coverage for New Discharges to TMDL or 303(d)-Listed Waters

Construction sites that discharge to a TMDL or 303(d)-listed waterbody are not eligible for coverage under this permit *unless* the operator:

1. Prevents exposing stormwater to pollutants for which the waterbody is impaired, and retains documentation in the SWPPP that details procedures taken to prevent exposure on site; *or*

2. Documents that the pollutants for which the waterbody is impaired are not present at the site, and retains documentation of this finding within the SWPPP; *or*

3. Provides Ecology with data indicating the discharge is not expected to cause or contribute to an exceedance of a water quality standard, and retains such data on site with the SWPPP. The operator must provide data and other technical information to Ecology that sufficiently demonstrate:

    a. For discharges to waters without an EPA-approved or -established TMDL, that the discharge of the pollutant for which the water is impaired will meet in-stream water quality criteria at the point of discharge to the waterbody; *or*

    b. For discharges to waters with an EPA-approved or -established TMDL, that there is sufficient remaining wasteload allocation in the TMDL to allow construction stormwater discharge and that existing dischargers to the waterbody are subject to compliance schedules designed to bring the waterbody into attainment with water quality standards.

    Operators of construction sites are eligible for coverage under this permit only after Ecology makes an affirmative determination that the *discharge will not cause or contribute to the existing impairment or exceed the TMDL.*

C. Sampling and Numeric Effluent Limits for Discharges to Water Bodies on the 303(d) List for Turbidity, Fine Sediment, or Phosphorus

1. Permittees who discharge to segments of water bodies on the 303(d) list (Category 5) for turbidity, fine sediment, or phosphorus must conduct turbidity sampling in accordance with Special Condition S4.C.2 and comply with either of the numeric effluent limits noted in Table 5 below.

2. As an alternative to the 25 NTUs effluent limit noted in Table 5 below (applied at the point where stormwater [or authorized non-stormwater] is discharged off-site), Permittees may choose to comply with the surface water quality standard for turbidity. The standard is: no more than 5 NTUs over background turbidity when the background turbidity is 50 NTUs or less, or no more than a 10% increase in turbidity when the background turbidity is more than 50 NTUs. In order to use the water quality standard requirement, the sampling must take place at the following locations:

    a. Background turbidity in the 303(d)-listed receiving water immediately upstream (upgradient) or outside the area of influence of the discharge.

    b. Turbidity at the point of discharge into the 303(d)-listed receiving water, inside the area of influence of the discharge**.**

3. Discharges that exceed the numeric effluent limit for turbidity constitute a violation of this permit.

4. Permittees whose discharges exceed the numeric effluent limit must sample discharges daily until the violation is corrected and comply with the non-compliance notification requirements in Special Condition S5.F.

Table 5 Turbidity, Fine Sediment & Phosphorus Sampling and Limits for 303(d)-Listed Waters

Parameter identified in 303(d) listing	Parameter Sampled	Unit	Analytical Method	Sampling Frequency	Numeric Effluent Limit[1]
• Turbidity • Fine Sediment • Phosphorus	Turbidity	NTU	SM2130	Weekly, if discharging	25 NTUs, at the point where stormwater is discharged from the site; ***OR*** In compliance with the surface water quality standard for turbidity (S8.C.2.a)

[1] Permittees subject to a numeric effluent limit for turbidity may, at their discretion, choose either numeric effluent limitation based on site-specific considerations including, but not limited to, safety, access and convenience.

D. Discharges to Water Bodies on the 303(d) List for High pH

1. Permittees who discharge to segments of water bodies on the 303(d) list (Category 5) for high pH must conduct pH sampling in accordance with the table below, and comply with the numeric effluent limit of pH 6.5 to 8.5 su (Table 6).

Table 6 pH Sampling and Limits for 303(d)-Listed Waters

Parameter identified in 303(d) listing	Parameter Sampled/Units	Analytical Method	Sampling Frequency	Numeric Effluent Limit
High pH	pH /Standard Units	pH meter	Weekly, if discharging	In the range of 6.5 – 8.5 su

2. At the Permittee's discretion, compliance with the limit shall be assessed at one of the following locations:

   a. Directly in the 303(d)-listed waterbody segment, inside the immediate area of influence of the discharge; *or*

   b. Alternatively, the Permittee may measure pH at the point where the discharge leaves the construction site, rather than in the receiving water.

3. Discharges that exceed the numeric effluent limit for pH (outside the range of 6.5 – 8.5 su) constitute a violation of this permit.

4. Permittees whose discharges exceed the numeric effluent limit must sample discharges daily until the violation is corrected and comply with the non-compliance notification requirements in Special Condition S5.F.

E. Sampling and Limits for Sites Discharging to Waters Covered by a TMDL or another Pollution Control Plan

1. Discharges to a waterbody that is subject to a Total Maximum Daily Load (TMDL) for turbidity, fine sediment, high pH, or phosphorus must be consistent with the TMDL. Refer to http://www.ecy.wa.gov/programs/wq/tmdl/TMDLsbyWria/TMDLbyWria.html for more information on TMDLs.

    a. Where an applicable TMDL sets specific waste load allocations or requirements for discharges covered by this permit, discharges must be consistent with any specific waste load allocations or requirements established by the applicable TMDL.

        i. The Permittee must sample discharges weekly, unless otherwise specified by the TMDL, to evaluate compliance with the specific waste load allocations or requirements.

        ii. Analytical methods used to meet the monitoring requirements must conform to the latest revision of the *Guidelines Establishing Test Procedures for the Analysis of Pollutants* contained in 40 CFR Part 136.

        iii. Turbidity and pH methods need not be accredited or registered unless conducted at a laboratory which must otherwise be accredited or registered.

    b. Where an applicable TMDL has established a general waste load allocation for construction stormwater discharges, but has not identified specific requirements, compliance with Special Conditions S4 (Monitoring) and S9 (SWPPPs) will constitute compliance with the approved TMDL.

    c. Where an applicable TMDL has not specified a waste load allocation for construction stormwater discharges, but has not excluded these discharges, compliance with Special Conditions S4 (Monitoring) and S9 (SWPPPs) will constitute compliance with the approved TMDL.

    d. Where an applicable TMDL specifically precludes or prohibits discharges from construction activity, the operator is not eligible for coverage under this permit.

S9. STORMWATER POLLUTION PREVENTION PLAN

The Permittee must prepare and properly implement an adequate Stormwater Pollution Prevention Plan (SWPPP) for construction activity in accordance with the requirements of this permit beginning with initial soil disturbance and until final stabilization.

A. The Permittee's SWPPP must meet the following objectives:

1. To identify best management practices (BMPs) which prevent erosion and sedimentation, and to reduce, eliminate or prevent stormwater contamination and water pollution from construction activity.

2. To prevent violations of surface water quality, groundwater quality, or sediment management standards.

3. To control peak volumetric flow rates and velocities of stormwater discharges.

B. General Requirements

1. The SWPPP must include a narrative and drawings. All BMPs must be clearly referenced in the narrative and marked on the drawings. The SWPPP narrative must include documentation to explain and justify the pollution prevention decisions made for the project. Documentation must include:

    a. Information about existing site conditions (topography, drainage, soils, vegetation, etc.).

    b. Potential erosion problem areas.

    c. The 13 elements of a SWPPP in Special Condition S9.D.1-13, including BMPs used to address each element.

    d. Construction phasing/sequence and general BMP implementation schedule.

    e. The actions to be taken if BMP performance goals are not achieved—for example, a contingency plan for additional treatment and/or storage of stormwater that would violate the water quality standards if discharged.

    f. Engineering calculations for ponds, treatment systems, and any other designed structures. When a treatment system requires engineering calculations, these calculations must be included in the SWPPP. Engineering calculations do not need to be included in the SWPPP for treatment systems that do not require such calculations.

2. The Permittee must modify the SWPPP if, during inspections or investigations conducted by the owner/operator, or the applicable local or state regulatory authority, it is determined that the SWPPP is, or would be, ineffective in eliminating or significantly minimizing pollutants in stormwater discharges from the site. The Permittee must then:

    a. Review the SWPPP for compliance with Special Condition S9 and make appropriate revisions within 7 days of the inspection or investigation.

    b. Immediately begin the process to fully implement and maintain appropriate source control and/or treatment BMPs as soon as possible, addressing the problems no later than 10 days from the inspection or investigation. If installation of necessary treatment BMPs is not feasible within 10 days, Ecology may approve additional time when an extension is requested by a Permittee within the initial 10-day response period.

    c. Document BMP implementation and maintenance in the site log book.

    The Permittee must modify the SWPPP whenever there is a change in design, construction, operation, or maintenance at the construction site that has, or could have, a significant effect on the discharge of pollutants to waters of the State.

C. Stormwater Best Management Practices (BMPs)

BMPs must be consistent with:

1. *Stormwater Management Manual for Western Washington* (most current approved edition at the time this permit was issued), for sites west of the crest of the Cascade Mountains; *or*

2. *Stormwater Management Manual for Eastern Washington* (most current approved edition at the time this permit was issued), for sites east of the crest of the Cascade Mountains; *or*

3. Revisions to the manuals listed in Special Condition S9.C.1 & 2, or other stormwater management guidance documents or manuals which provide an equivalent level of pollution prevention, that are approved by Ecology and incorporated into this permit in accordance with the permit modification requirements of WAC 173-226-230; *or*

4. Documentation in the SWPPP that the BMPs selected provide an equivalent level of pollution prevention, compared to the applicable stormwater management manuals, including:

    a. The technical basis for the selection of all stormwater BMPs (scientific, technical studies, and/or modeling) that support the performance claims for the BMPs being selected.

    b. An assessment of how the selected BMP will satisfy AKART requirements and the applicable federal technology-based treatment requirements under 40 CFR part 125.3.

D. SWPPP – Narrative Contents and Requirements

The Permittee must include each of the 13 elements below in Special Condition S9.D.1-13 in the narrative of the SWPPP and implement them unless site conditions render the element unnecessary and the exemption from that element is clearly justified in the SWPPP.

1. Preserve Vegetation/Mark Clearing Limits

    a. Before beginning land-disturbing activities, including clearing and grading, clearly mark all clearing limits, sensitive areas and their buffers, and trees that are to be preserved within the construction area.

    b. Retain the duff layer, native topsoil, and natural vegetation in an undisturbed state to the maximum degree practicable.

2. Establish Construction Access

    a. Limit construction vehicle access and exit to one route, if possible.

    b. Stabilize access points with a pad of quarry spalls, crushed rock, or other equivalent BMPs, to minimize tracking sediment onto roads.

    c. Locate wheel wash or tire baths on site, if the stabilized construction entrance is not effective in preventing tracking sediment onto roads.

    d. If sediment is tracked off site, clean the affected roadway thoroughly at the end of each day, or more frequently as necessary (for example, during wet weather). Remove sediment from roads by shoveling, sweeping, or pickup and transport of the sediment to a controlled sediment disposal area.

    e. Conduct street washing only after sediment removal in accordance with Special Condition S9.D.2.d.

    f. Control street wash wastewater by pumping back on site or otherwise preventing it from discharging into systems tributary to waters of the State.

3. Control Flow Rates

    a. Protect properties and waterways downstream of construction sites from erosion and the associated discharge of turbid waters due to increases in the velocity and peak volumetric flow rate of stormwater runoff from the project site, as required by local plan approval authority.

    b. Where necessary to comply with Special Condition S9.D.3.a, construct stormwater infiltration or detention BMPs as one of the first steps in grading. Assure that detention BMPs function properly before constructing site improvements (for example, impervious surfaces).

    c. If permanent infiltration ponds are used for flow control during construction, protect these facilities from sedimentation during the construction phase.

4. Install Sediment Controls

    The Permittee must design, install and maintain effective erosion controls and sediment controls to minimize the discharge of pollutants. At a minimum, the Permittee must:

    a. Construct sediment control BMPs (sediment ponds, traps, filters, infiltration facilities, etc.) as one of the first steps in grading. These BMPs must be functional before other land disturbing activities take place.

    b. Minimize sediment discharges from the site. The design, installation and maintenance of erosion and sediment controls must address factors such as the amount, frequency, intensity and duration of precipitation, the nature of resulting stormwater runoff, and soil characteristics, including the range of soil particle sizes expected to be present on the site.

    c. Direct stormwater runoff from disturbed areas through a sediment pond or other appropriate sediment removal BMP, before the runoff leaves a construction site or before discharge to an infiltration facility. Runoff from fully stabilized areas may be discharged without a sediment removal BMP, but must meet the flow control performance standard of Special Condition S9.D.3.a.

    d. Locate BMPs intended to trap sediment on site in a manner to avoid interference with the movement of juvenile salmonids attempting to enter off-channel areas or drainages.

    e. Provide and maintain natural buffers around surface waters, direct stormwater to vegetated areas to increase sediment removal and maximize stormwater infiltration, unless infeasible.

    f. Where feasible, design outlet structures that withdraw impounded stormwater from the surface to avoid discharging sediment that is still suspended lower in the water column.

5. Stabilize Soils

    a. The Permittee must stabilize exposed and unworked soils by application of effective BMPs that prevent erosion. Applicable BMPs include, but are not limited to: temporary and permanent seeding, sodding, mulching, plastic covering, erosion

control fabrics and matting, soil application of polyacrylamide (PAM), the early application of gravel base on areas to be paved, and dust control.

b. The Permittee must control stormwater volume and velocity within the site to minimize soil erosion.

c. The Permittee must control stormwater discharges, including both peak flow rates and total stormwater volume, to minimize erosion at outlets and to minimize downstream channel and stream bank erosion.

d. Depending on the geographic location of the project, the Permittee must not allow soils to remain exposed and unworked for more than the time periods set forth below to prevent erosion.

West of the Cascade Mountains Crest
During the dry season (May 1 - September 30): 7 days
During the wet season (October 1 - April 30): 2 days

East of the Cascade Mountains Crest, except for Central Basin*
During the dry season (July 1 - September 30): 10 days
During the wet season (October 1 - June 30): 5 days

The Central Basin*, East of the Cascade Mountains Crest
During the dry Season (July 1 - September 30): 30 days
During the wet season (October 1 - June 30): 15 days

***Note: The Central Basin** is defined as the portions of Eastern Washington with mean annual precipitation of less than 12 inches.

e. The Permittee must stabilize soils at the end of the shift before a holiday or weekend if needed based on the weather forecast.

f. The Permittee must stabilize soil stockpiles from erosion, protected with sediment trapping measures, and where possible, be located away from storm drain inlets, waterways, and drainage channels.

g. The Permittee must minimize the amount of soil exposed during construction activity.

h. The Permittee must minimize the disturbance of steep slopes.

i. The Permittee must minimize soil compaction and, unless infeasible, preserve topsoil.

6. Protect Slopes

a. The Permittee must design and construct cut-and-fill slopes in a manner to minimize erosion. Applicable practices include, but are not limited to, reducing continuous length of slope with terracing and diversions, reducing slope steepness, and roughening slope surfaces (for example, track walking).

b. The Permittee must divert off-site stormwater (run-on) or groundwater away from slopes and disturbed areas with interceptor dikes, pipes, and/or swales. Off-site stormwater should be managed separately from stormwater generated on the site.

c. At the top of slopes, collect drainage in pipe slope drains or protected channels to prevent erosion.

i. West of the Cascade Mountains Crest: Temporary pipe slope drains must handle the peak 10-minute flow rate from a Type 1A, 10-year, 24-hour frequency storm for the developed condition. Alternatively, the 10-year, 1-hour flow rate predicted by an approved continuous runoff model, increased by a factor of 1.6, may be used. The hydrologic analysis must use the existing land cover condition for predicting flow rates from tributary areas outside the project limits. For tributary areas on the project site, the analysis must use the temporary or permanent project land cover condition, whichever will produce the highest flow rates. If using the Western Washington Hydrology Model (WWHM) to predict flows, bare soil areas should be modeled as "landscaped area."

ii. East of the Cascade Mountains Crest: Temporary pipe slope drains must handle the expected peak flow rate from a 6-month, 3-hour storm for the developed condition, referred to as the short duration storm.

d. Place excavated material on the uphill side of trenches, consistent with safety and space considerations.

e. Place check dams at regular intervals within constructed channels that are cut down a slope.

7. Protect Drain Inlets

a. Protect all storm drain inlets made operable during construction so that stormwater runoff does not enter the conveyance system without first being filtered or treated to remove sediment.

b. Clean or remove and replace inlet protection devices when sediment has filled one-third of the available storage (unless a different standard is specified by the product manufacturer).

8. Stabilize Channels and Outlets

a. Design, construct and stabilize all on-site conveyance channels to prevent erosion from the following expected peak flows:

i. West of the Cascade Mountains Crest: Channels must handle the peak 10-minute flow rate from a Type 1A, 10-year, 24-hour frequency storm for the developed condition. Alternatively, the 10-year, 1-hour flow rate indicated by an approved continuous runoff model, increased by a factor of 1.6, may be used. The hydrologic analysis must use the existing land cover condition for predicting flow rates from tributary areas outside the project limits. For tributary areas on the project site, the analysis must use the temporary or permanent project land cover condition, whichever will produce the highest flow rates. If using the WWHM to predict flows, bare soil areas should be modeled as "landscaped area."

ii. East of the Cascade Mountains Crest: Channels must handle the expected peak flow rate from a 6-month, 3-hour storm for the developed condition, referred to as the short duration storm.

b. Provide stabilization, including armoring material, adequate to prevent erosion of outlets, adjacent stream banks, slopes, and downstream reaches at the outlets of all conveyance systems.

9. Control Pollutants

Design, install, implement and maintain effective pollution prevention measures to minimize the discharge of pollutants. The Permittee must:

a. Handle and dispose of all pollutants, including waste materials and demolition debris that occur on site in a manner that does not cause contamination of stormwater.

b. Provide cover, containment, and protection from vandalism for all chemicals, liquid products, petroleum products, and other materials that have the potential to pose a threat to human health or the environment. Minimize storage of hazardous materials on-site. Safety Data Sheets (SDS) should be supplied for all materials stored. Chemicals should be kept in their original labeled containers. On-site fueling tanks must include secondary containment. Secondary containment means placing tanks or containers within an impervious structure capable of containing 110% of the volume of the largest tank within the containment structure. Double-walled tanks do not require additional secondary containment.

c. Conduct maintenance, fueling, and repair of heavy equipment and vehicles using spill prevention and control measures. Clean contaminated surfaces immediately following any spill incident.

d. Discharge wheel wash or tire bath wastewater to a separate on-site treatment system that prevents discharge to surface water, such as closed-loop recirculation or upland land application, or to the sanitary sewer with local sewer district approval.

e. Apply fertilizers and pesticides in a manner and at application rates that will not result in loss of chemical to stormwater runoff. Follow manufacturers' label requirements for application rates and procedures.

f. Use BMPs to prevent contamination of stormwater runoff by pH-modifying sources. The sources for this contamination include, but are not limited to: bulk cement, cement kiln dust, fly ash, new concrete washing and curing waters, recycled concrete stockpiles, waste streams generated from concrete grinding and sawing, exposed aggregate processes, dewatering concrete vaults, concrete pumping and mixer washout waters. (Also refer to the definition for "concrete wastewater" in Appendix A – Definitions.)

g. Adjust the pH of stormwater or authorized non-stormwater if necessary to prevent an exceedance of groundwater and/or surface water quality standards.

h. Assure that washout of concrete trucks is performed off-site or in designated concrete washout areas only. Do not wash out concrete truck drums onto the ground, or into storm drains, open ditches, streets, or streams. Washout of small concrete handling equipment may be disposed of in a formed area awaiting concrete where it will not contaminate surface or groundwater. Do not dump excess concrete on site, except in designated concrete washout areas. Concrete spillage or concrete discharge directly to groundwater or surface waters of the State is

prohibited. At no time shall concrete be washed off into the footprint of an area where an infiltration BMP will be installed.

i. Obtain written approval from Ecology before using any chemical treatment, with the exception of CO_2, dry ice or food grade vinegar, to adjust pH.

j. Uncontaminated water from water-only based shaft drilling for construction of building, road, and bridge foundations may be infiltrated provided the wastewater is managed in a way that prohibits discharge to surface waters. Prior to infiltration, water from water-only based shaft drilling that comes into contact with curing concrete must be neutralized until pH is in the range of 6.5 to 8.5 (su).

10. Control Dewatering

a. Permittees must discharge foundation, vault, and trench dewatering water, which have characteristics similar to stormwater runoff at the site, in conjunction with BMPs to reduce sedimentation before discharge to a sediment trap or sediment pond.

b. Permittees may discharge clean, non-turbid dewatering water, such as well-point groundwater, to systems tributary to, or directly into surface waters of the State, as specified in Special Condition S9.D.8, provided the dewatering flow does not cause erosion or flooding of receiving waters. Do not route clean dewatering water through stormwater sediment ponds. Note that "surface waters of the State" may exist on a construction site as well as off site; for example, a creek running through a site.

c. Other dewatering treatment or disposal options may include:

i. Infiltration

ii. Transport off site in a vehicle, such as a vacuum flush truck, for legal disposal in a manner that does not pollute state waters.

iii. Ecology-approved on-site chemical treatment or other suitable treatment technologies (See S9.D.9.i, regarding chemical treatment written approval).

iv. Sanitary or combined sewer discharge with local sewer district approval, if there is no other option.

v. Use of a sedimentation bag with discharge to a ditch or swale for small volumes of localized dewatering.

d. Permittees must handle highly turbid or contaminated dewatering water separately from stormwater.

11. Maintain BMPs

a. Permittees must maintain and repair all temporary and permanent erosion and sediment control BMPs as needed to assure continued performance of their intended function in accordance with BMP specifications.

b. Permittees must remove all temporary erosion and sediment control BMPs within 30 days after achieving final site stabilization or after the temporary BMPs are no longer needed.

12. Manage the Project

    a. Phase development projects to the maximum degree practicable and take into account seasonal work limitations.

    b. Inspect, maintain and repair all BMPs as needed to assure continued performance of their intended function. Conduct site inspections and monitoring in accordance with Special Condition S4.

    c. Maintain, update, and implement the SWPPP in accordance with Special Conditions S3, S4, and S9.

13. Protect Low Impact Development (LID) BMPs

    The primary purpose of on-site LID Stormwater Management is to reduce the disruption of the natural site hydrology through infiltration. LID BMPs are permanent facilities.

    a. Permittees must protect all LID BMPs (including, but not limited to, Bioretention and Rain Garden facilities) from sedimentation through installation and maintenance of erosion and sediment control BMPs on portions of the site that drain into the Bioretention and/or Rain Garden facilities. Restore the BMPs to their fully functioning condition if they accumulate sediment during construction. Restoring the facility must include removal of sediment and any sediment-laden bioretention/ rain garden soils, and replacing the removed soils with soils meeting the design specification.

    b. Permittees must maintain the infiltration capabilities of LID BMPs by protecting against compaction by construction equipment and foot traffic. Protect completed lawn and landscaped areas from compaction due to construction equipment.

    c. Permittees must control erosion and avoid introducing sediment from surrounding land uses onto permeable pavements. Do not allow muddy construction equipment on the base material or pavement. Do not allow sediment-laden runoff onto permeable pavements or base materials.

    d. Permittees must clean permeable pavements fouled with sediments or no longer passing an initial infiltration test using local stormwater manual methodology or the manufacturer's procedures.

    e. Permittees must keep all heavy equipment off existing soils under LID BMPs that have been excavated to final grade to retain the infiltration rate of the soils.

E. SWPPP – Map Contents and Requirements

The Permittee's SWPPP must also include a vicinity map or general location map (for example, a USGS quadrangle map, a portion of a county or city map, or other appropriate map) with enough detail to identify the location of the construction site and receiving waters within one mile of the site.

The SWPPP must also include a legible site map (or maps) showing the entire construction site. The following features must be identified, unless not applicable due to site conditions.

1. The direction of north, property lines, and existing structures and roads.

2. Cut and fill slopes indicating the top and bottom of slope catch lines.

3. Approximate slopes, contours, and direction of stormwater flow before and after major grading activities.

4. Areas of soil disturbance and areas that will not be disturbed.

5. Locations of structural and nonstructural controls (BMPs) identified in the SWPPP.

6. Locations of off-site material, stockpiles, waste storage, borrow areas, and vehicle/equipment storage areas.

7. Locations of all surface water bodies, including wetlands.

8. Locations where stormwater or non-stormwater discharges off-site and/or to a surface waterbody, including wetlands.

9. Location of water quality sampling station(s), if sampling is required by state or local permitting authority.

10. Areas where final stabilization has been accomplished and no further construction-phase permit requirements apply.

11. Location or proposed location of LID facilities.

S10. NOTICE OF TERMINATION

Partial terminations of permit coverage are not authorized.

A. The site is eligible for termination of coverage when it has met any of the following conditions:

1. The site has undergone final stabilization, the Permittee has removed all temporary BMPs (except biodegradable BMPs clearly manufactured with the intention for the material to be left in place and not interfere with maintenance or land use), and all stormwater discharges associated with construction activity have been eliminated; *or*

2. All portions of the site that have not undergone final stabilization per Special Condition S10.A.1 have been sold and/or transferred (per Special Condition S2.A), and the Permittee no longer has operational control of the construction activity; *or*

3. For residential construction only, the Permittee has completed temporary stabilization and the homeowners have taken possession of the residences.

B. When the site is eligible for termination, the Permittee must submit a complete and accurate Notice of Termination (NOT) form, signed in accordance with General Condition G2, to:

Department of Ecology
Water Quality Program - Construction Stormwater
PO Box 47696
Olympia, WA 98504-7696

When an electronic termination form is available, the Permittee may choose to submit a complete and accurate Notice of Termination (NOT) form through the Water Quality Permitting Portal rather than mailing a hardcopy as noted above.

The termination is effective on the 31st calendar day following the date Ecology receives a complete NOT form, unless Ecology notifies the Permittee that termination request is denied because the Permittee has not met the eligibility requirements in Special Condition S10.A.

Permittees are required to comply with all conditions and effluent limitations in the permit until the permit has been terminated.

Permittees transferring the property to a new property owner or operator/Permittee are required to complete and submit the Notice of Transfer form to Ecology, but are not required to submit a Notice of Termination form for this type of transaction.

GENERAL CONDITIONS

G1. DISCHARGE VIOLATIONS

All discharges and activities authorized by this general permit must be consistent with the terms and conditions of this general permit. Any discharge of any pollutant more frequent than or at a level in excess of that identified and authorized by the general permit must constitute a violation of the terms and conditions of this permit.

G2. SIGNATORY REQUIREMENTS

A. All permit applications must bear a certification of correctness to be signed:

1. In the case of corporations, by a responsible corporate officer.
2. In the case of a partnership, by a general partner of a partnership.
3. In the case of sole proprietorship, by the proprietor.
4. In the case of a municipal, state, or other public facility, by either a principal executive officer or ranking elected official.

B. All reports required by this permit and other information requested by Ecology (including NOIs, NOTs, and Transfer of Coverage forms) must be signed by a person described above or by a duly authorized representative of that person. A person is a duly authorized representative only if:

1. The authorization is made in writing by a person described above and submitted to Ecology.
2. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility, such as the position of plant manager, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters.

C. Changes to authorization. If an authorization under paragraph G2.B.2 above is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of paragraph G2.B.2 above must be submitted to Ecology prior to or together with any reports, information, or applications to be signed by an authorized representative.

D. Certification. Any person signing a document under this section must make the following certification:

I certify under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

G3. RIGHT OF INSPECTION AND ENTRY

The Permittee must allow an authorized representative of Ecology, upon the presentation of credentials and such other documents as may be required by law:

A. To enter upon the premises where a discharge is located or where any records are kept under the terms and conditions of this permit.

B. To have access to and copy, at reasonable times and at reasonable cost, any records required to be kept under the terms and conditions of this permit.

C. To inspect, at reasonable times, any facilities, equipment (including monitoring and control equipment), practices, methods, or operations regulated or required under this permit.

D. To sample or monitor, at reasonable times, any substances or parameters at any location for purposes of assuring permit compliance or as otherwise authorized by the Clean Water Act.

G4. GENERAL PERMIT MODIFICATION AND REVOCATION

This permit may be modified, revoked and reissued, or terminated in accordance with the provisions of Chapter 173-226 WAC. Grounds for modification, revocation and reissuance, or termination include, but are not limited to, the following:

A. When a change occurs in the technology or practices for control or abatement of pollutants applicable to the category of dischargers covered under this permit.

B. When effluent limitation guidelines or standards are promulgated pursuant to the CWA or Chapter 90.48 RCW, for the category of dischargers covered under this permit.

C. When a water quality management plan containing requirements applicable to the category of dischargers covered under this permit is approved, or

D. When information is obtained that indicates cumulative effects on the environment from dischargers covered under this permit are unacceptable.

G5. REVOCATION OF COVERAGE UNDER THE PERMIT

Pursuant to Chapter 43.21B RCW and Chapter 173-226 WAC, the Director may terminate coverage for any discharger under this permit for cause. Cases where coverage may be terminated include, but are not limited to, the following:

A. Violation of any term or condition of this permit.

B. Obtaining coverage under this permit by misrepresentation or failure to disclose fully all relevant facts.

C. A change in any condition that requires either a temporary or permanent reduction or elimination of the permitted discharge.

D. Failure or refusal of the Permittee to allow entry as required in RCW 90.48.090.

E. A determination that the permitted activity endangers human health or the environment, or contributes to water quality standards violations.

F. Nonpayment of permit fees or penalties assessed pursuant to RCW 90.48.465 and Chapter 173-224 WAC.

G. Failure of the Permittee to satisfy the public notice requirements of WAC 173-226-130(5), when applicable.

The Director may require any discharger under this permit to apply for and obtain coverage under an individual permit or another more specific general permit. Permittees who have their coverage revoked for cause according to WAC 173-226-240 may request temporary coverage under this permit during the time an individual permit is being developed, provided the request is made within ninety (90) days from the time of revocation and is submitted along with a complete individual permit application form.

G6. REPORTING A CAUSE FOR MODIFICATION

The Permittee must submit a new application, or a supplement to the previous application, whenever a material change to the construction activity or in the quantity or type of discharge is anticipated which is not specifically authorized by this permit. This application must be submitted at least sixty (60) days prior to any proposed changes. Filing a request for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not relieve the Permittee of the duty to comply with the existing permit until it is modified or reissued.

G7. COMPLIANCE WITH OTHER LAWS AND STATUTES

Nothing in this permit will be construed as excusing the Permittee from compliance with any applicable federal, state, or local statutes, ordinances, or regulations.

G8. DUTY TO REAPPLY

The Permittee must apply for permit renewal at least 180 days prior to the specified expiration date of this permit. The Permittee must reapply using the electronic application form (NOI) available on Ecology's website. Permittees unable to submit electronically (for example, those who do not have an internet connection) must contact Ecology to request a waiver and obtain instructions on how to obtain a paper NOI.

Department of Ecology
Water Quality Program - Construction Stormwater
PO Box 47696
Olympia, WA 98504-7696

G9. REMOVED SUBSTANCE

The Permittee must not re-suspend or reintroduce collected screenings, grit, solids, sludges, filter backwash, or other pollutants removed in the course of treatment or control of stormwater to the final effluent stream for discharge to state waters.

G10. DUTY TO PROVIDE INFORMATION

The Permittee must submit to Ecology, within a reasonable time, all information that Ecology may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit or to determine compliance with this permit. The Permittee must also submit to Ecology, upon request, copies of records required to be kept by this permit [40 CFR 122.41(h)].

G11. OTHER REQUIREMENTS OF 40 CFR

All other requirements of 40 CFR 122.41 and 122.42 are incorporated in this permit by reference.

G12. ADDITIONAL MONITORING

Ecology may establish specific monitoring requirements in addition to those contained in this permit by administrative order or permit modification.

G13. PENALTIES FOR VIOLATING PERMIT CONDITIONS

Any person who is found guilty of willfully violating the terms and conditions of this permit shall be deemed guilty of a crime, and upon conviction thereof shall be punished by a fine of up to ten thousand dollars ($10,000) and costs of prosecution, or by imprisonment at the discretion of the court. Each day upon which a willful violation occurs may be deemed a separate and additional violation.

Any person who violates the terms and conditions of a waste discharge permit shall incur, in addition to any other penalty as provided by law, a civil penalty in the amount of up to ten thousand dollars ($10,000) for every such violation. Each and every such violation shall be a separate and distinct offense, and in case of a continuing violation, every day's continuance shall be deemed to be a separate and distinct violation.

G14. UPSET

Definition – "Upset" means an exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the Permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

An upset constitutes an affirmative defense to an action brought for noncompliance with such technology-based permit effluent limitations if the requirements of the following paragraph are met.

A Permittee who wishes to establish the affirmative defense of upset must demonstrate, through properly signed, contemporaneous operating logs or other relevant evidence that: 1) an upset occurred and that the Permittee can identify the cause(s) of the upset; 2) the permitted facility was being properly operated at the time of the upset; 3) the Permittee submitted notice of the upset as required in Special Condition S5.F, and; 4) the Permittee complied with any remedial measures required under this permit.

In any enforcement proceeding, the Permittee seeking to establish the occurrence of an upset has the burden of proof.

G15. PROPERTY RIGHTS

This permit does not convey any property rights of any sort, or any exclusive privilege.

G16. DUTY TO COMPLY

The Permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Clean Water Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or denial of a permit renewal application.

G17. TOXIC POLLUTANTS

The Permittee must comply with effluent standards or prohibitions established under Section 307(a) of the Clean Water Act for toxic pollutants within the time provided in the regulations that establish those standards or prohibitions, even if this permit has not yet been modified to incorporate the requirement.

G18. PENALTIES FOR TAMPERING

The Clean Water Act provides that any person who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than $10,000 per violation, or by imprisonment for not more than two years per violation, or by both. If a conviction of a person is for a violation committed after a first conviction of such person under this condition, punishment shall be a fine of not more than $20,000 per day of violation, or imprisonment of not more than four (4) years, or both.

G19. REPORTING PLANNED CHANGES

The Permittee must, as soon as possible, give notice to Ecology of planned physical alterations, modifications or additions to the permitted construction activity. The Permittee should be aware that, depending on the nature and size of the changes to the original permit, a new public notice and other permit process requirements may be required. Changes in activities that require reporting to Ecology include those that will result in:

A. The permitted facility being determined to be a new source pursuant to 40 CFR 122.29(b).

B. A significant change in the nature or an increase in quantity of pollutants discharged, including but not limited to: a 20% or greater increase in acreage disturbed by construction activity.

C. A change in or addition of surface water(s) receiving stormwater or non-stormwater from the construction activity.

D. A change in the construction plans and/or activity that affects the Permittee's monitoring requirements in Special Condition S4.

Following such notice, permit coverage may be modified, or revoked and reissued pursuant to 40 CFR 122.62(a) to specify and limit any pollutants not previously limited. Until such modification is effective, any new or increased discharge in excess of permit limits or not specifically authorized by this permit constitutes a violation.

G20. REPORTING OTHER INFORMATION

Where the Permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to Ecology, it must promptly submit such facts or information.

G21. REPORTING ANTICIPATED NON-COMPLIANCE

The Permittee must give advance notice to Ecology by submission of a new application or supplement thereto at least forty-five (45) days prior to commencement of such discharges, of any facility expansions, production increases, or other planned changes, such as process modifications, in the permitted facility or activity which may result in noncompliance with permit limits or conditions. Any maintenance of facilities, which might necessitate unavoidable interruption of

operation and degradation of effluent quality, must be scheduled during non-critical water quality periods and carried out in a manner approved by Ecology.

G22. REQUESTS TO BE EXCLUDED FROM COVERAGE UNDER THE PERMIT

Any discharger authorized by this permit may request to be excluded from coverage under the general permit by applying for an individual permit. The discharger must submit to the Director an application as described in WAC 173-220-040 or WAC 173-216-070, whichever is applicable, with reasons supporting the request. These reasons will fully document how an individual permit will apply to the applicant in a way that the general permit cannot. Ecology may make specific requests for information to support the request. The Director will either issue an individual permit or deny the request with a statement explaining the reason for the denial. When an individual permit is issued to a discharger otherwise subject to the construction stormwater general permit, the applicability of the construction stormwater general permit to that Permittee is automatically terminated on the effective date of the individual permit.

G23. APPEALS

A. The terms and conditions of this general permit, as they apply to the appropriate class of dischargers, are subject to appeal by any person within 30 days of issuance of this general permit, in accordance with Chapter 43.21B RCW, and Chapter 173-226 WAC.

B. The terms and conditions of this general permit, as they apply to an individual discharger, are appealable in accordance with Chapter 43.21B RCW within 30 days of the effective date of coverage of that discharger. Consideration of an appeal of general permit coverage of an individual discharger is limited to the general permit's applicability or nonapplicability to that individual discharger.

C. The appeal of general permit coverage of an individual discharger does not affect any other dischargers covered under this general permit. If the terms and conditions of this general permit are found to be inapplicable to any individual discharger(s), the matter shall be remanded to Ecology for consideration of issuance of an individual permit or permits.

G24. SEVERABILITY

The provisions of this permit are severable, and if any provision of this permit, or application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit shall not be affected thereby.

G25. BYPASS PROHIBITED

A. Bypass Procedures

Bypass, which is the intentional diversion of waste streams from any portion of a treatment facility, is prohibited for stormwater events below the design criteria for stormwater management. Ecology may take enforcement action against a Permittee for bypass unless one of the following circumstances (1, 2, 3 or 4) is applicable.

1. Bypass of stormwater is consistent with the design criteria and part of an approved management practice in the applicable stormwater management manual.

2. Bypass for essential maintenance without the potential to cause violation of permit limits or conditions.

Bypass is authorized if it is for essential maintenance and does not have the potential to cause violations of limitations or other conditions of this permit, or adversely impact public health.

3. Bypass of stormwater is unavoidable, unanticipated, and results in noncompliance of this permit.

   This bypass is permitted only if:

   a. Bypass is unavoidable to prevent loss of life, personal injury, or severe property damage. “Severe property damage” means substantial physical damage to property, damage to the treatment facilities which would cause them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass.

   b. There are no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, maintenance during normal periods of equipment downtime (but not if adequate backup equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventative maintenance), or transport of untreated wastes to another treatment facility.

   c. Ecology is properly notified of the bypass as required in Special Condition S5.F of this permit.

4. A planned action that would cause bypass of stormwater and has the potential to result in noncompliance of this permit during a storm event.

   The Permittee must notify Ecology at least thirty (30) days before the planned date of bypass. The notice must contain:

   a. A description of the bypass and its cause

   b. An analysis of all known alternatives which would eliminate, reduce, or mitigate the need for bypassing.

   c. A cost-effectiveness analysis of alternatives including comparative resource damage assessment.

   d. The minimum and maximum duration of bypass under each alternative.

   e. A recommendation as to the preferred alternative for conducting the bypass.

   f. The projected date of bypass initiation.

   g. A statement of compliance with SEPA.

   h. A request for modification of water quality standards as provided for in WAC 173-201A-110, if an exceedance of any water quality standard is anticipated.

   i. Steps taken or planned to reduce, eliminate, and prevent reoccurrence of the bypass.

5. For probable construction bypasses, the need to bypass is to be identified as early in the planning process as possible. The analysis required above must be considered during

preparation of the Stormwater Pollution Prevention Plan (SWPPP) and must be included to the extent practical. In cases where the probable need to bypass is determined early, continued analysis is necessary up to and including the construction period in an effort to minimize or eliminate the bypass.

Ecology will consider the following before issuing an administrative order for this type bypass:

a. If the bypass is necessary to perform construction or maintenance-related activities essential to meet the requirements of this permit.

b. If there are feasible alternatives to bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, stopping production, maintenance during normal periods of equipment down time, or transport of untreated wastes to another treatment facility.

c. If the bypass is planned and scheduled to minimize adverse effects on the public and the environment.

After consideration of the above and the adverse effects of the proposed bypass and any other relevant factors, Ecology will approve, conditionally approve, or deny the request. The public must be notified and given an opportunity to comment on bypass incidents of significant duration, to the extent feasible. Approval of a request to bypass will be by administrative order issued by Ecology under RCW 90.48.120.

B. Duty to Mitigate

The Permittee is required to take all reasonable steps to minimize or prevent any discharge or sludge use or disposal in violation of this permit that has a reasonable likelihood of adversely affecting human health or the environment.

APPENDIX A – DEFINITIONS

AKART is an acronym for "**A**ll **K**nown, **A**vailable, and **R**easonable methods of prevention, control, and **T**reatment." AKART represents the most current methodology that can be reasonably required for preventing, controlling, or abating the pollutants and controlling pollution associated with a discharge.

Applicable TMDL means a TMDL for turbidity, fine sediment, high pH, or phosphorus, which was completed and approved by EPA before January 1, 2021, or before the date the operator's complete permit application is received by Ecology, whichever is later. TMDLs completed after a complete permit application is received by Ecology become applicable to the Permittee only if they are imposed through an administrative order by Ecology, or through a modification of permit coverage.

Applicant means an *operator* seeking coverage under this permit.

Benchmark means a pollutant concentration used as a permit threshold, below which a pollutant is considered unlikely to cause a water quality violation, and above which it may. When pollutant concentrations exceed benchmarks, corrective action requirements take effect. Benchmark values are not water quality standards and are not numeric effluent limitations; they are indicator values.

Best Management Practices (BMPs) means schedules of activities, prohibitions of practices, maintenance procedures, and other physical, structural and/or managerial practices to prevent or reduce the pollution of waters of the State. BMPs include treatment systems, operating procedures, and practices to control stormwater associated with construction activity, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

Buffer means an area designated by a local jurisdiction that is contiguous to and intended to protect a sensitive area.

Bypass means the intentional diversion of waste streams from any portion of a treatment facility.

Calendar Day A period of 24 consecutive hours starting at 12:00 midnight and ending the following 12:00 midnight.

Calendar Week (same as **Week**) means a period of seven consecutive days starting at 12:01 a.m. (0:01 hours) on Sunday.

Certified Erosion and Sediment Control Lead (CESCL) means a person who has current certification through an approved erosion and sediment control training program that meets the minimum training standards established by Ecology (See BMP C160 in the SWMM).

Chemical Treatment means the addition of chemicals to stormwater and/or authorized non-stormwater prior to filtration and discharge to surface waters.

Clean Water Act (CWA) means the Federal Water Pollution Control Act enacted by Public Law 92-500, as amended by Public Laws 95-217, 95-576, 96-483, and 97-117; USC 1251 et seq.

Combined Sewer means a sewer which has been designed to serve as a sanitary sewer and a storm sewer, and into which inflow is allowed by local ordinance.

Common Plan of Development or Sale means a site where multiple separate and distinct construction activities may be taking place at different times on different schedules and/or by different contractors, but still under a single plan. Examples include: 1) phased projects and projects with multiple filings or lots, even if the separate phases or filings/lots will be constructed under separate contract or by separate owners (e.g., a development where lots are sold to separate builders); 2) a development plan that may be phased over multiple years, but is still under a consistent plan for long-term development; 3) projects in a contiguous area that may be unrelated but still under the same contract, such as construction of a building extension and a new parking lot at the same facility; and 4) linear projects such as roads, pipelines, or utilities. If the project is part of a common plan of development or sale, the disturbed area of the entire plan must be used in determining permit requirements.

Composite Sample means a mixture of grab samples collected at the same sampling point at different times, formed either by continuous sampling or by mixing discrete samples. May be "time-composite" (collected at constant time intervals) or "flow-proportional" (collected either as a constant sample volume at time intervals proportional to stream flow, or collected by increasing the volume of each aliquot as the flow increases while maintaining a constant time interval between the aliquots.

Concrete Wastewater means any water used in the production, pouring and/or clean-up of concrete or concrete products, and any water used to cut, grind, wash, or otherwise modify concrete or concrete products. Examples include water used for or resulting from concrete truck/mixer/pumper/tool/chute rinsing or washing, concrete saw cutting and surfacing (sawing, coring, grinding, roughening, hydro-demolition, bridge and road surfacing). When stormwater comingles with concrete wastewater, the resulting water is considered concrete wastewater and must be managed to prevent discharge to waters of the State, including groundwater.

Construction Activity means land disturbing operations including clearing, grading or excavation which disturbs the surface of the land (including off-site disturbance acreage related to construction-support activity). Such activities may include road construction, construction of residential houses, office buildings, or industrial buildings, site preparation, soil compaction, movement and stockpiling of topsoils, and demolition activity.

Construction Support Activity means off-site acreage that will be disturbed as a direct result of the construction project and will discharge stormwater. For example, off-site equipment staging yards, material storage areas, borrow areas, and parking areas.

Contaminant means any hazardous substance that does not occur naturally or occurs at greater than natural background levels. See definition of “hazardous substance” and WAC 173-340-200.

Contaminated soil means soil which contains contaminants, pollutants, or hazardous substances that do not occur naturally or occur at levels greater than natural background.

Contaminated groundwater means groundwater which contains contaminants, pollutants, or hazardous substances that do not occur naturally or occur at levels greater than natural background.

Demonstrably Equivalent means that the technical basis for the selection of all stormwater BMPs is documented within a SWPPP, including:

1. The method and reasons for choosing the stormwater BMPs selected.
2. The pollutant removal performance expected from the BMPs selected.

3. The technical basis supporting the performance claims for the BMPs selected, including any available data concerning field performance of the BMPs selected.
4. An assessment of how the selected BMPs will comply with state water quality standards.
5. An assessment of how the selected BMPs will satisfy both applicable federal technology-based treatment requirements and state requirements to use all known, available, and reasonable methods of prevention, control, and treatment (AKART).

Department means the Washington State Department of Ecology.

Detention means the temporary storage of stormwater to improve quality and/or to reduce the mass flow rate of discharge.

Dewatering means the act of pumping groundwater or stormwater away from an active construction site.

Director means the Director of the Washington State Department of Ecology or his/her authorized representative.

Discharger means an owner or operator of any facility or activity subject to regulation under Chapter 90.48 RCW or the Federal Clean Water Act.

Domestic Wastewater means water carrying human wastes, including kitchen, bath, and laundry wastes from residences, buildings, industrial establishments, or other places, together with such groundwater infiltration or surface waters as may be present.

Ecology means the Washington State Department of Ecology.

Engineered Soils means the use of soil amendments including, but not limited, to Portland cement treated base (CTB), cement kiln dust (CKD), or fly ash to achieve certain desirable soil characteristics.

Equivalent BMPs means operational, source control, treatment, or innovative BMPs which result in equal or better quality of stormwater discharge to surface water or to groundwater than BMPs selected from the SWMM.

Erosion means the wearing away of the land surface by running water, wind, ice, or other geological agents, including such processes as gravitational creep.

Erosion and Sediment Control BMPs means BMPs intended to prevent erosion and sedimentation, such as preserving natural vegetation, seeding, mulching and matting, plastic covering, filter fences, sediment traps, and ponds. Erosion and sediment control BMPs are synonymous with stabilization and structural BMPs.

Federal Operator is an entity that meets the definition of “Operator” in this permit and is either any department, agency or instrumentality of the executive, legislative, and judicial branches of the Federal government of the United States, or another entity, such as a private contractor, performing construction activity for any such department, agency, or instrumentality.

Final Stabilization (same as **fully stabilized** or **full stabilization**) means the completion of all soil disturbing activities at the site and the establishment of permanent vegetative cover, or equivalent permanent stabilization measures (such as pavement, riprap, gabions, or geotextiles) which will prevent erosion. See the applicable Stormwater Management Manual for more information on vegetative cover expectations and equivalent permanent stabilization measures.

Groundwater means water in a saturated zone or stratum beneath the land surface or a surface waterbody.

Hazardous Substance means any dangerous or extremely hazardous waste as defined in RCW 70.105.010 (5) and (6), or any dangerous or extremely dangerous waste as designated by rule under chapter 70.105 RCW; any hazardous sub-stance as defined in RCW 70.105.010(14) or any hazardous substance as defined by rule under chapter 70.105 RCW; any substance that, on the effective date of this section, is a hazardous substance under section 101(14) of the federal cleanup law, 42U.S.C., Sec. 9601(14); petroleum or petroleum products; and any substance or category of substances, including solid waste decomposition products, determined by the director by rule to present a threat to human health or the environment if released into the environment. The term hazardous substance does not include any of the following when contained in an underground storage tank from which there is not a release: crude oil or any fraction thereof or petroleum, if the tank is in compliance with all applicable federal, state, and local law.

Injection Well means a well that is used for the subsurface emplacement of fluids. (See **Well**.)

Jurisdiction means a political unit such as a city, town or county; incorporated for local self-government.

National Pollutant Discharge Elimination System (NPDES) means the national program for issuing, modifying, revoking and reissuing, terminating, monitoring, and enforcing permits, and imposing and enforcing pretreatment requirements, under sections 307, 402, 318, and 405 of the Federal Clean Water Act, for the discharge of pollutants to surface waters of the State from point sources. These permits are referred to as NPDES permits and, in Washington State, are administered by the Washington State Department of Ecology.

Notice of Intent (NOI) means the application for, or a request for coverage under this general permit pursuant to WAC 173-226-200.

Notice of Termination (NOT) means a request for termination of coverage under this general permit as specified by Special Condition S10 of this permit.

Operator means any party associated with a construction project that meets either of the following two criteria:

- The party has operational control over construction plans and specifications, including the ability to make modifications to those plans and specifications; or
- The party has day-to-day operational control of those activities at a project that are necessary to ensure compliance with a SWPPP for the site or other permit conditions (e.g., they are authorized to direct workers at a site to carry out activities required by the SWPPP or comply with other permit conditions).

Permittee means individual or entity that receives notice of coverage under this general permit.

pH means a liquid's measure of acidity or alkalinity. A pH of 7 is defined as neutral. Large variations above or below this value are considered harmful to most aquatic life.

pH Monitoring Period means the time period in which the pH of stormwater runoff from a site must be tested a minimum of once every seven days to determine if stormwater pH is between 6.5 and 8.5.

Point Source means any discernible, confined, and discrete conveyance, including but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, and container from which pollutants are or may be discharged to surface waters of the State. This term does not include return flows from irrigated agriculture. (See the Fact Sheet for further explanation)

Pollutant means dredged spoil, solid waste, incinerator residue, filter backwash, sewage, garbage, domestic sewage sludge (biosolids), munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt, and industrial, municipal, and agricultural waste. This term does not include sewage from vessels within the meaning of section 312 of the CWA, nor does it include dredged or fill material discharged in accordance with a permit issued under section 404 of the CWA.

Pollution means contamination or other alteration of the physical, chemical, or biological properties of waters of the State; including change in temperature, taste, color, turbidity, or odor of the waters; or such discharge of any liquid, gaseous, solid, radioactive or other substance into any waters of the State as will or is likely to create a nuisance or render such waters harmful, detrimental or injurious to the public health, safety or welfare; or to domestic, commercial, industrial, agricultural, recreational, or other legitimate beneficial uses; or to livestock, wild animals, birds, fish or other aquatic life.

Process Wastewater means any non-stormwater which, during manufacturing or processing, comes into direct contact with or results from the production or use of any raw material, intermediate product, finished product, byproduct, or waste product. If stormwater commingles with process wastewater, the commingled water is considered process wastewater.

Receiving Water means the waterbody at the point of discharge. If the discharge is to a storm sewer system, either surface or subsurface, the receiving water is the waterbody to which the storm system discharges. Systems designed primarily for other purposes such as for groundwater drainage, redirecting stream natural flows, or for conveyance of irrigation water/return flows that coincidentally convey stormwater are considered the receiving water.

Representative means a stormwater or wastewater sample which represents the flow and characteristics of the discharge. Representative samples may be a grab sample, a time-proportionate *composite sample*, or a flow proportionate sample. Ecology's Construction Stormwater Monitoring Manual provides guidance on representative sampling.

Responsible Corporate Officer for the purpose of signatory authority means: (i) a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation, or (ii) the manager of one or more manufacturing, production, or operating facilities, provided, the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures (40 CFR 122.22).

Sanitary Sewer means a sewer which is designed to convey domestic wastewater.

Sediment means the fragmented material that originates from the weathering and erosion of rocks or unconsolidated deposits, and is transported by, suspended in, or deposited by water.

Sedimentation means the depositing or formation of sediment.

Sensitive Area means a waterbody, wetland, stream, aquifer recharge area, or channel migration zone.

SEPA (State Environmental Policy Act) means the Washington State Law, RCW 43.21C.020, intended to prevent or eliminate damage to the environment.

Significant Amount means an amount of a pollutant in a discharge that is amenable to available and reasonable methods of prevention or treatment; or an amount of a pollutant that has a reasonable potential to cause a violation of surface or groundwater quality or sediment management standards.

Significant Concrete Work means greater than 1000 cubic yards placed or poured concrete or recycled concrete used over the life of a project.

Significant Contributor of Pollutants means a facility determined by Ecology to be a contributor of a significant amount(s) of a pollutant(s) to waters of the State of Washington.

Site means the land or water area where any "facility or activity" is physically located or conducted.

Source Control BMPs means physical, structural or mechanical devices or facilities that are intended to prevent pollutants from entering stormwater. A few examples of source control BMPs are erosion control practices, maintenance of stormwater facilities, constructing roofs over storage and working areas, and directing wash water and similar discharges to the sanitary sewer or a dead end sump.

Stabilization means the application of appropriate BMPs to prevent the erosion of soils, such as, temporary and permanent seeding, vegetative covers, mulching and matting, plastic covering and sodding. See also the definition of Erosion and Sediment Control BMPs.

Storm Drain means any drain which drains directly into a *storm sewer system*, usually found along roadways or in parking lots.

Storm Sewer System means a means a conveyance, or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, manmade channels, or storm drains designed or used for collecting or conveying stormwater. This does not include systems which are part of *a combined sewer* or Publicly Owned Treatment Works (POTW), as defined at 40 CFR 122.2.

Stormwater means that portion of precipitation that does not naturally percolate into the ground or evaporate, but flows via overland flow, interflow, pipes, and other features of a stormwater drainage system into a defined surface waterbody, or a constructed infiltration facility.

Stormwater Management Manual (SWMM) or **Manual** means the technical Manual published by Ecology for use by local governments that contain descriptions of and design criteria for BMPs to prevent, control, or treat pollutants in stormwater.

Stormwater Pollution Prevention Plan (SWPPP) means a documented plan to implement measures to identify, prevent, and control the contamination of point source discharges of stormwater.

Surface Waters of the State includes lakes, rivers, ponds, streams, inland waters, salt waters, and all other surface waters and water courses within the jurisdiction of the state of Washington.

Temporary Stabilization means the exposed ground surface has been covered with appropriate materials to provide temporary stabilization of the surface from water or wind erosion. Materials include, but are not limited to, mulch, riprap, erosion control mats or blankets and temporary cover crops. Seeding alone is not considered stabilization. Temporary stabilization is not a substitute for the more permanent “final stabilization.”

Total Maximum Daily Load (TMDL) means a calculation of the maximum amount of a pollutant that a waterbody can receive and still meet state water quality standards. Percentages of the total maximum daily load are allocated to the various pollutant sources. A TMDL is the sum of the allowable loads of a single pollutant from all contributing point and nonpoint sources. The TMDL calculations must include a "margin of safety" to ensure that the waterbody can be protected in case there are unforeseen events or unknown sources of the pollutant. The calculation must also account for seasonable variation in water quality.

Transfer of Coverage (TOC) means a request for transfer of coverage under this general permit as specified by Special Condition S2.A of this permit.

Treatment BMPs means BMPs that are intended to remove pollutants from stormwater. A few examples of treatment BMPs are detention ponds, oil/water separators, biofiltration, and constructed wetlands.

Transparency means a measurement of water clarity in centimeters (cm), using a 60 cm transparency tube. The transparency tube is used to estimate the relative clarity or transparency of water by noting the depth at which a black and white Secchi disc becomes visible when water is released from a value in the bottom of the tube. A transparency tube is sometimes referred to as a “turbidity tube.”

Turbidity means the clarity of water expressed as nephelometric turbidity units (NTUs) and measured with a calibrated turbidimeter.

Uncontaminated means free from any contaminant. See definition of “contaminant” and WAC 173-340-200.

Upset means an exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the Permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

Waste Load Allocation (WLA) means the portion of a receiving water’s loading capacity that is allocated to one of its existing or future point sources of pollution. WLAs constitute a type of water quality based effluent limitation (40 CFR 130.2[h]).

Water-Only Based Shaft Drilling is a shaft drilling process that uses water only and no additives are involved in the drilling of shafts for construction of building, road, or bridge foundations.

Water Quality means the chemical, physical, and biological characteristics of water, usually with respect to its suitability for a particular purpose.

Waters of the State includes those waters as defined as "waters of the United States" in 40 CFR Subpart 122.2 within the geographic boundaries of Washington State and "waters of the State" as defined in Chapter 90.48 RCW, which include lakes, rivers, ponds, streams, inland waters, underground waters, salt

waters, and all other surface waters and water courses within the jurisdiction of the state of Washington.

Well means a bored, drilled or driven shaft, or dug hole whose depth is greater than the largest surface dimension. (See **Injection Well**.)

Wheel Wash Wastewater means any water used in, or resulting from the operation of, a tire bath or wheel wash (BMP C106: Wheel Wash), or other structure or practice that uses water to physically remove mud and debris from vehicles leaving a construction site and prevent track-out onto roads. When stormwater comingles with wheel wash wastewater, the resulting water is considered wheel wash wastewater and must be managed according to Special Condition S9.D.9.

APPENDIX B – ACRONYMS

AKART	All Known, Available, and Reasonable Methods of Prevention, Control, and Treatment
BMP	Best Management Practice
CESCL	Certified Erosion and Sediment Control Lead
CFR	Code of Federal Regulations
CKD	Cement Kiln Dust
cm	Centimeters
CPD	Common Plan of Development
CTB	Cement-Treated Base
CWA	Clean Water Act
DMR	Discharge Monitoring Report
EPA	Environmental Protection Agency
ERTS	Environmental Report Tracking System
ESC	Erosion and Sediment Control
FR	Federal Register
LID	Low Impact Development
NOI	Notice of Intent
NOT	Notice of Termination
NPDES	National Pollutant Discharge Elimination System
NTU	Nephelometric Turbidity Unit
RCW	Revised Code of Washington
SEPA	State Environmental Policy Act
SWMM	Stormwater Management Manual
SWPPP	Stormwater Pollution Prevention Plan
TMDL	Total Maximum Daily Load
UIC	Underground Injection Control
USC	United States Code
USEPA	United States Environmental Protection Agency
WAC	Washington Administrative Code
WQ	Water Quality
WWHM	Western Washington Hydrology Model

GENERAL DISCHARGE LIMITATIONS

Operating Criteria

There shall be no odor of solvent, gasoline, or hydrogen sulfide (rotten egg odor), oil sheen, unusual color, or visible turbidity. The discharge must remain translucent. If any of the discharge limits are exceeded, you must stop discharging and notify KCIW at 206-263-3000.

Corrosive Substances

Limits

Maximum:	pH 12.0 (s.u.)
Instantaneous minimum:	pH 5.0 (s.u.)
Daily minimum:	pH 5.5 (s.u.)

The instantaneous minimum pH limit is violated whenever any single grab sample or any instantaneous recording is less than pH 5.0. The daily minimum pH limit is violated whenever any continuous recording of 15 minutes or longer remains below pH 5.5 or when each pH value of four consecutive grab samples collected at 15-minute intervals or longer within a 24-hour period remains below pH 5.5.

Discharges of more than 50 gallons per day of caustic solutions equivalent to more than five percent NaOH by weight or greater than pH 12.0 are prohibited unless authorized by KCIW and subject to special conditions to protect worker safety, the collection system, and treatment works.

Fats, Oils, and Grease (FOG)

Discharge of FOG shall not result in significant accumulations that either alone or in combination with other wastes are capable of obstructing flow or interfere with the operation or performance of sewer works or treatment facilities.

Nonpolar FOG (petroleum origin): The three nonpolar FOG grab samples shall be of equal volume, collected at least five minutes apart, and analyzed separately. When using EPA approved protocols specified in 40 CFR Part 136, the individual grab samples may be composited (at the laboratory) prior to analysis. The result of the composite sample or the average of the concentrations of the three grab samples may be reported as Total FOG unless the value is 100 mg/L or greater, in which case the concentration of nonpolar FOG must be reported.

Polar FOG (animal and/or vegetable origin): Dischargers of polar FOG shall minimize free-floating polar FOG. Dischargers may not add emulsifying agents exclusively for the purpose of emulsifying free-floating FOG.

Flammable or Explosive Materials

No person shall discharge any pollutant, as defined in 40 CFR 403.5, that creates a fire or explosion hazard in any sewer or treatment works, including, but not limited to, waste streams with a closed cup flashpoint of less than 140° Fahrenheit or 60° Centigrade using the test methods specified in 40 CFR 261.21.

At no time shall two successive readings on an explosion hazard meter, at the point of discharge into the system (or at any point in the system), be more than five percent nor any single reading be more than 10 percent of the lower explosive limit (LEL) of the meter.

Pollutants subject to this prohibition include, but are not limited to, gasoline, kerosene, naphtha, benzene, toluene, xylene, ethers, alcohols, ketones, aldehydes, peroxides, chlorates, perchlorates, bromates, carbides, hydrides, and sulfides, and any other substances that King County, the fire department, Washington State, or the EPA has notified the user are a fire hazard or a hazard to the system.

Petroleum Compounds	Maximum Concentration ppm (mg/L)
Benzene	0.07
Ethylbenzene	1.7
Toluene	1.4
Total xylenes	2.2

Heavy Metals/Cyanide

The industrial user shall not discharge wastes, which exceed the following limitations:

Heavy Metals & Cyanide	Instantaneous Maximum ppm (mg/L)[1]	Daily Average ppm (mg/L)[2]
Arsenic	4.0	1.0
Cadmium	0.6	0.5
Chromium	5.0	2.75
Copper	8.0	3.0
Lead	4.0	2.0
Mercury	0.2	0.1
Nickel	5.0	2.5
Silver	3.0	1.0
Zinc	10.0	5.0
Cyanide	3.0	2.0

[1] The instantaneous maximum is violated whenever the concentration of any sample, including a grab within a series used to calculate daily average concentrations, exceeds the limitation.

[2] The daily average limit is violated: a) for a continuous flow system when a composite sample consisting of four or more consecutive samples collected during a 24-hour period over intervals of 15 minutes or greater exceeds the limitation, or b) for a batch system when any sample exceeds the limitation. A composite sample is defined as at least four grab samples of equal volume taken throughout the processing day from a well-mixed final effluent chamber, and analyzed as a single sample.

High Temperature

The industrial user shall not discharge material with a temperature in excess of 65° C (150° F).

Hydrogen Sulfide

Atmospheric hydrogen sulfide: 10.0 ppm
(As measured at a monitoring manhole designated by KCIW)

Soluble sulfide limits may be established on a case-by-case basis depending upon volume of discharge and conditions in the receiving sewer, including oxygen content and existing sulfide concentrations.

Organic Compounds

No person shall discharge any organic pollutants that result in the presence of toxic gases, vapors, or fumes within a public or private sewer or treatment works in a quantity that may cause worker health and safety problems.

Organic pollutants subject to this restriction include, but are not limited to: Any organic pollutants compound listed in 40 CFR Section 433.11 (e) (total toxic organics [TTO] definition), acetone, 2-butanone (MEK), 4-methyl-2-pentanone (MIBK), and xylenes.

Settleable Solids

Settleable solids concentrations: 7.0 mL/L

APPENDIX F

Report Limitations and Guidelines for Use

REPORT LIMITATIONS AND GUIDELINES FOR USE

Geoscience is Not Exact

The geoscience practices (geotechnical engineering, geology, and environmental science) are far less exact than other engineering and natural science disciplines. It is important to recognize this limitation in evaluating the content of the report. If you are unclear how these "Report Limitations and Guidelines for Use" apply to your project or property, you should contact Aspect Consulting, LLC (Aspect).

This Report and Project-Specific Factors

Aspect's services are designed to meet the specific needs of our clients. Aspect has performed the services in general accordance with our agreement (the Agreement) with the Client (defined under the Limitations section of this project's work product). This report has been prepared for the exclusive use of the Client. This report should not be applied for any purpose or project except the purpose described in the Agreement.

Aspect considered many unique, project-specific factors when establishing the Scope of Work for this project and report. You should not rely on this report if it was:

- Not prepared for you;
- Not prepared for the specific purpose identified in the Agreement;
- Not prepared for the specific subject property assessed; or
- Completed before important changes occurred concerning the subject property, project, or governmental regulatory actions.

If changes are made to the project or subject property after the date of this report, Aspect should be retained to assess the impact of the changes with respect to the conclusions contained in the report.

Reliance Conditions for Third Parties

This report was prepared for the exclusive use of the Client. No other party may rely on the product of our services unless we agree in advance to such reliance in writing. This is to provide our firm with reasonable protection against liability claims by third parties with whom there would otherwise be no contractual limitations. Within the limitations of scope, schedule, and budget, our services have been executed in accordance with our Agreement with the Client and recognized geoscience practices in the same locality and involving similar conditions at the time this report was prepared.

Property Conditions Change Over Time

This report is based on conditions that existed at the time the study was performed. The findings and conclusions of this report may be affected by the passage of time, by events such as a change in property use or occupancy, or by natural events, such as floods,

earthquakes, slope instability, or groundwater fluctuations. If any of the described events may have occurred following the issuance of the report, you should contact Aspect so that we may evaluate whether changed conditions affect the continued reliability or applicability of our conclusions and recommendations.

Geotechnical, Geologic, and Environmental Reports Are Not Interchangeable

The equipment, techniques, and personnel used to perform a geotechnical or geologic study differ significantly from those used to perform an environmental study and vice versa. For that reason, a geotechnical engineering or geologic report does not usually address any environmental findings, conclusions, or recommendations (e.g., about the likelihood of encountering underground storage tanks or regulated contaminants). Similarly, environmental reports are not used to address geotechnical or geologic concerns regarding the subject property.

We appreciate the opportunity to perform these services. If you have any questions, please contact the Aspect Project Manager for this project.

ATTACHMENT 1

Construction Monitoring Program

Attachment 1. Construction Monitoring Program

The purpose of the construction monitoring program it to establish baseline conditions at and around the Project Site and actively monitor horizontal deflections, settlement, and vibration during construction. For this Project, we recommend a combination of a preconstruction survey, including CCTV video surveys of existing utilities, and construction monitoring, including settlement survey points, shoring deflection survey points, and vibration monitoring stations. Our recommendations for the construction monitoring program are detailed in the following sections.

Preconstruction and Postconstruction Survey

A preconstruction survey should be completed to document preconstruction conditions on and around the Site. The preconstruction survey should consist of video or photographic documentation of adjacent streets, utilities, buildings, existing cracks, or signs of settlement. Crack monitoring gauges should be installed across selected existing cracks where appropriate.

All sewer and storm lines in the right-of-way within 20 feet of any proposed shoring element should be videotaped prior to the preconstruction meeting. A copy of the video of the Seattle Public Utilities (SPU) water main should be sent to SPU.

A postconstruction survey should be completed to document any changes from existing conditions on and around the Site that were recorded during the preconstruction survey. The postconstruction survey should include another round of CCTV video, with a copy again sent to SPU.

Optical Survey

Optical survey of the Site and surrounding areas should be completed before and during construction to continually observe and evaluate the performance of the shoring walls and measure settlement of nearby features. The optical survey should be accurate to at least one-hundredth of a foot (0.01 feet) and made available to the design team and geotechnical engineer within 24 hours for immediate review.

Shoring survey points should be located along the perimeter of the shored excavation and spaced about every 15 feet to measure shoring deflection. Construction of the shoring walls should be temporarily stopped if the shoring wall is observed to deflect more than 1 inch total, or successive readings show deflection of more than 0.5 inches, in which case remedial action may be required.

Settlement survey points should be placed on nearby improvements behind the shoring wall, and along nearby curblines and/or centerlines of adjacent streets, spaced about every 20 feet to measure settlement resulting from shoring deflection, vibration, or construction dewatering. Settlement monitoring of the nearby SPU water main should also be conducted using settlement plates attached to reference rods (riser pipes) within a PVC protection sleeve. Settlement is determined by periodically measuring the elevation of the top of the reference rod. Suggested settlement monitoring thresholds are presented in Table 1, below.

Table 1. Settlement Monitoring Thresholds

Threshold (inches)	Action Needed
0.25 (warning level)	Implement corrective actions
0.50 (stop work level)	Stop work, develop mitigation plan

The optical survey should be completed by a licensed surveyor that is not the Contractor. Baseline readings of settlement monitoring points should be established prior to any construction activities, and baseline readings of shoring monitoring points should be established prior to excavation. All monitoring points should be surveyed twice a week during excavation and shoring wall construction, and more often if movements exceeding the warning level are observed. After the temporary shoring is completed and deflections have stabilized, the survey frequency may be decreased as determined by the geotechnical engineer.

Vibration Monitoring

Peak particle velocity (PPV) is the generally accepted vibration component for assessing the potential for damaging vibrations produced by a wide variety of energy sources, including construction equipment. Empirical studies show that the PPV associated with ground vibrations is inversely and exponentially proportional to the distance from the vibration source. In other words, the PPV decreases very rapidly with distance from the vibration source. For example, the PPV measured at 100 feet from the source will be approximately 0.1 percent of the PPV measured at the source for typical construction vibrations (Wiss, 1981). Because of the exponential rate of energy decay with distance from the source, variations in subsurface material type have only a minor effect on PPV, as compared to source distance.

We estimate the distances expected to produce PPV values of 0.5 and 1 inches per second for typical earthwork equipment (excavators, dump trucks and drilling equipment) to be about 10 and 5 feet, respectively. For typical vibratory pile driving equipment, the distances expected to produce PPV values of 0.5 and 1 inches per second is estimated to be about 40 and 20 feet, respectively. We anticipate ground vibrations produced by the proposed construction activities to be much less than the damage threshold values at the nearby commercial buildings. However, human perception of vibration is very sensitive and the associated PPV is much lower than the value that might result in damage of these structures. Therefore, we recommend providing outreach to the building owner(s) and the community informing them of the construction activities and what to expect by way of vibrations. We also recommend vibration monitoring be completed during critical construction activities where vibrations are likely to be generated.

The seismographic vibration monitoring should be performed using automated vibration monitoring systems that continuously collect vibration data. At least 1 week of vibration baseline readings should be taken before the start of construction. Typical automated vibration monitoring systems produce daily reports that should be made available to the design team and geotechnical engineer for immediate review. Vibration monitoring should be accurate to at least one-thousandth inch per second PPV (0.001 inch/second).

Vibration monitoring during shoring and excavation should continue at least until the shoring wall construction is complete and vibrations have stabilized.

The project specifications should identify two threshold levels: a “warning level” of 0.5 inches per second, where the Contractor must implement corrective actions; and a “stop work” level of 1 inch per second, where the Contractor must stop vibration-generating activities and develop a mitigation plan to be approved by the geotechnical engineer before resuming work. Suggested vibration monitoring thresholds are summarized in Table 2 below.

Table 2. Vibration Monitoring Thresholds

Threshold PPV (inch/second)	Action Needed
0.5	Implement corrective actions
1.0	Stop work, develop mitigation plan

DEVELOPMENT SERVICES DEPARTMENT
450 110TH AVENUE NE
BELLEVUE, WA 98009-9012

Environmental Checklist reviewed by Peter Rosen (PR) 6/17/2020

SEPA Environmental Checklist

If you need assistance in completing the checklist or have any questions regarding the environmental review process, please visit the Land Use Desk in the Permit Center between 8 a.m. and 4 p.m., Monday through Friday (Wednesday, 10 to 4) or call or email the Land Use Division at 425-452-4188 or landusereview@bellevuewa.gov. Assistance for the hearing impaired: Dial 711 (Telecommunications Relay Service).

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

Instructions for applicants:
This environmental checklist asks you to describe some basic information about your proposal. Please answer each question accurately and carefully, to the best of your knowledge. You may need to consult with an agency specialist or private consultant for some questions. You may use “not applicable” or "does not apply" only when you can explain why it does not apply and not when the answer is unknown. You may also attach or incorporate by reference additional studies and reports. Please make complete and accurate answers to these questions to the best of your ability in order to avoid delays.

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

PLEASE REMEMBER TO SIGN THE CHECKLIST. Electronic signatures are also acceptable.

A. Background [help]

1. Name of proposed project, if applicable: [help]
   Factoria Boulevard Stormwater Conveyance Improvement

2. Name of applicant: [help]
   Birol Shaha

3. Address and phone number of applicant and contact person: [help]
   City of Bellevue
   450 110th Avenue NE
   Bellevue WA 98009
   425-452-4477

4. Date checklist prepared: [help]
   March 25, 2020

5. Agency requesting checklist: [help]
   City of Bellevue

6. Proposed timing or schedule (including phasing, if applicable): [help]
   Construction is expected to begin in 2021 and completed in 2022. Construction phasing will likely include outfall replacement in 2021 with the storm trunk, inlets, laterals and mitigation activities in 2022.

7. Do you have any plans for future additions, expansion, or further activity related to or connected with this proposal? If yes, explain. [help]
   No

8. List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal. [help]
   Critical Areas Report, Biological Assessment, Geotechnical Report and Conceptual Mitigation Plan

9. Do you know whether applications are pending for governmental approvals of other proposals directly affecting the property covered by your proposal? If yes, explain. [help]
   There are no permits being actively reviewed for this proposal.

10. List any government approvals or permits that will be needed for your proposal, if known. [help]
    Federal:
    CWA Section 404 (US Army Corps of Engineers)
    Endangered Species Act and Magnuson-Stevens Act
    CWA Section 401 Water Quality Certification (Ecology)
    State:
    Hydraulic Project Approval (WDFW)
    SEPA (City)
    City of Bellevue:
    Critical Areas/Land Use Permit
    Grading and Drainage Permit

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Right-of-Way

11. Give brief, complete description of your proposal, including the proposed uses and the size of the project and site. There are several questions later in this checklist that ask you to describe certain aspects of your proposal. You do not need to repeat those answers on this page. (Lead agencies may modify this form to include additional specific information on project description.) [help]
The proposed project is a stormwater conveyance improvement that includes, replacement of the existing outfall in Richards Creek, replacement of main trunk line, addition of storm inlets and laterals along Factoria Boulevard. The project includes compensatory mitigation for permanent and temporary impacts to Richards Creek. The project site in total is approximately 1.3 acres in size.

12. Location of the proposal. Give sufficient information for a person to understand the precise location of your proposed project, including a street address, if any, and section, township, and range, if known. If a proposal would occur over a range of area, provide the range or boundaries of the site(s). Provide a legal description, site plan, vicinity map, and topographic map, if reasonably available. While you should submit any plans required by the agency, you are not required to duplicate maps or detailed plans submitted with any permit applications related to this checklist. [help]
The site is located adjacent to Factoria Village and Richards Creek. The site is in Township 25, Range 5E, and Section 9. Vicinity map is attached.

B. Environmental Elements [help]

1. Earth [help]

a. General description of the site: [help] (select one): ☒Flat, ☐rolling, ☐hilly, ☐steep slopes, ☐mountainous, other: *The project site is generally flat except for the slopes on the stream channel.*

b. What is the steepest slope on the site (approximate percent slope)? [help]
40% slope from the edge of pavement to the stream channel.

c. What general types of soils are found on the site (for example, clay, sand, gravel, peat, muck)? If you know the classification of agricultural soils, specify them and note any agricultural land of long-term commercial significance and whether the proposal results in removing any of these soils. [help]
Soil type is generally described as primarily looses to medium dense stratified sand and gravel with varying percentages of silt and clay. No agricultural land is within the project area.

d. Are there surface indications or history of unstable soils in the immediate vicinity? If so, describe. [help]
A potential for a few inches of ground settlement during a moderate to large earthquake were noted in the geotechnical

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report prepared by GeoEngineers Inc.

e. Describe the purpose, type, total area, and approximate quantities and total affected area of any filling, excavation, and grading proposed. Indicate source of fill. [help]
All areas and volumes are approximations:
Excavation from stormwater conveyance improvement;
Area:15,000 square feet
Volume: 4,600 cubic yards
Excavation from outfall replacement and stream channel enhancements;
Area: 19,000 square feet
Volume: 975 cubic yards
Fill will be obtained from an approved sources

f. Could erosion occur as a result of clearing, construction, or use? If so, generally describe. [help]
Yes, any exposure from excavation/filling of soil has potential for erosion. However, BMP's will be followed and TESC plans will be developed and followed for this application

g. About what percent of the site will be covered with impervious surfaces after project construction (for example, asphalt or buildings)? [help]
The percent of impervious area for the project site will be approximately 72%. There will only be an approximate increase of 1,100 square feet to the 1.3 acre site from this project.

h. Proposed measures to reduce or control erosion, or other impacts to the earth, if any: [help]
Measures to reduce erosion may include using filter fabric, silt fence, plastic covering, sodding, sediment bags, mulching, and/or soil stabilization. Seeding and revegating construction areas, employing inlet protection, and sweeping roadways after construction.

Project will comply with erosion and sediment controls per BCC 23.76

2. Air [help]

a. What types of emissions to the air would result from the proposal during construction, operation, and maintenance when the project is completed? If any, generally describe and give approximate quantities if known. [help]
During initial construction, heavy equipment would be emissions sources and small amounts of dust from earthmoving. No other air emissions would be expected through operation and maintenance.

b. Are there any off-site sources of emissions or odor that may affect your proposal? If so, generally describe. [help]
Work is close to a busy street so vehicle emissions are expected in the immediate area.

c. Proposed measures to reduce or control emissions or other impacts to air, if any: [help]
Limiting the amount of bare, dry soil and minimizing idling on

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heavy equipment

3. Water [help]

a. Surface Water:

Richards Creek is classified as a Type F fish-bearing stream

1) Is there any surface water body on or in the immediate vicinity of the site (including year-round and seasonal streams, saltwater, lakes, ponds, wetlands)? If yes, describe type and provide names. If appropriate, state what stream or river it flows into. [help]
Yes, there is Richard Creek, which flows into Kelsey Creek, and then into the Mercer Slough and into Lake Washington.

Will the project require any work over, in, or adjacent to (within 200 feet) the described waters? If yes, please describe and attach available plans. [help]
Yes, the proposed outfall and trunk line replacement will require work within Richards Creek.

3) Estimate the amount of fill and dredge material that would be placed in or removed from surface water or wetlands and indicate the area of the site that would be affected. Indicate the source of fill material. [help]
Project activities will occur in Richards Creek, including the stream enhancements and are approximate quantities are:
Excavated Material: 75 cubic yards,
Fill Material: 15 cubic yards
The total area of work under OHWM is 2,525 Square feet.

4) Will the proposal require surface water withdrawals or diversions? Give general description, purpose, and approximate quantities if known. [help]
Yes, existing stormwater in the conveyance system will be diverted around the project area and into Richards Creek during the construction window. Flows from upstream of the project site will be bypassed through the use of either a gravity-flow bypass system or pumped from vaults/catchbasins upstream of the project site and realeased in a non-erosive manner into Richards Creek. Approximate quantities are unknown as precipitation is the main component of the diversion but the basin encompasses approximately 283 acres of 64% impervious surface.

5) Does the proposal lie within a 100-year floodplain? If so, note location on the site plan. [help]
No, the portion of the project encompassing the Richards Creek channel is not within the FEMA mapped floodplain.

6) Does the proposal involve any discharges of waste materials to surface waters? If so, describe the type of waste and anticipated volume of discharge. [help]
No waste materials are anticipated to be discharged to surface waters in this proposal.

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b. Ground Water:

1) Will groundwater be withdrawn from a well for drinking water or other purposes? If so, give a general description of the well, proposed uses and approximate quantities withdrawn from the well. Will water be discharged to groundwater? Give general description, purpose, and approximate quantities if known. [help]
No wells are associated with this project so withdrawals or discharges to groundwater are not expected from this proposal.

2) Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (for example: Domestic sewage; industrial, containing the following chemicals…; agricultural; etc.). Describe the general size of the system, the number of such systems, the number of houses to be served (if applicable), or the number of animals or humans the system(s) are expected to serve. [help]
No waste material will be discharged into the ground from any sources for this project.

c. Water runoff (including stormwater):

1) Describe the source of runoff (including storm water) and method of collection and disposal, if any (include quantities, if known). Where will this water flow? Will this water flow into other waters? If so, describe. [help]
Upstream flow in the storm drain system replacement proposed in this project includes approximately 283 acres of 64% impervious surface from neighboring commercial business and residential areas. This will be collected by either gravity-flow bypass and/or pumps from vaults/catchbasins. The water will be discharged into the inlet of Richards Creek in a non-erosive manner.

2) Could waste materials enter ground or surface waters? If so, generally describe. [help]
Yes, as accidental spills or leaks from equipment may happen. BMP's will be employed to take corrective actions including, beginning containment and cleanup efforts immeadiately and completing them expeditiously according to all local, state, and federal regulations, and ensuring they take precedence over ordinary work. Cleanup will include proper disposal of any spilled material and used cleanup material. Spills will be reported to Washington State Department of Ecology's (Ecology) Southwest Regional Spill Response Office at 360-407-6300.

3) Does the proposal alter or otherwise affect drainage patterns in the vicinity of the site? If so, describe. [help]
The project aims to increase the drainage rates to reduce flooding but the drainage rates will not be altered and still be entering into Richards Creek.

d. Proposed measures to reduce or control surface, ground, and runoff water, and drainage

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To control runoff, project will comply with erosion and sediment controls per BCC 23.76

pattern impacts, if any: [help]
There will be no need for these measures as no major changes to the projects drainage patterns are anticipated after the project is complete.

4. Plants [help]

a. Check the types of vegetation found on the site: [help]
☐deciduous tree: alder, maple, aspen, other: *Click here to enter text.*
☐evergreen tree: fir, cedar, pine, other: *Click here to enter text.*
☒shrubs
☐grass
☐pasture
☐crop or grain
☐Orchards, vineyards or other permanent crops.
☐wet soil plants: cattail, buttercup, bullrush, skunk cabbage, other: *Click here to enter text.*
☐water plants: water lily, eelgrass, milfoil, other: *Click here to enter text.*
☒other types of vegetation: *Various ornamental species are present on the periphery of the site adjacent to businesses.*

b. What kind and amount of vegetation will be removed or altered? [help]
All vegetation (Himalyan Blackberry) adjacent to the channel will be removed and encompasses approximately 0.4 acres.

c. List threatened and endangered species known to be on or near the site. [help]
No threatened or endangered species and critical habitats are known to occur on the site from a review of the Washington Department of Fish and Wildlife Priority Habitats and Species (PHS) Tool.

d. Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any: [help]
A general description of the proposed native vegetation is included in the current design plan and proposes native riparian and upland species, but a vegetation management plan will be developed and approved by the City of Bellevue prior to the project start.

Proposal will enhance the stream buffer of Richards Creek within the project area with native trees and shrubs

e. List all noxious weeds and invasive species known
Himalayan Blackberrry

5. Animals [help]

a. List any birds and other animals which have been observed on or near the site or are known to be on or near the site. [help]

Examples include:

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birds: ☐hawk, ☐heron, ☐eagle, ☒songbirds, other: *Click here to enter text.*
mammals: ☐deer, ☐bear, ☐elk, ☐beaver, other: *Click here to enter text.*
fish: ☐bass, ☒salmon, ☐trout, ☐herring, ☐shellfish, other: *Lamprey*

b. List any threatened and endangered species known to be on or near the site. [help]
According to a SalmonScape review, both Steelhead and Salmon are located downstream of the project site in Richards Creek. However, the culvert under I-90 at the end of the project site is a partial barrier to fish passage and the upstream culvert prevents fish passage entirely (WDFW 2019).

c. Is the site part of a migration route? If so, explain. [help]
No migration routes are known to be within the project area.

d. Proposed measures to preserve or enhance wildlife, if any: [help]
The proposed mitigation includes stream channel enhancements to Richards Creek to enhance aquatic and riparian habitat. Planting of native vegetation and the creation of natural stream channel characteristics will improve the chances of both fish and aviary species to frequent the project site.

e. List any invasive animal species known to be on or near the site. [help]
None are currently known to be located on or near the site.

6. Energy and Natural Resources [help]

a. What kinds of energy (electric, natural gas, oil, wood stove, solar) will be used to meet the completed project's energy needs? Describe whether it will be used for heating, manufacturing, etc. [help]
No energy requirements are needed post construction of this project. The stormwater is gravity fed through the system.

b. Would your project affect the potential use of solar energy by adjacent properties? If so, generally describe. [help]
There are no proposed buildings or site features that may block solar radiation onto neighboring sites. Any impacts would be from heavy equipment which are not tall enough to impact a rooftop or pole mounted solar panel system.

c. What kinds of energy conservation features are included in the plans of this proposal? List other proposed measures to reduce or control energy impacts, if any: [help]
Limiting the idling on heavy equipment.

7. Environmental Health [help]

a. Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire and explosion, spill, or hazardous waste, that could occur as a result of this proposal? If so, describe. [help]
Due to the excavation activities adjacent to existing roads and businesses, contaminated soils may be encountered. Diesel

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fuels and hydraulic fluids would be the only potential hazardous waste prone to spills during construction.

1) Describe any known or possible contamination at the site from present or past uses. [help]
   There are 17 cleanup sites within a mile of the project area, all are at various levels from awaiting cleanup to No Further Action (NFA). The cleanup site located at the Formula One Fast Lube needs to addressed as it is where excavations associated with a lateral will occur and a NFA has not been cited for the area.

2) Describe existing hazardous chemicals/conditions that might affect project development and design. This includes underground hazardous liquid and gas transmission pipelines located within the project area and in the vicinity. [help]
   There is 4 inch high pressure natural gas line owned by Puget Sound Energy that will need to be relocated due to this project along with a sanitary sewer that is a biological hazard.

3) Describe any toxic or hazardous chemicals that might be stored, used, or produced during the project's development or construction, or at any time during the operating life of the project. [help]
   Diesel fuel and hydraulic fluid for heavy equipment may be stored onsite in approved locations.

4) Describe special emergency services that might be required. [help]
   No special emergency services will be required on-site for this project.

5) Proposed measures to reduce or control environmental health hazards, if any: [help]
   To avoid and minimize impacts, all stages of construction will employ the following best management practices (BMPs).
   Checking equipment for leaks and other problems that could result in the discharge of petroleum-based products or other material into critical areas.
   Taking corrective actions in the event of any discharge of oil, fuel, or chemicals into the water, including:
   In the event of a spill, beginning containment and cleanup efforts immediately and completing them expeditiously according to all local, state, and federal regulations, and ensuring they take precedence over ordinary work. Cleanup will include proper disposal of any spilled material and used cleanup material.
   Ascertaining the cause of the spill and taking appropriate action to prevent further incidents or environmental damage.
   Reporting spills to the Washington State Department of Ecology's (Ecology) Southwest Regional Spill Response

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Office at 360 407-6300.
Preventing the disposal or abandonment of excess or waste materials waterward of the OHWM or allowing these materials to enter waters of the state.
Disposing of waste materials in an appropriate landfill.
Keeping oil-absorbent materials present on site for use in the event of a spill or if any oil product is observed in critical areas.
Employment of erosion and sediment control measures including, but not limited to:
Using filter fabric, silt fence, plastic covering, sodding, sediment bags, mulching, and/or soil stabilization
Hand seeding, hydro-seeding, live staking
Employing inlet protection, sandbags, silt mat, straw bale barriers, vegetative buffers
Sweeping area roadways after construction

b. Noise [help]

1) What types of noise exist in the area which may affect your project (for example: traffic, equipment, operation, other)? [help]
Traffic associated with Factoria Boulevard.

2) What types and levels of noise would be created by or associated with the project on a short-term or a long-term basis (for example: traffic, construction, operation, other)? Indi-cate what hours noise would come from the site. [help]
Heavy equipment noise associated with excavation and fill would occur on a short-term construction basis during daytime hours. Existing traffic noise occurs on a long-term basis.

3) Proposed measures to reduce or control noise impacts, if any: [help]
This project will follow guidelines set forth in Chapter 9.18 of the City of Bellevue City Code.

8. Land and Shoreline Use [help]

a. What is the current use of the site and adjacent properties? Will the proposal affect current land uses on nearby or adjacent properties? If so, describe. [help]
Current land uses are commercial on adjacent properties. No impacts to the current uses and future uses won't be affected by this project as proposed.

b. Has the project site been used as working farmlands or working forest lands? If so, describe. How much agricultural or forest land of long-term commercial significance will be converted to other uses as a result of the proposal, if any? If resource lands have not been designated, how many acres in farmland or forest land tax status will be converted to nonfarm or nonforest use? [help]
No, there are no lands meeting this definition with the project area.

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1) Will the proposal affect or be affected by surrounding working farm or forest land normal business operations, such as oversize equipment access, the application of pesticides, tilling, and harvesting? If so, how: [help]
No, there are no lands meeting this definition with the project area.

c. Describe any structures on the site. [help]
There are no structures within the project area.

d. Will any structures be demolished? If so, what? [help]
No structures will be demolished with this proposal.

e. What is the current zoning classification of the site? [help]
The project site is encompassed by commercially zoned properties and is adjacent to office zoned properties. (East and west of project area)

f. What is the current comprehensive plan designation of the site? [help]
Commercial Business.

g. If applicable, what is the current shoreline master program designation of the site? [help]
The project site is not located within a designated shoreline of the state.

h. Has any part of the site been classified as a critical area by the city or county? If so, specify. [help]
Yes, Richards Creek is a designated F class stream under the City critical area ordinance.

Type F fish-bearing stream

i. Approximately how many people would reside or work in the completed project? [help]
None, there are no structures or commercial or residential associated with this project proposal.

j. Approximately how many people would the completed project displace? [help]
No people will be displaced from this project proposal.

k. Proposed measures to avoid or reduce displacement impacts, if any: [help]
No measures are proposed as there are no impacts associated with this project proposal.

l. Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any: [help]
Land uses are going to be staying the same between pre and post construction so existing and projected land uses and plans will be staying the same.

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

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There are no agricultural and forest lands of long-term commercial significance within or near the project area.

9. Housing [help]

a. Approximately how many units would be provided, if any? Indicate whether high, middle, or low-income housing. [help]
No housing units are included in this project proposal.

b. Approximately how many units, if any, would be eliminated? Indicate whether high, middle, or low-income housing. [help]
No units will be eliminated in this project proposal.

c. Proposed measures to reduce or control housing impacts, if any: [help]
No measures are needed as there are no impacts to housing in this project proposal.

10. Aesthetics [help]

a. What is the tallest height of any proposed structure(s), not including antennas; what is the principal exterior building material(s) proposed? [help]
The structures proposed in this project will all be below grade and not visible from surrounding road and commercial/residential areas.

b. What views in the immediate vicinity would be altered or obstructed? [help]
No views will be altered or obstructed by this project except from heavy equipment during construction.

c. Proposed measures to reduce or control aesthetic impacts, if any: [help]
No measures are proposed during construction. During the operation of the project, the mitigation proposed for riparian enhancements will create a greenspace in a largely developed section of Bellevue.

11. Light and Glare [help]

a. What type of light or glare will the proposal produce? What time of day would it mainly occur? [help]
Minimal glare from construction vehicles during workday hours. At night, utility reroute work will have lights for construction, reflective safety cones and detour signs will create glare.

b. Could light or glare from the finished project be a safety hazard or interfere with views? [help]
No, there shouldn't be any safety hazards created from light or glare from this project. No permanent lighting is proposed.

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Existing building and street lights already present throughout the site. Any night work will have lights pointing away from the roadway.

c. What existing off-site sources of light or glare may affect your proposal? [help]
Parking lots neighboring the project have impacts from outdoor lighting and streetlights located on Factoria Boulevard.

d. Proposed measures to reduce or control light and glare impacts, if any: [help]
Aiming lights away from the roadway, shielding lights and limiting the use to when they are necessary.

12. Recreation [help]

a. What designated and informal recreational opportunities are in the immediate vicinity? [help]
None, but a mixed pedestrian and biking trail is located to the north of the project area.

b. Would the proposed project displace any existing recreational uses? If so, describe. [help]
None

c. Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any: [help]
None are needed as there will be no impacts.

13. Historic and cultural preservation [help]

a. Are there any buildings, structures, or sites, located on or near the site that are over 45 years old listed in or eligible for listing in national, state, or local preservation registers located on or near the site? If so, specifically describe. [help]
No

b. Are there any landmarks, features, or other evidence of Indian or historic use or occupation? This may include human burials or old cemeteries. Are there any material evidence, artifacts, or areas of cultural importance on or near the site? Please list any professional studies conducted at the site to identify such resources. [help]
There is no material evidence on or within the direct vicinity of the project site. No professional studies have been done yet.

c. Describe the methods used to assess the potential impacts to cultural and historic resources on or near the project site. Examples include consultation with tribes and the department of archeology and historic preservation, archaeological surveys, historic maps, GIS data, etc. [help]
The site has been disturbed prior to the work detailed in this proposal and excavation limits are within prior excavations.

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

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No measures are currently proposed.

14. Transportation [help]

a. Identify public streets and highways serving the site or affected geographic area and describe proposed access to the existing street system. Show on site plans, if any. [help]
Factoria Boulevard, SE 36th Street and SE 38th Street access the project site.

b. Is the site or affected geographic area currently served by public transit? If so, generally describe. If not, what is the approximate distance to the nearest transit stop? [help]
Yes, there is a bus stop within the project area that will be moved to the south during construction. The bus stop will be reestablished following construction.

c. How many additional parking spaces would the completed project or non-project proposal have? How many would the project or proposal eliminate? [help]
None

d. Will the proposal require any new or improvements to existing roads, streets, pedestrian, bicycle or state transportation facilities, not including driveways? If so, generally describe (indicate whether public or private). [help]
Existing sidewalks will be updated to be Americans With Disabilities Act compliance.

e. Will the project or proposal use (or occur in the immediate vicinity of) water, rail, or air transportation? If so, generally describe. [help]
No.

f. How many vehicular trips per day would be generated by the completed project or proposal? If known, indicate when peak volumes would occur and what percentage of the volume would be trucks (such as commercial and nonpassenger vehicles). What data or transportation models were used to make these estimates? [help]
No new thru lanes are proposed with this project so this data isn't necessary.

Proposal would not generate new, additional vehicular trips

g. Will the proposal interfere with, affect or be affected by the movement of agricultural and forest products on roads or streets in the area? If so, generally describe. [help]
No interference to these products are expected with this proposal.

h. Proposed measures to reduce or control transportation impacts, if any: [help]
During construction, temporary traffic detours are needed to maintain traffic flow and business access. It is expected that the northbound lanes will be closed and the southbound lanes will be augmented to serve north-south traffic. Temporary driveway closures into Factoria Village will also occur, but two other driveways will continue to provice access.

15. Public Services [help]

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a. Would the project result in an increased need for public services (for example: fire protection, police protection, public transit, health care, schools, other)? If so, generally describe. [help]
No.

b. Proposed measures to reduce or control direct impacts on public services, if any. [help]
There are no measures proposed as there are no impacts to these services.

16. Utilities [help]

a. Circle utilities currently available at the site: [help]
electricity, natural gas, water, refuse service, telephone, sanitary sewer, septic system, other
Yes, there are utilities located around the project area which includes electricity,natural gas, water, telephone and sanitary sewer. Some will need to be relocated and others will remain in place.

c. Describe the utilities that are proposed for the project, the utility providing the service, and the general construction activities on the site or in the immediate vicinity which might be needed. [help]
No new utility services are proposed or will be needed for the project.

C. Signature [help]

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

Signature: Birol Shaha

Name of signee: *Birol Shaha*
Position and Agency/Organization: *Senior Engineer/Project Manager P.E. - City of Bellevue Utilities*
Date Submitted: *May 14, 2020*

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