King County
Department of Natural Resources and Parks
Wastewater Treatment Division
King Street Center, KSC-NR-0505
201 South Jackson Street
Seattle, WA 98104

Environmental Checklist Addendum

for the

King County Wastewater Treatment Division Sunset and Heathfield Pump Stations and Force Main Upgrade Project

July 2020

Prepared in compliance with the State Environmental Policy Act (SEPA) (RCW 43.21C), the SEPA Rules (WAC 197-11), and Chapter 20.44 King County Code, implementing SEPA in King County procedures.

This information is available in accessible formats upon request at (206) 477-5371 (voice) or 711 (TTY).

Sunset and Heathfield Pump Stations and Force Main Upgrade Project - SEPA Checklist Addendum

The King County Department of Natural Resources and Parks, Wastewater Treatment Division (WTD), has prepared this document to addend the SEPA environmental checklist for the Sunset and Heathfield Pump Stations and Force Main Upgrade Project. The DNS for the project, issued by WTD on September 17, 2015, is addended by the authority provided in WAC 197-11-600(4)(c) and conforms to the procedures for preparing an addendum in WAC 197-11-625.

This addendum provides additional information about the proposed project that does not substantially change the analysis of impacts in the existing environmental document for the project (WAC 197-11-706). Italicized text represents the new information added to the appropriate section of the original SEPA Checklist. Checklist sections without new information are not included in this addendum. Information provided does not substantially change the analysis and does not result in any significant adverse impacts. The lead agency has reviewed the changes and enhancements and finds that they are within the scope and magnitude of the impacts detailed in the SEPA Checklist and DNS that were issued on September 17, 2015.

The additional information provided in this addendum describes a proposed habitat improvements project, which is needed to offset inadvertent construction impacts to Vasa Creek, caused by the Sunset and Heathfield Pump Stations and Force Main Upgrade Project in August 2018.

ENVIRONMENTAL CHECKLIST

A. BACKGROUND

3. Address and phone number of applicant and contact person:

King County Department of Natural Resources and Parks
Wastewater Treatment Division
KSC-NR-0505
201 S. Jackson Street
Seattle, WA 98104

CONTACT: Grace Smith, Environmental Planner
Phone: (206) 477-8651
Email: grace.smith@kingcounty.gov

6. Proposed timing or schedule (including phasing, if applicable):

Project construction is scheduled to begin in Spring 2017. Project completion is estimated for Fall 2019.

The habitat improvements are proposed to begin in September 2020 and take approximately one month to complete.

8. List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal.

Jacobs Associates. Initial Geotechnical Investigation Technical Memorandum, February 2014.

McMillen Jacobs Associates. Draft Geotechnical Design Memorandum, July 2015.

Terracon Consultants, Inc. Draft Phase I Environmental Site Assessment, July 2015.

Urban Forestry Services, Inc. Level 2 Basic Tree Assessment and Protection Plan, July 2015.

Environmental Science Associates. Wetland and Stream Technical Memorandum and Critical Areas Report, August 2015.

Environmental Science Associates. Biological Evaluation and Essential Fish Habitat Assessment, August 2015.

SSA Acoustics, LLP. Environmental Noise Impact Assessment, August 2015.

Vasa Creek Floodplain Analysis, ESA, January 24, 2020

Vasa Creek Habitat Improvements Basis of Design Memorandum, ESA, June 12, 2020

Vasa Creek Habitat Improvements Storm Drainage Report, ESA, June 12, 2020

Vasa Creek Stream Study Memorandum, ESA, June 16, 2020

Vasa Creek Habitat Improvements JARPA, ESA, June 2020

Traffic Control Plan, HDR, June 2020

10. List any government approvals or permits that will be needed for your proposal, if known.

City of Bellevue (COB)

- Land Use Exemption – Amendment to previous approval (Heathfield Pump Station *de facto* Conditional Use Permit)
- Shoreline Substantial Development Permit
- Critical Areas Land Use Permit
- Clear and Grade Permit
- Right of Way/Street Use Permit
- Commercial Building Permits (Sunset and Heathfield Pump Stations)
- *Critical Areas Land Use Permit (for Vasa Creek habitat improvements)*
- *Clear and Grade Permit (for Vasa Creek habitat improvements)*

- *Right of Way/Street Use Permit (for Vasa Creek habitat improvements)*

King County Industrial Waste Program
- Waste Discharge Permit

Washington Department of Fish and Wildlife
- Hydraulic Project Approval
- *Major modification to Hydraulic Project Approval (for Vasa Creek habitat improvements)*

Washington Department of Ecology
- NPDES Construction Stormwater General Permit
- Coastal Zone Management Act Consistency Determination
- Clean Water Act Section 401 Water Quality Certification

Washington Department of Transportation
- Utility Permit

Washington Department of Archaeology and Historic Preservation
- National Historic Preservation Act (NHPA) Section 106 consultation
- *New National Historic Preservation Act (NHPA) Section 106 consultation (for Vasa Creek habitat improvements)*

United States Army Corps of Engineers (USACE)
- Nationwide Permit 12 (Clean Water Act (CWA) Section 404)
- *New Department of the Army (DA) Permit, Clean Water Act (CWA) Section 404 (for Vasa Creek habitat improvements)*

US Fish & Wildlife Service / National Oceanic & Atmospheric Admin. - Fisheries
- Endangered Species Act (ESA) Section 7 consultation
- *New Endangered Species Act (ESA) Section 7 consultation (for Vasa Creek habitat improvements)*

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.

To protect public health and the environment, King County proposes to upgrade its Sunset and Heathfield Pump Stations and associated force main sewer pipe system in Bellevue, WA. The Sunset and Heathfield Pump Stations operate in series to convey wastewater originating in Issaquah, the Sammamish Plateau, and some local Bellevue sewers, to King County's Eastgate Interceptor pipeline in the Eastgate area of Bellevue. Flow is conveyed through two parallel 24-in. and 12-in. diameter force main sewer pipes.

The purpose of the project is to increase the capacity and reliability of the wastewater conveyance system to accommodate demand associated with regional population growth. Design of this project is being guided using a holistic framework for incorporating community, environmental, and economic benefits into infrastructure projects, known as Envision.

Pump Station Upgrades

The first major element of the project will consist of upgrades inside the Sunset and Heathfield Pump Station buildings. The eight existing pumps (four in each pump station) will be replaced with eight new pumps (four in each pump station) along with supporting equipment. In addition, the electrical systems and heating, ventilation, and air conditioning (HVAC) systems at each pump station will be updated to maintain code compliance and improve odor control.

The second major element of the project will involve minor modifications to the exterior of each pump station and equipment on each pump station property. At the Sunset Pump Station (total parcel size: 18,024 sq. ft.), the existing standby generator will be replaced with a larger unit to support the new pumps in the event of a power outage. On the pump station roof, new supporting equipment will be installed. Other activities on the Sunset Pump Station property as part of this project will include replacing the fence surrounding the property, updating the site's landscaping to better support native wildlife, installation of stormwater bioretention systems including a green roof, and installing habitat enhancement structures such as root wads and habitat logs on the shoreline.

At the Heathfield Pump Station (total parcel size: 29,900 sq. ft.), the existing standby generator will be replaced with a larger unit, and the above-ground fuel tank to support the generator will be replaced with a larger tank. Adjacent to the pump station building, new electrical conduit will be buried and new supporting equipment will be installed. Other activities on the Heathfield Pump Station property will include the installation of a raingarden to manage stormwater, restoration and stabilization of a surface water drainage channel, and forest habitat restoration.

New Force Main Pipeline

The final major element of the project will be the installation of a new 24-in. diameter force main sewer line between the Sunset and Heathfield Pump Stations, and from the Heathfield Pump Station to the beginning of the Eastgate Interceptor. This new force main will replace the older, existing 12-in. force main, and will operate in conjunction with the existing 24-in. force main. Some segments of the existing 12-in. force main will be removed or decommissioned, and other segments will be reused as a conduit for communication lines between the Sunset and Heathfield Pump Stations.

In total, approximately 6,000 lineal ft. of force main pipe will be installed. The new pipe will be installed using a number of different construction methods, including cut and cover (open trench), horizontal directional drilling (HDD), and other trenchless methods (such as bore and jack or pipe ramming).

Cut and cover installation methods, which are currently expected to be used for approximately 4,000 lineal ft. of the pipeline, will involve the excavation and shoring of a relatively uniform linear trench, pipe installation, trench filling, and subsequent surface restoration. Cut and cover installation will generally follow road rights-of-way between Sunset Pump Station, Heathfield Pump Station, and the Eastgate Interceptor.

Installation using HDD methods, which are currently expected to be used for approximately 1,800 lineal ft. of the pipeline, will involve the excavation and shoring of entry and exit pits, using a guided drill system and drilling fluid to create a bore hole into which the force main pipe will be installed, pulling the pipe into the borehole, subsequent collection and disposal of drilling fluid, and filling and surface restoration of entry and exit pits. Horizontal directional drilling will be used as a lower-impact alternative to cut and cover methods in specific segments of the pipeline, in order to reduce project impacts to traffic flow on West Lake Sammamish Pkwy. SE, avoid existing underground utility infrastructure on SE 38th St., and protect significant trees, forest habitat, and steep slopes on the south side of SE 38th St.

Other trenchless installation methods, which are currently expected to be used for up to 500 lineal ft. of the pipeline, will involve the excavation of entry and exit pits, soil boring and installation of a steel casing, pipe installation, and subsequent filling and surface restoration of entry and exit pits. Other trenchless installation methods will generally be used in areas of the alignment where King County seeks to reduce project impacts to sensitive environmental resources, existing private or public property interests, or other elements of the project area. Segments of the new pipe that cross Vasa Creek will be installed using trenchless methods.

In August 2018, the Sunset and Heathfield Pump Stations and Force Main Upgrade Project caused inadvertent construction impacts to Vasa Creek during trenchless installation of a new sewer force main beneath the stream. To offset the negative impacts that occurred to Vasa Creek, WTD proposes to complete a compensatory habitat improvements project.

The proposed habitat improvements project will establish a low-flow channel along a portion of Vasa Creek to create enhanced stream channel morphology better suited for fish passage at low flows. Currently, Vasa Creek has insufficient stream power and sediment supply to restore the reach in question naturally. Proposed habitat improvements involve placing streambed material in the creek channel beneath the existing bridge to rebuild the stream banks and create a narrower low-flow channel with floodplain benches, similar to what exists upstream and downstream of the bridge at 164th Place SE. Habitat improvements have been designed to keep the channel bed in its current position and rebuild the banks.

The low flow channel beneath the bridge will be comparable in size and depth to the low flow channel of Vasa Creek up- and downstream and will be 9 inches deep at the center of the stream channel and 1.5 feet wide at the streambed, expanding out to 4

feet wide at the top of stream bank. Gently sloping floodplain benches will extend from the top of the channel banks to the bridge abutments. The channel is designed based on the Washington Department of Fish and Wildlife (WDFW) Water Crossings Design Guidelines (2013) for stream simulation through bridges and box culverts.

Invasive vegetation will be removed and restoration and enhancement plantings will be installed manually within the temporarily impacted stream buffer at the conclusion of the project.

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.

The project area is in Bellevue, WA, in Sections 11 and 12, Township 24 North, Range 5 East. The Sunset Pump Station is located at 3810 West Lake Sammamish Pkwy. SE, Bellevue, WA 98008 (King County Parcel Number 1224059131). The Heathfield Pump Station is located at 3541 163rd Ave. SE, Bellevue, WA 98008 (King County Parcel Number 3211900050). The new force main will generally follow this alignment:

> Exiting the Sunset Pump Station, the new force main will run northwest adjacent to West Lake Sammamish Pkwy. SE, west under SE 38th St., northwest under 164th Pl. SE, and southwest under 163rd Ave. SE into the Heathfield Pump Station.
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> Exiting the Heathfield Pump Station, the new force main will run northeast under 163rd Ave. SE, northwest under 164th Pl. SE, west under SE 35th Pl., and into the Eastgate Interceptor in the northwest corner of the intersection of SE 35th Pl. and SE Eastgate Way.

See Figures 1 and 2 for vicinity maps of the project.

The habitat improvements for Vasa Creek are located in Right of Way (ROW) near 164th Place SE in Bellevue, WA. See Figure 3 for project location.

B. ENVIRONMENTAL ELEMENTS

1. Earth

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.

The project will involve approximately 1.5 acres of soil disturbance through excavation, fill, or grading. Most of the excavation, fill, and grading for the project will be related to installing the new force main pipeline. Approximately 6,100 cu. yd. of soil will be excavated in order to install the pipe using cut and cover installation methods, with an approximately equal amount of subsequent fill. The trench will be approximately 4 ft. wide with a depth varying from approximately 5 to 20 ft. It is expected that the trench will be shored using a trench box during pipe installation.

Approximately 1,120 cu. yd. of soil will be excavated for HDD and other trenchless pipe installation methods, with an approximately equal amount of subsequent fill. Entry and exit pits for trenchless installation will be approximately 10 ft. wide, between approximately 10 and 30 ft. long, and between approximately 10 and 40 ft. deep. It is expected that the entry and exit pits will be shored using pre-augering and augercast pile methods.

Another approximately 390 cu. yd. will be excavated in order to connect the new pipe to the Eastgate Interceptor.

Construction at the Sunset and Heathfield Pump Station sites will consist of small amounts of excavation, grading and fill, likely less than 100 cu. yd. of excavation and subsequent fill in total.

For all excavation activities, subsequent backfill will consist of native soil to the greatest extent possible, supplemented with clean fill from an approved borrow source as required by City of Bellevue codes. All excavated areas will be restored to their previous grade at project completion.

Fill and excavation activates will occur within the streambed of Vasa Creek for habitat improvements. Approximately 20 cubic yards of excavation will be required within the streambed, affecting approximately 650 square feet of Vasa Creek.

Approximately 30 cubic yards of fill will be placed within the streambed of Vasa Creek during the habitat improvements. Approximately 20 cubic yards of the fill will be replacement of native material, and approximately 10 cubic yards will be 4-inch and 10-inch streambed cobble.

Temporary fill will consist of placing approximately 3 cubic yards of gravel bags within the streambed to construct isolation dams. These gravel bag dams will dewater the work area by temporarily directing the stream flow into a

temporary stream bypass. The gravel bags will affect approximately 25 square feet of Vasa Creek.

3. Water

a. Surface Water:

2) 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.

The new force main will cross Vasa Creek twice. Each crossing will be accomplished using trenchless construction methods. Specialized boring or ramming equipment will be used, as well as conventional construction equipment such as excavators, bulldozers, cranes, and dump trucks. The force main pipe and casing will be installed at a depth sufficient to avoid impacts to the creek. The first trenchless crossing will parallel the bridge crossing of 164th Pl. SE. Entry and exit pits for this crossing, described in detail in Section B.1.e. above, will be located on either side of the creek, within the 100-ft. buffer of Vasa Creek regulated by the City of Bellevue. The second trenchless crossing will be installed between the intersection of 164th Pl. SE and 163rd Ave. SE, and the Heathfield Pump Station property. Entry and exit pits for this crossing will also be located within the 100-ft. buffer of Vasa Creek.

In addition to the pits described above, construction activities outside of the Heathfield Pump Station and within the 100-ft. Vasa Creek stream buffer will include excavating to connect the new force main into the pump station, excavating to install electrical conduit, and installing supporting equipment. The project will also involve forest restoration activities on the Heathfield Pump Station property, as well as approximately 90 sq. ft. of slope stabilization and vegetation restoration within and around Drainage 2.

The project will involve work adjacent to and possibly in Lake Sammamish. On the Sunset Pump Station property, which is on the shore of the lake, construction activities will include excavating to connect the new force main into the pump station, excavating to install electrical conduit, and installing supporting equipment such as a new standby generator. Finally, the project will involve replacing the landscaping on the Sunset Pump Station property to better support native wildlife, and installing habitat enhancement structures above the ordinary high water mark of the lake.

Construction activities to install the new force main using HDD methods will occur adjacent to, and possibly in, Lake Sammamish. Pipe pullback operations may occur at either the east or west end of the HDD segment. If

the pipe is pulled back from the east end, approximately 1,800 ft. of pipe will need to be assembled near the shoreline and then floated on the surface of the lake before being pulled back. The pipe will be elevated with onshore equipment such as rollers or a long boom excavator during staging and pullback, so as not to disturb nearshore sediments or habitat. A tender boat will be used to manage the pipe as it is floated onto the lake surface, and approximately 15 buoy anchors will secure the pipe in place before it is pulled back. The pipe may be at least partially floating on the lake surface for approximately three weeks.

Other activities in the vicinity of Lake Sammamish that are associated with HDD construction methods will include the excavation of an entry or exit pit using conventional construction equipment such as excavators, bulldozers, cranes, and dump trucks. Activities may also include operating a drilling rig and a soil separation facility to remove soils from drilling fluid.

The west end of the HDD segment will be located within or near Wetland D. An entry or exit pit will be excavated at this location using conventional construction equipment such as excavators, bulldozers, cranes, and dump trucks. Other HDD-associated activities affecting this area may include operating a drilling rig, a soil separation facility, and conducting pipe pullback operations. Beyond the west end of the HDD segment, within Wetland D and Drainage 3, the new pipe will be installed using cut and cover methods. These water bodies will be restored upon project completion. On SE 35th Pl., the new pipe will be installed using cut-and-cover methods through Drainage 1. This drainage will be restored upon project completion.

Finally, staging and laydown for the project will occur on approximately 6,000 sq. ft. of vacant land adjacent to Wetland D, which is classified as wetland buffer. Staging and laydown may include equipment and materials storage, parking, and other temporary uses.

During completion of the Vasa Creek habitat improvements, the proposed low-flow channel will be constructed either by hand or using small earth moving equipment to backfill streambed gravels. The low-flow channel will be constructed in isolation from stream surface water by installing a temporary stream bypass using gravel bag dams, and placing straw wattles to minimize sediment movement. The 164th Place SE Bridge has insufficient clearance (< 5 feet) to allow large equipment to operate in the stream channel, although small equipment that applies minimal pressure to the ground may be used. If used, larger equipment, such as an excavator, will operate from the paved surface of the 164th Place SE bridge, and reach down into the stream channel to move material. The stream channel will be accessed from the northeastern end of the bridge,

where the stream banks are the lowest, and staging will occur within the ROW of 164th Place SE along the road shoulder.

Invasive vegetation will be removed and restoration and enhancement plantings will be installed manually in the temporarily impacted buffer areas at the conclusion of the project. See Figure 4 for a site plan.

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.

Within Wetland D, pipeline installation will require approximately 200 cu. yd. of soil excavation for cut-and-cover installation, approximately 50 cu. yd. of excavation for an HDD entry or exit pit, and a small amount of additional grading in Wetland D in order to accommodate construction equipment. The pipeline trench in Wetland D will then be filled with approximately 25 cu. yd. of pipe bedding material from an approved borrow source. Graded areas immediately surrounding the HDD pit will be temporarily covered with gravel or a similar material to provide a suitable surface for construction equipment. These activities will result in temporary impacts to approximately 1,500 sq. ft. of Wetland D.

Within Drainage 3, which is just west of Wetland D, cut-and-cover pipeline installation will require approximately 425 cu. yd. of soil excavation, and fill of approximately 75 cu. yd. of fill, comprised of pipe bedding material from an approved borrow source. These activities will result in temporary impacts to approximately 900 sq. ft. of Drainage 3.

Within Drainage 1, which is adjacent to SE 35th Pl., cut-and-cover pipeline installation will require approximately 650 cu. yd. of soil excavation, and fill of approximately 100 cu. yd. of fill, comprised of pipe bedding material from an approved borrow source. These activities will result in temporary impacts to approximately 1,100 sq. ft. of Drainage 1.

For all cut-and-cover trenches, as well as the HDD pit within Wetland D, backfill will consist of native soil to the greatest extent possible, supplemented with clean fill from an approved borrow source as required. All excavated or graded areas within surface waters and Wetland D will be restored to previous grade at project completion.

Finally, approximately 4 cu. yd. of river cobbles will be placed by hand within approximately 90 sq. ft. of Drainage 2 at Heathfield Pump Station as part of restoration activities.

Imported fill material for the Vasa Creek habitat improvements will consist of approximately 10 cubic yards of streambed gravels (8 cubic

yards of 4-inch streambed cobble and 2 cubic yards of 10-inch streambed cobble). Approximately 20 cubic yards of excavated streambed material will be mixed with the imported materials and replaced over an area of approximately 650 square feet.

4) Will the proposal require surface water withdrawals or diversions? Give general description, purpose, and approximate quantities if known.

The project may require temporary surface water diversions around the area of work within Drainages 1, 1-1, 2, and 3. Surface water, if present in these drainages during construction activities, will be bypassed using methods such as temporary gravity piping, diversion ditches, or storage and pumping equipment. Construction activities for this segment of pipe installation will occur during the dry season, and the quantity of surface water to be diverted will be negligible if there are no rain events. Following cut-and-cover pipeline installation, Drainages 1, 1-1, and 3 will be restored to pre-construction flow conditions. Surface water flow in Drainage 2 will be restored after slope stabilization activities are complete.

No surface water will be diverted or withdrawn once construction is complete.

During the habitat improvements project at Vasa Creek, a stream bypass will be constructed using gravel bag dams to isolate and temporarily de-water the work area. This will be accomplished by constructing temporary gravel bag dams at the upstream and downstream ends of the work area. The gravel bag dam at the upstream end of the work area will temporarily divert the stream flow into a stream bypass pipe, allowing the stream to continue to flow while the work area remains dry. A temporary energy dissipator will be constructed at the downstream end of the bypass pipe, to minimize turbidity when the stream is released back into the streambed. Straw wattles will be used to minimize sediment movement. The gravel bags, stream bypass pipe, and straw wattles will be removed entirely upon completion of the project.

d. Proposed measures to reduce or control surface, ground, and runoff water, and drainage pattern impacts, if any:

The project will be constructed in accordance with applicable local, state and federal permits and government approvals, which will specify a range of measures designed to reduce or control potential surface, ground or runoff water impacts.

Erosion and sediment control BMPs will be used during construction to reduce and control stormwater runoff impacts. Examples of typical BMPs that could be

used during construction are presented in Section B.1.h above. Additional construction BMPs that could be implemented to prevent introduction of contaminants into surface or ground water during construction include:

- Storing fuels and other potential contaminants away from surface waters in secured containment areas
- Refueling construction equipment and vehicles away from surface waters whenever practicable
- Containing equipment, materials and vehicle wash water associated with construction and preventing it from draining into surface waters
- Conducting regular inspections, maintenance, and repairs of fuel hoses, hydraulically operated equipment, lubrication equipment, and chemical/petroleum storage containers
- Maintaining spill containment and clean up material at construction sites
- Establishing communication protocol for handling spills

Ground water discharged from the project area during construction will be treated and monitored to ensure that it meets water quality standards before it is discharged to the stormwater collection system or surface waters. Any contaminants removed during treatment will be disposed of at an approved disposal site.

The project will include the installation of stormwater management control measures on the pump station properties. These measures may include new stormwater retention and filtration facilities on the pump station properties, such as a raingarden, green roof, or engineered biofiltration system. Filter media, soils, and plantings in these facilities will settle, absorb and filter stormwater runoff prior to infiltration or conveyance to the stormwater collection system.

The project itself is a measure to prevent potential adverse impacts to Vasa Creek or Lake Sammamish. The purpose of the project is to increase the capacity and reliability of a critical wastewater conveyance system in order to meet growing demand driven by regional population growth. Exceeding the capacity of the Sunset and Heathfield system could result in the discharge of untreated wastewater to Vasa Creek (from Heathfield Pump Station) or Lake Sammamish (from Sunset Pump Station).

For habitat improvements at Vasa Creek, Best Management Practices will be used to reduce impacts to the stream. Any stormwater runoff from construction activities will be intercepted by installing temporary erosion and sediment control measures including silt fencing and straw wattles. Spill containment measures will be properly implemented, monitored and maintained. Soil disturbances will be minimized to the maximum extent possible and clearing limits will be clearly defined. Construction activities will occur during the dry season within WDFW's in-water work window. A temporary energy dissipator will be incorporated into the temporary stream bypass system to avoid turbidity.

Initial stream dewatering and stream re-introduction will be controlled to minimize release of sediments downstream.

The project does not require any groundwater withdrawals and no water will be discharged to groundwater.

4. Plants

b. What kind and amount of vegetation will be removed or altered?

Construction of the project will require clearing vegetation from landscaped areas as well as infrequently-maintained or unmaintained vegetated areas. Vegetation, predominantly non-native invasive Himalayan blackberry, will be cleared from up to 2,000 sq. ft. of wetland habitat. Up to 20,000 sq. ft. of wetland and stream buffers will be affected by vegetation removal, as well as approximately 300 sq. ft. of shoreline area.

Vegetation within the road rights-of-way (i.e., unpaved shoulders) of West Lake Sammamish Pkwy SE, SE 38th St., 164th Pl. SE, SE 35th Pl., and SE Eastgate Way, such as grasses, English ivy, and ornamental shrubs, may be cleared for pipeline installation activities. In addition, some trees within the road right-of-way or on private property adjacent to the road will need to be removed due to the proximity of their root systems to construction activities. Throughout the total project area, it is estimated that between 50 and 60 trees, ranging in size from 6 in. diameter to 40 in. diameter, may need to be removed for project construction.

With the exception of a 25-sq. ft. area adjacent to Heathfield Pump Station, which will contain the footprint of a new piece of supporting equipment, all vegetated areas throughout the project will be replanted.

During habitat improvements at Vasa Creek, Invasive species will be removed from approximately 1,600 square feet of existing adjacent stream buffer. The area will be restored and replanted with a variety of native plants upon completion of streambed improvements.

d. Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any:

The use of HDD pipe installation methods will allow the preservation of a stand of largely intact forest canopy on the south side of SE 38th St. Throughout the project area, "significant" trees, as defined by the City of Bellevue code as healthy trees at least eight in. in diameter, will be protected and not disturbed to the maximum extent practicable. Trees outside of construction areas will be protected to City of Bellevue tree protection standards. Examples of tree protection measures that will be implemented include the placement of steel

plates or thick mulch within the dripline of trees near construction areas, and installing fencing and signage around trees to be protected. Trees and other vegetation removed from the project area will be replaced and the sites restored in compliance with applicable City of Bellevue code standards.

On the Sunset Pump Station property, landscaped areas removed during construction will be replanted largely with native species that are well-adapted to shoreline environments. On the Heathfield Pump Station property, invasive plants such as English ivy, which currently dominate the Vasa Creek buffer area, will be removed and controlled in order to re-establish a native forest understory. In wetlands, wetland buffers, and drainages that will be temporarily impacted by the project, most of which are currently dominated by invasive species such as reed canarygrass and Himalayan blackberry, suitable native species will be replanted after construction is complete.

General vegetation preservation measures to be implemented during construction include:

- Limiting construction to minimum construction corridors through sensitive areas to lessen temporary impacts
- Minimizing the area of disturbance to the amount necessary for construction of project features
- Revegetating disturbed areas as soon as possible after grading is completed

Upon completion of streambed habitat improvements to Vasa Creek, the stream buffer will be restored and planted with a variety of native plants, including sword fern (Polystichum munitum), Pacific wax myrtle (Myrica californica), tall Oregon grape (Mahonia aquifolium), Nootka rose (Rosa nutkana), and snowberry (Symphoricarpos albus). Any invasive plant species in the project vicinity will be removed.

8. Land and Shoreline Use

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.

The project is located in an area that is largely residential. Sunset Pump Station is located adjacent to privately-owned Vasa Park Resort, which offers beach access, camping, and facility rental. SE Eastgate Way, where the new force main will terminate, is adjacent to the Interstate 90 highway. The remainder of the project area is surrounded by single-family residential development or small multi-family residential buildings. The project will not affect current land uses.

The site where the habitat improvements will be completed to Vasa Creek is within City of Bellevue ROW. The proposal will not affect current land uses on adjacent properties.

c. Describe any structures on the site.

The Sunset and Heathfield Pump Stations, and associated equipment such as standby generators, are the only existing structures that will be affected by the project. The new force main pipe will be installed primarily in City of Bellevue right-of-way, under paved roads and both paved and unpaved road shoulders. One of the force main crossings of Vasa Creek will be underneath a bridge that supports 164th Pl. SE, at a depth and alignment which will not affect the bridge. The other Vasa Creek crossing will be underneath a culvert carrying the creek, at a depth that will not affect the culvert.

Structures on the project site for the habitat improvements to Vasa Creek include the existing 164th Place SE bridge and abutments.

14. Transportation

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?

The completed project will generate approximately one vehicular trip a week, for King County staff to perform normal operation and maintenance activities, identical to current conditions.

Construction activities will include regular truck trips during working hours throughout construction. Based on the predicted volume of materials to be hauled, it is estimated that cut-and-cover pipe installation will require approximately 1,600 round-trip truck trips over a period of approximately four months, in order to transport spoils and fill material. Pipe installation using HDD and other trenchless methods will require approximately 120 round-trip truck trips over a period of approximately one month, in order to transport drilling spoils.

Following completion of the habitat improvements to Vasa Creek, approximately one vehicle will visit the site twice per month to monitor the establishment of vegetated areas.

C. SIGNATURE

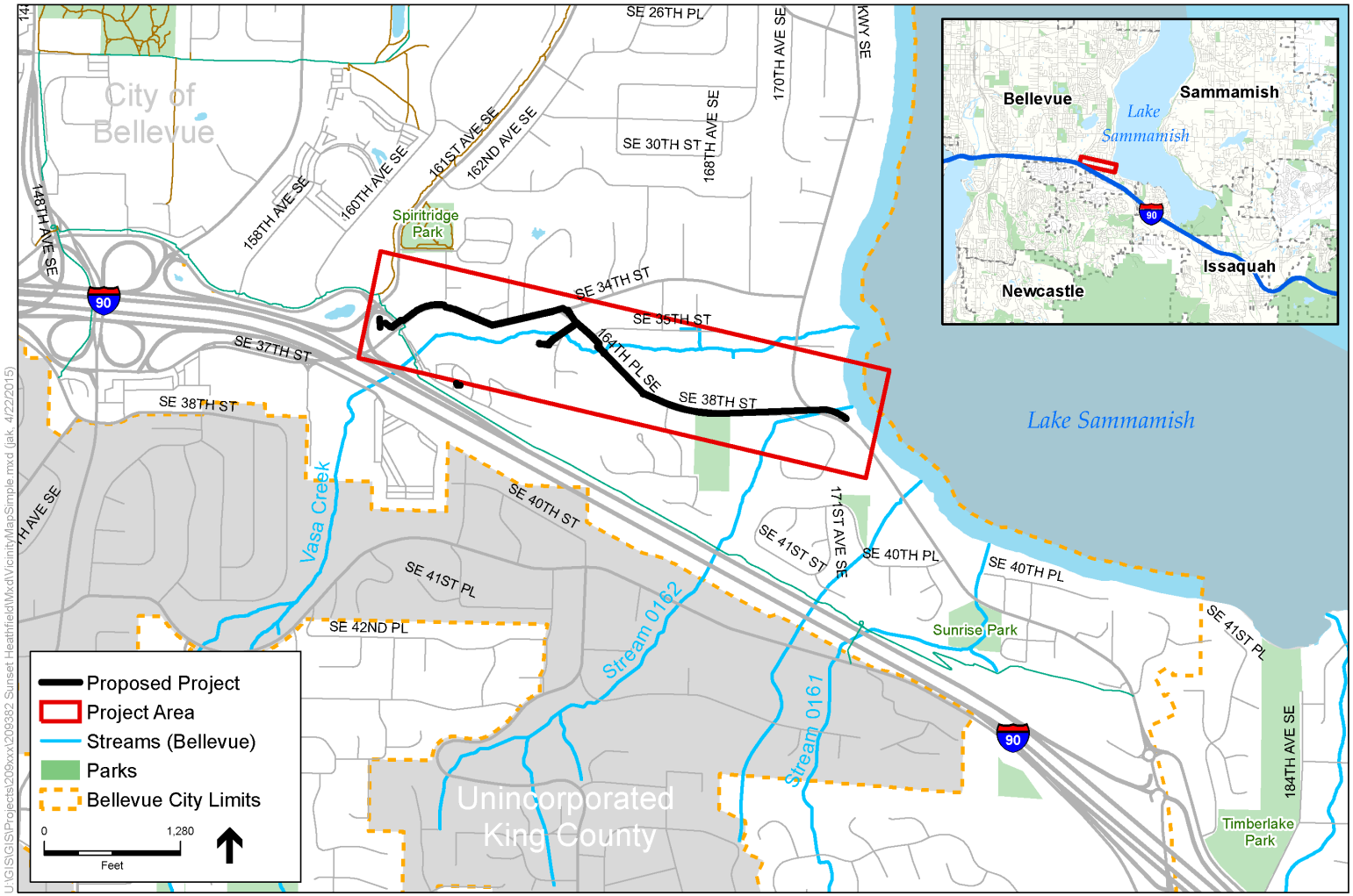
The above answers are true and complete to the best of my knowledge. I understand that the lead agency is relying on them to make its decision.

Signature: 

Katherine Fischer, Environmental Programs Managing Supervisor
Environmental and Community Services Section
King County Wastewater Treatment Division

Date Submitted: July 15, 2020

Figure 1. Vicinity map



SOURCE:
King County 2011; ESA 2015; City of Bellevue 2011; OSM 2014

Sunset Heathfield. 209382
Figure 1
Project Area and Vicinity Map

Figure 2. Alignment map.

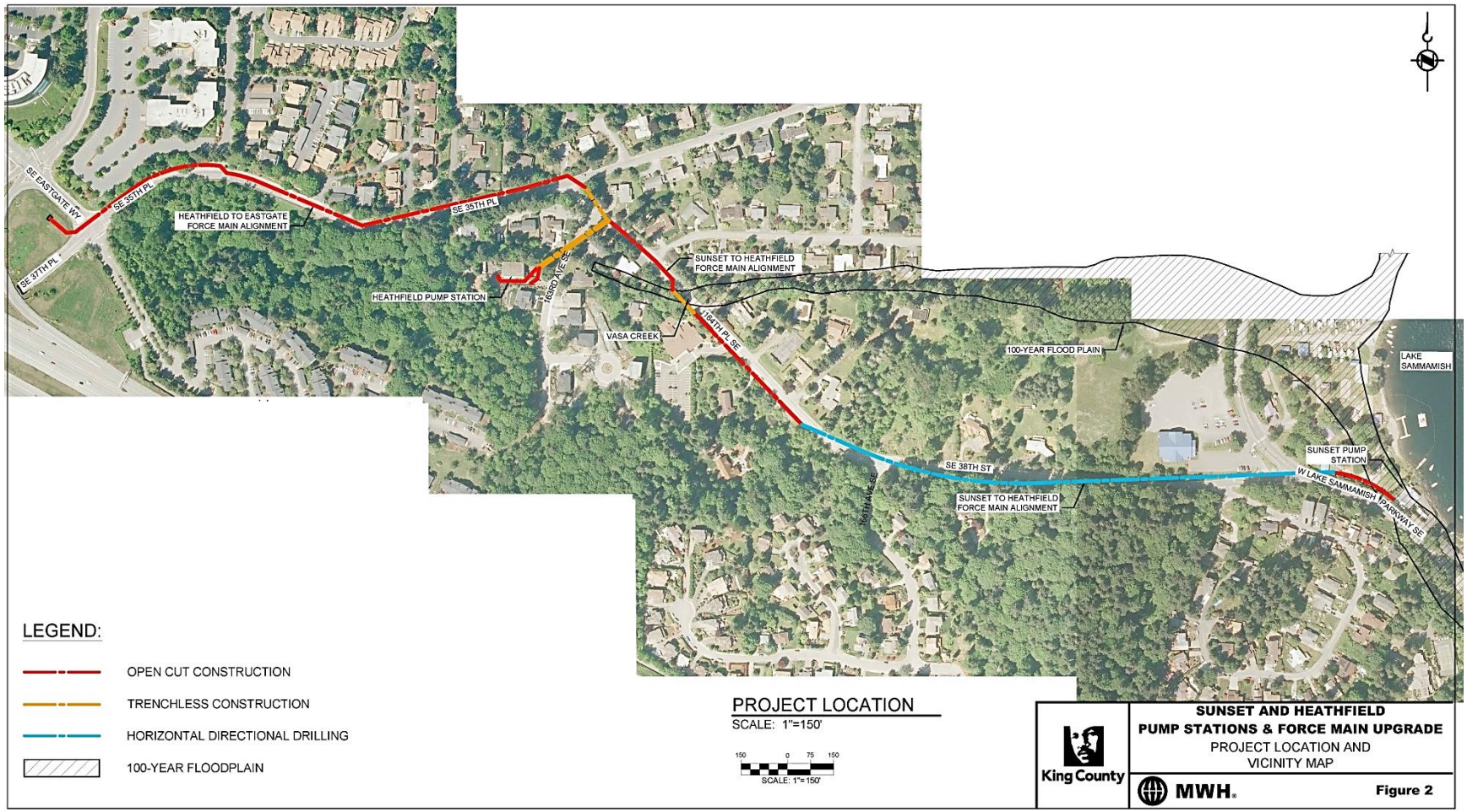
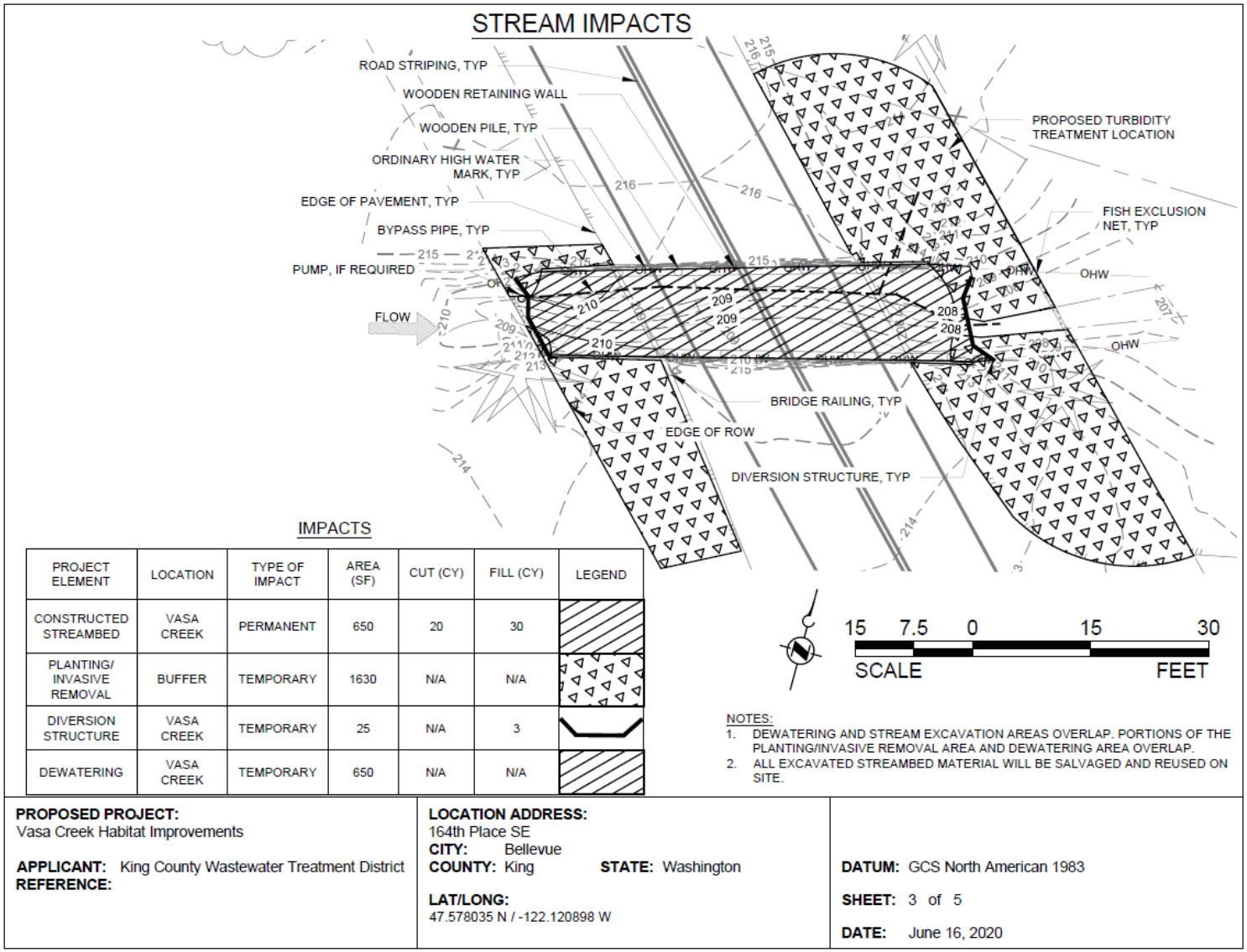


Figure 3. Vasa Creek Habitat Improvements Project Area

VICINITY MAP

Figure 4. Vasa Creek Habitat Improvements Site Plan



IMPACTS

PROJECT ELEMENT	LOCATION	TYPE OF IMPACT	AREA (SF)	CUT (CY)	FILL (CY)	LEGEND
CONSTRUCTED STREAMBED	VASA CREEK	PERMANENT	650	20	30	
PLANTING/ INVASIVE REMOVAL	BUFFER	TEMPORARY	1630	N/A	N/A	
DIVERSION STRUCTURE	VASA CREEK	TEMPORARY	25	N/A	3	
DEWATERING	VASA CREEK	TEMPORARY	650	N/A	N/A	

PROPOSED PROJECT:
Vasa Creek Habitat Improvements

APPLICANT: King County Wastewater Treatment District
REFERENCE:

LOCATION ADDRESS:
164th Place SE
CITY: Bellevue
COUNTY: King **STATE:** Washington

LAT/LONG:
47.578035 N / -122.120898 W

DATUM: GCS North American 1983

SHEET: 3 of 5

DATE: June 16, 2020

SUNSET AND HEATHFIELD PUMP STATIONS AND FORCE MAIN UPGRADE

CONTRACT NO 6153355

VASA CREEK HABITAT IMPROVEMENTS

FINAL PLANS

JUNE 2020

KING COUNTY
Department of
Natural Resources and Parks
Wastewater Treatment Division

GENERAL NOTES:

1. WORK SHALL CONFORM TO ALL LOCAL, STATE AND FEDERAL LAWS AND REGULATIONS AND PERMITS ISSUED FOR THE PROJECT. CONTRACTOR SHALL HAVE A COPY OF ALL PERMITS ONSITE AT ALL TIMES AND COMPLY WITH ALL CONDITIONS STIPULATED IN THE PERMITS.

2. CONTRACTOR SHALL HAVE COPIES OF THE APPROVED PLANS AND SPECIFICATIONS ON SITE AND READILY AVAILABLE AT ALL TIMES.

3. PRIOR TO ANY GROUND DISTURBANCE, CONTRACTOR SHALL LOCATE ALL UNDERGROUND AND OVERHEAD UTILITIES IN ACCORDANCE WITH STATE LAW. CONTRACTOR IS RESPONSIBLE FOR PROTECTING ALL UTILITIES AND ADJACENT INFRASTRUCTURE FROM DAMAGE DURING CONSTRUCTION.

4. PROJECT COORDINATE SYSTEM:
   HORIZONTAL DATUM: NORTH AMERICAN DATUM OF 1983 (NAD83) WASHINGTON STATE PLANE NORTH, US SURVEY FEET.

   VERTICAL DATUM: METRO (TO CONVERT FROM METRO TO NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88), SUBTRACT 96.43 FT FROM METRO ELEVATION.)

5. FEATURES AND TOPOGRAPHY SURVEYED BY TRUE NORTH LAND SURVEYING, JULY 2014. STREAM CHANNEL TOPOGRAPHY IS LIKELY TO HAVE CHANGED SINCE THIS SURVEY WAS PERFORMED. AREA BENEATH THE BRIDGE IS NOT SURVEYED. ELEVATIONS ARE APPROXIMATE FROM ESA FIELD MEASUREMENTS APRIL 2019.

6. ACCESS TO THE SITE IS ON PUBLIC ROADS. CONTRACTOR SHALL COORDINATE WITH THE CITY OF BELLEVUE FOR APPROVED HAUL ROUTES AND TRAFFIC PERMITS AND APPROVALS.

7. 164TH PLACE SE SHALL REMAIN OPEN DURING CONSTRUCTION. SINGLE LANE CLOSURE ONLY.

8. CONTRACTOR SHALL CONFINE CONSTRUCTION OPERATION TO WITHIN THE PUBLIC RIGHT-OF-WAY ONLY UNLESS OTHERWISE SPECIFIED.

9. EROSION AND SEDIMENT CONTROL SHALL COMPLY WITH ALL APPLICABLE LAWS AND REGULATIONS. THE CONTRACTOR SHALL ADOPT THE PROVIDED TEMPORARY EROSION AND SEDIMENT CONTROL PLAN (TESC) OR PREPARE AN ALTERNATIVE.

10. THE CONTRACTOR IS RESPONSIBLE FOR ALL WATER MANAGEMENT THROUGHOUT CONSTRUCTION, INCLUDING DEWATERING AND DRAINAGE. THE CONTRACTOR SHALL PROVIDE CONTINUOUS STREAM DIVERSION AND DEWATERING IN ACCORDANCE WITH THE PLANS, SPECS, AND PERMIT CONDITIONS. THE CONTRACTOR SHALL INSTALL A TEMPORARY STREAM DIVERSION SYSTEM BEFORE COMMENCING WORK BELOW THE ORDINARY HIGH WATER MARK OF VASA CREEK.

11. ALL WORK BELOW THE ORDINARY HIGH WATER ELEVATION SHALL BE COMPLETED DURING THE IN-WATER WORK PERIOD SPECIFIED BY PERMIT CONDITIONS.

12. INVASIVE SPECIES MANAGEMENT: FOR PROJECT THAT INCLUDES WORK AROUND LAKES, STREAMS, STREAMBANKS, OR WETLANDS, THE FOLLOWING PROTOCOLS WILL APPLY:
    NEW ZEALAND MUDSNAILS (POTAMOPYRGUS ANTIPODARUM) HAVE BEEN DETECTED IN STREAMS WITHIN THE CITY OF BELLEVUE. TO PREVENT THE SPREAD OF THIS INVASIVE SPECIES IN ACCORDANCE WITH RCW 77.135 AND 77.15.811, ALL STREAM PROJECTS SHALL MEET THE FOLLOWING REQUIREMENTS:
    - CONTRACTORS SHALL ENSURE THAT ALL EQUIPMENT IS CLEAN AND DECONTAMINATED OF ANY POTENTIAL INVASIVE SPECIES PRIOR AND AFTER WORKING IN BELLEVUE STREAMS. EQUIPMENT WITH MUD OR DEBRIS SHALL NOT BE ALLOWED TO BE DEPLOYED.
    - WORKERS SHALL FOLLOW THE PROCEDURES IN THE WASHINGTON DEPARTMENT OF FISH AND WILDLIFE INVASIVE SPECIES MANAGEMENT PROTOCOLS. VERSION 2 - NOVEMBER 12 (OR THE LATEST VERSION OF THIS DOCUMENT).
    - ALL EQUIPMENT SHALL BE QUARANTINED IN AN AREA WHERE MUD, DEBRIS, OR WATER CANNOT BE TRACKED INTO OTHER STREAMS OR STORM DRAINAGE CATCH BASINS.
    - ALL EQUIPMENT SHALL BE BRUSHED OR SPRAYED ON-SITE SO NO INVASIVE SPECIES CAN BE DISLODGED DURING TRANSPORT PRIOR TO FULL DECONTAMINATION. THE ON-SITE CLEANING SHALL OCCUR IN A WAY THAT MUD, DEBRIS, OR WATER CANNOT BE TRACKED INTO OTHER STREAMS OR STORM DRAINAGE CATCH BASINS. ALL EQUIPMENT SHALL BE DECONTAMINATED AT A SITE THAT DRAINS TO WASTEWATER (SUCH AS A COMMERCIAL CAR WASH) PRIOR TO USE IN OTHER STREAM PROJECTS.

13. THIS PROJECT INCLUDES INSTALLATION OF CONSTRUCTED STREAMBED UNDERNEATH A LOW CLEARANCE BRIDGE (APPROX. 4.5 FEET OF CLEARANCE). EQUIPMENT ACCESS MAY BE CHALLENGING, AND HAND WORK MAY BE REQUIRED.

14. ALL EXCESS MATERIAL SHALL BE REMOVED FROM THE SITE UPON COMPLETION OF THE PROJECT AND TAKEN TO A PERMITTED FACILITY.

15. IF AREAS OR FEATURES OUTSIDE DESIGNATED CONSTRUCTION ZONES SUSTAIN IMPACT FROM CONTRACTOR ACTIVITIES, CONTRACTOR SHALL RESTORE TO PRE-CONSTRUCTION CONDITION.

16. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ADEQUATE SAFEGUARDS, SAFETY DEVICES, PROTECTIVE EQUIPMENT, FLAGGERS, AND ANY OTHER NEEDED ACTIONS TO PROTECT THE LIFE, HEALTH, AND SAFETY OF THE PUBLIC, AND TO PROTECT PROPERTY IN CONNECTION WITH THE PERFORMANCE OF WORK COVERED BY THE CONTRACTOR.

17. VASA CREEK RIPARIAN BUFFER IS 100 FEET. THE ENTIRE PROJECT AREA IS WITHIN THE RIPARIAN BUFFER.

811
KNOW WHAT'S BELOW.
CALL 2 BUSINESS DAYS
BEFORE YOU DIG.
(UTILITY LOCATIONS ARE APPROX.)

VICINITY MAP

SHEET LIST

UTILITIES NOTES:

1. BURIED, OVERHEAD, AND EXPOSED UTILITIES ARE PRESENT ON THE SITE. THE CONTRACTOR IS RESPONSIBLE FOR LOCATING AND PROTECTING OR RESTORING ALL UTILITIES.

2. UTILITY LOCATIONS AND DESCRIPTIONS SHOWN ON PLANS HAVE BEEN COMPILED FROM AVAILABLE RECORDS AND/OR FIELD SURVEY. CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFICATION OF LOCATION AND DEPTH OF ALL EXISTING UTILITIES WITHIN THE CONSTRUCTION ZONE PRIOR TO BEGINNING CONSTRUCTION AND COORDINATION WITH UTILITY OWNERS TO PROTECT IN PLACE OR RESTORE UPON COMPLETION.

LEGAL DESCRIPTION:

THE PROJECT OCCURS ENTIRELY IN THE RIGHT-OF-WAY OF 164TH PLACE SE.

LEGEND:

- DECIDUOUS TREE
- CONIFEROUS TREE
- WOODEN PILE
- STORM WATER MANHOLE
- CONTROL POINT
- G — GAS LINE
- GUARDRAIL
- W — WATER LINE
- FM — SEWER FORCE MAIN LINE
- OT — OVERHEAD TRANSMISSION LINE
- T — UNDERGROUND TRANSMISSION LINE
- OP — OVERHEAD POWER LINE
- P — UNDERGROUND POWER LINE
- EDGE OF PAVEMENT
- X — FENCE
- EDGE OF RIGHT-OF-WAY
- PROPERTY LINE
- OHW — ORDINARY HIGH WATER
- (E) TOP OF BANK
- (E) LOW FLOW CHANNEL TOP OF BANK
- (N) TOP OF BANK
- (N) TOE OF BANK
- (N) CHANNEL CENTER LINE
- DIVERSION PIPE
- (E) MAJOR CONTOUR
- (E) MINOR CONTOUR
- (N) MAJOR CONTOUR
- (N) MINOR CONTOUR
- STREAMBED SEDIMENT
- EXISTING PAVEMENT
- FISH EXCLUSION NETTING
- ACCESS ROUTE
- STAGING AREA/GEOTEXXTILE
- STRAW WATTLES
- HVSF — HIGH VISIBILITY SILT FENCING
- 100YR — 100 YEAR FLOODPLAIN
- CG — CLEARING AND GRUBBING LIMIT

ABBREVIATIONS:

CG	CLEARING AND GRUBBING
CSWPPP	CONSTRUCTION STORMWATER POLLUTION PREVENTION PLAN
(E)	EXISTING
(N)	NEW
APPROX	APPROXIMATE
E	EAST / EASTING
EG	EXISTING GRADE
EL	ELEVATION
EX	EXISTING
FG	FINISH GRADE
FM	FORCE MAIN
FOD	FIBER OPTIC DUCT
FT	FOOT/FEET
G	GAS
GAL	GALLON
HVF	HIGH VISIBILITY FENCING
MIN	MINIMUM
N	NORTH / NORTHING
NTS	NOT TO SCALE
OC	ON CENTER
OHW	ORDINARY HIGH WATER
OP	OVERHEAD POWERLINE
OT	OVERHEAD TRANSMISSION LINE
P	POWER
PIP	PROTECT IN PLACE
ROW	RIGHT OF WAY
S	SEWER
SD	STORM DRAIN
SE	SOUTH EAST
SF	SQUARE FEET/SILT FENCE
STA	STATION
SS	SANITARY SEWER
T	TELECOMMUNICATION
TESC	TEMPORARY EROSION AND SEDIMENT CONTROL
TYP	TYPICAL
W	WATER
WDFW	WASHINGTON DEPARTMENT OF FISH AND WILDLIFE

NO	REVISION DESCRIPTION	BY	APVD	DATE

ESA
5309 SHILSHOLE AVE. NW,
STE. 200
SEATTLE, WA 98107
OFFICE - 206.789.9658
WWW.ESASSOC.COM

ELEANOR S. BARTOLOMEO — STATE OF WASHINGTON — REGISTERED PROFESSIONAL ENGINEER
6/16/2020

DESIGNED/DRAWN: A. FLOOR	SCALE: AS NOTED
PROJECT ENGINEER: E. BARTOLOMEO	REFERENCE 0 1"
DESIGN APPROVAL: J. SHEPPARD	FACILITY NUMBER: N/A
PROJECT ACCEPTANCE: A. GROTHE	CONTRACT NO: 6153355

King County

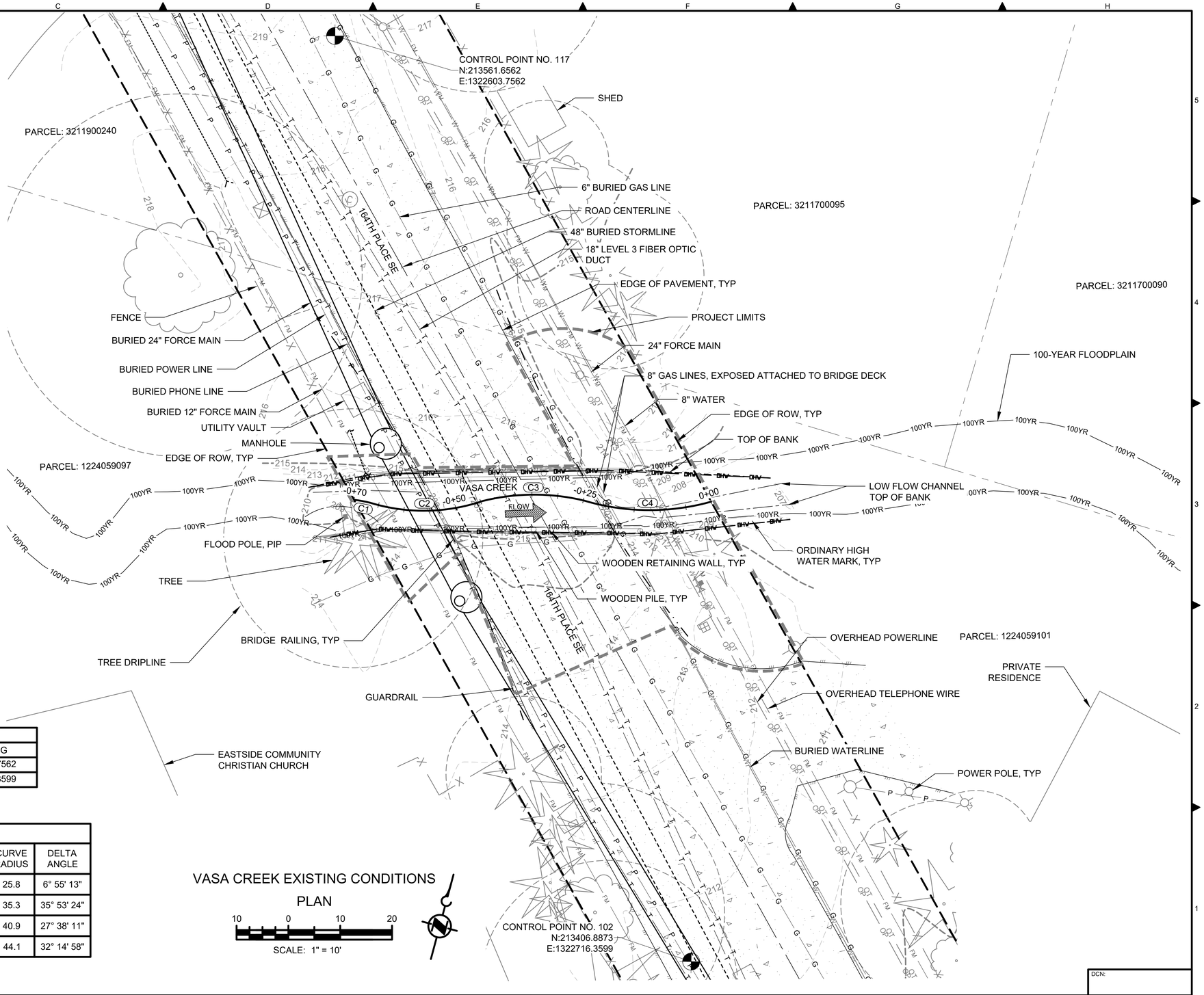
DEPARTMENT OF NATURAL RESOURCES & PARKS
WASTEWATER TREATMENT DIVISION
SUNSET AND HEATHFIELD PUMP STATIONS
AND FORCE MAIN UPGRADE

NOTES & LEGEND

DCN:
DATE: JUNE 2020
PROJECT FILE NO: 1038122
DRAWING NO: G102
SHT NO / TOTAL: 2 / 8
REV NO: 0

NOTES:

1. FEATURES AND TOPOGRAPHY SURVEYED BY TRUE NORTH LAND SURVEYING, JULY 2014. STREAM CHANNEL TOPOGRAPHY IS LIKELY TO HAVE CHANGED SINCE THIS SURVEY WAS PERFORMED. AREA BENEATH THE BRIDGE IS NOT SURVEYED. ELEVATIONS ARE APPROXIMATE FROM ESA FIELD MEASUREMENTS APRIL 2019.
2. BRIDGE IS PILE SUPPORTED. PILE DEPTH IS UNKNOWN.
3. VASA CREEK RIPARIAN BUFFER IS 100 FEET AND IS OUTSIDE OF THE PLAN VIEW AREA. THE ENTIRE PROJECT AREA IS WITHIN THE RIPARIAN BUFFER.
4. SEE SHEET G102 FOR UTILITIES NOTES.



CONTROL POINT TABLE				
POINT NUMBER	ELEVATION	DESCRIPTION	NORTHING	EASTING
NO. 117	218.60	MAG NAIL W/WASHER	213561.6562	1322603.7562
NO. 102	211.44	MAG NAIL W/WASHER	213406.8873	1322716.3599

ALIGNMENT CONTROL TABLE									
SEGMENT	BEGIN STATION	END STATION	BEGIN EASTING	BEGIN NORTHING	LINE BEARING	LINE DISTANCE	CURVE DISTANCE	CURVE RADIUS	DELTA ANGLE
C1	-0+70	-0+67	1,322,630.5	213,476.1	---	---	3.1	25.8	6° 55' 13"
C2	-0+67	-0+45	1,322,633.6	213,476.4	---	---	22.1	35.3	35° 53' 24"
C3	-0+45	-0+25	1,322,654.5	213,482.4	---	---	19.7	40.9	27° 38' 11"
C4	-0+25	0+00	1,322,673.4	213,487.5	---	---	24.8	44.1	32° 14' 58"

VASA CREEK EXISTING CONDITIONS
PLAN
10 0 10 20
SCALE: 1" = 10'

NO	REVISION DESCRIPTION	BY	APVD	DATE

ESA
5309 SHILSHOLE AVE. NW,
STE. 200
SEATTLE, WA 98107
OFFICE - 206.789.9658
WWW.ESASSOC.COM

ELEANOR S. BARTOLOMEO — STATE OF WASHINGTON — REGISTERED PROFESSIONAL ENGINEER
5/16/2020

DESIGNED/DRAWN: A. FLOOR	SCALE: AS NOTED
PROJECT ENGINEER: E.BARTOLOMEO	REFERENCE 0 1"
DESIGN APPROVAL: J. SHEPPARD	FACILITY NUMBER: N/A
PROJECT ACCEPTANCE: A. GROTHE	CONTRACT NO: 6153355

King County

DEPARTMENT OF NATURAL RESOURCES & PARKS
WASTEWATER TREATMENT DIVISION
SUNSET AND HEATHFIELD PUMP STATIONS AND FORCE MAIN UPGRADE

EXISTING CONDITIONS & SITE SURVEY CONTROL

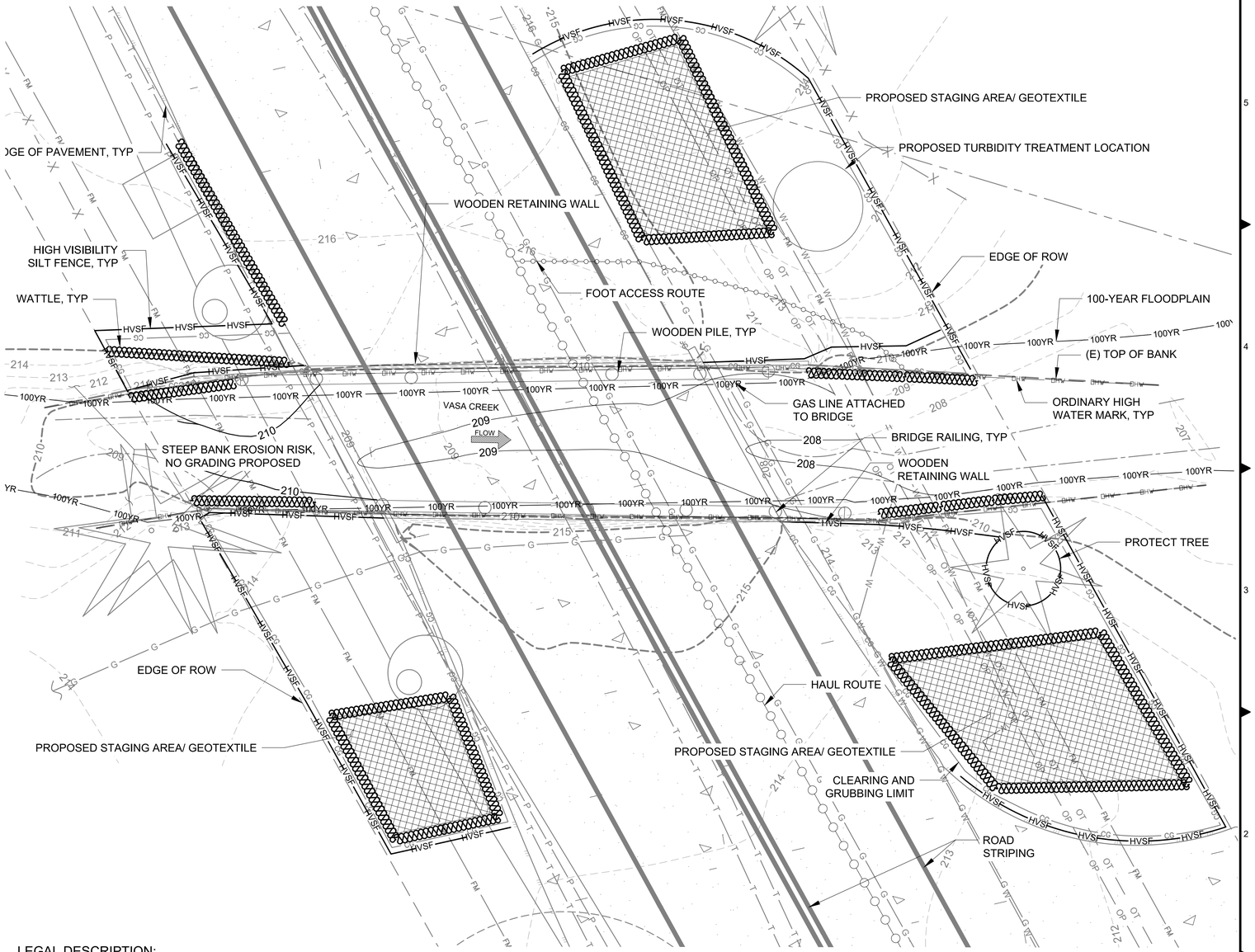
DCN:
DATE: JUNE 2020
PROJECT FILE NO: 1038122
DRAWING NO: G103
SHT NO 3 / TOTAL 8
REV NO: 0

CITY OF BELLEVUE STANDARD EROSION CONTROL NOTES:

1. CSWPPP AND TESC PLAN PREPARED BY ENVIRONMENTAL SCIENCE ASSOCIATES, SEATTLE. 206-789-9658
2. CSWPPP AND TESC PLAN TO BE IMPLEMENTED AND ALL BMPS MAINTAINED BY THE CONTRACTOR (CONTACT TBD).
3. 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 (DSD) 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 COB.
4. 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, RESTRICTORS, CHANNELS, RETENTION FACILITIES, UTILITIES, ETC.).
5. 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.
6. THE IMPLEMENTATION OF THESE ESC PLANS AND THE CONSTRUCTION, MAINTENANCE, REPLACEMENT, AND UPGRADING OF THESE ESC FACILITIES IS THE RESPONSIBILITY OF THE CONTRACTOR UNTIL ALL CONSTRUCTION IS COMPLETED AND APPROVED AND VEGETATION/LANDSCAPING IS ESTABLISHED.
7. 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 ENSURE THAT SEDIMENT AND SEDIMENT LADEN WATER DO NOT ENTER THE DRAINAGE SYSTEM, ROADWAYS, OR VIOLATE APPLICABLE WATER STANDARDS.
8. 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.
9. 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.
10. 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 CONTRACTOR FOR THE DURATION OF CONSTRUCTION.
11. 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 1ST THROUGH APRIL 30TH. FROM MAY 1ST THROUGH SEPTEMBER 30TH, EXPOSED SOILS MUST BE COVERED AT THE END OF EACH CONSTRUCTION WEEK AND AT THE THREAT OF RAIN.
12. 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. (NOTE - NO KNOWN CATCH BASINS ARE PRESENT ON SITE.)
13. STABILIZED CONSTRUCTION ENTRANCES SHALL BE INSTALLED AT THE BEGINNING OF CONSTRUCTION AND MAINTAINED FOR THE DURATION OF THE PROJECT, IF REQUIRED.
14. 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.
15. THE ESC FACILITIES SHALL BE INSPECTED DAILY BY THE APPLICANT/CONTRACTOR AND MAINTAINED AS NECESSARY TO ENSURE THEIR CONTINUED FUNCTIONING.
16. 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 AND GRADING INSPECTOR AT LEAST 24 HOURS IN ADVANCE OF ANY STOCKPILING.
17. 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.
18. FINAL SITE GRADING MUST DIRECT DRAINAGE AWAY FROM ALL BUILDING STRUCTURES AT A MINIMUM 5% SLOPE, PER THE INTERNATIONAL RESIDENTIAL CODE (IRC) R401.

PROJECT TESC NOTES:

1. INSTALL HIGH VISIBILITY SILT FENCE PER WSDOT STANDARD PLAN I-30.17-01 AND CITY OF BELLEVUE BMP C103 AND C233.
2. INSTALL WATTLES PER WSDOT STANDARD PLAN I-30.30-02 AND CITY OF BELLEVUE BMP C235.
3. PRESERVE AND PROTECT IN PLACE ALL TREES AND VEGETATION NOT DESIGNATED FOR REMOVAL PER CITY OF BELLEVUE BMP C101.
4. PROTECT TREES WITHIN THE LIMITS OF WORK PER CITY OF BELLEVUE BMP T101.
5. APPLY COMPOST AND MULCH TO DISTURBED AREAS OUTSIDE OF OHW PER CITY OF BELLEVUE BMPS C120 & C121. SEE SHEET L101.
6. ACCESS SHALL BE VIA 164TH PLACE SE. STREETS SHALL BE SWEPT AS NEEDED TO CONTROL DUST PER CITY OF BELLEVUE BMP C140.
7. VASA CREEK RIPARIAN BUFFER IS 100 FEET. THE BUFFER LIMIT IS OUTSIDE OF THE PLAN VIEW AREA. THE ENTIRE PROJECT AREA IS WITHIN THE BUFFER.
8. CONTRACTOR SHALL REMOVE ALL LOOSE DIRT FROM TRUCKS AND EQUIPMENT BEFORE IT LEAVES THE STAGING AREA. NO SEDIMENT TRACKING IS PERMITTED.



LEGAL DESCRIPTION:

THE PROJECT OCCURS ENTIRELY IN THE RIGHT-OF-WAY OF 164TH PLACE SE.

TEMPORARY EROSION CONTROL PLAN

5 0 5 10

SCALE: 1" = 5'

NO	REVISION DESCRIPTION	BY	APVD	DATE

ESA
5309 SHILSHOLE AVE. NW,
STE. 200
SEATTLE, WA 98107
OFFICE - 206.789.9658
WWW.ESASSOC.COM

ELEANOR S. BARTOLOMEO — STATE OF WASHINGTON — REGISTERED PROFESSIONAL ENGINEER — 6/16/2020

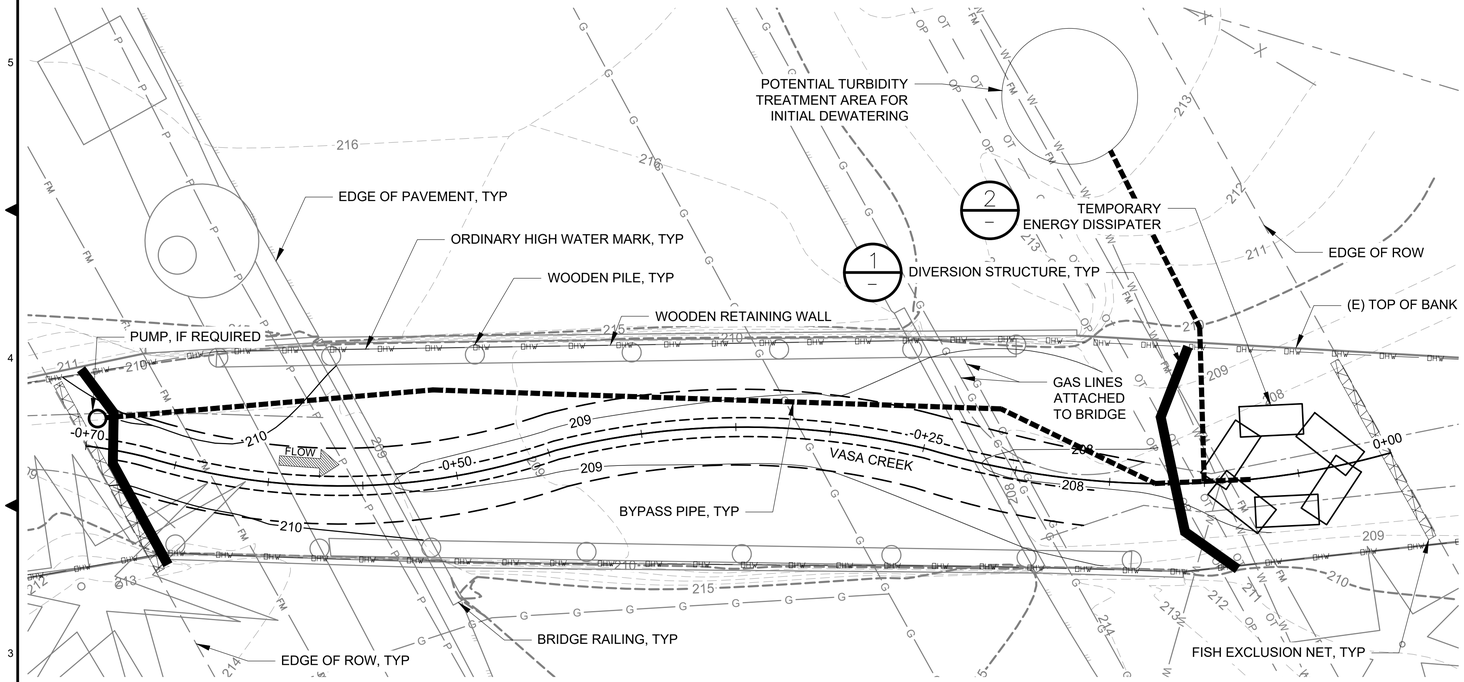
DESIGNED/DRAWN: E.BARTOLOMEO	SCALE: AS NOTED
PROJECT ENGINEER: E.BARTOLOMEO	REFERENCE 0 1"
DESIGN APPROVAL: J. SHEPPARD	FACILITY NUMBER: N/A
PROJECT ACCEPTANCE: A. GROTHE	CONTRACT NO: 6153355

King County

DEPARTMENT OF NATURAL RESOURCES & PARKS
WASTEWATER TREATMENT DIVISION
SUNSET AND HEATHFIELD PUMP STATIONS
AND FORCE MAIN UPGRADE

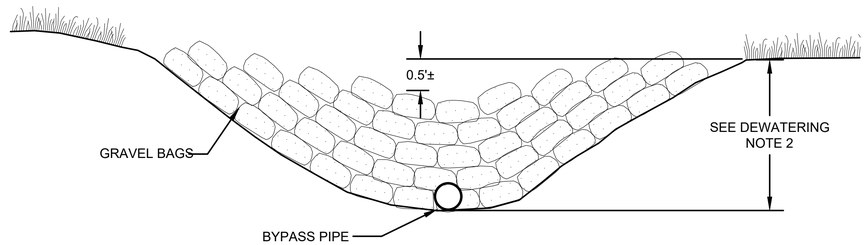
EROSION CONTROL PLAN

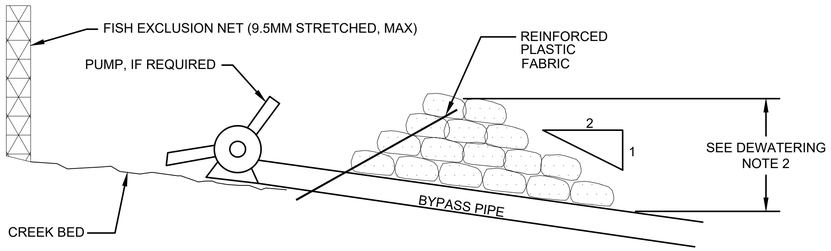
DCN:
DATE: JUNE 2020
PROJECT FILE NO: 1038122
DRAWING NO: G104
SHT NO / TOTAL: 4 / 8
REV NO: 0



DEWATERING PLAN

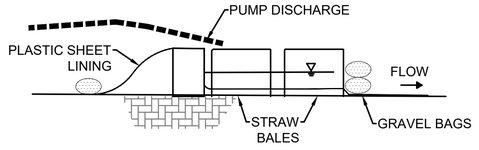
SCALE: 1" = 4'

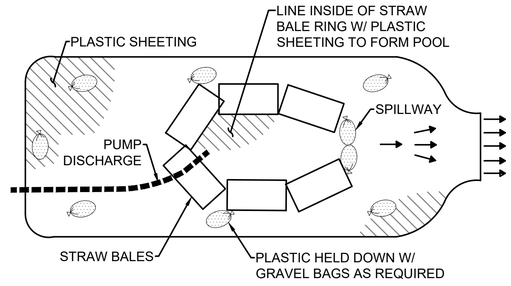




DIVERSION STRUCTURE

DETAIL 1 / SCALE: NTS





TEMPORARY ENERGY DISSIPATER

DETAIL 2 / SCALE: NTS

DEWATERING NOTES:

1. THE CONTRACTOR SHALL PREPARE AND SUBMIT A TEMPORARY STREAM DIVERSION PLAN FOR REVIEW BY THE PROJECT REPRESENTATIVE. THE CONTRACTOR SHALL NOT WORK WITHIN THE OHW OF VASA CREEK WITHOUT AN APPROVED TEMPORARY STREAM DIVERSION PLAN, PER SPECIFICATIONS.
2. THE DIVERSION STRUCTURES SHALL BE HIGH ENOUGH TO PREVENT OVERTOPPING AND ALLOW ENOUGH FREEBOARD FOR INCLEMENT WATER CONDITIONS. STRUCTURE HEIGHTS AND MATERIALS SHALL BE INCLUDED IN THE CONTRACTORS TEMPORARY STREAM DIVERSION PLAN. GRAVEL BAGS USED IN DIVERSION STRUCTURES SHALL BE FILLED WITH ROUNDED AGGREGATE INSTEAD OF SAND.
3. THE DIVERSION SYSTEM SHALL BE CAPABLE OF HANDLING THE EXPECTED FLOWS IN VASA CREEK DURING THE CONSTRUCTION PERIOD. FOR REFERENCE, THE 100-YEAR FLOW AT THE PROJECT SITE IS 15 CFS, AND THE 2-YEAR FLOW IS 5 CFS, PER THE CITY OF BELLEVUE FLOOD STUDY. THE CONTRACTOR SHALL ENSURE THAT THE DIVERSION SYSTEM SIZE CAN HANDLE THE 2-YEAR FLOWS AS A MINIMUM.
4. ALL DEWATERING PUMPS SHALL HAVE WDFW-APPROVED FISH SCREENS INSTALLED AND MAINTAINED PER RCW 77.57.010 AND RCW 77.57.070. ADDITIONALLY, FISH EXCLUSION NETTING SHALL BE INSTALLED UPSTREAM AND DOWNSTREAM OF THE ISOLATED WORK AREA. THE MINIMUM OPEN AREA FOR ALL TYPES OF FISH SCREENS IS 27%. THE SCREENED INTAKE FACILITY MUST HAVE ENOUGH SURFACE AREA TO ENSURE THAT THE VELOCITY THROUGH THE SCREEN IS LESS THAN 0.4 FEET PER SECOND.
5. FISH AND AQUATIC ORGANISM REMOVAL SHALL BE CONDUCTED PRIOR TO DEWATERING THE WORK AREA. FISH AND AQUATIC ORGANISMS WILL BE TEMPORARILY RELOCATED AS DIRECTED BY THE PROJECT REPRESENTATIVE.
6. ALL WORK WITHIN ORDINARY HIGH WATER OF VASA CREEK SHALL OCCUR DURING THE APPROVED IN-WATER WORK WINDOW PER PERMIT.
7. INVASIVE SPECIES MANAGEMENT: FOR PROJECT THAT INCLUDES WORK AROUND LAKES, STREAMS, STREAMBANKS, OR WETLANDS, THE FOLLOWING PROTOCOLS WILL APPLY:
   NEW ZEALAND MUDSNAILS (POTAMOPYRGUS ANTIPODARUM) HAVE BEEN DETECTED IN STREAMS WITHIN THE CITY OF BELLEVUE. TO PREVENT THE SPREAD OF THIS INVASIVE SPECIES IN ACCORDANCE WITH RCW 77.135 AND 77.15.811, ALL STREAM PROJECTS SHALL MEET THE FOLLOWING REQUIREMENTS:
   - CONTRACTORS SHALL ENSURE THAT ALL EQUIPMENT IS CLEAN AND DECONTAMINATED OF ANY POTENTIAL INVASIVE SPECIES PRIOR AND AFTER WORKING IN BELLEVUE STREAMS. EQUIPMENT WITH MUD OR DEBRIS SHALL NOT BE ALLOWED TO BE DEPLOYED.
   - WORKERS SHALL FOLLOW THE PROCEDURES IN THE WASHINGTON DEPARTMENT OF FISH AND WILDLIFE INVASIVE SPECIES MANAGEMENT PROTOCOLS. VERSION 2 - NOVEMBER 12 (OR THE LATEST VERSION OF THIS DOCUMENT).
   - ALL EQUIPMENT SHALL BE QUARANTINED IN AN AREA WHERE MUD, DEBRIS, OR WATER CANNOT BE TRACKED INTO OTHER STREAMS OR STORM DRAINAGE CATCH BASINS.
   - ALL EQUIPMENT SHALL BE BRUSHED OR SPRAYED ON-SITE SO NO INVASIVE SPECIES CAN BE DISLODGED DURING TRANSPORT PRIOR TO FULL DECONTAMINATION. THE ON-SITE CLEANING SHALL OCCUR IN A WAY THAT MUD, DEBRIS, OR WATER CANNOT BE TRACKED INTO OTHER STREAMS OR STORM DRAINAGE CATCH BASINS. ALL EQUIPMENT SHALL BE DECONTAMINATED AT A SITE THAT DRAINS TO WASTEWATER (SUCH AS A COMMERCIAL CAR WASH) PRIOR TO USE IN OTHER STREAM PROJECTS.
8. TURBIDITY LEVELS AT DISCHARGE MUST MEET ALL APPLICABLE PERMIT REQUIREMENTS. TURBIDITY TREATMENT SHALL BE CONTRACTOR DESIGNED AND DETAILED IN THE CONTRACTOR'S TEMPORARY STREAM DIVERSION PLAN. DEWATERING WATER MAY NOT BE DISCHARGED TO STORM OR SANITARY SEWERS SYSTEMS WITHOUT APPROPRIATE PERMITS. NO AREAS SUITABLE FOR INFILTRATION ARE PRESENT ON SITE.
9. THE CONTRACTOR SHALL INTRODUCE WATER TO THE NEW STREAM CHANNEL SECTION AND TRAP SEDIMENTS UNTIL THE STREAM SECTION IS FULLY REWATERED. REWATERING SHALL OCCUR AT A RATE TO AVOID LOSS OF SURFACE WATER DOWNSTREAM WHILE THE NEW CHANNEL IS REWATERED.

NO	REVISION DESCRIPTION	BY	APVD	DATE

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ELEANOR S. BARTOLOMEO — STATE OF WASHINGTON — REGISTERED PROFESSIONAL ENGINEER — 6/16/2020

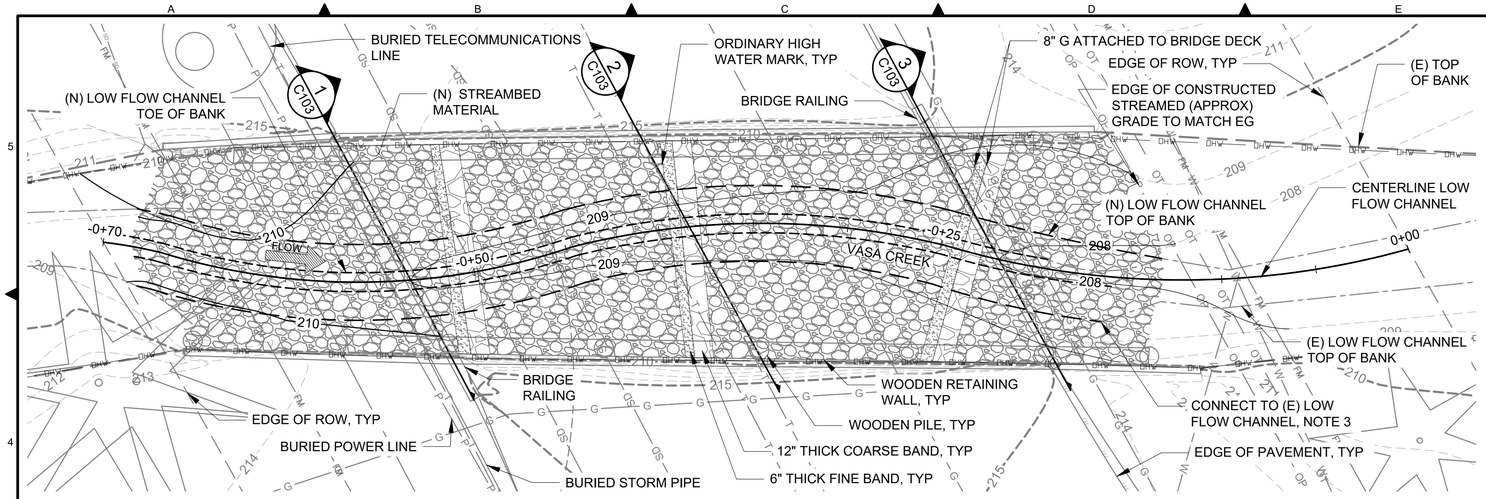
DESIGNED/DRAWN: E.BARTOLOMEO	SCALE: AS NOTED
PROJECT ENGINEER: E.BARTOLOMEO	REFERENCE 0 1"
DESIGN APPROVAL: J. SHEPPARD	FACILITY NUMBER: N/A
PROJECT ACCEPTANCE: A. GROTHE	CONTRACT NO: 6153355

King County

DEPARTMENT OF NATURAL RESOURCES & PARKS
WASTEWATER TREATMENT DIVISION
SUNSET AND HEATHFIELD PUMP STATIONS
AND FORCE MAIN UPGRADE

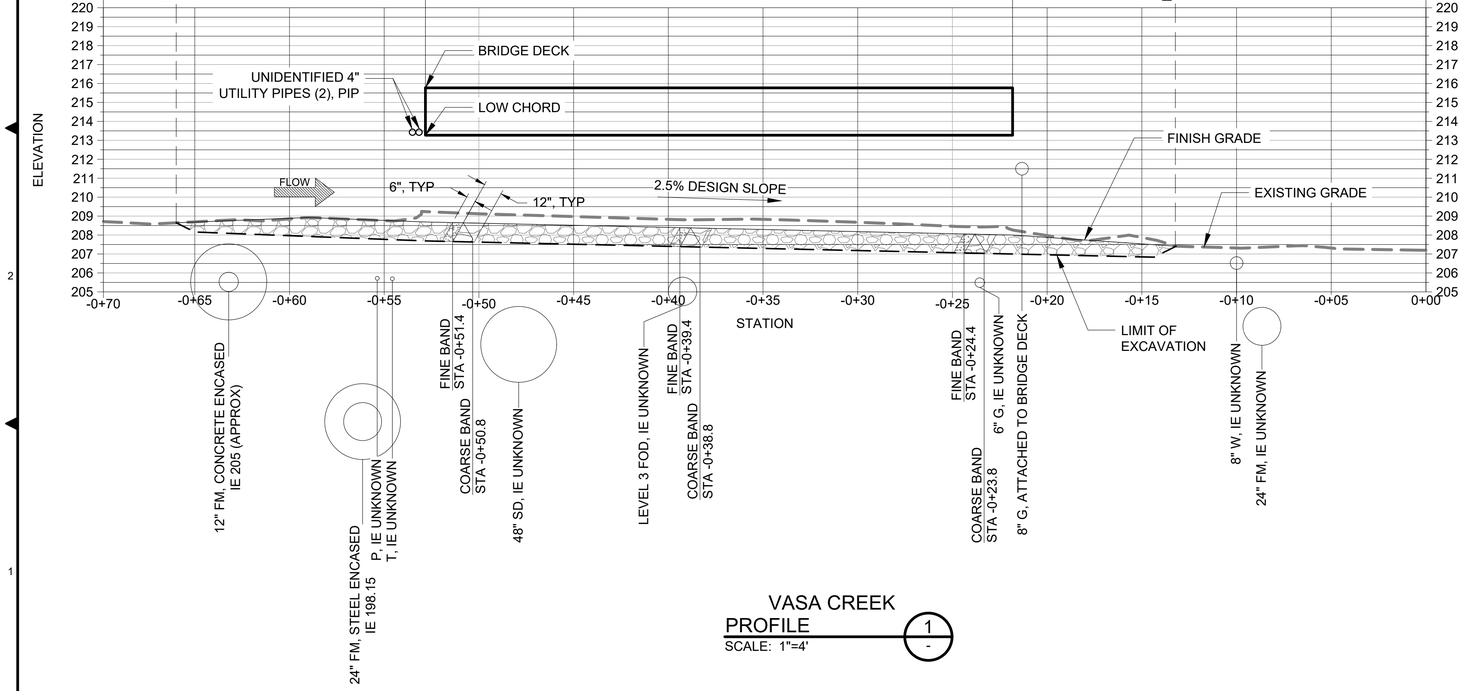
STREAM DEWATERING PLAN

DCN:
DATE: JUNE 2020
PROJECT FILE NO: 1038122
DRAWING NO: C101
SHT NO / TOTAL: 5 / 8
REV NO: 0



VASA CREEK
PLAN

4 0 4 8
SCALE: 1" = 4'



VASA CREEK
PROFILE (1/-)
SCALE: 1"=4'

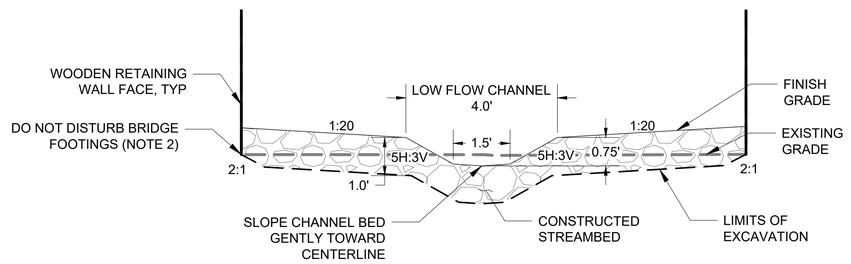
NOTES:

1. FEATURES AND TOPOGRAPHY SURVEYED BY TRUE NORTH LAND SURVEYING, JULY 2014. STREAM CHANNEL TOPOGRAPHY IS LIKELY TO HAVE CHANGED SINCE THIS SURVEY WAS PERFORMED. AREA BENEATH THE BRIDGE IS NOT SURVEYED. ELEVATIONS ARE APPROXIMATE FROM ESA FIELD MEASUREMENTS APRIL 2019.
2. SEE UTILITY NOTES, SHEET G102.
3. BRIDGE SUPPORTS CONSIST OF WOODEN PIERS IN FRONT OF WOODEN RETAINING WALLS. FOOTING TYPE AND AND DEPTH ARE UNKNOWN. SLOPE LIMITS OF EXCAVATION AWAY FROM BRIDGE ABUTMENTS AT 2:1 TO AVOID IMPACTS TO FOOTINGS. NOTIFY PROJECT REPRESENTATIVE IF FOOTINGS ARE ENCOUNTERED OR DAMAGED.
4. CONSTRUCT LOW FLOW CHANNEL BENEATH BRIDGE AS SHOWN. TRANSITION SMOOTHLY BETWEEN EXISTING AND DESIGN GRADES AT THE UPSTREAM AND DOWNSTREAM ENDS OF THE PROJECT AS DIRECTED BY PROJECT REPRESENTATIVE IN THE FIELD. LIMITS OF GRADING AND CONSTRUCTED STREAMBED ARE APPROXIMATE. MATCH CENTER LINE, TOP, AND TOE OF LOW FLOW CHANNEL AND CHANNEL BANKS.
5. COARSE BANDS SHALL BE 12" THICK. FINE BANDS SHALL BE 6" THICK.
6. STOCKPILE NATIVE STREAMBED EXCAVATED FROM THE CHANNEL FOR REUSE.
7. MIX STREAMBED MATERIALS AND COARSE BAND MATERIALS PER THE TABLES BELOW. MATERIAL MAY BE MIXED IN PLACE. MIXES SHALL BE EVENLY MIXED AND UNSORTED.
8. PLACE STREAMBED MATERIALS AND COARSE BANDS IN 12-INCH LIFTS.
   - 8.1. PLACE AN ADDITIONAL LAYER OF NATIVE FINES ON TOP AND WASH THIS MATERIAL INTO THE VOIDS IN THE COBBLES. CONTINUE WASHING IN FINES UNTIL WATER NO LONGER INFILTRATES INTO THE ROCK MATRIX.
   - 8.2. THE PROJECT REPRESENTATIVE WILL VISUALLY INSPECT AND CONFIRM COMPLETION OF THIS STEP BEFORE PROCEEDING WITH SECOND LAYER OF MATERIAL.
   - 8.3. REPEAT THIS SEQUENCE OF MATERIAL PLACEMENT, POWER WASHING SEDIMENT INTO COBBLE MATRIX, AND INSPECTION UNTIL TARGET ELEVATIONS ARE ACHIEVED.

STREAMBED MATERIAL	
PERCENTAGE	GRADATION
30%	4" STREAMBED COBBLE
70%	NATIVE STREAMBED, SALVAGED ON SITE

COARSE BANDS	
PERCENTAGE	GRADATION
30%	4" STREAMBED COBBLE
40%	10" STREAMBED COBBLE
30%	NATIVE STREAMBED, SALVAGED ON SITE

FINE BANDS	
PERCENTAGE	GRADATION
100%	NATIVE STREAMBED, SALVAGED ON SITE



CONSTRUCTED STREAMBED
DETAIL (2/-)
SCALE: 1"=2'

NO	REVISION DESCRIPTION	BY	APVD	DATE

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ELEANOR S. BARTOLOMEO — STATE OF WASHINGTON — REGISTERED PROFESSIONAL ENGINEER
6/16/2020

DESIGNED/DRAWN: E.BARTOLOMEO	SCALE: AS NOTED
PROJECT ENGINEER: E.BARTOLOMEO	REFERENCE 0 1"
DESIGN APPROVAL: J. SHEPPARD	FACILITY NUMBER: N/A
PROJECT ACCEPTANCE: A. GROTHE	CONTRACT NO: 6153355

King County

DEPARTMENT OF NATURAL RESOURCES & PARKS
WASTEWATER TREATMENT DIVISION
SUNSET AND HEATHFIELD PUMP STATIONS
AND FORCE MAIN UPGRADE

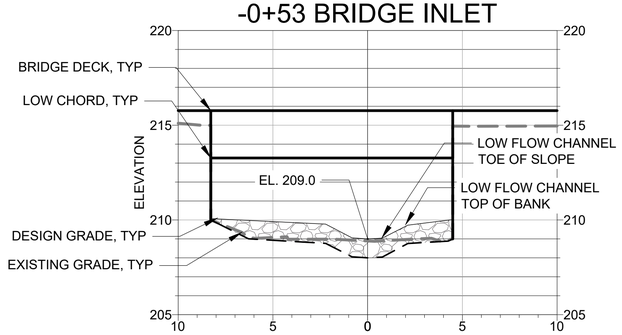
CHANNEL IMPROVEMENT PLAN & DETAILS

DCN:
DATE: JUNE 2020
PROJECT FILE NO: 1038122
DRAWING NO: C102
SHT NO / TOTAL: 6 / 8
REV NO: 0

NOTES:

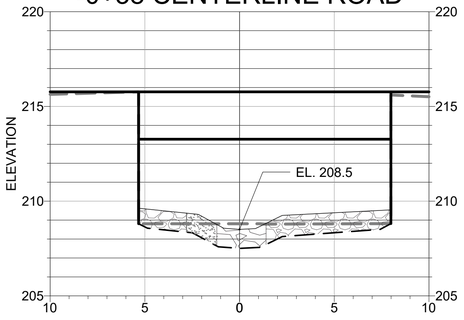
1. SECTIONS FACE DOWNSTREAM.
2. BRIDGE SUPPORTS CONSIST OF WOODEN PIERS IN FRONT OF WOODEN RETAINING WALLS. FOOTING TYPE AND AND DEPTH ARE UNKNOWN. SLOPE LIMITS OF EXCAVATION AWAY FROM BRIDGE ABUTMENTS AT 2:1 TO AVOID IMPACTS TO FOOTINGS. NOTIFY PROJECT REPRESENTATIVE IF FOOTINGS ARE ENCOUNTERED OR DAMAGED.
3. CONSTRUCT LOW FLOW CHANNEL BENEATH BRIDGE AS SHOWN. TRANSITION SMOOTHLY BETWEEN EXISTING AND DESIGN GRADES AT THE UPSTREAM AND DOWNSTREAM ENDS OF THE PROJECT AS DIRECTED BY PROJECT REPRESENTATIVE IN THE FIELD. LIMITS OF GRADING AND CONSTRUCTED STREAMBED ARE APPROXIMATE. MATCH CENTER LINE, TOP, AND TOE OF LOW FLOW CHANNEL AND CHANNEL BANKS.

-0+53 BRIDGE INLET



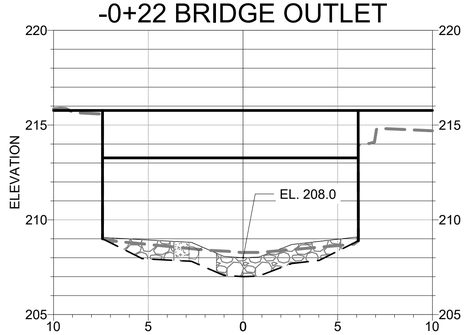
SECTION 1 (1/-)
SCALE: AS SHOWN

-0+38 CENTERLINE ROAD



SECTION 2 (2/-)
SCALE: AS SHOWN

-0+22 BRIDGE OUTLET



SECTION 3 (3/-)
SCALE: AS SHOWN

NO	REVISION DESCRIPTION	BY	APVD	DATE

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ELEANOR S. BARTOLOMEO, STATE OF WASHINGTON, REGISTERED PROFESSIONAL ENGINEER
5/16/2020

DESIGNED/DRAWN: M. NELSON	SCALE: AS NOTED
PROJECT ENGINEER: E.BARTOLOMEO	REFERENCE 0 1"
DESIGN APPROVAL: J. SHEPPARD	FACILITY NUMBER: N/A
PROJECT ACCEPTANCE: A. GROTHE	CONTRACT NO: 6153355

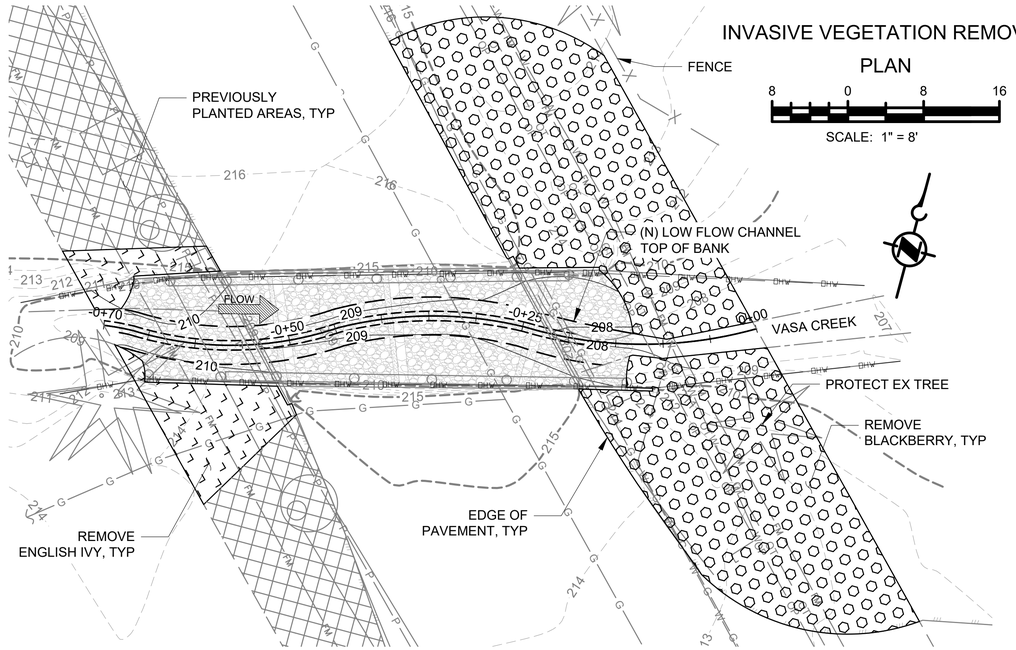
King County

DEPARTMENT OF NATURAL RESOURCES & PARKS
WASTEWATER TREATMENT DIVISION
SUNSET AND HEATHFIELD PUMP STATIONS
AND FORCE MAIN UPGRADE

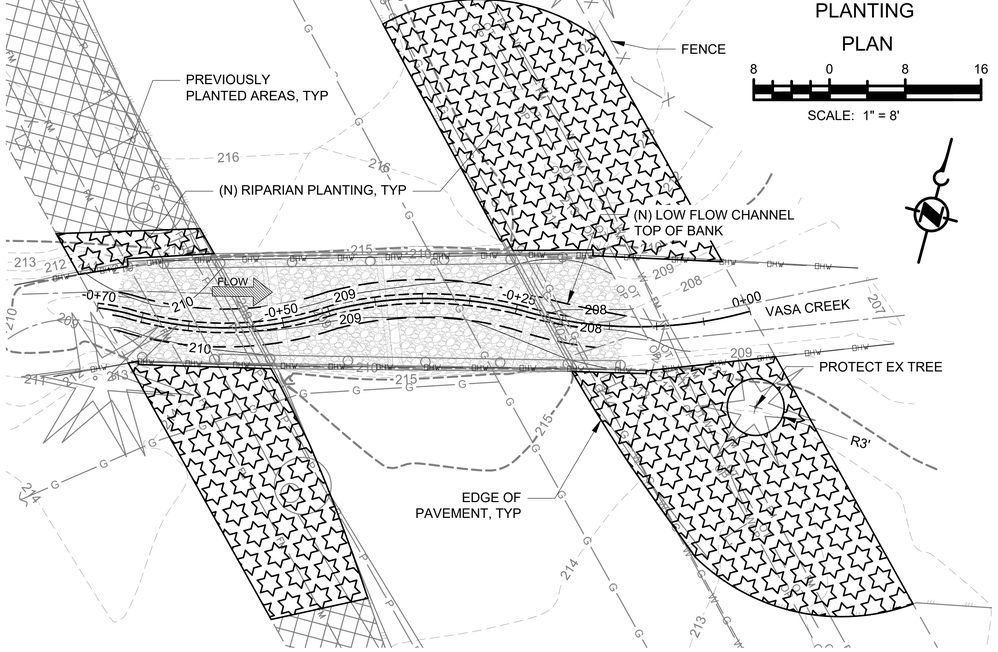
CHANNEL IMPROVEMENT SECTIONS

DCN:
DATE: JUNE 2020
PROJECT FILE NO: 1038122
DRAWING NO: C103
SHT NO 7 / TOTAL 8
REV NO: 0

INVASIVE VEGETATION REMOVAL PLAN



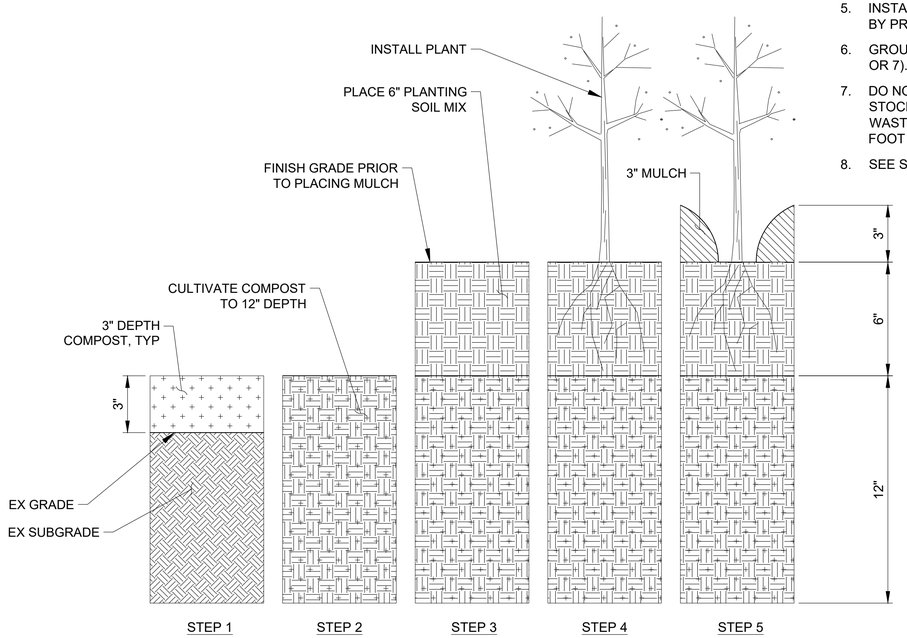
PLANTING PLAN



PLANTING SCHEDULE: RIPARIAN PLANTING AREA (1,476 SF)					
SYMBOL	SCIENTIFIC NAME	COMMON NAME	INSTALL SIZE	SPACING	QUANTITY
	MAHONIA AQUIFOLIUM	TALL OREGON GRAPE	1 GAL	6' OC	9
	MYRICA CALIFORNICA	PACIFIC WAX MYRTLE	1 GAL	6' OC	9
	POLYSTICHUM MUNITUM	SWORD FERN	1 GAL	6' OC	9
	ROSA NUTKANA	NOOTKA ROSE	1 GAL	6' OC	10
	SYMPHORICARPOS ALBUS	SNOWBERRY	1 GAL	6' OC	10

NOTES:

1. ANY DISCREPANCIES BETWEEN THE DRAWINGS, SPECIFICATIONS, AND SITE CONDITIONS SHALL BE BROUGHT TO THE ATTENTION OF THE OWNER'S REPRESENTATIVE PRIOR TO PROCEEDING WITH CONSTRUCTION.
2. PRESERVE AND PROTECT IN PLACE ALL TREES AND VEGETATION NOT DESIGNATED FOR REMOVAL.
3. REMOVE ALL INVASIVE SPECIES FROM THE PLANTING AREAS USING METHODS APPROVED BY THE STATE OF WASHINGTON NOXIOUS WEED CONTROL BOARD. SPECIFIC SPECIES TO BE REMOVED INCLUDE BUT ARE NOT LIMITED TO:
   A. HIMALAYAN BLACKBERRY (RUBUS ARMENIACUS)
   B. ENGLISH IVY (HEDERA HELIX)
4. LOCATIONS OF INVASIVE PLANTS ON THIS PLAN ARE APPROXIMATE.
5. INSTALL PLANT MATERIAL FOLLOWING APPROVAL OF INVASIVE REMOVAL BY PROJECT REPRESENTATIVE.
6. GROUP PLANTS OF SIMILAR SPECIES IN ODD NUMBER GROUPINGS (I.E. 3, 5, OR 7). INSTALL IN TRIANGULAR SPACING.
7. DO NOT DRIVE OR PARK ANY VEHICLES OR EQUIPMENT, STORE MATERIALS, STOCKPILE SOIL OR GRAVEL, OR DISPOSE OF ANY CONSTRUCTION OR WASTE MATERIAL WITHIN THE NEWLY INSTALLED PLANT AREAS. RESTRICT FOOT TRAFFIC WITHIN PROTECTED AREAS.
8. SEE SPECIFICATIONS FOR WATERING REQUIREMENTS.



PLANTING AREA PREPARATION SEQUENCE:

STEP 1
PLACE 3" COMPOST

STEP 2
INCORPORATE COMPOST TO 12" DEPTH

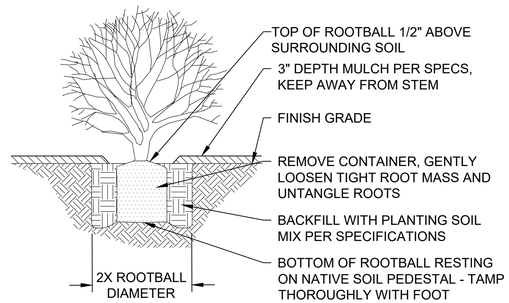
STEP 3
PLACE 6" PLANTING SOIL MIX PER SPECIFICATIONS

STEP 4
INSTALL PLANTS. SEE DETAIL 2 AND SPECIFICATIONS FOR METHOD AND PLANTING PLAN FOR LOCATIONS

STEP 5
INSTALL MULCH, 3" DEEP

SOIL PREPARATION

DETAIL 1 / -
SCALE: NTS



SHRUB PLANTING

DETAIL 2 / -
SCALE: NTS

NO	REVISION DESCRIPTION	BY	APVD	DATE

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STATE OF WASHINGTON · ALISONA B. GREENBERG · 19047 · LANDSCAPE ARCHITECT · 6/16/2020

DESIGNED/DRAWN: A. GREENBERG	SCALE: AS NOTED
PROJECT ENGINEER: E. BARTOLOMEO	REFERENCE 0 1"
DESIGN APPROVAL: J. SHEPPARD	FACILITY NUMBER: N/A
PROJECT ACCEPTANCE: A. GROTHE	CONTRACT NO: 6153355

King County

DEPARTMENT OF NATURAL RESOURCES & PARKS
WASTEWATER TREATMENT DIVISION
SUNSET AND HEATHFIELD PUMP STATIONS AND FORCE MAIN UPGRADE

PLANTING PLAN

DCN:	
DATE:	JUNE 2020
PROJECT FILE NO:	1038122
DRAWING NO:	L101
SHT NO / TOTAL	8 / 8
REV NO:	0

BORDER FILE EDITION: KCWTD-2012-Dsize-TB-Border
U:\Projects\SEA\WATER RESOURCES\2009 Projects\209382.04_Sunset & Heathfield Pump Station\08_CAD\DWG\L101 PLANTING PLAN.dwg | Layout: PLANTING PLAN
PLOTTED: Jun 16, 2020-12:43:47pm By MNelson
XREFS: X-TBLK.dwg; X-BASE.dwg; X-SURVEY.dwg; X-INVASIVES.dwg; X-PLANTING.dwg; X-LA-DETAILS.dwg; X-EG.dwg
IMAGES:

Code Analysis and Floodplain Analysis included

Vasa Creek Habitat Improvement Project

King County
Department of Natural Resources and Parks
Wastewater Treatment Division

Critical Areas Land Use Permit Application
Narrative Description

King County Wastewater Treatment Division (WTD) is requesting a Critical Areas Land Use Permit (CALUP) for habitat improvements at Vasa Creek, in the vicinity of the 164th Place SE bridge.

King County WTD proposes to:

- install a stream simulation channel within the stream bed,
- remove invasive vegetation, and
- plant native riparian vegetation.

The project will provide habitat improvements to offset unanticipated negative impacts that occurred to Vasa Creek in August 2018 related to the trenchless installation of a new sewer force main under Vasa Creek as part of the Sunset and Heathfield Pump Stations and Force Main Upgrade Project (Sunset/Heathfield Project).

Code Analysis

This narrative responds to the code requirements in Land Use Code (LUC) 20.25H.055.C.3.j, LUC 20.25H.080.A, and LUC 20.25H.180.C and is submitted with the CALUP.

Vasa Creek Habitat Improvement Project	
City of Bellevue Permit Criteria	**Applicant Response**
LUC 20.25H.055 Uses and development allowed within critical areas – Performance standards.	
C.3.j. Habitat Improvement Projects. Disturbance, clearing and grading are allowed in the critical area or critical area buffer for habitat improvement projects demonstrating an improvement to functions and values of a critical area or critical area buffer. Habitat improvement projects shall be:	The project is an allowed use within the stream critical area overlay as a Habitat Improvement Project.
i. Sponsored or cosponsored by a public agency or federally recognized tribe and whose primary function is habitat restoration; or	The project is not sponsored or cosponsored by a public agency/recognized tribe.
ii. Approved by the Director pursuant to LUC 20.25H.230.	Through this application, the applicant is seeking approval by the Director to perform a Habitat Improvement Project within critical areas, pursuant to the review process per LUC 20.25H.230.
LUC 20.25H.080 Performance standards (IV Streams)	
A. General. 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:	Vasa Creek is a Type F stream; kokanee and cutthroat trout have been documented in the stream, and there is available habitat for Chinook, coho, sockeye salmon, and steelhead.
1. Lights shall be directed away from the stream.	Not applicable - the proposal does not include lights.
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 - the proposal does not include noise-generating activity once in operation.
3. Toxic runoff from new impervious area shall be routed away from the stream.	Not applicable - the proposal does not include new impervious areas that would lead to toxic runoff.
4. Treated water may be allowed to enter the stream critical area buffer.	Following construction, planting vegetation, and stabilization of soils, the only water entering the stream other than upstream sources is rainwater. Rainwater will not be treated.

Vasa Creek Habitat Improvement Project	
City of Bellevue Permit Criteria	**Applicant Response**
5. The outer edge of the stream critical area buffer shall be planted with dense vegetation to limit pet or human use.	The County proposes to remove invasive vegetation, and plant native riparian vegetation. This will subsequently limit pet or human use.
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.	The use of fertilizers within 150 feet of the edge of the stream shall be in accordance with City of Bellevue Environmental BMPs.
7. All applicable standards of Chapter 24.06 BCC, Storm and Surface Water Utility Code, are met.	The project has less than 7,000 square feet of land disturbing activity and less than 2,000 square feet of new or replaced impervious surfaces. The project requires a Construction Stormwater Pollution Prevention (CSWPPP) through the City of Bellevue CSWPPP Short Form for Small Construction Projects.
LUC 20.25H.180C. Development in areas of special flood hazard	
C. General Performance Standards. Where use or development is allowed pursuant to LUC 20.25H.055, the following general performance standards apply:	The project is an allowed use within the stream critical area overlay as a Habitat Improvement Project.
1. Intrusion Over Frequently Flooded Areas Allowed. Any structure may intrude over frequently flooded areas if:	FEMA Flood Insurance Rate Maps show the 100-year floodplain (Zone A and Zone AE) along Vasa Creek from 163rd Avenue SE downstream (east) to Lake Sammamish. Stream enhancement has been designed to comply with the City of Bellevue's performance standards for areas of special flood hazard (for example, no rise in base flood elevation, effective base flood storage criteria, etc.).
a. The intrusion is located above existing grade, and does not alter the configuration of the frequently flooded area;	The project would install a roughened channel within the stream bed. As such, the finished grade would be below the existing grade (See Drawing C102) in a frequently flooded area. However, fill placed in the regulatory floodway will not lead to an increase in the Base Flood Elevation (BFE), because the fill will be placed in areas that are currently ineffective for flood storage.
b. The intrusion is at an elevation and orientation which maintains the existing vegetation of the frequently flooded area in a healthy condition. Solar access to vegetation must be maintained at least 50 percent of daylight hours during the normal growing season; and	The intrusion would be at an elevation and orientation that would enhance the existing vegetation and would subsequently enhance the frequently flood area. The project will remove invasive vegetation, and plant native riparian vegetation. The project will provide compensatory habitat enhancement to offset unanticipated negative impacts to Vasa Creek in August, 2018, associated with the County's Sunset/Heathfield construction project.
c. The intrusion does not encroach into the regulated floodway except in compliance with subsection C.5 of this section.	Work will encroach into the floodway of Vasa Creek; however, the project is in compliance with subsection C.5 (see response below).

Vasa Creek Habitat Improvement Project	
City of Bellevue Permit Criteria	**Applicant Response**
d. Development not meeting the requirements of this subsection C.1 may be allowed pursuant to LUC 20.25H.055 and only in accordance with the requirements set forth in the remainder of this section C.	The project is an allowed use within the stream critical area overlay as a Habitat Improvement Project. The project meets the requirements of subsection C1.
1. Elevation Certificate Following Construction. Following construction of a structure within a frequently flooded area, where the base flood elevation is provided, the applicant shall obtain an elevation certificate. The elevation certificate shall be completed by a surveyor licensed in the state of Washington and shall be submitted to City of Bellevue, Utilities Department. The Director shall obtain and transmit to the Director of the Utilities Department the elevation in relation to City of Bellevue vertical datum (NAVD 88) of the lowest floor, including basement, and attendant utilities of a new or substantially improved structure permitted by this part. All records shall be maintained for public inspection in accordance with 44 C.F.R. 60.3(b)(5)(iii) and the City of Bellevue record retention policy.	Not required. According to the analysis performed and documented in the *Vasa Creek Floodplain Analysis Memorandum (ESA, 2020)* included with this submittal, the proposed project is not expected to generate a rise in base flood conditions and the design meets the effective base flood storage criteria of the Bellevue Land Use Code Title 20.
2. Construction Materials and Methods. a. Site Design. All structures, utilities, and other improvements shall be located on the buildable portion of the site out of the frequently flooded area unless there is no buildable site out of the frequently flooded area. For sites with no buildable area out of the frequently flooded area, structures, utilities, and other improvements shall be placed on the highest land on the site, outside of the floodway, oriented parallel to flow rather than perpendicular, and sited as far from the stream and other critical areas as possible. If the Director detects any evidence of active hyporheic exchange on a site, the development shall be located to minimize disruption of such exchange.	Vasa Creek and its banks are also mapped as a frequently flooded area. The nature of the project as stream enhancement makes it impossible to locate the project anywhere else.

Vasa Creek Habitat Improvement Project	
City of Bellevue Permit Criteria	**Applicant Response**
b. Methods That Minimize Flood Damage. All new construction and substantial improvements shall be constructed using flood-resistant materials and using methods and practices that minimize flood damage.	Noted. All material used in streambed construction shall be smooth and round, clean, hard, durable material from a river or stream source and not broken or crushed.
c. Utility Protection. Electrical, heating, ventilation, plumbing, air-conditioning equipment, and other service facilities shall be designed and/or otherwise elevated or located so as to prevent water from entering or accumulating within the components during conditions of flooding.	Not applicable – utilities are not proposed for this project.
d. Anchoring. All new construction and substantial improvements shall be anchored to prevent flotation, collapse, or lateral movement of the structure.	Not applicable – there are no structural elements to be anchored. Streambed materials consist of imported cobbles and native streambed materials.
3. No Rise in the Base Flood Elevation (BFE). Any allowed use or development shall not result in a rise in the BFE.	Fill placed in the regulatory floodway will not lead to an increase in the Base Flood Elevation (BFE), because the fill will be placed in areas that are currently ineffective for flood storage. Hydraulic modeling demonstrates no rise in the BFE, based on the assumption that the City's current flood model in fact reflects the channel conditions that will exist once the project is constructed. See *Vasa Creek Floodplain Analysis Memorandum* (ESA, 2020).
a. Post and Pile. Post and piling techniques are preferred and are presumed to produce no increase in the BFE. Demonstration of no net rise in the BFE through calculation is not required.	Not applicable – post and piling techniques are not required for fill in the stream.
b. Compensatory Storage. Proposals using compensatory storage techniques to assure no rise in the BFE shall demonstrate no net rise in the BFE through the calculation by methods established in the Utilities Storm and Surface Water Engineering Standards, January 2016, Section D4-04.5, Floodplain/Floodway Analysis, now or as hereafter amended.	Not applicable – the proposal does not include compensatory storage because it will not decrease the effective base flood storage volume of the area.

Vasa Creek Habitat Improvement Project	
City of Bellevue Permit Criteria	**Applicant Response**
5. Development in the Regulatory Floodway. a. Encroachment into Regulatory Floodway Prohibited. Encroachments, including, but not limited to, fill, new construction, substantial improvements, and other development, are prohibited, unless a registered professional engineer certifies that the proposed encroachment into the regulatory floodway shall not result in any rise in the BFE using hydrological and hydraulic analysis performed in accordance with City of Bellevue Storm and Surface Water Engineering Standards, January 2016, or as hereafter amended. All new construction and substantial improvements shall comply with this section.	According to the analysis performed and documented in the *Vasa Creek Floodplain Analysis Memorandum (ESA, 2020)*, the proposed project is not expected to generate a rise in base flood conditions and the design meets the effective base flood storage criteria of the Bellevue Land Use Code Title 20.
b. Residential Structures. A residential structure located partially within the regulatory floodway will be considered as totally within the regulatory floodway and must comply with this subsection C.5. This subsection does not apply to structures identified as historical places. Construction or reconstruction of residential structures is prohibited within the regulatory floodway, except when:	Not applicable – the project does not include a residential structure.
iii. Repairs, reconstruction, or improvements to a structure do not increase the footprint; and	Not applicable – the project does not include repairs, reconstruction or improvements to a structure.
iv. Repairs, reconstruction, or improvements to a structure, the cost of which do not exceed 50 percent of the market value of the structure either (1) before the repair, reconstruction, or improvement is begun, or (2) if the structure has been damaged, and is being restored, before the damage occurred. Work done to comply with state or local health, sanitary, or safety codes identified by the Building Official and which are the minimum necessary to assure safe living conditions or any alteration of a structure listed on the National Register of Historic Places shall not be included in the 50 percent market value determination.	Not applicable – the project does not include repairs, reconstruction or improvements to a structure.

Vasa Creek Habitat Improvement Project	
City of Bellevue Permit Criteria	**Applicant Response**
c. Substantially Damaged Residential Structures. i. The Director may request the Washington State Department of Ecology to assess the risk of harm to life and property posed by the specific conditions of the regulatory floodway, and provide the City with a recommendation on repair or replacement of a substantially damaged residential structure consistent with WAC 173-158-076, now or as hereafter amended. Property owners shall be responsible for submitting to the City any information necessary to complete the assessment when such information is not otherwise available. No repair or replacement of a substantially damaged residential structure located in the regulatory floodway is allowed without a recommendation from the Department of Ecology.	Not applicable – the project does not include a damaged residential structure.
ii. Before the repair, replacement, or reconstruction is started, all requirements of this section must be satisfied. In addition, the following conditions shall be met: (1) There is no potential safe building location for the replacement residential structure on the same property outside the regulatory floodway;	Not applicable – the project does not include a damaged residential structure.
(2) A replacement residential structure is a residential structure built as a substitute for a previously existing residential structure of equivalent use and size;	Not applicable – the project does not include a damaged residential structure.
(3) Repairs or reconstruction or replacement of a residential structure shall not increase the total square footage of floodway encroachment;	Not applicable – the project does not include a damaged residential structure.
(4) The elevation of the lowest floor of the substantially damaged or replacement residential structure is a minimum of one foot higher than the base flood elevation;	Not applicable – the project does not include a damaged residential structure.

Vasa Creek Habitat Improvement Project	
City of Bellevue Permit Criteria	**Applicant Response**
(5) New and replacement water supply systems are designed to eliminate or minimize infiltration of flood water into the system;	Not applicable – the project does not include a water supply system.
(6) New and replacement sanitary sewerage systems are designed and located to eliminate or minimize infiltration of flood water into the system and discharge from the system into the flood waters; and	Not applicable – the project does not include a sanitary sewerage system.
(7) All other utilities and connections to public utilities are designed, constructed, and located to eliminate or minimize flood damage.	Not applicable – the project does not include utilities or connections to public utilities.
6. Modification of Stream Channel. Alteration of open stream channels shall be avoided, if feasible. If unavoidable, the following provisions shall apply to the alteration: a. Modifications shall only be allowed in accordance with the habitat improvement projects.	The project would modify the stream channel through installation of a roughened channel within the stream bed. However, the project is in accordance with a habitat improvement project.
b. Modification projects shall not result in blockage of side channels.	Noted – the project would not result in blockage of side channels.
c. The City of Bellevue shall notify adjacent communities, the state departments of Ecology and Fish and Wildlife, and the Federal Insurance Administration about the proposed modification at least 30 days prior to permit issuance.	Noted.

Vasa Creek Habitat Improvement Project	
City of Bellevue Permit Criteria	**Applicant Response**
d. The applicant shall maintain the altered or relocated portion of the stream channel to ensure that the flood-carrying capacity is not diminished. Maintenance shall be bonded for a period of five years, and be in accordance with an approved maintenance program.	As described in the Basis of Design Memo (See Performance Standards and Monitoring beginning on page 8), the Vasa Creek Fish Passage Improvements project will be monitored for five years. Construction is anticipated in the summer of 2020, which will be Year 0 for monitoring purposes. At each site visit, monitoring data will be recorded for all performance standards, and an annual report will be prepared in each of the five years following construction and will evaluate the monitoring data collected and provide a summary of the project's effectiveness in providing fish passage. The reports will be submitted to the permitting agencies and interested stakeholders by December 31 of each monitoring year.
7. Compensatory Storage. Development proposals must not reduce the effective base flood storage volume of the area of special flood hazard. Grading or other activity that would reduce the effective storage volume must be mitigated by creating compensatory storage on the site. The compensatory storage must: a. Provide equivalent elevations to that being displaced;	Not required – compensatory storage was not considered a feasible option because excavation will not occur within the channel due to habitat concerns. Fill will be placed in the ineffective flow areas adjacent to the bridge abutments. Since the fill is in ineffective flow areas, it isn't occupying effective base flood volume and the design meets the effective base flood storage criteria of Bellevue Land Use Code Title 20.
b. Be hydraulically connected to the source of flooding;	Not required – see response to 7a.
c. Be provided in the same construction season and before the flood season begins on September 30th;	Not required – see response to 7a.
d. Occur on site or off site if legal arrangements can be made to assure that the effective compensatory storage volume will be preserved over time;	Not required – see response to 7a.
e. Be supported by a detailed hydraulic analysis that: i. Is prepared by a licensed engineer;	Not required – see response to 7a.
ii. Demonstrates that the proposed compensatory storage does not adversely affect the BFE; and	Not required – see response to 7a.

Vasa Creek Habitat Improvement Project	
City of Bellevue Permit Criteria	**Applicant Response**
f. Meet all other critical areas rules subject to this part. If modification to a critical area or critical area buffer is required to complete the compensatory storage requirement, such modification shall be mitigated pursuant to an approved mitigation and restoration plan, LUC 20.25H.210.	Not required – see response to 7a.
8. Floodplain Ecological Functions. The use or development shall meet National Flood Insurance Program requirements for the protection of floodplain ecological functions in accordance with guidelines established by the Director. Floodplain ecological functions include, but are not limited to, stormwater quality, floodwater storage and conveyance capacity, and habitat.	FEMA Flood Insurance Rate Maps show the 100-year floodplain (Zone A and Zone AE) along Vasa Creek from 163rd Avenue SE downstream (east) to Lake Sammamish. Stream enhancement has been designed to comply with the City of Bellevue's performance standards for areas of special flood hazard and will not negatively affect floodplain ecological functions. See the Vasa Creek Floodplain Analysis for more information.

ESA 50 YEARS 1969-2019

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Seattle, WA 98107
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memorandum

date	January 24, 2020
to	Jacob Sheppard, King County Wastewater Treatment Division
from	Eleanor S. Bartolomeo, PE
subject	Vasa Creek Mitigation Project Floodplain Analysis Memo

Introduction

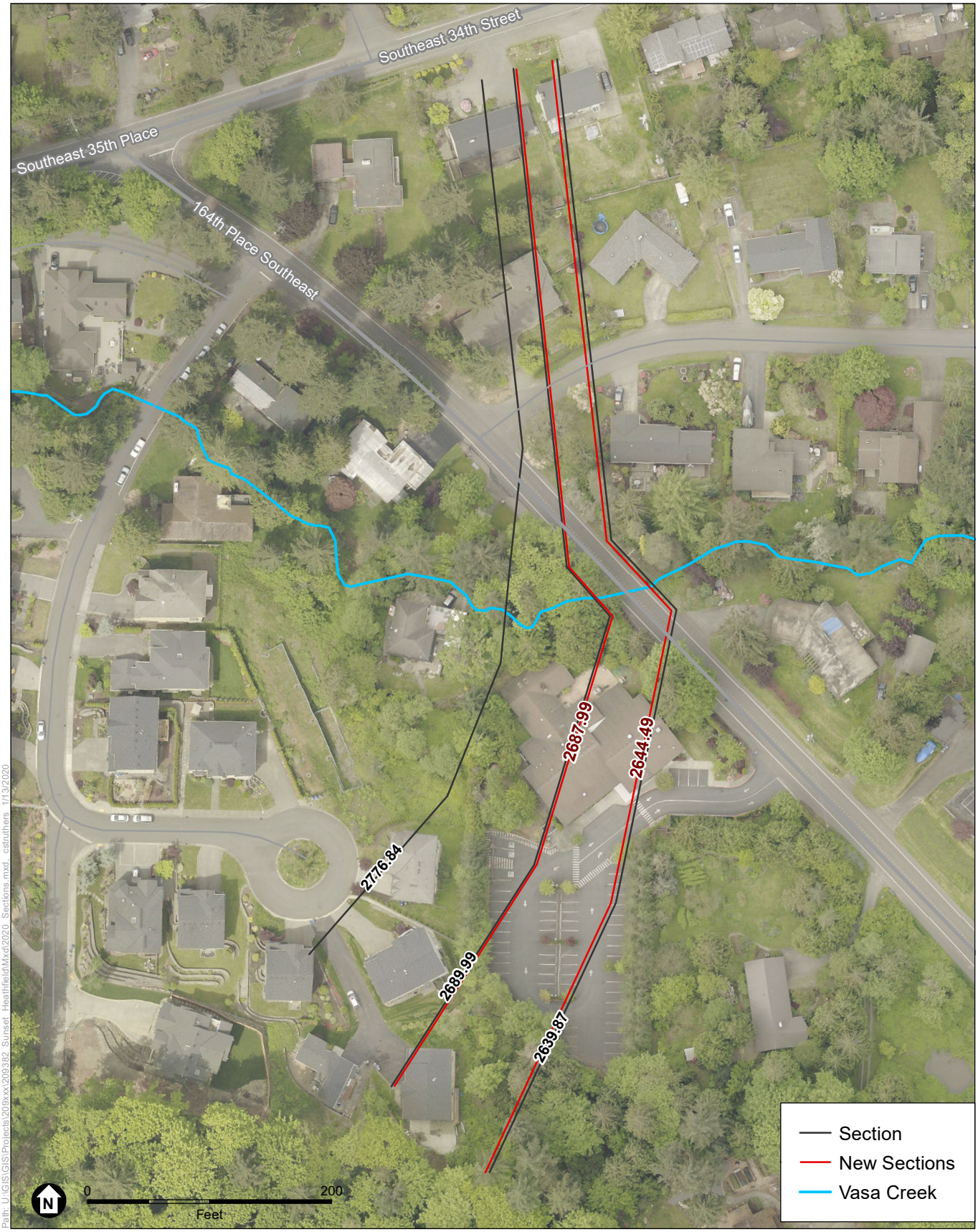
ESA is currently assisting the King County Wastewater Treatment Division (KCWTD) with instream improvements at the 164th Place SE crossing of Vasa Creek. The project site is located within the FEMA regulatory floodplain and regulatory floodway of Vasa Creek in Bellevue, Washington. The site is the preferred project identified by the City of Bellevue to mitigate for inadvertent KCWTD construction impacts to Vasa Creek related to trenchless installation of a new sewer force main under Vasa Creek as part of the Sunset and Heathfield Pump Stations and Force Main Upgrade. Figure 1 shows the project location and key points that will be referenced in this analysis.

Goals of this Memo

As part of the design review and permitting process, the City of Bellevue identified a municipal code requirement (Title 20, Part 20.25H.180, Paragraph C, Items 4 and 5) for hydraulic modeling to demonstrate no rise in base flood elevation and no net reduction in effective base flood storage. The City of Bellevue's requirements for development in the floodplain and floodway are:

- No rise in the Base Flood Elevation (BFE)
- No reduction in the effective base flood storage volume

This memo analyzes the potential effects of the proposed Vasa Creek Mitigation Project on base flood elevations and effective base flood storage volume in the Vasa Creek floodplain.



SOURCE: King County Imagery, 2017; ESA 2020

Sunset and Heathfield Pump Station Upgrades

Figure 1
Project Setting

ESA

Existing Conditions

Under existing conditions, the creek bed transitions at the beginning on the bridge abutments from a V-shaped channel upstream (Image 1), to a wide, flat plane with no defined channel or natural banks beneath the bridge (Image 2), and then back to a V-shaped channel downstream of the bridge (Image 3). This area without a defined channel causes flows to spread out and become very shallow and has been identified as a fish passage barrier at low flows. We suspect that the natural stream banks were excavated for abutment placement when the bridge was installed and not restored (King County Engineering Department [date illegible]). The 100-year flow through the upstream bridge section is limited to 15 cubic feet per second (cfs) by a flow splitter located approximately 500 feet upstream which routes the majority of the flows directly to Lake Sammamish. Modeled flows increase to 48 cfs downstream of the bridge. Because of the upstream flow splitter and mechanical removal of sediment from the system, Vasa Creek may have insufficient stream power and sediment supply to restore the reach naturally.

Image 1 – Vasa Creek Upstream of the 164th Place SE Bridge

Image 2 – Vasa Creek Beneath the 164th Place SE Bridge

Image 3 – Vasa Creek Downstream of the 164th Place SE Bridge

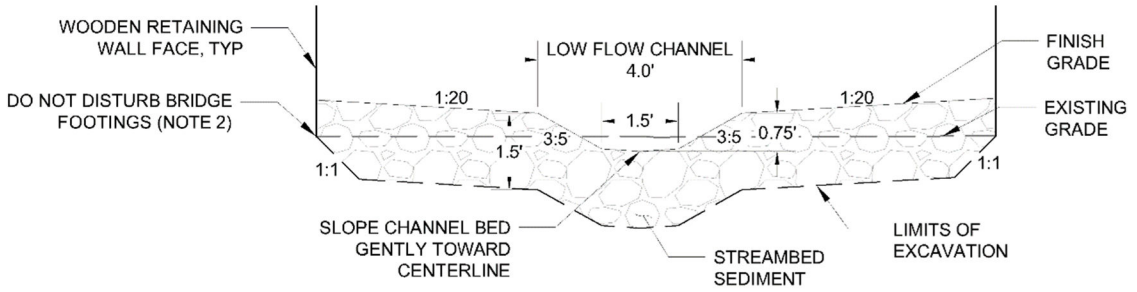
Proposed Project

ESA has developed a draft design for the site, shown in Appendix A, to improve fish passage at low flows. The design involves placing streambed material beneath the bridge to rebuild the missing stream banks and create a narrower low-flow channel with floodplain benches, similar to what exists upstream and downstream of the bridge. Placement of material to build the banks back to their original condition was selected over excavating a low flow channel into the current bed because the stream profile is already in equilibrium. In other words, the current thalweg elevation and slope of the stream bed beneath the bridge is geomorphically appropriate to its position in the system and contiguous with the elevation and slope of the streambed upstream and downstream. Consequently, ESA prefers to keep the channel bed in its current position and rebuild the missing banks.

If we were to create a low flow channel by excavating out material, we would be locally lowering the streambed in this reach disturbing equilibrium of the system. Streams out of equilibrium can change form rapidly to reestablish equilibrium conditions. The likeliest scenario is that an excavated channel would fill with sediment, eliminating the fish passage benefit within a few years. The worst case scenario could be that lowering the stream bed steepens the energy grade line and triggers a migrating head cut, which could move upstream through the system liberating large amounts of sediment and potentially damaging upstream infrastructure. It is possible to incorporate design elements to minimize the likelihood of either scenario, but we prefer to avoid the issue entirely by not disturbing the channel's equilibrium.

The proposed low-flow channel will be constructed by building up floodplain benches against each bridge abutment. The low flow channel beneath the bridge will be comparable in size and depth to the low flow channel of Vasa Creek up- and downstream and will be 9 inches deep at the thalweg and 1.5 feet wide at the bed, expanding out to 4 feet wide at the top of bank (Image 4). Gently sloping floodplain benches will extend from the top of the channel banks to the bridge abutments. The channel geometry is designed based on the Washington Department of Fish and Wildlife (WDFW) *Water Crossings Design Guidelines* for constructed streambed geometries through bridges and box culverts (WDFW 2013).

Image 4 – Proposed Low-flow Channel Design



Approach

ESA used the City of Bellevue model of Vasa Creek (Vasa Creek Model) developed for the 2014 Vasa Basin Study and the associated Letter of Map Revision (LOMR) to model existing and proposed conditions at the 164th Place SE bridge for the base (100-year recurrence interval) flood (WSE 2014; FEMA 2016). The model is a 1-dimensional HEC-RAS model. This analysis was performed using the Army Corps of Engineers HEC-RAS software, version 5.0.5.

In modeling terminology, the cross sections immediately upstream and downstream of a bridge or culvert are referred to as the bounding cross sections. These two cross sections are used by the model to define the shape of the channel through the bridge opening. In the existing Vasa Creek Model, channel geometry for the 164th Place SE bridge consists of stream cross sections approximately 10 feet upstream of the bridge (section number 2689.99) and 10 feet downstream of the bridge (section number 2639.87). While these cross sections are accurate depictions of the channel geometry in those locations, they do not capture the change in the channel width and shape through the bridge and its effects on stream hydraulics. In order to capture that change in channel shape, ESA adapted the Vasa Creek Model with two new bridge-bounding cross sections, one 8 feet upstream and the other 5.4 feet downstream of the 164th Place SE bridge. These cross sections represent the location, as measured in the field, where the Vasa Creek channel fully transitions from the V-shaped section to the flat, plane section described above. The channel geometry data for these sections was measured in the field during ESA's 2019 site visit (ESA 2019).

To conduct the analysis and accurately compare results, ESA made iterative changes to the effective Vasa Creek Model to demonstrate how each change affects model results and to help to isolate the root cause of any changes. Changes were limited to between the bounding cross sections of the 164th Place SE bridge: section 2689.99 upstream and section 2639.87 downstream. The bridge geometry and ineffective flow areas were not altered, and no other aspect of the model was changed. Changes in channel geometry are displayed graphically in Appendix B. All elevations are given in North American Vertical Datum of 1988 (NAVD 88).

Our analysis involved following model iterations and associated outputs:

1. **Duplicate Effective Model:** ESA obtained the 2014 Vasa Creek Basin Study Model from the City of Bellevue and ran it exactly as received with no edits. This is the effective FEMA model for this reach. We then confirmed that the results from this model run are identical to the values presented in City of Bellevue 2014 Vasa Basin Study (WSE 2014) and match the effective FEMA floodway table in the LOMR. In our reporting, outputs from this model are listed as "Duplicate".

2. **Corrected Effective Conditions Model**: For this model iteration, we started with the Duplicate Effective Model and inserted the new bounding cross sections upstream and downstream of the 164th Place SE bridge. The new upstream bridge-bounding cross section is 2.0 feet closer to the bridge, at station 2687.99, and was created by copying the geometry of the original upstream bridge-bounding cross section, 2689.99. The new downstream bridge-bounding cross section is 4.62 feet closer to the bridge, at station 2644.49, and was created by copying the geometry of the original downstream bridge-bounding cross section, 2639.87. Channel inverts for the new sections were selected based on the creek slope so that creek profile did not change from the Effective Model to this model. Because the new bounding cross sections are duplicates of the original bounding cross sections, the channel geometry at the bridge also did not change in this model iteration. The effective model had an additional 33 cfs of flow entering the creek at the downstream bridge cross section. For consistency in how the bridge is modeled, the flow file was adjusted to shift the inflow location from the old downstream section (2639.87) to the new one (2644.49). This iteration represents another interpretation of the Effective Model with computational, not physical, differences. In our reporting, outputs from this model are listed as "Corrected".

   This iteration was included in the analysis to identify any computational effects from inserting new cross sections into the model. HEC-RAS performs it computations from downstream to upstream by iteratively

balancing the energy equation at each cross section and then passing the results from each downstream section to the next section upstream as starting conditions to use when solving the energy equations at the upstream section. Adding cross sections – even if it doesn't change overall model geometry – adds computational points to the model, changes the values passed up the chain to the next section upstream, and can change the model results. In this case, increasing the density of the cross sections in the vicinity of the 164th Place SE bridge revealed a backup of water of 0.3 ft at the bridge that wasn't captured in the original Effective Model results. This backup of water may be associated with the break in channel slope observed in the creek profile or with constriction of the base flood through the bridge section. To reiterate – this change in the model output represents a computational effect in HEC-RAS, not any physical modification to the system.

3. **Existing Conditions Model**: For this model iteration, we started with the Corrected Effective Model and changed the channel geometry at the previously added bounding cross sections (section numbers 2687.99 and 2644.49) to reflect the conditions observed in the field with the wider, flat creek bed and the absence of banks. Sections 2689.99 and 2639.87 were unchanged and remain as they were in the Effective Model. This iteration represents pre-project conditions, corrected to capture the observed channel geometry at the 164th Place SE bridge. In our reporting, outputs from this model are listed as "Existing Conditions".

4. **Project Conditions Model**: For this model iteration, we started with the Existing Conditions Model and changed the channel geometry at the bounding cross sections (section numbers 2687.99 and 2644.49) to reflect the grading for the proposed project. This iteration represents post-project conditions with fish passage improvements. In our reporting, outputs from this model are listed as "Project Conditions".

Results

No Rise

Table 1 lists numerical water surface elevation (WSE) results for all of the model iterations for the bridge-bounding cross sections. As this table shows, adding two additional cross sections to the model in the vicinity of the 164th Place SE bridge revealed a backup of water under the bridge which hadn't been apparent with the more widely spaced cross sections of the Duplicate model. Section 2776.84, 112 feet upstream of the bridge, is also included to demonstrate that the change produced by the additional cross sections is localized and modeled water surface elevations converge back to the values published in the 2014 Vasa Basin Study. Following the format of the 2014 Vasa Basin Study, values are reported to the tenths of feet.

Table 1: Water Surface Elevation at the 100-Year Flow Event, in feet NAVD 88

Cross Section	Duplicate Model	Corrected Model	Existing Conditions	Project Conditions
2776.84	115.9	115.9	115.9	115.9
2689.99 (Original Bounding)	113.1	113.2	113.2	113.2
2687.99 (New Bounding)	NA	113.2	113.2	113.2
2664.99 US (Bridge)	113.0	113.2	113.2	113.2
2664.99 DS (Bridge)	112.9	113.1	113.2	113.2
2644.49 (New Bounding)	NA	113.1	113.2	113.2
2639.87 (Original Bounding)	112.9	112.9	112.9	112.9

US = Upstream, DS = Downstream

For purposes of demonstrating no net rise in the base flood elevations, we are comparing the Corrected Conditions Model (actual conditions on the ground) with the Proposed Conditions Model. Table 1 demonstrates that the proposed project meets the no rise criteria of Bellevue City Code Title 20. Because the amount of fill placed is very shallow (less than 1 foot on average) and the bridge opening is quite wide relative to Vasa Creek and the base flood event, the proposed project is not expected to generate a rise in base flood conditions.

Effective Base Flood Storage Volume

As compared to conditions measured in the field, the proposed project will add approximately 8 cubic yards of fill to Vasa Creek below the ordinary high water line. The project area is limited to the 164th Place SE right-of-way and the base flood is entirely contained within the channel banks in this reach. Consequently, compensatory storage was not considered a feasible option because we don't want to excavate within the channel due to habitat concerns. The fill will be placed in the ineffective flow areas adjacent to the bridge abutments. These areas are currently in the flow-shadow between the upstream and downstream channel banks and are unlikely to be providing effective conveyance and storage. (These ineffective flow areas were not included in the modeling because omitting them provides a more conservative approach for the no rise analysis by assuming that all of the fill occupies effective conveyance area.) Since the fill is ineffective flow areas, it isn't occupying effective base flood volume and the design meets the effective base flood storage criteria of Bellevue City Code Title 20.

References

Environmental Science Associates (ESA). 2019. Unpublished field data.

Federal Emergency Management Agency (FEMA). 2016. Letter of Map Revision Determination Document, Case No.: 15-10-0979P. Available at: https://map1.msc.fema.gov/data/53/L/15-10-0979P-530074.pdf?LOC=da867a18b5fb2e1b8de4857e508fc30b. Accessed December 2019.

King County Engineering Department. [Date illegible]. Standard 15'9" Precast Conc. Bridge Deck, Plans Elevations, Typical Sections. (Original construction plans for the 164th Place SE Bridge).

Washington Department of Fish and Wildlife (WDFW). 2013. *Water Crossings Design Guidelines.* Available at: https://wdfw.wa.gov/publications/01501. Accessed December 2019.

Watershed Science and Engineering (WSE). 2014. *2014 Vasa Basin Study.* Available at: https://bellevuewa.gov/sites/default/files/media/. Downloaded July 2015.

APPENDIX A

Draft Design Plans

SUNSET AND HEATHFIELD PUMP STATIONS AND FORCE MAIN UPGRADE

CONTRACT NO C01008C16

VASA CREEK HABITAT IMPROVEMENTS

DRAFT FINAL PLANS

JUNE 2019

KING COUNTY
Department of
Natural Resources and Parks
Wastewater Treatment Division

GENERAL NOTES:

1. WORK SHALL CONFORM TO ALL LOCAL, STATE AND FEDERAL LAWS AND REGULATIONS AND PERMITS ISSUED FOR THE PROJECT. CONTRACTOR SHALL HAVE A COPY OF ALL PERMITS ONSITE AT ALL TIMES AND COMPLY WITH ALL CONDITIONS STIPULATED IN THE PERMITS.
2. CONTRACTOR SHALL HAVE COPIES OF THE APPROVED PLANS AND SPECIFICATIONS ON SITE AND READILY AVAILABLE AT ALL TIMES.
3. PRIOR TO ANY GROUND DISTURBANCE, CONTRACTOR SHALL LOCATE ALL UNDERGROUND AND OVERHEAD UTILITIES IN ACCORDANCE WITH STATE LAW. CONTRACTOR IS RESPONSIBLE FOR PROTECTING ALL UTILITIES AND ADJACENT INFRASTRUCTURE FROM DAMAGE DURING CONSTRUCTION.
4. PROJECT COORDINATE SYSTEM:
   HORIZONTAL DATUM: NORTH AMERICAN DATUM OF 1983 (NAD83) WASHINGTON STATE PLANE NORTH, US SURVEY FEET.

   VERTICAL DATUM: METRO (TO CONVERT FROM METRO TO NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88), SUBTRACT 96.43 FT FROM METRO ELEVATION.)
5. FEATURES AND TOPOGRAPHY SURVEYED BY TRUE NORTH LAND SURVEYING, JULY 2014. STREAM CHANNEL TOPOGRAPHY IS LIKELY TO HAVE CHANGED SINCE THIS SURVEY WAS PERFORMED. AREA BENEATH THE BRIDGE IS NOT SURVEYED. ELEVATIONS ARE APPROXIMATE FROM ESA FIELD MEASUREMENTS APRIL 2019.
6. ACCESS TO THE SITE IS ON PUBLIC ROADS. CONTRACTOR SHALL COORDINATE WITH THE CITY OF BELLEVUE FOR APPROVED HAUL ROUTES AND TRAFFIC PERMITS AND APPROVALS.
7. CONTRACTOR SHALL CONFINE CONSTRUCTION OPERATION TO WITHIN PERMANENT EASEMENTS, TEMPORARY CONSTRUCTION EASEMENTS, OR PUBLIC RIGHT-OF-WAY ONLY UNLESS OTHERWISE SPECIFIED.
8. EROSION AND SEDIMENT CONTROL SHALL COMPLY WITH ALL APPLICABLE LAWS AND REGULATIONS.
9. THE CONTRACTOR IS RESPONSIBLE FOR ALL WATER MANAGEMENT THROUGHOUT CONSTRUCTION, INCLUDING DEWATERING AND DRAINAGE.
10. THIS PROJECT INCLUDES INSTALLATION OF CONSTRUCTED STREAMBED UNDERNEATH A LOW CLEARANCE BRIDGE (APPROX. 4.5 FEET OF CLEARANCE). EQUIPMENT ACCESS MAY BE CHALLENGING, AND HAND WORK MAY BE REQUIRED.

ABBREVIATIONS:

(E)	EXISTING
(N)	NEW
APPROX	APPROXIMATE
E	EAST / EASTING
EG	EXISTING GRADE
EL	ELEVATION
EX	EXISTING
FG	FINISH GRADE
FT	FOOT/FEET
GAL	GALLON
MIN	MINIMUM
N	NORTH / NORTHING
NTS	NOT TO SCALE
OC	ON CENTER
OHW	ORDINARY HIGH WATER
PIP	PROTECT IN PLACE
ROW	RIGHT OF WAY
SF	SQUARE FEET
STA	STATION
SWPPP	STORMWATER POLLUTION PREVENTION PLAN
TYP	TYPICAL
WDFW	WASHINGTON DEPARTMENT OF FISH AND WILDLIFE

LEGEND:

- DECIDUOUS TREE
- CONIFEROUS TREE
- SIGN
- WOODEN PILE
- STORM WATER MANHOLE
- G — GAS LINE
- W — WATER LINE
- FM — SEWER FORCE MAIN LINE
- OT — OVERHEAD TRANSMISSION LINE
- T — UNDERGROUND TRANSMISSION LINE
- OP — OVERHEAD POWER LINE
- P — UNDERGROUND POWER LINE
- EDGE OF PAVEMENT
- X — FENCE
- EDGE OF RIGHT-OF-WAY
- PROPERTY LINE
- OHW — ORDINARY HIGH WATER
- (E) TOP OF BANK
- (E) LOW FLOW CHANNEL TOP OF BANK
- (N) TOP OF BANK
- (N) TOE OF BANK
- (N) CHANNEL CENTER LINE
- DIVERSION PIPE
- (E) MAJOR CONTOUR
- (E) MINOR CONTOUR
- (N) MAJOR CONTOUR
- (N) MINOR CONTOUR
- STREAMBED SEDIMENT
- FISH EXCLUSION NETTING

SHEET LIST:

NO	REVISION DESCRIPTION	BY	APVD	DATE

ESA
5309 SHILSHOLE AVE. NW,
STE 200
SEATTLE, WA 98107
OFFICE - 206.789.9658
WWW.ESASSOC.COM

PRELIMINARY ISSUE DRAWING
INFORMATION ONLY
DRAFT FINAL

ELEANOR S. BARTOLOMEO — STATE OF WASHINGTON — 53611 — REGISTERED PROFESSIONAL ENGINEER — PRELIMINARY

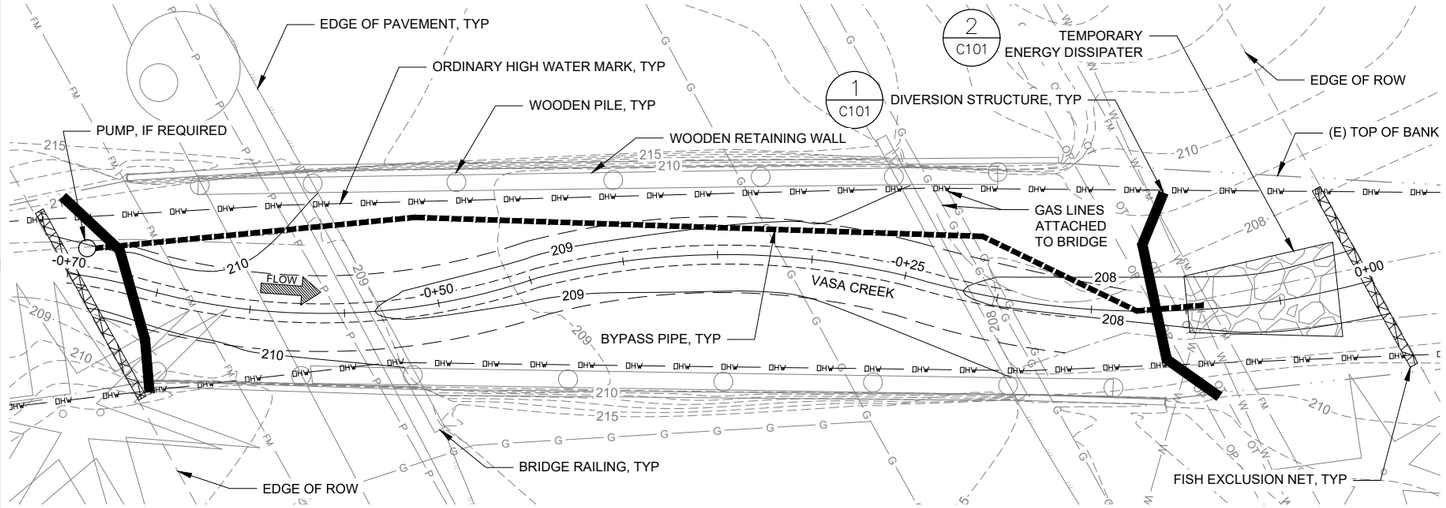
DESIGNED/DRAWN: E. GUTIERREZ	SCALE: AS NOTED
PROJECT ENGINEER: E. BARTOLOMEO	0 REFERENCE 1"
DESIGN APPROVAL: XXXX	FACILITY NUMBER:
PROJECT ACCEPTANCE: XXXX	CONTRACT NO: C01008C16

King County

DEPARTMENT OF NATURAL RESOURCES & PARKS
WASTEWATER TREATMENT DIVISION
SUNSET AND HEATHFIELD PUMP STATIONS
AND FORCE MAIN UPGRADE

NOTES & LEGEND

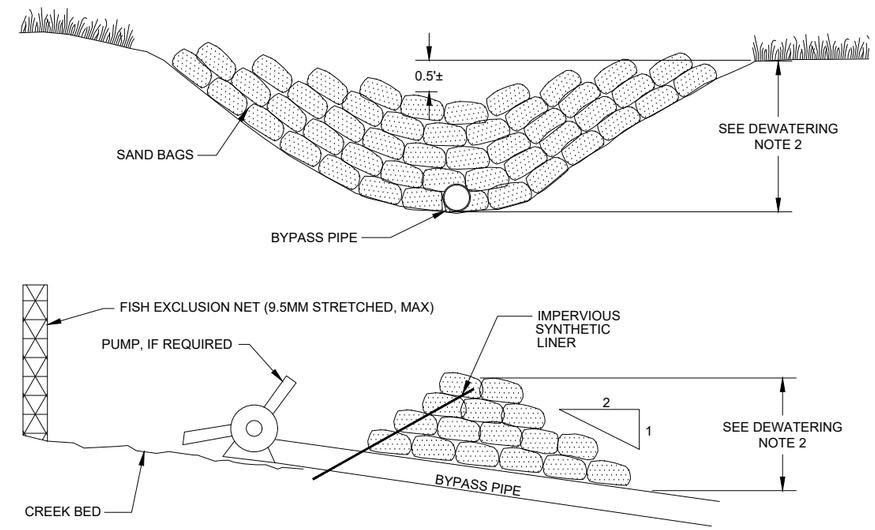
DCN:	
DATE:	JUNE 2019
PROJECT FILE NO:	1038122
DRAWING NO:	G102
SHT NO / TOTAL	2 / 5
REV NO:	0



DEWATERING
PLAN

4 0 4 8

SCALE: 1" = 4'



DIVERSION STRUCTURE

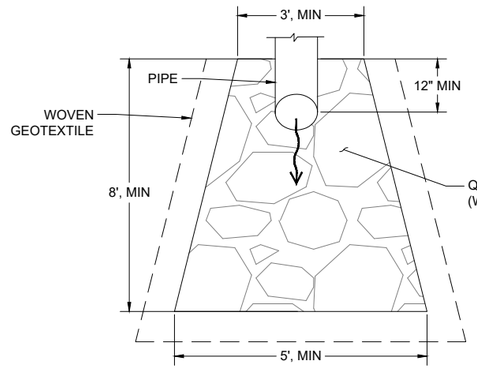
DETAIL 1
SCALE: NTS -

DEWATERING NOTES:

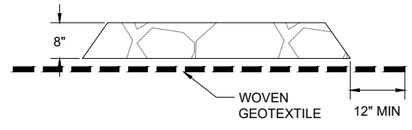
1. THE CONTRACTOR SHALL PREPARE AND SUBMIT A TEMPORARY STREAM DIVERSION PLAN FOR REVIEW BY THE PROJECT REPRESENTATIVE. THE CONTRACTOR SHALL NOT WORK WITHIN THE OHW OF VASA CREEK WITHOUT AN APPROVED TEMPORARY STREAM DIVERSION PLAN, PER SPECIFICATIONS.
2. THE DIVERSION STRUCTURES SHALL BE HIGH ENOUGH TO PREVENT OVERTOPPING AND ALLOW ENOUGH FREEBOARD FOR INCLEMENT WATER CONDITIONS. STRUCTURE HEIGHTS AND MATERIALS SHALL BE INCLUDED IN THE CONTRACTORS TEMPORARY STREAM DIVERSION PLAN.
3. SEE SPECIFICATIONS FOR THE CONSTRUCTION PERIOD FLOW RATE AND DIVERSION REQUIREMENTS.
4. ALL DEWATERING PUMPS SHALL HAVE WDFW-APPROVED FISH SCREENS. ADDITIONALLY, FISH EXCLUSION NETTING SHALL BE INSTALLED UPSTREAM AND DOWNSTREAM OF THE ISOLATED WORK AREA.
5. FISH AND AQUATIC ORGANISM REMOVAL SHALL BE CONDUCTED PRIOR TO DEWATERING THE WORK AREA. FISH AND AQUATIC ORGANISMS WILL BE TEMPORARILY RELOCATED UPSTREAM OF THE BYPASS.
6. ALL WORK WITHIN ORDINARY HIGH WATER OF VASA CREEK SHALL OCCUR DURING THE APPROVED IN-WATER WORK WINDOW: JULY 1 TO AUGUST 15.
7. ALL EQUIPMENT, INCLUDING FOOTWEAR, SHALL BE DECONTAMINATED BEFORE AND AFTER ENTERING VASA CREEK TO PREVENT THE SPREAD OF NEW ZEALAND MUDSNAIL PER CITY OF BELLEVUE REQUIREMENTS.

TEMPORARY ENERGY DISSIPATER NOTES:

1. GEOTEXTILE SHALL BE WOVEN AND SHALL HAVE A MINIMUM TEAR STRENGTH OF 80 LBS AND A PUNCTURE RESISTANCE OF 7.300 LBS.
2. GEOTEXTILE SHALL EXTEND 12" BEYOND THE EDGES OF THE TEMPORARY ENERGY DISSIPATER TO PREVENT QUARRY SPALLS FROM MIXING WITH THE STREAMBED MATERIALS.
3. GEOTEXTILE AND QUARRY SPALLS SHALL BE COMPLETELY REMOVED AFTER USE.



PLAN VIEW



SECTION VIEW

TEMPORARY ENERGY DISSIPATER

DETAIL 2
SCALE: NTS -

NO	REVISION DESCRIPTION	BY	APVD	DATE

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SEATTLE, WA 98107
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PRELIMINARY ISSUE DRAWING
INFORMATION ONLY
DRAFT FINAL

ELEANOR S. BARTOLOMEO
STATE OF WASHINGTON
53611
REGISTERED
PROFESSIONAL ENGINEER
PRELIMINARY

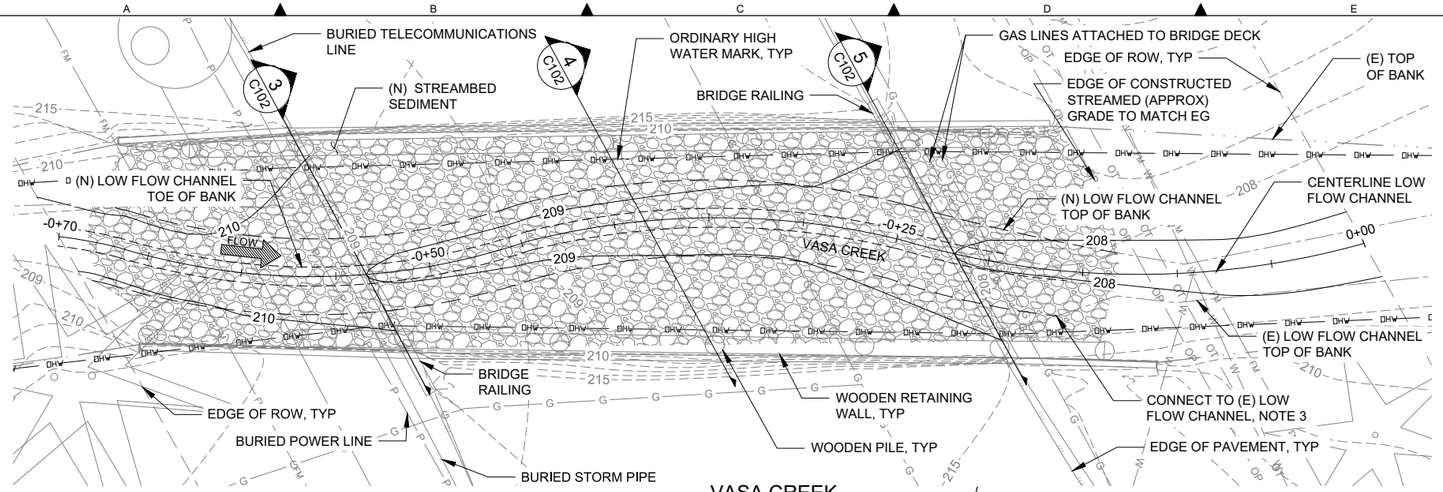
DESIGNED/DRAWN: E.BARTOLOMEO	SCALE: AS NOTED
PROJECT ENGINEER: E.BARTOLOMEO	REFERENCE 0 1"
DESIGN APPROVAL: XXXX	FACILITY NUMBER:
PROJECT ACCEPTANCE: XXXX	CONTRACT NO: C01008C16

King County

DEPARTMENT OF NATURAL RESOURCES & PARKS
WASTEWATER TREATMENT DIVISION
SUNSET AND HEATHFIELD PUMP STATIONS
AND FORCE MAIN UPGRADE

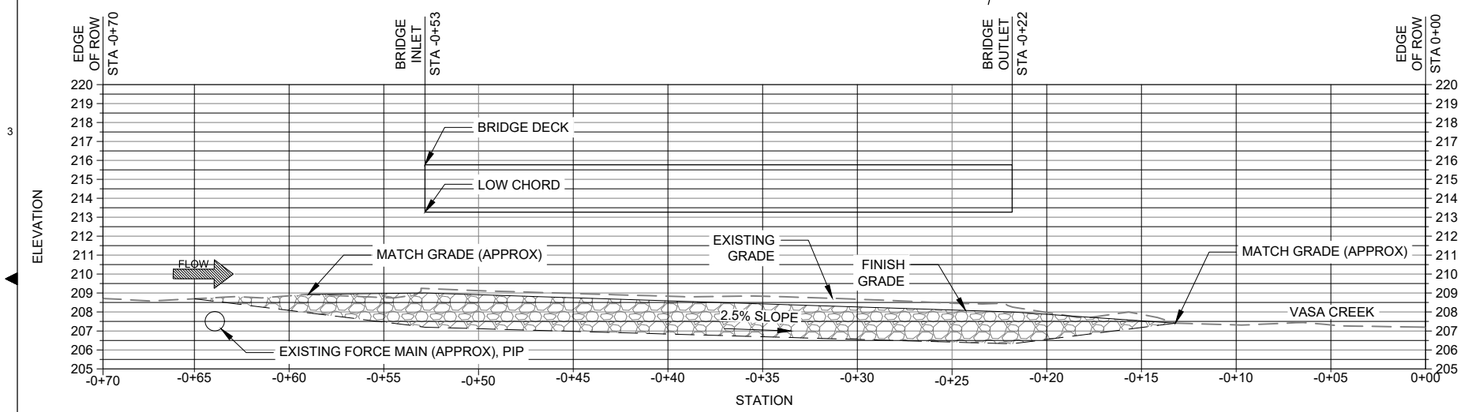
STREAM DEWATERING PLAN

DCN:	
DATE:	JUNE 2019
PROJECT FILE NO:	1038122
DRAWING NO:	C101
SHT NO / TOTAL	3 / 5
REV NO:	0

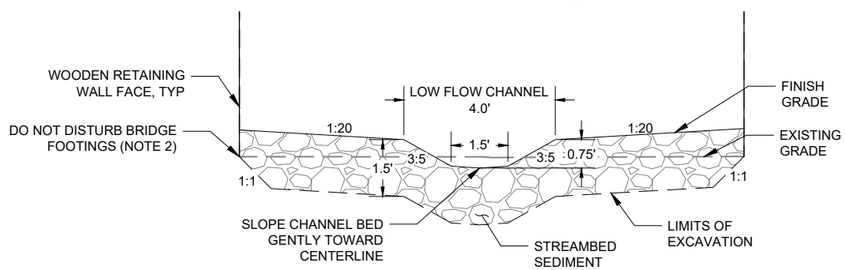


VASA CREEK
PLAN

SCALE: 1" = 4'



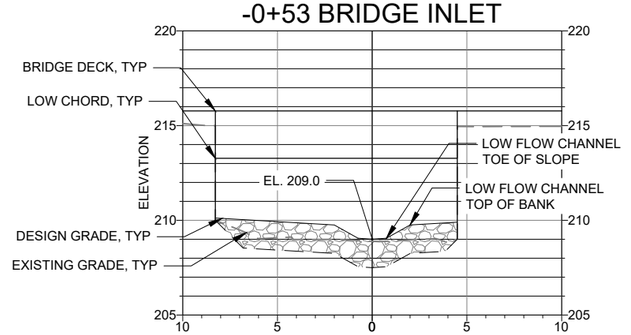
VASA CREEK
PROFILE 1
SCALE: 1"=4'



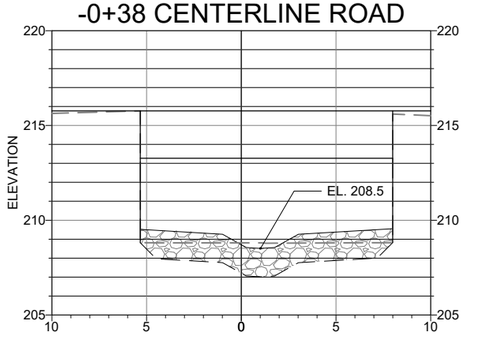
CONSTRUCTED STREAMBED
DETAIL 2
SCALE: 1"=2'

NOTES:

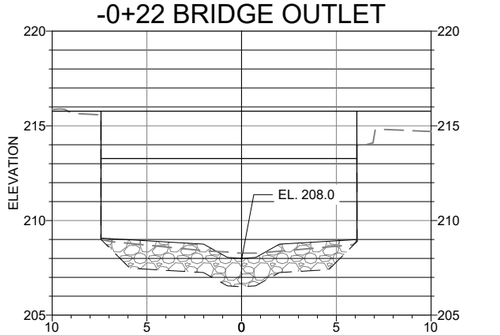
1. FEATURES AND TOPOGRAPHY SURVEYED BY TRUE NORTH LAND SURVEYING, JULY 2014. STREAM CHANNEL TOPOGRAPHY IS LIKELY TO HAVE CHANGED SINCE THIS SURVEY WAS PERFORMED. AREA BENEATH THE BRIDGE IS NOT SURVEYED. ELEVATIONS ARE APPROXIMATE FROM ESA FIELD MEASUREMENTS APRIL 2019.
2. BRIDGE FOOTING TYPE AND DEPTH ARE UNKNOWN. SLOPE LIMITS OF EXCAVATION AWAY FROM BRIDGE ABUTMENTS AT 1:1 TO AVOID IMPACTS TO FOOTINGS. NOTIFY PROJECT REPRESENTATIVE IF FOOTINGS ARE ENCOUNTERED OR DAMAGED.
5. CONSTRUCT LOW FLOW CHANNEL BENEATH BRIDGE AS SHOWN. TRANSITION SMOOTHLY BETWEEN EXISTING AND DESIGN GRADES AT THE UPSTREAM AND DOWNSTREAM ENDS OF THE PROJECT AS DIRECTED BY PROJECT REPRESENTATIVE IN THE FIELD. LIMITS OF GRADING AND CONSTRUCTED STREAMBED ARE APPROXIMATE. MATCH CENTER LINE, TOP, AND TOE OF LOW FLOW CHANNEL AND CHANNEL BANKS.
6. PLACE STREAMBED SEDIMENT IN LIFTS AND WASH IN NATIVE FINES PER SPECIFICATIONS.



SECTION 1 — 3 / -
SCALE: 1"=4'



SECTION 2 — 4 / -
SCALE: 1"=4'



SECTION 3 — 5 / -
SCALE: 1"=4'

NO	REVISION DESCRIPTION	BY	APVD	DATE

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PRELIMINARY ISSUE DRAWING
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ELEANOR S. BARTOLOMEO — STATE OF WASHINGTON — 53611 — REGISTERED PROFESSIONAL ENGINEER — PRELIMINARY

DESIGNED/DRAWN: E.BARTOLOMEO	SCALE: AS NOTED
PROJECT ENGINEER: E.BARTOLOMEO	REFERENCE 0 1"
DESIGN APPROVAL: XXXX	FACILITY NUMBER:
PROJECT ACCEPTANCE: XXXX	CONTRACT NO: C01008C16

King County

DEPARTMENT OF NATURAL RESOURCES & PARKS
WASTEWATER TREATMENT DIVISION
SUNSET AND HEATHFIELD PUMP STATIONS
AND FORCE MAIN UPGRADE

CHANNEL IMPROVEMENTS PLAN & DETAILS

DCN:	
DATE:	JUNE 2019
PROJECT FILE NO:	1038122
DRAWING NO:	C102
SHT NO / TOTAL	4 / 5
REV NO:	0

BORDER FILE EDITION: KCWTD-2012-Dsize-TB-Border
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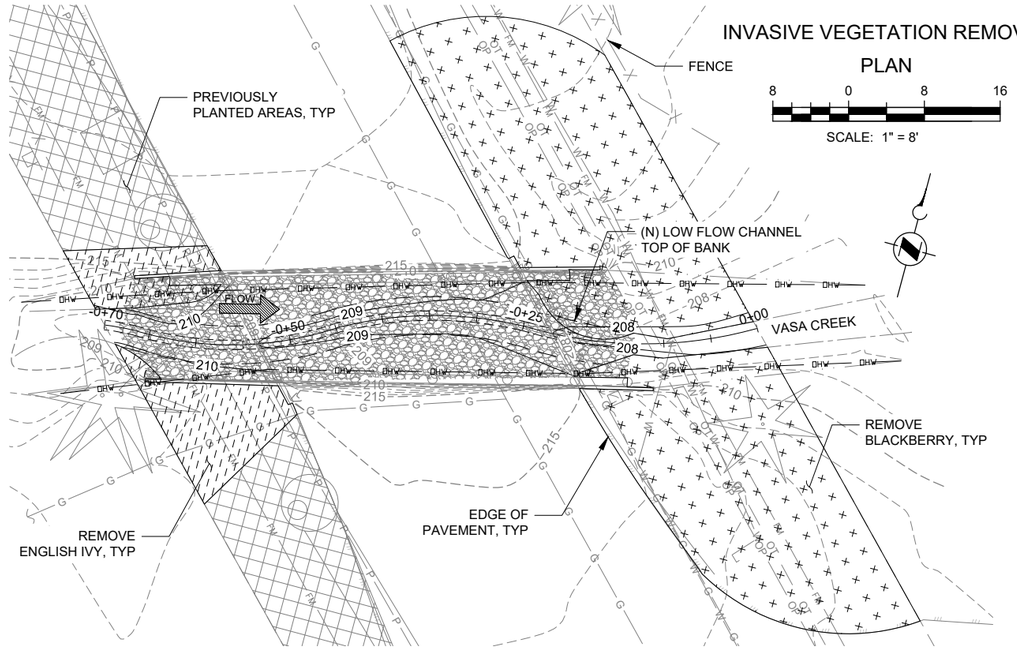
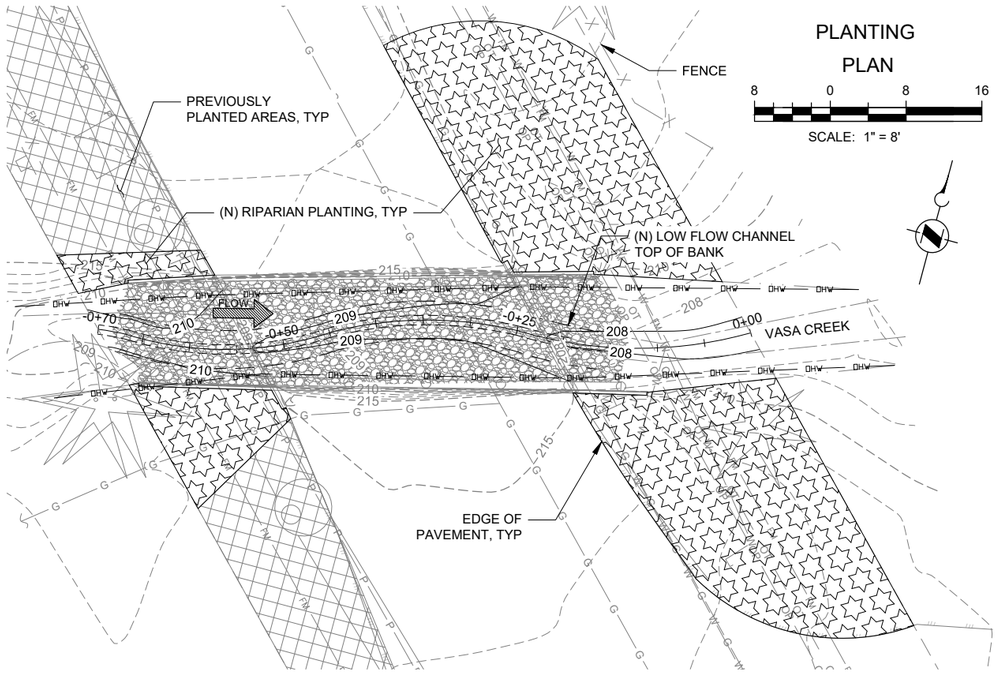
PLOTTED: Jun 14, 2019-07:22:35am By ebartolomeo
XREFS: X-TBLK.dwg; X-SURVEY.dwg; X-BASE.dwg
IMAGES:



INVASIVE VEGETATION REMOVAL PLAN

8 0 8 16

SCALE: 1" = 8'



PLANTING PLAN

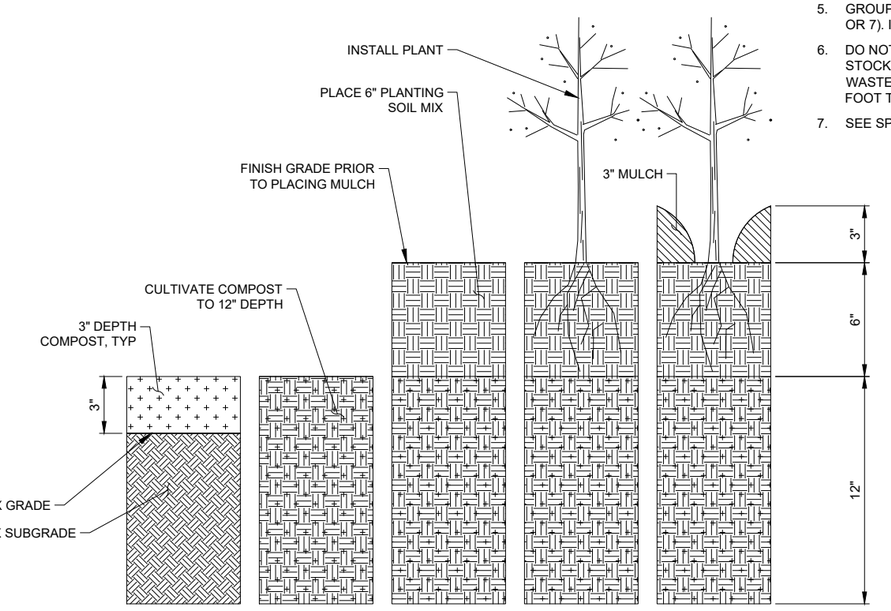
8 0 8 16

SCALE: 1" = 8'

PLANTING SCHEDULE: RIPARIAN PLANTING AREA (1,358 SF)					
SYMBOL	SCIENTIFIC NAME	COMMON NAME	INSTALL SIZE	SPACING	QUANTITY
	MAHONIA AQUIFOLIUM	TALL OREGON GRAPE	1 GAL	6' OC	9
	MYRICA CALIFORNICA	PACIFIC WAX MYRTLE	1 GAL	6' OC	9
	POLYSTICHUM MUNITUM	SWORD FERN	1 GAL	6' OC	9
	ROSA NUTKANA	NOOTKA ROSE	1 GAL	6' OC	9
	SYMPHORICARPOS ALBUS	SNOWBERRY	1 GAL	6' OC	8

NOTES:

1. ANY DISCREPANCIES BETWEEN THE DRAWINGS, SPECIFICATIONS, AND SITE CONDITIONS SHALL BE BROUGHT TO THE ATTENTION OF THE OWNER'S REPRESENTATIVE PRIOR TO PROCEEDING WITH CONSTRUCTION.
2. PRESERVE AND PROTECT IN PLACE ALL TREES AND VEGETATION NOT DESIGNATED FOR REMOVAL.
3. REMOVE ALL INVASIVE SPECIES FROM THE PLANTING AREAS PRIOR TO INSTALLATION USING METHODS APPROVED BY THE STATE OF WASHINGTON NOXIOUS WEED CONTROL BOARD. SPECIFIC SPECIES TO BE REMOVED INCLUDE:
   A. HIMALAYAN BLACKBERRY (RUBUS ARMENIACUS)
   B. ENGLISH IVY (HEDERA HELIX)
4. LOCATIONS OF INVASIVE PLANTS ON THIS PLAN ARE APPROXIMATE.
5. GROUP PLANTS OF SIMILAR SPECIES IN ODD NUMBER GROUPINGS (I.E. 3, 5, OR 7). INSTALL IN TRIANGULAR SPACING.
6. DO NOT DRIVE OR PARK ANY VEHICLES OR EQUIPMENT, STORE MATERIALS, STOCKPILE SOIL OR GRAVEL, OR DISPOSE OF ANY CONSTRUCTION OR WASTE MATERIAL WITHIN THE NEWLY INSTALLED PLANT AREAS. RESTRICT FOOT TRAFFIC WITHIN PROTECTED AREAS.
7. SEE SPECIFICATIONS FOR WATERING REQUIREMENTS.



PLANTING AREA PREPARATION SEQUENCE:

STEP 1
PLACE 3" COMPOST

STEP 2
INCORPORATE COMPOST TO 12" DEPTH

STEP 3
PLACE 6" PLANTING SOIL MIX

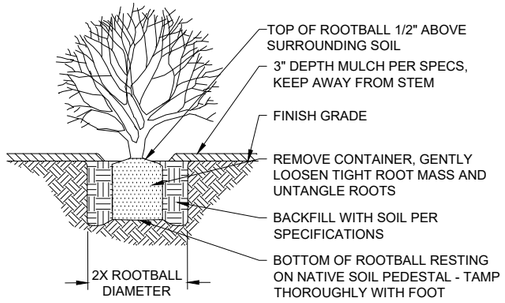
STEP 4
INSTALL PLANTS. SEE DETAIL 2 AND SPECIFICATIONS FOR METHOD AND PLANTING PLAN FOR LOCATIONS

STEP 5
INSTALL 3' DIAMETER MULCH RINGS, 3" DEEP

SOIL PREPARATION

DETAIL 1 / -

SCALE: NTS



SHRUB PLANTING

DETAIL 2 / -

SCALE: NTS

NO	REVISION DESCRIPTION	BY	APVD	DATE

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PRELIMINARY ISSUE DRAWING
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STATE OF WASHINGTON ALISONA B. GREENBERG PRELIMINARY NO. 10417 EXP. 2/28/2020 LANDSCAPE ARCHITECT

DESIGNED/DRAWN: A. GREENBERG	SCALE: AS NOTED
PROJECT ENGINEER: E. BARTOLOMEO	0 REFERENCE 1"
DESIGN APPROVAL: XXXX	FACILITY NUMBER:
PROJECT ACCEPTANCE: XXXX	CONTRACT NO: C01008C16

King County

DEPARTMENT OF NATURAL RESOURCES & PARKS
WASTEWATER TREATMENT DIVISION
SUNSET AND HEATHFIELD PUMP STATIONS AND FORCE MAIN UPGRADE

PLANTING PLAN

DCN:	
DATE:	JUNE 2019
PROJECT FILE NO:	1038122
DRAWING NO:	L101
SHT NO / TOTAL	5 / 5
REV NO:	0

BORDER FILE EDITION: KCWTD-2012-Dsize-TB-Border

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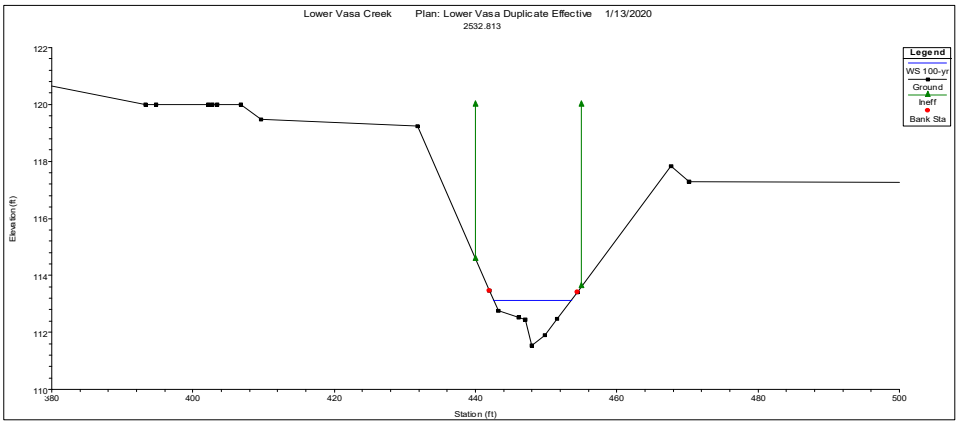
PLOTTED: Jun 14, 2019-07:22:48am By ebartolomeo
XREFS: X-TBLK.dwg; X-BASE.dwg; X-SURVEY.dwg; X-INVASIVES.dwg; X-PLANTING.dwg; X-LA-DETAILS.dwg
IMAGES:

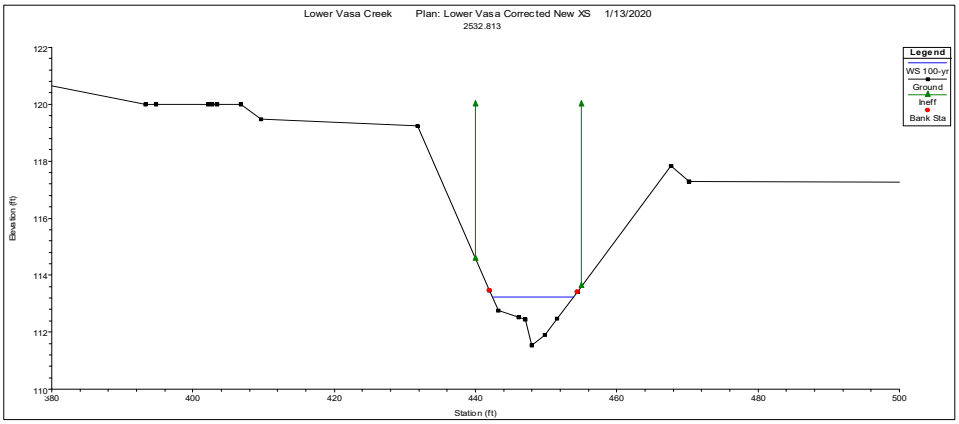
APPENDIX B

Cross Section Geometries & Water Surface Profiles

Section 2689.99 - Original Upstream Bounding Section

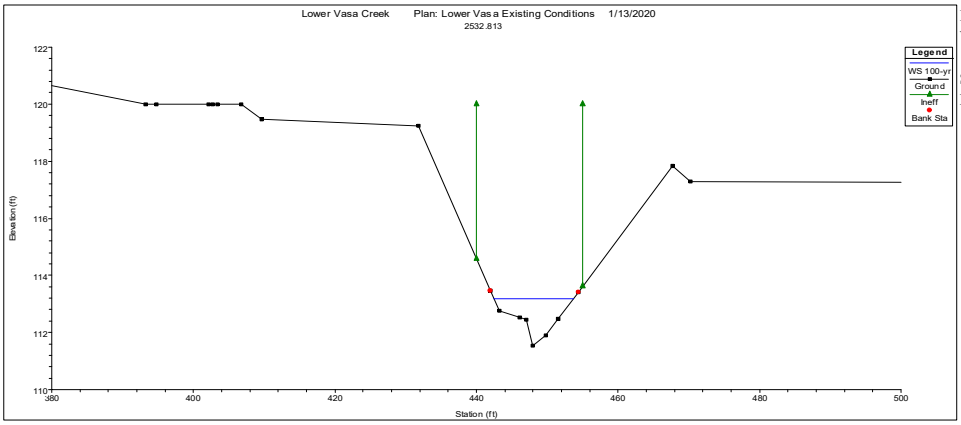


Duplicate Model:
WSE = 113.1 feet NAVD 88



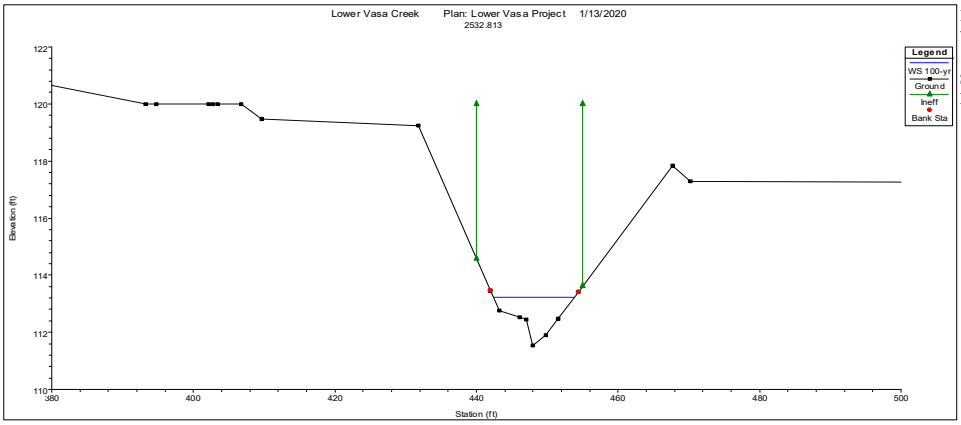
Corrected Model:
WSE = 113.2 feet NAVD 88

Section geometry is the same as the Duplicate Model.



Existing Conditions Model:
WSE = 113.2 feet NAVD 88

Section geometry is the same as the Duplicate Model.



Project Conditions Model:
WSE = 113.2 feet NAVD 88

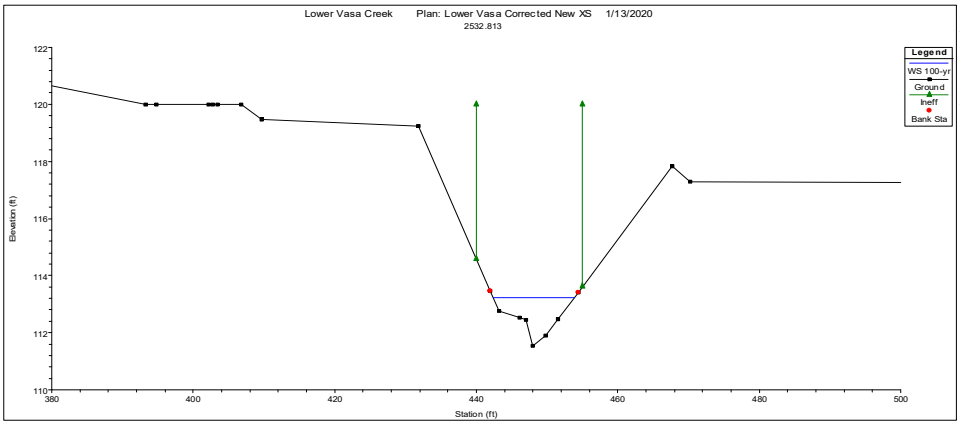
Section geometry is the same as the Duplicate Model.

Section 2687.99 - New Upstream Bounding Section

Duplicate Model:
WSE = NA

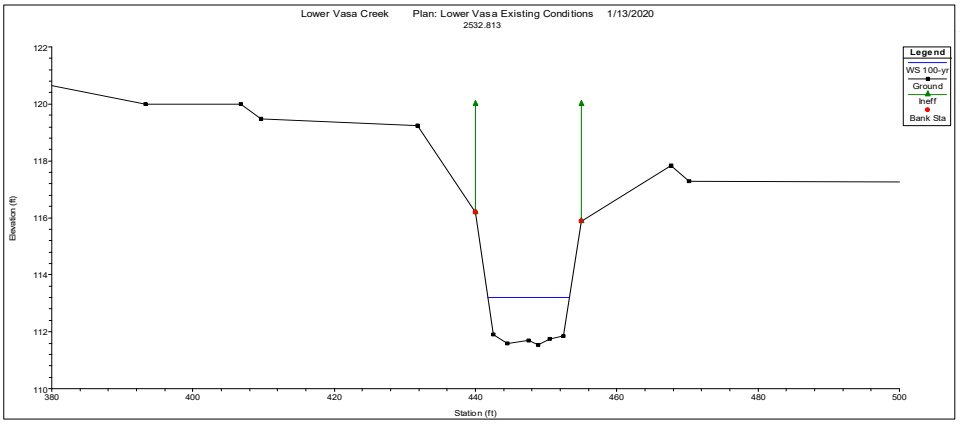
Section is not part of the original model.

Not Included



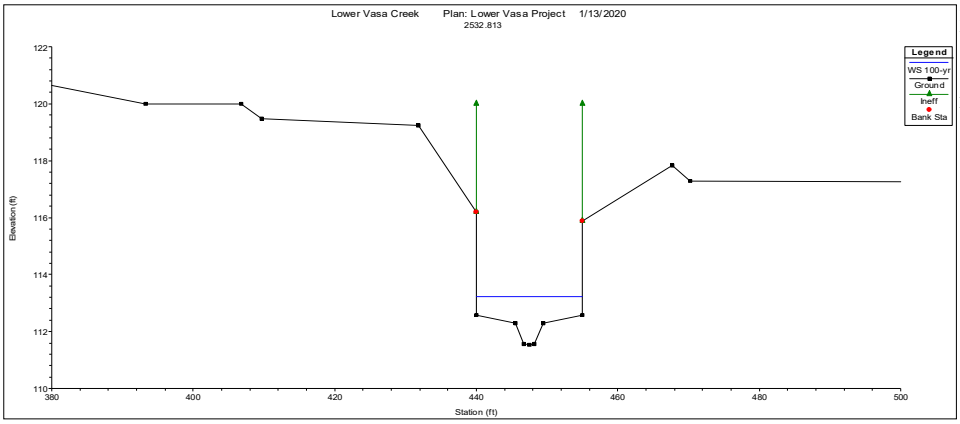
Corrected Model:
WSE = 113.2 feet NAVD 88

Section geometry is the same as section 2689.99 of the Duplicate Model.



Existing Conditions Model:
WSE = 113.2 feet NAVD 88

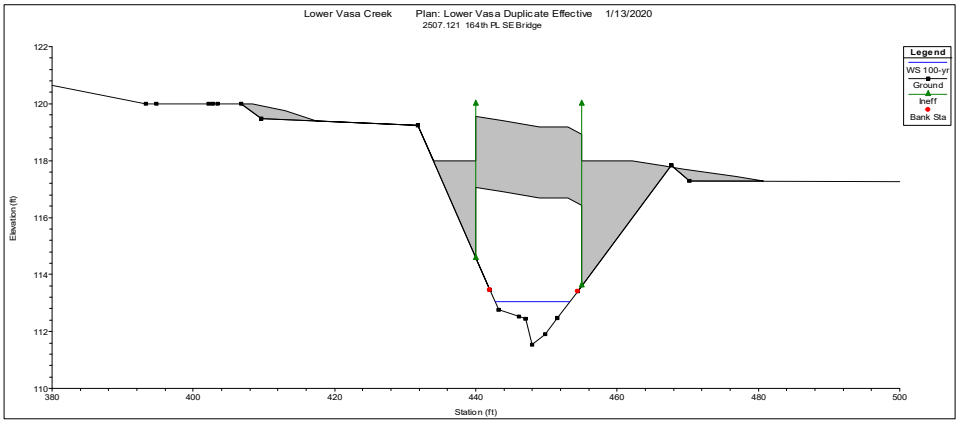
Section geometry updated to reflect conditions observed in the field.



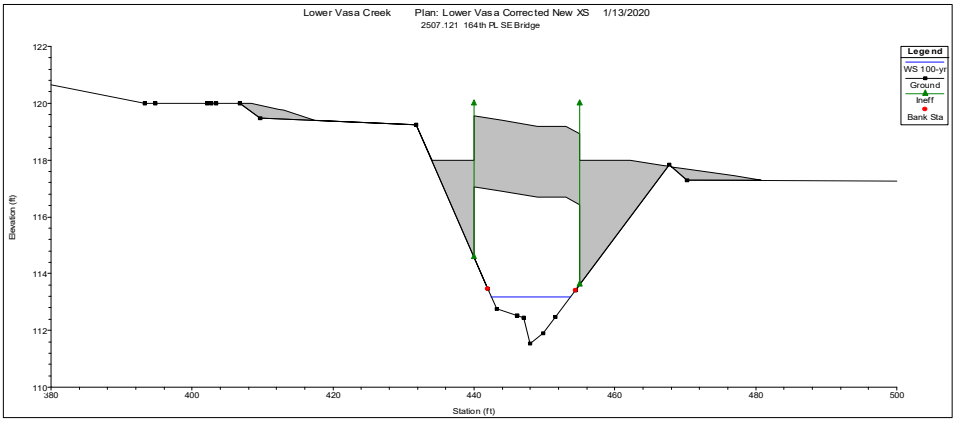
Project Conditions Model:
WSE = 113.2 feet NAVD 88

Section geometry updated to reflect proposed project conditions.

Section 2664.99 US - Upstream Bridge Face

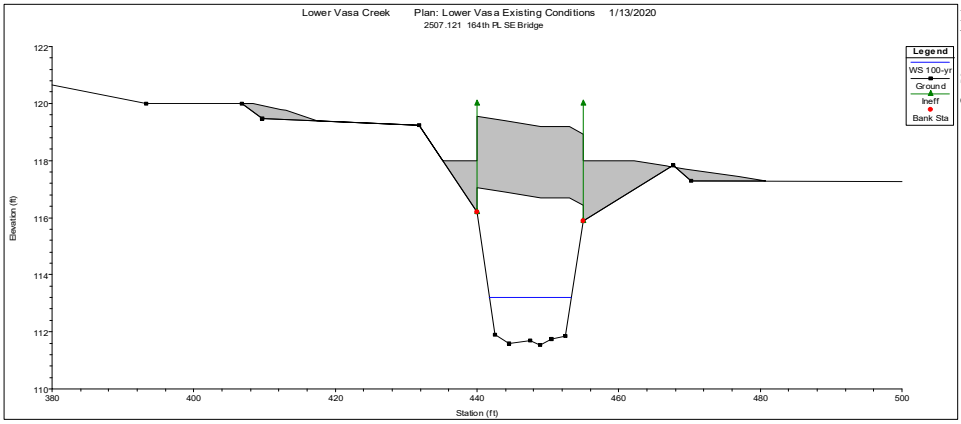


Duplicate Model:
WSE = 113.0 feet NAVD 88



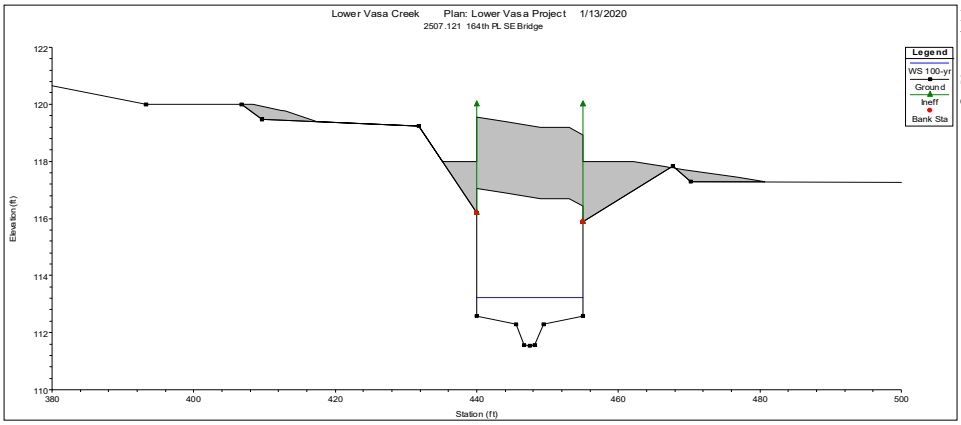
Corrected Model:
WSE = 113.2 feet NAVD 88

Section geometry is the same as the Duplicate Model.



Existing Conditions Model:
WSE = 113.2 feet NAVD 88

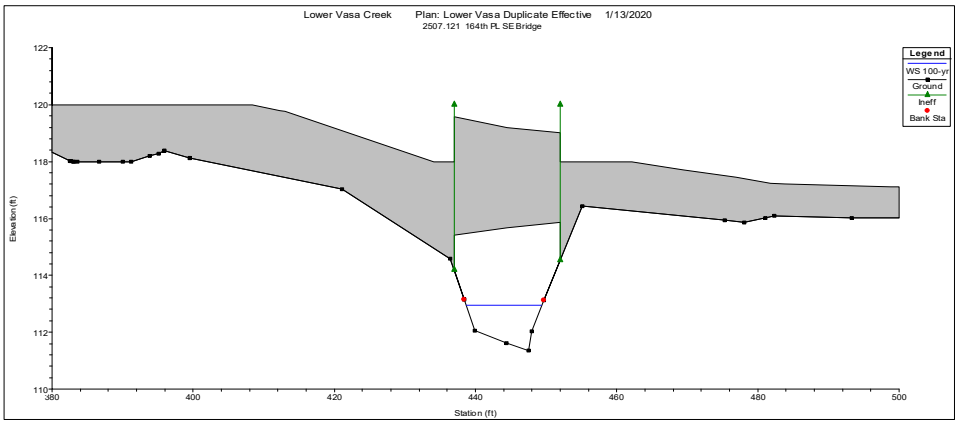
Section geometry represents observed field conditions.



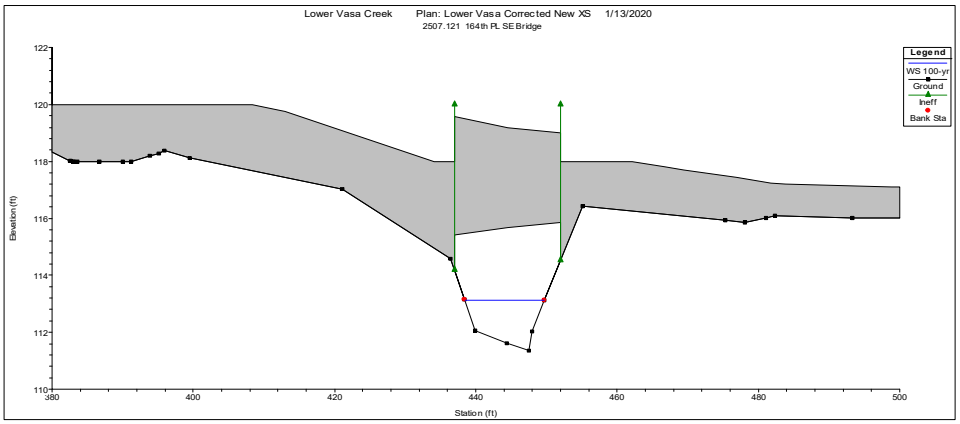
Project Conditions Model:
WSE = 113.2 feet NAVD 88

Section geometry represents proposed project conditions.

Section 2664.99 DS - Downstream Bridge Face

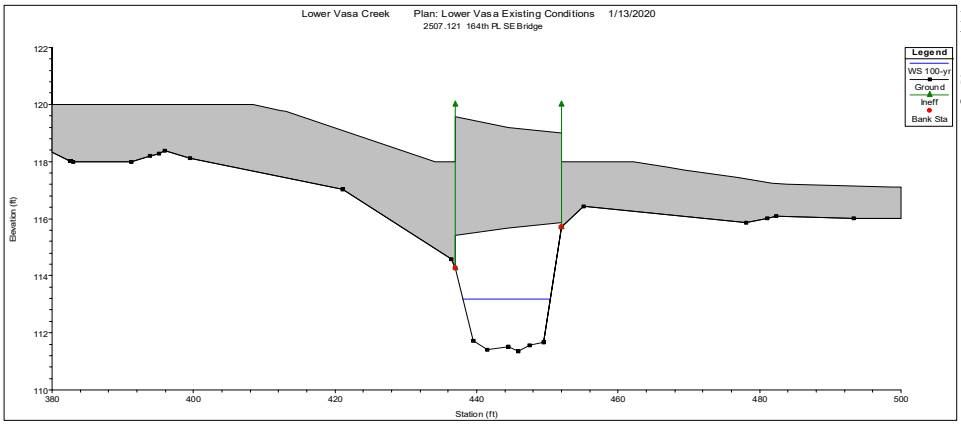


Duplicate Model:
WSE = 112.9 feet NAVD 88



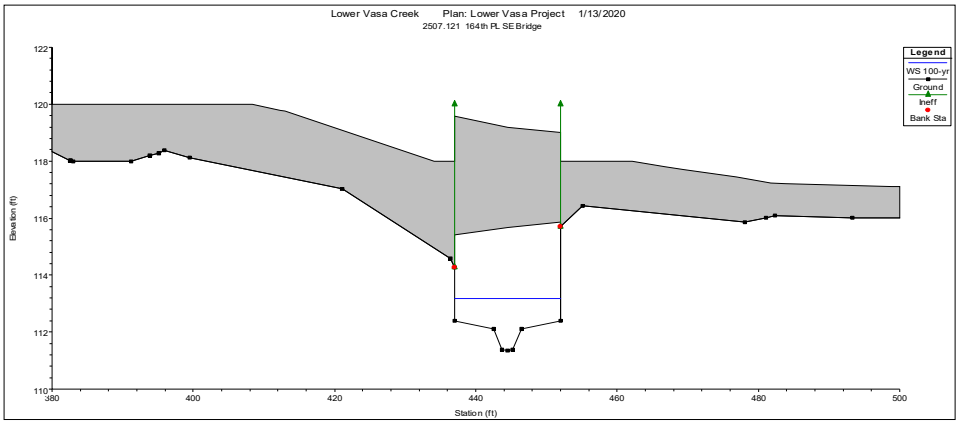
Corrected Model:
WSE = 113.1 feet NAVD 88

Section geometry is the same as the Duplicate Model.



Existing Conditions Model:
WSE = 113.2 feet NAVD 88

Section geometry represents observed field conditions.



Project Conditions Model:
WSE = 113.2 feet NAVD 88

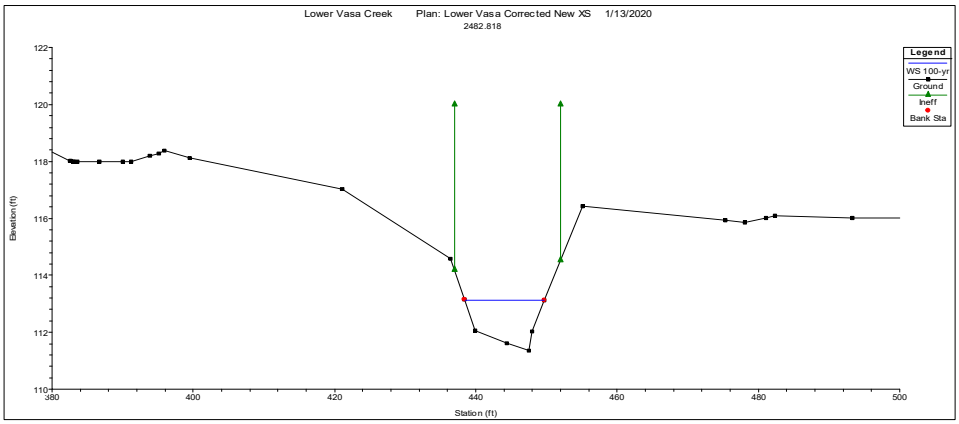
Section geometry represents proposed project conditions.

Section 2644.49 - New Dowstream Bounding Section

Duplicate Model:
WSE = NA

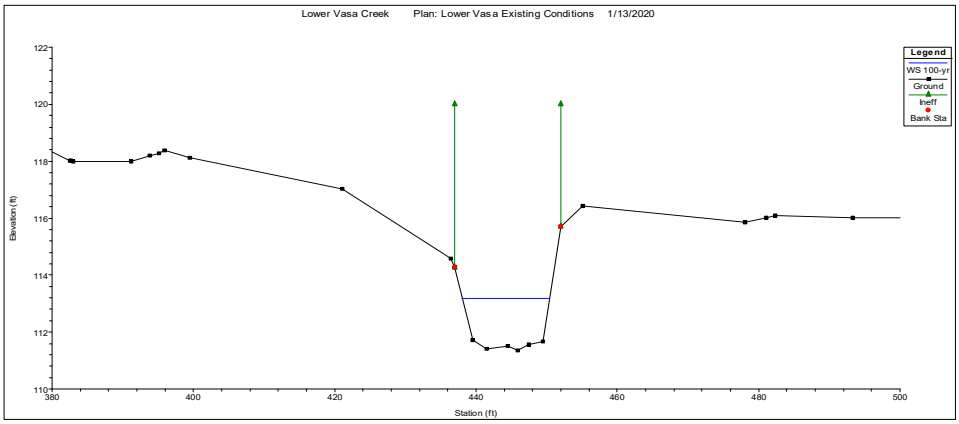
Section is not part of the original model.

Not Included



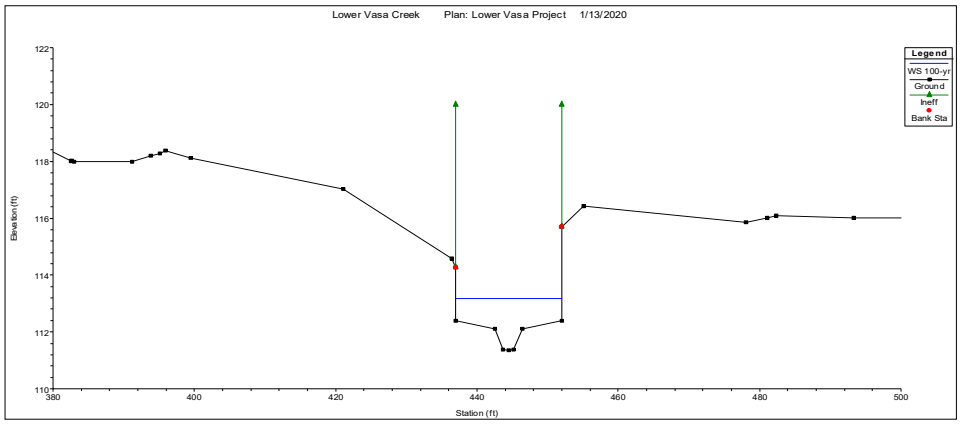
Corrected Model:
WSE = 113.1 feet NAVD 88

Section geometry is the same as the Duplicate Model.



Existing Conditions Model:
WSE = 113.2 feet NAVD 88

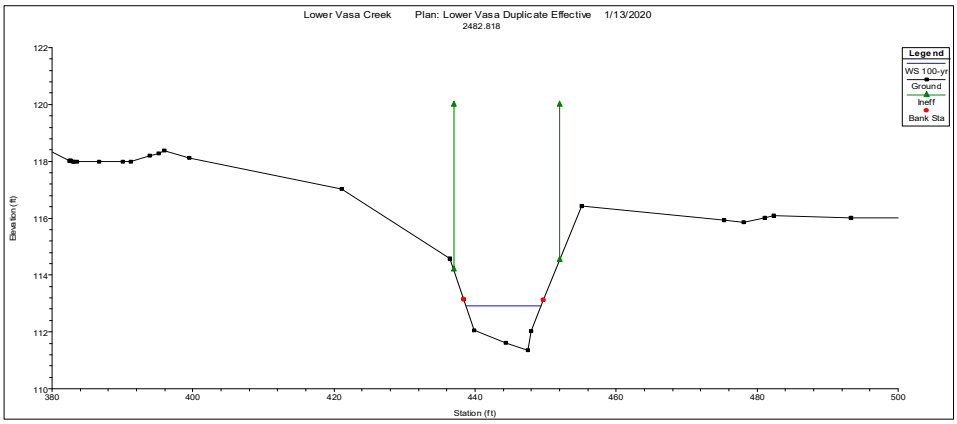
Section geometry represents observed field conditions.



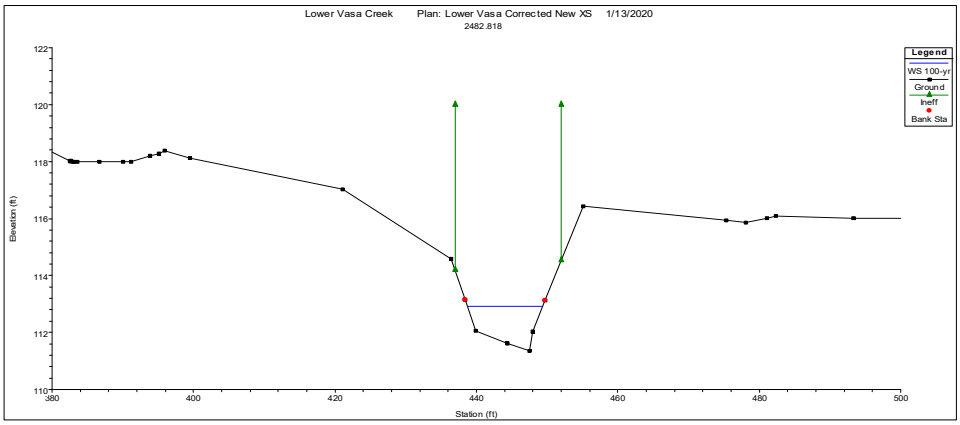
Project Conditions Model:
WSE = 113.2 feet NAVD 88

Section geometry represents proposed project conditions.

Section 2639.87 - Original Downstream Bounding Section

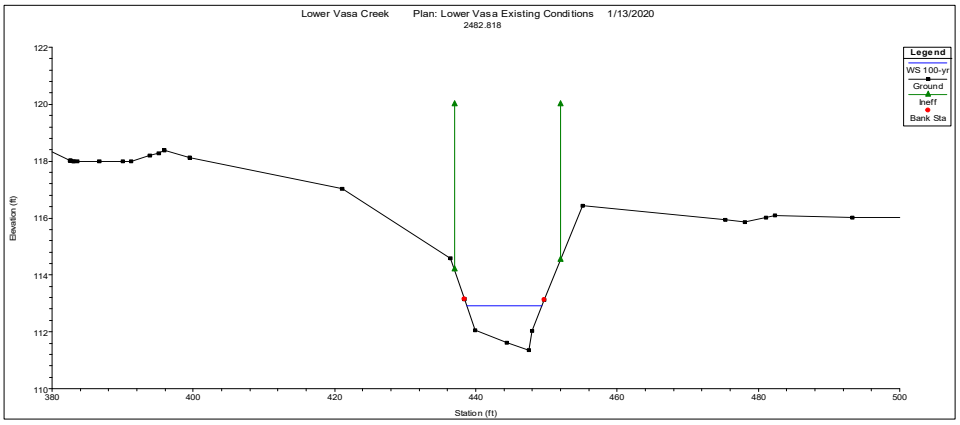


Duplicate Model:
WSE = 112.9 feet NAVD 88



Corrected Model:
WSE = 112.9 feet NAVD 88

Section geometry is the same as the Duplicate Model.



Existing Conditions Model:
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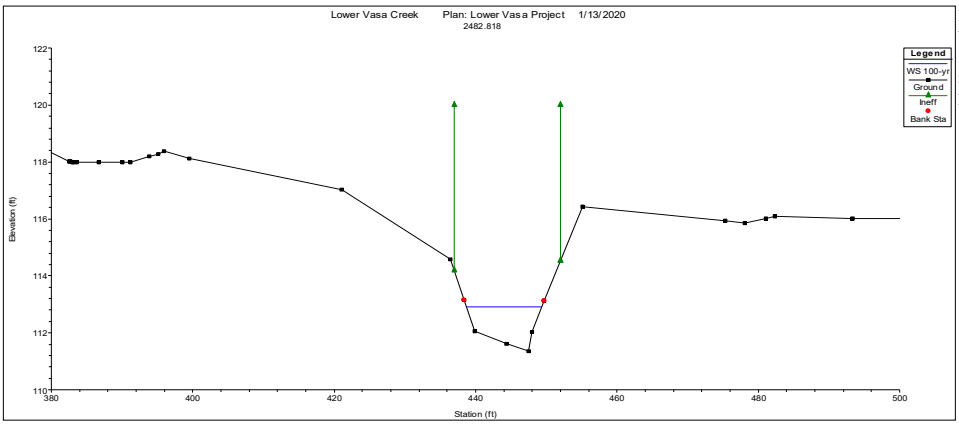
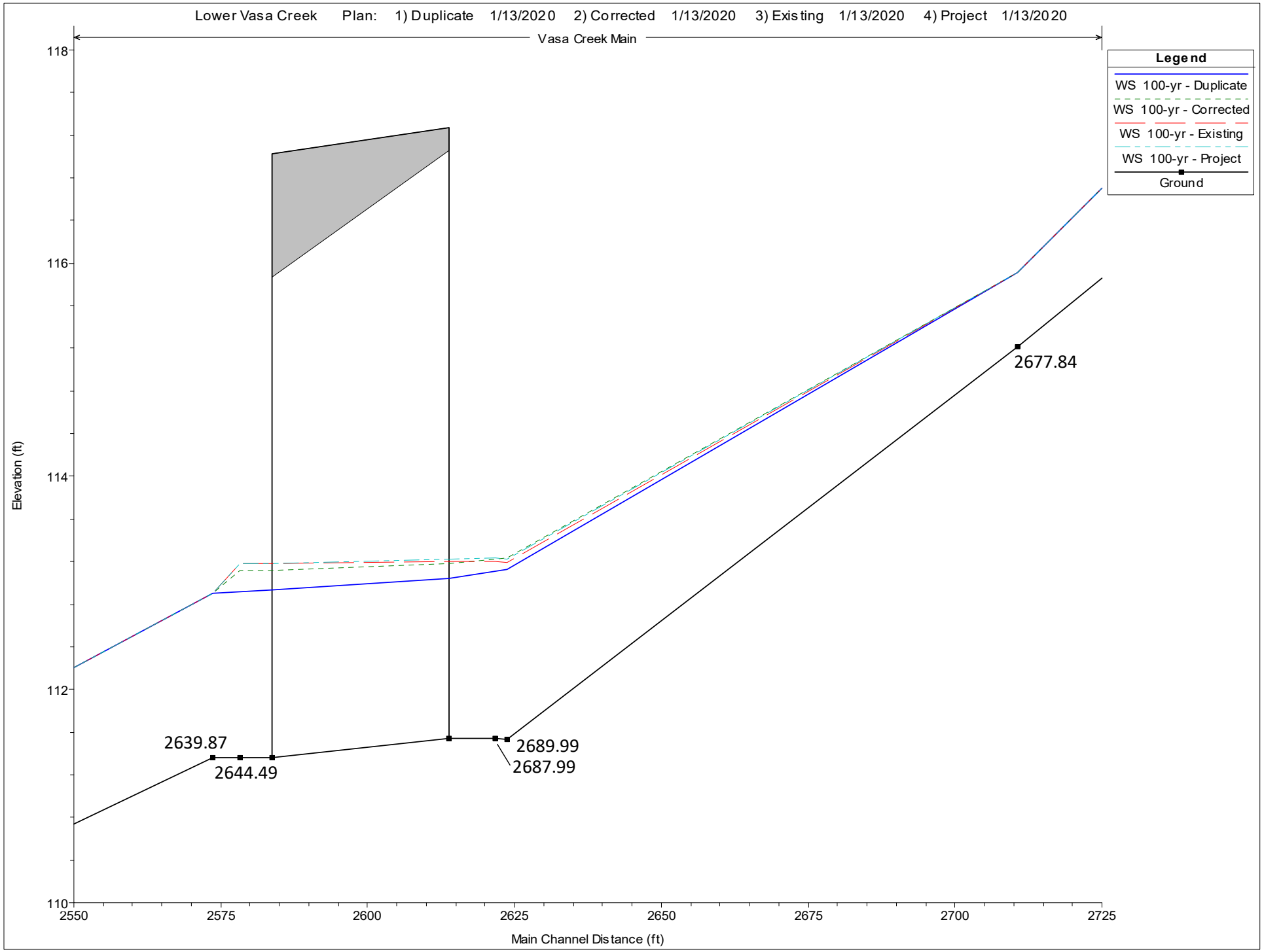
Section geometry is the same as the Duplicate Model.



Project Conditions Model:
WSE = 112.9 feet NAVD 88

Section geometry is the same as the Duplicate Model.


Lower Vasa Creek Plan: 1) Duplicate 1/13/2020 2) Corrected 1/13/2020 3) Existing 1/13/2020 4) Project 1/13/2020
Vasa Creek Main
Legend
WS 100-yr - Duplicate
WS 100-yr - Corrected
WS 100-yr - Existing
WS 100-yr - Project
Ground
2677.84
2639.87
2644.49
2689.99
2687.99
Elevation (ft)
Main Channel Distance (ft)
118
116
114
112
110
2550
2575
2600
2625
2650
2675
2700
2725

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Vasa Creek Habitat Improvements Stream Study

date	June 16, 2020
to	Grace Smith, King County Wastewater Treatment Division
from	Claire Hoffman, Biologist and Karmen Martin, Planner, Environmental Science Associates
subject	Vasa Creek Habitat Improvements - Stream Study Memo

Introduction

Environmental Science Associates (ESA) is assisting the King County Wastewater Treatment Division (WTD) in implementing habitat improvements on Vasa Creek, in the vicinity of the 164th Place SE bridge. WTD proposes to install a stream simulation channel within the stream bed, remove invasive vegetation, and plant native riparian vegetation. The project will provide habitat improvements to offset unanticipated negative impacts that occurred to Vasa Creek in August 2018 related to the trenchless installation of a new sewer force main under Vasa Creek as part of the Sunset and Heathfield Pump Stations and Force Main Upgrade Project (Sunset/Heathfield Project). The work requires permits and approvals from the US Army Corps of Engineers, Washington Department of Fish and Wildlife, and the City of Bellevue. Sheet 1 shows the project location and vicinity.

Goals of this Memo

As part of the permit submittal requirements for the City of Bellevue Critical Areas Land Use Permit, a stream study is required. Previously, a stream study was completed as part of the Sunset/Heathfield Project, and documented in a Critical Areas Report included in permit applications to the City of Bellevue. The *Sunset and Heathfield Pump Stations and Force Main Upgrade Wetland and Stream Technical Memorandum and Critical Areas Report* (ESA, 2015) is incorporated by reference (Bellevue Land Use Code [LUC] 20.25H.250D). This memo supplements information presented in the 2015 Critical Areas Report with information specific to the proposed habitat improvements. This memo provides a project overview, describes existing conditions, presents information on the proposed habitat improvements, and provides conclusions related to this project.

Project Overview

The purpose of the project is to establish a low-flow channel along a portion of Vasa Creek in order to create enhanced stream channel morphology that is better suited for fish passage at low flows. The project involves placing streambed material beneath the bridge to rebuild the missing stream banks and create a narrower low-flow channel with floodplain benches, similar to what exists upstream and downstream of the bridge. The habitat improvements will be within City of Bellevue right of way, on the undeveloped north shoulder of 164th Place SE and within the stream channel of Vasa Creek under the 164th Place SE bridge (see Sheet 2).

Existing Conditions

The Vasa Creek drainage basin is within Water Resource Inventory Area (WRIA) 8, the Lake Washington/ Cedar/Sammamish watershed. Vasa Creek drains approximately 1.9 square miles, with headwaters in the Somerset neighborhood of Bellevue. The creek flows generally north northeast until crossing below Interstate 90 (I-90) and then eastward to Lake Sammamish. Land use in the basin consists primarily of residential and commercial development and transportation corridors. The project area is zoned R-5 and adjacent land uses include single-family residential, institutional (church), and a transportation corridor (164th Place SE).

Vasa Creek is a Type F (fish) stream with a 100-foot stream buffer (LUC 20.25H.075.C). Washington Department of Fish and Wildlife (WDFW) maps the eastern/lower portion of Vasa Creek, which flows through the project area, as supporting several salmonid species. Coho and sockeye salmon occur from the lake to approximately 1,400 feet upstream (to just east of 167th Avenue SE, downstream of the project area). Kokanee are mapped from the lake to over 0.6 mile upstream, reaching areas 600 feet west of the 163rd Avenue SE crossing, upstream of the project area. Modeled steelhead and Chinook presence extends upstream to the same point. However, modeled presence is based solely on stream gradients, presence of fish downstream (in Lake Sammamish) and known natural barriers and does not incorporate stream size or habitat quality. Culverts that are partial barriers to fish passage are mapped east of West Lake Sammamish Parkway and at 163rd Avenue SE. I-90 is a complete fish passage barrier, preventing upstream access beyond this point. Overall, conditions in eastern/lower Vasa Creek provide adequate fish habitat (Tetra Tech, 2014). However, several low weirs with shallow downstream pools may hinder upstream migration (Bellevue, 2010; Tetra Tech, 2014). Between I-90 and Lake Sammamish, Vasa Creek flows through five road or driveway crossings (bridges and culverts), which have not been evaluated for potential barrier status (WSE, 2014). Vasa Creek and its banks are also mapped as a frequently flooded area.

Vasa Creek flows east through the project area, draining into Lake Sammamish north of Vasa Park Resort. At the project site, the stream flows under the 164th Place SE bridge. Here, Vasa Creek is approximately 6 feet wide with a gravel/cobble substrate. The riparian corridor consists of a forested area upstream of the bridge (Photo 1). English ivy (a nonnative invasive species) is prevalent in the understory. North of the bridge, Himalayan blackberry (another invasive species) is dominant (Photo 3).

Under existing conditions, the creek bed transitions at the beginning on the bridge abutments from a V-shaped channel upstream (Photo 1), to a wide, flat plane with no defined channel or natural banks beneath the bridge (Photo 2), and then back to a V-shaped channel downstream of the bridge (Photo 3). This area without a defined channel causes flows to spread out and become very shallow and has been identified as a fish passage barrier at low flows. It is suspected that the natural stream banks were excavated for abutment placement when the bridge was installed and not restored (King County Engineering Department [date illegible]). The 100-year flow through

the upstream bridge section is limited to 15 cubic feet per second (cfs) by a flow splitter located approximately 500 feet upstream which routes the majority of the flows directly to Lake Sammamish. Modeled flows increase to 48 cfs downstream of the bridge. Because of the upstream flow splitter and mechanical removal of sediment from the system, Vasa Creek may have insufficient stream power and sediment supply to restore the reach naturally.

Photo 1 – Vasa Creek Upstream of the 164th Place SE Bridge

Photo 2 – Vasa Creek Beneath the 164th Place SE Bridge

Photo 3 – Vasa Creek Downstream of the 164th Place SE Bridge

Proposed Channel Improvements

The project involves placing streambed material within 650 square feet (SF) (70 linear feet) of the Vasa Creek channel beneath the bridge to rebuild the stream banks and create a narrower low-flow channel with floodplain benches, similar to what exists upstream and downstream of the bridge. Placement of material to build the banks back to their likely original condition was selected over excavating a low flow channel into the current bed because the stream profile is already in equilibrium. In other words, the current thalweg elevation and slope of the stream bed beneath the bridge is geomorphically appropriate to its position in the system and contiguous with the elevation and slope of the streambed upstream and downstream. Consequently, the project has been designed to keep the channel bed in its current position and rebuild the banks.

The proposed low-flow channel will be constructed by building up floodplain benches against each bridge abutment. The low flow channel beneath the bridge will be comparable in size and depth to the low flow channel of Vasa Creek up- and downstream and will be 9 inches deep at the thalweg and 1.5 feet wide at the bed, expanding out to 4 feet wide at the top of bank. Gently sloping floodplain benches will extend from the top of the channel banks to the bridge abutments. The channel geometry is designed based on the WDFW *Water Crossings Design Guidelines* for constructed streambed geometries through bridges and box culverts (WDFW, 2013).

Areas temporarily impacted by construction will be enhanced and restored after construction activities are completed (Sheet 3). Approximately 1,280 square feet of stream buffer will be planted with a mixture of native shrubs (Sheet 5). Invasive species will be removed from the area and the soil prepared prior to planting.

As part of the design review and permitting process, the City of Bellevue identified a municipal code requirement (Title 20, Part 20.25H.180, Paragraph C, Items 4 and 5) for hydraulic modeling to demonstrate no rise in base flood elevation and no net reduction in effective base flood storage. The City of Bellevue requested King County address those requirements for this project. The *Vasa Creek Mitigation Project Floodplain Analysis Memo* (ESA, 2020) analyzed the potential effects of the proposed Vasa Creek Habitat Improvements on base flood elevations and effective base flood storage volume in the Vasa Creek floodplain. The analysis found that the proposed project is not expected to generate a rise in base flood conditions and the design meets the effective base flood storage criteria of Bellevue City Code Title 20.

Habitat improvement Construction Activities

The proposed low-flow channel will be constructed either by hand or by using small earth moving equipment to backfill stream bed gravels. The low-flow channel will be constructed in isolation from stream surface water by installing a temporary stream bypass with a gravel bag berm, and placing straw wattles to minimize sediment movement. The 164th Place SE Bridge has insufficient clearance (< 5 feet) to allow large equipment to operate in the stream channel, although small, low ground pressure equipment (< 8psi) may be used. If used, larger equipment, such as an excavator, will operate from the paved surface of the 164th Place SE bridge, reaching down into the channel. The channel will be accessed from the northeastern end of the bridge, where banks are the lowest, and staging will occur on the road shoulder of 164th Place SE. Invasive vegetation will be removed and restoration and enhancement plantings will be installed manually in the temporarily impacted buffer areas at the conclusion of the project. (Sheet 5). Best Management Practices will be used to reduce temporary impacts to Vasa Creek during construction.

Construction Schedule

Construction is scheduled for the 2020 in-water work window of July 16 – September 30. Work is anticipated to occur over 3 weeks beginning in early September 2020 with final completion by September 30, 2020.

Conclusions

Stream Impacts

The project intends to create enhanced stream channel morphology that is better suited for passage of salmonids during low flows. Increased fish access to the upstream habitat in Vasa Creek could increase overall production within the stream's basin. Best Management Practices will be used to reduce temporary impacts to Vasa Creek during construction. Storm water runoff from construction activities will be intercepted by installing temporary erosion and sediment control methods including silt fencing and straw wattles. Spill containment measures will be properly implemented, monitored and maintained. Soil disturbances will be minimized to the maximum extent possible and clearing limits will be clearly defined. Construction activities will occur during the dry season and within WDFW's in-water work window. The project does not require groundwater withdrawals and no water will be discharged to groundwater. A temporary energy dissipater will be incorporated into the stream bypass system to avoid turbidity. Initial stream dewatering and stream re-introduction will be controlled to minimize release of sediments.

The project will provide long-term habitat improvements to offset the unanticipated negative impacts to Vasa Creek that occurred in August 2018. Impacts related to construction of these enhancements are temporary and will be restored after construction. Given the long-term benefits to Vasa Creek, the project is considered self-mitigating of these temporary, construction-related impacts.

References

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Environmental Science Associates (ESA). 2020. *Vasa Creek Mitigation Project Floodplain Analysis Memo*. January 2020.

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Washington Department of Fish and Wildlife (WDFW). 2013. *Water Crossings Design Guidelines.* Available at: https://wdfw.wa.gov/publications/01501. Accessed December 2019.

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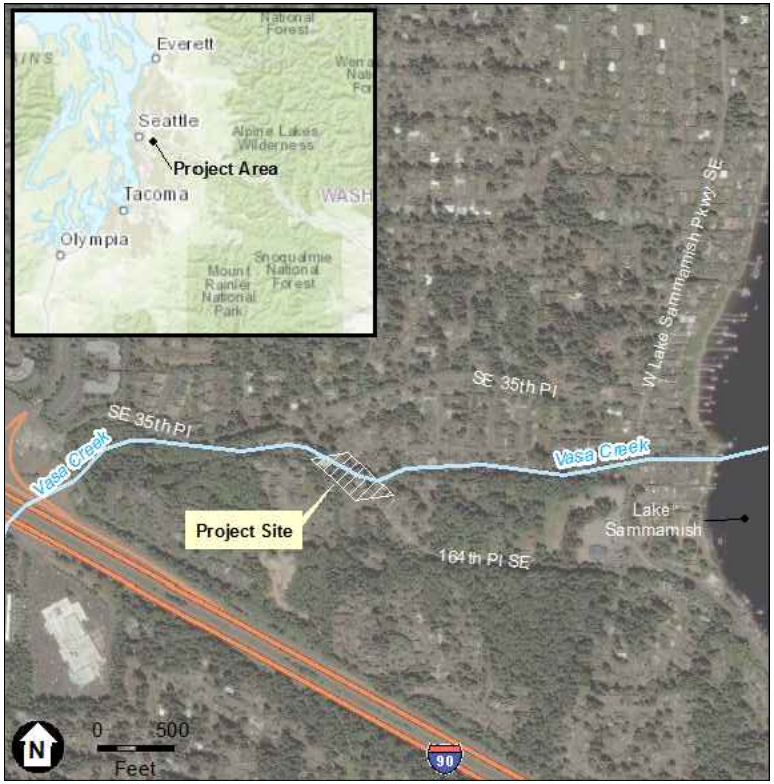
APPENDIX A

JARPA Sheets

VICINITY MAP & LEGEND

SHEET LIST

NUMBER	TITLE
1	VICINITY MAP & LEGEND
2	EXISTING CONDITIONS
3	STREAM IMPACTS
4	PROPOSED PLAN, SECTION, & PROFILE
5	PLANTING PLAN



VICINITY MAP

LEGEND:

- DECIDUOUS TREE
- CONIFEROUS TREE
- WOODEN PILE
- GUARDRAIL
- EDGE OF PAVEMENT
- FENCE
- EDGE OF RIGHT-OF-WAY
- PROPERTY LINE
- ORDINARY HIGH WATER
- (E) LOW FLOW CHANNEL TOP OF BANK
- (N) TOP OF BANK
- (N) TOE OF BANK
- (N) CHANNEL CENTER LINE
- DIVERSION PIPE
- (E) MAJOR CONTOUR
- (E) MINOR CONTOUR
- (N) MAJOR CONTOUR
- (N) MINOR CONTOUR
- STREAMBED MATERIAL
- FISH EXCLUSION NETTING
- EXISTING PAVEMENT
- 100YR — 100 YEAR FLOODPLAIN
- LIMIT OF WORK

PROPOSED PROJECT:
Vasa Creek Habitat Improvements

APPLICANT: King County Wastewater Treatment District
REFERENCE:

LOCATION ADDRESS:
164th Place SE
CITY: Bellevue
COUNTY: King **STATE:** Washington

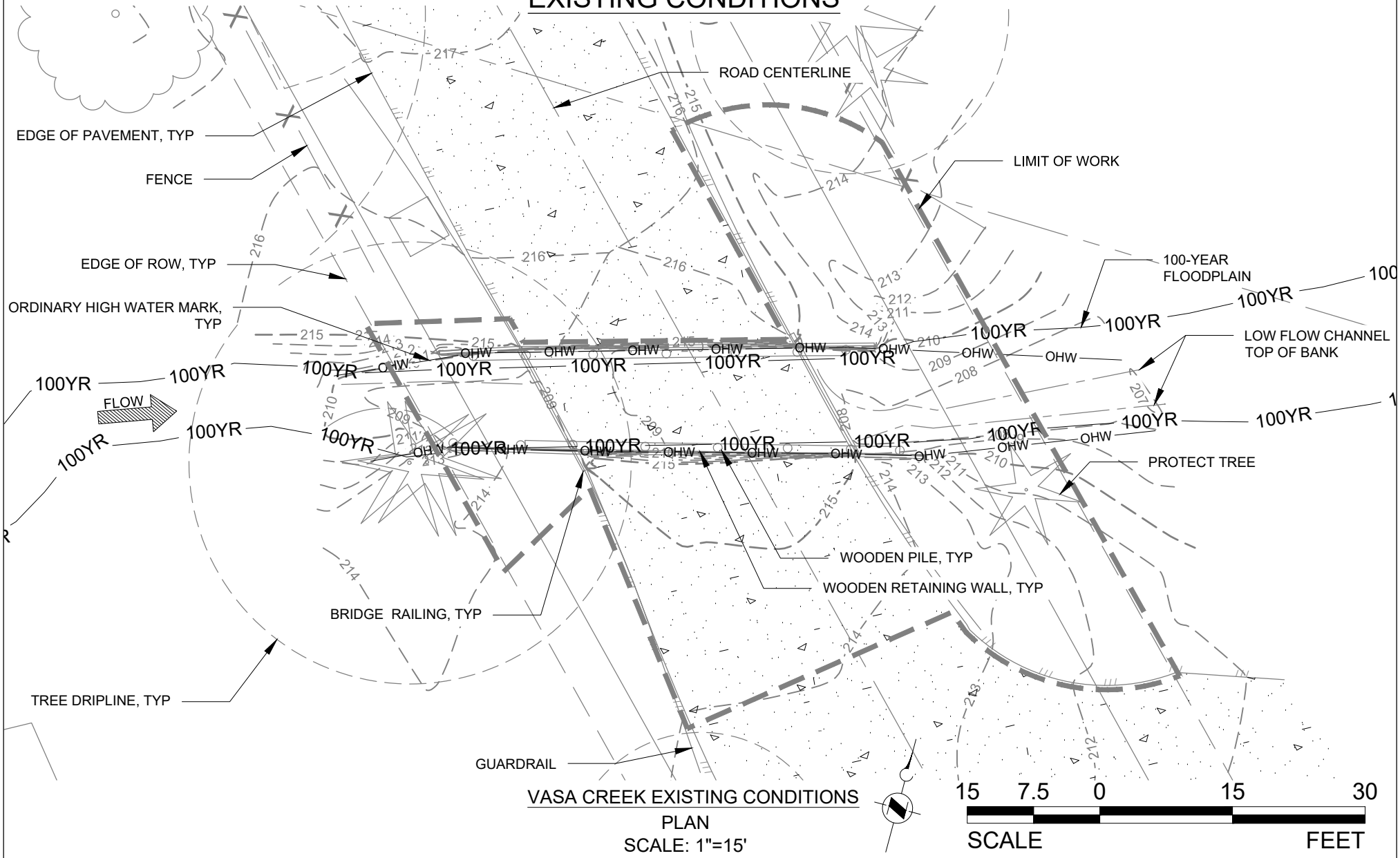
LAT/LONG:
47.578035 N / -122.120898 W

DATUM: GCS North American 1983

SHEET: 1 of 5

DATE: June 16, 2020

EXISTING CONDITIONS



VASA CREEK EXISTING CONDITIONS
PLAN
SCALE: 1"=15'

PROPOSED PROJECT:
Vasa Creek Habitat Improvements

APPLICANT: King County Wastewater Treatment District
REFERENCE:

LOCATION ADDRESS:
164th Place SE
CITY: Bellevue
COUNTY: King **STATE:** Washington

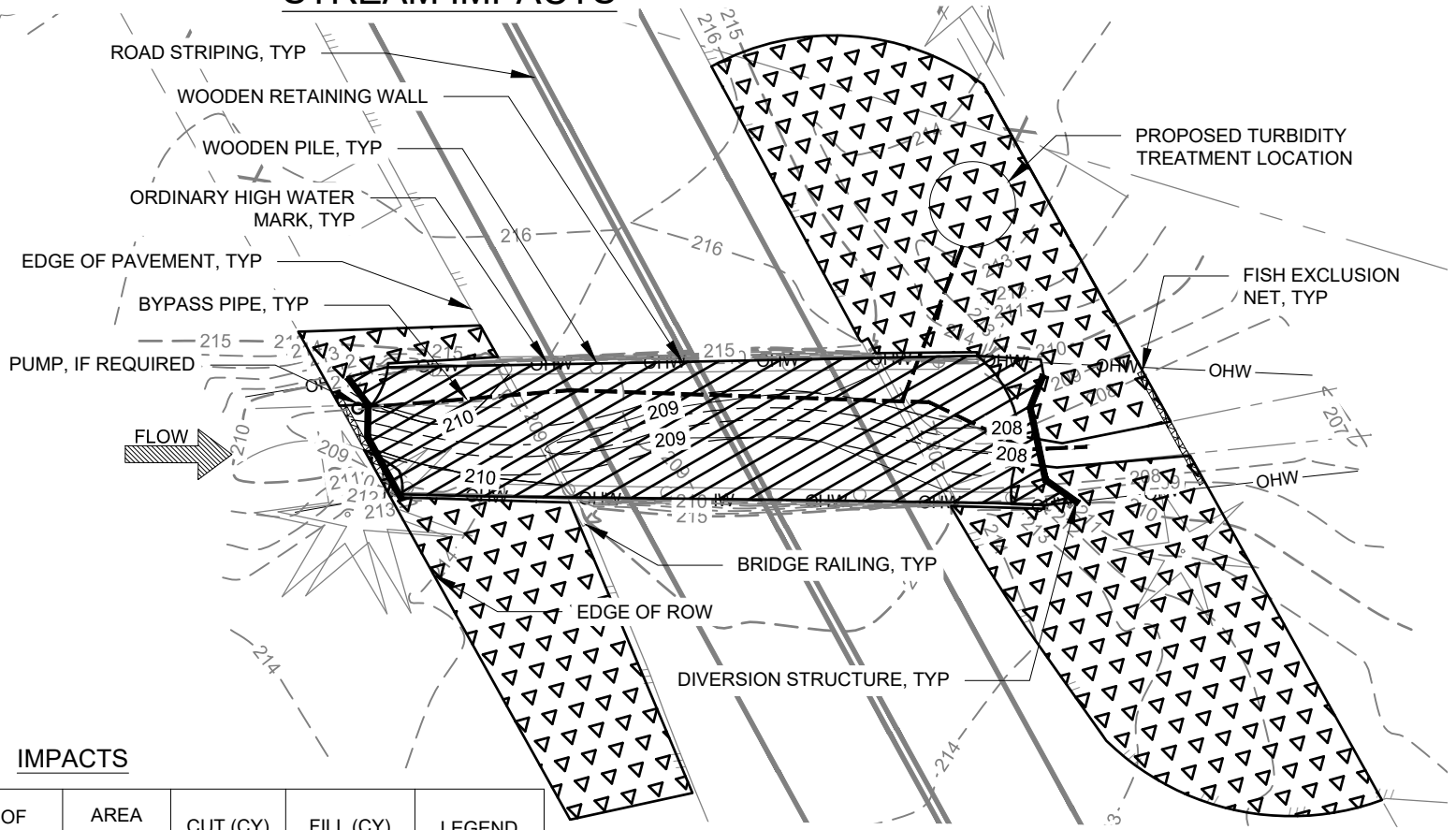
LAT/LONG:
47.578035 N / -122.120898 W

DATUM: GCS North American 1983

SHEET: 2 of 5

DATE: June 16, 2020

STREAM IMPACTS



IMPACTS

PROJECT ELEMENT	LOCATION	TYPE OF IMPACT	AREA (SF)	CUT (CY)	FILL (CY)	LEGEND
CONSTRUCTED STREAMBED	VASA CREEK	PERMANENT	650	20	30	
PLANTING/ INVASIVE REMOVAL	BUFFER	TEMPORARY	1630	N/A	N/A	
DIVERSION STRUCTURE	VASA CREEK	TEMPORARY	25	N/A	3	
DEWATERING	VASA CREEK	TEMPORARY	650	N/A	N/A	

15 7.5 0 15 30

SCALE FEET

NOTES:
1. DEWATERING AND STREAM EXCAVATION AREAS OVERLAP. PORTIONS OF THE PLANTING/INVASIVE REMOVAL AREA AND DEWATERING AREA OVERLAP.
2. ALL EXCAVATED STREAMBED MATERIAL WILL BE SALVAGED AND REUSED ON SITE.

PROPOSED PROJECT:
Vasa Creek Habitat Improvements

APPLICANT: King County Wastewater Treatment District
REFERENCE:

LOCATION ADDRESS:
164th Place SE
CITY: Bellevue
COUNTY: King **STATE:** Washington

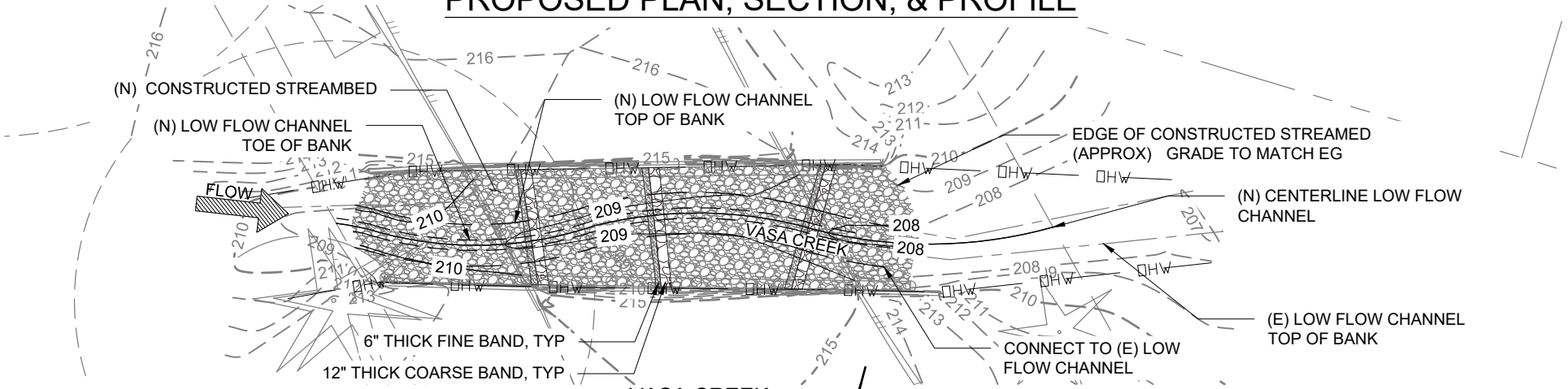
LAT/LONG:
47.578035 N / -122.120898 W

DATUM: GCS North American 1983

SHEET: 3 of 5

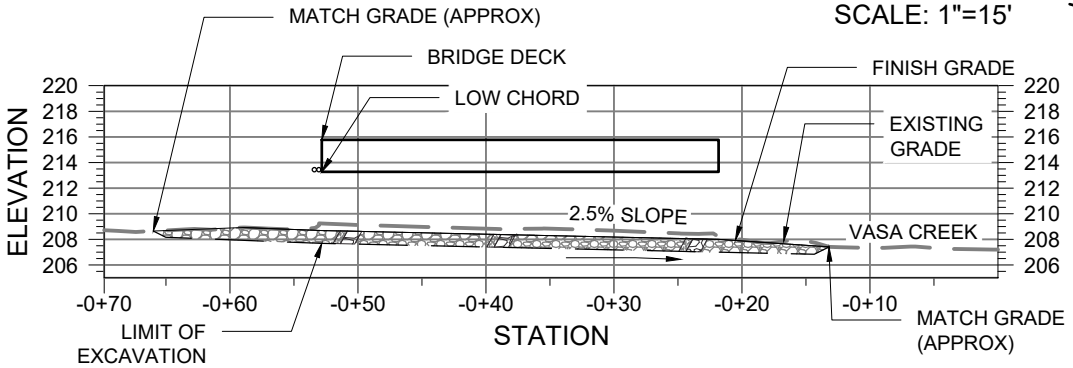
DATE: June 16, 2020

PROPOSED PLAN, SECTION, & PROFILE

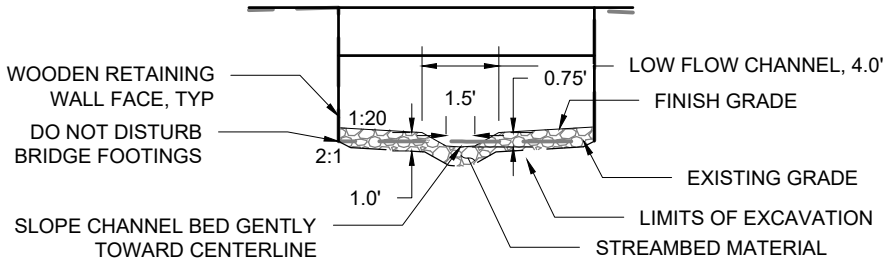


VASA CREEK
PLAN
SCALE: 1"=15'

15 7.5 0 15 30
SCALE FEET



VASA CREEK
PROFILE
SCALE: 1"=15'



VASA CREEK
TYPICAL SECTION
SCALE: 1"=15'

COARSE BANDS	
PERCENTAGE	GRADATION
30%	4" STREAMBED COBBLE
40%	10" STREAMBED COBBLE
30%	NATIVE STREAMBED, SALVAGED ON SITE

STREAMBED MATERIAL	
PERCENTAGE	GRADATION
30%	4" STREAMBED COBBLE
70%	NATIVE STREAMBED, SALVAGED ON SITE

FINE BANDS	
PERCENTAGE	GRADATION
100%	NATIVE STREAMBED, SALVAGED ON SITE

PROPOSED PROJECT:
Vasa Creek Habitat Improvements

APPLICANT: King County Wastewater Treatment District
REFERENCE:

LOCATION ADDRESS:
164th Place SE
CITY: Bellevue
COUNTY: King **STATE:** Washington

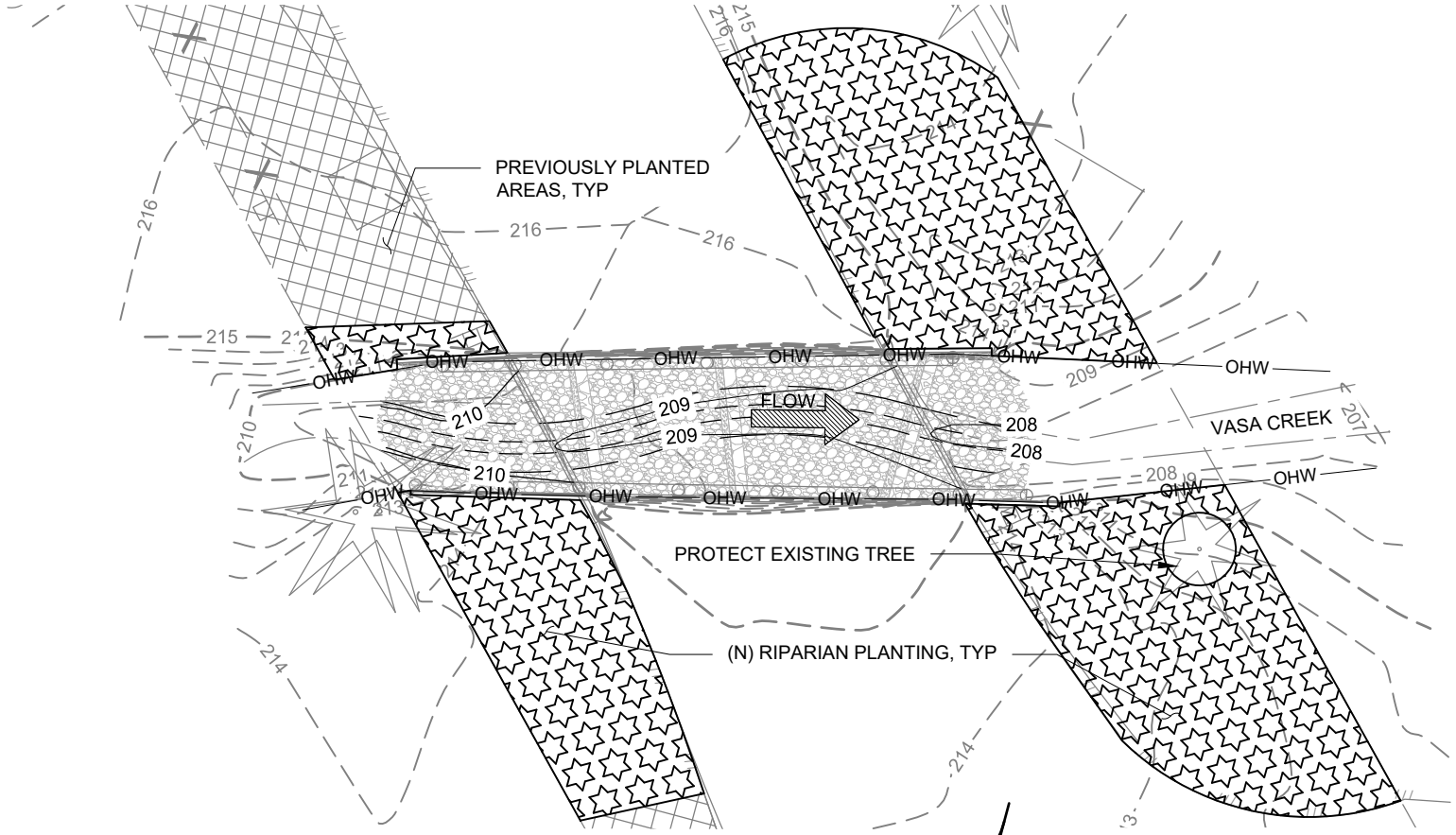
LAT/LONG:
47.578035 N / -122.120898 W

DATUM: GCS North American 1983

SHEET: 4 of 5

DATE: June 16, 2020

PLANTING PLAN



VASA CREEK
PLAN
SCALE: 1"=15'

15 7.5 0 15 30
SCALE FEET

PLANTING SCHEDULE					
SYMBOL	SCIENTIFIC NAME	COMMON NAME	INSTALL SIZE	SPACING	QUANTITY
	MAHONIA AQUIFOLIUM	TALL OREGON GRAPE	1 GAL	6' OC	9
	MYRICA CALIFORNICA	PACIFIC WAX MYRTLE	1 GAL	6' OC	9
	POLYSTICHUM MUNITUM	SWORD FERN	1 GAL	6' OC	9
	ROSA NUTKANA	NOOTKA ROSE	1 GAL	6' OC	10
	SYMPHORICARPOS ALBUS	SNOWBERRY	1 GAL	6' OC	10

PROPOSED PROJECT:
Vasa Creek Habitat Improvements

APPLICANT: King County Wastewater Treatment District
REFERENCE:

LOCATION ADDRESS:
164th Place SE
CITY: Bellevue
COUNTY: King **STATE:** Washington

LAT/LONG:
47.578035 N / -122.120898 W

DATUM: GCS North American 1983

SHEET: 5 of 5

DATE: June 16, 2020