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- Listen to the meeting by phone: 872-240-3412, Access Code: 261-991-485
- The public is encouraged to comment via email to pced@cityofanacortes.org, via written comment addressed to PCED, P.O. Box 547, Anacortes, WA 98221, or via e-comment (<https://www.anacorteswa.gov/700/Watch-Meetings> - click on meeting you wish to provide comment and in upper right corner is an option to include Public Comment). Public comments received prior to 3:00 p.m. the day of the meeting will become part of the record for the meeting, just as if presented in person.
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ANACORTES PLANNING COMMISSION

November 24, 2021

**Municipal Building Council Chambers
6th Street and "Q" Avenue**

**** This meeting will be held electronically only ****

AGENDA

6:00 PM

[VIEW PACKET MATERIALS HERE](#)

A. Roll Call

B. Minutes

- 1) None Draft Minutes of October 27, 2021

C. Correspondence

D. New Business

- 1) Public Hearing: SDP-2021-0005 City of Anacortes Wastewater Treatment Plant Outfall Relocation (Shoreline Conditional Use Permit and Shoreline Substantial Development Permit)
- 2) Public Hearing: SDP-2021-0009 - Skyline Dock & Piling Project

E. Old Business

The City of Anacortes encourages people with disabilities to participate in public meetings. For assistance with special needs, please contact the City Clerk at 360-299-1960 in advance of the meeting.



Planning Commission Public Hearing Minutes for October 27, 2021

This is not a verbatim transcript of the meeting and is written to capture the general spirit of the discussion based upon notes and video observation by the author. To view the video recording of this meeting, click [here](#), or go to <https://www.anacorteswa.gov/700/Watch-Meetings>.

Commission Chair MacKenzie called the Public Hearing of October 27, 2021, to order at 6 pm.

Roll Call:

Members Present: Commissioners Gary Molyneaux, Jeff Graf, Sarah Ruether, Frank Jeretzky, Linda Martin, Ward MacKenzie

Members Absent: 1 vacant position

Staff Present: Don Measamer, Dave Oicles

Minutes: The minutes from October 13, 2021, were accepted as submitted.

Correspondence: Don Measamer, PCED Director, mentioned there is a Planning Commission meeting scheduled for November 24, 2021, and would like to ensure we will have a quorum of at least 4 Commissioners present.

Old Business: Continued discussion on **Flood Plain Management, AMC chapter 19.74 updates.**

Mr. Measamer continued his presentation on the amendments and updating of AMC Chapter 19.74 and discussed the opportunity to include future sea level rise. Measamer introduced Jim Johannessen of Coastal Geologic Services, who has been contracted by the City to provide current information on sea level rise projections. Mr. Johannessen gave a presentation on the highlights of his report and provided answers to Commissioner's questions on the subject matter.

At 6:51 pm Chair MacKenzie asked for public input with none offered. Some Commissioners expressed preference of including a 2 foot rise above the base flood elevation instead of the standard 1 foot rise as other area Cities have used. Mr. Measamer stated he could develop a draft that includes the 2 foot rise. All agreed another meeting with public input is needed to discuss this more. The next meeting is scheduled for November 24, 2021.

New Business: None

With no further discussion, Chair MacKenzie concluded the meeting at 6:58pm.



Planning Commission Agenda Bill

Meeting Date: November 24, 2021 **Agenda Item:** D.1.

Subject: Public Hearing: SDP-2021-0005 City of Anacortes Wastewater Treatment Plant Outfall Relocation (Shoreline Conditional Use Permit and Shoreline Substantial Development Permit)

Staff Contact: LIBBY GRAGE

Approved for Submittal to Commission by

LIBBY GRAGE
LIBBY GRAGE

Action Type

Public Hearing

Summary Statement: The applicant has requested a Shoreline Substantial Development Permit and Shoreline Conditional Use Permit to relocate the Anacortes Wastewater Treatment Plant Outfall.

Background: The project completed the mandatory preapplication meeting and neighborhood meeting.

Previous Action: N/A

Competing Viewpoints Considered: There was a 30-day written public comment period for this proposal. The purpose of the open record public hearing is to obtain further comments from the public.

Recommended Motion: I move to recommend to City Council APPROVAL of SDP-2021-0005, subject to the recommended conditions of approval contained within the staff report.

Alternative Actions: Recommend approval with additional/modified conditions or denial.

Attachments (listed in order presented):

1. Exhibit 1: Staff Report
2. Exhibit 2: Vicinity Map
3. Exhibit 3: Application Docs
4. Exhibit 4: Issued SEPA
5. Exhibit 5: Public & Agency Comments
6. Exhibit 6: Notices
7. Exhibit 7: WDFW Issued HPA
8. Exhibit 8: Site Photos
9. Draft PC Recommendation



Anacortes Planning, Community & Economic Development Department

904 6TH Street / P.O. Box 547, Anacortes, WA 98221

360.299-1984 - Office Hours: Mon-Fri 8:00 AM – 5:00 PM

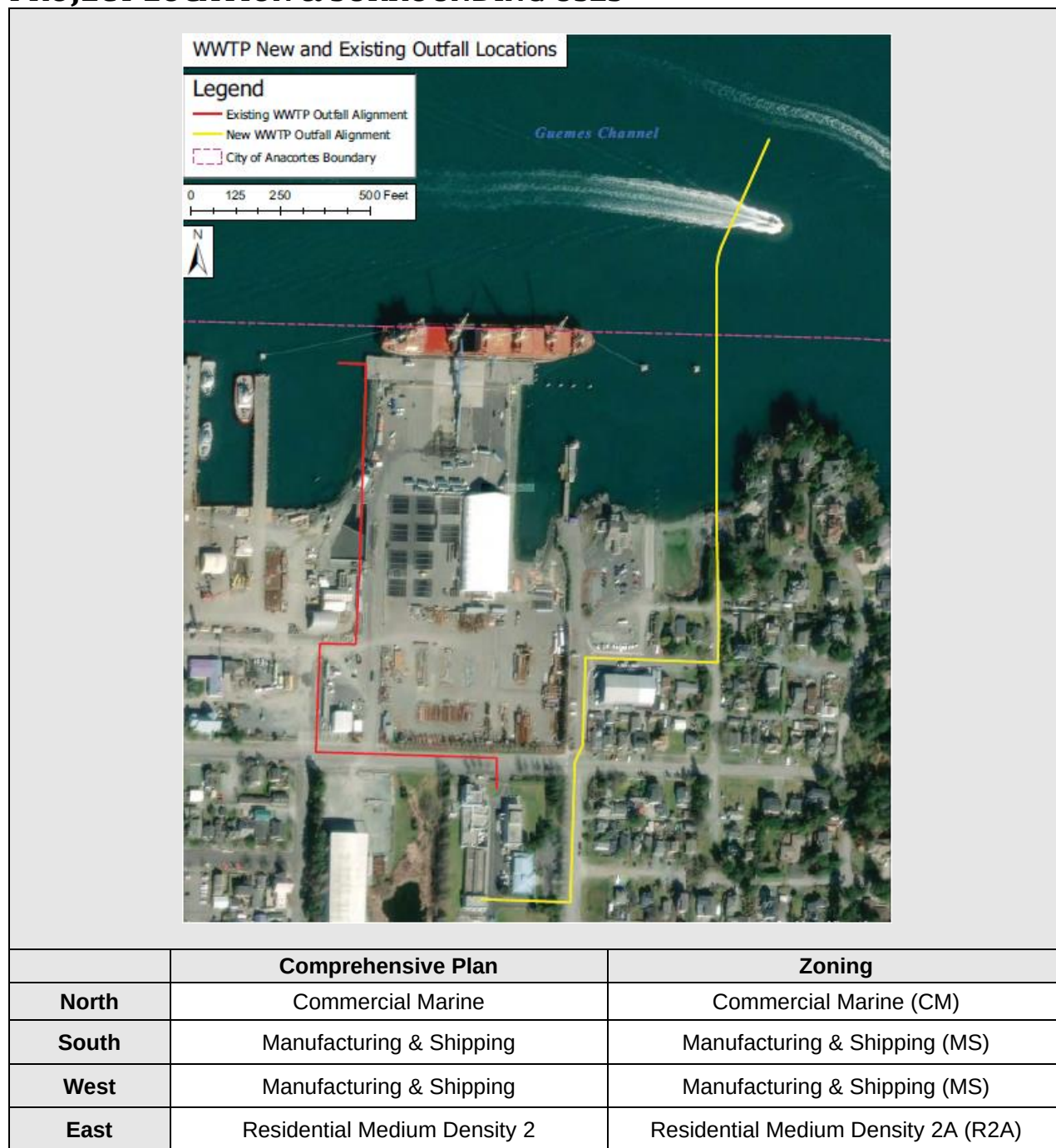
SHORELINE SUBSTANTIAL DEVELOPMENT & SHORELINE CONDITIONAL USE PERMIT: STAFF REPORT

File Number	SDP-2021-0005	Date of Report	November 17, 2021
Project Title	City of Anacortes Wastewater Treatment Plant Outfall Relocation	Related File(s)	
Project Location	Starting at 500 T ave N, 3rd St west, U ave N and into the Guemes Channel. Anacortes, Washington 98221 (Parcel 56815)		
Request	The applicant is requesting a Type-4 Shoreline Substantial Development Permit (SSDP) and Shoreline Conditional Use Permit (SCUP) to replace and relocate the damaged outfall pipe. The new pipe will be a 48-inch diameter Fiberglass Reinforced Pipe (FRP) coming from the WWTP for 1,631 feet until the Guemes Channel shoreline where the pipe will reduce to 42-inch outside diameter high density polyethylene (HDPE) pipe for 1,030 feet with an 86-foot diffuser angled to the northeast at approximately 24.5 degrees to better match the bidirectional current. The total length of the pipe will be 2,661 feet from the WWTP continuing into the Guemes Channel.		
Landowner	City of Anacortes, public right of way, state-owned aquatic lands		
Applicant	Fred Buckenmeyer, Public Works Director – City of Anacortes		

SITE INFORMATION

Zoning	Commercial Marine, Manufacturing & Shipping	Comprehensive Plan Designation	Commercial Marine, Manufacturing & Shipping
Shoreline Environment	Urban & Aquatic	Water Body	Guemes Channel
Present Use of Property	Public right-of-way and state-owned aquatic lands		

PROJECT LOCATION & SURROUNDING USES



PROCEDURAL

1. **Type of Review.** According to AMC 19.20.030(1) and 18.16.100(B), shoreline conditional use permits applications are a Type 3 review, and shoreline substantial development permit applications for projects valued greater than \$1 million or on sites of 3-acres or more are considered a Type 4 type of review. The applications are being processed collectively under the highest numbered type procedure required for either permit type – Type 4. For Type 4 reviews, the Planning Commission provides a recommendation for final decision to City Council regarding the proposed shoreline substantial

development permit. After city approval, the shoreline CUP will be submitted to the Department of Ecology for Ecology's review and approval.

2. **Project History & Public Notice.** A mandatory preapplication meeting was held on February 2, 2021. A neighborhood meeting was held on March 9, 2021. The application was submitted on May 24, 2021.

A notice of application with a 30-day public comment period and notice of public hearing were distributed as required by the Anacortes Municipal Code, as follows:

Determination of Completeness Issued	June 18, 2021
Notice of Application with Optional DNS Published	June 23, 2021
Notice of Hearing Published	November 3, 2021
Open Record Public Hearing (Planning Commission)	November 24, 2021
Closed Record Public Hearing (City Council)	December 13, 2021

3. **Environmental Review.** The City of Anacortes Department of Planning, Community and Economic Development issued a Mitigated Determination of Nonsignificance (MDNS) on September 27, 2021 after utilizing the Optional DNS process in WAC 197-11-355. There were no appeals of the threshold determination.
4. **Reviewing departments/agencies.** The project application was routed for review to applicable agencies and City departments as follows:

REVIEWING DEPARTMENTS & AGENCIES:				
City of Anacortes	Local Agencies & Districts	State & Federal	Skagit County	Other
☒ Building ☒ Fire Dept. ☒ Parks ☒ Planning ☒ Police ☒ Public Works ☒ Operations	☐ Skagit Transit ☐ Anacortes School District 103 ☒ Port of Anacortes	☒ DOE ☒ WDFW ☐ WSDOT ☒ DNR ☒ DAHP	☐ Health District ☒ Planning ☐ Public Works	☒ Swinomish Tribe ☒ Samish Tribe ☒ Upper Skagit Tribe
X = Request for review/comments sent to department or agency.				

5. **Consideration of written comments and applicant responses.** The notice of application public comment period ended on July 23, 2021. In making its recommendation, the Department considered timely received written comments and the applicant's responses, if any, as required in AMC 19.20.130(C). The applicant provided responses to the comments in a document date stamped received August 18, 2021. The following public and agency comments were received:
 - 5.1. Comment from the City's Public Works Engineering Dept., received July 13, 2021, requested detailed as-builts of new improvements, once completed, and information documenting any objects found during the excavation portion of the project.
 - 5.2. Comment from the Port of Anacortes, received July 22, 2021, included concern about maintenance of visual screening between homes on U Ave. and Port operations, potential impacts to the adjacent Wyman's Cleanup and mitigation habitat site, impacts to upland access to the adjacent commercial marine ramp, and measures to preserve water access for marine traffic to the commercial ramp and the Port's pier.

- 5.3. Comment from John Wilkinson, received June 25, 2021, listed a variety of concerns and questions, including project timing, and construction-related impacts such as neighborhood traffic impacts, emergency services access, rock blasting impacts, and noise.
- 5.4. Comment from Department of Natural Resources, dated July 7, 2021, requested being added to the project mailing list.
- 5.5. Comment from Department of Ecology, dated July 8, 2021, requested the applicant's response to the shoreline conditional use criteria.

DEPARTMENT REVIEW – FINDINGS OF FACT

Proposal Summary

1. The proposal is to construct a new Wastewater Treatment Plant (WWTP) outfall within the U Avenue right-of-way and Guemes Channel. The new outfall will replace the existing WWTP outfall located at Pier 2, which was damaged in a February 2020 storm. After considering various alternatives, including replacement of the outfall in the existing location and other alignments, the City identified the U Avenue alignment as the preferred location. The existing outfall at Pier 2 will be decommissioned upon completion of the new outfall.
2. The new outfall pipeline will be a 48-inch diameter Fiberglass Reinforced Pipe (RFP) coming from the WWTP for 1,631 feet. The pipe will be routed north via T Ave. to 3rd St., then east on 3rd St. to U Ave. and north to the Guemes Channel shoreline. At the shoreline the pipe will reduce to 42-inch outside diameter high density polyethylene (HDPE) pipe for 1,030 feet and will have an 86-foot diffuser angled to the northeast at approximately 24.5 degrees to better match the bidirectional current. The total length of the pipe will be 2,661-feet from the WWTP continuing into the Guemes Channel.
3. The new outfall will flow into deeper waters further from the shoreline and be able to convey larger volumes of treated effluent from the WWTP than the existing outfall at Pier 2. The overall design is to provide greater access for future maintenance needs, a better mixing zone for aquatic health, and to prevent further overflow events to better comply with the City's 2017 NPDES Permit.
4. The upland portion of the pipe will be completely under existing roadways until it reaches the north end of U Avenue. Upland materials to be excavated will be approximately 25,371 Cubic Yards (CY); materials to be backfilled will be approximately 24,612 CY.
5. At the north end of U Avenue, the nearshore section from MHHW to MLLW currently consists of a near-vertical revetment facing the waterway. Due to the extent of excavation necessary, steel sheet pile will be installed to shore surrounding material. Excavated slopes along the steep embankment will be backfilled with 12 inches of crushed gravel and covered with 2.5 feet of riprap covered with 6-18 inches of glacial till mix to the previously existing slope of 2:1. An existing stormwater outfall pipe will be slightly relocated to the east as part of the work.
6. Within the marine environment of Guemes Channel, approximately 380 feet of the pipe in the nearshore to a depth of 30 feet below Mean Lower Low Water (MLLW) will be buried. The remaining 650 feet will be submerged and anchored to the seabed. The marine portion of the work will consist of 2,955 CY of materials excavated for the pipe to be placed under the shoreline until approximately -30 MLLW where the pipe will come from the bank and continue onto the seabed. Materials to backfill the buried marine portion will be 2,820 CY of imported clean crushed gravel and glacial till sediment.

The project JARPA and Biological Assessment describe in detail how each element of the project will be constructed and identify conservation measures that will be implemented to avoid and minimize adverse impacts to the aquatic environment during construction.

Analysis – Shoreline Substantial Development Permit

7. Section 18.16.090 of the Anacortes Municipal Code provides criteria for review of a shoreline substantial development permit and reads: "*The decision maker shall review the application and related*

information and make a decision to approve, approve with conditions, or deny the application for a substantial development permit, conditional use, or variance. No permit shall be granted unless the proposed development is consistent with the provisions of th[e] [shoreline] master program, the Shoreline Management Act of 1971, and the rules and regulations adopted by the Department of Ecology thereunder”.

The sections below outline and analyze project conformance with applicable regulations.

Table 5.1 Shoreline Use and Modification Matrix

- 7.1. The Shoreline Master Program classifies the proposed outfall pipe as a Major Utility. Table 5.1 identifies Major Utilities as a Conditional Use in the Aquatic Shoreline Environment Designation (SED) and a Permitted Use in the Urban Maritime SED.

SMP Section 5.5 Shorelines of Statewide Significance

- 7.2. The proposed outfall pipe will extend into a Shoreline of Statewide Significance, which is the area lying seaward from the line of extreme low tide.

SMP Section 5.6 Aquatic

- 7.3. The in-water portion of the site (below OHWM) is located within the Aquatic SED. The purpose of the Aquatic SED is to “protect, restore, and manage the unique characteristics and resources of marine waters, including habitat, ecology, navigation and public enjoyment”.
- 7.4. Per Table 5.1 Shoreline Use and Modification Matrix, Major Utilities are a Conditional Use in the Aquatic SED. Conditional use criteria are discussed below.

SMP Section 5.11 Urban Maritime

- 7.5. The upland portion of the project site has a shoreline environment designation of Urban Maritime. The purpose of the Urban Maritime SED is to “preserve a variety of water-dependent, water-oriented, and water-related public, commercial, and industrial uses such as those associated with the Port of Anacortes”.
- 7.6. SMP DR-5.11.2 requires, where applicable, new development to include environmental cleanup (e.g. removal of contaminated soils) and restoration of the shoreline in compliance with state and federal laws.
- 7.6.1. Existing foreign debris and trash will be removed from the shoreline within the project boundaries and disturbed slopes will be replaced to existing conditions using a layer of rip rap covered by glacial till sediment and sand mix. The project will remove invasive species and impervious asphalt parking area at the end of U Avenue and replace with native vegetation and pedestrian walking paths.
- 7.7. SMP DR-5.11.3 requires that no net loss of shoreline function shall result from new development.
- 7.7.1. According to the City of Anacortes Shoreline Analysis Report, the overall rating for shoreline ecological functions within this reach of Guemes Channel is Low. The shoreline contains typical weed grasses with mostly steep, rocky banks and foreign dumped debris. The proposed outfall pipe will enter the marine waters where minimal aquatic vegetation and animals such as mussels and Dungeness crab are known to exist. According to the Biological Assessment (BA) provided with the application, there are no long-term negative impacts anticipated with this project, and the project will provide long-term improvement over existing conditions through the improved dilution factor of the new outfall and removal of contaminated sediments from the project footprint.

7.7.2. The project received Hydraulic Project Approval from the WA State Department of Fish & Wildlife on November 5, 2021. The approval includes provisions to avoid, minimize, restore, and compensate for adverse impacts.

7.8. Pursuant to DR-5.11.4, any impacts to ecological functions shall be fully mitigated with the mitigation sequencing defined in [SMP] Chapter 12. If mitigation is required for water-dependent use, off-site mitigation in conjunction with appropriate on-site mitigation would be most appropriate.

7.8.1. According to the BA, the project is designed to avoid and minimize adverse impacts to the aquatic environment by implementing specific conservation measures during construction activities. Long-term adverse impacts to the Guemes Channel are not anticipated as the area that will be excavated will be backfilled to the existing bed profile with clean Glacial till sediment. There is no eelgrass and minimal microalgae within the dredge footprint, so no mitigation for lost aquatic vegetation is warranted.

7.9. Per DR-5.11.5, redevelopment and renewal of substandard, degraded, or obsolete urban shoreline areas shall be encouraged in order to make maximum use of available shoreline resources and to accommodate future water-oriented uses.

7.9.1. As stated above, the project will remove foreign debris, invasive species, and the impervious asphalt parking area at the end of U Avenue and replace with native vegetation and pedestrian walking paths. This will enhance public access and use of the shoreline.

SMP Chapter 6 Environmental Protection General Regulations

7.10. Per DR-6.4.2, all shoreline permits shall contain provisions that require developers to comply with all applicable state law requirements regarding preservation of archaeological and historic resources, including provisions to stop work and notify appropriate agencies.

7.10.1. Review through the Section 106 process, including Tribal Consultation, will meet the goals and policies of SMP Section 6.4 Environmental Elements DR-6.4.2-6.4.4. The City has applied for funding from US Department of Homeland Security's Federal Emergency Management Agency (FEMA) in order to conduct the project. Section 106 of the National Historic Preservation Act requires Federal Agencies, including FEMA, to consider the effects of its actions on historic properties.

7.11. Per DR-6.4.15, all shoreline developments shall be located, designed, constructed, and operated so as not to be a hazard to public health and safety.

7.11.1. According to the project narrative, vessel traffic and public use will not be impacted by the outfall. The project is for the purpose of maintaining public health and safety.

7.12. Per DR-6.4.17, new development shall be located and designed to mitigate adverse impacts to views from public vista points.

7.12.1. According to the project narrative, the proposed pipe will be entirely underground until it surfaces onto the seabed at -30' MLLW. There will be no above ground structures associated with the project and no impacts to views from public vistas.

7.13. Per SMP DR-6.7.4, new sewer outfalls shall not be located in critical saltwater habitats or areas where outfall or discharge will adversely affect critical saltwater habitats unless the applicant can show all of the following:

- There is no alternative location for the outfall or pipe.

- The outfall or pipe is placed below the surface of the beach or bed of the water body.
 - The outfall discharges waterward of the intertidal zone.
 - The disturbed area will be revegetated with native plants.
 - The discharge point on the new outfall is located so the discharges, including nutrients in the discharge and currents, do not adversely affect critical saltwater habitats.
- 7.13.1. According to the project application, the outfall pipe will be placed below the surface of the beach and bed of the Guemes Channel until -30 MLLW and will discharge waterward of the intertidal zone. The area of disturbance currently lacks riparian and aquatic vegetation. Contaminated sediments will be removed from the project footprint and replaced with clean fish mix backfill. There will be no long-term effects of the project as the pipe will be replacing an existing outfall which will be decommissioned once the new one is completed. The new outfall design has been modeled through a mixing study meeting the Washington State Water Quality standards for outfalls discharging into the Guemes Channel. The study found that there was no reasonable potential of violating water quality criteria with the improved effluent mixing created by the new outfall design.
- 7.13.2. Approximately 700 feet offshore, WDFW Priority Habitat and Species Map identifies the Guemes Channel as Dungeness crab habitat. According to the Critical Areas Report completed for the project, *“no dredging will occur in mapped Dungeness crab habitat, outfall pipe and the diffuser will be anchored to the seabed which will make approximately 1,600 sq. ft. of seabed habitat inaccessible. Discharge from the outfall is not anticipated to impact Dungeness crab”*.
- 7.14. Per SMP Appendix A-5.1, areas with which state and federal and endangered, threatened, and sensitive species have primary association are designated FWHCAs. Guemes Channel is documented habitat for several listed species identified by USFWS and NMFS. Effects to these species and their habitat are addressed in the project Biological Assessment which addresses the project’s compliance with Section 7(c) of the Endangered Species Act. The report notes that although the proposal *“could have temporary impacts to ESA-listed species, there will be long term benefits with a chronic dilution factor for the proposed new outfall nearly 10 times greater than the existing and over 2,350 cubic yards of impacted Sediment Management Area (SMA) contaminated sediments removed from the aquatic environment”*.
- 7.15. The portion of the site within Guemes Channel is located within Zone AE (El. 7’) of the FEMA-mapped 100-year floodplain according to FIRM Panel 5303170040A. The upland project area is located within Zone X for having minimal flood hazard.
- 7.15.1. Work to occur within the portions of the site that are mapped within Zone AE are subject to the applicable code provisions, including obtaining a floodplain development permit, if applicable.

SMP Section 8.14 Utilities

- 7.16. Per SMP DR-8.14.2, utilities shall be designed and installed to meet future needs when possible.
- 7.16.1. The outfall pipe has been designed to consider future needs of the City, including consideration of future growth and climate conditions.
- 7.17. Per SMP DR-8.14.7, certain new major utility facilities, including sanitary sewer outfalls, may be permitted in shoreline jurisdiction if it can be shown that no practicable alternative exists outside shoreline jurisdiction.
- 7.17.1. The City’s existing damaged WWTP outfall at Pier 2 is located within shoreline jurisdiction. The relocated outfall requires a shoreline location so that the WWTP can continue discharge treated effluent to Puget Sound consistent with the City’s NPDES permit.

- 7.18. Per SMP DR-8.14.8, all impacts to fish and wildlife resources shall be fully mitigated.
- 7.18.1. As provided in the project's Biological Assessment Report, the proposed project is not anticipated to result in adverse impacts or a loss of ecological function due to the lack of existing vegetation and upland habitat. The new outfall will be in conformance with the City's existing NPDES permit, which includes performance standards and monitoring requirements to ensure water quality standards are met.
- 7.19. Per SMP 8.14.10, utilities shall be located adjacent to or within existing utility or circulation easements or rights-of-way whenever feasible. Joint use of rights-of-way and corridors is encouraged.
- 7.19.1. As indicated in the project's site plan, the proposed outfall pipe will be located within existing right-of-way.
- 7.20. Per SMP DR-8.14.12, when feasible, utility development shall include public access to the shoreline, trail systems, and other forms of recreation, providing such uses will not unduly interfere with utility operations, or endanger the public health, safety, and welfare.
- 7.20.1. The project is located at the terminus of U Avenue, which is developed with a paved cul-de-sac that currently provides public visual access to Guemes Channel. Public access will continue to be provided and will be enhanced after impervious surfaces are removed and planted with native vegetation and pedestrian walking paths.
- 7.21. Per SMP DR-8.14.13, utilities shall be located, designed, constructed, and operated so as to assure no net loss of shoreline ecological functions, preserve the natural landscape, and minimize conflicts with present and planned land and shoreline uses.
- 7.21.1. Based on the Critical Areas Report, no naturally vegetated areas, aquatic vegetation, or other significant habitat areas will be impacted. The project will improve conditions in the area long-term through removal of contaminated sediment and improved dilution of effluent. The underground and underwater location of the outfall pipe will avoid conflicts with present and planned land and shoreline uses.
- 7.22. Per SMP DR-8.14.14, to protect aesthetic qualities of the shoreline, new utility lines including electricity, communications, and fuel lines shall be located underground, except where the presence of bedrock or other obstructions make such placement infeasible.
- 7.22.1. As indicated in the project narrative, the outfall pipe will be located underground.
- 7.23. Per SMP DR-8.14.15, utility developments shall be located and designed so as to avoid, to the extent practicable, the need for any structural or artificial shoreline modification works for the life of the project.
- 7.23.1. The shoreline is currently primarily composed of rip rap and foreign debris. According to the Biological Assessment, the nearshore section from MHHW to MLLW currently consists of a near-vertical revetment facing the waterway at the end of U Ave. Excavated slopes along the steep embankment will be backfilled with 12 inches of crushed gravel and covered with 2.5 feet of riprap covered with 6-18 inches of glacial till mix to the previously existing slope of 2:1.
- 7.24. Per SMP DR-8.14-16, utilities should be avoided in floodplains to the greatest extent practicable; if necessary, flood protection structures shall not increase flood hazards in other areas along the waterbody.

- 7.24.1. The portion of the site within Guemes Channel is within the floodplain and will be required to obtain a floodplain development permit, if applicable, and conform to the applicable standards.
- 7.25. Per SMP DR-8.14.17, underwater construction of utilities or construction in adjacent wetlands shall be timed to avoid fish and wildlife migratory and spawning periods.
- 7.25.1. According to the Biological Assessment, the proposed in-water work window of August 1st – February 15th will minimize potential impacts to all listed species and forage species in accordance with approved authorized work window for saltwater areas within Tidal Reference Area 9 as referenced in WAC 220-660-330.
- 7.26. Per SMP DR-8.14.18, installation shall assure the prevention of siltation or beach erosion.
- 7.26.1. According to the Biological Assessment, erosion control BMPs such as silt fence will be utilized to prevent any inadvertent runoff to the Guemes Channel in accordance with the TESC plans.
- 7.27. Per SMP DR-8.14.19, upon completion of installation/maintenance of utilities in shorelines, the land/substrate shall be restored to its pre-project configuration, replanted with native species as appropriate, and be provided with maintenance care until the newly planted vegetation is established.
- 7.27.1. All excavated areas will be backfilled to pre-existing grade and configuration. The upland shoreline area will be enhanced with a pocket park, including new native vegetation and reduction in impervious surface areas.
- 7.28. Per SMP DR-8.14.20, when feasible, utilities within the shoreline shall be placed underground, and utility corridors shall be used for shoreline access.
- 7.28.1. As previously stated, the pipe will be underground until it surfaces on the seabed at - 30 feet MLLW.
- 7.29. Per SMP DR-8.14.21, undergrounding of utilities across a water body shall comply with all applicable local, state, and federal agency regulations and requirements; a shoreline permit is required.
- 7.29.1. All work within the Guemes Channel will comply with all applicable local, state, and federal agency regulations and requirements. No work will begin until all required permits and authorizations have been obtained.

Analysis – Shoreline Conditional Use Permit

SMP Section 3.1 Conditional Use Permits

8. Per SMP Section 3.1.D, uses classified as conditional uses may be authorized provided that the applicant can demonstrate all of the following:
- 8.1. That the proposed use will be consistent with the policies of RCW 90.58.020 and the policies of the Master Program.
- 8.1.1. The proposed use is consistent with RCW 90.58.020 and the policies of the SMP, as articulated above in the review and findings of fact.
- 8.2. That the proposed use will not interfere with the normal public use of public shorelines;

- 8.2.1. The project will not interfere with normal public use of the shoreline, harbor, or marine waters. The outfall will be placed underground and under the shoreline until -30 MLLW, the pipe will not be visible to the public as it extends to the Guemes Channel. There will be no above ground structures associated with the project. The shoreline will be replaced to the existing profile to maintain shoreline habitat and aesthetics for public use. Vessel traffic and use will not be impacted by the outfall.
- 8.3. That the proposed use of the site and design of the project will be compatible with other authorized uses within the area and uses planned for the area under the comprehensive plan and this Master Program;
 - 8.3.1. The use and design of the project are compatible with authorized uses in the Urban Maritime and Aquatic shoreline environment designations. The proposed outfall is not anticipated to conflict with area uses. The use is consistent with the management policies for Shorelines of Statewide Significance.
- 8.4. That the proposed use will cause no significant adverse effects to the shoreline environment in which it is to be located; and
 - 8.4.1. There will be no significant adverse effects to the shoreline environment. Once the pipe has been placed within the excavated/dredged trench, imported clean materials will be used as backfill to recreate the exiting profile of the shoreline. The outfall will be located below the existing grade and will not interfere with the continued growth of the shoreline habitat. Debris and waste materials will be removed from the shoreline during construction activities to further enhance the shoreline habitat.
- 8.5. That the public interest will suffer no substantial detrimental effect.
 - 8.5.1. The public interest will suffer no substantial detrimental effect given that the outfall will replace an existing damaged one, it will be primarily underground and not visible, and will not reduce public access to the shoreline or interfere with uses of the marine waters.
9. In the granting of all conditional use permits, consideration shall be given to the cumulative impact of additional requests for like actions in the area.
 - 9.1. Additional requests for like actions in the area are not likely to occur because the City is the only sewer provider to all areas located within the City. All wastewater is conveyed to the WWTP, treated, and discharged via outfall to Puget Sound. The existing outfall will be decommissioned after the proposed new outfall is completed.

CONCLUSIONS OF LAW

1. According to AMC 19.20.030(1) and 18.16.100(B) shoreline substantial development permit applications for projects valued greater than \$1 million or on sites of 3-acres or more are considered a Type 4 type of review. A shoreline conditional use permit is a Type 3-PC review type. The two permits applications are being processed concurrently under a Type 4 review process, whereby the Planning Commission makes a recommendation for final decision to City Council regarding the permits.
2. Proper notice for the application and public hearing has been provided.
3. The application was reviewed under the State Environmental Policy Act (SEPA) and a Mitigated Determination of Non-Significance was issued on September 27, 2021.
3. The subject application was reviewed for conformance with all applicable Shoreline Master Program policies and regulations, including but not limited to, Section 5.5 Shorelines of Statewide Significance, Section 5.6 Aquatic, Section 5.11 Urban Maritime, Section 5.12 Shoreline Use and Modification Matrix, Chapter 6 Environmental Protection General Regulations, Chapter 8 Specific Use Policies and

Development Regulations, and Section 9.11 of the Shoreline Master Program that regulates Shoreline Stabilization Measures.

4. The subject application was reviewed for conformance with the criteria of SMP Section 3.1 Conditional Use Permits and found to meet said criteria.
5. The subject proposal is consistent with the Washington State's Shoreline Management Act, City of Anacortes' 2010 Shoreline Master Program and development regulations listed therein for developments within the "Urban" and "Aquatic" shoreline environment designations.
6. Any Finding of Fact that is more correctly a Conclusion of Law is hereby incorporated as such by this reference.

RECOMMENDATION

Based upon the application, Findings of Fact, and Conclusions of the staff report, staff recommends that the Planning Commission recommend approval of the shoreline conditional use permit and substantial development permit with the following conditions of approval:

1. The scope of the project shall not exceed that as set out in the shoreline substantial development permit and shoreline conditional use permit application, except as modified by the permit decision or other jurisdictional agencies.
2. Prior to work occurring within shoreline jurisdiction, the applicant shall obtain a grading permit and floodplain development permit, if applicable (in addition to all other local, state and federal permits and authorizations).
3. Prior to issuance of a grading permit, final detailed construction plans and a final stormwater site plan shall be submitted to PCED and Public Works Departments for review and approval.
4. Shoreline stabilization measures shall be designed by a WA State licensed professional engineer and located, designed, and constructed in such a manner to assure no net loss of shoreline ecological functions and to avoid significant impacts to adjacent or down-current properties.
5. Prior to issuance of a grading permit, the applicant shall submit an erosion and sedimentation control plan for activities that involve the removal of vegetation, stockpiling of earth or other materials, or any activity that could result in shoreline erosion or siltation. The plan shall conform to the City of Anacortes Engineering Design Standards and shall utilize Best Management Practices (BMPs) to prevent shoreline erosion and siltation.
6. The project shall include the development of a pocket park within the U Avenue street end right-of-way. A final plan depicting access for existing homes, proposed landscaping, and other amenities shall be submitted to the PCED and Parks Departments for review and approval prior to grading permit issuance.
 - 6.1. The landscape design shall use native vegetation (i.e. 80% or greater), particularly drought-resistant and saline-tolerant plant species. The plan shall include species, size, location, planting specifications, and provisions for ensuring survival.
7. Trees removed during construction shall be replaced at a minimum ratio of 3:1. A final planting plan that includes species, size, location, planting specifications, and provisions for ensuring survival shall be submitted to PCED for review and approval and implemented prior to project completion.
8. Foreign dumped debris along the shore adjacent to the U Avenue City right-of-way shall be removed prior to completion of the project.
9. Development shall comply with the mitigation measures as listed in the SEPA Mitigated Determination of Non-Significance (MDNS) issued for the proposal on September 27, 2021 as follows:

- 9.1. All applicable permits and authorizations from local, state, and federal agencies with jurisdiction shall be obtained prior to the start of any construction activities. (MDNS #1)
- 9.2. To minimize neighborhood impacts, a detailed construction schedule and traffic management plan shall be developed, provided to the Public Works and Planning Departments for review, and implemented. (MDNS #2)
- 9.3. A construction equipment staging plan shall be developed and provided to the Public Works and Planning Departments for review. (MDNS #3)
- 9.4. Road closures and a blasting schedule shall be coordinated with the Anacortes Fire Department, including provision of alternate routes for emergency vehicles as needed. (MDNS #4)
- 9.5. The development shall comply with the recommendations, conservation measures, and best management practices as listed in the Biological Assessment dated July 2021, prepared by Widener & Associates, or as amended and approved by agencies with jurisdiction. (MDNS #5)
- 9.6. The development shall adhere to the recommendations and conclusions provided by the Geotechnical Report prepared by GeoEngineers, dated March 25, 2021. (MDNS #6)
 - 9.6.1. Prior to construction activities, direct communication with residents and adjacent property owners shall occur. Pre-blast and post-blast damage surveys of nearby homes and utilities (within 200') shall be conducted as requested by property owners. (MDNS #6.1)
- 9.7. All project activities shall conform to the City's noise control regulations and occur between the hours of 7:00 AM and 10:00 PM unless a noise variance is obtained. Rock blasting shall be conducted as much as possible between the hours of 8:00 AM and 5:00 PM or within daylight hours. (MDNS #7)
- 9.8. To avoid adverse impacts to cultural resources, the applicant shall comply with Section 106 of the National Historic Preservation Act and provide letter of concurrence from SHPO to the Planning Department prior to ground disturbing activities. (MDNS #8)
10. The applicant /landowner shall comply with federal statutes including but not limited to: Endangered Species Act, Clean Water Act, Marine Mammal Protection Act, and other federal statutes.
11. The development shall comply with all applicable Shoreline Master Program regulations, including but not limited to Chapter 5, Shoreline Environments & Associated Policies and Regulations, Chapter 6 Environmental Protection General Regulations, Chapter 8 Specific Use Policies and Development Regulations, and Chapter 9 Specific Shoreline Modification Policies and Development Regulations.
12. The development shall comply with all applicable state law requirements regarding preservation of archaeological and historic resources. Should protected resources be uncovered during excavation activities, all work shall stop, and the contractor shall notify appropriate Tribes and agencies, including WA State Department of Archaeology and Historic Preservation and the City of Anacortes.
13. Development shall comply with AMC 18.16.130 regulating the time limit for shoreline permits as follows:
 - 13.1. *Construction, or substantial progress toward completion, must begin within two (2) years after approval of the permit. Substantial progress toward construction shall include, but not limited to, the letting of bids, making of contracts, purchasing of materials involved in development, but shall not include development or uses which are inconsistent with the Shoreline Management Act or the city's master program. In determining the running two-year period hereof, there shall not be included the time during which development was not actually pursued by construction and the pendency of litigation reasonably related thereto made it reasonable not to so pursue; provided, that the city may, in its discretion, extend the two-year time period for a reasonable time based on factors, including the inability to expeditiously obtain other governmental permits which are required prior to the commencement of construction.*

13.2. *5-Year Permit Authorization: If construction has not been completed within five years of approval by the City of Anacortes, the city will review the permit, with prior notice to parties of record, and, upon showing of good cause, either extend the permit for one additional year, or terminate the permit. Prior to the city authorizing any permit extensions, it shall notify any parties of record and the Department of Ecology. Note: Only one single extension is permitted.*

14. Construction pursuant to a permit will not begin or be authorized until twenty-one days from the date the permit decision is filed with the Department of Ecology, as provided in RCW 90.58.130.

Staff reserves the right to supplement the record of the case to respond to matters and information raised after the writing of this report.

Exhibits:

Exhibit 1 – Staff Report

Exhibit 2 – Vicinity Map

Exhibit 3 – Application Documents

Exhibit 4 – Issued SEPA MDNS

Exhibit 5 – Public & Agency Comments

Exhibit 6 – Notices

Exhibit 7 – WDFW Issued HPA

Exhibit 8 – Site Photos



USACE REFERENCE #: NWS-2021-320

PLAN - SHEET 2 OF 6

APPLICANT: City of Anacortes

DATE: 7/2/2021

PROPOSED PROJECT: City of Anacortes WWTP Outfall

PROJECT LOCATION: 500 T Ave, Anacortes, WA 98221

Exhibit 3

Application

Documents



PLANNING, COMMUNITY, & ECONOMIC DEVELOPMENT DEPARTMENT
 Mailing Address: P.O. Box 547, Anacortes, WA 98221
 Office Location: 904 6th Street, Anacortes WA 98821
 Phone: (360) 299-1984

City of Anacortes
 Planning, Community &
 Economic Development

Date Received:

5/24/21

Master Land Use Permit Application

TYPE OF APPLICATION (check all that apply):		
☐ Administrative Interpretation ☐ Annexation Request ☐ Binding Site Plan (Preliminary) ☐ Boundary Line Adjustment (BLA)** ☐ BLA: Lot Consolidation** ☐ Comprehensive Plan/ Map Amendment Request** ☐ Conditional Use Permit (CUP) per AMC 19.36** ☐ Conditional/Special Use Permit (CUP) per AMC 17.70** ☐ Cottage Housing Development** ☐ Development Agreement	☐ Essential Public Facility ☐ Floodplain Development Permit ☐ Home Occupation Permit** ☐ Long Subdivision (Preliminary)** ☐ Lot Certification ☐ Minor Permit Revision ☐ Plat Amendment/Modification ☐ SEPA Environmental Review** ☒ Shoreline Conditional Use Permit** ☐ Shoreline Exemption** ☒ Shoreline Substantial Development Permit** ☐ Shoreline Variance**	☐ Short Subdivision (Preliminary)** ☐ Site Plan Review – Type 1** ☐ Site Plan Review – Type 2** ☐ Stormwater Management Manual Adjustments & Exceptions ☐ Variance (Level 1) ** ☐ Variance (Level 2) ** ☐ Wireless Conditional Use Permit (WCUP)** ☐ Wireless Service Facility (WSF) Permit** ☐ Zoning Code/ Map Amendment Request (Rezone)
**Permit type has supplemental application/checklist that must be submitted with Master Land Use Permit Application		
PROJECT & SITE INFORMATION:		
SITE ADDRESS: Starting at 500 T ave N, 3 rd St west, U ave N and into the Guemes Channel.	PROJECT NAME: City of Anacortes Wastewater Treatment Plant Outfall Relocation	
PARCEL NUMBER(S): City of Anacortes ROW, Guemes Channel, Parcel 5 (PMA No. 080024)	SECTION, TOWNSHIP, & RANGE: S18, T34N, R2E	
LOT SQUARE FOOTAGE & ACREAGE:	PROJECT VALUATION: \$30,000,000	
LEGAL DESCRIPTION: ROW and shoreline designation urban maritime East line of U Ave ROW	PRESENT ZONING: City ROW and Commercial Marine	
PRESENT USE OF PROPERTY: roadway and commercial marine waterfront	CUT & FILL (CY) PROPOSED: 2,955 CY removed; 2,820 CY fill in marine portion. Upland will be excavated and replaced to pre-existing grade.	
PRE-APPLICATION CONFERENCE HELD?: ☒ Yes, the City file # is <u>PRE-2021-0002</u> ☐ No	WATER SOURCE: ☐ City of Anacortes ☐ Private Well ☐ Community Well	
SEWAGE DISPOSAL: ☐ City of Anacortes ☐ Septic	ROAD ACCESS: ☒ City Road ☐ State Highway ☐ Private Road	

CRITICAL AREAS OR BUFFERS ON SITE OR WITHIN 300 FEET: ☒ Yes / Type <u>Shoreline</u> ☐ No		WATER BODIES WITHIN 200 FEET: ☒ Yes / Name: <u>Guemes Channel</u> ☐ No	
FLOODPLAIN: Flood Zone: AE FIRM Panel # 5303170040A Date of Panel: 9/16/2003			
LOT COVERAGE AREA CALCULATIONS: Existing Square Footage: Proposed Square Footage:			
IMPERVIOUS SURFACE AREA CALCULATIONS: Existing Impervious Square Footage: New Impervious Surface:			
DESCRIPTION OF SUBJECT PROPOSAL: ☐ Additional pages attached			
PROPOSED WORK: The proposed outfall pipe will be a 48-inch diameter high-density polyethylene (HDPE) pipe coming from the WWTP for 1,631 feet until the shoreline where the pipe will reduce to 42-inch outside diameter HDPE pipe for 1,030 feet with an 86-foot diffuser angled to the NW at approximately 24.5 degrees to better match the bidirectional current. The total length of the pipe will be 2,748 feet from the WWTP continuing into the Guemes Channel. The new pipe will be located east of the current outfall, terminate in deeper waters further from the shoreline, and be able to convey larger effluent volumes. The City needs to replace the damaged outfall and relocate it in an area with greater access for future.			
PROPERTY OWNER INFORMATION: ☐ Multiple owners attached			
NAME: Eric Shjarback; City of Anacortes		MAILING ADDRESS: P.O. Box 547	
CITY, STATE, ZIP: Anacortes, WA, 98221		PHONE #: (360)299-19080 (Eric, Shjarback)	
FAX #:		EMAIL ADDRESS: erics@cityofanacortes.org	
APPLICANT INFORMATION: ☒ Same as property owner			
NAME:		MAILING ADDRESS:	
CITY, STATE, ZIP:		PHONE #:	
FAX #:		EMAIL ADDRESS:	
CONTACT PERSON: ☐ Same as property owner ☐ Same as applicant			
NAME: Ross Widener, widener & associates		MAILING ADDRESS: 1902 120 th Pl S.E., Ste 202	
CITY, STATE, ZIP: Everett WA, 98208		PHONE #: (425)503-3629	
FAX #:		EMAIL ADDRESS: ross@widener-enviro.com	

ACKNOWLEDGEMENTS & SIGNATURE	
Read and initial each of the following statements prior to signing this application:	
	I understand that land use and/or planning permits do not authorize earth disturbing activities, the removal of vegetation, or the construction of buildings. I understand that additional permits will be required after my land use and/or planning permitting process is completed. I understand that no earth disturbing activities (including the removal of vegetation) may take place until after my land use and/or planning process is complete, and only after I have received additional permits such as Fill & Grade, Building Permit, or Right-of-Way permit(s).
	I understand that if critical areas (wetlands, streams, steep slopes, etc.) are found on or near my property I am not authorized to impact these areas in any way and will be required to leave an undisturbed buffer area around the critical area, as determined according to the City's critical areas regulations.
	I understand that depending on the size and scope of my project, I may be required to provide maintenance and/or performance bonds for items such as landscaping, critical areas, public roads and/or public utilities that I construct or install.
	I understand that I am solely responsible for providing complete and accurate information to the City. I understand that if my application is missing information or if inaccurate materials are submitted, my permits will be delayed. I understand that depending on how inaccurate and how incomplete my application is or becomes, the Department may require an entirely new application be submitted. I understand that when and if conditions change from that which my application originally represented, I am responsible for letting the City staff person assigned to my project know.
	I understand that I am applying for permits from the City of Anacortes only; and that additional permits from other Federal, State, and Local agencies could be required. I understand that the City of Anacortes cannot advise me of permits that are required from other agencies, and that I must contact these agencies to make sure I comply with their requirements. These agencies include (but are not limited to): Corps of Engineers, Department of Natural Resources, Department of Fish & Wildlife, Department of Ecology, and Northwest Clean Air Agency.
	I understand that I will be responsible for paying consultants that the City may deem necessary to review certain aspects of my application. I understand that these consultant reviews could include special inspections, traffic concurrency, critical areas, landscaping, stormwater, etc.

Signature required on next page.

By affixing my signature hereto, I certify that I am the owner, or am acting as the Owner's authorized agent, and that the application and documents contained with this submittal are complete and accurate to the best of my knowledge and abilities. If your title report lists a company, partnership or other owners, you must submit evidence that you are authorized to sign on behalf of the entity or others that are listed.

If you are an authorized representative you must submit an Agent Authorization Form.

Please attach additional signature sheets if there is more than one owner.

Under penalty of perjury, I certify that the information, statements, answers above regarding the subject application(s) are true and correct to the best of my knowledge and belief.

Signature: _____

Date: 5-7-21

Printed Name: FRED BUCKENMEYER PUBLIC WORKS DIRECTOR

STATE OF WASHINGTON)
) ss.
COUNTY OF SKAGIT

I certify that I know or have satisfactory evidence that _____ is the person who appeared before me, and said person acknowledged that he/she signed this instrument, and acknowledged it as the free and voluntary act for the uses and purposes mentioned in this instrument.

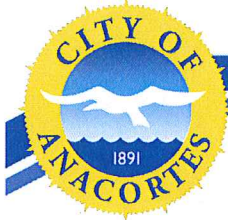
Given under my hand and official seal this _____ day of _____, 20____

Notary Public

Residing at _____

My appointment expires _____

(SEAL)



Date Received:

5/24/21

Planning, Community, & Economic Development Department
904 6th St. / P.O. Box 947, Anacortes, WA 98221
360-293-1984

AGENT AUTHORIZATION FORM

Use this form to authorize someone other than the property owner to apply for permits for the subject property.

Project Name: City of Anacortes Wastewater Treatment Plant Outfall Replacement

Property Address: start at 500 T ave north the 3rd St and ending at U ave into the Guemes Channel

City, State, Zip: Anacortes, WA, 98221

AUTHORIZATION STATEMENT

I / we, as the owners of the property identified above, authorize the below listed individual to act as our agent to submit applications, receive correspondence regarding the above-listed application, and sign and to receive notices on my/our behalf.

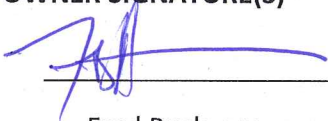
DESIGNATED AGENT

Agent Name: Jordan Widener of Widener & Associates

Agent Address: 1902 120th PL SE, STE 202

Agent City, State, Zip: Everett, WA, 98208

PROPERTY OWNER SIGNATURE(S)**

Signature: <u></u>	Signature: _____
Printed Name: <u>Fred Buckenmeyer</u>	Printed Name: _____
Title: <u>Public Works Director</u>	Title: _____
Company: <u>City of Anacortes</u>	Company: _____
Date: <u>5-27-21</u>	Date: _____

**Each property owner listed must have their signature notarized.

STATE OF WASHINGTON)
) ss.
COUNTY OF SKAGIT

I certify that I know or have satisfactory evidence that Fred Buckenmeyer is the person who appeared before me, and said person acknowledged that he/she signed this instrument, and acknowledged it as a free and voluntary act for the uses and purposes mentioned in this instrument.

Given under my hand and official seal this _____ day of _____, 20____

(SEAL)

Notary Public

Residing at _____

My appointment expires _____

STATE OF WASHINGTON)
) ss.
COUNTY OF SKAGIT

I certify that I know or have satisfactory evidence that _____ is the person who appeared before me, and said person acknowledged that he/she signed this instrument, and acknowledged it as a free and voluntary act for the uses and purposes mentioned in this instrument.

Given under my hand and official seal this _____ day of _____, 20____

(SEAL)

Notary Public

Residing at _____

My appointment expires _____



WASHINGTON STATE

Joint Aquatic Resources Permit Application (JARPA) Form^{1,2} [\[help\]](#)

USE BLACK OR BLUE INK TO ENTER ANSWERS IN THE WHITE SPACES BELOW.



US Army Corps
of Engineers®
Seattle District

AGENCY

Date received:

Agency reference #:

Tax Parcel #(s):

City of Anacortes
*Planning, Community &
Economic Development*

Date Received:

5/24/21

Part 1—Project Identification

1. Project Name (A name for your project that you create. Examples: Smith's Dock or Seabrook Lane Development) [\[help\]](#)

City of Anacortes Wastewater Treatment Plant Outfall Relocation

Part 2—Applicant

The person and/or organization responsible for the project. [\[help\]](#)

2a. Name (Last, First, Middle)

Shjarback, Eric

2b. Organization (If applicable)

City of Anacortes

2c. Mailing Address (Street or PO Box)

P.O. Box 547

2d. City, State, Zip

Anacortes, WA 98221

2e. Phone (1)

2f. Phone (2)

2g. Fax

2h. E-mail

360-299-1980

erics@cityofanacortes.org

¹Additional forms may be required for the following permits:

- If your project may qualify for Department of the Army authorization through a Regional General Permit (RGP), contact the U.S. Army Corps of Engineers for application information (206) 764-3495.
- Not all cities and counties accept the JARPA for their local Shoreline permits. If you need a Shoreline permit, contact the appropriate city or county government to make sure they accept the JARPA.

²To access an online JARPA form with [\[help\]](#) screens, go to

http://www.epermitting.wa.gov/site/alias_resourcecenter/jarpa_jarpa_form/9984/jarpa_form.aspx.

Part 3—Authorized Agent or Contact

Person authorized to represent the applicant about the project. (Note: Authorized agent(s) must sign 11b of this application.) [\[help\]](#)

3a. Name (Last, First, Middle)			
Widener, Ross			
3b. Organization (If applicable)			
Widener & Associates			
3c. Mailing Address (Street or PO Box)			
1902 120 th PL SE, STE 202			
3d. City, State, Zip			
Everett, WA 98208			
3e. Phone (1)	3f. Phone (2)	3g. Fax	3h. E-mail
425-332-3961	425-503-3629		ross@widener-enviro.com

Part 4—Property Owner(s)

Contact information for people or organizations owning the property(ies) where the project will occur. Consider both **upland and aquatic** ownership because the upland owners may not own the adjacent aquatic land. [\[help\]](#)

- ☒ Same as applicant. (Skip to Part 5.)
- ☐ Repair or maintenance activities on existing rights-of-way or easements. (Skip to Part 5.)
- ☐ There are multiple upland property owners. Complete the section below and fill out [JARPA Attachment A](#) for each additional property owner.
- ☒ Your project is on Department of Natural Resources (DNR)-managed aquatic lands. If you don't know, contact the DNR at (360) 902-1100 to determine aquatic land ownership. If yes, complete [JARPA Attachment E](#) to apply for the Aquatic Use Authorization.

4a. Name (Last, First, Middle)			
4b. Organization (If applicable)			
4c. Mailing Address (Street or PO Box)			
4d. City, State, Zip			
4e. Phone (1)	4f. Phone (2)	4g. Fax	4h. E-mail

Part 5—Project Location(s)

Identifying information about the property or properties where the project will occur. [\[help\]](#)

- ☐ There are multiple project locations (e.g. linear projects). Complete the section below and use [JARPA Attachment B](#) for each additional project location.

5a. Indicate the type of ownership of the property. (Check all that apply.) [help]			
☐ Private			
☐ Federal			
☒ Publicly owned (state, county, city, special districts like schools, ports, etc.)			
☐ Tribal			
☒ Department of Natural Resources (DNR) – managed aquatic lands (Complete JARPA Attachment E)			
5b. Street Address (Cannot be a PO Box. If there is no address, provide other location information in 5p.) [help]			
199 U Avenue			
5c. City, State, Zip (If the project is not in a city or town, provide the name of the nearest city or town.) [help]			
Anacortes, WA 98221			
5d. County [help]			
Skagit			
5e. Provide the section, township, and range for the project location. [help]			
¼ Section	Section	Township	Range
	18	35N	2E
5f. Provide the latitude and longitude of the project location. [help]			
• Example: 47.03922 N lat. / -122.89142 W long. (Use decimal degrees - NAD 83)			
48.520928 N lat / -122.604670 W long			
5g. List the tax parcel number(s) for the project location. [help]			
• The local county assessor's office can provide this information.			
City of Anacortes ROW, Guemes Channel, Parcel 5 (PMA No. 080024)			
5h. Contact information for all adjoining property owners. (If you need more space, use JARPA Attachment C.) [help]			
Name	Mailing Address		Tax Parcel # (if known)
PORT OF ANACORTES	100 COMMERCIAL AVE ANACORTES, WA 98221		P32868
FREER LUANNE	101 U AVENUE ANACORTES, WA 98221		P56458, P32871
JACKSON FAMILY TRUST	416 SECOND STREET ANACORTES, WA 98221		P56457, P32865

5i. List all wetlands on or adjacent to the project location. [help]
None
5j. List all waterbodies (other than wetlands) on or adjacent to the project location. [help]
Guemes Channel
5k. Is any part of the project area within a 100-year floodplain? [help]
☒ Yes ☐ No ☐ Don't know
5l. Briefly describe the vegetation and habitat conditions on the property. [help]
The shoreline contains typical weed grasses with mostly steep, rocky banks and foreign dumped debris. The proposed pipe outfall will enter the marine waters of the Guemes Channel, where minimal aquatic vegetation and animals such as mussels and Dungeness crab (<i>Cancer magister</i>) are known to exist. The immediate vicinity of the marine action area is listed as an Ecology Toxics Cleanup site due to contamination from past historical uses along the waterfront.
5m. Describe how the property is currently used. [help]
The landward property is currently used as public roadway and the marine portion is open marine waters mainly used by commercial boats as it is adjacent to the Port of Anacortes's boat launch. The project area crosses a small section of state-owned aquatic land managed by the Port of Anacortes as authorized by DNR.
5n. Describe how the adjacent properties are currently used. [help]
Adjacent properties near the upland access portion of this project are used as single-family residences. Adjacent to the marine portion of the project, the vicinity is used for the Port of Anacortes, where the property has been used as a port since 1926 for exporting dry bulk cargoes as well as for short term moorage for barges and other vessels.
5o. Describe the structures (above and below ground) on the property, including their purpose(s) and current condition. [help]
Mooring dolphins exist in the marine waters of Guemes Channel, west of the project area, where they previously served as mooring structures for the Wyman's Marina. A stormwater outfall pipe currently exists near the shoreline revetment section of the project at the northern end of U Avenue. No other structures are known to exist in the project area. The onshore portion of the project will result in excavation of roads. Utilities in the roadway will be worked around and no disruption in service will be needed.
5p. Provide driving directions from the closest highway to the project location, and attach a map. [help]
Heading west on Highway 20, head north on Commercial Avenue. Turn right (east) on 4 th Street. The City's Wastewater Treatment Plant is at the intersection of 4 th Street and T Avenue. The project's upland portion can be reached by continuing on 4 th Street one block past the Wastewater Treatment Plant, turning left (North) on U Avenue. Continue towards Guemes Channel, to the end of the roadway.

Part 6—Project Description

6a. Briefly summarize the overall project. You can provide more detail in 6b. [help]
The City of Anacortes (City) is proposing to install a new outfall for its Wastewater Treatment Plant at 500 T Avenue. The marine outfall improvements seaward of HTL will consist of the following elements: • Outfall length approximately 1,030 lineal feet ◆ 20 intertidal nearshore section through existing seawall (HTL to MLLW)

- ◆ 360 ft buried section (MLLW to -30 ft MLLW)
- ◆ 650 ft laid on the sea bottom (-30 ft MLLW to -70 ft MLLW)
- 86-foot-long diffuser at the end of the outfall
 - ◆ 20 diffuser ports
 - ◆ 4.5 ft port spacing
 - ◆ Water depth = -68 to -70 ft MLLW
 - ◆ Port diameter 4.75 inches
 - ◆ Port orientation: vertical discharge port from top of diffuser pipe
- Outfall pipe
 - ◆ 42-inch outside diameter
 - ◆ Pipe material will be high density polyethylene (HDPE)
 - ◆ Bolt-on precast concrete anchors will be used for HDPE pipeline anchoring.

Pipe will be fully buried shoreline to -30 ft MLLW.

6b. Describe the purpose of the project and why you want or need to perform it. [\[help\]](#)

The project is proposing to upgrade The City of Anacortes Wastewater Treatment Plant (WWTP) outfall by installing a new 42' pipe and diffuser within Guemes Channel and relocating the new outfall to the east of the Port of Anacortes' Pier 2. The new pipe will be located east of the current outfall, terminate in deeper waters further from the shoreline, and be able to convey larger effluent volumes. The City needs to replace the damaged outfall and relocate it in an area with greater access for future.

The existing outfall which is located on the west side of pier 2 was damaged in the federally declared January/February 2020 disaster event. Since the damage occurred during this disaster event repair costs are eligible for reimbursement through FEMA's Public Assistance (PA) program. Due to the 30-million-dollar cost estimate the City and FEMA have developed to repair the effluent line, the City has chosen to relocate the outfall instead of repair in place. The high-cost estimate is largely due to all the Port facilities and activities that would need to be temporarily relocated during construction.

6c. Indicate the project category. (Check all that apply) [\[help\]](#)

- ☐ Commercial
 ☐ Residential
 ☒ Institutional
 ☐ Transportation
 ☐ Recreational
☐ Maintenance
 ☐ Environmental Enhancement

6d. Indicate the major elements of your project. (Check all that apply) [\[help\]](#)

- | | | | |
|---|---|---|--|
| ☐ Aquaculture | ☐ Culvert | ☐ Float | ☐ Retaining Wall (upland) |
| ☐ Bank Stabilization | ☐ Dam / Weir | ☐ Floating Home | ☐ Road |
| ☐ Boat House | ☐ Dike / Levee / Jetty | ☐ Geotechnical Survey | ☐ Scientific Measurement Device |
| ☐ Boat Launch | ☐ Ditch | ☐ Land Clearing | ☐ Stairs |
| ☐ Boat Lift | ☐ Dock / Pier | ☐ Marina / Moorage | ☐ Stormwater facility |
| ☐ Bridge | ☐ Dredging | ☐ Mining | ☐ Swimming Pool |
| ☐ Bulkhead | ☐ Fence | ☒ Outfall Structure | ☐ Utility Line |
| ☐ Buoy | ☐ Ferry Terminal | ☐ Piling/Dolphin | |
| ☐ Channel Modification | ☐ Fishway | ☐ Raft | |

☐ Other:

6e. Describe how you plan to construct each project element checked in 6d. Include specific construction methods and equipment to be used. [\[help\]](#)

- Identify where each element will occur in relation to the nearest waterbody.
 - Indicate which activities are within the 100-year floodplain.
-
- Prior to construction, a containment cell will be placed, using at most a vibratory pile driver around the outline of the outfall alignment into the Guemes Channel to isolate the in-water work area. Shown in the attached drawings, a containment cell will be placed starting from 17+50 extending as far as possible before reaching high currents from the channel. The length of the containment cell will extend 300 feet from the shoreline, into the cove and the cell will be approximately 40 feet apart (20 feet on either side of the pipe) to allow for a barge with a long reach excavator to work inside. Fish screening will be completed using large fish nets and dragging them through the containment cell three consecutive times. This will encourage fish to leave the work area before a silt turbidity curtain will be placed around the end of the cell to prevent elevated turbidity levels from leaving the work zone. An enclosed clam shell bucket at the end of the excavator will also be used to remove sediment in order to limit dredged material loss and reduce turbidity.
 - The nearshore portion from above HTL out to MLLW will be constructed from shore using an excavator. This zone currently consists of a near-vertical revetment facing the waterway at the end of U Ave. The trench will be excavated from the top of the embankment, primarily in the dry during low tides except for the deeper lower portion below mid-tide. Materials excavated will be removed from the site and disposed of at an approved upland facility. At the completion of construction, the embankment will be restored with gravel to the pre-existing slope.
 - The buried section from MLLW to -30 ft MLLW will be excavated from a barge mounted crane with clamshell dredge to accommodate 360 ft portion of pipe to be laid in the trench. These excavations will be conducted during tidal inundation. Sediments will be tested for compliance with chemical and biological criteria. Sediments will be removed and disposed of at approved upland facility.
 - Excavation below the HTL line will be approximately 1 foot below mudline.
 - Imported backfill material will be clean ¾-inch minus clean crushed gravel and glacial till sediment.
 - Initial section coming from the end of U Ave, will sit 12 inches minimum from the undisturbed trench bottom, the bedding will consist of crushed gravel bedding. Crushed gravel will be back filled to original slope 2: 1, remaining top layer will consist of 2'-6" of riprap. Crushed gravel will be placed below pipe initial bottom lay portion with a minimum of 12 inches from trench bottom. The length until the exposed pipe will be back filled with crushed gravel to even out the grading from the trench then 8" minimum of fish mix backfill will be laid on top.
 - The buried pipeline will be placed in the excavated and bedded trench under the direction and control of divers. The pipeline may be placed by cranes either or both from shore and from offshore crane barge. This material will be placed with a clamshell dredge and verified by diver.

- The offshore pipe and diffuser will be placed using controlled submergence techniques staged from barges and tugs. The pipe will be joined and tested offsite and precast concrete anchors attached. The pipe string will be filled with air and towed to the site.
- Upon arrival, the pipe will be pressurized and tensioned at each end with cables. Water will be pumped into the pipe at the nearshore end with air evacuated at the offshore end. The controlled submergence is completed in a few hours on a single day.
- Certified divers using surface-supplied air will be used to support construction of the pipeline. Remaining bottom lay pipe will be secured with 2-piece bolt on concrete anchors.
- Divers will stage from the barge, and assist with pipe placement, pipe joining, and verification of the pipeline profile and condition before backfilling.

Anticipated in-water construction equipment includes a floating crane barge, materials storage barge, dive barge/vessel, tugs, vibratory hammer and work skiffs.

Once the new pipe has been backfilled and imported backfill has settled, the temporary containment and shoring will be extracted using a vibratory pile extractor or equivalent equipment.

All in-water work will occur during proposed work window of August 1st to February 15th in order to minimize potential impacts to federally listed aquatic species and forage fish species.

All work within the Guemes Channel is located within the FEMA-mapped 100-year floodplain.

6f. What are the anticipated start and end dates for project construction? (Month/Year) [\[help\]](#)

- If the project will be constructed in phases or stages, use [JARPA Attachment D](#) to list the start and end dates of each phase or stage.

Start Date: August 1st End Date: February 15th ☐ See JARPA Attachment D

6g. Fair market value of the project, including materials, labor, machine rentals, etc. [\[help\]](#)

\$30 million

6h. Will any portion of the project receive federal funding? [\[help\]](#)

- **If yes**, list each agency providing funds.

☒ Yes ☐ No ☐ Don't know Federal Emergency Management Agency

Part 7–Wetlands: Impacts and Mitigation

- ☐ Check here if there are wetlands or wetland buffers on or adjacent to the project area.
(If there are none, skip to Part 8.) [\[help\]](#)

7a. Describe how the project has been designed to avoid and minimize adverse impacts to wetlands. [\[help\]](#)

☐ Not applicable

7b. Will the project impact wetlands? [\[help\]](#)

☐ Yes ☐ No ☐ Don't know						
7c. Will the project impact wetland buffers? [help]						
☐ Yes ☐ No ☐ Don't know						
7d. Has a wetland delineation report been prepared? [help]						
If Yes, submit the report, including data sheets, with the JARPA package.						
☐ Yes ☐ No						
7e. Have the wetlands been rated using the Western Washington or Eastern Washington Wetland Rating System? [help]						
If Yes, submit the wetland rating forms and figures with the JARPA package.						
☐ Yes ☐ No ☐ Don't know						
7f. Have you prepared a mitigation plan to compensate for any adverse impacts to wetlands? [help]						
If Yes, submit the plan with the JARPA package and answer 7g. If No, or Not applicable, explain below why a mitigation plan should not be required.						
☐ Yes ☐ No ☐ Don't know						
7g. Summarize what the mitigation plan is meant to accomplish, and describe how a watershed approach was used to design the plan. [help]						
7h. Use the table below to list the type and rating of each wetland impacted, the extent and duration of the impact, and the type and amount of mitigation proposed. Or if you are submitting a mitigation plan with a similar table, you can state (below) where we can find this information in the plan. [help]						
Activity (fill, drain, excavate, flood, etc.)	Wetland Name ¹	Wetland type and rating category ²	Impact area (sq. ft. or Acres)	Duration of impact ³	Proposed mitigation type ⁴	Wetland mitigation area (sq. ft. or acres)
¹ If no official name for the wetland exists, create a unique name (such as "Wetland 1"). The name should be consistent with other project documents, such as a wetland delineation report. ² Ecology wetland categories based on current Western Washington or Eastern Washington Wetland Rating System. Provide the wetland rating forms with the JARPA package. ³ Indicate the days, months or years the wetland will be measurably impacted by the activity. Enter "permanent" if applicable. ⁴ Creation (C), Re-establishment/Rehabilitation (R), Enhancement (E), Preservation (P), Mitigation Bank/In-lieu fee (B)						
Page number(s) for similar information in the mitigation plan, if available: _____						
7i. For all filling activities identified in 7h, describe the source and nature of the fill material, the amount in cubic yards that will be used, and how and where it will be placed into the wetland. [help]						
7j. For all excavating activities identified in 7h, describe the excavation method, type and amount of material in cubic yards you will remove, and where the material will be disposed. [help]						

Part 8–Waterbodies (other than wetlands): Impacts and Mitigation

In Part 8, “waterbodies” refers to non-wetland waterbodies. (See Part 7 for information related to wetlands.)
[\[help\]](#)

☒ Check here if there are waterbodies on or adjacent to the project area. (If there are none, skip to Part 9.)

8a. Describe how the project is designed to avoid and minimize adverse impacts to the aquatic environment.

[\[help\]](#)

☐ Not applicable

The project is designed to avoid and minimize adverse impacts to the aquatic environment by implementing the following:

- All work below the high tide line (HTL) will be done during a proposed in-water work window of August 1st through February 15th.
- A containment cell and/or silt/turbidity curtain will be used within the work area to ensure that turbidity remains within state water quality standards at a point of compliance 150 feet from project activities. It will also allow for exclusion of aquatic species from the project area, including ESA-listed species, in accordance with the 2016 WSDOT Fish Exclusion Protocols and Standards.
- Remediation dredging methods will be used in areas where the containment cell will not reach.
- Turbidity monitoring will be conducted throughout construction in accordance with WAC 173-201A (Section 401 Water Quality Certification).
- As vibratory pile driving is known to disturb marine mammals such as ESA-listed Southern Resident killer whales and Central America humpback whales that could potentially occur within the action area of the project, a marine mammal monitoring plan will be developed in accordance with NMFS guidelines and will be implemented during all vibratory pile driving and extraction.
- BMPs including silt fence and/or straw wattles will be utilized to prevent any inadvertent runoff to the Guemes Channel. A Water Quality Monitoring plan will also be developed to monitor turbidity levels during dredging activities.
- Comprehensive erosion plans and a Spill Prevention, Control, and Countermeasures (SPCC) plan will be approved prior to construction that will outline measures to prevent contamination (i.e., from concrete and equipment fuel) during construction in accordance with the Stormwater Management Manual for Western Washington. The plans will detail site stabilization, slope protection, drainage way protection, and sediment retention.
- Spill kits will be kept on site at all times.
- Refueling will be done at least 200 feet from surface waters.
- All equipment will be checked daily for leaks and any necessary repairs will be made prior to the commencement of work.
- Clean ¾-inch minus crushed gravel will be imported as backfill.

8b. Will your project impact a waterbody or the area around a waterbody? [\[help\]](#)

☒ Yes ☐ No

8c. Have you prepared a mitigation plan to compensate for the project's adverse impacts to non-wetland waterbodies? [\[help\]](#)

- **If Yes**, submit the plan with the JARPA package and answer 8d.
- **If No, or Not applicable**, explain below why a mitigation plan should not be required.

☐ Yes ☒ No ☐ Don't know

A mitigation plan has not been developed however best management practices will be implemented in order to prevent any further impact. Long-term adverse impacts to the Guemes Channel are not anticipated as the area that will be dredged will be backfilled to the existing bed profile with clean Glacial till sediment. There is no eelgrass and minimal macroalgae within the dredge footprint, so no mitigation for lost aquatic vegetation is warranted.

- Comprehensive erosion and sediment control plans will be developed and implemented for each phase of construction in accordance with the Stormwater Management Manual for Western Washington. The plans could include elements for site stabilization, slope protection, drainage way protection, and sediment retention. The proposed action would also comply with applicable erosion control standards for the City of Anacortes.
- A silt/turbidity curtain and/or steel containment cell will be used to confine turbidity within the immediate work area when excavating sediments or placing backfill for the in-water portion of the outfall.
- Foreign dumped debris along the shoreline will be removed and disturbed slopes will be replaced to existing conditions using a layer of rip rap covered by glacial till sediment and sand mix.
- In water work will be conducted in accordance with authorized in-water work windows for tidal reference area 9, which typically corresponds to times when listed fish and forage species are least likely to be present (WAC 220-660-330). The in-water work window for this location is August 1st to February 15th.

8d. Summarize what the mitigation plan is meant to accomplish. Describe how a watershed approach was used to design the plan.

- If you already completed 7g you do not need to restate your answer here. [\[help\]](#)

N/A

8e. Summarize impact(s) to each waterbody in the table below. [\[help\]](#)

Activity (clear, dredge, fill, pile drive, etc.)	Waterbody name ¹	Impact location ²	Duration of impact ³	Amount of material (cubic yards) to be placed in or removed from waterbody	Area (sq. ft. or linear ft.) of waterbody directly affected
Excavation	Guemes Channel	Below HTL	Permanent	2955 CY	Approx. 19,000 sq. ft.
Back Fill/bedding	Guemes Channel	Below HTL	Permanent	2820 CY	Approx. 19,000 sq. ft.

¹ If no official name for the waterbody exists, create a unique name (such as "Stream 1") The name should be consistent with other documents provided.

² Indicate whether the impact will occur in or adjacent to the waterbody. If adjacent, provide the distance between the impact and the waterbody and indicate whether the impact will occur within the 100-year flood plain.

³ Indicate the days, months, or years the waterbody will be measurably impacted by the work. Enter "permanent" if applicable.

8f. For all activities identified in 8e, describe the source and nature of the fill material, amount (in cubic yards) you will use, and how and where it will be placed into the waterbody. [\[help\]](#)

Fill will consist of crushed gravel bedding under the pipe, for the length of pipe from HTL to -30 ft MLLW, a minimum of 12 inches will be placed from the bottom of the trench for the pipe to sit on. Excavated slopes along the shoreline will be back filled with a layer of rip rap and covered with a glacial till mix to the previously existing slope of 2:1. Total backfill will be approximately 2300 cubic yards.

8g. For all excavating or dredging activities identified in 8e, describe the method for excavating or dredging, type and amount of material you will remove, and where the material will be disposed. [\[help\]](#)

Excavation will be done using heavy equipment including and excavator, clamshell dredge, barge, and dump truck. Approximate volume of materials to be removed below the HTL line is 2700 CY. Materials will be tested for contaminants and disposed of at appropriate city facility upland.

Part 9—Additional Information

Any additional information you can provide helps the reviewer(s) understand your project. Complete as much of this section as you can. It is ok if you cannot answer a question.

9a. If you have already worked with any government agencies on this project, list them below. [\[help\]](#)

Agency Name	Contact Name	Phone	Most Recent Date of Contact
DNR	Brenda Werden	360-854-2836	February 2021
Samish Indian Nation	Jackie Ferry	360-770-7784	October 2020
WA EMD	Diane Woodard	253-512-7406	February 2021

9b. Are any of the wetlands or waterbodies identified in Part 7 or Part 8 of this JARPA on the Washington Department of Ecology's 303(d) List? [\[help\]](#)

- If Yes, list the parameter(s) below.
- If you don't know, use Washington Department of Ecology's Water Quality Assessment tools at: <https://ecology.wa.gov/Water-Shorelines/Water-quality/Water-improvement/Assessment-of-state-waters-303d>.

☐ Yes ☒ No
9c. What U.S. Geological Survey Hydrological Unit Code (HUC) is the project in? [help] Go to http://cfpub.epa.gov/surf/locate/index.cfm to help identify the HUC.
171100020500 – Padilla Bay – Strait of Georgia
9d. What Water Resource Inventory Area Number (WRIA #) is the project in? [help] Go to https://ecology.wa.gov/Water-Shorelines/Water-supply/Water-availability/Watershed-look-up to find the WRIA #.
WRIA 3- Lower Skagit/Samish
9e. Will the in-water construction work comply with the State of Washington water quality standards for turbidity? [help] Go to https://ecology.wa.gov/Water-Shorelines/Water-quality/Freshwater/Surface-water-quality-standards/Criteria for the standards.
☒ Yes ☐ No ☐ Not applicable
9f. If the project is within the jurisdiction of the Shoreline Management Act, what is the local shoreline environment designation? [help] - If you don't know, contact the local planning department. - For more information, go to: https://ecology.wa.gov/Water-Shorelines/Shoreline-coastal-management/Shoreline-coastal-planning/Shoreline-laws-rules-and-cases.
☐ Urban ☐ Natural ☐ Aquatic ☐ Conservancy ☒ Other: <u>Urban Maritime</u>
9g. What is the Washington Department of Natural Resources Water Type? [help] Go to http://www.dnr.wa.gov/forest-practices-water-typing for the Forest Practices Water Typing System.
☒ Shoreline ☐ Fish ☐ Non-Fish Perennial ☐ Non-Fish Seasonal
9h. Will this project be designed to meet the Washington Department of Ecology's most current stormwater manual? [help] If No, provide the name of the manual your project is designed to meet.
☒ Yes ☐ No
Name of manual: <u>2019 Stormwater Management Manual for Western Washington</u>
9i. Does the project site have known contaminated sediment? [help] If Yes, please describe below.
☐ Yes ☒ No
The site overlaps Sediment Management Area 2 (SMA-2) where sediment containing site-related Indicator Hazardous Substances including Carcinogenic Polycyclic Aromatic Hydrocarbons exceeding Preliminary Cleanup Levels from the mudline to a depth of 1-foot. Materials excavated to a depth of 1-foot below the HTL will be removed and disposed of at an upland facility.
9j. If you know what the property was used for in the past, describe below. [help]

The property is located next to the former site of the Robinson Marina (later the Wyman's Marina) on Ecology's Toxic Cleanup program. The former marina was initially developed after 1944 with a dock structure in place by 1956. In 1983, pilings in the dock and marina areas were replaced and the Port of Anacortes completed maintenance dredging. Until 1998, the Wyman family operated the site for boat servicing and maintenance on a continuous basis. After 1998, the marina and its services ceased, and two USTs were decommissioned and removed. During the fall of 2013, the former Wyman's Marina building, and associated structures were removed. The site, now called Robinson's Cove, is directly adjacent to the project area. The Anacortes Port Log Yard Site also adjacent to the project and listed in Ecology's Toxic Cleanup Program. It is generally located at 718 4th Street in Anacortes, Washington. The Site is owned by the Port of Anacortes (Port) and was used historically for log handling from the mid-1960's to about 2004. No developments have existed along the current project alignment in the past.

9k. Has a cultural resource (archaeological) survey been performed on the project area? [\[help\]](#)

- **If Yes**, attach it to your JARPA package.

☐ Yes ☒ No

9l. Name each species listed under the federal Endangered Species Act that occurs in the vicinity of the project area or might be affected by the proposed work. [\[help\]](#)

- Bull Trout (*Salvelinus confluentus*)
- Steelhead (*Oncorhynchus mykiss*)
- Chinook Salmon (*Oncorhynchus tshawytscha*)
- Bocaccio Rockfish (*Sebastes paucispinis*)
- Canary Rockfish (*Sebastes pinniger*)
- Yelloweye Rockfish (*Sebastes ruberrimus*)
- Eulachon (*Thaleichthys pacificus*)
- Killer Whale (*Orcinus orca*)
- Humpback Whale (*Megaptera novaeangliae*)
- Leatherback Sea Turtle (*Dermochelys coriacea*)
- Marbled Murrelet (*Brachyramphus marmoratus*)
- Yellow-Billed Cuckoo (*Coccyzus americanus*)
- Streaked Horned Lark (*Eremophila alpestris strigata*)
- Golden Paintbrush (*Castilleja levisecta*)
- Gray wolf (*Canis lupus*)

9m. Name each species or habitat on the Washington Department of Fish and Wildlife's Priority Habitats and Species List that might be affected by the proposed work. [\[help\]](#)

Dungeness crab (*Cancer magister*)

Part 10–SEPA Compliance and Permits

Use the resources and checklist below to identify the permits you are applying for.

- Online Project Questionnaire at <http://apps.oria.wa.gov/opas/>.
- Governor's Office for Regulatory Innovation and Assistance at (800) 917-0043 or help@oria.wa.gov.
- For a list of addresses to send your JARPA to, click on [agency addresses for completed JARPA](#).

10a. Compliance with the State Environmental Policy Act (SEPA). (Check all that apply.) [\[help\]](#)

- For more information about SEPA, go to <https://ecology.wa.gov/regulations-permits/SEPA-environmental-review>.

☐ A copy of the SEPA determination or letter of exemption is included with this application.
☐ A SEPA determination is pending with _____(lead agency). The expected decision date is _____
☐ I am applying for a Fish Habitat Enhancement Exemption. (Check the box below in 10b.) [help]
☐ This project is exempt (choose type of exemption below). ☐ Categorical Exemption. Under what section of the SEPA administrative code (WAC) is it exempt? _____ ☐ Other: _____
☐ SEPA is pre-empted by federal law.
10b. Indicate the permits you are applying for. (Check all that apply.) [help]
LOCAL GOVERNMENT
Local Government Shoreline permits: ☒ Substantial Development ☒ Conditional Use ☐ Variance ☐ Shoreline Exemption Type (explain): _____
Other City/County permits: ☒ Floodplain Development Permit ☒ Critical Areas Ordinance
STATE GOVERNMENT
Washington Department of Fish and Wildlife: ☒ Hydraulic Project Approval (HPA) ☐ Fish Habitat Enhancement Exemption – Attach Exemption Form
Washington Department of Natural Resources: ☒ Aquatic Use Authorization Complete JARPA Attachment E and submit a check for \$25 payable to the Washington Department of Natural Resources. <u>Do not send cash.</u>
Washington Department of Ecology: ☒ Section 401 Water Quality Certification ☐ Non-Federally Regulated Waters
FEDERAL AND TRIBAL GOVERNMENT
United States Department of the Army (U.S. Army Corps of Engineers): ☒ Section 404 (discharges into waters of the U.S.) ☒ Section 10 (work in navigable waters)
United States Coast Guard: For projects or bridges over waters of the United States, contact the U.S. Coast Guard at: d13bridges@uscg.mil ☐ Bridge Permit ☐ Private Aids to Navigation (or other non-bridge permits)
United States Environmental Protection Agency: ☐ Section 401 Water Quality Certification (discharges into waters of the U.S.) on tribal lands where tribes do not have treatment as a state (TAS)
Tribal Permits: (Check with the tribe to see if there are other tribal permits, e.g., Tribal Environmental Protection Act, Shoreline Permits, Hydraulic Project Permits, or other in addition to CWA Section 401 WQC)

☐ Section 401 Water Quality Certification (discharges into waters of the U.S.) where the tribe has treatment as a state (TAS).

Part 11—Authorizing Signatures

Signatures are required before submitting the JARPA package. The JARPA package includes the JARPA form, project plans, photos, etc. [\[help\]](#)

11a. Applicant Signature (required) [\[help\]](#)

I certify that to the best of my knowledge and belief, the information provided in this application is true, complete, and accurate. I also certify that I have the authority to carry out the proposed activities, and I agree to start work only after I have received all necessary permits.

I hereby authorize the agent named in Part 3 of this application to act on my behalf in matters related to this application. _____ (initial)

By initialing here, I state that I have the authority to grant access to the property. I also give my consent to the permitting agencies entering the property where the project is located to inspect the project site or any work related to the project. _____ (initial)

Applicant Printed Name

Applicant Signature

Date

11b. Authorized Agent Signature [\[help\]](#)

I certify that to the best of my knowledge and belief, the information provided in this application is true, complete, and accurate. I also certify that I have the authority to carry out the proposed activities and I agree to start work only after all necessary permits have been issued.

Authorized Agent Printed Name

Authorized Agent Signature

Date

11c. Property Owner Signature (if not applicant) [\[help\]](#)

Not required if project is on existing rights-of-way or easements (provide copy of easement with JARPA).

I consent to the permitting agencies entering the property where the project is located to inspect the project site or any work. These inspections shall occur at reasonable times and, if practical, with prior notice to the landowner.

Property Owner Printed Name

Property Owner Signature

Date

18 U.S.C §1001 provides that: Whoever, in any manner within the jurisdiction of any department or agency of the United States knowingly falsifies, conceals, or covers up by any trick, scheme, or device a material fact or makes any false, fictitious, or fraudulent statements or representations or makes or uses any false writing or document knowing same to contain any false, fictitious, or fraudulent statement or entry, shall be fined not more than \$10,000 or imprisoned not more than 5 years or both.

If you require this document in another format, contact the Governor's Office for Regulatory Innovation and Assistance (ORIA) at (800) 917-0043. People with hearing loss can call 711 for Washington Relay Service. People with a speech disability can call (877) 833-6341. ORIA publication number: ORIA-16-011 rev. 09/2018



WASHINGTON STATE
Joint Aquatic Resources Permit
Application (JARPA) [\[help\]](#)



US Army Corps
of Engineers
Seattle District

AGENCY USE ONLY

Date received: _____; ☐ Town
☐ Application Fee Received; ☐ Fee N/A
☐ New Application; ☐ Renewal Application
Type/Prefix #: _____; NaturE Use Code: _____
LM Initials & BP#: _____
RE Assets Finance BP#: _____
New Application Number: _____
Trust(s): _____; County: _____
AQR Plate #(s): _____
Gov Lot #(s): _____
Tax Parcel #(s): _____

Attachment E:
Aquatic Use Authorization on
Department of Natural Resources
(DNR)-managed aquatic lands [\[help\]](#)

Complete this attachment and submit it with the completed JARPA form only if you are applying for an Aquatic Use Authorization with DNR. Call (360) 902-1100 or visit <http://www.dnr.wa.gov/programs-and-services/aquatics/leasing-and-land-transactions> for more information.

- DNR recommends you discuss your proposal with a DNR land manager before applying for regulatory permits. Contact your regional land manager for more information on potential permit and survey requirements. You can find your regional land manager by calling (360) 902-1100 or going to <http://www.dnr.wa.gov/programs-and-services/aquatics/aquatic-districts-and-land-managers-map>. [\[help\]](#)
- The applicant may not begin work on DNR-managed aquatic lands until DNR grants an Aquatic Use Authorization.
- Include a \$25 non-refundable application processing fee, payable to the "Washington Department of Natural Resources." (Contact your Land Manager to determine if and when you are required to pay this fee.) [\[help\]](#)

DNR may reject the application at any time prior to issuing the applicant an Aquatic Use Authorization. [\[help\]](#)

Use black or blue ink to enter answers in white spaces below.

1. Applicant Name (Last, First, Middle)

Shjarback, Eric

2. Project Name (A name for your project that you create. Examples: Smith's Dock or Seabrook Lane Development) [\[help\]](#)

City of Anacortes Wastewater Treatment Plant Outfall Replacement

3. Phone Number and Email

360-299-1980, erics@cityofanacortes.org

4. Which of the following applies to Applicant? Check one and, if applicable, attach the written authority – bylaws, power of attorney, etc. [\[help\]](#)

☐ Corporation

☐ Limited Partnership

☐ General Partnership

☐ Limited Liability Company

Home State of Registration:

☐ Individual

☐ Marital Community (Identify spouse):

☒ Government Agency

☐ Other (Please Explain):

5. Washington UBI (Unified Business Identifier) number, if applicable: [\[help\]](#)

6. Are you aware of any existing or previously expired Aquatic Use Authorizations at the project location?

☐ Yes ☒ No ☐ Don't know

If Yes, Authorization number(s): _____

7. Do you intend to sublease the property to someone else?

☐ Yes ☒ No

If Yes, contact your Land Manager to discuss subleasing.

8. If fill material was used previously on DNR-managed aquatic lands, describe below the type of fill material and the purpose for using it. [\[help\]](#)

To be completed by DNR and a copy returned to the applicant.

Signature for projects on DNR-managed aquatic lands:

Applicant must obtain the signature of DNR Aquatics District Manager OR Assistant Division Manager if the project is located on DNR-managed aquatic lands.

I, a designated representative of the Dept. of Natural Resources, am aware that the project is being proposed on Dept. of Natural Resources-managed aquatic lands and agree that the applicant or his/her representative may pursue the necessary regulatory permits. My signature does not authorize the use of DNR-managed aquatic lands for this project.

Printed Name

Dept. of Natural Resources
District Manager or Assistant Division Manager

Signature

Dept. of Natural Resources
District Manager or Assistant Division Manager

Date

If you require this document in another format, contact the Governor's Office for Regulatory Innovation and Assistance (ORIA) at (800) 917-0043. People with hearing loss can call 711 for Washington Relay Service. People with a speech disability can call (877) 833-6341. ORIA Publication ORIA-16-016 rev. 10/2016



WASHINGTON STATE
Joint Aquatic Resources Permit
Application (JARPA) [\[help\]](#)



US Army Corps
of Engineers
Seattle District

AGENCY USE ONLY

Date received: _____; ☐ Town
☐ Application Fee Received; ☐ Fee N/A
☐ New Application; ☐ Renewal Application
Type/Prefix #: _____; NaturE Use Code: _____
LM Initials & BP#: _____
RE Assets Finance BP#: _____
New Application Number: _____
Trust(s): _____; County: _____
AQR Plate #(s): _____
Gov Lot #(s): _____
Tax Parcel #(s): _____

Attachment E:
Aquatic Use Authorization on
Department of Natural Resources
(DNR)-managed aquatic lands [\[help\]](#)

Complete this attachment and submit it with the completed JARPA form only if you are applying for an Aquatic Use Authorization with DNR. Call (360) 902-1100 or visit <http://www.dnr.wa.gov/programs-and-services/aquatics/leasing-and-land-transactions> for more information.

- DNR recommends you discuss your proposal with a DNR land manager before applying for regulatory permits. Contact your regional land manager for more information on potential permit and survey requirements. You can find your regional land manager by calling (360) 902-1100 or going to <http://www.dnr.wa.gov/programs-and-services/aquatics/aquatic-districts-and-land-managers-map>. [\[help\]](#)
- The applicant may not begin work on DNR-managed aquatic lands until DNR grants an Aquatic Use Authorization.
- Include a \$25 non-refundable application processing fee, payable to the "Washington Department of Natural Resources." (Contact your Land Manager to determine if and when you are required to pay this fee.) [\[help\]](#)

DNR may reject the application at any time prior to issuing the applicant an Aquatic Use Authorization. [\[help\]](#)

Use black or blue ink to enter answers in white spaces below.

1. Applicant Name (Last, First, Middle)

Shjarback, Eric

2. Project Name (A name for your project that you create. Examples: Smith's Dock or Seabrook Lane Development) [\[help\]](#)

City of Anacortes Wastewater Treatment Plant Outfall Replacement

3. Phone Number and Email

360-299-1980, erics@cityofanacortes.org

4. Which of the following applies to Applicant? Check one and, if applicable, attach the written authority – bylaws, power of attorney, etc. [\[help\]](#)

☐ Corporation

☐ Limited Partnership

☐ General Partnership

☐ Limited Liability Company

Home State of Registration:

☐ Individual

☐ Marital Community (Identify spouse):

☒ Government Agency

☐ Other (Please Explain):

5. Washington UBI (Unified Business Identifier) number, if applicable: [\[help\]](#)

6. Are you aware of any existing or previously expired Aquatic Use Authorizations at the project location?

☐ Yes ☒ No ☐ Don't know

If Yes, Authorization number(s): _____

7. Do you intend to sublease the property to someone else?

☐ Yes ☒ No

If Yes, contact your Land Manager to discuss subleasing.

8. If fill material was used previously on DNR-managed aquatic lands, describe below the type of fill material and the purpose for using it. [\[help\]](#)

To be completed by DNR and a copy returned to the applicant.

Signature for projects on DNR-managed aquatic lands:

Applicant must obtain the signature of DNR Aquatics District Manager OR Assistant Division Manager if the project is located on DNR-managed aquatic lands.

I, a designated representative of the Dept. of Natural Resources, am aware that the project is being proposed on Dept. of Natural Resources-managed aquatic lands and agree that the applicant or his/her representative may pursue the necessary regulatory permits. My signature does not authorize the use of DNR-managed aquatic lands for this project.

Printed Name

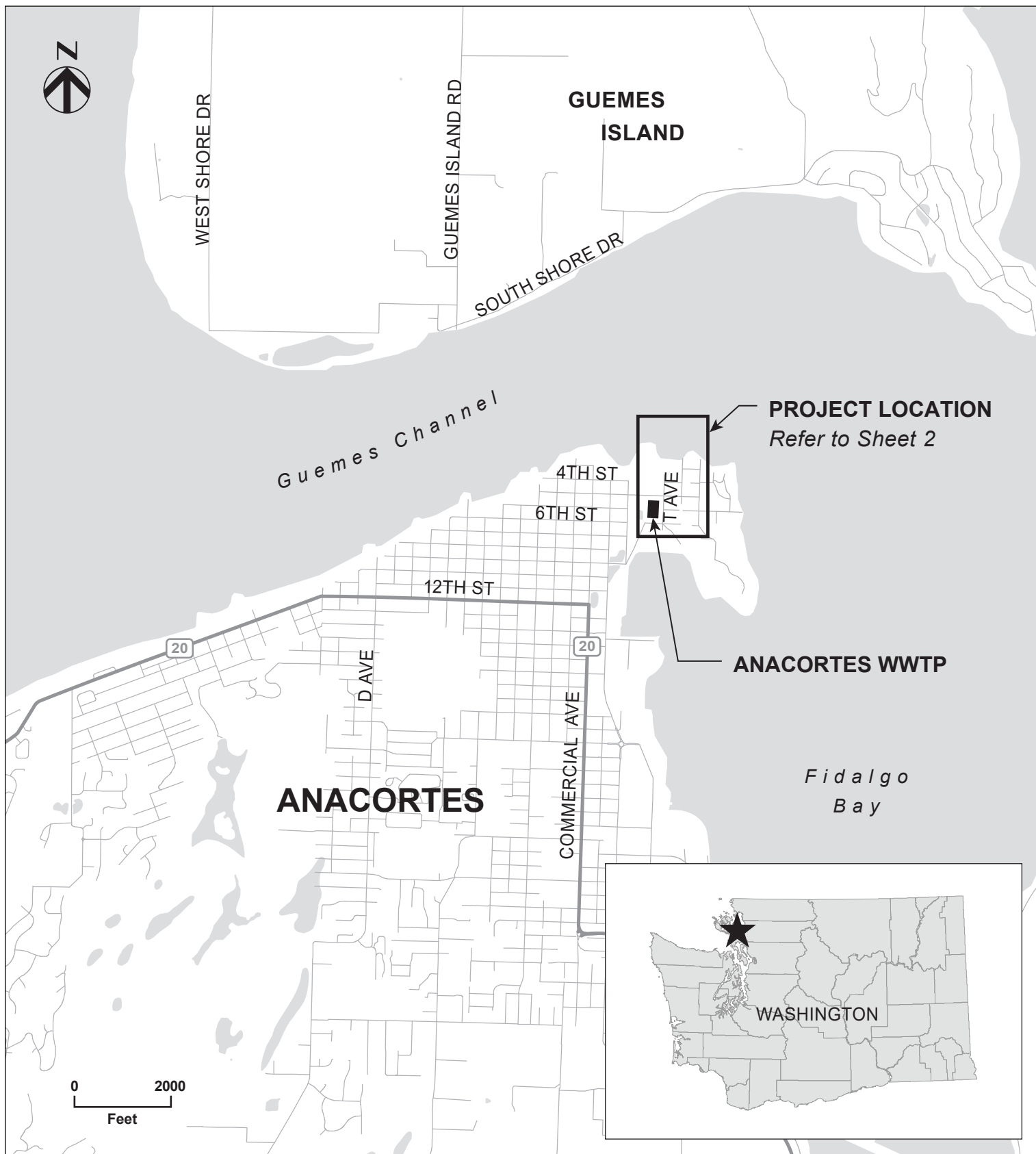
Dept. of Natural Resources
District Manager or Assistant Division Manager

Signature

Dept. of Natural Resources
District Manager or Assistant Division Manager

Date

If you require this document in another format, contact the Governor's Office for Regulatory Innovation and Assistance (ORIA) at (800) 917-0043. People with hearing loss can call 711 for Washington Relay Service. People with a speech disability can call (877) 833-6341. ORIA Publication ORIA-16-016 rev. 10/2016



APPLICANT: City of Anacortes

ADJACENT PROPERTIES: Port of Anacortes

DATE: xx/xx/2020

PROJECT LOCATION: 500 T Ave, Anacortes, WA 98221

IN: Guemes Channel

FIGURE: Sheet 1

LAT/LONG: 48.518373, -122.607101

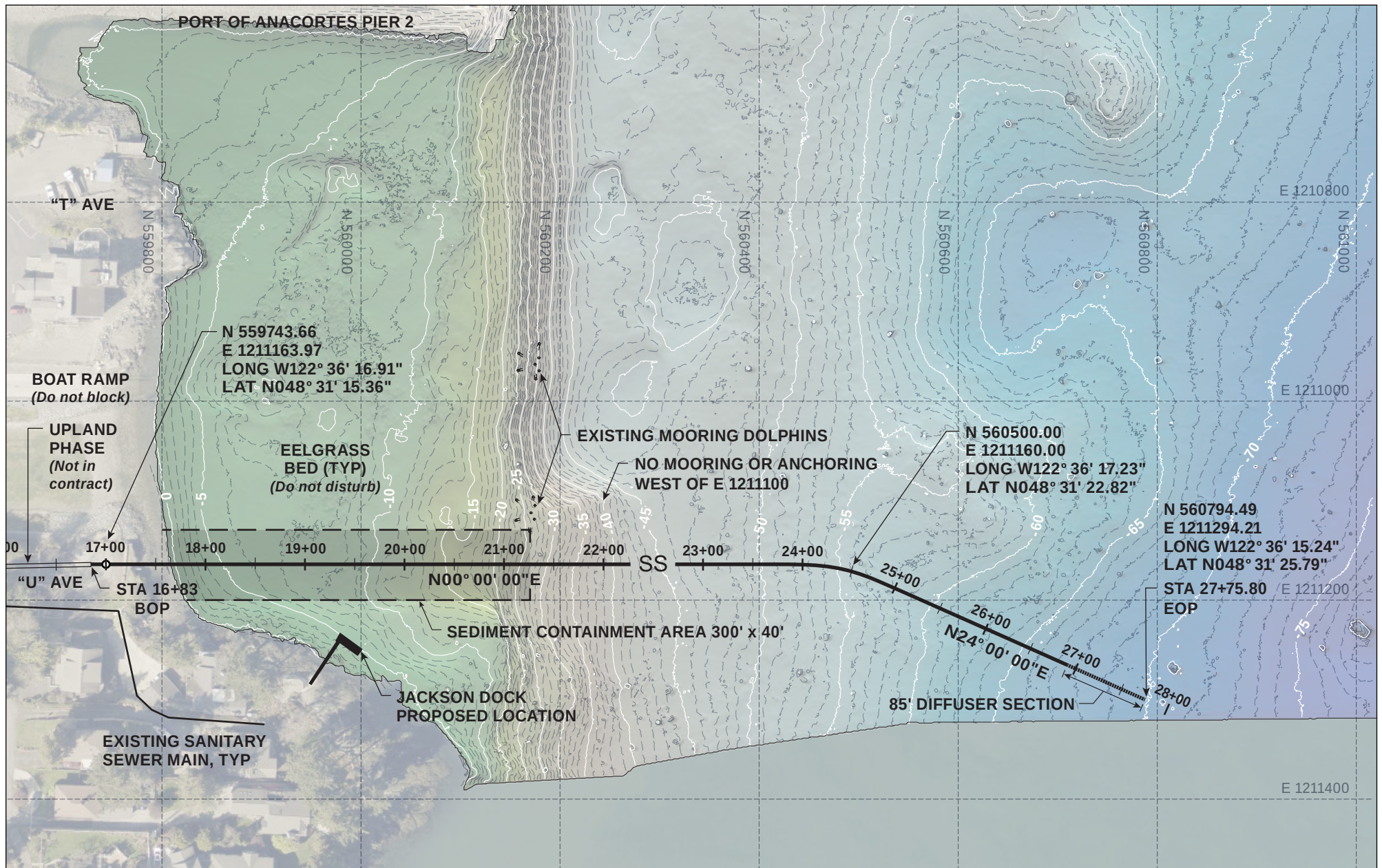
AT: Anacortes WA

CREATED BY: HDR Engineering,
Cosmopolitan
Engineering

PROPOSED PROJECT: City of Anacortes
WWTP Outfall

COUNTY: Skagit

STATE: Washington



APPLICANT: City of Anacortes

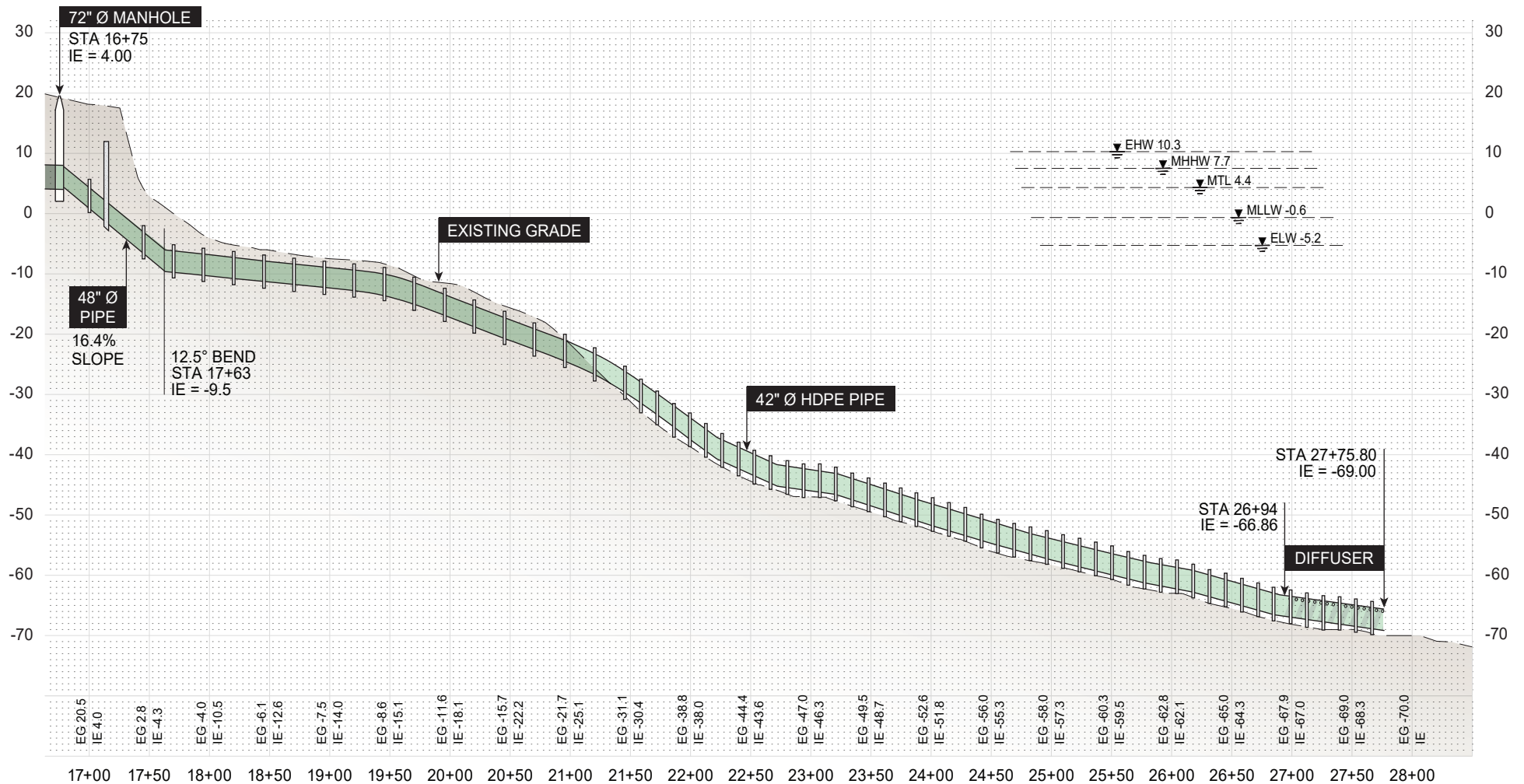
PROPOSED PROJECT: City of Anacortes WWTP Outfall

PROJECT LOCATION: 500 T Ave, Anacortes, WA 98221

PLAN - SHEET 2 OF 3

DATE: 3/30/2021





H = 40', V = 10'

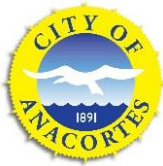
APPLICANT: City of Anacortes

PROPOSED PROJECT: City of Anacortes WWTP Outfall

PROJECT LOCATION: 500 T Ave, Anacortes, WA 98221

PROFILE - SHEET 3 OF 3

DATE: 3/30/2021



PLANNING, COMMUNITY, & ECONOMIC DEVELOPMENT DEPARTMENT
**SHORELINE SUBSTANTIAL DEVELOPMENT PERMIT, SHORELINE
 CONDITIONAL USE PERMIT, & SHORELINE VARIANCE CHECKLIST**

Mailing Address: P.O. Box 547, Anacortes, WA 98221

Office Location: 904 6th Street, Anacortes WA 98821

Phone: (360) 299-1984

City of Anacortes
 Planning, Community &
 Economic Development

Date Received:

5/24/21

Applicant Checklist	SUBMITTAL REQUIREMENTS: The number indicates the number of copies for submittal (if applicable).	PERMIT TYPE			
		Shoreline Substantial Development Permit	Shoreline Conditional Use Permit	Shoreline Variance	Office Use Only
	Master Permit Application (signed & notarized by all Landowners involved)	3	3	3	✓
	Joint Aquatic Resources Permit Application (JARPA)	3	3	3	✓
	Signed & Notarized Letter of Authorization if the applicant is not the landowner	3	3	3	✓
	Application Fee (see Land Use Permit Fee Schedule)	✓	✓	✓	*
	Conduct a Pre-Application Conference prior to application submittal	✓	✓	✓	✓
	Conduct a Neighborhood Meeting prior to application submittal (prior to the meeting, coordinate with PCED staff to determine where this can be held at, who can facilitate this, and how to do neighbor noticing)	✓	✓	✓	✓
	<u>Project Narrative</u> describing: the work proposed & use; construction /work methods; type of equipment to be used; project time frame; proposed cut & fill volumes; source & composition of cut & fill; proposed clearing; location of sanitary sewer, potable water, stormwater; access; location of critical areas on the subject property or within 300 feet of it. In the narrative also list the underlying shoreline environment /designation and provide details as to how your project achieves consistency with the Shoreline Master Program (SMP), policies, and development regulations (DR).	3	3	3	✓
	For Shoreline Conditional Use Permits, provide a detailed explanation of how you meet each criteria of approval as listed in Section 3.1(D) of the Shoreline Master Program.	N/A	3	N/A	*
	For Shoreline Variance requests, provide a detailed explanation of how you meet each criteria of approval as listed in Section 3.2(C) of the Shoreline Master Program	N/A	N/A	3	N/A
	SEPA Environmental Checklist –inquire with PCED to determine if required	3	3	3	✓
	Critical Area Report (this in part needs to address no net loss of ecological function and value) –inquire with PCED to determine if required	3	3	3	✓
	Biological Assessment /Evaluation –inquire with PCED to determine if required	3	3	3	✓
	Provide Floodplain /Areas of Special Flood Hazard Determination & FIRM Panel #	3	3	3	✓

		PERMIT TYPE:			
Applicant Checklist	SUBMITTAL REQUIREMENTS: The number indicates the number of copies for submittal (if applicable).	Shoreline Substantial Development Permit	Shoreline Conditional Use Permit	Shoreline Variance	Office Use Only
	Geotechnical Report –inquire with PCED to determine if required	3	3	3	N/A
	Parking, Landscape and Tree Preservation Plan(s) –inquire with PCED to determine if required	3	3	3	N/A
	Complete Stormwater Plan (that complies with AMC Chapter 19.76 & which addresses the minimum requirements of the current DOE SWMMWW)	3	3	3	✓
	Provide copies of Federal, State, and Local Permits and Approvals	3	3	3	
	Site Plan (Drawn to Scale & Surveyed –if applicable). For residential type of uses, see “ Residential Building Permit Site Plan Checklist ” for the items that need to be shown on a site plan. For commercial type of uses, see “ Commercial Building Permit Site Plan Checklist ” for the items that need to be shown on a site plan.	3	3	3	✓
	Scaled & dimensioned <u>Cross Sections</u> of both existing & proposed development. Also show existing & proposed ground elevations and the height of existing and proposed structures.	3	3	3	✓
	At time of submittal, provide PCED with a digital copy (on a Flash Drive, CD or emailed to pced@cityofanacortes.org) of all application material and plans submitted. PDF format preferred.	✓	✓	✓	✓

Project Narrative

Anacortes Wastewater Treatment Plant Outfall Replacement

The proposed outfall pipe will be a 48-inch diameter high-density polyethylene (HDPE) pipe coming from the WWTP for 1,631 feet until the shoreline where the pipe will reduce to 42-inch outside diameter HDPE pipe for 1,030 feet with an 86-foot diffuser angled to the NE at approximately 24.5 degrees to better match the bidirectional current. The total length of the pipe will be 2,748 feet from the WWTP continuing into the Guemes Channel. Aspects of the local climate including currents, prevailing winds, river outflow, and seasonal changes have all been accounted for in determining the best possible site location as well as depth. The new outfall will flow into deeper waters further from the shoreline and will be able to convey larger volumes to prevent future wet weather-related overflow events. The City is proposing this upgrade to reduce future environmental and health hazards related to the aging infrastructure. The overall design of this project is to provide a better mixing zone for aquatic health, and to prevent further overflow events to comply with the City's 2017 NPDES permit (Permit #WA0020257).

The upland project area is within existing right-of-way surrounded by highly developed properties, primarily residential and industrial. As the pipe will be placed below the current roadway, rock blasting and excavation will occur to place the pipe to an appropriate depth. All roads will be replaced to existing conditions of grade and topography with no additional impervious surface created, roadways will be replaced to the City's codes and standards. The project will not have impacts to any surrounding properties. There will be no off-site improvements and no views will be obstructed by the project. The completed project will be entirely underground and no changes in elevation will occur.

Within the marine portion there is no shoreline or aquatic vegetation in the proposed project area and no significant habitat features will be impacted. The shoreline will be excavated with appropriate erosion protection and environmental protocols, and turbidity control within the work area. The shoreline will be backfilled to pre-existing conditions. Along with installation of the new pipe the shoreline will be cleaned of debris and garbage to further aid in preservation of shoreline.

As per the AMC Table 19.41.040 or 19.41.050, this project would fall under 19.46.040 utilities. The outfall would be considered minor as there is not on-site personnel. Facilities under this provision are on-site stormwater retention, detention, or infiltration facilities; neighborhood serving telecommunications, gas, or electric facility; communications, gas, or electric facility; Electrical substation; Utility service. The shoreline designation is urban maritime. Legal description for the project site includes the Port of Anacortes up to the East line of the U avenue Right of Way. This project complies with the purpose of Urban Maritime 5.11 ASMP, to preserve a variety of water dependent, water-oriented, and water-related public, commercial, and industrial uses such as those associated with the Port of Anacortes. The development regulation applicable to this designation and project include:

- 5.11.2-Applicable shoreline restoration will occur, removal of debris and material on the shoreline within work area, as well as removal of contained sediments below the HTL.

- 5.11.3-There will be no net loss of shoreline ecological function from development s structure will be below the ground.
- 5.11.4-Mitigation will be accounted for in removal of contaminated sediments and placement of trees within the designated shoreline buffer.
- 5.11.5-Redevelopment and renewal of substandard, degraded, or obsolete urban shoreline areas will occur with the removal of debris and garbage, shoreline will be replaced to existing grade with clean imported materials and contaminated materials will be removed.
- 5.11.10-Developments consisting of water-dependent scientific, historical, industrial, commercial, cultural, or educational research uses, public access, water-oriented recreation and ecological restoration are not required to meet the setback requirements, nor are piers, ramps or docks.

Per table 5.1 Shoreline Use and Modification Matrix in section 5.12, the project is within permitted and conditional uses for this designation of shoreline.

Date Received:

6/22/21

Project Narrative

Anacortes Wastewater Treatment Plant Outfall Replacement

The proposed outfall pipe will be a 48-inch diameter high-density polyethylene (HDPE) pipe coming from the WWTP for 1,631 feet until the shoreline where the pipe will reduce to 42-inch outside diameter HDPE pipe for 1,030 feet with an 86-foot diffuser angled to the NE at approximately 24.5 degrees to better match the bidirectional current. The City needs to replace the damaged existing WWTP outfall and relocate it to an area with greater access for future maintenance activities. The total length of the new pipe will be 2,748 feet from the WWTP continuing into the Guemes Channel. Aspects of the local climate including currents, prevailing winds, river outflow, and seasonal changes have all been accounted for in determining the best possible site location as well as depth. The new outfall will flow into deeper waters further from the shoreline and will be able to convey larger volumes to prevent future wet weather-related overflow events. The overall design of this project is to provide a better mixing zone for aquatic health, and to prevent further overflow events to comply with the City's 2017 NPDES permit (Permit #WA0020257).

The upland project area is within existing right-of-way surrounded by highly developed properties, primarily residential and industrial. As the pipe will be placed below the current roadway, rock blasting and excavation will occur to place the pipe to an appropriate depth. All roads will be replaced to existing conditions of grade and topography with no additional impervious surface created, roadways will be replaced to the City's codes and standards. The project will not have impacts to any surrounding properties. There will be no off-site improvements and no views will be obstructed by the project. The completed project will be entirely underground and no changes in elevation will occur.

Within the marine portion there is no shoreline or aquatic vegetation in the proposed project area and no significant habitat features will be impacted. The shoreline will be excavated with appropriate erosion protection and environmental protocols, and turbidity control within the work area. The shoreline will be backfilled to pre-existing conditions. Along with installation of the new pipe the shoreline will be cleaned of debris and garbage to further aid in preservation of shoreline.

As per the AMC Table 19.41.040 or 19.41.050, this project would fall under 19.46.040 utilities. The outfall would be considered minor as there is not on-site personnel. Facilities under this provision are on-site stormwater retention, detention, or infiltration facilities; neighborhood serving telecommunications, gas, or electric facility; communications, gas, or electric facility; Electrical substation; Utility service. The shoreline designation is Urban Maritime. Legal description for the project site includes the Port of Anacortes up to the east side of the U Avenue Right of Way. This project complies with the purpose of Urban Maritime 5.11 ASMP, to preserve a variety of water dependent, water-oriented, and water-related public, commercial, and industrial uses such as those associated with the Port of Anacortes. The development regulation applicable to this designation and project include:

- 5.11.2- Where applicable, require new development to include environmental cleanup (e.g. removal of contaminated soils) and restoration of the shoreline in compliance with state and federal laws.
Applicable shoreline restoration will occur in the form of removal of debris and material on the shoreline within work area, as well as removal of contained sediments below the HTL.
- 5.11.3- No net loss of shoreline ecological function shall result from new development. For this project all perinate structures built around the shoreline will be located below ground.
- 5.11.4- Any impacts to ecological functions shall be fully mitigated with the mitigation sequencing defined in Chapter 12. If mitigation is required for water-dependent use, off-site mitigation in conjunction with appropriate on-site mitigation would be most appropriate.
For this project mitigation will be accounted for in removal of contaminated sediments and placement of trees within the designated shoreline buffer.
- 5.11.5- Redevelopment and renewal of substandard, degraded, or obsolete urban shoreline areas shall be encouraged in order to make maximum use of the available shoreline resources and to accommodate future water-oriented uses.
Redevelopment and renewal of substandard, degraded, or obsolete urban shoreline areas will occur in this project with the removal of debris and garbage from the shoreline. Also impacted shoreline will be replaced to existing grade with clean imported materials and contaminated materials will be removed.
- 5.11.10-Developments consisting of water-dependent scientific, historical, industrial, commercial, cultural, or educational research uses, public access, water-oriented recreation and ecological restoration are not required to meet the setback requirements, nor are piers, ramps or docks.

The proposed project will also meet the criteria outline in Section 3.1 (D) of the City of Anacortes Shoreline Master Program dated September 2010. This criterion is quoted from the Shoreline Master Program below and is followed by descriptions of how our project complies with these criteria.

1. *“The proposed outfall project will be consistent with the policies within RCW 90.58.020 and the policies of the Master Program.”*

The project is consistent with the policies within RCW 90.58.020 and the Master Program as it is a short-term construction impact with long-term benefit to the shoreline as imported clean materials will be used as backfill to recreate the existing profile of the shoreline and debris/waste material will be removed.

2. *“That the proposed use will not interfere with the normal public use of public shorelines.”*

The project will not interfere with normal public use of the shoreline, harbor, or marine waters. The outfall will be placed underground and under the shoreline until -30 MLLW, the pipe will not be visible to the public as it extends into the Guemes channel. There will

be no above ground structures associated with this project. The shoreline will be replaced to the existing profile to maintain shoreline habitat and aesthetics for public use. Vessel traffic and use will not be impacted by the outfall.

3. *“That the proposed use of the site and design of the project will be compatible with other authorized uses within the area and with uses planned for the area under the comprehensive plan and this Master Program.”*

The proposed outfall relocation is within the designated shoreline zone of Urban Maritime. Designation of the zone is preserving a variety of water-dependent, water-oriented, and water-related public, commercial, and industrial uses such as those associated with the Port of Anacortes. The WWTP currently has an existing outfall on the west side of Pier 2 within Port of Anacortes property, the proposed outfall will simply relocate the existing outfall to the east side. The existing outfall will be decommissioned once the replacement has been completed. There will be no overlap in use of the outfalls. A list of the shoreline designated uses the project complies with are detailed above in paragraph four discussing Urban Maritime 5.11 ASMP.

4. *“That the proposed use will cause no significant adverse effects to the shoreline environment in which it is to be located; and”*

There will be no significant adverse effects to the shoreline environment. Once the pipe has been placed within the excavated/dredge trench, imported clean materials will be used as backfill to recreate the existing profile of the shoreline. The proposed outfall will be located below the existing grade and will not interfere with the continued growth of the shoreline habitat. Debris and waste materials will also be removed from the shoreline during construction activities to further enhance the shoreline habitat.

5. *“That the public interest will suffer no substantial detrimental effect.”*

The public will not suffer substantial detrimental effects. The proposed outfall will be an underground utility, below the existing roadway and under the shoreline into the Guemes channel until a depth of -30 MLLW. The pipe will not be visible and will not interfere with uses of the marine waters. There will be no change in public access to the shoreline.

Per table 5.1 Shoreline Use, section 5.12 Modification Matrix and section 3.1 (D) of the City of Anacortes Shoreline Master Program the project is within permitted and conditional uses for this designation of shoreline.



SEPA ENVIRONMENTAL CHECKLIST

Purpose of checklist:

Governmental agencies use this checklist to help determine whether the environmental impacts of your proposal are significant. This information is also helpful to determine if available avoidance, minimization, or compensatory mitigation measures will address the probable significant impacts or if an environmental impact statement will be prepared to further analyze the proposal.

Instructions for applicants: [\[help\]](#)

This environmental checklist asks you to describe some basic information about your proposal. Please answer each question accurately and carefully, to the best of your knowledge. You may need to consult with an agency specialist or private consultant for some questions. You may use "not applicable" or "does not apply" only when you can explain why it does not apply and not when the answer is unknown. You may also attach or incorporate by reference additional studies reports. Complete and accurate answers to these questions often avoid delays with the SEPA process as well as later in the decision-making process.

The checklist questions apply to all parts of your proposal, even if you plan to do them over a period of time or on different parcels of land. Attach any additional information that will help describe your proposal or its environmental effects. The agency to which you submit this checklist may ask you to explain your answers or provide additional information reasonably related to determining if there may be significant adverse impact.

Use of checklist for nonprojected proposals: [\[help\]](#)

For nonprojected proposals (such as ordinances, regulations, plans and programs), complete the applicable parts of sections A and B plus the [SUPPLEMENTAL SHEET FOR NONPROJECT ACTIONS \(part D\)](#). Please completely answer all questions that apply and note that the words "project," "applicant," and "property or site" should be read as "proposal," "proponent," and "affected geographic area," respectively. The lead agency may exclude (for non-projects) questions in Part B - Environmental Elements –that do not contribute meaningfully to the analysis of the proposal.

A. BACKGROUND[\[help\]](#)

1. Name of proposed project, if applicable: [\[help\]](#)

Anacortes Wastewater Treatment Plant Outfall Relocation

2. Name of applicant: [\[help\]](#)

Eric Shjarback, City of Anacortes

*Fred Buckenmeyer,
PW Director*

3. Address and phone number of applicant and contact person: [\[help\]](#)

P.O. Box 547
Anacortes, WA 98221
360-299-1980

360-299-1954

4. Date checklist prepared: [\[help\]](#)

May 11, 2021

5. Agency requesting checklist: [\[help\]](#)

City of Anacortes

6. Proposed timing or schedule (including phasing, if applicable): [\[help\]](#)

In water work window August 1st through February 15th.

*Upland phase: Dec.
2021-June 2022
Marine phase: Aug.
2022-Feb. 2023*

7. Do you have any plans for future additions, expansion, or further activity related to or connected with this proposal? If yes, explain. [\[help\]](#)

Yes, in the future, further improvements to the City's wastewater treatment plant and systems will occur to treat wastewater and stormwater more efficiently.

8. List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal. [\[help\]](#)

- WDFW Biological Assessment Memo
- FEMA BA Programmatic Memo
- Geotechnical and Sediment Sampling study
- Mixing Zone study
- Nearshore Sediment Characterization Report
- Critical Areas Report
- Anacortes Wastewater Facilities Plan
- Dredging, Dewatering, and Backfill Plan
- Water quality Monitoring and Protection Plan

*Geotechnical Design Report,
3/25/21
Alignment Alternatives Technical
memo, HDR, 5/29/20
Alternative Refinement Analysis,
Widener & Assoc., 4/1/21
Biological Assessment, July 2021
Cultural Resources Monitoring
reports*

9. Do you know whether applications are pending for governmental approvals of other proposals directly affecting the property covered by your proposal? If yes, explain. [\[help\]](#)

None Known

10. List any government approvals or permits that will be needed for your proposal, if known. [\[help\]](#)

- Section 404 (Dredge or Fill into Waters of the U.S.) (USACE)
- Section 7 (Outfall Structures and Associated Intake Structures) (USACE)
- Section 401 Water Quality Certification (Ecology)
- NPDES Permits (Ecology)
- Hydraulic Project Approval (WDFW)
- Aquatic Use Authorization (DNR)
- Shoreline (Conditional Use) (City of Anacortes)
- Critical Areas (City of Anacortes)
- Operation Permit for Blasting (City of Anacortes)

11. Give brief, complete description of your proposal, including the proposed uses and the size of the project and site. There are several questions later in this checklist that ask you to describe certain aspects of your proposal. You do not need to repeat those answers on this page. (Lead agencies may modify this form to include additional specific information on project description.) [\[help\]](#)

The project is proposing to upgrade The City of Anacortes Wastewater Treatment Plant (WWTP) outfall by installing an outfall pipe which will be a 48-inch diameter high-density polyethylene (HDPE) pipe coming from the WWTP for 1,631 feet until the shoreline where the pipe will reduce to 42-inch outside diameter HDPE pipe for 1,030 feet with an 86-foot diffuser angled to the NE at approximately 24.5 degrees to better match the bidirectional current. The total length of the pipe will be 2,748 feet from the WWTP continuing into the Guemes Channel. The new pipe will be located east of the current outfall, terminate in deeper waters further from the shoreline, and be able to convey larger effluent volumes. The City needs to replace the damaged outfall and relocate it in an area with greater access for the future.

12. Location of the proposal. Give sufficient information for a person to understand the precise location of your proposed project, including a street address, if any, and section, township, and range, if known. If a proposal would occur over a range of area, provide the range or boundaries of the site(s). Provide a legal description, site plan, vicinity map, and topographic map, if reasonably available. While you should submit any plans required by the agency, you are not required to duplicate maps or detailed plans submitted with any permit applications related to this checklist. [\[help\]](#)

The City is proposing to construct a new underground WWTP pipe outfall extending north from the WWTP located at T Avenue north to 3rd Street where it will turn west and then follow U Avenue north into the Guemes Channel for an additional 1,030 feet. The project area is within existing right-of-way surrounded by highly developed properties, primarily residential and industrial. It is within the City of Anacortes, Skagit County, Washington and HUC 17110002. The project area is in Section 18 of Township 35 North, Range 2 East. The outfall is expected to extend waterward (northward) to end at approximately 48.520928 N latitude / -122.604670 W long.

B. ENVIRONMENTAL ELEMENTS [\[help\]](#)

1. Earth

a. General description of the site [\[help\]](#)

(circle one): Flat, rolling, hilly, steep slopes, mountainous, other _____

The site is generally flat, as the marine floor slopes downward towards the center of Guemes Channel, north of the site.

b. What is the steepest slope on the site (approximate percent slope)? [\[help\]](#)

The project is relatively flat until the transition from the upland into marine waters. The percent slope is approximately 20%.

c. What general types of soils are found on the site (for example, clay, sand, gravel, peat, muck)? If you know the classification of agricultural soils, specify them, and note any agricultural land of long-term commercial significance and whether the proposal results in removing any of these soils. [\[help\]](#)

The soil profile encountered on the shoreline and offshore at the project corridor generally consists of uncontrolled fill and soft recently deposited sediment, respectively, overlying glaciomarine drift or glacially consolidated soils underlain by metasedimentary siltstone/phyllite bedrock of the Lummi Formation. The upland portion consists of rock from the Lummi formation, fill placed in the 1950's and deposited materials of sand and clay.

d. Are there surface indications or history of unstable soils in the immediate vicinity? If so, describe. [\[help\]](#)

No Indications of unstable soils were found.

e. Describe the purpose, type, total area, and approximate quantities and total affected area of any filling, excavation, and grading proposed. Indicate source of fill. [\[help\]](#)

The upland portion of the pipe will be completely under the existing roadway. Materials to be excavated will be approximately 25,371 CY, materials to be backfilled will be approximately 24,612 CY. The marine portion will consist of 2,955 CY of materials excavated for the pipe to be placed under the shoreline until approximately -30 MLLW where the pipe will come from the bank and continue onto the seabed. Materials to backfill the buried marine portion will be 2,820 CY of imported clean crushed gravel and glacial till sediment. Total excavated materials will be approximately 28,326 CY. Total materials to be backfilled will be approximately 27,432 CY.

f. Could erosion occur as a result of clearing, construction, or use? If so, generally describe. [\[help\]](#)

It is unlikely this project would cause erosion. Proper stabilization such as a trench box or similar equipment, will be used in the upland trench.

g. About what percent of the site will be covered with impervious surfaces after project construction (for example, asphalt or buildings)? [\[help\]](#)

There will be no additional impervious surfaces created, the road will be replaced within the existing footprint, and will be updated using the City code and standards.

h. Proposed measures to reduce or control erosion, or other impacts to the earth, if any: [\[help\]](#)

Comprehensive erosion plans will be approved prior to construction that will outline measures to prevent contamination (i.e., from concrete and equipment fuel) during construction in accordance with the applicable Stormwater Management Manual for Western Washington. The Temporary Erosion and Sediment Control Plan (TESCP) will detail site stabilization, slope protection, drainage way protection, and sediment retention.

2. Air

a. What types of emissions to the air would result from the proposal during construction, operation, and maintenance when the project is completed? If any, generally describe and give approximate quantities if known. [\[help\]](#)

There will only be short term increases in emissions during construction from construction equipment, construction related vehicles and dust. No long term increases in emissions will occur since the proposal is a non-motorized underground pipe.

b. Are there any off-site sources of emissions or odor that may affect your proposal? If so, generally describe. [\[help\]](#)

There are no off-site sources of emissions that would affect this proposal.

c. Proposed measures to reduce or control emissions or other impacts to air, if any: [\[help\]](#)

No measured proposed. Equipment will be shutoff when not in use.

3. Water

a. Surface Water: [\[help\]](#)

1) Is there any surface water body on or in the immediate vicinity of the site (including year-round and seasonal streams, saltwater, lakes, ponds, wetlands)? If yes, describe type and provide names. If appropriate, state what stream or river it flows into. [\[help\]](#)

The marine portion of this project consists of placing the pipe into the water body of the Guemes Channel of the Puget Sound.

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. [\[help\]](#)

All work will be conducted in the Guemes Channel.

- The nearshore portion from above HTL out to MLLW will be constructed from shore using an excavator. This zone currently consists of a near-vertical revetment facing the waterway at the end of U Ave. The trench will be excavated from the top of the embankment, primarily in the dry during low tides except for the deeper lower portion below mid-tide. Materials excavated will be removed from the site and disposed of at an approved upland facility.
- The buried section from MLLW to -30 ft MLLW will be dredged from a barge mounted with an environmental level bucket to remove top layer of sediment consisting of silt and clay with organic materials. Then an excavator dredge with a conventional open excavator bucket with teeth will be used to remove the native substrate below the sediment as this material is denser. The trench will be approximately 50 feet across the top and approximately 10 feet across at the bottom the trench to prevent slough of sediment into the bottom of the trench, trench length will be approximately 400 feet. Dredge will be conducted until pre-determined depth is reached. Dredging activities will be tracked through contractor navigation and positioning system to ensure work remains within the dredge prism. The dredge material will be placed into the sediment barge which is moored beside the dredge. Each bucket will place both sediment and a volume of overlying water into the barge.
- The barges will be dewatered during dredging. Excess water that collects within the barge will be gravity drained through barge vents equipped with filter media (40 standard sieve size [0.4-millimeter pore size]) prior to discharge to the waterway. Reducing ponded water within the sediment barge during loading is a key component to reducing amount of additional water. The barges shall have watertight side walls (fences) and do not require “sealing” before transit to the offload facility. Before transit, water will be pumped out of the barges and through a woven sediment bag, and then discharged back to the open water within the site work area. No discharge of water will occur during transit of barges from the site to the transload facility. The sediment bag will be placed within the sediment barge’s bin walls prior to the barge departing from the dredge.
- Imported backfill material will be clean ¾-inch minus clean crushed gravel and glacial till sediment.
- Initial section coming from the end of U Ave, will sit 12 inches minimum from the undisturbed trench bottom, the bedding will consist of crushed gravel bedding. Crushed gravel will be back filled to original slope 2: 1, remaining top layer will consist of 2’ -6” of riprap. Crushed gravel will be placed below pipe initial bottom lay portion with a minimum of 12 inches from trench bottom. The length until the exposed pipe will be back filled with crushed gravel to even out the grading from the trench then 8” minimum of fish mix backfill will be laid on top.
- The buried pipeline will be placed in the excavated and bedded trench under the direction and control of divers. The pipeline may be placed by cranes either or both from shore and from offshore crane barge. This material will be placed with a clamshell dredge and verified by diver.
- The offshore pipe and diffuser will be placed using controlled submergence techniques staged from barges and tugs. The pipe will be joined and tested offsite and precast concrete anchors attached. The pipe string will be filled with air and towed to the site.

- Upon arrival, the pipe will be pressurized and tensioned at each end with cables. Water will be pumped into the pipe at the nearshore end with air evacuated at the offshore end. The controlled submergence is completed in a few hours on a single day.
- Certified divers using surface-supplied air will be used to support construction of the pipeline. Remaining bottom lay pipe will be secured with 2-piece bolt on concrete anchors.
- Divers will stage from the barge, and assist with pipe placement, pipe joining, and verification of the pipeline profile and condition before backfilling.
- Anticipated in-water construction equipment includes a floating crane barge, materials storage barge, dive barge/vessel, tugs, and work skiffs.

3) Estimate the amount of fill and dredge material that would be placed in or removed from surface water or wetlands and indicate the area of the site that would be affected. Indicate the source of fill material. [\[help\]](#)

Marine portion fill material will consist of imported crushed gravel and glacial till sediment of approximately 2,820 CY. Material to be dredged will consist of sediment and rock materials from existing seabed, approximate amount will be 2,955 CY.

4) Will the proposal require surface water withdrawals or diversions? Give general description, purpose, and approximate quantities if known. [\[help\]](#)

No surface water withdrawals or diversions will be required.

5) Does the proposal lie within a 100-year floodplain? If so, note location on the site plan. [\[help\]](#)

Yes, all work within the Guemes Channel is located within the FEMA-mapped 100-year floodplain. City of Anacortes 5303170040A effective 9/17/2003, Project site is located in Zone AE (El 7 feet).

6) Does the proposal involve any discharges of waste materials to surface waters? If so, describe the type of waste and anticipated volume of discharge. [\[help\]](#)

No, waste materials will be disposed of at an approved upland location in accordance with all applicable federal state and local laws. No discharge is anticipated but small amounts may be possible from equipment.

After construction, the outfall will discharge treated effluent into Guemes Channel.

b. Ground Water:

1) Will groundwater be withdrawn from a well for drinking water or other purposes? If so, give a general description of the well, proposed uses and approximate quantities withdrawn from the well. Will water be discharged to groundwater? Give general description, purpose, and approximate quantities if known. [\[help\]](#)

No groundwater will be withdrawn.

2) Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (for example: Domestic sewage; industrial, containing the following chemicals. . .; agricultural; etc.). Describe the general size of the system, the number of such systems, the number of houses to be served (if applicable), or the number of animals or humans the system(s) are expected to serve. [\[help\]](#)

No materials will be discharged into the ground from septic tanks or other sources.

c. Water runoff (including stormwater):

1) Describe the source of runoff (including storm water) and method of collection and disposal, if any (include quantities, if known). Where will this water flow? Will this water flow into other waters? If so, describe. [\[help\]](#)

Stormwater is the only potential source of runoff. Project timing is late summer to winter, so stormwater runoff would be from any potential rain. A stormwater management plan will be developed to be implemented with the project.

2) Could waste materials enter ground or surface waters? If so, generally describe. [\[help\]](#)

BMPs including silt fence, straw wattles or other BMPS's approved by Ecology will be utilized to prevent any inadvertent runoff to the Guemes Channel from dredging and excavation.

3) Does the proposal alter or otherwise affect drainage patterns in the vicinity of the site? If so, describe.

The roadway grading and drainage sites will be restored to pre-existing condition once the project is complete.

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

No long-term impacts to surface, ground, or runoff water are anticipated. During construction, the standard appropriate erosion and sediment control measures will be implemented to prevent turbid runoff from entering Guemes Channel untreated. These measures include installation of silt fence and/or straw wattle to prevent flow across any disturbed areas.

The outfall pipe capacity will be increased from the existing condition; however it will discharge with a more efficient and effective mixing zone in deeper water and allow for more efficient pump use. The new outfall design has been modeled through a mixing study meeting the WA State Water quality standards for outfalls discharging into Gumes Channel.

4. Plants [\[help\]](#)

a. Check the types of vegetation found on the site: [\[help\]](#)

- ☒ deciduous tree: alder, maple, aspen, other
- ☒ evergreen tree: fir, cedar, pine, other
- ☐ shrubs
- ☐ grass
- ☐ pasture
- ☐ crop or grain
- ☐ Orchards, vineyards, or other permanent crops.
- ☐ wet soil plants: cattail, buttercup, bullrush, skunk cabbage, other
- ☐ water plants: water lily, eelgrass, milfoil, other
- ☐ other types of vegetation

b. What kind and amount of vegetation will be removed or altered? [\[help\]](#)

A total of 6 trees will be removed to accommodate the pipe placement within the shoreline jurisdiction. Mitigation will be implemented by replanting trees at a ratio of 3:1, 18 trees will be planted along the west side of U Ave after removal of non-native bushes. Replanting will be within the same shoreline jurisdiction.

c. List threatened and endangered species known to be on or near the site. [\[help\]](#)

No threatened or endangered species are *known* to be on or near the site. The Golden paintbrush (*Castilleja levisecta*) may occur in the project boundary (USFWS) but it very unlikely due to the limited and poor habitat.

d. Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any: [\[help\]](#)

A ratio of 3:1 tree will be planted for mitigation. A total of 18 trees will be planted within the shoreline Jurisdiction along the west side of U Ave. Non-native bushes will be removed for planting of native trees.

e. List all noxious weeds and invasive species known to be on or near the site.

None known.

5. Animals

a. List any birds and other animals which have been observed on or near the site or are known to be on or near the site. Examples include: [\[help\]](#)

birds: hawk, heron, eagle, songbirds, other:

mammals: deer, bear, elk, beaver, other:
fish: bass, salmon, trout, herring, shellfish, other _____

b. List any threatened and endangered species known to be on or near the site. [\[help\]](#)

Species that may occur in the project boundary:

- Bull Trout (*Salvelinus confluentus*)
- Steelhead (*Oncorhynchus mykiss*)
- Chinook Salmon (*Oncorhynchus tshawytscha*)
- Bocaccio Rockfish (*Sebastes paucispinis*)
- Canary Rockfish (*Sebastes pinniger*)
- Yelloweye Rockfish (*Sebastes ruberrimus*)
- Eulachon (*Thaleichthys pacificus*)
- Killer Whale (*Orcinus orca*)
- Humpback Whale (*Megaptera novaeangliae*)
- Leatherback Sea Turtle (*Dermochelys coriacea*)
- Marbled Murrelet (*Brachyramphus marmoratus*)
- Yellow-Billed Cuckoo (*Coccyzus americanus*)
- Streaked Horned Lark (*Eremophila alpestris strigata*)
- Golden Paintbrush (*Castilleja levisecta*)
- Gray wolf (*Canis lupis*)

Conformance with Shoreline Master Program and critical areas regulations, ESA, and conditions of WDFW HPA, USACE permits/authorizations, DNR aquatic use authorization; DOE NPDES permit

c. Is the site part of a migration route? If so, explain. [\[help\]](#)

This site is within the Pacific Flyway route.

d. Proposed measures to preserve or enhance wildlife, if any: [\[help\]](#)

6 trees will be removed from the shoreline jurisdiction, for mitigation a ratio of 3:1 trees will be replanted within the same shoreline jurisdiction. Plants will be located along the west side of U ave. Measures will be taken to prevent damages to the surrounding environments such as turbidity monitoring.

e. List any invasive animal species known to be on or near the site.

No invasive species have been identified in the site location.

6. Energy and natural resources

a. What kinds of energy (electric, natural gas, oil, wood stove, solar) will be used to meet the completed project's energy needs? Describe whether it will be used for heating, manufacturing, etc. [\[help\]](#)

N/A

b. Would your project affect the potential use of solar energy by adjacent properties? If so, generally describe. [\[help\]](#)

No.

c. What kinds of energy conservation features are included in the plans of this proposal? List other proposed measures to reduce or control energy impacts, if any: [\[help\]](#)

None.

7. Environmental health

a. Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire and explosion, spill, or hazardous waste, that could occur as a result of this proposal? If so, describe. [\[help\]](#)

Construction equipment used for this project does have the potential for spillage of fuel, lubricants, and hydraulic fluids.

1) Describe any known or possible contamination at the site from present or past uses.

The marine portion overlaps Sediment Management Area 2 (SMA-2) where sediment containing site-related Indicator Hazardous Substances including Carcinogenic Polycyclic Aromatic Hydrocarbons exceeding Preliminary Cleanup Levels from the mudline to a depth of 1-foot. Materials excavated to a depth of 1-foot below the MHHW line will be removed and disposed of at an upland facility. There are no known contaminants in the upland portion.

2) Describe existing hazardous chemicals/conditions that might affect project development and design. This includes underground hazardous liquid and gas transmission pipelines located within the project area and in the vicinity.

There are no existing conditions that affect the project development or design.

3) Describe any toxic or hazardous chemicals that might be stored, used, or produced during the project's development or construction, or at any time during the operating life of the project.

Construction equipment used for this project does have the potential for spillage of fuel, lubricants, and hydraulic fluids.

4) Describe special emergency services that might be required.

No special emergency services will be required.

5) Proposed measures to reduce or control environmental health hazards, if any:

A Spill Prevention, Control, and Countermeasures (SPCC) plan will be approved prior to construction that will outline measures to prevent contamination (i.e., from concrete and equipment fuel) during construction.

b. Noise

1) What types of noise exist in the area which may affect your project (for example: traffic, equipment, operation, other)? [\[help\]](#)

Traffic is the main source of noise in this location, but it will not impact the project.

2) What types and levels of noise would be created by or associated with the project on a short-term or a long-term basis (for example: traffic, construction, operation, other)? Indi- cate what hours noise would come from the site. [\[help\]](#)

The following is a list of equipment that may be used on this project and the maximum noise level that each can produce at 50 feet: excavator (87 dBA), and dump truck (91 dBA). This noise would only occur during daytime hours. Controlled rock blasting will occur on the upland portion of the project however, suppressive matts and measure will be used and noise level will not exceed existing background levels.

3) Proposed measures to reduce or control noise impacts, if any: [\[help\]](#)

Construction will be conducted during city permitted work times of 7 AM to 10 PM as stated in the City Municipal Code. 17.54.010 Noise.

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. [\[help\]](#)

The shoreline property is currently used as open marine water, adjacent to the Port of Anacortes. The project area crosses a small section of state-owned aquatic land managed by the Port of Anacortes as authorized by DNR. The project area includes overlying sediment within the footprint of the future WWTP outfall pipe and NPDES discharge location for the City of Anacortes' wastewater treatment effluent. Nearby and adjacent properties will not be impacted. Property surrounding the ROW is residential, which access to will be temporarily impacted during excavation.

b. Has the project site been used as working farmlands or working forest lands? If so, describe. How much agricultural or forest land of long-term commercial significance will be converted. to other uses as a result of the proposal, if any? If resource lands have not been designated, how many acres in farmland or forest land tax status will be converted to nonfarm or non-forest use? [\[help\]](#)

None the project site has been working agriculture farmlands or working forest lands.

1) Will the proposal affect or be affected by surrounding working farm or forest land normal business operations, such as oversize equipment access, the application of pesticides, tilling, and harvesting? If so, how:

No.

c. Describe any structures on the site. [\[help\]](#)

No structures are within the footprint in the path of the outfall.

d. Will any structures be demolished? If so, what? [\[help\]](#)

No.

e. What is the current zoning classification of the site? [\[help\]](#)

Commercial Marine and designated right-of-way.

f. What is the current comprehensive plan designation of the site? [\[help\]](#)

The comprehensive plan designation is the same as above: Commercial Marine and designated right-of-way.

g. If applicable, what is the current shoreline master program designation of the site? [\[help\]](#)

The project site is located within Urban Maritime designation.

h. Has any part of the site been classified as a critical area by the city or county? If so, specify. [\[help\]](#)

The site is within shoreline jurisdiction with saltwater habitat. Per WDFW a small portion of the pipe placement within the Guemes channel is within Dungeness crab priority habitat.

i. Approximately how many people would reside or work in the completed project? [\[help\]](#)

None.

j. Approximately how many people would the completed project displace? [\[help\]](#)

None.

k. Proposed measures to avoid or reduce displacement impacts, if any: [\[help\]](#)

N/A.

L. Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any: [\[help\]](#)

The proposal is consistent with the City's comprehensive plan as Goal CF-3 is to "identify deficiencies in public facilities serving existing development based on adopted level of service standards (Anacortes 2016 Comprehensive Plan Vol. 1). In order to maintain compliance with the City's Municipal NPDES Permit (WA0020257) for this outfall, the pipe needs to be replaced.

m. Proposed measures to ensure the proposal is compatible with nearby agricultural and forest lands of long-term commercial significance, if any:

N/A.

9. Housing

a. Approximately how many units would be provided, if any? Indicate whether high, middle, or low-income housing. [\[help\]](#)

None.

b. Approximately how many units, if any, would be eliminated? Indicate whether high, middle, or low-income housing. [\[help\]](#)

None.

c. Proposed measures to reduce or control housing impacts, if any: [\[help\]](#)

None.

10. Aesthetics

a. What is the tallest height of any proposed structure(s), not including antennas; what is the principal exterior building material(s) proposed? [\[help\]](#)

Ground level, the pipe will be placed below the existing roadway into the Guemes channel below the shoreline.

b. What views in the immediate vicinity would be altered or obstructed? [\[help\]](#)

None.

c. Proposed measures to reduce or control aesthetic impacts, if any: [\[help\]](#)

None.

11. Light and glare

a. What type of light or glare will the proposal produce? What time of day would it mainly occur? [\[help\]](#)

None.

b. Could light or glare from the finished project be a safety hazard or interfere with views? [\[help\]](#)

No.

c. What existing off-site sources of light or glare may affect your proposal? [\[help\]](#)

None.

d. Proposed measures to reduce or control light and glare impacts, if any: [\[help\]](#)

None.

12. Recreation

a. What designated and informal recreational opportunities are in the immediate vicinity? [\[help\]](#)

There are residents next to the vicinity which may use the water access as well as small basketball court at the end of U ave.

b. Would the proposed project displace any existing recreational uses? If so, describe. [\[help\]](#)

None.

c. Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any: [\[help\]](#)

No measures proposed.

13. Historic and cultural preservation

a. Are there any buildings, structures, or sites, located on or near the site that are over 45 years old listed in or eligible for listing in national, state, or local preservation registers located on or near the site? If so, specifically describe. [\[help\]](#)

There are no properties listed on any register within the project site or adjacent to the project site.

b. Are there any landmarks, features, or other evidence of Indian or historic use or occupation? This may include human burials or old cemeteries. Are there any material evidence, artifacts, or areas of cultural importance on or near the site? Please list any professional studies conducted at the site to identify such resources. [\[help\]](#)

None.

c. Describe the methods used to assess the potential impacts to cultural and historic resources on or near the project site. Examples include consultation with tribes and the department of archeology and historic preservation, archaeological surveys, historic maps, GIS data, etc. [\[help\]](#)

Historical maps and information have been researched and no impacts are anticipated to occur.

d. Proposed measures to avoid, minimize, or compensate for loss, changes to, and disturbance to resources. Please include plans for the above and any permits that may be required.

No disturbances to resources are anticipated.

*Compliance with
Section 106 of the
National Historic
Preservation Act*

14. Transportation

a. Identify public streets and highways serving the site or affected geographic area and describe proposed access to the existing street system. Show on site plans, if any. [\[help\]](#)

As mentioned previously the pipe will be placed within the designated ROW, there are several access points to the site including T ave, 6th St, 5th St, 4th St 3rd St and U ave.

b. Is the site or affected geographic area currently served by public transit? If so, generally describe. If not, what is the approximate distance to the nearest transit stop? [\[help\]](#)

The nearest transit stop is on 6th St between Q Ave and Commercial Ave, .24 miles from the project location. This route will not be disrupted.

c. How many additional parking spaces would the completed project or non-project proposal have? How many would the project or proposal eliminate? [\[help\]](#)

No parking will be added.

d. Will the proposal require any new or improvements to existing roads, streets, pedestrian, bicycle, or state transportation facilities, not including driveways? If so, generally describe (indicate whether public or private). [\[help\]](#)

The pipe will be placed below ground level from the Wastewater Treatment Plant out into the Guemes Channel. Road and sidewalk will be disturbed but replaced back to City code and standard.

e. Will the project or proposal use (or occur in the immediate vicinity of) water, rail, or air transportation? If so, generally describe. [\[help\]](#)

None.

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 non passenger vehicles). What data or transportation models were used to make these estimates? [\[help\]](#)

No additional vehicles trips would be generated. Road will be rebuilt to current City code and standard.

g. Will the proposal interfere with, affect, or be affected by the movement of agricultural and forest products on roads or streets in the area? If so, generally describe.

No.

h. Proposed measures to reduce or control transportation impacts, if any: [\[help\]](#)

Development of a detailed traffic management plan

Not applicable.

15. Public services

a. Would the project result in an increased need for public services (for example: fire protection, police protection, public transit, health care, schools, other)? If so, generally describe. [\[help\]](#)

No.

b. Proposed measures to reduce or control direct impacts on public services, if any. [\[help\]](#)

Coordination with Fire Dept. to ensure continued emergency services access

None.

16. Utilities

a. Circle utilities currently available at the site: [\[help\]](#)
electricity, natural gas, water, refuse service, telephone, sanitary sewer, septic system, other _____

N/A

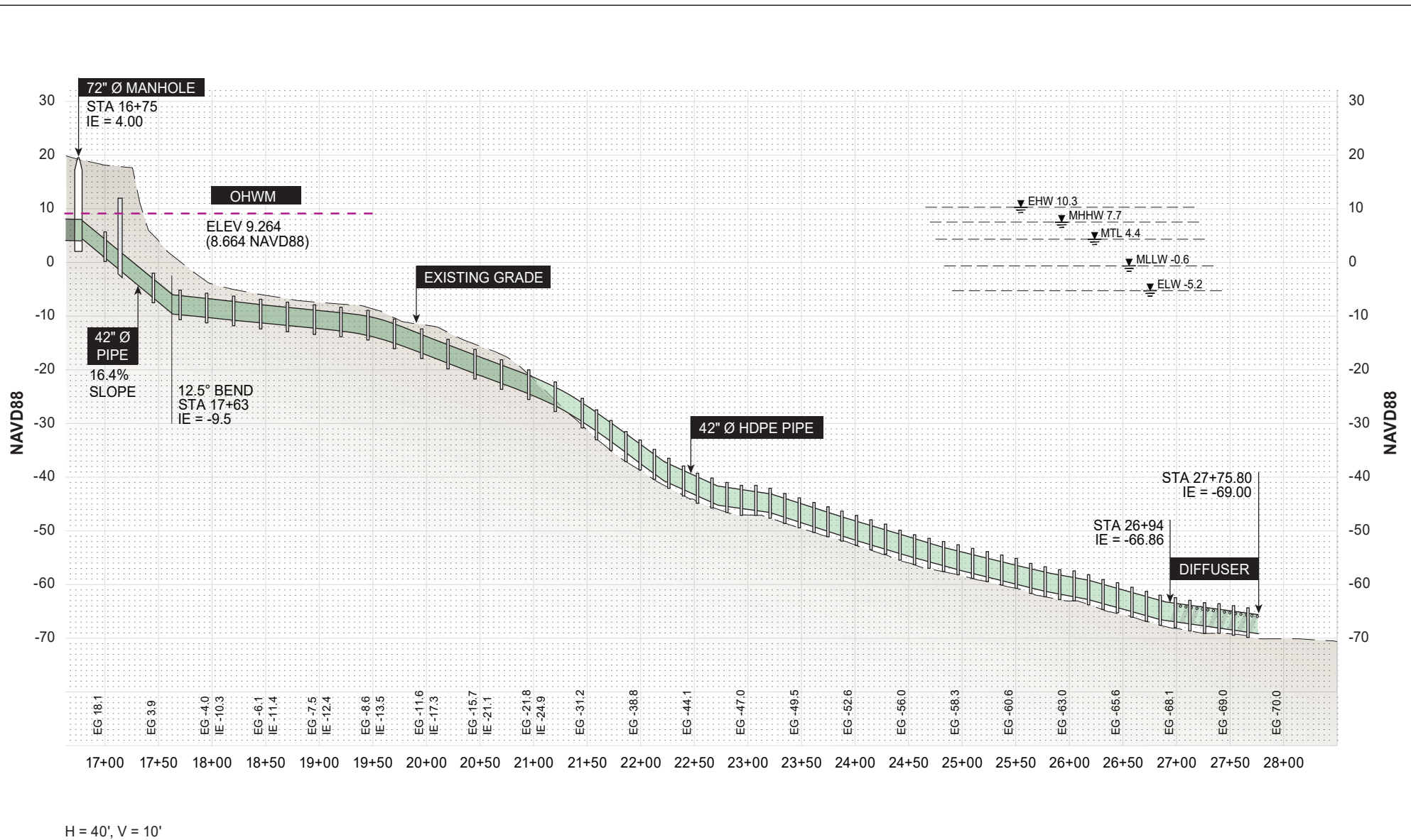
b. Describe the utilities that are proposed for the project, the utility providing the service, and the general construction activities on the site or in the immediate vicinity which might be needed. [\[help\]](#)

The pipe coming from the WWTP to the Guemes channel is considered a utility.

C. SIGNATURE [\[HELP\]](#)

I certify (or declare) under penalty of perjury under laws of the State of Washington that 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 a decision.

Signature: _____
Name of signee _____



Shoreline Development

APPLICANT: City of Anacortes

PROPOSED PROJECT: City of Anacortes WWTP Outfall Relocation

PROJECT LOCATION: 500 T Ave, Anacortes, WA 98221

Anacortes Wastewater Treatment Plant Outfall Relocation

Biological Assessment

City of Anacortes
Skagit County, Washington

Prepared for:

City of Anacortes
Public Works & Engineering
904 6th Street
Anacortes, WA 98221

Prepared by:

Widener & Associates
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July 2021

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1 Introduction

The City of Anacortes (the City) has applied for funding from the U.S. Department of Homeland Security's Federal Emergency Management Agency (FEMA) in order to conduct the Anacortes Wastewater Treatment Plant Outfall Relocation project (Project). The existing outfall was damaged during the February 2020 storm, which resulted in the Presidential Disaster Declaration DR 4539-WA. The Project plans to relocate the outfall location further out in Guemes Channel to better meet the requirements of the City's National Pollutant Discharge Elimination System (NPDES) permit.

This Biological Assessment (BA) has been developed by Widener & Associates (consultant) to address the proposed project in compliance with Section 7(c) of the Endangered Species Act (ESA) of 1973, as amended. Section 7 of the ESA requires that federal actions do not jeopardize the continued existence of any threatened, endangered, or proposed species; or result in the destruction or adverse modification of designated critical habitat (DCH).

During the February 2020 storm, excessive pressurized flow out of the wastewater treatment plant (WWTP) resulted in damage to a pipe joint at a manhole which was installed in 2017 to facilitate bypass pumping during the previous outfall repair. This resulted in a significant leak, flooding the neighboring area of the Port of Anacortes and Dakota Creek Shipyard with treated effluent. Multiple obstacles relating to Port operations and stormwater treatment are above the existing line in this location. The replacement of the outfall in this location would require significant disruption to operations at the Port of Anacortes and working around obstacles above the existing pipe make repairs cost prohibitive. The City now prefers to move forward with a new alignment outside the Port's property which will expedite construction. The expedience of this WWTP outfall relocation project is vital to the continued operations of the City and its ability to provide adequate sanitary services to a community of over 20,000 users on a daily basis.

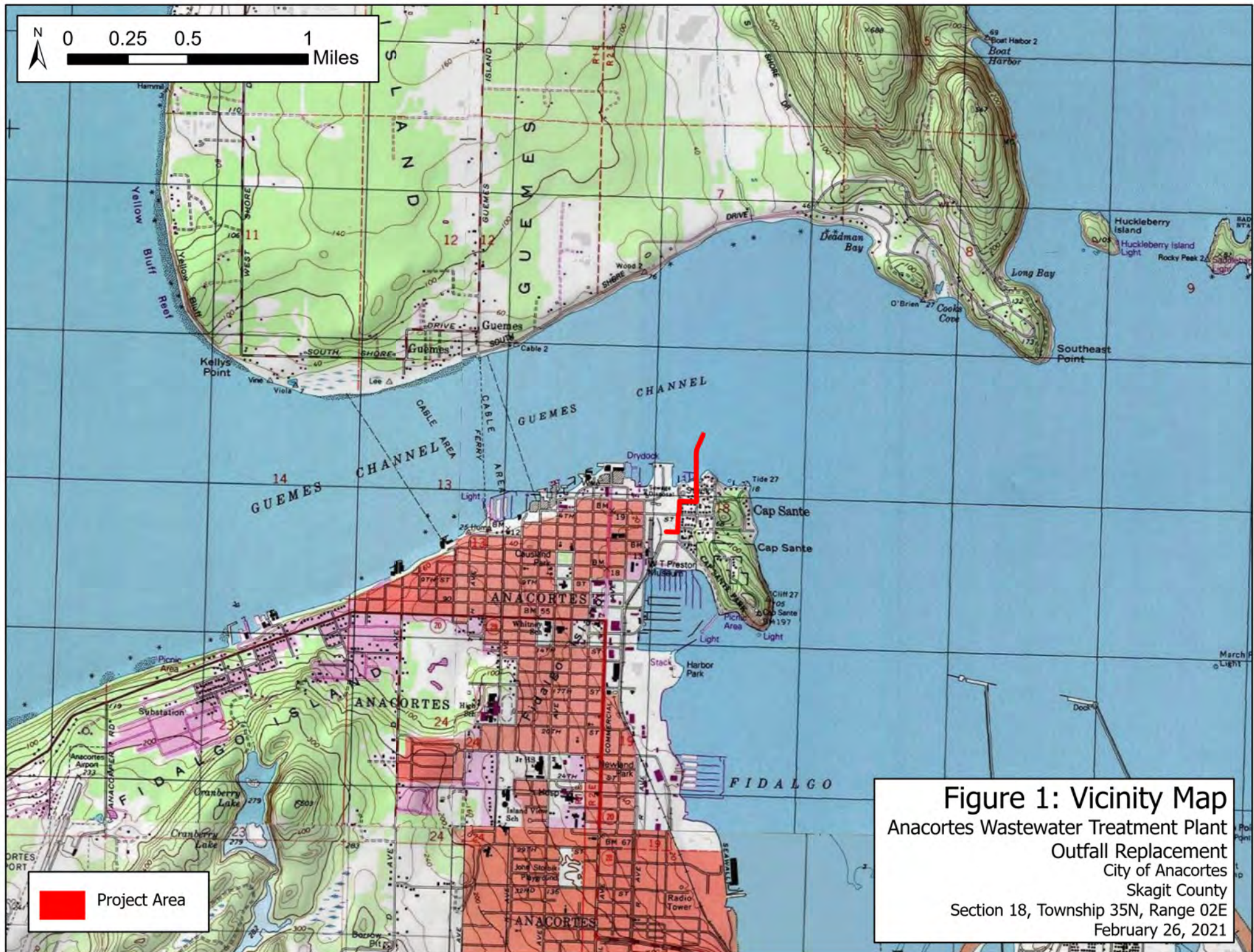
Informal ESA consultations were conducted in 2017 for the replacement of 320-feet of the outfall at its current location (NMFS Reference WCR-2017-6781 and USFWS Reference 01EWF00-2017-I-0839). Since these consultations, a portion of the pipe was repaired, however, further damage requires additional length of the pipeline outside the footprint of that included in the previous consultations. As described above, it has been determined that it is cost prohibitive to replace the pipe in its current alignment. Therefore, new consultations are necessary for the updated project to move the outfall outside of Port of Anacortes property.

The City will pursue an Alternative Procedures Project Authorization (APPA) which will construct a new outfall pipeline and diffuser east of the current outfall and Port of Anacortes Pier 2, which will extend north from the shoreline. This option could have temporary impacts to ESA-listed species but will create huge long-term benefits with a chronic dilution factor for the proposed new outfall nearly 10 times greater than the existing and over 2,350 cubic yards (CY) of impacted Sediment Management Area (SMA) contaminated sediments removed from the aquatic environment. Details for the new mixing zone modeling are provided in a Mixing Zone Study prepared for the project (Cosmopolitan Marine Engineering, 2021) and discussed in Section 8.6 Outfall Water Quality.

2 Project Location

The City will construct a new WWTP outfall extending north from the WWTP located at T Avenue north to 3rd Street where it will turn west and then follow U Avenue north into the Guemes Channel for approximately 1,030 feet. The project area is within existing right-of-way surrounded by highly developed properties, primarily residential and industrial. It is within the City of Anacortes, Skagit County, Washington and HUC 17110002. The project area is in Section 18 of Township 35 North, Range 2 East. See Figure 1.

As described above, due to obstacles around and above the old outfall line, an in-place repair will not be pursued by the City. The alignment of the proposed outfall in relation to the existing damaged outfall is shown on Figure 2.



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Figure 2



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3 Existing Environmental Conditions

There is extremely limited shoreline vegetation within the project area as it has been utilized as a port facility since 1926 and is heavily developed (marginal habitat). The area to the west and the project portion of the Guemes Channel is part of the Port of Anacortes and has high levels of shipping activity. Pier 2 is located just west of the project area and is used for short term moorage for barges and vessels and is used for exporting dry goods. Along the shoreline to the east is urban single family residential.

The shoreline area contains typical weed grasses with trash, large concrete rubble, and other debris. The banks are steep and rocky, and most was previously riprapped. The proposed pipe outfall will enter the marine waters of the Guemes Channel, where animals such as mussels (*Mytilus spp.*) and Dungeness crab (*Cancer magister*) are known to exist. There is no eelgrass and insignificant amounts of microalgae or other aquatic vegetation within the project footprint. The immediate vicinity of the marine action area is listed as an Ecology Toxics Cleanup site due to contamination from past historical uses along the waterfront. WDFW has no documented surf smelt and pacific herring spawning within the footprint of the project or the area of potential turbidity impacts (WDFW, 2021b).

The site overlaps Sediment Management Area 2 (SMA-2) of the Anacortes Port Log Yard Site which is on the Washington Department of Ecology's Confirmed and Suspected Contaminated Sites List (Facility Site ID # 21898438, Cleanup Site ID 3604). Sampling was performed in November 2020 along the outfall alignment to characterize sediments and the depth of contamination. Recent sediment depositions containing site-related Indicator Hazardous Substances including Carcinogenic Polycyclic Aromatic Hydrocarbons, exceeding Preliminary Cleanup Levels have been found from the mudline to a maximum depth of about 3 feet below the surface at one location. Most sampling locations did not have contamination below 1 foot. Further details are available in the Nearshore Sediment Characterization Report (Dalton, Olmsted & Fuglevand Inc, 2021b).

One portion of the Guemes Channel within the aquatic portion of the action area (approximately 0.3 miles to the west of the outfall pipe installation) is 303(d) listed by the Washington State Department of Ecology (ECY) for 2,3,7,8-TCDD (Dioxin). The path of the outfall does not enter this area of 303(d) listed waters.

The Guemes Channel was determined to be a fit receiving water based on the City's 2017 municipal NPDES permit (Permit # WA0020257). The City has maintained compliance with the water quality parameters reported for the effluent since the permit was issued. While the current outfall meets the discharge requirements, the new alignment will provide a better mixing zone for aquatic health by moving the outfall further into the bidirectional current between the City of Anacortes and Guemes Island.

4 Project Description

The proposed outfall pipe will be a 48-inch diameter high-density polyethylene (HDPE) pipe coming from the WWTP for 1,631 feet until the shoreline above mean higher high water (MHHW) where the pipe will reduce to 42-inch outside diameter HDPE pipe. This pipe will continue for 1,030 feet with an 86-foot diffuser angled to the NW at approximately 24.5 degrees to better match the bidirectional current. The total length of the pipe will be 2,748 feet from the WWTP continuing into the Guemes Channel. The bend in the marine portion of the pipe begins at mean lower low water (MLLW) at a depth of -55 feet and will continue in this direction for the remainder of the pipe and diffuser until a depth of -69 feet (-30 feet MLLW). The diffuser is 86 feet long with 20 ports in total, each 4.5 feet apart. The terminal port is 7 inches in diameter, ports #2-16 are 4.75 inches in diameter and ports #17-20 are 4.625 inches in diameter. The bathymetry of this location shows steady slope which would be ideal for a portion of the outfall and diffuser to be constructed and anchored to the seabed. Approximately 380 feet of the pipe in the nearshore to a depth of 30 feet below MLLW will be buried and the remaining 650 feet will be submerged and anchored to the seabed. Aspects of the local climate including currents, prevailing winds, river outflow, and seasonal changes have all been accounted for in determining the best possible site location as well as depth. See the attached drawings for additional project details.

The new outfall will flow into deeper waters further from the shoreline and be able to convey larger volumes to allow for the conveyance of effluent from the WWTP. This will allow the outfall to continue to comply with the City's 2017 municipal NPDES permit. The new design will provide a chronic dilution factor nearly 10 times greater than the existing outfall (Cosmopolitan Marine Engineering, 2021). The project is anticipated to remove 2,350 CY of contaminated material from the marine environment during dredging. Further details of the proposed dredging methods through this area to minimize any migration of contaminated material are included below.

5 Construction Techniques

The nearshore section from MHHW to MLLW currently consists of a near-vertical revetment facing the waterway at the end of U Avenue. Due to the extent of excavation necessary, steel sheet pile will be installed using a vibratory pile driver to shore surrounding material. The piles will be driven during low tide as much as possible, but approximately 10 feet of shoring on either side of the trench construction (approximately 10 sheet piles) near MLLW are estimated to be in water during installation. The trench will then be excavated from the top of the embankment by an excavator on land. Excavation will be completed in the dry as much as possible, however it is anticipated that a small portion near MLLW may occur in-water. Materials excavated will be removed from the site and disposed of at an approved upland facility. Excavated slopes along the steep embankment will be backfilled with 12 inches of crushed gravel and covered with 2.5 feet of riprap covered with 6-18 inches of glacial till mix to the previously existing slope of 2:1. See the attached project drawings in Appendix A.

The buried section from MLLW to -30 feet MLLW will be excavated from a barge mounted crane with clamshell dredge to accommodate 360-foot portion of pipe to be laid in the trench. The excavation will be conducted during tidal inundation in two phases of dredging. Turbidity will be monitored during all in-water work including dredging as required in the project's Water Quality Monitoring and Protection Plan

(WQMPP) (Widener and Associates, 2021a). Vessel operation will be restricted to tidal elevations and limited safe propulsion adequate to prevent prop scour or disturbance of contaminated sediments. Barges will avoid deploying their spuds (steel piles that are raised and lowered through the hull of the vessel to provide anchors for the barge) into any location with eelgrass which is found outside the project footprint. Due to the existing site contamination and related environmental impacts, it has been determined the use of sheet piling, silt curtains or similar containment systems around the dredging area is not feasible. Ecology strongly encouraged no containment structure be used around the proposed dredging location in order to eliminate the potential resuspension and migration of contaminated materials during installation as well as potential scour created around the structure from the current.

During the first phase of dredging, an environmental level-cut dredge bucket will be utilized to remove the contaminated recent sediments, approximately the first three feet of dredging. The lighter weight of the bucket will prevent it from digging into the harder underlying native materials. Dredging of the contaminated sediments will be performed to a width wider than the required dredging into the native sediments to reduce sloughing of adjacent recent sediments into the deeper excavation. This wider footprint will also provide a buffer area around the outfall for any future dredging that may be performed by others for remediation. The second phase will involve the dredging of harder native material to the required depth for outfall installation. It is anticipated that an excavator dredge with a conventional open excavator bucket with teeth will be required to remove this material. Further details are available in the Dredging, Dewatering, and Backfill Plan Including Dredge Confirmation Sampling prepared for the project (Dalton, Olmsted & Fuglevand, 2021a).

Dredged material will be placed on a barge immediately after removal for gravity dewatering or removal of ponded water by pumping. All water will be filtered through a filter medium. All sediments removed during dredging will be disposed of at approved upland facility. Sediments will be tested for compliance with chemical and biological criteria. Sediments not meeting these criteria will be disposed of at certified City approved landfill. Imported backfill material will be clean ¾-inch minus clean crushed gravel with less than two percent fine material. A minimum of 12 inches of crushed gravel bedding will be placed from the bottom of the trench prior to the pipe placement. The buried pipeline will be placed in the excavated and bedded trench under the direction and control of divers and barge workers. The pipeline will be placed by cranes from shore and from an offshore crane barge. The length of pipe, until the exposed pipe, will be backfilled with crushed gravel with a minimum of 16 inches of fish mix (a sand and round pea gravel mix at least 80 percent by weight between ⅛-inch and ¼-inch diameter) will be placed on top of any areas below the high tide line. Total backfill will be approximately 2,820 CY.

The remaining 650 feet of offshore pipe and diffuser will be placed using controlled submergence techniques staged from barges and tugs. The pipe will be joined and tested offsite with precast concrete anchors attached. The pipe string will be filled with air and towed to the site. Upon arrival, the pipe will be pressurized and tensioned at each end with cables. Water will be pumped into the pipe at the nearshore end with air evacuated at the offshore end. The controlled submergence is completed in a few hours on a single day. Certified divers using surface-supplied air will be used to support construction of the pipeline. Remaining bottom lay pipe will be secured with 2-piece bolt on concrete anchors. Divers will stage from the barge, and assist with pipe placement, pipe joining, and verification of the pipeline profile and condition

before backfilling. Anticipated in-water construction equipment includes a floating crane barge, materials storage barge, dive barge/vessel, tugs, and work skiffs. See Appendix A for drawings showing project activities within the Guemes Channel.

5.1 Construction Schedule

It is anticipated that construction will commence in August of 2021 and be completed by the end of February 2022. All in-water work will occur between August 1st, 2021 and February 15, 2022. This is the approved authorized work window for saltwater areas within Tidal Reference Area 9 are referenced in WAC 220-660-330.

5.2 Pre/Post Project Sediment Sampling

Prior to construction of the outfall, sampling will be completed along four transects crossing the planned dredge area. Samples will be collected approximately 12 feet to either side of the outfall pipe. Samples will be collected at the planned depth of dredging (0-1 feet below planned depth), 1-2 feet below the planned dredge depth and 2-3 feet below the planned dredge depth. This sampling will be completed under a separate permit but will confirm that sediment remaining after the outfall dredging are not contaminated. Further details are available in the Dredging, Dewatering, and Backfill Plan Including Dredge Confirmation Sampling (Dalton, Olmsted & Fuglevand, Inc, 2021a).

Resuspension of contaminated material during dredging is not anticipated to extend beyond 150 feet from the project limits, for the purposes of this project, Ecology is considering turbidity to be a surrogate for suspended contaminants (*pers. comm.* L. Inouye, 5/10/21). This will not expand the contaminated area beyond the limits of SMA-2. To confirm if the project changes the concentration of any chemicals of concern around the perimeter of the work area, a Pre/Post Construction Perimeter Sampling Work Plan (Dalton, Olmsted & Fuglevand, Inc, 2021c) has been reviewed and finalized by Ecology and the Port of Anacortes. This plan includes pre-construction surface sediment samples collected from a total of up to 13 locations, depending upon relative timing of proposed sampling by the Port of Anacortes and start of outfall construction. Three locations sampled during the Nearshore Sediment Characterization_(Dalton, Olmsted & Fuglevand Inc, 2021b) will be resampled. Post-construction surface samples will be collected from up to 13 locations. Samples will be collected between 0-10 cm below the sediment surface.

5.3 Site Preparation and Staging

Site preparation will include appropriate temporary erosion and sediment control (TESC) measures such as silt fencing being installed in order to prevent sediment from entering the Guemes Channel during upland construction. These TESC measures will be maintained throughout construction and adjusted as site conditions change. Temporary shoring will be installed before excavation to prevent erosion.

Any stockpiling of materials and staging of equipment will be done at least 200 feet from the MHHW of the Guemes Channel. Dredged substrate will be stockpiled within a lined barge and analyzed for potential contamination prior to off-site disposal. Backfill for the pipe and pipe bedding will be imported from an approved offsite commercial source and all spoils will be disposed of at an approved off-site location.

There is no existing natural vegetation that will be removed. The existing shoreline in the project area is completely covered in riprap, concrete, and other foreign debris. Dredged substrate will be contained in impervious containers to prevent leaking. It is anticipated that the only cleanup required will be of the foreign debris on the shore.

5.4 Stormwater Management

The project will meet the criteria to be considered an underground utility project which is listed as an exemption in chapter I-3.2 of the 2019 Stormwater Management Manual for Western Washington. The project is therefore not subject to treatment requirements for new or replaced pavement. The project will not create an increase in impervious surface, only replacement of surfaces with in-kind material or those with similar runoff characteristics. Existing rain gardens on T Avenue between 4th Street and 3rd Street which do not meet Ecology standards will be removed during construction. New treatment facilities which meet current standards will be constructed in a more appropriate location which meets the requirements in the 2019 Stormwater Management Manual for Western Washington.

5.5 Conservation Measures

The proposed in-water work window of August 1st -February 15th minimizes potential impacts to all listed fish species and forage species in accordance with approved authorized work window for saltwater areas within Tidal Reference Area 9 as referenced in WAC 220-660-330.

The project is designed to avoid and minimize adverse impacts to the aquatic environment by implementing the following:

- Steel sheet piling used for shoring during the nearshore trench construction will be driven with a vibratory hammer, no impact driving will occur. Shoring will be placed in the dry during low tide as much as possible which will minimize the time underwater noise will be created.
- No containment structure will be utilized around the proposed dredging location. This will eliminate the potential resuspension and migration of contaminated materials during installation as well as potential scour created around the structure from the current. This will also reduce the amount of pile driving necessary for the project which would disturb marine mammals.
- Contaminated material from the surface will be removed prior to any deeper dredging and from a wider footprint than required for trench construction to reduce sloughing of adjacent recent sediments into the deeper excavation and provide a buffer around the outfall line for future remediation.
- Vessel operation will be restricted to tidal elevations and limited safe propulsion adequate to prevent prop scour or disturbance of contaminated sediments.
- Barges will not deploy their spuds in eelgrass beds found outside the outfall alignment.
- Turbidity monitoring will be conducted throughout construction in accordance with Section 401 Water Quality Certification.
- Erosion control BMPs such as silt fence will be utilized to prevent any inadvertent runoff to the Guemes Channel in accordance with the TESC plans.
- Comprehensive erosion plans and a Spill Prevention, Control, and Countermeasures (SPCC) plan will be approved prior to construction that will outline measures to prevent contamination (i.e., from concrete and equipment fuel) during construction in accordance with the Stormwater Management

Manual for Western Washington (Ecology, 2019). The plans will detail site stabilization, slope protection, drainage way protection, and sediment retention.

- Existing rain gardens which do not comply with Ecology standards will be removed during construction and new treatment facilities which meet the requirements in the Stormwater Management Manual for Western Washington (Ecology, 2019) will be constructed as replacements.
- Spill kits will be kept on site at all times.
- Refueling will be done at least 200 feet from surface waters.
- All equipment will be checked daily for leaks and any necessary repairs will be made prior to the commencement of work.
- The shoreline will be backfilled to pre-existing grade and clean ¾-inch minus crushed gravel will be imported as backfill within the nearshore where contaminated materials are removed. Backfill materials will contain no more than two percent fine material.
- Backfill placement will be conducted in a manner to prevent water quality impacts. If necessary, placement procedures will include lowering the bucket to within five feet of the sediment surface, modifying the material placement rate, and/or use of a tremie tube or similar.
- Dredged material will be placed on a barge immediately after removal for gravity dewatering or removal of ponded water by pumping. All water will be filtered through a filter medium.
- 6-18 inches of fish mix, a sand and round pea gravel mix at least 80 percent by weight between 1/16-inch and 1/4-inch diameter, will be placed over shoreline armoring.

As there is no natural shoreline or aquatic vegetation within the proposed project area and no significant habitat features will be impacted, no mitigation is proposed for this project. The project will improve conditions in the area long-term through the removal of contaminated sediment and improved dilution of effluent.

6 Action Area

The action area for this project is defined by the maximum terrestrial and aquatic construction noise levels as these will have the farthest-reaching effects. Refer to Appendix B for a detailed noise analysis. The terrestrial portion of the action area is calculated as the distance for the maximum noise level during construction to attenuate to background levels. The terrestrial portion of the action area is defined as a radius of 8,891 feet (1.68 miles) from the limits of vibratory pile driving (Figure 3).

The aquatic portion of the action area was calculated based on the noise level generated during vibratory pile driving of steel sheet piles (Caltrans, 2020). This includes a portion of the Guemes Channel within 20,702 feet (3.92 miles) of vibratory pile driving activities, as this is where noise from driving the 24-inch steel sheet piles, necessary to hold in place surrounding material during nearshore excavation, will attenuate to marine mammal behavioral disturbance threshold levels. The aquatic portion of the action area is limited to line of sight from vibratory pile driving activities, as existing landmasses and shoreline structures are known to hinder the forward movement of elevated sound pressure levels (SPLs) within water (Figure 3). The aquatic portion of the action area also includes the anticipated mixing zone of 150 feet for potential turbidity impacts.

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Guemes Island

Guemes Channel

Fidalgo Island

Fidalgo Bay

- Project Area
- Action Area
- Aquatic Portion of Action Area

Figure 3: Action Area

Anacortes Wastewater Treatment Plant
Outfall Replacement
City of Anacortes
Section 18, Township 35N, Range 02E

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7 Species Information and Designated Critical Habitat

An official U.S. Fish and Wildlife Service (USFWS) species list for the project action area was obtained on February 12, 2021 (Appendix C). Note that USFWS-jurisdictional species are only addressed if they were included on the official IPAC list from the USFWS. Refer to Table 1 below for a summary of federally listed species that are listed as potentially occurring within the project vicinity.

Table 1. USFWS Listed ESA Species with Potential to be in the Project Vicinity

Common Name	Scientific Name	ESU or DPS	Federal status	Designated Critical Habitat in Action Area?
Gray Wolf	<i>Canis lupus</i>	Western DPS	Proposed Threatened	N/A
Marbled Murrelet	<i>Brachyramphus marmoratus</i>		Threatened	No
Streaked Horned Lark	<i>Eremophila alpestris strigata</i>		Threatened	No
Yellow-Billed Cuckoo	<i>Coccyzus americanus</i>	Western DPS	Threatened	No
Golden Paintbrush	<i>Castilleja levisecta</i>		Threatened	N/A
Bull Trout	<i>Salvelinus confluentus</i>	Coastal/Puget Sound DPS	Threatened	Yes

The following National Marine Fisheries Service (NMFS) jurisdictional species are identified as potentially being within the project vicinity:

Table 2. NMFS Listed ESA Species with Potential to be in the Project Vicinity

Common Name	Scientific Name	ESU or DPS	Federal status	Designated Critical Habitat in Action Area?
Steelhead	<i>Oncorhynchus mykiss</i>	Puget Sound DPS	Threatened	No
Chinook Salmon	<i>Oncorhynchus tshawytscha</i>	Puget Sound ESU	Threatened	Yes
Bocaccio Rockfish	<i>Sebastes paucispinis</i>	Puget Sound/ Georgia Basin DPS	Endangered	Yes
Yelloweye Rockfish	<i>Sebastes ruberrimus</i>	Puget Sound/ Georgia Basin DPS	Threatened	Yes
Eulachon	<i>Thaleichthys pacificus</i>	Southern DPS	Threatened	No
Killer Whale	<i>Orcinus orca</i>	Southern Resident DPS	Endangered	Yes
Humpback Whale	<i>Megaptera novaeangliae</i>	Central America DPS	Threatened	No

This BA does not evaluate potential impacts to dolly varden, which is proposed for listing based on Similarity of Appearance to a threatened taxon (bull trout). Under the Similarity of Appearance provisions of the ESA, Section 4(e) authorizes a species to be treated as if it were endangered or threatened if it closely resembles a listed species and law enforcement personnel would have substantial difficulty telling the two species apart. Although species listed under the Similarity of Appearance provisions receive some of the protections of the ESA, consultation requirements under Section 7 do not apply.

7.1 Western Gray Wolf

The western gray wolf was listed on January 4, 1974 (39 FR 1176) and delisted on November 3, 2020. The Western DPS is currently proposed for relisting as threatened. However, the western gray wolf population is centralized in Eastern Washington as the western DPS consists of Washington, Idaho, Montana, and Wyoming. All of Washington State is within the historic range of the gray wolf, however due to the fur trade they were almost extirpated from the region. The gray wolf has a wide range of habitats including mountains, forests, and grasslands. Previous sightings within 2002 put them back in Western Washington, however not near the project site. Due to the development of Anacortes and island status, the western gray wolf is highly unlikely in the area. This species will therefore not be discussed further in this document.

7.2 Marbled Murrelet

The marbled murrelet was listed as threatened on September 28, 1992 (FR 57 45328). While the action area does consist of possible foraging habitat for the murrelet, it is unlikely they will use the project location due to the poor fish habitat and disturbance created by the proximity to the Port of Anacortes along with shipping and recreational boat traffic. There could be potential impact to the murrelet nesting within 0.25 mile of the vibratory pile driving. However, this 0.25-mile disturbance area does not contain suitable sized nesting trees, instead consisting of the shores of the Guemes Channel to the north, the Port and City of Anacortes to the west and south with remaining eastern portion consisting of urban single-family homes.

Critical habitat for the Washington, Oregon and California populations of marbled murrelet was initially designated on June 24, 1996 (61 FR 26256) and was reevaluated in 2011 (76 FR 61599) and 2016 (81 FR 51348) where minor distribution of critical habitats has been modified. The nearest DCH for the murrelet is located approximately 26 miles northeast of the action area, and therefore not within the action area.

7.3 Streaked Horned Lark

The streaked horned lark was listed as threatened on November 4, 2013 (78 FR 61452). The project area is within historic ranges of the streaked horn lark however more updates data shows the current range in the south Puget Sound and Willamette Valley. The closest documented occurrence is approximately 87 miles south the project site near Tacoma (Anderson and Pearson, 2015). Habitat for the streaked horned lark generally consists of contiguous open landscape of at least 150 acres with sparse vegetation with few trees, shrubs, or other tall objects (Anderson and Pearson, 2105). They will utilize human altered landscapes such as agricultural fields and airfields. The immediate project site does not consist of this habitat, however there may be locations on Guemes Island of open field suitable for the streaked horned lark. However, as it has not been seen in this region of Puget Sound, it is very unlikely it will be within the project area.

7.4 Western Yellow-Billed Cuckoo

The western yellow-billed cuckoo was listed as threatened effective November 3, 2014 (79 FR 59992). Critical habitat was also proposed for designation on August 15, 2014, although no critical habitat was proposed in the State of Washington (79 FR 48548). The yellow-billed cuckoo is generally considered extirpated from Washington, but there have been 2 documented sightings in the Puget Sound lowlands since 1990 (Teachout, 2015). While no recent breeding has been confirmed in Washington, the possibility cannot be completely ruled out. Suitable breeding habitat is defined as patches of mature riparian willows and cottonwoods that are greater than 50 acres (Teachout, 2015). While there may be narrow strips of riparian

habitat along small creeks within the project action area, there is no suitable breeding habitat for yellow-billed cuckoo within the action area. As there are no recent documented occurrences of yellow-billed cuckoo in the vicinity and there is no suitable habitat within the action area, this species will not be discussed further in this document.

7.5 Golden Paintbrush

The golden paintbrush was listed as threatened on June 11, 1997 (62 FR 31740). No critical habitat has been designated. The golden paintbrush is a perennial herb generally found in upland prairies with deep rich soils and high light availability. Currently there are 48 populations, however only 5 of them occur in Washington. The nearest population to the project site is 17 miles south on Whidbey Island. This location is one of several sites on Whidbey Island being monitored for population integrity. Several smaller populations are present however they are on surrounding San Juan Islands approximately 20 miles to the west. This species relies on a fire regime for growth and population dispersal (USFWS, 2019). The project vicinity is not suitable habitat for this species as it is coastal and heavily developed and therefore not an area where fire regime is promoted or acceptable.

7.6 Coastal/Puget Sound Bull Trout

The Coastal/Puget Sound bull trout was listed as threatened effective December 1, 1999 (64 FR 58910). This DPS encompasses all Pacific Coast drainages within the coterminous United States north of the Columbia River in Washington, including those flowing into Puget Sound (64 FR 58912). This DPS does not include any artificial propagation programs. As such, this BA evaluates effects to natural-origin fish.

Coastal/Puget Sound bull trout exhibit both anadromous and fluvial life history forms that spend parts of their lives in marine or estuarine waters. Anadromous bull trout have been documented in the Samish River, Skagit River, and Nooksack Rivers which are 7, 11, and 17 miles, respectively, from the project area (WDFW, 2020). Anadromous bull trout are known to range in salt water up to 25 miles from the mouth of their natal freshwater streams or rivers (Kraemer, 1994).

Anadromous bull trout in the Puget Sound primarily utilize the eastern shore of the sound for migrating, foraging, and overwintering (USFWS, 2004). Within near shore areas, bull trout forage on juvenile salmonids, and forage fish such as herring, sand lance, and surf smelt, particularly keying in on spawning beaches. Juvenile salmonids are not anticipated to be present within the aquatic portion of the action area during the in-water work window (City of Anacortes, 1999) and the closest documented forage fish spawning area is a surf smelt spawning area approximately 2,500 feet west of the project area (WDFW, 2021b). It is not anticipated that bull trout utilize the project area for foraging during the in-water work window. However, the chance of adult or sub-adult bull trout migrating through the project area and foraging or migrating within the aquatic portion of the action area cannot be ruled out.

7.7 Coastal/Puget Sound Bull Trout Critical Habitat

Critical habitat for the Coastal/Puget Sound DPS of bull trout was designated on September 26, 2005 (70 FR 56212) and revised on October 18, 2010 (75 FR 63898). Current designated critical habitat includes nearshore habitat within the aquatic portion of the action area. Nearshore marine habitat within the aquatic portion of the action area is within Puget Sound Critical Habitat Unit (CHU) 2, which includes approximately 1,144 miles of streams, 40,182 acres of lakes, and 425 miles of marine shoreline (75 FR 63898). Unit 2 is further divided into core areas, or Critical Habitat Subunits (CHSUs). The aquatic portion of the action area is located within the Puget Sound Marine CHSU which includes the eastern shoreline of Guemes Island.

The extent of critical habitat for nearshore marine areas is from Mean Higher High Water (MHHW) to -10 m (-33 feet) Mean Lower Low Water (MLLW) (75 FR 63898). This is based on the average extent of the photic zone, where there is generally sufficient light to support primary productivity. A portion of the western action area is within the extent of nearshore critical habitat for Coastal/Puget Sound bull trout. Refer to Appendix D for the critical habitat assessment form.

7.8 Puget Sound Steelhead

The Puget Sound steelhead was listed as threatened effective June 11, 2007 (72 FR 26722) and this listing was updated on April 14, 2014 (79 FR 20802). This DPS includes naturally spawned anadromous *O. mykiss* (steelhead) originating below natural and manmade impassable barriers from rivers flowing into the Puget Sound from the Elwha River (inclusive) eastward, including rivers in Hood Canal, Puget Sound, and the Strait of Georgia. This DPS also included 6 artificial propagation programs. This BA evaluated affects to listed natural-origin fish and listed hatchery-origin fish.

Both summer and winter-run steelhead runs occur in the Skagit, Samish, and Nooksack Rivers as well as several smaller streams that flow into the North Puget Sound (WDFW, 2021a). It is unlikely that juvenile steelhead would be found in the aquatic portion of the action area during the in-water work window as the majority of juvenile steelhead will have migrated seaward (City of Anacortes, 1999) and juvenile steelhead migrate quickly through the Puget Sound to rear and forage in the ocean (NMFS, 2015). It is also unlikely that adult or subadult steelhead would utilize the immediate project area for foraging due to poor habitat conditions and they generally forage in deeper waters (NMFS, 2015). There is the potential for migrating or opportunistic foraging within the immediate project area and within the aquatic portion of the action area in general during the in-water work window.

Critical habitat for Puget Sound Salmon was designated on February 24, 2016 (81 FR 9252). No marine critical habitat has been proposed or designated for the Puget Sound DPS of steelhead.

7.9 Puget Sound Chinook Salmon

The Puget Sound ESU of Chinook salmon was listed as threatened effective on August 29, 2005 (70 FR 37160) and this listing was updated on April 14, 2014 (79 FR 20802). This ESU includes all naturally spawned populations of Chinook salmon from rivers and streams flowing into Puget Sound including the Straits of Juan De Fuca from the Elwha River, eastward, including rivers and streams flowing into Hood Canal, South Sound, North Sound, and the Strait of Georgia in Washington. This ESU also includes 26 artificial propagation programs (79 FR 20802). As such, this BA evaluates effects to both listed natural-origin and listed hatchery-origin fish.

Spring-run Chinook salmon runs occur in the Skagit and Nooksack Rivers while fall-run Chinook salmon runs occur in the Skagit, Samish, and Nooksack Rivers as well as several smaller streams and sloughs (WDFW, 2021a). Juvenile Chinook that out-migrate from the Puget Sound/Bellingham Bay travel and rear along the nearshore environments of the Guemes Channel, including within the aquatic portion of the action area (NMFS 2007). As with other juvenile salmonids in the action area, peak juvenile abundance is expected to occur between April and June (City of Anacortes, 1999; NMFS, 2015). However, by mid-July juvenile salmon have generally grown large enough that they are no longer dependent on nearshore habitat and will be foraging in more offshore waters (NMFS, 2015).

7.10 Puget Sound Chinook Salmon Critical Habitat

Critical habitat for this ESU was originally designated on February 16, 2000 (65 FR 7764) and included all marine, estuarine, and river reaches accessible to listed Chinook salmon in the Puget Sound. Critical habitat for the Puget Sound ESU of Chinook salmon was again designated on September 2, 2005 (70 FR 52631). Also included were adjacent riparian zones. Critical habitat has been designated within the action area.

7.11 Puget Sound/Georgia Basin Bocaccio and Yelloweye Rockfish

The Puget Sound/Georgia Basin DPS of bocaccio rockfish was listed as endangered and the yelloweye rockfish was listed as threatened on April 28, 2010 (75 FR 22276). This DPS includes the full extent of the Puget Sound and Georgia Basin for both species (74 FR 18516). Bocaccio and yelloweye rockfish are found from Alaska to southern California. Bocaccio were once commonly found within the Puget Sound but are very rare now. Extremely small numbers of Bocaccio have been caught during biological surveys of the Puget Sound in the last 20 years, but it is still considered to be an extant population. NMFS also considers yelloweye rockfish to rarely be present in the Puget Sound, but there is the potential to be present in the deeper parts of the action area (NMFS BRT, 2008).

Bocaccio have been found at varying depth but are most abundant from 50-250 m (165-825 ft) in depth (WDFW, 2021c), therefore are unlikely to be present in the project area. Yelloweye rockfish are mostly found as adults within water depths of 91 to 180 m (300-600 ft) though they have been reported at water depths from 15 to 549 m (48-1,800 ft), therefore are unlikely to be present in the project area where the WWTP pipe will excavated and buried. Sub-adults and adults are generally solitary and around areas with crevices or other refuge (WDFW, 2021d).

Bocaccio and yelloweye rockfish give birth to live larval young which drift with the ocean current and then eventually travel to the ocean floor where there is more protection from predators. As the fish mature, they move into deeper water habitat. Larval release occurs from February to September (NMFS, 2017a).

In addition, juvenile bocaccio are often associated with kelp and other macroalgae that is not present within the immediate project area, and while they are more likely to be found in shallow water than adults, they are typically found in waters between 100 and 400 feet deep (COSEWIC, 2002), deeper than the proposed project. While juvenile yelloweye rockfish are also found in shallower waters than the adults, however the rip-rap placement in the action area is not at sufficient depth to serve as yelloweye rockfish habitat.

As these species are rare in Puget Sound and adults are typically found at depths deeper than the project footprint, there is minimal chance of either species being present during project construction time frame. However, because of their wide dispersion on ocean currents, it is possible for some larval rockfish to be present in the project area at any time during the year.

7.12 Bocaccio and Yelloweye Rockfish Critical Habitat

Critical habitat for Puget Sound/Georgia Basin bocaccio and yelloweye rockfish was designated on November 13, 2014 (79 FR 68042). Both nearshore and deepwater critical habitats have been designated for bocaccio rockfish. Deepwater critical habitat has been designated within the eastern portion of the action area but is well outside of the limits of potential effects to bocaccio. The entire aquatic portion of the action area between EHW and -30 m (-98 ft) MLLW has been designated as nearshore critical habitat (79 FR 68042).

Deepwater critical habitat has been designated for yelloweye rockfish, including an area at the east end of the aquatic portion of the action area. Deepwater critical habitat includes areas greater than -30 m (-98 ft) below MLLW (79 FR 68042). No nearshore critical habitat has been designated due to the lack of association between juvenile yelloweye rockfish and nearshore habitat.

7.13 Eulachon

The Southern DPS of eulachon was listed as threatened effective on May 17, 2010 (75 FR 13012). The Southern DPS includes all eulachon populations spawning from the Nass River in British Columbia south to the Mad River in Northern California. Major production area for this species includes the Columbia and Fraser River (74 FR 10857).

There is no documented spawning of eulachon in the rivers of the Puget Sound, with the closest spawning habitat and DCH occurring in the Elwha River, approximately 51 miles southwest of the project area (NMFS, 2017b). Eulachon return to freshwater to spawn from late winter through mid-spring. Therefore, the probability of southern eulachon being found within the action area during construction is so low, no impacts to this species is expected.

7.14 Southern Resident Killer Whale

The DPS of the southern resident killer whale was federally listed as a threatened species on November 18, 2005 (NMFS, 2005). The Guemes Channel is within the habitat designated as summer core. Southern Resident killer whales have been sighted in the summer core area during every month of the year, but sightings are more consistent and concentrated in the summer months of June through August (NMFS, 2006). The winter months are when the SR DPS Killer Whales move into Puget Sound, away from the action area (NMFS, 2008). However, they have the potential to be within the action area year-round.

From 1976-2014 there were less than 55 visible sightings of the killer whales within the Guemes Channel, however they frequently pass through the Rosario Strait to the west (Olson et. al., 2018). Due to the shallow water, heavy boat traffic and poor foraging area, it is unlikely the Southern Resident killer whale will be present in the project action area during construction.

7.15 Killer Whale Critical Habitat

Critical habitat for the Southern Resident killer whale was effective on December 29, 2006 (71 FR 69054). Puget Sound contains approximately 2,560 square miles of critical habitat, excluding waters less than 20 feet deep relative to extreme high water. The project action area is within summer core area of southern resident killer whale critical habitat (NOAA, 2006).

7.16 Humpback Whale

The humpback whale was listed as threatened on June 2, 1970 under the Endangered Species Conservation Act of 1969, a precursor to the ESA (35 FR 8491). This listing was amended on September 8, 2016 to remove the species-level listing and list 4 endangered DPSs and 1 threatened DPS (81 FR 62260). One federally listed DPS of the humpback whale has been documented to be found in Washington waters during the summer, the endangered Central America DPS (NMFS, 2020b).

Humpback whales may be present in the aquatic zone of the action area during the summer; however, during the winter no whales are likely to be present, as they will have migrated south to their calving areas in tropical waters. It is unlikely this species utilize the area during construction due to the shipping traffic, construction noises, and the narrow/shallow channel of the Guemes Channel.

Critical habitat for the Central American DPS of humpback whales was designated on April 21, 2021 (86 FR 21082) off the Washington, Oregon, and California coast. The action area does not encompass humpback whale DCH.

8 Effects Analysis

There are no long-term negative impacts anticipated with this project, but it will involve temporary environmental disturbances. The project will provide long-term improvements over existing conditions through the improved dilution factor of the new outfall and removal of contaminated sediments from the project footprint.

8.1 Terrestrial Noise

Terrestrial construction noises created by vibratory pile driving will attenuate to background levels at approximately 8,891 feet or 1.68 miles from the project area. For other construction activities for road construction, road repairs, bridge construction and short duration activities a buffer of 0.25 miles from nesting sites is determined (WSDOT, 2020). The project location is not within known range of marbled murrelet nesting habitat and no suitable nesting trees are present in the action area.

There is low potential for marbled murrelets to be foraging in the area due to disturbance from the port and low-quality foraging habitat. If murrelets were foraging in the action area, increased noise can mask communication between foraging individuals. However, the project is considered a “typical” project as it does not contain impact pile driving of steel piles greater than 36 inches in diameter. Therefore, masking effects are considered insignificant (WSDOT, 2020).

8.2 Underwater Noise

Underwater noise will be created by the vibratory pile driving necessary for the placement and removal of 24-inch steel sheet pile shoring in the nearshore area. This will be limited to approximately 10 steel sheets expected to be driven in water. There are no established injury criteria for vibratory pile driving for fish or marbled murrelet (WSDOT 2020, Caltrans 2020). While there may be some behavioral response for sounds over 150 dBRMS, it is not considered significant enough to result in an adverse effect (WSDOT, 2020). Given the short duration of the in-water pile driving, the poor surrounding habitat, and the likelihood that listed fish will not be present in significant numbers during construction, behavioral effects can be considered discountable.

The southern resident killer whale is incorporated into the “mid-frequency cetaceans” category of the Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (NMFS, 2018b). The cumulative auditory injury threshold (SEL_{cum}) will extend for a maximum of 0.8 m (2.6 feet) away from vibratory pile driving for mid-frequency cetaceans (SRKW) and 39.1 m (128 feet) for the “low-frequency cetaceans” category which includes humpback whales. These estimates conservatively assume that all sheet piles will be driven in the same 24-hour period. The practical spreading loss model was used with the 120 dBRMS threshold to determine the behavioral disturbance area for vibratory pile driving which extends 20,702 feet (3.92 miles). See Appendix B for noise calculations.

8.3 Dredging/Substrate Disturbance

The buried section of pipeline from MLLW to -30 feet MLLW will be excavated from a barge mounted crane with clamshell dredge. Dredging will be completed without containment and will therefore not prevent any fish in the area from escaping to more suitable habitat. The disturbance within the in-water work area will temporarily reduce potential foraging habitat, but the area provides poor habitat for forage fish, and there is much more optimal forage fish habitat elsewhere in the Guemes Channel.

The nearshore excavation and dredging will temporarily disturb approximately 2,500 square feet of substrate; however, this will be a long-term benefit for habitat in the area as contaminated sediments will be removed. Contaminated material from the surface will be removed prior to any deeper dredging and from a wider footprint than required for trench construction to reduce sloughing of adjacent recent sediments into the deeper excavation and provide a buffer around the outfall line for future remediation. Prior to the project, additional dredge confirmation sampling will occur to confirm the sediments remaining in the dredge prism following construction will be free of contaminants. The project will result in the removal of 2,350 CY of contaminated sediments from the marine environment.

Potential movement of contaminated material during dredging is not anticipated to increase exposure of listed species. Contamination is not expected to extend beyond 150 feet from the project limits, for the purposes of this project, turbidity will be a surrogate for suspended contaminants (*pers. comm.* L. Inouye, 5/10/21). Any potential resuspension is expected to remain within the limits of SMA-2 and therefore not create any new contaminated habitat. Because the entire area surrounding the project limits will continue to be contaminated following construction, sampling around the perimeter will be conducted to ensure future remediation actions are adjusted, as necessary.

The project will not result in permanent impacts to the depth of water, clean materials will be imported to backfill the trench to the existing elevations and a minimum of 18 inches of fish mix will be placed on the surface.

8.4 Vegetation Removal

No naturally vegetated areas, aquatic vegetation, or other significant habitat features will be impacted. Trash and concrete debris will be removed from the shoreline at the end of U Avenue. The project will result in the removal of 6 trees from existing city street landscaping. Trees removed will be replaced at a ratio of 3:1 along U Avenue where non-native shrubs will be removed. This will include 6 Douglas fir, 9 madrone, and 3 bigleaf maples or equivalent native species available at the time of planting. Native grasses will also be used to replant any temporarily impacted areas outside of proposed pavement.

8.5 Construction Water Quality

The excavation of a trench to place the outfall pipeline will result in temporary turbidity increases during construction. Containment structures have been determined to be unfeasible due to the contamination of sediments and strong tidal currents in the project footprint. The containment structure would also require barges to always deploy their spuds outside of the dredge footprint into contaminated materials. Turbidity is expected to remain within state water quality standards at a point of compliance 150 feet from project activities. A WQMPP has been prepared for the project which requires monitoring of turbidity and includes

contingency measures such as the temporary deployment of sediment curtain if necessary to maintain compliance with water quality standards (Widener and Associates, 2021a). Adherence to the water quality standards for turbidity will also minimize the resuspension of contaminants from within the sediment and any potential migration to areas outside the SMA-2.

8.6 Outfall Discharge Water Quality

Under the City 2017 NPDES municipal permit, regular monitoring and testing is conducted for both marine life and human health. Water quality effluent limits include biochemical oxygen demand, total suspended solids, pH, fecal coliform, residual chlorine, and acute toxicity. The City has been in compliance with the monitoring requirements since the permit was issued and no exceedances of these limits have been reported through 2020.

The outfall pipe capacity will be increased from the existing condition; however, it will discharge with a more efficient and effective mixing zone in deeper water and allow for more efficient pump use. The new outfall design has been modeled through a mixing study (Cosmopolitan Marine Engineering, 2021) meeting the Washington State Water Quality standards for outfalls discharging into the Guemes Channel. This study found that there was no reasonable potential of violating water quality criteria with the improved effluent mixing created by the new outfall design chosen.

WWTP effluent is approximately 2.5 percent less dense than sea water, so it is vital for the diffuser to be sitting on a mild bottom slope. The diffuser site is located at a depth of -69 feet (MLLW), the actual discharge depth would be approximately -65 feet accounting for the diffuser pipe resting on the sea floor with ports 3 to 4 feet off the sea floor. The less dense effluent will rise vertically into the water column which will create turbulence and rapid mixing. As the effluent water rises vertical in the water column, plume trapping is an ideal objective for various reasons including biological health of sea floor and surface water, rapid mixing zones, and aesthetic nuisance. Maximizing frequency of plume trapping is an objective of the outfall design. The discharge plume does not impact drifting and non-strong swimming organisms because they cannot stay in the plume close to the outfall long enough to be affected. Strong swimming fish could maintain a position within the plume, but they can also avoid the discharge by swimming away. Mixing zones generally do not affect benthic organisms (bottom dwellers) such as Dungeness crab because the buoyant plume rises in the water column.

While the new outfall would discharge a larger volume of effluent, the dilution factor is much greater promoting a more effective mixing zone. The new outfall improves these aspects with a dilution factor of 798 compared to 72 with the current outfall. Changes in the location and depth of the new outfall are notable compared current outfall it at a depth of -31 MLLW, with a chronic mixing zone of 231 feet and an acute mixing zone of 23.1 feet. WAC 173-201A-210 defines the marines water designated uses and criteria where the key aspects of concerns are temperature, dissolved oxygen, turbidity, pH balance, and bacteria growth. As there will no changes in composition of the effluent, a more efficient mixing zone will allow for more rapid dilution. These aspects have been compared to the City's 2017 NPDES in relation to the current outfall and the replacement outfall, and all comply with the limitations. The replacement WWTP outfall would meet the water quality standards for an outfall discharging into the Guemes Channel.

9 Determination of Effects on Listed Species

Refer to Tables 3 and 4 below for a summary of effect determinations for each USFWS and NMFS species with the potential to be found within the project action area during the proposed project as well as designated critical habitat within the action area.

Table 3. Determination of Effects to USFWS Listed ESA Species and Critical Habitat

Listed Species	Federal Status	Designated Critical Habitat in Action Area?	Species Effect Determination	Critical Habitat Effect Determination
Marbled Murrelet (<i>Brachyramphus marmoratus</i>)	Threatened	No	Not Likely to Adversely Affect	N/A
Coastal/Puget Sound Bull Trout (<i>Salvelinus confluentus</i>)	Threatened	Yes	Not Likely to Adversely Affect	Not Likely to Adversely Affect

Table 4. Determination of Effects to NMFS Listed ESA Species and Critical Habitat

Common Name	Federal status	Designated Critical Habitat in Action Area?	Species Effect Determination	Critical Habitat Effect Determination
Steelhead (<i>Oncorhynchus mykiss</i>)	Threatened	No	Not Likely to Adversely Affect	N/A
Chinook Salmon (<i>Oncorhynchus tshawytscha</i>)	Threatened	Yes	Not Likely to Adversely Affect	Not Likely to Adversely Affect
Bocaccio Rockfish (<i>Sebastes paucispinis</i>)	Endangered	Yes	Not Likely to Adversely Affect	Not Likely to Adversely Affect
Yelloweye Rockfish (<i>Sebastes ruberrimus</i>)	Threatened	Yes	Not Likely to Adversely Affect	Not Likely to Adversely Affect
Eulachon (<i>Thaleichthys pacificus</i>)	Threatened	No	Not Likely to Adversely Affect	N/A
Killer Whale (<i>Orcinus orca</i>)	Endangered	Yes	Not Likely to Adversely Affect	Not Likely to Adversely Affect
Humpback Whale (<i>Megaptera novaeangliae</i>)	Threatened	No	Not Likely to Adversely Affect	N/A

9.1 **Puget Sound DPS of Steelhead (*Oncorhynchus mykiss*) (Threatened)**

The proposed project **may affect** Puget Sound steelhead because adult and subadult steelhead may be present within the aquatic portion of the action area during the proposed in-water work window.

The proposed project is **not likely to adversely affect** the Puget Sound DPS of steelhead for the following reasons:

- There is a very low probability of adult or sub-adult steelhead migrating or foraging within the project area during the proposed in-water work window.
- Juvenile steelhead are not anticipated to be found in the aquatic portion of the action area during the proposed in-water work window.
- Foraging habitat within the project area is poor due to lack of sufficient aquatic vegetation.
- No impact pile driving will occur, and vibratory pile driving is not anticipated to impact steelhead. Vibratory pile driving in-water will be minimal as the majority of the placement of nearshore shoring sheet piles will occur during low tide.
- There will be no shoreline impacts as shoreline is bare of riparian vegetation and will be backfilled to pre-existing grade.
- Turbidity will be monitored to ensure it remains within state water quality standards at a point of compliance 150 feet from project activities.
- There will be no long-term change in the bed profile as clean sand will be imported as backfill within the excavation and pipe trench footprint. The project will provide long-term improvement through the removal of 2,350 CY of contaminated sediments from the project footprint. A minimum of 16 inches of fish mix backfill will be placed on top of any areas below the high tide line.
- There will be no long-term effects of the project as the pipe will be replacing an existing outfall which will be decommissioned once the new one is completed, there will be no new effluent discharging into the Guemes Channel. The project will improve the dilution factor of the outfall.
- No increase in impervious surface will be created.

9.2 Puget Sound ESU of Chinook Salmon (*Oncorhynchus tshawytscha*) (Threatened)

The proposed project **may affect** Puget Sound Chinook salmon because adult and subadult Chinook salmon may be present within the aquatic portion of the action area during the proposed in-water work window.

The proposed project is **not likely to adversely affect** the Puget Sound ESU of Chinook salmon for the following reasons:

- There is a very low probability of adult or sub-adult chinook salmon migrating or foraging within the project area during the proposed in-water work window.
- Juvenile chinook salmon are not anticipated to be found in the aquatic portion of the action area during the proposed in-water work window.
- Foraging habitat within the project area is poor due to lack of sufficient aquatic vegetation.
- No impact pile driving will occur, and vibratory pile driving is not anticipated to impact Chinook salmon. Vibratory pile driving in-water will be minimal as the majority of the placement of nearshore shoring sheet piles will occur during low tide.
- There will be no shoreline impacts as shoreline is bare of riparian vegetation and will be backfilled to pre-existing grade.
- Turbidity will be monitored to ensure it remains within state water quality standards at a point of compliance 150 feet from project activities.
- There will be no long-term change in the bed profile as clean sand will be imported as backfill within the excavation and pipe trench footprint. The project will provide long-term improvement through the removal of 2,350 CY of contaminated sediments from the project footprint. A minimum of 16 inches of fish mix backfill will be placed on top of any areas below the high tide line.
- There will be no long-term effects of the project as the pipe will be replacing an existing outfall which will be decommissioned once the new one is completed, there will be no new effluent discharging into the Guemes Channel. The project will improve the dilution factor of the outfall.
- No increase in impervious surface will be created.

9.3 Puget Sound/Georgia Basin DPS of Bocaccio Rockfish (*Sebastes paucispinis*) (Endangered)

The proposed project **may affect** Puget Sound/Georgia Basin bocaccio rockfish because individuals may be present within the aquatic portion of the action area during the proposed in-water work window.

The proposed project is **not likely to adversely affect** the Puget Sound/Georgia Basin DPS of bocaccio rockfish for the following reasons:

- There is a very low probability of adult or sub-adult bocaccio within the project area as they are generally found at deeper depths.
- Juvenile bocaccio are not anticipated to be found in the project area as they are found at shallower depths than adults but still deeper than waters in the project footprint.
- While rockfish larvae may be suspended in the water column, given the distribution and overall low numbers of adults, it is unlikely that many larvae would be present any given time.
- No impact pile driving will occur, and vibratory pile driving is not anticipated to impact rockfish. Vibratory pile driving in-water will be minimal as the majority of the placement of nearshore shoring sheet piles will occur during low tide.
- There will be no long-term change in the bed profile as clean sand will be imported as backfill within the excavation and pipe trench footprint. The project will provide long-term improvement through the removal of 2,350 CY of contaminated sediments from the project footprint. A minimum of 16 inches of fish mix backfill will be placed on top of any areas below the high tide line.
- There will be no long-term effects of the project as the pipe will be replacing an existing outfall which will be decommissioned once the new one is completed, there will be no new effluent discharging into the Guemes Channel. The project will improve the dilution factor of the outfall.

9.4 Puget Sound/Georgia Basin DPS of Yelloweye Rockfish (*Sebastes ruberrimus*) (Threatened)

The proposed project **may affect** yelloweye rockfish because individuals may be present within the aquatic portion of the action area during the proposed in-water work window.

The proposed project is **not likely to adversely affect** the Puget Sound/Georgia Basin DPS of Yelloweye Rockfish for the following reasons:

- There is a very low probability of adult or sub-adult yelloweye rockfish within the project area as they are generally found at deeper depths.
- Juvenile rockfish are not anticipated to be found in the project area as they are found at shallower depths than adults but still deeper than waters in the project footprint.
- While rockfish larvae may be suspended in the water column, given the distribution and overall low numbers of adults, it is unlikely that many larvae would be present any given time.
- No impact pile driving will occur, and vibratory pile driving is not anticipated to impact fish. Vibratory pile driving in-water will be minimal as the majority of the placement of nearshore shoring sheet piles will occur during low tide.
- There will be no long-term change in the bed profile as clean sand will be imported as backfill within the excavation and pipe trench footprint. The project will provide long-term improvement through the removal of 2,350 CY of contaminated sediments from the project footprint. A minimum of 16 inches of fish mix backfill will be placed on top of any areas below the high tide line.
- There will be no long-term effects of the project as the pipe will be replacing an existing outfall which will be decommissioned once the new one is completed, there will be no new effluent discharging into the Guemes Channel. The project will improve the dilution factor of the outfall.

9.5 Southern DPS of Eulachon (*Thaleichthys pacificus*) (Threatened)

The proposed project **may affect** eulachon because it cannot be completely ruled out that individuals may be present within the aquatic portion of the action area during the proposed in-water work window.

The proposed project is **not likely to adversely affect** the Southern DPS of eulachon for the following reasons:

- There is a very low probability of eulachon utilizing the project area at any time as the closest spawning habitat and DCH occurs in the Elwha River, approximately 51 miles southwest.
- No impact pile driving will occur, and vibratory pile driving is not anticipated to impact fish. Vibratory pile driving in-water will be minimal as the majority of the placement of nearshore shoring sheet piles will occur during low tide.
- There will be no long-term change in the bed profile as clean sand will be imported as backfill within the excavation and pipe trench footprint. The project will provide long-term improvement through the removal of 2,350 CY of contaminated sediments from the project footprint. A minimum of 16 inches of fish mix backfill will be placed on top of any areas below the high tide line.
- There will be no long-term effects of the project as the pipe will be replacing an existing outfall which will be decommissioned once the new one is completed, there will be no new effluent discharging into the Guemes Channel. The project will improve the dilution factor of the outfall.

9.6 Southern Resident DPS of Killer Whale (*Orcinus orca*) (Endangered)

The proposed project **may affect** the Southern Resident DPS of killer whale because individuals may be present within the aquatic portion of the action area during the proposed in-water work window.

The proposed project is **not likely to adversely affect** the Southern Resident DPS of killer whale for the following reasons:

- There is a very low probability of killer whales migrating or foraging within the project area during the proposed in-water work window.
- There will be insignificant effects to prey species.
- Vibratory pile driving in-water will be minimal as the majority of the placement of sheet piles will occur during low tide. This will limit the potential time whales could be disturbed by the continuous sound created by the installation of nearshore shoring piles.
- As vibratory pile driving is known to disturb marine mammals such as ESA-listed Southern Resident killer whales that could potentially occur within the action area of the project, a marine mammal monitoring plan will be developed in accordance with NMFS guidelines and will be implemented during all vibratory pile driving and extraction.
- There will be no long-term effects of the project as the pipe will be replacing an existing outfall which will be decommissioned once the new one is completed, there will be no new effluent discharging into the Guemes Channel. The project will improve the dilution factor of the outfall.
- All other potential adverse effects of the project, including elevated turbidity and dredging are not expected to impact Southern Resident killer whales as these effects will be localized within shallow nearshore waters along a busy port that are not utilized by whales.

9.7 Central America DPS of Humpback Whale (*Megaptera novaeangilae*) (Threatened)

The proposed project **may affect** the Central America DPS of humpback whale as individuals may be present within the aquatic portion of the action area during the proposed in-water work window.

The proposed project is **not likely to adversely affect** the Central America DPS of humpback whale for the following reasons:

- There is a very low probability of a transitory individual being within the action area during the proposed in-water work window.
- There will be insignificant effects to prey species.
- Vibratory pile driving in-water will be minimal as the majority of the placement of sheet piles will occur during low tide. This will limit the potential time whales could be disturbed by the continuous sound created by the installation of nearshore shoring piles.
- As vibratory pile driving is known to disturb marine mammals such as ESA-listed Central America humpback whales that could potentially occur within the action area of the project, a marine mammal monitoring plan will be developed in accordance with NMFS guidelines and will be implemented during all vibratory pile driving and extraction.
- There will be no long-term effects of the project as the pipe will be replacing an existing outfall which will be decommissioned once the new one is completed, there will be no new effluent discharging into the Guemes Channel. The project will improve the dilution factor of the outfall.
- All other potential adverse effects of the project, including elevated turbidity and dredging are not expected to impact Central America humpback whales as these effects will be localized within shallow nearshore waters along a busy port that are not utilized by whales.

9.8 Marbled Murrelet (*Brachyramphus marmoratus*)

The proposed project **may affect** marbled murrelet because marbled murrelet may be present within the aquatic portion of the action area during the proposed in-water work window.

The proposed project is **not likely to adversely affect** marbled murrelet for the following reasons:

- It is unlikely that marbled murrelet would forage in the vicinity of the project area due to regular port activity and the poor-quality foraging habitat within the project area.
- There will be insignificant effects to forage fish species.
- No impact pile driving will occur, and vibratory pile driving is not anticipated to impact marbled murrelet. Vibratory pile driving in-water will be minimal as the majority of the placement of nearshore shoring sheet piles will occur during low tide.
- There will be no shoreline impacts as shoreline is bare of riparian vegetation and will be backfilled to pre-existing grade.
- There will be no long-term change in the bed profile as clean sand will be imported as backfill within the excavation and pipe trench footprint. The project will provide long-term improvement through the removal of contaminated sediments from the project footprint.
- There will be no long-term effects of the project as the pipe will be replacing an existing outfall which will be decommissioned once the new one is completed, there will be no new effluent discharging into the Guemes Channel. The project will improve the dilution factor of the outfall.

9.9 Bull Trout (*Salvelinus confluentus*) – Coastal/Puget Sound DPS

The proposed project **may affect** Coastal/Puget Sound bull trout because adult and subadult bull trout may be present within the aquatic portion of the action area during the proposed in-water work window.

The proposed project is **not likely to adversely affect** the Coastal/Puget Sound DPS of bull trout for the following reasons:

- There is a very low probability of adult or sub-adult bull trout migrating or foraging within the project area during the proposed in-water work window.
- Juvenile bull trout are not anticipated to be found in the aquatic portion of the action area during the proposed in-water work window.
- Foraging habitat within the project area is poor due to lack of sufficient aquatic vegetation.
- There will be insignificant effects to forage fish species.
- No impact pile driving will occur, and vibratory pile driving is not anticipated to impact bull trout. Vibratory pile driving in-water will be minimal as the majority of the placement of shoring sheet piles will occur during low tide.
- There will be no shoreline impacts as shoreline is bare of riparian vegetation and will be backfilled to pre-existing grade.
- There will be no long-term change in the bed profile as clean sand will be imported as backfill within the excavation and pipe trench footprint. The project will provide long-term improvement through the removal of 2,350 CY of contaminated sediments from the project footprint. A minimum of 16 inches of fish mix backfill will be placed on top of any areas below the high tide line.
- There will be no long-term effects of the project as the pipe will be replacing an existing outfall which will be decommissioned once the new one is completed, there will be no new effluent discharging into the Guemes Channel. The project will improve the dilution factor of the outfall.
- No increase in impervious surface will be created.

9.10 Coastal/Puget Sound Bull Trout Designated Critical Habitat

The proposed project **may affect** Coastal/Puget Sound bull trout critical habitat because nearshore critical habitat has been designated from MHHW to -10 m (-33 feet) MLLW within the aquatic portion of the action area.

The proposed project is **not likely to adversely affect** Coastal/Puget Sound bull trout designated nearshore critical habitat for the following reasons:

- Foraging habitat within the project area is poor due to lack of sufficient aquatic vegetation.
- There will be no shoreline impacts as shoreline is bare of riparian vegetation and will be backfilled to pre-existing grade. 6-18 inches of fish mix will be placed over shoreline armoring.
- Contaminated materials within the project footprint will be dredged in a manner to minimize resuspension or migration.
- Barges will not deploy their spuds in eelgrass beds found outside the outfall alignment.
- There will be no long-term change in the bed profile as clean sand will be imported as backfill within the excavation and pipe trench footprint. The project will provide long-term improvement through the removal of 2,350 CY of contaminated sediments from the project footprint. A minimum of 16 inches of fish mix backfill will be placed on top of any areas below the high tide line.
- There will be no long-term effects of the project as the pipe will be replacing an existing outfall which will be decommissioned once the new one is completed, there will be no new effluent discharging into the Guemes Channel. The project will improve the dilution factor of the outfall.

9.11 Essential Fish Habitat (EFH)

The Magnuson-Stevens Fishery Conservation and Management Act (MSA) includes a mandate that NMFS must identify Essential Fish Habitat (EFH) for federally-managed marine fish, and federal agencies must consult with NMFS on all activities, or proposed activities, authorized, funded, or undertaken by the agency that may adversely affect EFH (NMFS, 1996). The Pacific Fisheries Management Council (PFMC) has designated Essential Fish Habitat (EFH) for the Pacific Salmon Fishery, the Pacific Coast Groundfish Fishery, and the Coastal Pelagic Fishery (PFMC, 1998a; 1998b; 2014).

The EFH designation for groundfish is defined as the aquatic habitat necessary to allow for groundfish production to support a long-term sustainable fishery for groundfish and for groundfish contributions to a healthy ecosystem. The west coast groundfish management unit includes 83 species that typically live on or near the bottom of the ocean. Species groups include skates and sharks, rockfish (55 species), flatfish (12 species) and groundfish. Many groundfish species likely occur within the aquatic portion of the action area.

Coastal pelagic management unit includes schooling fishes that migrate in coastal waters. West coast pelagic species include the Pacific sardine (*Sardinops sagax*), Pacific chub (*Scomber japonicus*), northern anchovy (*Engraulis mordax*), jack mackerel (*Trachurus symmetricus*) and market squid (*Loligo opalescens*). While there is the potential for several pelagic species to be found within the aquatic portion of the action area, these species are primarily associated with open ocean and coastal areas.

All three salmon species included in the Pacific salmon management unit (Puget Sound Chinook salmon, coho salmon (*Oncorhynchus kisutch*), and pink salmon (*Oncorhynchus gorbuscha*)) may be present, but there is no documented spawning or rearing within the aquatic portion of the action area.

A detailed description of the proposed project can be found in Sections 4 and 5. The primary potential impacts to EFH are associated with installation of a combined sheet pile as well as dredging of sediment to allow for installation of the outfall pipe. No impact pile driving will be required and vibratory pile driving in the water will be extremely limited. Vibratory pile driving and extraction is generally not considered harmful to fish species, including those with designated EFH within the aquatic portion of the action area. Temporary increases in turbidity would remain within state water quality standards at a point of compliance 150 feet from project activities. Dredging would also be a temporary impact to EFH as clean sand will be imported to backfill within the dredge footprint to ensure that there will be no long-term change in the bed profile. No eelgrass and minimal macroalgae is present within the dredge footprint of the project. A detailed description of the project impacts can be found in Section 8.

The following conservation measures will be incorporated into the project at a minimum:

- The proposed in-water work window of August 1st -February 15th minimizes potential impacts to all listed fish species and forage species in accordance with approved authorized work window for saltwater areas within Tidal Reference Area 9 as referenced in WAC 220-660-330.
- Steel sheet piling used for shoring during the nearshore trench construction will be driven with a vibratory hammer, no impact driving will occur. Shoring will be placed in the dry during low tide as much as possible which will minimize the time underwater noise will be created.

- No containment structure will be utilized around the proposed dredging location. This will eliminate the potential resuspension and migration of contaminated materials during installation as well as potential scour created around the structure from the current.
- Contaminated material from the surface will be removed prior to any deeper dredging and from a wider footprint than required for trench construction to reduce sloughing of adjacent recent sediments into the deeper excavation and provide a buffer around the outfall line for future remediation.
- Vessel operation will be restricted to tidal elevations and limited safe propulsion adequate to prevent prop scour or disturbance of contaminated sediments.
- Barges will not deploy their spuds in eelgrass beds found outside the outfall alignment.
- Turbidity monitoring will be conducted throughout construction in accordance with Section 401 Water Quality Certification.
- Erosion control BMPs such as silt fence will be utilized to prevent any inadvertent runoff to the Guemes Channel in accordance with the TESC plans.
- Comprehensive erosion plans and a Spill Prevention, Control, and Countermeasures (SPCC) plan will be approved prior to construction that will outline measures to prevent contamination (i.e., from concrete and equipment fuel) during construction in accordance with the Stormwater Management Manual for Western Washington (Ecology, 2019). The plans will detail site stabilization, slope protection, drainage way protection, and sediment retention.
- Existing rain gardens which do not comply with Ecology standards will be removed during construction and new treatment facilities which meet the requirements in the Stormwater Management Manual for Western Washington (Ecology, 2019) will be constructed as replacements.
- Spill kits will be kept on site at all times.
- Refueling will be done at least 200 feet from surface waters.
- All equipment will be checked daily for leaks and any necessary repairs will be made prior to the commencement of work.
- The shoreline will be backfilled to pre-existing grade and clean ¾-inch minus crushed gravel will be imported as backfill within the nearshore where contaminated materials are removed. Backfill materials will contain no more than two percent fine material.
- Backfill placement will be conducted in a manner to prevent water quality impacts. If necessary, placement procedures will include lowering the bucket to within five feet of the sediment surface, modifying the material placement rate, and/or use of a tremie tube or similar.
- Dredged material will be placed on a barge immediately after removal for gravity dewatering or removal of ponded water by pumping. All water will be filtered through a filter medium.
- 6-18 inches of fish mix, a sand and round pea gravel mix at least 80 percent by weight between ⅛-inch and ¼-inch diameter, will be placed over shoreline armoring.

As a result of the conservation measures that will be incorporated, the proposed project **will not adversely affect** EFH for the Pacific Coast Groundfish Fishery, Coastal Pelagic Fishery, or Pacific salmon fishery.

10 References:

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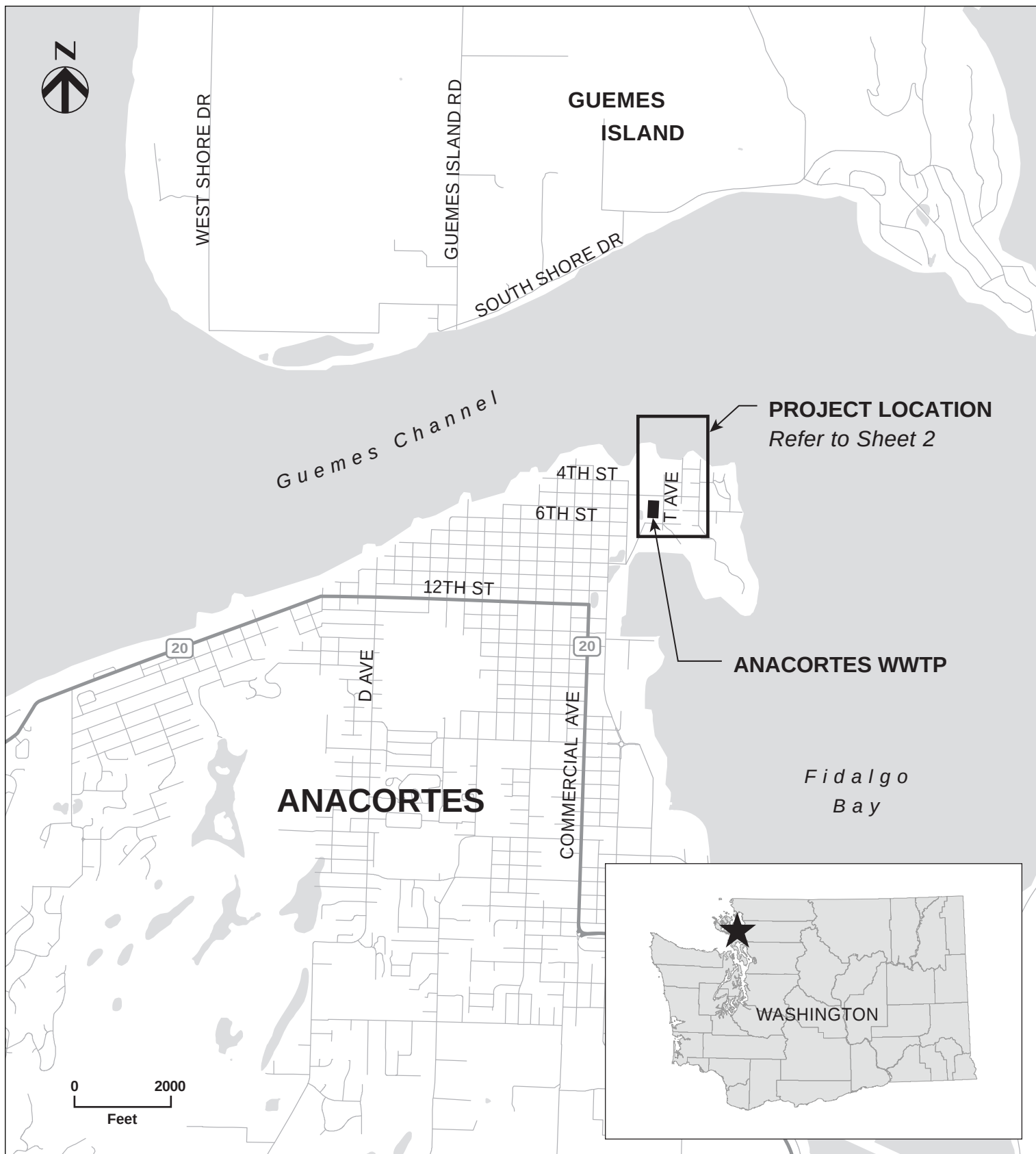
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Appendix A: Project Plans

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USACE REFERENCE #: NWS-2021-320

ADJACENT PROPERTIES: Port of Anacortes

DATE: 7/2/2021

APPLICANT: City of Anacortes

IN: Guemes Channel

FIGURE: Sheet 1 of 6

PROJECT LOCATION: 500 T Ave, Anacortes, WA 98221

AT: Anacortes WA

CREATED BY: HDR Engineering,
Cosmopolitan
Engineering

LAT/LONG: 48.518373, -122.607101

COUNTY: Skagit

PROPOSED PROJECT: City of Anacortes WWTP Outfall

STATE: Washington



USACE REFERENCE #: NWS-2021-320

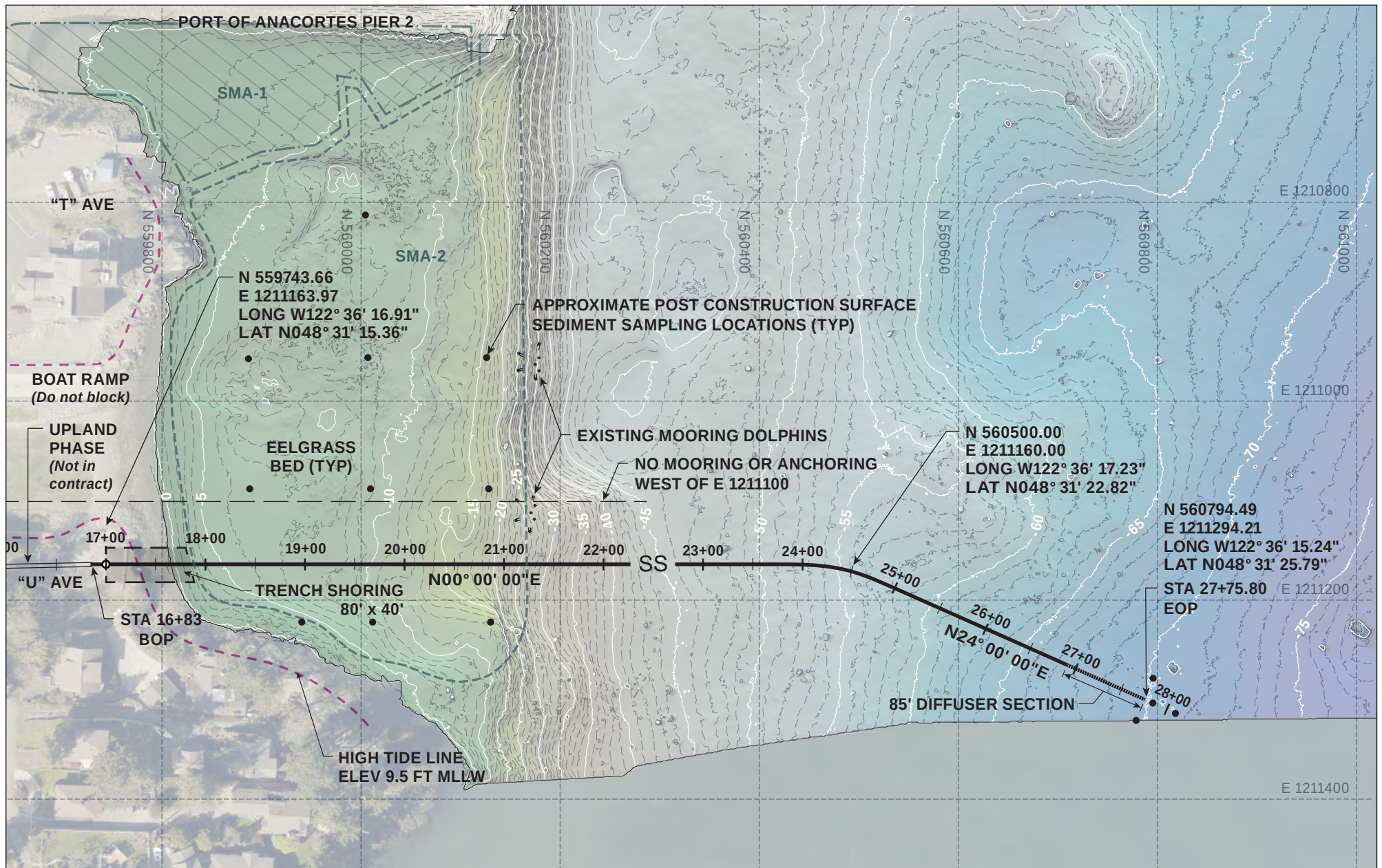
PLAN - SHEET 2 OF 6

APPLICANT: City of Anacortes

DATE: 7/2/2021

PROPOSED PROJECT: City of Anacortes WWTP Outfall

PROJECT LOCATION: 500 T Ave, Anacortes, WA 98221



USACE REFERENCE #: NWS-2021-320

APPLICANT: City of Anacortes

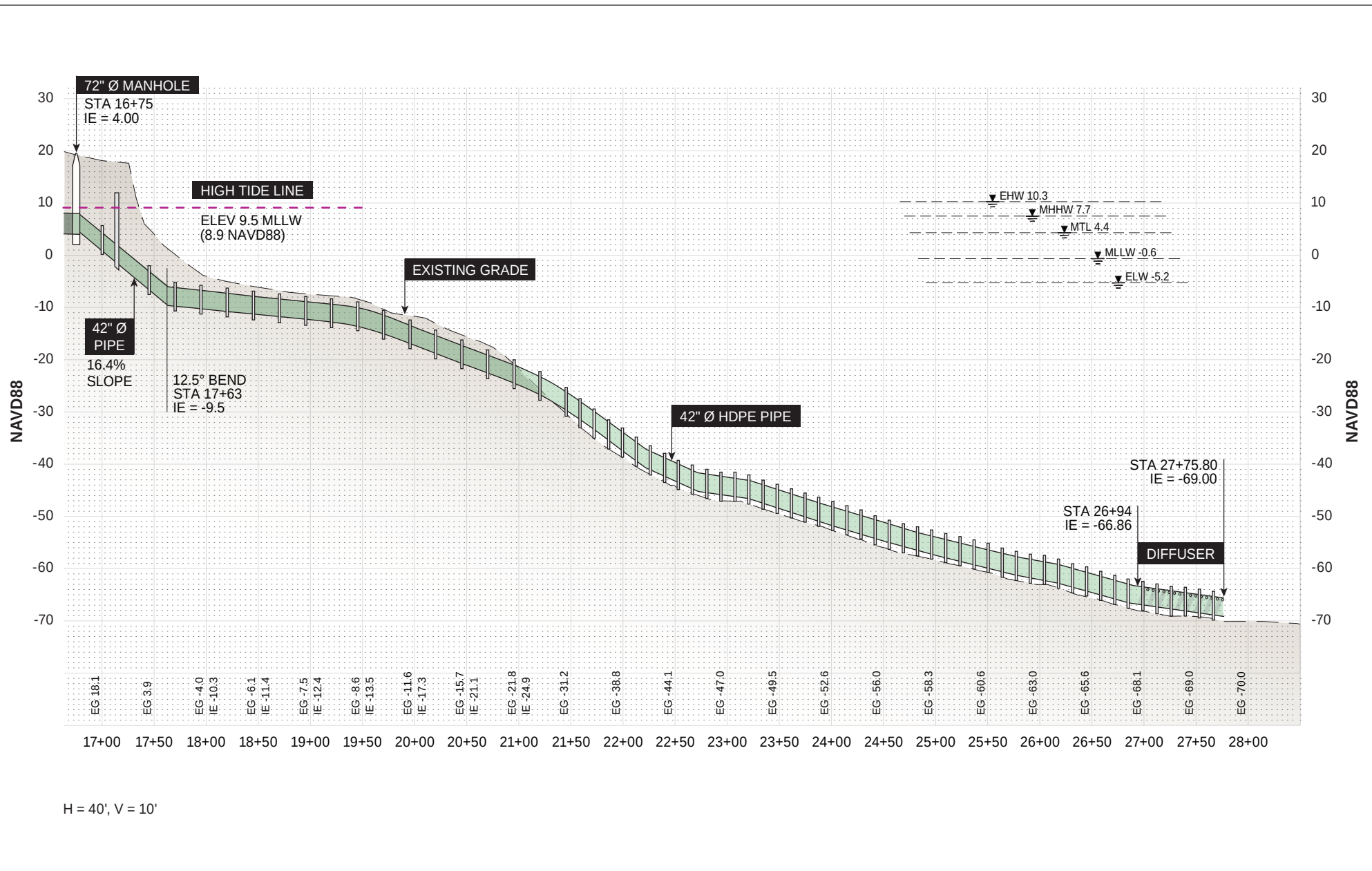
PROPOSED PROJECT: City of Anacortes WWTP Outfall

PROJECT LOCATION: 500 T Ave, Anacortes, WA 98221



PLAN - SHEET 3 OF 6

DATE: 7/2/2021



USACE REFERENCE #: NWS-2021-320

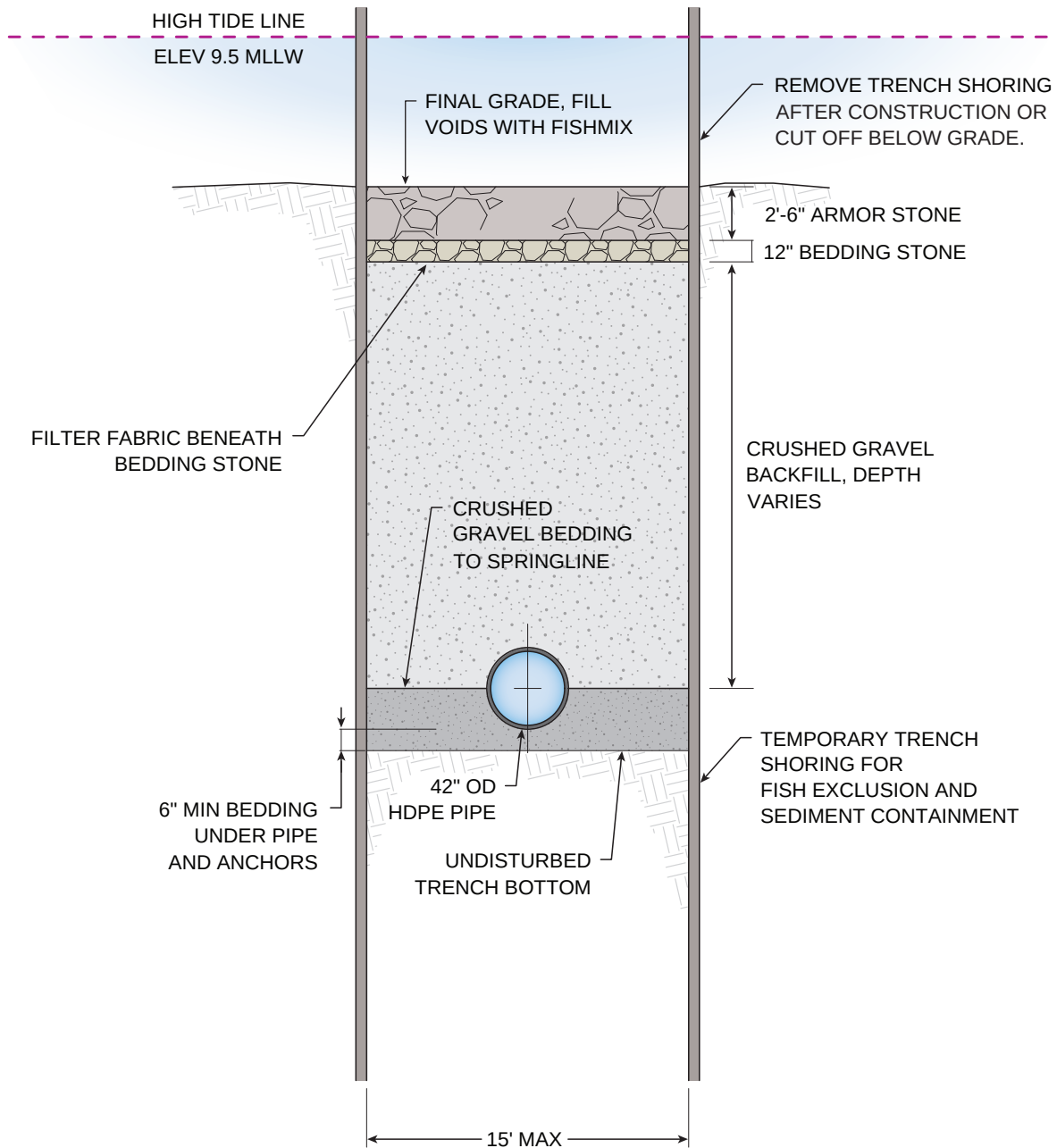
APPLICANT: City of Anacortes

PROPOSED PROJECT: City of Anacortes WWTP Outfall

PROJECT LOCATION: 500 T Ave, Anacortes, WA 98221

PLAN - SHEET 4 OF 6

DATE: 7/2/2021



SHORED SECTION

USACE REFERENCE #: NWS-2021-320

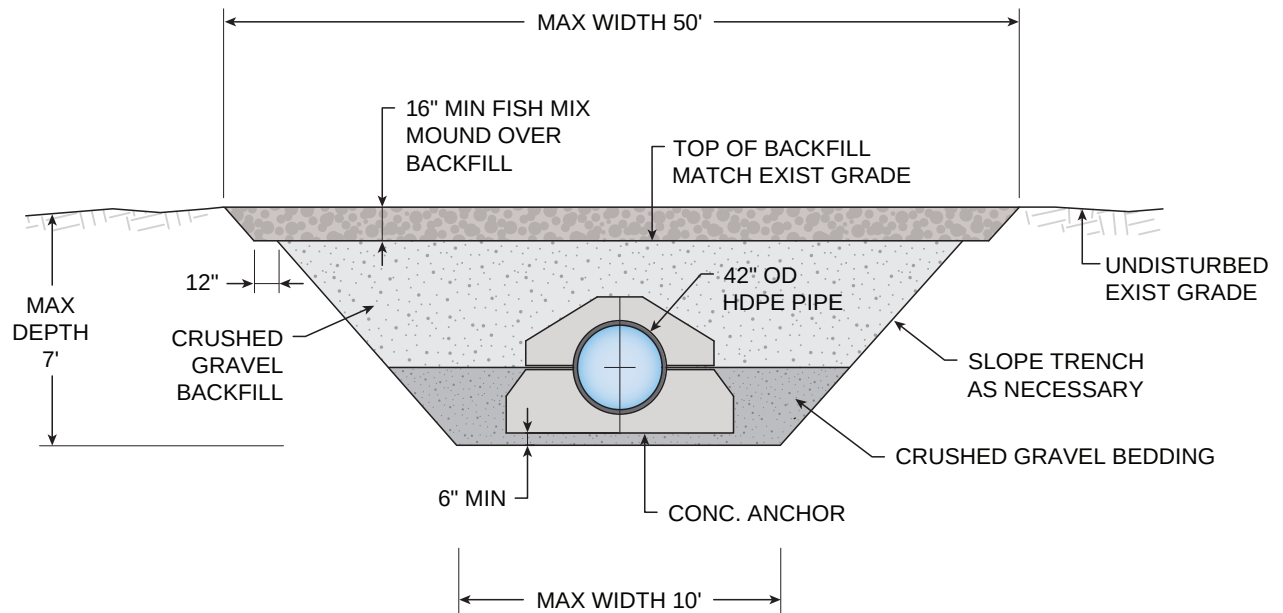
PLAN - SHEET 5 OF 6

APPLICANT: City of Anacortes

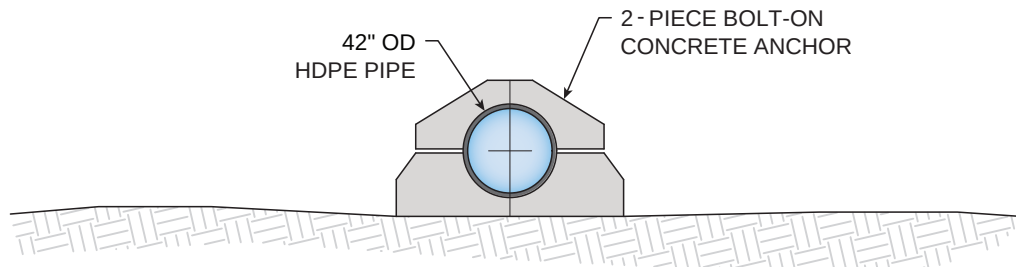
DATE: 7/2/2021

PROPOSED PROJECT: City of Anacortes WWTP Outfall

PROJECT LOCATION: 500 T Ave, Anacortes, WA 98221



BURIED SECTION



BOTTOM LAY SECTION

USACE REFERENCE #: NWS-2021-320

PLAN - SHEET 6 OF 6

APPLICANT: City of Anacortes

DATE: 7/2/2021

PROPOSED PROJECT: City of Anacortes WWTP Outfall

PROJECT LOCATION: 500 T Ave, Anacortes, WA 98221

Appendix B: Noise Analysis

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Noise Calculations:

The following calculations and values are based on information and guidance from the Biological Assessment Preparation Manual Chapter 7 updated August 2020 – Construction Noise Impact Assessment; prepared by the Washington State Department of Transportation and Technical Guidance for Assessment and Mitigation of Hydroacoustic Effects on Pile Driving on Fish, November 2015 by the California Department of Transportation.

Terrestrial Noise Attenuation:

For terrestrial animals, sound is measured in dBA, or A-weighted, this deemphasizes the upper and lower portions of the frequency spectrum, while emphasizing the middle portion of the spectrum (where humans have the greatest sensitivity).

Construction Noise: 105 dBA

The following is a list of equipment that may be used on this project and the maximum noise level that each can produce at 50 feet: vibratory pile driver (105 dBA), excavator (87 dBA), and dump truck (91 dBA). Using the law of decibel addition for the three loudest pieces of equipment that may be operating at any one time, construction noise generated at the project location could be up to 105 dBA (WSDOT, 2020). Controlled rock blasting will occur on the upland portion of the pipe placement; however, noise level will not exceed background levels as protective measures such as mats and suppression techniques will be used. The blasting will occur in the upland residential area of the project and will not affect the aquatic action area.

Background Noise Level: 60 dBA

As the project area is in an industrialized shoreline setting with frequent boat and vehicle traffic and port equipment operation, the background noise level is conservatively estimated at 60 dBA. (WSDOT, 2020)

Terrestrial Noise Attenuation Distance over land and water

Background noise is estimated at 60 dBA. The equation for attenuation distance is $D = D_0 * 10((\text{Construction Noise} - \text{background in dBA})/\alpha)$, where D_0 = distance original sound levels were measured (commonly 50 feet) and α = is 20 for “hard” site, point source.

$$D = D_0 * 10((\text{Construction Noise} - \text{Ambient Noise in dBA})/\alpha)$$

$$D = 50 * 10((105-60)/20)$$

$$D = 50 * 10(45/20)$$

$$D = 50 * 10(2.25)$$

$$D = 50 * 177.82$$

$$D = 8,891 \text{ feet}$$

Therefore, at approximately 8,891 feet or 1.68 miles from the project area, peak noise would attenuate to the background level. This is a conservative estimate south of the site as there are areas that have more soft than hard site characteristics (WSDOT, 2020).

Aquatic Noise Attenuation:

Underwater noise is most commonly measured as instantaneous peak sound pressure level (dBPEAK) or as the Root Mean Square (dBRMS) pressure level during an impulse. The peak pressure is the instantaneous maximum overpressure or underpressure observed during each pulse and can be presented in Pascals (Pa) or SPL in decibels (dB) referenced to a pressure of 1 micropascal (dB re: 1 μ Pa). The RMS level is the square root of the energy divided by the impulse duration. This level is the mean square pressure level of the pulse. It is used by the NMFS to describe disturbance-related effects to aquatic organisms from underwater

impulse-type noises. When evaluating potential injury impacts to fish, peak sound pressure (dBPEAK) is often used (WSDOT, 2020).

Aquatic Construction Noise: 162 dBRMS

A 162 dBRMS sound level is estimated 10 meters from a steel sheet, as the proposed piles are 24-inch-wide steel sheets needed for shoring and will be installed with a vibratory pile driver (Caltrans, 2015). The majority will be driven during low tide, but approximately 10 feet of shoring on either side of the trench construction (approximately 10 sheet piles) near MLLW are estimated to be in water during installation.

Background Noise Level: 122 dB

WSDOT has determined the background aquatic noise level for multiple functional hearing groups within the vicinity of the Anacortes Ferry Terminal. The broadband background (1Hz to 20kHz) is utilized for fish and marbled murrelet. In the project vicinity, the broadband background is expected to be approximately 122 dB during daytime hours (WSDOT, 2020).

Practical Spreading Loss Model

The Practical Spreading Loss Model is used to determine the extent of project-related underwater noise.

$$TL = 15\log(R1/R2)$$

TL = amount of spreading loss, or the difference between the source sound level and the ambient sound level at some distance

R1 = the distance where noise attenuates to ambient levels and/or disturbance/injury thresholds

R2 = the distance from the source of the initial sound measurement

The distance at which the source sound level attenuates to the background noise can be calculated by rearranging the terms.

$$R1 = R2 \cdot 10^{(TL/15)}$$

This formula can then be used to determine where the construction noise will attenuate to background noise. (WSDOT 2020)

Vibratory Pile Driving (162 dBRMS)

Vibratory pile driving of 24-inch AZ steel sheet results in levels of approximately 162 dBRMS (Caltrans, 2020).

$$R1 = R2 \cdot 10^{(TL/15)}$$

$$R1 = R2 \cdot 10^{((162-122)/15)}$$

$$R1 = 10 \cdot 10^{(2.67)}$$

$$R1 = 10 \cdot 467.7$$

$$R1 = 4,677 \text{ meters}$$

$$15,344 \text{ feet or } 2.90 \text{ miles}$$

Construction noise will therefore attenuate to background levels of 122 dB at 2.60 miles (15,344 feet) from vibratory pile driving installation of 24-inch-wide steel sheet piles.

Vibratory Hammering Behavioral Effect Extents on Marine Mammals

Aquatic Construction Noise: 162 dB_{RMS}

A 162 dB_{RMS} sound level is estimated 10 meters from a steel sheet, as the proposed piles are 24-inch-wide steel sheets and will be installed with a vibratory pile driver (Caltrans, 2015).

Potential Effect Threshold: 120 dB_{RMS}

As opposed to determining a background aquatic noise level within the project area, a threshold of 120 dB_{RMS} is used for whales in accordance with NMFS guidance for vibratory pile driving disturbance. (WSDOT, 2020).

Practical Spreading Loss Model

The Practical Spreading Loss Model is used to determine the extent of project-related underwater noise

$$TL = 15\log(R1/R2)$$

TL = amount of spreading loss, or the difference between the source sound level and the ambient sound level at some distance

R1 = the distance where noise attenuates to ambient levels and/or disturbance/injury thresholds

R2 = the distance from the source of the initial sound measurement

The distance at which the source sound level attenuates to the background noise can be calculated by rearranging the terms.

$$R1 = R2 * 10^{(TL/15)}$$

This formula can then be used to determine where the construction noise will attenuate to background noise.

Vibratory Pile Driving (162 dB_{RMS})

Vibratory pile driving of 24-inch steel sheet piles results in levels of approximately 162 dB_{RMS} (WSDOT).

$$R1 = R2 * 10^{(TL/15)}$$

$$R1 = R2 * 10^{((162-120)/15)}$$

$$R1 = 10 * 10^{(2.8)}$$

$$R1 = 10 * 631$$

$$R1 = 6,310 \text{ meters}$$

$$20,702 \text{ feet or } 3.92 \text{ miles}$$

Construction noise will therefore reach the threshold of 120 dB_{RMS} for whales at 3.92 miles (20,702 feet) from vibratory pile driving installation.

REFERENCES

Caltrans (California Department of Transportation). 2020. Technical Guidance for the Assessment of Hydroacoustic Effects of Pile Driving on Fish. <https://dot.ca.gov/-/media/dot-media/programs/environmental-analysis/documents/env/hydroacoustic-manual.pdf>

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A.1: Vibratory Pile Driving (STATIONARY SOURCE: Non-Impulsive, Continuous)						
VERSION 2.1: 2020						
KEY						
Action Proponent Provided Information						
NMFS Provided Information (Technical Guidance)						
Resultant Isopleth						
STEP 1: GENERAL PROJECT INFORMATION						
PROJECT TITLE	Anacortes WWTP Outfall Relocation					
PROJECT/SOURCE INFORMATION	24-inch steel sheetpiles vibratory pile driving Data from CalTrans - October 2020, Table I.2-1d, Port of Oakland					
Please include any assumptions						
PROJECT CONTACT						
STEP 2: WEIGHTING FACTOR ADJUSTMENT						
Weighting Factor Adjustment (kHz)*	2.5	Specify if relying on source-specific WFA, alternative weighting/dB adjustment, or if using default value Blackwell 2005; Dahl et al. 2015				
* Broadband: 95% frequency contour percentile (kHz) OR Narrowband: frequency (kHz); For appropriate default WFA: See INTRODUCTION tab		† If a user relies on alternative weighting/dB adjustment rather than relying upon the WFA (source-specific or default), they may override the Adjustment (dB) (row 48), and enter the new value directly. However, they must provide additional support and documentation supporting this modification.				
STEP 3: SOURCE-SPECIFIC INFORMATION						
Sound Pressure Level (L_{rms}), specified at "x" meters (Cell B30)	162					
Number of piles within 24-h period	10					
Duration to drive a single pile (minutes)	30					
Duration of Sound Production within 24-h period (seconds)	18000					
10 Log (duration of sound production)	42.55					
Transmission loss coefficient	9.3					
Distance of sound pressure level (L_{rms}) measurement (meters)	10					
NOTE: The User Spreadsheet tool provides a means to estimate distances associated with the Technical Guidance's PTS onset thresholds. Mitigation and monitoring requirements associated with a Marine Mammal Protection Act (MMPA) authorization or an Endangered Species Act (ESA) consultation or permit are independent management decisions made in the context of the proposed activity and comprehensive effects analysis, and are beyond the scope of the Technical Guidance and the User Spreadsheet tool.						
RESULTANT ISOPLETHS						
	Hearing Group	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
	SEL _{cum} Threshold	199	198	173	201	219
	PTS isopleth to threshold (meters)	39.1	0.8	73.4	17.5	0.2
WEIGHTING FUNCTION CALCULATIONS						
	Weighting Function Parameters	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
	a	1	1.6	1.8	1	2
	b	2	2	2	2	2
	f ₁	0.2	8.8	12	1.9	0.94
	f ₂	19	110	140	30	25
	C	0.13	1.2	1.36	0.75	0.64
	Adjustment (-dB)†	-0.05	-16.83	-23.50	-1.29	-0.60
$W(f) = C + 10 \log_{10} \left\{ \frac{(f/f_1)^{2a}}{[1 + (f/f_1)^2]^a [1 + (f/f_2)^2]^b} \right\}$						
NOTE: If user decided to override these Adjustments, they need to make sure to download another copy of the User Spreadsheet tool to ensure the built-in calculations function properly.						

Appendix C: USFWS IPaC List

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United States Department of the Interior

FISH AND WILDLIFE SERVICE

Washington Fish And Wildlife Office

510 Desmond Drive Se, Suite 102

Lacey, WA 98503-1263

Phone: (360) 753-9440 Fax: (360) 753-9405

<http://www.fws.gov/wafwo/>



In Reply Refer To:

February 12, 2021

Consultation Code: 01EWF00-2021-SLI-0639

Event Code: 01EWF00-2021-E-01234

Project Name: Anacortes Wastewater Treatment Plant Outfall Relocation

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, and proposed species, designated and proposed critical habitat, and candidate species that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. The species list is currently compiled at the county level. Additional information is available from the Washington Department of Fish and Wildlife, Priority Habitats and Species website: <http://wdfw.wa.gov/mapping/phs/> or at our office website: http://www.fws.gov/wafwo/species_new.html. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 et seq.), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether or not the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species, and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

<http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF>

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 et seq.). You may visit our website at <http://www.fws.gov/pacific/eagle/for> information on disturbance or take of the species and information on how to get a permit and what current guidelines and regulations are. Some projects affecting these species may require development of an eagle conservation plan: (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (<http://www.fws.gov/windenergy/>) for minimizing impacts to migratory birds and bats.

Also be aware that all marine mammals are protected under the Marine Mammal Protection Act (MMPA). The MMPA prohibits, with certain exceptions, the "take" of marine mammals in U.S. waters and by U.S. citizens on the high seas. The importation of marine mammals and marine mammal products into the U.S. is also prohibited. More information can be found on the MMPA website: <http://www.nmfs.noaa.gov/pr/laws/mmpa/>.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Related website:

National Marine Fisheries Service: http://www.nwr.noaa.gov/protected_species/species_list/species_lists.html

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Washington Fish And Wildlife Office

510 Desmond Drive Se, Suite 102

Lacey, WA 98503-1263

(360) 753-9440

Project Summary

Consultation Code: 01EWF00-2021-SLI-0639

Event Code: 01EWF00-2021-E-01234

Project Name: Anacortes Wastewater Treatment Plant Outfall Relocation

Project Type: WASTEWATER PIPELINE

Project Description: Relocation of an existing outfall pipe for the Anacortes Wastewater Treatment Plant to the west of Pier 2 of the Port of Anacortes.

Project Location:

Approximate location of the project can be viewed in Google Maps: <https://www.google.com/maps/@48.5209335,-122.59559869713924,14z>



Counties: Skagit County, Washington

Endangered Species Act Species

There is a total of 7 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries¹, as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

1. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME	STATUS
Gray Wolf <i>Canis lupus</i> Population: Western Distinct Population Segment No critical habitat has been designated for this species.	Proposed Endangered

Birds

NAME	STATUS
Marbled Murrelet <i>Brachyramphus marmoratus</i> Population: U.S.A. (CA, OR, WA) There is final critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/4467	Threatened
Streaked Horned Lark <i>Eremophila alpestris strigata</i> There is final critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/7268	Threatened
Yellow-billed Cuckoo <i>Coccyzus americanus</i> Population: Western U.S. DPS There is proposed critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/3911	Threatened

Fishes

NAME	STATUS
Bull Trout <i>Salvelinus confluentus</i> Population: U.S.A., conterminous, lower 48 states There is final critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/8212	Threatened
Dolly Varden <i>Salvelinus malma</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1008	Proposed Similarity of Appearance (Threatened)

Flowering Plants

NAME	STATUS
Golden Paintbrush <i>Castilleja levisecta</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/7706	Threatened

Critical habitats

There is 1 critical habitat wholly or partially within your project area under this office's jurisdiction.

NAME	STATUS
Bull Trout <i>Salvelinus confluentus</i> https://ecos.fws.gov/ecp/species/8212#crithab	Final

Appendix D: Bull Trout Critical Habitat Assessment

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ASSESSMENT OF IMPACTS TO CRITICAL HABITAT FOR
Coastal/Puget Sound Bull Trout
Designation Effective: November 17, 2010

Primary Constituent Elements
From 50 CFR Part 17, 70 FR 562212-311

The primary constituent elements determined essential to the conservation of bull trout (*Salvelinus confluentus*) are:

(1) Springs, seeps, groundwater sources, and subsurface water connectivity (hyporheic flows) to contribute to water quality and quantity and provide thermal refugia.

Existing Conditions: Not Applicable as the project will take place in marine waters.

Effects to PCE: N/A

(2) Migratory habitats with minimal physical, biological, or water quality impediments between spawning, rearing, overwintering, and freshwater and marine foraging habitats, including, but not limited to permanent, partial, intermittent, or seasonal barriers.

Existing Conditions: There are no physical barriers within the Guemes Channel, documented contamination in areas within the aquatic portion of the action area may impede bull trout migration.

Effects to PCE: The proposed project will not adversely affect this PCE. A small area of nearshore habitat will temporarily be disturbed by excavation and steel sheet pile shoring and a portion of offshore will temporarily be disturbed while the pipe is being placed on the seabed. Foraging habitat within the project area is poor and the bull trout will most likely not forage in this area. There will be no long-term effects to this PCE. The proposed project will not contribute to contamination in the Guemes Channel more than is permitted in the NPDES, as this project is replacing and relocating an existing outfall which will be decommissioned. The new outfall will create a more effective mixing zone by moving the discharge point further into the Guemes Channel to deeper water with a mild bottom slope suitable for placing the diffuser (Cosmopolitan Marine Engineering, 2021).

(3) An abundant food base, including terrestrial organisms of riparian origin, aquatic macroinvertebrates, and forage fish.

Existing Conditions: There is little available information on the abundance of the bull trout food base within the Guemes Channel. However, the decrease in populations of other salmonids within the Puget Sound has significantly reduced the aquatic food base of bull trout in this system. Forage fish spawning areas that are targeted by bull trout are located within the action area in general but are not located within the area of potential local impacts.

Effects to PCE: The proposed project will not adversely affect this PCE. The proposed timing of the project will result in a lack of juvenile salmonids, which are a common prey item of bull trout. There will also be no impacts to any forage fish spawning areas that are targeted by migrating bull trout in nearshore marine waters. The project area provides poor foraging habitat in general, and the minimal loss of habitat during in-water work will be temporary in nature.

(4) Complex river, stream, lake, reservoir, and marine shoreline aquatic environments and processes with features such as large wood, side channels, pools, undercut banks and substrates, to provide a variety of depths, gradients, velocities, and structure.

Existing Conditions: In general, there is a lack of complex marine shoreline features within the project area. The existing shoreline is dominated by small rock and sediment, due to previous contaminants hazmat clean up this portion of the shoreline has received restoration efforts however habitat is limited. There is some variety of depth within the project area, but the bed profile will not be impacted long-term.

Effects to PCE: The proposed project will not adversely affect this PCE as no existing habitat structures will be permanently impacted. There will be a temporary minor change in the bed profile during excavation for placement of pipe into the trench however materials will be backfilled to preexisting grade.

(5) Water temperatures ranging from 2 to 15 °C (36 to 59 °F), with adequate thermal refugia available for temperatures at the upper end of this range. Specific temperatures within this range will vary depending on bull trout life-history stage and form; geography; elevation; diurnal and seasonal variation: shade, such as that provided by riparian habitat; and local groundwater influence.

Existing Conditions: This PCE is met within the Guemes Channel.

Effects to PCE: The proposed project will have no negative effect on this PCE. There will be no change in water temperature as a result of this project.

(6) Substrates of sufficient amount, size, and composition to ensure success of egg and embryo overwinter survival, fry emergence, and young-of-the-year and juvenile survival. A minimal amount (e.g., less than 12 percent) of fine substrate less than 0.85 mm (0.03 in.) in diameter and minimal embeddedness of these fines in larger substrates are characteristic of these conditions.

Existing Conditions: Not applicable as the project will take place in the marine water.

Effects to PCE: N/A

(7) A natural hydrograph, including peak, high, low, and base flows within historic and seasonal ranges or, if flows are controlled, they minimize departures from a natural hydrograph.

Existing Conditions: Not Applicable as the project will take place in marine waters.

Effects to PCE: N/A

(8) Sufficient water quality and quantity such that normal reproduction, growth, and survival are not inhibited.

Existing Conditions: This PCE is not met within the aquatic portion of the action area due to areas of documented contamination. The entire width of the Guemes Channel just west of the project area is 303(d) listed for 2,3,7,8-TCDD (Dioxin). This area is within the aquatic portion of the action area.

Effects to PCE: This PCE will not be adversely affected by the proposed project. While there may be short-term impacts to water quality due to potential increases in turbidity during in-water work, turbidity is expected to remain within state water quality standards.

(9) *Few or no nonnative predatory (e.g., lake trout, walleye, northern pike, smallmouth bass; inbreeding (e.g., brook trout); or competitive (e.g., brown trout) species present.*

Existing Conditions: Not applicable as these non-native predatory fish and species with the potential for inbreeding and competition are found in freshwater only.

Effects to PCE: N/A

Determination of Effect:

The proposed project **may affect** Coastal/Puget Sound bull trout critical habitat because nearshore critical habitat has been designated from MHHW to -10 m (-33 ft) MLLW within the aquatic portion of the action area.

The proposed project is **not likely to adversely affect** Coastal/Puget Sound bull trout designated nearshore critical habitat for the following reasons:

- Foraging habitat within the project area is poor due to lack of sufficient aquatic vegetation.
- There will be no shoreline impacts as the shoreline consists completely of small rock and sediment.
- There will be no long-term change in the bed profile as clean gravel will be imported as backfill within the excavation and trench footprint.
- There will be no long-term adverse effects of the project as the pipe will be replacing an existing outfall, the existing outfall will be decommissioned. The new outfall will create a more effective mixing zone.

Conservation Measures:

The following conservation measures will be incorporated into the project at a minimum:

- All in-water work will occur within the USACE in-water work window of August 1st – February 15th to minimize impacts to potential prey species, especially salmonids
- Temporary steel sheet pile shoring will be constructed around the pipe along the nearshore. This will occur starting above MHHW and continue to just below MLLW. No impact pile driving will be used for the construction of the temporary steel sheet pile shoring.
- BMPs will be utilized to prevent any inadvertent runoff to the Guemes Channel.
- A Spill Prevention, Control, and Countermeasures (SPCC) plan will be approved prior to construction that will outline measures to prevent contamination (i.e., from concrete and equipment fuel) during construction.
- Vessel operation will be restricted to tidal elevations and limited safe propulsion adequate to prevent prop scour or disturbance of contaminated sediments.
- Barges will not deploy their spuds in eelgrass beds found outside the outfall alignment.
- Contaminated material from the surface will be removed prior to any deeper dredging and from a wider footprint than required for trench construction to reduce sloughing of adjacent recent sediments into the deeper excavation.

- Spill kits will be kept on site at all times.
- Refueling will be done at least 200 feet from surface water.
- All equipment will be checked daily for leaks and any necessary repairs will be made prior to the commencement of work.
- All waste materials, including excavated sediment, will be fully contained, and disposed of in accordance with federal, state, and local laws.
- Turbidity monitoring will be conducted throughout construction in accordance with Section 401 Water Quality Certification.
- The shoreline will be backfilled to pre-existing grade and clean ¾-inch minus crushed gravel will be imported as backfill within the nearshore where contaminated materials are removed. Backfill materials will contain no more than two percent fine material.
- Backfill placement will be conducted in a manner to prevent water quality impacts. If necessary, placement procedures will include lowering the bucket to within five feet of the sediment surface, modifying the material placement rate, and/or use of a tremie tube or similar.
- Dredged material will be placed on a barge immediately after removal for gravity dewatering or removal of ponded water by pumping. All water will be filtered through a filter medium.
- 6- 18 inches of fish mix, a sand and round pea gravel mix at least 80 percent by weight between ⅛-inch and ¼-inch diameter, will be placed over shoreline armoring.

Tess Cooper
City of Anacortes Planning,
Community & Economic Development
PO Box 547
Anacortes, WA 98221

April 26, 2021

City of Anacortes
*Planning, Community &
Economic Development*

Date Received:

9/17/21

Shoreline and Critical Areas Review
Wastewater Treatment Plant Outfall Relocation

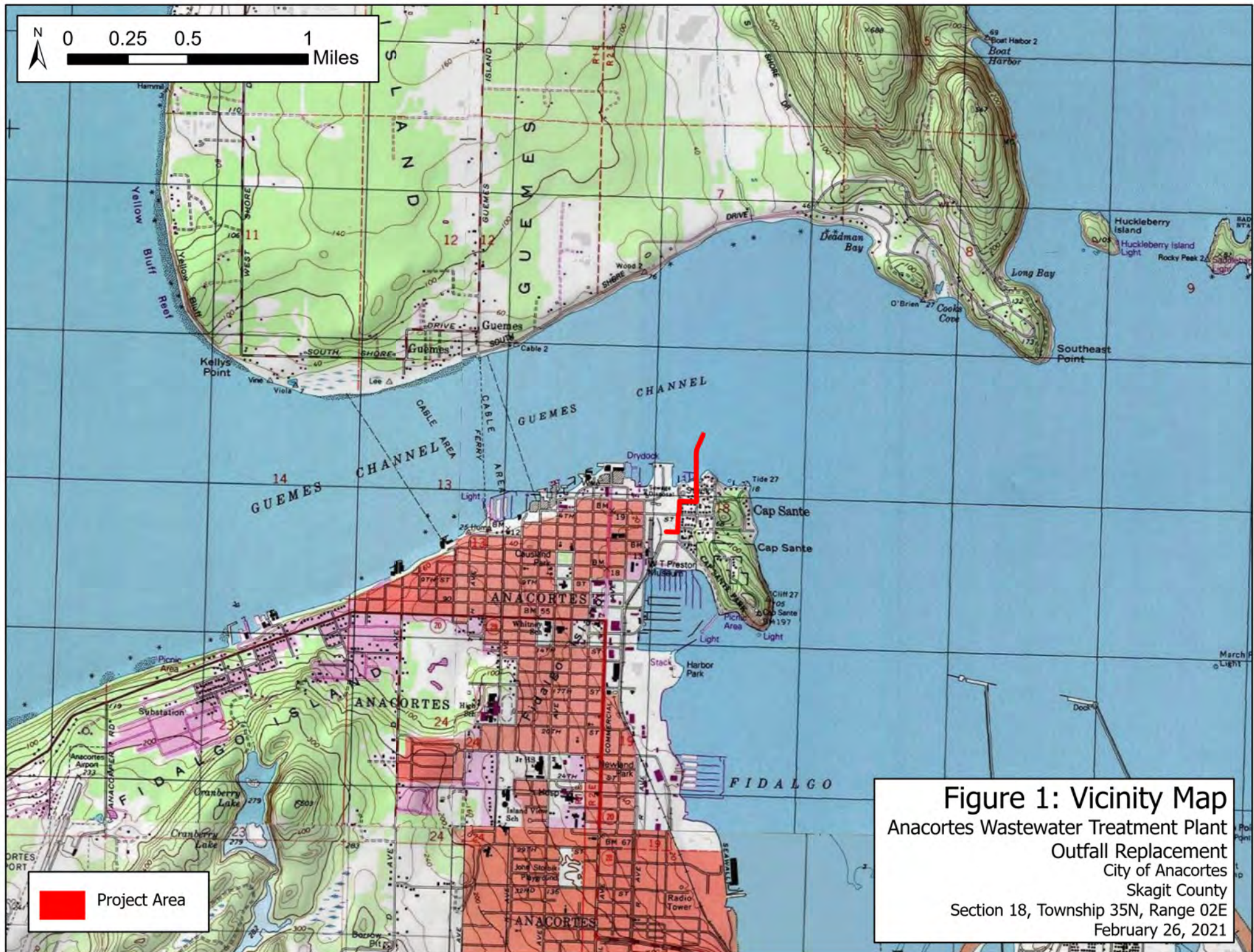
This letter has been prepared in order to provide information regarding shoreline and critical areas within the project area of the proposed wastewater treatment plant outfall as well as proposed minimization measures in order to avoid impacts to these resources and comply with the City of Anacortes Shoreline Master Program and critical areas code.

Project Description

The City will construct a new WWTP outfall extending north from the WWTP located at T Avenue north to 3rd Street where it will turn west and then follow U Avenue north into the Guemes Channel. The new outfall will flow in into deeper waters further from the shoreline and be able to convey larger volumes to prevent future wet weather-related overflow events. The City is proposing this upgrade to reduce future environmental and health hazards related to the aging infrastructure. The overall design of this project is to provide a better mixing zone for aquatic health, and to prevent further overflow events to comply with the City's 2017 municipal NPDES permit (Permit # WA0020257). The project is also anticipated to remove 2,350 cubic yards (CY) of contaminated material from the marine environment during dredging.

The proposed outfall pipe will be a 48-inch diameter high-density polyethylene (HDPE) pipe coming from the WWTP for 1,631 feet until the shoreline where the pipe will reduce to 42-inch outside diameter HDPE pipe for 1,030 feet with an 86-foot diffuser angled to the NW at approximately 24.5 degrees to better match the bidirectional current. The total length of the pipe will be 2,748 feet from the WWTP continuing into the Guemes Channel. The bend in the marine portion of the pipe begins at a depth of -55 feet (MLLW) and will continue in this direction for the remainder of the pipe and diffuser until a depth of -69 feet (MLLW). The diffuser is 86 feet long with 20 ports in total, each 4.5 feet apart. The terminal port is 7 inches in diameter, ports #2-16 are 4.75 inches in diameter and ports #17-20 are 4.625 inches in diameter. The bathymetry of this location shows steady slope which would be ideal for a portion of the outfall and diffuser to be constructed and anchored to the seabed. Approximately 380 feet of the pipe in the nearshore to a depth of 30 feet below MLLW will be buried and the remaining 650 feet will be submerged and anchored to the seabed. Aspects of the local climate including currents, prevailing winds, river outflow, and seasonal changes have all been accounted for in determining the best possible site location as well as depth.

The project area is within existing right-of-way surrounded by highly developed properties, primarily residential and industrial. It is within the City of Anacortes, Skagit County, Washington and in watershed HUC 17110002. The project area is in Section 18 of Township 35 North, Range 2 East. See Figure 1.



The existing WWTP outfall was damaged during a large rain event which occurred in February 2020. Due to obstacles around and above the old outfall line, an in-place repair will not be pursued by the City and an alternative analysis was prepared to determine the most favorable alignment (HDR 2020). With FEMA funding, the City will pursue an Alternative Procedures Project Authorization (APPA) which will construct a new outfall east of the current outfall and extending north from the shoreline. The alignment of the proposed outfall in relation to the existing damaged outfall is shown on Figure 2.

Construction Schedule and Methods

Prior to construction, a containment cell will be placed, using at most a vibratory pile driver around the outline of the outfall alignment into the Guemes Channel to isolate the in-water work area. Shown in the drawings in Appendix A, a containment cell will be placed starting from approximately station 17+50 extending as far as possible into the cove before reaching high currents from the channel. The cell will be approximately 40 feet apart (20 feet on either side of the pipe) to allow for a barge with a long reach excavator to work inside. Fish screening will be completed using large fish nets and dragging them through the containment cell three consecutive times. This will encourage fish to leave the work area before a silt turbidity curtain will be placed around the end of the cell to prevent elevated turbidity levels from leaving the work zone. An enclosed clam shell bucket at the end of the excavator will also be used to remove sediment to limit dredged material loss and reduce turbidity.

The nearshore portion from above MHHW out to MLLW will be constructed from shore using an excavator. This zone currently consists of a near-vertical revetment facing the waterway at the end of U Ave. The trench will be excavated from the top of the embankment, primarily in the dry during low tides except for the deeper lower portion below mid-tide. Materials excavated will be removed from the site and disposed of at an approved upland facility. At the completion of construction, the embankment will be restored with gravel to the pre-existing slope.

The buried section from MLLW to -30 ft MLLW will be excavated from a barge mounted crane with clamshell dredge to accommodate 360 ft portion of pipe to be laid in the trench. These excavations will be conducted during tidal inundation. Sediments will be tested for compliance with chemical and biological criteria. Sediments will be removed and disposed of at approved upland facility. Imported backfill material will be clean $\frac{3}{4}$ -inch minus clean crushed gravel. A minimum of 12 inches of crushed gravel bedding will be placed from the bottom of the trench prior to the pipe placement. The length of pipe, until the exposed pipe, will be backfilled with crushed gravel with a minimum of 16 inches of fish mix backfill placed on top of any areas below the high tide line. Total backfill will be approximately 2,820 cubic yards. The buried pipeline will be placed in the excavated and bedded trench under the direction and control of divers and barge workers. The pipeline will be placed by cranes from shore and from an offshore crane barge.

The site overlaps Sediment Management Area 2 (SMA-2) where sediment containing site-related Indicator Hazardous Substances including Carcinogenic Polycyclic Aromatic Hydrocarbons exceeding Preliminary Cleanup Levels from the mudline to a depth of 1-foot. Materials excavated to a depth of 1-foot below the MHHW line will be removed and disposed of at an upland facility. Excavated slopes along the steep embankment will be backfilled with 12" of crushed gravel and covered with 2.5 feet of riprap covered with at least 18 inches of glacial till mix to the previously existing slope of 2:1. The project is anticipated to remove approximately 2,350 CY of contaminated material.

Figure 2



The remaining 650 feet of offshore pipe and diffuser will be placed using controlled submergence techniques staged from barges and tugs. The pipe will be joined and tested offsite with precast concrete anchors attached. The pipe string will be filled with air and towed to the site. Upon arrival, the pipe will be pressurized and tensioned at each end with cables. Water will be pumped into the pipe at the nearshore end with air evacuated at the offshore end. The controlled submergence is completed in a few hours on a single day. Certified divers using surface-supplied air will be used to support construction of the pipeline. Remaining bottom lay pipe will be secured with 2-piece bolt on concrete anchors. Divers will stage from the barge, and assist with pipe placement, pipe joining, and verification of the pipeline profile and condition before backfilling. Anticipated in-water construction equipment includes a floating crane barge, materials storage barge, dive barge/vessel, tugs, and work skiffs. See Appendix A for additional project details within the Guemes Channel.

It is anticipated that construction will commence in June of 2021 and be completed by the end of February 2022. All in-water work will occur between August 1, 2021 and February 15, 2022. This is the approved authorized work window for saltwater areas within Tidal Reference Area 9 as referenced in WAC 220-660-330. Work to be conducted in June is consistent with extreme low tides and no in-water work will be conducted during this time.

Stormwater Treatment

The project will meet the criteria to be considered an underground utility project which is listed as an exemption in chapter I-3.2 of the 2019 Stormwater Management Manual for Western Washington. The project is therefore not subject to treatment requirements for new or replaced pavement. The project will not create an increase in impervious surface, only replacement of surfaces with in-kind material or those with similar runoff characteristics. Existing rain gardens on T Avenue between 4th Street and 3rd Street which do not meet Ecology standards will be removed during construction. New treatment facilities which meet current standards will be constructed in a more appropriate location which meets the requirements in the Stormwater Management Manual for Western Washington.

Existing Conditions

There is extremely limited shoreline vegetation as the project area is heavily developed as it has been utilized as a port facility since 1926. The area to the east and project portion of the Guemes Channel is part of the Port of Anacortes and has high levels of shipping activity. The Pier is used for short term moorage for barges and vessels and is used for exporting dry goods. To the west and to the east is urban single family residential.

There is no existing shoreline vegetated habitat as the shoreline is commercial marine use. The shoreline contains typical weed grasses with mostly steep, rocky banks, foreign dumped debris, and sediment build from the current. The proposed pipe outfall will enter the marine waters of the Guemes Channel, where minimal aquatic vegetation and animals such as mussels and Dungeness crab (*Cancer magister*) are known to exist. As previously mentioned, the vicinity of the marine area is listed as an Ecology Toxics Cleanup site due to contamination from past historical uses along the waterfront. The current condition of the marine ecosystem contains minimal aquatic vegetation as there is no eelgrass in the vicinity, however there is presence of sea lettuce and microalgae. As the shore quickly descends, small shellfish such as mussels and crabs represent the species likely to be present. This area was previously disturbed during contamination cleanup and appears to have minimal species presence though some habitat restoration has occurred.

The Guemes Channel has been determined to be a fit receiving water for the outfall, due to the bidirectional current between the City of Anacortes and Guemes Island. One portion of the Guemes Channel to the west is a 303(d) listed by the Washington State Department of Ecology (ECY) for 2,3,7,8-TCDD (Dioxin). The path of the outfall does not intercept the 303(d) listed section.

Shoreline Jurisdiction

The City of Anacortes Shoreline Master Program designates the project area within 200 feet of the OHWM as Urban Maritime. The 200-foot shoreline area within the project footprint is shown on Figure 3. Work within the shoreline will include the construction of a trench for the installation of the outfall pipe and removal of small amounts of vegetation. The majority of the project footprint within the shoreline is paved, however, a total of five trees will be removed during construction, two 22-inch diameter at breast height (DBH) fir trees and three 18-inch DBH madrone along with some non-native shrub landscaping. One additional 16-inch DBH maple will be removed along U Avenue outside the shoreline jurisdiction. These trees provide no significant habitat value as they are part of existing landscaping. The location of the tree and shrubs to be removed are shown on the attached landscaping map. All areas will be restored to existing elevations following construction.

Critical Areas Present

Anacortes Municipal Code (AMC) 17.70.540 designates areas of fish and wildlife habitat conservation. This includes areas with which state and federal endangered, threatened, and sensitive species have primary association. Guemes Channel is documented habitat for several listed species identified by the US Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS). Effects to these species and their habitat are addressed in the Biological Evaluation and National Marine Fisheries Service Section 7 Programmatic compliance memo prepared for the project.

AMC 17.70.540 A(2) requires that state priority habitats and areas associated with state priority species be considered Fish and Wildlife Habitat Conservation Areas. Approximately 700 feet offshore, WDFW Priority Habitat and Species Map identifies the Guemes Canal as Dungeness crab habitat (WDFW 2021). See Figure 3. Approximately 400 feet of the proposed outfall is within this area. No dredging will occur in mapped Dungeness crab habitat, outfall pipe and the diffuser will be anchored to the seabed which will make approximately 1,600 square feet of seabed habitat inaccessible. As described below, discharge from the outfall is not anticipated to impact Dungeness crab.

Critical Areas and Shoreline Designations

- Dungeness Crab Habitat
- Shoreline Residential
- Urban Maritime

New WWTP Outfall
Alignment

Figure 3: Critical Areas and Shoreline
Anacortes Wastewater Treatment Plant
Outfall Replacement

City of Anacortes
Skagit County
Section 18, Township 35N, Range 02E



0 137.5 275 550 Feet

Water Quality

The outfall pipe capacity will be increased from the existing condition; however, it will discharge with a more efficient and effective mixing zone in deeper water and reduce the potential for impacts during overflow events. The new outfall improves the dilution factor to 798 compared to 72 with the current outfall. The new outfall design has been modeled through a mixing study (Cosmopolitan Marine Engineering, 2021), meeting the Washington State Water Quality standards for outfalls discharging into the Guemes Channel and complying with the City's 2017 municipal NPDES permit. Once the new outfall is constructed, the existing outfall will be decommissioned. As there will be no changes in composition of the effluent, a more efficient mixing zone will allow for more rapid dilution and reduce the potential impacts to marine species.

WWTP effluent is approximately 2.5 percent less dense than sea water so it is vital for the diffuser to be sitting on a mild bottom slope. The diffuser site is located at a depth of -69 feet (MLLW), the actual discharge depth would be approximately -65 feet accounting for the diffuser pipe resting on the sea floor with ports 3 to 4 feet off the sea floor. The less dense effluent will rise vertically into the water column which will create turbulence and rapid mixing. As the effluent water rises vertical in the water column, plume trapping is an ideal objective for various reasons including biological health of sea floor and surface water, rapid mixing zones, and aesthetic nuisance. Maximizing frequency of plume trapping is an objective of the outfall design. The discharge plume does not impact drifting and non-strong swimming organisms because they cannot stay in the plume close to the outfall long enough to be affected. Strong swimming fish could maintain a position within the plume, but they can also avoid the discharge by swimming away. Mixing zones generally do not affect benthic organisms (bottom dwellers) such as Dungeness crab because the buoyant plume rises in the water column.

Aquatic life is a major concern, especially for areas deemed critical habitats or providing habitat for endangered or threatened species, however as specified in the City 2017 NPDES municipal permit WA0020257 regular monitoring and testing is conducted for both marine life and human health. While the new outfall would discharge a larger volume of effluent, the dilution factor is much greater promoting a more effective mixing zone. The new outfall improves these aspects with a dilution factor of 798 compared to 72 with the current outfall. Changes in the location and depth of the new outfall are notable compared current outfall it at a depth of -31 MLLW, with a chronic mixing zone of 231 feet and an acute mixing zone of 23.1 feet. WAC 173201A-210 defines the marines water designated uses and criteria where the key aspects of concerns are temperature, dissolved oxygen, turbidity, pH balance, and bacteria growth. As there will be no changes in composition of the effluent, a more efficient mixing zone will allow for more rapid dilution. These aspects have been compared to the City's 2017 NPDES in relation to the current outfall and the replacement outfall, and all comply with the limitations. The replacement WWTP outfall would meet the water quality standards for an outfall discharging into the Guemes Channel.

Minimization and Avoidance

The project is designed to avoid and minimize adverse impacts to the shoreline and critical areas by implementing the following:

- A steel enclosed containment cell constructed with a vibratory pile driver and/or silt/turbidity curtain will be used for the nearshore trench construction to ensure that turbidity remains within state water quality standards at a point of compliance 150 feet from project activities. These measures along with seining in accordance with 2016 WSDOT Fish Exclusion Protocols and Standards will deter aquatic species from entering the project area.
- Turbidity monitoring will be conducted throughout construction in accordance with Section 401 Water Quality Certification.
- BMPs such as silt fence will be utilized to prevent any inadvertent runoff to the Guemes Channel.
- Comprehensive erosion plans and a Spill Prevention, Control, and Countermeasures (SPCC) plan will be approved prior to construction that will outline measures to prevent contamination (i.e., from concrete and equipment fuel) during construction in accordance with the Stormwater Management Manual for Western Washington. The plans will detail site stabilization, slope protection, drainage way protection, and sediment retention.
- No increase in impervious surface will be created.
- Existing rain gardens which do not comply with Ecology standards will be removed during construction and new treatment facilities which meet the requirements in the Stormwater Management Manual for Western Washington will be constructed as replacements.
- Spill kits will be kept on site at all times.
- Refueling will be done at least 200 feet from surface waters.
- All equipment will be checked daily for leaks and any necessary repairs will be made prior to the commencement of work.
- The shoreline will be backfilled to pre-existing grade and clean ¾-inch minus crushed gravel will be imported as backfill within the nearshore where contaminated materials are removed.
- A minimum of 18 inches of fish mix will be placed over shoreline armoring.
- There will be no long-term change in the bed profile as clean sand will be imported as backfill within the excavation and pipe trench footprint.

Mitigation Proposed

No naturally vegetated areas, aquatic vegetation, or other significant habitat features will be impacted. Trash and concrete debris will be removed from the shoreline at the end of U Avenue. Riprap along the shoreline will be covered with a minimum of 18 inches of fish mix.

The project will result in the removal of 6 trees. Trees removed will be replaced at a ratio of 3:1 along U Avenue where non-native shrubs will be removed. This will include 6 Douglas Fir, 9 Madrone, and 3 bigleaf maples or equivalent native species available at the time of planting. Native grasses will also be used to replant any temporarily impacted areas outside of proposed pavement. See Appendix B for a landscaping map with planting locations.

Should you have any questions, please contact me at (425) 503-3629 or at ross@widener-enviro.com.

Sincerely,

A handwritten signature in blue ink, appearing to read "Ross Widener", is positioned above the printed name.

Ross Widener
Widener & Associates

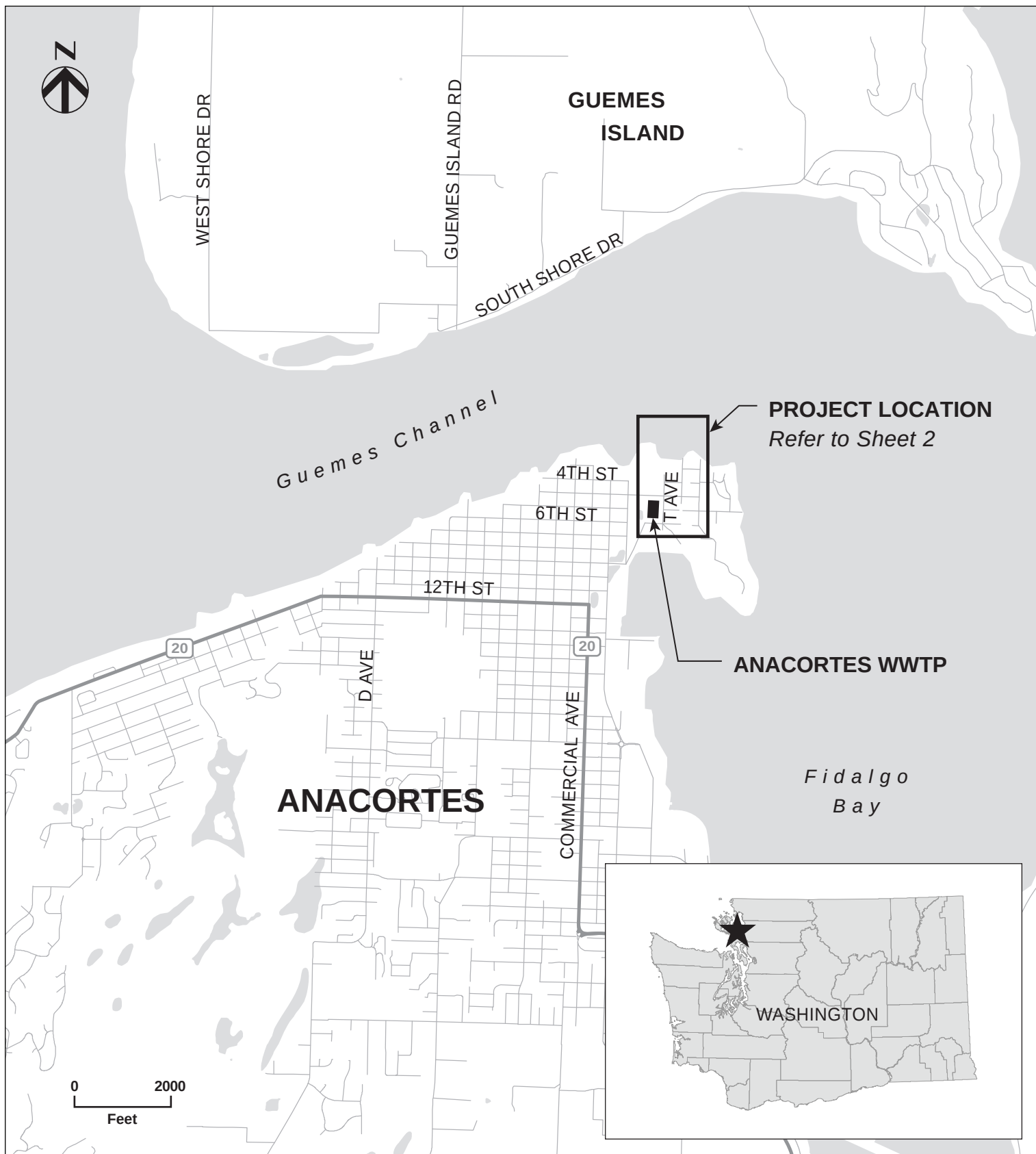
References:

Cosmopolitan Marine Engineering. 2021. City of Anacortes Mixing Zone Study. January.

HDR. 2020. City of Anacortes Outfall Alignment Alternative Analysis. May 29.

WDFW. 2021. Priority Habitat and Species on the Web. Accessed March 12, 2021. Available at:
<https://geodataservices.wdfw.wa.gov/hp/phs/>

Appendix A: Project Plans



USACE REFERENCE #: NWS-2021-320

ADJACENT PROPERTIES: Port of Anacortes

DATE: 4/9/2021

APPLICANT: City of Anacortes

IN: Guemes Channel

FIGURE: Sheet 1 of 6

PROJECT LOCATION: 500 T Ave, Anacortes, WA 98221

AT: Anacortes WA

CREATED BY: HDR Engineering,
Cosmopolitan
Engineering

LAT/LONG: 48.518373, -122.607101

COUNTY: Skagit

PROPOSED PROJECT: City of Anacortes WWTP Outfall

STATE: Washington



USACE REFERENCE #: NWS-2021-320

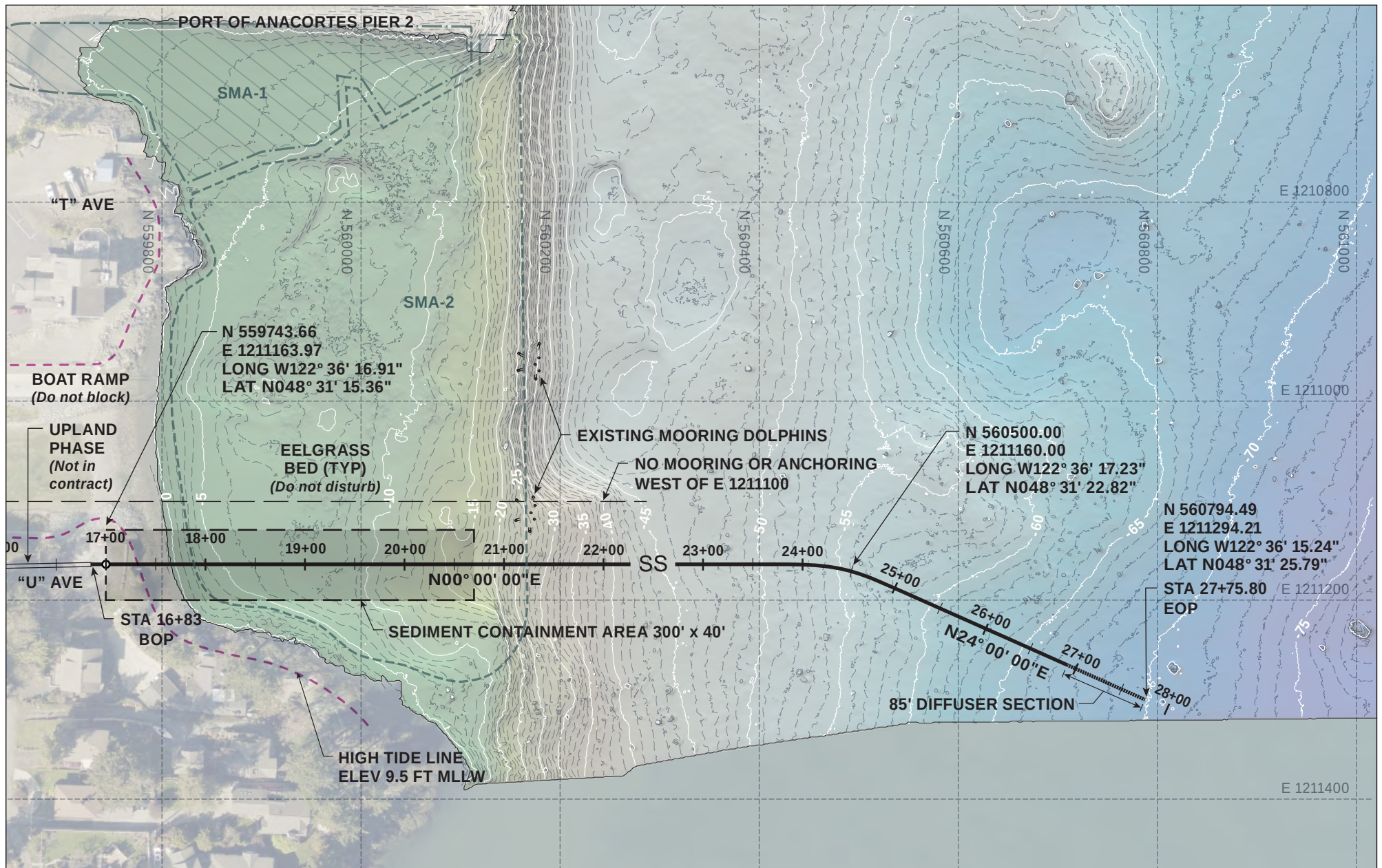
PLAN - SHEET 2 OF 6

APPLICANT: City of Anacortes

DATE: 4/9/2021

PROPOSED PROJECT: City of Anacortes WWTP Outfall

PROJECT LOCATION: 500 T Ave, Anacortes, WA 98221



USACE REFERENCE #: NWS-2021-320

APPLICANT: City of Anacortes

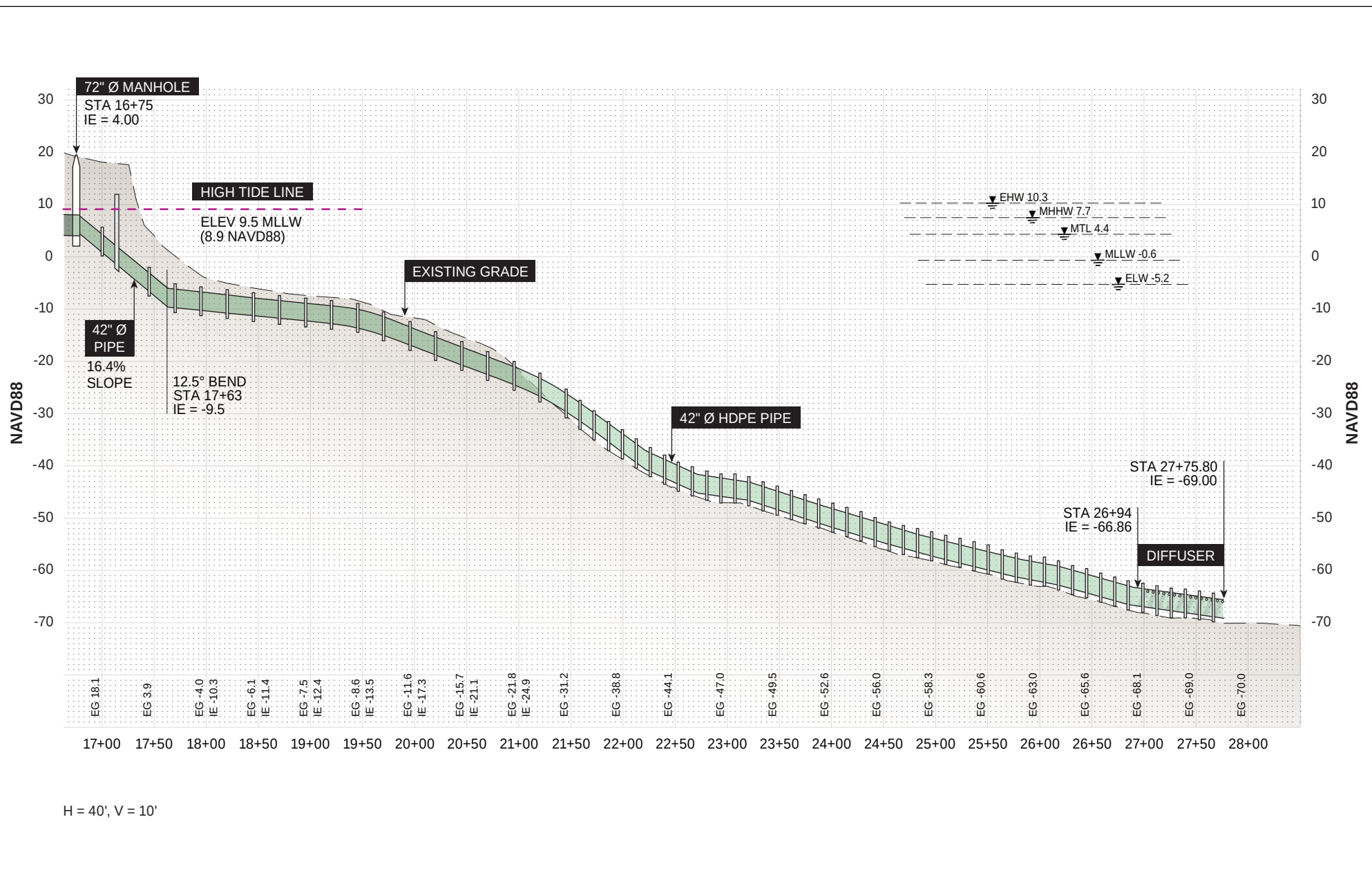
PROPOSED PROJECT: City of Anacortes WWTP Outfall

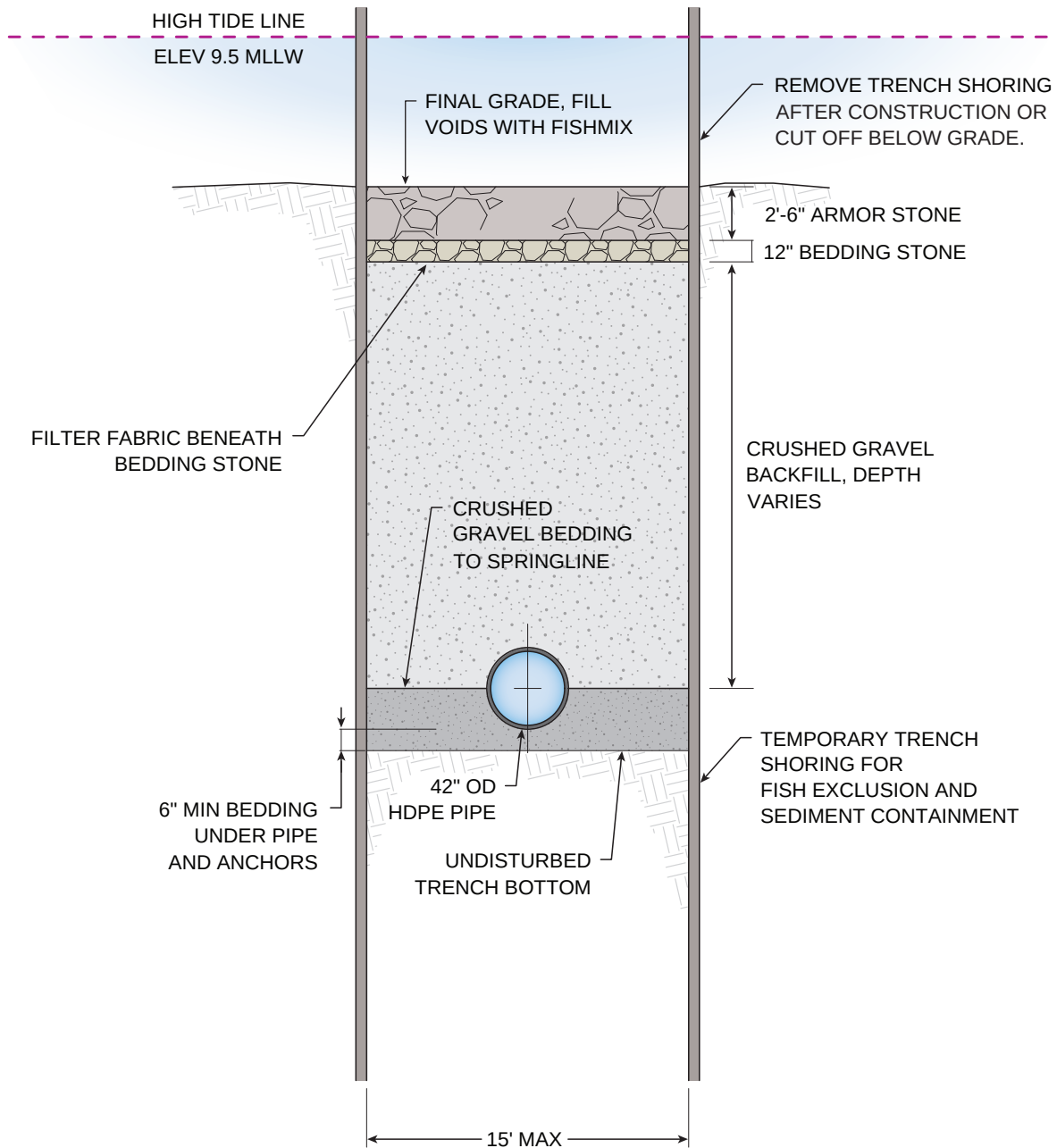
PROJECT LOCATION: 500 T Ave, Anacortes, WA 98221



PLAN - SHEET 3 OF 6

DATE: 4/9/2021





SHORED SECTION

USACE REFERENCE #: NWS-2021-320

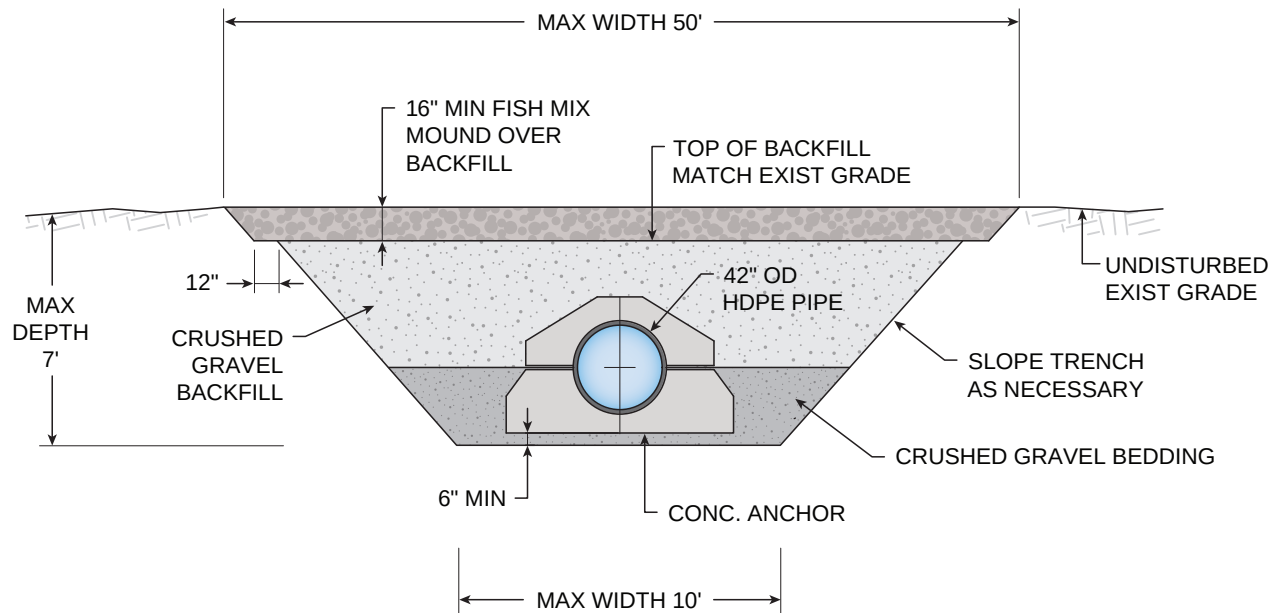
PLAN - SHEET 5 OF 6

APPLICANT: City of Anacortes

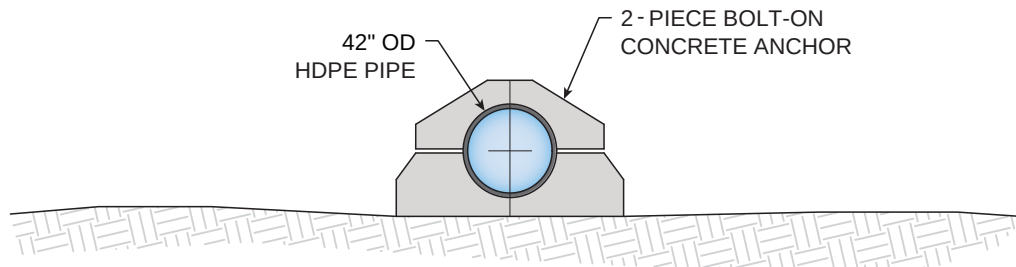
DATE: 4/9/2021

PROPOSED PROJECT: City of Anacortes WWTP Outfall

PROJECT LOCATION: 500 T Ave, Anacortes, WA 98221



BURIED SECTION



BOTTOM LAY SECTION

USACE REFERENCE #: NWS-2021-320

PLAN - SHEET 6 OF 6

APPLICANT: City of Anacortes

DATE: 4/9/2021

PROPOSED PROJECT: City of Anacortes WWTP Outfall

PROJECT LOCATION: 500 T Ave, Anacortes, WA 98221

Appendix B: Landscaping Map



Landscape Plan for WWTP Outfall Mitigation
Anacortes Wastewater Treatment Plant
Outfall Replacement
City of Anacortes
Skagit County
Section 18, Township 35N, Range 02E

Notes: Trees removed will be replaced at a ratio of 3:1. The total trees to be replaced will be 3 Maple, 6 Fir and 9 Madrona within the Mitigation Area outlined in green. Bushes of non-native species will be removed and planting will occur. Mitigation site is within the shoreline buffer. Areas disturbed with be seeded with native riparian seed mix.

Geotechnical Engineering Services

Anacortes WWTP Outfall
Anacortes, Washington

for
HDR Engineering

March 25, 2021



Geotechnical Engineering Services

Anacortes WWTP Outfall
Anacortes, Washington

for
HDR Engineering

March 25, 2021



554 West Bakerview Road
Bellingham, Washington 98226
360.647.1510

Geotechnical Engineering Services

Anacortes WWTP Outfall Anacortes, Washington

File No. 0382-032-01

March 25, 2021

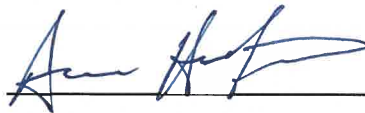
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J. Robert Gordon, PE
Senior Principal



AJH:JRG:leh

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1.0 INTRODUCTION

GeoEngineers, Inc. (GeoEngineers) is pleased to present this Geotechnical Engineering Services report for the proposed City of Anacortes (City) wastewater treatment plant (WWTP) outfall replacement project to be located in Anacortes, Washington. The approximate project location is shown in the Vicinity Map (Figure 1) and the existing site conditions relative to surrounding site features are shown in the Site and Exploration Plan (Figure 2).

Under HDR Engineering, Inc. (HDR), GeoEngineers worked on the preliminary design phase of this project in 2019 and 2020 to evaluate the feasibility of several alignments being considered by the design team. A preferred route and profile were determined, as shown in Figure 2. This report provides geotechnical conclusions and design recommendations in support of the project along the preferred route. Our services also included reviewing available geotechnical information near the site, drilling three onshore geotechnical borings that included rock corings, advancing 11 onshore rock percussive borings, drilling seven offshore geotechnical borings, installing three monitoring wells and completing laboratory testing on the samples obtained from the borings. GeoEngineers also subcontracted a geophysical survey along the onshore alignment and a portion of the offshore alignment of the preferred route.

GeoEngineers has been contracted to provide geotechnical engineering recommendations for the cut-and-cover onshore portion as well as the offshore portion of the proposed pipeline alignment. Our geotechnical engineering services were completed in general accordance with our Geotech Subconsultant Agreement for Professional Services dated March 3, 2020, and additional services authorized via subsequent amendments.

2.0 PROJECT DESCRIPTION

The City is planning to construct a new 42- to 48-inch pipeline from the WWTP to outfall into the Guemes Channel. The existing outfall pipe exits the WWTP on the north side of the plant and extends north through City right-of-way (ROW) and then property owned by the Port of Anacortes (Port) before discharging at the shoreline. The new pipeline is routed within City ROW along the upland portion of the route, and then through Washington State Department of Natural Resources (DNR) land for offshore portion of the route. The selected outfall route will consist of the outfall pipe exiting on the east side of the WWTP, proceeding north within the T Avenue ROW, east within the 3rd Street ROW, north within the U Avenue ROW, and through DNR lands to a diffuser location approximately 1,100 feet offshore.

3.0 BASIS OF STATIONING

The stationing referenced in this report is based on the pipeline alignment figure provided by HDR on February 11, 2021. This pipeline alignment has been incorporated into Figures 2 through 5.

The pipeline stationing referenced hereinafter and shown in the figures of this report represent a preliminary phase of the design that may have been superseded by the pipeline stationing presented in the project bid drawings developed by HDR. The location of subsurface exploration points, relative to the pipeline stationing, will be presented in the project drawings by HDR.

4.0 SITE DESCRIPTION

4.1. Surface Conditions

The project corridor is generally located in north Anacortes near the southern shoreline of the Guemes Channel which is connected to Fidalgo Bay and Padilla Bay to the east. The project can generally be separated into upland and marine areas of planned construction. The entire project area falls within northwest and southeast quadrants of Section 18, Township 35 North, and Range 2 East. The onshore portion of the project corridor is located in the marine district north of downtown Anacortes and generally follows portions of the T Avenue, 3rd Street, and U Avenue corridors. This portion of the project corridor is bounded to the west by property owned by the Port. The east side of the project corridor is bounded by a mixture of commercial real estate and single-family residences that are part of the Cap Sante Neighborhood. Surface grades along the planned alignment gradually rise from 13 feet (NAVD 88) at the connection to the WWTP to approximately 17 feet in elevation at the intersection with 3rd Street; steeper grades are encountered along the remaining portions of the onshore project corridor with surface elevations reaching 38 feet at the 3rd Street/U Avenue intersection; and dropping back down to 18 feet before a steep drop-off down to the shoreline of the Guemes Channel. The onshore portion of the alignment consists of paved low trafficked roadways with some areas along T Avenue containing parking stalls, curb, gutter, and sidewalks.

The offshore portion of the alignment extends approximately 1,100 feet north from the shoreline at the end of the U Avenue corridor into the Guemes Channel. Grades along the seabed floor along the planned alignment range from 5 to 15 percent slope and gradually descend from sea level to -10 feet in elevation within approximately 200 feet of the shoreline. The remaining portion of the alignment consists of steeper grades ranging from 15 to 20 percent slopes that descend to -70 feet in elevation at the alignment terminus. The seabed floor generally consists of shallow recently deposited sediments consisting of silt and clay with organic matter. Sonar mapping completed by the project surveyor David Evans and Associates (DEA) indicated the presence of glacial erratics (boulders) scattered on the seabed floor. This was confirmed in a remotely operated vehicle (ROV) study of the project alignment.

4.2. Geology

We reviewed a DNR map for the project area, “Geologic Map of Washington-Northwest quadrant, Washington Division of Geology and Earth Resources” by Dragovich et al. (2002). The geologic map indicates that the project corridor is situated on an outcrop of rock that continues to the east of the project corridor in an area called the Cap Sante Park and across the Guemes Channel on to Guemes Island. The exposed rock is mapped as part of the Lummi Formation which consists of marine metasedimentary rock. The Lummi Formation is metamorphosed pebble conglomerate, sandstone, and/or mudstone. The formation was deposited during the early Cretaceous to late Jurassic age (140 to 150 million years ago).

A contact with artificial fill, which was generally placed in the 1950s, is mapped just to the west of the project vicinity and is variable in composition and ranges from sand to clay derived from various marine dredging and upland sources. The fill is considered to be generally loose/soft, compressible, and with low shear strength. Granular fill zones can be moderately to highly susceptible to soil liquefaction where located below the water table.

Glaciomarine drift is mapped west of the fill within the project vicinity and generally underlies the artificial fill and/or beach/intertidal deposits. Glaciomarine drift typically consists of unsorted, unstratified silt and

clay with varying amounts of sand, gravel, cobbles, and occasional boulders. Glaciomarine drift is derived from sediment melted out of floating glacial ice that was deposited on the sea floor during periods of glacial retreat, while the land surface was depressed 500 to 600 feet from previous glaciations. This material locally contains shells and wood, and large erratics (boulders) can be present sporadically or even in a cluster. Glacially consolidated soils consist of dense to very dense sand with variable silt and gravel content and very stiff to hard clay or silt. This material is deposited and then overridden by glacial processes.

The offshore portion of the project corridor starts within a beach and intertidal area and therefore the upper native soils are a combination of beach, intertidal/recent sediment deposits, some glacial sediments, over bedrock.

4.3. Field Explorations and Geophysical Survey

4.3.1. Field Explorations

The locations of all the field explorations are shown in Figure 2. Details of the field exploration program, laboratory testing, and boring logs are presented in Appendix A. The various explorations are discussed below.

4.3.1.1. Onshore/Upland Borings

Subsurface soil, bedrock, and groundwater conditions were evaluated by completing three geotechnical borings, GEI-1A-20, GEI-1B-20, and GEI-2-20, on April 6 and 7, 2020 using a truck-mounted drill rig subcontracted to GeoEngineers. The borings were completed to depths of 51 to 90 feet below the existing ground surface (bgs).

Soil and rock depth and general characteristics were evaluated by completing 11 rock borings, RB-11+00 through RB-16+00, on November 17, 2020 using a track-mounted Furukawa HCR 1200 drill rig subcontracted to GeoEngineers. The rock borings were completed to depths of 19 to 37 feet bgs. A rock drill was used to explore to below the invert elevation of the proposed pipe between STA 11+00 and 16+00 where a rock cut is anticipated.

Three additional borings were completed as monitoring wells on March 9, 2021 to evaluate soil and groundwater conditions near the wastewater treatment plant and along T Avenue.

4.3.1.2. Offshore/Marine Borings

Subterranean soil and bedrock conditions were evaluated by completing seven geotechnical borings, SS-1 through SS-5, on November 16 through 19, 2020 using a track-mounted drill rig and barge subcontracted to Widener and Associates. The borings were completed to depths of 5.1 to 30.1 feet bgs (which is the mudline for offshore portion of the project corridor). Two of the borings required redrills because of refusal on cobbles/glacial erratics.

4.3.2. Laboratory Testing

Soil samples were obtained during the drilling program and taken to GeoEngineers' laboratory for further evaluation. Selected samples were tested for the determination of moisture content, fines content (material passing the U.S. No. 200 sieve), grain size distribution (sieve analysis) and Atterberg limits. A description of the laboratory testing, and the test results are presented on the logs as well as in Appendix B. Samples from rock cores were tested for unconfined compressive strength and Cerchar abrasivity by external laboratories. The results of the external laboratory testing are presented in Appendix C.

4.3.3. Geophysical Survey

GeoEngineers subcontracted Global Geophysics of Redmond, Washington to complete seven geophysical arrays at selected locations along the project alignment and within the project vicinity. The geophysical testing consisted of passive body wave refraction (array microtremor) surveys and electrical resistivity tomography (ERT). These tests were conducted to obtain vertical shear wave velocity data to characterize the depth to rock and subsurface soils along the upland and overwater portions of the alignment. This data was obtained to augment the subsurface information collected during drilling. The geophysical survey results are summarized in a report prepared by Global Geophysics, which is included in Appendix D, Geophysical Survey Report, and were incorporated into our interpretations and conclusions.

4.4. Previous Studies

As part of this evaluation, GeoEngineers' reviewed available geotechnical information completed for other nearby projects. The following reports and plans containing geotechnical information, logs of explorations, and foundation information were reviewed as part of this study:

- GeoEngineers, Inc. "Geotechnical Engineering Services, Pier 2 Dredging Project, Port of Anacortes, Anacortes, Washington". January 8, 2013.
- GeoEngineers, Inc. "Geotechnical Engineering Services, "T" Avenue and 4th Street Improvements, Anacortes, Washington". January 19, 2009.
- GeoEngineers, Inc. "Geotechnical Engineering Services, Wyman's Ramp Improvements, Anacortes, Washington". January 29, 2010.
- GeoEngineers, Inc "Geotechnical Study for Potential Habitat Mitigation, Wyman's Property, Anacortes, Washington". December 1, 2011.
- CH2M Hill. "Geotechnical Data Report, The City of Anacortes Wastewater Treatment Plant, Anacortes, Washington". April 1988.

The locations of explorations pertinent to this project are shown in Figure 2. Details of the boring logs are presented in Appendix E.

4.5. Surface Conditions

Surface conditions varied along the project corridor, with the onshore portion generally consisting of 3 to 4 inches of asphalt concrete overlying up to 24 inches of crushed rock base course consisting of gray gravel silt with sand. Offshore project corridor surface conditions are submarine with the sea floor generally being covered in recently deposited sediment varying from a few inches to 7 feet that contains organics. Detailed chemical analysis of offshore surface samples is being completed by the environmental consultant Dalton, Olmsted, and Fuglevand (DOF) for proper sediment management.

4.6. Subsurface Conditions

4.6.1. Soil Conditions

The soil profile encountered onshore and offshore at the project corridor generally consists of uncontrolled fill and soft recently deposited sediment, respectively, overlying glaciomarine drift or glacially consolidated soils underlain by metasedimentary siltstone/phyllite bedrock of the Lummi Formation. For the marine portion of the alignment glacial erratics (boulders) were observed on the seabed floor and encountered within the subsurface soil profile. Generalized geologic cross sections of the subsurface conditions along

proposed project based on nearby explorations are presented in Figures 3 through 5. The cross sections also show the proposed invert elevations of the proposed outfall pipeline.

Fill: The fill soils encountered along the upland portion of the project corridor generally consisted of loose to medium dense sand with variable silt and gravel content. The blow counts are typically between N=5 and 28. The fill observed has moderate to high shear strength and low compressibility. Based on explorations nearby but not in the project corridor, areas of uncontrolled fill may be encountered where debris or organic matter may be encountered.

Recent Sediments: Recent marine sediment deposits were encountered in overwater borings SS-1 through SS-5 and generally consist of very loose to loose/soft sand and silt with gravel, shells, and wood debris extending to depths of 2 to 7 feet below the existing mudline. The blow counts are typically between N=0 and 12.

Glaciomarine Drift (GMD): Glaciomarine drift generally consists of very stiff to stiff clay with variable sand and gravel content. The blow counts are typically between N=15 and 30. This unit has high shear strength, low compressibility, and low permeability characteristics. Glacial erratics (boulders) are present randomly within this unit.

- Glaciomarine drift was encountered below the fill in the upland borings GEI-1A-20, GEI-2-20, RB-11+00 through RB-12+00, RB-14+50 through RB-16+00, and MW-1-21, MW-2-21, and MW-3-21.
- Glaciomarine drift was encountered in the offshore borings SS-2 and SS-4, Boring SS-2A met refusal at approximately elevation -14 feet (5 feet bgs) but was shifted 8 feet to the north and reached elevation -29 feet (20 feet bgs) which suggests the presence of glacial erratics.

Glacially Consolidated Deposits: Glacially consolidated soils were generally encountered below the recent sediment and GMD in the overwater borings SS-1, SS-2B, SS-3A, SS-4, SS-5, and upland borings GEI-1A-20, GEI-1B-20, and RB-16+00. The glacially consolidated deposits encountered in our borings generally consisted of very stiff to hard sandy silt with variable sand content and dense to very dense fine to medium sand with variable silt content. The blow counts were typically greater than N=40. The unit was predominantly homogenous with limited layering or stratification.

Metasedimentary Rock: Rock was encountered across the entire project alignment and consists of a siltstone/sandstone or phyllite that is considered to be a Mesozoic metasedimentary rock and is mapped as part of the Lummi Formation. The Lummi Formation is comprised of metamorphosed pebble conglomerate, siltstone, sandstone, and/or mudstone. The formation was deposited during the early Cretaceous to late Jurassic age (140 to 150 million years before present). Rock core samples were tested for unconfined compression strengths and Cerchar abrasivity. The test results are presented in Appendix C.

- Rock was encountered in GEI-1-20 (near STA 7+50) at approximately 47 feet bgs. The rock encountered along the upland portion of the alignment between STA 11+00 and 16+00 was encountered between a few inches and 22 feet bgs.
- The rock encountered along the offshore portion of the alignment was encountered between 10 and 30 feet below mudline.
- Unconfined Compression Strengths (UCS) range from 5,190 to 9,320 pounds per square inch (psi);

4.6.2. Groundwater Conditions

Upland borings were completed with mud-rotary and air-percussion drilling methods. Therefore, accurate information related to groundwater seepage and static groundwater elevations was not available based on the drilling techniques. In the rock borings groundwater was observed during backfill of boreholes, however an accurate depth was not determinable. Sandy or gravelly soils will result in more seepage compared to fine grained clay such as glaciomarine drift. A perched groundwater is commonly encountered where groundwater flow is limited by a more impermeable layer. Saturated sand pods can also be encountered within glaciomarine drift or glacially consolidated soils.

- Based on our knowledge of the local conditions, we do not expect the upland borings to encounter a static groundwater table/local aquifer when excavations occur within the glaciomarine drift clay layer. However, utility trenches within the glaciomarine drift can serve as French drains and collect/route perched groundwater to low spots.
- Historic test pits within the WWTP completed by CH2M Hill encountered shallow groundwater at 1 to 1.5 feet bgs. Groundwater should be anticipated within existing fill soils within and near the existing wastewater treatment plant.
 - Based on review of project record drawings an underdrain system was installed below the existing primary clarifiers and Aeration Basin of the WWTP. The drawings indicate underdrain inverts of 17.2 to 19.7 feet below the top of slab of underdrain pump station. Details regarding the effect of this dewatering on overall groundwater regime of this area is not known.
 - The monitoring wells near the WWTP and along T Avenue were installed March 9, 2021. Groundwater levels were measured subsequently on March 16 and 23, 2021 and were determined to be at depths of 5 to 8.6 feet bgs (Elevation 4.4 to 9.1 feet).
- At the north end of U Avenue groundwater is anticipated to be tidally influenced. We understand that Mean Sea Level is 4.4 feet, (NAVD88).
- In the upland portion of the alignment perched groundwater should be anticipated at the contact between less permeable soils and seepage can occur from bedrock fractures. We anticipate that groundwater conditions at the upland borings should be expected to vary as a function of season, precipitation, and other factors including local tides in the Guemes Channel and Fidalgo Bay. The offshore borings were completed overwater in saturated conditions.

5.0 GEOLOGICALLY HAZARDOUS AREAS

The methods of designating geologic hazard areas are presented in the Anacortes Municipal Code (AMC) Chapter 17.70.180. Our evaluation included document review and site reconnaissance during our field exploration program.

5.1. Erosion Hazard

The AMC defines an erosion hazard as an area mapped as having moderate to severe, severe or very severe erosion hazard in the U.S. Department of Agriculture's (USDA's) Soil Conservation Service Soil Survey of the Skagit County Area (1989). According to the USDA Soil Survey, the majority of the soils along the project alignment present no erosion hazard to moderate erosion hazard. A slope of approximately 100 percent gradient (1H:1V [horizontal to vertical]) with visible signs of sloughing is present at Station 17+30, where the pipeline transitions from the road fill embankment to the shoreline area of the Guemes Channel. This slope is not mapped as a steep slope on the Skagit County Potential Landslide and Erosion Areas (2016) map.

In our opinion, the erosion hazard along the project alignment is low provided that temporary erosion control measures are used during construction as necessary depending on the weather, location, soil type, and other factors. The outfall installation will occur within trenches where sediment transport potential is minimal. Temporary erosion protection (e.g., straw, plastic, or other measures may be necessary over stockpiles and/or backfilled surfaces to reduce sediment transport until permanent surfacing applied. Appropriate best management practices (BMPs) should be incorporated into the temporary erosion and sediment control plan developed by the civil engineer. Additional efforts may be required near the identified steep slope at Station 17+30. We are available to provide additional input if desirable.

5.2. Landslide Hazard

The AMC defines numerous landslide hazard cases, with the most applicable definition of a landslide hazard being any area within 200 feet of a slope of 40 percent or steeper and with a vertical relief of 10 feet or more. To identify areas of steep slopes and landslide hazard we conducted site reconnaissance, reviewed the site topographic survey, and reviewed the Skagit County Potential Landslide and Erosion Areas (2016 map dated September 14, 2016).

The majority of the alignment consists of 0 to 15 percent slopes with some ranging from 15 to 20 percent. The site does not have any clearly identified slopes steeper than 20 percent as presented in the Skagit County Potential Landslide and Erosion Areas (2016) map. Based on our site evaluation, the pipeline alignment does not fall within a landslide hazard area and the potential for landslides to impact the proposed alignment is low.

5.3. Seismic Hazard

The AMC defines a seismic hazard area as those areas that are subject to severe risk of damage as a result of earthquake induced ground shaking, slope failure, settlement, soil liquefaction or surface faulting. The area identified at Station 17+30 consists of a steep slope that is approximately 12 feet tall at this location and is comprised of loose to medium dense variable granular fill and meets the definition of a seismic hazard area. Although not identified by the AMC the fill material has the potential of responding to seismic shaking. Additional discussion of seismic hazards and seismic hazard mitigation at the site are presented in Section 6.1.

5.4. Coal Mine Hazard

The AMC identifies a coal mine hazard area as those project areas that are underlain or affected by historic mine operations, or areas identified on maps produced by the DNR as a coal hazard. We reviewed the DNR document titled “Inventory of Abandoned Coal Mines in the State of Washington,” (LaSalata et al. 1985) to assess the impact from coal mining. We found no evidence to indicate that coal mine activity occurred anywhere along the project alignment. The mapped bedrock units and bedrock encountered during our exploration program are not associated with coal deposits. We conclude that there is no known coal mine hazard along the proposed alignment.

6.0 CONCLUSIONS AND RECOMMENDATIONS

We conclude that the design of the proposed outfall pipe can be accomplished with a combination of conventional and specialized earthwork equipment and techniques. The most significant challenges for the upland portion of the project will consist of design and construction of a deep trench through the competent rock. The most significant challenge for the marine portion of the project will consist of excavation of submarine glacially consolidated soils.

All procedures and materials should be in accordance with most recent Washington State Department of Transportation (WSDOT) Standard Specifications (hereinafter referred to as WSDOT Standard Specifications), unless another version or specification is referenced by project drawings and/or specifications.

We have provided general geotechnical design and construction considerations for the project in sections 6.1 through 6.5 of this report. In section 6.6, we have presented a summary of the most significant design issues for specific identified outfall pipe segments. For discussion purposes in the summary portion of this report, the alignment has been separated into five segments based on the general geologic material anticipated at the planned pipeline invert elevation.

6.1. Seismic Considerations

6.1.1. Seismicity

The project site is located within the Puget Sound region, which is seismically active. Seismicity in this region is attributed primarily to the interaction between the Pacific, Juan de Fuca and North American plates. The Juan de Fuca plate is subducting beneath the North American plate. It is thought that the resulting deformation and breakup of the Juan de Fuca plate might account for the deep focus earthquakes in the region. Hundreds of earthquakes have been recorded in the Puget Sound area. In recent history, four of these earthquakes were large events: (1) in 1946, a Richter magnitude 7.2 earthquake occurred in the Vancouver Island, British Columbia area; (2) in 1949, a Richter magnitude 7.1 earthquake occurred in the Olympia area; (3) in 1965, a Richter magnitude 6.5 earthquake occurred between Seattle and Tacoma; and (4) in 2001, a Richter magnitude 6.8 earthquake occurred near Olympia.

Research has concluded that historical large magnitude subduction-related earthquake activity has occurred along the Washington and Oregon coasts. Evidence suggests several large magnitude earthquakes (Richter magnitude 8 to 9) have occurred in the last 1,500 years, the most recent of which occurred about 300 years ago. No earthquakes of this magnitude have been documented during the recorded history of the Pacific Northwest. Design practices in Puget Sound and building codes consider the local seismic conditions, including local known faults, in the design of structures.

6.1.2. Fault and Surface Rupture Hazard

We reviewed the USGS Quaternary Fault and Fold Database for the United States (USGS 2018) and the Washington State DNR Geologic Information Portal to review the locations of faults along the pipeline alignment that may pose a risk of surface rupture. The nearest mapped active fault in both databases is the east-west trending Devil's Mountain Fault Zone, located approximately 10 miles south of the alignment. One older unnamed northwest trending fault is mapped approximately 0.1 miles southwest of the alignment, although the trace of the faults are inferred in these areas. Based on our evaluation and the distance to the nearest major fault, it is our opinion that the mapped faults do not present a significant risk of ground rupture at the project site.

6.1.3. Seismic Zone and LRFD Parameters

We understand that the 2017 version of the American Association of State Highway and Transportation Officials (AASHTO) Load and Resistance Factor Design (LRFD) manual will be used for design of the manholes, and any other structures along the alignment. The design earthquake has a 7 percent probability exceedance in 75 years (i.e., a 1,000-year recurrence interval). We recommend the site generally be classified as Site Class D however, seismic parameters will vary based on location. As the pipeline extends

over several thousand feet, seismic parameters may need to be evaluated at different points along the pipeline depending on the seismic design approach or structures requiring seismic design. Additional seismic parameters can be provided for other pipeline segments or specific structures if necessary. LRFD seismic parameters for structures along the pipeline are presented in Table 1.

TABLE 1. SPECTRAL RESPONSE ACCELERATIONS (SRAs) – MANHOLE STRUCTURES

SRA and Site Coefficients	PGA	Short Period	1-Second Period
Mapped SRA	PGA = 0.339	$S_s = 0.759$	$S_1 = 0.259$
Site Coefficients	$F_{pga} = 1.161$	$F_a = 1.196$	$F_v = 1.882$
Design SRA	$A_s = 0.394$	$S_{DS} = 0.908$	$S_{D1} = 0.487$

Note:

Site Class D Description: Soft soil ($15 < N < 50$).

6.1.4. Liquefaction Potential

Liquefaction is a phenomenon where soils experience a rapid loss of internal strength as a consequence of strong ground shaking. The evaluation of liquefaction potential is complex and is dependent on numerous site parameters, including soil grain size, soil density, site geometry, static stresses, and the magnitude and ground acceleration of the design-level earthquake. Ground settlement, lateral spreading, and/or sand boils may result from liquefaction. Infrastructure supported on liquefied soils could experience settlement or lateral movement that could be severely damaging. Conditions favorable to liquefaction occur in loose to medium dense, clean to moderately silty sand that is below the groundwater level. Dense soils/bedrock or soils that exhibit cohesion are generally considered not susceptible to liquefaction.

As shown in Figures 3 through 5, the pipe invert elevation puts the pipe bearing on glaciomarine drift, rock, and glacially consolidated soils. The glaciomarine drift is a stiff clay that is not considered susceptible to liquefaction; rock of course is not liquefiable; and the glacially consolidated soils are very dense and also not susceptible to liquefaction. The only potentially liquefiable soils identified are the upper offshore Recent Sediments; these will be removed over the pipeline and backfilled with gravel.

6.2. Excavation and Shoring

6.2.1. General

All excavations and other construction activities must be completed in accordance with applicable city, county, state, and federal safety standards. Portions of the excavations can be made as unshored open cuts or open cuts with trench boxes. The stability of open-cut slopes is a function of soil or rock type, groundwater level, slope inclination and nearby surface loads. In addition, existing utilities and power poles are located in places near the proposed alignment of the pipeline. The use of inadequately designed shoring and open cuts could impact the stability of adjacent roadways, nearby structures and existing utilities, and endanger personnel. In our opinion, the contractor will be in the best position to observe subsurface conditions continuously throughout the construction process and to respond to variable soil and groundwater conditions. Therefore, we recommend that the contractor have the primary responsibility for deciding whether or not to use an open-cut slope and shoring rather than some form of temporary excavation support.

This section provides a generalized discussion for excavation efforts over the entire alignment. Recommendations for specific segments of the alignment are provided in Section 6.6 of this report.

6.2.2. Upland Excavations

Planned excavation efforts on the upland portion of the alignment range from approximately 15 to 37 feet deep and will be completed in uncontrolled fill, glaciomarine drift, glacially consolidated soils and bedrock. We anticipate that excavation efforts in the soils will generally be completed using conventional open-trenching techniques. We also anticipate that rock blasting will be required over approximately 500 feet of the alignment to fracture the bedrock prior to excavation. Rock blasting is covered in Section 6.3 of this report.

Regardless of the soil type encountered in the excavation, shoring, trench boxes or sloped sidewalls will be required for excavations deeper than 4 feet per Washington State Administrative Code (WAC) 296-155, Part N. The temporary slope regulations assume no groundwater and that surface loads such as construction equipment and storage loads will be kept a sufficient distance away from the top of the cut so that the stability of the excavation is not affected. In order to maintain the stability of the cut, flatter slopes, dewatering, and/or shoring will be necessary for those portions of the excavations which are subjected to significant seepage. Temporary slopes in wet/saturated sand will be susceptible to sloughing, raveling and “running” conditions. It should be expected that unsupported cut slopes will experience some sloughing and raveling if exposed to surface water. Silt fences, berms, hay bales or other provisions should be installed along the top of the excavation to intercept surface runoff to reduce the potential for sloughing and erosion of cut slopes during wet weather.

6.2.3. Offshore Excavation/Dredging

Planned excavation and dredging efforts along the alignment north of the shoreline will be completed along in the nearshore alignment area extending approximately 400 feet offshore.

Sediments in this area consist of an overlying layer of recent sediment that has varying levels of chemical concentrations exceeding regulatory criteria. These recent sediments, varying from 2 to 7 feet thick are underlain by glacially consolidated soils with blow counts greater than $N=40$ that will require dredging in this area. Based on refusal encountered at boring S-2a, glacial erratics (boulders) should be expected within the dredge prism. It is anticipated that environmental dredging methods to contain contaminant release, resuspension and residuals will be required for dredging of the surficial material. Due to the high blow counts of the glacially consolidated soils, it is anticipated that large mechanical dredging equipment with sufficient breakout force will be required.

Dredged material will be handled in accordance with project plans, permits and specifications.

Excavations will extend up to 8 feet below the existing mudline and approximately 16 to 38 feet below the tidally influenced sea level. Soils encountered during excavation will consist of recent sediments, glaciomarine drift, and glacially consolidated soils. These soils generally range from very soft to hard and loose to very dense. Our investigations at the site encountered cobbles and boulders in the glaciomarine drift and glacially consolidated units. We recommend that excavation efforts use methods that are capable of applying downward pressure onto a toothed bucket, such as a backhoe firmly affixed to a barge, to excavate through the glaciomarine drift and glacially consolidated soil units. We recommend that offshore excavation efforts limit installation of temporary shoring as much as possible due to the presence of boulders and cobbles encountered during our investigation.

For planning purposes, we recommend that temporary unsupported cut slopes offshore conditions be planned to be inclined at 3H:1V or flatter. It should be recognized that Guemes Channel has significant

currents which could affect excavation considerations including cut slopes. Where stiff glaciomarine drift and dense glacially consolidated soils are encountered steeper slopes are likely feasible and could limit excavation quantities and disturbance area.

The approach to excavation/dredging and temporary shoring is most appropriately left up to the contractor, based on the diversity of available approaches, techniques, and equipment.

6.2.4. Temporary Cut Slopes - Upland

For planning purposes, we recommend that temporary cut slopes without trench boxes in onshore conditions be inclined based on the geologic unit and soil classification as shown in Table 2. The maximum temporary slopes shown in the onshore portion of the table apply to fully dewatered and unsubmerged conditions. Flatter slopes may be necessary if seepage is present on the cut face. Deep excavation through the rock identified in Segment 2 may require benching to achieve design depths. The contractor is responsible for evaluating the stability of the temporary cuts and using appropriate temporary slopes and/or shoring.

TABLE 2. MAXIMUM TEMPORARY CUT SLOPES

Geologic Unit	Typical Soil Classification	Maximum Temporary Slope (Onshore)
Fill and Recent Marine Sediments	Type C	1.5H:1V
Glaciomarine Drift	Type B or Type A	1H:1V to 0.75H:1V
Glacially Consolidated Soils	Type B or Type A	1H:1V to 0.75H:1V
Metasedimentary Rock (Heavily Fractured)	Fractured Rock	1H:1V to 0.75H:1V

Some sloughing and raveling of the cut slopes should be expected. Temporary covering for onshore excavations, such as heavy plastic sheeting, should be used to protect these slopes during periods of rainfall. Surface water runoff from above cut slopes must be prevented from flowing over the slope face by using curbs, berms, drainage ditches, swales, or other appropriate methods.

If temporary cut slopes experience excessive sloughing or raveling during construction, it may become necessary to modify the cut slopes to maintain safe working conditions and protect adjacent facilities or structures. Slopes experiencing excessive sloughing or raveling can be flattened, regraded to add intermediate slope benches, or additional dewatering can be provided if the poor slope performance is related to groundwater seepage or water currents in submerged conditions.

If temporary slopes occur near the edge of a roadway shoulder, we recommend that a protective barrier (such as a jersey barrier) be placed at the edge of the road to provide a buffer/protection for vehicle traffic. We recommend that the proximity of the temporary slope to the edge of the roadway consider potential sloughing and undermining of the road and surcharge effects.

Rock will be encountered along a portion of the upland alignment. We expect that the trenching will be completed by blasting. The cuts may be vertical if the trench sidewalls are massive, unjointed, with no loose material after blasting. If jointing or loose material is observed, the contractor will need to use an appropriate level of temporary shoring protection (which could include trench box(es) for worker safety.

6.2.5. Onshore Construction Dewatering

Groundwater should be anticipated within the existing fill soils in the existing WWTP and along T Avenue (STA 0+00 to STA 7+00). It is possible that a limited amount of perched groundwater could be encountered at the northern end of U Avenue (near STA 17+00). We anticipate some of the upland excavation areas could encounter groundwater seepage due to areas of perched groundwater over relatively impermeable glaciomarine drift or glacially consolidated soils. Seepage may also occur near utility crossings within granular backfill where water has accumulated. Seepage could occur from fractures/joints within the blasted rock trenches as well.

A general discussion of the dewatering methods anticipated for the project is discussed below. Where groundwater is present, dewatering will be required for pipe installation. Where water is encountered at the base of the excavation, it will be necessary to dewater to approximately 2 feet below the base of the excavation. If groundwater is encountered in rock, dewatering below the base of the excavation will not be necessary as long as it is managed appropriately with sumps and pumps.

6.2.5.1. Open Pumping

We expect that traditional trench dewatering of pumping from a sump that has been excavated at one end of the excavation or trench will be adequate to manage seepage flows for the upland portions of this alignment within glaciomarine drift and rock excavation areas. Drainage ditches that are connected to the sump are typically excavated along the sidewalls at the base of the excavation or trench. The excavation for the sump and the drainage ditches should be backfilled with gravel or crushed rock to reduce the amount of erosion and associated sediment in the water pumped from the sump. In our experience, a slotted casing, perforated 5-gallon bucket or 55-gallon drum that is installed in the sump backfill provides a suitable housing for a submersible pump.

The amount of water removed from the excavation by open pumping should be minimized because of high turbidity levels. Temporary storage of dewatering effluent from the sumps in a settlement tank or basin may be required to meet discharge permit requirements and reduce sediment content prior to discharging the water to surface water courses.

6.2.5.2. Wellpoints

We expect that portions of the outfall installation will require well points as the most effective dewatering method. We anticipate this condition will be encountered within the existing fill soils at the WWTP and along T Avenue (STA 0+00 to STA 7+00). Wellpoints are effective for dewatering all types of soils, whether pumping small amounts of water from silt or large quantities of water from coarse sand and gravel. In this particular situation where the trench will extend through saturated fill into an aquitard, dewatering will be required on both sides of the trench excavation. The volume of water generated by a wellpoint system is typically less than the volume generated by a corresponding system of pumped wells because the wellpoints are generally completed at a shallower depth. Because of the shallower completion depth, the volume of aquifer that contributes water to a wellpoint system is less than for a comparable deep well system.

Wellpoint systems are most suitable for dewatering shallow excavations where the water table must be lowered no more than about 15 feet bgs or the header surface. Multiple wellpoint stages are generally required beyond that depth because of the physical limitations of suction lift. Dewatering can be accomplished at depths greater than 15 feet where the excavation can be open cut to permit installation of the wellpoint header system below original grade. This technique increases the depth to which the water table can be lowered with wellpoints.

The wellpoints would likely need to be installed on less than 10-foot centers (typically 4 to 8 feet) to be effective, and as close as possible to the edge of the excavation. The wellpoint screens should be filter packed with graded sand, or sand and fine gravel to improve pumping efficiency and minimize the discharge of turbid water. Wellpoints must be sealed to a depth of at least 8 feet with hydrated bentonite chips forming a surface seal to encourage the development of a partial vacuum around each wellpoint.

6.2.5.3. Predrainage Schedule

The maximum drawdown of the water table in the immediate vicinity of pumped wells or wellpoints is often achieved several hours after the start of pumping. However, complete dewatering of the saturated zone within the cone of depression may require several days. This lag reflects the time it takes for vertical drainage of all the water stored in the saturated zone. We recommend pumping from wells or wellpoints 2 to 3 days prior to excavating to permit vertical drainage of the aquifer.

6.2.5.4. Dewatering Near Structures

Lowering the groundwater table can increase effective stress in soils and induce settlement. The contractor should use care when lowering the groundwater table below adjacent structures. This situation specifically occurs within the existing WWTP where the proposed pipeline passes near an existing building. The contractor should identify any other structures within their proposed dewatering drawdown zone in their dewatering submittal. We recommend the following steps in planning for dewatering near structures.

- Preconstruction survey should be taken of structures within 50 feet of the proposed dewatering drawdown zone.
- If the dewatering drawdown zone extends within 5 feet of a structure, settlement monitoring should be performed on the structure while dewatering is occurring and identify a threshold movement where dewatering methods will be modified.
- Partial groundwater cutoff or groundwater recharge measures could be utilized to limit drawdown in the immediate vicinity of structures.

6.2.5.5. Dewatering Qualifications, Experience and Submittals

We strongly recommend that dewatering be performed by a contractor or subcontractor with dewatering experience. If well points will be used, we recommend an experienced dewatering specialist contractor with competent and experienced staff who can demonstrate successful deployment and operation of vacuum wellpoint systems in the Pacific Northwest over the past 5 years, and who can install systems that use high capacity electronically controlled and monitored vacuum pumps. We also recommend a Dewatering Plan be required as a submittal from the contractor at least 2 weeks prior to dewatering, that fully describes the dewatering approach, including material and equipment specifications, calculations and supporting assumptions to ensure that dewatering is achieved to no less than 2 feet below excavation subgrade. The Dewatering Plan should include an appropriate survey program identifying critical infrastructure that will be monitored, schedule of survey times, and appropriate action plans if subsidence is observed. The Dewatering Plan should also include a plan for disposal of dewatering water. The Dewatering Plan should be prepared by or under the direct supervision of a Professional Engineer and Licensed Hydrogeologist registered in the State of Washington and having at least 5 years of demonstrated experience in the design and operation of vacuum wellpoint dewatering systems. The contractor may wish to install their own monitoring wells along portions of the alignment where groundwater is anticipated.

6.2.5.6. Dewatering Limitations

Our dewatering recommendations are based on evaluation of the available geotechnical information. Groundwater can create a safety threat and can seriously compromise arrangements for shoring excavations. Also, given the potential for natural variation in geologic formations, differing site conditions may be encountered that could lead to substantially different groundwater inflows and dewatering challenges than are presented in this evaluation. We did not perform pumping tests or other detailed hydrogeologic evaluations but could complete these evaluations if desired to provide contractors with additional information for estimating and bidding. Additional pumping/monitoring well installation would be required to complete a pumping test to measure hydraulic conductivity.

6.2.6. Temporary Shoring

We anticipate that portions of the upland pipeline construction will require some type of shoring system to support the temporary excavations and maintain the integrity of the surrounding undisturbed soils/rock, minimize disruption of adjacent improvements, as well as to protect the personnel working within the excavations.

Because of the diversity of available shoring systems and construction techniques, the design of temporary shoring is most appropriately left up to the contractor proposing to complete the installation. However, we recommend that the shoring be designed by a Professional Civil/Structural Engineer licensed in Washington, and the PE-stamped shoring plans and calculations be submitted to the Engineer of Record prior to construction. The following paragraphs present recommendations for the type of shoring system and design parameters that we conclude are appropriate for the subsurface conditions along the project alignment.

The site soils (absent groundwater) can be retained using conventional shoring systems such as shields, sheet piles, or trench boxes, with lateral restraint. The design of temporary shoring should allow for lateral pressures exerted by the adjacent soil, and surcharge loads due to traffic, construction equipment, and temporary stockpiles adjacent to the excavation, etc. Lateral load resistance can be mobilized through the use of braces, tiebacks, anchor blocks, and passive pressures on members that extend below the bottom of the excavation. Temporary shoring used to support trench excavations typically uses internal bracing such as hydraulic shoring or trench shield bracing.

Temporary shoring using internal bracing can be designed using active soil pressures. We recommend that temporary shoring be designed using a lateral pressure equal to an equivalent fluid density based on soil type as defined in Table 3. The table includes equivalent fluid pressures for soil conditions with horizontal ground surface adjacent to the excavation and for the condition where the ground within 5 feet of the excavation rises at an inclination of 1.5H:1V (such as stockpiled soils removed from the excavation). For adjacent slopes flatter than 1.5H:1V, soil pressures can be interpolated between this range of values. Other conditions should be evaluated on a case-by-case basis. These values are appropriate above the groundwater table (without hydrostatic conditions).

TABLE 3. ACTIVE EQUIVALENT FLUID EARTH PRESSURES FOR SHORED EXCAVATIONS

Geologic Unit	Active Equivalent Fluid Earth Pressure (pcf) Horizontal Ground Surface	Active Equivalent Fluid Earth Pressure (pcf) 1.5H:1V Slope/Backfill
Fill and Recent Marine Sediments	40	90
Glaciomarine Drift	35	80
Glacially Consolidated Soils, Heavily Fractured Metasedimentary Rock	35	80

Notes:

pcf = pounds per cubic foot

These lateral soil pressures do not include traffic or construction surcharges that should be added separately, if appropriate. Shoring near paved areas or driveway should be designed for a light traffic influence equal to a uniform lateral pressure of 70 pounds per square foot (psf) acting over the depth of the trench; 250 psf should be used if normal roadway and construction traffic will be adjacent to the trench. More conservative pressure values should be used if the designer deems them appropriate. These soil pressure recommendations are predicated upon the construction being essentially dewatered; therefore, hydrostatic water pressures are not included.

If portions of the shoring use passive elements such as anchors, reaction blocks, or embedded sheet piles available soil resistance can be estimated using passive soil pressures assuming an equivalent fluid density as defined in the Table 4.

TABLE 4. PASSIVE EQUIVALENT FLUID EARTH PRESSURES FOR LATERAL RESISTANCE AND BRACING

Geologic Unit/ Soil Type	Passive Equivalent Fluid Earth Pressure (pcf) Above Water Table	Passive Equivalent Fluid Earth Pressure (pcf) Below Water Table
Fill and Recent Marine Sediments	250	125
Glaciomarine Drift	300	150
Glacially Consolidated Soils, Heavily Fractured Metasedimentary Rock	350	150
Structural Fill	350	150

In addition to the design recommendations presented above, the following should be implemented for the shoring systems for the project:

- At locations where settlement could be detrimental to adjacent structures, utilities, or pavements, the shoring system should be designed to prevent significant lateral movement of the existing soils.
- Precautions should be taken during removal of the shoring or sheeting materials to minimize disturbance of the pipe, underlying bedding materials, and natural soils.
- Trench boxes should be of sufficient size, both vertically and horizontally, to support the excavation without excessive deformation of the natural soils.
- The open excavations should be backfilled as soon as practical after the shoring has been removed.

- Heavy construction equipment, construction materials, and excavated soil should not be allowed within a distance, measured from the edge of the excavation, equal to half the depth of the excavation, unless the shoring system has been designed for the additional lateral pressure.

6.3. Rock Blasting Considerations

All blasting should be planned and conducted in accordance with the applicable local, state, and federal (e.g., WAC 296-52, U.S. Bureau of Mines, Occupational Safety and Health Administration [OSHA]) safety regulations. The planning and conduct of blasting operations should be made the responsibility of a qualified specialty contractor or subcontractor. Construction site safety is generally the sole responsibility of the contractor, who also is solely responsible for the means, methods, and sequencing of the construction operations. We are providing these blasting considerations only as a service to our client. Under no circumstances should the information provided below be interpreted to mean that GeoEngineers is assuming responsibility for construction site safety or the contractors' activities including blasting. This information is provided on an informational basis for the contractor to help in their planning process.

Results from our explorations indicate that the rock encountered at the project site consists of a siltstone/sandstone or phyllite that is considered to be a Mesozoic metasedimentary rock and is mapped as part of the Lummi Formation. The Lummi Formation is comprised of metamorphosed pebble conglomerate, siltstone, sandstone, and/or mudstone. The formation was deposited during the early Cretaceous to late Jurassic age (140 to 150 million years before present). A summary of the laboratory tests results conducted on this metasedimentary rock indicates that:

1. Cerchar Abrasivity Index (CAI) ranges from 2.37 to 4.49;
2. Unconfined Compression Strengths (UCS) range from 5,190 to 9,320 pounds per square inch (psi);
3. Rock Quality Designation (RQD) ranges from 9 to 94 percent but is approximately 60 percent on average; and
4. Moh's Hardness ranges from 4 to 7 but is generally 5 or 6 on average.

Based on observations made during our explorations and completed laboratory test results, we anticipate that the encountered metasedimentary rock will generally consist of a competent rock matrix with interspersed zones of highly fractured material. The competent rock matrix will be moderately to highly abrasive and contribute to a very high tool wear rate and where the excavation extends into bedrock, it may be possible to excavate several feet into the rock near the soil/rock contact using a large horsepower excavator and rock ripper teeth, and possibly a hydraulic ram. Efforts to reach planned subgrade elevation below the soil/rock contact surface more than a few feet will require rock blasting to loosen or fracture the competent rock prior to spoil removal.

The goals of the blasting for this project are to allow efficient rock excavation, blast a rock excavation of preferred geometry based on the project grading plan, minimize overbreak, and protect adjacent facilities from adverse effects. The blasting will occur in relatively close proximity to existing homes. Therefore, quality control and careful blasting is absolutely critical for this project.

We provide the following specific comments and recommendations regarding blasting for this project:

- We recommend that the blasting contractor have current licenses, bonding and insurance in accordance with all applicable local, state and federal regulations.

- Ideally, the contractor should have experience blasting in the rock conditions in the Anacortes area.
- We recommend that a Safety and Blasting plan be prepared for all blasting being conducted under the direct supervision of a blaster-in-charge (BIC). The plans should include the following, but is not necessarily limited to:
 - Indicate that the BIC has complete authority of all contractor operations within the blast zone and responsibility for site safety during blasting and explosive handling operations.
 - Description of the qualified personnel, warnings and signals, electrical hazards and lightening protection, pre-blast safety check and site walk by BIC, checks for cut-offs and misfires, misfire handling procedures, control of vibration, control of fly rock, and overhead power lines and towers, as applicable. The blasting contractor should name the BIC. The BIC should be required to have and submit a copy of a valid State of Washington Blaster's license for construction.
 - A review of the geology and geologic structure at the site as it relates to the blasting plan. This review should include information provided in this geotechnical report as well as other information such as geologic maps, blast plans from adjacent project areas, and the contractor's experience on similar projects.
 - Blasting and shot plan including: the type of blasting; contractor's equipment capability and proposed borehole diameter; explosive selection for specific site conditions; specific gravity of rock and explosive; burden dimension; stiffness ratio; stemming and subdrilling depth of shot hole; loading density of shot hole; powder column length in shot hole; total weight of explosive per shot hole; powder factor per cubic volume of rock; vibration and scale distance formula; timing sequence and spacing between shot holes; and potential impacts to the track to establish if mats or additional protection is needed.
- The blasting contractor should obtain any permits for blasting and become familiar with any City of Anacortes requirements.
- Residences and local businesses are located immediately adjacent to the planned blasting alignment and will feel the blasting. We recommend direct communication with residents and adjacent property owners to limit damage complaints and lawsuits. This should include public notice in accordance with City of Anacortes requirements.
- Whenever blasting is being conducted in the vicinity of any gas, electric, water, fire alarm, telephone, telegraph, and steam utilities, the BIC must notify appropriate utility representatives: (1) at least twenty-four (24) hours in advance of blasting, (2) of the specific location and intended time of blasting, and (3) confirm the verbal notice with a written notice.
- We recommend pre-blast and post-blast damage surveys of nearby homes and utilities. The number and locations of homes should be determined by the blasting contractor and comply with applicable regulations. However, we recommend as a minimum all the residences located immediately adjacent to the proposed blasting alignment.
- We recommend that the soil overburden not be removed prior to blasting. Using proper blasting techniques, the overburden will prevent "fly-rock" from occurring. However, in sections with shallow or exposed bedrock, blasting mats may be appropriate based on the contractor's experience.
- No explosives should be stored overnight at the site.
- Stemming should consist of crushed rock.
- Vibration blast monitoring should be conducted during blasting to record peak particle velocities (PPVs) in areas with homes and critical infrastructure.

- In order to limit overblast and to minimize vibrations to nearby structures, it is recommended that peak particle velocities be kept below those recommended by Table 8-A or Figure 8-A in section 296-52 WAC. Our practical experience is that a maximum PPV of 0.5 inches per second is appropriate for residential areas. Monitoring of the PPV vibrations of each shot should be completed with no less than two seismographs that can measure three mutually perpendicular directions. located at each end of the shot and/or the closest part of nearby structures. The specifications should identify the maximum PPV and identify structures to be monitored.
- It may be appropriate to complete a test blast to confirm the blasting plan and peak particle velocities.

6.4. Structure Support, Foundation Materials, and Pipe Bedding

The project will include construction of at least three new below-grade manhole structures in addition to the pipeline. We understand the base of the structures will be 18 to 35 feet bgs at the manhole locations. Recommendations for design and construction of the below-grade pipeline and structures are provided in the following subsections.

6.4.1. Below-grade Structure Support

We do not anticipate that soft or potentially unstable soils will exist at the foundation subgrade, therefore we recommend planning for and providing a minimum 6-inch-thick layer of foundation material as described in this report as a leveling pad and to provide uniform support for all below-grade pipelines and structures. A thinner leveling course is acceptable for structures founded on bedrock. Where the base of the manholes or other structures will be founded on loose or soft soils such as softer portions of the glaciomarine drift, we recommend a minimum of 12 inches of foundation material be placed for leveling and support of these structures. If soft or wet conditions are encountered, it may be helpful to place a geotextile fabric as separation between the native subgrade and foundation imported. A fully dewatered excavation will be required to create a stabilized base.

6.4.2. Foundation Material

Where foundation material is necessary, we recommend that it consist of crushed rock such as 1¼-inch crushed surfacing base course (CSBC) (WSDOT Standard Specification 9-03.9[3]) or permeable ballast (WSDOT Standard Specification 9-03.9[2]). The interlocking of this size angular rock will provide strength for bearing capacity and will also limit intrusion of the subgrade soils into the void space (better than larger-sized rock) and allow groundwater drainage for sumps and pumping if necessary. The foundation material should be compacted to a uniformly firm condition with a plate compactor or similar equipment.

6.4.3. Lateral Earth Pressures for Below-Grade Structures

The walls of the below-grade manholes will be restrained from movement during backfilling if constructed using shored temporary open cuts, and the walls will be subjected to permanent pressures from groundwater. Therefore, the walls should be designed for lateral pressures corresponding to at-rest soil pressure and for full hydrostatic pressures below the design groundwater level. Although groundwater levels were not observed during our explorations, we do anticipate the presence of perched water in soils overlaying bedrock and tidally influenced water levels near the shoreline. For design purposes, we recommend that groundwater conservatively be assumed at approximately Elevation 10 feet for all proposed manholes for hydrostatic pressure determination, corresponding to extreme high seawater level. We recommend using the lateral earth pressures presented in Table 5 be used for manhole structure design.

Seismic loading will result in additional lateral soil pressures that affect the walls of the structure. If the walls of the manholes are to be designed for seismic forces, we recommend that the seismic loading be approximated using a uniform lateral pressure equal to $8H$ pounds per square foot (psf), where H is the depth in feet below grade of the structure. This seismic lateral pressure is in addition to, and should be superimposed upon, the static soil and hydrostatic pressures given in Table 5.

We also recommend below grade walls be designed for a surcharge pressure for traffic loading. For traffic loading, we recommend that below grade structures be designed for a uniform horizontal surcharge pressure of 70 psf, which only needs to be applied to a maximum depth of 15 feet below the ground surface.

TABLE 5. LATERAL EARTH PRESSURES AND SOIL PARAMETERS FOR BELOW-GRADE STRUCTURES

Parameter	Value
Soil Unit Weight Above Groundwater Table (Above Elevation 50 feet), γ	125 pcf
Soil Unit Weight Below Groundwater Table (Below Elevation 50 feet), γ'	62 pcf
Backfill Soil Friction Angle, ϕ	34 degrees
Foundation Soil Friction Angle, ϕ	34 degrees
At-Rest Earth Pressure Coefficient, K_0	0.44
At-Rest Earth Pressure Above Groundwater Table ¹	60 pcf
At-Rest Earth Pressure Below Groundwater Table (combined soil plus hydrostatic) ¹	95 pcf
Seismic Earth Pressure ^{2,3}	8H psf
Horizontal Traffic Surcharge Wall Pressure ^{3,4}	70 psf

Notes:

¹ Equivalent Fluid Density – triangular pressure distribution

² H = vault depth

³ Rectangular pressure distribution

⁴ Assumes 250 psf vertical traffic surcharge and active earth pressure coefficient, K_a . Horizontal traffic surcharge only needs to be applied to the upper 15 feet immediately below the ground surface.

6.4.4. Buoyancy and Uplift

Manhole structures should be designed to resist hydrostatic uplift, based on groundwater at Elevation 10 feet at all proposed manholes. Resistance to uplift can be developed by the dead weight of the structure and friction along the sides of the structure. Frictional resistance, if backfilled with generally granular structural fill, can be computed using a coefficient of friction of 0.35 applied to the lateral soil pressures. This coefficient of friction is an allowable value and includes a factor of safety of approximately 1.5. We recommend that lateral soil pressures for frictional uplift resistance be computed using an equivalent fluid density of 35 pcf above the groundwater table and 20 pcf below the groundwater table. In addition to the above means of resisting uplift, the structure may be constructed with a base that extends beyond the structure walls so that the weight of overlying soil resists a portion of the uplift. For this purpose, the overlying backfill may be assumed to have a submerged unit weight of 60 pcf below the high groundwater level, and 110 pcf above that elevation.

6.4.5. Frictional Resistance of Anchor Blocks

Lateral loads on concrete anchor blocks may be resisted by friction on the base of the blocks. For concrete anchor blocks supported on native offshore sediment, the allowable frictional resistance may be computed using a coefficient of friction of 0.37 applied to vertical dead-load forces, this value includes a factor of safety of 1.5.

6.4.6. Settlement

Mechanisms for static settlement of below-grade structures include poor bearing support immediately below the structure and consolidation of underlying compressible soils under new loads. We anticipate that the weight of new below-grade manhole structures will typically be similar to, or lighter than, the weight of soil or rock removed. It is our opinion that new below-grade structures will not be at risk of significant static settlement if proper construction techniques are used.

6.4.7. Pipe Bedding

Based on our explorations, general recommendations for onshore pipe bedding placement and compaction are presented below:

- Pipe bedding material, placement, compaction, and shaping should be in accordance with the project specifications, the pipe manufacturer's recommendations, and/or Section 7-09 of the WSDOT Standard Specifications; in case of conflict, project specifications shall prevail. At a minimum, the pipe bedding should meet the gradation requirements for Gravel Backfill for Pipe Zone Bedding Section 9-03.12(3) of the WSDOT Standard Specifications, unless otherwise stated by the project specifications. Bedding material for offshore portion of the pipeline will be specified by the marine outfall design engineer.
- Pipe bedding material should be used as backfill up to at least 12-inches above the crown of the pipe or per other design or manufacturer recommendations.
- Prior to the installation of the pipe, the pipe bedding should be shaped to fit the lower part of the pipe exterior with reasonable closeness to provide continuous support along the pipe.
- Pipe bedding material and/or backfill around the pipe should be placed in layers and tamped around the pipe to obtain complete contact per the project plans. In areas where a trench box is used, the bedding material should be placed before the trench box is advanced.

We anticipate that pipe bedding material in the offshore portions of the alignment will be placed using wet pluviation techniques.

6.4.8. Pipe Settlement

The likely mechanisms for pipe settlement stem from poor bearing support immediately below the pipe and consolidation of underlying compressible soils under new loads. The proposed pipe and backfill in buried sections will weigh only slightly more than the existing soils that it displaces. Therefore, there will be little to no increase in soil pressure below the pipe as a result of placement of the pipe and trench backfill. We estimate that settlement will be less than ½ inch in the glaciomarine drift and glacially consolidated soils and occur relatively rapidly upon loading. Settlement will be negligible where subgrade consists of bedrock.

6.4.9. Thrust Blocks

Where thrust blocks are needed along the pipeline alignment, imposed lateral loads can be resisted by lateral resistance and friction on the base of the blocks. An allowable lateral bearing capacity of 1,500 psf may be used. Friction on the base of the blocks can be evaluated using a coefficient of friction of 0.37. These values include a factor of safety of 1.5. Bearing support for the thrust blocks can be assessed using an allowable soil bearing capacity of 1.5 ksf for fill and soft recessional marine drift, provided the blocks are not founded on very loose/very soft soils or soils containing organic matter.

6.4.10. Seepage Collars

We recommend that seepage collars be included in the onshore design to limit groundwater flow in trench backfill surrounding the pipe. The seepage collars should consist of controlled low strength material (CLSM), concrete or clay and have a watertight seal around the pipe. The seepage collars should extend at least 1 foot into the native soils below and on the sides of the pipe and extend up to 4 feet above the pipe. The seepage collars should be evenly spaced at an interval determined by the designer, along the sloped portion of the alignment at north end of U Avenue, and both sides of the manholes.

The seepage collar between the manhole and shoreline at U Avenue should extend vertically to at least 3 feet above current extreme high water elevation.

6.4.11. Pipe Backfill at Shoreline

Erosion protection of the backfill in the trench as the pipe exits the trench at the shoreline of U Avenue is an important consideration.

We anticipate that riprap armoring will be included based on existing conditions that consist of similar materials. Prior to placement of riprap a layer of crushed rock will be placed. A geotextile may also be included between the crushed rock and existing fill and native soils.

6.5. Earthwork

6.5.1. Upland Pavement Demolition

The pipeline will be constructed in existing pavement and roadway embankments, and near existing structures and utilities in select areas. Any asphalt or cement concrete removed during demolition for the pipeline can be crushed or broken up for reuse as fill or disposed off-site at a permitted disposal site. Asphalt and concrete to be used within fill areas must be broken into pieces less than 6 inches in diameter and be mixed with other backfill soil. No voids should be created in the fill. Asphalt and cement concrete fill should not be used within 12 inches of the pipe, within 6 inches of final subgrade elevation, or below the water table.

6.5.2. Offshore Recent Marine Sediment

Sediment characterization of the nearshore sediments within the potential dredge prism have been sampled by DOF for chemical analysis. The nearshore area passes through a portion of the Port of Anacortes Log Yard Site, an Ecology listed and known contaminated site. Surface sediments within this area are anticipated to be unsuitable for open water disposal. Subsurface sediments may be suitable for open water disposal. It is anticipated that typical Remedial Dredging Methods will be used during dredging of sediments unsuitable for open water disposal.

6.5.3. Subgrade Preparation

We anticipate the onshore pipeline and manhole structures will typically be supported in glaciomarine drift or competent bedrock; the offshore pipeline will be supported on glaciomarine drift or glacially consolidated soils. Although the glaciomarine drift material encountered in our explorations was generally stiff to hard, we have observed zones of soft material to be present within this geologic unit. It is our opinion that the native site soils will provide adequate support for the proposed pipeline in onshore and offshore conditions. If unsuitably soft or organic material is encountered at the pipe or structure subgrade, or if the subgrade becomes disturbed during construction, the Engineer must be notified. Typically, GeoEngineers recommends overexcavation and replacement with a minimum of 1 foot of additional bedding material (described below) or foundation material. When such conditions are encountered onshore, we recommend that a representative of GeoEngineers observe the excavation conditions and evaluate the requirements for overexcavation and replacement. We recommend planning for placement of foundation material below the base of the structures, as discussed below.

6.5.4. Structural and Trench Backfill

We recommend that structural and trench backfill consist of non-plastic soil meeting the WSDOT Standard Specifications for Gravel Borrow, Section 9-03.14(1), Crushed Surfacing Base Course, 9-03.9(3) or Ballast 9-03.9(1). Subject to the approval of the Engineer, the fines content of the backfill may be changed if appropriate based on conditions encountered. For example, during winter construction, it may be appropriate to limit the fines content to less than 5 percent.

During placement of the initial lifts, the backfill material should not be bulldozed into the trench or dropped directly on the pipe. Furthermore, heavy vibratory equipment should not be permitted to operate directly over the pipe until a minimum of 2 feet of backfill has been placed. Backfill should be placed in 8- to 12-inch loose lifts, or that necessary to achieve the required compaction using the mechanical equipment chosen by the contractor. We recommend that the maximum dry density (MDD) be determined based on ASTM International (ASTM) D 1557.

- In settlement sensitive areas, such as roadways, driveways, structural backfill placed at depths greater than 2 feet bgs should be compacted to at least 90 percent of the MDD. The upper 2 feet of structural backfill should be compacted to at least 95 percent of the MDD in existing/future pavement areas.
- Structural fill placed for crushed surfacing base course below pavements should be compacted to at least 95 percent of the MDD.
- Structural fill placed adjacent to the thrust blocks should be compacted to at least 95 percent of the MDD per ASTM D 1557.

6.5.4.1. Suitability of Onshore Materials

The onshore materials within much of the proposed excavation depth for the pipeline consist of existing fill, clay (CL), silt (ML), and silty sand (SM). The existing silt/clay glaciomarine drift encountered during our explorations typically had moisture content above the optimum moisture content for compaction. Since these soils are highly moisture sensitive and have a high natural water content, it will be very difficult to compact these soils to dry densities greater than 90 percent of the MDD as specified. Therefore, we recommend that the existing glaciomarine drift be considered unsuitable for use as structural fill.

The existing fill is variable. Some of the fill consists of granular material with limited fines such that if it is properly segregated it may be suitable for reuse as structural fill. Fill soils with high percentage of fines should be considered unsuitable for reuse.

The project will generate a significant quantity of excavated rock. The excavated rock may be crushed/processed and reused as Crushed Surfacing Base Course, 9-03.9(3) or Ballast 9-03.9(1). Larger rocks may be reused at the shoreline at north end of U Avenue provided material specifications for the riprap are met.

6.5.4.2. Select Import Soils

We recommend that select import be used for backfill in all roadway and driveway crossings to minimize backfilling difficulties and improve quality control compared to using on-site silty soils. The select import fill should consist of sand and gravel with a fines content less than 5 percent based on that portion passing the 3/4-inch sieve. Suitable WSDOT Standard Specifications include Gravel Borrow 9-03.14(1), Crushed Surfacing Base Course, 9-03.9(3) or Ballast 9-03.9(1). Upon approval of the Engineer, a reduced gravel content may be appropriate to limit the MDD of the backfill soil as discussed below.

6.5.4.3. Trench Backfill Settlement

It is our experience that even properly compacted granular backfill over about a 15-foot thickness will experience some settlement within a few months of placement. This is associated with the difficulties achieving uniform compaction that deep in a trench excavation. If crushed rock products are used for entire trench backfill, we anticipate that risk of settlement will be reduced.

6.5.5. Wet Weather Earthwork and Erosion Control

General recommendations relative to earthwork performed in wet weather or in wet conditions are presented below. These recommendations should be incorporated into the contract specifications.

- Earthwork should be performed in small areas to minimize exposure to wet weather. Excavation or the removal of unsuitable soil should be followed promptly by the placement and compaction of clean fill. The size and type of construction equipment used may need to be limited to prevent soil disturbance.
- The ground surface within the construction area should be sealed by a smooth-drum vibratory roller, or equivalent, and under no circumstances should soil be left uncompacted and exposed to moisture that can erode off the jobsite.
- Excavation and placement of structural fill and trench backfill material should be performed under sufficient observation and testing to confirm that the work is completed in accordance with the project specifications and the recommendations contained herein.
- Soil stockpiles should be covered with plastic sheeting if wet weather conditions are anticipated.
- Silt fences should be installed between the work area and sensitive areas to prevent transport of sediment beyond the work area.

6.6. Segment-Specific Pipeline Design Considerations

This section of the report presents a summary of the segment-specific design recommendations for excavation and shoring, construction dewatering, and earthwork for segments along the project alignment. The alignment has been separated into five segments based on the general geologic material encountered during excavation and at the planned pipeline invert elevation. The information in this section is intended to assist the City and the design team in identifying soil conditions that are important for pipeline design and construction specifications development.

6.6.1. Segment 1: Station 0+00 to 10+65 – Fill and Glaciomarine Drift Conditions

We anticipate excavations in this section of the pipeline to extend through fill and glaciomarine drift to depths ranging from 14 to 16 feet bgs (Invert Elevation at about Elevation 2 feet). Soils at the base of the pipeline excavation are anticipated to consist of stiff silt and clay and zones of dense silty sand with variable gravel contents (glaciomarine drift). However, fill soils will be encountered above the glaciomarine drift that may have significant groundwater as previously discussed.

- No bedrock excavation anticipated for this segment. Glacial erratics (large boulders) should be anticipated.
- The on-site soils in this segment can generally be excavated using conventional earthmoving equipment and open-trenching techniques in combination with shoring. Larger debris, including concrete, boulders, and wood/tree debris can be present in fill soils. Large boulders are periodically encountered in excavations in glacially deposited soils.
- Due to the proximity to surrounding structures and roadways, excavations along this segment may require trench support/lateral restraint to support the temporary excavations and maintain the integrity of the surrounding undisturbed soils, minimize disruption of adjacent improvements and structures, as well as protect the personnel working within the excavations.
- Active equivalent fluid earth pressures as defined in Section 6.4.3 for uncontrolled fill and glaciomarine drift will be suitable for design of temporary shoring provided that the soils are properly dewatered.
- The soils expected to be encountered at subgrade level should provide adequate support for the new pipeline and manholes throughout this segment.
- Glaciomarine drift soils encountered in this segment will generally not be acceptable for reuse as structural fill where compaction above 90 percent MDD is necessary. Some portions of the existing granular fill can likely be used as general trench backfill if it meets requirements defined in Section 6.4.4 of this report.
- Near the existing WWTP and from STA 0+00 to STA 7+00, we anticipate that dewatering of the existing fill soils with wellpoints will be necessary to achieve excavation depths as previously discussed.
- There is potential for perched groundwater at the fill/native interface. Dewatering with sumps and pumping will likely be suitable for open trench excavations in areas of this pipeline segment where limited fill soils exist and most of the trench excavation occurs within the glaciomarine drift.

6.6.2. Segment 2: Station 10+65 to 15+60 – Shallow Bedrock Conditions

We anticipate excavations in this section of the pipeline to extend through fill, glaciomarine drift, and/or bedrock to depths ranging from 20 to 38 feet bgs or elevations of about 2 feet. Conditions at the base of the pipeline excavation should consist largely of bedrock with a few areas of glaciomarine drift in a short portion of the segment (station 11+00 to 11+85).

- The on-site soils in this segment can generally be excavated using conventional earthmoving equipment and open-trenching techniques after being fractured with rock blasting. Larger debris, including concrete, boulders, and wood/tree debris can be present in fill soils. Large boulders are periodically encountered in excavations in glacially deposited soils.

- Due to the proximity to surrounding structures and roadways, excavations along this segment will likely require trench support such as shields or trench boxes, with lateral restraint to support the temporary excavations and maintain the integrity of the surrounding undisturbed soils and fractured rocks, minimize disruption of adjacent improvements and structures, as well as protect the personnel working within the excavations.
- Active equivalent fluid earth pressures as defined in Section 6.4.3 for uncontrolled fill and glaciomarine drift will be suitable for design of temporary shoring.
- The soils/rock expected to be encountered at subgrade level should provide adequate support for the new pipeline throughout this segment.
- Glaciomarine drift soils and bedrock encountered in this segment will generally not be acceptable for reuse as structural fill where compaction above 90 percent MDD is necessary. Some portions of the existing granular fill or heavily fractured bedrock can likely be used as general trench backfill if it meets requirements defined in Section 6.5.4 of this report.
- Dewatering with sumps and pumping will likely be suitable for managing groundwater in open trench excavations in most areas of this pipeline segment. However, there is potential for perched groundwater at the fill/native interface, or within rock fractures during excavation in this pipeline segment.

6.6.3. Segment 3: Station 15+60 to 17+40 – Fill, Glaciomarine Drift, and Shoreline Manhole

We anticipate excavations in this section of the pipeline to extend through fill and glaciomarine drift to depths ranging from 15 to 20 feet bgs or elevations of -3 to 3 feet. Soils at the base of the pipeline excavation should consist largely of glaciomarine drift.

- No bedrock excavation anticipated for this segment. Glacial erratics should be anticipated.
- The on-site soils in this segment can generally be excavated using conventional earthmoving equipment and open-trenching techniques. Larger debris, including concrete, boulders, and wood/tree debris can be present in fill soils. Large boulders are periodically encountered in excavations in glacially deposited soils.
- Due to the proximity to surrounding structures and roadways, excavations along this segment will require trench support such as shields or trench boxes, with lateral restraint to support the temporary excavations and maintain the integrity of the surrounding undisturbed soils, minimize disruption of adjacent improvements and structures, as well as protect the personnel working within the excavations.
- Active equivalent fluid earth pressures as defined in Section 6.4.3 for uncontrolled fill and glaciomarine drift will be suitable for design of temporary shoring.
- The soils expected to be encountered at subgrade level should generally provide adequate support for the new pipeline and manholes throughout this segment.
- Glaciomarine drift soils encountered in this segment will generally not be acceptable for reuse as structural fill where compaction above 90 percent MDD is necessary. Some portions of the existing granular fill can likely be used as general trench backfill if it meets requirements defined in Section 6.3.5 of this report.

- Dewatering with open pumping for managing groundwater will likely be suitable for open trench excavations in most areas of this pipeline segment that is excavated in the native glaciomarine drift soils. However, there is potential for perched groundwater at the fill/native interface, during excavation in this pipeline segment.
- Due to the close proximity of the shoreline, installation of a cut off wall, berm, or coffer dam will likely be required at approximately station 17+50 to prevent seawater inundation during excavation. If the risk of seawater inundation is sufficiently mitigated, dewatering with open pumping will likely be suitable for trench excavations in most areas of this pipeline segment.
- The trench backfill may result in hydraulic connectivity with tidal waters. Therefore, we recommend a series of seepage collars be included in the design to reduce subsurface flow within the trench backfill, especially near the interface with the shoreline.

6.6.4. Segment 4: Station 17+40 to 21+30 – Offshore Buried Section

We anticipate excavations in this section of the pipeline to extend through recent sediments, glaciomarine drift, and glacially consolidated soils to depths ranging from 7 to 10 feet below the mudline or elevations of -5 to -22 feet. Soils at the base of the pipeline excavation should consist largely of glacially consolidated soils with some glaciomarine drift close to the shore.

- No bedrock excavation anticipated for this segment. Glacial erratics should be anticipated.
- The on-site soils in this segment will need to be excavated using barge supported earthmoving equipment and mechanical dredging techniques as previously discussed. Large boulders were encountered in our excavations in the glacially deposited soils.
- Active equivalent fluid earth pressures as defined in Section 6.4.3 for recent marine sediments and glaciomarine drift will be suitable for design of temporary shoring (if warranted).
- The soils expected to be encountered at subgrade level should generally provide adequate support for the new pipeline and manholes throughout this segment.
- Site soil in this segment will be handled and disposed in accordance with recommendations provided by the project environmental consultant DOF.
- This segment of the alignment will be completed below water. Work will need to be planned around tides and currents based on permitting requirements and capability of contractor's equipment.

6.6.5. Segment 5: Station 21+30 to 28+71 – Offshore Bottom Lay Section

Although no explorations are available in this segment, we anticipate that onsite soils in this pipeline segment will consist of thin layers of recent sediments overlying glaciomarine drift, and glacially consolidated soils. The pipeline in this segment will be anchored in place using precast concrete anchors. Soils at the base of the pipeline excavation should consist largely of glacially consolidated soils.

- No rock excavation is anticipated for this segment. However, Large cobbles and boulders along the alignment may require relocation per the plans and specs.
- No excavation is anticipated for this segment.

- The soils expected to be encountered at subgrade level should generally provide adequate support for the concrete anchors throughout this segment. Some settlement may occur; however, this type of pipe install typically is quite flexible.
- This segment of the alignment will be completed below water. Work will need to be planned around tides and currents based on permitting requirements and capability of contractor's equipment.

6.7. Pavement Reconstruction Considerations

The pipeline is planned to be constructed within the paved portions of T Avenue, 3rd Street, and U Avenue. For all newly constructed pavements it is imperative that the pipe excavations be backfilled and compacted to the specifications described in Section 6.5.4 of this report to provide the desired pavement performance. We recommend that sufficient monitoring occur during construction to confirm that the pipe subgrade and backfill is adequately prepared prior to paving.

At the time of this report, specific design parameters (traffic data) were not available to develop pavement sections. We reviewed the "City of Anacortes Street Classification Map, 2018" which identifies the majority of the roads along the alignment as local roads with the exception of T Avenue which is identified as a Minor Arterial. We recommend that asphalt pavement reconstruction conform to City of Anacortes Standards for minor arterial and non-arterial streets (City of Anacortes Standards, STR-15.2), which provides the following minimum pavement sections (or other per the project plans and specifications):

- Minor Arterial Street (T Avenue)
 - 3 inches of asphalt concrete Class B per WSDOT Standard Specifications.
 - 3 inches minimum of crushed surfacing top course per WSDOT Standard Specifications 9-03.9(3), compacted to at least 95 percent of the MDD based on ASTM D 1557 test procedure. (GeoEngineers recommends crushed surface base course rather than top course.)
 - 8 inches of gravel borrow in accordance with WSDOT Standard Specifications, 9-03.14(1), compacted to at least 95 percent of the MDD based on ASTM D 1557 test procedure.
- Non-arterial Streets (All other streets)
 - 3 inches of asphalt concrete Class B per WSDOT Standard Specifications.
 - 3 inches minimum of crushed surfacing top course per WSDOT Standard Specifications 9-03.9(3), compacted to at least 95 percent of the MDD based on ASTM D 1557 test procedure.
 - 6 inches of gravel borrow in accordance with WSDOT Standard Specifications, 9-03.14(1), compacted to at least 95 percent of the MDD based on ASTM D 1557 test procedure.

GeoEngineers can complete a detailed pavement design to potentially reduce the pavement sections, if desired, should traffic data be available.

6.8. Construction Monitoring

The project has variable subsurface conditions and some complex geotechnical issues. We recommend that GeoEngineers provide consultation and monitoring during construction. It is our experience that providing geotechnical support from the design team during bidding, preconstruction meetings and during the construction activities facilitates the contractor, progress and schedule and helps protect the owner from change orders. On this project, we recommend geotechnical involvement in at least the following aspects of the project:

- Dewatering and shoring considerations.
- Subgrade conditions for the pipeline, roadways, and other infrastructure.
- Approval of backfill sources.
- Monitoring and testing backfill in the trenches, per quality control specifications.
- General consultation to the owner, design team and contractor, as requested.

7.0 LIMITATIONS

We have prepared this geotechnical design report for HDR Engineering, City of Anacortes, and members of the design team for use in the design of the City of Anacortes Wastewater Treatment Plant Outfall project in Anacortes, Washington.

Within the limitations of scope, schedule and budget, our services have been executed in accordance with generally accepted practices in the field of geotechnical engineering in this area at the time this report was prepared. The conclusions, recommendations, and opinions presented in this report are based on our professional knowledge, judgment, and experience. No warranty or other conditions, express or implied, should be understood.

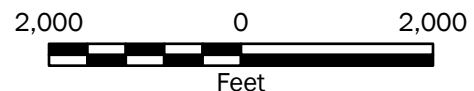
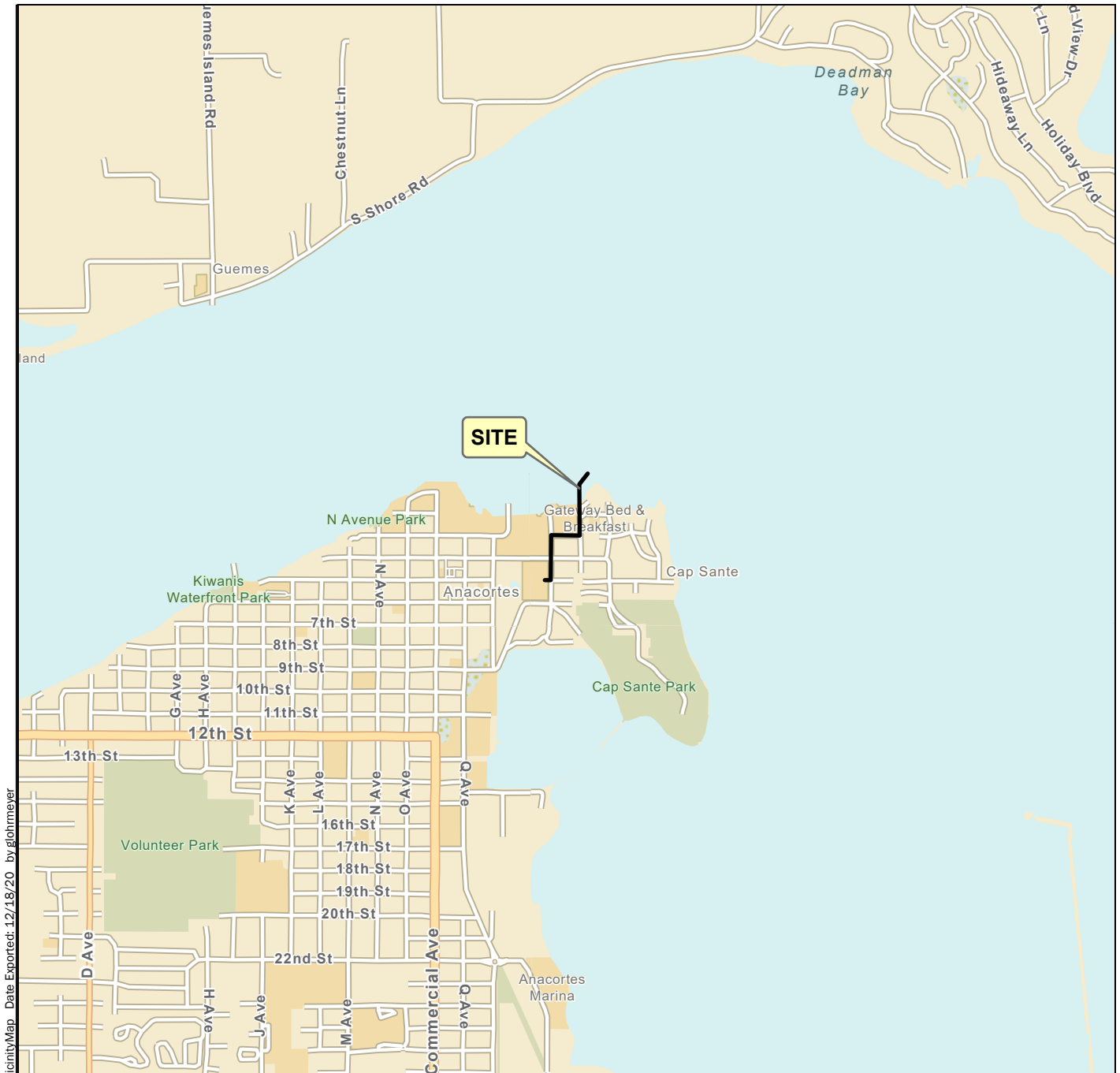
Any electronic form, facsimile or hard copy of the original document (email, text, table, and/or figure), if provided, and any attachments are only a copy of the original document. The original document is stored by GeoEngineers, Inc. and will serve as the official document of record.

Please refer to Appendix F titled “Report Limitations and Guidelines for Use” for additional information pertaining to use of this report.

8.0 REFERENCES

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Vicinity Map

Anacortes WWTP Outfall
Anacortes, Washington



Figure 1

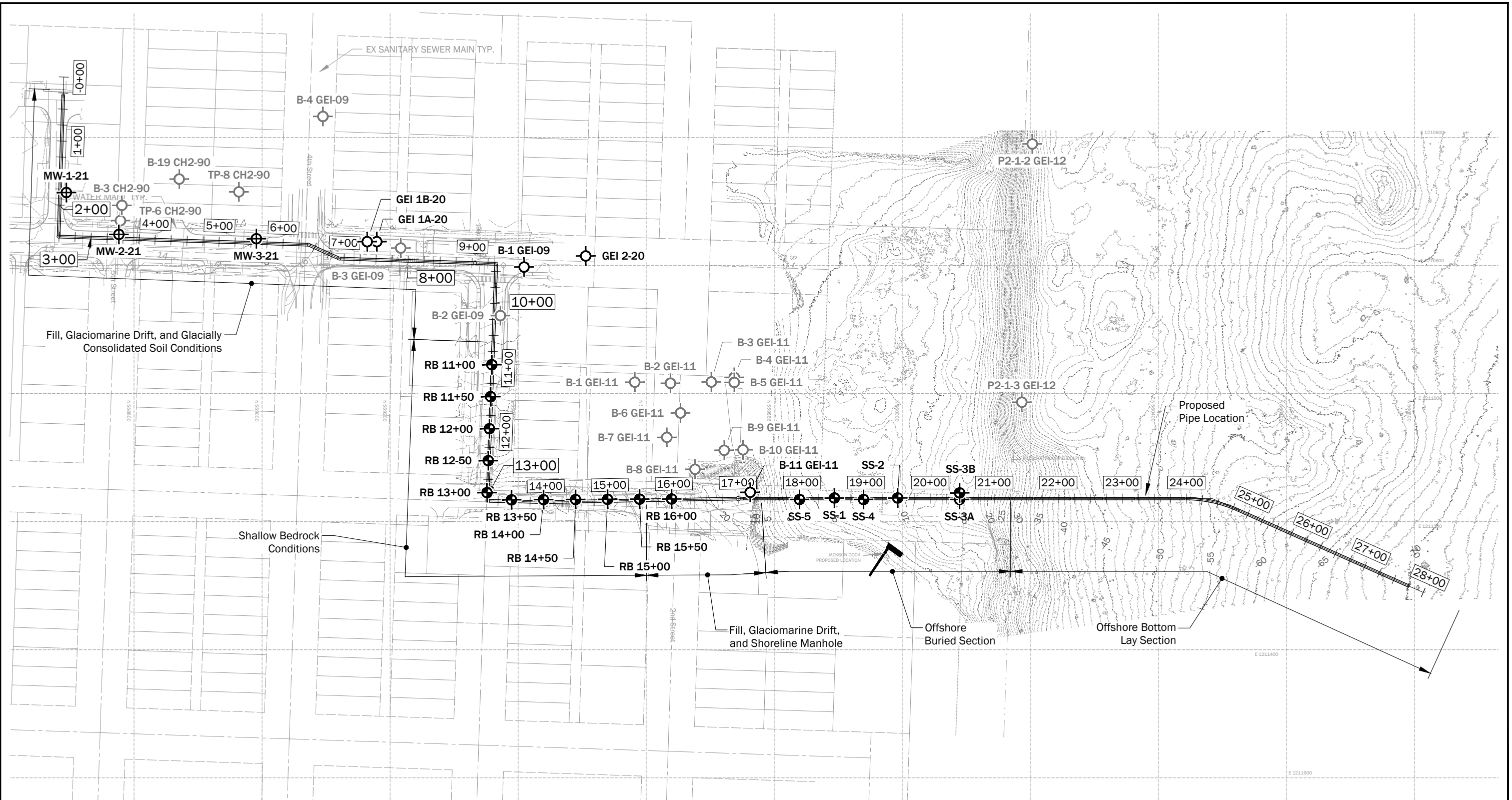
Notes:

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

Data Source: ESRI

Projection: Name: NAD 1983 UTM Zone 10N

\\geoengineers.com\WAN\Projects\0382032\CAD\02\Geotech\038203202_F02-F05_Site Plan and Profile.dwg TAB:F02 Date Exported: 03/25/21 - 9:04 by mwwoods



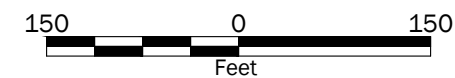
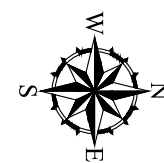
Notes:

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

Data Source: Base from HDR dated 11/11/2020.
Designs Transmitted 2/22/2021.

Projection: NAD83 Washington State Planes, North Zone, US Foot

Legend	
MW-1-21	Boring by GeoEngineers, Inc., 2021
RB 11+00	Boring by GeoEngineers, Inc., 2020
GEI-1A-20	Historical Exploration by GeoEngineers, Inc., (GEI- Current Study) - Appendix A
B-4	Historical Exploration by GeoEngineers, Inc. or others, (Sample Year) - Appendix E
—	Proposed Outfall Pipe and Stationing



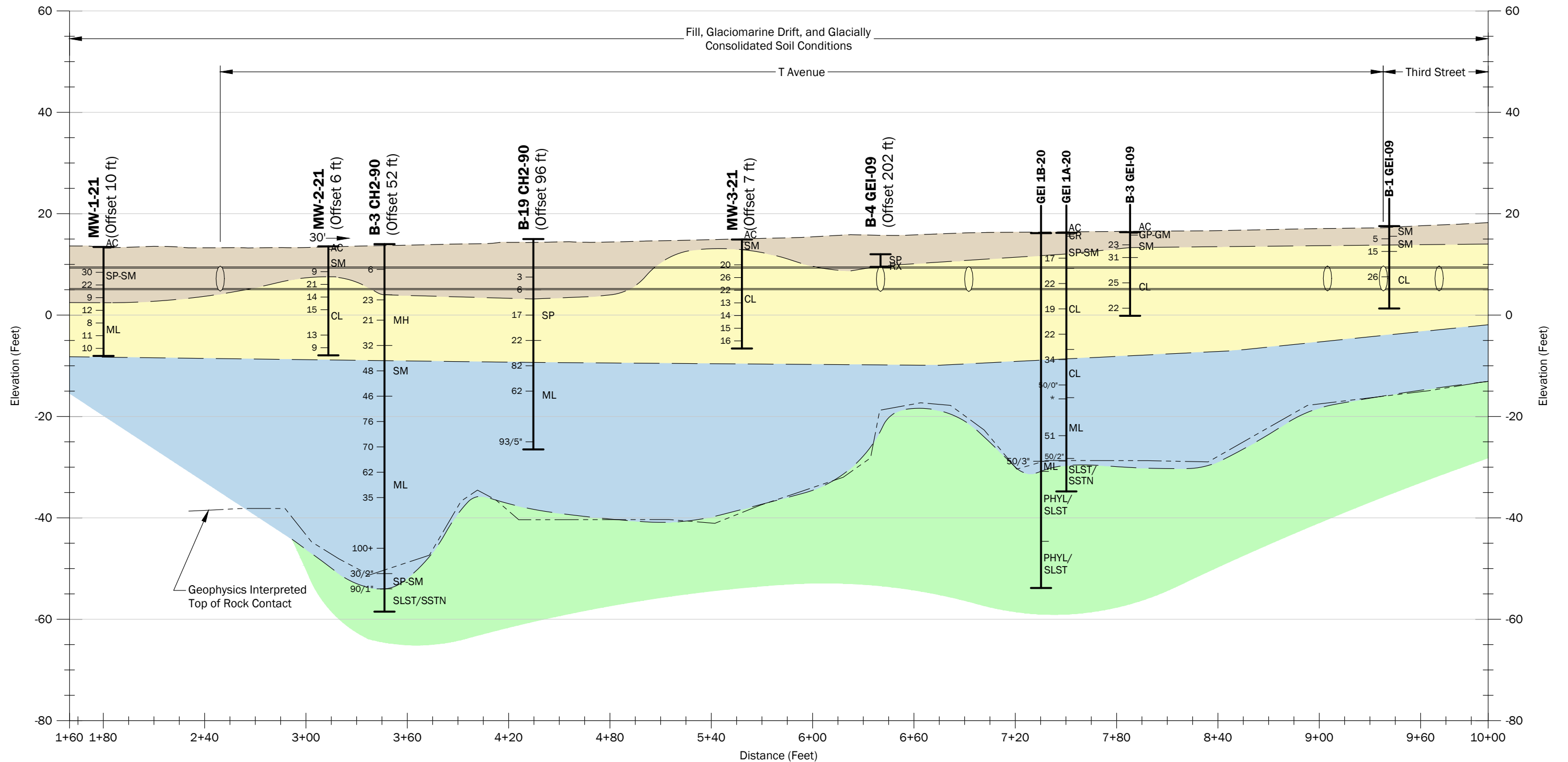
Site and Exploration Plan

Anacortes WWTP Outfall
Anacortes, Washington



Figure 2

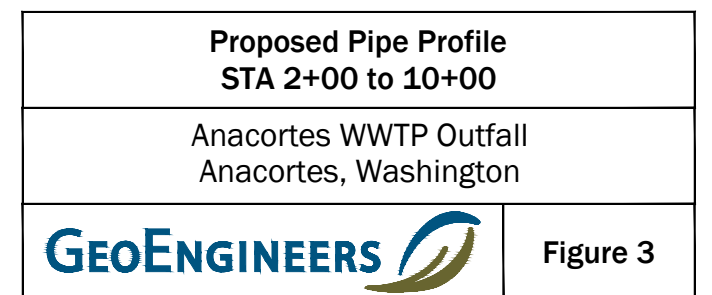
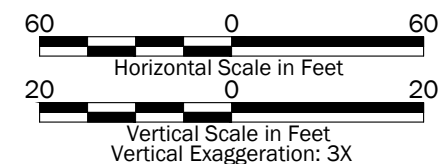
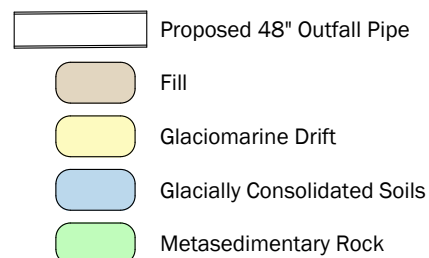
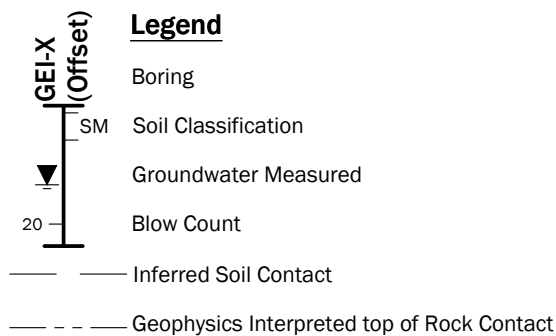
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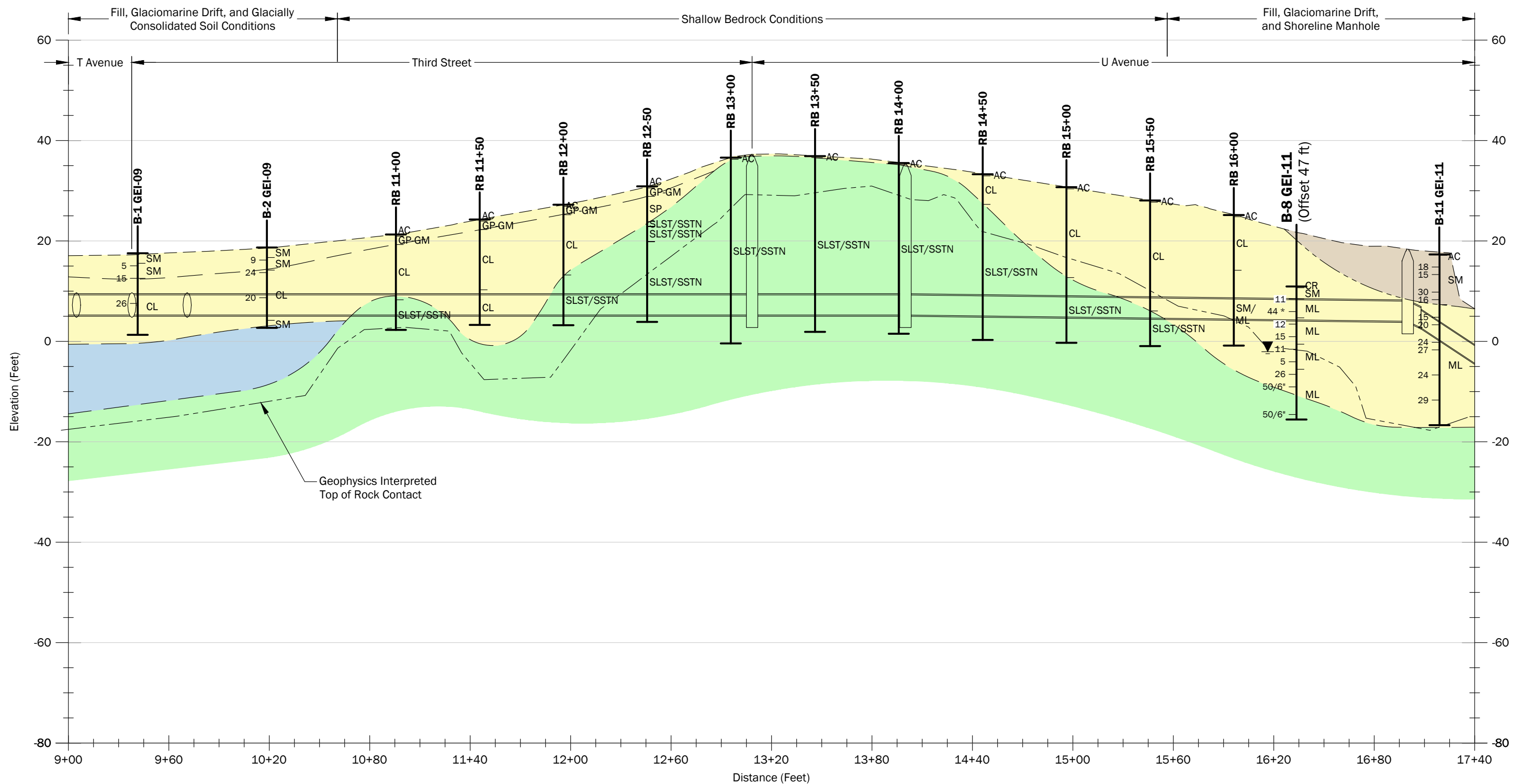
Notes:

1. The subsurface conditions shown are based on interpolation between widely spaced explorations and should be considered approximate; actual subsurface conditions may vary from those shown.
2. This figure is for informational purposes only. It is intended to assist in the identification of features discussed in a related document. Data were compiled from sources as listed in this figure. The data sources do not guarantee these data are accurate or complete. There may have been updates to the data since the publication of this figure. This figure is a copy of a master document. The hard copy is stored by GeoEngineers, Inc. and will serve as the official document of record.

Datum: NAVD 88, unless otherwise noted.



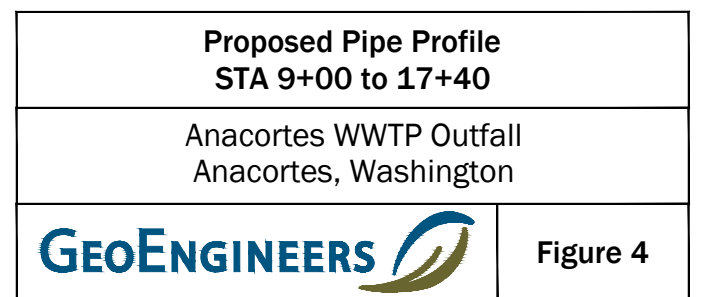
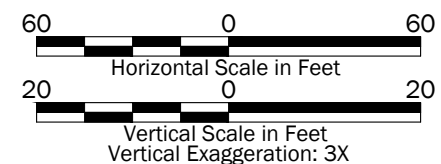
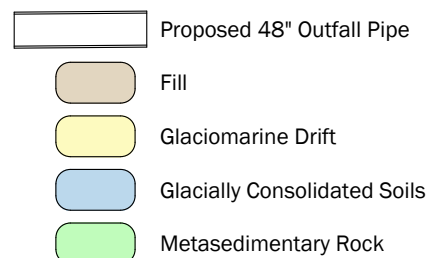
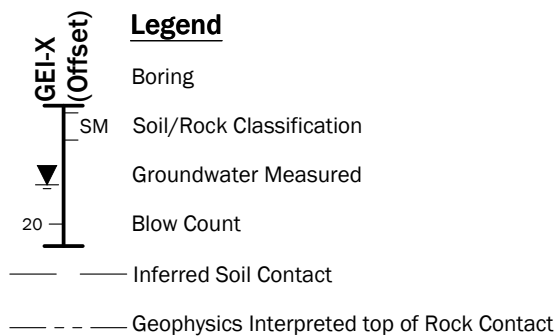
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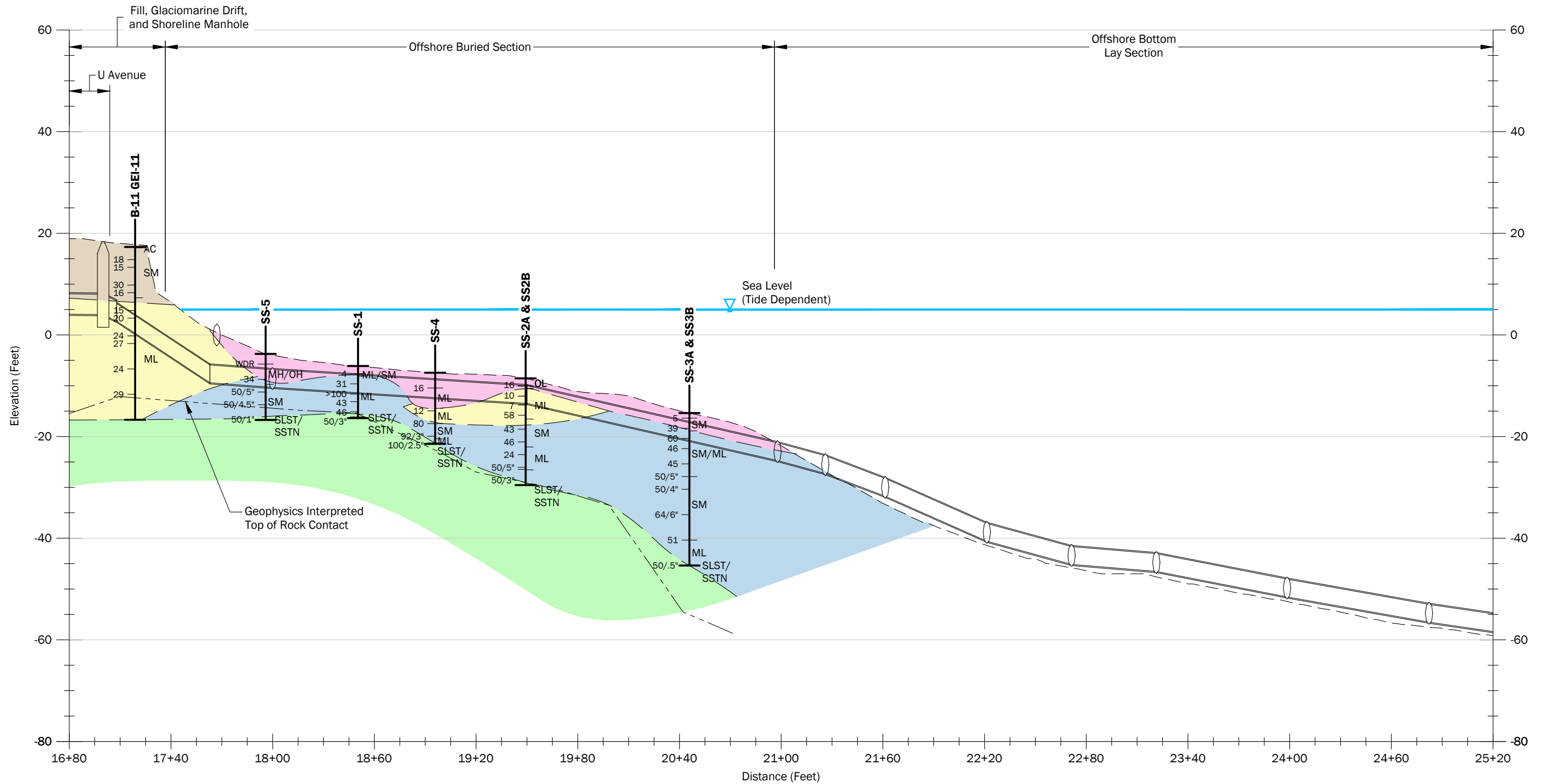
Notes:

1. The subsurface conditions shown are based on interpolation between widely spaced explorations and should be considered approximate; actual subsurface conditions may vary from those shown.
2. This figure is for informational purposes only. It is intended to assist in the identification of features discussed in a related document. Data were compiled from sources as listed in this figure. The data sources do not guarantee these data are accurate or complete. There may have been updates to the data since the publication of this figure. This figure is a copy of a master document. The hard copy is stored by GeoEngineers, Inc. and will serve as the official document of record.

Datum: NAVD 88, unless otherwise noted.



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Notes:

1. The subsurface conditions shown are based on interpolation between widely spaced explorations and should be considered approximate; actual subsurface conditions may vary from those shown.
2. This figure is for informational purposes only. It is intended to assist in the identification of features discussed in a related document. Data were compiled from sources as listed in this figure. The data sources do not guarantee these data are accurate or complete. There may have been updates to the data since the publication of this figure. This figure is a copy of a master document. The hard copy is stored by GeoEngineers, Inc. and will serve as the official document of record.

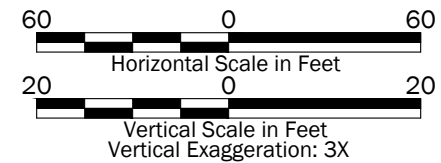
Datum: NAVD 88, unless otherwise noted.

GEI-X
(Offset)
SM
▼
20

Legend

- Boring
- Soil/Rock Classification
- Groundwater Measured
- SPT Blow Count
- Inferred Soil Contact
- Geophysics Interpreted top of Rock Contact

- Proposed 48" Outfall Pipe
- Fill
- Glaciomarine Drift
- Glacially Consolidated Soils
- Metasedimentary Rock
- Recent Sediment



Proposed Pipe Profile STA 16+80 to 25+20	
Anacortes WWTP Outfall Anacortes, Washington	
GEOENGINEERS	Figure 5

APPENDIX A

Field Explorations

APPENDIX A

FIELD EXPLORATIONS

Geotechnical Borings

GeoEngineers, Inc. (GeoEngineers) explored upland subsurface conditions along the project corridor by completing three geotechnical borings on April 6, 7, and 10, 2020. The upland borings and rock cores were completed with a truck mounted drill rig subcontracted to GeoEngineers. Overwater subterranean conditions were evaluated at the project corridor by completing seven geotechnical borings on November 16 through 19, 2020. The borings were completed using a track-mounted drill rig and barge subcontracted to Widener and Associates. Monitoring wells were installed on March 9, 2021. The explorations were advanced using hollow-stem auger and rock core drilling techniques. The borings were backfilled with a bentonite and cement grout mixture at the conclusion of each exploration. The approximate locations of the explorations are shown in the Site and Exploration Plan, Figure 2. The locations of the overwater explorations were determined by professional grade global positions system (GPS) in the field. Upland boring locations were determined by recreational grade GPS and should be considered approximate.

Soil samples from the borings were obtained using the Standard Penetration Test (SPT) method and ASTM International (ASTM) D 1586. This method involves driving a split spoon sampler a total of 18 or 24 inches using a 140-pound automatic hammer free falling 30 inches. Samples were also obtained using a 3.0-inch outside diameter modified California sampler driven into the soil with a 140-pound hammer free-falling 30 inches. For both sampler types, the number of blows required for each 6 inches of penetration was recorded. The number of blows required to drive the sampler the last or middle 12 inches are recorded in the boring logs. Where a California sampler was used, the blow counts have been converted to standard N blow counts using the Lacroix-Horn conversion method. The converted N values are presented on the boring logs. The samples were placed in plastic bags to maintain the moisture content and transported back to our laboratory for analysis and testing.

The explorations were continuously monitored by a geological engineer or geologist from our firm who examined and classified the soils encountered, obtained representative soil samples, observed groundwater conditions and prepared a detailed log of each boring. Soils encountered were classified visually in general accordance with ASTM D-2488-90, which is described in Figure A-1. An explanation of our boring log symbols is also shown in Figure A-1.

The geotechnical boring logs are presented in Figures A-3 through A-12. The exploration logs are based on our interpretation of the field and laboratory data and indicate the various types of soils encountered. It also indicates the depths at which these soils or their characteristics change, although the change might actually be gradual. If the change occurred between samples in the boring, it was interpreted.

Rock Borings

GeoEngineers explored upland subsurface conditions along the project corridor by completing 11 rock borings on November 17, 2020. The rock borings along the project corridor using an track mounted Furukawa rock drill HCR 1200 subcontracted to GeoEngineers. The explorations were advanced using pneumatic percussion drilling techniques and backfilled with a bentonite and cement grout mixture at the conclusion of each exploration. The approximate locations of the explorations are shown in the Site and

Exploration Plan, Figure 2 and were determined by recreational grade GPS and should be considered approximate.

Air or pneumatic percussion drilling is typically employed when auger, mud rotary, or rock coring techniques are not effective. It typically employs a blade, tricone bit, or downhole hammer to penetrate and compressed air is used as the drill flush to cool and lubricate the bit and carry drill cuttings to the surface. Due to the nature of this technique only small chip samples are recovered from the strata that is being drilled through. The explorations and drilling chips were continuously monitored by a geological engineer or geologist from our firm who examined and classified the soils and rock encountered, observed groundwater conditions and prepared a detailed log of each boring. The rock boring logs are presented in A-13 through A-26. Photos of rock cores collected during the geotechnical boring phase are presented in Figures A-27 through A-32.

The exploration logs are based on our interpretation of the field and laboratory data and indicate the various types of soils encountered. It also indicates the depths at which these soils or their characteristics change, although the change might actually be gradual. If a change is noted in the boring, it was interpreted.

Monitoring Well Drilling and Installation

Three hollow stem auger explorations were completed as monitoring wells. Monitoring wells were constructed using 2-inch diameter, Schedule 40, threaded, polyvinyl chloride (PVC) casing. Well screens consisted of 2-inch diameter, Schedule 40 PVC with 0.010-inch machine-cut slots. Locking caps were placed over the well casing.

A filter pack consisting of silica sand was placed around the well screen to limit entry of fine-grained particles from the surrounding formation into the wells. The filter pack in each well extended from the bottom of the well screen to at least approximately 2 to 3 feet above the top of the well screen.

The annular seal in each well consists of a minimum 3-feet thick concrete surface seal overlying bentonite chips overlying the filter pack. Protective steel monuments were installed over the wells and flush with the ground surface. Monitoring well construction details are shown on the exploration logs.

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS	
			GRAPH	LETTER		
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES	
		(LITTLE OR NO FINES)		GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES	
		GRAVELS WITH FINES		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES	
		(APPRECIABLE AMOUNT OF FINES)		GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES	
	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	SAND AND SANDY SOILS	CLEAN SANDS		SW	WELL-GRADED SANDS, GRAVELLY SANDS
			(LITTLE OR NO FINES)		SP	POORLY-GRADED SANDS, GRAVELLY SAND
SANDS WITH FINES				SM	SILTY SANDS, SAND - SILT MIXTURES	
(APPRECIABLE AMOUNT OF FINES)				SC	CLAYEY SANDS, SAND - CLAY MIXTURES	
FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS, ROCK FLOUR, CLAYEY SILTS WITH SLIGHT PLASTICITY	
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS	
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY	
	MORE THAN 50% PASSING NO. 200 SIEVE	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS SILTY SOILS
					CH	INORGANIC CLAYS OF HIGH PLASTICITY
					OH	ORGANIC CLAYS AND SILTS OF MEDIUM TO HIGH PLASTICITY
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS	

NOTE: Multiple symbols are used to indicate borderline or dual soil classifications

Sampler Symbol Descriptions

	2.4-inch I.D. split barrel
	Standard Penetration Test (SPT)
	Shelby tube
	Piston
	Direct-Push
	Bulk or grab
	Continuous Coring

Blowcount is recorded for driven samplers as the number of blows required to advance sampler 12 inches (or distance noted). See exploration log for hammer weight and drop.

"P" indicates sampler pushed using the weight of the drill rig.

"WOH" indicates sampler pushed using the weight of the hammer.

NOTE: The reader must refer to the discussion in the report text and the logs of explorations for a proper understanding of subsurface conditions. Descriptions on the logs apply only at the specific exploration locations and at the time the explorations were made; they are not warranted to be representative of subsurface conditions at other locations or times.

ADDITIONAL MATERIAL SYMBOLS

SYMBOLS		TYPICAL DESCRIPTIONS
GRAPH	LETTER	
	AC	Asphalt Concrete
	CC	Cement Concrete
	CR	Crushed Rock/Quarry Spalls
	SOD	Sod/Forest Duff
	TS	Topsoil

Groundwater Contact



Measured groundwater level in exploration, well, or piezometer



Measured free product in well or piezometer

Graphic Log Contact



Distinct contact between soil strata



Approximate contact between soil strata

Material Description Contact



Contact between geologic units



Contact between soil of the same geologic unit

Laboratory / Field Tests

%F	Percent fines
%G	Percent gravel
AL	Atterberg limits
CA	Chemical analysis
CP	Laboratory compaction test
CS	Consolidation test
DD	Dry density
DS	Direct shear
HA	Hydrometer analysis
MC	Moisture content
MD	Moisture content and dry density
Mohs	Mohs hardness scale
OC	Organic content
PM	Permeability or hydraulic conductivity
PI	Plasticity index
PL	Point load test
PP	Pocket penetrometer
SA	Sieve analysis
TX	Triaxial compression
UC	Unconfined compression
VS	Vane shear

Sheen Classification

NS	No Visible Sheen
SS	Slight Sheen
MS	Moderate Sheen
HS	Heavy Sheen

Key to Exploration Logs



Figure A-1

UNIFIED ROCK CLASSIFICATION SYSTEM (URCS)*

BASIC ELEMENTS

DEGREE OF WEATHERING

WEATHERED		ALTERED		REPRESENTATIVE	
SAND SIZE COMPLETELY DECOMPOSED STATE (CDS) E	GRAVEL SIZE PARTLY DECOMPOSED STATE (PDS) D	STAINED STATE (STS) C	VISUALLY FRESH STATE (VFS) B	MICRO FRESH STATE (HAND LENSE) (MFS) A	
PLASTIC	NON-PLASTIC	PLASTIC	NON-PLASTIC	COMPARE TO FRESH STATE	
				UNIT WEIGHT, RELATIVE ABSORPTION	

ESTIMATED STRENGTH

REMOLDING		REACTION TO IMPACT OF 1 LB. BALLPEEN HAMMER		
"MOLDABLE" (FRIABLE) (MBL) E	"CRATERS" (SHEARS) (CQ) D	"DENTS" (COMPRESSIVE) (DQ) C	"PITS" (TENSIONAL) (PQ) B	"REBOUNDS" (ELASTIC) (RQ) A
<1,000 PSI (<7 MPa)	1,000 to 3,000 PSI (7 to 21 Ma)	3,000 to 8,000 PSI (21 to 55 MPa)	3,000 to 15,000 PSI (55 to 103 MPA)	>15,000 PSI (>103 MPa)

DISCONTINUITIES

TRANSMITS WATER				LATENT PLANES OF SEPARATION (LPS) C	SOLID- PREFERRED BREAKAGE (SPB) B	SOLID- RANDOM BREAKAGE (SRB) A
YES	NO	YES	NO			
3-DIMENSIONAL PLANES OF SEPARATION (3D) E		2-DIMENSIONAL PLANES OF SEPARATION (2D) D				
INTERLOCK		ATTITUDE				

UNIT WEIGHT

LESS THAN 130 LBS/CU FT (2.10 Mg/CU M) (<130) E	130 TO 140 LBS/CU FT (2.10 TO 2.25 Mg/CU M) (130) D	140 TO 150 LBS/CU FT (2.25 TO 2.40 Mg/CU M) (140) C	150 TO 160 LBS/CU FT (2.40 TO 2.55 Mg/CU M) (150) B	GREATER THAN 160 LBS/CU FT (2.55 Mg/CU M) (>160) A
---	--	--	--	--

DESIGN NOTATION

WEATHERING	STRENGTH	DISCONTINUITY	WEIGHT
A-E	A-E	A-E	A-E

* Williamson, Douglas A., 1984, Unified Rock Classification System: Association of Engineering Geologists Bulletin, Vol. XXI, No. 3, pp. 345-354



ROCK CLASSIFICATION SYSTEM

FIGURE A-2

Drilled	Start 4/6/2020	End 4/6/2020	Total Depth (ft)	51	Logged By Checked By	WW AF2	Driller	Holocene Drilling	Drilling Method	Hollow-stem Auger/ Rock Core	
Surface Elevation (ft) Vertical Datum			16 NAVD88		Hammer Data		Autohammer 140 (lbs) / 30 (in) Drop		Drilling Equipment		D120
Easting (X) Northing (Y)			1210763 559179		System Datum		WA State Plane North NAD83 (feet)		Groundwater not observed at time of exploration		
Notes:											

Elevation (feet)	Depth (feet)	FIELD DATA				Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
		Interval Recovered Soil (in)/Rock (%)	Blows/foot	Sample/Run Testing	RQD %						
0	0						AC	4 inches asphalt concrete pavement			
							CR	4 inches base course			
							SP-SM	Brown fine to coarse sand with silt and gravel (medium dense, moist) (fill)			
5	5	12	17	1 %F					10	13	
10	10	18	22	2 MC			CL	Tan-brown with slight iron staining clay with sand and occasional gravel (very stiff, moist) (glaciomarine drift)	19		
15	15	18	19	3 SA					23	71	
20	20	18	22	4 AL				Decreased sand content with depth	23		AL (LL = 26, PI = 10)
25	25	18	34	5 SA			CL	Gray clay with silt and sand (hard, moist) (glacially consolidated soils)	14	56	
30	30	0	50/0"	6				Granite encountered from 30 to 32¾ feet			Switched to core H = 6
35	35	6	*	7			ML	Gray silt with occasional sand			* No blow counts - cored

Note: See Figure A-1 for explanation of symbols; Figure A-2 for unified rock classification system.
Coordinates Data Source: Horizontal approximated based on Aerial Imagery. Vertical approximated based on Topographic Survey.

Log of Boring GEI-1A-20



Project: Anacortes WWTP Outfall
Project Location: Anacortes, Washington
Project Number: 0382-032-01

Figure A-3
Sheet 1 of 2

Date: 12/14/20 Path: \\GEOENGINEERS.COM\WAN\PROJECTS\0_0382032\GINT\038203201.GPJ DBL\Library\Library\GEOENGINEERS_DF_STD_US_JUNE_2017.GLB\GIS\GEO TECH_SOIL_ROCK_SF_NO_GW

Elevation (feet)	FIELD DATA				Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
	Depth (feet)	Interval Recovered Soil (in)/Rock (%)	Blows/foot	Sample/Run Testing						
35										
40		18	51	8 AL			Becomes hard	15		AL (LL = 34, PI = 10) Chattering drilling at 42 feet
45		0 100	50/2"	9 Run 1	SLST/ SSTN		Siltstone/sandstone, dark gray with white quartz veins, fine grained, medium hard to hard, thinly spaced, discontinuities in poor condition (metasedimentary rock)			Only returns were sloughed Samples were mostly in small pieces, less than 1-inch bagged Gray rock chips
				Run 2			Bedrock interbedded with fine sand and some silt			Mohs = 5-6
50				Run 3						

Log of Boring GEI-1A-20 (continued)



Project: Anacortes WWTP Outfall
Project Location: Anacortes, Washington
Project Number: 0382-032-01

Figure A-3
Sheet 2 of 2

Drilled	Start 4/10/2020	End 4/10/2020	Total Depth (ft)	70	Logged By Checked By	WW AF2	Driller	Holocene Drilling	Drilling Method	Hollow-stem Auger/ Rock Core	
Surface Elevation (ft) Vertical Datum			16 NAVD88		Hammer Data		Autohammer 140 (lbs) / 30 (in) Drop		Drilling Equipment		D120
Easting (X) Northing (Y)			1210763 559164		System Datum		WA State Plane North NAD83 (feet)		Groundwater not observed at time of exploration		
Notes:											

Elevation (feet)	FIELD DATA					Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
	Interval	Recovered Soil (in)/Rock (%)	Blows/foot	Sample/Run Testing	RQD %						
0								See Log of Boring GEI-1A-20 for soil description to 45 feet			Drilled to 45 feet before starting sampling
5											
10											
15											
20											
25											
30											
35											

Note: See Figure A-1 for explanation of symbols; Figure A-2 for unified rock classification system.
Coordinates Data Source: Horizontal approximated based on Aerial Imagery. Vertical approximated based on Topographic Survey.

Log of Boring GEI-1B-20	
	Project: Anacortes WWTP Outfall
	Project Location: Anacortes, Washington
	Project Number: 0382-032-01
Figure A-4 Sheet 1 of 2	

Drilled	Start 4/7/2020	End 4/7/2020	Total Depth (ft)	90	Logged By Checked By	WW AF2	Driller	Holocene Drilling	Drilling Method	Hollow-stem Auger/ Rock Core	
Surface Elevation (ft) Vertical Datum			Undetermined NAVD88		Hammer Data		Autohammer 140 (lbs) / 30 (in) Drop		Drilling Equipment		D120
Easting (X) Northing (Y)					System Datum		WA State Plane North NAD83 (feet)		Groundwater not observed at time of exploration		
Notes:											

Elevation (feet)	FIELD DATA				Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
	Depth (feet)	Interval Recovered Soil (in)/Rock (%)	Blows/foot	Sample/Run Testing						
0						ML	Brown with slight iron staining sandy silt with occasional fine gravel (very stiff, moist) (glaciomarine drift)			
5		10	50/4"	1						
		1	50/1"	2		PHYL	Phyllite, gray with white, fine grained, slightly weathered, hard, closely spaced, rebound quality (metasedimentary rock)			Unit weight = 2.89 cm ³ ; Mohs = 4-5
		100		Run 1						
10		100		Run 2						Mohs = 5-6
		100		Run 3			Zones of conglomerate			Mohs = 5-6
15		100		Run 4						Mohs = 6
		100		Run 5						Mohs = 5-6
20		100		Run 6						Unit weight = 2.99 cm ³
		100		Run 7						UCS 21.8 to 22.5 feet = 8,170 psi Mohs = 6-7
25		100		Run 8						Mohs = 5-6
30		100								Mohs = 5-6
35										

Note: See Figure A-1 for explanation of symbols; Figure A-2 for unified rock classification system.
Coordinates Data Source: Horizontal approximated based on Aerial Imagery. Vertical approximated based on Topographic Survey.

Log of Boring GEI-2-20



Project: Anacortes WWTP Outfall
Project Location: Anacortes, Washington
Project Number: 0382-032-01

Figure A-5
Sheet 1 of 3

Date: 12/14/20 Path: \\GEOENGINEERS.COM\WAN\PROJECTS\0_0382032\GINT\038203201.GPJ DBL\Library\Library\GEOENGINEERS_DF_STD_US_JUNE_2017.GLB\GEIS_GEO TECH_SOIL_ROCK_SF_NO_GW

Elevation (feet)	FIELD DATA				Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
	Depth (feet)	Interval Recovered Soil (in)/Rock (%)	Blows/foot	Sample/Run Testing	RQD %					
35				Run 9	43					Mohs = 5-6
					67					Unit weight = 2.19 cm ³
40		100		Run 10	79					Mohs = 5-6
45		100		Run 11	69					UCS 44.3 to 45 feet = 5,930 psi Mohs = 5-6
50		100		Run 12	95					Mohs = 5-6
55		73		Run 13	9	PHYL	Phyllite, light green-gray to dark gray, fine grained, slightly weathered, strong, rebound quality, fractures/discontinuities, very closely spaced Highly fractured zone from 56 to 57 feet			Mohs = 4-5
60		100		Run 14	50					Mohs = 4-5
65		100		Run 15	70	PHYL	Phyllite, light green to gray to dark gray, fine to coarse grained, slightly weathered, strong			UCS 63.5 to 64.5 feet = 9,170 psi Mohs = 5-6
70		100		Run 16	58					Unit weight = 2.81 cm ³ ; Mohs = 5-6
		100		Run 17	0					Mohs = 4-5
		36		Run 18	0					
75		100		Run 19	0					Mohs = 4-5
		43		Run 20	0					
		36		Run 21	0					

Log of Boring GEI-2-20 (continued)



Project: Anacortes WWTP Outfall
Project Location: Anacortes, Washington
Project Number: 0382-032-01

Figure A-5
Sheet 2 of 3

Date: 12/14/20 Path: \\GEOENGINEERS.COM\WAN\PROJECTS\0_0382032\GINT\038203201.GPJ DBL\Library\Library\GEOENGINEERS_DF_STD_US_JUNE_2017\GLB\GIS\GEOTECH_SOIL_ROCK_SF_NO_GW

Elevation (feet)	FIELD DATA				Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
	Depth (feet)	Interval Recovered Soil (in)/Rock (%)	Blows/foot	Sample/Run Testing	RQD %					
	63			Run 22	0					Mohs = 4-5
	90			Run 23	87					Unit weight = 2.70 cm ³
	80	100		Run 24	62					Mohs = 5-6
	85	92		Run 25	76					UCS 82.8 to 84.1 feet = 5,190 psi
	90									Mohs = 5-6

Log of Boring GEI-2-20 (continued)



Project: Anacortes WWTP Outfall
 Project Location: Anacortes, Washington
 Project Number: 0382-032-01

Figure A-5
 Sheet 3 of 3

Start Drilled 11/16/2020	End 11/16/2020	Total Depth (ft) 10.25	Logged By Checked By AWS AJH	Driller Holt Drilling	Drilling Method Hollow-stem Auger
Surface Elevation (ft) Vertical Datum -6 NAVD88		Hammer Data Autohammer 140 (lbs) / 30 (in) Drop	Drilling Equipment B-57		
Easting (X) Northing (Y) 1211163 559894		System Datum WA State Plane North NAD83 (feet)	See "Remarks" section for groundwater observed		
Notes:					

Elevation (feet)	FIELD DATA					MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
	Interval Depth (feet)	Blows/foot Recovered (in)	Collected Sample	Sample Name Testing	Graphic Log	Group Classification			
0									Overwater drilling
	24	10		1 MC		ML/SM	16		SPT N-value = 4
	24	64		2 MC		ML	13		SPT N-value = 31
5	0	120/6"		3					Drill chatter at 5 feet SPT N-value >100
	18	111*		4					*Blow count overstated due to cobble in shoe SPT N-value = 42
	0.5	120/3"		5					SPT N-value >100
10	2	50/3"		6		SLST/SSTN			SPT N-value >100
						Dark gray with white quartz veins siltstone/sandstone, fine grained, medium hard to hard, thinly spaced, discontinuities in poor condition (metasedimentary rock)			

Note: See Figure A-1 for explanation of symbols; Figure A-2 for unified rock classification system.
Coordinates Data Source: Horizontal approximated based on Aerial Imagery. Vertical approximated based on Topographic Survey.

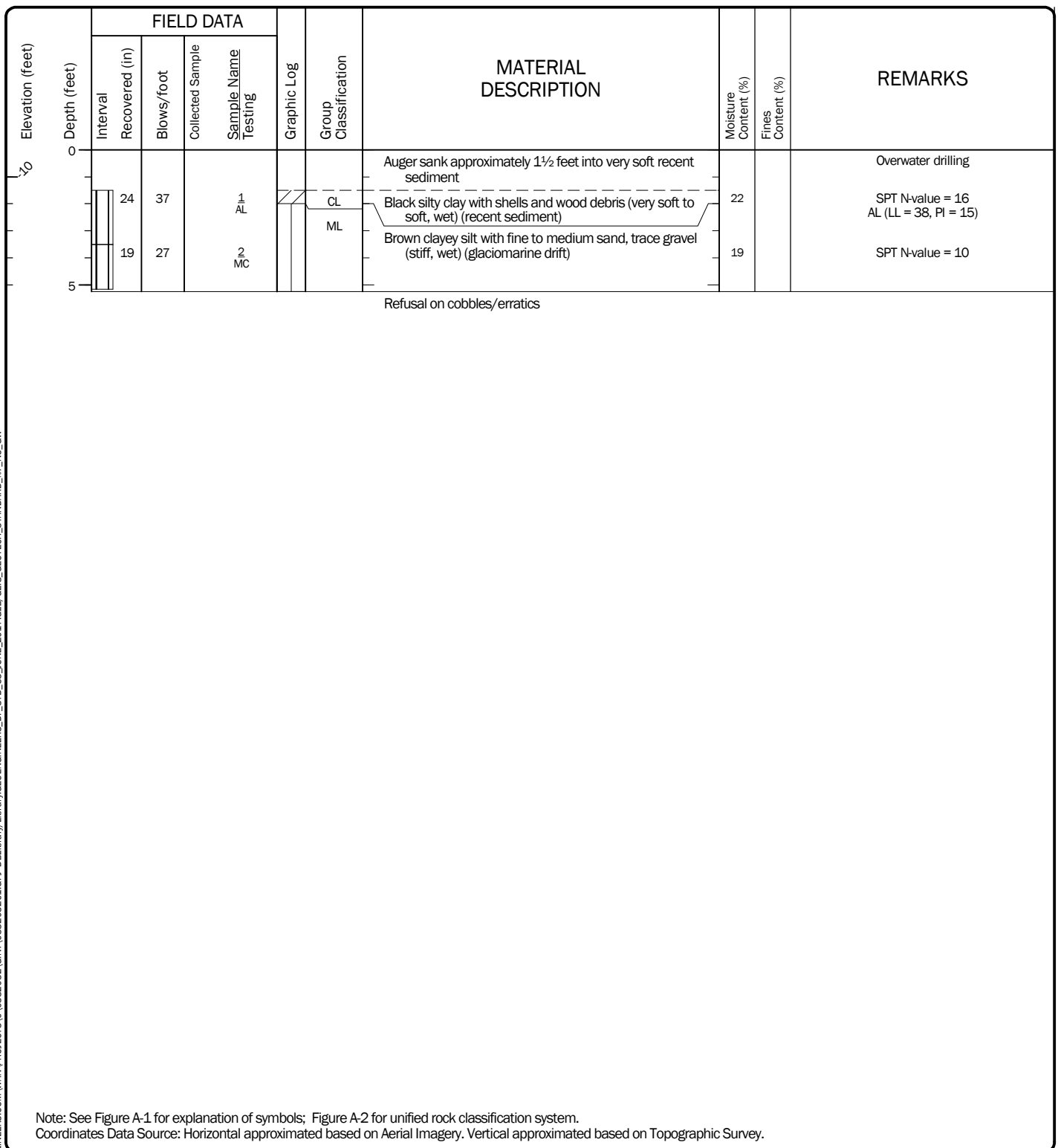
Log of Boring SS-1



Project: Anacortes WWTP Outfall
Project Location: Anacortes, Washington
Project Number: 0382-032-01

Figure A-6
Sheet 1 of 1

Start Drilled 11/16/2020	End 11/16/2020	Total Depth (ft) 5.25	Logged By Checked By AWS AJH	Driller Holt Drilling	Drilling Method Hollow-stem Auger
Surface Elevation (ft) Vertical Datum -9 NAVD88		Hammer Data Autohammer 140 (lbs) / 30 (in) Drop		Drilling Equipment B-57	
Easting (X) Northing (Y) 1211163 559993		System Datum WA State Plane North NAD83 (feet)		See "Remarks" section for groundwater observed	
Notes:					



Log of Boring SS-2A	
	Project: Anacortes WWTP Outfall
	Project Location: Anacortes, Washington
	Project Number: 0382-032-01
Figure A-7 Sheet 1 of 1	

Start Drilled 11/16/2020	End 11/16/2020	Total Depth (ft) 20.25	Logged By Checked By AWS AJH	Driller Holt Drilling	Drilling Method Hollow-stem Auger
Surface Elevation (ft) Vertical Datum		Undetermined NAVD88	Hammer Data Autohammer 140 (lbs) / 30 (in) Drop		Drilling Equipment B-57
Easting (X) Northing (Y)		System Datum	WA State Plane North NAD83 (feet)		See "Remarks" section for groundwater observed
Notes:					

Elevation (feet)	FIELD DATA					MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing				
0						See Log of Boring SS-2A for material description to 5¼ feet			Overwater drilling
5		22	19		1 MC	Brown silty clay with sand and occasional gravel, granitic clasts with biotite or mica, low to medium plasticity (stiff to hard, wet) (glaciomarine drift)	18		SPT N-value = 7
		24	151		2 MC		19		SPT N-value = 58
10		18	43		3 %F	Gray to brown gravelly fine sand with silt, non-plastic (very dense, wet) (glacially consolidated soils)	21	23	Drill chatter at 9½ feet
		24	46		4 MC		22		
15		24	24		5 %F	Gray silt with fine sand (hard, wet)	24	70	
		5	50/5"		6				Drill chatter at 17½ feet
20		3	50/3"		7	Dark gray with white quartz veins siltstone/sandstone, fine grained, medium hard to hard, thinly spaced, discontinuities in poor condition (metasedimentary rock)			

Note: See Figure A-1 for explanation of symbols; Figure A-2 for unified rock classification system.
Coordinates Data Source: Horizontal approximated based on Aerial Imagery. Vertical approximated based on Topographic Survey.

Log of Boring SS-2B



Project: Anacortes WWTP Outfall
Project Location: Anacortes, Washington
Project Number: 0382-032-01

Figure A-8
Sheet 1 of 1

Start Drilled 11/18/2020	End 11/18/2020	Total Depth (ft) 16	Logged By Checked By AWS AJH	Driller Holt Drilling	Drilling Method Hollow-stem Auger
Surface Elevation (ft) Vertical Datum -15 NAVD88		Hammer Data Autohammer 140 (lbs) / 30 (in) Drop		Drilling Equipment B-57	
Easting (X) Northing (Y) 1211165 560089		System Datum WA State Plane North NAD83 (feet)		See "Remarks" section for groundwater observed	
Notes:					

Elevation (feet)	FIELD DATA					MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing				
0						Auger sank approximately 1 foot into very soft recent sediment			Overwater drilling
	6	12			1	Gray sand with silt (loose, wet) (recent sediment)			SPT N-value = 5
									No sample, all used for environmental sampling
	22	94			2	With trace gravel			SPT N-value = 39
						Brown-gray silty sand to clayey silt with occasional gravel (very dense to hard, wet) (glacially consolidated soils)	10	47	SPT N-value = 60
5	24	158			3 SA	Becomes gray to brown	13		SPT N-value = 46
	24	120			4 MC	With some cobbles			
10						Lacks cobbles	12		
	16	45			5 MC				
									Drill chatter at 12 feet
	4	50/5"			6	Brown silty gravel with sand (dense, wet)			
15									No recovery
	4	50/4"			7				Smooth drill at 15 feet
						Refusal on cobbles/erratics			

Note: See Figure A-1 for explanation of symbols; Figure A-2 for unified rock classification system.
Coordinates Data Source: Horizontal approximated based on Aerial Imagery. Vertical approximated based on Topographic Survey.

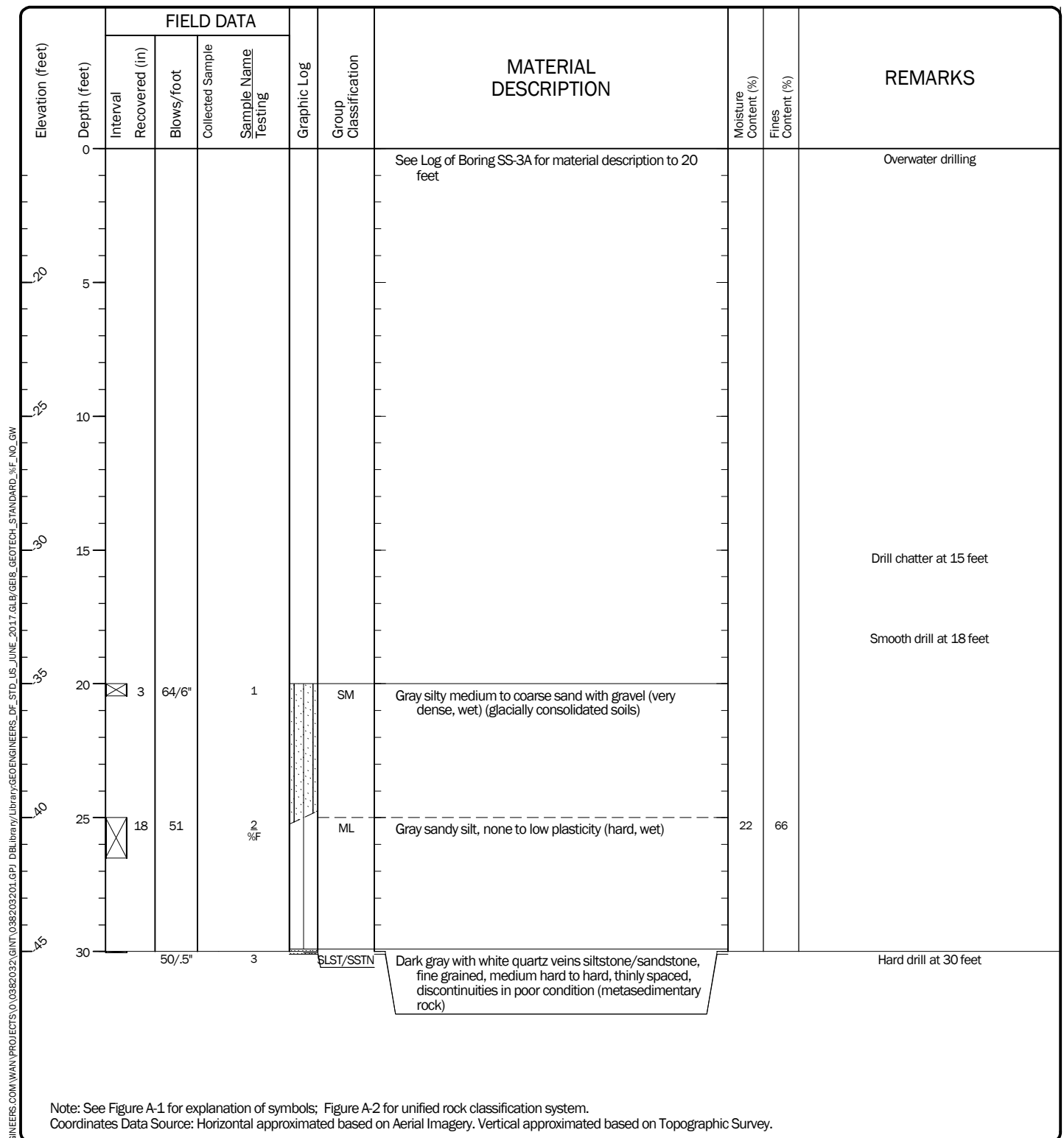
Log of Boring SS-3A



Project: Anacortes WWTP Outfall
Project Location: Anacortes, Washington
Project Number: 0382-032-01

Figure A-9
Sheet 1 of 1

Drilled	Start 11/19/2020	End 11/19/2020	Total Depth (ft)	30	Logged By Checked By	AWS AJH	Driller	Holt Drilling	Drilling Method	Hollow-stem Auger	
Surface Elevation (ft) Vertical Datum			-15 NAVD88		Hammer Data		Autohammer 140 (lbs) / 30 (in) Drop		Drilling Equipment		B-57
Easting (X) Northing (Y)			1211155 560090		System Datum		WA State Plane North NAD83 (feet)		See "Remarks" section for groundwater observed		
Notes:											



Log of Boring SS-3B	
	Project: Anacortes WWTP Outfall Project Location: Anacortes, Washington Project Number: 0382-032-01
Figure A-10 Sheet 1 of 1	

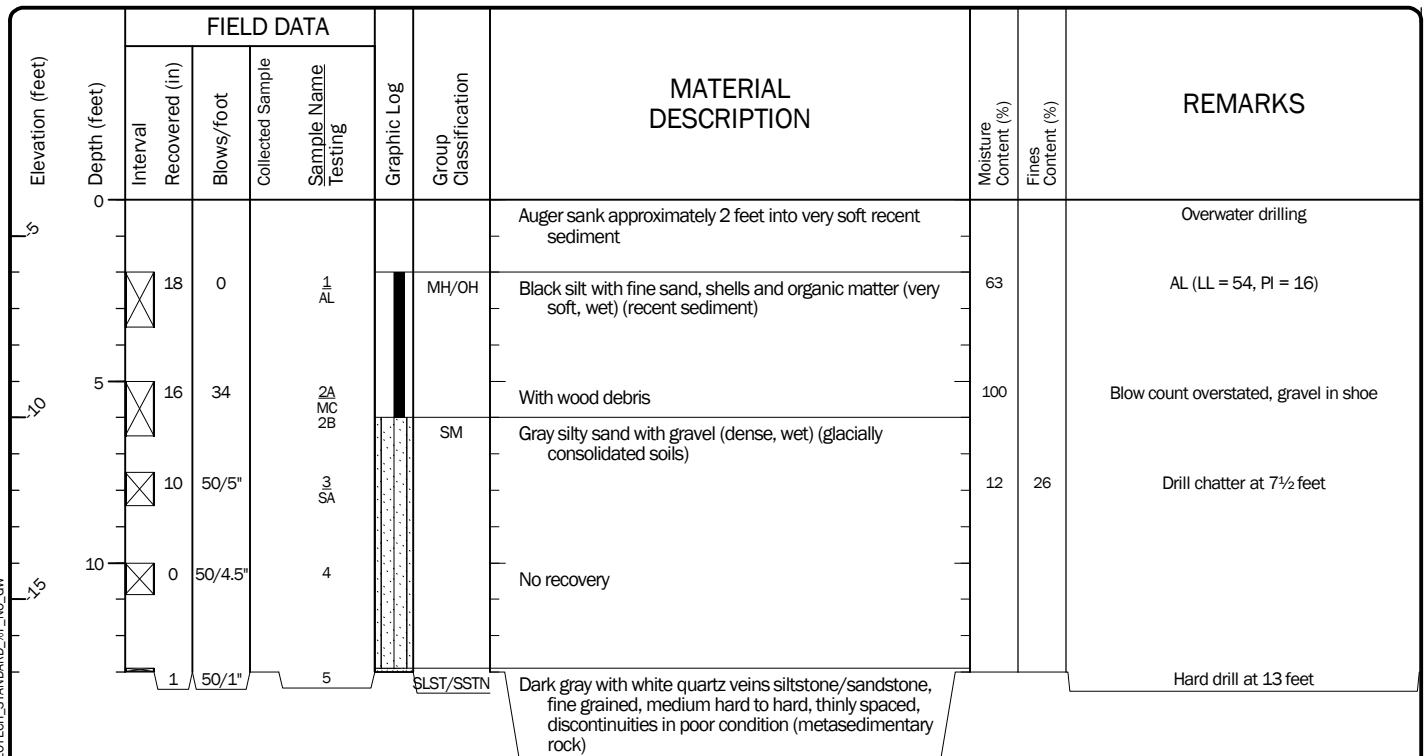
Start Drilled 11/19/2020	End 11/19/2020	Total Depth (ft) 14	Logged By Checked By AWS AJH	Driller Holt Drilling	Drilling Method Hollow-stem Auger
Surface Elevation (ft) Vertical Datum -7 NAVD88		Hammer Data Autohammer 140 (lbs) / 30 (in) Drop		Drilling Equipment B-57	
Easting (X) Northing (Y) 1211165 559939		System Datum WA State Plane North NAD83 (feet)		See "Remarks" section for groundwater observed	
Notes:					

Elevation (feet)	FIELD DATA					MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing				
0						Auger sunk approximately 3 feet into very soft recent sediment			
10		18	16		1 AL	Dark brown organic silt (soft, wet) (recent sediment)	72		AL (LL = 45, PI = 8)
5		18	12		2 MC	Brown silt (stiff, wet) (glaciomarine drift)	21		
10		9	80		3 MC	Gray gravelly medium to coarse sand with silt (very dense, wet) (glacially consolidated soils)	11		Drill chatter at 10 feet
20		7	92/3"		4	Gray silt with fine sand (very dense, wet)			Smooth drill at 12 feet
		2	100/2.5		5	Dark gray with white quartz veins siltstone/sandstone, fine grained, medium hard to hard, thinly spaced, discontinuities in poor condition (metasedimentary rock)			

Note: See Figure A-1 for explanation of symbols; Figure A-2 for unified rock classification system.
Coordinates Data Source: Horizontal approximated based on Aerial Imagery. Vertical approximated based on Topographic Survey.

Log of Boring SS-4	
	Project: Anacortes WWTP Outfall
	Project Location: Anacortes, Washington
	Project Number: 0382-032-01
Figure A-11 Sheet 1 of 1	

Drilled	Start	End	Total Depth (ft)	13	Logged By	AWS	Checked By	AJH	Driller	Holt Drilling	Drilling Method	Hollow-stem Auger	
Surface Elevation (ft)			-4		Hammer Data			Autohammer			Drilling Equipment		B-57
Vertical Datum			NAVD88		Data			140 (lbs) / 30 (in) Drop					
Easting (X)			1211165		System Datum			WA State Plane North			See "Remarks" section for groundwater observed		
Northing (Y)			559839		Datum			NAD83 (feet)					
Notes:													



Note: See Figure A-1 for explanation of symbols; Figure A-2 for unified rock classification system.
Coordinates Data Source: Horizontal approximated based on Aerial Imagery. Vertical approximated based on Topographic Survey.

Log of Boring SS-5



Project: Anacortes WWTP Outfall
Project Location: Anacortes, Washington
Project Number: 0382-032-01

Figure A-12
Sheet 1 of 1

Start Drilled 11/17/2020	End 11/17/2020	Total Depth (ft) 19	Logged By Checked By JES AJH	Driller McCallum Rock Drilling	Drilling Method Air-percussion
Surface Elevation (ft) Vertical Datum 21 NAVD88		Hammer Data N/A		Drilling Equipment Furukawa HCR 1200	
Easting (X) Northing (Y) 1210955 559359		System Datum WA State Plane North NAD83 (feet)		Groundwater not observed at time of exploration	
Notes:					

Elevation (feet)	Depth (feet)	FIELD DATA				Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
		Interval	Recovered (in)	Blows/foot	Collected Sample						
0	0						AC	4 inches asphalt concrete			Drilled with rock drill, no sample obtained. Observations based on cuttings and drill resistance.
							GP-GM	Gray gravel with silt and sand (crushed rock base course)			
							CL	Brown clay with sand (glaciomarine drift)			
							SLST/SSTN	Gray siltstone/sandstone (metasedimentary rock)			

Note: See Figure A-1 for explanation of symbols; Figure A-2 for unified rock classification system.
Coordinates Data Source: Horizontal approximated based on Aerial Imagery. Vertical approximated based on Topographic Survey.

Log of Boring RB-11+00



Project: Anacortes WWTP Outfall
Project Location: Anacortes, Washington
Project Number: 0382-032-01

Figure A-13
Sheet 1 of 1

Start Drilled 11/17/2020	End 11/17/2020	Total Depth (ft) 21	Logged By Checked By JES AJH	Driller McCallum Rock Drilling	Drilling Method Air-percussion
Surface Elevation (ft) Vertical Datum 24 NAVD88		Hammer Data N/A		Drilling Equipment Furukawa HCR 1200	
Easting (X) Northing (Y) 1211005 559357		System Datum WA State Plane North NAD83 (feet)		Groundwater not observed at time of exploration	
Notes:					

Elevation (feet)	FIELD DATA					MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing				
0						AC			Drilled with rock drill, no sample obtained. Observations based on cuttings and drill resistance.
						GP-GM			
						CL			
5									
10									
15						CL			
20									

No bedrock encountered

Note: See Figure A-1 for explanation of symbols; Figure A-2 for unified rock classification system.
Coordinates Data Source: Horizontal approximated based on Aerial Imagery. Vertical approximated based on Topographic Survey.

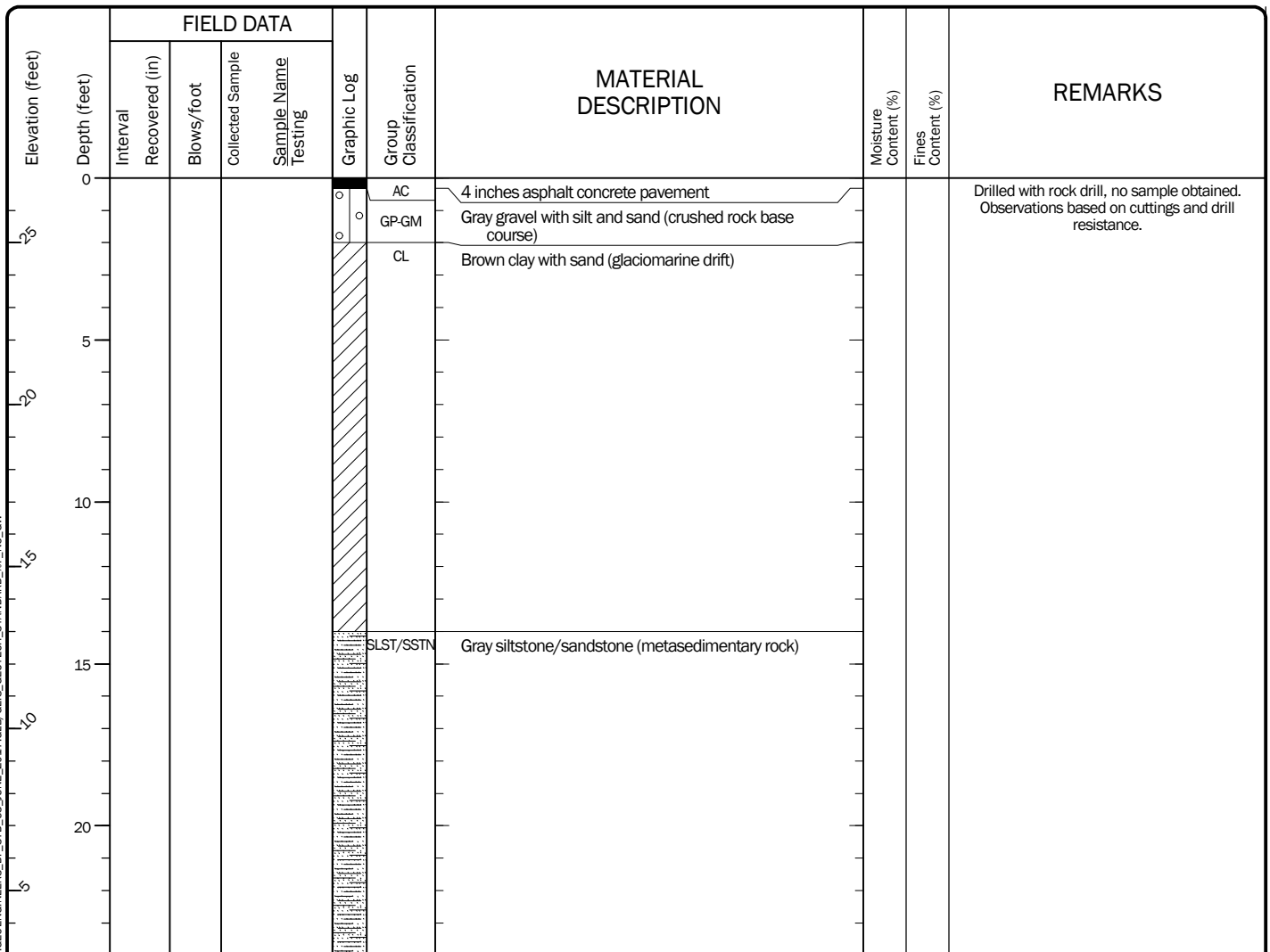
Log of Boring RB-11+50



Project: Anacortes WWTP Outfall
Project Location: Anacortes, Washington
Project Number: 0382-032-01

Figure A-14
Sheet 1 of 1

Start Drilled 11/17/2020	End 11/17/2020	Total Depth (ft) 24	Logged By Checked By JES AJH	Driller McCallum Rock Drilling	Drilling Method Air-percussion
Surface Elevation (ft) Vertical Datum 27 NAVD88		Hammer Data N/A		Drilling Equipment Furukawa HCR 1200	
Easting (X) Northing (Y) 1211055 559355		System Datum WA State Plane North NAD83 (feet)		Groundwater not observed at time of exploration	
Notes:					



Note: See Figure A-1 for explanation of symbols; Figure A-2 for unified rock classification system.
Coordinates Data Source: Horizontal approximated based on Aerial Imagery. Vertical approximated based on Topographic Survey.

Log of Boring RB-12+00



Project: Anacortes WWTP Outfall
Project Location: Anacortes, Washington
Project Number: 0382-032-01

Figure A-15
Sheet 1 of 1

Start Drilled 11/17/2020	End 11/17/2020	Total Depth (ft) 27	Logged By Checked By JES AJH	Driller McCallum Rock Drilling	Drilling Method Air-percussion
Surface Elevation (ft) Vertical Datum 31 NAVD88		Hammer Data N/A		Drilling Equipment Furukawa HCR 1200	
Easting (X) Northing (Y) 1211105 559353		System Datum WA State Plane North NAD83 (feet)		Groundwater not observed at time of exploration	
Notes:					

Elevation (feet)	FIELD DATA					MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing				
0						AC			Drilled with rock drill, no sample obtained. Observations based on cuttings and drill resistance.
						GP-GM			
						SP			
5									
						SLST/SSTN			
						SLST/SSTN			
10									
						SLST/SSTN			
15									
20									
25									

Note: See Figure A-1 for explanation of symbols; Figure A-2 for unified rock classification system.
Coordinates Data Source: Horizontal approximated based on Aerial Imagery. Vertical approximated based on Topographic Survey.

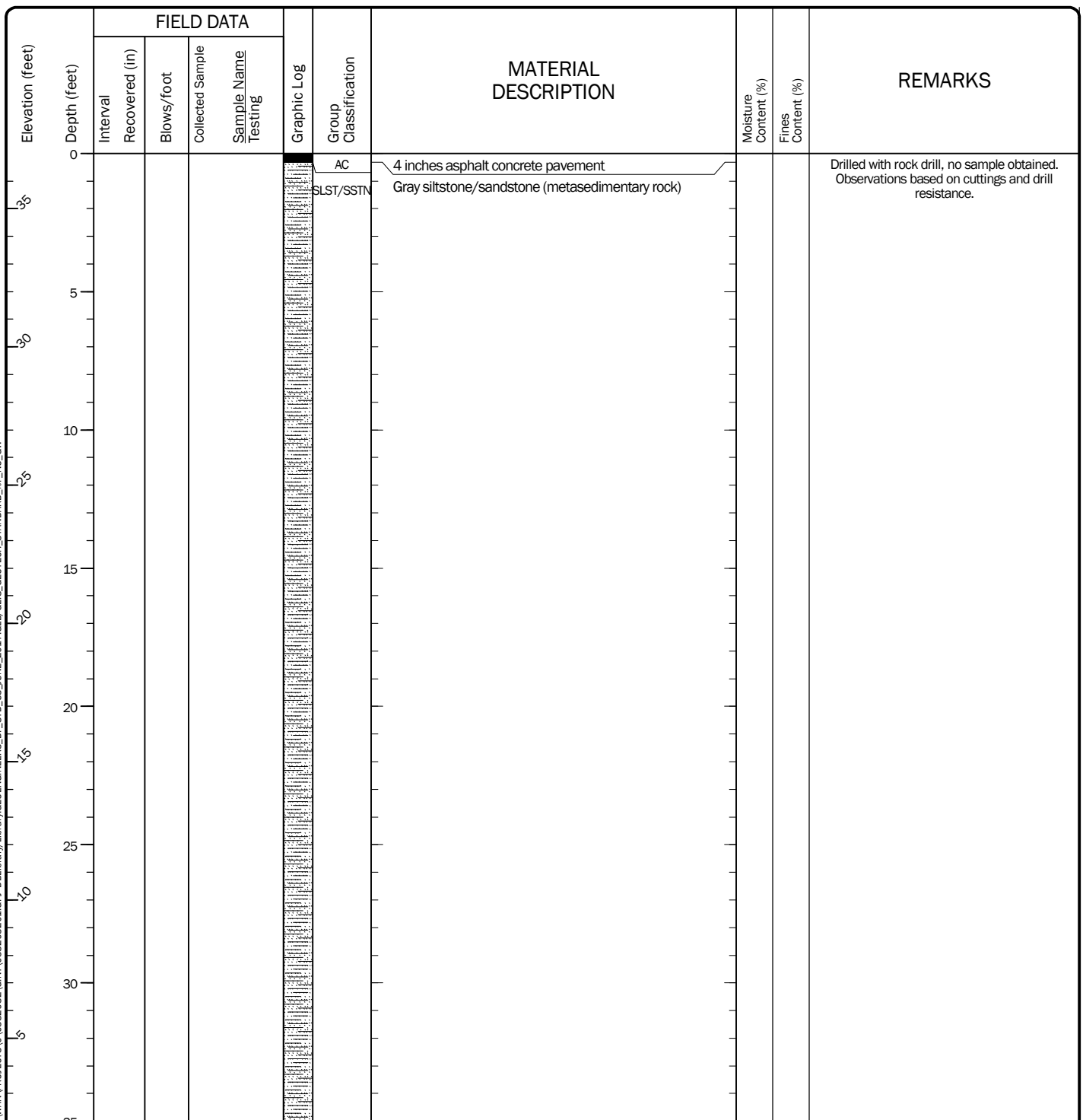
Log of Boring RB-12+50



Project: Anacortes WWTP Outfall
Project Location: Anacortes, Washington
Project Number: 0382-032-01

Figure A-16
Sheet 1 of 1

Drilled	Start 11/17/2020	End 11/17/2020	Total Depth (ft)	37	Logged By Checked By	JES AJH	Driller	McCallum Rock Drilling	Drilling Method	Air-percussion
Surface Elevation (ft) Vertical Datum	37 NAVD88			Hammer Data	N/A			Drilling Equipment	Furukawa HCR 1200	
Easting (X) Northing (Y)	1211155 559352			System Datum	WA State Plane North NAD83 (feet)			Groundwater not observed at time of exploration		
Notes:										



Note: See Figure A-1 for explanation of symbols; Figure A-2 for unified rock classification system.
Coordinates Data Source: Horizontal approximated based on Aerial Imagery. Vertical approximated based on Topographic Survey.

Log of Boring RB-13+00



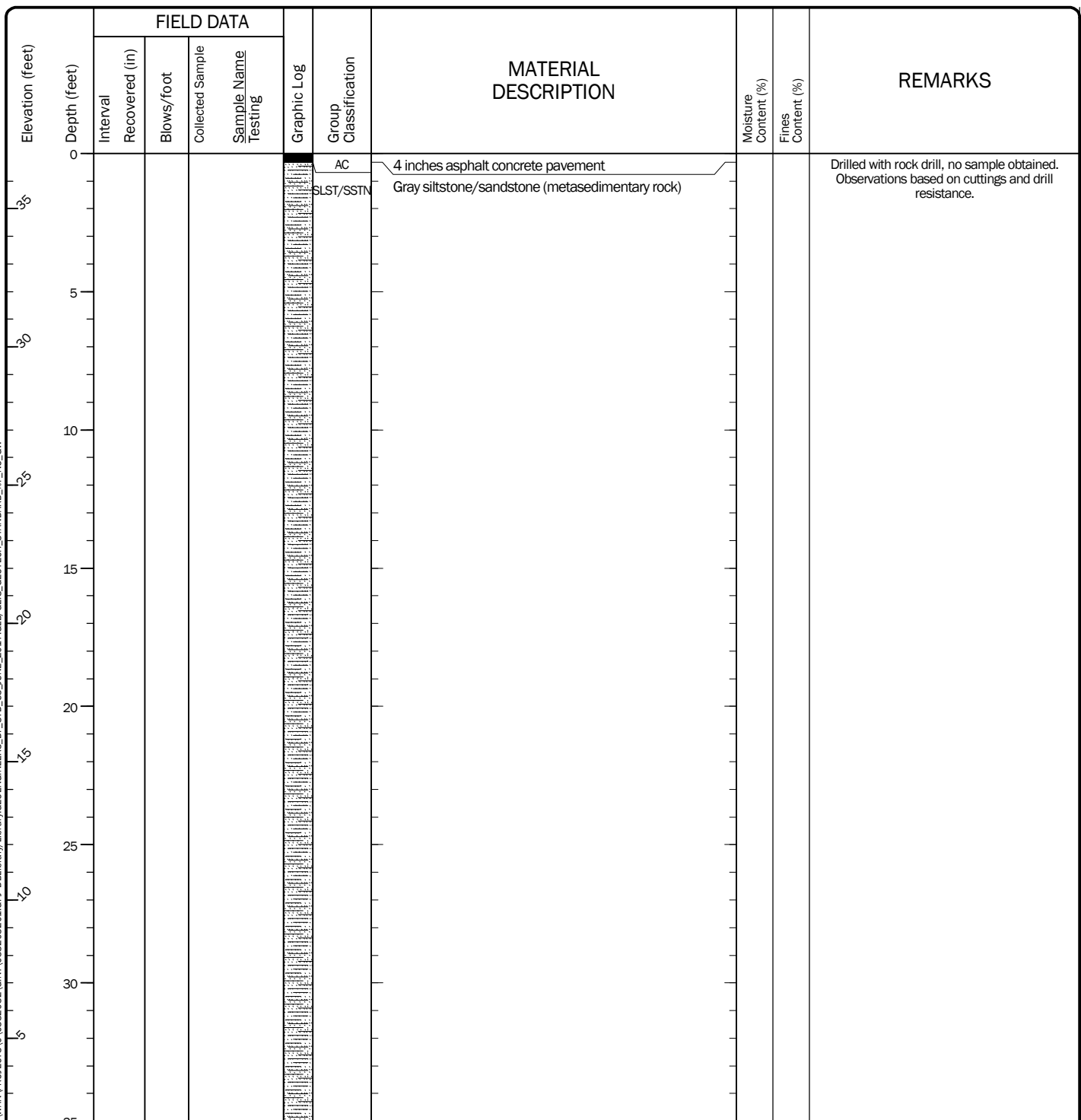
Project: Anacortes WWTP Outfall
Project Location: Anacortes, Washington
Project Number: 0382-032-01

Figure A-17
Sheet 1 of 2

GEOENGINEERS

Figure A-17
Sheet 2 of 2

Drilled	Start 11/17/2020	End 11/17/2020	Total Depth (ft)	35	Logged By Checked By	JES AJH	Driller	McCallum Rock Drilling	Drilling Method	Air-percussion	
Surface Elevation (ft) Vertical Datum			37 NAVD88		Hammer Data			N/A		Drilling Equipment	Furukawa HCR 1200
Easting (X) Northing (Y)			1211166 559390		System Datum			WA State Plane North NAD83 (feet)		Groundwater not observed at time of exploration	
Notes:											



Note: See Figure A-1 for explanation of symbols; Figure A-2 for unified rock classification system.
Coordinates Data Source: Horizontal approximated based on Aerial Imagery. Vertical approximated based on Topographic Survey.

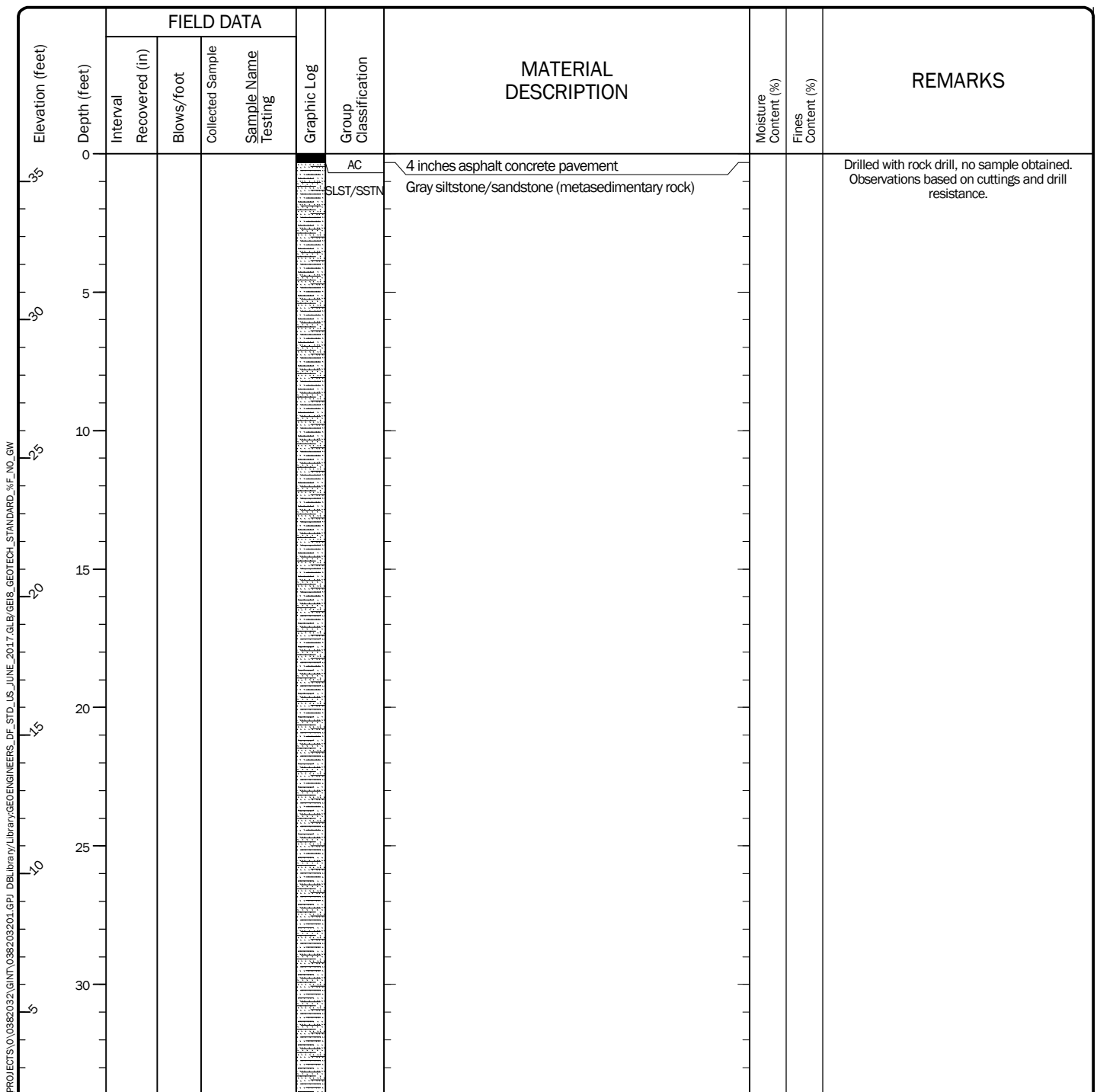
Log of Boring RB-13+50

GEOENGINEERS 

Project: Anacortes WWTP Outfall
Project Location: Anacortes, Washington
Project Number: 0382-032-01

Figure A-18
Sheet 1 of 1

Drilled	Start 11/17/2020	End 11/17/2020	Total Depth (ft)	34	Logged By Checked By	JES AJH	Driller	McCallum Rock Drilling	Drilling Method	Air-percussion
Surface Elevation (ft) Vertical Datum	36 NAVD88			Hammer Data			N/A		Drilling Equipment	Furukawa HCR 1200
Easting (X) Northing (Y)	1211166 559440			System Datum			WA State Plane North NAD83 (feet)		Groundwater not observed at time of exploration	
Notes:										



Drilled	Start 11/17/2020	End 11/17/2020	Total Depth (ft)	33	Logged By Checked By	JES AJH	Driller	McCallum Rock Drilling	Drilling Method	Air-percussion		
Surface Elevation (ft) Vertical Datum			33 NAVD88		Hammer Data			N/A		Drilling Equipment		Furukawa HCR 1200
Easting (X) Northing (Y)			1211165 559490		System Datum			WA State Plane North NAD83 (feet)		Groundwater not observed at time of exploration		
Notes:												

Elevation (feet)	Depth (feet)	FIELD DATA				Group Classification	MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
		Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing					
0	0					AC	4 inches asphalt concrete pavement			Drilled with rock drill, no sample obtained. Observations based on cuttings and drill resistance.
30						CL	Brown clay with sand (glaciomarine drift)			
5										
35						SLST/SSTN	Gray siltstone/sandstone (metasedimentary rock)			
10										
40										
15										
45										
20										
50										
25										
55										
30										
60										

Note: See Figure A-1 for explanation of symbols; Figure A-2 for unified rock classification system.
Coordinates Data Source: Horizontal approximated based on Aerial Imagery. Vertical approximated based on Topographic Survey.

Log of Boring RB-14+50



Project: Anacortes WWTP Outfall
Project Location: Anacortes, Washington
Project Number: 0382-032-01

Figure A-20
Sheet 1 of 1

Drilled	Start 11/17/2020	End 11/17/2020	Total Depth (ft)	31	Logged By Checked By	JES AJH	Driller	McCallum Rock Drilling	Drilling Method	Air-percussion		
Surface Elevation (ft) Vertical Datum			31 NAVD88		Hammer Data			N/A		Drilling Equipment		Furukawa HCR 1200
Easting (X) Northing (Y)			1211165 559540		System Datum			WA State Plane North NAD83 (feet)		Groundwater not observed at time of exploration		
Notes:												

Elevation (feet)	Depth (feet)	FIELD DATA				Group Classification	MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
		Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing					
0	0					AC	4 inches asphalt concrete pavement			Drilled with rock drill, no sample obtained. Observations based on cuttings and drill resistance.
						CL	Brown clay with sand and occasional gravel (very stiff) (glaciomarine drift)			
5	5									
10	10									
15	15									
20	20					SLST/SSTN	Gray siltstone/sandstone (metasedimentary rock)			
25	25									
30	30									

Note: See Figure A-1 for explanation of symbols; Figure A-2 for unified rock classification system.
Coordinates Data Source: Horizontal approximated based on Aerial Imagery. Vertical approximated based on Topographic Survey.

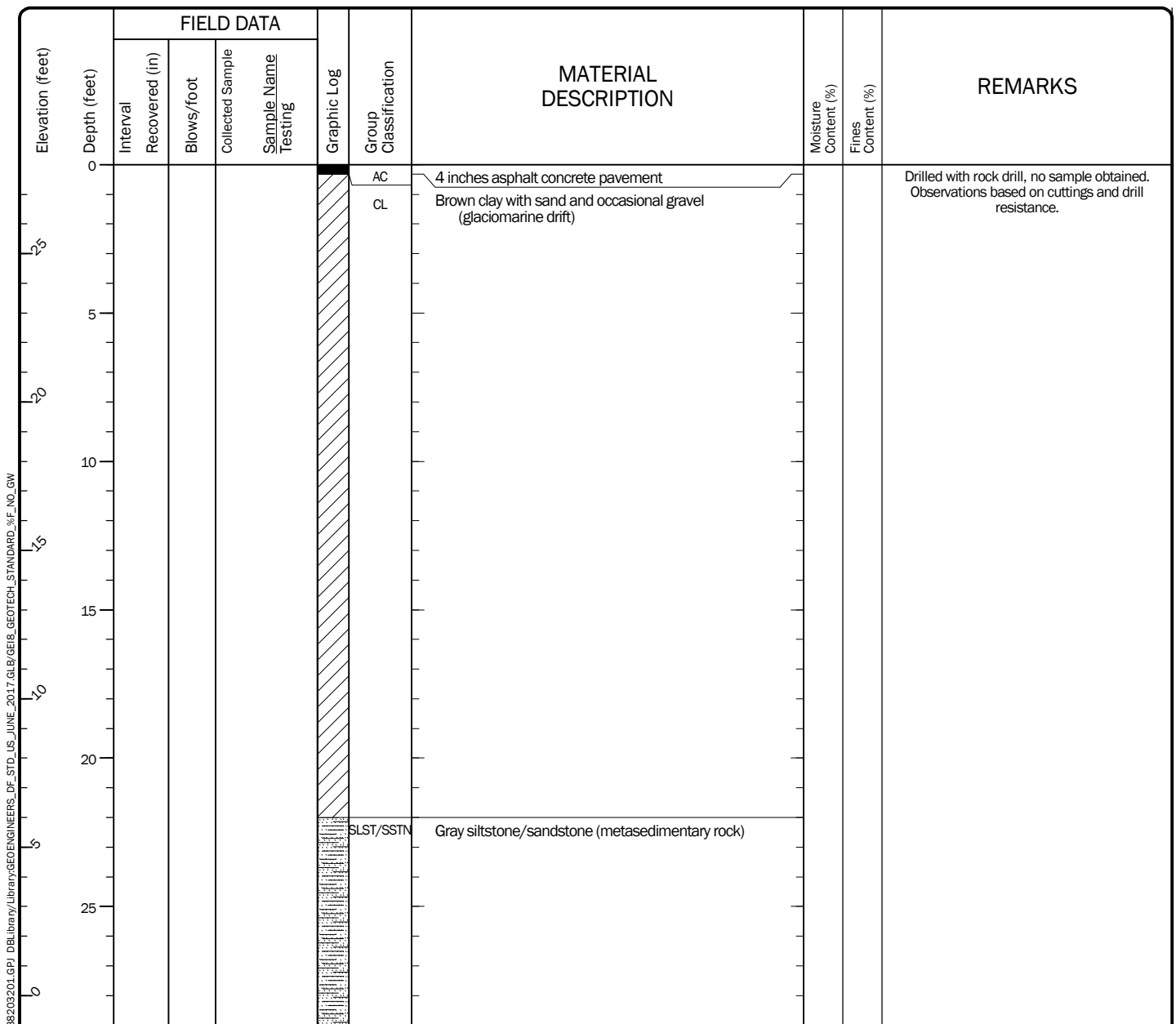
Log of Boring RB-15+00



Project: Anacortes WWTP Outfall
Project Location: Anacortes, Washington
Project Number: 0382-032-01

Figure A-21
Sheet 1 of 1

Drilled	Start 11/17/2020	End 11/17/2020	Total Depth (ft)	29	Logged By Checked By	JES AJH	Driller	McCallum Rock Drilling	Drilling Method	Air-percussion		
Surface Elevation (ft) Vertical Datum			28 NAVD88		Hammer Data			N/A		Drilling Equipment		Furukawa HCR 1200
Easting (X) Northing (Y)			1211165 559590		System Datum			WA State Plane North NAD83 (feet)		Groundwater not observed at time of exploration		
Notes:												



Note: See Figure A-1 for explanation of symbols; Figure A-2 for unified rock classification system.
Coordinates Data Source: Horizontal approximated based on Aerial Imagery. Vertical approximated based on Topographic Survey.

Log of Boring RB-15+50



Project: Anacortes WWTP Outfall
Project Location: Anacortes, Washington
Project Number: 0382-032-01

Figure A-22
Sheet 1 of 1

Start Drilled 11/17/2020	End 11/17/2020	Total Depth (ft) 26	Logged By Checked By JES AJH	Driller McCallum Rock Drilling	Drilling Method Air-percussion
Surface Elevation (ft) Vertical Datum 25 NAVD88		Hammer Data N/A		Drilling Equipment Furukawa HCR 1200	
Easting (X) Northing (Y) 1211165 559640		System Datum WA State Plane North NAD83 (feet)		Groundwater not observed at time of exploration	
Notes:					

Elevation (feet)	FIELD DATA				Group Classification	MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing					
0					AC	4 inches asphalt concrete pavement			Drilled with rock drill, no sample obtained. Observations based on cuttings and drill resistance. Easy drilling
					CL	Brown clay with sand (glaciomarine drift)			
5									
10									
15					SM/ML	Gray silty sand to sandy silt (glacially consolidated soils)			Increased drilling resistance
20									
25									

No bedrock encountered

Note: See Figure A-1 for explanation of symbols; Figure A-2 for unified rock classification system.
Coordinates Data Source: Horizontal approximated based on Aerial Imagery. Vertical approximated based on Topographic Survey.

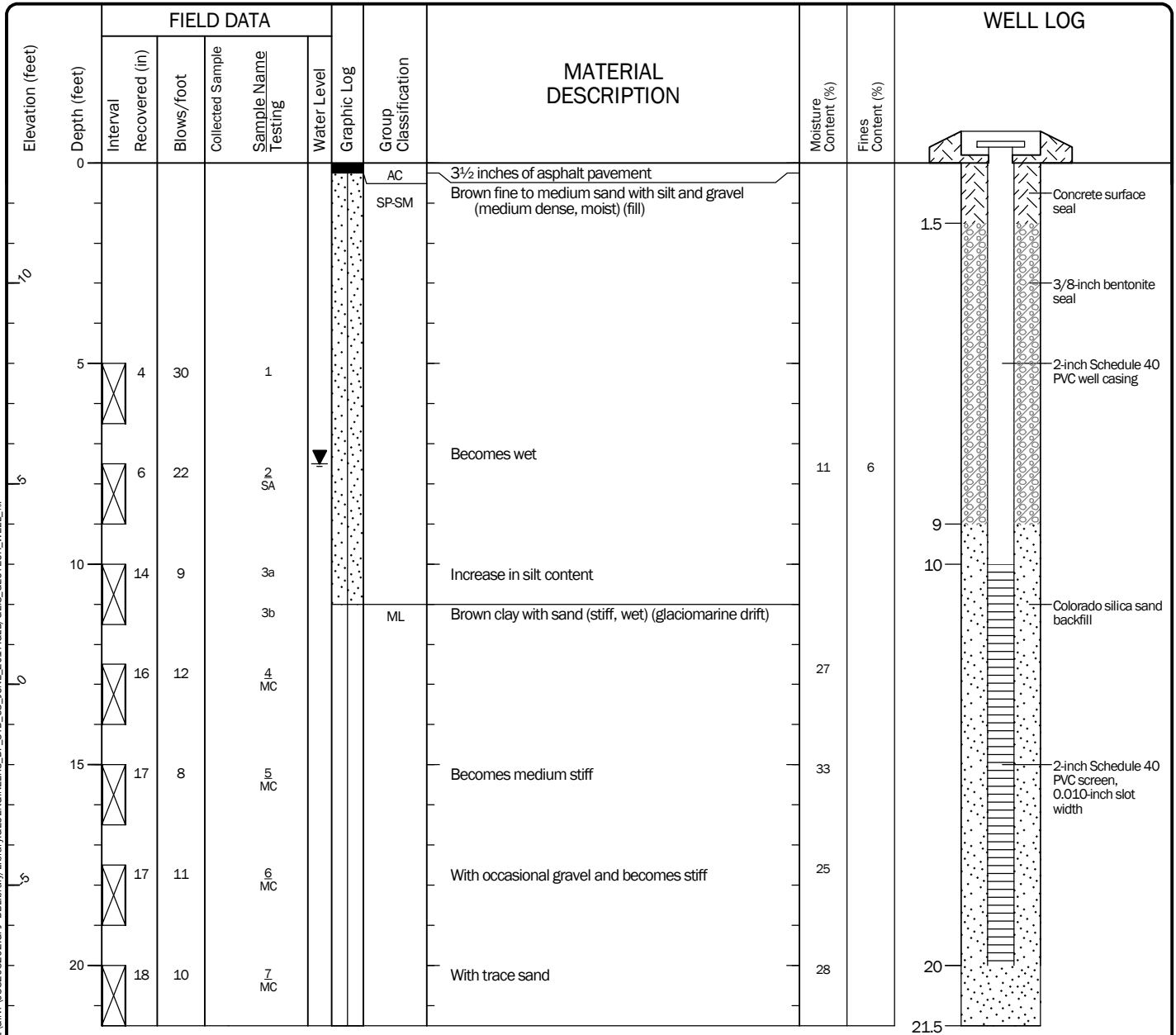
Log of Boring RB-16+00



Project: Anacortes WWTP Outfall
Project Location: Anacortes, Washington
Project Number: 0382-032-01

Figure A-23
Sheet 1 of 1

Start Drilled 3/9/2021	End 3/9/2021	Total Depth (ft) 21.5	Logged By Checked By JES	Driller Boretec 1, Inc.	Drilling Method Hollow-stem Auger
Hammer Data		Rope and Cathead 140 (lbs) / 30 (in) Drop	Drilling Equipment EC-55 Truck Mounted Rig		DOE Well I.D.: BJI 259 A 2-in well was installed on 3/9/2021 to a depth of 21.5 ft.
Surface Elevation (ft) Vertical Datum 13 NAVD88		Top of Casing Elevation (ft) 13.00		Groundwater Date Measured 3/16/2021	
Easting (X) Northing (Y) 1210686 558694		Horizontal Datum WA State Plane North NAD83 (feet)		Depth to Water (ft) 7.50	Elevation (ft) 5.50
Notes:					



Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on Aerial Imagery. Vertical approximated based on Topographic Survey.

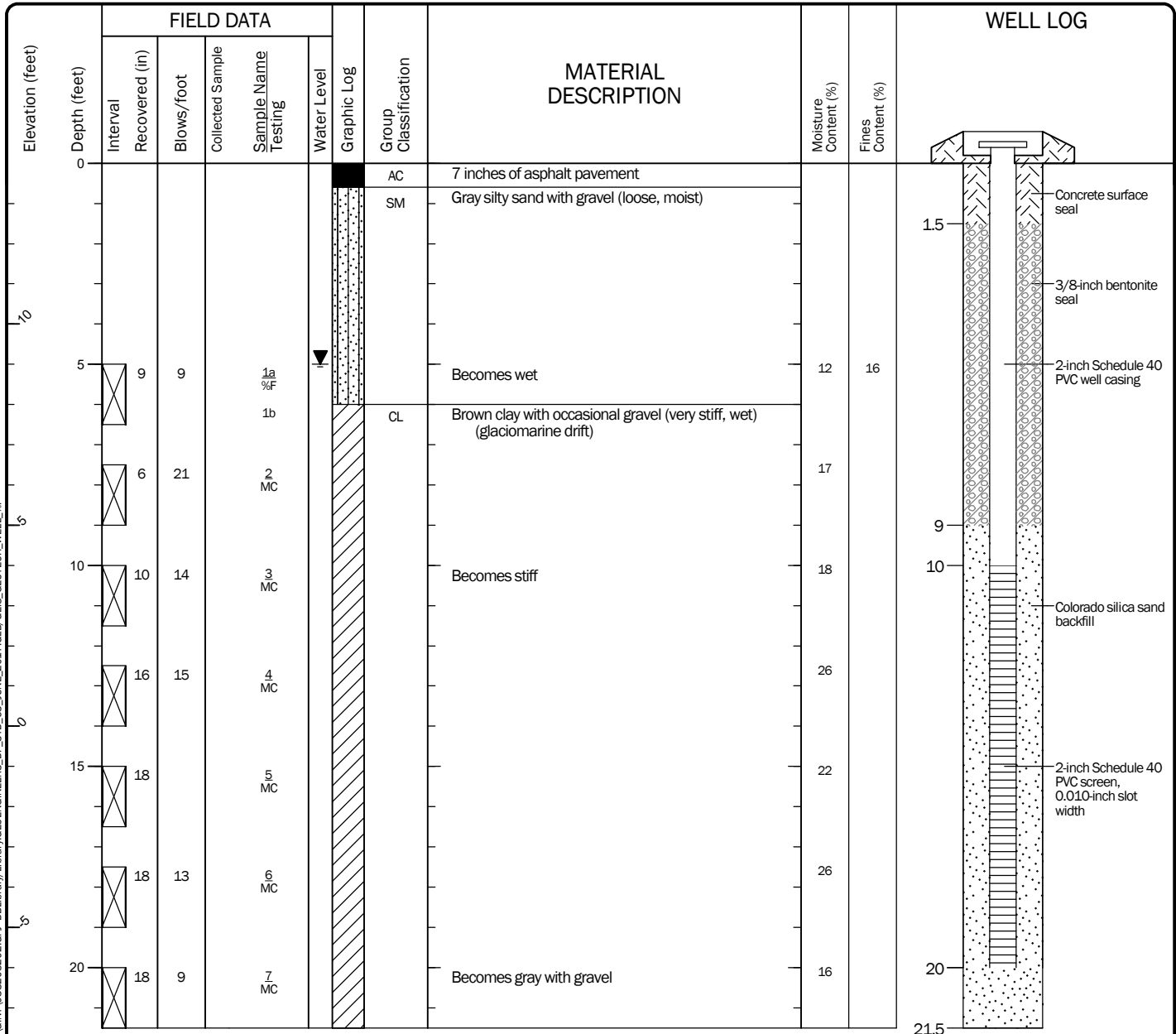
Log of Monitoring Well MW-1



Project: WWTP Outfall
Project Location: Anacortes, Washington
Project Number: 0382-032-02

Figure A-24
Sheet 1 of 1

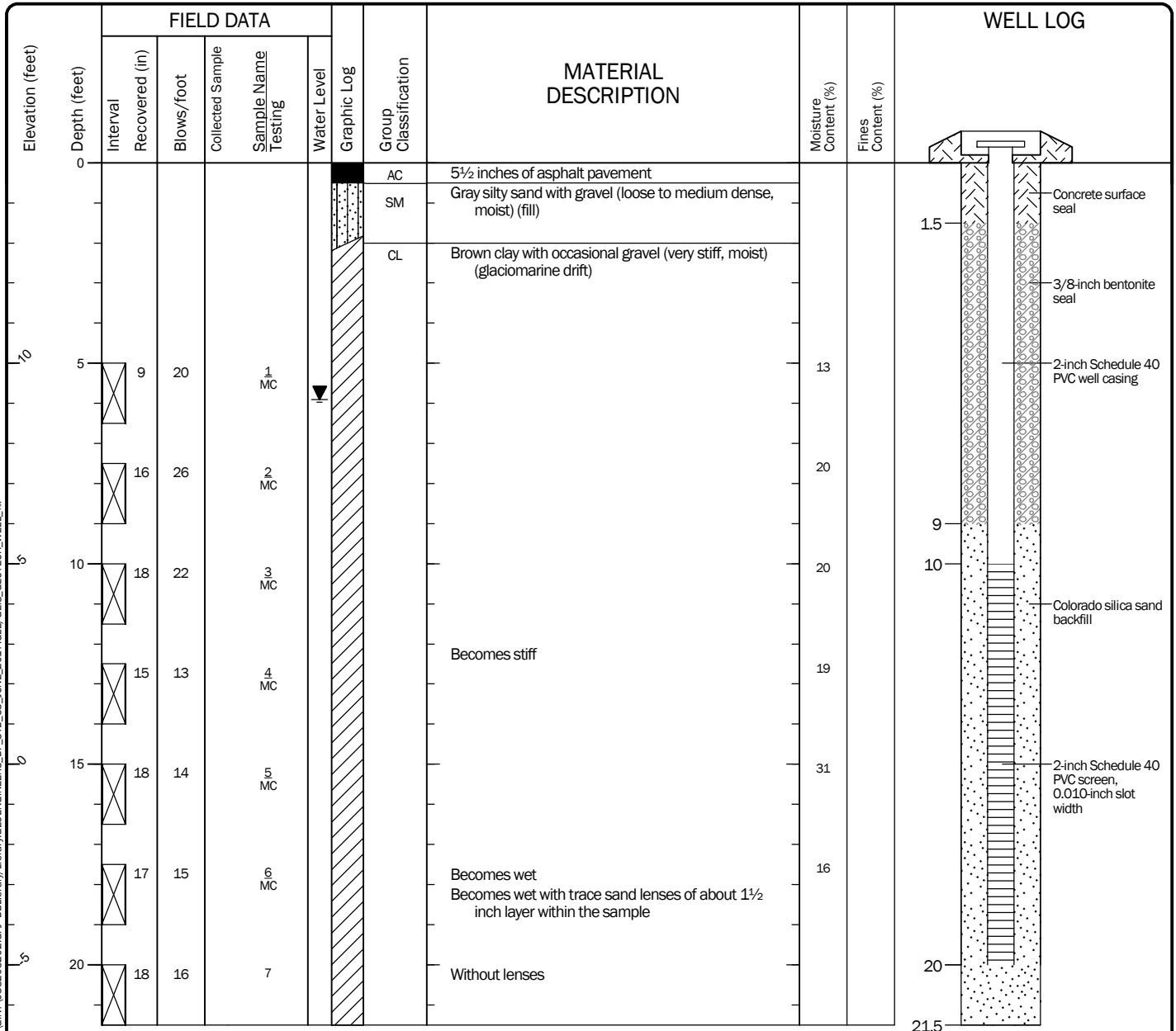
Drilled	Start 3/9/2021	End 3/9/2021	Total Depth (ft)	21.5	Logged By Checked By	JES	Driller	Boretac 1, Inc.		Drilling Method	Hollow-stem Auger		
Hammer Data	Rope and Cathead 140 (lbs) / 30 (in) Drop				Drilling Equipment	EC-55 Truck Mounted Rig			DOE Well I.D.: BJI 260 A 2-in well was installed on 3/9/2021 to a depth of 21.5 ft.				
Surface Elevation (ft) Vertical Datum	14 NAVD88				Top of Casing Elevation (ft)	14.00			<u>Groundwater</u> <u>Date Measured</u> 3/16/2021			Depth to <u>Water (ft)</u> 5.00	<u>Elevation (ft)</u> 9.00
Easting (X) Northing (Y)	1210751 558776				Horizontal Datum	WA State Plane North NAD83 (feet)							
Notes:													



Log of Monitoring Well MW-2

Project: WWTP Outfall
Project Location: Anacortes, Washington
Project Number: 0382-032-02

Start Drilled 3/9/2021	End 3/9/2021	Total Depth (ft) 21.5	Logged By Checked By JES	Driller Boretec 1, Inc.	Drilling Method Hollow-stem Auger
Hammer Data		Rope and Cathead 140 (lbs) / 30 (in) Drop	Drilling Equipment EC-55 Truck Mounted Rig		DOE Well I.D.: BJI 261 A 2-in well was installed on 3/9/2021 to a depth of 21.5 ft.
Surface Elevation (ft) Vertical Datum 15 NAVD88		Top of Casing Elevation (ft) 15.00		Groundwater Date Measured 3/16/2021	
Easting (X) Northing (Y) 1210758 558991		Horizontal Datum WA State Plane North NAD83 (feet)		Depth to Water (ft) 5.90	Elevation (ft) 9.10
Notes:					



Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on Aerial Imagery. Vertical approximated based on Topographic Survey.

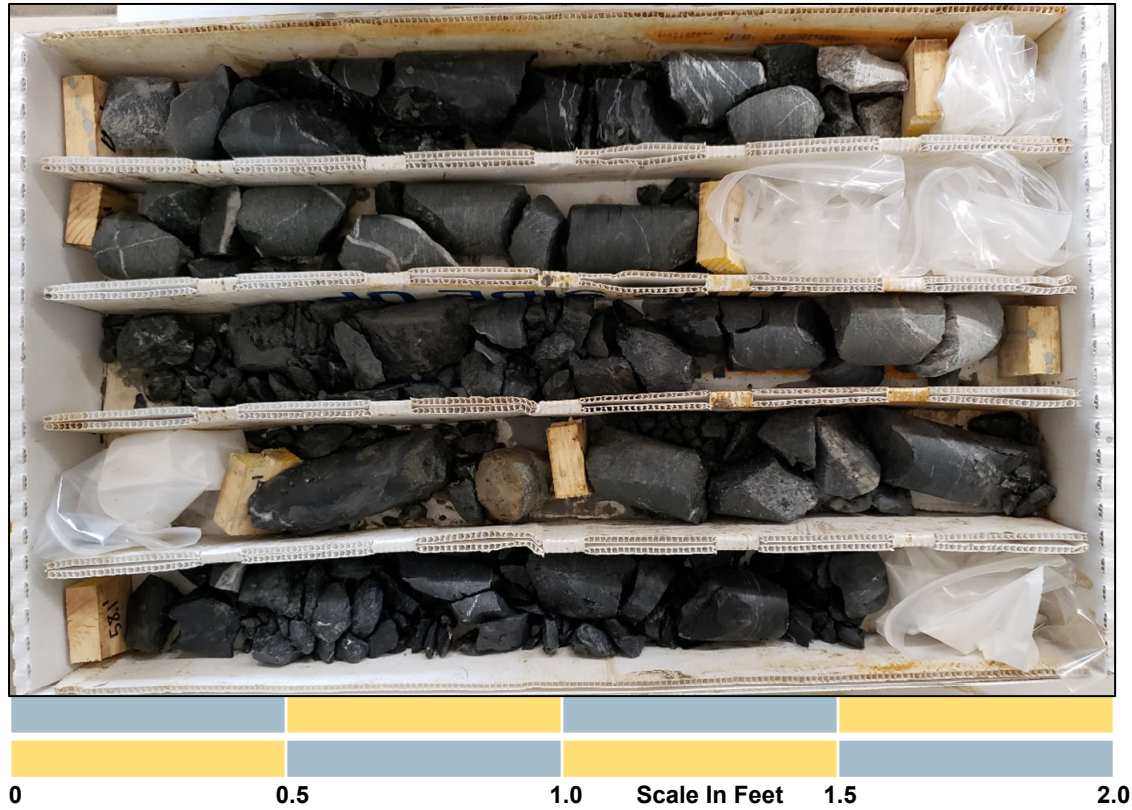
Log of Monitoring Well MW-3



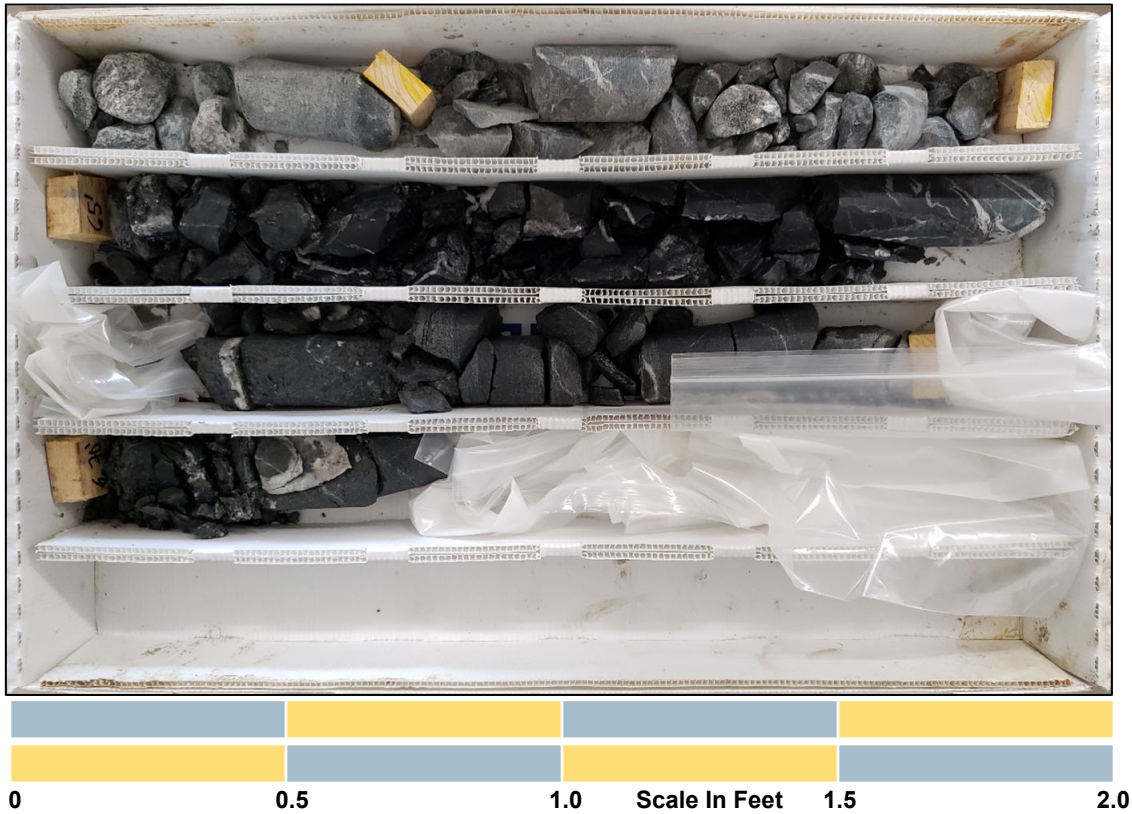
Project: WWTP Outfall
Project Location: Anacortes, Washington
Project Number: 0382-032-02

Figure A-26
Sheet 1 of 1

GEI-1B-20: 47' to 58'



GEI-1B-20: 58' to 70'



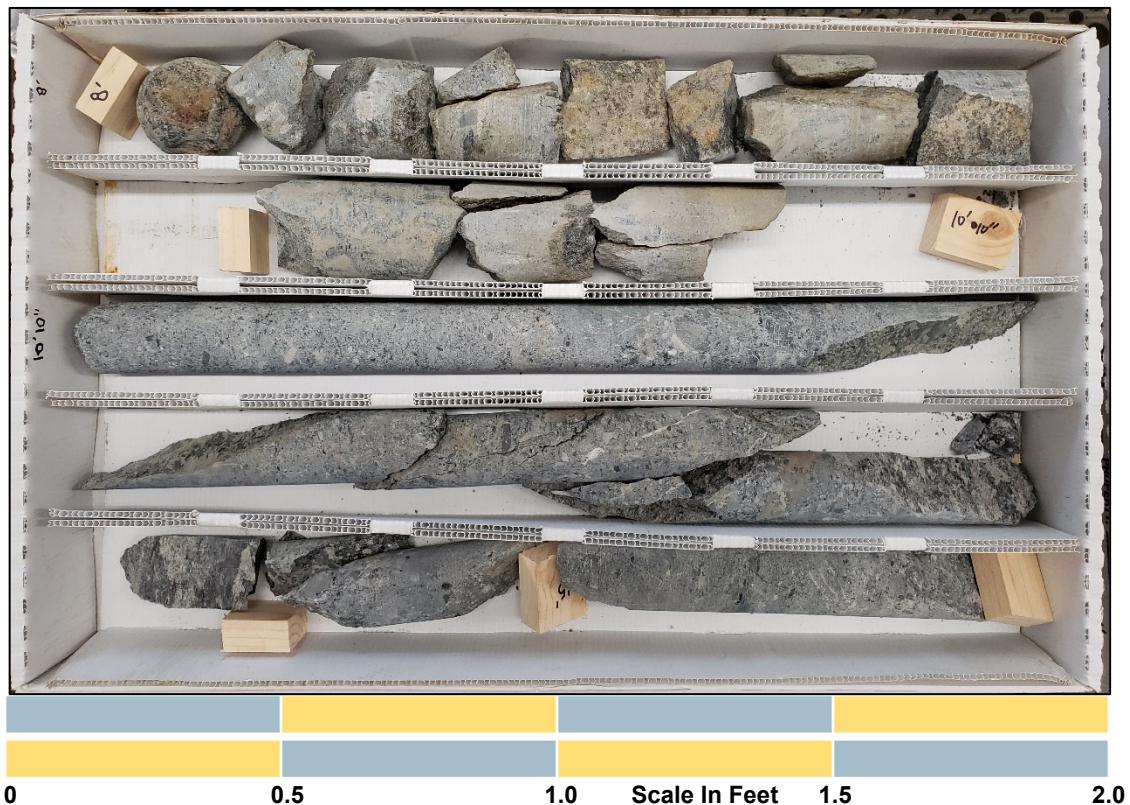
Rock Core Photographs

Anacortes WWTP Outfall
Anacortes, Washington

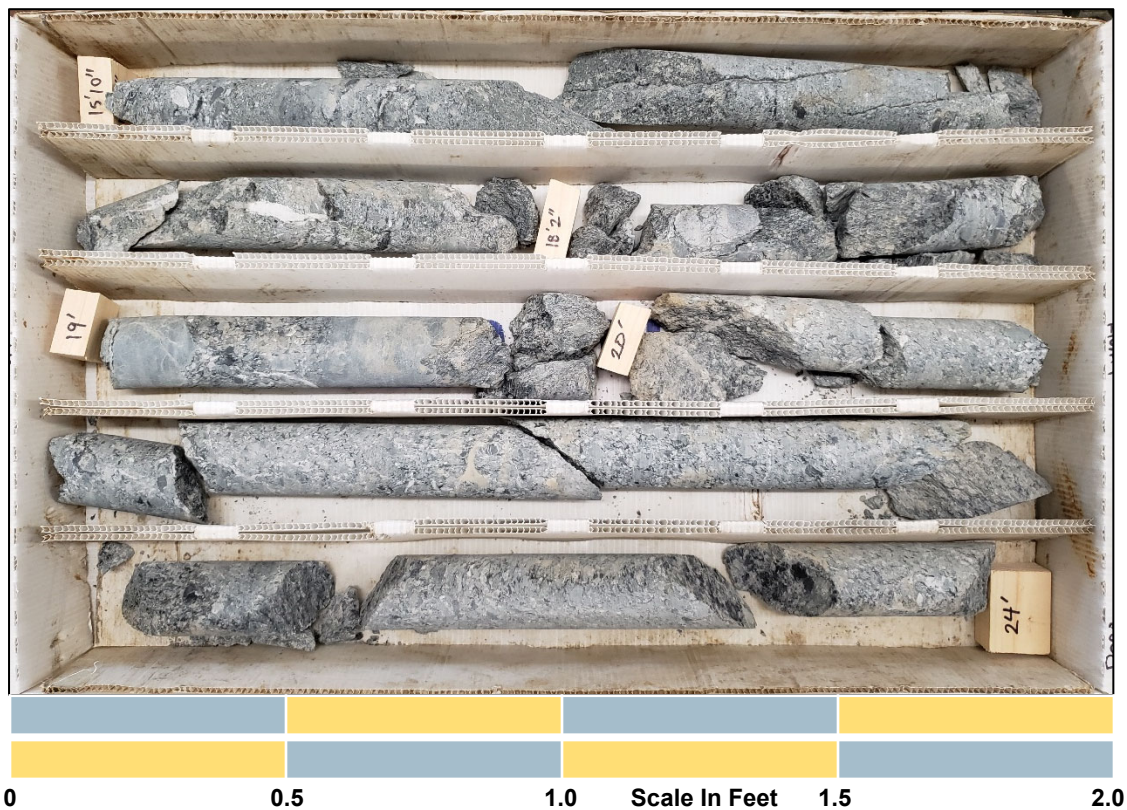


Figure A-27

GEI-2-20: 8' to 15' 10"



GEI-2-20: 15' 10" TO 24'



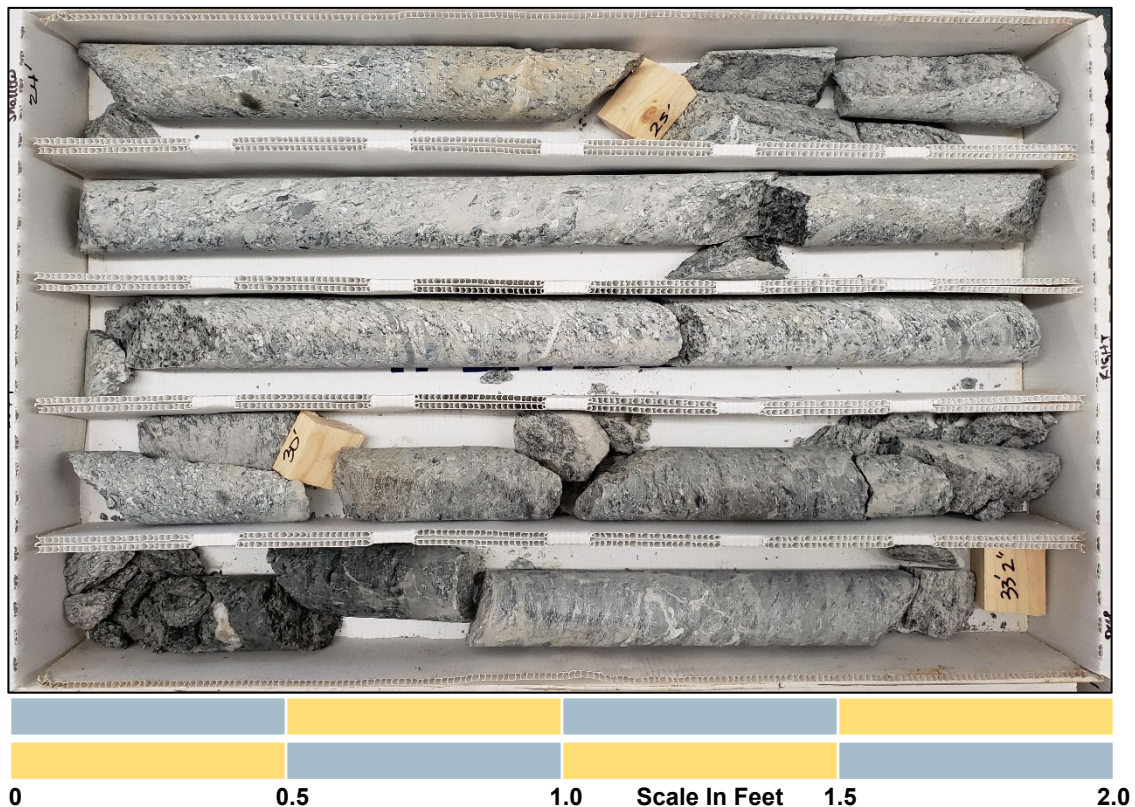
Rock Core Photographs

Anacortes WWTP Outfall
Anacortes, Washington

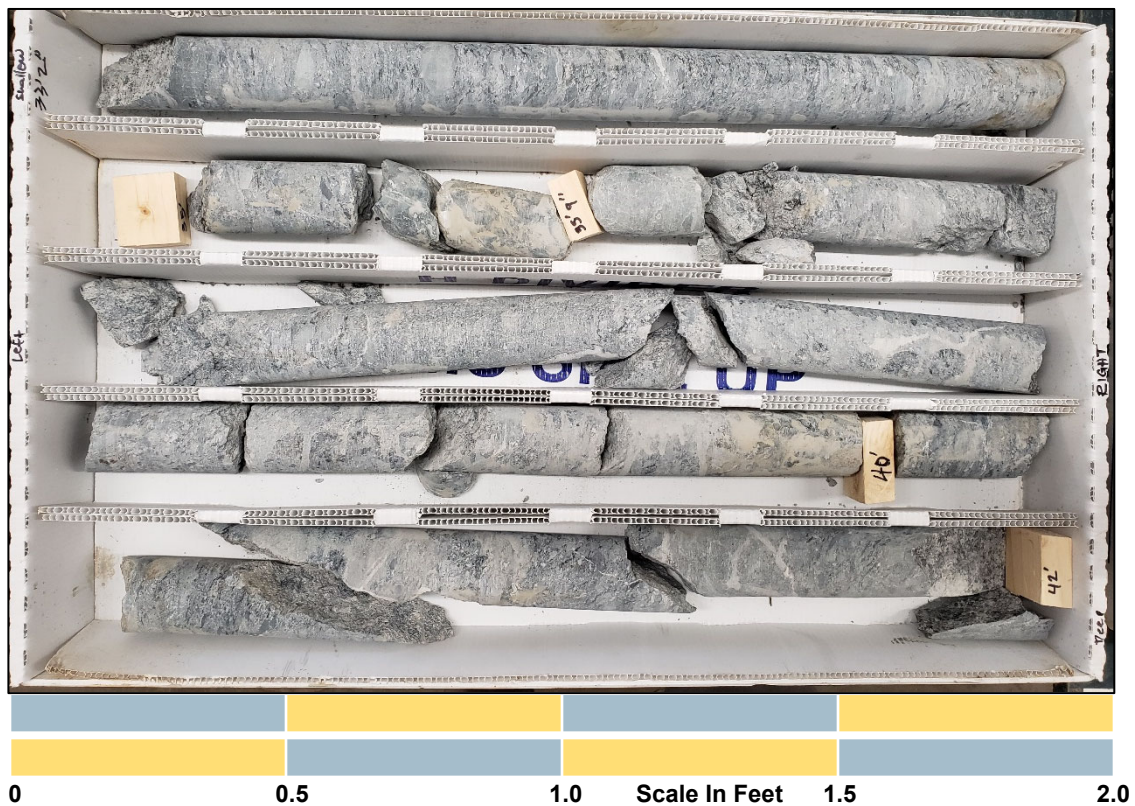


Figure A-28

GEI-2-20: 24' to 33' 2"



GEI-2-20: 33' 2" TO 42'



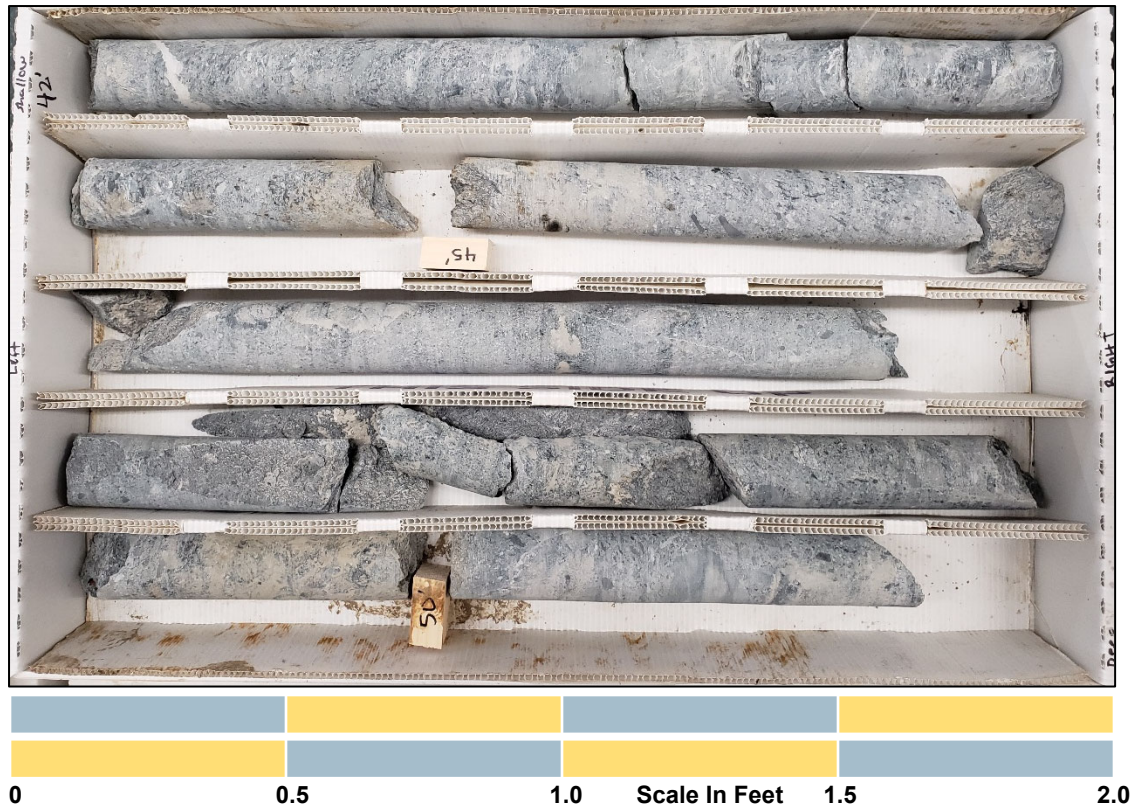
Rock Core Photographs

Anacortes WWTP Outfall
Anacortes, Washington

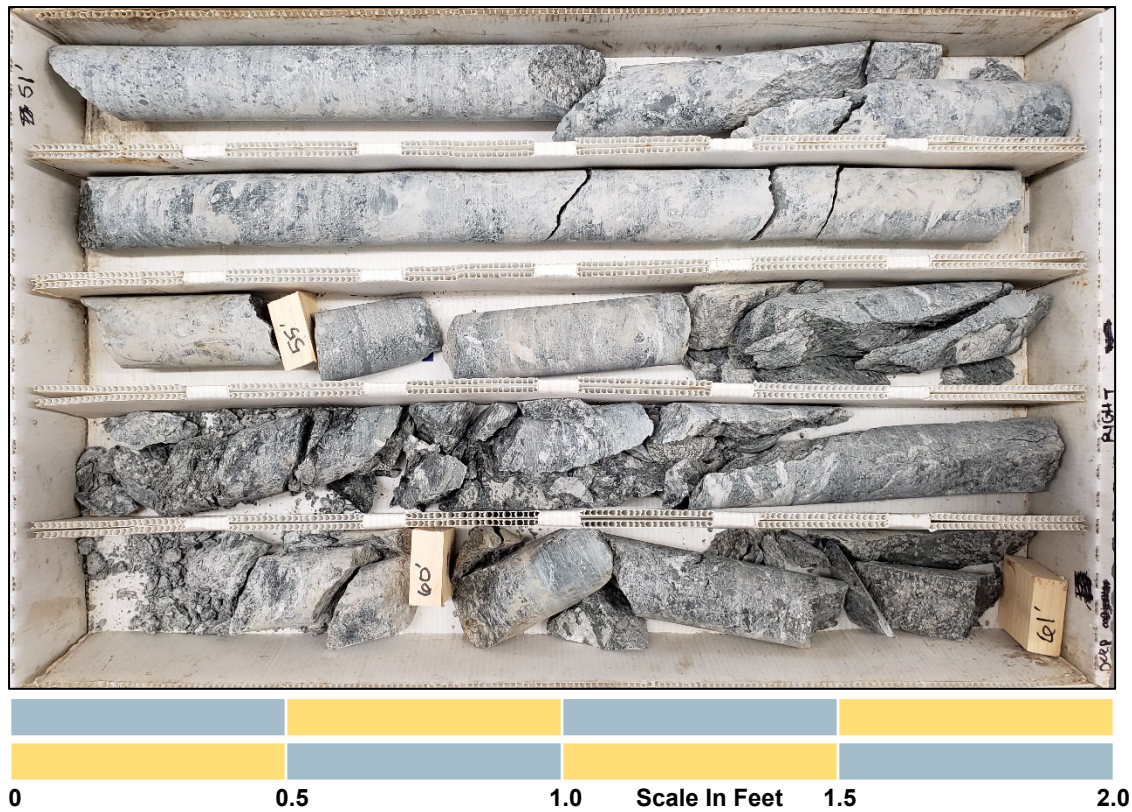


Figure A-29

GEI-2-20: 42' to 51'



GEI-2-20: 51' TO 61'



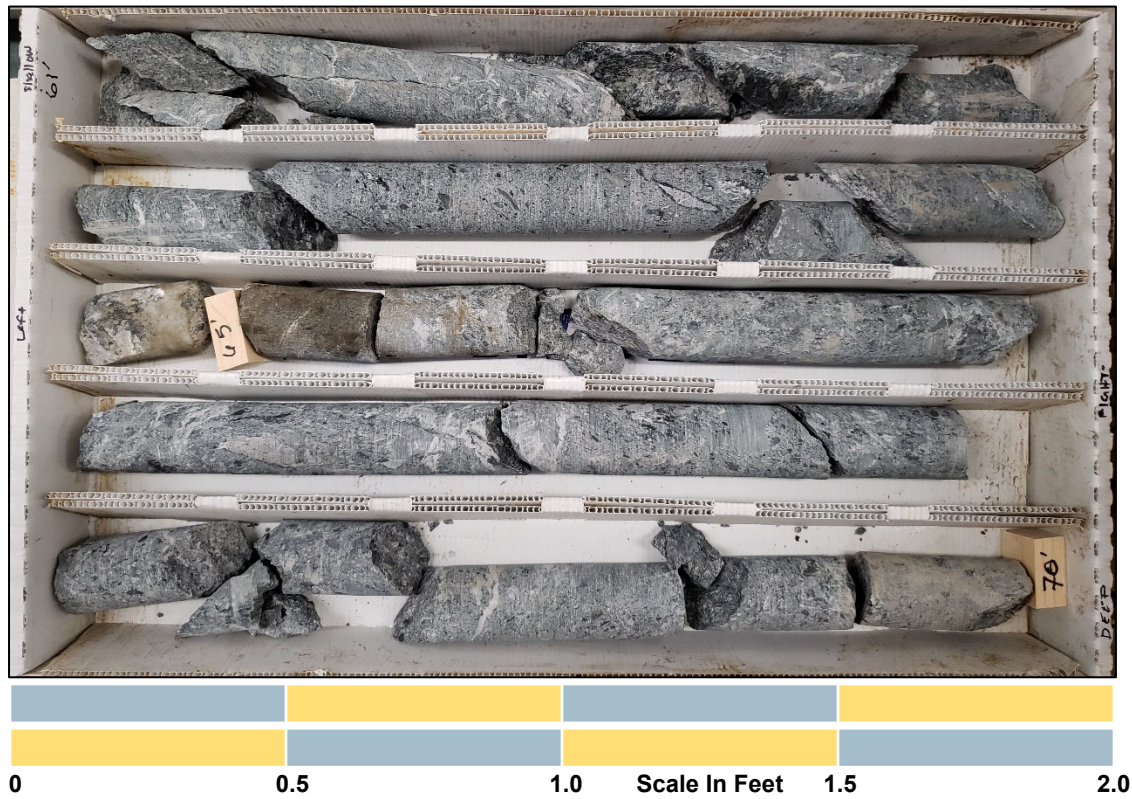
Rock Core Photographs

Anacortes WWTP Outfall
Anacortes, Washington

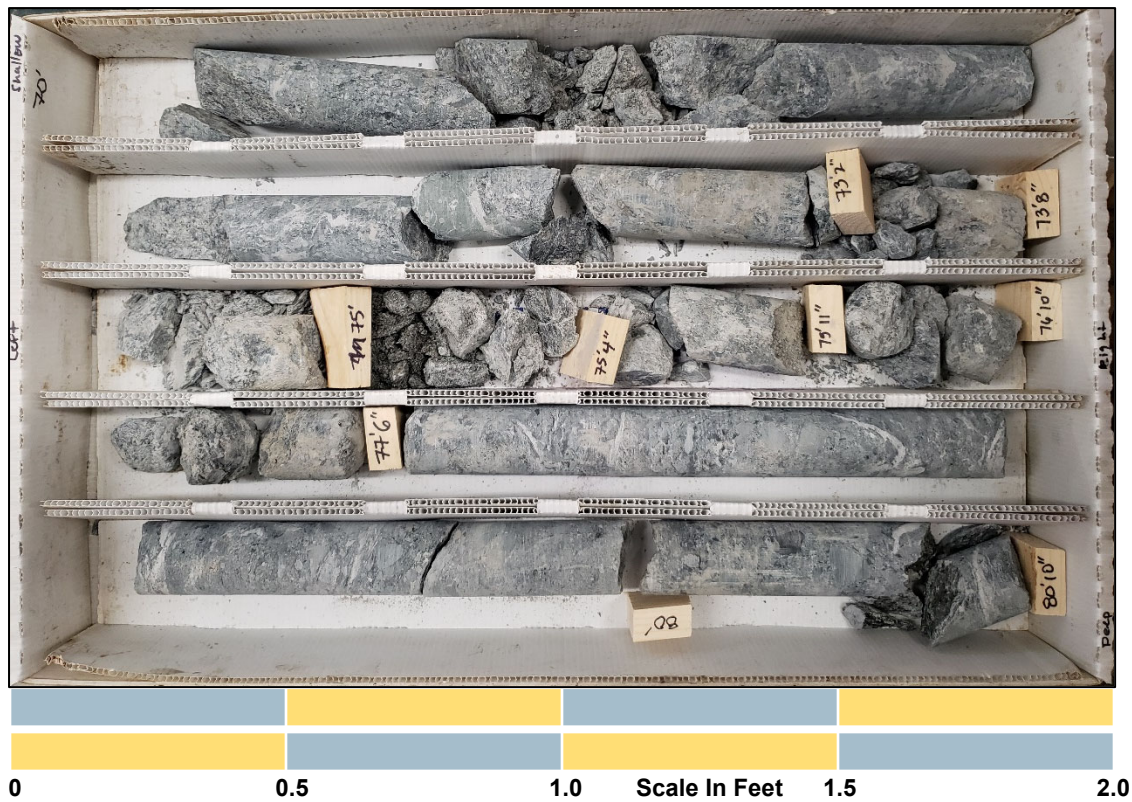


Figure A-30

GEI-2-20: 61' to 70'



GEI-2-20: 70' to 80' 10"

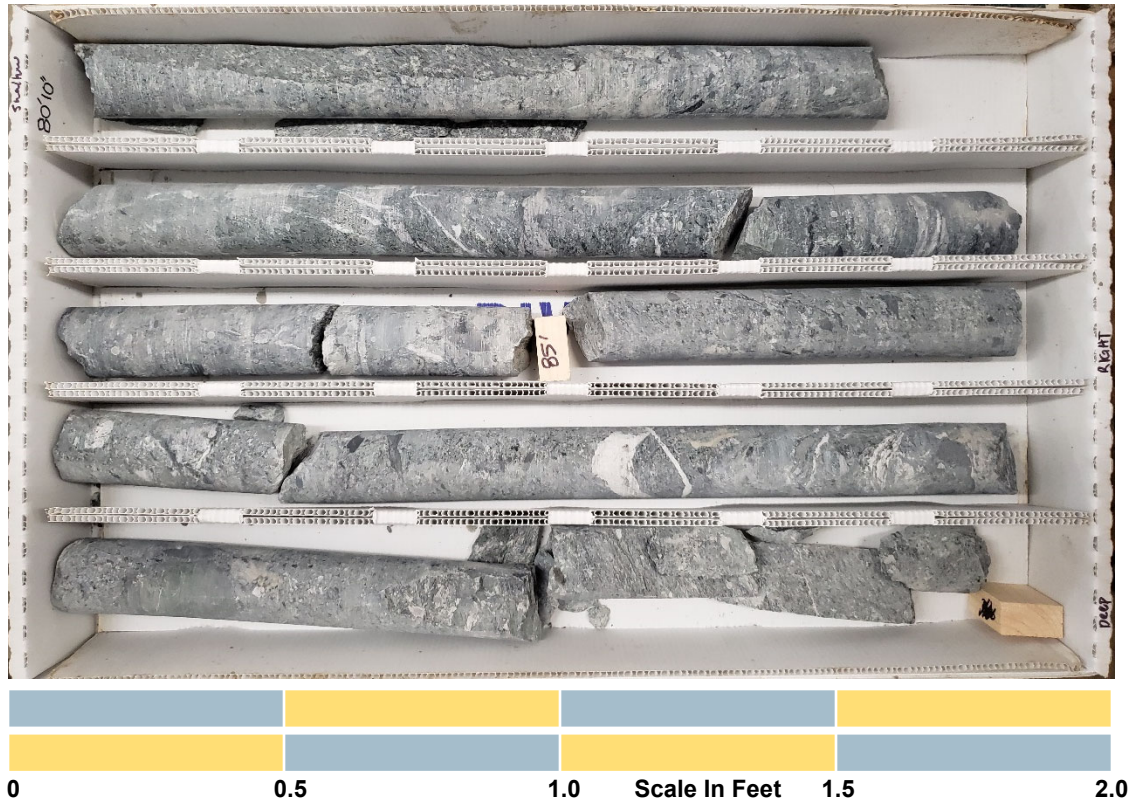


Rock Core Photographs

Anacortes WWTP Outfall
Anacortes, Washington



Figure A-31



Rock Core Photographs

Anacortes WWTP Outfall
Anacortes, Washington



Figure A-32

APPENDIX B

Laboratory Testing

APPENDIX B

LABORATORY TESTING

Soil samples obtained from the borings were transported to our laboratory and examined to confirm or modify field classifications, as well as to evaluate index properties of the soil samples. Representative samples were selected for laboratory testing consisting of the determination of the moisture content, percent fines content, and sieve analysis. The tests were performed in general accordance with test methods of ASTM International (ASTM) or other applicable procedures.

Moisture Content Testing

The natural moisture contents of selected soil samples obtained from the test pits were determined in general accordance with ASTM D 2216 test procedures. The results from the moisture content determinations are displayed in the column labeled “Moisture Content %” adjacent to the corresponding samples on the summary logs.

Percent Passing U.S. No. 200 Sieve

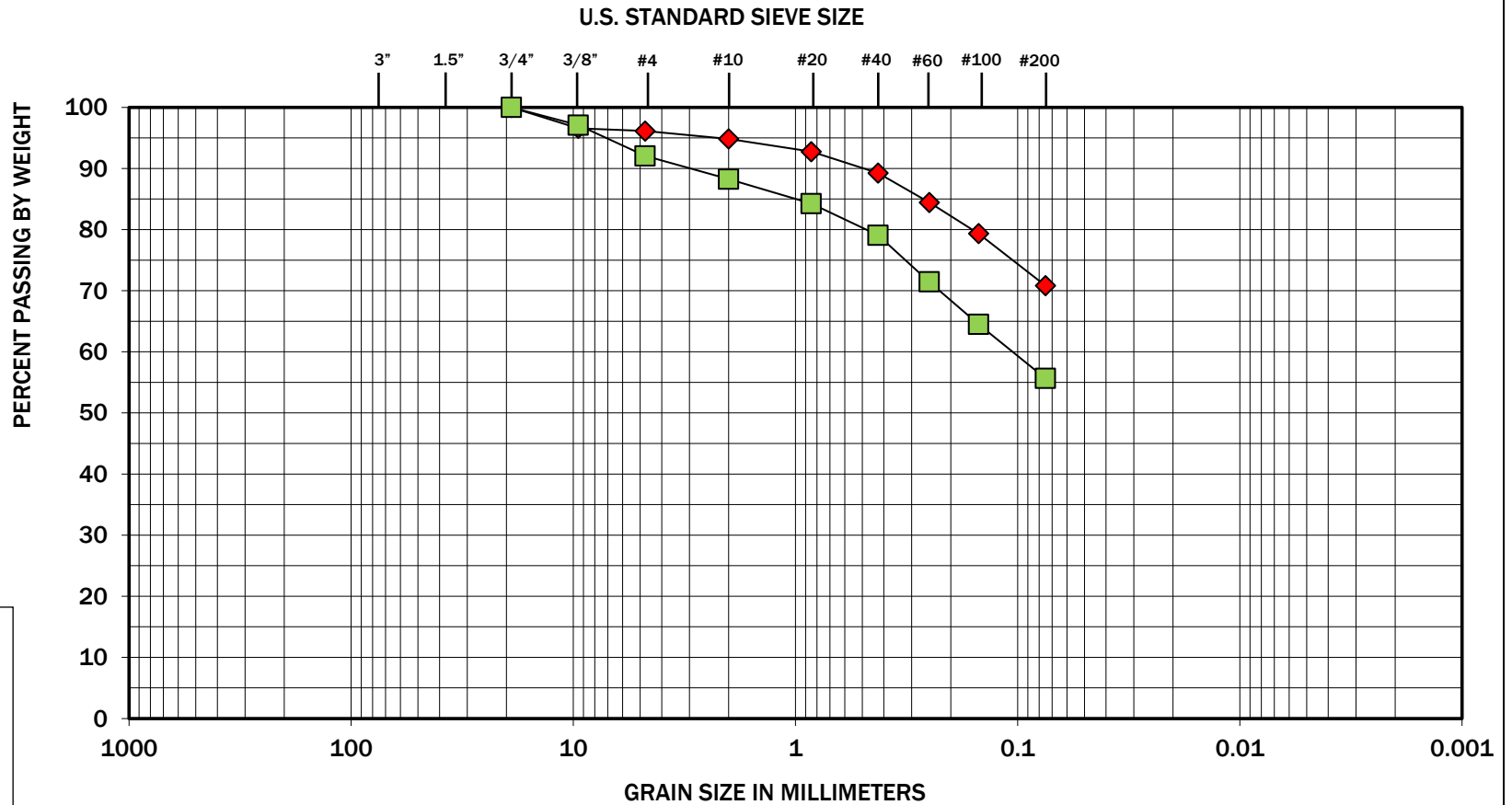
Selected samples were “washed” through the U.S. No. 200 mesh sieve to determine the relative percentage of coarse- and fine-grained particles in the soil. The percent passing value represents the percentage by weight of the sample finer than the U.S. No. 200 sieve. These tests were conducted in general accordance with ASTM D 1140. The results from the percent fines determinations are displayed in the column labeled “Fines Content (%)” adjacent to the corresponding samples on the summary exploration logs.

Sieve Analyses

Sieve analyses were performed on selected samples in general accordance with ASTM D 422 to determine the sample grain size distribution. The wet sieve analysis method was used to determine the percentage of soil greater than the U.S. No. 200 mesh sieve. The results of the sieve analyses were plotted, classified in general accordance with the Unified Soil Classification System (USCS), and are presented in Figures B-1 through B-3.

Atterberg Limits

Atterberg limit tests were completed for two soil samples. The tests were used to classify the soil as well as to aid in evaluating index properties and consolidation characteristics of the fine-grained soil deposits. The liquid limit and the plastic limit were obtained in general accordance with ASTM D 4318. The results of the Atterberg limits are summarized in Figures B-4 and B-5.



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Symbol	Boring Number	Depth (feet)	Moisture (%)	Soil Description
◆	GEI-1A-20	15	23	Clay (CL)
■	GEI-1A-20	25	14	Clay with silt and sand (CL)

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The grain size analysis results were obtained in general accordance with ASTM D 6913. GeoEngineers 17425 NE Union Hill Road Ste 250, Redmond, WA 98052

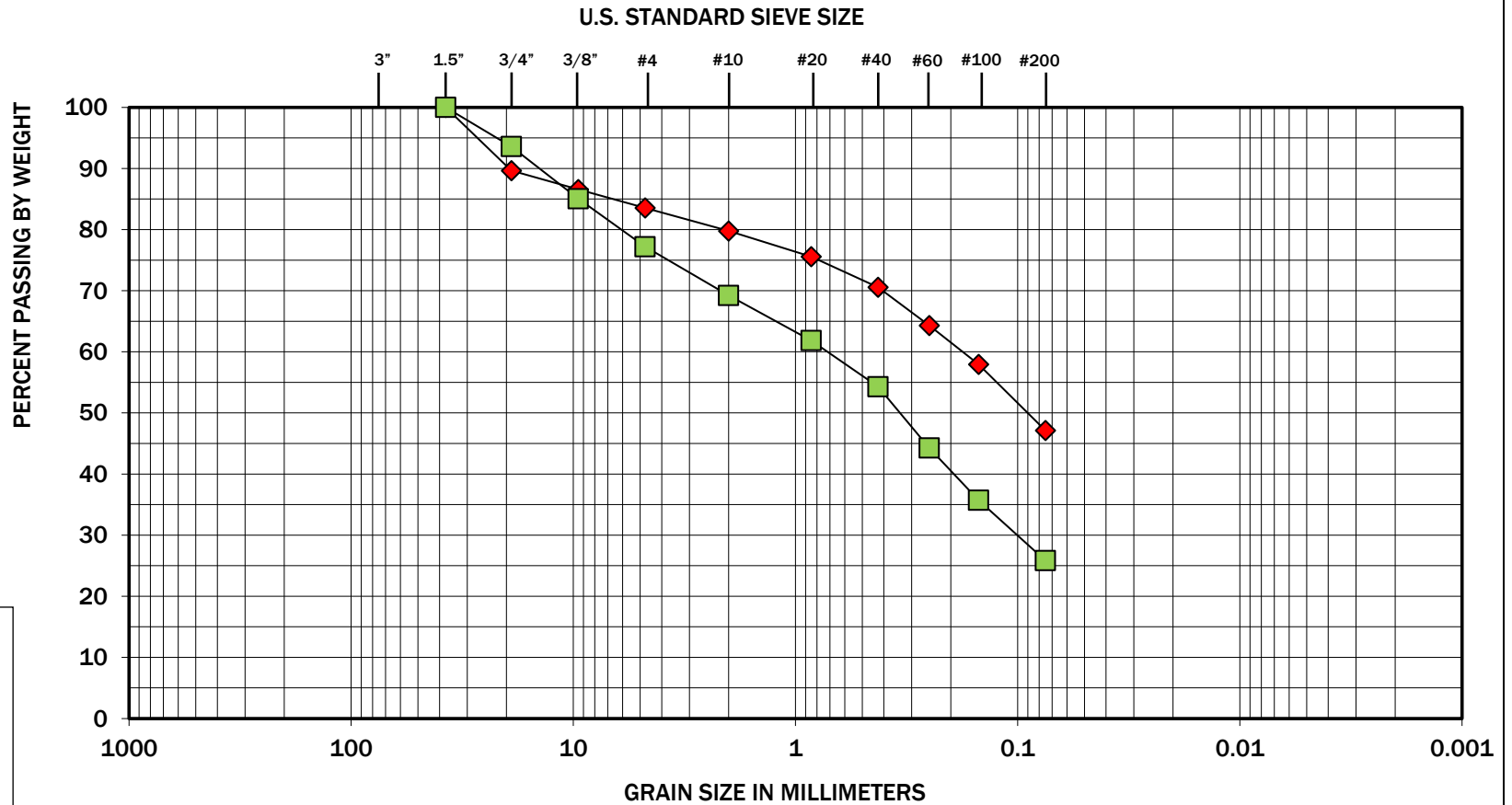
GEOENGINEERS



Figure B-1

Anacortes WWTP Outfall
Anacortes, Washington

Sieve Analysis Results

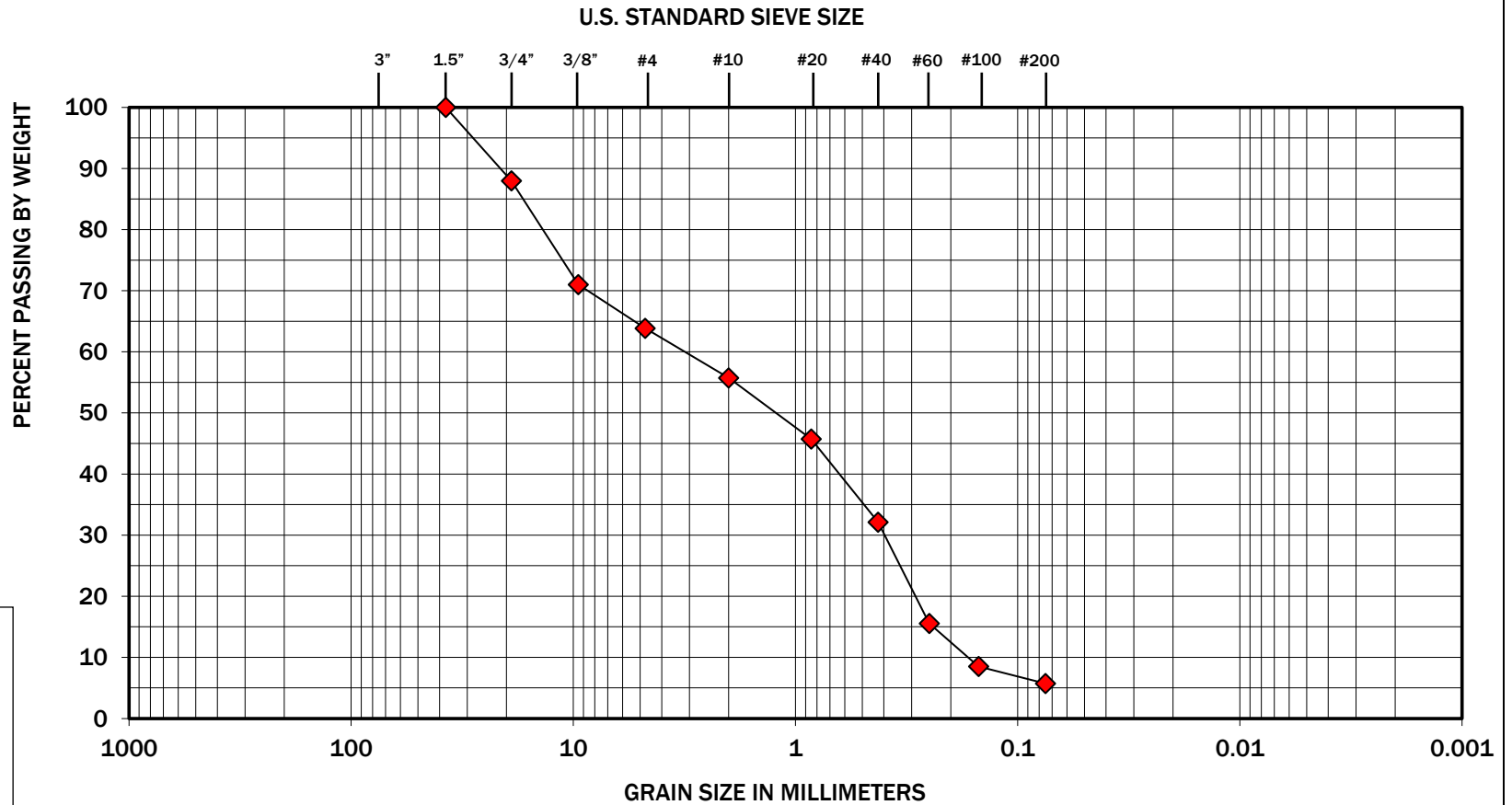


COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Symbol	Boring Number	Depth (feet)	Moisture (%)	Soil Description
◆	SS-3A	5	10	Silty sand with gravel (SM)
■	SS-5	7.5	12	Silty sand with gravel (SM)

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The grain size analysis results were obtained in general accordance with ASTM D 6913. GeoEngineers 17425 NE Union Hill Road Ste 250, Redmond, WA 98052



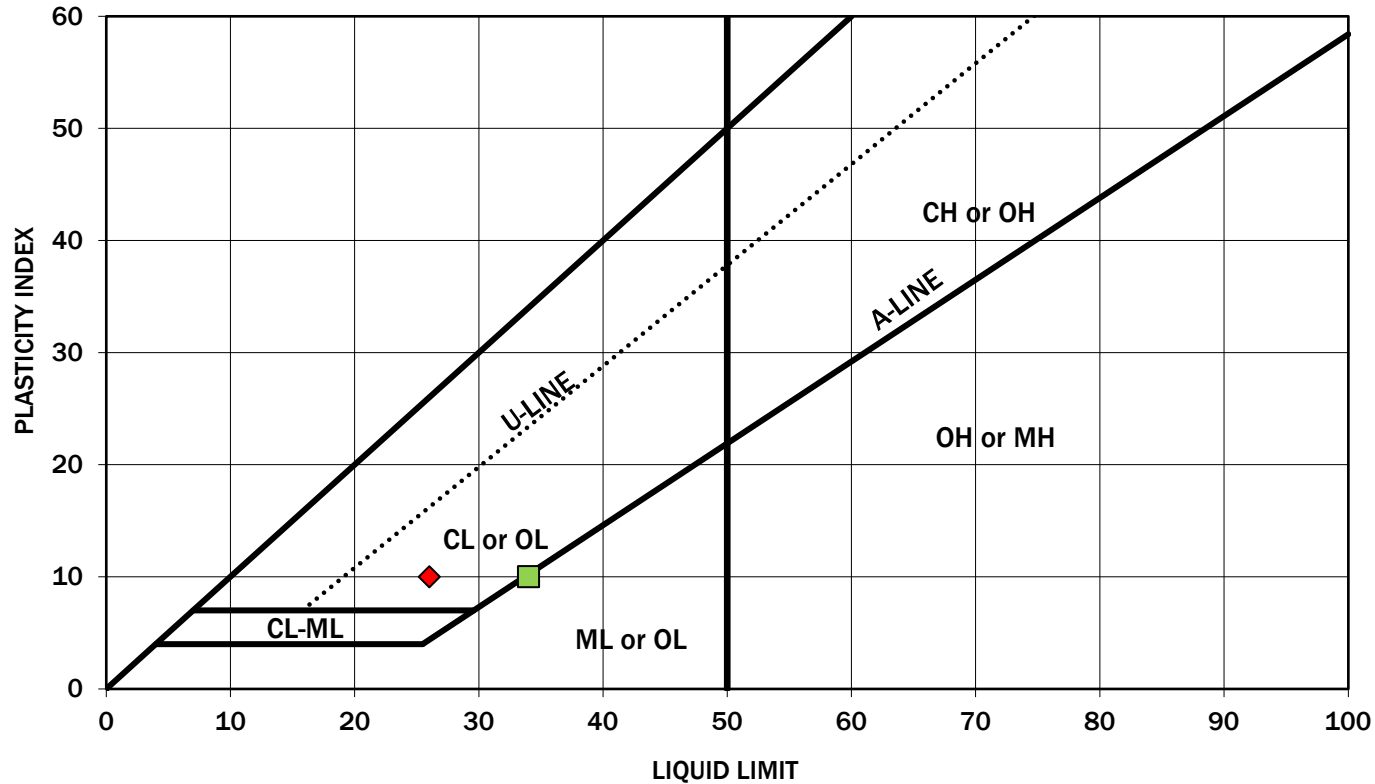
COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Symbol	Boring Number	Depth (feet)	Moisture (%)	Soil Description
◆	MW-1	7.5	11	Poorly graded sand with silt and gravel (SP-SM)

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The grain size analysis results were obtained in general accordance with ASTM D 6913. GeoEngineers 17425 NE Union Hill Road Ste 250, Redmond, WA 98052

PLASTICITY CHART



Symbol	Boring Number	Depth (feet)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Soil Description
◆	GEI-1A-20	20	23	26	10	Gray clay with sand (CL)
■	GEI-1A-20	40	15	34	10	Gray silt (ML)

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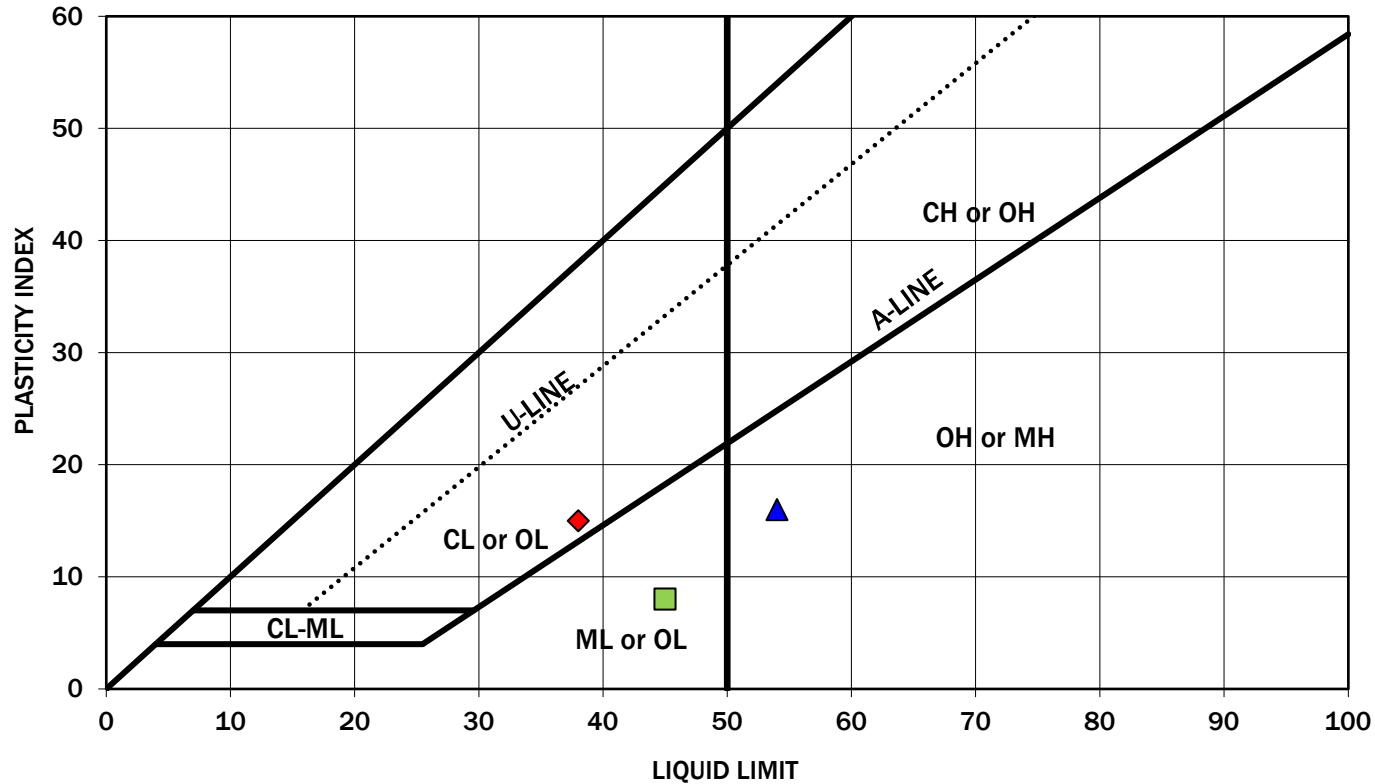
Atterberg Limits Test Results

Anacortes WWTP Outfall
Anacortes, Washington



Figure B-4

PLASTICITY CHART



Symbol	Boring Number	Depth (feet)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Soil Description
◆	SS-2A	1.5	22	38	15	Clay (CL)
■	SS-4	3	72	45	8	Silt (ML/OL)
▲	SS-5	2	63	54	16	Silt (MH/OH)

Note: This report may not be reproduced, except in full, without written approval of GeoEngineers, Inc. Test results are applicable only to the specific sample on which they were performed, and should not be interpreted as representative of any other samples obtained at other times, depths or locations, or generated by separate operations or processes. The liquid limit and plasticity index were obtained in general accordance with ASTM D 4318. GeoEngineers 17425 NE Union Hill Road Ste 250, Redmond, WA 98052

Offshore Atterberg Limits Test Results

Anacortes WWTP Outfall
Anacortes, Washington



Figure B-5

APPENDIX C

External Laboratory Testing

COMPRESSIVE STRENGTH TEST REPORT – DRILLED CORES

PROJECT: **Anacortes Water Treatment Plant Outfall**
ADDRESS: **Anacortes, WA, 98221**
PERMIT #: **N/A**
CLIENT: **Geoengineers**
CONTRACTOR: **N/A**

JOB #: **20-0405**
REPORT #: **MR001**
DATE: **4-22-2020**
PAGE #: **1 of 1**
INSPECTOR: **DK**

Core Location: **Anacortes Water Treatment Plant**

Laboratory Data:

Core No.	Location	Test Date	Time Tested	Total Load (lbs)	Compressive Strength (psi)	Remarks
1	UCS: d 63.5	4/22	N/A	22570	9170	GEI-2-20
2	UCS: d 82.8	4/22	N/A	12760	5190	GEI-2-20
3	UCS: d 44.3	4/22	N/A	14590	5930	GEI-2-20
4	UCS: d 21.8	4/22	N/A	20090	8170	GEI-2-20
5	UCS: d 60.8	4/22	N/A	33870	9320	GEI-1b-20
6	UCS: d 49.0	4/22	N/A	NT	NT	GEI-1b-20 – Fragment

Test Reference: ASTM D7012, Method C

	Core #1	Core #2	Core #3	Core #4	Core #5	Core #6
Length as Drilled, (+1/4")	NT	NT	NT	NT	NT	NT
Length Before Capping, (0.1")	3.97	3.74	3.96	4.00	2.74	NT
Length After Capping, (0.1")	4.12	3.89	4.12	4.16	2.89	NT
Average Diameter, (0.01")	1.77	1.77	1.77	1.77	1.77	NT
Date/Time Placed in Sealed Bag	NT	NT	NT	NT	NT	NT
Date/Time of End Preparation	NT	NT	NT	NT	NT	NT
Length/Diameter Correction	1.00	1.00	1.00	1.00	0.96	NT
Core Density, pcf	173.7	174.5	174.0	172.1	172.1	NT
Direction of Applied Load	Vertical					
Nominal Maximum Aggregate	N/A					
Defects in Cores Not Tested	Core #6 was a fragment.					
Deviation in Test Method	Cores were obtained by client; they were trimmed then sulfur capped and tested per ASTM D7012, Method C.					

Comments: Cores were provided by client.

Copies: GeoEngineers

David Bufalini

Reviewed by

Earth Mechanics Institute

Client: GeoEngineers

Project: Cerchar Testing

Date: 06/11/2020



Colorado School of Mines

Mining Engineering Department

Cerchar Abrasivity Test

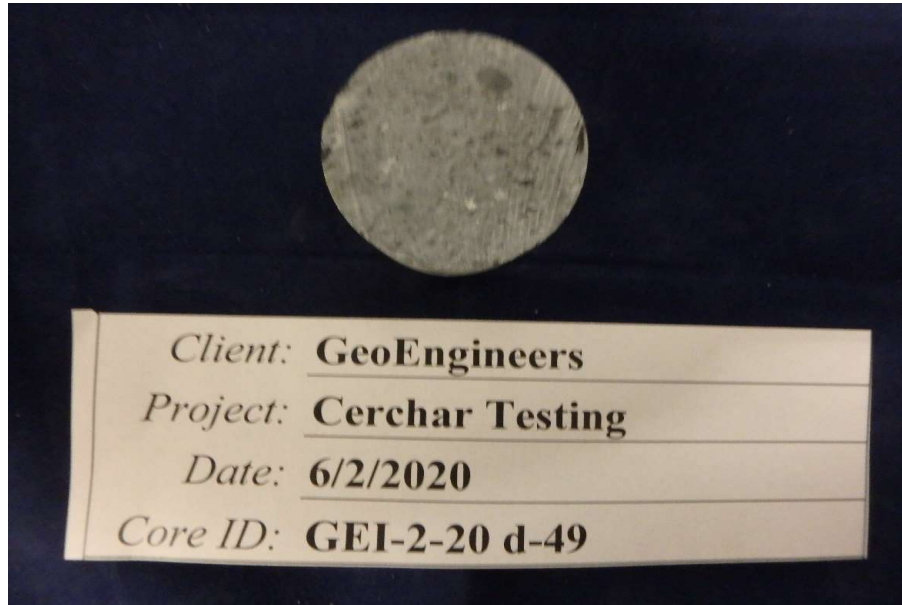
ASTM D7625

Sample ID	Rock Type	Cerchar Abrasivity Index (CAIs)*
GEI-2-20 d-49	Sedimentary	3.34
GEI-2-20 d-63.5	Sedimentary	4.38
GEI-2-20 d20.5	Sedimentary	4.49
GEI-2-10 d81	Sedimentary	2.37
GEI-1B-20 d61.5	Sedimentary	3.07
GEI-1B-20 d60	Sedimentary	2.93

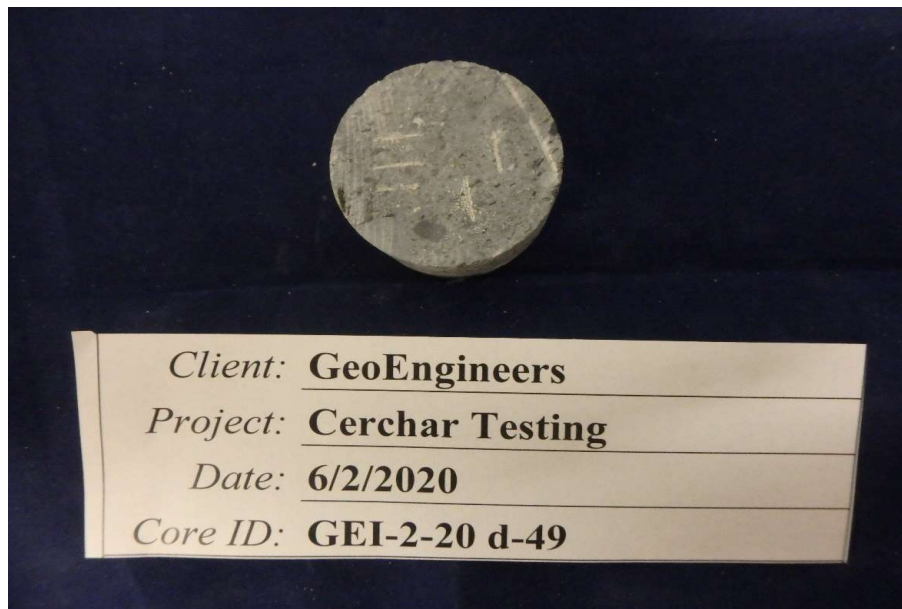
* CERCHAR tests have been run on saw cut surface. No correction factor has been added to the results.

Pictures of Sample Before and After
Cerchar Abrasivity Index

Client Name: GeoEngineers
Project Name: Cerchar Testing
Date: 6/11/2020
Sample ID: GEI-2-20 d-49



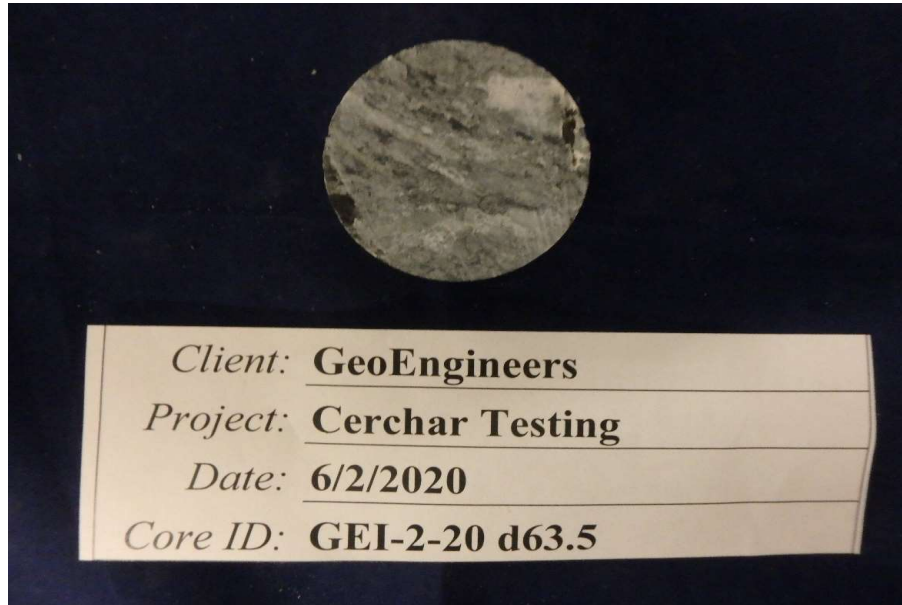
Before



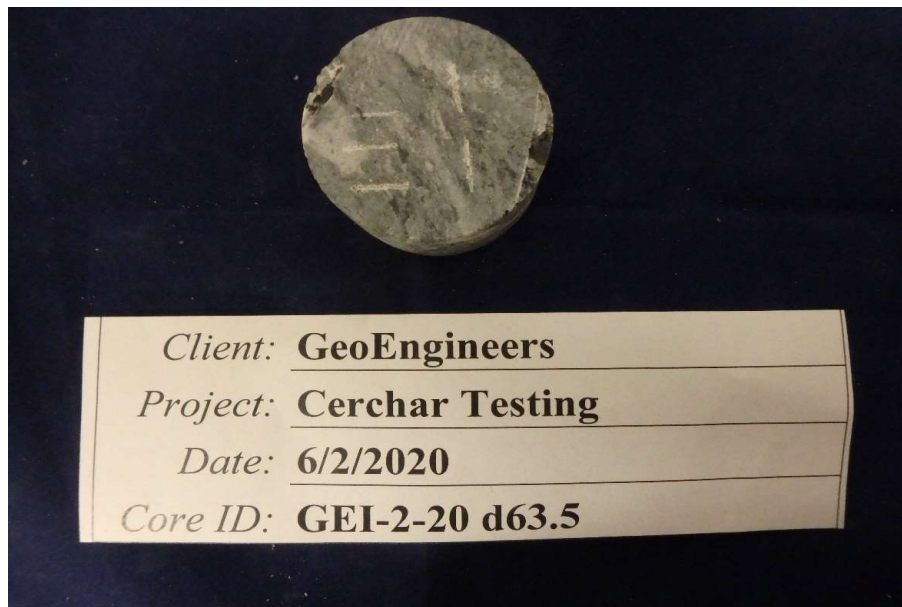
After

Pictures of Sample Before and After
Cerchar Abrasivity Index

Client Name: GeoEngineers
Project Name: Cerchar Testing
Date: 6/11/2020
Sample ID: GEI-2-20 d-63.5



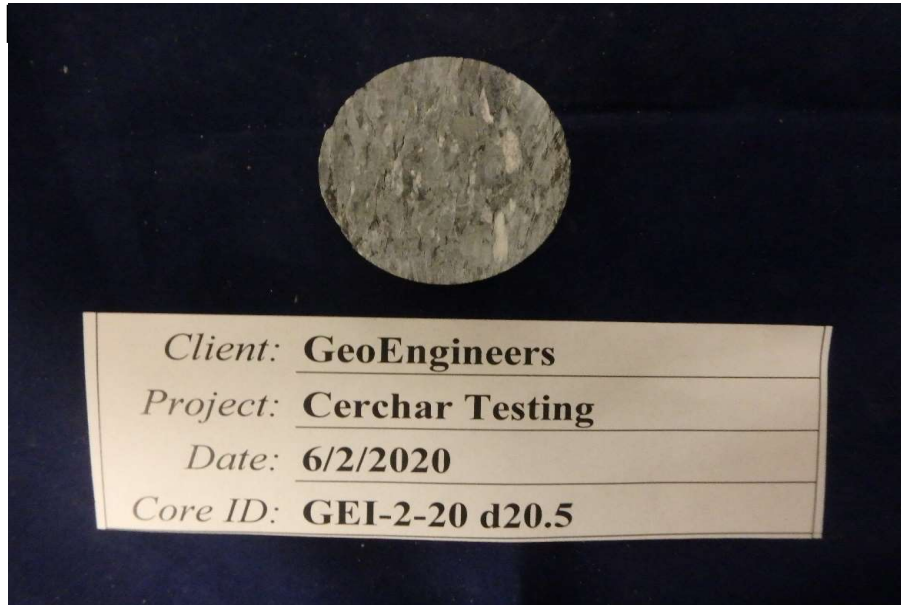
Before



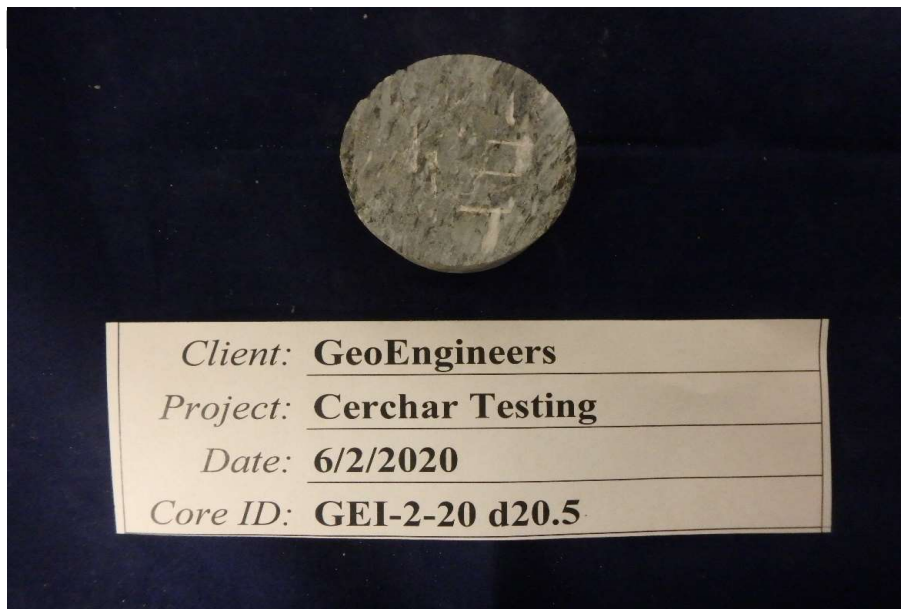
After

Pictures of Sample Before and After
Cerchar Abrasivity Index

Client Name: GeoEngineers
Project Name: Cerchar Testing
Date: 6/11/2020
Sample ID: GEI-2-20 d20.5



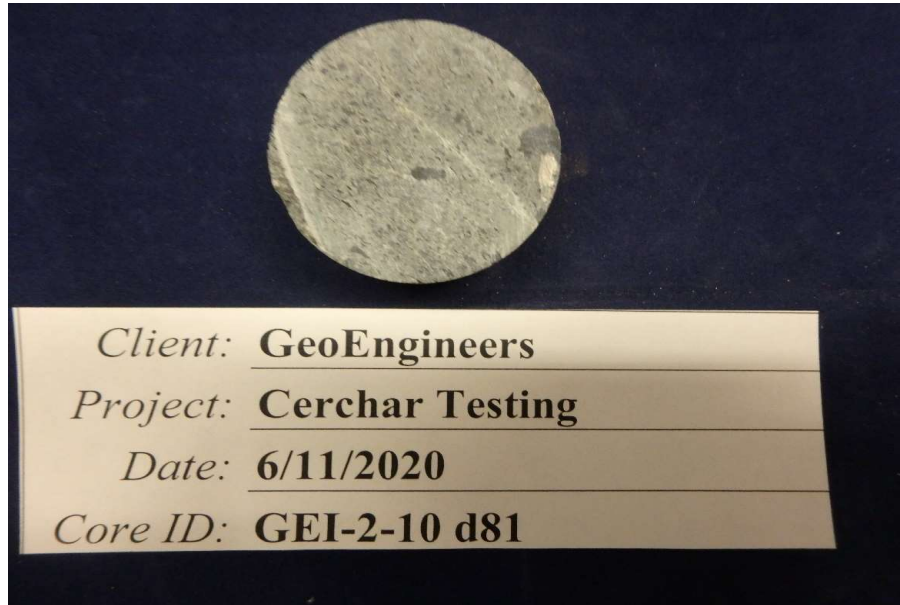
Before



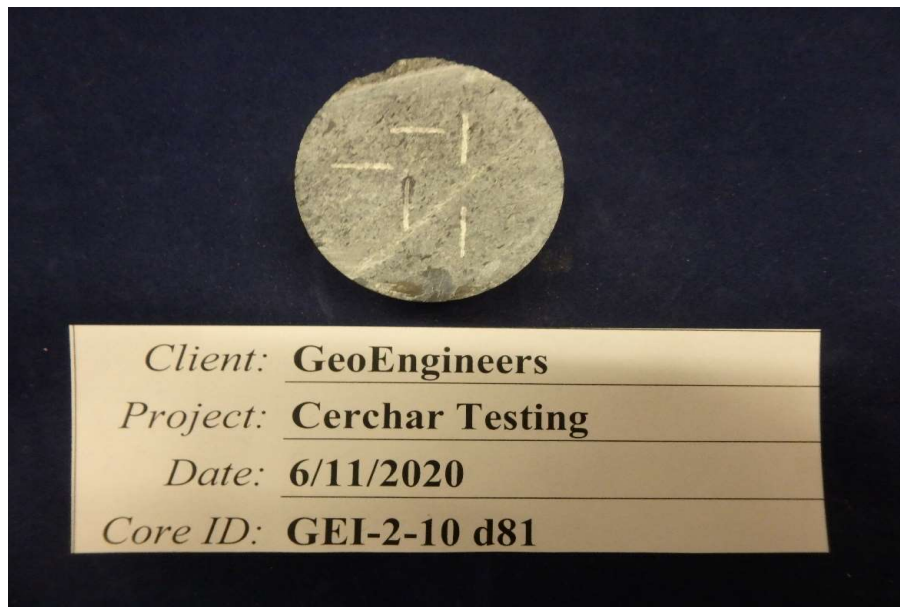
After

Pictures of Sample Before and After
Cerchar Abrasivity Index

Client Name: GeoEngineers
Project Name: Cerchar Testing
Date: 6/11/2020
Sample ID: GEI-2-10 d81



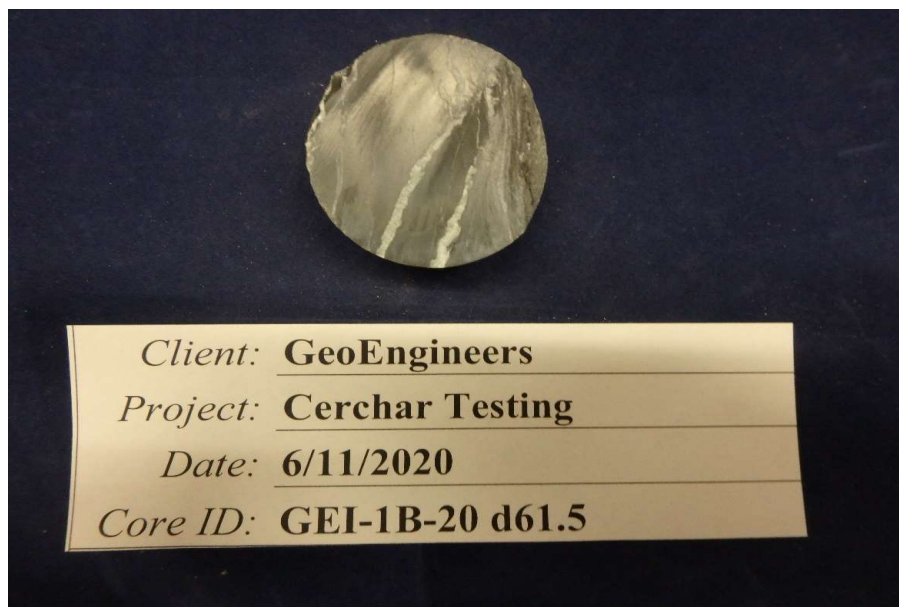
Before



After

Pictures of Sample Before and After
Cerchar Abrasivity Index

Client Name: GeoEngineers
Project Name: Cerchar Testing
Date: 6/11/2020
Sample ID: GEI-1B-20 d61.5



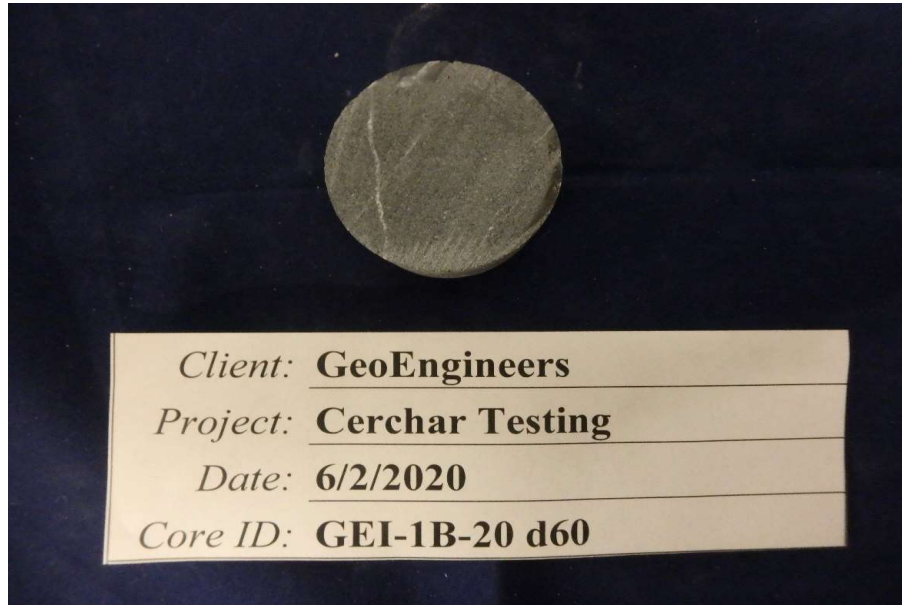
Before



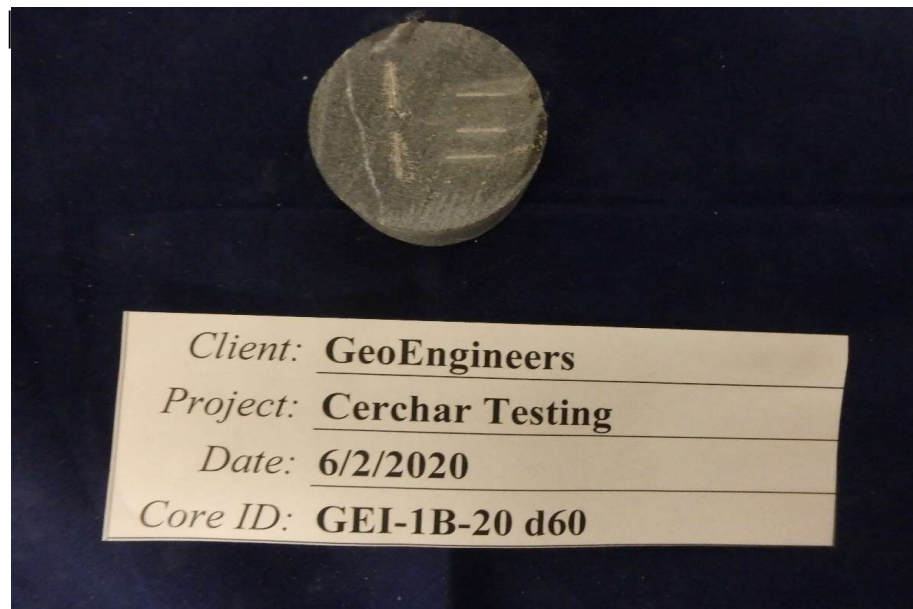
After

Pictures of Sample Before and After
Cerchar Abrasivity Index

Client Name: GeoEngineers
Project Name: Cerchar Testing
Date: 6/11/2020
Sample ID: GEI-1B-20 d60



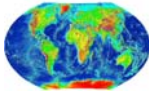
Before



After

APPENDIX D

Geophysics Report



Global Geophysics

P.O. Box 2229
Redmond, WA 98073-2229

Tel: 425-890-4321
Fax: 206-5820-0838

July 15, 2020

Our ref: 110-0513.000

GeoEngineers. Inc.
600 Dupont St,
Bellingham, WA 98225

Attention: Mr. Aaron Hartvigsen

**RE: REPORT FOR SEISMIC REFRACTION AND ELECTRICAL
RESISTIVITY TOMOGRAPHY SURVEYS FOR ANACORTES WWTP
OUTFALL, ANACORTES, WA**

Dear Mr. Hartvigsen:

Global Geophysics LLC. conducted seismic refraction, and electrical resistivity tomography surveys along the proposed outfall alignment for Anacortes Waste Water Treatment Plant, Anacortes, WA in June 2020. The objective of the studies is to study the depth to bedrock and rock rippability.

GEOPHYSICAL METHODS AND FIELD PROCEDURES

Seismic refraction and electrical resistivity tomography were used for this study. The following paragraphs describe the methods and field procedures.

Seismic Refraction

Seismic refraction is the traditional method for determining the rock velocity for rock rippability using a controlled energy source (hammer, blank shotgun shells, or chemical explosives) to generate a seismic signal. The seismic signals are received by a series of geophones (24, for example) that are connected to a seismic cable laid on the surface in a linear manner. The geophones, evenly spaced along the geophone cable, are placed on the ground surface. The seismic energy source (sledge hammer) is used to pound on the ground at several places along the array and off both ends.

The seismic wavelets travel through the earth to the geophones that convert the acoustic energy in the ground to an electric signal in the geophone cable. The seismograph detects the arriving electric signals with respect to time and stores the records for future data processing. The seismic data is processed to determine the seismic velocity of the earth material through which the energy has traveled and to model the subsurface geology. This geophysical model

depicts the earth in cross-section showing the velocity and thickness of the subsurface layers below the seismic line.

The seismic refraction survey was conducted using a Geometrics Geode 24-channel digital seismograph. The sensors used were Mark Products 4.5-Hz vertical geophones and the seismic energy source was a 20 lb. sledgehammer and KEG40 weight drop. The typical field procedure consisted of laying out the cables and planting the geophones at 5 ft intervals. The shots were set off at seven locations along the geophone array. Data was collected and saved in digital format and a field record was produced on the computer screen to check the data quality in real time.

Electrical Resistivity tomography (ERT)

The electrical resistivity tomography (ERT) technique maps differences in the electrical properties of geologic materials. These differences can result from variations in lithology, water content, pore-water chemistry, or contaminant plumes. The method involves transmitting an electric current into the ground between two electrodes and measuring the voltage between two other electrodes. The direct measurement is the apparent resistivity of the area beneath the electrodes. The measurements include deeper layers as the electrode spacing is increased. Recent advances in technology permit rapid collection of multiple soundings, using up to 112 electrodes for each spread. The data are modeled to create a 2-D geo-electric cross-section that is useful for mapping both vertical and horizontal variations of the subsurface strata.

The data was acquired with an AGI SuperSting R8 system using up to 56 electrodes spaced at a 10 feet interval. Once the cable was laid on the sea floor from a boat, multiple soundings will automatically be carried out by the control unit. The data was downloaded on site into a computer and processed using specialized inversion software to determine if all of the objectives have been met. The results were presented as a color-contoured cross-section that highlights stratigraphic features.

RESULTS

The line locations are presented in Figure 1. The seismic data are processed using SeisImager from Geometrics. The inverted p-wave velocity profiles are presented in Figures 2 and 3. Two interfaces are interpreted: top of the weathered rock and competent rock. The thickness of the overburden varies between 0 and 10 ft.

The resistivity data are processed using Res2DInv. The inverted resistivity profiles are presented in Figures 4. The interpreted top of the bedrock is shown by the dashed pick line. The resistivity data along U Avenue is very noisy (deleted more than 60% of data), which might have had a lot of interference from buried utilities along the road.

LIMITATION OF GEOPHYSICAL METHODS

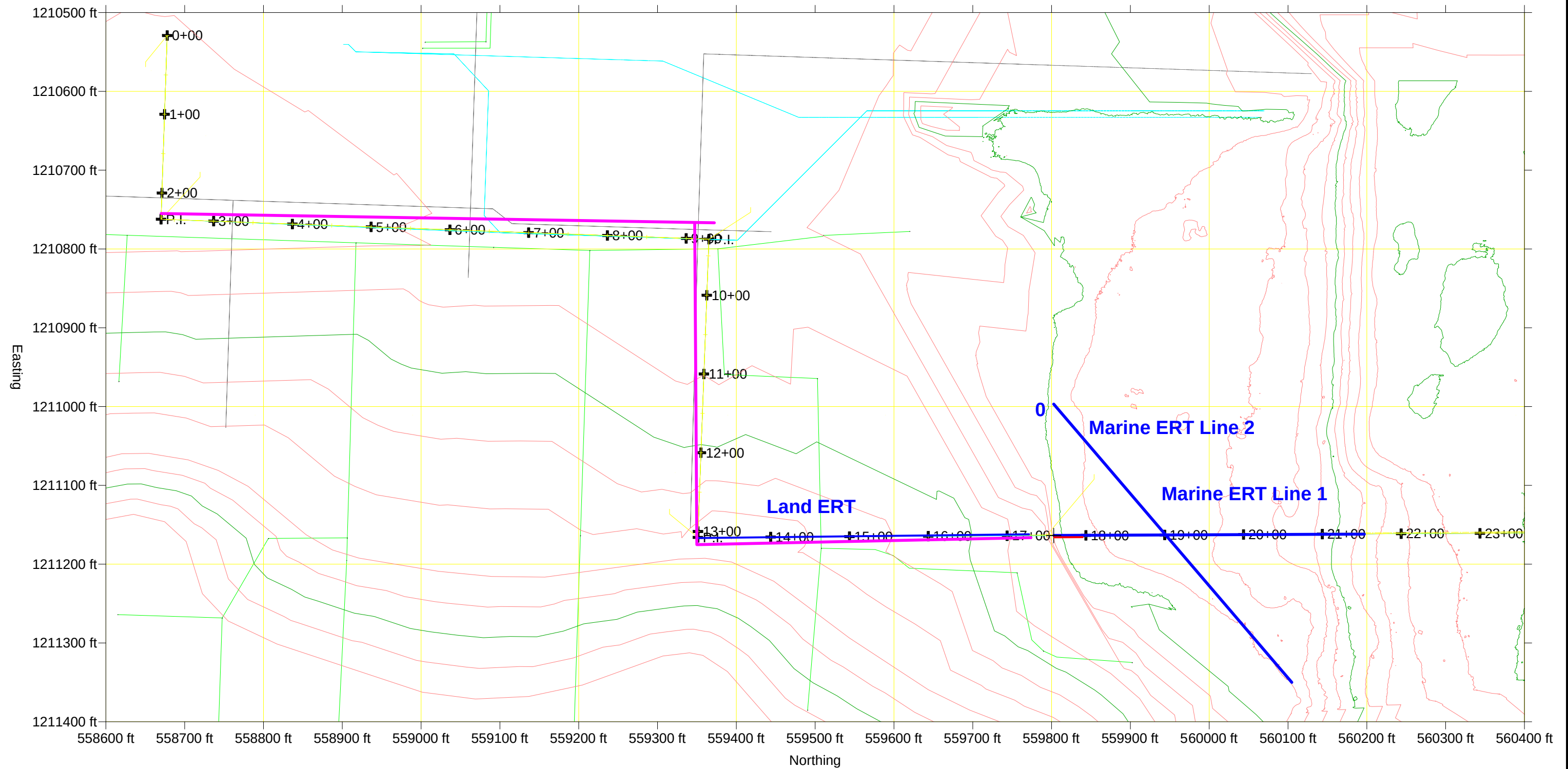
Global geophysics services are conducted in a manner consistent with the level of care and skill ordinarily exercised by other members of the geophysical community currently practicing under similar conditions subject to the time limits and financial and physical constraints applicable to the services. Seismic refraction and ERT are remote sensing geophysical methods that may not detect all subsurface conditions due to the limitations of the methods, soil conditions, size of the features and their depths.

Sincerely,

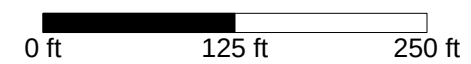
Global Geophysics



John Liu, Ph.D., R.G.
Principal Geophysicist

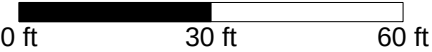
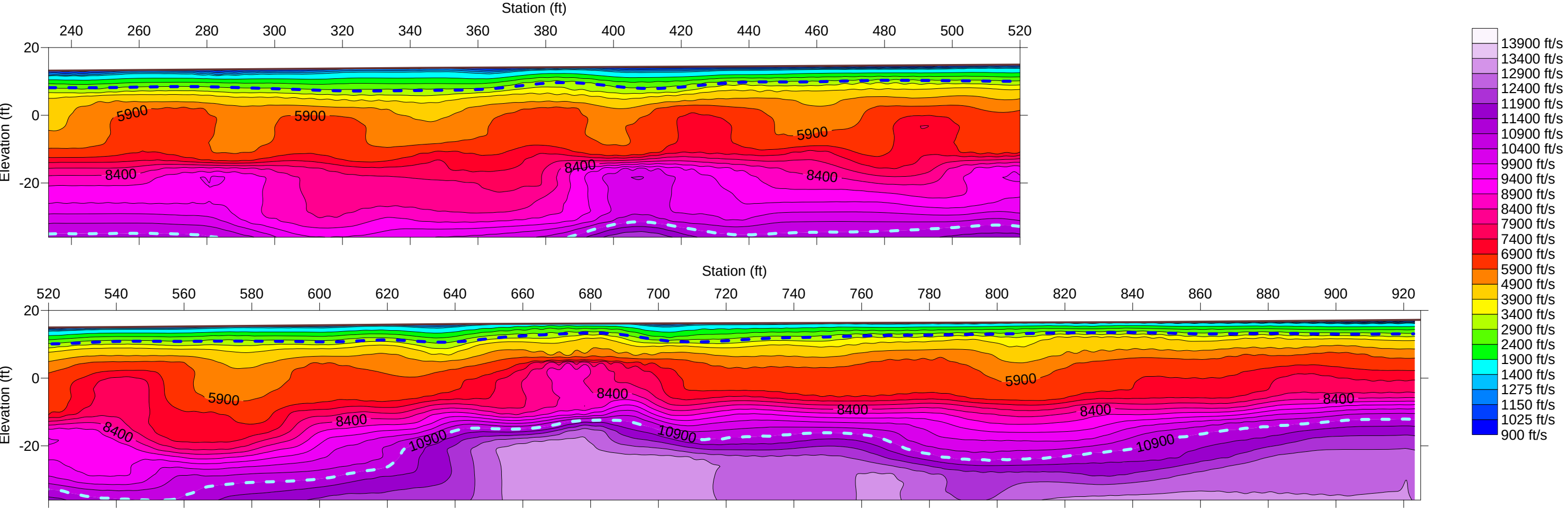


-  Refraction Line
-  ERT Line
-  Station Number



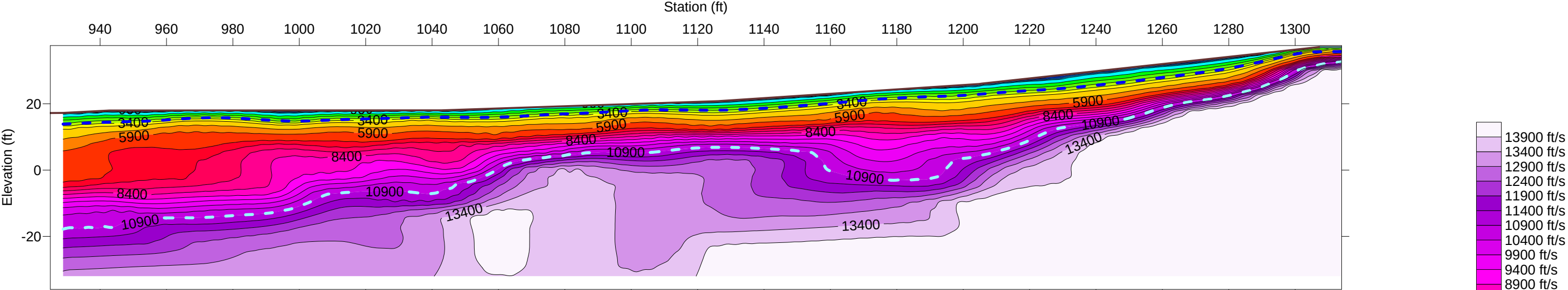
PROJECT			
Anacortes Sewer Outfall Geophysical Surveys			
TITLE			
Site Map			
Global Geophysics P.O. Box 2229 Redmond, WA 98073-2229 Tel: 425-890-4321	Project #: 110-0513		FILE No.
	DESIGN	--	SCALE AS SHOWN
	CADD	AK	REV.
	CHECK	JL	
	REVIEW	--	
FIGURE 1			

T Avenue

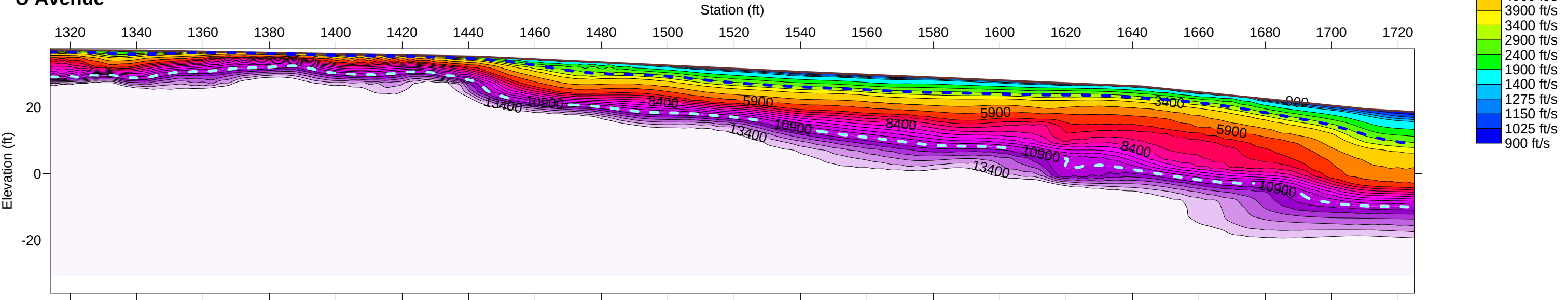


PROJECT			
Anacortes Sewer Outfall Geophysical Surveys			
TITLE			
P-wave Velocity Profiles			
Global Geophysics		Project #: 110-0513.000	FILE No.
P.O. Box 2229	Redmond, WA 98073-2229	DESIGN --	SCALE AS SHOWN REV.
Tel: 425-890-4321		CADD AK EJ	
		CHECK JL	
		REVIEW --	
FIGURE 2			

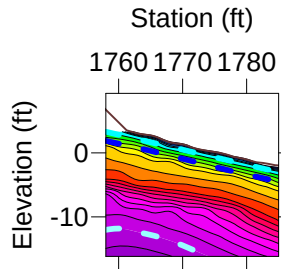
3rd Street



U Avenue

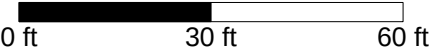


Beach



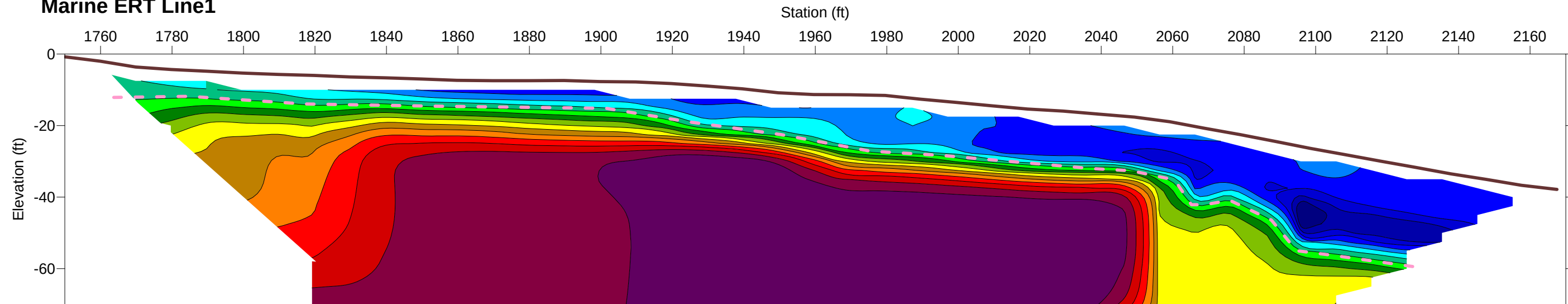
Legend:

- Interpreted top of the weathered rock
- Interpreted top of the competent rock

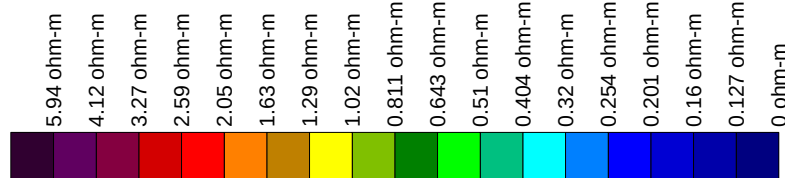
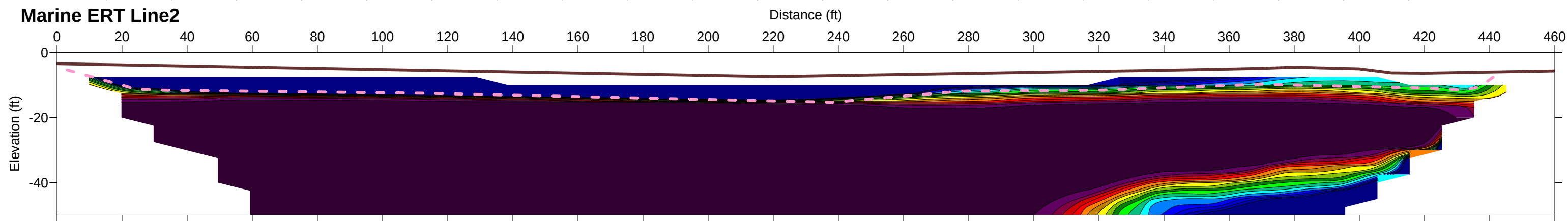


PROJECT			
Anacortes Sewer Outfall Geophysical Surveys			
TITLE			
P-wave Velocity Profiles			
Global Geophysics		Project #: 110-0513.000	FILE No.
P.O. Box 2229	DESIGN --	SCALE AS SHOWN	REV.
Redmond, WA 98073-2229	CADD AK EJ		
Tel: 425-890-4321	CHECK JL		
	REVIEW --		
FIGURE 3			

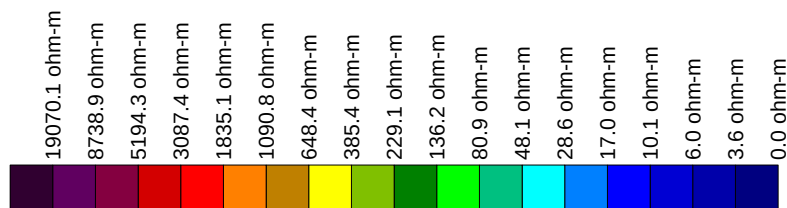
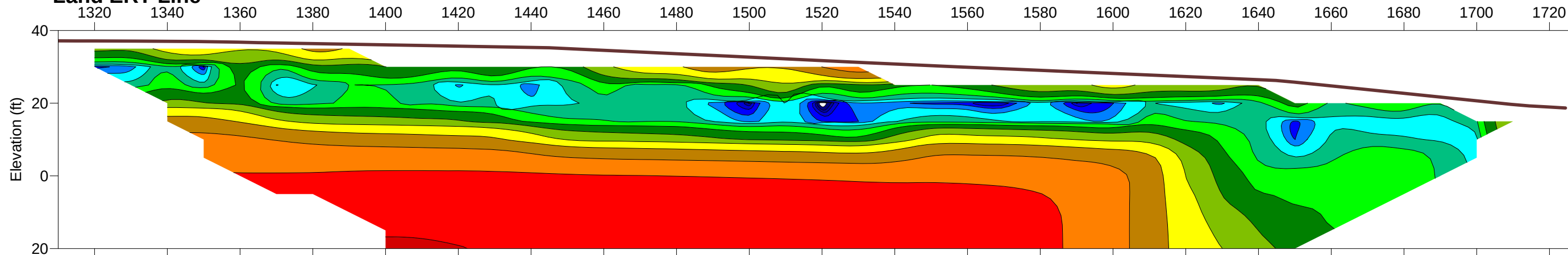
Marine ERT Line1



Marine ERT Line2

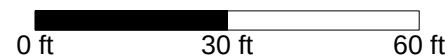


Land ERT Line



Legend:

--- Interpreted bedrock



PROJECT			
Anacortes Sewer Outfall Geophysical Surveys			
TITLE			
Resistivity Profiles			
Global Geophysics		Project #: 110-0513.000	FILE No.
P.O. Box 2229	Redmond, WA 98073-2229	DESIGN --	SCALE AS SHOWN
Tel: 425-890-4321		CADD AK	REV.
		CHECK JL	
		REVIEW --	
FIGURE 4			

APPENDIX E

Logs of Borings from Previous Studies

APPENDIX E

PREVIOUS STUDIES

GeoEngineers reviewed logs of previous explorations completed in the general vicinity of the currently planned project. The locations of previous explorations are shown on the Site Plan, Figure 2. The logs of the previous explorations are presented in this appendix and include:

- The logs of two borings (P2-1-2 A and P2-1-3) completed in 2012 by GeoEngineers in the report entitled “Geotechnical Engineering Services, Pier 2 Dredging Project, Port of Anacortes, Anacortes, Washington”. January 8, 2013.
- The logs of four borings (B-1 through B-4) completed in 2010 by GeoEngineers in the report entitled “Geotechnical Engineering Services, “T” Avenue and 4th Street Improvements, Anacortes, Washington”. January 19, 2010.
- The logs of five borings (B-1 through B-5) completed in 2009 by GeoEngineers in the report entitled “Geotechnical Engineering Services, Wyman’s Ramp Improvements, Anacortes, Washington”. January 29, 2010.
- The logs of six borings (B-6 through B-11) completed in 2011 by GeoEngineers in the report entitled “Geotechnical Study for Potential Habitat Mitigation, Wyman’s Property, Anacortes, Washington”. December 1, 2011.
- The logs of two borings (B-3 and B-19) and two test pits (TP-6 and TP-8) completed in 1986-1988 by CH2M Hill in the report entitled “Geotechnical Data Report, The City of Anacortes Wastewater Treatment Plant, Anacortes, Washington”. April 1988.

Start Drilled 11/14/2012	End 11/14/2012	Total Depth (ft) 8.5	Logged By Checked By RMB RST	Driller Boart Longyear	Drilling Method Hollow-Stem Auger
Surface Elevation (ft) Vertical Datum -43.6 MLLW		Hammer Data Autohammer 140 lbs / 30-inch drop		Drilling Equipment CME-75	
Latitude Longitude 48° 31' 19.88" -122° 36' 29.19"		System Datum Geographic		Groundwater Date Measured Depth to Water (ft) Elevation (ft) N/A	
Notes:					

Elevation (feet)	FIELD DATA					MATERIAL DESCRIPTION	Moisture Content, %	Dry Density, (pcf)	REMARKS
	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing				
0	21				1	Gray silty fine to medium sand with shell fragments and occasional gravel			
						Gray silt with sand and occasional shell fragments			
	24	50/5"			2	Gray silt with trace sand (very stiff, moist) (Whidbey Formation)			
					3				
5	24	81							
	24	70				Becomes hard			

Note: See Figure A-1 for explanation of symbols.

Log of Boring P2-1-1



Project: Pier 2 Dredging Project
Project Location: Anacortes, Washington
Project Number: 5147-023-01

Figure A-2
Sheet 1 of 1

Start Drilled 11/14/2012	End 11/14/2012	Total Depth (ft) 54	Logged By Checked By RMB RST	Driller Boart Longyear	Drilling Method Hollow-Stem Auger
Surface Elevation (ft) Vertical Datum	-43.6 MLLW	Hammer Data	Autohammer 140 lbs / 30-inch drop	Drilling Equipment	CME-75
Latitude Longitude	48° 31' 20.06" -122° 36' 29.19"	System Datum	Geographic	Groundwater Date Measured	Depth to Water (ft) Elevation (ft) N/A
Notes:					

Elevation (feet)	FIELD DATA					MATERIAL DESCRIPTION	Moisture Content, %	Dry Density, (pcf)	REMARKS
	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing				
0									
45									
5									
50									
10	14	26		1		Gray silt with fine sand (very stiff, moist) (glaciomarine drift)			
35	15	50		2					Shelby Tube sample attempted, no recovery
15						Gray silty fine sand (dense, moist) (Whidbey Formation)			
60	16	37		3		Gray silt with sand (hard, moist)			
20						Gray sandy silt to silty fine sand (hard/very dense, moist)			
65	15	51		4					
25	12	21		5		Gray sandy silt (very stiff, moist)			Shelby Tube sample attempted, no recovery
30						Becomes hard			
70									
35	14	48		6					

Note: See Figure A-1 for explanation of symbols.

Log of Boring P2-1-1 A



Project: Pier 2 Dredging Project
Project Location: Anacortes, Washington
Project Number: 5147-023-01

Figure A-3
Sheet 1 of 2

Seattle, Date: 1/7/13 Path: C:\USERS\CV\OSS\DESKTOP\514702301.GPJ DBTemplate\LibTemplate\GEOENGINEERS8 GDT\GEI8_GEOTECH_STANDARD

Elevation (feet)	FIELD DATA					Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content, %	Dry Density, (pcf)	REMARKS
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing							
35								ML	Gray sandy silt (hard, moist)			
38												
40		15	89		7							
43												
45		12	50/5"		8							
48												
50												
53		14	62		9							
56		12	75									

Note: See Figure A-1 for explanation of symbols.

Log of Boring P2-1-1 A (continued)



Project: Pier 2 Dredging Project
Project Location: Anacortes, Washington
Project Number: 5147-023-01

Figure A-3
Sheet 2 of 2

Start Drilled 11/15/2012	End 11/15/2012	Total Depth (ft) 9.5	Logged By Checked By RMB RST	Driller Boart Longyear	Drilling Method Hollow-Stem Auger
Surface Elevation (ft) Vertical Datum -42.71 MLLW		Hammer Data Autohammer 140 lbs / 30-inch drop		Drilling Equipment CME-75	
Latitude Longitude 48° 31' 19.90" -122° 36' 25.83"		System Datum Geographic		Groundwater Date Measured Depth to Water (ft) Elevation (ft) N/A	
Notes:					

Elevation (feet)	FIELD DATA					MATERIAL DESCRIPTION	Moisture Content, %	Dry Density, (pcf)	REMARKS
	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing				
0	12	22		1		SM			
45	12			2		SP			
	12			3					
5	12	45							
	9								
50	17								
	24	35							

Note: See Figure A-1 for explanation of symbols.

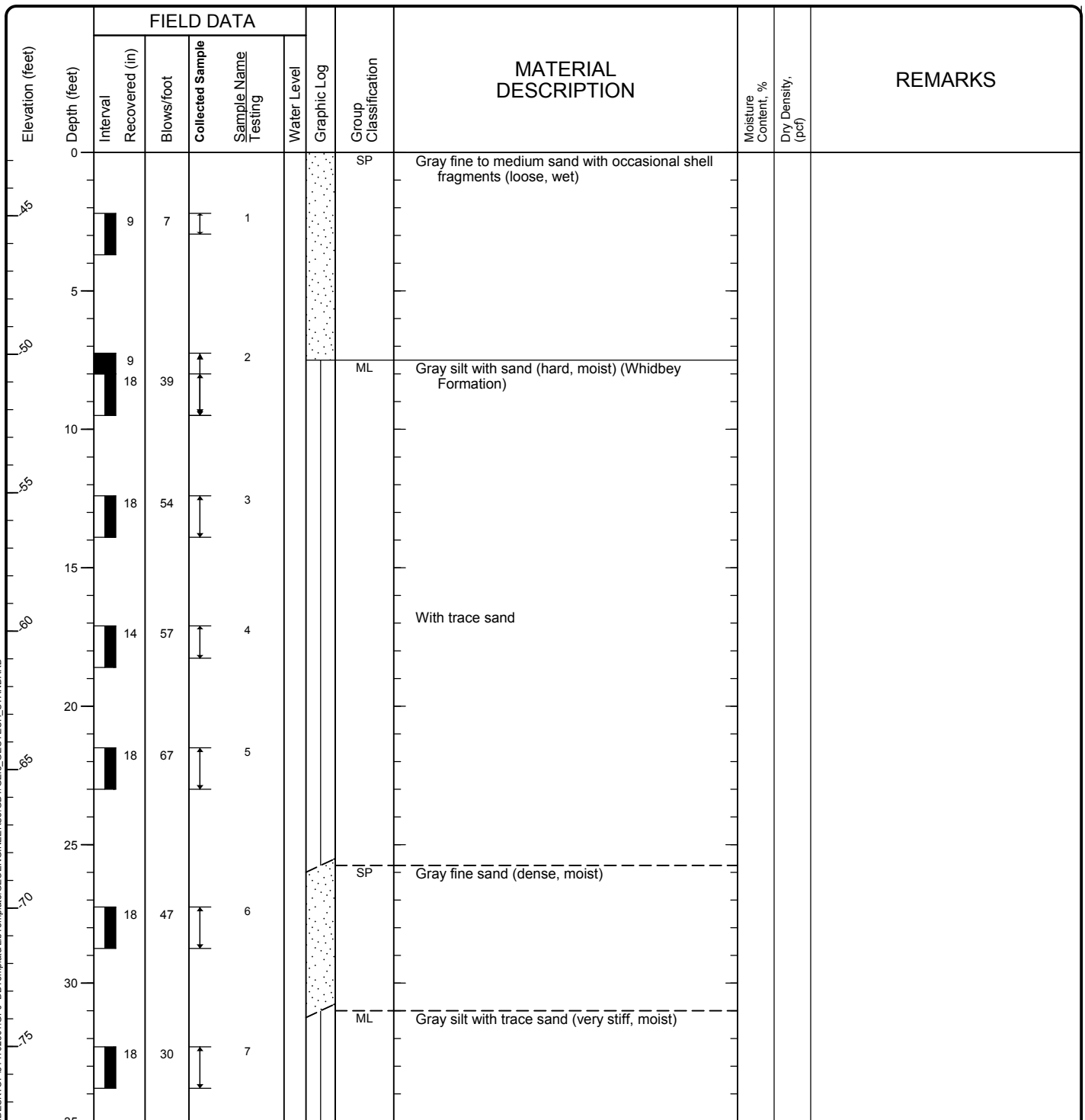
Log of Boring P2-1-2



Project: Pier 2 Dredging Project
Project Location: Anacortes, Washington
Project Number: 5147-023-01

Figure A-4
Sheet 1 of 1

Start Drilled 11/15/2012	End 11/15/2012	Total Depth (ft) 54	Logged By RMB Checked By RST	Driller Boart Longyear	Drilling Method Hollow-Stem Auger
Surface Elevation (ft) Vertical Datum -42.71 MLLW		Hammer Data Autohammer 140 lbs / 30-inch drop		Drilling Equipment CME-75	
Latitude Longitude 48° 31' 19.92" -122° 36' 25.35"		System Datum Geographic		Groundwater Date Measured Depth to Water (ft) Elevation (ft) N/A	
Notes:					



Note: See Figure A-1 for explanation of symbols.

Log of Boring P2-1-2 A



Project: Pier 2 Dredging Project
 Project Location: Anacortes, Washington
 Project Number: 5147-023-01

Figure A-5
 Sheet 1 of 2

Seattle, Date: 1/7/13 Path: C:\USERS\CV\OSS\DESKTOP\514702301.GPJ DBTemplate\LibTemplate\GEOENGINEERS8 GDT\GEI8_GEOTECH_STANDARD

Elevation (feet)	FIELD DATA					Group Classification	MATERIAL DESCRIPTION	Moisture Content, %	Dry Density, (pcf)	REMARKS
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing					
35						ML	Gray silt with trace sand (very stiff, moist)			
38		7 18	51		8					
40							Becomes hard			
42		18	61		9					
45										
48		14	89		10	ML/SM	Gray sandy silt to silty fine sand (hard/very dense, moist)			
50										
52		16	50/6"		11	ML	Gray silt with sand (hard, moist)			

Note: See Figure A-1 for explanation of symbols.

Log of Boring P2-1-2 A (continued)



Project: Pier 2 Dredging Project
Project Location: Anacortes, Washington
Project Number: 5147-023-01

Figure A-5
Sheet 2 of 2

Start Drilled 11/16/2012	End 11/16/2012	Total Depth (ft) 10	Logged By Checked By RMB RST	Driller Boart Longyear	Drilling Method Hollow-Stem Auger
Surface Elevation (ft) Vertical Datum -40.45 MLLW		Hammer Data Autohammer 140 lbs / 30-inch drop		Drilling Equipment CME-75	
Latitude Longitude 48° 31' 19.82" -122° 36' 19.36"		System Datum Geographic		Groundwater Date Measured Depth to Water (ft) Elevation (ft) N/A	
Notes:					

Elevation (feet)	FIELD DATA					MATERIAL DESCRIPTION	Moisture Content, %	Dry Density, (pcf)	REMARKS
	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing				
0	6	11	11	1		Dark gray silty fine to medium sand with shell fragments (loose, wet)			
18	24	24	24			Gray fine to medium sand with silt (loose, wet)			
16	26	26	26						
24	47	47	47	2		Gray silty fine sand (medium dense, moist)			
24	52	52	52	3		Gray silt with sand (very stiff, moist) (Whidbey Formation)			
24	45	45	45						
24	90	90	90			Gray silty clay (hard, moist)			

Note: See Figure A-1 for explanation of symbols.

Log of Boring P2-1-3		
	Project:	Pier 2 Dredging Project
	Project Location:	Anacortes, Washington
	Project Number:	5147-023-01
		Figure A-6 Sheet 1 of 1

Start Drilled 11/16/2012	End 11/16/2012	Total Depth (ft) 71	Logged By Checked By RMB RST	Driller Boart Longyear	Drilling Method Hollow-Stem Auger
Surface Elevation (ft) Vertical Datum	15.3 MLLW	Hammer Data	Autohammer 140 lbs / 30-inch drop	Drilling Equipment	CME-75
Latitude Longitude	48° 31' 19.04" -122° 36' 26.35"	System Datum	Geographic	Groundwater Date Measured	Depth to Water (ft) Elevation (ft)
Notes:				11/16/2012	10.0 5.3

Elevation (feet)	FIELD DATA					Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content, %	Dry Density, (pcf)	REMARKS
	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing							
0								AC	10 inches asphalt concrete			
								GP	6 inches gravel base			
								GP	Black medium to coarse gravel with coarse sand sized rock fragments (dense, dry) (fill)			
5	3	39		1								
10	4	6		2				GW	Brown silty fine gravel with sand (loose, wet)			Grinding chatter in drilling action, coarse gravel in cuttings
15	18	9		3				SM	Brown silty fine to medium sand with gravel (loose, wet)			
									6-inch cobble in cuttings			Heaving soils
20	3	9		4								
25	2	6		5				GP	Gray fine gravel (loose, wet) (marine sediment)			Sulfur odor
30	12	4		6				WD	Brown medium to coarse grain sized wood fragments with silt lenses and occasional shell fragments (very loose, moist to wet)			Sulfur odor
35	10	4		7				SM				

Note: See Figure A-1 for explanation of symbols.

Log of Boring P2-1-4 A



Project: Pier 2 Dredging Project
Project Location: Anacortes, Washington
Project Number: 5147-023-01

Figure A-7
Sheet 1 of 2

Seattle, Date: 1/7/13 Path: C:\USERS\CV\OSS\DESKTOP\P514702301.GPJ DBTemplate\LibTemplate\GEOENGINEERS88.GDT\GEIR8_GEO TECH_STANDARD

Elevation (feet)	FIELD DATA					Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content, %	Dry Density, (pcf)	REMARKS
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing							
35								SM	Dark gray silty fine sand with occasional shell fragments (very loose, moist)			
25	40	6	9		8			ML	Gray silt with occasional fine gravel (medium stiff, moist)			
30	45	12 14	22		9			ML/SM	Gray silt with sand to silty fine sand (very stiff/medium dense, moist) (Whidbey Formation)			
35	50	13	21		10			ML	Gray silt with sand (very stiff, moist)			
40	55	18	32		11			SM	Gray silty fine sand (dense, moist)			
45	60	16	36		12			ML	Gray silt with sand (hard, moist)			
50	65	16	22		13				Becomes very stiff			
55	70	18	23		14			SP	Gray fine sand with trace silt (medium dense, moist)			
								ML	Gray silt with sand (very stiff, moist)			

Note: See Figure A-1 for explanation of symbols.

Log of Boring P2-1-4 A (continued)



Project: Pier 2 Dredging Project
 Project Location: Anacortes, Washington
 Project Number: 5147-023-01

Figure A-7
 Sheet 2 of 2

Drilled	Start 12/4/2009	End 12/4/2009	Total Depth (ft) 16.25	Logged By Checked By AJH AKM	Driller Borettec, Inc.	Drilling Method Hollow-stem Auger
Surface Elevation (ft) Vertical Datum			Undetermined		Hammer Data 140 (lbs) / 30 (in) Drop	Drilling Equipment Track-mounted Drill Rig
Easting (X) Northing (Y)			System Datum		<u>Groundwater</u> Date Measured Depth to Water (ft) Elevation (ft) NOT ENCOUNTERED	
Notes:						

Elevation (feet)	FIELD DATA						MATERIAL DESCRIPTION	Moisture Content, %	Dry Density, (pcf)	REMARKS
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Water Level				
0							SM			Brown-black silty fine to coarse sand with gravel (medium dense, moist) (compacted roadbase)
		6	5		1		SM	14		Gray silty fine to medium sand with occasional gravel (loose, moist to wet) (fill)
5		18	15		2		CL	22		Gray clay with occasional sand and gravel (very stiff, moist) (glaciomarine drift)
10		18	26		3			22		- sand grades out
15		2	88/9"		4			20		

Note: See Figure A-1 for explanation of symbols.

Log of Boring B-1



Project: "T" Avenue and 4th Street Improvements
 Project Location: Anacortes, Washington
 Project Number: 5147-018-00

Figure A-2
 Sheet 1 of 1

Drilled	Start 12/4/2009	End 12/4/2009	Total Depth (ft)	16	Logged By Checked By	AJH AKM	Driller	Borettec, Inc.	Drilling Method	Hollow-stem Auger	
Surface Elevation (ft) Vertical Datum			Undetermined		Hammer Data		140 (lbs) / 30 (in) Drop		Drilling Equipment		Track-mounted Drill Rig
Easting (X) Northing (Y)					System Datum				Groundwater Date Measured		Depth to Water (ft) Elevation (ft) NOT ENCOUNTERED
Notes:											

Elevation (feet)	FIELD DATA						MATERIAL DESCRIPTION	Moisture Content, %	Dry Density, (pcf)	REMARKS
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Water Level				
0							SM			
							SM			
	12	9		1			SM	15		
							CL			
5	18	24		2			CL	16		
10	18	20		3				20		
15		50/5.5"		4			SM	15		

Note: See Figure A-1 for explanation of symbols.

Log of Boring B-2



Project: "T" Avenue and 4th Street Improvements
 Project Location: Anacortes, Washington
 Project Number: 5147-018-00

Figure A-3
 Sheet 1 of 1

Drilled	Start 12/4/2009	End 12/4/2009	Total Depth (ft) 16.5	Logged By Checked By AJH AKM	Driller Borettec, Inc.	Drilling Method Hollow-stem Auger
Surface Elevation (ft) Vertical Datum			Undetermined		Hammer Data 140 (lbs) / 30 (in) Drop	Drilling Equipment Track-mounted Drill Rig
Easting (X) Northing (Y)			System Datum		Groundwater Date Measured Depth to Water (ft) Elevation (ft) 16.0	
Notes:						

Elevation (feet)	FIELD DATA					MATERIAL DESCRIPTION	Moisture Content, %	Dry Density, (pcf)	REMARKS
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing				
0						AC			
						GP-GM			
						SM			
	3		28		1		5		
	5	6	10		2	SM	19		
						SM			
	10		8		3a		11		
					3b				
						CL	23		
	15		22		4a		26		
					4b		24		
						SM			

Note: See Figure A-1 for explanation of symbols.

Log of Boring B-4



Project: "T" Avenue and 4th Street Improvements
 Project Location: Anacortes, Washington
 Project Number: 5147-018-00

Figure A-5
 Sheet 1 of 1

Drilled	Start 12/4/2009	End 12/4/2009	Total Depth (ft)	15.5	Logged By Checked By	AJH AKM	Driller	Borettec, Inc.	Drilling Method	Hollow-stem Auger	
Surface Elevation (ft) Vertical Datum			21.0		Hammer Data		140 (lbs) / 30 (in) Drop		Drilling Equipment		Track-mounted Drill Rig
Easting (X) Northing (Y)					System Datum				Groundwater Date Measured		Depth to Water (ft) Elevation (ft) Not encountered
Notes:											

Elevation (feet)	FIELD DATA						MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	REMARKS
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Water Level				
0							GP-GM			12 inches of crushed rock
2.5							SM			Brown silty fine to medium sand with occasional gravel (medium dense, moist) (fill)
5		18	22		1		CL			Gray clay with occasional gravel (stiff, moist) (glaciomarine drift)
7.5		18	17		2			NS		CA
10		18	24		3			NS		
15			50/5"		4		RX			Bedrock

Note: See Figure A-1 for explanation of symbols.

Log of Boring B-2



Project: Wyman's Ramp
Project Location: Anacortes, Washington
Project Number: 5147-019-00

Figure A-3
Sheet 1 of 1

Drilled	Start 12/4/2009	End 12/4/2009	Total Depth (ft)	8	Logged By Checked By	AJH AKM	Driller	Borettec, Inc.	Drilling Method	Hollow-stem Auger	
Surface Elevation (ft) Vertical Datum			13.0		Hammer Data		140 (lbs) / 30 (in) Drop		Drilling Equipment		Track-mounted Drill Rig
Easting (X) Northing (Y)					System Datum				Groundwater Date Measured		Depth to Water (ft) Elevation (ft)
Notes:									Not encountered		

Elevation (feet)	FIELD DATA					Group Classification	MATERIAL DESCRIPTION	Moisture Content, %	Dry Density, (pcf)	REMARKS
	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Water Level Graphic Log					
0						CC	5 inches of Portland cement concrete			
						SP-SM	Brown fine to coarse sand with silt and gravel (medium dense, moist) (fill)			
10	18	57		1		CL	Brown clay with occasional gravel (very stiff, moist) (glaciomarine drift)	14		
5	18	28		2			- becomes gray	16		
0	0	50/1"		3		RX	Bedrock			No recovery

Note: See Figure A-1 for explanation of symbols.

Log of Boring B-3



Project: Wyman's Ramp
Project Location: Anacortes, Washington
Project Number: 5147-019-00

Figure A-4
Sheet 1 of 1

Drilled	Start 12/4/2009	End 12/4/2009	Total Depth (ft)	2.5	Logged By Checked By	AJH AKM	Driller	Borettec, Inc.	Drilling Method	Hollow-stem Auger	
Surface Elevation (ft) Vertical Datum			8.5		Hammer Data		140 (lbs) / 30 (in) Drop		Drilling Equipment		Track-mounted Drill Rig
Easting (X) Northing (Y)					System Datum				Groundwater Date Measured		Depth to Water (ft) Elevation (ft) Not encountered
Notes:											

Elevation (feet)	FIELD DATA						MATERIAL DESCRIPTION	Moisture Content, %	Dry Density, (pcf)	REMARKS
	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Water Level				
0							SP			Brown fine to coarse sand with occasional gravel (medium dense, moist) (fill)
0	50/0"			1			RX			Bedrock

Note: See Figure A-1 for explanation of symbols.

Log of Boring B-4



Project: Wyman's Ramp
 Project Location: Anacortes, Washington
 Project Number: 5147-019-00

Figure A-5
 Sheet 1 of 1

Start Drilled 11/19/2011	End 11/19/2011	Total Depth (ft) 10	Logged By Checked By ARJ RST	Driller Cascade Drilling, LP	Drilling Method Hollow-stem Auger
Surface Elevation (ft) Vertical Datum	18.7 NAVD88	Hammer Data	Auto-Hammer 140 (lbs) / 30 (in) Drop	Drilling Equipment	CME-75
Easting (X) Northing (Y)	559653.6067 121030.163	System Datum	NAD83	Groundwater Date Measured	Depth to Water (ft) Elevation (ft) Not encountered
Notes: Auger Data: 8 1/4-inch O.D.; 4 1/4-inch I.D.					

Elevation (feet)	FIELD DATA					MATERIAL DESCRIPTION	Moisture Content, %	Dry Density, (pcf)	REMARKS
	Interval Depth (feet)	Recovered (in)	Blows/foot	Collected Sample Sample Name Testing	Water Level Graphic Log	Group Classification			
0						CR			
						SM			
						ML			
5	7	12		1					
	16	18		2					
	18	12		3					
10	2	50/4"		4					

Refusal at 10 feet bgs (bedrock)

Note: See Figure A-1 for explanation of symbols.

Log of Boring B-6



Project: Wyman's Property - Geotechnical Study
 Project Location: Anacortes, Washington
 Project Number: 5147-019-03

Figure A-2
 Sheet 1 of 1

Start Drilled 11/18/2011	End 11/18/2011	Total Depth (ft) 17	Logged By Checked By ARJ RST	Driller Cascade Drilling, LP	Drilling Method Hollow-stem Auger
Surface Elevation (ft) Vertical Datum	21.4 NAVD88	Hammer Data	Auto-Hammer 140 (lbs) / 30 (in) Drop	Drilling Equipment	CME-75
Easting (X) Northing (Y)	559632.2708 1211868.342	System Datum	NAD83	Groundwater Date Measured	Depth to Water (ft) Elevation (ft)
Notes: Auger Data: 8 1/4-inch O.D.; 4 1/4-inch I.D.				11/18/2011	9.0 12.4

Elevation (feet)	FIELD DATA					MATERIAL DESCRIPTION	Moisture Content, %	Dry Density, (pcf)	REMARKS
	Interval Depth (feet)	Recovered (in)	Blows/foot	Collected Sample Sample Name Testing	Water Level Graphic Log	Group Classification			
0						CR			
0						SM			
	12	3		1					
	12	7		2					
5						ML			
	16	16		3					
10									
	14	26		4					
	12	66		5					
15									

Refusal at 17 feet bgs (bedrock)

Note: See Figure A-1 for explanation of symbols.

Log of Boring B-7



Project: Wyman's Property - Geotechnical Study
Project Location: Anacortes, Washington
Project Number: 5147-019-03

Figure A-3
Sheet 1 of 1

Start Drilled 11/18/2011	End 11/18/2011	Total Depth (ft) 26.5	Logged By Checked By ARJ RST	Driller Cascade Drilling, LP	Drilling Method Hollow-stem Auger
Surface Elevation (ft) Vertical Datum	19.8 NAVD88	Hammer Data	Auto-Hammer 140 (lbs) / 30 (in) Drop	Drilling Equipment	CME-75
Easting (X) Northing (Y)	559676.3414 1211118.096	System Datum	NAD83	Groundwater Date Measured	Depth to Water (ft) Elevation (ft)
Notes: Auger Data: 8 1/4-inch O.D.; 4 1/4-inch I.D.				11/18/2011	13.0 6.8

Elevation (feet)	FIELD DATA					MATERIAL DESCRIPTION	Moisture Content, %	Dry Density, (pcf)	REMARKS
	Interval Depth (feet)	Blows/foot Recovered (in)	Collected Sample Sample Name Testing	Water Level	Graphic Log Group Classification				
0					CR	3 inches of crushed rock			
					SM	Brown silty fine to medium sand with occasional gravel (loose, moist) (fill)			
	14	11	1		ML	Brown sandy silt with occasional gravel (stiff, moist) (glaciomarine drift)			
5	14	44 *	2		ML	Brown silt with occasional gravel (stiff, moist)			* Blow count elevated due to faulty sampler head
	16	12	3		ML	Brown silt with occasional gravel (stiff, moist)			
10	16	15	4		ML	Brown sandy silt with occasional gravel (stiff, moist)			
	18	11	5		ML	Gray silt (very stiff, moist)			
15	18	5	6		ML	Gray silt (very stiff, moist)			
	16	26	7		ML	Gray silt (very stiff, moist)			
20	12	50/6"	8						
25	4	50/6"	9						
Refusal at 26.5 feet bgs (bedrock)									

Note: See Figure A-1 for explanation of symbols.

Log of Boring B-8



Project: Wyman's Property - Geotechnical Study
Project Location: Anacortes, Washington
Project Number: 5147-019-03

Figure A-4
Sheet 1 of 1

Start Drilled 11/18/2011	End 11/18/2011	Total Depth (ft) 21.5	Logged By Checked By ARJ RST	Driller Cascade Drilling, LP	Drilling Method Hollow-stem Auger
Surface Elevation (ft) Vertical Datum	17.7 NAVD88	Hammer Data	Auto-Hammer 140 (lbs) / 30 (in) Drop	Drilling Equipment	CME-75
Easting (X) Northing (Y)	559721.9365 1211088.43	System Datum	NAD83	Groundwater Date Measured	Depth to Water (ft) Elevation (ft) Not encountered
Notes: Auger Data: 8 ¼-inch O.D.; 4 ¼-inch I.D.					

Elevation (feet)	FIELD DATA					MATERIAL DESCRIPTION	Moisture Content, %	Dry Density, (pcf)	REMARKS
	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing				
0						3 inches of crushed rock			
1						Brown silty fine to medium sand with gravel (medium dense, moist) (fill)			
2									
3						Becomes gray			
4									
5									
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Boring completed at 21.5 feet bgs.

Note: See Figure A-1 for explanation of symbols.

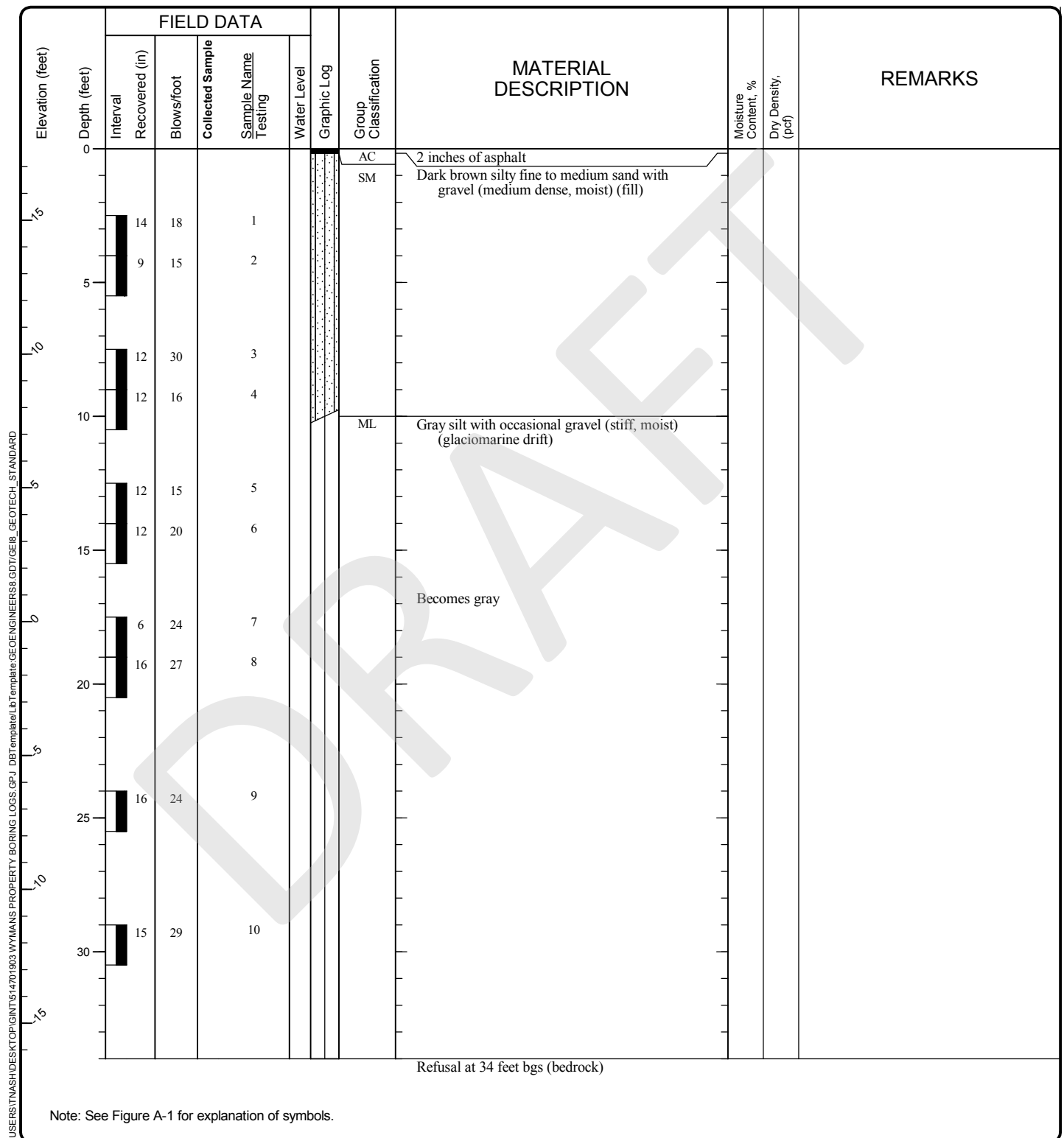
Log of Boring B-9



Project: Wyman's Property - Geotechnical Study
Project Location: Anacortes, Washington
Project Number: 5147-019-03

Figure A-5
Sheet 1 of 1

Start Drilled 11/19/2011	End 11/19/2011	Total Depth (ft) 34	Logged By Checked By ARJ RST	Driller Cascade Drilling, LP	Drilling Method Hollow-stem Auger
Surface Elevation (ft) Vertical Datum 17.7 NAVD88		Hammer Data Auto-Hammer 140 (lbs) / 30 (in) Drop		Drilling Equipment CME-75	
Easting (X) Northing (Y) 559762.4854 1211154.143		System Datum NAD83		Groundwater Date Measured Depth to Water (ft) Elevation (ft)	
Notes: Auger Data: 8 1/4-inch O.D.; 4 1/4-inch I.D.				Not encountered	



Log of Boring B-11		
	Project:	Wyman's Property - Geotechnical Study
	Project Location:	Anacortes, Washington
	Project Number:	5147-019-03
		Figure A-7 Sheet 1 of 1



PROJECT NUMBER

S21975.A1

BORING NUMBER

B3

SHEET 1 OF 3

SOIL BORING LOG

PROJECT ANACORTES STP LOCATION Anacortes Port Prop.
ELEVATION 105 ± DRILLING CONTRACTOR D. A. Kenner Drilling
DRILLING METHOD AND EQUIPMENT Mud Rotary
WATER LEVEL AND DATE NM START 1420 25 Nov 86 FINISH 1130 26 Nov 86 LOGGER GWA

ELEVATION	DEPTH BELOW SURFACE	SAMPLE			STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
		INTERVAL	TYPE AND NUMBER	RECOVERY	6"-6"-6" (N)	NAME, GRADATION OR PLASTICITY, PARTICLE SIZE DISTRIBUTION, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY, USCS GROUP SYMBOL		DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
								Rock? At 2' Pushed Aside
	5		S1	0	44-2 (6)	Probably (<u>Sandy Silt</u>) Med Stiff		Gravel ahead of Sampler??
	10		S2	1.3'	6-14-19 (23)	<u>Sandy Silt</u> (MH) 30%S 60%M 10%G Plastic, Mottled Tan-Gray, V. Stiff		CL <i>gms</i>
	15		S3	1.3'	5-9-12 (21)	<u>Sandy Silt</u> (MH) Same As Above		
	20		S4	1.5'	8-12-20 (32)	<u>Silty Sand w/Gravel</u> (SM) 15%G 55%S 30%M Gray, Wet, Dense		Gr Drilling Change to Tricone
	25		S5	1.5'	21-25-23 (48)	<u>Silty Sand w/Gravel</u> (SM) 15%G 65%Fine S 20%M Gray Moist Dense		
	30							



PROJECT NUMBER S21975.A1	BORING NUMBER B3	SHEET 2 OF 3
SOIL BORING LOG		

PROJECT ANACORTES STP LOCATION Anacortes Port Prop.
ELEVATION 105 ± DRILLING CONTRACTOR D. A. Kenner Drilling
DRILLING METHOD AND EQUIPMENT Mud Rotary
WATER LEVEL AND DATE NM START 1420 25 Nov 86 FINISH 1130 26 Nov 86 LOGGER GWA

ELEVATION	DEPTH BELOW SURFACE	SAMPLE			STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
		INTERVAL	TYPE AND NUMBER	RECOVERY	6"-6"-6" (N)	NAME, GRADATION OR PLASTICITY, PARTICLE SIZE DISTRIBUTION, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY, USCS GROUP SYMBOL		DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
30			S6	1.5'	13-18-28 (46)	<u>Silt w/Sand</u> (ML) Nonplastic, Fine Sand Gray, Hard		
35			S7	1.5'	26-35-41 (76)	<u>Silt w/Sand</u> (ML) Same as Above		
40			S8	1.5'	22-26-44 (70)	<u>Silt w/Sand</u> (ML) Same as Above		
45			S9	1.5'	23-35-27 (62)	<u>Silt w/Sand</u> (ML) Same as Above		
50			S10	1.5'	7-14-21 (35)	<u>Silt w/Sand</u> (ML) Same as above		
55								
60								



PROJECT NUMBER S21975.A1	BORING NUMBER B3	SHEET 3 OF 3
SOIL BORING LOG		

PROJECT ANACORTES STP LOCATION Anacortes Port Prop.
ELEVATION 105 ± DRILLING CONTRACTOR D. A. Kenner Drilling
DRILLING METHOD AND EQUIPMENT Mud Rotary
WATER LEVEL AND DATE NM START 1420 25 Nov 86 FINISH 1130 26 Nov 86 LOGGER GWA

ELEVATION	DEPTH BELOW SURFACE	SAMPLE			STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
		INTERVAL	TYPE AND NUMBER	RECOVERY	6"-6'-6" (ft)	NAME, GRADATION OR PLASTICITY, PARTICLE SIZE DISTRIBUTION, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY USCS GROUP SYMBOL		DEPTH OF CASING DRILLING RATE DRILLING FLUID LOSS TESTS AND INSTRUMENTATION
	60		S11	1.4'	17-40-50/ (100+) 0.3	Silt w/Sand (ML) Nonplastic, Fine Sand Gray, Hard		Gr @ 62' W x Rock?? - No
			S12	.6'	65-50/0.2	Poorly Graded Sand w/Silt (SP-SM) Fines Nonplastic Sand Fine Contains 10-15% Coars-Sand occasional Gr, Gray-Moist, V Dense		Rx?? 5min/inch
			S13	1/2"	90/0.1'			1015 Start to Core, Thin Mud, Set Casing etc.
	70					Rock (Phyllite)		
								Core 680-72.5 Rec 4.3/4.5 = 95% RQD 1.6/4.5 = 35%
	80							

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CH2M HILL

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PROJECT NUMBER: S24388.T1

BORING NUMBER: B-19

SHEET: 1

OF: 2

SOIL BORING LOG

PROJECT: ANACORTES WWTP

ELEVATION: ~105.0'

DRILLING METHOD AND EQUIPMENT: MUD ROTARY - CME 75

WATER LEVEL AND DATE: NA

LOCATION: ANACORTES, WASHINGTON

DRILLING CONTRACTOR: KENNER DRILLING

- CME 75

START: 1-12-88

FINISH: 1-12-88

LOGGER: J.X.STOUPA

DEPTH BELOW SURFACE (FT)	SAMPLE			STD. PEN. TEST 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY, USCS GROUP SYMBOL	S Y M B O L	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TEST AND INSTRUMENTATION
	INTERVAL (FT)	TYPE AND NUMBER	R E C (FT)				
0					FILL, mixture of sand, silt, clay, and gravels.		
5	5.5						Gravels in cuttings.
		ST1			Organics, silt, peat in tip of Shelby tube.		Easy pushing of Shelby tube.
	7.5						
	9.0	S1	0	2-1-2 (3)	NO RECOVERY.		
	10.0						
10		S2	1.0	2-2-4 (6)	SANDY SILT, medium plastic, 20% fine grained sand, with trace organics (ML). Bottom 2": SAND, clean, fine grained (SP).		Driller reported more mud loss than usual from 10 to 15 ft.
	11.5						
	15.0						
15		S3	1.0	4-7-10 (17)	SANDY SILT, mottled gray/brown, moist, stiff, medium plastic (ML). SAND, clean, fine to medium grained found in tip.(SP).		
	16.5						
	20.0						
20		S4	1.5	4-10-12 (22)	SANDY SILT, gray, moist, stiff, medium plastic, 30% fine grained sand, 60% silt, 10% gravels (ML).		Some gravels.
	21.5						
	25.0						
25		S5	1.5	18-32-50 (82)	SILT, gray, moist, very hard, non-plastic, less than 5% fine grained sand (ML).		
	26.5						
30							

PROJECT: ANACORTES WWTP	LOCATION: ANACORTES, WASHINGTON
ELEVATION: ~105.0'	DRILLING CONTRACTOR: KENNER DRILLING
DRILLING METHOD AND EQUIPMENT: MUD ROTARY - CME 75	
WATER LEVEL AND DATE: NA	START: 1-12-88 FINISH: 1-12-88 LOGGER: J.X.STOUPA

DEPTH BELOW SURFACE (FT)	SAMPLE			STD. PEN. TEST 6"-6"-6" (N)	SOIL DESCRIPTION	SYMBOL	COMMENTS
	INTERVAL (FT)	TYPE AND NUMBER	R E C (FT)				
30	30.0	S6	1.5	17-28-34 (62)	SILT, as above (ML).		
	31.5						
35							
	40.0						
40		S7	1.2	25-43- 50/5"	SILT, as above (ML).		
	41.4				END OF BORING AT 41.4 FEET.		
45							
50							
55							
60							

APPENDIX F

Report Limitations and Guidelines for Use

APPENDIX F

REPORT LIMITATIONS AND GUIDELINES FOR USE¹

This appendix provides information to help you manage your risks with respect to the use of this report.

Geotechnical Services are Performed for Specific Purposes, Persons and Projects

This report has been prepared for use by HDR, the City of Anacortes and members of the design team for use in the design of this project. This report may be made available to prospective contractors for bidding or estimating purposes; but our report, conclusions and interpretations should not be construed as a warranty of the subsurface conditions. This report is not intended for use by others, and the information contained herein is not applicable to other sites.

GeoEngineers structures our services to meet the specific needs of our clients. For example, a geotechnical or geologic study conducted for a civil engineer or architect may not fulfill the needs of a construction contractor or even another civil engineer or architect that are involved in the same project. Because each geotechnical or geologic study is unique, each geotechnical engineering or geologic report is unique, prepared solely for the specific client and project site. No one except HDR, the City of Anacortes and members of the design team should rely on this report without first conferring with GeoEngineers. This report should not be applied for any purpose or project except the one originally contemplated.

A Geotechnical Engineering or Geologic Report is Based on a Unique Set of Project-Specific Factors

This report has been prepared for the proposed Anacortes WWTP Outfall project in Anacortes, Washington. GeoEngineers considered a number of unique, project-specific factors when establishing the scope of services for this project and report. Unless GeoEngineers specifically indicates otherwise, do not rely on this report if it was:

- Not prepared for you,
- Not prepared for your project,
- Not prepared for the specific site explored, or
- Completed before important project changes were made.

For example, changes that can affect the applicability of this report include those that affect:

- The function of the proposed structure;
- Elevation, configuration, location, orientation or weight of the proposed structure;
- Composition of the design team; or
- Project ownership.

¹ Developed based on material provided by ASFE, Professional Firms Practicing in the Geosciences; www.asfe.org.

If important changes are made after the date of this report, GeoEngineers should be given the opportunity to review our interpretations and recommendations and provide written modifications or confirmation, as appropriate.

Environmental Concerns are Not Covered

Unless environmental services were specifically included in our scope of services, this report does not provide any environmental findings, conclusions, or recommendations, including but not limited to, the likelihood of encountering underground storage tanks or regulated contaminants.

Subsurface Conditions Can Change

This geotechnical or geologic report is based on conditions that existed at the time the study was performed. The findings and conclusions of this report may be affected by the passage of time, by manmade events such as construction on or adjacent to the site, or by natural events such as floods, earthquakes, slope instability or groundwater fluctuations. Always contact GeoEngineers before applying a report to determine if it remains applicable.

Most Geotechnical and Geologic Findings are Professional Opinions

Our interpretations of subsurface conditions are based on the boring results completed at the site. Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted. GeoEngineers reviewed historic field and laboratory data and then applied our professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ, sometimes significantly, from those indicated in this report. Our report, conclusions and interpretations should not be construed as a warranty of the subsurface conditions.

Geotechnical Engineering Report Recommendations are Not Final

Do not over-rely on the preliminary construction recommendations included in this report. These recommendations are not final, because they were developed principally from GeoEngineers' professional judgment and opinion. GeoEngineers' recommendations can be finalized only by observing actual subsurface conditions revealed during construction. GeoEngineers cannot assume responsibility or liability for this report's recommendations if we do not perform construction observation.

Sufficient monitoring, testing and consultation by GeoEngineers should be provided during construction to confirm that the conditions encountered are consistent with those indicated by the explorations, to provide recommendations for design changes should the conditions revealed during the work differ from those anticipated, and to evaluate whether or not earthwork activities are completed in accordance with our recommendations. Retaining GeoEngineers for construction observation for this project is the most effective method of managing the risks associated with unanticipated conditions.

A Geotechnical Engineering or Geologic Report Could Be Subject to Misinterpretation

Misinterpretation of this report by other design team members can result in costly problems. You could lower that risk by having GeoEngineers confer with appropriate members of the design team after submitting the report. Also retain GeoEngineers to review pertinent elements of the design team's plans and specifications. Contractors can also misinterpret a geotechnical engineering or geologic report. Reduce that risk by having GeoEngineers participate in pre-bid and preconstruction conferences, and by providing construction observation.

Give Contractors a Complete Report and Guidance

Some owners and design professionals believe they can make contractors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give contractors the complete geotechnical engineering or geologic report, but preface it with a clearly written letter of transmittal. In that letter, advise contractors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with GeoEngineers and/or to conduct additional study to obtain the specific types of information they need or prefer. A pre-bid conference can also be valuable. Be sure contractors have sufficient time to perform additional study. Only then might an owner be in a position to give contractors the best information available, while requiring them to at least share the financial responsibilities stemming from unanticipated conditions. Further, a contingency for unanticipated conditions should be included in your project budget and schedule.

Contractors Are Responsible for Site Safety on Their Own Construction Projects

Our geotechnical recommendations are not intended to direct the contractor's procedures, methods, schedule or management of the work site. The contractor is solely responsible for job site safety and for managing construction operations to minimize risks to on-site personnel and to adjacent properties.

Read These Provisions Closely

Some clients, design professionals and contractors may not recognize that the geoscience practices (geotechnical engineering or geology) are far less exact than other engineering and natural science disciplines. This lack of understanding can create unrealistic expectations that could lead to disappointments, claims and disputes. GeoEngineers includes these explanatory "limitations" provisions in our reports to help reduce such risks. Please confer with GeoEngineers if you are unclear how these "Report Limitations and Guidelines for Use" apply to your project or site.

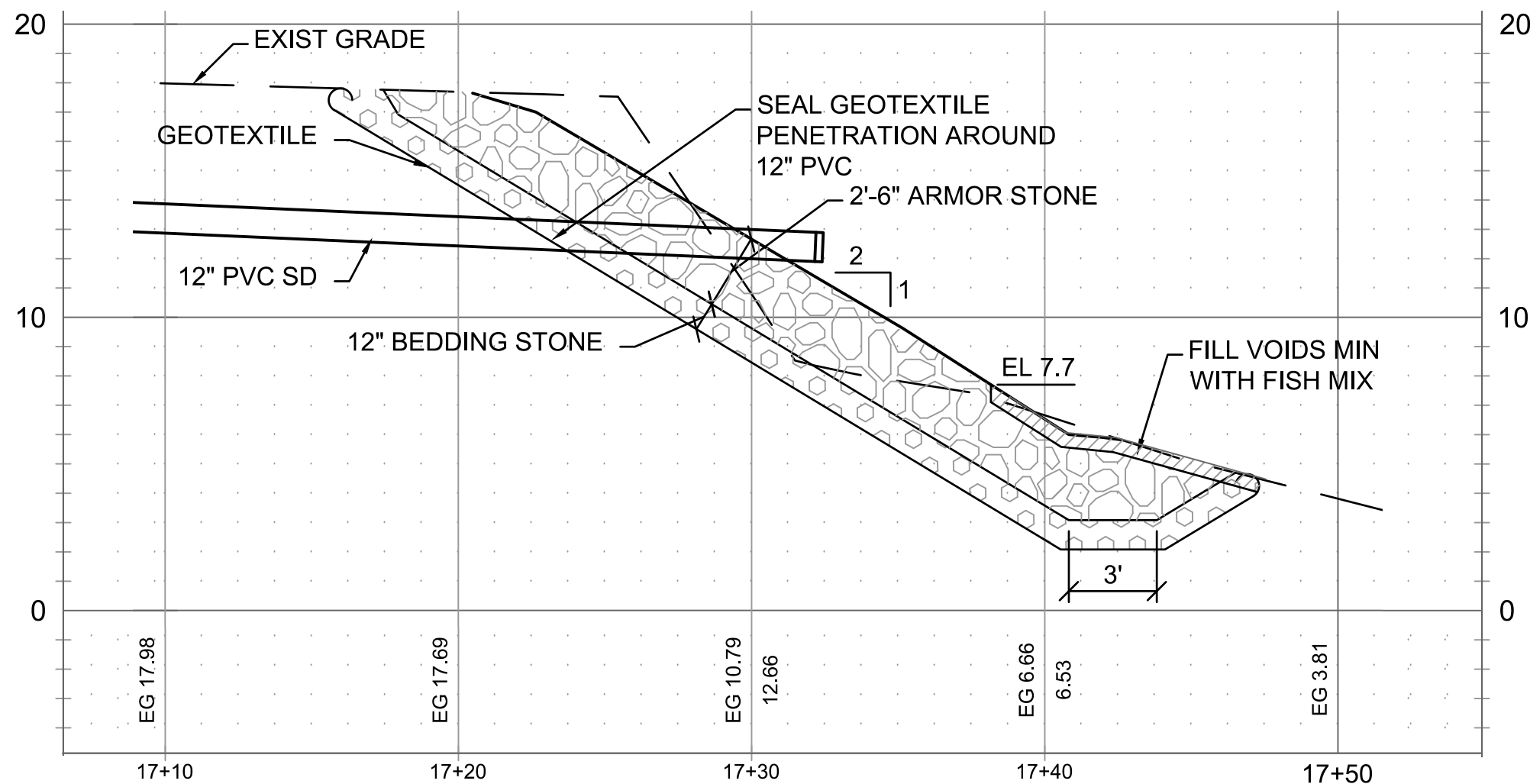
Geotechnical, Geologic and Environmental Reports Should Not Be Interchanged

The equipment, techniques and personnel used to perform an environmental study differ significantly from those used to perform a geotechnical or geologic study and vice versa. For that reason, a geotechnical engineering or geologic report does not usually relate any environmental findings, conclusions or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. Similarly, environmental reports are not used to address geotechnical or geologic concerns regarding a specific project.

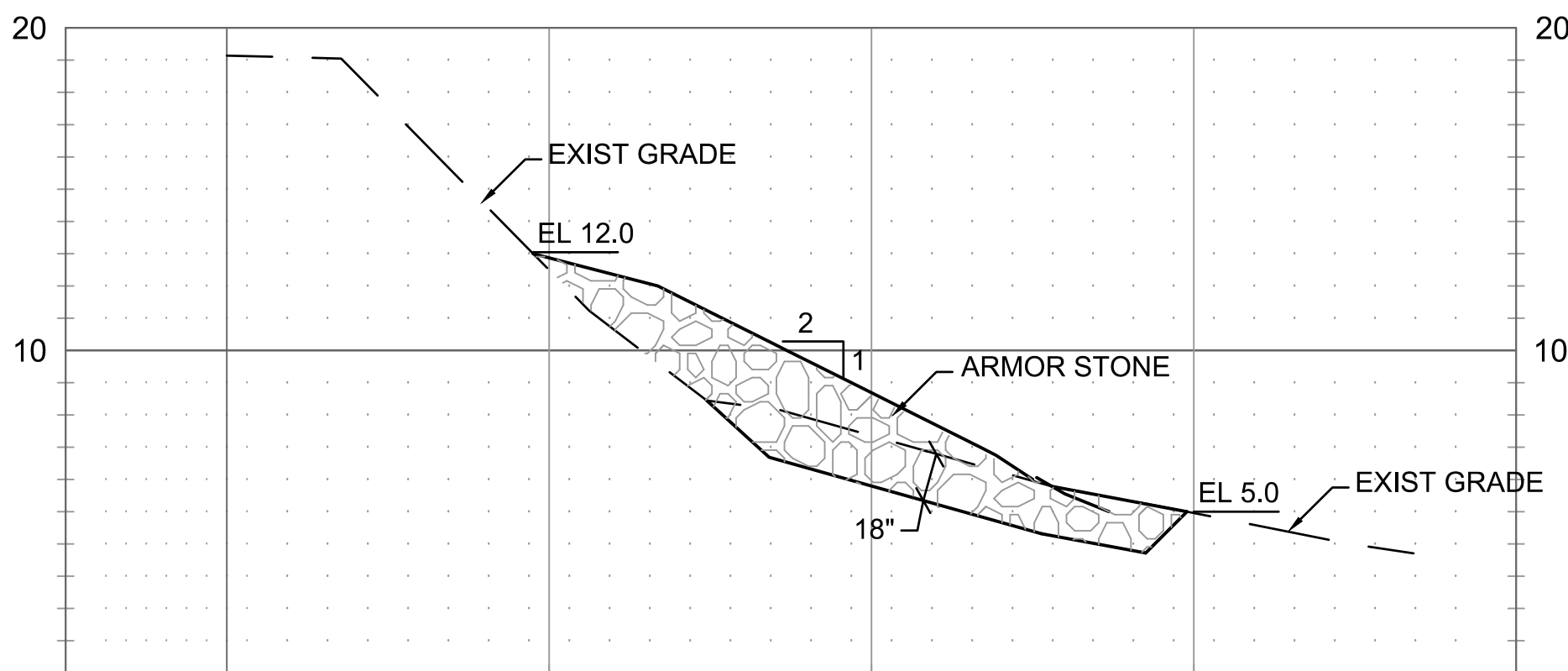
Biological Pollutants

GeoEngineers' Scope of Work specifically excludes the investigation, detection, or assessment of the presence of Biological Compounds which are Pollutants in or around any structure. Accordingly, this report includes no interpretations, recommendations, findings, or conclusions for the purpose of detecting, assessing, or abating Biological Pollutants. The term "Biological Pollutants" includes, but is not limited to, molds, fungi, spores, bacteria, and viruses, and/or any of their byproducts.

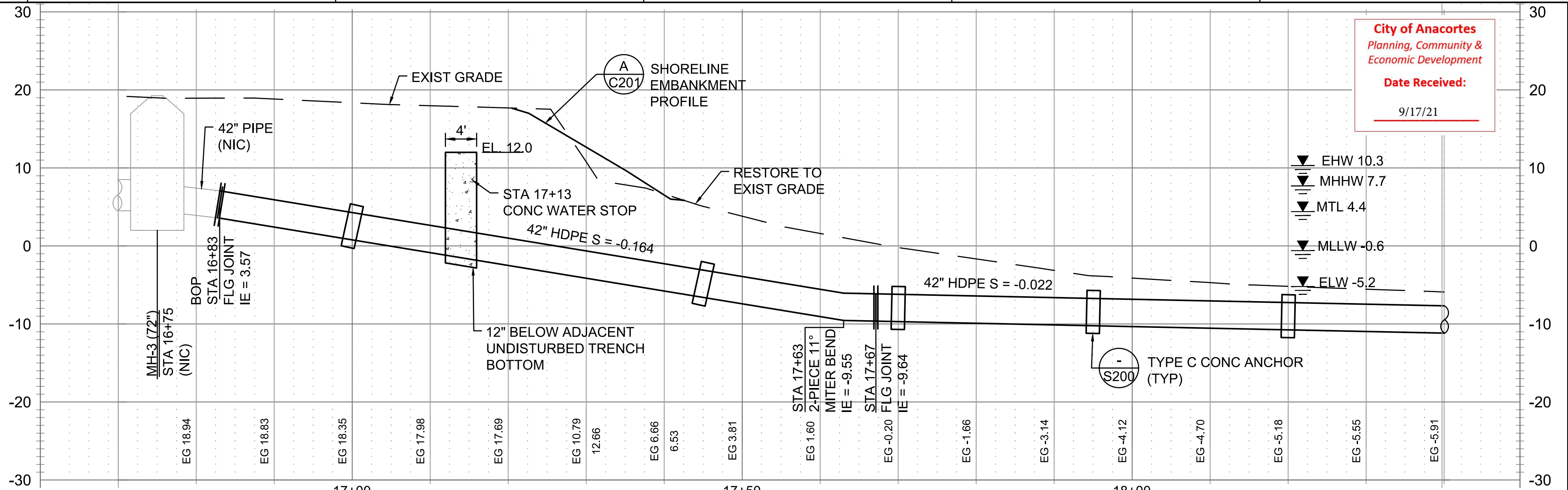
- NOTES:**
- CONTRACTOR TO LEAVE TEMPORARY BLIND FLANGE AT BOP STATION 1+83. BACKING RING SHALL BE 316 SST FOR PERMANENT INSTALLATION. BOLTS AND BLIND FLANGE SHALL BE MILD STEEL FOR TEMPORARY INSTALLATION FOR FUTURE CONNECTION BY UPLAND OUTFALL CONTRACTOR.
 - PROVIDE TEMPORARY 3" PVC VENT PIPE FROM BLIND FLANGE TO GROUND SURFACE WITH GOOSE NECK AND BIRD SCREEN ABOVE GRADE.
 - INSTALL IN CONFORMANCE WITH WSDOT STD SPECIFICATIONS AND STD PLAN B-55.20-02. MATERIAL: PVC ASTM D3034 SDR 35.
 - TYPE 1 CATCH BASIN PER WSDOT ST PLAN B-5.20-03, INSTALL IN CONFORMANCE WITH WSDOT STD SPECIFICATIONS.



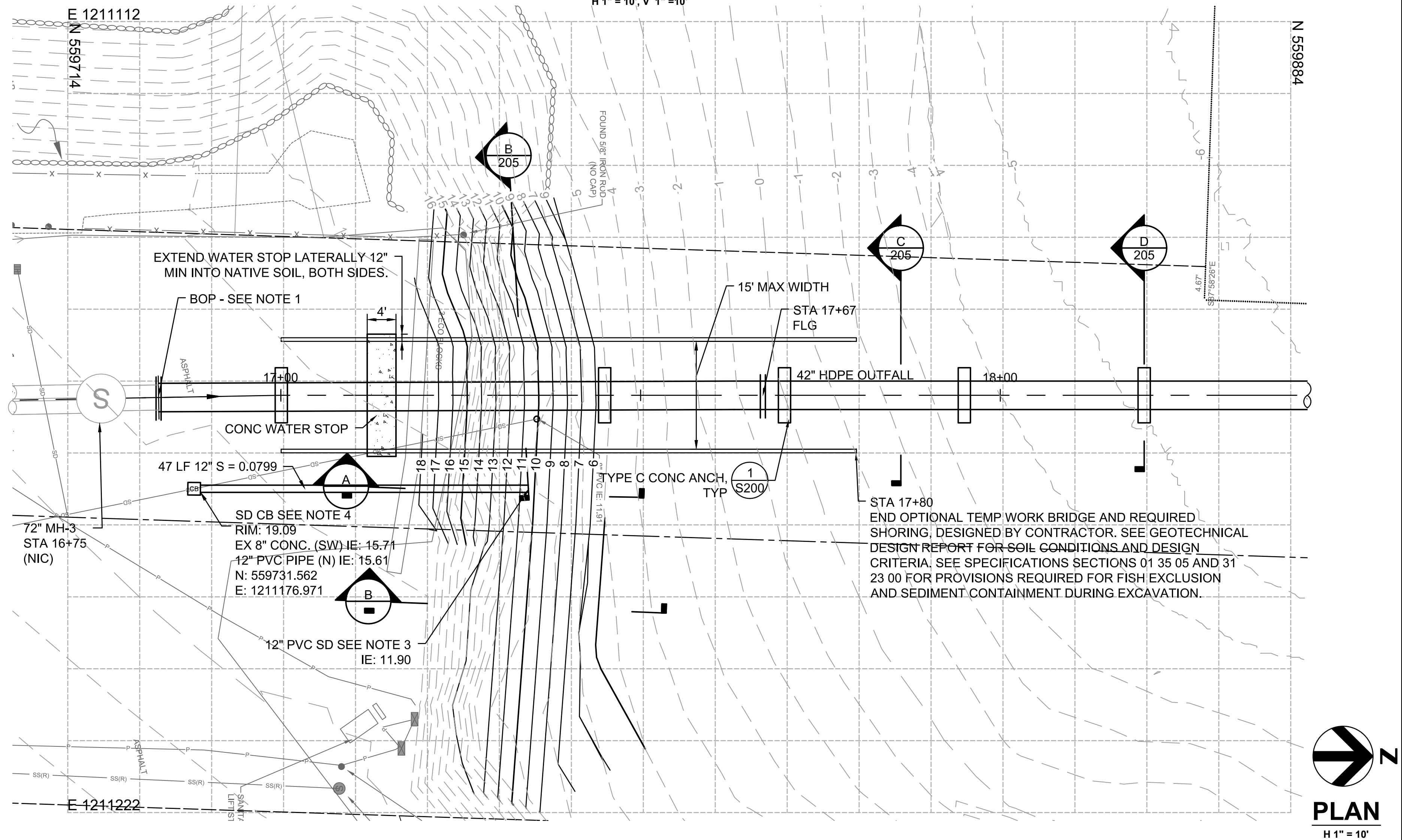
A
SECTION
SHORELINE EMBANKMENT PROFILE
H 1" = 5', V 1" = 5'



B
SECTION
EMBANKMENT BUTTRESS
H 1" = 5', V 1" = 5'



PROFILE
H 1" = 10', V 1" = 10'



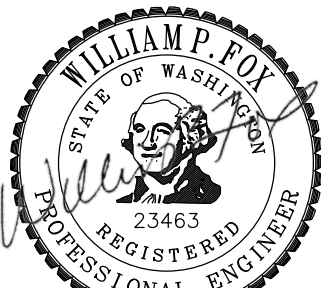
PLAN
H 1" = 10'



BRIGHT ENGINEERING, INC.
STRUCTURAL & CIVIL ENGINEERING

1	4/22/2021	CONTRACT DRAWING
ISSUE	DATE	DESCRIPTION

PROJECT MANAGER	FOX, WILLIAM
CIVIL ENG	FOX, WILLIAM
DRAWN BY	SCHMIDT, ADAM
PROJECT NUMBER	



4/7/2021

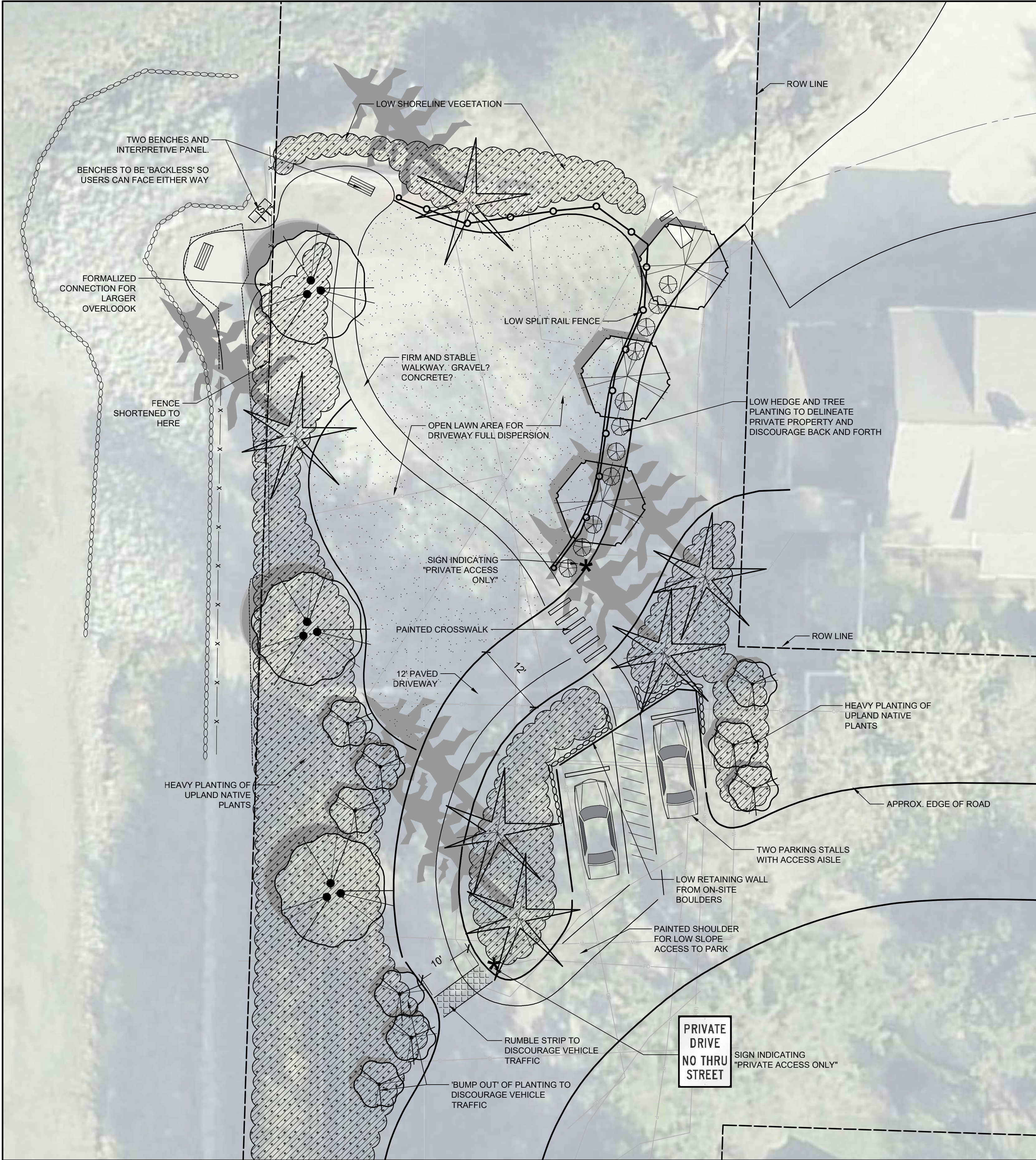
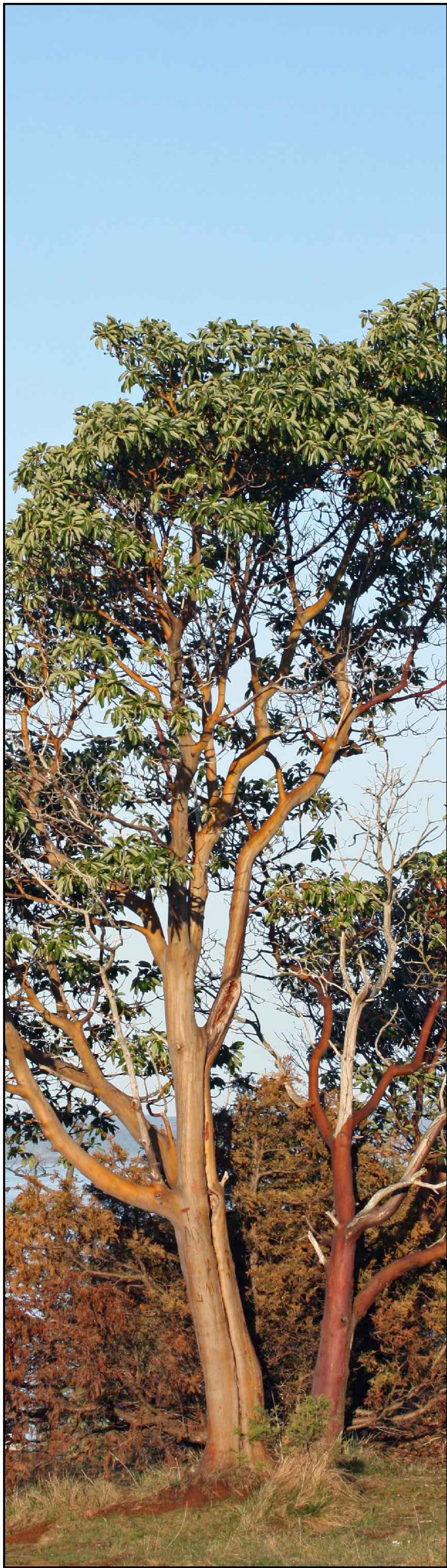
CITY OF ANACORTES
WWTP OUTFALL RELOCATION -
MARINE PHASE

DETAIL AREA 1
SHORELINE DETAIL

0 1" 2"
SCALE IS FOR 22" x 34" SHEET
(SCALE ACCORDINGLY FOR
ALL OTHER SHEET SIZES)

FILENAME C-201.DWG
SCALE 1" = 10'

SHEET
C-201



PRELIMINARY SITE PLAN
1" = 10'-0" (CHECK SCALE BAR FOR ACCURACY)



1 | BENCH AND SIGN DESIGN DETAILS
L-1 | NO SCALE



U Ave Park - Anacortes WA

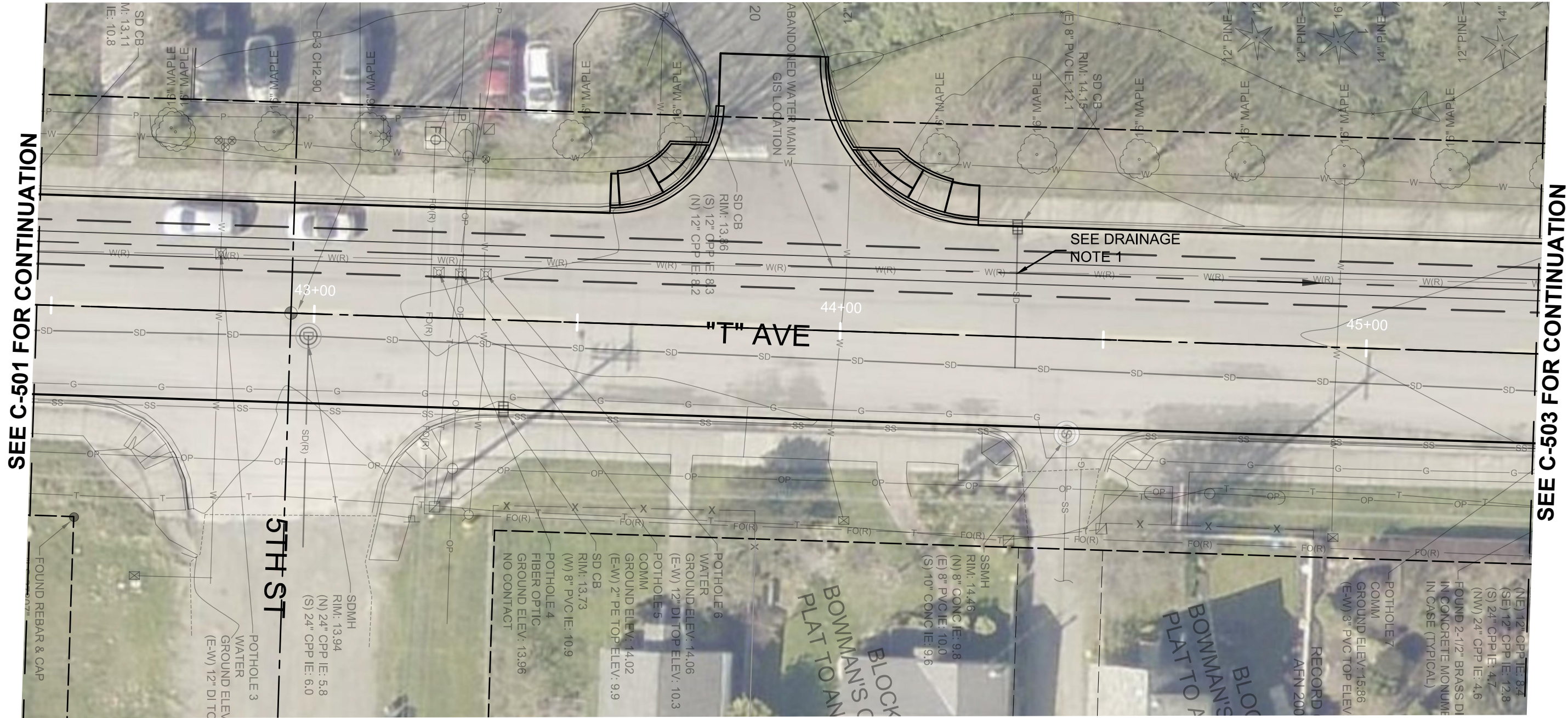
Conceptual Park Plan A

Prepared for:
City of Anacortes

Contact:
Eric Shjarback
Bob Vaux

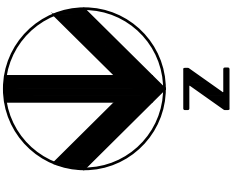
Prepared by:
eccosDesign
Landscape Architecture and Planning
Mount Vernon, WA 99273
p. 360.419.7400
f. 800.508.2017



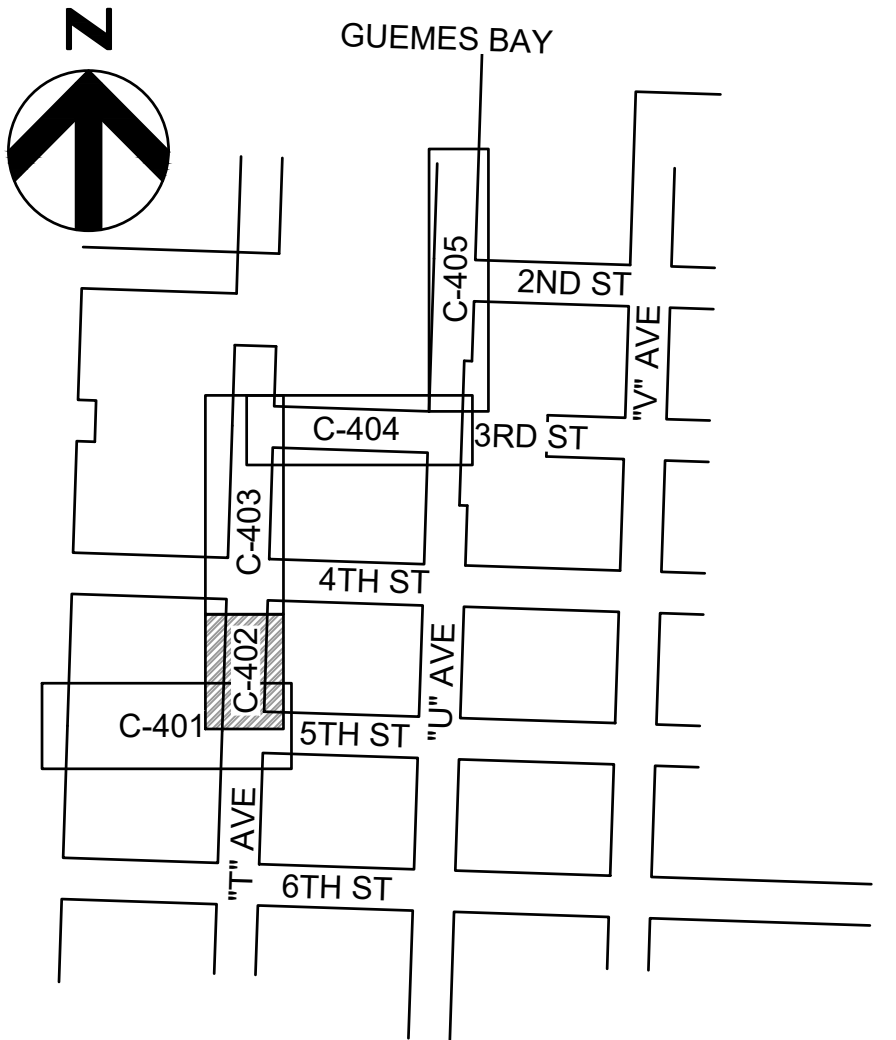
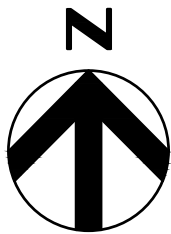


SEE C-501 FOR CONTINUATION

SEE C-503 FOR CONTINUATION



PLAN
H 1" = 20'



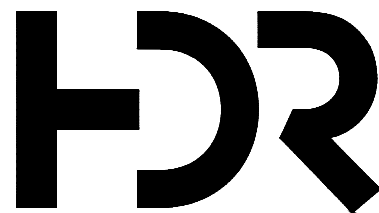
KEY MAP (NOT TO SCALE)

NOTES

- SEE SHEETS C-301 TO C-305 FOR ROADWAY RESTORATION.
- SEE SHEETS C-401 TO C-405 FOR OUTFALL PLAN AND PROFILES.

DRAINAGE NOTES

- PROTECT EXISTING SD PIPE AT TRENCH CROSSING. USE CDF BACKFILL AROUND SD PIPE EXPOSED DURING SS PIPE TRENCH EXCAVATION.



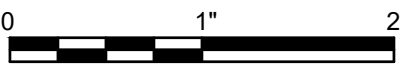
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ISSUE	DATE	DESCRIPTION

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CIVIL ENG	NORBERG, RANDY
DRAWN BY	SCHMIDT, ADAM
PROJECT NUMBER	

**PRELIMINARY
NOT FOR
CONSTRUCTION
OR
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**CITY OF ANACORTES
WWTP OUTFALL RELOCATION -
UPLAND PHASE**

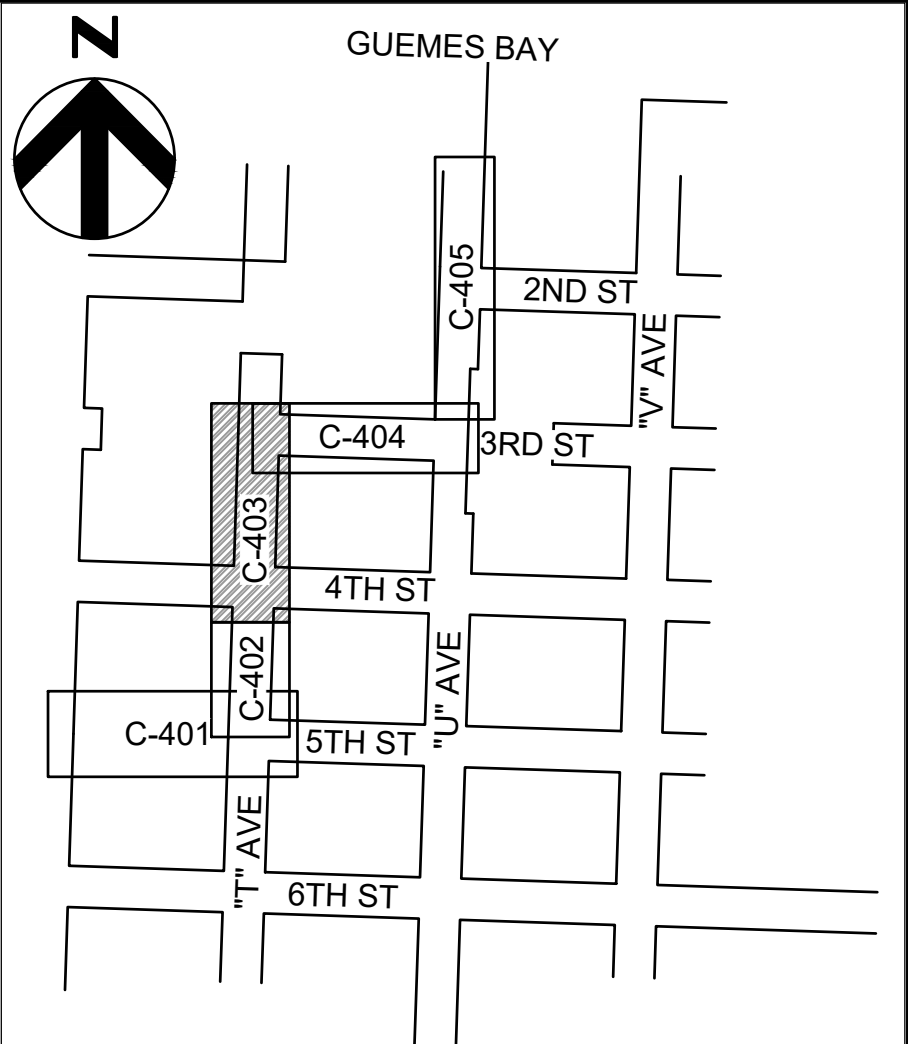
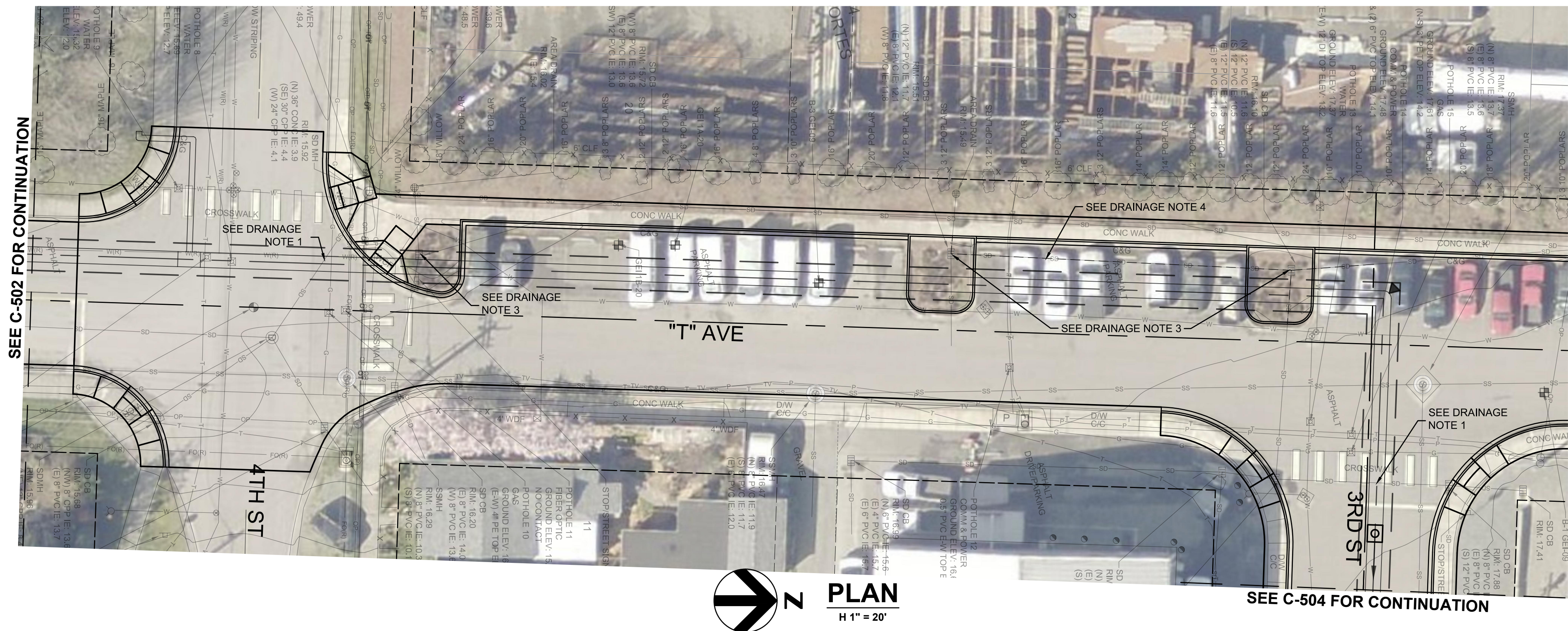
STORM DRAINAGE AREA 2



FILENAME	C-502.DWG
SCALE	1" = 20'

SHEET
C-502

NOTE TO REVIEWER:
ADDITIONAL RAIN GARDEN DETAILS WILL BE
DEVELOPED FOR THE NEXT SUBMITTAL



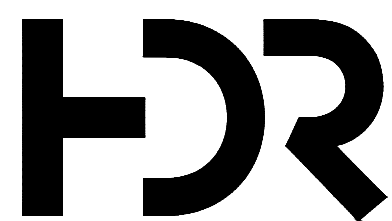
KEY MAP (NOT TO SCALE)

NOTES

1. SEE SHEETS C-301 TO C-305 FOR ROADWAY RESTORATION.
2. SEE SHEETS C-401 TO C-405 FOR OUTFALL PLAN AND PROFILES.

DRAINAGE NOTES

1. PROTECT EXISTING SD PIPE AT TRENCH CROSSING. USE CDF BACKFILL AROUND SD PIPE EXPOSED DURING SS PIPE TRENCH EXCAVATION.
2. PROTECT EXISTING SD PIPE RUNNING PARALLEL AND CLOSE TO SS PIPE TRENCH BOX.
3. REMOVE RAINGARDEN AND DRAINAGE FEATURES, SALVAGE SD AND CB'S, GRATES AND FRAMES. RECONSTRUCT RAINGARDEN AND SD DRAINAGE SYSTEM TO MATCH EXISTING, AND PER DETAILS ON C-XXX.
4. REMOVE AND REPLAE EX 12" SD, MATCH LOCATION AND INVERTS.



					PROJECT MANAGER	BERGSTROM, ERIC
					CIVIL ENG	NORBERG, RANDY
					DRAWN BY	SCHMIDT, ADAM
	4/2021	75% DESIGN				
ISSUE	DATE	DESCRIPTION			PROJECT NUMBER	

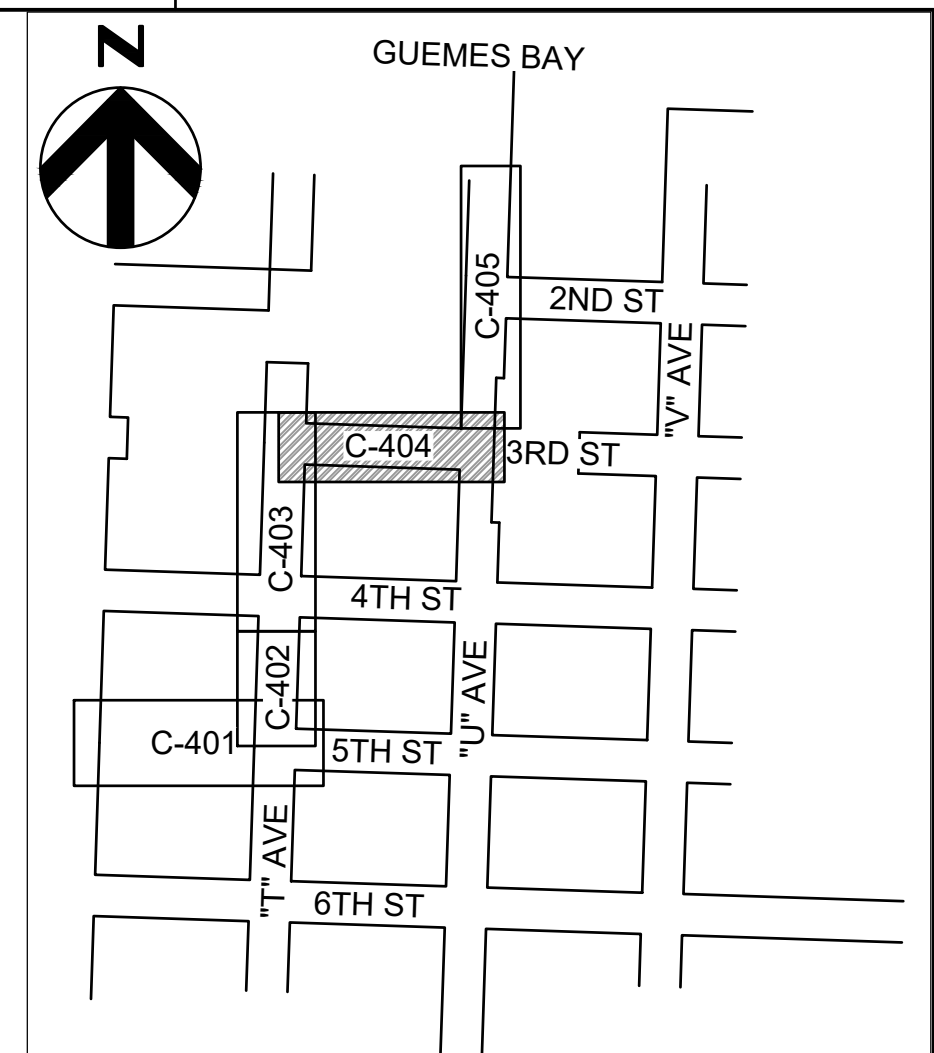
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NOT FOR
CONSTRUCTION
OR
RECORDING**

CITY OF ANACORTES WWTP OUTFALL RELOCATION - UPLAND PHASE



FILENAME	C-503.DWG
SCALE	1" = 20'

SHEET
C-503





Stormwater Site Plan Drainage Report

City of Anacortes – WWTP Outfall
Relocation– Upland Phase Contract

June 2021



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Certificate of Engineer

The technical material and data contained in this report for the **City of Anacortes WWTP Outfall Relocation Project - Upland Phase Contract, Stormwater Site Plan Drainage Report** was prepared under the supervision and direction of the undersigned.



E Randal Norberg, P.E.
Senior Water Resources Engineer
HDR Engineering, Inc.

June 2021

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Acronyms and Abbreviations

ac	acre
bgs	below ground surface
BMP	best management practice
cf	cubic foot/feet
cfs	cubic feet per second
COA	City of Anacortes
CSWPPP	Construction stormwater pollution prevention plan
ESC	erosion and sediment control
GIS	geographic information system
GULD	General Use Level Designation
LID	low-impact development
MC	Anacortes Municipal Code
MR	Minimum Requirement
MS4	Municipal Separate Storm Sewer System
MOU	Memorandum of Understanding
MWS	Modular Wetland System
NPDES	National Pollutant Discharge Elimination System
NPGPS	non-pollution generating pervious surface
O&M	operations and maintenance
OWS	oil-water separator
PGIS	pollution generating impervious surface
PGPS	pollution generating pervious surface
PIT	pilot infiltration tests
REC	Recording
SWM	Anacortes Surface Water Design Manual (SWM)
sf	square feet/foot
SP	Standard Plan
SR	Special Requirement
SWPPP	Stormwater pollution prevention plan
SWPPS	stormwater pollution prevention and spill control
TDA	threshold discharge area
TSS	total suspended solids
UIC	Underground Injection Control

1 Project Overview

1.1 Executive Summary

This Project is an Underground Utility Project that installs a utility outfall pipe entirely under existing city streets within City ROW, and replaces the disturbed surfaces. As such, the project can qualify for an Ecology stormwater manual exemption for stormwater criteria otherwise required from a street project or developer project. To qualify for the Ecology manual exemption, the utility work must “replace the ground surface with in-kind material or materials with similar runoff characteristics, and this utility work is subject only to Construction Stormwater Pollution Prevention: Minimum Requirement #2 (MR #2)”.

The Project replaces all impacted or disturbed surfaces in-kind or with material with similar runoff characteristics, from the City Waste Water Treatment Plant (WWTP) to about half way between “T” Avenue and the intersection of 3rd Street and “U” Avenue. The entire project will replace more than 68,000 sf of existing surfaces in-kind consistent with exemption requirements defined by Ecology. In the vicinity of the intersection of 3rd Street and “U” Avenue, a total of 821 sf of new pollution generating impervious hard surface is created where road grade restoration requires grade transitions to match existing grade.

Additional minor grading, pavement removal and surface disturbance occur at the end of “U” Avenue associated with pipe installation and the relocated temporary access driveway required to maintain residential access during pipe installation, and to construct 2 paved parking stalls. This work creates 649 sf of new pollution generating impervious hard surface that does not meet the manual exemption criteria for “replace in-kind” restoration.

Combined there is a total of 1,470 SF of pollution generating impervious surface which is non-exempt that is placed as part of the project. Utility work at the end of “U” Avenue also disturbs 6,489 sf of additional hard surface that is removed and replaced with hydroseeded amended soil for a net impact of 7,959 SF and a reduction of hard surfaces equal to 5,019 SF.

These are all new Non-Exempt surfaces that do not meet the utility exemption requirement and fall under Ecology manual evaluation.

The stormwater management approach for this project is consistent with Ecology criteria allowing all surfaces that get replaced “in-kind” to be exempt surfaces only subject to comply with Minimum Requirement number 2 (MR #2) - SWPPP/TESC measures. All disturbed or replaced non-exempt surfaces are subject to evaluation according to the Ecology manual. The non-exempt surfaces which need to be addressed according to Ecology criteria are 1,470 SF of new hard surfaces and remaining 6,489 SF of disturbed surfaces. This grand total of 7,959 sf, consists of existing hard surface and vegetated surface converted to hydroseeded amended soil.

The Ecology manual flowchart for Redevelopment indicates that an exceedance of 7,000 SF of non-exempt land disturbance requires the non-Exempt surfaces to be subject to MR #1 – MR #5.

The Project adds less than 5,000 sf of new or replaced hard surface and reduces the net hard surfaces. The project does not convert $\frac{3}{4}$ acres of vegetation to lawn, and does not convert any area of vegetation to pasture. Based on this evaluation of the flow chart, no other minimum requirements (MR's) are applicable. Flow control and water quality (MR #6 and MR #7) are not required for any part of the Project.

To Summarize; The entire Project site is subject to MR #2: preparing a Construction Stormwater Pollution Prevention Plan (SWPPP) that includes the Temporary Erosion Control (TESC) plans, and only the Non-Exempt surfaces are subject to MR #1 – MR #5. Specifically, MR #1 requiring this report including stormwater plan sheets as needed. MR #3 requiring source control of pollution during construction be addressed. MR #4 requiring preservation of Natural Drainage Systems and Outfalls, and MR #5 requiring On-Site Stormwater management BMP's be evaluated. While not required, three rain gardens on "T" Avenue (which have exhibited continuous performance issues) will be destroyed by the pipe installation, and will be replaced with three linear modular wetland treatment units with hopefully more reliable performance and ease of maintenance .

1.2 Introduction and Purpose

The City of Anacortes (City) is relocating their wastewater treatment plant utility outfall pipe that conveys treated wastewater sewer effluent from the WWTP to the Bay of the Salish Sea also known as the Guemes Channel (Channel). The WWTP Outfall Relocation is separated into two project contracts, the "WWTP Outfall Relocation - Marine Phase" (Marine Phase) and, "WWTP Outfall Relocation - Upland Phase" (Upland Phase) under separate permitting documents. This Stormwater Site Plan Drainage Report (SSP) is intended to address only the Upland Phase contract and not the off-shoreline or in-water utility work addressed by the Marine Phase design and permitting documents.

The Upland Phase work consists of installing the utility outfall pipe from the WWTP to the end of "U" Avenue (See Figure 1). The Marine Phase connects to the Upland Phase utility outfall pipe at the end of "U" Avenue and extends into the Channel. The Marine Phase contract is scheduled to begin before the Upland Phase contract starts and will overlap with the Upland Phase at the connection in the ROW of "U" Avenue.

The purpose of this drainage report, or Stormwater Site Plan (SSP) is to meet the requirements of MR #1 and document the stormwater control facilities proposed and the design basis of stormwater features for the City's WWTP Outfall Relocation Project - Upland Phase Contract (Project).

The City of Anacortes has lead permitting agency status for the Project, and as such, the stormwater facilities are being designed in compliance with the City's surface water and stormwater requirements. Due to code changes since the last ratified version of the City Stormwater Manual (2012), this project is also being designed to address the current City NPDES MS4 Phase II Permit. This drainage report has been prepared in accordance with the City's SSP format requirements.

This Project is subject to the City stormwater design criteria, which uses the 2012 Stormwater Management Manual for Western Washington as amended in December 2014. Newer stormwater design codes have been published by the Washington State Department of Ecology (Ecology) and are documented in the 2019 Stormwater Management Manual for Western Washington (SWMMWW). Where new Ecology code requirements exceed or supersede City 2012/2014 requirements, the most stringent, or current code, will be used for design and permitting purposes to ensure compliance with all NPDES MS4 Phase II permit requirements.

The Upland Phase work consists of open cut trenching of existing surfaces and blasting through rock to relocate the outfall pipe and then replacement of those impacted surfaces in-kind. This work includes utility repair work, fixing minor drainage issues and replacing or repairing existing drainage features and treatment systems which are impacted by the work or in poor maintenance condition or not working properly. The stormwater design classification for this Project is an Underground Utility Project, as defined in Section 1.3 of the SWMMWW. New or replaced impervious or pollution

generating surfaces not associated with utility replacement work (under 5,000 square feet) will be addressed according to the 2019 SWMMWW stormwater code requirements.

1.2.1 Existing Site Conditions, Topography, Drainage, Land Cover, Soils

The Project consists of constructing a wastewater utility outfall pipe within City streets along the route shown in Figure 1.

TOPOGRAPHY

Topography along the outfall pipe alignment on “T” Avenue gently slopes away from Guemes Channel with the road grade rising by about 25 feet to the intersection of 3rd Street and “U” Avenue to a local high point and drainage divide. 3rd Street follows a local ridge such that no off-site runoff gets onto the street surface in this block and the only runoff is from the roadway contained between sidewalks and HMA wedge curb (or thickened edge pavement) on both sides of the street. From this intersection the road grade falls toward the water going north on “U” Avenue by about 15 feet to the end of “U” Avenue where runoff grade levels off and is captured in two catch basins near the end of the street, one on each side of the road. Road runoff from these catch basins is combined and conveyed to an existing outfall on the rock armored slope at the shore.

DRAINAGE

The Project site consists of a single Threshold Discharge Area (TDA) with two stormwater outfalls. The runoff is discharged from this TDA within City stormwater MS4 conveyance pipes discharging directly into the Channel, one outfall is located at the end of “U” Avenue and the other conveying runoff northward along the west side of “T” Avenue. All street runoff is captured and completely contained within piped conveyances.

Drainage on 3rd Street from the highpoint flows westward, down gradient to “T” Avenue and is collected in the street drainage conveyance system. The roadway drainage at “T” Avenue is conveyed in a storm drain pipe running north on “T” Avenue. The storm drain pipe continues across Port property to discharge into the Channel.

There are three rain gardens along “T” Avenue located between on-street parking stalls that will be demolished by the Project. The rain gardens are not infiltrating well and have become a maintenance issue. While the project is a utility project and qualifies for exemption from stormwater upgrades with in-kind replacement, this project will perform maintenance upgrade replacement to the rain gardens changing from rain garden function to modular wetland units to provide runoff treatment. These modular wetland units have a smaller footprint than the rain gardens. The surface area not taken by the treatment units will have an amended soil that is hydroseeded for an in-kind pervious material to meet the in-kind surface replacement requirement.

LANDCOVER

The project site consists of existing City streets and sidewalks within City ROW from the WWTP to the north end of “U” Avenue. These surfaces are to be replaced in-kind. The surfaces on “T” Avenue are fully developed with asphalt road and concrete curb and gutter and concrete sidewalks. The west half of 3rd Street is also a fully developed road. The east half of 3rd Street is a narrower road section with HMA wedge curb on each side, with gravel shoulder and paved or unpaved driveways. “U” Avenue is generally asphalt with gravel shoulders and grass yards and dead ends at the waterfront.

Figure 1. Vicinity Map



SOILS

Soils are defined in the Project Geotechnical Engineering Report. Soil at the end of “U” Avenue is mostly uncontrolled fill material. The Geotechnical Engineering Report is not included with this SSP. The high point on 3rd Street is very closely underlain with rock as indicated in the outfall pipe profile.

There are no critical areas identified within the Project outfall alignment within City ROW. No known contamination has been identified within the Project work limits.

1.3 Proposed Conditions

The Project will install the utility Outfall pipe and restore existing surfaces with in-kind materials. Figure 2, “Exempt and Non-exempt Surface Areas” shows the Exempt surfaces with in-kind surface replacement in red, and the new and replaced impervious surfaces (Non-Exempt) are shown in blue and replaced pervious surfaces are shown in green. Targeted surfaces already treated with existing stormwater facilities (rain gardens) in “T” Avenue will be removed and replaced. Three rain gardens on “T” Avenue (which are currently not performing well due to poor infiltration issues and clogging) will be demolished by pipe installation and replaced with Modular Wetland Linear treatment units. The existing rain gardens treat surface water from the roadway and the new Linear Modular Wetland

water quality treatment units will treat this same runoff and exceed minimum water quality flow rates to enhance comprehensive coverage for targeted surface treatment by rain gardens.

1.3.1 Site Grading

The Project does not alter or change roadway grades and the surfaces will be restored in-kind to the same grades. Only minor changes occur near the north end of “U” Avenue and at the intersection of “U” Avenue and 3rd Street, to match existing grades. Paved road surfaces and other disturbed surfaces will be restored after utility outfall pipe installation. Sidewalk damaged by outfall pipe installation will be replaced and ADA ramps installed where possible.

Minor grading changes will occur near the north end of “U” Avenue and at the intersection of “U” Avenue and 3rd Street, to facilitate the new parking stalls and the temporary access drive to match existing grades, and correct surface water nuisance issues from repaving the curve into 2nd Street.

The roadway at the end of “U” Avenue will be restored with HMA wedge curb as before, and grades modified slightly to provide a curb the transition from the “U” Avenue parking stalls to the connection to 2nd Street curve. A temporary driveway to adjacent residences and access to a City pump station will be graded and paved over existing pavement. The paved access drive will be the final surface and provide access to the residences. The disturbed surfaces at the end of “U” Avenue will either be replaced in-kind or cleared with amended soil placed and hydroseeded as the final stabilized surface.

Excavation is limited to what is needed for trenching to install the utility outfall pipe. Trenching includes a 30 feet deep section through a bedrock where blasting will be used to create the trench. This deeper trench section to be blasted corresponds with the high point at 3rd Street and possibly some of the trenching out to the end of “U” Avenue. Slight surface grading modifications will occur at the end of “U” Avenue, mostly from parking stall creation and the temporary access road. All other surfaces will be restored to existing grade.

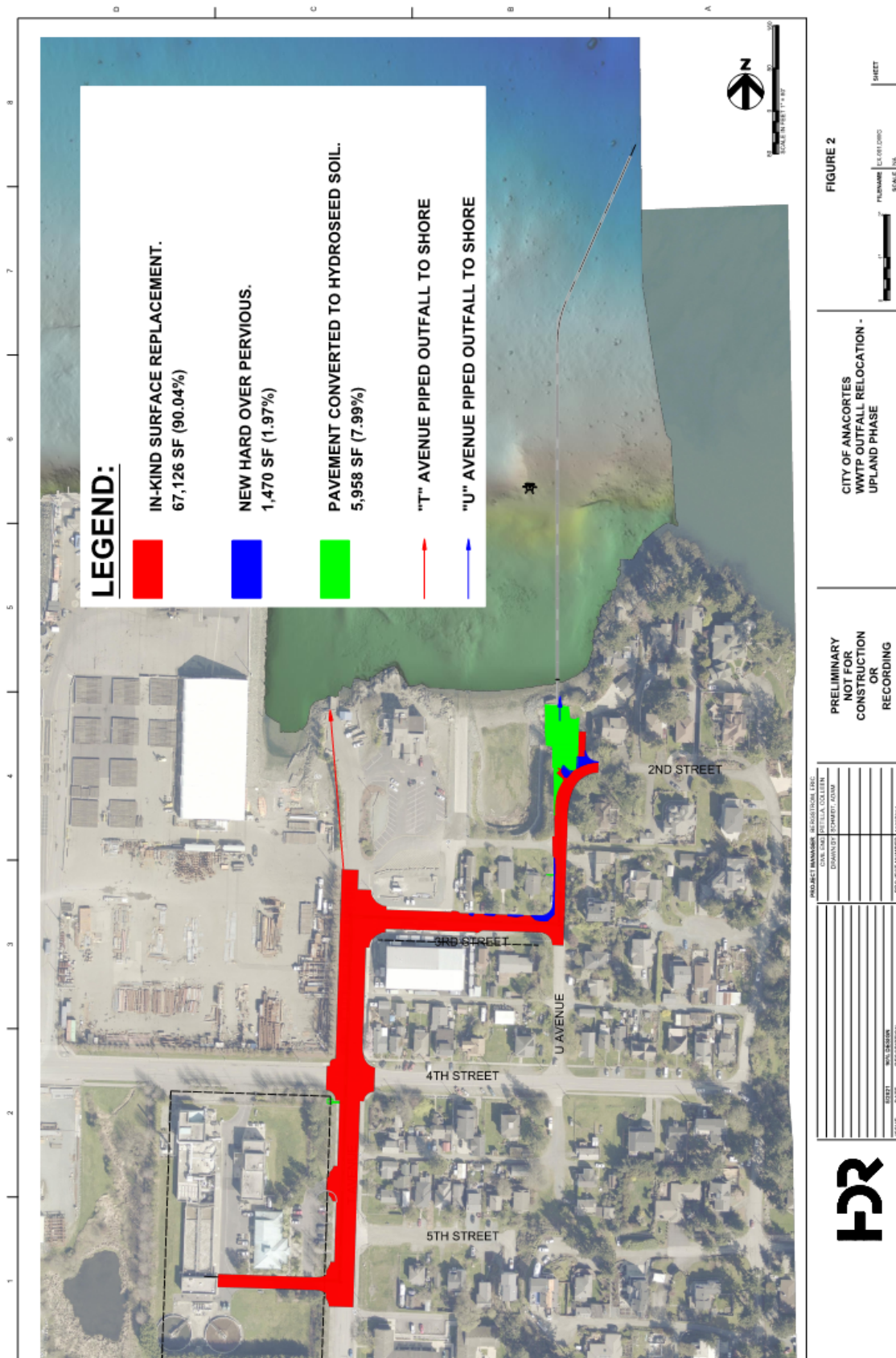
The area of disturbed surface replacement and restoration is shown on Figure 2.

1.3.2 Site Drainage

Roadway drainage along the pipe alignment will not be altered and road runoff will be captured and conveyed in City conveyance pipes to the Channel. All roadway surface water runoff will remain dedicated to the same drainage system, same treatment areas, and same TDA. The three rain gardens on “T” Avenue will be removed and replaced with hydroseeded amended soil and modular treatment units, maintaining water quality treatment for the targeted surfaces and providing in-kind surface replacement. The modular treatment units will be connected at the same locations and discharge to the same storm drainage pipe in “T” Avenue as the rain gardens. There will not be any new changes to conveyance or additional pollution generating surfaces added in “T” Avenue, only in-kind surface replacement. The new Linear Modular Wetland water quality treatment systems will provide Basic Water Quality treatment exceeding the treatment provided by the rain gardens for the targeted surfaces.

Sidewalk damaged by outfall pipe installation will be replaced and ADA ramps will be installed where applicable. Catch basin adjustments and relocations will not be required for the ADA ramps.

Figure 2. Exempt and Non-Exempt Surface Areas



KEY MAP (NOT TO SCALE)

PLAN
8" = 1'-0"

LEGEND:

- NEW IMPERVIOUS SURFACE 821 SF
- REPLACED IMPERVIOUS SURFACE 567 SF
- PAVEMENT SURFACE - REPLACED IN-KIND
- REPLACED PERVIOUS SURFACE 215 SF

FIGURE 3

CITY OF ANACORTES
WWTP OUTFALL RELOCATION -
UPLAND PHASE

PRELIMINARY
NOT FOR
CONSTRUCTION
OR
RECORDING

PROJECT MANAGER: RESIDENTIAL DIST.		CITY ENGINEER: GERRIT BOGARD		DRAWING BY: SHERMAN WAGNER	
PROJECT NUMBER: 160304	DATE: 10/20/16	PROJECT NUMBER: 160304	DATE: 10/20/16	PROJECT NUMBER: 160304	DATE: 10/20/16

1.4 Drainage Review Classification for Project

The City has accepted using the 2012 (and amended in 2014) Surface Water Management Manual and adhering to more stringent requirements in the Washington State Department of Ecology's 2019 Stormwater Management Manual for Western Washington (SWMMWW) as its design criteria.

This Project is an underground utility project within City streets and also subject to the City of Anacortes Public Works Engineering Standards, 7th Edition, November 2018, Chapter 2 – Stormwater Management (SWM). All disturbed surfaces along the pipeline working area that are replaced with in-kind material or materials with similar runoff characteristics, fall under the Utility Project Exemption in I-3.2 in the SWMMWW (see SWMMWW popups included at the end of this section). Under this criteria, new pavement over a gravel surface meets the “materials with similar runoff characteristic” definition for the Exemption. The SWMMWW Exemption states only Minimum Requirement 2, (MR #2): Construction Stormwater Pollution Prevention Plan (SWPPP) apply to the disturbed surfaces that are replaced in-kind. Figure 2 highlights the surfaces that fall under the Exemption in red (Exempt), and areas that do not fall under the Exemption in blue (Non-Exempt).

Based on the Project and this definition, the approach taken for stormwater design is that the Exemption applies to all work and disturbed surfaces along the entire pipeline alignment that are replaced with in-kind material or materials with similar runoff characteristics. The few areas not replaced with in-kind surfaces will be evaluated as disturbed area subject to the SWMMWW evaluation, and called Non-Exempt surfaces.

The total Project new Non-Exempt hard surface is 1,470 sf, which is all pollution generating hard surface (PGHS). The Project total Non-Exempt land disturbed at the end of “U” Avenue consists of pavement that is removed and replace with amended soil that gets hydroseeded (6,489 sf). The total disturbed surface (Exempt and Non-Exempt) is 7,959 sf. See Table 1 for Surface types and area totals.

SWMMWW requirements for the Non-Exempt new surfaces will be per the SWMMWW Flow Charts (Figures 5 and 6) that indicate Minimum Requirements # 1 through #5 only apply to the new and replaced Non-Exempt hard surfaces and land disturbed. No additional Minimum Requirements apply. Minimum Requirement 2: SWPPP, will be required for the entire site disturbed surfaces, including both Exempt and Non-Exempt surfaces.

Table 1. Surface Type and Areas

Surface Type	Total Exempt Surface Shown on Figure 2 (red)	Total New Non-Exempt Hard Surface Shown on Figure 3 & 4 (blue)	Total Non-Exempt Converted Pavement to Grass Shown on Figure 4 (green)
Replaced In-Kind Surface	67,126 sf	N/A	N/A
New PGIS Hard Surface	N/A	1,470 sf	N/A
New Hydroseeded Soil	N/A	N/A	6,489sf

* Total disturbed area of Non-Exempt surfaces = 7,959 sf

Excerpts below are from the 2019 SWMMWW Chapter I - 3: Exemptions

I-3.2 Exemptions

Unless otherwise indicated in this section, the practices described in this section are exempt from the Minimum Requirements, even if such practices meet the definition of new development or redevelopment.



The text in this box originates from one or more of the following Permits:

Appendix 1 of the Phase I / Phase II Municipal Stormwater Permits

Construction Stormwater General Permit

Underground Utility Projects

Underground utility projects that replace the ground surface with in-kind material or materials with similar runoff characteristics are only subject to [I-3.4.2 MR2: Construction Stormwater Pollution Prevention Plan \(SWPPP\)](#).



The text in this box originates from one or more of the following Permits:

Appendix 1 of the Phase I / Phase II Municipal Stormwater Permits

Construction Stormwater General Permit

Washington State Department of Ecology

2019 Stormwater Management Manual for Western Washington (2019 SWMMWW)

Publication No. 19-10-021



Figure 5. Ecology Flow Chart (Figure I-3.1 Requirements for New Development)

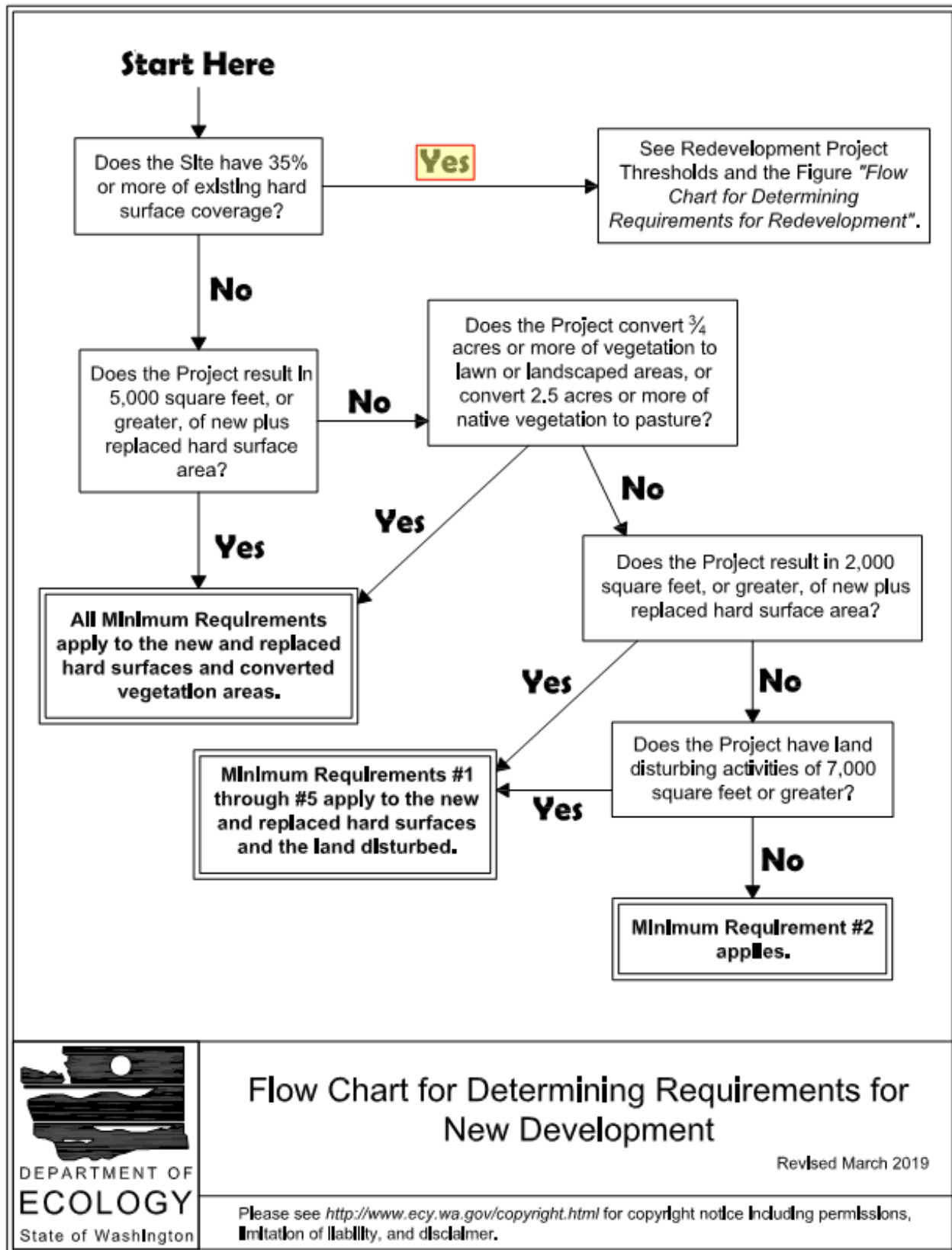
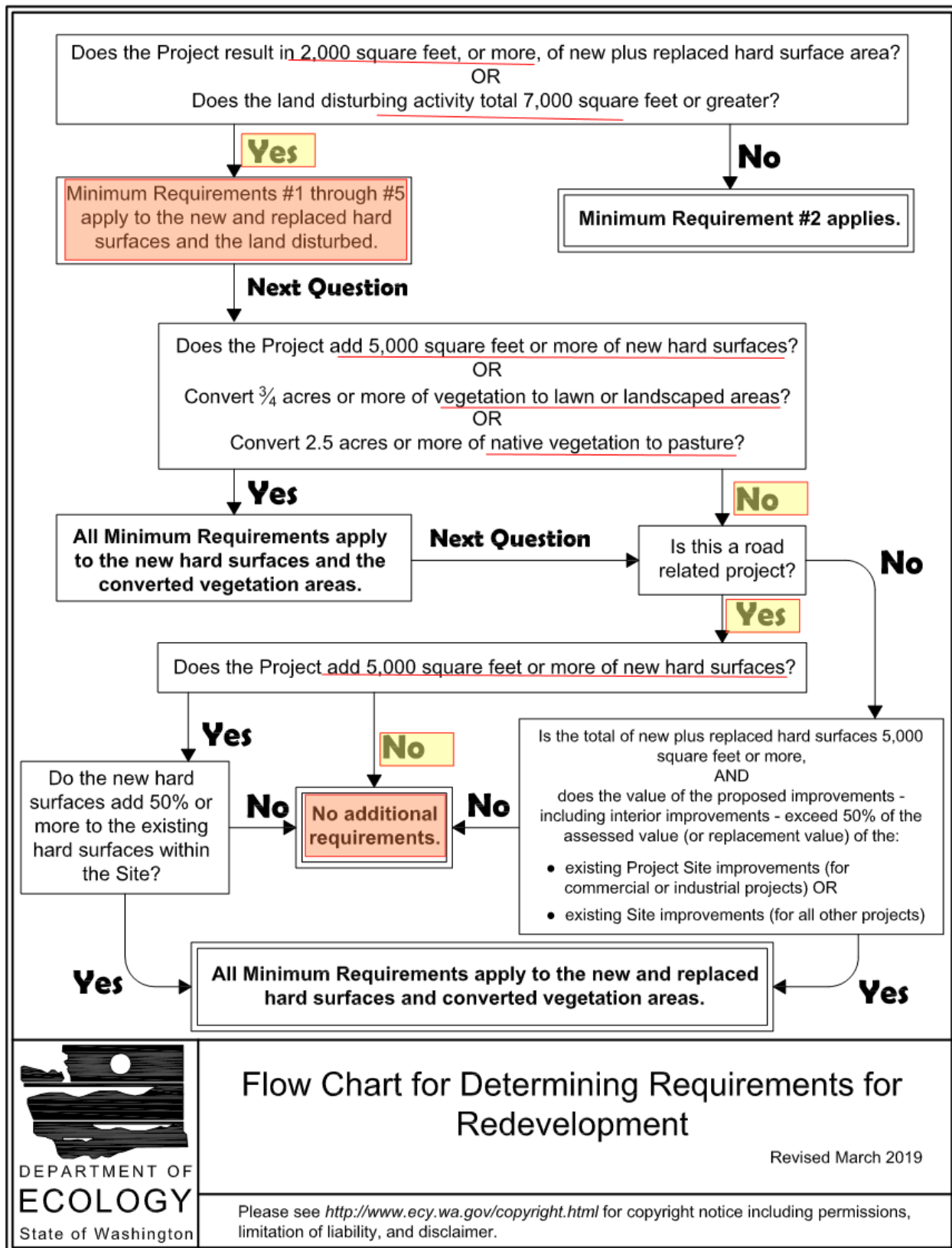


Figure 6. Ecology Flow Chart (Figure I-2.4.2 Requirements for Redevelopment)



2 Minimum Requirements

The Project is an underground utility project. See Section 1.3 for classification selection establishing requirements:

- a) Exempt surfaces are only subject to Minimum Requirement #2.
- b) Non-Exempt new and replaced hard surfaces and land disturbed are only subject to Minimum Requirements #1 - #5.
- c) No additional Minimum Requirements apply.

2.1 Minimum Requirement #1

Per Minimum Requirement 1, a Stormwater Site Plan (SSP) be prepared for the entire site. SSP stormwater plan sheets have been prepared and are provided in Appendix A. This Report has been prepared to meet MR1 and address impacts and requirements triggered, and improvements proposed as part of this project directly attributable to the “Non-Exempt” areas.

2.2 Minimum Requirement #2

Minimum Requirement #2 requires erosion and sediment controls (ESC) and stormwater pollution prevention and spill controls (SWPPS) be documented in a construction stormwater pollution prevention plan (SWPPP) for addressing the entire Project, both Exempt area and Non-Exempt area. The final SWPPP needs to be completed by the Contractor in accordance with the City Standards, the SWMMWW, and in compliance with the expected Project coverage under the NPDES Stormwater General Permit for Construction Activities.

A preliminary SWPPP (or CSWPPP) has been prepared for the Project that describes the methods and practices needed to prevent erosion and discharge of and other pollutants into receiving water bodies, during construction of the Project. The preliminary SWPPP has been included in Appendix B of this report.

Targeted TESC and SWPPS BMPs applicable to the site improvements are part of the preliminary SWPPP included in Table 3. Those ESC BMPs are consistent with the ECS design. The Contractor’s final SWPPP will be implemented and updated throughout construction by the Contractor. The preliminary SWPPP in Appendix B can be used by the Contractor as a basis for preparing the final SWPPP to be implemented for the Project.

This SSP section includes a description of the conceptual Temporary Erosion and Sedimentation Control (TESC) plan and proposed Erosion and Sediment Control (ESC) and Stormwater Pollution Prevention and Spill Control (SWPPS) BMPs as components of the Construction Stormwater Pollution Prevention Plan (SWPPP). The Contractor will create a final CSWPPP based on this section, Appendix B, and the guidance in the SWMMWW. The SWPPP shall be approved and appropriate BMP’s installed prior to starting any surface disturbing work. The CSWPP and TESC plan shall be updated as needed throughout the contract by the Contractor as part of construction submittals. BMP’s applied shall be consistent with the SWMMWW , MR #2 – Construction Stormwater Pollution Prevention, and City of Anacortes Standard Plans. A copy of the Contractor prepared SWPPP document must be maintained on-site and available for City staff access and review during construction. The contractor will be required to implement required BMPs, provide TESC construction oversight, conduct required monitoring and reporting, provide construction

stormwater permit compliance, and provide ongoing updates to the SWPPP consistent with their means/methods of construction.

2.2.1 ECS Plan and BMP Measures

A TESC plan and proper Contractor implementation of that plan is needed to meet the COA required ESC performance standards and comply with SWPPP and NPDES Construction Stormwater General Permit conditions. Full site coverage TESC plans are included with the site improvement drawings (Appendix A) and illustrate probable type and location of ESC BMPs proposed for Contractor implementation. The Contractor is responsible to complete the SWPPP and TESC plans for compliance prior to starting work. Table 3 summarizes the primary ESC BMP measures proposed for application within the various ESC categories for anticipated Project construction activities, based on guidance and criteria provided in the SWMMWW. These primary ESC measures are identified on the Erosion Control Plans included as part of the Site Improvement Plans. Where applicable, ESC measures have been specified in accordance with City Standard Plans (SP). Other WSDOT or DOE Standard Plan details are also proposed for use as part of the ESC design.

Table 2. CSWPPP Proposed Primary ESC BMP Measures

ESC Category	Applicable ESC Measure from SWMMWW, Chapter II-4	Site Application of Proposed ESC Measures
1. Clearing Limits	Required where disturbance is not fully within pavement or hard surface replacement.	Possibly along “U” Avenue
2. Cover Measures	Plastic covering Metal plates Temporary pavement patching Soils Hydroseeding	Temporary plastic covering, erosion protection trench asphalt patching end of “U” Avenue
3. Perimeter Protection	Silt fence or compost socks where not fully within pavement.	“U” Avenue and intersection
4. Traffic Area Stabilization	Street Sweeping	Sweep pavement as needed
5. Sediment Retention	Sediment settling tank, and filtering system Storm drain inlet protection Curb inlet protection	Use cover measures to avoid sediment laden runoff. Install in inlet catch basin inserts to existing curb inlets (side inlet, grate). Sediment tank as needed
6. Surface Water Collection	No collection systems required. Pavement runoff to be routed around trenches into existing street system.	Collection of direct precipitation into trench operation if needed to be pumped dispersion location if available, or to a temp settling tank prior to release
7. Dewatering Control	Temporary pumps, sedimentation tanks, and discharge control (if perched groundwater is encountered)	Trench work may require de-watering. Combined use temp settling tank(s) may be required
8. Dust Control	Track out and dust control, Street sweeping as needed	Operational site disturbed area
9. Protect Existing and Proposed Stormwater Facilities and On-site BMPs	Protect and restore ESC BMPs function	Site-wide disturbed area

ESC Category	Applicable ESC Measure from SWMMWW, Chapter II-4	Site Application of Proposed ESC Measures
11. Maintain Protective BMPs	Maintain and repair ESC BMPs Remove ESC BMPs, restore surfaces	Site-wide disturbed area ESC BMP placement locations
12. Manage the Project	CESCL inspection, monitoring, reporting CSWPPP updating and BMP maintenance	Site-wide disturbed area Contractor updates, maintain on-site
13. Protect LID BMPs	Existing rain gardens to be removed and replaced with in-kind surface	"T" Avenue rain gardens

The Contractor will be required to assign an ESC supervisor to the Project. The ESC supervisor must be a certified professional in ESC or a Certified Erosion and Sediment Control Lead (CESCL). The ESC supervisor will be responsible for the inspection, maintenance, and performance review of all ESC measures, as well as maintaining compliance with NPDES Construction Stormwater Permit conditions and associated monitoring and reporting to Ecology.

2.2.2 Construction Activities

This Project installs just under 1,700 LF of new outfall pipe from the WWTP to the connection with the Marine Phase in "U" Avenue. Work consists of trenching in City streets to install the new outfall pipe.

The targeted construction sequencing is as follows:

- Establish phased work limits for trenching and pipe installation segments
- Install temporary traffic controls for phased work
- Install ESC BMPs
- Establish SWPPS control measures
- Sawcut, trenching, and excavate/blast material (material removed from site)
- Outfall pipe installation and trench backfilling with imported material
- Temp paving of trench surface and other cover measures for disturbed surfaces
- Repeat above sequence for subsequent phases until pipe installation is complete
- Protect underground utilities and stormwater infrastructure, re-constructing as needed
- Remove and reconstruct the rain garden features with new Modular Wetland Systems
- Permanent pave the temp paved access to residences and city pump station
- Replace hard surface with soil and Hydroseed disturbed area at "U" Avenue
- Complete site overlay and replacement paving and pavement markings

The Project will include application of proposed ESC and SWPPS control measures such as: install ESC and SWPPPS control BMP measures including inlet protection, construction vehicle access entrance and/or track-out controls, treatment of pavement saw cutting material, stormwater sediment

tank, sump pumps, and a sediment treatment unit or other measures, monitoring to ensure discharging compliant or treated water to the existing SD system.

2.2.3 SWPPP BMP Measures

The SWPPP plan proposes control measures intended to prevent pollutants from coming into contact with site drainage, surface water, or groundwater. Table 3 summarizes the primary SWPPS BMP measures expected to be needed for anticipated Project construction activities, based on guidance and criteria provided in the SWMMWW.

Table 3. SWPPP Proposed Primary SWPPS BMP Measures

SWPPP Category	Applicable SWPPP Measure from SWMMWW	Site Application of Proposed SWPPP Measures
Follow effective pollutant handling and disposal procedures	Concrete handling, washout facilities Saw-cutting runoff controls	Site-wide good housekeeping practices Site-side for construction concrete washoff and washout containment
Provide cover and containment for materials, fuel and other pollutants	Materials delivery, storage and containment	Mobile construction equipment refueling at designated, fully contained site areas Site spill response kits Temporary covered bins for contaminated soils storage/removal
Maximize pollutant control and minimize pollutant sources	Construction stormwater filtration treatment	Portable or truck mounted settling tank with sand filter pressure pods if needed
Protect from spills and drips of petroleum products and other pollutants	Maintain protective BMPs	Designated construction vehicles parking area with drip pans, oil booms
Prevent or treat contamination of stormwater runoff by pH modifying sources	Concrete handling and washout facilities, pH control for high pH water	Concrete washoff and washout containment; CO ₂ sparging or compost sock filtration (if needed)

Trench backfilling will be immediately followed with temporary surface stabilization to prevent generating turbid runoff. Given the amount of surface exposing earthwork at any one time on this Project, it is expected that construction stormwater settling and filtration treatment of site runoff during construction will be needed during the wet season (October 31 – April 1). One settling tank (20,000 gal) could be sufficient for the maximum anticipated open trench of 600 LF allowed where blasting is required, and suffice for the lesser maximum open lengths of 200 LF at a time in all other open trench excavations. Construction runoff treatment controls are the Contractor's responsibility, including preparation of the phased ESC plan, sizing treatment BMPs and the approved SWPPP and updates.

2.3 Minimum Requirement #3

Minimum Requirement #3 requires source control of pollution. The applicable Non-Exempt surface for the Project consists of 1,470 sf of new hard and 6,489 sf of hydroseed soils at the end of "U" Avenue. No pollutant sources defined in MR #3 are constructed.

- Source control BMPs in accordance with the SWMMWW shall be applied during construction to any portion of the site, if any pollution-generating activities described in the SWMMWW are performed during construction.
- No source control BMPs are proposed for the applicable Exempt and Non-Exempt surfaces.

2.4 Minimum Requirement #4

Minimum Requirement #4 provides Preservation of Natural Drainage Systems and Outfalls as is applicable to the Project site. This requirement includes:

- Natural drainage patterns identified in the stormwater site plans and current drainage patterns shall be maintained. Discharges from the site limits will remain at the natural locations, to the extent practicable.
- The manner of discharge from the Project site is through existing conveyance pipes to direct outfall to the Channel, and will not change or impact off-site drainage. Therefore, the natural drainage patterns will not be changed and no drainage impacts are anticipated to occur in the off-site areas.

The applicable areas drain to the current outfalls and will not be changed. Runoff from hard surfaces continue unchanged, to each road drainage system and outfall. The drainage from the applicable Non-Exempt site areas will not be altered, all site runoff will continue to discharge into the City drainage system on 3rd Street and at the end of “U” Avenue, and existing outfall pipes to the Channel.

2.5 Minimum Requirement #5

Minimum Requirement #5 requires On-Site Stormwater management BMP's as applicable to the Non-Exempt surfaces on the Project site. Under SWMMWW I-3.4.5, Competing Needs Criteria, LID BMP's can be superseded or restricted where they are in conflict with: Transportation regulations to maintain the option for future expansion or multimodal use of public rights-of-way. The City may choose to exercise this right and supersede the LID requirements on these grounds. However, for this report, these surfaces will be evaluated per the manual. The Non-Exempt surfaces are located at the edges of 3rd Street near the intersection with “U” Avenue, and at the end of “U” Avenue. The new hard surface on 3rd Street is pavement that combines with road runoff and is routed in the City street stormwater conveyance system to the Channel. The applicable surface is all new road pavement, so no management BMP's are applicable.

The new hard surface on “U” Avenue is 647 sf, and the hard surface and landscaping area replaced with hydroseed (grass) is 6,489 sf. The new hard surface consists of parking stall runoff captured in a CB in the corner of the stall, and routed to the City stormwater outfall. No On-Site Management BMP's are applicable for this surface.

The new hard surface on the access driveway (412 sf) will sheet flow off the driveway pavement and be dispersed across the gently sloping hydroseeded surface on its way to the area drain CB on the stormwater outfall pipe that direct discharges to the Channel.

This hydroseeded soil (grass) essentially meets the only applicable requirement for On-Site Stormwater Management BMP on List #3, which is T5.12 Sheet Flow Dispersion for Driveways, by providing over 10 feet of gentle sloping vegetated buffer along the entire driveway.

List #3 for On-Site Stormwater Management BMP selection also requires all disturbed surfaces to meet BMP T5.13: Post-Construction Soil Quality and Depth. Hydroseeding amended soil will be installed to meet this requirement. No surface changes described above will interrupt or change the natural hydrologic characteristics of the site.

3 Runoff Treatment

No runoff treatment is required for the Project. Three existing rain garden features on “T” Avenue will be destroyed to install the Outfall pipeline. The rain gardens have experienced some maintenance issues and have performed less than expected. Based on this information, replacement of the rain gardens will not solve the function and maintenance problems. The rain gardens will be replaced with hydroseeded amended soils and prefabricated drop-in modular wetland units providing similar or in-kind surface runoff characteristics surface to meet the criteria of the Exemption for in-kind replacement. One unit will be installed in each rain garden location to replace the existing rain garden function. The prefabricated modular wetland treatment units provide basic treatment function for the road surface area captured, providing greater treatment than was provided by the rain gardens they are replacing. These units will be Modular Wetlands Linear (MWL), by Bio Clean from the Forterra Company. The Project will not take credit for the treatment provided and it is classified as replacement in-kind only. No treatment sizing criteria applies. The MWL units will provide water quality treatment replacing the rain garden function on a smaller footprint in the islands and unit underdrains will be connected to the street storm system. The MWL units are DOE General Use Level Designation (GULD) approved for basic treatment and will provide better treatment and require less frequent and easier maintenance than the current rain gardens being replaced. Units that fits in the rain garden island footprint will be used. See Appendix C for details.

Operation and Maintenance documents for the WML units are provided in Appendix D.

4 Conveyance System and Downstream Analysis

The City has not identified or provided any documents or records of drainage conveyance systems issues on “T” Avenue or “U” Avenue. Nothing indicates the existing systems experiences instances of backing up, or recorded conditions that would indicate a lack of capacity.

No change in surface type that would cause an increase in runoff is occurring. No increase in runoff or peak runoff will occur. No capacity analysis or calculations are required.

5 Special Reports and Studies

A geotechnical site investigation, evaluation, and report has been completed by GeoEngineers on March 25, 2021. No soil data is needed for the stormwater work of the Project. The report is not included in this report.

6 Other Permits

A list of permits, approvals, and notifications expected to be required for Project implementation includes:

City of Anacortes

- Site Plan Review
- Traffic control? Permit...
- Utility Construction Permit...

Washington Department of Ecology ?

- NPDES Construction General Stormwater Permit Coverage

.

7 References

City of Anacortes 2018 stormwater manual Chapter 2 (SWM).

WDOE (Washington State Department of Ecology) 2019 Stormwater Management Manual for Western Washington (SWMMWW).

City of Anacortes: City NPDES Permit, 2013-2018 Phase II Western Washington Municipal Stormwater Permit.

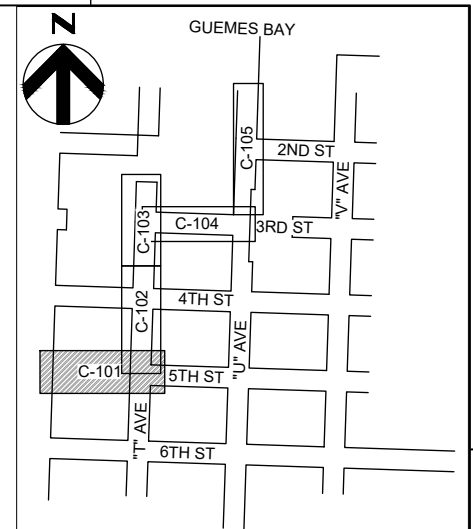
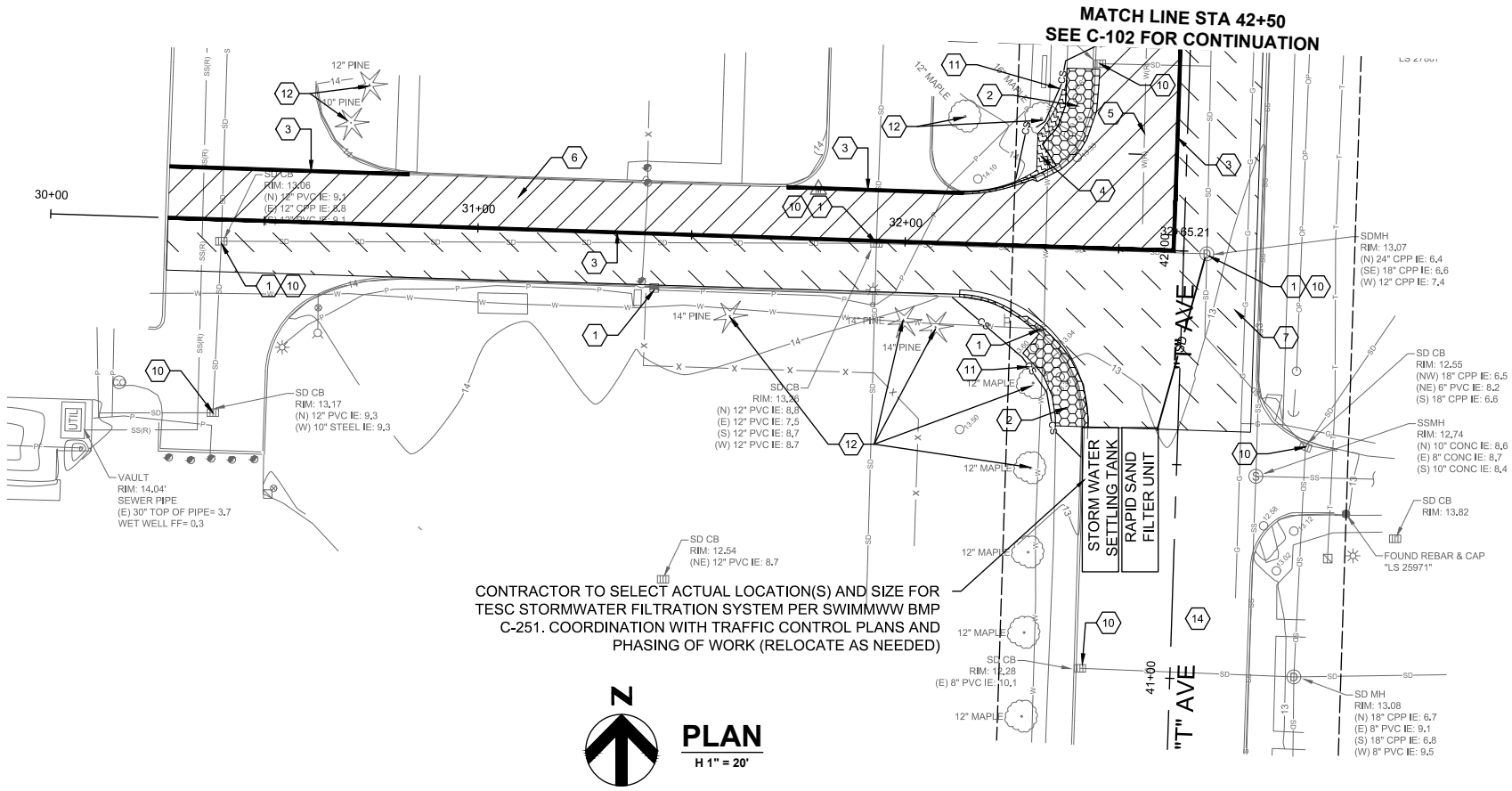
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Appendix A. Site Stormwater Drawings and TESC Plans

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KEY NOTES

- 1 ADJUST UTILITY TO GRADE
- 2 REMOVE CONCRETE CURB, GUTTER, AND SIDEWALK
- 3 FULL DEPTH SAW CUT PAVEMENT
- 4 CLEAR & GRUB
- 5 REMOVE ABANDONED AC WATER PIPE
- 6 FULL DEPTH PAVEMENT REMOVAL
- 7 PLANE 2 INCHES BITUMINOUS PAVEMENT
- 10 INSTALL AND MAINTAIN INLET PROTECTION (SEE DETAIL SHEET C-111)
- 11 INSTALL COMPOST SOCK (SEE DETAIL SHEET C-111)
- 12 PROTECT TREE IN PLACE, SEE SPECIFICATION SECTION 02 23 10
- 13 REMOVE TREE, SEE SPECIFICATION SECTION 31 10 00
- 14 CONTRACTOR TO LOCATE AND INSTALL CONSTRUCTION ENTRANCE AS NEEDED (SEE DETAIL SHEET C-111)

NOTES

- 1. THIS SHEET SHOWS ROADWAY ALIGNMENTS AND STATIONING THAT DIFFERS FROM THE PIPE ALIGNMENT AND STATIONING. SEE SHEETS C-3XX FOR ALIGNMENT DEFINITION.
- 2. RIGHT-OF-WAY REPRESENTS CONSTRUCTION LIMITS, UNLESS OTHERWISE NOTED.



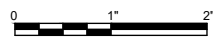
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CIVIL ENG	SKINNER, MASON
DRAWN BY	SKINNER, MASON
PROJECT NUMBER	10287864

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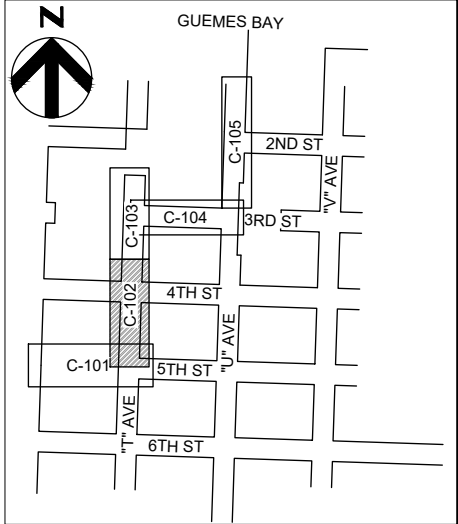
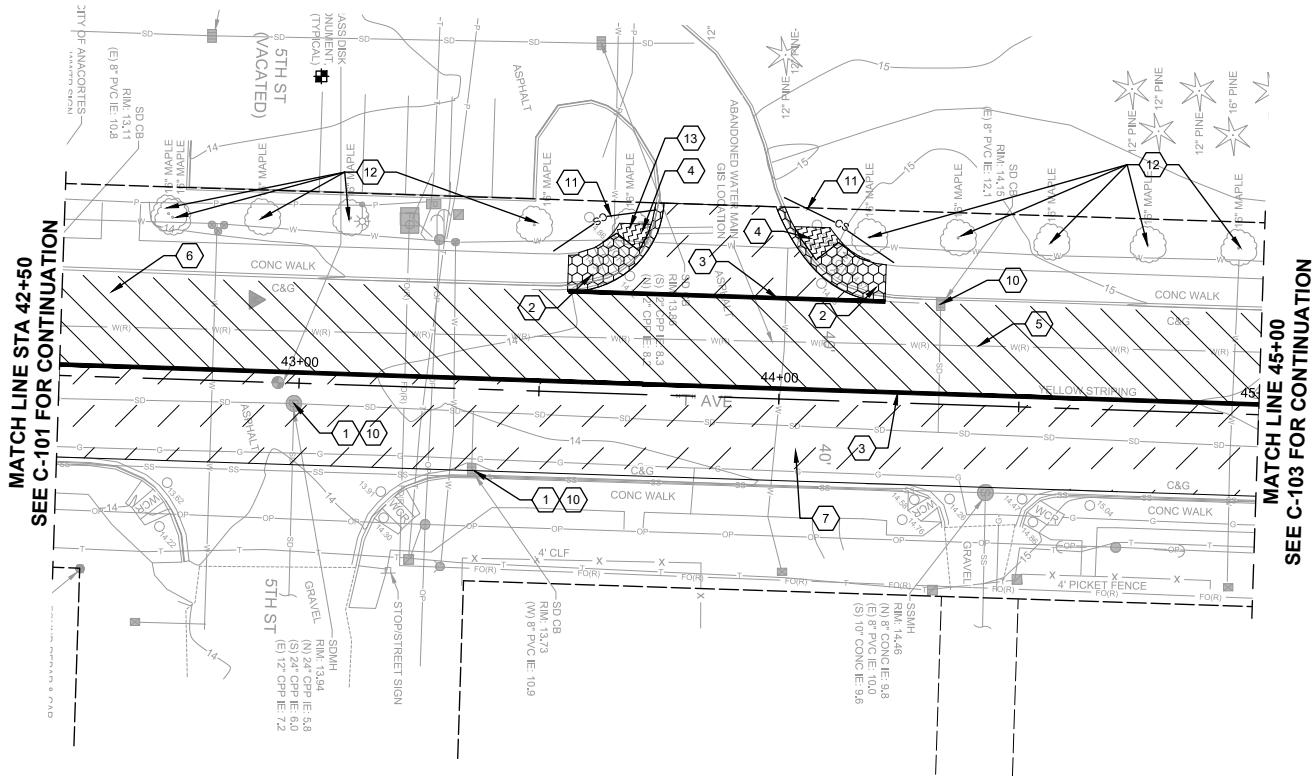
CITY OF ANACORTES
WWTP OUTFALL RELOCATION -
UPLAND PHASE

SITE PREP AND TESC PLAN 1
ROADWAY STA 30+00 - 42+50



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SCALE 1" = 20'

SHEET
C-101



KEY MAP (NOT TO SCALE)

KEY NOTES

- 1 ADJUST UTILITY TO GRADE
- 2 REMOVE CONCRETE CURB, GUTTER, AND SIDEWALK
- 3 FULL DEPTH SAW CUT PAVEMENT
- 4 CLEAR & GRUB
- 5 REMOVE ABANDONED AC WATER PIPE
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- 12 PROTECT TREE IN PLACE, SEE SPECIFICATION SECTION 02 23 10
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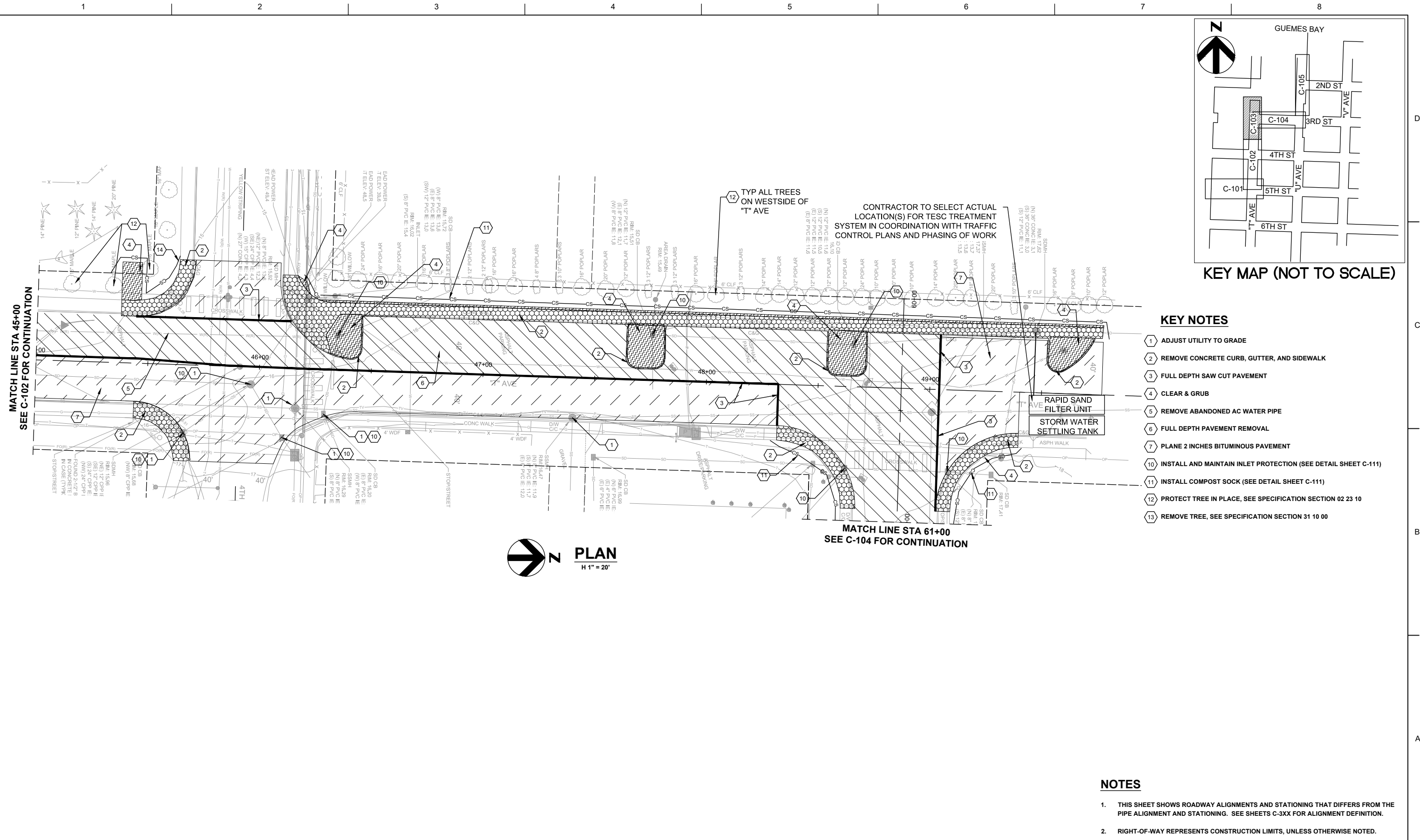
CITY OF ANACORTES
WWTP OUTFALL RELOCATION -
UPLAND PHASE

SITE PREP AND TESC PLAN 2
ROADWAY STA 42+50 - 45+32



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C-102



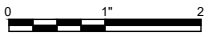
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	PROJECT NUMBER	10287864

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WWTP OUTFALL RELOCATION -
UPLAND PHASE**

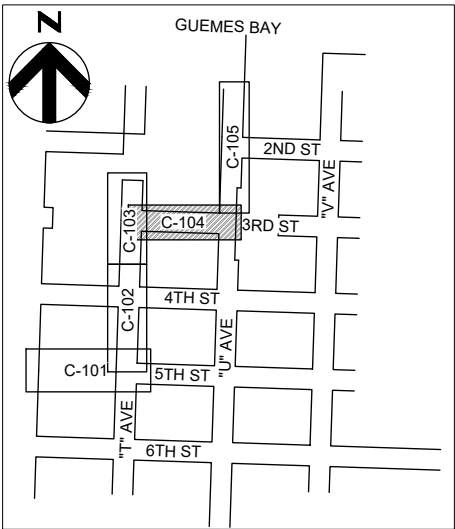
SITE PREP AND TESC PLAN 3

ROADWAY STA 45+32 - 61+00



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SHEET
C-103



KEY MAP (NOT TO SCALE)

KEY NOTES

- 1 ADJUST UTILITY TO GRADE
- 2 REMOVE CONCRETE CURB, GUTTER, AND SIDEWALK
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- 13 REMOVE TREE, SEE SPECIFICATION SECTION 31 10 00

NOTE TO REVIEWER:

COORDINATION WITH PSE IS ON-GOING. NEW UTILITY LOCATION AND ELEVATION HAS NOT BEEN DETERMINES.

NOTES

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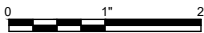
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CIVIL ENG	SKINNER, MASON
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PROJECT NUMBER	10287864

**PRELIMINARY
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CONSTRUCTION
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RECORDING**

**CITY OF ANACORTES
WWTP OUTFALL RELOCATION -
UPLAND PHASE**

SITE PREP AND TESC PLAN 4

ROADWAY STA 61+00 - 71+50



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SCALE	1" = 20'

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C-104

Appendix B. Preliminary Construction Stormwater Pollution Prevention Plan (CSWPPP)

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Preliminary - Construction Stormwater Pollution Prevention Plan

City of Anacortes – WWTP Outfall Relocation – Upland Phase Contract

90 Percent

June, 2021

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Appendices

Appendix C-1: Project Site Maps

Appendix C-2: City of Anacortes, WWTP Outfall Relocation – Upland Phase Contract

(Plans not included)

Appendix C-3: BMP Details

Appendix C-4: Example Inspection, Sampling, Maintenance, and Inventory Forms

Appendix C-5: Construction Schedule and Contact Information

Appendix C-6: Construction Stormwater General Permit (CSWGP)

1.0. Introduction

This Preliminary Construction Stormwater Pollution Prevention Plan (CSWPPP) is prepared for permit application. This CSWPPP will be updated and finalized by the Contractor prior to construction through submittals, and subsequently updated throughout the duration of construction of the WWTP Outfall Relocation – Upland Phase Contract (Project). The Contractor's final approved CSWPPP will be the basis for documentation of construction stormwater control measures consistent with compliance needs under the Construction Stormwater General Permit (CSWGP) coverage, as is expected to be obtained for the Project.

The Project corridor extends for approximately 1,700 linear feet within streets through the city of Anacortes. The Project corridor design comprises five blocks of sanitary sewer outfall pipe installation under City streets.

The Project consists of installing a new sewer utility pipeline, as well as replacement and addition of surfaces along the streets. Additional work required to allow sanitary sewer (SS) installation work includes utility relocations, protection and revised connections, modifications to side sewer service lines, new pavement at the 3rd Street and "U" Avenue intersection area, and new sidewalk with Americans with Disabilities Act (ADA)-compliant ramps where the trenching impacts existing sidewalks or forces the need for ADA ramps. Additionally, areas of grind and overlay are required to meet City of Anacortes (City/COR) standards.

This Project is located within the city of Anacortes and is subject to the stormwater requirements of the City. This CSWPPP and accompanying Temporary Erosion and Sediment Control (TESC) Plan (included in Appendix C-2) address requirements of the City Stormwater requirements. Additionally, the Project will be subject to coverage under the Washington State Department of Ecology (Ecology) CSWGP, and therefore, this CSWPPP also addresses CSWGP requirements (Appendix C-6).

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2.0. Existing Site Conditions and Proposed Construction Overview

This linear underground utility pipeline Project is a sewer outfall pipe replacement/restoration project under existing City roads, that has restricted and narrow work limits varying within City road ROW. The Contractor will be required to finalize an approved CSWPPP and TESC Plans, and prepare final amended plan documents that address its proposed means and methods of construction and sequencing of work within the Project work area. Work will be sequenced in phases that define discrete segments to be open-cut for pipeline installation. Individual phases will be defined and sequenced by the Contractor for work progression and incorporated in the Project schedule. Time will need to be allocated in the construction schedule for City review and edits and acceptance of the final adjusted TESC Plan for each construction phase, prior to starting each work phase. Work phases need to be planned in compliance with traffic control plans, wet season restrictions and other contract and permit restrictions. The Project criteria, regulations, and permits along with the Contractor's means and methods of construction and traffic control restrictions will help determine active work phases along with the sequence and timing of work activities. The confined, narrow site limitation will require construction access points one, if not on both sides of each active construction segment. Access points will be opened and closed, meeting approved traffic control access criteria as work progresses.

Final phase-specific TESC Plans prepared by the Contractor will be submitted to the City for review and acceptance prior to any ground-disturbing activity. TESC Plan features and construction best management practices (BMPs) will need to be installed and operational, including use of stabilized construction entrances/exits.

2.1 Existing Conditions

The WWTP Outfall pipeline spans approximately 1,700 linear feet between WWTP and Marine pipe. The pipe alignment is located entirely within existing City asphalt paved streets. Topography along the Outfall pipeline alignment generally slopes toward the Channel. Drainage along the Project alignment consist of street pavement (curb to curb) collected in street storm conveyance system. All on-site runoff (road runoff) exits the site through two City piped conveyances, one north along "T" Avenue to the Channel, and the other north to the Channel through an existing outfall at the north end of "U" Avenue.

There is no off-site runoff entering the site along the alignment as the sidewalks and thickened edge pavement separate road runoff from the adjacent ROW runoff. Road runoff from the east coming down adjacent streets intersecting "T" Avenue is captured in the road conveyance system, and extreme event runoff may send some road runoff onto "T" Avenue. This runoff is conveyed through the storm drain pipes to the Channel. Going east on 3rd Street runs up a local ridge to a local high point from "T" Avenue to "U" Avenue. No off-site runoff gets onto this section of 3rd Street. "U" Avenue drains northward to the 2nd Street intersection. Flow is captured in CBs in "U" Avenue which combine flows that discharge directly to the Channel. The impacted area (Non-Exempt) of the project is road surface around the U and 3rd intersection and down "U" Avenue to the outfall.

Appendix C-1 shows the effective threshold discharge area (TDA) delineated for the Non-Exempt areas of the Project. The TDA or drainage basin includes a small amount of City area and street flow draining northward on "U" Avenue to the outfall to the Channel. Runoff on 3rd Street gets collected in the "T" Avenue storm line to continues on "T" Avenue to the Channel.

There are no Critical areas in the Project limits. Additionally, the only potential steep slopes are the rock armored embankments at the north end of “U” Avenue which will not be impacted by Project work.

No known contamination has been identified within the Project work limits.

2.2 Proposed Construction Activities

The goal of the Project is the replacement of a WWTP Outfall sewer pipeline that will be decommissioned or removed. The proposed pipeline is shown on the civil design site improvement plans included with the permit submittal plan set. Water and other utility conflicts requiring relocation will also be performed to facilitate sewer pipeline installation.

The Project also includes some new pavement, sidewalk, ADA ramp improvements, and soil amendment and seeding improvements around the “U” Avenue and 3rd Street intersection, and at the end of “U” Avenue. Deep trenching in the vicinity of the 3rd Street and “U” Avenue intersection will require blasting of solid rock to reach pipe grade. The depth of the Outfall pipe installation will likely require dewatering. Dewatering is addressed separately from stormwater runoff. See the dewatering specifications for dewatering water control.

2.2.1 Description of Construction

The Outfall pipeline installation and restoration of the road surfaces impacted by the pipe installation is the bulk of Project work. The installation process will be open-cut trenching. Where underground or above-grade structures are proposed along the alignment, additional excavation will occur along the pipeline trench to install the structure and associated foundations. Certain portions of the proposed pipeline will be installed using blasting through rock. Full road width restoration will be provided for the entire pipeline length. Existing utilities will be protected or temporarily relocated then restored. And the entire road surface will be overlayed or repaved with curb gutter and sidewalk completed.

Segments of pipeline may include trench dewatering to install the pipeline. Water from the operations during well establishment is anticipated to yield noncompliant water during establishment that will be discharged according to the site Dewatering Plans (Specification Section 31 23 19). Treated construction stormwater will be discharged to the Channel through existing conveyance pipes to the Channel. Final stabilization of non-road surfaces on “U” Avenue will be performed following pipe installation and other work.

2.2.2 Description of Final Stabilization

Final stabilization along the pipeline alignment is primarily replace in-kind asphalt pavement and sidewalk, with some new hard surfaces. Hard surface will be removed and hydroseeded amended soils placed on all disturbed surfaces at the end of “U” Avenue. These areas are shown in the Site Restoration -TESC plans (Appendix C-2).

2.2.3 Wet Weather Plans

A Wet Weather Plan is not required, however updated TESC plans will be prepared and submitted prior to the wet season. TESC measures for the wet season will be accepted, installed and operational prior to the start of the wet season.

3.0. Stormwater TESC and SWPPS Measures

As part of the CSWPPP narrative, Table 3-1 summarizes the TESC and SWPPS BMPs proposed for Project use. These can be from either the DOE selection of BMPs described in Table II-3.2 of the SWMMWW or from the WSDOT TESC Manual (TESCM). These TESC and SWPPS measures and their components are further described in the narratives of Sections 3.1 and 3.2. The BMPs suggested for Project application are associated with the TESC Plans included in Appendix C-2. The TESC Plans are intended to provide the minimum BMPs application guidance to the Contractor in its preparation of the updated, final TESC Plans and CSWPPP.

The final TESC Plans and CSWPPP need to address the Contractor's phasing and sequencing of work activities along with its means and methods of construction. Measures will be taken to limit stormwater from entering the Outfall pipe trenches. Stormwater entering the trenches will mix with and become de-watering water, treated by the de-watering system. Final SWPPP and TESC documents need to be completed and approved prior to the start of construction. The Contractor should refer to the Project Specifications with more specific guidance included in 31 25 00 (ESC), and 31 11 00 (Site Clearing).

The Contractor's final TESC Plans and CSWPPP will be implemented beginning with initial land disturbance and remain in effect until final site stabilization.

The CSWPPP also includes compliance with all contract requirements. COA plans and updates need to be incorporated into the CSWPPP in compliance with the SWMMWW, applicable regulations, and Project permits.

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Table 3-1. TESC Approved SWPPS BMP Measures for Project Application

TESC/SWPPS BMP Measures by Element	Applicable COA TESC/Pollution Prevention BMP Measures under COA and WSDOT Standard Plans and Ecology BMP References	Site Application Locations/Areas for TESC/Pollution Prevention BMP Measures
TESC Element 1: Clearing Limits	WSDOT SP 1-10.10.01: High Visibility Fence Tree Protection Fence	At site perimeter at working limits Beyond and within working limits
5: Cover Measures for Disturbed Soil Stabilization	Ecology BMP C121: Mulching Ecology BMP C123: Plastic Covering Ecology BMP C235: Wattles Ecology BMP C120: Temporary and Permanent Seeding	Site disturbance areas, seeded areas Temporary stockpile cover Restored slopes restoration Site disturbance areas
6: Perimeter and Slope Protection	WSDOT: Filter Fabric Silt Fence	Linear sediment retention Perimeter flow dispersal Stockpile perimeter, restored slopes
2: Construction Access and Staging Area Stabilization	Stabilized Construction Entrance Ecology BMP C107: Construction Area/Parking Stabilization Ecology BMP C106: Wheel Wash	At site entrance/exit On-site roads and staging areas Near construction vehicles site exit
4: Sediment Retention Controls	Ecology BMP C240: Sediment Trap Ecology BMP C220: Storm Drain Inlet Protection	Runoff collection areas (small): tank Runoff collection at site inlets
8: Surface Water Collection	COR SP 504: Temporary Swale Ecology BMP C201: Grass-Lined Channels Ecology BMP C209: Outlet Protection Ecology BMP C206: Level Spreader	Drainage intercept areas Runoff conveyance for disturbed areas Temporary channel/storm drain outlets Runoff dispersal in vegetated areas
10: Dewatering Control	See Dewatering plans and Specifications	trench excavation dewatering
10: Dust Control	Ecology BMP C140: Dust Control; No Chemical Dust Suppressants	Site-wide
3: Flow Control	No Flow Control Facilities Required for Project	Project temporary discharges to City storm drains to Channel

TESC/SWPPS BMP Measures by Element	Applicable COA TESC/Pollution Prevention BMP Measures under COA and WSDOT Standard Plans and Ecology BMP References	Site Application Locations/Areas for TESC/Pollution Prevention BMP Measures
7: Protect Existing Inlets and Proposed Flow Control BMPs	No Flow Control Facilities in Construction Area to Protect	None within site working limits
11: Maintain Protective BMPs	Maintain any Ecology specified BMPs during construction Stabilize site using Ecology Specified BMPs	Site-wide
12: Manage the Project	Adhere to Wet Season Requirements including; CECL Inspection/Monitoring; Site Log Book Ecology BMP C162: Scheduling	Site-wide
SWPPS Element 13 SWPPS Pollution Prevention and Spill Control	Ecology BMP C151: Concrete Handling Ecology BMP C154: Concrete Washout Area Ecology BMP C152: Sawcutting and Surface Pollution Prevention Ecology BMP C153: Material Delivery, Storage, and Containment Ecology BMP C251: Construction Stormwater Filtration Ecology BMP C253: pH Control for High pH Water	Site areas with CIP concrete use Site areas with CIP concrete use Sawcutting location Construction staging areas Concentrated flow discharges Concentrated flow discharges

3.1 TESC Measures

This section describes stormwater TESC measures meeting the City criteria for treating construction stormwater.

3.1.1 Clearing Limits (Element 1)

Clearing limits are identified on the TESC Plans, and high-visibility fencing or silt fence will be installed along clearing limits where applicable prior to any site clearing, grading, or land-disturbing activities. Clearing limits have been shown to protect sensitive areas, which should not be disturbed, and to minimize the extents of vegetation and soils disturbance to allowable construction progress along the Project alignment. High-visibility fencing or high-visibility silt fencing (where downslope of construction areas) will be used to mark clearing limits, as required for permit compliance as shown on the TESC Plans (see Appendix C-2). Clearing limits will be finalized in the Contractor's approved TESC Plans update. These features may be installed in stages consistent with how the work is sequenced, or all at the beginning of the Project, with subsequent changes as site conditions dictate (see Table 3-1).

High-visibility and other fencing will also be used within the work limits to protect trees to be retained along with any sensitive areas and their buffers. Locations of tree protection BMPs are shown on the TESC Plans (see Appendix C-2). Project permits may also require additional clearing limit protection needs. Emphasis will be on limiting the extent of disturbed surfaces during the various work phases (limiting soils TESC exposure risks).

3.1.2 Construction Access and Staging Area Stabilization (Element 2)

Stabilized construction entrances will be provided where access to the Project occurs where track out could occur. The Contractor's updated TESC Plans in coordination with the traffic control plans will detail the entrance/exit configurations to control track out from the site. During construction, additional entrances/exits may be needed and will be added in updated TESC Plans. Additionally, all roads used for haul routes will be defined and cleaned as needed to minimize dust, sediment transport, and erosion within the City limits. Staging and stockpile locations are the responsibility of the Contractor. And will meet all CSWPPP criteria and City acceptance. Staging and stockpile areas will have temporary stabilization applied prior to use, and final stabilization will occur once those areas are no longer in use. The Contractor will need to coordinate entrances/exits and staging with construction traffic control plans. Wheel washes may be required at key construction exits during construction to prevent track out of sediment. Water used at the wheel washes will be contained, treated, and disposed of as specified by the appropriate permits and regulations. No wheel wash water can be discharged into waters of the State. Wheel wash BMPs will be maintained in accordance with SWMMWW criteria.

3.1.3 Flow Controls (Element 3)

No flow control measures are required, and the Contractors road runoff will be separated to the extent possible limiting the volume of construction runoff that may need treatment prior to discharge.

There is essentially no change in concentrated off-site run-on. The road surfaces drain to the curbs and adjacent road runoff can be isolated from the trench work to the extent practicable. Open-cut trenching in roadways will typically capture and contain direct precipitation. Road grades will naturally direct

precipitation falling into the trenches to the low end of the trench where sump dewatering is possible to the dewatering system described elsewhere.

Stormwater that can be captured before getting into the trench or exposed subgrade and meeting discharge requirements can be directly discharged to the exiting storm drain systems in "T" Avenue and "U" Avenue. Stormwater not meeting discharge requirements will be sent to a stormwater treatment system prior to discharge to the existing street storm drain systems.

Treatment can be provided as needed prior to discharge. It is unlikely that additional BMPs for sediment traps may be feasible. portable settling tanks, or tank trucks and water treatment units may be required to meet discharge turbidity limits. These phased TESC capture and treatment facilities may be required at one or more locations and will be shown on the Contractor-updated TESC Plans. All BMPs and control measures will need to be installed and operational prior to opening up any phase for work. The CSWPPP flow control TESC measures are more critical during winter months and shall comply with the wet season (October 1 – April 30) criteria for allowable work activities scheduled within the wet season and meet required discharge limits.

3.1.4 Sediment Retention Controls (Element 4)

The existing street flow drainage patterns will be maintained during construction, and perimeter controls will be used to prevent or contain sediment in runoff for treatment prior to discharge. A treatment system along with filter treatment may be needed at the North end of either or both "T" and "U" Avenues meeting release standards.

Runoff from roadway surfaces typically is captured in catch basin inlets and conveyed in storm drain pipes. Perimeter control measures will be used to trap sediment in vegetated areas as practicable, and inlet protection will be used to limit sediment on roadways from entering the storm drain system.

Several storm drain inlets are located within the Project work limits or downgrade of the work. Inlet protection will be installed in all storm drain inlets within the project limits and downstream of the work limits and pipeline installation phased construction activities. Minimum locations where inlet protection is proposed are shown on the TESC Plans.

Untreated stormwater runoff meeting release standards can be released or pumped to the downstream storm water pipes for discharge to the Channel. Dewatering well water during well establishment, is addressed separately from stormwater discharge and while development of both dewatering and stormwater plans will require coordination, dewatering is collected and treated separately from stormwater. The updated TESC Plan needs to be developed for consistency with BMPs from Table 3-1. Adjustments to sediment control BMPs may be required during the progress of work to achieve required CSWGP discharge and receiving water quality limitations. An updated TESC plan will be submitted and accepted a minimum of 7 days prior to the start of the wet season, and TESC measures implemented prior to the start of the wet season.

3.1.5 Cover Measures for Disturbed Soil Stabilization (Element 5)

Throughout the Project alignment, temporary and permanent cover measures will be provided to protect disturbed areas from erosion effects due to wind or precipitation. Exposed and unworked soils need to be stabilized according to the period set forth for dry and wet seasons, as required by Section the SWMMWW and in accordance with City requirements.

Table 3-2. Seasonal Cover Measure Requirements

Season	Dates	Number of Days Soils Can Be Left Exposed and Unworked
Dry	May 1–September 30	7 days
Wet	October 1–April 30	2 days

Exposed and unworked soils will be stabilized within the required time frame using temporary plastic covering, seeding and mulching, steel plating and/or by installing final cover measures consistent with the site restoration plans. Prior to installing final hydroseeding, native soils will be replaced per SWMMWW BMP T5.13: Post-Construction quality and depth.

During the dry season, stockpiles need to be covered with plastic or erosion control blankets or netting within 7 days of exposure and before weekends or forecasted rain. Stockpiles are subject to more stringent requirements in the wet season and must be protected if they will remain unworked for 12 hours.

All disturbed areas that will be unworked during the wet season must be stabilized with plastic covering, temporary seeding, and/or by final cover measures 1 week prior to the start of the wet season. During the wet season, mulching is required in addition to any seeding applied to exposed soils. Cover materials needed to stabilize all disturbed areas need to be stockpiled on site.

Constructed channels and outlets are not proposed for this Project. No City conveyance piping will be revised as part of the work other than slight relocation of CB's on "U" Avenue. The two stormwater outfalls will not be impacted or altered.

3.1.6 Perimeter and Slope Protection (Element 6)

Most of the site disturbance will be limited to within pavement surfaces and potential temporary stockpile locations. Exposed soils associated with proposed site restoration and stockpiles from trenching will be controlled using surface coverings and perimeter BMPs. The pipeline alignment traverses roads. No slopes requiring protection are located within pipeline alignment area work limits and no grade changes are planned along the alignment.

Slopes adjacent to the Project alignment at the end of "U" Avenue are currently armored with rock and will not be impacted by the trenching and Project work.

Pipe installation in the Street is not expected to impact the slopes. The area will be protected from erosion using compost socks, plastic sheeting, temporary seeding and mulching, or other final cover measures in accordance with the TESC plans.

The Project alignment is not near any landslide hazard areas, nor is Project work expected to impact any landslide hazard area.

During the wet season, more conservative perimeter protection BMPs should be used where work occurs near surface waters. For example, straw wattles and silt fencing will be applied at minimum; sandbags, interceptor dikes, and other measures should also be considered. As the Project schedule is developed, the BMPs in locations where wet season work is anticipated will need to be upgraded by the Contractor, and reflected in the TESC plans for the wet season.

3.1.7 Protect Existing and Proposed Inlets and Flow Control BMPs (Element 7)

No flow control facilities are required for the Project. Existing storm drain inlets within or downstream of work limits will be evaluated for inlet protection needs as part of the TESC Plan updates. Inlet protection will be provided as required to protect and maintain inlet operation and conveyance function. Protection measures will be maintained in accordance with the applicable BMP standards. Road surfaces will be kept clean by sweeping as needed to prevent trackout and control dust.

3.1.8 Surface Water Collection (Element 8)

Surface disturbance is expected to be created primarily along the open segments of pipeline installation, and for improvements other than within pipe installation limits.

Stormwater runoff that does meet CSWGP discharge standards at the work limits may need to be collected and treated prior to release.

Adjacent property stormwater currently does not enter the roadway and will not after completion of this Project.

No off-site run-on has been identified that enters the project work site (road surface). Perimeter controls will be enhanced to create or maintain street runoff separation, keeping flows within gutters and out of the open trench areas. Should isolated collection be required, shallow localized sumps will be used to collect runoff for pumping to stormwater system discharge, or to the treatment system(s). No permanent drainage channels or surface conveyance features will be created by this Project. No new outfalls will be created exiting the site or into the Channel.

3.1.9 Pollutants, Materials Delivery, Storage, and Containment (Element 9)

Chemicals used or stored on site must be kept in secondary containment when not in use. Additionally, stored fuel or chemicals will be covered with plastic sheeting or a similar BMP to limit contact with stormwater. When chemicals are in use, secondary containment or other temporary containment BMPs as well as spill control measures must be provided for operations. Materials, delivery, storage, and containment BMP specifications and maintenance requirements are provided in Appendix C-3.

Pipeline trenching, blasting equipment and other construction equipment along with refueling and maintenance of equipment are anticipated on site. Fueling and maintenance will occur away from any wetlands, streams, ditches, storm drain inlets, and flowing or standing water. Contractor means and methods of construction may introduce additional pollutant sources that will need to be identified and addressed with approved measures. Secondary containment must be used during refueling or maintenance, and spill control measures must be readily available. If spill control measures are employed, waste materials must be disposed of properly off site.

3.1.10 Dewatering Control (Element 10)

Because of the depth of the Outfall pipe and proximity of ground water and tidal ground water, dewatering is anticipated along most of the alignment. Dewatering is addressed separately from stormwater, but will need to be coordinated with stormwater systems. Trench dewatering is not discussed in this document, see the Dewatering Specifications for details.

3.1.11 Dust Control

In the event that conditions could cause wind transport of disturbed soils, BMPs will be implemented to limit dust. One of the more common practices is to apply water to exposed soils to the point that the soils become wet, but runoff is not generated. BMPs may also be implemented and include the temporary stabilization of exposed soils, or additional stabilization or rock applied on construction access entrances/exits. Details regarding dust control measures are provided in Appendix C-3.

3.1.12 Maintain Protective BMPs (Element 11)

All temporary and permanent BMPs will need to be maintained and repaired or replaced as needed to ensure continued performance of their intended function. Maintenance and repair will be conducted in accordance with each BMP specification included in Appendix C-3. The Contractor will keep a record on site of all maintenance performed (see Appendix C-4 for Inspection and Maintenance Form).

TESC and pollution prevention BMPs need to be removed within 30 days after final site stabilization is achieved or after the temporary BMPs are no longer needed. Trapped sediment shall be removed and disposed of at an approved off-site location. Disturbed soil resulting from removal of either BMPs or vegetation needs to be permanently stabilized.

Pollutants that are stored or used on site shall be handled and disposed of in a manner that does not result in contamination of stormwater. Section 3.2 discusses SWPPS pollution prevention BMPs proposed for use at the site. Protective BMP's will be maintained as long as they are needed, and removed at the end of the project.

3.1.13 Manage the Project (Element 12)

The Project will need to be managed by the Contractor through the use of phasing; inspection and monitoring; and proper implementation of the Contractor-adjusted CSWPPP and TESC Plan.

The Project will be phased by the Contractor to limit the total disturbance on site at any time to the maximum extent practicable. Additionally, work occurring near other surface waters (Channel) should be performed outside of the wet season as much as possible, in compliance with permits.

Inspection, maintenance, and repair of all BMPs will need to occur on an ongoing basis throughout construction to ensure performance of their intended function. Site inspections and monitoring will be conducted in accordance with the requirements specified in Section 4.0 of this CSWPPP. Monitoring locations are indicated on the TESC Plan in Appendix C-2 and are located in accordance with the applicable requirements.

The CSWPPP and TESC Plan will be updated and finalized by the Contractor consistent with its phasing and means and methods of construction prior to the start of construction. The Contractor will need to maintain and implement the plans effectively throughout the Project in accordance with permit requirements. As site work progresses, the Contractor will be required to routinely review and modify the CSWPPP and TESC Plan to reflect changing site conditions.

Additional details regarding management of the Project are provided in Appendix C-3.

3.1.14 Protect LID BMPs (Element 13)

The Project triggers no LID requirements as determined in the SSP. There are three existing LID features along the Project alignment impacted by this Project. They are three rain gardens being demolished and

replaced with in-kind surfacing and in ground treatment units on “T” Avenue. No other LID features are impacted and no other LID BMP’s are proposed.

3.2 SWPPS Measures

This section describes stormwater SWPPS measures meeting the criteria in the stormwater manuals.

3.2.1 Concrete Handling, Washout, and Disposal

Concrete will be handled in a manner that avoids contact with stormwater. Cover and containment will be provided for any non-cured concrete stored on site. Washout of concrete trucks, mixers, or other equipment, as well as disposal of concrete waste, will be done off site at an approved location. Additional requirements regarding handling, storage, and disposal are detailed in the concrete handling and concrete washout area BMP details included in Appendix C-3.

3.2.2 Sawcutting and Surfacing

Sawcutting is anticipated where sewer pipelines are to be decommissioned and occur in both roadway and trail areas. Surfacing operations are expected adjacent to where trail improvements are proposed. Sawcutting and surfacing operations need to follow the BMP specifications and maintenance requirements for those operations in Appendix C-3.

3.2.3 Disposal of Construction Waste

Decommissioning of Outfall connection pipeline is expected to create construction waste. Blasting may generate waste or contaminated water needing to be removed from the site. Any material or fluid not able to be reused or discharged will be transported off site to an approved disposal site.

3.2.4 Construction Stormwater Filtration and pH Control (Element 4)

Beyond Contractor application of required TESC source control BMPs, it is expected that capture and treatment by settling or pre-settling, with sand filter pods or similar treatment prior to discharging from the site to receiving waters. This is consistent with Project expected coverage under the CSWGP and other requirements. The need for additional runoff storage and treatment will need to be addressed in the Contractor’s TESC Plan prior to the start of work.

The linear nature of this Project may not allow installation of a single treatment site and single discharge location. The work areas and progression will be more limited and may require a treatment system, meeting the wet season quality for discharge. Stormwater may need to be pre-settled and possibly filtered through sand or other media prior to discharge. Runoff that meets permit standards can be discharged to the existing stormwater system. Runoff that does not meet discharge standards must be recycled back through the treatment system potentially including pumps/tanks/sand filters/or other treatment to meet release standards prior to release. The treatment system will need to be capable of meeting wet season release water quality standards and providing a system capable of handling wet season quantities of water for open phases.

Control of pH is not anticipated to be a concern within the Project. Scheduled work will be reviewed on an activity-specific basis and through monitoring, and appropriate BMPs and other measures will be taken

where pH could be an issue for compliance with stormwater release standards. All stormwater runoff discharge must comply with pH limits.

3.2.5 Inspection, Reporting, and Documentation

Inspection and maintenance of pollution prevention BMPs will occur according to their BMP details included in Appendix C-3. Reporting logs of inspection and maintenance of pollution prevention BMPs will be kept in a central location at the Project site. An example inspection and maintenance form including pollution prevention BMPs is included in Appendix C-4. Inspection and reporting of other TESC BMPs as well as pollution prevention BMPs are summarized in Sections 4.0 and 5.0 of this CSWPPP.

4.0. Monitoring and Sampling Requirements

Monitoring includes visual inspection, sampling for water quality parameters of concern, and documentation of the inspection and sampling findings in a site log book. A site log book will need to be maintained for all on-site construction activities and will include:

- A record of the implementation of the CSWPPP and TESC Plan and other permit requirements
- Site inspections
- Stormwater sampling data
- A record of any maintenance performed
- An inventory of chemicals stored on site

The site log book must be maintained on site within reasonable access to the site and be made available upon request to the City, or Ecology. Example inspection and maintenance, sampling, and inventory forms are included with Appendix C-4.

4.1 Site Inspection

Site inspections will be conducted at least once every calendar week and within 24 hours following any discharge from the site. For sites that are temporarily stabilized and inactive, the required frequency is reduced to once per calendar month.

The discharge point(s) will be finalized following the permit submittal and in accordance with the applicable requirements of the CSWGP.

4.2 Stormwater Quality Sampling

Sampling will be conducted at least once every calendar week and within 24 hours following any discharge from the site during the dry season. An increase in sampling frequency may be required for work performed in the wet. For all sites that are temporarily stabilized and inactive, the required frequency is reduced to once per calendar month.

4.2.1 Turbidity Sampling

Turbidity sampling must be performed with a calibrated turbidity meter. Discharges above the benchmark value of 25 nephelometric turbidity units (NTU) require different levels of action, as described in the following paragraphs.

Turbidity Requirements

If the turbidity of the discharge is 26 to 249 NTU, the following response actions will be needed:

1. Review the CSWPPP for compliance with CSWGP. Make appropriate revisions within 7 days of the date the discharge exceeded the benchmark.

2. Projects are required to take immediate action, applying additional TESC measures, to lower the NTU in runoff leaving the site to below 25 NTU. Address the problems within 10 days of the date the discharge exceeded the benchmark. If installation of necessary treatment BMPs is not feasible within 10 days, Ecology may approve additional time when the Permittee requests an extension within the initial 10-day response period.
3. Document BMP implementation and maintenance in the site log book.

If turbidity exceeds 250 NTU at any time, the following response steps will be needed:

1. Project proponents are required to notify the City within 24 hours.
2. Telephone or submit an electronic report to the applicable Ecology region's Environmental Report Tracking System (ERTS) within 24 hours.
 - **Northwest Region** (King, Kitsap, Island, San Juan, Skagit, Snohomish, and Whatcom Counties): Report an environmental issue - Washington State Department of Ecology
<https://ecology.wa.gov/About-us/Get-involved/Report-an-environmental-issue> or (425) 649-7000
3. Immediately begin the process to fully implement and maintain appropriate source control and/or treatment BMPs as soon as possible. Address the problems within 10 days of the date the discharge exceeded the benchmark. If installation of necessary treatment BMPs is not feasible within 10 days, Ecology may approve additional time when the Permittee requests an extension within the initial 10-day response period.
4. Review the TESC Plan for compliance and make appropriate revisions within 7 days of the discharge that exceeded the benchmark of 250 NTU.
5. Document BMP implementation and maintenance in the site log book.
6. Continue to sample discharges daily until one of the following is true:
 - Turbidity is 25 NTU (or lower)
 - Compliance with the water quality limit for turbidity is achieved:
 - 1–5 NTU over background turbidity, if background is less than 50 NTU
 - 1–10 percent over background turbidity, if background is 50 NTU or greater
 - The discharge stops or is eliminated.

If a site discharges directly to a surface water body, the NTU limit is based on the standards in Washington Administrative Code (WAC) Chapter 173-201. In general, projects are not allowed to discharge sediment-laden water to surface waters unless the background turbidity is not increased by more than 5 NTU. Project sites in seasonal suspension must meet this requirement.

If a turbidity test of surface water or stormwater entering on-site wetlands, streams, or lakes indicates a turbidity level greater than 5 NTU above background when the background turbidity is 50 NTU or less, or 10 percent above background when the background turbidity is greater than 50 NTU, then corrective actions and/or additional measures beyond those specified in WDOE manual Section 1.2.5.1 shall be implemented as deemed necessary by the City inspector or on-site CSWPPP supervisor.

4.2.2 pH Sampling

Monitoring pH is required for "significant concrete work" (i.e., greater than 1,000 cubic yards poured concrete over the life of the project). The use of recycled concrete or engineered soils (soil amendments

including but not limited to Portland cement-treated base [CTB], cement kiln dust [CKD], or fly ash) also requires pH monitoring.

For significant concrete work, pH sampling will start the first day concrete is poured and continue until it is cured, typically 3 weeks after the last pour. For engineered soils and recycled concrete, pH sampling begins when engineered soils or recycled concrete are first exposed to precipitation and continues until the area is fully stabilized. A pH meter will be used to monitor pH levels in runoff and surface water.

If the measured pH is 8.5 or greater, the following measures will be taken:

1. Prevent high-pH water from entering storm sewer systems or surface water
2. Adjust or neutralize the high-pH water to the range of 6.5 to 8.5 using appropriate technology, such as carbon dioxide (CO₂) sparging (liquid or dry ice)
3. Obtain written approval from Ecology prior to the use of chemical treatment other than CO₂ sparging or dry ice

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5.0. Discharges to 303(d) or Total Maximum Daily Load Water Bodies

This section describes anticipated Project discharges to 303(d) or total maximum daily load (TMDL) water bodies.

5.1 303(d)-Listed Water Bodies

Table 5-1 shows the 303(d)-listed water body for the Project site. The table lists whether the water body is listed for turbidity, fine sediment, phosphorus, pH, or another impairment. Waters listed as 303(d) for turbidity, fine sediment, phosphorus, or pH will comply with applicable effluent limitations in S8.C and S8.D of the CSWGP.

Table 5-1. Summary of 303(d)-Listed Water Bodies

Water Body Name	Turbidity	Fine Sediment	Phosphorus	pH	Other Impairments
Guemes Channel					

5.2 TMDL Water Bodies

TMDLs have not been developed for the Channel shown in Table 5-1. However, the contractor should confirm Listing status compliance with WAC.

No additional action is necessary at this time.

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6.0. Reporting and Record Keeping

This section describes Project reporting and record-keeping activities.

6.1 Record Keeping

This section describes Project record keeping, including the site log book, records retention, and updating the CSWPPP.

6.1.1 Site Log Book

A site log book will need to be maintained for all on-site construction activities and will include:

- A record of the implementation of the CSWPPP and TESC Plan and other permit requirements
- Site inspections
- Stormwater sampling data
- A record of any maintenance performed
- An inventory of chemicals stored on site

6.1.2 Records Retention

Records will be retained during the life of the Project and for a minimum of 3 years following the termination of permit coverage in accordance with Special Condition S5.C of the CSWGP.

The following CSWGP documentation will be retained on site:

- CSWGP
- Permit coverage letter
- CSWPPP and TESC Plan
- Site log book

CSWGP documentation will need to be provided within 14 days of receipt of a written request from Ecology. A copy of the CSWPPP or access to the CSWPPP will need to be provided to the public when requested in writing in accordance with Special Condition S5.G.2.b of the CSWGP.

6.1.3 Updating the CSWPPP

The CSWPPP and/or TESC Plan will need to be modified if one or both of the following conditions are met:

- It is found ineffective in eliminating or significantly minimizing pollutants in stormwater discharges from the site
- There is a change in design, construction, operation, or maintenance at the construction site that has, or could have, a significant effect on the discharge of pollutants to waters of the State

The CSWPPP and/or TESC Plan will need to be modified within 7 days if inspection(s) or investigation(s) determine that additional or modified BMPs are necessary for compliance. An updated timeline for BMP implementation will need to be prepared.

6.2 Reporting

This section describes Project reporting, including Discharge Monitoring Reports (DMRs) and notification of noncompliance.

6.2.1 Discharge Monitoring Reports

DMRs will need to be submitted to Ecology monthly. If there was no discharge during a given monitoring period the DMR will need to be submitted as required, reporting “no discharge.” The DMR due date is 15 days following the end of each calendar month.

DMRs will need to be reported online through Ecology’s WQWebDMR System (<https://secureaccess.wa.gov/public/saw/pub/displayRegister.do>).

6.2.2 Notification of Noncompliance

If any of the terms and conditions of the permit is not met, and the resulting noncompliance may cause a threat to human health or the environment, the following actions will need to be taken:

1. The Pollution Prevention Team Leader (see Appendix C-5) will notify the Construction Inspector at the City within 24 hours of the failure to comply.
2. The Pollution Prevention Team Leader (see Appendix C-5) will notify Ecology within 24 hours of the failure to comply by calling the applicable regional office ERTS phone number (regional office numbers are listed below).
3. Immediate action will be taken to prevent the discharge/pollution or otherwise stop or correct the noncompliance. If applicable, sampling and analysis of any noncompliance will be repeated immediately and the results will be submitted to Ecology within 5 days of becoming aware of the violation.
4. A detailed written report describing the noncompliance will be submitted to Ecology within 5 days, unless requested earlier by Ecology.

Specific information to be included in the noncompliance report is found in Special Condition S5.F.3 of the CSWGP.

Any time turbidity sampling indicates that turbidity is 250 NTU or greater, the Ecology Northwest Region Office ([425] 649-7000) will need to be notified by phone within 24 hours of analysis as required by Special Condition S5.A of the CSWGP. The following information will be included:

- Your name and phone number
- Permit number
- City/county of project
- Sample results
- Date/time of call
- Date/time of sample

- Project name

In accordance with Special Condition S4.D.5.b of the CSWGP, the Ecology Northwest Region Office will need to be notified if chemical treatment other than CO₂ sparging is planned for adjustment of high-pH water.

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7.0. References

City of Anacortes 2018 stormwater manual Chapter 2 and Chapter 4 (SWM).

WDOE (Washington State Department of Ecology) 2019 Stormwater Management Manual for Western Washington (SWMMWW).

City of Anacortes: City NPDES Permit, 2013-2018 Phase II Western Washington Municipal Stormwater Permit. (CSWGP)

City of Anacortes Interactive Map (Arcgis.com)

Google Earth Pro 2018. Aerial Imaging and Mapping Viewer of City of Anacortes. Accessed December 2018.

WSDOT 2019. Washington State Department of Transportation. Hydraulics Manual, M23-03.06.

WSDOT TESC Manual M3109.02, May 2019.

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Appendices

Appendix C-1. Project Site Maps

Appendix C-2. WWTP Outfall Relocation – Upland Phase Plan Set

Appendix C-3. BMP Details

Appendix C-4. Example Inspection, Sampling, Maintenance, and Inventory Forms

Appendix C-5. Construction Schedule and Contact Information

Appendix C-6 Construction Stormwater General Permit (CSWGP)

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Appendix C-1: Project Site Maps

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Appendix C-2: City of Anacortes, WWTP Outfall Relocation – Upland Phase Contract

(Plans not included)

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Appendix C-3: BMP Details

BMP's are allowed for this Project are from the DOE SWMMWW manual and the WSDOT Manual. Details for all applicable BMP's can be found as directed below:

Table II-3.1 of the SWMMWW – Construction Stormwater BMP's by Element, Lists applicable DOE BMP's
[2019SWMMWW - A Summary of Construction Stormwater BMPs](#)

Chapter 5 TESC Best Management Practices of the WSDOT TЕСM, Section 5-1.1 TESC BMP's, Lists applicable WSDOT BMP's

[Publications - Temporary Erosion and Sediment Control Manual | WSDOT \(wa.gov\)](#)

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Appendix C-4: Example Inspection, Sampling, Maintenance, and Inventory Forms

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Appendix C-5: Construction Schedule and Contact Information

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Project Construction Dates¹

Activity/Phase	Start Date	End Date
Overall Construction	July 2021	January 2023

¹ When selected, the contractor will provide a detailed construction schedule.

Contact Information

(To be prepared by the Contractor)

Title	Name(s)	Phone Number
Certified Erosion and Sediment Control Lead (CESCL)	[Insert Name]	[Insert Number]
Resident Engineer		
Emergency Ecology Contact		
Emergency Permittee/Owner Contact		
Non-Emergency Owner Contact		
Monitoring Personnel		
Ecology Regional Office	Northwest Region (King, Kitsap, Island, San Juan, Skagit, Snohomish, and Whatcom Counties)	(425) 649-7000

Appendix C-6: Construction Stormwater General Permit (CSWGP)

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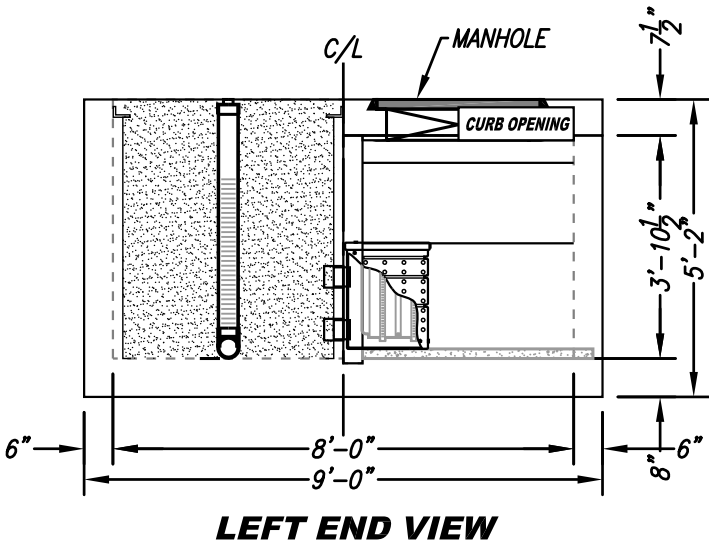
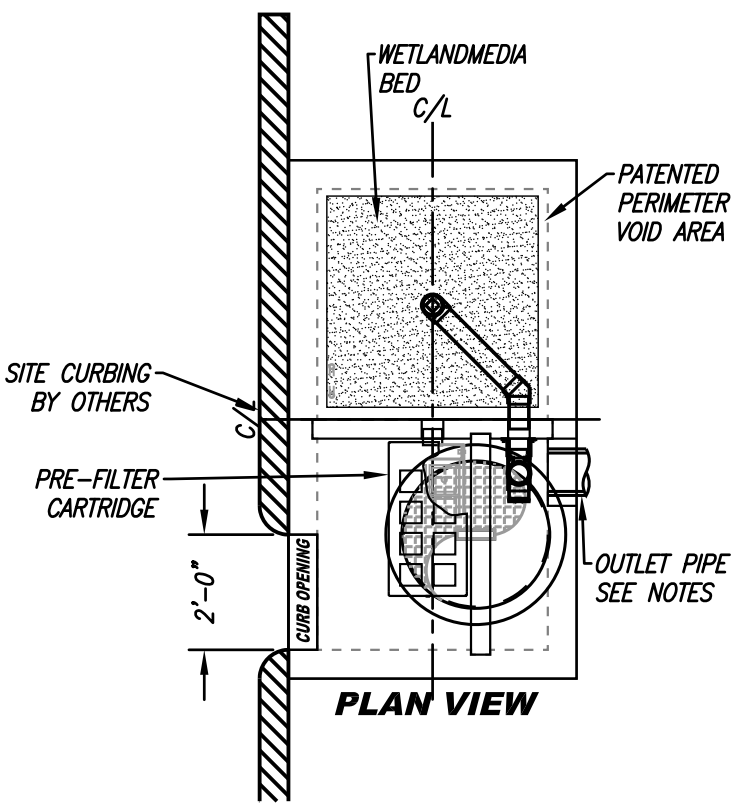
To be completed at: <https://ecology.wa.gov/Regulations-Permits/Permits-certifications/Stormwater-general-permits/Construction-stormwater-permit> following issuance of the permit coverage letter.

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Appendix C. Water Quality Units

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SITE SPECIFIC DATA			
PROJECT NUMBER		13056	
PROJECT NAME		WWTP OUTFALL RELOCATION	
PROJECT LOCATION		ANACORTES, WA	
STRUCTURE ID		UNIT 1	
TREATMENT REQUIRED			
VOLUME BASED (CF)		FLOW BASED (CFS)	
		0.115	
PEAK BYPASS REQUIRED (CFS) – IF APPLICABLE			TBD
PIPE DATA	I.E.	MATERIAL	DIAMETER
INLET PIPE 1	N/A	N/A	N/A
INLET PIPE 2	N/A	N/A	N/A
OUTLET PIPE	0.00	PVC	8"
	PRETREATMENT	BIOFILTRATION	DISCHARGE
RIM ELEVATION	4.58	4.58	4.58
SURFACE LOAD	HS-20	N/A	HS-20
FRAME & COVER	ø30"	N/A	N/A
WETLANDMEDIA VOLUME (CY)			2.28
ORIFICE SIZE (DIA. INCHES)			5 EA ø0.83"
NOTES: PRELIMINARY NOT FOR CONSTRUCTION.			

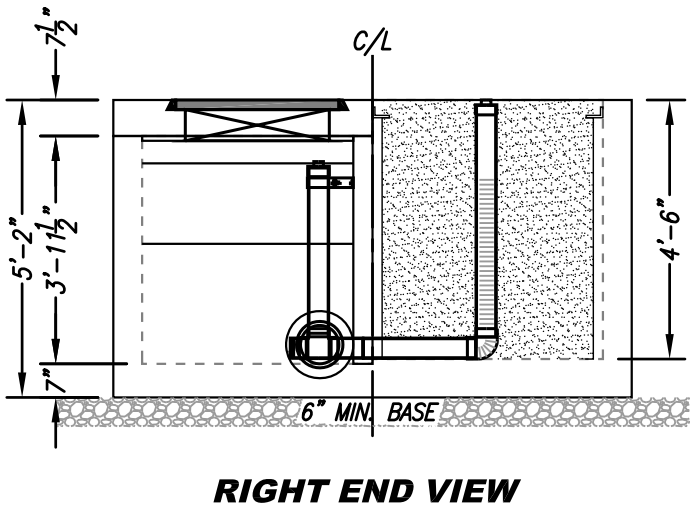
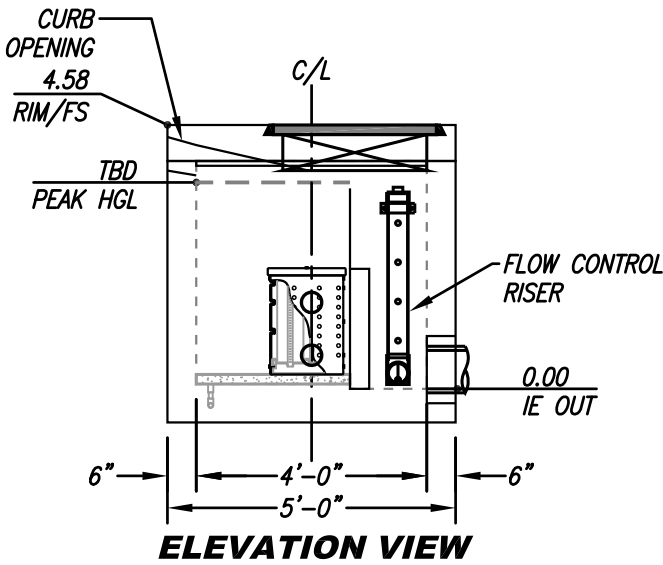


INSTALLATION NOTES

1. CONTRACTOR TO PROVIDE ALL LABOR, EQUIPMENT, MATERIALS AND INCIDENTALS REQUIRED TO OFFLOAD AND INSTALL THE SYSTEM AND APPURTENANCES IN ACCORDANCE WITH THIS DRAWING AND THE MANUFACTURERS' SPECIFICATIONS, UNLESS OTHERWISE STATED IN MANUFACTURER'S CONTRACT.
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GENERAL NOTES

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INTERNAL BYPASS DISCLOSURE:

THE DESIGN AND CAPACITY OF THE PEAK CONVEYANCE METHOD TO BE REVIEWED AND APPROVED BY THE ENGINEER OF RECORD. HGL(S) AT PEAK FLOW SHALL BE ASSESSED TO ENSURE NO UPSTREAM FLOODING. PEAK HGL AND BYPASS CAPACITY SHOWN ON DRAWING ARE USED FOR GUIDANCE ONLY.

TREATMENT FLOW (CFS)	0.115
OPERATING HEAD (FT)	3.4
PRETREATMENT LOADING RATE (GPM/SF)	2.0
WETLAND MEDIA LOADING RATE (GPM/SF)	1.0

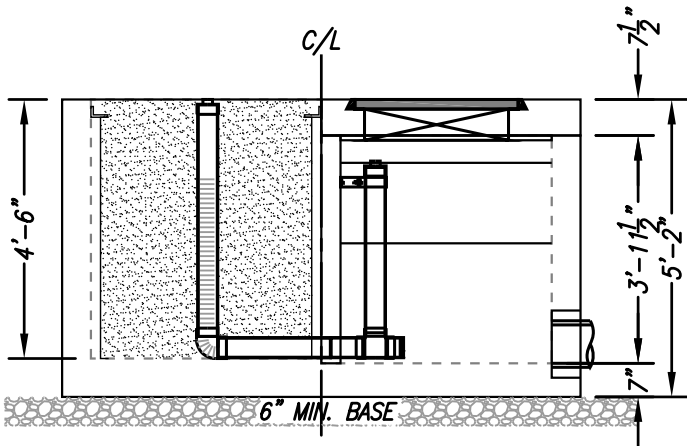
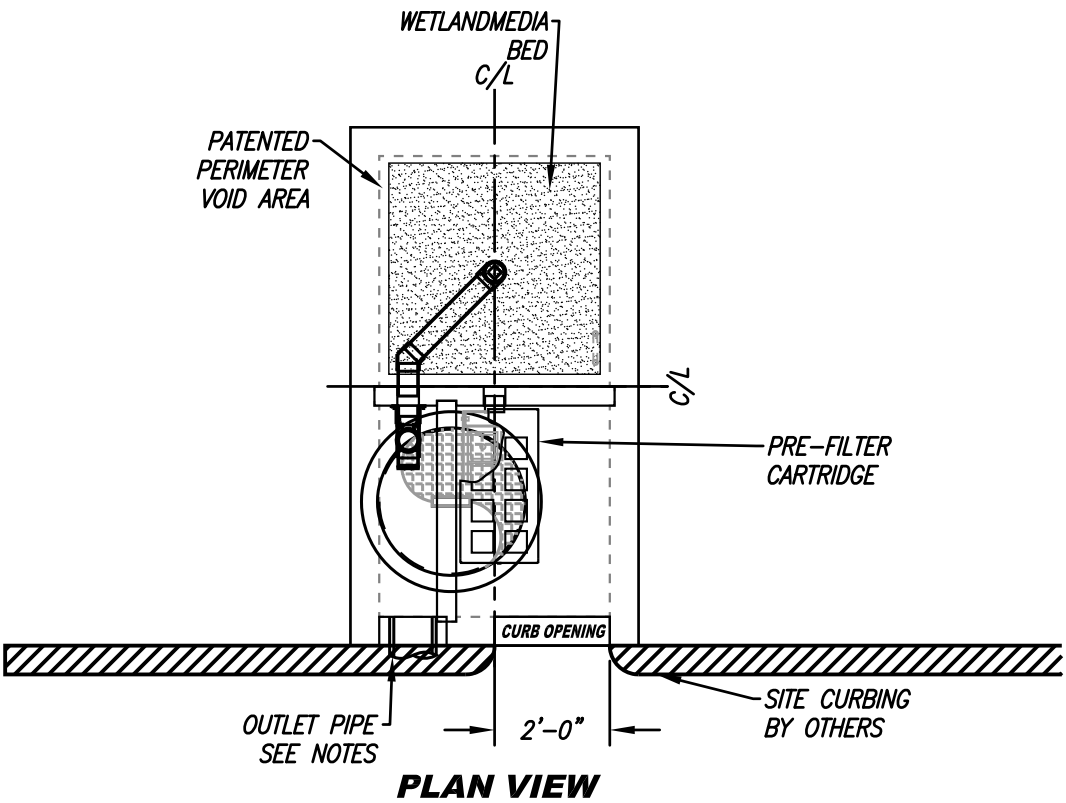


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MWS-L-4-8-4'-6"-C
STORMWATER BIOFILTRATION SYSTEM
STANDARD DETAIL

SITE SPECIFIC DATA			
PROJECT NUMBER		13056	
PROJECT NAME		WWTP OUTFALL RELOCATION	
PROJECT LOCATION		ANACORTES, WA	
STRUCTURE ID		UNIT 2	
TREATMENT REQUIRED			
VOLUME BASED (CF)		FLOW BASED (CFS)	
		0.115	
PEAK BYPASS REQUIRED (CFS) – IF APPLICABLE			TBD
PIPE DATA	I.E.	MATERIAL	DIAMETER
INLET PIPE 1	N/A	N/A	N/A
INLET PIPE 2	N/A	N/A	N/A
OUTLET PIPE	0.00	PVC	8”
	PRETREATMENT	BIOFILTRATION	DISCHARGE
RIM ELEVATION	4.58	4.58	4.58
SURFACE LOAD	HS-20	N/A	HS-20
FRAME & COVER	ø30”	N/A	N/A
WETLANDMEDIA VOLUME (CY)			2.28
ORIFICE SIZE (DIA. INCHES)			5 EA ø0.83”
NOTES: PRELIMINARY NOT FOR CONSTRUCTION.			



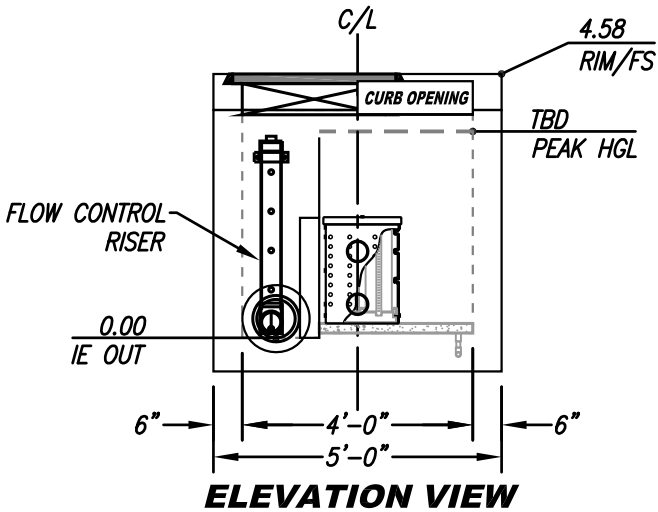
LEFT END VIEW

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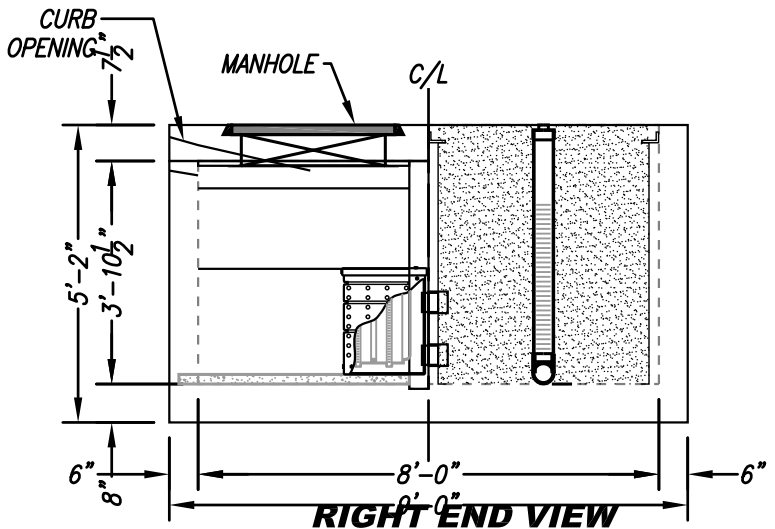
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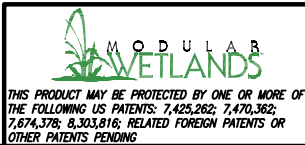
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RIGHT END VIEW

TREATMENT FLOW (CFS)	0.115
OPERATING HEAD (FT)	3.4
PRETREATMENT LOADING RATE (GPM/SF)	2.0
WETLAND MEDIA LOADING RATE (GPM/SF)	1.0

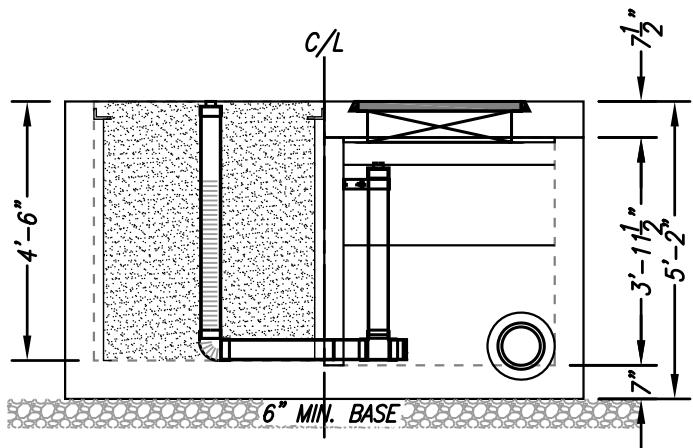
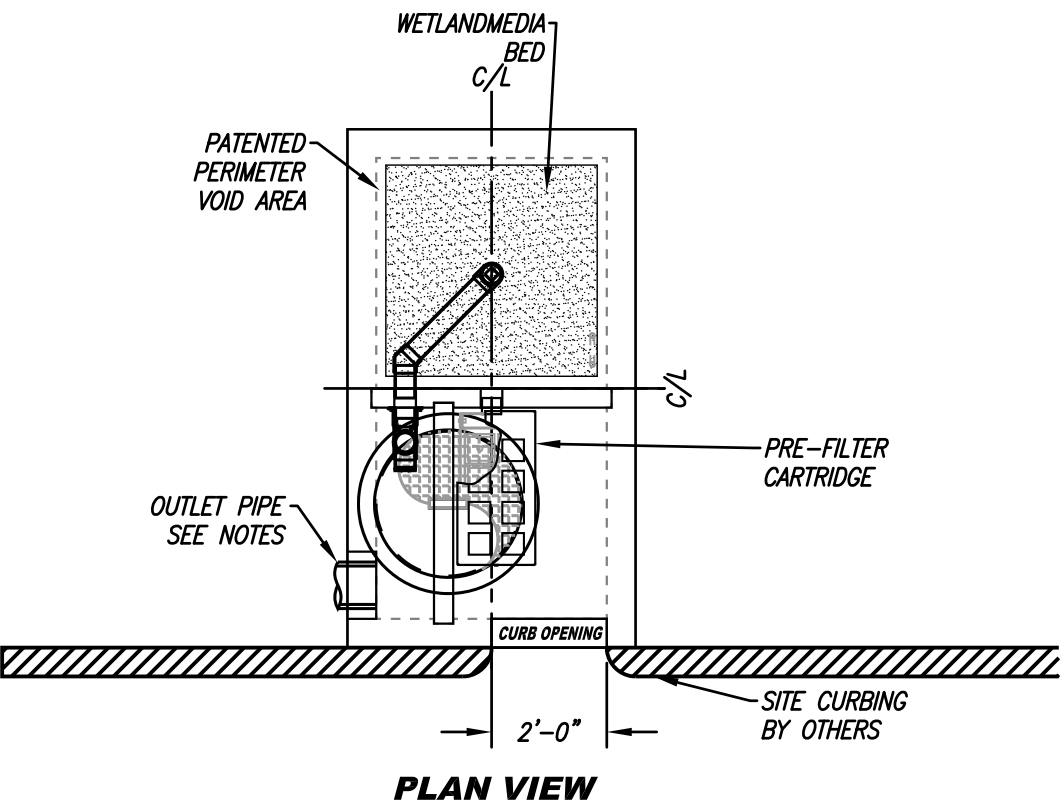


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MWS-L-4-8-4'-6"-C
STORMWATER BIOFILTRATION SYSTEM
STANDARD DETAIL

SITE SPECIFIC DATA			
PROJECT NUMBER		13056	
PROJECT NAME		WWTP OUTFALL RELOCATION	
PROJECT LOCATION		ANACORTES, WA	
STRUCTURE ID		UNIT 3	
TREATMENT REQUIRED			
VOLUME BASED (CF)		FLOW BASED (CFS)	
		0.115	
PEAK BYPASS REQUIRED (CFS) – IF APPLICABLE			TBD
PIPE DATA	I.E.	MATERIAL	DIAMETER
INLET PIPE 1	N/A	N/A	N/A
INLET PIPE 2	N/A	N/A	N/A
OUTLET PIPE	0.00	PVC	8"
	PRETREATMENT	BIOFILTRATION	DISCHARGE
RIM ELEVATION	4.58	4.58	4.58
SURFACE LOAD	HS-20	N/A	HS-20
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NOTES: PRELIMINARY NOT FOR CONSTRUCTION.			



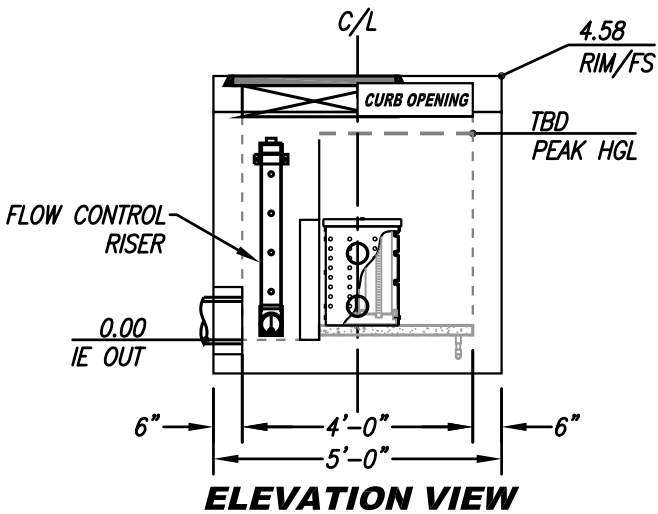
LEFT END VIEW

INSTALLATION NOTES

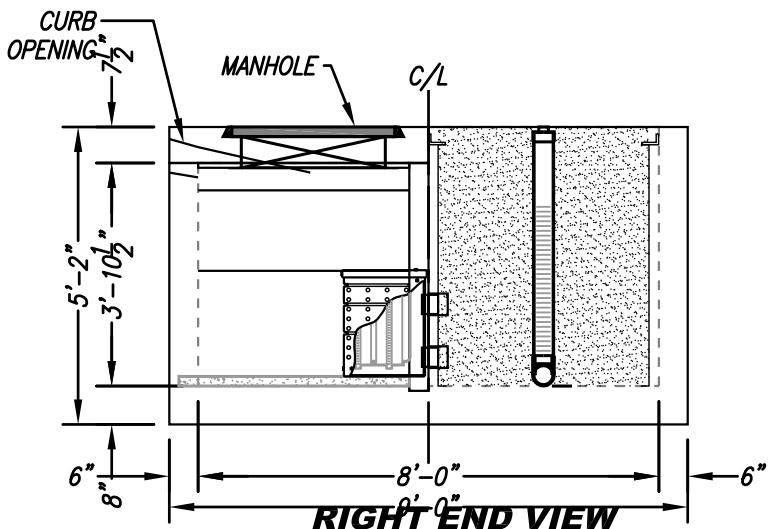
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ELEVATION VIEW

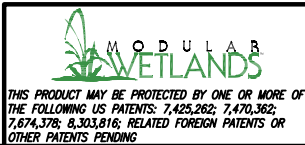


RIGHT END VIEW

INTERNAL BYPASS DISCLOSURE:

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OPERATING HEAD (FT)	3.4
PRETREATMENT LOADING RATE (GPM/SF)	2.0
WETLAND MEDIA LOADING RATE (GPM/SF)	1.0



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MWS-L-4-8-4'-6"-C
STORMWATER BIOFILTRATION SYSTEM
STANDARD DETAIL

Appendix D. Operation and Maintenance Documents

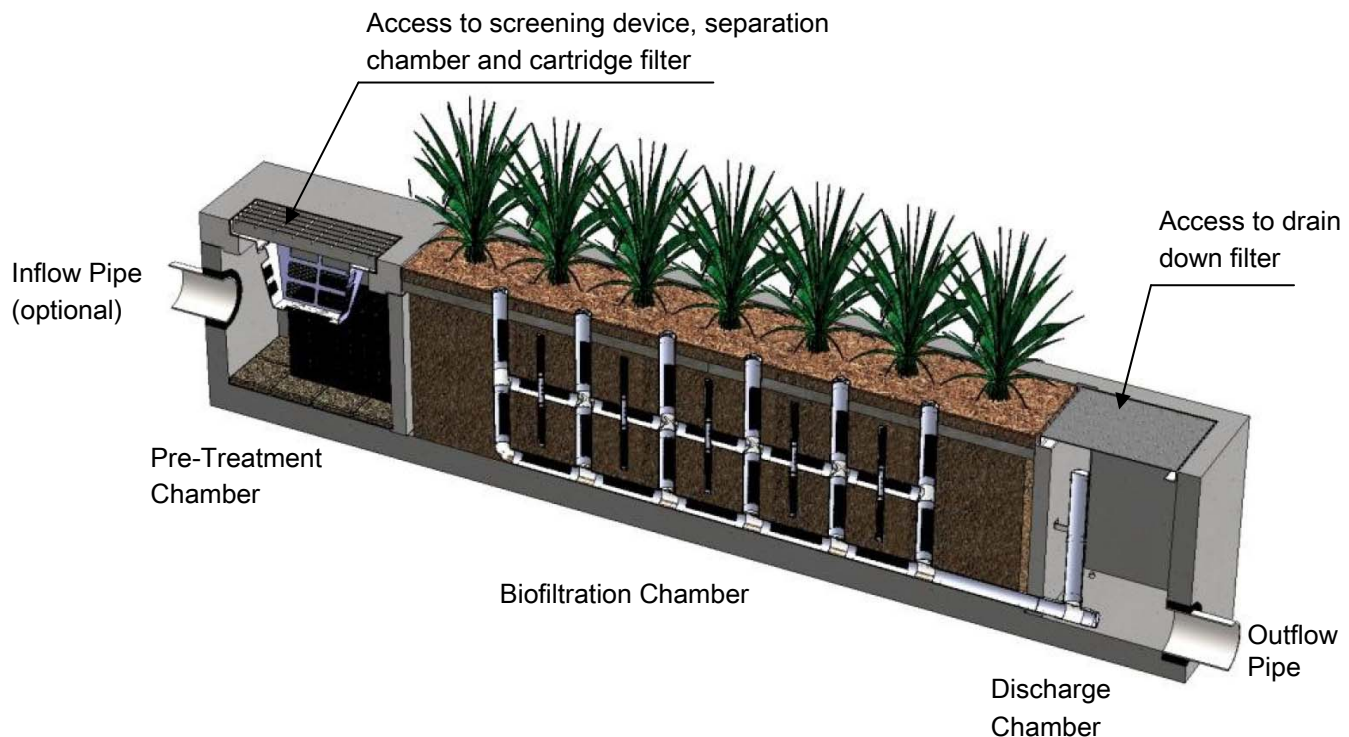
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Maintenance Guidelines for Modular Wetland System - Linear

Maintenance Summary

- o Remove Trash from Screening Device – average maintenance interval is 6 to 12 months.
 - *(5 minute average service time).*
- o Remove Sediment from Separation Chamber – average maintenance interval is 12 to 24 months.
 - *(10 minute average service time).*
- o Replace Cartridge Filter Media – average maintenance interval 12 to 24 months.
 - *(10-15 minute per cartridge average service time).*
- o Replace Drain Down Filter Media – average maintenance interval is 12 to 24 months.
 - *(5 minute average service time).*
- o Trim Vegetation – average maintenance interval is 6 to 12 months.
 - *(Service time varies).*

System Diagram



Maintenance Procedures

Screening Device

1. Remove grate or manhole cover to gain access to the screening device in the Pre-Treatment Chamber. Vault type units do not have screening device. Maintenance can be performed without entry.
2. Remove all pollutants collected by the screening device. Removal can be done manually or with the use of a vacuum truck. The hose of the vacuum truck will not damage the screening device.
3. Screening device can easily be removed from the Pre-Treatment Chamber to gain access to separation chamber and media filters below. Replace grate or manhole cover when completed.

Separation Chamber

1. Perform maintenance procedures of screening device listed above before maintaining the separation chamber.
2. With a pressure washer spray down pollutants accumulated on walls and cartridge filters.
3. Vacuum out Separation Chamber and remove all accumulated pollutants. Replace screening device, grate or manhole cover when completed.

Cartridge Filters

1. Perform maintenance procedures on screening device and separation chamber before maintaining cartridge filters.
2. Enter separation chamber.
3. Unscrew the two bolts holding the lid on each cartridge filter and remove lid.
4. Remove each of 4 to 8 media cages holding the media in place.
5. Spray down the cartridge filter to remove any accumulated pollutants.
6. Vacuum out old media and accumulated pollutants.
7. Reinstall media cages and fill with new media from manufacturer or outside supplier. Manufacturer will provide specification of media and sources to purchase.
8. Replace the lid and tighten down bolts. Replace screening device, grate or manhole cover when completed.

Drain Down Filter

1. Remove hatch or manhole cover over discharge chamber and enter chamber.
2. Unlock and lift drain down filter housing and remove old media block. Replace with new media block. Lower drain down filter housing and lock into place.
3. Exit chamber and replace hatch or manhole cover.



Maintenance Notes

1. Following maintenance and/or inspection, it is recommended the maintenance operator prepare a maintenance/inspection record. The record should include any maintenance activities performed, amount and description of debris collected, and condition of the system and its various filter mechanisms.
2. The owner should keep maintenance/inspection record(s) for a minimum of five years from the date of maintenance. These records should be made available to the governing municipality for inspection upon request at any time.
3. Transport all debris, trash, organics and sediments to approved facility for disposal in accordance with local and state requirements.
4. Entry into chambers may require confined space training based on state and local regulations.
5. No fertilizer shall be used in the Biofiltration Chamber.
6. Irrigation should be provided as recommended by manufacturer and/or landscape architect. Amount of irrigation required is dependent on plant species. Some plants may require irrigation.

Maintenance Procedure Illustration

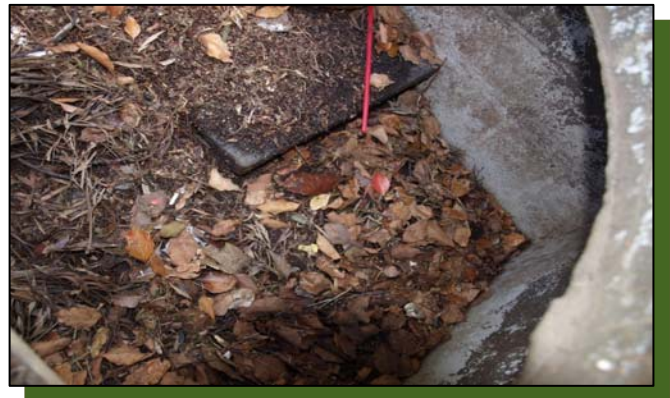
Screening Device

The screening device is located directly under the manhole or grate over the Pre-Treatment Chamber. It's mounted directly underneath for easy access and cleaning. Device can be cleaned by hand or with a vacuum truck.



Separation Chamber

The separation chamber is located directly beneath the screening device. It can be quickly cleaned using a vacuum truck or by hand. A pressure washer is useful to assist in the cleaning process.



Cartridge Filters

The cartridge filters are located in the Pre-Treatment chamber connected to the wall adjacent to the biofiltration chamber. The cartridges have removable tops to access the individual media filters. Once the cartridge is open media can be easily removed and replaced by hand or a vacuum truck.



Drain Down Filter

The drain down filter is located in the Discharge Chamber. The drain filter unlocks from the wall mount and hinges up. Remove filter block and replace with new block.

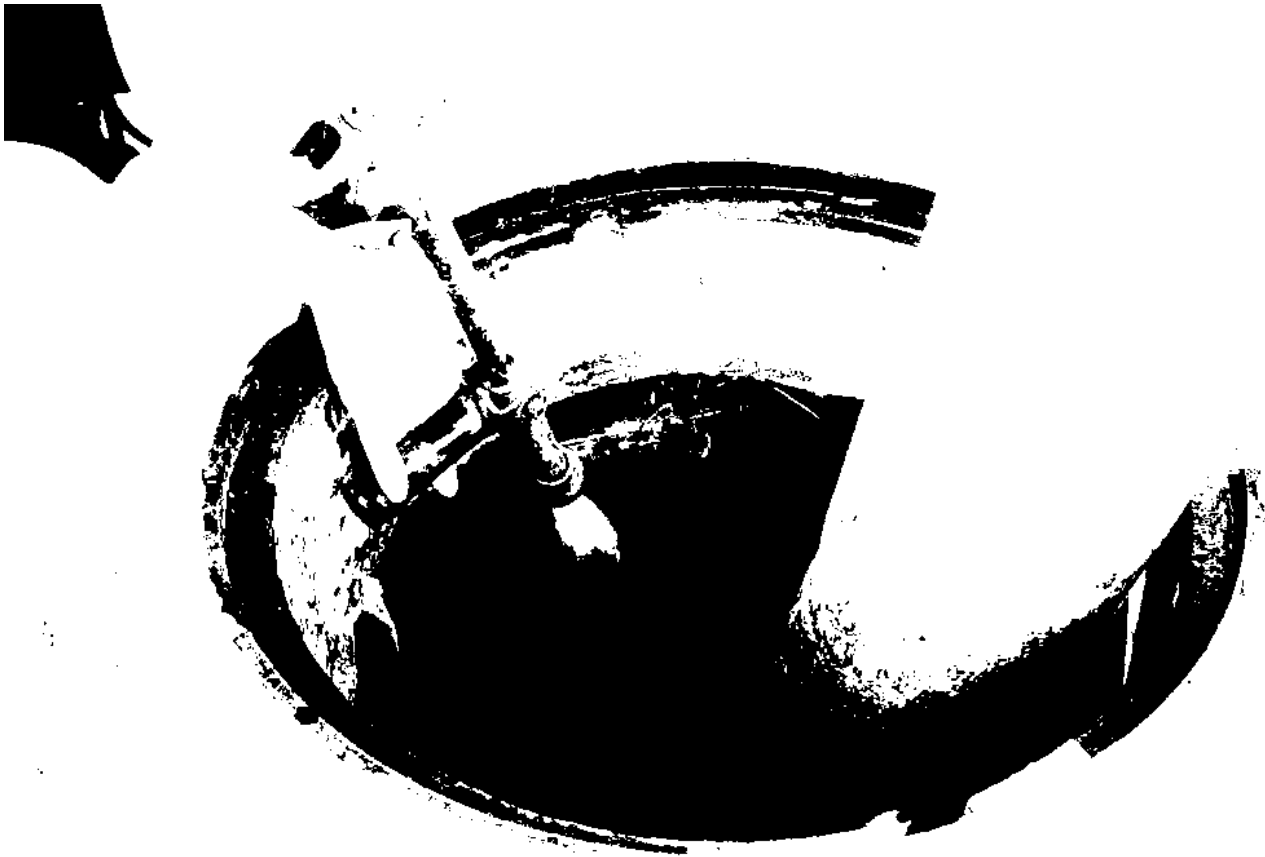


Trim Vegetation

Vegetation should be maintained in the same manner as surrounding vegetation and trimmed as needed. No fertilizer shall be used on the plants. Irrigation per the recommendation of the manufacturer and or landscape architect. Different types of vegetation requires different amounts of irrigation.



Inspection Form



Modular Wetland System, Inc.

P. 760.433-7640

F. 760-433-3176

E. Info@modularwetlands.com

www.modularwetlands.com

Project Name _____

Project Address _____ (city) (Zip Code)

Owner / Management Company _____

Contact _____

Phone () -

Inspector Name _____

Date ____ / ____ / ____ Time ____ AM / PM

Type of Inspection ☐ Routine ☐ Follow Up ☐ Complaint

☐ Storm

Storm Event in Last 72-hours? ☐ No ☐ Yes

Weather Condition _____

Additional Notes _____

For Office Use Only

(Reviewed By)

(Date)
Office personnel to complete section to the left.

Inspection Checklist

Modular Wetland System Type (Curb, Grate or UG Vault): _____ Size (22', 14' or etc.): _____

Structural Integrity:	Yes	No	Comments
Damage to pre-treatment access cover (manhole cover/grate) or cannot be opened using normal lifting pressure?			
Damage to discharge chamber access cover (manhole cover/grate) or cannot be opened using normal lifting pressure?			
Does the MWS unit show signs of structural deterioration (cracks in the wall, damage to frame)?			
Is the inlet/outlet pipe or drain down pipe damaged or otherwise not functioning properly?			
Working Condition:			
Is there evidence of illicit discharge or excessive oil, grease, or other automobile fluids entering and clogging the unit?			
Is there standing water in inappropriate areas after a dry period?			
Is the filter insert (if applicable) at capacity and/or is there an accumulation of debris/trash on the shelf system?			
Does the depth of sediment/trash/debris suggest a blockage of the inflow pipe, bypass or cartridge filter? If yes, specify which one in the comments section. Note depth of accumulation in in pre-treatment chamber.			Depth:
Does the cartridge filter media need replacement in pre-treatment chamber and/or discharge chamber?			Chamber:
Any signs of improper functioning in the discharge chamber? Note issues in comments section.			
Other Inspection Items:			
Is there an accumulation of sediment/trash/debris in the wetland media (if applicable)?			
Is it evident that the plants are alive and healthy (if applicable)? Please note Plant Information below.			
Is there a septic or foul odor coming from inside the system?			

Waste:	Yes	No
Sediment / Silt / Clay		
Trash / Bags / Bottles		
Green Waste / Leaves / Foliage		

Recommended Maintenance	
No Cleaning Needed	
Schedule Maintenance as Planned	
Needs Immediate Maintenance	

Plant Information	
Damage to Plants	
Plant Replacement	
Plant Trimming	

Additional Notes: _____

Maintenance Report



Modular Wetland System, Inc.

P. 760.433-7640

F. 760-433-3176

E. Info@modularwetlands.com

www.modularwetlands.com



Cleaning and Maintenance Report Modular Wetlands System



Project Name _____

Project Address _____
(city) (Zip Code)

Owner / Management Company _____

Contact _____

Phone () -

Inspector Name _____

Date ____ / ____ / ____ Time ____ AM / PM

Type of Inspection ☐ Routine ☐ Follow Up ☐ Complaint

☐ Storm Storm Event in Last 72-hours? ☐ No ☐ Yes

Weather Condition _____

Additional Notes _____

For Office Use Only

(Reviewed By)

(Date)
Office personnel to complete section to the left.

Site Map #	GPS Coordinates of Insert	Manufacturer / Description / Sizing	Trash Accumulation	Foliage Accumulation	Sediment Accumulation	Total Debris Accumulation	Condition of Media 25/50/75/100 (will be changed @ 75%)	Operational Per Manufactures' Specifications (If not, why?)
	Lat:	MWS Catch Basins						
	Long:							
		MWS Sedimentation Basin						
		Media Filter Condition						
		Plant Condition						
		Drain Down Media Condition						
		Discharge Chamber Condition						
		Drain Down Pipe Condition						
		Inlet and Outlet Pipe Condition						

Comments:

Construction Stormwater Site Inspection Form

Project Name _____ Permit # _____ Inspection Date _____ Time _____

Name of Certified Erosion Sediment Control Lead (CESCL) or qualified inspector if *less than one acre*

Print Name: _____

Approximate rainfall amount since the last inspection (in inches): _____

Approximate rainfall amount in the last 24 hours (in inches): _____

Current Weather Clear ☐ Cloudy ☐ Mist ☐ Rain ☐ Wind ☐ Fog ☐

A. Type of inspection: Weekly ☐ Post Storm Event ☐ Other ☐

B. Phase of Active Construction (check all that apply):

Pre Construction/installation of erosion/sediment controls

Concrete pours

Offsite improvements

☐ Clearing/Demo/Grading

☐ Vertical Construction/buildings

☐ Site temporary stabilized

☐ Infrastructure/storm/roads

☐ Utilities

☐ Final stabilization

C. Questions:

- | | | | | |
|--|-----|-------|----|-------|
| 1. Were all areas of construction and discharge points inspected? | Yes | _____ | No | _____ |
| 2. Did you observe the presence of suspended sediment, turbidity, discoloration, or oil sheen | Yes | _____ | No | _____ |
| 3. Was a water quality sample taken during inspection? (<i>refer to permit conditions S4 & S5</i>) | Yes | _____ | No | _____ |
| 4. Was there a turbid discharge 250 NTU or greater, or Transparency 6 cm or less?* | Yes | _____ | No | _____ |
| 5. If yes to #4 was it reported to Ecology? | Yes | _____ | No | _____ |
| 6. Is pH sampling required? pH range required is 6.5 to 8.5. | Yes | _____ | No | _____ |

If answering yes to a discharge, describe the event. Include when, where, and why it happened; what action was taken, and when.

*If answering yes to # 4 record NTU/Transparency with continual sampling daily until turbidity is 25 NTU or less/ transparency is 33 cm or greater.

Sampling Results: _____ Date: _____

Parameter	Method (circle one)	Result			Other/Note
		NTU	cm	pH	
Turbidity	tube, meter, laboratory				
pH	Paper, kit, meter				

Construction Stormwater Site Inspection Form

D. Check the observed status of all items. Provide "Action Required" details and dates.

Element #	Inspection	BMPs Inspected			BMP needs maintenance	BMP failed	Action required (describe in section F)
		yes	no	n/a			
1 Clearing Limits	Before beginning land disturbing activities are all clearing limits, natural resource areas (streams, wetlands, buffers, trees) protected with barriers or similar BMPs? (high visibility recommended)						
2 Construction Access	Construction access is stabilized with quarry spalls or equivalent BMP to prevent sediment from being tracked onto roads?						
	Sediment tracked onto the road way was cleaned thoroughly at the end of the day or more frequent as necessary.						
3 Control Flow Rates	Are flow control measures installed to control stormwater volumes and velocity during construction and do they protect downstream properties and waterways from erosion?						
	If permanent infiltration ponds are used for flow control during construction, are they protected from siltation?						
4 Sediment Controls	All perimeter sediment controls (e.g. silt fence, wattles, compost socks, berms, etc.) installed, and maintained in accordance with the Stormwater Pollution Prevention Plan (SWPPP).						
	Sediment control BMPs (sediment ponds, traps, filters etc.) have been constructed and functional as the first step of grading.						
	Stormwater runoff from disturbed areas is directed to sediment removal BMP.						
5 Stabilize Soils	Have exposed un-worked soils been stabilized with effective BMP to prevent erosion and sediment deposition?						

Construction Stormwater Site Inspection Form

Element #	Inspection	BMPs Inspected			BMP needs maintenance	BMP failed	Action required (describe in section F)
		yes	no	n/a			
5 Stabilize Soils Cont.	Are stockpiles stabilized from erosion, protected with sediment trapping measures and located away from drain inlet, waterways, and drainage channels?						
	Have soils been stabilized at the end of the shift, before a holiday or weekend if needed based on the weather forecast?						
6 Protect Slopes	Has stormwater and ground water been diverted away from slopes and disturbed areas with interceptor dikes, pipes and or swales?						
	Is off-site storm water managed separately from stormwater generated on the site?						
	Is excavated material placed on uphill side of trenches consistent with safety and space considerations?						
	Have check dams been placed at regular intervals within constructed channels that are cut down a slope?						
7 Drain Inlets	Storm drain inlets made operable during construction are protected.						
	Are existing storm drains within the influence of the project protected?						
8 Stabilize Channel and Outlets	Have all on-site conveyance channels been designed, constructed and stabilized to prevent erosion from expected peak flows?						
	Is stabilization, including armoring material, adequate to prevent erosion of outlets, adjacent stream banks, slopes and downstream conveyance systems?						
9 Control Pollutants	Are waste materials and demolition debris handled and disposed of to prevent contamination of stormwater?						
	Has cover been provided for all chemicals, liquid products, petroleum products, and other material?						
	Has secondary containment been provided capable of containing 110% of the volume?						
	Were contaminated surfaces cleaned immediately after a spill incident?						
	Were BMPs used to prevent contamination of stormwater by a pH modifying sources?						

Construction Stormwater Site Inspection Form

Element #	Inspection	BMPs Inspected			BMP needs maintenance	BMP failed	Action required (describe in section F)
		yes	no	n/a			
9 Cont.	Wheel wash wastewater is handled and disposed of properly.						
10 Control Dewatering	Concrete washout in designated areas. No washout or excess concrete on the ground.						
	Dewatering has been done to an approved source and in compliance with the SWPPP.						
	Were there any clean non turbid dewatering discharges?						
11 Maintain BMP	Are all temporary and permanent erosion and sediment control BMPs maintained to perform as intended?						
12 Manage the Project	Has the project been phased to the maximum degree practicable?						
	Has regular inspection, monitoring and maintenance been performed as required by the permit?						
	Has the SWPPP been updated, implemented and records maintained?						
13 Protect LID	Is all Bioretention and Rain Garden Facilities protected from sedimentation with appropriate BMPs?						
	Is the Bioretention and Rain Garden protected against over compaction of construction equipment and foot traffic to retain its infiltration capabilities?						
	Permeable pavements are clean and free of sediment and sediment laden-water runoff. Muddy construction equipment has not been on the base material or pavement.						
	Have soiled permeable pavements been cleaned of sediments and pass infiltration test as required by stormwater manual methodology?						
	Heavy equipment has been kept off existing soils under LID facilities to retain infiltration rate.						

E. Check all areas that have been inspected. ✓

All in place BMPs ☐ All disturbed soils ☐ All concrete wash out area ☐ All material storage areas ☐
 All discharge locations ☐ All equipment storage areas ☐ All construction entrances/exits ☐

Construction Stormwater Site Inspection Form

F. Elements checked "Action Required" (section D) describe corrective action to be taken. List the element number; be specific on location and work needed. Document, initial, and date when the corrective action has been completed and inspected.

Element #	Description and Location	Action Required	Completion Date	Initials

Attach additional page if needed

Sign the following certification:

"I certify that this report is true, accurate, and complete, to the best of my knowledge and belief"

Inspected by: (print) _____ (Signature) _____ Date: _____

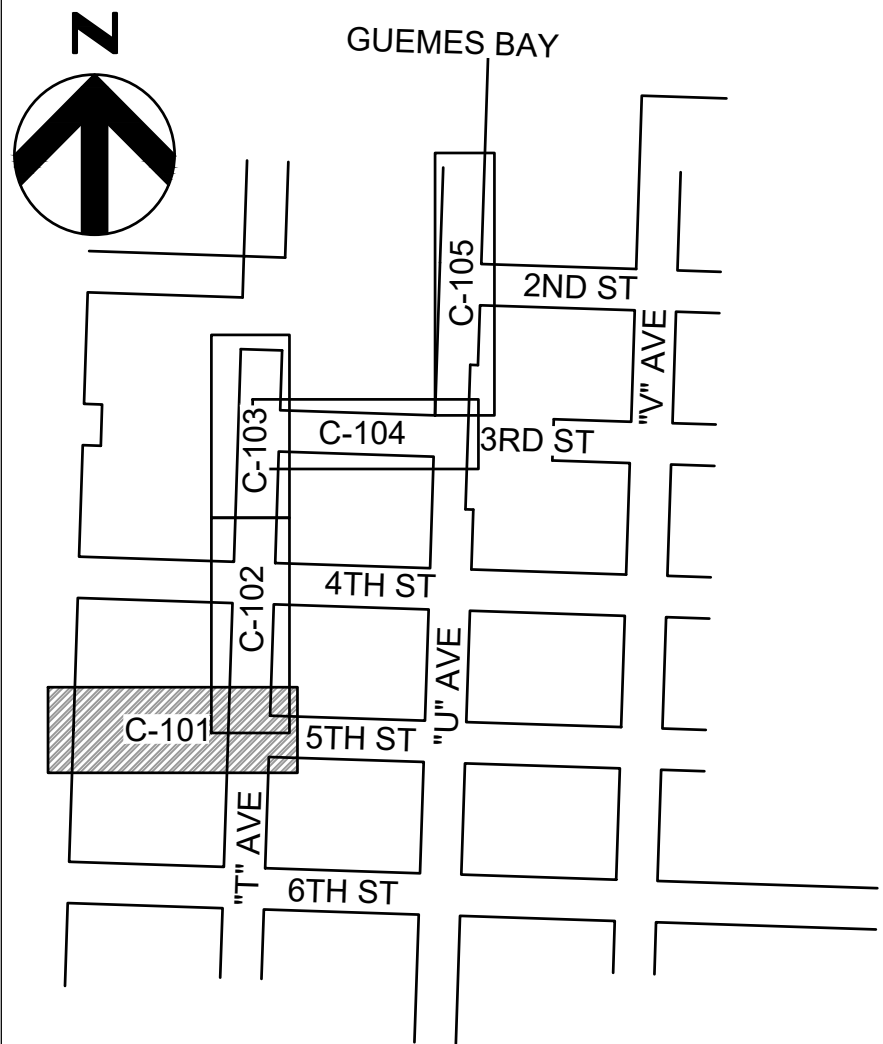
Title/Qualification of Inspector: _____

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City of Anacortes
Planning, Community &
Economic Development

Date Received:

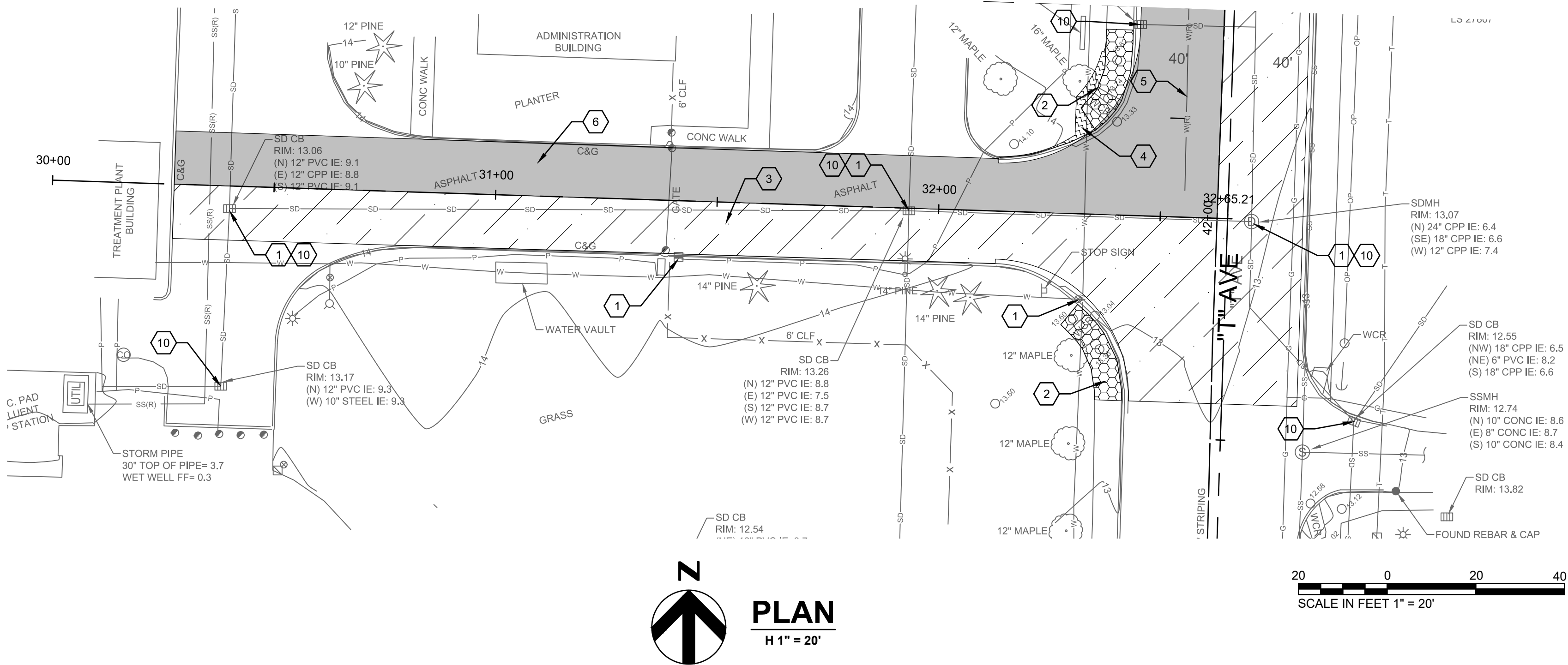
5/24/21



KEY MAP (NOT TO SCALE)

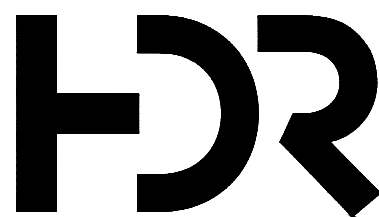
KEY NOTES

- 1 ADJUST UTILITY TO GRADE.
- 2 REMOVE CONCRETE CURB, GUTTER, AND SIDEWALK.
- 3 PLANE 2" HMA PAVEMENT.
- 4 CLEAR & GRUB.
- 5 REMOVE ABANDONED AC WATER PIPE.
- 6 FULL DEPTH PAVEMENT REPLACEMENT.
- 10 INSTALL AND MAINTAIN INLET PROTECTION.



NOTES

THIS SHEET SHOWS ROADWAY ALIGNMENTS AND STATIONING THAT DIFFERS FROM THE PIPE ALIGNMENT AND STATIONING. SEE SHEETS C-3XX FOR ALIGNMENT DEFINITION.



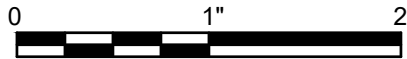
4/2021	75% DESIGN	
ISSUE	DATE	DESCRIPTION

PROJECT MANAGER	BERGSTROM, ERIC
CIVIL ENG	SKINNER, MASON
DRAWN BY	SKINNER, MASON
PROJECT NUMBER	

PRELIMINARY
NOT FOR
CONSTRUCTION
OR
RECORDING

CITY OF ANACORTES
WWTP OUTFALL RELOCATION -
UPLAND PHASE

SITE PREP AND TESC PLAN 1
STA 0+00 - 3+25



FILENAME C-101.DWG
SCALE 1" = 20'

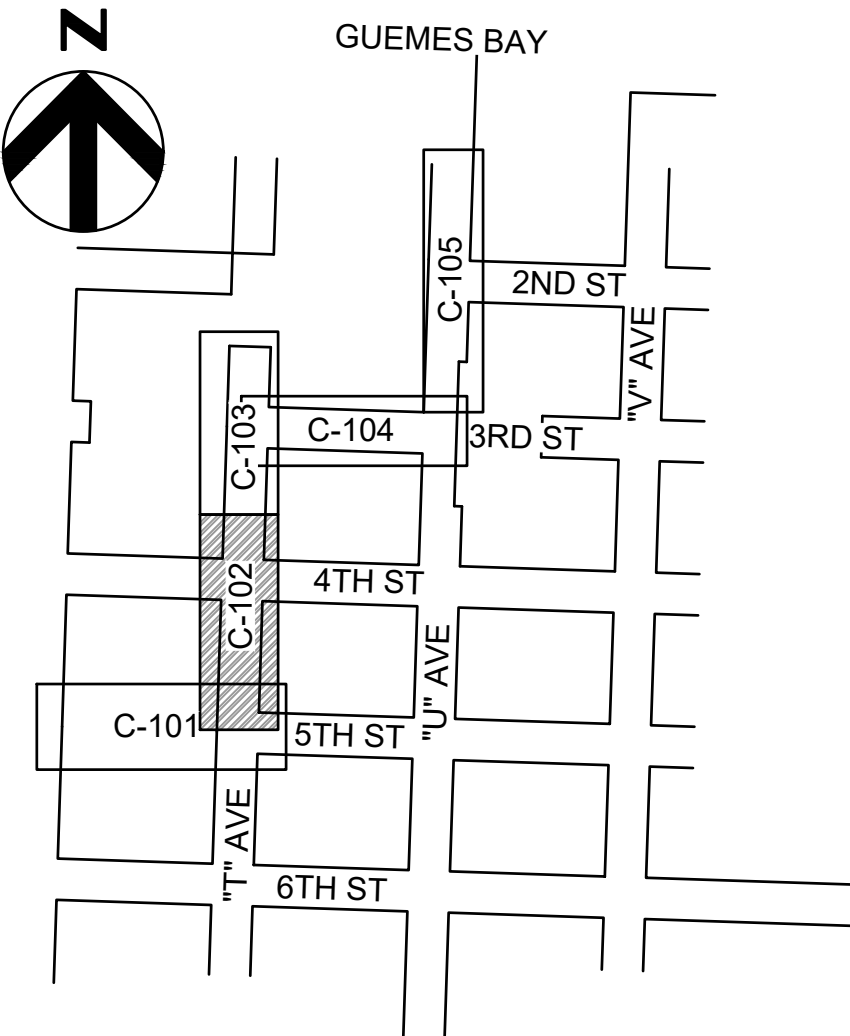
SHEET
C-101



PLAN

H 1" = 20'

H 1" = 20"



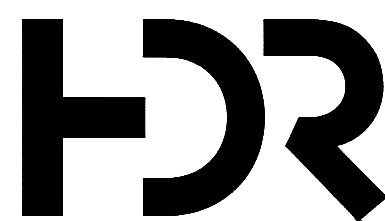
KEY MAP (NOT TO SCALE)

KEY NOTES

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- 2 REMOVE CONCRETE CURB, GUTTER, AND SIDEWALK.
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NOTES

THIS SHEET SHOWS ROADWAY ALIGNMENTS AND STATIONING THAT DIFFERS FROM THE PIPE
ALIGNMENT AND STATIONING. SEE SHEETS C-3XX FOR ALIGNMENT DEFINITION.



			PROJECT MANAGER	BERGSTROM, ERIC
			CIVIL ENG	SKINNER, MASON
			DRAWN BY	SKINNER, MASON
	4/2021	75% DESIGN		
ISSUE	DATE	DESCRIPTION	PROJECT NUMBER	

**PRELIMINARY
NOT FOR
CONSTRUCTION
OR
RECORDING**

**CITY OF ANACORTES
WWTP OUTFALL RELOCATION -
UPLAND PHASE**

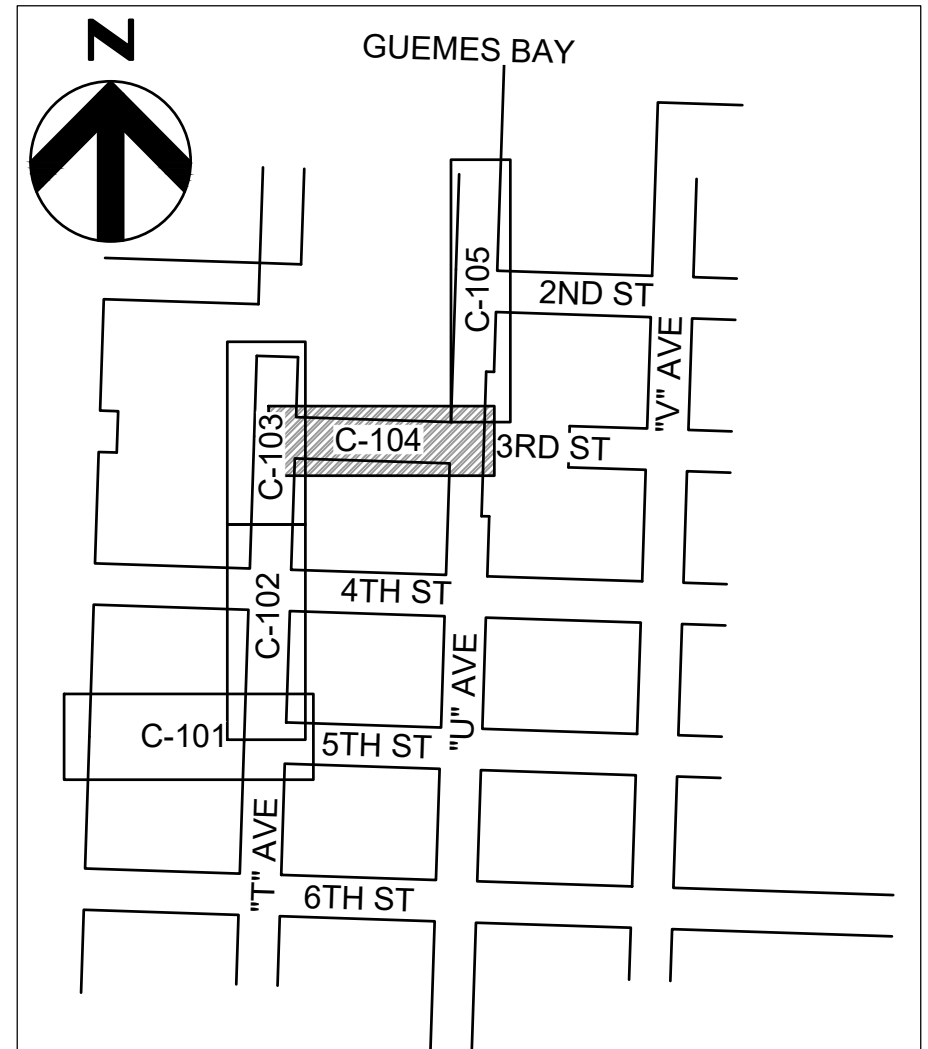
SITE PREP AND TESC PLAN 2

STA 3+25 - 6+75



FILENAME	C-102.DWG
SCALE	1" = 20'

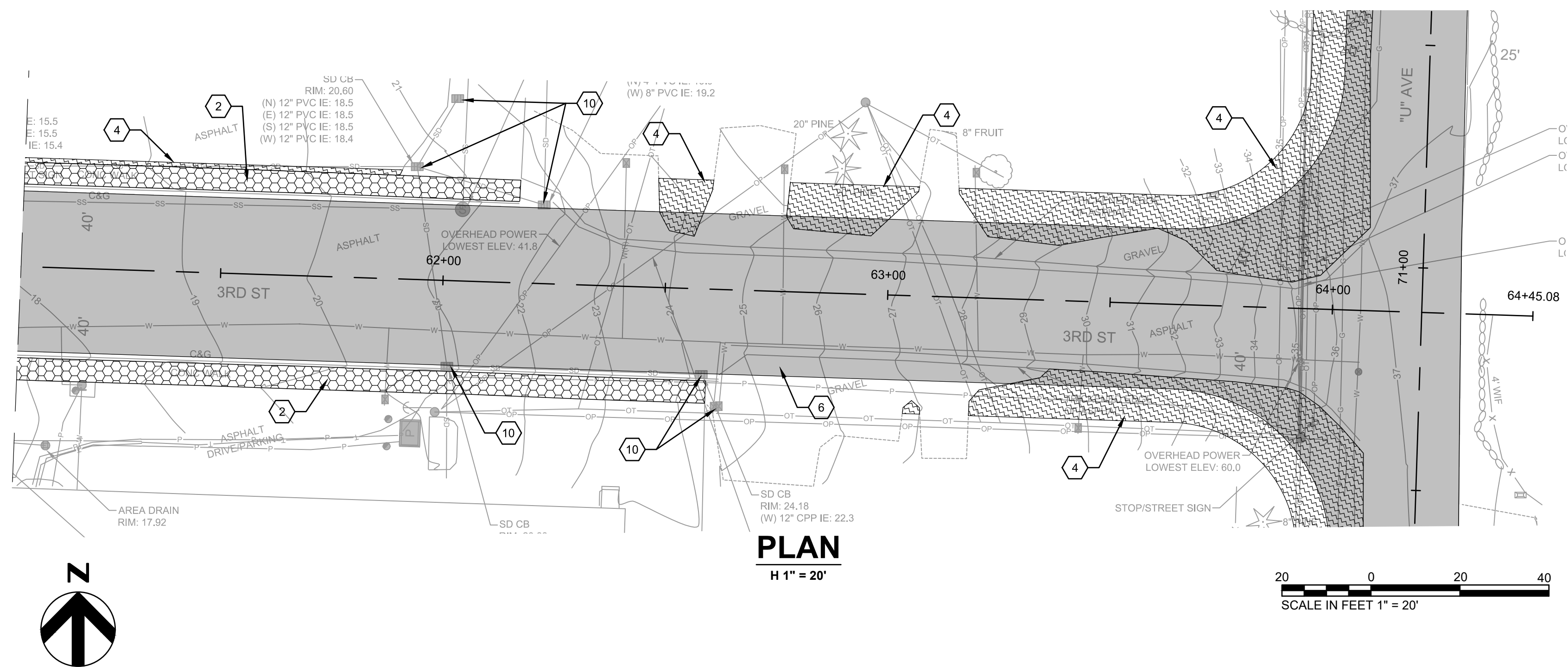
SHEET
C-102



KEY MAP (NOT TO SCALE)

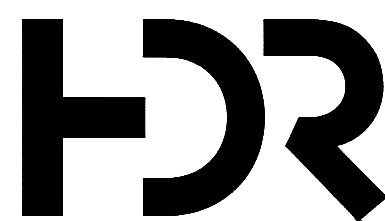
KEY NOTES

- 1 ADJUST UTILITY TO GRADE.
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- 3 PLANE 2" HMA PAVEMENT.
- 4 CLEAR & GRUB.
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- 6 FULL DEPTH PAVEMENT REPLACEMENT.
- 10 INSTALL AND MAINTAIN INLET PROTECTION.

PLAN
H 1" = 20'20 0 20 40
SCALE IN FEET 1" = 20'

NOTES

THIS SHEET SHOWS ROADWAY ALIGNMENTS AND STATIONING THAT DIFFERS FROM THE PIPE ALIGNMENT AND STATIONING. SEE SHEETS C-3XX FOR ALIGNMENT DEFINITION.



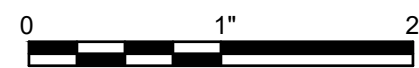
4/2021	75% DESIGN	
ISSUE	DATE	DESCRIPTION

PROJECT MANAGER	BERGSTROM, ERIC
CIVIL ENG	SKINNER, MASON
DRAWN BY	SKINNER, MASON
PROJECT NUMBER	

PRELIMINARY
NOT FOR
CONSTRUCTION
OR
RECORDING

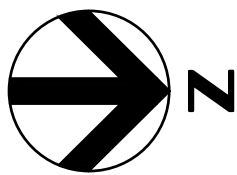
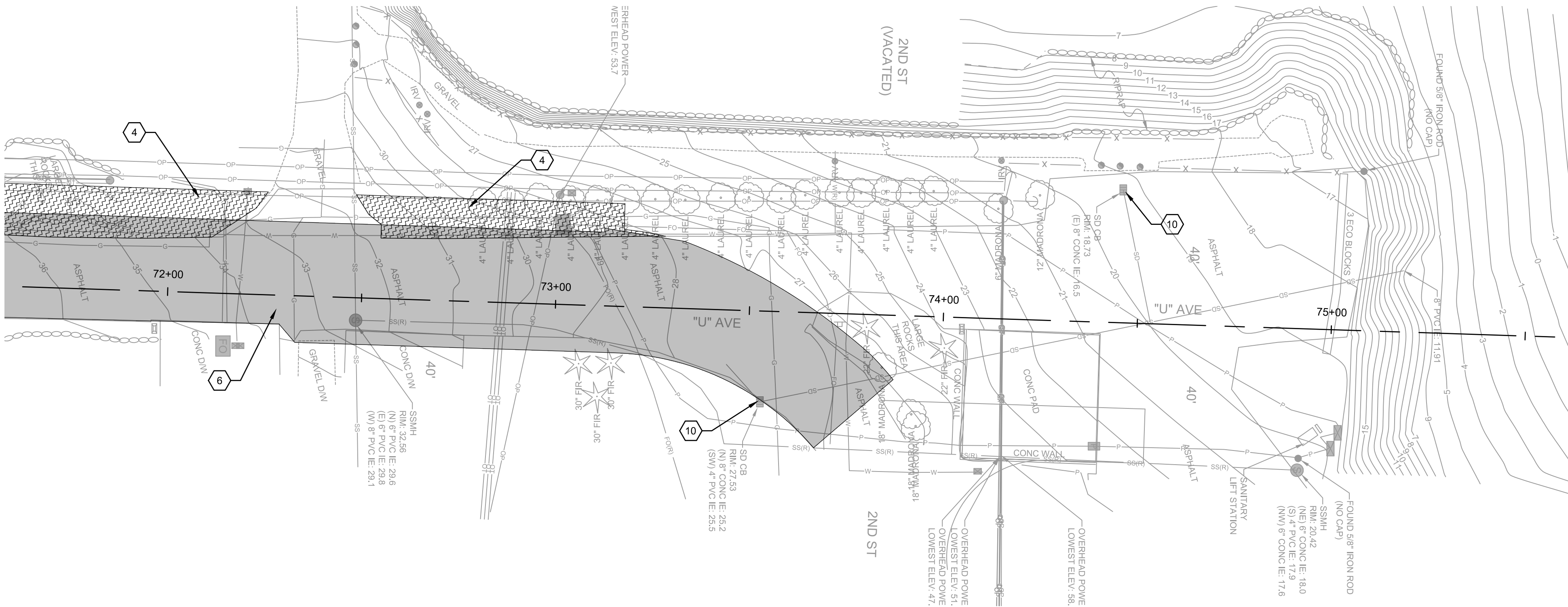
CITY OF ANACORTES
WWTP OUTFALL RELOCATION -
UPLAND PHASE

SITE PREP AND TESC PLAN 4
STA 10+25 - 13+00

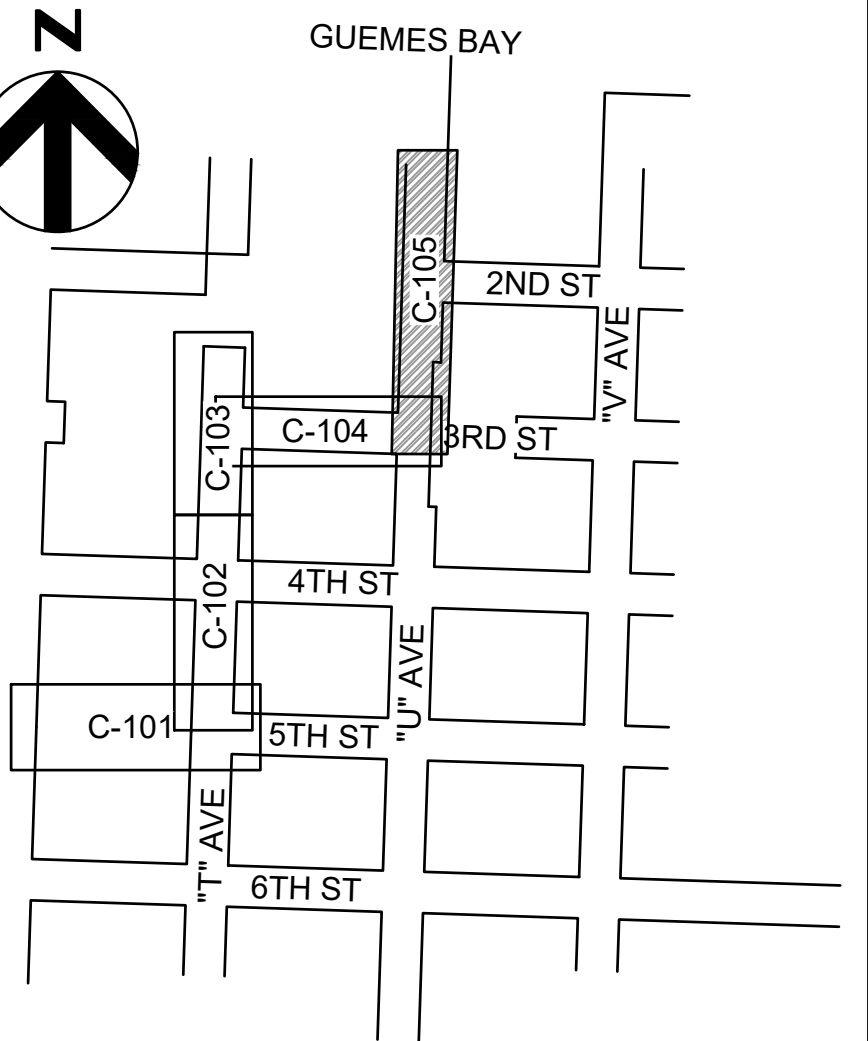
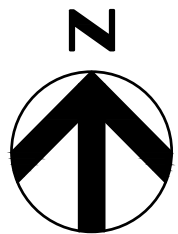
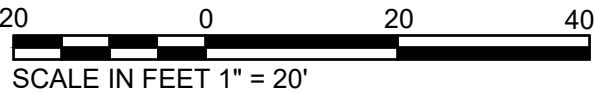


FILENAME C-104.DWG
SCALE 1" = 20'

SHEET
C-104



PLAN
H 1" = 20'



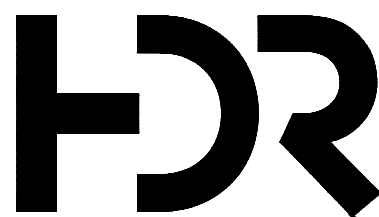
KEY MAP (NOT TO SCALE)

KEY NOTES

- 1 ADJUST UTILITY TO GRADE.
- 2 REMOVE CONCRETE CURB, GUTTER, AND SIDEWALK.
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- 4 CLEAR & GRUB.
- 5 REMOVE ABANDONED AC WATER PIPE.
- 6 FULL DEPTH PAVEMENT REPLACEMENT.
- 10 INSTALL AND MAINTAIN INLET PROTECTION.

NOTES

THIS SHEET SHOWS ROADWAY ALIGNMENTS AND STATIONING THAT DIFFERS FROM THE PIPE ALIGNMENT AND STATIONING. SEE SHEETS C-3XX FOR ALIGNMENT DEFINITION.



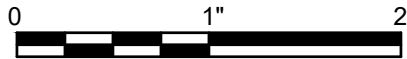
4/2021 75% DESIGN		
ISSUE	DATE	DESCRIPTION

PROJECT MANAGER BERGSTROM, ERIC	
CIVIL ENG	SKINNER, MASON
DRAWN BY	SKINNER, MASON
PROJECT NUMBER	

PRELIMINARY
NOT FOR
CONSTRUCTION
OR
RECORDING

CITY OF ANACORTES
WWTP OUTFALL RELOCATION -
UPLAND PHASE

SITE PREP AND TESC PLAN 5
STA 14+00 - 18+00



FILENAME	C-105.DWG
SCALE	1" = 20'

SHEET	C-105
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Date Received:
5/24/21

CULTURAL RESOURCES REPORT COVER SHEET

DAHP Project Number: 2020-05-03154

Author: Garth L. Baldwin and Oliver N. Patsch

Title of Report: RE: Anacortes Waste Water Treatment Plant Outfall Project, Skagit County, Washington

Date of Report: May 4, 2020

County(ies): Skagit Section: 18 Township: 35N Range: 2E

Quad: Anacortes North, WA (1995) Acres:

PDF of report submitted (REQUIRED) ☒ Yes

Historic Property Inventory Forms to be Approved Online? ☐ Yes ☒ No

Archaeological Site(s)/Isolate(s) Found or Amended? ☐ Yes ☒ No

TCP(s) found? ☐ Yes ☒ No

Replace a draft? ☐ Yes ☒ No

Satisfy a DAHP Archaeological Excavation Permit requirement? ☐ Yes # ☒ No

Were Human Remains Found? ☐ Yes DAHP Case # ☒ No

DAHP Archaeological Site #:

- Submission of PDFs is required.
- Please be sure that any PDF submitted to DAHP has its cover sheet, figures, graphics, appendices, attachments, correspondence, etc., compiled into one single PDF file.
- Please check that the PDF displays correctly when opened.



DRAYTON ARCHAEOLOGY

May 4, 2020
Drayton Project: 0420C

Ross Widener
Widener & Associates
1902 120th Pl. S.E. STE 202
Everett, WA 98208

RE: Anacortes Wastewater Treatment Plant Outfall Project, Skagit County, Washington

Mr. Widener,

Drayton Archaeology (Drayton) recently completed the archaeological monitoring for a soil testing regiment conducted at the city of Anacortes wastewater treatment facility. Two drill holes were monitored to depths exceeding 50 feet (15 meters). No cultural material was observed during the process. Please review the following information and let me know if there are any questions or comments. If so, I can be reached by telephone at 360.739.3921 or by email at garth@draytonarchaeology.com. If you or anyone else has questions or comments please contact me.

My Regards,

Garth L. Baldwin, MA, RPA 16248
Principal Drayton Archaeology

PROJECT LOCATION AND DESCRIPTION

The legal location of the project location is: Township 35 North, Range 2 East, in Section 18, Willamette Meridian (Figure 1). The project is furthermore located in the waterfront portion of Anacortes, east of the historic downtown area, near the intersection of T Ave and 4th St (Figure 2).

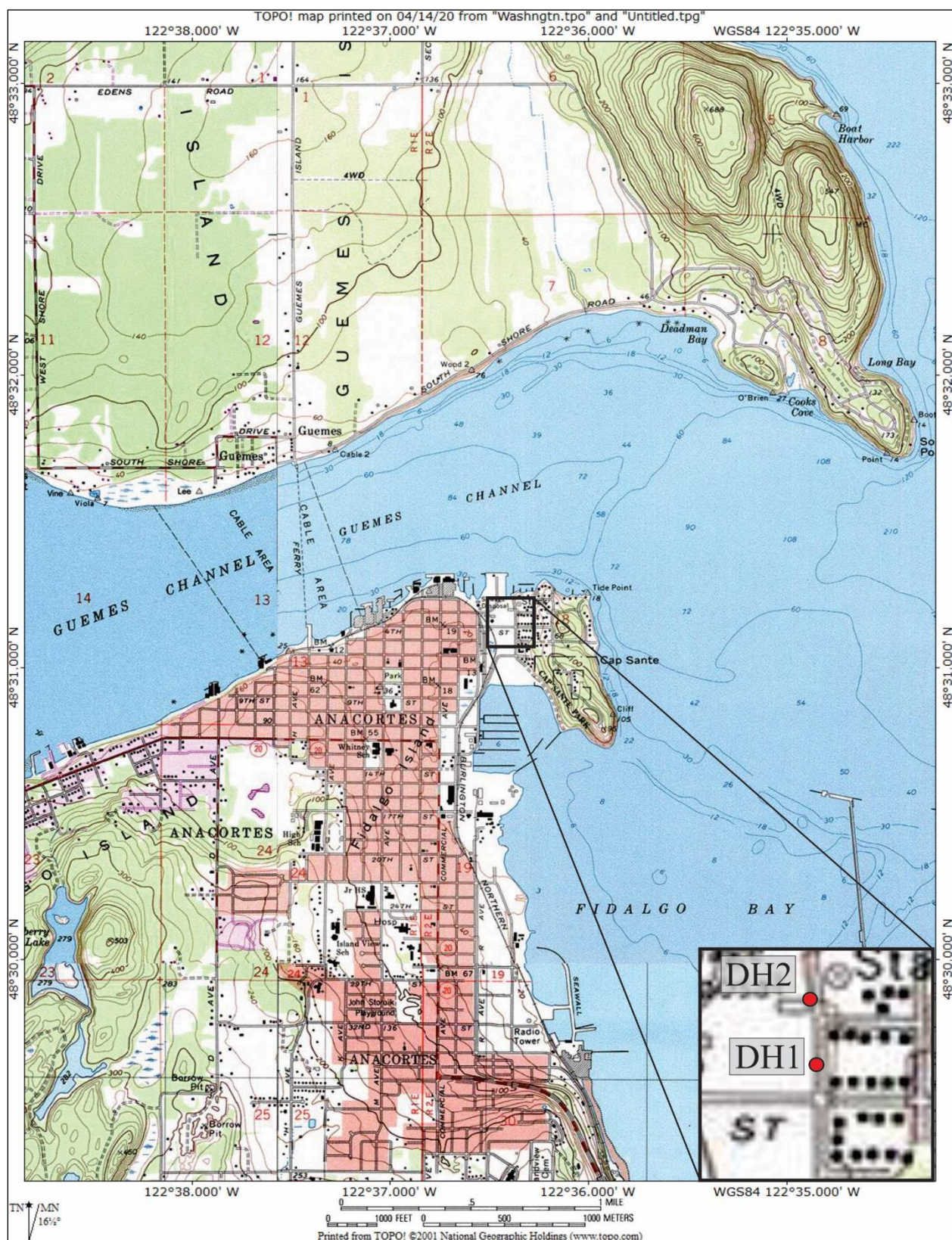


Figure 1. The project area illustrated on a portion of the Anacortes North, WA (1995) 7.5-minute USGS quadrangle map.



Figure 2. A Drayton adapted Google Earth image illustrating the two areas monitored.

MONITORING

Drayton archaeologist Oliver Patsch was present to monitor both drill holes which occurred over a three-day period April 6 - 8, 2020. Holocene Drilling conducted the drilling and Wade Worthing from GeoEngineers was present to log and sample the material. Material above bedrock was recovered via a hollow auger. Coring took place once bedrock was encountered. Weather conditions were mostly sunny with mild temperatures.

The first drill hole occurred on T Avenue, just north of the intersection with 4th Street (Photo 1). Sediment was encountered to a depth of approximately 30 feet (9 meters) at which point bedrock was encountered. Samples of each five-foot increment were bagged and collected by the Geo technician (Photo 2). The remaining material was collected in a drum (Photo 3). The five-foot auger sample was composed of a brown silty sand with occasional gravel. The ten-foot sample transitioned into a tan-brown clay with occasional sand inclusions. Variations of these sediments were encountered to bedrock and none of the material contained cultural material.



Photo 1. The first drill hole location, viewing north up T Avenue.



Photo 2. An example of the collection process from auger to bag.



Photo 3. The remaining, non-collected, material placed in a drum.

The second location occurred further north on T Avenue (Photo 4). The same procedure occurred but bedrock (or boulders) were encountered at much shallower depths, approximately five-feet (1.5 meters). Up to that point sediments encountered were similar to the first hole, comprising a brown silty sand (Photo 5). No cultural material was observed. Phyllite (boulder or bedrock) was generally encountered beyond the five-foot sample (Photo 6).



Photo 4. The second drill hole location, viewing southwest.



Photo 5. The first 5- foot sample.



Photo 6. Phyllite encountered beyond the sediment layer.

CONCLUSION

Drayton was present to monitor both drill hole locations for the Anacortes Waste Water Treatment Plant Outfall Project, Skagit County, Washington. Neither location encountered cultural materials



Landscape Plan for WWTP Outfall Mitigation
Anacortes Wastewater Treatment Plant
Outfall Replacement
City of Anacortes
Skagit County
Section 18, Township 35N, Range 02E

Notes: Trees removed will be replaced at a ratio of 3:1. The total trees to be replaced will be 3 Maple, 6 Fir and 9 Madrona within the Mitigation Area outlined in green. Bushes of non-native species will be removed and planting will occur. Mitigation site is within the shoreline buffer. Areas disturbed with be seeded with native riparian seed mix.

SEPA COMMENTS FROM KEVIN ANDERSON:

The Port of Anacortes (Port) thanks the City of Anacortes for the opportunity to provide minor comments on the proposed Wastewater Treatment Plant Outfall Relocation SEPA checklist and determination. As a landowner adjacent to the project site and waterfront property manager the Port welcomes the opportunity to provide perspective on the proposed project. We acknowledge the collaboration with the City of Anacortes on specific issues regarding the Port Management Agreement of subtidal lands and the continued work to address these concerns. This is especially important as planning for the Log Yard Site (Cleanup Site ID#3604) is in progress and the project site is nearby.

Comments:

1. The non-native vegetation on the west side of U-avenue serves as a visual screen to buffer residential uses from the industrial uses of the marine terminal. Will replacement of the bushes with 18 trees be of sufficient size and maturity to provide the same level of screening to the Cap Sante neighborhood?

We no longer anticipate full removal of the non-native vegetation along the west side of U-Avenue. The existing vegetation will be trimmed back in line with the existing edge of paving to provide working room for outfall construction. It is anticipated that the screen will remain intact or with only minor if any temporary changes in the screen.

The non-native bushes within the City right of way, were not installed with the intent to screen the Cap Sante neighborhood from Port Activities. If construction issues require some limited removal of the screening vegetation, our proposal is to replace any bushes that are removed with native trees consistent with the City's replicant ratio for trees removed of 3:1. The replacement may not provide the current absolute screen that the nonnative scree currently does however over time it will grow and soften the view of the industrial aspects of the port.

2. Outfall is adjacent to the Wyman's Cleanup and mitigation habitat site. The mitigation site provides habitat for salmonids, including listed species (Puget Sound Chinook). What measures will be taken to ensure construction of the project will not adversely impact this sensitive habitat?

The project has multiple environmental plans (pertaining to water quality, dredging, dewatering, and backfilling) specified in the contract specifications which must be complied with during construction. These Department of Ecology (DOE) approved plans will help to insure the protection of salmonoids and their habitat. In addition, the project will remove over 2700 cubic yards of contaminated soils from the nearshore environment and thus we expect this project to improve habitat for all Puget sound species that use the area.

3. The project may affect traffic patterns to nearby Port residential tenants, businesses, and users of the 24-7 commercial marine ramp. This commercial ramp is essential to commerce and transport to the San Juan Islands and other islands. The activity at the ramp is intermittent and

dependent on tides and activities. Timeline for upland work is unclear. Upland work may affect traffic in the neighborhood and users of the commercial ramp.

The City understands the importance of the commercial marine ramp to our neighboring communities. Access to the ramp will be maintained throughout the project. The project will temporarily impact traffic patterns of residents and businesses within the project vicinity. The City is working to limit these temporary impacts. To address this the City will have traffic detour routes during construction and is working to develop a webpage to provide more detail on when and what segments of the project will be affected by project construction activities, when those impacts will occur and their expected duration. Current anticipated time frame for upland construction work will be from December of 2021 through June 2022.

4. During the in-water construction phase, what measures will be taken to preserve access for marine traffic to the commercial ramp and the Port's pier from the water?

The marine portion of the project will be largely stationed around the east portion of the bay which is at least 100 feet away from the commercial ramp and 300 feet away from the Port's pier. Therefore, we do not anticipate any interference with marine traffic coming or going to these areas. Typical marine navigation protocols will be followed.

SEPA COMMENTS FROM JOHN WILKINSON:

Tess, thank you for providing the notice of the application being made for this project.

As an impacted neighbor living within 300ft of the project I briefly reviewed the document and have the following comments:

1. None of the Cap Sante neighbors' concerns submitted in March appear to be addressed by this document (the March list of consolidated concerns is attached). Please advise on when and how these will be addressed.

Apologies for the delay. See full list of comments and how each was addressed below under the heading "Consolidated List of Cap Sante Resident Questions about WWTP Outfall Project".

2. The document focus is on the maritime portion of the project. Page 9 summarily dismisses possible Upland impacts, that are the primary focus of the near neighbors, as follows:

"The upland project area is within existing right-of-way surrounded by highly developed properties, primarily residential and industrial. As the pipe will be placed below the current roadway, rock blasting and excavation will occur to place the pipe to an appropriate depth. All roads will be replaced to existing conditions of grade and topography with no additional impervious surface created, roadways will be replaced to the City's codes and standards. The project will not have permanent impacts to any surrounding properties. There will be no off-site improvements and no views will be obstructed by the project. The completed project will be entirely underground and no changes in elevation will occur."

Comment noted.

3. Some other errors/omissions were noted as follows:

The project is given file number SDP-2021-0006 in the mailout but SDP-2021-0005 for online documents.

The project number is SDP-2021-0005. Apologies for confusion.

pg. 72. Noise is calculated but no mention is made of compliance (or not) with existing ordinances, hours of operation etc. Seismic/blast intensities are also not calculated or mentioned.

City of Anacortes Noise Ordinance 19.69.020 defers to WA State Legislation section WAC 173-60-040 for Noise Control requirements. Due to the project's activities and classification, it follows under WAC 173-60-050 Exemptions (1)(c), and (1)(e).

Therefore, the project will not have Noise Control limitations but will have hours of operations. Project construction activities can only occur between the hours of 7:00 a.m. and 10:00 p.m. unless the project applies for a variance with the City planning department. The project's licensed Geotech recommendations for blasting are written into the project specifications. This includes having the blasting vibration limit at 0.5 inches per second (IPS).

Monitoring of peak particle velocity vibrations of each blast shot will be completed with no less than two seismographs that can measure three mutually perpendicular directions, located at each end of the shot and adjacent to structures within 200 feet of the blast.

pg. 127. sec.13: no historic properties are listed but our house at 404 2nd st is an historic property. it is subject to possible blast damage given stacked fieldstone basement walls and clay effluent pipes etc still servicing older homes along 2nd st. No mention is made of indemnification options for homeowners if/when damage occurs.

Historic properties must be "Determined Eligible" by the State Historic Preservation Office (SHPO) to be considered historic per guidelines written in the Natural Historic Preservation Act (Section 106). 404 2nd St, Anacortes, WA 98221 was "Determined Not Eligible" as a historic property by SHPO on 08/12/2013.

Per the Uniform Relocation Assistance and Real Property Acquisition Act (1970) (URA) and various Federal, State, and Local statutes and regulations, the City is required to repair damages which have been proven to have occurred as a result of the project. For residents within 200 feet of the blast zone (North of the corner of 3rd St and following U Ave out to the bay) or have justifiable concerns that their house or property may incur damage as a result of this project please reach out to jordancw@widener-enviro.com. Jordan will work with the contractor and homeowner to work out a "Right of Entry" agreement for the contractor to gain access to the property and conduct a pre-construction survey of said property. After construction, if the property owner feels damage has occurred Jordan and the project contractor will follow up with the property owner to conduct a post-construction survey. Therefore, if any damage occurs an appropriate estimate will be determined and submitted to the responsible party for payment and/or implementation of the repairs.

pg. 129. sec 16: no mention is made of the duration of service disruption on 129+ utility lines that will be severed or otherwise impacted by construction.

The City is actively working with the various utilities to properly manage this and limit any necessary utility interruptions. Based on discussions to date with the various utilities we do not anticipate any lengthy disruptions of service as alternate routing or methods of service will be installed as practical prior to outfall construction.

pg.88: the illustration shows the line going up 4th street to U Ave. Other illustrations show the 3rd St route to U Ave....In summary, the document addresses possible marine environment impacts but not the human impacts on multiple nearby residents. Please address these via timely communications with the residents who will be impacted.

The project team is working to set up a website to relay to the public the project schedule and other construction details. This website will include detour routes and schedule updates to let residents know how and when they can expect to be temporarily impacted by construction activities. It will also include contact information to assist any concerned citizens with questions about the project.

Consolidated List of Cap Sante Resident Questions about WWTP Outfall Project

1. What is the overall timing and duration of the Uplands portion of the Project?
 - a. Upland phase of the project as of now is expected to be from December of 2021 through June 2022. Notification for the project start time will be placed on the web page at least 45 days prior to construction.
2. What is the overall timing and duration of the Marine portion of the Project?
 - a. Marine phase of the project as of now is expected to be from August 2022 to February 2023 but maybe earlier if the appropriate permits are acquired. .
3. Where will heavy equipment and materials be kept during construction?
 - a. This will be up to the contractor's discretion but will be within City ROW or within a temporary construction easement.
4. Does FEMA 4539-R give COA emergency access to Private or POA land?
 - a. No, for temporary or permanent access to private property the City and project contractors must follow the Uniform Relocation Assistance and Real Property Acquisition Act. Therefore a "Right of Entry" agreement must be in place before any entity performing work for this project can work on Private land. For any government-controlled land such as POA land (The Port is a Public Corporation) the project must obtain a permit or easement to access.
5. How will heavy materials and excess fill and rock be stored and transported to/for Cap Sante? Along what route?

- a. Fill and rock may be stored near or at the project site, depending upon the contractor's specific means and methods. The exact location where materials will be stored and hauled to the site will be at the discretion of the contractor.
- 6. Given FEMA 4539-R provides funding of 75% of "total eligible costs"; who carries the burden of other costs and cost overruns, if any?
 - a. If any overruns occur this cost will be covered by the City.
- 7. Who will be the contact person with COA and/or POA for resident questions or concerns during construction?
 - a. Fred Buckenmeyer at 360-299-1954 or fredb@cityofanacortes.org and Jordan Widener at 510-725-2291 or jordancw@widener-enviro.com
- 8. Crossing of 4th St at T Ave. When and for how long will this intersection be closed or restricted access? (this is the only option for driving to Cap Sante)
 - a. The intersection of 4th St at T Ave will have restricted access during construction however one lane will be open to the public during construction. Details of the duration and access availability will be posted on the project website currently being developed by the project team.
- 9. Will emergency services and the elderly/disabled have 24/7 ability to go to/from Cap Sante?
 - a. Emergency services will have access during construction. Residents with disabilities adjacent to the construction route will be reached out to individually by the City to coordinate and appropriately accommodate them during construction.
- 10. Will any of the essential Utilities be out of service for Cap Sante? How long?
 - a. The City is actively working with the various utilities to properly manage this and limit any necessary utility interruptions. Based on discussions to date with the various utilities we do not anticipate any lengthy disruptions of service as alternate routing or methods of service will be installed as practical prior to outfall construction.
- 11. When will the Hybrid D-E option be assessed and MOUs with POA be finalized for routing of the Uplands portion of the Outfall?
 - a. The hybrid D-E was evaluated, and the "E" alignment has been selected as the preferred alternative. Final adoption of the alternative will be complete once the SEPA process is completed.
- 12. Will City Council vote on the final decision in a public meeting?
 - a. No. The final decision will be made through the SEPA process.

13. When, which and for how long will streets be closed or have restricted access?

Ref: <https://www.youtube.com/watch?v=CKcJxsZDcQk>

- a. Streets closures will be done in phases and the length of these phases will be at the discretion of the contractor, within the limits of the Contract. Details of the phases and durations will be posted on the project website which the project team is actively working to develop.

14. Will emergency services and the elderly/disabled have 24/7 ability to go to/for their residences/businesses?

- a. Emergency services will have 24/7 access during construction. Residents adjacent to construction activities with special access needs will be reached out to individually by the City to coordinate and appropriately accommodate them during construction.

15. Will any of the essential Utilities be out of service for residences/businesses including uphill (e.g. 2nd St to V Ave)?

- a. The City is actively working with the various utilities to properly manage this and limit any necessary utility interruptions. Based on discussions to date with the various utilities we do not anticipate any lengthy disruptions of service as alternate routing or methods of service will be installed as practical prior to outfall construction.

16. When and for how long will rock blasting occur along either the Hybrid D-E or the Option 3 route?

- a. This will be determined by the Contractor however the City is seeking to reduce the duration of the blasting activities. At this time it is anticipated a minimum of 45-days will be required for blasting activities. We anticipate blasting to occur in two phases and includes removal of the roadway, drilling to set the charges, blasting and removal of the crushed rock and debris.

17. Will COA Noise ordinance WAC 173-60-040 be monitored and enforced for all Upland operations? How and by Whom?

- a. City of Anacortes Noise Ordinance 19.69.020 defers to WA State Legislation section WAC 173-60-040 for Noise Control requirements. Due to the project's activities (during the upland phase) and classification, it follows under WAC 173-60-050 Exemptions (1)(c), and (1)(e). Therefore, the Upland phase of the project will not have Noise Control limitations but will have hours of operations. Project construction activities can only occur between the hours of 7:00 a.m. and 10:00 p.m. unless the project applies for a variance with the City planning department.

18. Has COA budgeted for and committed to honor restoration of trees and creation of a pocket park at the terminus of U Ave.?

- a. Funds for this project are set aside for the mitigation of trees removed due to construction. The pocket park will not be part of this project. However, the City is

actively working to fund and create the pocket park after construction of the new WWTP effluent line is complete.

19. Will residents be furnished with documentation of contractor liability insurance information, so they have recourse in the event of damage to their homes or property?

Ref: <https://www.youtube.com/watch?v=tVqBSJCbeQY>

- a. Contractor insurance information will not be provided to residents by the City.
 - b. For residents within 200 feet of the blast zone (North of the corner of 3rd St and following U Ave out to the bay) or have justifiable concerns that their house or property may incur damage as a result of this project please reach out to jordancw@widener-enviro.com. Jordan will work with the contractor and homeowner to work out a “Right of Entry” agreement for the contractor to gain access to the property and conduct a pre-construction survey of said property. After construction, if the property owner feels damage has occurred Jordan and the project contractor will follow up with the property owner to conduct a post-construction survey. Therefore, if any damage occurs an appropriate estimate will be determined and submitted to the responsible party for payment and/or implementation of the repairs.
20. Will COA Noise ordinance WAC 173-60-040 be monitored and enforced for Marine Operations? How and by Whom?
- a. City of Anacortes Noise Ordinance 19.69.020 defers to WA State Legislation section WAC 173-60-040 for Noise Control requirements. Due to the project’s classification, it follows under WAC 173-60-050 Exemption (1)(e). Therefore, the Marine phase of the project will not have Noise Control limitations but will have hours of operations. Project construction activities can only occur between the hours of 7:00 a.m. and 10:00 p.m. unless the project applies for a variance with the City planning department. Ordinances that apply to the project will be enforced by the City Public Works Department

Technical Memorandum



To: Eric Shjarback, P.E. – City of Anacortes
From: Eric Bergstrom, P.E. – HDR
Erik Simmons, P.E. - HDR
Date: May 29, 2020
Subject: Outfall Alignment Alternatives Analysis

City of Anacortes
*Planning, Community &
Economic Development*

Date Received:

9/17/21

1.0 Introduction

1.1 Background

The City of Anacortes (City) currently routes effluent from its Wastewater Treatment Plant (WWTP) to Guemes Channel via a 30-inch pipe. As part of Phase 1 of the Sanitary Sewage Storage Study Project the City has decided to construct a new outfall for the WWTP capable of conveying higher WWTP effluent and combined sewage flows. The City has contracted with HDR to evaluate alignment alternatives for the new WWTP outfall.

1.2 Purpose

The purpose of this study as defined in the Scope of Work is to evaluate multiple alignment alternatives in order to assist the City in selecting a preferred alignment that best suits their needs. The feasibility of the various alignments will be founded on:

- Data gathered from field visits and desktop reviews.
- Available geotechnical and environmental information.
- Permitting and easement requirements.
- Identifiable constructability issues and potential construction risks.
- Costs and funding sources.

2.0 Outfall Alternatives

The first step toward determining a preferred alignment for the presumed 48-inch outfall is to identify a number of alternative alignments for evaluation. Through a series of discussions with the City the five alternatives shown on Figure 2-1 have been selected for evaluation. All five alternatives start near the effluent pump station, head to east to T Avenue and then turn north. The different alternatives begin to diverge starting at the intersection of T Avenue and 4th Street. Short descriptions of each alternative are provided below.

The existing WWTP outfall does not extend beyond the Outer Harbor Line and is nominally designed for a capacity of about 10 mgd and the diffuser is approximately 30 feet deep. The dilution mixing for the existing outfall currently meets water quality parameters; however, based on the outfall designer's experience in permitting other outfalls it is assumed that the regulatory agencies will require a new outfall to be extended beyond the Outer Harbor Line. Preliminary evaluation of existing data has identified feasible diffuser locations in Guemes Channel for each of the Alternatives. All of these locations are roughly the same distance (800 to 1000 feet) beyond the Outer Harbor Line.

2.1 Outfall Alternative A

This alternative turns west onto 4th Street and parallels the existing outfall until the intersection of 3rd Street and R Avenue where it continues north onto Port of Anacortes (Port) property and into the Guemes Channel.

2.2 Outfall Alternative B

Similar to alternative A, this alternative turns west onto 4th Street and parallels the existing outfall. At the intersection of 3rd Street and R Avenue it continues to follow the existing outfall and turns east onto Port property where it can use an existing 20 foot wide easement. This alternative diverges from the existing outfall at the outer harbor line where it continues north into the Guemes Channel.

2.3 Outfall Alternative C

This alternative crosses 4th Street and continues north in T Avenue. After passing 3rd Street the alignment turns west onto Port property and then turns north into the Guemes Channel.

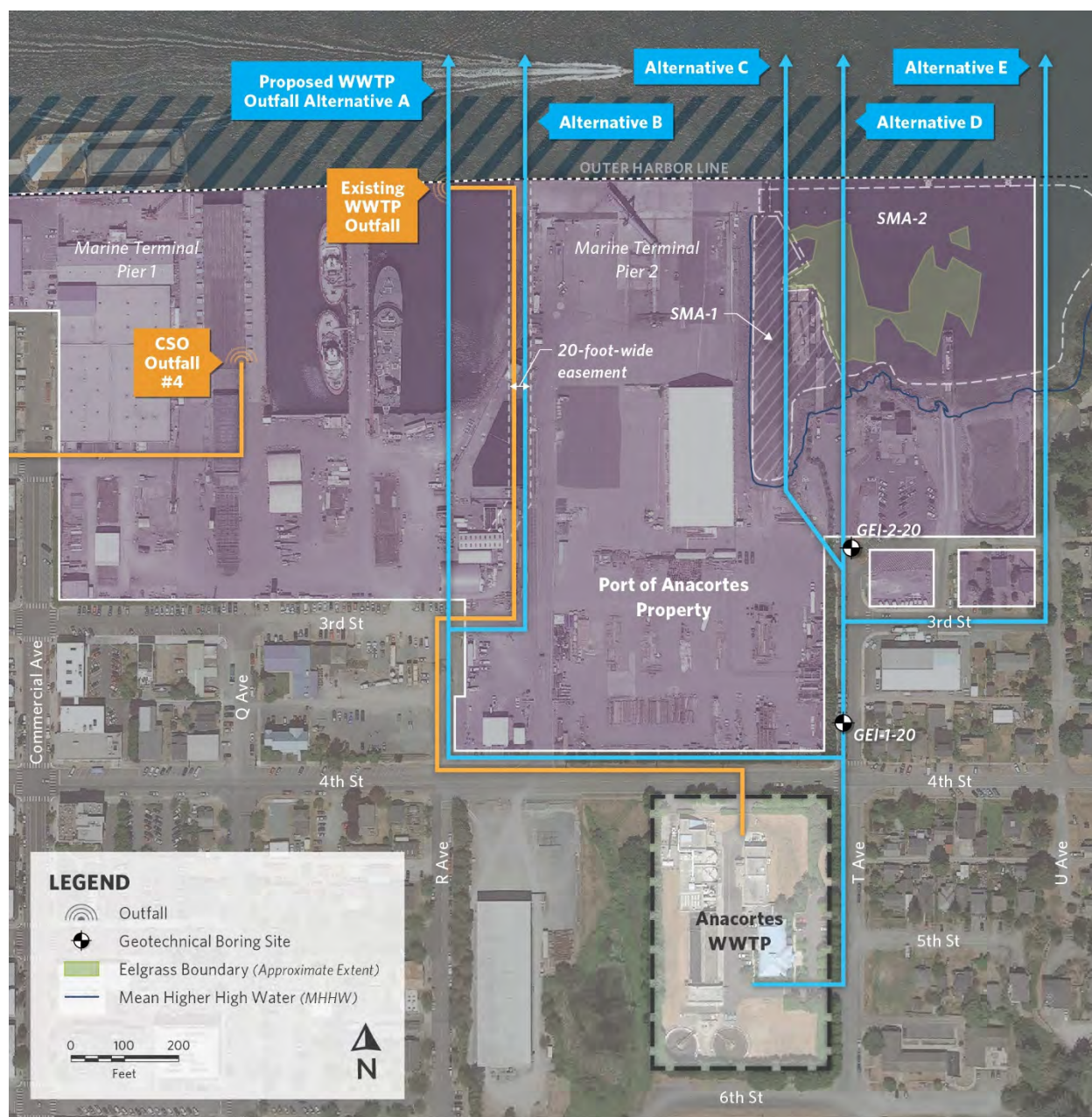
2.4 Outfall Alternative D

Similar to alternative C, this alternative crosses 4th Street and continues north in T Avenue. However, after passing 3rd Street this alignment continues north onto Port property and into the Guemes Channel.

2.5 Outfall Alternative E

Similar to alternative C, this alternative crosses 4th Street and continues north in T Avenue until reaching 3rd Street where it turns east and continues to U Avenue where it turns north and heads into the Guemes Channel.

Figure 2-1. Alignment Alternatives



AREAS IMPACTING ROUTING



Sediment Management Area 1 (SMA-1; Log Yard Cleanup Area)
Sediment containing Site-related IHSs including wood waste, metals, PAHs, benzoic acid, and dioxins and furans exceeding PCULs from the mudline to a depth of 6 feet.



Sediment Management Area 2 (SMA-2)
Sediment containing Site-related IHSs including cPAHs exceeding PCULs from the mudline to a depth of 1-foot.



Port of Anacortes permitted dredge area
All improvements in this zone need to be below the permitted dredge depth of -45.0 MLLW.

Notes: 1. Trenchless marine construction is being evaluated for all options. 2. Locations and scale are approximate. 3. A "Do Nothing" option was explored as part of our planning study and it was deemed infeasible, as was storage, etc.

rev 05.21.2020

3.0 Alignment Evaluation

A detailed evaluation of each alternative was conducted in order to identify a feasible alignment that can be carried forward into design. Evaluation criteria that have been used to assess and compare the various alternatives are described below.

- **Length** – This criterion compares the upland, marine, and overall lengths of each alternative.
- **Construction on Port Property** – This criterion identifies alternatives that require construction on Port property.
- **Construction Possible in 2021** – This criterion identifies the potential of alternatives to start construction in 2021.
- **Avoids Port Marine Dredge Area** – The Port has a lease on marine land from the Washington State Department of Natural Resources in the area around the Port. They have also been issued permits to dredge the marine bottom to minus 45 ft Mean Lower Low Water (MLLW) datum at the Outer Harbor Line which is at northern edge of the Port's Pier 2. Any alternative that passes through the Port lease land at the Outer Harbor Line will need to be below minus 45 ft MLLW plus an additional buffer of likely five additional feet. This criterion identifies alternatives that pass through the Port's permitted dredge area and would require being constructed to the depths noted above.
- **Cut and Cover Marine Construction** – This criterion assesses the constructability of the marine segment of each alternative using cut and cover construction methods. For Alignments A and C it is possible that a trestle, as illustrated in Figure 3-1, may be required to construct the near shore sections of the outfall. The trestle would provide a platform to facilitate the trenching required for the outfall. For all alternatives that cut and cover is a feasible option, sheet piling may be required to limit the width of the trench in the near shore sections of the outfall. Figure 3-2 illustrates the type of sheet piling that may be required. Alternates A through D would also have challenging construction as the
- **Contaminated Marine Sediments** – This criterion evaluates the possibility of encountering contaminated sediments such as wood waste, metals, polycyclic aromatic hydrocarbons (PAH), benzoic acid, etc....in the marine segment of each alternative. This evaluation is based on characterization of historical dredging by the Port of Anacortes or from Department of Ecology information about known contaminated sites.
- **Contaminated Upland Soils** – This criterion evaluates the possibility of encountering contaminated soils in the upland segment of each alternative. This assessment is based on historical use of the area along the alignment or documented contamination.
- **Upland Rock Excavation** – This criterion identifies upland segments of each alternative that will require rock excavation during construction. The depth and extent of rock excavation is not known at this time and would require additional investigations to characterize the amount of rock and the feasible construction methods.
- **Deep Trench Construction** – This criterion identifies upland segments of each alternative that will require deep trenches (depths greater than 20 feet) during construction. This criterion applies primarily to Alternative E. A preliminary plan and profile of this Alternative is included as Attachment A to this memorandum.
- **Trenchless Marine Construction** – This criterion evaluates the construction risk associated with using trenchless methods to install the marine segment of each alternative. For Alternatives A and B there may be high risk or it may not be feasible because of the seawall/bulkhead configurations in the port or historical piling that would complicate or possibly not allowing trenchless construction to be used. Alternative C may be feasible however the relics of historical piling may complicate or possibly not allow trenchless construction to be used. Alternative D may be feasible but it does require boring through rock that has been observed extending to the surface. The trenchless construction will likely transition from rock to marine sediments and there

could be a risk of encountering the relics of historical piling. Alternatives A through D all have the potential to disrupt activities at the port and the waterfront business.

- **Impacts Residential Access** – This criterion evaluates the impact each upland alternative has on access to residential homes. Alternative E would likely have the greatest impacts that would include noise, limited access to homes, and additional restrictions to residences during work hours,
- **Eelgrass** – This criterion identifies alternatives with marine segments that pass through eelgrass habitats. Trenchless construction would likely completely avoid eelgrass by boring well below the eelgrass.

A summary of the evaluations for each alternative are provided in Table 3-1.

Figure 3-1. Outfall construction using a trestle



Figure 3-2. Outfall construction using sheet piles



Table 3-1. Evaluation Summary

Alignment Alternatives	Length (ft)	Construction on Port Property	Construction Possible in 2021	Avoids Port Marine Dredge Area	Cut and Cover Marine Construction	Contaminated Marine Sediments	Contaminated Upland Soils	Upland Rock Excavation	Deep Trench Construction	Trenchless Marine Construction	Impacts Residential Access	Eelgrass	Items Requiring Further Consideration
A	Upland: 2,097 Marine: 700 Total: 2,797	Yes	Unlikely	No	Difficult	Likely	Likely due to historical activities	Not Likely	No	High Risk or Possibly not Feasible	Possible	Possible	Coordination with Port and new easement
B	Upland: 2,408 Marine: 800 Total: 3,208	Yes	Unlikely	No	Difficult	Likely	Likely due to historical activities	Not Likely	No	High Risk or Possibly not Feasible	Possible	Not Likely	Coordination with Port
C	Upland: 1,212 Marine: 650 Total: 1,862	Yes	Unlikely	No	Difficult	Likely	Likely due to historical activities	Possible	No	High Risk	Possible	Yes	Coordination with Port and new easement
D	Upland: 1,311 Marine: 1,100 Total: 2,411	Yes	Unlikely	No	Unlikely due to Rock	Likely	Less Likely	Yes	No	Feasible	Possible	Yes	Coordination with Port and new easement
E	Upland: 1,746 Marine: 600 Total: 2,346	No	Possible	Yes	Feasible	Possible	Less Likely	Very Likely	Yes	Feasible	Yes	Likely	Depth of rock along the alignment is critical to establishing feasible construction.

4.0 Costs

Conceptual level construction cost estimates were developed for each alternative alignment. The following parameters apply to each cost estimate:

- All prices are presented in 2020 dollars.
- Each estimate is American Association of Cost Engineers (AACE) Class 4 with an accuracy range of -15% to +30%.
- Unit costs were developed using HCSS Heavy Bid, a project construction cost estimating program.

The following assumptions apply to each cost estimate:

- Upland Pipeline Segment
 - All pipe is 48-inch Class 52 Ductile Iron Pipe.
 - An imported coarse aggregate material will be used for the pipeline bedding and backfill.
 - A 60" diameter sewer manhole will be installed to allow for the venting of air.
 - A 48"x24" tee with a 24" isolation valve will be installed to allow for a future wastewater treatment plant connection.
- Marine Pipeline Segment
 - Sheet piling will be used to limit the width of the marine trench and a trestle will be used to install the near shore segments of the outfall.
 - All pipe is 48-inch DR 11 high density polyethylene (HDPE).
- Indirect Construction Costs
 - Mobilization/Demobilization covers getting equipment to and from the project site.
 - Sales tax is 8.7% on permanent materials.
 - Bond & insurance is 2% of the total cost.
 - Project access covers setting up laydown yards and equipment staging areas.
 - General Conditions are 20% of the direct costs and this covers items such project management supervision, per diem, field offices, etc...
 - Contractor mark-up/profit is 15% of the direct costs.
- Indirect Project Cost
 - An allowance of \$3.75 million is assumed to cover City administration, permits and fees, engineering and construction management.

The following assumptions apply specifically to Alternative A:

- Upland Pipeline Segment
 - 19% of excavated soils will be contaminated.

The following assumptions apply specifically to Alternative B:

- Upland Pipeline Segment
 - 20% of excavated soils will be contaminated.
 - The concrete lined pond will be demolished and restored.
- Marine Pipeline Segment
 - Existing riprap will be removed and replaced.

The following assumptions apply specifically to Alternative C:

- Upland Pipeline Segment
 - 41% of excavated soils will be contaminated.
- Marine Pipeline Segment
 - Contaminated SMA-1 excavated materials will be disposed offsite upland and replaced with an imported material.

The following assumptions apply specifically to Alternative D:

- Upland Pipeline Segment
 - 23% of excavated soils will be contaminated.

- Costs were developed assuming conventional cut and cover methods of pipe installation; however, rock is at the surfaces at the shoreline and it has not been determined whether this method is a feasible construction technique without blasting the rock. It is generally accepted that blasting the rock will not be permitted in the water.

The following assumptions apply specifically to Alternative E:

- Upland Pipeline Segment
 - Rock excavation will be required and 30% of excavated materials will be rock.
- Marine Pipeline Segment
 - It is assumed that a sufficient layer of soil is exists to excavate a trench at the point where U Avenue terminates at the shoreline and in the near shore marine tide lands based on historical photographs in this vicinity that piling was installed previously. Additionally, geotechnical records from the Wyman Marina site remediation indicate that there is probably sufficient depth of soil to excavate a trench before hitting rock, This is the shoreline property immediately west of U Avenue,
 - Outfall will be laid on the bottom of the seafloor after approximately 150 feet.

A summary of the conceptual level cost estimates are provided below in Table 4-1.

Table 4-2. Summary of Estimated Costs (\$ million)

Alternative	Upland Outfall Construction	Marine Outfall Construction	Opinion of Probable Construction Cost	Range of Project Cost Including Project Indirect Costs	
				Low	High
A	\$5.5	\$11.3	\$16.8	\$18.8	\$24.0
B	\$5.9	\$10.0	\$15.9	\$18.1	\$22.9
C	\$4.5	\$12.7	\$17.2	\$19.2	\$24.4
D	\$4.3	\$12.3	\$16.6	\$18.7	\$23.7
E	\$9.2	\$6.7	\$15.9	\$18.0	\$22.8

The higher upland cost for Alternative E relative to the other alternatives reflects the deep trench and rock excavation construction assumed. The lower marine cost reflects the design team's perception that the constraints will not be as restrictive as the four alternatives that cross the Port property and require the outfall to be below the dredge depth of the Port.

5.0 Trenchless Construction

Trenchless construction using horizontal directional drilling (HDD) or direct pipe (DP) methods are potentially viable alternative methods for constructing the marine portion of the outfall to the diffuser. In both of these methods the marine portion of the outfall pipeline is installed from an entry point upland from the shore and then bored through the marine sediment and emerging from the ocean floor at diffuser location. A significant benefit of using trenchless construction is the avoidance of impacts to sensitive marine environments such as eelgrass beds and not disturbing contaminated sediments. Trenchless construction may also allow the pipeline to be installed well below the dredge depth of the Port. This method of pipeline does carry risks including encountering obstructions that could prevent the boring from advancing. This includes rocks, boulders, or relics of historical piling. Adequate room to install the pipeline is required on land. At this time, trenchless construction is still being evaluated for the different

alternatives; however, there is not sufficient information yet to determine if it is a feasible method of construction.

Budget estimates for trenchless construction of the marine portion of the outfall pipeline from \$6 to \$11 million. For Alternatives A through D, trenchless construction may be cost competitive with the cut and cover method. However, there is a lot of uncertainty in the depth of a sediment layer above rock and artifacts from historical uses of the Port property to determine if trenchless is feasible.

At this time, it appears that a cut and cover method of construction may be viable for Alternative E and may be more cost effective than a trenchless method based on assumptions by the design team. This includes the possibility of requiring trench shoring for only a very limited distance near the shoreline as shown in Figure 3-2 and possibly being able to lay the outfall pipeline on the marine bottom after it has reached a depth of 20 to 30 feet. It is also assumed that since Alignment E is outside of the Port leased land it would not be constrained by the requirement to be below the dredge depth of -45 MLLW when the pipeline extends beyond the Outer Harbor Line. Regulatory or permitting agencies may impose depth of bury or other requirements that may make trenchless construction a method that should be considered for this Alternative.

6.0 Results and Conclusions

Based on the information available for this alignment evaluation, Alternative E is considered the most favorable alignment for the following reasons:

- It does not require construction on Port property.
- It is possible that construction could start in 2021.
- It avoids the Port's permitted dredge area.
- The use of cut and cover construction methods for the marine segment of the alignment is considered to be feasible.
- It is unlikely that the soils for the upland segment of the alignment are contaminated because the Wyman Marina was cleaned up.
- It is feasible that trenchless construction methods could be used to install the marine segment of the alignment if necessary.

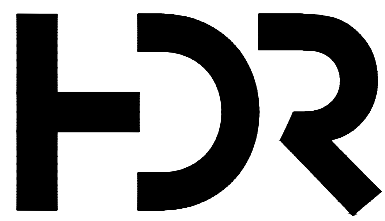
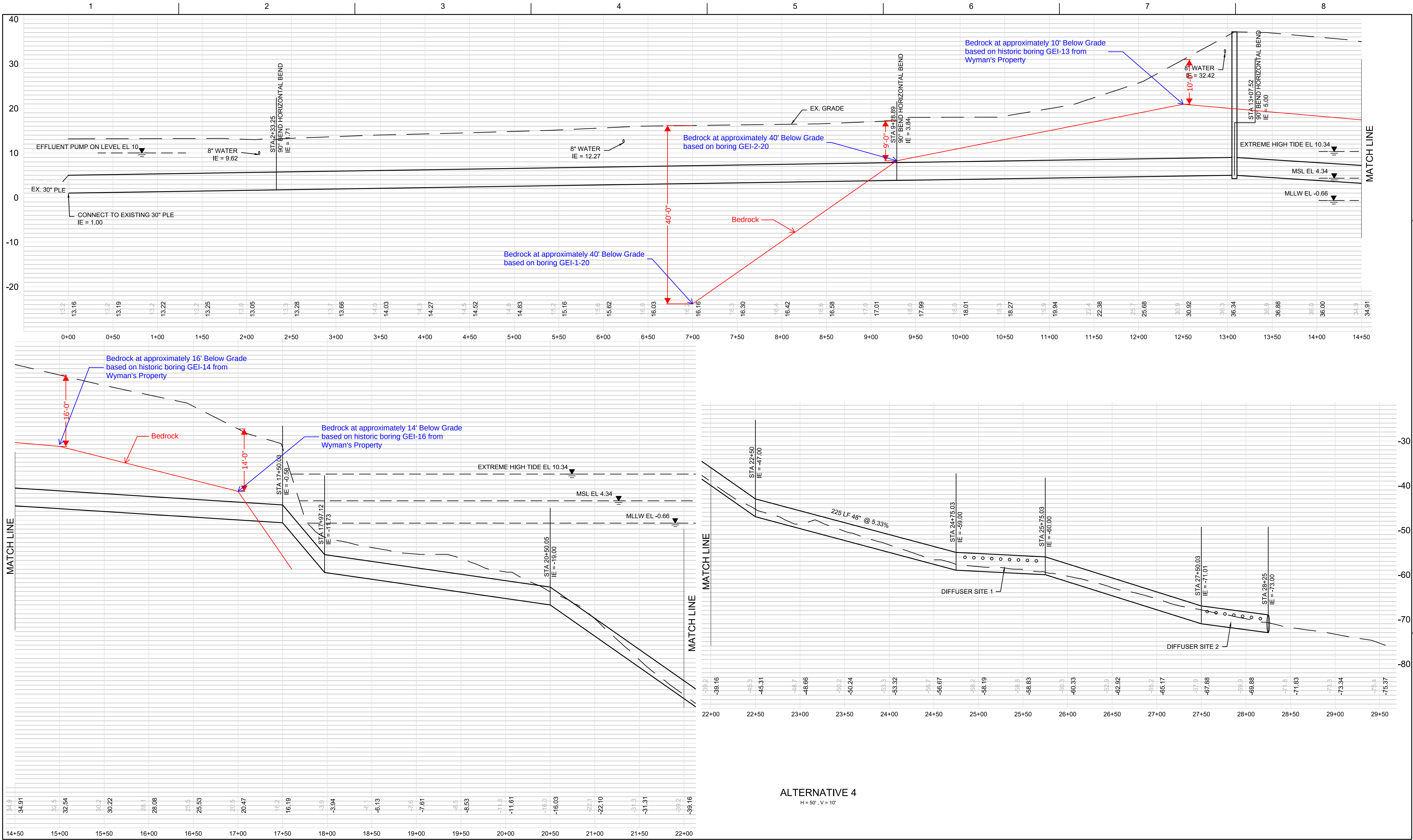
Additional investigation should be completed to determine depth of rock along the alignment and regulatory and permitting agencies should be consulted to determine constraints that may be imposed on the proposed Alternative E alignment.

Alternative B, paralleling the existing WWTP outfall through the City's existing easement is also another viable alternative. This alternative will require developing a plan to keep the existing outfall in service while the new outfall is being constructed. This alternative would require coordination with the Port and would require the pipeline to be below the dredge depth beyond the Outer Harbor Line.

Attachments

Preliminary Alternative E Plan and Profile

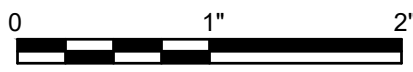
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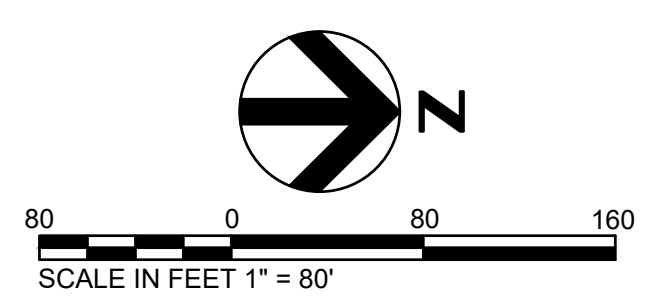
PROJECT MANAGER	BERGSTROM, ERIC
CIVIL ENG	SIMMONS, ERIK
DRAWN BY	SCHMIDT, ADAM
PROJECT NUMBER	

CITY OF ANACORTES
OUTFALL ALTERNATIVES
OPTION E PROFILE

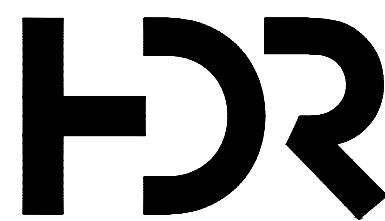


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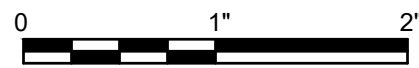
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ISSUE	DATE	DESCRIPTION

PROJECT MANAGER	BERGSTROM, ERIC
CIVIL ENG	SIMMONS, ERIK
DRAWN BY	SCHMIDT, ADAM
PROJECT NUMBER	

CITY OF ANACORTES
OUTFALL ALTERNATIVES
OPTION E



FILENAME
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April 1, 2021

**City of Anacortes Wastewater Treatment Plant Outfall Relocation
Alternative Refinement Analysis**
City of Anacortes, Skagit County, Washington

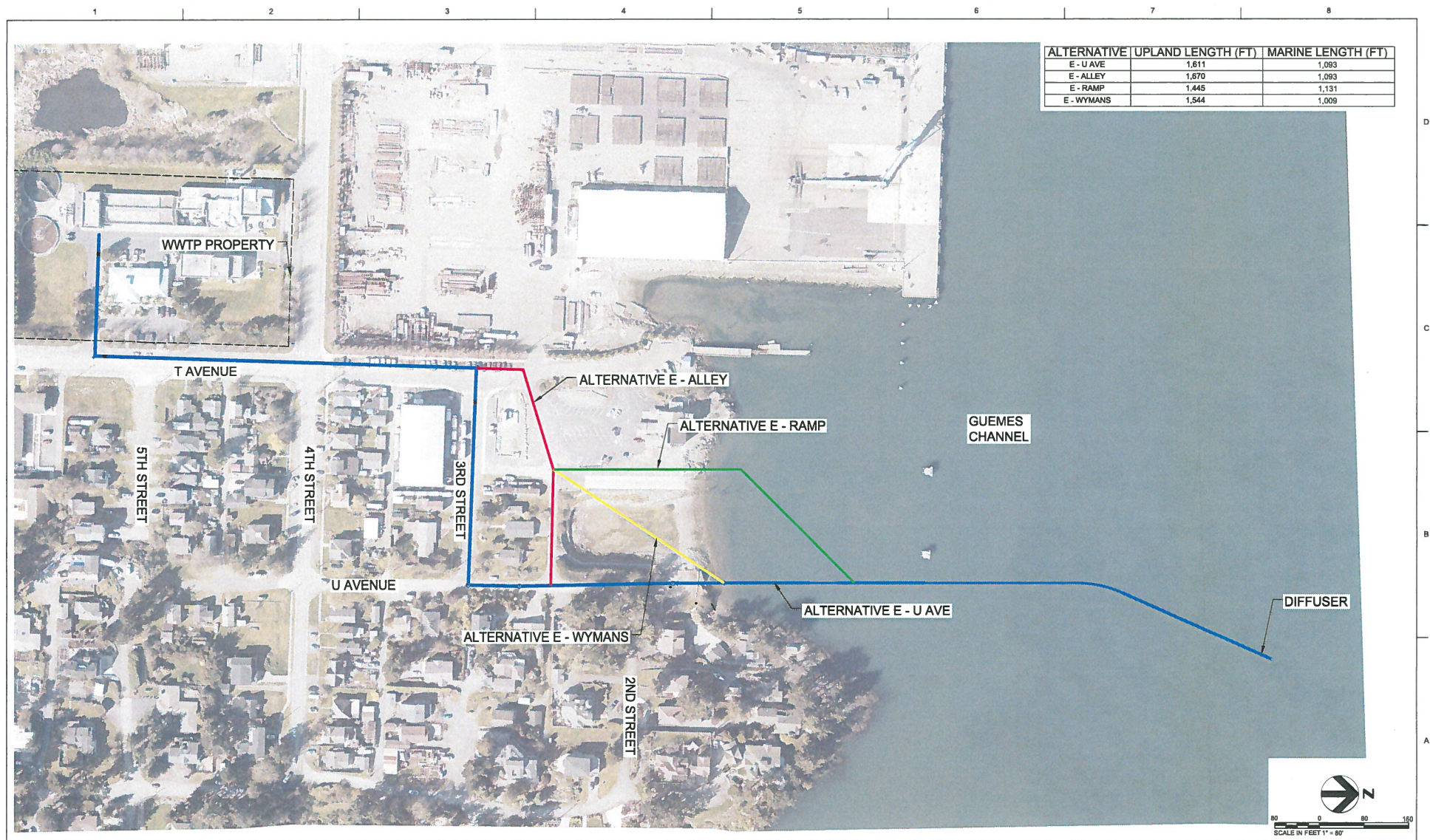
City of Anacortes
*Planning, Community &
Economic Development*

Date Received:

9/17/21

This Outfall Relocation Alignment Alternative Refinement Analysis has been prepared to evaluate potential outfall alignments not specifically detailed in the Outfall Alignment Alternatives Analysis Technical Memo by HDR (HDR TM), nor discussed during public outreach meetings for the project. These refinements in Alignment E are identified as Alternatives “E-Ramp”, “E-Wyman’s”, and “E-Alley”. These alternative alignments are evaluated using the factors in the HDR TM comparing these alternative alignments to the currently selected Alignment E to see if project benefits can be realized.

Figure 1 and Table 1 from the HDR TM have been reworked to focus on the Alignment E refinements and are shown below. Overall Alignments E-Ramp, E-Wyman’s, and E-Alley were potential alignments that were considered and eliminated during the alternatives evaluation process because they have multiple environmental, schedule and cost impacts compared to the chosen Alignment E, now labeled Alignment E-U Ave. The evaluation criteria listed in Table 1 are presented for the E-Ramp, E-Wyman’s, E-Alley and E-U Ave alternative alignments. Detailed explanations for the first twelve criteria listed in Table 1 can be found below.



4/2021	75% DESIGN	
ISSUE	DATE	DESCRIPTION

PROJECT MANAGER	BERGSTROM, ERIC
CIVIL ENG	PETILLA, COLLEEN
DRAWN BY	SCHMIDT, ADAM
PROJECT NUMBER	

PRELIMINARY
NOT FOR
CONSTRUCTION
OR
RECORDING

CITY OF ANACORTES
WWTP OUTFALL RELOCATION -
UPLAND PHASE

FIGURE 1



FILENAME C-001.DWG
SCALE NA

SHEET
C-001

Alignment Alternatives	Length (ft)	Port Property – Construction and Future Operations	Permitting & Construction Possible in 2021	Impacts to Port Facilities	Cut and Cover Marine Construction	Contaminated Marine Sediments	Contaminated Upland Soils	Upland Rock Blasting	Marine Rock Blasting	Deep Trench Construction	Temporary Impacts to Private Property Access	Eelgrass Impacts	Items Requiring Further Consideration
E-Ramp	Upland: 1,445 Marine: 1,131 Total: 2,576	Yes	No	Yes	Difficult, likely to require marine blasting	Yes – higher contaminated area	Likely due to historical activities	Yes	Yes	Yes	Yes. To be managed with Traffic Control Plan and Construction Schedule	Yes	Coordination with Port for new easement. Eelgrass mitigation requirements.
E-Wyman's	Upland: 1,544 Marine: 1,009 Total: 2,553	Yes	No	Yes	Feasible	Yes	Likely due to historical activities	Yes	Yes	No	Yes. To be managed with Traffic Control Plan and Construction Schedule	Yes	Coordination with Port for new easement and must replace Port's mitigation site. Eelgrass mitigation requirements.
E-Alley	Upland: 1,670 Marine: 1,093 Total: 2,763	Yes	Unlikely	Yes	Feasible	Less Likely	Possible	Yes	No	Yes	Yes. To be managed with Traffic Control Plan and Construction Schedule	Not Anticipated	Coordination with Port for new easement.
E-U Ave	Upland: 1,611 Marine: 1,093 Total: 2,704	No	Likely	No	Feasible	Less Likely	Less Likely	Yes	No	Yes	Yes. To be managed with Traffic Control Plan and Construction Schedule	Not Anticipated	Development of detailed construction schedule and traffic management plan to minimize neighborhood impacts.

1. Length:

The four alignments are of roughly equivalent total length with differences primarily in the upland versus marine lengths. The E-Ramp and E-Wyman's are approximately 150' shorter than the E-U Ave, the E-Alley is approximately 60' longer than the E-U Ave.

2. Port Property – Construction and Future Operations:

Alignments E-Ramp, E-Wyman's, and E-Alley all go onto Port Property. Assuming access agreements/easements could be negotiated, these alignments have the potential to impact or limit future Port operations and impact the City's ability to access and service this critical infrastructure. During and after construction, these alignments would impact use of the Port's boat launch ramp, which is a main service point for island communities.

3. Permitting and Construction Possible in 2021:

Alignment E is located 100% within City Right of Way on the uplands, avoiding timeline for negotiation of access to Port property and other potential property rights issues, including potential for project to go through Uniform Relocation Act for the Right of Way (ROW) process. This would have a significant impact to the timeline extending it out years and possibly requiring an Environmental Assessment permitting process. Alignment E avoids the Eelgrass (Item 12), which would increase permitting time. The E-Ramp alignment would require shoreline and likely in water blasting (Item 9), increasing permitting time.

4. Impacts to Port Facilities:

Alignments E-Ramp, and E-Wyman's impact the Ports boat launch ramp, infrastructure critical to island communities. The E-Wyman's alignment would impact the federally regulated Wyman's Aquatic Habitat Mitigation Site and disturbing this site would violate one of the Port's US Army Corp. permits. Not only does the City does not have permission to modify the Port's US Army Crop permit but it would take years to do so and adds substantial permitting complications to this project. See link below for more details on the Wyman's Aquatic Habitat Mitigation Site. <https://www.portofanacortes.com/wymans/>

Attempting to go through the Port's mitigation site and boat launch would create significant delays and potential mitigation requirements in the ROW and environmental permitting process.

5. Cut and Cover Marine Construction:

Cut and cover trenching is a potential for all three alternate alignments, with varying levels of complications based on site conditions. E-Ramp, E-Wyman's and E-Alley require blasting to be performed to allow rock excavation, similar to Alignment E-U Ave for upland areas.

E-Ramp alignment would require rock blasting at the shoreline (See Item 9) and likely in water blasting and would impact eel grass (See Item 12).

E-Wyman's would require blasting within the Wyman's Mitigation Site and then open trench excavation across the established habitat area (See Item 4).

E-Alley would require blasting on the uplands similar to Alignment E-U Ave but on Port property within a narrow (16' wide) alley compared to the 80' wide City ROW.

6. Contaminated Marine Sediments:

Alignments E-Ramp, and E-Wyman's are closer to the Ecology listed contamination site. This site use to be an old lumber milling and shipbuilding operations site with the highest levels of gasoline, heavy metals, and pesticide contamination near the shoreline just west of the boat ramp. This site is also in the middle of cleanup litigation between the Port and Ecology which the

City and the project funding partner (FEMA) do not want to become a liable party for cleaning up.

7. Contaminated Upland Soils:

Alignments E-Ramp, and E-Wyman's are closer to the near shore and in-water sediment contamination from the historic logging operation location. Sediment samples from the site failed to meet Ecology's acceptable Sediment Cleanup Objectives and Cleanup Screening Levels criteria for benthic (i.e., living in or near marine sediments) invertebrate community health. The alignments which stay away from the Port property reduces the Project's risk for running into contamination.

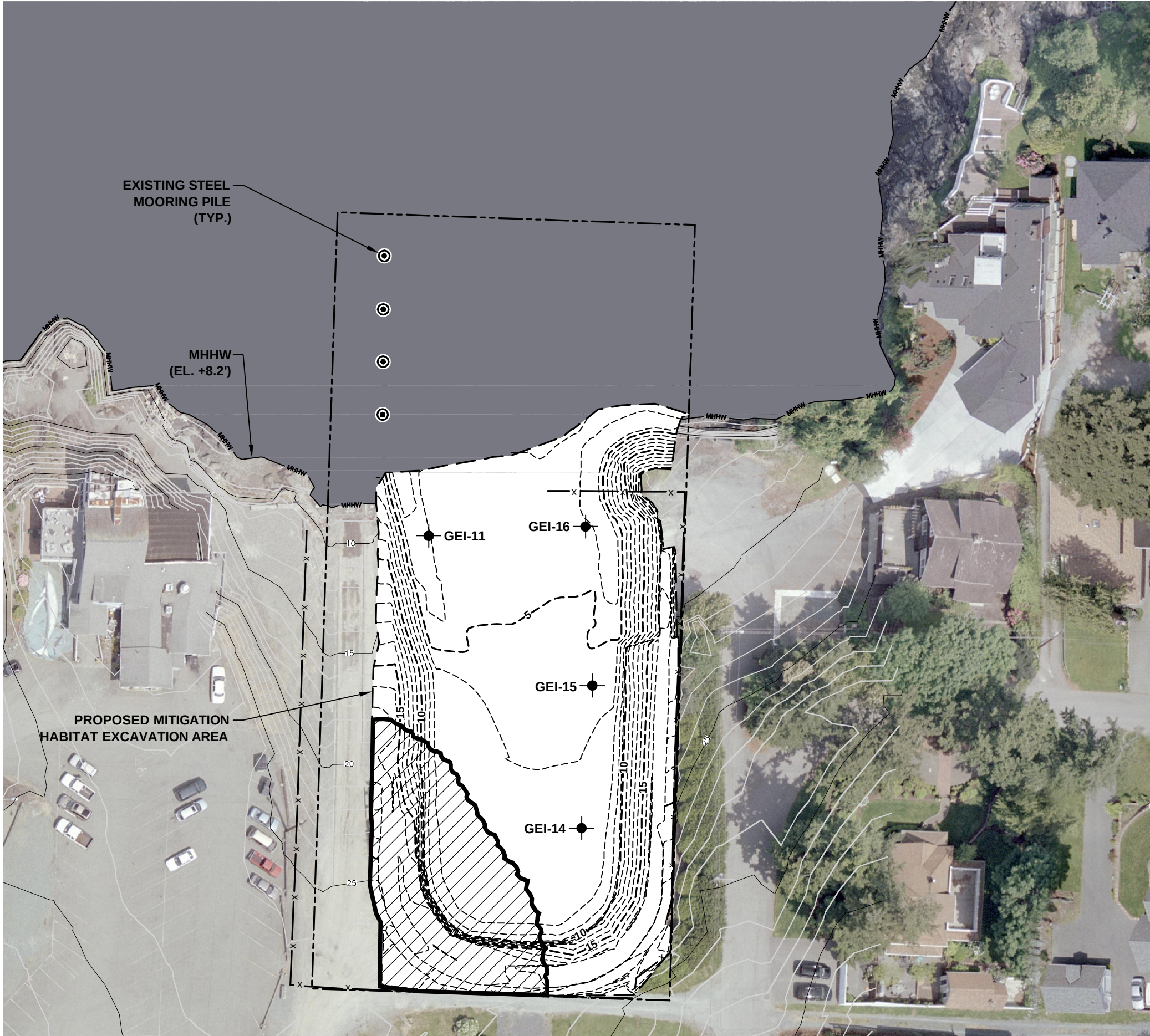
8. Upland Rock Blasting:

Based on the bedrock excavation performed south of the Wyman's mitigation site it is anticipated the E-Alley alignment could require increased blasting compared to Alignment E-U Ave. Overall any of the Alignment E options will have upland rock blasting. Horizontal drilling was considered but open trench was selected for a variety of reasons including costs, public impacts, potential marine environmental impacts, and other factors. Also, even with horizontal drilling, blasting and excavation would still be required in some areas including for manhole installations.

9. Marine Rock Blasting:

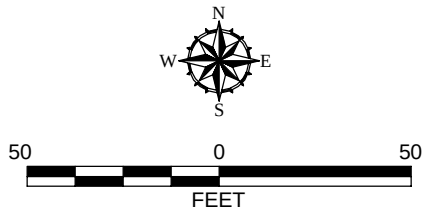
All the focused alternative E routes are anticipated to require blasting, some in or near the water. There is exposed bedrock just to the west of the boat ramp and bedrock was encountered at the south west side of the Wyman's Habitat excavation area (See Figure 6 below from Wyman's Completion Report). It is believed this bedrock extends under the approach to the boat launch ramp and into the area behind the restaurant. This bedrock is believed to be a serious impact to the E-Ramp, and E-Wyman's alignments. Bedrock at the shoreline or within the aquatic environment presents a much greater environmental planning and permitting challenge anticipated to prevent construction in 2021.

P:\15\16\7019\07\CAD\15\16\7019-07 CAR Fig 6.DWG\TAB1:LANDSCAPE MODIFIED BY THICHAUD ON OCT 01, 2014 - 12:25



Legend

- GEI-11 Discret Sample Location (GeoEngineers, 2012)
- Existing Fence
- Existing Topographic Contour (Feet MLLW)
- Excavation Grade Contour (Feet MLLW)
- Approximate Area of Bedrock Encountered within Habitat Excavation
- Site Boundary
- Habitat Excavation Area
- MHHW = Mean Higher High Water



Notes

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

Reference: Base Aerial taken by David C. Smith & Associates, Inc. on 6/17/2009.

Habitat Excavation Area	
Wyman's Marina Site Anacortes, Washington	
GEOENGINEERS	Figure 6

10. Deep Trench Construction:

There is not a significant difference between the required excavation depth for Alignment E-Alley compared Alignment E-U Ave. The ground surface at the alley and U Ave are within 3' of the elevations at 2nd and U Ave.

11. Temporary Impacts to Private Property Access:

Each of the Alignment E options require ~1450 to 1650 lineal feet of trenching and pipeline construction through the streets of Anacortes and will have temporary construction impacts to residents as well as those travelling thru the City. Though Alignments E-Ramp, E-Alley and E-Wyman's reduce temporary impacts to residents they have substantial impacts to the project's permitting process. Alignment E-U Ave only has temporary construction impacts to residents which will be reduced to the extent practicable with proper communication, construction planning and traffic control. A detailed Traffic Control Plan will be developed as part of the project and construction will be sequenced in a way that limits access restrictions to the extent practicable.

12. Eel Grass Impacts:

Alignments E-Ramp, and E-Wyman's will have an increased likely hood of impacting eel grass due to their closer proximity to the eel grass boundary around the center of the cove. Impacts to eel grass would require the project to do mitigation measures and create significant delays and potential mitigation requirements in the environmental permitting process.

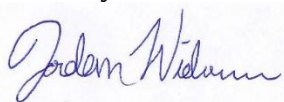
Summary:

Alternative E-U Ave has the highest probability of construction in 2021, the least environmental impacts, a reduced permitting process, does not impact use of the Ports launch ramp and keeps City infrastructure within City ROW. The required upland blasting is similar to the other potential alignments and appropriate construction scheduling, traffic controls and public coordination are required for all of the options.

Based on the factors listed above the funding partners for the Wastewater Treatment Plant (WWTP) Outfall Relocation project chose Alignment E-U Ave as the best alternative.

If you have any questions, please contact me at jordancw@widener-enviro.com or at 510-725-2291.

Sincerely,



Jordan Widener
Widener & Associates

Date Received:

9/17/21

City of Anacortes



Mixing Zone Study

Prepared for:

City of Anacortes
904 6th Street ♦ P.O. Box 547
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and

HDR, Inc.
929 108th Avenue, NE Suite 1300
Bellevue, WA 98004

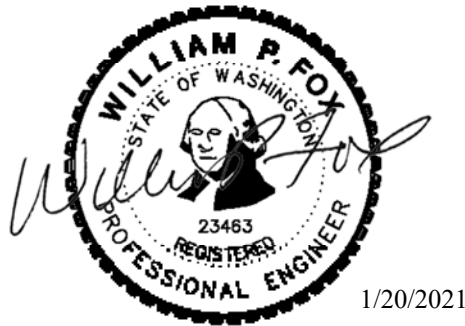
Prepared by:

Cosmopolitan Marine Engineering
PO Box 623 ♦ Gig Harbor, Washington 98335

January 2021

CERTIFICATE OF ENGINEER

The technical material and data contained in this document were prepared under the supervision and direction of the undersigned, whose seal as a professional engineer licensed to practice as such, is affixed below.



William P. Fox, PE
Cosmopolitan Marine Engineering

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SECTION 1: INTRODUCTION

1.1 FACILITY PLAN RECOMMENDATION

The City of Anacortes Wastewater System Facility Plan Combined Sewer System Evaluation (HDR, 2020) established five alternatives to address their SSO issues. The selected alternative includes increased wet weather treatment plant capacity and consolidation of effluent flows through a new outfall and diffuser into Guemes Channel. The new outfall will be upsized to handle all wet weather flows from the City's enhanced collection and treatment systems. The existing WWTP outfall west of Port of Anacortes' Pier 2 and CSO Outfall #4 will be eliminated.

1.2 MIXING ZONE STUDY REQUIREMENTS

The Facility Plan did not develop and evaluate any specific outfall and diffuser alternatives in Guemes Channel, or include a mixing zone study for the new outfall. This report provides the mixing zone study for a new WWTP outfall as required under WAC 173-240-060, specifically addressing the following subsections:

(d) [The report shall establish] the degree of treatment required based upon applicable permits and regulations, the receiving body of water, the amount and strength of wastewater to be treated, and

(e) A description of the receiving water, applicable water quality standards, and how water quality standards will be met outside of any applicable [mixing] zone.

1.3 WATER QUALITY AND MIXING ZONE STANDARDS

The Washington State water quality standards, Chapter 173-201A WAC, authorize the use of mixing zones for NPDES permitted wastewater discharges. Anacortes' existing NPDES permit includes authorization of a mixing zone for the present outfall diffuser at the northwest corner of Pier 2. The dilution factors established in Section S.1.B of the permit are shown in Table 1.

Table 1 Authorized Mixing Zone Dilution Factors for Existing Outfall

Water Quality Criterion	Dilution Factor
Acute Aquatic Life	31
Chronic Aquatic Life	72
Human Health – Carcinogen	305
Human Health – Non-Carcinogen	72

The mixing zone is a specified volume of a receiving water where mixing results in the dilution of the effluent with the receiving water and compliance with water quality standards is required at the boundary of the mixing zone. WAC 173-201A-400 specifies the maximum size of an estuarine mixing zone for which chronic and human health water quality criteria apply:

- (i) *[The mixing zone shall] not extend in any horizontal distance from the discharge port(s) for a distance greater than two hundred feet plus the depth of water over the discharge port(s) as measured during mean lower low water; and*
- (ii) *[The mixing zone shall] not occupy greater than twenty-five percent of the width of the water body as measured during mean lower low water.*

In addition, the mixing zone for which acute criteria apply:

shall not extend beyond ten percent of the distance [of the chronic mixing zone] as measured independently from the discharge port(s).

1.4 MIXING ZONE STUDY GUIDANCE DOCUMENT

This Mixing Zone Study will follow protocol established by Ecology (2018) in their *Permit Writer’s Manual*, notably Chapter 6 - Water Quality-Based Effluent Limits for Surface Waters. Specifically, Appendix C of the manual establishes detailed protocol for conducting mixing zone studies. The criteria in Appendix C include definition of the mixing zones for marine waters, critical worst-case conditions for effluent discharge and ambient receiving water, and selection and application of mixing zone models.

SECTION 2:

ROUND 1 MIXING ZONE MODELING – PRELIMINARY DIFFUSER DESIGN AND CRITICAL AMBIENT CONDITIONS

2.1 OBJECTIVE

Development of a diffuser location and design is an iterative process of environmental assessment and engineering alternative development. The effluent mixing component of the diffuser development is conducted in several rounds of computer simulations. In Round 1, presented in this section of the report, preliminary design criteria for the forcing factors in dilution modeling are estimated from existing information. An EPA computer model is run over combinations of the range of those forcing factors. The result provides a sensitivity analysis to identify the probable range of dilution values and the primary input parameters that control dilution at the mixing zone boundaries.

Hydrographic field studies and engineering development of the pipeline and diffuser manifold alternatives are being conducted in parallel with Round 1 mixing zone modeling. The results of Round 1 modeling will be used to establish critical ambient conditions and winnow the diffuser options that will be carried forward into Round 2, in which final diffuser design development and mixing zone modeling will be completed.

2.2 DILUTION MODEL

Ecology supports a number of numerical dilution models, which are described in Appendix C to the Permit Writer's Manual. Visual Plumes is an EPA computer interface used to evaluate effluent mixing with the receiving waters, consisting of a suite of mixing models. Included in Visual Plumes is the three-dimensional hydrodynamic model UM3 (Baumgartner, 1993). It simulates single and multi-port submerged discharges, and accounts for both momentum and buoyancy induced mixing. In addition to dilution, the model simulates parameters of interest including plume rise and diameter.

Ecology (2008, 2018) advises UM3 for Puget Sound outfalls. UM3 will be used within the Visual Plumes interface for evaluating effluent mixing and plume rise for this project.

2.3 MODELING INPUTS

The Visual Plumes interface allows for a variety of user-specified inputs including diffuser design qualities, effluent conditions, and ambient water conditions. This section describes the inputs that were used in this first round of modeling. To evaluate sensitivity of model results to key input parameters, a range of preliminary diffuser design configurations was developed (number and size of port openings, orientation, and spacing). In total, there were 14 diffuser designs, four diffuser depths, three mixing zone conditions, and 82 ambient water column profiles used.

2.3.1 Diffuser Design Parameters

The 14 diffuser designs used in this modeling are shown in Table 2.

Table 2 First Round Modeling Diffuser Designs

Number of Ports	Horizontal angle (degrees)	Port Diameter (in)	Port Spacing (ft)	Diffuser Length (ft)
1	0	32.4	n/a	n/a
4	90	12.6	10	40
			20	80
8	90	9.7	5	40
			10	80
			15	120
16	90	6	2.5	40
			5	80
			7.5	120
			10	160
32	90	5	2.5	80
			3.75	120
			5	160
			6.25	200

“Horizontal angle” refers to the direction in which the diffuser ports point. This information is relevant in connection with the current direction, which was input as 90 degrees. For the one-port design, the horizontal angle of zero degrees indicates a single pipe pointing out into the

receiving water at an angle perpendicular to the current and discharging from the end of the pipe. For the multi-port designs, the horizontal angle of 90 degrees corresponds to the body of the diffuser lying perpendicular to the current and the diffuser ports branching off in the direction of the current.

In addition to these parameters, all diffuser designs used an initial vertical angle of 30 degrees and port elevation of one meter. The vertical angle is the upward direction in which the diffuser ports point (zero degrees would be flat; 90 degrees would be pointing straight up). The port elevation is the distance between the ports and the bottom of the body of water. This elevation is mostly relevant in determining whether the effluent plume might hit the bottom – an unlikely occurrence with these inputs, but possible with a lower elevation and shallower angle.

2.3.2 Diffuser Depths

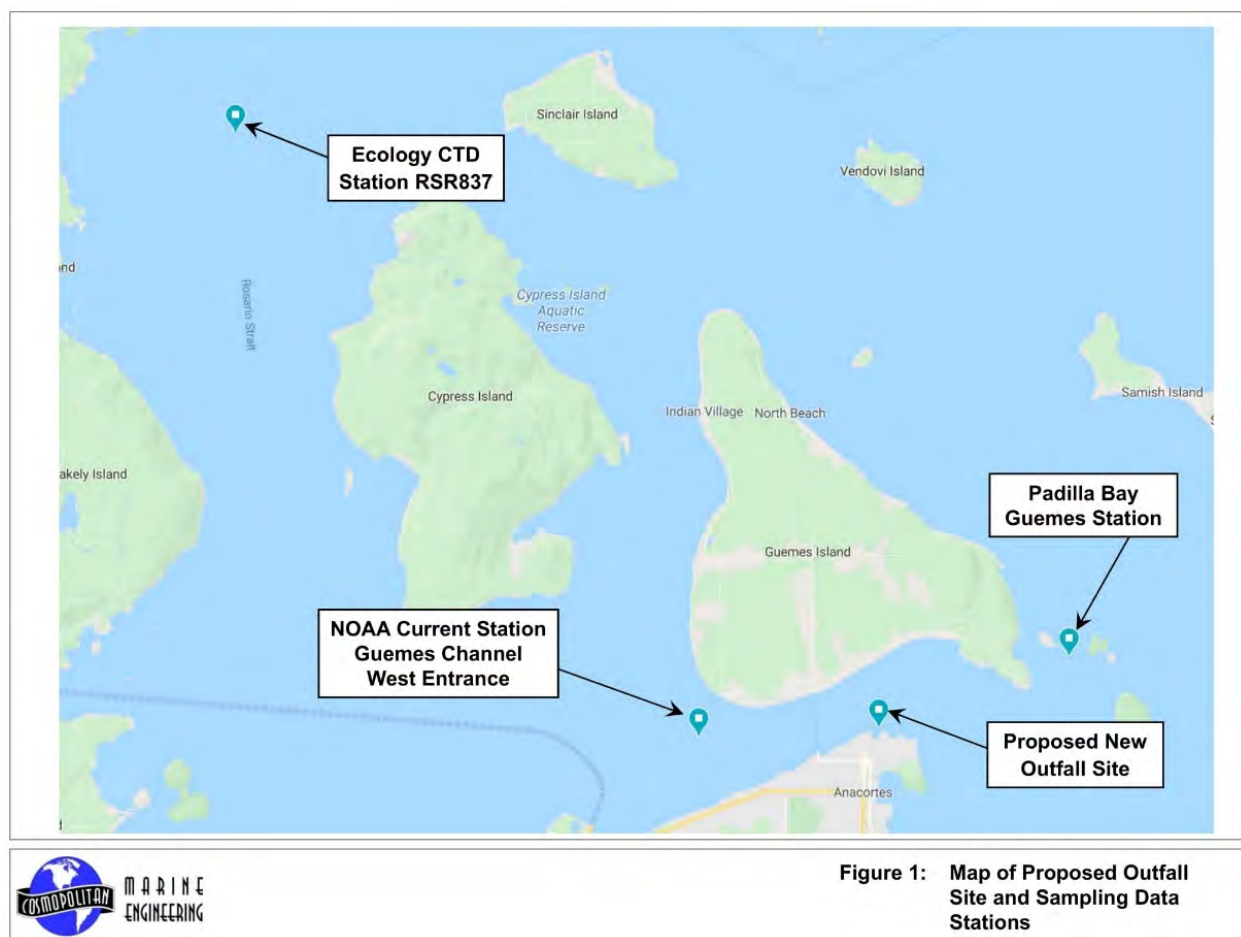
Based on available water depths in Guemes Channel offshore of Port of Anacortes facilities, and to test the influence of discharge depths on effluent mixing, the diffusers were modeled at discharge depths of 40, 50, 60, and 70 feet MLLW datum.

2.3.3 Ambient Temperature and Salinity

Wastewater effluent, with a specific gravity of approximately 1.0, is buoyant upon discharge to marine waters, which have specific gravity on the order of 1.024 in the Salish Sea (Puget Sound, Georgia Straits and Strait of Juan de Fuca). The buoyancy causes the discharged effluent to rise vertically in the water column, creating significant turbulence and rapid mixing. But the ambient density is layered, with fresher water near the surface due to river runoff and other oceanographic factors. This density stratification limits the rise of the effluent plume, and thus the dilution. The degree of ambient density stratification, or density gradients, is one of the principal determinants of effluent mixing.

Because ambient density stratification is so influential to effluent mixing, a comprehensive literature search of ambient salinity and temperature gradients has been conducted. This Round 1 modeling used temperature and salinity data from the two sites nearest Anacortes that have significant ambient density data. The locations of these sites are shown in Figure 1. The Rosario

Strait data were from the Marine Water project, a routine monitoring project conducted since 1999 by Ecology (Ecology.wa.gov) and were collected with a suite of Seabird instruments Models SBE 3 and SBE 4. The Guemes Channel data were provided by the Padilla Bay branch of the National Estuarine Research Reserve (coast.noaa.gov/nerrs) and were collected with a YSI Sonde. In both systems, instruments are lowered into the water to take measurements including CTD (conductivity, temperature, and depth) at a variety of depths. Salinity is calculated from these other measurements. The resulting data sets are referred to sometimes as water columns and sometimes as ambient profiles.



The data chosen for this modeling were from 2016 through early 2020. During this time frame, each organization performed sampling roughly once a month, for a total of 82 ambient profiles. For this modeling and the subsequent analysis, each ambient profile was given an alphanumeric label indicating the location and date. A full list of the sampling dates and their labels can be seen in Appendix A.

For each ambient profile, salinity and temperature data were entered into the Visual Plumes interface for every meter from one to 22 meters deep (this chosen cutoff point is equal to 72.2 ft, just slightly deeper than the 70 ft diffuser depth). The Ecology data already contained entries at every half meter; the Padilla Bay data was not given at any regular depth interval, so these data points were interpolated. Graphs of salinity and temperature for each profile can be seen in Appendix B.

2.3.4 Effluent and Ambient Flow

In this modeling, the current speed and effluent flow rates were varied to simulate both moderate and critical conditions according to Appendix C of the Permit Writer's Manual. The critical conditions were for assessing compliance with acute water quality criteria, and the moderate conditions were for chronic water quality criteria. For acute runs, current speeds in both the 10th percentile and the 90th percentile are specified. For the chronic runs, the 50th percentile current speed is required. Current speed statistics for this preliminary modeling were determined from 12 months of tidal current predictions every 5 minutes at NOAA's Guemes Channel, West Entrance station (tidesandcurrents.noaa.gov). The effluent flows chosen were preliminary projected 80-year buildout flow rates provided by HDR for Maximum Day Design Flow (acute) and Maximum Month Design Flow (chronic). These ambient and effluent values are shown in Table 3.

Table 3 Acute and Chronic Conditions

Conditions	Current Speed (m/s)	Effluent Flow (MGD)
Acute—10 th percentile	0.1	15.3
Acute—90 th percentile	1.23	15.3
Chronic—50 th percentile	0.51	5.6

2.3.5 Mixing Zone Dimensions

Visual Plumes outputs information about the effluent dilution at the boundaries of mixing zones, the sizes of which are user-specified. The sizes used in this modeling can be seen in Table 4. These values were contingent on the discharge depth, as per the regulations set out in 173-201A-

400 WAC and discussed in Section 1.3 of this report. For all modeling runs, Visual Plumes requires both acute and chronic mixing zone sizes and outputs the dilution for each. However, dilutions discussed in the analysis refer to only the acute dilution for acute runs and only the chronic dilution for chronic runs.

Table 4 Mixing Zone Dimensions

Port Depth (ft)	Chronic and Human-Health Mixing Zone Size (ft) ¹	Acute Mixing Zone Size (ft) ²
40	240	24
50	250	25
60	260	26
70	270	27

¹ distance measured from each diffuser port

² 10 percent of chronic mixing zone distance

2.3.6 Other Effluent and Ambient Qualities

In addition to the variable inputs listed above, the following inputs were used for every modeling run:

- Effluent salinity: 0 psu
- Effluent temperature: 60° F
- Effluent concentration: 100% (This produces model predictions that are inverse of dilution, useful for wastewater quality calculations.)
- Current direction: 90 degrees (This is somewhat arbitrary; as discussed in Section 2.3.1, it is only relevant in connection with the diffuser discharge angle.)
- Ambient effluent concentration: 0% (no tidal reflux)
- Pollutant decay rate: 0 s⁻¹
- Far-field diffusion coefficient: 0.0003 m^{2/3}s² (This coefficient is used in the Brooks farfield algorithm, which models plume behavior after the plume surfaces if it has not yet reached the edge of the chronic mixing zone. The value given here is the default value in Visual Plumes and is considered conservative.)

2.3.7 Total Modeling Runs

Effluent mixing was modeled in Visual Plumes for every possible combination of the 14 diffuser designs, four depths, three mixing zones, and 82 ambient profiles, for a total of 13,776 runs.

These runs were performed in large batches. Their outputs were saved in text files, which were then parsed by a computer program to check for correct inputs and read out the relevant prediction data for statistical and sensitivity analyses.

2.4 RESULTS AND ANALYSIS

2.4.1 Comparison of Ambient Profiles

One of the primary goals of this first round of modeling was to compare the 82 ambient profiles and determine which ones represented critical conditions (high density stratification), as defined by the lowest dilution at the boundaries of the mixing zones. For each profile, the average acute and chronic dilutions were calculated. This meant separately averaging the dilutions of all acute runs and all chronic runs that used that profile. Additionally, the average acute and chronic dilutions over all of the profiles were calculated. Then the acute and chronic values for each profile were divided by these broader values and expressed as a percentage. Resulting values lower than 100% indicated that a profile performed worse than average; values higher than 100% indicate better-than-average dilution. The full results of this process are shown in Appendix C. Summarizing charts can be seen in Figure 2.



Figure 2 Acute and Chronic Dilutions for Ambient Profiles

The following are some broad conclusions that can be drawn from these results:

- Spring and summer density profiles generally produced the lowest dilutions
- Guemes profiles produced lower dilutions than Rosario profiles
- 2016 and 2017 dilutions were lower than 2018 and 2019, on average.
- Summer of 2017 had particularly low dilution compared to all other years and seasons.
- Most acute dilutions differed only a few percentage points from the average, ranging from around 95% to 102%, while chronic dilutions varied much more widely, from about 51% to 112%.
- The most critical profiles are gue1706b (Guemes 6/20/17), gue1707 (Guemes 7/12/17), gue1708 (Guemes 8/9/17), and rsr1706 (Rosario 6/14/17). These four were in the bottom 5th percentile for both acute and chronic dilution.

2.4.2 Comparison of Diffuser Depths

To compare diffuser depths, a similar process was used to the one described in the previous section. For each port depth, the average dilutions for acute and chronic runs were calculated, and these results were then divided by the averages across all acute or chronic runs. The resulting values are shown in Table 5 and charted in Figure 3.

Table 5 Depth Comparison

Diffuser Depth (ft)	Acute Runs		Chronic Runs	
	Avg Dilution	Percent of All-Run Average	Avg Dilution	Percent of All-Run Average
40	36.26	91.9%	559.1	84.8%
50	38.38	97.2%	632.4	95.8%
60	40.54	102.7%	694.1	105.2%
70	42.70	108.2%	753.4	114.2%

Predictably, the dilutions are higher for the deeper diffusers. The chart reveals that the relationship between depth and dilution factor was essentially linear. Like with the ambient profile comparison, the chronic dilutions were more variable than the acute dilutions.

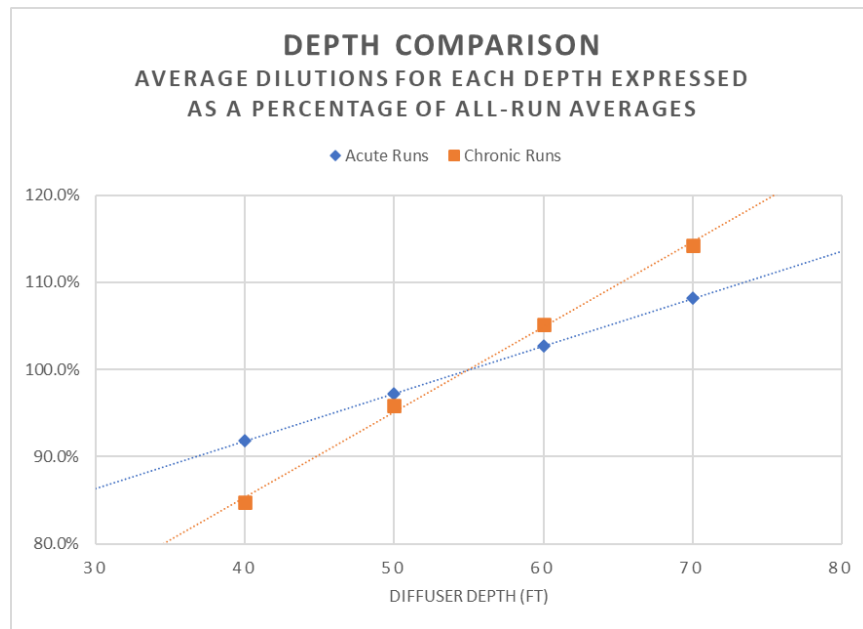


Figure 3 Depth Comparison with Linear Trendlines

2.4.3 Comparison of Current Speeds

Another aim of this round of modeling was to determine which of the two current speeds that were used for acute runs was more critical. Again, the metric used to compare the two was dilution. For each run using the 10th percentile current, there was a corresponding run using the 90th percentile current with identical diffuser design, ambient profile, and port depth. For each such pair of runs, the 10th percentile dilution was divided by the 90th percentile dilution, and the resulting value was expressed as a percentage. Values less than 100% indicated that the 10th percentile current produced lower dilutions under those particular parameters, and values greater than 100% indicated the 90th percentile current dilution values were lower. There were about 4,600 pairs of runs compared in this fashion, more than can be graphically displayed here.

However, these results were further manipulated in the following ways:

- The percentage values were averaged across all pairs of runs, with a resulting value of 149.4%, indicating that, in general, the 10th percentile current produced significantly higher dilutions than the 90th.
- The percentage values were also averaged across all of the runs that used each ambient profile. The results were fairly uniform, ranging from about 143% to 152%, revealing that the 10th percentile current produced higher dilutions than the 90th for every ambient

profile. However, it is worth noting that the lower values in the range were for the more critical spring and summer profiles that were identified earlier, indicating that the edge that the 10th percentile current had over the 90th was smaller under the most critical conditions.

- Finally, the percentage values were averaged across all of the runs that used each combination of port depth and diffuser design. Here, there was much more variation: the results ranged from 84% to 225%. For the simplest diffuser designs (fewest ports) at the shallowest depths, which generally had lower dilutions, the 10th percentile current was not notably better—and in several cases was worse—than the 90th percentile current. However, the 10th percentile current had far higher dilutions for the deeper and more complex diffusers.

The broad conclusion that can be drawn from this analysis and carried forward into Round 2 is that for the acute mixing zone, the 90th percentile current is more critical than the 10th percentile current.

2.4.4 Trapping

Thus far, the only metric that has been queried in this analysis is dilution at the boundaries of mixing zones. However, Visual Plumes also outputs other data, including information about trapping. Trapping occurs when the plume reaches neutral buoyancy underwater and thus does not rise all the way to the surface. The water surface is a biologically important interface, and a surfacing plume can constitute an aesthetic nuisance. Therefore, maximizing the frequency of plume trapping is an objective of the outfall design.

Trapping trends in Round 1 modeling were examined for the chronic runs only. This choice was somewhat arbitrary but was determined by the fact that the high effluent flow rates used in the acute modeling are rare events. The chronic conditions modeled are closer to a typical condition. Table 6 shows the trapping frequency and the average depth at which trapping occurred for the various diffuser depths from the chronic runs. Figure 4 shows the trapping frequency for each ambient profile.

Table 6 Trapping Frequency and Depth For Various Diffuser Depths

Diffuser Depth (ft)	Trapping Frequency	Average Trapping Depth (ft)
40	40.9%	26.65
50	50.5%	33.37
60	54.2%	39.69
70	56.1%	45.91

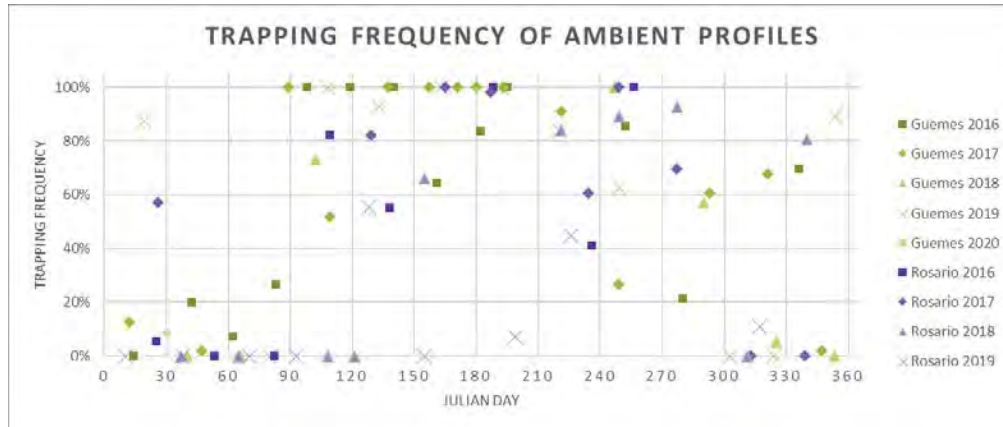


Figure 4 Trapping Frequency of Ambient Profiles

The following generalizations can be drawn from this data:

- Trapping occurred more frequently when deeper diffusers were used. The deeper the plume is discharged, the further it must travel to reach the surface and the more likely it is to reach neutral buoyancy before doing so.
- On average, when trapping did occur, the plume rose about 15-25 feet before trapping.
- The profiles that were worse for dilution (Guemes profiles, spring and summer, and 2016 and 2017) were also more likely to result in trapping. This is intuitive because the higher stratification in summer that limits dilution also inhibits the plume from reaching the surface.
- Winter months when ambient density stratification is less are the period when effluent plumes are most likely to surface.

2.5 SEASONAL OCEANOGRAPHIC FACTORS

The results of this modeling clearly indicate that spring and summer are the most critical seasons for effluent dilution. The temperature and salinity graphs in Appendix B shed light on this trend; they reveal that the water was more highly stratified in spring and summer, with layers of warmer and less salty water near the surface. The effluent mixing process depends on the warm and buoyant freshwater plume being propelled upward as it meets the colder and denser saltwater of the receiving body. If it then encounters layers of warm, fresh water near the surface, it is likely to reach neutral buoyancy and stop rising, curtailing the mixing process.

The occurrence of higher water temperatures in spring and summer is intuitive. The higher stratification, however, deserves some investigation. It was speculated that this trend may be due to high spring and summer flows in the Fraser River, which discharges into the Strait of Georgia near Vancouver, B.C., and to prevailing winds moving the resulting mass of freshwater south towards Anacortes. The Nooksack River discharging into Bellingham Bay is also a nearby source of fresh water that may have impacted stratification near Anacortes.

To test the viability of this theory, flow data from the Fraser and Nooksack Rivers were obtained and examined, as was wind data from the Tsawwassen ferry terminal, located on the Strait of Georgia near the U.S.-Canada border. The findings are described below. Relevant locations are shown in Figure 5.

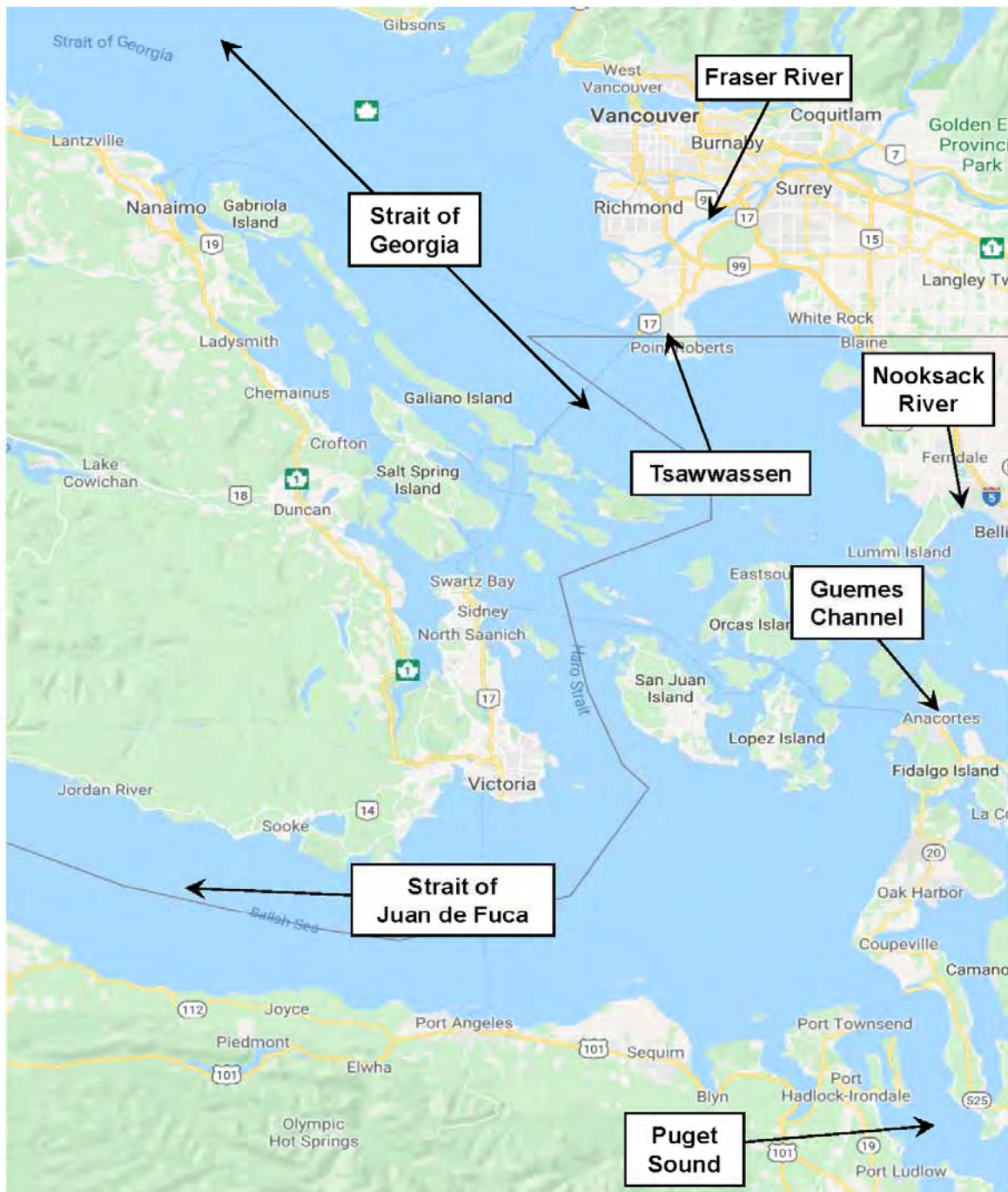


Figure 5: Map of Oceanographically Relevant Locations

2.5.1 Fraser River

The Fraser River is the longest river in British Columbia, and its drainage basin comprises roughly one quarter of BC's total land area. The Water Survey of Canada maintains a number of flow monitoring stations along the river and its tributaries (wateroffice.ec.gc.ca). The furthest downstream of these stations is located at the town of Hope, 130 kilometers east of Vancouver. Although the Hope station does not provide a complete snapshot of flows in the Fraser River, most of the river's discharge passes through this point. The Water Survey lists the drainage area of Fraser River at Hope at 217,000 square kilometers, and the drainage area of a water level monitoring station at Port Mann, only 30 kilometers from the coast and a mere 5 kilometers from the beginning of the delta that comprises the last portion of the river, is given as 232,000 square kilometers. Thus, the drainage area of Fraser River at Hope comprises around 93% of the drainage area much closer to the mouth. Furthermore, the upstream placement of this station frees it from the tidal influences that extends at least to the town of Mission, 60 kilometers east of the mouth of the river.

Flow data for the Fraser River at Hope from 2016 through 2019 are shown in Figure 6. These graphs were created with a free online graphing tool provided by the BC River Forecast Center (bcrfc.env.gov.bc.ca). They clearly illustrate a trend of high river flows in the spring and summer, with a peak occurring in May or June and flows tapering off slowly through the summer.

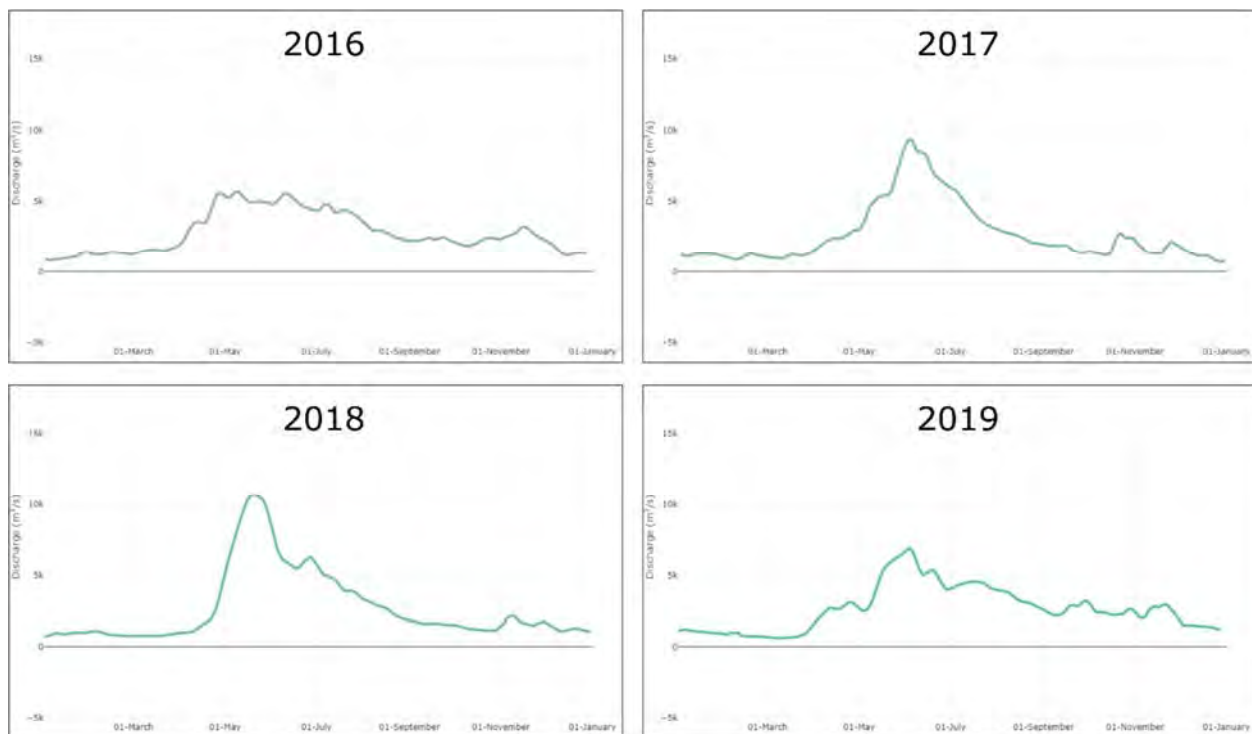


Figure 6 Fraser River at Hope 7-Day Mean Streamflow

2.5.2 Nooksack River

Another river that could potentially have influenced water conditions near Anacortes is the Nooksack River, which discharges into Bellingham Bay about 17 miles north of Anacortes. The US Geological Survey (USGS) operates multiple flow monitoring stations along the Nooksack River, including one station at Ferndale, WA, 5 miles north of the mouth of the river (waterdata.usgs.gov). The USGS data were downloaded at 15-minute intervals, from which monthly means were calculated for 2016 through 2019. Figure 7 shows a chart of these monthly means.

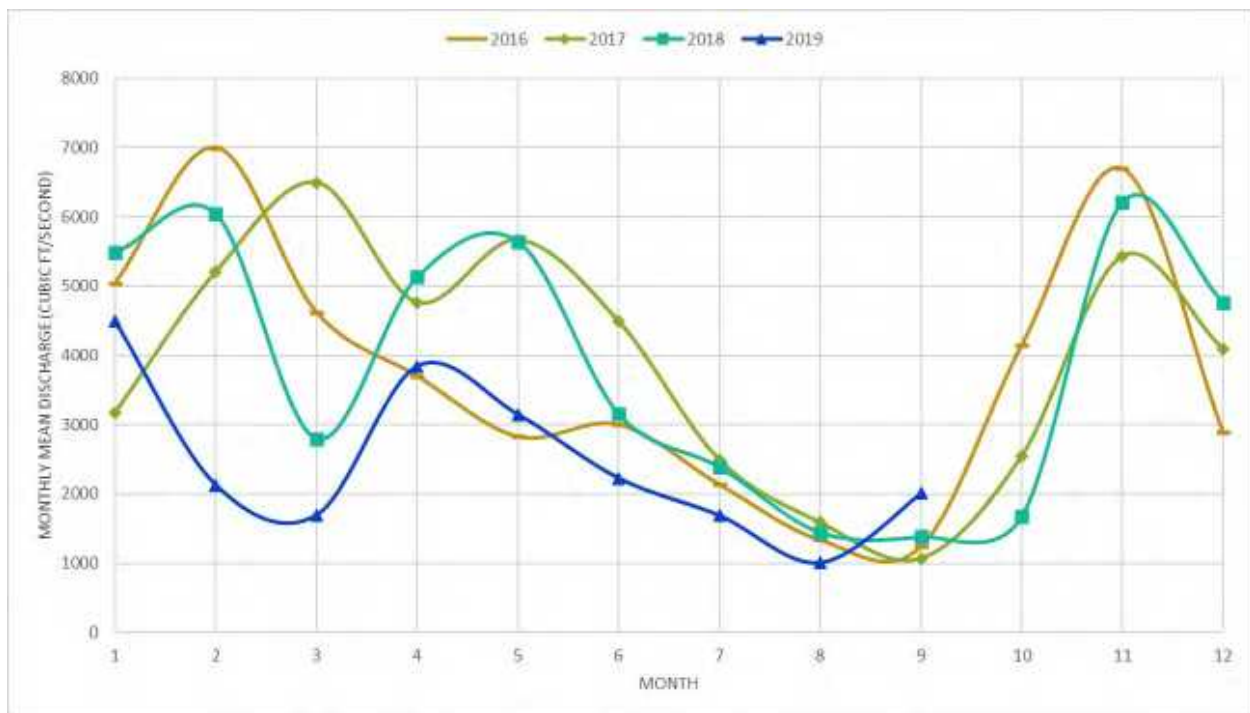


Figure 7 Nooksack River at Ferndale, WA Monthly Flow

This chart shows that the Nooksack tends to have one or more periods of peak flow during spring, with flows tapering off by the end of the summer and then peaking again in late fall. These peak flows do not align with the periods of high stratification as well as the Fraser's do. However, it must be noted that the Nooksack's discharge is only a fraction of the Fraser's. The average flow of each river is given in Table 7. These data were obtained from the BC Ministry of Environment (Fraser) and the USGS (Nooksack). The Nooksack's average flow is only about 3% of the Fraser's.

Table 7 Fraser and Nooksack Average Flow

River	Average Flow (ft ³ /sec)
Fraser	122,700
Nooksack	3,814

Scholarly sources agree with the assessment that the Fraser River is most influential near Anacortes. Moore et. al. (2008) of the University of Washington write the following regarding

the North Basin, an area they define as containing Anacortes, Bellingham, the San Juan Islands, and the southern Strait of Georgia:

The Fraser River strongly influences oceanographic properties in the Strait of Georgia and the Strait of Juan de Fuca... The majority of the Fraser River basin experiences substantially colder winter and spring temperatures than those of Puget Sound watersheds, and its annual runoff is dominated by snowmelt in early spring and early summer. As a result, climatological patterns of salinity in North Basin are dominated by the presence of fresher surface layers from June until September.

2.5.3 Prevailing Winds

To learn about wind behaviors in the Strait of Georgia, records from the Tsawwassen ferry terminal in BC were analyzed. This information was provided by Environment and Climate Change Canada, which maintains an online database of historical climate records (climate.weather.gc.ca). The accessed records consisted of wind speed and direction recorded at hourly intervals. These records alone were not particularly useful for determining the extent to which wind was blowing towards or away from Anacortes, so a metric was devised. Wind blowing straight from the mouth of the Fraser River to Anacortes would have a direction of 325 degrees; however, to account for nearby land masses influencing the path that water would need to take in order to travel between the two, this value was adjusted to 320 degrees. Each pair of speed and direction values in the data set was treated as a vector, and the component of that vector with a direction of 320 degrees was calculated. Examples of this process can be seen in Figure 8. The black arrows represent the true wind vector, and the red arrows represent the calculated portion. For this calculated portion, positive wind speed values indicate wind blowing towards Anacortes; negative values indicate wind blowing away from Anacortes.

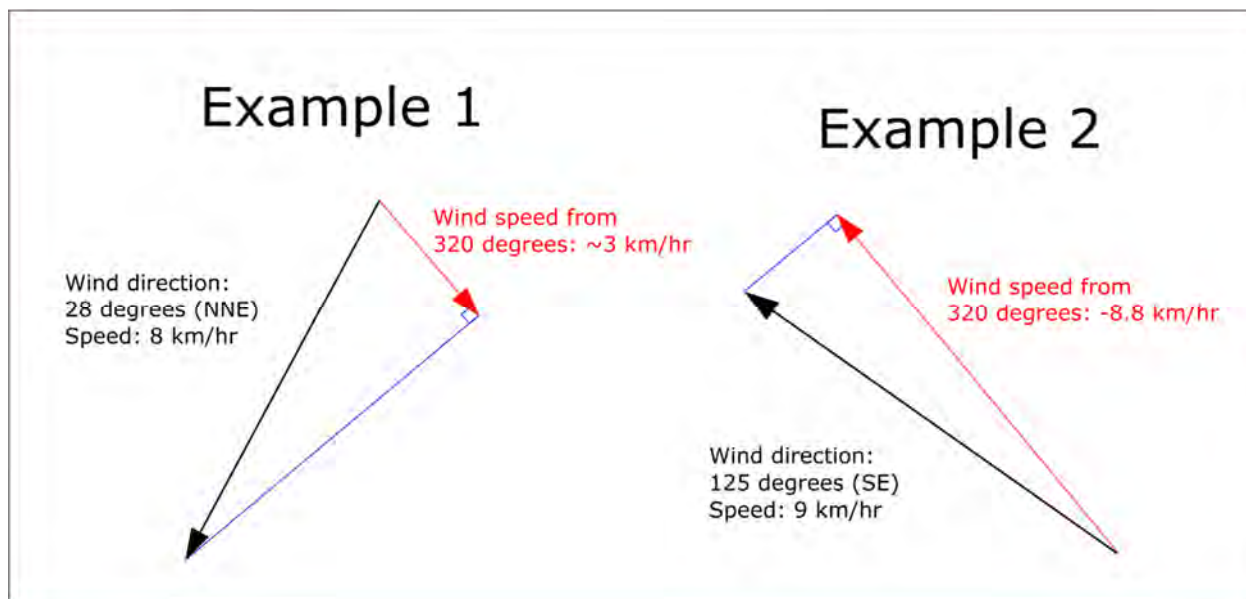


Figure 8 Calculating Wind Speed from 320 Degrees

After the vector portion of interest was extracted, the hourly data points were consolidated into daily means, which were then turned into 30-day moving averages and charted over the calendar year. This chart is shown in Figure 9. The filled-in portions of the chart indicate periods of time when more than 90% of the data points that should have gone into the moving average were missing. For the most part, the chart shows the wind blowing away from Anacortes rather than towards it (negative rather than positive values); however, the few times when the 30-day averages cross over into positive values do occur in spring and summer, and the negative values seen in spring and summer are less extreme than those in autumn and winter.

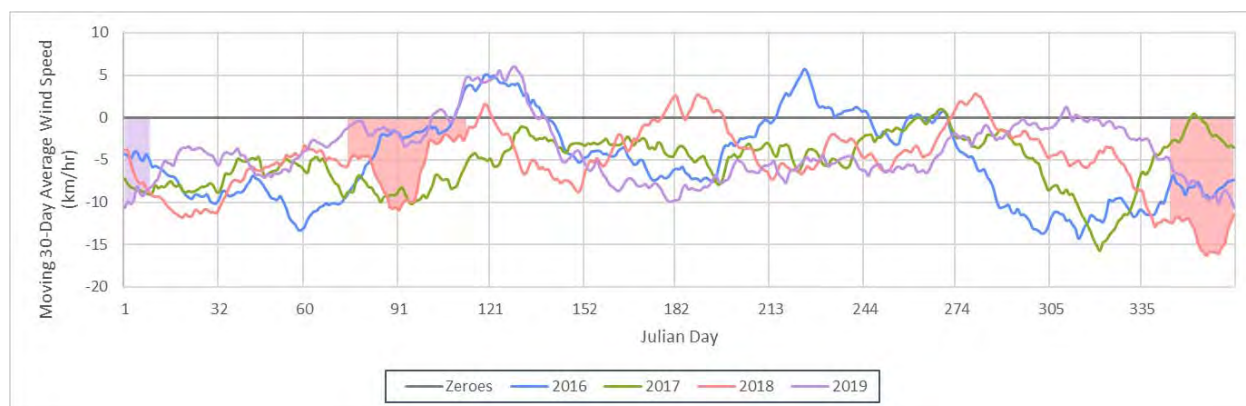


Figure 9 Wind from 320° (NW) at Tsawwassen Ferry Terminal, BC

2.5.4 Summary

This oceanographic investigation opened with the hypothesis that the high stratification in spring and summer may be due to high levels of freshwater being discharged from the Fraser and/or Nooksack River and blown southeast to Anacortes by the prevailing winds. The findings of this investigation give partial support to this theory. The Fraser River was found to have high spring and summer flows, and was determined to be the river with the most dominant influence on waters near Anacortes due to its relative size. The spring-summer correlation of high Fraser River discharge with high density stratification in Guemes Channel vicinity is clear, and is confirmed by oceanographers from University of Washington and Department of Ecology.

The wind investigation found that the amount of wind blowing from the Fraser River towards Anacortes was, in general, higher in spring and summer than it was in autumn and winter. However, in any given 30-day period, there was almost always more wind blowing away from Anacortes than towards it. From these findings, it is difficult to draw any conclusions about the wind's role in influencing water stratification.

2.6 INTER-ANNUAL OCEANOGRAPHIC FACTORS

The Round 1 modeling, as indicated by the lowest dilution predictions, revealed that 2016 and 2017 spring-summer stratification was higher than 2018 and 2019. In particular, the four ambient density profiles that produced the lowest dilutions were from June-August 2017 (Appendix C).

According to Ecology oceanographers (Bos and Albertson 2020), summer 2017 was fresh after a very wet spring. This was followed by typical and more salty-dense conditions in 2018 and 2019. Oceanographic upwelling cycles offshore of the Washington Coast contributed to the anomalous high stratification in 2017. The lower salinity in 2017 compared to 2018 and 2019 in Puget Sound is shown in Figure 10.

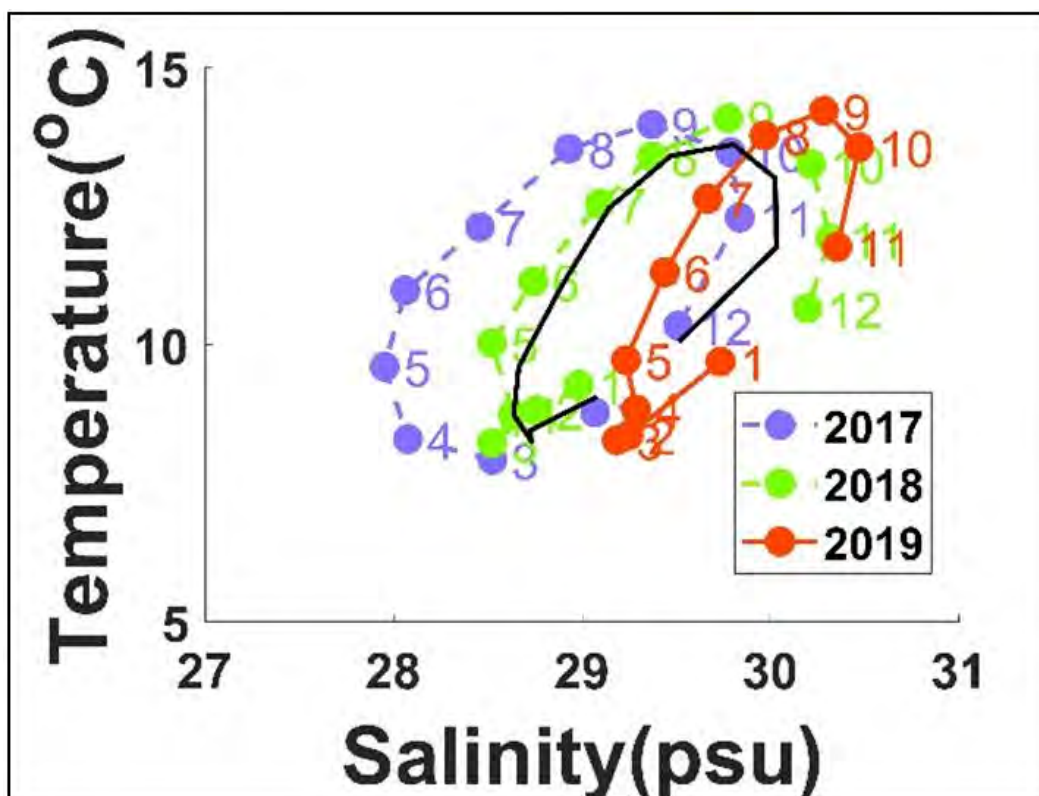


Figure 10 Temperature-Salinity Graph in Puget Sound 2017-2019

The conclusion from these observations relative to this mixing zone study is that inter-annual variations in ambient density stratification are significant near Guemes Channel. The four density profiles from June through August 2017 captured the critical ambient conditions of both seasonal and inter-annual (i.e. year-to-year) variability.

SECTION 3: ROUND 2 MIXING ZONE MODELING – DIFFUSER DESIGN AND DILUTION FACTORS

3.1 OVERVIEW

The Round 1 mixing zone modeling examined a range of diffuser lengths and depths, and established the critical ambient conditions for acute and chronic mixing zones. Field studies conducted concurrently with Round 1 modeling included a one-month current meter deployment and hydrographic mapping of the study area. This second round updates the critical ambient current statistics, establishes the recommended diffuser location and design parameters, and establishes the final mixing zone dilution factors for aquatic life and human health water quality criteria.

3.2 FIELD STUDIES

3.2.1 Hydrographic Mapping

Hydrographic surveys including multi-beam bathymetric mapping, side-scan sonar, and sub-bottom profiling were completed the first week of May 2020. The survey area encompassed both sides and offshore of the Port of Anacortes' Pier 2. The bathymetric map of the study zone for a new outfall is shown in Figure 11. Three general outfall corridors are shown, and the location of the current meter.

3.2.2 Current Meter

A Nortek 1 MHz upward-looking acoustic doppler current profiler (ADCP) was deployed by RPS Group, Inc. (2020) April 3 through May 5, 2020. The one-month deployment period captured the principal diurnal and lunar cycles of tidal currents. Culbertson Marine Construction provided vessel assistance and deckhands for the deployment and recovery.

The current meter was secured in a weighted frame with an acoustic release for recovery, and placed on the bottom at the locations shown. A photo of the apparatus prior to deployment from the Culbertson tug is shown in Figure 12.

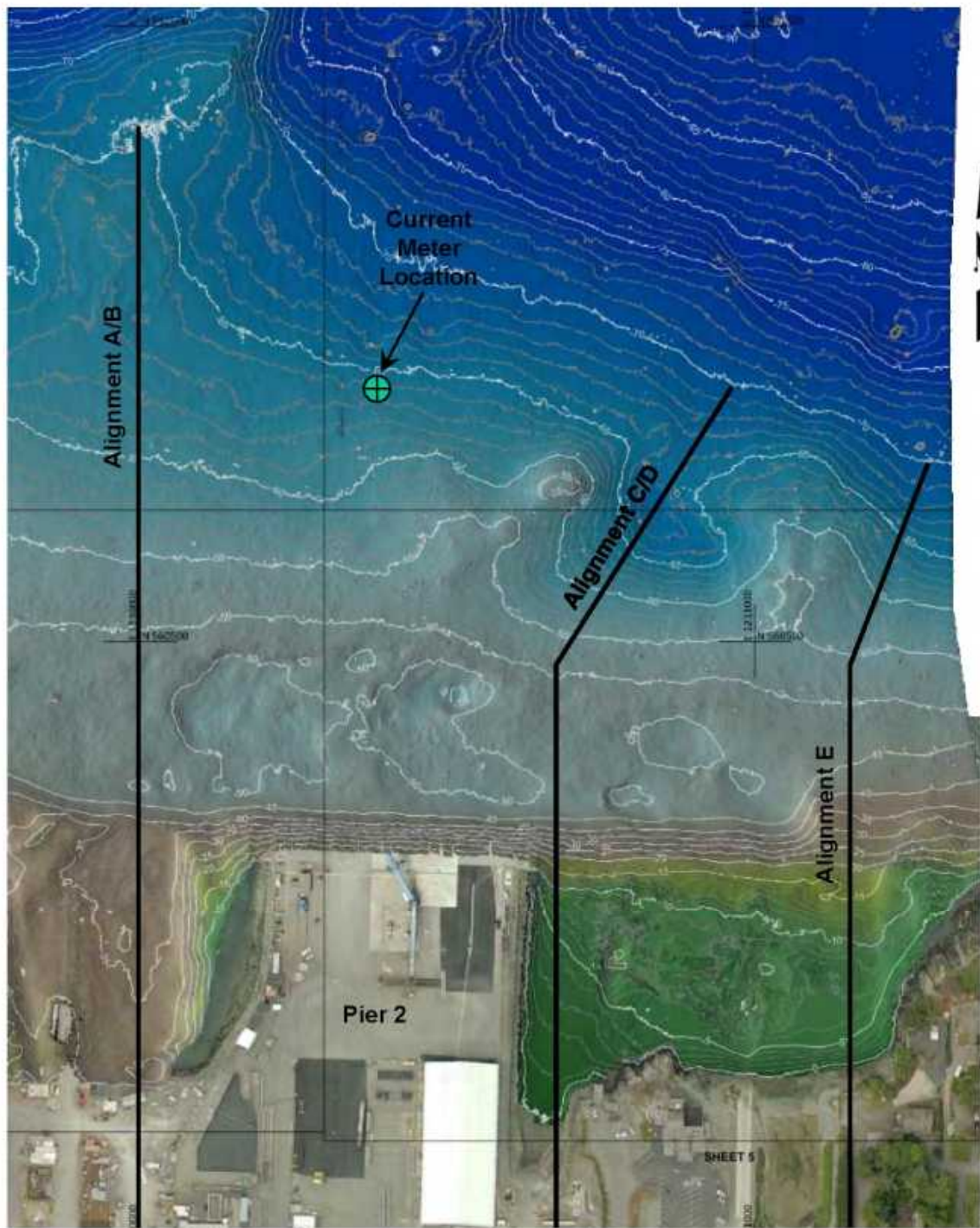


Figure 11: Alternative Outfall Alignments and Current Meter Location



Figure 12 ADCP Current Meter Prior to Deployment

The current meter report provided by RPS included both speed and direction data at ten-minute intervals. These data were given for nine depths, each two meters apart, spanning the 20-meter depth (at MLLW) at the deployment site. Figure 13 shows the distribution of current speeds and directions at the depth closest to the bottom. Graphics for other bins throughout the water column are similar in appearance. All reveal that the currents were highly bi-directional, flowing west during ebb tides and east during flood tides. Magnitude and frequency of ebb currents exceeded flood. Because the diffuser designs being considered are perpendicular to the principal current axis, this round of modeling retained the 90-degree current direction used in the first round.

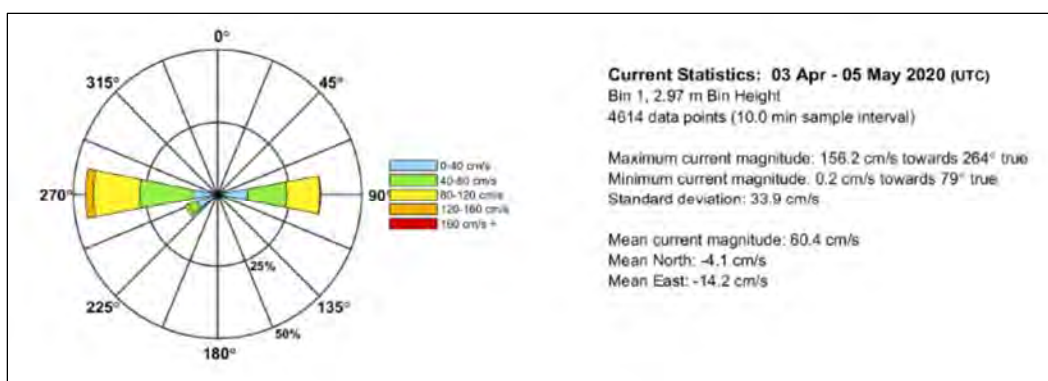


Figure 13 Current Velocity Statistics 3 Meters Above Bottom

To prepare the data for use in dilution modeling, each depth was queried for minimum, maximum, and 10th, 50th, and 90th percentile speeds. The results can be seen in Table 8. The shallowest depth, for which roughly 80% of the data was bad, was discarded. Excel was then used to interpolate data points for every whole-number meter between 3.7 and 17.7. These data were used in final modeling. Visual Plumes has a built-in extrapolation feature, which was used to populate the depths above and below this range

Table 8 Guemes Channel Current Meter Data Summary

Height Above Bottom (m)	Good Data Points (Percent of Total)	Current Speed (m/s)				
		Min	10 th Pctl.	50 th Pctl.	90 th Pctl.	Max
1.7	100%	0.034	0.205	0.560	1.04	1.49
3.7	100%	0.005	0.211	0.823	1.42	1.93
5.7	100%	0.003	0.200	0.810	1.40	1.93
7.7	100%	0.04	0.188	0.796	1.37	1.92
9.7	99.0%	0.004	0.173	0.772	1.33	1.90
11.7	98.9%	0.002	0.170	0.750	1.30	1.88
13.7	97.1%	0	0.164	0.715	1.24	1.83
15.7	93.6%	0.006	0.153	0.673	1.17	1.74
17.7	21.5%	0.002	0.144	0.601	1.05	1.56

3.3 DIFFUSER DESIGN DEVELOPMENT

3.3.1 Preferred Diffuser Sites

The outfall design team lead by HDR Engineering completed a comprehensive alternatives evaluation at the end of May 2020. Based on upland and in-water considerations, Outfall

Alternative E (Figure 11) was recommended to and concurred by City of Anacortes staff. This outfall alignment extends north from the U Avenue right-of-way. This alternative was selected largely due to its avoidance of the Port of Anacortes' Pier 2 operations and dredged berthing zone. At a depth of 55 feet, the alignment bends 24 degrees east to run perpendicular to the depth contours.

Because WWTP effluent is approximately 2.5 percent less dense than sea water, flow from deeper diffuser openings (ports) is reduced due to the differential density. Therefore, one of the most important diffuser siting objectives is to seek mild bottom slopes. Along Alignment E there are two favorable diffuser "benches" at depths of approximately 58 ft and 69 ft. The bottom slope at each of these two locations is 2.7 percent. The 69-foot site was selected, ranging from roughly 68 to 70 feet deep over the length of the diffuser. Accounting for the diffuser pipe resting on the seafloor with diffuser ports 3 to 4 feet off the sea floor, the actual discharge depth would be approximately 65 ft, which is used in final mixing zone modeling.

3.3.2 Hydraulic Design Parameters

The diffuser design parameters that affect outfall hydraulics include the number, size and spacing of diffuser ports. Effluent mixing can be maximized by increasing the length of a diffuser normal to the ambient current direction. Counterbalancing this objective are the hydraulic limitations on the diffuser from the density differential described above. The hydraulic design objectives for a diffuser include the following:

- Total area of all discharge ports should be approximately 50 percent of the cross-sectional area of the outfall pipe
- All ports flow fully during the lowest seasonal effluent flows of late summer (indicated by densimetric Froude number <1)
- Port flows are balanced from one end to the other during annual average flows
- Include an enlarged clean-out port at the terminus
- Pressure (head) losses at peak effluent flows must conform to the hydraulic limitations of the treatment plant

The 2.7 percent bottom slope effectively limits the diffuser length to approximately 90 feet over the range of Anacortes' effluent flows. An iterative approach of hydraulic and mixing zone modeling was conducted to optimize effluent mixing within these limitations. The selected diffuser design parameters that maximize effluent mixing within these hydraulic constraints are provided in Table 9. The final diffuser hydraulic spreadsheets and the charted distribution of individual port flows over the hydraulic range of flows are provided in Appendix D.

Table 9 Diffuser Design Criteria

Criterion	Value
Number of Ports	20
Port Spacing	4.5 ft
Terminal Port #1 Diameter	7.0 inches
Ports #2-16 Diameter	4.75 inches
Ports #17-20 Diameter	4.625 inches

3.4 FINAL DILUTION MODELING

3.4.1 Ambient Density Profiles

The calculation of dilution factors for water quality criteria requires the use of ambient density profiles with both the lowest dilution (i.e. maximum stratification) and highest dilution (i.e. minimum stratification). From Round 1 modeling, the profiles chosen to meet these conditions are listed in Table 10. It should be noted that all max-stratification profiles are from summer, and all but one of them are from 2017, an anomalous year of low salinity and high stratification confirmed by Ecology.

Table 10 Round 2 Ambient Density Profiles

Label	Date	Stratification
Gue1605	5/19/16	Maximum
Gue1706b	6/20/17	
Gue1706c	6/29/17	
Gue1707	7/12/17	
Gue1708	8/9/17	
Rsr1706	6/14/17	
Rsr1707	7/6/17	
Gue1601	1/14/16	Minimum

The minimum-stratification profile was chosen from among many similar winter profiles that were uniformly salty, cold, and well-mixed.

3.4.2 Effluent Flows

Table 11 lists the effluent flow rates used in this round of modeling to finalize the diffuser design and to calculate dilution factors for water quality criteria. The flow statistics used for each criterion are consistent with the guidelines established in the *Permit Writer's Manual* Appendix C. These values are preliminary design flows provided by HDR. While the first round of modeling used only the projected 80-year buildout rates, this round will use both those rates and the 20-year (2040) rates. The dilution factors calculated using the 2040 rates are the ones that will ultimately be carried forward into the NPDES permit. The buildout dilution factors will be presented alongside them for comparison.

Table 11 Round 2 Effluent Flow Rates

Criterion	Flow Statistic	Flow Rates (MGD)
Acute	Maximum Day	13.3 (2040) 15.3 (Buildout)
Chronic	Maximum Month	5.0 (2040) 5.6 (Buildout)
Human Health—Non-Carcinogen		
Human Health—Carcinogen	Annual Average	2.9 (2040) 3.2 (Buildout)

3.4.3 Vertical Port Orientation

One of the objectives of this final round of modeling was to determine the best vertical port orientation for the diffuser. To this end, a range of options was modeled under acute and chronic conditions. To reduce the number of model runs, only Gue1706b and buildout flow rates were used for this modeling. Table 12 shows the resulting dilutions.

Table 12 Vertical Port Orientation Modeling

Effluent Flow	Current Speed	Vertical Angle (degrees)	Acute Dilution	Chronic Dilution
Acute Buildout	10 th Percentile	30	53.39	n/a
		40	60.13	
		50	66.38	
		60	74.76	
		70	82.54	
		80	89.91	
		90	97.88	
	90 th Percentile	30	47.41	
		40	53.39	
		50	57.79	
		60	61.33	
		70	65.08	
		80	68.01	
		90	70.57	
Chronic Buildout	50 th Percentile	30	n/a	773.3
		40		773.3
		50		788.8
		60		788.8
		70		789.5
		80		789
		90		787.4

Although chronic dilution was not much impacted, the acute dilution at both 10th and 90th percentile currents was highly sensitive to changes in vertical angle, with the 90-degree angle resulting in highest dilutions. Thus, a vertical angle of 90 degrees was selected for the final diffuser design. As established in the first round of modeling, the dilutions at 90th percentile currents are lower than at 10th percentile currents.

3.4.4 Plume Trapping

As established during the first round of modeling, plume trapping is both aesthetically and ecologically desirable. The water quality standards WAC 173-201A and the mixing zone guidelines include aesthetic criteria that include minimizing plume surfacing. To investigate the trapping behavior of the final diffuser design, the design was modeled under all density profiles.

Chronic 2040 flows and 50th percentile currents were used to simulate average conditions. Because it would be prohibitively time-consuming to edit all 82 ambient profiles with the updated current speeds at each depth, an average value of 0.743 m/s was applied to the entire water column. Table 13 shows the results. To capture seasonal variations in trapping behavior, the results were partitioned by season. Trapping occurred nearly all of the time during the summer and about half of the time during the winter, and roughly three-quarters of the time over the whole year.

Table 13 Final Design Trapping Statistics

Season	Trapping Frequency	Avg. Trapping Depth (ft)
Winter (Dec – Feb)	52.6%	43.9
Spring (March – May)	69.6%	45.2
Summer (June – Aug)	95.2%	48.3
Autumn (Sept – Nov)	73.7%	48.1
Year Average	72.8%	46.4

3.4.5 Aquatic Life Criteria

The chosen diffuser design was submitted to a final round of modeling to determine dilution factors for acute and chronic aquatic life criteria. The resulting dilution factors are shown in Table 14. The critical cases for each category are highlighted, and the Visual Plumes outputs for these runs are included in Appendix E. Note that for each acute category, there are two profiles highlighted, Gue1706c and Gue1708. The two were equally critical, yielding identical dilution factors for both 2040 and buildout flow rates. In both categories, 90th percentile currents proved to be more critical than 10th percentile, as the first round of modeling suggested.

For chronic runs, the profile Gue1708 resulted in lowest dilutions under both 2040 and buildout flow rates. In each case, the dilution factor was less than half of that for the profile with the next-lowest dilution. This was due to a steep pycnocline located near the discharge depth, which rapidly trapped the plume before much mixing could occur. However, because this profile was from a period of anomalously high stratification, and because high effluent discharge is not expected to occur in August, when Gue1708 was measured, this profile does not truly represent reasonable worst-case conditions. The profile that resulted in the next-lowest dilutions, Gue1605, was selected instead.

Table 14 Acute and Chronic Dilutions for Final Diffuser Design

Effluent Flow	Current Speed	Ambient Profile	Dilution (Acute/Chronic)
Acute 2040	10 th Percentile	Gue1605	102.7
		Gue1706b	105.6
		Gue1706c	102.7
		Gue1707	100.0
		Gue1708	96.8
		Rsr1706	98.5
		Rsr1707	104.7
	90 th Percentile	Gue1605	71.2
		Gue1706b	71.2
		Gue1706c	69.8
		Gue1707	71.2
		Gue1708	69.8
		Rsr1706	71.2
		Rsr1707	71.2
Acute Buildout	10 th Percentile	Gue1605	96.7
		Gue1706b	97.9
		Gue1706c	96.8
		Gue1707	93.1
		Gue1708	92.7
		Rsr1706	90.1
		Rsr1707	98.6
	90 th Percentile	Gue1605	70.6
		Gue1706b	70.6
		Gue1706c	69.2
		Gue1707	70.6
		Gue1708	69.2
		Rsr1706	70.6
		Rsr1707	70.6
Chronic 2040	50 th Percentile	Gue1605	687.8
		Gue1706b	838.5
		Gue1706c	821.7
		Gue1707	805.8
		Gue1708	324.5
		Rsr1706	744.6
		Rsr1707	855.4
Chronic Buildout	50 th Percentile	Gue1605	659
		Gue1706b	787.4
		Gue1706c	772.4
		Gue1707	757.0
		Gue1708	305.0
		Rsr1706	675.1
		Rsr1707	819.0

3.4.6 Human Health Criteria

Appendix C of Ecology's *Permit Writer's Manual* requires that dilution factors for human health criteria be calculated as follows:

The density profile to use in human health-based analyses is the one that results in average mixing. This is determined as follows: (1) Generate the dilution factors for the two profiles (minimum and maximum), (2) calculate the reciprocal of the dilution factors to convert them to effluent concentrations, (3) calculate the average of the reciprocal dilution factors (average effluent concentration), and (4) calculate the reciprocal of the average effluent concentration and use that as the harmonic mean dilution factor.

As established at the beginning of this section, the minimum-stratification profile used to meet these specifications was Gue1601. Gue1605, which was identified in the previous section as the critical profile for chronic dilution, was used here as the maximum-stratification profile. The final diffuser design was modeled using these two profiles alongside the four effluent flows listed in Table 11.

The results of this modeling and the subsequent calculation of dilution factors are shown in Table 15. The Visual Plumes outputs are included in Appendix F.

Table 15 Human Health Dilution Factors

Human Health Criterion	Effluent Flow	Ambient Profile	Dilution	Reciprocal of Dilution	Average Reciprocal	Reciprocal of Average (Final Dilution Factor)
Carcinogen	2040	Gue1601	1200	0.000833	0.000979	1021
		Gue1605	889.1	0.001125		
	Buildout	Gue1601	1142.6	0.000875	0.001017	983.7
		Gue1605	863.6	0.001158		
Non-Carcinogen	2040	Gue1601	926.3	0.00108	0.001267	789.4
		Gue1605	687.8	0.001454		
	Buildout	Gue1601	868.5	0.001151	0.001334	749.4
		Gue1605	659	0.001517		

3.5 FINAL DILUTION FACTORS

Table 16 presents the final aquatic life and human health dilution factors for 2040 and buildout effluent flow rates. Upon completion of the proposed outfall and diffuser, the NPDES permit will be updated to include the 2040 dilution factors. These dilutions are used in the following section to assess compliance with water quality criteria at the mixing zone boundaries, and whether water quality-based effluent limits will be required in future NPDES permits.

Table 16 Final Aquatic Life and Human Health Dilutions

Criterion	2040 Dilution Factor	Buildout Dilution Factor
Aquatic Life—Acute	69.8	69.2
Aquatic Life—Chronic	688	659
Human Health—Carcinogen	1021	984
Human Health—Non-Carcinogen	789	749

SECTION 4: WATER QUALITY STANDARDS COMPLIANCE

In this section, the dilution factors for the proposed new outfall are used to determine whether there is reasonable potential of violating water quality criteria. “Reasonable potential” is a statistically-based algorithm developed by EPA to assess compliance with water quality criteria for aquatic life and human health protection. Ecology’s *PermitCalcs* spreadsheet tool is used in the calculations of reasonable potential for fecal coliform, toxic pollutants, ammonia, and temperature. The printed spreadsheets are provided in Appendix G.

Because the proposed new diffuser will increase effluent mixing significantly, many of the conclusions reached by Ecology in their Fact Sheet for the most recently issued NPDES Permit (Ecology 2017) still apply. These conclusions where repeated are referenced accordingly.

4.1 CONVENTIONAL WATER QUALITY PARAMETERS

4.1.1 Dissolved Oxygen and Biochemical Oxygen Demand

Biodegradable material in wastewater effluent can have an adverse effect on marine life by consuming oxygen in receiving waters, potentially causing dissolved oxygen levels to fall below water quality standards. The metric that is used to quantify this organic material is 5-day Biochemical Oxygen Demand (BOD₅). However, in this case, there is no cause for concern. Ecology’s 2017 Fact Sheet concludes the following:

With technology-based limits, this discharge results in a small amount of BOD₅ relative to the large amount of dilution in the receiving water at critical conditions. Technology-based limits will ensure that dissolved oxygen criteria are met in the receiving water.

It should be noted that the dilution referenced here is for the existing outfall, which has a chronic dilution factor of 72. The chronic dilution for the proposed new outfall is nearly 10 times greater than this previous value. Thus, the technology-based limits already in place will continue to assure that WQ criteria are met by a very wide margin of safety.

4.1.2 pH

Technology-based limits mandate that effluent pH be between 6.0 and 9.0. The 2017 Fact Sheet concludes that these limits “will assure compliance with the water quality standards of surface waters because of the high buffering capacity of marine water.” This remains true for the proposed new outfall, and no new limit is required.

4.1.3 Fecal Coliform

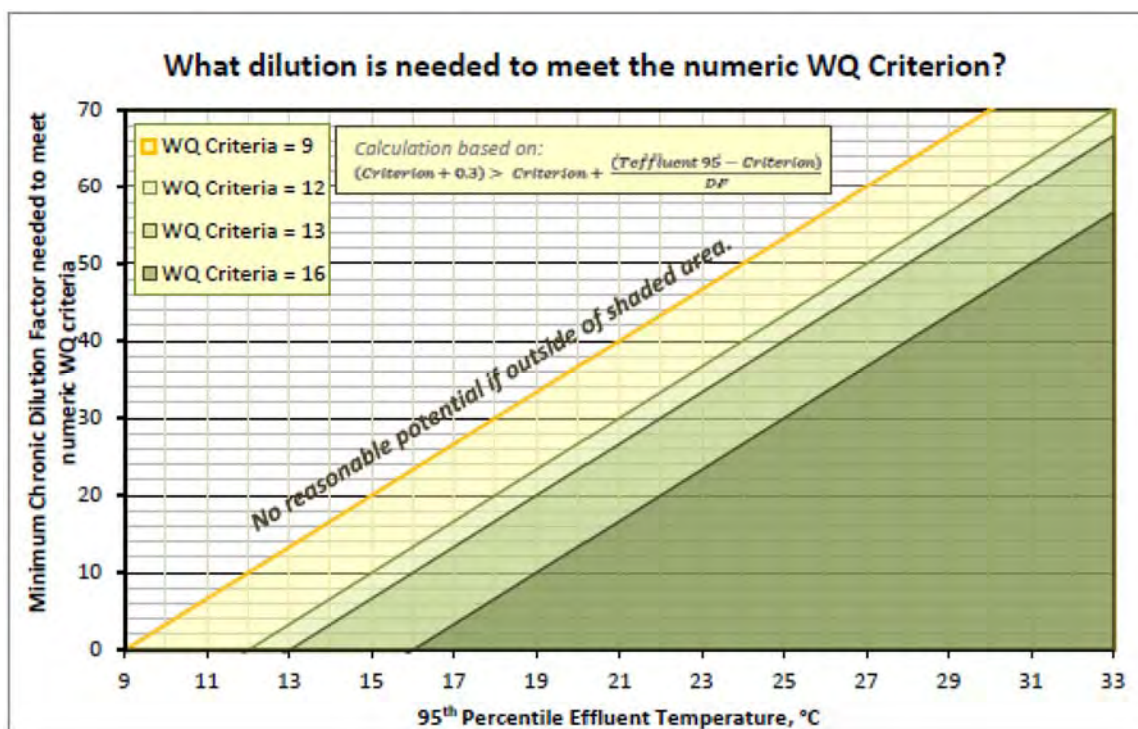
Technology-based limits mandate that the maximum concentration of fecal coliform bacteria in wastewater effluent is 400 organisms per 100 mL. The *PermitCalcs* spreadsheet (Appendix G) shows that even under these worst-case conditions, there is no potential of violating water quality standards.

4.1.4 Turbidity

Ecology determined in the 2017 Fact Sheet that it “expects no violations of the turbidity criteria outside the designated mixing zone provided the facility meets its technology-based total suspended solids permit limits.” With the increased dilution factors for the proposed new outfall, the same can be concluded here.

4.1.5 Temperature

Ecology imposes aquatic life-based criteria for temperature at the boundary of the chronic mixing zone. The *PermitCalcs* spreadsheet (Appendix G) shows no reasonable potential for violating these criteria. Figure 14, included by Ecology in their 2017 Fact Sheet, shows a graphical representation of the chronic dilution factors that would be necessary to meet water quality criteria given various effluent temperatures. In the case of Anacortes, with an annual 1-DADMax temperature of 24.5°C and water quality criterion of 16°C, the required dilution factor is roughly 30. The proposed new outfall will meet this limit by a wide margin, with a chronic dilution factor more than twenty times this needed value.



Source: City of Anacortes NPDES Permit Fact Sheet

Figure 14 Dilution Necessary to Meet Criteria at Edge of Mixing Zone

4.2 TOXIC COMPOUNDS

4.2.1 Effluent Data

The Anacortes WWTP routinely tests their effluent for a variety of aquatic life and human health toxic pollutants as specified in their NPDES permit. A summary table of Anacortes' effluent toxicant data is included in Appendix G. From 2013 to 2019, eighteen toxic pollutants were detected. Only three were detected at concentrations above aquatic-life or human-health water quality criteria: ammonia, bis(2-ethylhexyl) phthalate, and copper. Eighty-seven other pollutants were tested for and not detected.

4.2.2 Reasonable Potential Evaluation

A reasonable potential analysis was performed for all detected pollutants, including chlorine, using the *PermitCalcs* spreadsheet (Appendix G). The analysis shows that **no toxic pollutants are at risk of violating water quality criteria.**

For all pollutants, the effluent concentrations used in this analysis were taken from the aforementioned effluent sampling. For the ambient concentrations, a literature search for suitable toxics studies was conducted via Ecology's EIM database and other sources. Studies were considered suitable if they were no more than 15 years old, from sites near Anacortes (the furthest locations used were roughly 30 miles away), and did not concern a contaminated or formerly contaminated site. See Table 17 for a full list of ambient data used. The water quality criteria used are from Washington Administrative Code Chapter 173-201A. *PermitCalcs* was used to convert the WAC criteria for un-ionized ammonia to total ammonia as NH_3 .

Chlorine is currently the only pollutant with a water quality-based limit imposed. The City dechlorinates effluent prior to discharge to the outfall. The 95th percentile value from Jan 1, 2019 to June 23, 2020 for total residual chlorine of 160 ug/L was used in the calculation of reasonable potential. With this effluent concentration, even under critical conditions, the new outfall meets the water quality standard by a wide margin.

Table 17 Data Sources for Ambient Toxics Concentrations

Pollutant	Concentration (ug/L)	Source/Comments
Arsenic	1.48	Ecology 2011 toxics study. Values used are max concentrations from 3 sampling locations in Strait of Juan de Fuca over 3 sampling dates from 2009-2010 (included in References)
Cadmium	0.095	
Copper	0.28	
Lead	0.06	
Zinc	0.71	
Bis(2-EH) Phthalate	0 (Non-detect)	
1,4-Dichlorobenzene	0 (Non-detect)	
Dimethylphthalate	0 (Non-detect)	
Ammonia	1	EPA NARS (Nat'l Aquatic Resource Survey) sampling in Bellingham Bay in 2010 (accessed via epa.gov/national-aquatic-resource-surveys)
Antimony	0.5	Port Townsend Paper Company Receiving Water Study Maximum value of 5 sampling dates from Nov. 2015 to Sept. 2016 (accessed via EIM)
Mercury	0.00051	
Nickel	0.47	
Silver	0.016	
Chlorine	0	No suitable data located
Chloroform	0	
Chromium	0	
Selenium	0	
Tetrachloroethylene	0	
Toluene	0	

SECTION 5: REFERENCES

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APPENDIX A: LIST OF CTD SAMPLING DATES

Rosario Strait (Ecology Station RSR837)

Label	Date
rsr1601	1/25/2016
rsr1602	2/22/2016
rsr1603	3/22/2016
rsr1604	4/18/2016
rsr1605	5/17/2016
rsr1607	7/6/2016
rsr1608	8/23/2016
rsr1609	9/12/2016
rsr1701	1/26/2017
rsr1705	5/9/2017
rsr1706	6/14/2017
rsr1707	7/6/2017
rsr1708	8/22/2017
rsr1709	9/6/2017
rsr1710	10/4/2017
rsr1711	11/9/2017
rsr1712	12/5/2017
rsr1802	2/6/2018

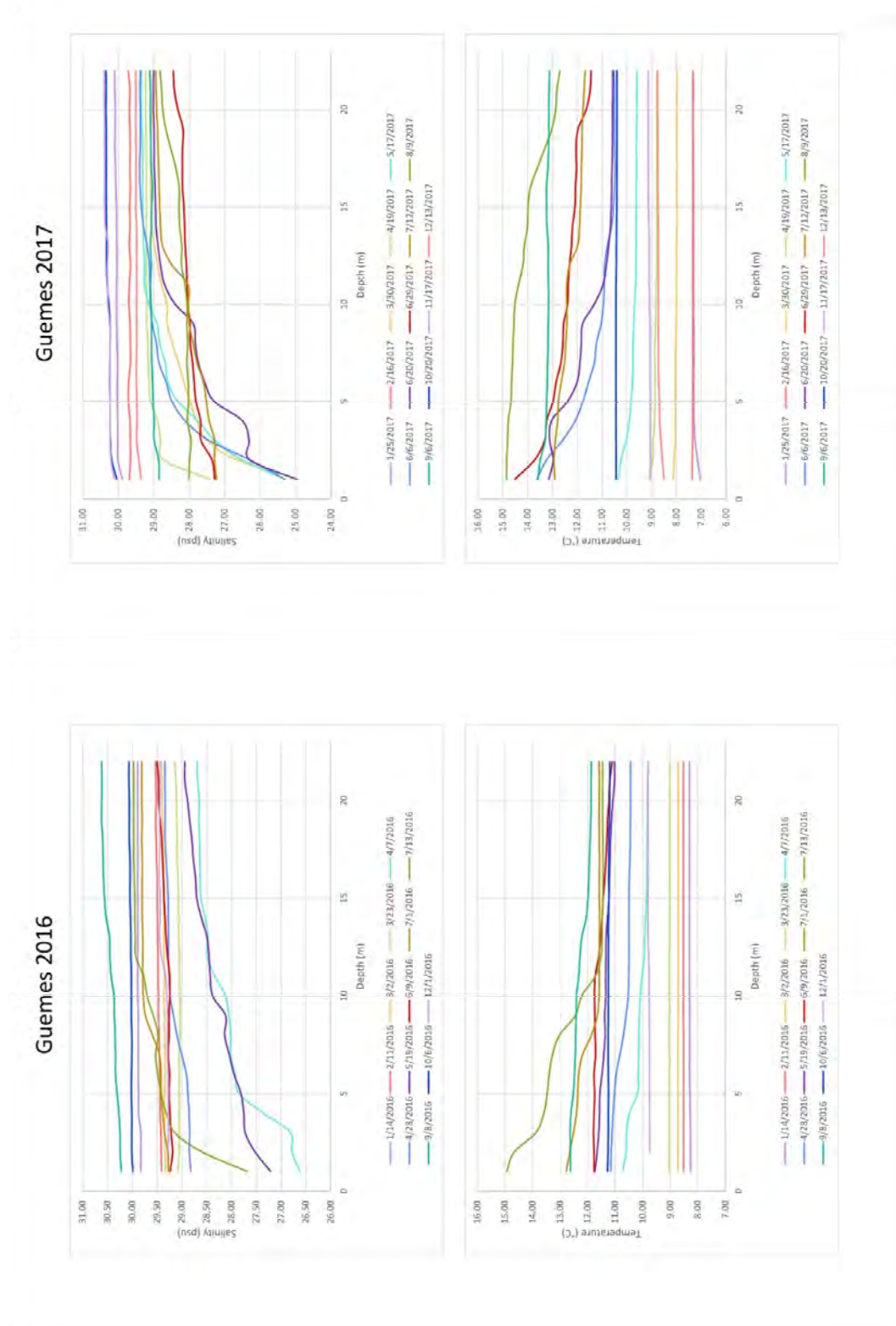
Label (cont.)	Date (cont.)
rsr1803	3/6/2018
rsr1804	4/18/2018
rsr1805	5/1/2018
rsr1806	6/4/2018
rsr1808	8/9/2018
rsr1809	9/6/2018
rsr1810	10/4/2018
rsr1811	11/7/2018
rsr1812	12/6/2018
rsr1901	1/10/2019
rsr1902	2/7/2019
rsr1903	3/11/2019
rsr1904	4/3/2019
rsr1905	5/8/2019
rsr1906	6/4/2019
rsr1907	7/18/2019
rsr1908	8/14/2019
rsr1911	11/13/2019

Guemes Channel (Padilla Bay National Estuarine Research Reserve)

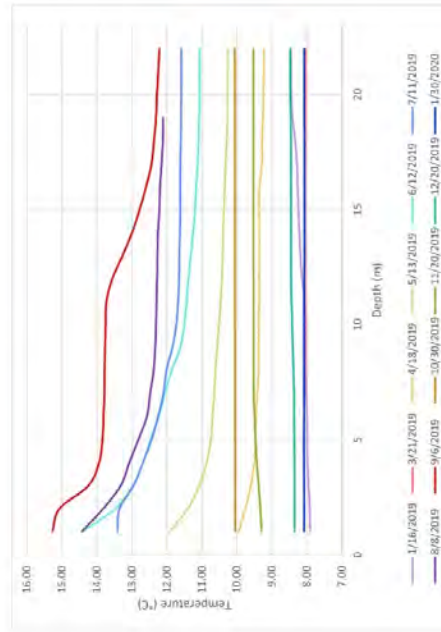
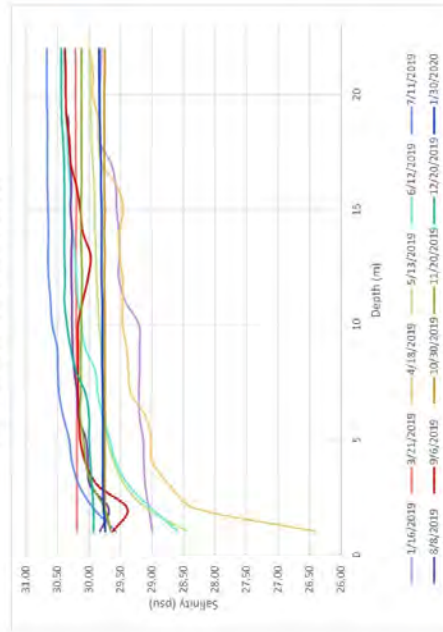
Label	Date
1/14/2016	gue1601
2/11/2016	gue1602
3/2/2016	gue1603a
3/23/2016	gue1603b
4/7/2016	gue1604a
4/28/2016	gue1604b
5/19/2016	gue1605
6/9/2016	gue1606a
6/30/2016	gue1606b
7/13/2016	gue1607
9/8/2016	gue1609
10/6/2016	gue1610
12/1/2016	gue1612
1/12/2017	gue1701
2/16/2017	gue1702
3/30/2017	gue1703
4/19/2017	gue1704
5/17/2017	gue1705
6/6/2017	gue1706a
6/20/2017	gue1706b
6/29/2017	gue1706c
7/12/2017	gue1707
8/9/2017	gue1708

Label (cont.)	Date (cont.)
9/6/2017	gue1709
10/20/2017	gue1710
11/17/2017	gue1711
12/13/2017	gue1712
2/9/2018	gue1802
3/7/2018	gue1803
4/12/2018	gue1804
9/4/2018	gue1809
10/17/2018	gue1810
11/21/2018	gue1811
12/19/2018	gue1812
1/19/2019	gue1901
3/21/2019	gue1903
4/18/2019	gue1904
5/13/2019	gue1905
6/12/2019	gue1906
7/11/2019	gue1907
8/8/2019	gue1908
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11/20/2019	gue1911
12/20/2019	gue1912
1/30/2020	gue2001

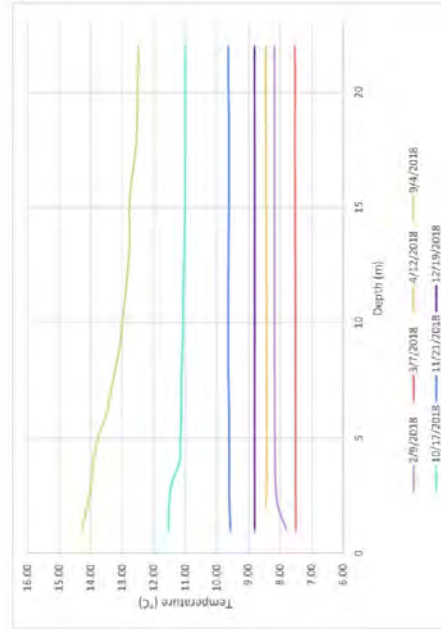
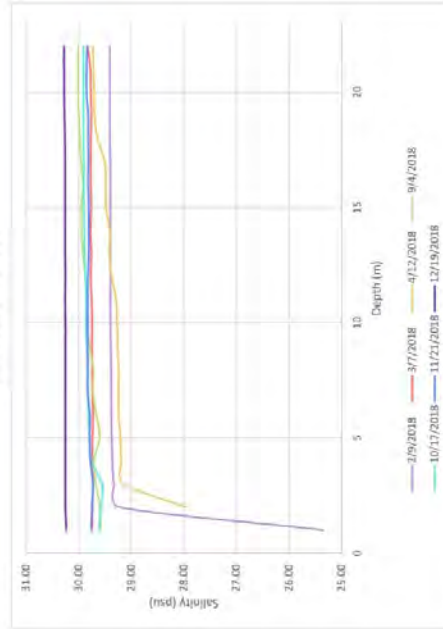
APPENDIX B: SALINITY AND TEMPERATURE GRAPHS



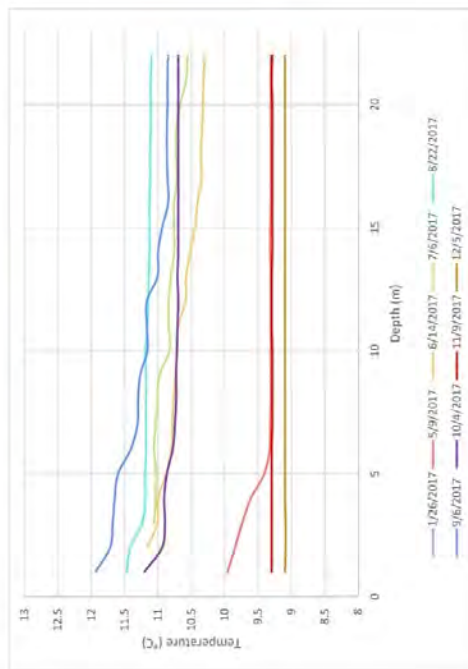
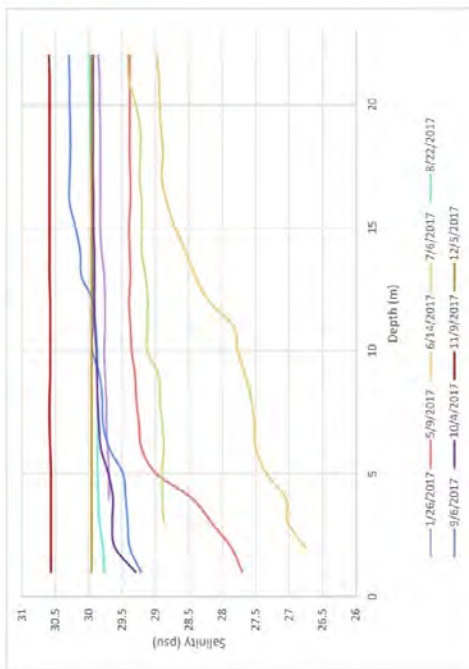
Guemes 2019 and 2020



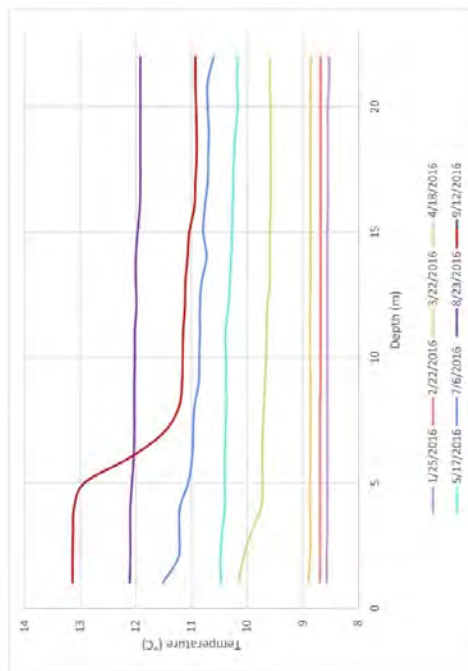
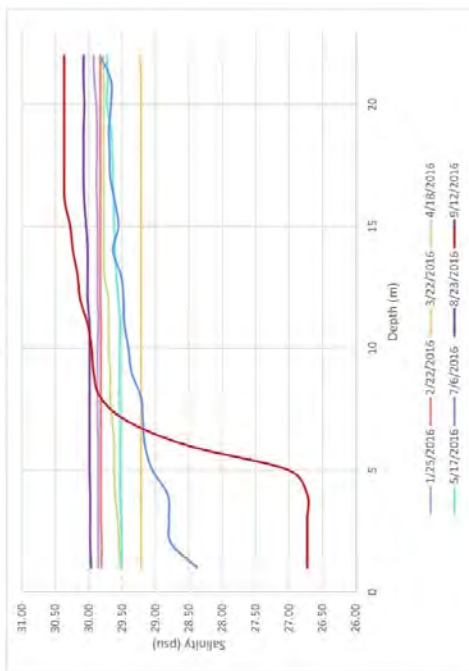
Guemes 2018



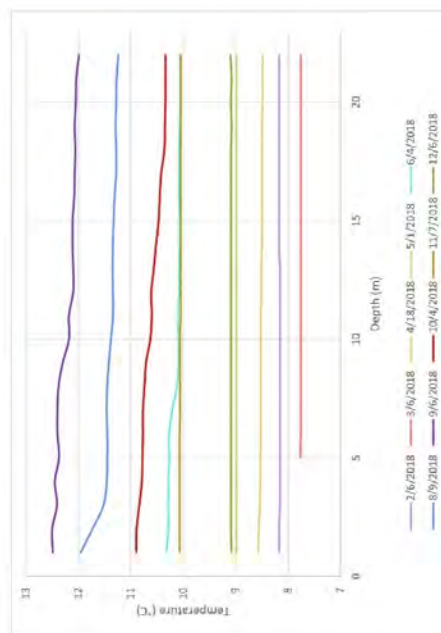
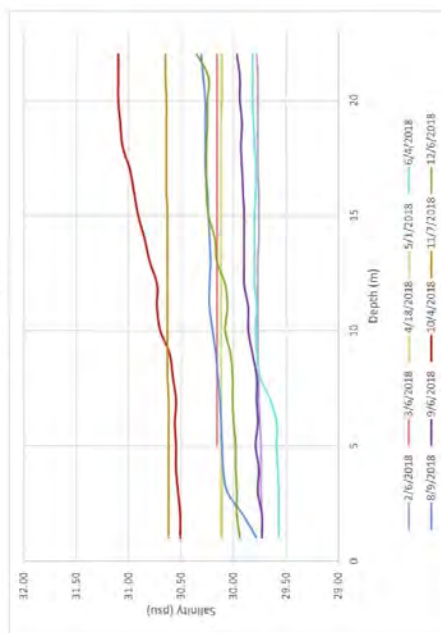
RSR 2017



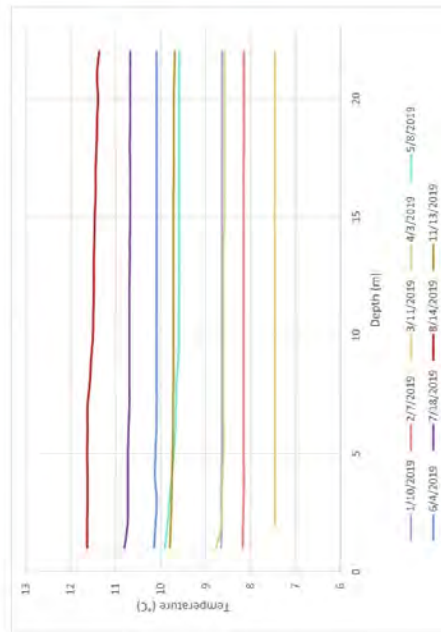
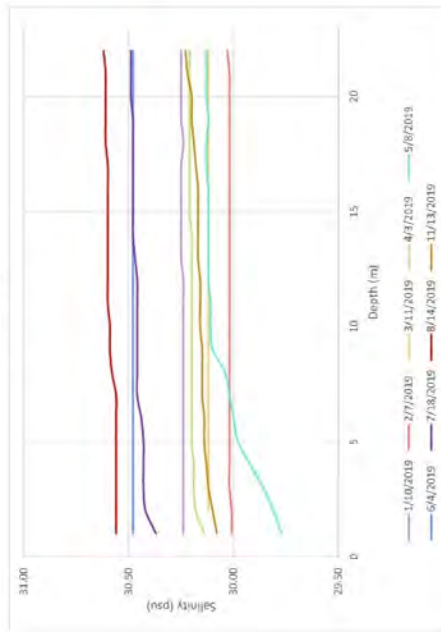
RSR 2016



RSR 2018



RSR 2019



APPENDIX C: AMBIENT PROFILE AVERAGE DILUTIONS

Yellow cells are in the bottom 5th percentile, green cells are in the bottom 10th percentile, and blue cells are in the bottom 25% percentile.

Profile Nickname	Acute		Chronic	
	Avg Dilution	% of Avg Across All Acute Runs	Avg Dilution	% of Avg Across All Chronic Runs
gue1601	39.8916071	101.1%	737.96	111.8%
gue1602	39.6602679	100.5%	733.28	111.1%
gue1603a	39.5527679	100.2%	716.09	108.5%
gue1603b	39.3146429	99.6%	700.89	106.2%
gue1604a	38.5586607	97.7%	518.94	78.6%
gue1604b	39.1549107	99.2%	645.63	97.8%
gue1605	38.38125	97.2%	462.66	70.1%
gue1606a	38.97625	98.8%	614.59	93.1%
gue1606b	39.2725	99.5%	675.92	102.4%
gue1607	39.0258929	98.9%	561.41	85.1%
gue1609	39.4988393	100.1%	600.28	91.0%
gue1610	39.6317857	100.4%	712.92	108.0%
gue1612	39.365	99.7%	691.42	104.8%
gue1701	39.9673214	101.3%	722.70	109.5%
gue1702	39.8620536	101.0%	731.59	110.9%
gue1703	38.9947321	98.8%	560.66	85.0%
gue1704	39.4036607	99.8%	715.46	108.4%
gue1705	39.0701786	99.0%	602.63	91.3%
gue1706a	38.8827679	98.5%	545.65	82.7%
gue1706b	38.189375	96.8%	492.12	74.6%
gue1706c	38.2158036	96.8%	541.55	82.1%
gue1707	38.0875	96.5%	481.86	73.0%
gue1708	37.6324107	95.3%	408.08	61.8%
gue1709	38.9160714	98.6%	695.22	105.4%
gue1710	39.845	101.0%	705.23	106.9%
gue1711	39.9254464	101.2%	682.19	103.4%
gue1712	39.6308929	100.4%	725.08	109.9%
gue1802	39.6378571	100.4%	727.71	110.3%
gue1803	39.8567857	101.0%	726.89	110.2%
gue1804	39.2997321	99.6%	571.42	86.6%
gue1809	39.0558036	99.0%	595.64	90.3%
gue1810	39.54375	100.2%	705.08	106.9%
gue1811	39.7549107	100.7%	734.33	111.3%
gue1812	39.9879464	101.3%	733.26	111.1%
gue1901	39.3255357	99.6%	520.39	78.9%
gue1903	40.015625	101.4%	735.55	111.5%
gue1904	39.1604464	99.2%	522.88	79.2%

gue1905	39.4649107	100.0%	655.19	99.3%
gue1906	39.3433929	99.7%	565.94	85.8%
gue1907	39.728125	100.7%	669.85	101.5%
gue1908	39.5501786	100.2%	682.68	103.5%
gue1909	38.9619643	98.7%	509.83	77.3%
gue1910	39.6571429	100.5%	732.34	111.0%
gue1911	39.906875	101.1%	740.94	112.3%
gue1912	39.934375	101.2%	684.46	103.7%
gue2001	39.858125	101.0%	720.84	109.2%
rsr1601	39.8657143	101.0%	724.94	109.9%
rsr1602	39.8420536	100.9%	734.10	111.3%
rsr1603	39.4775893	100.0%	729.85	110.6%
rsr1604	39.5897321	100.3%	694.55	105.3%
rsr1605	39.3924107	99.8%	662.99	100.5%
rsr1607	39.0135714	98.8%	528.73	80.1%
rsr1608	39.4396429	99.9%	692.25	104.9%
rsr1609	38.9992857	98.8%	544.67	82.5%
rsr1701	39.841875	100.9%	702.83	106.5%
rsr1705	39.4636607	100.0%	707.97	107.3%
rsr1706	37.8058929	95.8%	337.26	51.1%
rsr1707	38.9729464	98.7%	586.19	88.8%
rsr1708	39.5195536	100.1%	691.42	104.8%
rsr1709	39.3297321	99.6%	541.98	82.1%
rsr1710	39.6125893	100.4%	713.08	108.1%
rsr1711	40.1514286	101.7%	738.76	112.0%
rsr1712	39.8554464	101.0%	739.16	112.0%
rsr1802	39.8449107	101.0%	735.07	111.4%
rsr1803	40.0704464	101.5%	740.21	112.2%
rsr1804	39.9673214	101.3%	739.97	112.1%
rsr1805	39.9273214	101.2%	739.87	112.1%
rsr1806	39.6540179	100.5%	711.26	107.8%
rsr1808	39.6432143	100.4%	683.27	103.5%
rsr1809	39.2695536	99.5%	669.42	101.4%
rsr1810	39.6653571	100.5%	542.46	82.2%
rsr1811	40.0919643	101.6%	735.82	111.5%
rsr1812	39.7455357	100.7%	647.55	98.1%
rsr1901	39.9975	101.3%	737.52	111.8%
rsr1902	39.9342857	101.2%	737.79	111.8%
rsr1903	40.0701786	101.5%	740.90	112.3%
rsr1904	39.97	101.3%	734.62	111.3%
rsr1905	39.8334821	100.9%	720.33	109.2%
rsr1906	39.9752679	101.3%	740.29	112.2%
rsr1907	39.909375	101.1%	729.47	110.6%
rsr1908	39.8561607	101.0%	717.31	108.7%
rsr1911	39.8711607	101.0%	716.51	108.6%

APPENDIX D: DIFFUSER HYDRAULIC SPREADSHEETS

PROJECT NAME		Anacortes WWTP Outfall				
DESIGN FLOWS (MGD)						
Minimum Day Flow	1.5					
2040 Annual Average Flow	2.9					
2040 Maximum Month Flow	5					
2040 Maximum Day Flow	13.3					
2040 Peak Instantaneous Flow	16.9					
DIFFUSER DESIGN						
Diffuser diameter, in	31.5					
Diffuser diameter, ft	2.625					
Number of ports	20					
Port spacing, ft	4.5					
CD at terminal port	0.61					
Hazen-Williams friction factor, C	140					
Diffuser slope, ft/ft	0.027					
Ambient density, g/mL	1.024					
Effluent density, g/mL	0.999					
Effluent temp, deg F	55					
Kinematic viscosity, ft ² /sec	7.93E-06					
		Port no	Distance from End (ft)	P-dia (in)	P-dia (ft)	P-area (ft ²)
		1	0.00	6.96	0.580	0.264
		2	4.50	4.75	0.396	0.123
		3	9.00	4.75	0.396	0.123
		4	13.50	4.75	0.396	0.123
		5	18.00	4.75	0.396	0.123
		6	22.50	4.75	0.396	0.123
		7	27.00	4.75	0.396	0.123
		8	31.50	4.75	0.396	0.123
		9	36.00	4.75	0.396	0.123
		10	40.50	4.75	0.396	0.123
		11	45.00	4.75	0.396	0.123
		12	49.50	4.75	0.396	0.123
		13	54.00	4.75	0.396	0.123
		14	58.50	4.75	0.396	0.123
		15	63.00	4.75	0.396	0.123
		16	67.50	4.75	0.396	0.123
		17	72.00	4.625	0.385	0.117
		18	76.50	4.625	0.385	0.117
		19	81.00	4.625	0.385	0.117
		20	85.50	4.625	0.385	0.117

Anacortes Diffuser Hydraulics

Diffuser Design

Minimum Day Flow 1.5 MGD 2.33 CFS

Port No.	Total head (FT)	V ² --- 2gh	Discharge coeff	Port discharge (CFS)	Port velocity (FPS)	Increment in diffuser velocity (FPS)	Diffuser velocity (FPS)	Velocity head (FT)	Friction factor	Distance to next port (FT)	Head loss (FT)	Density head (FT)	TOTAL HEAD (FT)	Froude
1	0.010	0.000	0.610	0.13	0.50	0.024	0.02	0.0000	0.029	4.50	0.00000	0.00304	0.01334	0.74
2	0.013	0.001	0.610	0.07	0.57	0.013	0.04	0.0000	0.027	4.50	0.00000	0.00304	0.01638	1.01
3	0.016	0.001	0.609	0.08	0.63	0.014	0.05	0.0000	0.026	4.50	0.00000	0.00304	0.01942	1.12
4	0.019	0.002	0.609	0.08	0.68	0.015	0.07	0.0001	0.025	4.50	0.00000	0.00304	0.02247	1.22
5	0.022	0.003	0.608	0.09	0.73	0.017	0.08	0.0001	0.024	4.50	0.00000	0.00304	0.02551	1.31
6	0.026	0.004	0.608	0.10	0.78	0.018	0.10	0.0002	0.023	4.50	0.00001	0.00304	0.02856	1.40
7	0.029	0.006	0.607	0.10	0.82	0.019	0.12	0.0002	0.023	4.50	0.00001	0.00304	0.03161	1.48
8	0.032	0.007	0.606	0.11	0.87	0.020	0.14	0.0003	0.022	4.50	0.00001	0.00304	0.03466	1.55
9	0.035	0.009	0.606	0.11	0.90	0.021	0.16	0.0004	0.022	4.50	0.00001	0.00304	0.03772	1.62
10	0.038	0.011	0.605	0.12	0.94	0.021	0.18	0.0005	0.021	4.50	0.00002	0.00304	0.04078	1.69
11	0.041	0.013	0.604	0.12	0.98	0.022	0.20	0.0006	0.021	4.50	0.00002	0.00304	0.04384	1.75
12	0.044	0.015	0.603	0.12	1.01	0.023	0.23	0.0008	0.021	4.50	0.00003	0.00304	0.04691	1.82
13	0.047	0.017	0.601	0.13	1.05	0.024	0.25	0.0010	0.020	4.50	0.00003	0.00304	0.04998	1.87
14	0.050	0.020	0.600	0.13	1.08	0.024	0.28	0.0012	0.020	4.50	0.00004	0.00304	0.05307	1.93
15	0.053	0.022	0.599	0.14	1.11	0.025	0.30	0.0014	0.020	4.50	0.00005	0.00304	0.05615	1.98
16	0.056	0.025	0.598	0.14	1.14	0.026	0.33	0.0017	0.020	4.50	0.00006	0.00304	0.05925	2.04
17	0.059	0.028	0.596	0.14	1.16	0.026	0.35	0.0019	0.019	4.50	0.00006	0.00304	0.06235	2.12
18	0.062	0.031	0.595	0.14	1.19	0.026	0.38	0.0022	0.019	4.50	0.00007	0.00304	0.06547	2.16
19	0.065	0.034	0.593	0.14	1.22	0.026	0.40	0.0025	0.019	4.50	0.00008	0.00304	0.06859	2.21
20	0.069	0.037	0.592	0.15	1.24	0.027	0.43	0.0029	0.019	0.00	0.00000	0.00000	0.06859	2.26
TOTAL: 0.069 TOTAL: 2.33 AVG: 0.21 TOTAL: 0.05777 DIFF FROM TOTAL FLOW: 0.00														

Anacortes Diffuser Hydraulics

Min Day

2040 Annual Average Flow 2.9 MGD 4.50 CFS

Port No.	Total head (FT)	V ² --- 2gh	Discharge coeff	Port discharge (CFS)	Port velocity (FPS)	Increment in diffuser velocity (FPS)	Diffuser velocity (FPS)	Velocity head (FT)	Friction factor	Distance to next port (FT)	Head loss (FT)	Density head (FT)	TOTAL HEAD (FT)	Froude
1	0.105	0.000	0.610	0.42	1.59	0.077	0.08	0.0001	0.024	4.50	0.00000	0.00304	0.10804	2.35
2	0.108	0.001	0.610	0.20	1.61	0.037	0.11	0.0002	0.023	4.50	0.00001	0.00304	0.11109	2.88
3	0.111	0.002	0.609	0.20	1.63	0.037	0.15	0.0004	0.022	4.50	0.00001	0.00304	0.11415	2.92
4	0.114	0.003	0.608	0.20	1.65	0.038	0.19	0.0006	0.021	4.50	0.00002	0.00304	0.11721	2.96
5	0.117	0.005	0.608	0.21	1.67	0.038	0.23	0.0008	0.021	4.50	0.00003	0.00304	0.12028	2.99
6	0.120	0.007	0.607	0.21	1.69	0.038	0.26	0.0011	0.020	4.50	0.00004	0.00304	0.12336	3.03
7	0.123	0.009	0.606	0.21	1.71	0.039	0.30	0.0014	0.020	4.50	0.00005	0.00304	0.12644	3.06
8	0.126	0.011	0.604	0.21	1.72	0.039	0.34	0.0018	0.020	4.50	0.00006	0.00304	0.12955	3.09
9	0.130	0.014	0.603	0.21	1.74	0.040	0.38	0.0023	0.019	4.50	0.00007	0.00304	0.13266	3.12
10	0.133	0.017	0.601	0.22	1.76	0.040	0.42	0.0028	0.019	4.50	0.00009	0.00304	0.13579	3.15
11	0.136	0.020	0.600	0.22	1.77	0.040	0.46	0.0033	0.019	4.50	0.00011	0.00304	0.13894	3.18
12	0.139	0.024	0.598	0.22	1.79	0.041	0.50	0.0039	0.018	4.50	0.00012	0.00304	0.14210	3.21
13	0.142	0.028	0.596	0.22	1.80	0.041	0.54	0.0046	0.018	4.50	0.00014	0.00304	0.14529	3.23
14	0.145	0.032	0.594	0.22	1.82	0.041	0.59	0.0053	0.018	4.50	0.00016	0.00304	0.14849	3.26
15	0.148	0.036	0.592	0.23	1.83	0.042	0.63	0.0061	0.018	4.50	0.00019	0.00304	0.15172	3.28
16	0.152	0.040	0.590	0.23	1.84	0.042	0.67	0.0070	0.018	4.50	0.00021	0.00304	0.15497	3.31
17	0.155	0.045	0.588	0.22	1.86	0.040	0.71	0.0078	0.018	4.50	0.00024	0.00304	0.15825	3.37
18	0.158	0.049	0.585	0.22	1.87	0.040	0.75	0.0087	0.017	4.50	0.00026	0.00304	0.16155	3.39
19	0.162	0.054	0.583	0.22	1.88	0.041	0.79	0.0097	0.017	4.50	0.00029	0.00304	0.16488	3.42
20	0.165	0.059	0.581	0.22	1.89	0.041	0.83	0.0107	0.017	0.00	0.00000	0.00000	0.16488	3.44
MAX: 0.165														TOTAL: 0.05777
TOTAL: 4.50														AVG: 0.45
DIFF FROM TOTAL FLOW: 0.00														

Anacortes Diffuser Hydraulics

Avg

2040 Maximum Month Flow 5 MGD 7.75 CFS

Port No.	Total head (Ft)	V ² --- 2gh	Discharge coeff	Port discharge (CFS)	Port velocity (FPS)	Increment in diffuser velocity (FPS)	Diffuser velocity (FPS)	Velocity head (Ft)	Friction factor	Distance to next port (Ft)	Head loss (Ft)	Density head (Ft)	TOTAL HEAD (Ft)	Froude
1	0.365	0.000	0.610	0.78	2.96	0.144	0.14	0.0003	0.022	4.50	0.00001	0.00304	0.36805	4.38
2	0.368	0.001	0.610	0.37	2.97	0.067	0.21	0.0007	0.021	4.50	0.00003	0.00304	0.37112	5.32
3	0.371	0.002	0.609	0.37	2.98	0.068	0.28	0.0012	0.020	4.50	0.00004	0.00304	0.37420	5.34
4	0.374	0.003	0.608	0.37	2.99	0.068	0.35	0.0019	0.020	4.50	0.00006	0.00304	0.37730	5.35
5	0.377	0.005	0.608	0.37	2.99	0.068	0.42	0.0027	0.019	4.50	0.00009	0.00304	0.38043	5.37
6	0.380	0.007	0.606	0.37	3.00	0.068	0.48	0.0036	0.019	4.50	0.00012	0.00304	0.38359	5.38
7	0.384	0.009	0.605	0.37	3.01	0.068	0.55	0.0047	0.018	4.50	0.00015	0.00304	0.38678	5.39
8	0.387	0.012	0.604	0.37	3.01	0.069	0.62	0.0060	0.018	4.50	0.00018	0.00304	0.39000	5.40
9	0.390	0.015	0.602	0.37	3.02	0.069	0.69	0.0074	0.018	4.50	0.00022	0.00304	0.39326	5.41
10	0.393	0.019	0.601	0.37	3.02	0.069	0.76	0.0089	0.017	4.50	0.00027	0.00304	0.39657	5.42
11	0.397	0.023	0.599	0.37	3.03	0.069	0.83	0.0106	0.017	4.50	0.00031	0.00304	0.39992	5.42
12	0.400	0.027	0.597	0.37	3.03	0.069	0.90	0.0125	0.017	4.50	0.00036	0.00304	0.40333	5.43
13	0.403	0.031	0.595	0.37	3.03	0.069	0.96	0.0145	0.017	4.50	0.00042	0.00304	0.40678	5.43
14	0.407	0.036	0.592	0.37	3.03	0.069	1.03	0.0166	0.017	4.50	0.00047	0.00304	0.41030	5.43
15	0.410	0.040	0.590	0.37	3.03	0.069	1.10	0.0189	0.016	4.50	0.00053	0.00304	0.41387	5.43
16	0.414	0.046	0.587	0.37	3.03	0.069	1.17	0.0213	0.016	4.50	0.00060	0.00304	0.41750	5.43
17	0.418	0.051	0.584	0.35	3.03	0.065	1.24	0.0238	0.016	4.50	0.00066	0.00304	0.42120	5.51
18	0.421	0.056	0.582	0.35	3.03	0.065	1.30	0.0263	0.016	4.50	0.00072	0.00304	0.42497	5.50
19	0.425	0.062	0.579	0.35	3.03	0.065	1.37	0.0290	0.016	4.50	0.00079	0.00304	0.42880	5.50
20	0.429	0.068	0.576	0.35	3.03	0.065	1.43	0.0319	0.016	0.00	0.00000	0.00000	0.42880	5.50
MAX: 0.429 TOTAL: 7.75 AVG: 0.79 TOTAL: 0.05777														
DIFF FROM TOTAL FLOW: 0.00														

Anacortes Diffuser Hydraulics MMF

2040 Maximum Day Flow 13.3 MGD 20.62 CFS

Port No.	Total head (FT)	V ² --- 2gh	Discharge coeff	Port discharge (CFS)	Port velocity (FPS)	Increment in diffuser velocity (FPS)	Diffuser velocity (FPS)	Velocity head (FT)	Friction factor	Distance to next port (FT)	Head loss (FT)	Density head (FT)	TOTAL HEAD (FT)	Frond
1	2.747	0.000	0.610	2.14	8.11	0.396	0.40	0.0024	0.019	4.50	0.00008	0.00304	2.75012	12.02
2	2.750	0.001	0.610	1.00	8.11	0.184	0.58	0.0052	0.018	4.50	0.00016	0.00304	2.75332	14.54
3	2.753	0.002	0.609	1.00	8.11	0.184	0.76	0.0091	0.017	4.50	0.00027	0.00304	2.75663	14.54
4	2.757	0.003	0.608	1.00	8.11	0.184	0.95	0.0140	0.017	4.50	0.00040	0.00304	2.76008	14.53
5	2.760	0.003	0.607	1.00	8.10	0.184	1.13	0.0199	0.016	4.50	0.00056	0.00304	2.76368	14.52
6	2.764	0.007	0.606	1.00	8.09	0.184	1.32	0.0269	0.016	4.50	0.00074	0.00304	2.76746	14.50
7	2.767	0.010	0.605	0.99	8.08	0.184	1.50	0.0350	0.016	4.50	0.00094	0.00304	2.77144	14.48
8	2.771	0.013	0.604	0.99	8.07	0.183	1.68	0.0441	0.015	4.50	0.00117	0.00304	2.77565	14.46
9	2.776	0.015	0.602	0.99	8.05	0.183	1.87	0.0542	0.015	4.50	0.00141	0.00304	2.78010	14.43
10	2.780	0.019	0.600	0.99	8.03	0.183	2.05	0.0653	0.015	4.50	0.00168	0.00304	2.78482	14.40
11	2.785	0.023	0.598	0.99	8.01	0.182	2.23	0.0774	0.015	4.50	0.00197	0.00304	2.78983	14.36
12	2.790	0.023	0.596	0.98	7.99	0.182	2.41	0.0905	0.015	4.50	0.00227	0.00304	2.79514	14.32
13	2.795	0.032	0.594	0.98	7.97	0.181	2.60	0.1046	0.014	4.50	0.00260	0.00304	2.80078	14.28
14	2.801	0.037	0.591	0.98	7.94	0.181	2.78	0.1196	0.014	4.50	0.00294	0.00304	2.80676	14.24
15	2.807	0.043	0.589	0.97	7.91	0.180	2.96	0.1357	0.014	4.50	0.00331	0.00304	2.81311	14.19
16	2.813	0.048	0.586	0.97	7.89	0.179	3.14	0.1526	0.014	4.50	0.00369	0.00304	2.81983	14.14
17	2.820	0.054	0.583	0.92	7.86	0.169	3.30	0.1696	0.014	4.50	0.00406	0.00304	2.82694	14.27
18	2.827	0.060	0.580	0.91	7.83	0.169	3.47	0.1873	0.014	4.50	0.00446	0.00304	2.83443	14.22
19	2.834	0.066	0.577	0.91	7.80	0.163	3.64	0.2059	0.014	4.50	0.00486	0.00304	2.84234	14.16
20	2.842	0.072	0.574	0.91	7.76	0.167	3.81	0.2252	0.014	0.00	0.00000	0.00000	2.84234	14.10
MAX: 2.842 TOTAL: 20.61 AVG: 2.13 DIFF FROM TOTAL FLOW: 0.00														TOTAL: 0.05777

Anacortes Diffuser Hydraulics Max Day

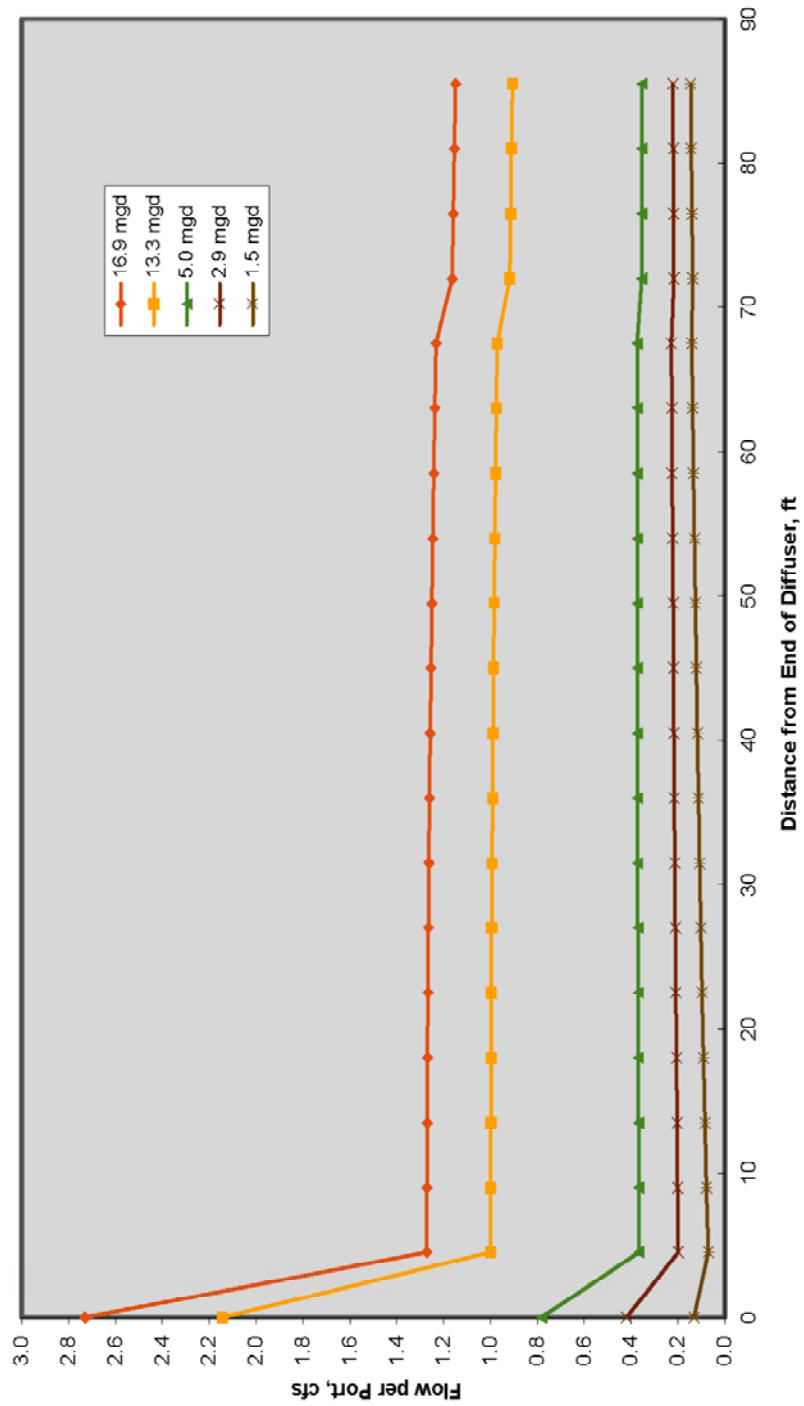
2040 Peak Instantaneous Flow 16.9 MGD 26.20 CFS

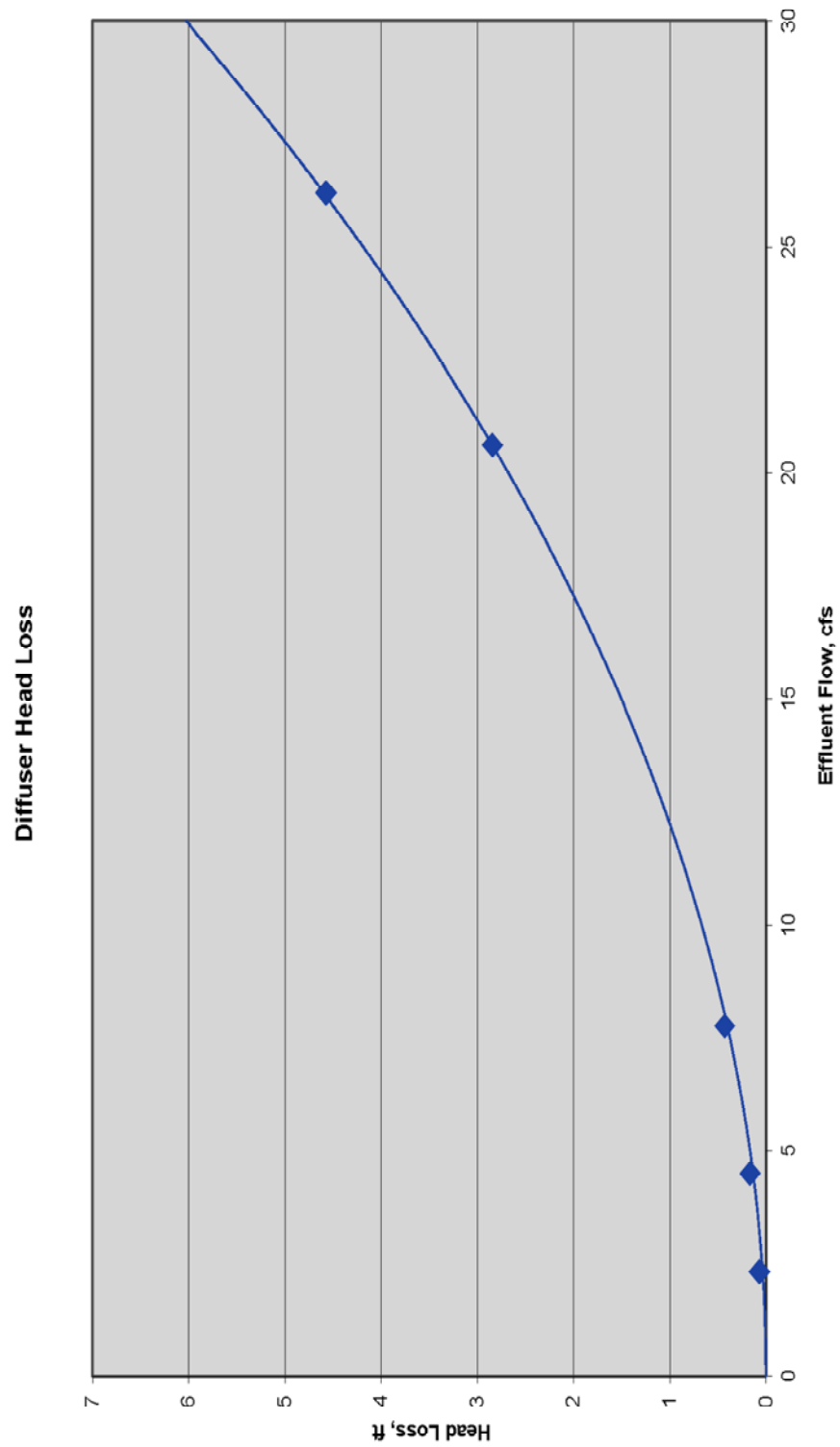
Port No.	Total head (FT)	V ² --- 2gh	Discharge coeff	Port discharge (CFS)	Port velocity (FPS)	Increment in diffuser velocity (FPS)	Diffuser velocity (FPS)	Velocity head (FT)	Friction factor	Distance to next port (FT)	Head loss (FT)	Density head (FT)	TOTAL HEAD (FT)	Froude
1	4.455	0.000	0.610	2.73	10.33	0.504	0.50	0.0040	0.018	4.50	0.00013	0.00304	4.45817	15.30
2	4.458	0.001	0.610	1.27	10.33	0.235	0.74	0.0085	0.017	4.50	0.00025	0.00304	4.46146	18.52
3	4.461	0.002	0.609	1.27	10.32	0.235	0.97	0.0147	0.017	4.50	0.00042	0.00304	4.46432	18.51
4	4.465	0.003	0.608	1.27	10.32	0.235	1.21	0.0227	0.016	4.50	0.00063	0.00304	4.46859	18.49
5	4.469	0.005	0.607	1.27	10.30	0.234	1.44	0.0323	0.016	4.50	0.00088	0.00304	4.47251	18.47
6	4.473	0.007	0.606	1.27	10.29	0.234	1.68	0.0437	0.015	4.50	0.00116	0.00304	4.47671	18.45
7	4.477	0.010	0.605	1.26	10.27	0.234	1.91	0.0567	0.015	4.50	0.00147	0.00304	4.48122	18.42
8	4.481	0.013	0.604	1.26	10.26	0.233	2.14	0.0714	0.015	4.50	0.00182	0.00304	4.48609	18.38
9	4.486	0.016	0.602	1.26	10.23	0.233	2.38	0.0877	0.015	4.50	0.00221	0.00304	4.49133	18.34
10	4.491	0.020	0.600	1.26	10.21	0.232	2.61	0.1057	0.014	4.50	0.00262	0.00304	4.49700	18.30
11	4.497	0.023	0.598	1.25	10.18	0.232	2.84	0.1252	0.014	4.50	0.00307	0.00304	4.50311	18.25
12	4.503	0.028	0.596	1.25	10.15	0.231	3.07	0.1464	0.014	4.50	0.00355	0.00304	4.50969	18.20
13	4.510	0.032	0.594	1.25	10.12	0.230	3.30	0.1692	0.014	4.50	0.00406	0.00304	4.51679	18.14
14	4.517	0.037	0.591	1.24	10.08	0.229	3.53	0.1935	0.014	4.50	0.00459	0.00304	4.52442	18.08
15	4.524	0.043	0.589	1.24	10.05	0.228	3.76	0.2194	0.014	4.50	0.00516	0.00304	4.53262	18.01
16	4.533	0.048	0.586	1.23	10.01	0.228	3.99	0.2468	0.014	4.50	0.00575	0.00304	4.54142	17.94
17	4.541	0.054	0.583	1.16	9.97	0.215	4.20	0.2741	0.013	4.50	0.00634	0.00304	4.55079	18.11
18	4.551	0.060	0.580	1.16	9.93	0.214	4.42	0.3027	0.013	4.50	0.00695	0.00304	4.56079	18.04
19	4.561	0.066	0.577	1.15	9.89	0.213	4.63	0.3326	0.013	4.50	0.00758	0.00304	4.57141	17.96
20	4.571	0.073	0.574	1.15	9.84	0.212	4.84	0.3638	0.013	0.00	0.00000	0.00000	4.57141	17.88
MAX: 4.571 TOTAL: 26.20 DIFF FROM TOTAL FLOW: 0.00 AVG: 2.71 TOTAL: 0.05777														

Anacortes Diffuser Hydraulics

PIF

Diffuser Flow Balance





APPENDIX E: VISUAL PLUMES RESULTS FOR AQUATIC LIFE CRITERIA

Effluent Flow	Current Speed	Ambient Profile	Dilution at Acute Boundary
Acute 2040 (13.3 MGD)	90 th Percentile	Gue1706c	69.79

/ Windows UM3.

Case 6; ambient file C:\Plumes\gue1706c.db; Diffuser table record 2: -----

Depth	Amb-cur	Amb-dir	Amb-sal	Amb-tem	Amb-pol	Decay	Far-spd	Far-dir	Disprsn
m	m/s	deg	psu	C	kg/kg	s-1	m/s	deg	m0.67/s2
0.0	1.45	90.0	26.74	14.51	0.0	0.0	1.45	90.0	0.0003
2.0	1.43	90.0	27.36	13.71	0.0	0.0	1.43	90.0	0.0003
3.0	1.42	90.0	27.67	13.31	0.0	0.0	1.42	90.0	0.0003
4.0	1.41	90.0	27.68	13.23	0.0	0.0	1.41	90.0	0.0003
5.0	1.4	90.0	27.81	12.98	0.0	0.0	1.4	90.0	0.0003
6.0	1.39	90.0	27.86	12.85	0.0	0.0	1.39	90.0	0.0003
7.0	1.38	90.0	27.91	12.66	0.0	0.0	1.38	90.0	0.0003
8.0	1.36	90.0	27.97	12.57	0.0	0.0	1.36	90.0	0.0003
9.0	1.35	90.0	27.98	12.54	0.0	0.0	1.35	90.0	0.0003
10.0	1.33	90.0	28.04	12.39	0.0	0.0	1.33	90.0	0.0003
11.0	1.31	90.0	28.06	12.36	0.0	0.0	1.31	90.0	0.0003
12.0	1.29	90.0	28.08	12.32	0.0	0.0	1.29	90.0	0.0003
13.0	1.26	90.0	28.11	12.23	0.0	0.0	1.26	90.0	0.0003
14.0	1.23	90.0	28.13	12.19	0.0	0.0	1.23	90.0	0.0003
15.0	1.2	90.0	28.15	12.09	0.0	0.0	1.2	90.0	0.0003
16.0	1.15	90.0	28.19	12.07	0.0	0.0	1.15	90.0	0.0003
17.0	1.1	90.0	28.19	12.03	0.0	0.0	1.1	90.0	0.0003
18.0	1.05	90.0	28.19	12.05	0.0	0.0	1.05	90.0	0.0003
19.0	1.0	90.0	28.17	11.97	0.0	0.0	1.0	90.0	0.0003
20.0	0.95	90.0	28.32	11.64	0.0	0.0	0.95	90.0	0.0003

Ports Spacing Ttl-flw

() (ft)

20.0 4.5 13.3

Froude number: 15.65

Step	Depth	P-dia	Polutnt	Density	Amb-den	Dilutn	x-posn	y-posn	Time
	(ft)	(in)	(%)	(sigmaT)	(sigmaT)	()	(ft)	(ft)	(s)
0	65.0	4.75	100.0	-0.92202	21.4727	1.0	0.0	0.0	0.0;
50	64.5	10.5	41.98	12.0425	21.4466	2.351	0.0	0.113	0.0956; axial vel 0.00412
51	64.49	10.62	41.4	12.173	21.4462	2.384	0.0	0.117	0.0977; begin overlap,
95	64.15	16.43	22.04	16.4957	21.4279	4.459	0.0	0.423	0.235; end overlap,
100	64.1	17.22	20.31	16.882	21.4257	4.837	0.0	0.483	0.259; axial vel 0.00524
150	63.46	28.15	7.698	19.6904	21.392	12.73	0.0	2.287	0.898;
200	62.4	45.25	2.86	20.7409	21.3364	34.22	0.0	9.976	3.396;
219	61.85	54.26	1.963	20.9263	21.3317	49.85	0.0	16.62	5.495; merging,
236	61.17	66.97	1.402	21.0422	21.3319	69.79	0.0	26.73	8.643; acute zone,
250	60.44	82.84	1.063	21.1124	21.3322	92.09	0.0	39.57	12.61;
300	55.64	198.8	0.395	21.2516	21.3363	247.8	0.0	142.5	43.44;
328	50.69	330.1	0.227	21.2846	21.3125	431.4	0.0	265.5	78.84; chronic zone,
340	47.97	409.2	0.179	21.2877	21.2846	547.2	0.0	345.8	101.2; trap level,
350	45.47	489.2	0.147	21.2851	21.26	667.0	0.0	441.9	127.5;
362	43.05	606.3	0.116	21.2778	21.2422	845.9	0.0	646.0	182.1; bottom hit,
364	43.01	628.5	0.111	21.2764	21.2413	880.1	0.0	698.3	195.9; local maximum rise or fall,

Outside chronic zone

Effluent Flow	Current Speed	Ambient Profile	Dilution at Acute Boundary
Acute 2040 (13.3 MGD)	90 th Percentile	Gue1708	69.79

/ Windows UM3.

Case 10; ambient file C:\Plumes\gue1708.db; Diffuser table record 2: -----

Depth	Amb-cur	Amb-dir	Amb-sal	Amb-tem	Amb-pol	Decay	Far-spd	Far-dir	Disprsn
m	m/s	deg	psu	C	kg/kg	s-1	m/s	deg	m0.67/s2
0.0	1.45	90.0	28.07	14.92	0.0	0.0	1.45	90.0	0.0003
2.0	1.43	90.0	27.99	14.84	0.0	0.0	1.43	90.0	0.0003
3.0	1.42	90.0	27.95	14.8	0.0	0.0	1.42	90.0	0.0003
4.0	1.41	90.0	28.05	14.78	0.0	0.0	1.41	90.0	0.0003
5.0	1.4	90.0	28.02	14.67	0.0	0.0	1.4	90.0	0.0003
6.0	1.39	90.0	28.03	14.64	0.0	0.0	1.39	90.0	0.0003
7.0	1.38	90.0	28.07	14.61	0.0	0.0	1.38	90.0	0.0003
8.0	1.36	90.0	28.05	14.59	0.0	0.0	1.36	90.0	0.0003
9.0	1.35	90.0	28.07	14.55	0.0	0.0	1.35	90.0	0.0003
10.0	1.33	90.0	28.06	14.51	0.0	0.0	1.33	90.0	0.0003
11.0	1.31	90.0	28.12	14.37	0.0	0.0	1.31	90.0	0.0003
12.0	1.29	90.0	28.22	14.19	0.0	0.0	1.29	90.0	0.0003
13.0	1.26	90.0	28.21	14.13	0.0	0.0	1.26	90.0	0.0003
14.0	1.23	90.0	28.27	14.0	0.0	0.0	1.23	90.0	0.0003
15.0	1.2	90.0	28.29	13.99	0.0	0.0	1.2	90.0	0.0003
16.0	1.15	90.0	28.28	13.89	0.0	0.0	1.15	90.0	0.0003
17.0	1.1	90.0	28.38	13.61	0.0	0.0	1.1	90.0	0.0003
18.0	1.05	90.0	28.52	13.31	0.0	0.0	1.05	90.0	0.0003
19.0	1.0	90.0	28.66	13.02	0.0	0.0	1.0	90.0	0.0003
20.0	0.95	90.0	28.75	12.87	0.0	0.0	0.95	90.0	0.0003

Ports Spacing Ttl-flo

() (ft) (MGD)

20.0 4.5 13.3

Froude number: 15.61

Step	Depth	P-dia	Polutnt	Density	Amb-den	Dilutn	x-posn	y-posn	Time
	(ft)	(in)	(%)	(sigmaT)	(sigmaT)	()	(ft)	(ft)	(s)
0	65.0	4.75	100.0	-0.92202	21.5967	1.0	0.0	0.0	0.0;
50	64.5	10.5	41.98	12.1246	21.582	2.351	0.0	0.113	0.0956; axial vel 0.00412
51	64.49	10.62	41.4	12.2559	21.5818	2.384	0.0	0.117	0.0977; begin overlap,
95	64.15	16.43	22.04	16.6065	21.5716	4.459	0.0	0.423	0.235; end overlap,
100	64.1	17.22	20.31	16.9956	21.5703	4.837	0.0	0.483	0.259; axial vel 0.00524
150	63.46	28.15	7.697	19.8283	21.5514	12.73	0.0	2.287	0.898;
200	62.4	45.25	2.859	20.9005	21.5202	34.22	0.0	9.963	3.392;
219	61.84	54.26	1.963	21.0911	21.4948	49.85	0.0	16.58	5.481; merging,
236	61.17	66.97	1.402	21.2021	21.4622	69.79	0.0	26.65	8.619; acute zone,
250	60.44	82.84	1.062	21.2611	21.4266	92.08	0.0	39.63	12.62;
282	57.93	143.7	0.564	21.3103	21.3029	173.5	0.0	98.43	30.42; trap level,
300	56.04	199.1	0.395	21.294	21.2076	247.8	0.0	178.3	54.1;
306	55.81	222.2	0.35	21.2831	21.1886	279.1	0.0	242.6	72.92; local maximum rise or fall,

Const Eddy Diffusivity. Farfield dispersion based on wastefield width of 31.70 m

conc	dilutn	width	distnce	time					
(%)		(m)	(m)	(hrs)	(%)	(s-1)	(m/s)	(m0.67/s2)	
0.34887	280.4	31.72	75.0	3.22E-4	0.0	0.0	0.909	3.00E-4	
0.349	280.3	31.78	80.0	0.00185	0.0	0.0	0.909	3.00E-4	
0.3492	280.2	31.84	85.0	0.00338	0.0	0.0	0.909	3.00E-4	

count: 3

Effluent Flow	Current Speed	Ambient Profile	Dilution at Acute Boundary
Acute Buildout (15.3 MGD)	90 th Percentile	Gue1706c	69.19

/ Windows UM3.

Case 5; ambient file C:\Plumes\gue1706c.db; Diffuser table record 1: -----

Depth	Amb-cur	Amb-dir	Amb-sal	Amb-tem	Amb-pol	Decay	Far-spd	Far-dir	Disprsn
m	m/s	deg	psu	C	kg/kg	s-1	m/s	deg	m0.67/s2
0.0	1.45	90.0	26.74	14.51	0.0	0.0	1.45	90.0	0.0003
2.0	1.43	90.0	27.36	13.71	0.0	0.0	1.43	90.0	0.0003
3.0	1.42	90.0	27.67	13.31	0.0	0.0	1.42	90.0	0.0003
4.0	1.41	90.0	27.68	13.23	0.0	0.0	1.41	90.0	0.0003
5.0	1.4	90.0	27.81	12.98	0.0	0.0	1.4	90.0	0.0003
6.0	1.39	90.0	27.86	12.85	0.0	0.0	1.39	90.0	0.0003
7.0	1.38	90.0	27.91	12.66	0.0	0.0	1.38	90.0	0.0003
8.0	1.36	90.0	27.97	12.57	0.0	0.0	1.36	90.0	0.0003
9.0	1.35	90.0	27.98	12.54	0.0	0.0	1.35	90.0	0.0003
10.0	1.33	90.0	28.04	12.39	0.0	0.0	1.33	90.0	0.0003
11.0	1.31	90.0	28.06	12.36	0.0	0.0	1.31	90.0	0.0003
12.0	1.29	90.0	28.08	12.32	0.0	0.0	1.29	90.0	0.0003
13.0	1.26	90.0	28.11	12.23	0.0	0.0	1.26	90.0	0.0003
14.0	1.23	90.0	28.13	12.19	0.0	0.0	1.23	90.0	0.0003
15.0	1.2	90.0	28.15	12.09	0.0	0.0	1.2	90.0	0.0003
16.0	1.15	90.0	28.19	12.07	0.0	0.0	1.15	90.0	0.0003
17.0	1.1	90.0	28.19	12.03	0.0	0.0	1.1	90.0	0.0003
18.0	1.05	90.0	28.19	12.05	0.0	0.0	1.05	90.0	0.0003
19.0	1.0	90.0	28.17	11.97	0.0	0.0	1.0	90.0	0.0003
20.0	0.95	90.0	28.32	11.64	0.0	0.0	0.95	90.0	0.0003

P-dia	P-elev	V-angle	H-angle	Ports	Spacing	AcuteMZ	ChronicMZ	P-depth	Ttl-flo	Eff-sal	Temp	Polutnt
(in)	(m)	(deg)	(deg)	(in)	(ft)	(ft)	(ft)	(ft)	(MGD)	(psu)	(F)	(%)
4.75	1.0	90.0	90.0	20.0	4.5	26.5	265.0	65.0	15.3	0.0	60.0	100.0

Froude number: 18.0

Step	Depth	P-dia	Polutnt	Density	Amb-den	Dilutn	x-posn	y-posn	Time
	(ft)	(in)	(%)	(sigmaT)	(sigmaT)	(in)	(ft)	(ft)	(s)
0	65.0	4.75	100.0	-0.92202	21.4727	1.0	0.0	0.0	0.0;
50	64.4	11.08	40.0	12.4841	21.4415	2.467	0.0	0.128	0.103;
62	64.29	12.78	33.5	13.9344	21.4357	2.941	0.0	0.19	0.134; axial vel 0.00489 begin overlap,
94	64.0	17.74	20.85	16.7599	21.4205	4.714	0.0	0.455	0.246; axial vel 0.0057 end overlap,
100	63.95	18.81	18.9	17.1944	21.4175	5.197	0.0	0.531	0.276;
150	63.23	31.1	7.174	19.8	21.3798	13.66	0.0	2.442	0.946;
200	62.05	50.12	2.665	20.7729	21.3316	36.72	0.0	10.6	3.579;
208	61.8	54.1	2.275	20.8548	21.3317	43.02	0.0	13.19	4.398; merging,
232	60.79	73.86	1.414	21.0352	21.3321	69.19	0.0	26.56	8.558; acute zone,
250	59.68	98.77	0.99	21.1243	21.3325	98.81	0.0	44.74	14.14;
300	53.9	241.0	0.368	21.2563	21.3326	265.9	0.0	162.0	48.91;
322	49.53	358.4	0.238	21.2792	21.3004	411.1	0.0	266.0	78.48; chronic zone,
332	47.11	428.4	0.195	21.281	21.276	501.1	0.0	334.6	97.47; trap level,
350	42.51	590.8	0.137	21.2735	21.2393	715.7	0.0	551.7	155.9;
354	41.89	634.6	0.126	21.2706	21.231	774.7	0.0	639.0	178.9; bottom hit,
356	41.86	657.7	0.121	21.2691	21.2292	806.0	0.0	692.4	193.0; local maximum rise or fall,

Outside chronic zone

Effluent Flow	Current Speed	Ambient Profile	Dilution at Acute Boundary
Acute Buildout (15.3 MGD)	90 th Percentile	Gue1708	69.19

/ Windows UM3.

Case 9; ambient file C:\Plumes\gue1708.db; Diffuser table record 1: -----

Depth	Amb-cur	Amb-dir	Amb-sal	Amb-tem	Amb-pol	Decay	Far-spd	Far-dir	Disprsn
m	m/s	deg	psu	C	kg/kg	s-1	m/s	deg	m0.67/s2
0.0	1.45	90.0	28.07	14.92	0.0	0.0	1.45	90.0	0.0003
2.0	1.43	90.0	27.99	14.84	0.0	0.0	1.43	90.0	0.0003
3.0	1.42	90.0	27.95	14.8	0.0	0.0	1.42	90.0	0.0003
4.0	1.41	90.0	28.05	14.78	0.0	0.0	1.41	90.0	0.0003
5.0	1.4	90.0	28.02	14.67	0.0	0.0	1.4	90.0	0.0003
6.0	1.39	90.0	28.03	14.64	0.0	0.0	1.39	90.0	0.0003
7.0	1.38	90.0	28.07	14.61	0.0	0.0	1.38	90.0	0.0003
8.0	1.36	90.0	28.05	14.59	0.0	0.0	1.36	90.0	0.0003
9.0	1.35	90.0	28.07	14.55	0.0	0.0	1.35	90.0	0.0003
10.0	1.33	90.0	28.06	14.51	0.0	0.0	1.33	90.0	0.0003
11.0	1.31	90.0	28.12	14.37	0.0	0.0	1.31	90.0	0.0003
12.0	1.29	90.0	28.22	14.19	0.0	0.0	1.29	90.0	0.0003
13.0	1.26	90.0	28.21	14.13	0.0	0.0	1.26	90.0	0.0003
14.0	1.23	90.0	28.27	14.0	0.0	0.0	1.23	90.0	0.0003
15.0	1.2	90.0	28.29	13.99	0.0	0.0	1.2	90.0	0.0003
16.0	1.15	90.0	28.28	13.89	0.0	0.0	1.15	90.0	0.0003
17.0	1.1	90.0	28.38	13.61	0.0	0.0	1.1	90.0	0.0003
18.0	1.05	90.0	28.52	13.31	0.0	0.0	1.05	90.0	0.0003
19.0	1.0	90.0	28.66	13.02	0.0	0.0	1.0	90.0	0.0003
20.0	0.95	90.0	28.75	12.87	0.0	0.0	0.95	90.0	0.0003

P-dia	P-elev	V-angle	H-angle	Ports	Spacing	AcuteMZ	ChrnCMZ	P-depth	Ttl-flo	Eff-sal	Temp	Polutnt
(in)	(m)	(deg)	(deg)	(in)	(ft)	(ft)	(ft)	(ft)	(MGD)	(psu)	(F)	(%)
4.75	1.0	90.0	90.0	20.0	4.5	26.5	265.0	65.0	15.3	0.0	60.0	100.0

Froude number: 17.95

Step	Depth	P-dia	Polutnt	Density	Amb-den	Dilutn	x-posn	y-posn	Time
	(ft)	(in)	(%)	(sigmaT)	(sigmaT)	(%)	(ft)	(ft)	(s)
0	65.0	4.75	100.0	-0.92202	21.5967	1.0	0.0	0.0	0.0;
50	64.4	11.08	40.0	12.5694	21.5792	2.467	0.0	0.128	0.103;
62	64.29	12.78	33.5	14.0289	21.5759	2.941	0.0	0.19	0.134; axial vel 0.00489 begin overlap,
94	64.0	17.74	20.84	16.8739	21.5674	4.714	0.0	0.455	0.246; axial vel 0.0057 end overlap,
100	63.95	18.81	18.9	17.3115	21.5657	5.197	0.0	0.531	0.276;
150	63.23	31.1	7.173	19.9421	21.5446	13.66	0.0	2.442	0.946;
200	62.05	50.12	2.665	20.9369	21.5046	36.72	0.0	10.58	3.574;
208	61.8	54.1	2.274	21.0193	21.4925	43.02	0.0	13.17	4.39; merging,
232	60.79	73.86	1.414	21.1894	21.4435	69.19	0.0	26.54	8.552; acute zone,
250	59.68	98.79	0.99	21.2579	21.3895	98.81	0.0	45.16	14.26;
275	57.46	153.3	0.603	21.2886	21.2798	162.1	0.0	94.2	29.04; trap level,
299	55.11	237.3	0.375	21.2597	21.1618	260.7	0.0	234.5	70.19; local maximum rise or fall,

Const Eddy Diffusivity. Farfield dispersion based on wastefield width of 32.09 m

conc	dilutn	width	distnce	time
(%)	(m)	(m)	(hrs)	(%)
0.3735	261.9	32.13	75.0	0.00108
0.37371	261.8	32.19	80.0	0.00261
0.3739	261.7	32.26	85.0	0.00414

count: 3

Effluent Flow	Current Speed	Ambient Profile	Dilution at Chronic Boundary
Chronic 2040 (5.0 MGD)	50 th Percentile	Gue1605	687.8

/ Windows UM3.

Case 3; ambient file C:\Plumes\gue1605.db; Diffuser table record 3: -----

Depth	Amb-cur	Amb-dir	Amb-sal	Amb-tem	Amb-pol	Decay	Far-spd	Far-dir	Disprsn
m	m/s	deg	psu	C	kg/kg	s-1	m/s	deg	m0.67/s2
0.0	0.845	90.0	27.12	11.78	0.0	0.0	0.845	90.0	0.0003
2.0	0.833	90.0	27.52	11.66	0.0	0.0	0.833	90.0	0.0003
3.0	0.827	90.0	27.72	11.6	0.0	0.0	0.827	90.0	0.0003
4.0	0.821	90.0	27.75	11.57	0.0	0.0	0.821	90.0	0.0003
5.0	0.815	90.0	27.81	11.56	0.0	0.0	0.815	90.0	0.0003
6.0	0.808	90.0	27.95	11.48	0.0	0.0	0.808	90.0	0.0003
7.0	0.801	90.0	28.05	11.41	0.0	0.0	0.801	90.0	0.0003
8.0	0.792	90.0	28.14	11.37	0.0	0.0	0.792	90.0	0.0003
9.0	0.78	90.0	28.12	11.38	0.0	0.0	0.78	90.0	0.0003
10.0	0.769	90.0	28.38	11.35	0.0	0.0	0.769	90.0	0.0003
11.0	0.758	90.0	28.43	11.35	0.0	0.0	0.758	90.0	0.0003
12.0	0.745	90.0	28.45	11.34	0.0	0.0	0.745	90.0	0.0003
13.0	0.727	90.0	28.5	11.33	0.0	0.0	0.727	90.0	0.0003
14.0	0.709	90.0	28.61	11.28	0.0	0.0	0.709	90.0	0.0003
15.0	0.688	90.0	28.7	11.23	0.0	0.0	0.688	90.0	0.0003
16.0	0.662	90.0	28.72	11.21	0.0	0.0	0.662	90.0	0.0003
17.0	0.626	90.0	28.77	11.19	0.0	0.0	0.626	90.0	0.0003
18.0	0.59	90.0	28.8	11.17	0.0	0.0	0.59	90.0	0.0003
19.0	0.554	90.0	28.85	11.13	0.0	0.0	0.554	90.0	0.0003
20.0	0.518	90.0	28.88	11.09	0.0	0.0	0.518	90.0	0.0003

Ports Spacing Ttl-flo

() (ft) (MGD)

20.0 4.5 5.0

Froude number: 5.811

Step	Depth	P-dia	Polutnt	Density	Amb-den	Dilutn	x-posn	y-posn	Time
	(ft)	(in)	(%)	(sigmaT)	(sigmaT)	()	(ft)	(ft)	(s)
0	65.0	4.75	100.0	-0.92202	22.0274	1.0	0.0	0.0	0.0;
28	64.82	7.021	65.19	7.05183	22.0258	1.522	0.0	0.0252	0.0723; begin overlap,
50	64.7	8.78	49.5	10.6453	22.0247	1.997	0.0	0.0752	0.138;
96	64.43	13.13	25.93	16.0499	22.0222	3.792	0.0	0.332	0.368; end overlap,
100	64.4	13.59	24.24	16.4383	22.022	4.055	0.0	0.372	0.398;
150	63.91	21.65	9.094	19.922	22.0175	10.77	0.0	1.815	1.359;
200	63.09	34.57	3.379	21.2359	22.0101	28.96	0.0	6.941	4.437; axial vel 0.00598
247	61.84	54.14	1.332	21.7009	21.9966	73.41	0.0	19.3	11.52; merging,
250	61.74	55.82	1.255	21.7179	21.9952	77.9	0.0	20.55	12.22;
262	61.25	64.88	0.99	21.7759	21.9886	98.79	0.0	26.55	15.59; acute zone,
300	58.8	119.3	0.466	21.8797	21.9561	209.6	0.0	61.27	34.66;
341	53.74	247.6	0.207	21.9099	21.9068	472.1	0.0	155.6	84.25; trap level,
350	52.26	290.6	0.173	21.908	21.8884	564.3	0.0	195.8	104.7;
360	50.69	347.1	0.142	21.9037	21.8792	687.8	0.0	268.0	140.7; chronic zone,
366	50.31	386.3	0.126	21.9008	21.8761	774.6	0.0	346.4	179.2; local maximum rise or fall,

Outside chronic zone

Effluent Flow	Current Speed	Ambient Profile	Dilution at Chronic Boundary
Chronic Buildout (5.6 MGD)	50 th Percentile	Gue1605	659

/ Windows UM3. 6/11/2020 5:50:45 PM

Case 1; ambient file C:\Plumes\gue1605.db; Diffuser table record 1: -----

Depth	Amb-cur	Amb-dir	Amb-sal	Amb-tem	Amb-pol	Decay	Far-spd	Far-dir	Disprsn
m	m/s	deg	psu	C	kg/kg	s-1	m/s	deg	m0.67/s2
0.0	0.845	90.0	27.12	11.78	0.0	0.0	0.845	90.0	0.0003
2.0	0.833	90.0	27.52	11.66	0.0	0.0	0.833	90.0	0.0003
3.0	0.827	90.0	27.72	11.6	0.0	0.0	0.827	90.0	0.0003
4.0	0.821	90.0	27.75	11.57	0.0	0.0	0.821	90.0	0.0003
5.0	0.815	90.0	27.81	11.56	0.0	0.0	0.815	90.0	0.0003
6.0	0.808	90.0	27.95	11.48	0.0	0.0	0.808	90.0	0.0003
7.0	0.801	90.0	28.05	11.41	0.0	0.0	0.801	90.0	0.0003
8.0	0.792	90.0	28.14	11.37	0.0	0.0	0.792	90.0	0.0003
9.0	0.78	90.0	28.12	11.38	0.0	0.0	0.78	90.0	0.0003
10.0	0.769	90.0	28.38	11.35	0.0	0.0	0.769	90.0	0.0003
11.0	0.758	90.0	28.43	11.35	0.0	0.0	0.758	90.0	0.0003
12.0	0.745	90.0	28.45	11.34	0.0	0.0	0.745	90.0	0.0003
13.0	0.727	90.0	28.5	11.33	0.0	0.0	0.727	90.0	0.0003
14.0	0.709	90.0	28.61	11.28	0.0	0.0	0.709	90.0	0.0003
15.0	0.688	90.0	28.7	11.23	0.0	0.0	0.688	90.0	0.0003
16.0	0.662	90.0	28.72	11.21	0.0	0.0	0.662	90.0	0.0003
17.0	0.626	90.0	28.77	11.19	0.0	0.0	0.626	90.0	0.0003
18.0	0.59	90.0	28.8	11.17	0.0	0.0	0.59	90.0	0.0003
19.0	0.554	90.0	28.85	11.13	0.0	0.0	0.554	90.0	0.0003
20.0	0.518	90.0	28.88	11.09	0.0	0.0	0.518	90.0	0.0003

P-dia	P-elev	V-angle	H-angle	Ports	Spacing	AcuteMZ	ChronicMZ	P-depth	Ttl-flo	Eff-sal	Temp	Polutnt
(in)	(m)	(deg)	(deg)	(in)	(ft)	(ft)	(ft)	(ft)	(MGD)	(psu)	(F)	(%)
4.75	1.0	90.0	90.0	20.0	4.5	26.5	265.0	65.0	5.6	0.0	60.0	100.0

Froude number: 6.509

Step	Depth	P-dia	Polutnt	Density	Amb-den	Dilutn	x-posn	y-posn	Time
	(ft)	(in)	(%)	(sigmaT)	(sigmaT)	(in)	(ft)	(ft)	(s)
0	65.0	4.75	100.0	-0.92202	22.0274	1.0	0.0	0.0	0.0;
35	64.74	7.933	56.9	8.95007	22.025	1.74	0.0	0.0445	0.0999; begin overlap,
50	64.65	9.293	46.74	11.2768	22.0242	2.114	0.0	0.086	0.149;
95	64.36	13.94	24.91	16.2842	22.0216	3.946	0.0	0.351	0.38; end overlap,
100	64.32	14.59	22.9	16.7454	22.0213	4.29	0.0	0.403	0.419;
150	63.78	23.46	8.597	20.0359	22.0164	11.39	0.0	1.929	1.425;
200	62.88	37.53	3.194	21.2773	22.0082	30.63	0.0	7.373	4.676; axial vel 0.00655
239	61.81	54.45	1.475	21.6675	21.9961	66.28	0.0	17.51	10.48; merging,
250	61.38	61.97	1.187	21.7313	21.9904	82.4	0.0	22.3	13.17;
258	61.02	69.24	1.013	21.7689	21.9854	96.55	0.0	26.65	15.6; acute zone,
300	57.96	138.6	0.441	21.88	21.9494	221.8	0.0	68.66	38.53;
335	53.24	259.0	0.22	21.9038	21.9005	443.5	0.0	153.3	82.73; trap level,
350	50.63	338.1	0.164	21.8998	21.879	596.9	0.0	230.3	121.4;
355	49.82	369.4	0.148	21.8976	21.8742	659.0	0.0	273.0	142.4; chronic zone,
362	49.37	418.4	0.129	21.8943	21.8705	757.0	0.0	369.6	189.5; local maximum rise or fall,

Outside chronic zone

APPENDIX F: VISUAL PLUMES RESULTS FOR HUMAN HEALTH CRITERIA

Effluent Flow	Current Speed	Ambient Profile	Dilution at Chronic Boundary
HH Carcinogen 2040 (2.9 MGD)	50 th Percentile	Gue1601	1200

/ Windows UM3. 6/18/2020 8:34:21 PM

Case 1; ambient file C:\Plumes\gue1601.db; Diffuser table record 1: -----

Depth	Amb-cur	Amb-dir	Amb-sal	Amb-tem	Amb-pol	Decay	Far-spd	Far-dir	Disprsn
m	m/s	deg	psu	C	kg/kg	s-1	m/s	deg	m0.67/s2
0.0	0.845	90.0	29.71	8.27	0.0	0.0	0.845	90.0	0.0003
2.0	0.833	90.0	29.79	8.27	0.0	0.0	0.833	90.0	0.0003
3.0	0.827	90.0	29.83	8.27	0.0	0.0	0.827	90.0	0.0003
4.0	0.821	90.0	29.87	8.28	0.0	0.0	0.821	90.0	0.0003
5.0	0.815	90.0	29.88	8.29	0.0	0.0	0.815	90.0	0.0003
6.0	0.808	90.0	29.88	8.3	0.0	0.0	0.808	90.0	0.0003
7.0	0.801	90.0	29.88	8.3	0.0	0.0	0.801	90.0	0.0003
8.0	0.792	90.0	29.88	8.3	0.0	0.0	0.792	90.0	0.0003
9.0	0.78	90.0	29.88	8.3	0.0	0.0	0.78	90.0	0.0003
10.0	0.769	90.0	29.89	8.3	0.0	0.0	0.769	90.0	0.0003
11.0	0.758	90.0	29.89	8.31	0.0	0.0	0.758	90.0	0.0003
12.0	0.745	90.0	29.89	8.31	0.0	0.0	0.745	90.0	0.0003
13.0	0.727	90.0	29.89	8.31	0.0	0.0	0.727	90.0	0.0003
14.0	0.709	90.0	29.89	8.31	0.0	0.0	0.709	90.0	0.0003
15.0	0.688	90.0	29.89	8.31	0.0	0.0	0.688	90.0	0.0003
16.0	0.662	90.0	29.89	8.31	0.0	0.0	0.662	90.0	0.0003
17.0	0.626	90.0	29.89	8.31	0.0	0.0	0.626	90.0	0.0003
18.0	0.59	90.0	29.89	8.31	0.0	0.0	0.59	90.0	0.0003
19.0	0.554	90.0	29.89	8.31	0.0	0.0	0.554	90.0	0.0003
20.0	0.518	90.0	29.89	8.31	0.0	0.0	0.518	90.0	0.0003

P-dia	P-elev	V-angle	H-angle	Ports	Spacing	AcuteMZ	ChronicMZ	P-depth	Ttl-flo	Eff-sal	Temp	Polutnt
(in)	(m)	(deg)	(deg)	(in)	(ft)	(ft)	(ft)	(ft)	(MGD)	(psu)	(F)	(%)
4.75	1.0	90.0	90.0	20.0	4.5	26.5	265.0	65.0	2.9	0.0	60.0	100.0

Froude number: 3.284

Step	Depth	P-dia	Polutnt	Dilutn	x-posn	y-posn	Time
	(ft)	(in)	(%)	(in)	(ft)	(ft)	(s)
0	65.0	4.75	100.0	1.0	0.0	0.0	0.0;
2	64.99	4.858	97.3	1.027	0.0	0.000179	0.0047; begin overlap,
50	64.84	7.421	56.18	1.761	0.0	0.0528	0.118;
92	64.68	9.648	32.39	3.038	0.0	0.241	0.308; end overlap,
100	64.64	10.25	28.02	3.508	0.0	0.312	0.366;
150	64.3	15.64	10.41	9.402	0.0	1.613	1.258;
200	63.72	24.79	3.868	25.27	0.0	5.9	3.874; axial vel 0.00418
250	62.76	39.95	1.437	67.97	0.0	16.56	10.06;
276	62.04	51.3	0.859	113.7	0.0	26.5	15.71; acute zone,
282	61.85	54.35	0.763	128.1	0.0	29.41	17.34; merging,
300	61.12	68.15	0.534	182.9	0.0	41.27	23.96;
350	57.28	157.1	0.198	492.2	0.0	111.1	61.83;
395	49.91	350.3	0.0814	1200.0	0.0	265.9	141.0; chronic zone,
400	48.73	382.6	0.0737	1324.9	0.0	292.9	154.3;
443	33.63	813.7	0.0315	3104.4	0.0	680.2	333.7; surface,

Outside chronic zone

Effluent Flow	Current Speed	Ambient Profile	Dilution at Chronic Boundary
HH Carcinogen 2040 (2.9 MGD)	50 th Percentile	Gue1605	889.1

/ Windows UM3.

Case 5; ambient file C:\Plumes\gue1605.db; Diffuser table record 1: -----

Depth	Amb-cur	Amb-dir	Amb-sal	Amb-tem	Amb-pol	Decay	Far-spd	Far-dir	Disprsn
m	m/s	deg	psu	C	kg/kg	s-1	m/s	deg	m0.67/s2
0.0	0.845	90.0	27.12	11.78	0.0	0.0	0.845	90.0	0.0003
2.0	0.833	90.0	27.52	11.66	0.0	0.0	0.833	90.0	0.0003
3.0	0.827	90.0	27.72	11.6	0.0	0.0	0.827	90.0	0.0003
4.0	0.821	90.0	27.75	11.57	0.0	0.0	0.821	90.0	0.0003
5.0	0.815	90.0	27.81	11.56	0.0	0.0	0.815	90.0	0.0003
6.0	0.808	90.0	27.95	11.48	0.0	0.0	0.808	90.0	0.0003
7.0	0.801	90.0	28.05	11.41	0.0	0.0	0.801	90.0	0.0003
8.0	0.792	90.0	28.14	11.37	0.0	0.0	0.792	90.0	0.0003
9.0	0.78	90.0	28.12	11.38	0.0	0.0	0.78	90.0	0.0003
10.0	0.769	90.0	28.38	11.35	0.0	0.0	0.769	90.0	0.0003
11.0	0.758	90.0	28.43	11.35	0.0	0.0	0.758	90.0	0.0003
12.0	0.745	90.0	28.45	11.34	0.0	0.0	0.745	90.0	0.0003
13.0	0.727	90.0	28.5	11.33	0.0	0.0	0.727	90.0	0.0003
14.0	0.709	90.0	28.61	11.28	0.0	0.0	0.709	90.0	0.0003
15.0	0.688	90.0	28.7	11.23	0.0	0.0	0.688	90.0	0.0003
16.0	0.662	90.0	28.72	11.21	0.0	0.0	0.662	90.0	0.0003
17.0	0.626	90.0	28.77	11.19	0.0	0.0	0.626	90.0	0.0003
18.0	0.59	90.0	28.8	11.17	0.0	0.0	0.59	90.0	0.0003
19.0	0.554	90.0	28.85	11.13	0.0	0.0	0.554	90.0	0.0003
20.0	0.518	90.0	28.88	11.09	0.0	0.0	0.518	90.0	0.0003

P-dia	P-elev	V-angle	H-angle	Ports	Spacing	AcuteMZ	ChronicMZ	P-depth	Ttl-flo	Eff-sal	Temp	Polutnt
(in)	(m)	(deg)	(deg)	()	(ft)	(ft)	(ft)	(ft)	(MGD)	(psu)	(F)	(%)
4.75	1.0	90.0	90.0	20.0	4.5	26.5	265.0	65.0	2.9	0.0	60.0	100.0

Froude number: 3.371

Step	Depth	P-dia	Polutnt	Dilutn	x-posn	y-posn	Time
	(ft)	(in)	(%)	()	(ft)	(ft)	(s)
0	65.0	4.75	100.0	1.0	0.0	0.0	0.0;
2	64.99	4.858	97.3	1.027	0.0	0.00018	0.00471; begin overlap,
50	64.84	7.427	56.22	1.761	0.0	0.0527	0.118;
93	64.67	9.713	31.96	3.081	0.0	0.248	0.314; end overlap,
100	64.64	10.24	28.14	3.497	0.0	0.311	0.366;
150	64.3	15.63	10.45	9.374	0.0	1.617	1.262;
200	63.73	24.76	3.884	25.19	0.0	5.967	3.917; axial vel 0.00417
250	62.77	39.9	1.443	67.77	0.0	16.87	10.25;
275	62.09	50.75	0.879	111.2	0.0	26.63	15.79; acute zone,
282	61.86	54.28	0.766	127.7	0.0	30.12	17.75; merging,
300	61.14	68.02	0.536	182.4	0.0	42.48	24.66;
350	57.4	156.9	0.199	490.9	0.0	122.2	67.92;
363	55.87	198.1	0.154	635.0	0.0	166.0	90.98; trap level,
380	53.73	268.8	0.11	889.1	0.0	265.7	142.4; chronic zone,
385	53.49	294.1	0.0996	981.7	0.0	322.9	171.5; local maximum rise or fall,

Outside chronic zone

Effluent Flow	Current Speed	Ambient Profile	Dilution at Chronic Boundary
HH Carcinogen Buildout (3.2 MGD)	50 th Percentile	Gue1601	1142.6

/ Windows UM3.

Case 3; ambient file C:\Plumes\gue1601.db; Diffuser table record 3: -----

Depth	Amb-cur	Amb-dir	Amb-sal	Amb-tem	Amb-pol	Decay	Far-spd	Far-dir	Disprsn
m	m/s	deg	psu	C	kg/kg	s-1	m/s	deg	m0.67/s2
0.0	0.845	90.0	29.71	8.27	0.0	0.0	0.845	90.0	0.0003
2.0	0.833	90.0	29.79	8.27	0.0	0.0	0.833	90.0	0.0003
3.0	0.827	90.0	29.83	8.27	0.0	0.0	0.827	90.0	0.0003
4.0	0.821	90.0	29.87	8.28	0.0	0.0	0.821	90.0	0.0003
5.0	0.815	90.0	29.88	8.29	0.0	0.0	0.815	90.0	0.0003
6.0	0.808	90.0	29.88	8.3	0.0	0.0	0.808	90.0	0.0003
7.0	0.801	90.0	29.88	8.3	0.0	0.0	0.801	90.0	0.0003
8.0	0.792	90.0	29.88	8.3	0.0	0.0	0.792	90.0	0.0003
9.0	0.78	90.0	29.88	8.3	0.0	0.0	0.78	90.0	0.0003
10.0	0.769	90.0	29.89	8.3	0.0	0.0	0.769	90.0	0.0003
11.0	0.758	90.0	29.89	8.31	0.0	0.0	0.758	90.0	0.0003
12.0	0.745	90.0	29.89	8.31	0.0	0.0	0.745	90.0	0.0003
13.0	0.727	90.0	29.89	8.31	0.0	0.0	0.727	90.0	0.0003
14.0	0.709	90.0	29.89	8.31	0.0	0.0	0.709	90.0	0.0003
15.0	0.688	90.0	29.89	8.31	0.0	0.0	0.688	90.0	0.0003
16.0	0.662	90.0	29.89	8.31	0.0	0.0	0.662	90.0	0.0003
17.0	0.626	90.0	29.89	8.31	0.0	0.0	0.626	90.0	0.0003
18.0	0.59	90.0	29.89	8.31	0.0	0.0	0.59	90.0	0.0003
19.0	0.554	90.0	29.89	8.31	0.0	0.0	0.554	90.0	0.0003
20.0	0.518	90.0	29.89	8.31	0.0	0.0	0.518	90.0	0.0003

Ports Spacing Ttl-flo

() (ft) (MGD)

20.0 4.5 3.2

Froude number: 3.624

Step	Depth	P-dia	Polutnt	Dilutn	x-posn	y-posn	Time
	(ft)	(in)	(%)	()	(ft)	(ft)	(s)
0	65.0	4.75	100.0	1.0	0.0	0.0	0.0;
2	64.99	4.864	97.07	1.029	0.0	0.000192	0.0048; begin overlap,
50	64.82	7.585	55.73	1.775	0.0	0.0541	0.12;
94	64.64	10.24	30.84	3.189	0.0	0.259	0.321; end overlap,
100	64.61	10.73	27.71	3.546	0.0	0.313	0.365;
150	64.25	16.49	10.3	9.5	0.0	1.614	1.255;
200	63.64	26.15	3.828	25.53	0.0	5.977	3.912; axial vel 0.00443
250	62.62	42.14	1.422	68.68	0.0	16.93	10.26;
275	61.9	53.59	0.867	112.7	0.0	26.72	15.8; acute zone,
276	61.87	54.1	0.85	114.9	0.0	27.19	16.07; merging,
300	60.84	73.95	0.528	184.8	0.0	43.15	24.97;
350	56.61	173.3	0.196	497.4	0.0	117.4	65.04;
392	49.26	365.9	0.0855	1142.6	0.0	265.9	140.5; chronic zone,
400	47.23	421.3	0.0729	1338.7	0.0	310.7	162.3;
438	33.14	820.1	0.0344	2841.2	0.0	657.1	321.9; surface,

Outside chronic zone

Effluent Flow	Current Speed	Ambient Profile	Dilution at Chronic Boundary
HH Carcinogen Buildout (3.2 MGD)	50 th Percentile	Gue1605	863.6

/ Windows UM3.

Case 7; ambient file C:\Plumes\gue1605.db; Diffuser table record 3: -----

Depth	Amb-cur	Amb-dir	Amb-sal	Amb-tem	Amb-pol	Decay	Far-spd	Far-dir	Disprsn
m	m/s	deg	psu	C	kg/kg	s-1	m/s	deg	m0.67/s2
0.0	0.845	90.0	27.12	11.78	0.0	0.0	0.845	90.0	0.0003
2.0	0.833	90.0	27.52	11.66	0.0	0.0	0.833	90.0	0.0003
3.0	0.827	90.0	27.72	11.6	0.0	0.0	0.827	90.0	0.0003
4.0	0.821	90.0	27.75	11.57	0.0	0.0	0.821	90.0	0.0003
5.0	0.815	90.0	27.81	11.56	0.0	0.0	0.815	90.0	0.0003
6.0	0.808	90.0	27.95	11.48	0.0	0.0	0.808	90.0	0.0003
7.0	0.801	90.0	28.05	11.41	0.0	0.0	0.801	90.0	0.0003
8.0	0.792	90.0	28.14	11.37	0.0	0.0	0.792	90.0	0.0003
9.0	0.78	90.0	28.12	11.38	0.0	0.0	0.78	90.0	0.0003
10.0	0.769	90.0	28.38	11.35	0.0	0.0	0.769	90.0	0.0003
11.0	0.758	90.0	28.43	11.35	0.0	0.0	0.758	90.0	0.0003
12.0	0.745	90.0	28.45	11.34	0.0	0.0	0.745	90.0	0.0003
13.0	0.727	90.0	28.5	11.33	0.0	0.0	0.727	90.0	0.0003
14.0	0.709	90.0	28.61	11.28	0.0	0.0	0.709	90.0	0.0003
15.0	0.688	90.0	28.7	11.23	0.0	0.0	0.688	90.0	0.0003
16.0	0.662	90.0	28.72	11.21	0.0	0.0	0.662	90.0	0.0003
17.0	0.626	90.0	28.77	11.19	0.0	0.0	0.626	90.0	0.0003
18.0	0.59	90.0	28.8	11.17	0.0	0.0	0.59	90.0	0.0003
19.0	0.554	90.0	28.85	11.13	0.0	0.0	0.554	90.0	0.0003
20.0	0.518	90.0	28.88	11.09	0.0	0.0	0.518	90.0	0.0003

Ports Spacing Ttl-flo

() (ft) (MGD)

20.0 4.5 3.2

Froude number: 3.719

Step	Depth	P-dia	Polutnt	Dilutn	x-posn	y-posn	Time	
	(ft)	(in)	(%)	()	(ft)	(ft)	(s)	
0	65.0	4.75	100.0	1.0	0.0	0.0	0.0;	
2	64.99	4.864	97.07	1.029	0.0	0.000192	0.00481;	begin overlap,
50	64.82	7.589	55.77	1.775	0.0	0.054	0.12;	
94	64.64	10.23	30.94	3.182	0.0	0.259	0.321;	end overlap,
100	64.61	10.72	27.82	3.536	0.0	0.312	0.364;	
150	64.25	16.47	10.34	9.472	0.0	1.617	1.257;	
200	63.64	26.12	3.843	25.46	0.0	6.041	3.953;	axial vel 0.00442
250	62.63	42.09	1.428	68.48	0.0	17.25	10.45;	
274	61.94	53.01	0.888	110.1	0.0	26.84	15.89;	acute zone,
276	61.88	54.04	0.853	114.6	0.0	27.82	16.43;	merging,
300	60.86	73.81	0.531	184.3	0.0	44.46	25.71;	
350	56.74	173.1	0.197	496.0	0.0	130.3	72.05;	
361	55.36	210.9	0.159	616.7	0.0	169.1	92.4;	trap level,
378	53.17	286.0	0.113	863.6	0.0	274.0	146.2;	chronic zone,
382	53.02	307.3	0.105	934.8	0.0	322.1	170.4;	local maximum rise or fall,

Outside chronic zone

Effluent Flow	Current Speed	Ambient Profile	Dilution at Chronic Boundary
HH Non-Carcinogen 2040 (5.0 MGD)	50 th Percentile	Gue1601	926.3

/ Windows UM3.

Case 2; ambient file C:\Plumes\gue1601.db; Diffuser table record 2: -----

Depth	Amb-cur	Amb-dir	Amb-sal	Amb-tem	Amb-pol	Decay	Far-spd	Far-dir	Disprsn
m	m/s	deg	psu	C	kg/kg	s-1	m/s	deg	m0.67/s2
0.0	0.845	90.0	29.71	8.27	0.0	0.0	0.845	90.0	0.0003
2.0	0.833	90.0	29.79	8.27	0.0	0.0	0.833	90.0	0.0003
3.0	0.827	90.0	29.83	8.27	0.0	0.0	0.827	90.0	0.0003
4.0	0.821	90.0	29.87	8.28	0.0	0.0	0.821	90.0	0.0003
5.0	0.815	90.0	29.88	8.29	0.0	0.0	0.815	90.0	0.0003
6.0	0.808	90.0	29.88	8.3	0.0	0.0	0.808	90.0	0.0003
7.0	0.801	90.0	29.88	8.3	0.0	0.0	0.801	90.0	0.0003
8.0	0.792	90.0	29.88	8.3	0.0	0.0	0.792	90.0	0.0003
9.0	0.78	90.0	29.88	8.3	0.0	0.0	0.78	90.0	0.0003
10.0	0.769	90.0	29.89	8.3	0.0	0.0	0.769	90.0	0.0003
11.0	0.758	90.0	29.89	8.31	0.0	0.0	0.758	90.0	0.0003
12.0	0.745	90.0	29.89	8.31	0.0	0.0	0.745	90.0	0.0003
13.0	0.727	90.0	29.89	8.31	0.0	0.0	0.727	90.0	0.0003
14.0	0.709	90.0	29.89	8.31	0.0	0.0	0.709	90.0	0.0003
15.0	0.688	90.0	29.89	8.31	0.0	0.0	0.688	90.0	0.0003
16.0	0.662	90.0	29.89	8.31	0.0	0.0	0.662	90.0	0.0003
17.0	0.626	90.0	29.89	8.31	0.0	0.0	0.626	90.0	0.0003
18.0	0.59	90.0	29.89	8.31	0.0	0.0	0.59	90.0	0.0003
19.0	0.554	90.0	29.89	8.31	0.0	0.0	0.554	90.0	0.0003
20.0	0.518	90.0	29.89	8.31	0.0	0.0	0.518	90.0	0.0003

Ports Spacing Ttl-flo

() (ft) (MGD)

20.0 4.5 5.0

Froude number: 5.662

Step	Depth	P-dia	Polutnt	Dilutn	x-posn	y-posn	Time
	(ft)	(in)	(%)	()	(ft)	(ft)	(s)
0	65.0	4.75	100.0	1.0	0.0	0.0	0.0;
28	64.82	7.018	65.17	1.522	0.0	0.0252	0.0722; begin overlap,
50	64.7	8.776	49.46	1.998	0.0	0.0752	0.138;
96	64.43	13.12	25.9	3.793	0.0	0.332	0.368; end overlap,
100	64.4	13.59	24.21	4.057	0.0	0.372	0.398;
150	63.91	21.65	9.077	10.78	0.0	1.809	1.355;
200	63.08	34.58	3.372	28.98	0.0	6.864	4.391; axial vel 0.00599
247	61.83	54.15	1.33	73.46	0.0	18.93	11.3; merging,
250	61.73	55.84	1.253	77.96	0.0	20.14	11.99;
263	61.19	65.81	0.968	100.8	0.0	26.51	15.56; acute zone,
300	58.77	119.3	0.465	209.8	0.0	58.63	33.19;
350	51.84	290.0	0.173	564.6	0.0	163.5	87.86;
375	45.69	450.4	0.105	926.3	0.0	269.4	139.7; chronic zone,
400	36.49	697.6	0.0643	1519.7	0.0	444.8	221.0;
408	32.64	802.1	0.0548	1780.5	0.0	522.9	255.9; surface,

Outside chronic zone

Effluent Flow	Current Speed	Ambient Profile	Dilution at Chronic Boundary
HH Non-Carcinogen 2040 (5.0 MGD)	50 th Percentile	Gue1605	687.8

/ Windows UM3.

Case 6; ambient file C:\Plumes\gue1605.db; Diffuser table record 2: -----

Depth	Amb-cur	Amb-dir	Amb-sal	Amb-tem	Amb-pol	Decay	Far-spd	Far-dir	Disprsn
m	m/s	deg	psu	C	kg/kg	s-1	m/s	deg	m0.67/s2
0.0	0.845	90.0	27.12	11.78	0.0	0.0	0.845	90.0	0.0003
2.0	0.833	90.0	27.52	11.66	0.0	0.0	0.833	90.0	0.0003
3.0	0.827	90.0	27.72	11.6	0.0	0.0	0.827	90.0	0.0003
4.0	0.821	90.0	27.75	11.57	0.0	0.0	0.821	90.0	0.0003
5.0	0.815	90.0	27.81	11.56	0.0	0.0	0.815	90.0	0.0003
6.0	0.808	90.0	27.95	11.48	0.0	0.0	0.808	90.0	0.0003
7.0	0.801	90.0	28.05	11.41	0.0	0.0	0.801	90.0	0.0003
8.0	0.792	90.0	28.14	11.37	0.0	0.0	0.792	90.0	0.0003
9.0	0.78	90.0	28.12	11.38	0.0	0.0	0.78	90.0	0.0003
10.0	0.769	90.0	28.38	11.35	0.0	0.0	0.769	90.0	0.0003
11.0	0.758	90.0	28.43	11.35	0.0	0.0	0.758	90.0	0.0003
12.0	0.745	90.0	28.45	11.34	0.0	0.0	0.745	90.0	0.0003
13.0	0.727	90.0	28.5	11.33	0.0	0.0	0.727	90.0	0.0003
14.0	0.709	90.0	28.61	11.28	0.0	0.0	0.709	90.0	0.0003
15.0	0.688	90.0	28.7	11.23	0.0	0.0	0.688	90.0	0.0003
16.0	0.662	90.0	28.72	11.21	0.0	0.0	0.662	90.0	0.0003
17.0	0.626	90.0	28.77	11.19	0.0	0.0	0.626	90.0	0.0003
18.0	0.59	90.0	28.8	11.17	0.0	0.0	0.59	90.0	0.0003
19.0	0.554	90.0	28.85	11.13	0.0	0.0	0.554	90.0	0.0003
20.0	0.518	90.0	28.88	11.09	0.0	0.0	0.518	90.0	0.0003

Ports Spacing Ttl-flo

() (ft) (MGD)

20.0 4.5 5.0

Froude number: 5.811

Step	Depth	P-dia	Polutnt	Dilutn	x-posn	y-posn	Time
	(ft)	(in)	(%)	()	(ft)	(ft)	(s)
0	65.0	4.75	100.0	1.0	0.0	0.0	0.0;
28	64.82	7.021	65.19	1.522	0.0	0.0252	0.0723; begin overlap,
50	64.7	8.78	49.5	1.997	0.0	0.0752	0.138;
96	64.43	13.13	25.93	3.792	0.0	0.332	0.368; end overlap,
100	64.4	13.59	24.24	4.055	0.0	0.372	0.398;
150	63.91	21.65	9.094	10.77	0.0	1.815	1.359;
200	63.09	34.57	3.379	28.96	0.0	6.941	4.437; axial vel 0.00598
247	61.84	54.14	1.332	73.41	0.0	19.3	11.52; merging,
250	61.74	55.82	1.255	77.9	0.0	20.55	12.22;
262	61.25	64.88	0.99	98.79	0.0	26.55	15.59; acute zone,
300	58.8	119.3	0.466	209.6	0.0	61.27	34.66;
341	53.74	247.6	0.207	472.1	0.0	155.6	84.25; trap level,
350	52.26	290.6	0.173	564.3	0.0	195.8	104.7;
360	50.69	347.1	0.142	687.8	0.0	268.0	140.7; chronic zone,
366	50.31	386.3	0.126	774.6	0.0	346.4	179.2; local maximum rise or fall,

Outside chronic zone

Effluent Flow	Current Speed	Ambient Profile	Dilution at Chronic Boundary
HH Non-Carcinogen Buildout (5.6 MGD)	50 th Percentile	Gue1601	868.5

/ Windows UM3.

Case 4; ambient file C:\Plumes\gue1601.db; Diffuser table record 4: -----

Depth	Amb-cur	Amb-dir	Amb-sal	Amb-tem	Amb-pol	Decay	Far-spd	Far-dir	Disprsn
m	m/s	deg	psu	C	kg/kg	s-1	m/s	deg	m0.67/s2
0.0	0.845	90.0	29.71	8.27	0.0	0.0	0.845	90.0	0.0003
2.0	0.833	90.0	29.79	8.27	0.0	0.0	0.833	90.0	0.0003
3.0	0.827	90.0	29.83	8.27	0.0	0.0	0.827	90.0	0.0003
4.0	0.821	90.0	29.87	8.28	0.0	0.0	0.821	90.0	0.0003
5.0	0.815	90.0	29.88	8.29	0.0	0.0	0.815	90.0	0.0003
6.0	0.808	90.0	29.88	8.3	0.0	0.0	0.808	90.0	0.0003
7.0	0.801	90.0	29.88	8.3	0.0	0.0	0.801	90.0	0.0003
8.0	0.792	90.0	29.88	8.3	0.0	0.0	0.792	90.0	0.0003
9.0	0.78	90.0	29.88	8.3	0.0	0.0	0.78	90.0	0.0003
10.0	0.769	90.0	29.89	8.3	0.0	0.0	0.769	90.0	0.0003
11.0	0.758	90.0	29.89	8.31	0.0	0.0	0.758	90.0	0.0003
12.0	0.745	90.0	29.89	8.31	0.0	0.0	0.745	90.0	0.0003
13.0	0.727	90.0	29.89	8.31	0.0	0.0	0.727	90.0	0.0003
14.0	0.709	90.0	29.89	8.31	0.0	0.0	0.709	90.0	0.0003
15.0	0.688	90.0	29.89	8.31	0.0	0.0	0.688	90.0	0.0003
16.0	0.662	90.0	29.89	8.31	0.0	0.0	0.662	90.0	0.0003
17.0	0.626	90.0	29.89	8.31	0.0	0.0	0.626	90.0	0.0003
18.0	0.59	90.0	29.89	8.31	0.0	0.0	0.59	90.0	0.0003
19.0	0.554	90.0	29.89	8.31	0.0	0.0	0.554	90.0	0.0003
20.0	0.518	90.0	29.89	8.31	0.0	0.0	0.518	90.0	0.0003

Ports Spacing Ttl-flo

() (ft) (MGD)

20.0 4.5 5.6

Froude number: 6.342

Step	Depth	P-dia	Polutnt	Dilutn	x-posn	y-posn	Time
	(ft)	(in)	(%)	()	(ft)	(ft)	(s)
0	65.0	4.75	100.0	1.0	0.0	0.0	0.0;
35	64.74	7.93	56.87	1.74	0.0	0.0445	0.0999; begin overlap,
50	64.65	9.291	46.71	2.114	0.0	0.086	0.149;
95	64.36	13.92	24.92	3.941	0.0	0.351	0.379; end overlap,
100	64.32	14.57	22.91	4.286	0.0	0.403	0.419;
150	63.78	23.44	8.596	11.38	0.0	1.919	1.418;
200	62.88	37.5	3.194	30.59	0.0	7.278	4.619; axial vel 0.00655
239	61.8	54.41	1.475	66.2	0.0	17.17	10.28; merging,
250	61.38	61.9	1.187	82.31	0.0	21.8	12.89;
259	60.96	70.17	0.993	98.36	0.0	26.58	15.55; acute zone,
300	57.93	138.4	0.441	221.5	0.0	65.16	36.61;
350	49.96	336.5	0.164	596.1	0.0	182.3	96.8;
369	44.82	469.9	0.112	868.5	0.0	267.2	137.9; chronic zone,
399	32.68	793.9	0.0621	1573.1	0.0	490.0	239.8; surface,

Outside chronic zone

Effluent Flow	Current Speed	Ambient Profile	Dilution at Chronic Boundary
HH Non-Carcinogen Buildout (2.9 MGD)	50 th Percentile	Gue1605	

/ Windows UM3.

Case 8; ambient file C:\Plumes\gue1605.db; Diffuser table record 4: -----

Depth	Amb-cur	Amb-dir	Amb-sal	Amb-tem	Amb-pol	Decay	Far-spd	Far-dir	Disprsn
m	m/s	deg	psu	C	kg/kg	s-1	m/s	deg	m0.67/s2
0.0	0.845	90.0	27.12	11.78	0.0	0.0	0.845	90.0	0.0003
2.0	0.833	90.0	27.52	11.66	0.0	0.0	0.833	90.0	0.0003
3.0	0.827	90.0	27.72	11.6	0.0	0.0	0.827	90.0	0.0003
4.0	0.821	90.0	27.75	11.57	0.0	0.0	0.821	90.0	0.0003
5.0	0.815	90.0	27.81	11.56	0.0	0.0	0.815	90.0	0.0003
6.0	0.808	90.0	27.95	11.48	0.0	0.0	0.808	90.0	0.0003
7.0	0.801	90.0	28.05	11.41	0.0	0.0	0.801	90.0	0.0003
8.0	0.792	90.0	28.14	11.37	0.0	0.0	0.792	90.0	0.0003
9.0	0.78	90.0	28.12	11.38	0.0	0.0	0.78	90.0	0.0003
10.0	0.769	90.0	28.38	11.35	0.0	0.0	0.769	90.0	0.0003
11.0	0.758	90.0	28.43	11.35	0.0	0.0	0.758	90.0	0.0003
12.0	0.745	90.0	28.45	11.34	0.0	0.0	0.745	90.0	0.0003
13.0	0.727	90.0	28.5	11.33	0.0	0.0	0.727	90.0	0.0003
14.0	0.709	90.0	28.61	11.28	0.0	0.0	0.709	90.0	0.0003
15.0	0.688	90.0	28.7	11.23	0.0	0.0	0.688	90.0	0.0003
16.0	0.662	90.0	28.72	11.21	0.0	0.0	0.662	90.0	0.0003
17.0	0.626	90.0	28.77	11.19	0.0	0.0	0.626	90.0	0.0003
18.0	0.59	90.0	28.8	11.17	0.0	0.0	0.59	90.0	0.0003
19.0	0.554	90.0	28.85	11.13	0.0	0.0	0.554	90.0	0.0003
20.0	0.518	90.0	28.88	11.09	0.0	0.0	0.518	90.0	0.0003

Ports Spacing Ttl-flo

() (ft) (MGD)

20.0 4.5 5.6

Froude number: 6.509

Step	Depth	P-dia	Polutnt	Dilutn	x-posn	y-posn	Time	
	(ft)	(in)	(%)	()	(ft)	(ft)	(s)	
0	65.0	4.75	100.0	1.0	0.0	0.0	0.0;	
35	64.74	7.933	56.9	1.74	0.0	0.0445	0.0999;	begin overlap,
50	64.65	9.293	46.74	2.114	0.0	0.086	0.149;	
95	64.36	13.94	24.91	3.946	0.0	0.351	0.38;	end overlap,
100	64.32	14.59	22.9	4.29	0.0	0.403	0.419;	
150	63.78	23.46	8.597	11.39	0.0	1.929	1.425;	
200	62.88	37.53	3.194	30.63	0.0	7.373	4.676;	axial vel 0.00655
239	61.81	54.45	1.475	66.28	0.0	17.51	10.48;	merging,
250	61.38	61.97	1.187	82.4	0.0	22.3	13.17;	
258	61.02	69.24	1.013	96.55	0.0	26.65	15.6;	acute zone,
300	57.96	138.6	0.441	221.8	0.0	68.66	38.53;	
335	53.24	259.0	0.22	443.5	0.0	153.3	82.73;	trap level,
350	50.63	338.1	0.164	596.9	0.0	230.3	121.4;	
355	49.82	369.4	0.148	659.0	0.0	273.0	142.4;	chronic zone,
362	49.37	418.4	0.129	757.0	0.0	369.6	189.5;	local maximum rise or fall,

Outside chronic zone

;

8:34:31 PM. amb fills: 3

APPENDIX G: EFFLUENT TOXICANT DATA AND REASONABLE POTENTIAL ANALYSIS SPREADSHEETS

ANACORTES EFFLUENT DATA SUMMARY

Pollutant Info		WAC Water Use Criteria			Max (or 65%) Detected Concentration (ug/L)	Max MOL for Effluent Sampling (ug/L)	Detected at Concentration Higher Than Criteria	Detected at Concentration Lower Than Criteria	Non-Detect with MCL Greater than WQ Criteria (WAC Version)	Has Criteria and Is Not Sampled
Pollutant	Priority Pollutant ?	Caching ent?	Acute	Chronic	HH					
AMMONIA un-ionized - see separate spreadsheets for FW criteria	N	N	12223	1836		38800	TRUE			
ACENAPHTHENE 83323 1E	N	N			110.70	0.06				
ACROLEIN 107028 1V	N	N			1.1	1.66			TRUE	
ACRYLONITRILE 107131 2V	Y	Y			0.03	1.00			TRUE	
ALDRIN 309002 1P	Y	Y	0.71	0.0019	5.80E-06					TRUE
ANTHRACENE 120127 3B	Y	N			4800	0.06				
ANTIMONY (INORGANIC) 7440380 1M	Y	N			180	1.3		TRUE		
ARSENIC (distilled) 7440382 2M	Y	Y	63	36	10	3.8		TRUE		
BENZENE 71432 3V	Y	Y			1.6					
BENZIDINE 92876 4B	Y	Y			2.30E-06	0.16				
BENZOFURANTHRAcene 55553 5B	Y	Y			0.021	9.00			TRUE	
BENZOFURANTHRAcene 55553 5B	Y	Y			0.021	0.05			TRUE	
BENZOFURANTHRAcene 55553 5B	Y	Y			0.0021	0.06			TRUE	
BENZOFURANTHRAcene 55553 5B	Y	Y			0.021	0.37			TRUE	
BENZOFURANTHRAcene 55553 5B	Y	Y			0.21	0.11				
BHC - ALPHA 319846 2P	Y	Y			0.0056					TRUE
BHC - BETA 319857 3P	Y	Y			0.002					TRUE
BIS(2-CHLOROETHYL)ETHER 111444 11B	Y	Y			0.06	0.10			TRUE	
BIS(2-ETHYLHEXYL)PHTHALATE 117817 13B	Y	Y			0.25	0.20				
BROMOFORM 75252 5V	Y	Y			27	0.20				
BUTYLBENZYLPHTHALATE 85687 15B	Y	N			0.59	0.10		TRUE		
CADMIUM - 7440439 4M	Y	N	42.00	3.3	0.35	0.3				
CADMIUM - 7440439 4M	Y	N			580	0.10				
CARBON TETRACHLORIDE 56235 8V	Y	Y	0.09	0.004	9.30E-06					TRUE
CHLOROBENZENE 108907 7V	Y	N								
CHLORDANE 57749 8P	Y	Y								
CHLOROBROMOMETHANE 121481 8V	Y	Y			3	0.39				
2-CHLORONAPHTHALENE 91587 14B	Y	N			180	0.20				
CHLORINE (liquid) 7782505 1V	N	N	13	7.50						TRUE
CHLOROPHENOL 9563 11V	Y	Y			1200	0.56		TRUE		
2-CHLOROPHENOL 9563 11V	Y	Y			17.00	0.30				
CHLOROPYRIFOS 2821882 1A	N	N	0.511	0.0056						TRUE
CHROMIUM(HEX) 16540299 - Disposed	Y	N	1.00	50	2.1	0.66		TRUE		
CHRYSENE 218019 18B	Y	Y								
COPPER - 744068 5M	Y	N	4.80	3.10						TRUE
COPPER - 744068 5M	Y	N	9.10	2.80						TRUE
CYANIDE 57125 14M	Y	N								TRUE
1,4 DDB										TRUE
1,4 DDB										TRUE
1,4 DDB										TRUE
1,4 DDB (and metabolites)			0.13	0.001						TRUE
DIBENZOFURANTHRAcene 53703 19B	Y	Y			0.0021	0.40			TRUE	
1,2-DICHLOROBENZENE 55501 20B	Y	N			2500	0.17				
1,3-DICHLOROBENZENE 54173 21B	Y	Y			16	0.22				
1,4-DICHLOROBENZENE 108467 22B	Y	N			580	0.09		TRUE		
2,3-DICHLOROBENZODIENE 91941 23B	Y	Y			0.0033	1.00			TRUE	

ANACORTES EFFLUENT DATA SUMMARY

Pollutant Info		WAC Maximum WQC Criteria			Max (or 35%) Detected Concentration (ug/L)	Max MDL for Effluent Sampling (ug/L)	Detected at Concentration Higher Than Criteria	Detected at Concentration Lower Than Criteria	(Min-Detect with MDL Greater than WQ Criteria (WAC Version))	His Criteria and Is Met Sampled
Pollutant	Priority Pollutant ?	Carcinogenic?	Scale	Clinical	HH					
DICHLOROBROMOMETHANE 75274 12V	Y	Y			3.5	0.20				
1,2-DICHLOROETHANE 107262 15V	Y	Y			120	0.30				
1,1-DICHLOROETHYLENE 75354 16V	Y	Y			4100	0.23				
2,4-DICHLOROPHENOL 120832 2A	Y	N			34	0.50				
1,2-DICHLOROPROPANE 78375 11V	Y	N			3.1	0.25				
1,3-DICHLOROPROPENE 542756 18V	Y	N				0.19				
DIELDRIN 60571 10P	Y	Y	0.71	0.0019	8.10E-05					TRUE
DIETHYLPHthalate 84662 24B	Y	N			5000	0.10				
2,4-DIMETHYLPHENOL 102679	Y	N			9730	0.80				
DIMETHYLPHthalate 131113 24B	Y	N			130000	0.40		TRUE		
DIMETHYL PHthalate 84342 26B	Y	N			510	0.10				
2-METHYL-4,6-DINITROPHENOL 544521 4A	Y	N			25	0.50				
2,4-DINITROPHENOL 51285 5A	Y	N			610	0.50				
DINITROTOluene 2,4 121142 27B	Y	Y			0.18	0.07				
DIOXIN(2,3,7,8-TCDD) 174651E	Y	Y			6.40E-05					TRUE
1,2-DIPHENYLHYDRAZINE 122667 30B	Y	Y			0.023	0.10				
ENDOSULFAN a 955988 11P b	Y	Y								
3,7,11,15,19 12P	Y	N	0.04	0.0087	10					TRUE
ALPHA-Endosulfan 355988 11P	Y	N			100					TRUE
BETA-Endosulfan 33213559 12P	Y	N								TRUE
ENDOSULFAN SULFATE 1031078 13P	Y	N			100					TRUE
ENDRIN 72285 13P	Y	N	0.037	0.0023	0.035					TRUE
ENDRIALDEHYDE 7421924 15P	Y	N			0.035					TRUE
ETHYL BENZENE 100914 19V	Y	N			270	0.12				
FLUORANTHENE 205440 31B	Y	N			16	0.08				
FLUORENE 85737 32B	Y	N			510	0.06				
HEPTACHLOR 76443 16P	Y	Y	0.0330	0.0036	0.00001000					TRUE
HEPTACHLOR EPOXIDE 1024573 17P	Y	Y			0.000074	0.20				TRUE
HEXACHLOROBENZENE 118741 31B	Y	Y			0.000062					TRUE
HEXACHLOROBUTADIENE 87883 34B	Y	Y			4.1	0.30				TRUE
HEXACHLOROCYCLOHEXANE-GAMMA (lindane) 58689 4P	Y	Y	0.15		17					
HEXACHLOROCYCLOPENTADIENE 74474 35B	Y	N			630	0.20				
HEXACHLOROETHANE 67721 36B	Y	Y			0.13	0.30				TRUE
INDENO(1,2,3-cd)PYRENE 193395	Y	Y			0.021	0.09				TRUE
ISOPHORONE 78397 31B	Y	Y			110	0.10				
LEAD - 7439921 7M Dependent on hardness	Y	N	210.00	5.10				TRUE		
3-METHYL-4-CHLOROPHENOL 59507	Y	N			3530	0.50				
METHYL BROMIDE 74609 20V	Y	N			2400	0.36				
METHYLENE CHLORIDE 75092 22V	Y	Y			250	0.28				
MERCURY 7439975 30M	Y	N	1.80	0.0550	0.15	0.006		TRUE		
NICKEL - 7440020 9M - Dependent on hardness	Y	N	74.00	5.20	130	14		TRUE		
NITROBENZENE 98951 40B	Y	N			320	0.20				
NITROSODIMETHYLAMINE N 62793 41B	Y	Y			0.34	1.20				TRUE

ANACORTES EFFLUENT DATA SUMMARY

Pollutant Info:		Priority Pollutant?	Carcinogen?	WAC Marine WQ Criteria			Max (or 45%) Detected Concentration (µg/L)	Max MDL for Effluent Sampling (µg/L)	Detected at Concentration Higher Than Criteria	Detected at Concentration Lower than Criteria	Non-Detect with MDL Greater than WQ Criteria (WQ Version)	Has Criteria and is Not Sampled
Pollutant				Acute	Chronic	HH						
DI-NITROSODI-N-PROPYLAMINE 32164-48-5		N	Y			0.056		0.10			TRUE	
NITROSODIPHENYLAMINE 85306-43-8		Y	Y			0.63		0.10				
PERYACHTHROPHENOL 87865-3A (pH dependent in freshwater)		Y	Y	13	1.90	0.002		0.30			TRUE	
PHENOL 108352-10A		Y	N			300000		0.30				
POLYBROMINATED BIPHENYLS (PBBs) 53469219, 11097691, 1104282, 11141165, 12672246, 11096525, 13274112, 18P-24P		Y	Y	10	0.03	0.00017		0.05				TRUE
PYRENE 125000-425		Y	N			460						
SELENIUM 7762492-10M		Y	N	290	71	460	4		TRUE			
SILVER - 7740224 11M dependent on hardness.		Y	N	1.90			0.8		TRUE			
TETRACHLOROETHANE 1,1,2,2 79345-23V		Y	Y			0.46		0.25				
TETRACHLOROETHYLENE 127184-24V		Y	Y			7.10		0.21	TRUE			
THALLIUM 7440280 12M		Y	N			0.27	0.50					TRUE
TOLUENE 108883-25V		Y	N			410		0.25	TRUE			
TOXAPHENE 8001332-25P		Y	Y	0.21	0.0002	0.000032	4.50					TRUE
1,2-TRANS-DICHLOROETHYLENE 156605-23V		Y	Y			5600		0.23				
TRICHLOROETHANE 1,2,4 120621-46B		Y	Y			0.14		0.20			TRUE	
TRICHLOROETHANE 1,1,1 71556-27V		Y	N			160000		0.33				
TRICHLOROETHANE 1,1,2,79005-26V		Y	Y			1.8		0.26				
TRICHLOROETHYLENE 75016-23V		Y	Y			0.86		0.15				
TRICHLOROPHENOL 2,4,6 18062-11A		Y	Y			0.28		0.20				
VINYL CHLORIDE 75014-31V		Y	Y			0.26		0.30				
ZINC- 7410355 13M/NOBRES dependent		Y	N	9000	8100	2900	55		TRUE			

Reasonable Potential Calculation

Facility	Anacortes WWTP
Water Body Type	Marine

Dilution Factors:	Acute	Chronic
Aquatic Life	69.8	687.8
Human Health Carcinogenic		1021.0
Human Health Non-Carcinogenic		789.4

Pollutant, CAS No. & NPDES Application Ref. No.		AMMONIA, Criteria as Total NH3	ANTIMONY (INORGANIC) 7440360 1M	ARSENIC (dissolved) 7440332 2M	BIS(2-ETHYLHEXYL) PHTHALATE 117617 13B	CADMIUM - 7440439 4M Hardness dependent	CHLORINE (Total Residual) 7782505	CHLOROFORM 67663 11V	CHROMIUM(HEX) 19540299 - Dissolved	COPPER - 744058 6M Hardness dependent	1,4-DICHLOROBENZENE 106467 22B	DIMETHYLPHTHALATE 131113 25B	
Effluent Data	# of Samples (n)	1562	10	23	7	5	540	7	10	25	7	7	
	Coeff of Variation (Cv)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	
	Effluent Concentration, ug/L (Max. or 95th Percentile)	38,800	0.985	1.97	14.6	0.3	160	2.2	9.8	14.6	2.5	0.4	
	Calculated 50th percentile Effluent Conc. (when n>10)	1											
Receiving Water Data	90th Percentile Conc., ug/L	1		1.48		0.095	0		0	0.28			
	Geo Mean, ug/L		0.5	1.48	0			0			0	0	
Water Quality Criteria	Aquatic Life Criteria, Acute ug/L	12,223	-	69	-	42	13	-	1100	4.8	-	-	
	Chronic	1,836	-	36	-	9.3	7.5	-	50	3.1	-	-	
	WQ Criteria for Protection of Human Health, ug/L	-	180	10	0.25	-	-	1200	-	-	580	130000	
	Metal Criteria Acute	-	-	1	-	0.994	-	-	-	0.83	-	-	
	Translator, decimal Chronic	-	-	-	-	0.994	-	-	-	0.83	-	-	
	Carcinogen?	N	N	Y	Y	N	N	Y	N	N	N	N	

Aquatic Life Reasonable Potential

Effluent percentile value		0.950	0.950	0.950	0.950	0.950	0.950
s	$s^2 = \ln(CV^2 + 1)$	0.555	0.555	0.555	0.555	0.555	0.555
Pn	$Pn = (1 - \text{confidence level})^{1/n}$	0.998	0.878	0.549	0.994	0.741	0.887
Multiplier		1.00	1.00	2.32	1.00	1.74	1.00
Max concentration (ug/L) at edge of...	Acute	557	1,487	0.104	2,293	0.244	0.450
	Chronic	57	1,481	0.096	0.233	0.025	0.297
Reasonable Potential? Limit Required?		NO	NO	NO	NO	NO	NO

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Human Health Reasonable Potential

s	$s^2 = \ln(CV^2 + 1)$	0.55451	0.55451	0.5545		0.55451		0.5545	0.5545
Pn	$Pn = (1 - \text{confidence level})/m$	0.741	0.878	0.652		0.652		0.652	0.652
Multiplier		0.69859	0.5243	0.8054		0.8054		0.8054	0.8054
Dilution Factor		789.4	1021	1021		1021		789.4	789.4
Max Conc. at edge of Chronic Zone, ug/L		0.50024	1.47953	0.0115		1.7E-03		0.0026	0.0004
Reasonable Potential? Limit Required?		NO	NO	NO		NO		NO	NO

Comments/Notes:

References: WAC 173-201A.

Technical Support Document for Water Quality-based Toxics Control, US EPA, March 1991, EPA/505/2-90-001, pages 56/99

Reasonable Potential Calculation - Page 2

Facility	Anacortes WWTP
Water Body Type	Marine

Dilution Factors:	Acute	Chronic
Aquatic Life	69.8	687.8
Human Health Carcinogenic		1021.0
Human Health Non-Carcinogenic		789.4

Pollutant, CAS No. & NPDES Application Ref. No.		LEAD - 7439921 7M dependent on hardness	MERCURY 7439976 8M	NICKEL - 7440020 9M - dependent on hardness	SELENIUM 7782492 10M	SILVER - 7740224 11M dependent on hardness.	TETRACHLOROETHYLENE 127184 24V	TOLUENE 108883 25V	ZINC - 7440666 13M hardness dependent			
Effluent Data	# of Samples (n)	12	2	25	19	6	7	7	25			
	Coeff of Variation (Cv)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	Effluent Concentration, ug/L (Max. or 95th Percentile)	0.5	0.005	5.96	4	0.8	0.5	4.6	49.4			
	Calculated 50th percentile Effluent Conc. (when n>10)			3	1				35			
Receiving Water Data	90th Percentile Conc., ug/L	0.06	0.00051	0.47	0	0.016			0.71			
	Geo Mean, ug/L		0.00051	0.47	0		0	0	0.71			
Water Quality Criteria	Aquatic Life Criteria, ug/L	210	1.8	74	290	1.9	-	-	90			
	Chronic	8.1	0.025	8.2	71	-	-	-	81			
	WQ Criteria for Protection of Human Health, ug/L	-	0.15	190	480	-	7.1	410	2900			
	Metal Criteria Acute	0.951	0.85	0.99	-	0.85	-	-	0.946			
	Translator, decimal Chronic	0.951	-	0.99	-	-	-	-	0.946			
	Carcinogen?	N	N	N	N	N	Y	N	N			

Aquatic Life Reasonable Potential

Effluent percentile value		0.950	0.950	0.950	0.950	0.950		0.950
s	$s^2 = \ln(CV^2 + 1)$	0.555	0.555	0.555	0.555	0.555		0.555
Pn	$Pn = (1 - \text{confidence level})^{1/n}$	0.779	0.224	0.887	0.854	0.607		0.887
Multiplier		1.63	3.79	1.00	1.39	2.14		1.00
Max concentration (ug/L) at edge of...	Acute	0.070	0.001	0.548	0.080	0.037		1.369
	Chronic	0.061	0.001	0.478	0.008	0.018		0.777
Reasonable Potential? Limit Required?		NO	NO	NO	NO	NO		NO

Human Health Reasonable Potential

s	$s^2 = \ln(CV^2 + 1)$	0.55451	0.55451	0.5545		0.55451	0.55451	0.5545
Pn	$Pn = (1 - \text{confidence level})^{1/n}$	0.224	0.887	0.854		0.652	0.652	0.887
Multiplier		1.5242	0.5109	0.5573		0.8054	0.8054	0.5109
Dilution Factor		789.4	789.4	789.4		1021	789.4	789.4
Max Conc. at edge of Chronic Zone, ug/L		0.00052	0.4732	0.0013		3.9E-04	4.7E-03	0.7534
Reasonable Potential? Limit Required?		NO	NO	NO		NO	NO	NO

Comments/Notes:

References: WAC 173-201A,

Technical Support Document for Water Quality-based Toxics Control, US EPA, March 1991, EPA/505/2-90-001, pages 56/99

Calculation of Fecal Coliform at Chronic Mixing Zone

INPUT	
Chronic Dilution Factor	687.8
Receiving Water Fecal Coliform, #/100 ml	0
Effluent Fecal Coliform - worst case, #/100 ml	400
Surface Water Criteria, #/100 ml	14
OUTPUT	
Fecal Coliform at Mixing Zone Boundary, #/100 ml	1
Difference between mixed and ambient, #/100 ml	1
Conclusion: At design flow, the discharge has no reasonable potential to violate water quality standards for fecal coliform.	

Marine Un-ionized Ammonia Criteria Calculation

Calculation of seawater fraction of un-ionized ammonia from Hampson (1977). Un-ionized ammonia criteria for salt water are from EPA 440/5-88-004. Revised 19-Oct-93.

INPUT	
1. Receiving Water Temperature, deg C (90th percentile):	13.1
2. Receiving Water pH, (90th percentile):	7.9
3. Receiving Water Salinity, g/kg (10th percentile):	30.2
4. Pressure, atm (EPA criteria assumes 1 atm):	1.0
5. Unionized ammonia criteria (mg un-ionized NH ₃ per liter) from EPA 440/5-88-004:	
Acute:	0.233
Chronic:	0.035
OUTPUT	
Using mixed temp and pH at mixing zone boundaries?	No
1. Molal Ionic Strength (not valid if >0.85):	0.621
2. pKa8 at 25 deg C (Whitfield model "B"):	9.317
3. Percent of Total Ammonia Present as Unionized:	1.6%
4. Total Ammonia Criteria (mg/L as NH ₃):	
Acute:	14.86
Chronic:	2.23
RESULTS	
Total Ammonia Criteria (mg/L as <u>N</u>)	
Acute:	12.22
Chronic:	1.84

Data source:

Marine Temperature Reasonable Potential and Limit Calculation

Based on WAC 173-201A-200(1)(c)(i)-(ii) and Water Quality Program Guidance. All Data inputs must meet WQ guidelines. The Water Quality temperature guidance document may be found at:
<http://www.ecy.wa.gov/biblio/0610100.html>

INPUT	May-Sep	Oct-Apr
1. Chronic Dilution Factor at Mixing Zone Boundary	687.8	687.8
2. Annual max 1DADMax Ambient Temperature (Background 90th percentile)	13.1 °C	13.1 °C
3. 1DADMax Effluent Temperature (95th percentile)	24.5 °C	14.5 °C
4. Aquatic Life Temperature WQ Criterion	16.0 °C	16.0 °C
OUTPUT		
5. Temperature at Chronic Mixing Zone Boundary:	13.12 °C	13.10 °C
6. Incremental Temperature Increase or decrease:	0.02 °C	0.00 °C
7. Incremental Temperature Increase $12/(T-2)$ if $T \leq$ crit:	1.08 °C	1.08 °C
8. Maximum Allowable Temperature at Mixing Zone Boundary:	14.18 °C	14.18 °C
A. If ambient temp is warmer than WQ criterion		
9. Does temp fall within this warmer temp range?	NO	NO
10. Temp increase allowed at mixing zone boundary, if required:	---	---
B. If ambient temp is cooler than WQ criterion but within $12/(T_{amb}-2)$ and within 0.3 °C of the criterion		
11. Does temp fall within this incremental temp. range?	NO	NO
12. Temp increase allowed at mixing zone boundary, if required:	---	---
C. If ambient temp is cooler than (WQ criterion-0.3) but within $12/(T_{amb}-2)$ of the criterion		
13. Does temp fall within this Incremental temp. range?	NO	NO
14. Temp increase allowed at mixing zone boundary, if required:	---	---
D. If ambient temp is cooler than (WQ criterion - $12/(T_{amb}-2)$)		
15. Does temp fall within this Incremental temp. range?	YES	YES
16. Temp increase allowed at mixing zone boundary, if required:	NO LIMIT	NO LIMIT
RESULTS		
17. Do any of the above cells show a temp increase?	NO	NO
18. Temperature Limit if Required?	NO LIMIT	NO LIMIT

Notes:

Nearshore Sediment Characterization Report

City of Anacortes Wastewater Treatment Plant Outfall

Guemes Channel, Anacortes, WA

April, 2021

Prepared for:
City of Anacortes

Prepared by:
DALTON, OLMSTED, & FUGLEVAND, INC.
1001 SW Klickitat Way, Suite 200B
Seattle, Washington 9813

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Appendix E	Final Characterization and Disposal Records
Appendix F	As Builts for Final Outfall Alignment and Dredge Prisms

ACRONYMS AND ABBREVIATIONS

cPAH.....	Carcinogenic Polycyclic Aromatic Hydrocarbons
DGPS.....	Differential Global Positioning System
DNR	Department of Natural Resources
EPA	Environmental Protection Agency
ft.....	feet
g.....	grams
L.....	liter
mg/kg	milligrams per kilogram; ppm
mL.....	milliliter
MLLW	Mean Lower Low Water
NAD	North American Datum
ng/kg	nanograms per kilogram
PCBs	polychlorinated biphenyls
PMA.....	Port Management Agreement
QA	Quality Assurance
QC.....	Quality Control
Work Plan.....	Sampling and Analysis Plan ¹
SL.....	Screening Level
SRM	Sediment Reference Material
SVOCs	semivolatile organic compounds
TEF.....	Toxic Equivalent Factor
TEQ.....	Toxic Equivalency
TOC.....	total organic carbon
TPH.....	total petroleum hydrocarbons
TPH-Dx.....	total petroleum hydrocarbons, diesel-range extended
ug/kg	micrograms per kilogram; ppb.

¹ Work Plan for Sediment Sampling and Analyses and Dredge Material Disposal, City of Anacortes Wastewater Treatment Plant Outfall, prepared by DOF November 12, 2020.

1. INTRODUCTION

1.1. Purpose

This sediment characterization report describes the sediment sampling conducted from November 16th through November 2020 supporting the installation of a new outfall for the City of Anacortes. The purpose of this report is to characterize potential dredge material from the alignment of the proposed wastewater treatment plant outfall pipeline for upland disposal.

1.2. Project Description

The proposed action is to install a new wastewater treatment plant outfall into the Guemes Channel (Figure 1-1). Approximately 400 feet of the nearshore portion of the proposed outfall will be buried and require trenching. Installation of the outfall will allow the City of Anacortes to meet its wastewater disposal needs.

1.2.1. CONCEPTUAL DREDGING PLAN

The proposed project is to bury the nearshore portion of a 42-inch outer diameter outfall pipeline. The nearshore portion is approximately 400 feet and the entire outfall pipeline is approximately 1,100 feet. It is proposed that the nearshore segment will be buried at least one foot below surface with a 2-foot allowable over dredge. Crushed gravel or suitable import material will be used to backfill the dredged area and restore the existing grade.

The precise location of the outfall pipeline will be finalized during the design phase. A 32 to 46-foot wide area was investigated to determine the ideal outfall burial location (Figure 1-2). The proposed alignment may be adjusted to reduce rock volume to be removed but will remain within the investigated boundary.

The existing quantity of material at the time of the May 6, 2020 David Evans and Associates survey that may be removed is calculated to be 10,565 cubic yards. This total was reached by assuming that the 42" diameter pipe would be buried at least one foot below surface and includes a 2-foot allowable over depth, side slopes and 20% contingency. The actual dredging quantity is anticipated to be less based on final alignment and construction requirements. The proposed dredging is new work dredging.

The proposed project will be dredged with a clamshell dredge. Material will be loaded into a bottom dump barge and be transported to a transload facility (to be determined during design) and then transported to a Class D landfill for upland disposal.

A detailed dredge plan will be developed during the design phase.

1.2.2. SITE HISTORY

The proposed outfall is located at 199 U Avenue, Anacortes, Washington and extends into the Guemes Channel (Figure 1-1).

Adjacent properties near the upland access portion of this project are used as single-family residences. Adjacent to the marine portion of the project, is an area used by the Port of Anacortes, for exporting dry

bulk cargoes as well as for short term moorage for barges and other vessels (Figure 1). This property has been used by the Port since 1926.

Dolphin pilings exist in the marine waters of Guemes Channel, west of the project area, where they previously served as mooring structures for Wyman's Marina. A stormwater outfall pipe currently exists near the shoreline revetment section of the project at the northern end of U Avenue (Figure 2). No other structures are known to exist in the project area.

The property is located next to the former site of the Robinson Marina (later the Wyman's Marina). The former marina was initially developed after 1944 with a dock structure in place by 1956. In 1983, pilings in the dock and marina areas were replaced and the Port of Anacortes completed maintenance dredging. Until 1998, the Wyman family operated the site for boat servicing and maintenance on a continuous basis. After 1998, the marina and its services ceased, and all underground storage tanks were decommissioned and removed. During the fall of 2013, the former Wyman's Marina building and associated structures were removed and a significant portion of the property was excavated to create intertidal habitat. The site, now called Robinson's Cove, is directly adjacent to the project area to the west. No other developments have existed along the current project alignment.

1.2.2.1. Site Use and Ownership

The property is currently used as open marine water, adjacent to the Port of Anacortes.

The proposed dredging is on Port of Anacortes property extending into Guemes Channel. The Port of Anacortes has a Port Management Agreement (PMA) with the Washington State Department of Natural Resources (DNR) to manage submerged lands. The investigation will occur on state-owned aquatic lands. The PMA is included Appendix A of the Work Plan.

1.2.2.2. Sediment Evaluation Standard

The site overlaps an area contained in a remedial action plan for the Anacortes Port Log Yard (Ecology FS ID: 21898438 / CS ID: 3604). The site overlaps Sediment Management Area 2 (SMA-2; Figure 1) where sediment containing site-related Indicator Hazardous Substances including carcinogenic polycyclic aromatic hydrocarbons (cPAH) exceeded Preliminary Cleanup Levels from the mudline to at least a depth of 1-foot (Geoengineers, 2015). Cleanup standards for the Port Log Yard is applied in this report for evaluation of nearshore sediment characterization.

2. SAMPLE COLLECTION

Surface and subsurface samples were collected according to the Work Plan for Sediment Sampling and Analyses and Dredge Material Disposal (Work Plan, 2020) (Appendix A). Any deviations from the Work Plan are identified in the following discussion.

2.1. Station Positioning

For subsurface and surface sampling sample station coordinates (Washington State Plane South NAD83 Feet) were established using a differential global positioning satellite (DGPS) system. The actual sample coordinates are recorded on the Sediment Sample Logs of Appendix B and summarized on Table 1-2.

2.2. Decontamination Procedures

Sample jars were provided by the analytical laboratory (ARI [Analytical Resources Incorporated of Tukwila, WA]) and did not require additional decontamination. Stainless steel spoons used for homogenizing prior to sample containerizing were scrubbed with clean water and Alconox solution, rinsed with clean water, followed by a de-ionized water rinse. The spoons were covered with aluminum foil following decontamination and prior to use. In the field, prior to any re-use, stainless steel sampling equipment was initially rinsed with site sea water, scrubbed with a fresh water/Alconox detergent solution, and rinsed with deionized water.

2.3. Field Documentation

The following field documentation was prepared by the DOF field representatives.

- Daily Field Log – General information including the names of the field crew, arrival and departure dates and times, weather, and other miscellaneous observations were recorded in the daily field log.
- Sediment Sample Log – A sample log for each aliquot location with the station name, date, time, sampling method and gear (and cast number if appropriate), water depth, and location coordinates were recorded on the sample log. Penetration depth, sediment type, sediment color, sediment odor, presence of any organisms, and obvious evidence of contamination (e.g., sheen, wood waste, oil droplets, sandblast grit, paint chips) were recorded, as well as the sample type, sample identifier, and unique sample number. Any materials that were removed prior to homogenizing, such as woody debris, shells, or rocks, were noted on the log sheet. Sample logs are included in Appendix B.

2.4. Sample Containers

The required volume of sample for analysis was placed in laboratory supplied containers. Each sample container was labeled using self-adhesive labels with the following information provided using waterproof ink:

- Sample identification number
- Site and/or project name
- Sampling date and time

2.5. Sample Storage

All sample containers were placed in a chilled cooler with ice at or near 4 degrees Celsius for transportation to ARI. The laboratory was responsible for storing at required storage temperatures and maintaining recommended maximum holding times depending upon the type of analyses to be performed.

2.6. Chain of Custody

Standard chain-of-custody procedures were used to document the chain-of-custody between sample collection and arrival at the analytical laboratory. Each set of samples sent to the laboratory was accompanied by a chain-of-custody/sample analysis request form that identified the samples by their unique identification number. The form identified the analyses to be conducted by referencing a list of specific analytes for the laboratory. Chain of Custody documentation is included in Appendix C.

2.7. Water Depth and Mudline Elevation

Water depth was measured at each sample location for both the surface and subsurface sediment samples using a lead line, consisting of a measurement tape and anchor weight as recorded on the Sediment Sample Logs in Appendix B. The mudline elevation was calculated by subtracting the depth of water from the tide elevation taken from the nearest NOAA station.

2.8. Surface Sediment Sampling

Surface sediment samples were collected with a stainless steel Shipek sampler deployed from the sampling vessel operated by Global Diving. Grab samples were collected at locations shown on Figure 1-2.

2.8.1. SAMPLING PROCEDURE

For each sample location, the sampler was deployed using a winch from the sampling vessel, and upon retrieval, the sample was inspected to ensure that the desired penetration depth was achieved and that the grab sampler was not overfilled, was completely closed, and retained all sediment including surficial fines.

Upon retrieval of an acceptable sediment sample, excess water was decanted from the sampler and samples were collected as described below:

- The sample was collected using a stainless-steel spoon while avoiding any sediment that was in contact with the inside surface of the grab sampler. The sediment was placed into a stainless-steel bowl.
- Observations of sediment color, texture, composition, and other characteristics were recorded on the sample field forms included in Appendix B.
- Sample was homogenized by mixing with a stainless-steel spoon until consistent color and texture was achieved. Sample was then placed in the appropriated sample jars (Work Plan, Table 2, Section 4.1.4) and stored for delivery to the lab for analysis.

2.8.2. WASTE SEDIMENT

Excess sediment generated during the sampling program was collected and placed into a 5-gallon bucket and placed in storage to be disposed of with dredged material.

2.8.3. DEVIATIONS FROM WORK PLAN

There were no deviations from the Work Plan.

2.9. Subsurface Sampling

Hollow stem auger sampling was performed by DOF staff with support by Culbertson Inc. on November 16 through 18, 2020. A 4-inch inside diameter hollow stem auger with a truck mounted drill rig was transported atop the spud barge and used for the sampling. Sampling procedures were performed as described below.

2.9.1. SAMPLING PROCEDURE

Sediment sampling for physical parameters was conducted by advancing the hollow stem auger through the marine substrate and collecting samples with a split spoon sampler. The general procedure is described below.

- Once the barge was in the general proximity of the planned sampling station and target sediment elevations were verified, the auger and drilling tools were lowered through the water column until reaching the sediment surface. The barge was then repositioned so the drilling tools were vertical and within +/- 5 feet of the designated target coordinates for each station.
- The samples were obtained by driving a 1.5-foot-long, 3 inch outer diameter split spoon sampler with an approximately 300 pound cable-actuated slide hammer a distance equal to the length of the sampler or to refusal (defined as 50 blows per six-inches).
- The hollow split-barrel sampler was advanced/driven ahead of the auger bit 18" for a given sample interval. The 18" drive/sample was repeated for the length of the boring collecting blow count data and sediment sample. The penetration resistance in blows per six-inch interval were recorded for each sample.
- The sampler was retrieved after each sample interval and brought back onboard. The amount of material retained in the core tube was measured and recorded in the field log. Samples were classified in the field. Visual observations of sediment type, stratigraphic features, and the presence or absence of any visible contamination were recorded in the boring log for each sample. Field boring logs are included in Appendix B.
- For each boring/core attempt, the station name, time of collection, depth to mudline, depth of boring, and total drilling time was noted in the field log. In addition, photographs of each core segment were taken.

Following retrieval of an acceptable core, the core was processed on board the barge. All processing occurred on a covered processing table. The cores were described, noting features such as sheen, woody debris, and biological features, and then photographed. Samples were taken from the exposed center portion of the core with care being taken not to sample material in contact with the outermost 0.5 cm. Sampling increments are noted on the field logs (Appendix B). For chemical sampling, the volumes removed were placed in a decontaminated stainless-steel bowl and mixed until homogenous in texture and color.

2.9.2. DEVIATIONS FROM WORK PLAN

At station SS-1 there was no recovery from 5 to 6.5 feet below the mudline. For this reason, the intervals sampled at SS-1 were 1-3, 3-5, and 6.5-8.5 feet.

At station SS-2 the auger settled into the sediment 1.5 feet. For this reason, the sample depth intervals were changed from 1-3, 3-5, 5-7, and 7-9 feet to 1.5-3.5, 3.5-5.5, 5.5-7.5, and 7.5-9.5 feet.

2.9.3. WASTE SEDIMENT

Excess sediment generated during the sampling program was collected and placed into drums and disposed of by the drill operators.

3. DATA SUMMARY

Chemical and physical analyses of sediment samples were completed by ARI. Raw laboratory data, including case narrative describing analytical problems is included in Appendix C.

Table 3-1 provides analytical result of sediment samples compared to Port Log Yard Screening Levels. Analytes exceeding Port Log Yard Screening Levels (GeoEngineers, 2015) are discussed below.

3.1. Exceedances

3.1.1. ORGANOMETALLIC COMPOUNDS

Tributyltin ion (TBT) (bulk) screening level (73 ug/kg) was exceeded at three of ten grab sample locations Sample 2 (118 ug/kg), Sample 5 (382 ug/kg) and Sample 5D (119 ug/kg).

3.1.2. POLYCYCLIC AROMATIC HYDROCARBONS (CPAH)

Total cPAHs (TEQ) exceeded *Protection of Human Health and High Tropic Ecological Receptors* standards (21 ug/kg) at eight of ten surface sample locations Sample 2 (287.5 ug/kg), Sample 3 (104.3 ug/kg), Sample 4 (107.3 ug/kg), Sample 5 (517.6 ug/kg), Sample 5D (119.2 ug/kg), Sample 6 (116.6 ug/kg) and Sample 7 (168.7 ug/kg) and at 1-3 feet below mudline at two of three subsurface sample locations SS-1 (22.593 ug/kg) and SS-3 (37.554 ug/kg). cPAH nondetects were calculated as zero.

3.1.3. POLYCHLORINATED BIPHENYLES

PCB Aroclors exceeded *Protection of Human Health and High Tropic Ecological Receptors* standards (3.5 ug/kg) at 8 of ten surface sample locations Sample 1 (11.5 ug/kg), Sample 2 (14.8 ug/kg), Sample 3 (7.6 ug/kg), Sample 4 (7.4 ug/kg), Sample 5 (7 ug/kg), Sample 5D (17.3 ug/kg), Sample 6D (4.5 ug/kg) and Sample 7 (13.9 ug/kg).

3.1.4. DIOXIN/FURANS

Total Dioxin/Furans (TEQ) exceeded *Protection of Human Health and High Tropic Ecological Receptors* standards (5 ng/kg) at one station Sample 2 (5.4 ng/kg).

4. DATA VALIDATION

Cari Sayler will conduct a verification and validation of analyses. QA1 and QA2 data validation reports will be included as Appendix D and submitted to Ecology as an addendum once the validation has been completed.

5. FINAL CHARACTERIZATION AND DISPOSAL RECORDS

Final characterization and disposal records will be included as Appendix E. This will be submitted to Ecology as an addendum to Sediment Characterization Report upon completion of dredging and disposal.

6. FINAL OUTFALL ALIGNMENT AND DREDGE PRISMS

Final Outfall alignment and dredge prism as-builds will be included as Appendix F. This will be submitted to Ecology as an addendum to Sediment Characterization Report upon completion of dredging and disposal.

LIST OF REFERENCES

GeoEngineers, 2015. *Final Remedial Investigation/Feasibility Study Work Plan: Anacortes Port Log Yard, Anacortes, Washington, Ecology Agreed Order No. DE 10630*. Seattle, WA

Work Plan, 2020. *Work Plan for Sediment Sampling and Analyses and Dredge Material Disposal, City of Anacortes Wastewater Treatment Plant Outfall*, prepared by DOF, dated November 12, 2020.

TABLES

Table 2-1 Sediment Sample Locations

Station	Proposed Sample Location ^a		Actual Sample Location		Actual Sample Location NAD83 ^b	
	Lat.	Long	Lat.	Long	Easting	Northing
1	48.521153	-122.604746	48.521156	-122.604750	1211152.96	559825.38
2	48.521294	-122.604672	48.521297	-122.604672	1211173.09	559876.25
3	48.521427	-122.604759	48.521428	-122.604740	1211157.72	559924.33
4	48.521568	-122.604682	48.521566	-122.604682	1211172.82	559974.48
5	48.521701	-122.604773	48.521701	-122.604779	1211150.55	560024.07
6	48.521842	-122.604695	48.521833	-122.604709	1211168.64	560071.94
7	48.521975	-122.604774	48.521962	-122.604771	1211154.56	560119.49
8	48.522096	-122.604704	48.522099	-122.604721	1211167.98	560169.16
SS-1 ^c	48.521345	-122.604715	48.521345	-122.604715	1211163.00	559894.00
SS-2 ^c	48.521616	-122.604725	48.521675	-122.604669	1211177.00	560014.00
SS-S ^c	48.521893	-122.604734	48.521891	-122.604705	1211170.00	560093.00

^a As provided in Work Plan Table 1

^b As provided on sample logs

^c SS – Subsurface Sample

Table 3-1 Sediment Sample Data Results

Parameter	Preparation Method	Analysis Method	CAS Number	Sediment Screening Level for Protection of Benthic Organisms		Protection of Human Health and Higher Trophic Ecological Receptors		Sample																				
				OC (0.5% to 3.5%)	OC (<0.5% or >3.5%)	Intertidal Sediment (above -3ft MLLW)	Subtidal Sediment (below -3 ft MLLW)	1	2	3	4	5	5D	6	6D	7	8	SS-1 1-3	SS-1 3-5	SS-1 6.5-8.5	SS-2 1.5-3.5	SS-2 3.5-5.5	SS-2 5.5-7.5	SS-2 7.5-9.5	SS-3 1-3	SS-3 3-5	SS-3 5-7	SS-3 7-9
Metals (mg/kg)																												
Antimony	EPA 3050B	EPA 6020A	7440-36-0	---	---	---	---	0.05 J	0.35 U	0.41 U	0.07 J	0.34 U	0.33 U	0.27 U	0.27 U	0.27 U	0.25 U	0.26 U	0.03 J	0.21 U	0.02 J	0.23 U	0.23 U	0.22 U	0.25 U	0.23 U	0.21 U	0.21 U
Arsenic	EPA 3050B	EPA 6020A	7440-38-2	57	57	11	11	3.15	6.44	6.17	6.26	7.5	7.24	6.56	5.65	5.98	3.2	4.38	4.02	5.11	3.96	6.05	6.37	4.9	3.78	5.02	1.14	2.82
Cadmium	EPA 3050B	EPA 6020A	7440-43-9	5.1	5.1	1	1	0.14	0.85	0.58	0.57	0.54	0.55	0.39	0.39	0.41	0.14	0.28	0.12	0.12	0.11 J	0.05 J	0.08 J	0.13	0.25	0.09 J	0.11 U	0.07 J
Chromium	EPA 3050B	EPA 6020A	7440-47-3	260	260	700,000	2,600,000	27.5	32.3	34.3	34.2	36.9	30.8	25.4	30.3	55.6	32	62	124	99.7	23.3	40.2	38.2	73.5	23.6	81.5	39.3	79.4
Copper	EPA 3050B	EPA 6020A	7440-50-8	390	390	19,000	69,000	28.4	36.3	31.7	25.4	29.3	22.2	12.3	6.63	23.8	12.5	34.3	23.7	23.9	19.5	41.2	41.3	37.4	8.34	21.3	9.48	26.5
Lead	EPA 3050B	EPA 6020A	7439-92-1	450	450	21	21	13.6	11.4	9.44	7.82	9.73	7.21	5.16	3.82	2.02	3.71	5.01	2.78	3.02	2.99	4.73	4.87	3.95	2.41	2.42	0.87	2.81
Mercury	CLP-M-245.5	EPA 7471	7439-97-6	0.41	0.41	0.2	0.2	0.0149 H,J	0.111 H	0.0835 H	0.0716 H	0.0531 H	0.46 H	0.0534 H	0.04 H	0.046 H	0.0181 H,J	0.157 H	0.0347 H	0.0321 H	0.0574 H	0.0377 H	0.0364 H	0.0317 H	0.019 H,J	0.0319 H	0.0307 H	0.0307 H
Selenium	EPA 3050B	EPA 6020A	7782-49-2	---	---	---	---	0.58 U	0.89	1.03	1.16	0.91	1.03	0.67 J	0.69 U	0.69 U	0.63 U	0.92	0.68	0.53 J	0.72	0.83	0.65	1.06	0.62 U	0.56 U	0.53 U	0.58
Silver	EPA 3050B	EPA 6020A	7440-22-4	6.1	6.1	2,300	8,700	0.05 J	0.17 J	0.11 J	0.11 J	0.08 J	0.08 J	0.06 J	0.05 J	0.05 J	0.03 J	0.1 J	0.07 J	0.06 J	0.06 J	0.05 J	0.07 J	0.07 J	0.05 J	0.06 J	0.21 U	0.09 J
Zinc	EPA 3050B	EPA 6020A	7440-66-6	410	410	140,000	520,000	122	82.8	77.8	76.2	62	63.9	38.5	39.9	38.4	38.6	59.9	45.4	47.4	34.9	68.1	69.6	60.1	27.6	38.6	20.7	43.5
Organometallic Compounds																												
Tributyltin ion (bulk; ug/kg)	Microwave 5 g -> 0.5 mL	Krone/EPA 8270E SIM	36643-28-4	73	73	73	73	16.7	118	17	8.97	382	119	15.9	3.08 J	2.05 J	0.838 J	23.1	4.92	3.81 U	9.34	3.84 U	3.83 U	0.502 J	0.958 J	3.82 U	3.83 U	3.8 U
Polycyclic Aromatic Hydrocarbons				(ug/kg OC)		(ug/kg)		(ug/kg)																				
Naphthalene	EPA 3550C/3546	EPA 8270E	91-20-3	99,000	2,100	3,800,000	29,000,000	19.9 U	30.6	23.9	37.7	65.8	80.2	102	67.8	65.1	7.7 J	34.5	19.9 U	19.9 U	6.4 J	19.9 U	19.9 U	19.9 U	36.1	20 U	19.9 U	20 U
Acenaphthylene	EPA 3550C/3546	EPA 8270E	208-96-8	66,000	1,300	11,000,000	88,000,000	19.9 U	34.8	14.5 J	12.7 J	48.1	15.9 J	13.7 J	22.2	14.9 J	19.9 U	19.9 U	19.9 U	19.9 U	19.8 U	19.9 U	19.9 U	20 U	20 U	19.9 U	20 U	
Acenaphthene	EPA 3550C/3546	EPA 8270E	83-32-9	16,000	500	11,000,000	88,000,000	19.9 U	10.7 J	24.9	10.8 J	17.9 J	23	17.1 J	9 J	13.9 J	19.9 U	19.9 U	19.9 U	19.9 U	19.8 U	19.9 U	19.9 U	19.9 U	5.6 J	20 U	19.9 U	20 U
Fluorene	EPA 3550C/3546	EPA 8270E	86-73-7	23,000	540	7,600,000	59,000,000	19.9 U	23	31.3	22.1	41.3	32	29.3	21.7	17.3 J	19.9 U	5 J	19.9 U	19.9 U	19.8 U	19.9 U	19.9 U	19.9 U	7.6 J	20 U	19.9 U	20 U
Phenanthrene	EPA 3550C/3546	EPA 8270E	85-01-8	100,000	1,500	57,000,000	440,000,000	7 J	146	77.1	69.5	201	89.3	161	133	88.8	19.9 U	20.1	6.2 J	6 J	12.3 J	4.7 J	4.8 J	19.9 U	30	20 U	19.9 U	6 J
Anthracene	EPA 3550C/3546	EPA 8270E	120-12-7	220,000	960	57,000,000	440,000,000	19.9 U	62.3	29.8	30.3	120	46.5	51.8	67.7	38.6	19.9 U	6.1 J	19.9 U	19.9 U	19.8 U	19.9 U	19.9 U	19.9 U	15.8 J	20 U	19.9 U	20 U
2-Methylnaphthalene	EPA 3550C/3546	EPA 8270E	91-57-6	38,000	670	760,000	5,900,000	9.1 J	17.8 J	24.2	21.6	21.2	24.2	13.7 J	18.5 J	14.2 J	19.9 U	8.3 J	19.9 U	19.9 U	19.8 U	19.9 U	19.9 U	19.9 U	20 U	20 U	19.9 U	20 U
Total LPAH ¹	---	---	---	370,000	5,200	---	---	7	307.4	201.5	183.1	494.1	311.1	374.9	321.4	238.6	7.7	65.7	6.2	6	18.7	4.7	4.8	0	95.1	0	0	6
Fluoranthene	EPA 3550C/3546	EPA 8270E	206-44-0	160,000	1,700	5,900,000	5,900,000	11.3 J	1480	182	100	1060	218	189	450	123	4.6 J	34.2	19.9 U	19.9 U	14.8 J	19.9 U	19.9 U	19.9 U	42	20 U	19.9 U	20 U
Pyrene	EPA 3550C/3546	EPA 8270E	129-00-0	1,000,000	2,600	5,700,000	44,000,000	26.3	1050	234	158	1030	304	266	503	184	8.8 J	116	8.2 J	19.9 U	93.7	19.9 U	19.9 U	6.6 J	57	20 U	19.9 U	20 U
Benz(a)anthracene	EPA 3550C/3546	EPA 8270E	56-55-3	110,000	1,300	650	5,000	6.2 J	193	57.9	62.3	366	82.1	80.5	170	64.5	19.9 U	11.5 J	19.9 U	19.9 U	5.4 J	19.9 U	19.9 U	19.9 U	23.6	20 U	19.9 U	20 U
Chrysene	EPA 3550C/3546	EPA 8270E	218-01-9	110,000	1,400	6,500	50,000	26.5	873	160	143	652	146	96	771	236	19.9 U	23.3	19.9 U	19.9 U	10.8 J	19.9 U	19.9 U	19.9 U	65.4	20 U	19.9 U	20 U
Benzofluoranthenes (b,j,k)	EPA 3550C/3546	EPA 8270E	205-99-2, 205-82-3, 207-08-9	230,000	3,200	650	5,000	28.4 J	788	209	217	816	202	175	989	600	39.8 U	42	39.8 U	39.8 U	31.3 J	39.7 U	39.7 U	39.9 U	76.2	39.9 U	39.8 U	40 U
Benzo(a)pyrene	EPA 3550C/3546	EPA 8270E	50-32-8	99,000	1,600	65	500	12.4 J	168	70.4	72.2	367	83	85	391	88	19.9 U	16 J	19.9 U	19.9 U	9.7 J	19.9 U	19.9 U	19.9 U	25.1	20 U	19.9 U	20 U
Indeno(1,2,3-c,d)pyrene	EPA 3550C/3546	EPA 8270E	193-39-5	34,000	600	650	5,000	19.9 U	93.6	38.4	39.2	183	43.8	37	180	85.5	19.9 U	10.1 J	19.9 U	19.9 U	19.8 U	19.9 U	19.9 U	19.9 U	11.9 J	20 U	19.9 U	20 U
Dibenzo(a,h)anthracene	EPA 3550C/3546	EPA 8270E	53-70-3	12,000	230	650	5,000	19.9 U	33.9	17.9 J	18.2 J	75.8	19.5 J	13.7 J	77.2	33.8	19.9 U	19.9 U	19.9 U	19.9 U	19.8 U	19.9 U	19.9 U	19.9 U	6.3 J	20 U	19.9 U	20 U
Benzo(g,h,i)perylene	EPA 3550C/3546	EPA 8270E	191-24-2	31,000	670	5,700,000	44,000,000	15 J	81	41.2	39.3	165	47.2	32.9	162	78.6	19.9 U	13.6 J	19.9 U	9.3 J	6.2 J	19.9 U	19.9 U	19.9 U	13.5 J	20 U	19.9 U	20 U
Total HPAH ²	---	---	---	960,000	12,000	---	---	126.1	4760.5	992.9	831	4714.8	1126.1	961.4	3693.2	1493.4	13.4	266.7	8.2	9.3	171.9	0	0	6.6	321	0	0	0
Total cPAHs - TEQ ³	---	---	---	---	---	21	21	16.125	287.5	104.3	107.3	517.6	119.2	116.6	540.3	168.7	0	22.593	0	0</								

Table 3-1 Sediment Sample Data Results

Parameter	Preparation Method	Analysis Method	CAS Number	Sediment Screening Level for Protection of Benthic Organisms		Protection of Human Health and Higher Trophic Ecological Receptors		Sample																							
				OC (0.5% to 3.5%)	OC (<0.5% or >3.5%)	Intertidal Sediment (above -3ft MLLW)	Subtidal Sediment (below -3 ft MLLW)	1	2	3	4	5	5D	6	6D	7	8	SS-1 1-3	SS-1 3-5	SS-1 6.5-8.5	SS-2 1.5-3.5	SS-2 3.5-5.5	SS-2 5.5-7.5	SS-2 7.5-9.5	SS-3 1-3	SS-3 3-5	SS-3 5-7	SS-3 7-9			
Aldrin	EPA 3540/3541/3550	EPA 8081	309-00-2, 5103-71-9, 5103-74-2, 5103-73-1, 39765-80-5, 27304-13-8, 60-57-176-44-8	---	---	---	---	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U				
Total Chlordane (sum of Cis-chlordane and Trans-chlordane)	EPA 3540/3541/3550	EPA 8081		---	---	---	---	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
Dieldrin	EPA 3540/3541/3550	EPA 8081	60-57-1	---	---	---	---	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U					
Heptachlor	EPA 3540/3541/3550	EPA 8081	76-44-8	---	---	---	---	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U					
Polychlorinated biphenyls (ug/kg)																															
PCB Aroclors	EPA 3540/3550	EPA 8082	---	---	130	3.5	3.5	11.5	14.8	7.6	7.2	7	17.3	2.1	4.5	13.9	0	2.1	0	0	1.8	0	0	0	0	0	1.3				
Dioxins & Furans (ng/kg; based on PQL)																															
Total Dioxin/Furans TEQ ⁴	---	EPA 1613B	---	5	5	5	5	2.4	5.4	4.6	3.1	3.9	2.5	0.8 J	2.8	0.5 J	0.2 J	1.4	0.3	0.2	0.6 J	0.2	0.3	0.3	2.7	0.3	0.2				

¹ Total LPAH calculated by adding detectable results for Naphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene, and Anthracene.

² Total HPAH calculated by adding detectable results for Fluoranthene, Pyrene, Benz(a)anthracene, Chrysene, Total Benzofluoranthenes, Benzo(a)pyrene, Indeno(1,2,3,-c,d)pyrene, Dibenzo(a,h)anthracene, and Benzo(g,h,i)perylene.

³ cPAH nondetects were calculated as zero.

⁴Total Dioxin/Furans TEQ was calculated using the EPA Basic TEQ Calculator.

Exceeds Benthic Organisms and Human Health Protection Levels

Exceeds Human Health Protection Levels

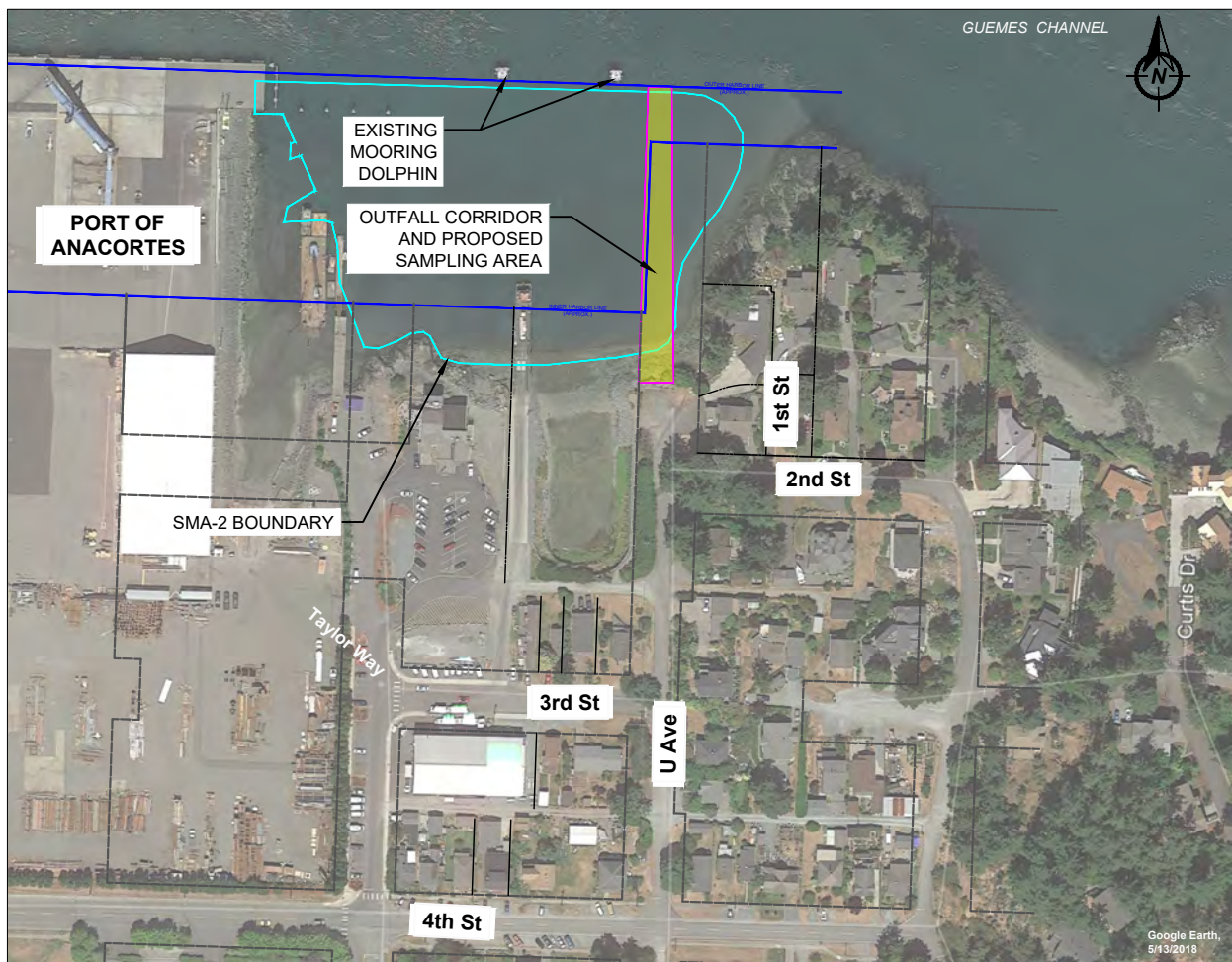
FIGURES



DRIVING DIRECTIONS FROM I-5 NORTHBOUND:
 -TAKE EXIT 230 FOR WA-20 WEST TOWARD ANACORTES
 -CONTINUE ON COMMERCIAL AVE
 -TURN RIGHT ONTO 4TH
 -TURN LEFT ONTO U AVENUE
 -CONTINUE TO END OF STREET

Source: Imagery from Google Earth.

VICINITY



Source: Imagery from Google Earth.

INSET

0 250
Scale in Feet

NOTES

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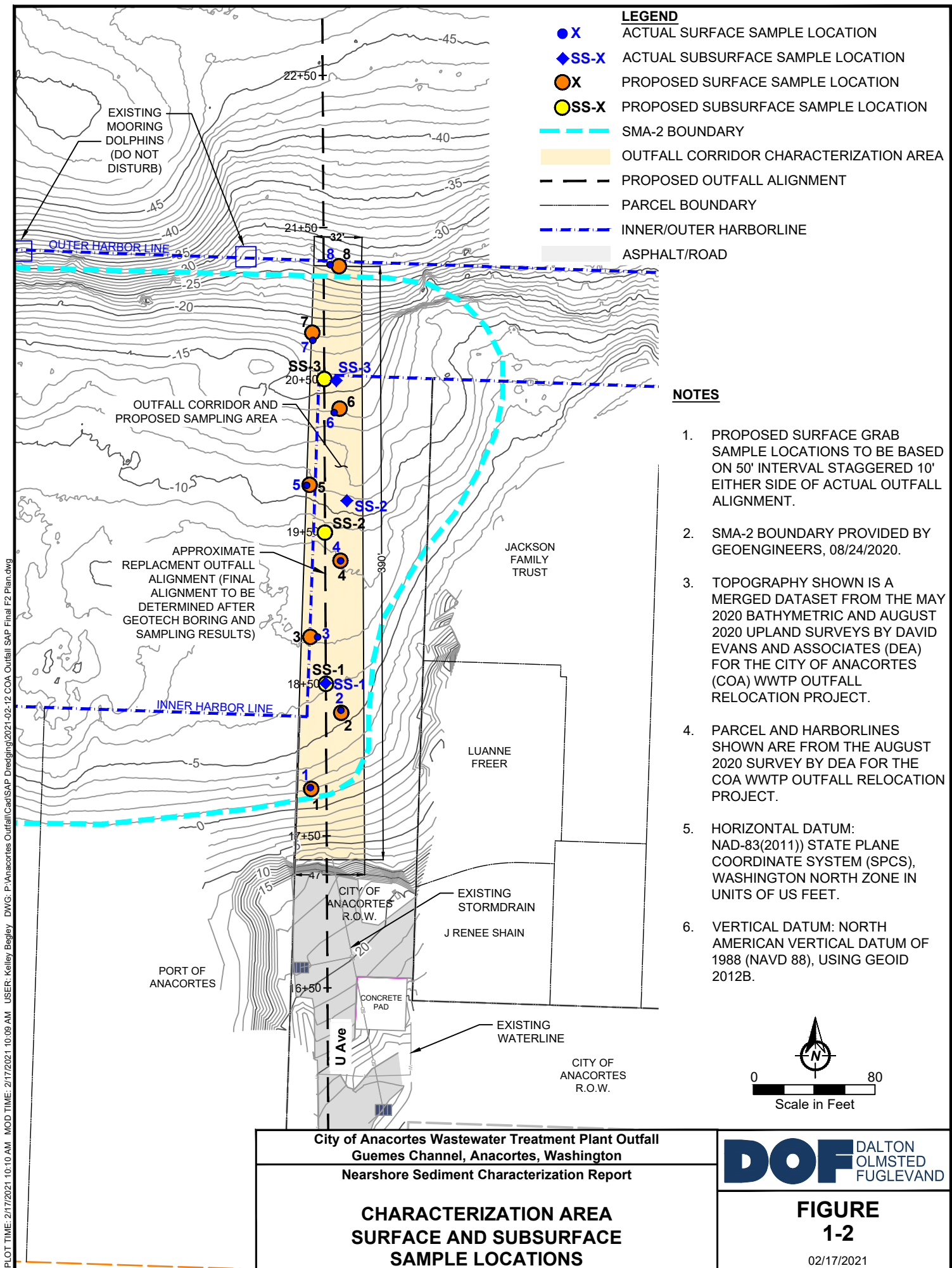
City of Anacortes Wastewater Treatment Plant Outfall
 Guemes Channel, Anacortes, Washington
 Nearshore Sediment Characterization Report

VICINITY MAP

DOF DALTON
 OLMSTED
 FUGLEVAND

FIGURE 1-1

02/17/2021



Appendix A

Work Plan for Sediment Sampling and Analyses and Dredge Material Disposal

City of Anacortes Wastewater Treatment Plant Outfall, Guemes
Channel, Anacortes WA

**WORK PLAN FOR SEDIMENT SAMPLING AND
ANALYSES AND DREDGE MATERIAL DISPOSAL
CITY OF ANACORTES WASTEWATER TREATMENT
PLANT OUTFALL
GUEMES CHANNEL, ANACORTES, WA**

Prepared For:
City of Anacortes



November 12, 2020

Acknowledgement

2020 Work Plan

City of Anacortes Wastewater Treatment Plant Outfall Replacement

Dredged Material Characterization

By signing below, I acknowledge that I have reviewed the Sampling and Analysis Plan and agree to follow the methods and quality assurance procedures contained therein.

Rob Webb, PE, Project Manager
Dalton, Olmsted & Fuglevand, Inc.

Date_____

Dave Cooper, PG, Senior Consulting Geologist
Dalton, Olmsted & Fuglevand, Inc.

Date_____

Cari Sayler, QA Manager
Sayler Data Solutions, Inc.

Date_____

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LIST OF ATTACHMENTS

Appendix A – Port of Anacortes and DNR Port Management Agreement	
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LIST OF ACRONYMS AND ABBREVIATIONS

°C	Degrees Celsius
ASTM	American Society of Testing and Materials
CFR	Code of Federal Regulations
cPAH	Carcinogenic Polycyclic Aromatic Hydrocarbons
COA	City of Anacortes
CoC	chemical of concern
CSL	Cleanup Screening Levels
cy	cubic yard
Dx	D1 – DMMU 1
DC	Dredge Composite
DGPS	Differential Global Positioning System
DMMP	Dredged Material Management Program (state of Washington)
DNR	Department of Natural Resources
EIM	Environmental Information Management
EPA	Environmental Protection Agency
ft	feet
g	grams
L	liter
mg/kg	milligrams per kilogram; ppm
mL	milliliter
MLLW	Mean Lower Low Water
MS	Matrix Spike
MSD	Matrix Spike Duplicate
MTCA	Model Toxics Control Act
N/A	not applicable
NAD	North American Datum
ng/kg	nanograms per kilogram
oz	ounce
PCBs	polychlorinated biphenyls
PMA	Port Management Agreement
QA	Quality Assurance
QC	Quality Control
RL	Reporting Limit
RPD	relative percent difference
Work Plan	Sampling and Analysis Plan

SL	Screening Level
SQS	Sediment Quality Standards
SRM	Sediment Reference Material
SVOCs	semivolatile organic compounds
TEF	Toxic Equivalent Factor
TEQ	Toxic Equivalency
TOC	total organic carbon
TPH	total petroleum hydrocarbons
TPH-Dx	total petroleum hydrocarbons, diesel-range extended
ug/kg	micrograms per kilogram; ppb.
WDFW	Washington State Department of Fish and Wildlife

I. PROJECT DESCRIPTION

A. PROPOSED ACTION

The proposed action is to install a new wastewater treatment plant outfall into the Guemes Channel (Figure 1). Approximately 400 feet of the nearshore portion of the proposed outfall will be buried and require trenching. Installation of the outfall will allow the City of Anacortes to meet its wastewater disposal needs.

B. DISPOSAL

All dredged material will be disposed upland.

C. CONCEPTUAL DREDGING PLAN

The proposed project is to bury the nearshore portion of a 42 inch outer diameter outfall pipeline. The nearshore portion is approximately 400 feet and the entire outfall pipeline is approximately 1,100 feet. It is proposed that the nearshore segment will be buried at least one foot below surface with a 2 foot allowable over dredge. Crushed gravel and either suitable dredged material or import material will be used to backfill the dredged area and restore the existing grade.

The precise location of the outfall pipeline will be finalized during the design phase based on additional drilling to gather geotechnical and sediment information. A 32 to 46-foot wide area will be investigated to determine the ideal outfall burial location (Figure 2). The proposed alignment may be adjusted to reduce rock volume to be removed but will remain within the investigated boundary.

The existing quantity of material at the time of the May 6, 2020 David Evans and Associates survey to be removed is calculated to be 10,565 cubic yards. This total was reached by assuming that the 42" diameter pipe would be buried at least one foot below surface and includes a 2 foot allowable over depth, side slopes and 20% contingency. The proposed dredging is new work dredging.

The proposed project will be dredged with a clamshell dredge. Material will be loaded into a bottom dump barge and be transported to a transload facility (to be determined during design) and then transported to a Class D landfill for upland disposal.

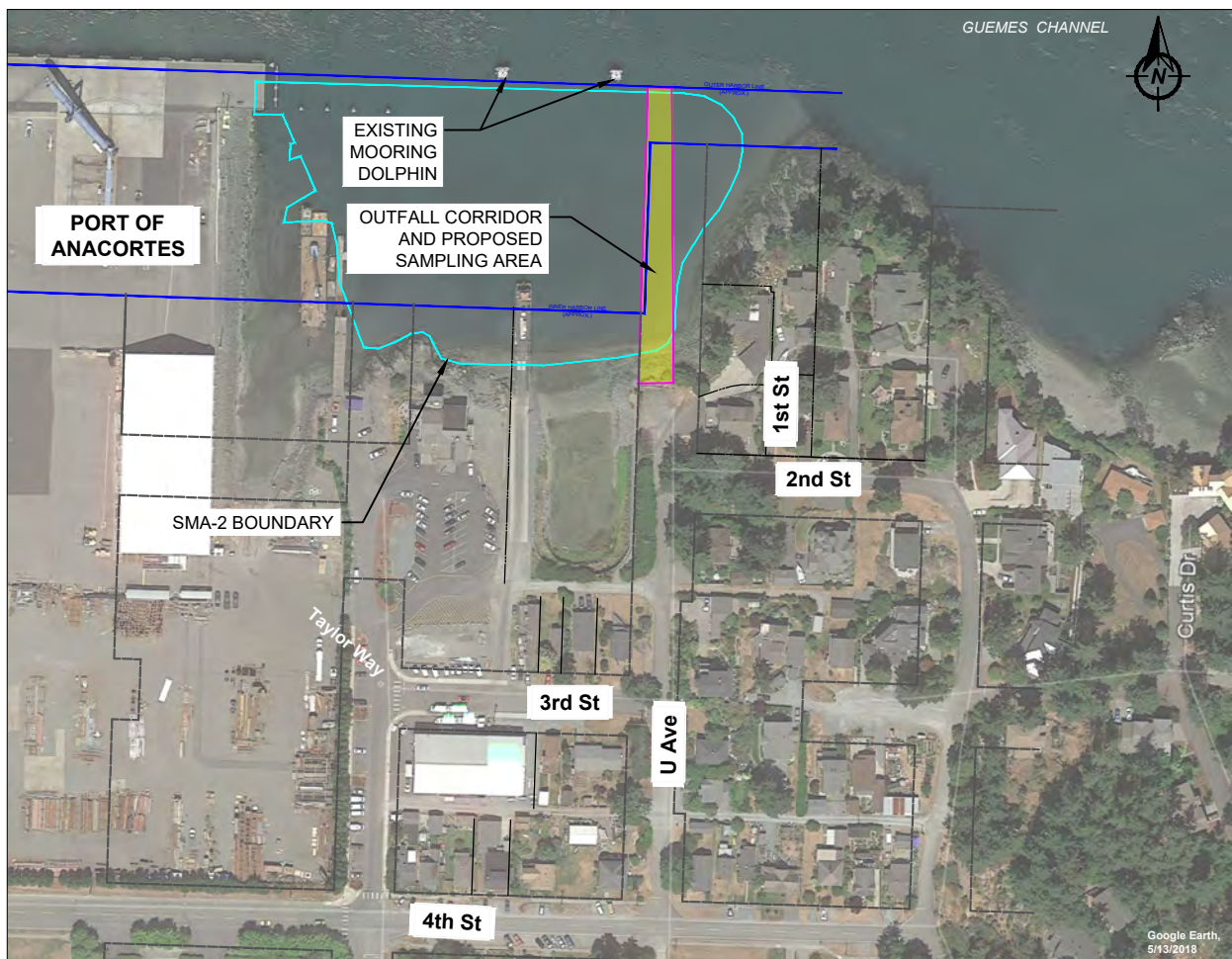
A detailed dredge plan will be developed during the design phase.



DRIVING DIRECTIONS FROM I-5 NORTHBOUND:
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 -CONTINUE ON COMMERCIAL AVE
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Source: Imagery from Google Earth.

VICINITY



Source: Imagery from Google Earth.

INSET

0 250
Scale in Feet

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5. SMA-2 BOUNDARY PROVIDED BY GEOENGINEERS, 08/24/2020.

City of Anacortes Wastewater Treatment Plant
 Anacortes, Washington
 Outfall Replacement Project Nearshore Dredging Area
 Sediment Sampling and Analysis Plan

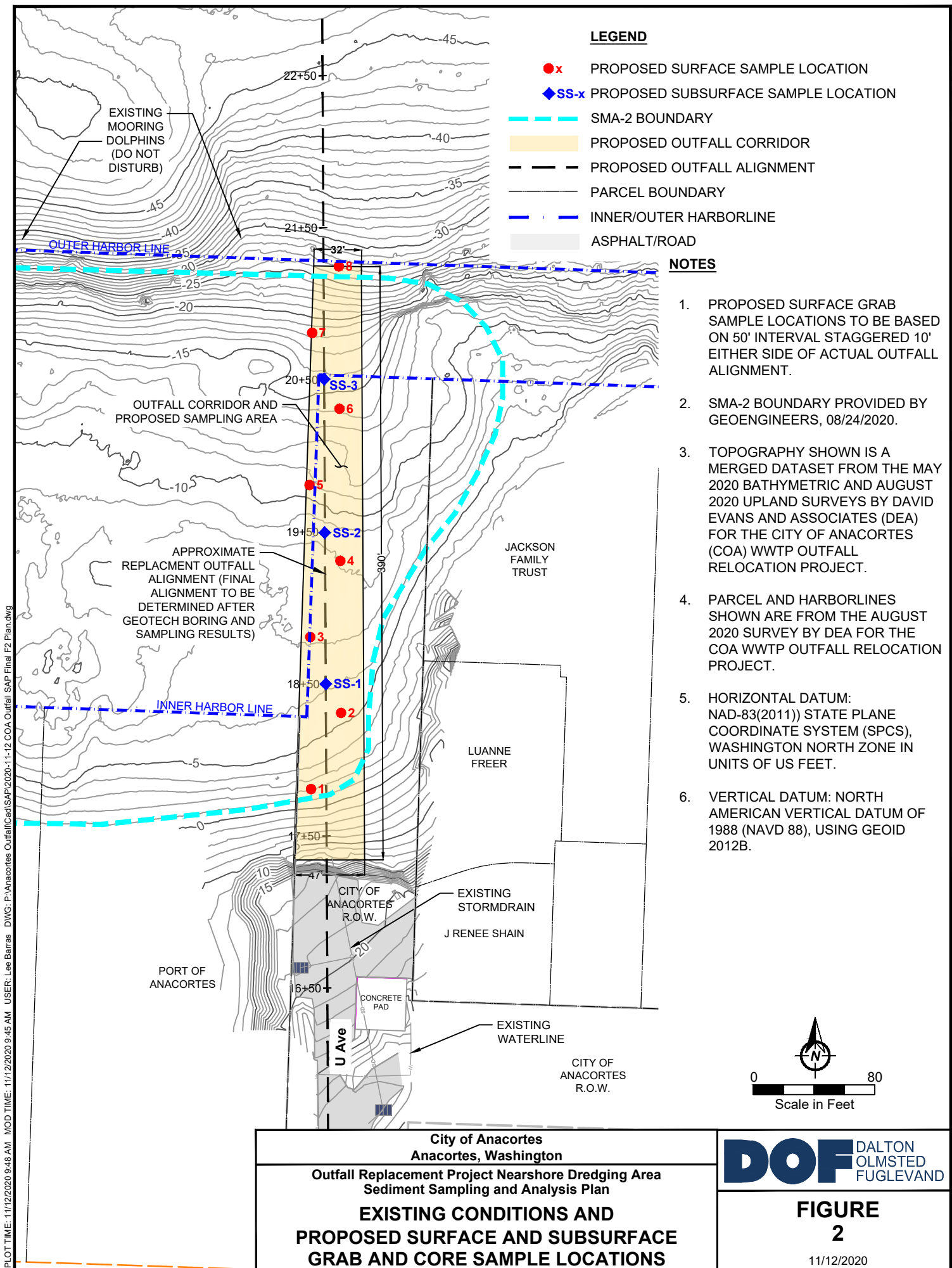
VICINITY MAP

DOF DALTON
 OLMSTED
 FUGLEVAND

FIGURE

1

11/12/2020



II. LEVEL I SITE HISTORY INFORMATION

A. SITE HISTORY

The proposed outfall is located at 199 U Avenue, Anacortes, Washington and extends into the Guemes Channel (Figure 1).

Adjacent properties near the upland access portion of this project are used as single-family residences. Adjacent to the marine portion of the project, is an area used by the Port of Anacortes, for exporting dry bulk cargoes as well as for short term moorage for barges and other vessels (Figure 1). This property has been used by the Port since 1926.

Dolphin pilings exist in the marine waters of Guemes Channel, west of the project area, where they previously served as mooring structures for Wyman's Marina. A stormwater outfall pipe currently exists near the shoreline revetment section of the project at the northern end of U Avenue (Figure 2). No other structures are known to exist in the project area.

The property is located next to the former site of the Robinson Marina (later the Wyman's Marina). The former marina was initially developed after 1944 with a dock structure in place by 1956. In 1983, pilings in the dock and marina areas were replaced and the Port of Anacortes completed maintenance dredging. Until 1998, the Wyman family operated the site for boat servicing and maintenance on a continuous basis. After 1998, the marina and its services ceased, and all underground storage tanks were decommissioned and removed. During the fall of 2013, the former Wyman's Marina building and associated structures were removed and a significant portion of the property was excavated to create intertidal habitat. The site, now called Robinson's Cove, is directly adjacent to the project area to the west. No other developments have existed along the current project alignment.

B. CURRENT SITE USE

The property is currently used as open marine water, adjacent to the Port of Anacortes.

C. SITE OWNERSHIP

The proposed dredging is on Port of Anacortes property extending into Guemes Channel. The Port of Anacortes has a Port Management Agreement (PMA) with the Washington State Department of Natural Resources (DNR) to manage submerged lands. The investigation will occur on state-owned aquatic lands. The PMA is included as Appendix A.

D. IDENTIFICATION OF POTENTIAL CONTAMINANT SOURCES

The site overlaps an area contained in a remedial action plan for the Anacortes Port Log Yard (Ecology FS ID: 21898438 / CS ID: 3604). The site overlaps Sediment Management Area 2 (SMA-2; Figure 1) where sediment containing site-related Indicator Hazardous Substances including carcinogenic polycyclic aromatic hydrocarbons (cPAH) exceeded Preliminary Cleanup Levels from the mudline to at least a depth of 1-foot (Geoengineers, 2015).

Remedial action reports from the adjacent Wyman's Marina & Wholesale Supply cleanup site (Ecology FS ID: 2821735 / CS ID: 2097) indicated that contaminants of potential concern either were not detected or were detected at concentrations less than Model Toxics Control Act (MTCA) Sediment Quality Standards (SQS) and sediment Cleanup Screening Levels (CSLs) for marine

sediments. This sampling was conducted in 1997 and 2004 and the specific sampling points do not overlap the proposed wastewater treatment plant outfall project limits.

E. INVASIVE SPECIES

The New Zealand mud snail (*Potamopyrgus antipodarum*) is an invasive mollusk that feeds on aquatic vegetation and algae in freshwater and brackish habitats. Mud snails have been found in lakes and rivers in Washington, including Indian Slough, Padilla, Washington, the nearest documented sighting (WDFW, 2019). Due to the high salinity of the Guemes Channel, tidal action and developed characteristics, New Zealand mud snails are not expected to be in the project area. No other invasive species are expected to be encountered.

III. COMPUTATION OF SAMPLING

A. FIELD SAMPLES

Subsurface samples from three locations and surface samples from eight locations are planned within the investigation area as shown in Figure 2. At each of the subsurface stations discrete samples will be collected at 1-3, 3-5, 5-7, and 7-9 feet below the sediment surface. Surface samples will be collected between 0-1 feet. Additional samples will be collected if geotechnical survey results require realignment such that initial sample locations are no longer representative. All samples will be archived and a subset of eight surface and twelve subsurface samples will be analyzed depending on the final design of the outfall location. Table 1 provides proposed sample station coordinates for the sample locations.

TABLE 1. SAMPLE STATION COORDINATES

Station	Sample Location (NAD83)	
	Lat.	Long
1	48.521153	-122.604746
2	48.521294	-122.604672
3	48.521427	-122.604759
4	48.521568	-122.604682
5	48.521701	-122.604773
6	48.521842	-122.604695
7	48.521975	-122.604774
8	48.522096	-122.604704
SS-1	48.521345	-122.604715
SS-2	48.521616	-122.604725
SS-S	48.521893	-122.604734

IV. SAMPLING PROCEDURES

A. FIELD QA PROJECT PLANNING

The following Quality Assurance project planning procedures will be followed for implementation of this Work Plan.

- Each person on the sampling team will have read and understood the Work Plan and their role in its implementation.
- Sample locations (latitude and longitude) will be programmed into positioning software prior to start of sampling.
- Sample labels will be preprinted prior to sample processing. Labels will be attached to jars prior to filling and labels will be dated, time-stamped and signed after jars are sealed.
- Sample logs will be pre-printed with sample identification information prior to start of sample processing.
- Proper decontamination procedures will be used for equipment and encased in tin foil until required in the field.
- Experienced personnel will be used to collect and process samples.

B. SAMPLE COLLECTION SCHEDULE

Sample collection is scheduled to be conducted in November 2020, contingent upon approval of this Work Plan and scheduling with contractors for sampling.

C. DECONTAMINATION

All sample processing equipment will be decontaminated prior to use and between handling material for individual samples. The grab sampler, split-barrel sampler and sampling utensils will be thoroughly cleaned prior to use according to the following procedure:

- Wash with brush and Alconox soap
- Tap Water Rinse
- Solvent rinse (acetone or hexane) if needed
- Rinse with distilled water

All hand work will be conducted with disposable latex or nitrile gloves, which will be rinsed with distilled water before and after handling each individual sample, as appropriate, to prevent sample contamination.

D. SAMPLE COLLECTION TECHNIQUES/EQUIPMENT

1. SAMPLING TECHNIQUES

The surface sediment sampling procedures include the following:

- All data from sediment grab collection is recorded real-time onto field logs.

- The sampling vessel is maneuvered to the designated target coordinates for dredge prism stations using the Differential Global Positioning System (DGPS) and an on-board navigation system.
- Prior to occupying a sampling station a pre-cleaned grab sampler is prepared.
- Once the sampling vessel is in the general proximity of the planned sampling station, the grab sampler is lowered into the water column. The sampling vessel will be repositioned so the grab sampler is within ± 5 ft of the designated target coordinates.
- The samples will be obtained by lowering the grab sampler to the sediment surface and allowing the line connected to the grab sampler to go slack.
- The sampler is retrieved after each sample and brought back onboard. The amount of material retained in the grab sampler is measured and recorded in the field log. Samples will be classified in the field as to material type using ASTM D 2488 as a general guide. Visual observations of sediment type, stratigraphic features, and the presence or absence of any visible contamination will be recorded for each sample.
- For each grab attempt, the station name, latitude/longitude, time of collection, and depth to mudline are noted in the field log. In addition, photographs of each grab sample will be taken.
- Samples will be collected from the exposed center portion of the grab sample from the surface down to 10 cm; the outermost sediment that contacts grab sampler walls will be discarded if at all possible.
- If the sample is discarded due to insufficient retention or because the target strata are not represented in the core sample, three additional grab attempts within 10 feet of the original location will be. One option to be evaluated after three failed attempts is relocation of the station to a more suitable location that is still representative of the dredge prism.

The subsurface sediment sampling procedures include the following:

- All data from sediment core collection is recorded real-time onto field logs.
- The sampling vessel is maneuvered to the designated target coordinates for dredge prism stations using the Differential Global Positioning System (DGPS) and an on-board navigation system.
- Prior to occupying a sampling station a pre-cleaned split barrel sampler is set into the drill rig apparatus.
- The borings will be advanced using a 4- inch inside diameter, hollow-stem auger with a truck-mounted drill rig, transported atop a spud barge equipped with moon pool.
- Once the sampling vessel is in the general proximity of the planned sampling station, the auger and drilling tools are lowered through the water column until reaching the sediment surface. The sampling vessel will be repositioned so the

drilling tools are vertical and within ± 5 ft of the designated target coordinates for dredge prism stations.

- The samples will be obtained by driving a 1.5-foot long, 3-inch outside diameter spit-spoon sampler, a modification of the Standard Penetration Test Procedure as described in ASTM:D 1586. The sampler will be driven with an approximately 300 pound cable-actuated slide hammer a distance equal to the length of the sampler or to "refusal" (defined as greater than 50 blows per six-inches). Cohesive or softer sediments will be sampled using a Shelby tube or GUS core barrel (piston assisted, Gregory Undisturbed Sampler).
- The hollow split-barrel sampler is advanced/driven ahead of the auger bit 18" for a given sample interval. The 18" drive/sample is repeated for the length of the boring collecting blow count data and sediment sample. The penetration resistance in blows per six-inch interval will be recorded for each sample.
- The sampler is retrieved after each sample interval and brought back onboard. The amount of material retained in the core tube is measured and recorded in the field log. Samples will be classified in the field as to material type using ASTM D 2488 as a general guide. Visual observations of sediment type, stratigraphic features, and the presence or absence of any visible contamination will be recorded in the boring log for each sample. A field boring log of each core will be prepared.
- For each boring/core attempt, the station name, latitude/longitude, time of collection, depth to mudline, depth of boring, and total drilling time are noted in the field log. In addition, photographs of each core segment will be taken.
- Core intervals will be retrieved and processed on board the barge as collected. All processing will occur on a foil or paper-covered processing table. Samples will be collected from the exposed center portion of the core; the outermost 0.5 cm will be discarded if at all possible.

2.EQUIPMENT

The following equipment will be used to collect sediment cores:

- Grab sampler
- Truck mounted drill rig on barge
- Hollow-stem auger
- 1.5-foot long, 3-inch outside diameter split-spoon sampler
- Sample tubes
- Pre-cleaned sample containers and labels
- Supplies (e.g., gloves, foil, coolers, table coverings)
- Decontamination materials and buckets
- Engineering field measuring tape
- Camera for photo documentation
- DGPS Positioning System

3.FIELD NOTES

All information concerning the collection of cores and grabs will be entered in a field notebook and/or grab log form. Field notes will be maintained during sampling and compositing operations. Included in the field notes will be the following.

- Names of the person(s) collecting and logging in the samples.
- Weather conditions.
- Approximate¹ measured mudline depth and tide adjusted corrected mudline elevation of each sample location.
- Date and time of collection of each sample.
- The sample location number and sample number.
- Descriptions of sediment and any non-sediment material.
- Any deviation from the approved sampling plan.

Photos of the field sampling will be taken.

4. POSITIONING

A DGPS will be used to navigate to, occupy, and document all over-water stations aboard the barge. Station coordinates will be digitally recorded and entered in the field logs at the time of collection of each sample. All station coordinates will be recorded in latitude and longitude as decimal minutes with a minimum precision of four (4) decimal places and shall be based on the North American Datum of 1983 (NAD 83). The horizontal positions of the proposed sample locations are shown on Figure 2.

E. SAMPLE HANDLING

1. SAMPLE LABELING

Each sample will be labeled to indicate the project, sample location, date and time, and sampler. Each sample will have a unique sample number generally as follows: COA _0x_1-2_2020mmdd where:

- COA – Project Identifier (COA)
- 0x, SS-x – Station Identifier
- 1-2 – Sample Depth (use “G” for surface grab samples)
- 2020mmdd – Sampling Date

2. SAMPLE LOGGING

For each sample, the following data will be recorded:

- Sample location (Figure 2)
- Physical soil description in accordance with the Unified Soil Classification System (includes soil type, density/consistency of soil, color)

¹ Mudline depth will be measured with a lead line, which provides an approximate elevation rather than survey equipment precision.

- Odor (e.g., hydrogen sulfide, petroleum products)
- Visual stratifications and lenses
- Vegetation
- Debris
- Biological Activity (e.g., detritus, shells, tubes, bioturbation, live or dead organisms)
- Presence of oil sheen
- Any other distinguishing characteristics or features

3. SAMPLE HANDLING

All samples will be archived. Select stations will be analyzed after the precise location of the outfall pipeline is finalized during the design phase. Samples will be placed in appropriate pre-cleaned containers obtained from the chemical laboratory. Each sample container will be clearly labeled with the project name, sample identification, date and time, and initials of person(s) preparing the sample, and referenced by entry into the log book.

Excess sediment generated during the sampling program will be collected for upland disposal and not returned to the waterway.

4. SAMPLE VOLUME AND CONTAINERS

The required volume of sample for analysis will be placed in laboratory supplied containers. Table 2 summarizes appropriate holding times, preservation methods, sample volumes and sample containers.

TABLE 2. SAMPLE VOLUME, HOLDING TIME, PRESERVATION AND CONTAINERS

Parameter	Holding Time (days)	Transport Preservation Method	Archive Preservation Method	Sample Volume ²	Sample Container
Grain Size	365	<6°C	<6°	300g	16 oz HDPE Wide Mouth
Total Solids	14	<6°C	<6°	45g	8 oz Wide Mouth
Total Organic Carbon	14	<6°C	<6°		
Total Volatile Solids	14	<6°C	<6°		
Total Sulfides	7	<6°C, 5mL ZnOAC ³	<6°	15g	4 oz Wide Mouth
Ammonia	7	<6°C	<6°	15g	4 oz Wide Mouth
Metals	180	<6°C	<6°	100g	4 oz Wide Mouth
SVOCs	14	<6°C	<6°	600g	16 oz Clear Glass
Pesticides	14	<6°C	<6°		
PCBs	365	<6°C	<6°		
Dioxin/Furans	365	<6°C	<6°	150g	8 oz Amber Glass

F. SAMPLE TRANSPORT AND CHAIN-OF-CUSTODY PROCEDURES

Filled sample containers will be placed in chilled coolers for storage and transport to the laboratory. Samples will be kept on ice until delivered to ARI. Sample handling will be documented using standard chain-of-custody procedures. Chain-of-custody procedures will commence in the field and will track delivery of the samples to laboratory.

Specific procedures are as follows:

- Samples will be packaged and shipped in accordance with U.S. Department of Transportation regulations as specified in 49 CFR 173.6 and 49 CFR 173.24.
- Individual sample containers will be packed to prevent breakage.
- The coolers will be clearly labeled with sufficient information (name of project, time and date container was sealed, person sealing the cooler and DOF's office name and address) to enable positive identification.
- Chain-of-custody forms will be enclosed in a plastic bag and placed inside lid of the cooler.

² Triple volume needed for samples designated for QA/QC samples

³ The sulfides sample will be preserved with 5 ml of 2 Normal zinc acetate for every 30 g of sediment.

- Signed and dated chain-of-custody seals will be placed on all coolers prior to shipping.

Upon transfer of sample possession to the testing laboratory, the chain-of-custody form will be signed by the persons transferring custody of the coolers. Upon receipt of samples at the laboratory, the condition of the samples, including temperature, will be recorded by the receiver.

V. PHYSICAL AND CHEMICAL TESTING

Samples will be analyzed by Analytical Resources, Inc. (ARI), Tukwila, Washington.

A. SEDIMENT CONVENTIONALS

Sediment conventionals will be analyzed according to the methodology listed in the following table based on Table D-1 (SCUM, 2019) and methodologies used in previous studies at the site.

TABLE 3. SEDIMENT ANALYTICAL METHODS AND SAMPLE QUANTITATION LIMITS - CONVENTIONALS

Parameter	Analysis Method
Total solids	PSEP (1986)
Total volatile solids (TVS)	PSEP (1986)
Grain size	PSEP (1986) / ASTM D-422
Total Organic Carbon (TOC)	EPA 9060
Total sulfides	PSEP
Ammonia	EPA 350.1 M/SM 4500-NH3

Grain size will be determined using ASTM Method D-422 (modified). For grain size analysis, homogenized sediment will be transferred to a container using a decontaminated stainless steel spoon. The appropriate sample label will be completed and taped to the sample container. The sample container will be kept on ice at approximately 4°C until transferred to laboratory custody.

Particle size will be determined by ASTM Method D-422, using the following sieve numbers: 4, 10, 20, 40, 60, 140, and 230. The fine-grained fraction will be classified by phi size (+5, +6, +7, +8, >8). Hydrogen peroxide will not be used in preparations for grain-size analysis. Sediment classification designation will be made in accordance with U.S. Soil Classification System, ASTM D 2487.

B. CHEMICALS OF CONCERN (COC)

Chemicals of Concern (CoC) are provided in Table 4. Since the outfall characterization is near the Remedial Investigation Study Area of the site Anacortes Port Log Yard, the screening levels (SL) from Work Plan (GeoEngineers, 2015) Table 1 are included in Table 3.

Care will be taken to assure that the inside of the bottle, cap, and sample are not cross-contaminated during transfer. Sample label and jar processing will proceed as described above.

Sediment CoCs will be screened based upon the methodology in the following table. Reporting Limits (RL) must be at or below SLs. If RLs are above SLs, additional steps may need to be taken by the laboratory to lower RLs, including reanalysis, additional cleanup steps, etc.

TABLE 4. SEDIMENT CoC ANALYTICAL METHODS AND BULK SEDIMENT GUIDELINES

Parameter	Preparation Method	Analysis Method	CAS Number	Port Log Yard Screening Levels (GeoEngineers, 2015)			
				Sediment Screening Level for Protection of Benthic Organisms		Protection of Human Health and Higher Trophic Ecological Receptors	
				OC (0.5% to 3.5%)	OC (<0.5% or >3.5%)	Intertidal Sediment (above -3 ft MLLW)	Subtidal Sediment (below -3 ft MLLW)
Metals				(mg/kg)			
Antimony	EPA 3050B	EPA 6020A	7440-36-0	---	---	---	---
Arsenic	EPA 3050B	EPA 6020A	7440-38-2	57	57	11	11
Cadmium	EPA 3050B	EPA 6020A	7440-43-9	5.1	5.1	1	1
Chromium	EPA 3050B	EPA 6020A	7440-47-3	260	260	700,000	2,600,000
Copper	EPA 3050B	EPA 6020A	7440-50-8	390	390	19,000	69,000
Lead	EPA 3050B	EPA 6020A	7439-92-1	450	450	21	21
Mercury	CLP-M-245.5	EPA 7471A	7439-97-6	0.41	0.41	0.2	0.2
Selenium	EPA 3050B	EPA 6020A	7782-49-2	---	---	---	---
Silver	EPA 3050B	EPA 6020A	7440-22-4	6.1	6.1	2,300	8,700
Zinc	EPA 3050B	EPA 6020A	7440-66-6	410	410	140,000	520,000
Organometallic Compounds							
Tributyltin ion (bulk; ug/kg)	Microwave 5 g -> 0.5 mL	Krone/EPA 8270E SIM	36643-28-4	73	73	73	73
Tributyltin ion (porewater; ug/L)				0.05	0.05	0.15	0.15
Polycyclic Aromatic Hydrocarbons				(ug/kg OC)	(ug/kg)		
Naphthalene	EPA 3550C/3546	EPA 8270E	91-20-3	99,000	2,100	3,800,000	29,000,000
Acenaphthylene	EPA 3550C/3546	EPA 8270E	208-96-8	66,000	1,300	11,000,000	88,000,000
Acenaphthene	EPA 3550C/3546	EPA 8270E	83-32-9	16,000	500	11,000,000	88,000,000
Fluorene	EPA 3550C/3546	EPA 8270E	86-73-7	23,000	540	7,600,000	59,000,000
Phenanthrene	EPA 3550C/3546	EPA 8270E	85-01-8	100,000	1,500	57,000,000	440,000,000
Anthracene	EPA 3550C/3546	EPA 8270E	120-12-7	220,000	960	57,000,000	440,000,000

Parameter	Preparation Method	Analysis Method	CAS Number	Port Log Yard Screening Levels (GeoEngineers, 2015)			
				Sediment Screening Level for Protection of Benthic Organisms		Protection of Human Health and Higher Trophic Ecological Receptors	
				OC (0.5% to 3.5%)	OC (<0.5% or >3.5%)	Intertidal Sediment (above -3 ft MLLW)	Subtidal Sediment (below -3 ft MLLW)
2-Methylnaphthalene	EPA 3550C/3546	EPA 8270E	91-57-6	38,000	670	760,000	5,900,000
Total LPAH	---	---	---	370,000	5,200	---	---
Fluoranthene	EPA 3550C/3546	EPA 8270E	206-44-0	160,000	1,700	5,900,000	5,900,000
Pyrene	EPA 3550C/3546	EPA 8270E	129-00-0	1,000,000	2,600	5,700,000	44,000,000
Benz(a)anthracene	EPA 3550C/3546	EPA 8270E	56-55-3	110,000	1,300	650	5,000
Chrysene	EPA 3550C/3546	EPA 8270E	218-01-9	110,000	1,400	6,500	50,000
Benzofluoranthenes (b,j,k)	EPA 3550C/3546	EPA 8270E	205-99-2 205-82-3 207-08-9	230,000	3,200	650	5,000
Benzo(a)pyrene	EPA 3550C/3546	EPA 8270E	50-32-8	99,000	1,600	65	500
Indeno(1,2,3-c,d)pyrene	EPA 3550C/3546	EPA 8270E	193-39-5	34,000	600	650	5,000
Dibenzo(a,h)-anthracene	EPA 3550C/3546	EPA 8270E	53-70-3	12,000	230	650	5,000
Benzo(g,h,i)-perylene	EPA 3550C/3546	EPA 8270E	191-24-2	31,000	670	5,700,000	44,000,000
Total HPAH	---	---	---	960,000	12,000	---	---
Total cPAHs - TEQ	---	---	---	---	---	21	21
Chlorinated Hydrocarbons				(ug/kg OC)	(ug/kg)		
1,4 Dichlorobenzene	EPA 3550	EPA 8270E/SIM	10646-7	3,100	110	88,000	680,000
1,2 Dichlorobenzene	EPA 3550	EPA 8270E/SIM	95-50-1	2,300	35	17,000,000	130,000,000
1,2,4 Trichlorobenzene	EPA 3550	EPA 8270E/SIM	120-82-1	810	31	16,000	130,000

Parameter	Preparation Method	Analysis Method	CAS Number	Port Log Yard Screening Levels (GeoEngineers, 2015)			
				Sediment Screening Level for Protection of Benthic Organisms		Protection of Human Health and Higher Trophic Ecological Receptors	
				OC (0.5% to 3.5%)	OC (<0.5% or >3.5%)	Intertidal Sediment (above -3 ft MLLW)	Subtidal Sediment (below -3 ft MLLW)
Hexachlorobenzene (HCB)	EPA 3540/3550	EPA 8270E/SIM	118-74-1	380	22	300	2,300
Phthalates				(ug/kg OC)	(ug/kg)		
Dimethyl phthalate	EPA 3550	EPA 8270E	131-11-3	53,000	71	---	---
Diethyl phthalate	EPA 3550	EPA 8270E	84-66-2	61,000	200	150,000,000	1,200,000,000
Dibutyl phthalate	EPA 3550	EPA 8270E	84-74-2	220,000	1,400	19,000,000	150,000,000
Butyl benzyl phthalate	EPA 3550	EPA 8270E	85-68-7	4,900	63	250,000	1,900,000
Bis(2-ethylhexyl)-phthalate	EPA 3550	EPA 8270E	117-81-7	47,000	1,300	34,000	260,000
Di-n-octyl phthalate	EPA 3550	EPA 8270E	117-84-0	58,000	6,200	1,900,000	15,000,000
Phenols				(ug/kg dry weight)			
Phenol	EPA 3550	EPA 8270E	108-95-2	420	420	57,000,000	440,000,000
2-Methylphenol	EPA 3550	EPA 8270E	95-48-7	63	63	9,500,000	73,000,000
4-Methylphenol	EPA 3550	EPA 8270E	106-44-5	670	670	19,000,000	150,000,000
2,4 Dimethylphenol	EPA 3550	EPA 8270E	105-67-9	29	29	3,800,000	29,000,000
Pentachlorophenol	EPA 3550	EPA 8270E	87-86-5	360	360	1,200	9,200
Miscellaneous Extractables				(ug/kg dry weight)			
Benzyl Alcohol ⁽²⁾	EPA 3550	EPA 8270E	100-51-6	57	57	19,000,000	150,000,000
Benzoic acid	EPA 3550	EPA 8270E	65-85-0	650	650	760,000,000	5,900,000,000
Dibenzofuran	EPA 3550	EPA 8270E	132-64-9	---	540	190,000	1,500,000
Hexachloro-butadiene	EPA 3540/3550	EPA 8270D/8081	87-68-3	---	11	6,100	47,000
N-Nitrosodi-phenylamine	EPA 3550	EPA 8270E	86-30-6	---	28	97,000	750,000

Parameter	Preparation Method	Analysis Method	CAS Number	Port Log Yard Screening Levels (GeoEngineers, 2015)			
				Sediment Screening Level for Protection of Benthic Organisms		Protection of Human Health and Higher Trophic Ecological Receptors	
				OC (0.5% to 3.5%)	OC (<0.5% or >3.5%)	Intertidal Sediment (above -3 ft MLLW)	Subtidal Sediment (below -3 ft MLLW)
Miscellaneous Extractables				(ug/kg OC)			
Dibenzofuran	EPA 3550	EPA 8270E	132-64-9	15,000	---	---	---
Hexachlorobutadiene	EPA 3540/3550	EPA 8270E/8081	87-68-3	3,900	---	---	---
N-Nitrosodiphenylamine	EPA 3550	EPA 8270E	86-30-6	11,000	---	---	---
Pesticides							
4,4'-DDD 4,4'-DDE 4,4'-DDT Sum of 4,4'-DDD, 4,4'-DDE, 4,4'-DDT	EPA 3540/3541/3550	EPA 8081B	72-54-8 72-55-9 50-29-3 ---	---	---	---	---
Aldrin	EPA 3540/3541/3550	EPA 8081B	309-00-2	---	---	---	---
Total Chlordane (sum of Cis-chlordane, trans-chlordane, cis-nonachlor, trans-nonachlor, oxychlordane)	EPA 3540/3541/3550	EPA 8081B	5103-71-9 5103-74-2 5103-73-1 39765-80-5 27304-13-8	---	---	---	---
Dieldrin	EPA 3540/3541/3550	EPA 8081B	60-57-1	---	---	---	---
Heptachlor	EPA 3540/3541/3550	EPA 8081B	76-44-8	---	---	---	---

Polychlorinated biphenyls				(ug/kg)			
PCB Aroclors	EPA 3540/3550	EPA 8082A	---	---	130	3.5	3.5
Dioxins & Furans				(ng/kg; based on PQL)			
Total Dioxin/Furans TEQ	---	EPA 1613B	---	5	5	5	5

C. DIOXINS/FURANS

Dioxin/furan testing is included in this SAP to coincide with the Port Log Yard Remedial Investigation Study.

The Puget Sound Sediment Reference Material (PS-SRM) shall be extracted and analyzed alongside dioxin samples.

The toxic equivalency (TEQ) of Dioxin/Furans is calculated by multiplying the toxic equivalent factor (TEF) of each congener by the concentration of the congener and summarizing the results. The congener TEFs are provided in the following table per Table 6-2 (SCUM, 2019).

TABLE 5. TOXICITY EQUIVALENCY FACTORS (TEFs) FOR PCDDs AND PCDFs

	CONGENERS / ISOMERS	TOXIC EQUIVALENCY FACTOR (TEF)
Dioxins	2,3,7,8-TCDD	1
	1,2,3,7,8-PeCDD	1
	1,2,3,4,7,8-HxCDD	0.1
	1,2,3,6,7,8-HxCDD	0.1
	1,2,3,7,8,9-HxCDD	0.1
	1,2,3,4,6,7,8-HpCDD	0.01
	OCDD	0.0003
Furans	2,3,7,8-TCDF	0.1
	1,2,3,7,8-PeCDF	0.03
	2,3,4,7,8-PeCDF	0.3
	1,2,3,4,7,8-HxCDF	0.1
	1,2,3,6,7,8-HxCDF	0.1
	2,3,4,6,7,8-HxCDF	0.1
	1,2,3,7,8,9-HxCDF	0.1
	1,2,3,4,6,7,8-HpCDF	0.01
	1,2,3,4,7,8,9-HpCDF	0.01
	OCDF	0.0003

D. LABORATORY QUALITY ASSURANCE

Duplicate field samples will be collected equal to 10% of field samples or 2 per week, whichever is greater. Two samples are prepared from a homogenate and are blind submitted to the laboratory.

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) are conducted to check accuracy and precision of analyses in specific sample matrices and assess sample matrix interferences. Known concentrations of analytes are added to sample and then processed through the entire analytical procedure and the recovery of the analytes is calculated. Results are expressed as percent recovery of the known spiked amount and relative percent difference (RPD) for MS/MSD pairs. Volume for MS and MSD will be retained from two stations.

Temperature Blanks will be used for each sample cooler shipped to the laboratory.

The following Laboratory QA/QC procedures will be followed during sample analysis.

TABLE 6. LABORATORY QA/QC WARNING AND ACTION LIMITS

QA Element	Warning Limits	Action Limits
Precision		
Conventionals	None	20% RSD
Metals	None	20% RPD or RSD
Organics	35% RPD or COV	
Matrix Spikes		
Metals	None	75-125% recovery
Organics		None (0% recovery may be cause for data rejection) (1)
Semi-volatiles and Pesticides	20-150%	
Reference Materials		
Metals	None	95% CI if specified for a particular CRM; 80-120% recovery if not.
Organics	None	95% CI for CRMs. No action limit for uncertified RMs.
Surrogate Spikes		
Organics		EPA CLP chemical specific recovery limits
Pesticides	60% min recovery	
Semi-volatiles	30% (acids) and 50% (base/neutral) min recovery	

(1) Rigorous control limits are not recommended due to possible matrix effects and interferences.

E. DATA VALIDATION

Cari Sayler will conduct a verification and validation based on completeness and compliance checks of sample receipt conditions and sample-related and instrument-related QC results (EPA Stage 2B). Based on the results of this review, the need for additional evaluation will be assessed that might include recalculation checks (EPA Stage 3) and review of actual instrument outputs (EPA Stage 4).

F. REPORTING

A sediment characterization report, which includes the following items will be prepared and submitted to the Washington State Department of Ecology.

- QA report documenting and explaining deviations from the Work Plan and effects of QA deviations on test results.
- Actual sampling locations in plan view with bathymetry, and target sample locations.
- Sampling coordinates in latitude and longitude in a table.
- Positioning method to locate sampling positions.
- Sampling equipment used, protocols used during sampling and explanation of any deviations from the Work Plan.
- Sampling log with sediment descriptions.
- Chain-of-custody procedures used.
- Chemical testing results including QC information and summary of data validation findings.
- Puget Sound SRM reporting requirements per guidance
- Table with analytical results compared to Port Log Yard Screening Levels (GeoEngineers, 2015) with any exceedances highlighted, including lab and validation qualifiers, method detection limits and RLs for all nondetects
- Explanation of any deviations from the Work Plan.
- Appendices including:
 - o Work Plan
 - o Logs and photos
 - o Raw laboratory data, including case narrative describing analytical problems
 - o Chain-of-Custody forms
 - o Data validation report
 - o Final characterization and disposal records
 - o As builds of final outfall alignment and dredge prisms

Quality Assurance Data Report (QA1 and QA2) will be submitted with Sediment Characterization Report.

VI. PERSONNEL RESPONSIBILITIES

The following table summarizes the project team and their responsibilities for the Work Plan preparation, sampling effort, analysis, and characterization report.

TABLE 7. PROJECT TEAM AND RESPONSIBILITIES

Task/Responsibility	Rob Webb	Dave Cooper	Ezra Beaver	Amanda Volgardsen	Cari Sayler
Overall project management	✓				
Sampling plan development	✓				
Agency coordination			✓		
Positioning		✓	✓		
Sediment sampling		✓	✓		
Compositing/subsampling		✓	✓		
Chemical analysis & QA				✓	
Data Validation					✓
Final Report	✓				

Rob Webb, Dalton, Olmsted & Fuglevand, Inc. (rwebb@dofnw.com; 360-908-1386)
 Dave Cooper⁴, Dalton, Olmsted & Fuglevand, Inc. (dcooper@dofnw.com, 206-660-3456)
 Ezra Beaver, Dalton, Olmsted & Fuglevand, Inc. (ebeaver@dofnw.com, 401-741-2556)
 Amanda Volgardsen, Analytical Resources, Inc. (amandav@arilabs.com, 206-695-6220)
 Cari Sayler, Sayler Data Solutions, Inc. (cari.say@saylerdata.com, 425-820-7504)

VII. SEDIMENT MANAGEMENT

Sediments to be dredged for the City of Anacortes will use typical environmental dredging procedures to manage the 4R's; risk, release, resuspension and residuals, as appropriate to the site.

Dredged sediments will be disposed at an approved subtitle D upland landfill.

VIII. REFERENCES

Toxics Cleanup Program, Washington State Department of Ecology, 2019. *Sediment Cleanup User's Manual (SCUM)* Olympia, WA

GeoEngineers, 2015. *Final Remedial Investigation/Feasibility Study Work Plan: Anacortes Port Log Yard, Anacortes, Washington, Ecology Agreed Order No. DE 10630*. Seattle, WA

⁴ Dave Cooper is a registered professional geologist with over 30 years of experience and a thorough knowledge of Puget Sound geology.

APPENDIX A



WASHINGTON STATE DEPARTMENT OF
Natural Resources

JENNIFER M. BELCHER
Commissioner of Public Lands

August 11, 2000

Mr. Dan Stahl, Executive Director
Port of Anacortes
PO Box 297
Anacortes, WA 98221

Dear Mr. Stahl: *dan*

Enclosed is the final signed copy of the amended Port of Anacortes (Port), Port Management Agreement (PMA). Consistent with the intent of the Consent to Assignment of lease no. 22-A02638 and the resolution passed by the Anacortes Port Commission, the PMA has been issued prior to the submission of legal surveys and a comprehensive site plan. The Port has agreed to supply amended exhibits by December 31, 2000. The Department of Natural Resources will remit to the Port a refund for rent payments in the amount of \$25,877.

The 1984 PMA document was terminated at the moment the 1995 model PMA was executed. PMA 20-080024 has been amended to the standards approved by the Board of Natural Resources in 1995. Lease no. 22-A02638 has been terminated. The land currently managed under lease no. 22-A02638 has been added to the 1995 PMA. Please record a memorandum recognizing these agreements with Skagit County.

Thank you for the good efforts on the part of the Port to facilitate these amendments to the PMA.

Sincerely,

Donald Olmsted, Ports Program Manager
Aquatic Resources Division

c: Maria Victoria Peeler, DNR Deputy Supervisor
Charles W. Turley, DNR Division Manager
Leslie A. Johnson, Wells & Johnson
Joseph Panesko, Assistant Attorney General
Eric Johnson, WPPA

Enclosures: PMA # 20-080024 amended to 1995 model standards
Termination agreement for 1984 PMA document
Termination agreement lease # 22-A02638

PORT MANAGEMENT AGREEMENT
Port of Anacortes No. 20-080024

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Port Management Agreement
No. 20-080024
PORT OF ANACORTES

This Port Management Agreement ("Agreement"), effective as of the **Sixteenth** day of **September, 1998** ("the Effective Date"), by and between the state of Washington ("the State"), through the Department of Natural Resources ("DNR"), and the **PORT OF ANACORTES** a government agency/entity ("the Port"),

WITNESSETH:

Whereas, DNR is directed by law to manage aquatic lands owned by the state of Washington; and

Whereas, RCW 79.90.475 authorizes DNR and the port district, upon request of a port district, to enter into an agreement to manage state-owned aquatic lands as set forth in said law; and

Whereas, this agreement is in the form of the Model Port Management Agreement approved by the Washington Board of Natural Resources pursuant to RCW 79.90.475 and the implementing regulations; and

Whereas, the Port has requested such an agreement; and

Whereas, DNR has determined that it is in the best interest of the state of Washington to enter into such an agreement with the Port,

Now, therefore, the parties hereto hereby agree as follows:

1. Term.

a. Term. This Agreement shall commence on the effective date, inclusive, and shall continue in full force and effect until the **Sixteenth** day of **September, 2028** (Expiration Date), inclusive, a period of thirty (30) years referred to as the "Term."

b. New Port Management Agreement.

(1) If either party desires to enter into a new Port Management Agreement following the Expiration Date, the parties will meet (as often as necessary) during the two years prior to the Expiration Date to determine the feasibility of entering into a new Port Management Agreement. The parties may at that time, based on the laws of the state of Washington and in the form of the Model Port Management Agreement in effect as of that date, negotiate a new management agreement.

(2) If either party decides it is not in its best interest to enter into a new agreement, the parties shall decide on the fair and reasonable allocation of the leasehold revenues for those Port leases that are in existence on the Property as of the Expiration Date. Consideration will be given to the Port's need to receive a fair return on capital invested by the Port on the Property. If the parties are unable to agree on a reasonable allocation of leasehold revenues as stated above, then either party may invoke the dispute resolution procedures under Section 24(b) below. In this event this agreement will be extended until such time as the dispute resolution regarding allocation has been concluded.

2. Delegation. DNR hereby delegates management to the Port, and the Port hereby accepts this delegation and agrees to manage the parcels of state-owned aquatic lands listed on Exhibit A, which are attached hereto and incorporated by reference, (hereinafter referred to as the "Property"), as of the Effective Date of this Agreement in accordance with the provisions hereof.

The parties intend that this Agreement encompass all authority required for the Port to effectively manage the Property as contemplated by RCW 79.90.475. The parties acknowledge that the delegation by DNR and the management by the Port contemplated by this Agreement is subject to and in accordance with State Law and regulations, including but not limited to applicable provisions of the Washington Administrative Code, the State Environmental Policy Act, the Aquatic Lands Act, the Shoreline Management Act, and the Growth Management Act. DNR retains the authority to set state-wide aquatic lands policy through administrative code provisions or adoption of policy by the Board of Natural Resources, as provided by law. The Port is responsible for implementation of that policy.

If future circumstances indicate that additional authority is required to effectively manage the Property, the Port may request such authority from DNR, which approval shall not be unreasonably withheld.

The Port is hereby granted exclusive authority to enter into leases or other use authorizations, including leases or use authorizations to itself, for the Property or portions thereof, except as otherwise provided herein. All such leases and use authorizations shall be subject to this Agreement and shall have a copy of the Agreement attached thereto and incorporated by reference. Said leases and use authorizations shall survive this Agreement. Any such lease by the Port shall contain a clause which states that upon termination of this Agreement (or successors thereof), or removal of the leased property therefrom, the lessor of said lease shall become DNR. The Port shall furnish to DNR copies of new leases, lease renewals, lease modifications, and surrender of leaseholds on parcels included in this Agreement upon execution of said lease documents.

The Port may not execute a lease or use authorization with itself for the Property to the extent the term of the lease or use authorization extends beyond the term of this Agreement.

DNR's delegation to the Port does not include the authority to bind the State or DNR to any financial obligations, to any environmental remediation of the Property, or to any habitat mitigation involving the Property without DNR's written consent.

3. Property.

Exhibit A contains a common description, legal description, planned use (if known, or if not, so stated), and map identifying each parcel of the Property. The Port may request management of any additional parcel of state-owned aquatic lands which meets the criteria established by law. Additional parcels approved by DNR for Port management shall be added to this Agreement by amending Exhibit A. DNR's approval for such requests shall be timely made and shall not be unreasonably withheld; however, DNR may consider whether the Port is meeting its current management obligations; whether DNR has invested in, planned for, or is legally committed to, a specific use which is inconsistent with the Port's proposed use for the requested parcel; whether Port acquisition would operate to release prior lessees or users to the detriment of the State; or whether litigation is pending or threatened concerning the parcel.

DNR shall respond to the Port in writing within forty-five (45) days of request either (i) approving or denying the request or (ii) identifying that additional information is needed for a decision. Once that additional information has been provided DNR shall respond to the Port in writing within forty-five (45) days, either approving or denying the request. If the DNR denies a request, DNR shall submit in writing its reasons for denial of the request. If DNR fails to submit such written responses as provided herein, the Port shall have the right to appeal to the Supervisor of the Department of Natural Resources for a decision. If DNR fails to submit a written response within ten (10) days (excluding weekends and state holidays) of receipt of appeal, then request shall be deemed approved and Exhibit A shall be amended.

Any parcel which no longer meets the criteria established by law shall cease to be covered by this Agreement and the management thereof shall return to DNR. Any parcel may be deleted from this Agreement at any time by mutual agreement. The Port shall promptly notify DNR of such parcel no longer meeting the criteria and such notice shall be deemed to amend Exhibit A. If all subject property is deleted this Agreement shall terminate. If any parcel is no longer included in this Agreement for any reason, upon cessation the Port shall promptly remit to DNR its pro rata share of any prepaid rent received for that parcel.

4. Access. It is not the intent that any parcel owned by the State which is not covered by this Agreement, or any property owned by the Port should be left without access as a result of the Port's management of the Property. Provisions for access to such parcels shall be listed on Exhibit A or its amendments.

5. Acceptance/Relinquishment of the Property Management. Except as otherwise agreed in writing the Port hereby accepts management of the Property listed on Exhibit A in its condition existing as of the Effective Date of this Agreement, or with respect to parcels added to Exhibit A in the future, the date such parcel(s) becomes listed on Exhibit A, and agrees, at its sole expense, to conform to federal, state, and local laws and regulations governing and regulating the use of the Property. DNR has disclosed to the Port all conditions known to DNR which would adversely affect the use of the Property and the Port acknowledges that neither DNR nor DNR's agent has made any warranty as to the suitability of the Property for conduct of the Port's business.

At the termination of this Agreement the Port shall relinquish management of the Property which shall be in its condition existing as of the date identified in the paragraph above,

or in a reasonable condition which would result from prudent management, except normal wear and tear as to improvements; provided, this section is not intended to address damages caused by contamination which shall be addressed under Section 8, Hazardous Substances, below.

6. Standard of Management. Management of the Property shall be consistent with Chapters 79.90 through 79.96 RCW, as amended, which state in pertinent part that: [the manager of state-owned aquatic lands shall strive to provide a balance of public benefits for all citizens of the state." Management shall also be consistent with the implementing regulations adopted by the DNR or the Board of Natural Resources, and policies adopted by the Board of Natural Resources. Adoption of such policies shall be preceded by ninety (90) days notice to the Washington Public Ports Association, or its successor, with adequate opportunity for comment before the Board of Natural Resources. The DNR and the Washington Public Ports Association, or its successor, shall meet annually to review statutes, regulations and policies.

The administrative procedures for management of the Property shall be those of Title 53 RCW.

7. Use/Planning. The Port may use the Property for port purposes as authorized in Title 53 RCW so long as said use is consistent with the Washington State Constitution and laws of the state of Washington. In the event the parties develop and agree in writing upon a long-range plan for aquatic land use for the Property, the Port may enter into leases for nonwater-dependent uses consistent with that plan without DNR approval. In the absence of a long-range plan for aquatic use of a portion of the Property, if the Port contemplates the possible lease or use of that portion of the Property for nonwater-dependent uses, it shall give DNR notice of its intentions at the earliest practicable time. DNR shall promptly meet with the Port to review the proposal for its consistency with the aquatic land policies of Chapters 79.90 through 79.96 RCW, as amended, and the implementing regulations adopted by DNR.

8. Hazardous Substances.

a. Definitions.

(1) Hazardous Substances. For purposes of this Agreement, a Hazardous Substance is any substance that is or may be in the future:

(a) Designated as, or that contains components designated as, hazardous, dangerous, toxic, or harmful by applicable federal, state, or local law, regulation, statute or ordinance; and/or

(b) Subject to regulation by such laws.

(2) Application Date. For purposes of this Agreement, the Application Date is the date on which application was first made by the Port for entry into this Agreement, unless the parties agree in writing that control of properties subject to this Agreement is assumed by the Port at a later date.

(3) Liability. As used in this Section 8, "Liability" means any obligation or cost of any kind arising from the release or threatened release of Hazardous Substances, or from any alleged violation of or failure to comply with any law referenced in Subsection 8(b), where the release, threatened release, alleged violation, or failure to comply is related to or arises out of the use or control of the Property. Liability includes damages (including natural resource

damages), claims, governmental investigations, proceedings or requirements, attorney fees in any investigation, administrative proceeding, trial or appeal, or witness or consultant costs.

b. Compliance. During the term of this Agreement, the Port shall comply, at its own expense, with all applicable governmental laws, regulations, permits, orders or requirements regarding the proper and lawful use, sale, transportation, generation, treatment, and disposal of Hazardous Substances related to or arising out of the Port's use or control of the Property. The Port, the lessees, and sublessees shall correct and remediate, if necessary, in accordance with applicable laws at their own expense any failure of compliance which occurs during the term of this Agreement.

c. Notice of Environmental Action.

(1) The Port shall promptly notify DNR, upon discovery of all spills, discharges or releases of any Hazardous Substances affecting the Property which are required to be reported to any federal, state, or local regulatory agency.

(2) DNR and Port shall promptly notify each other, upon discovery of any failure to comply with federal, state, or local laws or regulations with respect to the Property. Each shall promptly notify the other, upon discovery of any inspections on the Property by any regulatory entity, any fines, any regulatory orders for response or interim cleanup actions (actual or proposed), or any negotiations with any regulatory entity for a consent decree under any herein mentioned authority, or concerning any plans for any independent cleanup or mitigation and restoration of natural resources on the Property. This provision shall apply to orders issued to DNR or the Port or any third party concerning the Property.

d. Indemnity. To the extent permitted by law, the Port agrees to defend, indemnify, and hold the State, as the owner of aquatic lands, and DNR, as manager of aquatic lands, harmless from any imposition or attempted imposition of Liability upon the State or DNR related to or arising out of the use and control of the Property by the Port or anyone acting under authority of the Port from the Application Date through the end of the Term. This indemnity shall not apply to any imposition or attempted imposition of Liability that is related to or arises out of the use and control of the Property by the State or anyone acting under the authority of the State, other than the Port or anyone acting under the authority of the Port. This indemnity applies to the State solely in its capacity as the owner of aquatic lands and to DNR in its capacity as the manager of aquatic lands and does not extend to other units of state government or to the State in any capacity other than as owner of aquatic lands. Notwithstanding this provision or any other provision of this Agreement, the Port shall not be precluded from seeking relief from any other agency of state government other than DNR under the State Model Toxics Control Act, CH. 70.105D RCW ("MTCA"), the Comprehensive Environmental Response, Compensation, and Liability Act, 42 U.S.C. Section 9601 et. seq. ("CERCLA"), other similar statutes, or common law, for contribution, cost recovery, damages or other reimbursement for remediation of Hazardous Substance releases.

e. Pre-existing Contamination. The parties intend that this Agreement not alter or affect whatever Liability or responsibility either party may have for Hazardous Substance releases, or threatened releases, that occurred prior to the Application Date ("Pre-existing Contamination") under CERCLA, MTCA, or other laws that create cleanup obligations. In order to effectuate this intent, the parties agree that this Agreement will not be construed to be an indemnification or assignment of liability for any Pre-existing Contamination. Any

determination of liability or responsibility for addressing Pre-existing Contamination shall be undertaken without regard to this Agreement.

9. Port Regulations. The Port may adopt written policies and regulations to implement this Agreement and to direct the management of the Property. All such policies and regulations shall be submitted to DNR for review and comment prior to becoming effective. Any such policies or regulations must be consistent with this Agreement.

10. Rent. The following shall apply:

a. Port Use. The Port shall pay to DNR no rent for use of any portion of the Property or any state-owned improvements. In the event the Port engages in a nonwater-dependent use of any portion of the Property or any state-owned improvements, the Port shall establish the full fair market rental in dollars according to WAC 332-30-125 and shall remit, in dollars, to DNR eighty-five percent (85%) of that amount.

b. Third Party Uses. If the use of any portion of the Property involves a lease or other use authorization to a third party, rent for such portion shall be collected and distributed according to law. In the event the use is nonwater-dependent, the Port shall establish the fair market rental in dollars and shall remit, in dollars, to DNR that portion required by law.

11. Insurance and Performance Security. When the Port uses or leases any portion of the Property (including state-owned improvements) to a third party, the Port shall require the following:

a. Insurance.

(1) Liability. Bodily injury liability, including death, and property damage liability in an amount of not less than one million dollars (\$1,000,000) or such lesser amount approved by DNR, which approval shall not be unreasonably withheld. If the Port makes a written request for a lower insurance amount, DNR has forty-five (45) days following receipt of the request to respond in writing either approving or rejecting the request. If DNR fails to respond within forty-five (45) day period, the Port shall have the right to appeal to the Supervisor of the Department of Natural Resources for a decision. If DNR fails to submit a written response within ten (10) business days (excluding weekends and state holidays) of receipt of appeal, the request shall be deemed approved.

(2) Casualty. Fire and extended coverage for the insurable replacement cost of any state-owned improvements identified in Exhibit B. DNR shall provide the Port with the replacement cost value within sixty (60) days of the Port's request.

(3) In each of the cases above the State shall be named as an additional insured.

b. Performance Security.

(1) Rent Security. For those portions of the Property leased to third parties the Port shall require the third party to provide to the Port a bond, rent insurance, or other security in accordance with the requirements of RCW 53.08.085; provided, the Port commission shall not waive the rent security requirement or lower the amount of such requirement.

(2) Other Security. In addition, as is appropriate for the use occurring on the Property, the Port may require security for the performance of other lease terms including removal of improvements, trade fixtures, personal property, and hazardous substances.

c. Interim Use. When the Port leases any portion of the Property (including state-owned improvements) to a third party for a period of ninety (90) days or less, the third party shall not be required to provide insurance and performance security as stated in this Section 11 if the Port has its own insurance in the same amounts on the Property and the State is named as an additional insured.

12. Removal of Valuable Materials. Except as permitted by RCW 79.90.150 no valuable materials as referred to in Chapters 79.90 - 79.96 RCW shall be removed from any parcel subject to this Agreement without the prior written approval of DNR. If any approved removal requires payment to DNR for the value of the valuable materials removed, such payment shall be made within ninety (90) days of the removal.

13. Fills.

a. "Fill" defined. For the purposes of this Agreement, the term "Fill" means any material which has been added to increase the elevation of State-owned aquatic lands and includes rip rap, bulkheads, drainage systems or paving. "Fill" does not include confined disposal of contaminated sediments which is addressed under Section 14.

b. Adding or Removing Fill. If the Port or any of the Port's tenants proposes adding fill or removing fill from any portion of the Property, the Port shall give DNR notice of such intention at the earliest practical time. DNR shall promptly meet with the Port to review the proposal. If the proposed fill is consistent with Chapters 79.90 through 79.96 RCW, as amended, and implementing regulations, DNR shall issue written approval, which approval shall not be unreasonably withheld.

c. Rent. Except as provided for below in Subsection 13(d), rent for state-owned aquatic lands underlying the fill will be determined by the use occurring on the fill and distribution of rent will be in accordance with Section 10 of this agreement.

d. Fills with Upland Characteristics. The Port and DNR disagree as to whether filled state-owned aquatic lands with the characteristics of uplands are a nonwater-dependent use of the underlying aquatic lands. Until and unless the legislature or a court of competent jurisdiction interprets RCW 79.90.480(6) to indicate the contrary, the Port and DNR agree that the following principles control the establishment and distribution of rent between the Port and DNR for filled state-owned aquatic lands:

(1) The aquatic lands policies of RCW 79.90 control the establishment and distribution of rent for filled state-owned lands.

(2) As provided in statute, rent for state-owned aquatic lands that have been filled to the point of having the characteristic of uplands will be the full fair market rental value

of the filled land pursuant to WAC 332-30-125, or as amended, if the State owns the fill and has a right to charge for the fill.

(3) Rents for filled state-owned aquatic lands which have the characteristics of uplands will be distributed according to the use of the filled state-owned aquatic lands. Rents for water-dependent uses shall be paid to the Port. Rents for nonwater-dependent uses shall be divided between the Port and DNR. These understandings are set forth in detail in Section 10 of this Agreement.

e. Owner of Fill Identified. Fills placed on the Property prior to the Effective Date of this agreement and during the term of this Agreement shall be listed on Exhibit C. The owner of any fill which remains severed from the aquatic land shall be identified. Otherwise the fill shall be considered part of the aquatic lands, and shall be so identified.

14. Confined Disposal of Contaminated Sediments.

a. Definition. Confined Disposal of Contaminated Sediments means containment or isolation of contaminated sediments. This includes nearshore confined disposal, multi-user confined disposal, deep water confined aquatic disposal, and capping of contaminated sediments.

b. Exclusion from Agreement. Confined Disposal of Contaminated Sediments is not covered under this Agreement, and is not considered a Fill for the purposes of Section 13.

c. Agreement with DNR. A separate written agreement addressing Confined Disposal of Contaminated Sediments may be negotiated between the Port and DNR.

15. Improvements.

a. State-Owned Improvements. All state-owned improvements located on the Property are listed on Exhibit B. Improvements that become the property of the State during the term of this Agreement shall be listed on Exhibit B. These improvements shall remain the property of the State and shall be maintained at the Port's sole expense in a good condition and state of repair. Upon the cessation or termination of this Agreement as to any portion of the Property, the Port shall return said portion, together with the state-owned improvements, to DNR in a condition as good as when received, normal wear and tear excepted.

b. Non-State Owned Improvements. A management agreement or lease shall be deemed continuous from one term to the next (even after the expiration date) so long as the Port or the third party controls physical possession of the improvements and is diligently pursuing issuance of a new Agreement or lease.

(1) At any time during the continuous term of this, or any successor, Agreement(s), the Port shall determine whether improvements placed on the Property during the term of any lease are to be removed, and no compensation shall be due to the State for any such removal. DNR shall make such determination as to then existing improvements on final expiration or termination of this Agreement. The Port or the third party owner shall bear all costs of removal and of returning the parcel to the condition existing prior to placement of the improvements.

(2) Title to Improvements.

(a) Title to Port-constructed improvements shall remain with the Port so long as the parcel upon which they are located is continuously subject to a management agreement or lease with the State. Thereafter, title shall pass to the State.

(b) Title to third party-constructed improvements shall remain with the third party so long as the parcel upon which they are located is subject to a continuous lease. Thereafter, title shall pass to the State; provided, the Port may purchase the improvements from the third party for value; and further provided, the Port shall give notice to DNR if said improvements are being purchased from a bankruptcy trustee.

16. Easements.

a. Easements Granted by DNR.

(1) DNR may grant permanent easements across any portion of the Property. For purposes of this Agreement, outfalls of any type and sediment impact zones are considered permanent easements. DNR shall obtain the Port's written approval prior to making such grants, which approval shall not be unreasonably withheld. The Port has forty-five (45) days following receipt of the request to respond in writing either approving or rejecting the request. If the Port fails to respond within the forty-five (45) day period, the State shall have the right to appeal to the Port Commission for a decision. If the Port fails to submit a written response within ten (10) business days (excluding weekends and state holidays) of receipt of appeal, the request shall be deemed approved.

(2) Any request to DNR by the Port and its Lessee for a permanent easement across any portion of the Property shall be promptly considered and approval shall not be unreasonably withheld or delayed.

(3) If DNR grants any easements, DNR shall require the grantee to indemnify the Port to the same extent that the grantee indemnifies the State.

b. Easements Granted by Port. The Port may grant non-permanent easements without DNR approval so long as the term of each grant does not exceed the maximum term allowed by statute for leases of the burdened portion of the Property. Under no condition shall the term of any non-permanent easement exceed the Term of this Agreement unless approved by DNR.

17. Local Improvement Districts. Pursuant to RCW 79.44.040, the Commissioner of Public Lands (Commissioner) shall have the exclusive authority to consent or withhold consent to the inclusion of any portion of the Property in any local improvement district (LID). The Commissioner shall not withhold consent if the Port agrees to pay any assessment against the Property by such LID, regardless of when levied. The Port shall be responsible, during the term of this Agreement, for installments due on pre-existing LID assessments.

18. Taxes. Except for taxes and other governmental charges imposed by law on third parties, the Port shall be responsible for, and shall pay when due, all taxes, fees, licenses, and other governmental charges of whatever character or arising out of, or attributable to, the Property or to the Port's management, use and/or leasing thereof during the term of this Agreement.

19. Entry. Upon reasonable notice DNR shall have right of entry to the Property at reasonable times for any lawful purposes. Such entry, however, will be subject to reasonable security and safety regulations and shall not unreasonably interfere with the use of the Property.

20. Audits. DNR may periodically review the management of the Property by the Port for consistency with the Agreement, all applicable laws, chapters 79.90 through 79.96 RCW, policies adopted by the Board of Natural Resources, and administrative code provisions. DNR will promptly notify the Port if it believes the Port is not complying.

The Port shall make all records concerning the management of any portion of the Property available to DNR upon request.

21. Liens and Encumbrances. The Port shall keep the Property free from liens and other encumbrances (other than leases and other use authorizations authorized in Sections 2 Delegation, 16 Easements, and 17 Local Improvement Districts). Nothing in this Agreement shall be construed as authorizing the Port to obligate the State, directly or indirectly, to any costs, expenses, or financial liability on account of the management, use, lease, or other actions taken by the Port with respect to the Property.

22. Eminent Domain. If at any time during the term of the Agreement the Property or any part thereof is taken or condemned by any authority having the power of eminent domain, the Port, DNR, and any other person having a legal interest shall have the right to appear in such proceedings and be represented by their respective counsel, and each may claim just compensation for its respective loss or damage sustained by the taking or condemnation. Any award, compensation, damages, or payment by reason of such taking shall be apportioned within such proceeding and each party shall take such amount, if any, as may be awarded to it.

23. Non-Waiver. The failure of either party to insist upon the strict performance of any of the covenants or conditions of this Agreement in any one or more instances shall not be construed to be a waiver thereof. In the event that a default is for other than the payment of money, the acceptance by either party of payments required under the Agreement shall not be deemed as a waiver of such default.

24. Dispute Resolution.

a. Dispute. Means that whenever the Port and DNR cannot agree on the factual circumstances necessary to interpret this Agreement, or whenever the Port and DNR cannot agree on the application of any operative sections of this Agreement, either party may declare that a dispute exists concerning the Agreement.

b. Dispute Resolution.

(1) If either party declares the existence of a dispute concerning this Agreement, the declaring party shall so notify the other party and shall provide a written statement of the facts, its interpretation of the Agreement, and its position concerning such dispute. Within fifteen (15) days the other party shall provide to the declaring party a written statement addressing those same three elements. Within fifteen (15) days after the declaring party has received the other party's written statement, the parties shall meet and try to resolve the dispute.

(2) If the parties fail to resolve the dispute as provided in Subsection 24(1) above, then either party may request further review within fifteen (15) days by giving notice to the other party. Thereafter, the Supervisor of the Department of Natural Resources and the Port's Chief Administrative Officer (in the event the Port has no Chief Administrative Officer, then such person shall be designated by the Port Commission) shall meet within thirty (30) days of the request and try to resolve the dispute.

(3) In the event the dispute is not resolved within sixty (60) days after their first meeting as provided by Subsection 24(2) above, either party may request a meeting between the Commissioner of Public Lands and a member of the Port Commission empowered to represent the Port. Within sixty (60) days after such request, said two individuals shall meet and attempt to resolve such dispute. In the event they are unable to resolve the dispute within said sixty (60) day period, either party may petition the Superior Court for resolution of the dispute.

(4) During dispute resolution arising under Section 1(b)(2), the parties agree to extend the existing Agreement, as provided for in Section 1(b)(2).

25. Termination for Default. DNR may cancel this Agreement or remove any portion of the Property therefrom for any failure by the Port to perform its obligations under this Agreement on six (6) months written notice to the Port, unless, within that time, the Port cures such default. DNR's decision whether to cancel the Agreement or to remove any portion of the Property shall be reasonably exercised. If the default is of a character which cannot be remedied within six (6) months, the Port shall notify DNR and the parties shall agree on a reasonable period to remedy the default. In the event the parties cannot agree on a period, that shall be referred to resolution as provided in Section 24, Dispute Resolution. Failure to cure the default within such period may result in cancellation or removal of any portion of the Property upon notice. The decision by DNR to give notice of its intention to cancel this Agreement, or to remove a portion of the Property for default after expiration of the period for cure, shall constitute a dispute and shall be appropriate for resolution under Section 24, Dispute Resolution, herein.

26. Notices. All notices required by law or this Agreement shall be in writing and may be personally served or sent by first class mail. If such notice is served personally, service shall be conclusively deemed made at the time of service. If service is by first class mail, service shall be conclusively deemed made three (3) days after the deposit thereof in the United States mail, postage prepaid, addressed to the parties to whom such notice is to be given. Any notice may be given at the following address (or such other address as either party may notify the other, in writing):

DNR: DEPARTMENT OF NATURAL RESOURCES
Aquatic Resources Division
1111 Washington Street SE
PO Box 47027
Olympia, WA 98504-7027

PORT: PORT OF ANACORTES
1st and Commercial Street
PO Box 297
Anacortes WA, 98221

27. Attorney Fees. In the event either party shall be required to bring any action to enforce any of the provisions of this Agreement or shall be required to defend any action brought by the other with respect to this Agreement the prevailing party in such action shall be entitled to reasonable attorney's fees in addition to costs and necessary disbursements.

28. Assignment. No part of this Agreement may be assigned or otherwise transferred.

29. Severability. If any provision of this Agreement or its application to any person, or circumstance is held invalid, the remainder of the Agreement or the application of the provision to other persons or circumstances is not affected.

30. Amendments/Supplemental Provisions.

a. If, during the term of this Agreement, the Board of Natural Resources approves amendments to the Model Port Management Agreement pursuant to RCW 79.90.475, DNR shall give notice of that fact to the Port. Either party may request that this Agreement be amended to conform to the newly approved Model Port Management Agreement.

b. If unique conditions relating to management of the Property arise during the term of this Agreement, either party may request that a supplemental provision be added to this Agreement to accommodate those unique conditions. Such supplemental provisions shall not address issues of general port industry interest or interest to any other Washington port district, as determined by the Washington Public Ports Association (WPPA), or its successor organization. WPPA shall be given sixty (60) days to review the terms of any supplemental provision. WPPA shall give notice to DNR if WPPA determines the proposed terms are of general port district interest or of interest to any other Washington port district.

c. Acceptance of a subsequent Model Port Management Agreement or inclusion herein of a supplemental provision must be by mutual agreement of the parties.

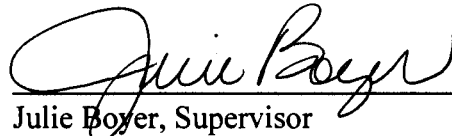
31. Survival. All obligations of the parties to be performed under the terms and conditions of this Agreement, including but not limited to, obligations occurring after the termination of this Agreement or removal of any portion of the Property from this Agreement shall not cease upon termination or removal, and shall continue as obligations until fully performed.

32. Entire Agreement. This is the entire agreement between the parties. There are no other agreements, either oral or written, that have not been incorporated into this Agreement. No amendments to this Agreement shall be binding unless the amendment is in writing and signed by the parties.

Signed this 11 day of August, ~~19~~ 2000

STATE:

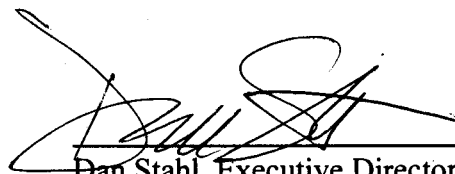
STATE OF WASHINGTON
DEPARTMENT OF NATURAL
RESOURCES



Julie Boyer, Supervisor

Signed this 25 day of Aug, ~~19~~ 2000

PORT:
PORT OF ANACORTES



Dan Stahl, Executive Director
1st and Commercial St
PO Box 297
Anacortes, WA 98221

CERTIFICATE OF ACKNOWLEDGMENT

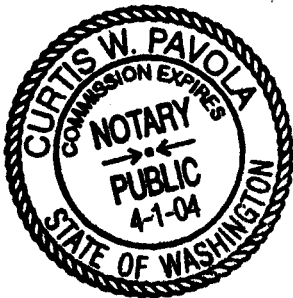
STATE OF WASHINGTON)

) ss.

County of Thurston)

On this 11th day of August, 2000, personally appeared before me JULIE BOYER, to me known to have signature authorization delegated to her to sign for JENNIFER M. BELCHER, the Commissioner of Public Lands, and ex officio administrator of the Department of Natural Resources of the state of Washington, the department that executed the within and foregoing instrument on behalf of the state of Washington, and acknowledged said instrument to be the free and voluntary act and deed of the state of Washington for the uses and purposes therein mentioned, and on oath stated that she was authorized to execute said instrument and that the seal affixed is the official seal of the Commissioner of Public Lands for the state of Washington.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my official seal the day and year first above written.



SEAL
Curtis W. Pavola

[Curtis W. Pavola]

(Type/Print Name)

Notary Public in and for the State of Washington
residing at Olympia

My Commission Expires 4-1-04

STATE OF WASHINGTON)

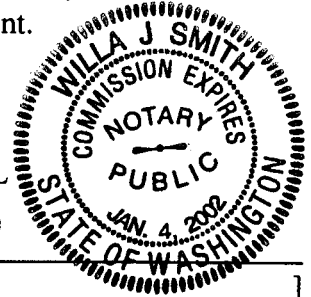
) ss.

COUNTY OF (_____)

I certify that I know or have satisfactory evidence that [Dan Stahl] is the person who appeared before me, and is the Executive Director of the Port of Anacortes ("Port"). I further certify that said person acknowledged the foregoing instrument to be the free and voluntary act of the Port for the uses and purposes mentioned in the instrument, and on oath state that [he/she] is duly authorized to execute and acknowledge said instrument.

DATED: [07/25/00]

SEAL



Willa J. Smith
[Willa J. Smith]

(Type/Print Name)

Notary Public in and for the State of Washington
residing at Snohomish County

My Commission Expires 01/04/02

INTRODUCTION TO EXHIBIT "A"

(Page 1 of 2)

Within sixty (60) days of the DNR refunding \$25,877.81 to the Port, the Port will complete the survey and related work (including proof of ownership or operating management of the abutting upland parcels, clearly referencing by the County Assessor's parcel number and indicating the PMA parcel to which it relates) and forward the same to the DNR, wherein the Port and the DNR agree to reconcile any discrepancies and replace the attached Exhibit "A" with a new Exhibit "A" within ninety (90) days of the DNR refunding \$25,877.81 to the Port, consistent with the following:

SPECIFICATIONS FOR EXHIBIT A

1. The location of the area to be leased shall be surveyed and become a part of the application to lease. This survey must comply with the standards set forth in WAC 332-130-090 as required and a Record of Survey plat shall be submitted showing the results of the survey and the location of the aquatic lease site applied for. A copy of the final proposed plat must be submitted for preliminary review prior to submission of the final plat. The final plat shall be filed with the county auditor and two copies that include the auditor's recording information shall be submitted to the Department's Land Manager. One of these copies shall be 8 1/2" x 11" in size. (RCW 79.90.120, .96.020, .96.040)
 2. The plat must be certified to be accurate, signed and sealed by a Washington State registered land surveyor (RCW 18.43.070), or a public official as prescribed by law.
 3. All field boundary surveys and plat preparation (actual map) shall be performed according to the standards prescribed in WAC 332-130 and Title 58 RCW.
 4. Distances and directions to the lease area from two or more controlling corners of a recorded subdivision, survey, or government survey (GLO) corners must be provided.
 5. The survey shall be related by meridian and coordinate to the Washington Coordinate System NAD'83(1991) by closed ties to NGS Control monuments, or the extension thereof. The designation of the control stations used shall appear on the plat.
 6. The plat must show the location of the following lines for:
 - (a) Tidal areas - Government meander line, line of mean high tide, line of mean low tide, and line of extreme low tide (include name of tidal bench mark(s) used or describe the alternate method employed for determining Tidal Datum). Lease tracts containing bedlands exclusively may be required to show the relationship to the line of extreme low tide and the -18 foot contour line only.
 - (b) Lakes - Government meander line, line of ordinary high water (original ordinary high water if area has experienced artificial raising or lowering of water level), and line of ordinary low water (include source of data) and line of navigability if established;
 - (c) Rivers - Line of ordinary high water and line of ordinary low water (include source of data) and line of navigability if established.
 - (d) Where they exist, the location of lots and blocks of platted tide or shore lands, inner and outer harbor lines, waterway lines, street boundaries, any local construction limit lines, and easements of record, with areas of encroachments.
- These lines must be shown in sufficient detail to compute each area of State-owned bed, tide, shore lands, harbor area, or waterways included within the proposed lease site.
7. Proposed lease area boundaries must be clearly shown with distances and directions of all boundary lines. The area of the lease shall be shown to an accuracy of (+/-)0.5% of the total area or (+/-) 10 square feet, whichever is greater.
 8. A narrative legal description must describe the actual area being proposed to lease. It must be prepared, signed and stamped by a licensed land surveyor, and shown upon, or attached to Exhibit A.
 9. The exhibit map must show a detailed plan of improvements to be constructed or already existing on the lease area, such as piers, wharves, bulkheads, breakwaters, dolphins, buoys, or other structures. Any structures and improvements need to be shown in sufficient detail to determine, what they are used for, and to ensure they are entirely within the lease area. Square footage shall be calculated and shown for structures and improvements that are classified as "nonwater-dependent" or "water oriented" uses per RCW 79.90.465 and WAC 332-30-106.
 10. No facility shall be constructed such that any portion of it falls outside the granted lease site.

Notes:

1. The lease of aquatic lands is often subject to preference rights. Applicants and surveyors should carefully determine the direction, and show detail, of the proration of coves and irregular shorelines.
2. VARIANCE - When the connection to the Washington Coordinate System would require an extensive control survey, the applicant may submit a request for a variance from that requirement to the land manager. The request shall clearly state the reasons for the variance, propose an alternate meridian, and be signed by a land surveyor licensed in Washington.
3. If questions arise regarding the items identified in these lease exhibit specifications, please contact the Department's Land Manager.

Effective date: February 1, 1997

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INTRODUCTION TO EXHIBIT "A"
(Page 2 of 2)

Exhibits will also include a comprehensive view of the entire area that clearly delineates:

- PMA parcel boundaries
- Existing physical shoreline
- Boundaries and assessors parcel numbers of the abutting upland
- Locations of the physical improvements both state owned and port owned
- Locations of any outfalls on state or abutting port land

The site maps will be developed in a digital format so it can be overlaid on the DNR's GIS system.

The ownership and uses of all improvements on state lands will be specified in both graphic and narrative formats. If non water-dependant uses are currently occupying state land, the following information will be supplied:

- Proof of age of the building or infrastructure
- Date when each of the current uses began
- Scaled building plan showing uses of areas in the building on all floors
- Statement regarding percent of time on any multi-use areas are directly involved in the operations for water-dependant and non water-dependant business
- Summary of measurements for any non water-dependant use areas

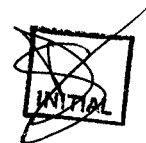


EXHIBIT A

Parcel A (Ship Harbor)

That portion of the harbor area fronting Tracts 1 through 5, Anacortes Tide Lands fronting Section 22, Township 35 North, Range 1 East, W.M., as shown on the 1987 Supplemental Map of Anacortes Harbor on file in the office of the Commissioner of Public Lands in Olympia, Washington; excluding that area designated as a "Public Place" for a state of Washington Ferry Terminal. Said area comprises 109.02 acres, more or less, as shown on Illustration A-1.

Note: For the period October 1, 1984 to April 7, 1987, Parcel A consisted of harbor area and bed of navigable waters at the same location, and as shown on the 1893 Plates of Anacortes Tide Lands. On April 7, 1987, the Harbor Line Commission approved relocation of the outer harbor line making all of Parcel A harbor area.

Parcel B (Marine Terminals)

That portion of the harbor area fronting vacated "Railroad", "Q", "R", "S", and "T" Avenues; "U" Avenue; and Tracts 4, 6, 7, and 8, Anacortes Tide Lands fronting Section 18, Township 35 North, Range 2 East, W.M., as shown on 1893 Plates of Anacortes Tide Lands on file in the office of the Commissioner of Public Lands in Olympia, Washington. Said area comprises 12.81 acres, more or less, as shown on Illustration A-2.

Parcel C (Cap Sante Waterway)

That portion of the harbor area fronting vacated "Cap Sante" and "V" Avenues, and Tract 4 Anacortes Tide Lands; Cap Sante Waterway; and the bed of navigable waters fronting said waterway bounded by the easterly extension of the north and south lines of said waterway to a line which is the southerly extension of the west line of "Y" Avenue; all fronting Section 19, Township 35 North, Range 2 East, W.M., as shown on the 1893 Plates of Anacortes Tide Lands on file in the office of the Commissioner of Public Lands in Olympia, Washington. Said areas comprise 24.51 acres, more or less, as shown on Illustration A-3.



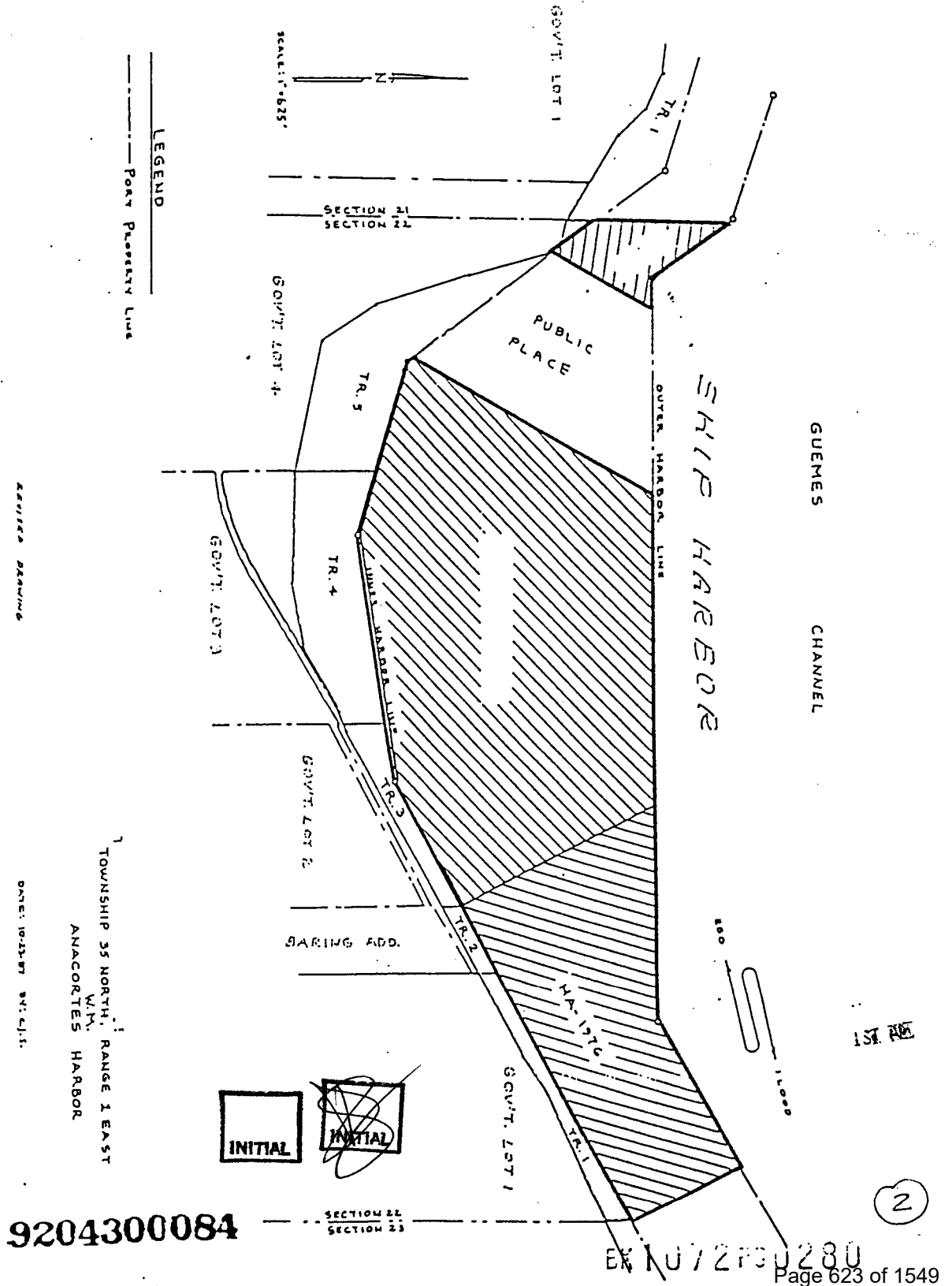
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EX 1072 PG 0279

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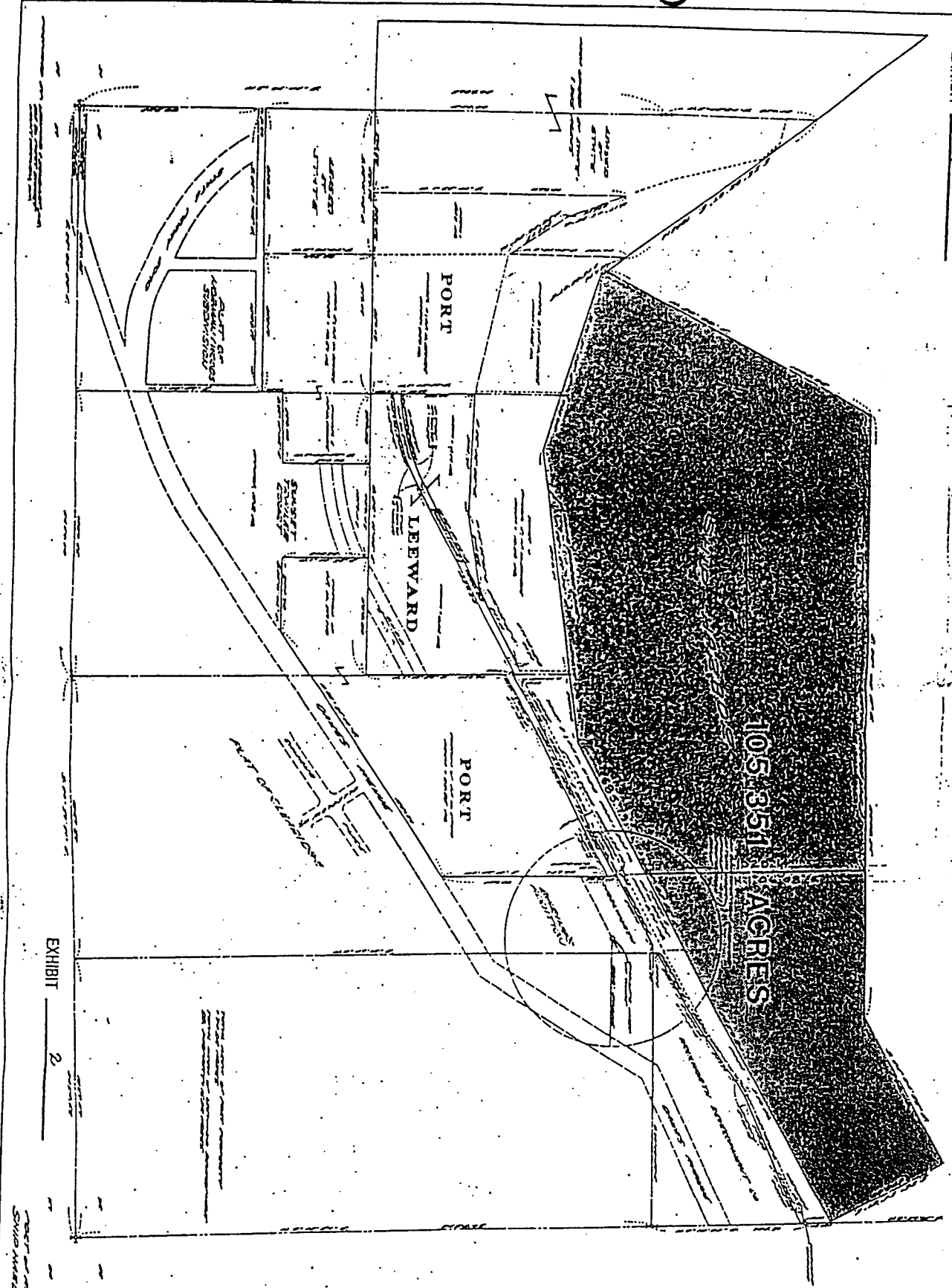
Illustration A - 1
Parcel A (Ship Harbor)



EXHIBIT

2

HARBOR LEASE AREA



105.351 ACRES

PORT

LEeward

PORT

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EXHIBIT

2

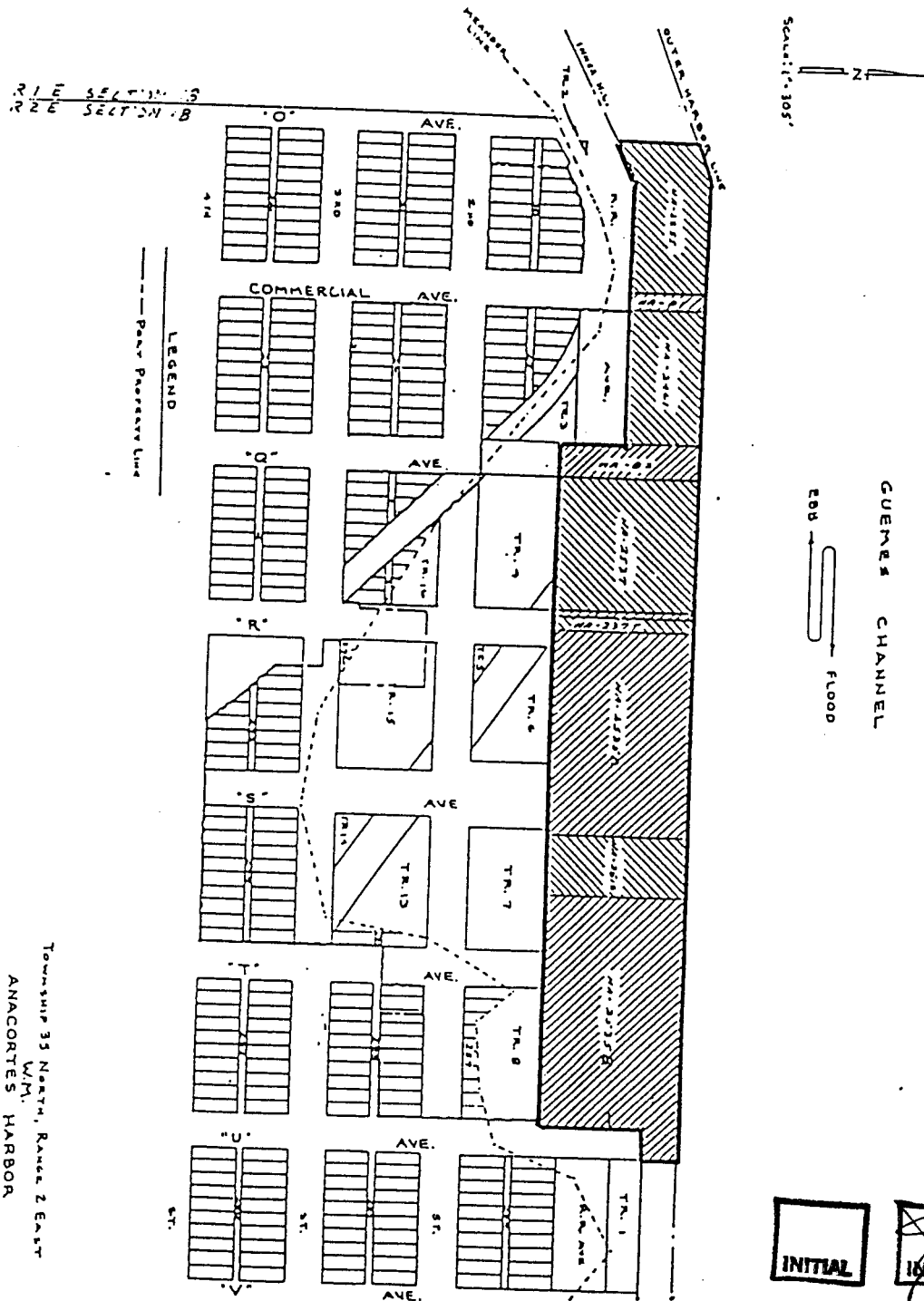
PORT OF HONOLULU
SOUNDING BOARD RECORD

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Illustration A - 2
Parcel B (Marine Terminals)

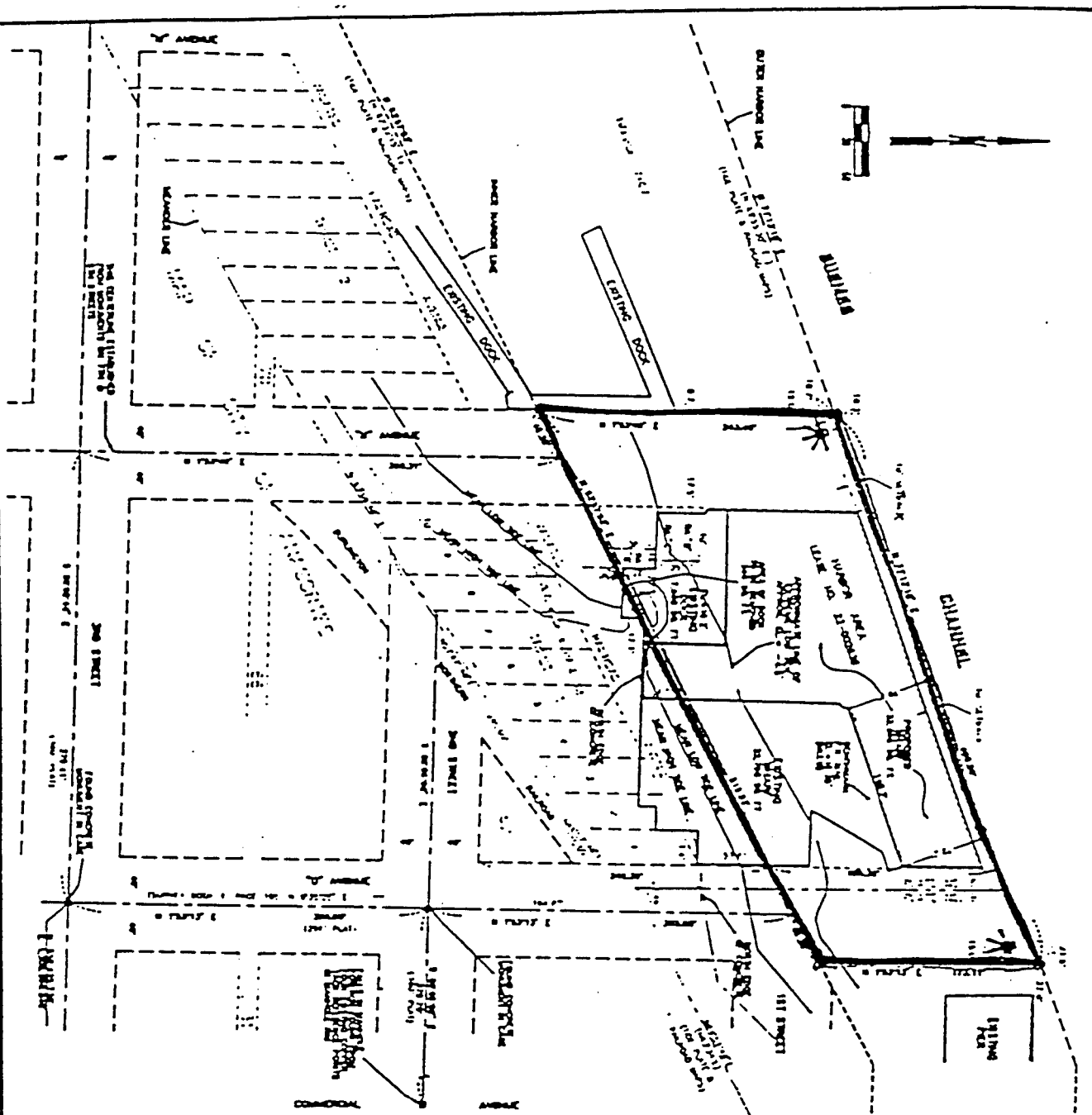


DATE: 3-7-78 BY: C.J.V.
Township 35 North, Range 2 East
ANACORTES HARBOR

9204300084

INITIAL INITIAL

EX 1072P30281 (4)



~~UFGW. DO NOT USE. NO. 22-00234~~

1. The first step in the process of creating a new product is to identify a market need. This involves conducting market research to determine what consumers want and what problems they are trying to solve. Once a need is identified, the next step is to develop a concept that addresses that need. This is often done through brainstorming sessions with a team of designers and engineers.

2. The second step is to create a prototype. A prototype is a small-scale model of the product that is used to test the concept and gather feedback. This can be done using a variety of materials and techniques, depending on the complexity of the product. The prototype is used to demonstrate the functionality of the product and to identify any potential issues or improvements.

3. The third step is to conduct a feasibility study. This involves evaluating the technical, financial, and market viability of the product. Technical feasibility involves determining whether the product can be manufactured using current technology. Financial feasibility involves estimating the costs of production and determining whether the product can be sold at a price that covers those costs. Market feasibility involves determining whether there is a sufficient market for the product.

4. The fourth step is to develop a business plan. A business plan is a document that outlines the company's strategy for producing and selling the product. It includes information about the company's goals, the market it is targeting, the competitive landscape, and the financial projections for the product. The business plan is used to attract investors and to guide the company's operations.

5. The fifth step is to manufacture the product. This involves setting up a production line and manufacturing the product in large quantities. This step often involves working with a manufacturer or a factory to produce the product. The manufacturer will use the design specifications and the prototype to create the final product.

6. The sixth step is to distribute the product. This involves getting the product into the hands of consumers. This can be done through a variety of channels, including retail stores, online marketplaces, and direct sales. The company will need to develop a distribution strategy that reaches the target market and maximizes sales.

7. The seventh step is to monitor the product's performance. This involves tracking sales, customer feedback, and other metrics to determine how well the product is performing in the market. This information is used to make adjustments to the product or the marketing strategy as needed.

8. The eighth step is to iterate and improve the product. Based on the feedback and performance data, the company may decide to make changes to the product or the marketing strategy. This process of iteration and improvement is ongoing and helps the company stay competitive in the market.

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IN - BOSTON PORTLAND INTERNATIONAL AREA

III

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LOU KAY 2-21-61 BORN IN U.S.A. BY KOREAN IN "YOUNG AMERICAN" 2-21-61 BORN IN U.S.A. BY KOREAN IN "YOUNG AMERICAN" 2-21-61 BORN IN U.S.A. BY KOREAN IN "YOUNG AMERICAN"

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THE BEAT non-beat and my ex-fiancee (1963) 'musical' and
of love, leading me to understand how beautiful my life

REINOLD METZ

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RECOMMENDATIONS

1. AND PROPOSED REVISIONS WERE
1. AND PULLED FORWARD BY LONGER BRUSH AND POOL.

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WOMIT MAP
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THIRD RECORD OF SURVEY

108

WILLIAM WOODRUFF
8 AREA LEASE HQ. 22-907658

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Lease No. 22-AD2638
Exhibit B to 7

Restoration

Restoring *Zostera marina* at Curtis Wharf and Gravel Dock, Anacortes,
WA.

Sandy Wyllie-Echeverria
School of Marine Affairs
University of Washington
and
Kern Ewing
Center for Urban Horticulture
University of Washington

19 August 1996

INTRODUCTION

William Wooding has filed an application for a permit from the Washington Department of Fish and Wildlife (WDFW) to expand the Curtis Wharf and Gravel Dock. These are two adjacent overwater structures in the city of Anacortes on the Guemes Channel (see attached figure). Potential impacts from this expansion project involve the shading of approximately 69 m² (743 sq. ft.) of *Zostera marina* var. *phillipsii* Backman (eelgrass) habitat and could result in lowered ecosystem productivity in this region. In addition, resident and migratory fish and waterbirds may lose valuable spawning and foraging habitat (Simenstad 1994; Wilson and Atkinson 1994). WDFW currently supports a "No-Net-Loss" policy involving the disturbance of such habitats as *Z. marina*. This document contains a detailed and site-specific plan to offset *Z. marina* habitat loss associated with the proposed expansion of the dock while at the same time salvaging valuable information concerning this type of habitat restoration. This additional information will allow for the expansion of a regional database relative to interannual variability in eelgrass patch dynamics (Wyllie-Echeverria and Thom 1994). This plan involves activities designed to restore a specific site (e.g., Thom 1994) adjacent to the Curtis Wharf and Gravel Dock facility and is based on the following: (1) observations associated with an onsite evaluation during Mean Lower Low Water on 30 July 1996, (2) conversations with Bill Wooding relative to the rate of spread of *Z. marina* at this site, and (3) knowledge pertaining to the autecology and reproductive capacity of *Z. marina*.

On 30 July 1996, we visited the site during Mean Lower Low Water and were able to measure the underwater area vegetated with *Z. marina* at the proposed impact site and documented that these plants, as well as those at other locations adjacent to the project site, were the variety *phillipsii* (Backman 1991). Four adjacent mitigation sites, requiring minimal alterations, were identified for having good potential to support *Z. marina* growth. The details of these alterations are discussed in later sections of this report. It is concluded that the selection of these mitigation sites is justified due to the description of previous activities at this location (Bill Wooding, personal communication) and the visual presence of certain artifacts (e.g., concrete slabs and chain link fence) found within the subtidal and intertidal zones that presently impede the *in situ* expansion of *Z. marina* patches. In addition, *Z. marina* was found growing under the southwest portion of the



9805040163

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Gravel Dock, one of the identified mitigation sites, which is a good indicator of its potential for further expansion in that area. The placement of underdock reflective material and/or the removal of the dock decking in certain area(s) may render this southwest area more suitable for *Z. marina* growth. On both counts, restoring the tide flat to a pre-existing state may result in an increase *Z. marina* cover (Thom 1994).

During a site visit, Bill Wooding related that: (1) *Z. marina* was not growing in the site of impact before earlier dock alterations in 1992, (2) *Z. marina* had expanded in an area adjacent to the dock in another location since the 1992 construction, and (3) he believed the removal of buildings from the surface of the dock was the primary factor in the re-growth of these two areas. Two of Mr. Wooding's associates both related a similar account. There is a survey drawing however, from 1991, that shows three small patches of *Z. marina* growing in the proposed impact area (Brian Williams WDFW, personal communication).

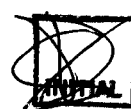
In addition, dock alterations in the northwest corner of the Curtis Wharf was constructed so as not to impact existing *Z. marina*. It was so stipulated that the dock be built leaving a 3m (10 ft.) buffer of unvegetated bottom between the dock and *in situ* *Z. marina*. It is evident that *Z. marina* has already begun to invade this buffer area.

Zostera marina reproduces both asexually (creeping rhizomes) and sexually (seeds) (den Hartog 1970; Phillips 1984). Both dispersal vectors enable *Z. marina* to colonize new habitats adjacent to *in situ* patches. Spread by creeping rhizomes not only increases seasonal biomass within patches (e.g., Kentula and McIntire 1986; Olesen and Sand-Jensen 1994) but also contributes to the plant's ability to expand patch edges into new habitat (e.g., Tomlinson 1974). In addition, Ruckelshaus (1994) noted that new plants resulting from the "seed rain" were found within a 1.27 m radius of the parent plants in False Bay, San Juan Island. Orth et al. (1994) also documented a long distance dispersal of 7.3 km from a source population in Chesapeake Bay. Previous work (Phillips 1972) describing the viability of Puget Sound *Z. marina* seed has been confirmed by preliminary results from ongoing studies (Wyllie-Echeverria 1996) thereby suggesting that seed stock may contribute to the re-growth at certain sites.

Since preliminary results from ongoing research at Battelle Marine Sciences Laboratory demonstrated that survival of transplanted *Z. marina* could not be expected to exceed 80% of the original planting (R. M. Thom personal communication), it is recommended that restoration through the creation of habitable sites near source populations be encouraged. At this particular project site, a plan for minor site alterations followed by routine monitoring may potentially be the most scientifically sound and economically and ecologically efficient method to restore *Z. marina*, thus preserving the "No-Net-Loss" criteria established by state and federal natural resource agencies. Moreover, this project provides the opportunity to determine if this approach may have merit for other small-scale shoreline modification proposals.

SITE DESCRIPTION

The impact and restoration sites are located on the south side of Guemes Channel near the city of Anacortes. The site of impact lies between the Gravel Dock and the Curtis Wharf and is a rectangular area measuring approximately 69 m² (743 sq. ft.). The five



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restoration mitigation sites (A, B, C, D, and E) total 144 m² (1568 sq. ft.) and vary in shape. As noted, plants at all locations adjacent to the project site are *Z. marina* var. *phillipsii* and grow between -0.5 ft. and -5.0 ft. tidal elevation in a sand/silt substrate. Restoration sites A and B are primarily lower intertidal (-0.5 ft. to -2.5 ft. MLLW) while sites C and D are primarily upper subtidal (-2.5 ft. to -5.0 ft. MLLW). The sediment at the site of impact has a higher concentration of silt than sediments at the restoration sites, however, these restoration sites have a similar composition of sand/silt as is found in the substrates of the existing *Z. marina* zone surrounding the west side of the Gravel Dock.

GOALS

The goal of this mitigation effort is to restore the identified sites in such a way that these locations are habitable for *Z. marina* and to provide a minimum 117 m² (1300 sq. ft.) of new *Z. marina* habitat with an average shoot density commensurate with the impact site (25 shoots/m²).

PERFORMANCE CRITERIA

The mitigation efforts will be considered successful by the WDFW when 117 m² (1300 sq. ft.) of new *Z. marina* habitat has been established at the designated mitigation sites, with an average shoot density equal to or greater than 80% of that of the impacted site. Mitigation success will be determined after year 3 monitoring has been completed.

RESTORATION TREATMENTS

Rubble Removal

Rubble and debris removal is planned for two sites immediately adjacent to the shoreline driveway leading to the Gravel Dock. Large slabs of concrete and other debris (e.g., chain link fence and old fish netting) lie exposed on the tide flat. All of this material is planned for removal and to be deposited at an appropriate landfill site. The removal process will be supervised in order to limit the amount of disturbance caused by physically lifting large objects out of the tide flat. Once the material is removed, the area will be raked smooth to fill depressions and bring the elevation back to a grade similar to the *in situ* *Z. marina* patches.

Back-hoes, front-end loaders, or other heavy mechanical equipment will not be allowed to traverse the existing *Z. marina* patches. Consequently, rubble removal in sensitive areas may be accomplished by hand, with a block and tackle from the dock surface, or by an on-water crane.

Reflection Panels

Light reflecting panels will be installed underneath the deck at site D. Panels will be manufactured from standard 2 cm (3/4") plywood, painted with non-toxic, white marine paint. Once painted, all panels will be sealed with an appropriate sealer (e.g.,



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Thompson's Water Seal). A total of 10 panels will be installed: five on the underside of the decking and five at right angles to these on the support pilings (perpendicular to the water's surface). The five perpendicular panels will be installed at the north end of Area D facing south towards the available daily sunlight. Care will be taken to avoid damage to existing *Z. marina* during installation.

Transplanting

Approximately 200 individual *Z. marina* shoots will be removed from the impact site prior to dock decking planned for construction above them. Individual shoots (ramets) with a minimum of 8 cm of rhizomes and roots attached will be bundled to form a planting unit. Each planting unit will contain approximately 5 shoots (Fonseca et al. 1982). Restoration sites C and D will be divided into halves (east and west). The eastern half of each of these two areas will be designated for the transplanting with one half of the units placed at each site.

Dock Removal

Prior to dock construction, a minimum of 45 m² (500 sq. ft.) of dock (deck and piles) will be removed within the eelgrass zone through consultation with WDFW.

MONITORING

Although the primary focus of monitoring will be to identify changes in plant distribution and density across the restored submerged bottom, important key environmental parameters will also be recorded over the three-year period.

A baseline map of *Z. marina* distribution will be developed at each of the treatment sites prior to initiating restoration activities. The baseline map of *Z. marina* distribution will be developed between May 15 and June 30, 1997.

Areas C and D

One underwater radiation sensor (LI-193SA Spherical Quantum Sensor, measures Photosynthetically Active Radiation [PAR]) will be deployed in the area of sites C and D following installation of the reflection panels and the transplanting of *Z. marina*. A second sensor will be deployed to the east of the first sensor underneath the existing dock and at the same bottom elevations as the first sensor. A third sensor will be deployed to the west of the first sensor in an area unaffected by the dock's shadow footprint and at the same elevation as the first two sensors.

Underwater radiation sensor data will be collected from May 1997 through May 2000. Sensor data collection will be once every two months between March and October of each year.

Eelgrass will be sampled at sites C and D annually in 1997, 1998, 1999, and 2000. Eelgrass sampling in 1998, 1999, and 2000 will correspond with the same time period during which the 1997 baseline sampling was conducted. A stratified random sampling scheme will be used to sample the newly established *Z. marina* plants. Specific stratified sampling sites within each restoration area will be determined prior to the first sampling

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INITIAL

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procedure. Within these sampling sites, a series of 1 m² quadrats will be randomly placed. Density, phenological characteristics (e.g. sterile, generative or seedling growth stages), and leaf width will be recorded within each quadrat.

Areas A, B and E

Eelgrass will be sampled at sites A, B, and E annually in 1997, 1998, 1999, and 2000. Eelgrass sampling in 1998, 1999, and 2000 will correspond with the same time period during which the 1997 baseline sampling was conducted. A series of 1 m² quadrats will be randomly placed in the area of rubble removal. Within each quadrat, grain size, organic carbon and redox potential will be recorded as well as *Z. marina* density, phenological characteristics, and leaf width. One core will also be extracted from each sampling quadrat and sieved for seed (see Harrison 1993).

Control Area

Eelgrass will be sampled at the control site annually in 1997, 1998, 1999, and 2000. Eelgrass sampling in 1998, 1999, and 2000 will correspond with the same time period during which the 1997 baseline sampling was conducted. Five 1 m² control quadrats will be established at five different bottom elevations to the west of the restoration sites and beyond the shadow footprint of the dock. An underwater radiation sensor will also be located in this area. The control quadrats will include the same elevation gradient as the restoration sites. Within each quadrat, *Z. marina* density, phenological characteristics, and leaf width will be recorded.

Photo documentation will be acquired from the deck of the Gravel Dock and should capture the *in situ* *Z. marina* in and among the restoration sites and control sites.

SCHEDULING

Development of the *Z. marina* baseline map and restoration activities at sites C and D, and underwater radiation sensor deployment, will begin after May 15, 1997.

The rubble removal and sand regrading at sites A and B will take place during the maximum low tides in June, 1997. *Z. marina* transplanting measures and control site quadrat sampling will also take place in June, 1997. Additional treatment activities may be implemented in July, 1997.

Following restoration treatments, transplanting measures, control quadrat sampling, and underwater sensor deployment, all remaining sampling quadrats will be established and sampled. Quadrat sampling will be implemented again during the 1998, 1999, and 2000. Sampling will be conducted during the same time period each year and will correspond with the same time period that baseline samples were collected in 1997.

CONTINGENCY PLANS

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If after year 2 monitoring has been completed and *Z. marina* colonization at the restoration sites is not satisfactory, additional dock deck removal in the vicinity of restoration sites A and C will be considered through consultation with WDFW.

If after year 3 monitoring has been completed and *Z. marina* at the restoration sites does not demonstrate an area distribution of a minimum 117 m² (1300 sq. ft.) and an average density of 80% of the average density of the impacted *Z. marina* site, the mitigation plan performance criteria will not have been satisfied. In the event that the mitigation plan performance criteria are not satisfied after year 3 monitoring has been completed, then additional dock deck removal and subsequent monitoring at restoration sites A and C will be implemented through consultation with WDFW.

REPORTING

A report will be filed with WDFW in the fall of 1997 detailing the results of restoration activities and the first year of monitoring. An additional report will be filed with WDFW following the conclusion of monitoring in 1998, 1999, and 2000.

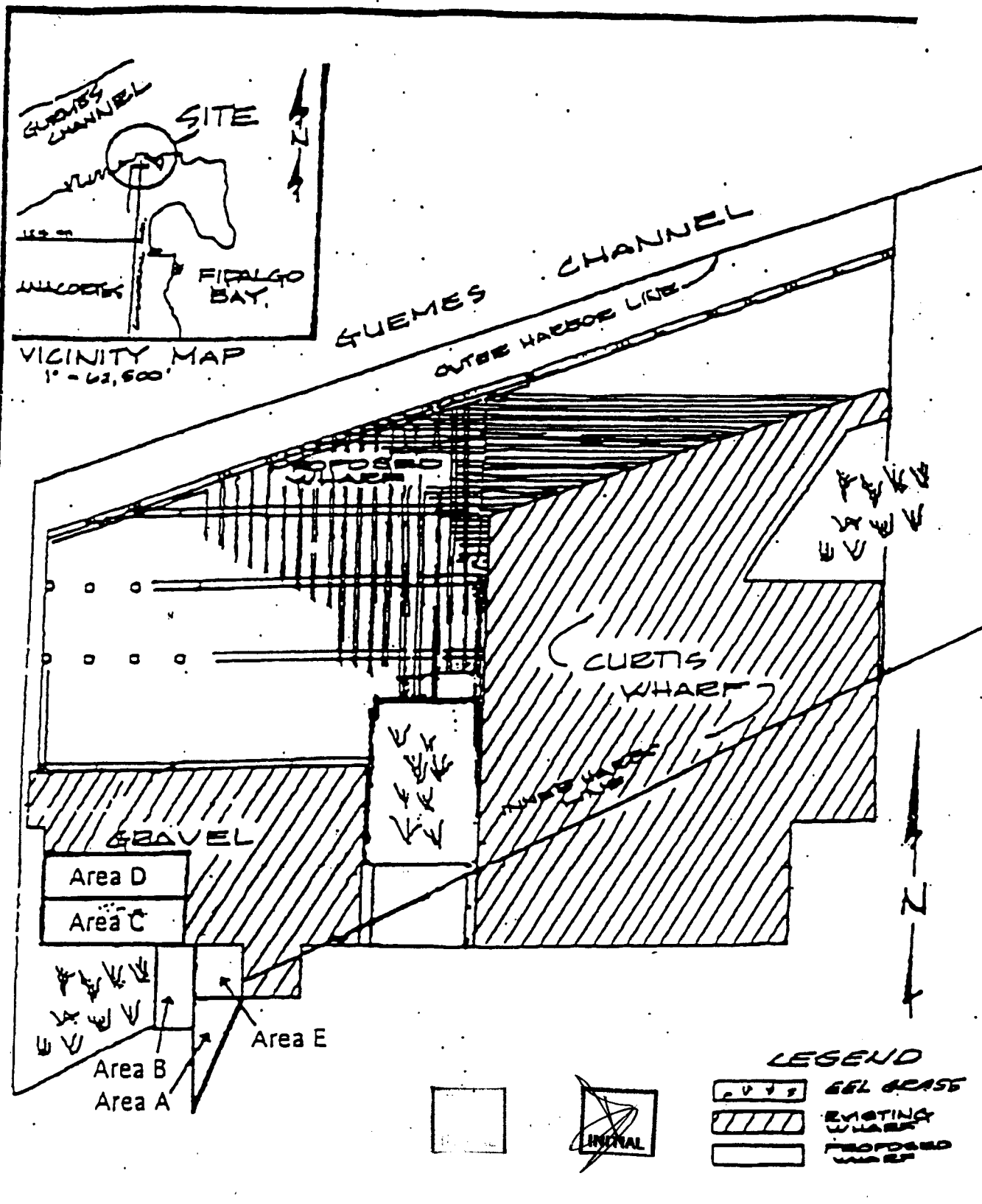
INDEMNITY

The restoration plan is a requirement of the Tenant. Tenant shall indemnify, defend, and hold harmless the State from any and all liability and requirements associated with this restoration plan.



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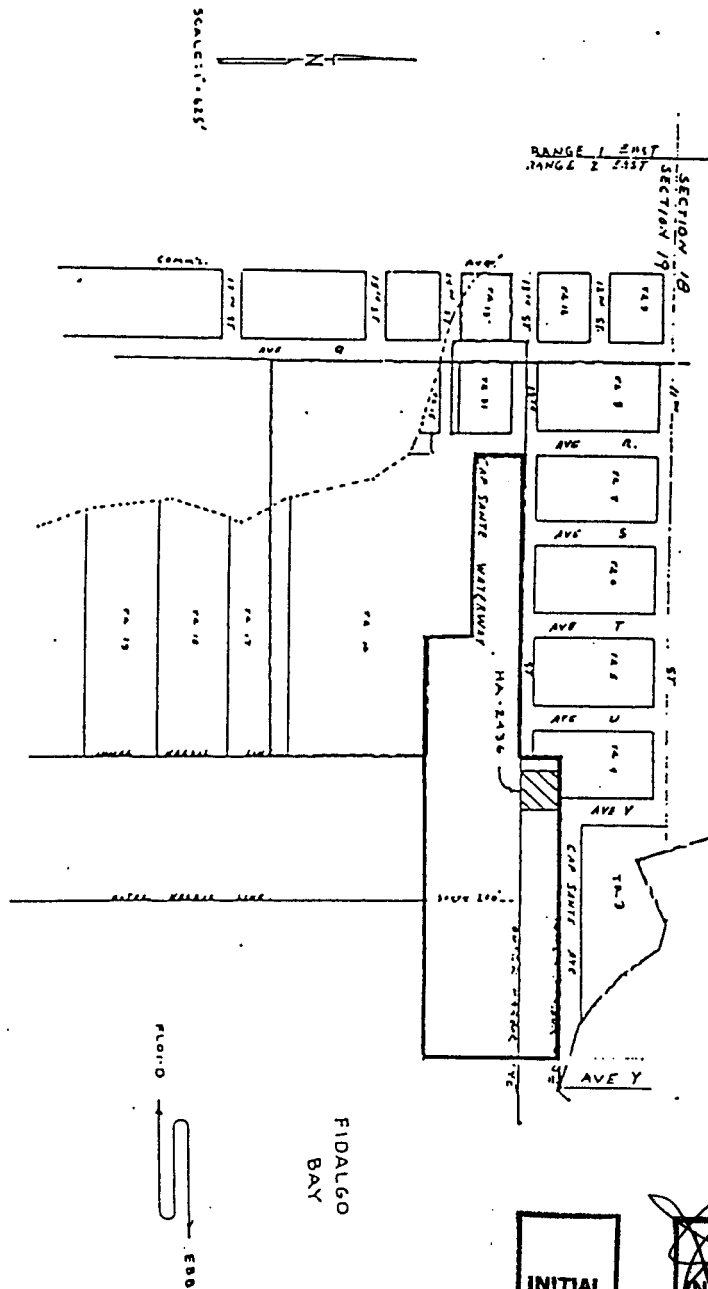
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Illustration A - 3
Parcel C (Cap Sante Waterway)

LEGEND
Port Property Lines



TOWNSHIP 35 NORTH, RANGE 2 EAST
W/M
ANACOSTES HARBOR
DATE: JUNE 20, 1960

9204300084

BR1072760282

EXHIBIT B

Parcel A.

As of the date of this agreement, no state-owned improvements exist on this parcel.

Parcel B.

As of the date of this agreement, no state-owned improvements exist on this parcel.

Parcel C.

As of the date of this agreement, no state-owned improvements exist on this parcel.

Navigational lights, daybeacons, a pile dolphin, and portions of the north and south breakwaters exist on this parcel. These are operated and maintained by the federal government. It is not intended that the port be responsible for these structures.

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Appendix B

Sediment Sampling Logs and Photos

SEDIMENT SAMPLE LOG

Project: 2020 City of Anacortes Outfall Sampling

Date: ~~8/23~~ 11/20/20

Station Name: 1

Sample Type: BACKGROUND
(Background, Grain Size)

Time: 741

Sample ID: SIZE LABEL

Sampling Method: GRAB
WINDO SHAPER

Cast No.: 5

Elevation of Sample		
Water Depth (Lead Line)	-	10.2 ft
Predicted Tide (MLLW)	+	4.8 ft
Mudline Elevation (MLLW)	=	-3.4 ft

Location of Sample		
WGS 1984		
Latitude	48.52156	
Longitude	-122.604750	
WA State Plane/WA North 4601/NAD83		
North	559825	US survey feet
East	121152	US survey feet

Grab Penetration Depth		
Depth of Grab Sampler	4	"
Distance from Top of Sampler to Top of Sediment	- 2 nd 1.5	"
Grab Penetration	=	2.5 "

Sample Description:

MIXED COLOR PREDOMINATELY GRAY

SANDY GRAVEL

GRAVEL > 1"

SHELL FRAGMENTS, SMALL

NO ODOR

City of Anacortes Outfall Sampling

COA_01_G_20201120

11/20/2020

07:41

E. Beaver

COMBINE W/ GRABS 3 + 6 TO HAVE ENOUGH VOLUME

Sediment Type, Color, Sediment Odor, Presence of Organisms, Evidence of Contamination (i.e. sandblast grit, oil droplets, wood waste, paint chips, etc), Material Removed Prior to Homogenizing and Approximate Quantity Removed

SEDIMENT SAMPLE LOG

Project: 2020 City of Anacortes Outfall SamplingDate: 11/19Station Name: 2Sample Type: BACKGROUND
(Background, Grain Size)Time: 1050Sample ID: SEIF LABELSampling Method: GRAB
WILCO SAMPLERCast No.: 1

Elevation of Sample	
Water Depth (Lead Line)	- <u>14.1</u> ft
Predicted Tide (MLLW)	+ <u>8.6</u> ft
Mudline Elevation (MLLW)	= <u>-5.5</u> ft

Location of Sample	
WGS 1984	
Latitude	<u>48.521297</u>
Longitude	<u>-122.604672</u>

WA State Plane/WA North 4601/NAD83	
North	<u>559876</u> US survey feet
East	<u>121173</u> US survey feet

Grab Penetration Depth	
Depth of Grab Sampler	<u>4</u> "
Distance from Top of Sampler to Top of Sediment	- <u>1</u> "
Grab Penetration	= <u>3</u> "

Sample Description:	
<u>VERY SOFT SILT</u>	
<u>LIGHT GRAY TOP .25" OVER DARK GRAY</u>	
<u>NO ODOR</u>	
<u>UNIFORM</u>	
	City of Anacortes Outfall Sampling
	COA_02_G_20201119
	11/19/2020
	10:50
	E. Beaver

Sediment Type, Color, Sediment Odor, Presence of Organisms, Evidence of Contamination (i.e. sandblast grit, oil droplets, wood waste, paint chips, etc), Material Removed Prior to Homogenizing and Approximate Quantity Removed

SEDIMENT SAMPLE LOG

Project: 2020 City of Anacortes Outfall Sampling

Date: 11/18/20

Station Name: 3 Sample Type: Background
(Background, Grain Size)

Time: 1209

Sample ID: SEIZ LABEL

Sampling Method: GRAB
WINDO SAMPLE

Cast No.: 2

Elevation of Sample	
Water Depth (Lead Line)	- 15.3 ft
Predicted Tide (MLLW)	+ 6.7 ft
Mudline Elevation (MLLW)	= -8.6 ft

Location of Sample	
WGS 1984	
Latitude	<u>48.521428</u>
Longitude	<u>-122.604740</u>

WA State Plane/WA North 4601/NAD83	
North	<u>559924</u> US survey feet
East	<u>121157</u> US survey feet

Grab Penetration Depth		
Depth of Grab Sampler		<u>4</u> "
Distance from Top of Sampler to		
Top of Sediment	-	<u>0</u> "
Grab Penetration	=	<u>4</u> "

Sample Description:	
VERY SOFT	
DARK GREY TO LIGHT GREY	
SILT	
NO ODOR	
LARGE PIECE OF SEAWEEED	
	City of Anacortes Outfall Sampling
	COA_03_G_20201118
	11/18/2020
	12:09
	E. Beaver
Sediment Type, Color, Sediment Odor, Presence of Organisms, Evidence of Contamination (i.e. sandblast grit, oil droplets, wood waste, paint chips, etc), Material Removed Prior to Homogenizing and Approximate Quantity Removed	

SEDIMENT SAMPLE LOG

Project: 2020 City of Anacortes Outfall SamplingDate: 11/18Station Name: 4Sample Type: BACKGROUND
(Background, Grain Size)Time: 1106Sample ID: SEE LABELSampling Method: GRAB
WILCO SHIPERCast No.: 3

Elevation of Sample		
Water Depth (Lead Line)	-	<u>17' 2"</u> ft
Predicted Tide (MLLW)	+	<u>8.8</u> ft
Mudline Elevation (MLLW)	=	<u>-8.4</u> ft

Location of Sample		
WGS 1984		
Latitude	<u>48.521566</u>	
Longitude	<u>-122.604682</u>	

WA State Plane/WA North 4601/NAD83		
North	<u>559974</u>	US survey feet
East	<u>8271172</u>	US survey feet

Grab Penetration Depth		
Depth of Grab Sampler	<u>4</u>	"
Distance from Top of Sampler to Top of Sediment	-	<u>.25</u> "
Grab Penetration	=	<u>3.75</u> "

Sample Description:
<u>VERY SOFT SILT</u>
<u>LIGHT TO DARK GREY</u>
<u>SLIGHT H2S ODOR</u>

Sediment Type, Color, Sediment Odor, Presence of Organisms, Evidence of Contamination (i.e. sandblast grit, oil droplets, wood waste, paint chips, etc), Material Removed Prior to Homogenizing and Approximate Quantity Removed

SEDIMENT SAMPLE LOG

Project: 2020 City of Anacortes Outfall SamplingDate: 11/19/20Station Name: 5Sample Type: BACKGROUND
(Background, Grain Size)Time: 1241Sample ID: SEIE LABELSampling Method: GRAB
WILCO SHAPIKCast No.: 1

Elevation of Sample		
Water Depth	-	<u>18.0</u> ft
(Lead Line)		
Predicted Tide (MLLW)	+	<u>6.1</u> ft
Mudline Elevation (MLLW)	=	<u>-11.9</u> ft

Location of Sample		
WGS 1984		
Latitude	<u>48.521701</u>	
Longitude	<u>-122.604779</u>	

WA State Plane/WA North 4601/NAD83		
North	<u>560024</u>	US survey feet
East	<u>121150</u>	US survey feet

Grab Penetration Depth		
Depth of Grab Sampler	<u>4</u>	"
Distance from Top of Sampler to		
Top of Sediment	-	<u>1</u> "
Grab Penetration	=	<u>3</u> "

Sample Description:	
<u>DARK GRAY SILT VERY SOFT, 0.25" LIGHT BROWN</u>	
<u>1 SHELL FRAGMENT</u>	<u>SILT ON SURFACE</u>
<u>SMALL AMOUNT ORGANICS</u>	City of Anacortes Outfall Sampling
<u>UNIFORM THROUGHOUT</u>	COA_05-D_G_20201119
<u>NO ODOR</u>	11/19/2020
	12:41
	E. Beaver
	City of Anacortes Outfall Sampling
	COA_05_G_20201119
	11/19/2020
	12:41
	E. Beaver

Sediment Type, Color, Sediment Odor, Presence of Organisms, Evidence of Contamination (i.e. s
wood waste, paint chips, etc), Material Removed Prior to Homogenizing and Approximate Qua

SEDIMENT SAMPLE LOG

Project: 2020 City of Anacortes Outfall SamplingDate: 11/20/20Station Name: 6Sample Type: BACKGROUND
(Background, Grain Size)Time: 1154Sample ID: SIZE LABELSampling Method: GRAB
WILCO SHIPERCast No.: 6

Elevation of Sample		
Water Depth	-	<u>23.6</u> ft
(Lead Line)		
Predicted Tide (MLLW)	+	<u>6.7</u> ft
Mudline Elevation (MLLW)	=	<u>-16.9</u> ft

Location of Sample		
WGS 1984		
Latitude	<u>48.521833</u>	
Longitude	<u>-122.604769</u>	

WA State Plane/WA North 4601/NAD83		
North	<u>560671</u>	US survey feet
East	<u>121168</u>	US survey feet

Grab Penetration Depth		
Depth of Grab Sampler	<u>4</u>	"
Distance from Top of Sampler to		
Top of Sediment	-	<u>1</u> "
Grab Penetration	=	<u>3</u> "

Sample Description:		
<u>~1.5" VERY SOFT SILT LIGHT BROWN, GRAY</u>		
<u>BELOW 1.5" SANDY SILT SOME SHELL FRAGMENTS</u>		
<u>DARK GRAY</u>	City of Anacortes Outfall Sampling	City of Anacortes Outfall Sampling
<u>NO ODOOR</u>	COA_06_G_20201120	COA_06-D_G_20201120
<u>INVERTEBRATE</u>	11/20/2020	11/20/2020
	11:54	11:54
	E. Beaver	E. Beaver
<u>COMBINED WITH CASTS 2,3+4 FOR ENOUGH QC VOLUME</u>		
Sediment Type, Color, Sediment Odor, Presence of Organisms, Evidence of Contamination (i.e. sandblast grit, oil droplets, wood waste, paint chips, etc), Material Removed Prior to Homogenizing and Approximate Quantity Removed		

SEDIMENT SAMPLE LOG

Project: 2020 City of Anacortes Outfall SamplingDate: 11/18Station Name: 7Sample Type: BACKGROUND
(Background, Grain Size)Time: 1136Sample ID: STEEL LABELSampling Method: GRAB
WILCOX SHIPERCast No.: 4

Elevation of Sample	
Water Depth (Lead Line)	- <u>27.0</u> ft
Predicted Tide (MLLW)	+ <u>8.0</u> ft
Mudline Elevation (MLLW)	= <u>-19.0</u> ft

Location of Sample	
WGS 1984	
Latitude	<u>48.524962</u>
Longitude	<u>-122.604771</u>
WA State Plane/WA North 4601/NAD83	
North	<u>560119</u> US survey feet
East	<u>121154</u> US survey feet

Grab Penetration Depth	
Depth of Grab Sampler	<u>4</u> "
Distance from Top of Sampler to Top of Sediment	- <u>1.5</u> <u>2.538</u> "
Grab Penetration	= <u>2.5</u> "

Sample Description:	
<u>SANDY SILT</u>	
<u>LIGHT BROWN</u>	
<u>SMALL SHELL FRAGMENTS</u>	
<u>NO ODOR</u>	
City of Anacortes Outfall Sampling	
COA_07_G_20201118	
11/18/2020	
11:36	
E. Beaver	

Sediment Type, Color, Sediment Odor, Presence of Organisms, Evidence of Contamination (i.e. sandblast grit, oil droplets, wood waste, paint chips, etc), Material Removed Prior to Homogenizing and Approximate Quantity Removed

SEDIMENT SAMPLE LOG

Project: 2020 City of Anacortes Outfall SamplingDate: 11/19Station Name: 8Sample Type: BACKGROUND
(Background, Grain Size)Time: 1112Sample ID: SIEVE LABELSampling Method: GRAB
WILD SHARKCast No.: 3

Elevation of Sample		
Water Depth	-	<u>36.6</u> ft
(Lead Line)		
Predicted Tide (MLLW)	+	<u>8.3</u> ft
Mudline Elevation (MLLW)	=	<u>-28.3</u> ft

Location of Sample		
WGS 1984		
Latitude	<u>48.522099</u>	
Longitude	<u>-122.604771</u>	

WA State Plane/WA North 4601/NAD83		
North	<u>560119</u>	US survey feet
East	<u>1211154</u>	US survey feet

Grab Penetration Depth		
Depth of Grab Sampler	<u>4</u>	"
Distance from Top of Sampler to		
Top of Sediment	-	<u>2</u> "
Grab Penetration	=	<u>2</u> "

Sample Description:	
<u>GRAY SAND</u>	
<u>SMALL FRAGMENT, SMALL</u>	
<u>3" WOOD WASTE CHUNK</u>	
<u>INVERTEBRATE</u>	
<u>NO ODOR</u>	
	City of Anacortes Outfall Sampling
	COA_08_G_20201119
	11/19/2020
	11:12
	E. Beaver
Sediment Type, Color, Sediment Odor, Presence of Organisms, Evidence of Contamination (i.e. sandblast grit, oil droplets, wood waste, paint chips, etc), Material Removed Prior to Homogenizing and Approximate Quantity Removed	

PROJECT: City of Anacortes	COORDINATES (NAD83): N559894 E1211163
LOCATION: SS-1	DEPTH TO MUDLINE: 18.2' from deck to mud, 4.7' from deck to water
BORING CONTRACTOR: DOF/Holt	Elevation (MLLW): -6.4 ft
BORING EQUIPMENT: Mobile B57 Tracked, 4.25" HSA, 140# auto hammer, 30" drop	DATE: 11/16/2020 START TIME: 1255 STOP TIME: 1530
SAMPLING VESSEL/COMPANY: Culbertson	TOTAL DEPTH OF BORING: 10 ft
SAMPLING METHOD: 2.5" ID x 24" california	LOGGED BY: D. Cooper
	RESPONSIBLE PROF.: D. Cooper REG. NO.: 1600

NOTES: Auger settled into soft bottom approx 1'

DEPTH (feet)	SAMPLES						
	Sample ID	Sample Length	Sample Depth below mudline (ft: from - to)	Blows/6 inch	Time	USCS Classification	
1	SS-1_1-3 Composite		1.0-3.0	2/5/5/12	13:25	ML	Black, wet, soft, SILT with shell fragments
2						ML	Gray, wet, stiff, plastic, SILT with coarse sand, trace gravel
3	SS-1_3-5 Composite		3.0-5.0	4/31/33/4	13:35		Gray, wet, very dense, silty, SAND with gravel (Glacially consolidated soils)
4							
5	SS-1_6.5-8.5 Composite		5.0-6.5	5/26/120	14:50		no recovery
6							
7						SM	Gray, wet, very dense, silty, SAND with gravel
8							
9	changed to 1.5" SPT		8.5-8.75	120 - 3"	15:30		3" shattered cobble in shoe
10							
			10	50-3"		SSTN	Grey, weathered, Meta Sandstone fragments - Refusal at 10'

Note: The summary log is an interpretation based on samples, drill action, and interpolation. Variations between what is shown and actual conditions should be anticipated.

PROJECT: City of Anacortes	COORDINATES (NAD83):	N 559997	E 1211163
LOCATION: SS-2	DEPTH TO MUDLINE: 23.3' from deck to mud, 4.6' from deck to water		
BORING CONTRACTOR: DOF/Holt	Elevation (MLLW):	-9.6 ft	
BORING EQUIPMENT: Mobile B57 Tracked 140# Auto Hammer, 4.25" HSA, 140# auto hammer	DATE: 11/18/2020	START TIME: 8:50	STOP TIME: 12:00
SAMPLING VESSEL/COMPANY: Culbertson	TOTAL DEPTH OF BORING: 18 ft		
SAMPLING METHOD: 2.5" ID x 24" california	LOGGED BY: D. Cooper		
NOTES: Auger settled into soft bottom approx 1.5'	RESPONSIBLE PROF.: D. Cooper	REG. NO.: 1600	

DEPTH (feet)	SAMPLES						
	Sample ID	Sample Length	Sample Depth below mudline (ft: from - to)	Blows/6 inch	Time	USCS Classification	
1	SS-2_1.5-3.5 Composite		1.5-3.5	8/16/21/21	9:15	ML	black, wet, soft, SILT with trace shell with woody debris, silt rip up clasts between 2.4' and 2.6'
2						CL	
3	SS-2_3.5-5.5 Composite		3.5-5.5	4/13/14/120-2"	9:25	CL	gray, wet, stiff, plastic, SILT with trace gravel
4						SP-SM	
5	SS-2_5.5-7.5 Composite		5.5-7.5	4/7/12/107	10:30	SP-SM	gray, wet, very dense, gravelly, silty, SAND (Glacially consolidated soils) 1/2" gravels and weathered minerals -Refusal at 5' (Glacial erratic?) - shifted to North 5 feet to continue drilling.
6						ML	
7	SS-2_7.5-9.5 Composite		7.5-9.5	4/109/42/92	10:45	ML	gray-tan mottled, wet, very dense, fine sandy, SILT, with trace gravels 1/2" gravels
8						ML	
9	change to 1.5" SPT		10-11.5	11/23/20		SP	gray, saturated, dense, fine to medium SAND silty sand interbed at 10.8' becomes oxidized orange
10						SP	
11			12.5-14	9/26/20/28			gray, wet, stiff, fine sandy SILT
12							
13			15-16.5	9/11/13			becomes very stiff
14							
15			17.5-17.9	50/5"		ML	
16						ML	
17							
18							
19							
20						SSTN	

Note: The summary log is an interpretation based on samples, drill action, and interpolation. Variations between what is shown and actual conditions should be anticipated.

PROJECT: City of Anacortes	COORDINATES (NAD83):	N560094	E1211163
LOCATION: SS-3	DEPTH TO MUDLINE: 28.0' from deck to mud, 4.7' from deck to water		
BORING CONTRACTOR: DOF/Holt	Elevation (MLLW):	-16.2	ft
BORING EQUIPMENT: Mobile B57 Tracked, 4.25" HSA, 140# auto hammer, 30" drop	11/18/2020	START TIME: 1350	STOP TIME: 1630
SAMPLING VESSEL/COMPANY: Culbertson	TOTAL DEPTH OF BORING: 16 ft		
SAMPLING METHOD: 2.5" ID x 24" california	LOGGED BY: D. Cooper		
	RESPONSIBLE PROF.: D. Cooper	REG. NO.: 1600	

NOTES: Auger settled into soft bottom approx 1'

DEPTH (feet)	SAMPLES						
	Sample ID	Sample Length	Sample Drive Depth below mudline (ft: from - to)	Blows/6 inch	Time	USCS Classification	
1	SS-3_1-3	1.0-3.0	1/1/5/7	14:20	SM	Dark gray, wet, soft, silty, fine to medium SAND with trace shell fragments	
2	Composite						
3	SS-3_3-5	3.0-5.0	8/39/64/89	14:30	SP	dark gray, saturated, dense, gravelly, SAND. Grades coarser	
4	Composite					gray, wet, very dense, gravelly, silty, SAND (Glacially consolidated soils)	
5	SS-3_5-7	5.0-7.0	42/76/82/104	14:40		gray, wet, very dense gravelly, silty, SAND	
6							
7	SS-3_7-9	7.0-9.0	48/455/75/72	14:50		gray, wet, very dense, gravelly, silty, SAND	
8	Composite					gravel >1"	
9							
10	changed to 1.5" SPT	10.0-11.5	9/16/20/29		SM		
11							
12							
13		12.5-13.0	50-5"			dark gray, saturated, very dense, gravelly SAND with silt. gravel > 2"	
14							
15		15.0-15.8	43/50-4"				
16							
	- Boring terminated at 16' due to darkness, End-of-day						

Note: The summary log is an interpretation based on samples, drill action, and interpolation. Variations between what is shown and actual conditions should be anticipated.



Grab from Station 1



Grab from Station 2



Grab from Station 3



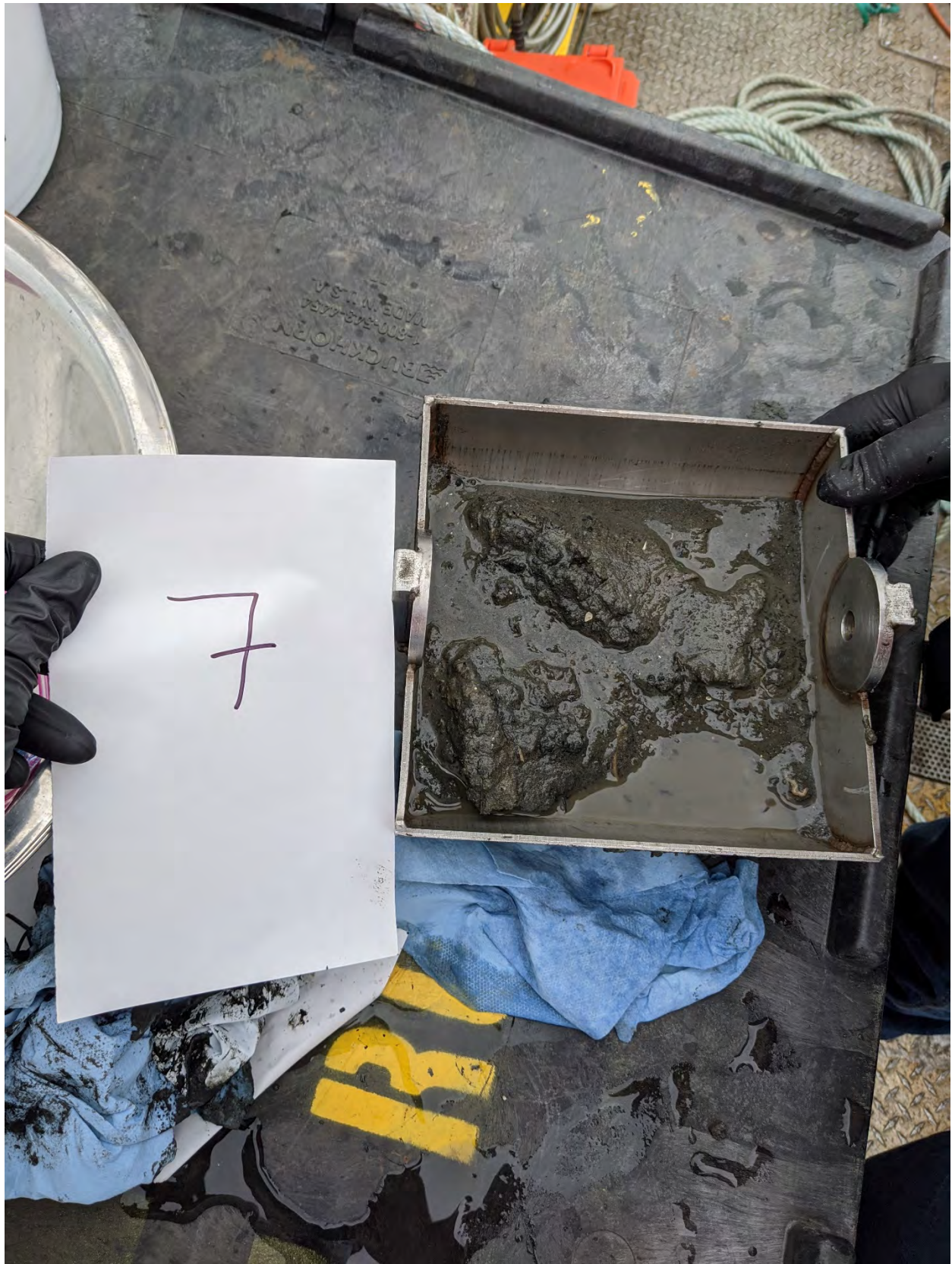
Grab from Station 4



Grab from Station 5



Grab from Station 6



Grab from Station 7



Grab from Station 8

Appendix C

Chain of Custody Forms and Raw Laboratory Data



Analytical Resources, Incorporated
Analytical Chemists and Consultants

26 March 2021

Ezra Beaver
Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue, WA 98007

RE: COA Outfall

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)
20K0364

Associated SDG ID(s)
N/A

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclose Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the requirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

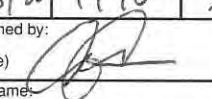
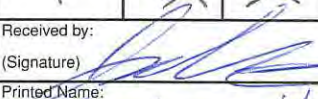
Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, Inc.

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.



Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: 20K0364		Turn-around Requested: NORMAL		Page: 1 of	
ARI Client Company: DOF		Phone: 206 660 3466		Date:	Ice Present? Yes
Client Contact: EZRA BEAVER / DAVE COOPER / ROB WEBB		No. of Coolers: 3		Cooler Temps: See CRF	
Client Project Name: COA OUTFALL				Analysis Requested	
Client Project #: COA-001		Samplers: D COOPER / A. CERRUTI		Notes/Comments	
Sample ID	Date	Time	Matrix	No. Containers	
COA-SS-1-1-3-20201116	11/16/20	1325	SOIL	7	
COA-SS-1-3-5-20201116	11/16/20	1335	SOIL	7	
COA-SS-1-6.5-8.5-20201116	11/16/20	1450	SOIL	7	
COA-SS-2-1.5-3.5-20201118	11/18/20	0915	SOIL	7	
COA-SS-2-3.5-5.5-20201118	11/18/20	0925	SOIL	7	
COA-SS-2-5.5-7.5-20201118	11/18/20	1030	SOIL	7	
COA-SS-2-7.5-9.5-20201118	11/18/20	1045	SOIL	7	
COA-SS-3-1-3-20201118	11/18/20	1420	SOIL	5	
COA-SS-3-3-5-20201118	11/18/20	1430	SOIL	7	
COA-SS-3-5-7-20201118	11/18/20	1440	SOIL	7	
Comments/Special Instructions • REFER TO DOF SAP FOR ANALYTICAL TABLES. • CONTACT EZRA BEAVER WITH QUESTIONS.		Relinquished by: (Signature)  Printed Name: ANTHONY CERRUTI Company: DOF Date & Time: 11/19/2020 1548		Received by: (Signature)  Printed Name: Jacob Walter Company: ARI Date & Time: 11/19/2020 1548	



Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)
www.arilabs.com

Limits of Liability: ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, notwithstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

ARI Assigned Number: 2060364		Turn-around Requested: NORMAL		Page: 2 of																									
ARI Client Company: DOF		Phone: 206 660 3466		Date:	Ice Present? Yes																								
Client Contact: EZRA BEAVER / DAVE COOPER / ROB WEBB				No. of Coolers: 3	Cooler Temps: see CRF																								
Client Project Name: COA OUTFALL				Analysis Requested																									
Client Project #: COA-001		Samplers: DCOOPER / A CERUTI		Notes/Comments																									
Sample ID	Date	Time	Matrix	No. Containers	SMS TABLE 3	SMS TABLE 4	DIOXINS/FURANS TABLE 5	ARCHIVE																					
COA_SS-3_7-9_20201118	11/18/2020	1450	SOIL	7	X	X	X	X AC.																					
Comments/Special Instructions		Relinquished by: (Signature) [Signature]		Received by: (Signature) [Signature]		Relinquished by: (Signature)		Received by: (Signature)																					
		Printed Name: ANTHONY CERUTI		Printed Name: Jacob Walke		Printed Name:		Printed Name:																					
		Company: DOF		Company: ARZ		Company:		Company:																					
		Date & Time: 11/19/2020 1548		Date & Time: 11/19/2020 1548		Date & Time:		Date & Time:																					

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:06

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
COA_SS-1_1-3_20201116	20K0364-01	Solid	16-Nov-2020 13:25	19-Nov-2020 15:48
COA_SS-1_3-5_20201116	20K0364-02	Solid	16-Nov-2020 13:35	19-Nov-2020 15:48
COA_SS-1_6.5-8.5_20201116	20K0364-03	Solid	16-Nov-2020 14:50	19-Nov-2020 15:48
COA_SS-2_1.5-3.5_20201118	20K0364-04	Solid	18-Nov-2020 09:15	19-Nov-2020 15:48
COA_SS-2_3.5-5.5_20201118	20K0364-05	Solid	18-Nov-2020 09:25	19-Nov-2020 15:48
COA_SS-2_5.5-7.5_20201118	20K0364-06	Solid	18-Nov-2020 10:30	19-Nov-2020 15:48
COA_SS-2_7.5-9.5_20201118	20K0364-07	Solid	18-Nov-2020 10:45	19-Nov-2020 15:48
COA_SS-3_1-3_20201118	20K0364-08	Solid	18-Nov-2020 14:20	19-Nov-2020 15:48
COA_SS-3_3-5_20201118	20K0364-09	Solid	18-Nov-2020 14:30	19-Nov-2020 15:48
COA_SS-3_5-7_20201118	20K0364-10	Solid	18-Nov-2020 14:40	19-Nov-2020 15:48
COA_SS-3_7-9_20201118	20K0364-11	Solid	18-Nov-2020 14:50	19-Nov-2020 15:48



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:06

Work Order Case Narrative

Sample receipt

Samples as listed on the preceding page were received 19-Nov-2020 15:48 under ARI work order 20K0364. For details regarding sample receipt, please refer to the Cooler Receipt Form.

Semivolatiles - EPA Method SW8270E

The samples were extracted and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements, with the exception of all associated "Q" flagged analytes which are out of control low in the CCAL and d5-Phenol is out of control high. All associated samples that contain analyte have been flagged with a "Q" qualifier.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits with the exception of surrogates flagged on the associated forms.

The method blank was clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

The matrix spike/matrix spike duplicate (MS/MSD) percent recoveries and relative percent difference (RPD) were within advisory control limits with the exception of analytes flagged on the associated forms.

The SRM is in control and was analyzed 17 minutes past the 12 hour QC period. All targets meet recovery limits-no corrective action taken.

Butyl Tin(s) - EPA Method SW8270E-SIM

The sample(s) were extracted and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

The SRM recoveries were within limits with the exception of analytes flagged on the associated form.

The matrix spike/matrix spike duplicate (MS/MSD) percent recoveries and relative percent difference (RPD) were within



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:06

advisory control limits.

Pesticides - EPA Method SW8081B

The sample(s) were extracted and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements with the exception of CCV6 for 2,4 DDT, DDT failed on CLP2 okay on CLP1, CCVD for DCBP which failed on CLP2 okay on CLP1 and CCVA for CCVE: 2,4DDT failed on CLP2 okay on CLP1.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

The SRM recoveries were within limits.

Semivolatiles - EPA Method SW8270E-SIM

The samples were extracted and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements, with the exception of all associated "Q" flagged analytes which are out of control low in the CCAL. All associated samples that contain analyte have been flagged with a "Q" qualifier.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blanks were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

The matrix spike/matrix spike duplicate (MS/MSD) percent recoveries and relative percent difference (RPD) were within advisory control limits.

The SRM recoveries were within limits.

PCB Aroclors - EPA Method SW8082A



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:06

The samples were extracted and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank was clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

The matrix spike/matrix spike duplicate (MS/MSD) percent recoveries and relative percent difference (RPD) were within advisory control limits.

The SRM recoveries were within limits.

Dioxin/Furans - EPA Method 1613

The samples were extracted and analyzed within the recommended holding times. Analysis was performed using an application specific column developed by Restek. The RTX-Dioxin2 column has unique isomer separation for the 2378-TCDF, eliminating the need for confirmation analysis.

The samples were re-extracted due to a missing SRM requirement. Both sets of data have been provided for your review.

Initial and continuing calibrations were within method requirements.

Labeled internal standard areas were within limits.

The cleanup surrogate percent recoveries were within control limits.

The method blank contains a reportable response for OCDD, HpCDF, 1,2,3,7,8-PeCDF and OCDF at or below the reporting limit. Associated detected results and QC have been flagged with "B" qualifiers. No further corrective action was taken.

The OPR (Ongoing Precision and Recovery) standard percent recoveries were within control limits.

The SRM recoveries were within limits.

The sample duplicate RPDs are outside of the advisory control limits for analytes flagged on the associated forms.

Total Metals - EPA Method 6020B and 7471

The samples were digested and analyzed within the recommended holding times with the exception of mercury which has been flagged with a "H" qualifier. The samples were originally analyzed in hold without an SRM and re-digested and analyzed with an SRM outside of holding.



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:06

Initial and continuing calibrations were within method requirements.

The method blanks were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

The reference material (SRM) percent recoveries were within control limits.

The matrix spike (MS) percent recoveries and the duplicate (DUP) relative percent difference (RPD) were within advisory control limits with the exception of analytes flagged on the associated forms.

Wet Chemistry

The samples were prepared and analyzed within the recommended holding times with the exception of analytes flagged with a "H" qualifier.

Initial and continuing calibrations were within method requirements.

The method blanks were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

The reference material (SRM) percent recoveries were within control limits.

The matrix spike (MS) percent recoveries and the duplicate (DUP) relative percent difference (RPD) were within advisory control limits.

Grainsize

The samples were submitted to Materials Testing & Consulting, Inc. (MTC) for grainsize analysis. The MTC report is included here in its entirety.



Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: DOF

Project Name: COA outfall

COC No(s): NA

Delivered by: Fed-Ex UPS Courier Hand Delivered Other: NA

Assigned ARI Job No: 20K0364

Tracking No: NA

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of the cooler? YES NO

Were custody papers included with the cooler? YES NO

Were custody papers properly filled out (ink, signed, etc.) YES NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry)

Time 1548

2.6 3.2 1.6

If cooler temperature is out of compliance fill out form 00070F

Temp Gun ID#: DOO 5206

Cooler Accepted by: JS Date: 11/19/2020 Time: 1548

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler? YES NO

What kind of packing material was used? ... Bubble Wrap Wet Ice Gel Packs Baggies Foam Block Paper Other: NA

Was sufficient ice used (if appropriate)? NA YES NO

How were bottles sealed in plastic bags? Individually Grouped Not

Did all bottles arrive in good condition (unbroken)? YES NO

Were all bottle labels complete and legible? YES NO

Did the number of containers listed on COC match with the number of containers received? YES NO

Did all bottle labels and tags agree with custody papers? YES NO

Were all bottles used correct for the requested analyses? YES NO

Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs) ... NA YES NO

Were all VOC vials free of air bubbles? NA YES NO

Was sufficient amount of sample sent in each bottle? YES NO

Date VOC Trip Blank was made at ARI: NA

Were the sample(s) split by ARI? NA YES Date/Time: Equipment: Split by:

Samples Logged by: SC Date: 11/23/2020 Time: 1426 Labels checked by: SC

**** Notify Project Manager of discrepancies or concerns ****

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC
<u>COA-SS-2-SC</u>			
<u>COA-SS-2-5.5-6.5-20200118</u>	<u>COA-SS-2-5.5-7.5-20201118</u>		

Additional Notes, Discrepancies, & Resolutions:

By: SC Date: 11/23/2020

Materials Testing & Consulting, Inc.

Geotechnical Engineering • Special Inspection • Materials Testing • Environmental Consulting



Project: COA Outfall (20K0364)
Project #: 20S038-25
Client : Analytical Resources, Inc.
Source: Multiple
MTC Sample#: Multiple

Date Received: November 24, 2020
Sampled By: Others
Date Reported: January 19, 2021
Tested By: B. Goble

CASE NARRATIVE

1. Seven samples were submitted for grain size analysis according to Puget Sound Estuary Protocol (PSEP) methodology.
2. The samples were run in a single batch and one sample from another job was chosen for triplicate analysis. The triplicate data is reported on the QA summary.
3. The data is provided in summary tables and plots.
4. There were no noted anomalies during this testing.

All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.

Reviewed by: _____

Materials Testing & Consulting, Inc.

Geotechnical Engineering • Special Inspection • Materials Testing • Environmental Consulting



Project: COA Outfall (20K0364)
Project #: 20S038-25
Date Received: November 24, 2020
Date Tested: January 11, 2021

Client: Analytical Resources, Inc.
Sampled by: Others
Tested by: B. Goble

Apparent Grain Size Distribution Summary Percent Finer Than Indicated Size

Sample No.	Gravel			Very Coarse Sand	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Silt				Clay	
Phi Size	-3	-2	-1	0	1	2	3	4	5	6	7	8	9	10
Sieve Size (microns)	3/8"	#4 (4750)	#10 (2000)	#18 (1000)	#35 (500)	#60 (250)	#120 (125)	#230 (63)	31.0	15.6	7.8	3.9	2.0	1.0
COA_05_G_20201119	100.0	100.0	99.0	97.3	95.6	92.6	71.9	46.0	33.0	22.2	17.1	14.1	9.8	4.0
	100.0	100.0	95.1	94.4	92.8	87.8	68.0	44.3	33.6	21.2	16.4	13.5	8.4	3.2
	100.0	100.0	99.8	99.3	96.7	93.0	70.8	42.7	31.2	22.1	17.2	13.9	8.8	2.8
COA SS-1 1-3 20201116	100.0	83.8	79.9	77.5	74.4	68.8	61.6	54.8	45.1	34.6	27.0	20.2	13.8	7.0
COA SS-1 3-5 20201116	100.0	88.8	84.0	80.3	75.9	69.7	58.7	50.2	40.7	30.6	22.6	15.7	10.8	5.3
COA SS-2 1.5-3.5 20201118	100.0	99.0	94.4	92.0	89.4	84.6	78.0	71.0	60.7	48.8	38.9	30.5	21.8	10.0
COA SS-2 3.5-5.5 20201118	100.0	96.4	93.0	90.0	85.8	80.1	71.2	64.9	55.0	45.5	35.4	26.8	16.7	8.8
COA SS-3 3-5 20201118	100.0	97.6	89.4	84.3	77.7	67.7	57.8	49.1	37.9	27.9	19.3	12.5	7.7	2.3
COA SS-3 5-7 20201118	100.0	90.2	78.8	74.5	70.0	63.0	54.7	46.5	36.9	26.6	17.3	10.2	4.8	1.9
COA SS-3 7-9 20201118	100.0	98.5	84.8	80.5	76.4	70.9	60.8	51.2	40.7	28.9	19.4	11.1	5.2	1.9

All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.

Reviewed by: E. Goble

Corporate ~ 777 Chrysler Drive • Burlington, WA 98233 • Phone (360) 755-1990 • Fax (360) 755-1980
Regional Offices: Olympia ~ 360.534.9777 Bellingham ~ 360.647.6061 Silverdale ~ 360.698.6787 Tukwila ~ 206.241.1974
 Visit our website: www.mtc-inc.net

Materials Testing & Consulting, Inc.

Geotechnical Engineering • Special Inspection • Materials Testing • Environmental Consulting



Project: COA Outfall (20K0364)
Project #: 20S038-25
Date Received: November 24, 2020
Date Tested: January 11, 2021

Client: Analytical Resources, Inc.
Sampled by: Others
Tested by: B. Goble

Apparent Grain Size Distribution Summary Percent Retained in Each Size Fraction

Sample No.	Gravel	Very Coarse Sand	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Coarse Silt	Medium Silt	Fine Silt	Very Fine Silt	Clay			Total Fines
Phi Size	< -1	-1 to 0	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	> 10	> 4
Sieve Size (microns)	> #10 (2000)	10-18 (2000-1000)	18-35 (1000-500)	35-60 (500-250)	60-120 (250-125)	120-230 (125-62)	62.5-31.0	31.0-15.6	15.6-7.8	7.8-3.9	3.9-2.0	2.0-1.0	<1.0	<230 (<62)
COA_05_G_20201119	1.0	1.7	1.8	3.0	20.7	25.9	13.0	10.8	5.1	3.1	4.3	5.7	4.0	46.0
	4.9	0.7	1.6	5.0	19.8	23.8	10.7	12.4	4.8	3.0	5.0	5.3	3.2	44.3
	0.2	0.5	2.5	3.7	22.2	28.0	11.6	9.0	5.0	3.2	5.1	6.0	2.8	42.7
COA SS-1 1-3 20201116	20.1	2.3	3.1	5.6	7.2	6.8	9.7	10.5	7.6	6.8	6.4	6.8	7.0	54.8
COA SS-1 3-5 20201116	16.0	3.7	4.5	6.2	11.0	8.5	9.5	10.1	8.0	6.9	4.9	5.5	5.3	50.2
COA SS-2 1.5-3.5 20201118	5.6	2.4	2.7	4.7	6.7	6.9	10.4	11.8	10.0	8.4	8.7	11.8	10.0	71.0
COA SS-2 3.5-5.5 20201118	7.0	3.0	4.3	5.7	8.9	6.2	10.0	9.4	10.1	8.6	10.1	7.9	8.8	64.9
COA SS-3 3-5 20201118	10.6	5.1	6.7	10.0	9.9	8.7	11.2	10.0	8.7	6.7	4.8	5.4	2.3	49.1
COA SS-3 5-7 20201118	21.2	4.3	4.6	7.0	8.3	8.2	9.6	10.3	9.3	7.1	5.4	2.9	1.9	46.5
COA SS-3 7-9 20201118	15.2	4.3	4.1	5.4	10.2	9.6	10.5	11.8	9.6	8.3	5.8	3.3	1.9	51.2

All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.

Reviewed by: _____

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Materials Testing & Consulting, Inc.

Geotechnical Engineering • Special Inspection • Materials Testing • Environmental Consulting



Project: COA Outfall (20K0364)
Project #: 20S038-25
Date Received: November 24, 2020
Date Tested: January 11, 2021

Client: Analytical Resources, Inc.
Sampled by: Others
Tested by: B. Goble

Relative Standard Deviation, By Phi Size

Sample ID	-3	-2	-1	0	1	2	3	4	5	6	7	8	9	10
COA_05_G_20201119	100.0	100.0	99.0	97.3	95.6	92.6	71.9	46.0	33.0	22.2	17.1	14.1	9.8	4.0
	100.0	100.0	95.1	94.4	92.8	87.8	68.0	44.3	33.6	21.2	16.4	13.5	8.4	3.2
	100.0	100.0	99.8	99.3	96.7	93.0	70.8	42.7	31.2	22.1	17.2	13.9	8.8	2.8
AVE	100.0	100.0	98.0	97.0	95.0	91.1	70.2	44.3	32.6	21.9	16.9	13.8	9.0	3.3
STDEV	0.0	0.0	2.1	2.0	1.6	2.3	1.6	1.3	1.0	0.4	0.3	0.3	0.6	0.5
%RSD	0.0	0.0	2.1	2.0	1.7	2.6	2.3	3.0	3.2	2.0	2.0	2.0	6.2	16.0

The Triplicate Applies To The Following Samples

Client ID	Date Sampled	Date Extracted	Date Complete	QA Ratio (95-105)	Data Qualifiers	Pipette Portion (5.0-25.0g)
COA_05_G_20201119	11/19/2020	1/4/2021	1/11/2021	100.9		9.0
	11/19/2020	1/4/2021	1/11/2021	103.7		10.6
	11/19/2020	1/4/2021	1/11/2021	100.1		7.5
COA SS-1 1-3 20201116	11/16/2020	1/4/2021	1/11/2021	102.5		15.4
COA SS-1 3-5 20201116	11/16/2020	1/4/2021	1/11/2021	101.7		17.6
COA SS-2 1.5-3.5 20201118	11/18/2020	1/4/2021	1/11/2021	102.6		15.4
COA SS-2 3.5-5.5 20201118	11/18/2020	1/4/2021	1/11/2021	101.6		20.8
COA SS-3 3-5 20201118	11/18/2020	1/4/2021	1/11/2021	103.6		17.4
COA SS-3 5-7 20201118	11/18/2020	1/4/2021	1/11/2021	103.0		16.9
COA SS-3 7-9 20201118	11/18/2020	1/4/2021	1/11/2021	102.0		16.6

All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.

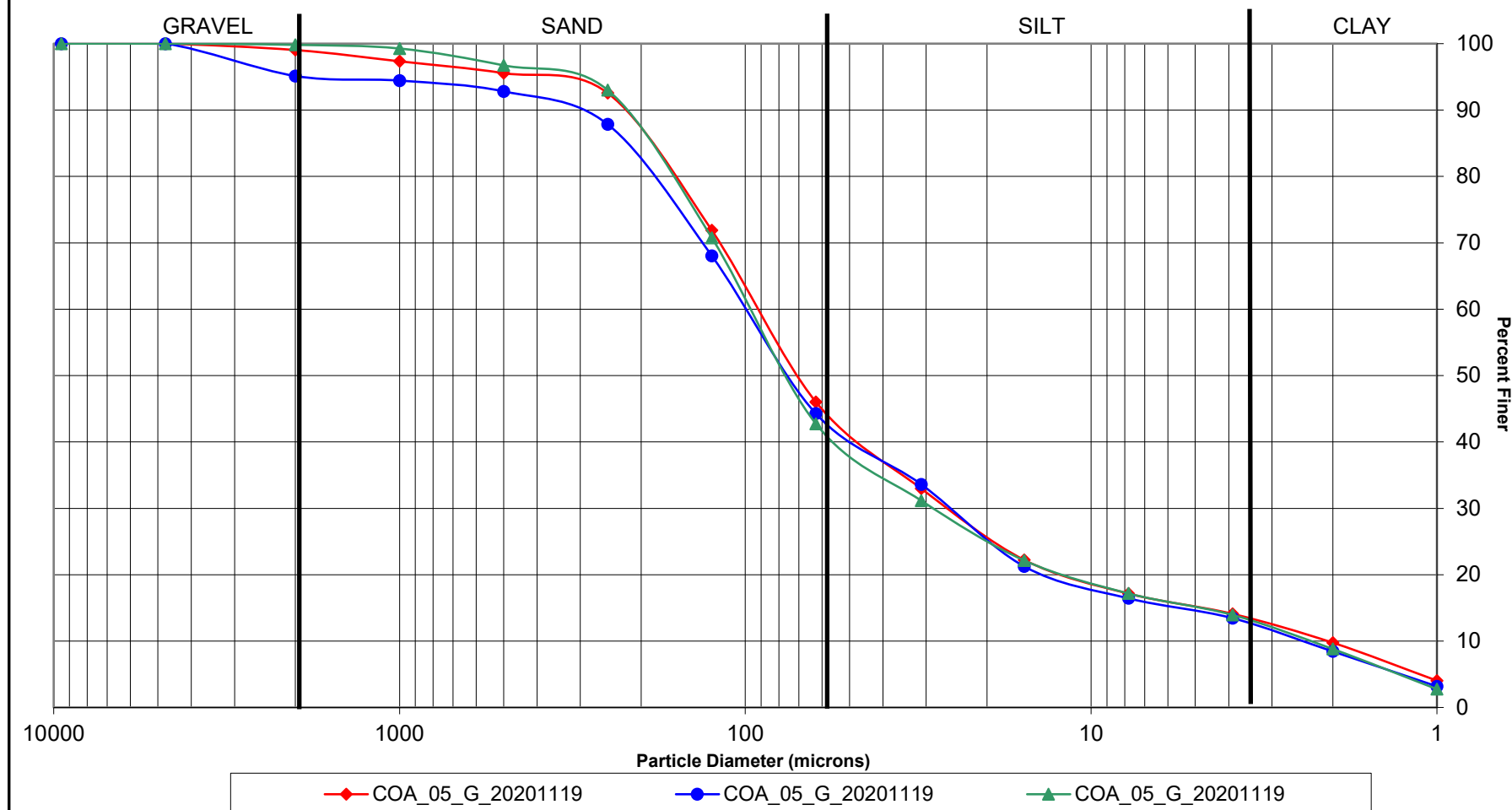
Reviewed by: E. Goble

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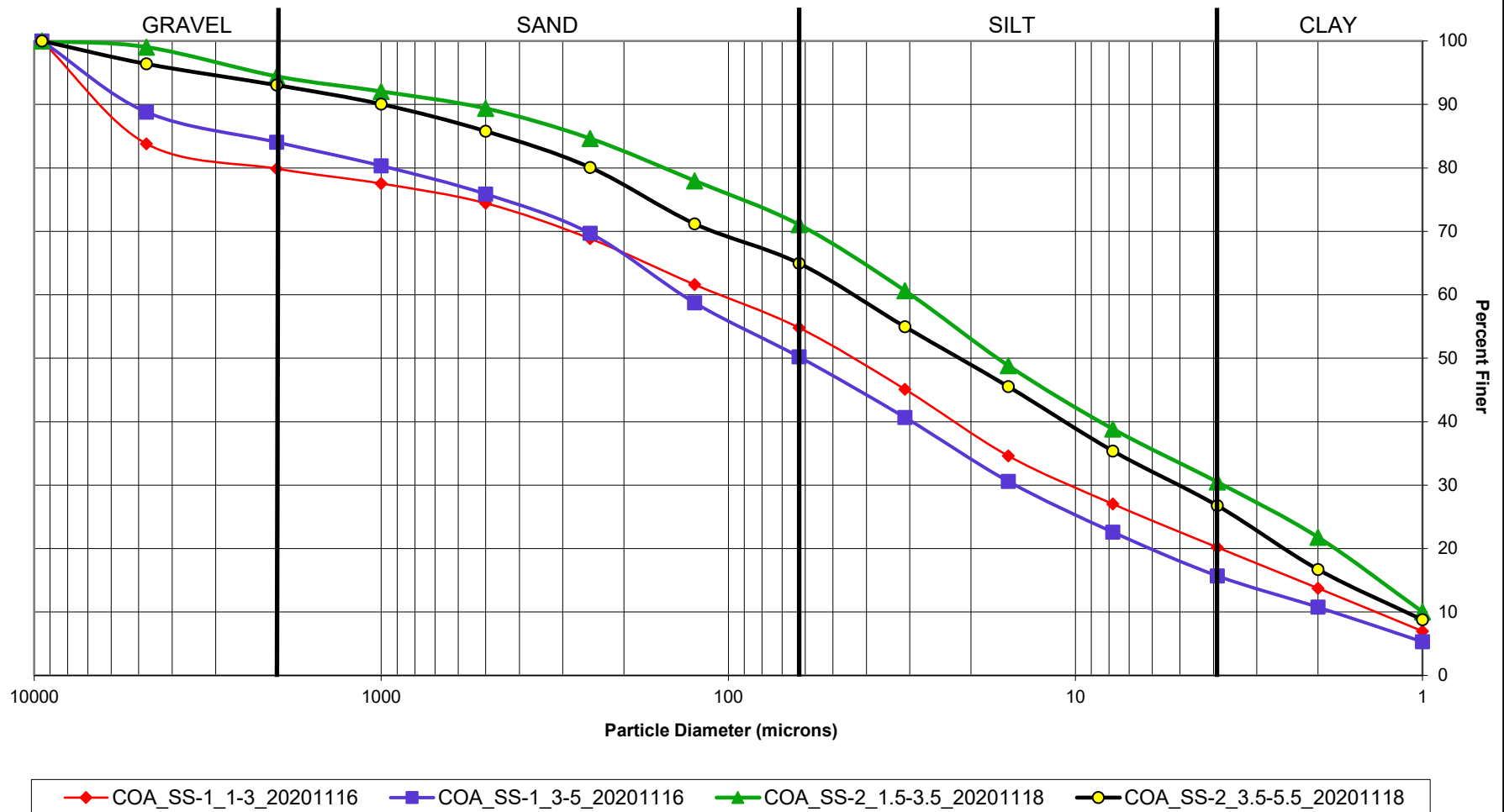


PSEP Grain Size Distribution

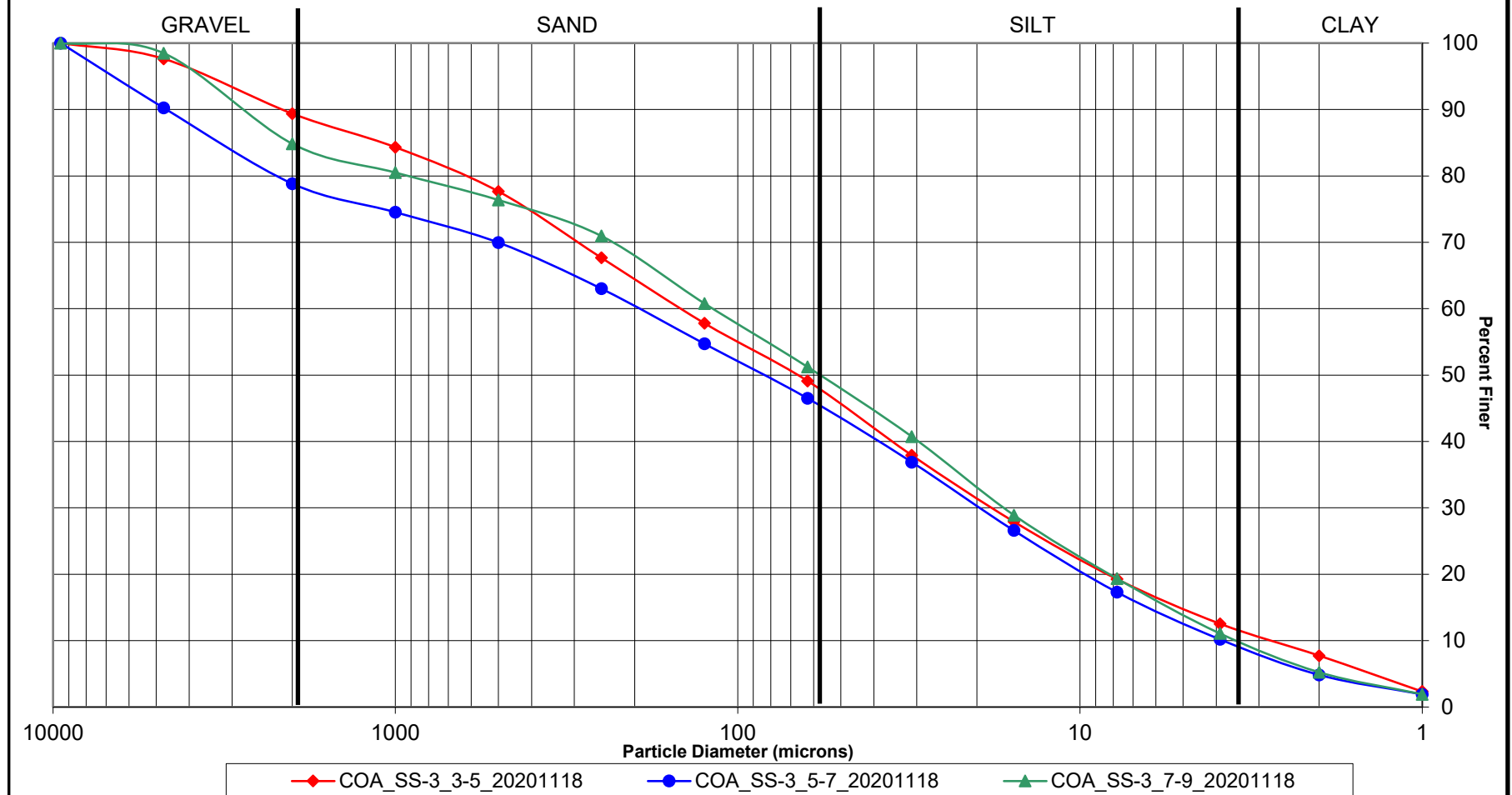
Triplicate Sample Plot



PSEP Grain Size Distribution



PSEP Grain Size Distribution





Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:06

COA_SS-1_1-3_20201116
20K0364-01 (Solid)

Semivolatile Organic Compounds

Method: EPA 8270E		Sampled: 11/16/2020 13:25	
Instrument: NT10 Analyst: VTS		Analyzed: 12/22/2020 17:31	
Sample Preparation:	Preparation Method: EPA 3546 (Microwave)	Extract ID: 20K0364-01 D 03	
	Preparation Batch: BIK0843	Dry Weight: 10.05 g	
	Prepared: 11/30/2020	% Solids: 77.72	
Sample Cleanup:	Cleanup Method: GPC	Extract ID: 20K0364-01 D 03	
	Cleanup Batch: CIL0220	Initial Volume: 1 uL	
	Cleaned: 16-Dec-2020	Final Volume: 1 uL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Phenol	108-95-2	1	8.2	19.9	ND	ug/kg	U
Benzyl Alcohol	100-51-6	1	14.8	19.9	ND	ug/kg	U
2-Methylphenol	95-48-7	1	7.8	19.9	ND	ug/kg	U
Hexachloroethane	67-72-1	1	5.6	19.9	ND	ug/kg	U
4-Methylphenol	106-44-5	1	14.6	19.9	ND	ug/kg	U
Naphthalene	91-20-3	1	5.2	19.9	34.5	ug/kg	
Benzoic acid	65-85-0	1	58.8	199	ND	ug/kg	U
2-Methylnaphthalene	91-57-6	1	5.6	19.9	8.3	ug/kg	J
Acenaphthylene	208-96-8	1	4.7	19.9	ND	ug/kg	U
Dimethylphthalate	131-11-3	1	6.4	19.9	ND	ug/kg	U
Acenaphthene	83-32-9	1	5.1	19.9	ND	ug/kg	U
Dibenzofuran	132-64-9	1	4.6	19.9	5.1	ug/kg	J
Fluorene	86-73-7	1	4.9	19.9	5.0	ug/kg	J
Diethyl phthalate	84-66-2	1	17.6	19.9	ND	ug/kg	U
N-Nitrosodiphenylamine	86-30-6	1	9.5	19.9	ND	ug/kg	U
Hexachlorobenzene	118-74-1	1	4.7	19.9	ND	ug/kg	U
Pentachlorophenol	87-86-5	1	31.1	99.5	ND	ug/kg	U
Phenanthrene	85-01-8	1	4.7	19.9	20.1	ug/kg	
Anthracene	120-12-7	1	5.9	19.9	6.1	ug/kg	J
Di-n-Butylphthalate	84-74-2	1	5.3	19.9	ND	ug/kg	U
Fluoranthene	206-44-0	1	4.5	19.9	34.2	ug/kg	
Pyrene	129-00-0	1	5.5	19.9	116	ug/kg	
Butylbenzylphthalate	85-68-7	1	8.0	19.9	ND	ug/kg	U
Benzo(a)anthracene	56-55-3	1	5.2	19.9	11.5	ug/kg	J
Chrysene	218-01-9	1	5.2	19.9	23.3	ug/kg	
bis(2-Ethylhexyl)phthalate	117-81-7	1	28.7	49.8	378	ug/kg	
Di-n-Octylphthalate	117-84-0	1	8.7	19.9	ND	ug/kg	U
Benzofluoranthenes, Total		1	10.2	39.8	42.0	ug/kg	
Benzo(a)pyrene	50-32-8	1	6.4	19.9	16.0	ug/kg	J
Indeno(1,2,3-cd)pyrene	193-39-5	1	6.0	19.9	10.1	ug/kg	J
Dibenzo(a,h)anthracene	53-70-3	1	6.1	19.9	ND	ug/kg	U
Benzo(g,h,i)perylene	191-24-2	1	5.8	19.9	13.6	ug/kg	J



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1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

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Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:06

COA_SS-1_1-3_20201116
20K0364-01 (Solid)

Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 11/16/2020 13:25

Instrument: NT10 Analyst: VTS

Analyzed: 12/22/2020 17:31

Analyte	CAS Number	Recovery	Recovery	Units	Notes
		Limits			
Surrogate: 2-Fluorophenol		27-120 %	69.5	%	
Surrogate: Phenol-d5		29-120 %	71.1	%	Q
Surrogate: 2-Chlorophenol-d4		31-120 %	74.2	%	
Surrogate: 1,2-Dichlorobenzene-d4		32-120 %	64.9	%	
Surrogate: Nitrobenzene-d5		30-120 %	83.2	%	
Surrogate: 2-Fluorobiphenyl		35-120 %	78.8	%	
Surrogate: 2,4,6-Tribromophenol		24-134 %	73.6	%	
Surrogate: p-Terphenyl-d14		37-120 %	86.6	%	



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Reported:
26-Mar-2021 16:06

COA_SS-1_1-3_20201116
20K0364-01 (Solid)

Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM		Sampled: 11/16/2020 13:25
Instrument: NT10 Analyst: VTS		Analyzed: 12/22/2020 17:31
Sample Preparation:	Preparation Method: EPA 3546 (Microwave) Preparation Batch: BIK0843 Prepared: 11/30/2020	Extract ID: 20K0364-01 D 03 Dry Weight: 10.05 g % Solids: 77.72
Sample Cleanup:	Cleanup Method: GPC Cleanup Batch: CIL0220 Cleaned: 16-Dec-2020	Initial Volume: 1 uL Final Volume: 1 uL Extract ID: 20K0364-01 D 03

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
1,4-Dichlorobenzene	106-46-7	1	0.6	5.0	ND	ug/kg	U
1,2-Dichlorobenzene	95-50-1	1	0.7	5.0	ND	ug/kg	U
2,4-Dimethylphenol	105-67-9	1	2.2	19.9	ND	ug/kg	U
1,2,4-Trichlorobenzene	120-82-1	1	2.7	5.0	ND	ug/kg	U
Hexachlorobutadiene	87-68-3	1	0.7	5.0	ND	ug/kg	U
Surrogate: 2-Fluorophenol				27-120 %	69.8	%	
Surrogate: p-Terphenyl-d14				37-120 %	79.2	%	



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Reported:
26-Mar-2021 16:06

COA_SS-1_1-3_20201116
20K0364-01 (Solid)

Butyl Tins

Method: EPA 8270E-SIM			Sampled: 11/16/2020 13:25
Instrument: NT8 Analyst: JZ			Analyzed: 12/17/2020 14:23
Sample Preparation:	Preparation Method: EPA 3546 (Microwave)		Extract ID: 20K0364-01 D 04 Dry Weight: 5.10 g % Solids: 77.72
	Preparation Batch: BIK0863	Sample Size: 6.56 g (wet)	
	Prepared: 11/30/2020	Final Volume: 0.5 mL	
Sample Cleanup:	Cleanup Method: Silica Gel		Extract ID: 20K0364-01 D 04
	Cleanup Batch: CIL0161	Initial Volume: 0.5 mL	
	Cleaned: 16-Dec-2020	Final Volume: 0.5 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Tributyltin Ion	36643-28-4	1	0.441	3.79	23.1	ug/kg	
Dibutyltin Ion	14488-53-0	1	1.70	5.67	6.23	ug/kg	
Butyltin Ion	78763-54-9	1	1.85	4.00	ND	ug/kg	U
Tetrabutyltin	1461-25-2	1	4.90	4.90	ND	ug/kg	U
Surrogate: Tripentyltin				30-160 %	103	%	
Surrogate: Tripropyltin				30-160 %	63.5	%	



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Reported:
26-Mar-2021 16:06

COA_SS-1_1-3_20201116
20K0364-01 (Solid)

Chlorinated Pesticides

Method: EPA 8081B		Sampled: 11/16/2020 13:25	
Instrument: ECD6 Analyst: YZ/VTs		Analyzed: 03/15/2021 17:06	
Sample Preparation:	Preparation Method: EPA 3546 (Microwave)	Extract ID: 20K0364-01 B 06	
	Preparation Batch: BJB0764	Dry Weight: 12.51 g	
	Prepared: 02/26/2021	% Solids: 77.72	
Sample Cleanup:	Cleanup Method: Silica Gel	Extract ID: 20K0364-01 B 06	
	Cleanup Batch: CJC0097	Initial Volume: 2.5 mL	
	Cleaned: 09-Mar-2021	Final Volume: 2.5 mL	
Sample Cleanup:	Cleanup Method: Sulfur	Extract ID: 20K0364-01 B 06	
	Cleanup Batch: CJC0096	Initial Volume: 2.5 mL	
	Cleaned: 09-Mar-2021	Final Volume: 2.5 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Heptachlor	76-44-8	1	0.05	0.50	ND	ug/kg	U
Aldrin	309-00-2	1	0.37	0.50	ND	ug/kg	U
trans-Chlordane (beta-Chlordane)	5103-74-2	1	0.33	0.50	ND	ug/kg	U
cis-Chlordane (alpha-chlordane)	5103-71-9	1	0.11	0.50	ND	ug/kg	U
4,4'-DDE	72-55-9	1	0.13	1.00	ND	ug/kg	U
Dieldrin	60-57-1	1	0.11	1.00	ND	ug/kg	U
4,4'-DDD	72-54-8	1	0.32	1.00	ND	ug/kg	U
4,4'-DDT	50-29-3	1	0.32	1.00	ND	ug/kg	U
Oxychlordane	27304-13-8	1	0.13	1.00	ND	ug/kg	U
cis-Nonachlor	5103-73-1	1	0.21	1.00	ND	ug/kg	U
trans-Nonachlor	39765-80-5	1	0.23	1.00	ND	ug/kg	U
Surrogate: Decachlorobiphenyl				30-160 %	89.6	%	
Surrogate: Decachlorobiphenyl [2C]				30-160 %	76.3	%	
Surrogate: Tetrachlorometaxylene				30-160 %	72.9	%	
Surrogate: Tetrachlorometaxylene [2C]				30-160 %	71.3	%	



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26-Mar-2021 16:06

COA_SS-1_1-3_20201116
20K0364-01 (Solid)

Aroclor PCB

Method: EPA 8082A		Sampled: 11/16/2020 13:25	
Instrument: ECD7 Analyst: JGR		Analyzed: 12/19/2020 15:52	
Sample Preparation:	Preparation Method: EPA 3546 (Microwave)	Extract ID: 20K0364-01 D 01	
	Preparation Batch: BIK0842	Dry Weight: 12.51 g	
	Prepared: 11/28/2020	% Solids: 77.72	
Sample Cleanup:	Cleanup Method: Silica Gel	Extract ID: 20K0364-01 D 01	
	Cleanup Batch: CIL0203	Initial Volume: 2.5 mL	
	Cleaned: 19-Dec-2020	Final Volume: 2.5 mL	
Sample Cleanup:	Cleanup Method: Sulfuric Acid	Extract ID: 20K0364-01 D 01	
	Cleanup Batch: CIL0201	Initial Volume: 2.5 mL	
	Cleaned: 19-Dec-2020	Final Volume: 2.5 mL	
Sample Cleanup:	Cleanup Method: Sulfur	Extract ID: 20K0364-01 D 01	
	Cleanup Batch: CIL0202	Initial Volume: 2.5 mL	
	Cleaned: 19-Dec-2020	Final Volume: 2.5 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Aroclor 1016	12674-11-2	1	1.6	4.0	ND	ug/kg	U
Aroclor 1221	11104-28-2	1	1.6	4.0	ND	ug/kg	U
Aroclor 1232	11141-16-5	1	1.6	4.0	ND	ug/kg	U
Aroclor 1242	53469-21-9	1	1.6	4.0	ND	ug/kg	U
Aroclor 1248	12672-29-6	1	1.6	4.0	ND	ug/kg	U
Aroclor 1254	11097-69-1	1	1.6	4.0	2.1	ug/kg	J
Aroclor 1260	11096-82-5	1	0.6	4.0	ND	ug/kg	U
Aroclor 1262	37324-23-5	1	0.6	4.0	ND	ug/kg	U
Aroclor 1268	11100-14-4	1	0.6	4.0	ND	ug/kg	U
Surrogate: Decachlorobiphenyl				40-126 %	80.9	%	
Surrogate: Tetrachlorometaxylene				44-120 %	81.4	%	
Surrogate: Decachlorobiphenyl [2C]				40-126 %	92.4	%	
Surrogate: Tetrachlorometaxylene [2C]				44-120 %	87.7	%	



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1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:06

COA_SS-1_1-3_20201116
20K0364-01 (Solid)

Dioxins/Furans

Method: EPA 1613B			Sampled: 11/16/2020 13:25		
Instrument: AUTOSPEC01 Analyst: pk			Analyzed: 12/07/2020 15:58		
Sample Preparation:	Preparation Method: EPA 1613			Extract ID: 20K0364-01 C 01	
	Preparation Batch: BIL0036	Sample Size: 12.93 g (wet)		Dry Weight: 10.04 g	
	Prepared: 12/03/2020	Final Volume: 20 uL		% Solids: 77.62	
Sample Cleanup:	Cleanup Method: Silica Gel			Extract ID: 20K0364-01 C 01	
	Cleanup Batch: CIL0058	Initial Volume: 20 mL			
	Cleaned: 05-Dec-2020	Final Volume: 20 mL			
Sample Cleanup:	Cleanup Method: Sulfuric Acid			Extract ID: 20K0364-01 C 01	
	Cleanup Batch: CIL0057	Initial Volume: 20 mL			
	Cleaned: 04-Dec-2020	Final Volume: 20 mL			
Sample Cleanup:	Cleanup Method: Florisil			Extract ID: 20K0364-01 C 01	
	Cleanup Batch: CIL0059	Initial Volume: 20 mL			
	Cleaned: 05-Dec-2020	Final Volume: 20 mL			

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting		Result	Units	Notes
				EDL	Limit			
2,3,7,8-TCDF		1.356	0.655-0.886	0.063	0.098	0.996	0.172	ng/kg EMPC, J
2,3,7,8-TCDD			0.655-0.886	0.139	0.085	0.996	ND	ng/kg U
1,2,3,7,8-PeCDF			1.318-1.783	0.149	0.118	0.996	ND	ng/kg U
2,3,4,7,8-PeCDF			1.318-1.783	0.149	0.112	0.996	ND	ng/kg U
1,2,3,7,8-PeCDD		1.273	1.318-1.783	0.179	0.107	0.996	0.198	ng/kg EMPC, J
1,2,3,4,7,8-HxCDF		1.717	1.054-1.426	0.139	0.069	0.996	0.115	ng/kg EMPC, J
1,2,3,6,7,8-HxCDF		1.345	1.054-1.426	0.179	0.068	0.996	0.121	ng/kg J
2,3,4,6,7,8-HxCDF			1.054-1.426	0.110	0.069	0.996	ND	ng/kg U
1,2,3,7,8,9-HxCDF			1.054-1.426	0.209	0.062	0.996	ND	ng/kg U
1,2,3,4,7,8-HxCDD		0.942	1.054-1.426	0.179	0.134	0.996	0.148	ng/kg EMPC, J
1,2,3,6,7,8-HxCDD		1.637	1.054-1.426	0.149	0.120	0.996	0.597	ng/kg EMPC, J
1,2,3,7,8,9-HxCDD		0.998	1.054-1.426	0.219	0.144	0.996	0.359	ng/kg EMPC, J
1,2,3,4,6,7,8-HpCDF		1.032	0.893-1.208	0.209	0.069	0.996	2.26	ng/kg
1,2,3,4,7,8,9-HpCDF		1.390	0.893-1.208	0.159	0.110	0.996	0.178	ng/kg EMPC, J
1,2,3,4,6,7,8-HpCDD		1.111	0.893-1.208	0.558	0.224	2.49	16.0	ng/kg
OCDF		1.017	0.757-1.024	1.10	0.290	2.49	9.39	ng/kg
OCDD		0.872	0.757-1.024	4.28	0.744	9.96	172	ng/kg B
Homologue groups								
Total TCDF						0.996	ND	ng/kg U
Total TCDD						0.996	0.172	ng/kg J
Total PeCDF						0.996	0.578	ng/kg J
Total PeCDD						0.996	0.119	ng/kg J
Total HxCDF						0.996	1.56	ng/kg
Total HxCDD						0.996	4.60	ng/kg
Total HpCDF						0.996	8.48	ng/kg
Total HpCDD						0.996	46.3	ng/kg B



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:06

COA_SS-1_1-3_20201116
20K0364-01 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/16/2020 13:25

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 12/07/2020 15:58

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting Limit	Result	Units	Notes
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC):				0.66			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC):				0.59			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, EMPC = ND):				0.49			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, EMPC = ND):				0.25			



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1420 - 156th Ave., NE STE C1
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Project Number: COA-001
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Reported:
26-Mar-2021 16:06

COA_SS-1_1-3_20201116
20K0364-01 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/16/2020 13:25

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 12/07/2020 15:58

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting Limit	Result	Units	Notes
Labeled compounds							
13C12-2,3,7,8-TCDF		0.787	0.655-0.886	24-169 %	81.1	%	
13C12-2,3,7,8-TCDD		0.796	0.655-0.886	25-164 %	81.3	%	
13C12-1,2,3,7,8-PeCDF		1.541	1.318-1.783	24-185 %	81.6	%	
13C12-2,3,4,7,8-PeCDF		1.559	1.318-1.783	21-178 %	76.5	%	
13C12-1,2,3,7,8-PeCDD		1.582	1.318-1.783	25-181 %	74.3	%	
13C12-1,2,3,4,7,8-HxCDF		0.498	0.434-0.587	26-152 %	87.4	%	
13C12-1,2,3,6,7,8-HxCDF		0.495	0.434-0.587	26-123 %	75.8	%	
13C12-2,3,4,6,7,8-HxCDF		0.509	0.434-0.587	28-136 %	80.1	%	
13C12-1,2,3,7,8,9-HxCDF		0.499	0.434-0.587	29-147 %	114	%	
13C12-1,2,3,4,7,8-HxCDD		1.265	1.054-1.426	32-141 %	88.3	%	
13C12-1,2,3,6,7,8-HxCDD		1.252	1.054-1.426	28-130 %	80.5	%	
13C12-1,2,3,4,6,7,8-HpCDF		0.413	0.374-0.506	28-143 %	69.4	%	
13C12-1,2,3,4,7,8,9-HpCDF		0.425	0.374-0.506	26-138 %	64.9	%	
13C12-1,2,3,4,6,7,8-HpCDD		1.088	0.893-1.208	23-140 %	71.5	%	
13C12-OCDD		0.996	0.757-1.024	17-157 %	55.5	%	
37Cl4-2,3,7,8-TCDD				35-197 %	89.1	%	



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Reported:
26-Mar-2021 16:06

COA_SS-1_1-3_20201116
20K0364-01 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/16/2020 13:25

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 12/07/2020 15:58

Analyte	DF/Split	Ion Ratio	Ratio Limits	EDL	Reporting	Result	Units	Notes
					Limit			



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
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Project: COA Outfall
Project Number: COA-001
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Reported:
26-Mar-2021 16:06

COA_SS-1_1-3_20201116
20K0364-01 (Solid)

Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 11/16/2020 13:25

Instrument: ICPMS1 Analyst: MCB

Analyzed: 03/24/2021 15:09

Sample Preparation:

Preparation Method: SWN EPA 3050B

Extract ID: 20K0364-01 F 01

Preparation Batch: BJC0564

Sample Size: 1.028 g (wet)

Dry Weight: 0.78 g

Prepared: 03/22/2021

Final Volume: 50 mL

% Solids: 75.68

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Antimony	7440-36-0	20	0.02	0.26	ND	mg/kg	U
Chromium	7440-47-3	20	0.17	0.64	62.0	mg/kg	
Lead	7439-92-1	20	0.09	0.13	5.01	mg/kg	
Silver	7440-22-4	20	0.02	0.26	0.10	mg/kg	J



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Reported:
26-Mar-2021 16:06

COA_SS-1_1-3_20201116
20K0364-01 (Solid)

Metals and Metallic Compounds

Method: EPA 6020B UCT-KED

Sampled: 11/16/2020 13:25

Instrument: ICPMS1 Analyst: MCB

Analyzed: 03/23/2021 20:42

Sample Preparation:

Preparation Method: SWN EPA 3050B

Extract ID: 20K0364-01 F 01

Preparation Batch: BJC0564

Sample Size: 1.028 g (wet)

Dry Weight: 0.78 g

Prepared: 03/22/2021

Final Volume: 50 mL

% Solids: 75.68

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	20	0.03	0.26	4.38	mg/kg	
Cadmium	7440-43-9	20	0.04	0.13	0.28	mg/kg	
Copper	7440-50-8	20	0.44	0.64	34.3	mg/kg	
Selenium	7782-49-2	20	0.57	0.64	0.92	mg/kg	
Zinc	7440-66-6	20	1.1	5.1	59.9	mg/kg	



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Reported:
26-Mar-2021 16:06

COA_SS-1_1-3_20201116
20K0364-01 (Solid)

Metals and Metallic Compounds

Method: EPA 7471B

Sampled: 11/16/2020 13:25

Instrument: HYDRA Analyst: BLC

Analyzed: 03/23/2021 12:01

Sample Preparation:

Preparation Method: SMM EPA 7471B

Extract ID: 20K0364-01 F

Preparation Batch: BJC0610

Sample Size: 0.255 g (wet)

Dry Weight: 0.19 g

Prepared: 03/23/2021

Final Volume: 50 mL

% Solids: 75.68

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.00544	0.0259	0.157	mg/kg	H



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Reported:
26-Mar-2021 16:06

COA_SS-1_1-3_20201116
20K0364-01 (Solid)

Wet Chemistry

Method: EPA 9060A m

Sampled: 11/16/2020 13:25

Instrument: TOC Cube Analyst: BF

Analyzed: 11/25/2020 22:41

Sample Preparation:

Preparation Method: PSEP 1986 (modified)

Extract ID: 20K0364-01 F

Preparation Batch: BIK0802

Sample Size: 0.5006 g (wet)

Dry Weight: 0.38 g

Prepared: 11/25/2020

Final Volume: 0.5006 mL

% Solids: 75.68

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Organic Carbon		1	0.02	0.02	0.35	%	



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Reported:
26-Mar-2021 16:06

COA_SS-1_1-3_20201116
20K0364-01 (Solid)

Wet Chemistry

Method: PSEP 1986
Instrument: BAL2 Analyst: UW

Sampled: 11/16/2020 13:25

Analyzed: 11/23/2020 17:50

Sample Preparation: Preparation Method: No Prep Wet Chem
Preparation Batch: BIK0734 Sample Size: 10 g (wet)
Prepared: 11/23/2020 Final Volume: 10 g

Extract ID: 20K0364-01

Dry Weight: 7.57 g

% Solids: 75.68

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Volatile Solids		1	0.01	0.01	2.50	%	

Sample Preparation: Preparation Method: No Prep Wet Chem
Preparation Batch: BIK0735 Sample Size: 5 g (wet)
Prepared: 11/23/2020 Final Volume: 5 g

Extract ID: 20K0364-01

Dry Weight: 3.78 g

% Solids: 75.68

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Solids, Sulfide		1	0.04	0.04	70.92	%	



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Reported:
26-Mar-2021 16:06

COA_SS-1_1-3_20201116
20K0364-01 (Solid)

Wet Chemistry

Method: SM 2540 G-97

Sampled: 11/16/2020 13:25

Instrument: BAL2 Analyst: UW

Analyzed: 11/23/2020 17:50

Sample Preparation:

Preparation Method: No Prep Wet Chem

Extract ID: 20K0364-01

Preparation Batch: BIK0734

Sample Size: 10 g (wet)

Dry Weight: 7.57 g

Prepared: 11/23/2020

Final Volume: 10 g

% Solids: 75.68

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Solids		1	0.04	0.04	75.68	%	



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Reported:
26-Mar-2021 16:06

COA_SS-1_1-3_20201116
20K0364-01 (Solid)

Wet Chemistry

Method: SM 4500-NH3 H-97

Sampled: 11/16/2020 13:25

Instrument: LACHAT2 Analyst: LRB

Analyzed: 11/30/2020 14:41

Sample Preparation:

Preparation Method: MSA 33.3 (2M KCl)

Extract ID: 20K0364-01 F

Preparation Batch: BIK0769

Sample Size: 4.17 g (wet)

Dry Weight: 3.16 g

Prepared: 11/24/2020

Final Volume: 40 mL

% Solids: 75.68

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Ammonia-N	7664-41-7	1	0.51	0.51	8.77	mg/kg NH3-N	H



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Project Number: COA-001
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Reported:
26-Mar-2021 16:06

COA_SS-1_1-3_20201116
20K0364-01 (Solid)

Wet Chemistry

Method: SM 4500-S2 D-00 (PSEP)
Instrument: UV1800-1 Analyst: CDE

Sampled: 11/16/2020 13:25
Analyzed: 12/03/2020 17:00

Sample Preparation: Preparation Method: PSEP 1986
Preparation Batch: BIK0743 Sample Size: 5.53 g (wet)
Prepared: 11/24/2020 Final Volume: 100 mL
Extract ID: 20K0364-01 G
Dry Weight: 3.92 g
% Solids: 70.92

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Sulfide	18496-25-8	20	25.5	25.5	158	mg/kg	H, D



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Project Number: COA-001
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Reported:
26-Mar-2021 16:06

COA_SS-1_1-3_20201116
20K0364-01 (Solid)

Extractions

Method: ASTM D2216	Sampled: 11/16/2020 13:25	
Instrument: N/A Analyst: NL	Analyzed: 11/26/2020 05:10	
Sample Preparation:	Preparation Method: No Prep-Organics	Extract ID: 20K0364-01
	Preparation Batch: BIK0789	Dry Weight: 0.76 g
	Prepared: 11/25/2020	% Solids: 75.68
	Sample Size: 1 g (wet)	
	Final Volume: 1 g	

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Total Solids		1	0.01	77.62	%	



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Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:06

COA_SS-1_1-3_20201116
20K0364-01 (Solid)

Extractions

Method: ASTM D2216

Sampled: 11/16/2020 13:25

Instrument: N/A Analyst: NL

Analyzed: 11/26/2020 05:10

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Labeled compounds						



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Project Number: COA-001
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Reported:
26-Mar-2021 16:06

COA_SS-1_1-3_20201116
20K0364-01 (Solid)

Geotechnical Methods

Method: PSEP-PS

Sampled: 11/16/2020 13:25

Instrument: MT&C Analyst:

Analyzed: 01/11/2021 00:00

Analysis by: Materials Testing & Consulting, Inc. (Olympia)

Sample Preparation: Preparation Method: No Prep Geo
Preparation Batch: B011121
Prepared: 01/11/2021

Extract ID: 20K0364-01

Final Volume:

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Phi Size <-1	GS_GRAVEL	1	0.1	20.1	%	
Phi Size -1 to 0	GS_VCS	1	0.1	2.3	%	
Phi Size 0 to 1	GS_CS	1	0.1	3.1	%	
Phi Size 1 to 2	GS_MS	1	0.1	5.6	%	
Phi Size 2 to 3	GS_FS	1	0.1	7.2	%	
Phi Size 3 to 4	GS_VFS	1	0.1	6.8	%	
Phi Size 4 to 5	GS_CSILT	1	0.1	9.7	%	
Phi Size 5 to 6	GS_MSILT	1	0.1	10.5	%	
Phi Size 6 to 7	GS_FSILT	1	0.1	7.6	%	
Phi Size 7 to 8	GS_VFSILT	1	0.1	6.8	%	
Phi Size 8 to 9	GS_CCLAY	1	0.1	6.4	%	
Phi Size 9 to 10	GS_MCLAY	1	0.1	6.8	%	
Phi Size >10	GS_FCLAY	1	0.1	7.0	%	
Total Fines	GS_TOTFINES	1	0.1	54.8	%	



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Reported:
26-Mar-2021 16:06

COA_SS-1_1-3_20201116
20K0364-01RE1 (Solid)

Dioxins/Furans

Method: EPA 1613B			Sampled: 11/16/2020 13:25		
Instrument: AUTOSPEC01 Analyst: pk			Analyzed: 03/02/2021 16:01		
Sample Preparation:	Preparation Method: EPA 1613			Extract ID: 20K0364-01RE1 C 02	
	Preparation Batch: BJB0531	Sample Size: 12.91 g (wet)		Dry Weight: 10.02 g	
	Prepared: 02/23/2021	Final Volume: 20 uL		% Solids: 77.62	
Sample Cleanup:	Cleanup Method: Silica Gel			Extract ID: 20K0364-01RE1 C 02	
	Cleanup Batch: CJB0177	Initial Volume: 20 mL			
	Cleaned: 25-Feb-2021	Final Volume: 20 mL			
Sample Cleanup:	Cleanup Method: Sulfuric Acid			Extract ID: 20K0364-01RE1 C 02	
	Cleanup Batch: CJB0176	Initial Volume: 20 mL			
	Cleaned: 24-Feb-2021	Final Volume: 20 mL			
Sample Cleanup:	Cleanup Method: Florisil			Extract ID: 20K0364-01RE1 C 02	
	Cleanup Batch: CJB0178	Initial Volume: 20 mL			
	Cleaned: 25-Feb-2021	Final Volume: 20 mL			

Analyte	DF/Split	Ion Ratio	Ratio Limits	EDL	Reporting		Result	Units	Notes
						Limit			
2,3,7,8-TCDF		0.663	0.655-0.886	0.058	0.075	0.998	0.410	ng/kg	J
2,3,7,8-TCDD		0.509	0.655-0.886	0.150	0.088	0.998	0.207	ng/kg	EMPC, J
1,2,3,7,8-PeCDF		0.732	1.318-1.783	0.240	0.113	0.998	0.199	ng/kg	EMPC, J, B
2,3,4,7,8-PeCDF			1.318-1.783	0.220	0.117	0.998	ND	ng/kg	U
1,2,3,7,8-PeCDD		1.487	1.318-1.783	0.170	0.126	0.998	0.375	ng/kg	J
1,2,3,4,7,8-HxCDF		0.777	1.054-1.426	0.279	0.096	0.998	0.305	ng/kg	EMPC, J
1,2,3,6,7,8-HxCDF		1.633	1.054-1.426	0.200	0.101	0.998	0.273	ng/kg	EMPC, J
2,3,4,6,7,8-HxCDF		2.122	1.054-1.426	0.170	0.096	0.998	0.171	ng/kg	EMPC, J
1,2,3,7,8,9-HxCDF			1.054-1.426	0.190	0.102	0.998	ND	ng/kg	U
1,2,3,4,7,8-HxCDD		1.112	1.054-1.426	0.170	0.131	0.998	0.362	ng/kg	J
1,2,3,6,7,8-HxCDD		1.126	1.054-1.426	0.180	0.130	0.998	1.51	ng/kg	
1,2,3,7,8,9-HxCDD		1.160	1.054-1.426	0.220	0.134	0.998	0.695	ng/kg	J
1,2,3,4,6,7,8-HpCDF		1.074	0.893-1.208	0.210	0.109	0.998	6.30	ng/kg	
1,2,3,4,7,8,9-HpCDF		1.618	0.893-1.208	0.240	0.132	0.998	0.335	ng/kg	EMPC, J
1,2,3,4,6,7,8-HpCDD		1.045	0.893-1.208	0.559	0.356	2.49	63.7	ng/kg	
OCDF		0.947	0.757-1.024	1.10	0.225	2.49	29.9	ng/kg	B
OCDD		0.877	0.757-1.024	4.59	0.408	9.98	664	ng/kg	B
Homologue groups									
Total TCDF						0.998	1.11	ng/kg	
Total TCDD						0.998	0.599	ng/kg	J
Total PeCDF						0.998	0.942	ng/kg	J
Total PeCDD						0.998	1.47	ng/kg	
Total HxCDF						0.998	4.26	ng/kg	
Total HxCDD						0.998	22.5	ng/kg	
Total HpCDF						0.998	25.4	ng/kg	B
Total HpCDD						0.998	349	ng/kg	



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Project: COA Outfall
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Reported:
26-Mar-2021 16:06

COA_SS-1_1-3_20201116
20K0364-01RE1 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/16/2020 13:25

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 03/02/2021 16:01

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting Limit	Result	Units	Notes
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC):				1.89			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC):				1.87			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, EMPC = ND):				1.75			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, EMPC = ND):				1.58			



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Reported:
26-Mar-2021 16:06

COA_SS-1_1-3_20201116
20K0364-01RE1 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/16/2020 13:25

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 03/02/2021 16:01

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting Limit	Result	Units	Notes
Labeled compounds							
13C12-2,3,7,8-TCDF		0.792	0.655-0.886	24-169 %	101	%	
13C12-2,3,7,8-TCDD		0.796	0.655-0.886	25-164 %	84.5	%	
13C12-1,2,3,7,8-PeCDF		1.516	1.318-1.783	24-185 %	90.0	%	
13C12-2,3,4,7,8-PeCDF		1.520	1.318-1.783	21-178 %	79.3	%	
13C12-1,2,3,7,8-PeCDD		1.632	1.318-1.783	25-181 %	65.9	%	
13C12-1,2,3,4,7,8-HxCDF		0.516	0.434-0.587	26-152 %	91.4	%	
13C12-1,2,3,6,7,8-HxCDF		0.512	0.434-0.587	26-123 %	87.1	%	
13C12-2,3,4,6,7,8-HxCDF		0.517	0.434-0.587	28-136 %	91.8	%	
13C12-1,2,3,7,8,9-HxCDF		0.508	0.434-0.587	29-147 %	88.9	%	
13C12-1,2,3,4,7,8-HxCDD		1.276	1.054-1.426	32-141 %	87.3	%	
13C12-1,2,3,6,7,8-HxCDD		1.225	1.054-1.426	28-130 %	82.4	%	
13C12-1,2,3,4,6,7,8-HpCDF		0.457	0.374-0.506	28-143 %	97.1	%	
13C12-1,2,3,4,7,8,9-HpCDF		0.438	0.374-0.506	26-138 %	101	%	
13C12-1,2,3,4,6,7,8-HpCDD		1.077	0.893-1.208	23-140 %	92.8	%	
13C12-OCDD		0.891	0.757-1.024	17-157 %	77.5	%	
37Cl4-2,3,7,8-TCDD				35-197 %	92.1	%	



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:06

COA_SS-1_3-5_20201116
20K0364-02 (Solid)

Semivolatile Organic Compounds

Method: EPA 8270E			Sampled: 11/16/2020 13:35	
Instrument: NT10 Analyst: VTS			Analyzed: 12/22/2020 18:09	
Sample Preparation:	Preparation Method: EPA 3546 (Microwave)	Sample Size: 11.33 g (wet)	Extract ID: 20K0364-02 D 03	
	Preparation Batch: BIK0843		Dry Weight: 10.05 g	
	Prepared: 11/30/2020		% Solids: 88.66	
Sample Cleanup:	Cleanup Method: GPC	Initial Volume: 1 uL	Extract ID: 20K0364-02 D 03	
	Cleanup Batch: CIL0220			
	Cleaned: 16-Dec-2020			

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Phenol	108-95-2	1	8.2	19.9	ND	ug/kg	U
Benzyl Alcohol	100-51-6	1	14.8	19.9	ND	ug/kg	U
2-Methylphenol	95-48-7	1	7.8	19.9	ND	ug/kg	U
Hexachloroethane	67-72-1	1	5.6	19.9	ND	ug/kg	U
4-Methylphenol	106-44-5	1	14.6	19.9	ND	ug/kg	U
Naphthalene	91-20-3	1	5.2	19.9	ND	ug/kg	U
Benzoic acid	65-85-0	1	58.8	199	ND	ug/kg	U
2-Methylnaphthalene	91-57-6	1	5.6	19.9	ND	ug/kg	U
Acenaphthylene	208-96-8	1	4.7	19.9	ND	ug/kg	U
Dimethylphthalate	131-11-3	1	6.4	19.9	ND	ug/kg	U
Acenaphthene	83-32-9	1	5.1	19.9	ND	ug/kg	U
Dibenzofuran	132-64-9	1	4.6	19.9	ND	ug/kg	U
Fluorene	86-73-7	1	4.9	19.9	ND	ug/kg	U
Diethyl phthalate	84-66-2	1	17.6	19.9	ND	ug/kg	U
N-Nitrosodiphenylamine	86-30-6	1	9.5	19.9	ND	ug/kg	U
Hexachlorobenzene	118-74-1	1	4.7	19.9	ND	ug/kg	U
Pentachlorophenol	87-86-5	1	31.2	99.6	ND	ug/kg	U
Phenanthrene	85-01-8	1	4.7	19.9	6.2	ug/kg	J
Anthracene	120-12-7	1	5.9	19.9	ND	ug/kg	U
Di-n-Butylphthalate	84-74-2	1	5.3	19.9	ND	ug/kg	U
Fluoranthene	206-44-0	1	4.5	19.9	ND	ug/kg	U
Pyrene	129-00-0	1	5.5	19.9	8.2	ug/kg	J
Butylbenzylphthalate	85-68-7	1	8.0	19.9	ND	ug/kg	U
Benzo(a)anthracene	56-55-3	1	5.2	19.9	ND	ug/kg	U
Chrysene	218-01-9	1	5.2	19.9	ND	ug/kg	U
bis(2-Ethylhexyl)phthalate	117-81-7	1	28.7	49.8	ND	ug/kg	U
Di-n-Octylphthalate	117-84-0	1	8.7	19.9	ND	ug/kg	U
Benzo(a)fluoranthene, Total		1	10.2	39.8	ND	ug/kg	U
Benzo(a)pyrene	50-32-8	1	6.5	19.9	ND	ug/kg	U
Indeno(1,2,3-cd)pyrene	193-39-5	1	6.0	19.9	ND	ug/kg	U
Dibenzo(a,h)anthracene	53-70-3	1	6.1	19.9	ND	ug/kg	U
Benzo(g,h,i)perylene	191-24-2	1	5.8	19.9	ND	ug/kg	U



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Reported:
26-Mar-2021 16:06

COA_SS-1_3-5_20201116
20K0364-02 (Solid)

Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 11/16/2020 13:35

Instrument: NT10 Analyst: VTS

Analyzed: 12/22/2020 18:09

Analyte	CAS Number	Recovery	Recovery	Units	Notes
		Limits			
Surrogate: 2-Fluorophenol		27-120 %	57.8	%	
Surrogate: Phenol-d5		29-120 %	72.1	%	Q
Surrogate: 2-Chlorophenol-d4		31-120 %	67.1	%	
Surrogate: 1,2-Dichlorobenzene-d4		32-120 %	70.5	%	
Surrogate: Nitrobenzene-d5		30-120 %	93.8	%	
Surrogate: 2-Fluorobiphenyl		35-120 %	85.4	%	
Surrogate: 2,4,6-Tribromophenol		24-134 %	35.9	%	
Surrogate: p-Terphenyl-d14		37-120 %	95.7	%	



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Reported:
26-Mar-2021 16:06

COA_SS-1_3-5_20201116
20K0364-02 (Solid)

Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM		Sampled: 11/16/2020 13:35
Instrument: NT10 Analyst: VTS		Analyzed: 12/22/2020 18:09
Sample Preparation:	Preparation Method: EPA 3546 (Microwave) Preparation Batch: BIK0843 Prepared: 11/30/2020	Extract ID: 20K0364-02 D 03 Dry Weight: 10.05 g % Solids: 88.66
Sample Cleanup:	Cleanup Method: GPC Cleanup Batch: CIL0220 Cleaned: 16-Dec-2020	Initial Volume: 1 uL Final Volume: 1 uL Extract ID: 20K0364-02 D 03

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
1,4-Dichlorobenzene	106-46-7	1	0.6	5.0	ND	ug/kg	U
1,2-Dichlorobenzene	95-50-1	1	0.7	5.0	ND	ug/kg	U
2,4-Dimethylphenol	105-67-9	1	2.2	19.9	ND	ug/kg	U
1,2,4-Trichlorobenzene	120-82-1	1	2.7	5.0	ND	ug/kg	U
Hexachlorobutadiene	87-68-3	1	0.7	5.0	ND	ug/kg	U
Surrogate: 2-Fluorophenol				27-120 %	60.8	%	
Surrogate: p-Terphenyl-d14				37-120 %	83.7	%	



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Reported:
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COA_SS-1_3-5_20201116
20K0364-02 (Solid)

Butyl Tins

Method: EPA 8270E-SIM			Sampled: 11/16/2020 13:35
Instrument: NT8 Analyst: JZ			Analyzed: 12/17/2020 14:39
Sample Preparation:	Preparation Method: EPA 3546 (Microwave)		Extract ID: 20K0364-02 D 04 Dry Weight: 5.05 g % Solids: 88.66
	Preparation Batch: BIK0863	Sample Size: 5.7 g (wet)	
	Prepared: 11/30/2020	Final Volume: 0.5 mL	
Sample Cleanup:	Cleanup Method: Silica Gel		Extract ID: 20K0364-02 D 04
	Cleanup Batch: CIL0161	Initial Volume: 0.5 mL	
	Cleaned: 16-Dec-2020	Final Volume: 0.5 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Tributyltin Ion	36643-28-4	1	0.445	3.82	4.92	ug/kg	
Dibutyltin Ion	14488-53-0	1	1.71	5.72	ND	ug/kg	U
Butyltin Ion	78763-54-9	1	1.87	4.04	ND	ug/kg	U
Tetrabutyltin	1461-25-2	1	4.95	4.95	ND	ug/kg	U
<i>Surrogate: Triphenyltin</i>				30-160 %	103	%	
<i>Surrogate: Tripropyltin</i>				30-160 %	74.1	%	



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COA_SS-1_3-5_20201116
20K0364-02 (Solid)

Chlorinated Pesticides

Method: EPA 8081B		Sampled: 11/16/2020 13:35	
Instrument: ECD6 Analyst: YZ/VTs		Analyzed: 03/15/2021 18:18	
Sample Preparation:	Preparation Method: EPA 3546 (Microwave)	Extract ID: 20K0364-02 B 06	
	Preparation Batch: BJB0764	Sample Size: 14.12 g (wet)	Dry Weight: 12.52 g
	Prepared: 02/26/2021	Final Volume: 2.5 mL	% Solids: 88.66
Sample Cleanup:	Cleanup Method: Silica Gel	Extract ID: 20K0364-02 B 06	
	Cleanup Batch: CJC0097	Initial Volume: 2.5 mL	
	Cleaned: 09-Mar-2021	Final Volume: 2.5 mL	
Sample Cleanup:	Cleanup Method: Sulfur	Extract ID: 20K0364-02 B 06	
	Cleanup Batch: CJC0096	Initial Volume: 2.5 mL	
	Cleaned: 09-Mar-2021	Final Volume: 2.5 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Heptachlor	76-44-8	1	0.05	0.50	ND	ug/kg	U
Aldrin	309-00-2	1	0.37	0.50	ND	ug/kg	U
trans-Chlordane (beta-Chlordane)	5103-74-2	1	0.33	0.50	ND	ug/kg	U
cis-Chlordane (alpha-chlordane)	5103-71-9	1	0.11	0.50	ND	ug/kg	U
4,4'-DDE	72-55-9	1	0.13	1.00	ND	ug/kg	U
Dieldrin	60-57-1	1	0.11	1.00	ND	ug/kg	U
4,4'-DDD	72-54-8	1	0.32	1.00	ND	ug/kg	U
4,4'-DDT	50-29-3	1	0.32	1.00	ND	ug/kg	U
Oxychlordane	27304-13-8	1	0.13	1.00	ND	ug/kg	U
cis-Nonachlor	5103-73-1	1	0.21	1.00	ND	ug/kg	U
trans-Nonachlor	39765-80-5	1	0.23	1.00	ND	ug/kg	U
Surrogate: Decachlorobiphenyl				30-160 %	65.3	%	
Surrogate: Decachlorobiphenyl [2C]				30-160 %	63.9	%	
Surrogate: Tetrachlorometaxylene				30-160 %	65.0	%	
Surrogate: Tetrachlorometaxylene [2C]				30-160 %	63.8	%	



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COA_SS-1_3-5_20201116
20K0364-02 (Solid)

Aroclor PCB

Method: EPA 8082A		Sampled: 11/16/2020 13:35	
Instrument: ECD7 Analyst: JGR		Analyzed: 12/19/2020 16:13	
Sample Preparation:	Preparation Method: EPA 3546 (Microwave)	Extract ID: 20K0364-02 D 01	
	Preparation Batch: BIK0842	Dry Weight: 12.52 g	
	Prepared: 11/28/2020	% Solids: 88.66	
Sample Cleanup:	Cleanup Method: Silica Gel	Extract ID: 20K0364-02 D 01	
	Cleanup Batch: CIL0203	Initial Volume: 2.5 mL	
	Cleaned: 19-Dec-2020	Final Volume: 2.5 mL	
Sample Cleanup:	Cleanup Method: Sulfuric Acid	Extract ID: 20K0364-02 D 01	
	Cleanup Batch: CIL0201	Initial Volume: 2.5 mL	
	Cleaned: 19-Dec-2020	Final Volume: 2.5 mL	
Sample Cleanup:	Cleanup Method: Sulfur	Extract ID: 20K0364-02 D 01	
	Cleanup Batch: CIL0202	Initial Volume: 2.5 mL	
	Cleaned: 19-Dec-2020	Final Volume: 2.5 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Aroclor 1016	12674-11-2	1	1.6	4.0	ND	ug/kg	U
Aroclor 1221	11104-28-2	1	1.6	4.0	ND	ug/kg	U
Aroclor 1232	11141-16-5	1	1.6	4.0	ND	ug/kg	U
Aroclor 1242	53469-21-9	1	1.6	4.0	ND	ug/kg	U
Aroclor 1248	12672-29-6	1	1.6	4.0	ND	ug/kg	U
Aroclor 1254	11097-69-1	1	1.6	4.0	ND	ug/kg	U
Aroclor 1260	11096-82-5	1	0.6	4.0	ND	ug/kg	U
Aroclor 1262	37324-23-5	1	0.6	4.0	ND	ug/kg	U
Aroclor 1268	11100-14-4	1	0.6	4.0	ND	ug/kg	U
Surrogate: Decachlorobiphenyl				40-126 %	76.4	%	
Surrogate: Tetrachlorometaxylene				44-120 %	77.1	%	
Surrogate: Decachlorobiphenyl [2C]				40-126 %	89.9	%	
Surrogate: Tetrachlorometaxylene [2C]				44-120 %	80.5	%	



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Reported:
26-Mar-2021 16:06

COA_SS-1_3-5_20201116
20K0364-02 (Solid)

Dioxins/Furans

Method: EPA 1613B			Sampled: 11/16/2020 13:35		
Instrument: AUTOSPEC01 Analyst: pk			Analyzed: 12/07/2020 16:48		
Sample Preparation:	Preparation Method: EPA 1613			Extract ID: 20K0364-02 C 01	
	Preparation Batch: BIL0036	Sample Size: 11.53 g (wet)		Dry Weight: 10.03 g	
	Prepared: 12/03/2020	Final Volume: 20 uL		% Solids: 86.96	
Sample Cleanup:	Cleanup Method: Silica Gel			Extract ID: 20K0364-02 C 01	
	Cleanup Batch: CIL0058	Initial Volume: 20 mL			
	Cleaned: 05-Dec-2020	Final Volume: 20 mL			
Sample Cleanup:	Cleanup Method: Sulfuric Acid			Extract ID: 20K0364-02 C 01	
	Cleanup Batch: CIL0057	Initial Volume: 20 mL			
	Cleaned: 04-Dec-2020	Final Volume: 20 mL			
Sample Cleanup:	Cleanup Method: Florisil			Extract ID: 20K0364-02 C 01	
	Cleanup Batch: CIL0059	Initial Volume: 20 mL			
	Cleaned: 05-Dec-2020	Final Volume: 20 mL			

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting		Result	Units	Notes
				EDL	Limit			
2,3,7,8-TCDF			0.655-0.886	0.063	0.101	0.997	ND	ng/kg U
2,3,7,8-TCDD			0.655-0.886	0.140	0.095	0.997	ND	ng/kg U
1,2,3,7,8-PeCDF			1.318-1.783	0.150	0.108	0.997	ND	ng/kg U
2,3,4,7,8-PeCDF			1.318-1.783	0.150	0.102	0.997	ND	ng/kg U
1,2,3,7,8-PeCDD			1.318-1.783	0.180	0.108	0.997	ND	ng/kg U
1,2,3,4,7,8-HxCDF			1.054-1.426	0.140	0.069	0.997	ND	ng/kg U
1,2,3,6,7,8-HxCDF			1.054-1.426	0.180	0.069	0.997	ND	ng/kg U
2,3,4,6,7,8-HxCDF			1.054-1.426	0.110	0.070	0.997	ND	ng/kg U
1,2,3,7,8,9-HxCDF			1.054-1.426	0.209	0.086	0.997	ND	ng/kg U
1,2,3,4,7,8-HxCDD			1.054-1.426	0.180	0.099	0.997	ND	ng/kg U
1,2,3,6,7,8-HxCDD			1.054-1.426	0.150	0.094	0.997	ND	ng/kg U
1,2,3,7,8,9-HxCDD			1.054-1.426	0.219	0.109	0.997	ND	ng/kg U
1,2,3,4,6,7,8-HpCDF		1.038	0.893-1.208	0.209	0.053	0.997	0.149	ng/kg J
1,2,3,4,7,8,9-HpCDF			0.893-1.208	0.160	0.077	0.997	ND	ng/kg U
1,2,3,4,6,7,8-HpCDD		1.066	0.893-1.208	0.559	0.109	2.49	1.12	ng/kg J
OCDF		0.832	0.757-1.024	1.10	0.175	2.49	0.693	ng/kg J
OCDD		0.783	0.757-1.024	4.29	0.237	9.97	15.0	ng/kg B
Homologue groups								
Total TCDF						0.997	ND	ng/kg U
Total TCDD						0.997	ND	ng/kg U
Total PeCDF						0.997	ND	ng/kg U
Total PeCDD						0.997	ND	ng/kg U
Total HxCDF						0.997	ND	ng/kg U
Total HxCDD						0.997	0.232	ng/kg J
Total HpCDF						0.997	0.149	ng/kg J
Total HpCDD						0.997	3.15	ng/kg B



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Reported:
26-Mar-2021 16:06

COA_SS-1_3-5_20201116
20K0364-02 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/16/2020 13:35

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 12/07/2020 16:48

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting Limit	Result	Units	Notes
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC):				0.17			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC):				0.02			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, EMPC = ND):				0.17			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, EMPC = ND):				0.02			



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COA_SS-1_3-5_20201116
20K0364-02 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/16/2020 13:35

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 12/07/2020 16:48

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting Limit	Result	Units	Notes
Labeled compounds							
13C12-2,3,7,8-TCDF		0.780	0.655-0.886	24-169 %	79.8	%	
13C12-2,3,7,8-TCDD		0.788	0.655-0.886	25-164 %	83.0	%	
13C12-1,2,3,7,8-PeCDF		1.579	1.318-1.783	24-185 %	77.4	%	
13C12-2,3,4,7,8-PeCDF		1.553	1.318-1.783	21-178 %	73.6	%	
13C12-1,2,3,7,8-PeCDD		1.673	1.318-1.783	25-181 %	71.6	%	
13C12-1,2,3,4,7,8-HxCDF		0.495	0.434-0.587	26-152 %	88.9	%	
13C12-1,2,3,6,7,8-HxCDF		0.499	0.434-0.587	26-123 %	77.2	%	
13C12-2,3,4,6,7,8-HxCDF		0.510	0.434-0.587	28-136 %	82.1	%	
13C12-1,2,3,7,8,9-HxCDF		0.464	0.434-0.587	29-147 %	89.5	%	
13C12-1,2,3,4,7,8-HxCDD		1.278	1.054-1.426	32-141 %	91.4	%	
13C12-1,2,3,6,7,8-HxCDD		1.372	1.054-1.426	28-130 %	81.6	%	
13C12-1,2,3,4,6,7,8-HpCDF		0.418	0.374-0.506	28-143 %	66.5	%	
13C12-1,2,3,4,7,8,9-HpCDF		0.421	0.374-0.506	26-138 %	66.7	%	
13C12-1,2,3,4,6,7,8-HpCDD		1.041	0.893-1.208	23-140 %	72.2	%	
13C12-OCDD		0.933	0.757-1.024	17-157 %	47.2	%	
37Cl4-2,3,7,8-TCDD				35-197 %	89.8	%	



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COA_SS-1_3-5_20201116
20K0364-02 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/16/2020 13:35

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 12/07/2020 16:48

Analyte	DF/Split	Ion Ratio	Ratio Limits	EDL	Reporting	Result	Units	Notes
					Limit			



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COA_SS-1_3-5_20201116
20K0364-02 (Solid)

Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 11/16/2020 13:35

Instrument: ICPMS1 Analyst: MCB

Analyzed: 03/24/2021 14:56

Sample Preparation:

Preparation Method: SWN EPA 3050B

Extract ID: 20K0364-02 F 01

Preparation Batch: BJC0564

Sample Size: 1.041 g (wet)

Dry Weight: 0.90 g

Prepared: 03/22/2021

Final Volume: 50 mL

% Solids: 86.55

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Antimony	7440-36-0	20	0.02	0.22	0.03	mg/kg	J
Chromium	7440-47-3	20	0.14	0.55	124	mg/kg	
Lead	7439-92-1	20	0.08	0.11	2.78	mg/kg	
Silver	7440-22-4	20	0.02	0.22	0.07	mg/kg	J



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:06

COA_SS-1_3-5_20201116
20K0364-02 (Solid)

Metals and Metallic Compounds

Method: EPA 6020B UCT-KED

Sampled: 11/16/2020 13:35

Instrument: ICPMS1 Analyst: MCB

Analyzed: 03/23/2021 20:29

Sample Preparation:

Preparation Method: SWN EPA 3050B

Extract ID: 20K0364-02 F 01

Preparation Batch: BJC0564

Sample Size: 1.041 g (wet)

Dry Weight: 0.90 g

Prepared: 03/22/2021

Final Volume: 50 mL

% Solids: 86.55

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	20	0.02	0.22	4.02	mg/kg	
Cadmium	7440-43-9	20	0.03	0.11	0.12	mg/kg	
Copper	7440-50-8	20	0.38	0.55	23.7	mg/kg	
Selenium	7782-49-2	20	0.49	0.55	0.68	mg/kg	
Zinc	7440-66-6	20	0.9	4.4	45.4	mg/kg	



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Reported:
26-Mar-2021 16:06

COA_SS-1_3-5_20201116
20K0364-02 (Solid)

Metals and Metallic Compounds

Method: EPA 7471B

Sampled: 11/16/2020 13:35

Instrument: HYDRA Analyst: BLC

Analyzed: 03/23/2021 12:13

Sample Preparation:

Preparation Method: SMM EPA 7471B

Extract ID: 20K0364-02 F

Preparation Batch: BJC0610

Sample Size: 0.243 g (wet)

Dry Weight: 0.21 g

Prepared: 03/23/2021

Final Volume: 50 mL

% Solids: 86.55

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.00499	0.0238	0.0347	mg/kg	H



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Reported:
26-Mar-2021 16:06

COA_SS-1_3-5_20201116
20K0364-02 (Solid)

Wet Chemistry

Method: EPA 9060A m

Sampled: 11/16/2020 13:35

Instrument: TOC Cube Analyst: BF

Analyzed: 11/25/2020 23:12

Sample Preparation:

Preparation Method: PSEP 1986 (modified)

Extract ID: 20K0364-02 F

Preparation Batch: BIK0802

Sample Size: 0.506 g (wet)

Dry Weight: 0.44 g

Prepared: 11/25/2020

Final Volume: 0.506 mL

% Solids: 86.55

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Organic Carbon		1	0.02	0.02	0.14	%	



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Reported:
26-Mar-2021 16:06

COA_SS-1_3-5_20201116
20K0364-02 (Solid)

Wet Chemistry

Method: PSEP 1986
Instrument: BAL2 Analyst: UW

Sampled: 11/16/2020 13:35

Analyzed: 11/23/2020 17:50

Sample Preparation: Preparation Method: No Prep Wet Chem
Preparation Batch: BIK0734 Sample Size: 5 g (wet)
Prepared: 11/23/2020 Final Volume: 5 g

Extract ID: 20K0364-02

Dry Weight: 4.33 g

% Solids: 86.55

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Volatile Solids		1	0.01	0.01	1.29	%	

Sample Preparation: Preparation Method: No Prep Wet Chem
Preparation Batch: BIK0735 Sample Size: 5 g (wet)
Prepared: 11/23/2020 Final Volume: 5 g

Extract ID: 20K0364-02

Dry Weight: 4.33 g

% Solids: 86.55

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Solids, Sulfide		1	0.04	0.04	79.75	%	



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Reported:
26-Mar-2021 16:06

COA_SS-1_3-5_20201116
20K0364-02 (Solid)

Wet Chemistry

Method: SM 2540 G-97

Sampled: 11/16/2020 13:35

Instrument: BAL2 Analyst: UW

Analyzed: 11/23/2020 17:50

Sample Preparation:

Preparation Method: No Prep Wet Chem

Extract ID: 20K0364-02

Preparation Batch: BIK0734

Sample Size: 5 g (wet)

Dry Weight: 4.33 g

Prepared: 11/23/2020

Final Volume: 5 g

% Solids: 86.55

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Solids		1	0.04	0.04	86.55	%	



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Reported:
26-Mar-2021 16:06

COA_SS-1_3-5_20201116
20K0364-02 (Solid)

Wet Chemistry

Method: SM 4500-NH3 H-97

Sampled: 11/16/2020 13:35

Instrument: LACHAT2 Analyst: LRB

Analyzed: 11/30/2020 14:42

Sample Preparation:

Preparation Method: MSA 33.3 (2M KCl)

Extract ID: 20K0364-02 F

Preparation Batch: BIK0769

Sample Size: 4.22 g (wet)

Dry Weight: 3.65 g

Prepared: 11/24/2020

Final Volume: 40 mL

% Solids: 86.55

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Ammonia-N	7664-41-7	1	0.44	0.44	2.27	mg/kg NH3-N	H



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Reported:
26-Mar-2021 16:06

COA_SS-1_3-5_20201116
20K0364-02 (Solid)

Wet Chemistry

Method: SM 4500-S2 D-00 (PSEP)

Sampled: 11/16/2020 13:35

Instrument: UV1800-1 Analyst: CDE

Analyzed: 12/03/2020 16:59

Sample Preparation:

Preparation Method: PSEP 1986

Extract ID: 20K0364-02 G

Preparation Batch: BIK0743

Sample Size: 5.268 g (wet)

Dry Weight: 4.20 g

Prepared: 11/24/2020

Final Volume: 100 mL

% Solids: 79.75

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Sulfide	18496-25-8	1	1.19	1.19	ND	mg/kg	H, U



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Reported:
26-Mar-2021 16:06

COA_SS-1_3-5_20201116
20K0364-02 (Solid)

Extractions

Method: ASTM D2216	Sampled: 11/16/2020 13:35	
Instrument: N/A Analyst: NL	Analyzed: 11/26/2020 05:10	
Sample Preparation:	Preparation Method: No Prep-Organics	Extract ID: 20K0364-02
	Preparation Batch: BIK0789	Dry Weight: 0.87 g
	Prepared: 11/25/2020	% Solids: 86.55
	Sample Size: 1 g (wet)	
	Final Volume: 1 g	

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Total Solids		1	0.01	86.96	%	



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Reported:
26-Mar-2021 16:06

COA_SS-1_3-5_20201116
20K0364-02 (Solid)

Extractions

Method: ASTM D2216

Sampled: 11/16/2020 13:35

Instrument: N/A Analyst: NL

Analyzed: 11/26/2020 05:10

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Labeled compounds						



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Reported:
26-Mar-2021 16:06

COA_SS-1_3-5_20201116
20K0364-02 (Solid)

Geotechnical Methods

Method: PSEP-PS

Sampled: 11/16/2020 13:35

Instrument: MT&C Analyst:

Analyzed: 01/11/2021 00:00

Analysis by: Materials Testing & Consulting, Inc. (Olympia)

Sample Preparation: Preparation Method: No Prep Geo
Preparation Batch: B011121
Prepared: 01/11/2021

Extract ID: 20K0364-02

Final Volume:

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Phi Size <-1	GS_GRAVEL	1	0.1	16.0	%	
Phi Size -1 to 0	GS_VCS	1	0.1	3.7	%	
Phi Size 0 to 1	GS_CS	1	0.1	4.5	%	
Phi Size 1 to 2	GS_MS	1	0.1	6.2	%	
Phi Size 2 to 3	GS_FS	1	0.1	11.0	%	
Phi Size 3 to 4	GS_VFS	1	0.1	8.5	%	
Phi Size 4 to 5	GS_CSILT	1	0.1	9.5	%	
Phi Size 5 to 6	GS_MSILT	1	0.1	10.1	%	
Phi Size 6 to 7	GS_FSILT	1	0.1	8.0	%	
Phi Size 7 to 8	GS_VFSILT	1	0.1	6.9	%	
Phi Size 8 to 9	GS_CCLAY	1	0.1	4.9	%	
Phi Size 9 to 10	GS_MCLAY	1	0.1	5.5	%	
Phi Size >10	GS_FCLAY	1	0.1	5.3	%	
Total Fines	GS_TOTFINES	1	0.1	50.2	%	



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Reported:
26-Mar-2021 16:06

COA_SS-1_3-5_20201116
20K0364-02RE1 (Solid)

Dioxins/Furans

Method: EPA 1613B		Sampled: 11/16/2020 13:35	
Instrument: AUTOSPEC01 Analyst: pk		Analyzed: 03/02/2021 16:51	
Sample Preparation:	Preparation Method: EPA 1613	Extract ID: 20K0364-02RE1 C 02	
	Preparation Batch: BJB0531	Dry Weight: 10.02 g	
	Prepared: 02/23/2021	% Solids: 86.96	
Sample Cleanup:	Cleanup Method: Silica Gel	Extract ID: 20K0364-02RE1 C 02	
	Cleanup Batch: CJB0177	Initial Volume: 20 mL	
	Cleaned: 25-Feb-2021	Final Volume: 20 mL	
Sample Cleanup:	Cleanup Method: Sulfuric Acid	Extract ID: 20K0364-02RE1 C 02	
	Cleanup Batch: CJB0176	Initial Volume: 20 mL	
	Cleaned: 24-Feb-2021	Final Volume: 20 mL	
Sample Cleanup:	Cleanup Method: Florisil	Extract ID: 20K0364-02RE1 C 02	
	Cleanup Batch: CJB0178	Initial Volume: 20 mL	
	Cleaned: 25-Feb-2021	Final Volume: 20 mL	

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting		Result	Units	Notes
				EDL	Limit			
2,3,7,8-TCDF			0.655-0.886	0.058	0.090	0.998	ND	ng/kg U
2,3,7,8-TCDD			0.655-0.886	0.150	0.107	0.998	ND	ng/kg U
1,2,3,7,8-PeCDF			1.318-1.783	0.240	0.095	0.998	ND	ng/kg U
2,3,4,7,8-PeCDF			1.318-1.783	0.220	0.086	0.998	ND	ng/kg U
1,2,3,7,8-PeCDD			1.318-1.783	0.170	0.130	0.998	ND	ng/kg U
1,2,3,4,7,8-HxCDF			1.054-1.426	0.280	0.088	0.998	ND	ng/kg U
1,2,3,6,7,8-HxCDF			1.054-1.426	0.200	0.089	0.998	ND	ng/kg U
2,3,4,6,7,8-HxCDF			1.054-1.426	0.170	0.085	0.998	ND	ng/kg U
1,2,3,7,8,9-HxCDF			1.054-1.426	0.190	0.106	0.998	ND	ng/kg U
1,2,3,4,7,8-HxCDD			1.054-1.426	0.170	0.108	0.998	ND	ng/kg U
1,2,3,6,7,8-HxCDD			1.054-1.426	0.180	0.101	0.998	ND	ng/kg U
1,2,3,7,8,9-HxCDD			1.054-1.426	0.220	0.107	0.998	ND	ng/kg U
1,2,3,4,6,7,8-HpCDF		1.808	0.893-1.208	0.210	0.094	0.998	0.160	ng/kg EMPC, J
1,2,3,4,7,8,9-HpCDF			0.893-1.208	0.240	0.123	0.998	ND	ng/kg U
1,2,3,4,6,7,8-HpCDD		0.808	0.893-1.208	0.559	0.126	2.50	1.38	ng/kg EMPC, J
OCDF		1.202	0.757-1.024	1.10	0.230	2.50	1.28	ng/kg EMPC, J, B
OCDD		0.826	0.757-1.024	4.59	0.227	9.98	12.0	ng/kg B
Homologue groups								
Total TCDF						0.998	ND	ng/kg U
Total TCDD						0.998	ND	ng/kg U
Total PeCDF						0.998	ND	ng/kg U
Total PeCDD						0.998	ND	ng/kg U
Total HxCDF						0.998	ND	ng/kg U
Total HxCDD						0.998	ND	ng/kg U
Total HpCDF						0.998	ND	ng/kg U
Total HpCDD						0.998	2.49	ng/kg



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Reported:
26-Mar-2021 16:06

COA_SS-1_3-5_20201116
20K0364-02RE1 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/16/2020 13:35

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 03/02/2021 16:51

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting Limit	Result	Units	Notes
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC):				0.19			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC):				0.02			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, EMPC = ND):				0.18			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, EMPC = ND):				0.00			



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Reported:
26-Mar-2021 16:06

COA_SS-1_3-5_20201116
20K0364-02RE1 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/16/2020 13:35

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 03/02/2021 16:51

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting Limit	Result	Units	Notes
Labeled compounds							
13C12-2,3,7,8-TCDF		0.775	0.655-0.886	24-169 %	92.1	%	
13C12-2,3,7,8-TCDD		0.797	0.655-0.886	25-164 %	81.7	%	
13C12-1,2,3,7,8-PeCDF		1.515	1.318-1.783	24-185 %	74.5	%	
13C12-2,3,4,7,8-PeCDF		1.493	1.318-1.783	21-178 %	76.1	%	
13C12-1,2,3,7,8-PeCDD		1.649	1.318-1.783	25-181 %	72.9	%	
13C12-1,2,3,4,7,8-HxCDF		0.510	0.434-0.587	26-152 %	92.4	%	
13C12-1,2,3,6,7,8-HxCDF		0.514	0.434-0.587	26-123 %	88.6	%	
13C12-2,3,4,6,7,8-HxCDF		0.514	0.434-0.587	28-136 %	91.0	%	
13C12-1,2,3,7,8,9-HxCDF		0.520	0.434-0.587	29-147 %	88.9	%	
13C12-1,2,3,4,7,8-HxCDD		1.291	1.054-1.426	32-141 %	87.7	%	
13C12-1,2,3,6,7,8-HxCDD		1.264	1.054-1.426	28-130 %	81.0	%	
13C12-1,2,3,4,6,7,8-HpCDF		0.440	0.374-0.506	28-143 %	84.1	%	
13C12-1,2,3,4,7,8,9-HpCDF		0.433	0.374-0.506	26-138 %	85.0	%	
13C12-1,2,3,4,6,7,8-HpCDD		1.077	0.893-1.208	23-140 %	86.2	%	
13C12-OCDD		0.941	0.757-1.024	17-157 %	67.5	%	
37Cl4-2,3,7,8-TCDD				35-197 %	87.7	%	



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Reported:
26-Mar-2021 16:06

COA_SS-2_1.5-3.5_20201118
20K0364-04 (Solid)

Semivolatile Organic Compounds

Method: EPA 8270E			Sampled: 11/18/2020 09:15	
Instrument: NT10 Analyst: VTS			Analyzed: 12/22/2020 18:47	
Sample Preparation:	Preparation Method: EPA 3546 (Microwave)	Sample Size: 12.78 g (wet)	Extract ID: 20K0364-04 D 03	
	Preparation Batch: BIK0843		Dry Weight: 10.08 g	
	Prepared: 11/30/2020		% Solids: 78.86	
Sample Cleanup:	Cleanup Method: GPC	Initial Volume: 1 uL	Extract ID: 20K0364-04 D 03	
	Cleanup Batch: CIL0220			
	Cleaned: 16-Dec-2020			

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Phenol	108-95-2	1	8.2	19.8	ND	ug/kg	U
Benzyl Alcohol	100-51-6	1	14.8	19.8	ND	ug/kg	U
2-Methylphenol	95-48-7	1	7.8	19.8	ND	ug/kg	U
Hexachloroethane	67-72-1	1	5.6	19.8	ND	ug/kg	U
4-Methylphenol	106-44-5	1	14.6	19.8	ND	ug/kg	U
Naphthalene	91-20-3	1	5.2	19.8	6.4	ug/kg	J
Benzoic acid	65-85-0	1	58.6	198	ND	ug/kg	U
2-Methylnaphthalene	91-57-6	1	5.6	19.8	ND	ug/kg	U
Acenaphthylene	208-96-8	1	4.7	19.8	ND	ug/kg	U
Dimethylphthalate	131-11-3	1	6.4	19.8	ND	ug/kg	U
Acenaphthene	83-32-9	1	5.1	19.8	ND	ug/kg	U
Dibenzofuran	132-64-9	1	4.6	19.8	ND	ug/kg	U
Fluorene	86-73-7	1	4.9	19.8	ND	ug/kg	U
Diethyl phthalate	84-66-2	1	17.6	19.8	25.9	ug/kg	
N-Nitrosodiphenylamine	86-30-6	1	9.5	19.8	ND	ug/kg	U
Hexachlorobenzene	118-74-1	1	4.7	19.8	ND	ug/kg	U
Pentachlorophenol	87-86-5	1	31.1	99.2	ND	ug/kg	U
Phenanthrene	85-01-8	1	4.7	19.8	12.3	ug/kg	J
Anthracene	120-12-7	1	5.9	19.8	ND	ug/kg	U
Di-n-Butylphthalate	84-74-2	1	5.3	19.8	ND	ug/kg	U
Fluoranthene	206-44-0	1	4.5	19.8	14.8	ug/kg	J
Pyrene	129-00-0	1	5.5	19.8	93.7	ug/kg	
Butylbenzylphthalate	85-68-7	1	8.0	19.8	ND	ug/kg	U
Benzo(a)anthracene	56-55-3	1	5.1	19.8	5.4	ug/kg	J
Chrysene	218-01-9	1	5.2	19.8	10.8	ug/kg	J
bis(2-Ethylhexyl)phthalate	117-81-7	1	28.6	49.6	ND	ug/kg	U
Di-n-Octylphthalate	117-84-0	1	8.7	19.8	ND	ug/kg	U
Benzo(a)fluoranthene, Total		1	10.1	39.7	31.3	ug/kg	J
Benzo(a)pyrene	50-32-8	1	6.4	19.8	9.7	ug/kg	J
Indeno(1,2,3-cd)pyrene	193-39-5	1	5.9	19.8	ND	ug/kg	U
Dibenzo(a,h)anthracene	53-70-3	1	6.1	19.8	ND	ug/kg	U
Benzo(g,h,i)perylene	191-24-2	1	5.8	19.8	6.2	ug/kg	J



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Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:06

COA_SS-2_1.5-3.5_20201118
20K0364-04 (Solid)

Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 11/18/2020 09:15

Instrument: NT10 Analyst: VTS

Analyzed: 12/22/2020 18:47

Analyte	CAS Number	Recovery	Recovery	Units	Notes
		Limits			
Surrogate: 2-Fluorophenol		27-120 %	68.1	%	
Surrogate: Phenol-d5		29-120 %	71.8	%	Q
Surrogate: 2-Chlorophenol-d4		31-120 %	75.2	%	
Surrogate: 1,2-Dichlorobenzene-d4		32-120 %	67.6	%	
Surrogate: Nitrobenzene-d5		30-120 %	87.9	%	
Surrogate: 2-Fluorobiphenyl		35-120 %	80.0	%	
Surrogate: 2,4,6-Tribromophenol		24-134 %	67.2	%	
Surrogate: p-Terphenyl-d14		37-120 %	83.5	%	



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Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:06

COA_SS-2_1.5-3.5_20201118
20K0364-04 (Solid)

Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM		Sampled: 11/18/2020 09:15
Instrument: NT10 Analyst: VTS		Analyzed: 12/22/2020 18:47
Sample Preparation:	Preparation Method: EPA 3546 (Microwave) Preparation Batch: BIK0843 Prepared: 11/30/2020	Extract ID: 20K0364-04 D 03 Dry Weight: 10.08 g % Solids: 78.86
Sample Cleanup:	Cleanup Method: GPC Cleanup Batch: CIL0220 Cleaned: 16-Dec-2020	Initial Volume: 1 uL Final Volume: 1 uL Extract ID: 20K0364-04 D 03

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
1,4-Dichlorobenzene	106-46-7	1	0.6	5.0	ND	ug/kg	U
1,2-Dichlorobenzene	95-50-1	1	0.7	5.0	ND	ug/kg	U
2,4-Dimethylphenol	105-67-9	1	2.2	19.8	ND	ug/kg	U
1,2,4-Trichlorobenzene	120-82-1	1	2.7	5.0	ND	ug/kg	U
Hexachlorobutadiene	87-68-3	1	0.7	5.0	ND	ug/kg	U
Surrogate: 2-Fluorophenol				27-120 %	69.9	%	
Surrogate: p-Terphenyl-d14				37-120 %	77.5	%	



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COA_SS-2_1.5-3.5_20201118
20K0364-04 (Solid)

Butyl Tins

Method: EPA 8270E-SIM			Sampled: 11/18/2020 09:15
Instrument: NT8 Analyst: JZ			Analyzed: 12/17/2020 15:29
Sample Preparation:	Preparation Method: EPA 3546 (Microwave)		Extract ID: 20K0364-04 D 04 Dry Weight: 5.05 g % Solids: 78.86
	Preparation Batch: BIK0863	Sample Size: 6.41 g (wet)	
	Prepared: 11/30/2020	Final Volume: 0.5 mL	
Sample Cleanup:	Cleanup Method: Silica Gel		Extract ID: 20K0364-04 D 04
	Cleanup Batch: CIL0161	Initial Volume: 0.5 mL	
	Cleaned: 16-Dec-2020	Final Volume: 0.5 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Tributyltin Ion	36643-28-4	1	0.445	3.82	9.34	ug/kg	
Dibutyltin Ion	14488-53-0	1	1.71	5.72	2.73	ug/kg	J
Butyltin Ion	78763-54-9	1	1.87	4.04	ND	ug/kg	U
Tetrabutyltin	1461-25-2	1	4.95	4.95	ND	ug/kg	U
<i>Surrogate: Triphenyltin</i>				30-160 %	106	%	
<i>Surrogate: Tripropyltin</i>				30-160 %	67.4	%	



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COA_SS-2_1.5-3.5_20201118
20K0364-04 (Solid)

Chlorinated Pesticides

Method: EPA 8081B		Sampled: 11/18/2020 09:15	
Instrument: ECD6 Analyst: YZ/VTS		Analyzed: 03/15/2021 18:37	
Sample Preparation:	Preparation Method: EPA 3546 (Microwave)	Extract ID: 20K0364-04 B 06	
	Preparation Batch: BJB0764	Dry Weight: 12.54 g	
	Prepared: 02/26/2021	% Solids: 78.86	
Sample Cleanup:	Cleanup Method: Silica Gel	Extract ID: 20K0364-04 B 06	
	Cleanup Batch: CJC0097	Initial Volume: 2.5 mL	
	Cleaned: 09-Mar-2021	Final Volume: 2.5 mL	
Sample Cleanup:	Cleanup Method: Sulfur	Extract ID: 20K0364-04 B 06	
	Cleanup Batch: CJC0096	Initial Volume: 2.5 mL	
	Cleaned: 09-Mar-2021	Final Volume: 2.5 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Heptachlor	76-44-8	1	0.05	0.50	ND	ug/kg	U
Aldrin	309-00-2	1	0.37	0.50	ND	ug/kg	U
trans-Chlordane (beta-Chlordane)	5103-74-2	1	0.33	0.50	ND	ug/kg	U
cis-Chlordane (alpha-chlordane)	5103-71-9	1	0.11	0.50	ND	ug/kg	U
4,4'-DDE	72-55-9	1	0.13	1.00	ND	ug/kg	U
Dieldrin	60-57-1	1	0.11	1.00	ND	ug/kg	U
4,4'-DDD	72-54-8	1	0.32	1.00	ND	ug/kg	U
4,4'-DDT	50-29-3	1	0.32	1.00	ND	ug/kg	U
Oxychlordane	27304-13-8	1	0.13	1.00	ND	ug/kg	U
cis-Nonachlor	5103-73-1	1	0.21	1.00	ND	ug/kg	U
trans-Nonachlor	39765-80-5	1	0.23	1.00	ND	ug/kg	U
Surrogate: Decachlorobiphenyl				30-160 %	93.2	%	
Surrogate: Decachlorobiphenyl [2C]				30-160 %	68.4	%	
Surrogate: Tetrachlorometaxylene				30-160 %	63.6	%	
Surrogate: Tetrachlorometaxylene [2C]				30-160 %	62.1	%	



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COA_SS-2_1.5-3.5_20201118
20K0364-04 (Solid)

Aroclor PCB

Method: EPA 8082A		Sampled: 11/18/2020 09:15	
Instrument: ECD7 Analyst: JGR		Analyzed: 12/19/2020 16:33	
Sample Preparation:	Preparation Method: EPA 3546 (Microwave)	Extract ID: 20K0364-04 D 01	
	Preparation Batch: BIK0842	Dry Weight: 12.50 g	
	Prepared: 11/28/2020	% Solids: 78.86	
Sample Cleanup:	Cleanup Method: Silica Gel	Extract ID: 20K0364-04 D 01	
	Cleanup Batch: CIL0203	Initial Volume: 2.5 mL	
	Cleaned: 19-Dec-2020	Final Volume: 2.5 mL	
Sample Cleanup:	Cleanup Method: Sulfuric Acid	Extract ID: 20K0364-04 D 01	
	Cleanup Batch: CIL0201	Initial Volume: 2.5 mL	
	Cleaned: 19-Dec-2020	Final Volume: 2.5 mL	
Sample Cleanup:	Cleanup Method: Sulfur	Extract ID: 20K0364-04 D 01	
	Cleanup Batch: CIL0202	Initial Volume: 2.5 mL	
	Cleaned: 19-Dec-2020	Final Volume: 2.5 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Aroclor 1016	12674-11-2	1	1.6	4.0	ND	ug/kg	U
Aroclor 1221	11104-28-2	1	1.6	4.0	ND	ug/kg	U
Aroclor 1232	11141-16-5	1	1.6	4.0	ND	ug/kg	U
Aroclor 1242	53469-21-9	1	1.6	4.0	ND	ug/kg	U
Aroclor 1248	12672-29-6	1	1.6	4.0	ND	ug/kg	U
Aroclor 1254	11097-69-1	1	1.6	4.0	1.8	ug/kg	J
Aroclor 1260	11096-82-5	1	0.6	4.0	ND	ug/kg	U
Aroclor 1262	37324-23-5	1	0.6	4.0	ND	ug/kg	U
Aroclor 1268	11100-14-4	1	0.6	4.0	ND	ug/kg	U
Surrogate: Decachlorobiphenyl				40-126 %	63.1	%	
Surrogate: Tetrachlorometaxylene				44-120 %	70.0	%	
Surrogate: Decachlorobiphenyl [2C]				40-126 %	61.3	%	
Surrogate: Tetrachlorometaxylene [2C]				44-120 %	73.0	%	



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COA_SS-2_1.5-3.5_20201118
20K0364-04 (Solid)

Dioxins/Furans

Method: EPA 1613B			Sampled: 11/18/2020 09:15		
Instrument: AUTOSPEC01 Analyst: pk			Analyzed: 12/07/2020 17:37		
Sample Preparation:	Preparation Method: EPA 1613			Extract ID: 20K0364-04 C 01	
	Preparation Batch: BIL0036	Sample Size: 12.67 g (wet)		Dry Weight: 10.01 g	
	Prepared: 12/03/2020	Final Volume: 20 uL		% Solids: 79.02	
Sample Cleanup:	Cleanup Method: Silica Gel			Extract ID: 20K0364-04 C 01	
	Cleanup Batch: CIL0058	Initial Volume: 20 mL			
	Cleaned: 05-Dec-2020	Final Volume: 20 mL			
Sample Cleanup:	Cleanup Method: Sulfuric Acid			Extract ID: 20K0364-04 C 01	
	Cleanup Batch: CIL0057	Initial Volume: 20 mL			
	Cleaned: 04-Dec-2020	Final Volume: 20 mL			
Sample Cleanup:	Cleanup Method: Florisil			Extract ID: 20K0364-04 C 01	
	Cleanup Batch: CIL0059	Initial Volume: 20 mL			
	Cleaned: 05-Dec-2020	Final Volume: 20 mL			

Analyte	DF/Split	Ion Ratio	Ratio Limits	EDL	Reporting		Result	Units	Notes
						Limit			
2,3,7,8-TCDF		1.105	0.655-0.886	0.063	0.104	0.999	0.448	ng/kg	EMPC, J
2,3,7,8-TCDD			0.655-0.886	0.140	0.072	0.999	ND	ng/kg	U
1,2,3,7,8-PeCDF			1.318-1.783	0.150	0.095	0.999	ND	ng/kg	U
2,3,4,7,8-PeCDF			1.318-1.783	0.150	0.094	0.999	ND	ng/kg	U
1,2,3,7,8-PeCDD		1.759	1.318-1.783	0.180	0.105	0.999	0.212	ng/kg	J
1,2,3,4,7,8-HxCDF		1.550	1.054-1.426	0.140	0.067	0.999	0.119	ng/kg	EMPC, J
1,2,3,6,7,8-HxCDF			1.054-1.426	0.180	0.066	0.999	ND	ng/kg	U
2,3,4,6,7,8-HxCDF		1.587	1.054-1.426	0.110	0.064	0.999	0.168	ng/kg	EMPC, J
1,2,3,7,8,9-HxCDF			1.054-1.426	0.210	0.069	0.999	ND	ng/kg	U
1,2,3,4,7,8-HxCDD			1.054-1.426	0.180	0.156	0.999	ND	ng/kg	U
1,2,3,6,7,8-HxCDD		1.243	1.054-1.426	0.150	0.151	0.999	0.553	ng/kg	J
1,2,3,7,8,9-HxCDD		1.903	1.054-1.426	0.220	0.174	0.999	0.435	ng/kg	EMPC, J
1,2,3,4,6,7,8-HpCDF		1.064	0.893-1.208	0.210	0.071	0.999	2.13	ng/kg	
1,2,3,4,7,8,9-HpCDF			0.893-1.208	0.160	0.087	0.999	ND	ng/kg	U
1,2,3,4,6,7,8-HpCDD		1.127	0.893-1.208	0.559	0.198	2.50	15.5	ng/kg	
OCDF		0.978	0.757-1.024	1.10	0.196	2.50	5.49	ng/kg	
OCDD		0.901	0.757-1.024	4.29	0.495	9.99	124	ng/kg	B
Homologue groups									
Total TCDF						0.999	0.273	ng/kg	J
Total TCDD						0.999	0.524	ng/kg	J
Total PeCDF						0.999	0.381	ng/kg	J
Total PeCDD						0.999	0.911	ng/kg	J
Total HxCDF						0.999	1.93	ng/kg	
Total HxCDD						0.999	6.65	ng/kg	
Total HpCDF						0.999	7.33	ng/kg	
Total HpCDD						0.999	55.0	ng/kg	B



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26-Mar-2021 16:06

COA_SS-2_1.5-3.5_20201118
20K0364-04 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/18/2020 09:15

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 12/07/2020 17:37

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting Limit	Result	Units	Notes
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC):				0.67			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC):				0.60			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, EMPC = ND):				0.61			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, EMPC = ND):				0.48			



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COA_SS-2_1.5-3.5_20201118
20K0364-04 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/18/2020 09:15

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 12/07/2020 17:37

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting Limit	Result	Units	Notes
Labeled compounds							
13C12-2,3,7,8-TCDF		0.793	0.655-0.886	24-169 %	76.7	%	
13C12-2,3,7,8-TCDD		0.793	0.655-0.886	25-164 %	77.9	%	
13C12-1,2,3,7,8-PeCDF		1.468	1.318-1.783	24-185 %	72.4	%	
13C12-2,3,4,7,8-PeCDF		1.559	1.318-1.783	21-178 %	69.6	%	
13C12-1,2,3,7,8-PeCDD		1.620	1.318-1.783	25-181 %	67.9	%	
13C12-1,2,3,4,7,8-HxCDF		0.493	0.434-0.587	26-152 %	79.8	%	
13C12-1,2,3,6,7,8-HxCDF		0.488	0.434-0.587	26-123 %	71.6	%	
13C12-2,3,4,6,7,8-HxCDF		0.500	0.434-0.587	28-136 %	75.3	%	
13C12-1,2,3,7,8,9-HxCDF		0.491	0.434-0.587	29-147 %	94.9	%	
13C12-1,2,3,4,7,8-HxCDD		1.308	1.054-1.426	32-141 %	81.7	%	
13C12-1,2,3,6,7,8-HxCDD		1.369	1.054-1.426	28-130 %	77.7	%	
13C12-1,2,3,4,6,7,8-HpCDF		0.481	0.374-0.506	28-143 %	69.5	%	
13C12-1,2,3,4,7,8,9-HpCDF		0.423	0.374-0.506	26-138 %	74.4	%	
13C12-1,2,3,4,6,7,8-HpCDD		1.068	0.893-1.208	23-140 %	76.6	%	
13C12-OCDD		0.909	0.757-1.024	17-157 %	61.1	%	
37Cl4-2,3,7,8-TCDD				35-197 %	84.0	%	



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20K0364-04 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/18/2020 09:15

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 12/07/2020 17:37

Analyte	DF/Split	Ion Ratio	Ratio Limits	EDL	Reporting	Result	Units	Notes
					Limit			



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COA_SS-2_1.5-3.5_20201118
20K0364-04 (Solid)

Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 11/18/2020 09:15

Instrument: ICPMS1 Analyst: MCB

Analyzed: 03/24/2021 15:00

Sample Preparation:

Preparation Method: SWN EPA 3050B

Extract ID: 20K0364-04 F 01

Preparation Batch: BJC0564

Sample Size: 1.079 g (wet)

Dry Weight: 0.83 g

Prepared: 03/22/2021

Final Volume: 50 mL

% Solids: 77.15

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Antimony	7440-36-0	20	0.02	0.24	0.02	mg/kg	J
Chromium	7440-47-3	20	0.16	0.60	23.3	mg/kg	
Lead	7439-92-1	20	0.08	0.12	2.99	mg/kg	
Silver	7440-22-4	20	0.02	0.24	0.06	mg/kg	J



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COA_SS-2_1.5-3.5_20201118
20K0364-04 (Solid)

Metals and Metallic Compounds

Method: EPA 6020B UCT-KED

Sampled: 11/18/2020 09:15

Instrument: ICPMS1 Analyst: MCB

Analyzed: 03/23/2021 20:33

Sample Preparation:

Preparation Method: SWN EPA 3050B

Extract ID: 20K0364-04 F 01

Preparation Batch: BJC0564

Sample Size: 1.079 g (wet)

Dry Weight: 0.83 g

Prepared: 03/22/2021

Final Volume: 50 mL

% Solids: 77.15

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	20	0.03	0.24	3.96	mg/kg	
Cadmium	7440-43-9	20	0.04	0.12	0.11	mg/kg	J
Copper	7440-50-8	20	0.41	0.60	19.5	mg/kg	
Selenium	7782-49-2	20	0.53	0.60	0.72	mg/kg	
Zinc	7440-66-6	20	1.0	4.8	34.9	mg/kg	



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COA_SS-2_1.5-3.5_20201118
20K0364-04 (Solid)

Metals and Metallic Compounds

Method: EPA 7471B

Sampled: 11/18/2020 09:15

Instrument: HYDRA Analyst: BLC

Analyzed: 03/23/2021 12:15

Sample Preparation:

Preparation Method: SMM EPA 7471B

Extract ID: 20K0364-04 F

Preparation Batch: BJC0610

Sample Size: 0.221 g (wet)

Dry Weight: 0.17 g

Prepared: 03/23/2021

Final Volume: 50 mL

% Solids: 77.15

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.00616	0.0293	0.0574	mg/kg	H



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COA_SS-2_1.5-3.5_20201118
20K0364-04 (Solid)

Wet Chemistry

Method: EPA 9060A m

Sampled: 11/18/2020 09:15

Instrument: TOC Cube Analyst: BF

Analyzed: 11/25/2020 23:43

Sample Preparation:

Preparation Method: PSEP 1986 (modified)

Extract ID: 20K0364-04 F

Preparation Batch: BIK0802

Sample Size: 0.514 g (wet)

Dry Weight: 0.40 g

Prepared: 11/25/2020

Final Volume: 0.514 mL

% Solids: 77.15

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Organic Carbon		1	0.02	0.02	0.20	%	



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COA_SS-2_1.5-3.5_20201118
20K0364-04 (Solid)

Wet Chemistry

Method: PSEP 1986

Sampled: 11/18/2020 09:15

Instrument: BAL2 Analyst: UW

Analyzed: 11/23/2020 17:50

Sample Preparation:	Preparation Method: No Prep Wet Chem	Sample Size: 5 g (wet)	Extract ID: 20K0364-04
	Preparation Batch: BIK0734	Final Volume: 5 g	Dry Weight: 3.86 g
	Prepared: 11/23/2020		% Solids: 77.15

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Volatile Solids		1	0.01	0.01	2.34	%	

Sample Preparation:	Preparation Method: No Prep Wet Chem	Sample Size: 5 g (wet)	Extract ID: 20K0364-04
	Preparation Batch: BIK0735	Final Volume: 5 g	Dry Weight: 3.86 g
	Prepared: 11/23/2020		% Solids: 77.15

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Solids, Sulfide		1	0.04	0.04	75.95	%	



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COA_SS-2_1.5-3.5_20201118
20K0364-04 (Solid)

Wet Chemistry

Method: SM 2540 G-97

Sampled: 11/18/2020 09:15

Instrument: BAL2 Analyst: UW

Analyzed: 11/23/2020 17:50

Sample Preparation:

Preparation Method: No Prep Wet Chem

Extract ID: 20K0364-04

Preparation Batch: BIK0734

Sample Size: 5 g (wet)

Dry Weight: 3.86 g

Prepared: 11/23/2020

Final Volume: 5 g

% Solids: 77.15

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Solids		1	0.04	0.04	77.15	%	



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COA_SS-2_1.5-3.5_20201118
20K0364-04 (Solid)

Wet Chemistry

Method: SM 4500-NH3 H-97	Sampled: 11/18/2020 09:15
Instrument: LACHAT2 Analyst: LRB	Analyzed: 11/30/2020 14:43
Sample Preparation:	Preparation Method: MSA 33.3 (2M KCl)
	Preparation Batch: BIK0769
	Sample Size: 4.26 g (wet)
	Final Volume: 40 mL
	Extract ID: 20K0364-04 F
	Dry Weight: 3.29 g
	% Solids: 77.15

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Ammonia-N	7664-41-7	1	0.49	0.49	6.69	mg/kg NH3-N	



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Reported:
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COA_SS-2_1.5-3.5_20201118
20K0364-04 (Solid)

Wet Chemistry

Method: SM 4500-S2 D-00 (PSEP)

Sampled: 11/18/2020 09:15

Instrument: UV1800-1 Analyst: CDE

Analyzed: 12/03/2020 17:00

Sample Preparation:

Preparation Method: PSEP 1986

Extract ID: 20K0364-04 G

Preparation Batch: BIK0743

Sample Size: 5.301 g (wet)

Dry Weight: 4.03 g

Prepared: 11/24/2020

Final Volume: 100 mL

% Solids: 75.95

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Sulfide	18496-25-8	1	1.24	1.24	20.9	mg/kg	



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COA_SS-2_1.5-3.5_20201118
20K0364-04 (Solid)

Extractions

Method: ASTM D2216	Sampled: 11/18/2020 09:15	
Instrument: N/A Analyst: NL	Analyzed: 11/26/2020 05:10	
Sample Preparation:	Preparation Method: No Prep-Organics	Extract ID: 20K0364-04
	Preparation Batch: BIK0789	Dry Weight: 0.77 g
	Prepared: 11/25/2020	% Solids: 77.15
	Sample Size: 1 g (wet)	
	Final Volume: 1 g	

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Total Solids		1	0.01	79.02	%	



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COA_SS-2_1.5-3.5_20201118
20K0364-04 (Solid)

Extractions

Method: ASTM D2216

Sampled: 11/18/2020 09:15

Instrument: N/A Analyst: NL

Analyzed: 11/26/2020 05:10

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Labeled compounds						



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COA_SS-2_1.5-3.5_20201118
20K0364-04 (Solid)

Geotechnical Methods

Method: PSEP-PS

Sampled: 11/18/2020 09:15

Instrument: MT&C Analyst:

Analyzed: 01/11/2021 00:00

Analysis by: Materials Testing & Consulting, Inc. (Olympia)

Sample Preparation: Preparation Method: No Prep Geo
Preparation Batch: B011121
Prepared: 01/11/2021

Extract ID: 20K0364-04

Final Volume:

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Phi Size <-1	GS_GRAVEL	1	0.1	5.6	%	
Phi Size -1 to 0	GS_VCS	1	0.1	2.4	%	
Phi Size 0 to 1	GS_CS	1	0.1	2.7	%	
Phi Size 1 to 2	GS_MS	1	0.1	4.7	%	
Phi Size 2 to 3	GS_FS	1	0.1	6.7	%	
Phi Size 3 to 4	GS_VFS	1	0.1	6.9	%	
Phi Size 4 to 5	GS_CSILT	1	0.1	10.4	%	
Phi Size 5 to 6	GS_MSILT	1	0.1	11.8	%	
Phi Size 6 to 7	GS_FSILT	1	0.1	10.0	%	
Phi Size 7 to 8	GS_VFSILT	1	0.1	8.4	%	
Phi Size 8 to 9	GS_CCLAY	1	0.1	8.7	%	
Phi Size 9 to 10	GS_MCLAY	1	0.1	11.8	%	
Phi Size >10	GS_FCLAY	1	0.1	10.0	%	
Total Fines	GS_TOTFINES	1	0.1	71.0	%	



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COA_SS-2_1.5-3.5_20201118
20K0364-04RE1 (Solid)

Dioxins/Furans

Method: EPA 1613B			Sampled: 11/18/2020 09:15		
Instrument: AUTOSPEC01 Analyst: pk			Analyzed: 03/02/2021 17:40		
Sample Preparation:	Preparation Method: EPA 1613			Extract ID: 20K0364-04RE1 C 02	
	Preparation Batch: BJB0531	Sample Size: 12.71 g (wet)		Dry Weight: 10.04 g	
	Prepared: 02/23/2021	Final Volume: 20 uL		% Solids: 79.02	
Sample Cleanup:	Cleanup Method: Silica Gel			Extract ID: 20K0364-04RE1 C 02	
	Cleanup Batch: CJB0177	Initial Volume: 20 mL			
	Cleaned: 25-Feb-2021	Final Volume: 20 mL			
Sample Cleanup:	Cleanup Method: Sulfuric Acid			Extract ID: 20K0364-04RE1 C 02	
	Cleanup Batch: CJB0176	Initial Volume: 20 mL			
	Cleaned: 24-Feb-2021	Final Volume: 20 mL			
Sample Cleanup:	Cleanup Method: Florisil			Extract ID: 20K0364-04RE1 C 02	
	Cleanup Batch: CJB0178	Initial Volume: 20 mL			
	Cleaned: 25-Feb-2021	Final Volume: 20 mL			

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting		Result	Units	Notes
				EDL	Limit			
2,3,7,8-TCDF		0.804	0.655-0.886	0.058	0.092	0.996	0.394	ng/kg J
2,3,7,8-TCDD			0.655-0.886	0.149	0.102	0.996	ND	ng/kg U
1,2,3,7,8-PeCDF			1.318-1.783	0.239	0.128	0.996	ND	ng/kg U
2,3,4,7,8-PeCDF			1.318-1.783	0.219	0.122	0.996	ND	ng/kg U
1,2,3,7,8-PeCDD			1.318-1.783	0.169	0.170	0.996	ND	ng/kg U
1,2,3,4,7,8-HxCDF		1.623	1.054-1.426	0.279	0.104	0.996	0.248	ng/kg EMPC, J
1,2,3,6,7,8-HxCDF			1.054-1.426	0.199	0.113	0.996	ND	ng/kg U
2,3,4,6,7,8-HxCDF			1.054-1.426	0.169	0.105	0.996	ND	ng/kg U
1,2,3,7,8,9-HxCDF			1.054-1.426	0.189	0.111	0.996	ND	ng/kg U
1,2,3,4,7,8-HxCDD		1.044	1.054-1.426	0.169	0.143	0.996	0.261	ng/kg EMPC, J
1,2,3,6,7,8-HxCDD		1.380	1.054-1.426	0.179	0.140	0.996	0.792	ng/kg J
1,2,3,7,8,9-HxCDD		1.166	1.054-1.426	0.219	0.146	0.996	0.499	ng/kg J
1,2,3,4,6,7,8-HpCDF		1.167	0.893-1.208	0.209	0.078	0.996	3.24	ng/kg
1,2,3,4,7,8,9-HpCDF		0.738	0.893-1.208	0.239	0.103	0.996	0.219	ng/kg EMPC, J
1,2,3,4,6,7,8-HpCDD		1.116	0.893-1.208	0.558	0.193	2.49	17.7	ng/kg
OCDF		1.009	0.757-1.024	1.10	0.158	2.49	8.16	ng/kg B
OCDD		0.839	0.757-1.024	4.58	0.480	9.96	130	ng/kg B
Homologue groups								
Total TCDF						0.996	0.626	ng/kg J
Total TCDD						0.996	1.14	ng/kg
Total PeCDF						0.996	0.630	ng/kg J
Total PeCDD						0.996	1.55	ng/kg
Total HxCDF						0.996	3.32	ng/kg
Total HxCDD						0.996	6.29	ng/kg
Total HpCDF						0.996	10.4	ng/kg B
Total HpCDD						0.996	48.0	ng/kg



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COA_SS-2_1.5-3.5_20201118
20K0364-04RE1 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/18/2020 09:15

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 03/02/2021 17:40

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting Limit	Result	Units	Notes
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC):				0.65			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC):				0.47			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, EMPC = ND):				0.62			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, EMPC = ND):				0.42			



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20K0364-04RE1 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/18/2020 09:15

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 03/02/2021 17:40

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting Limit	Result	Units	Notes
Labeled compounds							
13C12-2,3,7,8-TCDF		0.774	0.655-0.886	24-169 %	88.2	%	
13C12-2,3,7,8-TCDD		0.808	0.655-0.886	25-164 %	83.7	%	
13C12-1,2,3,7,8-PeCDF		1.513	1.318-1.783	24-185 %	85.5	%	
13C12-2,3,4,7,8-PeCDF		1.496	1.318-1.783	21-178 %	82.6	%	
13C12-1,2,3,7,8-PeCDD		1.659	1.318-1.783	25-181 %	80.4	%	
13C12-1,2,3,4,7,8-HxCDF		0.508	0.434-0.587	26-152 %	86.7	%	
13C12-1,2,3,6,7,8-HxCDF		0.518	0.434-0.587	26-123 %	81.7	%	
13C12-2,3,4,6,7,8-HxCDF		0.515	0.434-0.587	28-136 %	87.2	%	
13C12-1,2,3,7,8,9-HxCDF		0.519	0.434-0.587	29-147 %	94.6	%	
13C12-1,2,3,4,7,8-HxCDD		1.269	1.054-1.426	32-141 %	81.2	%	
13C12-1,2,3,6,7,8-HxCDD		1.244	1.054-1.426	28-130 %	78.7	%	
13C12-1,2,3,4,6,7,8-HpCDF		0.436	0.374-0.506	28-143 %	90.1	%	
13C12-1,2,3,4,7,8,9-HpCDF		0.426	0.374-0.506	26-138 %	91.4	%	
13C12-1,2,3,4,6,7,8-HpCDD		1.040	0.893-1.208	23-140 %	94.6	%	
13C12-OCDD		0.895	0.757-1.024	17-157 %	77.3	%	
37Cl4-2,3,7,8-TCDD				35-197 %	94.0	%	



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COA_SS-2_3.5-5.5_20201118
20K0364-05 (Solid)

Semivolatile Organic Compounds

Method: EPA 8270E		Sampled: 11/18/2020 09:25	
Instrument: NT10 Analyst: VTS		Analyzed: 12/22/2020 19:24	
Sample Preparation:	Preparation Method: EPA 3546 (Microwave)	Extract ID: 20K0364-05 D 03	
	Preparation Batch: BIK0843	Dry Weight: 10.06 g	
	Prepared: 11/30/2020	% Solids: 82.36	
Sample Cleanup:	Cleanup Method: GPC	Extract ID: 20K0364-05 D 03	
	Cleanup Batch: CIL0220	Initial Volume: 1 uL	
	Cleaned: 16-Dec-2020	Final Volume: 1 uL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Phenol	108-95-2	1	8.2	19.9	ND	ug/kg	U
Benzyl Alcohol	100-51-6	1	14.8	19.9	ND	ug/kg	U
2-Methylphenol	95-48-7	1	7.8	19.9	ND	ug/kg	U
Hexachloroethane	67-72-1	1	5.6	19.9	ND	ug/kg	U
4-Methylphenol	106-44-5	1	14.6	19.9	ND	ug/kg	U
Naphthalene	91-20-3	1	5.2	19.9	ND	ug/kg	U
Benzoic acid	65-85-0	1	58.7	199	ND	ug/kg	U
2-Methylnaphthalene	91-57-6	1	5.6	19.9	ND	ug/kg	U
Acenaphthylene	208-96-8	1	4.7	19.9	ND	ug/kg	U
Dimethylphthalate	131-11-3	1	6.4	19.9	ND	ug/kg	U
Acenaphthene	83-32-9	1	5.1	19.9	ND	ug/kg	U
Dibenzofuran	132-64-9	1	4.6	19.9	ND	ug/kg	U
Fluorene	86-73-7	1	4.9	19.9	ND	ug/kg	U
Diethyl phthalate	84-66-2	1	17.6	19.9	ND	ug/kg	U
N-Nitrosodiphenylamine	86-30-6	1	9.5	19.9	ND	ug/kg	U
Hexachlorobenzene	118-74-1	1	4.7	19.9	ND	ug/kg	U
Pentachlorophenol	87-86-5	1	31.1	99.4	ND	ug/kg	U
Phenanthrene	85-01-8	1	4.7	19.9	4.7	ug/kg	J
Anthracene	120-12-7	1	5.9	19.9	ND	ug/kg	U
Di-n-Butylphthalate	84-74-2	1	5.3	19.9	ND	ug/kg	U
Fluoranthene	206-44-0	1	4.5	19.9	ND	ug/kg	U
Pyrene	129-00-0	1	5.5	19.9	ND	ug/kg	U
Butylbenzylphthalate	85-68-7	1	8.0	19.9	ND	ug/kg	U
Benzo(a)anthracene	56-55-3	1	5.1	19.9	ND	ug/kg	U
Chrysene	218-01-9	1	5.2	19.9	ND	ug/kg	U
bis(2-Ethylhexyl)phthalate	117-81-7	1	28.6	49.7	ND	ug/kg	U
Di-n-Octylphthalate	117-84-0	1	8.7	19.9	ND	ug/kg	U
Benzo(a)fluoranthene, Total		1	10.1	39.7	ND	ug/kg	U
Benzo(a)pyrene	50-32-8	1	6.4	19.9	ND	ug/kg	U
Indeno(1,2,3-cd)pyrene	193-39-5	1	6.0	19.9	ND	ug/kg	U
Dibenzo(a,h)anthracene	53-70-3	1	6.1	19.9	ND	ug/kg	U
Benzo(g,h,i)perylene	191-24-2	1	5.8	19.9	ND	ug/kg	U



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Reported:
26-Mar-2021 16:06

COA_SS-2_3.5-5.5_20201118
20K0364-05 (Solid)

Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 11/18/2020 09:25

Instrument: NT10 Analyst: VTS

Analyzed: 12/22/2020 19:24

Analyte	CAS Number	Recovery	Recovery	Units	Notes
		Limits			
Surrogate: 2-Fluorophenol		27-120 %	73.4	%	
Surrogate: Phenol-d5		29-120 %	71.8	%	Q
Surrogate: 2-Chlorophenol-d4		31-120 %	76.5	%	
Surrogate: 1,2-Dichlorobenzene-d4		32-120 %	67.0	%	
Surrogate: Nitrobenzene-d5		30-120 %	88.6	%	
Surrogate: 2-Fluorobiphenyl		35-120 %	81.9	%	
Surrogate: 2,4,6-Tribromophenol		24-134 %	71.7	%	
Surrogate: p-Terphenyl-d14		37-120 %	89.6	%	



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COA_SS-2_3.5-5.5_20201118
20K0364-05 (Solid)

Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM			Sampled: 11/18/2020 09:25	
Instrument: NT10 Analyst: VTS			Analyzed: 12/22/2020 19:24	
Sample Preparation:	Preparation Method: EPA 3546 (Microwave)		Extract ID: 20K0364-05 D 03	
	Preparation Batch: BIK0843	Sample Size: 12.22 g (wet)		Dry Weight: 10.06 g
	Prepared: 11/30/2020	Final Volume: 1 mL		% Solids: 82.36
Sample Cleanup:	Cleanup Method: GPC		Extract ID: 20K0364-05 D 03	
	Cleanup Batch: CIL0220	Initial Volume: 1 uL		
	Cleaned: 16-Dec-2020	Final Volume: 1 uL		

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
1,4-Dichlorobenzene	106-46-7	1	0.6	5.0	ND	ug/kg	U
1,2-Dichlorobenzene	95-50-1	1	0.7	5.0	ND	ug/kg	U
2,4-Dimethylphenol	105-67-9	1	2.2	19.9	ND	ug/kg	U
1,2,4-Trichlorobenzene	120-82-1	1	2.7	5.0	ND	ug/kg	U
Hexachlorobutadiene	87-68-3	1	0.7	5.0	ND	ug/kg	U
Surrogate: 2-Fluorophenol				27-120 %	73.8	%	
Surrogate: p-Terphenyl-d14				37-120 %	80.2	%	



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Reported:
26-Mar-2021 16:06

COA_SS-2_3.5-5.5_20201118
20K0364-05 (Solid)

Butyl Tins

Method: EPA 8270E-SIM			Sampled: 11/18/2020 09:25	
Instrument: NT8 Analyst: JZ			Analyzed: 12/17/2020 15:45	
Sample Preparation:	Preparation Method: EPA 3546 (Microwave)		Extract ID: 20K0364-05 D 04	
	Preparation Batch: BIK0863	Sample Size: 6.1 g (wet)		Dry Weight: 5.02 g
	Prepared: 11/30/2020	Final Volume: 0.5 mL		% Solids: 82.36
Sample Cleanup:	Cleanup Method: Silica Gel		Extract ID: 20K0364-05 D 04	
	Cleanup Batch: CIL0161	Initial Volume: 0.5 mL		
	Cleaned: 16-Dec-2020	Final Volume: 0.5 mL		

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Tributyltin Ion	36643-28-4	1	0.448	3.84	ND	ug/kg	U
Dibutyltin Ion	14488-53-0	1	1.72	5.75	ND	ug/kg	U
Butyltin Ion	78763-54-9	1	1.88	4.06	ND	ug/kg	U
Tetrabutyltin	1461-25-2	1	4.98	4.98	ND	ug/kg	U
Surrogate: Tripentyltin				30-160 %	96.2	%	
Surrogate: Tripropyltin				30-160 %	63.1	%	



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COA_SS-2_3.5-5.5_20201118
20K0364-05 (Solid)

Chlorinated Pesticides

Method: EPA 8081B		Sampled: 11/18/2020 09:25	
Instrument: ECD6 Analyst: YZ/VTs		Analyzed: 03/15/2021 18:55	
Sample Preparation:	Preparation Method: EPA 3546 (Microwave)	Extract ID: 20K0364-05 B 06	
	Preparation Batch: BJB0764	Sample Size: 15.22 g (wet)	Dry Weight: 12.54 g
	Prepared: 02/26/2021	Final Volume: 2.5 mL	% Solids: 82.36
Sample Cleanup:	Cleanup Method: Silica Gel	Extract ID: 20K0364-05 B 06	
	Cleanup Batch: CJC0097	Initial Volume: 2.5 mL	
	Cleaned: 09-Mar-2021	Final Volume: 2.5 mL	
Sample Cleanup:	Cleanup Method: Sulfur	Extract ID: 20K0364-05 B 06	
	Cleanup Batch: CJC0096	Initial Volume: 2.5 mL	
	Cleaned: 09-Mar-2021	Final Volume: 2.5 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Heptachlor	76-44-8	1	0.05	0.50	ND	ug/kg	U
Aldrin	309-00-2	1	0.37	0.50	ND	ug/kg	U
trans-Chlordane (beta-Chlordane)	5103-74-2	1	0.33	0.50	ND	ug/kg	U
cis-Chlordane (alpha-chlordane)	5103-71-9	1	0.11	0.50	ND	ug/kg	U
4,4'-DDE	72-55-9	1	0.13	1.00	ND	ug/kg	U
Dieldrin	60-57-1	1	0.11	1.00	ND	ug/kg	U
4,4'-DDD	72-54-8	1	0.32	1.00	ND	ug/kg	U
4,4'-DDT	50-29-3	1	0.32	1.00	ND	ug/kg	U
Oxychlordane	27304-13-8	1	0.13	1.00	ND	ug/kg	U
cis-Nonachlor	5103-73-1	1	0.21	1.00	ND	ug/kg	U
trans-Nonachlor	39765-80-5	1	0.23	1.00	ND	ug/kg	U
Surrogate: Decachlorobiphenyl				30-160 %	89.7	%	
Surrogate: Decachlorobiphenyl [2C]				30-160 %	73.8	%	
Surrogate: Tetrachlorometaxylene				30-160 %	66.5	%	
Surrogate: Tetrachlorometaxylene [2C]				30-160 %	68.0	%	



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Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:06

COA_SS-2_3.5-5.5_20201118
20K0364-05 (Solid)

Aroclor PCB

Method: EPA 8082A		Sampled: 11/18/2020 09:25	
Instrument: ECD7 Analyst: JGR		Analyzed: 12/19/2020 16:54	
Sample Preparation:	Preparation Method: EPA 3546 (Microwave)	Extract ID: 20K0364-05 D 01	
	Preparation Batch: BIK0842	Dry Weight: 12.51 g	
	Prepared: 11/28/2020	% Solids: 82.36	
Sample Cleanup:	Cleanup Method: Silica Gel	Extract ID: 20K0364-05 D 01	
	Cleanup Batch: CIL0203	Initial Volume: 2.5 mL	
	Cleaned: 19-Dec-2020	Final Volume: 2.5 mL	
Sample Cleanup:	Cleanup Method: Sulfuric Acid	Extract ID: 20K0364-05 D 01	
	Cleanup Batch: CIL0201	Initial Volume: 2.5 mL	
	Cleaned: 19-Dec-2020	Final Volume: 2.5 mL	
Sample Cleanup:	Cleanup Method: Sulfur	Extract ID: 20K0364-05 D 01	
	Cleanup Batch: CIL0202	Initial Volume: 2.5 mL	
	Cleaned: 19-Dec-2020	Final Volume: 2.5 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Aroclor 1016	12674-11-2	1	1.6	4.0	ND	ug/kg	U
Aroclor 1221	11104-28-2	1	1.6	4.0	ND	ug/kg	U
Aroclor 1232	11141-16-5	1	1.6	4.0	ND	ug/kg	U
Aroclor 1242	53469-21-9	1	1.6	4.0	ND	ug/kg	U
Aroclor 1248	12672-29-6	1	1.6	4.0	ND	ug/kg	U
Aroclor 1254	11097-69-1	1	1.6	4.0	ND	ug/kg	U
Aroclor 1260	11096-82-5	1	0.6	4.0	ND	ug/kg	U
Aroclor 1262	37324-23-5	1	0.6	4.0	ND	ug/kg	U
Aroclor 1268	11100-14-4	1	0.6	4.0	ND	ug/kg	U
Surrogate: Decachlorobiphenyl					40-126 %	72.3	%
Surrogate: Tetrachlorometaxylene					44-120 %	72.1	%
Surrogate: Decachlorobiphenyl [2C]					40-126 %	87.2	%
Surrogate: Tetrachlorometaxylene [2C]					44-120 %	72.3	%



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Reported:
26-Mar-2021 16:06

COA_SS-2_3.5-5.5_20201118
20K0364-05 (Solid)

Dioxins/Furans

Method: EPA 1613B			Sampled: 11/18/2020 09:25		
Instrument: AUTOSPEC01 Analyst: pk			Analyzed: 12/07/2020 18:27		
Sample Preparation:	Preparation Method: EPA 1613			Extract ID: 20K0364-05 C 01	
	Preparation Batch: BIL0036	Sample Size: 12.23 g (wet)		Dry Weight: 10.03 g	
	Prepared: 12/03/2020	Final Volume: 20 uL		% Solids: 82.02	
Sample Cleanup:	Cleanup Method: Silica Gel			Extract ID: 20K0364-05 C 01	
	Cleanup Batch: CIL0058	Initial Volume: 20 mL			
	Cleaned: 05-Dec-2020	Final Volume: 20 mL			
Sample Cleanup:	Cleanup Method: Sulfuric Acid			Extract ID: 20K0364-05 C 01	
	Cleanup Batch: CIL0057	Initial Volume: 20 mL			
	Cleaned: 04-Dec-2020	Final Volume: 20 mL			
Sample Cleanup:	Cleanup Method: Florisil			Extract ID: 20K0364-05 C 01	
	Cleanup Batch: CIL0059	Initial Volume: 20 mL			
	Cleaned: 05-Dec-2020	Final Volume: 20 mL			

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting		Result	Units	Notes
				EDL	Limit			
2,3,7,8-TCDF			0.655-0.886	0.063	0.097	0.997	ND	ng/kg U
2,3,7,8-TCDD			0.655-0.886	0.140	0.103	0.997	ND	ng/kg U
1,2,3,7,8-PeCDF			1.318-1.783	0.150	0.133	0.997	ND	ng/kg U
2,3,4,7,8-PeCDF			1.318-1.783	0.150	0.128	0.997	ND	ng/kg U
1,2,3,7,8-PeCDD			1.318-1.783	0.179	0.127	0.997	ND	ng/kg U
1,2,3,4,7,8-HxCDF			1.054-1.426	0.140	0.054	0.997	ND	ng/kg U
1,2,3,6,7,8-HxCDF			1.054-1.426	0.179	0.053	0.997	ND	ng/kg U
2,3,4,6,7,8-HxCDF			1.054-1.426	0.110	0.055	0.997	ND	ng/kg U
1,2,3,7,8,9-HxCDF			1.054-1.426	0.209	0.069	0.997	ND	ng/kg U
1,2,3,4,7,8-HxCDD			1.054-1.426	0.179	0.154	0.997	ND	ng/kg U
1,2,3,6,7,8-HxCDD			1.054-1.426	0.150	0.137	0.997	ND	ng/kg U
1,2,3,7,8,9-HxCDD			1.054-1.426	0.219	0.165	0.997	ND	ng/kg U
1,2,3,4,6,7,8-HpCDF			0.893-1.208	0.209	0.057	0.997	ND	ng/kg U
1,2,3,4,7,8,9-HpCDF			0.893-1.208	0.160	0.075	0.997	ND	ng/kg U
1,2,3,4,6,7,8-HpCDD		1.152	0.893-1.208	0.558	0.200	2.49	2.00	ng/kg J
OCDF			0.757-1.024	1.10	0.228	2.49	ND	ng/kg U
OCDD		0.805	0.757-1.024	4.29	0.422	9.97	24.7	ng/kg B
Homologue groups								
Total TCDF						0.997	ND	ng/kg U
Total TCDD						0.997	0.479	ng/kg J
Total PeCDF						0.997	ND	ng/kg U
Total PeCDD						0.997	0.132	ng/kg J
Total HxCDF						0.997	ND	ng/kg U
Total HxCDD						0.997	2.06	ng/kg U
Total HpCDF						0.997	ND	ng/kg U
Total HpCDD						0.997	4.73	ng/kg B



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Reported:
26-Mar-2021 16:06

COA_SS-2_3.5-5.5_20201118
20K0364-05 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/18/2020 09:25

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 12/07/2020 18:27

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting Limit	Result	Units	Notes
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC):				0.20			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC):				0.03			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, EMPC = ND):				0.20			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, EMPC = ND):				0.03			



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20K0364-05 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/18/2020 09:25

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 12/07/2020 18:27

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting Limit	Result	Units	Notes
Labeled compounds							
13C12-2,3,7,8-TCDF		0.769	0.655-0.886	24-169 %	67.9	%	
13C12-2,3,7,8-TCDD		0.790	0.655-0.886	25-164 %	69.7	%	
13C12-1,2,3,7,8-PeCDF		1.517	1.318-1.783	24-185 %	66.7	%	
13C12-2,3,4,7,8-PeCDF		1.532	1.318-1.783	21-178 %	64.9	%	
13C12-1,2,3,7,8-PeCDD		1.646	1.318-1.783	25-181 %	61.5	%	
13C12-1,2,3,4,7,8-HxCDF		0.492	0.434-0.587	26-152 %	73.7	%	
13C12-1,2,3,6,7,8-HxCDF		0.488	0.434-0.587	26-123 %	65.5	%	
13C12-2,3,4,6,7,8-HxCDF		0.504	0.434-0.587	28-136 %	67.6	%	
13C12-1,2,3,7,8,9-HxCDF		0.496	0.434-0.587	29-147 %	74.7	%	
13C12-1,2,3,4,7,8-HxCDD		1.298	1.054-1.426	32-141 %	72.9	%	
13C12-1,2,3,6,7,8-HxCDD		1.186	1.054-1.426	28-130 %	67.0	%	
13C12-1,2,3,4,6,7,8-HpCDF		0.433	0.374-0.506	28-143 %	57.7	%	
13C12-1,2,3,4,7,8,9-HpCDF		0.416	0.374-0.506	26-138 %	61.3	%	
13C12-1,2,3,4,6,7,8-HpCDD		1.082	0.893-1.208	23-140 %	62.0	%	
13C12-OCDD		0.890	0.757-1.024	17-157 %	40.4	%	
37Cl4-2,3,7,8-TCDD				35-197 %	83.0	%	



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20K0364-05 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/18/2020 09:25

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 12/07/2020 18:27

Analyte	DF/Split	Ion Ratio	Ratio Limits	EDL	Reporting	Result	Units	Notes
					Limit			



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COA_SS-2_3.5-5.5_20201118
20K0364-05 (Solid)

Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 11/18/2020 09:25

Instrument: ICPMS1 Analyst: MCB

Analyzed: 03/24/2021 15:05

Sample Preparation:

Preparation Method: SWN EPA 3050B

Extract ID: 20K0364-05 F 01

Preparation Batch: BJC0564

Sample Size: 1.064 g (wet)

Dry Weight: 0.87 g

Prepared: 03/22/2021

Final Volume: 50 mL

% Solids: 81.90

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Antimony	7440-36-0	20	0.02	0.23	ND	mg/kg	U
Chromium	7440-47-3	20	0.15	0.57	40.2	mg/kg	
Lead	7439-92-1	20	0.08	0.11	4.73	mg/kg	
Silver	7440-22-4	20	0.02	0.23	0.05	mg/kg	J



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COA_SS-2_3.5-5.5_20201118
20K0364-05 (Solid)

Metals and Metallic Compounds

Method: EPA 6020B UCT-KED

Sampled: 11/18/2020 09:25

Instrument: ICPMS1 Analyst: MCB

Analyzed: 03/23/2021 20:38

Sample Preparation:

Preparation Method: SWN EPA 3050B

Extract ID: 20K0364-05 F 01

Preparation Batch: BJC0564

Sample Size: 1.064 g (wet)

Dry Weight: 0.87 g

Prepared: 03/22/2021

Final Volume: 50 mL

% Solids: 81.90

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	20	0.03	0.23	6.05	mg/kg	
Cadmium	7440-43-9	20	0.03	0.11	0.05	mg/kg	J
Copper	7440-50-8	20	0.39	0.57	41.2	mg/kg	
Selenium	7782-49-2	20	0.50	0.57	0.83	mg/kg	
Zinc	7440-66-6	20	0.9	4.6	68.1	mg/kg	



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Reported:
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COA_SS-2_3.5-5.5_20201118
20K0364-05 (Solid)

Metals and Metallic Compounds

Method: EPA 7471B

Sampled: 11/18/2020 09:25

Instrument: HYDRA Analyst: BLC

Analyzed: 03/23/2021 12:17

Sample Preparation:

Preparation Method: SMM EPA 7471B

Extract ID: 20K0364-05 F

Preparation Batch: BJC0610

Sample Size: 0.26 g (wet)

Dry Weight: 0.21 g

Prepared: 03/23/2021

Final Volume: 50 mL

% Solids: 81.90

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.00493	0.0235	0.0377	mg/kg	H



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Reported:
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COA_SS-2_3.5-5.5_20201118
20K0364-05 (Solid)

Wet Chemistry

Method: EPA 9060A m

Sampled: 11/18/2020 09:25

Instrument: TOC Cube Analyst: BF

Analyzed: 11/26/2020 00:14

Sample Preparation:

Preparation Method: PSEP 1986 (modified)

Extract ID: 20K0364-05 F

Preparation Batch: BIK0802

Sample Size: 0.5875 g (wet)

Dry Weight: 0.48 g

Prepared: 11/25/2020

Final Volume: 0.5875 mL

% Solids: 81.90

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Organic Carbon		1	0.02	0.02	0.21	%	



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COA_SS-2_3.5-5.5_20201118
20K0364-05 (Solid)

Wet Chemistry

Method: PSEP 1986

Sampled: 11/18/2020 09:25

Instrument: BAL2 Analyst: UW

Analyzed: 11/23/2020 17:50

Sample Preparation:	Preparation Method: No Prep Wet Chem	Sample Size: 5 g (wet)	Extract ID: 20K0364-05
	Preparation Batch: BIK0734	Final Volume: 5 g	Dry Weight: 4.10 g
	Prepared: 11/23/2020		% Solids: 81.90

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Volatile Solids		1	0.01	0.01	1.68	%	

Sample Preparation:	Preparation Method: No Prep Wet Chem	Sample Size: 5 g (wet)	Extract ID: 20K0364-05
	Preparation Batch: BIK0735	Final Volume: 5 g	Dry Weight: 4.10 g
	Prepared: 11/23/2020		% Solids: 81.90

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Solids, Sulfide		1	0.04	0.04	79.26	%	



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COA_SS-2_3.5-5.5_20201118
20K0364-05 (Solid)

Wet Chemistry

Method: SM 2540 G-97

Sampled: 11/18/2020 09:25

Instrument: BAL2 Analyst: UW

Analyzed: 11/23/2020 17:50

Sample Preparation:

Preparation Method: No Prep Wet Chem

Extract ID: 20K0364-05

Preparation Batch: BIK0734

Sample Size: 5 g (wet)

Dry Weight: 4.10 g

Prepared: 11/23/2020

Final Volume: 5 g

% Solids: 81.90

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Solids		1	0.04	0.04	81.90	%	



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COA_SS-2_3.5-5.5_20201118
20K0364-05 (Solid)

Wet Chemistry

Method: SM 4500-NH3 H-97	Sampled: 11/18/2020 09:25
Instrument: LACHAT2 Analyst: LRB	Analyzed: 11/30/2020 14:45
Sample Preparation:	Preparation Method: MSA 33.3 (2M KCl)
	Preparation Batch: BIK0769
	Sample Size: 4.05 g (wet)
	Final Volume: 40 mL
	Extract ID: 20K0364-05 F
	Dry Weight: 3.32 g
	% Solids: 81.90

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Ammonia-N	7664-41-7	1	0.48	0.48	3.40	mg/kg NH3-N	



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Reported:
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COA_SS-2_3.5-5.5_20201118
20K0364-05 (Solid)

Wet Chemistry

Method: SM 4500-S2 D-00 (PSEP)

Sampled: 11/18/2020 09:25

Instrument: UV1800-1 Analyst: CDE

Analyzed: 12/03/2020 17:01

Sample Preparation:

Preparation Method: PSEP 1986

Extract ID: 20K0364-05 G

Preparation Batch: BIK0743

Sample Size: 5.398 g (wet)

Dry Weight: 4.28 g

Prepared: 11/24/2020

Final Volume: 100 mL

% Solids: 79.26

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Sulfide	18496-25-8	1	1.17	1.17	ND	mg/kg	U



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Reported:
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COA_SS-2_3.5-5.5_20201118
20K0364-05 (Solid)

Extractions

Method: ASTM D2216	Sampled: 11/18/2020 09:25	
Instrument: N/A Analyst: NL	Analyzed: 11/26/2020 05:10	
Sample Preparation:	Preparation Method: No Prep-Organics	Extract ID: 20K0364-05
	Preparation Batch: BIK0789	Dry Weight: 0.82 g
	Prepared: 11/25/2020	% Solids: 81.90
	Sample Size: 1 g (wet)	
	Final Volume: 1 g	

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Total Solids		1	0.01	82.02	%	



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COA_SS-2_3.5-5.5_20201118
20K0364-05 (Solid)

Extractions

Method: ASTM D2216

Sampled: 11/18/2020 09:25

Instrument: N/A Analyst: NL

Analyzed: 11/26/2020 05:10

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Labeled compounds						



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COA_SS-2_3.5-5.5_20201118
20K0364-05 (Solid)

Geotechnical Methods

Method: PSEP-PS

Sampled: 11/18/2020 09:25

Instrument: MT&C Analyst:

Analyzed: 01/11/2021 00:00

Analysis by: Materials Testing & Consulting, Inc. (Olympia)

Sample Preparation: Preparation Method: No Prep Geo
Preparation Batch: B011121
Prepared: 01/11/2021

Extract ID: 20K0364-05

Final Volume:

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Phi Size <-1	GS_GRAVEL	1	0.1	7.0	%	
Phi Size -1 to 0	GS_VCS	1	0.1	3.0	%	
Phi Size 0 to 1	GS_CS	1	0.1	4.3	%	
Phi Size 1 to 2	GS_MS	1	0.1	5.7	%	
Phi Size 2 to 3	GS_FS	1	0.1	8.9	%	
Phi Size 3 to 4	GS_VFS	1	0.1	6.2	%	
Phi Size 4 to 5	GS_CSILT	1	0.1	10.0	%	
Phi Size 5 to 6	GS_MSILT	1	0.1	9.4	%	
Phi Size 6 to 7	GS_FSILT	1	0.1	10.1	%	
Phi Size 7 to 8	GS_VFSILT	1	0.1	8.6	%	
Phi Size 8 to 9	GS_CCLAY	1	0.1	10.1	%	
Phi Size 9 to 10	GS_MCLAY	1	0.1	7.9	%	
Phi Size >10	GS_FCLAY	1	0.1	8.8	%	
Total Fines	GS_TOTFINES	1	0.1	64.9	%	



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Reported:
26-Mar-2021 16:06

COA_SS-2_3.5-5.5_20201118
20K0364-05RE1 (Solid)

Dioxins/Furans

Method: EPA 1613B			Sampled: 11/18/2020 09:25		
Instrument: AUTOSPEC01 Analyst: pk			Analyzed: 03/02/2021 18:29		
Sample Preparation:	Preparation Method: EPA 1613			Extract ID: 20K0364-05RE1 C 02	
	Preparation Batch: BJB0531	Sample Size: 12.2 g (wet)		Dry Weight: 10.01 g	
	Prepared: 02/23/2021	Final Volume: 20 uL		% Solids: 82.02	
Sample Cleanup:	Cleanup Method: Silica Gel			Extract ID: 20K0364-05RE1 C 02	
	Cleanup Batch: CJB0177	Initial Volume: 20 mL			
	Cleaned: 25-Feb-2021	Final Volume: 20 mL			
Sample Cleanup:	Cleanup Method: Sulfuric Acid			Extract ID: 20K0364-05RE1 C 02	
	Cleanup Batch: CJB0176	Initial Volume: 20 mL			
	Cleaned: 24-Feb-2021	Final Volume: 20 mL			
Sample Cleanup:	Cleanup Method: Florisil			Extract ID: 20K0364-05RE1 C 02	
	Cleanup Batch: CJB0178	Initial Volume: 20 mL			
	Cleaned: 25-Feb-2021	Final Volume: 20 mL			

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting		Result	Units	Notes
				EDL	Limit			
2,3,7,8-TCDF			0.655-0.886	0.058	0.079	0.999	ND	ng/kg U
2,3,7,8-TCDD			0.655-0.886	0.150	0.084	0.999	ND	ng/kg U
1,2,3,7,8-PeCDF			1.318-1.783	0.240	0.095	0.999	ND	ng/kg U
2,3,4,7,8-PeCDF			1.318-1.783	0.220	0.089	0.999	ND	ng/kg U
1,2,3,7,8-PeCDD			1.318-1.783	0.170	0.117	0.999	ND	ng/kg U
1,2,3,4,7,8-HxCDF			1.054-1.426	0.280	0.075	0.999	ND	ng/kg U
1,2,3,6,7,8-HxCDF			1.054-1.426	0.200	0.079	0.999	ND	ng/kg U
2,3,4,6,7,8-HxCDF			1.054-1.426	0.170	0.075	0.999	ND	ng/kg U
1,2,3,7,8,9-HxCDF			1.054-1.426	0.190	0.088	0.999	ND	ng/kg U
1,2,3,4,7,8-HxCDD			1.054-1.426	0.170	0.139	0.999	ND	ng/kg U
1,2,3,6,7,8-HxCDD			1.054-1.426	0.180	0.139	0.999	ND	ng/kg U
1,2,3,7,8,9-HxCDD		0.875	1.054-1.426	0.220	0.143	0.999	0.158	ng/kg EMPC, J
1,2,3,4,6,7,8-HpCDF		1.375	0.893-1.208	0.210	0.075	0.999	0.088	ng/kg EMPC, J
1,2,3,4,7,8,9-HpCDF			0.893-1.208	0.240	0.100	0.999	ND	ng/kg U
1,2,3,4,6,7,8-HpCDD		1.345	0.893-1.208	0.560	0.128	2.50	1.82	ng/kg EMPC, J
OCDF		0.871	0.757-1.024	1.10	0.179	2.50	0.459	ng/kg J, B
OCDD		0.878	0.757-1.024	4.60	0.251	9.99	27.5	ng/kg B
Homologue groups								
Total TCDF						0.999	ND	ng/kg U
Total TCDD						0.999	0.213	ng/kg J
Total PeCDF						0.999	0.066	ng/kg J
Total PeCDD						0.999	ND	ng/kg U
Total HxCDF						0.999	ND	ng/kg U
Total HxCDD						0.999	ND	ng/kg U
Total HpCDF						0.999	ND	ng/kg U
Total HpCDD						0.999	2.48	ng/kg



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Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:06

COA_SS-2_3.5-5.5_20201118
20K0364-05RE1 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/18/2020 09:25

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 03/02/2021 18:29

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting Limit	Result	Units	Notes
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC):				0.19			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC):				0.04			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, EMPC = ND):				0.18			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, EMPC = ND):				0.01			



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20K0364-05RE1 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/18/2020 09:25

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 03/02/2021 18:29

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting Limit	Result	Units	Notes
Labeled compounds							
13C12-2,3,7,8-TCDF		0.780	0.655-0.886	24-169 %	84.7	%	
13C12-2,3,7,8-TCDD		0.791	0.655-0.886	25-164 %	81.7	%	
13C12-1,2,3,7,8-PeCDF		1.431	1.318-1.783	24-185 %	78.2	%	
13C12-2,3,4,7,8-PeCDF		1.530	1.318-1.783	21-178 %	78.3	%	
13C12-1,2,3,7,8-PeCDD		1.605	1.318-1.783	25-181 %	75.8	%	
13C12-1,2,3,4,7,8-HxCDF		0.512	0.434-0.587	26-152 %	88.0	%	
13C12-1,2,3,6,7,8-HxCDF		0.519	0.434-0.587	26-123 %	84.7	%	
13C12-2,3,4,6,7,8-HxCDF		0.510	0.434-0.587	28-136 %	86.8	%	
13C12-1,2,3,7,8,9-HxCDF		0.521	0.434-0.587	29-147 %	86.0	%	
13C12-1,2,3,4,7,8-HxCDD		1.228	1.054-1.426	32-141 %	84.2	%	
13C12-1,2,3,6,7,8-HxCDD		1.211	1.054-1.426	28-130 %	78.8	%	
13C12-1,2,3,4,6,7,8-HpCDF		0.411	0.374-0.506	28-143 %	82.2	%	
13C12-1,2,3,4,7,8,9-HpCDF		0.438	0.374-0.506	26-138 %	81.3	%	
13C12-1,2,3,4,6,7,8-HpCDD		1.045	0.893-1.208	23-140 %	84.8	%	
13C12-OCDD		0.870	0.757-1.024	17-157 %	62.4	%	
37Cl4-2,3,7,8-TCDD				35-197 %	92.4	%	



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Reported:
26-Mar-2021 16:06

COA_SS-3_1-3_20201118
20K0364-08 (Solid)

Semivolatile Organic Compounds

Method: EPA 8270E		Sampled: 11/18/2020 14:20	
Instrument: NT10 Analyst: VTS		Analyzed: 12/22/2020 20:02	
Sample Preparation:	Preparation Method: EPA 3546 (Microwave)	Extract ID: 20K0364-08 B 03	
	Preparation Batch: BIK0843	Dry Weight: 10.02 g	
	Prepared: 11/30/2020	% Solids: 78.64	
Sample Cleanup:	Cleanup Method: GPC	Extract ID: 20K0364-08 B 03	
	Cleanup Batch: CIL0220	Initial Volume: 1 uL	
	Cleaned: 16-Dec-2020	Final Volume: 1 uL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Phenol	108-95-2	1	8.2	20.0	ND	ug/kg	U
Benzyl Alcohol	100-51-6	1	14.9	20.0	ND	ug/kg	U
2-Methylphenol	95-48-7	1	7.8	20.0	ND	ug/kg	U
Hexachloroethane	67-72-1	1	5.6	20.0	ND	ug/kg	U
4-Methylphenol	106-44-5	1	14.7	20.0	ND	ug/kg	U
Naphthalene	91-20-3	1	5.2	20.0	36.1	ug/kg	
Benzoic acid	65-85-0	1	59.0	200	ND	ug/kg	U
2-Methylnaphthalene	91-57-6	1	5.7	20.0	ND	ug/kg	U
Acenaphthylene	208-96-8	1	4.8	20.0	ND	ug/kg	U
Dimethylphthalate	131-11-3	1	6.4	20.0	ND	ug/kg	U
Acenaphthene	83-32-9	1	5.1	20.0	5.6	ug/kg	J
Dibenzofuran	132-64-9	1	4.6	20.0	6.9	ug/kg	J
Fluorene	86-73-7	1	4.9	20.0	7.6	ug/kg	J
Diethyl phthalate	84-66-2	1	17.7	20.0	31.6	ug/kg	
N-Nitrosodiphenylamine	86-30-6	1	9.6	20.0	ND	ug/kg	U
Hexachlorobenzene	118-74-1	1	4.7	20.0	ND	ug/kg	U
Pentachlorophenol	87-86-5	1	31.2	99.8	ND	ug/kg	U
Phenanthrene	85-01-8	1	4.7	20.0	30.0	ug/kg	
Anthracene	120-12-7	1	5.9	20.0	15.8	ug/kg	J
Di-n-Butylphthalate	84-74-2	1	5.3	20.0	ND	ug/kg	U
Fluoranthene	206-44-0	1	4.5	20.0	42.0	ug/kg	
Pyrene	129-00-0	1	5.5	20.0	57.0	ug/kg	
Butylbenzylphthalate	85-68-7	1	8.0	20.0	ND	ug/kg	U
Benzo(a)anthracene	56-55-3	1	5.2	20.0	23.6	ug/kg	
Chrysene	218-01-9	1	5.2	20.0	65.4	ug/kg	
bis(2-Ethylhexyl)phthalate	117-81-7	1	28.7	49.9	49.4	ug/kg	J
Di-n-Octylphthalate	117-84-0	1	8.7	20.0	ND	ug/kg	U
Benzo(a)fluoranthene, Total		1	10.2	39.9	76.2	ug/kg	
Benzo(a)pyrene	50-32-8	1	6.5	20.0	25.1	ug/kg	
Indeno(1,2,3-cd)pyrene	193-39-5	1	6.0	20.0	11.9	ug/kg	J
Dibenzo(a,h)anthracene	53-70-3	1	6.1	20.0	6.3	ug/kg	J
Benzo(g,h,i)perylene	191-24-2	1	5.8	20.0	13.5	ug/kg	J



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Reported:
26-Mar-2021 16:06

COA_SS-3_1-3_20201118
20K0364-08 (Solid)

Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 11/18/2020 14:20

Instrument: NT10 Analyst: VTS

Analyzed: 12/22/2020 20:02

Analyte	CAS Number	Recovery	Recovery	Units	Notes
		Limits			
Surrogate: 2-Fluorophenol		27-120 %	70.1	%	
Surrogate: Phenol-d5		29-120 %	75.0	%	Q
Surrogate: 2-Chlorophenol-d4		31-120 %	78.8	%	
Surrogate: 1,2-Dichlorobenzene-d4		32-120 %	66.9	%	
Surrogate: Nitrobenzene-d5		30-120 %	89.2	%	
Surrogate: 2-Fluorobiphenyl		35-120 %	82.0	%	
Surrogate: 2,4,6-Tribromophenol		24-134 %	79.7	%	
Surrogate: p-Terphenyl-d14		37-120 %	96.4	%	



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COA_SS-3_1-3_20201118
20K0364-08 (Solid)

Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM		Sampled: 11/18/2020 14:20
Instrument: NT10 Analyst: VTS		Analyzed: 12/22/2020 20:02
Sample Preparation:	Preparation Method: EPA 3546 (Microwave) Preparation Batch: BIK0843 Prepared: 11/30/2020	Extract ID: 20K0364-08 B 03 Dry Weight: 10.02 g % Solids: 78.64
Sample Cleanup:	Cleanup Method: GPC Cleanup Batch: CIL0220 Cleaned: 16-Dec-2020	Initial Volume: 1 uL Final Volume: 1 uL Extract ID: 20K0364-08 B 03

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
1,4-Dichlorobenzene	106-46-7	1	0.6	5.0	ND	ug/kg	U
1,2-Dichlorobenzene	95-50-1	1	0.7	5.0	ND	ug/kg	U
2,4-Dimethylphenol	105-67-9	1	2.2	20.0	ND	ug/kg	U
1,2,4-Trichlorobenzene	120-82-1	1	2.7	5.0	ND	ug/kg	U
Hexachlorobutadiene	87-68-3	1	0.7	5.0	ND	ug/kg	U
<i>Surrogate: 2-Fluorophenol</i>				27-120 %	73.0	%	
<i>Surrogate: p-Terphenyl-d14</i>				37-120 %	87.4	%	



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Reported:
26-Mar-2021 16:06

COA_SS-3_1-3_20201118
20K0364-08 (Solid)

Butyl Tins

Method: EPA 8270E-SIM			Sampled: 11/18/2020 14:20
Instrument: NT8 Analyst: JZ			Analyzed: 12/17/2020 16:02
Sample Preparation:	Preparation Method: EPA 3546 (Microwave)		Extract ID: 20K0364-08 B 04
	Preparation Batch: BIK0863	Sample Size: 6.44 g (wet)	Dry Weight: 5.06 g
	Prepared: 11/30/2020	Final Volume: 0.5 mL	% Solids: 78.64
Sample Cleanup:	Cleanup Method: Silica Gel		Extract ID: 20K0364-08 B 04
	Cleanup Batch: CIL0161	Initial Volume: 0.5 mL	
	Cleaned: 16-Dec-2020	Final Volume: 0.5 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Tributyltin Ion	36643-28-4	1	0.444	3.81	0.958	ug/kg	J
Dibutyltin Ion	14488-53-0	1	1.71	5.71	ND	ug/kg	U
Butyltin Ion	78763-54-9	1	1.87	4.03	ND	ug/kg	U
Tetrabutyltin	1461-25-2	1	4.94	4.94	ND	ug/kg	U
Surrogate: Tripentyltin					30-160 %	108	%
Surrogate: Tripropyltin					30-160 %	69.3	%



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Reported:
26-Mar-2021 16:06

COA_SS-3_1-3_20201118
20K0364-08 (Solid)

Chlorinated Pesticides

Method: EPA 8081B		Sampled: 11/18/2020 14:20	
Instrument: ECD6 Analyst: YZ/VTs		Analyzed: 03/15/2021 19:13	
Sample Preparation:	Preparation Method: EPA 3546 (Microwave)	Extract ID: 20K0364-08 B 06	
	Preparation Batch: BJB0764	Sample Size: 15.96 g (wet)	Dry Weight: 12.55 g
	Prepared: 02/26/2021	Final Volume: 2.5 mL	% Solids: 78.64
Sample Cleanup:	Cleanup Method: Silica Gel	Extract ID: 20K0364-08 B 06	
	Cleanup Batch: CJC0097	Initial Volume: 2.5 mL	
	Cleaned: 09-Mar-2021	Final Volume: 2.5 mL	
Sample Cleanup:	Cleanup Method: Sulfur	Extract ID: 20K0364-08 B 06	
	Cleanup Batch: CJC0096	Initial Volume: 2.5 mL	
	Cleaned: 09-Mar-2021	Final Volume: 2.5 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Heptachlor	76-44-8	1	0.05	0.50	ND	ug/kg	U
Aldrin	309-00-2	1	0.37	0.50	ND	ug/kg	U
trans-Chlordane (beta-Chlordane)	5103-74-2	1	0.33	0.50	ND	ug/kg	U
cis-Chlordane (alpha-chlordane)	5103-71-9	1	0.11	0.50	ND	ug/kg	U
4,4'-DDE	72-55-9	1	0.13	1.00	ND	ug/kg	U
Dieldrin	60-57-1	1	0.11	1.00	ND	ug/kg	U
4,4'-DDD	72-54-8	1	0.32	1.00	ND	ug/kg	U
4,4'-DDT	50-29-3	1	0.32	1.00	ND	ug/kg	U
Oxychlordane	27304-13-8	1	0.13	1.00	ND	ug/kg	U
cis-Nonachlor	5103-73-1	1	0.21	1.00	ND	ug/kg	U
trans-Nonachlor	39765-80-5	1	0.23	1.00	ND	ug/kg	U
Surrogate: Decachlorobiphenyl				30-160 %	77.2	%	
Surrogate: Decachlorobiphenyl [2C]				30-160 %	66.9	%	
Surrogate: Tetrachlorometaxylene				30-160 %	65.8	%	
Surrogate: Tetrachlorometaxylene [2C]				30-160 %	61.6	%	



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COA_SS-3_1-3_20201118
20K0364-08 (Solid)

Aroclor PCB

Method: EPA 8082A		Sampled: 11/18/2020 14:20	
Instrument: ECD7 Analyst: JGR		Analyzed: 12/19/2020 17:14	
Sample Preparation:	Preparation Method: EPA 3546 (Microwave)	Extract ID: 20K0364-08 B 01	
	Preparation Batch: BIK0842	Dry Weight: 12.53 g	
	Prepared: 11/28/2020	% Solids: 78.64	
Sample Cleanup:	Cleanup Method: Silica Gel	Extract ID: 20K0364-08 B 01	
	Cleanup Batch: CIL0203	Initial Volume: 2.5 mL	
	Cleaned: 19-Dec-2020	Final Volume: 2.5 mL	
Sample Cleanup:	Cleanup Method: Sulfuric Acid	Extract ID: 20K0364-08 B 01	
	Cleanup Batch: CIL0201	Initial Volume: 2.5 mL	
	Cleaned: 19-Dec-2020	Final Volume: 2.5 mL	
Sample Cleanup:	Cleanup Method: Sulfur	Extract ID: 20K0364-08 B 01	
	Cleanup Batch: CIL0202	Initial Volume: 2.5 mL	
	Cleaned: 19-Dec-2020	Final Volume: 2.5 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Aroclor 1016	12674-11-2	1	1.6	4.0	ND	ug/kg	U
Aroclor 1221	11104-28-2	1	1.6	4.0	ND	ug/kg	U
Aroclor 1232	11141-16-5	1	1.6	4.0	ND	ug/kg	U
Aroclor 1242	53469-21-9	1	1.6	4.0	ND	ug/kg	U
Aroclor 1248	12672-29-6	1	1.6	4.0	ND	ug/kg	U
Aroclor 1254	11097-69-1	1	1.6	4.0	ND	ug/kg	U
Aroclor 1260	11096-82-5	1	0.6	4.0	ND	ug/kg	U
Aroclor 1262	37324-23-5	1	0.6	4.0	ND	ug/kg	U
Aroclor 1268	11100-14-4	1	0.6	4.0	ND	ug/kg	U
Surrogate: Decachlorobiphenyl				40-126 %	69.4	%	
Surrogate: Tetrachlorometaxylene				44-120 %	73.6	%	
Surrogate: Decachlorobiphenyl [2C]				40-126 %	84.6	%	
Surrogate: Tetrachlorometaxylene [2C]				44-120 %	71.2	%	



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26-Mar-2021 16:06

COA_SS-3_1-3_20201118
20K0364-08 (Solid)

Dioxins/Furans

Method: EPA 1613B			Sampled: 11/18/2020 14:20		
Instrument: AUTOSPEC01 Analyst: pk			Analyzed: 12/07/2020 19:16		
Sample Preparation:	Preparation Method: EPA 1613			Extract ID: 20K0364-08 A 01	
	Preparation Batch: BIL0036	Sample Size: 12.63 g (wet)		Dry Weight: 10.03 g	
	Prepared: 12/03/2020	Final Volume: 20 uL		% Solids: 79.42	
Sample Cleanup:	Cleanup Method: Silica Gel			Extract ID: 20K0364-08 A 01	
	Cleanup Batch: CIL0058	Initial Volume: 20 mL			
	Cleaned: 05-Dec-2020	Final Volume: 20 mL			
Sample Cleanup:	Cleanup Method: Sulfuric Acid			Extract ID: 20K0364-08 A 01	
	Cleanup Batch: CIL0057	Initial Volume: 20 mL			
	Cleaned: 04-Dec-2020	Final Volume: 20 mL			
Sample Cleanup:	Cleanup Method: Florisil			Extract ID: 20K0364-08 A 01	
	Cleanup Batch: CIL0059	Initial Volume: 20 mL			
	Cleaned: 05-Dec-2020	Final Volume: 20 mL			

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting		Result	Units	Notes
				EDL	Limit			
2,3,7,8-TCDF			0.655-0.886	0.063	0.119	0.997	ND	ng/kg U
2,3,7,8-TCDD			0.655-0.886	0.140	0.101	0.997	ND	ng/kg U
1,2,3,7,8-PeCDF			1.318-1.783	0.150	0.155	0.997	ND	ng/kg U
2,3,4,7,8-PeCDF			1.318-1.783	0.150	0.148	0.997	ND	ng/kg U
1,2,3,7,8-PeCDD			1.318-1.783	0.179	0.172	0.997	ND	ng/kg U
1,2,3,4,7,8-HxCDF			1.054-1.426	0.140	0.086	0.997	ND	ng/kg U
1,2,3,6,7,8-HxCDF			1.054-1.426	0.179	0.085	0.997	ND	ng/kg U
2,3,4,6,7,8-HxCDF			1.054-1.426	0.110	0.083	0.997	ND	ng/kg U
1,2,3,7,8,9-HxCDF			1.054-1.426	0.209	0.094	0.997	ND	ng/kg U
1,2,3,4,7,8-HxCDD			1.054-1.426	0.179	0.146	0.997	ND	ng/kg U
1,2,3,6,7,8-HxCDD		3.210	1.054-1.426	0.150	0.133	0.997	0.191	ng/kg EMPC, J
1,2,3,7,8,9-HxCDD			1.054-1.426	0.219	0.158	0.997	ND	ng/kg U
1,2,3,4,6,7,8-HpCDF		1.041	0.893-1.208	0.209	0.084	0.997	1.11	ng/kg
1,2,3,4,7,8,9-HpCDF			0.893-1.208	0.160	0.120	0.997	ND	ng/kg U
1,2,3,4,6,7,8-HpCDD		1.082	0.893-1.208	0.558	0.248	2.49	5.38	ng/kg
OCDF		1.014	0.757-1.024	1.10	0.393	2.49	3.38	ng/kg
OCDD		0.936	0.757-1.024	4.29	0.710	9.97	68.4	ng/kg B
Homologue groups								
Total TCDF						0.997	ND	ng/kg U
Total TCDD						0.997	0.243	ng/kg J
Total PeCDF						0.997	ND	ng/kg U
Total PeCDD						0.997	ND	ng/kg U
Total HxCDF						0.997	0.974	ng/kg J
Total HxCDD						0.997	0.855	ng/kg J
Total HpCDF						0.997	3.44	ng/kg
Total HpCDD						0.997	16.3	ng/kg B



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:06

COA_SS-3_1-3_20201118
20K0364-08 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/18/2020 14:20

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 12/07/2020 19:16

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting Limit	Result	Units	Notes
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC):				0.31			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC):				0.11			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, EMPC = ND):				0.30			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, EMPC = ND):				0.09			



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Reported:
26-Mar-2021 16:06

COA_SS-3_1-3_20201118
20K0364-08 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/18/2020 14:20

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 12/07/2020 19:16

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting Limit	Result	Units	Notes
Labeled compounds							
13C12-2,3,7,8-TCDF		0.779	0.655-0.886	24-169 %	73.3	%	
13C12-2,3,7,8-TCDD		0.788	0.655-0.886	25-164 %	75.3	%	
13C12-1,2,3,7,8-PeCDF		1.619	1.318-1.783	24-185 %	65.5	%	
13C12-2,3,4,7,8-PeCDF		1.565	1.318-1.783	21-178 %	62.2	%	
13C12-1,2,3,7,8-PeCDD		1.717	1.318-1.783	25-181 %	57.3	%	
13C12-1,2,3,4,7,8-HxCDF		0.497	0.434-0.587	26-152 %	82.9	%	
13C12-1,2,3,6,7,8-HxCDF		0.488	0.434-0.587	26-123 %	74.1	%	
13C12-2,3,4,6,7,8-HxCDF		0.498	0.434-0.587	28-136 %	78.1	%	
13C12-1,2,3,7,8,9-HxCDF		0.492	0.434-0.587	29-147 %	92.5	%	
13C12-1,2,3,4,7,8-HxCDD		1.267	1.054-1.426	32-141 %	83.1	%	
13C12-1,2,3,6,7,8-HxCDD		1.290	1.054-1.426	28-130 %	81.6	%	
13C12-1,2,3,4,6,7,8-HpCDF		0.418	0.374-0.506	28-143 %	69.0	%	
13C12-1,2,3,4,7,8,9-HpCDF		0.445	0.374-0.506	26-138 %	75.7	%	
13C12-1,2,3,4,6,7,8-HpCDD		1.066	0.893-1.208	23-140 %	77.0	%	
13C12-OCDD		0.941	0.757-1.024	17-157 %	52.2	%	
37Cl4-2,3,7,8-TCDD				35-197 %	82.8	%	



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Reported:
26-Mar-2021 16:06

COA_SS-3_1-3_20201118
20K0364-08 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/18/2020 14:20

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 12/07/2020 19:16

Analyte	DF/Split	Ion Ratio	Ratio Limits	EDL	Reporting	Result	Units	Notes
					Limit			



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Reported:
26-Mar-2021 16:06

COA_SS-3_1-3_20201118
20K0364-08 (Solid)

Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 11/18/2020 14:20

Instrument: ICPMS1 Analyst: MCB

Analyzed: 03/23/2021 21:34

Sample Preparation:

Preparation Method: SWN EPA 3050B

Extract ID: 20K0364-08 D 01

Preparation Batch: BJC0564

Sample Size: 1.011 g (wet)

Dry Weight: 0.80 g

Prepared: 03/22/2021

Final Volume: 50 mL

% Solids: 79.58

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Antimony	7440-36-0	20	0.02	0.25	ND	mg/kg	U
Chromium	7440-47-3	20	0.16	0.62	23.6	mg/kg	
Lead	7439-92-1	20	0.08	0.12	2.41	mg/kg	
Silver	7440-22-4	20	0.02	0.25	0.05	mg/kg	J



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Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:06

COA_SS-3_1-3_20201118
20K0364-08 (Solid)

Metals and Metallic Compounds

Method: EPA 6020B UCT-KED

Sampled: 11/18/2020 14:20

Instrument: ICPMS1 Analyst: MCB

Analyzed: 03/23/2021 21:34

Sample Preparation:

Preparation Method: SWN EPA 3050B

Extract ID: 20K0364-08 D 01

Preparation Batch: BJC0564

Sample Size: 1.011 g (wet)

Dry Weight: 0.80 g

Prepared: 03/22/2021

Final Volume: 50 mL

% Solids: 79.58

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	20	0.03	0.25	3.78	mg/kg	
Cadmium	7440-43-9	20	0.04	0.12	0.25	mg/kg	
Copper	7440-50-8	20	0.42	0.62	8.34	mg/kg	
Selenium	7782-49-2	20	0.55	0.62	ND	mg/kg	U
Zinc	7440-66-6	20	1.0	5.0	27.6	mg/kg	



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Reported:
26-Mar-2021 16:06

COA_SS-3_1-3_20201118
20K0364-08 (Solid)

Metals and Metallic Compounds

Method: EPA 7471B

Sampled: 11/18/2020 14:20

Instrument: HYDRA Analyst: BLC

Analyzed: 03/23/2021 12:20

Sample Preparation:

Preparation Method: SMM EPA 7471B

Extract ID: 20K0364-08 D

Preparation Batch: BJC0610

Sample Size: 0.256 g (wet)

Dry Weight: 0.20 g

Prepared: 03/23/2021

Final Volume: 50 mL

% Solids: 79.58

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.00515	0.0245	0.0190	mg/kg	H, J



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Reported:
26-Mar-2021 16:06

COA_SS-3_1-3_20201118
20K0364-08 (Solid)

Wet Chemistry

Method: EPA 9060A m

Sampled: 11/18/2020 14:20

Instrument: TOC Cube Analyst: BF

Analyzed: 11/26/2020 00:45

Sample Preparation:

Preparation Method: PSEP 1986 (modified)

Extract ID: 20K0364-08 B

Preparation Batch: BIK0802

Sample Size: 0.5312 g (wet)

Dry Weight: 0.42 g

Prepared: 11/25/2020

Final Volume: 0.5312 mL

% Solids: 79.58

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Organic Carbon		1	0.02	0.02	1.12	%	



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Reported:
26-Mar-2021 16:06

COA_SS-3_1-3_20201118
20K0364-08 (Solid)

Wet Chemistry

Method: PSEP 1986
Instrument: BAL2 Analyst: UW

Sampled: 11/18/2020 14:20

Analyzed: 11/23/2020 17:50

Sample Preparation: Preparation Method: No Prep Wet Chem
Preparation Batch: BIK0734 Sample Size: 5 g (wet)
Prepared: 11/23/2020 Final Volume: 5 g

Extract ID: 20K0364-08

Dry Weight: 3.98 g

% Solids: 79.58

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Volatile Solids		1	0.01	0.01	1.61	%	

Sample Preparation: Preparation Method: No Prep Wet Chem
Preparation Batch: BIK0735 Sample Size: 5 g (wet)
Prepared: 11/23/2020 Final Volume: 5 g

Extract ID: 20K0364-08

Dry Weight: 3.98 g

% Solids: 79.58

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Solids, Sulfide		1	0.04	0.04	74.41	%	



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Reported:
26-Mar-2021 16:06

COA_SS-3_1-3_20201118
20K0364-08 (Solid)

Wet Chemistry

Method: SM 2540 G-97

Sampled: 11/18/2020 14:20

Instrument: BAL2 Analyst: UW

Analyzed: 11/23/2020 17:50

Sample Preparation:

Preparation Method: No Prep Wet Chem

Extract ID: 20K0364-08

Preparation Batch: BIK0734

Sample Size: 5 g (wet)

Dry Weight: 3.98 g

Prepared: 11/23/2020

Final Volume: 5 g

% Solids: 79.58

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Solids		1	0.04	0.04	79.58	%	



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Reported:
26-Mar-2021 16:06

COA_SS-3_1-3_20201118
20K0364-08 (Solid)

Wet Chemistry

Method: SM 4500-NH3 H-97

Sampled: 11/18/2020 14:20

Instrument: LACHAT2 Analyst: LRB

Analyzed: 11/30/2020 14:53

Sample Preparation:

Preparation Method: MSA 33.3 (2M KCl)

Extract ID: 20K0364-08 B

Preparation Batch: BIK0769

Sample Size: 4.48 g (wet)

Dry Weight: 3.57 g

Prepared: 11/24/2020

Final Volume: 40 mL

% Solids: 79.58

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Ammonia-N	7664-41-7	1	0.45	0.45	5.00	mg/kg NH3-N	



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Reported:
26-Mar-2021 16:06

COA_SS-3_1-3_20201118
20K0364-08 (Solid)

Wet Chemistry

Method: SM 4500-S2 D-00 (PSEP)

Sampled: 11/18/2020 14:20

Instrument: UV1800-1 Analyst: CDE

Analyzed: 12/03/2020 17:01

Sample Preparation:

Preparation Method: PSEP 1986

Extract ID: 20K0364-08 E

Preparation Batch: BIK0743

Sample Size: 5.264 g (wet)

Dry Weight: 3.92 g

Prepared: 11/24/2020

Final Volume: 100 mL

% Solids: 74.41

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Sulfide	18496-25-8	10	12.8	12.8	157	mg/kg	D



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Reported:
26-Mar-2021 16:06

COA_SS-3_1-3_20201118
20K0364-08 (Solid)

Extractions

Method: ASTM D2216	Sampled: 11/18/2020 14:20	
Instrument: N/A Analyst: NL	Analyzed: 11/26/2020 05:10	
Sample Preparation:	Preparation Method: No Prep-Organics	Extract ID: 20K0364-08
	Preparation Batch: BIK0789	Dry Weight: 0.80 g
	Prepared: 11/25/2020	% Solids: 79.58
	Sample Size: 1 g (wet)	
	Final Volume: 1 g	

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Total Solids		1	0.01	79.42	%	
Labeled compounds						



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Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:06

COA_SS-3_1-3_20201118
20K0364-08RE1 (Solid)

Dioxins/Furans

Method: EPA 1613B		Sampled: 11/18/2020 14:20	
Instrument: AUTOSPEC01 Analyst: pk		Analyzed: 03/02/2021 21:04	
Sample Preparation:	Preparation Method: EPA 1613	Extract ID: 20K0364-08RE1 A 02	
	Preparation Batch: BJB0531	Sample Size: 12.65 g (wet)	Dry Weight: 10.05 g
	Prepared: 02/23/2021	Final Volume: 20 uL	% Solids: 79.42
Sample Cleanup:	Cleanup Method: Silica Gel	Extract ID: 20K0364-08RE1 A 02	
	Cleanup Batch: CJB0177	Initial Volume: 20 mL	
	Cleaned: 25-Feb-2021	Final Volume: 20 mL	
Sample Cleanup:	Cleanup Method: Sulfuric Acid	Extract ID: 20K0364-08RE1 A 02	
	Cleanup Batch: CJB0176	Initial Volume: 20 mL	
	Cleaned: 24-Feb-2021	Final Volume: 20 mL	
Sample Cleanup:	Cleanup Method: Florisil	Extract ID: 20K0364-08RE1 A 02	
	Cleanup Batch: CJB0178	Initial Volume: 20 mL	
	Cleaned: 25-Feb-2021	Final Volume: 20 mL	

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting		Result	Units	Notes
				EDL	Limit			
2,3,7,8-TCDF		0.980	0.655-0.886	0.058	0.094	0.995	1.24	ng/kg
2,3,7,8-TCDD			0.655-0.886	0.149	0.087	0.995	ND	ng/kg
1,2,3,7,8-PeCDF		1.987	1.318-1.783	0.239	0.210	0.995	1.71	ng/kg
2,3,4,7,8-PeCDF		1.683	1.318-1.783	0.219	0.196	0.995	3.02	ng/kg
1,2,3,7,8-PeCDD		2.036	1.318-1.783	0.169	0.103	0.995	0.774	ng/kg
1,2,3,4,7,8-HxCDF		1.313	1.054-1.426	0.279	0.076	0.995	2.93	ng/kg
1,2,3,6,7,8-HxCDF		1.133	1.054-1.426	0.199	0.081	0.995	2.95	ng/kg
2,3,4,6,7,8-HxCDF		1.273	1.054-1.426	0.169	0.074	0.995	3.44	ng/kg
1,2,3,7,8,9-HxCDF		1.189	1.054-1.426	0.189	0.083	0.995	0.692	ng/kg
1,2,3,4,7,8-HxCDD		1.485	1.054-1.426	0.169	0.097	0.995	0.333	ng/kg
1,2,3,6,7,8-HxCDD		1.334	1.054-1.426	0.179	0.095	0.995	1.46	ng/kg
1,2,3,7,8,9-HxCDD		1.275	1.054-1.426	0.219	0.099	0.995	0.630	ng/kg
1,2,3,4,6,7,8-HpCDF		1.019	0.893-1.208	0.209	0.102	0.995	12.1	ng/kg
1,2,3,4,7,8,9-HpCDF		0.877	0.893-1.208	0.239	0.130	0.995	0.733	ng/kg
1,2,3,4,6,7,8-HpCDD		1.048	0.893-1.208	0.557	0.281	2.49	27.9	ng/kg
OCDF		0.911	0.757-1.024	1.09	0.222	2.49	17.6	ng/kg
OCDD		0.905	0.757-1.024	4.58	0.402	9.95	213	ng/kg
Homologue groups								
Total TCDF						0.995	23.2	ng/kg
Total TCDD						0.995	1.86	ng/kg
Total PeCDF						0.995	23.8	ng/kg
Total PeCDD						0.995	0.797	ng/kg
Total HxCDF						0.995	27.3	ng/kg
Total HxCDD						0.995	5.72	ng/kg
Total HpCDF						0.995	27.2	ng/kg
Total HpCDD						0.995	48.5	ng/kg



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Reported:
26-Mar-2021 16:06

COA_SS-3_1-3_20201118
20K0364-08RE1 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/18/2020 14:20

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 03/02/2021 21:04

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting Limit	Result	Units	Notes
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC):				3.62			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC):				3.58			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, EMPC = ND):				3.12			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, EMPC = ND):				2.59			



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Reported:
26-Mar-2021 16:06

COA_SS-3_1-3_20201118
20K0364-08RE1 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/18/2020 14:20

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 03/02/2021 21:04

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting Limit	Result	Units	Notes
Labeled compounds							
13C12-2,3,7,8-TCDF		0.773	0.655-0.886	24-169 %	88.7	%	
13C12-2,3,7,8-TCDD		0.801	0.655-0.886	25-164 %	82.7	%	
13C12-1,2,3,7,8-PeCDF		1.505	1.318-1.783	24-185 %	82.0	%	
13C12-2,3,4,7,8-PeCDF		1.507	1.318-1.783	21-178 %	81.3	%	
13C12-1,2,3,7,8-PeCDD		1.572	1.318-1.783	25-181 %	77.4	%	
13C12-1,2,3,4,7,8-HxCDF		0.506	0.434-0.587	26-152 %	87.9	%	
13C12-1,2,3,6,7,8-HxCDF		0.532	0.434-0.587	26-123 %	85.8	%	
13C12-2,3,4,6,7,8-HxCDF		0.519	0.434-0.587	28-136 %	88.6	%	
13C12-1,2,3,7,8,9-HxCDF		0.523	0.434-0.587	29-147 %	99.6	%	
13C12-1,2,3,4,7,8-HxCDD		1.261	1.054-1.426	32-141 %	83.3	%	
13C12-1,2,3,6,7,8-HxCDD		1.255	1.054-1.426	28-130 %	82.3	%	
13C12-1,2,3,4,6,7,8-HpCDF		0.432	0.374-0.506	28-143 %	82.0	%	
13C12-1,2,3,4,7,8,9-HpCDF		0.433	0.374-0.506	26-138 %	84.8	%	
13C12-1,2,3,4,6,7,8-HpCDD		1.116	0.893-1.208	23-140 %	87.9	%	
13C12-OCDD		0.902	0.757-1.024	17-157 %	71.2	%	
37Cl4-2,3,7,8-TCDD				35-197 %	92.5	%	



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Reported:
26-Mar-2021 16:06

COA_SS-3_3-5_20201118
20K0364-09 (Solid)

Semivolatile Organic Compounds

Method: EPA 8270E		Sampled: 11/18/2020 14:30	
Instrument: NT10 Analyst: VTS		Analyzed: 12/22/2020 20:39	
Sample Preparation:	Preparation Method: EPA 3546 (Microwave)	Extract ID: 20K0364-09 D 03	
	Preparation Batch: BIK0843	Dry Weight: 10.02 g	
	Prepared: 11/30/2020	% Solids: 87.79	
Sample Cleanup:	Cleanup Method: GPC	Extract ID: 20K0364-09 D 03	
	Cleanup Batch: CIL0220	Initial Volume: 1 uL	
	Cleaned: 16-Dec-2020	Final Volume: 1 uL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Phenol	108-95-2	1	8.2	20.0	ND	ug/kg	U
Benzyl Alcohol	100-51-6	1	14.9	20.0	ND	ug/kg	U
2-Methylphenol	95-48-7	1	7.8	20.0	ND	ug/kg	U
Hexachloroethane	67-72-1	1	5.6	20.0	ND	ug/kg	U
4-Methylphenol	106-44-5	1	14.7	20.0	ND	ug/kg	U
Naphthalene	91-20-3	1	5.2	20.0	ND	ug/kg	U
Benzoic acid	65-85-0	1	59.0	200	ND	ug/kg	U
2-Methylnaphthalene	91-57-6	1	5.7	20.0	ND	ug/kg	U
Acenaphthylene	208-96-8	1	4.8	20.0	ND	ug/kg	U
Dimethylphthalate	131-11-3	1	6.4	20.0	ND	ug/kg	U
Acenaphthene	83-32-9	1	5.1	20.0	ND	ug/kg	U
Dibenzofuran	132-64-9	1	4.6	20.0	ND	ug/kg	U
Fluorene	86-73-7	1	4.9	20.0	ND	ug/kg	U
Diethyl phthalate	84-66-2	1	17.7	20.0	33.7	ug/kg	
N-Nitrosodiphenylamine	86-30-6	1	9.6	20.0	ND	ug/kg	U
Hexachlorobenzene	118-74-1	1	4.7	20.0	ND	ug/kg	U
Pentachlorophenol	87-86-5	1	31.2	99.8	ND	ug/kg	U
Phenanthrene	85-01-8	1	4.7	20.0	ND	ug/kg	U
Anthracene	120-12-7	1	5.9	20.0	ND	ug/kg	U
Di-n-Butylphthalate	84-74-2	1	5.3	20.0	ND	ug/kg	U
Fluoranthene	206-44-0	1	4.5	20.0	ND	ug/kg	U
Pyrene	129-00-0	1	5.5	20.0	ND	ug/kg	U
Butylbenzylphthalate	85-68-7	1	8.0	20.0	ND	ug/kg	U
Benzo(a)anthracene	56-55-3	1	5.2	20.0	ND	ug/kg	U
Chrysene	218-01-9	1	5.2	20.0	ND	ug/kg	U
bis(2-Ethylhexyl)phthalate	117-81-7	1	28.8	49.9	ND	ug/kg	U
Di-n-Octylphthalate	117-84-0	1	8.7	20.0	ND	ug/kg	U
Benzo(a)fluoranthene, Total		1	10.2	39.9	ND	ug/kg	U
Benzo(a)pyrene	50-32-8	1	6.5	20.0	ND	ug/kg	U
Indeno(1,2,3-cd)pyrene	193-39-5	1	6.0	20.0	ND	ug/kg	U
Dibenzo(a,h)anthracene	53-70-3	1	6.1	20.0	ND	ug/kg	U
Benzo(g,h,i)perylene	191-24-2	1	5.8	20.0	ND	ug/kg	U



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Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:06

COA_SS-3_3-5_20201118
20K0364-09 (Solid)

Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 11/18/2020 14:30

Instrument: NT10 Analyst: VTS

Analyzed: 12/22/2020 20:39

Analyte	CAS Number	Recovery	Recovery	Units	Notes
		Limits			
Surrogate: 2-Fluorophenol		27-120 %	69.5	%	
Surrogate: Phenol-d5		29-120 %	71.9	%	Q
Surrogate: 2-Chlorophenol-d4		31-120 %	73.1	%	
Surrogate: 1,2-Dichlorobenzene-d4		32-120 %	69.0	%	
Surrogate: Nitrobenzene-d5		30-120 %	89.7	%	
Surrogate: 2-Fluorobiphenyl		35-120 %	82.2	%	
Surrogate: 2,4,6-Tribromophenol		24-134 %	56.8	%	
Surrogate: p-Terphenyl-d14		37-120 %	85.5	%	



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Reported:
26-Mar-2021 16:06

COA_SS-3_3-5_20201118
20K0364-09 (Solid)

Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM		Sampled: 11/18/2020 14:30
Instrument: NT10 Analyst: VTS		Analyzed: 12/22/2020 20:39
Sample Preparation:	Preparation Method: EPA 3546 (Microwave) Preparation Batch: BIK0843 Prepared: 11/30/2020	Extract ID: 20K0364-09 D 03 Dry Weight: 10.02 g % Solids: 87.79
Sample Cleanup:	Cleanup Method: GPC Cleanup Batch: CIL0220 Cleaned: 16-Dec-2020	Initial Volume: 1 uL Final Volume: 1 uL Extract ID: 20K0364-09 D 03

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
1,4-Dichlorobenzene	106-46-7	1	0.6	5.0	ND	ug/kg	U
1,2-Dichlorobenzene	95-50-1	1	0.7	5.0	ND	ug/kg	U
2,4-Dimethylphenol	105-67-9	1	2.2	20.0	ND	ug/kg	U
1,2,4-Trichlorobenzene	120-82-1	1	2.7	5.0	ND	ug/kg	U
Hexachlorobutadiene	87-68-3	1	0.7	5.0	ND	ug/kg	U
<i>Surrogate: 2-Fluorophenol</i>				27-120 %	70.3	%	
<i>Surrogate: p-Terphenyl-d14</i>				37-120 %	78.2	%	



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Reported:
26-Mar-2021 16:06

COA_SS-3_3-5_20201118
20K0364-09 (Solid)

Butyl Tins

Method: EPA 8270E-SIM			Sampled: 11/18/2020 14:30
Instrument: NT8 Analyst: JZ			Analyzed: 12/17/2020 16:18
Sample Preparation:	Preparation Method: EPA 3546 (Microwave)		Extract ID: 20K0364-09 D 04 Dry Weight: 5.06 g % Solids: 87.79
	Preparation Batch: BIK0863	Sample Size: 5.76 g (wet)	
	Prepared: 11/30/2020	Final Volume: 0.5 mL	
Sample Cleanup:	Cleanup Method: Silica Gel		Extract ID: 20K0364-09 D 04
	Cleanup Batch: CIL0161	Initial Volume: 0.5 mL	
	Cleaned: 16-Dec-2020	Final Volume: 0.5 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Tributyltin Ion	36643-28-4	1	0.445	3.82	ND	ug/kg	U
Dibutyltin Ion	14488-53-0	1	1.71	5.72	ND	ug/kg	U
Butyltin Ion	78763-54-9	1	1.87	4.03	ND	ug/kg	U
Tetrabutyltin	1461-25-2	1	4.94	4.94	ND	ug/kg	U
<i>Surrogate: Triphenyltin</i>				30-160 %	107	%	
<i>Surrogate: Tripropyltin</i>				30-160 %	68.3	%	



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Reported:
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COA_SS-3_3-5_20201118
20K0364-09 (Solid)

Chlorinated Pesticides

Method: EPA 8081B		Sampled: 11/18/2020 14:30	
Instrument: ECD6 Analyst: YZ/VTs		Analyzed: 03/15/2021 19:31	
Sample Preparation:	Preparation Method: EPA 3546 (Microwave)	Extract ID: 20K0364-09 B 01	
	Preparation Batch: BJB0764	Dry Weight: 12.55 g	
	Prepared: 02/26/2021	% Solids: 87.79	
Sample Cleanup:	Cleanup Method: Silica Gel	Extract ID: 20K0364-09 B 01	
	Cleanup Batch: CJC0097	Initial Volume: 2.5 mL	
	Cleaned: 09-Mar-2021	Final Volume: 2.5 mL	
Sample Cleanup:	Cleanup Method: Sulfur	Extract ID: 20K0364-09 B 01	
	Cleanup Batch: CJC0096	Initial Volume: 2.5 mL	
	Cleaned: 09-Mar-2021	Final Volume: 2.5 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Heptachlor	76-44-8	1	0.05	0.50	ND	ug/kg	U
Aldrin	309-00-2	1	0.37	0.50	ND	ug/kg	U
trans-Chlordane (beta-Chlordane)	5103-74-2	1	0.33	0.50	ND	ug/kg	U
cis-Chlordane (alpha-chlordane)	5103-71-9	1	0.11	0.50	ND	ug/kg	U
4,4'-DDE	72-55-9	1	0.13	1.00	ND	ug/kg	U
Dieldrin	60-57-1	1	0.11	1.00	ND	ug/kg	U
4,4'-DDD	72-54-8	1	0.32	1.00	ND	ug/kg	U
4,4'-DDT	50-29-3	1	0.32	1.00	ND	ug/kg	U
Oxychlordane	27304-13-8	1	0.13	1.00	ND	ug/kg	U
cis-Nonachlor	5103-73-1	1	0.21	1.00	ND	ug/kg	U
trans-Nonachlor	39765-80-5	1	0.23	1.00	ND	ug/kg	U
Surrogate: Decachlorobiphenyl				30-160 %	79.3	%	
Surrogate: Decachlorobiphenyl [2C]				30-160 %	68.3	%	
Surrogate: Tetrachlorometaxylene				30-160 %	62.6	%	
Surrogate: Tetrachlorometaxylene [2C]				30-160 %	61.4	%	



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COA_SS-3_3-5_20201118
20K0364-09 (Solid)

Aroclor PCB

Method: EPA 8082A		Sampled: 11/18/2020 14:30	
Instrument: ECD7 Analyst: JGR		Analyzed: 12/19/2020 17:35	
Sample Preparation:	Preparation Method: EPA 3546 (Microwave)	Extract ID: 20K0364-09 D 01	
	Preparation Batch: BIK0842	Dry Weight: 12.52 g	
	Prepared: 11/28/2020	% Solids: 87.79	
Sample Cleanup:	Cleanup Method: Silica Gel	Extract ID: 20K0364-09 D 01	
	Cleanup Batch: CIL0203	Initial Volume: 2.5 mL	
	Cleaned: 19-Dec-2020	Final Volume: 2.5 mL	
Sample Cleanup:	Cleanup Method: Sulfuric Acid	Extract ID: 20K0364-09 D 01	
	Cleanup Batch: CIL0201	Initial Volume: 2.5 mL	
	Cleaned: 19-Dec-2020	Final Volume: 2.5 mL	
Sample Cleanup:	Cleanup Method: Sulfur	Extract ID: 20K0364-09 D 01	
	Cleanup Batch: CIL0202	Initial Volume: 2.5 mL	
	Cleaned: 19-Dec-2020	Final Volume: 2.5 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Aroclor 1016	12674-11-2	1	1.6	4.0	ND	ug/kg	U
Aroclor 1221	11104-28-2	1	1.6	4.0	ND	ug/kg	U
Aroclor 1232	11141-16-5	1	1.6	4.0	ND	ug/kg	U
Aroclor 1242	53469-21-9	1	1.6	4.0	ND	ug/kg	U
Aroclor 1248	12672-29-6	1	1.6	4.0	ND	ug/kg	U
Aroclor 1254	11097-69-1	1	1.6	4.0	ND	ug/kg	U
Aroclor 1260	11096-82-5	1	0.6	4.0	ND	ug/kg	U
Aroclor 1262	37324-23-5	1	0.6	4.0	ND	ug/kg	U
Aroclor 1268	11100-14-4	1	0.6	4.0	ND	ug/kg	U
Surrogate: Decachlorobiphenyl				40-126 %	67.0	%	
Surrogate: Tetrachlorometaxylene				44-120 %	66.3	%	
Surrogate: Decachlorobiphenyl [2C]				40-126 %	82.6	%	
Surrogate: Tetrachlorometaxylene [2C]				44-120 %	70.7	%	



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Reported:
26-Mar-2021 16:06

COA_SS-3_3-5_20201118
20K0364-09 (Solid)

Dioxins/Furans

Method: EPA 1613B			Sampled: 11/18/2020 14:30		
Instrument: AUTOSPEC01 Analyst: pk			Analyzed: 12/07/2020 21:51		
Sample Preparation:	Preparation Method: EPA 1613			Extract ID: 20K0364-09 C 01	
	Preparation Batch: BIL0036	Sample Size: 11.59 g (wet)		Dry Weight: 10.03 g	
	Prepared: 12/03/2020	Final Volume: 20 uL		% Solids: 86.51	
Sample Cleanup:	Cleanup Method: Silica Gel			Extract ID: 20K0364-09 C 01	
	Cleanup Batch: CIL0058	Initial Volume: 20 mL			
	Cleaned: 05-Dec-2020	Final Volume: 20 mL			
Sample Cleanup:	Cleanup Method: Sulfuric Acid			Extract ID: 20K0364-09 C 01	
	Cleanup Batch: CIL0057	Initial Volume: 20 mL			
	Cleaned: 04-Dec-2020	Final Volume: 20 mL			
Sample Cleanup:	Cleanup Method: Florisil			Extract ID: 20K0364-09 C 01	
	Cleanup Batch: CIL0059	Initial Volume: 20 mL			
	Cleaned: 05-Dec-2020	Final Volume: 20 mL			

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting		Result	Units	Notes
				EDL	Limit			
2,3,7,8-TCDF			0.655-0.886	0.063	0.129	0.997	ND	ng/kg U
2,3,7,8-TCDD			0.655-0.886	0.140	0.111	0.997	ND	ng/kg U
1,2,3,7,8-PeCDF			1.318-1.783	0.150	0.164	0.997	ND	ng/kg U
2,3,4,7,8-PeCDF			1.318-1.783	0.150	0.153	0.997	ND	ng/kg U
1,2,3,7,8-PeCDD			1.318-1.783	0.180	0.120	0.997	ND	ng/kg U
1,2,3,4,7,8-HxCDF			1.054-1.426	0.140	0.056	0.997	ND	ng/kg U
1,2,3,6,7,8-HxCDF			1.054-1.426	0.180	0.058	0.997	ND	ng/kg U
2,3,4,6,7,8-HxCDF			1.054-1.426	0.110	0.059	0.997	ND	ng/kg U
1,2,3,7,8,9-HxCDF			1.054-1.426	0.209	0.076	0.997	ND	ng/kg U
1,2,3,4,7,8-HxCDD			1.054-1.426	0.180	0.156	0.997	ND	ng/kg U
1,2,3,6,7,8-HxCDD			1.054-1.426	0.150	0.145	0.997	ND	ng/kg U
1,2,3,7,8,9-HxCDD			1.054-1.426	0.219	0.171	0.997	ND	ng/kg U
1,2,3,4,6,7,8-HpCDF			0.893-1.208	0.209	0.063	0.997	ND	ng/kg U
1,2,3,4,7,8,9-HpCDF			0.893-1.208	0.160	0.090	0.997	ND	ng/kg U
1,2,3,4,6,7,8-HpCDD		1.047	0.893-1.208	0.559	0.168	2.49	0.344	ng/kg J
OCDF			0.757-1.024	1.10	0.243	2.49	ND	ng/kg U
OCDD		0.954	0.757-1.024	4.29	0.342	9.97	4.42	ng/kg J, B
Homologue groups								
Total TCDF						0.997	ND	ng/kg U
Total TCDD						0.997	ND	ng/kg U
Total PeCDF						0.997	ND	ng/kg U
Total PeCDD						0.997	ND	ng/kg U
Total HxCDF						0.997	ND	ng/kg U
Total HxCDD						0.997	ND	ng/kg U
Total HpCDF						0.997	ND	ng/kg U
Total HpCDD						0.997	0.344	ng/kg J, B



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Reported:
26-Mar-2021 16:06

COA_SS-3_3-5_20201118
20K0364-09 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/18/2020 14:30

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 12/07/2020 21:51

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting Limit	Result	Units	Notes
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC):				0.19			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC):				0.00			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, EMPC = ND):				0.19			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, EMPC = ND):				0.00			



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20K0364-09 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/18/2020 14:30

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 12/07/2020 21:51

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting Limit	Result	Units	Notes
Labeled compounds							
13C12-2,3,7,8-TCDF		0.790	0.655-0.886	24-169 %	76.2	%	
13C12-2,3,7,8-TCDD		0.798	0.655-0.886	25-164 %	77.2	%	
13C12-1,2,3,7,8-PeCDF		1.623	1.318-1.783	24-185 %	68.9	%	
13C12-2,3,4,7,8-PeCDF		1.557	1.318-1.783	21-178 %	65.9	%	
13C12-1,2,3,7,8-PeCDD		1.646	1.318-1.783	25-181 %	62.1	%	
13C12-1,2,3,4,7,8-HxCDF		0.484	0.434-0.587	26-152 %	83.5	%	
13C12-1,2,3,6,7,8-HxCDF		0.565	0.434-0.587	26-123 %	82.1	%	
13C12-2,3,4,6,7,8-HxCDF		0.545	0.434-0.587	28-136 %	86.3	%	
13C12-1,2,3,7,8,9-HxCDF		0.494	0.434-0.587	29-147 %	85.0	%	
13C12-1,2,3,4,7,8-HxCDD		1.269	1.054-1.426	32-141 %	86.9	%	
13C12-1,2,3,6,7,8-HxCDD		1.363	1.054-1.426	28-130 %	85.2	%	
13C12-1,2,3,4,6,7,8-HpCDF		0.410	0.374-0.506	28-143 %	71.3	%	
13C12-1,2,3,4,7,8,9-HpCDF		0.437	0.374-0.506	26-138 %	72.0	%	
13C12-1,2,3,4,6,7,8-HpCDD		1.102	0.893-1.208	23-140 %	72.1	%	
13C12-OCDD		0.927	0.757-1.024	17-157 %	49.1	%	
37Cl4-2,3,7,8-TCDD				35-197 %	85.0	%	



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20K0364-09 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/18/2020 14:30

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 12/07/2020 21:51

Analyte	DF/Split	Ion Ratio	Ratio Limits	EDL	Reporting	Result	Units	Notes
					Limit			



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COA_SS-3_3-5_20201118
20K0364-09 (Solid)

Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 11/18/2020 14:30

Instrument: ICPMS1 Analyst: MCB

Analyzed: 03/23/2021 21:38

Sample Preparation:

Preparation Method: SWN EPA 3050B

Extract ID: 20K0364-09 F 01

Preparation Batch: BJC0564

Sample Size: 1.016 g (wet)

Dry Weight: 0.89 g

Prepared: 03/22/2021

Final Volume: 50 mL

% Solids: 87.44

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Antimony	7440-36-0	20	0.02	0.23	ND	mg/kg	U
Chromium	7440-47-3	20	0.08	0.56	81.5	mg/kg	
Lead	7439-92-1	20	0.08	0.11	2.42	mg/kg	
Silver	7440-22-4	20	0.02	0.23	0.06	mg/kg	J



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COA_SS-3_3-5_20201118
20K0364-09 (Solid)

Metals and Metallic Compounds

Method: EPA 6020B UCT-KED

Sampled: 11/18/2020 14:30

Instrument: ICPMS1 Analyst: MCB

Analyzed: 03/23/2021 21:38

Sample Preparation:

Preparation Method: SWN EPA 3050B

Extract ID: 20K0364-09 F 01

Preparation Batch: BJC0564

Sample Size: 1.016 g (wet)

Dry Weight: 0.89 g

Prepared: 03/22/2021

Final Volume: 50 mL

% Solids: 87.44

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	20	0.02	0.23	5.02	mg/kg	
Cadmium	7440-43-9	20	0.03	0.11	0.09	mg/kg	J
Copper	7440-50-8	20	0.38	0.56	21.3	mg/kg	
Selenium	7782-49-2	20	0.50	0.56	ND	mg/kg	U
Zinc	7440-66-6	20	0.9	4.5	38.6	mg/kg	



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COA_SS-3_3-5_20201118
20K0364-09 (Solid)

Metals and Metallic Compounds

Method: EPA 7471B

Sampled: 11/18/2020 14:30

Instrument: HYDRA Analyst: BLC

Analyzed: 03/23/2021 12:27

Sample Preparation:

Preparation Method: SMM EPA 7471B

Extract ID: 20K0364-09 F

Preparation Batch: BJC0610

Sample Size: 0.219 g (wet)

Dry Weight: 0.19 g

Prepared: 03/23/2021

Final Volume: 50 mL

% Solids: 87.44

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.00548	0.0261	0.0319	mg/kg	H



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Reported:
26-Mar-2021 16:06

COA_SS-3_3-5_20201118
20K0364-09 (Solid)

Wet Chemistry

Method: EPA 9060A m

Sampled: 11/18/2020 14:30

Instrument: TOC Cube Analyst: BF

Analyzed: 11/26/2020 01:15

Sample Preparation:

Preparation Method: PSEP 1986 (modified)

Extract ID: 20K0364-09 F

Preparation Batch: BIK0802

Sample Size: 0.521 g (wet)

Dry Weight: 0.46 g

Prepared: 11/25/2020

Final Volume: 0.521 mL

% Solids: 87.44

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Organic Carbon		1	0.02	0.02	0.07	%	



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:06

COA_SS-3_3-5_20201118
20K0364-09 (Solid)

Wet Chemistry

Method: PSEP 1986

Sampled: 11/18/2020 14:30

Instrument: BAL2 Analyst: UW

Analyzed: 11/23/2020 17:50

Sample Preparation:	Preparation Method: No Prep Wet Chem	Sample Size: 5 g (wet)	Extract ID: 20K0364-09
	Preparation Batch: BIK0734	Final Volume: 5 g	Dry Weight: 4.37 g
	Prepared: 11/23/2020		% Solids: 87.44

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Volatile Solids		1	0.01	0.01	1.11	%	

Sample Preparation:	Preparation Method: No Prep Wet Chem	Sample Size: 5 g (wet)	Extract ID: 20K0364-09
	Preparation Batch: BIK0735	Final Volume: 5 g	Dry Weight: 4.37 g
	Prepared: 11/23/2020		% Solids: 87.44

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Solids, Sulfide		1	0.04	0.04	82.80	%	



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Reported:
26-Mar-2021 16:06

COA_SS-3_3-5_20201118
20K0364-09 (Solid)

Wet Chemistry

Method: SM 2540 G-97

Sampled: 11/18/2020 14:30

Instrument: BAL2 Analyst: UW

Analyzed: 11/23/2020 17:50

Sample Preparation:

Preparation Method: No Prep Wet Chem

Extract ID: 20K0364-09

Preparation Batch: BIK0734

Sample Size: 5 g (wet)

Dry Weight: 4.37 g

Prepared: 11/23/2020

Final Volume: 5 g

% Solids: 87.44

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Solids		1	0.04	0.04	87.44	%	



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Reported:
26-Mar-2021 16:06

COA_SS-3_3-5_20201118
20K0364-09 (Solid)

Wet Chemistry

Method: SM 4500-NH3 H-97

Sampled: 11/18/2020 14:30

Instrument: LACHAT2 Analyst: LRB

Analyzed: 11/30/2020 14:55

Sample Preparation:

Preparation Method: MSA 33.3 (2M KCl)

Extract ID: 20K0364-09 F

Preparation Batch: BIK0769

Sample Size: 4.11 g (wet)

Dry Weight: 3.59 g

Prepared: 11/24/2020

Final Volume: 40 mL

% Solids: 87.44

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Ammonia-N	7664-41-7	1	0.45	0.45	3.61	mg/kg NH3-N	



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Reported:
26-Mar-2021 16:06

COA_SS-3_3-5_20201118
20K0364-09 (Solid)

Wet Chemistry

Method: SM 4500-S2 D-00 (PSEP)

Sampled: 11/18/2020 14:30

Instrument: UV1800-1 Analyst: CDE

Analyzed: 12/03/2020 17:01

Sample Preparation:

Preparation Method: PSEP 1986

Extract ID: 20K0364-09 G

Preparation Batch: BIK0743

Sample Size: 5.289 g (wet)

Dry Weight: 4.38 g

Prepared: 11/24/2020

Final Volume: 100 mL

% Solids: 82.80

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Sulfide	18496-25-8	1	1.14	1.14	ND	mg/kg	U



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Reported:
26-Mar-2021 16:06

COA_SS-3_3-5_20201118
20K0364-09 (Solid)

Extractions

Method: ASTM D2216	Sampled: 11/18/2020 14:30	
Instrument: N/A Analyst: NL	Analyzed: 11/26/2020 05:10	
Sample Preparation:	Preparation Method: No Prep-Organics	Extract ID: 20K0364-09
	Preparation Batch: BIK0789	Dry Weight: 0.87 g
	Prepared: 11/25/2020	% Solids: 87.44
	Sample Size: 1 g (wet)	
	Final Volume: 1 g	

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Total Solids		1	0.01	86.51	%	



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Reported:
26-Mar-2021 16:06

COA_SS-3_3-5_20201118
20K0364-09 (Solid)

Extractions

Method: ASTM D2216

Sampled: 11/18/2020 14:30

Instrument: N/A Analyst: NL

Analyzed: 11/26/2020 05:10

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
<u>Labeled compounds</u>						



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Reported:
26-Mar-2021 16:06

COA_SS-3_3-5_20201118
20K0364-09 (Solid)

Geotechnical Methods

Method: PSEP-PS

Sampled: 11/18/2020 14:30

Instrument: MT&C Analyst:

Analyzed: 01/11/2021 00:00

Analysis by: Materials Testing & Consulting, Inc. (Olympia)

Sample Preparation: Preparation Method: No Prep Geo
Preparation Batch: B011121
Prepared: 01/11/2021

Extract ID: 20K0364-09

Final Volume:

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Phi Size <-1	GS_GRAVEL	1	0.1	10.6	%	
Phi Size -1 to 0	GS_VCS	1	0.1	5.1	%	
Phi Size 0 to 1	GS_CS	1	0.1	6.7	%	
Phi Size 1 to 2	GS_MS	1	0.1	10.0	%	
Phi Size 2 to 3	GS_FS	1	0.1	9.9	%	
Phi Size 3 to 4	GS_VFS	1	0.1	8.7	%	
Phi Size 4 to 5	GS_CSILT	1	0.1	11.2	%	
Phi Size 5 to 6	GS_MSILT	1	0.1	10.0	%	
Phi Size 6 to 7	GS_FSILT	1	0.1	8.7	%	
Phi Size 7 to 8	GS_VFSILT	1	0.1	6.7	%	
Phi Size 8 to 9	GS_CCLAY	1	0.1	4.8	%	
Phi Size 9 to 10	GS_MCLAY	1	0.1	5.4	%	
Phi Size >10	GS_FCLAY	1	0.1	2.3	%	
Total Fines	GS_TOTFINES	1	0.1	49.1	%	



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Reported:
26-Mar-2021 16:06

COA_SS-3_3-5_20201118
20K0364-09RE1 (Solid)

Dioxins/Furans

Method: EPA 1613B			Sampled: 11/18/2020 14:30		
Instrument: AUTOSPEC01 Analyst: pk			Analyzed: 03/02/2021 21:54		
Sample Preparation:	Preparation Method: EPA 1613			Extract ID: 20K0364-09RE1 C 02	
	Preparation Batch: BJB0531	Sample Size: 11.61 g (wet)		Dry Weight: 10.04 g	
	Prepared: 02/23/2021	Final Volume: 20 uL		% Solids: 86.51	
Sample Cleanup:	Cleanup Method: Silica Gel			Extract ID: 20K0364-09RE1 C 02	
	Cleanup Batch: CJB0177	Initial Volume: 20 mL			
	Cleaned: 25-Feb-2021	Final Volume: 20 mL			
Sample Cleanup:	Cleanup Method: Sulfuric Acid			Extract ID: 20K0364-09RE1 C 02	
	Cleanup Batch: CJB0176	Initial Volume: 20 mL			
	Cleaned: 24-Feb-2021	Final Volume: 20 mL			
Sample Cleanup:	Cleanup Method: Florisil			Extract ID: 20K0364-09RE1 C 02	
	Cleanup Batch: CJB0178	Initial Volume: 20 mL			
	Cleaned: 25-Feb-2021	Final Volume: 20 mL			

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting		Result	Units	Notes
				EDL	Limit			
2,3,7,8-TCDF			0.655-0.886	0.058	0.070	0.996	ND	ng/kg U
2,3,7,8-TCDD			0.655-0.886	0.149	0.089	0.996	ND	ng/kg U
1,2,3,7,8-PeCDF			1.318-1.783	0.239	0.085	0.996	ND	ng/kg U
2,3,4,7,8-PeCDF			1.318-1.783	0.219	0.076	0.996	ND	ng/kg U
1,2,3,7,8-PeCDD		0.856	1.318-1.783	0.169	0.093	0.996	0.066	ng/kg EMPC, J
1,2,3,4,7,8-HxCDF			1.054-1.426	0.279	0.057	0.996	ND	ng/kg U
1,2,3,6,7,8-HxCDF			1.054-1.426	0.199	0.057	0.996	ND	ng/kg U
2,3,4,6,7,8-HxCDF			1.054-1.426	0.169	0.056	0.996	ND	ng/kg U
1,2,3,7,8,9-HxCDF			1.054-1.426	0.189	0.070	0.996	ND	ng/kg U
1,2,3,4,7,8-HxCDD			1.054-1.426	0.169	0.105	0.996	ND	ng/kg U
1,2,3,6,7,8-HxCDD			1.054-1.426	0.179	0.097	0.996	ND	ng/kg U
1,2,3,7,8,9-HxCDD			1.054-1.426	0.219	0.104	0.996	ND	ng/kg U
1,2,3,4,6,7,8-HpCDF		0.757	0.893-1.208	0.209	0.073	0.996	0.143	ng/kg EMPC, J
1,2,3,4,7,8,9-HpCDF			0.893-1.208	0.239	0.095	0.996	ND	ng/kg U
1,2,3,4,6,7,8-HpCDD		0.826	0.893-1.208	0.558	0.103	2.49	0.513	ng/kg EMPC, J
OCDF		0.881	0.757-1.024	1.10	0.172	2.49	3.21	ng/kg B
OCDD		0.880	0.757-1.024	4.58	0.137	9.96	5.16	ng/kg J, B
Homologue groups								
Total TCDF						0.996	ND	ng/kg U
Total TCDD						0.996	ND	ng/kg U
Total PeCDF						0.996	ND	ng/kg U
Total PeCDD						0.996	ND	ng/kg U
Total HxCDF						0.996	ND	ng/kg U
Total HxCDD						0.996	ND	ng/kg U
Total HpCDF						0.996	ND	ng/kg U
Total HpCDD						0.996	ND	ng/kg U



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Reported:
26-Mar-2021 16:06

COA_SS-3_3-5_20201118
20K0364-09RE1 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/18/2020 14:30

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 03/02/2021 21:54

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting Limit	Result	Units	Notes
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC):				0.14			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC):				0.01			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, EMPC = ND):				0.09			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, EMPC = ND):				0.00			



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COA_SS-3_3-5_20201118
20K0364-09RE1 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/18/2020 14:30

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 03/02/2021 21:54

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting Limit	Result	Units	Notes
Labeled compounds							
13C12-2,3,7,8-TCDF		0.803	0.655-0.886	24-169 %	90.1	%	
13C12-2,3,7,8-TCDD		0.806	0.655-0.886	25-164 %	80.4	%	
13C12-1,2,3,7,8-PeCDF		1.524	1.318-1.783	24-185 %	79.8	%	
13C12-2,3,4,7,8-PeCDF		1.518	1.318-1.783	21-178 %	83.6	%	
13C12-1,2,3,7,8-PeCDD		1.643	1.318-1.783	25-181 %	73.2	%	
13C12-1,2,3,4,7,8-HxCDF		0.514	0.434-0.587	26-152 %	86.5	%	
13C12-1,2,3,6,7,8-HxCDF		0.501	0.434-0.587	26-123 %	84.9	%	
13C12-2,3,4,6,7,8-HxCDF		0.509	0.434-0.587	28-136 %	85.4	%	
13C12-1,2,3,7,8,9-HxCDF		0.522	0.434-0.587	29-147 %	84.5	%	
13C12-1,2,3,4,7,8-HxCDD		1.247	1.054-1.426	32-141 %	84.5	%	
13C12-1,2,3,6,7,8-HxCDD		1.239	1.054-1.426	28-130 %	80.4	%	
13C12-1,2,3,4,6,7,8-HpCDF		0.444	0.374-0.506	28-143 %	89.7	%	
13C12-1,2,3,4,7,8,9-HpCDF		0.438	0.374-0.506	26-138 %	90.8	%	
13C12-1,2,3,4,6,7,8-HpCDD		1.098	0.893-1.208	23-140 %	82.5	%	
13C12-OCDD		0.918	0.757-1.024	17-157 %	64.2	%	
37Cl4-2,3,7,8-TCDD				35-197 %	88.3	%	



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Reported:
26-Mar-2021 16:06

COA_SS-3_5-7_20201118
20K0364-10 (Solid)

Semivolatile Organic Compounds

Method: EPA 8270E		Sampled: 11/18/2020 14:40	
Instrument: NT10 Analyst: VTS		Analyzed: 12/22/2020 21:16	
Sample Preparation:	Preparation Method: EPA 3546 (Microwave)	Extract ID: 20K0364-10 D 03	
	Preparation Batch: BIK0843	Dry Weight: 10.04 g	
	Prepared: 11/30/2020	% Solids: 89.23	
Sample Cleanup:	Sample Size: 11.25 g (wet)	Extract ID: 20K0364-10 D 03	
	Final Volume: 1 mL		
	Cleanup Method: GPC		
	Cleanup Batch: CIL0220		
	Initial Volume: 1 uL		
	Cleaned: 16-Dec-2020		
	Final Volume: 1 uL		

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Phenol	108-95-2	1	8.2	19.9	ND	ug/kg	U
Benzyl Alcohol	100-51-6	1	14.8	19.9	ND	ug/kg	U
2-Methylphenol	95-48-7	1	7.8	19.9	ND	ug/kg	U
Hexachloroethane	67-72-1	1	5.6	19.9	ND	ug/kg	U
4-Methylphenol	106-44-5	1	14.6	19.9	ND	ug/kg	U
Naphthalene	91-20-3	1	5.2	19.9	ND	ug/kg	U
Benzoic acid	65-85-0	1	58.9	199	ND	ug/kg	U
2-Methylnaphthalene	91-57-6	1	5.6	19.9	ND	ug/kg	U
Acenaphthylene	208-96-8	1	4.8	19.9	ND	ug/kg	U
Dimethylphthalate	131-11-3	1	6.4	19.9	ND	ug/kg	U
Acenaphthene	83-32-9	1	5.1	19.9	ND	ug/kg	U
Dibenzofuran	132-64-9	1	4.6	19.9	ND	ug/kg	U
Fluorene	86-73-7	1	4.9	19.9	ND	ug/kg	U
Diethyl phthalate	84-66-2	1	17.6	19.9	26.0	ug/kg	
N-Nitrosodiphenylamine	86-30-6	1	9.5	19.9	ND	ug/kg	U
Hexachlorobenzene	118-74-1	1	4.7	19.9	ND	ug/kg	U
Pentachlorophenol	87-86-5	1	31.2	99.6	ND	ug/kg	U
Phenanthrene	85-01-8	1	4.7	19.9	ND	ug/kg	U
Anthracene	120-12-7	1	5.9	19.9	ND	ug/kg	U
Di-n-Butylphthalate	84-74-2	1	5.3	19.9	ND	ug/kg	U
Fluoranthene	206-44-0	1	4.5	19.9	ND	ug/kg	U
Pyrene	129-00-0	1	5.5	19.9	ND	ug/kg	U
Butylbenzylphthalate	85-68-7	1	8.0	19.9	ND	ug/kg	U
Benzo(a)anthracene	56-55-3	1	5.2	19.9	ND	ug/kg	U
Chrysene	218-01-9	1	5.2	19.9	ND	ug/kg	U
bis(2-Ethylhexyl)phthalate	117-81-7	1	28.7	49.8	219	ug/kg	
Di-n-Octylphthalate	117-84-0	1	8.7	19.9	ND	ug/kg	U
Benzo(a)fluoranthene, Total		1	10.2	39.8	ND	ug/kg	U
Benzo(a)pyrene	50-32-8	1	6.5	19.9	ND	ug/kg	U
Indeno(1,2,3-cd)pyrene	193-39-5	1	6.0	19.9	ND	ug/kg	U
Dibenzo(a,h)anthracene	53-70-3	1	6.1	19.9	ND	ug/kg	U
Benzo(g,h,i)perylene	191-24-2	1	5.8	19.9	ND	ug/kg	U



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Reported:
26-Mar-2021 16:06

COA_SS-3_5-7_20201118
20K0364-10 (Solid)

Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 11/18/2020 14:40

Instrument: NT10 Analyst: VTS

Analyzed: 12/22/2020 21:16

Analyte	CAS Number	Recovery	Recovery	Units	Notes
		Limits			
Surrogate: 2-Fluorophenol		27-120 %	68.4	%	
Surrogate: Phenol-d5		29-120 %	71.7	%	Q
Surrogate: 2-Chlorophenol-d4		31-120 %	73.9	%	
Surrogate: 1,2-Dichlorobenzene-d4		32-120 %	67.9	%	
Surrogate: Nitrobenzene-d5		30-120 %	88.9	%	
Surrogate: 2-Fluorobiphenyl		35-120 %	80.9	%	
Surrogate: 2,4,6-Tribromophenol		24-134 %	55.6	%	
Surrogate: p-Terphenyl-d14		37-120 %	90.5	%	



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COA_SS-3_5-7_20201118
20K0364-10 (Solid)

Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM		Sampled: 11/18/2020 14:40
Instrument: NT10 Analyst: VTS		Analyzed: 12/22/2020 21:16
Sample Preparation:	Preparation Method: EPA 3546 (Microwave) Preparation Batch: BIK0843 Prepared: 11/30/2020	Extract ID: 20K0364-10 D 03 Dry Weight: 10.04 g % Solids: 89.23
Sample Cleanup:	Cleanup Method: GPC Cleanup Batch: CIL0220 Cleaned: 16-Dec-2020	Initial Volume: 1 uL Final Volume: 1 uL Extract ID: 20K0364-10 D 03

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
1,4-Dichlorobenzene	106-46-7	1	0.6	5.0	ND	ug/kg	U
1,2-Dichlorobenzene	95-50-1	1	0.7	5.0	ND	ug/kg	U
2,4-Dimethylphenol	105-67-9	1	2.2	19.9	ND	ug/kg	U
1,2,4-Trichlorobenzene	120-82-1	1	2.7	5.0	ND	ug/kg	U
Hexachlorobutadiene	87-68-3	1	0.7	5.0	ND	ug/kg	U
Surrogate: 2-Fluorophenol				27-120 %	70.9	%	
Surrogate: p-Terphenyl-d14				37-120 %	77.7	%	



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Reported:
26-Mar-2021 16:06

COA_SS-3_5-7_20201118
20K0364-10 (Solid)

Butyl Tins

Method: EPA 8270E-SIM			Sampled: 11/18/2020 14:40
Instrument: NT8 Analyst: JZ			Analyzed: 12/17/2020 16:35
Sample Preparation:	Preparation Method: EPA 3546 (Microwave)		Extract ID: 20K0364-10 D 04
	Preparation Batch: BIK0863	Sample Size: 5.65 g (wet)	Dry Weight: 5.04 g
	Prepared: 11/30/2020	Final Volume: 0.5 mL	% Solids: 89.23
Sample Cleanup:	Cleanup Method: Silica Gel		Extract ID: 20K0364-10 D 04
	Cleanup Batch: CIL0161	Initial Volume: 0.5 mL	
	Cleaned: 16-Dec-2020	Final Volume: 0.5 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Tributyltin Ion	36643-28-4	1	0.446	3.83	ND	ug/kg	U
Dibutyltin Ion	14488-53-0	1	1.72	5.73	ND	ug/kg	U
Butyltin Ion	78763-54-9	1	1.87	4.05	ND	ug/kg	U
Tetrabutyltin	1461-25-2	1	4.96	4.96	ND	ug/kg	U
<i>Surrogate: Triphenyltin</i>				30-160 %	99.6	%	
<i>Surrogate: Tripropyltin</i>				30-160 %	68.3	%	



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Reported:
26-Mar-2021 16:06

COA_SS-3_5-7_20201118
20K0364-10 (Solid)

Chlorinated Pesticides

Method: EPA 8081B		Sampled: 11/18/2020 14:40	
Instrument: ECD6 Analyst: YZ/VTs		Analyzed: 03/15/2021 19:49	
Sample Preparation:	Preparation Method: EPA 3546 (Microwave)	Extract ID: 20K0364-10 B 01	
	Preparation Batch: BJB0764	Dry Weight: 12.54 g	
	Prepared: 02/26/2021	% Solids: 89.23	
Sample Cleanup:	Cleanup Method: Silica Gel	Extract ID: 20K0364-10 B 01	
	Cleanup Batch: CJC0097	Initial Volume: 2.5 mL	
	Cleaned: 09-Mar-2021	Final Volume: 2.5 mL	
Sample Cleanup:	Cleanup Method: Sulfur	Extract ID: 20K0364-10 B 01	
	Cleanup Batch: CJC0096	Initial Volume: 2.5 mL	
	Cleaned: 09-Mar-2021	Final Volume: 2.5 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Heptachlor	76-44-8	1	0.05	0.50	ND	ug/kg	U
Aldrin	309-00-2	1	0.37	0.50	ND	ug/kg	U
trans-Chlordane (beta-Chlordane)	5103-74-2	1	0.33	0.50	ND	ug/kg	U
cis-Chlordane (alpha-chlordane)	5103-71-9	1	0.11	0.50	ND	ug/kg	U
4,4'-DDE	72-55-9	1	0.13	1.00	ND	ug/kg	U
Dieldrin	60-57-1	1	0.11	1.00	ND	ug/kg	U
4,4'-DDD	72-54-8	1	0.32	1.00	ND	ug/kg	U
4,4'-DDT	50-29-3	1	0.32	1.00	ND	ug/kg	U
Oxychlordane	27304-13-8	1	0.13	1.00	ND	ug/kg	U
cis-Nonachlor	5103-73-1	1	0.21	1.00	ND	ug/kg	U
trans-Nonachlor	39765-80-5	1	0.23	1.00	ND	ug/kg	U
Surrogate: Decachlorobiphenyl				30-160 %	78.3	%	
Surrogate: Decachlorobiphenyl [2C]				30-160 %	70.0	%	
Surrogate: Tetrachlorometaxylene				30-160 %	62.4	%	
Surrogate: Tetrachlorometaxylene [2C]				30-160 %	62.1	%	



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1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:06

COA_SS-3_5-7_20201118
20K0364-10 (Solid)

Aroclor PCB

Method: EPA 8082A		Sampled: 11/18/2020 14:40	
Instrument: ECD7 Analyst: JGR		Analyzed: 12/19/2020 17:56	
Sample Preparation:	Preparation Method: EPA 3546 (Microwave)	Extract ID: 20K0364-10 D 01	
	Preparation Batch: BIK0842	Dry Weight: 12.55 g	
	Prepared: 11/28/2020	% Solids: 89.23	
Sample Cleanup:	Cleanup Method: Silica Gel	Extract ID: 20K0364-10 D 01	
	Cleanup Batch: CIL0203	Initial Volume: 2.5 mL	
	Cleaned: 19-Dec-2020	Final Volume: 2.5 mL	
Sample Cleanup:	Cleanup Method: Sulfuric Acid	Extract ID: 20K0364-10 D 01	
	Cleanup Batch: CIL0201	Initial Volume: 2.5 mL	
	Cleaned: 19-Dec-2020	Final Volume: 2.5 mL	
Sample Cleanup:	Cleanup Method: Sulfur	Extract ID: 20K0364-10 D 01	
	Cleanup Batch: CIL0202	Initial Volume: 2.5 mL	
	Cleaned: 19-Dec-2020	Final Volume: 2.5 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Aroclor 1016	12674-11-2	1	1.6	4.0	ND	ug/kg	U
Aroclor 1221	11104-28-2	1	1.6	4.0	ND	ug/kg	U
Aroclor 1232	11141-16-5	1	1.6	4.0	ND	ug/kg	U
Aroclor 1242	53469-21-9	1	1.6	4.0	ND	ug/kg	U
Aroclor 1248	12672-29-6	1	1.6	4.0	ND	ug/kg	U
Aroclor 1254	11097-69-1	1	1.6	4.0	ND	ug/kg	U
Aroclor 1260	11096-82-5	1	0.6	4.0	ND	ug/kg	U
Aroclor 1262	37324-23-5	1	0.6	4.0	ND	ug/kg	U
Aroclor 1268	11100-14-4	1	0.6	4.0	ND	ug/kg	U
Surrogate: Decachlorobiphenyl				40-126 %	73.8	%	
Surrogate: Tetrachlorometaxylene				44-120 %	71.6	%	
Surrogate: Decachlorobiphenyl [2C]				40-126 %	93.0	%	
Surrogate: Tetrachlorometaxylene [2C]				44-120 %	72.9	%	



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Reported:
26-Mar-2021 16:06

COA_SS-3_5-7_20201118
20K0364-10 (Solid)

Dioxins/Furans

Method: EPA 1613B			Sampled: 11/18/2020 14:40		
Instrument: AUTOSPEC01 Analyst: pk			Analyzed: 12/07/2020 22:41		
Sample Preparation:	Preparation Method: EPA 1613			Extract ID: 20K0364-10 C 01	
	Preparation Batch: BIL0036	Sample Size: 11.2 g (wet)		Dry Weight: 10.01 g	
	Prepared: 12/03/2020	Final Volume: 20 uL		% Solids: 89.38	
Sample Cleanup:	Cleanup Method: Silica Gel			Extract ID: 20K0364-10 C 01	
	Cleanup Batch: CIL0058	Initial Volume: 20 mL			
	Cleaned: 05-Dec-2020	Final Volume: 20 mL			
Sample Cleanup:	Cleanup Method: Sulfuric Acid			Extract ID: 20K0364-10 C 01	
	Cleanup Batch: CIL0057	Initial Volume: 20 mL			
	Cleaned: 04-Dec-2020	Final Volume: 20 mL			
Sample Cleanup:	Cleanup Method: Florisil			Extract ID: 20K0364-10 C 01	
	Cleanup Batch: CIL0059	Initial Volume: 20 mL			
	Cleaned: 05-Dec-2020	Final Volume: 20 mL			

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting		Result	Units	Notes
				EDL	Limit			
2,3,7,8-TCDF			0.655-0.886	0.063	0.078	0.999	ND	ng/kg U
2,3,7,8-TCDD			0.655-0.886	0.140	0.070	0.999	ND	ng/kg U
1,2,3,7,8-PeCDF			1.318-1.783	0.150	0.094	0.999	ND	ng/kg U
2,3,4,7,8-PeCDF			1.318-1.783	0.150	0.091	0.999	ND	ng/kg U
1,2,3,7,8-PeCDD			1.318-1.783	0.180	0.078	0.999	ND	ng/kg U
1,2,3,4,7,8-HxCDF			1.054-1.426	0.140	0.043	0.999	ND	ng/kg U
1,2,3,6,7,8-HxCDF			1.054-1.426	0.180	0.043	0.999	ND	ng/kg U
2,3,4,6,7,8-HxCDF			1.054-1.426	0.110	0.042	0.999	ND	ng/kg U
1,2,3,7,8,9-HxCDF			1.054-1.426	0.210	0.053	0.999	ND	ng/kg U
1,2,3,4,7,8-HxCDD			1.054-1.426	0.180	0.091	0.999	ND	ng/kg U
1,2,3,6,7,8-HxCDD			1.054-1.426	0.150	0.083	0.999	ND	ng/kg U
1,2,3,7,8,9-HxCDD			1.054-1.426	0.220	0.099	0.999	ND	ng/kg U
1,2,3,4,6,7,8-HpCDF		0.814	0.893-1.208	0.210	0.036	0.999	0.054	ng/kg EMPC, J
1,2,3,4,7,8,9-HpCDF			0.893-1.208	0.160	0.051	0.999	ND	ng/kg U
1,2,3,4,6,7,8-HpCDD		0.737	0.893-1.208	0.559	0.099	2.50	0.432	ng/kg EMPC, J
OCDF		0.826	0.757-1.024	1.10	0.168	2.50	0.449	ng/kg J
OCDD		0.759	0.757-1.024	4.30	0.315	9.99	7.44	ng/kg J, B
Homologue groups								
Total TCDF						0.999	ND	ng/kg U
Total TCDD						0.999	ND	ng/kg U
Total PeCDF						0.999	ND	ng/kg U
Total PeCDD						0.999	ND	ng/kg U
Total HxCDF						0.999	ND	ng/kg U
Total HxCDD						0.999	ND	ng/kg U
Total HpCDF						0.999	0.104	ng/kg J
Total HpCDD						0.999	ND	ng/kg U



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Reported:
26-Mar-2021 16:06

COA_SS-3_5-7_20201118
20K0364-10 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/18/2020 14:40

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 12/07/2020 22:41

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting Limit	Result	Units	Notes
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC):				0.12			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC):				0.01			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, EMPC = ND):				0.12			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, EMPC = ND):				0.00			



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Dioxins/Furans

Method: EPA 1613B

Sampled: 11/18/2020 14:40

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 12/07/2020 22:41

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting Limit	Result	Units	Notes
Labeled compounds							
13C12-2,3,7,8-TCDF		0.786	0.655-0.886	24-169 %	79.8	%	
13C12-2,3,7,8-TCDD		0.799	0.655-0.886	25-164 %	81.5	%	
13C12-1,2,3,7,8-PeCDF		1.618	1.318-1.783	24-185 %	71.6	%	
13C12-2,3,4,7,8-PeCDF		1.554	1.318-1.783	21-178 %	68.4	%	
13C12-1,2,3,7,8-PeCDD		1.666	1.318-1.783	25-181 %	65.0	%	
13C12-1,2,3,4,7,8-HxCDF		0.486	0.434-0.587	26-152 %	87.2	%	
13C12-1,2,3,6,7,8-HxCDF		0.501	0.434-0.587	26-123 %	79.6	%	
13C12-2,3,4,6,7,8-HxCDF		0.503	0.434-0.587	28-136 %	82.2	%	
13C12-1,2,3,7,8,9-HxCDF		0.484	0.434-0.587	29-147 %	92.2	%	
13C12-1,2,3,4,7,8-HxCDD		1.306	1.054-1.426	32-141 %	84.7	%	
13C12-1,2,3,6,7,8-HxCDD		1.322	1.054-1.426	28-130 %	83.4	%	
13C12-1,2,3,4,6,7,8-HpCDF		0.422	0.374-0.506	28-143 %	73.4	%	
13C12-1,2,3,4,7,8,9-HpCDF		0.421	0.374-0.506	26-138 %	74.7	%	
13C12-1,2,3,4,6,7,8-HpCDD		1.107	0.893-1.208	23-140 %	77.7	%	
13C12-OCDD		1.007	0.757-1.024	17-157 %	51.8	%	
37Cl4-2,3,7,8-TCDD				35-197 %	89.8	%	



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COA_SS-3_5-7_20201118
20K0364-10 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/18/2020 14:40

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 12/07/2020 22:41

Analyte	DF/Split	Ion Ratio	Ratio Limits	EDL	Reporting	Result	Units	Notes
					Limit			



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COA_SS-3_5-7_20201118
20K0364-10 (Solid)

Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 11/18/2020 14:40

Instrument: ICPMS1 Analyst: MCB

Analyzed: 03/23/2021 21:43

Sample Preparation:

Preparation Method: SWN EPA 3050B

Extract ID: 20K0364-10 F 01

Preparation Batch: BJC0564

Sample Size: 1.039 g (wet)

Dry Weight: 0.94 g

Prepared: 03/22/2021

Final Volume: 50 mL

% Solids: 90.41

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Antimony	7440-36-0	20	0.02	0.21	ND	mg/kg	U
Chromium	7440-47-3	20	0.14	0.53	39.3	mg/kg	
Lead	7439-92-1	20	0.07	0.11	0.87	mg/kg	
Silver	7440-22-4	20	0.02	0.21	ND	mg/kg	U



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Reported:
26-Mar-2021 16:06

COA_SS-3_5-7_20201118
20K0364-10 (Solid)

Metals and Metallic Compounds

Method: EPA 6020B UCT-KED

Sampled: 11/18/2020 14:40

Instrument: ICPMS1 Analyst: MCB

Analyzed: 03/23/2021 21:43

Sample Preparation:

Preparation Method: SWN EPA 3050B

Extract ID: 20K0364-10 F 01

Preparation Batch: BJC0564

Sample Size: 1.039 g (wet)

Dry Weight: 0.94 g

Prepared: 03/22/2021

Final Volume: 50 mL

% Solids: 90.41

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic	7440-38-2	20	0.02	0.21	1.14	mg/kg	
Cadmium	7440-43-9	20	0.03	0.11	ND	mg/kg	U
Copper	7440-50-8	20	0.36	0.53	9.48	mg/kg	
Selenium	7782-49-2	20	0.47	0.53	ND	mg/kg	U
Zinc	7440-66-6	20	0.9	4.3	20.7	mg/kg	



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Reported:
26-Mar-2021 16:06

COA_SS-3_5-7_20201118
20K0364-10 (Solid)

Metals and Metallic Compounds

Method: EPA 7471B

Sampled: 11/18/2020 14:40

Instrument: HYDRA Analyst: BLC

Analyzed: 03/23/2021 12:29

Sample Preparation:

Preparation Method: SMM EPA 7471B

Extract ID: 20K0364-10 F

Preparation Batch: BJC0610

Sample Size: 0.282 g (wet)

Dry Weight: 0.25 g

Prepared: 03/23/2021

Final Volume: 50 mL

% Solids: 90.41

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.00412	0.0196	0.0307	mg/kg	H



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Reported:
26-Mar-2021 16:06

COA_SS-3_5-7_20201118
20K0364-10 (Solid)

Wet Chemistry

Method: EPA 9060A m

Sampled: 11/18/2020 14:40

Instrument: TOC Cube Analyst: BF

Analyzed: 11/26/2020 02:48

Sample Preparation:

Preparation Method: PSEP 1986 (modified)

Extract ID: 20K0364-10 F

Preparation Batch: BIK0802

Sample Size: 0.586 g (wet)

Dry Weight: 0.53 g

Prepared: 11/25/2020

Final Volume: 0.586 mL

% Solids: 90.41

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Organic Carbon		1	0.02	0.02	0.07	%	



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26-Mar-2021 16:06

COA_SS-3_5-7_20201118
20K0364-10 (Solid)

Wet Chemistry

Method: PSEP 1986

Sampled: 11/18/2020 14:40

Instrument: BAL2 Analyst: UW

Analyzed: 11/23/2020 17:50

Sample Preparation:	Preparation Method: No Prep Wet Chem	Sample Size: 5 g (wet)	Extract ID: 20K0364-10
	Preparation Batch: BIK0734	Final Volume: 5 g	Dry Weight: 4.52 g
	Prepared: 11/23/2020		% Solids: 90.41

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Volatile Solids		1	0.01	0.01	1.07	%	

Sample Preparation:	Preparation Method: No Prep Wet Chem	Sample Size: 5 g (wet)	Extract ID: 20K0364-10
	Preparation Batch: BIK0735	Final Volume: 5 g	Dry Weight: 4.52 g
	Prepared: 11/23/2020		% Solids: 90.41

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Solids, Sulfide		1	0.04	0.04	83.92	%	



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COA_SS-3_5-7_20201118
20K0364-10 (Solid)

Wet Chemistry

Method: SM 2540 G-97

Sampled: 11/18/2020 14:40

Instrument: BAL2 Analyst: UW

Analyzed: 11/23/2020 17:50

Sample Preparation:

Preparation Method: No Prep Wet Chem

Extract ID: 20K0364-10

Preparation Batch: BIK0734

Sample Size: 5 g (wet)

Dry Weight: 4.52 g

Prepared: 11/23/2020

Final Volume: 5 g

% Solids: 90.41

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Solids		1	0.04	0.04	90.41	%	



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COA_SS-3_5-7_20201118
20K0364-10 (Solid)

Wet Chemistry

Method: SM 4500-NH3 H-97

Sampled: 11/18/2020 14:40

Instrument: LACHAT2 Analyst: LRB

Analyzed: 11/30/2020 14:56

Sample Preparation:

Preparation Method: MSA 33.3 (2M KCl)

Extract ID: 20K0364-10 F

Preparation Batch: BIK0769

Sample Size: 4.32 g (wet)

Dry Weight: 3.91 g

Prepared: 11/24/2020

Final Volume: 40 mL

% Solids: 90.41

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Ammonia-N	7664-41-7	1	0.41	0.41	3.36	mg/kg NH3-N	



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Reported:
26-Mar-2021 16:06

COA_SS-3_5-7_20201118
20K0364-10 (Solid)

Wet Chemistry

Method: SM 4500-S2 D-00 (PSEP)

Sampled: 11/18/2020 14:40

Instrument: UV1800-1 Analyst: CDE

Analyzed: 12/03/2020 17:04

Sample Preparation:

Preparation Method: PSEP 1986

Extract ID: 20K0364-10 G

Preparation Batch: BIK0743

Sample Size: 5.065 g (wet)

Dry Weight: 4.25 g

Prepared: 11/24/2020

Final Volume: 100 mL

% Solids: 83.92

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Sulfide	18496-25-8	1	1.18	1.18	ND	mg/kg	U



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Reported:
26-Mar-2021 16:06

COA_SS-3_5-7_20201118
20K0364-10 (Solid)

Extractions

Method: ASTM D2216	Sampled: 11/18/2020 14:40	
Instrument: N/A Analyst: NL	Analyzed: 11/26/2020 05:10	
Sample Preparation:	Preparation Method: No Prep-Organics	Extract ID: 20K0364-10
	Preparation Batch: BIK0789	Dry Weight: 0.90 g
	Prepared: 11/25/2020	% Solids: 90.41
	Sample Size: 1 g (wet)	
	Final Volume: 1 g	

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Total Solids		1	0.01	89.38	%	



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Reported:
26-Mar-2021 16:06

COA_SS-3_5-7_20201118
20K0364-10 (Solid)

Extractions

Method: ASTM D2216

Sampled: 11/18/2020 14:40

Instrument: N/A Analyst: NL

Analyzed: 11/26/2020 05:10

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Labeled compounds						



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26-Mar-2021 16:06

COA_SS-3_5-7_20201118
20K0364-10 (Solid)

Geotechnical Methods

Method: PSEP-PS

Sampled: 11/18/2020 14:40

Instrument: MT&C Analyst:

Analyzed: 01/11/2021 00:00

Analysis by: Materials Testing & Consulting, Inc. (Olympia)

Sample Preparation: Preparation Method: No Prep Geo
Preparation Batch: B011121
Prepared: 01/11/2021

Extract ID: 20K0364-10

Final Volume:

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Phi Size <-1	GS_GRAVEL	1	0.1	21.2	%	
Phi Size -1 to 0	GS_VCS	1	0.1	4.3	%	
Phi Size 0 to 1	GS_CS	1	0.1	4.6	%	
Phi Size 1 to 2	GS_MS	1	0.1	7.0	%	
Phi Size 2 to 3	GS_FS	1	0.1	8.3	%	
Phi Size 3 to 4	GS_VFS	1	0.1	8.2	%	
Phi Size 4 to 5	GS_CSILT	1	0.1	9.6	%	
Phi Size 5 to 6	GS_MSILT	1	0.1	10.3	%	
Phi Size 6 to 7	GS_FSILT	1	0.1	9.3	%	
Phi Size 7 to 8	GS_VFSILT	1	0.1	7.1	%	
Phi Size 8 to 9	GS_CCLAY	1	0.1	5.4	%	
Phi Size 9 to 10	GS_MCLAY	1	0.1	2.9	%	
Phi Size >10	GS_FCLAY	1	0.1	1.9	%	
Total Fines	GS_TOTFINES	1	0.1	46.5	%	



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1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:06

COA_SS-3_5-7_20201118
20K0364-10RE1 (Solid)

Dioxins/Furans

Method: EPA 1613B		Sampled: 11/18/2020 14:40	
Instrument: AUTOSPEC01 Analyst: pk		Analyzed: 03/02/2021 22:43	
Sample Preparation:	Preparation Method: EPA 1613	Extract ID: 20K0364-10RE1 C 02	
	Preparation Batch: BJB0531	Sample Size: 11.25 g (wet)	Dry Weight: 10.06 g
	Prepared: 02/23/2021	Final Volume: 20 uL	% Solids: 89.38
Sample Cleanup:	Cleanup Method: Silica Gel	Extract ID: 20K0364-10RE1 C 02	
	Cleanup Batch: CJB0177	Initial Volume: 20 mL	
	Cleaned: 25-Feb-2021	Final Volume: 20 mL	
Sample Cleanup:	Cleanup Method: Sulfuric Acid	Extract ID: 20K0364-10RE1 C 02	
	Cleanup Batch: CJB0176	Initial Volume: 20 mL	
	Cleaned: 24-Feb-2021	Final Volume: 20 mL	
Sample Cleanup:	Cleanup Method: Florisil	Extract ID: 20K0364-10RE1 C 02	
	Cleanup Batch: CJB0178	Initial Volume: 20 mL	
	Cleaned: 25-Feb-2021	Final Volume: 20 mL	

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting		Result	Units	Notes
				EDL	Limit			
2,3,7,8-TCDF			0.655-0.886	0.058	0.061	0.995	ND	ng/kg U
2,3,7,8-TCDD			0.655-0.886	0.149	0.077	0.995	ND	ng/kg U
1,2,3,7,8-PeCDF			1.318-1.783	0.239	0.105	0.995	ND	ng/kg U
2,3,4,7,8-PeCDF			1.318-1.783	0.219	0.095	0.995	ND	ng/kg U
1,2,3,7,8-PeCDD			1.318-1.783	0.169	0.109	0.995	ND	ng/kg U
1,2,3,4,7,8-HxCDF			1.054-1.426	0.278	0.069	0.995	ND	ng/kg U
1,2,3,6,7,8-HxCDF			1.054-1.426	0.199	0.070	0.995	ND	ng/kg U
2,3,4,6,7,8-HxCDF			1.054-1.426	0.169	0.066	0.995	ND	ng/kg U
1,2,3,7,8,9-HxCDF			1.054-1.426	0.189	0.078	0.995	ND	ng/kg U
1,2,3,4,7,8-HxCDD			1.054-1.426	0.169	0.090	0.995	ND	ng/kg U
1,2,3,6,7,8-HxCDD			1.054-1.426	0.179	0.090	0.995	ND	ng/kg U
1,2,3,7,8,9-HxCDD			1.054-1.426	0.219	0.092	0.995	ND	ng/kg U
1,2,3,4,6,7,8-HpCDF			0.893-1.208	0.209	0.068	0.995	ND	ng/kg U
1,2,3,4,7,8,9-HpCDF			0.893-1.208	0.239	0.089	0.995	ND	ng/kg U
1,2,3,4,6,7,8-HpCDD		1.019	0.893-1.208	0.557	0.109	2.49	0.281	ng/kg J
OCDF		0.905	0.757-1.024	1.09	0.171	2.49	0.358	ng/kg J, B
OCDD		0.866	0.757-1.024	4.57	0.164	9.95	3.17	ng/kg J, B
Homologue groups								
Total TCDF						0.995	ND	ng/kg U
Total TCDD						0.995	ND	ng/kg U
Total PeCDF						0.995	ND	ng/kg U
Total PeCDD						0.995	ND	ng/kg U
Total HxCDF						0.995	ND	ng/kg U
Total HxCDD						0.995	ND	ng/kg U
Total HpCDF						0.995	ND	ng/kg U
Total HpCDD						0.995	0.281	ng/kg J



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Reported:
26-Mar-2021 16:06

COA_SS-3_5-7_20201118
20K0364-10RE1 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/18/2020 14:40

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 03/02/2021 22:43

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting Limit	Result	Units	Notes
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC):				0.14			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC):				0.00			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, EMPC = ND):				0.14			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, EMPC = ND):				0.00			



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COA_SS-3_5-7_20201118
20K0364-10RE1 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/18/2020 14:40

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 03/02/2021 22:43

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting Limit	Result	Units	Notes
Labeled compounds							
13C12-2,3,7,8-TCDF		0.769	0.655-0.886	24-169 %	89.0	%	
13C12-2,3,7,8-TCDD		0.797	0.655-0.886	25-164 %	80.4	%	
13C12-1,2,3,7,8-PeCDF		1.505	1.318-1.783	24-185 %	74.4	%	
13C12-2,3,4,7,8-PeCDF		1.497	1.318-1.783	21-178 %	76.6	%	
13C12-1,2,3,7,8-PeCDD		1.627	1.318-1.783	25-181 %	72.4	%	
13C12-1,2,3,4,7,8-HxCDF		0.508	0.434-0.587	26-152 %	84.7	%	
13C12-1,2,3,6,7,8-HxCDF		0.512	0.434-0.587	26-123 %	83.4	%	
13C12-2,3,4,6,7,8-HxCDF		0.513	0.434-0.587	28-136 %	86.0	%	
13C12-1,2,3,7,8,9-HxCDF		0.502	0.434-0.587	29-147 %	86.3	%	
13C12-1,2,3,4,7,8-HxCDD		1.262	1.054-1.426	32-141 %	84.6	%	
13C12-1,2,3,6,7,8-HxCDD		1.271	1.054-1.426	28-130 %	84.6	%	
13C12-1,2,3,4,6,7,8-HpCDF		0.443	0.374-0.506	28-143 %	76.6	%	
13C12-1,2,3,4,7,8,9-HpCDF		0.428	0.374-0.506	26-138 %	79.3	%	
13C12-1,2,3,4,6,7,8-HpCDD		1.128	0.893-1.208	23-140 %	82.6	%	
13C12-OCDD		0.920	0.757-1.024	17-157 %	61.9	%	
37Cl4-2,3,7,8-TCDD				35-197 %	85.7	%	



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Reported:
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COA_SS-3_7-9_20201118
20K0364-11 (Solid)

Semivolatile Organic Compounds

Method: EPA 8270E		Sampled: 11/18/2020 14:50	
Instrument: NT10 Analyst: VTS		Analyzed: 12/22/2020 21:54	
Sample Preparation:	Preparation Method: EPA 3546 (Microwave)	Extract ID: 20K0364-11 D 03	
	Preparation Batch: BIK0843	Dry Weight: 10.01 g	
	Prepared: 11/30/2020	% Solids: 89.18	
Sample Cleanup:	Cleanup Method: GPC	Extract ID: 20K0364-11 D 03	
	Cleanup Batch: CIL0220	Initial Volume: 1 uL	
	Cleaned: 16-Dec-2020	Final Volume: 1 uL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Phenol	108-95-2	1	8.2	20.0	ND	ug/kg	U
Benzyl Alcohol	100-51-6	1	14.9	20.0	ND	ug/kg	U
2-Methylphenol	95-48-7	1	7.8	20.0	ND	ug/kg	U
Hexachloroethane	67-72-1	1	5.6	20.0	ND	ug/kg	U
4-Methylphenol	106-44-5	1	14.7	20.0	ND	ug/kg	U
Naphthalene	91-20-3	1	5.2	20.0	ND	ug/kg	U
Benzoic acid	65-85-0	1	59.1	200	ND	ug/kg	U
2-Methylnaphthalene	91-57-6	1	5.7	20.0	ND	ug/kg	U
Acenaphthylene	208-96-8	1	4.8	20.0	ND	ug/kg	U
Dimethylphthalate	131-11-3	1	6.4	20.0	ND	ug/kg	U
Acenaphthene	83-32-9	1	5.1	20.0	ND	ug/kg	U
Dibenzofuran	132-64-9	1	4.6	20.0	ND	ug/kg	U
Fluorene	86-73-7	1	4.9	20.0	ND	ug/kg	U
Diethyl phthalate	84-66-2	1	17.7	20.0	ND	ug/kg	U
N-Nitrosodiphenylamine	86-30-6	1	9.6	20.0	ND	ug/kg	U
Hexachlorobenzene	118-74-1	1	4.7	20.0	ND	ug/kg	U
Pentachlorophenol	87-86-5	1	31.3	99.9	ND	ug/kg	U
Phenanthrene	85-01-8	1	4.7	20.0	6.0	ug/kg	J
Anthracene	120-12-7	1	5.9	20.0	ND	ug/kg	U
Di-n-Butylphthalate	84-74-2	1	5.3	20.0	ND	ug/kg	U
Fluoranthene	206-44-0	1	4.5	20.0	ND	ug/kg	U
Pyrene	129-00-0	1	5.5	20.0	ND	ug/kg	U
Butylbenzylphthalate	85-68-7	1	8.0	20.0	ND	ug/kg	U
Benzo(a)anthracene	56-55-3	1	5.2	20.0	ND	ug/kg	U
Chrysene	218-01-9	1	5.2	20.0	ND	ug/kg	U
bis(2-Ethylhexyl)phthalate	117-81-7	1	28.8	50.0	ND	ug/kg	U
Di-n-Octylphthalate	117-84-0	1	8.7	20.0	ND	ug/kg	U
Benzo(a)fluoranthene, Total		1	10.2	40.0	ND	ug/kg	U
Benzo(a)pyrene	50-32-8	1	6.5	20.0	ND	ug/kg	U
Indeno(1,2,3-cd)pyrene	193-39-5	1	6.0	20.0	ND	ug/kg	U
Dibenzo(a,h)anthracene	53-70-3	1	6.2	20.0	ND	ug/kg	U
Benzo(g,h,i)perylene	191-24-2	1	5.8	20.0	ND	ug/kg	U



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Reported:
26-Mar-2021 16:06

COA_SS-3_7-9_20201118
20K0364-11 (Solid)

Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 11/18/2020 14:50

Instrument: NT10 Analyst: VTS

Analyzed: 12/22/2020 21:54

Analyte	CAS Number	Recovery	Recovery	Units	Notes
		Limits			
Surrogate: 2-Fluorophenol		27-120 %	41.7	%	
Surrogate: Phenol-d5		29-120 %	63.9	%	Q
Surrogate: 2-Chlorophenol-d4		31-120 %	50.6	%	
Surrogate: 1,2-Dichlorobenzene-d4		32-120 %	66.0	%	
Surrogate: Nitrobenzene-d5		30-120 %	87.3	%	
Surrogate: 2-Fluorobiphenyl		35-120 %	81.0	%	
Surrogate: 2,4,6-Tribromophenol		24-134 %	12.0	%	*
Surrogate: p-Terphenyl-d14		37-120 %	88.2	%	



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COA_SS-3_7-9_20201118
20K0364-11 (Solid)

Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM		Sampled: 11/18/2020 14:50
Instrument: NT10 Analyst: VTS		Analyzed: 12/22/2020 21:54
Sample Preparation:	Preparation Method: EPA 3546 (Microwave) Preparation Batch: BIK0843 Prepared: 11/30/2020	Extract ID: 20K0364-11 D 03 Dry Weight: 10.01 g % Solids: 89.18
Sample Cleanup:	Cleanup Method: GPC Cleanup Batch: CIL0220 Cleaned: 16-Dec-2020	Initial Volume: 1 uL Final Volume: 1 uL Extract ID: 20K0364-11 D 03

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
1,4-Dichlorobenzene	106-46-7	1	0.6	5.0	ND	ug/kg	U
1,2-Dichlorobenzene	95-50-1	1	0.7	5.0	ND	ug/kg	U
2,4-Dimethylphenol	105-67-9	1	2.2	20.0	ND	ug/kg	U
1,2,4-Trichlorobenzene	120-82-1	1	2.7	5.0	ND	ug/kg	U
Hexachlorobutadiene	87-68-3	1	0.7	5.0	ND	ug/kg	U
<i>Surrogate: 2-Fluorophenol</i>				27-120 %	43.6	%	
<i>Surrogate: p-Terphenyl-d14</i>				37-120 %	78.6	%	



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Reported:
26-Mar-2021 16:06

COA_SS-3_7-9_20201118
20K0364-11 (Solid)

Butyl Tins

Method: EPA 8270E-SIM			Sampled: 11/18/2020 14:50	
Instrument: NT8 Analyst: JZ			Analyzed: 12/17/2020 16:51	
Sample Preparation:	Preparation Method: EPA 3546 (Microwave)		Extract ID: 20K0364-11 D 04	
	Preparation Batch: BIK0863	Sample Size: 5.7 g (wet)		Dry Weight: 5.08 g
	Prepared: 11/30/2020	Final Volume: 0.5 mL		% Solids: 89.18
Sample Cleanup:	Cleanup Method: Silica Gel		Extract ID: 20K0364-11 D 04	
	Cleanup Batch: CIL0161	Initial Volume: 0.5 mL		
	Cleaned: 16-Dec-2020	Final Volume: 0.5 mL		

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Tributyltin Ion	36643-28-4	1	0.443	3.80	ND	ug/kg	U
Dibutyltin Ion	14488-53-0	1	1.70	5.69	ND	ug/kg	U
Butyltin Ion	78763-54-9	1	1.86	4.01	ND	ug/kg	U
Tetrabutyltin	1461-25-2	1	4.92	4.92	ND	ug/kg	U
<i>Surrogate: Triphenyltin</i>				30-160 %	96.4	%	
<i>Surrogate: Tripropyltin</i>				30-160 %	61.6	%	



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Reported:
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COA_SS-3_7-9_20201118
20K0364-11 (Solid)

Chlorinated Pesticides

Method: EPA 8081B		Sampled: 11/18/2020 14:50	
Instrument: ECD6 Analyst: YZ/VTs		Analyzed: 03/15/2021 20:07	
Sample Preparation:	Preparation Method: EPA 3546 (Microwave)	Extract ID: 20K0364-11 B 01	
	Preparation Batch: BJB0764	Sample Size: 14.05 g (wet)	Dry Weight: 12.53 g
	Prepared: 02/26/2021	Final Volume: 2.5 mL	% Solids: 89.18
Sample Cleanup:	Cleanup Method: Silica Gel	Extract ID: 20K0364-11 B 01	
	Cleanup Batch: CJC0097	Initial Volume: 2.5 mL	
	Cleaned: 09-Mar-2021	Final Volume: 2.5 mL	
Sample Cleanup:	Cleanup Method: Sulfur	Extract ID: 20K0364-11 B 01	
	Cleanup Batch: CJC0096	Initial Volume: 2.5 mL	
	Cleaned: 09-Mar-2021	Final Volume: 2.5 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Heptachlor	76-44-8	1	0.05	0.50	ND	ug/kg	U
Aldrin	309-00-2	1	0.37	0.50	ND	ug/kg	U
trans-Chlordane (beta-Chlordane)	5103-74-2	1	0.33	0.50	ND	ug/kg	U
cis-Chlordane (alpha-chlordane)	5103-71-9	1	0.11	0.50	ND	ug/kg	U
4,4'-DDE	72-55-9	1	0.13	1.00	ND	ug/kg	U
Dieldrin	60-57-1	1	0.11	1.00	ND	ug/kg	U
4,4'-DDD	72-54-8	1	0.32	1.00	ND	ug/kg	U
4,4'-DDT	50-29-3	1	0.32	1.00	ND	ug/kg	U
Oxychlordane	27304-13-8	1	0.13	1.00	ND	ug/kg	U
cis-Nonachlor	5103-73-1	1	0.21	1.00	ND	ug/kg	U
trans-Nonachlor	39765-80-5	1	0.23	1.00	ND	ug/kg	U
Surrogate: Decachlorobiphenyl				30-160 %	78.7	%	
Surrogate: Decachlorobiphenyl [2C]				30-160 %	69.2	%	
Surrogate: Tetrachlorometaxylene				30-160 %	67.6	%	
Surrogate: Tetrachlorometaxylene [2C]				30-160 %	64.0	%	



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COA_SS-3_7-9_20201118
20K0364-11 (Solid)

Aroclor PCB

Method: EPA 8082A		Sampled: 11/18/2020 14:50	
Instrument: ECD7 Analyst: JGR		Analyzed: 12/19/2020 18:57	
Sample Preparation:	Preparation Method: EPA 3546 (Microwave)	Extract ID: 20K0364-11 D 01	
	Preparation Batch: BIK0842	Dry Weight: 12.51 g	
	Prepared: 11/28/2020	% Solids: 89.18	
Sample Cleanup:	Cleanup Method: Silica Gel	Extract ID: 20K0364-11 D 01	
	Cleanup Batch: CIL0203	Initial Volume: 2.5 mL	
	Cleaned: 19-Dec-2020	Final Volume: 2.5 mL	
Sample Cleanup:	Cleanup Method: Sulfuric Acid	Extract ID: 20K0364-11 D 01	
	Cleanup Batch: CIL0201	Initial Volume: 2.5 mL	
	Cleaned: 19-Dec-2020	Final Volume: 2.5 mL	
Sample Cleanup:	Cleanup Method: Sulfur	Extract ID: 20K0364-11 D 01	
	Cleanup Batch: CIL0202	Initial Volume: 2.5 mL	
	Cleaned: 19-Dec-2020	Final Volume: 2.5 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Aroclor 1016	12674-11-2	1	1.6	4.0	ND	ug/kg	U
Aroclor 1221	11104-28-2	1	1.6	4.0	ND	ug/kg	U
Aroclor 1232	11141-16-5	1	1.6	4.0	ND	ug/kg	U
Aroclor 1242	53469-21-9	1	1.6	4.0	ND	ug/kg	U
Aroclor 1248	12672-29-6	1	1.6	4.0	ND	ug/kg	U
Aroclor 1254	11097-69-1	1	1.6	4.0	ND	ug/kg	U
Aroclor 1260	11096-82-5	1	0.6	4.0	1.3	ug/kg	J
Aroclor 1262	37324-23-5	1	0.6	4.0	ND	ug/kg	U
Aroclor 1268	11100-14-4	1	0.6	4.0	ND	ug/kg	U
Surrogate: Decachlorobiphenyl				40-126 %	79.9	%	
Surrogate: Tetrachlorometaxylene				44-120 %	80.6	%	
Surrogate: Decachlorobiphenyl [2C]				40-126 %	98.4	%	
Surrogate: Tetrachlorometaxylene [2C]				44-120 %	79.3	%	



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COA_SS-3_7-9_20201118
20K0364-11 (Solid)

Dioxins/Furans

Method: EPA 1613B		Sampled: 11/18/2020 14:50	
Instrument: AUTOSPEC01 Analyst: pk		Analyzed: 12/07/2020 23:30	
Sample Preparation:	Preparation Method: EPA 1613	Extract ID: 20K0364-11 C 01	
	Preparation Batch: BIL0036	Dry Weight: 10.06 g	
	Prepared: 12/03/2020	% Solids: 89.48	
Sample Cleanup:	Cleanup Method: Silica Gel	Extract ID: 20K0364-11 C 01	
	Cleanup Batch: CIL0058	Initial Volume: 20 mL	
	Cleaned: 05-Dec-2020	Final Volume: 20 mL	
Sample Cleanup:	Cleanup Method: Sulfuric Acid	Extract ID: 20K0364-11 C 01	
	Cleanup Batch: CIL0057	Initial Volume: 20 mL	
	Cleaned: 04-Dec-2020	Final Volume: 20 mL	
Sample Cleanup:	Cleanup Method: Florisil	Extract ID: 20K0364-11 C 01	
	Cleanup Batch: CIL0059	Initial Volume: 20 mL	
	Cleaned: 05-Dec-2020	Final Volume: 20 mL	

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting		Result	Units	Notes
				EDL	Limit			
2,3,7,8-TCDF			0.655-0.886	0.063	0.096	0.994	ND	ng/kg U
2,3,7,8-TCDD			0.655-0.886	0.139	0.084	0.994	ND	ng/kg U
1,2,3,7,8-PeCDF			1.318-1.783	0.149	0.120	0.994	ND	ng/kg U
2,3,4,7,8-PeCDF			1.318-1.783	0.149	0.107	0.994	ND	ng/kg U
1,2,3,7,8-PeCDD			1.318-1.783	0.179	0.097	0.994	ND	ng/kg U
1,2,3,4,7,8-HxCDF			1.054-1.426	0.139	0.050	0.994	ND	ng/kg U
1,2,3,6,7,8-HxCDF			1.054-1.426	0.179	0.050	0.994	ND	ng/kg U
2,3,4,6,7,8-HxCDF			1.054-1.426	0.109	0.047	0.994	ND	ng/kg U
1,2,3,7,8,9-HxCDF			1.054-1.426	0.209	0.065	0.994	ND	ng/kg U
1,2,3,4,7,8-HxCDD			1.054-1.426	0.179	0.105	0.994	ND	ng/kg U
1,2,3,6,7,8-HxCDD			1.054-1.426	0.149	0.100	0.994	ND	ng/kg U
1,2,3,7,8,9-HxCDD			1.054-1.426	0.219	0.116	0.994	ND	ng/kg U
1,2,3,4,6,7,8-HpCDF			0.893-1.208	0.209	0.046	0.994	ND	ng/kg U
1,2,3,4,7,8,9-HpCDF			0.893-1.208	0.159	0.064	0.994	ND	ng/kg U
1,2,3,4,6,7,8-HpCDD		1.335	0.893-1.208	0.557	0.130	2.49	0.430	ng/kg EMPC, J
OCDF			0.757-1.024	1.09	0.208	2.49	ND	ng/kg U
OCDD		0.879	0.757-1.024	4.28	0.278	9.94	5.32	ng/kg J, B
Homologue groups								
Total TCDF						0.994	ND	ng/kg U
Total TCDD						0.994	ND	ng/kg U
Total PeCDF						0.994	ND	ng/kg U
Total PeCDD						0.994	ND	ng/kg U
Total HxCDF						0.994	ND	ng/kg U
Total HxCDD						0.994	ND	ng/kg U
Total HpCDF						0.994	ND	ng/kg U
Total HpCDD						0.994	ND	ng/kg U



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:06

COA_SS-3_7-9_20201118
20K0364-11 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/18/2020 14:50

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 12/07/2020 23:30

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting Limit	Result	Units	Notes
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC):				0.15			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC):				0.01			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, EMPC = ND):				0.14			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, EMPC = ND):				0.00			



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Reported:
26-Mar-2021 16:06

COA_SS-3_7-9_20201118
20K0364-11 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/18/2020 14:50

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 12/07/2020 23:30

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting Limit	Result	Units	Notes
Labeled compounds							
13C12-2,3,7,8-TCDF		0.794	0.655-0.886	24-169 %	71.0	%	
13C12-2,3,7,8-TCDD		0.797	0.655-0.886	25-164 %	72.2	%	
13C12-1,2,3,7,8-PeCDF		1.601	1.318-1.783	24-185 %	64.9	%	
13C12-2,3,4,7,8-PeCDF		1.556	1.318-1.783	21-178 %	66.7	%	
13C12-1,2,3,7,8-PeCDD		1.691	1.318-1.783	25-181 %	64.5	%	
13C12-1,2,3,4,7,8-HxCDF		0.499	0.434-0.587	26-152 %	77.6	%	
13C12-1,2,3,6,7,8-HxCDF		0.495	0.434-0.587	26-123 %	68.7	%	
13C12-2,3,4,6,7,8-HxCDF		0.498	0.434-0.587	28-136 %	74.1	%	
13C12-1,2,3,7,8,9-HxCDF		0.485	0.434-0.587	29-147 %	77.2	%	
13C12-1,2,3,4,7,8-HxCDD		1.284	1.054-1.426	32-141 %	76.1	%	
13C12-1,2,3,6,7,8-HxCDD		1.229	1.054-1.426	28-130 %	69.8	%	
13C12-1,2,3,4,6,7,8-HpCDF		0.468	0.374-0.506	28-143 %	65.3	%	
13C12-1,2,3,4,7,8,9-HpCDF		0.435	0.374-0.506	26-138 %	65.3	%	
13C12-1,2,3,4,6,7,8-HpCDD		1.006	0.893-1.208	23-140 %	70.5	%	
13C12-OCDD		0.824	0.757-1.024	17-157 %	43.3	%	
37Cl4-2,3,7,8-TCDD				35-197 %	83.8	%	



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Reported:
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COA_SS-3_7-9_20201118
20K0364-11 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/18/2020 14:50

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 12/07/2020 23:30

Analyte	DF/Split	Ion Ratio	Ratio Limits	EDL	Reporting	Result	Units	Notes
					Limit			



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Reported:
26-Mar-2021 16:06

COA_SS-3_7-9_20201118
20K0364-11 (Solid)

Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 11/18/2020 14:50

Instrument: ICPMS1 Analyst: MCB

Analyzed: 03/23/2021 21:47

Sample Preparation:

Preparation Method: SWN EPA 3050B

Extract ID: 20K0364-11 F 01

Preparation Batch: BJC0564

Sample Size: 1.053 g (wet)

Dry Weight: 0.94 g

Prepared: 03/22/2021

Final Volume: 50 mL

% Solids: 89.50

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Antimony	7440-36-0	20	0.02	0.21	ND	mg/kg	U
Chromium	7440-47-3	20	0.07	0.53	79.4	mg/kg	
Lead	7439-92-1	20	0.07	0.11	2.81	mg/kg	
Silver	7440-22-4	20	0.02	0.21	0.09	mg/kg	J



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Reported:
26-Mar-2021 16:06

COA_SS-3_7-9_20201118
20K0364-11 (Solid)

Metals and Metallic Compounds

Method: EPA 6020B UCT-KED

Sampled: 11/18/2020 14:50

Instrument: ICPMS1 Analyst: MCB

Analyzed: 03/23/2021 21:47

Sample Preparation:

Preparation Method: SWN EPA 3050B

Extract ID: 20K0364-11 F 01

Preparation Batch: BJC0564

Sample Size: 1.053 g (wet)

Dry Weight: 0.94 g

Prepared: 03/22/2021

Final Volume: 50 mL

% Solids: 89.50

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic	7440-38-2	20	0.02	0.21	2.82	mg/kg	
Cadmium	7440-43-9	20	0.03	0.11	0.07	mg/kg	J
Copper	7440-50-8	20	0.36	0.53	26.5	mg/kg	
Selenium	7782-49-2	20	0.47	0.53	0.58	mg/kg	
Zinc	7440-66-6	20	0.9	4.2	43.5	mg/kg	



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Reported:
26-Mar-2021 16:06

COA_SS-3_7-9_20201118
20K0364-11 (Solid)

Metals and Metallic Compounds

Method: EPA 7471B

Sampled: 11/18/2020 14:50

Instrument: HYDRA Analyst: BLC

Analyzed: 03/23/2021 12:31

Sample Preparation:

Preparation Method: SMM EPA 7471B

Extract ID: 20K0364-11 F

Preparation Batch: BJC0610

Sample Size: 0.235 g (wet)

Dry Weight: 0.21 g

Prepared: 03/23/2021

Final Volume: 50 mL

% Solids: 89.50

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.00499	0.0238	0.0307	mg/kg	H



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Reported:
26-Mar-2021 16:06

COA_SS-3_7-9_20201118
20K0364-11 (Solid)

Wet Chemistry

Method: EPA 9060A m

Sampled: 11/18/2020 14:50

Instrument: TOC Cube Analyst: BF

Analyzed: 11/26/2020 03:19

Sample Preparation:

Preparation Method: PSEP 1986 (modified)

Extract ID: 20K0364-11 F

Preparation Batch: BIK0802

Sample Size: 0.5058 g (wet)

Dry Weight: 0.45 g

Prepared: 11/25/2020

Final Volume: 0.5058 mL

% Solids: 89.50

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Organic Carbon		1	0.02	0.02	0.08	%	



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Reported:
26-Mar-2021 16:06

COA_SS-3_7-9_20201118
20K0364-11 (Solid)

Wet Chemistry

Method: PSEP 1986

Sampled: 11/18/2020 14:50

Instrument: BAL2 Analyst: UW

Analyzed: 11/23/2020 17:50

Sample Preparation:	Preparation Method: No Prep Wet Chem	Sample Size: 5 g (wet)	Extract ID: 20K0364-11
	Preparation Batch: BIK0734	Final Volume: 5 g	Dry Weight: 4.47 g
	Prepared: 11/23/2020		% Solids: 89.50

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Volatile Solids		1	0.01	0.01	1.18	%	

Sample Preparation:	Preparation Method: No Prep Wet Chem	Sample Size: 5 g (wet)	Extract ID: 20K0364-11
	Preparation Batch: BIK0735	Final Volume: 5 g	Dry Weight: 4.47 g
	Prepared: 11/23/2020		% Solids: 89.50

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Solids, Sulfide		1	0.04	0.04	84.25	%	



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Reported:
26-Mar-2021 16:06

COA_SS-3_7-9_20201118
20K0364-11 (Solid)

Wet Chemistry

Method: SM 2540 G-97

Sampled: 11/18/2020 14:50

Instrument: BAL2 Analyst: UW

Analyzed: 11/23/2020 17:50

Sample Preparation:

Preparation Method: No Prep Wet Chem

Extract ID: 20K0364-11

Preparation Batch: BIK0734

Sample Size: 5 g (wet)

Dry Weight: 4.47 g

Prepared: 11/23/2020

Final Volume: 5 g

% Solids: 89.50

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Solids		1	0.04	0.04	89.50	%	



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Reported:
26-Mar-2021 16:06

COA_SS-3_7-9_20201118
20K0364-11 (Solid)

Wet Chemistry

Method: SM 4500-NH3 H-97

Sampled: 11/18/2020 14:50

Instrument: LACHAT2 Analyst: LRB

Analyzed: 11/30/2020 14:57

Sample Preparation:

Preparation Method: MSA 33.3 (2M KCl)

Extract ID: 20K0364-11 F

Preparation Batch: BIK0769

Sample Size: 4.01 g (wet)

Dry Weight: 3.59 g

Prepared: 11/24/2020

Final Volume: 40 mL

% Solids: 89.50

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Ammonia-N	7664-41-7	1	0.45	0.45	2.96	mg/kg NH3-N	



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Reported:
26-Mar-2021 16:06

COA_SS-3_7-9_20201118
20K0364-11 (Solid)

Wet Chemistry

Method: SM 4500-S2 D-00 (PSEP)

Sampled: 11/18/2020 14:50

Instrument: UV1800-1 Analyst: CDE

Analyzed: 12/03/2020 17:04

Sample Preparation:

Preparation Method: PSEP 1986

Extract ID: 20K0364-11 G

Preparation Batch: BIK0743

Sample Size: 5.651 g (wet)

Dry Weight: 4.76 g

Prepared: 11/24/2020

Final Volume: 100 mL

% Solids: 84.25

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Sulfide	18496-25-8	1	1.05	1.05	ND	mg/kg	U



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Project: COA Outfall
Project Number: COA-001
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Reported:
26-Mar-2021 16:06

COA_SS-3_7-9_20201118
20K0364-11 (Solid)

Extractions

Method: ASTM D2216	Sampled: 11/18/2020 14:50	
Instrument: N/A Analyst: NL	Analyzed: 11/26/2020 05:10	
Sample Preparation:	Preparation Method: No Prep-Organics	Extract ID: 20K0364-11
	Preparation Batch: BIK0789	Dry Weight: 0.89 g
	Prepared: 11/25/2020	% Solids: 89.50
	Sample Size: 1 g (wet)	
	Final Volume: 1 g	

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Total Solids		1	0.01	89.48	%	



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Reported:
26-Mar-2021 16:06

COA_SS-3_7-9_20201118
20K0364-11 (Solid)

Extractions

Method: ASTM D2216

Sampled: 11/18/2020 14:50

Instrument: N/A Analyst: NL

Analyzed: 11/26/2020 05:10

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Labeled compounds						



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Project Number: COA-001
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Reported:
26-Mar-2021 16:06

COA_SS-3_7-9_20201118
20K0364-11 (Solid)

Geotechnical Methods

Method: PSEP-PS

Sampled: 11/18/2020 14:50

Instrument: MT&C Analyst:

Analyzed: 01/11/2021 00:00

Analysis by: Materials Testing & Consulting, Inc. (Olympia)

Sample Preparation: Preparation Method: No Prep Geo
Preparation Batch: B011121
Prepared: 01/11/2021

Extract ID: 20K0364-11

Final Volume:

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Phi Size <-1	GS_GRAVEL	1	0.1	15.2	%	
Phi Size -1 to 0	GS_VCS	1	0.1	4.3	%	
Phi Size 0 to 1	GS_CS	1	0.1	4.1	%	
Phi Size 1 to 2	GS_MS	1	0.1	5.4	%	
Phi Size 2 to 3	GS_FS	1	0.1	10.2	%	
Phi Size 3 to 4	GS_VFS	1	0.1	9.6	%	
Phi Size 4 to 5	GS_CSILT	1	0.1	10.5	%	
Phi Size 5 to 6	GS_MSILT	1	0.1	11.8	%	
Phi Size 6 to 7	GS_FSILT	1	0.1	9.6	%	
Phi Size 7 to 8	GS_VFSILT	1	0.1	8.3	%	
Phi Size 8 to 9	GS_CCLAY	1	0.1	5.8	%	
Phi Size 9 to 10	GS_MCLAY	1	0.1	3.3	%	
Phi Size >10	GS_FCLAY	1	0.1	1.9	%	
Total Fines	GS_TOTFINES	1	0.1	51.2	%	



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Reported:
26-Mar-2021 16:06

COA_SS-3_7-9_20201118
20K0364-11RE1 (Solid)

Dioxins/Furans

Method: EPA 1613B			Sampled: 11/18/2020 14:50		
Instrument: AUTOSPEC01 Analyst: pk			Analyzed: 03/02/2021 23:33		
Sample Preparation:	Preparation Method: EPA 1613			Extract ID: 20K0364-11RE1 C 02	
	Preparation Batch: BJB0531	Sample Size: 11.2 g (wet)		Dry Weight: 10.02 g	
	Prepared: 02/23/2021	Final Volume: 20 uL		% Solids: 89.48	
Sample Cleanup:	Cleanup Method: Silica Gel			Extract ID: 20K0364-11RE1 C 02	
	Cleanup Batch: CJB0177	Initial Volume: 20 mL			
	Cleaned: 25-Feb-2021	Final Volume: 20 mL			
Sample Cleanup:	Cleanup Method: Sulfuric Acid			Extract ID: 20K0364-11RE1 C 02	
	Cleanup Batch: CJB0176	Initial Volume: 20 mL			
	Cleaned: 24-Feb-2021	Final Volume: 20 mL			
Sample Cleanup:	Cleanup Method: Florisil			Extract ID: 20K0364-11RE1 C 02	
	Cleanup Batch: CJB0178	Initial Volume: 20 mL			
	Cleaned: 25-Feb-2021	Final Volume: 20 mL			

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting		Result	Units	Notes
				EDL	Limit			
2,3,7,8-TCDF			0.655-0.886	0.058	0.051	0.998	ND	ng/kg U
2,3,7,8-TCDD			0.655-0.886	0.150	0.072	0.998	ND	ng/kg U
1,2,3,7,8-PeCDF		0.772	1.318-1.783	0.239	0.085	0.998	0.114	ng/kg EMPC, J, B
2,3,4,7,8-PeCDF			1.318-1.783	0.220	0.086	0.998	ND	ng/kg U
1,2,3,7,8-PeCDD		1.351	1.318-1.783	0.170	0.091	0.998	0.101	ng/kg J
1,2,3,4,7,8-HxCDF			1.054-1.426	0.279	0.076	0.998	ND	ng/kg U
1,2,3,6,7,8-HxCDF		2.186	1.054-1.426	0.200	0.078	0.998	0.136	ng/kg EMPC, J
2,3,4,6,7,8-HxCDF			1.054-1.426	0.170	0.077	0.998	ND	ng/kg U
1,2,3,7,8,9-HxCDF			1.054-1.426	0.190	0.090	0.998	ND	ng/kg U
1,2,3,4,7,8-HxCDD			1.054-1.426	0.170	0.119	0.998	ND	ng/kg U
1,2,3,6,7,8-HxCDD			1.054-1.426	0.180	0.120	0.998	ND	ng/kg U
1,2,3,7,8,9-HxCDD			1.054-1.426	0.220	0.123	0.998	ND	ng/kg U
1,2,3,4,6,7,8-HpCDF		0.930	0.893-1.208	0.210	0.091	0.998	0.222	ng/kg J
1,2,3,4,7,8,9-HpCDF			0.893-1.208	0.239	0.119	0.998	ND	ng/kg U
1,2,3,4,6,7,8-HpCDD		1.122	0.893-1.208	0.559	0.111	2.49	0.490	ng/kg J
OCDF		0.788	0.757-1.024	1.10	0.192	2.49	5.53	ng/kg B
OCDD		0.921	0.757-1.024	4.59	0.151	9.98	5.05	ng/kg J, B
Homologue groups								
Total TCDF						0.998	ND	ng/kg U
Total TCDD						0.998	ND	ng/kg U
Total PeCDF						0.998	ND	ng/kg U
Total PeCDD						0.998	0.101	ng/kg J
Total HxCDF						0.998	ND	ng/kg U
Total HxCDD						0.998	ND	ng/kg U
Total HpCDF						0.998	0.304	ng/kg J, B
Total HpCDD						0.998	0.490	ng/kg J



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Reported:
26-Mar-2021 16:06

COA_SS-3_7-9_20201118
20K0364-11RE1 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/18/2020 14:50

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 03/02/2021 23:33

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting Limit	Result	Units	Notes
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC):				0.21			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC):				0.13			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, EMPC = ND):				0.20			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, EMPC = ND):				0.11			



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Reported:
26-Mar-2021 16:06

COA_SS-3_7-9_20201118
20K0364-11RE1 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/18/2020 14:50

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 03/02/2021 23:33

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting Limit	Result	Units	Notes
Labeled compounds							
13C12-2,3,7,8-TCDF		0.774	0.655-0.886	24-169 %	97.8	%	
13C12-2,3,7,8-TCDD		0.795	0.655-0.886	25-164 %	76.3	%	
13C12-1,2,3,7,8-PeCDF		1.452	1.318-1.783	24-185 %	75.3	%	
13C12-2,3,4,7,8-PeCDF		1.525	1.318-1.783	21-178 %	68.6	%	
13C12-1,2,3,7,8-PeCDD		1.628	1.318-1.783	25-181 %	65.7	%	
13C12-1,2,3,4,7,8-HxCDF		0.511	0.434-0.587	26-152 %	82.9	%	
13C12-1,2,3,6,7,8-HxCDF		0.507	0.434-0.587	26-123 %	79.9	%	
13C12-2,3,4,6,7,8-HxCDF		0.505	0.434-0.587	28-136 %	81.3	%	
13C12-1,2,3,7,8,9-HxCDF		0.500	0.434-0.587	29-147 %	82.8	%	
13C12-1,2,3,4,7,8-HxCDD		1.259	1.054-1.426	32-141 %	81.1	%	
13C12-1,2,3,6,7,8-HxCDD		1.334	1.054-1.426	28-130 %	77.0	%	
13C12-1,2,3,4,6,7,8-HpCDF		0.443	0.374-0.506	28-143 %	72.3	%	
13C12-1,2,3,4,7,8,9-HpCDF		0.439	0.374-0.506	26-138 %	74.9	%	
13C12-1,2,3,4,6,7,8-HpCDD		1.120	0.893-1.208	23-140 %	77.7	%	
13C12-OCDD		0.899	0.757-1.024	17-157 %	57.3	%	
37Cl4-2,3,7,8-TCDD				35-197 %	81.0	%	



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:06

Semivolatile Organic Compounds - Quality Control

Batch BIK0843 - EPA 3546 (Microwave)

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BIK0843-BLK1)						Prepared: 30-Nov-2020 Analyzed: 22-Dec-2020 16:16					
Phenol	ND	8.2	20.0	ug/kg							U
Benzyl Alcohol	ND	14.9	20.0	ug/kg							U
2-Methylphenol	ND	7.8	20.0	ug/kg							U
Hexachloroethane	ND	5.7	20.0	ug/kg							U
4-Methylphenol	ND	14.7	20.0	ug/kg							U
Naphthalene	ND	5.3	20.0	ug/kg							U
Benzoic acid	ND	59.1	200	ug/kg							U
2-Methylnaphthalene	ND	5.7	20.0	ug/kg							U
Acenaphthylene	ND	4.8	20.0	ug/kg							U
Dimethylphthalate	ND	6.4	20.0	ug/kg							U
Acenaphthene	ND	5.1	20.0	ug/kg							U
Dibenzofuran	ND	4.6	20.0	ug/kg							U
Fluorene	ND	5.0	20.0	ug/kg							U
Diethyl phthalate	ND	17.7	20.0	ug/kg							U
N-Nitrosodiphenylamine	ND	9.6	20.0	ug/kg							U
Hexachlorobenzene	ND	4.7	20.0	ug/kg							U
Pentachlorophenol	ND	31.3	100	ug/kg							U
Phenanthrene	ND	4.7	20.0	ug/kg							U
Anthracene	ND	5.9	20.0	ug/kg							U
Di-n-Butylphthalate	ND	5.3	20.0	ug/kg							U
Fluoranthene	ND	4.5	20.0	ug/kg							U
Pyrene	ND	5.6	20.0	ug/kg							U
Butylbenzylphthalate	ND	8.1	20.0	ug/kg							U
Benzo(a)anthracene	ND	5.2	20.0	ug/kg							U
Chrysene	ND	5.2	20.0	ug/kg							U
bis(2-Ethylhexyl)phthalate	ND	28.8	50.0	ug/kg							U
Di-n-Octylphthalate	ND	8.7	20.0	ug/kg							U
Benzo(a)fluoranthene, Total	ND	10.2	40.0	ug/kg							U
Benzo(a)pyrene	ND	6.5	20.0	ug/kg							U
Indeno(1,2,3-cd)pyrene	ND	6.0	20.0	ug/kg							U
Dibenzo(a,h)anthracene	ND	6.2	20.0	ug/kg							U
Benzo(g,h,i)perylene	ND	5.8	20.0	ug/kg							U
Surrogate: 2-Fluorophenol	524			ug/kg	750		69.8	27-120			
Surrogate: Phenol-d5	506			ug/kg	750		67.4	29-120			Q
Surrogate: 2-Chlorophenol-d4	547			ug/kg	750		73.0	31-120			



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Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:06

Semivolatile Organic Compounds - Quality Control

Batch BIK0843 - EPA 3546 (Microwave)

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BIK0843-BLK1)						Prepared: 30-Nov-2020 Analyzed: 22-Dec-2020 16:16					
Surrogate: 1,2-Dichlorobenzene-d4	324			ug/kg	500		64.9	32-120			
Surrogate: Nitrobenzene-d5	423			ug/kg	500		84.6	30-120			
Surrogate: 2-Fluorobiphenyl	387			ug/kg	500		77.3	35-120			
Surrogate: 2,4,6-Tribromophenol	496			ug/kg	750		66.1	24-134			
Surrogate: p-Terphenyl-d14	405			ug/kg	500		80.9	37-120			
LCS (BIK0843-BS1)						Prepared: 30-Nov-2020 Analyzed: 22-Dec-2020 16:54					
Phenol	378	8.2	20.0	ug/kg	500		75.6	34-120			
Benzyl Alcohol	372	14.9	20.0	ug/kg	500		74.4	19-120			
2-Methylphenol	372	7.8	20.0	ug/kg	500		74.4	28-120			
Hexachloroethane	364	5.7	20.0	ug/kg	500		72.8	38-120			
4-Methylphenol	399	14.7	20.0	ug/kg	500		79.8	29-120			
Naphthalene	318	5.3	20.0	ug/kg	500		63.6	43-120			
Benzoic acid	1910	59.1	200	ug/kg	2300		82.9	10-120			
2-Methylnaphthalene	344	5.7	20.0	ug/kg	500		68.8	43-120			
Acenaphthylene	305	4.8	20.0	ug/kg	500		61.0	42-120			Q
Dimethylphthalate	384	6.4	20.0	ug/kg	500		76.8	43-120			
Acenaphthene	347	5.1	20.0	ug/kg	500		69.4	45-120			
Dibenzofuran	385	4.6	20.0	ug/kg	500		77.0	43-120			
Fluorene	358	5.0	20.0	ug/kg	500		71.6	45-120			
Diethyl phthalate	416	17.7	20.0	ug/kg	500		83.2	50-120			
N-Nitrosodiphenylamine	468	9.6	20.0	ug/kg	500		93.6	70-154			
Hexachlorobenzene	316	4.7	20.0	ug/kg	500		63.2	33-120			Q
Pentachlorophenol	1150	31.3	100	ug/kg	1300		88.6	16-120			
Phenanthrene	377	4.7	20.0	ug/kg	500		75.4	49-120			
Anthracene	364	5.9	20.0	ug/kg	500		72.8	45-120			
Di-n-Butylphthalate	428	5.3	20.0	ug/kg	500		85.5	48-126			
Fluoranthene	447	4.5	20.0	ug/kg	500		89.3	53-145			
Pyrene	452	5.6	20.0	ug/kg	500		90.4	52-134			
Butylbenzylphthalate	438	8.1	20.0	ug/kg	500		87.6	45-132			
Benzo(a)anthracene	374	5.2	20.0	ug/kg	500		74.8	49-120			
Chrysene	377	5.2	20.0	ug/kg	500		75.3	47-120			
bis(2-Ethylhexyl)phthalate	432	28.8	50.0	ug/kg	500		86.5	34-130			
Di-n-Octylphthalate	371	8.7	20.0	ug/kg	500		74.1	28-124			
Benzo(a)fluoranthene, Total	782	10.2	40.0	ug/kg	1000		78.2	30-160			



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1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:06

Semivolatile Organic Compounds - Quality Control

Batch BIK0843 - EPA 3546 (Microwave)

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BIK0843-BS1)											
Prepared: 30-Nov-2020						Analyzed: 22-Dec-2020 16:54					
Benzo(a)pyrene	365	6.5	20.0	ug/kg	500		73.0	42-120			
Indeno(1,2,3-cd)pyrene	327	6.0	20.0	ug/kg	500		65.4	42-163			Q
Dibenzo(a,h)anthracene	318	6.2	20.0	ug/kg	500		63.7	30-133			Q
Benzo(g,h,i)perylene	313	5.8	20.0	ug/kg	500		62.6	46-148			Q
Surrogate: 2-Fluorophenol	648			ug/kg	750		86.4	27-120			
Surrogate: Phenol-d5	681			ug/kg	750		90.8	29-120			Q
Surrogate: 2-Chlorophenol-d4	617			ug/kg	750		82.2	31-120			
Surrogate: 1,2-Dichlorobenzene-d4	358			ug/kg	500		71.6	32-120			
Surrogate: Nitrobenzene-d5	430			ug/kg	500		86.1	30-120			
Surrogate: 2-Fluorobiphenyl	411			ug/kg	500		82.1	35-120			
Surrogate: 2,4,6-Tribromophenol	618			ug/kg	750		82.4	24-134			
Surrogate: p-Terphenyl-d14	455			ug/kg	500		91.0	37-120			
Matrix Spike (BIK0843-MS1)											
Source: 20K0364-11				Prepared: 30-Nov-2020				Analyzed: 23-Dec-2020 00:23			
Phenol	359	8.2	20.0	ug/kg	500	ND	71.8	34-120			
Benzyl Alcohol	378	14.9	20.0	ug/kg	500	ND	75.6	19-120			
2-Methylphenol	64.5	7.8	20.0	ug/kg	500	ND	12.9	28-120			*
Hexachloroethane	390	5.7	20.0	ug/kg	500	ND	77.9	38-120			
4-Methylphenol	199	14.7	20.0	ug/kg	500	ND	39.9	29-120			
Naphthalene	323	5.3	20.0	ug/kg	500	ND	64.5	43-120			
Benzoic acid	1330	59.1	200	ug/kg	2300	ND	58.0	10-120			
2-Methylnaphthalene	347	5.7	20.0	ug/kg	500	ND	69.4	43-120			
Acenaphthylene	297	4.8	20.0	ug/kg	500	ND	59.5	42-120			Q
Dimethylphthalate	371	6.4	20.0	ug/kg	500	ND	74.2	43-120			
Acenaphthene	350	5.1	20.0	ug/kg	500	ND	70.0	45-120			
Dibenzofuran	378	4.6	20.0	ug/kg	500	ND	75.7	43-120			
Fluorene	351	5.0	20.0	ug/kg	500	ND	70.1	45-120			
Diethyl phthalate	392	17.7	20.0	ug/kg	500	ND	78.3	50-120			
N-Nitrosodiphenylamine	251	9.6	20.0	ug/kg	500	ND	50.3	70-154			*
Hexachlorobenzene	312	4.7	20.0	ug/kg	500	ND	62.4	33-120			Q
Pentachlorophenol	598	31.3	100	ug/kg	1300	ND	46.0	16-120			
Phenanthrene	378	4.7	20.0	ug/kg	500	6.0	74.4	49-120			
Anthracene	344	5.9	20.0	ug/kg	500	ND	68.8	45-120			
Di-n-Butylphthalate	401	5.3	20.0	ug/kg	500	ND	80.1	48-126			
Fluoranthene	474	4.5	20.0	ug/kg	500	ND	94.8	53-145			



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Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:06

Semivolatile Organic Compounds - Quality Control

Batch BIK0843 - EPA 3546 (Microwave)

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike (BIK0843-MS1)											
Source: 20K0364-11				Prepared: 30-Nov-2020 Analyzed: 23-Dec-2020 00:23							
Pyrene	462	5.6	20.0	ug/kg	500	ND	92.5	52-134			
Butylbenzylphthalate	455	8.1	20.0	ug/kg	500	ND	91.1	45-132			
Benzo(a)anthracene	355	5.2	20.0	ug/kg	500	ND	71.0	49-120			
Chrysene	357	5.2	20.0	ug/kg	500	ND	71.4	47-120			
bis(2-Ethylhexyl)phthalate	460	28.8	50.0	ug/kg	500	ND	92.1	34-130			
Di-n-Octylphthalate	353	8.7	20.0	ug/kg	500	ND	70.6	28-124			
Benzofluoranthenes, Total	771	10.2	40.0	ug/kg	1000	ND	77.1	30-160			
Benzo(a)pyrene	333	6.5	20.0	ug/kg	500	ND	66.6	42-120			
Indeno(1,2,3-cd)pyrene	331	6.0	20.0	ug/kg	500	ND	66.2	42-163			Q
Dibenzo(a,h)anthracene	335	6.2	20.0	ug/kg	500	ND	67.0	30-133			Q
Benzo(g,h,i)perylene	314	5.8	20.0	ug/kg	500	ND	62.8	46-148			Q
Surrogate: 2-Fluorophenol	469			ug/kg	750	312	62.5	27-120			
Surrogate: Phenol-d5	649			ug/kg	750	479	86.5	29-120			Q
Surrogate: 2-Chlorophenol-d4	503			ug/kg	750	379	67.1	31-120			
Surrogate: 1,2-Dichlorobenzene-d4	355			ug/kg	500	330	71.0	32-120			
Surrogate: Nitrobenzene-d5	442			ug/kg	500	436	88.3	30-120			
Surrogate: 2-Fluorobiphenyl	411			ug/kg	500	405	82.1	35-120			
Surrogate: 2,4,6-Tribromophenol	297			ug/kg	750	90.2	39.5	24-134			
Surrogate: p-Terphenyl-d14	457			ug/kg	500	441	91.4	37-120			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike Dup (BIK0843-MSD1)											
Source: 20K0364-11				Prepared: 30-Nov-2020 Analyzed: 23-Dec-2020 01:01							
Phenol	370	8.2	20.0	ug/kg	500	ND	74.0	34-120	3.12	30	
Benzyl Alcohol	392	14.9	20.0	ug/kg	500	ND	78.4	19-120	3.63	30	
2-Methylphenol	103	7.8	20.0	ug/kg	500	ND	20.5	28-120	45.70	30	*
Hexachloroethane	379	5.7	20.0	ug/kg	500	ND	75.8	38-120	2.74	30	
4-Methylphenol	243	14.7	20.0	ug/kg	500	ND	48.7	29-120	19.90	30	
Naphthalene	319	5.3	20.0	ug/kg	500	ND	63.8	43-120	1.07	30	
Benzoic acid	1300	59.1	200	ug/kg	2300	ND	56.6	10-120	2.39	30	
2-Methylnaphthalene	347	5.7	20.0	ug/kg	500	ND	69.4	43-120	0.10	30	
Acenaphthylene	306	4.8	20.0	ug/kg	500	ND	61.2	42-120	2.90	30	Q
Dimethylphthalate	387	6.4	20.0	ug/kg	500	ND	77.5	43-120	4.28	30	
Acenaphthene	354	5.1	20.0	ug/kg	500	ND	70.8	45-120	1.27	30	
Dibenzofuran	388	4.6	20.0	ug/kg	500	ND	77.7	43-120	2.60	30	
Fluorene	356	5.0	20.0	ug/kg	500	ND	71.1	45-120	1.45	30	



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Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:06

Semivolatile Organic Compounds - Quality Control

Batch BIK0843 - EPA 3546 (Microwave)

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike Dup (BIK0843-MSD1)											
Source: 20K0364-11				Prepared: 30-Nov-2020 Analyzed: 23-Dec-2020 01:01							
Diethyl phthalate	410	17.7	20.0	ug/kg	500	ND	82.0	50-120	4.59	30	
N-Nitrosodiphenylamine	304	9.6	20.0	ug/kg	500	ND	60.7	70-154	18.90	30	*
Hexachlorobenzene	326	4.7	20.0	ug/kg	500	ND	65.2	33-120	4.28	30	Q
Pentachlorophenol	693	31.3	100	ug/kg	1300	ND	53.3	16-120	14.70	30	
Phenanthrene	393	4.7	20.0	ug/kg	500	6.0	77.4	49-120	3.85	30	
Anthracene	369	5.9	20.0	ug/kg	500	ND	73.7	45-120	6.93	30	
Di-n-Butylphthalate	441	5.3	20.0	ug/kg	500	ND	88.1	48-126	9.56	30	
Fluoranthene	481	4.5	20.0	ug/kg	500	ND	96.2	53-145	1.43	30	
Pyrene	481	5.6	20.0	ug/kg	500	ND	96.1	52-134	3.87	30	
Butylbenzylphthalate	471	8.1	20.0	ug/kg	500	ND	94.1	45-132	3.33	30	
Benzo(a)anthracene	377	5.2	20.0	ug/kg	500	ND	75.3	49-120	5.90	30	
Chrysene	381	5.2	20.0	ug/kg	500	ND	76.1	47-120	6.41	30	
bis(2-Ethylhexyl)phthalate	459	28.8	50.0	ug/kg	500	ND	91.8	34-130	0.31	30	
Di-n-Octylphthalate	368	8.7	20.0	ug/kg	500	ND	73.6	28-124	4.29	30	
Benzo(a)pyrene	348	6.5	20.0	ug/kg	500	ND	69.6	42-120	4.33	30	
Indeno(1,2,3-cd)pyrene	339	6.0	20.0	ug/kg	500	ND	67.8	42-163	2.42	30	Q
Dibenzo(a,h)anthracene	335	6.2	20.0	ug/kg	500	ND	66.9	30-133	0.13	30	Q
Benzo(g,h,i)perylene	323	5.8	20.0	ug/kg	500	ND	64.5	46-148	2.67	30	Q
Surrogate: 2-Fluorophenol	510			ug/kg	750	312	67.9	27-120			
Surrogate: Phenol-d5	654			ug/kg	750	479	87.2	29-120			Q
Surrogate: 2-Chlorophenol-d4	520			ug/kg	750	379	69.3	31-120			
Surrogate: 1,2-Dichlorobenzene-d4	342			ug/kg	500	330	68.4	32-120			
Surrogate: Nitrobenzene-d5	427			ug/kg	500	436	85.4	30-120			
Surrogate: 2-Fluorobiphenyl	404			ug/kg	500	405	80.9	35-120			
Surrogate: 2,4,6-Tribromophenol	356			ug/kg	750	90.2	47.5	24-134			
Surrogate: p-Terphenyl-d14	462			ug/kg	500	441	92.4	37-120			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Reference (BIK0843-SRM1)				Prepared: 30-Nov-2020 Analyzed: 23-Dec-2020 01:38							
Phenol	3840	82.3	200	ug/kg	4870		78.9	18-182			
2-Methylphenol	4680	78.4	200	ug/kg	5870		79.7	27-174			
Hexachloroethane	1920	56.5	200	ug/kg	5770		33.3	9-191			
4-Methylphenol	5010	147	200	ug/kg	5980		83.8	10-189			
Naphthalene	806	52.5	200	ug/kg	1920		42.0	41-159			



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Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:06

Semivolatile Organic Compounds - Quality Control

Batch BIK0843 - EPA 3546 (Microwave)

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Reference (BIK0843-SRM1)						Prepared: 30-Nov-2020 Analyzed: 23-Dec-2020 01:38					
2-Methylnaphthalene	2170	56.7	200	ug/kg	3600		60.3	51-149			
Acenaphthylene	3320	47.7	200	ug/kg	5450		61.0	57-142			Q
Acenaphthene	2910	51.3	200	ug/kg	4250		68.6	59-141			
Dibenzofuran	3060	46.1	200	ug/kg	4010		76.2	58-142			
Fluorene	4740	49.5	200	ug/kg	5780		82.0	48-152			
N-Nitrosodiphenylamine	7290	95.7	200	ug/kg	5460		133	24-176			
Hexachlorobenzene	1790	47.4	200	ug/kg	2610		68.5	41-159			Q
Pentachlorophenol	5080	313	1000	ug/kg	5820		87.2	8-192			
Phenanthrene	1740	46.9	200	ug/kg	2210		78.6	40-160			
Anthracene	2260	59.3	200	ug/kg	3240		69.7	52-148			
Fluoranthene	4370	45.2	200	ug/kg	4060		108	46-155			
Pyrene	6040	55.5	200	ug/kg	6300		95.9	27-173			
Benzo(a)anthracene	2670	51.8	200	ug/kg	3280		81.3	33-167			
Chrysene	1370	52.2	200	ug/kg	1750		78.1	62-139			
Di-n-Octylphthalate	6090	87.2	200	ug/kg	7640		79.7	7-192			
Benzo(a)pyrene	1100	64.8	200	ug/kg	1690		65.0	44-156			
Indeno(1,2,3-cd)pyrene	2090	59.9	200	ug/kg	2670		78.4	27-173			Q
Dibenzo(a,h)anthracene	2290	61.6	200	ug/kg	3030		75.5	19-181			Q
Benzo(g,h,i)perylene	2050	58.2	200	ug/kg	2550		80.6	40-160			Q
Surrogate: 2-Fluorophenol	6430			ug/kg	7500		85.7	27-120			
Surrogate: Phenol-d5	6600			ug/kg	7500		88.0	29-120			Q
Surrogate: 2-Chlorophenol-d4	6180			ug/kg	7500		82.4	31-120			
Surrogate: 1,2-Dichlorobenzene-d4	3640			ug/kg	5000		72.8	32-120			
Surrogate: Nitrobenzene-d5	4660			ug/kg	5000		93.2	30-120			
Surrogate: 2-Fluorobiphenyl	4110			ug/kg	5000		82.3	35-120			
Surrogate: 2,4,6-Tribromophenol	5360			ug/kg	7500		71.5	24-134			
Surrogate: p-Terphenyl-d14	4740			ug/kg	5000		94.8	37-120			



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:06

Semivolatile Organic Compounds - SIM - Quality Control

Batch BIK0843 - EPA 3546 (Microwave)

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BIK0843-BLK2) Prepared: 30-Nov-2020 Analyzed: 22-Dec-2020 16:16											
1,4-Dichlorobenzene	ND	0.6	5.0	ug/kg							U
1,2-Dichlorobenzene	ND	0.7	5.0	ug/kg							U
2,4-Dimethylphenol	ND	2.2	20.0	ug/kg							U
1,2,4-Trichlorobenzene	ND	2.7	5.0	ug/kg							U
Hexachlorobutadiene	ND	0.7	5.0	ug/kg							U
Surrogate: 2-Fluorophenol	541			ug/kg	750		72.1	27-120			
Surrogate: p-Terphenyl-d14	363			ug/kg	500		72.5	37-120			

LCS (BIK0843-BS2) Prepared: 30-Nov-2020 Analyzed: 22-Dec-2020 16:54											
1,4-Dichlorobenzene	318	0.6	5.0	ug/kg	500		63.6	36-120			Q
1,2-Dichlorobenzene	317	0.7	5.0	ug/kg	500		63.4	36-120			
2,4-Dimethylphenol	774	2.2	20.0	ug/kg	1300		59.5	10-120			
1,2,4-Trichlorobenzene	275	2.7	5.0	ug/kg	500		55.1	35-120			
Hexachlorobutadiene	308	0.7	5.0	ug/kg	500		61.6	34-120			
Surrogate: 2-Fluorophenol	670			ug/kg	750		89.3	27-120			
Surrogate: p-Terphenyl-d14	411			ug/kg	500		82.2	37-120			

Matrix Spike (BIK0843-MS2) Source: 20K0364-11 Prepared: 30-Nov-2020 Analyzed: 23-Dec-2020 00:23											
1,4-Dichlorobenzene	327	0.6	5.0	ug/kg	500	ND	65.4	36-120			Q
1,2-Dichlorobenzene	320	0.7	5.0	ug/kg	500	ND	64.0	36-120			
2,4-Dimethylphenol	199	2.2	20.0	ug/kg	1300	ND	15.3	10-120			
1,2,4-Trichlorobenzene	283	2.7	5.0	ug/kg	500	ND	56.5	35-120			
Hexachlorobutadiene	310	0.7	5.0	ug/kg	500	ND	62.0	34-120			
Surrogate: 2-Fluorophenol	482			ug/kg	750	327	64.3	27-120			
Surrogate: p-Terphenyl-d14	410			ug/kg	500	393	82.1	37-120			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike Dup (BIK0843-MSD2) Source: 20K0364-11 Prepared: 30-Nov-2020 Analyzed: 23-Dec-2020 01:01											
1,4-Dichlorobenzene	324	0.6	5.0	ug/kg	500	ND	64.9	36-120	0.82	30	Q
1,2-Dichlorobenzene	323	0.7	5.0	ug/kg	500	ND	64.6	36-120	0.92	30	
2,4-Dimethylphenol	191	2.2	20.0	ug/kg	1300	ND	14.7	10-120	4.16	30	
1,2,4-Trichlorobenzene	280	2.7	5.0	ug/kg	500	ND	56.0	35-120	0.86	30	
Hexachlorobutadiene	309	0.7	5.0	ug/kg	500	ND	61.8	34-120	0.30	30	
Surrogate: 2-Fluorophenol	531			ug/kg	750	327	70.8	27-120			



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Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:06

Semivolatile Organic Compounds - SIM - Quality Control

Batch BIK0843 - EPA 3546 (Microwave)

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike Dup (BIK0843-MSD2)		Source: 20K0364-11		Prepared: 30-Nov-2020		Analyzed: 23-Dec-2020 01:01				
Surrogate: p-Terphenyl-d14	424			ug/kg	500	393	84.8	37-120		

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Reference (BIK0843-SRM2)		Prepared: 30-Nov-2020		Analyzed: 23-Dec-2020 01:38						
1,4-Dichlorobenzene	1720	6.0	50.0	ug/kg	7450		23.1	12-188		Q
1,2-Dichlorobenzene	442	7.4	50.0	ug/kg	1700		26.0	17-184		
2,4-Dimethylphenol	3020	21.7	200	ug/kg	4380		69.0	19-181		
Surrogate: 2-Fluorophenol	6590			ug/kg	7500		87.9	27-120		
Surrogate: p-Terphenyl-d14	4250			ug/kg	5000		85.0	37-120		



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Project: COA Outfall
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Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:06

Butyl Tins - Quality Control

Batch BIK0863 - EPA 3546 (Microwave)

Instrument: NT8 Analyst: JZ

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BIK0863-BLK1)											
						Prepared: 30-Nov-2020 Analyzed: 17-Dec-2020 13:33					
Tributyltin Ion	ND	0.450	3.86	ug/kg							U
Dibutyltin Ion	ND	1.73	5.78	ug/kg							U
Butyltin Ion	ND	1.89	4.08	ug/kg							U
Tetrabutyltin	ND	5.00	5.00	ug/kg							U
Surrogate: Triphenyltin	45.7			ug/kg	45.2	101		30-160			
Surrogate: Tripropyltin	29.2			ug/kg	43.7	66.6		30-160			
LCS (BIK0863-BS1)											
						Prepared: 30-Nov-2020 Analyzed: 17-Dec-2020 13:50					
Tributyltin Ion	35.4	0.450	3.86	ug/kg	44.6	79.4		30-160			
Dibutyltin Ion	34.0	1.73	5.78	ug/kg	38.4	88.6		30-160			
Butyltin Ion	27.9	1.89	4.08	ug/kg	31.2	89.6		30-160			
Surrogate: Triphenyltin	46.8			ug/kg	45.2	104		30-160			
Surrogate: Tripropyltin	29.1			ug/kg	43.7	66.6		30-160			
Matrix Spike (BIK0863-MS1)											
			Source: 20K0364-02		Prepared: 30-Nov-2020 Analyzed: 17-Dec-2020 14:56						
Tributyltin Ion	38.4	0.445	3.82	ug/kg	44.1	4.92	76.0	30-160			
Dibutyltin Ion	35.5	1.71	5.72	ug/kg	37.9	ND	93.5	30-160			
Butyltin Ion	24.3	1.87	4.04	ug/kg	30.8	ND	78.9	30-160			
Surrogate: Triphenyltin	49.2			ug/kg	44.7	46.1	110	30-160			
Surrogate: Tripropyltin	30.8			ug/kg	43.3	32.1	71.2	30-160			
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											
Matrix Spike Dup (BIK0863-MSD1)											
			Source: 20K0364-02		Prepared: 30-Nov-2020 Analyzed: 17-Dec-2020 15:12						
Tributyltin Ion	37.7	0.445	3.82	ug/kg	44.1	4.92	74.5	30-160	1.75	30	
Dibutyltin Ion	35.9	1.71	5.72	ug/kg	37.9	ND	94.6	30-160	1.15	30	
Butyltin Ion	24.3	1.87	4.04	ug/kg	30.8	ND	78.9	30-160	0.09	30	
Surrogate: Triphenyltin	47.8			ug/kg	44.7	46.1	107	30-160			
Surrogate: Tripropyltin	30.4			ug/kg	43.3	32.1	70.1	30-160			
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											
Reference (BIK0863-SRM1)											
						Prepared: 30-Nov-2020 Analyzed: 17-Dec-2020 14:06					
Tributyltin Ion	483	2.25	19.3	ug/kg	430		112	50-150			
Dibutyltin Ion	573	8.65	28.9	ug/kg	631		90.8	50-150			
Butyltin Ion	639	9.45	20.4	ug/kg	1470		43.5	50-150			*



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Reported:
26-Mar-2021 16:06

Butyl Tins - Quality Control

Batch BIK0863 - EPA 3546 (Microwave)

Instrument: NT8 Analyst: JZ

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Reference (BIK0863-SRM1)					Prepared: 30-Nov-2020 Analyzed: 17-Dec-2020 14:06						
Surrogate: Triphenyltin	259			ug/kg	226		115	30-160			
Surrogate: Tripropyltin	151			ug/kg	219		68.9	30-160			



Dalton, Olmsted & Fuglevand, Inc
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Project: COA Outfall
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Reported:
26-Mar-2021 16:06

Chlorinated Pesticides - Quality Control

Batch BJB0764 - EPA 3546 (Microwave)

Instrument: ECD6 Analyst: YZ/VTs

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJB0764-BLK1)											
						Prepared: 26-Feb-2021 Analyzed: 15-Mar-2021 16:11					
Heptachlor	ND	0.05	0.50	ug/kg							U
Aldrin	ND	0.37	0.50	ug/kg							U
trans-Chlordane (beta-Chlordane)	ND	0.33	0.50	ug/kg							U
cis-Chlordane (alpha-chlordane)	ND	0.11	0.50	ug/kg							U
4,4'-DDE	ND	0.14	1.00	ug/kg							U
Dieldrin	ND	0.12	1.00	ug/kg							U
4,4'-DDD	ND	0.32	1.00	ug/kg							U
4,4'-DDT	ND	0.33	1.00	ug/kg							U
Oxychlordane	ND	0.13	1.00	ug/kg							U
cis-Nonachlor	ND	0.21	1.00	ug/kg							U
trans-Nonachlor	ND	0.23	1.00	ug/kg							U
Surrogate: Decachlorobiphenyl	7.19			ug/kg	8.00		89.8	30-160			
Surrogate: Decachlorobiphenyl [2C]	5.68			ug/kg	8.00		71.1	30-160			
Surrogate: Tetrachlorometaxylene	5.44			ug/kg	8.00		68.0	30-160			
Surrogate: Tetrachlorometaxylene [2C]	5.53			ug/kg	8.00		69.1	30-160			
LCS (BJB0764-BS1)											
						Prepared: 26-Feb-2021 Analyzed: 15-Mar-2021 16:29					
Heptachlor	2.94	0.05	0.50	ug/kg	4.00		73.4	26-120			
Aldrin [2C]	3.02	0.37	0.50	ug/kg	4.00		75.5	26-120			
trans-Chlordane (beta-Chlordane)	3.57	0.33	0.50	ug/kg	4.00		89.3	21-120			
cis-Chlordane (alpha-chlordane)	3.36	0.11	0.50	ug/kg	4.00		84.0	39-120			
4,4'-DDE [2C]	6.82	0.14	1.00	ug/kg	8.00		85.2	35-120			
Dieldrin	7.04	0.12	1.00	ug/kg	8.00		88.0	10-140			
4,4'-DDD	6.91	0.32	1.00	ug/kg	8.00		86.3	50-120			
4,4'-DDT	6.75	0.33	1.00	ug/kg	8.00		84.4	39-120			
Surrogate: Decachlorobiphenyl	7.15			ug/kg	8.00		89.4	30-160			
Surrogate: Decachlorobiphenyl [2C]	6.42			ug/kg	8.00		80.2	30-160			
Surrogate: Tetrachlorometaxylene	5.55			ug/kg	8.00		69.4	30-160			
Surrogate: Tetrachlorometaxylene [2C]	5.83			ug/kg	8.00		72.8	30-160			
LCS (BJB0764-BS2)											
						Prepared: 26-Feb-2021 Analyzed: 15-Mar-2021 16:48					
Oxychlordane [2C]	5.49	0.13	1.00	ug/kg	8.00		68.6	30-160			
cis-Nonachlor	5.59	0.21	1.00	ug/kg	8.00		69.9	30-160			
trans-Nonachlor	6.00	0.23	1.00	ug/kg	8.00		74.9	30-160			



Dalton, Olmsted & Fuglevand, Inc
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Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:06

Chlorinated Pesticides - Quality Control

Batch BJB0764 - EPA 3546 (Microwave)

Instrument: ECD6 Analyst: YZ/VTs

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BJB0764-BS2)						Prepared: 26-Feb-2021	Analyzed: 15-Mar-2021 16:48				
Surrogate: Decachlorobiphenyl	6.70			ug/kg	8.00		83.8	30-160			
Surrogate: Decachlorobiphenyl [2C]	5.70			ug/kg	8.00		71.3	30-160			
Surrogate: Tetrachlorometaxylene	5.08			ug/kg	8.00		63.5	30-160			
Surrogate: Tetrachlorometaxylene [2C]	5.28			ug/kg	8.00		65.9	30-160			
Reference (BJB0764-SRM1)						Prepared: 26-Feb-2021	Analyzed: 16-Mar-2021 00:21				
4,4'-DDE [2C]	355	3.38	25.0	ug/kg	315		113	1-199			D
Dieldrin [2C]	95.8	2.88	25.0	ug/kg	53.3		180	0-238			P1, D
4,4'-DDD	134	8.00	25.0	ug/kg	120		112	8-192			D
4,4'-DDT	124	8.13	25.0	ug/kg	92.1		135	0-227			D
Surrogate: Decachlorobiphenyl	125			ug/kg	100		125	30-160			
Surrogate: Decachlorobiphenyl [2C]	84.0			ug/kg	100		84.0	30-160			
Surrogate: Tetrachlorometaxylene	74.6			ug/kg	100		74.6	30-160			
Surrogate: Tetrachlorometaxylene [2C]	80.2			ug/kg	100		80.2	30-160			



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Project: COA Outfall
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Reported:
26-Mar-2021 16:06

Aroclor PCB - Quality Control

Batch BIK0842 - EPA 3546 (Microwave)

Instrument: ECD7 Analyst: JGR

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BIK0842-BLK1)											
						Prepared: 28-Nov-2020 Analyzed: 19-Dec-2020 15:11					
Aroclor 1016	ND	1.6	4.0	ug/kg							U
Aroclor 1221	ND	1.6	4.0	ug/kg							U
Aroclor 1232	ND	1.6	4.0	ug/kg							U
Aroclor 1242	ND	1.6	4.0	ug/kg							U
Aroclor 1248	ND	1.6	4.0	ug/kg							U
Aroclor 1254	ND	1.6	4.0	ug/kg							U
Aroclor 1260	ND	0.6	4.0	ug/kg							U
Aroclor 1262	ND	0.6	4.0	ug/kg							U
Aroclor 1268	ND	0.6	4.0	ug/kg							U
Surrogate: Decachlorobiphenyl	6.36			ug/kg	8.00		79.5	40-126			
Surrogate: Tetrachlorometaxylene	6.14			ug/kg	8.00		76.8	44-120			
Surrogate: Decachlorobiphenyl [2C]	7.42			ug/kg	8.00		92.8	40-126			
Surrogate: Tetrachlorometaxylene [2C]	6.19			ug/kg	8.00		77.4	44-120			
LCS (BIK0842-BS1)											
						Prepared: 28-Nov-2020 Analyzed: 19-Dec-2020 15:32					
Aroclor 1016 [2C]	82.6	1.6	4.0	ug/kg	101		82.0	56-120			
Aroclor 1260 [2C]	99.8	0.6	4.0	ug/kg	101		99.0	58-120			
Surrogate: Decachlorobiphenyl	6.30			ug/kg	8.00		78.8	40-126			
Surrogate: Tetrachlorometaxylene	5.93			ug/kg	8.00		74.1	44-120			
Surrogate: Decachlorobiphenyl [2C]	7.45			ug/kg	8.00		93.2	40-126			
Surrogate: Tetrachlorometaxylene [2C]	5.72			ug/kg	8.00		71.5	44-120			
Matrix Spike (BIK0842-MS1)											
				Source: 20K0364-10		Prepared: 28-Nov-2020 Analyzed: 19-Dec-2020 18:16					
Aroclor 1016	73.3	1.6	4.0	ug/kg	101	ND	72.7	56-120			
Aroclor 1260	76.1	0.6	4.0	ug/kg	101	ND	75.5	58-120			
Surrogate: Decachlorobiphenyl	6.03			ug/kg	8.00		75.3	40-126			
Surrogate: Tetrachlorometaxylene	5.76			ug/kg	8.00		72.0	44-120			
Surrogate: Decachlorobiphenyl [2C]	7.29			ug/kg	8.00		91.1	40-126			
Surrogate: Tetrachlorometaxylene [2C]	5.82			ug/kg	8.00		72.8	44-120			
Matrix Spike Dup (BIK0842-MSD1)											
				Source: 20K0364-10		Prepared: 28-Nov-2020 Analyzed: 19-Dec-2020 18:37					
Aroclor 1016	79.7	1.6	4.0	ug/kg	101	ND	79.1	56-120	8.48	30	
Aroclor 1260	77.8	0.6	4.0	ug/kg	101	ND	77.2	58-120	2.29	30	

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



Dalton, Olmsted & Fuglevand, Inc
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Reported:
26-Mar-2021 16:06

Aroclor PCB - Quality Control

Batch BIK0842 - EPA 3546 (Microwave)

Instrument: ECD7 Analyst: JGR

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike Dup (BIK0842-MSD1)		Source: 20K0364-10		Prepared: 28-Nov-2020		Analyzed: 19-Dec-2020 18:37					
Surrogate: Decachlorobiphenyl	6.08			ug/kg	8.00		76.0	40-126			
Surrogate: Tetrachlorometaxylene	6.10			ug/kg	8.00		76.2	44-120			
Surrogate: Decachlorobiphenyl [2C]	7.66			ug/kg	8.00		95.8	40-126			
Surrogate: Tetrachlorometaxylene [2C]	5.94			ug/kg	8.00		74.2	44-120			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Reference (BIK0842-SRM1)		Prepared: 28-Nov-2020		Analyzed: 19-Dec-2020 21:01							
Aroclor 1248 [2C]	1490	19.5	50.0	ug/kg	1520		98.0	20-180			
Surrogate: Decachlorobiphenyl	70.2			ug/kg	100		70.2	40-126			
Surrogate: Tetrachlorometaxylene	65.3			ug/kg	100		65.3	44-120			
Surrogate: Decachlorobiphenyl [2C]	91.3			ug/kg	100		91.3	40-126			
Surrogate: Tetrachlorometaxylene [2C]	69.4			ug/kg	100		69.4	44-120			



Dalton, Olmsted & Fuglevand, Inc
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Project: COA Outfall
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Reported:
26-Mar-2021 16:06

Dioxins/Furans - Quality Control

Batch BIL0036 - EPA 1613

Instrument: AUTOSPEC01 Analyst: pl

QC Sample/Analyte	Ion Ratio	Ratio Limits	EDL	Reporting Limit	Result	Units	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BIL0036-BLK1)											
				Prepared: 03-Dec-2020		Analyzed: 07-Dec-2020 13:31					
2,3,7,8-TCDF		0.655-0.886	0.163	1.00	ND	ng/kg					U
2,3,7,8-TCDD		0.655-0.886	0.127	1.00	ND	ng/kg					U
1,2,3,7,8-PeCDF		1.318-1.783	0.115	1.00	ND	ng/kg					U
2,3,4,7,8-PeCDF		1.318-1.783	0.100	1.00	ND	ng/kg					U
1,2,3,7,8-PeCDD		1.318-1.783	0.135	1.00	ND	ng/kg					U
1,2,3,4,7,8-HxCDF		1.054-1.426	0.085	1.00	ND	ng/kg					U
1,2,3,6,7,8-HxCDF		1.054-1.426	0.079	1.00	ND	ng/kg					U
2,3,4,6,7,8-HxCDF		1.054-1.426	0.086	1.00	ND	ng/kg					U
1,2,3,7,8,9-HxCDF		1.054-1.426	0.126	1.00	ND	ng/kg					U
1,2,3,4,7,8-HxCDD		1.054-1.426	0.122	1.00	ND	ng/kg					U
1,2,3,6,7,8-HxCDD		1.054-1.426	0.107	1.00	ND	ng/kg					U
1,2,3,7,8,9-HxCDD		1.054-1.426	0.129	1.00	ND	ng/kg					U
1,2,3,4,6,7,8-HpCDF		0.893-1.208	0.065	1.00	ND	ng/kg					U
1,2,3,4,7,8,9-HpCDF		0.893-1.208	0.103	1.00	ND	ng/kg					U
1,2,3,4,6,7,8-HpCDD		0.893-1.208	0.212	2.50	ND	ng/kg					U
OCDF		0.757-1.024	0.381	2.50	ND	ng/kg					U
OCDD	1.008	0.757-1.024		10.0	2.35	ng/kg					J
Homologue group											
Total TCDF				1.00	ND	ng/kg					U
Total TCDD				1.00	ND	ng/kg					U
Total PeCDF				1.00	ND	ng/kg					U
Total PeCDD				1.00	ND	ng/kg					U
Total HxCDF				1.00	ND	ng/kg					U
Total HxCDD				1.00	ND	ng/kg					U
Total HpCDF				1.00	ND	ng/kg					U
Total HpCDD				1.00	0.0967	ng/kg					

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC): 0.10
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC): 0.00
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, EMPC=ND): 0.10
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0 EDL, EMPC=ND): 0.00



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:06

Dioxins/Furans - Quality Control

Batch BIL0036 - EPA 1613

Instrument: AUTOSPEC01 Analyst: pl

QC Sample/Analyte	Ion Ratio	Ratio Limits	EDL	Reporting Limit	Result	Units	%REC	%REC Limits	RPD	RPD Limit	Notes
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Blank (BIL0036-BLK1)

Prepared: 03-Dec-2020 Analyzed: 07-Dec-2020 13:31

Labeled compounds

13C12-2,3,7,8-TCDF	0.752	0.655-0.886			66.0					24-169 %	
13C12-2,3,7,8-TCDD	0.798	0.655-0.886			66.2					25-164 %	
13C12-1,2,3,4,7,8-PeCDF	1.598	1.318-1.783			58.5					24-185 %	
13C12-2,3,4,7,8-PeCDF	1.573	1.318-1.783			58.3					21-178 %	
13C12-1,2,3,7,8-PeCDD	1.773	1.318-1.783			58.7					25-181 %	
13C12-1,2,3,4,7,8-HxCDF	0.489	0.434-0.587			68.9					26-152 %	
13C12-1,2,3,6,7,8-HxCDF	0.480	0.434-0.587			75.7					26-123 %	
13C12-2,3,4,6,7,8-HxCDF	0.509	0.434-0.587			66.0					28-136 %	
13C12-1,2,3,7,8,9-HxCDF	0.505	0.434-0.587			59.9					29-147 %	
13C12-1,2,3,4,7,8-HxCDD	1.268	1.054-1.426			71.1					32-141 %	
13C12-1,2,3,6,7,8-HxCDD	1.293	1.054-1.426			75.4					28-130 %	
13C12-1,2,3,4,6,7,8-HpCDF	0.389	0.374-0.506			62.9					28-143 %	
13C12-1,2,3,4,7,8,9-HpCDF	0.414	0.374-0.506			55.9					26-138 %	
13C12-1,2,3,4,6,7,8-HpCDD	1.103	0.893-1.208			68.4					23-140 %	
13C12-OCDD	0.903	0.757-1.024			41.0					17-157 %	
37Cl4-2,3,7,8-TCDD					87.8					35-197 %	

LCS (BIL0036-BS1)

Prepared: 03-Dec-2020 Analyzed: 07-Dec-2020 14:20

2,3,7,8-TCDF	0.776	0.655-0.886	1.00	19.5	ng/kg	97.5	75-158 %	
2,3,7,8-TCDD	0.775	0.655-0.886	1.00	18.9	ng/kg	94.4	67-158 %	
1,2,3,7,8-PeCDF	1.677	1.318-1.783	1.00	96.5	ng/kg	96.5	80-134 %	
2,3,4,7,8-PeCDF	1.755	1.318-1.783	1.00	95.6	ng/kg	95.6	68-160 %	
1,2,3,7,8-PeCDD	1.449	1.318-1.783	1.00	107	ng/kg	107	70-142 %	
1,2,3,4,7,8-HxCDF	1.365	1.054-1.426	1.00	99.1	ng/kg	99.1	72-134 %	
1,2,3,6,7,8-HxCDF	1.387	1.054-1.426	1.00	98.0	ng/kg	98.0	84-130 %	
2,3,4,6,7,8-HxCDF	1.295	1.054-1.426	1.00	95.1	ng/kg	95.1	70-156 %	
1,2,3,7,8,9-HxCDF	1.340	1.054-1.426	1.00	96.6	ng/kg	96.6	78-130 %	
1,2,3,4,7,8-HxCDD	1.252	1.054-1.426	1.00	109	ng/kg	109	70-164 %	
1,2,3,6,7,8-HxCDD	1.160	1.054-1.426	1.00	106	ng/kg	106	76-134 %	
1,2,3,7,8,9-HxCDD	1.226	1.054-1.426	1.00	96.9	ng/kg	96.9	64-162 %	
1,2,3,4,6,7,8-HpCDF	1.161	0.893-1.208	1.00	87.0	ng/kg	87.0	82-122 %	
1,2,3,4,7,8,9-HpCDF	0.956	0.893-1.208	1.00	96.8	ng/kg	96.8	78-138 %	
1,2,3,4,6,7,8-HpCDD	1.076	0.893-1.208	2.50	106	ng/kg	106	70-140 %	
OCDF	0.932	0.757-1.024	2.50	217	ng/kg	109	63-170 %	
OCDD	0.891	0.757-1.024	10.0	214	ng/kg	107	78-144 %	B



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:06

Dioxins/Furans - Quality Control

Batch BIL0036 - EPA 1613

Instrument: AUTOSPEC01 Analyst: pl

QC Sample/Analyte	Ion Ratio	Ratio Limits	EDL	Reporting Limit	Result	Units	%REC	Limits	RPD	RPD Limit	Notes
LCS (BIL0036-BS1)											
Prepared: 03-Dec-2020					Analyzed: 07-Dec-2020 14:20						
Labeled compounds											
13C12-2,3,7,8-TCDF	0.772	0.655-0.886				70.5				24-169 %	
13C12-2,3,7,8-TCDD	0.798	0.655-0.886				69.2				25-164 %	
13C12-1,2,3,7,8-PeCDF	1.681	1.318-1.783				60.4				24-185 %	
13C12-2,3,4,7,8-PeCDF	1.524	1.318-1.783				58.9				21-178 %	
13C12-1,2,3,7,8-PeCDD	1.716	1.318-1.783				58.0				25-181 %	
13C12-1,2,3,4,7,8-HxCDF	0.491	0.434-0.587				81.4				26-152 %	
13C12-1,2,3,6,7,8-HxCDF	0.457	0.434-0.587				82.2				26-123 %	
13C12-2,3,4,6,7,8-HxCDF	0.480	0.434-0.587				75.1				28-136 %	
13C12-1,2,3,7,8,9-HxCDF	0.516	0.434-0.587				69.1				29-147 %	
13C12-1,2,3,4,7,8-HxCDD	1.263	1.054-1.426				76.2				32-141 %	
13C12-1,2,3,6,7,8-HxCDD	1.331	1.054-1.426				81.6				28-130 %	
13C12-1,2,3,4,6,7,8-HpCDF	0.409	0.374-0.506				80.0				28-143 %	
13C12-1,2,3,4,7,8,9-HpCDF	0.414	0.374-0.506				67.8				26-138 %	
13C12-1,2,3,4,6,7,8-HpCDD	1.085	0.893-1.208				71.4				23-140 %	
13C12-OCDD	0.963	0.757-1.024				45.0				17-157 %	
37Cl4-2,3,7,8-TCDD						81.6				35-197 %	

Duplicate (BIL0036-DUP1)		Source: 20K0364-01		Prepared: 03-Dec-2020		Analyzed: 07-Dec-2020 15:09					
2,3,7,8-TCDF		0.655-0.886	0.151	0.996	ND	ng/kg					U
2,3,7,8-TCDD		0.655-0.886	0.136	0.996	ND	ng/kg					U
1,2,3,7,8-PeCDF		1.318-1.783	0.140	0.996	ND	ng/kg					U
2,3,4,7,8-PeCDF		1.318-1.783	0.137	0.996	ND	ng/kg					U
1,2,3,7,8-PeCDD	1.470	1.318-1.783		0.996	0.258	ng/kg		26.50	25		*, J
1,2,3,4,7,8-HxCDF	1.478	1.054-1.426		0.996	0.161	ng/kg		33.40	25		*, EMPC, J
1,2,3,6,7,8-HxCDF	1.329	1.054-1.426		0.996	0.154	ng/kg		24.20	25		J
2,3,4,6,7,8-HxCDF		1.054-1.426	0.078	0.996	ND	ng/kg					U
1,2,3,7,8,9-HxCDF	1.248	1.054-1.426		0.996	0.151	ng/kg					J
1,2,3,4,7,8-HxCDD		1.054-1.426	0.155	0.996	ND	ng/kg					U
1,2,3,6,7,8-HxCDD	1.150	1.054-1.426		0.996	0.542	ng/kg		9.70	25		J
1,2,3,7,8,9-HxCDD	1.171	1.054-1.426		0.996	0.504	ng/kg		33.70	25		*, J
1,2,3,4,6,7,8-HpCDF	1.011	0.893-1.208		0.996	2.72	ng/kg		18.40	25		
1,2,3,4,7,8,9-HpCDF	1.721	0.893-1.208		0.996	0.234	ng/kg		27.20	25		*, EMPC, J
1,2,3,4,6,7,8-HpCDD	1.016	0.893-1.208		2.49	22.2	ng/kg		32.50	25		*
OCDF	0.973	0.757-1.024		2.49	16.2	ng/kg		53.30	25		*
OCDD	0.834	0.757-1.024		9.96	280	ng/kg		47.60	25		*, B



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:06

Dioxins/Furans - Quality Control

Batch BIL0036 - EPA 1613

Instrument: AUTOSPEC01 Analyst: pl

QC Sample/Analyte	Ion Ratio	Ratio Limits	EDL	Reporting Limit	Result	Units	%REC	Limits	RPD	RPD Limit	Notes
Duplicate (BIL0036-DUP1)											
Source: 20K0364-01		Prepared: 03-Dec-2020 Analyzed: 07-Dec-2020 15:09									
Homologue group											
Total TCDF				0.996	0.0885	ng/kg					
Total TCDD				0.996	0.326	ng/kg			62.10	200	
Total PeCDF				0.996	0.810	ng/kg			33.50	200	
Total PeCDD				0.996	0.699	ng/kg			142.00	200	
Total HxCDF				0.996	3.56	ng/kg			78.30	200	
Total HxCDD				0.996	7.90	ng/kg			52.80	200	
Total HpCDF				0.996	11.7	ng/kg			31.80	200	
Total HpCDD				0.996	66.6	ng/kg			35.90	200	



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
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Project: COA Outfall
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Reported:
26-Mar-2021 16:06

Dioxins/Furans - Quality Control

Batch BIL0036 - EPA 1613

Instrument: AUTOSPEC01 Analyst: pl

QC Sample/Analyte	Ion Ratio	Ratio Limits	EDL	Reporting Limit	Result	Units	%REC	Limits	RPD	RPD Limit	Notes
Duplicate (BIL0036-DUP1)											
Source: 20K0364-01		Prepared: 03-Dec-2020 Analyzed: 07-Dec-2020 15:09									
Labeled compounds											
13C12-2,3,7,8-TCDF	0.783	0.655-0.886			74.6					24-169 %	
13C12-2,3,7,8-TCDD	0.797	0.655-0.886			76.1					25-164 %	
13C12-1,2,3,7,8-PeCDF	1.517	1.318-1.783			63.8					24-185 %	
13C12-2,3,4,7,8-PeCDF	1.525	1.318-1.783			62.6					21-178 %	
13C12-1,2,3,7,8-PeCDD	1.727	1.318-1.783			63.4					25-181 %	
13C12-1,2,3,4,7,8-HxCDF	0.491	0.434-0.587			81.2					26-152 %	
13C12-1,2,3,6,7,8-HxCDF	0.476	0.434-0.587			73.8					26-123 %	
13C12-2,3,4,6,7,8-HxCDF	0.481	0.434-0.587			78.7					28-136 %	
13C12-1,2,3,7,8,9-HxCDF	0.523	0.434-0.587			95.7					29-147 %	
13C12-1,2,3,4,7,8-HxCDD	1.283	1.054-1.426			80.6					32-141 %	
13C12-1,2,3,6,7,8-HxCDD	1.261	1.054-1.426			84.1					28-130 %	
13C12-1,2,3,4,6,7,8-HpCDF	0.422	0.374-0.506			73.3					28-143 %	
13C12-1,2,3,4,7,8,9-HpCDF	0.404	0.374-0.506			72.5					26-138 %	
13C12-1,2,3,4,6,7,8-HpCDD	1.189	0.893-1.208			81.4					23-140 %	
13C12-OCDD	0.922	0.757-1.024			51.3					17-157 %	
37Cl4-2,3,7,8-TCDD					83.7					35-197 %	



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:06

Dioxins/Furans - Quality Control

Batch BJB0531 - EPA 1613

Instrument: AUTOSPEC01 Analyst: pl

QC Sample/Analyte	Ion Ratio	Ratio Limits	EDL	Reporting Limit	Result	Units	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJB0531-BLK1)				Prepared: 23-Feb-2021		Analyzed: 02-Mar-2021 12:44					
2,3,7,8-TCDF		0.655-0.886	0.086	1.00	ND	ng/kg					U
2,3,7,8-TCDD		0.655-0.886	0.091	1.00	ND	ng/kg					U
1,2,3,7,8-PeCDF	1.063	1.318-1.783		1.00	0.0828	ng/kg					EMPC, J
2,3,4,7,8-PeCDF		1.318-1.783	0.083	1.00	ND	ng/kg					U
1,2,3,7,8-PeCDD		1.318-1.783	0.115	1.00	ND	ng/kg					U
1,2,3,4,7,8-HxCDF		1.054-1.426	0.085	1.00	ND	ng/kg					U
1,2,3,6,7,8-HxCDF		1.054-1.426	0.087	1.00	ND	ng/kg					U
2,3,4,6,7,8-HxCDF		1.054-1.426	0.085	1.00	ND	ng/kg					U
1,2,3,7,8,9-HxCDF		1.054-1.426	0.107	1.00	ND	ng/kg					U
1,2,3,4,7,8-HxCDD		1.054-1.426	0.082	1.00	ND	ng/kg					U
1,2,3,6,7,8-HxCDD		1.054-1.426	0.081	1.00	ND	ng/kg					U
1,2,3,7,8,9-HxCDD		1.054-1.426	0.084	1.00	ND	ng/kg					U
1,2,3,4,6,7,8-HpCDF		0.893-1.208	0.104	1.00	ND	ng/kg					U
1,2,3,4,7,8,9-HpCDF		0.893-1.208	0.136	1.00	ND	ng/kg					U
1,2,3,4,6,7,8-HpCDD		0.893-1.208	0.132	2.50	ND	ng/kg					U
OCDF	0.763	0.757-1.024		2.50	2.46	ng/kg					J
OCDD	0.776	0.757-1.024		10.0	0.833	ng/kg					J
Homologue group											
Total TCDF				1.00	ND	ng/kg					U
Total TCDD				1.00	ND	ng/kg					U
Total PeCDF				1.00	ND	ng/kg					U
Total PeCDD				1.00	ND	ng/kg					U
Total HxCDF				1.00	ND	ng/kg					U
Total HxCDD				1.00	ND	ng/kg					U
Total HpCDF				1.00	0.112	ng/kg					
Total HpCDD				1.00	ND	ng/kg					U

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC): 0.08
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC): 0.00
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, EMPC=ND): 0.08
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0 EDL, EMPC=ND): 0.00



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
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Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:06

Dioxins/Furans - Quality Control

Batch BJB0531 - EPA 1613

Instrument: AUTOSPEC01 Analyst: pl

QC Sample/Analyte	Ion Ratio	Ratio Limits	EDL	Reporting Limit	Result	Units	%REC	Limits	RPD	RPD Limit	Notes
Blank (BJB0531-BLK1)				Prepared: 23-Feb-2021	Analyzed: 02-Mar-2021 12:44						
Labeled compounds											
13C12-2,3,7,8-TCDF	0.778	0.655-0.886			85.1					24-169 %	
13C12-2,3,7,8-TCDD	0.789	0.655-0.886			83.8					25-164 %	
13C12-1,2,3,7,8-PeCDF	1.533	1.318-1.783			81.7					24-185 %	
13C12-2,3,4,7,8-PeCDF	1.507	1.318-1.783			80.6					21-178 %	
13C12-1,2,3,7,8-PeCDD	1.628	1.318-1.783			80.0					25-181 %	
13C12-1,2,3,4,7,8-HxCDF	0.506	0.434-0.587			88.8					26-152 %	
13C12-1,2,3,6,7,8-HxCDF	0.522	0.434-0.587			88.3					26-123 %	
13C12-2,3,4,6,7,8-HxCDF	0.502	0.434-0.587			86.6					28-136 %	
13C12-1,2,3,7,8,9-HxCDF	0.500	0.434-0.587			84.7					29-147 %	
13C12-1,2,3,4,7,8-HxCDD	1.261	1.054-1.426			89.8					32-141 %	
13C12-1,2,3,6,7,8-HxCDD	1.245	1.054-1.426			85.3					28-130 %	
13C12-1,2,3,4,6,7,8-HpCDF	0.447	0.374-0.506			75.4					28-143 %	
13C12-1,2,3,4,7,8,9-HpCDF	0.439	0.374-0.506			77.0					26-138 %	
13C12-1,2,3,4,6,7,8-HpCDD	1.036	0.893-1.208			81.0					23-140 %	
13C12-OCDD	0.885	0.757-1.024			52.5					17-157 %	
37Cl4-2,3,7,8-TCDD					92.0					35-197 %	
LCS (BJB0531-BS1)				Prepared: 23-Feb-2021	Analyzed: 02-Mar-2021 13:33						
2,3,7,8-TCDF	0.774	0.655-0.886		1.00	22.2	ng/kg	111	75-158 %			
2,3,7,8-TCDD	0.786	0.655-0.886		1.00	21.0	ng/kg	105	67-158 %			
1,2,3,7,8-PeCDF	1.740	1.318-1.783		1.00	102	ng/kg	102	80-134 %			B
2,3,4,7,8-PeCDF	1.633	1.318-1.783		1.00	102	ng/kg	102	68-160 %			
1,2,3,7,8-PeCDD	1.563	1.318-1.783		1.00	109	ng/kg	109	70-142 %			
1,2,3,4,7,8-HxCDF	1.253	1.054-1.426		1.00	104	ng/kg	104	72-134 %			
1,2,3,6,7,8-HxCDF	1.215	1.054-1.426		1.00	111	ng/kg	111	84-130 %			
2,3,4,6,7,8-HxCDF	1.285	1.054-1.426		1.00	105	ng/kg	105	70-156 %			
1,2,3,7,8,9-HxCDF	1.264	1.054-1.426		1.00	104	ng/kg	104	78-130 %			
1,2,3,4,7,8-HxCDD	1.215	1.054-1.426		1.00	109	ng/kg	109	70-164 %			
1,2,3,6,7,8-HxCDD	1.135	1.054-1.426		1.00	110	ng/kg	110	76-134 %			
1,2,3,7,8,9-HxCDD	1.258	1.054-1.426		1.00	106	ng/kg	106	64-162 %			
1,2,3,4,6,7,8-HpCDF	1.053	0.893-1.208		1.00	110	ng/kg	110	82-122 %			
1,2,3,4,7,8,9-HpCDF	1.033	0.893-1.208		1.00	107	ng/kg	107	78-138 %			
1,2,3,4,6,7,8-HpCDD	1.055	0.893-1.208		2.50	105	ng/kg	105	70-140 %			
OCDF	1.021	0.757-1.024		2.50	181	ng/kg	90.3	63-170 %			B
OCDD	0.889	0.757-1.024		10.0	182	ng/kg	91.0	78-144 %			B



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:06

Dioxins/Furans - Quality Control

Batch BJB0531 - EPA 1613

Instrument: AUTOSPEC01 Analyst: pl

QC Sample/Analyte	Ion Ratio	Ratio Limits	EDL	Reporting Limit	Result	Units	%REC	Limits	RPD	RPD Limit	Notes
LCS (BJB0531-BS1)					Prepared: 23-Feb-2021	Analyzed: 02-Mar-2021 13:33					
Labeled compounds											
13C12-2,3,7,8-TCDF	0.783	0.655-0.886			79.2				24-169	%	
13C12-2,3,7,8-TCDD	0.788	0.655-0.886			80.0				25-164	%	
13C12-1,2,3,7,8-PeCDF	1.517	1.318-1.783			81.8				24-185	%	
13C12-2,3,4,7,8-PeCDF	1.507	1.318-1.783			77.7				21-178	%	
13C12-1,2,3,7,8-PeCDD	1.651	1.318-1.783			76.0				25-181	%	
13C12-1,2,3,4,7,8-HxCDF	0.515	0.434-0.587			83.5				26-152	%	
13C12-1,2,3,6,7,8-HxCDF	0.516	0.434-0.587			81.9				26-123	%	
13C12-2,3,4,6,7,8-HxCDF	0.517	0.434-0.587			80.9				28-136	%	
13C12-1,2,3,7,8,9-HxCDF	0.516	0.434-0.587			78.7				29-147	%	
13C12-1,2,3,4,7,8-HxCDD	1.289	1.054-1.426			81.6				32-141	%	
13C12-1,2,3,6,7,8-HxCDD	1.239	1.054-1.426			78.8				28-130	%	
13C12-1,2,3,4,6,7,8-HpCDF	0.411	0.374-0.506			73.8				28-143	%	
13C12-1,2,3,4,7,8,9-HpCDF	0.437	0.374-0.506			73.2				26-138	%	
13C12-1,2,3,4,6,7,8-HpCDD	1.119	0.893-1.208			77.5				23-140	%	
13C12-OCDD	0.892	0.757-1.024			60.2				17-157	%	
37Cl4-2,3,7,8-TCDD					84.3				35-197	%	

Duplicate (BJB0531-DUP1)				Source: 20K0364-01RE1		Prepared: 23-Feb-2021		Analyzed: 02-Mar-2021 15:12			
2,3,7,8-TCDF	0.808	0.655-0.886		0.999	0.353	ng/kg		14.90	25		J
2,3,7,8-TCDD		0.655-0.886	0.092	0.999	ND	ng/kg					U
1,2,3,7,8-PeCDF	1.505	1.318-1.783		0.999	0.126	ng/kg		45.00	25		*, J, B
2,3,4,7,8-PeCDF	1.963	1.318-1.783		0.999	0.177	ng/kg					EMPC, J
1,2,3,7,8-PeCDD	1.973	1.318-1.783		0.999	0.422	ng/kg		11.60	25		EMPC, J
1,2,3,4,7,8-HxCDF	1.363	1.054-1.426		0.999	0.331	ng/kg		8.13	25		J
1,2,3,6,7,8-HxCDF	1.199	1.054-1.426		0.999	0.219	ng/kg		21.80	25		J
2,3,4,6,7,8-HxCDF	1.063	1.054-1.426		0.999	0.188	ng/kg		9.53	25		J
1,2,3,7,8,9-HxCDF		1.054-1.426	0.100	0.999	ND	ng/kg					U
1,2,3,4,7,8-HxCDD	0.832	1.054-1.426		0.999	0.316	ng/kg		13.60	25		EMPC, J
1,2,3,6,7,8-HxCDD	1.265	1.054-1.426		0.999	1.77	ng/kg		15.90	25		
1,2,3,7,8,9-HxCDD	1.355	1.054-1.426		0.999	0.863	ng/kg		21.60	25		J
1,2,3,4,6,7,8-HpCDF	0.951	0.893-1.208		0.999	6.14	ng/kg		2.63	25		
1,2,3,4,7,8,9-HpCDF	1.009	0.893-1.208		0.999	0.279	ng/kg		18.10	25		J
1,2,3,4,6,7,8-HpCDD	1.022	0.893-1.208		2.50	78.2	ng/kg		20.50	25		
OCDF	0.944	0.757-1.024		2.50	28.6	ng/kg		4.54	25		B
OCDD	0.861	0.757-1.024		9.99	785	ng/kg		16.70	25		B



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:06

Dioxins/Furans - Quality Control

Batch BJB0531 - EPA 1613

Instrument: AUTOSPEC01 Analyst: pl

QC Sample/Analyte	Ion Ratio	Ratio Limits	EDL	Reporting Limit	Result	Units	%REC	%REC Limits	RPD	RPD Limit	Notes
Duplicate (BJB0531-DUP1)											
Source: 20K0364-01RE1											
Prepared: 23-Feb-2021 Analyzed: 02-Mar-2021 15:12											
Homologue group											
Total TCDF				0.999	0.887	ng/kg			22.80	200	
Total TCDD				0.999	0.628	ng/kg			4.77	200	
Total PeCDF				0.999	1.50	ng/kg			45.80	200	
Total PeCDD				0.999	0.520	ng/kg			95.70	200	
Total HxCDF				0.999	7.10	ng/kg			50.10	200	
Total HxCDD				0.999	25.9	ng/kg			14.20	200	
Total HpCDF				0.999	25.3	ng/kg			0.46	200	
Total HpCDD				0.999	466	ng/kg			28.60	200	



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Reported:
26-Mar-2021 16:06

Dioxins/Furans - Quality Control

Batch BJB0531 - EPA 1613

Instrument: AUTOSPEC01 Analyst: pl

QC Sample/Analyte	Ion Ratio	Ratio Limits	EDL	Reporting Limit	Result	Units	%REC	Limits	RPD	RPD Limit	Notes
Duplicate (BJB0531-DUP1)											
Source: 20K0364-01RE1			Prepared: 23-Feb-2021		Analyzed: 02-Mar-2021 15:12						
Labeled compounds											
13C12-2,3,7,8-TCDF	0.789	0.655-0.886			91.6				24-169 %		
13C12-2,3,7,8-TCDD	0.791	0.655-0.886			83.7				25-164 %		
13C12-1,2,3,7,8-PeCDF	1.505	1.318-1.783			88.0				24-185 %		
13C12-2,3,4,7,8-PeCDF	1.508	1.318-1.783			88.2				21-178 %		
13C12-1,2,3,7,8-PeCDD	1.610	1.318-1.783			86.2				25-181 %		
13C12-1,2,3,4,7,8-HxCDF	0.512	0.434-0.587			89.7				26-152 %		
13C12-1,2,3,6,7,8-HxCDF	0.555	0.434-0.587			85.7				26-123 %		
13C12-2,3,4,6,7,8-HxCDF	0.524	0.434-0.587			88.5				28-136 %		
13C12-1,2,3,7,8,9-HxCDF	0.506	0.434-0.587			63.6				29-147 %		
13C12-1,2,3,4,7,8-HxCDD	1.270	1.054-1.426			85.1				32-141 %		
13C12-1,2,3,6,7,8-HxCDD	1.260	1.054-1.426			77.5				28-130 %		
13C12-1,2,3,4,6,7,8-HpCDF	0.441	0.374-0.506			89.5				28-143 %		
13C12-1,2,3,4,7,8,9-HpCDF	0.440	0.374-0.506			91.9				26-138 %		
13C12-1,2,3,4,6,7,8-HpCDD	1.043	0.893-1.208			91.7				23-140 %		
13C12-OCDD	0.889	0.757-1.024			72.2				17-157 %		
37Cl4-2,3,7,8-TCDD					90.5				35-197 %		
Reference (BJB0531-SRM1)											
				Prepared: 23-Feb-2021	Analyzed: 02-Mar-2021 14:22						
2,3,7,8-TCDF	0.834	0.655-0.886		2.00	1.30	ng/kg	117	50-150 %			J
2,3,7,8-TCDD	0.679	0.655-0.886		2.00	1.21	ng/kg	115	50-150 %			J
1,2,3,7,8-PeCDF	1.475	1.318-1.783		2.00	1.76	ng/kg	143	50-150 %			J, B
2,3,4,7,8-PeCDF	2.153	1.318-1.783		2.00	1.17	ng/kg	110	50-150 %			EMPC, J
1,2,3,7,8-PeCDD	1.685	1.318-1.783		2.00	1.39	ng/kg	129	50-150 %			J
1,2,3,4,7,8-HxCDF	1.367	1.054-1.426		2.00	3.38	ng/kg	112	50-150 %			
1,2,3,6,7,8-HxCDF	1.207	1.054-1.426		2.00	1.25	ng/kg	115	50-150 %			J
2,3,4,6,7,8-HxCDF	1.343	1.054-1.426		2.00	2.22	ng/kg	121	50-150 %			
1,2,3,7,8,9-HxCDF	1.130	1.054-1.426		2.00	0.477	ng/kg	93.4	50-150 %			J
1,2,3,4,7,8-HxCDD	1.258	1.054-1.426		2.00	1.41	ng/kg	88.6	50-150 %			J
1,2,3,6,7,8-HxCDD	1.137	1.054-1.426		2.00	3.82	ng/kg	98.6	50-150 %			
1,2,3,7,8,9-HxCDD	1.318	1.054-1.426		2.00	2.78	ng/kg	91.4	50-150 %			
1,2,3,4,6,7,8-HpCDF	1.139	0.893-1.208		2.00	20.9	ng/kg	112	50-150 %			
1,2,3,4,7,8,9-HpCDF	1.132	0.893-1.208		2.00	1.47	ng/kg	90.1	50-150 %			J
1,2,3,4,6,7,8-HpCDD	1.031	0.893-1.208		5.00	99.4	ng/kg	110	50-150 %			
OCDF	0.970	0.757-1.024		5.00	54.2	ng/kg	92.9	50-150 %			B
OCDD	0.872	0.757-1.024		20.0	763	ng/kg	94.0	50-150 %			B



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:06

Dioxins/Furans - Quality Control

Batch BJB0531 - EPA 1613

Instrument: AUTOSPEC01 Analyst: pl

QC Sample/Analyte	Ion Ratio	Ratio Limits	EDL	Reporting Limit	Result	Units	%REC	Limits	RPD	RPD Limit	Notes
Reference (BJB0531-SRM1)				Prepared: 23-Feb-2021	Analyzed: 02-Mar-2021 14:22						
Labeled compounds											
13C12-2,3,7,8-TCDF	0.793	0.655-0.886				104				24-169 %	
13C12-2,3,7,8-TCDD	0.802	0.655-0.886				93.1				25-164 %	
13C12-1,2,3,7,8-PeCDF	1.575	1.318-1.783				101				24-185 %	
13C12-2,3,4,7,8-PeCDF	1.519	1.318-1.783				101				21-178 %	
13C12-1,2,3,7,8-PeCDD	1.646	1.318-1.783				94.2				25-181 %	
13C12-1,2,3,4,7,8-HxCDF	0.514	0.434-0.587				93.5				26-152 %	
13C12-1,2,3,6,7,8-HxCDF	0.511	0.434-0.587				90.8				26-123 %	
13C12-2,3,4,6,7,8-HxCDF	0.517	0.434-0.587				93.8				28-136 %	
13C12-1,2,3,7,8,9-HxCDF	0.521	0.434-0.587				84.8				29-147 %	
13C12-1,2,3,4,7,8-HxCDD	1.280	1.054-1.426				89.9				32-141 %	
13C12-1,2,3,6,7,8-HxCDD	1.276	1.054-1.426				83.5				28-130 %	
13C12-1,2,3,4,6,7,8-HpCDF	0.440	0.374-0.506				88.0				28-143 %	
13C12-1,2,3,4,7,8,9-HpCDF	0.434	0.374-0.506				93.3				26-138 %	
13C12-1,2,3,4,6,7,8-HpCDD	1.041	0.893-1.208				93.5				23-140 %	
13C12-OCDD	0.945	0.757-1.024				71.0				17-157 %	
37Cl4-2,3,7,8-TCDD						100				35-197 %	



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1420 - 156th Ave., NE STE C1
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Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:06

Metals and Metallic Compounds - Quality Control

Batch BIK0835 - SWN EPA 3050B

Instrument: ICPMS1 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BIK0835-BLK1) Prepared: 27-Nov-2020 Analyzed: 02-Dec-2020 16:43												
Antimony	121	0.02	0.02	0.20	mg/kg							J
Antimony	123	ND	0.03	0.20	mg/kg							U
Chromium	52	ND	0.13	0.50	mg/kg							U
Chromium	53	ND	0.07	0.50	mg/kg							U
Lead	208	ND	0.07	0.10	mg/kg							U
Silver	107	ND	0.02	0.20	mg/kg							U
Arsenic	75a	ND	0.02	0.20	mg/kg							U
Cadmium	111	ND	0.03	0.10	mg/kg							U
Cadmium	114	ND	0.04	0.10	mg/kg							U
Copper	63	ND	0.34	0.50	mg/kg							U
Copper	65	ND	0.35	0.50	mg/kg							U
Selenium	78	ND	0.44	0.50	mg/kg							U
Zinc	66	1.0	0.8	4.0	mg/kg							J
Zinc	67	1.0	0.9	4.0	mg/kg							J

LCS (BIK0835-BS1) Prepared: 27-Nov-2020 Analyzed: 02-Dec-2020 16:47												
Antimony	121	25.4	0.02	0.20	mg/kg	25.0		102	80-120			
Antimony	123	26.0	0.03	0.20	mg/kg	25.0		104	80-120			
Chromium	52	26.7	0.13	0.50	mg/kg	25.0		107	80-120			
Chromium	53	26.6	0.07	0.50	mg/kg	25.0		106	80-120			
Lead	208	25.1	0.07	0.10	mg/kg	25.0		101	80-120			
Silver	107	24.5	0.02	0.20	mg/kg	25.0		97.9	80-120			
Arsenic	75a	23.6	0.02	0.20	mg/kg	25.0		94.3	80-120			
Cadmium	111	24.1	0.03	0.10	mg/kg	25.0		96.5	80-120			
Cadmium	114	24.1	0.04	0.10	mg/kg	25.0		96.4	80-120			
Copper	63	25.7	0.34	0.50	mg/kg	25.0		103	80-120			
Copper	65	25.7	0.35	0.50	mg/kg	25.0		103	80-120			
Selenium	78	74.4	0.44	0.50	mg/kg	80.0		93.0	80-120			
Zinc	66	76.9	0.8	4.0	mg/kg	80.0		96.1	80-120			
Zinc	67	74.7	0.9	4.0	mg/kg	80.0		93.4	80-120			

Duplicate (BIK0835-DUP1) Source: 20K0364-01 Prepared: 27-Nov-2020 Analyzed: 02-Dec-2020 19:37												
Antimony	121	ND	0.02	0.24	mg/kg		ND					U
Chromium	52	71.1	0.16	0.61	mg/kg		69.3			2.50	20	
Lead	208	4.35	0.08	0.12	mg/kg		4.58			5.16	20	



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Project: COA Outfall
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Reported:
26-Mar-2021 16:06

Metals and Metallic Compounds - Quality Control

Batch BIK0835 - SWN EPA 3050B

Instrument: ICPMS1 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Duplicate (BIK0835-DUP1)		Source: 20K0364-01				Prepared: 27-Nov-2020		Analyzed: 02-Dec-2020 19:37				
Silver	107	0.07	0.02	0.24	mg/kg		0.08			11.70	20	J
Arsenic	75a	3.56	0.03	0.24	mg/kg		4.95			32.50	20	*
Cadmium	111	0.16	0.04	0.12	mg/kg		0.18			14.50	20	
Copper	63	28.9	0.41	0.61	mg/kg		77.4			91.20	20	*
Selenium	78	0.89	0.54	0.61	mg/kg		0.89			0.50	20	
Zinc	66	52.6	1.0	4.9	mg/kg		53.2			1.17	20	

Matrix Spike (BIK0835-MS1)		Source: 20K0364-01				Prepared: 27-Nov-2020		Analyzed: 02-Dec-2020 19:43				
Antimony	121	0.24	0.02	0.24	mg/kg	30.4	ND	0.804	75-125			*
Chromium	52	85.2	0.16	0.61	mg/kg	30.4	69.3	52.2	75-125			*
Lead	208	34.3	0.08	0.12	mg/kg	30.4	4.58	97.8	75-125			
Silver	107	22.6	0.02	0.24	mg/kg	30.4	0.08	74.1	75-125			*
Arsenic	75a	30.0	0.03	0.24	mg/kg	30.4	4.95	82.5	75-125			
Cadmium	111	27.1	0.04	0.12	mg/kg	30.4	0.18	88.6	75-125			
Copper	63	54.3	0.41	0.61	mg/kg	30.4	77.4	-76.0	75-125			*
Selenium	78	85.4	0.53	0.61	mg/kg	97.2	0.89	87.0	75-125			
Zinc	66	136	1.0	4.9	mg/kg	97.2	53.2	85.1	75-125			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike Dup (BIK0835-MSD1)		Source: 20K0364-01				Prepared: 27-Nov-2020		Analyzed: 02-Dec-2020 19:48				
Antimony	121	0.20	0.02	0.24	mg/kg	30.5	ND	0.644	75-125	21.70	20	*, J
Chromium	52	108	0.16	0.61	mg/kg	30.5	69.3	126	75-125	23.20	20	*
Lead	208	29.8	0.08	0.12	mg/kg	30.5	4.58	82.6	75-125	14.10	20	
Silver	107	17.9	0.02	0.24	mg/kg	30.5	0.08	58.5	75-125	23.10	20	*
Arsenic	75a	31.2	0.03	0.24	mg/kg	30.5	4.95	86.1	75-125	3.81	20	
Cadmium	111	24.7	0.04	0.12	mg/kg	30.5	0.18	80.4	75-125	9.35	20	
Copper	63	50.0	0.41	0.61	mg/kg	30.5	77.4	-90.0	75-125	8.32	20	*
Selenium	78	80.4	0.54	0.61	mg/kg	97.5	0.89	81.6	75-125	5.97	20	
Zinc	66	125	1.0	4.9	mg/kg	97.5	53.2	73.9	75-125	8.09	20	*

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Post Spike (BIK0835-PS1)		Source: 20K0364-01				Prepared: 27-Nov-2020		Analyzed: 02-Dec-2020 19:54				
Antimony	121	473			mg/kg	500	0.00	94.6	80-120			
Chromium	52	1570			mg/kg	500	1140	86.8	80-120			
Silver	107	500			mg/kg	500	1.28	99.8	80-120			



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:06

Metals and Metallic Compounds - Quality Control

Batch BIK0835 - SWN EPA 3050B

Instrument: ICPMS1 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Post Spike (BIK0835-PS1)		Source: 20K0364-01		Prepared: 27-Nov-2020 Analyzed: 02-Dec-2020 19:54								
Copper	63	1710			mg/kg	500	1270	88.2	80-120			
Zinc	66	2350			mg/kg	1600	873	92.3	80-120			



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Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:06

Metals and Metallic Compounds - Quality Control

Batch BJC0564 - SWN EPA 3050B

Instrument: ICPMS1 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJC0564-BLK1)						Prepared: 22-Mar-2021 Analyzed: 23-Mar-2021 17:06						
Antimony	121	ND	0.02	0.20	mg/kg							U
Antimony	123	ND	0.03	0.20	mg/kg							U
Chromium	52	ND	0.13	0.50	mg/kg							U
Chromium	53	ND	0.07	0.50	mg/kg							U
Lead	208	ND	0.07	0.10	mg/kg							U
Silver	107	ND	0.02	0.20	mg/kg							U
Arsenic	75a	ND	0.02	0.20	mg/kg							U
Cadmium	111	ND	0.03	0.10	mg/kg							U
Cadmium	114	ND	0.04	0.10	mg/kg							U
Copper	63	ND	0.34	0.50	mg/kg							U
Copper	65	ND	0.35	0.50	mg/kg							U
Selenium	78	ND	0.44	0.50	mg/kg							U
Zinc	66	ND	0.8	4.0	mg/kg							U
Zinc	67	ND	0.9	4.0	mg/kg							U

LCS (BJC0564-BS1)						Prepared: 22-Mar-2021 Analyzed: 23-Mar-2021 17:10						
Antimony	121	23.7	0.02	0.20	mg/kg	25.0		94.8	80-120			
Antimony	123	23.9	0.03	0.20	mg/kg	25.0		95.6	80-120			
Chromium	52	24.6	0.13	0.50	mg/kg	25.0		98.6	80-120			
Chromium	53	24.5	0.07	0.50	mg/kg	25.0		98.0	80-120			
Lead	208	25.8	0.07	0.10	mg/kg	25.0		103	80-120			
Silver	107	23.1	0.02	0.20	mg/kg	25.0		92.6	80-120			
Arsenic	75a	23.6	0.02	0.20	mg/kg	25.0		94.2	80-120			
Cadmium	111	24.0	0.03	0.10	mg/kg	25.0		95.9	80-120			
Cadmium	114	24.2	0.04	0.10	mg/kg	25.0		97.0	80-120			
Copper	63	25.8	0.34	0.50	mg/kg	25.0		103	80-120			
Copper	65	25.8	0.35	0.50	mg/kg	25.0		103	80-120			
Selenium	78	75.4	0.44	0.50	mg/kg	80.0		94.2	80-120			
Zinc	66	79.6	0.8	4.0	mg/kg	80.0		99.5	80-120			
Zinc	67	76.6	0.9	4.0	mg/kg	80.0		95.8	80-120			

Duplicate (BJC0564-DUP1)						Source: 20K0364-01 Prepared: 22-Mar-2021 Analyzed: 23-Mar-2021 20:46						
Arsenic	75a	4.71	0.03	0.26	mg/kg		4.38			7.34	20	
Cadmium	111	0.23	0.04	0.13	mg/kg		0.28			18.10	20	
Copper	63	35.2	0.44	0.64	mg/kg		34.3			2.69	20	



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Reported:
26-Mar-2021 16:06

Metals and Metallic Compounds - Quality Control

Batch BJC0564 - SWN EPA 3050B

Instrument: ICPMS1 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Duplicate (BJC0564-DUP1)		Source: 20K0364-01			Prepared: 22-Mar-2021		Analyzed: 23-Mar-2021 20:46					
Selenium	78	0.80	0.57	0.64	mg/kg		0.92			14.40	20	
Zinc	66	59.0	1.1	5.1	mg/kg		59.9			1.49	20	

Duplicate (BJC0564-DUP2)		Source: 20K0364-01			Prepared: 22-Mar-2021		Analyzed: 24-Mar-2021 15:14					
Antimony	121	ND	0.02	0.26	mg/kg		ND					U
Chromium	52	56.0	0.17	0.64	mg/kg		62.0			10.10	20	
Lead	208	4.94	0.09	0.13	mg/kg		5.01			1.32	20	
Silver	107	0.08	0.02	0.26	mg/kg		0.10			22.40	20	L, J

Matrix Spike (BJC0564-MS1)		Source: 20K0364-01			Prepared: 22-Mar-2021		Analyzed: 23-Mar-2021 20:51					
Arsenic	75a	35.3	0.03	0.26	mg/kg	32.2	4.38	96.1	75-125			
Cadmium	111	31.7	0.04	0.13	mg/kg	32.2	0.28	97.6	75-125			
Copper	63	70.3	0.44	0.64	mg/kg	32.2	34.3	112	75-125			
Selenium	78	96.2	0.57	0.64	mg/kg	103	0.92	92.3	75-125			
Zinc	66	162	1.1	5.2	mg/kg	103	59.9	98.6	75-125			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike (BJC0564-MS2)		Source: 20K0364-01			Prepared: 22-Mar-2021		Analyzed: 24-Mar-2021 15:18					
Antimony	121	0.78	0.02	0.26	mg/kg	32.2	ND	2.42	75-125			*
Chromium	52	79.2	0.17	0.64	mg/kg	32.2	62.0	53.2	75-125			*
Lead	208	39.4	0.09	0.13	mg/kg	32.2	5.01	107	75-125			
Silver	107	27.0	0.02	0.26	mg/kg	32.2	0.10	83.4	75-125			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike Dup (BJC0564-MSD1)		Source: 20K0364-01			Prepared: 22-Mar-2021		Analyzed: 23-Mar-2021 20:56					
Arsenic	75a	34.1	0.03	0.26	mg/kg	32.1	4.38	92.5	75-125	3.53	20	
Cadmium	111	32.6	0.04	0.13	mg/kg	32.1	0.28	101	75-125	2.73	20	
Copper	63	70.3	0.44	0.64	mg/kg	32.1	34.3	112	75-125	0.11	20	
Selenium	78	98.3	0.57	0.64	mg/kg	103	0.92	94.7	75-125	2.23	20	
Zinc	66	163	1.1	5.1	mg/kg	103	59.9	100	75-125	0.97	20	

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike Dup (BJC0564-MSD2)		Source: 20K0364-01			Prepared: 22-Mar-2021		Analyzed: 24-Mar-2021 15:23					
Antimony	121	0.79	0.02	0.26	mg/kg	32.1	ND	2.47	75-125	1.67	20	*
Chromium	52	106	0.17	0.64	mg/kg	32.1	62.0	137	75-125	28.90	20	*



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Reported:
26-Mar-2021 16:06

Metals and Metallic Compounds - Quality Control

Batch BJC0564 - SWN EPA 3050B

Instrument: ICPMS1 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike Dup (BJC0564-MSD2)		Source: 20K0364-01		Prepared: 22-Mar-2021		Analyzed: 24-Mar-2021 15:23						
Lead	208	35.9	0.09	0.13	mg/kg	32.1	5.01	96.0	75-125	9.36	20	
Silver	107	24.1	0.02	0.26	mg/kg	32.1	0.10	74.8	75-125	11.00	20	*

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Post Spike (BJC0564-PS1)		Source: 20K0364-01		Prepared: 22-Mar-2021		Analyzed: 24-Mar-2021 15:29						
Antimony	121	452			mg/kg	500	ND	90.3	80-120			
Chromium	52	1440			mg/kg	500	62.0	94.3	80-120			
Silver	107	456			mg/kg	500	0.10	90.8	80-120			

Reference (BJC0564-SRM1)				Prepared: 22-Mar-2021		Analyzed: 23-Mar-2021 21:08						
Arsenic	75a	92.9	0.02	0.20	mg/kg	97.6		95.2	82.8-111.4			
Cadmium	111	126	0.03	0.10	mg/kg	114		110	82.8-117.5			
Copper	65	101	0.35	0.50	mg/kg	97.7		103	83.9-115.7			
Selenium	78	98.1	0.44	0.50	mg/kg	93.1		105	78.9-121.4			
Zinc	66	212	0.8	4.0	mg/kg	212		100	80.7-118.9			

Reference (BJC0564-SRM2)				Prepared: 22-Mar-2021		Analyzed: 24-Mar-2021 15:36						
Antimony	121	7.94	0.02	0.20	mg/kg	99.4		7.99	0-204.2			
Chromium	53	154	0.07	0.50	mg/kg	147		105	81.6-117.7			
Lead	208	104	0.07	0.10	mg/kg	105		98.7	82.6-117.1			
Silver	107	29.4	0.02	0.20	mg/kg	32.0		92.0	79.7-120			



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Reported:
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Metals and Metallic Compounds - Quality Control

Batch BJC0610 - SMM EPA 7471B

Instrument: HYDRA Analyst: BLC

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJC0610-BLK1)						Prepared: 23-Mar-2021	Analyzed: 23-Mar-2021 11:52				
Mercury	ND	0.00525	0.0250	mg/kg							U
LCS (BJC0610-BS1)						Prepared: 23-Mar-2021	Analyzed: 23-Mar-2021 11:59				
Mercury	0.481	0.00525	0.0250	mg/kg	0.500		96.2	80-120			
Duplicate (BJC0610-DUP1)						Source: 20K0364-01	Prepared: 23-Mar-2021	Analyzed: 23-Mar-2021 12:03			
Mercury	0.0394	0.00551	0.0262	mg/kg		0.157			120.00	20	*, H, L
Matrix Spike (BJC0610-MS1)						Source: 20K0364-01	Prepared: 23-Mar-2021	Analyzed: 23-Mar-2021 12:06			
Mercury	0.343	0.00551	0.0262	mg/kg	0.262	0.157	70.7	75-125			*, H
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											
Matrix Spike Dup (BJC0610-MSD1)						Source: 20K0364-01	Prepared: 23-Mar-2021	Analyzed: 23-Mar-2021 12:08			
Mercury	0.343	0.00553	0.0263	mg/kg	0.263	0.157	70.6	75-125	0.16	20	*, H
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											
Post Spike (BJC0610-PS1)						Source: 20K0364-01	Prepared: 23-Mar-2021	Analyzed: 23-Mar-2021 12:43			
Mercury	0.00162			mg/kg	0.00100	0.157	101	0-200			H
Reference (BJC0610-SRM1)							Prepared: 23-Mar-2021	Analyzed: 23-Mar-2021 12:10			
Mercury	5.66	0.0502	0.239	mg/kg	5.99		94.4	74.1-126			D



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Reported:
26-Mar-2021 16:06

Wet Chemistry - Quality Control

Batch BIK0734 - No Prep Wet Chem

Instrument: BAL2 Analyst: UW

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC Limits	RPD	RPD Limit	Notes
Blank (BIK0734-BLK1)					Prepared: 23-Nov-2020 Analyzed: 23-Nov-2020 17:50					
Volatile Solids	ND	0.01	0.01	%						U
Total Solids	ND	0.04	0.04	%						U
Duplicate (BIK0734-DUP1)					Source: 20K0364-01 Prepared: 23-Nov-2020 Analyzed: 23-Nov-2020 17:50					
Volatile Solids	2.30	0.01	0.01	%		2.50		8.22	20	
Total Solids	76.61	0.04	0.04	%		75.68		1.21	20	



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Reported:
26-Mar-2021 16:06

Wet Chemistry - Quality Control

Batch BIK0735 - No Prep Wet Chem

Instrument: BAL2 Analyst: UW

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC Limits	RPD	RPD Limit	Notes
Blank (BIK0735-BLK1)					Prepared: 23-Nov-2020 Analyzed: 23-Nov-2020 17:50					
Total Solids, Sulfide	ND	0.04	0.04	%						U
Duplicate (BIK0735-DUP1)					Source: 20K0364-01 Prepared: 23-Nov-2020 Analyzed: 23-Nov-2020 17:50					
Total Solids, Sulfide	72.88	0.04	0.04	%		70.92		2.73	20	



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Reported:
26-Mar-2021 16:06

Wet Chemistry - Quality Control

Batch BIK0743 - PSEP 1986

Instrument: UV1800-1 Analyst: CDE

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BIK0743-BLK1)						Prepared: 24-Nov-2020 Analyzed: 03-Dec-2020 16:59					
Sulfide	ND	1.00	1.00	mg/kg							U
LCS (BIK0743-BS2)						Prepared: 24-Nov-2020 Analyzed: 03-Dec-2020 17:42					
Sulfide	152	20.0	20.0	mg/kg	165		92.3	75-125			D
Duplicate (BIK0743-DUP1)						Source: 20K0364-01 Prepared: 24-Nov-2020 Analyzed: 03-Dec-2020 17:00					
Sulfide	172	27.6	27.6	mg/kg		158			8.64	20	H, D
Matrix Spike (BIK0743-MS1)						Source: 20K0364-01 Prepared: 24-Nov-2020 Analyzed: 03-Dec-2020 17:00					
Sulfide	347	27.5	27.5	mg/kg	227	158	83.5	75-125			H, D

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



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Reported:
26-Mar-2021 16:06

Wet Chemistry - Quality Control

Batch BIK0769 - MSA 33.3 (2M KCl)

Instrument: LACHAT2 Analyst: LRB

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BIK0769-BLK1)					Prepared: 24-Nov-2020 Analyzed: 30-Nov-2020 14:30						
Ammonia-N	ND	0.40	0.40	mg/kg NH3-N							U
LCS (BIK0769-BS1)					Prepared: 24-Nov-2020 Analyzed: 30-Nov-2020 14:35						
Ammonia-N	104	8.00	8.00	mg/kg NH3-N	100		104	90-110			D



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Reported:
26-Mar-2021 16:06

Wet Chemistry - Quality Control

Batch BIK0802 - PSEP 1986 (modified)

Instrument: TOC Cube Analyst: BF

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC Limits	RPD	RPD Limit	Notes
Blank (BIK0802-BLK1)					Prepared: 25-Nov-2020 Analyzed: 25-Nov-2020 21:10					
Total Organic Carbon	ND	0.02	0.02	%						U
LCS (BIK0802-BS1)					Prepared: 25-Nov-2020 Analyzed: 25-Nov-2020 21:40					
Total Organic Carbon	44.9	0.02	0.02	%	44.4		101 80-120			
Reference (BIK0802-SRM1)					Prepared: 25-Nov-2020 Analyzed: 25-Nov-2020 22:11					
Total Organic Carbon	2.75	0.02	0.02	%	2.99		92.0 80-120			



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Certified Analyses included in this Report

Analyte	Certifications
EPA 1613B in Solid	
2,3,7,8-TCDF	DoD-ELAP,NELAP,WADOE
2,3,7,8-TCDF	DoD-ELAP,NELAP
2,3,7,8-TCDF	DoD-ELAP,WADOE
2,3,7,8-TCDF	DoD-ELAP,NELAP,WADOE
2,3,7,8-TCDD	DoD-ELAP,NELAP,WADOE
2,3,7,8-TCDD	DoD-ELAP,WADOE
2,3,7,8-TCDD	DoD-ELAP,NELAP,WADOE
2,3,7,8-TCDD	DoD-ELAP,NELAP
1,2,3,7,8-PeCDF	DoD-ELAP,NELAP,WADOE
1,2,3,7,8-PeCDF	DoD-ELAP,WADOE
1,2,3,7,8-PeCDF	DoD-ELAP,NELAP
1,2,3,7,8-PeCDF	DoD-ELAP,NELAP,WADOE
2,3,4,7,8-PeCDF	DoD-ELAP,NELAP,WADOE
2,3,4,7,8-PeCDF	DoD-ELAP,NELAP,WADOE
2,3,4,7,8-PeCDF	DoD-ELAP,WADOE
2,3,4,7,8-PeCDF	DoD-ELAP,NELAP
1,2,3,7,8-PeCDD	DoD-ELAP,NELAP,WADOE
1,2,3,7,8-PeCDD	DoD-ELAP,WADOE
1,2,3,7,8-PeCDD	DoD-ELAP,NELAP,WADOE
1,2,3,7,8-PeCDD	DoD-ELAP,NELAP
1,2,3,4,7,8-HxCDF	DoD-ELAP,WADOE
1,2,3,4,7,8-HxCDF	DoD-ELAP,NELAP,WADOE
1,2,3,4,7,8-HxCDF	DoD-ELAP,NELAP
1,2,3,4,7,8-HxCDF	DoD-ELAP,NELAP,WADOE
1,2,3,6,7,8-HxCDF	DoD-ELAP,NELAP
1,2,3,6,7,8-HxCDF	DoD-ELAP,NELAP,WADOE
1,2,3,6,7,8-HxCDF	DoD-ELAP,WADOE
1,2,3,6,7,8-HxCDF	DoD-ELAP,NELAP,WADOE
2,3,4,6,7,8-HxCDF	DoD-ELAP,WADOE
2,3,4,6,7,8-HxCDF	DoD-ELAP,NELAP,WADOE
2,3,4,6,7,8-HxCDF	DoD-ELAP,NELAP
2,3,4,6,7,8-HxCDF	DoD-ELAP,NELAP,WADOE
1,2,3,7,8,9-HxCDF	DoD-ELAP,NELAP
1,2,3,7,8,9-HxCDF	DoD-ELAP,WADOE
1,2,3,7,8,9-HxCDF	DoD-ELAP,NELAP,WADOE



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1,2,3,7,8,9-HxCDF	DoD-ELAP,NELAP,WADOE
1,2,3,4,7,8-HxCDD	DoD-ELAP,NELAP,WADOE
1,2,3,4,7,8-HxCDD	DoD-ELAP,NELAP,WADOE
1,2,3,4,7,8-HxCDD	DoD-ELAP,WADOE
1,2,3,4,7,8-HxCDD	DoD-ELAP,NELAP
1,2,3,6,7,8-HxCDD	DoD-ELAP,NELAP,WADOE
1,2,3,6,7,8-HxCDD	DoD-ELAP,NELAP,WADOE
1,2,3,6,7,8-HxCDD	DoD-ELAP,WADOE
1,2,3,6,7,8-HxCDD	DoD-ELAP,NELAP
1,2,3,7,8,9-HxCDD	DoD-ELAP,NELAP,WADOE
1,2,3,7,8,9-HxCDD	DoD-ELAP,WADOE
1,2,3,7,8,9-HxCDD	DoD-ELAP,NELAP
1,2,3,7,8,9-HxCDD	DoD-ELAP,NELAP,WADOE
1,2,3,4,6,7,8-HpCDF	DoD-ELAP,NELAP
1,2,3,4,6,7,8-HpCDF	DoD-ELAP,NELAP,WADOE
1,2,3,4,6,7,8-HpCDF	DoD-ELAP,NELAP,WADOE
1,2,3,4,6,7,8-HpCDF	DoD-ELAP,WADOE
1,2,3,4,7,8,9-HpCDF	DoD-ELAP,WADOE
1,2,3,4,7,8,9-HpCDF	DoD-ELAP,NELAP,WADOE
1,2,3,4,7,8,9-HpCDF	DoD-ELAP,NELAP,WADOE
1,2,3,4,7,8,9-HpCDF	DoD-ELAP,NELAP
1,2,3,4,6,7,8-HpCDD	DoD-ELAP,WADOE
1,2,3,4,6,7,8-HpCDD	DoD-ELAP,NELAP
1,2,3,4,6,7,8-HpCDD	DoD-ELAP,NELAP,WADOE
1,2,3,4,6,7,8-HpCDD	DoD-ELAP,NELAP,WADOE
OCDF	DoD-ELAP,NELAP,WADOE
OCDF	DoD-ELAP,NELAP
OCDF	DoD-ELAP,WADOE
OCDF	DoD-ELAP,NELAP,WADOE
OCDD	DoD-ELAP,NELAP,WADOE
OCDD	DoD-ELAP,NELAP
OCDD	DoD-ELAP,NELAP,WADOE
OCDD	DoD-ELAP,WADOE
Total TCDF	DoD-ELAP,NELAP,WADOE
Total TCDF	DoD-ELAP,WADOE
Total TCDF	DoD-ELAP,NELAP,WADOE
Total TCDF	DoD-ELAP,NELAP
Total TCDD	DoD-ELAP,NELAP,WADOE
Total TCDD	DoD-ELAP,NELAP,WADOE



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Total TCDD	DoD-ELAP,WADOE
Total TCDD	DoD-ELAP,NELAP
Total PeCDF	DoD-ELAP,NELAP
Total PeCDF	DoD-ELAP,NELAP,WADOE
Total PeCDF	DoD-ELAP,NELAP,WADOE
Total PeCDF	DoD-ELAP,WADOE
Total PeCDD	DoD-ELAP,NELAP,WADOE
Total PeCDD	DoD-ELAP,NELAP
Total PeCDD	DoD-ELAP,WADOE
Total PeCDD	DoD-ELAP,NELAP,WADOE
Total HxCDF	DoD-ELAP,NELAP,WADOE
Total HxCDF	DoD-ELAP,NELAP
Total HxCDF	DoD-ELAP,NELAP,WADOE
Total HxCDF	DoD-ELAP,WADOE
Total HxCDD	DoD-ELAP,NELAP,WADOE
Total HxCDD	DoD-ELAP,NELAP,WADOE
Total HxCDD	DoD-ELAP,WADOE
Total HxCDD	DoD-ELAP,NELAP
Total HpCDF	DoD-ELAP,NELAP,WADOE
Total HpCDF	DoD-ELAP,NELAP,WADOE
Total HpCDF	DoD-ELAP,NELAP
Total HpCDF	DoD-ELAP,WADOE
Total HpCDD	DoD-ELAP,NELAP,WADOE
Total HpCDD	DoD-ELAP,WADOE
Total HpCDD	DoD-ELAP,NELAP
Total HpCDD	DoD-ELAP,NELAP,WADOE
13C12-2,3,7,8-TCDF	DoD-ELAP
13C12-2,3,7,8-TCDF	DoD-ELAP
13C12-2,3,7,8-TCDF	DoD-ELAP
13C12-2,3,7,8-TCDF	DoD-ELAP
13C12-2,3,7,8-TCDD	DoD-ELAP
13C12-2,3,7,8-TCDD	DoD-ELAP
13C12-2,3,7,8-TCDD	DoD-ELAP
13C12-2,3,7,8-TCDD	DoD-ELAP
13C12-1,2,3,7,8-PeCDF	DoD-ELAP
13C12-1,2,3,7,8-PeCDF	DoD-ELAP
13C12-1,2,3,7,8-PeCDF	DoD-ELAP
13C12-1,2,3,7,8-PeCDF	DoD-ELAP
13C12-2,3,4,7,8-PeCDF	DoD-ELAP



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13C12-2,3,4,7,8-PeCDF	DoD-ELAP
13C12-2,3,4,7,8-PeCDF	DoD-ELAP
13C12-2,3,4,7,8-PeCDF	DoD-ELAP
13C12-1,2,3,7,8-PeCDD	DoD-ELAP
13C12-1,2,3,7,8-PeCDD	DoD-ELAP
13C12-1,2,3,7,8-PeCDD	DoD-ELAP
13C12-1,2,3,7,8-PeCDD	DoD-ELAP
13C12-1,2,3,4,7,8-HxCDF	DoD-ELAP
13C12-1,2,3,4,7,8-HxCDF	DoD-ELAP
13C12-1,2,3,4,7,8-HxCDF	DoD-ELAP
13C12-1,2,3,4,7,8-HxCDF	DoD-ELAP
13C12-1,2,3,6,7,8-HxCDF	DoD-ELAP
13C12-1,2,3,6,7,8-HxCDF	DoD-ELAP
13C12-1,2,3,6,7,8-HxCDF	DoD-ELAP
13C12-1,2,3,6,7,8-HxCDF	DoD-ELAP
13C12-2,3,4,6,7,8-HxCDF	DoD-ELAP
13C12-2,3,4,6,7,8-HxCDF	DoD-ELAP
13C12-2,3,4,6,7,8-HxCDF	DoD-ELAP
13C12-1,2,3,7,8,9-HxCDF	DoD-ELAP
13C12-1,2,3,7,8,9-HxCDF	DoD-ELAP
13C12-1,2,3,7,8,9-HxCDF	DoD-ELAP
13C12-1,2,3,7,8,9-HxCDF	DoD-ELAP
13C12-1,2,3,4,7,8-HxCDD	DoD-ELAP
13C12-1,2,3,4,7,8-HxCDD	DoD-ELAP
13C12-1,2,3,4,7,8-HxCDD	DoD-ELAP
13C12-1,2,3,4,7,8-HxCDD	DoD-ELAP
13C12-1,2,3,6,7,8-HxCDD	DoD-ELAP
13C12-1,2,3,6,7,8-HxCDD	DoD-ELAP
13C12-1,2,3,6,7,8-HxCDD	DoD-ELAP
13C12-1,2,3,4,6,7,8-HpCDF	DoD-ELAP
13C12-1,2,3,4,6,7,8-HpCDF	DoD-ELAP
13C12-1,2,3,4,6,7,8-HpCDF	DoD-ELAP
13C12-1,2,3,4,6,7,8-HpCDF	DoD-ELAP
13C12-1,2,3,4,7,8,9-HpCDF	DoD-ELAP
13C12-1,2,3,4,7,8,9-HpCDF	DoD-ELAP
13C12-1,2,3,4,7,8,9-HpCDF	DoD-ELAP



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13C12-1,2,3,4,6,7,8-HpCDD	DoD-ELAP
13C12-1,2,3,4,6,7,8-HpCDD	DoD-ELAP
13C12-1,2,3,4,6,7,8-HpCDD	DoD-ELAP
13C12-1,2,3,4,6,7,8-HpCDD	DoD-ELAP
13C12-OCDD	DoD-ELAP
13C12-OCDD	DoD-ELAP
13C12-OCDD	DoD-ELAP
13C12-OCDD	DoD-ELAP
37Cl4-2,3,7,8-TCDD	DoD-ELAP
37Cl4-2,3,7,8-TCDD	DoD-ELAP
37Cl4-2,3,7,8-TCDD	DoD-ELAP
37Cl4-2,3,7,8-TCDD	DoD-ELAP

EPA 6020B in Solid

Silver-107	NELAP,DoD-ELAP
Silver-107	DoD-ELAP,WADOE
Silver-107	NELAP,DoD-ELAP,WADOE
Silver-107	NELAP,DoD-ELAP,WADOE
Chromium-52	DoD-ELAP,WADOE,ADEC
Chromium-52	NELAP,DoD-ELAP,ADEC
Chromium-52	NELAP,DoD-ELAP,WADOE,ADEC
Chromium-52	NELAP,DoD-ELAP,WADOE,ADEC
Chromium-53	NELAP,DoD-ELAP,WADOE,ADEC
Chromium-53	NELAP,DoD-ELAP,WADOE,ADEC
Chromium-53	DoD-ELAP,WADOE,ADEC
Chromium-53	NELAP,DoD-ELAP,ADEC
Lead-208	DoD-ELAP,WADOE,ADEC
Lead-208	NELAP,DoD-ELAP,WADOE,ADEC
Lead-208	NELAP,DoD-ELAP,WADOE,ADEC
Lead-208	NELAP,DoD-ELAP,ADEC
Antimony-121	NELAP,DoD-ELAP,WADOE
Antimony-121	DoD-ELAP,WADOE
Antimony-121	NELAP,DoD-ELAP,WADOE
Antimony-121	NELAP,DoD-ELAP
Antimony-123	DoD-ELAP,WADOE
Antimony-123	NELAP,DoD-ELAP
Antimony-123	NELAP,DoD-ELAP,WADOE
Antimony-123	NELAP,DoD-ELAP,WADOE

EPA 6020B UCT-KED in Solid

Arsenic-75a	NELAP,DoD-ELAP,ADEC
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Arsenic-75a	DoD-ELAP,WADOE,ADEC
Arsenic-75a	NELAP,DoD-ELAP,WADOE,ADEC
Arsenic-75a	NELAP,DoD-ELAP,WADOE,ADEC
Cadmium-111	DoD-ELAP,WADOE,ADEC
Cadmium-111	NELAP,DoD-ELAP,ADEC
Cadmium-111	NELAP,DoD-ELAP,WADOE,ADEC
Cadmium-111	NELAP,DoD-ELAP,WADOE,ADEC
Cadmium-114	NELAP,DoD-ELAP,WADOE,ADEC
Cadmium-114	NELAP,DoD-ELAP,WADOE,ADEC
Cadmium-114	NELAP,DoD-ELAP,ADEC
Cadmium-114	DoD-ELAP,WADOE,ADEC
Copper-63	NELAP,DoD-ELAP,WADOE
Copper-63	DoD-ELAP,WADOE
Copper-63	NELAP,DoD-ELAP
Copper-63	NELAP,DoD-ELAP,WADOE
Copper-65	NELAP,DoD-ELAP,WADOE
Copper-65	DoD-ELAP,WADOE
Copper-65	NELAP,DoD-ELAP,WADOE
Copper-65	NELAP,DoD-ELAP
Selenium-78	NELAP,DoD-ELAP
Selenium-78	NELAP,DoD-ELAP,WADOE
Selenium-78	DoD-ELAP,WADOE
Selenium-78	NELAP,DoD-ELAP,WADOE
Zinc-66	NELAP,DoD-ELAP,WADOE
Zinc-66	NELAP,DoD-ELAP,WADOE
Zinc-66	NELAP,DoD-ELAP
Zinc-66	DoD-ELAP,WADOE
Zinc-67	DoD-ELAP,WADOE
Zinc-67	NELAP,DoD-ELAP,WADOE
Zinc-67	NELAP,DoD-ELAP
Zinc-67	NELAP,DoD-ELAP,WADOE

EPA 7471B in Solid

Mercury	NELAP,DoD-ELAP,CALAP
Mercury	WADOE,DoD-ELAP,CALAP
Mercury	WADOE,NELAP,DoD-ELAP,CALAP
Mercury	WADOE,NELAP,DoD-ELAP

EPA 8081B in Solid

alpha-BHC	DoD-ELAP,NELAP,CALAP,WADOE
alpha-BHC	DoD-ELAP,NELAP,WADOE



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alpha-BHC	DoD-ELAP,CALAP,WADOE
alpha-BHC	DoD-ELAP,NELAP,CALAP
alpha-BHC [2C]	DoD-ELAP,NELAP,CALAP
alpha-BHC [2C]	DoD-ELAP,NELAP,CALAP,WADOE
alpha-BHC [2C]	DoD-ELAP,CALAP,WADOE
alpha-BHC [2C]	DoD-ELAP,NELAP,WADOE
beta-BHC	DoD-ELAP,NELAP,WADOE
beta-BHC	DoD-ELAP,NELAP,CALAP
beta-BHC	DoD-ELAP,NELAP,CALAP,WADOE
beta-BHC	DoD-ELAP,CALAP,WADOE
beta-BHC [2C]	DoD-ELAP,NELAP,CALAP,WADOE
beta-BHC [2C]	DoD-ELAP,NELAP,WADOE
beta-BHC [2C]	DoD-ELAP,CALAP,WADOE
beta-BHC [2C]	DoD-ELAP,NELAP,CALAP
gamma-BHC (Lindane)	DoD-ELAP,NELAP,CALAP,WADOE
gamma-BHC (Lindane)	DoD-ELAP,NELAP,CALAP
gamma-BHC (Lindane)	DoD-ELAP,NELAP,WADOE
gamma-BHC (Lindane)	DoD-ELAP,CALAP,WADOE
gamma-BHC (Lindane) [2C]	DoD-ELAP,NELAP,CALAP
gamma-BHC (Lindane) [2C]	DoD-ELAP,CALAP,WADOE
gamma-BHC (Lindane) [2C]	DoD-ELAP,NELAP,CALAP,WADOE
gamma-BHC (Lindane) [2C]	DoD-ELAP,NELAP,WADOE
delta-BHC	DoD-ELAP,NELAP,WADOE
delta-BHC	DoD-ELAP,NELAP,CALAP,WADOE
delta-BHC	DoD-ELAP,NELAP,CALAP
delta-BHC	DoD-ELAP,CALAP,WADOE
delta-BHC [2C]	DoD-ELAP,NELAP,CALAP
delta-BHC [2C]	DoD-ELAP,NELAP,WADOE
delta-BHC [2C]	DoD-ELAP,CALAP,WADOE
delta-BHC [2C]	DoD-ELAP,NELAP,CALAP,WADOE
Heptachlor	DoD-ELAP,NELAP,CALAP
Heptachlor	DoD-ELAP,NELAP,WADOE
Heptachlor	DoD-ELAP,NELAP,CALAP,WADOE
Heptachlor	DoD-ELAP,CALAP,WADOE
Heptachlor [2C]	DoD-ELAP,CALAP,WADOE
Heptachlor [2C]	DoD-ELAP,NELAP,CALAP
Heptachlor [2C]	DoD-ELAP,NELAP,CALAP,WADOE
Heptachlor [2C]	DoD-ELAP,NELAP,WADOE
Aldrin	DoD-ELAP,NELAP,CALAP,WADOE



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Aldrin	DoD-ELAP,CALAP,WADOE
Aldrin	DoD-ELAP,NELAP,CALAP
Aldrin	DoD-ELAP,NELAP,WADOE
Aldrin [2C]	DoD-ELAP,CALAP,WADOE
Aldrin [2C]	DoD-ELAP,NELAP,WADOE
Aldrin [2C]	DoD-ELAP,NELAP,CALAP
Aldrin [2C]	DoD-ELAP,NELAP,CALAP,WADOE
Heptachlor Epoxide	DoD-ELAP,NELAP,CALAP
Heptachlor Epoxide	DoD-ELAP,NELAP,CALAP,WADOE
Heptachlor Epoxide	DoD-ELAP,CALAP,WADOE
Heptachlor Epoxide	DoD-ELAP,NELAP,WADOE
Heptachlor Epoxide [2C]	DoD-ELAP,NELAP,CALAP,WADOE
Heptachlor Epoxide [2C]	DoD-ELAP,CALAP,WADOE
Heptachlor Epoxide [2C]	DoD-ELAP,NELAP,WADOE
Heptachlor Epoxide [2C]	DoD-ELAP,NELAP,CALAP
trans-Chlordane (beta-Chlordane)	DoD-ELAP,NELAP
trans-Chlordane (beta-Chlordane)	DoD-ELAP,NELAP,CALAP
trans-Chlordane (beta-Chlordane)	DoD-ELAP,CALAP
trans-Chlordane (beta-Chlordane)	DoD-ELAP,NELAP,CALAP
trans-Chlordane (beta-Chlordane) [2C]	DoD-ELAP,NELAP
trans-Chlordane (beta-Chlordane) [2C]	DoD-ELAP,CALAP
trans-Chlordane (beta-Chlordane) [2C]	DoD-ELAP,NELAP,CALAP
trans-Chlordane (beta-Chlordane) [2C]	DoD-ELAP,NELAP,CALAP
cis-Chlordane (alpha-chlordane)	DoD-ELAP,NELAP,WADOE
cis-Chlordane (alpha-chlordane)	DoD-ELAP,CALAP,WADOE
cis-Chlordane (alpha-chlordane)	DoD-ELAP,NELAP,CALAP,WADOE
cis-Chlordane (alpha-chlordane)	DoD-ELAP,NELAP,CALAP
cis-Chlordane (alpha-chlordane) [2C]	DoD-ELAP,NELAP,CALAP,WADOE
cis-Chlordane (alpha-chlordane) [2C]	DoD-ELAP,NELAP,CALAP
cis-Chlordane (alpha-chlordane) [2C]	DoD-ELAP,NELAP,WADOE
cis-Chlordane (alpha-chlordane) [2C]	DoD-ELAP,CALAP,WADOE
Endosulfan I	DoD-ELAP,NELAP,CALAP,WADOE
Endosulfan I	DoD-ELAP,NELAP,CALAP
Endosulfan I	DoD-ELAP,NELAP,WADOE
Endosulfan I	DoD-ELAP,CALAP,WADOE
Endosulfan I [2C]	DoD-ELAP,NELAP,CALAP
Endosulfan I [2C]	DoD-ELAP,NELAP,WADOE
Endosulfan I [2C]	DoD-ELAP,NELAP,CALAP,WADOE
Endosulfan I [2C]	DoD-ELAP,CALAP,WADOE



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4,4'-DDE	DoD-ELAP,NELAP,CALAP,WADOE
4,4'-DDE	DoD-ELAP,NELAP,WADOE
4,4'-DDE	DoD-ELAP,CALAP,WADOE
4,4'-DDE	DoD-ELAP,NELAP,CALAP
4,4'-DDE [2C]	DoD-ELAP,CALAP,WADOE
4,4'-DDE [2C]	DoD-ELAP,NELAP,WADOE
4,4'-DDE [2C]	DoD-ELAP,NELAP,CALAP,WADOE
4,4'-DDE [2C]	DoD-ELAP,NELAP,CALAP
Dieldrin	DoD-ELAP,NELAP,WADOE
Dieldrin	DoD-ELAP,CALAP,WADOE
Dieldrin	DoD-ELAP,NELAP,CALAP
Dieldrin	DoD-ELAP,NELAP,CALAP,WADOE
Dieldrin [2C]	DoD-ELAP,CALAP,WADOE
Dieldrin [2C]	DoD-ELAP,NELAP,WADOE
Dieldrin [2C]	DoD-ELAP,NELAP,CALAP,WADOE
Dieldrin [2C]	DoD-ELAP,NELAP,CALAP
Endrin	DoD-ELAP,NELAP,WADOE
Endrin	DoD-ELAP,NELAP,CALAP
Endrin	DoD-ELAP,NELAP,CALAP,WADOE
Endrin	DoD-ELAP,CALAP,WADOE
Endrin [2C]	DoD-ELAP,CALAP,WADOE
Endrin [2C]	DoD-ELAP,NELAP,CALAP,WADOE
Endrin [2C]	DoD-ELAP,NELAP,WADOE
Endrin [2C]	DoD-ELAP,NELAP,CALAP
Endosulfan II	DoD-ELAP,NELAP,WADOE
Endosulfan II	DoD-ELAP,CALAP,WADOE
Endosulfan II	DoD-ELAP,NELAP,CALAP
Endosulfan II	DoD-ELAP,NELAP,CALAP,WADOE
Endosulfan II [2C]	DoD-ELAP,NELAP,CALAP,WADOE
Endosulfan II [2C]	DoD-ELAP,NELAP,CALAP
Endosulfan II [2C]	DoD-ELAP,NELAP,WADOE
Endosulfan II [2C]	DoD-ELAP,CALAP,WADOE
4,4'-DDD	DoD-ELAP,NELAP,WADOE
4,4'-DDD	DoD-ELAP,NELAP,CALAP
4,4'-DDD	DoD-ELAP,CALAP,WADOE
4,4'-DDD	DoD-ELAP,NELAP,CALAP,WADOE
4,4'-DDD [2C]	DoD-ELAP,NELAP,WADOE
4,4'-DDD [2C]	DoD-ELAP,NELAP,CALAP,WADOE
4,4'-DDD [2C]	DoD-ELAP,NELAP,CALAP



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4,4'-DDD [2C]	DoD-ELAP,CALAP,WADOE
Endrin Aldehyde	DoD-ELAP,CALAP,WADOE
Endrin Aldehyde	DoD-ELAP,NELAP,WADOE
Endrin Aldehyde	DoD-ELAP,NELAP,CALAP
Endrin Aldehyde	DoD-ELAP,NELAP,CALAP,WADOE
Endrin Aldehyde [2C]	DoD-ELAP,NELAP,WADOE
Endrin Aldehyde [2C]	DoD-ELAP,CALAP,WADOE
Endrin Aldehyde [2C]	DoD-ELAP,NELAP,CALAP
Endrin Aldehyde [2C]	DoD-ELAP,NELAP,CALAP,WADOE
4,4'-DDT	DoD-ELAP,NELAP,CALAP
4,4'-DDT	DoD-ELAP,NELAP,CALAP,WADOE
4,4'-DDT	DoD-ELAP,NELAP,WADOE
4,4'-DDT	DoD-ELAP,CALAP,WADOE
4,4'-DDT [2C]	DoD-ELAP,NELAP,CALAP
4,4'-DDT [2C]	DoD-ELAP,NELAP,CALAP,WADOE
4,4'-DDT [2C]	DoD-ELAP,NELAP,WADOE
4,4'-DDT [2C]	DoD-ELAP,CALAP,WADOE
Endosulfan Sulfate	DoD-ELAP,CALAP,WADOE
Endosulfan Sulfate	DoD-ELAP,NELAP,CALAP,WADOE
Endosulfan Sulfate	DoD-ELAP,NELAP,CALAP
Endosulfan Sulfate	DoD-ELAP,NELAP,WADOE
Endosulfan Sulfate [2C]	DoD-ELAP,NELAP,WADOE
Endosulfan Sulfate [2C]	DoD-ELAP,NELAP,CALAP
Endosulfan Sulfate [2C]	DoD-ELAP,CALAP,WADOE
Endosulfan Sulfate [2C]	DoD-ELAP,NELAP,CALAP,WADOE
Endrin Ketone	DoD-ELAP,NELAP,CALAP,WADOE
Endrin Ketone	DoD-ELAP,NELAP,CALAP
Endrin Ketone	DoD-ELAP,NELAP,WADOE
Endrin Ketone	DoD-ELAP,CALAP,WADOE
Endrin Ketone [2C]	DoD-ELAP,NELAP,CALAP
Endrin Ketone [2C]	DoD-ELAP,CALAP,WADOE
Endrin Ketone [2C]	DoD-ELAP,NELAP,WADOE
Endrin Ketone [2C]	DoD-ELAP,NELAP,CALAP,WADOE
Methoxychlor	DoD-ELAP,NELAP,CALAP
Methoxychlor	DoD-ELAP,NELAP,WADOE
Methoxychlor	DoD-ELAP,NELAP,CALAP,WADOE
Methoxychlor	DoD-ELAP,CALAP,WADOE
Methoxychlor [2C]	DoD-ELAP,NELAP,WADOE
Methoxychlor [2C]	DoD-ELAP,NELAP,CALAP



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Methoxychlor [2C]	DoD-ELAP,CALAP,WADOE
Methoxychlor [2C]	DoD-ELAP,NELAP,CALAP,WADOE
Hexachlorobutadiene	DoD-ELAP,NELAP,WADOE
Hexachlorobutadiene	DoD-ELAP,NELAP,CALAP,WADOE
Hexachlorobutadiene	DoD-ELAP,NELAP,CALAP
Hexachlorobutadiene	DoD-ELAP,CALAP,WADOE
Hexachlorobutadiene [2C]	DoD-ELAP,NELAP,WADOE
Hexachlorobutadiene [2C]	DoD-ELAP,NELAP,CALAP,WADOE
Hexachlorobutadiene [2C]	DoD-ELAP,CALAP,WADOE
Hexachlorobutadiene [2C]	DoD-ELAP,NELAP,CALAP
Hexachlorobenzene	DoD-ELAP,NELAP,WADOE
Hexachlorobenzene	DoD-ELAP,NELAP,CALAP,WADOE
Hexachlorobenzene	DoD-ELAP,NELAP,CALAP
Hexachlorobenzene	DoD-ELAP,CALAP,WADOE
Hexachlorobenzene [2C]	DoD-ELAP,NELAP,CALAP
Hexachlorobenzene [2C]	DoD-ELAP,NELAP,CALAP,WADOE
Hexachlorobenzene [2C]	DoD-ELAP,NELAP,WADOE
Hexachlorobenzene [2C]	DoD-ELAP,CALAP,WADOE
2,4'-DDE	DoD-ELAP,NELAP,CALAP,WADOE
2,4'-DDE	DoD-ELAP,NELAP,WADOE
2,4'-DDE	DoD-ELAP,CALAP,WADOE
2,4'-DDE	DoD-ELAP,NELAP,CALAP
2,4'-DDE [2C]	DoD-ELAP,NELAP,CALAP
2,4'-DDE [2C]	DoD-ELAP,NELAP,CALAP,WADOE
2,4'-DDE [2C]	DoD-ELAP,NELAP,WADOE
2,4'-DDE [2C]	DoD-ELAP,CALAP,WADOE
2,4'-DDD	DoD-ELAP,NELAP,WADOE
2,4'-DDD	DoD-ELAP,NELAP,CALAP
2,4'-DDD	DoD-ELAP,CALAP,WADOE
2,4'-DDD	DoD-ELAP,NELAP,CALAP,WADOE
2,4'-DDD [2C]	DoD-ELAP,NELAP,CALAP
2,4'-DDD [2C]	DoD-ELAP,NELAP,WADOE
2,4'-DDD [2C]	DoD-ELAP,CALAP,WADOE
2,4'-DDD [2C]	DoD-ELAP,NELAP,CALAP,WADOE
2,4'-DDT	DoD-ELAP,NELAP,WADOE
2,4'-DDT	DoD-ELAP,NELAP,CALAP
2,4'-DDT	DoD-ELAP,NELAP,CALAP,WADOE
2,4'-DDT	DoD-ELAP,CALAP,WADOE
2,4'-DDT [2C]	DoD-ELAP,NELAP,CALAP



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2,4'-DDT [2C]	DoD-ELAP,NELAP,WADOE
2,4'-DDT [2C]	DoD-ELAP,CALAP,WADOE
2,4'-DDT [2C]	DoD-ELAP,NELAP,CALAP,WADOE
Oxychlordane	DoD-ELAP,CALAP,WADOE
Oxychlordane	DoD-ELAP,NELAP,WADOE
Oxychlordane	DoD-ELAP,NELAP,CALAP,WADOE
Oxychlordane	DoD-ELAP,NELAP,CALAP
Oxychlordane [2C]	DoD-ELAP,NELAP,CALAP,WADOE
Oxychlordane [2C]	DoD-ELAP,CALAP,WADOE
Oxychlordane [2C]	DoD-ELAP,NELAP,WADOE
Oxychlordane [2C]	DoD-ELAP,NELAP,CALAP
cis-Nonachlor	DoD-ELAP,CALAP,WADOE
cis-Nonachlor	DoD-ELAP,NELAP,WADOE
cis-Nonachlor	DoD-ELAP,NELAP,CALAP
cis-Nonachlor	DoD-ELAP,NELAP,CALAP,WADOE
cis-Nonachlor [2C]	DoD-ELAP,NELAP,CALAP,WADOE
cis-Nonachlor [2C]	DoD-ELAP,CALAP,WADOE
cis-Nonachlor [2C]	DoD-ELAP,NELAP,WADOE
cis-Nonachlor [2C]	DoD-ELAP,NELAP,CALAP
trans-Nonachlor	DoD-ELAP,CALAP,WADOE
trans-Nonachlor	DoD-ELAP,NELAP,CALAP
trans-Nonachlor	DoD-ELAP,NELAP,CALAP,WADOE
trans-Nonachlor	DoD-ELAP,NELAP,WADOE
trans-Nonachlor [2C]	DoD-ELAP,NELAP,WADOE
trans-Nonachlor [2C]	DoD-ELAP,CALAP,WADOE
trans-Nonachlor [2C]	DoD-ELAP,NELAP,CALAP
trans-Nonachlor [2C]	DoD-ELAP,NELAP,CALAP,WADOE
Mirex	DoD-ELAP,NELAP,CALAP
Mirex	DoD-ELAP,NELAP,WADOE
Mirex	DoD-ELAP,NELAP,CALAP,WADOE
Mirex	DoD-ELAP,CALAP,WADOE
Mirex [2C]	DoD-ELAP,NELAP,WADOE
Mirex [2C]	DoD-ELAP,NELAP,CALAP,WADOE
Mirex [2C]	DoD-ELAP,NELAP,CALAP
Mirex [2C]	DoD-ELAP,CALAP,WADOE
Hexachloroethane	NELAP,CALAP,WADOE
Hexachloroethane	NELAP,WADOE
Hexachloroethane	CALAP,WADOE
Hexachloroethane	NELAP,CALAP



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Hexachloroethane [2C]	NELAP,CALAP,WADOE
Hexachloroethane [2C]	CALAP,WADOE
Hexachloroethane [2C]	NELAP,CALAP
Hexachloroethane [2C]	NELAP,WADOE
Toxaphene	DoD-ELAP,WADOE
Toxaphene	DoD-ELAP,NELAP
Toxaphene	DoD-ELAP,NELAP,WADOE
Toxaphene	DoD-ELAP,NELAP,WADOE
Toxaphene [2C]	DoD-ELAP,WADOE
Toxaphene [2C]	DoD-ELAP,NELAP,WADOE
Toxaphene [2C]	DoD-ELAP,NELAP
Toxaphene [2C]	DoD-ELAP,NELAP,WADOE
Chlordane, technical	DoD-ELAP,WADOE
Chlordane, technical	DoD-ELAP,NELAP,WADOE
Chlordane, technical	DoD-ELAP,NELAP,WADOE
Chlordane, technical	DoD-ELAP,NELAP
Chlordane, technical [2C]	DoD-ELAP,NELAP,WADOE
Chlordane, technical [2C]	DoD-ELAP,NELAP,WADOE
Chlordane, technical [2C]	DoD-ELAP,WADOE
Chlordane, technical [2C]	DoD-ELAP,NELAP

EPA 8082A in Solid

Aroclor 1016	DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1016	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1016	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1016	WADOE,DoD-ELAP,CALAP,ADEC
Aroclor 1016 [2C]	DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1016 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1016 [2C]	WADOE,DoD-ELAP,CALAP,ADEC
Aroclor 1016 [2C]	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1221	DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1221	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1221	WADOE,DoD-ELAP,CALAP,ADEC
Aroclor 1221	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1221 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1221 [2C]	WADOE,DoD-ELAP,CALAP,ADEC
Aroclor 1221 [2C]	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1221 [2C]	DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1232	WADOE,DoD-ELAP,CALAP,ADEC
Aroclor 1232	WADOE,DoD-ELAP,NELAP,ADEC



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Aroclor 1232	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1232	DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1232 [2C]	WADOE,DoD-ELAP,CALAP,ADEC
Aroclor 1232 [2C]	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1232 [2C]	DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1232 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1242	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1242	WADOE,DoD-ELAP,CALAP,ADEC
Aroclor 1242	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1242	DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1242 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1242 [2C]	WADOE,DoD-ELAP,CALAP,ADEC
Aroclor 1242 [2C]	DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1242 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1242 [2C]	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1248	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1248	WADOE,DoD-ELAP,CALAP,ADEC
Aroclor 1248	DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1248	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1248 [2C]	DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1248 [2C]	WADOE,DoD-ELAP,CALAP,ADEC
Aroclor 1248 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1248 [2C]	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1254	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1254	WADOE,DoD-ELAP,CALAP,ADEC
Aroclor 1254	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1254	DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1254 [2C]	WADOE,DoD-ELAP,CALAP,ADEC
Aroclor 1254 [2C]	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1254 [2C]	DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1254 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1260	DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1260	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1260	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1260	WADOE,DoD-ELAP,CALAP,ADEC
Aroclor 1260 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1260 [2C]	WADOE,DoD-ELAP,CALAP,ADEC
Aroclor 1260 [2C]	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1260 [2C]	DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1262	WADOE,DoD-ELAP,NELAP,ADEC



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Aroclor 1262	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1262	WADOE,DoD-ELAP,CALAP,ADEC
Aroclor 1262	DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1262 [2C]	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1262 [2C]	DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1262 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1262 [2C]	WADOE,DoD-ELAP,CALAP,ADEC
Aroclor 1268	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1268	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1268	DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1268	WADOE,DoD-ELAP,CALAP,ADEC
Aroclor 1268 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1268 [2C]	WADOE,DoD-ELAP,CALAP,ADEC
Aroclor 1268 [2C]	DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1268 [2C]	WADOE,DoD-ELAP,NELAP,CALAP,ADEC

EPA 8270E in Solid

Phenol	CALAP,DoD-ELAP,NELAP
Phenol	CALAP,DoD-ELAP,NELAP,WADOE
Phenol	DoD-ELAP,NELAP,WADOE
Phenol	CALAP,DoD-ELAP,WADOE
bis(2-chloroethyl) ether	CALAP,DoD-ELAP,WADOE
bis(2-chloroethyl) ether	DoD-ELAP,NELAP,WADOE
bis(2-chloroethyl) ether	CALAP,DoD-ELAP,NELAP,WADOE
bis(2-chloroethyl) ether	CALAP,DoD-ELAP,NELAP
2-Chlorophenol	CALAP,DoD-ELAP,NELAP,WADOE
2-Chlorophenol	CALAP,DoD-ELAP,WADOE
2-Chlorophenol	CALAP,DoD-ELAP,NELAP
2-Chlorophenol	DoD-ELAP,NELAP,WADOE
1,3-Dichlorobenzene	DoD-ELAP,NELAP,WADOE
1,3-Dichlorobenzene	CALAP,DoD-ELAP,NELAP
1,3-Dichlorobenzene	CALAP,DoD-ELAP,NELAP,WADOE
1,3-Dichlorobenzene	CALAP,DoD-ELAP,WADOE
1,4-Dichlorobenzene	CALAP,DoD-ELAP,NELAP
1,4-Dichlorobenzene	DoD-ELAP,NELAP,WADOE
1,4-Dichlorobenzene	CALAP,DoD-ELAP,NELAP,WADOE
1,4-Dichlorobenzene	CALAP,DoD-ELAP,WADOE
1,2-Dichlorobenzene	CALAP,DoD-ELAP,NELAP
1,2-Dichlorobenzene	CALAP,DoD-ELAP,WADOE
1,2-Dichlorobenzene	DoD-ELAP,NELAP,WADOE



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1,2-Dichlorobenzene	CALAP,DoD-ELAP,NELAP,WADOE
Benzyl Alcohol	CALAP,DoD-ELAP,WADOE
Benzyl Alcohol	DoD-ELAP,NELAP,WADOE
Benzyl Alcohol	CALAP,DoD-ELAP,NELAP
Benzyl Alcohol	CALAP,DoD-ELAP,NELAP,WADOE
2,2'-Oxybis(1-chloropropane)	DoD-ELAP,NELAP
2,2'-Oxybis(1-chloropropane)	DoD-ELAP,NELAP
2,2'-Oxybis(1-chloropropane)	DoD-ELAP
2,2'-Oxybis(1-chloropropane)	DoD-ELAP,NELAP
2-Methylphenol	CALAP,DoD-ELAP,NELAP
2-Methylphenol	DoD-ELAP,NELAP,WADOE
2-Methylphenol	CALAP,DoD-ELAP,WADOE
2-Methylphenol	CALAP,DoD-ELAP,NELAP,WADOE
Hexachloroethane	CALAP,DoD-ELAP,NELAP,WADOE
Hexachloroethane	CALAP,DoD-ELAP,NELAP
Hexachloroethane	CALAP,DoD-ELAP,WADOE
Hexachloroethane	DoD-ELAP,NELAP,WADOE
N-Nitroso-di-n-Propylamine	CALAP,DoD-ELAP,WADOE
N-Nitroso-di-n-Propylamine	CALAP,DoD-ELAP,NELAP
N-Nitroso-di-n-Propylamine	DoD-ELAP,NELAP,WADOE
N-Nitroso-di-n-Propylamine	CALAP,DoD-ELAP,NELAP,WADOE
4-Methylphenol	DoD-ELAP,NELAP,WADOE
4-Methylphenol	CALAP,DoD-ELAP,NELAP,WADOE
4-Methylphenol	CALAP,DoD-ELAP,NELAP
4-Methylphenol	CALAP,DoD-ELAP,WADOE
Nitrobenzene	CALAP,DoD-ELAP,NELAP,WADOE
Nitrobenzene	CALAP,DoD-ELAP,NELAP
Nitrobenzene	DoD-ELAP,NELAP,WADOE
Nitrobenzene	CALAP,DoD-ELAP,WADOE
Isophorone	CALAP,DoD-ELAP,WADOE
Isophorone	DoD-ELAP,NELAP,WADOE
Isophorone	CALAP,DoD-ELAP,NELAP
Isophorone	CALAP,DoD-ELAP,NELAP,WADOE
2-Nitrophenol	CALAP,DoD-ELAP,NELAP,WADOE
2-Nitrophenol	CALAP,DoD-ELAP,WADOE
2-Nitrophenol	DoD-ELAP,NELAP,WADOE
2-Nitrophenol	CALAP,DoD-ELAP,NELAP
2,4-Dimethylphenol	CALAP,DoD-ELAP,WADOE
2,4-Dimethylphenol	CALAP,DoD-ELAP,NELAP



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2,4-Dimethylphenol	DoD-ELAP,NELAP,WADOE
2,4-Dimethylphenol	CALAP,DoD-ELAP,NELAP,WADOE
Bis(2-Chloroethoxy)methane	CALAP,DoD-ELAP,WADOE
Bis(2-Chloroethoxy)methane	CALAP,DoD-ELAP,NELAP
Bis(2-Chloroethoxy)methane	DoD-ELAP,NELAP,WADOE
Bis(2-Chloroethoxy)methane	CALAP,DoD-ELAP,NELAP,WADOE
2,4-Dichlorophenol	CALAP,DoD-ELAP,NELAP,WADOE
2,4-Dichlorophenol	CALAP,DoD-ELAP,WADOE
2,4-Dichlorophenol	CALAP,DoD-ELAP,NELAP
2,4-Dichlorophenol	DoD-ELAP,NELAP,WADOE
1,2,4-Trichlorobenzene	CALAP,DoD-ELAP,NELAP,WADOE
1,2,4-Trichlorobenzene	CALAP,DoD-ELAP,WADOE
1,2,4-Trichlorobenzene	CALAP,DoD-ELAP,NELAP
1,2,4-Trichlorobenzene	DoD-ELAP,NELAP,WADOE
Naphthalene	DoD-ELAP,NELAP,WADOE,ADEC
Naphthalene	CALAP,DoD-ELAP,NELAP,ADEC
Naphthalene	CALAP,DoD-ELAP,WADOE,ADEC
Naphthalene	CALAP,DoD-ELAP,NELAP,WADOE,ADEC
Benzoic acid	CALAP,DoD-ELAP,NELAP,WADOE
Benzoic acid	CALAP,DoD-ELAP,NELAP
Benzoic acid	DoD-ELAP,NELAP,WADOE
Benzoic acid	CALAP,DoD-ELAP,WADOE
4-Chloroaniline	CALAP,DoD-ELAP,NELAP
4-Chloroaniline	CALAP,DoD-ELAP,WADOE
4-Chloroaniline	DoD-ELAP,NELAP,WADOE
4-Chloroaniline	CALAP,DoD-ELAP,NELAP,WADOE
Hexachlorobutadiene	CALAP,DoD-ELAP,WADOE
Hexachlorobutadiene	CALAP,DoD-ELAP,NELAP
Hexachlorobutadiene	CALAP,DoD-ELAP,NELAP,WADOE
Hexachlorobutadiene	DoD-ELAP,NELAP,WADOE
4-Chloro-3-Methylphenol	CALAP,DoD-ELAP,NELAP,WADOE
4-Chloro-3-Methylphenol	CALAP,DoD-ELAP,NELAP
4-Chloro-3-Methylphenol	DoD-ELAP,NELAP,WADOE
4-Chloro-3-Methylphenol	CALAP,DoD-ELAP,WADOE
2-Methylnaphthalene	DoD-ELAP,NELAP,WADOE,ADEC
2-Methylnaphthalene	CALAP,DoD-ELAP,NELAP,ADEC
2-Methylnaphthalene	CALAP,DoD-ELAP,NELAP,WADOE,ADEC
2-Methylnaphthalene	CALAP,DoD-ELAP,WADOE,ADEC
Hexachlorocyclopentadiene	CALAP,DoD-ELAP,NELAP,WADOE



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Hexachlorocyclopentadiene	CALAP,DoD-ELAP,WADOE
Hexachlorocyclopentadiene	DoD-ELAP,NELAP,WADOE
Hexachlorocyclopentadiene	CALAP,DoD-ELAP,NELAP
2,4,6-Trichlorophenol	CALAP,DoD-ELAP,NELAP
2,4,6-Trichlorophenol	CALAP,DoD-ELAP,NELAP,WADOE
2,4,6-Trichlorophenol	CALAP,DoD-ELAP,WADOE
2,4,6-Trichlorophenol	DoD-ELAP,NELAP,WADOE
2,4,5-Trichlorophenol	DoD-ELAP,NELAP,WADOE
2,4,5-Trichlorophenol	CALAP,DoD-ELAP,NELAP,WADOE
2,4,5-Trichlorophenol	CALAP,DoD-ELAP,WADOE
2,4,5-Trichlorophenol	CALAP,DoD-ELAP,NELAP
2-Chloronaphthalene	CALAP,DoD-ELAP,NELAP
2-Chloronaphthalene	CALAP,DoD-ELAP,NELAP,WADOE
2-Chloronaphthalene	CALAP,DoD-ELAP,WADOE
2-Chloronaphthalene	DoD-ELAP,NELAP,WADOE
2-Nitroaniline	CALAP,DoD-ELAP,WADOE
2-Nitroaniline	CALAP,DoD-ELAP,NELAP
2-Nitroaniline	DoD-ELAP,NELAP,WADOE
2-Nitroaniline	CALAP,DoD-ELAP,NELAP,WADOE
Acenaphthylene	CALAP,DoD-ELAP,WADOE,ADEC
Acenaphthylene	CALAP,DoD-ELAP,NELAP,ADEC
Acenaphthylene	DoD-ELAP,NELAP,WADOE,ADEC
Acenaphthylene	CALAP,DoD-ELAP,NELAP,WADOE,ADEC
Dimethylphthalate	CALAP,DoD-ELAP,NELAP,WADOE
Dimethylphthalate	CALAP,DoD-ELAP,NELAP
Dimethylphthalate	CALAP,DoD-ELAP,WADOE
Dimethylphthalate	DoD-ELAP,NELAP,WADOE
2,6-Dinitrotoluene	CALAP,DoD-ELAP,WADOE
2,6-Dinitrotoluene	DoD-ELAP,NELAP,WADOE
2,6-Dinitrotoluene	CALAP,DoD-ELAP,NELAP
2,6-Dinitrotoluene	CALAP,DoD-ELAP,NELAP,WADOE
Acenaphthene	CALAP,DoD-ELAP,NELAP,ADEC
Acenaphthene	DoD-ELAP,NELAP,WADOE,ADEC
Acenaphthene	CALAP,DoD-ELAP,WADOE,ADEC
Acenaphthene	CALAP,DoD-ELAP,NELAP,WADOE,ADEC
3-Nitroaniline	CALAP,DoD-ELAP,NELAP
3-Nitroaniline	CALAP,DoD-ELAP,WADOE
3-Nitroaniline	DoD-ELAP,NELAP,WADOE
3-Nitroaniline	CALAP,DoD-ELAP,NELAP,WADOE



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Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:06

2,4-Dinitrophenol	CALAP,DoD-ELAP,NELAP,WADOE
2,4-Dinitrophenol	DoD-ELAP,NELAP,WADOE
2,4-Dinitrophenol	CALAP,DoD-ELAP,NELAP
2,4-Dinitrophenol	CALAP,DoD-ELAP,WADOE
Dibenzofuran	CALAP,DoD-ELAP,NELAP,WADOE,ADEC
Dibenzofuran	CALAP,DoD-ELAP,NELAP,ADEC
Dibenzofuran	CALAP,DoD-ELAP,WADOE,ADEC
Dibenzofuran	DoD-ELAP,NELAP,WADOE,ADEC
4-Nitrophenol	DoD-ELAP,NELAP,WADOE
4-Nitrophenol	CALAP,DoD-ELAP,NELAP,WADOE
4-Nitrophenol	CALAP,DoD-ELAP,NELAP
4-Nitrophenol	CALAP,DoD-ELAP,WADOE
2,4-Dinitrotoluene	DoD-ELAP,NELAP,WADOE
2,4-Dinitrotoluene	CALAP,DoD-ELAP,WADOE
2,4-Dinitrotoluene	CALAP,DoD-ELAP,NELAP,WADOE
2,4-Dinitrotoluene	CALAP,DoD-ELAP,NELAP
Fluorene	CALAP,DoD-ELAP,NELAP,WADOE,ADEC
Fluorene	CALAP,DoD-ELAP,NELAP,ADEC
Fluorene	CALAP,DoD-ELAP,WADOE,ADEC
Fluorene	DoD-ELAP,NELAP,WADOE,ADEC
4-Chlorophenylphenyl ether	DoD-ELAP,NELAP
4-Chlorophenylphenyl ether	CALAP,DoD-ELAP,NELAP
4-Chlorophenylphenyl ether	CALAP,DoD-ELAP,NELAP
4-Chlorophenylphenyl ether	CALAP,DoD-ELAP
Diethyl phthalate	DoD-ELAP,NELAP,WADOE
Diethyl phthalate	CALAP,DoD-ELAP,NELAP,WADOE
Diethyl phthalate	CALAP,DoD-ELAP,WADOE
Diethyl phthalate	CALAP,DoD-ELAP,NELAP
4-Nitroaniline	CALAP,DoD-ELAP,NELAP
4-Nitroaniline	DoD-ELAP,NELAP,WADOE
4-Nitroaniline	CALAP,DoD-ELAP,WADOE
4-Nitroaniline	CALAP,DoD-ELAP,NELAP,WADOE
4,6-Dinitro-2-methylphenol	CALAP,DoD-ELAP,WADOE
4,6-Dinitro-2-methylphenol	CALAP,DoD-ELAP,NELAP,WADOE
4,6-Dinitro-2-methylphenol	DoD-ELAP,NELAP,WADOE
4,6-Dinitro-2-methylphenol	CALAP,DoD-ELAP,NELAP
N-Nitrosodiphenylamine	DoD-ELAP,WADOE
N-Nitrosodiphenylamine	DoD-ELAP,NELAP
N-Nitrosodiphenylamine	DoD-ELAP,NELAP,WADOE



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

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N-Nitrosodiphenylamine	DoD-ELAP,NELAP,WADOE
4-Bromophenyl phenyl ether	CALAP,DoD-ELAP,NELAP
4-Bromophenyl phenyl ether	CALAP,DoD-ELAP,NELAP,WADOE
4-Bromophenyl phenyl ether	CALAP,DoD-ELAP,WADOE
4-Bromophenyl phenyl ether	DoD-ELAP,NELAP,WADOE
Hexachlorobenzene	CALAP,DoD-ELAP,NELAP
Hexachlorobenzene	CALAP,DoD-ELAP,WADOE
Hexachlorobenzene	CALAP,DoD-ELAP,NELAP,WADOE
Hexachlorobenzene	DoD-ELAP,NELAP,WADOE
Pentachlorophenol	CALAP,DoD-ELAP,WADOE
Pentachlorophenol	CALAP,DoD-ELAP,NELAP,WADOE
Pentachlorophenol	DoD-ELAP,NELAP,WADOE
Pentachlorophenol	CALAP,DoD-ELAP,NELAP
Phenanthrene	CALAP,DoD-ELAP,WADOE,ADEC
Phenanthrene	CALAP,DoD-ELAP,NELAP,ADEC
Phenanthrene	CALAP,DoD-ELAP,NELAP,WADOE,ADEC
Phenanthrene	DoD-ELAP,NELAP,WADOE,ADEC
Anthracene	CALAP,DoD-ELAP,WADOE,ADEC
Anthracene	CALAP,DoD-ELAP,NELAP,ADEC
Anthracene	CALAP,DoD-ELAP,NELAP,WADOE,ADEC
Anthracene	DoD-ELAP,NELAP,WADOE,ADEC
Carbazole	CALAP,DoD-ELAP,NELAP,WADOE,ADEC
Carbazole	CALAP,DoD-ELAP,NELAP,ADEC
Carbazole	CALAP,DoD-ELAP,WADOE,ADEC
Carbazole	DoD-ELAP,NELAP,WADOE,ADEC
Di-n-Butylphthalate	DoD-ELAP,NELAP,WADOE
Di-n-Butylphthalate	CALAP,DoD-ELAP,WADOE
Di-n-Butylphthalate	CALAP,DoD-ELAP,NELAP,WADOE
Di-n-Butylphthalate	CALAP,DoD-ELAP,NELAP
Fluoranthene	CALAP,DoD-ELAP,WADOE,ADEC
Fluoranthene	CALAP,DoD-ELAP,NELAP,WADOE,ADEC
Fluoranthene	CALAP,DoD-ELAP,NELAP,ADEC
Fluoranthene	DoD-ELAP,NELAP,WADOE,ADEC
Pyrene	CALAP,DoD-ELAP,NELAP,ADEC
Pyrene	CALAP,DoD-ELAP,WADOE,ADEC
Pyrene	DoD-ELAP,NELAP,WADOE,ADEC
Pyrene	CALAP,DoD-ELAP,NELAP,WADOE,ADEC
Butylbenzylphthalate	CALAP,DoD-ELAP,WADOE
Butylbenzylphthalate	DoD-ELAP,NELAP,WADOE



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
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Butylbenzylphthalate	CALAP,DoD-ELAP,NELAP,WADOE
Butylbenzylphthalate	CALAP,DoD-ELAP,NELAP
Benzo(a)anthracene	CALAP,DoD-ELAP,WADOE,ADEC
Benzo(a)anthracene	CALAP,DoD-ELAP,NELAP,ADEC
Benzo(a)anthracene	DoD-ELAP,NELAP,WADOE,ADEC
Benzo(a)anthracene	CALAP,DoD-ELAP,NELAP,WADOE,ADEC
3,3'-Dichlorobenzidine	DoD-ELAP,WADOE
3,3'-Dichlorobenzidine	DoD-ELAP,NELAP,WADOE
3,3'-Dichlorobenzidine	DoD-ELAP,NELAP,WADOE
3,3'-Dichlorobenzidine	DoD-ELAP,NELAP
Chrysene	DoD-ELAP,NELAP,WADOE,ADEC
Chrysene	CALAP,DoD-ELAP,NELAP,ADEC
Chrysene	CALAP,DoD-ELAP,NELAP,WADOE,ADEC
Chrysene	CALAP,DoD-ELAP,WADOE,ADEC
bis(2-Ethylhexyl)phthalate	DoD-ELAP,NELAP,WADOE
bis(2-Ethylhexyl)phthalate	CALAP,DoD-ELAP,WADOE
bis(2-Ethylhexyl)phthalate	CALAP,DoD-ELAP,NELAP
bis(2-Ethylhexyl)phthalate	CALAP,DoD-ELAP,NELAP,WADOE
Di-n-Octylphthalate	CALAP,DoD-ELAP,NELAP
Di-n-Octylphthalate	CALAP,DoD-ELAP,NELAP,WADOE
Di-n-Octylphthalate	DoD-ELAP,NELAP,WADOE
Di-n-Octylphthalate	CALAP,DoD-ELAP,WADOE
Benzo(b)fluoranthene	DoD-ELAP,NELAP,WADOE,ADEC
Benzo(b)fluoranthene	CALAP,DoD-ELAP,WADOE,ADEC
Benzo(b)fluoranthene	CALAP,DoD-ELAP,NELAP,ADEC
Benzo(b)fluoranthene	CALAP,DoD-ELAP,NELAP,WADOE,ADEC
Benzo(k)fluoranthene	DoD-ELAP,NELAP,WADOE,ADEC
Benzo(k)fluoranthene	CALAP,DoD-ELAP,NELAP,WADOE,ADEC
Benzo(k)fluoranthene	CALAP,DoD-ELAP,NELAP,ADEC
Benzo(k)fluoranthene	CALAP,DoD-ELAP,WADOE,ADEC
Benzo(a)pyrene	CALAP,ADEC
Benzo(a)pyrene	CALAP,WADOE,ADEC
Benzo(a)pyrene	WADOE,ADEC
Benzo(a)pyrene	CALAP,WADOE,ADEC
Benzo(a)pyrene	DoD-ELAP,NELAP,WADOE,ADEC
Benzo(a)pyrene	CALAP,DoD-ELAP,WADOE,ADEC
Benzo(a)pyrene	CALAP,DoD-ELAP,NELAP,WADOE,ADEC
Benzo(a)pyrene	CALAP,DoD-ELAP,NELAP,ADEC
Benzo(a)pyrene	CALAP,DoD-ELAP,WADOE,ADEC



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

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Indeno(1,2,3-cd)pyrene	CALAP,DoD-ELAP,NELAP,ADEC
Indeno(1,2,3-cd)pyrene	DoD-ELAP,NELAP,WADOE,ADEC
Indeno(1,2,3-cd)pyrene	CALAP,DoD-ELAP,NELAP,WADOE,ADEC
Dibenzo(a,h)anthracene	DoD-ELAP,NELAP,WADOE,ADEC
Dibenzo(a,h)anthracene	CALAP,DoD-ELAP,NELAP,WADOE,ADEC
Dibenzo(a,h)anthracene	CALAP,DoD-ELAP,NELAP,ADEC
Dibenzo(a,h)anthracene	CALAP,DoD-ELAP,WADOE,ADEC
Benzo(g,h,i)perylene	DoD-ELAP,NELAP,WADOE,ADEC
Benzo(g,h,i)perylene	CALAP,DoD-ELAP,WADOE,ADEC
Benzo(g,h,i)perylene	CALAP,DoD-ELAP,NELAP,ADEC
Benzo(g,h,i)perylene	CALAP,DoD-ELAP,NELAP,WADOE,ADEC
N-Nitrosodimethylamine	CALAP,DoD-ELAP,NELAP,WADOE
N-Nitrosodimethylamine	CALAP,DoD-ELAP,NELAP
N-Nitrosodimethylamine	CALAP,DoD-ELAP,WADOE
N-Nitrosodimethylamine	DoD-ELAP,NELAP,WADOE
Aniline	CALAP,DoD-ELAP,NELAP,WADOE
Aniline	DoD-ELAP,NELAP,WADOE
Aniline	CALAP,DoD-ELAP,NELAP
Aniline	CALAP,DoD-ELAP,WADOE
Retene	CALAP,DoD-ELAP,WADOE
Retene	DoD-ELAP,NELAP,WADOE
Retene	CALAP,DoD-ELAP,NELAP
Retene	CALAP,DoD-ELAP,NELAP,WADOE
Pyridine	DoD-ELAP,NELAP,WADOE
Pyridine	CALAP,DoD-ELAP,WADOE
Pyridine	CALAP,DoD-ELAP,NELAP,WADOE
Pyridine	CALAP,DoD-ELAP,NELAP
1-Methylnaphthalene	CALAP,DoD-ELAP,NELAP,ADEC
1-Methylnaphthalene	CALAP,DoD-ELAP,WADOE,ADEC
1-Methylnaphthalene	DoD-ELAP,NELAP,WADOE,ADEC
1-Methylnaphthalene	CALAP,DoD-ELAP,NELAP,WADOE,ADEC
Azobenzene (1,2-DP-Hydrazine)	NELAP,WADOE
Azobenzene (1,2-DP-Hydrazine)	CALAP,NELAP,WADOE
Azobenzene (1,2-DP-Hydrazine)	CALAP,NELAP
Azobenzene (1,2-DP-Hydrazine)	CALAP,WADOE
2,3,4,6-Tetrachlorophenol	DoD-ELAP
2,3,4,6-Tetrachlorophenol	DoD-ELAP,WADOE
2,3,4,6-Tetrachlorophenol	DoD-ELAP,WADOE
2,3,4,6-Tetrachlorophenol	DoD-ELAP,WADOE



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
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Benzidine	DoD-ELAP,NELAP
Benzidine	DoD-ELAP,NELAP
Benzidine	DoD-ELAP
Benzidine	DoD-ELAP,NELAP
Tetrachloroguaiacol	DoD-ELAP
Tetrachloroguaiacol	DoD-ELAP,WADOE
Tetrachloroguaiacol	DoD-ELAP,WADOE
Tetrachloroguaiacol	DoD-ELAP,WADOE
3,4,5-Trichloroguaiacol	WADOE
3,4,5-Trichloroguaiacol	
3,4,5-Trichloroguaiacol	WADOE
3,4,5-Trichloroguaiacol	WADOE
3,4,6-Trichloroguaiacol	WADOE
3,4,6-Trichloroguaiacol	WADOE
3,4,6-Trichloroguaiacol	WADOE
4,5,6-Trichloroguaiacol	WADOE
4,5,6-Trichloroguaiacol	
4,5,6-Trichloroguaiacol	WADOE
4,5,6-Trichloroguaiacol	WADOE
Guaiacol	WADOE
Guaiacol	WADOE
Guaiacol	
Guaiacol	WADOE

EPA 8270E-SIM in Solid

Tributyltin Ion	WADOE,DoD-ELAP
Tributyltin Ion	DoD-ELAP
Tributyltin Ion	WADOE,DoD-ELAP
Tributyltin Ion	WADOE,DoD-ELAP
Dibutyltin Ion	WADOE,DoD-ELAP
Dibutyltin Ion	WADOE,DoD-ELAP
Dibutyltin Ion	DoD-ELAP
Dibutyltin Ion	WADOE,DoD-ELAP
Butyltin Ion	WADOE
Butyltin Ion	
Butyltin Ion	WADOE
Butyltin Ion	WADOE
Phenol	CALAP,NELAP
Phenol	CALAP,NELAP,WADOE



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Phenol	CALAP,WADOE
Phenol	NELAP,WADOE
1,3-Dichlorobenzene	CALAP,WADOE
1,3-Dichlorobenzene	CALAP,NELAP,WADOE
1,3-Dichlorobenzene	NELAP,WADOE
1,3-Dichlorobenzene	CALAP,NELAP
1,4-Dichlorobenzene	CALAP,WADOE
1,4-Dichlorobenzene	NELAP,WADOE
1,4-Dichlorobenzene	CALAP,NELAP
1,4-Dichlorobenzene	CALAP,NELAP,WADOE
1,2-Dichlorobenzene	CALAP,WADOE
1,2-Dichlorobenzene	CALAP,NELAP,WADOE
1,2-Dichlorobenzene	CALAP,NELAP
1,2-Dichlorobenzene	NELAP,WADOE
Benzyl Alcohol	CALAP,WADOE
Benzyl Alcohol	CALAP,NELAP
Benzyl Alcohol	CALAP,NELAP,WADOE
Benzyl Alcohol	NELAP,WADOE
2-Methylphenol	CALAP,NELAP
2-Methylphenol	CALAP,NELAP,WADOE
2-Methylphenol	NELAP,WADOE
2-Methylphenol	CALAP,WADOE
N-Nitroso-di-n-Propylamine	CALAP,WADOE
N-Nitroso-di-n-Propylamine	CALAP,NELAP,WADOE
N-Nitroso-di-n-Propylamine	NELAP,WADOE
N-Nitroso-di-n-Propylamine	CALAP,NELAP
4-Methylphenol	CALAP,NELAP,WADOE
4-Methylphenol	CALAP,NELAP
4-Methylphenol	CALAP,WADOE
4-Methylphenol	NELAP,WADOE
2,4-Dimethylphenol	CALAP,NELAP
2,4-Dimethylphenol	NELAP,WADOE
2,4-Dimethylphenol	CALAP,NELAP,WADOE
2,4-Dimethylphenol	CALAP,WADOE
1,2,4-Trichlorobenzene	CALAP,NELAP
1,2,4-Trichlorobenzene	CALAP,NELAP,WADOE
1,2,4-Trichlorobenzene	NELAP,WADOE
1,2,4-Trichlorobenzene	CALAP,WADOE
Hexachlorobutadiene	NELAP,WADOE



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Hexachlorobutadiene	CALAP,WADOE
Hexachlorobutadiene	CALAP,NELAP
Hexachlorobutadiene	CALAP,NELAP,WADOE
N-Nitrosodimethylamine	CALAP,NELAP
N-Nitrosodimethylamine	CALAP,WADOE
N-Nitrosodimethylamine	NELAP,WADOE
N-Nitrosodimethylamine	CALAP,NELAP,WADOE
Dimethylphthalate	CALAP,WADOE
Dimethylphthalate	CALAP,NELAP,WADOE
Dimethylphthalate	CALAP,NELAP
Dimethylphthalate	NELAP,WADOE
Diethyl phthalate	CALAP,WADOE
Diethyl phthalate	CALAP,NELAP
Diethyl phthalate	NELAP,WADOE
Diethyl phthalate	CALAP,NELAP,WADOE
N-Nitrosodiphenylamine	CALAP,NELAP
N-Nitrosodiphenylamine	CALAP,NELAP,WADOE
N-Nitrosodiphenylamine	NELAP,WADOE
N-Nitrosodiphenylamine	CALAP,WADOE
Hexachlorobenzene	NELAP,WADOE
Hexachlorobenzene	CALAP,WADOE
Hexachlorobenzene	CALAP,NELAP
Hexachlorobenzene	CALAP,NELAP,WADOE
Pentachlorophenol	CALAP,NELAP,WADOE
Pentachlorophenol	CALAP,WADOE
Pentachlorophenol	CALAP,NELAP
Pentachlorophenol	NELAP,WADOE
Butylbenzylphthalate	CALAP,NELAP,WADOE
Butylbenzylphthalate	NELAP,WADOE
Butylbenzylphthalate	CALAP,NELAP
Butylbenzylphthalate	CALAP,WADOE
Dibenzo(a,h)anthracene	CALAP,NELAP,WADOE
Dibenzo(a,h)anthracene	CALAP,NELAP
Dibenzo(a,h)anthracene	NELAP,WADOE
Dibenzo(a,h)anthracene	CALAP,WADOE

EPA 9060A m in Solid

Total Organic Carbon	WADOE
Total Organic Carbon	
Total Organic Carbon	WADOE



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Total Organic Carbon WADOE

SM 4500-NH3 H-97 in Solid

Ammonia-N WADOE,NELAP
Ammonia-N WADOE,NELAP
Ammonia-N NELAP
Ammonia-N WADOE

SM 4500-S2 D-00 (PSEP) in Solid

Sulfide DoD-ELAP,NELAP,WADOE
Sulfide DoD-ELAP,NELAP,WADOE
Sulfide DoD-ELAP,NELAP
Sulfide DoD-ELAP,WADOE

Code	Description	Number	Expires
ADEC	Alaska Dept of Environmental Conservation	17-015	03/28/2023
DoD-ELAP	DoD-Environmental Laboratory Accreditation Program	66169	02/28/2022



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Reported:
26-Mar-2021 16:06

Notes and Definitions

*	Flagged value is not within established control limits.
B	This analyte was detected in the method blank.
D	The reported value is from a dilution
E	Concentration exceeds the calibration range.
EMPC	Estimated Maximum Possible Concentration qualifier for HRGCMS Dioxin
H	Hold time violation - Hold time was exceeded.
J	Estimated concentration value detected below the reporting limit.
L	Analyte concentration is ≤ 5 times the reporting limit and the replicate control limit defaults to $\pm$ RL instead of 20% RPD
M	Estimated value for a GC/MS analyte detected and confirmed by an analyst but with low spectral match parameters.
P1	The reported value is greater than 40% difference between the concentrations determined on two GC columns where applicable.
P1	>40% difference between the concentrations on two GC columns.
Q	ICV/CCV Acceptance Criteria not met.
U	This analyte is not detected above the reporting limit (RL) or if noted, not detected above the limit of detection (LOD).
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
[2C]	Indicates this result was quantified on the second column on a dual column analysis.



Analytical Resources, Incorporated
Analytical Chemists and Consultants

25 March 2021

Ezra Beaver
Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue, WA 98007

RE: COA Outfall

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)
20K0372

Associated SDG ID(s)
N/A

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclose Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the requirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, Inc.

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.



⏮ Reply all 🗑 Delete 🗑 Junk Block ⋮

Re: DOF Samples

20K0372

The client would like the samples below pulled and logged the same as the previous samples in 20K0364. Please log on a 21 day TAT on a new work order:

Thanks Amanda,

For the referenced CoC the following three samples were requested to be archived:

COA_SS-1_6.5-8.5_20201116
COA_SS-2_5.5-7.5_20201116
COA_SS-2_7.5-9.5_20201116

Regards,
Amanda Volgardsen Johnson
Analytical Resources, Inc.
Project Manager

- Direct: 206-695-6220
- Office: 206-695-6200
- Cell: 253-797-5154 (preferred as I mainly work remotely)

I will be offline Friday November 27th, ARI will be open limited hours.

As many of our staff are working remotely we have changed sample receiving hours to 8 to 5 until further notice, sorry about the inconvenience .

<https://www.arilabs.com>

Version changes coming this year to SW-846 8260 and 8270 organic and 6010 and 6020 metals analysis methods.

"Humor is the universal solvent against the abrasive elements of life." - Alan Simpson

Reply | Reply all | Forward

20K0372

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: 20K0372		Turn-around Requested: NORMAL		Page: 1 of								
ARI Client Company: DOF		Phone: 206 660 3466		Date:	Ice Present? Yes							
Client Contact: EZRA BEAVER / DAVE COOPER / ROB WEBB				No. of Coolers: 3	Cooler Temps: See CRF							
Client Project Name: COA OUTFALL												
Client Project #: COA-001		Samplers: D COOPER / A. CERRUTI										
Sample ID	Date	Time	Matrix	No. Containers	SMS TABLE 3	SMS TABLE 4	DIOXINS/ FURANS TABLE 5	ARCHIVE	Analysis Requested			Notes/Comments
COA-SS-1-1-3-20201116	11/16/20	1325	SOIL	7	X	X	X					
COA-SS-1-3-5-20201116	11/16/20	1335	SOIL	7	X	X	X					
COA-SS-1-6.5-8.5-20201116	11/16/20	1450	SOIL	7	X	X	X	X				
COA-SS-2-1.5-3.5-20201118	11/18/20	0915	SOIL	7	X	X	X					
COA-SS-2-3.5-5.5-20201118	11/18/20	0925	SOIL	7	X	X	X					
COA-SS-2-5.5-7.5-20201118	11/18/20	1030	SOIL	7	X	X	X	X				
COA-SS-2-7.5-9.5-20201118	11/18/20	1045	SOIL	7	X	X	X	X				
COA-SS-3-1-3-20201118	11/18/20	1420	SOIL	5	X	X	X					
COA-SS-3-3-5-20201118	11/18/20	1430	SOIL	7	X	X	X					
COA-SS-3-5-7-20201118	11/18/20	1440	SOIL	7	X	X	X					
Comments/Special Instructions: • REFER TO DOF SAP FOR ANALYTICAL TABLES. • CONTACT EZRA BEAVER WITH QUESTIONS.		Relinquished by: (Signature)  Printed Name: ANTHONY CERRUTI Company: DOF Date & Time: 11/19/2020 1548		Received by: (Signature)  Printed Name: Jacob Walter Company: ARI Date & Time: 11/19/2020 1548		Relinquished by: (Signature) Printed Name: Company: Date & Time:		Received by: (Signature) Printed Name: Company: Date & Time:				



Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)
www.arilabs.com

Limits of Liability: ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, notwithstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: 2006364		Turn-around Requested: NORMAL		Page: 2 of		 Analytical Resources, Incorporated Analytical Chemists and Consultants 4611 South 134th Place, Suite 100 Tukwila, WA 98168 206-695-6200 206-695-6201 (fax) www.arilabs.com																	
ARI Client Company: DOF		Phone: 206 660 3466		Date:				Ice Present? Yes															
Client Contact: EZRA BEAVER / DAVE COOPER / ROB WEBB				No. of Coolers: 3				Cooler Temps: see CDF															
Client Project Name: COA OUTFALL				Analysis Requested																			
Client Project #: COA-001		Samplers: DCOOPER / A CERRUTI		Analysis Requested				Notes/Comments															
Sample ID		Date	Time	Matrix	No. Containers	SMS TABLE 3	SMS TABLE 4	DIOXINS/ FURANS TABLE 5	ARCHIVE														
COA_SS-3_7-9_20201118		11/18/2020	1450	SOIL	7	X	X	X	X AC.														
Comments/Special Instructions		Relinquished by: (Signature) 		Received by: (Signature) 		Relinquished by: (Signature)		Received by: (Signature)															
		Printed Name: ANTHONY CERRUTI		Printed Name: Jacob Walker		Printed Name:		Printed Name:															
		Company: DOF		Company: ARZ		Company:		Company:															
		Date & Time: 11/19/2020 1548		Date & Time: 11/19/2020 1548		Date & Time:		Date & Time:															

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Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
25-Mar-2021 18:57

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
COA_SS-1_6.5-8.5_20201116	20K0372-01	Solid	16-Nov-2020 14:50	24-Nov-2020 09:44
COA_SS-2_5.5-7.5_20201118	20K0372-02	Solid	18-Nov-2020 10:30	24-Nov-2020 09:44
COA_SS-2_7.5-9.5_20201118	20K0372-03	Solid	18-Nov-2020 10:45	24-Nov-2020 09:44



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1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
25-Mar-2021 18:57

Work Order Case Narrative

Sample receipt

Samples as listed on the preceding page were received 19-Nov-2020 under ARI work order 20K0372. For details regarding sample receipt, please refer to the Cooler Receipt Form.

Semivolatiles - EPA Method SW8270E

The samples were extracted and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements, with the exception of all associated "Q" flagged analytes which are out of control low in the CCAL and d5-phenol is out of control high. All associated samples that contain analyte have been flagged with a "Q" qualifier.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank was clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

The SRM recoveries were within limits and analyzed 17 minutes outside of the twelve hour QC window.

Butyl Tin(s) - EPA Method SW8270E-SIM

The sample(s) were extracted and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

The SRM recoveries were within limits with the exception of analytes flagged on the associated form.

Pesticides - EPA Method SW8081B

The sample(s) were extracted and analyzed within the recommended holding times.



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Project Number: COA-001
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Reported:
25-Mar-2021 18:57

Initial and continuing calibrations were within method requirements with the exception of CCV6 for 2,4 DDT, DDT failed on CLP2 okay on CLP1, CCVD for DCBP which failed on CLP2 okay on CLP1 and CCVA for CCVE: 2,4DDT failed on CLP2 okay on CLP1.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

The SRM recoveries were within limits.

Semivolatiles - EPA Method SW8270E-SIM

The samples were extracted and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements, with the exception of all associated "Q" flagged analytes which are out of control low in the CCAL. All associated samples that contain analyte have been flagged with a "Q" qualifier.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blanks were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

The SRM recoveries were within limits.

PCB Aroclors - EPA Method SW8082A

The samples were extracted and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank was clean at the reporting limits.



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Project: COA Outfall
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Reported:
25-Mar-2021 18:57

The blank spike (BS/LCS) percent recoveries were within control limits.

The SRM recoveries were within limits.

Dioxin/Furans - EPA Method 1613

The samples were extracted and analyzed within the recommended holding times. Analysis was performed using an application specific column developed by Restek. The RTX-Dioxin2 column has unique isomer separation for the 2378-TCDF, eliminating the need for confirmation analysis.

The samples were re-extracted due to a missing SRM requirement. Both sets of data have been provided for your review.

Initial and continuing calibrations were within method requirements.

Labeled internal standard areas were within limits.

The cleanup surrogate percent recoveries were within control limits.

The method blank contains a reportable response for OCDD, HxCDD and OCDF below the reporting limit. Associated detected results and QC have been flagged with "B" qualifiers. No further corrective action was taken.

The OPR (Ongoing Precision and Recovery) standard percent recoveries were within control limits.

The SRM recoveries were within limits.

Total Metals - EPA Method 6020B and 7471

The samples were digested and analyzed within the recommended holding times with the exception of mercury which has been flagged with a "H" qualifier. The samples were originally analyzed in hold without an SRM and re-digested and analyzed with an SRM outside of holding.

Initial and continuing calibrations were within method requirements.

The method blanks were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

The reference material (SRM) percent recoveries were within control limits.

Wet Chemistry

The samples were prepared and analyzed within the recommended holding times with the exception of analytes flagged with a "H" qualifier.



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Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
25-Mar-2021 18:57

Initial and continuing calibrations were within method requirements.

The method blanks were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

The reference material (SRM) percent recoveries were within control limits.

Grainsize

The samples were submitted to Materials Testing & Consulting, Inc. (MTC) for grainsize analysis. The MTC report is included here in its entirety.

Materials Testing & Consulting, Inc.

Geotechnical Engineering • Special Inspection • Materials Testing • Environmental Consulting



Project: COA Outfall (20K0372)
Project #: 20S038-25
Client : Analytical Resources, Inc.
Source: Multiple
MTC Sample#: Multiple

Date Received: November 24, 2020
Sampled By: Others
Date Reported: January 19, 2021
Tested By: B. Goble

CASE NARRATIVE

1. Three samples were submitted for grain size analysis according to Puget Sound Estuary Protocol (PSEP) methodology.
2. The samples were run in a single batch and one sample from another job was chosen for triplicate analysis. The triplicate data is reported on the QA summary.
3. The data is provided in summary tables and plots.
4. There were no noted anomalies during this testing.

All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.

Reviewed by: _____

Materials Testing & Consulting, Inc.

Geotechnical Engineering • Special Inspection • Materials Testing • Environmental Consulting



Project: COA Outfall (20K0372)
Project #: 20S038-25
Date Received: November 24, 2020
Date Tested: January 11, 2021

Client: Analytical Resources, Inc.
Sampled by: Others
Tested by: B. Goble

Apparent Grain Size Distribution Summary Percent Finer Than Indicated Size

Sample No.	Gravel			Very Coarse Sand	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Silt				Clay	
Phi Size	-3	-2	-1	0	1	2	3	4	5	6	7	8	9	10
Sieve Size (microns)	3/8"	#4 (4750)	#10 (2000)	#18 (1000)	#35 (500)	#60 (250)	#120 (125)	#230 (63)	31.0	15.6	7.8	3.9	2.0	1.0
COA_05_G_20201119	100.0	100.0	99.0	97.3	95.6	92.6	71.9	46.0	33.0	22.2	17.1	14.1	9.8	4.0
	100.0	100.0	95.1	94.4	92.8	87.8	68.0	44.3	33.6	21.2	16.4	13.5	8.4	3.2
	100.0	100.0	99.8	99.3	96.7	93.0	70.8	42.7	31.2	22.1	17.2	13.9	8.8	2.8
COA SS-1 6.5-8.5 20201116	100.0	80.4	71.0	66.4	60.3	51.9	43.5	36.6	29.9	23.3	16.6	11.2	8.5	5.1
COA SS-2 5.5-7.5 20201118	100.0	99.1	98.0	96.6	94.7	91.9	85.9	81.3	76.1	61.6	48.3	36.1	24.4	14.1
COA SS-2 7.5-9.5 20201118	100.0	98.4	93.7	91.1	88.0	82.7	76.1	69.4	61.0	46.1	35.4	25.6	17.6	11.2

All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.

Reviewed by: 

Corporate ~ 777 Chrysler Drive • Burlington, WA 98233 • Phone (360) 755-1990 • Fax (360) 755-1980
Regional Offices: Olympia ~ 360.534.9777 Bellingham ~ 360.647.6061 Silverdale ~ 360.698.6787 Tukwila ~ 206.241.1974
 Visit our website: www.mtc-inc.net

Materials Testing & Consulting, Inc.

Geotechnical Engineering • Special Inspection • Materials Testing • Environmental Consulting



Project: COA Outfall (20K0372)
Project #: 20S038-25
Date Received: November 24, 2020
Date Tested: January 11, 2021

Client: Analytical Resources, Inc.
Sampled by: Others
Tested by: B. Goble

Apparent Grain Size Distribution Summary

Percent Retained in Each Size Fraction

Sample No.	Gravel	Very Coarse Sand	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Coarse Silt	Medium Silt	Fine Silt	Very Fine Silt	Clay			Total Fines
Phi Size	< -1	-1 to 0	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	> 10	> 4
Sieve Size (microns)	> #10 (2000)	10-18 (2000-1000)	18-35 (1000-500)	35-60 (500-250)	60-120 (250-125)	120-230 (125-62)	62.5-31.0	31.0-15.6	15.6-7.8	7.8-3.9	3.9-2.0	2.0-1.0	<1.0	<230 (<62)
COA_05_G_20201119	1.0	1.7	1.8	3.0	20.7	25.9	13.0	10.8	5.1	3.1	4.3	5.7	4.0	46.0
	4.9	0.7	1.6	5.0	19.8	23.8	10.7	12.4	4.8	3.0	5.0	5.3	3.2	44.3
	0.2	0.5	2.5	3.7	22.2	28.0	11.6	9.0	5.0	3.2	5.1	6.0	2.8	42.7
COA SS-1 6.5-8.5 20201116	29.0	4.6	6.1	8.5	8.3	7.0	6.7	6.6	6.7	5.3	2.8	3.4	5.1	36.6
COA SS-2 5.5-7.5 20201118	2.0	1.4	2.0	2.7	6.0	4.5	5.3	14.5	13.3	12.2	11.7	10.3	14.1	81.3
COA SS-2 7.5-9.5 20201118	6.3	2.6	3.2	5.3	6.6	6.7	8.4	14.9	10.7	9.8	8.0	6.4	11.2	69.4

All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.

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Materials Testing & Consulting, Inc.

Geotechnical Engineering • Special Inspection • Materials Testing • Environmental Consulting



Project: COA Outfall (20K0372)
Project #: 20S038-25
Date Received: November 24, 2020
Date Tested: January 11, 2021

Client: Analytical Resources, Inc.
Sampled by: Others
Tested by: B. Goble

Relative Standard Deviation, By Phi Size

Sample ID	-3	-2	-1	0	1	2	3	4	5	6	7	8	9	10
COA_05_G_20201119	100.0	100.0	99.0	97.3	95.6	92.6	71.9	46.0	33.0	22.2	17.1	14.1	9.8	4.0
	100.0	100.0	95.1	94.4	92.8	87.8	68.0	44.3	33.6	21.2	16.4	13.5	8.4	3.2
	100.0	100.0	99.8	99.3	96.7	93.0	70.8	42.7	31.2	22.1	17.2	13.9	8.8	2.8
AVE	100.0	100.0	98.0	97.0	95.0	91.1	70.2	44.3	32.6	21.9	16.9	13.8	9.0	3.3
STDEV	0.0	0.0	2.1	2.0	1.6	2.3	1.6	1.3	1.0	0.4	0.3	0.3	0.6	0.5
%RSD	0.0	0.0	2.1	2.0	1.7	2.6	2.3	3.0	3.2	2.0	2.0	2.0	6.2	16.0

The Triplicate Applies To The Following Samples

Client ID	Date Sampled	Date Extracted	Date Complete	QA Ratio (95-105)	Data Qualifiers	Pipette Portion (5.0-25.0g)
COA_05_G_20201119	11/19/2020	1/4/2021	1/11/2021	100.9		9.0
	11/19/2020	1/4/2021	1/11/2021	103.7		10.6
	11/19/2020	1/4/2021	1/11/2021	100.1		7.5
COA SS-1 6.5-8.5 20201116	11/16/2020	1/4/2021	1/11/2021	100.5		15.3
COA SS-2 5.5-7.5 20201118	11/16/2020	1/4/2021	1/11/2021	100.1		24.7
COA SS-2 7.5-9.5 20201118	11/16/2020	1/4/2021	1/11/2021	102.6		18.4

All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.

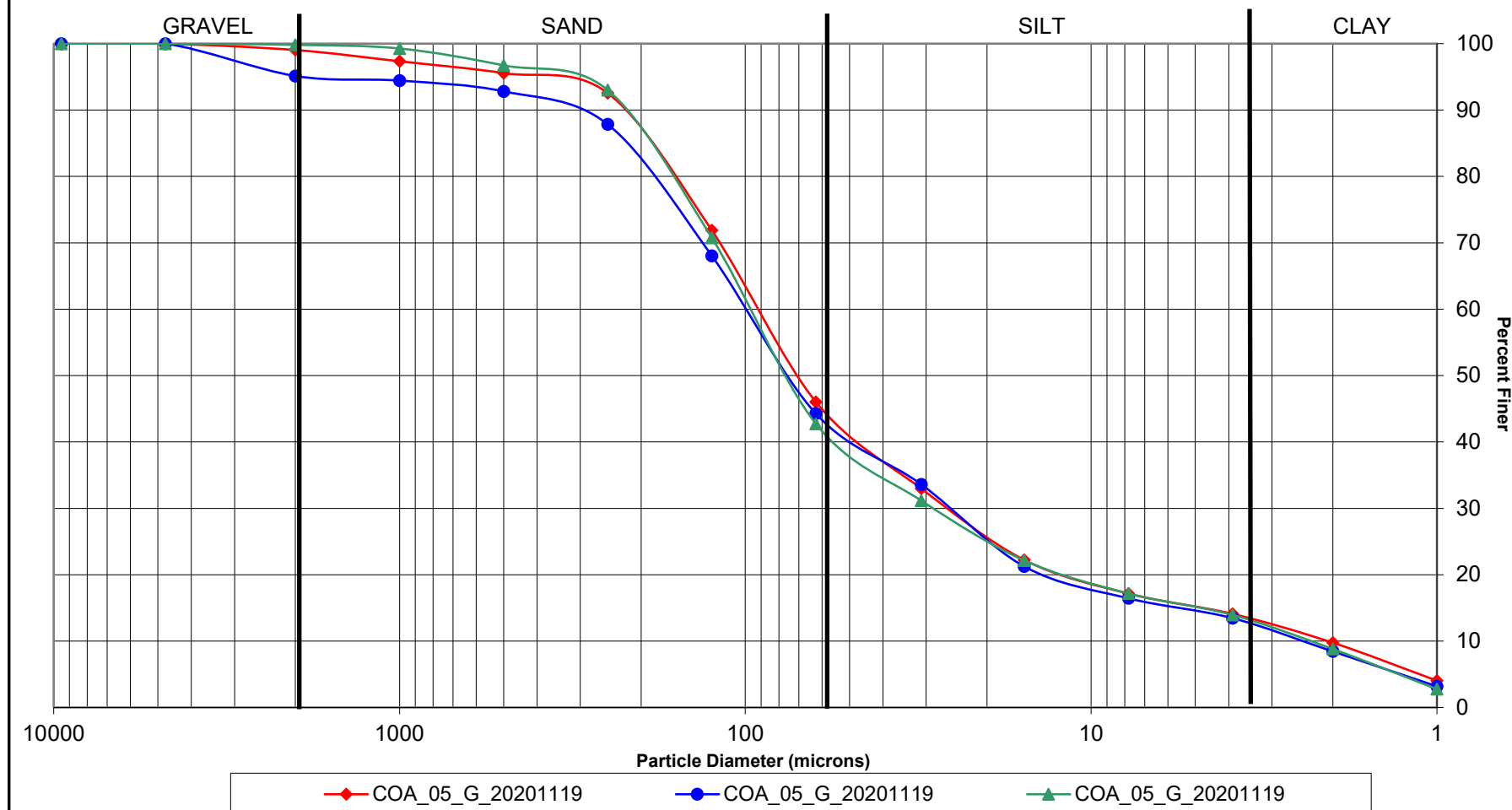
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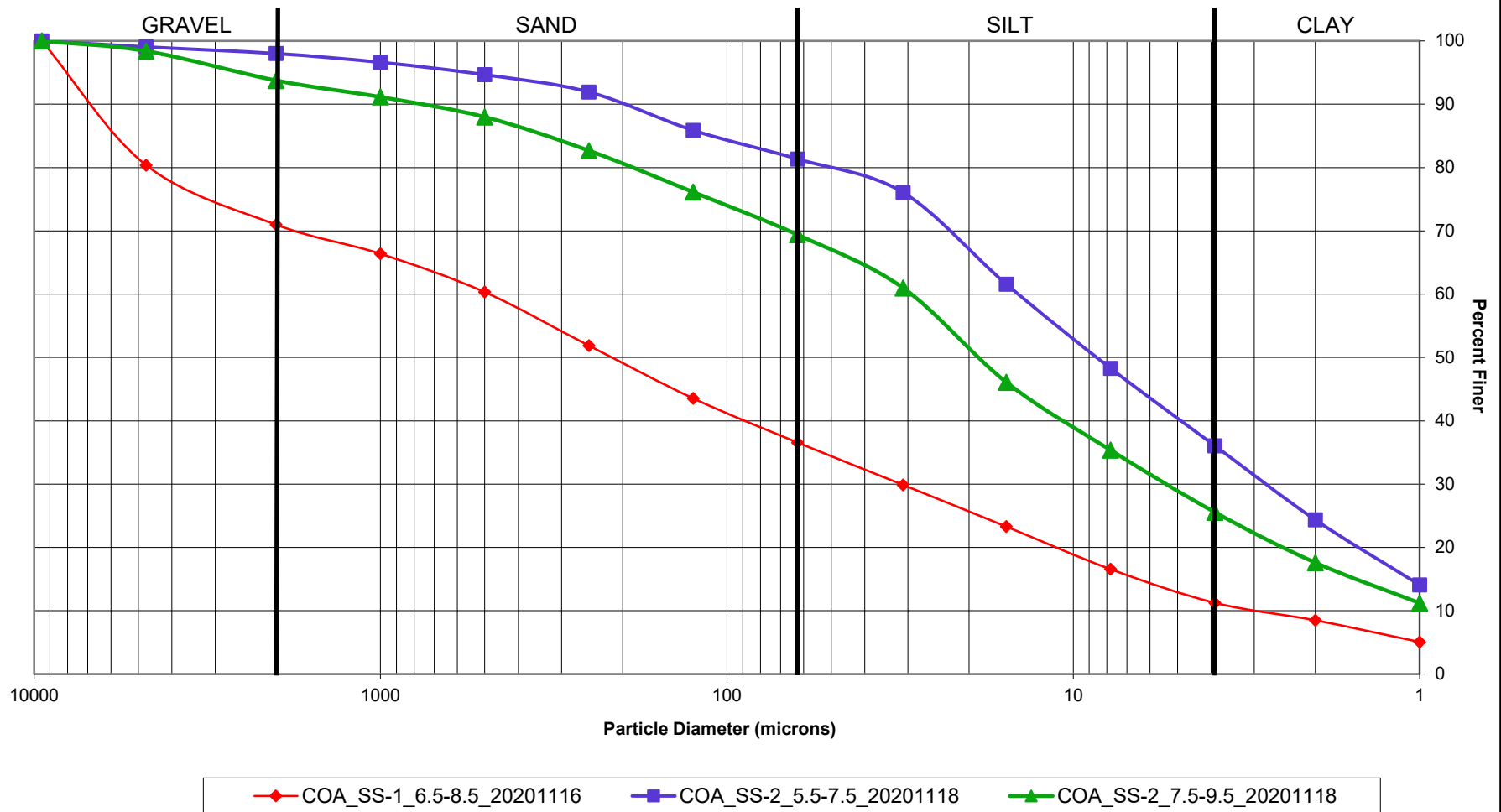


PSEP Grain Size Distribution

Triplicate Sample Plot



PSEP Grain Size Distribution





Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
25-Mar-2021 18:57

COA_SS-1_6.5-8.5_20201116
20K0372-01 (Solid)

Semivolatile Organic Compounds

Method: EPA 8270E		Sampled: 11/16/2020 14:50	
Instrument: NT10 Analyst: VTS		Analyzed: 12/22/2020 22:31	
Sample Preparation:	Preparation Method: EPA 3546 (Microwave)	Extract ID: 20K0372-01 D 03	
	Preparation Batch: BIK0843	Dry Weight: 10.05 g	
	Prepared: 11/30/2020	% Solids: 87.91	
Sample Cleanup:	Cleanup Method: GPC	Extract ID: 20K0372-01 D 03	
	Cleanup Batch: CIL0220	Initial Volume: 1 uL	
	Cleaned: 16-Dec-2020	Final Volume: 1 uL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Phenol	108-95-2	1	8.2	19.9	8.9	ug/kg	J
Benzyl Alcohol	100-51-6	1	14.8	19.9	ND	ug/kg	U
2-Methylphenol	95-48-7	1	7.8	19.9	ND	ug/kg	U
Hexachloroethane	67-72-1	1	5.6	19.9	ND	ug/kg	U
4-Methylphenol	106-44-5	1	14.6	19.9	ND	ug/kg	U
Naphthalene	91-20-3	1	5.2	19.9	ND	ug/kg	U
Benzoic acid	65-85-0	1	58.8	199	ND	ug/kg	U
2-Methylnaphthalene	91-57-6	1	5.6	19.9	ND	ug/kg	U
Acenaphthylene	208-96-8	1	4.7	19.9	ND	ug/kg	U
Dimethylphthalate	131-11-3	1	6.4	19.9	ND	ug/kg	U
Acenaphthene	83-32-9	1	5.1	19.9	ND	ug/kg	U
Dibenzofuran	132-64-9	1	4.6	19.9	ND	ug/kg	U
Fluorene	86-73-7	1	4.9	19.9	ND	ug/kg	U
Diethyl phthalate	84-66-2	1	17.6	19.9	ND	ug/kg	U
N-Nitrosodiphenylamine	86-30-6	1	9.5	19.9	ND	ug/kg	U
Hexachlorobenzene	118-74-1	1	4.7	19.9	ND	ug/kg	U
Pentachlorophenol	87-86-5	1	31.2	99.5	ND	ug/kg	U
Phenanthrene	85-01-8	1	4.7	19.9	6.0	ug/kg	J
Anthracene	120-12-7	1	5.9	19.9	ND	ug/kg	U
Di-n-Butylphthalate	84-74-2	1	5.3	19.9	ND	ug/kg	U
Fluoranthene	206-44-0	1	4.5	19.9	ND	ug/kg	U
Pyrene	129-00-0	1	5.5	19.9	ND	ug/kg	U
Butylbenzylphthalate	85-68-7	1	8.0	19.9	ND	ug/kg	U
Benzo(a)anthracene	56-55-3	1	5.2	19.9	ND	ug/kg	U
Chrysene	218-01-9	1	5.2	19.9	ND	ug/kg	U
bis(2-Ethylhexyl)phthalate	117-81-7	1	28.7	49.8	ND	ug/kg	U
Di-n-Octylphthalate	117-84-0	1	8.7	19.9	ND	ug/kg	U
Benzo(a)fluoranthene, Total		1	10.2	39.8	ND	ug/kg	U
Benzo(a)pyrene	50-32-8	1	6.4	19.9	ND	ug/kg	U
Indeno(1,2,3-cd)pyrene	193-39-5	1	6.0	19.9	ND	ug/kg	U
Dibenzo(a,h)anthracene	53-70-3	1	6.1	19.9	ND	ug/kg	U
Benzo(g,h,i)perylene	191-24-2	1	5.8	19.9	9.3	ug/kg	J



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
25-Mar-2021 18:57

COA_SS-1_6.5-8.5_20201116
20K0372-01 (Solid)

Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 11/16/2020 14:50

Instrument: NT10 Analyst: VTS

Analyzed: 12/22/2020 22:31

Analyte	CAS Number	Recovery	Recovery	Units	Notes
		Limits			
Surrogate: 2-Fluorophenol		27-120 %	54.5	%	
Surrogate: Phenol-d5		29-120 %	65.5	%	Q
Surrogate: 2-Chlorophenol-d4		31-120 %	61.7	%	
Surrogate: 1,2-Dichlorobenzene-d4		32-120 %	64.2	%	
Surrogate: Nitrobenzene-d5		30-120 %	86.2	%	
Surrogate: 2-Fluorobiphenyl		35-120 %	77.4	%	
Surrogate: 2,4,6-Tribromophenol		24-134 %	31.7	%	
Surrogate: p-Terphenyl-d14		37-120 %	85.8	%	



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Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
25-Mar-2021 18:57

COA_SS-1_6.5-8.5_20201116
20K0372-01 (Solid)

Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM		Sampled: 11/16/2020 14:50
Instrument: NT10 Analyst: VTS		Analyzed: 12/22/2020 22:31
Sample Preparation:	Preparation Method: EPA 3546 (Microwave) Preparation Batch: BIK0843 Prepared: 11/30/2020	Extract ID: 20K0372-01 D 03 Dry Weight: 10.05 g % Solids: 87.91
Sample Cleanup:	Cleanup Method: GPC Cleanup Batch: CIL0220 Cleaned: 16-Dec-2020	Initial Volume: 1 uL Final Volume: 1 uL Extract ID: 20K0372-01 D 03

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
1,4-Dichlorobenzene	106-46-7	1	0.6	5.0	ND	ug/kg	U
1,2-Dichlorobenzene	95-50-1	1	0.7	5.0	ND	ug/kg	U
2,4-Dimethylphenol	105-67-9	1	2.2	19.9	ND	ug/kg	U
1,2,4-Trichlorobenzene	120-82-1	1	2.7	5.0	ND	ug/kg	U
Hexachlorobutadiene	87-68-3	1	0.7	5.0	ND	ug/kg	U
Surrogate: 2-Fluorophenol				27-120 %	56.8	%	
Surrogate: p-Terphenyl-d14				37-120 %	76.7	%	



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Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
25-Mar-2021 18:57

COA_SS-1_6.5-8.5_20201116
20K0372-01 (Solid)

Butyl Tins

Method: EPA 8270E-SIM			Sampled: 11/16/2020 14:50
Instrument: NT8 Analyst: JZ			Analyzed: 12/17/2020 17:08
Sample Preparation:	Preparation Method: EPA 3546 (Microwave)		Extract ID: 20K0372-01 D 04 Dry Weight: 5.06 g % Solids: 87.91
	Preparation Batch: BIK0863	Sample Size: 5.76 g (wet)	
	Prepared: 11/30/2020	Final Volume: 0.5 mL	
Sample Cleanup:	Cleanup Method: Silica Gel		Extract ID: 20K0372-01 D 04
	Cleanup Batch: CIL0161	Initial Volume: 0.5 mL	
	Cleaned: 16-Dec-2020	Final Volume: 0.5 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Tributyltin Ion	36643-28-4	1	0.444	3.81	ND	ug/kg	U
Dibutyltin Ion	14488-53-0	1	1.71	5.71	ND	ug/kg	U
Butyltin Ion	78763-54-9	1	1.87	4.03	ND	ug/kg	U
Tetrabutyltin	1461-25-2	1	4.94	4.94	ND	ug/kg	U
Surrogate: Tripentyltin				30-160 %	101	%	
Surrogate: Tripropyltin				30-160 %	65.4	%	



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COA_SS-1_6.5-8.5_20201116
20K0372-01 (Solid)

Chlorinated Pesticides

Method: EPA 8081B		Sampled: 11/16/2020 14:50	
Instrument: ECD6 Analyst: YZ/VTS		Analyzed: 03/15/2021 20:25	
Sample Preparation:	Preparation Method: EPA 3546 (Microwave)	Extract ID: 20K0372-01 B 01	
	Preparation Batch: BJB0764	Dry Weight: 12.51 g	
	Prepared: 02/26/2021	% Solids: 87.91	
Sample Cleanup:	Cleanup Method: Silica Gel	Extract ID: 20K0372-01 B 01	
	Cleanup Batch: CJC0097	Initial Volume: 2.5 mL	
	Cleaned: 09-Mar-2021	Final Volume: 2.5 mL	
Sample Cleanup:	Cleanup Method: Sulfur	Extract ID: 20K0372-01 B 01	
	Cleanup Batch: CJC0096	Initial Volume: 2.5 mL	
	Cleaned: 09-Mar-2021	Final Volume: 2.5 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Heptachlor	76-44-8	1	0.05	0.50	ND	ug/kg	U
Aldrin	309-00-2	1	0.37	0.50	ND	ug/kg	U
trans-Chlordane (beta-Chlordane)	5103-74-2	1	0.33	0.50	ND	ug/kg	U
cis-Chlordane (alpha-chlordane)	5103-71-9	1	0.11	0.50	ND	ug/kg	U
4,4'-DDE	72-55-9	1	0.13	1.00	ND	ug/kg	U
Dieldrin	60-57-1	1	0.11	1.00	ND	ug/kg	U
4,4'-DDD	72-54-8	1	0.32	1.00	ND	ug/kg	U
4,4'-DDT	50-29-3	1	0.32	1.00	ND	ug/kg	U
Oxychlordane	27304-13-8	1	0.13	1.00	ND	ug/kg	U
cis-Nonachlor	5103-73-1	1	0.21	1.00	ND	ug/kg	U
trans-Nonachlor	39765-80-5	1	0.23	1.00	ND	ug/kg	U
Surrogate: Decachlorobiphenyl				30-160 %	85.2	%	
Surrogate: Decachlorobiphenyl [2C]				30-160 %	76.0	%	
Surrogate: Tetrachlorometaxylene				30-160 %	73.0	%	
Surrogate: Tetrachlorometaxylene [2C]				30-160 %	73.6	%	



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Reported:
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COA_SS-1_6.5-8.5_20201116
20K0372-01 (Solid)

Aroclor PCB

Method: EPA 8082A		Sampled: 11/16/2020 14:50	
Instrument: ECD7 Analyst: JGR		Analyzed: 12/19/2020 19:59	
Sample Preparation:	Preparation Method: EPA 3546 (Microwave)	Extract ID: 20K0372-01 D 01	
	Preparation Batch: BIK0842	Dry Weight: 12.50 g	
	Prepared: 11/28/2020	% Solids: 87.91	
Sample Cleanup:	Cleanup Method: Silica Gel	Extract ID: 20K0372-01 D 01	
	Cleanup Batch: CIL0203	Initial Volume: 2.5 mL	
	Cleaned: 19-Dec-2020	Final Volume: 2.5 mL	
Sample Cleanup:	Cleanup Method: Sulfuric Acid	Extract ID: 20K0372-01 D 01	
	Cleanup Batch: CIL0201	Initial Volume: 2.5 mL	
	Cleaned: 19-Dec-2020	Final Volume: 2.5 mL	
Sample Cleanup:	Cleanup Method: Sulfur	Extract ID: 20K0372-01 D 01	
	Cleanup Batch: CIL0202	Initial Volume: 2.5 mL	
	Cleaned: 19-Dec-2020	Final Volume: 2.5 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Aroclor 1016	12674-11-2	1	1.6	4.0	ND	ug/kg	U
Aroclor 1221	11104-28-2	1	1.6	4.0	ND	ug/kg	U
Aroclor 1232	11141-16-5	1	1.6	4.0	ND	ug/kg	U
Aroclor 1242	53469-21-9	1	1.6	4.0	ND	ug/kg	U
Aroclor 1248	12672-29-6	1	1.6	4.0	ND	ug/kg	U
Aroclor 1254	11097-69-1	1	1.6	4.0	ND	ug/kg	U
Aroclor 1260	11096-82-5	1	0.6	4.0	ND	ug/kg	U
Aroclor 1262	37324-23-5	1	0.6	4.0	ND	ug/kg	U
Aroclor 1268	11100-14-4	1	0.6	4.0	ND	ug/kg	U
Surrogate: Decachlorobiphenyl				40-126 %	60.2	%	
Surrogate: Tetrachlorometaxylene				44-120 %	60.6	%	
Surrogate: Decachlorobiphenyl [2C]				40-126 %	70.0	%	
Surrogate: Tetrachlorometaxylene [2C]				44-120 %	63.1	%	



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COA_SS-1_6.5-8.5_20201116
20K0372-01 (Solid)

Dioxins/Furans

Method: EPA 1613B			Sampled: 11/16/2020 14:50		
Instrument: AUTOSPEC01 Analyst: pk			Analyzed: 12/08/2020 00:19		
Sample Preparation:	Preparation Method: EPA 1613			Extract ID: 20K0372-01 C 01	
	Preparation Batch: BIL0036	Sample Size: 11.39 g (wet)		Dry Weight: 10.03 g	
	Prepared: 12/03/2020	Final Volume: 20 uL		% Solids: 88.06	
Sample Cleanup:	Cleanup Method: Silica Gel			Extract ID: 20K0372-01 C 01	
	Cleanup Batch: CIL0058	Initial Volume: 20 mL			
	Cleaned: 05-Dec-2020	Final Volume: 20 mL			
Sample Cleanup:	Cleanup Method: Sulfuric Acid			Extract ID: 20K0372-01 C 01	
	Cleanup Batch: CIL0057	Initial Volume: 20 mL			
	Cleaned: 04-Dec-2020	Final Volume: 20 mL			
Sample Cleanup:	Cleanup Method: Florisil			Extract ID: 20K0372-01 C 01	
	Cleanup Batch: CIL0059	Initial Volume: 20 mL			
	Cleaned: 05-Dec-2020	Final Volume: 20 mL			

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting		Result	Units	Notes
				EDL	Limit			
2,3,7,8-TCDF			0.655-0.886	0.063	0.078	0.997	ND	ng/kg U
2,3,7,8-TCDD			0.655-0.886	0.140	0.068	0.997	ND	ng/kg U
1,2,3,7,8-PeCDF			1.318-1.783	0.150	0.103	0.997	ND	ng/kg U
2,3,4,7,8-PeCDF			1.318-1.783	0.150	0.096	0.997	ND	ng/kg U
1,2,3,7,8-PeCDD			1.318-1.783	0.179	0.095	0.997	ND	ng/kg U
1,2,3,4,7,8-HxCDF			1.054-1.426	0.140	0.058	0.997	ND	ng/kg U
1,2,3,6,7,8-HxCDF			1.054-1.426	0.179	0.057	0.997	ND	ng/kg U
2,3,4,6,7,8-HxCDF			1.054-1.426	0.110	0.056	0.997	ND	ng/kg U
1,2,3,7,8,9-HxCDF			1.054-1.426	0.209	0.078	0.997	ND	ng/kg U
1,2,3,4,7,8-HxCDD			1.054-1.426	0.179	0.098	0.997	ND	ng/kg U
1,2,3,6,7,8-HxCDD			1.054-1.426	0.150	0.095	0.997	ND	ng/kg U
1,2,3,7,8,9-HxCDD			1.054-1.426	0.219	0.110	0.997	ND	ng/kg U
1,2,3,4,6,7,8-HpCDF			0.893-1.208	0.209	0.057	0.997	ND	ng/kg U
1,2,3,4,7,8,9-HpCDF			0.893-1.208	0.160	0.073	0.997	ND	ng/kg U
1,2,3,4,6,7,8-HpCDD		0.979	0.893-1.208	0.558	0.142	2.49	0.750	ng/kg J
OCDF			0.757-1.024	1.10	0.147	2.49	ND	ng/kg U
OCDD		0.972	0.757-1.024	4.29	0.276	9.97	9.84	ng/kg J, B
Homologue groups								
Total TCDF						0.997	ND	ng/kg U
Total TCDD						0.997	ND	ng/kg U
Total PeCDF						0.997	ND	ng/kg U
Total PeCDD						0.997	ND	ng/kg U
Total HxCDF						0.997	ND	ng/kg U
Total HxCDD						0.997	0.145	ng/kg J
Total HpCDF						0.997	0.180	ng/kg J
Total HpCDD						0.997	0.750	ng/kg J, B



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Reported:
25-Mar-2021 18:57

COA_SS-1_6.5-8.5_20201116
20K0372-01 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/16/2020 14:50

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 12/08/2020 00:19

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting Limit	Result	Units	Notes
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC):				0.14			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC):				0.01			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, EMPC = ND):				0.14			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, EMPC = ND):				0.01			



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20K0372-01 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/16/2020 14:50

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 12/08/2020 00:19

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting Limit	Result	Units	Notes
Labeled compounds							
13C12-2,3,7,8-TCDF		0.788	0.655-0.886	24-169 %	72.9	%	
13C12-2,3,7,8-TCDD		0.807	0.655-0.886	25-164 %	75.3	%	
13C12-1,2,3,7,8-PeCDF		1.619	1.318-1.783	24-185 %	67.2	%	
13C12-2,3,4,7,8-PeCDF		1.518	1.318-1.783	21-178 %	68.8	%	
13C12-1,2,3,7,8-PeCDD		1.579	1.318-1.783	25-181 %	64.8	%	
13C12-1,2,3,4,7,8-HxCDF		0.499	0.434-0.587	26-152 %	82.4	%	
13C12-1,2,3,6,7,8-HxCDF		0.497	0.434-0.587	26-123 %	72.1	%	
13C12-2,3,4,6,7,8-HxCDF		0.488	0.434-0.587	28-136 %	75.4	%	
13C12-1,2,3,7,8,9-HxCDF		0.515	0.434-0.587	29-147 %	80.6	%	
13C12-1,2,3,4,7,8-HxCDD		1.287	1.054-1.426	32-141 %	81.9	%	
13C12-1,2,3,6,7,8-HxCDD		1.244	1.054-1.426	28-130 %	71.8	%	
13C12-1,2,3,4,6,7,8-HpCDF		0.429	0.374-0.506	28-143 %	62.4	%	
13C12-1,2,3,4,7,8,9-HpCDF		0.377	0.374-0.506	26-138 %	68.9	%	
13C12-1,2,3,4,6,7,8-HpCDD		1.108	0.893-1.208	23-140 %	65.2	%	
13C12-OCDD		0.840	0.757-1.024	17-157 %	52.0	%	
37Cl4-2,3,7,8-TCDD				35-197 %	83.5	%	



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COA_SS-1_6.5-8.5_20201116
20K0372-01 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/16/2020 14:50

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 12/08/2020 00:19

Analyte	DF/Split	Ion Ratio	Ratio Limits	EDL	Reporting	Result	Units	Notes
					Limit			



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COA_SS-1_6.5-8.5_20201116
20K0372-01 (Solid)

Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 11/16/2020 14:50

Instrument: ICPMS1 Analyst: MCB

Analyzed: 03/23/2021 21:52

Sample Preparation:

Preparation Method: SWN EPA 3050B

Extract ID: 20K0372-01 F 01

Preparation Batch: BJC0564

Sample Size: 1.078 g (wet)

Dry Weight: 0.94 g

Prepared: 03/22/2021

Final Volume: 50 mL

% Solids: 87.04

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Antimony	7440-36-0	20	0.02	0.21	ND	mg/kg	U
Chromium	7440-47-3	20	0.07	0.53	99.7	mg/kg	
Lead	7439-92-1	20	0.07	0.11	3.02	mg/kg	
Silver	7440-22-4	20	0.02	0.21	0.06	mg/kg	J



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COA_SS-1_6.5-8.5_20201116
20K0372-01 (Solid)

Metals and Metallic Compounds

Method: EPA 6020B UCT-KED

Sampled: 11/16/2020 14:50

Instrument: ICPMS1 Analyst: MCB

Analyzed: 03/23/2021 21:52

Sample Preparation:

Preparation Method: SWN EPA 3050B

Extract ID: 20K0372-01 F 01

Preparation Batch: BJC0564

Sample Size: 1.078 g (wet)

Dry Weight: 0.94 g

Prepared: 03/22/2021

Final Volume: 50 mL

% Solids: 87.04

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	20	0.02	0.21	5.11	mg/kg	
Cadmium	7440-43-9	20	0.03	0.11	0.12	mg/kg	
Copper	7440-50-8	20	0.36	0.53	23.9	mg/kg	
Selenium	7782-49-2	20	0.47	0.53	0.53	mg/kg	J
Zinc	7440-66-6	20	0.9	4.3	47.4	mg/kg	



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COA_SS-1_6.5-8.5_20201116
20K0372-01 (Solid)

Metals and Metallic Compounds

Method: EPA 7471B

Sampled: 11/16/2020 14:50

Instrument: HYDRA Analyst: BLC

Analyzed: 03/23/2021 12:33

Sample Preparation:

Preparation Method: SMM EPA 7471B

Extract ID: 20K0372-01 F

Preparation Batch: BJC0610

Sample Size: 0.242 g (wet)

Dry Weight: 0.21 g

Prepared: 03/23/2021

Final Volume: 50 mL

% Solids: 87.04

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.00498	0.0237	0.0321	mg/kg	H



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Reported:
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COA_SS-1_6.5-8.5_20201116
20K0372-01 (Solid)

Wet Chemistry

Method: EPA 9060A m

Sampled: 11/16/2020 14:50

Instrument: TOC Cube Analyst: BF

Analyzed: 11/26/2020 03:50

Sample Preparation:

Preparation Method: PSEP 1986 (modified)

Extract ID: 20K0372-01 F

Preparation Batch: BIK0802

Sample Size: 0.5283 g (wet)

Dry Weight: 0.46 g

Prepared: 11/25/2020

Final Volume: 0.5283 mL

% Solids: 87.04

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Organic Carbon		1	0.02	0.02	0.11	%	



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COA_SS-1_6.5-8.5_20201116
20K0372-01 (Solid)

Wet Chemistry

Method: PSEP 1986

Sampled: 11/16/2020 14:50

Instrument: BAL2 Analyst: UW

Analyzed: 11/24/2020 17:15

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 20K0372-01
Preparation Batch: BIK0773 Sample Size: 10 g (wet) Dry Weight: 8.70 g
Prepared: 11/24/2020 Final Volume: 10 g % Solids: 87.04

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Volatile Solids		1	0.01	0.01	1.35	%	

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 20K0372-01
Preparation Batch: BIK0778 Sample Size: 5 g (wet) Dry Weight: 4.35 g
Prepared: 11/24/2020 Final Volume: 5 g % Solids: 87.04

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Solids, Sulfide		1	0.04	0.04	77.57	%	



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COA_SS-1_6.5-8.5_20201116
20K0372-01 (Solid)

Wet Chemistry

Method: SM 2540 G-97

Sampled: 11/16/2020 14:50

Instrument: BAL2 Analyst: UW

Analyzed: 11/24/2020 17:15

Sample Preparation:

Preparation Method: No Prep Wet Chem

Extract ID: 20K0372-01

Preparation Batch: BIK0773

Sample Size: 10 g (wet)

Dry Weight: 8.70 g

Prepared: 11/24/2020

Final Volume: 10 g

% Solids: 87.04

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Solids		1	0.04	0.04	87.04	%	



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COA_SS-1_6.5-8.5_20201116
20K0372-01 (Solid)

Wet Chemistry

Method: SM 4500-NH3 H-97

Sampled: 11/16/2020 14:50

Instrument: LACHAT2 Analyst: LRB

Analyzed: 11/30/2020 14:58

Sample Preparation:

Preparation Method: MSA 33.3 (2M KCl)

Extract ID: 20K0372-01 F

Preparation Batch: BIK0769

Sample Size: 4.28 g (wet)

Dry Weight: 3.73 g

Prepared: 11/24/2020

Final Volume: 40 mL

% Solids: 87.04

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Ammonia-N	7664-41-7	1	0.43	0.43	2.46	mg/kg NH3-N	H



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COA_SS-1_6.5-8.5_20201116
20K0372-01 (Solid)

Wet Chemistry

Method: SM 4500-S2 D-00 (PSEP)

Sampled: 11/16/2020 14:50

Instrument: UV1800-1 Analyst: CDE

Analyzed: 12/03/2020 17:05

Sample Preparation:

Preparation Method: PSEP 1986

Extract ID: 20K0372-01 G

Preparation Batch: BIK0762

Sample Size: 5.162 g (wet)

Dry Weight: 4.00 g

Prepared: 11/24/2020

Final Volume: 100 mL

% Solids: 77.57

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Sulfide	18496-25-8	1	1.25	1.25	1.40	mg/kg	H



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
25-Mar-2021 18:57

COA_SS-1_6.5-8.5_20201116
20K0372-01 (Solid)

Extractions

Method: ASTM D2216	Sampled: 11/16/2020 14:50	
Instrument: N/A Analyst: NL	Analyzed: 11/26/2020 05:10	
Sample Preparation:	Preparation Method: No Prep-Organics	Extract ID: 20K0372-01
	Preparation Batch: BIK0790	Dry Weight: 0.87 g
	Prepared: 11/25/2020	% Solids: 87.04
	Sample Size: 1 g (wet)	
	Final Volume: 1 g	

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Total Solids		1	0.01	88.06	%	
Labeled compounds						



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Reported:
25-Mar-2021 18:57

COA_SS-1_6.5-8.5_20201116
20K0372-01RE1 (Solid)

Dioxins/Furans

Method: EPA 1613B		Sampled: 11/16/2020 14:50	
Instrument: AUTOSPEC01 Analyst: pk		Analyzed: 03/03/2021 00:22	
Sample Preparation:	Preparation Method: EPA 1613	Extract ID: 20K0372-01RE1 C 02	
	Preparation Batch: BJB0531	Dry Weight: 10.06 g	
	Prepared: 02/23/2021	% Solids: 88.06	
Sample Cleanup:	Cleanup Method: Silica Gel	Extract ID: 20K0372-01RE1 C 02	
	Cleanup Batch: CJB0177	Initial Volume: 20 mL	
	Cleaned: 25-Feb-2021	Final Volume: 20 mL	
Sample Cleanup:	Cleanup Method: Sulfuric Acid	Extract ID: 20K0372-01RE1 C 02	
	Cleanup Batch: CJB0176	Initial Volume: 20 mL	
	Cleaned: 24-Feb-2021	Final Volume: 20 mL	
Sample Cleanup:	Cleanup Method: Florisil	Extract ID: 20K0372-01RE1 C 02	
	Cleanup Batch: CJB0178	Initial Volume: 20 mL	
	Cleaned: 25-Feb-2021	Final Volume: 20 mL	

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting		Result	Units	Notes
				EDL	Limit			
2,3,7,8-TCDF			0.655-0.886	0.058	0.073	0.994	ND	ng/kg U
2,3,7,8-TCDD			0.655-0.886	0.149	0.103	0.994	ND	ng/kg U
1,2,3,7,8-PeCDF			1.318-1.783	0.239	0.109	0.994	ND	ng/kg U
2,3,4,7,8-PeCDF			1.318-1.783	0.219	0.100	0.994	ND	ng/kg U
1,2,3,7,8-PeCDD			1.318-1.783	0.169	0.105	0.994	ND	ng/kg U
1,2,3,4,7,8-HxCDF			1.054-1.426	0.278	0.079	0.994	ND	ng/kg U
1,2,3,6,7,8-HxCDF			1.054-1.426	0.199	0.077	0.994	ND	ng/kg U
2,3,4,6,7,8-HxCDF			1.054-1.426	0.169	0.076	0.994	ND	ng/kg U
1,2,3,7,8,9-HxCDF			1.054-1.426	0.189	0.090	0.994	ND	ng/kg U
1,2,3,4,7,8-HxCDD			1.054-1.426	0.169	0.095	0.994	ND	ng/kg U
1,2,3,6,7,8-HxCDD			1.054-1.426	0.179	0.097	0.994	ND	ng/kg U
1,2,3,7,8,9-HxCDD			1.054-1.426	0.219	0.099	0.994	ND	ng/kg U
1,2,3,4,6,7,8-HpCDF			0.893-1.208	0.209	0.076	0.994	ND	ng/kg U
1,2,3,4,7,8,9-HpCDF			0.893-1.208	0.239	0.100	0.994	ND	ng/kg U
1,2,3,4,6,7,8-HpCDD		1.001	0.893-1.208	0.557	0.097	2.49	0.382	ng/kg J
OCDF			0.757-1.024	1.09	0.179	2.49	ND	ng/kg U
OCDD		0.946	0.757-1.024	4.57	0.231	9.94	4.99	ng/kg J, B
Homologue groups								
Total TCDF						0.994	ND	ng/kg U
Total TCDD						0.994	ND	ng/kg U
Total PeCDF						0.994	ND	ng/kg U
Total PeCDD						0.994	ND	ng/kg U
Total HxCDF						0.994	ND	ng/kg U
Total HxCDD						0.994	0.146	ng/kg J
Total HpCDF						0.994	ND	ng/kg U
Total HpCDD						0.994	1.01	ng/kg



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Reported:
25-Mar-2021 18:57

COA_SS-1_6.5-8.5_20201116
20K0372-01RE1 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/16/2020 14:50

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 03/03/2021 00:22

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting Limit	Result	Units	Notes
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC):				0.16			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC):				0.01			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, EMPC = ND):				0.16			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, EMPC = ND):				0.01			



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25-Mar-2021 18:57

COA_SS-1_6.5-8.5_20201116
20K0372-01RE1 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/16/2020 14:50

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 03/03/2021 00:22

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting Limit	Result	Units	Notes
Labeled compounds							
13C12-2,3,7,8-TCDF		0.775	0.655-0.886	24-169 %	73.5	%	
13C12-2,3,7,8-TCDD		0.791	0.655-0.886	25-164 %	73.8	%	
13C12-1,2,3,7,8-PeCDF		1.547	1.318-1.783	24-185 %	73.9	%	
13C12-2,3,4,7,8-PeCDF		1.464	1.318-1.783	21-178 %	71.7	%	
13C12-1,2,3,7,8-PeCDD		1.664	1.318-1.783	25-181 %	67.3	%	
13C12-1,2,3,4,7,8-HxCDF		0.510	0.434-0.587	26-152 %	77.8	%	
13C12-1,2,3,6,7,8-HxCDF		0.512	0.434-0.587	26-123 %	76.5	%	
13C12-2,3,4,6,7,8-HxCDF		0.516	0.434-0.587	28-136 %	77.5	%	
13C12-1,2,3,7,8,9-HxCDF		0.509	0.434-0.587	29-147 %	76.1	%	
13C12-1,2,3,4,7,8-HxCDD		1.242	1.054-1.426	32-141 %	76.1	%	
13C12-1,2,3,6,7,8-HxCDD		1.266	1.054-1.426	28-130 %	73.0	%	
13C12-1,2,3,4,6,7,8-HpCDF		0.434	0.374-0.506	28-143 %	68.7	%	
13C12-1,2,3,4,7,8,9-HpCDF		0.438	0.374-0.506	26-138 %	69.7	%	
13C12-1,2,3,4,6,7,8-HpCDD		1.065	0.893-1.208	23-140 %	73.5	%	
13C12-OCDD		0.892	0.757-1.024	17-157 %	57.6	%	
37Cl4-2,3,7,8-TCDD				35-197 %	79.2	%	



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Reported:
25-Mar-2021 18:57

COA_SS-2_5.5-7.5_20201118
20K0372-02 (Solid)

Semivolatile Organic Compounds

Method: EPA 8270E			Sampled: 11/18/2020 10:30	
Instrument: NT10 Analyst: VTS			Analyzed: 12/22/2020 23:09	
Sample Preparation:	Preparation Method: EPA 3546 (Microwave)	Sample Size: 12.52 g (wet)	Extract ID: 20K0372-02 D 03	
	Preparation Batch: BIK0843		Dry Weight: 10.07 g	
	Prepared: 11/30/2020		% Solids: 80.45	
Sample Cleanup:	Cleanup Method: GPC	Initial Volume: 1 uL	Extract ID: 20K0372-02 D 03	
	Cleanup Batch: CIL0220			
	Cleaned: 16-Dec-2020			

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Phenol	108-95-2	1	8.2	19.9	ND	ug/kg	U
Benzyl Alcohol	100-51-6	1	14.8	19.9	ND	ug/kg	U
2-Methylphenol	95-48-7	1	7.8	19.9	ND	ug/kg	U
Hexachloroethane	67-72-1	1	5.6	19.9	ND	ug/kg	U
4-Methylphenol	106-44-5	1	14.6	19.9	ND	ug/kg	U
Naphthalene	91-20-3	1	5.2	19.9	ND	ug/kg	U
Benzoic acid	65-85-0	1	58.7	199	ND	ug/kg	U
2-Methylnaphthalene	91-57-6	1	5.6	19.9	ND	ug/kg	U
Acenaphthylene	208-96-8	1	4.7	19.9	ND	ug/kg	U
Dimethylphthalate	131-11-3	1	6.4	19.9	ND	ug/kg	U
Acenaphthene	83-32-9	1	5.1	19.9	ND	ug/kg	U
Dibenzofuran	132-64-9	1	4.6	19.9	ND	ug/kg	U
Fluorene	86-73-7	1	4.9	19.9	ND	ug/kg	U
Diethyl phthalate	84-66-2	1	17.6	19.9	26.8	ug/kg	
N-Nitrosodiphenylamine	86-30-6	1	9.5	19.9	ND	ug/kg	U
Hexachlorobenzene	118-74-1	1	4.7	19.9	ND	ug/kg	U
Pentachlorophenol	87-86-5	1	31.1	99.3	ND	ug/kg	U
Phenanthrene	85-01-8	1	4.7	19.9	4.8	ug/kg	J
Anthracene	120-12-7	1	5.9	19.9	ND	ug/kg	U
Di-n-Butylphthalate	84-74-2	1	5.3	19.9	ND	ug/kg	U
Fluoranthene	206-44-0	1	4.5	19.9	ND	ug/kg	U
Pyrene	129-00-0	1	5.5	19.9	ND	ug/kg	U
Butylbenzylphthalate	85-68-7	1	8.0	19.9	ND	ug/kg	U
Benzo(a)anthracene	56-55-3	1	5.1	19.9	ND	ug/kg	U
Chrysene	218-01-9	1	5.2	19.9	ND	ug/kg	U
bis(2-Ethylhexyl)phthalate	117-81-7	1	28.6	49.6	ND	ug/kg	U
Di-n-Octylphthalate	117-84-0	1	8.7	19.9	ND	ug/kg	U
Benzo(a)fluoranthene, Total		1	10.1	39.7	ND	ug/kg	U
Benzo(a)pyrene	50-32-8	1	6.4	19.9	ND	ug/kg	U
Indeno(1,2,3-cd)pyrene	193-39-5	1	5.9	19.9	ND	ug/kg	U
Dibenzo(a,h)anthracene	53-70-3	1	6.1	19.9	ND	ug/kg	U
Benzo(g,h,i)perylene	191-24-2	1	5.8	19.9	ND	ug/kg	U



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Reported:
25-Mar-2021 18:57

COA_SS-2_5.5-7.5_20201118
20K0372-02 (Solid)

Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 11/18/2020 10:30

Instrument: NT10 Analyst: VTS

Analyzed: 12/22/2020 23:09

Analyte	CAS Number	Recovery	Recovery	Units	Notes
		Limits			
Surrogate: 2-Fluorophenol		27-120 %	69.2	%	
Surrogate: Phenol-d5		29-120 %	69.0	%	Q
Surrogate: 2-Chlorophenol-d4		31-120 %	72.8	%	
Surrogate: 1,2-Dichlorobenzene-d4		32-120 %	64.1	%	
Surrogate: Nitrobenzene-d5		30-120 %	86.6	%	
Surrogate: 2-Fluorobiphenyl		35-120 %	77.0	%	
Surrogate: 2,4,6-Tribromophenol		24-134 %	65.4	%	
Surrogate: p-Terphenyl-d14		37-120 %	85.7	%	



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COA_SS-2_5.5-7.5_20201118
20K0372-02 (Solid)

Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM			Sampled: 11/18/2020 10:30	
Instrument: NT10 Analyst: VTS			Analyzed: 12/22/2020 23:09	
Sample Preparation:	Preparation Method: EPA 3546 (Microwave)		Extract ID: 20K0372-02 D 03	
	Preparation Batch: BIK0843	Sample Size: 12.52 g (wet)		Dry Weight: 10.07 g
	Prepared: 11/30/2020	Final Volume: 1 mL		% Solids: 80.45
Sample Cleanup:	Cleanup Method: GPC		Extract ID: 20K0372-02 D 03	
	Cleanup Batch: CIL0220	Initial Volume: 1 uL		
	Cleaned: 16-Dec-2020	Final Volume: 1 uL		

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
1,4-Dichlorobenzene	106-46-7	1	0.6	5.0	ND	ug/kg	U
1,2-Dichlorobenzene	95-50-1	1	0.7	5.0	ND	ug/kg	U
2,4-Dimethylphenol	105-67-9	1	2.2	19.9	ND	ug/kg	U
1,2,4-Trichlorobenzene	120-82-1	1	2.7	5.0	ND	ug/kg	U
Hexachlorobutadiene	87-68-3	1	0.7	5.0	ND	ug/kg	U
Surrogate: 2-Fluorophenol				27-120 %	70.2	%	
Surrogate: p-Terphenyl-d14				37-120 %	76.2	%	



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25-Mar-2021 18:57

COA_SS-2_5.5-7.5_20201118
20K0372-02 (Solid)

Butyl Tins

Method: EPA 8270E-SIM			Sampled: 11/18/2020 10:30
Instrument: NT8 Analyst: JZ			Analyzed: 12/17/2020 17:24
Sample Preparation:	Preparation Method: EPA 3546 (Microwave)		Extract ID: 20K0372-02 D 04 Dry Weight: 5.04 g % Solids: 80.45
	Preparation Batch: BIK0863	Sample Size: 6.26 g (wet)	
	Prepared: 11/30/2020	Final Volume: 0.5 mL	
Sample Cleanup:	Cleanup Method: Silica Gel		Extract ID: 20K0372-02 D 04
	Cleanup Batch: CIL0161	Initial Volume: 0.5 mL	
	Cleaned: 16-Dec-2020	Final Volume: 0.5 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Tributyltin Ion	36643-28-4	1	0.447	3.83	ND	ug/kg	U
Dibutyltin Ion	14488-53-0	1	1.72	5.74	ND	ug/kg	U
Butyltin Ion	78763-54-9	1	1.88	4.05	ND	ug/kg	U
Tetrabutyltin	1461-25-2	1	4.96	4.96	ND	ug/kg	U
Surrogate: Triphenyltin				30-160 %	86.5	%	
Surrogate: Tripropyltin				30-160 %	57.8	%	



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Reported:
25-Mar-2021 18:57

COA_SS-2_5.5-7.5_20201118
20K0372-02 (Solid)

Chlorinated Pesticides

Method: EPA 8081B		Sampled: 11/18/2020 10:30	
Instrument: ECD6 Analyst: YZ/VTs		Analyzed: 03/15/2021 20:44	
Sample Preparation:	Preparation Method: EPA 3546 (Microwave)	Extract ID: 20K0372-02 B 01	
	Preparation Batch: BJB0764	Dry Weight: 12.52 g	
	Prepared: 02/26/2021	% Solids: 80.45	
Sample Cleanup:	Cleanup Method: Silica Gel	Extract ID: 20K0372-02 B 01	
	Cleanup Batch: CJC0097	Initial Volume: 2.5 mL	
	Cleaned: 09-Mar-2021	Final Volume: 2.5 mL	
Sample Cleanup:	Cleanup Method: Sulfur	Extract ID: 20K0372-02 B 01	
	Cleanup Batch: CJC0096	Initial Volume: 2.5 mL	
	Cleaned: 09-Mar-2021	Final Volume: 2.5 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Heptachlor	76-44-8	1	0.05	0.50	ND	ug/kg	U
Aldrin	309-00-2	1	0.37	0.50	ND	ug/kg	U
trans-Chlordane (beta-Chlordane)	5103-74-2	1	0.33	0.50	ND	ug/kg	U
cis-Chlordane (alpha-chlordane)	5103-71-9	1	0.11	0.50	ND	ug/kg	U
4,4'-DDE	72-55-9	1	0.13	1.00	ND	ug/kg	U
Dieldrin	60-57-1	1	0.11	1.00	ND	ug/kg	U
4,4'-DDD	72-54-8	1	0.32	1.00	ND	ug/kg	U
4,4'-DDT	50-29-3	1	0.32	1.00	ND	ug/kg	U
Oxychlordane	27304-13-8	1	0.13	1.00	ND	ug/kg	U
cis-Nonachlor	5103-73-1	1	0.21	1.00	ND	ug/kg	U
trans-Nonachlor	39765-80-5	1	0.23	1.00	ND	ug/kg	U
Surrogate: Decachlorobiphenyl				30-160 %	81.6	%	
Surrogate: Decachlorobiphenyl [2C]				30-160 %	73.4	%	
Surrogate: Tetrachlorometaxylene				30-160 %	67.5	%	
Surrogate: Tetrachlorometaxylene [2C]				30-160 %	68.4	%	



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COA_SS-2_5.5-7.5_20201118
20K0372-02 (Solid)

Aroclor PCB

Method: EPA 8082A		Sampled: 11/18/2020 10:30	
Instrument: ECD7 Analyst: JGR		Analyzed: 12/19/2020 20:20	
Sample Preparation:	Preparation Method: EPA 3546 (Microwave)	Extract ID: 20K0372-02 D 01	
	Preparation Batch: BIK0842	Dry Weight: 12.53 g	
	Prepared: 11/28/2020	% Solids: 80.45	
Sample Cleanup:	Cleanup Method: Silica Gel	Extract ID: 20K0372-02 D 01	
	Cleanup Batch: CIL0203	Initial Volume: 2.5 mL	
	Cleaned: 19-Dec-2020	Final Volume: 2.5 mL	
Sample Cleanup:	Cleanup Method: Sulfuric Acid	Extract ID: 20K0372-02 D 01	
	Cleanup Batch: CIL0201	Initial Volume: 2.5 mL	
	Cleaned: 19-Dec-2020	Final Volume: 2.5 mL	
Sample Cleanup:	Cleanup Method: Sulfur	Extract ID: 20K0372-02 D 01	
	Cleanup Batch: CIL0202	Initial Volume: 2.5 mL	
	Cleaned: 19-Dec-2020	Final Volume: 2.5 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Aroclor 1016	12674-11-2	1	1.6	4.0	ND	ug/kg	U
Aroclor 1221	11104-28-2	1	1.6	4.0	ND	ug/kg	U
Aroclor 1232	11141-16-5	1	1.6	4.0	ND	ug/kg	U
Aroclor 1242	53469-21-9	1	1.6	4.0	ND	ug/kg	U
Aroclor 1248	12672-29-6	1	1.6	4.0	ND	ug/kg	U
Aroclor 1254	11097-69-1	1	1.6	4.0	ND	ug/kg	U
Aroclor 1260	11096-82-5	1	0.6	4.0	ND	ug/kg	U
Aroclor 1262	37324-23-5	1	0.6	4.0	ND	ug/kg	U
Aroclor 1268	11100-14-4	1	0.6	4.0	ND	ug/kg	U
Surrogate: Decachlorobiphenyl				40-126 %	73.1	%	
Surrogate: Tetrachlorometaxylene				44-120 %	70.4	%	
Surrogate: Decachlorobiphenyl [2C]				40-126 %	92.0	%	
Surrogate: Tetrachlorometaxylene [2C]				44-120 %	71.0	%	



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Reported:
25-Mar-2021 18:57

COA_SS-2_5.5-7.5_20201118
20K0372-02 (Solid)

Dioxins/Furans

Method: EPA 1613B			Sampled: 11/18/2020 10:30		
Instrument: AUTOSPEC01 Analyst: pk			Analyzed: 12/08/2020 01:09		
Sample Preparation:	Preparation Method: EPA 1613			Extract ID: 20K0372-02 C 01	
	Preparation Batch: BIL0036	Sample Size: 12.35 g (wet)		Dry Weight: 10.05 g	
	Prepared: 12/03/2020	Final Volume: 20 uL		% Solids: 81.36	
Sample Cleanup:	Cleanup Method: Silica Gel			Extract ID: 20K0372-02 C 01	
	Cleanup Batch: CIL0058	Initial Volume: 20 mL			
	Cleaned: 05-Dec-2020	Final Volume: 20 mL			
Sample Cleanup:	Cleanup Method: Sulfuric Acid			Extract ID: 20K0372-02 C 01	
	Cleanup Batch: CIL0057	Initial Volume: 20 mL			
	Cleaned: 04-Dec-2020	Final Volume: 20 mL			
Sample Cleanup:	Cleanup Method: Florisil			Extract ID: 20K0372-02 C 01	
	Cleanup Batch: CIL0059	Initial Volume: 20 mL			
	Cleaned: 05-Dec-2020	Final Volume: 20 mL			

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting		Result	Units	Notes
				EDL	Limit			
2,3,7,8-TCDF			0.655-0.886	0.063	0.097	0.995	ND	ng/kg U
2,3,7,8-TCDD			0.655-0.886	0.139	0.111	0.995	ND	ng/kg U
1,2,3,7,8-PeCDF			1.318-1.783	0.149	0.136	0.995	ND	ng/kg U
2,3,4,7,8-PeCDF			1.318-1.783	0.149	0.131	0.995	ND	ng/kg U
1,2,3,7,8-PeCDD			1.318-1.783	0.179	0.136	0.995	ND	ng/kg U
1,2,3,4,7,8-HxCDF			1.054-1.426	0.139	0.076	0.995	ND	ng/kg U
1,2,3,6,7,8-HxCDF			1.054-1.426	0.179	0.073	0.995	ND	ng/kg U
2,3,4,6,7,8-HxCDF			1.054-1.426	0.109	0.074	0.995	ND	ng/kg U
1,2,3,7,8,9-HxCDF			1.054-1.426	0.209	0.095	0.995	ND	ng/kg U
1,2,3,4,7,8-HxCDD			1.054-1.426	0.179	0.156	0.995	ND	ng/kg U
1,2,3,6,7,8-HxCDD			1.054-1.426	0.149	0.141	0.995	ND	ng/kg U
1,2,3,7,8,9-HxCDD			1.054-1.426	0.219	0.168	0.995	ND	ng/kg U
1,2,3,4,6,7,8-HpCDF			0.893-1.208	0.209	0.049	0.995	ND	ng/kg U
1,2,3,4,7,8,9-HpCDF			0.893-1.208	0.159	0.066	0.995	ND	ng/kg U
1,2,3,4,6,7,8-HpCDD		0.932	0.893-1.208	0.557	0.194	2.49	2.08	ng/kg J
OCDF			0.757-1.024	1.09	0.191	2.49	ND	ng/kg U
OCDD		0.852	0.757-1.024	4.28	0.775	9.95	32.2	ng/kg B
Homologue groups								
Total TCDF						0.995	ND	ng/kg U
Total TCDD						0.995	0.321	ng/kg J
Total PeCDF						0.995	ND	ng/kg U
Total PeCDD						0.995	ND	ng/kg U
Total HxCDF						0.995	ND	ng/kg U
Total HxCDD						0.995	ND	ng/kg U
Total HpCDF						0.995	ND	ng/kg U
Total HpCDD						0.995	2.08	ng/kg B



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
25-Mar-2021 18:57

COA_SS-2_5.5-7.5_20201118
20K0372-02 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/18/2020 10:30

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 12/08/2020 01:09

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting Limit	Result	Units	Notes
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC):				0.22			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC):				0.03			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, EMPC = ND):				0.22			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, EMPC = ND):				0.03			



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1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
25-Mar-2021 18:57

COA_SS-2_5.5-7.5_20201118
20K0372-02 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/18/2020 10:30

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 12/08/2020 01:09

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting Limit	Result	Units	Notes
Labeled compounds							
13C12-2,3,7,8-TCDF		0.788	0.655-0.886	24-169 %	69.0	%	
13C12-2,3,7,8-TCDD		0.811	0.655-0.886	25-164 %	69.8	%	
13C12-1,2,3,7,8-PeCDF		1.488	1.318-1.783	24-185 %	62.1	%	
13C12-2,3,4,7,8-PeCDF		1.609	1.318-1.783	21-178 %	63.8	%	
13C12-1,2,3,7,8-PeCDD		1.642	1.318-1.783	25-181 %	59.4	%	
13C12-1,2,3,4,7,8-HxCDF		0.477	0.434-0.587	26-152 %	78.2	%	
13C12-1,2,3,6,7,8-HxCDF		0.484	0.434-0.587	26-123 %	69.9	%	
13C12-2,3,4,6,7,8-HxCDF		0.489	0.434-0.587	28-136 %	73.1	%	
13C12-1,2,3,7,8,9-HxCDF		0.493	0.434-0.587	29-147 %	78.8	%	
13C12-1,2,3,4,7,8-HxCDD		1.292	1.054-1.426	32-141 %	79.4	%	
13C12-1,2,3,6,7,8-HxCDD		1.363	1.054-1.426	28-130 %	74.5	%	
13C12-1,2,3,4,6,7,8-HpCDF		0.424	0.374-0.506	28-143 %	64.0	%	
13C12-1,2,3,4,7,8,9-HpCDF		0.419	0.374-0.506	26-138 %	66.6	%	
13C12-1,2,3,4,6,7,8-HpCDD		1.078	0.893-1.208	23-140 %	68.3	%	
13C12-OCDD		0.886	0.757-1.024	17-157 %	49.1	%	
37Cl4-2,3,7,8-TCDD				35-197 %	81.7	%	



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Reported:
25-Mar-2021 18:57

COA_SS-2_5.5-7.5_20201118
20K0372-02 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/18/2020 10:30

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 12/08/2020 01:09

Analyte	DF/Split	Ion Ratio	Ratio Limits	EDL	Reporting	Result	Units	Notes
					Limit			



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
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Project: COA Outfall
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Reported:
25-Mar-2021 18:57

COA_SS-2_5.5-7.5_20201118
20K0372-02 (Solid)

Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 11/18/2020 10:30

Instrument: ICPMS1 Analyst: MCB

Analyzed: 03/23/2021 21:56

Sample Preparation:

Preparation Method: SWN EPA 3050B

Extract ID: 20K0372-02 F 01

Preparation Batch: BJC0564

Sample Size: 1.072 g (wet)

Dry Weight: 0.87 g

Prepared: 03/22/2021

Final Volume: 50 mL

% Solids: 81.06

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Antimony	7440-36-0	20	0.02	0.23	ND	mg/kg	U
Chromium	7440-47-3	20	0.15	0.58	38.2	mg/kg	
Lead	7439-92-1	20	0.08	0.12	4.87	mg/kg	
Silver	7440-22-4	20	0.02	0.23	0.07	mg/kg	J



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Bellevue WA, 98007

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Project Manager: Ezra Beaver

Reported:
25-Mar-2021 18:57

COA_SS-2_5.5-7.5_20201118
20K0372-02 (Solid)

Metals and Metallic Compounds

Method: EPA 6020B UCT-KED

Sampled: 11/18/2020 10:30

Instrument: ICPMS1 Analyst: MCB

Analyzed: 03/23/2021 21:56

Sample Preparation:

Preparation Method: SWN EPA 3050B

Extract ID: 20K0372-02 F 01

Preparation Batch: BJC0564

Sample Size: 1.072 g (wet)

Dry Weight: 0.87 g

Prepared: 03/22/2021

Final Volume: 50 mL

% Solids: 81.06

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	20	0.03	0.23	6.37	mg/kg	
Cadmium	7440-43-9	20	0.03	0.12	0.08	mg/kg	J
Copper	7440-50-8	20	0.39	0.58	41.3	mg/kg	
Selenium	7782-49-2	20	0.51	0.58	0.65	mg/kg	
Zinc	7440-66-6	20	0.9	4.6	69.6	mg/kg	



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Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
25-Mar-2021 18:57

COA_SS-2_5.5-7.5_20201118
20K0372-02 (Solid)

Metals and Metallic Compounds

Method: EPA 7471B

Sampled: 11/18/2020 10:30

Instrument: HYDRA Analyst: BLC

Analyzed: 03/23/2021 12:36

Sample Preparation:

Preparation Method: SMM EPA 7471B

Extract ID: 20K0372-02 F

Preparation Batch: BJC0610

Sample Size: 0.263 g (wet)

Dry Weight: 0.21 g

Prepared: 03/23/2021

Final Volume: 50 mL

% Solids: 81.06

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.00493	0.0235	0.0364	mg/kg	H



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
25-Mar-2021 18:57

COA_SS-2_5.5-7.5_20201118
20K0372-02 (Solid)

Wet Chemistry

Method: EPA 9060A m

Sampled: 11/18/2020 10:30

Instrument: TOC Cube Analyst: BF

Analyzed: 11/26/2020 04:20

Sample Preparation:

Preparation Method: PSEP 1986 (modified)

Extract ID: 20K0372-02 F

Preparation Batch: BIK0802

Sample Size: 0.5924 g (wet)

Dry Weight: 0.48 g

Prepared: 11/25/2020

Final Volume: 0.5924 mL

% Solids: 81.06

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Organic Carbon		1	0.02	0.02	0.09	%	



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Reported:
25-Mar-2021 18:57

COA_SS-2_5.5-7.5_20201118
20K0372-02 (Solid)

Wet Chemistry

Method: PSEP 1986

Sampled: 11/18/2020 10:30

Instrument: BAL2 Analyst: UW

Analyzed: 11/24/2020 17:15

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 20K0372-02
Preparation Batch: BIK0773 Sample Size: 10 g (wet) Dry Weight: 8.11 g
Prepared: 11/24/2020 Final Volume: 10 g % Solids: 81.06

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Volatile Solids		1	0.01	0.01	1.97	%	

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 20K0372-02
Preparation Batch: BIK0778 Sample Size: 5 g (wet) Dry Weight: 4.05 g
Prepared: 11/24/2020 Final Volume: 5 g % Solids: 81.06

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Solids, Sulfide		1	0.04	0.04	76.07	%	



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Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
25-Mar-2021 18:57

COA_SS-2_5.5-7.5_20201118
20K0372-02 (Solid)

Wet Chemistry

Method: SM 2540 G-97

Sampled: 11/18/2020 10:30

Instrument: BAL2 Analyst: UW

Analyzed: 11/24/2020 17:15

Sample Preparation:

Preparation Method: No Prep Wet Chem

Extract ID: 20K0372-02

Preparation Batch: BIK0773

Sample Size: 10 g (wet)

Dry Weight: 8.11 g

Prepared: 11/24/2020

Final Volume: 10 g

% Solids: 81.06

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Solids		1	0.04	0.04	81.06	%	



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
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Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
25-Mar-2021 18:57

COA_SS-2_5.5-7.5_20201118
20K0372-02 (Solid)

Wet Chemistry

Method: SM 4500-NH3 H-97	Sampled: 11/18/2020 10:30
Instrument: LCHAT2 Analyst: LRB	Analyzed: 11/30/2020 14:59
Sample Preparation:	Preparation Method: MSA 33.3 (2M KCl)
	Preparation Batch: BIK0769
	Sample Size: 4.08 g (wet)
	Final Volume: 40 mL
	Extract ID: 20K0372-02 F
	Dry Weight: 3.31 g
	% Solids: 81.06

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Ammonia-N	7664-41-7	1	0.48	0.48	2.99	mg/kg NH3-N	



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Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
25-Mar-2021 18:57

COA_SS-2_5.5-7.5_20201118
20K0372-02 (Solid)

Wet Chemistry

Method: SM 4500-S2 D-00 (PSEP)

Sampled: 11/18/2020 10:30

Instrument: UV1800-1 Analyst: CDE

Analyzed: 12/03/2020 17:06

Sample Preparation:

Preparation Method: PSEP 1986

Extract ID: 20K0372-02 G

Preparation Batch: BIK0762

Sample Size: 5.203 g (wet)

Dry Weight: 3.96 g

Prepared: 11/24/2020

Final Volume: 100 mL

% Solids: 76.07

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Sulfide	18496-25-8	1	1.26	1.26	ND	mg/kg	U



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
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Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
25-Mar-2021 18:57

COA_SS-2_5.5-7.5_20201118
20K0372-02 (Solid)

Extractions

Method: ASTM D2216	Sampled: 11/18/2020 10:30	
Instrument: N/A Analyst: NL	Analyzed: 11/26/2020 05:10	
Sample Preparation:	Preparation Method: No Prep-Organics	Extract ID: 20K0372-02
	Preparation Batch: BIK0790	Dry Weight: 0.81 g
	Prepared: 11/25/2020	% Solids: 81.06
	Sample Size: 1 g (wet)	
	Final Volume: 1 g	

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Total Solids		1	0.01	81.36	%	
Labeled compounds						



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
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Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
25-Mar-2021 18:57

COA_SS-2_5.5-7.5_20201118
20K0372-02RE1 (Solid)

Dioxins/Furans

Method: EPA 1613B			Sampled: 11/18/2020 10:30		
Instrument: AUTOSPEC01 Analyst: pk			Analyzed: 03/03/2021 01:11		
Sample Preparation:	Preparation Method: EPA 1613			Extract ID: 20K0372-02RE1 C 02	
	Preparation Batch: BJB0531	Sample Size: 12.38 g (wet)		Dry Weight: 10.07 g	
	Prepared: 02/23/2021	Final Volume: 20 uL		% Solids: 81.36	
Sample Cleanup:	Cleanup Method: Silica Gel			Extract ID: 20K0372-02RE1 C 02	
	Cleanup Batch: CJB0177	Initial Volume: 20 mL			
	Cleaned: 25-Feb-2021	Final Volume: 20 mL			
Sample Cleanup:	Cleanup Method: Sulfuric Acid			Extract ID: 20K0372-02RE1 C 02	
	Cleanup Batch: CJB0176	Initial Volume: 20 mL			
	Cleaned: 24-Feb-2021	Final Volume: 20 mL			
Sample Cleanup:	Cleanup Method: Florisil			Extract ID: 20K0372-02RE1 C 02	
	Cleanup Batch: CJB0178	Initial Volume: 20 mL			
	Cleaned: 25-Feb-2021	Final Volume: 20 mL			

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting		Result	Units	Notes
				EDL	Limit			
2,3,7,8-TCDF			0.655-0.886	0.058	0.069	0.993	ND	ng/kg U
2,3,7,8-TCDD			0.655-0.886	0.149	0.110	0.993	ND	ng/kg U
1,2,3,7,8-PeCDF			1.318-1.783	0.238	0.091	0.993	ND	ng/kg U
2,3,4,7,8-PeCDF			1.318-1.783	0.218	0.088	0.993	ND	ng/kg U
1,2,3,7,8-PeCDD			1.318-1.783	0.169	0.117	0.993	ND	ng/kg U
1,2,3,4,7,8-HxCDF			1.054-1.426	0.278	0.084	0.993	ND	ng/kg U
1,2,3,6,7,8-HxCDF			1.054-1.426	0.199	0.081	0.993	ND	ng/kg U
2,3,4,6,7,8-HxCDF			1.054-1.426	0.169	0.080	0.993	ND	ng/kg U
1,2,3,7,8,9-HxCDF			1.054-1.426	0.189	0.093	0.993	ND	ng/kg U
1,2,3,4,7,8-HxCDD			1.054-1.426	0.169	0.104	0.993	ND	ng/kg U
1,2,3,6,7,8-HxCDD			1.054-1.426	0.179	0.104	0.993	ND	ng/kg U
1,2,3,7,8,9-HxCDD		1.368	1.054-1.426	0.218	0.107	0.993	0.179	ng/kg J
1,2,3,4,6,7,8-HpCDF		1.004	0.893-1.208	0.208	0.069	0.993	0.198	ng/kg J
1,2,3,4,7,8,9-HpCDF		0.588	0.893-1.208	0.238	0.088	0.993	0.093	ng/kg EMPC, J
1,2,3,4,6,7,8-HpCDD		1.099	0.893-1.208	0.556	0.153	2.48	2.54	ng/kg
OCDF		0.887	0.757-1.024	1.09	0.234	2.48	4.74	ng/kg B
OCDD		0.860	0.757-1.024	4.57	0.313	9.93	37.6	ng/kg B
Homologue groups								
Total TCDF						0.993	0.074	ng/kg J
Total TCDD						0.993	ND	ng/kg U
Total PeCDF						0.993	ND	ng/kg U
Total PeCDD						0.993	ND	ng/kg U
Total HxCDF						0.993	ND	ng/kg U
Total HxCDD						0.993	0.841	ng/kg J
Total HpCDF						0.993	0.198	ng/kg J, B
Total HpCDD						0.993	6.02	ng/kg



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
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Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
25-Mar-2021 18:57

COA_SS-2_5.5-7.5_20201118
20K0372-02RE1 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/18/2020 10:30

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 03/03/2021 01:11

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting Limit	Result	Units	Notes
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC):				0.22			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC):				0.06			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, EMPC = ND):				0.22			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, EMPC = ND):				0.06			



Dalton, Olmsted & Fuglevand, Inc
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Project: COA Outfall
Project Number: COA-001
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Reported:
25-Mar-2021 18:57

COA_SS-2_5.5-7.5_20201118
20K0372-02RE1 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/18/2020 10:30

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 03/03/2021 01:11

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting Limit	Result	Units	Notes
Labeled compounds							
13C12-2,3,7,8-TCDF		0.796	0.655-0.886	24-169 %	75.6	%	
13C12-2,3,7,8-TCDD		0.802	0.655-0.886	25-164 %	77.3	%	
13C12-1,2,3,7,8-PeCDF		1.464	1.318-1.783	24-185 %	76.1	%	
13C12-2,3,4,7,8-PeCDF		1.500	1.318-1.783	21-178 %	70.8	%	
13C12-1,2,3,7,8-PeCDD		1.607	1.318-1.783	25-181 %	69.8	%	
13C12-1,2,3,4,7,8-HxCDF		0.511	0.434-0.587	26-152 %	77.1	%	
13C12-1,2,3,6,7,8-HxCDF		0.515	0.434-0.587	26-123 %	78.2	%	
13C12-2,3,4,6,7,8-HxCDF		0.513	0.434-0.587	28-136 %	77.8	%	
13C12-1,2,3,7,8,9-HxCDF		0.502	0.434-0.587	29-147 %	79.2	%	
13C12-1,2,3,4,7,8-HxCDD		1.246	1.054-1.426	32-141 %	79.4	%	
13C12-1,2,3,6,7,8-HxCDD		1.267	1.054-1.426	28-130 %	73.8	%	
13C12-1,2,3,4,6,7,8-HpCDF		0.441	0.374-0.506	28-143 %	67.2	%	
13C12-1,2,3,4,7,8,9-HpCDF		0.431	0.374-0.506	26-138 %	70.1	%	
13C12-1,2,3,4,6,7,8-HpCDD		1.071	0.893-1.208	23-140 %	76.0	%	
13C12-OCDD		0.907	0.757-1.024	17-157 %	57.5	%	
37Cl4-2,3,7,8-TCDD				35-197 %	86.5	%	



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
25-Mar-2021 18:57

COA_SS-2_7.5-9.5_20201118
20K0372-03 (Solid)

Semivolatile Organic Compounds

Method: EPA 8270E			Sampled: 11/18/2020 10:45	
Instrument: NT10 Analyst: VTS			Analyzed: 12/22/2020 23:46	
Sample Preparation:	Preparation Method: EPA 3546 (Microwave)		Extract ID: 20K0372-03 D 03	
	Preparation Batch: BIK0843	Sample Size: 11.97 g (wet)		Dry Weight: 10.03 g
	Prepared: 11/30/2020	Final Volume: 1 mL		% Solids: 83.82
Sample Cleanup:	Cleanup Method: GPC		Extract ID: 20K0372-03 D 03	
	Cleanup Batch: CIL0220	Initial Volume: 1 uL		
	Cleaned: 16-Dec-2020	Final Volume: 1 uL		

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Phenol	108-95-2	1	8.2	19.9	ND	ug/kg	U
Benzyl Alcohol	100-51-6	1	14.9	19.9	ND	ug/kg	U
2-Methylphenol	95-48-7	1	7.8	19.9	ND	ug/kg	U
Hexachloroethane	67-72-1	1	5.6	19.9	ND	ug/kg	U
4-Methylphenol	106-44-5	1	14.7	19.9	ND	ug/kg	U
Naphthalene	91-20-3	1	5.2	19.9	ND	ug/kg	U
Benzoic acid	65-85-0	1	58.9	199	ND	ug/kg	U
2-Methylnaphthalene	91-57-6	1	5.7	19.9	ND	ug/kg	U
Acenaphthylene	208-96-8	1	4.8	19.9	ND	ug/kg	U
Dimethylphthalate	131-11-3	1	6.4	19.9	ND	ug/kg	U
Acenaphthene	83-32-9	1	5.1	19.9	ND	ug/kg	U
Dibenzofuran	132-64-9	1	4.6	19.9	ND	ug/kg	U
Fluorene	86-73-7	1	4.9	19.9	ND	ug/kg	U
Diethyl phthalate	84-66-2	1	17.6	19.9	ND	ug/kg	U
N-Nitrosodiphenylamine	86-30-6	1	9.5	19.9	ND	ug/kg	U
Hexachlorobenzene	118-74-1	1	4.7	19.9	ND	ug/kg	U
Pentachlorophenol	87-86-5	1	31.2	99.7	ND	ug/kg	U
Phenanthrene	85-01-8	1	4.7	19.9	ND	ug/kg	U
Anthracene	120-12-7	1	5.9	19.9	ND	ug/kg	U
Di-n-Butylphthalate	84-74-2	1	5.3	19.9	ND	ug/kg	U
Fluoranthene	206-44-0	1	4.5	19.9	ND	ug/kg	U
Pyrene	129-00-0	1	5.5	19.9	6.6	ug/kg	J
Butylbenzylphthalate	85-68-7	1	8.0	19.9	ND	ug/kg	U
Benzo(a)anthracene	56-55-3	1	5.2	19.9	ND	ug/kg	U
Chrysene	218-01-9	1	5.2	19.9	ND	ug/kg	U
bis(2-Ethylhexyl)phthalate	117-81-7	1	28.7	49.8	ND	ug/kg	U
Di-n-Octylphthalate	117-84-0	1	8.7	19.9	ND	ug/kg	U
Benzo(a)fluoranthene, Total		1	10.2	39.9	ND	ug/kg	U
Benzo(a)pyrene	50-32-8	1	6.5	19.9	ND	ug/kg	U
Indeno(1,2,3-cd)pyrene	193-39-5	1	6.0	19.9	ND	ug/kg	U
Dibenzo(a,h)anthracene	53-70-3	1	6.1	19.9	ND	ug/kg	U
Benzo(g,h,i)perylene	191-24-2	1	5.8	19.9	ND	ug/kg	U



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Reported:
25-Mar-2021 18:57

COA_SS-2_7.5-9.5_20201118
20K0372-03 (Solid)

Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 11/18/2020 10:45

Instrument: NT10 Analyst: VTS

Analyzed: 12/22/2020 23:46

Analyte	CAS Number	Recovery	Recovery	Units	Notes
		Limits			
Surrogate: 2-Fluorophenol		27-120 %	68.0	%	
Surrogate: Phenol-d5		29-120 %	68.5	%	Q
Surrogate: 2-Chlorophenol-d4		31-120 %	71.8	%	
Surrogate: 1,2-Dichlorobenzene-d4		32-120 %	65.9	%	
Surrogate: Nitrobenzene-d5		30-120 %	87.3	%	
Surrogate: 2-Fluorobiphenyl		35-120 %	79.4	%	
Surrogate: 2,4,6-Tribromophenol		24-134 %	61.1	%	
Surrogate: p-Terphenyl-d14		37-120 %	90.7	%	



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Reported:
25-Mar-2021 18:57

COA_SS-2_7.5-9.5_20201118
20K0372-03 (Solid)

Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM			Sampled: 11/18/2020 10:45	
Instrument: NT10 Analyst: VTS			Analyzed: 12/22/2020 23:46	
Sample Preparation:	Preparation Method: EPA 3546 (Microwave)		Extract ID: 20K0372-03 D 03	
	Preparation Batch: BIK0843	Sample Size: 11.97 g (wet)		Dry Weight: 10.03 g
	Prepared: 11/30/2020	Final Volume: 1 mL		% Solids: 83.82
Sample Cleanup:	Cleanup Method: GPC		Extract ID: 20K0372-03 D 03	
	Cleanup Batch: CIL0220	Initial Volume: 1 uL		
	Cleaned: 16-Dec-2020	Final Volume: 1 uL		

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
1,4-Dichlorobenzene	106-46-7	1	0.6	5.0	ND	ug/kg	U
1,2-Dichlorobenzene	95-50-1	1	0.7	5.0	ND	ug/kg	U
2,4-Dimethylphenol	105-67-9	1	2.2	19.9	ND	ug/kg	U
1,2,4-Trichlorobenzene	120-82-1	1	2.7	5.0	ND	ug/kg	U
Hexachlorobutadiene	87-68-3	1	0.7	5.0	ND	ug/kg	U
Surrogate: 2-Fluorophenol				27-120 %	70.9	%	
Surrogate: p-Terphenyl-d14				37-120 %	79.1	%	



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COA_SS-2_7.5-9.5_20201118
20K0372-03 (Solid)

Butyl Tins

Method: EPA 8270E-SIM			Sampled: 11/18/2020 10:45	
Instrument: NT8 Analyst: JZ			Analyzed: 12/17/2020 17:41	
Sample Preparation:	Preparation Method: EPA 3546 (Microwave)		Extract ID: 20K0372-03 D 04	
	Preparation Batch: BIK0863	Sample Size: 5.99 g (wet)		Dry Weight: 5.02 g
	Prepared: 11/30/2020	Final Volume: 0.5 mL		% Solids: 83.82
Sample Cleanup:	Cleanup Method: Silica Gel		Extract ID: 20K0372-03 D 04	
	Cleanup Batch: CIL0161	Initial Volume: 0.5 mL		
	Cleaned: 16-Dec-2020	Final Volume: 0.5 mL		

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Tributyltin Ion	36643-28-4	1	0.448	3.84	0.502	ug/kg	J
Dibutyltin Ion	14488-53-0	1	1.72	5.76	ND	ug/kg	U
Butyltin Ion	78763-54-9	1	1.88	4.06	ND	ug/kg	U
Tetrabutyltin	1461-25-2	1	4.98	4.98	ND	ug/kg	U
Surrogate: Tripentyltin				30-160 %	86.6	%	
Surrogate: Tripropyltin				30-160 %	54.9	%	



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COA_SS-2_7.5-9.5_20201118
20K0372-03 (Solid)

Chlorinated Pesticides

Method: EPA 8081B		Sampled: 11/18/2020 10:45	
Instrument: ECD6 Analyst: YZ/VTs		Analyzed: 03/15/2021 21:02	
Sample Preparation:	Preparation Method: EPA 3546 (Microwave)	Extract ID: 20K0372-03 B 01	
	Preparation Batch: BJB0764	Dry Weight: 12.51 g	
	Prepared: 02/26/2021	% Solids: 83.82	
Sample Cleanup:	Cleanup Method: Silica Gel	Extract ID: 20K0372-03 B 01	
	Cleanup Batch: CJC0097	Initial Volume: 2.5 mL	
	Cleaned: 09-Mar-2021	Final Volume: 2.5 mL	
Sample Cleanup:	Cleanup Method: Sulfur	Extract ID: 20K0372-03 B 01	
	Cleanup Batch: CJC0096	Initial Volume: 2.5 mL	
	Cleaned: 09-Mar-2021	Final Volume: 2.5 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Heptachlor	76-44-8	1	0.05	0.50	ND	ug/kg	U
Aldrin	309-00-2	1	0.37	0.50	ND	ug/kg	U
trans-Chlordane (beta-Chlordane)	5103-74-2	1	0.33	0.50	ND	ug/kg	U
cis-Chlordane (alpha-chlordane)	5103-71-9	1	0.11	0.50	ND	ug/kg	U
4,4'-DDE	72-55-9	1	0.13	1.00	ND	ug/kg	U
Dieldrin	60-57-1	1	0.11	1.00	ND	ug/kg	U
4,4'-DDD	72-54-8	1	0.32	1.00	ND	ug/kg	U
4,4'-DDT	50-29-3	1	0.32	1.00	ND	ug/kg	U
Oxychlordane	27304-13-8	1	0.13	1.00	ND	ug/kg	U
cis-Nonachlor	5103-73-1	1	0.21	1.00	ND	ug/kg	U
trans-Nonachlor	39765-80-5	1	0.23	1.00	ND	ug/kg	U
Surrogate: Decachlorobiphenyl				30-160 %	94.0	%	
Surrogate: Decachlorobiphenyl [2C]				30-160 %	80.3	%	
Surrogate: Tetrachlorometaxylene				30-160 %	75.0	%	
Surrogate: Tetrachlorometaxylene [2C]				30-160 %	74.9	%	



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COA_SS-2_7.5-9.5_20201118
20K0372-03 (Solid)

Aroclor PCB

Method: EPA 8082A		Sampled: 11/18/2020 10:45	
Instrument: ECD7 Analyst: JGR		Analyzed: 12/19/2020 20:40	
Sample Preparation:	Preparation Method: EPA 3546 (Microwave)	Extract ID: 20K0372-03 D 01	
	Preparation Batch: BIK0842	Dry Weight: 12.54 g	
	Prepared: 11/28/2020	% Solids: 83.82	
Sample Cleanup:	Cleanup Method: Silica Gel	Extract ID: 20K0372-03 D 01	
	Cleanup Batch: CIL0203	Initial Volume: 2.5 mL	
	Cleaned: 19-Dec-2020	Final Volume: 2.5 mL	
Sample Cleanup:	Cleanup Method: Sulfuric Acid	Extract ID: 20K0372-03 D 01	
	Cleanup Batch: CIL0201	Initial Volume: 2.5 mL	
	Cleaned: 19-Dec-2020	Final Volume: 2.5 mL	
Sample Cleanup:	Cleanup Method: Sulfur	Extract ID: 20K0372-03 D 01	
	Cleanup Batch: CIL0202	Initial Volume: 2.5 mL	
	Cleaned: 19-Dec-2020	Final Volume: 2.5 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Aroclor 1016	12674-11-2	1	1.6	4.0	ND	ug/kg	U
Aroclor 1221	11104-28-2	1	1.6	4.0	ND	ug/kg	U
Aroclor 1232	11141-16-5	1	1.6	4.0	ND	ug/kg	U
Aroclor 1242	53469-21-9	1	1.6	4.0	ND	ug/kg	U
Aroclor 1248	12672-29-6	1	1.6	4.0	ND	ug/kg	U
Aroclor 1254	11097-69-1	1	1.6	4.0	ND	ug/kg	U
Aroclor 1260	11096-82-5	1	0.6	4.0	ND	ug/kg	U
Aroclor 1262	37324-23-5	1	0.6	4.0	ND	ug/kg	U
Aroclor 1268	11100-14-4	1	0.6	4.0	ND	ug/kg	U
Surrogate: Decachlorobiphenyl				40-126 %	71.2	%	
Surrogate: Tetrachlorometaxylene				44-120 %	67.7	%	
Surrogate: Decachlorobiphenyl [2C]				40-126 %	88.1	%	
Surrogate: Tetrachlorometaxylene [2C]				44-120 %	72.0	%	



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Reported:
25-Mar-2021 18:57

COA_SS-2_7.5-9.5_20201118
20K0372-03 (Solid)

Dioxins/Furans

Method: EPA 1613B			Sampled: 11/18/2020 10:45		
Instrument: AUTOSPEC01 Analyst: pk			Analyzed: 12/08/2020 01:58		
Sample Preparation:	Preparation Method: EPA 1613			Extract ID: 20K0372-03 C 01	
	Preparation Batch: BIL0036	Sample Size: 12.12 g (wet)		Dry Weight: 10.02 g	
	Prepared: 12/03/2020	Final Volume: 20 uL		% Solids: 82.64	
Sample Cleanup:	Cleanup Method: Silica Gel			Extract ID: 20K0372-03 C 01	
	Cleanup Batch: CIL0058	Initial Volume: 20 mL			
	Cleaned: 05-Dec-2020	Final Volume: 20 mL			
Sample Cleanup:	Cleanup Method: Sulfuric Acid			Extract ID: 20K0372-03 C 01	
	Cleanup Batch: CIL0057	Initial Volume: 20 mL			
	Cleaned: 04-Dec-2020	Final Volume: 20 mL			
Sample Cleanup:	Cleanup Method: Florisil			Extract ID: 20K0372-03 C 01	
	Cleanup Batch: CIL0059	Initial Volume: 20 mL			
	Cleaned: 05-Dec-2020	Final Volume: 20 mL			

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting		Result	Units	Notes
				EDL	Limit			
2,3,7,8-TCDF			0.655-0.886	0.063	0.094	0.998	ND	ng/kg U
2,3,7,8-TCDD			0.655-0.886	0.140	0.095	0.998	ND	ng/kg U
1,2,3,7,8-PeCDF			1.318-1.783	0.150	0.106	0.998	ND	ng/kg U
2,3,4,7,8-PeCDF			1.318-1.783	0.150	0.100	0.998	ND	ng/kg U
1,2,3,7,8-PeCDD			1.318-1.783	0.180	0.143	0.998	ND	ng/kg U
1,2,3,4,7,8-HxCDF			1.054-1.426	0.140	0.069	0.998	ND	ng/kg U
1,2,3,6,7,8-HxCDF			1.054-1.426	0.180	0.068	0.998	ND	ng/kg U
2,3,4,6,7,8-HxCDF			1.054-1.426	0.110	0.066	0.998	ND	ng/kg U
1,2,3,7,8,9-HxCDF			1.054-1.426	0.210	0.079	0.998	ND	ng/kg U
1,2,3,4,7,8-HxCDD			1.054-1.426	0.180	0.125	0.998	ND	ng/kg U
1,2,3,6,7,8-HxCDD			1.054-1.426	0.150	0.112	0.998	ND	ng/kg U
1,2,3,7,8,9-HxCDD			1.054-1.426	0.220	0.134	0.998	ND	ng/kg U
1,2,3,4,6,7,8-HpCDF		1.309	0.893-1.208	0.210	0.064	0.998	0.290	ng/kg EMPC, J
1,2,3,4,7,8,9-HpCDF			0.893-1.208	0.160	0.084	0.998	ND	ng/kg U
1,2,3,4,6,7,8-HpCDD		1.214	0.893-1.208	0.559	0.207	2.50	2.88	ng/kg EMPC
OCDF		0.689	0.757-1.024	1.10	0.316	2.50	1.20	ng/kg EMPC, J
OCDD		0.884	0.757-1.024	4.29	0.476	9.98	34.1	ng/kg B
Homologue groups								
Total TCDF						0.998	ND	ng/kg U
Total TCDD						0.998	ND	ng/kg U
Total PeCDF						0.998	ND	ng/kg U
Total PeCDD						0.998	ND	ng/kg U
Total HxCDF						0.998	0.259	ng/kg J
Total HxCDD						0.998	ND	ng/kg U
Total HpCDF						0.998	0.661	ng/kg J
Total HpCDD						0.998	5.53	ng/kg B



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Reported:
25-Mar-2021 18:57

COA_SS-2_7.5-9.5_20201118
20K0372-03 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/18/2020 10:45

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 12/08/2020 01:58

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting Limit	Result	Units	Notes
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC):				0.22			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC):				0.04			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, EMPC = ND):				0.20			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, EMPC = ND):				0.01			



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COA_SS-2_7.5-9.5_20201118
20K0372-03 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/18/2020 10:45

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 12/08/2020 01:58

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting Limit	Result	Units	Notes
Labeled compounds							
13C12-2,3,7,8-TCDF		0.781	0.655-0.886	24-169 %	72.0	%	
13C12-2,3,7,8-TCDD		0.827	0.655-0.886	25-164 %	73.8	%	
13C12-1,2,3,7,8-PeCDF		1.507	1.318-1.783	24-185 %	63.3	%	
13C12-2,3,4,7,8-PeCDF		1.531	1.318-1.783	21-178 %	63.0	%	
13C12-1,2,3,7,8-PeCDD		1.640	1.318-1.783	25-181 %	59.2	%	
13C12-1,2,3,4,7,8-HxCDF		0.481	0.434-0.587	26-152 %	74.9	%	
13C12-1,2,3,6,7,8-HxCDF		0.499	0.434-0.587	26-123 %	66.3	%	
13C12-2,3,4,6,7,8-HxCDF		0.495	0.434-0.587	28-136 %	72.2	%	
13C12-1,2,3,7,8,9-HxCDF		0.492	0.434-0.587	29-147 %	84.9	%	
13C12-1,2,3,4,7,8-HxCDD		1.275	1.054-1.426	32-141 %	78.4	%	
13C12-1,2,3,6,7,8-HxCDD		1.243	1.054-1.426	28-130 %	70.2	%	
13C12-1,2,3,4,6,7,8-HpCDF		0.462	0.374-0.506	28-143 %	67.6	%	
13C12-1,2,3,4,7,8,9-HpCDF		0.421	0.374-0.506	26-138 %	70.9	%	
13C12-1,2,3,4,6,7,8-HpCDD		1.091	0.893-1.208	23-140 %	71.2	%	
13C12-OCDD		0.927	0.757-1.024	17-157 %	48.2	%	
37Cl4-2,3,7,8-TCDD				35-197 %	82.4	%	



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COA_SS-2_7.5-9.5_20201118
20K0372-03 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/18/2020 10:45

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 12/08/2020 01:58

Analyte	DF/Split	Ion Ratio	Ratio Limits	EDL	Reporting	Result	Units	Notes
					Limit			



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COA_SS-2_7.5-9.5_20201118
20K0372-03 (Solid)

Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 11/18/2020 10:45

Instrument: ICPMS1 Analyst: MCB

Analyzed: 03/23/2021 22:01

Sample Preparation:

Preparation Method: SWN EPA 3050B

Extract ID: 20K0372-03 F 01

Preparation Batch: BJC0564

Sample Size: 1.058 g (wet)

Dry Weight: 0.91 g

Prepared: 03/22/2021

Final Volume: 50 mL

% Solids: 86.33

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Antimony	7440-36-0	20	0.02	0.22	ND	mg/kg	U
Chromium	7440-47-3	20	0.14	0.55	73.5	mg/kg	
Lead	7439-92-1	20	0.07	0.11	3.95	mg/kg	
Silver	7440-22-4	20	0.02	0.22	0.07	mg/kg	J



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1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
25-Mar-2021 18:57

COA_SS-2_7.5-9.5_20201118
20K0372-03 (Solid)

Metals and Metallic Compounds

Method: EPA 6020B UCT-KED

Sampled: 11/18/2020 10:45

Instrument: ICPMS1 Analyst: MCB

Analyzed: 03/23/2021 22:01

Sample Preparation:

Preparation Method: SWN EPA 3050B

Extract ID: 20K0372-03 F 01

Preparation Batch: BJC0564

Sample Size: 1.058 g (wet)

Dry Weight: 0.91 g

Prepared: 03/22/2021

Final Volume: 50 mL

% Solids: 86.33

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	20	0.02	0.22	4.90	mg/kg	
Cadmium	7440-43-9	20	0.03	0.11	0.13	mg/kg	
Copper	7440-50-8	20	0.37	0.55	37.4	mg/kg	
Selenium	7782-49-2	20	0.48	0.55	1.06	mg/kg	
Zinc	7440-66-6	20	0.9	4.4	60.1	mg/kg	



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Reported:
25-Mar-2021 18:57

COA_SS-2_7.5-9.5_20201118
20K0372-03 (Solid)

Metals and Metallic Compounds

Method: EPA 7471B

Sampled: 11/18/2020 10:45

Instrument: HYDRA Analyst: BLC

Analyzed: 03/23/2021 12:38

Sample Preparation:

Preparation Method: SMM EPA 7471B

Extract ID: 20K0372-03 F

Preparation Batch: BJC0610

Sample Size: 0.252 g (wet)

Dry Weight: 0.22 g

Prepared: 03/23/2021

Final Volume: 50 mL

% Solids: 86.33

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.00483	0.0230	0.0317	mg/kg	H



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Reported:
25-Mar-2021 18:57

COA_SS-2_7.5-9.5_20201118
20K0372-03 (Solid)

Wet Chemistry

Method: EPA 9060A m

Sampled: 11/18/2020 10:45

Instrument: TOC Cube Analyst: BF

Analyzed: 11/26/2020 04:51

Sample Preparation:

Preparation Method: PSEP 1986 (modified)

Extract ID: 20K0372-03 F

Preparation Batch: BIK0802

Sample Size: 0.5034 g (wet)

Dry Weight: 0.43 g

Prepared: 11/25/2020

Final Volume: 0.5034 mL

% Solids: 86.33

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Organic Carbon		1	0.02	0.02	0.11	%	



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Reported:
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COA_SS-2_7.5-9.5_20201118
20K0372-03 (Solid)

Wet Chemistry

Method: PSEP 1986

Sampled: 11/18/2020 10:45

Instrument: BAL2 Analyst: UW

Analyzed: 11/24/2020 17:15

Sample Preparation:	Preparation Method: No Prep Wet Chem	Sample Size: 10 g (wet)	Extract ID: 20K0372-03
	Preparation Batch: BIK0773	Final Volume: 10 g	Dry Weight: 8.63 g
	Prepared: 11/24/2020		% Solids: 86.33

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Volatile Solids		1	0.01	0.01	1.41	%	

Sample Preparation:	Preparation Method: No Prep Wet Chem	Sample Size: 5 g (wet)	Extract ID: 20K0372-03
	Preparation Batch: BIK0778	Final Volume: 5 g	Dry Weight: 4.32 g
	Prepared: 11/24/2020		% Solids: 86.33

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Solids, Sulfide		1	0.04	0.04	83.40	%	



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Reported:
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COA_SS-2_7.5-9.5_20201118
20K0372-03 (Solid)

Wet Chemistry

Method: SM 2540 G-97

Sampled: 11/18/2020 10:45

Instrument: BAL2 Analyst: UW

Analyzed: 11/24/2020 17:15

Sample Preparation:

Preparation Method: No Prep Wet Chem

Extract ID: 20K0372-03

Preparation Batch: BIK0773

Sample Size: 10 g (wet)

Dry Weight: 8.63 g

Prepared: 11/24/2020

Final Volume: 10 g

% Solids: 86.33

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Solids		1	0.04	0.04	86.33	%	



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Reported:
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COA_SS-2_7.5-9.5_20201118
20K0372-03 (Solid)

Wet Chemistry

Method: SM 4500-NH3 H-97
Instrument: LCHAT2 Analyst: LRB
Sample Preparation: Preparation Method: MSA 33.3 (2M KCl)
Preparation Batch: BIK0769 Sample Size: 4.53 g (wet)
Prepared: 11/24/2020 Final Volume: 40 mL
Extract ID: 20K0372-03 F
Dry Weight: 3.91 g
% Solids: 86.33

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Ammonia-N	7664-41-7	1	0.41	0.41	1.55	mg/kg NH3-N	



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Reported:
25-Mar-2021 18:57

COA_SS-2_7.5-9.5_20201118
20K0372-03 (Solid)

Wet Chemistry

Method: SM 4500-S2 D-00 (PSEP)
Instrument: UV1800-1 Analyst: CDE

Sampled: 11/18/2020 10:45
Analyzed: 12/03/2020 17:06

Sample Preparation: Preparation Method: PSEP 1986
Preparation Batch: BIK0762 Sample Size: 5.26 g (wet)
Prepared: 11/24/2020 Final Volume: 100 mL
Extract ID: 20K0372-03 G
Dry Weight: 4.39 g
% Solids: 83.40

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Sulfide	18496-25-8	1	1.14	1.14	ND	mg/kg	U



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Reported:
25-Mar-2021 18:57

COA_SS-2_7.5-9.5_20201118
20K0372-03 (Solid)

Extractions

Method: ASTM D2216	Sampled: 11/18/2020 10:45	
Instrument: N/A Analyst: NL	Analyzed: 11/26/2020 05:10	
Sample Preparation:	Preparation Method: No Prep-Organics	Extract ID: 20K0372-03
	Preparation Batch: BIK0790	Dry Weight: 0.86 g
	Prepared: 11/25/2020	% Solids: 86.33
	Sample Size: 1 g (wet)	
	Final Volume: 1 g	

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Total Solids		1	0.01	82.64	%	
Labeled compounds						



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Project: COA Outfall
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Reported:
25-Mar-2021 18:57

COA_SS-2_7.5-9.5_20201118
20K0372-03RE1 (Solid)

Dioxins/Furans

Method: EPA 1613B		Sampled: 11/18/2020 10:45	
Instrument: AUTOSPEC01 Analyst: pk		Analyzed: 03/03/2021 02:01	
Sample Preparation:	Preparation Method: EPA 1613	Extract ID: 20K0372-03RE1 C 02	
	Preparation Batch: BJB0531	Sample Size: 12.12 g (wet)	Dry Weight: 10.02 g
	Prepared: 02/23/2021	Final Volume: 20 uL	% Solids: 82.64
Sample Cleanup:	Cleanup Method: Silica Gel	Extract ID: 20K0372-03RE1 C 02	
	Cleanup Batch: CJB0177	Initial Volume: 20 mL	
	Cleaned: 25-Feb-2021	Final Volume: 20 mL	
Sample Cleanup:	Cleanup Method: Sulfuric Acid	Extract ID: 20K0372-03RE1 C 02	
	Cleanup Batch: CJB0176	Initial Volume: 20 mL	
	Cleaned: 24-Feb-2021	Final Volume: 20 mL	
Sample Cleanup:	Cleanup Method: Florisil	Extract ID: 20K0372-03RE1 C 02	
	Cleanup Batch: CJB0178	Initial Volume: 20 mL	
	Cleaned: 25-Feb-2021	Final Volume: 20 mL	

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting		Result	Units	Notes
				EDL	Limit			
2,3,7,8-TCDF			0.655-0.886	0.058	0.066	0.998	ND	ng/kg U
2,3,7,8-TCDD			0.655-0.886	0.150	0.074	0.998	ND	ng/kg U
1,2,3,7,8-PeCDF			1.318-1.783	0.240	0.097	0.998	ND	ng/kg U
2,3,4,7,8-PeCDF			1.318-1.783	0.220	0.094	0.998	ND	ng/kg U
1,2,3,7,8-PeCDD			1.318-1.783	0.170	0.120	0.998	ND	ng/kg U
1,2,3,4,7,8-HxCDF			1.054-1.426	0.280	0.063	0.998	ND	ng/kg U
1,2,3,6,7,8-HxCDF			1.054-1.426	0.200	0.062	0.998	ND	ng/kg U
2,3,4,6,7,8-HxCDF			1.054-1.426	0.170	0.062	0.998	ND	ng/kg U
1,2,3,7,8,9-HxCDF			1.054-1.426	0.190	0.074	0.998	ND	ng/kg U
1,2,3,4,7,8-HxCDD			1.054-1.426	0.170	0.098	0.998	ND	ng/kg U
1,2,3,6,7,8-HxCDD			1.054-1.426	0.180	0.104	0.998	ND	ng/kg U
1,2,3,7,8,9-HxCDD		1.578	1.054-1.426	0.220	0.104	0.998	0.132	ng/kg EMPC, J
1,2,3,4,6,7,8-HpCDF		1.381	0.893-1.208	0.210	0.070	0.998	0.209	ng/kg EMPC, J
1,2,3,4,7,8,9-HpCDF			0.893-1.208	0.240	0.094	0.998	ND	ng/kg U
1,2,3,4,6,7,8-HpCDD		1.067	0.893-1.208	0.559	0.126	2.50	2.39	ng/kg J
OCDF		1.229	0.757-1.024	1.10	0.127	2.50	1.21	ng/kg EMPC, J, B
OCDD		0.872	0.757-1.024	4.59	0.219	9.98	28.5	ng/kg B
Homologue groups								
Total TCDF						0.998	ND	ng/kg U
Total TCDD						0.998	ND	ng/kg U
Total PeCDF						0.998	ND	ng/kg U
Total PeCDD						0.998	ND	ng/kg U
Total HxCDF						0.998	ND	ng/kg U
Total HxCDD						0.998	0.988	ng/kg J
Total HpCDF						0.998	ND	ng/kg U
Total HpCDD						0.998	7.52	ng/kg



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Reported:
25-Mar-2021 18:57

COA_SS-2_7.5-9.5_20201118
20K0372-03RE1 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/18/2020 10:45

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 03/03/2021 02:01

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting Limit	Result	Units	Notes
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC):				0.19			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC):				0.05			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, EMPC = ND):				0.18			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, EMPC = ND):				0.03			



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Reported:
25-Mar-2021 18:57

COA_SS-2_7.5-9.5_20201118
20K0372-03RE1 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/18/2020 10:45

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 03/03/2021 02:01

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting Limit	Result	Units	Notes
Labeled compounds							
13C12-2,3,7,8-TCDF		0.775	0.655-0.886	24-169 %	70.5	%	
13C12-2,3,7,8-TCDD		0.793	0.655-0.886	25-164 %	71.3	%	
13C12-1,2,3,7,8-PeCDF		1.611	1.318-1.783	24-185 %	74.3	%	
13C12-2,3,4,7,8-PeCDF		1.551	1.318-1.783	21-178 %	67.6	%	
13C12-1,2,3,7,8-PeCDD		1.626	1.318-1.783	25-181 %	65.0	%	
13C12-1,2,3,4,7,8-HxCDF		0.505	0.434-0.587	26-152 %	71.6	%	
13C12-1,2,3,6,7,8-HxCDF		0.515	0.434-0.587	26-123 %	70.1	%	
13C12-2,3,4,6,7,8-HxCDF		0.508	0.434-0.587	28-136 %	71.3	%	
13C12-1,2,3,7,8,9-HxCDF		0.506	0.434-0.587	29-147 %	73.6	%	
13C12-1,2,3,4,7,8-HxCDD		1.245	1.054-1.426	32-141 %	71.8	%	
13C12-1,2,3,6,7,8-HxCDD		1.231	1.054-1.426	28-130 %	68.0	%	
13C12-1,2,3,4,6,7,8-HpCDF		0.447	0.374-0.506	28-143 %	65.4	%	
13C12-1,2,3,4,7,8,9-HpCDF		0.440	0.374-0.506	26-138 %	65.5	%	
13C12-1,2,3,4,6,7,8-HpCDD		1.121	0.893-1.208	23-140 %	72.5	%	
13C12-OCDD		0.929	0.757-1.024	17-157 %	56.8	%	
37Cl4-2,3,7,8-TCDD				35-197 %	79.6	%	



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Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
25-Mar-2021 18:57

Semivolatile Organic Compounds - Quality Control

Batch BIK0843 - EPA 3546 (Microwave)

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BIK0843-BLK1)						Prepared: 30-Nov-2020 Analyzed: 22-Dec-2020 16:16					
Phenol	ND	8.2	20.0	ug/kg							U
Benzyl Alcohol	ND	14.9	20.0	ug/kg							U
2-Methylphenol	ND	7.8	20.0	ug/kg							U
Hexachloroethane	ND	5.7	20.0	ug/kg							U
4-Methylphenol	ND	14.7	20.0	ug/kg							U
Naphthalene	ND	5.3	20.0	ug/kg							U
Benzoic acid	ND	59.1	200	ug/kg							U
2-Methylnaphthalene	ND	5.7	20.0	ug/kg							U
Acenaphthylene	ND	4.8	20.0	ug/kg							U
Dimethylphthalate	ND	6.4	20.0	ug/kg							U
Acenaphthene	ND	5.1	20.0	ug/kg							U
Dibenzofuran	ND	4.6	20.0	ug/kg							U
Fluorene	ND	5.0	20.0	ug/kg							U
Diethyl phthalate	ND	17.7	20.0	ug/kg							U
N-Nitrosodiphenylamine	ND	9.6	20.0	ug/kg							U
Hexachlorobenzene	ND	4.7	20.0	ug/kg							U
Pentachlorophenol	ND	31.3	100	ug/kg							U
Phenanthrene	ND	4.7	20.0	ug/kg							U
Anthracene	ND	5.9	20.0	ug/kg							U
Di-n-Butylphthalate	ND	5.3	20.0	ug/kg							U
Fluoranthene	ND	4.5	20.0	ug/kg							U
Pyrene	ND	5.6	20.0	ug/kg							U
Butylbenzylphthalate	ND	8.1	20.0	ug/kg							U
Benzo(a)anthracene	ND	5.2	20.0	ug/kg							U
Chrysene	ND	5.2	20.0	ug/kg							U
bis(2-Ethylhexyl)phthalate	ND	28.8	50.0	ug/kg							U
Di-n-Octylphthalate	ND	8.7	20.0	ug/kg							U
Benzo(a)fluoranthene, Total	ND	10.2	40.0	ug/kg							U
Benzo(a)pyrene	ND	6.5	20.0	ug/kg							U
Indeno(1,2,3-cd)pyrene	ND	6.0	20.0	ug/kg							U
Dibenzo(a,h)anthracene	ND	6.2	20.0	ug/kg							U
Benzo(g,h,i)perylene	ND	5.8	20.0	ug/kg							U
Surrogate: 2-Fluorophenol	524			ug/kg	750		69.8	27-120			
Surrogate: Phenol-d5	506			ug/kg	750		67.4	29-120			Q
Surrogate: 2-Chlorophenol-d4	547			ug/kg	750		73.0	31-120			



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Project: COA Outfall
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Project Manager: Ezra Beaver

Reported:
25-Mar-2021 18:57

Semivolatile Organic Compounds - Quality Control

Batch BIK0843 - EPA 3546 (Microwave)

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BIK0843-BLK1)						Prepared: 30-Nov-2020 Analyzed: 22-Dec-2020 16:16					
Surrogate: 1,2-Dichlorobenzene-d4	324			ug/kg	500		64.9	32-120			
Surrogate: Nitrobenzene-d5	423			ug/kg	500		84.6	30-120			
Surrogate: 2-Fluorobiphenyl	387			ug/kg	500		77.3	35-120			
Surrogate: 2,4,6-Tribromophenol	496			ug/kg	750		66.1	24-134			
Surrogate: p-Terphenyl-d14	405			ug/kg	500		80.9	37-120			
LCS (BIK0843-BS1)						Prepared: 30-Nov-2020 Analyzed: 22-Dec-2020 16:54					
Phenol	378	8.2	20.0	ug/kg	500		75.6	34-120			
Benzyl Alcohol	372	14.9	20.0	ug/kg	500		74.4	19-120			
2-Methylphenol	372	7.8	20.0	ug/kg	500		74.4	28-120			
Hexachloroethane	364	5.7	20.0	ug/kg	500		72.8	38-120			
4-Methylphenol	399	14.7	20.0	ug/kg	500		79.8	29-120			
Naphthalene	318	5.3	20.0	ug/kg	500		63.6	43-120			
Benzoic acid	1910	59.1	200	ug/kg	2300		82.9	10-120			
2-Methylnaphthalene	344	5.7	20.0	ug/kg	500		68.8	43-120			
Acenaphthylene	305	4.8	20.0	ug/kg	500		61.0	42-120			Q
Dimethylphthalate	384	6.4	20.0	ug/kg	500		76.8	43-120			
Acenaphthene	347	5.1	20.0	ug/kg	500		69.4	45-120			
Dibenzofuran	385	4.6	20.0	ug/kg	500		77.0	43-120			
Fluorene	358	5.0	20.0	ug/kg	500		71.6	45-120			
Diethyl phthalate	416	17.7	20.0	ug/kg	500		83.2	50-120			
N-Nitrosodiphenylamine	468	9.6	20.0	ug/kg	500		93.6	70-154			
Hexachlorobenzene	316	4.7	20.0	ug/kg	500		63.2	33-120			Q
Pentachlorophenol	1150	31.3	100	ug/kg	1300		88.6	16-120			
Phenanthrene	377	4.7	20.0	ug/kg	500		75.4	49-120			
Anthracene	364	5.9	20.0	ug/kg	500		72.8	45-120			
Di-n-Butylphthalate	428	5.3	20.0	ug/kg	500		85.5	48-126			
Fluoranthene	447	4.5	20.0	ug/kg	500		89.3	53-145			
Pyrene	452	5.6	20.0	ug/kg	500		90.4	52-134			
Butylbenzylphthalate	438	8.1	20.0	ug/kg	500		87.6	45-132			
Benzo(a)anthracene	374	5.2	20.0	ug/kg	500		74.8	49-120			
Chrysene	377	5.2	20.0	ug/kg	500		75.3	47-120			
bis(2-Ethylhexyl)phthalate	432	28.8	50.0	ug/kg	500		86.5	34-130			
Di-n-Octylphthalate	371	8.7	20.0	ug/kg	500		74.1	28-124			
Benzofluoranthenes, Total	782	10.2	40.0	ug/kg	1000		78.2	30-160			



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Project: COA Outfall
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Project Manager: Ezra Beaver

Reported:
25-Mar-2021 18:57

Semivolatile Organic Compounds - Quality Control

Batch BIK0843 - EPA 3546 (Microwave)

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BIK0843-BS1)											
Prepared: 30-Nov-2020						Analyzed: 22-Dec-2020 16:54					
Benzo(a)pyrene	365	6.5	20.0	ug/kg	500		73.0	42-120			
Indeno(1,2,3-cd)pyrene	327	6.0	20.0	ug/kg	500		65.4	42-163			Q
Dibenzo(a,h)anthracene	318	6.2	20.0	ug/kg	500		63.7	30-133			Q
Benzo(g,h,i)perylene	313	5.8	20.0	ug/kg	500		62.6	46-148			Q
Surrogate: 2-Fluorophenol	648			ug/kg	750		86.4	27-120			
Surrogate: Phenol-d5	681			ug/kg	750		90.8	29-120			Q
Surrogate: 2-Chlorophenol-d4	617			ug/kg	750		82.2	31-120			
Surrogate: 1,2-Dichlorobenzene-d4	358			ug/kg	500		71.6	32-120			
Surrogate: Nitrobenzene-d5	430			ug/kg	500		86.1	30-120			
Surrogate: 2-Fluorobiphenyl	411			ug/kg	500		82.1	35-120			
Surrogate: 2,4,6-Tribromophenol	618			ug/kg	750		82.4	24-134			
Surrogate: p-Terphenyl-d14	455			ug/kg	500		91.0	37-120			
Reference (BIK0843-SRM1)											
Prepared: 30-Nov-2020						Analyzed: 23-Dec-2020 01:38					
Phenol	3840	82.3	200	ug/kg	4870		78.9	18-182			
2-Methylphenol	4680	78.4	200	ug/kg	5870		79.7	27-174			
Hexachloroethane	1920	56.5	200	ug/kg	5770		33.3	9-191			
4-Methylphenol	5010	147	200	ug/kg	5980		83.8	10-189			
Naphthalene	806	52.5	200	ug/kg	1920		42.0	41-159			
2-Methylnaphthalene	2170	56.7	200	ug/kg	3600		60.3	51-149			
Acenaphthylene	3320	47.7	200	ug/kg	5450		61.0	57-142			Q
Acenaphthene	2910	51.3	200	ug/kg	4250		68.6	59-141			
Dibenzofuran	3060	46.1	200	ug/kg	4010		76.2	58-142			
Fluorene	4740	49.5	200	ug/kg	5780		82.0	48-152			
N-Nitrosodiphenylamine	7290	95.7	200	ug/kg	5460		133	24-176			
Hexachlorobenzene	1790	47.4	200	ug/kg	2610		68.5	41-159			Q
Pentachlorophenol	5080	313	1000	ug/kg	5820		87.2	8-192			
Phenanthrene	1740	46.9	200	ug/kg	2210		78.6	40-160			
Anthracene	2260	59.3	200	ug/kg	3240		69.7	52-148			
Fluoranthene	4370	45.2	200	ug/kg	4060		108	46-155			
Pyrene	6040	55.5	200	ug/kg	6300		95.9	27-173			
Benzo(a)anthracene	2670	51.8	200	ug/kg	3280		81.3	33-167			
Chrysene	1370	52.2	200	ug/kg	1750		78.1	62-139			
Di-n-Octylphthalate	6090	87.2	200	ug/kg	7640		79.7	7-192			
Benzo(a)pyrene	1100	64.8	200	ug/kg	1690		65.0	44-156			



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
25-Mar-2021 18:57

Semivolatile Organic Compounds - Quality Control

Batch BIK0843 - EPA 3546 (Microwave)

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Reference (BIK0843-SRM1)											
Prepared: 30-Nov-2020						Analyzed: 23-Dec-2020 01:38					
Indeno(1,2,3-cd)pyrene	2090	59.9	200	ug/kg	2670		78.4	27-173			Q
Dibenzo(a,h)anthracene	2290	61.6	200	ug/kg	3030		75.5	19-181			Q
Benzo(g,h,i)perylene	2050	58.2	200	ug/kg	2550		80.6	40-160			Q
Surrogate: 2-Fluorophenol	6430			ug/kg	7500		85.7	27-120			
Surrogate: Phenol-d5	6600			ug/kg	7500		88.0	29-120			Q
Surrogate: 2-Chlorophenol-d4	6180			ug/kg	7500		82.4	31-120			
Surrogate: 1,2-Dichlorobenzene-d4	3640			ug/kg	5000		72.8	32-120			
Surrogate: Nitrobenzene-d5	4660			ug/kg	5000		93.2	30-120			
Surrogate: 2-Fluorobiphenyl	4110			ug/kg	5000		82.3	35-120			
Surrogate: 2,4,6-Tribromophenol	5360			ug/kg	7500		71.5	24-134			
Surrogate: p-Terphenyl-d14	4740			ug/kg	5000		94.8	37-120			



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Reported:
25-Mar-2021 18:57

Semivolatile Organic Compounds - SIM - Quality Control

Batch BIK0843 - EPA 3546 (Microwave)

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BIK0843-BLK2)											
						Prepared: 30-Nov-2020 Analyzed: 22-Dec-2020 16:16					
1,4-Dichlorobenzene	ND	0.6	5.0	ug/kg							U
1,2-Dichlorobenzene	ND	0.7	5.0	ug/kg							U
2,4-Dimethylphenol	ND	2.2	20.0	ug/kg							U
1,2,4-Trichlorobenzene	ND	2.7	5.0	ug/kg							U
Hexachlorobutadiene	ND	0.7	5.0	ug/kg							U
Surrogate: 2-Fluorophenol	541			ug/kg	750		72.1	27-120			
Surrogate: p-Terphenyl-d14	363			ug/kg	500		72.5	37-120			
LCS (BIK0843-BS2)											
						Prepared: 30-Nov-2020 Analyzed: 22-Dec-2020 16:54					
1,4-Dichlorobenzene	318	0.6	5.0	ug/kg	500		63.6	36-120			Q
1,2-Dichlorobenzene	317	0.7	5.0	ug/kg	500		63.4	36-120			
2,4-Dimethylphenol	774	2.2	20.0	ug/kg	1300		59.5	10-120			
1,2,4-Trichlorobenzene	275	2.7	5.0	ug/kg	500		55.1	35-120			
Hexachlorobutadiene	308	0.7	5.0	ug/kg	500		61.6	34-120			
Surrogate: 2-Fluorophenol	670			ug/kg	750		89.3	27-120			
Surrogate: p-Terphenyl-d14	411			ug/kg	500		82.2	37-120			
Reference (BIK0843-SRM2)											
						Prepared: 30-Nov-2020 Analyzed: 23-Dec-2020 01:38					
1,4-Dichlorobenzene	1720	6.0	50.0	ug/kg	7450		23.1	12-188			Q
1,2-Dichlorobenzene	442	7.4	50.0	ug/kg	1700		26.0	17-184			
2,4-Dimethylphenol	3020	21.7	200	ug/kg	4380		69.0	19-181			
Surrogate: 2-Fluorophenol	6590			ug/kg	7500		87.9	27-120			
Surrogate: p-Terphenyl-d14	4250			ug/kg	5000		85.0	37-120			



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Reported:
25-Mar-2021 18:57

Butyl Tins - Quality Control

Batch BIK0863 - EPA 3546 (Microwave)

Instrument: NT8 Analyst: JZ

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BIK0863-BLK1)											
						Prepared: 30-Nov-2020 Analyzed: 17-Dec-2020 13:33					
Tributyltin Ion	ND	0.450	3.86	ug/kg							U
Dibutyltin Ion	ND	1.73	5.78	ug/kg							U
Butyltin Ion	ND	1.89	4.08	ug/kg							U
Tetrabutyltin	ND	5.00	5.00	ug/kg							U
Surrogate: Triphenyltin	45.7			ug/kg	45.2	101		30-160			
Surrogate: Tripropyltin	29.2			ug/kg	43.7	66.6		30-160			
LCS (BIK0863-BS1)											
						Prepared: 30-Nov-2020 Analyzed: 17-Dec-2020 13:50					
Tributyltin Ion	35.4	0.450	3.86	ug/kg	44.6	79.4		30-160			
Dibutyltin Ion	34.0	1.73	5.78	ug/kg	38.4	88.6		30-160			
Butyltin Ion	27.9	1.89	4.08	ug/kg	31.2	89.6		30-160			
Surrogate: Triphenyltin	46.8			ug/kg	45.2	104		30-160			
Surrogate: Tripropyltin	29.1			ug/kg	43.7	66.6		30-160			
Reference (BIK0863-SRM1)											
						Prepared: 30-Nov-2020 Analyzed: 17-Dec-2020 14:06					
Tributyltin Ion	483	2.25	19.3	ug/kg	430	112		50-150			
Dibutyltin Ion	573	8.65	28.9	ug/kg	631	90.8		50-150			
Butyltin Ion	639	9.45	20.4	ug/kg	1470	43.5		50-150			*
Surrogate: Triphenyltin	259			ug/kg	226	115		30-160			
Surrogate: Tripropyltin	151			ug/kg	219	68.9		30-160			



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Project: COA Outfall
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Reported:
25-Mar-2021 18:57

Chlorinated Pesticides - Quality Control

Batch BJB0764 - EPA 3546 (Microwave)

Instrument: ECD6 Analyst: YZ/VTs

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJB0764-BLK1)											
						Prepared: 26-Feb-2021 Analyzed: 15-Mar-2021 16:11					
Heptachlor	ND	0.05	0.50	ug/kg							U
Aldrin	ND	0.37	0.50	ug/kg							U
trans-Chlordane (beta-Chlordane)	ND	0.33	0.50	ug/kg							U
cis-Chlordane (alpha-chlordane)	ND	0.11	0.50	ug/kg							U
4,4'-DDE	ND	0.14	1.00	ug/kg							U
Dieldrin	ND	0.12	1.00	ug/kg							U
4,4'-DDD	ND	0.32	1.00	ug/kg							U
4,4'-DDT	ND	0.33	1.00	ug/kg							U
Oxychlordane	ND	0.13	1.00	ug/kg							U
cis-Nonachlor	ND	0.21	1.00	ug/kg							U
trans-Nonachlor	ND	0.23	1.00	ug/kg							U
Surrogate: Decachlorobiphenyl	7.19			ug/kg	8.00		89.8	30-160			
Surrogate: Decachlorobiphenyl [2C]	5.68			ug/kg	8.00		71.1	30-160			
Surrogate: Tetrachlorometaxylene	5.44			ug/kg	8.00		68.0	30-160			
Surrogate: Tetrachlorometaxylene [2C]	5.53			ug/kg	8.00		69.1	30-160			
LCS (BJB0764-BS1)											
						Prepared: 26-Feb-2021 Analyzed: 15-Mar-2021 16:29					
Heptachlor	2.94	0.05	0.50	ug/kg	4.00		73.4	26-120			
Aldrin [2C]	3.02	0.37	0.50	ug/kg	4.00		75.5	26-120			
trans-Chlordane (beta-Chlordane)	3.57	0.33	0.50	ug/kg	4.00		89.3	21-120			
cis-Chlordane (alpha-chlordane)	3.36	0.11	0.50	ug/kg	4.00		84.0	39-120			
4,4'-DDE [2C]	6.82	0.14	1.00	ug/kg	8.00		85.2	35-120			
Dieldrin	7.04	0.12	1.00	ug/kg	8.00		88.0	10-140			
4,4'-DDD	6.91	0.32	1.00	ug/kg	8.00		86.3	50-120			
4,4'-DDT	6.75	0.33	1.00	ug/kg	8.00		84.4	39-120			
Surrogate: Decachlorobiphenyl	7.15			ug/kg	8.00		89.4	30-160			
Surrogate: Decachlorobiphenyl [2C]	6.42			ug/kg	8.00		80.2	30-160			
Surrogate: Tetrachlorometaxylene	5.55			ug/kg	8.00		69.4	30-160			
Surrogate: Tetrachlorometaxylene [2C]	5.83			ug/kg	8.00		72.8	30-160			
LCS (BJB0764-BS2)											
						Prepared: 26-Feb-2021 Analyzed: 15-Mar-2021 16:48					
Oxychlordane [2C]	5.49	0.13	1.00	ug/kg	8.00		68.6	30-160			
cis-Nonachlor	5.59	0.21	1.00	ug/kg	8.00		69.9	30-160			
trans-Nonachlor	6.00	0.23	1.00	ug/kg	8.00		74.9	30-160			



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Reported:
25-Mar-2021 18:57

Chlorinated Pesticides - Quality Control

Batch BJB0764 - EPA 3546 (Microwave)

Instrument: ECD6 Analyst: YZ/VTs

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BJB0764-BS2)						Prepared: 26-Feb-2021	Analyzed: 15-Mar-2021 16:48				
Surrogate: Decachlorobiphenyl	6.70			ug/kg	8.00		83.8	30-160			
Surrogate: Decachlorobiphenyl [2C]	5.70			ug/kg	8.00		71.3	30-160			
Surrogate: Tetrachlorometaxylene	5.08			ug/kg	8.00		63.5	30-160			
Surrogate: Tetrachlorometaxylene [2C]	5.28			ug/kg	8.00		65.9	30-160			
Reference (BJB0764-SRM1)						Prepared: 26-Feb-2021	Analyzed: 16-Mar-2021 00:21				
4,4'-DDE [2C]	355	3.38	25.0	ug/kg	315		113	1-199			D
Dieldrin [2C]	95.8	2.88	25.0	ug/kg	53.3		180	0-238			P1, D
4,4'-DDD	134	8.00	25.0	ug/kg	120		112	8-192			D
4,4'-DDT	124	8.13	25.0	ug/kg	92.1		135	0-227			D
Surrogate: Decachlorobiphenyl	125			ug/kg	100		125	30-160			
Surrogate: Decachlorobiphenyl [2C]	84.0			ug/kg	100		84.0	30-160			
Surrogate: Tetrachlorometaxylene	74.6			ug/kg	100		74.6	30-160			
Surrogate: Tetrachlorometaxylene [2C]	80.2			ug/kg	100		80.2	30-160			



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Project: COA Outfall
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Reported:
25-Mar-2021 18:57

Aroclor PCB - Quality Control

Batch BIK0842 - EPA 3546 (Microwave)

Instrument: ECD7 Analyst: JGR

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BIK0842-BLK1)											
						Prepared: 28-Nov-2020 Analyzed: 19-Dec-2020 15:11					
Aroclor 1016	ND	1.6	4.0	ug/kg							U
Aroclor 1221	ND	1.6	4.0	ug/kg							U
Aroclor 1232	ND	1.6	4.0	ug/kg							U
Aroclor 1242	ND	1.6	4.0	ug/kg							U
Aroclor 1248	ND	1.6	4.0	ug/kg							U
Aroclor 1254	ND	1.6	4.0	ug/kg							U
Aroclor 1260	ND	0.6	4.0	ug/kg							U
Aroclor 1262	ND	0.6	4.0	ug/kg							U
Aroclor 1268	ND	0.6	4.0	ug/kg							U
Surrogate: Decachlorobiphenyl	6.36			ug/kg	8.00		79.5	40-126			
Surrogate: Tetrachlorometaxylene	6.14			ug/kg	8.00		76.8	44-120			
Surrogate: Decachlorobiphenyl [2C]	7.42			ug/kg	8.00		92.8	40-126			
Surrogate: Tetrachlorometaxylene [2C]	6.19			ug/kg	8.00		77.4	44-120			
LCS (BIK0842-BS1)											
						Prepared: 28-Nov-2020 Analyzed: 19-Dec-2020 15:32					
Aroclor 1016 [2C]	82.6	1.6	4.0	ug/kg	101		82.0	56-120			
Aroclor 1260 [2C]	99.8	0.6	4.0	ug/kg	101		99.0	58-120			
Surrogate: Decachlorobiphenyl	6.30			ug/kg	8.00		78.8	40-126			
Surrogate: Tetrachlorometaxylene	5.93			ug/kg	8.00		74.1	44-120			
Surrogate: Decachlorobiphenyl [2C]	7.45			ug/kg	8.00		93.2	40-126			
Surrogate: Tetrachlorometaxylene [2C]	5.72			ug/kg	8.00		71.5	44-120			
Reference (BIK0842-SRM1)											
						Prepared: 28-Nov-2020 Analyzed: 19-Dec-2020 21:01					
Aroclor 1248 [2C]	1490	19.5	50.0	ug/kg	1520		98.0	20-180			
Surrogate: Decachlorobiphenyl	70.2			ug/kg	100		70.2	40-126			
Surrogate: Tetrachlorometaxylene	65.3			ug/kg	100		65.3	44-120			
Surrogate: Decachlorobiphenyl [2C]	91.3			ug/kg	100		91.3	40-126			
Surrogate: Tetrachlorometaxylene [2C]	69.4			ug/kg	100		69.4	44-120			



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Project: COA Outfall
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Reported:
25-Mar-2021 18:57

Dioxins/Furans - Quality Control

Batch BIL0036 - EPA 1613

Instrument: AUTOSPEC01 Analyst: pl

QC Sample/Analyte	Ion Ratio	Ratio Limits	EDL	Reporting Limit	Result	Units	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BIL0036-BLK1)											
				Prepared: 03-Dec-2020		Analyzed: 07-Dec-2020 13:31					
2,3,7,8-TCDF		0.655-0.886	0.163	1.00	ND	ng/kg					U
2,3,7,8-TCDD		0.655-0.886	0.127	1.00	ND	ng/kg					U
1,2,3,7,8-PeCDF		1.318-1.783	0.115	1.00	ND	ng/kg					U
2,3,4,7,8-PeCDF		1.318-1.783	0.100	1.00	ND	ng/kg					U
1,2,3,7,8-PeCDD		1.318-1.783	0.135	1.00	ND	ng/kg					U
1,2,3,4,7,8-HxCDF		1.054-1.426	0.085	1.00	ND	ng/kg					U
1,2,3,6,7,8-HxCDF		1.054-1.426	0.079	1.00	ND	ng/kg					U
2,3,4,6,7,8-HxCDF		1.054-1.426	0.086	1.00	ND	ng/kg					U
1,2,3,7,8,9-HxCDF		1.054-1.426	0.126	1.00	ND	ng/kg					U
1,2,3,4,7,8-HxCDD		1.054-1.426	0.122	1.00	ND	ng/kg					U
1,2,3,6,7,8-HxCDD		1.054-1.426	0.107	1.00	ND	ng/kg					U
1,2,3,7,8,9-HxCDD		1.054-1.426	0.129	1.00	ND	ng/kg					U
1,2,3,4,6,7,8-HpCDF		0.893-1.208	0.065	1.00	ND	ng/kg					U
1,2,3,4,7,8,9-HpCDF		0.893-1.208	0.103	1.00	ND	ng/kg					U
1,2,3,4,6,7,8-HpCDD		0.893-1.208	0.212	2.50	ND	ng/kg					U
OCDF		0.757-1.024	0.381	2.50	ND	ng/kg					U
OCDD	1.008	0.757-1.024		10.0	2.35	ng/kg					J
Homologue group											
Total TCDF				1.00	ND	ng/kg					U
Total TCDD				1.00	ND	ng/kg					U
Total PeCDF				1.00	ND	ng/kg					U
Total PeCDD				1.00	ND	ng/kg					U
Total HxCDF				1.00	ND	ng/kg					U
Total HxCDD				1.00	ND	ng/kg					U
Total HpCDF				1.00	ND	ng/kg					U
Total HpCDD				1.00	0.0967	ng/kg					

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC): 0.10
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC): 0.00
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, EMPC=ND): 0.10
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0 EDL, EMPC=ND): 0.00



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Reported:
25-Mar-2021 18:57

Dioxins/Furans - Quality Control

Batch BIL0036 - EPA 1613

Instrument: AUTOSPEC01 Analyst: pl

QC Sample/Analyte	Ion Ratio	Ratio Limits	EDL	Reporting Limit	Result	Units	%REC	Limits	RPD	Limit	Notes
Blank (BIL0036-BLK1)				Prepared: 03-Dec-2020		Analyzed: 07-Dec-2020 13:31					
Labeled compounds											
13C12-2,3,7,8-TCDF	0.752	0.655-0.886			66.0					24-169 %	
13C12-2,3,7,8-TCDD	0.798	0.655-0.886			66.2					25-164 %	
13C12-1,2,3,7,8-PeCDF	1.598	1.318-1.783			58.5					24-185 %	
13C12-2,3,4,7,8-PeCDF	1.573	1.318-1.783			58.3					21-178 %	
13C12-1,2,3,7,8-PeCDD	1.773	1.318-1.783			58.7					25-181 %	
13C12-1,2,3,4,7,8-HxCDF	0.489	0.434-0.587			68.9					26-152 %	
13C12-1,2,3,6,7,8-HxCDF	0.480	0.434-0.587			75.7					26-123 %	
13C12-2,3,4,6,7,8-HxCDF	0.509	0.434-0.587			66.0					28-136 %	
13C12-1,2,3,7,8,9-HxCDF	0.505	0.434-0.587			59.9					29-147 %	
13C12-1,2,3,4,7,8-HxCDD	1.268	1.054-1.426			71.1					32-141 %	
13C12-1,2,3,6,7,8-HxCDD	1.293	1.054-1.426			75.4					28-130 %	
13C12-1,2,3,4,6,7,8-HpCDF	0.389	0.374-0.506			62.9					28-143 %	
13C12-1,2,3,4,7,8,9-HpCDF	0.414	0.374-0.506			55.9					26-138 %	
13C12-1,2,3,4,6,7,8-HpCDD	1.103	0.893-1.208			68.4					23-140 %	
13C12-OCDD	0.903	0.757-1.024			41.0					17-157 %	
37Cl4-2,3,7,8-TCDD					87.8					35-197 %	
LCS (BIL0036-BS1)				Prepared: 03-Dec-2020		Analyzed: 07-Dec-2020 14:20					
2,3,7,8-TCDF	0.776	0.655-0.886		1.00	19.5	ng/kg	97.5	75-158 %			
2,3,7,8-TCDD	0.775	0.655-0.886		1.00	18.9	ng/kg	94.4	67-158 %			
1,2,3,7,8-PeCDF	1.677	1.318-1.783		1.00	96.5	ng/kg	96.5	80-134 %			
2,3,4,7,8-PeCDF	1.755	1.318-1.783		1.00	95.6	ng/kg	95.6	68-160 %			
1,2,3,7,8-PeCDD	1.449	1.318-1.783		1.00	107	ng/kg	107	70-142 %			
1,2,3,4,7,8-HxCDF	1.365	1.054-1.426		1.00	99.1	ng/kg	99.1	72-134 %			
1,2,3,6,7,8-HxCDF	1.387	1.054-1.426		1.00	98.0	ng/kg	98.0	84-130 %			
2,3,4,6,7,8-HxCDF	1.295	1.054-1.426		1.00	95.1	ng/kg	95.1	70-156 %			
1,2,3,7,8,9-HxCDF	1.340	1.054-1.426		1.00	96.6	ng/kg	96.6	78-130 %			
1,2,3,4,7,8-HxCDD	1.252	1.054-1.426		1.00	109	ng/kg	109	70-164 %			
1,2,3,6,7,8-HxCDD	1.160	1.054-1.426		1.00	106	ng/kg	106	76-134 %			
1,2,3,7,8,9-HxCDD	1.226	1.054-1.426		1.00	96.9	ng/kg	96.9	64-162 %			
1,2,3,4,6,7,8-HpCDF	1.161	0.893-1.208		1.00	87.0	ng/kg	87.0	82-122 %			
1,2,3,4,7,8,9-HpCDF	0.956	0.893-1.208		1.00	96.8	ng/kg	96.8	78-138 %			
1,2,3,4,6,7,8-HpCDD	1.076	0.893-1.208		2.50	106	ng/kg	106	70-140 %			
OCDF	0.932	0.757-1.024		2.50	217	ng/kg	109	63-170 %			
OCDD	0.891	0.757-1.024		10.0	214	ng/kg	107	78-144 %			B



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
25-Mar-2021 18:57

Dioxins/Furans - Quality Control

Batch BIL0036 - EPA 1613

Instrument: AUTOSPEC01 Analyst: pl

QC Sample/Analyte	Ion Ratio	Ratio Limits	EDL	Reporting Limit	Result	Units	%REC	Limits	RPD	RPD Limit	Notes
LCS (BIL0036-BS1)					Prepared: 03-Dec-2020 Analyzed: 07-Dec-2020 14:20						
Labeled compounds											
13C12-2,3,7,8-TCDF	0.772	0.655-0.886				70.5				24-169 %	
13C12-2,3,7,8-TCDD	0.798	0.655-0.886				69.2				25-164 %	
13C12-1,2,3,7,8-PeCDF	1.681	1.318-1.783				60.4				24-185 %	
13C12-2,3,4,7,8-PeCDF	1.524	1.318-1.783				58.9				21-178 %	
13C12-1,2,3,7,8-PeCDD	1.716	1.318-1.783				58.0				25-181 %	
13C12-1,2,3,4,7,8-HxCDF	0.491	0.434-0.587				81.4				26-152 %	
13C12-1,2,3,6,7,8-HxCDF	0.457	0.434-0.587				82.2				26-123 %	
13C12-2,3,4,6,7,8-HxCDF	0.480	0.434-0.587				75.1				28-136 %	
13C12-1,2,3,7,8,9-HxCDF	0.516	0.434-0.587				69.1				29-147 %	
13C12-1,2,3,4,7,8-HxCDD	1.263	1.054-1.426				76.2				32-141 %	
13C12-1,2,3,6,7,8-HxCDD	1.331	1.054-1.426				81.6				28-130 %	
13C12-1,2,3,4,6,7,8-HpCDF	0.409	0.374-0.506				80.0				28-143 %	
13C12-1,2,3,4,7,8,9-HpCDF	0.414	0.374-0.506				67.8				26-138 %	
13C12-1,2,3,4,6,7,8-HpCDD	1.085	0.893-1.208				71.4				23-140 %	
13C12-OCDD	0.963	0.757-1.024				45.0				17-157 %	
37Cl4-2,3,7,8-TCDD						81.6				35-197 %	



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
25-Mar-2021 18:57

Dioxins/Furans - Quality Control

Batch BJB0531 - EPA 1613

Instrument: AUTOSPEC01 Analyst: pl

QC Sample/Analyte	Ion Ratio	Ratio Limits	EDL	Reporting Limit	Result	Units	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJB0531-BLK1)											
				Prepared: 23-Feb-2021		Analyzed: 02-Mar-2021 12:44					
2,3,7,8-TCDF		0.655-0.886	0.086	1.00	ND	ng/kg					U
2,3,7,8-TCDD		0.655-0.886	0.091	1.00	ND	ng/kg					U
1,2,3,7,8-PeCDF	1.063	1.318-1.783		1.00	0.0828	ng/kg					EMPC, J
2,3,4,7,8-PeCDF		1.318-1.783	0.083	1.00	ND	ng/kg					U
1,2,3,7,8-PeCDD		1.318-1.783	0.115	1.00	ND	ng/kg					U
1,2,3,4,7,8-HxCDF		1.054-1.426	0.085	1.00	ND	ng/kg					U
1,2,3,6,7,8-HxCDF		1.054-1.426	0.087	1.00	ND	ng/kg					U
2,3,4,6,7,8-HxCDF		1.054-1.426	0.085	1.00	ND	ng/kg					U
1,2,3,7,8,9-HxCDF		1.054-1.426	0.107	1.00	ND	ng/kg					U
1,2,3,4,7,8-HxCDD		1.054-1.426	0.082	1.00	ND	ng/kg					U
1,2,3,6,7,8-HxCDD		1.054-1.426	0.081	1.00	ND	ng/kg					U
1,2,3,7,8,9-HxCDD		1.054-1.426	0.084	1.00	ND	ng/kg					U
1,2,3,4,6,7,8-HpCDF		0.893-1.208	0.104	1.00	ND	ng/kg					U
1,2,3,4,7,8,9-HpCDF		0.893-1.208	0.136	1.00	ND	ng/kg					U
1,2,3,4,6,7,8-HpCDD		0.893-1.208	0.132	2.50	ND	ng/kg					U
OCDF	0.763	0.757-1.024		2.50	2.46	ng/kg					J
OCDD	0.776	0.757-1.024		10.0	0.833	ng/kg					J
Homologue group											
Total TCDF				1.00	ND	ng/kg					U
Total TCDD				1.00	ND	ng/kg					U
Total PeCDF				1.00	ND	ng/kg					U
Total PeCDD				1.00	ND	ng/kg					U
Total HxCDF				1.00	ND	ng/kg					U
Total HxCDD				1.00	ND	ng/kg					U
Total HpCDF				1.00	0.112	ng/kg					
Total HpCDD				1.00	ND	ng/kg					U

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC): 0.08
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC): 0.00
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, EMPC=ND): 0.08
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0 EDL, EMPC=ND): 0.00



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
25-Mar-2021 18:57

Dioxins/Furans - Quality Control

Batch BJB0531 - EPA 1613

Instrument: AUTOSPEC01 Analyst: pl

QC Sample/Analyte	Ion Ratio	Ratio Limits	EDL	Reporting Limit	Result	Units	%REC	%REC Limits	RPD	RPD Limit	Notes
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Blank (BJB0531-BLK1)

Prepared: 23-Feb-2021 Analyzed: 02-Mar-2021 12:44

Labeled compounds

13C12-2,3,7,8-TCDF	0.778	0.655-0.886			85.1					24-169 %	
13C12-2,3,7,8-TCDD	0.789	0.655-0.886			83.8					25-164 %	
13C12-1,2,3,4,7,8-PeCDF	1.533	1.318-1.783			81.7					24-185 %	
13C12-2,3,4,7,8-PeCDF	1.507	1.318-1.783			80.6					21-178 %	
13C12-1,2,3,7,8-PeCDD	1.628	1.318-1.783			80.0					25-181 %	
13C12-1,2,3,4,7,8-HxCDF	0.506	0.434-0.587			88.8					26-152 %	
13C12-1,2,3,6,7,8-HxCDF	0.522	0.434-0.587			88.3					26-123 %	
13C12-2,3,4,6,7,8-HxCDF	0.502	0.434-0.587			86.6					28-136 %	
13C12-1,2,3,7,8,9-HxCDF	0.500	0.434-0.587			84.7					29-147 %	
13C12-1,2,3,4,7,8-HxCDD	1.261	1.054-1.426			89.8					32-141 %	
13C12-1,2,3,6,7,8-HxCDD	1.245	1.054-1.426			85.3					28-130 %	
13C12-1,2,3,4,6,7,8-HpCDF	0.447	0.374-0.506			75.4					28-143 %	
13C12-1,2,3,4,7,8,9-HpCDF	0.439	0.374-0.506			77.0					26-138 %	
13C12-1,2,3,4,6,7,8-HpCDD	1.036	0.893-1.208			81.0					23-140 %	
13C12-OCDD	0.885	0.757-1.024			52.5					17-157 %	
37Cl4-2,3,7,8-TCDD					92.0					35-197 %	

LCS (BJB0531-BS1)

Prepared: 23-Feb-2021 Analyzed: 02-Mar-2021 13:33

2,3,7,8-TCDF	0.774	0.655-0.886	1.00	22.2	ng/kg	111	75-158 %		
2,3,7,8-TCDD	0.786	0.655-0.886	1.00	21.0	ng/kg	105	67-158 %		
1,2,3,7,8-PeCDF	1.740	1.318-1.783	1.00	102	ng/kg	102	80-134 %		B
2,3,4,7,8-PeCDF	1.633	1.318-1.783	1.00	102	ng/kg	102	68-160 %		
1,2,3,7,8-PeCDD	1.563	1.318-1.783	1.00	109	ng/kg	109	70-142 %		
1,2,3,4,7,8-HxCDF	1.253	1.054-1.426	1.00	104	ng/kg	104	72-134 %		
1,2,3,6,7,8-HxCDF	1.215	1.054-1.426	1.00	111	ng/kg	111	84-130 %		
2,3,4,6,7,8-HxCDF	1.285	1.054-1.426	1.00	105	ng/kg	105	70-156 %		
1,2,3,7,8,9-HxCDF	1.264	1.054-1.426	1.00	104	ng/kg	104	78-130 %		
1,2,3,4,7,8-HxCDD	1.215	1.054-1.426	1.00	109	ng/kg	109	70-164 %		
1,2,3,6,7,8-HxCDD	1.135	1.054-1.426	1.00	110	ng/kg	110	76-134 %		
1,2,3,7,8,9-HxCDD	1.258	1.054-1.426	1.00	106	ng/kg	106	64-162 %		
1,2,3,4,6,7,8-HpCDF	1.053	0.893-1.208	1.00	110	ng/kg	110	82-122 %		
1,2,3,4,7,8,9-HpCDF	1.033	0.893-1.208	1.00	107	ng/kg	107	78-138 %		
1,2,3,4,6,7,8-HpCDD	1.055	0.893-1.208	2.50	105	ng/kg	105	70-140 %		
OCDF	1.021	0.757-1.024	2.50	181	ng/kg	90.3	63-170 %		B
OCDD	0.889	0.757-1.024	10.0	182	ng/kg	91.0	78-144 %		B



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
25-Mar-2021 18:57

Dioxins/Furans - Quality Control

Batch BJB0531 - EPA 1613

Instrument: AUTOSPEC01 Analyst: pl

QC Sample/Analyte	Ion Ratio	Ratio Limits	EDL	Reporting Limit	Result	Units	%REC	Limits	RPD	RPD Limit	Notes
LCS (BJB0531-BS1)				Prepared: 23-Feb-2021	Analyzed: 02-Mar-2021 13:33						
Labeled compounds											
13C12-2,3,7,8-TCDF	0.783	0.655-0.886			79.2				24-169 %		
13C12-2,3,7,8-TCDD	0.788	0.655-0.886			80.0				25-164 %		
13C12-1,2,3,7,8-PeCDF	1.517	1.318-1.783			81.8				24-185 %		
13C12-2,3,4,7,8-PeCDF	1.507	1.318-1.783			77.7				21-178 %		
13C12-1,2,3,7,8-PeCDD	1.651	1.318-1.783			76.0				25-181 %		
13C12-1,2,3,4,7,8-HxCDF	0.515	0.434-0.587			83.5				26-152 %		
13C12-1,2,3,6,7,8-HxCDF	0.516	0.434-0.587			81.9				26-123 %		
13C12-2,3,4,6,7,8-HxCDF	0.517	0.434-0.587			80.9				28-136 %		
13C12-1,2,3,7,8,9-HxCDF	0.516	0.434-0.587			78.7				29-147 %		
13C12-1,2,3,4,7,8-HxCDD	1.289	1.054-1.426			81.6				32-141 %		
13C12-1,2,3,6,7,8-HxCDD	1.239	1.054-1.426			78.8				28-130 %		
13C12-1,2,3,4,6,7,8-HpCDF	0.411	0.374-0.506			73.8				28-143 %		
13C12-1,2,3,4,7,8,9-HpCDF	0.437	0.374-0.506			73.2				26-138 %		
13C12-1,2,3,4,6,7,8-HpCDD	1.119	0.893-1.208			77.5				23-140 %		
13C12-OCDD	0.892	0.757-1.024			60.2				17-157 %		
37Cl4-2,3,7,8-TCDD					84.3				35-197 %		
Reference (BJB0531-SRM1)				Prepared: 23-Feb-2021	Analyzed: 02-Mar-2021 14:22						
2,3,7,8-TCDF	0.834	0.655-0.886		2.00	1.30	ng/kg	117	50-150 %			J
2,3,7,8-TCDD	0.679	0.655-0.886		2.00	1.21	ng/kg	115	50-150 %			J
1,2,3,7,8-PeCDF	1.475	1.318-1.783		2.00	1.76	ng/kg	143	50-150 %			J, B
2,3,4,7,8-PeCDF	2.153	1.318-1.783		2.00	1.17	ng/kg	110	50-150 %			EMPC, J
1,2,3,7,8-PeCDD	1.685	1.318-1.783		2.00	1.39	ng/kg	129	50-150 %			J
1,2,3,4,7,8-HxCDF	1.367	1.054-1.426		2.00	3.38	ng/kg	112	50-150 %			
1,2,3,6,7,8-HxCDF	1.207	1.054-1.426		2.00	1.25	ng/kg	115	50-150 %			J
2,3,4,6,7,8-HxCDF	1.343	1.054-1.426		2.00	2.22	ng/kg	121	50-150 %			
1,2,3,7,8,9-HxCDF	1.130	1.054-1.426		2.00	0.477	ng/kg	93.4	50-150 %			J
1,2,3,4,7,8-HxCDD	1.258	1.054-1.426		2.00	1.41	ng/kg	88.6	50-150 %			J
1,2,3,6,7,8-HxCDD	1.137	1.054-1.426		2.00	3.82	ng/kg	98.6	50-150 %			
1,2,3,7,8,9-HxCDD	1.318	1.054-1.426		2.00	2.78	ng/kg	91.4	50-150 %			
1,2,3,4,6,7,8-HpCDF	1.139	0.893-1.208		2.00	20.9	ng/kg	112	50-150 %			
1,2,3,4,7,8,9-HpCDF	1.132	0.893-1.208		2.00	1.47	ng/kg	90.1	50-150 %			J
1,2,3,4,6,7,8-HpCDD	1.031	0.893-1.208		5.00	99.4	ng/kg	110	50-150 %			
OCDF	0.970	0.757-1.024		5.00	54.2	ng/kg	92.9	50-150 %			B
OCDD	0.872	0.757-1.024		20.0	763	ng/kg	94.0	50-150 %			B



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
25-Mar-2021 18:57

Dioxins/Furans - Quality Control

Batch BJB0531 - EPA 1613

Instrument: AUTOSPEC01 Analyst: pl

QC Sample/Analyte	Ion Ratio	Ratio Limits	EDL	Reporting Limit	Result	Units	%REC	Limits	RPD	RPD Limit	Notes
Reference (BJB0531-SRM1)				Prepared: 23-Feb-2021	Analyzed: 02-Mar-2021 14:22						
Labeled compounds											
13C12-2,3,7,8-TCDF	0.793	0.655-0.886				104				24-169 %	
13C12-2,3,7,8-TCDD	0.802	0.655-0.886				93.1				25-164 %	
13C12-1,2,3,7,8-PeCDF	1.575	1.318-1.783				101				24-185 %	
13C12-2,3,4,7,8-PeCDF	1.519	1.318-1.783				101				21-178 %	
13C12-1,2,3,7,8-PeCDD	1.646	1.318-1.783				94.2				25-181 %	
13C12-1,2,3,4,7,8-HxCDF	0.514	0.434-0.587				93.5				26-152 %	
13C12-1,2,3,6,7,8-HxCDF	0.511	0.434-0.587				90.8				26-123 %	
13C12-2,3,4,6,7,8-HxCDF	0.517	0.434-0.587				93.8				28-136 %	
13C12-1,2,3,7,8,9-HxCDF	0.521	0.434-0.587				84.8				29-147 %	
13C12-1,2,3,4,7,8-HxCDD	1.280	1.054-1.426				89.9				32-141 %	
13C12-1,2,3,6,7,8-HxCDD	1.276	1.054-1.426				83.5				28-130 %	
13C12-1,2,3,4,6,7,8-HpCDF	0.440	0.374-0.506				88.0				28-143 %	
13C12-1,2,3,4,7,8,9-HpCDF	0.434	0.374-0.506				93.3				26-138 %	
13C12-1,2,3,4,6,7,8-HpCDD	1.041	0.893-1.208				93.5				23-140 %	
13C12-OCDD	0.945	0.757-1.024				71.0				17-157 %	
37Cl4-2,3,7,8-TCDD						100				35-197 %	



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
25-Mar-2021 18:57

Metals and Metallic Compounds - Quality Control

Batch BIK0835 - SWN EPA 3050B

Instrument: ICPMS1 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BIK0835-BLK1)						Prepared: 27-Nov-2020 Analyzed: 02-Dec-2020 16:43						
Antimony	121	0.02	0.02	0.20	mg/kg							J
Antimony	123	ND	0.03	0.20	mg/kg							U
Chromium	52	ND	0.13	0.50	mg/kg							U
Chromium	53	ND	0.07	0.50	mg/kg							U
Lead	208	ND	0.07	0.10	mg/kg							U
Silver	107	ND	0.02	0.20	mg/kg							U
Arsenic	75a	ND	0.02	0.20	mg/kg							U
Cadmium	111	ND	0.03	0.10	mg/kg							U
Cadmium	114	ND	0.04	0.10	mg/kg							U
Copper	63	ND	0.34	0.50	mg/kg							U
Copper	65	ND	0.35	0.50	mg/kg							U
Selenium	78	ND	0.44	0.50	mg/kg							U
Zinc	66	1.0	0.8	4.0	mg/kg							J
Zinc	67	1.0	0.9	4.0	mg/kg							J

LCS (BIK0835-BS1)						Prepared: 27-Nov-2020 Analyzed: 02-Dec-2020 16:47						
Antimony	121	25.4	0.02	0.20	mg/kg	25.0		102	80-120			
Antimony	123	26.0	0.03	0.20	mg/kg	25.0		104	80-120			
Chromium	52	26.7	0.13	0.50	mg/kg	25.0		107	80-120			
Chromium	53	26.6	0.07	0.50	mg/kg	25.0		106	80-120			
Lead	208	25.1	0.07	0.10	mg/kg	25.0		101	80-120			
Silver	107	24.5	0.02	0.20	mg/kg	25.0		97.9	80-120			
Arsenic	75a	23.6	0.02	0.20	mg/kg	25.0		94.3	80-120			
Cadmium	111	24.1	0.03	0.10	mg/kg	25.0		96.5	80-120			
Cadmium	114	24.1	0.04	0.10	mg/kg	25.0		96.4	80-120			
Copper	63	25.7	0.34	0.50	mg/kg	25.0		103	80-120			
Copper	65	25.7	0.35	0.50	mg/kg	25.0		103	80-120			
Selenium	78	74.4	0.44	0.50	mg/kg	80.0		93.0	80-120			
Zinc	66	76.9	0.8	4.0	mg/kg	80.0		96.1	80-120			
Zinc	67	74.7	0.9	4.0	mg/kg	80.0		93.4	80-120			



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
25-Mar-2021 18:57

Metals and Metallic Compounds - Quality Control

Batch BJC0564 - SWN EPA 3050B

Instrument: ICPMS1 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJC0564-BLK1)						Prepared: 22-Mar-2021 Analyzed: 23-Mar-2021 17:06						
Antimony	121	ND	0.02	0.20	mg/kg							U
Antimony	123	ND	0.03	0.20	mg/kg							U
Chromium	52	ND	0.13	0.50	mg/kg							U
Chromium	53	ND	0.07	0.50	mg/kg							U
Lead	208	ND	0.07	0.10	mg/kg							U
Silver	107	ND	0.02	0.20	mg/kg							U
Arsenic	75a	ND	0.02	0.20	mg/kg							U
Cadmium	111	ND	0.03	0.10	mg/kg							U
Cadmium	114	ND	0.04	0.10	mg/kg							U
Copper	63	ND	0.34	0.50	mg/kg							U
Copper	65	ND	0.35	0.50	mg/kg							U
Selenium	78	ND	0.44	0.50	mg/kg							U
Zinc	66	ND	0.8	4.0	mg/kg							U
Zinc	67	ND	0.9	4.0	mg/kg							U

LCS (BJC0564-BS1)						Prepared: 22-Mar-2021 Analyzed: 23-Mar-2021 17:10						
Antimony	121	23.7	0.02	0.20	mg/kg	25.0		94.8	80-120			
Antimony	123	23.9	0.03	0.20	mg/kg	25.0		95.6	80-120			
Chromium	52	24.6	0.13	0.50	mg/kg	25.0		98.6	80-120			
Chromium	53	24.5	0.07	0.50	mg/kg	25.0		98.0	80-120			
Lead	208	25.8	0.07	0.10	mg/kg	25.0		103	80-120			
Silver	107	23.1	0.02	0.20	mg/kg	25.0		92.6	80-120			
Arsenic	75a	23.6	0.02	0.20	mg/kg	25.0		94.2	80-120			
Cadmium	111	24.0	0.03	0.10	mg/kg	25.0		95.9	80-120			
Cadmium	114	24.2	0.04	0.10	mg/kg	25.0		97.0	80-120			
Copper	63	25.8	0.34	0.50	mg/kg	25.0		103	80-120			
Copper	65	25.8	0.35	0.50	mg/kg	25.0		103	80-120			
Selenium	78	75.4	0.44	0.50	mg/kg	80.0		94.2	80-120			
Zinc	66	79.6	0.8	4.0	mg/kg	80.0		99.5	80-120			
Zinc	67	76.6	0.9	4.0	mg/kg	80.0		95.8	80-120			

Reference (BJC0564-SRM1)						Prepared: 22-Mar-2021 Analyzed: 23-Mar-2021 21:08						
Arsenic	75a	92.9	0.02	0.20	mg/kg	97.6		95.2	82.8-111.4			
Cadmium	111	126	0.03	0.10	mg/kg	114		110	82.8-117.5			
Copper	65	101	0.35	0.50	mg/kg	97.7		103	83.9-115.7			



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Reported:
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Metals and Metallic Compounds - Quality Control

Batch BJC0564 - SWN EPA 3050B

Instrument: ICPMS1 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Reference (BJC0564-SRM1)						Prepared: 22-Mar-2021 Analyzed: 23-Mar-2021 21:08						
Selenium	78	98.1	0.44	0.50	mg/kg	93.1		105	78.9-121.4			
Zinc	66	212	0.8	4.0	mg/kg	212		100	80.7-118.9			
Reference (BJC0564-SRM2)						Prepared: 22-Mar-2021 Analyzed: 24-Mar-2021 15:36						
Antimony	121	7.94	0.02	0.20	mg/kg	99.4		7.99	0-204.2			
Chromium	53	154	0.07	0.50	mg/kg	147		105	81.6-117.7			
Lead	208	104	0.07	0.10	mg/kg	105		98.7	82.6-117.1			
Silver	107	29.4	0.02	0.20	mg/kg	32.0		92.0	79.7-120			



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Metals and Metallic Compounds - Quality Control

Batch BJC0610 - SMM EPA 7471B

Instrument: HYDRA Analyst: BLC

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJC0610-BLK1)						Prepared: 23-Mar-2021	Analyzed: 23-Mar-2021 11:52				
Mercury	ND	0.00525	0.0250	mg/kg							U
LCS (BJC0610-BS1)						Prepared: 23-Mar-2021	Analyzed: 23-Mar-2021 11:59				
Mercury	0.481	0.00525	0.0250	mg/kg	0.500		96.2	80-120			
Reference (BJC0610-SRM1)						Prepared: 23-Mar-2021	Analyzed: 23-Mar-2021 12:10				
Mercury	5.66	0.0502	0.239	mg/kg	5.99		94.4	74.1-126			D



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Reported:
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Wet Chemistry - Quality Control

Batch BIK0762 - PSEP 1986

Instrument: UV1800-1 Analyst: CDE

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BIK0762-BLK1)						Prepared: 24-Nov-2020 Analyzed: 03-Dec-2020 17:04					
Sulfide	ND	1.00	1.00	mg/kg							U
LCS (BIK0762-BS1)						Prepared: 24-Nov-2020 Analyzed: 03-Dec-2020 17:05					
Sulfide	148	20.0	20.0	mg/kg	165		89.4	75-125			D



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Reported:
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Wet Chemistry - Quality Control

Batch BIK0769 - MSA 33.3 (2M KCl)

Instrument: LACHAT2 Analyst: LRB

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC Limits	RPD	RPD Limit	Notes
Blank (BIK0769-BLK1)					Prepared: 24-Nov-2020 Analyzed: 30-Nov-2020 14:30					
Ammonia-N	ND	0.40	0.40	mg/kg NH3-N						U
LCS (BIK0769-BS1)					Prepared: 24-Nov-2020 Analyzed: 30-Nov-2020 14:35					
Ammonia-N	104	8.00	8.00	mg/kg NH3-N	100	104	90-110			D



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Project Manager: Ezra Beaver

Reported:
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Wet Chemistry - Quality Control

Batch BIK0773 - No Prep Wet Chem

Instrument: BAL2 Analyst: UW

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BIK0773-BLK1)					Prepared: 24-Nov-2020 Analyzed: 24-Nov-2020 17:15						
Volatile Solids	ND	0.01	0.01	%							U
Total Solids	ND	0.04	0.04	%							U



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Reported:
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Wet Chemistry - Quality Control

Batch BIK0778 - No Prep Wet Chem

Instrument: BAL2 Analyst: UW

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC Limits	RPD Limit	Notes
Blank (BIK0778-BLK1)					Prepared: 24-Nov-2020 Analyzed: 24-Nov-2020 17:15				
Total Solids, Sulfide	ND	0.04	0.04	%					U



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Reported:
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Wet Chemistry - Quality Control

Batch BIK0802 - PSEP 1986 (modified)

Instrument: TOC Cube Analyst: BF

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC Limits	RPD	RPD Limit	Notes
Blank (BIK0802-BLK1)					Prepared: 25-Nov-2020 Analyzed: 25-Nov-2020 21:10					
Total Organic Carbon	ND	0.02	0.02	%						U
LCS (BIK0802-BS1)					Prepared: 25-Nov-2020 Analyzed: 25-Nov-2020 21:40					
Total Organic Carbon	44.9	0.02	0.02	%	44.4		101 80-120			
Reference (BIK0802-SRM1)					Prepared: 25-Nov-2020 Analyzed: 25-Nov-2020 22:11					
Total Organic Carbon	2.75	0.02	0.02	%	2.99		92.0 80-120			



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Certified Analyses included in this Report

Analyte	Certifications
EPA 1613B in Solid	
2,3,7,8-TCDF	DoD-ELAP,NELAP,WADOE
2,3,7,8-TCDF	DoD-ELAP,NELAP
2,3,7,8-TCDF	DoD-ELAP,WADOE
2,3,7,8-TCDF	DoD-ELAP,NELAP,WADOE
2,3,7,8-TCDD	DoD-ELAP,NELAP,WADOE
2,3,7,8-TCDD	DoD-ELAP,WADOE
2,3,7,8-TCDD	DoD-ELAP,NELAP,WADOE
2,3,7,8-TCDD	DoD-ELAP,NELAP
1,2,3,7,8-PeCDF	DoD-ELAP,NELAP,WADOE
1,2,3,7,8-PeCDF	DoD-ELAP,WADOE
1,2,3,7,8-PeCDF	DoD-ELAP,NELAP
1,2,3,7,8-PeCDF	DoD-ELAP,NELAP,WADOE
2,3,4,7,8-PeCDF	DoD-ELAP,NELAP,WADOE
2,3,4,7,8-PeCDF	DoD-ELAP,NELAP,WADOE
2,3,4,7,8-PeCDF	DoD-ELAP,WADOE
2,3,4,7,8-PeCDF	DoD-ELAP,NELAP
1,2,3,7,8-PeCDD	DoD-ELAP,NELAP,WADOE
1,2,3,7,8-PeCDD	DoD-ELAP,WADOE
1,2,3,7,8-PeCDD	DoD-ELAP,NELAP,WADOE
1,2,3,7,8-PeCDD	DoD-ELAP,NELAP
1,2,3,4,7,8-HxCDF	DoD-ELAP,WADOE
1,2,3,4,7,8-HxCDF	DoD-ELAP,NELAP,WADOE
1,2,3,4,7,8-HxCDF	DoD-ELAP,NELAP
1,2,3,4,7,8-HxCDF	DoD-ELAP,NELAP,WADOE
1,2,3,6,7,8-HxCDF	DoD-ELAP,NELAP
1,2,3,6,7,8-HxCDF	DoD-ELAP,NELAP,WADOE
1,2,3,6,7,8-HxCDF	DoD-ELAP,WADOE
1,2,3,6,7,8-HxCDF	DoD-ELAP,NELAP,WADOE
2,3,4,6,7,8-HxCDF	DoD-ELAP,WADOE
2,3,4,6,7,8-HxCDF	DoD-ELAP,NELAP,WADOE
2,3,4,6,7,8-HxCDF	DoD-ELAP,NELAP
2,3,4,6,7,8-HxCDF	DoD-ELAP,NELAP,WADOE
1,2,3,7,8,9-HxCDF	DoD-ELAP,NELAP
1,2,3,7,8,9-HxCDF	DoD-ELAP,WADOE
1,2,3,7,8,9-HxCDF	DoD-ELAP,NELAP,WADOE



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1,2,3,7,8,9-HxCDF	DoD-ELAP,NELAP,WADOE
1,2,3,4,7,8-HxCDD	DoD-ELAP,NELAP,WADOE
1,2,3,4,7,8-HxCDD	DoD-ELAP,NELAP,WADOE
1,2,3,4,7,8-HxCDD	DoD-ELAP,WADOE
1,2,3,4,7,8-HxCDD	DoD-ELAP,NELAP
1,2,3,6,7,8-HxCDD	DoD-ELAP,NELAP,WADOE
1,2,3,6,7,8-HxCDD	DoD-ELAP,NELAP,WADOE
1,2,3,6,7,8-HxCDD	DoD-ELAP,WADOE
1,2,3,6,7,8-HxCDD	DoD-ELAP,NELAP
1,2,3,7,8,9-HxCDD	DoD-ELAP,NELAP,WADOE
1,2,3,7,8,9-HxCDD	DoD-ELAP,WADOE
1,2,3,7,8,9-HxCDD	DoD-ELAP,NELAP
1,2,3,7,8,9-HxCDD	DoD-ELAP,NELAP,WADOE
1,2,3,4,6,7,8-HpCDF	DoD-ELAP,NELAP
1,2,3,4,6,7,8-HpCDF	DoD-ELAP,NELAP,WADOE
1,2,3,4,6,7,8-HpCDF	DoD-ELAP,NELAP,WADOE
1,2,3,4,6,7,8-HpCDF	DoD-ELAP,WADOE
1,2,3,4,7,8,9-HpCDF	DoD-ELAP,WADOE
1,2,3,4,7,8,9-HpCDF	DoD-ELAP,NELAP,WADOE
1,2,3,4,7,8,9-HpCDF	DoD-ELAP,NELAP,WADOE
1,2,3,4,7,8,9-HpCDF	DoD-ELAP,NELAP
1,2,3,4,6,7,8-HpCDD	DoD-ELAP,WADOE
1,2,3,4,6,7,8-HpCDD	DoD-ELAP,NELAP
1,2,3,4,6,7,8-HpCDD	DoD-ELAP,NELAP,WADOE
1,2,3,4,6,7,8-HpCDD	DoD-ELAP,NELAP,WADOE
OCDF	DoD-ELAP,NELAP,WADOE
OCDF	DoD-ELAP,NELAP
OCDF	DoD-ELAP,WADOE
OCDF	DoD-ELAP,NELAP,WADOE
OCDD	DoD-ELAP,NELAP,WADOE
OCDD	DoD-ELAP,NELAP
OCDD	DoD-ELAP,NELAP,WADOE
OCDD	DoD-ELAP,WADOE
Total TCDF	DoD-ELAP,NELAP,WADOE
Total TCDF	DoD-ELAP,WADOE
Total TCDF	DoD-ELAP,NELAP,WADOE
Total TCDF	DoD-ELAP,NELAP
Total TCDD	DoD-ELAP,NELAP,WADOE
Total TCDD	DoD-ELAP,NELAP,WADOE



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Total TCDD	DoD-ELAP,WADOE
Total TCDD	DoD-ELAP,NELAP
Total PeCDF	DoD-ELAP,NELAP
Total PeCDF	DoD-ELAP,NELAP,WADOE
Total PeCDF	DoD-ELAP,NELAP,WADOE
Total PeCDF	DoD-ELAP,WADOE
Total PeCDD	DoD-ELAP,NELAP,WADOE
Total PeCDD	DoD-ELAP,NELAP
Total PeCDD	DoD-ELAP,WADOE
Total PeCDD	DoD-ELAP,NELAP,WADOE
Total HxCDF	DoD-ELAP,NELAP,WADOE
Total HxCDF	DoD-ELAP,NELAP
Total HxCDF	DoD-ELAP,NELAP,WADOE
Total HxCDF	DoD-ELAP,WADOE
Total HxCDD	DoD-ELAP,NELAP,WADOE
Total HxCDD	DoD-ELAP,NELAP,WADOE
Total HxCDD	DoD-ELAP,WADOE
Total HxCDD	DoD-ELAP,NELAP
Total HpCDF	DoD-ELAP,NELAP,WADOE
Total HpCDF	DoD-ELAP,NELAP,WADOE
Total HpCDF	DoD-ELAP,NELAP
Total HpCDF	DoD-ELAP,WADOE
Total HpCDD	DoD-ELAP,NELAP,WADOE
Total HpCDD	DoD-ELAP,WADOE
Total HpCDD	DoD-ELAP,NELAP
Total HpCDD	DoD-ELAP,NELAP,WADOE
13C12-2,3,7,8-TCDF	DoD-ELAP
13C12-2,3,7,8-TCDF	DoD-ELAP
13C12-2,3,7,8-TCDF	DoD-ELAP
13C12-2,3,7,8-TCDF	DoD-ELAP
13C12-2,3,7,8-TCDD	DoD-ELAP
13C12-2,3,7,8-TCDD	DoD-ELAP
13C12-2,3,7,8-TCDD	DoD-ELAP
13C12-2,3,7,8-TCDD	DoD-ELAP
13C12-1,2,3,7,8-PeCDF	DoD-ELAP
13C12-1,2,3,7,8-PeCDF	DoD-ELAP
13C12-1,2,3,7,8-PeCDF	DoD-ELAP
13C12-1,2,3,7,8-PeCDF	DoD-ELAP
13C12-2,3,4,7,8-PeCDF	DoD-ELAP



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13C12-2,3,4,7,8-PeCDF	DoD-ELAP
13C12-2,3,4,7,8-PeCDF	DoD-ELAP
13C12-2,3,4,7,8-PeCDF	DoD-ELAP
13C12-1,2,3,7,8-PeCDD	DoD-ELAP
13C12-1,2,3,7,8-PeCDD	DoD-ELAP
13C12-1,2,3,7,8-PeCDD	DoD-ELAP
13C12-1,2,3,7,8-PeCDD	DoD-ELAP
13C12-1,2,3,4,7,8-HxCDF	DoD-ELAP
13C12-1,2,3,4,7,8-HxCDF	DoD-ELAP
13C12-1,2,3,4,7,8-HxCDF	DoD-ELAP
13C12-1,2,3,4,7,8-HxCDF	DoD-ELAP
13C12-1,2,3,6,7,8-HxCDF	DoD-ELAP
13C12-1,2,3,6,7,8-HxCDF	DoD-ELAP
13C12-1,2,3,6,7,8-HxCDF	DoD-ELAP
13C12-1,2,3,6,7,8-HxCDF	DoD-ELAP
13C12-2,3,4,6,7,8-HxCDF	DoD-ELAP
13C12-2,3,4,6,7,8-HxCDF	DoD-ELAP
13C12-2,3,4,6,7,8-HxCDF	DoD-ELAP
13C12-1,2,3,7,8,9-HxCDF	DoD-ELAP
13C12-1,2,3,7,8,9-HxCDF	DoD-ELAP
13C12-1,2,3,7,8,9-HxCDF	DoD-ELAP
13C12-1,2,3,7,8,9-HxCDF	DoD-ELAP
13C12-1,2,3,4,7,8-HxCDD	DoD-ELAP
13C12-1,2,3,4,7,8-HxCDD	DoD-ELAP
13C12-1,2,3,4,7,8-HxCDD	DoD-ELAP
13C12-1,2,3,4,7,8-HxCDD	DoD-ELAP
13C12-1,2,3,6,7,8-HxCDD	DoD-ELAP
13C12-1,2,3,6,7,8-HxCDD	DoD-ELAP
13C12-1,2,3,6,7,8-HxCDD	DoD-ELAP
13C12-1,2,3,4,6,7,8-HpCDF	DoD-ELAP
13C12-1,2,3,4,6,7,8-HpCDF	DoD-ELAP
13C12-1,2,3,4,6,7,8-HpCDF	DoD-ELAP
13C12-1,2,3,4,6,7,8-HpCDF	DoD-ELAP
13C12-1,2,3,4,7,8,9-HpCDF	DoD-ELAP
13C12-1,2,3,4,7,8,9-HpCDF	DoD-ELAP
13C12-1,2,3,4,7,8,9-HpCDF	DoD-ELAP



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13C12-1,2,3,4,6,7,8-HpCDD	DoD-ELAP
13C12-1,2,3,4,6,7,8-HpCDD	DoD-ELAP
13C12-1,2,3,4,6,7,8-HpCDD	DoD-ELAP
13C12-1,2,3,4,6,7,8-HpCDD	DoD-ELAP
13C12-OCDD	DoD-ELAP
13C12-OCDD	DoD-ELAP
13C12-OCDD	DoD-ELAP
13C12-OCDD	DoD-ELAP
37Cl4-2,3,7,8-TCDD	DoD-ELAP
37Cl4-2,3,7,8-TCDD	DoD-ELAP
37Cl4-2,3,7,8-TCDD	DoD-ELAP
37Cl4-2,3,7,8-TCDD	DoD-ELAP

EPA 6020B in Solid

Silver-107	NELAP,DoD-ELAP
Silver-107	DoD-ELAP,WADOE
Silver-107	NELAP,DoD-ELAP,WADOE
Silver-107	NELAP,DoD-ELAP,WADOE
Chromium-52	DoD-ELAP,WADOE,ADEC
Chromium-52	NELAP,DoD-ELAP,ADEC
Chromium-52	NELAP,DoD-ELAP,WADOE,ADEC
Chromium-52	NELAP,DoD-ELAP,WADOE,ADEC
Chromium-53	NELAP,DoD-ELAP,WADOE,ADEC
Chromium-53	NELAP,DoD-ELAP,WADOE,ADEC
Chromium-53	DoD-ELAP,WADOE,ADEC
Chromium-53	NELAP,DoD-ELAP,ADEC
Lead-208	DoD-ELAP,WADOE,ADEC
Lead-208	NELAP,DoD-ELAP,WADOE,ADEC
Lead-208	NELAP,DoD-ELAP,WADOE,ADEC
Lead-208	NELAP,DoD-ELAP,ADEC
Antimony-121	NELAP,DoD-ELAP,WADOE
Antimony-121	DoD-ELAP,WADOE
Antimony-121	NELAP,DoD-ELAP,WADOE
Antimony-121	NELAP,DoD-ELAP
Antimony-123	DoD-ELAP,WADOE
Antimony-123	NELAP,DoD-ELAP
Antimony-123	NELAP,DoD-ELAP,WADOE
Antimony-123	NELAP,DoD-ELAP,WADOE

EPA 6020B UCT-KED in Solid

Arsenic-75a	NELAP,DoD-ELAP,ADEC
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Arsenic-75a	DoD-ELAP,WADOE,ADEC
Arsenic-75a	NELAP,DoD-ELAP,WADOE,ADEC
Arsenic-75a	NELAP,DoD-ELAP,WADOE,ADEC
Cadmium-111	DoD-ELAP,WADOE,ADEC
Cadmium-111	NELAP,DoD-ELAP,ADEC
Cadmium-111	NELAP,DoD-ELAP,WADOE,ADEC
Cadmium-111	NELAP,DoD-ELAP,WADOE,ADEC
Cadmium-114	NELAP,DoD-ELAP,WADOE,ADEC
Cadmium-114	NELAP,DoD-ELAP,WADOE,ADEC
Cadmium-114	NELAP,DoD-ELAP,ADEC
Cadmium-114	DoD-ELAP,WADOE,ADEC
Copper-63	NELAP,DoD-ELAP,WADOE
Copper-63	DoD-ELAP,WADOE
Copper-63	NELAP,DoD-ELAP
Copper-63	NELAP,DoD-ELAP,WADOE
Copper-65	NELAP,DoD-ELAP,WADOE
Copper-65	DoD-ELAP,WADOE
Copper-65	NELAP,DoD-ELAP,WADOE
Copper-65	NELAP,DoD-ELAP
Selenium-78	NELAP,DoD-ELAP
Selenium-78	NELAP,DoD-ELAP,WADOE
Selenium-78	DoD-ELAP,WADOE
Selenium-78	NELAP,DoD-ELAP,WADOE
Zinc-66	NELAP,DoD-ELAP,WADOE
Zinc-66	NELAP,DoD-ELAP,WADOE
Zinc-66	NELAP,DoD-ELAP
Zinc-66	DoD-ELAP,WADOE
Zinc-67	DoD-ELAP,WADOE
Zinc-67	NELAP,DoD-ELAP,WADOE
Zinc-67	NELAP,DoD-ELAP
Zinc-67	NELAP,DoD-ELAP,WADOE

EPA 7471B in Solid

Mercury	NELAP,DoD-ELAP,CALAP
Mercury	WADOE,DoD-ELAP,CALAP
Mercury	WADOE,NELAP,DoD-ELAP,CALAP
Mercury	WADOE,NELAP,DoD-ELAP

EPA 8081B in Solid

alpha-BHC	DoD-ELAP,NELAP,CALAP,WADOE
alpha-BHC	DoD-ELAP,NELAP,WADOE



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alpha-BHC	DoD-ELAP,CALAP,WADOE
alpha-BHC	DoD-ELAP,NELAP,CALAP
alpha-BHC [2C]	DoD-ELAP,NELAP,CALAP
alpha-BHC [2C]	DoD-ELAP,NELAP,CALAP,WADOE
alpha-BHC [2C]	DoD-ELAP,CALAP,WADOE
alpha-BHC [2C]	DoD-ELAP,NELAP,WADOE
beta-BHC	DoD-ELAP,NELAP,WADOE
beta-BHC	DoD-ELAP,NELAP,CALAP
beta-BHC	DoD-ELAP,NELAP,CALAP,WADOE
beta-BHC	DoD-ELAP,CALAP,WADOE
beta-BHC [2C]	DoD-ELAP,NELAP,CALAP,WADOE
beta-BHC [2C]	DoD-ELAP,NELAP,WADOE
beta-BHC [2C]	DoD-ELAP,CALAP,WADOE
beta-BHC [2C]	DoD-ELAP,NELAP,CALAP
gamma-BHC (Lindane)	DoD-ELAP,NELAP,CALAP,WADOE
gamma-BHC (Lindane)	DoD-ELAP,NELAP,CALAP
gamma-BHC (Lindane)	DoD-ELAP,NELAP,WADOE
gamma-BHC (Lindane)	DoD-ELAP,CALAP,WADOE
gamma-BHC (Lindane) [2C]	DoD-ELAP,NELAP,CALAP
gamma-BHC (Lindane) [2C]	DoD-ELAP,CALAP,WADOE
gamma-BHC (Lindane) [2C]	DoD-ELAP,NELAP,CALAP,WADOE
gamma-BHC (Lindane) [2C]	DoD-ELAP,NELAP,WADOE
delta-BHC	DoD-ELAP,NELAP,WADOE
delta-BHC	DoD-ELAP,NELAP,CALAP,WADOE
delta-BHC	DoD-ELAP,NELAP,CALAP
delta-BHC	DoD-ELAP,CALAP,WADOE
delta-BHC [2C]	DoD-ELAP,NELAP,CALAP
delta-BHC [2C]	DoD-ELAP,NELAP,WADOE
delta-BHC [2C]	DoD-ELAP,CALAP,WADOE
delta-BHC [2C]	DoD-ELAP,NELAP,CALAP,WADOE
Heptachlor	DoD-ELAP,NELAP,CALAP
Heptachlor	DoD-ELAP,NELAP,WADOE
Heptachlor	DoD-ELAP,NELAP,CALAP,WADOE
Heptachlor	DoD-ELAP,CALAP,WADOE
Heptachlor [2C]	DoD-ELAP,CALAP,WADOE
Heptachlor [2C]	DoD-ELAP,NELAP,CALAP
Heptachlor [2C]	DoD-ELAP,NELAP,CALAP,WADOE
Heptachlor [2C]	DoD-ELAP,NELAP,WADOE
Aldrin	DoD-ELAP,NELAP,CALAP,WADOE



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Aldrin	DoD-ELAP,CALAP,WADOE
Aldrin	DoD-ELAP,NELAP,CALAP
Aldrin	DoD-ELAP,NELAP,WADOE
Aldrin [2C]	DoD-ELAP,CALAP,WADOE
Aldrin [2C]	DoD-ELAP,NELAP,WADOE
Aldrin [2C]	DoD-ELAP,NELAP,CALAP
Aldrin [2C]	DoD-ELAP,NELAP,CALAP,WADOE
Heptachlor Epoxide	DoD-ELAP,NELAP,CALAP
Heptachlor Epoxide	DoD-ELAP,NELAP,CALAP,WADOE
Heptachlor Epoxide	DoD-ELAP,CALAP,WADOE
Heptachlor Epoxide	DoD-ELAP,NELAP,WADOE
Heptachlor Epoxide [2C]	DoD-ELAP,NELAP,CALAP,WADOE
Heptachlor Epoxide [2C]	DoD-ELAP,CALAP,WADOE
Heptachlor Epoxide [2C]	DoD-ELAP,NELAP,WADOE
Heptachlor Epoxide [2C]	DoD-ELAP,NELAP,CALAP
trans-Chlordane (beta-Chlordane)	DoD-ELAP,NELAP
trans-Chlordane (beta-Chlordane)	DoD-ELAP,NELAP,CALAP
trans-Chlordane (beta-Chlordane)	DoD-ELAP,CALAP
trans-Chlordane (beta-Chlordane)	DoD-ELAP,NELAP,CALAP
trans-Chlordane (beta-Chlordane) [2C]	DoD-ELAP,NELAP
trans-Chlordane (beta-Chlordane) [2C]	DoD-ELAP,CALAP
trans-Chlordane (beta-Chlordane) [2C]	DoD-ELAP,NELAP,CALAP
trans-Chlordane (beta-Chlordane) [2C]	DoD-ELAP,NELAP,CALAP
cis-Chlordane (alpha-chlordane)	DoD-ELAP,NELAP,WADOE
cis-Chlordane (alpha-chlordane)	DoD-ELAP,CALAP,WADOE
cis-Chlordane (alpha-chlordane)	DoD-ELAP,NELAP,CALAP,WADOE
cis-Chlordane (alpha-chlordane)	DoD-ELAP,NELAP,CALAP
cis-Chlordane (alpha-chlordane) [2C]	DoD-ELAP,NELAP,CALAP,WADOE
cis-Chlordane (alpha-chlordane) [2C]	DoD-ELAP,NELAP,CALAP
cis-Chlordane (alpha-chlordane) [2C]	DoD-ELAP,NELAP,WADOE
cis-Chlordane (alpha-chlordane) [2C]	DoD-ELAP,CALAP,WADOE
Endosulfan I	DoD-ELAP,NELAP,CALAP,WADOE
Endosulfan I	DoD-ELAP,NELAP,CALAP
Endosulfan I	DoD-ELAP,NELAP,WADOE
Endosulfan I	DoD-ELAP,CALAP,WADOE
Endosulfan I [2C]	DoD-ELAP,NELAP,CALAP
Endosulfan I [2C]	DoD-ELAP,NELAP,WADOE
Endosulfan I [2C]	DoD-ELAP,NELAP,CALAP,WADOE
Endosulfan I [2C]	DoD-ELAP,CALAP,WADOE



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4,4'-DDE	DoD-ELAP,NELAP,CALAP,WADOE
4,4'-DDE	DoD-ELAP,NELAP,WADOE
4,4'-DDE	DoD-ELAP,CALAP,WADOE
4,4'-DDE	DoD-ELAP,NELAP,CALAP
4,4'-DDE [2C]	DoD-ELAP,CALAP,WADOE
4,4'-DDE [2C]	DoD-ELAP,NELAP,WADOE
4,4'-DDE [2C]	DoD-ELAP,NELAP,CALAP,WADOE
4,4'-DDE [2C]	DoD-ELAP,NELAP,CALAP
Dieldrin	DoD-ELAP,NELAP,WADOE
Dieldrin	DoD-ELAP,CALAP,WADOE
Dieldrin	DoD-ELAP,NELAP,CALAP
Dieldrin	DoD-ELAP,NELAP,CALAP,WADOE
Dieldrin [2C]	DoD-ELAP,CALAP,WADOE
Dieldrin [2C]	DoD-ELAP,NELAP,WADOE
Dieldrin [2C]	DoD-ELAP,NELAP,CALAP,WADOE
Dieldrin [2C]	DoD-ELAP,NELAP,CALAP
Endrin	DoD-ELAP,NELAP,WADOE
Endrin	DoD-ELAP,NELAP,CALAP
Endrin	DoD-ELAP,NELAP,CALAP,WADOE
Endrin	DoD-ELAP,CALAP,WADOE
Endrin [2C]	DoD-ELAP,CALAP,WADOE
Endrin [2C]	DoD-ELAP,NELAP,CALAP,WADOE
Endrin [2C]	DoD-ELAP,NELAP,WADOE
Endrin [2C]	DoD-ELAP,NELAP,CALAP
Endosulfan II	DoD-ELAP,NELAP,WADOE
Endosulfan II	DoD-ELAP,CALAP,WADOE
Endosulfan II	DoD-ELAP,NELAP,CALAP
Endosulfan II	DoD-ELAP,NELAP,CALAP,WADOE
Endosulfan II [2C]	DoD-ELAP,NELAP,CALAP,WADOE
Endosulfan II [2C]	DoD-ELAP,NELAP,CALAP
Endosulfan II [2C]	DoD-ELAP,NELAP,WADOE
Endosulfan II [2C]	DoD-ELAP,CALAP,WADOE
4,4'-DDD	DoD-ELAP,NELAP,WADOE
4,4'-DDD	DoD-ELAP,NELAP,CALAP
4,4'-DDD	DoD-ELAP,CALAP,WADOE
4,4'-DDD	DoD-ELAP,NELAP,CALAP,WADOE
4,4'-DDD [2C]	DoD-ELAP,NELAP,WADOE
4,4'-DDD [2C]	DoD-ELAP,NELAP,CALAP,WADOE
4,4'-DDD [2C]	DoD-ELAP,NELAP,CALAP



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4,4'-DDD [2C]	DoD-ELAP,CALAP,WADOE
Endrin Aldehyde	DoD-ELAP,CALAP,WADOE
Endrin Aldehyde	DoD-ELAP,NELAP,WADOE
Endrin Aldehyde	DoD-ELAP,NELAP,CALAP
Endrin Aldehyde	DoD-ELAP,NELAP,CALAP,WADOE
Endrin Aldehyde [2C]	DoD-ELAP,NELAP,WADOE
Endrin Aldehyde [2C]	DoD-ELAP,CALAP,WADOE
Endrin Aldehyde [2C]	DoD-ELAP,NELAP,CALAP
Endrin Aldehyde [2C]	DoD-ELAP,NELAP,CALAP,WADOE
4,4'-DDT	DoD-ELAP,NELAP,CALAP
4,4'-DDT	DoD-ELAP,NELAP,CALAP,WADOE
4,4'-DDT	DoD-ELAP,NELAP,WADOE
4,4'-DDT	DoD-ELAP,CALAP,WADOE
4,4'-DDT [2C]	DoD-ELAP,NELAP,CALAP
4,4'-DDT [2C]	DoD-ELAP,NELAP,CALAP,WADOE
4,4'-DDT [2C]	DoD-ELAP,NELAP,WADOE
4,4'-DDT [2C]	DoD-ELAP,CALAP,WADOE
Endosulfan Sulfate	DoD-ELAP,CALAP,WADOE
Endosulfan Sulfate	DoD-ELAP,NELAP,CALAP,WADOE
Endosulfan Sulfate	DoD-ELAP,NELAP,CALAP
Endosulfan Sulfate	DoD-ELAP,NELAP,WADOE
Endosulfan Sulfate [2C]	DoD-ELAP,NELAP,WADOE
Endosulfan Sulfate [2C]	DoD-ELAP,NELAP,CALAP
Endosulfan Sulfate [2C]	DoD-ELAP,CALAP,WADOE
Endosulfan Sulfate [2C]	DoD-ELAP,NELAP,CALAP,WADOE
Endrin Ketone	DoD-ELAP,NELAP,CALAP,WADOE
Endrin Ketone	DoD-ELAP,NELAP,CALAP
Endrin Ketone	DoD-ELAP,NELAP,WADOE
Endrin Ketone	DoD-ELAP,CALAP,WADOE
Endrin Ketone [2C]	DoD-ELAP,NELAP,CALAP
Endrin Ketone [2C]	DoD-ELAP,CALAP,WADOE
Endrin Ketone [2C]	DoD-ELAP,NELAP,WADOE
Endrin Ketone [2C]	DoD-ELAP,NELAP,CALAP,WADOE
Methoxychlor	DoD-ELAP,NELAP,CALAP
Methoxychlor	DoD-ELAP,NELAP,WADOE
Methoxychlor	DoD-ELAP,NELAP,CALAP,WADOE
Methoxychlor	DoD-ELAP,CALAP,WADOE
Methoxychlor [2C]	DoD-ELAP,NELAP,WADOE
Methoxychlor [2C]	DoD-ELAP,NELAP,CALAP



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Methoxychlor [2C]	DoD-ELAP,CALAP,WADOE
Methoxychlor [2C]	DoD-ELAP,NELAP,CALAP,WADOE
Hexachlorobutadiene	DoD-ELAP,NELAP,WADOE
Hexachlorobutadiene	DoD-ELAP,NELAP,CALAP,WADOE
Hexachlorobutadiene	DoD-ELAP,NELAP,CALAP
Hexachlorobutadiene	DoD-ELAP,CALAP,WADOE
Hexachlorobutadiene [2C]	DoD-ELAP,NELAP,WADOE
Hexachlorobutadiene [2C]	DoD-ELAP,NELAP,CALAP,WADOE
Hexachlorobutadiene [2C]	DoD-ELAP,CALAP,WADOE
Hexachlorobutadiene [2C]	DoD-ELAP,NELAP,CALAP
Hexachlorobenzene	DoD-ELAP,NELAP,WADOE
Hexachlorobenzene	DoD-ELAP,NELAP,CALAP,WADOE
Hexachlorobenzene	DoD-ELAP,NELAP,CALAP
Hexachlorobenzene	DoD-ELAP,CALAP,WADOE
Hexachlorobenzene [2C]	DoD-ELAP,NELAP,CALAP
Hexachlorobenzene [2C]	DoD-ELAP,NELAP,CALAP,WADOE
Hexachlorobenzene [2C]	DoD-ELAP,NELAP,WADOE
Hexachlorobenzene [2C]	DoD-ELAP,CALAP,WADOE
2,4'-DDE	DoD-ELAP,NELAP,CALAP,WADOE
2,4'-DDE	DoD-ELAP,NELAP,WADOE
2,4'-DDE	DoD-ELAP,CALAP,WADOE
2,4'-DDE	DoD-ELAP,NELAP,CALAP
2,4'-DDE [2C]	DoD-ELAP,NELAP,CALAP
2,4'-DDE [2C]	DoD-ELAP,NELAP,CALAP,WADOE
2,4'-DDE [2C]	DoD-ELAP,NELAP,WADOE
2,4'-DDE [2C]	DoD-ELAP,CALAP,WADOE
2,4'-DDD	DoD-ELAP,NELAP,WADOE
2,4'-DDD	DoD-ELAP,NELAP,CALAP
2,4'-DDD	DoD-ELAP,CALAP,WADOE
2,4'-DDD	DoD-ELAP,NELAP,CALAP,WADOE
2,4'-DDD [2C]	DoD-ELAP,NELAP,CALAP
2,4'-DDD [2C]	DoD-ELAP,NELAP,WADOE
2,4'-DDD [2C]	DoD-ELAP,CALAP,WADOE
2,4'-DDD [2C]	DoD-ELAP,NELAP,CALAP,WADOE
2,4'-DDT	DoD-ELAP,NELAP,WADOE
2,4'-DDT	DoD-ELAP,NELAP,CALAP
2,4'-DDT	DoD-ELAP,NELAP,CALAP,WADOE
2,4'-DDT	DoD-ELAP,CALAP,WADOE
2,4'-DDT [2C]	DoD-ELAP,NELAP,CALAP



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2,4'-DDT [2C]	DoD-ELAP,NELAP,WADOE
2,4'-DDT [2C]	DoD-ELAP,CALAP,WADOE
2,4'-DDT [2C]	DoD-ELAP,NELAP,CALAP,WADOE
Oxychlordane	DoD-ELAP,CALAP,WADOE
Oxychlordane	DoD-ELAP,NELAP,WADOE
Oxychlordane	DoD-ELAP,NELAP,CALAP,WADOE
Oxychlordane	DoD-ELAP,NELAP,CALAP
Oxychlordane [2C]	DoD-ELAP,NELAP,CALAP,WADOE
Oxychlordane [2C]	DoD-ELAP,CALAP,WADOE
Oxychlordane [2C]	DoD-ELAP,NELAP,WADOE
Oxychlordane [2C]	DoD-ELAP,NELAP,CALAP
cis-Nonachlor	DoD-ELAP,CALAP,WADOE
cis-Nonachlor	DoD-ELAP,NELAP,WADOE
cis-Nonachlor	DoD-ELAP,NELAP,CALAP
cis-Nonachlor	DoD-ELAP,NELAP,CALAP,WADOE
cis-Nonachlor [2C]	DoD-ELAP,NELAP,CALAP,WADOE
cis-Nonachlor [2C]	DoD-ELAP,CALAP,WADOE
cis-Nonachlor [2C]	DoD-ELAP,NELAP,WADOE
cis-Nonachlor [2C]	DoD-ELAP,NELAP,CALAP
trans-Nonachlor	DoD-ELAP,CALAP,WADOE
trans-Nonachlor	DoD-ELAP,NELAP,CALAP
trans-Nonachlor	DoD-ELAP,NELAP,CALAP,WADOE
trans-Nonachlor	DoD-ELAP,NELAP,WADOE
trans-Nonachlor [2C]	DoD-ELAP,NELAP,WADOE
trans-Nonachlor [2C]	DoD-ELAP,CALAP,WADOE
trans-Nonachlor [2C]	DoD-ELAP,NELAP,CALAP
trans-Nonachlor [2C]	DoD-ELAP,NELAP,CALAP,WADOE
Mirex	DoD-ELAP,NELAP,CALAP
Mirex	DoD-ELAP,NELAP,WADOE
Mirex	DoD-ELAP,NELAP,CALAP,WADOE
Mirex	DoD-ELAP,CALAP,WADOE
Mirex [2C]	DoD-ELAP,NELAP,WADOE
Mirex [2C]	DoD-ELAP,NELAP,CALAP,WADOE
Mirex [2C]	DoD-ELAP,NELAP,CALAP
Mirex [2C]	DoD-ELAP,CALAP,WADOE
Hexachloroethane	NELAP,CALAP,WADOE
Hexachloroethane	NELAP,WADOE
Hexachloroethane	CALAP,WADOE
Hexachloroethane	NELAP,CALAP



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Hexachloroethane [2C]	NELAP,CALAP,WADOE
Hexachloroethane [2C]	CALAP,WADOE
Hexachloroethane [2C]	NELAP,CALAP
Hexachloroethane [2C]	NELAP,WADOE
Toxaphene	DoD-ELAP,WADOE
Toxaphene	DoD-ELAP,NELAP
Toxaphene	DoD-ELAP,NELAP,WADOE
Toxaphene	DoD-ELAP,NELAP,WADOE
Toxaphene [2C]	DoD-ELAP,WADOE
Toxaphene [2C]	DoD-ELAP,NELAP,WADOE
Toxaphene [2C]	DoD-ELAP,NELAP
Toxaphene [2C]	DoD-ELAP,NELAP,WADOE
Chlordane, technical	DoD-ELAP,WADOE
Chlordane, technical	DoD-ELAP,NELAP,WADOE
Chlordane, technical	DoD-ELAP,NELAP,WADOE
Chlordane, technical	DoD-ELAP,NELAP
Chlordane, technical [2C]	DoD-ELAP,NELAP,WADOE
Chlordane, technical [2C]	DoD-ELAP,NELAP,WADOE
Chlordane, technical [2C]	DoD-ELAP,WADOE
Chlordane, technical [2C]	DoD-ELAP,NELAP

EPA 8082A in Solid

Aroclor 1016	DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1016	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1016	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1016	WADOE,DoD-ELAP,CALAP,ADEC
Aroclor 1016 [2C]	DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1016 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1016 [2C]	WADOE,DoD-ELAP,CALAP,ADEC
Aroclor 1016 [2C]	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1221	DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1221	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1221	WADOE,DoD-ELAP,CALAP,ADEC
Aroclor 1221	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1221 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1221 [2C]	WADOE,DoD-ELAP,CALAP,ADEC
Aroclor 1221 [2C]	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1221 [2C]	DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1232	WADOE,DoD-ELAP,CALAP,ADEC
Aroclor 1232	WADOE,DoD-ELAP,NELAP,ADEC



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Aroclor 1232	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1232	DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1232 [2C]	WADOE,DoD-ELAP,CALAP,ADEC
Aroclor 1232 [2C]	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1232 [2C]	DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1232 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1242	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1242	WADOE,DoD-ELAP,CALAP,ADEC
Aroclor 1242	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1242	DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1242 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1242 [2C]	WADOE,DoD-ELAP,CALAP,ADEC
Aroclor 1242 [2C]	DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1242 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1242 [2C]	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1248	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1248	WADOE,DoD-ELAP,CALAP,ADEC
Aroclor 1248	DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1248	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1248 [2C]	DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1248 [2C]	WADOE,DoD-ELAP,CALAP,ADEC
Aroclor 1248 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1248 [2C]	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1254	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1254	WADOE,DoD-ELAP,CALAP,ADEC
Aroclor 1254	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1254	DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1254 [2C]	WADOE,DoD-ELAP,CALAP,ADEC
Aroclor 1254 [2C]	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1254 [2C]	DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1254 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1260	DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1260	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1260	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1260	WADOE,DoD-ELAP,CALAP,ADEC
Aroclor 1260 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1260 [2C]	WADOE,DoD-ELAP,CALAP,ADEC
Aroclor 1260 [2C]	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1260 [2C]	DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1262	WADOE,DoD-ELAP,NELAP,ADEC



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Aroclor 1262	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1262	WADOE,DoD-ELAP,CALAP,ADEC
Aroclor 1262	DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1262 [2C]	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1262 [2C]	DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1262 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1262 [2C]	WADOE,DoD-ELAP,CALAP,ADEC
Aroclor 1268	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1268	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1268	DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1268	WADOE,DoD-ELAP,CALAP,ADEC
Aroclor 1268 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1268 [2C]	WADOE,DoD-ELAP,CALAP,ADEC
Aroclor 1268 [2C]	DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1268 [2C]	WADOE,DoD-ELAP,NELAP,CALAP,ADEC

EPA 8270E in Solid

Phenol	CALAP,DoD-ELAP,NELAP
Phenol	CALAP,DoD-ELAP,NELAP,WADOE
Phenol	DoD-ELAP,NELAP,WADOE
Phenol	CALAP,DoD-ELAP,WADOE
bis(2-chloroethyl) ether	CALAP,DoD-ELAP,WADOE
bis(2-chloroethyl) ether	DoD-ELAP,NELAP,WADOE
bis(2-chloroethyl) ether	CALAP,DoD-ELAP,NELAP,WADOE
bis(2-chloroethyl) ether	CALAP,DoD-ELAP,NELAP
2-Chlorophenol	CALAP,DoD-ELAP,NELAP,WADOE
2-Chlorophenol	CALAP,DoD-ELAP,WADOE
2-Chlorophenol	CALAP,DoD-ELAP,NELAP
2-Chlorophenol	DoD-ELAP,NELAP,WADOE
1,3-Dichlorobenzene	DoD-ELAP,NELAP,WADOE
1,3-Dichlorobenzene	CALAP,DoD-ELAP,NELAP
1,3-Dichlorobenzene	CALAP,DoD-ELAP,NELAP,WADOE
1,3-Dichlorobenzene	CALAP,DoD-ELAP,WADOE
1,4-Dichlorobenzene	CALAP,DoD-ELAP,NELAP
1,4-Dichlorobenzene	DoD-ELAP,NELAP,WADOE
1,4-Dichlorobenzene	CALAP,DoD-ELAP,NELAP,WADOE
1,4-Dichlorobenzene	CALAP,DoD-ELAP,WADOE
1,2-Dichlorobenzene	CALAP,DoD-ELAP,NELAP
1,2-Dichlorobenzene	CALAP,DoD-ELAP,WADOE
1,2-Dichlorobenzene	DoD-ELAP,NELAP,WADOE



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1,2-Dichlorobenzene	CALAP,DoD-ELAP,NELAP,WADOE
Benzyl Alcohol	CALAP,DoD-ELAP,WADOE
Benzyl Alcohol	DoD-ELAP,NELAP,WADOE
Benzyl Alcohol	CALAP,DoD-ELAP,NELAP
Benzyl Alcohol	CALAP,DoD-ELAP,NELAP,WADOE
2,2'-Oxybis(1-chloropropane)	DoD-ELAP,NELAP
2,2'-Oxybis(1-chloropropane)	DoD-ELAP,NELAP
2,2'-Oxybis(1-chloropropane)	DoD-ELAP
2,2'-Oxybis(1-chloropropane)	DoD-ELAP,NELAP
2-Methylphenol	CALAP,DoD-ELAP,NELAP
2-Methylphenol	DoD-ELAP,NELAP,WADOE
2-Methylphenol	CALAP,DoD-ELAP,WADOE
2-Methylphenol	CALAP,DoD-ELAP,NELAP,WADOE
Hexachloroethane	CALAP,DoD-ELAP,NELAP,WADOE
Hexachloroethane	CALAP,DoD-ELAP,NELAP
Hexachloroethane	CALAP,DoD-ELAP,WADOE
Hexachloroethane	DoD-ELAP,NELAP,WADOE
N-Nitroso-di-n-Propylamine	CALAP,DoD-ELAP,WADOE
N-Nitroso-di-n-Propylamine	CALAP,DoD-ELAP,NELAP
N-Nitroso-di-n-Propylamine	DoD-ELAP,NELAP,WADOE
N-Nitroso-di-n-Propylamine	CALAP,DoD-ELAP,NELAP,WADOE
4-Methylphenol	DoD-ELAP,NELAP,WADOE
4-Methylphenol	CALAP,DoD-ELAP,NELAP,WADOE
4-Methylphenol	CALAP,DoD-ELAP,NELAP
4-Methylphenol	CALAP,DoD-ELAP,WADOE
Nitrobenzene	CALAP,DoD-ELAP,NELAP,WADOE
Nitrobenzene	CALAP,DoD-ELAP,NELAP
Nitrobenzene	DoD-ELAP,NELAP,WADOE
Nitrobenzene	CALAP,DoD-ELAP,WADOE
Isophorone	CALAP,DoD-ELAP,WADOE
Isophorone	DoD-ELAP,NELAP,WADOE
Isophorone	CALAP,DoD-ELAP,NELAP
Isophorone	CALAP,DoD-ELAP,NELAP,WADOE
2-Nitrophenol	CALAP,DoD-ELAP,NELAP,WADOE
2-Nitrophenol	CALAP,DoD-ELAP,WADOE
2-Nitrophenol	DoD-ELAP,NELAP,WADOE
2-Nitrophenol	CALAP,DoD-ELAP,NELAP
2,4-Dimethylphenol	CALAP,DoD-ELAP,WADOE
2,4-Dimethylphenol	CALAP,DoD-ELAP,NELAP



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2,4-Dimethylphenol	DoD-ELAP,NELAP,WADOE
2,4-Dimethylphenol	CALAP,DoD-ELAP,NELAP,WADOE
Bis(2-Chloroethoxy)methane	CALAP,DoD-ELAP,WADOE
Bis(2-Chloroethoxy)methane	CALAP,DoD-ELAP,NELAP
Bis(2-Chloroethoxy)methane	DoD-ELAP,NELAP,WADOE
Bis(2-Chloroethoxy)methane	CALAP,DoD-ELAP,NELAP,WADOE
2,4-Dichlorophenol	CALAP,DoD-ELAP,NELAP,WADOE
2,4-Dichlorophenol	CALAP,DoD-ELAP,WADOE
2,4-Dichlorophenol	CALAP,DoD-ELAP,NELAP
2,4-Dichlorophenol	DoD-ELAP,NELAP,WADOE
1,2,4-Trichlorobenzene	CALAP,DoD-ELAP,NELAP,WADOE
1,2,4-Trichlorobenzene	CALAP,DoD-ELAP,WADOE
1,2,4-Trichlorobenzene	CALAP,DoD-ELAP,NELAP
1,2,4-Trichlorobenzene	DoD-ELAP,NELAP,WADOE
Naphthalene	DoD-ELAP,NELAP,WADOE,ADEC
Naphthalene	CALAP,DoD-ELAP,NELAP,ADEC
Naphthalene	CALAP,DoD-ELAP,WADOE,ADEC
Naphthalene	CALAP,DoD-ELAP,NELAP,WADOE,ADEC
Benzoic acid	CALAP,DoD-ELAP,NELAP,WADOE
Benzoic acid	CALAP,DoD-ELAP,NELAP
Benzoic acid	DoD-ELAP,NELAP,WADOE
Benzoic acid	CALAP,DoD-ELAP,WADOE
4-Chloroaniline	CALAP,DoD-ELAP,NELAP
4-Chloroaniline	CALAP,DoD-ELAP,WADOE
4-Chloroaniline	DoD-ELAP,NELAP,WADOE
4-Chloroaniline	CALAP,DoD-ELAP,NELAP,WADOE
Hexachlorobutadiene	CALAP,DoD-ELAP,WADOE
Hexachlorobutadiene	CALAP,DoD-ELAP,NELAP
Hexachlorobutadiene	CALAP,DoD-ELAP,NELAP,WADOE
Hexachlorobutadiene	DoD-ELAP,NELAP,WADOE
4-Chloro-3-Methylphenol	CALAP,DoD-ELAP,NELAP,WADOE
4-Chloro-3-Methylphenol	CALAP,DoD-ELAP,NELAP
4-Chloro-3-Methylphenol	DoD-ELAP,NELAP,WADOE
4-Chloro-3-Methylphenol	CALAP,DoD-ELAP,WADOE
2-Methylnaphthalene	DoD-ELAP,NELAP,WADOE,ADEC
2-Methylnaphthalene	CALAP,DoD-ELAP,NELAP,ADEC
2-Methylnaphthalene	CALAP,DoD-ELAP,NELAP,WADOE,ADEC
2-Methylnaphthalene	CALAP,DoD-ELAP,WADOE,ADEC
Hexachlorocyclopentadiene	CALAP,DoD-ELAP,NELAP,WADOE



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Hexachlorocyclopentadiene	CALAP,DoD-ELAP,WADOE
Hexachlorocyclopentadiene	DoD-ELAP,NELAP,WADOE
Hexachlorocyclopentadiene	CALAP,DoD-ELAP,NELAP
2,4,6-Trichlorophenol	CALAP,DoD-ELAP,NELAP
2,4,6-Trichlorophenol	CALAP,DoD-ELAP,NELAP,WADOE
2,4,6-Trichlorophenol	CALAP,DoD-ELAP,WADOE
2,4,6-Trichlorophenol	DoD-ELAP,NELAP,WADOE
2,4,5-Trichlorophenol	DoD-ELAP,NELAP,WADOE
2,4,5-Trichlorophenol	CALAP,DoD-ELAP,NELAP,WADOE
2,4,5-Trichlorophenol	CALAP,DoD-ELAP,WADOE
2,4,5-Trichlorophenol	CALAP,DoD-ELAP,NELAP
2-Chloronaphthalene	CALAP,DoD-ELAP,NELAP
2-Chloronaphthalene	CALAP,DoD-ELAP,NELAP,WADOE
2-Chloronaphthalene	CALAP,DoD-ELAP,WADOE
2-Chloronaphthalene	DoD-ELAP,NELAP,WADOE
2-Nitroaniline	CALAP,DoD-ELAP,WADOE
2-Nitroaniline	CALAP,DoD-ELAP,NELAP
2-Nitroaniline	DoD-ELAP,NELAP,WADOE
2-Nitroaniline	CALAP,DoD-ELAP,NELAP,WADOE
Acenaphthylene	CALAP,DoD-ELAP,WADOE,ADEC
Acenaphthylene	CALAP,DoD-ELAP,NELAP,ADEC
Acenaphthylene	DoD-ELAP,NELAP,WADOE,ADEC
Acenaphthylene	CALAP,DoD-ELAP,NELAP,WADOE,ADEC
Dimethylphthalate	CALAP,DoD-ELAP,NELAP,WADOE
Dimethylphthalate	CALAP,DoD-ELAP,NELAP
Dimethylphthalate	CALAP,DoD-ELAP,WADOE
Dimethylphthalate	DoD-ELAP,NELAP,WADOE
2,6-Dinitrotoluene	CALAP,DoD-ELAP,WADOE
2,6-Dinitrotoluene	DoD-ELAP,NELAP,WADOE
2,6-Dinitrotoluene	CALAP,DoD-ELAP,NELAP
2,6-Dinitrotoluene	CALAP,DoD-ELAP,NELAP,WADOE
Acenaphthene	CALAP,DoD-ELAP,NELAP,ADEC
Acenaphthene	DoD-ELAP,NELAP,WADOE,ADEC
Acenaphthene	CALAP,DoD-ELAP,WADOE,ADEC
Acenaphthene	CALAP,DoD-ELAP,NELAP,WADOE,ADEC
3-Nitroaniline	CALAP,DoD-ELAP,NELAP
3-Nitroaniline	CALAP,DoD-ELAP,WADOE
3-Nitroaniline	DoD-ELAP,NELAP,WADOE
3-Nitroaniline	CALAP,DoD-ELAP,NELAP,WADOE



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2,4-Dinitrophenol	CALAP,DoD-ELAP,NELAP,WADOE
2,4-Dinitrophenol	DoD-ELAP,NELAP,WADOE
2,4-Dinitrophenol	CALAP,DoD-ELAP,NELAP
2,4-Dinitrophenol	CALAP,DoD-ELAP,WADOE
Dibenzofuran	CALAP,DoD-ELAP,NELAP,WADOE,ADEC
Dibenzofuran	CALAP,DoD-ELAP,NELAP,ADEC
Dibenzofuran	CALAP,DoD-ELAP,WADOE,ADEC
Dibenzofuran	DoD-ELAP,NELAP,WADOE,ADEC
4-Nitrophenol	DoD-ELAP,NELAP,WADOE
4-Nitrophenol	CALAP,DoD-ELAP,NELAP,WADOE
4-Nitrophenol	CALAP,DoD-ELAP,NELAP
4-Nitrophenol	CALAP,DoD-ELAP,WADOE
2,4-Dinitrotoluene	DoD-ELAP,NELAP,WADOE
2,4-Dinitrotoluene	CALAP,DoD-ELAP,WADOE
2,4-Dinitrotoluene	CALAP,DoD-ELAP,NELAP,WADOE
2,4-Dinitrotoluene	CALAP,DoD-ELAP,NELAP
Fluorene	CALAP,DoD-ELAP,NELAP,WADOE,ADEC
Fluorene	CALAP,DoD-ELAP,NELAP,ADEC
Fluorene	CALAP,DoD-ELAP,WADOE,ADEC
Fluorene	DoD-ELAP,NELAP,WADOE,ADEC
4-Chlorophenylphenyl ether	DoD-ELAP,NELAP
4-Chlorophenylphenyl ether	CALAP,DoD-ELAP,NELAP
4-Chlorophenylphenyl ether	CALAP,DoD-ELAP,NELAP
4-Chlorophenylphenyl ether	CALAP,DoD-ELAP
Diethyl phthalate	DoD-ELAP,NELAP,WADOE
Diethyl phthalate	CALAP,DoD-ELAP,NELAP,WADOE
Diethyl phthalate	CALAP,DoD-ELAP,WADOE
Diethyl phthalate	CALAP,DoD-ELAP,NELAP
4-Nitroaniline	CALAP,DoD-ELAP,NELAP
4-Nitroaniline	DoD-ELAP,NELAP,WADOE
4-Nitroaniline	CALAP,DoD-ELAP,WADOE
4-Nitroaniline	CALAP,DoD-ELAP,NELAP,WADOE
4,6-Dinitro-2-methylphenol	CALAP,DoD-ELAP,WADOE
4,6-Dinitro-2-methylphenol	CALAP,DoD-ELAP,NELAP,WADOE
4,6-Dinitro-2-methylphenol	DoD-ELAP,NELAP,WADOE
4,6-Dinitro-2-methylphenol	CALAP,DoD-ELAP,NELAP
N-Nitrosodiphenylamine	DoD-ELAP,WADOE
N-Nitrosodiphenylamine	DoD-ELAP,NELAP
N-Nitrosodiphenylamine	DoD-ELAP,NELAP,WADOE



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N-Nitrosodiphenylamine	DoD-ELAP,NELAP,WADOE
4-Bromophenyl phenyl ether	CALAP,DoD-ELAP,NELAP
4-Bromophenyl phenyl ether	CALAP,DoD-ELAP,NELAP,WADOE
4-Bromophenyl phenyl ether	CALAP,DoD-ELAP,WADOE
4-Bromophenyl phenyl ether	DoD-ELAP,NELAP,WADOE
Hexachlorobenzene	CALAP,DoD-ELAP,NELAP
Hexachlorobenzene	CALAP,DoD-ELAP,WADOE
Hexachlorobenzene	CALAP,DoD-ELAP,NELAP,WADOE
Hexachlorobenzene	DoD-ELAP,NELAP,WADOE
Pentachlorophenol	CALAP,DoD-ELAP,WADOE
Pentachlorophenol	CALAP,DoD-ELAP,NELAP,WADOE
Pentachlorophenol	DoD-ELAP,NELAP,WADOE
Pentachlorophenol	CALAP,DoD-ELAP,NELAP
Phenanthrene	CALAP,DoD-ELAP,WADOE,ADEC
Phenanthrene	CALAP,DoD-ELAP,NELAP,ADEC
Phenanthrene	CALAP,DoD-ELAP,NELAP,WADOE,ADEC
Phenanthrene	DoD-ELAP,NELAP,WADOE,ADEC
Anthracene	CALAP,DoD-ELAP,WADOE,ADEC
Anthracene	CALAP,DoD-ELAP,NELAP,ADEC
Anthracene	CALAP,DoD-ELAP,NELAP,WADOE,ADEC
Anthracene	DoD-ELAP,NELAP,WADOE,ADEC
Carbazole	CALAP,DoD-ELAP,NELAP,WADOE,ADEC
Carbazole	CALAP,DoD-ELAP,NELAP,ADEC
Carbazole	CALAP,DoD-ELAP,WADOE,ADEC
Carbazole	DoD-ELAP,NELAP,WADOE,ADEC
Di-n-Butylphthalate	DoD-ELAP,NELAP,WADOE
Di-n-Butylphthalate	CALAP,DoD-ELAP,WADOE
Di-n-Butylphthalate	CALAP,DoD-ELAP,NELAP,WADOE
Di-n-Butylphthalate	CALAP,DoD-ELAP,NELAP
Fluoranthene	CALAP,DoD-ELAP,WADOE,ADEC
Fluoranthene	CALAP,DoD-ELAP,NELAP,WADOE,ADEC
Fluoranthene	CALAP,DoD-ELAP,NELAP,ADEC
Fluoranthene	DoD-ELAP,NELAP,WADOE,ADEC
Pyrene	CALAP,DoD-ELAP,NELAP,ADEC
Pyrene	CALAP,DoD-ELAP,WADOE,ADEC
Pyrene	DoD-ELAP,NELAP,WADOE,ADEC
Pyrene	CALAP,DoD-ELAP,NELAP,WADOE,ADEC
Butylbenzylphthalate	CALAP,DoD-ELAP,WADOE
Butylbenzylphthalate	DoD-ELAP,NELAP,WADOE



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Butylbenzylphthalate	CALAP,DoD-ELAP,NELAP,WADOE
Butylbenzylphthalate	CALAP,DoD-ELAP,NELAP
Benzo(a)anthracene	CALAP,DoD-ELAP,WADOE,ADEC
Benzo(a)anthracene	CALAP,DoD-ELAP,NELAP,ADEC
Benzo(a)anthracene	DoD-ELAP,NELAP,WADOE,ADEC
Benzo(a)anthracene	CALAP,DoD-ELAP,NELAP,WADOE,ADEC
3,3'-Dichlorobenzidine	DoD-ELAP,WADOE
3,3'-Dichlorobenzidine	DoD-ELAP,NELAP,WADOE
3,3'-Dichlorobenzidine	DoD-ELAP,NELAP,WADOE
3,3'-Dichlorobenzidine	DoD-ELAP,NELAP
Chrysene	DoD-ELAP,NELAP,WADOE,ADEC
Chrysene	CALAP,DoD-ELAP,NELAP,ADEC
Chrysene	CALAP,DoD-ELAP,NELAP,WADOE,ADEC
Chrysene	CALAP,DoD-ELAP,WADOE,ADEC
bis(2-Ethylhexyl)phthalate	DoD-ELAP,NELAP,WADOE
bis(2-Ethylhexyl)phthalate	CALAP,DoD-ELAP,WADOE
bis(2-Ethylhexyl)phthalate	CALAP,DoD-ELAP,NELAP
bis(2-Ethylhexyl)phthalate	CALAP,DoD-ELAP,NELAP,WADOE
Di-n-Octylphthalate	CALAP,DoD-ELAP,NELAP
Di-n-Octylphthalate	CALAP,DoD-ELAP,NELAP,WADOE
Di-n-Octylphthalate	DoD-ELAP,NELAP,WADOE
Di-n-Octylphthalate	CALAP,DoD-ELAP,WADOE
Benzo(b)fluoranthene	DoD-ELAP,NELAP,WADOE,ADEC
Benzo(b)fluoranthene	CALAP,DoD-ELAP,WADOE,ADEC
Benzo(b)fluoranthene	CALAP,DoD-ELAP,NELAP,ADEC
Benzo(b)fluoranthene	CALAP,DoD-ELAP,NELAP,WADOE,ADEC
Benzo(k)fluoranthene	DoD-ELAP,NELAP,WADOE,ADEC
Benzo(k)fluoranthene	CALAP,DoD-ELAP,NELAP,WADOE,ADEC
Benzo(k)fluoranthene	CALAP,DoD-ELAP,NELAP,ADEC
Benzo(k)fluoranthene	CALAP,DoD-ELAP,WADOE,ADEC
Benzo(a)fluoranthenes, Total	CALAP,ADEC
Benzo(a)fluoranthenes, Total	CALAP,WADOE,ADEC
Benzo(a)fluoranthenes, Total	WADOE,ADEC
Benzo(a)fluoranthenes, Total	CALAP,WADOE,ADEC
Benzo(a)pyrene	DoD-ELAP,NELAP,WADOE,ADEC
Benzo(a)pyrene	CALAP,DoD-ELAP,WADOE,ADEC
Benzo(a)pyrene	CALAP,DoD-ELAP,NELAP,WADOE,ADEC
Benzo(a)pyrene	CALAP,DoD-ELAP,NELAP,ADEC
Indeno(1,2,3-cd)pyrene	CALAP,DoD-ELAP,WADOE,ADEC



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
25-Mar-2021 18:57

Indeno(1,2,3-cd)pyrene	CALAP,DoD-ELAP,NELAP,ADEC
Indeno(1,2,3-cd)pyrene	DoD-ELAP,NELAP,WADOE,ADEC
Indeno(1,2,3-cd)pyrene	CALAP,DoD-ELAP,NELAP,WADOE,ADEC
Dibenzo(a,h)anthracene	DoD-ELAP,NELAP,WADOE,ADEC
Dibenzo(a,h)anthracene	CALAP,DoD-ELAP,NELAP,WADOE,ADEC
Dibenzo(a,h)anthracene	CALAP,DoD-ELAP,NELAP,ADEC
Dibenzo(a,h)anthracene	CALAP,DoD-ELAP,WADOE,ADEC
Benzo(g,h,i)perylene	DoD-ELAP,NELAP,WADOE,ADEC
Benzo(g,h,i)perylene	CALAP,DoD-ELAP,WADOE,ADEC
Benzo(g,h,i)perylene	CALAP,DoD-ELAP,NELAP,ADEC
Benzo(g,h,i)perylene	CALAP,DoD-ELAP,NELAP,WADOE,ADEC
N-Nitrosodimethylamine	CALAP,DoD-ELAP,NELAP,WADOE
N-Nitrosodimethylamine	CALAP,DoD-ELAP,NELAP
N-Nitrosodimethylamine	CALAP,DoD-ELAP,WADOE
N-Nitrosodimethylamine	DoD-ELAP,NELAP,WADOE
Aniline	CALAP,DoD-ELAP,NELAP,WADOE
Aniline	DoD-ELAP,NELAP,WADOE
Aniline	CALAP,DoD-ELAP,NELAP
Aniline	CALAP,DoD-ELAP,WADOE
Retene	CALAP,DoD-ELAP,WADOE
Retene	DoD-ELAP,NELAP,WADOE
Retene	CALAP,DoD-ELAP,NELAP
Retene	CALAP,DoD-ELAP,NELAP,WADOE
Pyridine	DoD-ELAP,NELAP,WADOE
Pyridine	CALAP,DoD-ELAP,WADOE
Pyridine	CALAP,DoD-ELAP,NELAP,WADOE
Pyridine	CALAP,DoD-ELAP,NELAP
1-Methylnaphthalene	CALAP,DoD-ELAP,NELAP,ADEC
1-Methylnaphthalene	CALAP,DoD-ELAP,WADOE,ADEC
1-Methylnaphthalene	DoD-ELAP,NELAP,WADOE,ADEC
1-Methylnaphthalene	CALAP,DoD-ELAP,NELAP,WADOE,ADEC
Azobenzene (1,2-DP-Hydrazine)	NELAP,WADOE
Azobenzene (1,2-DP-Hydrazine)	CALAP,NELAP,WADOE
Azobenzene (1,2-DP-Hydrazine)	CALAP,NELAP
Azobenzene (1,2-DP-Hydrazine)	CALAP,WADOE
2,3,4,6-Tetrachlorophenol	DoD-ELAP
2,3,4,6-Tetrachlorophenol	DoD-ELAP,WADOE
2,3,4,6-Tetrachlorophenol	DoD-ELAP,WADOE
2,3,4,6-Tetrachlorophenol	DoD-ELAP,WADOE



Dalton, Olmsted & Fuglevand, Inc
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Reported:
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Benzidine	DoD-ELAP,NELAP
Benzidine	DoD-ELAP,NELAP
Benzidine	DoD-ELAP
Benzidine	DoD-ELAP,NELAP
Tetrachloroguaiacol	DoD-ELAP
Tetrachloroguaiacol	DoD-ELAP,WADOE
Tetrachloroguaiacol	DoD-ELAP,WADOE
Tetrachloroguaiacol	DoD-ELAP,WADOE
3,4,5-Trichloroguaiacol	WADOE
3,4,5-Trichloroguaiacol	
3,4,5-Trichloroguaiacol	WADOE
3,4,5-Trichloroguaiacol	WADOE
3,4,6-Trichloroguaiacol	WADOE
3,4,6-Trichloroguaiacol	WADOE
3,4,6-Trichloroguaiacol	WADOE
4,5,6-Trichloroguaiacol	WADOE
4,5,6-Trichloroguaiacol	
4,5,6-Trichloroguaiacol	WADOE
4,5,6-Trichloroguaiacol	WADOE
Guaiacol	WADOE
Guaiacol	WADOE
Guaiacol	
Guaiacol	WADOE

EPA 8270E-SIM in Solid

Tributyltin Ion	WADOE,DoD-ELAP
Tributyltin Ion	DoD-ELAP
Tributyltin Ion	WADOE,DoD-ELAP
Tributyltin Ion	WADOE,DoD-ELAP
Dibutyltin Ion	WADOE,DoD-ELAP
Dibutyltin Ion	WADOE,DoD-ELAP
Dibutyltin Ion	DoD-ELAP
Dibutyltin Ion	WADOE,DoD-ELAP
Butyltin Ion	WADOE
Butyltin Ion	
Butyltin Ion	WADOE
Butyltin Ion	WADOE
Phenol	CALAP,NELAP
Phenol	CALAP,NELAP,WADOE



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Reported:
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Phenol	CALAP,WADOE
Phenol	NELAP,WADOE
1,3-Dichlorobenzene	CALAP,WADOE
1,3-Dichlorobenzene	CALAP,NELAP,WADOE
1,3-Dichlorobenzene	NELAP,WADOE
1,3-Dichlorobenzene	CALAP,NELAP
1,4-Dichlorobenzene	CALAP,WADOE
1,4-Dichlorobenzene	NELAP,WADOE
1,4-Dichlorobenzene	CALAP,NELAP
1,4-Dichlorobenzene	CALAP,NELAP,WADOE
1,2-Dichlorobenzene	CALAP,WADOE
1,2-Dichlorobenzene	CALAP,NELAP,WADOE
1,2-Dichlorobenzene	CALAP,NELAP
1,2-Dichlorobenzene	NELAP,WADOE
Benzyl Alcohol	CALAP,WADOE
Benzyl Alcohol	CALAP,NELAP
Benzyl Alcohol	CALAP,NELAP,WADOE
Benzyl Alcohol	NELAP,WADOE
2-Methylphenol	CALAP,NELAP
2-Methylphenol	CALAP,NELAP,WADOE
2-Methylphenol	NELAP,WADOE
2-Methylphenol	CALAP,WADOE
N-Nitroso-di-n-Propylamine	CALAP,WADOE
N-Nitroso-di-n-Propylamine	CALAP,NELAP,WADOE
N-Nitroso-di-n-Propylamine	NELAP,WADOE
N-Nitroso-di-n-Propylamine	CALAP,NELAP
4-Methylphenol	CALAP,NELAP,WADOE
4-Methylphenol	CALAP,NELAP
4-Methylphenol	CALAP,WADOE
4-Methylphenol	NELAP,WADOE
2,4-Dimethylphenol	CALAP,NELAP
2,4-Dimethylphenol	NELAP,WADOE
2,4-Dimethylphenol	CALAP,NELAP,WADOE
2,4-Dimethylphenol	CALAP,WADOE
1,2,4-Trichlorobenzene	CALAP,NELAP
1,2,4-Trichlorobenzene	CALAP,NELAP,WADOE
1,2,4-Trichlorobenzene	NELAP,WADOE
1,2,4-Trichlorobenzene	CALAP,WADOE
Hexachlorobutadiene	NELAP,WADOE



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Hexachlorobutadiene	CALAP,WADOE
Hexachlorobutadiene	CALAP,NELAP
Hexachlorobutadiene	CALAP,NELAP,WADOE
N-Nitrosodimethylamine	CALAP,NELAP
N-Nitrosodimethylamine	CALAP,WADOE
N-Nitrosodimethylamine	NELAP,WADOE
N-Nitrosodimethylamine	CALAP,NELAP,WADOE
Dimethylphthalate	CALAP,WADOE
Dimethylphthalate	CALAP,NELAP,WADOE
Dimethylphthalate	CALAP,NELAP
Dimethylphthalate	NELAP,WADOE
Diethyl phthalate	CALAP,WADOE
Diethyl phthalate	CALAP,NELAP
Diethyl phthalate	NELAP,WADOE
Diethyl phthalate	CALAP,NELAP,WADOE
N-Nitrosodiphenylamine	CALAP,NELAP
N-Nitrosodiphenylamine	CALAP,NELAP,WADOE
N-Nitrosodiphenylamine	NELAP,WADOE
N-Nitrosodiphenylamine	CALAP,WADOE
Hexachlorobenzene	NELAP,WADOE
Hexachlorobenzene	CALAP,WADOE
Hexachlorobenzene	CALAP,NELAP
Hexachlorobenzene	CALAP,NELAP,WADOE
Pentachlorophenol	CALAP,NELAP,WADOE
Pentachlorophenol	CALAP,WADOE
Pentachlorophenol	CALAP,NELAP
Pentachlorophenol	NELAP,WADOE
Butylbenzylphthalate	CALAP,NELAP,WADOE
Butylbenzylphthalate	NELAP,WADOE
Butylbenzylphthalate	CALAP,NELAP
Butylbenzylphthalate	CALAP,WADOE
Dibenzo(a,h)anthracene	CALAP,NELAP,WADOE
Dibenzo(a,h)anthracene	CALAP,NELAP
Dibenzo(a,h)anthracene	NELAP,WADOE
Dibenzo(a,h)anthracene	CALAP,WADOE

EPA 9060A m in Solid

Total Organic Carbon	WADOE
Total Organic Carbon	
Total Organic Carbon	WADOE



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Reported:
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Total Organic Carbon WADOE

SM 4500-NH3 H-97 in Solid

Ammonia-N WADOE,NELAP
Ammonia-N WADOE,NELAP
Ammonia-N NELAP
Ammonia-N WADOE

SM 4500-S2 D-00 (PSEP) in Solid

Sulfide DoD-ELAP,NELAP,WADOE
Sulfide DoD-ELAP,NELAP,WADOE
Sulfide DoD-ELAP,NELAP
Sulfide DoD-ELAP,WADOE

Code	Description	Number	Expires
ADEC	Alaska Dept of Environmental Conservation	17-015	03/28/2023
DoD-ELAP	DoD-Environmental Laboratory Accreditation Program	66169	02/28/2022



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Notes and Definitions

*	Flagged value is not within established control limits.
B	This analyte was detected in the method blank.
D	The reported value is from a dilution
E	Concentration exceeds the calibration range.
EMPC	Estimated Maximum Possible Concentration qualifier for HRGCMS Dioxin
H	Hold time violation - Hold time was exceeded.
J	Estimated concentration value detected below the reporting limit.
M	Estimated value for a GC/MS analyte detected and confirmed by an analyst but with low spectral match parameters.
P1	The reported value is greater than 40% difference between the concentrations determined on two GC columns where applicable.
P1	>40% difference between the concentrations on two GC columns.
Q	ICV/CCV Acceptance Criteria not met.
U	This analyte is not detected above the reporting limit (RL) or if noted, not detected above the limit of detection (LOD).
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
[2C]	Indicates this result was quantified on the second column on a dual column analysis.



Analytical Resources, Incorporated
Analytical Chemists and Consultants

26 March 2021

Ezra Beaver
Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue, WA 98007

RE: COA Outfall

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)
20K0374

Associated SDG ID(s)
N/A

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclose Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the requirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, Inc.

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.



Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: 20K0374		Turn-around Requested: NORMAL		Page: 1 of 1		 Analytical Resources, Incorporated Analytical Chemists and Consultants 4611 South 134th Place, Suite 100 Tukwila, WA 98168 206-695-6200 206-695-6201 (fax) www.arilabs.com										
ARI Client Company: DOF		Phone: 206 6603466		Date: 11/23/20				Ice Present? Yes								
Client Contact: IEZRA BEAVER/DANE COOPER/ROB WEBB				No. of Coolers: 3				Cooler Temps: See CFE								
Client Project Name: COA OUTFALL				Analysis Requested												
Client Project #: COA-001		Samplers: IE. BEAVER		<table border="1"> <tr> <td>SMS TABLE 3</td> <td>SMS TABLE 4</td> <td>DIXONS/ FUGANS TABLE 5</td> <td>ARCHIVE</td> <td></td> <td></td> <td></td> <td></td> <td>Notes/Comments</td> </tr> </table>				SMS TABLE 3	SMS TABLE 4	DIXONS/ FUGANS TABLE 5	ARCHIVE					Notes/Comments
SMS TABLE 3	SMS TABLE 4	DIXONS/ FUGANS TABLE 5	ARCHIVE					Notes/Comments								
Sample ID	Date	Time	Matrix	No. Containers												
COA-01-G-20201120	11/20/20	07:41	S	6	X	X	X									
COA-02-G-20201119	11/19/20	10:50	S	6	X	X	X									
COA-03-G-20201118	11/18/20	12:09	S	6	X	X	X									
COA-04-G-20201118	11/18/20	11:06	S	6	X	X	X									
COA-05-G-20201119	11/19/20	12:41	S	18	X	X	X		EXTRA VOLUME FOR MS/MSD							
COA-05-D-G-20201119	11/19/20	12:41	S	6	X	X	X									
COA-06-G-20201120	11/20/20	11:54	S	18	X	X	X		EXTRA VOLUME FOR MS/MSD							
COA-06-D-G-20201120	11/20/20	11:54	S	6	X	X	X									
COA-07-G-20201118	11/18/20	11:36	S	6	X	X	X									
COA-08-G-20201119	11/19/20	11:12	S	6	X	X	X									
Comments/Special Instructions * REFER TO DOF SAP FOR ANALYTICAL TABLES		Relinquished by: (Signature) [Signature]		Received by: (Signature) [Signature]		Relinquished by: (Signature)		Received by: (Signature)								
Printed Name: IEZRA BEAVER		Printed Name: Jacob [Signature]		Printed Name:		Printed Name:										
Company: DOF		Company: ARZ		Company:		Company:										
Date & Time: 11/23/20 1505		Date & Time: 11/23/2020 1505		Date & Time:		Date & Time:										

Limits of Liability: ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, notwithstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
COA_01_G_20201120	20K0374-01	Solid	20-Nov-2020 07:41	23-Nov-2020 15:05
COA_02_G_20201119	20K0374-02	Solid	19-Nov-2020 10:50	23-Nov-2020 15:05
COA_03_G_20201118	20K0374-03	Solid	18-Nov-2020 12:09	23-Nov-2020 15:05
COA_04_G_20201118	20K0374-04	Solid	18-Nov-2020 11:06	23-Nov-2020 15:05
COA_05_G_20201119	20K0374-05	Solid	19-Nov-2020 12:41	23-Nov-2020 15:05
COA_05-D_G_20201119	20K0374-06	Solid	19-Nov-2020 12:41	23-Nov-2020 15:05
COA_06_G_20201120	20K0374-07	Solid	20-Nov-2020 11:54	23-Nov-2020 15:05
COA_06-D_G_20201120	20K0374-08	Solid	20-Nov-2020 11:54	23-Nov-2020 15:05
COA_07_G_20201118	20K0374-09	Solid	18-Nov-2020 11:36	23-Nov-2020 15:05
COA_08_G_20201119	20K0374-10	Solid	19-Nov-2020 11:12	23-Nov-2020 15:05



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Reported:
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Work Order Case Narrative

Sample receipt

Samples as listed on the preceding page were received 23-November-2020 under ARI work order 20K0374. For details regarding sample receipt, please refer to the Cooler Receipt Form.

Semivolatiles - EPA Method SW8270E

The samples were extracted and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements, with the exception of all associated "Q" flagged analytes which are out of control low in the CCAL. All associated samples that contain analyte have been flagged with a "Q" qualifier.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank was clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

The matrix spike/matrix spike duplicate (MS/MSD) percent recoveries and relative percent difference (RPD) were within advisory control limits with the exception of analytes flagged on the associated forms.

Butyl Tin(s) - EPA Method SW8270E-SIM

The sample(s) were extracted and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

The SRM recoveries were within limits with the exception of analytes flagged on the associated form.

The matrix spike/matrix spike duplicate (MS/MSD) percent recoveries and relative percent difference (RPD) were within advisory control limits with the exception of analytes flagged on the associated forms.



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Pesticides - EPA Method SW8081B

The sample(s) were extracted and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements with the exception of CCV6 for 2,4 DDT, DDT failed on CLP2 okay on CLP1, CCVD for DCBP which failed on CLP2 okay on CLP1 and CCVA for CCVE: 2,4DDT failed on CLP2 okay on CLP1.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

The SRM recoveries were within limits.

The matrix spike/matrix spike duplicate (MS/MSD) percent recoveries and relative percent difference (RPD) were within advisory control limits with the exception of analytes flagged on the associated forms.

Semivolatiles - EPA Method SW8270E-SIM

The samples were extracted and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements, with the exception of all associated "Q" flagged analytes which are out of control high in the CCAL. All associated samples that contain analyte have been flagged with a "Q" qualifier.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blanks were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

The matrix spike/matrix spike duplicate (MS/MSD) percent recoveries and relative percent difference (RPD) were within advisory control limits with the exception of analytes flagged on the associated forms.

The SRM recoveries were within limits.

PCB Aroclors - EPA Method SW8082A

The samples were extracted and analyzed within the recommended holding times.



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Reported:
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Initial and continuing calibrations were within method requirements with the exception of ar1260ccvc which fails low on one column. The associated are non-detects for failed bracket and no further action was taken.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank was clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

The matrix spike/matrix spike duplicate (MS/MSD) percent recoveries and relative percent difference (RPD) were within advisory control limits.

The SRM recoveries were within limits.

Dioxin/Furans - EPA Method 1613

The samples were extracted and analyzed within the recommended holding times. Analysis was performed using an application specific column developed by Restek. The RTX-Dioxin2 column has unique isomer separation for the 2378-TCDF, eliminating the need for confirmation analysis.

The samples were re-extracted due to a missing SRM requirement. Both sets of data have been provided for your review.

Initial and continuing calibrations were within method requirements.

Labeled internal standard areas were within limits.

The cleanup surrogate percent recoveries were within control limits.

The method blank contains a reportable response for OCDD, HxCDD and OCDF at or below the reporting limit. Associated detected results and QC have been flagged with "B" qualifiers. No further corrective action was taken.

The OPR (Ongoing Precision and Recovery) standard percent recoveries were within control limits.

The SRM recoveries were within limits.

The sample duplicate RPDs are outside of the advisory control limits for analytes flagged on the associated forms.

Total Metals - EPA Method 6020B and 7471

The samples were digested and analyzed within the recommended holding times with the exception of mercury which has been flagged with a "H" qualifier. The samples were originally analyzed in hold without an SRM and re-digested and analyzed with an SRM outside of holding.



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

Initial and continuing calibrations were within method requirements.

The method blanks were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

The reference material (SRM) percent recoveries were within control limits.

The matrix spike (MS) percent recoveries and the duplicate (DUP) relative percent difference (RPD) were within advisory control limits with the exception of analytes flagged on the associated forms.

Wet Chemistry

The samples were prepared and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blanks were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

The reference material (SRM) percent recoveries were within control limits.

The matrix spike (MS) percent recoveries and the duplicate (DUP) relative percent difference (RPD) were within advisory control limits with the exception of analytes flagged on the associated forms.

Grainsize

The samples were submitted to Materials Testing & Consulting, Inc. (MTC) for grainsize analysis. The MTC report is included here in its entirety.

Cooler Receipt Form

ARI Client: DOF

Project Name: COA outfall

COC No(s): NA

Delivered by: Fed-Ex UPS Courier Hand Delivered Other:

Assigned ARI Job No: 2010374

Tracking No: _____ NA

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of the cooler? YES ☒ NO ☐

Were custody papers included with the cooler? YES NO

Were custody papers properly filled out (ink, signed, etc.) YES NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry)

Time 1505 0.3 0.4 0.6

If cooler temperature is out of compliance fill out form 00070F Temp Gun ID#: DOO 5206

Cooler Accepted by: JG Date: 11/23/2020 Time: 1505

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler? YES NO

What kind of packing material was used? ... Bubble Wrap Wet Ice Gel Packs Baggies Foam Block Paper Other:

Was sufficient ice used (if appropriate)? NA YES NO

How were bottles sealed in plastic bags? Individually Grouped Not

Did all bottles arrive in good condition (unbroken)? YES NO

Were all bottle labels complete and legible? YES NO

Did the number of containers listed on COC match with the number of containers received? YES NO

Did all bottle labels and tags agree with custody papers? YES NO

Were all bottles used correct for the requested analyses? YES NO

Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs) ... NA YES NO

Were all VOC vials free of air bubbles? NA YES NO

Was sufficient amount of sample sent in each bottle? YES NO

Date VOC Trip Blank was made at ARI..... NA

Were the sample(s) split by ARI? NA YES Date/Time: _____ Equipment: _____ Split by: _____

Samples Logged by: SC Date: 11/24/2021 Time: 1526 Labels checked by: SC

**** Notify Project Manager of discrepancies or concerns ****

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

By: _____ Date: _____

Materials Testing & Consulting, Inc.

Geotechnical Engineering • Special Inspection • Materials Testing • Environmental Consulting



Project: COA Outfall (20K0374)
Project #: 20S038-25
Client : Analytical Resources, Inc.
Source: Multiple
MTC Sample#: Multiple

Date Received: November 24, 2020
Sampled By: Others
Date Reported: January 18, 2021
Tested By: B. Goble

CASE NARRATIVE

1. Ten samples were submitted for grain size analysis according to Puget Sound Estuary Protocol (PSEP) methodology.
2. The samples were run in two batches and two samples from this job was chosen for triplicate analysis. The triplicate data is reported on the QA summary.
3. Two samples did not contain the required amount of fines for the pipette portion of the analysis. The samples could not be split to yield the required amount of fines while staying within the capacity of the balance. The samples have been qualified on the QA summary.
4. The data is provided in summary tables and plots.
5. There were no other noted anomalies during this testing.

All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.

Reviewed by: _____

Materials Testing & Consulting, Inc.

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Project: COA Outfall (20K0374)
Project #: 20S038-25
Date Received: November 24, 2020
Date Tested: January 11, 2021

Client: Analytical Resources, Inc.
Sampled by: Others
Tested by: B. Goble

Apparent Grain Size Distribution Summary Percent Finer Than Indicated Size

Sample No.	Gravel			Very Coarse Sand	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Silt				Clay	
Phi Size	-3	-2	-1	0	1	2	3	4	5	6	7	8	9	10
Sieve Size (microns)	3/8"	#4 (4750)	#10 (2000)	#18 (1000)	#35 (500)	#60 (250)	#120 (125)	#230 (63)	31.0	15.6	7.8	3.9	2.0	1.0
COA_05_G_20201119	100.0	100.0	99.0	97.3	95.6	92.6	71.9	46.0	33.0	22.2	17.1	14.1	9.8	4.0
	100.0	100.0	95.1	94.4	92.8	87.8	68.0	44.3	33.6	21.2	16.4	13.5	8.4	3.2
	100.0	100.0	99.8	99.3	96.7	93.0	70.8	42.7	31.2	22.1	17.2	13.9	8.8	2.8
COA_01_G_20201120	100.0	76.2	60.5	41.4	22.1	4.9	0.6	0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
COA_02_G_20201119	100.0	100.0	100.0	100.0	99.7	96.9	90.3	73.9	43.4	27.0	19.5	15.0	9.6	3.9
COA_03_G_20201118	100.0	100.0	100.0	99.5	98.2	97.0	93.3	82.5	67.1	42.0	28.0	21.8	14.7	9.8
COA_04_G_20201118	100.0	100.0	100.0	100.0	99.8	98.2	92.6	78.3	62.8	37.7	26.2	20.1	13.7	8.8
COA_05-D_G_20201119	100.0	100.0	99.7	99.1	97.5	93.0	74.4	48.0	38.7	23.4	17.5	14.0	9.9	3.9
COA_06-D_G_20201120	100.0	99.4	96.5	92.4	81.0	59.2	26.5	15.0	11.4	8.5	7.0	5.7	4.0	1.6
COA_07_G_20201118	100.0	100.0	99.6	98.0	92.1	74.9	29.3	13.4	10.7	8.1	6.4	5.1	3.1	1.4
COA_08_G_20201119	100.0	98.2	94.9	58.2	17.4	6.6	2.6	2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0

All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.

Reviewed by: 

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Materials Testing & Consulting, Inc.

Geotechnical Engineering • Special Inspection • Materials Testing • Environmental Consulting



Project: COA Outfall (20K0374)
Project #: 20S038-25
Date Received: November 24, 2020
Date Tested: January 11, 2021

Client: Analytical Resources, Inc.
Sampled by: Others
Tested by: B. Goble

Apparent Grain Size Distribution Summary

Percent Retained in Each Size Fraction

Sample No.	Gravel	Very Coarse Sand	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Coarse Silt	Medium Silt	Fine Silt	Very Fine Silt	Clay			Total Fines
Phi Size	< -1	-1 to 0	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	> 10	> 4
Sieve Size (microns)	> #10 (2000)	10-18 (2000-1000)	18-35 (1000-500)	35-60 (500-250)	60-120 (250-125)	120-230 (125-62)	62.5-31.0	31.0-15.6	15.6-7.8	7.8-3.9	3.9-2.0	2.0-1.0	<1.0	<230 (<62)
COA_05_G_20201119	1.0	1.7	1.8	3.0	20.7	25.9	13.0	10.8	5.1	3.1	4.3	5.7	4.0	46.0
	4.9	0.7	1.6	5.0	19.8	23.8	10.7	12.4	4.8	3.0	5.0	5.3	3.2	44.3
	0.2	0.5	2.5	3.7	22.2	28.0	11.6	9.0	5.0	3.2	5.1	6.0	2.8	42.7
COA 01 G 20201120	39.5	19.1	19.3	17.1	4.4	0.2	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	0.4
COA 02 G 20201119	0.0	0.0	0.3	2.8	6.6	16.4	30.5	16.4	7.5	4.6	5.4	5.7	3.9	73.9
COA 03 G 20201118	0.0	0.5	1.3	1.2	3.7	10.8	15.5	25.1	13.9	6.2	7.2	4.9	9.8	82.5
COA 04 G 20201118	0.0	0.0	0.2	1.7	5.6	14.3	15.5	25.1	11.5	6.1	6.4	4.9	8.8	78.3
COA 05-D G 20201119	0.3	0.6	1.7	4.4	18.6	26.4	9.3	15.3	5.9	3.6	4.0	6.0	3.9	48.0
COA 06-D G 20201120	3.5	4.1	11.4	21.9	32.7	11.4	3.6	2.9	1.6	1.3	1.6	2.4	1.6	15.0
COA 07 G 20201118	0.4	1.6	5.9	17.2	45.5	15.9	2.7	2.6	1.6	1.4	1.9	1.7	1.4	13.4
COA 08 G 20201119	5.1	36.8	40.8	10.8	4.0	0.5	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0

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Reviewed by: E. Goble

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Materials Testing & Consulting, Inc.

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Project: COA Outfall (20K0374)
Project #: 20S038-25
Date Received: November 24, 2020
Date Tested: January 11, 2021

Client: Analytical Resources, Inc.
Sampled by: Others
Tested by: B. Goble

Relative Standard Deviation, By Phi Size

Sample ID	-3	-2	-1	0	1	2	3	4	5	6	7	8	9	10
COA_05_G_20201119	100.0	100.0	99.0	97.3	95.6	92.6	71.9	46.0	33.0	22.2	17.1	14.1	9.8	4.0
	100.0	100.0	95.1	94.4	92.8	87.8	68.0	44.3	33.6	21.2	16.4	13.5	8.4	3.2
	100.0	100.0	99.8	99.3	96.7	93.0	70.8	42.7	31.2	22.1	17.2	13.9	8.8	2.8
AVE	100.0	100.0	98.0	97.0	95.0	91.1	70.2	44.3	32.6	21.9	16.9	13.8	9.0	3.3
STDEV	0.0	0.0	2.1	2.0	1.6	2.3	1.6	1.3	1.0	0.4	0.3	0.3	0.6	0.5
%RSD	0.0	0.0	2.1	2.0	1.7	2.6	2.3	3.0	3.2	2.0	2.0	2.0	6.2	16.0

The Triplicate Applies To The Following Samples

Client ID	Date Sampled	Date Extracted	Date Complete	QA Ratio (95-105)	Data Qualifiers	Pipette Portion (5.0-25.0g)
COA_05_G_20201119	11/19/2020	1/4/2021	1/11/2021	100.9		9.0
	11/19/2020	1/4/2021	1/11/2021	103.7		10.6
	11/19/2020	1/4/2021	1/11/2021	100.1		7.5
COA_01_G_20201120	11/20/2020	1/4/2021	1/11/2021	99.7	SS	0.5
COA_02_G_20201119	11/19/2020	1/4/2021	1/11/2021	103.5		12.0
COA_03_G_20201118	11/18/2020	1/4/2021	1/11/2021	103.5		12.5
COA_04_G_20201118	11/18/2020	1/4/2021	1/11/2021	103.7		13.0
COA_05-D_G_20201119	11/19/2020	1/4/2021	1/11/2021	102.4		9.7
COA_06-D_G_20201120	11/20/2020	1/4/2021	1/11/2021	100.9		7.6
COA_07_G_20201118	11/18/2020	1/4/2021	1/11/2021	100.4		6.1
COA_08_G_20201119	11/19/2020	1/4/2021	1/11/2021	99.7	SS	2.6

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Reviewed by: B. Goble

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Project: COA Outfall (20K0374)
Project #: 20S038-25
Client : Analytical Resources, Inc.
Source: Multiple
MTC Sample#: Multiple

Date Received: November 24, 2020
Sampled By: Others
Date Tested: January 18, 2021
Tested By: B. Goble

Data Qualifiers

PSEP Grain Size Analysis

SM - The sample matrix was not appropriate for the requested analysis. This normally refers to samples contaminated with an organic product that interferes with the sieving process and/or moisture content, porosity and saturation calculations.

SS - The sample did not contain the proportion of "fines" required to perform the pipette portion of the grain size analysis.

W - The weight of the sample in some pipette aliquots was below the level required for accurate weighing.

F - The samples were frozen prior to particle size determination.

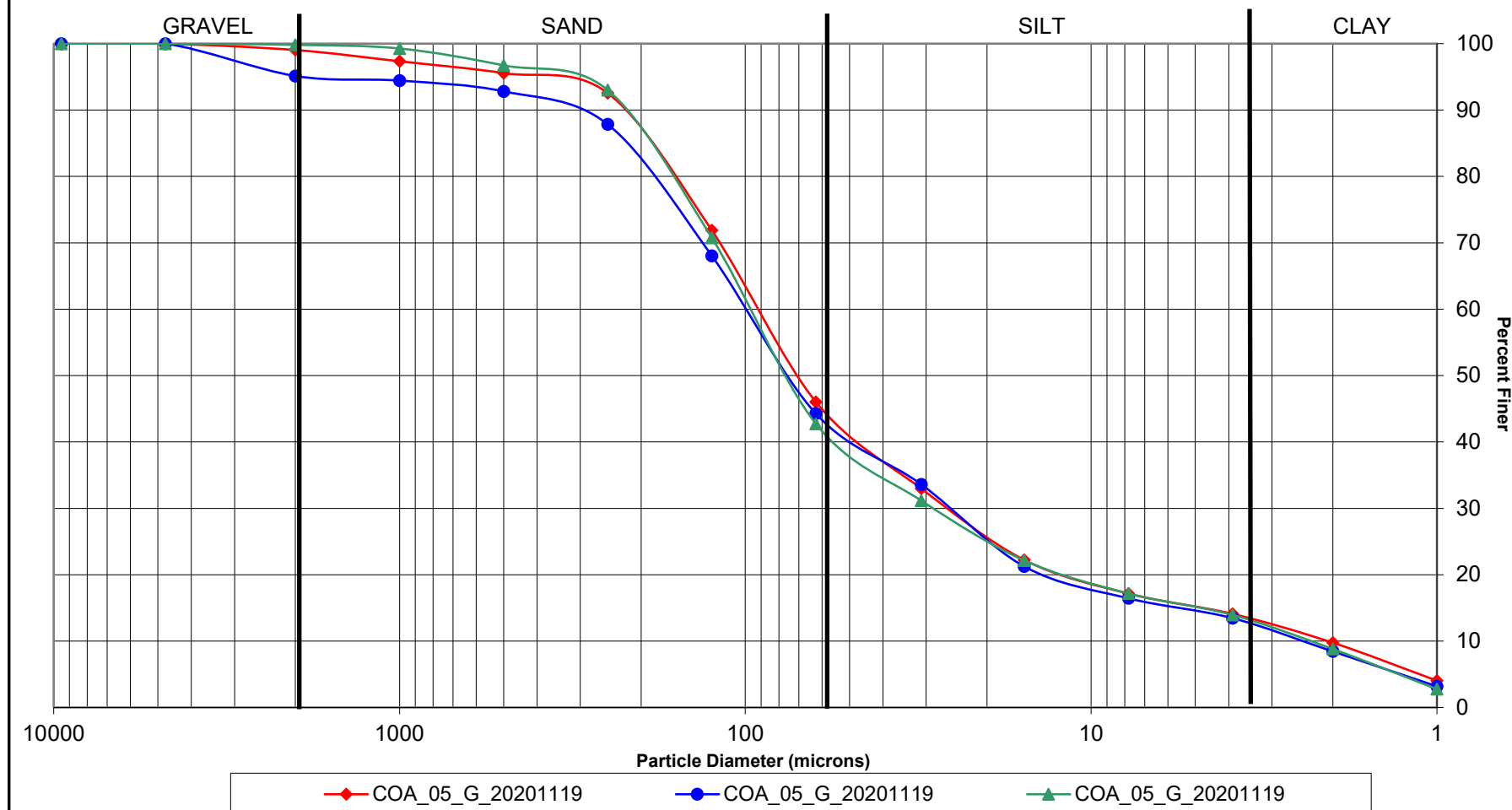
LV - Due to low sample volume provided, the samples could not be rerun to meet QA requirements.

Reviewed by: _____

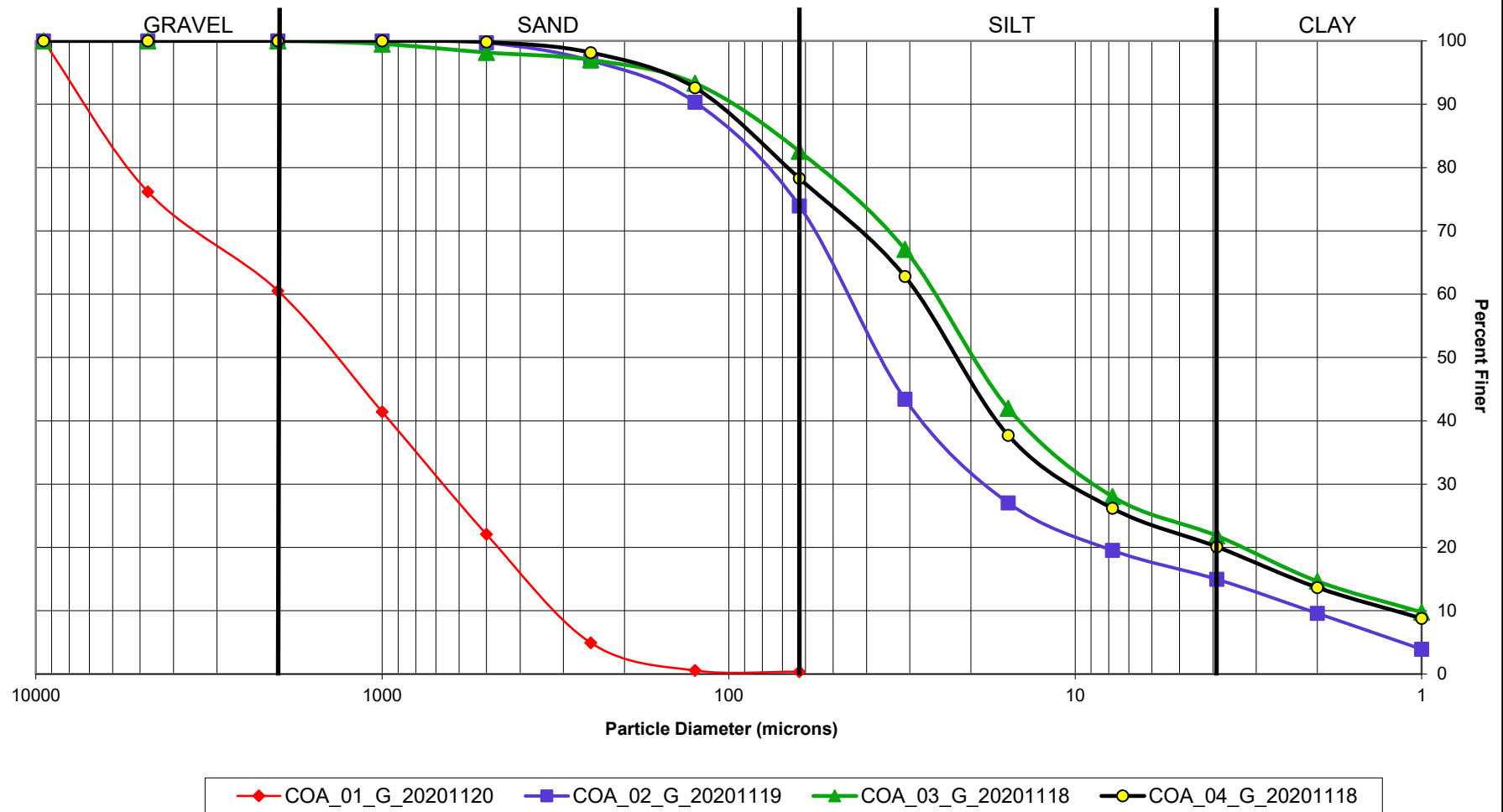


PSEP Grain Size Distribution

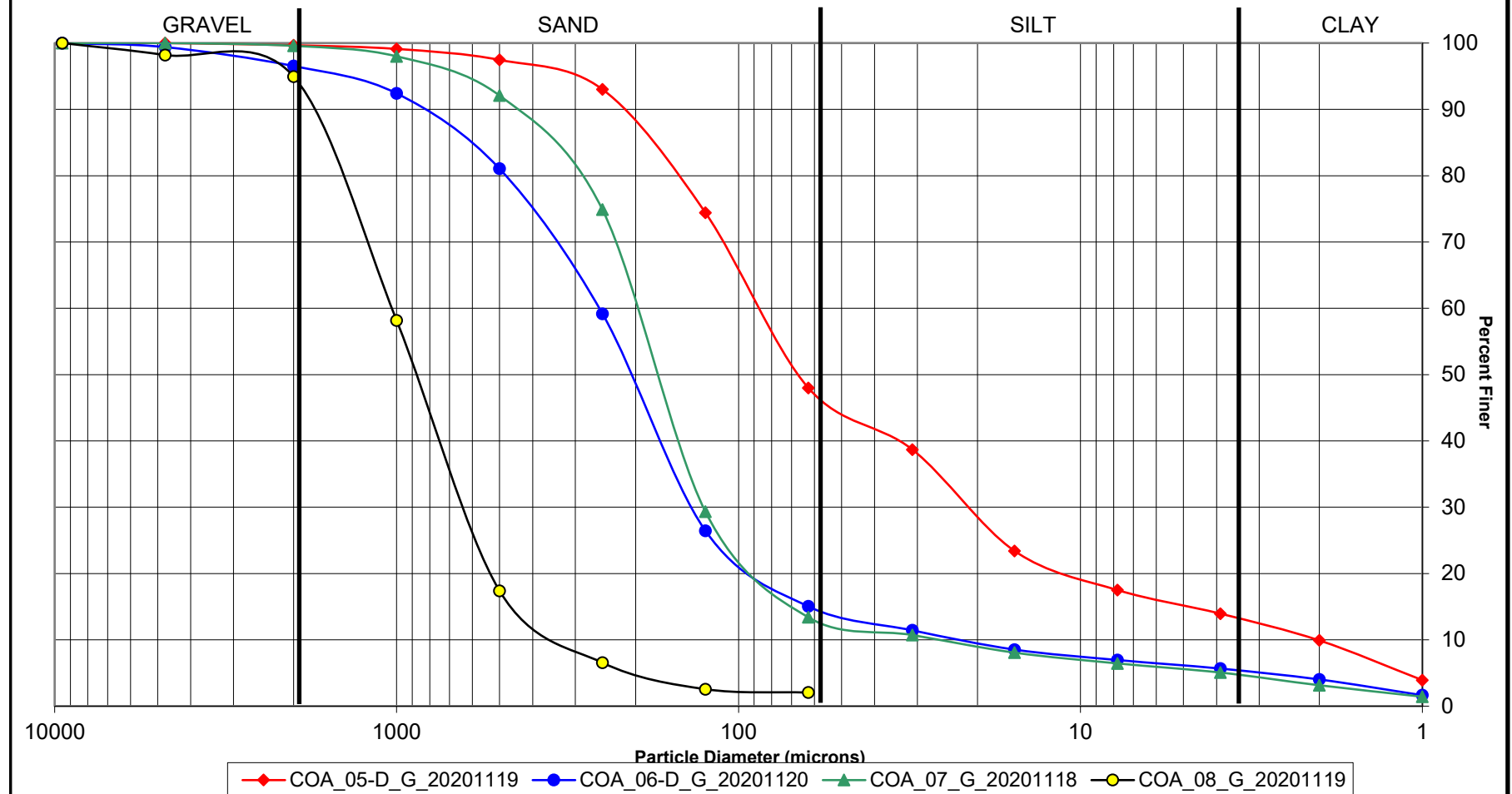
Triplicate Sample Plot



PSEP Grain Size Distribution



PSEP Grain Size Distribution



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Project: COA Outfall (20K0374)
Project #: 20S038-25
Date Received: November 24, 2020
Date Tested: January 11, 2021

Client: Analytical Resources, Inc.
Sampled by: Others
Tested by: B. Goble

Apparent Grain Size Distribution Summary Percent Finer Than Indicated Size

Sample No.	Gravel			Very Coarse Sand	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Silt				Clay	
Phi Size	-3	-2	-1	0	1	2	3	4	5	6	7	8	9	10
Sieve Size (microns)	3/8"	#4 (4750)	#10 (2000)	#18 (1000)	#35 (500)	#60 (250)	#120 (125)	#230 (63)	31.0	15.6	7.8	3.9	2.0	1.0
COA_06_G_20201120	100.0	98.0	94.9	90.8	80.0	59.0	27.3	16.1	11.1	8.7	7.0	5.6	4.6	2.5
	100.0	95.9	94.1	89.4	78.4	58.2	24.8	13.2	11.1	8.5	6.8	5.5	4.5	2.4
	100.0	97.8	95.9	92.1	80.7	58.8	25.9	14.4	11.6	8.7	7.2	5.9	4.7	2.7

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Project: COA Outfall (20K0374)

Client: Analytical Resources, Inc.

Project #: 20S038-25

Date Received: November 24, 2020

Sampled by: Others

Date Tested: January 11, 2021

Tested by: B. Goble

Apparent Grain Size Distribution Summary

Percent Retained in Each Size Fraction

Sample No.	Gravel	Very Coarse Sand	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Coarse Silt	Medium Silt	Fine Silt	Very Fine Silt	Clay			Total Fines
Phi Size	< -1	-1 to 0	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	> 10	> 4
Sieve Size (microns)	> #10 (2000)	10-18 (2000-1000)	18-35 (1000-500)	35-60 (500-250)	60-120 (250-125)	120-230 (125-62)	62.5-31.0	31.0-15.6	15.6-7.8	7.8-3.9	3.9-2.0	2.0-1.0	<1.0	<230 (<62)
COA_06_G_20201120	5.1	4.1	10.8	21.0	31.7	11.2	5.0	2.4	1.7	1.4	1.0	2.1	2.5	16.1
	5.9	4.7	11.0	20.2	33.5	11.6	2.1	2.6	1.7	1.3	1.0	2.1	2.4	13.2
	4.1	3.8	11.4	21.9	32.9	11.5	2.8	2.9	1.5	1.3	1.2	2.0	2.7	14.4

All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.

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Project: COA Outfall (20K0374)

Project #: 20S038-25

Date Received: November 24, 2020

Date Tested: January 11, 2021

Client: Analytical Resources, Inc.

Sampled by: Others

Tested by: B. Goble

Relative Standard Deviation, By Phi Size

Sample ID	-3	-2	-1	0	1	2	3	4	5	6	7	8	9	10
COA_06_G_20201120	100.0	98.0	94.9	90.8	80.0	59.0	27.3	16.1	11.1	8.7	7.0	5.6	4.6	2.5
	100.0	95.9	94.1	89.4	78.4	58.2	24.8	13.2	11.1	8.5	6.8	5.5	4.5	2.4
	100.0	97.8	95.9	92.1	80.7	58.8	25.9	14.4	11.6	8.7	7.2	5.9	4.7	2.7
AVE	100.0	97.2	95.0	90.8	79.7	58.7	26.0	14.6	11.3	8.6	7.0	5.7	4.6	2.5
STDEV	0.0	1.0	0.7	1.1	1.0	0.3	1.1	1.2	0.2	0.1	0.2	0.2	0.1	0.1
%RSD	0.0	1.0	0.8	1.2	1.2	0.6	4.1	8.3	2.2	1.3	2.6	3.1	1.8	5.1

The Triplicate Applies To The Following Samples

Client ID	Date Sampled	Date Extracted	Date Complete	QA Ratio (95-105)	Data Qualifiers	Pipette Portion (5.0-25.0g)
COA_06_G_20201120	11/20/2020	1/4/2021	1/11/2021	102.4		6.3
	11/20/2020	1/4/2021	1/11/2021	100.4		6.0
	11/20/2020	1/4/2021	1/11/2021	100.4		6.5

All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.

Reviewed by:

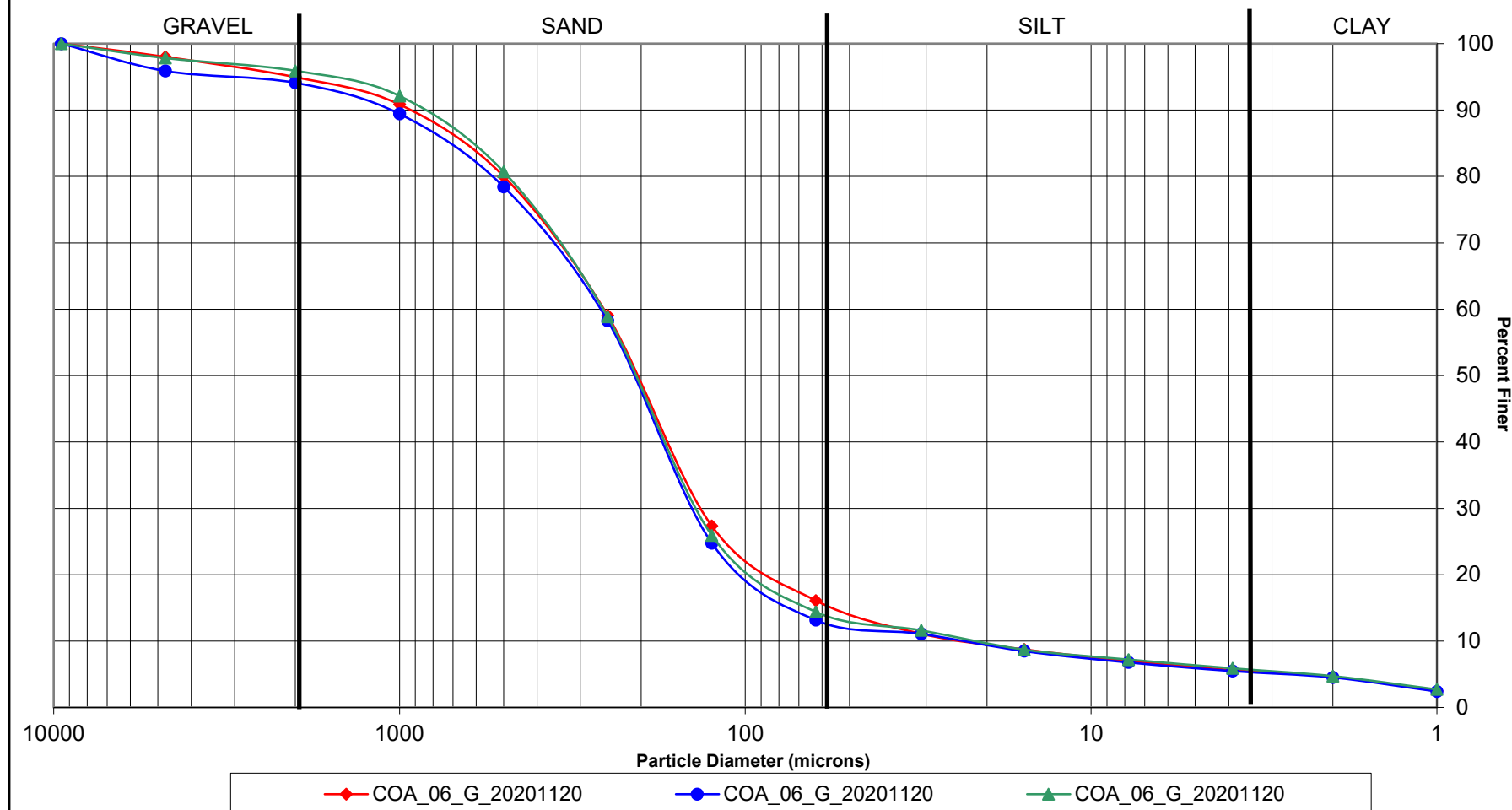
B. Goble

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PSEP Grain Size Distribution

Triplicate Sample Plot





Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

COA_01_G_20201120
20K0374-01 (Solid)

Semivolatile Organic Compounds

Method: EPA 8270E
Instrument: NT10 Analyst: VTS
Sample Preparation: Preparation Method: EPA 3546 (Microwave)
Preparation Batch: BIK0878 Sample Size: 11.79 g (wet)
Prepared: 12/01/2020 Final Volume: 1 mL
Extract ID: 20K0374-01 D 04
Dry Weight: 10.07 g
% Solids: 85.43

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Phenol	108-95-2	1	8.2	19.9	ND	ug/kg	Ua
Benzyl Alcohol	100-51-6	1	14.8	19.9	ND	ug/kg	Ua
2-Methylphenol	95-48-7	1	7.8	19.9	ND	ug/kg	Ua
Hexachloroethane	67-72-1	1	5.6	19.9	ND	ug/kg	Ua
4-Methylphenol	106-44-5	1	14.6	19.9	ND	ug/kg	Ua
Naphthalene	91-20-3	1	5.2	19.9	ND	ug/kg	Ua
Benzoic acid	65-85-0	1	58.7	199	73.4	ug/kg	J
2-Methylnaphthalene	91-57-6	1	5.6	19.9	9.1	ug/kg	J
Acenaphthylene	208-96-8	1	4.7	19.9	ND	ug/kg	Ua
Dimethylphthalate	131-11-3	1	6.4	19.9	ND	ug/kg	Ua
Acenaphthene	83-32-9	1	5.1	19.9	ND	ug/kg	Ua
Dibenzofuran	132-64-9	1	4.6	19.9	ND	ug/kg	Ua
Fluorene	86-73-7	1	4.9	19.9	ND	ug/kg	Ua
Diethyl phthalate	84-66-2	1	17.6	19.9	ND	ug/kg	Ua
N-Nitrosodiphenylamine	86-30-6	1	9.5	19.9	ND	ug/kg	Ua
Hexachlorobenzene	118-74-1	1	4.7	19.9	ND	ug/kg	Ua
Pentachlorophenol	87-86-5	1	31.1	99.3	ND	ug/kg	Ua
Phenanthrene	85-01-8	1	4.7	19.9	7.0	ug/kg	J
Anthracene	120-12-7	1	5.9	19.9	ND	ug/kg	Ua
Di-n-Butylphthalate	84-74-2	1	5.3	19.9	15.0	ug/kg	J
Fluoranthene	206-44-0	1	4.5	19.9	11.3	ug/kg	J
Pyrene	129-00-0	1	5.5	19.9	26.3	ug/kg	
Butylbenzylphthalate	85-68-7	1	8.0	19.9	ND	ug/kg	Ua
Benzo(a)anthracene	56-55-3	1	5.1	19.9	6.2	ug/kg	J
Chrysene	218-01-9	1	5.2	19.9	26.5	ug/kg	
bis(2-Ethylhexyl)phthalate	117-81-7	1	28.6	49.6	ND	ug/kg	Ua
Di-n-Octylphthalate	117-84-0	1	8.7	19.9	ND	ug/kg	Ua
Benzo(a)fluoranthene, Total		1	10.1	39.7	28.4	ug/kg	J
Benzo(a)pyrene	50-32-8	1	6.4	19.9	12.4	ug/kg	J
Indeno(1,2,3-cd)pyrene	193-39-5	1	5.9	19.9	ND	ug/kg	Ua
Dibenzo(a,h)anthracene	53-70-3	1	6.1	19.9	ND	ug/kg	Ua
Benzo(g,h,i)perylene	191-24-2	1	5.8	19.9	15.0	ug/kg	J
Surrogate: 2-Fluorophenol				27-120 %	73.9	%	
Surrogate: Phenol-d5				29-120 %	80.4	%	
Surrogate: 2-Chlorophenol-d4				31-120 %	82.5	%	



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Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

COA_01_G_20201120
20K0374-01 (Solid)

Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 11/20/2020 07:41

Instrument: NT10 Analyst: VTS

Analyzed: 12/30/2020 16:43

Analyte	CAS Number	Recovery	Recovery	Units	Notes
		Limits			
Surrogate: 1,2-Dichlorobenzene-d4		32-120 %	71.9	%	
Surrogate: Nitrobenzene-d5		30-120 %	97.6	%	
Surrogate: 2-Fluorobiphenyl		35-120 %	93.3	%	
Surrogate: 2,4,6-Tribromophenol		24-134 %	80.6	%	
Surrogate: p-Terphenyl-d14		37-120 %	85.4	%	



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Reported:
26-Mar-2021 16:29

COA_01_G_20201120
20K0374-01 (Solid)

Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM

Sampled: 11/20/2020 07:41

Instrument: NT10 Analyst: VTS

Analyzed: 12/30/2020 16:43

Sample Preparation:

Preparation Method: EPA 3546 (Microwave)

Extract ID: 20K0374-01 D 04

Preparation Batch: BIK0878

Sample Size: 11.79 g (wet)

Dry Weight: 10.07 g

Prepared: 12/01/2020

Final Volume: 1 mL

% Solids: 85.43

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
1,4-Dichlorobenzene	106-46-7	1	0.6	5.0	ND	ug/kg	Ua
1,2-Dichlorobenzene	95-50-1	1	0.7	5.0	ND	ug/kg	Ua
2,4-Dimethylphenol	105-67-9	1	2.2	19.9	ND	ug/kg	Ua
1,2,4-Trichlorobenzene	120-82-1	1	2.7	5.0	ND	ug/kg	Ua
Hexachlorobutadiene	87-68-3	1	0.7	5.0	ND	ug/kg	Ua
Surrogate: 2-Fluorophenol				27-120 %	76.7	%	Q
Surrogate: p-Terphenyl-d14				37-120 %	84.8	%	



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Reported:
26-Mar-2021 16:29

COA_01_G_20201120
20K0374-01 (Solid)

Butyl Tins

Method: EPA 8270E-SIM	Sampled: 11/20/2020 07:41	
Instrument: NT8 Analyst: JZ	Analyzed: 12/17/2020 19:03	
Sample Preparation:	Preparation Method: EPA 3546 (Microwave)	Extract ID: 20K0374-01 D 03
	Preparation Batch: BIK0879	Sample Size: 5.91 g (wet)
	Prepared: 12/01/2020	Final Volume: 0.5 mL
		Dry Weight: 5.05 g
		% Solids: 85.43
Sample Cleanup:	Cleanup Method: Silica Gel	Extract ID: 20K0374-01 D 03
	Cleanup Batch: CIL0160	Initial Volume: 0.5 mL
	Cleaned: 17-Dec-2020	Final Volume: 0.5 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Tributyltin Ion	36643-28-4	1	0.446	3.82	16.7	ug/kg	
Dibutyltin Ion	14488-53-0	1	1.71	5.72	8.53	ug/kg	
Butyltin Ion	78763-54-9	1	1.87	4.04	ND	ug/kg	Ua
Tetrabutyltin	1461-25-2	1	4.95	4.95	ND	ug/kg	Ua
Surrogate: Tripentyltin					30-160 %	66.1	%
Surrogate: Tripropyltin					30-160 %	45.4	%



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Reported:
26-Mar-2021 16:29

COA_01_G_20201120
20K0374-01 (Solid)

Chlorinated Pesticides

Method: EPA 8081B		Sampled: 11/20/2020 07:41	
Instrument: ECD6 Analyst: YZ/VTs		Analyzed: 03/15/2021 21:20	
Sample Preparation:	Preparation Method: EPA 3546 (Microwave)	Extract ID: 20K0374-01 B 01	
	Preparation Batch: BJB0764	Sample Size: 14.66 g (wet)	Dry Weight: 12.52 g
	Prepared: 02/26/2021	Final Volume: 2.5 mL	% Solids: 85.43
Sample Cleanup:	Cleanup Method: Silica Gel	Extract ID: 20K0374-01 B 01	
	Cleanup Batch: CJC0097	Initial Volume: 2.5 mL	
	Cleaned: 09-Mar-2021	Final Volume: 2.5 mL	
Sample Cleanup:	Cleanup Method: Sulfur	Extract ID: 20K0374-01 B 01	
	Cleanup Batch: CJC0096	Initial Volume: 2.5 mL	
	Cleaned: 09-Mar-2021	Final Volume: 2.5 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Heptachlor	76-44-8	1	0.05	0.50	ND	ug/kg	Ua
Aldrin	309-00-2	1	0.37	0.50	ND	ug/kg	Ua
trans-Chlordane (beta-Chlordane)	5103-74-2	1	0.33	0.50	ND	ug/kg	Ua
cis-Chlordane (alpha-chlordane)	5103-71-9	1	0.11	0.50	ND	ug/kg	Ua
4,4'-DDE	72-55-9	1	0.13	1.00	ND	ug/kg	Ua
Dieldrin	60-57-1	1	0.11	1.00	ND	ug/kg	Ua
4,4'-DDD	72-54-8	1	0.32	1.00	ND	ug/kg	Ua
4,4'-DDT	50-29-3	1	0.32	1.00	ND	ug/kg	Ua
Oxychlordane	27304-13-8	1	0.13	1.00	ND	ug/kg	Ua
cis-Nonachlor	5103-73-1	1	0.21	1.00	ND	ug/kg	Ua
trans-Nonachlor	39765-80-5	1	0.23	1.00	ND	ug/kg	Ua
Surrogate: Decachlorobiphenyl				30-160 %	56.0	%	
Surrogate: Decachlorobiphenyl [2C]				30-160 %	49.8	%	
Surrogate: Tetrachlorometaxylene				30-160 %	36.7	%	
Surrogate: Tetrachlorometaxylene [2C]				30-160 %	37.9	%	



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Reported:
26-Mar-2021 16:29

COA_01_G_20201120
20K0374-01 (Solid)

Aroclor PCB

Method: EPA 8082A		Sampled: 11/20/2020 07:41	
Instrument: ECD7 Analyst: JGR		Analyzed: 12/22/2020 10:21	
Sample Preparation:	Preparation Method: EPA 3546 (Microwave)	Extract ID: 20K0374-01 D 01	
	Preparation Batch: BIK0877	Dry Weight: 12.50 g	
	Prepared: 11/30/2020	% Solids: 85.43	
Sample Cleanup:	Cleanup Method: Silica Gel	Extract ID: 20K0374-01 D 01	
	Cleanup Batch: CIL0224	Initial Volume: 2.5 mL	
	Cleaned: 21-Dec-2020	Final Volume: 2.5 mL	
Sample Cleanup:	Cleanup Method: Sulfuric Acid	Extract ID: 20K0374-01 D 01	
	Cleanup Batch: CIL0218	Initial Volume: 2.5 mL	
	Cleaned: 21-Dec-2020	Final Volume: 2.5 mL	
Sample Cleanup:	Cleanup Method: Sulfur	Extract ID: 20K0374-01 D 01	
	Cleanup Batch: CIL0219	Initial Volume: 2.5 mL	
	Cleaned: 21-Dec-2020	Final Volume: 2.5 mL	
Sample Cleanup:	Cleanup Method: Alumina	Extract ID: 20K0374-01 D 01	
	Cleanup Batch: CIL0223	Initial Volume: 2.5 mL	
	Cleaned: 21-Dec-2020	Final Volume: 2.5 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Aroclor 1016	12674-11-2	1	1.6	4.0	ND	ug/kg	Ua
Aroclor 1221	11104-28-2	1	1.6	4.0	ND	ug/kg	Ua
Aroclor 1232	11141-16-5	1	1.6	4.0	ND	ug/kg	Ua
Aroclor 1242	53469-21-9	1	1.6	4.0	ND	ug/kg	Ua
Aroclor 1248	12672-29-6	1	1.6	4.0	3.5	ug/kg	J
Aroclor 1254	11097-69-1	1	1.6	4.0	4.8	ug/kg	J
Aroclor 1260	11096-82-5	1	0.6	4.0	3.2	ug/kg	J
Aroclor 1262	37324-23-5	1	0.6	4.0	ND	ug/kg	Ua
Aroclor 1268	11100-14-4	1	0.6	4.0	ND	ug/kg	Ua
Surrogate: Decachlorobiphenyl					40-126 %	67.4	%
Surrogate: Tetrachlorometaxylene					44-120 %	68.9	%
Surrogate: Decachlorobiphenyl [2C]					40-126 %	79.6	%
Surrogate: Tetrachlorometaxylene [2C]					44-120 %	71.2	%



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Reported:
26-Mar-2021 16:29

COA_01_G_20201120
20K0374-01 (Solid)

Dioxins/Furans

Method: EPA 1613B			Sampled: 11/20/2020 07:41		
Instrument: AUTOSPEC01 Analyst: pk			Analyzed: 12/18/2020 16:26		
Sample Preparation:	Preparation Method: EPA 1613			Extract ID: 20K0374-01 C 01	
	Preparation Batch: BIL0237	Sample Size: 12.12 g (wet)		Dry Weight: 10.08 g	
	Prepared: 12/10/2020	Final Volume: 20 uL		% Solids: 83.14	
Sample Cleanup:	Cleanup Method: Silica Gel			Extract ID: 20K0374-01 C 01	
	Cleanup Batch: CIL0151	Initial Volume: 20 mL			
	Cleaned: 15-Dec-2020	Final Volume: 20 mL			
Sample Cleanup:	Cleanup Method: Sulfuric Acid			Extract ID: 20K0374-01 C 01	
	Cleanup Batch: CIL0150	Initial Volume: 20 mL			
	Cleaned: 14-Dec-2020	Final Volume: 20 mL			
Sample Cleanup:	Cleanup Method: Florisil			Extract ID: 20K0374-01 C 01	
	Cleanup Batch: CIL0152	Initial Volume: 20 mL			
	Cleaned: 15-Dec-2020	Final Volume: 20 mL			

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting		Result	Units	Notes
				EDL	Limit			
2,3,7,8-TCDF		0.830	0.655-0.886	0.063	0.205	0.992	13.9	ng/kg X
2,3,7,8-TCDD			0.655-0.886	0.139	0.122	0.992	ND	ng/kg Ua
1,2,3,7,8-PeCDF			1.318-1.783	0.149	0.231	0.992	ND	ng/kg Ua
2,3,4,7,8-PeCDF		1.866	1.318-1.783	0.149	0.217	0.992	0.708	ng/kg EMPC, J
1,2,3,7,8-PeCDD			1.318-1.783	0.179	0.300	0.992	ND	ng/kg Ua
1,2,3,4,7,8-HxCDF		1.156	1.054-1.426	0.139	0.296	0.992	0.351	ng/kg J
1,2,3,6,7,8-HxCDF		1.687	1.054-1.426	0.179	0.308	0.992	0.853	ng/kg EMPC, J
2,3,4,6,7,8-HxCDF		1.135	1.054-1.426	0.109	0.311	0.992	1.93	ng/kg
1,2,3,7,8,9-HxCDF			1.054-1.426	0.208	0.453	0.992	ND	ng/kg Ua
1,2,3,4,7,8-HxCDD			1.054-1.426	0.179	0.332	0.992	ND	ng/kg Ua
1,2,3,6,7,8-HxCDD		1.245	1.054-1.426	0.149	0.342	0.992	0.938	ng/kg J
1,2,3,7,8,9-HxCDD		1.618	1.054-1.426	0.218	0.383	0.992	0.888	ng/kg EMPC, J
1,2,3,4,6,7,8-HpCDF		1.043	0.893-1.208	0.208	0.409	0.992	3.94	ng/kg
1,2,3,4,7,8,9-HpCDF			0.893-1.208	0.159	0.706	0.992	ND	ng/kg Ua
1,2,3,4,6,7,8-HpCDD		1.113	0.893-1.208	0.556	0.512	2.48	14.6	ng/kg
OCDF		0.975	0.757-1.024	1.09	0.918	2.48	5.52	ng/kg
OCDD		0.839	0.757-1.024	4.27	0.842	9.92	79.8	ng/kg B
Homologue groups								
Total TCDF						0.992	89.3	ng/kg
Total TCDD						0.992	2.71	ng/kg
Total PeCDF						0.992	108	ng/kg
Total PeCDD						0.992	3.09	ng/kg
Total HxCDF						0.992	30.1	ng/kg
Total HxCDD						0.992	10.2	ng/kg
Total HpCDF						0.992	13.6	ng/kg
Total HpCDD						0.992	36.6	ng/kg



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Reported:
26-Mar-2021 16:29

COA_01_G_20201120
20K0374-01 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/20/2020 07:41

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 12/18/2020 16:26

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting Limit	Result	Units	Notes
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC):				2.57			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC):				2.31			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, EMPC = ND):				2.37			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, EMPC = ND):				1.92			



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20K0374-01 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/20/2020 07:41

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 12/18/2020 16:26

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting Limit	Result	Units	Notes
Labeled compounds							
13C12-2,3,7,8-TCDF		0.775	0.655-0.886	24-169 %	63.6	%	
13C12-2,3,7,8-TCDD		0.819	0.655-0.886	25-164 %	73.4	%	
13C12-1,2,3,7,8-PeCDF		1.510	1.318-1.783	24-185 %	52.6	%	
13C12-2,3,4,7,8-PeCDF		1.491	1.318-1.783	21-178 %	51.4	%	
13C12-1,2,3,7,8-PeCDD		1.608	1.318-1.783	25-181 %	55.5	%	
13C12-1,2,3,4,7,8-HxCDF		0.483	0.434-0.587	26-152 %	74.2	%	
13C12-1,2,3,6,7,8-HxCDF		0.495	0.434-0.587	26-123 %	61.7	%	
13C12-2,3,4,6,7,8-HxCDF		0.492	0.434-0.587	28-136 %	63.0	%	
13C12-1,2,3,7,8,9-HxCDF		0.486	0.434-0.587	29-147 %	60.0	%	
13C12-1,2,3,4,7,8-HxCDD		1.308	1.054-1.426	32-141 %	75.1	%	
13C12-1,2,3,6,7,8-HxCDD		1.266	1.054-1.426	28-130 %	60.5	%	
13C12-1,2,3,4,6,7,8-HpCDF		0.417	0.374-0.506	28-143 %	40.1	%	
13C12-1,2,3,4,7,8,9-HpCDF		0.423	0.374-0.506	26-138 %	38.3	%	
13C12-1,2,3,4,6,7,8-HpCDD		1.069	0.893-1.208	23-140 %	47.8	%	
13C12-OCDD		0.862	0.757-1.024	17-157 %	24.2	%	
37Cl4-2,3,7,8-TCDD				35-197 %	88.6	%	



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COA_01_G_20201120
20K0374-01 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/20/2020 07:41

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 12/18/2020 16:26

Analyte	DF/Split	Ion Ratio	Ratio Limits	EDL	Reporting	Result	Units	Notes
					Limit			



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26-Mar-2021 16:29

COA_01_G_20201120
20K0374-01 (Solid)

Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 11/20/2020 07:41

Instrument: ICPMS1 Analyst: MCB

Analyzed: 03/23/2021 18:00

Sample Preparation:

Preparation Method: SWN EPA 3050B

Extract ID: 20K0374-01 E 02

Preparation Batch: BJC0563

Sample Size: 1.053 g (wet)

Dry Weight: 0.87 g

Prepared: 03/22/2021

Final Volume: 50 mL

% Solids: 82.23

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Antimony	7440-36-0	20	0.02	0.23	0.05	mg/kg	J
Chromium	7440-47-3	20	0.15	0.58	27.5	mg/kg	
Lead	7439-92-1	20	0.08	0.12	13.6	mg/kg	
Silver	7440-22-4	20	0.02	0.23	0.05	mg/kg	J



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Reported:
26-Mar-2021 16:29

COA_01_G_20201120
20K0374-01 (Solid)

Metals and Metallic Compounds

Method: EPA 6020B UCT-KED

Sampled: 11/20/2020 07:41

Instrument: ICPMS1 Analyst: MCB

Analyzed: 03/23/2021 18:00

Sample Preparation:

Preparation Method: SWN EPA 3050B

Extract ID: 20K0374-01 E 02

Preparation Batch: BJC0563

Sample Size: 1.053 g (wet)

Dry Weight: 0.87 g

Prepared: 03/22/2021

Final Volume: 50 mL

% Solids: 82.23

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	20	0.03	0.23	3.15	mg/kg	
Cadmium	7440-43-9	20	0.03	0.12	0.14	mg/kg	
Copper	7440-50-8	20	0.39	0.58	28.4	mg/kg	
Selenium	7782-49-2	20	0.51	0.58	ND	mg/kg	Ua
Zinc	7440-66-6	20	0.9	4.6	122	mg/kg	



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COA_01_G_20201120
20K0374-01 (Solid)

Metals and Metallic Compounds

Method: EPA 7471B

Sampled: 11/20/2020 07:41

Instrument: HYDRA Analyst: BLC

Analyzed: 03/23/2021 11:33

Sample Preparation:

Preparation Method: SMM EPA 7471B

Extract ID: 20K0374-01 E

Preparation Batch: BJC0609

Sample Size: 0.256 g (wet)

Dry Weight: 0.21 g

Prepared: 03/22/2021

Final Volume: 50 mL

% Solids: 82.23

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.00499	0.0238	0.0149	mg/kg	H, J



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

COA_01_G_20201120
20K0374-01 (Solid)

Wet Chemistry

Method: EPA 9060A m

Sampled: 11/20/2020 07:41

Instrument: TOC Cube Analyst: BF

Analyzed: 11/26/2020 12:36

Sample Preparation:

Preparation Method: PSEP 1986 (modified)

Extract ID: 20K0374-01 E

Preparation Batch: BIK0803

Sample Size: 0.5049 g (wet)

Dry Weight: 0.42 g

Prepared: 11/25/2020

Final Volume: 0.5049 mL

% Solids: 82.23

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Organic Carbon		1	0.02	0.02	1.08	%	



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Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

COA_01_G_20201120
20K0374-01 (Solid)

Wet Chemistry

Method: PSEP 1986
Instrument: BAL2 Analyst: UW

Sampled: 11/20/2020 07:41

Analyzed: 11/24/2020 17:15

Sample Preparation: Preparation Method: No Prep Wet Chem
Preparation Batch: BIK0773 Sample Size: 10 g (wet)
Prepared: 11/24/2020 Final Volume: 10 g

Extract ID: 20K0374-01

Dry Weight: 8.22 g

% Solids: 82.23

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Volatile Solids		1	0.01	0.01	1.60	%	

Sample Preparation: Preparation Method: No Prep Wet Chem
Preparation Batch: BIK0778 Sample Size: 5 g (wet)
Prepared: 11/24/2020 Final Volume: 5 g

Extract ID: 20K0374-01

Dry Weight: 4.11 g

% Solids: 82.23

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Solids, Sulfide		1	0.04	0.04	82.25	%	



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Reported:
26-Mar-2021 16:29

COA_01_G_20201120
20K0374-01 (Solid)

Wet Chemistry

Method: SM 2540 G-97

Sampled: 11/20/2020 07:41

Instrument: BAL2 Analyst: UW

Analyzed: 11/24/2020 17:15

Sample Preparation:

Preparation Method: No Prep Wet Chem

Extract ID: 20K0374-01

Preparation Batch: BIK0773

Sample Size: 10 g (wet)

Dry Weight: 8.22 g

Prepared: 11/24/2020

Final Volume: 10 g

% Solids: 82.23

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Solids		1	0.04	0.04	82.23	%	



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Reported:
26-Mar-2021 16:29

COA_01_G_20201120
20K0374-01 (Solid)

Wet Chemistry

Method: SM 4500-NH3 H-97
Instrument: LACHAT2 Analyst: LRB
Sample Preparation: Preparation Method: MSA 33.3 (2M KCl)
Preparation Batch: BIK0769 Sample Size: 4.75 g (wet)
Prepared: 11/24/2020 Final Volume: 40 mL
Extract ID: 20K0374-01 E
Dry Weight: 3.91 g
% Solids: 82.23

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Ammonia-N	7664-41-7	1	0.41	0.41	1.93	mg/kg NH3-N	



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Reported:
26-Mar-2021 16:29

COA_01_G_20201120
20K0374-01 (Solid)

Wet Chemistry

Method: SM 4500-S2 D-00 (PSEP)

Sampled: 11/20/2020 07:41

Instrument: UV1800-1 Analyst: CDE

Analyzed: 12/03/2020 17:06

Sample Preparation:

Preparation Method: PSEP 1986

Extract ID: 20K0374-01 F

Preparation Batch: BIK0762

Sample Size: 5.092 g (wet)

Dry Weight: 4.19 g

Prepared: 11/24/2020

Final Volume: 100 mL

% Solids: 82.25

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Sulfide	18496-25-8	1	1.19	1.19	2.63	mg/kg	



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Reported:
26-Mar-2021 16:29

COA_01_G_20201120
20K0374-01 (Solid)

Extractions

Method: ASTM D2216	Sampled: 11/20/2020 07:41	
Instrument: N/A Analyst: NL	Analyzed: 11/26/2020 05:10	
Sample Preparation:	Preparation Method: No Prep-Organics	Extract ID: 20K0374-01
	Preparation Batch: BIK0789	Dry Weight: 0.82 g
	Prepared: 11/25/2020	% Solids: 82.23
	Sample Size: 1 g (wet)	
	Final Volume: 1 g	

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Total Solids		1	0.01	83.14	%	



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Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

COA_01_G_20201120
20K0374-01 (Solid)

Extractions

Method: ASTM D2216

Sampled: 11/20/2020 07:41

Instrument: N/A Analyst: NL

Analyzed: 11/26/2020 05:10

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Labeled compounds						



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Reported:
26-Mar-2021 16:29

COA_01_G_20201120
20K0374-01 (Solid)

Geotechnical Methods

Method: PSEP-PS

Sampled: 11/20/2020 07:41

Instrument: MT&C Analyst:

Analyzed: 01/11/2021 00:00

Analysis by: Materials Testing & Consulting, Inc. (Olympia)

Sample Preparation: Preparation Method: No Prep Geo
Preparation Batch: B011121
Prepared: 01/11/2021

Extract ID: 20K0374-01

Final Volume:

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Phi Size <-1	GS_GRAVEL	1	0.1	39.5	%	
Phi Size -1 to 0	GS_VCS	1	0.1	19.1	%	
Phi Size 0 to 1	GS_CS	1	0.1	19.3	%	
Phi Size 1 to 2	GS_MS	1	0.1	17.1	%	
Phi Size 2 to 3	GS_FS	1	0.1	4.4	%	
Phi Size 3 to 4	GS_VFS	1	0.1	0.2	%	
Phi Size 4 to 5	GS_CSILT	1	0.4	ND	%	U
Phi Size 5 to 6	GS_MSILT	1	0.4	ND	%	U
Phi Size 6 to 7	GS_FSILT	1	0.4	ND	%	U
Phi Size 7 to 8	GS_VFSILT	1	0.4	ND	%	U
Phi Size 8 to 9	GS_CCLAY	1	0.4	ND	%	U
Phi Size 9 to 10	GS_MCLAY	1	0.4	ND	%	U
Phi Size >10	GS_FCLAY	1	0.4	ND	%	U
Total Fines	GS_TOTFINES	1	0.1	0.4	%	



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Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

COA_01_G_20201120
20K0374-01RE1 (Solid)

Dioxins/Furans

Method: EPA 1613B		Sampled: 11/20/2020 07:41	
Instrument: AUTOSPEC01 Analyst: pk		Analyzed: 03/04/2021 20:42	
Sample Preparation:	Preparation Method: EPA 1613	Extract ID: 20K0374-01RE1 C 01	
	Preparation Batch: BJB0762	Dry Weight: 10.08 g	
	Prepared: 03/01/2021	% Solids: 83.14	
Sample Cleanup:	Cleanup Method: Silica Gel	Extract ID: 20K0374-01RE1 C 01	
	Cleanup Batch: CJC0027	Initial Volume: 20 mL	
	Cleaned: 03-Mar-2021	Final Volume: 20 mL	
Sample Cleanup:	Cleanup Method: Sulfuric Acid	Extract ID: 20K0374-01RE1 C 01	
	Cleanup Batch: CJC0026	Initial Volume: 20 mL	
	Cleaned: 02-Mar-2021	Final Volume: 20 mL	
Sample Cleanup:	Cleanup Method: Florisil	Extract ID: 20K0374-01RE1 C 01	
	Cleanup Batch: CJC0028	Initial Volume: 20 mL	
	Cleaned: 03-Mar-2021	Final Volume: 20 mL	

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting		Result	Units	Notes
				EDL	Limit			
2,3,7,8-TCDF		0.959	0.655-0.886	0.058	0.172	0.992	1.40	ng/kg EMPC, X
2,3,7,8-TCDD			0.655-0.886	0.149	0.157	0.992	ND	ng/kg Ua
1,2,3,7,8-PeCDF			1.318-1.783	0.238	0.289	0.992	ND	ng/kg Ua
2,3,4,7,8-PeCDF		1.838	1.318-1.783	0.218	0.287	0.992	1.02	ng/kg EMPC
1,2,3,7,8-PeCDD			1.318-1.783	0.169	0.474	0.992	ND	ng/kg Ua
1,2,3,4,7,8-HxCDF		2.428	1.054-1.426	0.278	0.404	0.992	0.725	ng/kg EMPC, J
1,2,3,6,7,8-HxCDF		1.241	1.054-1.426	0.198	0.427	0.992	1.18	ng/kg
2,3,4,6,7,8-HxCDF		1.282	1.054-1.426	0.169	0.429	0.992	2.81	ng/kg
1,2,3,7,8,9-HxCDF			1.054-1.426	0.189	0.552	0.992	ND	ng/kg Ua
1,2,3,4,7,8-HxCDD			1.054-1.426	0.169	0.402	0.992	ND	ng/kg Ua
1,2,3,6,7,8-HxCDD		1.616	1.054-1.426	0.179	0.457	0.992	1.24	ng/kg EMPC
1,2,3,7,8,9-HxCDD		1.281	1.054-1.426	0.218	0.441	0.992	0.877	ng/kg J
1,2,3,4,6,7,8-HpCDF		1.143	0.893-1.208	0.208	0.447	0.992	4.43	ng/kg
1,2,3,4,7,8,9-HpCDF			0.893-1.208	0.238	0.621	0.992	ND	ng/kg Ua
1,2,3,4,6,7,8-HpCDD		1.055	0.893-1.208	0.556	0.554	2.48	15.6	ng/kg
OCDF		0.943	0.757-1.024	1.09	0.889	2.48	5.04	ng/kg B
OCDD		0.830	0.757-1.024	4.57	0.974	9.92	72.1	ng/kg B
Homologue groups								
Total TCDF						0.992	25.4	ng/kg
Total TCDD						0.992	3.09	ng/kg
Total PeCDF						0.992	40.1	ng/kg
Total PeCDD						0.992	3.48	ng/kg
Total HxCDF						0.992	37.6	ng/kg
Total HxCDD						0.992	7.24	ng/kg B
Total HpCDF						0.992	13.2	ng/kg
Total HpCDD						0.992	39.8	ng/kg



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Reported:
26-Mar-2021 16:29

COA_01_G_20201120
20K0374-01RE1 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/20/2020 07:41

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 03/04/2021 20:42

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting Limit	Result	Units	Notes
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC):				1.72			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC):				1.35			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, EMPC = ND):				1.40			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, EMPC = ND):				0.71			



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Reported:
26-Mar-2021 16:29

COA_01_G_20201120
20K0374-01RE1 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/20/2020 07:41

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 03/04/2021 20:42

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting Limit	Result	Units	Notes
Labeled compounds							
13C12-2,3,7,8-TCDF		0.791	0.655-0.886	24-169 %	84.1	%	
13C12-2,3,7,8-TCDD		0.819	0.655-0.886	25-164 %	76.2	%	
13C12-1,2,3,7,8-PeCDF		1.523	1.318-1.783	24-185 %	62.8	%	
13C12-2,3,4,7,8-PeCDF		1.527	1.318-1.783	21-178 %	58.4	%	
13C12-1,2,3,7,8-PeCDD		1.635	1.318-1.783	25-181 %	46.7	%	
13C12-1,2,3,4,7,8-HxCDF		0.512	0.434-0.587	26-152 %	89.2	%	
13C12-1,2,3,6,7,8-HxCDF		0.520	0.434-0.587	26-123 %	84.2	%	
13C12-2,3,4,6,7,8-HxCDF		0.514	0.434-0.587	28-136 %	80.9	%	
13C12-1,2,3,7,8,9-HxCDF		0.528	0.434-0.587	29-147 %	75.8	%	
13C12-1,2,3,4,7,8-HxCDD		1.263	1.054-1.426	32-141 %	83.0	%	
13C12-1,2,3,6,7,8-HxCDD		1.229	1.054-1.426	28-130 %	70.4	%	
13C12-1,2,3,4,6,7,8-HpCDF		0.445	0.374-0.506	28-143 %	66.5	%	
13C12-1,2,3,4,7,8,9-HpCDF		0.430	0.374-0.506	26-138 %	63.8	%	
13C12-1,2,3,4,6,7,8-HpCDD		1.087	0.893-1.208	23-140 %	61.2	%	
13C12-OCDD		0.954	0.757-1.024	17-157 %	40.7	%	
37Cl4-2,3,7,8-TCDD				35-197 %	86.5	%	



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Project: COA Outfall
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Reported:
26-Mar-2021 16:29

COA_02_G_20201119
20K0374-02 (Solid)

Semivolatile Organic Compounds

Method: EPA 8270E
Instrument: NT10 Analyst: VTS
Sample Preparation: Preparation Method: EPA 3546 (Microwave)
Preparation Batch: BIK0878 Sample Size: 17.65 g (wet)
Prepared: 12/01/2020 Final Volume: 1 mL
Extract ID: 20K0374-02 D 04
Dry Weight: 10.04 g
% Solids: 56.89

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Phenol	108-95-2	1	8.2	19.9	12.7	ug/kg	J
Benzyl Alcohol	100-51-6	1	14.8	19.9	ND	ug/kg	Ua
2-Methylphenol	95-48-7	1	7.8	19.9	ND	ug/kg	Ua
Hexachloroethane	67-72-1	1	5.6	19.9	ND	ug/kg	Ua
4-Methylphenol	106-44-5	1	14.6	19.9	51.3	ug/kg	
Naphthalene	91-20-3	1	5.2	19.9	30.6	ug/kg	
Benzoic acid	65-85-0	1	58.9	199	ND	ug/kg	Ua
2-Methylnaphthalene	91-57-6	1	5.6	19.9	17.8	ug/kg	J
Acenaphthylene	208-96-8	1	4.8	19.9	34.8	ug/kg	
Dimethylphthalate	131-11-3	1	6.4	19.9	26.3	ug/kg	
Acenaphthene	83-32-9	1	5.1	19.9	10.7	ug/kg	J
Dibenzofuran	132-64-9	1	4.6	19.9	11.9	ug/kg	J
Fluorene	86-73-7	1	4.9	19.9	23.0	ug/kg	
Diethyl phthalate	84-66-2	1	17.6	19.9	27.4	ug/kg	
N-Nitrosodiphenylamine	86-30-6	1	9.5	19.9	ND	ug/kg	Ua
Hexachlorobenzene	118-74-1	1	4.7	19.9	ND	ug/kg	Ua
Pentachlorophenol	87-86-5	1	31.2	99.6	ND	ug/kg	Ua
Phenanthrene	85-01-8	1	4.7	19.9	146	ug/kg	
Anthracene	120-12-7	1	5.9	19.9	62.3	ug/kg	
Di-n-Butylphthalate	84-74-2	1	5.3	19.9	15.9	ug/kg	J
Fluoranthene	206-44-0	1	4.5	19.9	1480	ug/kg	
Pyrene	129-00-0	1	5.5	19.9	1050	ug/kg	
Butylbenzylphthalate	85-68-7	1	8.0	19.9	9.8	ug/kg	J
Benzo(a)anthracene	56-55-3	1	5.2	19.9	193	ug/kg	
Chrysene	218-01-9	1	5.2	19.9	873	ug/kg	
bis(2-Ethylhexyl)phthalate	117-81-7	1	28.7	49.8	48.8	ug/kg	J
Di-n-Octylphthalate	117-84-0	1	8.7	19.9	ND	ug/kg	Ua
Benzo(a)fluoranthene, Total		1	10.2	39.8	788	ug/kg	
Benzo(a)pyrene	50-32-8	1	6.5	19.9	168	ug/kg	
Indeno(1,2,3-cd)pyrene	193-39-5	1	6.0	19.9	93.6	ug/kg	
Dibenzo(a,h)anthracene	53-70-3	1	6.1	19.9	33.9	ug/kg	
Benzo(g,h,i)perylene	191-24-2	1	5.8	19.9	81.0	ug/kg	
Surrogate: 2-Fluorophenol				27-120 %	74.3	%	
Surrogate: Phenol-d5				29-120 %	84.7	%	
Surrogate: 2-Chlorophenol-d4				31-120 %	86.0	%	



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Project: COA Outfall
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Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

COA_02_G_20201119
20K0374-02 (Solid)

Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 11/19/2020 10:50

Instrument: NT10 Analyst: VTS

Analyzed: 12/30/2020 17:21

Analyte	CAS Number	Recovery	Recovery	Units	Notes
		Limits			
Surrogate: 1,2-Dichlorobenzene-d4		32-120 %	75.2	%	
Surrogate: Nitrobenzene-d5		30-120 %	96.0	%	
Surrogate: 2-Fluorobiphenyl		35-120 %	94.0	%	
Surrogate: 2,4,6-Tribromophenol		24-134 %	90.9	%	
Surrogate: p-Terphenyl-d14		37-120 %	85.5	%	



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Reported:
26-Mar-2021 16:29

COA_02_G_20201119
20K0374-02 (Solid)

Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM
Instrument: NT10 Analyst: VTS
Sample Preparation: Preparation Method: EPA 3546 (Microwave)
Preparation Batch: BIK0878 Sample Size: 17.65 g (wet)
Prepared: 12/01/2020 Final Volume: 1 mL
Extract ID: 20K0374-02 D 04
Dry Weight: 10.04 g
% Solids: 56.89

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
1,4-Dichlorobenzene	106-46-7	1	0.6	5.0	ND	ug/kg	Ua
1,2-Dichlorobenzene	95-50-1	1	0.7	5.0	ND	ug/kg	Ua
2,4-Dimethylphenol	105-67-9	1	2.2	19.9	3.0	ug/kg	J
1,2,4-Trichlorobenzene	120-82-1	1	2.7	5.0	ND	ug/kg	Ua
Hexachlorobutadiene	87-68-3	1	0.7	5.0	ND	ug/kg	Ua
Surrogate: 2-Fluorophenol				27-120 %	76.6	%	Q
Surrogate: p-Terphenyl-d14				37-120 %	80.2	%	



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Reported:
26-Mar-2021 16:29

COA_02_G_20201119
20K0374-02 (Solid)

Butyl Tins

Method: EPA 8270E-SIM			Sampled: 11/19/2020 10:50		
Instrument: NT8 Analyst: JZ			Analyzed: 12/17/2020 19:19		
Sample Preparation:	Preparation Method: EPA 3546 (Microwave)	Extract ID: 20K0374-02 D 03			
	Preparation Batch: BIK0879	Sample Size: 8.82 g (wet)		Dry Weight: 5.02 g	
	Prepared: 12/01/2020	Final Volume: 0.5 mL		% Solids: 56.89	
Sample Cleanup:	Cleanup Method: Silica Gel	Extract ID: 20K0374-02 D 03			
	Cleanup Batch: CIL0160	Initial Volume: 0.5 mL			
	Cleaned: 17-Dec-2020	Final Volume: 0.5 mL			

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Tributyltin Ion	36643-28-4	1	0.448	3.85	118	ug/kg	
Dibutyltin Ion	14488-53-0	1	1.72	5.76	42.8	ug/kg	
Butyltin Ion	78763-54-9	1	1.88	4.07	9.52	ug/kg	
Tetrabutyltin	1461-25-2	1	4.98	4.98	ND	ug/kg	Ua
<i>Surrogate: Triphenyltin</i>				30-160 %	107	%	
<i>Surrogate: Tripropyltin</i>				30-160 %	63.3	%	



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Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

COA_02_G_20201119
20K0374-02 (Solid)

Chlorinated Pesticides

Method: EPA 8081B		Sampled: 11/19/2020 10:50	
Instrument: ECD6 Analyst: YZ/VTs		Analyzed: 03/15/2021 22:32	
Sample Preparation:	Preparation Method: EPA 3546 (Microwave)	Extract ID: 20K0374-02 B 01	
	Preparation Batch: BJB0764	Dry Weight: 12.50 g	
	Prepared: 02/26/2021	% Solids: 56.89	
Sample Cleanup:	Cleanup Method: Silica Gel	Extract ID: 20K0374-02 B 01	
	Cleanup Batch: CJC0097	Initial Volume: 2.5 mL	
	Cleaned: 09-Mar-2021	Final Volume: 2.5 mL	
Sample Cleanup:	Cleanup Method: Sulfur	Extract ID: 20K0374-02 B 01	
	Cleanup Batch: CJC0096	Initial Volume: 2.5 mL	
	Cleaned: 09-Mar-2021	Final Volume: 2.5 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Heptachlor	76-44-8	1	0.05	0.50	ND	ug/kg	Ua
Aldrin	309-00-2	1	0.37	0.50	ND	ug/kg	Ua
trans-Chlordane (beta-Chlordane)	5103-74-2	1	0.33	0.50	ND	ug/kg	Ua
cis-Chlordane (alpha-chlordane)	5103-71-9	1	0.11	0.50	ND	ug/kg	Ua
4,4'-DDE	72-55-9	1	0.13	1.00	ND	ug/kg	Ua
Dieldrin	60-57-1	1	0.11	1.00	ND	ug/kg	Ua
4,4'-DDD	72-54-8	1	0.32	1.00	ND	ug/kg	Ua
4,4'-DDT	50-29-3	1	0.32	1.00	ND	ug/kg	Ua
Oxychlordane	27304-13-8	1	0.13	1.00	ND	ug/kg	Ua
cis-Nonachlor	5103-73-1	1	0.21	1.00	ND	ug/kg	Ua
trans-Nonachlor	39765-80-5	1	0.23	1.00	ND	ug/kg	Ua
Surrogate: Decachlorobiphenyl				30-160 %	84.3	%	
Surrogate: Decachlorobiphenyl [2C]				30-160 %	67.9	%	
Surrogate: Tetrachlorometaxylene				30-160 %	49.8	%	
Surrogate: Tetrachlorometaxylene [2C]				30-160 %	63.6	%	



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1420 - 156th Ave., NE STE C1
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Reported:
26-Mar-2021 16:29

COA_02_G_20201119
20K0374-02 (Solid)

Aroclor PCB

Method: EPA 8082A		Sampled: 11/19/2020 10:50	
Instrument: ECD7 Analyst: JGR		Analyzed: 12/22/2020 10:41	
Sample Preparation:	Preparation Method: EPA 3546 (Microwave)	Extract ID: 20K0374-02 D 01	
	Preparation Batch: BIK0877	Dry Weight: 12.50 g	
	Prepared: 11/30/2020	% Solids: 56.89	
Sample Cleanup:	Cleanup Method: Silica Gel	Extract ID: 20K0374-02 D 01	
	Cleanup Batch: CIL0224	Initial Volume: 2.5 mL	
	Cleaned: 21-Dec-2020	Final Volume: 2.5 mL	
Sample Cleanup:	Cleanup Method: Sulfuric Acid	Extract ID: 20K0374-02 D 01	
	Cleanup Batch: CIL0218	Initial Volume: 2.5 mL	
	Cleaned: 21-Dec-2020	Final Volume: 2.5 mL	
Sample Cleanup:	Cleanup Method: Sulfur	Extract ID: 20K0374-02 D 01	
	Cleanup Batch: CIL0219	Initial Volume: 2.5 mL	
	Cleaned: 21-Dec-2020	Final Volume: 2.5 mL	
Sample Cleanup:	Cleanup Method: Alumina	Extract ID: 20K0374-02 D 01	
	Cleanup Batch: CIL0223	Initial Volume: 2.5 mL	
	Cleaned: 21-Dec-2020	Final Volume: 2.5 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Aroclor 1016	12674-11-2	1	1.6	4.0	ND	ug/kg	Ua
Aroclor 1221	11104-28-2	1	1.6	4.0	ND	ug/kg	Ua
Aroclor 1232	11141-16-5	1	1.6	4.0	ND	ug/kg	Ua
Aroclor 1242	53469-21-9	1	1.6	4.0	ND	ug/kg	Ua
Aroclor 1248	12672-29-6	1	1.6	4.0	5.3	ug/kg	
Aroclor 1254	11097-69-1	1	1.6	4.0	6.8	ug/kg	
Aroclor 1260	11096-82-5	1	0.6	4.0	2.7	ug/kg	J
Aroclor 1262	37324-23-5	1	0.6	4.0	ND	ug/kg	Ua
Aroclor 1268	11100-14-4	1	0.6	4.0	ND	ug/kg	Ua
Surrogate: Decachlorobiphenyl					40-126 %	71.2 %	
Surrogate: Tetrachlorometaxylene					44-120 %	76.3 %	
Surrogate: Decachlorobiphenyl [2C]					40-126 %	80.8 %	
Surrogate: Tetrachlorometaxylene [2C]					44-120 %	79.8 %	



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Reported:
26-Mar-2021 16:29

COA_02_G_20201119
20K0374-02 (Solid)

Dioxins/Furans

Method: EPA 1613B			Sampled: 11/19/2020 10:50		
Instrument: AUTOSPEC01 Analyst: pk			Analyzed: 12/18/2020 17:15		
Sample Preparation:	Preparation Method: EPA 1613			Extract ID: 20K0374-02 C 01	
	Preparation Batch: BIL0237	Sample Size: 17.73 g (wet)		Dry Weight: 10.05 g	
	Prepared: 12/10/2020	Final Volume: 20 uL		% Solids: 56.70	
Sample Cleanup:	Cleanup Method: Silica Gel			Extract ID: 20K0374-02 C 01	
	Cleanup Batch: CIL0151	Initial Volume: 20 mL			
	Cleaned: 15-Dec-2020	Final Volume: 20 mL			
Sample Cleanup:	Cleanup Method: Sulfuric Acid			Extract ID: 20K0374-02 C 01	
	Cleanup Batch: CIL0150	Initial Volume: 20 mL			
	Cleaned: 14-Dec-2020	Final Volume: 20 mL			
Sample Cleanup:	Cleanup Method: Florisil			Extract ID: 20K0374-02 C 01	
	Cleanup Batch: CIL0152	Initial Volume: 20 mL			
	Cleaned: 15-Dec-2020	Final Volume: 20 mL			

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting		Result	Units	Notes
				EDL	Limit			
2,3,7,8-TCDF		0.859	0.655-0.886	0.063	0.158	0.995	2.57	ng/kg X
2,3,7,8-TCDD			0.655-0.886	0.139	0.090	0.995	ND	ng/kg Ua
1,2,3,7,8-PeCDF		2.297	1.318-1.783	0.149	0.150	0.995	0.307	ng/kg EMPC, X, J
2,3,4,7,8-PeCDF		1.927	1.318-1.783	0.149	0.137	0.995	0.482	ng/kg EMPC, J
1,2,3,7,8-PeCDD		1.758	1.318-1.783	0.179	0.144	0.995	0.968	ng/kg J
1,2,3,4,7,8-HxCDF		1.388	1.054-1.426	0.139	0.131	0.995	0.932	ng/kg J
1,2,3,6,7,8-HxCDF		1.548	1.054-1.426	0.179	0.137	0.995	0.672	ng/kg EMPC, J
2,3,4,6,7,8-HxCDF		1.270	1.054-1.426	0.109	0.143	0.995	1.06	ng/kg
1,2,3,7,8,9-HxCDF		1.476	1.054-1.426	0.209	0.173	0.995	0.280	ng/kg EMPC, J
1,2,3,4,7,8-HxCDD		1.274	1.054-1.426	0.179	0.204	0.995	0.721	ng/kg J
1,2,3,6,7,8-HxCDD		1.192	1.054-1.426	0.149	0.197	0.995	4.15	ng/kg
1,2,3,7,8,9-HxCDD		1.238	1.054-1.426	0.219	0.228	0.995	2.08	ng/kg
1,2,3,4,6,7,8-HpCDF		1.167	0.893-1.208	0.209	0.149	0.995	17.5	ng/kg
1,2,3,4,7,8,9-HpCDF		1.241	0.893-1.208	0.159	0.203	0.995	1.11	ng/kg EMPC
1,2,3,4,6,7,8-HpCDD		1.030	0.893-1.208	0.557	0.405	2.49	127	ng/kg
OCDF		0.891	0.757-1.024	1.09	0.333	2.49	59.4	ng/kg
OCDD		0.859	0.757-1.024	4.28	0.796	9.95	1180	ng/kg B
Homologue groups								
Total TCDF						0.995	13.4	ng/kg
Total TCDD						0.995	4.79	ng/kg
Total PeCDF						0.995	9.50	ng/kg
Total PeCDD						0.995	2.87	ng/kg
Total HxCDF						0.995	28.0	ng/kg
Total HxCDD						0.995	45.8	ng/kg
Total HpCDF						0.995	65.2	ng/kg
Total HpCDD						0.995	423	ng/kg



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Reported:
26-Mar-2021 16:29

COA_02_G_20201119
20K0374-02 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/19/2020 10:50

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 12/18/2020 17:15

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting Limit	Result	Units	Notes
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC):				4.24			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC):				4.20			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, EMPC = ND):				4.11			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, EMPC = ND):				3.94			



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20K0374-02 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/19/2020 10:50

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 12/18/2020 17:15

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting Limit	Result	Units	Notes
Labeled compounds							
13C12-2,3,7,8-TCDF		0.783	0.655-0.886	24-169 %	64.1	%	
13C12-2,3,7,8-TCDD		0.819	0.655-0.886	25-164 %	72.6	%	
13C12-1,2,3,7,8-PeCDF		1.539	1.318-1.783	24-185 %	62.0	%	
13C12-2,3,4,7,8-PeCDF		1.541	1.318-1.783	21-178 %	62.8	%	
13C12-1,2,3,7,8-PeCDD		1.610	1.318-1.783	25-181 %	63.9	%	
13C12-1,2,3,4,7,8-HxCDF		0.496	0.434-0.587	26-152 %	75.3	%	
13C12-1,2,3,6,7,8-HxCDF		0.475	0.434-0.587	26-123 %	62.2	%	
13C12-2,3,4,6,7,8-HxCDF		0.491	0.434-0.587	28-136 %	64.4	%	
13C12-1,2,3,7,8,9-HxCDF		0.498	0.434-0.587	29-147 %	51.4	%	
13C12-1,2,3,4,7,8-HxCDD		1.344	1.054-1.426	32-141 %	77.6	%	
13C12-1,2,3,6,7,8-HxCDD		1.260	1.054-1.426	28-130 %	62.9	%	
13C12-1,2,3,4,6,7,8-HpCDF		0.420	0.374-0.506	28-143 %	53.6	%	
13C12-1,2,3,4,7,8,9-HpCDF		0.418	0.374-0.506	26-138 %	56.8	%	
13C12-1,2,3,4,6,7,8-HpCDD		1.088	0.893-1.208	23-140 %	63.7	%	
13C12-OCDD		0.914	0.757-1.024	17-157 %	42.4	%	
37Cl4-2,3,7,8-TCDD				35-197 %	80.3	%	



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20K0374-02 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/19/2020 10:50

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 12/18/2020 17:15

Analyte	DF/Split	Ion Ratio	Ratio Limits	EDL	Reporting	Result	Units	Notes
					Limit			



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COA_02_G_20201119
20K0374-02 (Solid)

Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 11/19/2020 10:50

Instrument: ICPMS1 Analyst: MCB

Analyzed: 03/23/2021 18:04

Sample Preparation:

Preparation Method: SWN EPA 3050B

Extract ID: 20K0374-02 E 02

Preparation Batch: BJC0563

Sample Size: 1.042 g (wet)

Dry Weight: 0.56 g

Prepared: 03/22/2021

Final Volume: 50 mL

% Solids: 54.12

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Antimony	7440-36-0	20	0.03	0.35	ND	mg/kg	Ua
Chromium	7440-47-3	20	0.23	0.89	32.3	mg/kg	
Lead	7439-92-1	20	0.12	0.18	11.4	mg/kg	
Silver	7440-22-4	20	0.03	0.35	0.17	mg/kg	J



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Reported:
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COA_02_G_20201119
20K0374-02 (Solid)

Metals and Metallic Compounds

Method: EPA 6020B UCT-KED

Sampled: 11/19/2020 10:50

Instrument: ICPMS1 Analyst: MCB

Analyzed: 03/23/2021 18:04

Sample Preparation:

Preparation Method: SWN EPA 3050B

Extract ID: 20K0374-02 E 02

Preparation Batch: BJC0563

Sample Size: 1.042 g (wet)

Dry Weight: 0.56 g

Prepared: 03/22/2021

Final Volume: 50 mL

% Solids: 54.12

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	20	0.04	0.35	6.44	mg/kg	
Cadmium	7440-43-9	20	0.05	0.18	0.85	mg/kg	
Copper	7440-50-8	20	0.60	0.89	36.3	mg/kg	
Selenium	7782-49-2	20	0.78	0.89	0.89	mg/kg	
Zinc	7440-66-6	20	1.5	7.1	82.8	mg/kg	



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COA_02_G_20201119
20K0374-02 (Solid)

Metals and Metallic Compounds

Method: EPA 7471B

Sampled: 11/19/2020 10:50

Instrument: HYDRA Analyst: BLC

Analyzed: 03/23/2021 11:36

Sample Preparation:

Preparation Method: SMM EPA 7471B

Extract ID: 20K0374-02 E

Preparation Batch: BJC0609

Sample Size: 0.232 g (wet)

Dry Weight: 0.13 g

Prepared: 03/22/2021

Final Volume: 50 mL

% Solids: 54.12

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.00836	0.0398	0.111	mg/kg	H



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COA_02_G_20201119
20K0374-02 (Solid)

Wet Chemistry

Method: EPA 9060A m

Sampled: 11/19/2020 10:50

Instrument: TOC Cube Analyst: BF

Analyzed: 11/26/2020 13:07

Sample Preparation:

Preparation Method: PSEP 1986 (modified)

Extract ID: 20K0374-02 E

Preparation Batch: BIK0803

Sample Size: 0.3771 g (wet)

Dry Weight: 0.20 g

Prepared: 11/25/2020

Final Volume: 0.3771 mL

% Solids: 54.12

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Organic Carbon		1	0.02	0.02	1.36	%	



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COA_02_G_20201119
20K0374-02 (Solid)

Wet Chemistry

Method: PSEP 1986
Instrument: BAL2 Analyst: UW

Sampled: 11/19/2020 10:50

Analyzed: 11/24/2020 17:15

Sample Preparation: Preparation Method: No Prep Wet Chem
Preparation Batch: BIK0773 Sample Size: 5 g (wet)
Prepared: 11/24/2020 Final Volume: 5 g

Extract ID: 20K0374-02

Dry Weight: 2.71 g

% Solids: 54.12

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Volatile Solids		1	0.01	0.01	4.92	%	

Sample Preparation: Preparation Method: No Prep Wet Chem
Preparation Batch: BIK0778 Sample Size: 5 g (wet)
Prepared: 11/24/2020 Final Volume: 5 g

Extract ID: 20K0374-02

Dry Weight: 2.71 g

% Solids: 54.12

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Solids, Sulfide		1	0.04	0.04	54.46	%	



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COA_02_G_20201119
20K0374-02 (Solid)

Wet Chemistry

Method: SM 2540 G-97

Sampled: 11/19/2020 10:50

Instrument: BAL2 Analyst: UW

Analyzed: 11/24/2020 17:15

Sample Preparation:

Preparation Method: No Prep Wet Chem

Extract ID: 20K0374-02

Preparation Batch: BIK0773

Sample Size: 5 g (wet)

Dry Weight: 2.71 g

Prepared: 11/24/2020

Final Volume: 5 g

% Solids: 54.12

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Solids		1	0.04	0.04	54.12	%	



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COA_02_G_20201119
20K0374-02 (Solid)

Wet Chemistry

Method: SM 4500-S2 D-00 (PSEP)

Sampled: 11/19/2020 10:50

Instrument: UV1800-1 Analyst: CDE

Analyzed: 12/03/2020 17:06

Sample Preparation:

Preparation Method: PSEP 1986

Extract ID: 20K0374-02 F

Preparation Batch: BIK0762

Sample Size: 5.335 g (wet)

Dry Weight: 2.91 g

Prepared: 11/24/2020

Final Volume: 100 mL

% Solids: 54.46

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Sulfide	18496-25-8	50	86.0	86.0	984	mg/kg	D



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Reported:
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COA_02_G_20201119
20K0374-02 (Solid)

Extractions

Method: ASTM D2216	Sampled: 11/19/2020 10:50	
Instrument: N/A Analyst: NL	Analyzed: 11/26/2020 05:10	
Sample Preparation:	Preparation Method: No Prep-Organics	Extract ID: 20K0374-02
	Preparation Batch: BIK0789	Dry Weight: 0.54 g
	Prepared: 11/25/2020	% Solids: 54.12
	Sample Size: 1 g (wet)	
	Final Volume: 1 g	

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Total Solids		1	0.01	56.70	%	



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COA_02_G_20201119
20K0374-02 (Solid)

Extractions

Method: ASTM D2216

Sampled: 11/19/2020 10:50

Instrument: N/A Analyst: NL

Analyzed: 11/26/2020 05:10

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Labeled compounds						



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COA_02_G_20201119
20K0374-02 (Solid)

Geotechnical Methods

Method: PSEP-PS

Sampled: 11/19/2020 10:50

Instrument: MT&C Analyst:

Analyzed: 01/11/2021 00:00

Analysis by: Materials Testing & Consulting, Inc. (Olympia)

Sample Preparation: Preparation Method: No Prep Geo
Preparation Batch: B011121
Prepared: 01/11/2021

Extract ID: 20K0374-02

Final Volume:

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Phi Size <-1	GS_GRAVEL	1	0.1	ND	%	
Phi Size -1 to 0	GS_VCS	1	0.1	ND	%	
Phi Size 0 to 1	GS_CS	1	0.1	0.3	%	
Phi Size 1 to 2	GS_MS	1	0.1	2.8	%	
Phi Size 2 to 3	GS_FS	1	0.1	6.6	%	
Phi Size 3 to 4	GS_VFS	1	0.1	16.4	%	
Phi Size 4 to 5	GS_CSILT	1	0.1	30.5	%	
Phi Size 5 to 6	GS_MSILT	1	0.1	16.4	%	
Phi Size 6 to 7	GS_FSILT	1	0.1	7.5	%	
Phi Size 7 to 8	GS_VFSILT	1	0.1	4.6	%	
Phi Size 8 to 9	GS_CCLAY	1	0.1	5.4	%	
Phi Size 9 to 10	GS_MCLAY	1	0.1	5.7	%	
Phi Size >10	GS_FCLAY	1	0.1	3.9	%	
Total Fines	GS_TOTFINES	1	0.1	73.9	%	



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

COA_02_G_20201119
20K0374-02RE1 (Solid)

Dioxins/Furans

Method: EPA 1613B		Sampled: 11/19/2020 10:50	
Instrument: AUTOSPEC01 Analyst: pk		Analyzed: 03/04/2021 21:31	
Sample Preparation:	Preparation Method: EPA 1613	Extract ID: 20K0374-02RE1 C 01	
	Preparation Batch: BJB0762	Dry Weight: 10.05 g	
	Prepared: 03/01/2021	% Solids: 56.70	
Sample Cleanup:	Cleanup Method: Silica Gel	Extract ID: 20K0374-02RE1 C 01	
	Cleanup Batch: CJC0027	Initial Volume: 20 mL	
	Cleaned: 03-Mar-2021	Final Volume: 20 mL	
Sample Cleanup:	Cleanup Method: Sulfuric Acid	Extract ID: 20K0374-02RE1 C 01	
	Cleanup Batch: CJC0026	Initial Volume: 20 mL	
	Cleaned: 02-Mar-2021	Final Volume: 20 mL	
Sample Cleanup:	Cleanup Method: Florisil	Extract ID: 20K0374-02RE1 C 01	
	Cleanup Batch: CJC0028	Initial Volume: 20 mL	
	Cleaned: 03-Mar-2021	Final Volume: 20 mL	

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting		Result	Units	Notes
				EDL	Limit			
2,3,7,8-TCDF		0.848	0.655-0.886	0.058	0.087	0.995	2.99	ng/kg X
2,3,7,8-TCDD		0.395	0.655-0.886	0.149	0.087	0.995	0.359	ng/kg EMPC, J
1,2,3,7,8-PeCDF		1.681	1.318-1.783	0.239	0.131	0.995	0.517	ng/kg X, J
2,3,4,7,8-PeCDF		1.709	1.318-1.783	0.219	0.119	0.995	0.533	ng/kg J
1,2,3,7,8-PeCDD		1.497	1.318-1.783	0.169	0.158	0.995	1.44	ng/kg
1,2,3,4,7,8-HxCDF		1.332	1.054-1.426	0.279	0.112	0.995	1.17	ng/kg
1,2,3,6,7,8-HxCDF		1.286	1.054-1.426	0.199	0.120	0.995	0.837	ng/kg J
2,3,4,6,7,8-HxCDF		1.392	1.054-1.426	0.169	0.120	0.995	1.44	ng/kg
1,2,3,7,8,9-HxCDF		1.736	1.054-1.426	0.189	0.169	0.995	0.332	ng/kg EMPC, J
1,2,3,4,7,8-HxCDD		1.212	1.054-1.426	0.169	0.204	0.995	1.38	ng/kg
1,2,3,6,7,8-HxCDD		1.171	1.054-1.426	0.179	0.215	0.995	6.14	ng/kg
1,2,3,7,8,9-HxCDD		1.144	1.054-1.426	0.219	0.215	0.995	3.29	ng/kg
1,2,3,4,6,7,8-HpCDF		1.094	0.893-1.208	0.209	0.159	0.995	25.3	ng/kg
1,2,3,4,7,8,9-HpCDF		1.118	0.893-1.208	0.239	0.221	0.995	1.55	ng/kg
1,2,3,4,6,7,8-HpCDD		1.042	0.893-1.208	0.557	0.377	2.49	162	ng/kg
OCDF		0.926	0.757-1.024	1.09	0.315	2.49	91.4	ng/kg B
OCDD		0.860	0.757-1.024	4.58	0.600	9.95	1260	ng/kg B
Homologue groups								
Total TCDF						0.995	15.2	ng/kg
Total TCDD						0.995	53.2	ng/kg
Total PeCDF						0.995	20.6	ng/kg
Total PeCDD						0.995	32.8	ng/kg
Total HxCDF						0.995	37.9	ng/kg
Total HxCDD						0.995	72.1	ng/kg B
Total HpCDF						0.995	95.8	ng/kg
Total HpCDD						0.995	449	ng/kg



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Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

COA_02_G_20201119
20K0374-02RE1 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/19/2020 10:50

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 03/04/2021 21:31

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting Limit	Result	Units	Notes
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC):				6.03			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC):				6.03			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, EMPC = ND):				5.83			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, EMPC = ND):				5.63			



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Reported:
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COA_02_G_20201119
20K0374-02RE1 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/19/2020 10:50

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 03/04/2021 21:31

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting Limit	Result	Units	Notes
Labeled compounds							
13C12-2,3,7,8-TCDF		0.784	0.655-0.886	24-169 %	90.8	%	
13C12-2,3,7,8-TCDD		0.813	0.655-0.886	25-164 %	91.4	%	
13C12-1,2,3,7,8-PeCDF		1.515	1.318-1.783	24-185 %	85.4	%	
13C12-2,3,4,7,8-PeCDF		1.507	1.318-1.783	21-178 %	86.4	%	
13C12-1,2,3,7,8-PeCDD		1.631	1.318-1.783	25-181 %	80.6	%	
13C12-1,2,3,4,7,8-HxCDF		0.507	0.434-0.587	26-152 %	97.4	%	
13C12-1,2,3,6,7,8-HxCDF		0.512	0.434-0.587	26-123 %	89.7	%	
13C12-2,3,4,6,7,8-HxCDF		0.517	0.434-0.587	28-136 %	91.7	%	
13C12-1,2,3,7,8,9-HxCDF		0.504	0.434-0.587	29-147 %	65.1	%	
13C12-1,2,3,4,7,8-HxCDD		1.265	1.054-1.426	32-141 %	84.6	%	
13C12-1,2,3,6,7,8-HxCDD		1.251	1.054-1.426	28-130 %	78.0	%	
13C12-1,2,3,4,6,7,8-HpCDF		0.452	0.374-0.506	28-143 %	85.0	%	
13C12-1,2,3,4,7,8,9-HpCDF		0.453	0.374-0.506	26-138 %	82.0	%	
13C12-1,2,3,4,6,7,8-HpCDD		1.077	0.893-1.208	23-140 %	82.8	%	
13C12-OCDD		0.916	0.757-1.024	17-157 %	53.0	%	
37Cl4-2,3,7,8-TCDD				35-197 %	96.5	%	



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COA_02_G_20201119
20K0374-02RE1 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/19/2020 10:50

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 03/04/2021 21:31

Analyte	DF/Split	Ion Ratio	Ratio Limits	EDL	Reporting	Result	Units	Notes
					Limit			



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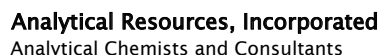
Reported:
26-Mar-2021 16:29

COA_02_G_20201119
20K0374-02RE1 (Solid)

Wet Chemistry

Method: SM 4500-NH3 H-97
Instrument: LCHAT2 Analyst: LRB
Sample Preparation: Preparation Method: MSA 33.3 (2M KCl)
Preparation Batch: BIK0769 Sample Size: 4.32 g (wet)
Prepared: 11/24/2020 Final Volume: 40 mL
Extract ID: 20K0374-02RE1 E
Dry Weight: 2.34 g
% Solids: 54.12

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Ammonia-N	7664-41-7	5	3.42	3.42	27.9	mg/kg NH3-N	D



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Reported:
26-Mar-2021 16:29

COA_03_G_20201118
20K0374-03 (Solid)

Method: EPA 8270E		Sampled: 11/18/2020 12:09
Instrument: NT10 Analyst: VTS		Analyzed: 12/30/2020 17:59
Sample Preparation:	Preparation Method: EPA 3546 (Microwave) Preparation Batch: BIK0878 Prepared: 12/01/2020	Extract ID: 20K0374-03 D 04 Dry Weight: 10.03 g % Solids: 46.15
	Sample Size: 21.73 g (wet) Final Volume: 1 mL	

Analytical Resources, Inc.

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.



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1420 - 156th Ave., NE STE C1
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Project: COA Outfall
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Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

COA_03_G_20201118
20K0374-03 (Solid)

Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 11/18/2020 12:09

Instrument: NT10 Analyst: VTS

Analyzed: 12/30/2020 17:59

Analyte	CAS Number	Recovery	Recovery	Units	Notes
		Limits			
Surrogate: 1,2-Dichlorobenzene-d4		32-120 %	69.4	%	
Surrogate: Nitrobenzene-d5		30-120 %	87.2	%	
Surrogate: 2-Fluorobiphenyl		35-120 %	85.3	%	
Surrogate: 2,4,6-Tribromophenol		24-134 %	76.2	%	
Surrogate: p-Terphenyl-d14		37-120 %	76.8	%	



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Reported:
26-Mar-2021 16:29

COA_03_G_20201118
20K0374-03 (Solid)

Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM

Sampled: 11/18/2020 12:09

Instrument: NT10 Analyst: VTS

Analyzed: 12/30/2020 17:59

Sample Preparation:

Preparation Method: EPA 3546 (Microwave)

Extract ID: 20K0374-03 D 04

Preparation Batch: BIK0878

Sample Size: 21.73 g (wet)

Dry Weight: 10.03 g

Prepared: 12/01/2020

Final Volume: 1 mL

% Solids: 46.15

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
1,4-Dichlorobenzene	106-46-7	1	0.6	5.0	ND	ug/kg	Ua
1,2-Dichlorobenzene	95-50-1	1	0.7	5.0	ND	ug/kg	Ua
2,4-Dimethylphenol	105-67-9	1	2.2	19.9	2.2	ug/kg	J
1,2,4-Trichlorobenzene	120-82-1	1	2.7	5.0	ND	ug/kg	Ua
Hexachlorobutadiene	87-68-3	1	0.7	5.0	ND	ug/kg	Ua
Surrogate: 2-Fluorophenol				27-120 %	72.6	%	Q
Surrogate: p-Terphenyl-d14				37-120 %	72.5	%	



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Reported:
26-Mar-2021 16:29

COA_03_G_20201118
20K0374-03 (Solid)

Butyl Tins

Method: EPA 8270E-SIM			Sampled: 11/18/2020 12:09		
Instrument: NT8 Analyst: JZ			Analyzed: 12/17/2020 19:36		
Sample Preparation:	Preparation Method: EPA 3546 (Microwave)			Extract ID: 20K0374-03 D 03	
	Preparation Batch: BIK0879	Sample Size: 10.86 g (wet)		Dry Weight: 5.01 g	
	Prepared: 12/01/2020	Final Volume: 0.5 mL		% Solids: 46.15	
Sample Cleanup:	Cleanup Method: Silica Gel			Extract ID: 20K0374-03 D 03	
	Cleanup Batch: CIL0160	Initial Volume: 0.5 mL			
	Cleaned: 17-Dec-2020	Final Volume: 0.5 mL			

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Tributyltin Ion	36643-28-4	1	0.449	3.85	17.0	ug/kg	
Dibutyltin Ion	14488-53-0	1	1.73	5.77	7.49	ug/kg	
Butyltin Ion	78763-54-9	1	1.89	4.07	3.35	ug/kg	J
Tetrabutyltin	1461-25-2	1	4.99	4.99	ND	ug/kg	Ua
Surrogate: Tripentyltin				30-160 %	107	%	
Surrogate: Tripropyltin				30-160 %	58.2	%	



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Reported:
26-Mar-2021 16:29

COA_03_G_20201118
20K0374-03 (Solid)

Chlorinated Pesticides

Method: EPA 8081B		Sampled: 11/18/2020 12:09	
Instrument: ECD6 Analyst: YZ/VTs		Analyzed: 03/15/2021 22:50	
Sample Preparation:	Preparation Method: EPA 3546 (Microwave)	Extract ID: 20K0374-03 B 01	
	Preparation Batch: BJB0764	Sample Size: 27.14 g (wet)	Dry Weight: 12.53 g
	Prepared: 02/26/2021	Final Volume: 2.5 mL	% Solids: 46.15
Sample Cleanup:	Cleanup Method: Silica Gel	Extract ID: 20K0374-03 B 01	
	Cleanup Batch: CJC0097	Initial Volume: 2.5 mL	
	Cleaned: 09-Mar-2021	Final Volume: 2.5 mL	
Sample Cleanup:	Cleanup Method: Sulfur	Extract ID: 20K0374-03 B 01	
	Cleanup Batch: CJC0096	Initial Volume: 2.5 mL	
	Cleaned: 09-Mar-2021	Final Volume: 2.5 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Heptachlor	76-44-8	1	0.05	0.50	ND	ug/kg	Ua
Aldrin	309-00-2	1	0.37	0.50	ND	ug/kg	Ua
trans-Chlordane (beta-Chlordane)	5103-74-2	1	0.33	0.50	ND	ug/kg	Ua
cis-Chlordane (alpha-chlordane)	5103-71-9	1	0.11	0.50	ND	ug/kg	Ua
4,4'-DDE	72-55-9	1	0.13	1.00	ND	ug/kg	Ua
Dieldrin	60-57-1	1	0.11	1.00	ND	ug/kg	Ua
4,4'-DDD	72-54-8	1	0.32	1.00	ND	ug/kg	Ua
4,4'-DDT	50-29-3	1	0.32	1.00	ND	ug/kg	Ua
Oxychlordane	27304-13-8	1	0.13	1.00	ND	ug/kg	Ua
cis-Nonachlor	5103-73-1	1	0.21	1.00	ND	ug/kg	Ua
trans-Nonachlor	39765-80-5	1	0.23	1.00	ND	ug/kg	Ua
Surrogate: Decachlorobiphenyl				30-160 %	99.4	%	
Surrogate: Decachlorobiphenyl [2C]				30-160 %	68.8	%	
Surrogate: Tetrachlorometaxylene				30-160 %	82.4	%	
Surrogate: Tetrachlorometaxylene [2C]				30-160 %	77.5	%	



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Reported:
26-Mar-2021 16:29

COA_03_G_20201118
20K0374-03 (Solid)

Aroclor PCB

Method: EPA 8082A		Sampled: 11/18/2020 12:09	
Instrument: ECD7 Analyst: JGR		Analyzed: 12/22/2020 11:02	
Sample Preparation:	Preparation Method: EPA 3546 (Microwave)	Extract ID: 20K0374-03 D 01	
	Preparation Batch: BIK0877	Dry Weight: 12.50 g	
	Prepared: 11/30/2020	% Solids: 46.15	
Sample Cleanup:	Cleanup Method: Silica Gel	Extract ID: 20K0374-03 D 01	
	Cleanup Batch: CIL0224	Initial Volume: 2.5 mL	
	Cleaned: 21-Dec-2020	Final Volume: 2.5 mL	
Sample Cleanup:	Cleanup Method: Sulfuric Acid	Extract ID: 20K0374-03 D 01	
	Cleanup Batch: CIL0218	Initial Volume: 2.5 mL	
	Cleaned: 21-Dec-2020	Final Volume: 2.5 mL	
Sample Cleanup:	Cleanup Method: Sulfur	Extract ID: 20K0374-03 D 01	
	Cleanup Batch: CIL0219	Initial Volume: 2.5 mL	
	Cleaned: 21-Dec-2020	Final Volume: 2.5 mL	
Sample Cleanup:	Cleanup Method: Alumina	Extract ID: 20K0374-03 D 01	
	Cleanup Batch: CIL0223	Initial Volume: 2.5 mL	
	Cleaned: 21-Dec-2020	Final Volume: 2.5 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Aroclor 1016	12674-11-2	1	1.6	4.0	ND	ug/kg	Ua
Aroclor 1221	11104-28-2	1	1.6	4.0	ND	ug/kg	Ua
Aroclor 1232	11141-16-5	1	1.6	4.0	ND	ug/kg	Ua
Aroclor 1242	53469-21-9	1	1.6	4.0	ND	ug/kg	Ua
Aroclor 1248	12672-29-6	1	1.6	4.0	3.3	ug/kg	J
Aroclor 1254	11097-69-1	1	1.6	4.0	3.1	ug/kg	J
Aroclor 1260	11096-82-5	1	0.6	4.0	1.2	ug/kg	J
Aroclor 1262	37324-23-5	1	0.6	4.0	ND	ug/kg	Ua
Aroclor 1268	11100-14-4	1	0.6	4.0	ND	ug/kg	Ua
Surrogate: Decachlorobiphenyl					40-126 %	67.8	%
Surrogate: Tetrachlorometaxylene					44-120 %	75.7	%
Surrogate: Decachlorobiphenyl [2C]					40-126 %	79.1	%
Surrogate: Tetrachlorometaxylene [2C]					44-120 %	78.4	%



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Reported:
26-Mar-2021 16:29

COA_03_G_20201118
20K0374-03 (Solid)

Dioxins/Furans

Method: EPA 1613B		Sampled: 11/18/2020 12:09	
Instrument: AUTOSPEC01 Analyst: pk		Analyzed: 12/18/2020 18:05	
Sample Preparation:	Preparation Method: EPA 1613	Extract ID: 20K0374-03 C 01	
	Preparation Batch: BIL0237	Dry Weight: 10.04 g	
	Prepared: 12/10/2020	% Solids: 46.61	
Sample Cleanup:	Cleanup Method: Silica Gel	Extract ID: 20K0374-03 C 01	
	Cleanup Batch: CIL0151	Initial Volume: 20 mL	
	Cleaned: 15-Dec-2020	Final Volume: 20 mL	
Sample Cleanup:	Cleanup Method: Sulfuric Acid	Extract ID: 20K0374-03 C 01	
	Cleanup Batch: CIL0150	Initial Volume: 20 mL	
	Cleaned: 14-Dec-2020	Final Volume: 20 mL	
Sample Cleanup:	Cleanup Method: Florisil	Extract ID: 20K0374-03 C 01	
	Cleanup Batch: CIL0152	Initial Volume: 20 mL	
	Cleaned: 15-Dec-2020	Final Volume: 20 mL	

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting		Result	Units	Notes
				EDL	Limit			
2,3,7,8-TCDF		0.802	0.655-0.886	0.063	0.110	0.996	1.64	ng/kg
2,3,7,8-TCDD		0.474	0.655-0.886	0.140	0.087	0.996	0.261	ng/kg
1,2,3,7,8-PeCDF		1.821	1.318-1.783	0.149	0.098	0.996	0.338	ng/kg
2,3,4,7,8-PeCDF		1.411	1.318-1.783	0.149	0.088	0.996	0.374	ng/kg
1,2,3,7,8-PeCDD		1.346	1.318-1.783	0.179	0.107	0.996	1.20	ng/kg
1,2,3,4,7,8-HxCDF		1.322	1.054-1.426	0.140	0.094	0.996	0.667	ng/kg
1,2,3,6,7,8-HxCDF		1.261	1.054-1.426	0.179	0.095	0.996	0.434	ng/kg
2,3,4,6,7,8-HxCDF		1.290	1.054-1.426	0.110	0.106	0.996	0.741	ng/kg
1,2,3,7,8,9-HxCDF			1.054-1.426	0.209	0.148	0.996	ND	ng/kg
1,2,3,4,7,8-HxCDD		1.243	1.054-1.426	0.179	0.197	0.996	0.791	ng/kg
1,2,3,6,7,8-HxCDD		1.146	1.054-1.426	0.149	0.186	0.996	3.81	ng/kg
1,2,3,7,8,9-HxCDD		1.220	1.054-1.426	0.219	0.218	0.996	2.84	ng/kg
1,2,3,4,6,7,8-HpCDF		1.157	0.893-1.208	0.209	0.166	0.996	12.9	ng/kg
1,2,3,4,7,8,9-HpCDF		1.321	0.893-1.208	0.159	0.248	0.996	0.836	ng/kg
1,2,3,4,6,7,8-HpCDD		1.060	0.893-1.208	0.558	0.552	2.49	102	ng/kg
OCDF		0.849	0.757-1.024	1.10	0.287	2.49	49.1	ng/kg
OCDD		0.876	0.757-1.024	4.28	0.791	9.96	995	ng/kg
Homologue groups								
Total TCDF						0.996	7.06	ng/kg
Total TCDD						0.996	3.27	ng/kg
Total PeCDF						0.996	4.29	ng/kg
Total PeCDD						0.996	4.36	ng/kg
Total HxCDF						0.996	17.5	ng/kg
Total HxCDD						0.996	38.0	ng/kg
Total HpCDF						0.996	45.9	ng/kg
Total HpCDD						0.996	261	ng/kg



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

COA_03_G_20201118
20K0374-03 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/18/2020 12:09

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 12/18/2020 18:05

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting Limit	Result	Units	Notes
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC):				4.15			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC):				4.15			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, EMPC = ND):				4.01			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, EMPC = ND):				3.87			



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1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

COA_03_G_20201118
20K0374-03 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/18/2020 12:09

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 12/18/2020 18:05

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting Limit	Result	Units	Notes
Labeled compounds							
13C12-2,3,7,8-TCDF		0.787	0.655-0.886	24-169 %	73.9	%	
13C12-2,3,7,8-TCDD		0.808	0.655-0.886	25-164 %	80.6	%	
13C12-1,2,3,7,8-PeCDF		1.522	1.318-1.783	24-185 %	70.8	%	
13C12-2,3,4,7,8-PeCDF		1.546	1.318-1.783	21-178 %	73.2	%	
13C12-1,2,3,7,8-PeCDD		1.630	1.318-1.783	25-181 %	73.2	%	
13C12-1,2,3,4,7,8-HxCDF		0.496	0.434-0.587	26-152 %	84.4	%	
13C12-1,2,3,6,7,8-HxCDF		0.498	0.434-0.587	26-123 %	69.7	%	
13C12-2,3,4,6,7,8-HxCDF		0.493	0.434-0.587	28-136 %	71.3	%	
13C12-1,2,3,7,8,9-HxCDF		0.494	0.434-0.587	29-147 %	58.7	%	
13C12-1,2,3,4,7,8-HxCDD		1.296	1.054-1.426	32-141 %	84.1	%	
13C12-1,2,3,6,7,8-HxCDD		1.283	1.054-1.426	28-130 %	67.6	%	
13C12-1,2,3,4,6,7,8-HpCDF		0.428	0.374-0.506	28-143 %	65.6	%	
13C12-1,2,3,4,7,8,9-HpCDF		0.421	0.374-0.506	26-138 %	63.8	%	
13C12-1,2,3,4,6,7,8-HpCDD		1.069	0.893-1.208	23-140 %	69.6	%	
13C12-OCDD		0.914	0.757-1.024	17-157 %	47.5	%	
37Cl4-2,3,7,8-TCDD				35-197 %	90.3	%	



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Reported:
26-Mar-2021 16:29

COA_03_G_20201118
20K0374-03 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/18/2020 12:09

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 12/18/2020 18:05

Analyte	DF/Split	Ion Ratio	Ratio Limits	EDL	Reporting	Result	Units	Notes
					Limit			



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
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Reported:
26-Mar-2021 16:29

COA_03_G_20201118
20K0374-03 (Solid)

Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 11/18/2020 12:09

Instrument: ICPMS1 Analyst: MCB

Analyzed: 03/23/2021 18:09

Sample Preparation:

Preparation Method: SWN EPA 3050B

Extract ID: 20K0374-03 E 02

Preparation Batch: BJC0563

Sample Size: 1.092 g (wet)

Dry Weight: 0.49 g

Prepared: 03/22/2021

Final Volume: 50 mL

% Solids: 44.94

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Antimony	7440-36-0	20	0.04	0.41	ND	mg/kg	Ua
Chromium	7440-47-3	20	0.26	1.02	34.3	mg/kg	
Lead	7439-92-1	20	0.14	0.20	9.44	mg/kg	
Silver	7440-22-4	20	0.03	0.41	0.11	mg/kg	J



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1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

COA_03_G_20201118
20K0374-03 (Solid)

Metals and Metallic Compounds

Method: EPA 6020B UCT-KED

Sampled: 11/18/2020 12:09

Instrument: ICPMS1 Analyst: MCB

Analyzed: 03/23/2021 18:09

Sample Preparation:

Preparation Method: SWN EPA 3050B

Extract ID: 20K0374-03 E 02

Preparation Batch: BJC0563

Sample Size: 1.092 g (wet)

Dry Weight: 0.49 g

Prepared: 03/22/2021

Final Volume: 50 mL

% Solids: 44.94

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	20	0.04	0.41	6.17	mg/kg	
Cadmium	7440-43-9	20	0.06	0.20	0.58	mg/kg	
Copper	7440-50-8	20	0.69	1.02	31.7	mg/kg	
Selenium	7782-49-2	20	0.90	1.02	1.03	mg/kg	
Zinc	7440-66-6	20	1.7	8.2	77.8	mg/kg	



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Reported:
26-Mar-2021 16:29

COA_03_G_20201118
20K0374-03 (Solid)

Metals and Metallic Compounds

Method: EPA 7471B

Sampled: 11/18/2020 12:09

Instrument: HYDRA Analyst: BLC

Analyzed: 03/23/2021 11:38

Sample Preparation:

Preparation Method: SMM EPA 7471B

Extract ID: 20K0374-03 E

Preparation Batch: BJC0609

Sample Size: 0.245 g (wet)

Dry Weight: 0.11 g

Prepared: 03/22/2021

Final Volume: 50 mL

% Solids: 44.94

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.00954	0.0454	0.0835	mg/kg	H



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Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

COA_03_G_20201118
20K0374-03 (Solid)

Wet Chemistry

Method: EPA 9060A m

Sampled: 11/18/2020 12:09

Instrument: TOC Cube Analyst: BF

Analyzed: 11/26/2020 13:38

Sample Preparation:

Preparation Method: PSEP 1986 (modified)

Extract ID: 20K0374-03 E

Preparation Batch: BIK0803

Sample Size: 0.3138 g (wet)

Dry Weight: 0.14 g

Prepared: 11/25/2020

Final Volume: 0.3138 mL

% Solids: 44.94

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Organic Carbon		1	0.02	0.02	1.57	%	



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Reported:
26-Mar-2021 16:29

COA_03_G_20201118
20K0374-03 (Solid)

Wet Chemistry

Method: PSEP 1986

Sampled: 11/18/2020 12:09

Instrument: BAL2 Analyst: UW

Analyzed: 11/24/2020 17:15

Sample Preparation:	Preparation Method: No Prep Wet Chem	Sample Size: 5 g (wet)	Extract ID: 20K0374-03
	Preparation Batch: BIK0773	Final Volume: 5 g	Dry Weight: 2.25 g
	Prepared: 11/24/2020		% Solids: 44.94

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Volatile Solids		1	0.01	0.01	5.87	%	

Sample Preparation:	Preparation Method: No Prep Wet Chem	Sample Size: 5 g (wet)	Extract ID: 20K0374-03
	Preparation Batch: BIK0778	Final Volume: 5 g	Dry Weight: 2.25 g
	Prepared: 11/24/2020		% Solids: 44.94

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Solids, Sulfide		1	0.04	0.04	43.80	%	



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Reported:
26-Mar-2021 16:29

COA_03_G_20201118
20K0374-03 (Solid)

Wet Chemistry

Method: SM 2540 G-97

Sampled: 11/18/2020 12:09

Instrument: BAL2 Analyst: UW

Analyzed: 11/24/2020 17:15

Sample Preparation:

Preparation Method: No Prep Wet Chem

Extract ID: 20K0374-03

Preparation Batch: BIK0773

Sample Size: 5 g (wet)

Dry Weight: 2.25 g

Prepared: 11/24/2020

Final Volume: 5 g

% Solids: 44.94

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Solids		1	0.04	0.04	44.94	%	



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Reported:
26-Mar-2021 16:29

COA_03_G_20201118
20K0374-03 (Solid)

Wet Chemistry

Method: SM 4500-S2 D-00 (PSEP)
Instrument: UV1800-1 Analyst: CDE

Sampled: 11/18/2020 12:09
Analyzed: 12/03/2020 17:07

Sample Preparation: Preparation Method: PSEP 1986
Preparation Batch: BIK0762 Sample Size: 5.021 g (wet)
Prepared: 11/24/2020 Final Volume: 100 mL
Extract ID: 20K0374-03 F
Dry Weight: 2.20 g
% Solids: 43.80

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Sulfide	18496-25-8	100	227	227	2260	mg/kg	D



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Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

COA_03_G_20201118
20K0374-03 (Solid)

Extractions

Method: ASTM D2216

Sampled: 11/18/2020 12:09

Instrument: N/A Analyst: NL

Analyzed: 11/26/2020 05:10

Sample Preparation:

Preparation Method: No Prep-Organics

Extract ID: 20K0374-03

Preparation Batch: BIK0789

Sample Size: 1 g (wet)

Dry Weight: 0.45 g

Prepared: 11/25/2020

Final Volume: 1 g

% Solids: 44.94

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Total Solids		1	0.01	46.61	%	



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Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

COA_03_G_20201118
20K0374-03 (Solid)

Extractions

Method: ASTM D2216

Sampled: 11/18/2020 12:09

Instrument: N/A Analyst: NL

Analyzed: 11/26/2020 05:10

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Labeled compounds						



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

COA_03_G_20201118
20K0374-03 (Solid)

Geotechnical Methods

Method: PSEP-PS

Sampled: 11/18/2020 12:09

Instrument: MT&C Analyst:

Analyzed: 01/11/2021 00:00

Analysis by: Materials Testing & Consulting, Inc. (Olympia)

Sample Preparation: Preparation Method: No Prep Geo
Preparation Batch: B011121
Prepared: 01/11/2021

Extract ID: 20K0374-03

Final Volume:

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Phi Size <-1	GS_GRAVEL	1	0.1	ND	%	
Phi Size -1 to 0	GS_VCS	1	0.1	0.5	%	
Phi Size 0 to 1	GS_CS	1	0.1	1.3	%	
Phi Size 1 to 2	GS_MS	1	0.1	1.2	%	
Phi Size 2 to 3	GS_FS	1	0.1	3.7	%	
Phi Size 3 to 4	GS_VFS	1	0.1	10.8	%	
Phi Size 4 to 5	GS_CSILT	1	0.1	15.5	%	
Phi Size 5 to 6	GS_MSILT	1	0.1	25.1	%	
Phi Size 6 to 7	GS_FSILT	1	0.1	13.9	%	
Phi Size 7 to 8	GS_VFSILT	1	0.1	6.2	%	
Phi Size 8 to 9	GS_CCLAY	1	0.1	7.2	%	
Phi Size 9 to 10	GS_MCLAY	1	0.1	4.9	%	
Phi Size >10	GS_FCLAY	1	0.1	9.8	%	
Total Fines	GS_TOTFINES	1	0.1	82.5	%	



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Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

COA_03_G_20201118
20K0374-03RE1 (Solid)

Dioxins/Furans

Method: EPA 1613B		Sampled: 11/18/2020 12:09	
Instrument: AUTOSPEC01 Analyst: pk		Analyzed: 03/04/2021 22:20	
Sample Preparation:	Preparation Method: EPA 1613	Extract ID: 20K0374-03RE1 C 01	
	Preparation Batch: BJB0762	Sample Size: 21.53 g (wet)	Dry Weight: 10.04 g
	Prepared: 03/01/2021	Final Volume: 20 uL	% Solids: 46.61
Sample Cleanup:	Cleanup Method: Silica Gel	Extract ID: 20K0374-03RE1 C 01	
	Cleanup Batch: CJC0027	Initial Volume: 20 mL	
	Cleaned: 03-Mar-2021	Final Volume: 20 mL	
Sample Cleanup:	Cleanup Method: Sulfuric Acid	Extract ID: 20K0374-03RE1 C 01	
	Cleanup Batch: CJC0026	Initial Volume: 20 mL	
	Cleaned: 02-Mar-2021	Final Volume: 20 mL	
Sample Cleanup:	Cleanup Method: Florisil	Extract ID: 20K0374-03RE1 C 01	
	Cleanup Batch: CJC0028	Initial Volume: 20 mL	
	Cleaned: 03-Mar-2021	Final Volume: 20 mL	

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting		Result	Units	Notes
				EDL	Limit			
2,3,7,8-TCDF		0.786	0.655-0.886	0.058	0.068	0.996	2.07	ng/kg
2,3,7,8-TCDD		0.371	0.655-0.886	0.149	0.070	0.996	0.247	ng/kg
1,2,3,7,8-PeCDF		1.393	1.318-1.783	0.239	0.127	0.996	0.446	ng/kg
2,3,4,7,8-PeCDF		1.949	1.318-1.783	0.219	0.120	0.996	0.488	ng/kg
1,2,3,7,8-PeCDD		1.633	1.318-1.783	0.169	0.138	0.996	1.27	ng/kg
1,2,3,4,7,8-HxCDF		1.153	1.054-1.426	0.279	0.120	0.996	0.967	ng/kg
1,2,3,6,7,8-HxCDF		1.257	1.054-1.426	0.199	0.127	0.996	0.667	ng/kg
2,3,4,6,7,8-HxCDF		1.456	1.054-1.426	0.169	0.125	0.996	1.05	ng/kg
1,2,3,7,8,9-HxCDF		1.588	1.054-1.426	0.189	0.152	0.996	0.321	ng/kg
1,2,3,4,7,8-HxCDD		1.175	1.054-1.426	0.169	0.165	0.996	1.30	ng/kg
1,2,3,6,7,8-HxCDD		1.270	1.054-1.426	0.179	0.160	0.996	5.70	ng/kg
1,2,3,7,8,9-HxCDD		1.114	1.054-1.426	0.219	0.168	0.996	3.02	ng/kg
1,2,3,4,6,7,8-HpCDF		1.060	0.893-1.208	0.209	0.137	0.996	20.9	ng/kg
1,2,3,4,7,8,9-HpCDF		1.108	0.893-1.208	0.239	0.179	0.996	1.48	ng/kg
1,2,3,4,6,7,8-HpCDD		1.057	0.893-1.208	0.558	0.463	2.49	141	ng/kg
OCDF		0.920	0.757-1.024	1.10	0.260	2.49	93.2	ng/kg
OCDD		0.865	0.757-1.024	4.58	0.564	9.96	1070	ng/kg
Homologue groups								
Total TCDF						0.996	9.04	ng/kg
Total TCDD						0.996	14.0	ng/kg
Total PeCDF						0.996	5.35	ng/kg
Total PeCDD						0.996	11.1	ng/kg
Total HxCDF						0.996	24.4	ng/kg
Total HxCDD						0.996	51.6	ng/kg
Total HpCDF						0.996	83.6	ng/kg
Total HpCDD						0.996	337	ng/kg



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

COA_03_G_20201118
20K0374-03RE1 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/18/2020 12:09

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 03/04/2021 22:20

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting Limit	Result	Units	Notes
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC):				5.17			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC):				5.17			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, EMPC = ND):				4.90			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, EMPC = ND):				4.64			



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Reported:
26-Mar-2021 16:29

COA_03_G_20201118
20K0374-03RE1 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/18/2020 12:09

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 03/04/2021 22:20

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting Limit	Result	Units	Notes
Labeled compounds							
13C12-2,3,7,8-TCDF		0.769	0.655-0.886	24-169 %	82.3	%	
13C12-2,3,7,8-TCDD		0.802	0.655-0.886	25-164 %	83.8	%	
13C12-1,2,3,7,8-PeCDF		1.515	1.318-1.783	24-185 %	79.3	%	
13C12-2,3,4,7,8-PeCDF		1.507	1.318-1.783	21-178 %	78.3	%	
13C12-1,2,3,7,8-PeCDD		1.608	1.318-1.783	25-181 %	71.3	%	
13C12-1,2,3,4,7,8-HxCDF		0.516	0.434-0.587	26-152 %	84.9	%	
13C12-1,2,3,6,7,8-HxCDF		0.513	0.434-0.587	26-123 %	80.0	%	
13C12-2,3,4,6,7,8-HxCDF		0.529	0.434-0.587	28-136 %	82.2	%	
13C12-1,2,3,7,8,9-HxCDF		0.519	0.434-0.587	29-147 %	74.9	%	
13C12-1,2,3,4,7,8-HxCDD		1.293	1.054-1.426	32-141 %	78.7	%	
13C12-1,2,3,6,7,8-HxCDD		1.280	1.054-1.426	28-130 %	72.2	%	
13C12-1,2,3,4,6,7,8-HpCDF		0.438	0.374-0.506	28-143 %	80.5	%	
13C12-1,2,3,4,7,8,9-HpCDF		0.440	0.374-0.506	26-138 %	82.0	%	
13C12-1,2,3,4,6,7,8-HpCDD		1.083	0.893-1.208	23-140 %	79.5	%	
13C12-OCDD		0.930	0.757-1.024	17-157 %	61.1	%	
37Cl4-2,3,7,8-TCDD				35-197 %	88.9	%	



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Reported:
26-Mar-2021 16:29

COA_03_G_20201118
20K0374-03RE1 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/18/2020 12:09

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 03/04/2021 22:20

Analyte	DF/Split	Ion Ratio	Ratio Limits	EDL	Reporting	Result	Units	Notes
					Limit			



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Project: COA Outfall
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Reported:
26-Mar-2021 16:29

COA_03_G_20201118
20K0374-03RE1 (Solid)

Wet Chemistry

Method: SM 4500-NH3 H-97
Instrument: LACHAT2 Analyst: LRB
Sample Preparation: Preparation Method: MSA 33.3 (2M KCl)
Preparation Batch: BIK0769 Sample Size: 4.53 g (wet)
Prepared: 11/24/2020 Final Volume: 40 mL
Extract ID: 20K0374-03RE1 E
Dry Weight: 2.04 g
% Solids: 44.94

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Ammonia-N	7664-41-7	5	3.93	3.93	41.5	mg/kg NH3-N	D



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Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

COA_04_G_20201118
20K0374-04 (Solid)

Semivolatile Organic Compounds

Method: EPA 8270E
Instrument: NT10 Analyst: VTS
Sample Preparation: Preparation Method: EPA 3546 (Microwave)
Preparation Batch: BIK0878 Sample Size: 20.21 g (wet)
Prepared: 12/01/2020 Final Volume: 1 mL
Extract ID: 20K0374-04 D 04
Dry Weight: 10.03 g
% Solids: 49.63

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Phenol	108-95-2	1	8.2	19.9	11.3	ug/kg	J
Benzyl Alcohol	100-51-6	1	14.9	19.9	ND	ug/kg	Ua
2-Methylphenol	95-48-7	1	7.8	19.9	ND	ug/kg	Ua
Hexachloroethane	67-72-1	1	5.6	19.9	ND	ug/kg	Ua
4-Methylphenol	106-44-5	1	14.7	19.9	16.3	ug/kg	J
Naphthalene	91-20-3	1	5.2	19.9	37.7	ug/kg	
Benzoic acid	65-85-0	1	58.9	199	ND	ug/kg	Ua
2-Methylnaphthalene	91-57-6	1	5.7	19.9	21.6	ug/kg	
Acenaphthylene	208-96-8	1	4.8	19.9	12.7	ug/kg	J
Dimethylphthalate	131-11-3	1	6.4	19.9	8.3	ug/kg	J
Acenaphthene	83-32-9	1	5.1	19.9	10.8	ug/kg	J
Dibenzofuran	132-64-9	1	4.6	19.9	14.1	ug/kg	J
Fluorene	86-73-7	1	4.9	19.9	22.1	ug/kg	
Diethyl phthalate	84-66-2	1	17.6	19.9	ND	ug/kg	Ua
N-Nitrosodiphenylamine	86-30-6	1	9.5	19.9	ND	ug/kg	Ua
Hexachlorobenzene	118-74-1	1	4.7	19.9	ND	ug/kg	Ua
Pentachlorophenol	87-86-5	1	31.2	99.7	ND	ug/kg	Ua
Phenanthrene	85-01-8	1	4.7	19.9	69.5	ug/kg	
Anthracene	120-12-7	1	5.9	19.9	30.3	ug/kg	
Di-n-Butylphthalate	84-74-2	1	5.3	19.9	18.4	ug/kg	J
Fluoranthene	206-44-0	1	4.5	19.9	100	ug/kg	
Pyrene	129-00-0	1	5.5	19.9	158	ug/kg	
Butylbenzylphthalate	85-68-7	1	8.0	19.9	ND	ug/kg	Ua
Benzo(a)anthracene	56-55-3	1	5.2	19.9	62.3	ug/kg	
Chrysene	218-01-9	1	5.2	19.9	143	ug/kg	
bis(2-Ethylhexyl)phthalate	117-81-7	1	28.7	49.8	35.7	ug/kg	J
Di-n-Octylphthalate	117-84-0	1	8.7	19.9	ND	ug/kg	Ua
Benzo(a)fluoranthene, Total		1	10.2	39.9	217	ug/kg	
Benzo(a)pyrene	50-32-8	1	6.5	19.9	72.2	ug/kg	
Indeno(1,2,3-cd)pyrene	193-39-5	1	6.0	19.9	39.2	ug/kg	
Dibenzo(a,h)anthracene	53-70-3	1	6.1	19.9	18.2	ug/kg	J
Benzo(g,h,i)perylene	191-24-2	1	5.8	19.9	39.3	ug/kg	
Surrogate: 2-Fluorophenol				27-120 %	66.2	%	
Surrogate: Phenol-d5				29-120 %	72.0	%	
Surrogate: 2-Chlorophenol-d4				31-120 %	75.0	%	



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Reported:
26-Mar-2021 16:29

COA_04_G_20201118
20K0374-04 (Solid)

Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 11/18/2020 11:06

Instrument: NT10 Analyst: VTS

Analyzed: 12/30/2020 18:37

Analyte	CAS Number	Recovery	Recovery	Units	Notes
		Limits			
Surrogate: 1,2-Dichlorobenzene-d4		32-120 %	66.5	%	
Surrogate: Nitrobenzene-d5		30-120 %	86.5	%	
Surrogate: 2-Fluorobiphenyl		35-120 %	83.9	%	
Surrogate: 2,4,6-Tribromophenol		24-134 %	72.0	%	
Surrogate: p-Terphenyl-d14		37-120 %	76.6	%	



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COA_04_G_20201118
20K0374-04 (Solid)

Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM

Sampled: 11/18/2020 11:06

Instrument: NT10 Analyst: VTS

Analyzed: 12/30/2020 18:37

Sample Preparation:

Preparation Method: EPA 3546 (Microwave)

Extract ID: 20K0374-04 D 04

Preparation Batch: BIK0878

Sample Size: 20.21 g (wet)

Dry Weight: 10.03 g

Prepared: 12/01/2020

Final Volume: 1 mL

% Solids: 49.63

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
1,4-Dichlorobenzene	106-46-7	1	0.6	5.0	ND	ug/kg	Ua
1,2-Dichlorobenzene	95-50-1	1	0.7	5.0	ND	ug/kg	Ua
2,4-Dimethylphenol	105-67-9	1	2.2	19.9	ND	ug/kg	Ua
1,2,4-Trichlorobenzene	120-82-1	1	2.7	5.0	ND	ug/kg	Ua
Hexachlorobutadiene	87-68-3	1	0.7	5.0	ND	ug/kg	Ua
Surrogate: 2-Fluorophenol				27-120 %	68.9	%	Q
Surrogate: p-Terphenyl-d14				37-120 %	71.6	%	



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COA_04_G_20201118
20K0374-04 (Solid)

Butyl Tins

Method: EPA 8270E-SIM		Sampled: 11/18/2020 11:06
Instrument: NT8 Analyst: JZ		Analyzed: 12/17/2020 19:52
Sample Preparation:	Preparation Method: EPA 3546 (Microwave) Preparation Batch: BIK0879 Prepared: 12/01/2020	Extract ID: 20K0374-04 D 03 Dry Weight: 5.01 g % Solids: 49.63
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CIL0160 Cleaned: 17-Dec-2020	Initial Volume: 0.5 mL Final Volume: 0.5 mL Extract ID: 20K0374-04 D 03

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Tributyltin Ion	36643-28-4	1	0.449	3.85	8.97	ug/kg	
Dibutyltin Ion	14488-53-0	1	1.73	5.77	6.23	ug/kg	
Butyltin Ion	78763-54-9	1	1.89	4.07	ND	ug/kg	Ua
Tetrabutyltin	1461-25-2	1	4.99	4.99	ND	ug/kg	Ua
<i>Surrogate: Triphenyltin</i>					30-160 %	106	%
<i>Surrogate: Tripropyltin</i>					30-160 %	63.7	%



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COA_04_G_20201118
20K0374-04 (Solid)

Chlorinated Pesticides

Method: EPA 8081B		Sampled: 11/18/2020 11:06	
Instrument: ECD6 Analyst: YZ/VTs		Analyzed: 03/15/2021 23:09	
Sample Preparation:	Preparation Method: EPA 3546 (Microwave)	Extract ID: 20K0374-04 B 01	
	Preparation Batch: BJB0764	Dry Weight: 12.53 g	
	Prepared: 02/26/2021	% Solids: 49.63	
Sample Cleanup:	Cleanup Method: Silica Gel	Extract ID: 20K0374-04 B 01	
	Cleanup Batch: CJC0097	Initial Volume: 2.5 mL	
	Cleaned: 09-Mar-2021	Final Volume: 2.5 mL	
Sample Cleanup:	Cleanup Method: Sulfur	Extract ID: 20K0374-04 B 01	
	Cleanup Batch: CJC0096	Initial Volume: 2.5 mL	
	Cleaned: 09-Mar-2021	Final Volume: 2.5 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Heptachlor	76-44-8	1	0.05	0.50	ND	ug/kg	Ua
Aldrin	309-00-2	1	0.37	0.50	ND	ug/kg	Ua
trans-Chlordane (beta-Chlordane)	5103-74-2	1	0.33	0.50	ND	ug/kg	Ua
cis-Chlordane (alpha-chlordane)	5103-71-9	1	0.11	0.50	ND	ug/kg	Ua
4,4'-DDE	72-55-9	1	0.13	1.00	ND	ug/kg	Ua
Dieldrin	60-57-1	1	0.11	1.00	ND	ug/kg	Ua
4,4'-DDD	72-54-8	1	0.32	1.00	ND	ug/kg	Ua
4,4'-DDT	50-29-3	1	0.32	1.00	ND	ug/kg	Ua
Oxychlordane	27304-13-8	1	0.13	1.00	ND	ug/kg	Ua
cis-Nonachlor	5103-73-1	1	0.21	1.00	ND	ug/kg	Ua
trans-Nonachlor	39765-80-5	1	0.23	1.00	ND	ug/kg	Ua
Surrogate: Decachlorobiphenyl				30-160 %	108	%	P1
Surrogate: Decachlorobiphenyl [2C]				30-160 %	65.1	%	P1
Surrogate: Tetrachlorometaxylene				30-160 %	92.0	%	
Surrogate: Tetrachlorometaxylene [2C]				30-160 %	68.4	%	



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COA_04_G_20201118
20K0374-04 (Solid)

Aroclor PCB

Method: EPA 8082A		Sampled: 11/18/2020 11:06	
Instrument: ECD7 Analyst: JGR		Analyzed: 12/22/2020 11:23	
Sample Preparation:	Preparation Method: EPA 3546 (Microwave)	Extract ID: 20K0374-04 D 01	
	Preparation Batch: BIK0877	Dry Weight: 12.51 g	
	Prepared: 11/30/2020	% Solids: 49.63	
Sample Cleanup:	Cleanup Method: Silica Gel	Extract ID: 20K0374-04 D 01	
	Cleanup Batch: CIL0224	Initial Volume: 2.5 mL	
	Cleaned: 21-Dec-2020	Final Volume: 2.5 mL	
Sample Cleanup:	Cleanup Method: Sulfuric Acid	Extract ID: 20K0374-04 D 01	
	Cleanup Batch: CIL0218	Initial Volume: 2.5 mL	
	Cleaned: 21-Dec-2020	Final Volume: 2.5 mL	
Sample Cleanup:	Cleanup Method: Sulfur	Extract ID: 20K0374-04 D 01	
	Cleanup Batch: CIL0219	Initial Volume: 2.5 mL	
	Cleaned: 21-Dec-2020	Final Volume: 2.5 mL	
Sample Cleanup:	Cleanup Method: Alumina	Extract ID: 20K0374-04 D 01	
	Cleanup Batch: CIL0223	Initial Volume: 2.5 mL	
	Cleaned: 21-Dec-2020	Final Volume: 2.5 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Aroclor 1016	12674-11-2	1	1.6	4.0	ND	ug/kg	Ua
Aroclor 1221	11104-28-2	1	1.6	4.0	ND	ug/kg	Ua
Aroclor 1232	11141-16-5	1	1.6	4.0	ND	ug/kg	Ua
Aroclor 1242	53469-21-9	1	1.6	4.0	ND	ug/kg	Ua
Aroclor 1248	12672-29-6	1	1.6	4.0	3.9	ug/kg	J
Aroclor 1254	11097-69-1	1	1.6	4.0	2.5	ug/kg	J
Aroclor 1260	11096-82-5	1	0.6	4.0	0.8	ug/kg	J
Aroclor 1262	37324-23-5	1	0.6	4.0	ND	ug/kg	Ua
Aroclor 1268	11100-14-4	1	0.6	4.0	ND	ug/kg	Ua
Surrogate: Decachlorobiphenyl					40-126 %	65.0 %	
Surrogate: Tetrachlorometaxylene					44-120 %	74.6 %	
Surrogate: Decachlorobiphenyl [2C]					40-126 %	76.3 %	
Surrogate: Tetrachlorometaxylene [2C]					44-120 %	78.2 %	



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26-Mar-2021 16:29

COA_04_G_20201118
20K0374-04 (Solid)

Dioxins/Furans

Method: EPA 1613B		Sampled: 11/18/2020 11:06	
Instrument: AUTOSPEC01 Analyst: pk		Analyzed: 12/18/2020 20:39	
Sample Preparation:	Preparation Method: EPA 1613	Extract ID: 20K0374-04 C 01	
	Preparation Batch: BIL0237	Dry Weight: 10.01 g	
	Prepared: 12/10/2020	% Solids: 49.12	
Sample Cleanup:	Cleanup Method: Silica Gel	Extract ID: 20K0374-04 C 01	
	Cleanup Batch: CIL0151	Initial Volume: 20 mL	
	Cleaned: 15-Dec-2020	Final Volume: 20 mL	
Sample Cleanup:	Cleanup Method: Sulfuric Acid	Extract ID: 20K0374-04 C 01	
	Cleanup Batch: CIL0150	Initial Volume: 20 mL	
	Cleaned: 14-Dec-2020	Final Volume: 20 mL	
Sample Cleanup:	Cleanup Method: Florisil	Extract ID: 20K0374-04 C 01	
	Cleanup Batch: CIL0152	Initial Volume: 20 mL	
	Cleaned: 15-Dec-2020	Final Volume: 20 mL	

Analyte	DF/Split	Ion Ratio	Ratio Limits	EDL	Reporting		Result	Units	Notes
					Limit	Limit			
2,3,7,8-TCDF		0.901	0.655-0.886	0.063	0.106	0.999	1.16	ng/kg	EMPC
2,3,7,8-TCDD		0.413	0.655-0.886	0.140	0.100	0.999	0.250	ng/kg	EMPC, J
1,2,3,7,8-PeCDF		1.347	1.318-1.783	0.150	0.144	0.999	0.297	ng/kg	J
2,3,4,7,8-PeCDF		2.778	1.318-1.783	0.150	0.127	0.999	0.371	ng/kg	EMPC, J
1,2,3,7,8-PeCDD		1.053	1.318-1.783	0.180	0.194	0.999	0.916	ng/kg	EMPC, J
1,2,3,4,7,8-HxCDF		1.317	1.054-1.426	0.140	0.115	0.999	0.613	ng/kg	J
1,2,3,6,7,8-HxCDF		1.191	1.054-1.426	0.180	0.121	0.999	0.398	ng/kg	J
2,3,4,6,7,8-HxCDF		2.013	1.054-1.426	0.110	0.115	0.999	0.435	ng/kg	EMPC, J
1,2,3,7,8,9-HxCDF			1.054-1.426	0.210	0.191	0.999	ND	ng/kg	Ua
1,2,3,4,7,8-HxCDD		0.941	1.054-1.426	0.180	0.200	0.999	0.859	ng/kg	EMPC, J
1,2,3,6,7,8-HxCDD		1.117	1.054-1.426	0.150	0.196	0.999	3.61	ng/kg	
1,2,3,7,8,9-HxCDD		1.313	1.054-1.426	0.220	0.225	0.999	2.14	ng/kg	
1,2,3,4,6,7,8-HpCDF		1.308	0.893-1.208	0.210	0.100	0.999	11.1	ng/kg	EMPC
1,2,3,4,7,8,9-HpCDF		1.530	0.893-1.208	0.160	0.145	0.999	0.548	ng/kg	EMPC, J
1,2,3,4,6,7,8-HpCDD		1.081	0.893-1.208	0.560	0.349	2.50	94.0	ng/kg	
OCDF		0.946	0.757-1.024	1.10	0.245	2.50	27.4	ng/kg	
OCDD		0.868	0.757-1.024	4.30	1.13	9.99	786	ng/kg	B
Homologue groups									
Total TCDF						0.999	2.07	ng/kg	
Total TCDD						0.999	2.68	ng/kg	
Total PeCDF						0.999	4.02	ng/kg	
Total PeCDD						0.999	2.77	ng/kg	
Total HxCDF						0.999	13.0	ng/kg	
Total HxCDD						0.999	47.9	ng/kg	
Total HpCDF						0.999	22.6	ng/kg	
Total HpCDD						0.999	290	ng/kg	



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COA_04_G_20201118
20K0374-04 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/18/2020 11:06

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 12/18/2020 20:39

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting Limit	Result	Units	Notes
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC):				3.52			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC):				3.51			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, EMPC = ND):				2.70			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, EMPC = ND):				1.87			



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COA_04_G_20201118
20K0374-04 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/18/2020 11:06

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 12/18/2020 20:39

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting Limit	Result	Units	Notes
Labeled compounds							
13C12-2,3,7,8-TCDF		0.768	0.655-0.886	24-169 %	56.8	%	
13C12-2,3,7,8-TCDD		0.802	0.655-0.886	25-164 %	56.2	%	
13C12-1,2,3,7,8-PeCDF		1.544	1.318-1.783	24-185 %	53.4	%	
13C12-2,3,4,7,8-PeCDF		1.552	1.318-1.783	21-178 %	57.8	%	
13C12-1,2,3,7,8-PeCDD		1.586	1.318-1.783	25-181 %	57.7	%	
13C12-1,2,3,4,7,8-HxCDF		0.495	0.434-0.587	26-152 %	72.2	%	
13C12-1,2,3,6,7,8-HxCDF		0.520	0.434-0.587	26-123 %	62.6	%	
13C12-2,3,4,6,7,8-HxCDF		0.490	0.434-0.587	28-136 %	66.2	%	
13C12-1,2,3,7,8,9-HxCDF		0.493	0.434-0.587	29-147 %	48.4	%	
13C12-1,2,3,4,7,8-HxCDD		1.282	1.054-1.426	32-141 %	71.5	%	
13C12-1,2,3,6,7,8-HxCDD		1.199	1.054-1.426	28-130 %	63.2	%	
13C12-1,2,3,4,6,7,8-HpCDF		0.432	0.374-0.506	28-143 %	58.6	%	
13C12-1,2,3,4,7,8,9-HpCDF		0.431	0.374-0.506	26-138 %	59.0	%	
13C12-1,2,3,4,6,7,8-HpCDD		1.071	0.893-1.208	23-140 %	66.3	%	
13C12-OCDD		0.930	0.757-1.024	17-157 %	43.2	%	
37Cl4-2,3,7,8-TCDD				35-197 %	90.2	%	



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COA_04_G_20201118
20K0374-04 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/18/2020 11:06

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 12/18/2020 20:39

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting		Result	Units	Notes
				EDL	Limit			



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COA_04_G_20201118
20K0374-04 (Solid)

Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 11/18/2020 11:06

Instrument: ICPMS1 Analyst: MCB

Analyzed: 03/23/2021 19:08

Sample Preparation:

Preparation Method: SWN EPA 3050B

Extract ID: 20K0374-04 E 02

Preparation Batch: BJC0563

Sample Size: 1.029 g (wet)

Dry Weight: 0.50 g

Prepared: 03/22/2021

Final Volume: 50 mL

% Solids: 48.19

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Antimony	7440-36-0	20	0.04	0.40	0.07	mg/kg	J
Chromium	7440-47-3	20	0.26	1.01	34.2	mg/kg	
Lead	7439-92-1	20	0.14	0.20	9.73	mg/kg	
Silver	7440-22-4	20	0.03	0.40	0.11	mg/kg	J



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COA_04_G_20201118
20K0374-04 (Solid)

Metals and Metallic Compounds

Method: EPA 6020B UCT-KED

Sampled: 11/18/2020 11:06

Instrument: ICPMS1 Analyst: MCB

Analyzed: 03/23/2021 19:08

Sample Preparation:

Preparation Method: SWN EPA 3050B

Extract ID: 20K0374-04 E 02

Preparation Batch: BJC0563

Sample Size: 1.029 g (wet)

Dry Weight: 0.50 g

Prepared: 03/22/2021

Final Volume: 50 mL

% Solids: 48.19

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	20	0.04	0.40	6.26	mg/kg	
Cadmium	7440-43-9	20	0.06	0.20	0.57	mg/kg	
Copper	7440-50-8	20	0.69	1.01	29.3	mg/kg	
Selenium	7782-49-2	20	0.89	1.01	1.16	mg/kg	
Zinc	7440-66-6	20	1.7	8.1	76.2	mg/kg	



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
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Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

COA_04_G_20201118
20K0374-04 (Solid)

Metals and Metallic Compounds

Method: EPA 7471B

Sampled: 11/18/2020 11:06

Instrument: HYDRA Analyst: BLC

Analyzed: 03/23/2021 11:40

Sample Preparation:

Preparation Method: SMM EPA 7471B

Extract ID: 20K0374-04 E

Preparation Batch: BJC0609

Sample Size: 0.243 g (wet)

Dry Weight: 0.12 g

Prepared: 03/22/2021

Final Volume: 50 mL

% Solids: 48.19

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.00897	0.0427	0.0716	mg/kg	H



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Reported:
26-Mar-2021 16:29

COA_04_G_20201118
20K0374-04 (Solid)

Wet Chemistry

Method: EPA 9060A m

Sampled: 11/18/2020 11:06

Instrument: TOC Cube Analyst: BF

Analyzed: 11/26/2020 15:11

Sample Preparation:

Preparation Method: PSEP 1986 (modified)

Extract ID: 20K0374-04 E

Preparation Batch: BIK0803

Sample Size: 0.3036 g (wet)

Dry Weight: 0.15 g

Prepared: 11/25/2020

Final Volume: 0.3036 mL

% Solids: 48.19

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Organic Carbon		1	0.02	0.02	1.38	%	



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Reported:
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COA_04_G_20201118
20K0374-04 (Solid)

Wet Chemistry

Method: PSEP 1986

Sampled: 11/18/2020 11:06

Instrument: BAL2 Analyst: UW

Analyzed: 11/24/2020 17:15

Sample Preparation:	Preparation Method: No Prep Wet Chem	Sample Size: 5 g (wet)	Extract ID: 20K0374-04
	Preparation Batch: BIK0773	Final Volume: 5 g	Dry Weight: 2.41 g
	Prepared: 11/24/2020		% Solids: 48.19

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Volatile Solids		1	0.01	0.01	5.39	%	

Sample Preparation:	Preparation Method: No Prep Wet Chem	Sample Size: 5 g (wet)	Extract ID: 20K0374-04
	Preparation Batch: BIK0778	Final Volume: 5 g	Dry Weight: 2.41 g
	Prepared: 11/24/2020		% Solids: 48.19

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Solids, Sulfide		1	0.04	0.04	48.12	%	



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Reported:
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COA_04_G_20201118
20K0374-04 (Solid)

Wet Chemistry

Method: SM 2540 G-97

Sampled: 11/18/2020 11:06

Instrument: BAL2 Analyst: UW

Analyzed: 11/24/2020 17:15

Sample Preparation:

Preparation Method: No Prep Wet Chem

Extract ID: 20K0374-04

Preparation Batch: BIK0773

Sample Size: 5 g (wet)

Dry Weight: 2.41 g

Prepared: 11/24/2020

Final Volume: 5 g

% Solids: 48.19

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Solids		1	0.04	0.04	48.19	%	



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Reported:
26-Mar-2021 16:29

COA_04_G_20201118
20K0374-04 (Solid)

Wet Chemistry

Method: SM 4500-S2 D-00 (PSEP)

Sampled: 11/18/2020 11:06

Instrument: UV1800-1 Analyst: CDE

Analyzed: 12/03/2020 17:13

Sample Preparation:

Preparation Method: PSEP 1986

Extract ID: 20K0374-04 F

Preparation Batch: BIK0762

Sample Size: 5.108 g (wet)

Dry Weight: 2.46 g

Prepared: 11/24/2020

Final Volume: 100 mL

% Solids: 48.12

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Sulfide	18496-25-8	100	203	203	1690	mg/kg	D



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Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

COA_04_G_20201118
20K0374-04 (Solid)

Extractions

Method: ASTM D2216	Sampled: 11/18/2020 11:06	
Instrument: N/A Analyst: NL	Analyzed: 11/26/2020 05:10	
Sample Preparation:	Preparation Method: No Prep-Organics	Extract ID: 20K0374-04
	Preparation Batch: BIK0789	Dry Weight: 0.48 g
	Prepared: 11/25/2020	% Solids: 48.19
	Sample Size: 1 g (wet)	
	Final Volume: 1 g	

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Total Solids		1	0.01	49.12	%	



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Project: COA Outfall
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Reported:
26-Mar-2021 16:29

COA_04_G_20201118
20K0374-04 (Solid)

Extractions

Method: ASTM D2216

Sampled: 11/18/2020 11:06

Instrument: N/A Analyst: NL

Analyzed: 11/26/2020 05:10

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Labeled compounds						



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Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

COA_04_G_20201118
20K0374-04 (Solid)

Geotechnical Methods

Method: PSEP-PS

Sampled: 11/18/2020 11:06

Instrument: MT&C Analyst:

Analyzed: 01/11/2021 00:00

Analysis by: Materials Testing & Consulting, Inc. (Olympia)

Sample Preparation: Preparation Method: No Prep Geo
Preparation Batch: B011121
Prepared: 01/11/2021

Extract ID: 20K0374-04

Final Volume:

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Phi Size <-1	GS_GRAVEL	1	0.1	ND	%	
Phi Size -1 to 0	GS_VCS	1	0.1	ND	%	
Phi Size 0 to 1	GS_CS	1	0.1	0.2	%	
Phi Size 1 to 2	GS_MS	1	0.1	1.7	%	
Phi Size 2 to 3	GS_FS	1	0.1	5.6	%	
Phi Size 3 to 4	GS_VFS	1	0.1	14.3	%	
Phi Size 4 to 5	GS_CSILT	1	0.1	15.5	%	
Phi Size 5 to 6	GS_MSILT	1	0.1	25.1	%	
Phi Size 6 to 7	GS_FSILT	1	0.1	11.5	%	
Phi Size 7 to 8	GS_VFSILT	1	0.1	6.1	%	
Phi Size 8 to 9	GS_CCLAY	1	0.1	6.4	%	
Phi Size 9 to 10	GS_MCLAY	1	0.1	4.9	%	
Phi Size >10	GS_FCLAY	1	0.1	8.8	%	
Total Fines	GS_TOTFINES	1	0.1	78.3	%	



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Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

COA_04_G_20201118
20K0374-04RE1 (Solid)

Dioxins/Furans

Method: EPA 1613B		Sampled: 11/18/2020 11:06	
Instrument: AUTOSPEC01 Analyst: pk		Analyzed: 03/04/2021 23:10	
Sample Preparation:	Preparation Method: EPA 1613	Extract ID: 20K0374-04RE1 C 01	
	Preparation Batch: BJB0762	Dry Weight: 10.01 g	
	Prepared: 03/01/2021	% Solids: 49.12	
Sample Cleanup:	Cleanup Method: Silica Gel	Extract ID: 20K0374-04RE1 C 01	
	Cleanup Batch: CJC0027	Initial Volume: 20 mL	
	Cleaned: 03-Mar-2021	Final Volume: 20 mL	
Sample Cleanup:	Cleanup Method: Sulfuric Acid	Extract ID: 20K0374-04RE1 C 01	
	Cleanup Batch: CJC0026	Initial Volume: 20 mL	
	Cleaned: 02-Mar-2021	Final Volume: 20 mL	
Sample Cleanup:	Cleanup Method: Florisil	Extract ID: 20K0374-04RE1 C 01	
	Cleanup Batch: CJC0028	Initial Volume: 20 mL	
	Cleaned: 03-Mar-2021	Final Volume: 20 mL	

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting		Result	Units	Notes
				EDL	Limit			
2,3,7,8-TCDF		0.859	0.655-0.886	0.058	0.165	0.999	1.63	ng/kg
2,3,7,8-TCDD		0.239	0.655-0.886	0.150	0.086	0.999	0.212	ng/kg
1,2,3,7,8-PeCDF		1.207	1.318-1.783	0.240	0.159	0.999	0.298	ng/kg
2,3,4,7,8-PeCDF		1.527	1.318-1.783	0.220	0.142	0.999	0.316	ng/kg
1,2,3,7,8-PeCDD		1.763	1.318-1.783	0.170	0.128	0.999	0.945	ng/kg
1,2,3,4,7,8-HxCDF		1.435	1.054-1.426	0.280	0.093	0.999	0.671	ng/kg
1,2,3,6,7,8-HxCDF		1.402	1.054-1.426	0.200	0.091	0.999	0.523	ng/kg
2,3,4,6,7,8-HxCDF		1.205	1.054-1.426	0.170	0.084	0.999	0.696	ng/kg
1,2,3,7,8,9-HxCDF		0.997	1.054-1.426	0.190	0.106	0.999	0.161	ng/kg
1,2,3,4,7,8-HxCDD		1.211	1.054-1.426	0.170	0.154	0.999	0.737	ng/kg
1,2,3,6,7,8-HxCDD		1.259	1.054-1.426	0.180	0.151	0.999	3.71	ng/kg
1,2,3,7,8,9-HxCDD		1.178	1.054-1.426	0.220	0.157	0.999	1.93	ng/kg
1,2,3,4,6,7,8-HpCDF		1.035	0.893-1.208	0.210	0.114	0.999	10.5	ng/kg
1,2,3,4,7,8,9-HpCDF		0.828	0.893-1.208	0.240	0.155	0.999	0.677	ng/kg
1,2,3,4,6,7,8-HpCDD		1.066	0.893-1.208	0.560	0.294	2.50	79.7	ng/kg
OCDF		0.911	0.757-1.024	1.10	0.206	2.50	29.1	ng/kg
OCDD		0.863	0.757-1.024	4.60	0.378	9.99	611	ng/kg
Homologue groups								
Total TCDF						0.999	7.54	ng/kg
Total TCDD						0.999	4.99	ng/kg
Total PeCDF						0.999	3.23	ng/kg
Total PeCDD						0.999	6.04	ng/kg
Total HxCDF						0.999	14.0	ng/kg
Total HxCDD						0.999	39.0	ng/kg
Total HpCDF						0.999	33.8	ng/kg
Total HpCDD						0.999	259	ng/kg



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Project: COA Outfall
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Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

COA_04_G_20201118
20K0374-04RE1 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/18/2020 11:06

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 03/04/2021 23:10

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting Limit	Result	Units	Notes
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC):				3.37			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC):				3.37			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, EMPC = ND):				3.21			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, EMPC = ND):				3.06			



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Reported:
26-Mar-2021 16:29

COA_04_G_20201118
20K0374-04RE1 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/18/2020 11:06

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 03/04/2021 23:10

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting Limit	Result	Units	Notes
Labeled compounds							
13C12-2,3,7,8-TCDF		0.780	0.655-0.886	24-169 %	77.8	%	
13C12-2,3,7,8-TCDD		0.795	0.655-0.886	25-164 %	82.1	%	
13C12-1,2,3,7,8-PeCDF		1.513	1.318-1.783	24-185 %	79.0	%	
13C12-2,3,4,7,8-PeCDF		1.524	1.318-1.783	21-178 %	80.5	%	
13C12-1,2,3,7,8-PeCDD		1.639	1.318-1.783	25-181 %	75.5	%	
13C12-1,2,3,4,7,8-HxCDF		0.510	0.434-0.587	26-152 %	80.5	%	
13C12-1,2,3,6,7,8-HxCDF		0.503	0.434-0.587	26-123 %	75.6	%	
13C12-2,3,4,6,7,8-HxCDF		0.505	0.434-0.587	28-136 %	82.8	%	
13C12-1,2,3,7,8,9-HxCDF		0.506	0.434-0.587	29-147 %	75.5	%	
13C12-1,2,3,4,7,8-HxCDD		1.256	1.054-1.426	32-141 %	76.1	%	
13C12-1,2,3,6,7,8-HxCDD		1.274	1.054-1.426	28-130 %	69.2	%	
13C12-1,2,3,4,6,7,8-HpCDF		0.442	0.374-0.506	28-143 %	75.5	%	
13C12-1,2,3,4,7,8,9-HpCDF		0.437	0.374-0.506	26-138 %	75.1	%	
13C12-1,2,3,4,6,7,8-HpCDD		1.072	0.893-1.208	23-140 %	77.9	%	
13C12-OCDD		0.921	0.757-1.024	17-157 %	57.9	%	
37Cl4-2,3,7,8-TCDD				35-197 %	92.5	%	



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Reported:
26-Mar-2021 16:29

COA_04_G_20201118
20K0374-04RE1 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/18/2020 11:06

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 03/04/2021 23:10

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting		Result	Units	Notes
				EDL	Limit			



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Reported:
26-Mar-2021 16:29

COA_04_G_20201118
20K0374-04RE1 (Solid)

Wet Chemistry

Method: SM 4500-NH3 H-97

Sampled: 11/18/2020 11:06

Instrument: LACHAT2 Analyst: LRB

Analyzed: 11/30/2020 15:26

Sample Preparation:

Preparation Method: MSA 33.3 (2M KCl)

Extract ID: 20K0374-04RE1 E

Preparation Batch: BIK0769

Sample Size: 4.78 g (wet)

Dry Weight: 2.30 g

Prepared: 11/24/2020

Final Volume: 40 mL

% Solids: 48.19

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Ammonia-N	7664-41-7	5	3.47	3.47	34.8	mg/kg NH3-N	D



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Reported:
26-Mar-2021 16:29

COA_05_G_20201119
20K0374-05 (Solid)

Semivolatile Organic Compounds

Method: EPA 8270E
Instrument: NT10 Analyst: VTS
Sample Preparation: Preparation Method: EPA 3546 (Microwave)
Preparation Batch: BIK0878 Sample Size: 16.79 g (wet)
Prepared: 12/01/2020 Final Volume: 1 mL
Extract ID: 20K0374-05 J 04
Dry Weight: 10.04 g
% Solids: 59.79

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Phenol	108-95-2	1	8.2	19.9	10.0	ug/kg	J
Benzyl Alcohol	100-51-6	1	14.8	19.9	ND	ug/kg	Ua
2-Methylphenol	95-48-7	1	7.8	19.9	ND	ug/kg	Ua
Hexachloroethane	67-72-1	1	5.6	19.9	ND	ug/kg	Ua
4-Methylphenol	106-44-5	1	14.6	19.9	81.3	ug/kg	
Naphthalene	91-20-3	1	5.2	19.9	65.8	ug/kg	
Benzoic acid	65-85-0	1	58.9	199	ND	ug/kg	Ua
2-Methylnaphthalene	91-57-6	1	5.6	19.9	21.2	ug/kg	
Acenaphthylene	208-96-8	1	4.8	19.9	48.1	ug/kg	
Dimethylphthalate	131-11-3	1	6.4	19.9	ND	ug/kg	Ua
Acenaphthene	83-32-9	1	5.1	19.9	17.9	ug/kg	J
Dibenzofuran	132-64-9	1	4.6	19.9	22.0	ug/kg	
Fluorene	86-73-7	1	4.9	19.9	41.3	ug/kg	
Diethyl phthalate	84-66-2	1	17.6	19.9	ND	ug/kg	Ua
N-Nitrosodiphenylamine	86-30-6	1	9.5	19.9	ND	ug/kg	Ua
Hexachlorobenzene	118-74-1	1	4.7	19.9	ND	ug/kg	Ua
Pentachlorophenol	87-86-5	1	31.2	99.6	ND	ug/kg	Ua
Phenanthrene	85-01-8	1	4.7	19.9	201	ug/kg	
Anthracene	120-12-7	1	5.9	19.9	120	ug/kg	
Di-n-Butylphthalate	84-74-2	1	5.3	19.9	17.1	ug/kg	J
Fluoranthene	206-44-0	1	4.5	19.9	1060	ug/kg	
Pyrene	129-00-0	1	5.5	19.9	1030	ug/kg	
Butylbenzylphthalate	85-68-7	1	8.0	19.9	ND	ug/kg	Ua
Benzo(a)anthracene	56-55-3	1	5.2	19.9	366	ug/kg	
Chrysene	218-01-9	1	5.2	19.9	652	ug/kg	
bis(2-Ethylhexyl)phthalate	117-81-7	1	28.7	49.8	32.6	ug/kg	J
Di-n-Octylphthalate	117-84-0	1	8.7	19.9	ND	ug/kg	Ua
Benzo(a)fluoranthene, Total		1	10.2	39.8	816	ug/kg	
Benzo(a)pyrene	50-32-8	1	6.5	19.9	367	ug/kg	
Indeno(1,2,3-cd)pyrene	193-39-5	1	6.0	19.9	183	ug/kg	
Dibenzo(a,h)anthracene	53-70-3	1	6.1	19.9	75.8	ug/kg	
Benzo(g,h,i)perylene	191-24-2	1	5.8	19.9	165	ug/kg	
Surrogate: 2-Fluorophenol				27-120 %	68.7	%	
Surrogate: Phenol-d5				29-120 %	74.7	%	
Surrogate: 2-Chlorophenol-d4				31-120 %	77.0	%	



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Reported:
26-Mar-2021 16:29

COA_05_G_20201119
20K0374-05 (Solid)

Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 11/19/2020 12:41

Instrument: NT10 Analyst: VTS

Analyzed: 12/30/2020 19:14

Analyte	CAS Number	Recovery	Recovery	Units	Notes
		Limits			
Surrogate: 1,2-Dichlorobenzene-d4		32-120 %	65.9	%	
Surrogate: Nitrobenzene-d5		30-120 %	86.9	%	
Surrogate: 2-Fluorobiphenyl		35-120 %	85.5	%	
Surrogate: 2,4,6-Tribromophenol		24-134 %	82.6	%	
Surrogate: p-Terphenyl-d14		37-120 %	80.8	%	



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Reported:
26-Mar-2021 16:29

COA_05_G_20201119
20K0374-05 (Solid)

Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM

Sampled: 11/19/2020 12:41

Instrument: NT10 Analyst: VTS

Analyzed: 12/30/2020 19:14

Sample Preparation:

Preparation Method: EPA 3546 (Microwave)

Extract ID: 20K0374-05 J 04

Preparation Batch: BIK0878

Sample Size: 16.79 g (wet)

Dry Weight: 10.04 g

Prepared: 12/01/2020

Final Volume: 1 mL

% Solids: 59.79

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
1,4-Dichlorobenzene	106-46-7	1	0.6	5.0	ND	ug/kg	Ua
1,2-Dichlorobenzene	95-50-1	1	0.7	5.0	ND	ug/kg	Ua
2,4-Dimethylphenol	105-67-9	1	2.2	19.9	ND	ug/kg	Ua
1,2,4-Trichlorobenzene	120-82-1	1	2.7	5.0	ND	ug/kg	Ua
Hexachlorobutadiene	87-68-3	1	0.7	5.0	ND	ug/kg	Ua
Surrogate: 2-Fluorophenol				27-120 %	71.1	%	Q
Surrogate: p-Terphenyl-d14				37-120 %	76.0	%	



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1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

COA_05_G_20201119
20K0374-05 (Solid)

Butyl Tins

Method: EPA 8270E-SIM			Sampled: 11/19/2020 12:41	
Instrument: NT8 Analyst: JZ			Analyzed: 12/17/2020 20:09	
Sample Preparation:	Preparation Method: EPA 3546 (Microwave)		Extract ID: 20K0374-05 J 03	
	Preparation Batch: BIK0879	Sample Size: 8.36 g (wet)		Dry Weight: 5.00 g
	Prepared: 12/01/2020	Final Volume: 0.5 mL		% Solids: 59.79
Sample Cleanup:	Cleanup Method: Silica Gel		Extract ID: 20K0374-05 J 03	
	Cleanup Batch: CIL0160	Initial Volume: 0.5 mL		
	Cleaned: 17-Dec-2020	Final Volume: 0.5 mL		

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Tributyltin Ion	36643-28-4	1	0.450	3.86	322	ug/kg	E
Dibutyltin Ion	14488-53-0	1	1.73	5.78	8.48	ug/kg	
Butyltin Ion	78763-54-9	1	1.89	4.08	ND	ug/kg	Ua
Tetrabutyltin	1461-25-2	1	5.00	5.00	6.35	ug/kg	
<i>Surrogate: Triphenyltin</i>				30-160 %	101	%	
<i>Surrogate: Tripropyltin</i>				30-160 %	64.2	%	



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Reported:
26-Mar-2021 16:29

COA_05_G_20201119
20K0374-05 (Solid)

Chlorinated Pesticides

Method: EPA 8081B

Sampled: 11/19/2020 12:41

Instrument: ECD6 Analyst: YZ/VTS

Analyzed: 03/15/2021 23:27

Sample Preparation:

Preparation Method: EPA 3546 (Microwave)

Extract ID: 20K0374-05 D

Preparation Batch: BJB0764

Sample Size: 20.91 g (wet)

Dry Weight: 12.50 g

Prepared: 02/26/2021

Final Volume: 2.5 mL

% Solids: 59.79

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Heptachlor	76-44-8	1	0.05	0.50	ND	ug/kg	Ua
Aldrin	309-00-2	1	0.37	0.50	ND	ug/kg	Ua
trans-Chlordane (beta-Chlordane)	5103-74-2	1	0.33	0.50	ND	ug/kg	Ua
cis-Chlordane (alpha-chlordane)	5103-71-9	1	0.11	0.50	ND	ug/kg	Ua
4,4'-DDE	72-55-9	1	0.13	1.00	ND	ug/kg	Ua
Dieldrin	60-57-1	1	0.11	1.00	ND	ug/kg	Ua
4,4'-DDD	72-54-8	1	0.32	1.00	ND	ug/kg	Ua
4,4'-DDT	50-29-3	1	0.32	1.00	ND	ug/kg	Ua
Oxychlordane	27304-13-8	1	0.13	1.00	ND	ug/kg	Ua
cis-Nonachlor	5103-73-1	1	0.21	1.00	ND	ug/kg	Ua
trans-Nonachlor	39765-80-5	1	0.23	1.00	ND	ug/kg	Ua
Surrogate: Decachlorobiphenyl				30-160 %	102	%	
Surrogate: Decachlorobiphenyl [2C]				30-160 %	71.3	%	
Surrogate: Tetrachlorometaxylene				30-160 %	83.7	%	
Surrogate: Tetrachlorometaxylene [2C]				30-160 %	68.6	%	



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Reported:
26-Mar-2021 16:29

COA_05_G_20201119
20K0374-05 (Solid)

Aroclor PCB

Method: EPA 8082A			Sampled: 11/19/2020 12:41	
Instrument: ECD7 Analyst: JGR			Analyzed: 12/22/2020 11:43	
Sample Preparation:	Preparation Method: EPA 3546 (Microwave)	Sample Size: 20.96 g (wet) Final Volume: 2.5 mL	Extract ID: 20K0374-05 J 01	
	Preparation Batch: BIK0877		Dry Weight: 12.53 g	
	Prepared: 11/30/2020		% Solids: 59.79	
Sample Cleanup:	Cleanup Method: Silica Gel	Initial Volume: 2.5 mL Final Volume: 2.5 mL	Extract ID: 20K0374-05 J 01	
	Cleanup Batch: CIL0224			
	Cleaned: 21-Dec-2020			
Sample Cleanup:	Cleanup Method: Sulfuric Acid	Initial Volume: 2.5 mL Final Volume: 2.5 mL	Extract ID: 20K0374-05 J 01	
	Cleanup Batch: CIL0218			
	Cleaned: 21-Dec-2020			
Sample Cleanup:	Cleanup Method: Sulfur	Initial Volume: 2.5 mL Final Volume: 2.5 mL	Extract ID: 20K0374-05 J 01	
	Cleanup Batch: CIL0219			
	Cleaned: 21-Dec-2020			
Sample Cleanup:	Cleanup Method: Alumina	Initial Volume: 2.5 mL Final Volume: 2.5 mL	Extract ID: 20K0374-05 J 01	
	Cleanup Batch: CIL0223			
	Cleaned: 21-Dec-2020			

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Aroclor 1016	12674-11-2	1	1.6	4.0	ND	ug/kg	Ua
Aroclor 1221	11104-28-2	1	1.6	4.0	ND	ug/kg	Ua
Aroclor 1232	11141-16-5	1	1.6	4.0	ND	ug/kg	Ua
Aroclor 1242	53469-21-9	1	1.6	4.0	ND	ug/kg	Ua
Aroclor 1248	12672-29-6	1	1.6	4.0	3.4	ug/kg	J
Aroclor 1254	11097-69-1	1	1.6	4.0	2.6	ug/kg	J
Aroclor 1260	11096-82-5	1	0.6	4.0	1.0	ug/kg	J
Aroclor 1262	37324-23-5	1	0.6	4.0	ND	ug/kg	Ua
Aroclor 1268	11100-14-4	1	0.6	4.0	ND	ug/kg	Ua
Surrogate: Decachlorobiphenyl					40-126 %	65.7 %	
Surrogate: Tetrachlorometaxylene					44-120 %	74.7 %	
Surrogate: Decachlorobiphenyl [2C]					40-126 %	75.2 %	
Surrogate: Tetrachlorometaxylene [2C]					44-120 %	80.7 %	



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Reported:
26-Mar-2021 16:29

COA_05_G_20201119
20K0374-05 (Solid)

Dioxins/Furans

Method: EPA 1613B		Sampled: 11/19/2020 12:41	
Instrument: AUTOSPEC01 Analyst: pk		Analyzed: 12/18/2020 21:29	
Sample Preparation:	Preparation Method: EPA 1613	Extract ID: 20K0374-05 G 01	
	Preparation Batch: BIL0237	Dry Weight: 10.05 g	
	Prepared: 12/10/2020	% Solids: 59.88	
Sample Cleanup:	Cleanup Method: Silica Gel	Extract ID: 20K0374-05 G 01	
	Cleanup Batch: CIL0151	Initial Volume: 20 mL	
	Cleaned: 15-Dec-2020	Final Volume: 20 mL	
Sample Cleanup:	Cleanup Method: Sulfuric Acid	Extract ID: 20K0374-05 G 01	
	Cleanup Batch: CIL0150	Initial Volume: 20 mL	
	Cleaned: 14-Dec-2020	Final Volume: 20 mL	
Sample Cleanup:	Cleanup Method: Florisil	Extract ID: 20K0374-05 G 01	
	Cleanup Batch: CIL0152	Initial Volume: 20 mL	
	Cleaned: 15-Dec-2020	Final Volume: 20 mL	

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting		Result	Units	Notes
				EDL	Limit			
2,3,7,8-TCDF		0.861	0.655-0.886	0.063	0.068	0.995	0.797	ng/kg J
2,3,7,8-TCDD			0.655-0.886	0.139	0.076	0.995	ND	ng/kg Ua
1,2,3,7,8-PeCDF		1.720	1.318-1.783	0.149	0.108	0.995	0.235	ng/kg J
2,3,4,7,8-PeCDF		0.853	1.318-1.783	0.149	0.103	0.995	0.208	ng/kg EMPC, J
1,2,3,7,8-PeCDD		1.728	1.318-1.783	0.179	0.100	0.995	0.584	ng/kg J
1,2,3,4,7,8-HxCDF		1.375	1.054-1.426	0.139	0.084	0.995	0.565	ng/kg J
1,2,3,6,7,8-HxCDF		1.068	1.054-1.426	0.179	0.088	0.995	0.256	ng/kg J
2,3,4,6,7,8-HxCDF		3.102	1.054-1.426	0.109	0.088	0.995	0.391	ng/kg EMPC, J
1,2,3,7,8,9-HxCDF		1.581	1.054-1.426	0.209	0.119	0.995	0.250	ng/kg EMPC, J
1,2,3,4,7,8-HxCDD		1.043	1.054-1.426	0.179	0.221	0.995	0.774	ng/kg EMPC, J
1,2,3,6,7,8-HxCDD		1.378	1.054-1.426	0.149	0.208	0.995	3.42	ng/kg
1,2,3,7,8,9-HxCDD		1.212	1.054-1.426	0.219	0.244	0.995	1.57	ng/kg
1,2,3,4,6,7,8-HpCDF		1.103	0.893-1.208	0.209	0.092	0.995	13.0	ng/kg
1,2,3,4,7,8,9-HpCDF		1.094	0.893-1.208	0.159	0.110	0.995	0.793	ng/kg J
1,2,3,4,6,7,8-HpCDD		1.067	0.893-1.208	0.557	0.323	2.49	224	ng/kg
OCDF		0.970	0.757-1.024	1.09	0.226	2.49	59.8	ng/kg
OCDD		0.862	0.757-1.024	4.28	0.564	9.95	1400	ng/kg B
Homologue groups								
Total TCDF						0.995	2.98	ng/kg
Total TCDD						0.995	2.32	ng/kg
Total PeCDF						0.995	2.83	ng/kg
Total PeCDD						0.995	2.46	ng/kg
Total HxCDF						0.995	14.4	ng/kg
Total HxCDD						0.995	113	ng/kg
Total HpCDF						0.995	56.1	ng/kg
Total HpCDD						0.995	1200	ng/kg



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Reported:
26-Mar-2021 16:29

COA_05_G_20201119
20K0374-05 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/19/2020 12:41

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 12/18/2020 21:29

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting Limit	Result	Units	Notes
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC):				4.31			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC):				4.27			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, EMPC = ND):				4.21			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, EMPC = ND):				4.07			



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COA_05_G_20201119
20K0374-05 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/19/2020 12:41

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 12/18/2020 21:29

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting Limit	Result	Units	Notes
Labeled compounds							
13C12-2,3,7,8-TCDF		0.783	0.655-0.886	24-169 %	62.8	%	
13C12-2,3,7,8-TCDD		0.825	0.655-0.886	25-164 %	74.2	%	
13C12-1,2,3,7,8-PeCDF		1.534	1.318-1.783	24-185 %	71.9	%	
13C12-2,3,4,7,8-PeCDF		1.536	1.318-1.783	21-178 %	73.1	%	
13C12-1,2,3,7,8-PeCDD		1.665	1.318-1.783	25-181 %	73.0	%	
13C12-1,2,3,4,7,8-HxCDF		0.495	0.434-0.587	26-152 %	77.8	%	
13C12-1,2,3,6,7,8-HxCDF		0.522	0.434-0.587	26-123 %	66.3	%	
13C12-2,3,4,6,7,8-HxCDF		0.496	0.434-0.587	28-136 %	72.3	%	
13C12-1,2,3,7,8,9-HxCDF		0.497	0.434-0.587	29-147 %	35.0	%	
13C12-1,2,3,4,7,8-HxCDD		1.291	1.054-1.426	32-141 %	73.8	%	
13C12-1,2,3,6,7,8-HxCDD		1.282	1.054-1.426	28-130 %	61.8	%	
13C12-1,2,3,4,6,7,8-HpCDF		0.438	0.374-0.506	28-143 %	61.2	%	
13C12-1,2,3,4,7,8,9-HpCDF		0.424	0.374-0.506	26-138 %	73.5	%	
13C12-1,2,3,4,6,7,8-HpCDD		1.075	0.893-1.208	23-140 %	70.5	%	
13C12-OCDD		0.903	0.757-1.024	17-157 %	48.7	%	
37Cl4-2,3,7,8-TCDD				35-197 %	86.4	%	



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COA_05_G_20201119
20K0374-05 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/19/2020 12:41

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 12/18/2020 21:29

Analyte	DF/Split	Ion Ratio	Ratio Limits	EDL	Reporting	Result	Units	Notes
					Limit			



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26-Mar-2021 16:29

COA_05_G_20201119
20K0374-05 (Solid)

Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 11/19/2020 12:41

Instrument: ICPMS1 Analyst: MCB

Analyzed: 03/23/2021 18:13

Sample Preparation:

Preparation Method: SWN EPA 3050B

Extract ID: 20K0374-05 N 01

Preparation Batch: BJC0563

Sample Size: 1.041 g (wet)

Dry Weight: 0.60 g

Prepared: 03/22/2021

Final Volume: 50 mL

% Solids: 57.16

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Antimony	7440-36-0	20	0.03	0.34	ND	mg/kg	Ua
Chromium	7440-47-3	20	0.22	0.84	36.9	mg/kg	
Lead	7439-92-1	20	0.11	0.17	7.82	mg/kg	
Silver	7440-22-4	20	0.03	0.34	0.08	mg/kg	J



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Reported:
26-Mar-2021 16:29

COA_05_G_20201119
20K0374-05 (Solid)

Metals and Metallic Compounds

Method: EPA 6020B UCT-KED

Sampled: 11/19/2020 12:41

Instrument: ICPMS1 Analyst: MCB

Analyzed: 03/23/2021 18:13

Sample Preparation:

Preparation Method: SWN EPA 3050B

Extract ID: 20K0374-05 N 01

Preparation Batch: BJC0563

Sample Size: 1.041 g (wet)

Dry Weight: 0.60 g

Prepared: 03/22/2021

Final Volume: 50 mL

% Solids: 57.16

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	20	0.04	0.34	7.50	mg/kg	
Cadmium	7440-43-9	20	0.05	0.17	0.54	mg/kg	
Copper	7440-50-8	20	0.57	0.84	25.4	mg/kg	
Selenium	7782-49-2	20	0.74	0.84	0.91	mg/kg	
Zinc	7440-66-6	20	1.4	6.7	62.0	mg/kg	



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Reported:
26-Mar-2021 16:29

COA_05_G_20201119
20K0374-05 (Solid)

Wet Chemistry

Method: EPA 9060A m

Sampled: 11/19/2020 12:41

Instrument: TOC Cube Analyst: BF

Analyzed: 11/26/2020 05:22

Sample Preparation:

Preparation Method: PSEP 1986 (modified)

Extract ID: 20K0374-05 M

Preparation Batch: BIK0802

Sample Size: 0.4211 g (wet)

Dry Weight: 0.24 g

Prepared: 11/25/2020

Final Volume: 0.4211 mL

% Solids: 57.16

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Organic Carbon		1	0.02	0.02	1.56	%	



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Reported:
26-Mar-2021 16:29

COA_05_G_20201119
20K0374-05 (Solid)

Wet Chemistry

Method: PSEP 1986

Sampled: 11/19/2020 12:41

Instrument: BAL2 Analyst: UW

Analyzed: 11/24/2020 17:15

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 20K0374-05
Preparation Batch: BIK0773 Sample Size: 5 g (wet) Dry Weight: 2.86 g
Prepared: 11/24/2020 Final Volume: 5 g % Solids: 57.16

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Volatile Solids		1	0.01	0.01	5.04	%	

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 20K0374-05
Preparation Batch: BIK0778 Sample Size: 5 g (wet) Dry Weight: 2.86 g
Prepared: 11/24/2020 Final Volume: 5 g % Solids: 57.16

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Solids, Sulfide		1	0.04	0.04	55.95	%	



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Reported:
26-Mar-2021 16:29

COA_05_G_20201119
20K0374-05 (Solid)

Wet Chemistry

Method: SM 2540 G-97

Sampled: 11/19/2020 12:41

Instrument: BAL2 Analyst: UW

Analyzed: 11/24/2020 17:15

Sample Preparation:

Preparation Method: No Prep Wet Chem

Extract ID: 20K0374-05

Preparation Batch: BIK0773

Sample Size: 5 g (wet)

Dry Weight: 2.86 g

Prepared: 11/24/2020

Final Volume: 5 g

% Solids: 57.16

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Solids		1	0.04	0.04	57.16	%	



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Reported:
26-Mar-2021 16:29

COA_05_G_20201119
20K0374-05 (Solid)

Extractions

Method: ASTM D2216	Sampled: 11/19/2020 12:41	
Instrument: N/A Analyst: NL	Analyzed: 11/26/2020 05:10	
Sample Preparation:	Preparation Method: No Prep-Organics	Extract ID: 20K0374-05
	Preparation Batch: BIK0789	Dry Weight: 0.57 g
	Prepared: 11/25/2020	% Solids: 57.16
	Sample Size: 1 g (wet)	
	Final Volume: 1 g	

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Total Solids		1	0.01	59.88	%	



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26-Mar-2021 16:29

COA_05_G_20201119
20K0374-05 (Solid)

Extractions

Method: ASTM D2216

Sampled: 11/19/2020 12:41

Instrument: N/A Analyst: NL

Analyzed: 11/26/2020 05:10

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
<u>Labeled compounds</u>						



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26-Mar-2021 16:29

COA_05_G_20201119
20K0374-05 (Solid)

Geotechnical Methods

Method: PSEP-PS

Sampled: 11/19/2020 12:41

Instrument: MT&C Analyst:

Analyzed: 01/11/2021 00:00

Analysis by: Materials Testing & Consulting, Inc. (Olympia)

Sample Preparation: Preparation Method: No Prep Geo
Preparation Batch: B011121
Prepared: 01/11/2021

Extract ID: 20K0374-05

Final Volume:

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Phi Size <-1	GS_GRAVEL	1	0.1	1.0	%	
Phi Size -1 to 0	GS_VCS	1	0.1	1.7	%	
Phi Size 0 to 1	GS_CS	1	0.1	1.8	%	
Phi Size 1 to 2	GS_MS	1	0.1	3.0	%	
Phi Size 2 to 3	GS_FS	1	0.1	20.7	%	
Phi Size 3 to 4	GS_VFS	1	0.1	25.9	%	
Phi Size 4 to 5	GS_CSILT	1	0.1	13.0	%	
Phi Size 5 to 6	GS_MSILT	1	0.1	10.8	%	
Phi Size 6 to 7	GS_FSILT	1	0.1	5.1	%	
Phi Size 7 to 8	GS_VFSILT	1	0.1	3.1	%	
Phi Size 8 to 9	GS_CCLAY	1	0.1	4.3	%	
Phi Size 9 to 10	GS_MCLAY	1	0.1	5.7	%	
Phi Size >10	GS_FCLAY	1	0.1	4.0	%	
Total Fines	GS_TOTFINES	1	0.1	46.0	%	



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Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

COA_05_G_20201119
20K0374-05RE1 (Solid)

Butyl Tins

Method: EPA 8270E-SIM			Sampled: 11/19/2020 12:41
Instrument: NT8 Analyst: JZ			Analyzed: 12/19/2020 13:19
Sample Preparation:	Preparation Method: EPA 3546 (Microwave)		Extract ID: 20K0374-05RE1 J 03
	Preparation Batch: BIK0879	Sample Size: 8.36 g (wet)	Dry Weight:5.00 g
	Prepared: 12/01/2020	Final Volume: 0.5 mL	% Solids: 59.79
Sample Cleanup:	Cleanup Method: Silica Gel		Extract ID: 20K0374-05RE1 J 03
	Cleanup Batch: CIL0160	Initial Volume: 0.5 mL	
	Cleaned: 17-Dec-2020	Final Volume: 0.5 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Tributyltin Ion	36643-28-4	3	1.35	11.6	382	ug/kg	D
Dibutyltin Ion	14488-53-0	3	5.19	17.3	9.29	ug/kg	J, D
Butyltin Ion	78763-54-9	3	5.67	12.2	ND	ug/kg	Ua
Tetrabutyltin	1461-25-2	3	15.0	15.0	ND	ug/kg	Ua
<i>Surrogate: Triphenyltin</i>				30-160 %	109	%	
<i>Surrogate: Tripropyltin</i>				30-160 %	76.1	%	



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Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

COA_05_G_20201119
20K0374-05RE1 (Solid)

Dioxins/Furans

Method: EPA 1613B		Sampled: 11/19/2020 12:41	
Instrument: AUTOSPEC01 Analyst: pk		Analyzed: 03/05/2021 01:44	
Sample Preparation:	Preparation Method: EPA 1613	Extract ID: 20K0374-05RE1 G 01	
	Preparation Batch: BJB0762	Sample Size: 16.78 g (wet)	Dry Weight: 10.05 g
	Prepared: 03/01/2021	Final Volume: 20 uL	% Solids: 59.88
Sample Cleanup:	Cleanup Method: Silica Gel	Extract ID: 20K0374-05RE1 G 01	
	Cleanup Batch: CJC0027	Initial Volume: 20 mL	
	Cleaned: 03-Mar-2021	Final Volume: 20 mL	
Sample Cleanup:	Cleanup Method: Sulfuric Acid	Extract ID: 20K0374-05RE1 G 01	
	Cleanup Batch: CJC0026	Initial Volume: 20 mL	
	Cleaned: 02-Mar-2021	Final Volume: 20 mL	
Sample Cleanup:	Cleanup Method: Florisil	Extract ID: 20K0374-05RE1 G 01	
	Cleanup Batch: CJC0028	Initial Volume: 20 mL	
	Cleaned: 03-Mar-2021	Final Volume: 20 mL	

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting		Result	Units	Notes
				EDL	Limit			
2,3,7,8-TCDF		0.930	0.655-0.886	0.058	0.089	0.995	1.16	ng/kg EMPC
2,3,7,8-TCDD		0.483	0.655-0.886	0.149	0.095	0.995	0.285	ng/kg EMPC, J
1,2,3,7,8-PeCDF		1.333	1.318-1.783	0.239	0.159	0.995	0.298	ng/kg J
2,3,4,7,8-PeCDF		1.556	1.318-1.783	0.219	0.149	0.995	0.210	ng/kg J
1,2,3,7,8-PeCDD		1.097	1.318-1.783	0.169	0.141	0.995	0.655	ng/kg EMPC, J
1,2,3,4,7,8-HxCDF		1.549	1.054-1.426	0.279	0.080	0.995	0.518	ng/kg EMPC, J
1,2,3,6,7,8-HxCDF		1.106	1.054-1.426	0.199	0.080	0.995	0.365	ng/kg J
2,3,4,6,7,8-HxCDF		1.177	1.054-1.426	0.169	0.077	0.995	0.450	ng/kg J
1,2,3,7,8,9-HxCDF			1.054-1.426	0.189	0.101	0.995	ND	ng/kg Ua
1,2,3,4,7,8-HxCDD		1.151	1.054-1.426	0.169	0.245	0.995	0.689	ng/kg J
1,2,3,6,7,8-HxCDD		1.211	1.054-1.426	0.179	0.250	0.995	3.21	ng/kg
1,2,3,7,8,9-HxCDD		1.232	1.054-1.426	0.219	0.255	0.995	1.34	ng/kg
1,2,3,4,6,7,8-HpCDF		1.060	0.893-1.208	0.209	0.115	0.995	9.00	ng/kg
1,2,3,4,7,8,9-HpCDF		0.899	0.893-1.208	0.239	0.149	0.995	0.531	ng/kg J
1,2,3,4,6,7,8-HpCDD		1.017	0.893-1.208	0.557	0.478	2.49	108	ng/kg
OCDF		0.948	0.757-1.024	1.09	0.161	2.49	27.4	ng/kg B
OCDD		0.904	0.757-1.024	4.58	0.478	9.95	746	ng/kg B
Homologue groups								
Total TCDF						0.995	2.67	ng/kg
Total TCDD						0.995	3.21	ng/kg
Total PeCDF						0.995	2.79	ng/kg
Total PeCDD						0.995	2.11	ng/kg
Total HxCDF						0.995	13.1	ng/kg
Total HxCDD						0.995	47.8	ng/kg B
Total HpCDF						0.995	34.8	ng/kg
Total HpCDD						0.995	419	ng/kg



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Reported:
26-Mar-2021 16:29

COA_05_G_20201119
20K0374-05RE1 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/19/2020 12:41

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 03/05/2021 01:44

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting Limit	Result	Units	Notes
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC):				3.20			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC):				3.19			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, EMPC = ND):				2.64			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, EMPC = ND):				2.08			



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COA_05_G_20201119
20K0374-05RE1 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/19/2020 12:41

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 03/05/2021 01:44

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting Limit	Result	Units	Notes
Labeled compounds							
13C12-2,3,7,8-TCDF		0.777	0.655-0.886	24-169 %	87.8	%	
13C12-2,3,7,8-TCDD		0.800	0.655-0.886	25-164 %	83.8	%	
13C12-1,2,3,7,8-PeCDF		1.526	1.318-1.783	24-185 %	78.2	%	
13C12-2,3,4,7,8-PeCDF		1.506	1.318-1.783	21-178 %	78.5	%	
13C12-1,2,3,7,8-PeCDD		1.679	1.318-1.783	25-181 %	72.0	%	
13C12-1,2,3,4,7,8-HxCDF		0.511	0.434-0.587	26-152 %	83.1	%	
13C12-1,2,3,6,7,8-HxCDF		0.512	0.434-0.587	26-123 %	80.3	%	
13C12-2,3,4,6,7,8-HxCDF		0.511	0.434-0.587	28-136 %	84.0	%	
13C12-1,2,3,7,8,9-HxCDF		0.515	0.434-0.587	29-147 %	60.3	%	
13C12-1,2,3,4,7,8-HxCDD		1.263	1.054-1.426	32-141 %	78.8	%	
13C12-1,2,3,6,7,8-HxCDD		1.253	1.054-1.426	28-130 %	72.5	%	
13C12-1,2,3,4,6,7,8-HpCDF		0.453	0.374-0.506	28-143 %	73.1	%	
13C12-1,2,3,4,7,8,9-HpCDF		0.454	0.374-0.506	26-138 %	75.0	%	
13C12-1,2,3,4,6,7,8-HpCDD		1.046	0.893-1.208	23-140 %	78.4	%	
13C12-OCDD		0.915	0.757-1.024	17-157 %	58.8	%	
37Cl4-2,3,7,8-TCDD				35-197 %	92.3	%	



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COA_05_G_20201119
20K0374-05RE1 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/19/2020 12:41

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 03/05/2021 01:44

Analyte	DF/Split	Ion Ratio	Ratio Limits	EDL	Reporting	Result	Units	Notes
					Limit			



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Reported:
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COA_05_G_20201119
20K0374-05RE1 (Solid)

Metals and Metallic Compounds

Method: EPA 7471B

Sampled: 11/19/2020 12:41

Instrument: HYDRA Analyst: BLC

Analyzed: 03/23/2021 14:32

Sample Preparation:

Preparation Method: SMM EPA 7471B

Extract ID: 20K0374-05RE1 N

Preparation Batch: BJC0633

Sample Size: 0.239 g (wet)

Dry Weight: 0.14 g

Prepared: 03/23/2021

Final Volume: 50 mL

% Solids: 57.16

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.00769	0.0366	0.0531	mg/kg	H



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Reported:
26-Mar-2021 16:29

COA_05_G_20201119
20K0374-05RE1 (Solid)

Wet Chemistry

Method: SM 4500-NH3 H-97

Sampled: 11/19/2020 12:41

Instrument: LACHAT2 Analyst: LRB

Analyzed: 11/30/2020 15:16

Sample Preparation:

Preparation Method: MSA 33.3 (2M KCl)

Extract ID: 20K0374-05RE1 O

Preparation Batch: BIK0769

Sample Size: 4.3 g (wet)

Dry Weight: 2.46 g

Prepared: 11/24/2020

Final Volume: 40 mL

% Solids: 57.16

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Ammonia-N	7664-41-7	5	3.25	3.25	27.7	mg/kg NH3-N	D



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Reported:
26-Mar-2021 16:29

COA_05_G_20201119
20K0374-05RE1 (Solid)

Wet Chemistry

Method: SM 4500-S2 D-00 (PSEP)

Sampled: 11/19/2020 12:41

Instrument: UV1800-1 Analyst: CDE

Analyzed: 12/03/2020 17:42

Sample Preparation:

Preparation Method: PSEP 1986

Extract ID: 20K0374-05RE1 P

Preparation Batch: BIK0762

Sample Size: 5.201 g (wet)

Dry Weight: 2.91 g

Prepared: 11/24/2020

Final Volume: 100 mL

% Solids: 55.95

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Sulfide	18496-25-8	100	172	172	1380	mg/kg	D



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Reported:
26-Mar-2021 16:29

COA_05-D_G_20201119
20K0374-06 (Solid)

Semivolatile Organic Compounds

Method: EPA 8270E
Instrument: NT10 Analyst: VTS
Sample Preparation: Preparation Method: EPA 3546 (Microwave)
Preparation Batch: BIK0878 Sample Size: 16.81 g (wet)
Prepared: 12/01/2020 Final Volume: 1 mL
Extract ID: 20K0374-06 D 04
Dry Weight: 10.02 g
% Solids: 59.61

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Phenol	108-95-2	1	8.2	20.0	15.0	ug/kg	J
Benzyl Alcohol	100-51-6	1	14.9	20.0	ND	ug/kg	Ua
2-Methylphenol	95-48-7	1	7.8	20.0	ND	ug/kg	Ua
Hexachloroethane	67-72-1	1	5.6	20.0	ND	ug/kg	Ua
4-Methylphenol	106-44-5	1	14.7	20.0	46.0	ug/kg	
Naphthalene	91-20-3	1	5.2	20.0	80.2	ug/kg	
Benzoic acid	65-85-0	1	59.0	200	ND	ug/kg	Ua
2-Methylnaphthalene	91-57-6	1	5.7	20.0	24.2	ug/kg	
Acenaphthylene	208-96-8	1	4.8	20.0	15.9	ug/kg	J
Dimethylphthalate	131-11-3	1	6.4	20.0	8.5	ug/kg	J
Acenaphthene	83-32-9	1	5.1	20.0	23.0	ug/kg	
Dibenzofuran	132-64-9	1	4.6	20.0	24.1	ug/kg	
Fluorene	86-73-7	1	4.9	20.0	32.0	ug/kg	
Diethyl phthalate	84-66-2	1	17.7	20.0	ND	ug/kg	Ua
N-Nitrosodiphenylamine	86-30-6	1	9.6	20.0	ND	ug/kg	Ua
Hexachlorobenzene	118-74-1	1	4.7	20.0	ND	ug/kg	Ua
Pentachlorophenol	87-86-5	1	31.2	99.8	ND	ug/kg	Ua
Phenanthrene	85-01-8	1	4.7	20.0	89.3	ug/kg	
Anthracene	120-12-7	1	5.9	20.0	46.5	ug/kg	
Di-n-Butylphthalate	84-74-2	1	5.3	20.0	15.6	ug/kg	J
Fluoranthene	206-44-0	1	4.5	20.0	218	ug/kg	
Pyrene	129-00-0	1	5.5	20.0	304	ug/kg	
Butylbenzylphthalate	85-68-7	1	8.0	20.0	ND	ug/kg	Ua
Benzo(a)anthracene	56-55-3	1	5.2	20.0	82.1	ug/kg	
Chrysene	218-01-9	1	5.2	20.0	146	ug/kg	
bis(2-Ethylhexyl)phthalate	117-81-7	1	28.7	49.9	ND	ug/kg	Ua
Di-n-Octylphthalate	117-84-0	1	8.7	20.0	ND	ug/kg	Ua
Benzo(a)fluoranthene, Total		1	10.2	39.9	202	ug/kg	
Benzo(a)pyrene	50-32-8	1	6.5	20.0	83.0	ug/kg	
Indeno(1,2,3-cd)pyrene	193-39-5	1	6.0	20.0	43.8	ug/kg	
Dibenzo(a,h)anthracene	53-70-3	1	6.1	20.0	19.5	ug/kg	J
Benzo(g,h,i)perylene	191-24-2	1	5.8	20.0	47.2	ug/kg	
Surrogate: 2-Fluorophenol					27-120 %	71.8	%
Surrogate: Phenol-d5					29-120 %	75.3	%
Surrogate: 2-Chlorophenol-d4					31-120 %	79.3	%



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Reported:
26-Mar-2021 16:29

COA_05-D_G_20201119
20K0374-06 (Solid)

Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 11/19/2020 12:41

Instrument: NT10 Analyst: VTS

Analyzed: 12/30/2020 21:08

Analyte	CAS Number	Recovery	Recovery	Units	Notes
		Limits			
Surrogate: 1,2-Dichlorobenzene-d4		32-120 %	70.3	%	
Surrogate: Nitrobenzene-d5		30-120 %	88.1	%	
Surrogate: 2-Fluorobiphenyl		35-120 %	85.8	%	
Surrogate: 2,4,6-Tribromophenol		24-134 %	83.1	%	
Surrogate: p-Terphenyl-d14		37-120 %	79.1	%	



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COA_05-D_G_20201119
20K0374-06 (Solid)

Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM

Sampled: 11/19/2020 12:41

Instrument: NT10 Analyst: VTS

Analyzed: 12/30/2020 21:08

Sample Preparation:

Preparation Method: EPA 3546 (Microwave)

Extract ID: 20K0374-06 D 04

Preparation Batch: BIK0878

Sample Size: 16.81 g (wet)

Dry Weight: 10.02 g

Prepared: 12/01/2020

Final Volume: 1 mL

% Solids: 59.61

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
1,4-Dichlorobenzene	106-46-7	1	0.6	5.0	1.7	ug/kg	J
1,2-Dichlorobenzene	95-50-1	1	0.7	5.0	ND	ug/kg	Ua
2,4-Dimethylphenol	105-67-9	1	2.2	20.0	3.6	ug/kg	J
1,2,4-Trichlorobenzene	120-82-1	1	2.7	5.0	ND	ug/kg	Ua
Hexachlorobutadiene	87-68-3	1	0.7	5.0	ND	ug/kg	Ua
Surrogate: 2-Fluorophenol				27-120 %	74.2	%	Q
Surrogate: p-Terphenyl-d14				37-120 %	74.0	%	



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Reported:
26-Mar-2021 16:29

COA_05-D_G_20201119
20K0374-06 (Solid)

Butyl Tins

Method: EPA 8270E-SIM			Sampled: 11/19/2020 12:41
Instrument: NT8 Analyst: JZ			Analyzed: 12/17/2020 20:58
Sample Preparation:	Preparation Method: EPA 3546 (Microwave)		Extract ID: 20K0374-06 D 03
	Preparation Batch: BIK0879	Sample Size: 8.39 g (wet)	Dry Weight:5.00 g
	Prepared: 12/01/2020	Final Volume: 0.5 mL	% Solids: 59.61
Sample Cleanup:	Cleanup Method: Silica Gel		Extract ID: 20K0374-06 D 03
	Cleanup Batch: CIL0160	Initial Volume: 0.5 mL	
	Cleaned: 17-Dec-2020	Final Volume: 0.5 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Tributyltin Ion	36643-28-4	1	0.450	3.86	119	ug/kg	
Dibutyltin Ion	14488-53-0	1	1.73	5.78	39.8	ug/kg	
Butyltin Ion	78763-54-9	1	1.89	4.08	21.1	ug/kg	
Tetrabutyltin	1461-25-2	1	5.00	5.00	ND	ug/kg	Ua
<i>Surrogate: Triphenyltin</i>				30-160 %	123	%	
<i>Surrogate: Tripropyltin</i>				30-160 %	68.0	%	



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Reported:
26-Mar-2021 16:29

COA_05-D_G_20201119
20K0374-06 (Solid)

Chlorinated Pesticides

Method: EPA 8081B		Sampled: 11/19/2020 12:41	
Instrument: ECD6 Analyst: YZ/VTs		Analyzed: 03/16/2021 01:33	
Sample Preparation:	Preparation Method: EPA 3546 (Microwave)	Extract ID: 20K0374-06 B 02	
	Preparation Batch: BJC0009	Dry Weight: 12.51 g	
	Prepared: 03/01/2021	% Solids: 59.61	
Sample Cleanup:	Cleanup Method: Silica Gel	Extract ID: 20K0374-06 B 02	
	Cleanup Batch: CJC0140	Initial Volume: 2.5 mL	
	Cleaned: 11-Mar-2021	Final Volume: 2.5 mL	
Sample Cleanup:	Cleanup Method: Sulfur	Extract ID: 20K0374-06 B 02	
	Cleanup Batch: CJC0139	Initial Volume: 2.5 mL	
	Cleaned: 11-Mar-2021	Final Volume: 2.5 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Heptachlor	76-44-8	1	0.05	0.50	ND	ug/kg	Ua
Aldrin	309-00-2	1	0.37	0.50	ND	ug/kg	Ua
trans-Chlordane (beta-Chlordane)	5103-74-2	1	0.33	0.50	ND	ug/kg	Ua
cis-Chlordane (alpha-chlordane)	5103-71-9	1	0.11	0.50	ND	ug/kg	Ua
4,4'-DDE	72-55-9	1	0.13	1.00	ND	ug/kg	Ua
Dieldrin	60-57-1	1	0.11	1.00	ND	ug/kg	Ua
4,4'-DDD	72-54-8	1	0.32	1.00	ND	ug/kg	Ua
4,4'-DDT	50-29-3	1	0.32	1.00	ND	ug/kg	Ua
Oxychlordane	27304-13-8	1	0.13	1.00	ND	ug/kg	Ua
cis-Nonachlor	5103-73-1	1	0.21	1.00	ND	ug/kg	Ua
trans-Nonachlor	39765-80-5	1	0.23	1.00	ND	ug/kg	Ua
Surrogate: Decachlorobiphenyl				30-160 %	90.2	%	
Surrogate: Decachlorobiphenyl [2C]				30-160 %	72.9	%	
Surrogate: Tetrachlorometaxylene				30-160 %	88.6	%	
Surrogate: Tetrachlorometaxylene [2C]				30-160 %	61.4	%	



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

COA_05-D_G_20201119
20K0374-06 (Solid)

Aroclor PCB

Method: EPA 8082A		Sampled: 11/19/2020 12:41	
Instrument: ECD7 Analyst: JGR		Analyzed: 12/22/2020 12:45	
Sample Preparation:	Preparation Method: EPA 3546 (Microwave)	Extract ID: 20K0374-06 D 01	
	Preparation Batch: BIK0877	Dry Weight: 12.50 g	
	Prepared: 11/30/2020	% Solids: 59.61	
Sample Cleanup:	Cleanup Method: Silica Gel	Extract ID: 20K0374-06 D 01	
	Cleanup Batch: CIL0224	Initial Volume: 2.5 mL	
	Cleaned: 21-Dec-2020	Final Volume: 2.5 mL	
Sample Cleanup:	Cleanup Method: Sulfuric Acid	Extract ID: 20K0374-06 D 01	
	Cleanup Batch: CIL0218	Initial Volume: 2.5 mL	
	Cleaned: 21-Dec-2020	Final Volume: 2.5 mL	
Sample Cleanup:	Cleanup Method: Sulfur	Extract ID: 20K0374-06 D 01	
	Cleanup Batch: CIL0219	Initial Volume: 2.5 mL	
	Cleaned: 21-Dec-2020	Final Volume: 2.5 mL	
Sample Cleanup:	Cleanup Method: Alumina	Extract ID: 20K0374-06 D 01	
	Cleanup Batch: CIL0223	Initial Volume: 2.5 mL	
	Cleaned: 21-Dec-2020	Final Volume: 2.5 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Aroclor 1016	12674-11-2	1	1.6	4.0	ND	ug/kg	Ua
Aroclor 1221	11104-28-2	1	1.6	4.0	ND	ug/kg	Ua
Aroclor 1232	11141-16-5	1	1.6	4.0	ND	ug/kg	Ua
Aroclor 1242	53469-21-9	1	1.6	4.0	ND	ug/kg	Ua
Aroclor 1248	12672-29-6	1	1.6	4.0	4.5	ug/kg	
Aroclor 1254	11097-69-1	1	1.6	4.0	7.9	ug/kg	
Aroclor 1260	11096-82-5	1	0.6	4.0	4.9	ug/kg	
Aroclor 1262	37324-23-5	1	0.6	4.0	ND	ug/kg	Ua
Aroclor 1268	11100-14-4	1	0.6	4.0	ND	ug/kg	Ua
Surrogate: Decachlorobiphenyl					40-126 %	66.7 %	
Surrogate: Tetrachlorometaxylene					44-120 %	74.9 %	
Surrogate: Decachlorobiphenyl [2C]					40-126 %	76.5 %	
Surrogate: Tetrachlorometaxylene [2C]					44-120 %	82.3 %	



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Reported:
26-Mar-2021 16:29

COA_05-D_G_20201119
20K0374-06 (Solid)

Dioxins/Furans

Method: EPA 1613B		Sampled: 11/19/2020 12:41	
Instrument: AUTOSPEC01 Analyst: pk		Analyzed: 12/18/2020 22:18	
Sample Preparation:	Preparation Method: EPA 1613	Extract ID: 20K0374-06 C 01	
	Preparation Batch: BIL0237	Dry Weight: 10.02 g	
	Prepared: 12/10/2020	% Solids: 58.25	
Sample Cleanup:	Cleanup Method: Silica Gel	Extract ID: 20K0374-06 C 01	
	Cleanup Batch: CIL0151	Initial Volume: 20 mL	
	Cleaned: 15-Dec-2020	Final Volume: 20 mL	
Sample Cleanup:	Cleanup Method: Sulfuric Acid	Extract ID: 20K0374-06 C 01	
	Cleanup Batch: CIL0150	Initial Volume: 20 mL	
	Cleaned: 14-Dec-2020	Final Volume: 20 mL	
Sample Cleanup:	Cleanup Method: Florisil	Extract ID: 20K0374-06 C 01	
	Cleanup Batch: CIL0152	Initial Volume: 20 mL	
	Cleaned: 15-Dec-2020	Final Volume: 20 mL	

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting		Result	Units	Notes
				EDL	Limit			
2,3,7,8-TCDF			0.655-0.886	0.063	0.091	0.998	ND	ng/kg Ua
2,3,7,8-TCDD			0.655-0.886	0.140	0.103	0.998	ND	ng/kg Ua
1,2,3,7,8-PeCDF			1.318-1.783	0.150	0.127	0.998	ND	ng/kg Ua
2,3,4,7,8-PeCDF			1.318-1.783	0.150	0.112	0.998	ND	ng/kg Ua
1,2,3,7,8-PeCDD			1.318-1.783	0.180	0.155	0.998	ND	ng/kg Ua
1,2,3,4,7,8-HxCDF		0.923	1.054-1.426	0.140	0.080	0.998	0.129	ng/kg EMPC, J
1,2,3,6,7,8-HxCDF			1.054-1.426	0.180	0.081	0.998	ND	ng/kg Ua
2,3,4,6,7,8-HxCDF			1.054-1.426	0.110	0.078	0.998	ND	ng/kg Ua
1,2,3,7,8,9-HxCDF			1.054-1.426	0.210	0.101	0.998	ND	ng/kg Ua
1,2,3,4,7,8-HxCDD			1.054-1.426	0.180	0.145	0.998	ND	ng/kg Ua
1,2,3,6,7,8-HxCDD		1.184	1.054-1.426	0.150	0.139	0.998	0.805	ng/kg J
1,2,3,7,8,9-HxCDD			1.054-1.426	0.220	0.161	0.998	ND	ng/kg Ua
1,2,3,4,6,7,8-HpCDF		0.925	0.893-1.208	0.210	0.095	0.998	3.34	ng/kg
1,2,3,4,7,8,9-HpCDF		0.633	0.893-1.208	0.160	0.131	0.998	0.243	ng/kg EMPC, J
1,2,3,4,6,7,8-HpCDD		1.083	0.893-1.208	0.559	0.227	2.50	32.8	ng/kg
OCDF		1.012	0.757-1.024	1.10	0.229	2.50	13.7	ng/kg
OCDD		0.874	0.757-1.024	4.29	0.432	9.98	297	ng/kg B
Homologue groups								
Total TCDF						0.998	ND	ng/kg Ua
Total TCDD						0.998	ND	ng/kg Ua
Total PeCDF						0.998	0.342	ng/kg J
Total PeCDD						0.998	ND	ng/kg Ua
Total HxCDF						0.998	3.97	ng/kg
Total HxCDD						0.998	5.83	ng/kg
Total HpCDF						0.998	14.2	ng/kg
Total HpCDD						0.998	87.2	ng/kg



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Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

COA_05-D_G_20201119
20K0374-06 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/19/2020 12:41

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 12/18/2020 22:18

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting Limit	Result	Units	Notes
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC):				0.73			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC):				0.55			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, EMPC = ND):				0.72			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, EMPC = ND):				0.54			



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COA_05-D_G_20201119
20K0374-06 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/19/2020 12:41

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 12/18/2020 22:18

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting Limit	Result	Units	Notes
Labeled compounds							
13C12-2,3,7,8-TCDF		0.796	0.655-0.886	24-169 %	59.2	%	
13C12-2,3,7,8-TCDD		0.817	0.655-0.886	25-164 %	60.3	%	
13C12-1,2,3,7,8-PeCDF		1.539	1.318-1.783	24-185 %	60.9	%	
13C12-2,3,4,7,8-PeCDF		1.557	1.318-1.783	21-178 %	64.9	%	
13C12-1,2,3,7,8-PeCDD		1.680	1.318-1.783	25-181 %	61.5	%	
13C12-1,2,3,4,7,8-HxCDF		0.510	0.434-0.587	26-152 %	63.1	%	
13C12-1,2,3,6,7,8-HxCDF		0.492	0.434-0.587	26-123 %	53.8	%	
13C12-2,3,4,6,7,8-HxCDF		0.497	0.434-0.587	28-136 %	59.5	%	
13C12-1,2,3,7,8,9-HxCDF		0.496	0.434-0.587	29-147 %	59.1	%	
13C12-1,2,3,4,7,8-HxCDD		1.287	1.054-1.426	32-141 %	61.3	%	
13C12-1,2,3,6,7,8-HxCDD		1.311	1.054-1.426	28-130 %	49.8	%	
13C12-1,2,3,4,6,7,8-HpCDF		0.432	0.374-0.506	28-143 %	50.8	%	
13C12-1,2,3,4,7,8,9-HpCDF		0.424	0.374-0.506	26-138 %	53.0	%	
13C12-1,2,3,4,6,7,8-HpCDD		1.099	0.893-1.208	23-140 %	54.4	%	
13C12-OCDD		0.922	0.757-1.024	17-157 %	34.2	%	
37Cl4-2,3,7,8-TCDD				35-197 %	91.6	%	



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Reported:
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COA_05-D_G_20201119
20K0374-06 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/19/2020 12:41

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 12/18/2020 22:18

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting		Result	Units	Notes
				EDL	Limit			



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Reported:
26-Mar-2021 16:29

COA_05-D_G_20201119
20K0374-06 (Solid)

Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 11/19/2020 12:41

Instrument: ICPMS1 Analyst: MCB

Analyzed: 03/23/2021 19:13

Sample Preparation:

Preparation Method: SWN EPA 3050B

Extract ID: 20K0374-06 E 02

Preparation Batch: BJC0563

Sample Size: 1.067 g (wet)

Dry Weight: 0.60 g

Prepared: 03/22/2021

Final Volume: 50 mL

% Solids: 56.48

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Antimony	7440-36-0	20	0.03	0.33	ND	mg/kg	Ua
Chromium	7440-47-3	20	0.22	0.83	30.8	mg/kg	
Lead	7439-92-1	20	0.11	0.17	7.21	mg/kg	
Silver	7440-22-4	20	0.03	0.33	0.08	mg/kg	J



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Project: COA Outfall
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Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

COA_05-D_G_20201119
20K0374-06 (Solid)

Metals and Metallic Compounds

Method: EPA 6020B UCT-KED

Sampled: 11/19/2020 12:41

Instrument: ICPMS1 Analyst: MCB

Analyzed: 03/23/2021 19:13

Sample Preparation:

Preparation Method: SWN EPA 3050B

Extract ID: 20K0374-06 E 02

Preparation Batch: BJC0563

Sample Size: 1.067 g (wet)

Dry Weight: 0.60 g

Prepared: 03/22/2021

Final Volume: 50 mL

% Solids: 56.48

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	20	0.04	0.33	7.24	mg/kg	
Cadmium	7440-43-9	20	0.05	0.17	0.55	mg/kg	
Copper	7440-50-8	20	0.56	0.83	22.2	mg/kg	
Selenium	7782-49-2	20	0.73	0.83	1.03	mg/kg	
Zinc	7440-66-6	20	1.4	6.6	63.9	mg/kg	



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Reported:
26-Mar-2021 16:29

COA_05-D_G_20201119
20K0374-06 (Solid)

Metals and Metallic Compounds

Method: EPA 7471B

Sampled: 11/19/2020 12:41

Instrument: HYDRA Analyst: BLC

Analyzed: 03/23/2021 11:43

Sample Preparation:

Preparation Method: SMM EPA 7471B

Extract ID: 20K0374-06 E

Preparation Batch: BJC0609

Sample Size: 0.269 g (wet)

Dry Weight: 0.15 g

Prepared: 03/22/2021

Final Volume: 50 mL

% Solids: 56.48

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.00691	0.0329	0.0720	mg/kg	H



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Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

COA_05-D_G_20201119
20K0374-06 (Solid)

Wet Chemistry

Method: EPA 9060A m

Sampled: 11/19/2020 12:41

Instrument: TOC Cube Analyst: BF

Analyzed: 11/26/2020 15:43

Sample Preparation:

Preparation Method: PSEP 1986 (modified)

Extract ID: 20K0374-06 E

Preparation Batch: BIK0803

Sample Size: 0.3238 g (wet)

Dry Weight: 0.18 g

Prepared: 11/25/2020

Final Volume: 0.3238 mL

% Solids: 56.48

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Organic Carbon		1	0.02	0.02	1.63	%	



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Reported:
26-Mar-2021 16:29

COA_05-D_G_20201119
20K0374-06 (Solid)

Wet Chemistry

Method: PSEP 1986

Sampled: 11/19/2020 12:41

Instrument: BAL2 Analyst: UW

Analyzed: 11/24/2020 17:15

Sample Preparation:	Preparation Method: No Prep Wet Chem	Sample Size: 5 g (wet)	Extract ID: 20K0374-06
	Preparation Batch: BIK0773	Final Volume: 5 g	Dry Weight: 2.82 g
	Prepared: 11/24/2020		% Solids: 56.48

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Volatile Solids		1	0.01	0.01	5.26	%	

Sample Preparation:	Preparation Method: No Prep Wet Chem	Sample Size: 5 g (wet)	Extract ID: 20K0374-06
	Preparation Batch: BIK0778	Final Volume: 5 g	Dry Weight: 2.82 g
	Prepared: 11/24/2020		% Solids: 56.48

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Solids, Sulfide		1	0.04	0.04	55.27	%	



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Reported:
26-Mar-2021 16:29

COA_05-D_G_20201119
20K0374-06 (Solid)

Wet Chemistry

Method: SM 2540 G-97

Sampled: 11/19/2020 12:41

Instrument: BAL2 Analyst: UW

Analyzed: 11/24/2020 17:15

Sample Preparation:

Preparation Method: No Prep Wet Chem

Extract ID: 20K0374-06

Preparation Batch: BIK0773

Sample Size: 5 g (wet)

Dry Weight: 2.82 g

Prepared: 11/24/2020

Final Volume: 5 g

% Solids: 56.48

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Solids		1	0.04	0.04	56.48	%	



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Reported:
26-Mar-2021 16:29

COA_05-D_G_20201119
20K0374-06 (Solid)

Wet Chemistry

Method: SM 4500-S2 D-00 (PSEP)

Sampled: 11/19/2020 12:41

Instrument: UV1800-1 Analyst: CDE

Analyzed: 12/03/2020 17:14

Sample Preparation:

Preparation Method: PSEP 1986

Extract ID: 20K0374-06 F

Preparation Batch: BIK0762

Sample Size: 5.133 g (wet)

Dry Weight: 2.84 g

Prepared: 11/24/2020

Final Volume: 100 mL

% Solids: 55.27

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Sulfide	18496-25-8	100	176	176	1270	mg/kg	D



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Reported:
26-Mar-2021 16:29

COA_05-D_G_20201119
20K0374-06 (Solid)

Extractions

Method: ASTM D2216	Sampled: 11/19/2020 12:41	
Instrument: N/A Analyst: NL	Analyzed: 11/26/2020 05:10	
Sample Preparation:	Preparation Method: No Prep-Organics	Extract ID: 20K0374-06
	Preparation Batch: BIK0789	Dry Weight: 0.56 g
	Prepared: 11/25/2020	% Solids: 56.48
	Sample Size: 1 g (wet)	
	Final Volume: 1 g	

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Total Solids		1	0.01	58.25	%	



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Reported:
26-Mar-2021 16:29

COA_05-D_G_20201119
20K0374-06 (Solid)

Extractions

Method: ASTM D2216

Sampled: 11/19/2020 12:41

Instrument: N/A Analyst: NL

Analyzed: 11/26/2020 05:10

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Labeled compounds						



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Reported:
26-Mar-2021 16:29

COA_05-D_G_20201119
20K0374-06 (Solid)

Geotechnical Methods

Method: PSEP-PS

Sampled: 11/19/2020 12:41

Instrument: MT&C Analyst:

Analyzed: 01/11/2021 00:00

Analysis by: Materials Testing & Consulting, Inc. (Olympia)

Sample Preparation: Preparation Method: No Prep Geo
Preparation Batch: B011121
Prepared: 01/11/2021

Extract ID: 20K0374-06

Final Volume:

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Phi Size <-1	GS_GRAVEL	1	0.1	0.3	%	
Phi Size -1 to 0	GS_VCS	1	0.1	0.6	%	
Phi Size 0 to 1	GS_CS	1	0.1	1.7	%	
Phi Size 1 to 2	GS_MS	1	0.1	4.4	%	
Phi Size 2 to 3	GS_FS	1	0.1	18.6	%	
Phi Size 3 to 4	GS_VFS	1	0.1	26.4	%	
Phi Size 4 to 5	GS_CSILT	1	0.1	9.3	%	
Phi Size 5 to 6	GS_MSILT	1	0.1	15.3	%	
Phi Size 6 to 7	GS_FSILT	1	0.1	5.9	%	
Phi Size 7 to 8	GS_VFSILT	1	0.1	3.6	%	
Phi Size 8 to 9	GS_CCLAY	1	0.1	4.0	%	
Phi Size 9 to 10	GS_MCLAY	1	0.1	6.0	%	
Phi Size >10	GS_FCLAY	1	0.1	3.9	%	
Total Fines	GS_TOTFINES	1	0.1	48.0	%	



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Reported:
26-Mar-2021 16:29

COA_05-D_G_20201119
20K0374-06RE1 (Solid)

Dioxins/Furans

Method: EPA 1613B		Sampled: 11/19/2020 12:41	
Instrument: AUTOSPEC01 Analyst: pk		Analyzed: 03/05/2021 02:34	
Sample Preparation:	Preparation Method: EPA 1613	Extract ID: 20K0374-06RE1 C 01	
	Preparation Batch: BJB0762	Dry Weight: 10.02 g	
	Prepared: 03/01/2021	% Solids: 58.25	
Sample Cleanup:	Cleanup Method: Silica Gel	Extract ID: 20K0374-06RE1 C 01	
	Cleanup Batch: CJC0027	Initial Volume: 20 mL	
	Cleaned: 03-Mar-2021	Final Volume: 20 mL	
Sample Cleanup:	Cleanup Method: Sulfuric Acid	Extract ID: 20K0374-06RE1 C 01	
	Cleanup Batch: CJC0026	Initial Volume: 20 mL	
	Cleaned: 02-Mar-2021	Final Volume: 20 mL	
Sample Cleanup:	Cleanup Method: Florisil	Extract ID: 20K0374-06RE1 C 01	
	Cleanup Batch: CJC0028	Initial Volume: 20 mL	
	Cleaned: 03-Mar-2021	Final Volume: 20 mL	

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting		Result	Units	Notes
				EDL	Limit			
2,3,7,8-TCDF		0.774	0.655-0.886	0.058	0.072	0.998	1.14	ng/kg
2,3,7,8-TCDD			0.655-0.886	0.150	0.070	0.998	ND	ng/kg Ua
1,2,3,7,8-PeCDF			1.318-1.783	0.240	0.148	0.998	ND	ng/kg Ua
2,3,4,7,8-PeCDF			1.318-1.783	0.220	0.134	0.998	ND	ng/kg Ua
1,2,3,7,8-PeCDD		1.476	1.318-1.783	0.170	0.192	0.998	0.556	ng/kg J
1,2,3,4,7,8-HxCDF		1.335	1.054-1.426	0.279	0.075	0.998	0.455	ng/kg J
1,2,3,6,7,8-HxCDF		1.658	1.054-1.426	0.200	0.079	0.998	0.206	ng/kg EMPC, J
2,3,4,6,7,8-HxCDF		1.193	1.054-1.426	0.170	0.077	0.998	0.246	ng/kg J
1,2,3,7,8,9-HxCDF			1.054-1.426	0.190	0.101	0.998	ND	ng/kg Ua
1,2,3,4,7,8-HxCDD		0.978	1.054-1.426	0.170	0.176	0.998	0.629	ng/kg EMPC, J
1,2,3,6,7,8-HxCDD		1.069	1.054-1.426	0.180	0.167	0.998	2.98	ng/kg
1,2,3,7,8,9-HxCDD		1.083	1.054-1.426	0.220	0.176	0.998	1.16	ng/kg
1,2,3,4,6,7,8-HpCDF		1.103	0.893-1.208	0.210	0.098	0.998	5.38	ng/kg
1,2,3,4,7,8,9-HpCDF		1.392	0.893-1.208	0.240	0.136	0.998	0.331	ng/kg EMPC, J
1,2,3,4,6,7,8-HpCDD		1.046	0.893-1.208	0.559	0.393	2.50	127	ng/kg
OCDF		0.977	0.757-1.024	1.10	0.166	2.50	13.1	ng/kg B
OCDD		0.860	0.757-1.024	4.59	0.561	9.98	786	ng/kg B
Homologue groups								
Total TCDF						0.998	4.78	ng/kg
Total TCDD						0.998	1.79	ng/kg
Total PeCDF						0.998	2.39	ng/kg
Total PeCDD						0.998	3.13	ng/kg
Total HxCDF						0.998	9.83	ng/kg
Total HxCDD						0.998	55.4	ng/kg B
Total HpCDF						0.998	17.5	ng/kg
Total HpCDD						0.998	530	ng/kg



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Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

COA_05-D_G_20201119
20K0374-06RE1 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/19/2020 12:41

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 03/05/2021 02:34

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting Limit	Result	Units	Notes
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC):				2.87			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC):				2.80			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, EMPC = ND):				2.82			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, EMPC = ND):				2.72			



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Dioxins/Furans

Method: EPA 1613B

Sampled: 11/19/2020 12:41

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 03/05/2021 02:34

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting Limit	Result	Units	Notes
Labeled compounds							
13C12-2,3,7,8-TCDF		0.792	0.655-0.886	24-169 %	81.5	%	
13C12-2,3,7,8-TCDD		0.795	0.655-0.886	25-164 %	76.0	%	
13C12-1,2,3,7,8-PeCDF		1.540	1.318-1.783	24-185 %	71.3	%	
13C12-2,3,4,7,8-PeCDF		1.527	1.318-1.783	21-178 %	72.4	%	
13C12-1,2,3,7,8-PeCDD		1.628	1.318-1.783	25-181 %	67.3	%	
13C12-1,2,3,4,7,8-HxCDF		0.507	0.434-0.587	26-152 %	72.7	%	
13C12-1,2,3,6,7,8-HxCDF		0.509	0.434-0.587	26-123 %	70.1	%	
13C12-2,3,4,6,7,8-HxCDF		0.521	0.434-0.587	28-136 %	74.7	%	
13C12-1,2,3,7,8,9-HxCDF		0.509	0.434-0.587	29-147 %	45.2	%	
13C12-1,2,3,4,7,8-HxCDD		1.254	1.054-1.426	32-141 %	69.0	%	
13C12-1,2,3,6,7,8-HxCDD		1.260	1.054-1.426	28-130 %	64.1	%	
13C12-1,2,3,4,6,7,8-HpCDF		0.441	0.374-0.506	28-143 %	65.7	%	
13C12-1,2,3,4,7,8,9-HpCDF		0.440	0.374-0.506	26-138 %	63.5	%	
13C12-1,2,3,4,6,7,8-HpCDD		1.083	0.893-1.208	23-140 %	67.7	%	
13C12-OCDD		0.867	0.757-1.024	17-157 %	49.8	%	
37Cl4-2,3,7,8-TCDD				35-197 %	91.0	%	



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COA_05-D_G_20201119
20K0374-06RE1 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/19/2020 12:41

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 03/05/2021 02:34

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting		Result	Units	Notes
				EDL	Limit			



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Reported:
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COA_05-D_G_20201119
20K0374-06RE1 (Solid)

Wet Chemistry

Method: SM 4500-NH3 H-97

Sampled: 11/19/2020 12:41

Instrument: LACHAT2 Analyst: KOTT

Analyzed: 11/30/2020 12:51

Sample Preparation:

Preparation Method: MSA 33.3 (2M KCl)

Extract ID: 20K0374-06RE1 E

Preparation Batch: BIK0770

Sample Size: 4.32 g (wet)

Dry Weight: 2.44 g

Prepared: 11/24/2020

Final Volume: 40 mL

% Solids: 56.48

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Ammonia-N	7664-41-7	5	3.28	3.28	28.0	mg/kg NH3-N	D



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Reported:
26-Mar-2021 16:29

COA_06_G_20201120
20K0374-07 (Solid)

Semivolatile Organic Compounds

Method: EPA 8270E
Instrument: NT10 Analyst: VTS
Sample Preparation: Preparation Method: EPA 3546 (Microwave)
Preparation Batch: BIK0878 Sample Size: 13.62 g (wet)
Prepared: 12/01/2020 Final Volume: 1 mL
Extract ID: 20K0374-07 J 04
Dry Weight: 10.02 g
% Solids: 73.60

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Phenol	108-95-2	1	8.2	20.0	10.8	ug/kg	J
Benzyl Alcohol	100-51-6	1	14.9	20.0	ND	ug/kg	Ua
2-Methylphenol	95-48-7	1	7.8	20.0	ND	ug/kg	Ua
Hexachloroethane	67-72-1	1	5.6	20.0	ND	ug/kg	Ua
4-Methylphenol	106-44-5	1	14.7	20.0	31.5	ug/kg	
Naphthalene	91-20-3	1	5.2	20.0	102	ug/kg	
Benzoic acid	65-85-0	1	59.0	200	ND	ug/kg	Ua
2-Methylnaphthalene	91-57-6	1	5.7	20.0	13.7	ug/kg	J
Acenaphthylene	208-96-8	1	4.8	20.0	13.7	ug/kg	J
Dimethylphthalate	131-11-3	1	6.4	20.0	ND	ug/kg	Ua
Acenaphthene	83-32-9	1	5.1	20.0	17.1	ug/kg	J
Dibenzofuran	132-64-9	1	4.6	20.0	14.4	ug/kg	J
Fluorene	86-73-7	1	4.9	20.0	29.3	ug/kg	
Diethyl phthalate	84-66-2	1	17.7	20.0	23.8	ug/kg	
N-Nitrosodiphenylamine	86-30-6	1	9.5	20.0	ND	ug/kg	Ua
Hexachlorobenzene	118-74-1	1	4.7	20.0	ND	ug/kg	Ua
Pentachlorophenol	87-86-5	1	31.2	99.8	ND	ug/kg	Ua
Phenanthrene	85-01-8	1	4.7	20.0	161	ug/kg	
Anthracene	120-12-7	1	5.9	20.0	51.8	ug/kg	
Di-n-Butylphthalate	84-74-2	1	5.3	20.0	14.3	ug/kg	J
Fluoranthene	206-44-0	1	4.5	20.0	189	ug/kg	
Pyrene	129-00-0	1	5.5	20.0	266	ug/kg	
Butylbenzylphthalate	85-68-7	1	8.0	20.0	ND	ug/kg	Ua
Benzo(a)anthracene	56-55-3	1	5.2	20.0	80.5	ug/kg	
Chrysene	218-01-9	1	5.2	20.0	96.0	ug/kg	
bis(2-Ethylhexyl)phthalate	117-81-7	1	28.7	49.9	ND	ug/kg	Ua
Di-n-Octylphthalate	117-84-0	1	8.7	20.0	ND	ug/kg	Ua
Benzo(a)fluoranthene, Total		1	10.2	39.9	175	ug/kg	
Benzo(a)pyrene	50-32-8	1	6.5	20.0	85.0	ug/kg	
Indeno(1,2,3-cd)pyrene	193-39-5	1	6.0	20.0	37.0	ug/kg	
Dibenzo(a,h)anthracene	53-70-3	1	6.1	20.0	13.7	ug/kg	J
Benzo(g,h,i)perylene	191-24-2	1	5.8	20.0	32.9	ug/kg	
Surrogate: 2-Fluorophenol				27-120 %	71.8	%	
Surrogate: Phenol-d5				29-120 %	77.8	%	
Surrogate: 2-Chlorophenol-d4				31-120 %	81.3	%	



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Reported:
26-Mar-2021 16:29

COA_06_G_20201120
20K0374-07 (Solid)

Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 11/20/2020 11:54

Instrument: NT10 Analyst: VTS

Analyzed: 12/30/2020 21:46

Analyte	CAS Number	Recovery	Recovery	Units	Notes
		Limits			
Surrogate: 1,2-Dichlorobenzene-d4		32-120 %	71.8	%	
Surrogate: Nitrobenzene-d5		30-120 %	93.5	%	
Surrogate: 2-Fluorobiphenyl		35-120 %	89.1	%	
Surrogate: 2,4,6-Tribromophenol		24-134 %	84.6	%	
Surrogate: p-Terphenyl-d14		37-120 %	83.8	%	



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COA_06_G_20201120
20K0374-07 (Solid)

Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM

Sampled: 11/20/2020 11:54

Instrument: NT10 Analyst: VTS

Analyzed: 12/30/2020 21:46

Sample Preparation:

Preparation Method: EPA 3546 (Microwave)

Extract ID: 20K0374-07 J 04

Preparation Batch: BIK0878

Sample Size: 13.62 g (wet)

Dry Weight: 10.02 g

Prepared: 12/01/2020

Final Volume: 1 mL

% Solids: 73.60

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
1,4-Dichlorobenzene	106-46-7	1	0.6	5.0	1.1	ug/kg	J
1,2-Dichlorobenzene	95-50-1	1	0.7	5.0	ND	ug/kg	Ua
2,4-Dimethylphenol	105-67-9	1	2.2	20.0	2.2	ug/kg	J
1,2,4-Trichlorobenzene	120-82-1	1	2.7	5.0	ND	ug/kg	Ua
Hexachlorobutadiene	87-68-3	1	0.7	5.0	ND	ug/kg	Ua
Surrogate: 2-Fluorophenol				27-120 %	76.6	%	Q
Surrogate: p-Terphenyl-d14				37-120 %	77.8	%	



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Reported:
26-Mar-2021 16:29

COA_06_G_20201120
20K0374-07 (Solid)

Butyl Tins

Method: EPA 8270E-SIM			Sampled: 11/20/2020 11:54
Instrument: NT8 Analyst: JZ			Analyzed: 12/17/2020 21:15
Sample Preparation:	Preparation Method: EPA 3546 (Microwave)		Extract ID: 20K0374-07 J 03
	Preparation Batch: BIK0879	Sample Size: 6.8 g (wet)	
	Prepared: 12/01/2020	Final Volume: 0.5 mL	
Sample Cleanup:	Cleanup Method: Silica Gel		Extract ID: 20K0374-07 J 03
	Cleanup Batch: CIL0160	Initial Volume: 0.5 mL	
	Cleaned: 17-Dec-2020	Final Volume: 0.5 mL	
			Dry Weight: 5.00 g
			% Solids: 73.60

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Tributyltin Ion	36643-28-4	1	0.450	3.86	15.9	ug/kg	
Dibutyltin Ion	14488-53-0	1	1.73	5.77	3.17	ug/kg	J
Butyltin Ion	78763-54-9	1	1.89	4.08	ND	ug/kg	Ua
Tetrabutyltin	1461-25-2	1	5.00	5.00	ND	ug/kg	Ua
<i>Surrogate: Tripentyltin</i>				30-160 %	114	%	
<i>Surrogate: Tripropyltin</i>				30-160 %	70.3	%	



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Reported:
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COA_06_G_20201120
20K0374-07 (Solid)

Chlorinated Pesticides

Method: EPA 8081B		Sampled: 11/20/2020 11:54	
Instrument: ECD6 Analyst: YZ/VTs		Analyzed: 03/16/2021 01:51	
Sample Preparation:	Preparation Method: EPA 3546 (Microwave)	Extract ID: 20K0374-07 D 01	
	Preparation Batch: BJC0009	Dry Weight: 12.50 g	
	Prepared: 03/01/2021	% Solids: 73.60	
Sample Cleanup:	Cleanup Method: Silica Gel	Extract ID: 20K0374-07 D 01	
	Cleanup Batch: CJC0140	Initial Volume: 2.5 mL	
	Cleaned: 11-Mar-2021	Final Volume: 2.5 mL	
Sample Cleanup:	Cleanup Method: Sulfur	Extract ID: 20K0374-07 D 01	
	Cleanup Batch: CJC0139	Initial Volume: 2.5 mL	
	Cleaned: 11-Mar-2021	Final Volume: 2.5 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Heptachlor	76-44-8	1	0.05	0.50	ND	ug/kg	Ua
Aldrin	309-00-2	1	0.37	0.50	ND	ug/kg	Ua
trans-Chlordane (beta-Chlordane)	5103-74-2	1	0.33	0.50	ND	ug/kg	Ua
cis-Chlordane (alpha-chlordane)	5103-71-9	1	0.11	0.50	ND	ug/kg	Ua
4,4'-DDE	72-55-9	1	0.13	1.00	ND	ug/kg	Ua
Dieldrin	60-57-1	1	0.11	1.00	ND	ug/kg	Ua
4,4'-DDD	72-54-8	1	0.32	1.00	ND	ug/kg	Ua
4,4'-DDT	50-29-3	1	0.32	1.00	ND	ug/kg	Ua
Oxychlordane	27304-13-8	1	0.13	1.00	ND	ug/kg	Ua
cis-Nonachlor	5103-73-1	1	0.21	1.00	ND	ug/kg	Ua
trans-Nonachlor	39765-80-5	1	0.23	1.00	ND	ug/kg	Ua
Surrogate: Decachlorobiphenyl				30-160 %	74.7	%	
Surrogate: Decachlorobiphenyl [2C]				30-160 %	60.0	%	
Surrogate: Tetrachlorometaxylene				30-160 %	70.2	%	
Surrogate: Tetrachlorometaxylene [2C]				30-160 %	60.7	%	



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COA_06_G_20201120
20K0374-07 (Solid)

Aroclor PCB

Method: EPA 8082A		Sampled: 11/20/2020 11:54	
Instrument: ECD7 Analyst: JGR		Analyzed: 12/22/2020 13:47	
Sample Preparation:	Preparation Method: EPA 3546 (Microwave)	Extract ID: 20K0374-07 J 01	
	Preparation Batch: BIK0877	Dry Weight: 12.50 g	
	Prepared: 11/30/2020	% Solids: 73.60	
Sample Cleanup:	Cleanup Method: Silica Gel	Extract ID: 20K0374-07 J 01	
	Cleanup Batch: CIL0224	Initial Volume: 2.5 mL	
	Cleaned: 21-Dec-2020	Final Volume: 2.5 mL	
Sample Cleanup:	Cleanup Method: Sulfuric Acid	Extract ID: 20K0374-07 J 01	
	Cleanup Batch: CIL0218	Initial Volume: 2.5 mL	
	Cleaned: 21-Dec-2020	Final Volume: 2.5 mL	
Sample Cleanup:	Cleanup Method: Sulfur	Extract ID: 20K0374-07 J 01	
	Cleanup Batch: CIL0219	Initial Volume: 2.5 mL	
	Cleaned: 21-Dec-2020	Final Volume: 2.5 mL	
Sample Cleanup:	Cleanup Method: Alumina	Extract ID: 20K0374-07 J 01	
	Cleanup Batch: CIL0223	Initial Volume: 2.5 mL	
	Cleaned: 21-Dec-2020	Final Volume: 2.5 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Aroclor 1016	12674-11-2	1	1.6	4.0	ND	ug/kg	Ua
Aroclor 1221	11104-28-2	1	1.6	4.0	ND	ug/kg	Ua
Aroclor 1232	11141-16-5	1	1.6	4.0	ND	ug/kg	Ua
Aroclor 1242	53469-21-9	1	1.6	4.0	ND	ug/kg	Ua
Aroclor 1248	12672-29-6	1	1.6	4.0	2.1	ug/kg	J
Aroclor 1254	11097-69-1	1	1.6	4.0	ND	ug/kg	Ua
Aroclor 1260	11096-82-5	1	0.6	4.0	ND	ug/kg	Ua
Aroclor 1262	37324-23-5	1	0.6	4.0	ND	ug/kg	Ua
Aroclor 1268	11100-14-4	1	0.6	4.0	ND	ug/kg	Ua
Surrogate: Decachlorobiphenyl					40-126 %	70.5 %	
Surrogate: Tetrachlorometaxylene					44-120 %	78.7 %	
Surrogate: Decachlorobiphenyl [2C]					40-126 %	82.8 %	
Surrogate: Tetrachlorometaxylene [2C]					44-120 %	80.6 %	



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Reported:
26-Mar-2021 16:29

COA_06_G_20201120
20K0374-07 (Solid)

Dioxins/Furans

Method: EPA 1613B			Sampled: 11/20/2020 11:54	
Instrument: AUTOSPEC01 Analyst: pk			Analyzed: 12/18/2020 23:08	
Sample Preparation:	Preparation Method: EPA 1613	Sample Size: 13.53 g (wet) Final Volume: 20 uL	Extract ID: 20K0374-07 G 01	
	Preparation Batch: BIL0237		Dry Weight: 10.01 g	
	Prepared: 12/10/2020		% Solids: 73.99	
Sample Cleanup:	Cleanup Method: Silica Gel	Initial Volume: 20 mL Final Volume: 20 mL	Extract ID: 20K0374-07 G 01	
	Cleanup Batch: CIL0151			
	Cleaned: 15-Dec-2020			
Sample Cleanup:	Cleanup Method: Sulfuric Acid	Initial Volume: 20 mL Final Volume: 20 mL	Extract ID: 20K0374-07 G 01	
	Cleanup Batch: CIL0150			
	Cleaned: 14-Dec-2020			
Sample Cleanup:	Cleanup Method: Florisil	Initial Volume: 20 mL Final Volume: 20 mL	Extract ID: 20K0374-07 G 01	
	Cleanup Batch: CIL0152			
	Cleaned: 15-Dec-2020			

Analyte	DF/Split	Ion Ratio	Ratio Limits	EDL	Reporting		Result	Units	Notes
						Limit			
2,3,7,8-TCDF		0.925	0.655-0.886	0.063	0.068	0.999	0.445	ng/kg	EMPC, J
2,3,7,8-TCDD			0.655-0.886	0.140	0.053	0.999	ND	ng/kg	Ua
1,2,3,7,8-PeCDF			1.318-1.783	0.150	0.063	0.999	ND	ng/kg	Ua
2,3,4,7,8-PeCDF			1.318-1.783	0.150	0.060	0.999	ND	ng/kg	Ua
1,2,3,7,8-PeCDD		1.849	1.318-1.783	0.180	0.076	0.999	0.211	ng/kg	EMPC, J
1,2,3,4,7,8-HxCDF		1.262	1.054-1.426	0.140	0.042	0.999	0.075	ng/kg	J
1,2,3,6,7,8-HxCDF		2.033	1.054-1.426	0.180	0.045	0.999	0.097	ng/kg	EMPC, J
2,3,4,6,7,8-HxCDF		0.755	1.054-1.426	0.110	0.044	0.999	0.083	ng/kg	EMPC, J
1,2,3,7,8,9-HxCDF			1.054-1.426	0.210	0.060	0.999	ND	ng/kg	Ua
1,2,3,4,7,8-HxCDD		1.187	1.054-1.426	0.180	0.069	0.999	0.190	ng/kg	J
1,2,3,6,7,8-HxCDD		1.248	1.054-1.426	0.150	0.068	0.999	0.858	ng/kg	J
1,2,3,7,8,9-HxCDD			1.054-1.426	0.220	0.078	0.999	ND	ng/kg	Ua
1,2,3,4,6,7,8-HpCDF		1.123	0.893-1.208	0.210	0.042	0.999	2.16	ng/kg	
1,2,3,4,7,8,9-HpCDF		1.364	0.893-1.208	0.160	0.055	0.999	0.107	ng/kg	EMPC, J
1,2,3,4,6,7,8-HpCDD		1.035	0.893-1.208	0.559	0.085	2.50	18.5	ng/kg	
OCDF		0.955	0.757-1.024	1.10	0.082	2.50	5.90	ng/kg	
OCDD		0.840	0.757-1.024	4.30	0.314	9.99	178	ng/kg	B
Homologue groups									
Total TCDF						0.999	1.31	ng/kg	
Total TCDD						0.999	0.735	ng/kg	J
Total PeCDF						0.999	0.581	ng/kg	J
Total PeCDD						0.999	0.660	ng/kg	J
Total HxCDF						0.999	2.24	ng/kg	
Total HxCDD						0.999	6.73	ng/kg	
Total HpCDF						0.999	6.60	ng/kg	
Total HpCDD						0.999	49.1	ng/kg	



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

COA_06_G_20201120
20K0374-07 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/20/2020 11:54

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 12/18/2020 23:08

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting Limit	Result	Units	Notes
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC):				0.69			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC):				0.65			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, EMPC = ND):				0.55			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, EMPC = ND):				0.37			



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Project: COA Outfall
Project Number: COA-001
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Reported:
26-Mar-2021 16:29

COA_06_G_20201120
20K0374-07 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/20/2020 11:54

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 12/18/2020 23:08

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting Limit	Result	Units	Notes
Labeled compounds							
13C12-2,3,7,8-TCDF		0.793	0.655-0.886	24-169 %	73.0	%	
13C12-2,3,7,8-TCDD		0.803	0.655-0.886	25-164 %	83.7	%	
13C12-1,2,3,7,8-PeCDF		1.533	1.318-1.783	24-185 %	87.1	%	
13C12-2,3,4,7,8-PeCDF		1.530	1.318-1.783	21-178 %	88.2	%	
13C12-1,2,3,7,8-PeCDD		1.651	1.318-1.783	25-181 %	85.0	%	
13C12-1,2,3,4,7,8-HxCDF		0.499	0.434-0.587	26-152 %	88.0	%	
13C12-1,2,3,6,7,8-HxCDF		0.518	0.434-0.587	26-123 %	70.1	%	
13C12-2,3,4,6,7,8-HxCDF		0.507	0.434-0.587	28-136 %	77.2	%	
13C12-1,2,3,7,8,9-HxCDF		0.501	0.434-0.587	29-147 %	34.3	%	
13C12-1,2,3,4,7,8-HxCDD		1.270	1.054-1.426	32-141 %	78.4	%	
13C12-1,2,3,6,7,8-HxCDD		1.270	1.054-1.426	28-130 %	65.5	%	
13C12-1,2,3,4,6,7,8-HpCDF		0.436	0.374-0.506	28-143 %	73.2	%	
13C12-1,2,3,4,7,8,9-HpCDF		0.437	0.374-0.506	26-138 %	81.1	%	
13C12-1,2,3,4,6,7,8-HpCDD		1.085	0.893-1.208	23-140 %	89.8	%	
13C12-OCDD		0.918	0.757-1.024	17-157 %	61.0	%	
37Cl4-2,3,7,8-TCDD				35-197 %	94.8	%	



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Reported:
26-Mar-2021 16:29

COA_06_G_20201120
20K0374-07 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/20/2020 11:54

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 12/18/2020 23:08

Analyte	DF/Split	Ion Ratio	Ratio Limits	EDL	Reporting	Result	Units	Notes
					Limit			



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
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Reported:
26-Mar-2021 16:29

COA_06_G_20201120
20K0374-07 (Solid)

Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 11/20/2020 11:54

Instrument: ICPMS1 Analyst: MCB

Analyzed: 03/23/2021 19:32

Sample Preparation:

Preparation Method: SWN EPA 3050B

Extract ID: 20K0374-07 O 01

Preparation Batch: BJC0563

Sample Size: 1.071 g (wet)

Dry Weight: 0.74 g

Prepared: 03/22/2021

Final Volume: 50 mL

% Solids: 69.17

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Antimony	7440-36-0	20	0.02	0.27	ND	mg/kg	Ua
Chromium	7440-47-3	20	0.18	0.67	25.4	mg/kg	
Lead	7439-92-1	20	0.09	0.13	3.71	mg/kg	
Silver	7440-22-4	20	0.02	0.27	0.06	mg/kg	J



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Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

COA_06_G_20201120
20K0374-07 (Solid)

Metals and Metallic Compounds

Method: EPA 6020B UCT-KED

Sampled: 11/20/2020 11:54

Instrument: ICPMS1 Analyst: MCB

Analyzed: 03/23/2021 19:32

Sample Preparation:

Preparation Method: SWN EPA 3050B

Extract ID: 20K0374-07 O 01

Preparation Batch: BJC0563

Sample Size: 1.071 g (wet)

Dry Weight: 0.74 g

Prepared: 03/22/2021

Final Volume: 50 mL

% Solids: 69.17

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	20	0.03	0.27	6.56	mg/kg	
Cadmium	7440-43-9	20	0.04	0.13	0.39	mg/kg	
Copper	7440-50-8	20	0.46	0.67	23.8	mg/kg	
Selenium	7782-49-2	20	0.59	0.67	0.67	mg/kg	J
Zinc	7440-66-6	20	1.1	5.4	38.5	mg/kg	



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Project: COA Outfall
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Reported:
26-Mar-2021 16:29

COA_06_G_20201120
20K0374-07 (Solid)

Metals and Metallic Compounds

Method: EPA 7471B

Sampled: 11/20/2020 11:54

Instrument: HYDRA Analyst: BLC

Analyzed: 03/23/2021 11:17

Sample Preparation:

Preparation Method: SMM EPA 7471B

Extract ID: 20K0374-07 O

Preparation Batch: BJC0609

Sample Size: 0.287 g (wet)

Dry Weight: 0.20 g

Prepared: 03/22/2021

Final Volume: 50 mL

% Solids: 69.17

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.00529	0.0252	0.0534	mg/kg	H



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1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

COA_06_G_20201120
20K0374-07 (Solid)

Wet Chemistry

Method: EPA 9060A m

Sampled: 11/20/2020 11:54

Instrument: TOC Cube Analyst: BF

Analyzed: 11/26/2020 16:14

Sample Preparation:

Preparation Method: PSEP 1986 (modified)

Extract ID: 20K0374-07 M

Preparation Batch: BIK0803

Sample Size: 0.5295 g (wet)

Dry Weight: 0.37 g

Prepared: 11/25/2020

Final Volume: 0.5295 mL

% Solids: 69.17

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Organic Carbon		1	0.02	0.02	0.97	%	



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Reported:
26-Mar-2021 16:29

COA_06_G_20201120
20K0374-07 (Solid)

Wet Chemistry

Method: PSEP 1986

Sampled: 11/20/2020 11:54

Instrument: BAL2 Analyst: UW

Analyzed: 11/24/2020 17:15

Sample Preparation:	Preparation Method: No Prep Wet Chem	Sample Size: 5 g (wet)	Extract ID: 20K0374-07
	Preparation Batch: BIK0773	Final Volume: 5 g	Dry Weight: 3.46 g
	Prepared: 11/24/2020		% Solids: 69.17

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Volatile Solids		1	0.01	0.01	3.41	%	

Sample Preparation:	Preparation Method: No Prep Wet Chem	Sample Size: 5 g (wet)	Extract ID: 20K0374-07
	Preparation Batch: BIK0778	Final Volume: 5 g	Dry Weight: 3.46 g
	Prepared: 11/24/2020		% Solids: 69.17

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Solids, Sulfide		1	0.04	0.04	69.30	%	



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
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Reported:
26-Mar-2021 16:29

COA_06_G_20201120
20K0374-07 (Solid)

Wet Chemistry

Method: SM 2540 G-97

Sampled: 11/20/2020 11:54

Instrument: BAL2 Analyst: UW

Analyzed: 11/24/2020 17:15

Sample Preparation:

Preparation Method: No Prep Wet Chem

Extract ID: 20K0374-07

Preparation Batch: BIK0773

Sample Size: 5 g (wet)

Dry Weight: 3.46 g

Prepared: 11/24/2020

Final Volume: 5 g

% Solids: 69.17

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Solids		1	0.04	0.04	69.17	%	



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

COA_06_G_20201120
20K0374-07 (Solid)

Wet Chemistry

Method: SM 4500-S2 D-00 (PSEP)

Sampled: 11/20/2020 11:54

Instrument: UV1800-1 Analyst: CDE

Analyzed: 12/03/2020 17:15

Sample Preparation:

Preparation Method: PSEP 1986

Extract ID: 20K0374-07 P

Preparation Batch: BIK0762

Sample Size: 5.172 g (wet)

Dry Weight: 3.58 g

Prepared: 11/24/2020

Final Volume: 100 mL

% Solids: 69.30

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Sulfide	18496-25-8	20	27.9	27.9	257	mg/kg	D



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

COA_06_G_20201120
20K0374-07 (Solid)

Extractions

Method: ASTM D2216	Sampled: 11/20/2020 11:54	
Instrument: N/A Analyst: NL	Analyzed: 11/26/2020 05:10	
Sample Preparation:	Preparation Method: No Prep-Organics	Extract ID: 20K0374-07
	Preparation Batch: BIK0789	Dry Weight: 0.69 g
	Prepared: 11/25/2020	% Solids: 69.17
	Sample Size: 1 g (wet)	
	Final Volume: 1 g	

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Total Solids		1	0.01	73.99	%	



Dalton, Olmsted & Fuglevand, Inc
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Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

COA_06_G_20201120
20K0374-07 (Solid)

Extractions

Method: ASTM D2216

Sampled: 11/20/2020 11:54

Instrument: N/A Analyst: NL

Analyzed: 11/26/2020 05:10

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Labeled compounds						



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

COA_06_G_20201120
20K0374-07 (Solid)

Geotechnical Methods

Method: PSEP-PS

Sampled: 11/20/2020 11:54

Instrument: MT&C Analyst:

Analyzed: 01/11/2021 00:00

Analysis by: Materials Testing & Consulting, Inc. (Olympia)

Sample Preparation: Preparation Method: No Prep Geo
Preparation Batch: B011121
Prepared: 01/11/2021

Extract ID: 20K0374-07

Final Volume:

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Phi Size <-1	GS_GRAVEL	1	0.1	5.1	%	
Phi Size -1 to 0	GS_VCS	1	0.1	4.1	%	
Phi Size 0 to 1	GS_CS	1	0.1	10.8	%	
Phi Size 1 to 2	GS_MS	1	0.1	21.0	%	
Phi Size 2 to 3	GS_FS	1	0.1	31.7	%	
Phi Size 3 to 4	GS_VFS	1	0.1	11.2	%	
Phi Size 4 to 5	GS_CSILT	1	0.1	5.0	%	
Phi Size 5 to 6	GS_MSILT	1	0.1	2.4	%	
Phi Size 6 to 7	GS_FSILT	1	0.1	1.7	%	
Phi Size 7 to 8	GS_VFSILT	1	0.1	1.4	%	
Phi Size 8 to 9	GS_CCLAY	1	0.1	1.0	%	
Phi Size 9 to 10	GS_MCLAY	1	0.1	2.1	%	
Phi Size >10	GS_FCLAY	1	0.1	2.5	%	
Total Fines	GS_TOTFINES	1	0.1	16.1	%	



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Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

COA_06_G_20201120
20K0374-07RE1 (Solid)

Dioxins/Furans

Method: EPA 1613B		Sampled: 11/20/2020 11:54	
Instrument: AUTOSPEC01 Analyst: pk		Analyzed: 03/05/2021 03:23	
Sample Preparation:	Preparation Method: EPA 1613	Extract ID: 20K0374-07RE1 G 01	
	Preparation Batch: BJB0762	Dry Weight: 10.01 g	
	Prepared: 03/01/2021	% Solids: 73.99	
Sample Cleanup:	Cleanup Method: Silica Gel	Extract ID: 20K0374-07RE1 G 01	
	Cleanup Batch: CJC0027	Initial Volume: 20 mL	
	Cleaned: 03-Mar-2021	Final Volume: 20 mL	
Sample Cleanup:	Cleanup Method: Sulfuric Acid	Extract ID: 20K0374-07RE1 G 01	
	Cleanup Batch: CJC0026	Initial Volume: 20 mL	
	Cleaned: 02-Mar-2021	Final Volume: 20 mL	
Sample Cleanup:	Cleanup Method: Florisil	Extract ID: 20K0374-07RE1 G 01	
	Cleanup Batch: CJC0028	Initial Volume: 20 mL	
	Cleaned: 03-Mar-2021	Final Volume: 20 mL	

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting		Result	Units	Notes
				EDL	Limit			
2,3,7,8-TCDF		0.657	0.655-0.886	0.058	0.077	0.999	0.488	ng/kg J
2,3,7,8-TCDD			0.655-0.886	0.150	0.086	0.999	ND	ng/kg Ua
1,2,3,7,8-PeCDF			1.318-1.783	0.240	0.096	0.999	ND	ng/kg Ua
2,3,4,7,8-PeCDF			1.318-1.783	0.220	0.089	0.999	ND	ng/kg Ua
1,2,3,7,8-PeCDD		1.168	1.318-1.783	0.170	0.196	0.999	0.232	ng/kg EMPC, J
1,2,3,4,7,8-HxCDF		1.111	1.054-1.426	0.280	0.083	0.999	0.220	ng/kg J
1,2,3,6,7,8-HxCDF		1.272	1.054-1.426	0.200	0.088	0.999	0.142	ng/kg J
2,3,4,6,7,8-HxCDF		1.633	1.054-1.426	0.170	0.080	0.999	0.230	ng/kg EMPC, J
1,2,3,7,8,9-HxCDF			1.054-1.426	0.190	0.090	0.999	ND	ng/kg Ua
1,2,3,4,7,8-HxCDD			1.054-1.426	0.170	0.130	0.999	ND	ng/kg Ua
1,2,3,6,7,8-HxCDD		0.928	1.054-1.426	0.180	0.129	0.999	0.939	ng/kg EMPC, J
1,2,3,7,8,9-HxCDD		1.071	1.054-1.426	0.220	0.133	0.999	0.539	ng/kg J
1,2,3,4,6,7,8-HpCDF		0.965	0.893-1.208	0.210	0.074	0.999	4.68	ng/kg
1,2,3,4,7,8,9-HpCDF		1.410	0.893-1.208	0.240	0.099	0.999	0.271	ng/kg EMPC, J
1,2,3,4,6,7,8-HpCDD		1.015	0.893-1.208	0.559	0.191	2.50	21.1	ng/kg
OCDF		0.939	0.757-1.024	1.10	0.159	2.50	6.29	ng/kg B
OCDD		0.851	0.757-1.024	4.60	0.350	9.99	134	ng/kg B
Homologue groups								
Total TCDF						0.999	1.26	ng/kg
Total TCDD						0.999	0.539	ng/kg J
Total PeCDF						0.999	1.03	ng/kg
Total PeCDD						0.999	ND	ng/kg Ua
Total HxCDF						0.999	5.59	ng/kg
Total HxCDD						0.999	5.73	ng/kg B
Total HpCDF						0.999	12.5	ng/kg
Total HpCDD						0.999	86.4	ng/kg



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

COA_06_G_20201120
20K0374-07RE1 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/20/2020 11:54

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 03/05/2021 03:23

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting Limit	Result	Units	Notes
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC):				0.86			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC):				0.79			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, EMPC = ND):				0.68			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, EMPC = ND):				0.44			



Dalton, Olmsted & Fuglevand, Inc
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Project: COA Outfall
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Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

COA_06_G_20201120
20K0374-07RE1 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/20/2020 11:54

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 03/05/2021 03:23

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting Limit	Result	Units	Notes
Labeled compounds							
13C12-2,3,7,8-TCDF		0.800	0.655-0.886	24-169 %	75.6	%	
13C12-2,3,7,8-TCDD		0.799	0.655-0.886	25-164 %	77.5	%	
13C12-1,2,3,7,8-PeCDF		1.498	1.318-1.783	24-185 %	72.4	%	
13C12-2,3,4,7,8-PeCDF		1.520	1.318-1.783	21-178 %	71.6	%	
13C12-1,2,3,7,8-PeCDD		1.630	1.318-1.783	25-181 %	66.9	%	
13C12-1,2,3,4,7,8-HxCDF		0.508	0.434-0.587	26-152 %	75.3	%	
13C12-1,2,3,6,7,8-HxCDF		0.511	0.434-0.587	26-123 %	72.7	%	
13C12-2,3,4,6,7,8-HxCDF		0.508	0.434-0.587	28-136 %	77.2	%	
13C12-1,2,3,7,8,9-HxCDF		0.510	0.434-0.587	29-147 %	77.4	%	
13C12-1,2,3,4,7,8-HxCDD		1.265	1.054-1.426	32-141 %	73.5	%	
13C12-1,2,3,6,7,8-HxCDD		1.262	1.054-1.426	28-130 %	67.7	%	
13C12-1,2,3,4,6,7,8-HpCDF		0.435	0.374-0.506	28-143 %	70.3	%	
13C12-1,2,3,4,7,8,9-HpCDF		0.439	0.374-0.506	26-138 %	68.5	%	
13C12-1,2,3,4,6,7,8-HpCDD		1.077	0.893-1.208	23-140 %	75.4	%	
13C12-OCDD		0.937	0.757-1.024	17-157 %	58.2	%	
37Cl4-2,3,7,8-TCDD				35-197 %	92.0	%	



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

COA_06_G_20201120
20K0374-07RE1 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/20/2020 11:54

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 03/05/2021 03:23

Analyte	DF/Split	Ion Ratio	Ratio Limits	EDL	Reporting	Result	Units	Notes
					Limit			



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Reported:
26-Mar-2021 16:29

COA_06_G_20201120
20K0374-07RE1 (Solid)

Wet Chemistry

Method: SM 4500-NH3 H-97
Instrument: LACHAT2 Analyst: KOTT

Sample Preparation: Preparation Method: MSA 33.3 (2M KCl)
Preparation Batch: BIK0770 Sample Size: 4.4 g (wet)
Prepared: 11/24/2020 Final Volume: 40 mL

Extract ID: 20K0374-07RE1 N
Dry Weight: 3.04 g
% Solids: 69.17

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Ammonia-N	7664-41-7	2	1.05	1.05	11.8	mg/kg NH3-N	D



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Reported:
26-Mar-2021 16:29

COA_06-D_G_20201120
20K0374-08 (Solid)

Semivolatile Organic Compounds

Method: EPA 8270E
Instrument: NT10 Analyst: VTS
Sample Preparation: Preparation Method: EPA 3546 (Microwave)
Preparation Batch: BIK0878 Sample Size: 13.74 g (wet)
Prepared: 12/01/2020 Final Volume: 1 mL
Extract ID: 20K0374-08 D 04
Dry Weight: 10.04 g
% Solids: 73.09

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Phenol	108-95-2	1	8.2	19.9	8.7	ug/kg	J
Benzyl Alcohol	100-51-6	1	14.8	19.9	ND	ug/kg	Ua
2-Methylphenol	95-48-7	1	7.8	19.9	ND	ug/kg	Ua
Hexachloroethane	67-72-1	1	5.6	19.9	ND	ug/kg	Ua
4-Methylphenol	106-44-5	1	14.6	19.9	ND	ug/kg	Ua
Naphthalene	91-20-3	1	5.2	19.9	67.8	ug/kg	
Benzoic acid	65-85-0	1	58.8	199	ND	ug/kg	Ua
2-Methylnaphthalene	91-57-6	1	5.6	19.9	18.5	ug/kg	J
Acenaphthylene	208-96-8	1	4.7	19.9	22.2	ug/kg	
Dimethylphthalate	131-11-3	1	6.4	19.9	183	ug/kg	
Acenaphthene	83-32-9	1	5.1	19.9	9.0	ug/kg	J
Dibenzofuran	132-64-9	1	4.6	19.9	21.1	ug/kg	
Fluorene	86-73-7	1	4.9	19.9	21.7	ug/kg	
Diethyl phthalate	84-66-2	1	17.6	19.9	17.6	ug/kg	J
N-Nitrosodiphenylamine	86-30-6	1	9.5	19.9	ND	ug/kg	Ua
Hexachlorobenzene	118-74-1	1	4.7	19.9	ND	ug/kg	Ua
Pentachlorophenol	87-86-5	1	31.2	99.6	ND	ug/kg	Ua
Phenanthrene	85-01-8	1	4.7	19.9	133	ug/kg	
Anthracene	120-12-7	1	5.9	19.9	67.7	ug/kg	
Di-n-Butylphthalate	84-74-2	1	5.3	19.9	19.7	ug/kg	J
Fluoranthene	206-44-0	1	4.5	19.9	450	ug/kg	
Pyrene	129-00-0	1	5.5	19.9	503	ug/kg	
Butylbenzylphthalate	85-68-7	1	8.0	19.9	ND	ug/kg	Ua
Benzo(a)anthracene	56-55-3	1	5.2	19.9	170	ug/kg	
Chrysene	218-01-9	1	5.2	19.9	771	ug/kg	
bis(2-Ethylhexyl)phthalate	117-81-7	1	28.7	49.8	118	ug/kg	
Di-n-Octylphthalate	117-84-0	1	8.7	19.9	ND	ug/kg	Ua
Benzo(a)fluoranthene, Total		1	10.2	39.8	989	ug/kg	
Benzo(a)pyrene	50-32-8	1	6.5	19.9	391	ug/kg	
Indeno(1,2,3-cd)pyrene	193-39-5	1	6.0	19.9	180	ug/kg	
Dibenzo(a,h)anthracene	53-70-3	1	6.1	19.9	77.2	ug/kg	
Benzo(g,h,i)perylene	191-24-2	1	5.8	19.9	162	ug/kg	
Surrogate: 2-Fluorophenol				27-120 %	72.5	%	
Surrogate: Phenol-d5				29-120 %	75.6	%	
Surrogate: 2-Chlorophenol-d4				31-120 %	80.9	%	



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Reported:
26-Mar-2021 16:29

COA_06-D_G_20201120
20K0374-08 (Solid)

Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 11/20/2020 11:54

Instrument: NT10 Analyst: VTS

Analyzed: 12/30/2020 23:38

Analyte	CAS Number	Recovery	Recovery	Units	Notes
		Limits			
Surrogate: 1,2-Dichlorobenzene-d4		32-120 %	74.6	%	
Surrogate: Nitrobenzene-d5		30-120 %	96.7	%	
Surrogate: 2-Fluorobiphenyl		35-120 %	93.5	%	
Surrogate: 2,4,6-Tribromophenol		24-134 %	84.7	%	
Surrogate: p-Terphenyl-d14		37-120 %	86.1	%	



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Reported:
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COA_06-D_G_20201120
20K0374-08 (Solid)

Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM

Sampled: 11/20/2020 11:54

Instrument: NT10 Analyst: VTS

Analyzed: 12/30/2020 23:38

Sample Preparation:

Preparation Method: EPA 3546 (Microwave)

Extract ID: 20K0374-08 D 04

Preparation Batch: BIK0878

Sample Size: 13.74 g (wet)

Dry Weight: 10.04 g

Prepared: 12/01/2020

Final Volume: 1 mL

% Solids: 73.09

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
1,4-Dichlorobenzene	106-46-7	1	0.6	5.0	ND	ug/kg	Ua
1,2-Dichlorobenzene	95-50-1	1	0.7	5.0	ND	ug/kg	Ua
2,4-Dimethylphenol	105-67-9	1	2.2	19.9	3.2	ug/kg	J
1,2,4-Trichlorobenzene	120-82-1	1	2.7	5.0	ND	ug/kg	Ua
Hexachlorobutadiene	87-68-3	1	0.7	5.0	ND	ug/kg	Ua
Surrogate: 2-Fluorophenol				27-120 %	75.1	%	Q
Surrogate: p-Terphenyl-d14				37-120 %	79.9	%	



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Reported:
26-Mar-2021 16:29

COA_06-D_G_20201120
20K0374-08 (Solid)

Butyl Tins

Method: EPA 8270E-SIM	Sampled: 11/20/2020 11:54	
Instrument: NT8 Analyst: JZ	Analyzed: 12/17/2020 22:04	
Sample Preparation:	Preparation Method: EPA 3546 (Microwave)	Extract ID: 20K0374-08 D 03
	Preparation Batch: BIK0879	Sample Size: 6.89 g (wet)
	Prepared: 12/01/2020	Final Volume: 0.5 mL
		Dry Weight: 5.04 g
		% Solids: 73.09
Sample Cleanup:	Cleanup Method: Silica Gel	Extract ID: 20K0374-08 D 03
	Cleanup Batch: CIL0160	Initial Volume: 0.5 mL
	Cleaned: 17-Dec-2020	Final Volume: 0.5 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Tributyltin Ion	36643-28-4	1	0.447	3.83	3.08	ug/kg	J
Dibutyltin Ion	14488-53-0	1	1.72	5.74	2.33	ug/kg	J
Butyltin Ion	78763-54-9	1	1.88	4.05	ND	ug/kg	Ua
Tetrabutyltin	1461-25-2	1	4.96	4.96	ND	ug/kg	Ua
Surrogate: Tripentyltin					30-160 %	88.1	%
Surrogate: Tripropyltin					30-160 %	58.4	%



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Reported:
26-Mar-2021 16:29

COA_06-D_G_20201120
20K0374-08 (Solid)

Chlorinated Pesticides

Method: EPA 8081B		Sampled: 11/20/2020 11:54	
Instrument: ECD6 Analyst: YZ/VTs		Analyzed: 03/16/2021 02:45	
Sample Preparation:	Preparation Method: EPA 3546 (Microwave)	Extract ID: 20K0374-08 B 02	
	Preparation Batch: BJC0009	Dry Weight: 12.53 g	
	Prepared: 03/01/2021	% Solids: 73.09	
Sample Cleanup:	Cleanup Method: Silica Gel	Extract ID: 20K0374-08 B 02	
	Cleanup Batch: CJC0140	Initial Volume: 2.5 mL	
	Cleaned: 11-Mar-2021	Final Volume: 2.5 mL	
Sample Cleanup:	Cleanup Method: Sulfur	Extract ID: 20K0374-08 B 02	
	Cleanup Batch: CJC0139	Initial Volume: 2.5 mL	
	Cleaned: 11-Mar-2021	Final Volume: 2.5 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Heptachlor	76-44-8	1	0.05	0.50	ND	ug/kg	Ua
Aldrin	309-00-2	1	0.37	0.50	ND	ug/kg	Ua
trans-Chlordane (beta-Chlordane)	5103-74-2	1	0.33	0.50	ND	ug/kg	Ua
cis-Chlordane (alpha-chlordane)	5103-71-9	1	0.11	0.50	ND	ug/kg	Ua
4,4'-DDE	72-55-9	1	0.13	1.00	ND	ug/kg	Ua
Dieldrin	60-57-1	1	0.11	1.00	ND	ug/kg	Ua
4,4'-DDD	72-54-8	1	0.32	1.00	ND	ug/kg	Ua
4,4'-DDT	50-29-3	1	0.32	1.00	ND	ug/kg	Ua
Oxychlordane	27304-13-8	1	0.13	1.00	ND	ug/kg	Ua
cis-Nonachlor	5103-73-1	1	0.21	1.00	ND	ug/kg	Ua
trans-Nonachlor	39765-80-5	1	0.23	1.00	ND	ug/kg	Ua
Surrogate: Decachlorobiphenyl				30-160 %	83.4	%	
Surrogate: Decachlorobiphenyl [2C]				30-160 %	64.7	%	
Surrogate: Tetrachlorometaxylene				30-160 %	52.3	%	P1
Surrogate: Tetrachlorometaxylene [2C]				30-160 %	81.2	%	P1



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Reported:
26-Mar-2021 16:29

COA_06-D_G_20201120
20K0374-08 (Solid)

Aroclor PCB

Method: EPA 8082A		Sampled: 11/20/2020 11:54	
Instrument: ECD7 Analyst: JGR		Analyzed: 12/22/2020 17:13	
Sample Preparation:	Preparation Method: EPA 3546 (Microwave)	Extract ID: 20K0374-08 D 01	
	Preparation Batch: BIK0877	Dry Weight: 12.56 g	
	Prepared: 11/30/2020	% Solids: 73.09	
Sample Cleanup:	Cleanup Method: Silica Gel	Extract ID: 20K0374-08 D 01	
	Cleanup Batch: CIL0224	Initial Volume: 2.5 mL	
	Cleaned: 21-Dec-2020	Final Volume: 2.5 mL	
Sample Cleanup:	Cleanup Method: Sulfuric Acid	Extract ID: 20K0374-08 D 01	
	Cleanup Batch: CIL0218	Initial Volume: 2.5 mL	
	Cleaned: 21-Dec-2020	Final Volume: 2.5 mL	
Sample Cleanup:	Cleanup Method: Sulfur	Extract ID: 20K0374-08 D 01	
	Cleanup Batch: CIL0219	Initial Volume: 2.5 mL	
	Cleaned: 21-Dec-2020	Final Volume: 2.5 mL	
Sample Cleanup:	Cleanup Method: Alumina	Extract ID: 20K0374-08 D 01	
	Cleanup Batch: CIL0223	Initial Volume: 2.5 mL	
	Cleaned: 21-Dec-2020	Final Volume: 2.5 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Aroclor 1016	12674-11-2	1	1.6	4.0	ND	ug/kg	Ua
Aroclor 1221	11104-28-2	1	1.6	4.0	ND	ug/kg	Ua
Aroclor 1232	11141-16-5	1	1.6	4.0	ND	ug/kg	Ua
Aroclor 1242	53469-21-9	1	1.6	4.0	ND	ug/kg	Ua
Aroclor 1248	12672-29-6	1	1.6	4.0	2.1	ug/kg	J
Aroclor 1254	11097-69-1	1	1.6	4.0	1.7	ug/kg	J
Aroclor 1260	11096-82-5	1	0.6	4.0	0.7	ug/kg	J
Aroclor 1262	37324-23-5	1	0.6	4.0	ND	ug/kg	Ua
Aroclor 1268	11100-14-4	1	0.6	4.0	ND	ug/kg	Ua
Surrogate: Decachlorobiphenyl					40-126 %	68.7	%
Surrogate: Tetrachlorometaxylene					44-120 %	75.2	%
Surrogate: Decachlorobiphenyl [2C]					40-126 %	85.7	%
Surrogate: Tetrachlorometaxylene [2C]					44-120 %	77.1	%



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Reported:
26-Mar-2021 16:29

COA_06-D_G_20201120
20K0374-08 (Solid)

Dioxins/Furans

Method: EPA 1613B		Sampled: 11/20/2020 11:54	
Instrument: AUTOSPEC01 Analyst: pk		Analyzed: 12/18/2020 23:57	
Sample Preparation:	Preparation Method: EPA 1613	Extract ID: 20K0374-08 C 01	
	Preparation Batch: BIL0237	Dry Weight: 10.04 g	
	Prepared: 12/10/2020	% Solids: 72.95	
Sample Cleanup:	Cleanup Method: Silica Gel	Extract ID: 20K0374-08 C 01	
	Cleanup Batch: CIL0151	Initial Volume: 20 mL	
	Cleaned: 15-Dec-2020	Final Volume: 20 mL	
Sample Cleanup:	Cleanup Method: Sulfuric Acid	Extract ID: 20K0374-08 C 01	
	Cleanup Batch: CIL0150	Initial Volume: 20 mL	
	Cleaned: 14-Dec-2020	Final Volume: 20 mL	
Sample Cleanup:	Cleanup Method: Florisil	Extract ID: 20K0374-08 C 01	
	Cleanup Batch: CIL0152	Initial Volume: 20 mL	
	Cleaned: 15-Dec-2020	Final Volume: 20 mL	

Analyte	DF/Split	Ion Ratio	Ratio Limits	EDL	Reporting		Result	Units	Notes
					Limit	Limit			
2,3,7,8-TCDF		0.956	0.655-0.886	0.063	0.062	0.996	0.627	ng/kg	EMPC, X, J
2,3,7,8-TCDD			0.655-0.886	0.139	0.082	0.996	ND	ng/kg	Ua
1,2,3,7,8-PeCDF		1.835	1.318-1.783	0.149	0.111	0.996	0.158	ng/kg	EMPC, J
2,3,4,7,8-PeCDF		2.352	1.318-1.783	0.149	0.109	0.996	0.467	ng/kg	EMPC, J
1,2,3,7,8-PeCDD		1.602	1.318-1.783	0.179	0.123	0.996	0.264	ng/kg	J
1,2,3,4,7,8-HxCDF		1.450	1.054-1.426	0.139	0.078	0.996	1.56	ng/kg	EMPC
1,2,3,6,7,8-HxCDF		1.430	1.054-1.426	0.179	0.078	0.996	0.581	ng/kg	EMPC, J
2,3,4,6,7,8-HxCDF		1.624	1.054-1.426	0.110	0.078	0.996	0.410	ng/kg	EMPC, J
1,2,3,7,8,9-HxCDF		1.615	1.054-1.426	0.209	0.142	0.996	0.400	ng/kg	EMPC, J
1,2,3,4,7,8-HxCDD		1.973	1.054-1.426	0.179	0.155	0.996	0.467	ng/kg	EMPC, J
1,2,3,6,7,8-HxCDD		1.209	1.054-1.426	0.149	0.150	0.996	6.16	ng/kg	
1,2,3,7,8,9-HxCDD		1.158	1.054-1.426	0.219	0.173	0.996	1.10	ng/kg	
1,2,3,4,6,7,8-HpCDF		1.094	0.893-1.208	0.209	0.168	0.996	39.0	ng/kg	
1,2,3,4,7,8,9-HpCDF		1.104	0.893-1.208	0.159	0.218	0.996	1.71	ng/kg	
1,2,3,4,6,7,8-HpCDD		1.016	0.893-1.208	0.558	0.300	2.49	116	ng/kg	
OCDF		0.871	0.757-1.024	1.10	0.231	2.49	65.1	ng/kg	
OCDD		0.858	0.757-1.024	4.28	0.484	9.96	562	ng/kg	B
Homologue groups									
Total TCDF						0.996	1.76	ng/kg	
Total TCDD						0.996	0.208	ng/kg	J
Total PeCDF						0.996	2.90	ng/kg	
Total PeCDD						0.996	0.414	ng/kg	J
Total HxCDF						0.996	34.0	ng/kg	
Total HxCDD						0.996	41.9	ng/kg	
Total HpCDF						0.996	139	ng/kg	
Total HpCDD						0.996	372	ng/kg	



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Reported:
26-Mar-2021 16:29

COA_06-D_G_20201120
20K0374-08 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/20/2020 11:54

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 12/18/2020 23:57

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting Limit	Result	Units	Notes
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC):				3.34			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC):				3.29			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, EMPC = ND):				3.06			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, EMPC = ND):				2.75			



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COA_06-D_G_20201120
20K0374-08 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/20/2020 11:54

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 12/18/2020 23:57

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting Limit	Result	Units	Notes
Labeled compounds							
13C12-2,3,7,8-TCDF		0.781	0.655-0.886	24-169 %	79.7	%	
13C12-2,3,7,8-TCDD		0.813	0.655-0.886	25-164 %	79.9	%	
13C12-1,2,3,7,8-PeCDF		1.525	1.318-1.783	24-185 %	75.0	%	
13C12-2,3,4,7,8-PeCDF		1.547	1.318-1.783	21-178 %	74.8	%	
13C12-1,2,3,7,8-PeCDD		1.656	1.318-1.783	25-181 %	71.3	%	
13C12-1,2,3,4,7,8-HxCDF		0.494	0.434-0.587	26-152 %	85.3	%	
13C12-1,2,3,6,7,8-HxCDF		0.496	0.434-0.587	26-123 %	74.2	%	
13C12-2,3,4,6,7,8-HxCDF		0.498	0.434-0.587	28-136 %	80.4	%	
13C12-1,2,3,7,8,9-HxCDF		0.492	0.434-0.587	29-147 %	49.7	%	
13C12-1,2,3,4,7,8-HxCDD		1.275	1.054-1.426	32-141 %	82.3	%	
13C12-1,2,3,6,7,8-HxCDD		1.295	1.054-1.426	28-130 %	67.0	%	
13C12-1,2,3,4,6,7,8-HpCDF		0.437	0.374-0.506	28-143 %	70.3	%	
13C12-1,2,3,4,7,8,9-HpCDF		0.437	0.374-0.506	26-138 %	76.6	%	
13C12-1,2,3,4,6,7,8-HpCDD		1.049	0.893-1.208	23-140 %	76.2	%	
13C12-OCDD		0.930	0.757-1.024	17-157 %	52.2	%	
37Cl4-2,3,7,8-TCDD				35-197 %	92.9	%	



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Reported:
26-Mar-2021 16:29

COA_06-D_G_20201120
20K0374-08 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/20/2020 11:54

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 12/18/2020 23:57

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting		Result	Units	Notes
				EDL	Limit			



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

COA_06-D_G_20201120
20K0374-08 (Solid)

Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 11/20/2020 11:54

Instrument: ICPMS1 Analyst: MCB

Analyzed: 03/23/2021 19:17

Sample Preparation:

Preparation Method: SWN EPA 3050B

Extract ID: 20K0374-08 E 02

Preparation Batch: BJC0563

Sample Size: 1.052 g (wet)

Dry Weight: 0.73 g

Prepared: 03/22/2021

Final Volume: 50 mL

% Solids: 69.25

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Antimony	7440-36-0	20	0.02	0.27	ND	mg/kg	Ua
Chromium	7440-47-3	20	0.18	0.69	30.3	mg/kg	
Lead	7439-92-1	20	0.09	0.14	5.16	mg/kg	
Silver	7440-22-4	20	0.02	0.27	0.05	mg/kg	J



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Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

COA_06-D_G_20201120
20K0374-08 (Solid)

Metals and Metallic Compounds

Method: EPA 6020B UCT-KED

Sampled: 11/20/2020 11:54

Instrument: ICPMS1 Analyst: MCB

Analyzed: 03/24/2021 14:50

Sample Preparation:

Preparation Method: SWN EPA 3050B

Extract ID: 20K0374-08 E 02

Preparation Batch: BJC0563

Sample Size: 1.052 g (wet)

Dry Weight: 0.73 g

Prepared: 03/22/2021

Final Volume: 50 mL

% Solids: 69.25

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	20	0.03	0.27	5.65	mg/kg	
Cadmium	7440-43-9	20	0.04	0.14	0.39	mg/kg	
Copper	7440-50-8	20	0.47	0.69	12.5	mg/kg	
Selenium	7782-49-2	20	0.60	0.69	ND	mg/kg	Ua
Zinc	7440-66-6	20	1.1	5.5	39.9	mg/kg	



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Reported:
26-Mar-2021 16:29

COA_06-D_G_20201120
20K0374-08 (Solid)

Metals and Metallic Compounds

Method: EPA 7471B

Sampled: 11/20/2020 11:54

Instrument: HYDRA Analyst: BLC

Analyzed: 03/23/2021 11:45

Sample Preparation:

Preparation Method: SMM EPA 7471B

Extract ID: 20K0374-08 E

Preparation Batch: BJC0609

Sample Size: 0.252 g (wet)

Dry Weight: 0.17 g

Prepared: 03/22/2021

Final Volume: 50 mL

% Solids: 69.25

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.00602	0.0287	0.0400	mg/kg	H



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1420 - 156th Ave., NE STE C1
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Reported:
26-Mar-2021 16:29

COA_06-D_G_20201120
20K0374-08 (Solid)

Wet Chemistry

Method: EPA 9060A m

Sampled: 11/20/2020 11:54

Instrument: TOC Cube Analyst: BF

Analyzed: 11/26/2020 18:17

Sample Preparation:

Preparation Method: PSEP 1986 (modified)

Extract ID: 20K0374-08 E

Preparation Batch: BIK0803

Sample Size: 0.4115 g (wet)

Dry Weight: 0.28 g

Prepared: 11/25/2020

Final Volume: 0.4115 mL

% Solids: 69.25

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Organic Carbon		1	0.02	0.02	1.09	%	



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Reported:
26-Mar-2021 16:29

COA_06-D_G_20201120
20K0374-08 (Solid)

Wet Chemistry

Method: PSEP 1986

Sampled: 11/20/2020 11:54

Instrument: BAL2 Analyst: UW

Analyzed: 11/24/2020 17:15

Sample Preparation:	Preparation Method: No Prep Wet Chem	Sample Size: 5 g (wet)	Extract ID: 20K0374-08
	Preparation Batch: BIK0773	Final Volume: 5 g	Dry Weight: 3.46 g
	Prepared: 11/24/2020		% Solids: 69.25

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Volatile Solids		1	0.01	0.01	3.44	%	

Sample Preparation:	Preparation Method: No Prep Wet Chem	Sample Size: 5 g (wet)	Extract ID: 20K0374-08
	Preparation Batch: BIK0778	Final Volume: 5 g	Dry Weight: 3.46 g
	Prepared: 11/24/2020		% Solids: 69.25

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Solids, Sulfide		1	0.04	0.04	69.36	%	



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Reported:
26-Mar-2021 16:29

COA_06-D_G_20201120
20K0374-08 (Solid)

Wet Chemistry

Method: SM 2540 G-97

Sampled: 11/20/2020 11:54

Instrument: BAL2 Analyst: UW

Analyzed: 11/24/2020 17:15

Sample Preparation:

Preparation Method: No Prep Wet Chem

Extract ID: 20K0374-08

Preparation Batch: BIK0773

Sample Size: 5 g (wet)

Dry Weight: 3.46 g

Prepared: 11/24/2020

Final Volume: 5 g

% Solids: 69.25

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Solids		1	0.04	0.04	69.25	%	



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Reported:
26-Mar-2021 16:29

COA_06-D_G_20201120
20K0374-08 (Solid)

Wet Chemistry

Method: SM 4500-NH3 H-97
Instrument: LCHAT2 Analyst: KOTT
Sample Preparation: Preparation Method: MSA 33.3 (2M KCl)
Preparation Batch: BIK0770 Sample Size: 4.39 g (wet)
Prepared: 11/24/2020 Final Volume: 40 mL
Extract ID: 20K0374-08 E
Dry Weight: 3.04 g
% Solids: 69.25

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Ammonia-N	7664-41-7	1	0.53	0.53	12.8	mg/kg NH3-N	



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Reported:
26-Mar-2021 16:29

COA_06-D_G_20201120
20K0374-08 (Solid)

Wet Chemistry

Method: SM 4500-S2 D-00 (PSEP)
Instrument: UV1800-1 Analyst: CDE

Sampled: 11/20/2020 11:54
Analyzed: 12/03/2020 17:15

Sample Preparation: Preparation Method: PSEP 1986
Preparation Batch: BIK0762 Sample Size: 5.043 g (wet)
Prepared: 11/24/2020 Final Volume: 100 mL
Extract ID: 20K0374-08 F
Dry Weight: 3.50 g
% Solids: 69.36

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Sulfide	18496-25-8	20	28.6	28.6	277	mg/kg	D



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Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

COA_06-D_G_20201120
20K0374-08 (Solid)

Extractions

Method: ASTM D2216	Sampled: 11/20/2020 11:54	
Instrument: N/A Analyst: NL	Analyzed: 11/26/2020 05:10	
Sample Preparation:	Preparation Method: No Prep-Organics	Extract ID: 20K0374-08
	Preparation Batch: BIK0789	Dry Weight: 0.69 g
	Prepared: 11/25/2020	% Solids: 69.25
	Sample Size: 1 g (wet)	
	Final Volume: 1 g	

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Total Solids		1	0.01	72.95	%	



Dalton, Olmsted & Fuglevand, Inc
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Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

COA_06-D_G_20201120
20K0374-08 (Solid)

Extractions

Method: ASTM D2216

Sampled: 11/20/2020 11:54

Instrument: N/A Analyst: NL

Analyzed: 11/26/2020 05:10

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Labeled compounds						



Dalton, Olmsted & Fuglevand, Inc
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Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

COA_06-D_G_20201120
20K0374-08 (Solid)

Geotechnical Methods

Method: PSEP-PS

Sampled: 11/20/2020 11:54

Instrument: MT&C Analyst:

Analyzed: 01/11/2021 00:00

Analysis by: Materials Testing & Consulting, Inc. (Olympia)

Sample Preparation: Preparation Method: No Prep Geo
Preparation Batch: B011121
Prepared: 01/11/2021

Extract ID: 20K0374-08

Final Volume:

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Phi Size <-1	GS_GRAVEL	1	0.1	3.5	%	
Phi Size -1 to 0	GS_VCS	1	0.1	4.1	%	
Phi Size 0 to 1	GS_CS	1	0.1	11.4	%	
Phi Size 1 to 2	GS_MS	1	0.1	21.9	%	
Phi Size 2 to 3	GS_FS	1	0.1	32.7	%	
Phi Size 3 to 4	GS_VFS	1	0.1	11.4	%	
Phi Size 4 to 5	GS_CSILT	1	0.1	3.6	%	
Phi Size 5 to 6	GS_MSILT	1	0.1	2.9	%	
Phi Size 6 to 7	GS_FSILT	1	0.1	1.6	%	
Phi Size 7 to 8	GS_VFSILT	1	0.1	1.3	%	
Phi Size 8 to 9	GS_CCLAY	1	0.1	1.6	%	
Phi Size 9 to 10	GS_MCLAY	1	0.1	2.4	%	
Phi Size >10	GS_FCLAY	1	0.1	1.6	%	
Total Fines	GS_TOTFINES	1	0.1	15.0	%	



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Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

COA_06-D_G_20201120
20K0374-08RE1 (Solid)

Dioxins/Furans

Method: EPA 1613B		Sampled: 11/20/2020 11:54	
Instrument: AUTOSPEC01 Analyst: pk		Analyzed: 03/05/2021 04:13	
Sample Preparation:	Preparation Method: EPA 1613	Extract ID: 20K0374-08RE1 C 01	
	Preparation Batch: BJB0762	Dry Weight: 10.04 g	
	Prepared: 03/01/2021	% Solids: 72.95	
Sample Cleanup:	Cleanup Method: Silica Gel	Extract ID: 20K0374-08RE1 C 01	
	Cleanup Batch: CJC0027	Initial Volume: 20 mL	
	Cleaned: 03-Mar-2021	Final Volume: 20 mL	
Sample Cleanup:	Cleanup Method: Sulfuric Acid	Extract ID: 20K0374-08RE1 C 01	
	Cleanup Batch: CJC0026	Initial Volume: 20 mL	
	Cleaned: 02-Mar-2021	Final Volume: 20 mL	
Sample Cleanup:	Cleanup Method: Florisil	Extract ID: 20K0374-08RE1 C 01	
	Cleanup Batch: CJC0028	Initial Volume: 20 mL	
	Cleaned: 03-Mar-2021	Final Volume: 20 mL	

Analyte	DF/Split	Ion Ratio	Ratio Limits	EDL	Reporting		Result	Units	Notes
					Limit				
2,3,7,8-TCDF		0.689	0.655-0.886	0.058	0.114	0.996	0.387	ng/kg	J
2,3,7,8-TCDD		0.326	0.655-0.886	0.149	0.075	0.996	0.169	ng/kg	EMPC, J
1,2,3,7,8-PeCDF		2.068	1.318-1.783	0.239	0.094	0.996	0.143	ng/kg	EMPC, J
2,3,4,7,8-PeCDF		0.725	1.318-1.783	0.219	0.089	0.996	0.084	ng/kg	EMPC, J
1,2,3,7,8-PeCDD			1.318-1.783	0.169	0.145	0.996	ND	ng/kg	Ua
1,2,3,4,7,8-HxCDF		0.981	1.054-1.426	0.279	0.080	0.996	0.142	ng/kg	EMPC, J
1,2,3,6,7,8-HxCDF		0.985	1.054-1.426	0.199	0.082	0.996	0.156	ng/kg	EMPC, J
2,3,4,6,7,8-HxCDF		2.264	1.054-1.426	0.169	0.079	0.996	0.124	ng/kg	EMPC, J
1,2,3,7,8,9-HxCDF			1.054-1.426	0.189	0.084	0.996	ND	ng/kg	Ua
1,2,3,4,7,8-HxCDD		1.414	1.054-1.426	0.169	0.152	0.996	0.304	ng/kg	J
1,2,3,6,7,8-HxCDD		1.512	1.054-1.426	0.179	0.149	0.996	0.995	ng/kg	EMPC, J
1,2,3,7,8,9-HxCDD		1.184	1.054-1.426	0.219	0.155	0.996	0.509	ng/kg	J
1,2,3,4,6,7,8-HpCDF		1.065	0.893-1.208	0.209	0.084	0.996	3.04	ng/kg	
1,2,3,4,7,8,9-HpCDF		1.260	0.893-1.208	0.239	0.116	0.996	0.125	ng/kg	EMPC, J
1,2,3,4,6,7,8-HpCDD		1.099	0.893-1.208	0.558	0.202	2.49	28.1	ng/kg	
OCDF		0.978	0.757-1.024	1.10	0.157	2.49	6.61	ng/kg	B
OCDD		0.821	0.757-1.024	4.58	0.266	9.96	172	ng/kg	B
Homologue groups									
Total TCDF						0.996	1.56	ng/kg	
Total TCDD						0.996	1.34	ng/kg	
Total PeCDF						0.996	0.562	ng/kg	J
Total PeCDD						0.996	0.874	ng/kg	J
Total HxCDF						0.996	2.88	ng/kg	
Total HxCDD						0.996	10.2	ng/kg	B
Total HpCDF						0.996	9.01	ng/kg	
Total HpCDD						0.996	115	ng/kg	



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Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

COA_06-D_G_20201120
20K0374-08RE1 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/20/2020 11:54

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 03/05/2021 04:13

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting Limit	Result	Units	Notes
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC):				0.89			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC):				0.80			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, EMPC = ND):				0.72			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, EMPC = ND):				0.48			



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Reported:
26-Mar-2021 16:29

COA_06-D_G_20201120
20K0374-08RE1 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/20/2020 11:54

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 03/05/2021 04:13

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting Limit	Result	Units	Notes
Labeled compounds							
13C12-2,3,7,8-TCDF		0.769	0.655-0.886	24-169 %	73.9	%	
13C12-2,3,7,8-TCDD		0.808	0.655-0.886	25-164 %	79.0	%	
13C12-1,2,3,7,8-PeCDF		1.497	1.318-1.783	24-185 %	71.9	%	
13C12-2,3,4,7,8-PeCDF		1.522	1.318-1.783	21-178 %	70.6	%	
13C12-1,2,3,7,8-PeCDD		1.641	1.318-1.783	25-181 %	67.4	%	
13C12-1,2,3,4,7,8-HxCDF		0.509	0.434-0.587	26-152 %	75.8	%	
13C12-1,2,3,6,7,8-HxCDF		0.509	0.434-0.587	26-123 %	73.7	%	
13C12-2,3,4,6,7,8-HxCDF		0.511	0.434-0.587	28-136 %	77.5	%	
13C12-1,2,3,7,8,9-HxCDF		0.515	0.434-0.587	29-147 %	79.5	%	
13C12-1,2,3,4,7,8-HxCDD		1.246	1.054-1.426	32-141 %	73.5	%	
13C12-1,2,3,6,7,8-HxCDD		1.263	1.054-1.426	28-130 %	69.7	%	
13C12-1,2,3,4,6,7,8-HpCDF		0.440	0.374-0.506	28-143 %	68.8	%	
13C12-1,2,3,4,7,8,9-HpCDF		0.447	0.374-0.506	26-138 %	68.2	%	
13C12-1,2,3,4,6,7,8-HpCDD		1.040	0.893-1.208	23-140 %	75.2	%	
13C12-OCDD		0.892	0.757-1.024	17-157 %	58.7	%	
37Cl4-2,3,7,8-TCDD				35-197 %	88.6	%	



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Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

COA_07_G_20201118
20K0374-09 (Solid)

Semivolatile Organic Compounds

Method: EPA 8270E
Instrument: NT10 Analyst: VTS
Sample Preparation: Preparation Method: EPA 3546 (Microwave)
Preparation Batch: BIK0878
Prepared: 12/01/2020
Sample Size: 14.07 g (wet)
Final Volume: 1 mL
Extract ID: 20K0374-09 D 04
Dry Weight: 10.05 g
% Solids: 71.43

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Phenol	108-95-2	1	8.2	19.9	ND	ug/kg	Ua
Benzyl Alcohol	100-51-6	1	14.8	19.9	ND	ug/kg	Ua
2-Methylphenol	95-48-7	1	7.8	19.9	ND	ug/kg	Ua
Hexachloroethane	67-72-1	1	5.6	19.9	ND	ug/kg	Ua
4-Methylphenol	106-44-5	1	14.6	19.9	ND	ug/kg	Ua
Naphthalene	91-20-3	1	5.2	19.9	65.1	ug/kg	
Benzoic acid	65-85-0	1	58.8	199	ND	ug/kg	Ua
2-Methylnaphthalene	91-57-6	1	5.6	19.9	14.2	ug/kg	J
Acenaphthylene	208-96-8	1	4.7	19.9	14.9	ug/kg	J
Dimethylphthalate	131-11-3	1	6.4	19.9	ND	ug/kg	Ua
Acenaphthene	83-32-9	1	5.1	19.9	13.9	ug/kg	J
Dibenzofuran	132-64-9	1	4.6	19.9	14.9	ug/kg	J
Fluorene	86-73-7	1	4.9	19.9	17.3	ug/kg	J
Diethyl phthalate	84-66-2	1	17.6	19.9	ND	ug/kg	Ua
N-Nitrosodiphenylamine	86-30-6	1	9.5	19.9	ND	ug/kg	Ua
Hexachlorobenzene	118-74-1	1	4.7	19.9	ND	ug/kg	Ua
Pentachlorophenol	87-86-5	1	31.1	99.5	ND	ug/kg	Ua
Phenanthrene	85-01-8	1	4.7	19.9	88.8	ug/kg	
Anthracene	120-12-7	1	5.9	19.9	38.6	ug/kg	
Di-n-Butylphthalate	84-74-2	1	5.3	19.9	17.5	ug/kg	J
Fluoranthene	206-44-0	1	4.5	19.9	123	ug/kg	
Pyrene	129-00-0	1	5.5	19.9	184	ug/kg	
Butylbenzylphthalate	85-68-7	1	8.0	19.9	ND	ug/kg	Ua
Benzo(a)anthracene	56-55-3	1	5.2	19.9	64.5	ug/kg	
Chrysene	218-01-9	1	5.2	19.9	236	ug/kg	
bis(2-Ethylhexyl)phthalate	117-81-7	1	28.7	49.8	ND	ug/kg	Ua
Di-n-Octylphthalate	117-84-0	1	8.7	19.9	ND	ug/kg	Ua
Benzo(a)fluoranthene, Total		1	10.1	39.8	600	ug/kg	
Benzo(a)pyrene	50-32-8	1	6.4	19.9	88.0	ug/kg	
Indeno(1,2,3-cd)pyrene	193-39-5	1	6.0	19.9	85.5	ug/kg	
Dibenzo(a,h)anthracene	53-70-3	1	6.1	19.9	33.8	ug/kg	
Benzo(g,h,i)perylene	191-24-2	1	5.8	19.9	78.6	ug/kg	
Surrogate: 2-Fluorophenol				27-120 %	68.3	%	
Surrogate: Phenol-d5				29-120 %	70.3	%	
Surrogate: 2-Chlorophenol-d4				31-120 %	76.8	%	



Dalton, Olmsted & Fuglevand, Inc
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Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

COA_07_G_20201118
20K0374-09 (Solid)

Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 11/18/2020 11:36

Instrument: NT10 Analyst: VTS

Analyzed: 12/31/2020 00:16

Analyte	CAS Number	Recovery	Recovery	Units	Notes
		Limits			
Surrogate: 1,2-Dichlorobenzene-d4		32-120 %	70.0	%	
Surrogate: Nitrobenzene-d5		30-120 %	89.7	%	
Surrogate: 2-Fluorobiphenyl		35-120 %	83.3	%	
Surrogate: 2,4,6-Tribromophenol		24-134 %	77.6	%	
Surrogate: p-Terphenyl-d14		37-120 %	83.2	%	



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Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

COA_07_G_20201118
20K0374-09 (Solid)

Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM

Sampled: 11/18/2020 11:36

Instrument: NT10 Analyst: VTS

Analyzed: 12/31/2020 00:16

Sample Preparation:

Preparation Method: EPA 3546 (Microwave)

Extract ID: 20K0374-09 D 04

Preparation Batch: BIK0878

Sample Size: 14.07 g (wet)

Dry Weight: 10.05 g

Prepared: 12/01/2020

Final Volume: 1 mL

% Solids: 71.43

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
1,4-Dichlorobenzene	106-46-7	1	0.6	5.0	ND	ug/kg	Ua
1,2-Dichlorobenzene	95-50-1	1	0.7	5.0	ND	ug/kg	Ua
2,4-Dimethylphenol	105-67-9	1	2.2	19.9	2.2	ug/kg	J
1,2,4-Trichlorobenzene	120-82-1	1	2.7	5.0	ND	ug/kg	Ua
Hexachlorobutadiene	87-68-3	1	0.7	5.0	ND	ug/kg	Ua
Surrogate: 2-Fluorophenol				27-120 %	70.0	%	Q
Surrogate: p-Terphenyl-d14				37-120 %	76.0	%	



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Reported:
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COA_07_G_20201118
20K0374-09 (Solid)

Butyl Tins

Method: EPA 8270E-SIM			Sampled: 11/18/2020 11:36
Instrument: NT8 Analyst: JZ			Analyzed: 12/19/2020 11:57
Sample Preparation:	Preparation Method: EPA 3546 (Microwave)		Extract ID: 20K0374-09 D 03
	Preparation Batch: BIK0879	Sample Size: 7.01 g (wet)	Dry Weight: 5.01 g
	Prepared: 12/01/2020	Final Volume: 0.5 mL	% Solids: 71.43
Sample Cleanup:	Cleanup Method: Silica Gel		Extract ID: 20K0374-09 D 03
	Cleanup Batch: CIL0160	Initial Volume: 0.5 mL	
	Cleaned: 17-Dec-2020	Final Volume: 0.5 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Tributyltin Ion	36643-28-4	1	0.449	3.85	2.05	ug/kg	J
Dibutyltin Ion	14488-53-0	1	1.73	5.77	5.48	ug/kg	J
Butyltin Ion	78763-54-9	1	1.89	4.07	ND	ug/kg	Ua
Tetrabutyltin	1461-25-2	1	4.99	4.99	ND	ug/kg	Ua
<i>Surrogate: Triphenyltin</i>				30-160 %	91.0	%	
<i>Surrogate: Tripropyltin</i>				30-160 %	60.0	%	



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Reported:
26-Mar-2021 16:29

COA_07_G_20201118
20K0374-09 (Solid)

Chlorinated Pesticides

Method: EPA 8081B		Sampled: 11/18/2020 11:36	
Instrument: ECD6 Analyst: YZ/VTs		Analyzed: 03/16/2021 03:03	
Sample Preparation:	Preparation Method: EPA 3546 (Microwave)	Extract ID: 20K0374-09 B 02	
	Preparation Batch: BJC0009	Dry Weight: 12.59 g	
	Prepared: 03/01/2021	% Solids: 71.43	
Sample Cleanup:	Cleanup Method: Silica Gel	Extract ID: 20K0374-09 B 02	
	Cleanup Batch: CJC0140	Initial Volume: 2.5 mL	
	Cleaned: 11-Mar-2021	Final Volume: 2.5 mL	
Sample Cleanup:	Cleanup Method: Sulfur	Extract ID: 20K0374-09 B 02	
	Cleanup Batch: CJC0139	Initial Volume: 2.5 mL	
	Cleaned: 11-Mar-2021	Final Volume: 2.5 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Heptachlor	76-44-8	1	0.05	0.50	ND	ug/kg	Ua
Aldrin	309-00-2	1	0.37	0.50	ND	ug/kg	Ua
trans-Chlordane (beta-Chlordane)	5103-74-2	1	0.32	0.50	ND	ug/kg	Ua
cis-Chlordane (alpha-chlordane)	5103-71-9	1	0.11	0.50	ND	ug/kg	Ua
4,4'-DDE	72-55-9	1	0.13	0.99	ND	ug/kg	Ua
Dieldrin	60-57-1	1	0.11	0.99	ND	ug/kg	Ua
4,4'-DDD	72-54-8	1	0.32	0.99	ND	ug/kg	Ua
4,4'-DDT	50-29-3	1	0.32	0.99	ND	ug/kg	Ua
Oxychlordane	27304-13-8	1	0.13	0.99	ND	ug/kg	Ua
cis-Nonachlor	5103-73-1	1	0.21	0.99	ND	ug/kg	Ua
trans-Nonachlor	39765-80-5	1	0.23	0.99	ND	ug/kg	Ua
Surrogate: Decachlorobiphenyl				30-160 %	84.2	%	
Surrogate: Decachlorobiphenyl [2C]				30-160 %	59.5	%	
Surrogate: Tetrachlorometaxylene				30-160 %	66.3	%	
Surrogate: Tetrachlorometaxylene [2C]				30-160 %	54.9	%	



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26-Mar-2021 16:29

COA_07_G_20201118
20K0374-09 (Solid)

Aroclor PCB

Method: EPA 8082A		Sampled: 11/18/2020 11:36	
Instrument: ECD7 Analyst: JGR		Analyzed: 12/22/2020 17:33	
Sample Preparation:	Preparation Method: EPA 3546 (Microwave)	Extract ID: 20K0374-09 D 01	
	Preparation Batch: BIK0877	Dry Weight: 12.53 g	
	Prepared: 11/30/2020	% Solids: 71.43	
Sample Cleanup:	Cleanup Method: Silica Gel	Extract ID: 20K0374-09 D 01	
	Cleanup Batch: CIL0224	Initial Volume: 2.5 mL	
	Cleaned: 21-Dec-2020	Final Volume: 2.5 mL	
Sample Cleanup:	Cleanup Method: Sulfuric Acid	Extract ID: 20K0374-09 D 01	
	Cleanup Batch: CIL0218	Initial Volume: 2.5 mL	
	Cleaned: 21-Dec-2020	Final Volume: 2.5 mL	
Sample Cleanup:	Cleanup Method: Sulfur	Extract ID: 20K0374-09 D 01	
	Cleanup Batch: CIL0219	Initial Volume: 2.5 mL	
	Cleaned: 21-Dec-2020	Final Volume: 2.5 mL	
Sample Cleanup:	Cleanup Method: Alumina	Extract ID: 20K0374-09 D 01	
	Cleanup Batch: CIL0223	Initial Volume: 2.5 mL	
	Cleaned: 21-Dec-2020	Final Volume: 2.5 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Aroclor 1016	12674-11-2	1	1.6	4.0	ND	ug/kg	Ua
Aroclor 1221	11104-28-2	1	1.6	4.0	ND	ug/kg	Ua
Aroclor 1232	11141-16-5	1	1.6	4.0	ND	ug/kg	Ua
Aroclor 1242	53469-21-9	1	1.6	4.0	ND	ug/kg	Ua
Aroclor 1248	12672-29-6	1	1.6	4.0	ND	ug/kg	Ua
Aroclor 1254	11097-69-1	1	1.6	4.0	13.9	ug/kg	
Aroclor 1260	11096-82-5	1	0.6	4.0	ND	ug/kg	Ua
Aroclor 1262	37324-23-5	1	0.6	4.0	ND	ug/kg	Ua
Aroclor 1268	11100-14-4	1	0.6	4.0	ND	ug/kg	Ua
Surrogate: Decachlorobiphenyl					40-126 %	71.1 %	
Surrogate: Tetrachlorometaxylene					44-120 %	78.1 %	
Surrogate: Decachlorobiphenyl [2C]					40-126 %	79.1 %	
Surrogate: Tetrachlorometaxylene [2C]					44-120 %	79.4 %	



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26-Mar-2021 16:29

COA_07_G_20201118
20K0374-09 (Solid)

Dioxins/Furans

Method: EPA 1613B		Sampled: 11/18/2020 11:36	
Instrument: AUTOSPEC01 Analyst: pk		Analyzed: 12/19/2020 00:47	
Sample Preparation:	Preparation Method: EPA 1613	Extract ID: 20K0374-09 C 01	
	Preparation Batch: BIL0237	Dry Weight: 10.02 g	
	Prepared: 12/10/2020	% Solids: 73.16	
Sample Cleanup:	Cleanup Method: Silica Gel	Extract ID: 20K0374-09 C 01	
	Cleanup Batch: CIL0151	Initial Volume: 20 mL	
	Cleaned: 15-Dec-2020	Final Volume: 20 mL	
Sample Cleanup:	Cleanup Method: Sulfuric Acid	Extract ID: 20K0374-09 C 01	
	Cleanup Batch: CIL0150	Initial Volume: 20 mL	
	Cleaned: 14-Dec-2020	Final Volume: 20 mL	
Sample Cleanup:	Cleanup Method: Florisil	Extract ID: 20K0374-09 C 01	
	Cleanup Batch: CIL0152	Initial Volume: 20 mL	
	Cleaned: 15-Dec-2020	Final Volume: 20 mL	

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting		Result	Units	Notes
				EDL	Limit			
2,3,7,8-TCDF		0.713	0.655-0.886	0.063	0.072	0.998	0.420	ng/kg J
2,3,7,8-TCDD			0.655-0.886	0.140	0.066	0.998	ND	ng/kg Ua
1,2,3,7,8-PeCDF			1.318-1.783	0.150	0.155	0.998	ND	ng/kg Ua
2,3,4,7,8-PeCDF			1.318-1.783	0.150	0.139	0.998	ND	ng/kg Ua
1,2,3,7,8-PeCDD			1.318-1.783	0.180	0.135	0.998	ND	ng/kg Ua
1,2,3,4,7,8-HxCDF		1.002	1.054-1.426	0.140	0.049	0.998	0.153	ng/kg EMPC, J
1,2,3,6,7,8-HxCDF		0.961	1.054-1.426	0.180	0.052	0.998	0.166	ng/kg EMPC, J
2,3,4,6,7,8-HxCDF			1.054-1.426	0.110	0.050	0.998	ND	ng/kg Ua
1,2,3,7,8,9-HxCDF			1.054-1.426	0.210	0.088	0.998	ND	ng/kg Ua
1,2,3,4,7,8-HxCDD			1.054-1.426	0.180	0.142	0.998	ND	ng/kg Ua
1,2,3,6,7,8-HxCDD		1.410	1.054-1.426	0.150	0.138	0.998	0.918	ng/kg J
1,2,3,7,8,9-HxCDD		1.372	1.054-1.426	0.219	0.159	0.998	0.472	ng/kg J
1,2,3,4,6,7,8-HpCDF		1.213	0.893-1.208	0.210	0.073	0.998	4.37	ng/kg EMPC
1,2,3,4,7,8,9-HpCDF		0.796	0.893-1.208	0.160	0.101	0.998	0.195	ng/kg EMPC, J
1,2,3,4,6,7,8-HpCDD		1.015	0.893-1.208	0.559	0.227	2.49	25.1	ng/kg
OCDF		0.975	0.757-1.024	1.10	0.172	2.49	8.40	ng/kg
OCDD		0.887	0.757-1.024	4.29	0.582	9.98	267	ng/kg B
Homologue groups								
Total TCDF						0.998	1.87	ng/kg
Total TCDD						0.998	1.18	ng/kg
Total PeCDF						0.998	1.13	ng/kg
Total PeCDD						0.998	0.250	ng/kg J
Total HxCDF						0.998	4.83	ng/kg
Total HxCDD						0.998	11.6	ng/kg
Total HpCDF						0.998	5.97	ng/kg
Total HpCDD						0.998	144	ng/kg



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Reported:
26-Mar-2021 16:29

COA_07_G_20201118
20K0374-09 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/18/2020 11:36

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 12/19/2020 00:47

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting Limit	Result	Units	Notes
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC):				0.73			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC):				0.59			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, EMPC = ND):				0.69			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, EMPC = ND):				0.51			



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COA_07_G_20201118
20K0374-09 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/18/2020 11:36

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 12/19/2020 00:47

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting Limit	Result	Units	Notes
Labeled compounds							
13C12-2,3,7,8-TCDF		0.797	0.655-0.886	24-169 %	79.0	%	
13C12-2,3,7,8-TCDD		0.806	0.655-0.886	25-164 %	76.0	%	
13C12-1,2,3,7,8-PeCDF		1.551	1.318-1.783	24-185 %	74.2	%	
13C12-2,3,4,7,8-PeCDF		1.527	1.318-1.783	21-178 %	77.5	%	
13C12-1,2,3,7,8-PeCDD		1.670	1.318-1.783	25-181 %	74.9	%	
13C12-1,2,3,4,7,8-HxCDF		0.499	0.434-0.587	26-152 %	83.4	%	
13C12-1,2,3,6,7,8-HxCDF		0.520	0.434-0.587	26-123 %	72.2	%	
13C12-2,3,4,6,7,8-HxCDF		0.500	0.434-0.587	28-136 %	76.8	%	
13C12-1,2,3,7,8,9-HxCDF		0.494	0.434-0.587	29-147 %	53.5	%	
13C12-1,2,3,4,7,8-HxCDD		1.309	1.054-1.426	32-141 %	81.2	%	
13C12-1,2,3,6,7,8-HxCDD		1.268	1.054-1.426	28-130 %	64.9	%	
13C12-1,2,3,4,6,7,8-HpCDF		0.431	0.374-0.506	28-143 %	68.8	%	
13C12-1,2,3,4,7,8,9-HpCDF		0.431	0.374-0.506	26-138 %	70.0	%	
13C12-1,2,3,4,6,7,8-HpCDD		1.061	0.893-1.208	23-140 %	73.7	%	
13C12-OCDD		0.930	0.757-1.024	17-157 %	44.7	%	
37Cl4-2,3,7,8-TCDD				35-197 %	87.3	%	



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COA_07_G_20201118
20K0374-09 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/18/2020 11:36

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 12/19/2020 00:47

Analyte	DF/Split	Ion Ratio	Ratio Limits	EDL	Reporting	Result	Units	Notes
					Limit			



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COA_07_G_20201118
20K0374-09 (Solid)

Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 11/18/2020 11:36

Instrument: ICPMS1 Analyst: MCB

Analyzed: 03/23/2021 19:21

Sample Preparation:

Preparation Method: SWN EPA 3050B

Extract ID: 20K0374-09 E 02

Preparation Batch: BJC0563

Sample Size: 1.057 g (wet)

Dry Weight: 0.73 g

Prepared: 03/22/2021

Final Volume: 50 mL

% Solids: 68.82

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Antimony	7440-36-0	20	0.02	0.27	ND	mg/kg	Ua
Chromium	7440-47-3	20	0.18	0.69	55.6	mg/kg	
Lead	7439-92-1	20	0.09	0.14	3.82	mg/kg	
Silver	7440-22-4	20	0.02	0.27	0.05	mg/kg	J



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COA_07_G_20201118
20K0374-09 (Solid)

Metals and Metallic Compounds

Method: EPA 6020B UCT-KED

Sampled: 11/18/2020 11:36

Instrument: ICPMS1 Analyst: MCB

Analyzed: 03/23/2021 19:21

Sample Preparation:

Preparation Method: SWN EPA 3050B

Extract ID: 20K0374-09 E 02

Preparation Batch: BJC0563

Sample Size: 1.057 g (wet)

Dry Weight: 0.73 g

Prepared: 03/22/2021

Final Volume: 50 mL

% Solids: 68.82

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	20	0.03	0.27	5.98	mg/kg	
Cadmium	7440-43-9	20	0.04	0.14	0.41	mg/kg	
Copper	7440-50-8	20	0.47	0.69	12.3	mg/kg	
Selenium	7782-49-2	20	0.60	0.69	ND	mg/kg	Ua
Zinc	7440-66-6	20	1.1	5.5	38.4	mg/kg	



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COA_07_G_20201118
20K0374-09 (Solid)

Metals and Metallic Compounds

Method: EPA 7471B

Sampled: 11/18/2020 11:36

Instrument: HYDRA Analyst: BLC

Analyzed: 03/23/2021 11:47

Sample Preparation:

Preparation Method: SMM EPA 7471B

Extract ID: 20K0374-09 E

Preparation Batch: BJC0609

Sample Size: 0.289 g (wet)

Dry Weight: 0.20 g

Prepared: 03/22/2021

Final Volume: 50 mL

% Solids: 68.82

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.00528	0.0251	0.0460	mg/kg	H



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26-Mar-2021 16:29

COA_07_G_20201118
20K0374-09 (Solid)

Wet Chemistry

Method: EPA 9060A m

Sampled: 11/18/2020 11:36

Instrument: TOC Cube Analyst: BF

Analyzed: 11/26/2020 21:23

Sample Preparation:

Preparation Method: PSEP 1986 (modified)

Extract ID: 20K0374-09 E

Preparation Batch: BIK0803

Sample Size: 0.5191 g (wet)

Dry Weight: 0.36 g

Prepared: 11/25/2020

Final Volume: 0.5191 mL

% Solids: 68.82

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Organic Carbon		1	0.02	0.02	0.93	%	



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COA_07_G_20201118
20K0374-09 (Solid)

Wet Chemistry

Method: PSEP 1986

Sampled: 11/18/2020 11:36

Instrument: BAL2 Analyst: UW

Analyzed: 11/24/2020 17:15

Sample Preparation:	Preparation Method: No Prep Wet Chem	Sample Size: 5 g (wet)	Extract ID: 20K0374-09
	Preparation Batch: BIK0773	Final Volume: 5 g	Dry Weight: 3.44 g
	Prepared: 11/24/2020		% Solids: 68.82

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Volatile Solids		1	0.01	0.01	3.48	%	

Sample Preparation:	Preparation Method: No Prep Wet Chem	Sample Size: 5 g (wet)	Extract ID: 20K0374-09
	Preparation Batch: BIK0778	Final Volume: 5 g	Dry Weight: 3.44 g
	Prepared: 11/24/2020		% Solids: 68.82

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Solids, Sulfide		1	0.04	0.04	69.31	%	



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COA_07_G_20201118
20K0374-09 (Solid)

Wet Chemistry

Method: SM 2540 G-97

Sampled: 11/18/2020 11:36

Instrument: BAL2 Analyst: UW

Analyzed: 11/24/2020 17:15

Sample Preparation:

Preparation Method: No Prep Wet Chem

Extract ID: 20K0374-09

Preparation Batch: BIK0773

Sample Size: 5 g (wet)

Dry Weight: 3.44 g

Prepared: 11/24/2020

Final Volume: 5 g

% Solids: 68.82

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Solids		1	0.04	0.04	68.82	%	



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Reported:
26-Mar-2021 16:29

COA_07_G_20201118
20K0374-09 (Solid)

Wet Chemistry

Method: SM 4500-NH3 H-97

Sampled: 11/18/2020 11:36

Instrument: LACHAT2 Analyst: KOTT

Analyzed: 11/30/2020 12:31

Sample Preparation:

Preparation Method: MSA 33.3 (2M KCl)

Extract ID: 20K0374-09 E

Preparation Batch: BIK0770

Sample Size: 4.72 g (wet)

Dry Weight: 3.25 g

Prepared: 11/24/2020

Final Volume: 40 mL

% Solids: 68.82

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Ammonia-N	7664-41-7	1	0.49	0.49	8.76	mg/kg NH3-N	



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

COA_07_G_20201118
20K0374-09 (Solid)

Wet Chemistry

Method: SM 4500-S2 D-00 (PSEP)

Sampled: 11/18/2020 11:36

Instrument: UV1800-1 Analyst: CDE

Analyzed: 12/03/2020 17:16

Sample Preparation:

Preparation Method: PSEP 1986

Extract ID: 20K0374-09 F

Preparation Batch: BIK0762

Sample Size: 5.148 g (wet)

Dry Weight: 3.57 g

Prepared: 11/24/2020

Final Volume: 100 mL

% Solids: 69.31

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Sulfide	18496-25-8	10	14.0	14.0	114	mg/kg	D



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Reported:
26-Mar-2021 16:29

COA_07_G_20201118
20K0374-09 (Solid)

Extractions

Method: ASTM D2216	Sampled: 11/18/2020 11:36	
Instrument: N/A Analyst: NL	Analyzed: 11/26/2020 05:10	
Sample Preparation:	Preparation Method: No Prep-Organics	Extract ID: 20K0374-09
	Preparation Batch: BIK0789	Dry Weight: 0.69 g
	Prepared: 11/25/2020	% Solids: 68.82
	Sample Size: 1 g (wet)	
	Final Volume: 1 g	

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Total Solids		1	0.01	73.16	%	



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Reported:
26-Mar-2021 16:29

COA_07_G_20201118
20K0374-09 (Solid)

Extractions

Method: ASTM D2216

Sampled: 11/18/2020 11:36

Instrument: N/A Analyst: NL

Analyzed: 11/26/2020 05:10

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Labeled compounds						



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Reported:
26-Mar-2021 16:29

COA_07_G_20201118
20K0374-09 (Solid)

Geotechnical Methods

Method: PSEP-PS

Sampled: 11/18/2020 11:36

Instrument: MT&C Analyst:

Analyzed: 01/11/2021 00:00

Analysis by: Materials Testing & Consulting, Inc. (Olympia)

Sample Preparation: Preparation Method: No Prep Geo
Preparation Batch: B011121
Prepared: 01/11/2021

Extract ID: 20K0374-09

Final Volume:

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Phi Size <-1	GS_GRAVEL	1	0.1	0.4	%	
Phi Size -1 to 0	GS_VCS	1	0.1	1.6	%	
Phi Size 0 to 1	GS_CS	1	0.1	5.9	%	
Phi Size 1 to 2	GS_MS	1	0.1	17.2	%	
Phi Size 2 to 3	GS_FS	1	0.1	45.5	%	
Phi Size 3 to 4	GS_VFS	1	0.1	15.9	%	
Phi Size 4 to 5	GS_CSILT	1	0.1	2.7	%	
Phi Size 5 to 6	GS_MSILT	1	0.1	2.6	%	
Phi Size 6 to 7	GS_FSILT	1	0.1	1.6	%	
Phi Size 7 to 8	GS_VFSILT	1	0.1	1.4	%	
Phi Size 8 to 9	GS_CCLAY	1	0.1	1.9	%	
Phi Size 9 to 10	GS_MCLAY	1	0.1	1.7	%	
Phi Size >10	GS_FCLAY	1	0.1	1.4	%	
Total Fines	GS_TOTFINES	1	0.1	13.4	%	



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Reported:
26-Mar-2021 16:29

COA_07_G_20201118
20K0374-09RE1 (Solid)

Dioxins/Furans

Method: EPA 1613B		Sampled: 11/18/2020 11:36	
Instrument: AUTOSPEC01 Analyst: pk		Analyzed: 03/05/2021 05:02	
Sample Preparation:	Preparation Method: EPA 1613	Extract ID: 20K0374-09RE1 C 01	
	Preparation Batch: BJB0762	Dry Weight: 10.02 g	
	Prepared: 03/01/2021	% Solids: 73.16	
Sample Cleanup:	Cleanup Method: Silica Gel	Extract ID: 20K0374-09RE1 C 01	
	Cleanup Batch: CJC0027	Initial Volume: 20 mL	
	Cleaned: 03-Mar-2021	Final Volume: 20 mL	
Sample Cleanup:	Cleanup Method: Sulfuric Acid	Extract ID: 20K0374-09RE1 C 01	
	Cleanup Batch: CJC0026	Initial Volume: 20 mL	
	Cleaned: 02-Mar-2021	Final Volume: 20 mL	
Sample Cleanup:	Cleanup Method: Florisil	Extract ID: 20K0374-09RE1 C 01	
	Cleanup Batch: CJC0028	Initial Volume: 20 mL	
	Cleaned: 03-Mar-2021	Final Volume: 20 mL	

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting		Result	Units	Notes
				EDL	Limit			
2,3,7,8-TCDF		0.762	0.655-0.886	0.058	0.092	0.998	0.365	ng/kg J
2,3,7,8-TCDD		0.344	0.655-0.886	0.150	0.069	0.998	0.168	ng/kg EMPC, J
1,2,3,7,8-PeCDF			1.318-1.783	0.239	0.143	0.998	ND	ng/kg Ua
2,3,4,7,8-PeCDF		2.374	1.318-1.783	0.219	0.136	0.998	0.164	ng/kg EMPC, J
1,2,3,7,8-PeCDD			1.318-1.783	0.170	0.139	0.998	ND	ng/kg Ua
1,2,3,4,7,8-HxCDF		0.811	1.054-1.426	0.279	0.074	0.998	0.156	ng/kg EMPC, J
1,2,3,6,7,8-HxCDF		1.043	1.054-1.426	0.200	0.074	0.998	0.169	ng/kg EMPC, J
2,3,4,6,7,8-HxCDF		1.970	1.054-1.426	0.170	0.071	0.998	0.194	ng/kg EMPC, J
1,2,3,7,8,9-HxCDF			1.054-1.426	0.190	0.082	0.998	ND	ng/kg Ua
1,2,3,4,7,8-HxCDD		1.415	1.054-1.426	0.170	0.119	0.998	0.220	ng/kg J
1,2,3,6,7,8-HxCDD		1.340	1.054-1.426	0.180	0.118	0.998	0.718	ng/kg J
1,2,3,7,8,9-HxCDD		0.966	1.054-1.426	0.219	0.122	0.998	0.421	ng/kg EMPC, J
1,2,3,4,6,7,8-HpCDF		1.162	0.893-1.208	0.210	0.075	0.998	1.99	ng/kg
1,2,3,4,7,8,9-HpCDF		0.498	0.893-1.208	0.239	0.106	0.998	0.091	ng/kg EMPC, J
1,2,3,4,6,7,8-HpCDD		1.054	0.893-1.208	0.559	0.166	2.49	11.9	ng/kg
OCDF		0.953	0.757-1.024	1.10	0.134	2.49	4.13	ng/kg B
OCDD		0.859	0.757-1.024	4.59	0.170	9.98	74.2	ng/kg B
Homologue groups								
Total TCDF						0.998	0.973	ng/kg J
Total TCDD						0.998	0.786	ng/kg J
Total PeCDF						0.998	0.493	ng/kg J
Total PeCDD						0.998	0.356	ng/kg J
Total HxCDF						0.998	2.07	ng/kg
Total HxCDD						0.998	8.01	ng/kg B
Total HpCDF						0.998	5.32	ng/kg
Total HpCDD						0.998	37.9	ng/kg



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Reported:
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COA_07_G_20201118
20K0374-09RE1 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/18/2020 11:36

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 03/05/2021 05:02

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting Limit	Result	Units	Notes
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC):				0.68			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC):				0.60			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, EMPC = ND):				0.52			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, EMPC = ND):				0.29			



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COA_07_G_20201118
20K0374-09RE1 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/18/2020 11:36

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 03/05/2021 05:02

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting Limit	Result	Units	Notes
Labeled compounds							
13C12-2,3,7,8-TCDF		0.778	0.655-0.886	24-169 %	80.9	%	
13C12-2,3,7,8-TCDD		0.805	0.655-0.886	25-164 %	82.7	%	
13C12-1,2,3,7,8-PeCDF		1.475	1.318-1.783	24-185 %	78.4	%	
13C12-2,3,4,7,8-PeCDF		1.497	1.318-1.783	21-178 %	75.1	%	
13C12-1,2,3,7,8-PeCDD		1.619	1.318-1.783	25-181 %	71.6	%	
13C12-1,2,3,4,7,8-HxCDF		0.506	0.434-0.587	26-152 %	82.7	%	
13C12-1,2,3,6,7,8-HxCDF		0.512	0.434-0.587	26-123 %	80.2	%	
13C12-2,3,4,6,7,8-HxCDF		0.508	0.434-0.587	28-136 %	84.4	%	
13C12-1,2,3,7,8,9-HxCDF		0.498	0.434-0.587	29-147 %	87.4	%	
13C12-1,2,3,4,7,8-HxCDD		1.266	1.054-1.426	32-141 %	80.3	%	
13C12-1,2,3,6,7,8-HxCDD		1.211	1.054-1.426	28-130 %	76.3	%	
13C12-1,2,3,4,6,7,8-HpCDF		0.439	0.374-0.506	28-143 %	73.2	%	
13C12-1,2,3,4,7,8,9-HpCDF		0.438	0.374-0.506	26-138 %	71.3	%	
13C12-1,2,3,4,6,7,8-HpCDD		1.115	0.893-1.208	23-140 %	80.8	%	
13C12-OCDD		0.906	0.757-1.024	17-157 %	62.5	%	
37Cl4-2,3,7,8-TCDD				35-197 %	88.9	%	



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Reported:
26-Mar-2021 16:29

COA_08_G_20201119
20K0374-10 (Solid)

Semivolatile Organic Compounds

Method: EPA 8270E
Instrument: NT10 Analyst: VTS
Sample Preparation: Preparation Method: EPA 3546 (Microwave)
Preparation Batch: BIK0878 Sample Size: 12.42 g (wet)
Prepared: 12/01/2020 Final Volume: 1 mL
Extract ID: 20K0374-10 D 04
Dry Weight: 10.04 g
% Solids: 80.82

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Phenol	108-95-2	1	8.2	19.9	ND	ug/kg	Ua
Benzyl Alcohol	100-51-6	1	14.8	19.9	ND	ug/kg	Ua
2-Methylphenol	95-48-7	1	7.8	19.9	ND	ug/kg	Ua
Hexachloroethane	67-72-1	1	5.6	19.9	ND	ug/kg	Ua
4-Methylphenol	106-44-5	1	14.6	19.9	ND	ug/kg	Ua
Naphthalene	91-20-3	1	5.2	19.9	7.7	ug/kg	J
Benzoic acid	65-85-0	1	58.9	199	ND	ug/kg	Ua
2-Methylnaphthalene	91-57-6	1	5.6	19.9	ND	ug/kg	Ua
Acenaphthylene	208-96-8	1	4.8	19.9	ND	ug/kg	Ua
Dimethylphthalate	131-11-3	1	6.4	19.9	ND	ug/kg	Ua
Acenaphthene	83-32-9	1	5.1	19.9	ND	ug/kg	Ua
Dibenzofuran	132-64-9	1	4.6	19.9	ND	ug/kg	Ua
Fluorene	86-73-7	1	4.9	19.9	ND	ug/kg	Ua
Diethyl phthalate	84-66-2	1	17.6	19.9	ND	ug/kg	Ua
N-Nitrosodiphenylamine	86-30-6	1	9.5	19.9	ND	ug/kg	Ua
Hexachlorobenzene	118-74-1	1	4.7	19.9	ND	ug/kg	Ua
Pentachlorophenol	87-86-5	1	31.2	99.6	ND	ug/kg	Ua
Phenanthrene	85-01-8	1	4.7	19.9	ND	ug/kg	Ua
Anthracene	120-12-7	1	5.9	19.9	ND	ug/kg	Ua
Di-n-Butylphthalate	84-74-2	1	5.3	19.9	14.8	ug/kg	J
Fluoranthene	206-44-0	1	4.5	19.9	4.6	ug/kg	J
Pyrene	129-00-0	1	5.5	19.9	8.8	ug/kg	J
Butylbenzylphthalate	85-68-7	1	8.0	19.9	ND	ug/kg	Ua
Benzo(a)anthracene	56-55-3	1	5.2	19.9	ND	ug/kg	Ua
Chrysene	218-01-9	1	5.2	19.9	ND	ug/kg	Ua
bis(2-Ethylhexyl)phthalate	117-81-7	1	28.7	49.8	ND	ug/kg	Ua
Di-n-Octylphthalate	117-84-0	1	8.7	19.9	ND	ug/kg	Ua
Benzo(a)fluoranthene, Total		1	10.2	39.8	ND	ug/kg	Ua
Benzo(a)pyrene	50-32-8	1	6.5	19.9	ND	ug/kg	Ua
Indeno(1,2,3-cd)pyrene	193-39-5	1	6.0	19.9	ND	ug/kg	Ua
Dibenzo(a,h)anthracene	53-70-3	1	6.1	19.9	ND	ug/kg	Ua
Benzo(g,h,i)perylene	191-24-2	1	5.8	19.9	ND	ug/kg	Ua
Surrogate: 2-Fluorophenol				27-120 %	67.8	%	
Surrogate: Phenol-d5				29-120 %	72.4	%	
Surrogate: 2-Chlorophenol-d4				31-120 %	86.6	%	



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Reported:
26-Mar-2021 16:29

COA_08_G_20201119
20K0374-10 (Solid)

Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 11/19/2020 11:12

Instrument: NT10 Analyst: VTS

Analyzed: 12/31/2020 00:53

Analyte	CAS Number	Recovery	Recovery	Units	Notes
		Limits			
Surrogate: 1,2-Dichlorobenzene-d4		32-120 %	77.2	%	
Surrogate: Nitrobenzene-d5		30-120 %	98.8	%	
Surrogate: 2-Fluorobiphenyl		35-120 %	90.4	%	
Surrogate: 2,4,6-Tribromophenol		24-134 %	56.1	%	
Surrogate: p-Terphenyl-d14		37-120 %	85.6	%	



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COA_08_G_20201119
20K0374-10 (Solid)

Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM

Sampled: 11/19/2020 11:12

Instrument: NT10 Analyst: VTS

Analyzed: 12/31/2020 00:53

Sample Preparation:

Preparation Method: EPA 3546 (Microwave)

Extract ID: 20K0374-10 D 04

Preparation Batch: BIK0878

Sample Size: 12.42 g (wet)

Dry Weight: 10.04 g

Prepared: 12/01/2020

Final Volume: 1 mL

% Solids: 80.82

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
1,4-Dichlorobenzene	106-46-7	1	0.6	5.0	ND	ug/kg	Ua
1,2-Dichlorobenzene	95-50-1	1	0.7	5.0	ND	ug/kg	Ua
2,4-Dimethylphenol	105-67-9	1	2.2	19.9	ND	ug/kg	Ua
1,2,4-Trichlorobenzene	120-82-1	1	2.7	5.0	ND	ug/kg	Ua
Hexachlorobutadiene	87-68-3	1	0.7	5.0	ND	ug/kg	Ua
Surrogate: 2-Fluorophenol				27-120 %	70.1	%	Q
Surrogate: p-Terphenyl-d14				37-120 %	78.1	%	



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Reported:
26-Mar-2021 16:29

COA_08_G_20201119
20K0374-10 (Solid)

Butyl Tins

Method: EPA 8270E-SIM			Sampled: 11/19/2020 11:12
Instrument: NT8 Analyst: JZ			Analyzed: 12/19/2020 12:13
Sample Preparation:	Preparation Method: EPA 3546 (Microwave)		Extract ID: 20K0374-10 D 03
	Preparation Batch: BIK0879	Sample Size: 6.2 g (wet)	Dry Weight: 5.01 g
	Prepared: 12/01/2020	Final Volume: 0.5 mL	% Solids: 80.82
Sample Cleanup:	Cleanup Method: Silica Gel		Extract ID: 20K0374-10 D 03
	Cleanup Batch: CIL0160	Initial Volume: 0.5 mL	
	Cleaned: 17-Dec-2020	Final Volume: 0.5 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Tributyltin Ion	36643-28-4	1	0.449	3.85	0.838	ug/kg	J
Dibutyltin Ion	14488-53-0	1	1.73	5.77	ND	ug/kg	Ua
Butyltin Ion	78763-54-9	1	1.89	4.07	ND	ug/kg	Ua
Tetrabutyltin	1461-25-2	1	4.99	4.99	ND	ug/kg	Ua
<i>Surrogate: Triphenyltin</i>				30-160 %	93.7	%	
<i>Surrogate: Tripropyltin</i>				30-160 %	61.7	%	



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Reported:
26-Mar-2021 16:29

COA_08_G_20201119
20K0374-10 (Solid)

Chlorinated Pesticides

Method: EPA 8081B		Sampled: 11/19/2020 11:12	
Instrument: ECD6 Analyst: YZ/VTs		Analyzed: 03/16/2021 03:22	
Sample Preparation:	Preparation Method: EPA 3546 (Microwave)	Extract ID: 20K0374-10 B 02	
	Preparation Batch: BJC0009	Sample Size: 15.48 g (wet)	Dry Weight: 12.51 g
	Prepared: 03/01/2021	Final Volume: 2.5 mL	% Solids: 80.82
Sample Cleanup:	Cleanup Method: Silica Gel	Extract ID: 20K0374-10 B 02	
	Cleanup Batch: CJC0140	Initial Volume: 2.5 mL	
	Cleaned: 11-Mar-2021	Final Volume: 2.5 mL	
Sample Cleanup:	Cleanup Method: Sulfur	Extract ID: 20K0374-10 B 02	
	Cleanup Batch: CJC0139	Initial Volume: 2.5 mL	
	Cleaned: 11-Mar-2021	Final Volume: 2.5 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Heptachlor	76-44-8	1	0.05	0.50	ND	ug/kg	Ua
Aldrin	309-00-2	1	0.37	0.50	ND	ug/kg	Ua
trans-Chlordane (beta-Chlordane)	5103-74-2	1	0.33	0.50	ND	ug/kg	Ua
cis-Chlordane (alpha-chlordane)	5103-71-9	1	0.11	0.50	ND	ug/kg	Ua
4,4'-DDE	72-55-9	1	0.13	1.00	ND	ug/kg	Ua
Dieldrin	60-57-1	1	0.11	1.00	ND	ug/kg	Ua
4,4'-DDD	72-54-8	1	0.32	1.00	ND	ug/kg	Ua
4,4'-DDT	50-29-3	1	0.32	1.00	ND	ug/kg	Ua
Oxychlordane	27304-13-8	1	0.13	1.00	ND	ug/kg	Ua
cis-Nonachlor	5103-73-1	1	0.21	1.00	ND	ug/kg	Ua
trans-Nonachlor	39765-80-5	1	0.23	1.00	ND	ug/kg	Ua
Surrogate: Decachlorobiphenyl				30-160 %	72.3	%	
Surrogate: Decachlorobiphenyl [2C]				30-160 %	61.7	%	
Surrogate: Tetrachlorometaxylene				30-160 %	51.7	%	
Surrogate: Tetrachlorometaxylene [2C]				30-160 %	49.2	%	



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Reported:
26-Mar-2021 16:29

COA_08_G_20201119
20K0374-10 (Solid)

Aroclor PCB

Method: EPA 8082A			Sampled: 11/19/2020 11:12	
Instrument: ECD7 Analyst: JGR			Analyzed: 12/22/2020 17:54	
Sample Preparation:	Preparation Method: EPA 3546 (Microwave)	Sample Size: 15.47 g (wet) Final Volume: 2.5 mL	Extract ID: 20K0374-10 D 01	
	Preparation Batch: BIK0877		Dry Weight: 12.50 g	
	Prepared: 11/30/2020		% Solids: 80.82	
Sample Cleanup:	Cleanup Method: Silica Gel	Initial Volume: 2.5 mL Final Volume: 2.5 mL	Extract ID: 20K0374-10 D 01	
	Cleanup Batch: CIL0224			
	Cleaned: 21-Dec-2020			
Sample Cleanup:	Cleanup Method: Sulfuric Acid	Initial Volume: 2.5 mL Final Volume: 2.5 mL	Extract ID: 20K0374-10 D 01	
	Cleanup Batch: CIL0218			
	Cleaned: 21-Dec-2020			
Sample Cleanup:	Cleanup Method: Sulfur	Initial Volume: 2.5 mL Final Volume: 2.5 mL	Extract ID: 20K0374-10 D 01	
	Cleanup Batch: CIL0219			
	Cleaned: 21-Dec-2020			
Sample Cleanup:	Cleanup Method: Alumina	Initial Volume: 2.5 mL Final Volume: 2.5 mL	Extract ID: 20K0374-10 D 01	
	Cleanup Batch: CIL0223			
	Cleaned: 21-Dec-2020			

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Aroclor 1016	12674-11-2	1	1.6	4.0	ND	ug/kg	Ua
Aroclor 1221	11104-28-2	1	1.6	4.0	ND	ug/kg	Ua
Aroclor 1232	11141-16-5	1	1.6	4.0	ND	ug/kg	Ua
Aroclor 1242	53469-21-9	1	1.6	4.0	ND	ug/kg	Ua
Aroclor 1248	12672-29-6	1	1.6	4.0	ND	ug/kg	Ua
Aroclor 1254	11097-69-1	1	1.6	4.0	ND	ug/kg	Ua
Aroclor 1260	11096-82-5	1	0.6	4.0	ND	ug/kg	Ua
Aroclor 1262	37324-23-5	1	0.6	4.0	ND	ug/kg	Ua
Aroclor 1268	11100-14-4	1	0.6	4.0	ND	ug/kg	Ua
Surrogate: Decachlorobiphenyl					40-126 %	75.7 %	
Surrogate: Tetrachlorometaxylene					44-120 %	78.5 %	
Surrogate: Decachlorobiphenyl [2C]					40-126 %	91.6 %	
Surrogate: Tetrachlorometaxylene [2C]					44-120 %	81.1 %	



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

COA_08_G_20201119
20K0374-10 (Solid)

Dioxins/Furans

Method: EPA 1613B			Sampled: 11/19/2020 11:12		
Instrument: AUTOSPEC01 Analyst: pk			Analyzed: 12/19/2020 01:36		
Sample Preparation:	Preparation Method: EPA 1613			Extract ID: 20K0374-10 C 01	
	Preparation Batch: BIL0237	Sample Size: 12.4 g (wet)		Dry Weight: 10.06 g	
	Prepared: 12/10/2020	Final Volume: 20 uL		% Solids: 81.15	
Sample Cleanup:	Cleanup Method: Silica Gel			Extract ID: 20K0374-10 C 01	
	Cleanup Batch: CIL0151	Initial Volume: 20 mL			
	Cleaned: 15-Dec-2020	Final Volume: 20 mL			
Sample Cleanup:	Cleanup Method: Sulfuric Acid			Extract ID: 20K0374-10 C 01	
	Cleanup Batch: CIL0150	Initial Volume: 20 mL			
	Cleaned: 14-Dec-2020	Final Volume: 20 mL			
Sample Cleanup:	Cleanup Method: Florisil			Extract ID: 20K0374-10 C 01	
	Cleanup Batch: CIL0152	Initial Volume: 20 mL			
	Cleaned: 15-Dec-2020	Final Volume: 20 mL			

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting		Result	Units	Notes
				EDL	Limit			
2,3,7,8-TCDF		0.932	0.655-0.886	0.063	0.047	0.994	0.071	ng/kg EMPC, J
2,3,7,8-TCDD			0.655-0.886	0.139	0.059	0.994	ND	ng/kg Ua
1,2,3,7,8-PeCDF			1.318-1.783	0.149	0.076	0.994	ND	ng/kg Ua
2,3,4,7,8-PeCDF			1.318-1.783	0.149	0.067	0.994	ND	ng/kg Ua
1,2,3,7,8-PeCDD			1.318-1.783	0.179	0.087	0.994	ND	ng/kg Ua
1,2,3,4,7,8-HxCDF			1.054-1.426	0.139	0.046	0.994	ND	ng/kg Ua
1,2,3,6,7,8-HxCDF			1.054-1.426	0.179	0.044	0.994	ND	ng/kg Ua
2,3,4,6,7,8-HxCDF			1.054-1.426	0.109	0.045	0.994	ND	ng/kg Ua
1,2,3,7,8,9-HxCDF			1.054-1.426	0.209	0.055	0.994	ND	ng/kg Ua
1,2,3,4,7,8-HxCDD			1.054-1.426	0.179	0.079	0.994	ND	ng/kg Ua
1,2,3,6,7,8-HxCDD		1.085	1.054-1.426	0.149	0.075	0.994	0.214	ng/kg J
1,2,3,7,8,9-HxCDD		0.538	1.054-1.426	0.219	0.088	0.994	0.175	ng/kg EMPC, J
1,2,3,4,6,7,8-HpCDF		1.100	0.893-1.208	0.209	0.041	0.994	0.500	ng/kg J
1,2,3,4,7,8,9-HpCDF			0.893-1.208	0.159	0.059	0.994	ND	ng/kg Ua
1,2,3,4,6,7,8-HpCDD		1.013	0.893-1.208	0.557	0.091	2.48	3.59	ng/kg
OCDF		0.791	0.757-1.024	1.09	0.133	2.48	1.01	ng/kg J
OCDD		0.824	0.757-1.024	4.27	0.213	9.94	24.9	ng/kg B
Homologue groups								
Total TCDF						0.994	ND	ng/kg Ua
Total TCDD						0.994	0.111	ng/kg J
Total PeCDF						0.994	0.078	ng/kg J
Total PeCDD						0.994	ND	ng/kg Ua
Total HxCDF						0.994	ND	ng/kg Ua
Total HxCDD						0.994	0.753	ng/kg J
Total HpCDF						0.994	0.500	ng/kg J
Total HpCDD						0.994	8.54	ng/kg



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1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

COA_08_G_20201119
20K0374-10 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/19/2020 11:12

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 12/19/2020 01:36

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting Limit	Result	Units	Notes
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC):				0.19			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC):				0.09			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, EMPC = ND):				0.18			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, EMPC = ND):				0.07			



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Reported:
26-Mar-2021 16:29

COA_08_G_20201119
20K0374-10 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/19/2020 11:12

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 12/19/2020 01:36

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting Limit	Result	Units	Notes
Labeled compounds							
13C12-2,3,7,8-TCDF		0.797	0.655-0.886	24-169 %	80.2	%	
13C12-2,3,7,8-TCDD		0.799	0.655-0.886	25-164 %	81.5	%	
13C12-1,2,3,7,8-PeCDF		1.552	1.318-1.783	24-185 %	84.2	%	
13C12-2,3,4,7,8-PeCDF		1.559	1.318-1.783	21-178 %	87.9	%	
13C12-1,2,3,7,8-PeCDD		1.679	1.318-1.783	25-181 %	86.6	%	
13C12-1,2,3,4,7,8-HxCDF		0.506	0.434-0.587	26-152 %	85.2	%	
13C12-1,2,3,6,7,8-HxCDF		0.495	0.434-0.587	26-123 %	75.5	%	
13C12-2,3,4,6,7,8-HxCDF		0.502	0.434-0.587	28-136 %	80.0	%	
13C12-1,2,3,7,8,9-HxCDF		0.495	0.434-0.587	29-147 %	87.0	%	
13C12-1,2,3,4,7,8-HxCDD		1.292	1.054-1.426	32-141 %	84.4	%	
13C12-1,2,3,6,7,8-HxCDD		1.268	1.054-1.426	28-130 %	69.3	%	
13C12-1,2,3,4,6,7,8-HpCDF		0.425	0.374-0.506	28-143 %	74.3	%	
13C12-1,2,3,4,7,8,9-HpCDF		0.439	0.374-0.506	26-138 %	78.6	%	
13C12-1,2,3,4,6,7,8-HpCDD		1.058	0.893-1.208	23-140 %	83.7	%	
13C12-OCDD		0.918	0.757-1.024	17-157 %	55.3	%	
37Cl4-2,3,7,8-TCDD				35-197 %	89.0	%	



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Reported:
26-Mar-2021 16:29

COA_08_G_20201119
20K0374-10 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/19/2020 11:12

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 12/19/2020 01:36

Analyte	DF/Split	Ion Ratio	Ratio Limits	EDL	Reporting	Result	Units	Notes
					Limit			



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Reported:
26-Mar-2021 16:29

COA_08_G_20201119
20K0374-10 (Solid)

Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 11/19/2020 11:12

Instrument: ICPMS1 Analyst: MCB

Analyzed: 03/23/2021 19:26

Sample Preparation:

Preparation Method: SWN EPA 3050B

Extract ID: 20K0374-10 E 02

Preparation Batch: BJC0563

Sample Size: 1.018 g (wet)

Dry Weight: 0.79 g

Prepared: 03/22/2021

Final Volume: 50 mL

% Solids: 77.93

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Antimony	7440-36-0	20	0.02	0.25	ND	mg/kg	Ua
Chromium	7440-47-3	20	0.16	0.63	32.0	mg/kg	
Lead	7439-92-1	20	0.09	0.13	2.02	mg/kg	
Silver	7440-22-4	20	0.02	0.25	0.03	mg/kg	J



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Reported:
26-Mar-2021 16:29

COA_08_G_20201119
20K0374-10 (Solid)

Metals and Metallic Compounds

Method: EPA 6020B UCT-KED

Sampled: 11/19/2020 11:12

Instrument: ICPMS1 Analyst: MCB

Analyzed: 03/23/2021 19:26

Sample Preparation:

Preparation Method: SWN EPA 3050B

Extract ID: 20K0374-10 E 02

Preparation Batch: BJC0563

Sample Size: 1.018 g (wet)

Dry Weight: 0.79 g

Prepared: 03/22/2021

Final Volume: 50 mL

% Solids: 77.93

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	20	0.03	0.25	3.20	mg/kg	
Cadmium	7440-43-9	20	0.04	0.13	0.14	mg/kg	
Copper	7440-50-8	20	0.43	0.63	6.63	mg/kg	
Selenium	7782-49-2	20	0.55	0.63	ND	mg/kg	Ua
Zinc	7440-66-6	20	1.0	5.0	38.6	mg/kg	



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Reported:
26-Mar-2021 16:29

COA_08_G_20201119
20K0374-10 (Solid)

Metals and Metallic Compounds

Method: EPA 7471B

Sampled: 11/19/2020 11:12

Instrument: HYDRA Analyst: BLC

Analyzed: 03/23/2021 11:49

Sample Preparation:

Preparation Method: SMM EPA 7471B

Extract ID: 20K0374-10 E

Preparation Batch: BJC0609

Sample Size: 0.265 g (wet)

Dry Weight: 0.21 g

Prepared: 03/22/2021

Final Volume: 50 mL

% Solids: 77.93

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.00508	0.0242	0.0181	mg/kg	H, J



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Reported:
26-Mar-2021 16:29

COA_08_G_20201119
20K0374-10 (Solid)

Wet Chemistry

Method: EPA 9060A m

Sampled: 11/19/2020 11:12

Instrument: TOC Cube Analyst: BF

Analyzed: 11/26/2020 21:54

Sample Preparation:

Preparation Method: PSEP 1986 (modified)

Extract ID: 20K0374-10 E

Preparation Batch: BIK0803

Sample Size: 0.4461 g (wet)

Dry Weight: 0.35 g

Prepared: 11/25/2020

Final Volume: 0.4461 mL

% Solids: 77.93

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Organic Carbon		1	0.02	0.02	0.13	%	



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Reported:
26-Mar-2021 16:29

COA_08_G_20201119
20K0374-10 (Solid)

Wet Chemistry

Method: PSEP 1986

Sampled: 11/19/2020 11:12

Instrument: BAL2 Analyst: UW

Analyzed: 11/24/2020 17:15

Sample Preparation:	Preparation Method: No Prep Wet Chem	Sample Size: 5 g (wet)	Extract ID: 20K0374-10
	Preparation Batch: BIK0773	Final Volume: 5 g	Dry Weight: 3.90 g
	Prepared: 11/24/2020		% Solids: 77.93

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Volatile Solids		1	0.01	0.01	1.05	%	

Sample Preparation:	Preparation Method: No Prep Wet Chem	Sample Size: 5 g (wet)	Extract ID: 20K0374-10
	Preparation Batch: BIK0778	Final Volume: 5 g	Dry Weight: 3.90 g
	Prepared: 11/24/2020		% Solids: 77.93

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Solids, Sulfide		1	0.04	0.04	76.90	%	



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Reported:
26-Mar-2021 16:29

COA_08_G_20201119
20K0374-10 (Solid)

Wet Chemistry

Method: SM 2540 G-97

Sampled: 11/19/2020 11:12

Instrument: BAL2 Analyst: UW

Analyzed: 11/24/2020 17:15

Sample Preparation:

Preparation Method: No Prep Wet Chem

Extract ID: 20K0374-10

Preparation Batch: BIK0773

Sample Size: 5 g (wet)

Dry Weight: 3.90 g

Prepared: 11/24/2020

Final Volume: 5 g

% Solids: 77.93

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Solids		1	0.04	0.04	77.93	%	



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Reported:
26-Mar-2021 16:29

COA_08_G_20201119
20K0374-10 (Solid)

Wet Chemistry

Method: SM 4500-NH3 H-97

Sampled: 11/19/2020 11:12

Instrument: LACHAT2 Analyst: KOTT

Analyzed: 11/30/2020 12:32

Sample Preparation:

Preparation Method: MSA 33.3 (2M KCl)

Extract ID: 20K0374-10 E

Preparation Batch: BIK0770

Sample Size: 4.29 g (wet)

Dry Weight: 3.34 g

Prepared: 11/24/2020

Final Volume: 40 mL

% Solids: 77.93

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Ammonia-N	7664-41-7	1	0.48	0.48	1.81	mg/kg NH3-N	



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Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

COA_08_G_20201119
20K0374-10 (Solid)

Wet Chemistry

Method: SM 4500-S2 D-00 (PSEP)

Sampled: 11/19/2020 11:12

Instrument: UV1800-1 Analyst: CDE

Analyzed: 12/03/2020 17:17

Sample Preparation:

Preparation Method: PSEP 1986

Extract ID: 20K0374-10 F

Preparation Batch: BIK0762

Sample Size: 5.587 g (wet)

Dry Weight: 4.30 g

Prepared: 11/24/2020

Final Volume: 100 mL

% Solids: 76.90

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Sulfide	18496-25-8	1	1.16	1.16	2.89	mg/kg	



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Reported:
26-Mar-2021 16:29

COA_08_G_20201119
20K0374-10 (Solid)

Extractions

Method: ASTM D2216

Sampled: 11/19/2020 11:12

Instrument: N/A Analyst: NL

Analyzed: 11/26/2020 05:10

Sample Preparation:

Preparation Method: No Prep-Organics

Extract ID: 20K0374-10

Preparation Batch: BIK0789

Sample Size: 1 g (wet)

Dry Weight: 0.78 g

Prepared: 11/25/2020

Final Volume: 1 g

% Solids: 77.93

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Total Solids		1	0.01	81.15	%	



Dalton, Olmsted & Fuglevand, Inc
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Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

COA_08_G_20201119
20K0374-10 (Solid)

Extractions

Method: ASTM D2216

Sampled: 11/19/2020 11:12

Instrument: N/A Analyst: NL

Analyzed: 11/26/2020 05:10

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Labeled compounds						



Dalton, Olmsted & Fuglevand, Inc
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Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

COA_08_G_20201119
20K0374-10 (Solid)

Geotechnical Methods

Method: PSEP-PS

Sampled: 11/19/2020 11:12

Instrument: MT&C Analyst:

Analyzed: 01/11/2021 00:00

Analysis by: Materials Testing & Consulting, Inc. (Olympia)

Sample Preparation: Preparation Method: No Prep Geo
Preparation Batch: B011121
Prepared: 01/11/2021

Extract ID: 20K0374-10

Final Volume:

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Phi Size <-1	GS_GRAVEL	1	0.1	5.1	%	
Phi Size -1 to 0	GS_VCS	1	0.1	36.8	%	
Phi Size 0 to 1	GS_CS	1	0.1	40.8	%	
Phi Size 1 to 2	GS_MS	1	0.1	10.8	%	
Phi Size 2 to 3	GS_FS	1	0.1	4.0	%	
Phi Size 3 to 4	GS_VFS	1	0.1	0.5	%	
Phi Size 4 to 5	GS_CSILT	1	2.0	ND	%	U
Phi Size 5 to 6	GS_MSILT	1	2.0	ND	%	U
Phi Size 6 to 7	GS_FSILT	1	2.0	ND	%	U
Phi Size 7 to 8	GS_VFSILT	1	2.0	ND	%	U
Phi Size 8 to 9	GS_CCLAY	1	2.0	ND	%	U
Phi Size 9 to 10	GS_MCLAY	1	2.0	ND	%	U
Phi Size >10	GS_FCLAY	1	2.0	ND	%	U
Total Fines	GS_TOTFINES	1	0.1	2.0	%	



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Reported:
26-Mar-2021 16:29

COA_08_G_20201119
20K0374-10RE1 (Solid)

Dioxins/Furans

Method: EPA 1613B		Sampled: 11/19/2020 11:12	
Instrument: AUTOSPEC01 Analyst: pk		Analyzed: 03/05/2021 05:51	
Sample Preparation:	Preparation Method: EPA 1613	Extract ID: 20K0374-10RE1 C 01	
	Preparation Batch: BJB0762	Sample Size: 12.4 g (wet)	Dry Weight: 10.06 g
	Prepared: 03/01/2021	Final Volume: 20 uL	% Solids: 81.15
Sample Cleanup:	Cleanup Method: Silica Gel	Extract ID: 20K0374-10RE1 C 01	
	Cleanup Batch: CJC0027	Initial Volume: 20 mL	
	Cleaned: 03-Mar-2021	Final Volume: 20 mL	
Sample Cleanup:	Cleanup Method: Sulfuric Acid	Extract ID: 20K0374-10RE1 C 01	
	Cleanup Batch: CJC0026	Initial Volume: 20 mL	
	Cleaned: 02-Mar-2021	Final Volume: 20 mL	
Sample Cleanup:	Cleanup Method: Florisil	Extract ID: 20K0374-10RE1 C 01	
	Cleanup Batch: CJC0028	Initial Volume: 20 mL	
	Cleaned: 03-Mar-2021	Final Volume: 20 mL	

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting		Result	Units	Notes
				EDL	Limit			
2,3,7,8-TCDF		0.548	0.655-0.886	0.058	0.077	0.994	0.101	ng/kg EMPC, J
2,3,7,8-TCDD			0.655-0.886	0.149	0.057	0.994	ND	ng/kg Ua
1,2,3,7,8-PeCDF			1.318-1.783	0.239	0.081	0.994	ND	ng/kg Ua
2,3,4,7,8-PeCDF			1.318-1.783	0.219	0.080	0.994	ND	ng/kg Ua
1,2,3,7,8-PeCDD			1.318-1.783	0.169	0.102	0.994	ND	ng/kg Ua
1,2,3,4,7,8-HxCDF			1.054-1.426	0.278	0.060	0.994	ND	ng/kg Ua
1,2,3,6,7,8-HxCDF			1.054-1.426	0.199	0.059	0.994	ND	ng/kg Ua
2,3,4,6,7,8-HxCDF			1.054-1.426	0.169	0.058	0.994	ND	ng/kg Ua
1,2,3,7,8,9-HxCDF			1.054-1.426	0.189	0.069	0.994	ND	ng/kg Ua
1,2,3,4,7,8-HxCDD			1.054-1.426	0.169	0.109	0.994	ND	ng/kg Ua
1,2,3,6,7,8-HxCDD		1.553	1.054-1.426	0.179	0.107	0.994	0.253	ng/kg EMPC, J
1,2,3,7,8,9-HxCDD		0.737	1.054-1.426	0.219	0.111	0.994	0.161	ng/kg EMPC, J
1,2,3,4,6,7,8-HpCDF		0.773	0.893-1.208	0.209	0.060	0.994	0.652	ng/kg EMPC, J
1,2,3,4,7,8,9-HpCDF			0.893-1.208	0.239	0.085	0.994	ND	ng/kg Ua
1,2,3,4,6,7,8-HpCDD		1.026	0.893-1.208	0.557	0.138	2.48	4.01	ng/kg
OCDF		0.861	0.757-1.024	1.09	0.158	2.48	2.51	ng/kg B
OCDD		0.854	0.757-1.024	4.57	0.153	9.94	26.0	ng/kg B
Homologue groups								
Total TCDF						0.994	0.092	ng/kg J
Total TCDD						0.994	0.108	ng/kg J
Total PeCDF						0.994	ND	ng/kg Ua
Total PeCDD						0.994	0.072	ng/kg J
Total HxCDF						0.994	0.386	ng/kg J
Total HxCDD						0.994	0.757	ng/kg J, B
Total HpCDF						0.994	1.05	ng/kg
Total HpCDD						0.994	14.1	ng/kg



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

COA_08_G_20201119
20K0374-10RE1 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/19/2020 11:12

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 03/05/2021 05:51

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting Limit	Result	Units	Notes
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC):				0.22			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC):				0.11			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, EMPC = ND):				0.19			
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, EMPC = ND):				0.05			



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COA_08_G_20201119
20K0374-10RE1 (Solid)

Dioxins/Furans

Method: EPA 1613B

Sampled: 11/19/2020 11:12

Instrument: AUTOSPEC01 Analyst: pk

Analyzed: 03/05/2021 05:51

Analyte	DF/Split	Ion Ratio	Ratio Limits	Reporting Limit	Result	Units	Notes
Labeled compounds							
13C12-2,3,7,8-TCDF		0.779	0.655-0.886	24-169 %	90.9	%	
13C12-2,3,7,8-TCDD		0.801	0.655-0.886	25-164 %	86.5	%	
13C12-1,2,3,7,8-PeCDF		1.502	1.318-1.783	24-185 %	77.7	%	
13C12-2,3,4,7,8-PeCDF		1.505	1.318-1.783	21-178 %	70.7	%	
13C12-1,2,3,7,8-PeCDD		1.620	1.318-1.783	25-181 %	69.5	%	
13C12-1,2,3,4,7,8-HxCDF		0.513	0.434-0.587	26-152 %	82.8	%	
13C12-1,2,3,6,7,8-HxCDF		0.517	0.434-0.587	26-123 %	81.3	%	
13C12-2,3,4,6,7,8-HxCDF		0.516	0.434-0.587	28-136 %	83.7	%	
13C12-1,2,3,7,8,9-HxCDF		0.510	0.434-0.587	29-147 %	81.2	%	
13C12-1,2,3,4,7,8-HxCDD		1.283	1.054-1.426	32-141 %	84.1	%	
13C12-1,2,3,6,7,8-HxCDD		1.243	1.054-1.426	28-130 %	75.5	%	
13C12-1,2,3,4,6,7,8-HpCDF		0.440	0.374-0.506	28-143 %	75.0	%	
13C12-1,2,3,4,7,8,9-HpCDF		0.435	0.374-0.506	26-138 %	73.7	%	
13C12-1,2,3,4,6,7,8-HpCDD		1.075	0.893-1.208	23-140 %	82.1	%	
13C12-OCDD		0.908	0.757-1.024	17-157 %	64.3	%	
37Cl4-2,3,7,8-TCDD				35-197 %	91.9	%	



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Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

Semivolatile Organic Compounds - Quality Control

Batch BIK0878 - EPA 3546 (Microwave)

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BIK0878-BLK1)						Prepared: 01-Dec-2020 Analyzed: 30-Dec-2020 15:27					
Phenol	ND	8.2	20.0	ug/kg							Ua
Benzyl Alcohol	ND	14.9	20.0	ug/kg							Ua
2-Methylphenol	ND	7.8	20.0	ug/kg							Ua
Hexachloroethane	ND	5.7	20.0	ug/kg							Ua
4-Methylphenol	ND	14.7	20.0	ug/kg							Ua
Naphthalene	ND	5.3	20.0	ug/kg							Ua
Benzoic acid	ND	59.1	200	ug/kg							Ua
2-Methylnaphthalene	ND	5.7	20.0	ug/kg							Ua
Acenaphthylene	ND	4.8	20.0	ug/kg							Ua
Dimethylphthalate	ND	6.4	20.0	ug/kg							Ua
Acenaphthene	ND	5.1	20.0	ug/kg							Ua
Dibenzofuran	ND	4.6	20.0	ug/kg							Ua
Fluorene	ND	5.0	20.0	ug/kg							Ua
Diethyl phthalate	ND	17.7	20.0	ug/kg							Ua
N-Nitrosodiphenylamine	ND	9.6	20.0	ug/kg							Ua
Hexachlorobenzene	ND	4.7	20.0	ug/kg							Ua
Pentachlorophenol	ND	31.3	100	ug/kg							Ua
Phenanthrene	ND	4.7	20.0	ug/kg							Ua
Anthracene	ND	5.9	20.0	ug/kg							Ua
Di-n-Butylphthalate	15.6	5.3	20.0	ug/kg							J
Fluoranthene	ND	4.5	20.0	ug/kg							Ua
Pyrene	ND	5.6	20.0	ug/kg							Ua
Butylbenzylphthalate	ND	8.1	20.0	ug/kg							Ua
Benzo(a)anthracene	ND	5.2	20.0	ug/kg							Ua
Chrysene	ND	5.2	20.0	ug/kg							Ua
bis(2-Ethylhexyl)phthalate	ND	28.8	50.0	ug/kg							Ua
Di-n-Octylphthalate	ND	8.7	20.0	ug/kg							Ua
Benzo(a)fluoranthene, Total	ND	10.2	40.0	ug/kg							Ua
Benzo(a)pyrene	ND	6.5	20.0	ug/kg							Ua
Indeno(1,2,3-cd)pyrene	ND	6.0	20.0	ug/kg							Ua
Dibenzo(a,h)anthracene	ND	6.2	20.0	ug/kg							Ua
Benzo(g,h,i)perylene	ND	5.8	20.0	ug/kg							Ua
Surrogate: 2-Fluorophenol	535			ug/kg	750		71.3	27-120			
Surrogate: Phenol-d5	528			ug/kg	750		70.4	29-120			
Surrogate: 2-Chlorophenol-d4	606			ug/kg	750		80.7	31-120			



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Semivolatile Organic Compounds - Quality Control

Batch BIK0878 - EPA 3546 (Microwave)

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BIK0878-BLK1)						Prepared: 01-Dec-2020 Analyzed: 30-Dec-2020 15:27					
Surrogate: 1,2-Dichlorobenzene-d4	338			ug/kg	500		67.7	32-120			
Surrogate: Nitrobenzene-d5	424			ug/kg	500		84.9	30-120			
Surrogate: 2-Fluorobiphenyl	377			ug/kg	500		75.4	35-120			
Surrogate: 2,4,6-Tribromophenol	411			ug/kg	750		54.7	24-134			
Surrogate: p-Terphenyl-d14	374			ug/kg	500		74.7	37-120			
LCS (BIK0878-BS1)						Prepared: 01-Dec-2020 Analyzed: 30-Dec-2020 16:05					
Phenol	456	8.2	20.0	ug/kg	500		91.3	34-120			
Benzyl Alcohol	362	14.9	20.0	ug/kg	500		72.5	19-120			
2-Methylphenol	363	7.8	20.0	ug/kg	500		72.5	28-120			
Hexachloroethane	363	5.7	20.0	ug/kg	500		72.7	38-120			
4-Methylphenol	401	14.7	20.0	ug/kg	500		80.2	29-120			
Naphthalene	316	5.3	20.0	ug/kg	500		63.3	43-120			
Benzoic acid	2060	59.1	200	ug/kg	2300		89.7	10-120			
2-Methylnaphthalene	333	5.7	20.0	ug/kg	500		66.6	43-120			
Acenaphthylene	268	4.8	20.0	ug/kg	500		53.6	42-120			
Dimethylphthalate	403	6.4	20.0	ug/kg	500		80.7	43-120			
Acenaphthene	357	5.1	20.0	ug/kg	500		71.3	45-120			
Dibenzofuran	384	4.6	20.0	ug/kg	500		76.9	43-120			
Fluorene	449	5.0	20.0	ug/kg	500		89.9	45-120			
Diethyl phthalate	429	17.7	20.0	ug/kg	500		85.7	50-120			
N-Nitrosodiphenylamine	477	9.6	20.0	ug/kg	500		95.4	70-154			
Hexachlorobenzene	329	4.7	20.0	ug/kg	500		65.8	33-120			Q
Pentachlorophenol	1220	31.3	100	ug/kg	1300		94.0	16-120			
Phenanthrene	406	4.7	20.0	ug/kg	500		81.1	49-120			
Anthracene	370	5.9	20.0	ug/kg	500		73.9	45-120			
Di-n-Butylphthalate	484	5.3	20.0	ug/kg	500		96.9	48-126			
Fluoranthene	413	4.5	20.0	ug/kg	500		82.6	53-145			
Pyrene	470	5.6	20.0	ug/kg	500		94.0	52-134			
Butylbenzylphthalate	444	8.1	20.0	ug/kg	500		88.8	45-132			
Benzo(a)anthracene	400	5.2	20.0	ug/kg	500		80.0	49-120			
Chrysene	417	5.2	20.0	ug/kg	500		83.5	47-120			
bis(2-Ethylhexyl)phthalate	426	28.8	50.0	ug/kg	500		85.2	34-130			
Di-n-Octylphthalate	408	8.7	20.0	ug/kg	500		81.6	28-124			
Benzofluoranthenes, Total	928	10.2	40.0	ug/kg	1000		92.8	30-160			



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Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

Semivolatile Organic Compounds - Quality Control

Batch BIK0878 - EPA 3546 (Microwave)

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BIK0878-BS1)											
						Prepared: 01-Dec-2020 Analyzed: 30-Dec-2020 16:05					
Benzo(a)pyrene	398	6.5	20.0	ug/kg	500		79.6	42-120			
Indeno(1,2,3-cd)pyrene	462	6.0	20.0	ug/kg	500		92.3	42-163			
Dibenzo(a,h)anthracene	448	6.2	20.0	ug/kg	500		89.6	30-133			
Benzo(g,h,i)perylene	471	5.8	20.0	ug/kg	500		94.2	46-148			
Surrogate: 2-Fluorophenol	673			ug/kg	750		89.7	27-120			
Surrogate: Phenol-d5	705			ug/kg	750		94.0	29-120			
Surrogate: 2-Chlorophenol-d4	625			ug/kg	750		83.3	31-120			
Surrogate: 1,2-Dichlorobenzene-d4	363			ug/kg	500		72.5	32-120			
Surrogate: Nitrobenzene-d5	448			ug/kg	500		89.7	30-120			
Surrogate: 2-Fluorobiphenyl	419			ug/kg	500		83.8	35-120			
Surrogate: 2,4,6-Tribromophenol	588			ug/kg	750		78.3	24-134			
Surrogate: p-Terphenyl-d14	433			ug/kg	500		86.6	37-120			
Matrix Spike (BIK0878-MS1)											
				Source: 20K0374-05		Prepared: 01-Dec-2020 Analyzed: 30-Dec-2020 19:52					
Phenol	388	8.2	19.9	ug/kg	498	10.0	76.0	34-120			
Benzyl Alcohol	361	14.8	19.9	ug/kg	498	ND	72.6	19-120			
2-Methylphenol	388	7.8	19.9	ug/kg	498	ND	77.8	28-120			
Hexachloroethane	332	5.6	19.9	ug/kg	498	ND	66.7	38-120			
4-Methylphenol	441	14.6	19.9	ug/kg	498	81.3	72.2	29-120			
Naphthalene	417	5.2	19.9	ug/kg	498	65.8	70.5	43-120			
Benzoic acid	1030	58.9	199	ug/kg	2290	ND	45.0	10-120			
2-Methylnaphthalene	377	5.6	19.9	ug/kg	498	21.2	71.5	43-120			
Acenaphthylene	392	4.8	19.9	ug/kg	498	48.1	69.0	42-120			
Dimethylphthalate	396	6.4	19.9	ug/kg	498	ND	79.4	43-120			
Acenaphthene	409	5.1	19.9	ug/kg	498	17.9	78.5	45-120			
Dibenzofuran	430	4.6	19.9	ug/kg	498	22.0	81.8	43-120			
Fluorene	563	4.9	19.9	ug/kg	498	41.3	105	45-120			
Diethyl phthalate	514	17.6	19.9	ug/kg	498	ND	103	50-120			
N-Nitrosodiphenylamine	384	9.5	19.9	ug/kg	498	ND	77.1	70-154			
Hexachlorobenzene	358	4.7	19.9	ug/kg	498	ND	71.8	33-120			Q
Pentachlorophenol	1310	31.2	99.6	ug/kg	1290	ND	101	16-120			
Phenanthrene	570	4.7	19.9	ug/kg	498	201	74.1	49-120			
Anthracene	462	5.9	19.9	ug/kg	498	120	68.6	45-120			
Di-n-Butylphthalate	448	5.3	19.9	ug/kg	498	17.1	86.5	48-126			
Fluoranthene	704	4.5	19.9	ug/kg	498	1060	-70.7	53-145			*



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Reported:
26-Mar-2021 16:29

Semivolatile Organic Compounds - Quality Control

Batch BIK0878 - EPA 3546 (Microwave)

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike (BIK0878-MS1) Source: 20K0374-05 Prepared: 01-Dec-2020 Analyzed: 30-Dec-2020 19:52											
Pyrene	775	5.5	19.9	ug/kg	498	1030	-51.4	52-134			*
Butylbenzylphthalate	451	8.0	19.9	ug/kg	498	ND	90.5	45-132			
Benzo(a)anthracene	596	5.2	19.9	ug/kg	498	366	46.2	49-120			*
Chrysene	862	5.2	19.9	ug/kg	498	652	42.1	47-120			*
bis(2-Ethylhexyl)phthalate	501	28.7	49.8	ug/kg	498	32.6	94.1	34-130			
Di-n-Octylphthalate	406	8.7	19.9	ug/kg	498	ND	81.4	28-124			
Benzo(a)pyrene	609	6.5	19.9	ug/kg	498	367	48.7	42-120			
Indeno(1,2,3-cd)pyrene	435	6.0	19.9	ug/kg	498	183	50.6	42-163			
Dibenzo(a,h)anthracene	415	6.1	19.9	ug/kg	498	75.8	68.2	30-133			
Benzo(g,h,i)perylene	356	5.8	19.9	ug/kg	498	165	38.5	46-148			*
Surrogate: 2-Fluorophenol	618			ug/kg	747	513	82.7	27-120			
Surrogate: Phenol-d5	669			ug/kg	747	558	89.6	29-120			
Surrogate: 2-Chlorophenol-d4	633			ug/kg	747	575	84.7	31-120			
Surrogate: 1,2-Dichlorobenzene-d4	353			ug/kg	498	328	70.8	32-120			
Surrogate: Nitrobenzene-d5	439			ug/kg	498	433	88.2	30-120			
Surrogate: 2-Fluorobiphenyl	443			ug/kg	498	426	89.0	35-120			
Surrogate: 2,4,6-Tribromophenol	635			ug/kg	747	617	85.0	24-134			
Surrogate: p-Terphenyl-d14	422			ug/kg	498	402	84.8	37-120			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike (BIK0878-MS2) Source: 20K0374-07 Prepared: 01-Dec-2020 Analyzed: 30-Dec-2020 22:23											
Phenol	421	8.2	20.0	ug/kg	499	10.8	82.2	34-120			
Benzyl Alcohol	386	14.9	20.0	ug/kg	499	ND	77.3	19-120			
2-Methylphenol	368	7.8	20.0	ug/kg	499	ND	73.8	28-120			
Hexachloroethane	357	5.6	20.0	ug/kg	499	ND	71.6	38-120			
4-Methylphenol	440	14.7	20.0	ug/kg	499	31.5	82.0	29-120			
Naphthalene	585	5.2	20.0	ug/kg	499	102	96.8	43-120			
Benzoic acid	1570	59.0	200	ug/kg	2290	ND	68.5	10-120			
2-Methylnaphthalene	452	5.7	20.0	ug/kg	499	13.7	87.9	43-120			
Acenaphthylene	200	4.8	20.0	ug/kg	499	13.7	37.2	42-120			*
Dimethylphthalate	417	6.4	20.0	ug/kg	499	ND	83.7	43-120			
Acenaphthene	455	5.1	20.0	ug/kg	499	17.1	87.8	45-120			
Dibenzofuran	449	4.6	20.0	ug/kg	499	14.4	87.1	43-120			
Fluorene	604	4.9	20.0	ug/kg	499	29.3	115	45-120			



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Reported:
26-Mar-2021 16:29

Semivolatile Organic Compounds - Quality Control

Batch BIK0878 - EPA 3546 (Microwave)

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike (BIK0878-MS2)											
Source: 20K0374-07				Prepared: 01-Dec-2020 Analyzed: 30-Dec-2020 22:23							
Diethyl phthalate	453	17.7	20.0	ug/kg	499	23.8	86.0	50-120			
N-Nitrosodiphenylamine	446	9.5	20.0	ug/kg	499	ND	89.3	70-154			
Hexachlorobenzene	353	4.7	20.0	ug/kg	499	ND	70.7	33-120			Q
Pentachlorophenol	1290	31.2	99.8	ug/kg	1300	ND	99.5	16-120			
Phenanthrene	687	4.7	20.0	ug/kg	499	161	106	49-120			
Anthracene	417	5.9	20.0	ug/kg	499	51.8	73.2	45-120			
Di-n-Butylphthalate	465	5.3	20.0	ug/kg	499	14.3	90.3	48-126			
Fluoranthene	1140	4.5	20.0	ug/kg	499	189	190	53-145			*
Pyrene	993	5.5	20.0	ug/kg	499	266	146	52-134			*
Butylbenzylphthalate	480	8.0	20.0	ug/kg	499	ND	96.2	45-132			
Benzo(a)anthracene	596	5.2	20.0	ug/kg	499	80.5	103	49-120			
Chrysene	758	5.2	20.0	ug/kg	499	96.0	133	47-120			*
bis(2-Ethylhexyl)phthalate	476	28.7	49.9	ug/kg	499	ND	95.4	34-130			
Di-n-Octylphthalate	415	8.7	20.0	ug/kg	499	ND	83.3	28-124			
Benzo(a)fluoranthene, Total	1350	10.2	39.9	ug/kg	998	175	118	30-160			
Benzo(a)pyrene	550	6.5	20.0	ug/kg	499	85.0	93.2	42-120			
Indeno(1,2,3-cd)pyrene	414	6.0	20.0	ug/kg	499	37.0	75.6	42-163			
Dibenzo(a,h)anthracene	397	6.1	20.0	ug/kg	499	13.7	76.9	30-133			
Benzo(g,h,i)perylene	360	5.8	20.0	ug/kg	499	32.9	65.6	46-148			
Surrogate: 2-Fluorophenol	627			ug/kg	748	537	83.8	27-120			
Surrogate: Phenol-d5	704			ug/kg	748	582	94.2	29-120			
Surrogate: 2-Chlorophenol-d4	657			ug/kg	748	608	87.8	31-120			
Surrogate: 1,2-Dichlorobenzene-d4	378			ug/kg	499	358	75.7	32-120			
Surrogate: Nitrobenzene-d5	452			ug/kg	499	466	90.5	30-120			
Surrogate: 2-Fluorobiphenyl	450			ug/kg	499	444	90.2	35-120			
Surrogate: 2,4,6-Tribromophenol	619			ug/kg	748	633	82.7	24-134			
Surrogate: p-Terphenyl-d14	434			ug/kg	499	418	87.1	37-120			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike Dup (BIK0878-MSD1)											
Source: 20K0374-05				Prepared: 01-Dec-2020 Analyzed: 30-Dec-2020 20:30							
Phenol	412	8.2	19.9	ug/kg	498	10.0	80.8	34-120	6.00	30	
Benzyl Alcohol	357	14.8	19.9	ug/kg	498	ND	71.8	19-120	1.13	30	
2-Methylphenol	366	7.8	19.9	ug/kg	498	ND	73.4	28-120	5.83	30	
Hexachloroethane	349	5.6	19.9	ug/kg	498	ND	70.1	38-120	5.02	30	
4-Methylphenol	430	14.6	19.9	ug/kg	498	81.3	69.9	29-120	2.61	30	



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

Semivolatile Organic Compounds - Quality Control

Batch BIK0878 - EPA 3546 (Microwave)

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike Dup (BIK0878-MSD1)											
Source: 20K0374-05				Prepared: 01-Dec-2020 Analyzed: 30-Dec-2020 20:30							
Naphthalene	423	5.2	19.9	ug/kg	498	65.8	71.8	43-120	1.60	30	
Benzoic acid	836	58.9	199	ug/kg	2290	ND	36.5	10-120	20.90	30	
2-Methylnaphthalene	371	5.6	19.9	ug/kg	498	21.2	70.3	43-120	1.62	30	
Acenaphthylene	352	4.8	19.9	ug/kg	498	48.1	61.0	42-120	10.70	30	
Dimethylphthalate	482	6.4	19.9	ug/kg	498	ND	96.8	43-120	19.70	30	
Acenaphthene	399	5.1	19.9	ug/kg	498	17.9	76.5	45-120	2.47	30	
Dibenzofuran	426	4.6	19.9	ug/kg	498	22.0	81.1	43-120	0.88	30	
Fluorene	555	4.9	19.9	ug/kg	498	41.3	103	45-120	1.53	30	
Diethyl phthalate	410	17.6	19.9	ug/kg	498	ND	82.3	50-120	22.60	30	
N-Nitrosodiphenylamine	334	9.5	19.9	ug/kg	498	ND	67.0	70-154	14.10	30	*
Hexachlorobenzene	337	4.7	19.9	ug/kg	498	ND	67.6	33-120	6.02	30	Q
Pentachlorophenol	1210	31.2	99.6	ug/kg	1290	ND	93.1	16-120	7.96	30	
Phenanthrene	547	4.7	19.9	ug/kg	498	201	69.5	49-120	4.11	30	
Anthracene	406	5.9	19.9	ug/kg	498	120	57.3	45-120	13.00	30	
Di-n-Butylphthalate	419	5.3	19.9	ug/kg	498	17.1	80.6	48-126	6.73	30	
Fluoranthene	855	4.5	19.9	ug/kg	498	1060	-40.4	53-145	19.40	30	*
Pyrene	902	5.5	19.9	ug/kg	498	1030	-25.8	52-134	15.20	30	*
Butylbenzylphthalate	416	8.0	19.9	ug/kg	498	ND	83.6	45-132	7.94	30	
Benzo(a)anthracene	524	5.2	19.9	ug/kg	498	366	31.6	49-120	13.00	30	*
Chrysene	759	5.2	19.9	ug/kg	498	652	21.4	47-120	12.70	30	*
bis(2-Ethylhexyl)phthalate	469	28.7	49.8	ug/kg	498	32.6	87.7	34-130	6.62	30	
Di-n-Octylphthalate	397	8.7	19.9	ug/kg	498	ND	79.8	28-124	2.04	30	
Benzo(a)fluoranthene, Total	1140	10.2	39.8	ug/kg	996	816	32.8	30-160	9.30	30	
Benzo(a)pyrene	493	6.5	19.9	ug/kg	498	367	25.3	42-120	21.20	30	*
Indeno(1,2,3-cd)pyrene	394	6.0	19.9	ug/kg	498	183	42.4	42-163	9.89	30	
Dibenzo(a,h)anthracene	388	6.1	19.9	ug/kg	498	75.8	62.8	30-133	6.74	30	
Benzo(g,h,i)perylene	337	5.8	19.9	ug/kg	498	165	34.6	46-148	5.60	30	*
Surrogate: 2-Fluorophenol	611			ug/kg	747	513	81.7	27-120			
Surrogate: Phenol-d5	660			ug/kg	747	558	88.3	29-120			
Surrogate: 2-Chlorophenol-d4	612			ug/kg	747	575	81.9	31-120			
Surrogate: 1,2-Dichlorobenzene-d4	345			ug/kg	498	328	69.2	32-120			
Surrogate: Nitrobenzene-d5	430			ug/kg	498	433	86.2	30-120			
Surrogate: 2-Fluorobiphenyl	431			ug/kg	498	426	86.5	35-120			
Surrogate: 2,4,6-Tribromophenol	602			ug/kg	747	617	80.6	24-134			
Surrogate: p-Terphenyl-d14	395			ug/kg	498	402	79.3	37-120			



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

Semivolatile Organic Compounds - Quality Control

Batch BIK0878 - EPA 3546 (Microwave)

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Matrix Spike Dup (BIK0878-MSD1)

Source: 20K0374-05

Prepared: 01-Dec-2020 Analyzed: 30-Dec-2020 20:30

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike Dup (BIK0878-MSD2)

Source: 20K0374-07

Prepared: 01-Dec-2020 Analyzed: 30-Dec-2020 23:01

Phenol	403	8.2	20.0	ug/kg	499	10.8	78.7	34-120	4.31	30	
Benzyl Alcohol	392	14.9	20.0	ug/kg	499	ND	78.6	19-120	1.69	30	
2-Methylphenol	396	7.8	20.0	ug/kg	499	ND	79.4	28-120	7.29	30	
Hexachloroethane	366	5.6	20.0	ug/kg	499	ND	73.4	38-120	2.52	30	
4-Methylphenol	444	14.7	20.0	ug/kg	499	31.5	82.7	29-120	0.80	30	
Naphthalene	407	5.2	20.0	ug/kg	499	102	61.1	43-120	36.00	30	*
Benzoic acid	1620	59.0	200	ug/kg	2290	ND	70.8	10-120	3.21	30	
2-Methylnaphthalene	385	5.7	20.0	ug/kg	499	13.7	74.5	43-120	16.00	30	
Acenaphthylene	370	4.8	20.0	ug/kg	499	13.7	71.4	42-120	59.80	30	*
Dimethylphthalate	430	6.4	20.0	ug/kg	499	ND	86.2	43-120	3.00	30	
Acenaphthene	411	5.1	20.0	ug/kg	499	17.1	78.9	45-120	10.30	30	
Dibenzofuran	439	4.6	20.0	ug/kg	499	14.4	85.2	43-120	2.09	30	
Fluorene	593	4.9	20.0	ug/kg	499	29.3	113	45-120	1.90	30	
Diethyl phthalate	452	17.7	20.0	ug/kg	499	23.8	85.9	50-120	0.12	30	
N-Nitrosodiphenylamine	488	9.5	20.0	ug/kg	499	ND	97.8	70-154	9.04	30	
Hexachlorobenzene	368	4.7	20.0	ug/kg	499	ND	73.9	33-120	4.34	30	Q
Pentachlorophenol	1400	31.2	99.8	ug/kg	1300	ND	108	16-120	8.04	30	
Phenanthrene	536	4.7	20.0	ug/kg	499	161	75.2	49-120	24.70	30	
Anthracene	417	5.9	20.0	ug/kg	499	51.8	73.3	45-120	0.11	30	
Di-n-Butylphthalate	483	5.3	20.0	ug/kg	499	14.3	94.0	48-126	3.91	30	
Fluoranthene	623	4.5	20.0	ug/kg	499	189	87.1	53-145	58.40	30	*
Pyrene	661	5.5	20.0	ug/kg	499	266	79.3	52-134	40.10	30	*
Butylbenzylphthalate	441	8.0	20.0	ug/kg	499	ND	88.4	45-132	8.45	30	
Benzo(a)anthracene	528	5.2	20.0	ug/kg	499	80.5	89.6	49-120	12.20	30	
Chrysene	653	5.2	20.0	ug/kg	499	96.0	112	47-120	14.90	30	
bis(2-Ethylhexyl)phthalate	488	28.7	49.9	ug/kg	499	ND	97.9	34-130	2.56	30	
Di-n-Octylphthalate	429	8.7	20.0	ug/kg	499	ND	86.1	28-124	3.33	30	
Benzo(a)fluoranthene, Total	1150	10.2	39.9	ug/kg	998	175	98.0	30-160	15.80	30	
Benzo(a)pyrene	466	6.5	20.0	ug/kg	499	85.0	76.4	42-120	16.50	30	
Indeno(1,2,3-cd)pyrene	365	6.0	20.0	ug/kg	499	37.0	65.8	42-163	12.60	30	
Dibenzo(a,h)anthracene	374	6.1	20.0	ug/kg	499	13.7	72.3	30-133	5.99	30	
Benzo(g,h,i)perylene	307	5.8	20.0	ug/kg	499	32.9	55.0	46-148	15.90	30	



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

Semivolatile Organic Compounds - Quality Control

Batch BIK0878 - EPA 3546 (Microwave)

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC %REC	%REC Limits	RPD RPD	RPD Limit	Notes
Matrix Spike Dup (BIK0878-MSD2)		Source: 20K0374-07		Prepared: 01-Dec-2020		Analyzed: 30-Dec-2020 23:01					
Surrogate: 2-Fluorophenol	632			ug/kg	748	537	84.5	27-120			
Surrogate: Phenol-d5	691			ug/kg	748	582	92.4	29-120			
Surrogate: 2-Chlorophenol-d4	641			ug/kg	748	608	85.7	31-120			
Surrogate: 1,2-Dichlorobenzene-d4	371			ug/kg	499	358	74.3	32-120			
Surrogate: Nitrobenzene-d5	452			ug/kg	499	466	90.7	30-120			
Surrogate: 2-Fluorobiphenyl	448			ug/kg	499	444	89.8	35-120			
Surrogate: 2,4,6-Tribromophenol	619			ug/kg	748	633	82.8	24-134			
Surrogate: p-Terphenyl-d14	417			ug/kg	499	418	83.6	37-120			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

Semivolatile Organic Compounds - SIM - Quality Control

Batch BIK0878 - EPA 3546 (Microwave)

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BIK0878-BLK2) Prepared: 01-Dec-2020 Analyzed: 30-Dec-2020 15:27											
1,4-Dichlorobenzene	ND	0.6	5.0	ug/kg							Ua
1,2-Dichlorobenzene	ND	0.7	5.0	ug/kg							Ua
2,4-Dimethylphenol	ND	2.2	20.0	ug/kg							Ua
1,2,4-Trichlorobenzene	ND	2.7	5.0	ug/kg							Ua
Hexachlorobutadiene	ND	0.7	5.0	ug/kg							Ua
Surrogate: 2-Fluorophenol	536			ug/kg	750		71.4	27-120			Q
Surrogate: p-Terphenyl-d14	343			ug/kg	500		68.6	37-120			

LCS (BIK0878-BS2) Prepared: 01-Dec-2020 Analyzed: 30-Dec-2020 16:05											
1,4-Dichlorobenzene	333	0.6	5.0	ug/kg	500		66.6	36-120			
1,2-Dichlorobenzene	325	0.7	5.0	ug/kg	500		64.9	36-120			
2,4-Dimethylphenol	498	2.2	20.0	ug/kg	1300		38.3	10-120			
1,2,4-Trichlorobenzene	280	2.7	5.0	ug/kg	500		55.9	35-120			
Hexachlorobutadiene	314	0.7	5.0	ug/kg	500		62.8	34-120			
Surrogate: 2-Fluorophenol	686			ug/kg	750		91.4	27-120			Q
Surrogate: p-Terphenyl-d14	405			ug/kg	500		81.0	37-120			

Matrix Spike (BIK0878-MS3) Source: 20K0374-05 Prepared: 01-Dec-2020 Analyzed: 30-Dec-2020 19:52											
1,4-Dichlorobenzene	331	0.6	5.0	ug/kg	498	ND	66.4	36-120			
1,2-Dichlorobenzene	324	0.7	5.0	ug/kg	498	ND	65.0	36-120			
2,4-Dimethylphenol	549	2.2	19.9	ug/kg	1290	ND	42.4	10-120			
1,2,4-Trichlorobenzene	284	2.7	5.0	ug/kg	498	ND	57.0	35-120			
Hexachlorobutadiene	311	0.7	5.0	ug/kg	498	ND	62.4	34-120			
Surrogate: 2-Fluorophenol	641			ug/kg	747	531	85.7	27-120			Q
Surrogate: p-Terphenyl-d14	390			ug/kg	498	379	78.3	37-120			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike (BIK0878-MS4) Source: 20K0374-07 Prepared: 01-Dec-2020 Analyzed: 30-Dec-2020 22:23											
1,4-Dichlorobenzene	350	0.6	5.0	ug/kg	499	1.1	69.9	36-120			
1,2-Dichlorobenzene	342	0.7	5.0	ug/kg	499	ND	68.5	36-120			
2,4-Dimethylphenol	409	2.2	20.0	ug/kg	1300	2.2	31.4	10-120			
1,2,4-Trichlorobenzene	293	2.7	5.0	ug/kg	499	ND	58.7	35-120			
Hexachlorobutadiene	323	0.7	5.0	ug/kg	499	ND	64.8	34-120			
Surrogate: 2-Fluorophenol	656			ug/kg	748	573	87.7	27-120			Q



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Reported:
26-Mar-2021 16:29

Semivolatile Organic Compounds - SIM - Quality Control

Batch BIK0878 - EPA 3546 (Microwave)

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Matrix Spike (BIK0878-MS4) Source: 20K0374-07 Prepared: 01-Dec-2020 Analyzed: 30-Dec-2020 22:23

Surrogate: <i>p</i> -Terphenyl- <i>d</i> 14	393			ug/kg	499	388	78.7	37-120			
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Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike Dup (BIK0878-MSD3) Source: 20K0374-05 Prepared: 01-Dec-2020 Analyzed: 30-Dec-2020 20:30

1,4-Dichlorobenzene	336	0.6	5.0	ug/kg	498	ND	67.5	36-120	1.64	30	
1,2-Dichlorobenzene	330	0.7	5.0	ug/kg	498	ND	66.3	36-120	1.89	30	
2,4-Dimethylphenol	433	2.2	19.9	ug/kg	1290	ND	33.4	10-120	23.70	30	
1,2,4-Trichlorobenzene	286	2.7	5.0	ug/kg	498	ND	57.3	35-120	0.60	30	
Hexachlorobutadiene	310	0.7	5.0	ug/kg	498	ND	62.2	34-120	0.33	30	

Surrogate: 2-Fluorophenol	632			ug/kg	747	531	84.6	27-120			Q
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Surrogate: <i>p</i> -Terphenyl- <i>d</i> 14	373			ug/kg	498	379	74.9	37-120			
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Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike Dup (BIK0878-MSD4) Source: 20K0374-07 Prepared: 01-Dec-2020 Analyzed: 30-Dec-2020 23:01

1,4-Dichlorobenzene	355	0.6	5.0	ug/kg	499	1.1	70.9	36-120	1.52	30	
1,2-Dichlorobenzene	348	0.7	5.0	ug/kg	499	ND	69.8	36-120	1.91	30	
2,4-Dimethylphenol	653	2.2	20.0	ug/kg	1300	2.2	50.2	10-120	45.90	30	*
1,2,4-Trichlorobenzene	301	2.7	5.0	ug/kg	499	ND	60.3	35-120	2.69	30	
Hexachlorobutadiene	334	0.7	5.0	ug/kg	499	ND	66.9	34-120	3.12	30	

Surrogate: 2-Fluorophenol	671			ug/kg	748	573	89.7	27-120			Q
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Surrogate: <i>p</i> -Terphenyl- <i>d</i> 14	385			ug/kg	499	388	77.1	37-120			
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Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Reference (BIK0878-SRM1) Prepared: 01-Dec-2020 Analyzed: 31-Dec-2020 02:09

1,4-Dichlorobenzene	2290	6.0	50.0	ug/kg	7450		30.7	12-188			
1,2-Dichlorobenzene	542	7.4	50.0	ug/kg	1700		31.9	17-184			
2,4-Dimethylphenol	3390	21.7	200	ug/kg	4380		77.4	19-181			

Surrogate: 2-Fluorophenol	7010			ug/kg	7500		93.5	27-120			Q
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Surrogate: <i>p</i> -Terphenyl- <i>d</i> 14	3800			ug/kg	5000		76.0	37-120			
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Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

Butyl Tins - Quality Control

Batch BIK0879 - EPA 3546 (Microwave)

Instrument: NT8 Analyst: JZ

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BIK0879-BLK1)											
						Prepared: 01-Dec-2020 Analyzed: 17-Dec-2020 18:14					
Tributyltin Ion	ND	0.450	3.86	ug/kg							Ua
Dibutyltin Ion	ND	1.73	5.78	ug/kg							Ua
Butyltin Ion	ND	1.89	4.08	ug/kg							Ua
Tetrabutyltin	ND	5.00	5.00	ug/kg							Ua
Surrogate: Triphenyltin	44.7			ug/kg	45.2		98.8	30-160			
Surrogate: Tripropyltin	30.6			ug/kg	43.7		69.9	30-160			
LCS (BIK0879-BS1)											
						Prepared: 01-Dec-2020 Analyzed: 17-Dec-2020 18:30					
Tributyltin Ion	41.6	0.450	3.86	ug/kg	44.6		93.4	30-160			
Dibutyltin Ion	38.3	1.73	5.78	ug/kg	38.4		99.8	30-160			
Butyltin Ion	33.3	1.89	4.08	ug/kg	31.2		107	30-160			
Surrogate: Triphenyltin	51.9			ug/kg	45.2		115	30-160			
Surrogate: Tripropyltin	33.8			ug/kg	43.7		77.2	30-160			
Matrix Spike (BIK0879-MS1)											
				Source: 20K0374-05		Prepared: 01-Dec-2020 Analyzed: 17-Dec-2020 20:25					
Tributyltin Ion	49.6	0.450	3.86	ug/kg	44.6	322	-612	30-160			*
Dibutyltin Ion	38.7	1.73	5.78	ug/kg	38.4	8.48	78.9	30-160			
Butyltin Ion	26.3	1.89	4.08	ug/kg	31.2	ND	84.5	30-160			
Surrogate: Triphenyltin	49.0			ug/kg	45.2	45.4	108	30-160			
Surrogate: Tripropyltin	28.0			ug/kg	43.8	28.1	63.9	30-160			
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											
Matrix Spike (BIK0879-MS2)											
				Source: 20K0374-07		Prepared: 01-Dec-2020 Analyzed: 17-Dec-2020 21:31					
Tributyltin Ion	40.8	0.450	3.86	ug/kg	44.6	15.9	55.8	30-160			
Dibutyltin Ion	36.3	1.73	5.78	ug/kg	38.4	3.17	86.4	30-160			
Butyltin Ion	21.1	1.89	4.08	ug/kg	31.2	ND	67.6	30-160			
Surrogate: Triphenyltin	45.5			ug/kg	45.2	51.6	101	30-160			
Surrogate: Tripropyltin	23.6			ug/kg	43.8	30.7	53.9	30-160			
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											
Matrix Spike Dup (BIK0879-MSD1)											
				Source: 20K0374-05		Prepared: 01-Dec-2020 Analyzed: 17-Dec-2020 20:42					
Tributyltin Ion	50.3	0.450	3.86	ug/kg	44.6	322	-610	30-160	1.41	30	*
Dibutyltin Ion	39.5	1.73	5.78	ug/kg	38.4	8.48	80.7	30-160	1.84	30	
Butyltin Ion	25.6	1.89	4.08	ug/kg	31.2	ND	82.2	30-160	2.86	30	



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Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

Butyl Tins - Quality Control

Batch BIK0879 - EPA 3546 (Microwave)

Instrument: NT8 Analyst: JZ

QC Sample/Analyte	Detection Result	Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike Dup (BIK0879-MSD1) Source: 20K0374-05 Prepared: 01-Dec-2020 Analyzed: 17-Dec-2020 20:42											
Surrogate: Triphenyltin	48.0			ug/kg	45.2	45.4	106	30-160			
Surrogate: Tripropyltin	28.0			ug/kg	43.8	28.1	64.1	30-160			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike Dup (BIK0879-MSD2) Source: 20K0374-07 Prepared: 01-Dec-2020 Analyzed: 17-Dec-2020 21:48											
Tributyltin Ion	40.5	0.450	3.86	ug/kg	44.6	15.9	55.1	30-160	0.76	30	
Dibutyltin Ion	38.5	1.73	5.78	ug/kg	38.4	3.17	92.1	30-160	5.80	30	
Butyltin Ion	27.1	1.89	4.08	ug/kg	31.2	ND	87.0	30-160	25.10	30	
Surrogate: Triphenyltin	46.2			ug/kg	45.2	51.6	102	30-160			
Surrogate: Tripropyltin	28.6			ug/kg	43.8	30.7	65.2	30-160			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Reference (BIK0879-SRM1) Prepared: 01-Dec-2020 Analyzed: 17-Dec-2020 18:46											
Tributyltin Ion	453	2.25	19.3	ug/kg	430		105	50-150			
Dibutyltin Ion	513	8.65	28.9	ug/kg	631		81.3	50-150			
Butyltin Ion	635	9.45	20.4	ug/kg	1470		43.2	50-150			*
Surrogate: Triphenyltin	260			ug/kg	226		115	30-160			
Surrogate: Tripropyltin	147			ug/kg	219		67.3	30-160			



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Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

Chlorinated Pesticides - Quality Control

Batch BJB0764 - EPA 3546 (Microwave)

Instrument: ECD6 Analyst: YZ/VTs

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJB0764-BLK1)											
						Prepared: 26-Feb-2021 Analyzed: 15-Mar-2021 16:11					
Heptachlor	ND	0.05	0.50	ug/kg							Ua
Aldrin	ND	0.37	0.50	ug/kg							Ua
trans-Chlordane (beta-Chlordane)	ND	0.33	0.50	ug/kg							Ua
cis-Chlordane (alpha-chlordane)	ND	0.11	0.50	ug/kg							Ua
4,4'-DDE	ND	0.14	1.00	ug/kg							Ua
Dieldrin	ND	0.12	1.00	ug/kg							Ua
4,4'-DDD	ND	0.32	1.00	ug/kg							Ua
4,4'-DDT	ND	0.33	1.00	ug/kg							Ua
Oxychlordane	ND	0.13	1.00	ug/kg							Ua
cis-Nonachlor	ND	0.21	1.00	ug/kg							Ua
trans-Nonachlor	ND	0.23	1.00	ug/kg							Ua
Surrogate: Decachlorobiphenyl	7.19			ug/kg	8.00		89.8	30-160			
Surrogate: Decachlorobiphenyl [2C]	5.68			ug/kg	8.00		71.1	30-160			
Surrogate: Tetrachlorometaxylene	5.44			ug/kg	8.00		68.0	30-160			
Surrogate: Tetrachlorometaxylene [2C]	5.53			ug/kg	8.00		69.1	30-160			
LCS (BJB0764-BS1)											
						Prepared: 26-Feb-2021 Analyzed: 15-Mar-2021 16:29					
Heptachlor	2.94	0.05	0.50	ug/kg	4.00		73.4	26-120			
Aldrin [2C]	3.02	0.37	0.50	ug/kg	4.00		75.5	26-120			
trans-Chlordane (beta-Chlordane)	3.57	0.33	0.50	ug/kg	4.00		89.3	21-120			
cis-Chlordane (alpha-chlordane)	3.36	0.11	0.50	ug/kg	4.00		84.0	39-120			
4,4'-DDE [2C]	6.82	0.14	1.00	ug/kg	8.00		85.2	35-120			
Dieldrin	7.04	0.12	1.00	ug/kg	8.00		88.0	10-140			
4,4'-DDD	6.91	0.32	1.00	ug/kg	8.00		86.3	50-120			
4,4'-DDT	6.75	0.33	1.00	ug/kg	8.00		84.4	39-120			
Surrogate: Decachlorobiphenyl	7.15			ug/kg	8.00		89.4	30-160			
Surrogate: Decachlorobiphenyl [2C]	6.42			ug/kg	8.00		80.2	30-160			
Surrogate: Tetrachlorometaxylene	5.55			ug/kg	8.00		69.4	30-160			
Surrogate: Tetrachlorometaxylene [2C]	5.83			ug/kg	8.00		72.8	30-160			
LCS (BJB0764-BS2)											
						Prepared: 26-Feb-2021 Analyzed: 15-Mar-2021 16:48					
Oxychlordane [2C]	5.49	0.13	1.00	ug/kg	8.00		68.6	30-160			
cis-Nonachlor	5.59	0.21	1.00	ug/kg	8.00		69.9	30-160			
trans-Nonachlor	6.00	0.23	1.00	ug/kg	8.00		74.9	30-160			



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Reported:
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Chlorinated Pesticides - Quality Control

Batch BJB0764 - EPA 3546 (Microwave)

Instrument: ECD6 Analyst: YZ/VTs

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BJB0764-BS2)						Prepared: 26-Feb-2021 Analyzed: 15-Mar-2021 16:48					
Surrogate: Decachlorobiphenyl	6.70			ug/kg	8.00		83.8	30-160			
Surrogate: Decachlorobiphenyl [2C]	5.70			ug/kg	8.00		71.3	30-160			
Surrogate: Tetrachlorometaxylene	5.08			ug/kg	8.00		63.5	30-160			
Surrogate: Tetrachlorometaxylene [2C]	5.28			ug/kg	8.00		65.9	30-160			

Matrix Spike (BJB0764-MS1)						Source: 20K0374-05 Prepared: 26-Feb-2021 Analyzed: 15-Mar-2021 23:45					
Heptachlor	3.23	0.05	0.50	ug/kg	4.00	ND	80.8	26-120			P1
Aldrin	2.44	0.37	0.50	ug/kg	4.00	ND	61.0	26-120			
trans-Chlordane (beta-Chlordane)	3.11	0.33	0.50	ug/kg	4.00	ND	77.8	21-120			
cis-Chlordane (alpha-chlordane)	2.43	0.11	0.50	ug/kg	4.00	ND	60.7	39-120			
4,4'-DDE	5.62	0.13	1.00	ug/kg	8.00	ND	70.3	35-120			
Dieldrin	4.41	0.11	1.00	ug/kg	8.00	ND	55.1	10-140			
4,4'-DDD	6.89	0.32	1.00	ug/kg	8.00	ND	86.1	50-120			
4,4'-DDT	8.57	0.32	1.00	ug/kg	8.00	ND	107	39-120			
Surrogate: Decachlorobiphenyl	8.81			ug/kg	8.00		110	30-160			
Surrogate: Decachlorobiphenyl [2C]	6.18			ug/kg	8.00		77.2	30-160			
Surrogate: Tetrachlorometaxylene	6.37			ug/kg	8.00		79.6	30-160			
Surrogate: Tetrachlorometaxylene [2C]	5.22			ug/kg	8.00		65.2	30-160			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike Dup (BJB0764-MSD1)						Source: 20K0374-05 Prepared: 26-Feb-2021 Analyzed: 18-Mar-2021 01:29					
Heptachlor	2.32	0.05	0.50	ug/kg	4.00	ND	58.0	26-120	32.70	30	*
Aldrin	1.76	0.37	0.50	ug/kg	4.00	ND	43.9	26-120	32.50	30	*, P1
trans-Chlordane (beta-Chlordane)	2.04	0.33	0.50	ug/kg	4.00	ND	51.1	21-120	41.60	30	*
cis-Chlordane (alpha-chlordane)	1.85	0.11	0.50	ug/kg	4.00	ND	46.3	39-120	26.90	30	
4,4'-DDE	4.45	0.13	1.00	ug/kg	8.00	ND	55.6	35-120	23.30	30	
Dieldrin	3.61	0.11	1.00	ug/kg	8.00	ND	45.1	10-140	20.00	30	P1
4,4'-DDD	5.66	0.32	1.00	ug/kg	8.00	ND	70.8	50-120	19.60	30	
4,4'-DDT	6.56	0.32	1.00	ug/kg	8.00	ND	82.0	39-120	26.60	30	
Surrogate: Decachlorobiphenyl	8.28			ug/kg	8.00		104	30-160			
Surrogate: Decachlorobiphenyl [2C]	5.72			ug/kg	8.00		71.5	30-160			
Surrogate: Tetrachlorometaxylene	4.54			ug/kg	8.00		56.7	30-160			
Surrogate: Tetrachlorometaxylene [2C]	4.47			ug/kg	8.00		55.8	30-160			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



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Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

Chlorinated Pesticides - Quality Control

Batch BJB0764 - EPA 3546 (Microwave)

Instrument: ECD6 Analyst: YZ/VTs

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Reference (BJB0764-SRM1)						Prepared: 26-Feb-2021 Analyzed: 16-Mar-2021 00:21					
4,4'-DDE [2C]	355	3.38	25.0	ug/kg	315		113	1-199			D
Dieldrin [2C]	95.8	2.88	25.0	ug/kg	53.3		180	0-238			P1, D
4,4'-DDD	134	8.00	25.0	ug/kg	120		112	8-192			D
4,4'-DDT	124	8.13	25.0	ug/kg	92.1		135	0-227			D
Surrogate: Decachlorobiphenyl	125			ug/kg	100	125		30-160			
Surrogate: Decachlorobiphenyl [2C]	84.0			ug/kg	100	84.0		30-160			
Surrogate: Tetrachlorometaxylene	74.6			ug/kg	100	74.6		30-160			
Surrogate: Tetrachlorometaxylene [2C]	80.2			ug/kg	100	80.2		30-160			



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Reported:
26-Mar-2021 16:29

Chlorinated Pesticides - Quality Control

Batch BJC0009 - EPA 3546 (Microwave)

Instrument: ECD6 Analyst: YZ/VTs

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJC0009-BLK1)											
Prepared: 01-Mar-2021						Analyzed: 16-Mar-2021 00:39					
Heptachlor	ND	0.05	0.50	ug/kg							Ua
Aldrin	ND	0.37	0.50	ug/kg							Ua
trans-Chlordane (beta-Chlordane)	ND	0.33	0.50	ug/kg							Ua
cis-Chlordane (alpha-chlordane)	ND	0.11	0.50	ug/kg							Ua
4,4'-DDE	ND	0.14	1.00	ug/kg							Ua
Dieldrin	ND	0.12	1.00	ug/kg							Ua
4,4'-DDD	ND	0.32	1.00	ug/kg							Ua
4,4'-DDT	ND	0.33	1.00	ug/kg							Ua
Oxychlordane	ND	0.13	1.00	ug/kg							Ua
cis-Nonachlor	ND	0.21	1.00	ug/kg							Ua
trans-Nonachlor	ND	0.23	1.00	ug/kg							Ua
Surrogate: Decachlorobiphenyl	7.06			ug/kg	8.00		88.3	30-160			
Surrogate: Decachlorobiphenyl [2C]	6.44			ug/kg	8.00		80.5	30-160			
Surrogate: Tetrachlorometaxylene	4.55			ug/kg	8.00		56.8	30-160			
Surrogate: Tetrachlorometaxylene [2C]	4.73			ug/kg	8.00		59.2	30-160			
LCS (BJC0009-BS1)											
Prepared: 01-Mar-2021						Analyzed: 16-Mar-2021 00:57					
Heptachlor	2.42	0.05	0.50	ug/kg	4.00		60.5	26-120			
Aldrin [2C]	2.51	0.37	0.50	ug/kg	4.00		62.9	26-120			
trans-Chlordane (beta-Chlordane)	2.95	0.33	0.50	ug/kg	4.00		73.7	21-120			
cis-Chlordane (alpha-chlordane)	2.83	0.11	0.50	ug/kg	4.00		70.8	39-120			
4,4'-DDE [2C]	5.76	0.14	1.00	ug/kg	8.00		71.9	35-120			
Dieldrin	5.94	0.12	1.00	ug/kg	8.00		74.3	10-140			
4,4'-DDD	5.55	0.32	1.00	ug/kg	8.00		69.3	50-120			
4,4'-DDT	5.49	0.33	1.00	ug/kg	8.00		68.6	39-120			
Surrogate: Decachlorobiphenyl	6.39			ug/kg	8.00		79.9	30-160			
Surrogate: Decachlorobiphenyl [2C]	5.28			ug/kg	8.00		66.0	30-160			
Surrogate: Tetrachlorometaxylene	4.46			ug/kg	8.00		55.8	30-160			
Surrogate: Tetrachlorometaxylene [2C]	4.62			ug/kg	8.00		57.8	30-160			
LCS (BJC0009-BS2)											
Prepared: 01-Mar-2021						Analyzed: 16-Mar-2021 01:15					
Heptachlor	2.23	0.05	0.50	ug/kg	4.00		55.8	26-120			
Aldrin [2C]	2.37	0.37	0.50	ug/kg	4.00		59.1	26-120			
trans-Chlordane (beta-Chlordane)	3.04	0.33	0.50	ug/kg	4.00		75.9	21-120			
cis-Chlordane (alpha-chlordane)	2.93	0.11	0.50	ug/kg	4.00		73.3	39-120			



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Reported:
26-Mar-2021 16:29

Chlorinated Pesticides - Quality Control

Batch BJC0009 - EPA 3546 (Microwave)

Instrument: ECD6 Analyst: YZ/VTs

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BJC0009-BS2)						Prepared: 01-Mar-2021 Analyzed: 16-Mar-2021 01:15					
4,4'-DDE	5.97	0.14	1.00	ug/kg	8.00		74.7	35-120			
Dieldrin	6.26	0.12	1.00	ug/kg	8.00		78.2	10-140			
4,4'-DDD	5.71	0.32	1.00	ug/kg	8.00		71.4	50-120			
4,4'-DDT	5.65	0.33	1.00	ug/kg	8.00		70.6	39-120			
Surrogate: Decachlorobiphenyl	6.66			ug/kg	8.00		83.3	30-160			
Surrogate: Decachlorobiphenyl [2C]	5.33			ug/kg	8.00		66.6	30-160			
Surrogate: Tetrachlorometaxylene	3.52			ug/kg	8.00		44.0	30-160			
Surrogate: Tetrachlorometaxylene [2C]	3.64			ug/kg	8.00		45.5	30-160			

Matrix Spike (BJC0009-MS1)						Source: 20K0374-07 Prepared: 01-Mar-2021 Analyzed: 16-Mar-2021 02:09					
Heptachlor	1.97	0.05	0.50	ug/kg	4.00	ND	49.3	26-120			
Aldrin	1.65	0.37	0.50	ug/kg	4.00	ND	41.2	26-120			*, P1
trans-Chlordane (beta-Chlordane)	2.46	0.33	0.50	ug/kg	4.00	ND	61.5	21-120			P1
cis-Chlordane (alpha-chlordane)	1.55	0.11	0.50	ug/kg	4.00	ND	38.7	39-120			*
4,4'-DDE	3.39	0.13	1.00	ug/kg	8.00	ND	42.4	35-120			
Dieldrin	4.04	0.11	1.00	ug/kg	8.00	ND	50.5	10-140			
4,4'-DDD	3.82	0.32	1.00	ug/kg	8.00	ND	47.8	50-120			*
4,4'-DDT	3.68	0.32	1.00	ug/kg	8.00	ND	46.0	39-120			
Surrogate: Decachlorobiphenyl	4.71			ug/kg	8.00		58.8	30-160			
Surrogate: Decachlorobiphenyl [2C]	3.77			ug/kg	8.00		47.2	30-160			
Surrogate: Tetrachlorometaxylene	3.93			ug/kg	8.00		49.1	30-160			
Surrogate: Tetrachlorometaxylene [2C]	3.59			ug/kg	8.00		44.9	30-160			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike Dup (BJC0009-MSD1)						Source: 20K0374-07 Prepared: 01-Mar-2021 Analyzed: 16-Mar-2021 02:27					
Heptachlor	1.65	0.05	0.50	ug/kg	4.00	ND	41.2	26-120	17.80	30	
Aldrin	1.58	0.37	0.50	ug/kg	4.00	ND	39.4	26-120	4.52	30	*, P1
trans-Chlordane (beta-Chlordane)	1.69	0.33	0.50	ug/kg	4.00	ND	42.3	21-120	37.10	30	*
cis-Chlordane (alpha-chlordane)	1.48	0.11	0.50	ug/kg	4.00	ND	36.9	39-120	4.63	30	*, P1
4,4'-DDE	3.29	0.13	1.00	ug/kg	8.00	ND	41.1	35-120	3.03	30	P1
Dieldrin	4.02	0.11	1.00	ug/kg	8.00	ND	50.3	10-140	0.52	30	
4,4'-DDD	6.70	0.32	1.00	ug/kg	8.00	ND	83.8	50-120	54.70	30	*
4,4'-DDT	8.50	0.32	1.00	ug/kg	8.00	ND	106	39-120	79.20	30	*
Surrogate: Decachlorobiphenyl	6.14			ug/kg	8.00		76.8	30-160			



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Reported:
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Chlorinated Pesticides - Quality Control

Batch BJC0009 - EPA 3546 (Microwave)

Instrument: ECD6 Analyst: YZ/VTs

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike Dup (BJC0009-MSD1)		Source: 20K0374-07		Prepared: 01-Mar-2021		Analyzed: 16-Mar-2021 02:27					
Surrogate: Decachlorobiphenyl [2C]	4.93			ug/kg	8.00		61.7	30-160			
Surrogate: Tetrachlorometaxylene	3.75			ug/kg	8.00		46.8	30-160			
Surrogate: Tetrachlorometaxylene [2C]	4.78			ug/kg	8.00		59.7	30-160			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Reference (BJC0009-SRM1)		Prepared: 01-Mar-2021		Analyzed: 16-Mar-2021 03:58							
4,4'-DDE [2C]	290	3.38	25.0	ug/kg	315		92.1	1-199			D
Dieldrin	49.1	2.88	25.0	ug/kg	53.3		92.2	0-238			D
4,4'-DDD	103	8.00	25.0	ug/kg	120		85.5	8-192			D
4,4'-DDT	80.0	8.13	25.0	ug/kg	92.1		86.9	0-227			D
Surrogate: Decachlorobiphenyl	80.1			ug/kg	100		80.1	30-160			
Surrogate: Decachlorobiphenyl [2C]	64.0			ug/kg	100		64.0	30-160			
Surrogate: Tetrachlorometaxylene	51.2			ug/kg	100		51.2	30-160			
Surrogate: Tetrachlorometaxylene [2C]	57.0			ug/kg	100		57.0	30-160			



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Project: COA Outfall
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Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

Aroclor PCB - Quality Control

Batch BIK0877 - EPA 3546 (Microwave)

Instrument: ECD7 Analyst: JGR

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BIK0877-BLK1)											
						Prepared: 30-Nov-2020 Analyzed: 22-Dec-2020 09:40					
Aroclor 1016	ND	1.6	4.0	ug/kg							Ua
Aroclor 1221	ND	1.6	4.0	ug/kg							Ua
Aroclor 1232	ND	1.6	4.0	ug/kg							Ua
Aroclor 1242	ND	1.6	4.0	ug/kg							Ua
Aroclor 1248	ND	1.6	4.0	ug/kg							Ua
Aroclor 1254	ND	1.6	4.0	ug/kg							Ua
Aroclor 1260	ND	0.6	4.0	ug/kg							Ua
Aroclor 1262	ND	0.6	4.0	ug/kg							Ua
Aroclor 1268	ND	0.6	4.0	ug/kg							Ua
Surrogate: Decachlorobiphenyl	5.73			ug/kg	8.00		71.6	40-126			
Surrogate: Tetrachlorometaxylene	6.07			ug/kg	8.00		75.8	44-120			
Surrogate: Decachlorobiphenyl [2C]	7.21			ug/kg	8.00		90.2	40-126			
Surrogate: Tetrachlorometaxylene [2C]	6.35			ug/kg	8.00		79.3	44-120			
LCS (BIK0877-BS1)											
						Prepared: 30-Nov-2020 Analyzed: 22-Dec-2020 10:00					
Aroclor 1016 [2C]	84.4	1.6	4.0	ug/kg	101		83.8	56-120			
Aroclor 1260 [2C]	89.1	0.6	4.0	ug/kg	101		88.4	58-120			
Surrogate: Decachlorobiphenyl	5.72			ug/kg	8.00		71.5	40-126			
Surrogate: Tetrachlorometaxylene	5.98			ug/kg	8.00		74.7	44-120			
Surrogate: Decachlorobiphenyl [2C]	7.24			ug/kg	8.00		90.5	40-126			
Surrogate: Tetrachlorometaxylene [2C]	6.02			ug/kg	8.00		75.3	44-120			
Matrix Spike (BIK0877-MS1)											
			Source: 20K0374-05			Prepared: 30-Nov-2020 Analyzed: 22-Dec-2020 12:04					
Aroclor 1016	69.6	1.6	4.0	ug/kg	101	ND	68.9	56-120			
Aroclor 1260	69.5	0.6	4.0	ug/kg	101	1.0	68.0	58-120			
Surrogate: Decachlorobiphenyl	5.82			ug/kg	8.00		72.8	40-126			
Surrogate: Tetrachlorometaxylene	6.46			ug/kg	8.00		80.8	44-120			
Surrogate: Decachlorobiphenyl [2C]	6.45			ug/kg	8.00		80.6	40-126			
Surrogate: Tetrachlorometaxylene [2C]	6.79			ug/kg	8.00		84.9	44-120			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike (BIK0877-MS2)											
			Source: 20K0374-07			Prepared: 30-Nov-2020 Analyzed: 22-Dec-2020 14:07					
Aroclor 1016	68.3	1.6	4.0	ug/kg	101	ND	67.7	56-120			
Aroclor 1260 [2C]	70.1	0.6	4.0	ug/kg	101	ND	69.4	58-120			



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

Aroclor PCB - Quality Control

Batch BIK0877 - EPA 3546 (Microwave)

Instrument: ECD7 Analyst: JGR

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike (BIK0877-MS2)		Source: 20K0374-07		Prepared: 30-Nov-2020		Analyzed: 22-Dec-2020 14:07					
Surrogate: Decachlorobiphenyl	5.51			ug/kg	8.00		68.9	40-126			
Surrogate: Tetrachlorometaxylene	5.95			ug/kg	8.00		74.3	44-120			
Surrogate: Decachlorobiphenyl [2C]	5.81			ug/kg	8.00		72.6	40-126			
Surrogate: Tetrachlorometaxylene [2C]	6.70			ug/kg	8.00		83.7	44-120			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike Dup (BIK0877-MSD1)		Source: 20K0374-05		Prepared: 30-Nov-2020		Analyzed: 22-Dec-2020 12:24					
Aroclor 1016	71.8	1.6	4.0	ug/kg	101	ND	71.1	56-120	3.08	30	
Aroclor 1260	67.9	0.6	4.0	ug/kg	101	1.0	66.4	58-120	2.32	30	
Surrogate: Decachlorobiphenyl	5.42			ug/kg	8.00		67.8	40-126			
Surrogate: Tetrachlorometaxylene	6.03			ug/kg	8.00		75.4	44-120			
Surrogate: Decachlorobiphenyl [2C]	5.98			ug/kg	8.00		74.7	40-126			
Surrogate: Tetrachlorometaxylene [2C]	6.53			ug/kg	8.00		81.7	44-120			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike Dup (BIK0877-MSD2)		Source: 20K0374-07		Prepared: 30-Nov-2020		Analyzed: 22-Dec-2020 16:52					
Aroclor 1016	69.7	1.6	4.0	ug/kg	101	ND	69.2	56-120	2.14	30	
Aroclor 1260 [2C]	76.2	0.6	4.0	ug/kg	101	ND	75.4	58-120	8.30	30	
Surrogate: Decachlorobiphenyl	5.63			ug/kg	8.00		70.3	40-126			
Surrogate: Tetrachlorometaxylene	5.78			ug/kg	8.00		72.2	44-120			
Surrogate: Decachlorobiphenyl [2C]	6.46			ug/kg	8.00		80.7	40-126			
Surrogate: Tetrachlorometaxylene [2C]	6.41			ug/kg	8.00		80.1	44-120			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Reference (BIK0877-SRM1)				Prepared: 30-Nov-2020		Analyzed: 22-Dec-2020 18:35					
Aroclor 1248	1530	19.5	50.0	ug/kg	1520		100	20-180			
Surrogate: Decachlorobiphenyl	78.5			ug/kg	100		78.5	40-126			
Surrogate: Tetrachlorometaxylene	80.5			ug/kg	100		80.5	44-120			
Surrogate: Decachlorobiphenyl [2C]	99.4			ug/kg	100		99.4	40-126			
Surrogate: Tetrachlorometaxylene [2C]	80.4			ug/kg	100		80.4	44-120			



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

Dioxins/Furans - Quality Control

Batch BIL0237 - EPA 1613

Instrument: AUTOSPEC01 Analyst: pl

QC Sample/Analyte	Ion Ratio	Ratio Limits	EDL	Reporting Limit	Result	Units	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BIL0237-BLK1)											
				Prepared: 10-Dec-2020		Analyzed: 18-Dec-2020 13:08					
2,3,7,8-TCDF		0.655-0.886	0.088	1.00	ND	ng/kg					Ua
2,3,7,8-TCDD		0.655-0.886	0.065	1.00	ND	ng/kg					Ua
1,2,3,7,8-PeCDF		1.318-1.783	0.101	1.00	ND	ng/kg					Ua
2,3,4,7,8-PeCDF		1.318-1.783	0.091	1.00	ND	ng/kg					Ua
1,2,3,7,8-PeCDD		1.318-1.783	0.082	1.00	ND	ng/kg					Ua
1,2,3,4,7,8-HxCDF		1.054-1.426	0.048	1.00	ND	ng/kg					Ua
1,2,3,6,7,8-HxCDF		1.054-1.426	0.048	1.00	ND	ng/kg					Ua
2,3,4,6,7,8-HxCDF		1.054-1.426	0.049	1.00	ND	ng/kg					Ua
1,2,3,7,8,9-HxCDF		1.054-1.426	0.068	1.00	ND	ng/kg					Ua
1,2,3,4,7,8-HxCDD		1.054-1.426	0.112	1.00	ND	ng/kg					Ua
1,2,3,6,7,8-HxCDD		1.054-1.426	0.102	1.00	ND	ng/kg					Ua
1,2,3,7,8,9-HxCDD		1.054-1.426	0.121	1.00	ND	ng/kg					Ua
1,2,3,4,6,7,8-HpCDF		0.893-1.208	0.051	1.00	ND	ng/kg					Ua
1,2,3,4,7,8,9-HpCDF		0.893-1.208	0.061	1.00	ND	ng/kg					Ua
1,2,3,4,6,7,8-HpCDD		0.893-1.208	0.080	2.50	ND	ng/kg					Ua
OCDF		0.757-1.024	0.135	2.50	ND	ng/kg					Ua
OCDD	0.904	0.757-1.024		10.0	1.71	ng/kg					J
Homologue group											
Total TCDF				1.00	ND	ng/kg					Ua
Total TCDD				1.00	ND	ng/kg					Ua
Total PeCDF				1.00	ND	ng/kg					Ua
Total PeCDD				1.00	ND	ng/kg					Ua
Total HxCDF				1.00	ND	ng/kg					Ua
Total HxCDD				1.00	ND	ng/kg					Ua
Total HpCDF				1.00	ND	ng/kg					Ua
Total HpCDD				1.00	ND	ng/kg					Ua

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC): 0.06
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC): 0.00
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, EMPC=ND): 0.06
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0 EDL, EMPC=ND): 0.00



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

Dioxins/Furans - Quality Control

Batch BIL0237 - EPA 1613

Instrument: AUTOSPEC01 Analyst: pl

QC Sample/Analyte	Ion Ratio	Ratio Limits	EDL	Reporting Limit	Result	Units	%REC	%REC Limits	RPD	RPD Limit	Notes
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Blank (BIL0237-BLK1)

Prepared: 10-Dec-2020 Analyzed: 18-Dec-2020 13:08

Labeled compounds

13C12-2,3,7,8-TCDF	0.750	0.655-0.886			80.7					24-169 %	
13C12-2,3,7,8-TCDD	0.826	0.655-0.886			80.2					25-164 %	
13C12-1,2,3,7,8-PeCDF	1.533	1.318-1.783			71.6					24-185 %	
13C12-2,3,4,7,8-PeCDF	1.550	1.318-1.783			73.7					21-178 %	
13C12-1,2,3,7,8-PeCDD	1.584	1.318-1.783			74.8					25-181 %	
13C12-1,2,3,4,7,8-HxCDF	0.478	0.434-0.587			80.8					26-152 %	
13C12-1,2,3,6,7,8-HxCDF	0.480	0.434-0.587			84.9					26-123 %	
13C12-2,3,4,6,7,8-HxCDF	0.494	0.434-0.587			77.3					28-136 %	
13C12-1,2,3,7,8,9-HxCDF	0.455	0.434-0.587			79.6					29-147 %	
13C12-1,2,3,4,7,8-HxCDD	1.277	1.054-1.426			78.2					32-141 %	
13C12-1,2,3,6,7,8-HxCDD	1.286	1.054-1.426			76.2					28-130 %	
13C12-1,2,3,4,6,7,8-HpCDF	0.497	0.374-0.506			73.4					28-143 %	
13C12-1,2,3,4,7,8,9-HpCDF	0.378	0.374-0.506			80.2					26-138 %	
13C12-1,2,3,4,6,7,8-HpCDD	1.063	0.893-1.208			73.9					23-140 %	
13C12-OCDD	0.782	0.757-1.024			54.6					17-157 %	
37Cl4-2,3,7,8-TCDD					97.2					35-197 %	

LCS (BIL0237-BS1)

Prepared: 10-Dec-2020 Analyzed: 18-Dec-2020 13:58

2,3,7,8-TCDF	0.871	0.655-0.886	1.00	20.1	ng/kg	100	75-158 %		
2,3,7,8-TCDD	0.822	0.655-0.886	1.00	19.8	ng/kg	99.2	67-158 %		
1,2,3,7,8-PeCDF	1.683	1.318-1.783	1.00	112	ng/kg	112	80-134 %		
2,3,4,7,8-PeCDF	1.716	1.318-1.783	1.00	106	ng/kg	106	68-160 %		
1,2,3,7,8-PeCDD	1.634	1.318-1.783	1.00	108	ng/kg	108	70-142 %		
1,2,3,4,7,8-HxCDF	1.366	1.054-1.426	1.00	107	ng/kg	107	72-134 %		
1,2,3,6,7,8-HxCDF	1.385	1.054-1.426	1.00	105	ng/kg	105	84-130 %		
2,3,4,6,7,8-HxCDF	1.311	1.054-1.426	1.00	103	ng/kg	103	70-156 %		
1,2,3,7,8,9-HxCDF	1.329	1.054-1.426	1.00	104	ng/kg	104	78-130 %		
1,2,3,4,7,8-HxCDD	1.256	1.054-1.426	1.00	102	ng/kg	102	70-164 %		
1,2,3,6,7,8-HxCDD	1.316	1.054-1.426	1.00	108	ng/kg	108	76-134 %		
1,2,3,7,8,9-HxCDD	1.113	1.054-1.426	1.00	106	ng/kg	106	64-162 %		
1,2,3,4,6,7,8-HpCDF	1.174	0.893-1.208	1.00	107	ng/kg	107	82-122 %		
1,2,3,4,7,8,9-HpCDF	1.092	0.893-1.208	1.00	93.7	ng/kg	93.7	78-138 %		
1,2,3,4,6,7,8-HpCDD	1.092	0.893-1.208	2.50	115	ng/kg	115	70-140 %		
OCDF	0.842	0.757-1.024	2.50	204	ng/kg	102	63-170 %		
OCDD	0.914	0.757-1.024	10.0	198	ng/kg	99.1	78-144 %		B



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

Dioxins/Furans - Quality Control

Batch BIL0237 - EPA 1613

Instrument: AUTOSPEC01 Analyst: pl

QC Sample/Analyte	Ion Ratio	Ratio Limits	EDL	Reporting Limit	Result	Units	%REC	Limits	RPD	RPD Limit	Notes
LCS (BIL0237-BS1)					Prepared: 10-Dec-2020 Analyzed: 18-Dec-2020 13:58						
Labeled compounds											
13C12-2,3,7,8-TCDF	0.775	0.655-0.886				74.1				24-169 %	
13C12-2,3,7,8-TCDD	0.800	0.655-0.886				78.0				25-164 %	
13C12-1,2,3,7,8-PeCDF	1.500	1.318-1.783				73.6				24-185 %	
13C12-2,3,4,7,8-PeCDF	1.521	1.318-1.783				80.1				21-178 %	
13C12-1,2,3,7,8-PeCDD	1.637	1.318-1.783				80.8				25-181 %	
13C12-1,2,3,4,7,8-HxCDF	0.497	0.434-0.587				80.0				26-152 %	
13C12-1,2,3,6,7,8-HxCDF	0.557	0.434-0.587				78.5				26-123 %	
13C12-2,3,4,6,7,8-HxCDF	0.495	0.434-0.587				76.4				28-136 %	
13C12-1,2,3,7,8,9-HxCDF	0.479	0.434-0.587				76.3				29-147 %	
13C12-1,2,3,4,7,8-HxCDD	1.250	1.054-1.426				82.2				32-141 %	
13C12-1,2,3,6,7,8-HxCDD	1.245	1.054-1.426				74.5				28-130 %	
13C12-1,2,3,4,6,7,8-HpCDF	0.425	0.374-0.506				63.3				28-143 %	
13C12-1,2,3,4,7,8,9-HpCDF	0.430	0.374-0.506				69.8				26-138 %	
13C12-1,2,3,4,6,7,8-HpCDD	1.113	0.893-1.208				68.6				23-140 %	
13C12-OCDD	0.923	0.757-1.024				46.0				17-157 %	
37Cl4-2,3,7,8-TCDD						90.9				35-197 %	

Duplicate (BIL0237-DUP1)											
						Source: 20K0374-05 Prepared: 10-Dec-2020 Analyzed: 18-Dec-2020 14:47					
2,3,7,8-TCDF	0.798	0.655-0.886		0.996	1.12	ng/kg		33.50	25		*
2,3,7,8-TCDD	0.406	0.655-0.886		0.996	0.295	ng/kg					EMPC, J
1,2,3,7,8-PeCDF	2.185	1.318-1.783		0.996	0.314	ng/kg		28.60	25		*, EMPC, J
2,3,4,7,8-PeCDF	1.952	1.318-1.783		0.996	0.377	ng/kg		57.70	25		*, EMPC, J
1,2,3,7,8-PeCDD	1.615	1.318-1.783		0.996	0.673	ng/kg		14.20	25		J
1,2,3,4,7,8-HxCDF	1.697	1.054-1.426		0.996	0.570	ng/kg		0.85	25		EMPC, J
1,2,3,6,7,8-HxCDF	1.704	1.054-1.426		0.996	0.380	ng/kg		39.10	25		*, EMPC, J
2,3,4,6,7,8-HxCDF	1.644	1.054-1.426		0.996	0.602	ng/kg		42.50	25		*, EMPC, J
1,2,3,7,8,9-HxCDF	0.880	1.054-1.426		0.996	0.286	ng/kg		13.20	25		EMPC, J
1,2,3,4,7,8-HxCDD	2.433	1.054-1.426		0.996	0.536	ng/kg		36.40	25		*, EMPC, J
1,2,3,6,7,8-HxCDD	1.337	1.054-1.426		0.996	2.88	ng/kg		17.10	25		
1,2,3,7,8,9-HxCDD	1.233	1.054-1.426		0.996	1.45	ng/kg		8.30	25		
1,2,3,4,6,7,8-HpCDF	1.140	0.893-1.208		0.996	9.98	ng/kg		26.00	25		*
1,2,3,4,7,8,9-HpCDF	0.900	0.893-1.208		0.996	0.622	ng/kg		24.20	25		J
1,2,3,4,6,7,8-HpCDD	1.053	0.893-1.208		2.49	84.2	ng/kg		90.60	25		*
OCDF	0.894	0.757-1.024		2.49	22.7	ng/kg		90.00	25		*
OCDD	0.876	0.757-1.024		9.96	615	ng/kg		77.90	25		*, B



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

Dioxins/Furans - Quality Control

Batch BIL0237 - EPA 1613

Instrument: AUTOSPEC01 Analyst: pl

QC Sample/Analyte	Ion Ratio	Ratio Limits	EDL	Reporting Limit	Result	Units	%REC	Limits	RPD	RPD Limit	Notes
Duplicate (BIL0237-DUP1)											
Source: 20K0374-05		Prepared: 10-Dec-2020 Analyzed: 18-Dec-2020 14:47									
Homologue group											
Total TCDF				0.996	5.69	ng/kg			62.40	200	
Total TCDD				0.996	4.89	ng/kg			71.40	200	
Total PeCDF				0.996	2.34	ng/kg			18.90	200	
Total PeCDD				0.996	4.00	ng/kg			47.70	200	
Total HxCDF				0.996	12.4	ng/kg			14.70	200	
Total HxCDD				0.996	26.0	ng/kg			125.00	200	
Total HpCDF				0.996	35.7	ng/kg			44.40	200	
Total HpCDD				0.996	235	ng/kg			135.00	200	



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
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Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

Dioxins/Furans - Quality Control

Batch BIL0237 - EPA 1613

Instrument: AUTOSPEC01 Analyst: pl

QC Sample/Analyte	Ion Ratio	Ratio Limits	EDL	Reporting Limit	Result	Units	%REC	%REC Limits	RPD	RPD Limit	Notes
Duplicate (BIL0237-DUP1) Source: 20K0374-05 Prepared: 10-Dec-2020 Analyzed: 18-Dec-2020 14:47											
Labeled compounds											
13C12-2,3,7,8-TCDF	0.788	0.655-0.886			72.7					24-169 %	
13C12-2,3,7,8-TCDD	0.831	0.655-0.886			78.6					25-164 %	
13C12-1,2,3,7,8-PeCDF	1.505	1.318-1.783			70.3					24-185 %	
13C12-2,3,4,7,8-PeCDF	1.546	1.318-1.783			75.5					21-178 %	
13C12-1,2,3,7,8-PeCDD	1.560	1.318-1.783			78.3					25-181 %	
13C12-1,2,3,4,7,8-HxCDF	0.491	0.434-0.587			77.1					26-152 %	
13C12-1,2,3,6,7,8-HxCDF	0.448	0.434-0.587			72.7					26-123 %	
13C12-2,3,4,6,7,8-HxCDF	0.484	0.434-0.587			77.1					28-136 %	
13C12-1,2,3,7,8,9-HxCDF	0.482	0.434-0.587			53.4					29-147 %	
13C12-1,2,3,4,7,8-HxCDD	1.288	1.054-1.426			84.7					32-141 %	
13C12-1,2,3,6,7,8-HxCDD	1.265	1.054-1.426			77.7					28-130 %	
13C12-1,2,3,4,6,7,8-HpCDF	0.425	0.374-0.506			65.8					28-143 %	
13C12-1,2,3,4,7,8,9-HpCDF	0.433	0.374-0.506			70.2					26-138 %	
13C12-1,2,3,4,6,7,8-HpCDD	1.064	0.893-1.208			75.1					23-140 %	
13C12-OCDD	0.928	0.757-1.024			57.7					17-157 %	
37Cl4-2,3,7,8-TCDD					90.6					35-197 %	
Duplicate (BIL0237-DUP2) Source: 20K0374-07 Prepared: 10-Dec-2020 Analyzed: 18-Dec-2020 15:37											
2,3,7,8-TCDF	0.834	0.655-0.886		0.989	0.430	ng/kg			3.47	25	J
2,3,7,8-TCDD		0.655-0.886	0.089	0.989		ng/kg					Ua
1,2,3,7,8-PeCDF		1.318-1.783	0.129	0.989		ng/kg					Ua
2,3,4,7,8-PeCDF	1.180	1.318-1.783		0.989	0.198	ng/kg					EMPC, J
1,2,3,7,8-PeCDD	3.079	1.318-1.783		0.989	0.266	ng/kg			23.30	25	EMPC, J
1,2,3,4,7,8-HxCDF	0.888	1.054-1.426		0.989	0.225	ng/kg			99.90	25	*, EMPC, J
1,2,3,6,7,8-HxCDF	0.971	1.054-1.426		0.989	0.149	ng/kg			42.20	25	*, EMPC, J
2,3,4,6,7,8-HxCDF	1.232	1.054-1.426		0.989	0.221	ng/kg			91.00	25	*, J
1,2,3,7,8,9-HxCDF		1.054-1.426	0.078	0.989		ng/kg					Ua
1,2,3,4,7,8-HxCDD		1.054-1.426	0.130	0.989		ng/kg					Ua
1,2,3,6,7,8-HxCDD	1.728	1.054-1.426		0.989	0.876	ng/kg			1.98	25	EMPC, J
1,2,3,7,8,9-HxCDD	1.512	1.054-1.426		0.989	0.488	ng/kg					EMPC, J
1,2,3,4,6,7,8-HpCDF	1.029	0.893-1.208		0.989	2.24	ng/kg			3.71	25	
1,2,3,4,7,8,9-HpCDF	1.909	0.893-1.208		0.989	0.137	ng/kg			24.00	25	EMPC, J
1,2,3,4,6,7,8-HpCDD	1.069	0.893-1.208		2.47	26.3	ng/kg			34.80	25	*
OCDF	0.946	0.757-1.024		2.47	4.39	ng/kg			29.20	25	*
OCDD	0.856	0.757-1.024		9.89	195	ng/kg			9.22	25	B



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

Dioxins/Furans - Quality Control

Batch BIL0237 - EPA 1613

Instrument: AUTOSPEC01 Analyst: pl

QC Sample/Analyte	Ion Ratio	Ratio Limits	EDL	Reporting Limit	Result	Units	%REC	%REC Limits	RPD	RPD Limit	Notes
Duplicate (BIL0237-DUP2)											
Source: 20K0374-07		Prepared: 10-Dec-2020 Analyzed: 18-Dec-2020 15:37									
Homologue group											
Total TCDF				0.989	1.19	ng/kg			10.00	200	Ua
Total TCDD				0.989	0.648	ng/kg			12.50	200	
Total PeCDF				0.989	ND	ng/kg					
Total PeCDD				0.989	0.281	ng/kg			80.50	200	
Total HxCDF				0.989	3.99	ng/kg			56.20	200	
Total HxCDD				0.989	10.7	ng/kg			46.00	200	
Total HpCDF				0.989	7.30	ng/kg			10.10	200	
Total HpCDD				0.989	112	ng/kg			77.90	200	



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
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Project: COA Outfall
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Reported:
26-Mar-2021 16:29

Dioxins/Furans - Quality Control

Batch BIL0237 - EPA 1613

Instrument: AUTOSPEC01 Analyst: pl

QC Sample/Analyte	Ion Ratio	Ratio Limits	EDL	Reporting Limit	Result	Units	%REC	Limits	RPD	RPD Limit	Notes
Duplicate (BIL0237-DUP2)											
Source: 20K0374-07			Prepared: 10-Dec-2020		Analyzed: 18-Dec-2020 15:37						
Labeled compounds											
13C12-2,3,7,8-TCDF	0.782	0.655-0.886			79.7				24-169 %		
13C12-2,3,7,8-TCDD	0.819	0.655-0.886			83.3				25-164 %		
13C12-1,2,3,7,8-PeCDF	1.534	1.318-1.783			77.2				24-185 %		
13C12-2,3,4,7,8-PeCDF	1.515	1.318-1.783			83.4				21-178 %		
13C12-1,2,3,7,8-PeCDD	1.650	1.318-1.783			84.1				25-181 %		
13C12-1,2,3,4,7,8-HxCDF	0.498	0.434-0.587			90.7				26-152 %		
13C12-1,2,3,6,7,8-HxCDF	0.498	0.434-0.587			76.8				26-123 %		
13C12-2,3,4,6,7,8-HxCDF	0.500	0.434-0.587			79.2				28-136 %		
13C12-1,2,3,7,8,9-HxCDF	0.490	0.434-0.587			67.4				29-147 %		
13C12-1,2,3,4,7,8-HxCDD	1.327	1.054-1.426			86.4				32-141 %		
13C12-1,2,3,6,7,8-HxCDD	1.223	1.054-1.426			72.4				28-130 %		
13C12-1,2,3,4,6,7,8-HpCDF	0.432	0.374-0.506			69.5				28-143 %		
13C12-1,2,3,4,7,8,9-HpCDF	0.435	0.374-0.506			75.9				26-138 %		
13C12-1,2,3,4,6,7,8-HpCDD	1.083	0.893-1.208			79.2				23-140 %		
13C12-OCDD	0.923	0.757-1.024			54.6				17-157 %		
37Cl4-2,3,7,8-TCDD					93.8				35-197 %		



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

Dioxins/Furans - Quality Control

Batch BJB0762 - EPA 1613

Instrument: AUTOSPEC01 Analyst: pl

QC Sample/Analyte	Ion Ratio	Ratio Limits	EDL	Reporting Limit	Result	Units	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJB0762-BLK2)					Prepared: 01-Mar-2021		Analyzed: 04-Mar-2021 12:21				
2,3,7,8-TCDF		0.655-0.886	0.072	1.00	ND	ng/kg					Ua
2,3,7,8-TCDD		0.655-0.886	0.079	1.00	ND	ng/kg					Ua
1,2,3,7,8-PeCDF		1.318-1.783	0.097	1.00	ND	ng/kg					Ua
2,3,4,7,8-PeCDF		1.318-1.783	0.091	1.00	ND	ng/kg					Ua
1,2,3,7,8-PeCDD		1.318-1.783	0.113	1.00	ND	ng/kg					Ua
1,2,3,4,7,8-HxCDF		1.054-1.426	0.080	1.00	ND	ng/kg					Ua
1,2,3,6,7,8-HxCDF		1.054-1.426	0.079	1.00	ND	ng/kg					Ua
2,3,4,6,7,8-HxCDF		1.054-1.426	0.077	1.00	ND	ng/kg					Ua
1,2,3,7,8,9-HxCDF		1.054-1.426	0.096	1.00	ND	ng/kg					Ua
1,2,3,4,7,8-HxCDD		1.054-1.426	0.094	1.00	ND	ng/kg					Ua
1,2,3,6,7,8-HxCDD		1.054-1.426	0.097	1.00	ND	ng/kg					Ua
1,2,3,7,8,9-HxCDD		1.054-1.426	0.098	1.00	ND	ng/kg					Ua
1,2,3,4,6,7,8-HpCDF		0.893-1.208	0.266	1.00	ND	ng/kg					Ua
1,2,3,4,7,8,9-HpCDF		0.893-1.208	0.341	1.00	ND	ng/kg					Ua
1,2,3,4,6,7,8-HpCDD		0.893-1.208	0.323	2.50	ND	ng/kg					Ua
OCDF	0.988	0.757-1.024		2.50	3.16	ng/kg					
OCDD	0.686	0.757-1.024		10.0	1.51	ng/kg					EMPC, J
Homologue group											
Total TCDF				1.00	ND	ng/kg					Ua
Total TCDD				1.00	ND	ng/kg					Ua
Total PeCDF				1.00	ND	ng/kg					Ua
Total PeCDD				1.00	ND	ng/kg					Ua
Total HxCDF				1.00	ND	ng/kg					Ua
Total HxCDD				1.00	0.113	ng/kg					
Total HpCDF				1.00	ND	ng/kg					Ua
Total HpCDD				1.00	ND	ng/kg					Ua

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC): 0.08
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC): 0.00
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, EMPC=ND): 0.08
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0 EDL, EMPC=ND): 0.00



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

Dioxins/Furans - Quality Control

Batch BJB0762 - EPA 1613

Instrument: AUTOSPEC01 Analyst: pl

QC Sample/Analyte	Ion Ratio	Ratio Limits	EDL	Reporting Limit	Result	Units	%REC	%REC Limits	RPD	RPD Limit	Notes
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Blank (BJB0762-BLK2)

Prepared: 01-Mar-2021 Analyzed: 04-Mar-2021 12:21

Labeled compounds

13C12-2,3,7,8-TCDF	0.782	0.655-0.886			94.2					24-169 %	
13C12-2,3,7,8-TCDD	0.779	0.655-0.886			96.0					25-164 %	
13C12-1,2,3,4,7,8-PeCDF	1.526	1.318-1.783			94.1					24-185 %	
13C12-2,3,4,7,8-PeCDF	1.504	1.318-1.783			89.4					21-178 %	
13C12-1,2,3,7,8-PeCDD	1.647	1.318-1.783			88.9					25-181 %	
13C12-1,2,3,4,7,8-HxCDF	0.503	0.434-0.587			95.0					26-152 %	
13C12-1,2,3,6,7,8-HxCDF	0.508	0.434-0.587			93.7					26-123 %	
13C12-2,3,4,6,7,8-HxCDF	0.520	0.434-0.587			93.0					28-136 %	
13C12-1,2,3,7,8,9-HxCDF	0.515	0.434-0.587			91.2					29-147 %	
13C12-1,2,3,4,7,8-HxCDD	1.264	1.054-1.426			95.0					32-141 %	
13C12-1,2,3,6,7,8-HxCDD	1.232	1.054-1.426			92.8					28-130 %	
13C12-1,2,3,4,6,7,8-HpCDF	0.442	0.374-0.506			84.9					28-143 %	
13C12-1,2,3,4,7,8,9-HpCDF	0.436	0.374-0.506			86.9					26-138 %	
13C12-1,2,3,4,6,7,8-HpCDD	1.084	0.893-1.208			90.6					23-140 %	
13C12-OCDD	0.901	0.757-1.024			66.2					17-157 %	
37Cl4-2,3,7,8-TCDD					102					35-197 %	

LCS (BJB0762-BS2)

Prepared: 01-Mar-2021 Analyzed: 04-Mar-2021 13:11

2,3,7,8-TCDF	0.783	0.655-0.886	1.00	21.4	ng/kg	107	75-158 %		
2,3,7,8-TCDD	0.801	0.655-0.886	1.00	20.4	ng/kg	102	67-158 %		
1,2,3,7,8-PeCDF	1.637	1.318-1.783	1.00	109	ng/kg	109	80-134 %		
2,3,4,7,8-PeCDF	1.634	1.318-1.783	1.00	108	ng/kg	108	68-160 %		
1,2,3,7,8-PeCDD	1.539	1.318-1.783	1.00	109	ng/kg	109	70-142 %		
1,2,3,4,7,8-HxCDF	1.283	1.054-1.426	1.00	107	ng/kg	107	72-134 %		
1,2,3,6,7,8-HxCDF	1.300	1.054-1.426	1.00	111	ng/kg	111	84-130 %		
2,3,4,6,7,8-HxCDF	1.309	1.054-1.426	1.00	110	ng/kg	110	70-156 %		
1,2,3,7,8,9-HxCDF	1.330	1.054-1.426	1.00	106	ng/kg	106	78-130 %		
1,2,3,4,7,8-HxCDD	1.271	1.054-1.426	1.00	108	ng/kg	108	70-164 %		
1,2,3,6,7,8-HxCDD	1.177	1.054-1.426	1.00	109	ng/kg	109	76-134 %		
1,2,3,7,8,9-HxCDD	1.201	1.054-1.426	1.00	108	ng/kg	108	64-162 %		
1,2,3,4,6,7,8-HpCDF	1.069	0.893-1.208	1.00	108	ng/kg	108	82-122 %		
1,2,3,4,7,8,9-HpCDF	1.085	0.893-1.208	1.00	109	ng/kg	109	78-138 %		
1,2,3,4,6,7,8-HpCDD	1.112	0.893-1.208	2.50	110	ng/kg	110	70-140 %		
OCDF	0.899	0.757-1.024	2.50	193	ng/kg	96.3	63-170 %		B
OCDD	0.853	0.757-1.024	10.0	181	ng/kg	90.7	78-144 %		B



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
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Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

Dioxins/Furans - Quality Control

Batch BJB0762 - EPA 1613

Instrument: AUTOSPEC01 Analyst: pl

QC Sample/Analyte	Ion Ratio	Ratio Limits	EDL	Reporting Limit	Result	Units	%REC	Limits	RPD	RPD Limit	Notes
LCS (BJB0762-BS2)					Prepared: 01-Mar-2021		Analyzed: 04-Mar-2021 13:11				
Labeled compounds											
13C12-2,3,7,8-TCDF	0.790	0.655-0.886				103				24-169 %	
13C12-2,3,7,8-TCDD	0.794	0.655-0.886				90.5				25-164 %	
13C12-1,2,3,7,8-PeCDF	1.465	1.318-1.783				85.4				24-185 %	
13C12-2,3,4,7,8-PeCDF	1.456	1.318-1.783				83.9				21-178 %	
13C12-1,2,3,7,8-PeCDD	1.630	1.318-1.783				82.2				25-181 %	
13C12-1,2,3,4,7,8-HxCDF	0.509	0.434-0.587				89.1				26-152 %	
13C12-1,2,3,6,7,8-HxCDF	0.510	0.434-0.587				87.2				26-123 %	
13C12-2,3,4,6,7,8-HxCDF	0.520	0.434-0.587				88.7				28-136 %	
13C12-1,2,3,7,8,9-HxCDF	0.530	0.434-0.587				88.3				29-147 %	
13C12-1,2,3,4,7,8-HxCDD	1.261	1.054-1.426				88.3				32-141 %	
13C12-1,2,3,6,7,8-HxCDD	1.242	1.054-1.426				84.9				28-130 %	
13C12-1,2,3,4,6,7,8-HpCDF	0.418	0.374-0.506				80.9				28-143 %	
13C12-1,2,3,4,7,8,9-HpCDF	0.444	0.374-0.506				84.7				26-138 %	
13C12-1,2,3,4,6,7,8-HpCDD	1.048	0.893-1.208				85.6				23-140 %	
13C12-OCDD	0.911	0.757-1.024				64.9				17-157 %	
37Cl4-2,3,7,8-TCDD						97.7				35-197 %	

Duplicate (BJB0762-DUP1)		Source: 20K0374-05RE1		Prepared: 01-Mar-2021		Analyzed: 04-Mar-2021 19:03					
2,3,7,8-TCDF	0.893	0.655-0.886		0.996	1.20	ng/kg		3.59	25		EMPC
2,3,7,8-TCDD	0.429	0.655-0.886		0.996	0.279	ng/kg		2.23	25		EMPC, J
1,2,3,7,8-PeCDF	1.546	1.318-1.783		0.996	0.609	ng/kg		68.70	25		*, J
2,3,4,7,8-PeCDF	1.306	1.318-1.783		0.996	0.478	ng/kg		78.10	25		*, EMPC, J
1,2,3,7,8-PeCDD	1.415	1.318-1.783		0.996	0.807	ng/kg		20.90	25		J
1,2,3,4,7,8-HxCDF	1.413	1.054-1.426		0.996	1.01	ng/kg		64.60	25		*
1,2,3,6,7,8-HxCDF	1.412	1.054-1.426		0.996	0.638	ng/kg		54.40	25		*, J
2,3,4,6,7,8-HxCDF	1.263	1.054-1.426		0.996	0.676	ng/kg		40.10	25		*, J
1,2,3,7,8,9-HxCDF	1.465	1.054-1.426		0.996	0.354	ng/kg					EMPC, J
1,2,3,4,7,8-HxCDD	1.183	1.054-1.426		0.996	0.824	ng/kg		17.90	25		J
1,2,3,6,7,8-HxCDD	1.122	1.054-1.426		0.996	3.76	ng/kg		15.90	25		
1,2,3,7,8,9-HxCDD	1.189	1.054-1.426		0.996	1.73	ng/kg		25.00	25		
1,2,3,4,6,7,8-HpCDF	0.973	0.893-1.208		0.996	11.0	ng/kg		19.70	25		
1,2,3,4,7,8,9-HpCDF	1.233	0.893-1.208		0.996	0.891	ng/kg		50.60	25		EMPC, *, J
1,2,3,4,6,7,8-HpCDD	1.046	0.893-1.208		2.49	132	ng/kg		20.20	25		
OCDF	0.883	0.757-1.024		2.49	29.8	ng/kg		8.48	25		B
OCDD	0.853	0.757-1.024		9.96	801	ng/kg		7.21	25		B



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

Dioxins/Furans - Quality Control

Batch BJB0762 - EPA 1613

Instrument: AUTOSPEC01 Analyst: pl

QC Sample/Analyte	Ion Ratio	Ratio Limits	EDL	Reporting Limit	Result	Units	%REC	%REC Limits	RPD	RPD Limit	Notes
Duplicate (BJB0762-DUP1)											
Source: 20K0374-05RE1											
Prepared: 01-Mar-2021 Analyzed: 04-Mar-2021 19:03											
Homologue group											
Total TCDF				0.996	4.10	ng/kg			42.30	200	
Total TCDD				0.996	3.89	ng/kg			19.30	200	
Total PeCDF				0.996	3.90	ng/kg			33.30	200	
Total PeCDD				0.996	7.10	ng/kg			108.00	200	
Total HxCDF				0.996	20.2	ng/kg			42.80	200	
Total HxCDD				0.996	58.8	ng/kg			20.70	200	
Total HpCDF				0.996	41.5	ng/kg			17.50	200	
Total HpCDD				0.996	589	ng/kg			33.90	200	



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Reported:
26-Mar-2021 16:29

Dioxins/Furans - Quality Control

Batch BJB0762 - EPA 1613

Instrument: AUTOSPEC01 Analyst: pl

QC Sample/Analyte	Ion Ratio	Ratio Limits	EDL	Reporting Limit	Result	Units	%REC	%REC Limits	RPD	RPD Limit	Notes
Duplicate (BJB0762-DUP1) Source: 20K0374-05RE1 Prepared: 01-Mar-2021 Analyzed: 04-Mar-2021 19:03											
Labeled compounds											
13C12-2,3,7,8-TCDF	0.784	0.655-0.886			94.3				24-169 %		
13C12-2,3,7,8-TCDD	0.824	0.655-0.886			88.0				25-164 %		
13C12-1,2,3,7,8-PeCDF	1.533	1.318-1.783			82.3				24-185 %		
13C12-2,3,4,7,8-PeCDF	1.529	1.318-1.783			85.4				21-178 %		
13C12-1,2,3,7,8-PeCDD	1.668	1.318-1.783			80.6				25-181 %		
13C12-1,2,3,4,7,8-HxCDF	0.510	0.434-0.587			93.7				26-152 %		
13C12-1,2,3,6,7,8-HxCDF	0.520	0.434-0.587			90.9				26-123 %		
13C12-2,3,4,6,7,8-HxCDF	0.520	0.434-0.587			93.7				28-136 %		
13C12-1,2,3,7,8,9-HxCDF	0.500	0.434-0.587			45.3				29-147 %		
13C12-1,2,3,4,7,8-HxCDD	1.255	1.054-1.426			85.7				32-141 %		
13C12-1,2,3,6,7,8-HxCDD	1.260	1.054-1.426			82.0				28-130 %		
13C12-1,2,3,4,6,7,8-HpCDF	0.436	0.374-0.506			87.0				28-143 %		
13C12-1,2,3,4,7,8,9-HpCDF	0.442	0.374-0.506			83.5				26-138 %		
13C12-1,2,3,4,6,7,8-HpCDD	1.071	0.893-1.208			86.3				23-140 %		
13C12-OCDD	0.907	0.757-1.024			65.9				17-157 %		
37Cl4-2,3,7,8-TCDD					92.8				35-197 %		
Duplicate (BJB0762-DUP2) Source: 20K0374-07RE1 Prepared: 01-Mar-2021 Analyzed: 04-Mar-2021 19:52											
2,3,7,8-TCDF	0.715	0.655-0.886		0.999	0.388	ng/kg			22.80	25	J
2,3,7,8-TCDD		0.655-0.886	0.070	0.999		ng/kg					Ua
1,2,3,7,8-PeCDF		1.318-1.783	0.096	0.999		ng/kg					Ua
2,3,4,7,8-PeCDF	1.729	1.318-1.783		0.999	0.206	ng/kg					J
1,2,3,7,8-PeCDD	1.858	1.318-1.783		0.999	0.351	ng/kg			40.70	25	*, EMPC, J
1,2,3,4,7,8-HxCDF	1.434	1.054-1.426		0.999	0.219	ng/kg			0.53	25	EMPC, J
1,2,3,6,7,8-HxCDF	1.370	1.054-1.426		0.999	0.176	ng/kg			21.20	25	J
2,3,4,6,7,8-HxCDF	1.398	1.054-1.426		0.999	0.180	ng/kg			23.90	25	J
1,2,3,7,8,9-HxCDF		1.054-1.426	0.091	0.999		ng/kg					Ua
1,2,3,4,7,8-HxCDD	1.061	1.054-1.426		0.999	0.255	ng/kg					J
1,2,3,6,7,8-HxCDD	1.299	1.054-1.426		0.999	1.01	ng/kg			6.86	25	
1,2,3,7,8,9-HxCDD	1.317	1.054-1.426		0.999	0.546	ng/kg			1.21	25	J
1,2,3,4,6,7,8-HpCDF	1.070	0.893-1.208		0.999	2.30	ng/kg			68.10	25	*
1,2,3,4,7,8,9-HpCDF	0.832	0.893-1.208		0.999	0.208	ng/kg			26.10	25	*, EMPC, J
1,2,3,4,6,7,8-HpCDD	1.065	0.893-1.208		2.50	15.2	ng/kg			32.10	25	*
OCDF	0.974	0.757-1.024		2.50	6.32	ng/kg			0.45	25	B
OCDD	0.876	0.757-1.024		9.99	102	ng/kg			27.40	25	*, B



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

Dioxins/Furans - Quality Control

Batch BJB0762 - EPA 1613

Instrument: AUTOSPEC01 Analyst: pl

QC Sample/Analyte	Ion Ratio	Ratio Limits	EDL	Reporting Limit	Result	Units	%REC	%REC Limits	RPD	RPD Limit	Notes
Duplicate (BJB0762-DUP2)											
Source: 20K0374-07RE1											
Prepared: 01-Mar-2021 Analyzed: 04-Mar-2021 19:52											
Homologue group											
Total TCDF				0.999	1.91	ng/kg			40.60	200	
Total TCDD				0.999	0.985	ng/kg			58.60	200	
Total PeCDF				0.999	1.15	ng/kg			11.10	200	
Total PeCDD				0.999	ND	ng/kg					Ua
Total HxCDF				0.999	3.09	ng/kg			57.60	200	
Total HxCDD				0.999	8.43	ng/kg			38.20	200	
Total HpCDF				0.999	7.23	ng/kg			53.60	200	
Total HpCDD				0.999	49.9	ng/kg			53.60	200	



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Reported:
26-Mar-2021 16:29

Dioxins/Furans - Quality Control

Batch BJB0762 - EPA 1613

Instrument: AUTOSPEC01 Analyst: pl

QC Sample/Analyte	Ion Ratio	Ratio Limits	EDL	Reporting Limit	Result	Units	%REC	%REC Limits	RPD	RPD Limit	Notes
Duplicate (BJB0762-DUP2) Source: 20K0374-07RE1 Prepared: 01-Mar-2021 Analyzed: 04-Mar-2021 19:52											
Labeled compounds											
13C12-2,3,7,8-TCDF	0.780	0.655-0.886			90.1					24-169 %	
13C12-2,3,7,8-TCDD	0.797	0.655-0.886			89.3					25-164 %	
13C12-1,2,3,7,8-PeCDF	1.507	1.318-1.783			88.0					24-185 %	
13C12-2,3,4,7,8-PeCDF	1.513	1.318-1.783			89.1					21-178 %	
13C12-1,2,3,7,8-PeCDD	1.597	1.318-1.783			83.7					25-181 %	
13C12-1,2,3,4,7,8-HxCDF	0.512	0.434-0.587			85.5					26-152 %	
13C12-1,2,3,6,7,8-HxCDF	0.515	0.434-0.587			80.8					26-123 %	
13C12-2,3,4,6,7,8-HxCDF	0.518	0.434-0.587			89.0					28-136 %	
13C12-1,2,3,7,8,9-HxCDF	0.507	0.434-0.587			77.3					29-147 %	
13C12-1,2,3,4,7,8-HxCDD	1.275	1.054-1.426			84.0					32-141 %	
13C12-1,2,3,6,7,8-HxCDD	1.255	1.054-1.426			76.6					28-130 %	
13C12-1,2,3,4,6,7,8-HpCDF	0.436	0.374-0.506			84.9					28-143 %	
13C12-1,2,3,4,7,8,9-HpCDF	0.439	0.374-0.506			89.3					26-138 %	
13C12-1,2,3,4,6,7,8-HpCDD	1.074	0.893-1.208			88.2					23-140 %	
13C12-OCDD	0.919	0.757-1.024			70.3					17-157 %	
37Cl4-2,3,7,8-TCDD					92.7					35-197 %	
Reference (BJB0762-SRM1) Prepared: 01-Mar-2021 Analyzed: 04-Mar-2021 18:13											
2,3,7,8-TCDF	0.729	0.655-0.886		2.00	1.64	ng/kg	148	50-150 %			J
2,3,7,8-TCDD	0.581	0.655-0.886		2.00	1.21	ng/kg	115	50-150 %			EMPC, J
1,2,3,7,8-PeCDF	1.895	1.318-1.783		2.00	1.39	ng/kg	113	50-150 %			EMPC, J
2,3,4,7,8-PeCDF	1.576	1.318-1.783		2.00	1.18	ng/kg	110	50-150 %			J
1,2,3,7,8-PeCDD	1.233	1.318-1.783		2.00	1.48	ng/kg	137	50-150 %			EMPC, J
1,2,3,4,7,8-HxCDF	1.197	1.054-1.426		2.00	3.25	ng/kg	108	50-150 %			
1,2,3,6,7,8-HxCDF	1.511	1.054-1.426		2.00	1.22	ng/kg	112	50-150 %			EMPC, J
2,3,4,6,7,8-HxCDF	1.275	1.054-1.426		2.00	2.19	ng/kg	119	50-150 %			
1,2,3,7,8,9-HxCDF	1.343	1.054-1.426		2.00	0.439	ng/kg	85.9	50-150 %			J
1,2,3,4,7,8-HxCDD	1.135	1.054-1.426		2.00	1.53	ng/kg	96.2	50-150 %			J
1,2,3,6,7,8-HxCDD	1.390	1.054-1.426		2.00	3.95	ng/kg	102	50-150 %			
1,2,3,7,8,9-HxCDD	1.151	1.054-1.426		2.00	3.14	ng/kg	103	50-150 %			
1,2,3,4,6,7,8-HpCDF	1.143	0.893-1.208		2.00	19.8	ng/kg	106	50-150 %			
1,2,3,4,7,8,9-HpCDF	0.990	0.893-1.208		2.00	1.76	ng/kg	108	50-150 %			J
1,2,3,4,6,7,8-HpCDD	1.113	0.893-1.208		5.00	104	ng/kg	114	50-150 %			
OCDF	0.940	0.757-1.024		5.00	53.2	ng/kg	91.1	50-150 %			B
OCDD	0.899	0.757-1.024		20.0	741	ng/kg	91.3	50-150 %			B



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

Dioxins/Furans - Quality Control

Batch BJB0762 - EPA 1613

Instrument: AUTOSPEC01 Analyst: pl

QC Sample/Analyte	Ion Ratio	Ratio Limits	EDL	Reporting Limit	Result	Units	%REC	Limits	RPD	RPD Limit	Notes
Reference (BJB0762-SRM1)					Prepared: 01-Mar-2021		Analyzed: 04-Mar-2021 18:13				
Labeled compounds											
13C12-2,3,7,8-TCDF	0.773	0.655-0.886				91.7				24-169 %	
13C12-2,3,7,8-TCDD	0.801	0.655-0.886				93.3				25-164 %	
13C12-1,2,3,7,8-PeCDF	1.518	1.318-1.783				92.1				24-185 %	
13C12-2,3,4,7,8-PeCDF	1.532	1.318-1.783				93.5				21-178 %	
13C12-1,2,3,7,8-PeCDD	1.628	1.318-1.783				85.8				25-181 %	
13C12-1,2,3,4,7,8-HxCDF	0.510	0.434-0.587				91.0				26-152 %	
13C12-1,2,3,6,7,8-HxCDF	0.496	0.434-0.587				88.3				26-123 %	
13C12-2,3,4,6,7,8-HxCDF	0.522	0.434-0.587				91.5				28-136 %	
13C12-1,2,3,7,8,9-HxCDF	0.506	0.434-0.587				81.6				29-147 %	
13C12-1,2,3,4,7,8-HxCDD	1.301	1.054-1.426				85.9				32-141 %	
13C12-1,2,3,6,7,8-HxCDD	1.194	1.054-1.426				81.5				28-130 %	
13C12-1,2,3,4,6,7,8-HpCDF	0.430	0.374-0.506				91.8				28-143 %	
13C12-1,2,3,4,7,8,9-HpCDF	0.434	0.374-0.506				91.0				26-138 %	
13C12-1,2,3,4,6,7,8-HpCDD	1.058	0.893-1.208				91.0				23-140 %	
13C12-OCDD	0.925	0.757-1.024				75.9				17-157 %	
37Cl4-2,3,7,8-TCDD						96.5				35-197 %	



Dalton, Olmsted & Fuglevand, Inc
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Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

Metals and Metallic Compounds - Quality Control

Batch BIL0138 - SWN EPA 3050B

Instrument: ICPMS1 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BIL0138-BLK1) Prepared: 07-Dec-2020 Analyzed: 08-Dec-2020 15:30												
Chromium	52	ND	0.13	0.50	mg/kg							Ua
Chromium	53	ND	0.07	0.50	mg/kg							Ua
Lead	208	ND	0.07	0.10	mg/kg							Ua
Silver	107	ND	0.02	0.20	mg/kg							Ua
Arsenic	75a	ND	0.02	0.20	mg/kg							Ua
Cadmium	111	ND	0.03	0.10	mg/kg							Ua
Cadmium	114	ND	0.04	0.10	mg/kg							Ua
Selenium	78	ND	0.44	0.50	mg/kg							Ua
LCS (BIL0138-BS1) Prepared: 07-Dec-2020 Analyzed: 08-Dec-2020 15:35												
Chromium	52	22.3	0.13	0.50	mg/kg	25.0		89.3	80-120			
Chromium	53	23.0	0.07	0.50	mg/kg	25.0		92.1	80-120			
Lead	208	23.1	0.07	0.10	mg/kg	25.0		92.6	80-120			
Silver	107	22.1	0.02	0.20	mg/kg	25.0		88.4	80-120			
Arsenic	75a	22.6	0.02	0.20	mg/kg	25.0		90.3	80-120			
Cadmium	111	23.3	0.03	0.10	mg/kg	25.0		93.2	80-120			
Cadmium	114	23.6	0.04	0.10	mg/kg	25.0		94.4	80-120			
Selenium	78	72.9	0.44	0.50	mg/kg	80.0		91.1	80-120			
Duplicate (BIL0138-DUP1) Source: 20K0374-05 Prepared: 07-Dec-2020 Analyzed: 08-Dec-2020 16:00												
Chromium	52	25.6	0.22	0.85	mg/kg		31.9			21.70	20	*
Lead	208	6.69	0.12	0.17	mg/kg		7.71			14.20	20	
Silver	107	0.08	0.03	0.34	mg/kg		0.09			8.43	20	J
Arsenic	75a	6.72	0.04	0.34	mg/kg		7.35			8.96	20	
Cadmium	111	0.49	0.05	0.17	mg/kg		0.58			15.40	20	
Selenium	78	1.27	0.75	0.85	mg/kg		1.32			3.64	20	
Duplicate (BIL0138-DUP2) Source: 20K0374-07 Prepared: 07-Dec-2020 Analyzed: 08-Dec-2020 16:58												
Chromium	52	27.2	0.18	0.71	mg/kg		28.5			4.64	20	
Lead	208	4.22	0.10	0.14	mg/kg		3.72			12.60	20	
Silver	107	0.05	0.02	0.28	mg/kg		0.05			5.50	20	J
Arsenic	75a	7.75	0.03	0.28	mg/kg		5.36			36.60	20	*
Cadmium	111	0.40	0.04	0.14	mg/kg		0.38			4.83	20	
Selenium	78	0.95	0.62	0.71	mg/kg		0.84			12.10	20	
Matrix Spike (BIL0138-MS1) Source: 20K0374-05 Prepared: 07-Dec-2020 Analyzed: 08-Dec-2020 16:05												



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
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Reported:
26-Mar-2021 16:29

Metals and Metallic Compounds - Quality Control

Batch BIL0138 - SWN EPA 3050B

Instrument: ICPMS1 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike (BIL0138-MS1)		Source: 20K0374-05		Prepared: 07-Dec-2020 Analyzed: 08-Dec-2020 16:05								
Chromium	52	63.0	0.22	0.85	mg/kg	42.7	31.9	73.0	75-125			*
Lead	208	46.1	0.12	0.17	mg/kg	42.7	7.71	89.9	75-125			
Silver	107	29.6	0.03	0.34	mg/kg	42.7	0.09	69.1	75-125			*
Arsenic	75a	44.3	0.04	0.34	mg/kg	42.7	7.35	86.6	75-125			
Cadmium	111	39.0	0.05	0.17	mg/kg	42.7	0.58	89.9	75-125			
Selenium	78	118	0.75	0.85	mg/kg	137	1.32	85.4	75-125			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike (BIL0138-MS2)		Source: 20K0374-07		Prepared: 07-Dec-2020 Analyzed: 08-Dec-2020 18:27								
Chromium	52	53.4	0.18	0.71	mg/kg	35.3	28.5	70.7	75-125			*
Lead	208	32.9	0.10	0.14	mg/kg	35.3	3.72	82.6	75-125			
Silver	107	25.7	0.02	0.28	mg/kg	35.3	0.05	72.6	75-125			*
Arsenic	75a	35.2	0.03	0.28	mg/kg	35.3	5.36	84.6	75-125			
Cadmium	111	31.3	0.04	0.14	mg/kg	35.3	0.38	87.6	75-125			
Selenium	78	96.2	0.62	0.71	mg/kg	113	0.84	84.3	75-125			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike Dup (BIL0138-MSD1)		Source: 20K0374-05		Prepared: 07-Dec-2020 Analyzed: 08-Dec-2020 17:20								
Chromium	52	64.5	0.22	0.86	mg/kg	42.8	31.9	76.3	75-125	2.23	20	
Lead	208	47.6	0.12	0.17	mg/kg	42.8	7.71	93.3	75-125	3.21	20	
Silver	107	32.2	0.03	0.34	mg/kg	42.8	0.09	75.1	75-125	8.44	20	
Arsenic	75a	44.4	0.04	0.34	mg/kg	42.8	7.35	86.8	75-125	0.22	20	
Cadmium	111	39.1	0.05	0.17	mg/kg	42.8	0.58	90.0	75-125	0.26	20	
Selenium	78	120	0.75	0.86	mg/kg	137	1.32	86.5	75-125	1.37	20	

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike Dup (BIL0138-MSD2)		Source: 20K0374-07		Prepared: 07-Dec-2020 Analyzed: 08-Dec-2020 17:08								
Chromium	52	53.2	0.18	0.71	mg/kg	35.3	28.5	70.1	75-125	0.39	20	*
Lead	208	35.2	0.10	0.14	mg/kg	35.3	3.72	89.1	75-125	6.79	20	
Silver	107	26.5	0.02	0.28	mg/kg	35.3	0.05	74.8	75-125	3.07	20	*
Arsenic	75a	38.6	0.03	0.28	mg/kg	35.3	5.36	94.1	75-125	9.11	20	
Cadmium	111	33.6	0.04	0.14	mg/kg	35.3	0.38	94.1	75-125	7.08	20	
Selenium	78	102	0.62	0.71	mg/kg	113	0.84	89.2	75-125	5.66	20	

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



Dalton, Olmsted & Fuglevand, Inc
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Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

Metals and Metallic Compounds - Quality Control

Batch BIL0138 - SWN EPA 3050B

Instrument: ICPMS1 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Post Spike (BIL0138-PS1)		Source: 20K0374-05		Prepared: 07-Dec-2020 Analyzed: 08-Dec-2020 16:15								
Chromium	52	798			mg/kg	500	374	84.8	80-120			
Silver	107	445			mg/kg	500	1.00	88.9	80-120			
Post Spike (BIL0138-PS2)		Source: 20K0374-07		Prepared: 07-Dec-2020 Analyzed: 08-Dec-2020 17:13								
Chromium	52	836			mg/kg	500	402	86.9	80-120			
Silver	107	505			mg/kg	500	0.72	101	80-120			



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1420 - 156th Ave., NE STE C1
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Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

Metals and Metallic Compounds - Quality Control

Batch BJC0563 - SWN EPA 3050B

Instrument: ICPMS1 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJC0563-BLK1)						Prepared: 22-Mar-2021 Analyzed: 23-Mar-2021 17:01						
Antimony	121	ND	0.02	0.20	mg/kg							Ua
Antimony	123	ND	0.03	0.20	mg/kg							Ua
Chromium	52	ND	0.13	0.50	mg/kg							Ua
Chromium	53	0.08	0.07	0.50	mg/kg							J
Lead	208	ND	0.07	0.10	mg/kg							Ua
Silver	107	ND	0.02	0.20	mg/kg							Ua
Arsenic	75a	ND	0.02	0.20	mg/kg							Ua
Cadmium	111	ND	0.03	0.10	mg/kg							Ua
Cadmium	114	ND	0.04	0.10	mg/kg							Ua
Copper	63	ND	0.34	0.50	mg/kg							Ua
Copper	65	ND	0.35	0.50	mg/kg							Ua
Selenium	78	ND	0.44	0.50	mg/kg							Ua
Zinc	66	ND	0.8	4.0	mg/kg							Ua
Zinc	67	ND	0.9	4.0	mg/kg							Ua

LCS (BJC0563-BS1)						Prepared: 22-Mar-2021 Analyzed: 23-Mar-2021 16:57						
Antimony	121	24.4	0.02	0.20	mg/kg	25.0		97.5	80-120			
Antimony	123	25.1	0.03	0.20	mg/kg	25.0		100	80-120			
Chromium	52	24.6	0.13	0.50	mg/kg	25.0		98.4	80-120			
Chromium	53	25.0	0.07	0.50	mg/kg	25.0		99.8	80-120			
Lead	208	26.1	0.07	0.10	mg/kg	25.0		104	80-120			
Silver	107	24.1	0.02	0.20	mg/kg	25.0		96.4	80-120			
Arsenic	75a	24.1	0.02	0.20	mg/kg	25.0		96.5	80-120			
Cadmium	111	25.2	0.03	0.10	mg/kg	25.0		101	80-120			
Cadmium	114	24.8	0.04	0.10	mg/kg	25.0		99.2	80-120			
Copper	63	26.4	0.34	0.50	mg/kg	25.0		106	80-120			
Copper	65	26.1	0.35	0.50	mg/kg	25.0		105	80-120			
Selenium	78	76.6	0.44	0.50	mg/kg	80.0		95.7	80-120			
Zinc	66	80.4	0.8	4.0	mg/kg	80.0		101	80-120			
Zinc	67	78.4	0.9	4.0	mg/kg	80.0		98.0	80-120			

Duplicate (BJC0563-DUP1)						Source: 20K0374-05 Prepared: 22-Mar-2021 Analyzed: 23-Mar-2021 18:17						
Antimony	121	ND	0.03	0.34	mg/kg		ND					Ua
Chromium	52	30.4	0.22	0.84	mg/kg		36.9			19.00	20	
Lead	208	6.89	0.11	0.17	mg/kg		7.82			12.60	20	



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

Metals and Metallic Compounds - Quality Control

Batch BJC0563 - SWN EPA 3050B

Instrument: ICPMS1 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Duplicate (BJC0563-DUP1)		Source: 20K0374-05				Prepared: 22-Mar-2021		Analyzed: 23-Mar-2021 18:17				
Silver	107	0.08	0.03	0.34	mg/kg		0.08			2.01	20	J
Arsenic	75a	7.41	0.04	0.34	mg/kg		7.50			1.21	20	
Cadmium	111	0.58	0.05	0.17	mg/kg		0.54			6.75	20	
Copper	63	23.8	0.57	0.84	mg/kg		25.4			6.18	20	
Selenium	78	0.88	0.74	0.84	mg/kg		0.91			2.81	20	
Zinc	66	62.9	1.4	6.7	mg/kg		62.0			1.45	20	
Duplicate (BJC0563-DUP2)		Source: 20K0374-07				Prepared: 22-Mar-2021		Analyzed: 23-Mar-2021 19:36				
Antimony	121	ND	0.02	0.27	mg/kg		ND					Ua
Chromium	52	32.3	0.18	0.67	mg/kg		25.4			24.10	20	*
Lead	208	5.88	0.09	0.13	mg/kg		3.71			45.20	20	*
Silver	107	0.06	0.02	0.27	mg/kg		0.06			4.76	20	J
Arsenic	75a	6.32	0.03	0.27	mg/kg		6.56			3.79	20	
Cadmium	111	0.39	0.04	0.13	mg/kg		0.39			0.35	20	
Copper	63	14.3	0.46	0.67	mg/kg		23.8			49.70	20	*
Selenium	78	ND	0.59	0.67	mg/kg		0.67					Ua
Zinc	66	41.5	1.1	5.4	mg/kg		38.5			7.46	20	
Matrix Spike (BJC0563-MS1)		Source: 20K0374-05				Prepared: 22-Mar-2021		Analyzed: 23-Mar-2021 18:22				
Antimony	121	1.86	0.03	0.33	mg/kg	41.9	ND	4.44	75-125			*
Chromium	52	72.7	0.22	0.84	mg/kg	41.9	36.9	85.7	75-125			
Lead	208	50.1	0.11	0.17	mg/kg	41.9	7.82	101	75-125			
Silver	107	38.9	0.03	0.33	mg/kg	41.9	0.08	92.7	75-125			
Arsenic	75a	48.1	0.04	0.33	mg/kg	41.9	7.50	97.1	75-125			
Cadmium	111	43.2	0.05	0.17	mg/kg	41.9	0.54	102	75-125			
Copper	63	73.1	0.57	0.84	mg/kg	41.9	25.4	114	75-125			
Selenium	78	130	0.74	0.84	mg/kg	134	0.91	96.1	75-125			
Zinc	66	197	1.4	6.7	mg/kg	134	62.0	101	75-125			
Matrix Spike (BJC0563-MS2)		Source: 20K0374-07				Prepared: 22-Mar-2021		Analyzed: 23-Mar-2021 19:41				
Antimony	121	2.10	0.02	0.27	mg/kg	33.7	ND	6.24	75-125			*
Chromium	52	57.5	0.18	0.67	mg/kg	33.7	25.4	95.3	75-125			
Lead	208	39.1	0.09	0.13	mg/kg	33.7	3.71	105	75-125			
Silver	107	31.2	0.02	0.27	mg/kg	33.7	0.06	92.7	75-125			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

Metals and Metallic Compounds - Quality Control

Batch BJC0563 - SWN EPA 3050B

Instrument: ICPMS1 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike (BJC0563-MS2)		Source: 20K0374-07		Prepared: 22-Mar-2021		Analyzed: 23-Mar-2021 19:41						
Arsenic	75a	39.5	0.03	0.27	mg/kg	33.7	6.56	97.8	75-125			
Cadmium	111	35.0	0.04	0.13	mg/kg	33.7	0.39	103	75-125			
Copper	63	65.5	0.46	0.67	mg/kg	33.7	23.8	124	75-125			
Selenium	78	107	0.59	0.67	mg/kg	108	0.67	98.8	75-125			
Zinc	66	150	1.1	5.4	mg/kg	108	38.5	104	75-125			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike Dup (BJC0563-MSD1)		Source: 20K0374-05		Prepared: 22-Mar-2021		Analyzed: 23-Mar-2021 18:27						
Antimony	121	1.42	0.03	0.34	mg/kg	41.9	ND	3.38	75-125	27.00	20	*
Chromium	52	69.0	0.22	0.84	mg/kg	41.9	36.9	76.6	75-125	5.24	20	
Lead	208	49.8	0.11	0.17	mg/kg	41.9	7.82	100	75-125	0.42	20	
Silver	107	37.6	0.03	0.34	mg/kg	41.9	0.08	89.4	75-125	3.47	20	
Arsenic	75a	45.4	0.04	0.34	mg/kg	41.9	7.50	90.3	75-125	5.96	20	
Cadmium	111	40.9	0.05	0.17	mg/kg	41.9	0.54	96.3	75-125	5.34	20	
Copper	63	74.5	0.57	0.84	mg/kg	41.9	25.4	117	75-125	1.89	20	
Selenium	78	124	0.74	0.84	mg/kg	134	0.91	91.5	75-125	4.66	20	
Zinc	66	191	1.4	6.7	mg/kg	134	62.0	96.2	75-125	3.10	20	

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike Dup (BJC0563-MSD2)		Source: 20K0374-07		Prepared: 22-Mar-2021		Analyzed: 23-Mar-2021 19:46						
Antimony	121	1.73	0.02	0.27	mg/kg	33.7	ND	5.13	75-125	19.20	20	*
Chromium	52	75.7	0.18	0.67	mg/kg	33.7	25.4	149	75-125	27.40	20	*
Lead	208	298	0.09	0.13	mg/kg	33.7	3.71	871	75-125	154.00	20	*
Silver	107	29.9	0.02	0.27	mg/kg	33.7	0.06	88.5	75-125	4.35	20	
Arsenic	75a	37.3	0.03	0.27	mg/kg	33.7	6.56	91.1	75-125	5.61	20	
Cadmium	111	33.3	0.04	0.13	mg/kg	33.7	0.39	97.6	75-125	4.97	20	
Copper	63	46.7	0.46	0.67	mg/kg	33.7	23.8	67.9	75-125	33.60	20	*
Selenium	78	102	0.59	0.67	mg/kg	108	0.67	93.7	75-125	5.03	20	
Zinc	66	147	1.1	5.4	mg/kg	108	38.5	100	75-125	2.10	20	

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Post Spike (BJC0563-PS1)		Source: 20K0374-05		Prepared: 22-Mar-2021		Analyzed: 23-Mar-2021 18:32						
Antimony	121	475			mg/kg	500	ND	94.9	80-120			

Post Spike (BJC0563-PS2)		Source: 20K0374-07		Prepared: 22-Mar-2021		Analyzed: 23-Mar-2021 19:53						
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1420 - 156th Ave., NE STE C1
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Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

Metals and Metallic Compounds - Quality Control

Batch BJC0563 - SWN EPA 3050B

Instrument: ICPMS1 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Post Spike (BJC0563-PS2)		Source: 20K0374-07				Prepared: 22-Mar-2021		Analyzed: 23-Mar-2021 19:53				
Antimony	121	474			mg/kg	500	ND	94.7	80-120			
Chromium	52	830			mg/kg	500	25.4	90.8	80-120			
Lead	208	556			mg/kg	500	3.71	100	80-120			
Copper	63	871			mg/kg	500	23.8	104	80-120			
Reference (BJC0563-SRM1)						Prepared: 22-Mar-2021		Analyzed: 23-Mar-2021 18:40				
Antimony	121	6.14	0.02	0.20	mg/kg	99.4		6.17	0-204.2			
Chromium	53	149	0.07	0.50	mg/kg	147		101	81.6-117.7			
Lead	208	113	0.07	0.10	mg/kg	105		107	82.6-117.1			
Silver	107	29.7	0.02	0.20	mg/kg	32.0		92.7	79.7-120			
Arsenic	75a	95.2	0.02	0.20	mg/kg	97.6		97.5	82.8-111.4			
Cadmium	111	129	0.03	0.10	mg/kg	114		113	82.8-117.5			
Copper	63	102	0.34	0.50	mg/kg	97.7		105	83.9-115.7			
Selenium	78	97.3	0.44	0.50	mg/kg	93.1		105	78.9-121.4			
Zinc	66	222	0.8	4.0	mg/kg	212		105	80.7-118.9			



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Reported:
26-Mar-2021 16:29

Metals and Metallic Compounds - Quality Control

Batch BJC0609 - SMM EPA 7471B

Instrument: HYDRA Analyst: BLC

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJC0609-BLK1)						Prepared: 22-Mar-2021	Analyzed: 23-Mar-2021 11:03				
Mercury	ND	0.00525	0.0250	mg/kg							Ua
LCS (BJC0609-BS1)						Prepared: 22-Mar-2021	Analyzed: 23-Mar-2021 11:06				
Mercury	0.499	0.00525	0.0250	mg/kg	0.500		99.8	80-120			
Duplicate (BJC0609-DUP2)						Source: 20K0374-07	Prepared: 22-Mar-2021	Analyzed: 23-Mar-2021 11:19			
Mercury	0.0365	0.00529	0.0252	mg/kg		0.0534			37.60	20	H
Matrix Spike (BJC0609-MS2)						Source: 20K0374-07	Prepared: 22-Mar-2021	Analyzed: 23-Mar-2021 11:22			
Mercury	0.306	0.00533	0.0254	mg/kg	0.254	0.0534	99.7	75-125			H
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											
Matrix Spike Dup (BJC0609-MSD2)						Source: 20K0374-07	Prepared: 22-Mar-2021	Analyzed: 23-Mar-2021 11:24			
Mercury	0.295	0.00529	0.0252	mg/kg	0.252	0.0534	95.8	75-125	3.80	20	H
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											
Reference (BJC0609-SRM1)							Prepared: 22-Mar-2021	Analyzed: 23-Mar-2021 11:31			
Mercury	5.32	0.0502	0.239	mg/kg	5.99		88.8	74.1-126			D



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Project: COA Outfall
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Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

Metals and Metallic Compounds - Quality Control

Batch BJC0633 - SMM EPA 7471B

Instrument: HYDRA Analyst: BLC

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJC0633-BLK1)						Prepared: 23-Mar-2021	Analyzed: 23-Mar-2021 14:27				
Mercury	ND	0.00525	0.0250	mg/kg							Ua
LCS (BJC0633-BS1)						Prepared: 23-Mar-2021	Analyzed: 23-Mar-2021 14:30				
Mercury	0.490	0.00525	0.0250	mg/kg	0.500		98.0	80-120			
Duplicate (BJC0633-DUP1)						Source: 20K0374-05RE1	Prepared: 23-Mar-2021	Analyzed: 23-Mar-2021 14:34			
Mercury	0.0505	0.00759	0.0361	mg/kg		0.0531			5.04	20	H
Matrix Spike (BJC0633-MS1)						Source: 20K0374-05RE1	Prepared: 23-Mar-2021	Analyzed: 23-Mar-2021 14:36			
Mercury	0.423	0.00756	0.0360	mg/kg	0.360	0.0531	103	75-125			H
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											
Matrix Spike Dup (BJC0633-MSD1)						Source: 20K0374-05RE1	Prepared: 23-Mar-2021	Analyzed: 23-Mar-2021 14:39			
Mercury	0.460	0.00765	0.0364	mg/kg	0.364	0.0531	112	75-125	8.30	20	H
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											
Reference (BJC0633-SRM1)						Prepared: 23-Mar-2021	Analyzed: 23-Mar-2021 14:41				
Mercury	5.13	0.0517	0.246	mg/kg	5.99		85.6	74.1-126			D



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1420 - 156th Ave., NE STE C1
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Project: COA Outfall
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Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

Wet Chemistry - Quality Control

Batch BIK0762 - PSEP 1986

Instrument: UV1800-1 Analyst: CDE

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BIK0762-BLK1)						Prepared: 24-Nov-2020 Analyzed: 03-Dec-2020 17:04					
Sulfide	ND	1.00	1.00	mg/kg							Ua
LCS (BIK0762-BS1)						Prepared: 24-Nov-2020 Analyzed: 03-Dec-2020 17:05					
Sulfide	148	20.0	20.0	mg/kg	165		89.4	75-125			D
Duplicate (BIK0762-DUP2)						Source: 20K0374-07 Prepared: 24-Nov-2020 Analyzed: 03-Dec-2020 17:15					
Sulfide	274	26.9	26.9	mg/kg		257			6.46	20	D
Duplicate (BIK0762-DUP3)						Source: 20K0374-05RE1 Prepared: 24-Nov-2020 Analyzed: 03-Dec-2020 17:43					
Sulfide	1230	166	166	mg/kg		1380			12.20	20	D
Matrix Spike (BIK0762-MS2)						Source: 20K0374-07 Prepared: 24-Nov-2020 Analyzed: 03-Dec-2020 17:16					
Sulfide	460	26.5	26.5	mg/kg	219	257	93.0	75-125			D
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											
Matrix Spike (BIK0762-MS3)						Source: 20K0374-05RE1 Prepared: 24-Nov-2020 Analyzed: 03-Dec-2020 17:43					
Sulfide	1650	170	170	mg/kg	281	1380	95.5	75-125			*, HC, D
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											



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Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

Wet Chemistry - Quality Control

Batch BIK0769 - MSA 33.3 (2M KCl)

Instrument: LACHAT2 Analyst: LRB

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BIK0769-BLK1)					Prepared: 24-Nov-2020 Analyzed: 30-Nov-2020 14:30						
Ammonia-N	ND	0.40	0.40	mg/kg NH3-N							Ua
LCS (BIK0769-BS1)					Prepared: 24-Nov-2020 Analyzed: 30-Nov-2020 14:35						
Ammonia-N	104	8.00	8.00	mg/kg NH3-N	100		104	90-110			D
Duplicate (BIK0769-DUP2)					Source: 20K0374-05RE1 Prepared: 24-Nov-2020 Analyzed: 30-Nov-2020 15:18						
Ammonia-N	28.4	2.90	2.90	mg/kg NH3-N		27.7			2.31	20	D
Matrix Spike (BIK0769-MS1)					Source: 20K0374-05RE1 Prepared: 24-Nov-2020 Analyzed: 30-Nov-2020 14:40						
Ammonia-N	178	12.8	12.8	mg/kg NH3-N	160	27.7	93.5	75-125			D

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



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Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

Wet Chemistry - Quality Control

Batch BIK0770 - MSA 33.3 (2M KCl)

Instrument: LACHAT2 Analyst: KOTT

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BIK0770-BLK1)					Prepared: 24-Nov-2020 Analyzed: 30-Nov-2020 12:20						
Ammonia-N	ND	0.40	0.40	mg/kg NH3-N							Ua
LCS (BIK0770-BS1)					Prepared: 24-Nov-2020 Analyzed: 30-Nov-2020 12:22						
Ammonia-N	101	8.00	8.00	mg/kg NH3-N	100		101	90-110			D
Duplicate (BIK0770-DUP2)					Source: 20K0374-07RE1 Prepared: 24-Nov-2020 Analyzed: 30-Nov-2020 12:48						
Ammonia-N	12.6	0.97	0.97	mg/kg NH3-N		11.8			5.96	20	D
Matrix Spike (BIK0770-MS1)					Source: 20K0374-07RE1 Prepared: 24-Nov-2020 Analyzed: 30-Nov-2020 12:27						
Ammonia-N	132	0.53	10.1	mg/kg NH3-N	127	11.8	95.1	75-125			D

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



Dalton, Olmsted & Fuglevand, Inc
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Project: COA Outfall
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Reported:
26-Mar-2021 16:29

Wet Chemistry - Quality Control

Batch BIK0773 - No Prep Wet Chem

Instrument: BAL2 Analyst: UW

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC Limits	RPD	RPD Limit	Notes
Blank (BIK0773-BLK1)					Prepared: 24-Nov-2020 Analyzed: 24-Nov-2020 17:15					
Volatile Solids	ND	0.01	0.01	%						Ua
Total Solids	ND	0.04	0.04	%						Ua
Duplicate (BIK0773-DUP1)					Source: 20K0374-05 Prepared: 24-Nov-2020 Analyzed: 24-Nov-2020 17:15					
Volatile Solids	5.32	0.01	0.01	%		5.04		5.37	20	
Total Solids	56.31	0.04	0.04	%		57.16		1.50	20	
Duplicate (BIK0773-DUP2)					Source: 20K0374-07 Prepared: 24-Nov-2020 Analyzed: 24-Nov-2020 17:15					
Volatile Solids	3.41	0.01	0.01	%		3.41		0.19	20	
Total Solids	68.73	0.04	0.04	%		69.17		0.64	20	



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Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

Wet Chemistry - Quality Control

Batch BIK0778 - No Prep Wet Chem

Instrument: BAL2 Analyst: UW

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC Limits	RPD	RPD Limit	Notes
Blank (BIK0778-BLK1)					Prepared: 24-Nov-2020 Analyzed: 24-Nov-2020 17:15					
Total Solids, Sulfide	ND	0.04	0.04	%						Ua
Duplicate (BIK0778-DUP1)					Source: 20K0374-05 Prepared: 24-Nov-2020 Analyzed: 24-Nov-2020 17:15					
Total Solids, Sulfide	56.06	0.04	0.04	%		55.95		0.20	20	
Duplicate (BIK0778-DUP2)					Source: 20K0374-07 Prepared: 24-Nov-2020 Analyzed: 24-Nov-2020 17:15					
Total Solids, Sulfide	68.83	0.04	0.04	%		69.30		0.69	20	



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Bellevue WA, 98007

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Project Number: COA-001
Project Manager: Ezra Beaver

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Wet Chemistry - Quality Control

Batch BIK0802 - PSEP 1986 (modified)

Instrument: TOC Cube Analyst: BF

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BIK0802-BLK1)						Prepared: 25-Nov-2020 Analyzed: 25-Nov-2020 21:10					
Total Organic Carbon	ND	0.02	0.02	%							Ua
LCS (BIK0802-BS1)						Prepared: 25-Nov-2020 Analyzed: 25-Nov-2020 21:40					
Total Organic Carbon	44.9	0.02	0.02	%	44.4		101	80-120			
Duplicate (BIK0802-DUP1)						Source: 20K0374-05 Prepared: 25-Nov-2020 Analyzed: 26-Nov-2020 05:53					
Total Organic Carbon	1.64	0.02	0.02	%		1.56			5.03	20	
Matrix Spike (BIK0802-MS1)						Source: 20K0374-05 Prepared: 25-Nov-2020 Analyzed: 26-Nov-2020 06:24					
Total Organic Carbon	3.24	0.02	0.02	%	1.73	1.56	97.0	75-125			
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											
Matrix Spike Dup (BIK0802-MSD1)						Source: 20K0374-05 Prepared: 25-Nov-2020 Analyzed: 26-Nov-2020 06:55					
Total Organic Carbon	3.19	0.02	0.02	%	1.49	1.56	109	75-125	1.58	20	
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											
Reference (BIK0802-SRM1)						Prepared: 25-Nov-2020 Analyzed: 25-Nov-2020 22:11					
Total Organic Carbon	2.75	0.02	0.02	%	2.99		92.0	80-120			



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Wet Chemistry - Quality Control

Batch BIK0803 - PSEP 1986 (modified)

Instrument: TOC Cube Analyst: BF

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BIK0803-BLK1)						Prepared: 25-Nov-2020 Analyzed: 26-Nov-2020 08:59					
Total Organic Carbon	ND	0.02	0.02	%							Ua
LCS (BIK0803-BS1)						Prepared: 25-Nov-2020 Analyzed: 26-Nov-2020 09:30					
Total Organic Carbon	44.9	0.02	0.02	%	44.4		101	80-120			
Duplicate (BIK0803-DUP1)						Source: 20K0374-07 Prepared: 25-Nov-2020 Analyzed: 26-Nov-2020 16:44					
Total Organic Carbon	1.43	0.02	0.02	%		0.97			38.00	20	*
Matrix Spike (BIK0803-MS1)						Source: 20K0374-07 Prepared: 25-Nov-2020 Analyzed: 26-Nov-2020 17:15					
Total Organic Carbon	2.62	0.02	0.02	%	1.32	0.97	125	75-125			
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											
Matrix Spike Dup (BIK0803-MSD1)						Source: 20K0374-07 Prepared: 25-Nov-2020 Analyzed: 26-Nov-2020 17:46					
Total Organic Carbon	2.25	0.02	0.02	%	1.25	0.97	102	75-125	15.40	20	
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											
Reference (BIK0803-SRM1)						Prepared: 25-Nov-2020 Analyzed: 26-Nov-2020 10:01					
Total Organic Carbon	2.70	0.02	0.02	%	2.99		90.3	80-120			



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Analysis by: Materials Testing & Consulting, Inc. (Olympia)

Geotechnical Methods - Quality Control

Batch B011121 - No Prep Geo

Instrument: MT&C Analyst:

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Duplicate (B011121-DUP1)		Source: 20K0374-07		Prepared: 11-Jan-2021		Analyzed: 11-Jan-2021 00:00				
Phi Size <-1	5.9	0.1	%		5.1		0-0	14.50		
Phi Size -1 to 0	4.7	0.1	%		4.1		0-0	13.60		
Phi Size 0 to 1	11.0	0.1	%		10.8		0-0	1.80		
Phi Size 1 to 2	20.2	0.1	%		21.0		0-0	3.90		
Phi Size 2 to 3	33.5	0.1	%		31.7		0-0	5.50		
Phi Size 3 to 4	11.6	0.1	%		11.2		0-0	3.50		
Phi Size 4 to 5	2.1	0.1	%		5.0		0-0	81.70		
Phi Size 5 to 6	2.6	0.1	%		2.4		0-0	8.00		
Phi Size 6 to 7	1.7	0.1	%		1.7		0-0	0.00		
Phi Size 7 to 8	1.3	0.1	%		1.4		0-0	7.40		
Phi Size 8 to 9	1.0	0.1	%		1.0		0-0	0.00		
Phi Size 9 to 10	2.1	0.1	%		2.1		0-0	0.00		
Phi Size >10	2.4	0.1	%		2.5		0-0	4.10		
Total Fines	13.2	0.1	%		16.1		0-0	19.80		
Triplicate (B011121-DUP2)		Source: 20K0374-07		Prepared: 11-Jan-2021		Analyzed: 11-Jan-2021 00:00				
Phi Size <-1	4.1	0.1	%		5.1		0-0	21.70		
Phi Size -1 to 0	3.8	0.1	%		4.1		0-0	7.60		
Phi Size 0 to 1	11.4	0.1	%		10.8		0-0	5.40		
Phi Size 1 to 2	21.9	0.1	%		21.0		0-0	4.20		
Phi Size 2 to 3	32.9	0.1	%		31.7		0-0	3.70		
Phi Size 3 to 4	11.5	0.1	%		11.2		0-0	2.60		
Phi Size 4 to 5	2.8	0.1	%		5.0		0-0	56.40		
Phi Size 5 to 6	2.9	0.1	%		2.4		0-0	18.90		
Phi Size 6 to 7	1.5	0.1	%		1.7		0-0	12.50		
Phi Size 7 to 8	1.3	0.1	%		1.4		0-0	7.40		
Phi Size 8 to 9	1.2	0.1	%		1.0		0-0	18.20		
Phi Size 9 to 10	2.0	0.1	%		2.1		0-0	4.90		
Phi Size >10	2.7	0.1	%		2.5		0-0	7.70		
Total Fines	14.4	0.1	%		16.1		0-0	11.10		



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Certified Analyses included in this Report

Analyte	Certifications
EPA 1613B in Solid	
2,3,7,8-TCDF	DoD-ELAP,NELAP,WADOE
2,3,7,8-TCDF	DoD-ELAP,NELAP
2,3,7,8-TCDF	DoD-ELAP,WADOE
2,3,7,8-TCDF	DoD-ELAP,NELAP,WADOE
2,3,7,8-TCDD	DoD-ELAP,NELAP,WADOE
2,3,7,8-TCDD	DoD-ELAP,WADOE
2,3,7,8-TCDD	DoD-ELAP,NELAP,WADOE
2,3,7,8-TCDD	DoD-ELAP,NELAP
1,2,3,7,8-PeCDF	DoD-ELAP,NELAP,WADOE
1,2,3,7,8-PeCDF	DoD-ELAP,WADOE
1,2,3,7,8-PeCDF	DoD-ELAP,NELAP
1,2,3,7,8-PeCDF	DoD-ELAP,NELAP,WADOE
2,3,4,7,8-PeCDF	DoD-ELAP,NELAP,WADOE
2,3,4,7,8-PeCDF	DoD-ELAP,NELAP,WADOE
2,3,4,7,8-PeCDF	DoD-ELAP,WADOE
2,3,4,7,8-PeCDF	DoD-ELAP,NELAP
1,2,3,7,8-PeCDD	DoD-ELAP,NELAP,WADOE
1,2,3,7,8-PeCDD	DoD-ELAP,WADOE
1,2,3,7,8-PeCDD	DoD-ELAP,NELAP,WADOE
1,2,3,7,8-PeCDD	DoD-ELAP,NELAP
1,2,3,4,7,8-HxCDF	DoD-ELAP,WADOE
1,2,3,4,7,8-HxCDF	DoD-ELAP,NELAP,WADOE
1,2,3,4,7,8-HxCDF	DoD-ELAP,NELAP
1,2,3,4,7,8-HxCDF	DoD-ELAP,NELAP,WADOE
1,2,3,6,7,8-HxCDF	DoD-ELAP,NELAP
1,2,3,6,7,8-HxCDF	DoD-ELAP,NELAP,WADOE
1,2,3,6,7,8-HxCDF	DoD-ELAP,WADOE
1,2,3,6,7,8-HxCDF	DoD-ELAP,NELAP,WADOE
2,3,4,6,7,8-HxCDF	DoD-ELAP,WADOE
2,3,4,6,7,8-HxCDF	DoD-ELAP,NELAP,WADOE
2,3,4,6,7,8-HxCDF	DoD-ELAP,NELAP
2,3,4,6,7,8-HxCDF	DoD-ELAP,NELAP,WADOE
1,2,3,7,8,9-HxCDF	DoD-ELAP,NELAP
1,2,3,7,8,9-HxCDF	DoD-ELAP,WADOE
1,2,3,7,8,9-HxCDF	DoD-ELAP,NELAP,WADOE



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1,2,3,7,8,9-HxCDF	DoD-ELAP,NELAP,WADOE
1,2,3,4,7,8-HxCDD	DoD-ELAP,NELAP,WADOE
1,2,3,4,7,8-HxCDD	DoD-ELAP,NELAP,WADOE
1,2,3,4,7,8-HxCDD	DoD-ELAP,WADOE
1,2,3,4,7,8-HxCDD	DoD-ELAP,NELAP
1,2,3,6,7,8-HxCDD	DoD-ELAP,NELAP,WADOE
1,2,3,6,7,8-HxCDD	DoD-ELAP,NELAP,WADOE
1,2,3,6,7,8-HxCDD	DoD-ELAP,WADOE
1,2,3,6,7,8-HxCDD	DoD-ELAP,NELAP
1,2,3,7,8,9-HxCDD	DoD-ELAP,NELAP,WADOE
1,2,3,7,8,9-HxCDD	DoD-ELAP,WADOE
1,2,3,7,8,9-HxCDD	DoD-ELAP,NELAP
1,2,3,7,8,9-HxCDD	DoD-ELAP,NELAP,WADOE
1,2,3,4,6,7,8-HpCDF	DoD-ELAP,NELAP
1,2,3,4,6,7,8-HpCDF	DoD-ELAP,NELAP,WADOE
1,2,3,4,6,7,8-HpCDF	DoD-ELAP,NELAP,WADOE
1,2,3,4,6,7,8-HpCDF	DoD-ELAP,WADOE
1,2,3,4,7,8,9-HpCDF	DoD-ELAP,WADOE
1,2,3,4,7,8,9-HpCDF	DoD-ELAP,NELAP,WADOE
1,2,3,4,7,8,9-HpCDF	DoD-ELAP,NELAP,WADOE
1,2,3,4,7,8,9-HpCDF	DoD-ELAP,NELAP
1,2,3,4,6,7,8-HpCDD	DoD-ELAP,WADOE
1,2,3,4,6,7,8-HpCDD	DoD-ELAP,NELAP
1,2,3,4,6,7,8-HpCDD	DoD-ELAP,NELAP,WADOE
1,2,3,4,6,7,8-HpCDD	DoD-ELAP,NELAP,WADOE
OCDF	DoD-ELAP,NELAP,WADOE
OCDF	DoD-ELAP,NELAP
OCDF	DoD-ELAP,WADOE
OCDF	DoD-ELAP,NELAP,WADOE
OCDD	DoD-ELAP,NELAP,WADOE
OCDD	DoD-ELAP,NELAP
OCDD	DoD-ELAP,NELAP,WADOE
OCDD	DoD-ELAP,WADOE
Total TCDF	DoD-ELAP,NELAP,WADOE
Total TCDF	DoD-ELAP,WADOE
Total TCDF	DoD-ELAP,NELAP,WADOE
Total TCDF	DoD-ELAP,NELAP
Total TCDD	DoD-ELAP,NELAP,WADOE
Total TCDD	DoD-ELAP,NELAP,WADOE



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Total TCDD	DoD-ELAP,WADOE
Total TCDD	DoD-ELAP,NELAP
Total PeCDF	DoD-ELAP,NELAP
Total PeCDF	DoD-ELAP,NELAP,WADOE
Total PeCDF	DoD-ELAP,NELAP,WADOE
Total PeCDF	DoD-ELAP,WADOE
Total PeCDD	DoD-ELAP,NELAP,WADOE
Total PeCDD	DoD-ELAP,NELAP
Total PeCDD	DoD-ELAP,WADOE
Total PeCDD	DoD-ELAP,NELAP,WADOE
Total HxCDF	DoD-ELAP,NELAP,WADOE
Total HxCDF	DoD-ELAP,NELAP
Total HxCDF	DoD-ELAP,NELAP,WADOE
Total HxCDF	DoD-ELAP,WADOE
Total HxCDD	DoD-ELAP,NELAP,WADOE
Total HxCDD	DoD-ELAP,NELAP,WADOE
Total HxCDD	DoD-ELAP,WADOE
Total HxCDD	DoD-ELAP,NELAP
Total HpCDF	DoD-ELAP,NELAP,WADOE
Total HpCDF	DoD-ELAP,NELAP,WADOE
Total HpCDF	DoD-ELAP,NELAP
Total HpCDF	DoD-ELAP,WADOE
Total HpCDD	DoD-ELAP,NELAP,WADOE
Total HpCDD	DoD-ELAP,WADOE
Total HpCDD	DoD-ELAP,NELAP
Total HpCDD	DoD-ELAP,NELAP,WADOE
13C12-2,3,7,8-TCDF	DoD-ELAP
13C12-2,3,7,8-TCDF	DoD-ELAP
13C12-2,3,7,8-TCDF	DoD-ELAP
13C12-2,3,7,8-TCDF	DoD-ELAP
13C12-2,3,7,8-TCDD	DoD-ELAP
13C12-2,3,7,8-TCDD	DoD-ELAP
13C12-2,3,7,8-TCDD	DoD-ELAP
13C12-2,3,7,8-TCDD	DoD-ELAP
13C12-1,2,3,7,8-PeCDF	DoD-ELAP
13C12-1,2,3,7,8-PeCDF	DoD-ELAP
13C12-1,2,3,7,8-PeCDF	DoD-ELAP
13C12-1,2,3,7,8-PeCDF	DoD-ELAP
13C12-2,3,4,7,8-PeCDF	DoD-ELAP



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13C12-2,3,4,7,8-PeCDF	DoD-ELAP
13C12-2,3,4,7,8-PeCDF	DoD-ELAP
13C12-2,3,4,7,8-PeCDF	DoD-ELAP
13C12-1,2,3,7,8-PeCDD	DoD-ELAP
13C12-1,2,3,7,8-PeCDD	DoD-ELAP
13C12-1,2,3,7,8-PeCDD	DoD-ELAP
13C12-1,2,3,7,8-PeCDD	DoD-ELAP
13C12-1,2,3,4,7,8-HxCDF	DoD-ELAP
13C12-1,2,3,4,7,8-HxCDF	DoD-ELAP
13C12-1,2,3,4,7,8-HxCDF	DoD-ELAP
13C12-1,2,3,4,7,8-HxCDF	DoD-ELAP
13C12-1,2,3,6,7,8-HxCDF	DoD-ELAP
13C12-1,2,3,6,7,8-HxCDF	DoD-ELAP
13C12-1,2,3,6,7,8-HxCDF	DoD-ELAP
13C12-1,2,3,6,7,8-HxCDF	DoD-ELAP
13C12-2,3,4,6,7,8-HxCDF	DoD-ELAP
13C12-2,3,4,6,7,8-HxCDF	DoD-ELAP
13C12-2,3,4,6,7,8-HxCDF	DoD-ELAP
13C12-1,2,3,7,8,9-HxCDF	DoD-ELAP
13C12-1,2,3,7,8,9-HxCDF	DoD-ELAP
13C12-1,2,3,7,8,9-HxCDF	DoD-ELAP
13C12-1,2,3,7,8,9-HxCDF	DoD-ELAP
13C12-1,2,3,4,7,8-HxCDD	DoD-ELAP
13C12-1,2,3,4,7,8-HxCDD	DoD-ELAP
13C12-1,2,3,4,7,8-HxCDD	DoD-ELAP
13C12-1,2,3,4,7,8-HxCDD	DoD-ELAP
13C12-1,2,3,6,7,8-HxCDD	DoD-ELAP
13C12-1,2,3,6,7,8-HxCDD	DoD-ELAP
13C12-1,2,3,6,7,8-HxCDD	DoD-ELAP
13C12-1,2,3,4,6,7,8-HpCDF	DoD-ELAP
13C12-1,2,3,4,6,7,8-HpCDF	DoD-ELAP
13C12-1,2,3,4,6,7,8-HpCDF	DoD-ELAP
13C12-1,2,3,4,6,7,8-HpCDF	DoD-ELAP
13C12-1,2,3,4,7,8,9-HpCDF	DoD-ELAP
13C12-1,2,3,4,7,8,9-HpCDF	DoD-ELAP
13C12-1,2,3,4,7,8,9-HpCDF	DoD-ELAP



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13C12-1,2,3,4,6,7,8-HpCDD	DoD-ELAP
13C12-1,2,3,4,6,7,8-HpCDD	DoD-ELAP
13C12-1,2,3,4,6,7,8-HpCDD	DoD-ELAP
13C12-1,2,3,4,6,7,8-HpCDD	DoD-ELAP
13C12-OCDD	DoD-ELAP
13C12-OCDD	DoD-ELAP
13C12-OCDD	DoD-ELAP
13C12-OCDD	DoD-ELAP
37Cl4-2,3,7,8-TCDD	DoD-ELAP
37Cl4-2,3,7,8-TCDD	DoD-ELAP
37Cl4-2,3,7,8-TCDD	DoD-ELAP
37Cl4-2,3,7,8-TCDD	DoD-ELAP

EPA 6020B in Solid

Silver-107	NELAP,DoD-ELAP
Silver-107	DoD-ELAP,WADOE
Silver-107	NELAP,DoD-ELAP,WADOE
Silver-107	NELAP,DoD-ELAP,WADOE
Chromium-52	DoD-ELAP,WADOE,ADEC
Chromium-52	NELAP,DoD-ELAP,ADEC
Chromium-52	NELAP,DoD-ELAP,WADOE,ADEC
Chromium-52	NELAP,DoD-ELAP,WADOE,ADEC
Chromium-53	NELAP,DoD-ELAP,WADOE,ADEC
Chromium-53	NELAP,DoD-ELAP,WADOE,ADEC
Chromium-53	DoD-ELAP,WADOE,ADEC
Chromium-53	NELAP,DoD-ELAP,ADEC
Lead-208	DoD-ELAP,WADOE,ADEC
Lead-208	NELAP,DoD-ELAP,WADOE,ADEC
Lead-208	NELAP,DoD-ELAP,WADOE,ADEC
Lead-208	NELAP,DoD-ELAP,ADEC
Antimony-121	NELAP,DoD-ELAP,WADOE
Antimony-121	DoD-ELAP,WADOE
Antimony-121	NELAP,DoD-ELAP,WADOE
Antimony-121	NELAP,DoD-ELAP
Antimony-123	DoD-ELAP,WADOE
Antimony-123	NELAP,DoD-ELAP
Antimony-123	NELAP,DoD-ELAP,WADOE
Antimony-123	NELAP,DoD-ELAP,WADOE

EPA 6020B UCT-KED in Solid

Arsenic-75a	NELAP,DoD-ELAP,ADEC
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Arsenic-75a	DoD-ELAP,WADOE,ADEC
Arsenic-75a	NELAP,DoD-ELAP,WADOE,ADEC
Arsenic-75a	NELAP,DoD-ELAP,WADOE,ADEC
Cadmium-111	DoD-ELAP,WADOE,ADEC
Cadmium-111	NELAP,DoD-ELAP,ADEC
Cadmium-111	NELAP,DoD-ELAP,WADOE,ADEC
Cadmium-111	NELAP,DoD-ELAP,WADOE,ADEC
Cadmium-114	NELAP,DoD-ELAP,WADOE,ADEC
Cadmium-114	NELAP,DoD-ELAP,WADOE,ADEC
Cadmium-114	NELAP,DoD-ELAP,ADEC
Cadmium-114	DoD-ELAP,WADOE,ADEC
Copper-63	NELAP,DoD-ELAP,WADOE
Copper-63	DoD-ELAP,WADOE
Copper-63	NELAP,DoD-ELAP
Copper-63	NELAP,DoD-ELAP,WADOE
Copper-65	NELAP,DoD-ELAP,WADOE
Copper-65	DoD-ELAP,WADOE
Copper-65	NELAP,DoD-ELAP,WADOE
Copper-65	NELAP,DoD-ELAP
Selenium-78	NELAP,DoD-ELAP
Selenium-78	NELAP,DoD-ELAP,WADOE
Selenium-78	DoD-ELAP,WADOE
Selenium-78	NELAP,DoD-ELAP,WADOE
Zinc-66	NELAP,DoD-ELAP,WADOE
Zinc-66	NELAP,DoD-ELAP,WADOE
Zinc-66	NELAP,DoD-ELAP
Zinc-66	DoD-ELAP,WADOE
Zinc-67	DoD-ELAP,WADOE
Zinc-67	NELAP,DoD-ELAP,WADOE
Zinc-67	NELAP,DoD-ELAP
Zinc-67	NELAP,DoD-ELAP,WADOE

EPA 7471B in Solid

Mercury	NELAP,DoD-ELAP,CALAP
Mercury	WADOE,DoD-ELAP,CALAP
Mercury	WADOE,NELAP,DoD-ELAP,CALAP
Mercury	WADOE,NELAP,DoD-ELAP

EPA 8081B in Solid

alpha-BHC	DoD-ELAP,NELAP,CALAP,WADOE
alpha-BHC	DoD-ELAP,NELAP,WADOE



Dalton, Olmsted & Fuglevand, Inc
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alpha-BHC	DoD-ELAP,CALAP,WADOE
alpha-BHC	DoD-ELAP,NELAP,CALAP
alpha-BHC [2C]	DoD-ELAP,NELAP,CALAP
alpha-BHC [2C]	DoD-ELAP,NELAP,CALAP,WADOE
alpha-BHC [2C]	DoD-ELAP,CALAP,WADOE
alpha-BHC [2C]	DoD-ELAP,NELAP,WADOE
beta-BHC	DoD-ELAP,NELAP,WADOE
beta-BHC	DoD-ELAP,NELAP,CALAP
beta-BHC	DoD-ELAP,NELAP,CALAP,WADOE
beta-BHC	DoD-ELAP,CALAP,WADOE
beta-BHC [2C]	DoD-ELAP,NELAP,CALAP,WADOE
beta-BHC [2C]	DoD-ELAP,NELAP,WADOE
beta-BHC [2C]	DoD-ELAP,CALAP,WADOE
beta-BHC [2C]	DoD-ELAP,NELAP,CALAP
gamma-BHC (Lindane)	DoD-ELAP,NELAP,CALAP,WADOE
gamma-BHC (Lindane)	DoD-ELAP,NELAP,CALAP
gamma-BHC (Lindane)	DoD-ELAP,NELAP,WADOE
gamma-BHC (Lindane)	DoD-ELAP,CALAP,WADOE
gamma-BHC (Lindane) [2C]	DoD-ELAP,NELAP,CALAP
gamma-BHC (Lindane) [2C]	DoD-ELAP,CALAP,WADOE
gamma-BHC (Lindane) [2C]	DoD-ELAP,NELAP,CALAP,WADOE
gamma-BHC (Lindane) [2C]	DoD-ELAP,NELAP,WADOE
delta-BHC	DoD-ELAP,NELAP,WADOE
delta-BHC	DoD-ELAP,NELAP,CALAP,WADOE
delta-BHC	DoD-ELAP,NELAP,CALAP
delta-BHC	DoD-ELAP,CALAP,WADOE
delta-BHC [2C]	DoD-ELAP,NELAP,CALAP
delta-BHC [2C]	DoD-ELAP,NELAP,WADOE
delta-BHC [2C]	DoD-ELAP,CALAP,WADOE
delta-BHC [2C]	DoD-ELAP,NELAP,CALAP,WADOE
Heptachlor	DoD-ELAP,NELAP,CALAP
Heptachlor	DoD-ELAP,NELAP,WADOE
Heptachlor	DoD-ELAP,NELAP,CALAP,WADOE
Heptachlor	DoD-ELAP,CALAP,WADOE
Heptachlor [2C]	DoD-ELAP,CALAP,WADOE
Heptachlor [2C]	DoD-ELAP,NELAP,CALAP
Heptachlor [2C]	DoD-ELAP,NELAP,CALAP,WADOE
Heptachlor [2C]	DoD-ELAP,NELAP,WADOE
Aldrin	DoD-ELAP,NELAP,CALAP,WADOE



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Aldrin	DoD-ELAP,CALAP,WADOE
Aldrin	DoD-ELAP,NELAP,CALAP
Aldrin	DoD-ELAP,NELAP,WADOE
Aldrin [2C]	DoD-ELAP,CALAP,WADOE
Aldrin [2C]	DoD-ELAP,NELAP,WADOE
Aldrin [2C]	DoD-ELAP,NELAP,CALAP
Aldrin [2C]	DoD-ELAP,NELAP,CALAP,WADOE
Heptachlor Epoxide	DoD-ELAP,NELAP,CALAP
Heptachlor Epoxide	DoD-ELAP,NELAP,CALAP,WADOE
Heptachlor Epoxide	DoD-ELAP,CALAP,WADOE
Heptachlor Epoxide	DoD-ELAP,NELAP,WADOE
Heptachlor Epoxide [2C]	DoD-ELAP,NELAP,CALAP,WADOE
Heptachlor Epoxide [2C]	DoD-ELAP,CALAP,WADOE
Heptachlor Epoxide [2C]	DoD-ELAP,NELAP,WADOE
Heptachlor Epoxide [2C]	DoD-ELAP,NELAP,CALAP
trans-Chlordane (beta-Chlordane)	DoD-ELAP,NELAP
trans-Chlordane (beta-Chlordane)	DoD-ELAP,NELAP,CALAP
trans-Chlordane (beta-Chlordane)	DoD-ELAP,CALAP
trans-Chlordane (beta-Chlordane)	DoD-ELAP,NELAP,CALAP
trans-Chlordane (beta-Chlordane) [2C]	DoD-ELAP,NELAP
trans-Chlordane (beta-Chlordane) [2C]	DoD-ELAP,CALAP
trans-Chlordane (beta-Chlordane) [2C]	DoD-ELAP,NELAP,CALAP
trans-Chlordane (beta-Chlordane) [2C]	DoD-ELAP,NELAP,CALAP
cis-Chlordane (alpha-chlordane)	DoD-ELAP,NELAP,WADOE
cis-Chlordane (alpha-chlordane)	DoD-ELAP,CALAP,WADOE
cis-Chlordane (alpha-chlordane)	DoD-ELAP,NELAP,CALAP,WADOE
cis-Chlordane (alpha-chlordane)	DoD-ELAP,NELAP,CALAP
cis-Chlordane (alpha-chlordane) [2C]	DoD-ELAP,NELAP,CALAP,WADOE
cis-Chlordane (alpha-chlordane) [2C]	DoD-ELAP,NELAP,CALAP
cis-Chlordane (alpha-chlordane) [2C]	DoD-ELAP,NELAP,WADOE
cis-Chlordane (alpha-chlordane) [2C]	DoD-ELAP,CALAP,WADOE
Endosulfan I	DoD-ELAP,NELAP,CALAP,WADOE
Endosulfan I	DoD-ELAP,NELAP,CALAP
Endosulfan I	DoD-ELAP,NELAP,WADOE
Endosulfan I	DoD-ELAP,CALAP,WADOE
Endosulfan I [2C]	DoD-ELAP,NELAP,CALAP
Endosulfan I [2C]	DoD-ELAP,NELAP,WADOE
Endosulfan I [2C]	DoD-ELAP,NELAP,CALAP,WADOE
Endosulfan I [2C]	DoD-ELAP,CALAP,WADOE



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4,4'-DDE	DoD-ELAP,NELAP,CALAP,WADOE
4,4'-DDE	DoD-ELAP,NELAP,WADOE
4,4'-DDE	DoD-ELAP,CALAP,WADOE
4,4'-DDE	DoD-ELAP,NELAP,CALAP
4,4'-DDE [2C]	DoD-ELAP,CALAP,WADOE
4,4'-DDE [2C]	DoD-ELAP,NELAP,WADOE
4,4'-DDE [2C]	DoD-ELAP,NELAP,CALAP,WADOE
4,4'-DDE [2C]	DoD-ELAP,NELAP,CALAP
Dieldrin	DoD-ELAP,NELAP,WADOE
Dieldrin	DoD-ELAP,CALAP,WADOE
Dieldrin	DoD-ELAP,NELAP,CALAP
Dieldrin	DoD-ELAP,NELAP,CALAP,WADOE
Dieldrin [2C]	DoD-ELAP,CALAP,WADOE
Dieldrin [2C]	DoD-ELAP,NELAP,WADOE
Dieldrin [2C]	DoD-ELAP,NELAP,CALAP,WADOE
Dieldrin [2C]	DoD-ELAP,NELAP,CALAP
Endrin	DoD-ELAP,NELAP,WADOE
Endrin	DoD-ELAP,NELAP,CALAP
Endrin	DoD-ELAP,NELAP,CALAP,WADOE
Endrin	DoD-ELAP,CALAP,WADOE
Endrin [2C]	DoD-ELAP,CALAP,WADOE
Endrin [2C]	DoD-ELAP,NELAP,CALAP,WADOE
Endrin [2C]	DoD-ELAP,NELAP,WADOE
Endrin [2C]	DoD-ELAP,NELAP,CALAP
Endosulfan II	DoD-ELAP,NELAP,WADOE
Endosulfan II	DoD-ELAP,CALAP,WADOE
Endosulfan II	DoD-ELAP,NELAP,CALAP
Endosulfan II	DoD-ELAP,NELAP,CALAP,WADOE
Endosulfan II [2C]	DoD-ELAP,NELAP,CALAP,WADOE
Endosulfan II [2C]	DoD-ELAP,NELAP,CALAP
Endosulfan II [2C]	DoD-ELAP,NELAP,WADOE
Endosulfan II [2C]	DoD-ELAP,CALAP,WADOE
4,4'-DDD	DoD-ELAP,NELAP,WADOE
4,4'-DDD	DoD-ELAP,NELAP,CALAP
4,4'-DDD	DoD-ELAP,CALAP,WADOE
4,4'-DDD	DoD-ELAP,NELAP,CALAP,WADOE
4,4'-DDD [2C]	DoD-ELAP,NELAP,WADOE
4,4'-DDD [2C]	DoD-ELAP,NELAP,CALAP,WADOE
4,4'-DDD [2C]	DoD-ELAP,NELAP,CALAP



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4,4'-DDD [2C]	DoD-ELAP,CALAP,WADOE
Endrin Aldehyde	DoD-ELAP,CALAP,WADOE
Endrin Aldehyde	DoD-ELAP,NELAP,WADOE
Endrin Aldehyde	DoD-ELAP,NELAP,CALAP
Endrin Aldehyde	DoD-ELAP,NELAP,CALAP,WADOE
Endrin Aldehyde [2C]	DoD-ELAP,NELAP,WADOE
Endrin Aldehyde [2C]	DoD-ELAP,CALAP,WADOE
Endrin Aldehyde [2C]	DoD-ELAP,NELAP,CALAP
Endrin Aldehyde [2C]	DoD-ELAP,NELAP,CALAP,WADOE
4,4'-DDT	DoD-ELAP,NELAP,CALAP
4,4'-DDT	DoD-ELAP,NELAP,CALAP,WADOE
4,4'-DDT	DoD-ELAP,NELAP,WADOE
4,4'-DDT	DoD-ELAP,CALAP,WADOE
4,4'-DDT [2C]	DoD-ELAP,NELAP,CALAP
4,4'-DDT [2C]	DoD-ELAP,NELAP,CALAP,WADOE
4,4'-DDT [2C]	DoD-ELAP,NELAP,WADOE
4,4'-DDT [2C]	DoD-ELAP,CALAP,WADOE
Endosulfan Sulfate	DoD-ELAP,CALAP,WADOE
Endosulfan Sulfate	DoD-ELAP,NELAP,CALAP,WADOE
Endosulfan Sulfate	DoD-ELAP,NELAP,CALAP
Endosulfan Sulfate	DoD-ELAP,NELAP,WADOE
Endosulfan Sulfate [2C]	DoD-ELAP,NELAP,WADOE
Endosulfan Sulfate [2C]	DoD-ELAP,NELAP,CALAP
Endosulfan Sulfate [2C]	DoD-ELAP,CALAP,WADOE
Endosulfan Sulfate [2C]	DoD-ELAP,NELAP,CALAP,WADOE
Endrin Ketone	DoD-ELAP,NELAP,CALAP,WADOE
Endrin Ketone	DoD-ELAP,NELAP,CALAP
Endrin Ketone	DoD-ELAP,NELAP,WADOE
Endrin Ketone	DoD-ELAP,CALAP,WADOE
Endrin Ketone [2C]	DoD-ELAP,NELAP,CALAP
Endrin Ketone [2C]	DoD-ELAP,CALAP,WADOE
Endrin Ketone [2C]	DoD-ELAP,NELAP,WADOE
Endrin Ketone [2C]	DoD-ELAP,NELAP,CALAP,WADOE
Methoxychlor	DoD-ELAP,NELAP,CALAP
Methoxychlor	DoD-ELAP,NELAP,WADOE
Methoxychlor	DoD-ELAP,NELAP,CALAP,WADOE
Methoxychlor	DoD-ELAP,CALAP,WADOE
Methoxychlor [2C]	DoD-ELAP,NELAP,WADOE
Methoxychlor [2C]	DoD-ELAP,NELAP,CALAP



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Methoxychlor [2C]	DoD-ELAP,CALAP,WADOE
Methoxychlor [2C]	DoD-ELAP,NELAP,CALAP,WADOE
Hexachlorobutadiene	DoD-ELAP,NELAP,WADOE
Hexachlorobutadiene	DoD-ELAP,NELAP,CALAP,WADOE
Hexachlorobutadiene	DoD-ELAP,NELAP,CALAP
Hexachlorobutadiene	DoD-ELAP,CALAP,WADOE
Hexachlorobutadiene [2C]	DoD-ELAP,NELAP,WADOE
Hexachlorobutadiene [2C]	DoD-ELAP,NELAP,CALAP,WADOE
Hexachlorobutadiene [2C]	DoD-ELAP,CALAP,WADOE
Hexachlorobutadiene [2C]	DoD-ELAP,NELAP,CALAP
Hexachlorobenzene	DoD-ELAP,NELAP,WADOE
Hexachlorobenzene	DoD-ELAP,NELAP,CALAP,WADOE
Hexachlorobenzene	DoD-ELAP,NELAP,CALAP
Hexachlorobenzene	DoD-ELAP,CALAP,WADOE
Hexachlorobenzene [2C]	DoD-ELAP,NELAP,CALAP
Hexachlorobenzene [2C]	DoD-ELAP,NELAP,CALAP,WADOE
Hexachlorobenzene [2C]	DoD-ELAP,NELAP,WADOE
Hexachlorobenzene [2C]	DoD-ELAP,CALAP,WADOE
2,4'-DDE	DoD-ELAP,NELAP,CALAP,WADOE
2,4'-DDE	DoD-ELAP,NELAP,WADOE
2,4'-DDE	DoD-ELAP,CALAP,WADOE
2,4'-DDE	DoD-ELAP,NELAP,CALAP
2,4'-DDE [2C]	DoD-ELAP,NELAP,CALAP
2,4'-DDE [2C]	DoD-ELAP,NELAP,CALAP,WADOE
2,4'-DDE [2C]	DoD-ELAP,NELAP,WADOE
2,4'-DDE [2C]	DoD-ELAP,CALAP,WADOE
2,4'-DDD	DoD-ELAP,NELAP,WADOE
2,4'-DDD	DoD-ELAP,NELAP,CALAP
2,4'-DDD	DoD-ELAP,CALAP,WADOE
2,4'-DDD	DoD-ELAP,NELAP,CALAP,WADOE
2,4'-DDD [2C]	DoD-ELAP,NELAP,CALAP
2,4'-DDD [2C]	DoD-ELAP,NELAP,WADOE
2,4'-DDD [2C]	DoD-ELAP,CALAP,WADOE
2,4'-DDD [2C]	DoD-ELAP,NELAP,CALAP,WADOE
2,4'-DDT	DoD-ELAP,NELAP,WADOE
2,4'-DDT	DoD-ELAP,NELAP,CALAP
2,4'-DDT	DoD-ELAP,NELAP,CALAP,WADOE
2,4'-DDT	DoD-ELAP,CALAP,WADOE
2,4'-DDT [2C]	DoD-ELAP,NELAP,CALAP



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2,4'-DDT [2C]	DoD-ELAP,NELAP,WADOE
2,4'-DDT [2C]	DoD-ELAP,CALAP,WADOE
2,4'-DDT [2C]	DoD-ELAP,NELAP,CALAP,WADOE
Oxychlordane	DoD-ELAP,CALAP,WADOE
Oxychlordane	DoD-ELAP,NELAP,WADOE
Oxychlordane	DoD-ELAP,NELAP,CALAP,WADOE
Oxychlordane	DoD-ELAP,NELAP,CALAP
Oxychlordane [2C]	DoD-ELAP,NELAP,CALAP,WADOE
Oxychlordane [2C]	DoD-ELAP,CALAP,WADOE
Oxychlordane [2C]	DoD-ELAP,NELAP,WADOE
Oxychlordane [2C]	DoD-ELAP,NELAP,CALAP
cis-Nonachlor	DoD-ELAP,CALAP,WADOE
cis-Nonachlor	DoD-ELAP,NELAP,WADOE
cis-Nonachlor	DoD-ELAP,NELAP,CALAP
cis-Nonachlor	DoD-ELAP,NELAP,CALAP,WADOE
cis-Nonachlor [2C]	DoD-ELAP,NELAP,CALAP,WADOE
cis-Nonachlor [2C]	DoD-ELAP,CALAP,WADOE
cis-Nonachlor [2C]	DoD-ELAP,NELAP,WADOE
cis-Nonachlor [2C]	DoD-ELAP,NELAP,CALAP
trans-Nonachlor	DoD-ELAP,CALAP,WADOE
trans-Nonachlor	DoD-ELAP,NELAP,CALAP
trans-Nonachlor	DoD-ELAP,NELAP,CALAP,WADOE
trans-Nonachlor	DoD-ELAP,NELAP,WADOE
trans-Nonachlor [2C]	DoD-ELAP,NELAP,WADOE
trans-Nonachlor [2C]	DoD-ELAP,CALAP,WADOE
trans-Nonachlor [2C]	DoD-ELAP,NELAP,CALAP
trans-Nonachlor [2C]	DoD-ELAP,NELAP,CALAP,WADOE
Mirex	DoD-ELAP,NELAP,CALAP
Mirex	DoD-ELAP,NELAP,WADOE
Mirex	DoD-ELAP,NELAP,CALAP,WADOE
Mirex	DoD-ELAP,CALAP,WADOE
Mirex [2C]	DoD-ELAP,NELAP,WADOE
Mirex [2C]	DoD-ELAP,NELAP,CALAP,WADOE
Mirex [2C]	DoD-ELAP,NELAP,CALAP
Mirex [2C]	DoD-ELAP,CALAP,WADOE
Hexachloroethane	NELAP,CALAP,WADOE
Hexachloroethane	NELAP,WADOE
Hexachloroethane	CALAP,WADOE
Hexachloroethane	NELAP,CALAP



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Hexachloroethane [2C]	NELAP,CALAP,WADOE
Hexachloroethane [2C]	CALAP,WADOE
Hexachloroethane [2C]	NELAP,CALAP
Hexachloroethane [2C]	NELAP,WADOE
Toxaphene	DoD-ELAP,WADOE
Toxaphene	DoD-ELAP,NELAP
Toxaphene	DoD-ELAP,NELAP,WADOE
Toxaphene	DoD-ELAP,NELAP,WADOE
Toxaphene [2C]	DoD-ELAP,WADOE
Toxaphene [2C]	DoD-ELAP,NELAP,WADOE
Toxaphene [2C]	DoD-ELAP,NELAP
Toxaphene [2C]	DoD-ELAP,NELAP,WADOE
Chlordane, technical	DoD-ELAP,WADOE
Chlordane, technical	DoD-ELAP,NELAP,WADOE
Chlordane, technical	DoD-ELAP,NELAP,WADOE
Chlordane, technical	DoD-ELAP,NELAP
Chlordane, technical [2C]	DoD-ELAP,NELAP,WADOE
Chlordane, technical [2C]	DoD-ELAP,NELAP,WADOE
Chlordane, technical [2C]	DoD-ELAP,WADOE
Chlordane, technical [2C]	DoD-ELAP,NELAP

EPA 8082A in Solid

Aroclor 1016	DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1016	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1016	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1016	WADOE,DoD-ELAP,CALAP,ADEC
Aroclor 1016 [2C]	DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1016 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1016 [2C]	WADOE,DoD-ELAP,CALAP,ADEC
Aroclor 1016 [2C]	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1221	DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1221	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1221	WADOE,DoD-ELAP,CALAP,ADEC
Aroclor 1221	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1221 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1221 [2C]	WADOE,DoD-ELAP,CALAP,ADEC
Aroclor 1221 [2C]	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1221 [2C]	DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1232	WADOE,DoD-ELAP,CALAP,ADEC
Aroclor 1232	WADOE,DoD-ELAP,NELAP,ADEC



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Aroclor 1232	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1232	DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1232 [2C]	WADOE,DoD-ELAP,CALAP,ADEC
Aroclor 1232 [2C]	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1232 [2C]	DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1232 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1242	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1242	WADOE,DoD-ELAP,CALAP,ADEC
Aroclor 1242	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1242	DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1242 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1242 [2C]	WADOE,DoD-ELAP,CALAP,ADEC
Aroclor 1242 [2C]	DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1242 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1242 [2C]	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1248	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1248	WADOE,DoD-ELAP,CALAP,ADEC
Aroclor 1248	DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1248	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1248 [2C]	DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1248 [2C]	WADOE,DoD-ELAP,CALAP,ADEC
Aroclor 1248 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1248 [2C]	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1254	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1254	WADOE,DoD-ELAP,CALAP,ADEC
Aroclor 1254	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1254	DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1254 [2C]	WADOE,DoD-ELAP,CALAP,ADEC
Aroclor 1254 [2C]	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1254 [2C]	DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1254 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1260	DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1260	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1260	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1260	WADOE,DoD-ELAP,CALAP,ADEC
Aroclor 1260 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1260 [2C]	WADOE,DoD-ELAP,CALAP,ADEC
Aroclor 1260 [2C]	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1260 [2C]	DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1262	WADOE,DoD-ELAP,NELAP,ADEC



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Aroclor 1262	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1262	WADOE,DoD-ELAP,CALAP,ADEC
Aroclor 1262	DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1262 [2C]	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1262 [2C]	DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1262 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1262 [2C]	WADOE,DoD-ELAP,CALAP,ADEC
Aroclor 1268	WADOE,DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1268	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1268	DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1268	WADOE,DoD-ELAP,CALAP,ADEC
Aroclor 1268 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1268 [2C]	WADOE,DoD-ELAP,CALAP,ADEC
Aroclor 1268 [2C]	DoD-ELAP,NELAP,CALAP,ADEC
Aroclor 1268 [2C]	WADOE,DoD-ELAP,NELAP,CALAP,ADEC

EPA 8270E in Solid

Phenol	CALAP,DoD-ELAP,NELAP
Phenol	CALAP,DoD-ELAP,NELAP,WADOE
Phenol	DoD-ELAP,NELAP,WADOE
Phenol	CALAP,DoD-ELAP,WADOE
bis(2-chloroethyl) ether	CALAP,DoD-ELAP,WADOE
bis(2-chloroethyl) ether	DoD-ELAP,NELAP,WADOE
bis(2-chloroethyl) ether	CALAP,DoD-ELAP,NELAP,WADOE
bis(2-chloroethyl) ether	CALAP,DoD-ELAP,NELAP
2-Chlorophenol	CALAP,DoD-ELAP,NELAP,WADOE
2-Chlorophenol	CALAP,DoD-ELAP,WADOE
2-Chlorophenol	CALAP,DoD-ELAP,NELAP
2-Chlorophenol	DoD-ELAP,NELAP,WADOE
1,3-Dichlorobenzene	DoD-ELAP,NELAP,WADOE
1,3-Dichlorobenzene	CALAP,DoD-ELAP,NELAP
1,3-Dichlorobenzene	CALAP,DoD-ELAP,NELAP,WADOE
1,3-Dichlorobenzene	CALAP,DoD-ELAP,WADOE
1,4-Dichlorobenzene	CALAP,DoD-ELAP,NELAP
1,4-Dichlorobenzene	DoD-ELAP,NELAP,WADOE
1,4-Dichlorobenzene	CALAP,DoD-ELAP,NELAP,WADOE
1,4-Dichlorobenzene	CALAP,DoD-ELAP,WADOE
1,2-Dichlorobenzene	CALAP,DoD-ELAP,NELAP
1,2-Dichlorobenzene	CALAP,DoD-ELAP,WADOE
1,2-Dichlorobenzene	DoD-ELAP,NELAP,WADOE



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1,2-Dichlorobenzene	CALAP,DoD-ELAP,NELAP,WADOE
Benzyl Alcohol	CALAP,DoD-ELAP,WADOE
Benzyl Alcohol	DoD-ELAP,NELAP,WADOE
Benzyl Alcohol	CALAP,DoD-ELAP,NELAP
Benzyl Alcohol	CALAP,DoD-ELAP,NELAP,WADOE
2,2'-Oxybis(1-chloropropane)	DoD-ELAP,NELAP
2,2'-Oxybis(1-chloropropane)	DoD-ELAP,NELAP
2,2'-Oxybis(1-chloropropane)	DoD-ELAP
2,2'-Oxybis(1-chloropropane)	DoD-ELAP,NELAP
2-Methylphenol	CALAP,DoD-ELAP,NELAP
2-Methylphenol	DoD-ELAP,NELAP,WADOE
2-Methylphenol	CALAP,DoD-ELAP,WADOE
2-Methylphenol	CALAP,DoD-ELAP,NELAP,WADOE
Hexachloroethane	CALAP,DoD-ELAP,NELAP,WADOE
Hexachloroethane	CALAP,DoD-ELAP,NELAP
Hexachloroethane	CALAP,DoD-ELAP,WADOE
Hexachloroethane	DoD-ELAP,NELAP,WADOE
N-Nitroso-di-n-Propylamine	CALAP,DoD-ELAP,WADOE
N-Nitroso-di-n-Propylamine	CALAP,DoD-ELAP,NELAP
N-Nitroso-di-n-Propylamine	DoD-ELAP,NELAP,WADOE
N-Nitroso-di-n-Propylamine	CALAP,DoD-ELAP,NELAP,WADOE
4-Methylphenol	DoD-ELAP,NELAP,WADOE
4-Methylphenol	CALAP,DoD-ELAP,NELAP,WADOE
4-Methylphenol	CALAP,DoD-ELAP,NELAP
4-Methylphenol	CALAP,DoD-ELAP,WADOE
Nitrobenzene	CALAP,DoD-ELAP,NELAP,WADOE
Nitrobenzene	CALAP,DoD-ELAP,NELAP
Nitrobenzene	DoD-ELAP,NELAP,WADOE
Nitrobenzene	CALAP,DoD-ELAP,WADOE
Isophorone	CALAP,DoD-ELAP,WADOE
Isophorone	DoD-ELAP,NELAP,WADOE
Isophorone	CALAP,DoD-ELAP,NELAP
Isophorone	CALAP,DoD-ELAP,NELAP,WADOE
2-Nitrophenol	CALAP,DoD-ELAP,NELAP,WADOE
2-Nitrophenol	CALAP,DoD-ELAP,WADOE
2-Nitrophenol	DoD-ELAP,NELAP,WADOE
2-Nitrophenol	CALAP,DoD-ELAP,NELAP
2,4-Dimethylphenol	CALAP,DoD-ELAP,WADOE
2,4-Dimethylphenol	CALAP,DoD-ELAP,NELAP



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2,4-Dimethylphenol	DoD-ELAP,NELAP,WADOE
2,4-Dimethylphenol	CALAP,DoD-ELAP,NELAP,WADOE
Bis(2-Chloroethoxy)methane	CALAP,DoD-ELAP,WADOE
Bis(2-Chloroethoxy)methane	CALAP,DoD-ELAP,NELAP
Bis(2-Chloroethoxy)methane	DoD-ELAP,NELAP,WADOE
Bis(2-Chloroethoxy)methane	CALAP,DoD-ELAP,NELAP,WADOE
2,4-Dichlorophenol	CALAP,DoD-ELAP,NELAP,WADOE
2,4-Dichlorophenol	CALAP,DoD-ELAP,WADOE
2,4-Dichlorophenol	CALAP,DoD-ELAP,NELAP
2,4-Dichlorophenol	DoD-ELAP,NELAP,WADOE
1,2,4-Trichlorobenzene	CALAP,DoD-ELAP,NELAP,WADOE
1,2,4-Trichlorobenzene	CALAP,DoD-ELAP,WADOE
1,2,4-Trichlorobenzene	CALAP,DoD-ELAP,NELAP
1,2,4-Trichlorobenzene	DoD-ELAP,NELAP,WADOE
Naphthalene	DoD-ELAP,NELAP,WADOE,ADEC
Naphthalene	CALAP,DoD-ELAP,NELAP,ADEC
Naphthalene	CALAP,DoD-ELAP,WADOE,ADEC
Naphthalene	CALAP,DoD-ELAP,NELAP,WADOE,ADEC
Benzoic acid	CALAP,DoD-ELAP,NELAP,WADOE
Benzoic acid	CALAP,DoD-ELAP,NELAP
Benzoic acid	DoD-ELAP,NELAP,WADOE
Benzoic acid	CALAP,DoD-ELAP,WADOE
4-Chloroaniline	CALAP,DoD-ELAP,NELAP
4-Chloroaniline	CALAP,DoD-ELAP,WADOE
4-Chloroaniline	DoD-ELAP,NELAP,WADOE
4-Chloroaniline	CALAP,DoD-ELAP,NELAP,WADOE
Hexachlorobutadiene	CALAP,DoD-ELAP,WADOE
Hexachlorobutadiene	CALAP,DoD-ELAP,NELAP
Hexachlorobutadiene	CALAP,DoD-ELAP,NELAP,WADOE
Hexachlorobutadiene	DoD-ELAP,NELAP,WADOE
4-Chloro-3-Methylphenol	CALAP,DoD-ELAP,NELAP,WADOE
4-Chloro-3-Methylphenol	CALAP,DoD-ELAP,NELAP
4-Chloro-3-Methylphenol	DoD-ELAP,NELAP,WADOE
4-Chloro-3-Methylphenol	CALAP,DoD-ELAP,WADOE
2-Methylnaphthalene	DoD-ELAP,NELAP,WADOE,ADEC
2-Methylnaphthalene	CALAP,DoD-ELAP,NELAP,ADEC
2-Methylnaphthalene	CALAP,DoD-ELAP,NELAP,WADOE,ADEC
2-Methylnaphthalene	CALAP,DoD-ELAP,WADOE,ADEC
Hexachlorocyclopentadiene	CALAP,DoD-ELAP,NELAP,WADOE



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Hexachlorocyclopentadiene	CALAP,DoD-ELAP,WADOE
Hexachlorocyclopentadiene	DoD-ELAP,NELAP,WADOE
Hexachlorocyclopentadiene	CALAP,DoD-ELAP,NELAP
2,4,6-Trichlorophenol	CALAP,DoD-ELAP,NELAP
2,4,6-Trichlorophenol	CALAP,DoD-ELAP,NELAP,WADOE
2,4,6-Trichlorophenol	CALAP,DoD-ELAP,WADOE
2,4,6-Trichlorophenol	DoD-ELAP,NELAP,WADOE
2,4,5-Trichlorophenol	DoD-ELAP,NELAP,WADOE
2,4,5-Trichlorophenol	CALAP,DoD-ELAP,NELAP,WADOE
2,4,5-Trichlorophenol	CALAP,DoD-ELAP,WADOE
2,4,5-Trichlorophenol	CALAP,DoD-ELAP,NELAP
2-Chloronaphthalene	CALAP,DoD-ELAP,NELAP
2-Chloronaphthalene	CALAP,DoD-ELAP,NELAP,WADOE
2-Chloronaphthalene	CALAP,DoD-ELAP,WADOE
2-Chloronaphthalene	DoD-ELAP,NELAP,WADOE
2-Nitroaniline	CALAP,DoD-ELAP,WADOE
2-Nitroaniline	CALAP,DoD-ELAP,NELAP
2-Nitroaniline	DoD-ELAP,NELAP,WADOE
2-Nitroaniline	CALAP,DoD-ELAP,NELAP,WADOE
Acenaphthylene	CALAP,DoD-ELAP,WADOE,ADEC
Acenaphthylene	CALAP,DoD-ELAP,NELAP,ADEC
Acenaphthylene	DoD-ELAP,NELAP,WADOE,ADEC
Acenaphthylene	CALAP,DoD-ELAP,NELAP,WADOE,ADEC
Dimethylphthalate	CALAP,DoD-ELAP,NELAP,WADOE
Dimethylphthalate	CALAP,DoD-ELAP,NELAP
Dimethylphthalate	CALAP,DoD-ELAP,WADOE
Dimethylphthalate	DoD-ELAP,NELAP,WADOE
2,6-Dinitrotoluene	CALAP,DoD-ELAP,WADOE
2,6-Dinitrotoluene	DoD-ELAP,NELAP,WADOE
2,6-Dinitrotoluene	CALAP,DoD-ELAP,NELAP
2,6-Dinitrotoluene	CALAP,DoD-ELAP,NELAP,WADOE
Acenaphthene	CALAP,DoD-ELAP,NELAP,ADEC
Acenaphthene	DoD-ELAP,NELAP,WADOE,ADEC
Acenaphthene	CALAP,DoD-ELAP,WADOE,ADEC
Acenaphthene	CALAP,DoD-ELAP,NELAP,WADOE,ADEC
3-Nitroaniline	CALAP,DoD-ELAP,NELAP
3-Nitroaniline	CALAP,DoD-ELAP,WADOE
3-Nitroaniline	DoD-ELAP,NELAP,WADOE
3-Nitroaniline	CALAP,DoD-ELAP,NELAP,WADOE



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2,4-Dinitrophenol	CALAP,DoD-ELAP,NELAP,WADOE
2,4-Dinitrophenol	DoD-ELAP,NELAP,WADOE
2,4-Dinitrophenol	CALAP,DoD-ELAP,NELAP
2,4-Dinitrophenol	CALAP,DoD-ELAP,WADOE
Dibenzofuran	CALAP,DoD-ELAP,NELAP,WADOE,ADEC
Dibenzofuran	CALAP,DoD-ELAP,NELAP,ADEC
Dibenzofuran	CALAP,DoD-ELAP,WADOE,ADEC
Dibenzofuran	DoD-ELAP,NELAP,WADOE,ADEC
4-Nitrophenol	DoD-ELAP,NELAP,WADOE
4-Nitrophenol	CALAP,DoD-ELAP,NELAP,WADOE
4-Nitrophenol	CALAP,DoD-ELAP,NELAP
4-Nitrophenol	CALAP,DoD-ELAP,WADOE
2,4-Dinitrotoluene	DoD-ELAP,NELAP,WADOE
2,4-Dinitrotoluene	CALAP,DoD-ELAP,WADOE
2,4-Dinitrotoluene	CALAP,DoD-ELAP,NELAP,WADOE
2,4-Dinitrotoluene	CALAP,DoD-ELAP,NELAP
Fluorene	CALAP,DoD-ELAP,NELAP,WADOE,ADEC
Fluorene	CALAP,DoD-ELAP,NELAP,ADEC
Fluorene	CALAP,DoD-ELAP,WADOE,ADEC
Fluorene	DoD-ELAP,NELAP,WADOE,ADEC
4-Chlorophenylphenyl ether	DoD-ELAP,NELAP
4-Chlorophenylphenyl ether	CALAP,DoD-ELAP,NELAP
4-Chlorophenylphenyl ether	CALAP,DoD-ELAP,NELAP
4-Chlorophenylphenyl ether	CALAP,DoD-ELAP
Diethyl phthalate	DoD-ELAP,NELAP,WADOE
Diethyl phthalate	CALAP,DoD-ELAP,NELAP,WADOE
Diethyl phthalate	CALAP,DoD-ELAP,WADOE
Diethyl phthalate	CALAP,DoD-ELAP,NELAP
4-Nitroaniline	CALAP,DoD-ELAP,NELAP
4-Nitroaniline	DoD-ELAP,NELAP,WADOE
4-Nitroaniline	CALAP,DoD-ELAP,WADOE
4-Nitroaniline	CALAP,DoD-ELAP,NELAP,WADOE
4,6-Dinitro-2-methylphenol	CALAP,DoD-ELAP,WADOE
4,6-Dinitro-2-methylphenol	CALAP,DoD-ELAP,NELAP,WADOE
4,6-Dinitro-2-methylphenol	DoD-ELAP,NELAP,WADOE
4,6-Dinitro-2-methylphenol	CALAP,DoD-ELAP,NELAP
N-Nitrosodiphenylamine	DoD-ELAP,WADOE
N-Nitrosodiphenylamine	DoD-ELAP,NELAP
N-Nitrosodiphenylamine	DoD-ELAP,NELAP,WADOE



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N-Nitrosodiphenylamine	DoD-ELAP,NELAP,WADOE
4-Bromophenyl phenyl ether	CALAP,DoD-ELAP,NELAP
4-Bromophenyl phenyl ether	CALAP,DoD-ELAP,NELAP,WADOE
4-Bromophenyl phenyl ether	CALAP,DoD-ELAP,WADOE
4-Bromophenyl phenyl ether	DoD-ELAP,NELAP,WADOE
Hexachlorobenzene	CALAP,DoD-ELAP,NELAP
Hexachlorobenzene	CALAP,DoD-ELAP,WADOE
Hexachlorobenzene	CALAP,DoD-ELAP,NELAP,WADOE
Hexachlorobenzene	DoD-ELAP,NELAP,WADOE
Pentachlorophenol	CALAP,DoD-ELAP,WADOE
Pentachlorophenol	CALAP,DoD-ELAP,NELAP,WADOE
Pentachlorophenol	DoD-ELAP,NELAP,WADOE
Pentachlorophenol	CALAP,DoD-ELAP,NELAP
Phenanthrene	CALAP,DoD-ELAP,WADOE,ADEC
Phenanthrene	CALAP,DoD-ELAP,NELAP,ADEC
Phenanthrene	CALAP,DoD-ELAP,NELAP,WADOE,ADEC
Phenanthrene	DoD-ELAP,NELAP,WADOE,ADEC
Anthracene	CALAP,DoD-ELAP,WADOE,ADEC
Anthracene	CALAP,DoD-ELAP,NELAP,ADEC
Anthracene	CALAP,DoD-ELAP,NELAP,WADOE,ADEC
Anthracene	DoD-ELAP,NELAP,WADOE,ADEC
Carbazole	CALAP,DoD-ELAP,NELAP,WADOE,ADEC
Carbazole	CALAP,DoD-ELAP,NELAP,ADEC
Carbazole	CALAP,DoD-ELAP,WADOE,ADEC
Carbazole	DoD-ELAP,NELAP,WADOE,ADEC
Di-n-Butylphthalate	DoD-ELAP,NELAP,WADOE
Di-n-Butylphthalate	CALAP,DoD-ELAP,WADOE
Di-n-Butylphthalate	CALAP,DoD-ELAP,NELAP,WADOE
Di-n-Butylphthalate	CALAP,DoD-ELAP,NELAP
Fluoranthene	CALAP,DoD-ELAP,WADOE,ADEC
Fluoranthene	CALAP,DoD-ELAP,NELAP,WADOE,ADEC
Fluoranthene	CALAP,DoD-ELAP,NELAP,ADEC
Fluoranthene	DoD-ELAP,NELAP,WADOE,ADEC
Pyrene	CALAP,DoD-ELAP,NELAP,ADEC
Pyrene	CALAP,DoD-ELAP,WADOE,ADEC
Pyrene	DoD-ELAP,NELAP,WADOE,ADEC
Pyrene	CALAP,DoD-ELAP,NELAP,WADOE,ADEC
Butylbenzylphthalate	CALAP,DoD-ELAP,WADOE
Butylbenzylphthalate	DoD-ELAP,NELAP,WADOE



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Butylbenzylphthalate	CALAP,DoD-ELAP,NELAP,WADOE
Butylbenzylphthalate	CALAP,DoD-ELAP,NELAP
Benzo(a)anthracene	CALAP,DoD-ELAP,WADOE,ADEC
Benzo(a)anthracene	CALAP,DoD-ELAP,NELAP,ADEC
Benzo(a)anthracene	DoD-ELAP,NELAP,WADOE,ADEC
Benzo(a)anthracene	CALAP,DoD-ELAP,NELAP,WADOE,ADEC
3,3'-Dichlorobenzidine	DoD-ELAP,WADOE
3,3'-Dichlorobenzidine	DoD-ELAP,NELAP,WADOE
3,3'-Dichlorobenzidine	DoD-ELAP,NELAP,WADOE
3,3'-Dichlorobenzidine	DoD-ELAP,NELAP
Chrysene	DoD-ELAP,NELAP,WADOE,ADEC
Chrysene	CALAP,DoD-ELAP,NELAP,ADEC
Chrysene	CALAP,DoD-ELAP,NELAP,WADOE,ADEC
Chrysene	CALAP,DoD-ELAP,WADOE,ADEC
bis(2-Ethylhexyl)phthalate	DoD-ELAP,NELAP,WADOE
bis(2-Ethylhexyl)phthalate	CALAP,DoD-ELAP,WADOE
bis(2-Ethylhexyl)phthalate	CALAP,DoD-ELAP,NELAP
bis(2-Ethylhexyl)phthalate	CALAP,DoD-ELAP,NELAP,WADOE
Di-n-Octylphthalate	CALAP,DoD-ELAP,NELAP
Di-n-Octylphthalate	CALAP,DoD-ELAP,NELAP,WADOE
Di-n-Octylphthalate	DoD-ELAP,NELAP,WADOE
Di-n-Octylphthalate	CALAP,DoD-ELAP,WADOE
Benzo(b)fluoranthene	DoD-ELAP,NELAP,WADOE,ADEC
Benzo(b)fluoranthene	CALAP,DoD-ELAP,WADOE,ADEC
Benzo(b)fluoranthene	CALAP,DoD-ELAP,NELAP,ADEC
Benzo(b)fluoranthene	CALAP,DoD-ELAP,NELAP,WADOE,ADEC
Benzo(k)fluoranthene	DoD-ELAP,NELAP,WADOE,ADEC
Benzo(k)fluoranthene	CALAP,DoD-ELAP,NELAP,WADOE,ADEC
Benzo(k)fluoranthene	CALAP,DoD-ELAP,NELAP,ADEC
Benzo(k)fluoranthene	CALAP,DoD-ELAP,WADOE,ADEC
Benzo(a)pyrene	DoD-ELAP,NELAP,WADOE,ADEC
Benzo(a)pyrene	CALAP,DoD-ELAP,WADOE,ADEC
Benzo(a)pyrene	CALAP,DoD-ELAP,NELAP,WADOE,ADEC
Benzo(a)pyrene	CALAP,DoD-ELAP,NELAP,ADEC
Indeno(1,2,3-cd)pyrene	CALAP,DoD-ELAP,WADOE,ADEC



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Indeno(1,2,3-cd)pyrene	CALAP,DoD-ELAP,NELAP,ADEC
Indeno(1,2,3-cd)pyrene	DoD-ELAP,NELAP,WADOE,ADEC
Indeno(1,2,3-cd)pyrene	CALAP,DoD-ELAP,NELAP,WADOE,ADEC
Dibenzo(a,h)anthracene	DoD-ELAP,NELAP,WADOE,ADEC
Dibenzo(a,h)anthracene	CALAP,DoD-ELAP,NELAP,WADOE,ADEC
Dibenzo(a,h)anthracene	CALAP,DoD-ELAP,NELAP,ADEC
Dibenzo(a,h)anthracene	CALAP,DoD-ELAP,WADOE,ADEC
Benzo(g,h,i)perylene	DoD-ELAP,NELAP,WADOE,ADEC
Benzo(g,h,i)perylene	CALAP,DoD-ELAP,WADOE,ADEC
Benzo(g,h,i)perylene	CALAP,DoD-ELAP,NELAP,ADEC
Benzo(g,h,i)perylene	CALAP,DoD-ELAP,NELAP,WADOE,ADEC
N-Nitrosodimethylamine	CALAP,DoD-ELAP,NELAP,WADOE
N-Nitrosodimethylamine	CALAP,DoD-ELAP,NELAP
N-Nitrosodimethylamine	CALAP,DoD-ELAP,WADOE
N-Nitrosodimethylamine	DoD-ELAP,NELAP,WADOE
Aniline	CALAP,DoD-ELAP,NELAP,WADOE
Aniline	DoD-ELAP,NELAP,WADOE
Aniline	CALAP,DoD-ELAP,NELAP
Aniline	CALAP,DoD-ELAP,WADOE
Retene	CALAP,DoD-ELAP,WADOE
Retene	DoD-ELAP,NELAP,WADOE
Retene	CALAP,DoD-ELAP,NELAP
Retene	CALAP,DoD-ELAP,NELAP,WADOE
Pyridine	DoD-ELAP,NELAP,WADOE
Pyridine	CALAP,DoD-ELAP,WADOE
Pyridine	CALAP,DoD-ELAP,NELAP,WADOE
Pyridine	CALAP,DoD-ELAP,NELAP
1-Methylnaphthalene	CALAP,DoD-ELAP,NELAP,ADEC
1-Methylnaphthalene	CALAP,DoD-ELAP,WADOE,ADEC
1-Methylnaphthalene	DoD-ELAP,NELAP,WADOE,ADEC
1-Methylnaphthalene	CALAP,DoD-ELAP,NELAP,WADOE,ADEC
Azobenzene (1,2-DP-Hydrazine)	NELAP,WADOE
Azobenzene (1,2-DP-Hydrazine)	CALAP,NELAP,WADOE
Azobenzene (1,2-DP-Hydrazine)	CALAP,NELAP
Azobenzene (1,2-DP-Hydrazine)	CALAP,WADOE
2,3,4,6-Tetrachlorophenol	DoD-ELAP
2,3,4,6-Tetrachlorophenol	DoD-ELAP,WADOE
2,3,4,6-Tetrachlorophenol	DoD-ELAP,WADOE
2,3,4,6-Tetrachlorophenol	DoD-ELAP,WADOE



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

Benzidine	DoD-ELAP,NELAP
Benzidine	DoD-ELAP,NELAP
Benzidine	DoD-ELAP
Benzidine	DoD-ELAP,NELAP
Tetrachloroguaiacol	DoD-ELAP
Tetrachloroguaiacol	DoD-ELAP,WADOE
Tetrachloroguaiacol	DoD-ELAP,WADOE
Tetrachloroguaiacol	DoD-ELAP,WADOE
3,4,5-Trichloroguaiacol	WADOE
3,4,5-Trichloroguaiacol	
3,4,5-Trichloroguaiacol	WADOE
3,4,5-Trichloroguaiacol	WADOE
3,4,6-Trichloroguaiacol	WADOE
3,4,6-Trichloroguaiacol	WADOE
3,4,6-Trichloroguaiacol	WADOE
4,5,6-Trichloroguaiacol	WADOE
4,5,6-Trichloroguaiacol	
4,5,6-Trichloroguaiacol	WADOE
4,5,6-Trichloroguaiacol	WADOE
Guaiacol	WADOE
Guaiacol	WADOE
Guaiacol	
Guaiacol	WADOE

EPA 8270E-SIM in Solid

Tributyltin Ion	WADOE,DoD-ELAP
Tributyltin Ion	DoD-ELAP
Tributyltin Ion	WADOE,DoD-ELAP
Tributyltin Ion	WADOE,DoD-ELAP
Dibutyltin Ion	WADOE,DoD-ELAP
Dibutyltin Ion	WADOE,DoD-ELAP
Dibutyltin Ion	DoD-ELAP
Dibutyltin Ion	WADOE,DoD-ELAP
Butyltin Ion	WADOE
Butyltin Ion	
Butyltin Ion	WADOE
Butyltin Ion	WADOE
Phenol	CALAP,NELAP
Phenol	CALAP,NELAP,WADOE



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

Phenol	CALAP,WADOE
Phenol	NELAP,WADOE
1,3-Dichlorobenzene	CALAP,WADOE
1,3-Dichlorobenzene	CALAP,NELAP,WADOE
1,3-Dichlorobenzene	NELAP,WADOE
1,3-Dichlorobenzene	CALAP,NELAP
1,4-Dichlorobenzene	CALAP,WADOE
1,4-Dichlorobenzene	NELAP,WADOE
1,4-Dichlorobenzene	CALAP,NELAP
1,4-Dichlorobenzene	CALAP,NELAP,WADOE
1,2-Dichlorobenzene	CALAP,WADOE
1,2-Dichlorobenzene	CALAP,NELAP,WADOE
1,2-Dichlorobenzene	CALAP,NELAP
1,2-Dichlorobenzene	NELAP,WADOE
Benzyl Alcohol	CALAP,WADOE
Benzyl Alcohol	CALAP,NELAP
Benzyl Alcohol	CALAP,NELAP,WADOE
Benzyl Alcohol	NELAP,WADOE
2-Methylphenol	CALAP,NELAP
2-Methylphenol	CALAP,NELAP,WADOE
2-Methylphenol	NELAP,WADOE
2-Methylphenol	CALAP,WADOE
N-Nitroso-di-n-Propylamine	CALAP,WADOE
N-Nitroso-di-n-Propylamine	CALAP,NELAP,WADOE
N-Nitroso-di-n-Propylamine	NELAP,WADOE
N-Nitroso-di-n-Propylamine	CALAP,NELAP
4-Methylphenol	CALAP,NELAP,WADOE
4-Methylphenol	CALAP,NELAP
4-Methylphenol	CALAP,WADOE
4-Methylphenol	NELAP,WADOE
2,4-Dimethylphenol	CALAP,NELAP
2,4-Dimethylphenol	NELAP,WADOE
2,4-Dimethylphenol	CALAP,NELAP,WADOE
2,4-Dimethylphenol	CALAP,WADOE
1,2,4-Trichlorobenzene	CALAP,NELAP
1,2,4-Trichlorobenzene	CALAP,NELAP,WADOE
1,2,4-Trichlorobenzene	NELAP,WADOE
1,2,4-Trichlorobenzene	CALAP,WADOE
Hexachlorobutadiene	NELAP,WADOE



Dalton, Olmsted & Fuglevand, Inc
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Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

Hexachlorobutadiene	CALAP,WADOE
Hexachlorobutadiene	CALAP,NELAP
Hexachlorobutadiene	CALAP,NELAP,WADOE
N-Nitrosodimethylamine	CALAP,NELAP
N-Nitrosodimethylamine	CALAP,WADOE
N-Nitrosodimethylamine	NELAP,WADOE
N-Nitrosodimethylamine	CALAP,NELAP,WADOE
Dimethylphthalate	CALAP,WADOE
Dimethylphthalate	CALAP,NELAP,WADOE
Dimethylphthalate	CALAP,NELAP
Dimethylphthalate	NELAP,WADOE
Diethyl phthalate	CALAP,WADOE
Diethyl phthalate	CALAP,NELAP
Diethyl phthalate	NELAP,WADOE
Diethyl phthalate	CALAP,NELAP,WADOE
N-Nitrosodiphenylamine	CALAP,NELAP
N-Nitrosodiphenylamine	CALAP,NELAP,WADOE
N-Nitrosodiphenylamine	NELAP,WADOE
N-Nitrosodiphenylamine	CALAP,WADOE
Hexachlorobenzene	NELAP,WADOE
Hexachlorobenzene	CALAP,WADOE
Hexachlorobenzene	CALAP,NELAP
Hexachlorobenzene	CALAP,NELAP,WADOE
Pentachlorophenol	CALAP,NELAP,WADOE
Pentachlorophenol	CALAP,WADOE
Pentachlorophenol	CALAP,NELAP
Pentachlorophenol	NELAP,WADOE
Butylbenzylphthalate	CALAP,NELAP,WADOE
Butylbenzylphthalate	NELAP,WADOE
Butylbenzylphthalate	CALAP,NELAP
Butylbenzylphthalate	CALAP,WADOE
Dibenzo(a,h)anthracene	CALAP,NELAP,WADOE
Dibenzo(a,h)anthracene	CALAP,NELAP
Dibenzo(a,h)anthracene	NELAP,WADOE
Dibenzo(a,h)anthracene	CALAP,WADOE

EPA 9060A m in Solid

Total Organic Carbon	WADOE
Total Organic Carbon	
Total Organic Carbon	WADOE



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue WA, 98007

Project: COA Outfall
Project Number: COA-001
Project Manager: Ezra Beaver

Reported:
26-Mar-2021 16:29

Total Organic Carbon WADOE

SM 4500-NH3 H-97 in Solid

Ammonia-N WADOE,NELAP
Ammonia-N WADOE,NELAP
Ammonia-N NELAP
Ammonia-N WADOE

SM 4500-S2 D-00 (PSEP) in Solid

Sulfide DoD-ELAP,NELAP,WADOE
Sulfide DoD-ELAP,NELAP,WADOE
Sulfide DoD-ELAP,NELAP
Sulfide DoD-ELAP,WADOE

Code	Description	Number	Expires
ADEC	Alaska Dept of Environmental Conservation	17-015	03/28/2023
DoD-ELAP	DoD-Environmental Laboratory Accreditation Program	66169	02/28/2022



Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
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Project: COA Outfall
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Reported:
26-Mar-2021 16:29

Notes and Definitions

*	Flagged value is not within established control limits.
B	This analyte was detected in the method blank.
D	The reported value is from a dilution
E	Concentration exceeds the calibration range.
EMPC	Estimated Maximum Possible Concentration qualifier for HRGCMS Dioxin
H	Hold time violation - Hold time was exceeded.
HC	The natural concentration of the spiked analyte is so high that an accurate determination of spike recovery is not possible
J	Estimated concentration value detected below the reporting limit.
M	Estimated value for a GC/MS analyte detected and confirmed by an analyst but with low spectral match parameters.
P1	The reported value is greater than 40% difference between the concentrations determined on two GC columns where applicable.
P1	>40% difference between the concentrations on two GC columns.
Q	ICV/CCV Acceptance Criteria not met.
U	This analyte is not detected above the applicable reporting or detection limit.
Ua	This analyte is not detected above the reporting limit (RL) or if noted, not detected above the limit of detection (LOD).
X	Indicates possible CDPE interference.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
[2C]	Indicates this result was quantified on the second column on a dual column analysis.

Appendix D

Data Validation Report

To be submitted once validation has been completed

Appendix E

Final Characterization and Disposal Records

To be submitted as addendum to this report when dredging and disposal completed

Appendix F

As-Builds for Final Alignment and Dredging Prisms

To be submitted as addendum to this report when dredging and disposal completed

Federal Emergency Management Administration
Environmental & Historic Preservation
Region 10
Attn: Philip Fisher, Archaeologist
130 228th St SW
Bothell, WA 98021

September 9, 2021

Area of Potential Effect (APE) Memorandum
WWTP Outfall Relocation (4539-DR-WA Anacortes)
Anacortes, WA

Dear Philip Fisher,

The purpose of this memo is to outline the Area of Potential Effect (APE) for the WWTP Outfall Relocation project in compliance with Section 106 of the National Historic Preservation Act. The City of Anacortes is proposing the construction of a new outfall pipe for the City of Anacortes Wastewater Treatment Plant (WWTP). The proposed pipe will be 1,631-foot, 48-inch diameter high-density polyethylene (HDPE) pipe for the upland phase. At the shoreline the pipe diameter reduced to 42 inches and runs for another 1,030 feet. The waterward section will have an 86-foot diffuser angled ~24.5° northwest to better match the bidirectional current. For the upland phase, the pipe will exit the east side of the WWTP, turn south on T Avenue, turn east on 3rd Street, and finally turn north onto U Avenue where it will head to the shoreline. Excavation for the upland phase of the outfall will vary between ~15 feet and ~35 feet below the ground surface (BGS), with most of the excavation occurring within 20 feet BGS and rock blasting going deeper. Excavation will be limited to a 15-foot width within existing right-of-way (ROW) or WWTP property.

The proposed project occurs within the City of Anacortes in Skagit County on City of Anacortes WWTP property as well as the existing ROW of T Avenue from the WWTP to 3rd Street, 3rd Street between T Avenue and U Avenue, and U Avenue from 3rd Street until it dead ends. The project is located within Section 18 of Township 35 North, Range 2 East (See attached Vicinity Map and APE Map).

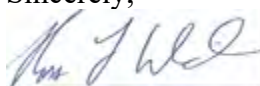
The proposed project will require rock blasting as the bedrock is shallow in some sections of the project area. See attached APE Map for blasting locations. Because of the presence of residences adjacent to the APE, 0.5 inches per second (IPS) will be the limit for rock blasting. Monitoring of peak particle velocity vibrations of each blast shot will be completed with no less than two seismographs that can measure three mutually perpendicular directions, located at each end of the shot and adjacent to structures within 200 feet of the blast. With these efforts, adjacent homes will not be impacted by this project.

Most of the proposed outfall pipe will require excavation into native soil layers, and thus will be considered “high potential” for encountering potentially prehistoric materials. The outfall invert depth will hit bedrock at Station ~10+75 and will run through bedrock until Station ~11+31. The pipe again hits bedrock at Station ~12+00 and runs through bedrock until Station ~15+93. At Station ~12+96 bedrock is within a foot of the existing grade. Bedrock elevation does not fall below 1 foot along the project footprint until Station ~15+30 (See attached Underground Utility Profile). Between Stations ~12+00 and ~15+30, excavation will have a “low potential” for encountering potentially prehistoric materials. Excavation will also have a “low potential” for encountering potentially prehistoric materials once excavation reaches bedrock depths from Stations ~10+75 to ~11+31, ~12+00 to ~12+96, and ~15+30 to ~15+93. Most of the project sits on a layer of fill which at its greatest depth is ~12.5 BGS. Stations shown on the attached Underground Utility Profile with a fill layer will have a “low potential” for encountering potentially prehistoric materials within the fill layer. There are also numerous underground utilities that cross the proposed outfall footprint. These utilities range from less than a foot BGS to ~12.5 feet BGS. At each utility crossing there is assumed to be ~4 feet of soil disturbance on either side. ~4 feet on either side of each utility crossing down to the depth of each crossing will also have a “low potential” for encountering potentially prehistoric materials (See attached Underground Utility Profile and Underground Utilities Map). All other areas will be considered “high potential” for encountering potentially prehistoric materials. A qualified archaeologist will be on-site to monitor excavation in the described “high potential” areas. The in-water phase of this project is not anticipated to encounter any shipwrecks (see attached Guemes Channel Acoustic Images).

A search of the Department of Archaeology and Historic Preservation’s (DAHP) Washington Information System for Architectural & Archaeological Records Data (WISAARD) shows that there are no properties listed on the National Register of Historic Places (NRHP) within the project’s APE. There are 17 houses adjacent to the APE boundary which are 45 years or older and no Historic Property Inventories (HPIs) performed. There are three properties adjacent to the APE with Historic Property Inventories (HPIs) that have no determination of eligibility to be listed on the NRHP: Brewster, Julia, House located at 519 5th Street; Dodge, Harry and Lorena, House located at 417 2nd Street; and Todd, Leroy and Elsie, House located at 418 2nd Street. The closest determined historic site listed in the NRHP is the Great Northern Depot - Anacortes located ~0.07 miles southwest of the WWTP at R Avenue and 7th Street.

On behalf of the City of Anacortes, we request your assistance in obtaining approval for the APE for the proposed project in compliance with Section 106 of the National Historic Preservation Act. We believe with proper archaeological monitoring and documentation that the proposed project will not have adverse effects on any culturally or historically significant buildings or artifacts. Should you have any questions, please contact me at (425) 332-3961 or at ross@widener-enviro.com.

Sincerely,



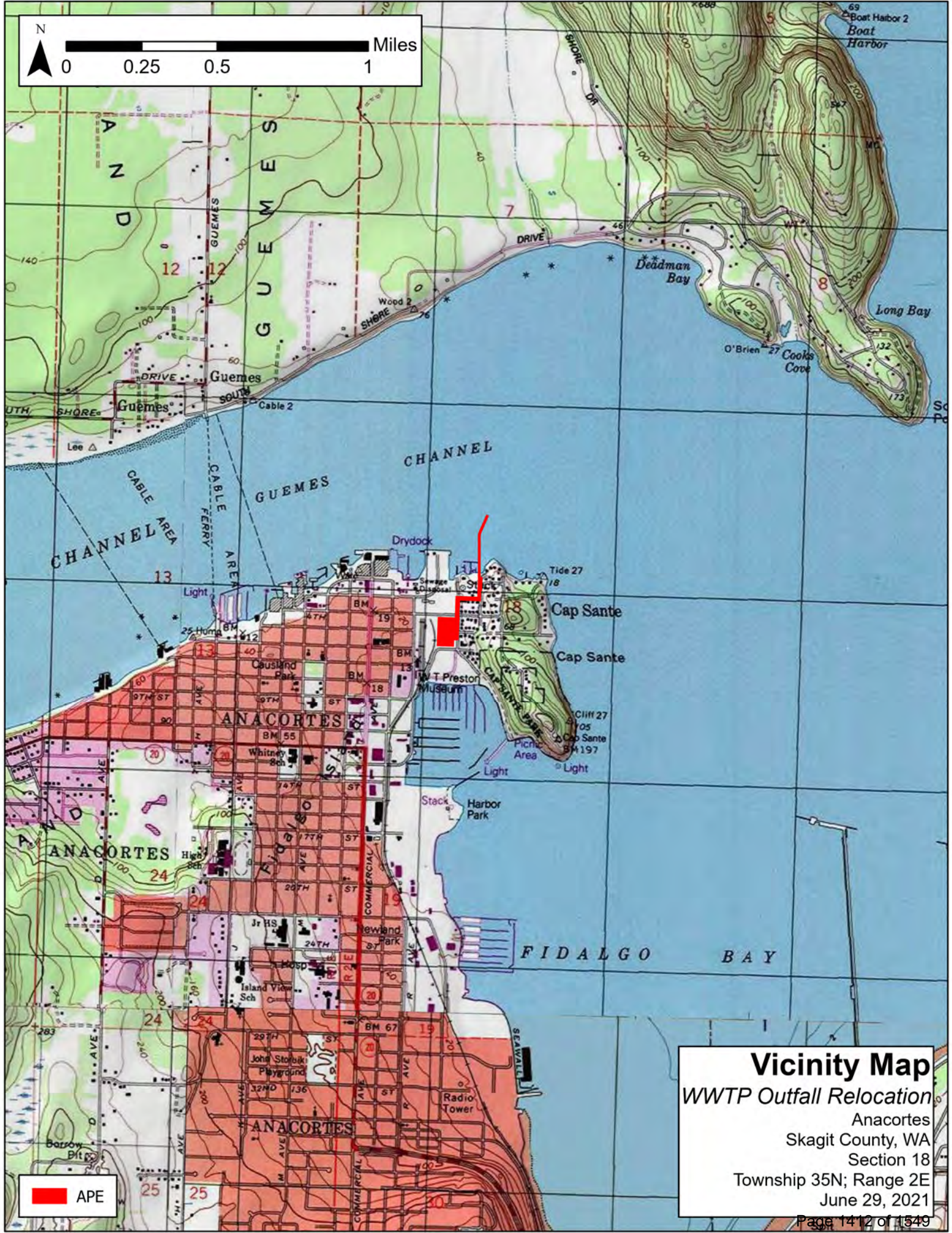
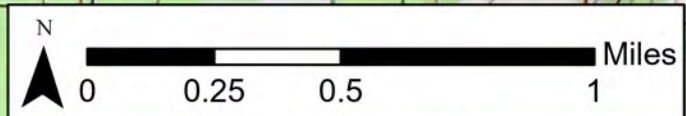
Ross Widener
Widener & Associates

Attachments:

Vicinity and APE Maps

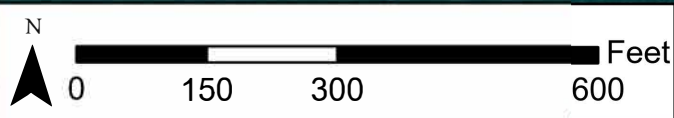
Underground Utilities Profile and Map

Guemes Channel Acoustic Images



APE

Vicinity Map
WWTP Outfall Relocation
Anacortes
Skagit County, WA
Section 18
Township 35N; Range 2E
June 29, 2021
Page 1412 of 1549



Legend

- Approximate Blasting Line
- 200 ft Blasting Buffer
- Properties With Houses 45 Years or Older
- Property Boundaries
- APE

Guemes Channel

2nd St

V Ave

3rd St

3rd St

U Ave

4th St

T Ave

5th St

APE Map

WWTP Outfall Relocation

Anacortes

Skagit County, WA

Section 18

Township 35N; Range 2E

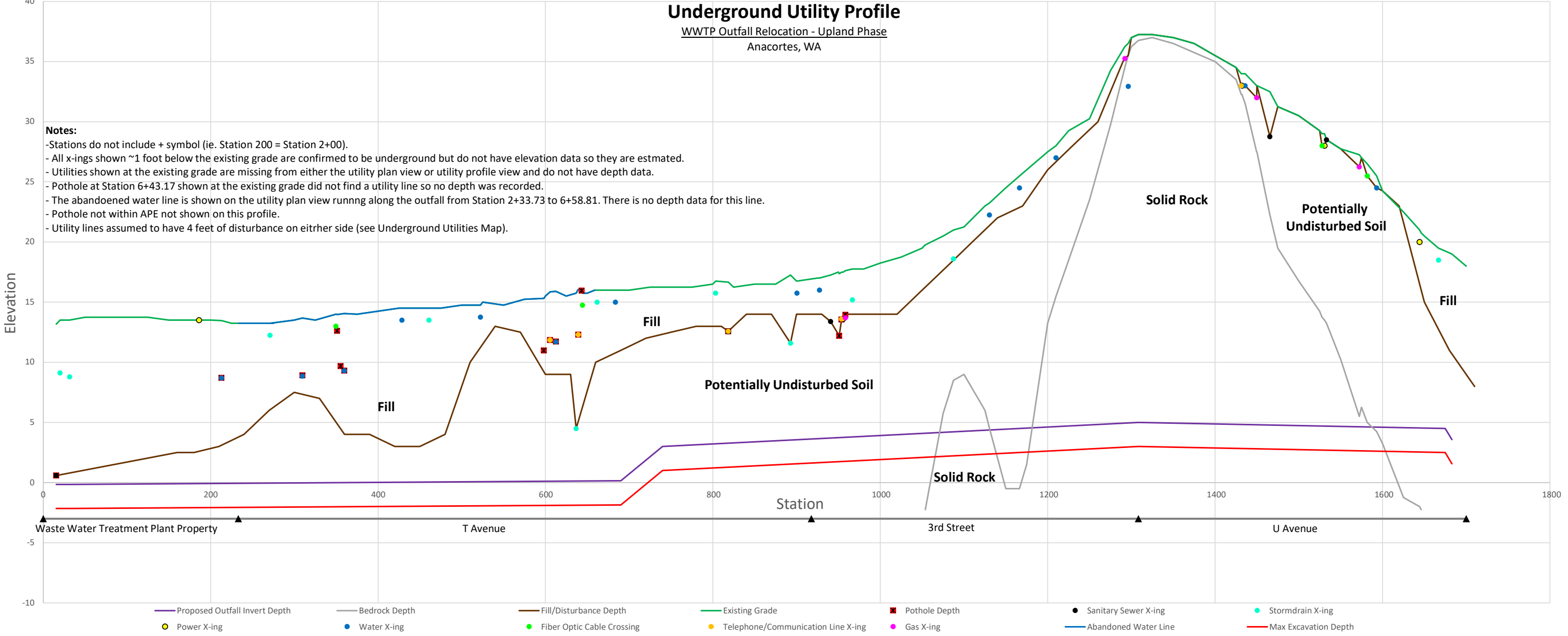
September 1, 2021

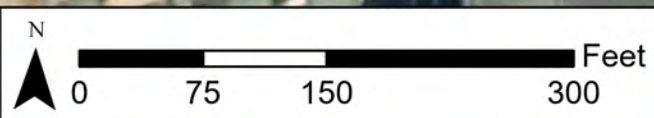
Page 1413 of 1549

Underground Utility Profile

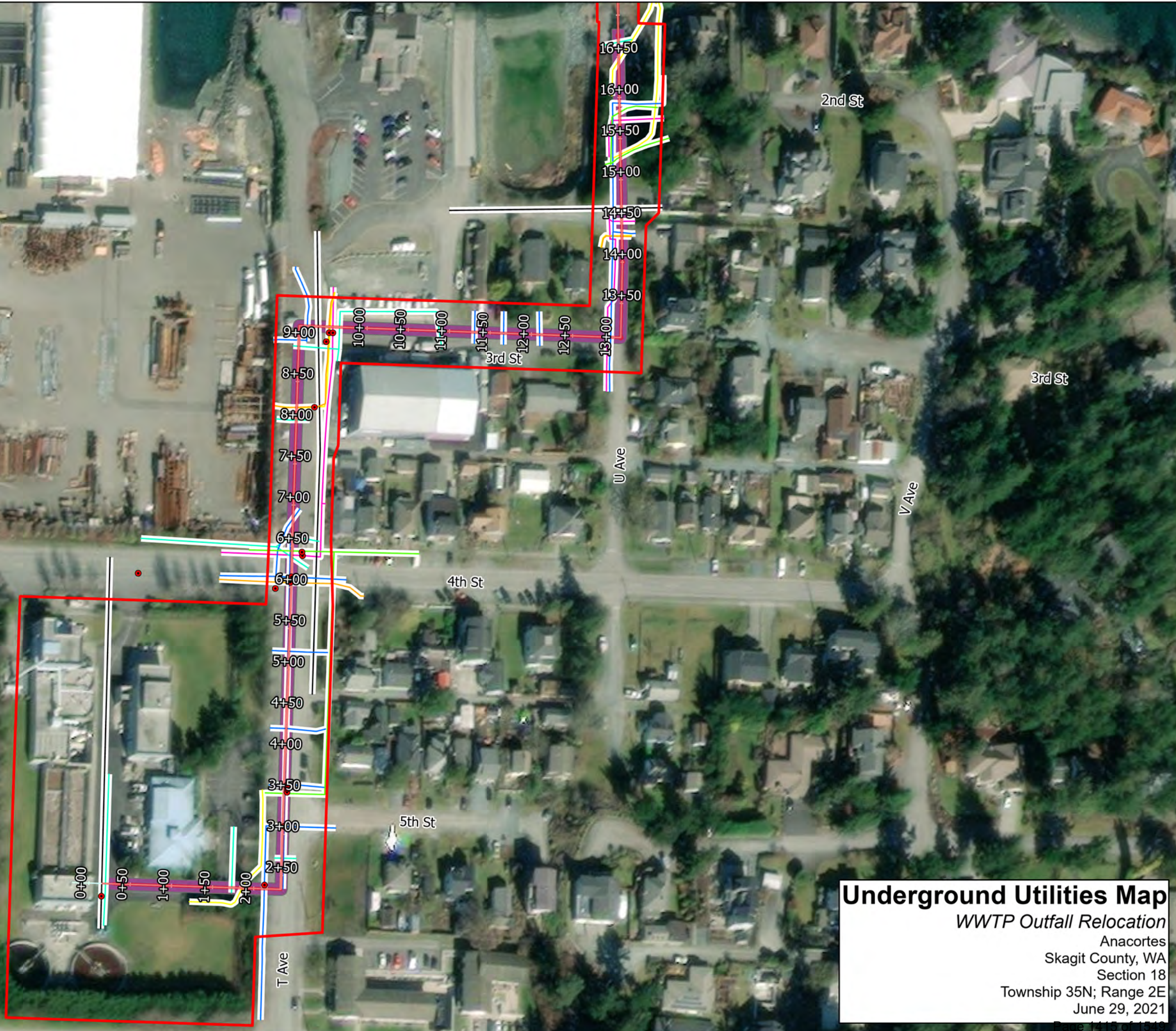
WWTP Outfall Relocation - Upland Phase
Anacortes, WA

- Notes:**
- Stations do not include + symbol (ie. Station 200 = Station 2+00).
 - All x-ings shown ~1 foot below the existing grade are confirmed to be underground but do not have elevation data so they are estimated.
 - Utilities shown at the existing grade are missing from either the utility plan view or utility profile view and do not have depth data.
 - Pothole at Station 6+43.17 shown at the existing grade did not find a utility line so no depth was recorded.
 - The abandoned water line is shown on the utility plan view running along the outfall from Station 2+33.73 to 6+58.81. There is no depth data for this line.
 - Pothole not within APE not shown on this profile.
 - Utility lines assumed to have 4 feet of disturbance on either side (see Underground Utilities Map).

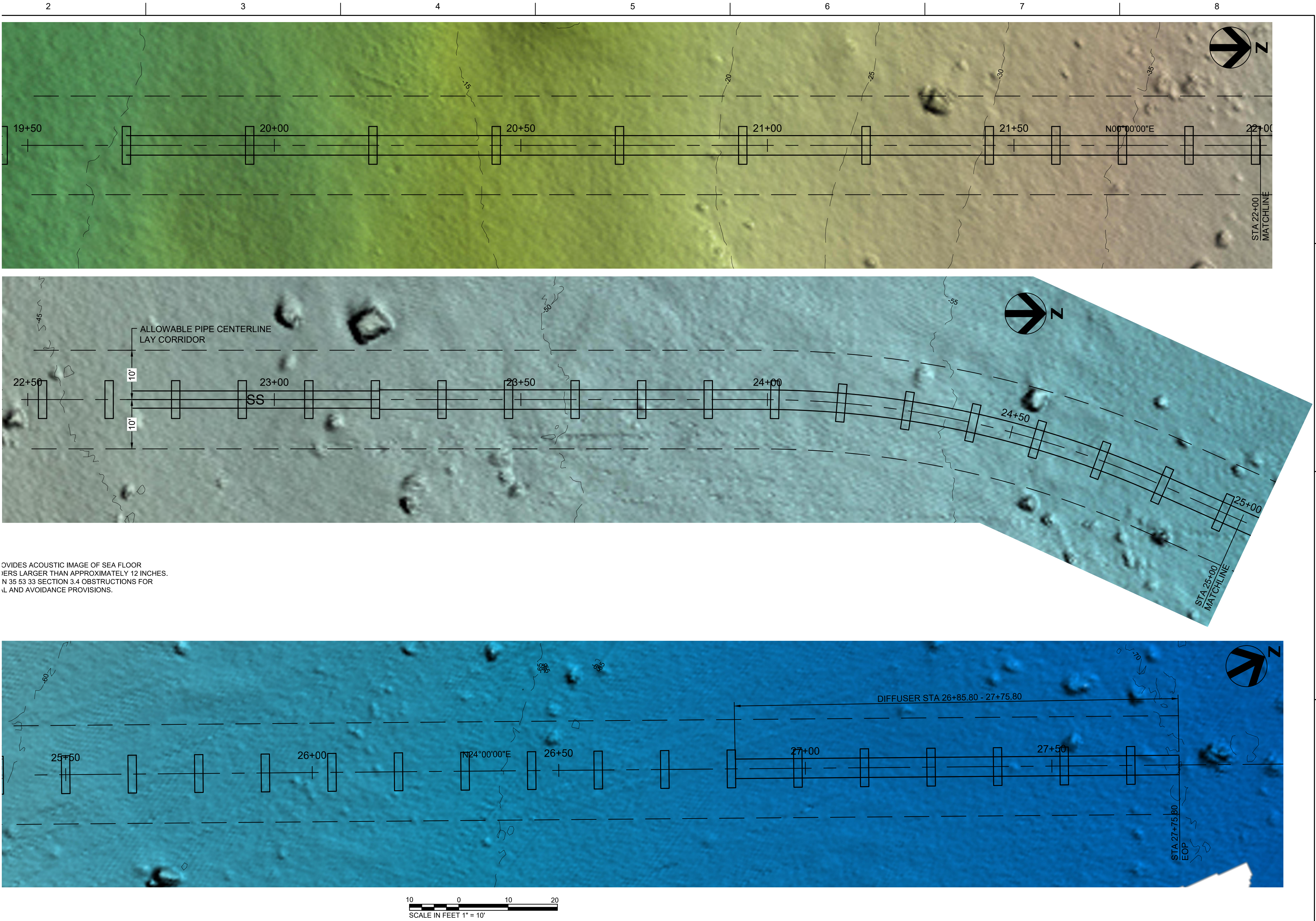




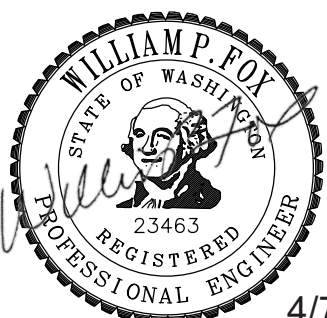
- Pothole Locations
- Existing Crossing Fiber Optic Cable
- Existing Crossing Water Line
- Existing Crossing Phone/Communications Line
- Existing Crossing Stormdrain
- Existing Crossing Sanitary Sewer Line
- Existing Crossing Underground Power Line
- Existing Crossing Gas Line
- Utility Buffer (4 feet on either side)
- Outfall Excavation Area
- Outfall Layout
- APE



Underground Utilities Map
WWTP Outfall Relocation
Anacortes
Skagit County, WA
Section 18
Township 35N; Range 2E
June 29, 2021



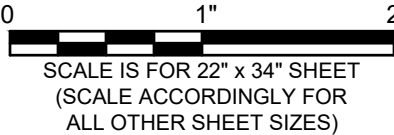
			PROJECT MANAGER FOX, WILLIAM	
			CIVIL ENG FOX, WILLIAM	
			DRAWN BY SCHMIDT, ADAM	
1	4/22/2021	CONTRACT DRAWING		
ISSUE	DATE	DESCRIPTION		
			PROJECT NUMBER	



4/7/2021

CITY OF ANACORTES
WWTP OUTFALL RELOCATION -
MARINE PHASE

Guemes Channel Acoustic Image
- Boulder Detail

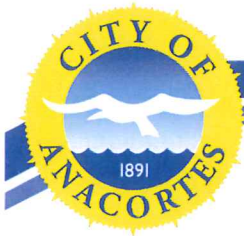


FILENAME C-207.DWG
SCALE 1" = 10'

SHEET
C-207

Exhibit 4

Issued SEPA & Notices



STATE ENVIRONMENTAL POLICY ACT (SEPA)

Mitigated Determination of Non-Significance (MDNS)

PROJECT INFORMATION:

Project Title	City of Anacortes Wastewater Treatment Plant (WWTP) Outfall Relocation
File Number	SDP-2021-0005
Project Location	Within public rights-of-way from the WWTP located at T Avenue north to 3 rd Street, then east to U Avenue, then north to Guemes Channel
Landowner	City of Anacortes, WADNR
Applicant	City of Anacortes
Date of Completeness	June 18, 2021
Project Description	Shoreline substantial development permit and shoreline conditional use permit to construct a new wastewater treatment plant (WWTP) outfall pipe to replace an existing outfall to Guemes Channel. The new outfall pipe will be a 48-inch diameter Fiberglass Reinforced Pipe (FRP) coming from the WWTP for 1,631 feet until the Guemes Channel shoreline, where it will reduce to 42-inch outside diameter high density polyethylene (HDPE) pipe for 1,030 feet with an 86-foot diffuser angled to the northeast at approximately 24.5 degrees to better match the bidirectional current. The total length of the pipe will be 2,661-feet from the WWTP continuing into the Guemes Channel.

The City of Anacortes Department of Planning, Community & Economic Development has determined that this project does not have a probable significant adverse impact on the environment. Pursuant to WAC 197-11-350(3), the proposal has been clarified, changed, and conditioned to include necessary mitigation measures to avoid, minimize or compensate for probable significant impacts. An environmental impact statement (EIS) is not required under RCW § 43.21C.030(2)(c). The necessary mitigation measures are listed below, the Environmental Checklist is attached, and additional project information is available at <https://www.anacorteswa.gov/161/Planning-Community-Economic-Development>.

This determination is based on the following findings and conclusions:

- The conditions listed below, conformance with required aquatic permits/use authorizations issued by WDFW, USACE, and DOE for in-water work, conformance with the City's NPDES permit, and the City of Anacortes' codes governing noise, land use, traffic, drainage, fire protection, shoreline management, and building will provide substantial mitigation of the proposal's environmental impacts. The City of Anacortes derives the authority to require mitigation from Chapter 18.04 of the Anacortes Municipal Code and the State Environmental Policy Act.

MITIGATION MEASURES/ CONDITIONS:

1. All applicable permits and authorizations from local, state, and federal agencies with jurisdiction shall be obtained prior to the start of any construction activities.
2. To minimize neighborhood impacts, a detailed construction schedule and traffic management plan shall be developed, provided to the Public Works and Planning Departments for review, and implemented.
3. A construction equipment staging plan shall be developed and provided to the Public Works and Planning Departments for review.

4. Road closures shall be coordinated with the Anacortes Fire Department, including provision of alternate routes for emergency vehicles as needed.
5. The development shall comply with the recommendations, conservation measures, and best management practices as listed in the Biological Assessment dated July 2021, prepared by Widener & Associates, or as amended and approved by agencies with jurisdiction.
6. The development shall adhere to the recommendations and conclusions provided by the Geotechnical Report prepared by GeoEngineers, dated March 25, 2021.
 - 6.1. Prior to construction activities, direct communication with residents and adjacent property owners shall occur. Pre-blast and post-blast damage surveys of nearby homes and utilities (within 200') shall be conducted as requested by property owners.
7. All project activities shall conform to the City's noise control regulations and occur between the hours of 7:00 AM and 10:00 PM unless a noise variance is obtained. Rock blasting shall be conducted as much as possible between the hours of 8:00 AM and 5:00 PM or within daylight hours.
8. To avoid adverse impacts to cultural resources, the applicant shall comply with Section 106 of the National Historic Preservation Act and provide letter of concurrence from SHPO to the Planning Department prior to ground disturbing activities.

Responsible Official: Don Measamer, Director/SEPA Responsible Official
Planning, Community, & Economic Development Department

Address: P.O. Box 547
Anacortes, WA 98221

Phone: 360-299-1942

Signature: _____

Issue Date: _____

9/27/21

This MDNS is issued after using the optional DNS process in WAC 197-11-355. There is no further comment period on this MDNS.

For further information, contact the City of Anacortes' Department of Planning, Community, & Economic Development at (360) 299-1984. The issuance of this Mitigated Determination of Non-significance should not be interpreted as acceptance or approval of the proposal as presented. The City of Anacortes reserves the right to deny or approve said proposal subject to conditions if it is determined to be in the best interests of the city and/or necessary for the general health, safety, and welfare of the public to do so.

SEPA APPEAL PROCEDURE:

This environmental determination may be appealed in accordance with the procedures outlined in AMC Chapter 18.04 and 19.20. Appeals must be on forms provided by the Planning, Community & Economic Department (PCED), contain the information specified in AMC 19.20.180.F, be accompanied by a filing fee of \$200, and be delivered to the City Clerk by mail or personal delivery by **5:00 PM**, 14 calendar days after the written notice of the decision is issued. Additional information regarding the appeal process may be obtained from City of Anacortes PCED, (360) 299-1984.

Grage, Libby

From: NoReply@ecy.wa.gov
Sent: Monday, September 27, 2021 10:59 AM
To: Grage, Libby
Subject: SEPA record published

The SEPA admin reviewed and published [SEPA record number 202105234, "Anacortes Wastewater Treatment Plant Outfall Relocation"](#).

Lead Agency File Number: SDP-2021-0005.

It will now be available to the public.

From: Sadie Hinklin
Email: separegister@ecy.wa.gov
Phone number: (564) 999-1739

Grage, Libby

From: Grage, Libby
Sent: Monday, September 27, 2021 10:21 AM
To: 'Jordan Widener'; Ross Widener; Buckenmeyer, Fred; Hohmann, Tim
Cc: 'wilkinson.johnr@gmail.com'; Brenda Treadwell; 'Kevin Anderson'; Brenda Werden; Maria Sandercock (ECY); Brandon Black (brandonb@co.skagit.wa.us); 'ross.zimmerman@dnr.wa.gov'; 'bob.warriner@dfw.wa.gov'; Thomas Wooten; jackie ferry; Stan Walsh, Natural Resources Skagit Coop; 'nkammer@skagitcoop.org'; 'Daisy.P.Douglass@usace.army.mil'; Scott Schyuler; 'dahp.separeview@dahp.wa.gov'; Measamer, Don
Subject: City of Anacortes WWTP Outfall SEPA (SDP-2021-0005)
Attachments: 20210927-IssuedSEPA.pdf

Good morning,

Please find attached the issued MDNS for the above referenced project.

Please let me know if you have any questions.

Best regards,

Libby Grage | City of Anacortes
Planning, Community & Economic Development Department
Planning Manager
P.O. Box 547 | 904 6th Street | Anacortes, WA 98221
360.299.1986 (work) | 360-661-3505 (work cell)
libbyb@cityofanacortes.org | www.cityofanacortes.org

My incoming and outgoing email messages are subject to public disclosure requirements per RCW 42.56.

Exhibit 5

Public & Agency Comments

Grage, Libby

City of Anacortes
*Planning, Community &
Economic Development*

Date Received:

6/25/21

From: John R Wilkinson <wilkinson.johnr@gmail.com>
Sent: Friday, June 25, 2021 9:15 AM
To: Cooper, Tess
Cc: Shjarback, Eric; Walters, Ryan (Anacortes City Council)
Subject: Notice of Application for planned Outfall Project
Attachments: Consolidated List of Cap Sante Resident Questions about WWTP Outfall Project.docx

Tess, Thank you for providing the notice of the application being made for this project.

As an impacted neighbor living within 300ft of the project I briefly reviewed the document and have the following comments:

1. None of the Cap Sante neighbors concerns submitted in March appear to be addressed by this document (the March list of consolidated concerns is attached). Please advise on when and how these will be addressed.
2. The document focus is on the maritime portion of the project. Page 9 summarily dismisses possible Upland impacts, that are the primary focus of the near neighbors, as follows:
"The upland project area is within existing right-of-way surrounded by highly developed properties, primarily residential and industrial. As the pipe will be placed below the current roadway, rock blasting and excavation will occur to place the pipe to an appropriate depth. All roads will be replaced to existing conditions of grade and topography with no additional impervious surface created, roadways will be replaced to the City's codes and standards. **The project will not have impacts to any surrounding properties. There will be no off-site improvements and no views will be obstructed by the project.** The completed project will be entirely underground and no changes in elevation will occur."
3. Some other errors/omissions were noted as follows:

The project is given file number SDP-2021-0006 in the mailout but SDP-2021-0005 for online documents.
pg 72. Noise is calculated but no mention is made of compliance (or not) with existing ordinances, hours of operation etc. Seismic/blast intensities are also not calculated or mentioned.
pg 127. sec.13: no historic properties are listed but our house at 404 2nd st is an historic property. it is subject to possible blast damage given stacked fieldstone basement walls and clay effluent pipes etc still servicing older homes along 2nd st. No mention is made of indemnification options for homeowners if/when damage occurs.
pg 129. sec 16: no mention is made of the duration of service disruption on 129+ utility lines that will be severed or otherwise impacted by construction.
pg.88: the illustration shows the line going up 4th street to U Ave. Other illustrations show the 3rd st route to U Ave.....

In summary, the document addresses possible marine environment impacts but not the human impacts on multiple nearby residents. Please address these via timely communications with the residents who will be impacted.

Thank you,
John Wilkinson

Date Received:

6/25/21

Consolidated List of Cap Sante Resident Questions about WWTP Outfall Project

	Question/Request
General	What is the overall timing and duration of the Uplands portion of the Project?
	What is the overall timing and duration of the Marine portion of the Project?
	Where will heavy equipment and materials be kept during construction?
	Does FEMA 4539-R give COA emergency access to Private or POA land?
	How will heavy materials and excess fill and rock be stored and transported to/fro Cap Sante? Along what route?
	Given FEMA 4539-R provides funding of 75% of "total eligible costs"; who carries the burden of other costs and cost overruns, if any?
	Who will be the contact person with COA and/or POA for resident questions or concerns during construction?
Crossing of 4th St at T Ave.	When and for how long will this intersection be closed or restricted access? (this is the only option for driving to Cap Sante)
	Will emergency services and the elderly/disabled have 24/7 ability to go to/fro Cap Sante?
	Will any of the essential Utilities be out of service for Cap Sante? How long?
Uplands Routing	When will the Hybrid D-E option be assessed and MOUs with POA be finalized for routing of the Uplands portion of the Outfall?
	Will City Council vote on the final decision in a public meeting?
Uplands Operations	When, which and for how long will streets be closed or have restricted access? Ref: https://www.youtube.com/watch?v=CKcJxsZDcqlk
	Will emergency services and the elderly/disabled have 24/7 ability to go to/fro their residences/businesses?
	Will any of the essential Utilities be out of service for residences/businesses including uphill (e.g. 2 nd St to V Ave).
	When and for how long will rock blasting occur along either the Hybrid D-E or the Option 3 route?
	Will COA Noise ordinance WAC 173-60-040 be monitored and enforced for all Upland operations? How and by Whom?
	Has COA budgeted for and committed to honor restoration of trees and creation of a pocket park at the terminus of U Ave.?
	Will residents be furnished with documentation of contractor liability insurance information so they have recourse in the event of damage to their homes or property? Ref: https://www.youtube.com/watch?v=tVqBSJCbeQY
Marine Operations	Will COA Noise ordinance WAC 173-60-040 be monitored and enforced for Marine Operations? How and by Whom?

Date Received:

7/7/21

From: [Werden, Brenda \(DNR\)](#)
To: [Cooper, Tess](#)
Subject: FW: Request for Review SDP-2021-0005
Date: Wednesday, July 7, 2021 4:51:10 PM

Hi Tess, can I get on this mailing list.

Thank you.

Brenda Werden
Washington State Department of Natural Resources

From: Zimmerman, Ross (DNR) <Ross.Zimmerman@dnr.wa.gov>
Sent: Tuesday, July 6, 2021 9:52 AM
To: Werden, Brenda (DNR) <BRENDA.WERDEN@dnr.wa.gov>
Subject: FW: Request for Review SDP-2021-0005

In case you didn't receive this!

Ross Zimmerman
Washington State Department of Natural Resources (DNR)
360-707-1355

From: Cooper, Tess <tessc@cityofanacortes.org>
Sent: Tuesday, July 6, 2021 9:50 AM
To: Kevin Anderson <Kevin.Anderson@portofanacortes.com>; Brenda Treadwell <Brenda.Treadwell@portofanacortes.com>; SEPA@dahp.wa.gov; COM GMU Review Team <reviewteam@commerce.wa.gov>; Sandercock, Maria (ECY) <MARI461@ECY.WA.GOV>; DNR RE SEPACENTER <SEPACENTER@dnr.wa.gov>; Zimmerman, Ross (DNR) <Ross.Zimmerman@dnr.wa.gov>; Warinner, Robert J (DFW) <Robert.Warinner@dfw.wa.gov>; roland.storme@wsdot.wa.gov; Daisy.P.Douglass@usace.army.mil; Wooten, Tom <tomwooten@samishtribe.nsn.us>; 'jferry@samishtribe.nsn.us' <jferry@samishtribe.nsn.us>; Todd Woodard <twoodard@samishtribe.nsn.us>; Amy Trainer <atrain@swinomish.nsn.us>; Josephine Jefferson <jjefferson@swinomish.nsn.us>; 'jpeters@swinomish.nsn.us' <jpeters@swinomish.nsn.us>; 'thpo@sauk-suiattle.com' <thpo@sauk-suiattle.com>; 'kjoseph@sauk-suiattle.com' <kjoseph@sauk-suiattle.com>; 'sschuyler@upperskagit.com' <sschuyler@upperskagit.com>; 'swalsh@skagitcoop.org' <swalsh@skagitcoop.org>; 'Nora Kammer' <nkammer@skagitcoop.org>; klyste@stillaguamish.com; jvaneyk@stillaguamish.com; cstevens@stillaguamish.com
Subject: Request for Review SDP-2021-0005

External Email

Good Morning,

Please see below the link to the application materials for the above Shoreline Substantial Development & Shoreline Conditional Use Permits to replace and relocate the outfall for the Waste Water Treatment Plant. Please note that I am asking to receive comments by **Wednesday, July 23rd**.

[Project Documents Here:](#)

Do not hesitate to contact me should you have any questions as I am the planner assigned to the project.

Respectfully,

Tess Cooper, Senior Planner

Planning, Community & Economic Development Dept.

City of Anacortes - PO Box 547 – 904 6th St. – Anacortes, WA 98221

360.588.8234 – tessc@cityofanacortes.org – www.cityofanacortes.org

My incoming and outgoing email messages are subject to public disclosure requirements per RCW 42.56

Date Received:

7/22/21

From: [Kevin Anderson](#)
To: [Cooper, Tess](#)
Cc: [Brenda Treadwell](#)
Subject: WWTP Outfall Relocate SEPA Comments
Date: Thursday, July 22, 2021 9:03:20 AM
Attachments: [poasiq_d19ee07f-be0a-4d26-953f-27ea1ea4ebef11111111111111111111.png](#)
[LinkedIn_fdeed7d0-2ce8-4776-bb85-96c7be25146211111111111111111111111111111111.png](#)
[Facebook_fbe4fb87-fab0-4161-950c-87b48893b0a911111111111111111111111111111111.png](#)
[COA Outfall SEPA Comments_072221.pdf](#)

Good morning Tess,

Please find the attached minor comments on the relocation of the WWTP outfall. We appreciate the chance to provide comments on this project.

Best regards,
Kevin

Best Regards,

Kevin Anderson | Environmental Specialist

Direct (360) 299-1827 | Mobile (360) 770-5194

100 Commercial Ave, Anacortes, WA 98221



Port of Anacortes  

Public Communication: Information contained in any communication to or from the Port of Anacortes, including attachments, may be subject to the disclosure requirements of Washington's Public Records Act, Ch. 42.56 RCW.



Attn: Tess Cooper, Planner
City of Anacortes
P.O. Box 547
Anacortes, WA 98221
7/22/21

Re: City of Anacortes Wastewater Treatment Plant Outfall Relocation SEPA Checklist Comments

Dear Ms. Cooper:

The Port of Anacortes (Port) thanks the City of Anacortes for the opportunity to provide minor comments on the proposed Wastewater Treatment Plant Outfall Relocation SEPA checklist and determination. As a landowner adjacent to the project site and waterfront property manager the Port welcomes the opportunity to provide perspective on the proposed project.

We acknowledge the collaboration with the City of Anacortes on specific issues regarding the Port Management Agreement of subtidal lands and the continued work to address these concerns. This is especially important as planning for the Log Yard Site ([Cleanup Site ID#3604](#)) is in progress and the project site is nearby.

Comments:

1. The non-native vegetation on the west side of U-avenue serves as a visual screen to buffer residential uses from the industrial uses of the marine terminal. Will replacement of the bushes with 18 trees be of sufficient size and maturity to provide the same level of screening to the Cap Sante neighborhood?
2. Outfall is adjacent to the Wyman's Cleanup and mitigation habitat site. The mitigation site provides habitat for salmonids, including listed species (Puget Sound Chinook). What measures will be taken to ensure construction of the project will not adversely impact this sensitive habitat?
3. The project may affect traffic patterns to nearby Port residential tenants, businesses, and users of the 24-7 commercial marine ramp. This commercial ramp is essential to commerce and transport to the San Juan Islands and other islands. The activity at the ramp is intermittent and dependent on tides and activities. Timeline for upland work is unclear. Upland work may affect traffic in the neighborhood and users of the commercial ramp.
4. During the in-water construction phase, what measures will be taken to preserve access for marine traffic to the commercial ramp and the Port's pier from the water?

Thank you for the opportunity to provide commentary on this project. If you need additional follow up or information our comments please don't hesitate to contact me.

Best regards,

Kevin Anderson

Environmental Specialist, PORT OF ANACORTES

Grage, Libby

City of Anacortes
*Planning, Community &
Economic Development*

Date Received:

7/13/21

From: Lange, Steve
Sent: Tuesday, July 13, 2021 10:06 AM
To: Cooper, Tess
Subject: RE: Request for Review SDP-2021-0005

Tess,

I have no issues with what is being proposed. I would request detailed as-built of new improvements, but also of that they find in the ground since there is over a 100-years of history in this neighborhood.

Thanks,
Steven Lange
Senior Engineering Tech

From: Cooper, Tess <tessc@cityofanacortes.org>
Sent: Tuesday, July 6, 2021 9:43 AM
To: Development Review Group <DevelopmentReviewGroup@cityofanacortes.org>
Subject: Request for Review SDP-2021-0005

Good Morning,

Please see below the link to the application materials for the above Shoreline Substantial Development & Shoreline Conditional Use Permits to replace and relocate the outfall for the Waste Water Treatment Plant. Please note that I am asking to receive comments by **Wednesday, July 23rd**.

[Project Documents Here:](#)

Do not hesitate to contact me should you have any questions as I am the planner assigned to the project.

Respectfully,

Tess Cooper, Senior Planner
Planning, Community & Economic Development Dept.
City of Anacortes - PO Box 547 - 904 6th St. - Anacortes, WA 98221
360.588.8234 - tessc@cityofanacortes.org - www.cityofanacortes.org

My incoming and outgoing email messages are subject to public disclosure requirements per RCW 42.56

Date Received:

7/8/21

From: [Sandercock, Maria \(ECY\)](#)
To: [Cooper, Tess](#)
Subject: RE: Request for Review SDP-2021-0005
Date: Thursday, July 8, 2021 12:11:58 PM

Great, thanks Tess! I've taken a quick look through this and I don't have any other comments.

Best,
Maria

From: Cooper, Tess <tessc@cityofanacortes.org>
Sent: Thursday, July 8, 2021 11:54 AM
To: Sandercock, Maria (ECY) <MARI461@ECY.WA.GOV>
Subject: RE: Request for Review SDP-2021-0005

THIS EMAIL ORIGINATED FROM OUTSIDE THE WASHINGTON STATE EMAIL SYSTEM - Take caution not to open attachments or links unless you know the sender AND were expecting the attachment or the link

Maria,

See the requested materials updated on the public portal here:
<https://docs.cityofanacortes.org/WebLink/0/doc/544383/Page1.aspx>

Thanks,

Tess Cooper, Senior Planner

Planning, Community & Economic Development Dept.

City of Anacortes - PO Box 547 – 904 6th St. – Anacortes, WA 98221
360.588.8234 – tessc@cityofanacortes.org – www.cityofanacortes.org

My incoming and outgoing email messages are subject to public disclosure requirements per RCW 42.56

From: Sandercock, Maria (ECY) <MARI461@ECY.WA.GOV>
Sent: Thursday, July 8, 2021 11:10 AM
To: Cooper, Tess <tessc@cityofanacortes.org>
Subject: RE: Request for Review SDP-2021-0005

Hi Tess,

Thanks for this notice. I looked through the application materials on the website. I did not see any responses to the shoreline conditional use criteria. If they haven't already, I would recommend the applicant submit responses to those, since those are the main approval criteria for both the City and Ecology when reviewing SCUPs.

They can find the criteria in the Anacortes SMP Chapter 3.1.D and in [WAC 173-27-160](#).

Cheers,
Maria

Maria Sandercock, AICP

Shoreline Planner | WA Department of Ecology | Shorelands & Environmental Assistance
cell: 425-256-1372 | maria.sandercock@ecy.wa.gov

We have moved!

Ecology's Northwest Regional Office has moved to Shoreline:

- Physical address: 15700 Dayton Ave N, Shoreline, WA
- Mailing address: PO Box 330316, Shoreline, WA 98133-9716
- 24-hour reception line: 206-594-0000

This communication is public record and may be subject to disclosure as per the Washington State Public Records Act, RCW 42.56.

From: Cooper, Tess <tessc@cityofanacortes.org>

Sent: Tuesday, July 6, 2021 9:50 AM

To: Kevin Anderson <Kevin.Anderson@portofanacortes.com>; Brenda Treadwell <Brenda.Treadwell@portofanacortes.com>; SEPA (DAHP) <sepa@dahp.wa.gov>; COM GMU Review Team <reviewteam@commerce.wa.gov>; Sandercock, Maria (ECY) <MARI461@ECY.WA.GOV>; DNR RE SEPACENTER <SEPACENTER@dnr.wa.gov>; Zimmerman, Ross (DNR) <Ross.Zimmerman@dnr.wa.gov>; Warinner, Robert J (DFW) <Robert.Warinner@dfw.wa.gov>; roland.storme@wsdot.wa.gov; Daisy.P.Douglass@usace.army.mil; Wooten, Tom <tomwooten@samishtribe.nsn.us>; 'jferry@samishtribe.nsn.us' <jferry@samishtribe.nsn.us>; Todd Woodard <twoodard@samishtribe.nsn.us>; Amy Trainer <atrain@swinomish.nsn.us>; Josephine Jefferson <jjefferson@swinomish.nsn.us>; 'jpeters@swinomish.nsn.us' <jpeters@swinomish.nsn.us>; 'thpo@sauk-suiattle.com' <thpo@sauk-suiattle.com>; 'kjoseph@sauk-suiattle.com' <kjoseph@sauk-suiattle.com>; 'sschuyler@upperskagit.com' <sschuyler@upperskagit.com>; 'swalsh@skagitcoop.org' <swalsh@skagitcoop.org>; 'Nora Kammer' <nkammer@skagitcoop.org>; klyste@stillaguamish.com; jvaneyk@stillaguamish.com; cstevens@stillaguamish.com

Subject: Request for Review SDP-2021-0005

THIS EMAIL ORIGINATED FROM OUTSIDE THE WASHINGTON STATE EMAIL SYSTEM - Take caution not to open attachments or links unless you know the sender AND were expecting the attachment or the link

Good Morning,

Please see below the link to the application materials for the above Shoreline Substantial Development & Shoreline Conditional Use Permits to replace and relocate the outfall for the Waste Water Treatment Plant. Please note that I am asking to receive comments by **Wednesday, July 23rd**.

[Project Documents Here:](#)

Do not hesitate to contact me should you have any questions as I am the planner assigned to the project.

Respectfully,

Tess Cooper, Senior Planner

Planning, Community & Economic Development Dept.

City of Anacortes - PO Box 547 – 904 6th St. – Anacortes, WA 98221

360.588.8234 – tessc@cityofanacortes.org – www.cityofanacortes.org

My incoming and outgoing email messages are subject to public disclosure requirements per RCW 42.56

Exhibit 6

Public Notices

Grage, Libby

From: Grage, Libby
Sent: Wednesday, November 3, 2021 5:43 PM
To: Brenda Treadwell; 'Kevin Anderson'; brenda.werden@dnr.wa.gov; 'John R Wilkinson'; Maria Sandercock (ECY); Brandon Black (brandonb@co.skagit.wa.us); 'ross.zimmerman@dnr.wa.gov'; 'bob.warriner@dfw.wa.gov'; 'Daisy.P.Douglass@usace.army.mil'
Subject: Notice of Public Hearing: SDP-2021-0005 - Anacortes Wastewater Treatment Plant Outfall SCUP/SSDP
Attachments: Notice of Hearing.pdf

Hello,

Please find attached the public hearing notice for the above referenced project.

Please let me know if you have any questions.

Best regards,

Libby Grage | City of Anacortes
Planning, Community & Economic Development Department
Planning Manager
P.O. Box 547 | 904 6th Street | Anacortes, WA 98221
360.299.1986 (work) | 360-661-3505 (work cell)
libbyb@cityofanacortes.org | www.cityofanacortes.org

My incoming and outgoing email messages are subject to public disclosure requirements per RCW 42.56.

ADVERTISING PROOF



STANWOOD CAMANO NEWS

1215 Anderson Rd,
Mount Vernon, WA 98274
Ph. (360) 416-2210 Fax: (907) 452-5054

BILLING DATE:	ACCOUNT NO:
06/18/21	45993



CITY OF ANACORTES
PO BOX 547
ANACORTES, WA 98221

Notice of Application with Optional SEPA DNS:

AD #	DESCRIPTION	START	STOP	TIMES	AMOUNT
112981	Notice of Applicatio	06/23/21	06/23/21	2	\$170.52

NOTICE IS HEREBY GIV-
EN THAT AN APPLICA-
TION WAS MADE FOR
THE FOLLOWING PRO-
POSAL:

File Number: SDP-2021-
0006

Property Owner: City of
Anacortes

Applicant: Widener & As-
sociates

Date of Application: May
24, 2021

Date of Completeness:
June 18, 2021

Project Location: Starting
at 500 T ave N, 3rd St west,
U ave N and into the Gue-
mes Channel. Anacortes,
Washington 98221 (Parcel
56815 and city ROW)

Request: The applicant
is requesting a type-4
shoreline substantial
development permit and
shoreline conditional use
permit to replace and
relocate the damaged
outfall pipe which will
be a 48-inch diameter
high-density polyeth-
ylene (HDPE) pipe com-
ing from the WWTP for
1,631 feet until the shore-
line where the pipe will
reduce to 42-inch out-
side diameter HDPE pipe
for 1,030 feet with an 86-
foot diffuser angled to
the NW at approximately
24.5 degrees to better
match the bidirectional
current. The total length
of the pipe will be 2,748
feet from the WWTP con-
tinuing into the Guemes
Channel.

Other permits required:
WDEP, UBA, and UACOF

Payments:

Date	Method	Card Type	Last 4 Digits	Check	Amount
Discount:					\$0.00
Surcharge:					\$0.00
Credits:					\$0.00
				Gross:	\$170.52
				Paid Amount:	\$0.00
				Amount Due:	\$170.52

We Appreciate Your Business!

AD# 112981

WDFW HPA and USACE approval.

Environmental documents: SEPA Environmental Checklist, Critical Area Report, Draft Biological Evaluation.

Public Hearing: The two permits will follow consolidated review process under the SSDP and Pre-decision open record Hearing date will be determined and publicized at a later date.

Public Comment Period: The Notice of Application was published on June 23rd, 2021. Written comments must be submitted to the contact person listed below by **5:00 PM on July 23rd, 2021.**

SEPA Review: Based on the submitted application and available information, the City anticipates issuing an MDNS for this proposal and the optional DNS process as specified in WAC § 197.11.355 is being utilized. Consequently, this may be the only opportunity to comment on the environmental impacts of this proposal. This proposal may include mitigation measures under applicable codes, and the project review process may incorporate or require mitigation measures regardless of whether an EIS is prepared. A copy of the subsequent SEPA threshold determination for the proposal may be obtained upon request.

ANY PERSON HAS THE RIGHT TO RECEIVE NOTICE, PARTICIPATE IN ANY HEARINGS, REQUEST A COPY OF THE FINAL DECISION AND APPEAL THE DECISION AS PROVIDED BY LAW.

Document Availability: Application documents may be reviewed at <https://www.anacorteswa.gov/161/Planning-Community-Economic-Development> by clicking "Notices of Application" and then opening the appropriate project file number folder.

Appeals: Any party with standing may appeal the decision, once made, within 14 calendar days after written notice of the decision is mailed, per

the provisions in AMU 19.20.180, Appeals.

For Project Information: Tess Cooper, Senior Planner; 360-588-8234, tessc@cityofanacortes.org; City of Anacortes Department of Planning, Community, & Economic Development, P.O. Box 547, Anacortes, WA 98221

**Published
June 23, 2021
AA-112981**



Notice of Application with Optional SEPA DNS:

NOTICE IS HEREBY GIVEN THAT AN APPLICATION WAS MADE FOR THE FOLLOWING PROPOSAL:

File Number: SDP-2021-0006

Property Owner: City of Anacortes

Applicant: Widener & Associates

Date of Application: May 24, 2021

Date of Completeness: June 18, 2021

Project Location: Starting at 500 T ave N, 3rd St west, U ave N and into the Guemes Channel. Anacortes, Washington 98221 (Parcel 56815)

Request: The applicant is requesting a type-4 shoreline substantial development permit and shoreline conditional use permit to replace and relocate the damaged outfall pipe which will be a 48-inch diameter high-density polyethylene (HDPE) pipe coming from the WWTP for 1,631 feet until the shoreline where the pipe will reduce to 42-inch outside diameter HDPE pipe for 1,030 feet with an 86-foot diffuser angled to the NW at approximately 24.5 degrees to better match the bidirectional current. The total length of the pipe will be 2,748 feet from the WWTP continuing into the Guemes Channel.

Other permits required: WDFW HPA and USACE approval.

Environmental documents: SEPA Environmental Checklist, Critical Area Report, Draft Biological Evaluation.

Public Hearing: The two permits will follow consolidated review process under the SSDP and Pre-decision open record Hearing date will be determined and publicized at a later date.

Public Comment Period: The Notice of Application was published on June 23rd, 2021. Written comments must be submitted to the contact person listed below by **5:00 PM on July 23rd, 2021**.

SEPA Review: Based on the submitted application and available information, the City anticipates issuing an MDNS for this proposal and the optional DNS process as specified in WAC § 197.11.355 is being utilized. Consequently, this may be the only opportunity to comment on the environmental impacts of this proposal. This proposal may include mitigation measures under applicable codes, and the project review process may incorporate or require mitigation measures regardless of whether an EIS is prepared. A copy of the subsequent SEPA threshold determination for the proposal may be obtained upon request.

ANY PERSON HAS THE RIGHT TO RECEIVE NOTICE, PARTICIPATE IN ANY HEARINGS, REQUEST A COPY OF THE FINAL DECISION AND APPEAL THE DECISION AS PROVIDED BY LAW.

Document Availability: Application documents may be reviewed at <https://www.anacorteswa.gov/161/Planning-Community-Economic-Development> by clicking "Notices of Application" and then opening the appropriate project file number folder.

Appeals: Any party with standing may appeal the decision, once made, within 14 calendar days after written notice of the decision is mailed, per the provisions in AMC 19.20.180, *Appeals*.

For Project Information: Tess Cooper, Senior Planner; 360-588-8234, tessc@cityofanacortes.org; City of Anacortes Department of Planning, Community, & Economic Development, P.O. Box 547, Anacortes, WA 98221



Notice of Public Hearing

NOTICE IS HEREBY GIVEN that a Pre-Decision Open Record Public Hearing will be held by the Anacortes Planning Commission on Wednesday, November 24, 2021 at 6:00 PM for the following proposal:

File Number: SDP-2021-0005
Project Name: Anacortes Wastewater Treatment Plant Outfall Relocation
Property Owner: City of Anacortes
Applicant: Widener & Associates, on behalf of City of Anacortes
Project Location: Starting at 500 T ave N, 3rd St west, U ave N and into the Guemes Channel. Anacortes, Washington 98221 (Parcel 56815)

SCAN HERE TO VIEW

All File Materials & Staff Report:



Request: The applicant is requesting a Type-4 shoreline substantial development permit and shoreline conditional use permit to replace and relocate the damaged outfall pipe. The new pipe will be a 48-inch diameter Fiberglass Reinforced Pipe (FRP) pipe coming from the WWTP for 1,631 feet until the Guemes Channel shoreline where the pipe will reduce to 42-inch outside diameter high density polyethylene (HDPE) pipe for 1,030 feet with an 86-foot diffuser angled to the northeast at approximately 24.5 degrees to better match the bidirectional current. The total length of the pipe will be 2,661 feet from the WWTP continuing into the Guemes Channel.

Environmental Review: A Mitigated SEPA threshold Determination of Non-Significance (MDNS) was issued for the project on September 27, 2021, under WAC 197-11-340(2), after using the Optional DNS process in WAC 197-11-355. There is no further comment period on the MDNS.

Public Hearing:

Planning Commission Open Record Public Hearing: Wednesday, November 24, 2021 at 6:00 PM
City Council Closed Record Decision Hearing: Monday, December 13, 2021 at 6:00 PM

- Virtual meeting participation instructions and connection information can be viewed here: <https://www.anacorteswa.gov/700/Meeting-Documents-and-Video>. Meeting attendance options will be posted on the applicable agenda published the week before the meeting. Hearings will be conducted in accordance with the rules of procedure adopted by the hearing body.
- Members of the public who require special assistance to participate in or access the public hearing may contact the [City Clerk](#) 24 hours before the meeting to make special arrangements. Dial 360-299-1960.

Document Availability: Application documents may be reviewed at <https://www.anacorteswa.gov/1377/Current-Projects> by clicking under "Current Planning Applications" and then opening the appropriate project file number folder. The staff report will be available for review at this location no later than 5:00 PM on November 18, 2021.

Appeals: Per AMC 18.16.110, appeals of a final decision of the City of Anacortes or the Department of Ecology, once made, must be filed within 21-days of the date of filing of the final permit and will be heard by the Shoreline Hearings Board pursuant to the procedures and timelines of RCW 90.50.180.

For Project Information: Libby Grage, Planning Manager; 360-299-1986; libbyb@cityofanacortes.org; City of Anacortes Department of Planning, Community, & Economic Development, P.O. Box 547, Anacortes, WA 98221

LAND USE PERMIT NOTICE DISTRIBUTION

File Number: SDP-2021-0005
Project Name: COA WWTP SCUP/SSDP



Notice of Hearing - Affidavit of Posting

Where	Date	By:	Notes
REQUIRED BY CODE			
Anacortes American	11/3/2021	LBG	sent 10/28/21
Applicant	11/3/2021		
Appellant	N/A		
Parties of Record	11/3/21 via email		Kevin Anderson, POA Brenda Treadwell, POA John Wilkinson, wilkinson.johnr@gmail.com
Any person who requested notice	N/A		
Agencies with Jurisdiction or who commented	11/3/21 via email		Maria Sandercock, DOE Brenda Werden, DNR Daisy Douglass, USACE Bob Warriner, WDFW
WSDOT	N/A		N/A
Skagit County	11/3/21 via email		Brandon Black
Posting property	11/5/2021		
City Hall	11/5/2021		
Library	11/5/2021		
COURTESY			
Webpage	11/3/2021		
NotifyMe Email List	11/3/2021		

Exhibit 8

Issued HPA



HYDRAULIC PROJECT APPROVAL

Washington Department of
Fish & Wildlife
PO Box 43234
Olympia, WA 98504-3234
(360) 902-2200

Issued Date: November 05, 2021
Project End Date: November 04, 2026

Permit Number: 2021-4-798+01
FPA/Public Notice Number: N/A
Application ID: 24045

PERMITTEE	AUTHORIZED AGENT OR CONTRACTOR
City of Anacortes ATTENTION: Fred Buckenmeyer P.O. Box 547 Anacortes, WA 98221	Widener & Associates ATTENTION: Ross Widener 1902 120th Place SE, Suite 202 Everett, WA 98208

Project Name: City of Anacortes Wastewater Treatment Plant Outfall Relocation

Project Description: The project is proposing to upgrade The City of Anacortes Wastewater Treatment Plant (WWTP) outfall by installing an outfall pipe which will be a 48-inch diameter high-density polyethylene (HDPE) pipe coming from the WWTP for 1,631 feet until the shoreline where the pipe will reduce to 42-inch outside diameter HDPE pipe for 1,030 feet with an 86-foot diffuser angled to the NW at approximately 24.5 degrees to better match the bidirectional current. The total length of the pipe will be 2,748 feet from the WWTP continuing into the Guemes Channel. The new pipe will be located east of the current outfall, terminate in deeper waters further from the shoreline, and will be able to convey larger effluent volumes.

PROVISIONS

1. **TIMING LIMITATION:** To protect fish and shellfish habitats at the job site, work below the ordinary high water line (OHWL) must occur from August 1 and February 15 of any year.
2. **APPROVED PLANS:** Work must be accomplished per plans and specifications submitted with the application and approved by the Washington Department of Fish and Wildlife, entitled "CITY OF ANACORTES WASTEWATER TREATMENT PLANT OUTFALL RELOCATION," dated October 5, 2021, except as modified by this Hydraulic Project Approval (HPA). You must have a copy of these plans and this HPA available on site during all phases of the project construction.

NOTIFICATION

3. **PRE- AND POST-CONSTRUCTION NOTIFICATION:** You, your agent, or contractor must contact the Washington Department of Fish and Wildlife by e-mail at HPAapplications@dfw.wa.gov; mail to Post Office Box 43234, Olympia, Washington 98504-3234; or fax to (360) 902-2946 at least three business days before starting work, and again within seven days after completing the work. The notification must include the permittee's name, project location, starting date for work or date the work was completed, and the permit number. The Washington Department of Fish and Wildlife may conduct inspections during and after construction; however, the Washington Department of Fish and Wildlife will notify you or your agent before conducting the inspection.
4. **FISH KILL/ WATER QUALITY PROBLEM NOTIFICATION:** If a fish kill occurs or fish are observed in distress at the job site, immediately stop all activities causing harm. Immediately notify the Washington Department of Fish and Wildlife of the problem. If the likely cause of the fish kill or fish distress is related to water quality, also notify the Washington Military Department Emergency Management Division at 1-800-258-5990. Activities related to the fish kill or fish distress must not resume until the Washington Department of Fish and Wildlife gives approval. The Washington Department of Fish and Wildlife may require additional measures to mitigate impacts.

STAGING, JOB SITE ACCESS AND EQUIPMENT

5. Establish the staging area (used for activities such as equipment storage, vehicle storage, fueling, servicing, and



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hazardous material storage) in a location and manner that will prevent contaminants like petroleum products, hydraulic fluid, fresh concrete, sediments, sediment-laden water, chemicals, or any other toxic or harmful materials from entering waters of the state.

6. Confine the use of equipment to specific access and work corridor shown in the approved plans.
7. Check equipment daily for leaks and complete any required repairs before using the equipment in or near the water.
8. Lubricants composed of biodegradable base oils such as vegetable oils, synthetic esters, and polyalkylene glycols are recommended for use in equipment operated in or near water.
9. Operate vessels with minimal propulsion power to avoid prop scour damage to the bed and marine vegetation habitats.
10. Operate vessels during tidal elevations that are adequate to prevent grounding of the barge.
11. Do not deploy anchors or spuds in seagrass or kelp.

CONSTRUCTION-RELATED SEDIMENT, EROSION AND POLLUTION CONTAINMENT

12. Prevent contaminants from the project, such as petroleum products, hydraulic fluid, fresh concrete, sediments, sediment-laden water, chemicals, or any other toxic or harmful materials, from entering or leaching into waters of the state.

OUTFALL

13. The total length of the new outfall pipe shall not exceed 2,748 feet.
14. The outlet of the submerged outfall piping shall not protrude above grade landward of -30' MLLW.
15. The diffuser shall utilize small port holes in order to prevent fish from entering the diffuser/outfall pipe.
16. Divers shall assist with outfall pipe placement, pipe joining, and verification of the pipeline profile and condition.

DREDGING

17. Conduct dredging with dredge types and methods that cause the least impacts to fish and shellfish.
18. Bucket descent shall slow down at least 3 feet above sediment surface to limit disturbance.
19. Dredged material shall be placed on the barge immediately following removal.
20. To minimize turbidity, hopper dredges, scows and barges used to transport dredged materials to the disposal or transfer sites must completely contain the dredged material.
21. To avoid attracting fish to artificial light at night, limit dredging activities to daylight hours whenever feasible.
22. All activities must follow the approved "WATER QUALITY MONITORING AND PROTECTION PLAN" (WQMPP) dated May 2021.

DEMOBILIZATION/CLEANUP

23. Remove all steel sheet piles and other debris and deleterious materials resulting from construction from the beach area or bed and prevent from entering waters of the state.
24. Following installation of the new marine outfall pipe, backfill the dredge footprint with approximately 2,820cy of clean material and restore the bed profile to pre-construction conditions.

LOCATION #1:	Site Name: U Ave Outfall U Avenue, Anacortes, WA 98221
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Permit Number: 2021-4-798+01
FPA/Public Notice Number: N/A
Application ID: 24045

WORK START:		November 5, 2021			WORK END:		November 4, 2026	
<u>WRIA</u>		<u>Waterbody:</u>			<u>Tributary to:</u>			
03 - Skagit Lower - Samish		Unknown Stream Number			Unknown			
<u>1/4 SEC:</u>	<u>Section:</u>	<u>Township:</u>	<u>Range:</u>	<u>Latitude:</u>	<u>Longitude:</u>	<u>County:</u>		
	18	35 N	02 E	48.520928	-122.604670	Skagit		
<u>Location #1 Driving Directions</u>								
Heading west on Highway 20, head north on Commercial Avenue. Turn right (east) on 4th Street. The City's Wastewater Treatment Plant is at the intersection of 4th Street and T Avenue. The project's upland portion can be reached by continuing on 4th Street one block past the Wastewater Treatment Plant, turning left (North) on U Avenue. Continue towards Guemes Channel, to the end of the roadway.								

APPLY TO ALL HYDRAULIC PROJECT APPROVALS

This Hydraulic Project Approval pertains only to those requirements of the Washington State Hydraulic Code, specifically Chapter 77.55 RCW. Additional authorization from other public agencies may be necessary for this project. The person(s) to whom this Hydraulic Project Approval is issued is responsible for applying for and obtaining any additional authorization from other public agencies (local, state and/or federal) that may be necessary for this project.

This Hydraulic Project Approval shall be available on the job site at all times and all its provisions followed by the person(s) to whom this Hydraulic Project Approval is issued and operator(s) performing the work.

This Hydraulic Project Approval does not authorize trespass.

The person(s) to whom this Hydraulic Project Approval is issued and operator(s) performing the work may be held liable for any loss or damage to fish life or fish habitat that results from failure to comply with the provisions of this Hydraulic Project Approval.

Failure to comply with the provisions of this Hydraulic Project Approval could result in civil action against you, including, but not limited to, a stop work order or notice to comply, and/or a gross misdemeanor criminal charge, possibly punishable by fine and/or imprisonment.

All Hydraulic Project Approvals issued under RCW 77.55.021 are subject to additional restrictions, conditions, or revocation if the Department of Fish and Wildlife determines that changed conditions require such action. The person(s) to whom this Hydraulic Project Approval is issued has the right to appeal those decisions. Procedures for filing appeals are listed below.



HYDRAULIC PROJECT APPROVAL

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FPA/Public Notice Number: N/A

Application ID: 24045

MINOR MODIFICATIONS TO THIS HPA: You may request approval of minor modifications to the required work timing or to the plans and specifications approved in this HPA unless this is a General HPA. If this is a General HPA you must use the Major Modification process described below. Any approved minor modification will require issuance of a letter documenting the approval. A minor modification to the required work timing means any change to the work start or end dates of the current work season to enable project or work phase completion. Minor modifications will be approved only if spawning or incubating fish are not present within the vicinity of the project. You may request subsequent minor modifications to the required work timing. A minor modification of the plans and specifications means any changes in the materials, characteristics or construction of your project that does not alter the project's impact to fish life or habitat and does not require a change in the provisions of the HPA to mitigate the impacts of the modification. If you originally applied for your HPA through the online Aquatic Protection Permitting System (APPS), you may request a minor modification through APPS. A link to APPS is at <http://wdfw.wa.gov/licensing/hpa/>. If you did not use APPS you must submit a written request that clearly indicates you are seeking a minor modification to an existing HPA. Written requests must include the name of the applicant, the name of the authorized agent if one is acting for the applicant, the APP ID number of the HPA, the date issued, the permitting biologist, the requested changes to the HPA, the reason for the requested change, the date of the request, and the requestor's signature. Send by mail to: Washington Department of Fish and Wildlife, PO Box 43234, Olympia, Washington 98504-3234, or by email to HPAapplications@dfw.wa.gov. You should allow up to 45 days for the department to process your request.

MAJOR MODIFICATIONS TO THIS HPA: You may request approval of major modifications to any aspect of your HPA. Any approved change other than a minor modification to your HPA will require issuance of a new HPA. If you originally applied for your HPA through the online Aquatic Protection Permitting System (APPS), you may request a major modification through APPS. A link to APPS is at <http://wdfw.wa.gov/licensing/hpa/>. If you did not use APPS you must submit a written request that clearly indicates you are requesting a major modification to an existing HPA. Written requests must include the name of the applicant, the name of the authorized agent if one is acting for the applicant, the APP ID number of the HPA, the date issued, the permitting biologist, the requested changes to the HPA, the reason for the requested change, the date of the request, and the requestor's signature. Send your written request by mail to: Washington Department of Fish and Wildlife, PO Box 43234, Olympia, Washington 98504-3234. You may email your request for a major modification to HPAapplications@dfw.wa.gov. You should allow up to 45 days for the department to process your request.

APPEALS INFORMATION

If you wish to appeal the issuance, denial, conditioning, or modification of a Hydraulic Project Approval (HPA), Washington Department of Fish and Wildlife (WDFW) recommends that you first contact the department employee who issued or denied the HPA to discuss your concerns. Such a discussion may resolve your concerns without the need for further appeal action. If you proceed with an appeal, you may request an informal or formal appeal. WDFW encourages you to take advantage of the informal appeal process before initiating a formal appeal. The informal appeal process includes a review by department management of the HPA or denial and often resolves issues faster and with less legal complexity than the formal appeal process. If the informal appeal process does not resolve your concerns, you may advance your appeal to the formal process. You may contact the HPA Appeals Coordinator at (360) 902-2534 for more information.

A. INFORMAL APPEALS: WAC 220-660-460 is the rule describing how to request an informal appeal of WDFW actions taken under Chapter 77.55 RCW. Please refer to that rule for complete informal appeal procedures. The following information summarizes that rule.



HYDRAULIC PROJECT APPROVAL

Washington Department of
Fish & Wildlife
PO Box 43234
Olympia, WA 98504-3234
(360) 902-2200

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Project End Date: November 04, 2026

Permit Number: 2021-4-798+01
FPA/Public Notice Number: N/A
Application ID: 24045

A person who is aggrieved by the issuance, denial, conditioning, or modification of an HPA may request an informal appeal of that action. You must send your request to WDFW by mail to the HPA Appeals Coordinator, Department of Fish and Wildlife, Habitat Program, PO Box 43234, Olympia, Washington 98504-3234; e-mail to HPAapplications@dfw.wa.gov; fax to (360) 902-2946; or hand-delivery to the Natural Resources Building, 1111 Washington St SE, Habitat Program, Fifth floor. WDFW must receive your request within 30 days from the date you receive notice of the decision. If you agree, and you applied for the HPA, resolution of the appeal may be facilitated through an informal conference with the WDFW employee responsible for the decision and a supervisor. If a resolution is not reached through the informal conference, or you are not the person who applied for the HPA, the HPA Appeals Coordinator or designee may conduct an informal hearing or review and recommend a decision to the Director or designee. If you are not satisfied with the results of the informal appeal, you may file a request for a formal appeal.

B. FORMAL APPEALS: WAC 220-660-470 is the rule describing how to request a formal appeal of WDFW actions taken under Chapter 77.55 RCW. Please refer to that rule for complete formal appeal procedures. The following information summarizes that rule.

A person who is aggrieved by the issuance, denial, conditioning, or modification of an HPA may request a formal appeal of that action. You must send your request for a formal appeal to the clerk of the Pollution Control Hearings Boards and serve a copy on WDFW within 30 days from the date you receive notice of the decision. You may serve WDFW by mail to the HPA Appeals Coordinator, Department of Fish and Wildlife, Habitat Program, PO Box 43234, Olympia, Washington 98504-3234; e-mail to HPAapplications@dfw.wa.gov; fax to (360) 902-2946; or hand-delivery to the Natural Resources Building, 1111 Washington St SE, Habitat Program, Fifth floor. The time period for requesting a formal appeal is suspended during consideration of a timely informal appeal. If there has been an informal appeal, you may request a formal appeal within 30 days from the date you receive the Director's or designee's written decision in response to the informal appeal.

C. FAILURE TO APPEAL WITHIN THE REQUIRED TIME PERIODS: If there is no timely request for an appeal, the WDFW action shall be final and unappealable.

Habitat Biologist Marcus.Reaves@dfw.wa.gov
Marcus Reaves 360-466-4345, Ext:251

for Director
WDFW









DRAFT

ANACORTES PLANNING COMMISSION

Findings of Fact, Conclusions of Law and Recommendation

File Number	SDP-2021-0005
Project Name	City of Anacortes Wastewater Treatment Plant Outfall Relocation
Proposal	The applicant is requesting a Type-4 Shoreline Substantial Development Permit (SSDP) and Shoreline Conditional Use Permit (SCUP) to replace and relocate the damaged outfall pipe. The new pipe will be a 48-inch diameter Fiberglass Reinforced Pipe (FRP) coming from the WWTP for 1,631 feet until the Guemes Channel shoreline where the pipe will reduce to 42-inch outside diameter high density polyethylene (HDPE) pipe for 1,030 feet with an 86-foot diffuser angled to the northeast at approximately 24.5 degrees to better match the bidirectional current. The total length of the pipe will be 2,661 feet from the WWTP continuing into the Guemes Channel.
Public Hearing	Anacortes Planning Commission
Public Hearing Date	November 24, 2021
PC Deliberations	
Decision Body	Anacortes City Council
Closed Record Hearing Date	December 13, 2021
Exhibits	Exhibit 1 – Staff Report Exhibit 2 – Vicinity Map Exhibit 3 – Application Documents Exhibit 4 – Issued SEPA MDNS Exhibit 5 – Public & Agency Comments Exhibit 6 – Notices Exhibit 7 – WDFW Issued HPA Exhibit 8 – Site Photos

Documents are available at City Hall in the Planning, Community, and Economic Development Department or may be accessed on the public portal:

<https://docs.cityofanacortes.org/WebLink/Browse.aspx?dbid=0&startid=434848&row=1>

After considering the written and spoken comments and considering the record before it, the Planning Commission enters the following findings of fact, conclusions of law, and recommendation:

Findings of Fact & Conclusions of Law

1. The Staff report dated November 17, 2021, accurately describes the project proposal and is hereby incorporated by reference. (Exhibit 1)
2. The following members of the public provided testimony during the public hearing:

- a.
 - b.
3. The following additional exhibits were entered into the record at the public hearing:
- a.
4. The following additional Findings of Fact and/or Conclusions of Law are entered:
- a.

Recommendation

Based on the foregoing findings and conclusions of law, and review of the City's regulatory authority to implement the policies, standards, and regulations of the Anacortes Municipal Code, the Planning Commission hereby makes the following recommendation regarding the subject Shoreline Substantial Development and Shoreline Conditional Use Permits:

- ☐ Approve with Conditions
☐ Approve
☐ Deny

Subject to staff's recommended conditions in the Staff Report dated November 17, 2021 and any additional Commissioner conditions of approval as listed below:

1.

Commission Vote	Support	Oppose	Absent	Abstain
Sarah Ruether				
Gary Molyneaux				
Jeffrey Graf				
Ward MacKenzie				
Jack Curtis				
Frank Jeretzky				
Linda Martin				
Total				

ANACORTES PLANNING COMMISSION
Anacortes, Washington

Ward MacKenzie
Planning Commission Chair

Date



Planning Commission Agenda Bill

Meeting Date: November 24, 2021 **Agenda Item:** D.2.

Subject: Public Hearing: SDP-2021-0009 - Skyline Dock & Piling Project

Staff Contact: MORGAN EMILY

Approved for Submittal to Commission by

MORGAN EMILY

LIBBY GRAGE

Action Type

Public Hearing

Summary Statement: The applicant has requested Shoreline Substantial Development permit with SEPA Review for the upgrade to an existing community dock on Flounders Bay.

Background: The project completed the mandatory pre-application and neighborhood meetings.

Previous Action: N/A

Competing Viewpoints Considered:

Recommended Motion: I move to approve SDP-2021-0009, subject to the staff recommended conditions of approval contained within the staff report.

Alternative Actions: Approval with modified conditions or denial

Attachments (listed in order presented):

1. Exhibit A - Staff Report
2. Exhibit B - Application Materials
3. Exhibit C - Notices
4. Exhibit D - Comments
5. Exhibit E - Issued DNS



Anacortes Planning, Community & Economic Development Department

904 6TH Street / P.O. Box 547, Anacortes, WA 98221

360.299-1984 - Office Hours: Mon-Fri 8:00 AM – 5:00 PM

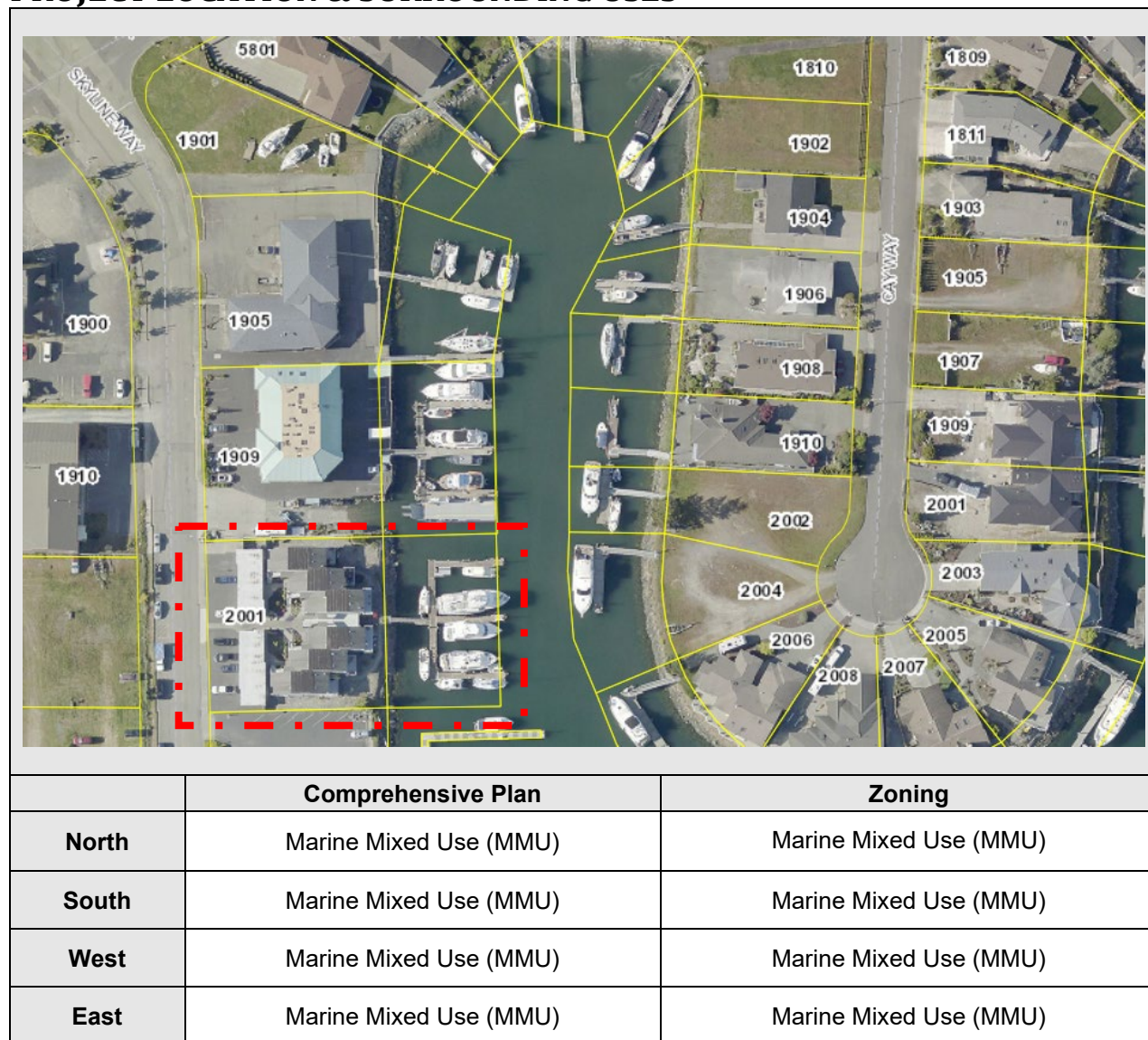
SHORELINE SUBSTANTIAL DEVELOPMENT PERMIT: STAFF REPORT

File Number	SDP-2021-0009	Date of Report	November 17, 2021
Project Title	Skyline Dock & Piling Project	Related File(s)	PRE-2021-0006
Project Location	2001 Skyline Way (P80330)		
Request	The applicant has requested Shoreline Substantial Development permit with SEPA Review for the upgrade to an existing community dock on Flounders Bay. The project proposes to replace (10) existing creosote pilings with 12 in. galvanized steel pilings. The existing concrete floats, totaling 1,722 sq. ft., would be replaced with steel framed FRP grated floats; the floats are to be installed in the same layout and location as existing. The existing 3 ft. by 32 ft. gangway is to be replaced by a 4 ft. by 40 ft. grated gangway.		
Landowner	Interbay Condominium Marina Attn: Bruce Cay, representative of owner's association 2001 Skyline Way Anacortes, WA 98221		
Applicant	Tyler Zimmerman, TZ Engineering, LLC 16980 Sargent Ln Burlington, WA 98233		

SITE INFORMATION

Zoning	Marine Mixed Use (MMU)	Comprehensive Plan Designation	Marine Mixed Use (MMU)
Present Use of Property	The subject property multifamily with a private community marina.		
Critical Areas	Pursuant to Appendix "A" of the Shoreline Master Program (SMP) regulating critical areas, the subject development was reviewed for proximity to critical areas. The subject property is subject to the following: SMP A-3: Geologically Hazardous Areas Based on the City mapping system, the subject property is located in an identified area of tsunami hazard; however, the proposed dock modifications are to be installed waterward/outside of the identified hazard area. Therefore, this section would not apply to the proposed dock project. SMP A-1: Frequently Flooded Areas Based on FEMA's National Flood Hazard Mapping, the project is located within FIRM panels 5303170060A; this area is identified as Zone AE. Work to occur within Zone AE shall be subject to the applicable code provisions.		

PROJECT LOCATION & SURROUNDING USES



PROCEDURAL

1. **Type of Review.** According to AMC 19.20.030(1) and 18.16.100(B), shoreline substantial development permit applications for projects valued less than \$1 million are considered a Type 3 review. For Type 3 reviews, the Planning Commission holds the public hearing and provides the final decision regarding the proposed shoreline substantial development permit.
2. **Project History.** A mandatory preapplication meeting was held on March 2, 2021 with the mandatory neighborhood meeting being held on August 12, 2021.
3. **Environmental Review.** A SEPA threshold Determination of Non-significance (DNS) was issued for this project on November 15, 2021, under WAC 197-11-340(2), after using the Optional DNS process in WAC 197-11-355. There is no further comment period on the DNS.
4. **Public notice and reviewing departments/agencies.** A notice of application with a 30-day public was published in the Anacortes American, posted on the project site and mailed to property owners within 300 ft.

Application Submitted	September 14, 2021
Determination of Completeness Issued	October 5, 2021
Notice of Application & Public Hearing with Optional SEPA DNS Published	October 13, 2021
Open Record Public Hearing (Planning Commission)	November 24, 2021

5. **Reviewing departments/agencies.** The project application was routed for review to applicable agencies and City departments.

REVIEWING DEPARTMENTS & AGENCIES:				
City of Anacortes	Local Agencies & Districts	State & Federal	Skagit County	Other
☒ Building ☒ Fire Dept. ☒ Parks ☒ Planning ☒ Police ☒ Public Works ☒ Operations	☐ Skagit Transit ☐ Anacortes School District 103 ☒ Port of Anacortes	☒ DOE ☒ WDFW ☐ WSDOT ☒ DNR ☒ DAHP	☐ Health District ☐ Planning ☐ Public Works	☒ Swinomish Tribe ☒ Samish Tribe ☒ Upper Skagit Tribe
X = Request for review/comments sent to department or agency.				

6. **Consideration of written comments and applicant responses.** The notice of application public comment period ended on November 12, 2021. In making its recommendation, the Department considered timely received written comments and the applicant's responses, if any, as required in AMC 19.20.130(C).
- 6.1. No comments regarding potential environmental impacts were received from the public or agencies.
- 6.2. Comments relaying "*no objection to the proposed project*" were received from City of Anacortes Building Department, Public Works Department, and the Suak-Suiattle Indian Tribe.
- 6.3. Comments of the City of Anacortes Fire Department and Building Department provided requirements for construction, to be satisfied at time of building permit submittal.

DEPARTMENT REVIEW – FINDINGS OF FACT

- The application was submitted by Tyler Zimmerman of TZ Engineering. on behalf of the property owners, Interbay Condominium Association, for the upgrades to the existing community dock on Flounders Bay.
- The project proposes to replace the existing creosote pilings, concrete floats, and gangway.
 - The (10) creosote pilings are to be replaced with 12 in. galvanized steel piles, driven approximately 15 in. below grade.
 - The existing concrete floats, totaling 1,722 sq. ft. would be replaced with steel framed FRP graded floats; the floats are to be installed in the same layout and location as existing.
 - The existing 3 ft. by 32 ft. gangway is to be replaced with a 4 ft. by 40 ft. grated gangway.

- 2.4. All proposed decking would be 62% of open area allowing for an increase in light penetration.
- 2.5. The subject property is located within the Urban shoreline environment designation with majority of the work occurring within the Aquatic shoreline environment designation.
3. According to Table 5.1 of the SMP, private docks/piers are permitted within this reach of the Urban shoreline environment designation.
- 3.1. Permitted, when meeting requirements for that use and shoreline area, may be subject to Shoreline Substantial Development Permit or shoreline exemption requirements.
- 3.2. Being as the scope of work proposes repair via replacement of decking and deck substructure (floats) along with the replacement of more than 50% of the existing pilings, the project does not qualify for a Shoreline Exemption; pursuant to SMP DR-9.5.14, the proposal is to be reviewed as a new dock and therefore, a Shoreline Substantial Development Permit is required.
4. The placement of a private dock/pier is subject to the policies and development regulations of SMP 9.5, specifically the following:
- 4.1. Per SMP DR-9.5.2, prior to granting a permit for a pier, dock, or float, the effects of the structure upon adjacent shoreline shall be determined, and disposition of the permit by the City shall reflect such determination.
- The proposed dock is to be similar in size as well as location and is to be grated, with a 62% light permeability. The existing dock is decked with solid wood decking, therefore limiting light penetration. As conditioned, staff does not anticipate the proposed dock to result in an adverse impact to the shoreline.
- 4.2. Per SMP DR-9.5.3, design and construction of all piers and docks (and floats) are required to mitigate for impacts to ecological processes and functions.
- The proposed dock is self-mitigating as it would result in the removal of creosote pilings, remove the old wood decking, and would allow for light penetration; therefore, satisfying the restoration goals and objectives of SMP B-3 and this section.
- 4.3. Per SMP DR-9.5.4, the proposed design, location, and construction of the dock as well as the subsequent use and operation of the dock should: minimize adverse effects to ecological function and health, be capable of withstanding expected environmental conditions, minimize hazards of users, and minimize interference with adjacent water uses and navigation.
- Based on the application materials, the proposed dock would be designed, located, and constructed to satisfy this provision being as it is to be located in the same footprint as the existing; therefore, no new impacts are anticipated.
- 4.4. Per SMP DR-9.5.5, all docks, piers, and floats must adhere to the required design standards of this section.
- As conditioned, the proposed dock would meet the required design standards of this section.
- 4.5. Per SMP DR-9.5.11, pier and dock construction shall be restricted to the minimum size necessary to meet the needs of the proposed water-dependent use.
- As indicated in the application materials, the proposed dock replacement would not exceed the existing footprint or size. The replacement dock has been determined to be the minimum size necessary to continue the existing use of motor vessel moorage.

CONCLUSIONS OF LAW

1. Pursuant to AMC 19.20.030, the Planning Commission has authority to make a decision on the proposal after conducting a pre-decision open record public hearing. The proposal requires a shoreline substantial development permit.
2. Property notice for the public hearing has been provided. Notice was posted on the property and published in the Anacortes American newspaper on October 13, 2021, more than 15 days prior to the date of the hearing.

SHORELINE MANAGEMENT ACT (RCW 90.58):

3. Proposed development lies within 200 ft. of a shoreline of statewide significance (RCW 90.58.030(2)(f)) and is therefore subject to conformance with the City of Anacortes' Shoreline Master Program (SMP).
4. The subject property is located within the Urban shoreline environment designation with majority of the work occurring within the Aquatic shoreline environment designation.
5. The purpose of the Urban designation is to provide for commercial, industrial, and recreational uses (residential uses in some locations), and public land uses while seeking opportunities for protection and restoration of ecological function.
6. The purpose of the Aquatic designation is to protect, restore and manage the unique characteristics and resources of marine waters, including habitat, ecology, navigation and public enjoyment.
7. The subject proposal is not exempt from obtaining an approved Shoreline Substantial Development Permit (SSDP) per WAC 173-27-040. Accordingly, on October 15, 2021, the City of Anacortes' Department of Planning, Community, & Economic Development received the subject application from the applicant.
8. According to AMC 19.20.030(1) and 18.16.100(B), shoreline substantial development permit applications for projects valued less than \$1 million are considered a Type 3 type of review. For Type 3 reviews, the Planning Commission holds the public hearing and provides the final decision regarding the proposed shoreline substantial development permit.
9. The subject shoreline permit was reviewed for conformance with all applicable Shoreline Master Program regulations, including but not limited to, Section 5.6, Aquatic; Section 5.10, Shoreline Residential; Chapter 6, Environmental Protection General Regulations; Chapter 8, Specific Use Policies and Development Regulations; and Section 9.5 that regulates the docks, piers, and floats.
10. The subject proposal is consistent with the Washington State's Shoreline Management Act, City of Anacortes' 2010 Shoreline Master Program and development regulations listed therein for developments within the "Shoreline Residential" and "Aquatic" shoreline environment designations.
11. Any Finding of Fact that is more correctly a Conclusion of Law is hereby incorporated as such by this reference.
12. Staff reserves the right to supplement the record of the case to respond to matters and information raised subsequent to the writing of this report.

RECOMMENDATION

Based upon the application, Findings of Fact, and Conclusions of the staff report, staff recommends that the Planning Commission approve the shoreline substantial development permit subject to the following conditions of approval:

1. The scope of the project shall not exceed that as set out in the shoreline permit application shall be valid for the activities described within the JARPA and shown on the site plan of record, except as modified by this decision or other jurisdictional agencies.

2. All applicable permits (local, state, & federal) shall be secured before any construction activities begin onsite and copies provided to the City of Anacortes' PCED.
 - 2.1. With the submittal of the building permit, the applicant shall obtain a Floodplain Development Permit, as issued by the City of Anacortes Building Department, unless determined not applicable.
3. Hours of construction/work are limited to 7:00 AM to 10:00 PM, (7) days a week. If work must occur outside these hours, a noise variance shall be first obtained.
4. Noise levels shall not to exceed those standards as established by the state pursuant to Chapter 70.107 RCW and contained in Chapter 173.60 WAC.
5. The applicant /landowner shall comply with federal statutes including but not limited to: Endangered Species Act, Clean Water Act, Marine Mammal Protection Act, and other federal statutes.
6. The project shall comply with all applicable Shoreline Master Program regulations, including but not limited to, Chapter 5, Shoreline Environments & Associated Policies and Regulations; Chapter 6, Environmental Protection General Regulations; Chapter 8, Specific Use Policies and Development Regulations; and Chapter 9, Specific Shoreline Modification Policies and Development Regulations.
7. The project shall comply with SMP Section 9.5 regulating development requirements for the placement of private use docks as follows:
 - 7.1. The design, location, and construction of docks, floats, and piers, as well as their subsequent use and operation, shall: a. Minimize adverse effects on fish, shellfish, wildlife, water quality, and geohydraulic processes. Methods include but are not limited to: a. limiting the footprint of the structure to that which is necessary to serve the intended water-dependent use and minimizing the use of materials hazardous to the environment. b. Be capable of withstanding expected environmental conditions. c. Minimize hazards to users. d. Minimize interference with adjacent water uses and navigation.
 - 7.2. All docks, piers and floats shall adhere to the following design standards: a. Railings, if provided, shall be of clear or open framework design and conform to the Building Code where required. b. Utility service on docks and piers shall be placed on or under the deck. Overhead utility service is prohibited. Floodlighting shall be shielded to prevent unnecessary glare. Page 152 c. Appropriate marking shall be provided as necessary to avoid hazardous conditions for water surface users. d. Piers, docks and floats shall be constructed of materials that comply with requirements of federal and state regulations.
 - 7.3. Docks, piers, and floats shall not extend beyond the inner harbor line, unless approved by WDNR.
8. Development shall comply with AMC 18.16.130 regulating the time limit for shoreline permits as follows:
 - A. Construction, or substantial progress toward completion, must begin within two (2) years after approval of the permit. Substantial progress toward construction shall include, but not limited to, the letting of bids, making of contracts, purchasing of materials involved in development, but shall not include development or uses which are inconsistent with the Shoreline Management Act or the city's master program. In determining the running two-year period hereof, there shall not be included the time during which development was not actually pursued by construction and the pendency of litigation reasonably related thereto made it reasonable not to so pursue; provided, that the city may, in its discretion, extend the two-year time period for a reasonable time based on factors, including the inability to expeditiously obtain other governmental permits which are required prior to the commencement of construction.
 - B. 5-Year Permit Authorization: If construction has not been completed within five years of approval by the City of Anacortes, the city will review the permit, with prior notice to parties of record, and, upon showing of good cause, either extend the permit for one additional year, or terminate the permit. Prior to the city authorizing any permit extensions, it shall notify any parties of record and the Department of Ecology. Note: Only one single extension is permitted.



REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY
SEATTLE DISTRICT, CORPS OF ENGINEERS
P.O. BOX 3755
SEATTLE, WASHINGTON 98124-3755

August 18, 2021

Regulatory Branch

Mr. Greg Van Zandt
5301 Doon Way
Anacortes, Washington 98221

Reference: NWS-2021-209
Van Zandt, Greg

Dear Mr. Van Zandt:

We have reviewed your application to replace piling and floats in Flounder Bay (Skyline Marina) at Anacortes, Skagit County, Washington. Based on the information you provided to us, Nationwide Permit (NWP) 3, *Maintenance* (Federal Register January 6, 2017, Vol. 82, No. 4), authorizes your proposal as depicted on the enclosed drawings dated August 7, 2021. In order for this authorization to be valid, you must ensure the work is performed in accordance with the enclosed *NWP 3, Terms and Conditions* and the following special condition:

a. No residue from construction activity shall be allowed to remain in waters of the U. S. The permittee must install and maintain debris collection measures until all project operations are complete.

b. In order to meet the requirements of the Endangered Species Act (ESA) and Magnuson-Stevens Fishery Conservation and Management Act (MSA) *Phase I* programmatic consultation (National Marine Fisheries Service (NMFS) Reference Number 2005-07506; U.S. Fish and Wildlife Service (USFWS) Reference Number 01EWWF00-2015-I-0104), you must implement and abide by the *List of Requirements for Piling Replacement* dated May 3, 2017, available on the U.S. Army Corps of Engineers (Corps) website (Permit Guidebook, Endangered Species, Programmatic Consultations, Various Activities throughout Washington State typically authorized by Nationwide Permit (Phase I)). In addition, you must comply with the relevant conservation measures in the *General Implementation Conditions* also available on the Corps website. Failure to comply with the commitments made in this document constitutes non-compliance with the ESA and your Corps permit. If you cannot comply with the terms and conditions of this programmatic consultation, you must, prior to commencing construction, contact the Corps, Seattle District, Regulatory Branch for an individual consultation in accordance with the requirements of the ESA and/or the Magnuson-Stevens Fishery Conservation and Management Act. The USFWS/NMFS is the appropriate authority to determine compliance with the ESA.

c. In order to meet the requirements of the Endangered Species Act and protect Puget Sound Chinook, Puget Sound steelhead, and Coastal-Puget Sound bull trout, the permittee may conduct the authorized in-water activities from July 16th through February 15th in any year this permit is valid. No in-water work authorized by this permit shall occur from February 16th through July 15th.

d. Incidents where any individuals of fish species, marine mammals and/or sea turtles listed by National Oceanic and Atmospheric Administration Fisheries (NOAA Fisheries) under the Endangered Species Act appear to be injured or killed as a result of discharges of dredged or fill material into waters of the U.S. or structures or work in navigable waters of the U.S. authorized by this Nationwide Permit verification shall be reported to NOAA Fisheries, Office of Protected Resources at (301) 713-1401 and the Regulatory Office of the Seattle District of the U.S. Army Corps of Engineers at (206) 764-3495. The finder should leave the animal alone, make note of any circumstances likely causing the death or injury, note the location and number of individuals involved and, if possible, take photographs. Adult animals should not be disturbed unless circumstances arise where they are obviously injured or killed by discharge exposure or some unnatural cause. The finder may be asked to carry out instructions provided by NOAA Fisheries to collect specimens or take other measures to ensure that evidence intrinsic to the specimen is preserved.

We have reviewed your project pursuant to the requirements of the Endangered Species Act, the Magnuson-Stevens Fishery Conservation and Management Act and the National Historic Preservation Act. We have determined this project complies with the requirements of these laws provided you comply with all of the permit general and special conditions.

The authorized work complies with the Washington State Department of Ecology's (Ecology) Water Quality Certification and the Coastal Zone Management Act requirements for this NWP. No further coordination with Ecology is required.

You have not requested a jurisdictional determination for this proposed project. If you believe the Corps does not have jurisdiction over all or portions of your project you may request a preliminary or approved jurisdictional determination (JD). If one is requested, please be aware that we may require the submittal of additional information to complete the JD and work authorized in this letter may not occur until the JD has been completed.

Our verification of this NWP authorization is valid until March 18, 2022, unless the NWP is modified, reissued, or revoked prior to that date. If the authorized work has not been completed by that date and you have commenced or are under contract to commence this activity before March 18, 2022, you will have until March 18, 2023, to complete the activity under the enclosed terms and conditions of this NWP. Failure to comply with all terms and conditions of this NWP verification invalidates this authorization and could result in a violation of Section 404 of the

Clean Water Act and/or Section 10 of the Rivers and Harbors Act. You must also obtain all local, State, and other Federal permits that apply to this project.

You are cautioned that any change in project location or plans will require that you submit a copy of the revised plans to this office and obtain our approval before you begin work. Deviating from the approved plans could result in the assessment of criminal or civil penalties.

Upon completing the authorized work, you must fill out and return the enclosed *Certificate of Compliance with Department of the Army Permit*. Thank you for your cooperation during the permitting process. We are interested in your experience with our Regulatory Program and encourage you to complete a customer service survey. These documents and information about our program are available on our website at www.nws.usace.army.mil, select "Regulatory Branch, Permit Information" and then "Contact Us."

A copy of this letter with enclosures will be furnished to Mr. Tyler Zimmerman of TZ Engineering, LLC at tyler@tzengineering.com. If you have any questions, please feel free to contact me at (360) 734-3156 or via email at randel.j.perry@usace.army.mil.

Sincerely,

A handwritten signature in black ink, appearing to read "Randel J. Perry". The signature is fluid and cursive, with the first name "Randel" being more prominent.

Randel Perry, Project Manager
Regulatory Branch

Enclosures

PROJECT LOCATION

ANACORTES
EVERETT
SEATTLE
TACOMA
OLYMPIA
CHELAN
WENATCHEE
ELLENSBURG
YAKIMA
RICHLAND
KENNEWICK
WALLA WALLA
COLVILLE
SPOKANE

WASHINGTON

PROJECT LOCATION

ANACORTES
BURROWS ISLAND
ALLAN ISLAND
FIDALGO ISLAND
FLINDER BAY

ADJACENT PROPERTY OWNERS:

A - KELLER TRUST, 1909 SKYLINE WY
A - SKYLINE MARINA HOLDINGS LLC, 2011 SKYLINE WY
B - JOHN IVE, 5207 DOON WAY
B - DAHL CHRIS, 5309 DOON WY
B - NACHTWEIH DENNIS, 2010 COVE PL

LOCATION A:
BRUCE CAY, 2001 SKYLINE WAY, P80330

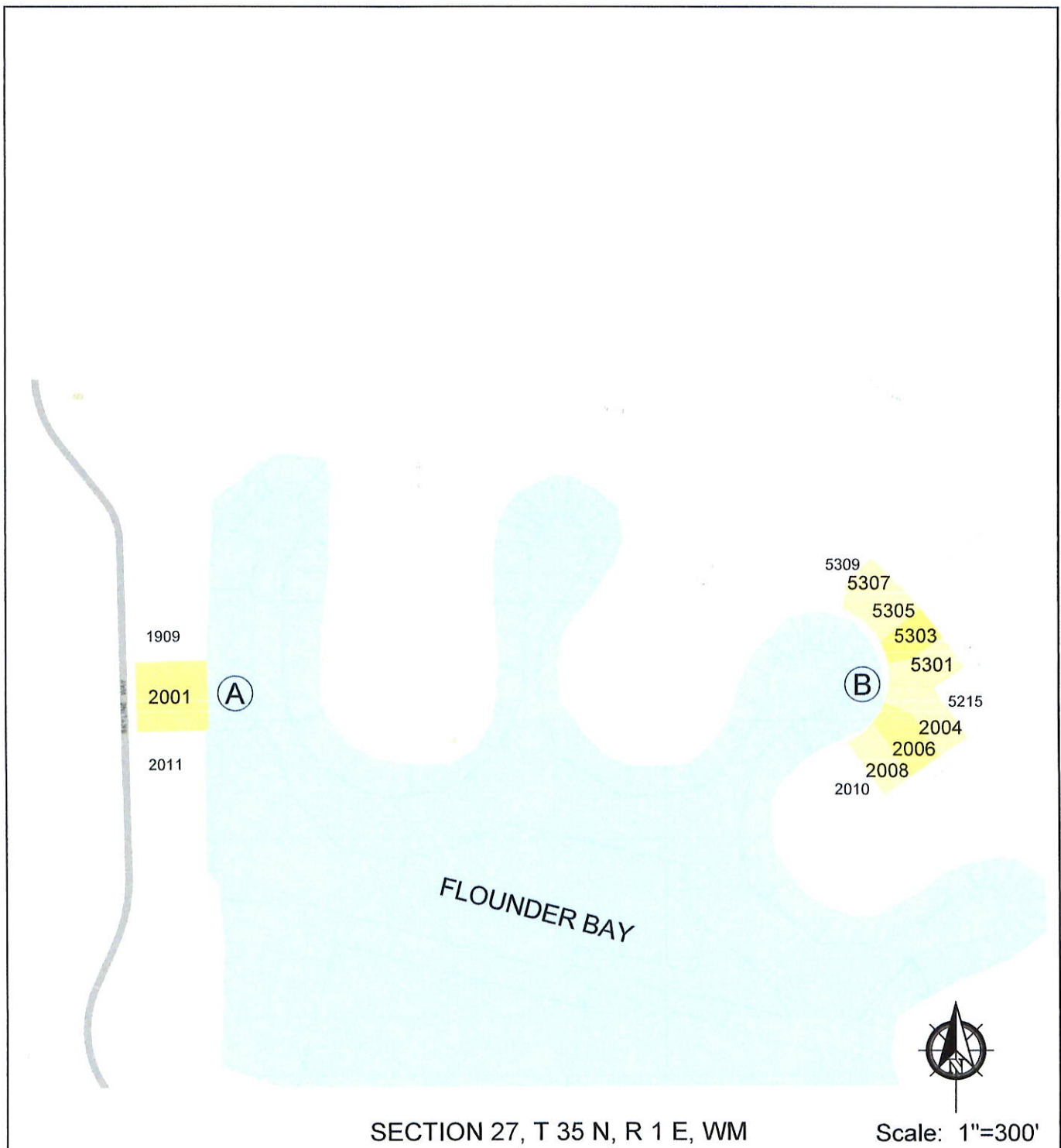
LOCATION B:
SARA VAN ZANDT, 5301 DOON WAY, P60013
JOHN LEONE, 5303 DOON WAY, P59636
ETHAN LEE, 2004 COVE PLACE, P60015
KEITH SLETTEN, 2006 COVE PLACE, P60016

THOMAS GARCIA, 5305 DOON WAY, P59635
WILLIAM STINSON, 5307 DOON WAY, P59634
RONALD GIARD, 2008 COVE PLACE, P60017

SECTION 27, T 35 N, R 1 E, WM

No Scale

PERMIT APPLICATION		Corps Ref# NWS-2021-209	VICINITY MAP
REFERENCE:	LOCATION A: 2001 SKYLINE WAY	PROPOSED PROJECT: IMPROVE EXISTING PIERS, PILES, RAMPS & FLOATS	
APPLICANT: TZ ENGINEERING, LLC	LOCATION B: 5301/5303 DOON WAY	IN: FLOUNDER BAY / BURROWS BAY	
ADJACENT PROPERTY OWNERS:	2004/2006 COVE PLACE	NEAR/AT: ANACORTES	
A - SEE LIST	5305/5307 DOON WAY	COUNTY: SKAGIT	
B - SEE LIST	2008 COVE PLACE	STATE: WA	
	LAT/LONG A: 48°29'34"N / 122°40'42"W		
	LAT/LONG B: 48°29'42"N / 122°40'36"W		
PAGE 1 OF 10		DATE: 08/07/2021	



SECTION 27, T 35 N, R 1 E, WM

Scale: 1"=300'

PERMIT APPLICATION

NWS-2021-209

PROJECT SITE MAP

REFERENCE:

APPLICANT: TZ ENGINEERING, LLC

ADJACENT PROPERTY OWNERS:

A - KELLER TRUST, 1909 SKYLINE WY

A - SKYLINE MARINA HOLDINGS LLC,
2011 SKYLINE WY

B - DAHL CHRIS, 5309 DOON WY

B - NACHTWEIH DENNIS, 2010 COVE PL

LOCATION A: 2001 SKYLINE WAY

LOCATION B: 5301/5303 DOON WAY
2004/2006 COVE PLACE

LAT/LONG A: 48°29'34"N / 122°40'42"W

LAT/LONG B: 48°29'42"N / 122°40'36"W

PAGE 2 OF 10 DATE: 08/07/2021

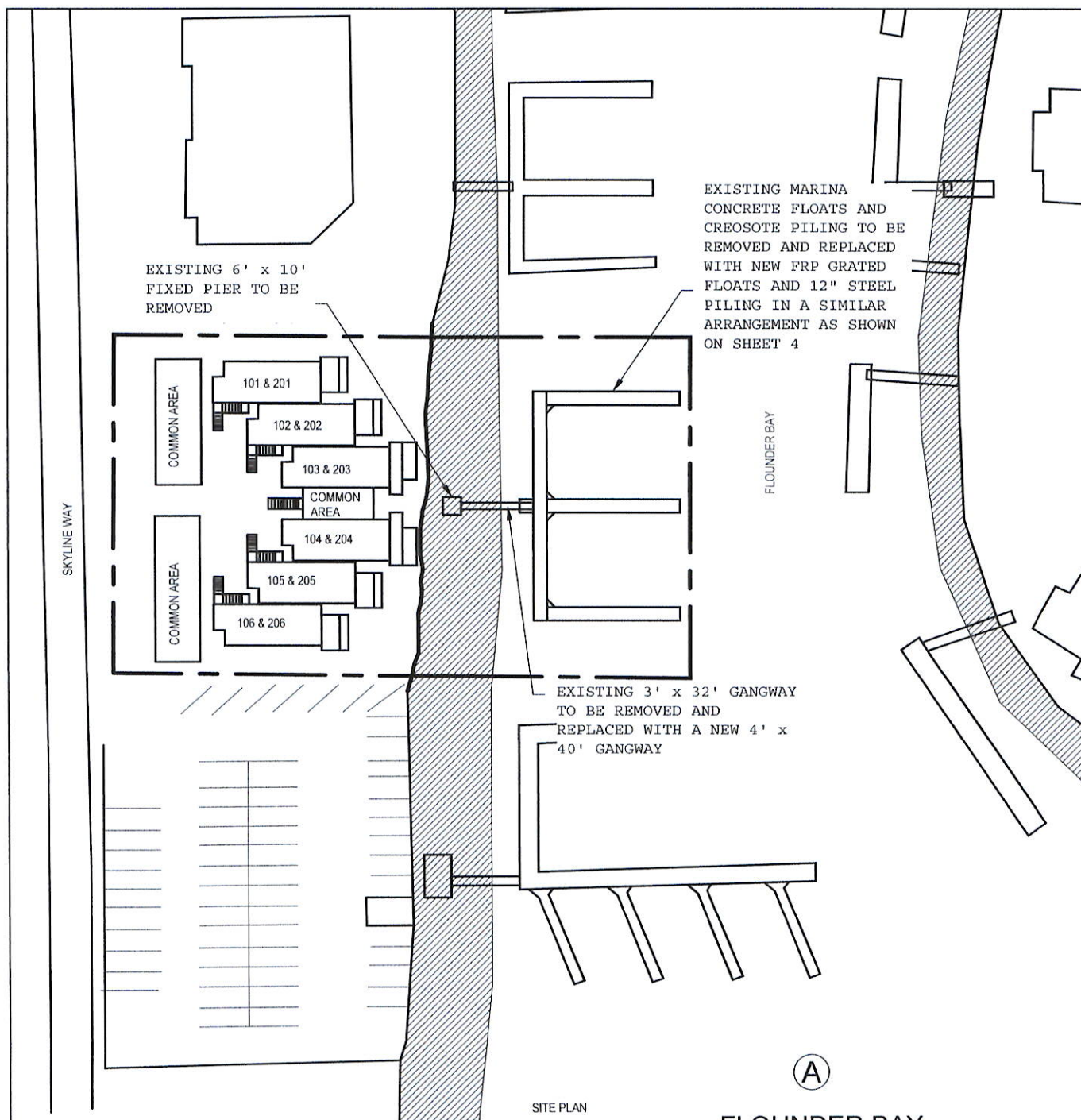
PROPOSED PROJECT: IMPROVE
EXISTING PIERS, PILES, RAMPS &
FLOATS

IN: FLOUNDER BAY / BURROWS BAY

NEAR/AT: ANACORTES

COUNTY: SKAGIT

STATE: WA



PERMIT APPLICATION

NWS-2021-209

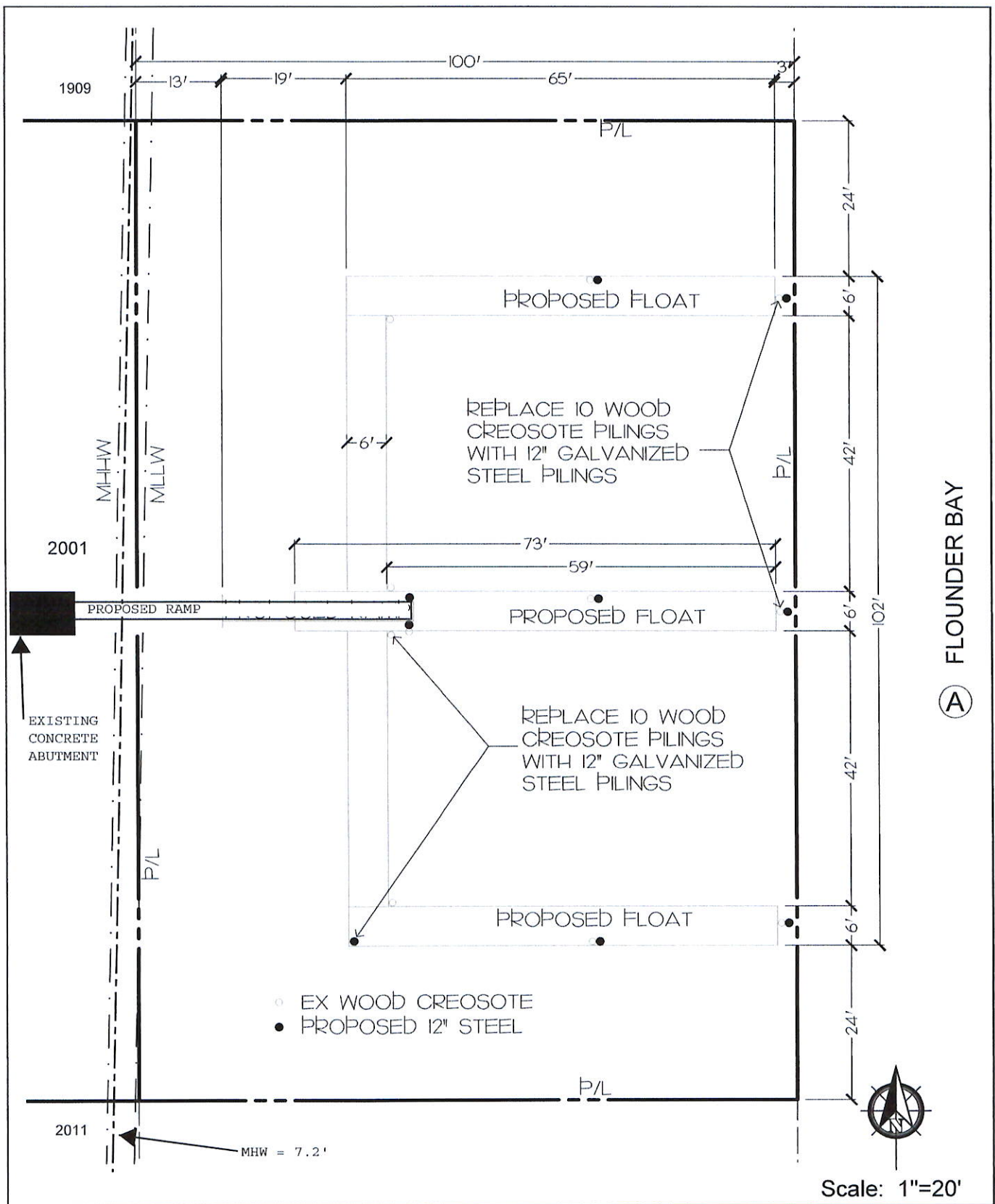
LOCATION A - PLAN

REFERENCE:

LOCATION A: 2001 SKYLINE WAY

PROPOSED PROJECT: IMPROVE
EXISTING PIERS, PILES, RAMPS &
FLOATS

APPLICANT: TZ ENGINEERING, LLC PAGE 3 OF 10 DATE: 08/07/2021



PERMIT APPLICATION

NWS-2021-209

LOCATION A - PLAN

REFERENCE:

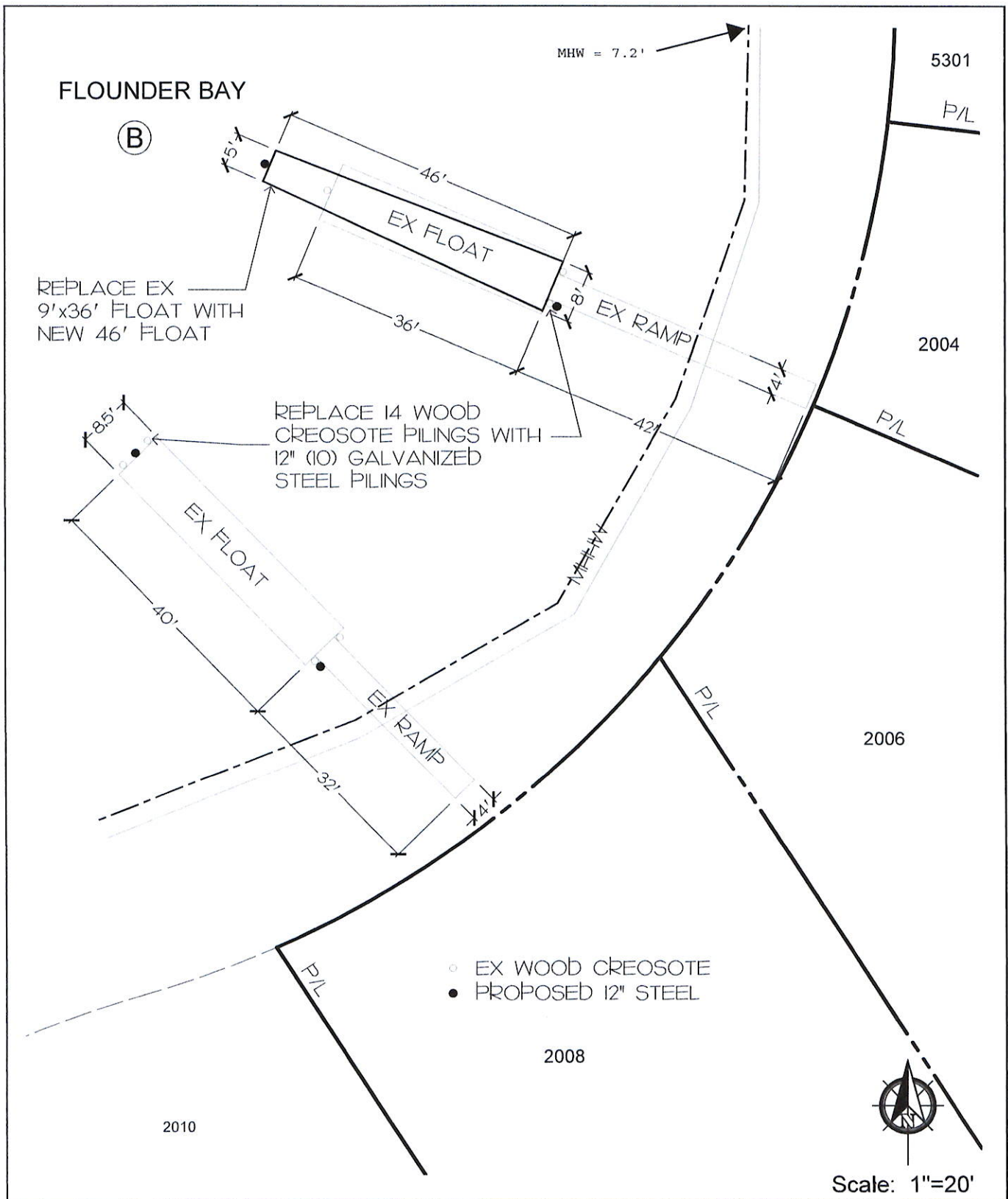
LOCATION A: 2001 SKYLINE WAY

PROPOSED PROJECT: IMPROVE
EXISTING PIERS, PILES, RAMPS &
FLOATS

APPLICANT: TZ ENGINEERING, LLC

PAGE 4 OF 10

DATE: 08/07/2021



PERMIT APPLICATION

NWS-2021-209

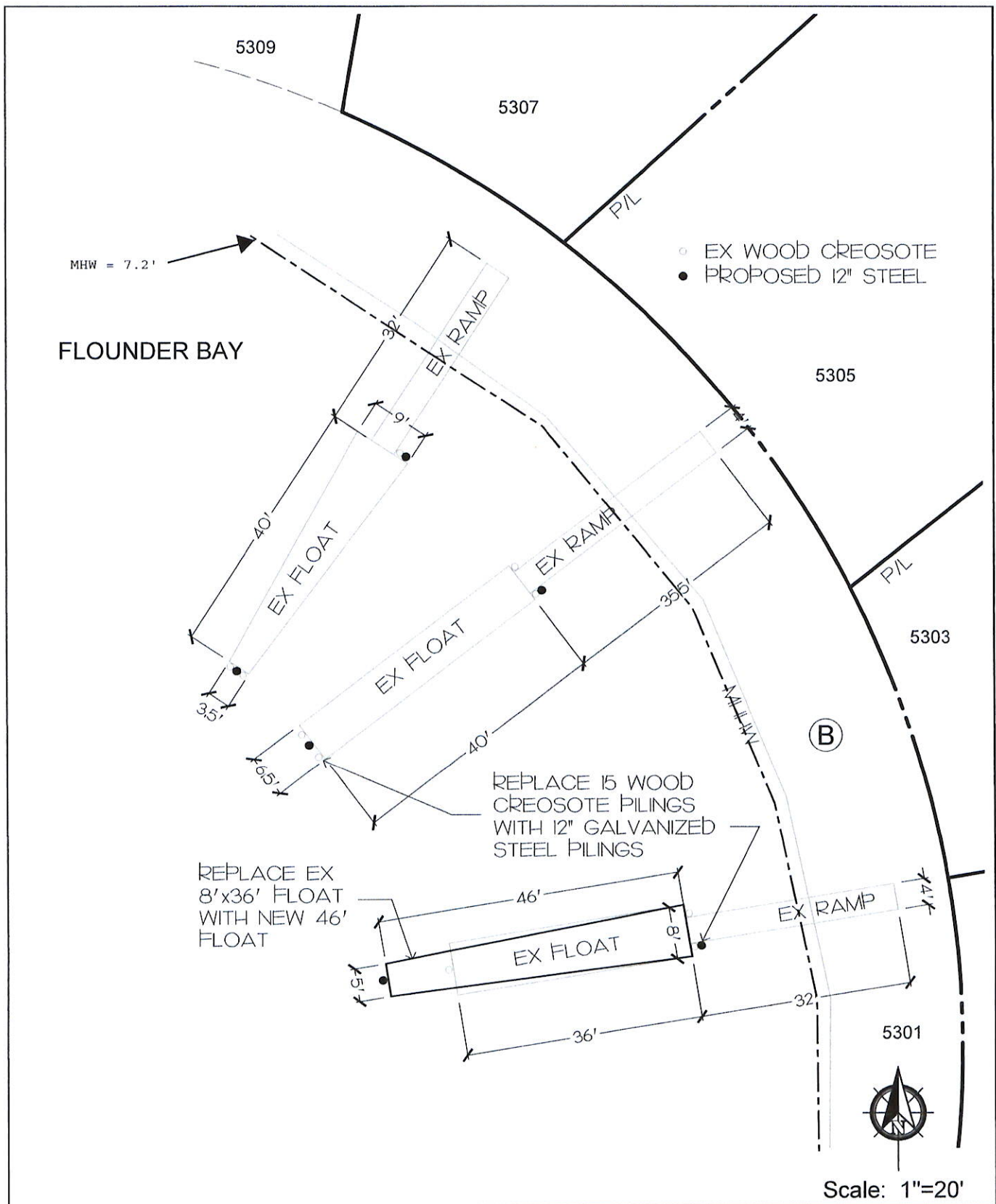
LOCATION B - PLAN

REFERENCE:

LOCATION B: 2004/2006/2008 COVE PLACE

PROPOSED PROJECT: IMPROVE
EXISTING PIERS, PILES, RAMPS &
FLOATS

APPLICANT: TZ ENGINEERING, LLC PAGE 5 OF 10 DATE: 08/07/2021



PERMIT APPLICATION

NWS-2021-209

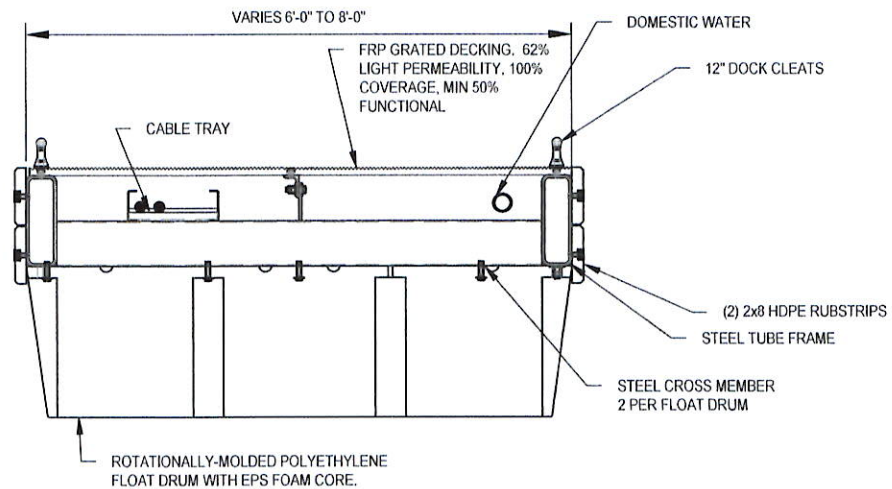
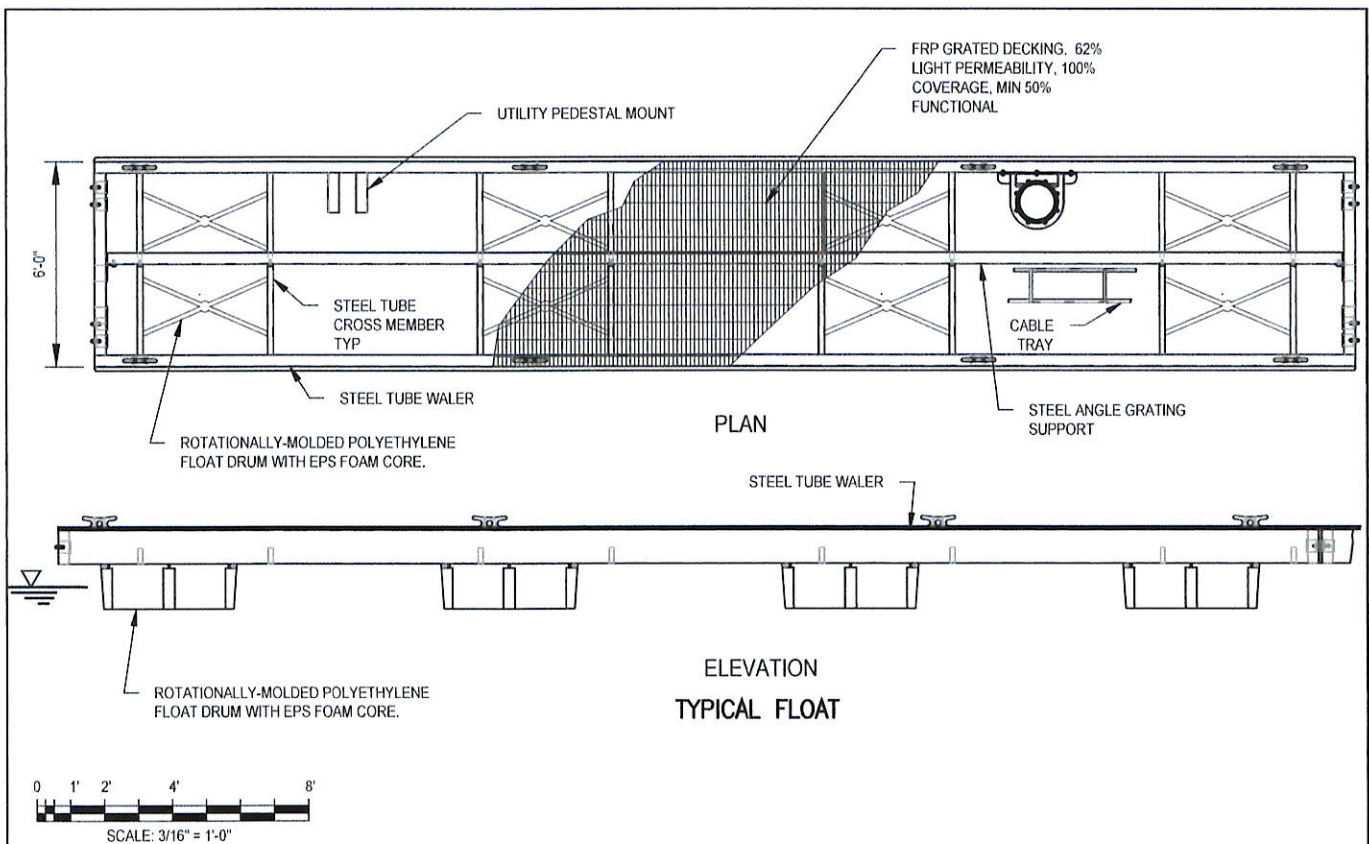
LOCATION B - PLAN

REFERENCE:

LOCATION B: 5301/5303/5305 DOON WAY

PROPOSED PROJECT: IMPROVE
EXISTING PIERS, PILES, RAMPS &
FLOATS

APPLICANT: TZ ENGINEERING, LLC PAGE 6 OF 10 DATE: 08/07/2021



A - A

Scale: 3/16"=1'-0"

PERMIT APPLICATION

NWS-2021-209

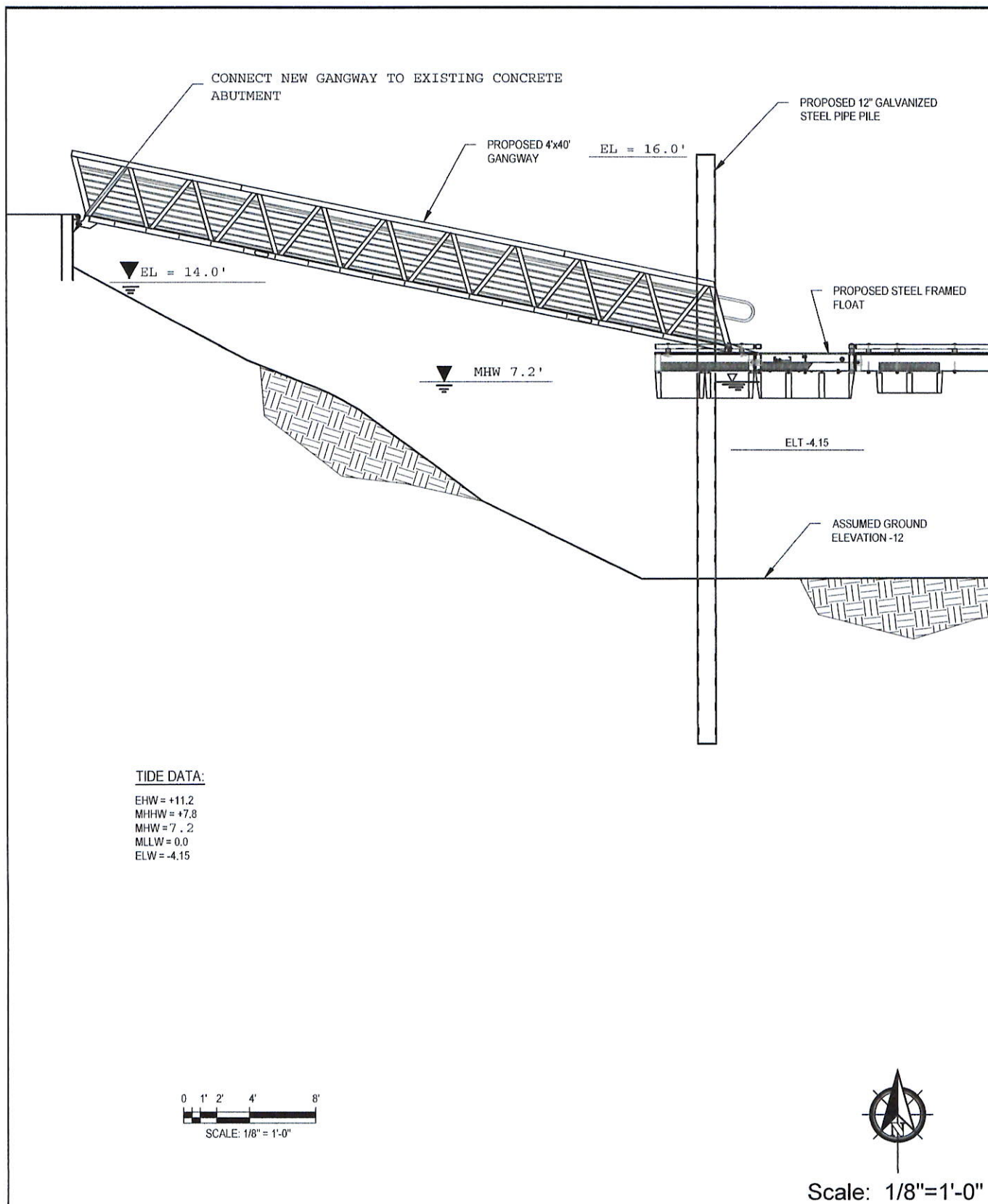
DETAIL - TYPICAL FLOAT

REFERENCE:

LOCATION A & LOCATION B

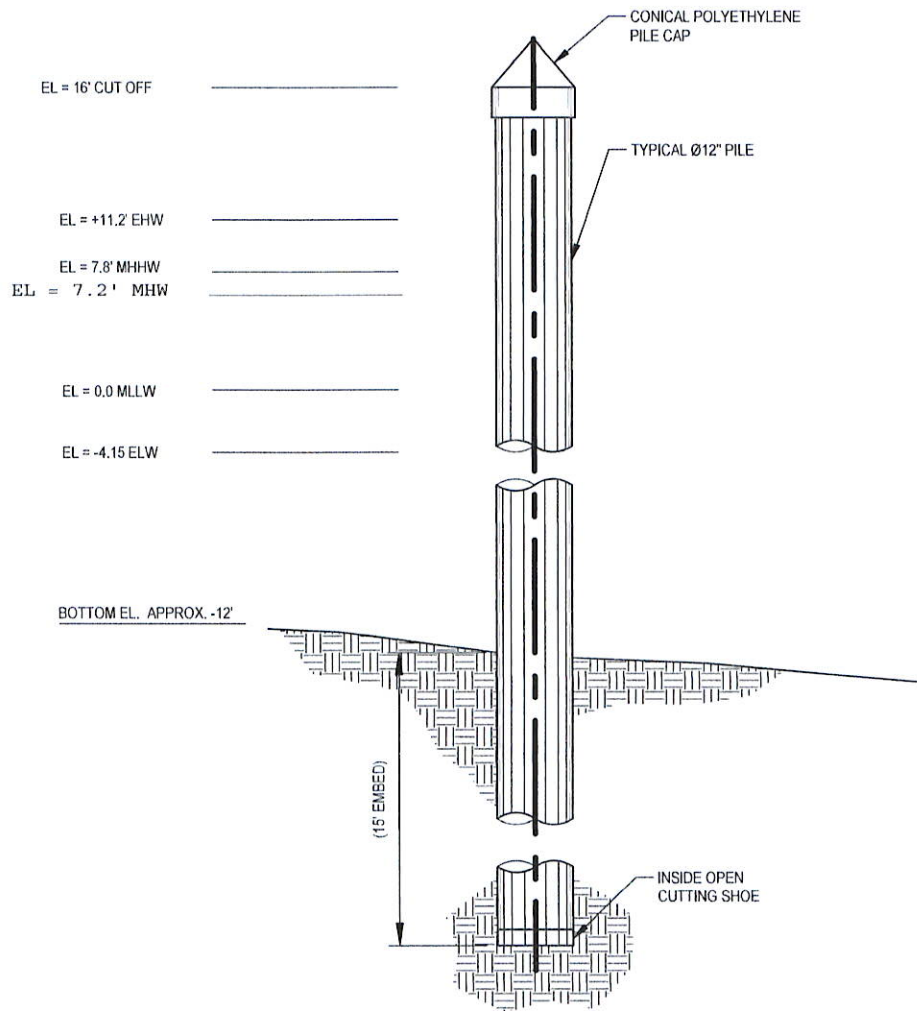
APPLICANT: TZ ENGINEERING, LLC PAGE 7 OF 10 DATE: 08/07/2021

PROPOSED PROJECT: IMPROVE EXISTING PIERS, PILES, RAMPS & FLOATS



PERMIT APPLICATION **NWS-2021-209** **LOCATION A - RAMP ELEVATION**

REFERENCE:	LOCATION A: 2001 SKYLINE WAY	PROPOSED PROJECT: IMPROVE EXISTING PIERS, PILES, RAMPS & FLOATS
APPLICANT: TZ ENGINEERING, LLC	PAGE 8 OF 10 DATE: 08/07/2021	



TYPICAL PILE

COATING:
HOT DIP GALVANIZE

No Scale

PERMIT APPLICATION

NWS-2021-209

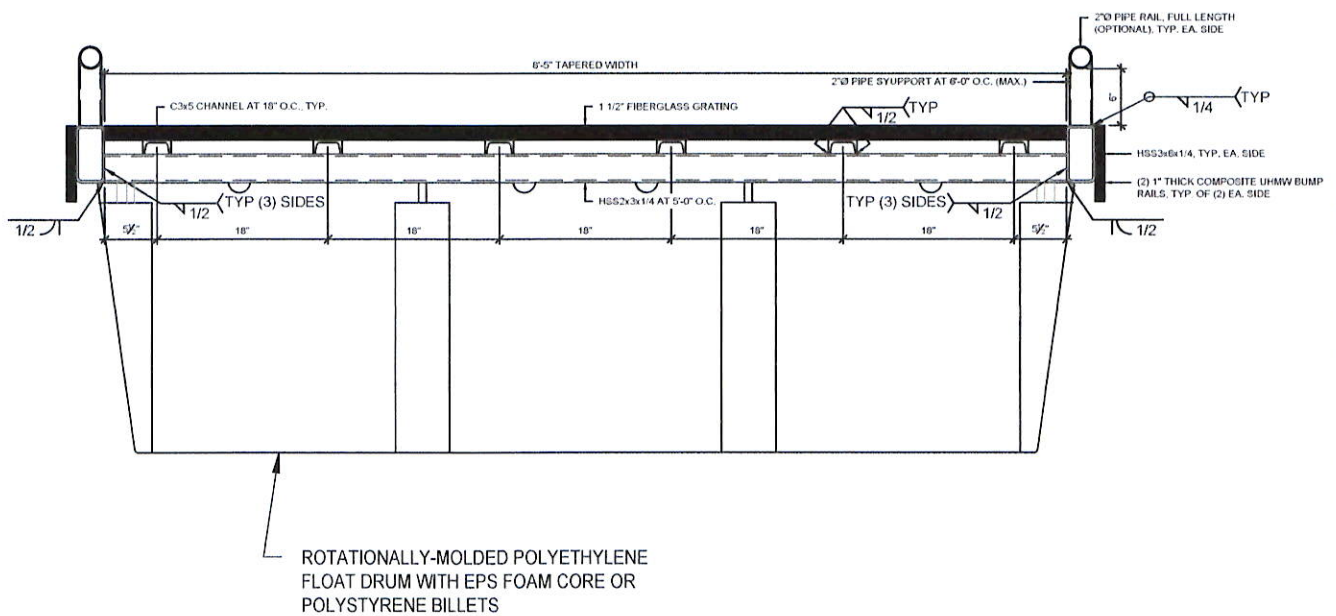
DETAIL - TYPICAL PILE

REFERENCE:

LOCATION A & LOCATION B

PROPOSED PROJECT: IMPROVE
EXISTING PIERS, PILES, RAMPS &
FLOATS

APPLICANT: TZ ENGINEERING, LLC PAGE 10 OF 10 DATE: 08/07/2021



DOCK FLOAT SECTION

No Scale

PERMIT APPLICATION

NWS-2021-209

LOCATION B & C - DETAIL

LOCATION B: 5301/5303 DOON WAY

REFERENCE:

APPLICANT: TZ ENGINEERING, LLC PAGE 7 OF 7 DATE: 08/07/2021

PROPOSED PROJECT: IMPROVE
EXISTING PIERS, PILES, RAMPS &
FLOATS



US Army Corps
of Engineers ®
Seattle District

NATIONWIDE PERMIT 3

Terms and Conditions

Effective Date: March 19, 2017



-
- A. Description of Authorized Activities
 - B. U.S. Army Corps of Engineers (Corps) National General Conditions for all NWP
 - C. Corps Seattle District Regional General Conditions
 - D. Corps Regional Specific Conditions for this NWP
 - E. Washington Department of Ecology (Ecology) Section 401 Water Quality Certification (401 Certification): General Conditions
 - F. Ecology 401 Certification: Specific Conditions for this NWP
 - G. Coastal Zone Management Consistency Response for this NWP
-

In addition to any special condition that may be required on a case-by-case basis by the District Engineer, the following terms and conditions must be met, as applicable, for a Nationwide Permit (NWP) authorization to be valid in Washington State.

A. DESCRIPTION OF AUTHORIZED ACTIVITIES

3. Maintenance. (a) The repair, rehabilitation, or replacement of any previously authorized, currently serviceable structure or fill, or of any currently serviceable structure or fill authorized by 33 CFR 330.3, provided that the structure or fill is not to be put to uses differing from those uses specified or contemplated for it in the original permit or the most recently authorized modification. Minor deviations in the structure's configuration or filled area, including those due to changes in materials, construction techniques, requirements of other regulatory agencies, or current construction codes or safety standards that are necessary to make the repair, rehabilitation, or replacement are authorized. This NWP also authorizes the removal of previously authorized structures or fills. Any stream channel modification is limited to the minimum necessary for the repair, rehabilitation, or replacement of the structure or fill; such modifications, including the removal of material from the stream channel, must be immediately adjacent to the project. This NWP also authorizes the removal of accumulated sediment and debris within, and in the immediate vicinity of, the structure or fill. This NWP also authorizes the repair, rehabilitation, or replacement of those structures or fills destroyed or damaged by storms, floods, fire or other discrete events, provided the repair, rehabilitation, or replacement is commenced, or is under contract to commence, within two years of the date of their destruction or damage. In cases of catastrophic events, such as hurricanes or tornadoes, this two-year limit may be waived by the district engineer, provided the permittee can demonstrate funding, contract, or other similar delays. (b) This NWP also authorizes the removal of accumulated sediments and debris outside the immediate vicinity of existing structures (e.g., bridges, culverted road crossings, water intake structures, etc.). The removal of sediment is limited to the minimum necessary to restore the waterway in the vicinity of the structure to the approximate dimensions that existed when the structure was built, but cannot extend farther than 200 feet in any direction from the structure. This 200 foot limit does not apply to maintenance dredging to remove accumulated sediments blocking or restricting outfall and intake structures or to maintenance dredging to remove accumulated sediments from canals associated with outfall and intake structures. All dredged or excavated materials must be deposited and retained in an area that has no waters of the United States unless otherwise specifically approved by the district engineer under separate authorization. (c) This NWP also authorizes temporary structures, fills, and work, including the use of temporary mats, necessary to conduct the maintenance activity. Appropriate measures must be taken to maintain normal downstream flows and minimize flooding to the maximum extent practicable, when temporary structures, work, and discharges, including cofferdams, are necessary for construction activities, access fills, or dewatering of construction

sites. Temporary fills must consist of materials, and be placed in a manner, that will not be eroded by expected high flows. After conducting the maintenance activity, temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The areas affected by temporary fills must be revegetated, as appropriate. (d) This NWP does not authorize maintenance dredging for the primary purpose of navigation. This NWP does not authorize beach restoration. This NWP does not authorize new stream channelization or stream relocation projects. Notification: For activities authorized by paragraph (b) of this NWP, the permittee must submit a pre-construction notification to the district engineer prior to commencing the activity (see general condition 32). The pre-construction notification must include information regarding the original design capacities and configurations of the outfalls, intakes, small impoundments, and canals. (Authorities: Section 10 of the Rivers and Harbors Act of 1899 and section 404 of the Clean Water Act (Sections 10 and 404)) Note: This NWP authorizes the repair, rehabilitation, or replacement of any previously authorized structure or fill that does not qualify for the Clean Water Act section 404(f) exemption for maintenance.

B. CORPS NATIONAL GENERAL CONDITIONS FOR ALL NWPs

To qualify for NWP authorization, the prospective permittee must comply with the following general conditions, as applicable, in addition to any regional or case-specific conditions imposed by the division engineer or district engineer. Every person who may wish to obtain permit authorization under one or more NWPs, or who is currently relying on an existing or prior permit authorization under one or more NWPs, has been and is on notice that all of the provisions of 33 CFR 330.1 through 330.6 apply to every NWP authorization. Note especially 33 CFR 330.5 relating to the modification, suspension, or revocation of any NWP authorization.

1. Navigation. (a) No activity may cause more than a minimal adverse effect on navigation. (b) Any safety lights and signals prescribed by the U.S. Coast Guard, through regulations or otherwise, must be installed and maintained at the permittee's expense on authorized facilities in navigable waters of the United States. (c) The permittee understands and agrees that, if future operations by the United States require the removal, relocation, or other alteration, of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required, upon due notice from the Corps of Engineers, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United States. No claim shall be made against the United States on account of any such removal or alteration.

2. Aquatic Life Movements. No activity may substantially disrupt the necessary life cycle movements of those species of aquatic life indigenous to the waterbody, including those species that normally migrate through the area, unless the activity's primary purpose is to impound water. All permanent and temporary crossings of waterbodies shall be suitably culverted, bridged, or otherwise designed and constructed to maintain low flows to sustain the movement of those aquatic species. If a bottomless culvert cannot be used, then the crossing should be designed and constructed to minimize adverse effects to aquatic life movements.

3. Spawning Areas. Activities in spawning areas during spawning seasons must be avoided to the maximum extent practicable. Activities that result in the physical destruction (e.g., through excavation, fill, or downstream smothering by substantial turbidity) of an important spawning area are not authorized.

4. Migratory Bird Breeding Areas. Activities in waters of the United States that serve as breeding areas for migratory birds must be avoided to the maximum extent practicable.

5. Shellfish Beds. No activity may occur in areas of concentrated shellfish populations, unless the activity is directly related to a shellfish harvesting activity authorized by NWPs 4 and 48, or is a shellfish seeding or habitat restoration activity authorized by NWP 27.

6. Suitable Material. No activity may use unsuitable material (e.g., trash, debris, car bodies, asphalt, etc.). Material used for construction or discharged must be free from toxic pollutants in toxic amounts (see section 307 of the Clean Water Act).

7. Water Supply Intakes. No activity may occur in the proximity of a public water supply intake, except where the activity is for the repair or improvement of public water supply intake structures or adjacent bank stabilization.

8. Adverse Effects From Impoundments. If the activity creates an impoundment of water, adverse effects to the aquatic system due to accelerating the passage of water, and/or restricting its flow must be minimized to the maximum extent practicable.

9. Management of Water Flows. To the maximum extent practicable, the pre-construction course, condition, capacity, and location of open waters must be maintained for each activity, including stream channelization, storm water management activities, and temporary and permanent road crossings, except as provided below. The activity must be constructed to withstand expected high flows. The activity must not restrict or impede the passage of normal or high flows, unless the primary purpose of the activity is to impound water or manage high flows. The activity may alter the pre-construction course, condition, capacity, and location of open waters if it benefits the aquatic environment (e.g., stream restoration or relocation activities).

10. Fills Within 100-Year Floodplains. The activity must comply with applicable FEMA-approved state or local floodplain management requirements.

11. Equipment. Heavy equipment working in wetlands or mudflats must be placed on mats, or other measures must be taken to minimize soil disturbance.

12. Soil Erosion and Sediment Controls. Appropriate soil erosion and sediment controls must be used and maintained in effective operating condition during construction, and all exposed soil and other fills, as well as any work below the ordinary high water mark or high tide line, must be permanently stabilized at the earliest practicable date. Permittees are encouraged to perform work within waters of the United States during periods of low-flow or no-flow, or during low tides.

13. Removal of Temporary Fills. Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The affected areas must be revegetated, as appropriate.

14. Proper Maintenance. Any authorized structure or fill shall be properly maintained, including maintenance to ensure public safety and compliance with applicable NWP general conditions, as well as any activity-specific conditions added by the district engineer to an NWP authorization.

15. Single and Complete Project. The activity must be a single and complete project. The same NWP cannot be used more than once for the same single and complete project.

16. Wild and Scenic Rivers. (a) No NWP activity may occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a “study river” for possible inclusion in the system while the river is in an official study status, unless the appropriate Federal agency with direct management responsibility for such river, has determined in writing that the proposed activity will not adversely affect the Wild and Scenic River designation or study status. (b) If a proposed NWP

activity will occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a “study river” for possible inclusion in the system while the river is in an official study status, the permittee must submit a pre-construction notification (see general condition 32). The district engineer will coordinate the PCN with the Federal agency with direct management responsibility for that river. The permittee shall not begin the NWP activity until notified by the district engineer that the Federal agency with direct management responsibility for that river has determined in writing that the proposed NWP activity will not adversely affect the Wild and Scenic River designation or study status. (c) Information on Wild and Scenic Rivers may be obtained from the appropriate Federal land management agency responsible for the designated Wild and Scenic River or study river (e.g., National Park Service, U.S. Forest Service, Bureau of Land Management, U.S. Fish and Wildlife Service). Information on these rivers is also available at: <http://www.rivers.gov/>.

17. Tribal Rights. No NWP activity may cause more than minimal adverse effects on tribal rights (including treaty rights), protected tribal resources, or tribal lands.

18. Endangered Species. (a) No activity is authorized under any NWP which is likely to directly or indirectly jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act (ESA), or which will directly or indirectly destroy or adversely modify the critical habitat of such species. No activity is authorized under any NWP which “may affect” a listed species or critical habitat, unless ESA section 7 consultation addressing the effects of the proposed activity has been completed. Direct effects are the immediate effects on listed species and critical habitat caused by the NWP activity. Indirect effects are those effects on listed species and critical habitat that are caused by the NWP activity and are later in time, but still are reasonably certain to occur. (b) Federal agencies should follow their own procedures for complying with the requirements of the ESA. If pre-construction notification is required for the proposed activity, the Federal permittee must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements. The district engineer will verify that the appropriate documentation has been submitted. If the appropriate documentation has not been submitted, additional ESA section 7 consultation may be necessary for the activity and the respective federal agency would be responsible for fulfilling its obligation under section 7 of the ESA. (c) Non-federal permittees must submit a pre-construction notification to the district engineer if any listed species or designated critical habitat might be affected or is in the vicinity of the activity, or if the activity is located in designated critical habitat, and shall not begin work on the activity until notified by the district engineer that the requirements of the ESA have been satisfied and that the activity is authorized. For activities that might affect Federally-listed endangered or threatened species or designated critical habitat, the pre-construction notification must include the name(s) of the endangered or threatened species that might be affected by the proposed activity or that utilize the designated critical habitat that might be affected by the proposed activity. The district engineer will determine whether the proposed activity “may affect” or will have “no effect” to listed species and designated critical habitat and will notify the non-Federal applicant of the Corps’ determination within 45 days of receipt of a complete pre-construction notification. In cases where the non-Federal applicant has identified listed species or critical habitat that might be affected or is in the vicinity of the activity, and has so notified the Corps, the applicant shall not begin work until the Corps has provided notification that the proposed activity will have “no effect” on listed species or critical habitat, or until ESA section 7 consultation has been completed. If the non-Federal applicant has not heard back from the Corps within 45 days, the applicant must still wait for notification from the Corps. (d) As a result of formal or informal consultation with the FWS or NMFS the district engineer may add species-specific permit conditions to the NWPs. (e) Authorization of an activity by an NWP does not authorize the “take” of a threatened or endangered species as defined under the ESA. In the absence of separate authorization (e.g., an ESA Section 10 Permit, a Biological Opinion with “incidental take” provisions, etc.) from the FWS or the NMFS, the Endangered Species Act prohibits any person subject to the jurisdiction of the United States to take a listed species, where “take” means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. The word

“harm” in the definition of “take” means an act which actually kills or injures wildlife. Such an act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering.

(f) If the non-federal permittee has a valid ESA section 10(a)(1)(B) incidental take permit with an approved Habitat Conservation Plan for a project or a group of projects that includes the proposed NWP activity, the non-federal applicant should provide a copy of that ESA section 10(a)(1)(B) permit with the PCN required by paragraph (c) of this general condition. The district engineer will coordinate with the agency that issued the ESA section 10(a)(1)(B) permit to determine whether the proposed NWP activity and the associated incidental take were considered in the internal ESA section 7 consultation conducted for the ESA section 10(a)(1)(B) permit. If that coordination results in concurrence from the agency that the proposed NWP activity and the associated incidental take were considered in the internal ESA section 7 consultation for the ESA section 10(a)(1)(B) permit, the district engineer does not need to conduct a separate ESA section 7 consultation for the proposed NWP activity. The district engineer will notify the non-federal applicant within 45 days of receipt of a complete pre-construction notification whether the ESA section 10(a)(1)(B) permit covers the proposed NWP activity or whether additional ESA section 7 consultation is required. (g) Information on the location of threatened and endangered species and their critical habitat can be obtained directly from the offices of the FWS and NMFS or their world wide web pages at <http://www.fws.gov/> or <http://www.fws.gov/ipac> and <http://www.nmfs.noaa.gov/pr/species/esa/> respectively.

19. Migratory Birds and Bald and Golden Eagles. The permittee is responsible for ensuring their action complies with the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act. The permittee is responsible for contacting appropriate local office of the U.S. Fish and Wildlife Service to determine applicable measures to reduce impacts to migratory birds or eagles, including whether “incidental take” permits are necessary and available under the Migratory Bird Treaty Act or Bald and Golden Eagle Protection Act for a particular activity.

20. Historic Properties. (a) In cases where the district engineer determines that the activity may have the potential to cause effects to properties listed, or eligible for listing, in the National Register of Historic Places, the activity is not authorized, until the requirements of Section 106 of the National Historic Preservation Act (NHPA) have been satisfied. (b) Federal permittees should follow their own procedures for complying with the requirements of section 106 of the National Historic Preservation Act. If pre-construction notification is required for the proposed NWP activity, the Federal permittee must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements. The district engineer will verify that the appropriate documentation has been submitted. If the appropriate documentation is not submitted, then additional consultation under section 106 may be necessary. The respective federal agency is responsible for fulfilling its obligation to comply with section 106. (c) Non-federal permittees must submit a pre-construction notification to the district engineer if the NWP activity might have the potential to cause effects to any historic properties listed on, determined to be eligible for listing on, or potentially eligible for listing on the National Register of Historic Places, including previously unidentified properties. For such activities, the pre-construction notification must state which historic properties might have the potential to be affected by the proposed NWP activity or include a vicinity map indicating the location of the historic properties or the potential for the presence of historic properties. Assistance regarding information on the location of, or potential for, the presence of historic properties can be sought from the State Historic Preservation Officer, Tribal Historic Preservation Officer, or designated tribal representative, as appropriate, and the National Register of Historic Places (see 33 CFR 330.4(g)). When reviewing pre-construction notifications, district engineers will comply with the current procedures for addressing the requirements of section 106 of the National Historic Preservation Act. The district engineer shall make a reasonable and good faith effort to carry out appropriate identification efforts, which may include background research, consultation, oral history interviews, sample field investigation, and field survey. Based on the information submitted in the PCN and these identification efforts, the district engineer shall determine whether the proposed NWP activity

has the potential to cause effects on the historic properties. Section 106 consultation is not required when the district engineer determines that the activity does not have the potential to cause effects on historic properties (see 36 CFR 800.3(a)). Section 106 consultation is required when the district engineer determines that the activity has the potential to cause effects on historic properties. The district engineer will conduct consultation with consulting parties identified under 36 CFR 800.2(c) when he or she makes any of the following effect determinations for the purposes of section 106 of the NHPA: no historic properties affected, no adverse effect, or adverse effect. Where the non-Federal applicant has identified historic properties on which the activity might have the potential to cause effects and so notified the Corps, the non-Federal applicant shall not begin the activity until notified by the district engineer either that the activity has no potential to cause effects to historic properties or that NHPA section 106 consultation has been completed. (d) For non-federal permittees, the district engineer will notify the prospective permittee within 45 days of receipt of a complete pre-construction notification whether NHPA section 106 consultation is required. If NHPA section 106 consultation is required, the district engineer will notify the non-Federal applicant that he or she cannot begin the activity until section 106 consultation is completed. If the non-Federal applicant has not heard back from the Corps within 45 days, the applicant must still wait for notification from the Corps. (e) Prospective permittees should be aware that section 110k of the NHPA (54 U.S.C. 306113) prevents the Corps from granting a permit or other assistance to an applicant who, with intent to avoid the requirements of section 106 of the NHPA, has intentionally significantly adversely affected a historic property to which the permit would relate, or having legal power to prevent it, allowed such significant adverse effect to occur, unless the Corps, after consultation with the Advisory Council on Historic Preservation (ACHP), determines that circumstances justify granting such assistance despite the adverse effect created or permitted by the applicant. If circumstances justify granting the assistance, the Corps is required to notify the ACHP and provide documentation specifying the circumstances, the degree of damage to the integrity of any historic properties affected, and proposed mitigation. This documentation must include any views obtained from the applicant, SHPO/THPO, appropriate Indian tribes if the undertaking occurs on or affects historic properties on tribal lands or affects properties of interest to those tribes, and other parties known to have a legitimate interest in the impacts to the permitted activity on historic properties.

21. Discovery of Previously Unknown Remains and Artifacts. If you discover any previously unknown historic, cultural or archeological remains and artifacts while accomplishing the activity authorized by this permit, you must immediately notify the district engineer of what you have found, and to the maximum extent practicable, avoid construction activities that may affect the remains and artifacts until the required coordination has been completed. The district engineer will initiate the Federal, Tribal, and state coordination required to determine if the items or remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

22. Designated Critical Resource Waters. Critical resource waters include, NOAA-managed marine sanctuaries and marine monuments, and National Estuarine Research Reserves. The district engineer may designate, after notice and opportunity for public comment, additional waters officially designated by a state as having particular environmental or ecological significance, such as outstanding national resource waters or state natural heritage sites. The district engineer may also designate additional critical resource waters after notice and opportunity for public comment. (a) Discharges of dredged or fill material into waters of the United States are not authorized by NWPs 7, 12, 14, 16, 17, 21, 29, 31, 35, 39, 40, 42, 43, 44, 49, 50, 51, and 52 for any activity within, or directly affecting, critical resource waters, including wetlands adjacent to such waters. (b) For NWPs 3, 8, 10, 13, 15, 18, 19, 22, 23, 25, 27, 28, 30, 33, 34, 36, 37, 38, and 54, notification is required in accordance with general condition 32, for any activity proposed in the designated critical resource waters including wetlands adjacent to those waters. The district engineer may authorize activities under these NWPs only after it is determined that the impacts to the critical resource waters will be no more than minimal.

23. **Mitigation.** The district engineer will consider the following factors when determining appropriate and practicable mitigation necessary to ensure that the individual and cumulative adverse environmental effects are no more than minimal: (a) The activity must be designed and constructed to avoid and minimize adverse effects, both temporary and permanent, to waters of the United States to the maximum extent practicable at the project site (i.e., on site). (b) Mitigation in all its forms (avoiding, minimizing, rectifying, reducing, or compensating for resource losses) will be required to the extent necessary to ensure that the individual and cumulative adverse environmental effects are no more than minimal. (c) Compensatory mitigation at a minimum one-for-one ratio will be required for all wetland losses that exceed 1/10-acre and require pre-construction notification, unless the district engineer determines in writing that either some other form of mitigation would be more environmentally appropriate or the adverse environmental effects of the proposed activity are no more than minimal, and provides an activity-specific waiver of this requirement. For wetland losses of 1/10-acre or less that require pre-construction notification, the district engineer may determine on a case-by-case basis that compensatory mitigation is required to ensure that the activity results in only minimal adverse environmental effects. (d) For losses of streams or other open waters that require pre-construction notification, the district engineer may require compensatory mitigation to ensure that the activity results in no more than minimal adverse environmental effects. Compensatory mitigation for losses of streams should be provided, if practicable, through stream rehabilitation, enhancement, or preservation, since streams are difficult-to-replace resources (see 33 CFR 332.3(e)(3)). (e) Compensatory mitigation plans for NWP activities in or near streams or other open waters will normally include a requirement for the restoration or enhancement, maintenance, and legal protection (e.g., conservation easements) of riparian areas next to open waters. In some cases, the restoration or maintenance/protection of riparian areas may be the only compensatory mitigation required. Restored riparian areas should consist of native species. The width of the required riparian area will address documented water quality or aquatic habitat loss concerns. Normally, the riparian area will be 25 to 50 feet wide on each side of the stream, but the district engineer may require slightly wider riparian areas to address documented water quality or habitat loss concerns. If it is not possible to restore or maintain/protect a riparian area on both sides of a stream, or if the waterbody is a lake or coastal waters, then restoring or maintaining/protecting a riparian area along a single bank or shoreline may be sufficient. Where both wetlands and open waters exist on the project site, the district engineer will determine the appropriate compensatory mitigation (e.g., riparian areas and/or wetlands compensation) based on what is best for the aquatic environment on a watershed basis. In cases where riparian areas are determined to be the most appropriate form of minimization or compensatory mitigation, the district engineer may waive or reduce the requirement to provide wetland compensatory mitigation for wetland losses. (f) Compensatory mitigation projects provided to offset losses of aquatic resources must comply with the applicable provisions of 33 CFR part 332.

(1) The prospective permittee is responsible for proposing an appropriate compensatory mitigation option if compensatory mitigation is necessary to ensure that the activity results in no more than minimal adverse environmental effects. For the NWPs, the preferred mechanism for providing compensatory mitigation is mitigation bank credits or in-lieu fee program credits (see 33 CFR 332.3(b)(2) and (3)). However, if an appropriate number and type of mitigation bank or in-lieu credits are not available at the time the PCN is submitted to the district engineer, the district engineer may approve the use of permittee-responsible mitigation. (2) The amount of compensatory mitigation required by the district engineer must be sufficient to ensure that the authorized activity results in no more than minimal individual and cumulative adverse environmental effects (see 33 CFR 330.1(e)(3)). (See also 33 CFR 332.3(f)). (3) Since the likelihood of success is greater and the impacts to potentially valuable uplands are reduced, aquatic resource restoration should be the first compensatory mitigation option considered for permittee-responsible mitigation. (4) If permittee-responsible mitigation is the proposed option, the prospective permittee is responsible for submitting a mitigation plan. A conceptual or detailed mitigation plan may be used by the district engineer to make the decision on the NWP verification request, but a final mitigation plan that addresses the applicable requirements of 33 CFR 332.4(c)(2) through (14) must be approved by the district engineer

before the permittee begins work in waters of the United States, unless the district engineer determines that prior approval of the final mitigation plan is not practicable or not necessary to ensure timely completion of the required compensatory mitigation (see 33 CFR 332.3(k)(3)). (5) If mitigation bank or in-lieu fee program credits are the proposed option, the mitigation plan only needs to address the baseline conditions at the impact site and the number of credits to be provided. (6) Compensatory mitigation requirements (e.g., resource type and amount to be provided as compensatory mitigation, site protection, ecological performance standards, monitoring requirements) may be addressed through conditions added to the NWP authorization, instead of components of a compensatory mitigation plan (see 33 CFR 332.4(c)(1)(ii)).

(g) Compensatory mitigation will not be used to increase the acreage losses allowed by the acreage limits of the NWPs. For example, if an NWP has an acreage limit of 1/2-acre, it cannot be used to authorize any NWP activity resulting in the loss of greater than 1/2-acre of waters of the United States, even if compensatory mitigation is provided that replaces or restores some of the lost waters. However, compensatory mitigation can and should be used, as necessary, to ensure that an NWP activity already meeting the established acreage limits also satisfies the no more than minimal impact requirement for the NWPs. (h) Permittees may propose the use of mitigation banks, in-lieu fee programs, or permittee-responsible mitigation. When developing a compensatory mitigation proposal, the permittee must consider appropriate and practicable options consistent with the framework at 33 CFR 332.3(b). For activities resulting in the loss of marine or estuarine resources, permittee-responsible mitigation may be environmentally preferable if there are no mitigation banks or in-lieu fee programs in the area that have marine or estuarine credits available for sale or transfer to the permittee. For permittee-responsible mitigation, the special conditions of the NWP verification must clearly indicate the party or parties responsible for the implementation and performance of the compensatory mitigation project, and, if required, its long-term management. (i) Where certain functions and services of waters of the United States are permanently adversely affected by a regulated activity, such as discharges of dredged or fill material into waters of the United States that will convert a forested or scrub-shrub wetland to a herbaceous wetland in a permanently maintained utility line right-of-way, mitigation may be required to reduce the adverse environmental effects of the activity to the no more than minimal level.

24. Safety of Impoundment Structures. To ensure that all impoundment structures are safely designed, the district engineer may require non-Federal applicants to demonstrate that the structures comply with established state dam safety criteria or have been designed by qualified persons. The district engineer may also require documentation that the design has been independently reviewed by similarly qualified persons, and appropriate modifications made to ensure safety.

25. Water Quality. Where States and authorized Tribes, or EPA where applicable, have not previously certified compliance of an NWP with CWA section 401, individual 401 Water Quality Certification must be obtained or waived (see 33 CFR 330.4(c)). The district engineer or State or Tribe may require additional water quality management measures to ensure that the authorized activity does not result in more than minimal degradation of water quality.

26. Coastal Zone Management. In coastal states where an NWP has not previously received a state coastal zone management consistency concurrence, an individual state coastal zone management consistency concurrence must be obtained, or a presumption of concurrence must occur (see 33 CFR 330.4(d)). The district engineer or a State may require additional measures to ensure that the authorized activity is consistent with state coastal zone management requirements.

27. Regional and Case-By-Case Conditions. The activity must comply with any regional conditions that may have been added by the Division Engineer (see 33 CFR 330.4(e)) and with any case specific conditions added by the Corps or by the state, Indian Tribe, or U.S. EPA in its section 401 Water Quality Certification, or by the state in its Coastal Zone Management Act consistency determination.

28. Use of Multiple Nationwide Permits. The use of more than one NWP for a single and complete project is prohibited, except when the acreage loss of waters of the United States authorized by the NWPs does not exceed the acreage limit of the NWP with the highest specified acreage limit. For example, if a road crossing over tidal waters is constructed under NWP 14, with associated bank stabilization authorized by NWP 13, the maximum acreage loss of waters of the United States for the total project cannot exceed 1/3-acre.

29. Transfer of Nationwide Permit Verifications. If the permittee sells the property associated with a nationwide permit verification, the permittee may transfer the nationwide permit verification to the new owner by submitting a letter to the appropriate Corps district office to validate the transfer. A copy of the nationwide permit verification must be attached to the letter, and the letter must contain the following statement and signature: “When the structures or work authorized by this nationwide permit are still in existence at the time the property is transferred, the terms and conditions of this nationwide permit, including any special conditions, will continue to be binding on the new owner(s) of the property. To validate the transfer of this nationwide permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below.”

(Transferee)

(Date)

30. Compliance Certification. Each permittee who receives an NWP verification letter from the Corps must provide a signed certification documenting completion of the authorized activity and implementation of any required compensatory mitigation. The success of any required permittee-responsible mitigation, including the achievement of ecological performance standards, will be addressed separately by the district engineer. The Corps will provide the permittee the certification document with the NWP verification letter. The certification document will include: (a) A statement that the authorized activity was done in accordance with the NWP authorization, including any general, regional, or activity-specific conditions; (b) A statement that the implementation of any required compensatory mitigation was completed in accordance with the permit conditions. If credits from a mitigation bank or in-lieu fee program are used to satisfy the compensatory mitigation requirements, the certification must include the documentation required by 33 CFR 332.3(l)(3) to confirm that the permittee secured the appropriate number and resource type of credits; and (c) The signature of the permittee certifying the completion of the activity and mitigation. The completed certification document must be submitted to the district engineer within 30 days of completion of the authorized activity or the implementation of any required compensatory mitigation, whichever occurs later.

31. Activities Affecting Structures or Works Built by the United States. If an NWP activity also requires permission from the Corps pursuant to 33 U.S.C. 408 because it will alter or temporarily or permanently occupy or use a U.S. Army Corps of Engineers (USACE) federally authorized Civil Works project (a “USACE project”), the prospective permittee must submit a pre-construction notification. See paragraph (b)(10) of general condition 32. An activity that requires section 408 permission is not authorized by NWP until the appropriate Corps office issues the section 408 permission to alter, occupy, or use the USACE project, and the district engineer issues a written NWP verification.

32. Pre-Construction Notification. (a) Timing. Where required by the terms of the NWP, the prospective permittee must notify the district engineer by submitting a pre-construction notification (PCN) as early as possible. The district engineer must determine if the PCN is complete within 30 calendar days of the date of receipt and, if the PCN is determined to be incomplete, notify the prospective permittee within that 30 day period to request the additional information necessary to make the PCN complete. The request must specify the information needed to make the PCN complete. As a general rule, district engineers will

request additional information necessary to make the PCN complete only once. However, if the prospective permittee does not provide all of the requested information, then the district engineer will notify the prospective permittee that the PCN is still incomplete and the PCN review process will not commence until all of the requested information has been received by the district engineer. The prospective permittee shall not begin the activity until either:

(1) He or she is notified in writing by the district engineer that the activity may proceed under the NWP with any special conditions imposed by the district or division engineer; or

(2) 45 calendar days have passed from the district engineer's receipt of the complete PCN and the prospective permittee has not received written notice from the district or division engineer. However, if the permittee was required to notify the Corps pursuant to general condition 18 that listed species or critical habitat might be affected or are in the vicinity of the activity, or to notify the Corps pursuant to general condition 20 that the activity might have the potential to cause effects to historic properties, the permittee cannot begin the activity until receiving written notification from the Corps that there is "no effect" on listed species or "no potential to cause effects" on historic properties, or that any consultation required under Section 7 of the Endangered Species Act (see 33 CFR 330.4(f)) and/or section 106 of the National Historic Preservation Act (see 33 CFR 330.4(g)) has been completed. Also, work cannot begin under NWPs 21, 49, or 50 until the permittee has received written approval from the Corps. If the proposed activity requires a written waiver to exceed specified limits of an NWP, the permittee may not begin the activity until the district engineer issues the waiver. If the district or division engineer notifies the permittee in writing that an individual permit is required within 45 calendar days of receipt of a complete PCN, the permittee cannot begin the activity until an individual permit has been obtained. Subsequently, the permittee's right to proceed under the NWP may be modified, suspended, or revoked only in accordance with the procedure set forth in 33 CFR 330.5(d)(2).

(b) Contents of Pre-Construction Notification: The PCN must be in writing and include the following information:

(1) Name, address and telephone numbers of the prospective permittee;

(2) Location of the proposed activity;

(3) Identify the specific NWP or NWP(s) the prospective permittee wants to use to authorize the proposed activity;

(4) A description of the proposed activity; the activity's purpose; direct and indirect adverse environmental effects the activity would cause, including the anticipated amount of loss of wetlands, other special aquatic sites, and other waters expected to result from the NWP activity, in acres, linear feet, or other appropriate unit of measure; a description of any proposed mitigation measures intended to reduce the adverse environmental effects caused by the proposed activity; and any other NWP(s), regional general permit(s), or individual permit(s) used or intended to be used to authorize any part of the proposed project or any related activity, including other separate and distant crossings for linear projects that require Department of the Army authorization but do not require pre-construction notification. The description of the proposed activity and any proposed mitigation measures should be sufficiently detailed to allow the district engineer to determine that the adverse environmental effects of the activity will be no more than minimal and to determine the need for compensatory mitigation or other mitigation measures. For single and complete linear projects, the PCN must include the quantity of anticipated losses of wetlands, other special aquatic sites, and other waters for each single and complete crossing of those wetlands, other special aquatic sites, and other waters. Sketches should be provided when necessary to show that the activity complies with the terms of the NWP. (Sketches usually clarify the activity and when provided results in a quicker decision. Sketches should contain sufficient detail to provide an illustrative description of the proposed activity (e.g., a conceptual plan), but do not need to be detailed engineering plans);

(5) The PCN must include a delineation of wetlands, other special aquatic sites, and other waters, such as lakes and ponds, and perennial, intermittent, and ephemeral streams, on the project site. Wetland delineations must be prepared in accordance with the current method required by the Corps. The permittee may ask the Corps to delineate the special aquatic sites and other waters on the project site, but there may be a delay if the Corps does the delineation, especially if the project site is

large or contains many wetlands, other special aquatic sites, and other waters. Furthermore, the 45 day period will not start until the delineation has been submitted to or completed by the Corps, as appropriate;

(6) If the proposed activity will result in the loss of greater than 1/10-acre of wetlands and a PCN is required, the prospective permittee must submit a statement describing how the mitigation requirement will be satisfied, or explaining why the adverse environmental effects are no more than minimal and why compensatory mitigation should not be required. As an alternative, the prospective permittee may submit a conceptual or detailed mitigation plan.

(7) For non-Federal permittees, if any listed species or designated critical habitat might be affected or is in the vicinity of the activity, or if the activity is located in designated critical habitat, the PCN must include the name(s) of those endangered or threatened species that might be affected by the proposed activity or utilize the designated critical habitat that might be affected by the proposed activity. For NWP activities that require pre-construction notification, Federal permittees must provide documentation demonstrating compliance with the Endangered Species Act;

(8) For non-Federal permittees, if the NWP activity might have the potential to cause effects to a historic property listed on, determined to be eligible for listing on, or potentially eligible for listing on, the National Register of Historic Places, the PCN must state which historic property might have the potential to be affected by the proposed activity or include a vicinity map indicating the location of the historic property. For NWP activities that require pre-construction notification, Federal permittees must provide documentation demonstrating compliance with section 106 of the National Historic Preservation Act;

(9) For an activity that will occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a “study river” for possible inclusion in the system while the river is in an official study status, the PCN must identify the Wild and Scenic River or the “study river” (see general condition 16); and

(10) For an activity that requires permission from the Corps pursuant to 33 U.S.C. 408 because it will alter or temporarily or permanently occupy or use a U.S. Army Corps of Engineers federally authorized civil works project, the pre-construction notification must include a statement confirming that the project proponent has submitted a written request for section 408 permission from the Corps office having jurisdiction over that USACE project.

(c) Form of Pre-Construction Notification: The standard individual permit application form (Form ENG 4345) may be used, but the completed application form must clearly indicate that it is an NWP PCN and must include all of the applicable information required in paragraphs (b)(1) through (10) of this general condition. A letter containing the required information may also be used. Applicants may provide electronic files of PCNs and supporting materials if the district engineer has established tools and procedures for electronic submittals. (d) Agency Coordination: (1) The district engineer will consider any comments from Federal and state agencies concerning the proposed activity’s compliance with the terms and conditions of the NWPs and the need for mitigation to reduce the activity’s adverse environmental effects so that they are no more than minimal. (2) Agency coordination is required for: (i) all NWP activities that require pre-construction notification and result in the loss of greater than 1/2-acre of waters of the United States; (ii) NWP 21, 29, 39, 40, 42, 43, 44, 50, 51, and 52 activities that require pre-construction notification and will result in the loss of greater than 300 linear feet of stream bed; (iii) NWP 13 activities in excess of 500 linear feet, fills greater than one cubic yard per running foot, or involve discharges of dredged or fill material into special aquatic sites; and (iv) NWP 54 activities in excess of 500 linear feet, or that extend into the waterbody more than 30 feet from the mean low water line in tidal waters or the ordinary high water mark in the Great Lakes. (3) When agency coordination is required, the district engineer will immediately provide (e.g., via e-mail, facsimile transmission, overnight mail, or other expeditious manner) a copy of the complete PCN to the appropriate Federal or state offices (FWS, state natural resource or water quality agency, EPA, and, if appropriate, the NMFS). With the exception of NWP 37, these agencies will have 10 calendar days from the date the material is transmitted to notify the district engineer via telephone, facsimile transmission, or e-mail that they intend to provide substantive, site-specific comments. The comments must explain why the agency believes the adverse

environmental effects will be more than minimal. If so contacted by an agency, the district engineer will wait an additional 15 calendar days before making a decision on the pre-construction notification. The district engineer will fully consider agency comments received within the specified time frame concerning the proposed activity's compliance with the terms and conditions of the NWP, including the need for mitigation to ensure the net adverse environmental effects of the proposed activity are no more than minimal. The district engineer will provide no response to the resource agency, except as provided below. The district engineer will indicate in the administrative record associated with each pre-construction notification that the resource agencies' concerns were considered. For NWP 37, the emergency watershed protection and rehabilitation activity may proceed immediately in cases where there is an unacceptable hazard to life or a significant loss of property or economic hardship will occur. The district engineer will consider any comments received to decide whether the NWP 37 authorization should be modified, suspended, or revoked in accordance with the procedures at 33 CFR 330.5. (4) In cases of where the prospective permittee is not a Federal agency, the district engineer will provide a response to NMFS within 30 calendar days of receipt of any Essential Fish Habitat conservation recommendations, as required by section 305(b)(4)(B) of the Magnuson-Stevens Fishery Conservation and Management Act. (5) Applicants are encouraged to provide the Corps with either electronic files or multiple copies of pre-construction notifications to expedite agency coordination.

District Engineer's Decision: 1. In reviewing the PCN for the proposed activity, the district engineer will determine whether the activity authorized by the NWP will result in more than minimal individual or cumulative adverse environmental effects or may be contrary to the public interest. If a project proponent requests authorization by a specific NWP, the district engineer should issue the NWP verification for that activity if it meets the terms and conditions of that NWP, unless he or she determines, after considering mitigation, that the proposed activity will result in more than minimal individual and cumulative adverse effects on the aquatic environment and other aspects of the public interest and exercises discretionary authority to require an individual permit for the proposed activity. For a linear project, this determination will include an evaluation of the individual crossings of waters of the United States to determine whether they individually satisfy the terms and conditions of the NWP(s), as well as the cumulative effects caused by all of the crossings authorized by NWP. If an applicant requests a waiver of the 300 linear foot limit on impacts to streams or of an otherwise applicable limit, as provided for in NWPs 13, 21, 29, 36, 39, 40, 42, 43, 44, 50, 51, 52, or 54, the district engineer will only grant the waiver upon a written determination that the NWP activity will result in only minimal individual and cumulative adverse environmental effects. For those NWPs that have a waivable 300 linear foot limit for losses of intermittent and ephemeral stream bed and a 1/2-acre limit (i.e., NWPs 21, 29, 39, 40, 42, 43, 44, 50, 51, and 52), the loss of intermittent and ephemeral stream bed, plus any other losses of jurisdictional waters and wetlands, cannot exceed 1/2-acre. 2. When making minimal adverse environmental effects determinations the district engineer will consider the direct and indirect effects caused by the NWP activity. He or she will also consider the cumulative adverse environmental effects caused by activities authorized by NWP and whether those cumulative adverse environmental effects are no more than minimal. The district engineer will also consider site specific factors, such as the environmental setting in the vicinity of the NWP activity, the type of resource that will be affected by the NWP activity, the functions provided by the aquatic resources that will be affected by the NWP activity, the degree or magnitude to which the aquatic resources perform those functions, the extent that aquatic resource functions will be lost as a result of the NWP activity (e.g., partial or complete loss), the duration of the adverse effects (temporary or permanent), the importance of the aquatic resource functions to the region (e.g., watershed or ecoregion), and mitigation required by the district engineer. If an appropriate functional or condition assessment method is available and practicable to use, that assessment method may be used by the district engineer to assist in the minimal adverse environmental effects determination. The district engineer may add case-specific special conditions to the NWP authorization to address site-specific environmental concerns. 3. If the proposed activity requires a PCN and will result in a loss of greater than 1/10-acre of wetlands, the prospective permittee should submit a mitigation proposal with the PCN. Applicants may also propose compensatory mitigation for NWP activities with smaller impacts, or

for impacts to other types of waters (e.g., streams). The district engineer will consider any proposed compensatory mitigation or other mitigation measures the applicant has included in the proposal in determining whether the net adverse environmental effects of the proposed activity are no more than minimal. The compensatory mitigation proposal may be either conceptual or detailed. If the district engineer determines that the activity complies with the terms and conditions of the NWP and that the adverse environmental effects are no more than minimal, after considering mitigation, the district engineer will notify the permittee and include any activity-specific conditions in the NWP verification the district engineer deems necessary. Conditions for compensatory mitigation requirements must comply with the appropriate provisions at 33 CFR 332.3(k). The district engineer must approve the final mitigation plan before the permittee commences work in waters of the United States, unless the district engineer determines that prior approval of the final mitigation plan is not practicable or not necessary to ensure timely completion of the required compensatory mitigation. If the prospective permittee elects to submit a compensatory mitigation plan with the PCN, the district engineer will expeditiously review the proposed compensatory mitigation plan. The district engineer must review the proposed compensatory mitigation plan within 45 calendar days of receiving a complete PCN and determine whether the proposed mitigation would ensure the NWP activity results in no more than minimal adverse environmental effects. If the net adverse environmental effects of the NWP activity (after consideration of the mitigation proposal) are determined by the district engineer to be no more than minimal, the district engineer will provide a timely written response to the applicant. The response will state that the NWP activity can proceed under the terms and conditions of the NWP, including any activity-specific conditions added to the NWP authorization by the district engineer. 4. If the district engineer determines that the adverse environmental effects of the proposed activity are more than minimal, then the district engineer will notify the applicant either: (a) that the activity does not qualify for authorization under the NWP and instruct the applicant on the procedures to seek authorization under an individual permit; (b) that the activity is authorized under the NWP subject to the applicant's submission of a mitigation plan that would reduce the adverse environmental effects so that they are no more than minimal; or (c) that the activity is authorized under the NWP with specific modifications or conditions. Where the district engineer determines that mitigation is required to ensure no more than minimal adverse environmental effects, the activity will be authorized within the 45-day PCN period (unless additional time is required to comply with general conditions 18, 20, and/or 31, or to evaluate PCNs for activities authorized by NWPs 21, 49, and 50), with activity-specific conditions that state the mitigation requirements. The authorization will include the necessary conceptual or detailed mitigation plan or a requirement that the applicant submit a mitigation plan that would reduce the adverse environmental effects so that they are no more than minimal. When compensatory mitigation is required, no work in waters of the United States may occur until the district engineer has approved a specific mitigation plan or has determined that prior approval of a final mitigation plan is not practicable or not necessary to ensure timely completion of the required compensatory mitigation.

Further Information: 1. District Engineers have authority to determine if an activity complies with the terms and conditions of an NWP. 2. NWPs do not obviate the need to obtain other federal, state, or local permits, approvals, or authorizations required by law. 3. NWPs do not grant any property rights or exclusive privileges. 4. NWPs do not authorize any injury to the property or rights of others. 5. NWPs do not authorize interference with any existing or proposed Federal project (see general condition 31).

C. CORPS SEATTLE DISTRICT REGIONAL GENERAL CONDITIONS: The following conditions apply to all NWPs for the Seattle District in Washington State, unless specified.

1. Project Drawings: Drawings must be submitted with pre-construction notification (PCN). Drawings must provide a clear understanding of the proposed project, and how waters of the U.S. will be affected. Drawings must be originals and not reduced copies of large-scale plans. Engineering drawings are not required. Existing and proposed site conditions (manmade and landscape features) must be drawn to scale.

2. Aquatic Resources Requiring Special Protection: Activities resulting in a loss of waters of the United States in mature forested wetlands, bogs and peatlands, aspen-dominated wetlands, alkali wetlands, vernal pools, camas prairie wetlands, estuarine wetlands, wetlands in coastal lagoons, and wetlands in dunal systems along the Washington coast cannot be authorized by a NWP, except by the following NWPs:

- NWP 3 – Maintenance
- NWP 20 – Response Operations for Oil and Hazardous Substances
- NWP 32 – Completed Enforcement Actions
- NWP 38 – Cleanup of Hazardous and Toxic Waste

In order to use one of the above-referenced NWPs in any of the aquatic resources requiring special protection, prospective permittees must submit a PCN to the Corps of Engineers (see NWP general condition 32) and obtain written authorization before commencing work.

3. New Bank Stabilization in Tidal Waters of Puget Sound: Activities involving new bank stabilization in tidal waters in Water Resource Inventory Areas (WRIAs) 8, 9, 10, 11 and 12 (within the areas identified on Figures 1a through 1e on Corps website) cannot be authorized by NWP.

4. Commencement Bay: The following NWPs may not be used to authorize activities located in the Commencement Bay Study Area (see Figure 2 on Corps website):

- NWP 12 – Utility Line Activities (substations)
- NWP 13 – Bank Stabilization
- NWP 14 – Linear Transportation Projects
- NWP 23 – Approved Categorical Exclusions
- NWP 29 – Residential Developments
- NWP 39 – Commercial and Institutional Developments
- NWP 40 – Agricultural Activities
- NWP 41 – Reshaping Existing Drainage Ditches
- NWP 42 – Recreational Facilities
- NWP 43 – Stormwater and Wastewater Management Facilities

5. Bank Stabilization: All projects including new or maintenance bank stabilization activities require PCN to the Corps of Engineers (see NWP general condition 32). For new bank stabilization projects only, the following must be submitted to the Corps of Engineers:

- a. The cause of the erosion and the distance of any existing structures from the area(s) being stabilized.
- b. The type and length of existing bank stabilization within 300 feet of the proposed project.
- c. A description of current conditions and expected post-project conditions in the waterbody.
- d. A statement describing how the project incorporates elements avoiding and minimizing adverse environmental effects to the aquatic environment and nearshore riparian area, including vegetation impacts in the waterbody.

In addition to a. through d., the results from any relevant geotechnical investigations can be submitted with the PCN if it describes current or expected conditions in the waterbody.

6. Crossings of Waters of the United States: Any project including installing, replacing, or modifying crossings of waters of the United States, such as culverts or bridges, requires submittal of a PCN to the Corps of Engineers (see NWP general condition 32). If a culvert is proposed to cross waters of the U.S. where salmonid species are present or could be present, the project must apply the stream simulation design method from the Washington Department of Fish and Wildlife located in the *Water Crossing Design Guidelines* (2013), or a design method which provides passage at all life stages at all flows where the salmonid species would naturally seek passage. If the stream simulation design method is not applied

for a culvert where salmonid species are present or could be present, the project proponent must provide a rationale in the PCN sufficient to establish one of the following:

- a. The existence of extraordinary site conditions.
- b. How the proposed design will provide equivalent or better fish passage and fisheries habitat benefits than the stream simulation design method.

If a culvert is proposed to cross waters of the U.S. where salmonid species are present or could be present, project proponents must provide a monitoring plan with the PCN that specifies how the proposed culvert will be assessed over a five-year period from the time of construction completion to ensure its effectiveness in providing passage at all life stages at all flows where the salmonid species would naturally seek passage. Culverts installed under emergency authorization that do not meet the above design criteria will be required to meet the above design criteria to receive an after-the-fact nationwide permit verification.

7. Stream Loss: A PCN is required for all activities that result in the loss of any linear feet of stream beds. No activity shall result in the loss of any linear feet of perennial stream beds or the loss of greater than 300 linear feet of intermittent and/or ephemeral stream beds. A stream may be rerouted if it is designed in a manner that maintains or restores hydrologic, ecologic, and geomorphic stream processes, provided there is not a reduction in the linear feet of stream bed. Streams include brooks, creeks, rivers, and historical waters of the U.S. that have been channelized into ditches. This condition does not apply to ditches constructed in uplands. Stream loss restrictions may be waived by the district engineer on a case-by-case basis provided the activities result in net increases of aquatic resource functions and services.

8. Mitigation: Pre-construction notification is required for any project that will result in permanent wetland losses that exceed 1,000 square feet. In addition to the requirements of General Condition 23 (Mitigation), compensatory mitigation at a minimum one-to-one ratio will be required for all permanent wetland losses that exceed 1,000 square feet. When a PCN is required for wetland losses less than 1,000 square feet, the Corps of Engineers may determine on a case-by-case basis that compensatory mitigation is required to ensure that the activity results in minimal adverse effects on the aquatic environment. Compensatory mitigation for impacts to marine waters, lakes, and streams will be determined on a case-by-case basis. If temporary impacts to waters of the U.S. exceed six months, the Corps of Engineers may require compensatory mitigation for temporal effects.

9. Magnuson-Stevens Fishery Conservation and Management Act – Essential Fish Habitat Essential Fish Habitat (EFH) is defined as those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity. If EFH may be adversely affected by a proposed activity, the prospective permittee must provide a written EFH assessment with an analysis of the effects of the proposed action on EFH. The assessment must identify the type(s) of essential fish habitat (i.e., Pacific salmon, groundfish, and/or coastal-pelagic species) that may be affected. If the Corps of Engineers determines the project will adversely affect EFH, consultation with NOAA Fisheries will be required. Federal agencies should follow their own procedures for complying with the requirements of the Magnuson-Stevens Fishery Conservation and Management Act. If PCN is required for the proposed activity, Federal permittees must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements.

10. Forage Fish: For projects in forage fish spawning habitat, in-water work must occur within designated forage fish work windows, or when forage fish are not spawning. If working outside of a designated work window, or if forage fish work windows are closed year round, work may occur if the work window restriction is released for a period of time after a forage fish spawning survey has been conducted by a biologist approved by the Washington State Department of Fish and Wildlife (WDFW). Forage fish species with designated in-water work windows include Pacific sand lance (*Ammodytes hexapterus*), Pacific herring (*Clupea pallasii*), and surf smelt (*Hypomesus pretiosus*). This RGC does not

apply to NWP 48, *Commercial Shellfish Aquaculture Activities*. Please see specific regional conditions for NWP 48.

11. Notification of Permit Requirements: The permittee must provide a copy of the nationwide permit authorization letter, conditions, and permit drawings to all contractors and any other parties performing the authorized work prior to the commencement of any work in waters of the U.S. The permittee must ensure all appropriate contractors and any other parties performing the authorized work at the project site have read and understand relevant NWP conditions as well as plans, approvals, and documents referenced in the NWP letter. A copy of these documents must be maintained onsite throughout the duration of construction.

12. Construction Boundaries: Permittees must clearly mark all construction area boundaries before beginning work on projects that involve grading or placement of fill. Boundary markers and/or construction fencing must be maintained and clearly visible for the duration of construction. Permittees should avoid and minimize removal of native vegetation (including submerged aquatic vegetation) to the maximum extent possible.

13. Temporary Impacts and Site Restoration

- a. Temporary impacts to waters of the U.S. must not exceed six months unless the prospective permittee requests and receives a waiver by the district engineer. Temporary impacts to waters of the U.S. must be identified in the PCN.
- b. No more than 1/2 acre of waters of the U.S. may be temporarily filled unless the prospective permittee requests and receives a waiver from the district engineer (temporary fills do not affect specified limits for loss of waters associated with specific nationwide permits).
- c. Native soils removed from waters of the U.S. for project construction should be stockpiled and used for site restoration. Restoration of temporarily disturbed areas must include returning the area to pre-project ground surface contours. If native soil is not available from the project site for restoration, suitable clean soil of the same textural class may be used. Other soils may be used only if identified in the PCN.
- d. The permittee must revegetate disturbed areas with native plant species sufficient in number, spacing, and diversity to restore affected functions. A maintenance and monitoring plan commensurate with the impacts, may be required. Revegetation must begin as soon as site conditions allow within the same growing season as the disturbance unless the schedule is approved by the Corps of Engineers. Native plants removed from waters of the U.S. for project construction should be stockpiled and used for revegetation when feasible. Temporary Erosion and Sediment Control measures must be removed as soon as the area has established vegetation sufficient to control erosion and sediment.
- e. If the Corps determines the project will result in temporary impacts of submerged aquatic vegetation (SAV) that are more than minimal, a monitoring plan must be submitted. If recovery is not achieved by the end of the monitoring period, contingencies must be implemented, and additional monitoring will be required.

This RGC does not apply to NWP 48, *Commercial Shellfish Aquaculture Activities*. Please see specific regional conditions for NWP 48.

D. CORPS REGIONAL SPECIFIC CONDITIONS FOR THIS NWPS: none

E. ECOLOGY 401 CERTIFICATION: GENERAL CONDITIONS

In addition to all the Corps National and Seattle Districts' Regional permit conditions, the following State General Section 401 Water Quality Certification (Section 401) conditions apply to all Nationwide Permits whether **certified** or **partially certified** in the State of Washington.

1. **For in-water construction activities.** Ecology Section 401 review is required for projects or

activities authorized under NWP that will cause, or may be likely to cause or contribute to an exceedance of a State water quality standard (Chapter 173-201A WAC) or sediment management standard (Chapter 173-204 WAC). State water quality standards and sediment management standards are available on Ecology's website. Note: In-water activities include any activity within a wetland and/or activities below the ordinary high water mark (OHWM).

2. Projects or Activities Discharging to Impaired Waters. Ecology Section 401 review is required for projects or activities authorized under NWPs if the project or activity will occur in a 303(d) listed segment of a waterbody or upstream of a listed segment and may result in further exceedances of the specific listed parameter. To determine if your project or activity is in a 303(d) listed segment of a waterbody, visit Ecology's Water Quality Assessment webpage for maps and search tools.

3. Application. For projects or activities that will require Ecology Section 401 review, applicants must provide Ecology with a Joint Aquatic Resources Permit Application (JARPA) along with the documentation provided to the Corps, as described in National General Condition 32, Pre-Construction Notification, including, when applicable: (a) A description of the project, including site plans, project purpose, direct and indirect adverse environmental effects the project would cause, best management practices (BMPs), and any other Department of the Army or federal agency permits used or intended to be used to authorize any part of the proposed project or any related activity. (b) Drawings indicating the Ordinary High Water Mark (OHWM), delineation of special aquatic sites and other waters of the state. Wetland delineations must be prepared in accordance with the current method required by the Corps and shall include Ecology's Wetland Rating form. Wetland rating forms are subject to review and verification by Ecology staff. Guidance for determining the OHWM is available on Ecology's website. (c) A statement describing how the mitigation requirement will be satisfied. A conceptual or detailed mitigation or restoration plan may be submitted. See State General Condition 5 for details on mitigation requirements. (d) Other applicable requirements of Corps Nationwide Permit General Condition 32, Corps Regional Conditions, or notification conditions of the applicable NWP. (e) Within 180 calendar days from receipt of applicable documents noted above **and** a copy of the final authorization letter from the Corps providing coverage for a proposed project or activity under the NWP Program Ecology will provide the applicant notice of whether an individual Section 401 will be required for the project. If Ecology fails to act within a year after receipt of **both** of these documents, Section 401 is presumed waived.

4. Aquatic resources requiring special protection. Certain aquatic resources are unique, difficult-to-replace components of the aquatic environment in Washington State. Activities that would affect these resources must be avoided to the greatest extent possible. Compensating for adverse impacts to high value aquatic resources is typically difficult, prohibitively expensive, and may not be possible in some landscape settings. Ecology Section 401 review is required for activities in or affecting the following aquatic resources (and not prohibited by Seattle District Regional General Condition): (a) Wetlands with special characteristics (as defined in the Washington State Wetland Rating Systems for western and eastern Washington, Ecology Publications #14-06-029 and #14-06-030):

- Estuarine wetlands.
- Wetlands of High Conservation Value.
- Bogs.
- Old-growth and mature forested wetlands.
- Wetlands in coastal lagoons.
- Interdunal wetlands.
- Vernal pools.
- Alkali wetlands.

(b) Fens, aspen-dominated wetlands, camas prairie wetlands. (c) Marine water with eelgrass (*Zostera marina*) beds (except for NWP 48). (d) Category I wetlands. (e) Category II wetlands with a habitat score ≥ 8 points. This State General Condition does not apply to the following Nationwide Permits:

5. Mitigation. Applicants are required to show that they have followed the mitigation sequence and have first avoided and minimized impacts to aquatic resources wherever practicable. For projects requiring Ecology Section 401 review with unavoidable impacts to aquatic resources, adequate compensatory mitigation must be provided.

(a) Wetland mitigation plans submitted for Ecology review and approval shall be based on the most current guidance provided in Wetland Mitigation in Washington State, Parts 1 and 2 (available on Ecology’s website) and shall, at a minimum, include the following:

i. A description of the measures taken to avoid and minimize impacts to wetlands and other waters of the U.S.

ii. The nature of the proposed impacts (i.e., acreage of wetlands and functions lost or degraded).

iii. The rationale for the mitigation site that was selected.

iv. The goals and objectives of the compensatory mitigation project.

v. How the mitigation project will be accomplished, including construction sequencing, best management practices to protect water quality, proposed performance standards for measuring success and the proposed buffer widths.

vi. How it will be maintained and monitored to assess progress towards goals and objectives. Monitoring will generally be required for a minimum of five years. For forested and scrub-shrub wetlands, 10 years of monitoring will often be necessary.

vii. How the compensatory mitigation site will be legally protected for the long term. Refer to Wetland Mitigation in Washington State – Part 2: Developing Mitigation Plans (Ecology Publication #06-06-011b) and Selecting Wetland Mitigation Sites Using a Watershed Approach (Ecology Publications #09-06-032 (Western Washington) and #10-06-007 (Eastern Washington)) for guidance on selecting suitable mitigation sites and developing mitigation plans. Ecology encourages the use of alternative mitigation approaches, including credit/debit methodology, advance mitigation, and other programmatic approach such as mitigation banks and in-lieu fee programs. If you are interested in proposing use of an alternative mitigation approach, consult with the appropriate Ecology regional staff person. Information on alternative mitigation approaches is available on Ecology’s website.

(b) Mitigation for other aquatic resource impacts will be determined on a case-by-case basis.

6. Temporary Fills. Ecology Section 401 review is required for any project or activity with temporary fill in wetlands or other waters of the state for more than 90 days, unless the applicant has received written approval from Ecology. Note: This State General Condition does not apply to projects or activities authorized under NWP 33, *Temporary Construction, Access, and Dewatering*

7. Stormwater pollution prevention: All projects that involve land disturbance or impervious surfaces must implement stormwater pollution prevention or control measures to avoid discharge of pollutants in stormwater runoff to waters of the State.

(a) For land disturbances during construction, the applicant must obtain and implement permits (e.g., Construction Stormwater General Permit) where required and follow Ecology’s current stormwater manual.

(b) Following construction, prevention or treatment of on-going stormwater runoff from impervious surfaces shall be provided.

Ecology’s Stormwater Management and Design Manuals and stormwater permit information are available on Ecology’s website.

8. State Section 401 Review for PCNs not receiving 45-day response from the Seattle District. In the event the Seattle District Corps does not issue a NWP authorization letter within 45 calendar days of receipt of a **complete** pre-construction notification, the applicant must contact Ecology for Section 401 review prior to commencing work.

F. ECOLOGY 401 CERTIFICATION: SPECIFIC CONDITIONS FOR THIS NWP:

Certified subject to conditions. Ecology Section 401 review is required for projects or activities authorized under this NWP if:

1. The project or activities are below the Ordinary High Water Mark (OHWM) with new work being proposed outside the original footprint.
2. The proposed project or activity increases the original footprint of the structure by more than 1/10th acre in wetlands.
3. The project or activity includes adding a new structure, such as a weir, flap gate/tide gate, or culvert to the site.

G. COASTAL ZONE MANAGEMENT CONSISTENCY RESPONSE FOR THIS NWP: General

Conditions: For Non-Federal Permittees

1. Necessary Data and Information. A Coastal Zone Management Program “Certification of Consistency” form is required for projects located within a coastal county. “Certification of Consistency” forms are available on Ecology’s website. The form shall include a description of the proposed project or activity and evidence of compliance with the applicable enforceable policies of the Washington Coastal Zone Management Program (CZMP). Also, a map of the site location is required.
2. Timing. Within 6 months from receipt of the necessary data and information, Ecology will provide a federal consistency determination for the proposed project or activity. If Ecology fails to act within the 6 month period, concurrence with the CZMP is presumed.

General Conditions: For Federal Permittees (Agencies)

1. Necessary Data and Information. Federal agencies shall submit the determination, information, and analysis required by 15 CFR 930.39 to obtain a federal consistency determination.
2. Timing. Within 60 days from receipt of the necessary data and information, Ecology will provide a federal consistency determination for the proposed project or activity. If Ecology fails to act within the 60 day period, concurrence with the CZMP is presumed.

Response: Ecology concurs that this NWP is consistent with the CZMP, subject to the following condition: An individual Coastal Zone Management Consistency Determination is required for project or activities under this NWP if State Section 401 review is required.



MEMORANDUM

September 13, 2021

To: City of Anacortes, Planning, Community & Economic Development Department
Attn: Emily Morgan – Associate Planner
From: Tyler Zimmerman, P.E. (TZE)
Subject: Flounder Bay – Dock Project 2001 Skyline Way

We are requesting permit review for this proposed improvement project.

This project is located in Flounder Bay within Skyline Marina in the City of Anacortes in Skagit County Washington. Location A address is 2001 Skyline Way, Lat 48.49278N, Long 122.67833W. Site plans and additional project details are attached and discussed below.

2001 Skyline Way Interbay Condo Association, Bruce Cay owners rep – Replace 10 creosote piling with 12” galvanized steel piling, replace the existing concrete floats with steel framed FRP grated floats and replace the existing gangway. The general layout of the proposed is the same as the existing with 1,742 sq ft of existing overwater float coverage (OWC) and 1,722 sq ft of proposed OWC. Proposed floats will be FRP grated decking with approximately 62% light permeability. Proposed layout will include new utility pedestals.

- Land Use Permit
- Floodplain Development Permit
- Shoreline Substantial Development Permit
- SEPA Review

The shoreline is designation is Shoreline Urban and the uplands includes condominiums and parking areas.

The proposed improvements follow the City of Anacortes Shoreline Master Program (SMP) and specific use policies and development regulations as outlined in chapter 8 of the SMP.

8.7 Marinas

Policy 8.7.1 – Shore line processes and functions will be maintained as is with a single point of access to the proposed floats in the same location as the existing.

Policy 8.7.2 – Adjacent uses include marinas and single docks mooring vessels similar in size and type as that will be moored at this facility.

Policy 8.7.3 – The facility is designed to the applicable standards and guidelines of federal, state and local agencies.

Policy 8.7.4 – Water quality will be improved with the removal of existing creosote piling.



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Policy 8.7.5 – Viewpoints and public access will not be altered by this project.

Policy 8.7.6 – State Department of Fish and Wildlife (WDFW) and the US Army Corps of Engineers (ACOE) have been consulted about this development. The WDFW permit is pending and the ACOE permit has been received.

Policy 8.7.7 – This is not a new marina or marina expansion, but the facility has been designed to minimize damage to fish and shellfish by utilizing grated decking for increased light penetration and removal of creosote piling.

Policy 8.7.8 – Natural shoreline processes will be maintained with no new impacts.

Policy 8.7.9 – Fuel is not sold, stored or supplied at this facility. There is a fuel dock nearby for vessels to receive fuel.

Policy 8.7.10 – Local health and safety standards will be complied with during the development of this project.

Policy 8.7.11 – Moorage at this location is for upland residence only. No upland storage or launching facilities are part of this project.

Policy 8.7.12 – This is a water-dependent activity that will be maintained with the proposed improvements.

Development Regulations:

DR-8.7.1 – No floating building is proposed as part of this project.

DR-8.7.2 – This project is not an expansion, new mooring buoy field or new marina. It is a replacement of the existing floats in the same configuration as the existing. Mooring is used by the upland residence of the condos.

DR-8.7.3 - State Department of Fish and Wildlife (WDFW) and the US Army Corps of Engineers (ACOE) have been consulted about this development. The WDFW permit is pending and the ACOE permit has been received.

DR-8.7.4 – No breakwaters, jetties, groins, bulkheads, landfills or dredging is part of this project.

DR-8.7.5 – Parking is provided for each of the upland residences.

DR-8.7.6 – Restrooms and solid waste facilities are provided for each resident.

DR-8.7.7 – Fish and selfish cleaning waste is typically disposed of at the solid waste facility provided.



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DR-8.7.8 – Petroleum and toxic product transfer are not allowed at this facility.

DR-8.7.9 – This is a private facility with no public access.

DR-8.7.10 – Sewage pump-out facilities are not provided at this facility. They are available with Skyline Marina at other locations accessible to users of this facility.

DR-8.7.11 - The condo association maintains the landscaping for the uplands adjacent to the facility.

DR-8.7.12 – No accessory uses take place at this facility. Docks are for mooring vessels for the condo owners only.

DR-8.7.13 – No over-the-water parking is proposed for this project.

DR-8.7.14 – No transient moorage space is provided at this facility.

DR-8.7.15 – This is not a new marina or marina expansion.

DR-8.7.16 – Project is a replacement of the existing floats maintaining the same configuration and follows table 5.2.

DR-8.7.17 – This is a private facility with no public access. Existing viewpoints will not be impacted by this project.

9.5 Docks, Piers and Floats

Policy 9.5.1 – Use of this facility is a water-dependent use for access to watercraft by the upland condo owners.

Policy 9.5.2 – This project is within Flounder Bay.

Policy 9.5.3 – This is a permitted dock and liveboards are not allowed.

Policy 9.5.4 – No boathouses are included in this facility.

Policy 9.5.5 – This project does not change the existing characteristics of the facility and has been designed to minimize impacts to the environment and provide safe access for the users.

Policy 9.5.6 – No mooring buoys will be installed and are not practicable in this location.

Policy 9.5.7 – Floating docks will be utilized.

Policy 9.5.8 – Cooperative use of this facility is practiced by the condo residences.

Policy 9.5.9 – No navigable waters will be obstructed. No public uses will be reduced.



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Policy 9.5.10 – Creosote piling will be removed as part of this project. No new creosote or pentachlorophenol treated wood products will be used.

Policy 9.5.11 – The minimum sized dock is currently in use and that size will be maintained as part of this project.

Development Regulations

DR-9.5.1 – This project follows a-e of this section. There will not be any residential uses of the floats, no fill waterward of the OHWM or wetlands, no floats associated with the upland natural environment designation and is located within Flounder Bay.

DR-9.5.2 – The proposed floats will be accessed from the same location as the existing floats.

DR-9.5.3 – The project is self-mitigating by utilizing new floats with grated surfaces for increased light penetration as well as removal of creosote piling.

DR-9.5.4 – The new floats and piling will minimize adverse effects on fish, shellfish and wildlife by having light penetrating surfaces and removal of creosote piling. The new design will be more robust than the existing capable of withstanding expected environmental conditions and minimize hazards to users.

DR-9.5.5 – Railings will be clear framework design and conform to the international building code. Utility services will be placed under the deck and floodlighting will be shielded. Docks will be constructed of materials that comply with state and federal regulations.

DR-9.5.6 – This is a water dependent use.

DR-9.5.7 – Current water dependent uses of the docks will remain the same.

DR-9.5.8 – No upland boathouses will be installed as part of the project.

DR-9.5.9 – Dock will not extend beyond the inner harbor line. Proposed float layout is the same as the existing.

DR-9.5.10 – This is not an area of substantial littoral drift or significant historic/scenic value.

DR-9.5.11 – The proposed dock size is the minimum necessary to meet the needs of the adjacent condo owners and the maximum practicable for the lot size.

DR9.5.12 – This is not for new residential development.



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DR-9.5.13 – Floats will not be more than 8 feet wide and will contain at least 50% functional grating. Proposed float orientation will the same as the existing.

DR-9.5.14 – This is not a repair proposal.

DR-9.5.15 – This project is not along Cap Sante.



WASHINGTON STATE

Joint Aquatic Resources Permit Application (JARPA) Form^{1,2} [\[help\]](#)

USE BLACK OR BLUE INK TO ENTER ANSWERS IN THE WHITE SPACES BELOW.



US Army Corps
of Engineers®
Seattle District

AGENCY USE ONLY

Date received:

Agency reference #: _____

Tax Parcel #(s): _____

CITY OF ANACORTES

Planning, Community, &
Economic Development

Date Received:

09/14/2021

SDP-2021-0009

Part 1–Project Identification

1. Project Name (A name for your project that you create. Examples: Smith's Dock or Seabrook Lane Development) [\[help\]](#)

Flounder Bay Dock Project- 2001 Skyline Way

Part 2–Applicant

The person and/or organization responsible for the project. [\[help\]](#)

2a. Name (Last, First, Middle)

Cay, Bruce

2b. Organization (If applicable)

2c. Mailing Address (Street or PO Box)

2001 Skyline Way

2d. City, State, Zip

Anacortes, WA 98221

2e. Phone (1)

2f. Phone (2)

2g. Fax

2h. E-mail

214-783-6975

caystar@aol.com

¹Additional forms may be required for the following permits:

- If your project may qualify for Department of the Army authorization through a Regional General Permit (RGP), contact the U.S. Army Corps of Engineers for application information (206) 764-3495.
- Not all cities and counties accept the JARPA for their local Shoreline permits. If you need a Shoreline permit, contact the appropriate city or county government to make sure they accept the JARPA.

²To access an online JARPA form with [help] screens, go to

http://www.epermitting.wa.gov/site/alias_resourcecenter/jarpa_jarpa_form/9984/jarpa_form.aspx.

For other help, contact the Governor's Office for Regulatory Innovation and Assistance at (800) 917-0043 or help@oria.wa.gov.

Part 3–Authorized Agent or Contact

Person authorized to represent the applicant about the project. (Note: Authorized agent(s) must sign 11b of this application.) [\[help\]](#)

3a. Name (Last, First, Middle)			
Zimmerman, Tyler			
3b. Organization (If applicable)			
TZ Engineering, LLC			
3c. Mailing Address (Street or PO Box)			
16980 Sargent Ln			
3d. City, State, Zip			
Burlington, WA 98233			
3e. Phone (1)	3f. Phone (2)	3g. Fax	3h. E-mail
360-466-8075			tyler@tzengineering.com

Part 4–Property Owner(s)

Contact information for people or organizations owning the property(ies) where the project will occur. Consider both **upland and aquatic** ownership because the upland owners may not own the adjacent aquatic land. [\[help\]](#)

- ☐ Same as applicant. (Skip to Part 5.)
- ☐ Repair or maintenance activities on existing rights-of-way or easements. (Skip to Part 5.)
- ☒ There are multiple upland property owners. Complete the section below and fill out [JARPA Attachment A](#) for each additional property owner.
- ☐ Your project is on Department of Natural Resources (DNR)-managed aquatic lands. If you don't know, contact the DNR at (360) 902-1100 to determine aquatic land ownership. If yes, complete [JARPA Attachment E](#) to apply for the Aquatic Use Authorization.

4a. Name (Last, First, Middle)			
See Attachment A			
4b. Organization (If applicable)			
4c. Mailing Address (Street or PO Box)			
2001 Skyline Way			
4d. City, State, Zip			
Anacortes, WA 98221			
4e. Phone (1)	4f. Phone (2)	4g. Fax	4h. E-mail

Part 5–Project Location(s)

Identifying information about the property or properties where the project will occur. [\[help\]](#)

- ☒ There are multiple project locations (e.g. linear projects). Complete the section below and use [JARPA Attachment B](#) for each additional project location.

5a. Indicate the type of ownership of the property. (Check all that apply.) [\[help\]](#)

- ☒ Private
☐ Federal
☐ Publicly owned (state, county, city, special districts like schools, ports, etc.)
☐ Tribal
☐ Department of Natural Resources (DNR) – managed aquatic lands (Complete [JARPA Attachment E](#))

5b. Street Address (Cannot be a PO Box. If there is no address, provide other location information in 5p.) [\[help\]](#)

Location A: 2001 Skyline Way

5c. City, State, Zip (If the project is not in a city or town, provide the name of the nearest city or town.) [\[help\]](#)

Anacortes, WA 98221

5d. County [\[help\]](#)

Skagit

5e. Provide the section, township, and range for the project location. [\[help\]](#)

¼ Section	Section	Township	Range
SW	27	35 N	1 E

5f. Provide the latitude and longitude of the project location. [\[help\]](#)

- Example: 47.03922 N lat. / -122.89142 W long. (Use decimal degrees - NAD 83)

Location A: 48.49278N lat -122.67833W Long

5g. List the tax parcel number(s) for the project location. [\[help\]](#)

- The local county assessor's office can provide this information.

P80330

5h. Contact information for all adjoining property owners. (If you need more space, use [JARPA Attachment C.](#)) [\[help\]](#)

Name	Mailing Address	Tax Parcel # (if known)
See attached Attachment C		

5i. List all wetlands on or adjacent to the project location. [help]
None
5j. List all waterbodies (other than wetlands) on or adjacent to the project location. [help]
The project sites are within Flounder Bay which is part of Skyline Marina adjacent to Burrows Bay
5k. Is any part of the project area within a 100-year floodplain? [help]
☐ Yes ☒ No ☐ Don't know
5l. Briefly describe the vegetation and habitat conditions on the property. [help]
Bottom substrate along the shoreline consists of rock, mud, clay, and gravel. The rock and gravel below the high tide line are from the riprap placed along the shoreline. The shoreline banks are lined with riprap. Beyond the shoreline bottom substrate consists of mud. Water depths at the project site range from about 10 feet to about 15 feet. There is no natural shoreline within the general vicinity of the project site. There is no overhanging vegetation at the project site or any natural vegetation landward of the project site. Flounder Bay is a human-made environment, i.e., it is a dredged marina.
5m. Describe how the property is currently used. [help]
Small boat seasonal and long term moorage for upland adjacent property owners.
5n. Describe how the adjacent properties are currently used. [help]
Small boat seasonal and long term moorage for upland adjacent property owners.
5o. Describe the structures (above and below ground) on the property, including their purpose(s) and current condition. [help]
Upland includes condominium and single family homes and parking area. There are gangway ramps down to existing floats that are held in place by creosote piling. The residence of the upland domiciles utilize the floats for moorage of their small boats and watercraft. Generally non-commercial in nature.
5p. Provide driving directions from the closest highway to the project location, and attach a map. [help]
From I-5 Northbound, take Highway 20 exit to the west towards Anacortes. Continue on Highway 20 spur towards the Anacortes ferry landing. Continue past the ferry landing. Continue onto Sunset way, turn left on skyline Way and Project Site A will be on your right.

Part 6–Project Description

6a. Briefly summarize the overall project. You can provide more detail in 6b. [\[help\]](#)

In general, this project will upgrade existing docks by replacement of creosote piling with 12" steel piling with dock replacement and gangway replacement proposed

6b. Describe the purpose of the project and why you want or need to perform it. [\[help\]](#)

Existing creosote piling and docks being replaced are nearing the end of their useful lifecycle.

6c. Indicate the project category. (Check all that apply) [\[help\]](#)

- ☐ Commercial
 ☒ Residential
 ☐ Institutional
 ☐ Transportation
 ☐ Recreational
☐ Maintenance
 ☐ Environmental Enhancement

6d. Indicate the major elements of your project. (Check all that apply) [\[help\]](#)

- | | | | |
|--|---|---|---|
| ☐ Aquaculture
☐ Bank Stabilization
☐ Boat House
☐ Boat Launch
☐ Boat Lift
☐ Bridge
☐ Bulkhead
☐ Buoy
☐ Channel Modification | ☐ Culvert
☐ Dam / Weir
☐ Dike / Levee / Jetty
☐ Ditch
☒ Dock / Pier
☐ Dredging
☐ Fence
☐ Ferry Terminal
☐ Fishway | ☐ Float
☐ Floating Home
☐ Geotechnical Survey
☐ Land Clearing
☐ Marina / Moorage
☐ Mining
☐ Outfall Structure
☒ Piling/Dolphin
☐ Raft | ☐ Retaining Wall (upland)
☐ Road
☐ Scientific Measurement Device
☐ Stairs
☐ Stormwater facility
☐ Swimming Pool
☐ Utility Line |
|--|---|---|---|

☐ Other:

6e. Describe how you plan to construct each project element checked in 6d. Include specific construction methods and equipment to be used. [\[help\]](#)

- Identify where each element will occur in relation to the nearest waterbody.
- Indicate which activities are within the 100-year floodplain.

The construction and placement of the ramp and dock will not require on-site preparation work. The ramp and float will be pre-constructed and barged to the site. Piling will be vibrated using a 60' x 30' foot barge moved with two small skiffs. The docks scheduled for replacement will be floated in place using the skiffs.

Pile vibrating and dock placement will take about 14 days for the Site A floats. The whole project is anticipated to be completed within 5 weeks. Timing will be dependent upon the Washington Department of Fish and Wildlife Hydraulics Project Approval and other federal agencies requirements to avoid affects on listed species.

6f. What are the anticipated start and end dates for project construction? (Month/Year) [\[help\]](#)

- If the project will be constructed in phases or stages, use [JARPA Attachment D](#) to list the start and end dates of each phase or stage.

Start Date: August 16, 2021

End Date: October 30, 2021

☐ See JARPA Attachment D

6g. Fair market value of the project, including materials, labor, machine rentals, etc. [\[help\]](#)

\$80,000

6h. Will any portion of the project receive federal funding? [\[help\]](#)

- If yes, list each agency providing funds.

☐ Yes ☒ No ☐ Don't know

Part 7–Wetlands: Impacts and Mitigation

☐ Check here if there are wetlands or wetland buffers on or adjacent to the project area.

(If there are none, skip to Part 8.) [\[help\]](#)

7a. Describe how the project has been designed to avoid and minimize adverse impacts to wetlands. [\[help\]](#)

☒ Not applicable

7b. Will the project impact wetlands? [\[help\]](#)

☐ Yes ☒ No ☐ Don't know

7c. Will the project impact wetland buffers? [\[help\]](#)

☐ Yes ☒ No ☐ Don't know

7d. Has a wetland delineation report been prepared? [\[help\]](#)

- If Yes, submit the report, including data sheets, with the JARPA package.

☐ Yes
☒ No

7e. Have the wetlands been rated using the Western Washington or Eastern Washington Wetland Rating System? [\[help\]](#)

- If Yes, submit the wetland rating forms and figures with the JARPA package.

☐ Yes
☒ No
☐ Don't know

7f. Have you prepared a mitigation plan to compensate for any adverse impacts to wetlands? [\[help\]](#)

- If Yes, submit the plan with the JARPA package and answer 7g.
- If No, or Not applicable, explain below why a mitigation plan should not be required.

☐ Yes
☒ No
☐ Don't know

7g. Summarize what the mitigation plan is meant to accomplish, and describe how a watershed approach was used to design the plan. [\[help\]](#)

7h. Use the table below to list the type and rating of each wetland impacted, the extent and duration of the impact, and the type and amount of mitigation proposed. Or if you are submitting a mitigation plan with a similar table, you can state (below) where we can find this information in the plan. [\[help\]](#)

Activity (fill, drain, excavate, flood, etc.)	Wetland Name ¹	Wetland type and rating category ²	Impact area (sq. ft. or Acres)	Duration of impact ³	Proposed mitigation type ⁴	Wetland mitigation area (sq. ft. or acres)

¹ If no official name for the wetland exists, create a unique name (such as "Wetland 1"). The name should be consistent with other project documents, such as a wetland delineation report.
² Ecology wetland category based on current Western Washington or Eastern Washington Wetland Rating System. Provide the wetland rating forms with the JARPA package.
³ Indicate the days, months or years the wetland will be measurably impacted by the activity. Enter "permanent" if applicable.
⁴ Creation (C), Re-establishment/Rehabilitation (R), Enhancement (E), Preservation (P), Mitigation Bank/In-lieu fee (B)

Page number(s) for similar information in the mitigation plan, if available: _____

7i. For all filling activities identified in 7h, describe the source and nature of the fill material, the amount in cubic yards that will be used, and how and where it will be placed into the wetland. [\[help\]](#)

7j. For all excavating activities identified in 7h, describe the excavation method, type and amount of material in cubic yards you will remove, and where the material will be disposed. [\[help\]](#)

Part 8–Waterbodies (other than wetlands): Impacts and Mitigation

In Part 8, “waterbodies” refers to non-wetland waterbodies. (See Part 7 for information related to wetlands.) [\[help\]](#)

☒ Check here if there are waterbodies on or adjacent to the project area. (If there are none, skip to Part 9.)

8a. Describe how the project is designed to avoid and minimize adverse impacts to the aquatic environment. [\[help\]](#)

☐ Not applicable

Steel piles will be used instead of treated wood piling. Grating will be used on the gangway and dock allowing some light through. The project will be timed outside of the salmonid and bull trout migration windows and outside of winter season and bald eagle nesting season. The floating docks will have about grated surfaces to allow light passage and the ramp will be grated.

8b. Will your project impact a waterbody or the area around a waterbody? [\[help\]](#)

☒ Yes ☐ No

8c. Have you prepared a mitigation plan to compensate for the project's adverse impacts to non-wetland waterbodies? [\[help\]](#)

- If **Yes**, submit the plan with the JARPA package and answer 8d.
- If **No, or Not applicable**, explain below why a mitigation plan should not be required.

☐ Yes ☒ No ☐ Don't know

The project is self-mitigating by replacing creosote piles with steel piling and concrete dock surfaces with grated dock surfaces.

8d. Summarize what the mitigation plan is meant to accomplish. Describe how a watershed approach was used to design the plan.

- If you already completed 7g you do not need to restate your answer here. [\[help\]](#)

The project is self-mitigating by replacing creosote piles with steel piling and concrete dock surfaces with grated dock surfaces.

8e. Summarize impact(s) to each waterbody in the table below. [\[help\]](#)

Activity (clear, dredge, fill, pile drive, etc.)	Waterbody name ¹	Impact location ²	Duration of impact ³	Amount of material (cubic yards) to be placed in or removed from waterbody	Area (sq. ft. or linear ft.) of waterbody directly affected
Pile drive	Flounder Bay	In Flounder Bay	Permanent	10- 12" Steel Piling	7.85 sq. ft.
Piling Removal	Flounder Bay	In Flounder Bay	Permanent	10 – Creosote Piling	7.85 sq. ft.

¹ If no official name for the waterbody exists, create a unique name (such as "Stream 1") The name should be consistent with other documents provided.

² Indicate whether the impact will occur in or adjacent to the waterbody. If adjacent, provide the distance between the impact and the waterbody and indicate whether the impact will occur within the 100-year flood plain.

³ Indicate the days, months or years the waterbody will be measurably impacted by the work. Enter "permanent" if applicable.

8f. For all activities identified in 8e, describe the source and nature of the fill material, amount (in cubic yards) you will use, and how and where it will be placed into the waterbody. [\[help\]](#)

8g. For all excavating or dredging activities identified in 8e, describe the method for excavating or dredging, type and amount of material you will remove, and where the material will be disposed. [\[help\]](#)

Piling will be removed and installed using a vibratory hammer hooked to a crane positioned on a barge.

Part 9–Additional Information

Any additional information you can provide helps the reviewer(s) understand your project. Complete as much of this section as you can. It is ok if you cannot answer a question.

9a. If you have already worked with any government agencies on this project, list them below. [\[help\]](#)

Agency Name	Contact Name	Phone	Most Recent Date of Contact
City of Anacortes	Emily Morgan	360-298-4350	February 9, 2021

9b. Are any of the wetlands or waterbodies identified in Part 7 or Part 8 of this JARPA on the Washington Department of Ecology's 303(d) List? [\[help\]](#)

- If **Yes**, list the parameter(s) below.
- If you don't know, use Washington Department of Ecology's Water Quality Assessment tools at: <https://ecology.wa.gov/Water-Shorelines/Water-quality/Water-improvement/Assessment-of-state-waters-303d>.

☒ Yes ☒ No

Listing ID 64707
Rosario Straight, Inner Skyline 2006 and 2007
Copper

9c. What U.S. Geological Survey Hydrological Unit Code (HUC) is the project in? [\[help\]](#)

- Go to <http://cfpub.epa.gov/surf/locate/index.cfm> to help identify the HUC.

Rosario Straight – Strait of Juan De Fuca 171100191300

9d. What Water Resource Inventory Area Number (WRIA #) is the project in? [\[help\]](#)

- Go to <https://ecology.wa.gov/Water-Shorelines/Water-supply/Water-availability/Watershed-look-up> to find the WRIA #.

WRIA 03

9e. Will the in-water construction work comply with the State of Washington water quality standards for turbidity? [\[help\]](#)

- Go to <https://ecology.wa.gov/Water-Shorelines/Water-quality/Freshwater/Surface-water-quality-standards/Criteria> for the standards.

☒ Yes ☐ No ☐ Not applicable

9f. If the project is within the jurisdiction of the Shoreline Management Act, what is the local shoreline environment designation? [\[help\]](#)

- If you don't know, contact the local planning department.
- For more information, go to: <https://ecology.wa.gov/Water-Shorelines/Shoreline-coastal-management/Shoreline-coastal-planning/Shoreline-laws-rules-and-cases>.

☐ Urban ☐ Natural ☐ Aquatic ☐ Conservancy ☒ Other: shoreline urban

9g. What is the Washington Department of Natural Resources Water Type? [\[help\]](#)

- Go to <http://www.dnr.wa.gov/forest-practices-water-typing> for the Forest Practices Water Typing System.

☒ Shoreline ☐ Fish ☐ Non-Fish Perennial ☐ Non-Fish Seasonal

9h. Will this project be designed to meet the Washington Department of Ecology's most current stormwater manual? [\[help\]](#)

- **If No**, provide the name of the manual your project is designed to meet.

☒ Yes ☐ No

Name of manual: _____

9i. Does the project site have known contaminated sediment? [\[help\]](#)

- **If Yes**, please describe below.

☐ Yes ☒ No

9j. If you know what the property was used for in the past, describe below. [\[help\]](#)

9k. Has a cultural resource (archaeological) survey been performed on the project area? [help] • If Yes, attach it to your JARPA package.
☐ Yes ☒ No

9l. Name each species listed under the federal Endangered Species Act that occurs in the vicinity of the project area or might be affected by the proposed work. [\[help\]](#)

Marbled murrelet
Bald eagle
Bull trout
Chinook salmon
Steelhead
Stellar Sea lion
Leatherback sea turtle
Humpback whale

9m. Name each species or habitat on the Washington Department of Fish and Wildlife's Priority Habitats and Species List that might be affected by the proposed work. [\[help\]](#)

Pinto Abalone
Yuma myotis

Part 10–SEPA Compliance and Permits

Use the resources and checklist below to identify the permits you are applying for.

- Online Project Questionnaire at <http://apps.oria.wa.gov/opas/>.
- Governor's Office for Regulatory Innovation and Assistance at (800) 917-0043 or help@oria.wa.gov.
- For a list of addresses to send your JARPA to, click on [agency addresses for completed JARPA](#).

10a. Compliance with the State Environmental Policy Act (SEPA). (Check all that apply.) [\[help\]](#)

- For more information about SEPA, go to <https://ecology.wa.gov/regulations-permits/SEPA-environmental-review>.

☐ A copy of the SEPA determination or letter of exemption is included with this application.

☒ A SEPA determination is pending with City of Anacortes (lead agency). The expected decision date is July 2021.

☐ I am applying for a Fish Habitat Enhancement Exemption. (Check the box below in 10b.) [\[help\]](#)

☐ This project is exempt (choose type of exemption below).

☐ Categorical Exemption. Under what section of the SEPA administrative code (WAC) is it exempt?

☐ Other: _____

☐ SEPA is pre-empted by federal law.

10b. Indicate the permits you are applying for. (Check all that apply.) [\[help\]](#)

LOCAL GOVERNMENT

Local Government Shoreline permits:

- ☒ Substantial Development ☐ Conditional Use ☐ Variance
☐ Shoreline Exemption Type (explain): _____

Other City/County permits:

- ☒ Floodplain Development Permit ☐ Critical Areas Ordinance

STATE GOVERNMENT

Washington Department of Fish and Wildlife:

- ☒ Hydraulic Project Approval (HPA) ☐ Fish Habitat Enhancement Exemption – [Attach Exemption Form](#)

Washington Department of Natural Resources:

- ☐ Aquatic Use Authorization
Complete [JARPA Attachment E](#) and submit a check for \$25 payable to the Washington Department of Natural Resources.
Do not send cash.

Washington Department of Ecology:

- ☒ Section 401 Water Quality Certification ☐ Non-Federally Regulated Waters

FEDERAL AND TRIBAL GOVERNMENT

United States Department of the Army (U.S. Army Corps of Engineers):

- ☐ Section 404 (discharges into waters of the U.S.) ☒ Section 10 (work in navigable waters)

United States Coast Guard:

For projects or bridges over waters of the United States, contact the U.S. Coast Guard at: d13-pf-d13bridges@uscg.mil

- ☐ Bridge Permit ☐ Private Aids to Navigation (or other non-bridge permits)

United States Environmental Protection Agency:

- ☒ Section 401 Water Quality Certification (discharges into waters of the U.S.) on tribal lands where tribes do not have treatment as a state (TAS)

Tribal Permits: (Check with the tribe to see if there are other tribal permits, e.g., Tribal Environmental Protection Act, Shoreline Permits, Hydraulic Project Permits, or other in addition to CWA Section 401 WQC)

- ☐ Section 401 Water Quality Certification (discharges into waters of the U.S.) where the tribe has treatment as a state (TAS).

Part 11—Authorizing Signatures

Signatures are required before submitting the JARPA package. The JARPA package includes the JARPA form, project plans, photos, etc. [\[help\]](#)

11a. Applicant Signature (required) [\[help\]](#)

I certify that to the best of my knowledge and belief, the information provided in this application is true, complete, and accurate. I also certify that I have the authority to carry out the proposed activities, and I agree to start work only after I have received all necessary permits.

I hereby authorize the agent named in Part 3 of this application to act on my behalf in matters related to this application. BC (initial)

By initialing here, I state that I have the authority to grant access to the property. I also give my consent to the permitting agencies entering the property where the project is located to inspect the project site or any work related to the project. BC (initial)

See attached attachment

Applicant Printed Name	Applicant Signature	Date

11b. Authorized Agent Signature [\[help\]](#)

I certify that to the best of my knowledge and belief, the information provided in this application is true, complete, and accurate. I also certify that I have the authority to carry out the proposed activities and I agree to start work only after all necessary permits have been issued.

Authorized Agent Printed Name	Authorized Agent Signature	Date

11c. Property Owner Signature (if not applicant) [\[help\]](#)

Not required if project is on existing rights-of-way or easements (provide copy of easement with JARPA).

I consent to the permitting agencies entering the property where the project is located to inspect the project site or any work. These inspections shall occur at reasonable times and, if practical, with prior notice to the landowner.

Property Owner Printed Name	Property Owner Signature	Date

18 U.S.C §1001 provides that: Whoever, in any manner within the jurisdiction of any department or agency of the United States knowingly falsifies, conceals, or covers up by any trick, scheme, or device a material fact or makes any false, fictitious, or fraudulent statements or representations or makes or uses any false writing or document knowing same to contain any false, fictitious, or fraudulent statement or entry, shall be fined not more than \$10,000 or imprisoned not more than 5 years or both.

If you require this document in another format, contact the Governor's Office for Regulatory Innovation and Assistance (ORIA) at (800) 917-0043. People with hearing loss can call 711 for Washington Relay Service. People with a speech disability can call (877) 833-6341. ORIA publication number: ORIA-16-011 rev. 09/2018



WASHINGTON STATE
Joint Aquatic Resources Permit
Application (JARPA) [\[help\]](#)



US Army Corps
of Engineers®
Seattle District

AGENCY USE ONLY

Date received: _____

Agency reference #: _____

Tax Parcel #(s): _____

TO BE COMPLETED BY APPLICANT [\[help\]](#)

Project Name: _____

Location Name (if applicable): _____

Attachment A:
For additional property owner(s) [\[help\]](#)

Use this attachment only if you have more than one property owner.
Complete one attachment for each additional property owner
impacted by the project.

Signatures of property owners are not needed for repair or maintenance activities on existing rights-of-way or easements.

Use black or blue ink to enter answers in white spaces below.

1. Name (Last, First, Middle) and Organization (if applicable)

Cay, Bruce

2. Mailing Address (Street or PO Box)

2001 Skyline Way

3. City, State, Zip

Anacortes, WA 98221

4. Phone (1)

5. Phone (2)

6. Fax

7. E-mail

caystar@aol.com

Address or tax parcel number of property you own:

2001 Skyline Way, P80330

Signature of Property Owner

I consent to the permitting agencies entering the property where the project is located to inspect the project site or any work. These inspections shall occur at reasonable times and, if practical, with prior notice to the landowner.

R. Bruce Cay president
Printed Name *Interbay*

[Signature]
Signature

If you require this document in another format, contact the Governor's Office for Regulatory Innovation and Assistance (ORIA) at (800) 917-0043. People with hearing loss can call 711 for Washington Relay Service. People with a speech disability can call (877) 833-6341. ORIA publication number: ORIA-16-012 rev. 10/2016



WASHINGTON STATE
Joint Aquatic Resources Permit
Application (JARPA) [\[help\]](#)



US Army Corps
of Engineers®
Seattle District

AGENCY USE ONLY	
Date received:	_____
Agency reference #:	_____
Tax Parcel #(s):	_____ _____ _____

TO BE COMPLETED BY APPLICANT [help]	
Project Name:	_____
Location Name (if applicable):	_____ _____

Attachment B:
For additional project location(s) [\[help\]](#)

Use this attachment only if you have more than one project location.

Use a separate form for each additional location.

Use black or blue ink to enter answers in white spaces below.

1. Indicate the type of ownership of the property. (Check all that apply.) [help]			
☒ Private			
☐ Federal			
☐ Publicly owned (state, county, city, special districts like schools, ports, etc.)			
☐ Tribal			
☐ Department of Natural Resources (DNR) – managed aquatic lands (Complete JARPA Attachment E)			
2. Street Address (Cannot be a PO Box. If there is no address, provide other location information in 16) [help]			
2001 Skyline Way			
3. City, State, Zip (If the project is not in a city or town, provide the name of the nearest city or town.) [help]			
Anacortes, WA 98221			
4. County [help]			
Skagit			
5. Provide the section, township, and range for the project location. [help]			
¼ Section	Section	Township	Range
Sw	28	35N	1E
6. Provide the latitude and longitude of the project location. [help]			
• Example: 47.03922 N lat. / -122.89142 W long (Use decimal degrees - NAD 83)			
Lat 48.49278N Long -122.67833W			
7. List the tax parcel number(s) for the project location. [help]			
• The local county assessor's office can provide this information.			
P80330			

8. Contact information for all adjoining property owners. (If you need more space, use [JARPA Attachment C.](#)) [\[help\]](#)

Name	Mailing Address	Tax Parcel # (if known)
Keller Trust	1909 Skyline Way	P111452
	Anacortes, WA 98221	
Skyline Marina Holdings	2011 Skyline Way	P60079
	Anacortes, WA 98221	

9. List all wetlands on or adjacent to the project location. [\[help\]](#)

10. List all waterbodies (other than wetlands) on or adjacent to the project location. [\[help\]](#)

Flounder Bay

11. Is any part of the project area within a 100-year flood plain? [\[help\]](#)

☐ Yes ☒ No ☐ Don't know

12. Briefly describe the vegetation and habitat conditions on the property. [\[help\]](#)

The upland portions of the lots are covered with homes or landscaping.
Bottom substrate along the shoreline consists of rock, mud, clay, and gravel. The rock and gravel below the high tide line are from the riprap placed along the shoreline. The shoreline banks are lined with riprap. Beyond the shoreline bottom substrate consists of mud. Actively growing eelgrass was not observed within the survey area from the shoreline or docks. Water depths at the project site range from about 10 feet to about 15 feet. There is no natural shoreline within the general vicinity of the project site. There is no overhanging vegetation at the project site or any natural vegetation landward of the project site. Flounder Bay is a human-made environment, i.e., it is a dredged marina.

13. Describe how the property is currently used. [\[help\]](#)

Small boat seasonal and long term moorage for upland adjacent property owners.

14. Describe how the adjacent properties are currently used. [\[help\]](#)

Small boat seasonal and long term moorage.

15. Describe the structures (above and below ground) on the property, including their purpose(s). [\[help\]](#)

Upland includes condominium and parking area. There is a gangway ramp down to existing floats that are held in place by creosote piling. The residence of the upland domiciles utilize the floats for moorage of their small boats and watercraft. Generally non-commercial in nature.

16. Provide driving directions from the closest highway to the project location, and attach a map. [\[help\]](#)

From I-5 Northbound, take Highway 20 exit to the west towards Anacortes. Continue on Highway 20 spur towards the Anacortes ferry landing. Continue past the ferry landing and onto Sunset way, turn left on skyline Way and Project Site A will be on your right.

If you require this document in another format, contact the Governor's Office for Regulatory Innovation and Assistance (ORIA) at (800) 917-0043. People with hearing loss can call 711 for Washington Relay Service. People with a speech disability can call (877) 833-6341. ORIA publication number: ORIA-16-013 rev. 10/2016

YOUR TRIP TO:

2001 Skyline Way, Anacortes, WA, 98221-2902

33 MIN | 20.2 MI **Est. fuel cost: \$1.57**

Trip time based on traffic conditions as of 11:22 AM on February 11, 2021. Current Traffic: Moderate



Print a full health report of your car with HUM vehicle diagnostics (800) 906-2501

1. Start out going **north** on I-5 N.

Then 0.08 miles ----- 0.08 total miles

2. Take the **WA-20** exit, EXIT 230, toward **Skagit Airport/Burlington/Anacortes**.

Then 0.41 miles ----- 0.49 total miles

3. Turn **left** onto Cascade Loop/Chuckanut Drive/W Rio Vista Ave/WA-20.
Continue to follow Cascade Loop/WA-20.

Then 11.70 miles ----- 12.19 total miles



4. Enter next roundabout and take the 1st exit onto State Highway 20 Spur/WA-20 Spur.

Then 2.74 miles ----- 14.93 total miles



5. Enter next roundabout and take the 1st exit onto Commercial Ave/WA-20 Spur.

Then 1.33 miles ----- 16.26 total miles

6. Turn **left** onto 12th St/WA-20 Spur. Continue to follow WA-20 Spur. Pass through 1 roundabout.*If you reach 11th St you've gone a little too far.*

Then 3.10 miles ----- 19.36 total miles

7. Stay **straight** to go onto Sunset Ave.

Then 0.51 miles ----- 19.87 total miles

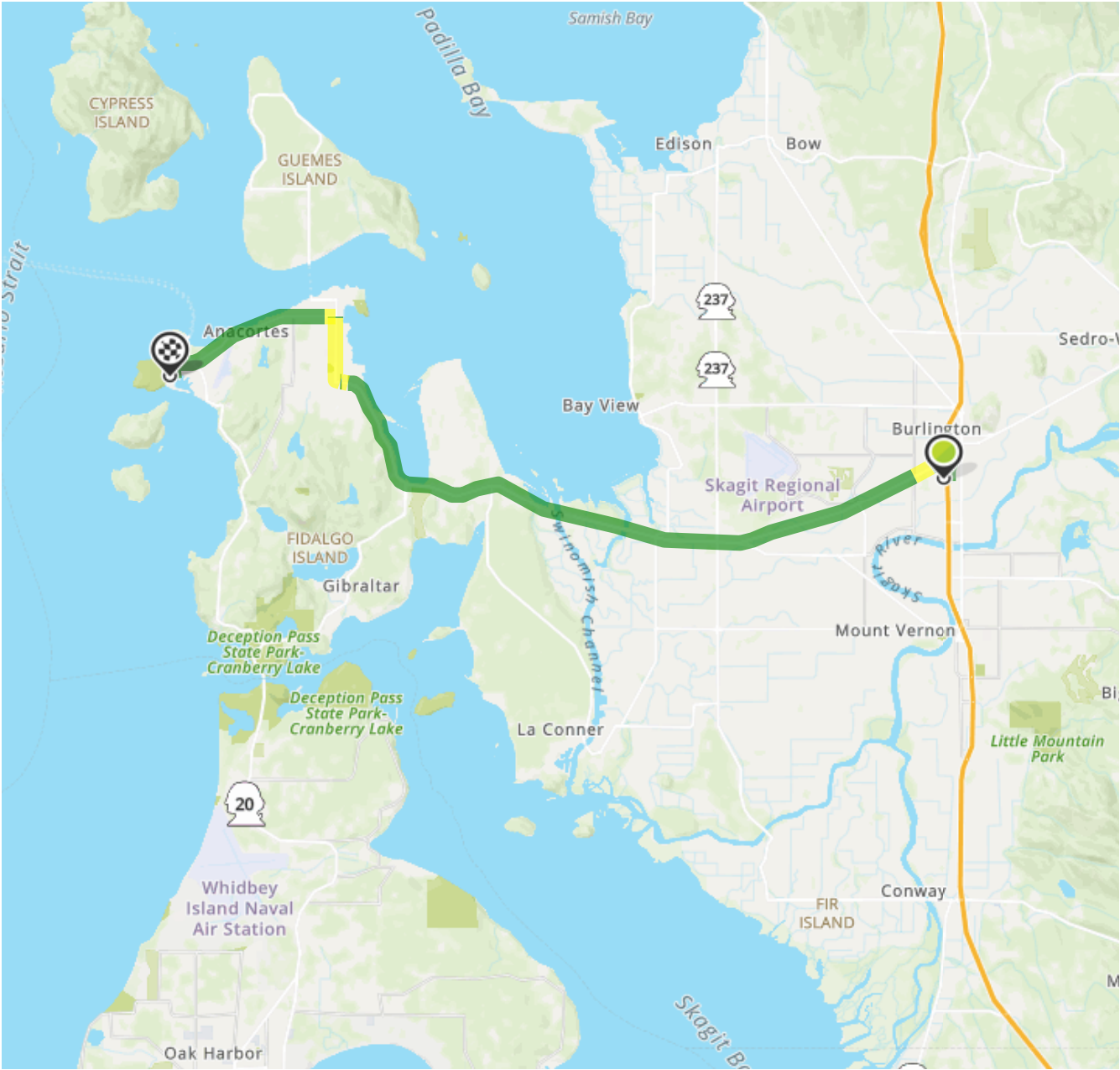
8. Take the 3rd **left** onto Skyline Way.
*Skyline Way is just past Coho Ln.**If you reach Washington Blvd you've gone about 0.1 miles too far.*

Then 0.34 miles ----- 20.20 total miles

9. 2001 Skyline Way, Anacortes, WA 98221-2902, 2001 SKYLINE WAY is on the **left**.*Your destination is just past Kingsway.**If you reach Cabana Ln you've gone about 0.1 miles too far.*

 Save to My Maps

Use of directions and maps is subject to our [Terms of Use](#). We don't guarantee accuracy, route conditions or usability. You assume all risk of use.





WASHINGTON STATE
Joint Aquatic Resources Permit
Application (JARPA) [\[help\]](#)



US Army Corps
of Engineers®
Seattle District

Attachment C:
Contact information for adjoining
property owners. [\[help\]](#)

Use this attachment only if you have more than four adjoining property owners.

AGENCY USE ONLY	
Date received:	_____
Agency reference #:	_____
Tax Parcel #(s):	_____ _____ _____

TO BE COMPLETED BY APPLICANT [help]	
Project Name:	_____
Location Name (if applicable):	_____ _____

Use black or blue ink to enter answers in white spaces below.

1. Contact information for all adjoining property owners. [help]		
Name	Mailing Address	Tax Parcel # (if known)
Keller Trust	1909 Skyline Way	P111452
	Anacortes, WA 98221	
Skyline Marina Holdings, LLC	2011 Skyline Way	P60079
	Anacortes, WA 98221	

If you require this document in another format, contact the Governor's Office for Regulatory Innovation and Assistance (ORIA) at (800) 917-0043. People with hearing loss can call 711 for Washington Relay Service. People with a speech disability can call (877) 833-6341. ORIA publication number: ORIA-16-014 rev. 10/2016



PLANNING, COMMUNITY, & ECONOMIC DEVELOPMENT DEPARTMENT
Mailing Address: P.O. Box 547, Anacortes, WA 98221
Office Location: 904 6th Street, Anacortes WA 98821
Phone: (360) 299-1984

CITY OF ANACORTES

Planning, Community, &
Economic Development

Date Received:

09/14/2021

SDP-2021-0009

Master Land Use Permit Application

TYPE OF APPLICATION (check all that apply):		
☐ Administrative Interpretation ☐ Annexation Request ☐ Binding Site Plan (Preliminary) ☐ Boundary Line Adjustment (BLA) ☐ Comprehensive Plan/ Map Amendment Request ☐ Conditional Use Permit (CUP) per AMC 19.36 ☐ Conditional/Special Use Permit (CUP) per AMC 17.70 ☐ Cottage Housing Development ☐ Development Agreement ☐ Essential Public Facility	☒ Floodplain Development Permit ☐ Home Occupation Permit ☐ Long Subdivision (Preliminary) ☐ Lot Certification ☐ Minor Permit Revision ☐ Plat Amendment /Modification ☒ SEPA Environmental Review ☐ Shoreline Conditional Use Permit ☐ Shoreline Exemption ☒ Shoreline Substantial Development Permit ☐ Shoreline Variance	☐ Short Subdivision (Preliminary) ☐ Site Plan Review – Type 1 ☐ Site Plan Review – Type 2 ☐ Stormwater Management Manual Adjustments & Exceptions ☐ Variance (Level 1) ☐ Variance (Level 2) ☐ Wireless Conditional Use Permit (WCUP) ☐ Wireless Service Facility (WSF) Permit ☐ Zoning Code/ Map Amendment Request (Rezone)
PROJECT & SITE INFORMATION:		
SITE ADDRESS: 2001 Skyline Way		PROJECT NAME: Flounder Bay Dock Project 2001 Skyline Way
PARCEL NUMBER(S): LOCATION A: P80330		SECTION, TOWNSHIP, & RANGE LOCATION A: T35N R1E S27
LOT SQUARE FOOTAGE & ACREAGE:		PROJECT VALUATION: \$80,000
LEGAL DESCRIPTION: Skyline Division #13 Lot 8		PRESENT ZONING: LOCATION A: URBAN SHORELINE
PRESENT USE OF PROPERTY: Moorage of vessels for adjacent owners		CUT & FILL (CY) PROPOSED: 0 CY
PRE-APPLICATION CONFERENCE HELD?: ☒ Yes, the City file # is PRE-2021-0006 ☐ No		WATER SOURCE: ☒ City of Anacortes ☐ Private Well ☐ Community Well
SEWAGE DISPOSAL: ☒ City of Anacortes ☐ Septic		ROAD ACCESS: ☒ City Road ☐ State Highway ☐ Private Road

CRITICAL AREAS OR BUFFERS ON SITE OR WITHIN 300 FEET: ☐ Yes / Type _____ ☒ No	WATER BODIES WITHIN 200 FEET: ☒ Yes / Name: <u>Flounder Bay</u> ☐ No
FLOODPLAIN: Flood Zone: No FIRM Panel # _____ Date of Panel: _____	
LOT COVERAGE AREA CALCULATIONS: Existing Square Footage: SEE ATTACHED INFORMATION Proposed Square Footage: SEE ATTACHED INFORMATION	
IMPERVIOUS SURFACE AREA CALCULATIONS: Existing Impervious Square Footage: N/A New Impervious Surface: N/A	
DESCRIPTION OF SUBJECT PROPOSAL: ☒ Additional pages attached	
PROPOSED WORK: <u>SEE ATTACHED INFORMATION</u> _____ _____ _____ _____ _____ _____	
PROPERTY OWNER INFORMATION: ☒ Multiple owners attached	
NAME: Bruce Cay, Owners Rep, Interbay Condominiums	MAILING ADDRESS: 2001 Skyline Way
CITY, STATE, ZIP: Anacortes, WA 98221	PHONE #: 214-783-6975
FAX #:	EMAIL ADDRESS: caystay@aol.com
APPLICANT INFORMATION: ☐ Same as property owner	
NAME: Tyler Zimmerman, TZ Engineering, LLC	MAILING ADDRESS: 16980 Sargent Ln
CITY, STATE, ZIP: Burlington, WA 98233	PHONE #: 360-466-8075
FAX #:	EMAIL ADDRESS: tyler@tzengineering.com
CONTACT PERSON: ☐ Same as property owner ☒ Same as applicant	
NAME:	MAILING ADDRESS:
CITY, STATE, ZIP:	PHONE #:
FAX #:	EMAIL ADDRESS:

ACKNOWLEDGEMENTS & SIGNATURE	
Read and initial each of the following statements prior to signing this application:	
	I understand that land use and/or planning permits do not authorize earth disturbing activities, the removal of vegetation, or the construction of buildings. I understand that additional permits will be required after my land use and/or planning permitting process is completed. I understand that no earth disturbing activities (including the removal of vegetation) may take place until after my land use and/or planning process is complete, and only after I have received additional permits such as Fill & Grade, Building Permit, or Right-of-Way permit(s).
	I understand that if critical areas (wetlands, streams, steep slopes, etc.) are found on or near my property I am not authorized to impact these areas in any way and will be required to leave an undisturbed buffer area around the critical area, as determined according the City's critical areas regulations.
	I understand that depending on the size and scope of my project, I may be required to provide maintenance and/or performance bonds for items such as landscaping, critical areas, public roads and/or public utilities that I construct or install.
	I understand that I am solely responsible for providing complete and accurate information to the City. I understand that if my application is missing information or if inaccurate materials are submitted, my permits will be delayed. I understand that depending on how inaccurate and how incomplete my application is or becomes, the Department may require an entirely new application be submitted. I understand that when and if conditions change from that which my application originally represented, I am responsible for letting the City staff person assigned to my project know.
	I understand that I am applying for permits from the City of Anacortes only; and that additional permits from other Federal, State, and Local agencies could be required. I understand that the City of Anacortes cannot advise me of permits that are required from other agencies, and that I must contact these agencies to make sure I comply with their requirements. These agencies include (but are not limited to): Corps of Engineers, Department of Natural Resources, Department of Fish & Wildlife, Department of Ecology, and Northwest Clean Air Agency.
	I understand that I will be responsible for paying consultants that the City may deem necessary to review certain aspects of my application. I understand that these consultant reviews could include special inspections, traffic concurrency, critical areas, landscaping, stormwater, etc.

Signature required on next page.

By affixing my signature hereto, I certify that I am the owner, or am acting as the Owner's authorized agent, and that the application and documents contained with this submittal are complete and accurate to the best of my knowledge and abilities. If your title report lists a company, partnership or other owners, you must submit evidence that you are authorized to sign on behalf of the entity or others that are listed.

If you are an authorized representative you must submit an Agent Authorization Form.

Please attach additional signature sheets if there is more than one owner.

Under penalty of perjury, I certify that the information, statements, answers above regarding the subject application(s) are true and correct to the best of my knowledge and belief.

Signature: _____ Date: 09/13/21

Printed Name: Tyler Zimmerman

STATE OF WASHINGTON)
) ss.
COUNTY OF SKAGIT

I certify that I know or have satisfactory evidence that _____ is the person who appeared before me, and said person acknowledged that he/she signed this instrument, and acknowledged it as the free and voluntary act for the uses and purposes mentioned in this instrument.

Given under my hand and official seal this _____ day of _____, 20____

Notary Public

(SEAL)

Residing at _____

My appointment expires _____



Planning, Community, & Economic Development Department
904 6th St. / P.O. Box 947, Anacortes, WA 98221
360-293-1984

AGENT AUTHORIZATION FORM

Use this form to authorize someone other than the property owner to apply for permits for the subject property.

Project Name: FLOUNDER BAY DOCK PROJECT
Property Address: 2001 SKYLINE WAY
City, State, Zip: ANACORTES, WA 98221

AUTHORIZATION STATEMENT

I / we, as the owners of the property identified above, authorize the below listed individual to act as our agent to submit applications, receive correspondence regarding the above-listed application, and sign and to receive notices on my/our behalf.

DESIGNATED AGENT

Agent Name: Tyler Zimmerman, TZ Engineering, LLC
Agent Address: 16980 Sargent Ln
Agent City, State, Zip: Burlington, WA 98233

PROPERTY OWNER SIGNATURE(S)**

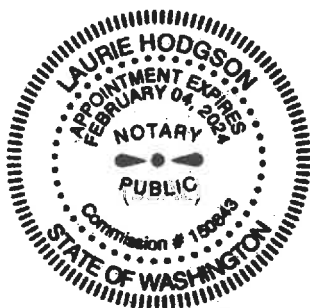
Signature: <u></u>	Signature: _____
Printed Name: <u>R. Bruce Cary</u>	Printed Name: _____
Title: <u>President</u>	Title: _____
Company: <u>Interbay Condominiums</u>	Company: _____
Date: <u>3/19/2021</u>	Date: _____

**Each property owner listed must have their signature notarized.

STATE OF WASHINGTON)
) ss.
COUNTY OF SKAGIT

I certify that I know or have satisfactory evidence that R. Bruce Cay is
the person who appeared before me, and said person acknowledged that he/she signed this
instrument, and acknowledged it as a free and voluntary act for the uses and purposes
mentioned in this instrument.

Given under my hand and official seal this 19 day of March, 20 21



Laurie Hodgson
Notary Public

Residing at Anacortes

My appointment expires 02-04-2024

STATE OF WASHINGTON)
) ss.
COUNTY OF SKAGIT

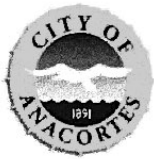
I certify that I know or have satisfactory evidence that _____ is
the person who appeared before me, and said person acknowledged that he/she signed this
instrument, and acknowledged it as a free and voluntary act for the uses and purposes
mentioned in this instrument.

Given under my hand and official seal this _____ day of _____, 20 _____

Notary Public

Residing at _____

My appointment expires _____



PLANNING, COMMUNITY, & ECONOMIC DEVELOPMENT DEPARTMENT
**SHORELINE SUBSTANTIAL DEVELOPMENT PERMIT, SHORELINE
 CONDITIONAL USE PERMIT, & SHORELINE VARIANCE CHECKLIST**

Mailing Address: P.O. Box 547, Anacortes, WA 98221

Office Location: 904 6th Street, Anacortes WA 98821

Phone: (360) 299-1984

Applicant Checklist		PERMIT TYPE:			
		Shoreline Substantial Development Permit	Shoreline Conditional Use Permit	Shoreline Variance	Office Use Only
	SUBMITTAL REQUIREMENTS: The number indicates the number of copies for submittal (if applicable).				
✓	Master Permit Application (signed & notarized by all Landowners involved)	3	3	3	
✓	Joint Aquatic Resources Permit Application (JARPA)	3	3	3	
✓	Signed & Notarized Letter of Authorization if the applicant is not the landowner	3	3	3	
	Application Fee (see Land Use Permit Fee Schedule)	✓	✓	✓	
✓	Conduct a Pre-Application Conference prior to application submittal	✓	✓	✓	
✓	Conduct a Neighborhood Meeting prior to application submittal (prior to the meeting, coordinate with PCED staff to determine where this can be held at, who can facilitate this, and how to do neighbor noticing)	✓	✓	✓	
✓	<u>Project Narrative</u> describing: the work proposed & use; construction /work methods; type of equipment to be used; project time frame; proposed cut & fill volumes; source & composition of cut & fill; proposed clearing; location of sanitary sewer, potable water, stormwater; access; location of critical areas on the subject property or within 300 feet of it. In the narrative also list the underlying shoreline environment /designation and provide details as to how your project achieves consistency with the Shoreline Master Program (SMP), policies, and development regulations (DR).	3	3	3	
N/A	For Shoreline Conditional Use Permits, provide a detailed explanation of how you meet each criteria of approval as listed in Section 3.1(D) of the Shoreline Master Program.	N/A	3	N/A	
N/A	For Shoreline Variance requests, provide a detailed explanation of how you meet each criteria of approval as listed in Section 3.2(C) of the Shoreline Master Program	N/A	N/A	3	
✓	SEPA Environmental Checklist –inquire with PCED to determine if required	3	3	3	
N/A	Critical Area Report (this in part needs to address no net loss of ecological function and value) –inquire with PCED to determine if required	3	3	3	
N/A	Biological Assessment /Evaluation –inquire with PCED to determine if required	3	3	3	
N/A	Provide Floodplain /Areas of Special Flood Hazard Determination & FIRM Panel #	3	3	3	

		PERMIT TYPE:			
Applicant Checklist	SUBMITTAL REQUIREMENTS: The number indicates the number of copies for submittal (if applicable).	Shoreline Substantial Development Permit	Shoreline Conditional Use Permit	Shoreline Variance	Office Use Only
N/A	Geotechnical Report –inquire with PCED to determine if required	3	3	3	
N/A	Parking, Landscape and Tree Preservation Plan(s) –inquire with PCED to determine if required	3	3	3	
N/A	Complete Stormwater Plan (that complies with AMC Chapter 19.76 & which addresses the minimum requirements of the current DOE SWMMWW)	3	3	3	
✓	Provide copies of Federal, State, and Local Permits and Approvals	3	3	3	
✓	Site Plan (Drawn to Scale & Surveyed –if applicable). For residential type of uses, see “ Residential Building Permit Site Plan Checklist ” for the items that need to be shown on a site plan. For commercial type of uses, see “ Commercial Building Permit Site Plan Checklist ” for the items that need to be shown on a site plan.	3	3	3	
✓	Scaled & dimensioned Cross Sections of both existing & proposed development. Also show existing & proposed ground elevations and the height of existing and proposed structures.	3	3	3	
✓	At time of submittal, provide PCED with a digital copy (on a Flash Drive, CD or emailed to pced@cityofanacortes.org) of all application material and plans submitted. PDF format preferred.	✓	✓	✓	

PROJECT LOCATION

CITY OF ANACORTES

Planning, Community, & Economic Development

Date Received:

09/14/2021

SDP-2021-0009

WASHINGTON

ADJACENT PROPERTY OWNERS:

A - KELLER TRUST, 1909 SKYLINE WY

A - SKYLINE MARINA HOLDINGS LLC, 2011 SKYLINE WY

PROJECT LOCATION

LOCATION A:

BRUCE CAY, 2001 SKYLINE WAY, P80330

SECTION 27, T 35 N, R 1 E, WM

No Scale

PERMIT APPLICATION

VICINITY MAP

REFERENCE:

APPLICANT: TZ ENGINEERING, LLC

ADJACENT PROPERTY OWNERS:

A - SEE LIST

LOCATION A: 2001 SKYLINE WAY

LAT/LONG A: 48°29'34"N / 122°40'42"W

LAT/LONG B: 48°29'42"N / 122°40'36"W

PROPOSED PROJECT: IMPROVE EXISTING PIERS, PILES, RAMPS & FLOATS

IN: FLOUNDER BAY / BURROWS BAY

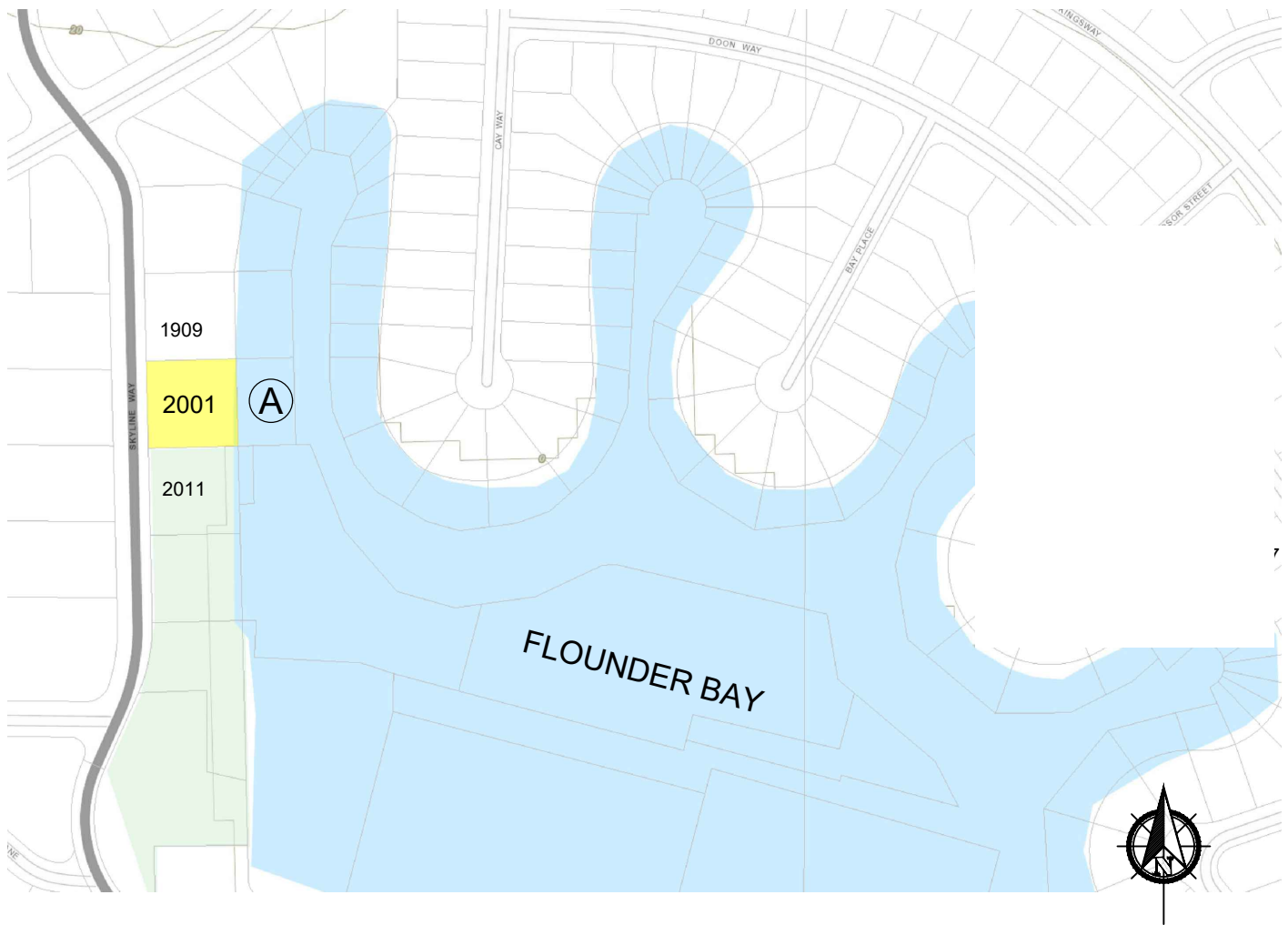
NEAR/AT: ANACORTES

COUNTY: SKAGIT

STATE: WA

PAGE 1 OF 7

DATE: 4/20/2021



SECTION 27, T 35 N, R 1 E, WM

Scale: 1"=300'

PERMIT APPLICATION

PROJECT SITE MAP

REFERENCE:

APPLICANT: TZ ENGINEERING, LLC

ADJACENT PROPERTY OWNERS:

A - KELLER TRUST, 1909 SKYLINE WY

A - SKYLINE MARINA HOLDINGS LLC,
2011 SKYLINE WY

LOCATION A: 2001 SKYLINE WAY

LAT/LONG A: 48°29'34"N / 122°40'42"W

PAGE 2 OF 7

DATE: 4/20/2021

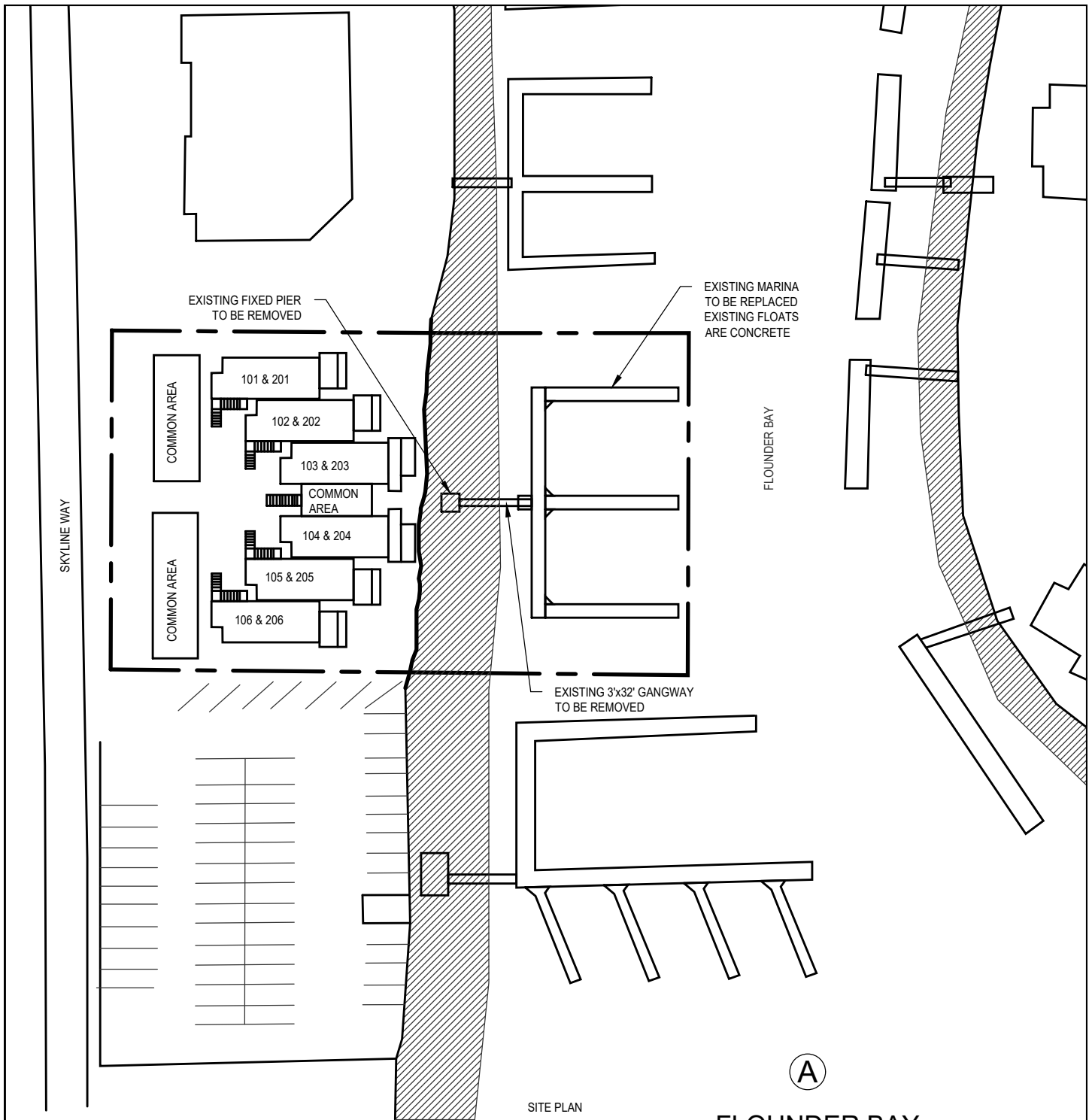
PROPOSED PROJECT: IMPROVE
EXISTING PIERS, PILES, RAMPS &
FLOATS

IN: FLOUNDER BAY / BURROWS BAY

NEAR/AT: ANACORTES

COUNTY: SKAGIT

STATE: WA



Scale: 1/64"=1'-0"

PERMIT APPLICATION

LOCATION A - PLAN

REFERENCE:

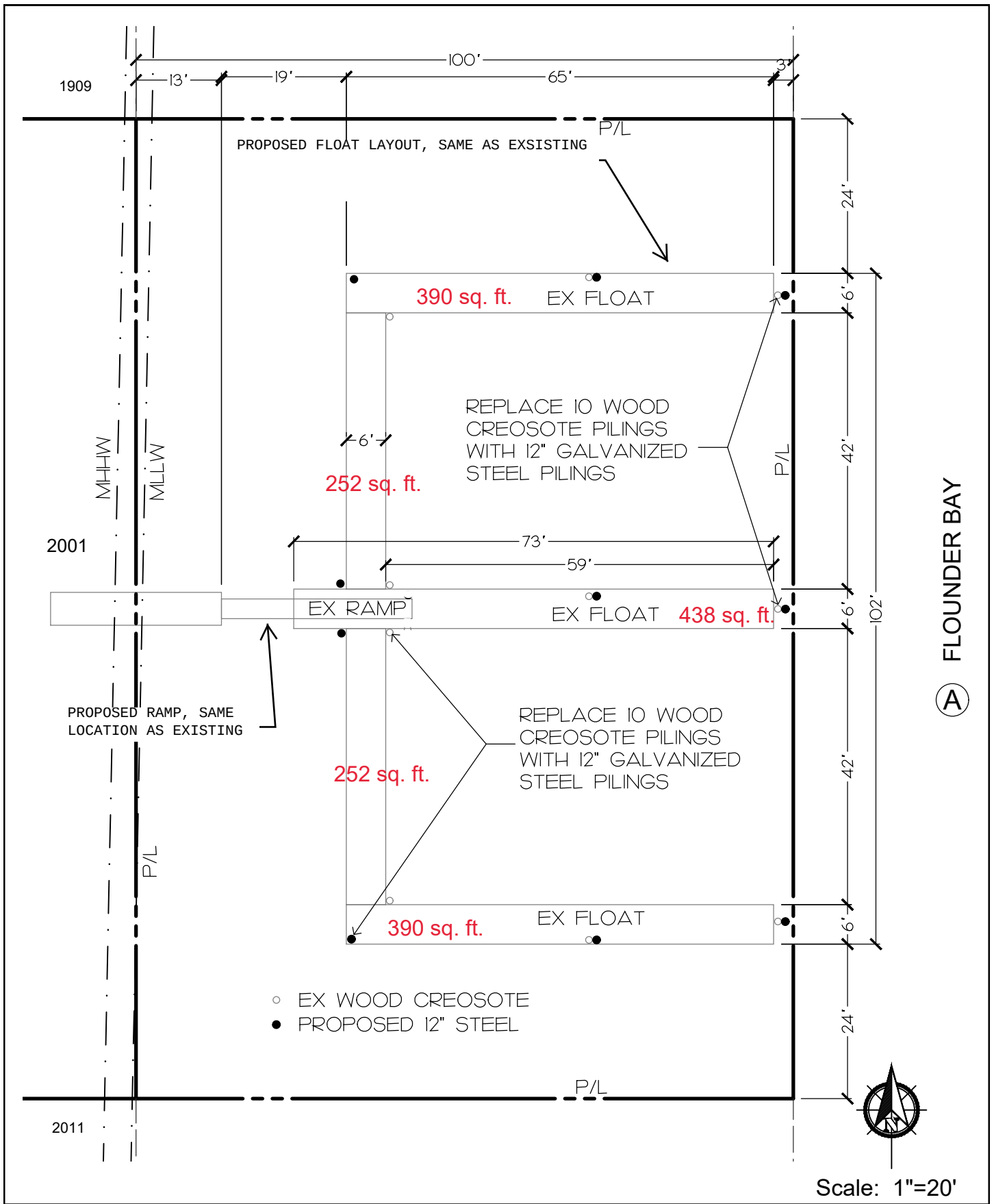
LOCATION A: 2001 SKYLINE WAY

PROPOSED PROJECT: IMPROVE
EXISTING PIERS, PILES, RAMPS &
FLOATS

APPLICANT: TZ ENGINEERING, LLC

PAGE 3 OF 7

DATE: 4/20/2021



PERMIT APPLICATION

LOCATION A - PLAN

REFERENCE:

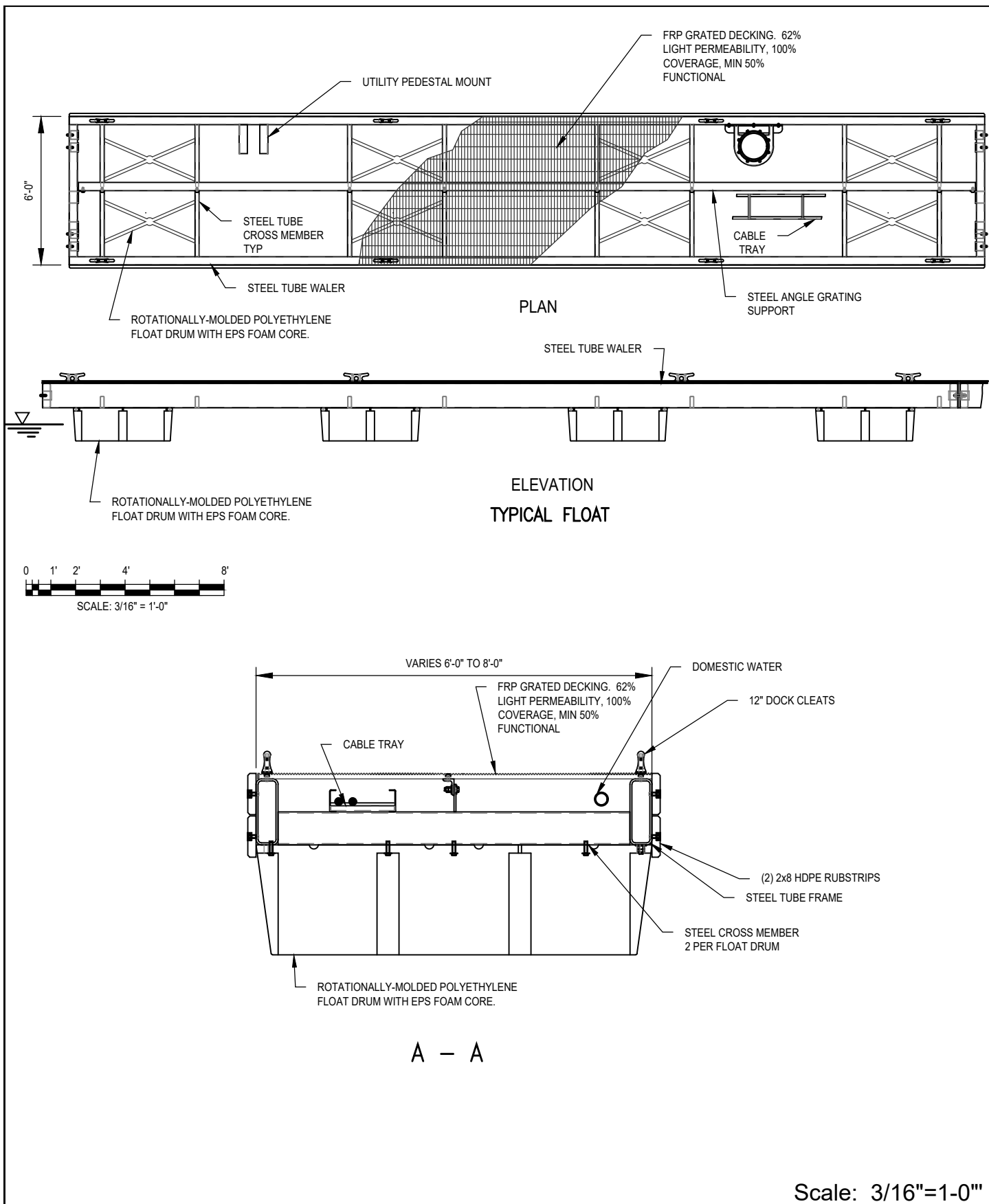
LOCATION A: 2001 SKYLINE WAY

PROPOSED PROJECT: IMPROVE
EXISTING PIERS, PILES, RAMPS &
FLOATS

APPLICANT: TZ ENGINEERING, LLC

PAGE 4 OF 7

DATE: 4/20/2021



PERMIT APPLICATION

DETAIL - TYPICAL FLOAT

REFERENCE:

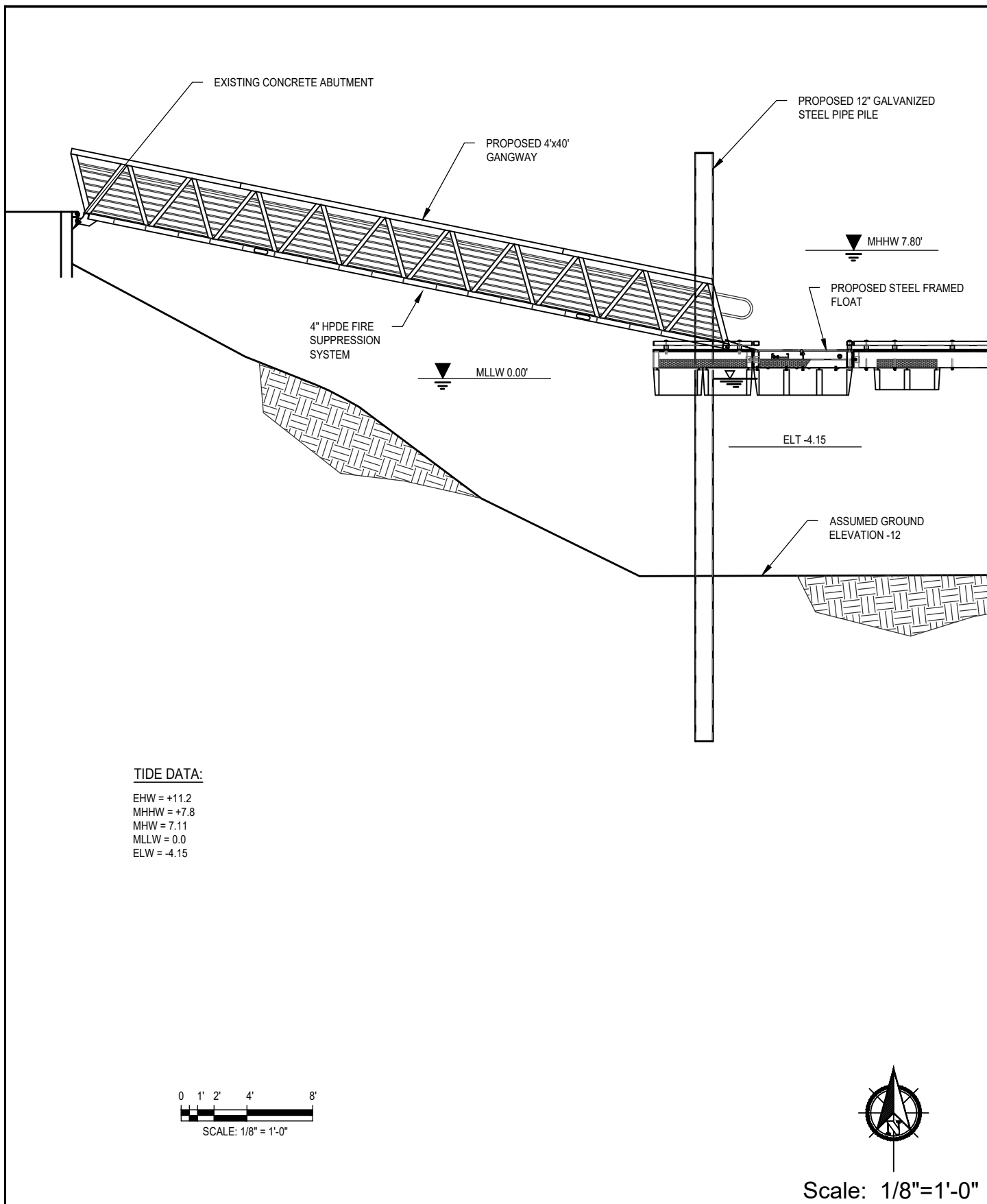
LOCATION A

APPLICANT: TZ ENGINEERING, LLC

PAGE 5 OF 7

DATE: 4/20/2021

PROPOSED PROJECT: IMPROVE
EXISTING PIERS, PILES, RAMPS &
FLOATS



PERMIT APPLICATION

LOCATION A - RAMP ELEVATION

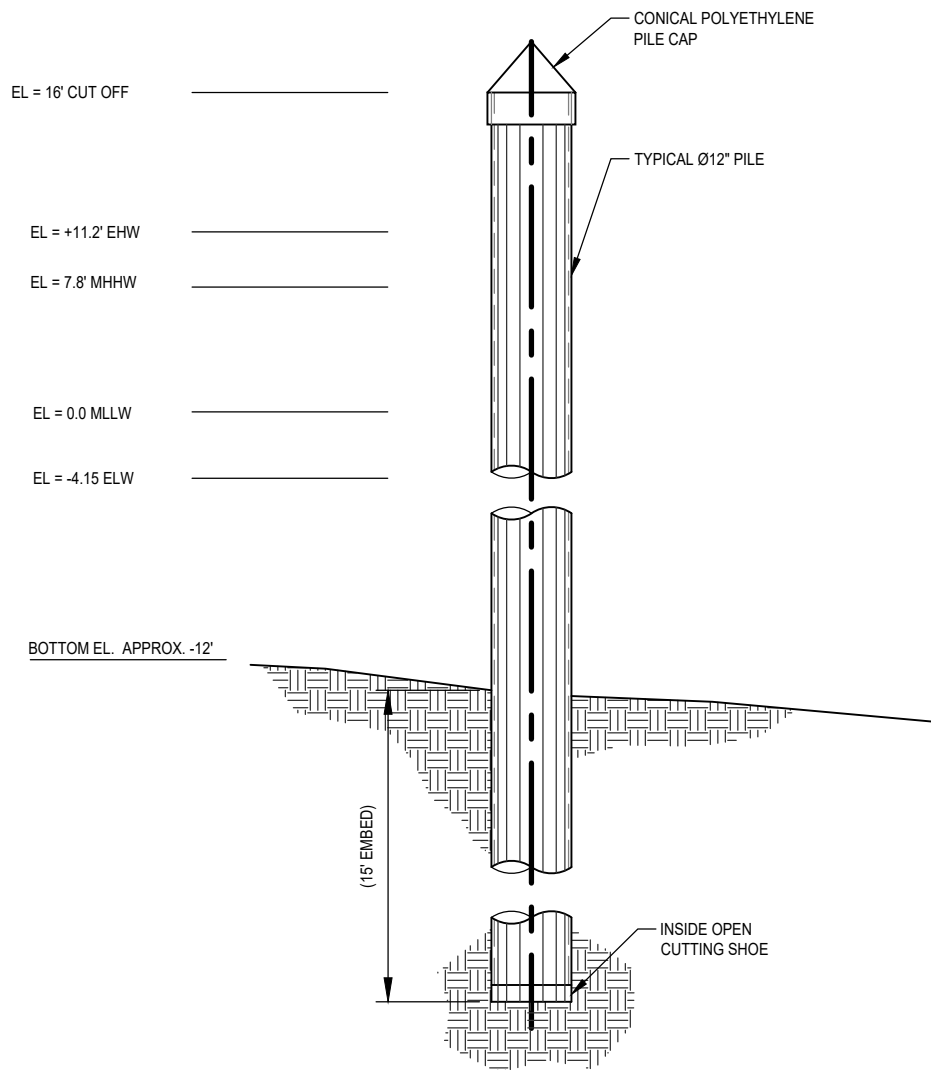
REFERENCE:

LOCATION A: 2001 SKYLINE WAY

PROPOSED PROJECT: IMPROVE
 EXISTING PIERS, PILES, RAMPS &
 FLOATS

APPLICANT: TZ ENGINEERING, LLC PAGE 6 OF 7

DATE: 4/20/2021



TYPICAL PILE

COATING:
HOT DIP GALVANIZE

No Scale

PERMIT APPLICATION

DETAIL - TYPICAL PILE

REFERENCE:

LOCATION A

APPLICANT: TZ ENGINEERING, LLC

PAGE 7 OF 7

DATE: 4/20/2021

PROPOSED PROJECT: IMPROVE
EXISTING PIERS, PILES, RAMPS &
FLOATS

**CITY OF ANACORTES**

Planning, Community, &
Economic Development

Date Received:

09/14/2021

SDP-2021-0009

**LAND USE****SEPA ENVIRONMENTAL CHECKLIST*****Purpose of checklist:***

Governmental agencies use this checklist to help determine whether the environmental impacts of your proposal are significant. This information is also helpful to determine if available avoidance, minimization or compensatory mitigation measures will address the probable significant impacts or if an environmental impact statement will be prepared to further analyze the proposal.

Instructions for applicants: [\[help\]](#)

This environmental checklist asks you to describe some basic information about your proposal. Please answer each question accurately and carefully, to the best of your knowledge. You may need to consult with an agency specialist or private consultant for some questions. You may use "not applicable" or "does not apply" only when you can explain why it does not apply and not when the answer is unknown. You may also attach or incorporate by reference additional studies reports. Complete and accurate answers to these questions often avoid delays with the SEPA process as well as later in the decision-making process.

The checklist questions apply to all parts of your proposal, even if you plan to do them over a period of time or on different parcels of land. Attach any additional information that will help describe your proposal or its environmental effects. The agency to which you submit this checklist may ask you to explain your answers or provide additional information reasonably related to determining if there may be significant adverse impact.

Use of checklist for nonproject proposals: [\[help\]](#)

For nonproject proposals (such as ordinances, regulations, plans and programs), complete the applicable parts of sections A and B plus the [SUPPLEMENTAL SHEET FOR NONPROJECT ACTIONS \(part D\)](#). Please completely answer all questions that apply and note that the words "project," "applicant," and "property or site" should be read as "proposal," "proponent," and "affected geographic area," respectively. The lead agency may exclude (for non-projects) questions in Part B - Environmental Elements –that do not contribute meaningfully to the analysis of the proposal.

A. BACKGROUND [\[help\]](#)

1. Name of proposed project, if applicable:
- [\[help\]](#)

Flounder Bay Dock Project - 2001 Skyline Way

2. Name of applicant:
- [\[help\]](#)

Tyler Zimmerman, TZ Engineering, LLC

3. Address and phone number of applicant and contact person:
- [\[help\]](#)

16980 Sargent Ln, Burlington, WA 98233

4. Date checklist prepared:
- [\[help\]](#)

9/01/21

5. Agency requesting checklist:
- [\[help\]](#)

City of Anacortes

6. Proposed timing or schedule (including phasing, if applicable):
- [\[help\]](#)

Fall 2021

7. Do you have any plans for future additions, expansion, or further activity related to or connected with this proposal? If yes, explain.
- [\[help\]](#)

No

8. List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal.
- [\[help\]](#)

None

9. Do you know whether applications are pending for governmental approvals of other proposals directly affecting the property covered by your proposal? If yes, explain.
- [\[help\]](#)

No

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

[\[help\]](#) **WDFW HPA permit, ACOE permit, WA-DOE water quality certification, City of Anacortes Permit**

11. Give brief, complete description of your proposal, including the proposed uses and the size of the project and site. There are several questions later in this checklist that ask you to describe certain aspects of your proposal. You do not need to repeat those answers on this page. (Lead agencies may modify this form to include additional specific information on project description.)
- [\[help\]](#)
- In general, this project will upgrade existing docks by replacement of 10 creosote piling with 10-12" steel piling with dock and gangway replacement proposed. 12" Steel piles and deck grating will be used on the gangway and dock.**

12. Location of the proposal. Give sufficient information for a person to understand the precise location of your proposed project, including a street address, if any, and section, township, and

range, if known. If a proposal would occur over a range of area, provide the range or boundaries of the site(s). Provide a legal description, site plan, vicinity map, and topographic map, if reasonably available. While you should submit any plans required by the agency, you are not required to duplicate maps or detailed plans submitted with any permit applications related to this checklist. [\[help\]](#)

Location A address is 2001 Skyline Way, Lat 48.49278N, Long 122.67833W.

B. ENVIRONMENTAL ELEMENTS [\[help\]](#)

1. Earth

- a. General description of the site [\[help\]](#)
(circle one): Flat, rolling, hilly, steep slopes, mountainous,
other _____ **This project takes place in the water. Upland is fully developed flat land consisting of single family and multi-family housing.**

- b. What is the steepest slope on the site (approximate percent slope)? [\[help\]](#)

The steepest slope is the shoreline embankment that is approximately a 3:1 slope.

- c. What general types of soils are found on the site (for example, clay, sand, gravel, peat, muck)? If you know the classification of agricultural soils, specify them and note any agricultural land of long-term commercial significance and whether the proposal results in removing any of these soils. [\[help\]](#)
Bottom substrate along the shoreline consists of rock, mud, clay, and gravel. The shoreline banks are lined with riprap. Beyond the shoreline bottom substrate consists of mud. Flounder Bay is a human-made environment, i.e., it is a dredged marina
- d. Are there surface indications or history of unstable soils in the immediate vicinity? If so, describe. [\[help\]](#)

No

- e. Describe the purpose, type, total area, and approximate quantities and total affected area of any filling, excavation, and grading proposed. Indicate source of fill. [\[help\]](#)

No, filling, excavation or grading proposed

- f. Could erosion occur as a result of clearing, construction, or use? If so, generally describe. [\[help\]](#)

No

- g. About what percent of the site will be covered with impervious surfaces after project construction (for example, asphalt or buildings)? [\[help\]](#)

Not applicable.

- h. Proposed measures to reduce or control erosion, or other impacts to the earth, if any: [\[help\]](#)

Piling will be removed and installed using a vibratory hammer hooked to a crane positioned on a barge.

2. Air

- a. What types of emissions to the air would result from the proposal during construction, operation, and maintenance when the project is completed? If any, generally describe and give approximate quantities if known. [\[help\]](#)

Emissions will be from the equipment used to construct the project. Boat, crane, small generator and welder.

- b. Are there any off-site sources of emissions or odor that may affect your proposal? If so, generally describe. [\[help\]](#)

No

- c. Proposed measures to reduce or control emissions or other impacts to air, if any: [\[help\]](#)

None

3. Water

- a. Surface Water: [\[help\]](#)

- 1) Is there any surface water body on or in the immediate vicinity of the site (including year-round and seasonal streams, saltwater, lakes, ponds, wetlands)? If yes, describe type and provide names. If appropriate, state what stream or river it flows into. [\[help\]](#)

The project sites are within Flounder Bay which is part of Skyline Marina adjacent to Burrows Bay. Saltwater.

- 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. [\[help\]](#)

Yes, the work will take place in Flounder Bay.

- 3) Estimate the amount of fill and dredge material that would be placed in or removed from surface water or wetlands and indicate the area of the site that would be affected. Indicate the source of fill material. [\[help\]](#)

No Fill, only the removal of creosote piling and installation of 12" steel piling.

Piling removal = 7.85 sq ft, Piling Install = 7.85 sq ft

- 4) Will the proposal require surface water withdrawals or diversions? Give general description, purpose, and approximate quantities if known. [\[help\]](#)

NO

- 5) Does the proposal lie within a 100-year floodplain? If so, note location on the site plan. [\[help\]](#)

NO

- 6) Does the proposal involve any discharges of waste materials to surface waters? If so, describe the type of waste and anticipated volume of discharge. [\[help\]](#)

NO

b. Ground Water:

- 1) Will groundwater be withdrawn from a well for drinking water or other purposes? If so, give a general description of the well, proposed uses and approximate quantities withdrawn from the well. Will water be discharged to groundwater? Give general description, purpose, and approximate quantities if known. [\[help\]](#)

NO

- 2) Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (for example: Domestic sewage; industrial, containing the following chemicals. . . ; agricultural; etc.). Describe the general size of the system, the number of such systems, the number of houses to be served (if applicable), or the number of animals or humans the system(s) are expected to serve. [\[help\]](#)

NONE

c. Water runoff (including stormwater):

- 1) Describe the source of runoff (including storm water) and method of collection and disposal, if any (include quantities, if known). Where will this water flow? Will this water flow into other waters? If so, describe. [\[help\]](#)

NONE

- 2) Could waste materials enter ground or surface waters? If so, generally describe. [\[help\]](#)

NO

- 3) Does the proposal alter or otherwise affect drainage patterns in the vicinity of the site? If so, describe.

NO

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

NONE

4. Plants [\[help\]](#)

- a. Check the types of vegetation found on the site: [\[help\]](#)

____deciduous tree: alder, maple, aspen, other

____evergreen tree: fir, cedar, pine, other

____shrubs

____grass

____pasture

____crop or grain

____Orchards, vineyards or other permanent crops.

____wet soil plants: cattail, buttercup, bullrush, skunk cabbage, other

_____ water plants: water lily, eelgrass, milfoil, other
NONE other types of vegetation

- b. What kind and amount of vegetation will be removed or altered? [\[help\]](#)
 NONE

- c. List threatened and endangered species known to be on or near the site. [\[help\]](#)
 Marbled murrelet, Bald eagle, Bull trout, Chinook salmon, Steelhead , Stellar
 Sea lion, Leatherback sea turtle, Humpback whale

- d. Proposed landscaping, use of native plants, or other measures to preserve or enhance
 vegetation on the site, if any: [\[help\]](#)
 NONE

- e. List all noxious weeds and invasive species known to be on or near the site.
 NONE

5. Animals

- a. List any birds and other animals which have been observed on or near the site or are known
 to be on or near the site. Examples include: [\[help\]](#)

birds: hawk, heron, eagle, songbirds, other:

mammals: deer, bear, elk, beaver, other:

fish: bass, salmon, trout, herring, shellfish, other _____

Hawks, eagles, herons, songbirds, deer

- b. List any threatened and endangered species known to be on or near the site. [\[help\]](#)

Marbled murrelet, Bald eagle, Bull trout, Chinook salmon, Steelhead , Stellar
 Sea lion, Leatherback sea turtle, Humpback whale

- c. Is the site part of a migration route? If so, explain. [\[help\]](#)
 No

- d. Proposed measures to preserve or enhance wildlife, if any: [\[help\]](#)
 replacing creosote piles with a same number of steel piling and concrete dock
 surfaces with grated dock surfaces.

- e. List any invasive animal species known to be on or near the site.
 None known

6. Energy and natural resources

- a. What kinds of energy (electric, natural gas, oil, wood stove, solar) will be used to meet
 the completed project's energy needs? Describe whether it will be used for heating,
 manufacturing, etc. [\[help\]](#)
 Electricity for shore power for boat to maintain charges on batteries, etc.

- b. Would your project affect the potential use of solar energy by adjacent properties?
 If so, generally describe. [\[help\]](#)
 No

- c. What kinds of energy conservation features are included in the plans of this proposal?

List other proposed measures to reduce or control energy impacts, if any: [\[help\]](#)

NONE

7. Environmental health

- a. Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire and explosion, spill, or hazardous waste, that could occur as a result of this proposal?

If so, describe. [\[help\]](#)

NONE

- 1) Describe any known or possible contamination at the site from present or past uses.

NONE

- 2) Describe existing hazardous chemicals/conditions that might affect project development and design. This includes underground hazardous liquid and gas transmission pipelines located within the project area and in the vicinity.

NONE

- 3) Describe any toxic or hazardous chemicals that might be stored, used, or produced during the project's development or construction, or at any time during the operating life of the project.

Petroleum products for fuel and lubes during construction.

- 4) Describe special emergency services that might be required.

NONE

- 5) Proposed measures to reduce or control environmental health hazards, if any:

Proper use of BMP's and good housekeeping during construction.

b. Noise

- 1) What types of noise exist in the area which may affect your project (for example: traffic, equipment, operation, other)? [\[help\]](#)

NONE

- 2) What types and levels of noise would be created by or associated with the project on a short-term or a long-term basis (for example: traffic, construction, operation, other)? Indicate what hours noise would come from the site. [\[help\]](#)

Equipment operation and pile driving with a vibratory hammer. Daytime 6am-8pm

- 3) Proposed measures to reduce or control noise impacts, if any: [\[help\]](#)

Pile driving with a vibratory hammer instead of an impact hammer.

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. [\[help\]](#)

Upland includes condominium and single family homes and parking area. Generally non-commercial in nature.

- b. Has the project site been used as working farmlands or working forest lands? If so, describe.

How much agricultural or forest land of long-term commercial significance will be converted

to other uses as a result of the proposal, if any? If resource lands have not been designated, how many acres in farmland or forest land tax status will be converted to nonfarm or nonforest use? [\[help\]](#) NO

1) Will the proposal affect or be affected by surrounding working farm or forest land normal business operations, such as oversize equipment access, the application of pesticides, tilling, and harvesting? If so, how: NO

c. Describe any structures on the site. [\[help\]](#)

Upland includes condominium and single family homes and parking area.

d. Will any structures be demolished? If so, what? [\[help\]](#)
NO

e. What is the current zoning classification of the site? [\[help\]](#)
Shoreline Urban

f. What is the current comprehensive plan designation of the site? [\[help\]](#)
Unknown

g. If applicable, what is the current shoreline master program designation of the site? [\[help\]](#)
Shoreline Urban

h. Has any part of the site been classified as a critical area by the city or county? If so, specify. [\[help\]](#) NO

i. Approximately how many people would reside or work in the completed project? [\[help\]](#)
None. The floats moor boats for the upland housing.

j. Approximately how many people would the completed project displace? [\[help\]](#)
NONE

k. Proposed measures to avoid or reduce displacement impacts, if any: [\[help\]](#)
NONE

l. Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any: [\[help\]](#)
Project does not change the current land use

m. Proposed measures to ensure the proposal is compatible with nearby agricultural and forest lands of long-term commercial significance, if any:
NONE

9. Housing

a. Approximately how many units would be provided, if any? Indicate whether high, middle, or low-income housing. [\[help\]](#)
NONE

b. Approximately how many units, if any, would be eliminated? Indicate whether high, middle, or low-income housing. [\[help\]](#)
NONE

c. Proposed measures to reduce or control housing impacts, if any: [\[help\]](#)
NONE

10. Aesthetics

a. What is the tallest height of any proposed structure(s), not including antennas; what is the principal exterior building material(s) proposed? [\[help\]](#)
10' Piling

b. What views in the immediate vicinity would be altered or obstructed? [\[help\]](#)
NONE

c. Proposed measures to reduce or control aesthetic impacts, if any: [\[help\]](#)
None

11. Light and glare

a. What type of light or glare will the proposal produce? What time of day would it mainly occur? [\[help\]](#)
NONE

b. Could light or glare from the finished project be a safety hazard or interfere with views? [\[help\]](#)
NO

c. What existing off-site sources of light or glare may affect your proposal? [\[help\]](#)
NONE

d. Proposed measures to reduce or control light and glare impacts, if any: [\[help\]](#)
NONE

12. Recreation

a. What designated and informal recreational opportunities are in the immediate vicinity? [\[help\]](#)
Boating, fishing, hiking

b. Would the proposed project displace any existing recreational uses? If so, describe. [\[help\]](#)
NO

c. Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any: [\[help\]](#)
NONE

13. Historic and cultural preservation

- a. Are there any buildings, structures, or sites, located on or near the site that are over 45 years old listed in or eligible for listing in national, state, or local preservation registers located on or near the site? If so, specifically describe. [\[help\]](#)

NO

- b. Are there any landmarks, features, or other evidence of Indian or historic use or occupation? This may include human burials or old cemeteries. Are there any material evidence, artifacts, or areas of cultural importance on or near the site? Please list any professional studies conducted at the site to identify such resources. [\[help\]](#)

NO

- c. Describe the methods used to assess the potential impacts to cultural and historic resources on or near the project site. Examples include consultation with tribes and the department of archeology and historic preservation, archaeological surveys, historic maps, GIS data, etc.

[\[help\]](#)

Search of the DAHP's online database.

- d. Proposed measures to avoid, minimize, or compensate for loss, changes to, and disturbance to resources. Please include plans for the above and any permits that may be required.

NONE

14. Transportation

- a. Identify public streets and highways serving the site or affected geographic area and describe proposed access to the existing street system. Show on site plans, if any. [\[help\]](#)

Access to the sites is from Skyline Way. No change in access is proposed.

- b. Is the site or affected geographic area currently served by public transit? If so, generally describe. If not, what is the approximate distance to the nearest transit stop? [\[help\]](#)

Yes. Skagit Transit has a bus stop near the site at the intersection of Skyline way and Kingsway. Approximately 1/4 mile from the site.

- c. How many additional parking spaces would the completed project or non-project proposal have? How many would the project or proposal eliminate? [\[help\]](#)

NONE

- d. Will the proposal require any new or improvements to existing roads, streets, pedestrian, bicycle or state transportation facilities, not including driveways? If so, generally describe (indicate whether public or private). [\[help\]](#)

NO

- e. Will the project or proposal use (or occur in the immediate vicinity of) water, rail, or air transportation? If so, generally describe. [\[help\]](#) NO

- f. How many vehicular trips per day would be generated by the completed project or proposal? If known, indicate when peak volumes would occur and what percentage of the volume would be trucks (such as commercial and nonpassenger vehicles). What data or transportation models were used to make these estimates? [\[help\]](#)

NONE

- g. Will the proposal interfere with, affect or be affected by the movement of agricultural and forest products on roads or streets in the area? If so, generally describe.

NO

- h. Proposed measures to reduce or control transportation impacts, if any: [\[help\]](#)

NONE

15. Public services

- a. Would the project result in an increased need for public services (for example: fire protection, police protection, public transit, health care, schools, other)? If so, generally describe. [\[help\]](#)

NO

- b. Proposed measures to reduce or control direct impacts on public services, if any. [\[help\]](#)

NONE

16. Utilities

- a. Circle utilities currently available at the site: [\[help\]](#)

electricity, natural gas, water, refuse service, telephone, sanitary sewer, septic system,
other _____

- b. Describe the utilities that are proposed for the project, the utility providing the service, and the general construction activities on the site or in the immediate vicinity which might be needed. [\[help\]](#)

NO changes to utility services are proposed.

C. SIGNATURE [\[HELP\]](#)

I certify (or declare) under penalty of perjury under laws of the State of Washington that 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 a decision.

Signature: _____

Name of signee Tyler Zimmerman

Position and Agency/Organization TZ Engineering, LLC

Date Submitted: 09/14/21



NOTICE OF APPLICATION and PUBLIC HEARING with OPTIONAL SEPA DNS

SCAN HERE TO VIEW

All File Materials & Staff Report:



File Number: SDP-2021-0009

Owner: Bruce Cay for Interbay Condominiums Marina

Agent: Tyler Zimmerman, TZ Engineering, LLC

Date of Application: September 14, 2021

Date of Completeness: October 5, 2021

Project Location: 2001 Skyline Way (P80330)

NOTICE IS HEREBY GIVEN THAT AN APPLICATION WAS MADE FOR THE FOLLOWING PROPOSAL:

The applicant has requested Shoreline Substantial Development permit with SEPA Review for the upgrade to an existing community dock on Flounders Bay. The project proposes to replace (10) existing creosote pilings with 12 in. galvanized steel pilings. The existing concrete floats, totaling 1,722 sq. ft., would be replaced with steel framed FRP grated floats; the floats are to be installed in the same layout and location as existing. The existing 3 ft. by 32 ft. gangway is to be replaced by a 4 ft. by 40 ft. grated gangway. The subject property is located within the Urban shoreline environment designation with majority of the work occurring within the Aquatic shoreline environment designation.

Required Project Permits/Approvals: The following may be required in addition to the above: SEPA environmental review, Building Permit, Hydraulic Permit Approval (WDFW), USACE Approval Permit, Floodplain Development Permit

SEPA Review: Based on the submitted application and available information, the City anticipates issuing a DNS for this proposal and the optional DNS process as specified in WAC 197.11.355 is being utilized. Consequently, this may be the only opportunity to comment on the environmental impacts of this proposal. This proposal may include mitigation measures under applicable codes, and the project review process may incorporate or require mitigation measures regardless of whether an EIS is prepared. A copy of the subsequent SEPA threshold determination for the proposal may be obtained upon request.

Existing Environmental Documents: SEPA Checklist

Public Comment Period: The joint Notice of Application and Public Hearing was published on October 13th, 2021. Written comments must be submitted to the contact person listed below by **5:00 PM on November 12th, 2021**.

Open-Record Decision Hearing: A virtual open-record decision hearing to make a decision on the application will be held by the Planning Commission on **November 24th, 2021 at 6:00 pm** via Zoom video conferencing.

- Virtual meeting participation instructions and connection information can be viewed here: <https://www.anacorteswa.gov/700/Meeting-Documents-and-Video>. Meeting attendance options will be posted on the applicable agenda published the week before the meeting. Hearings will be conducted in accordance with the rules of procedure adopted by the hearing body.
- Members of the public who require special assistance to participate in or access the public hearing may contact the [City Clerk](#) 24 hours before the meeting to make special arrangements. Dial 360-299-1960.

ANY PERSON HAS THE RIGHT TO RECEIVE NOTICE, PARTICIPATE IN ANY HEARINGS, REQUEST A COPY OF THE FINAL DECISION AND APPEAL THE DECISION AS PROVIDED BY LAW.

Document Availability: Application documents may also be reviewed at <https://www.anacorteswa.gov/161/Planning-Community-Economic-Development> by clicking **"Current Land Use Projects & Notices"**.

For Project Information: Emily Morgan, Senior Planner; Phone: (360) 298-4350

Email: emilym@cityofanacortes.org; City of Anacortes, P.O. Box 547, Anacortes, WA 98221

Appeals: Any party with standing may appeal the decision, once made, within 14 calendar days after written notice of the decision is mailed, per the provisions in AMC 19.20.180, *Appeals*.

Commenter	Dept	Comments	Upload
Frisinger, Rob	Building	Building has no objections. If work will occur between the low, low water mark and the 100 year flood plane boundary, a flood development permit will be required.	
Lange, Steve	Engineering	No comments at this time.	
Kennedy, Jack	Fire	See attached.	Fir... ...

Agency Comments

Commenters will automatically be emailed notification of the decision.

Commenter	Commenter Email	Comment
Sauk-Suiattle Indian Tribe	kjoseph@sauk-suiattle.com	Sauk-Sui... 80.... I n i t i a l

Public Comments

Commenters will automatically be emailed notification of the decision.

Commenter	Commenter Email	Comment
		I n i t i a l

FIRE DEPARTMENT REQUIREMENTS

1. Per International Fire Code, City of Anacortes Ordinance, and/or NFPA regulations; renovation of the existing dock will require compliance with current code. This regulation applies to all wharves, piers, and/or floats. A dry standpipe system per NFPA 14 will be required.
2. These comments are preliminary in nature and subject to change as additional information becomes available.

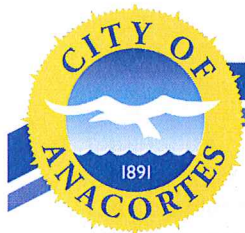
From: [Kevin Joseph](#)
To: [Morgan, Emily](#)
Subject: City of Anacortes Invitation to Comment on Proposed Land Use Action SDP-2021-0009
Date: Friday, October 15, 2021 10:10:43 AM

Good Morning Emily,

The Sauk-Suiattle Indian Tribe has no concerns with this project and will defer to any other interested tribe or party.

Thanks,

Kevin Joseph



STATE ENVIRONMENTAL POLICY ACT (SEPA)

Determination of Non-Significance (DNS)

Project Title	Skyline Dock & Piling Project
File Number	SDP-2021-0009
Site Address	2001 Skyline Way
APN(s)	P80330
Applicant/Owner	Bruce Cay for Interbay Condominiums Marina
Agent	Tyler Zimmerman, TZ Engineering, LLC
Application Date	September 14, 2021
Notice of Application	October 13, 2021; comment period ended November 12, 2021
Request	The applicant has requested Shoreline Substantial Development permit with SEPA Review for the upgrade to an existing community dock on Flounders Bay. The project proposes to replace (10) existing creosote pilings with 12 in. galvanized steel pilings. The existing concrete floats, totaling 1,722 sq. ft., would be replaced with steel framed FRP grated floats; the floats are to be installed in the same layout and location as existing. The existing 3 ft. by 32 ft. gangway is to be replaced by a 4 ft. by 40 ft. grated gangway. The project proposes the use of FRP grated decking material which would allow for 62% light permeability, a reduction in complete over water coverage that the existing solid wood decking presented. The subject property is located within the Urban shoreline environment designation with majority of the work occurring within the Aquatic shoreline environment designation.

The City of Anacortes Department of Planning, Community & Economic Development has determined that this project does not have a probable significant adverse impact on the environment. An environmental impact statement (EIS) is not required under RCW § 43.21C.030(2)(c). This decision was made after review of a completed environmental checklist and other information on file with the lead agency. This information is available at <https://www.anacorteswa.gov/161/Planning-CommunityEconomic-Development> under ***“Current Land Use Projects and Notices”***:

This determination is based on the following findings and conclusions:

- No comments regarding potential environmental impacts were received from the public or agencies.
- Comments relaying “no objection to the proposed project” were received from City of Anacortes Building Department, Public Works Department, and the Suak-Suiattle Indian Tribe.
- Comments of the City of Anacortes Fire Department and Building Department provided requirements for construction, to be satisfied at time of building permit submittal.
- The proposal’s conformance with existing Anacortes Municipal Code regulations and acquisition of applicable agency permits prior to site construction adequately address potential impacts of this project.
- This DNS is issued under WAC 197-11-340(2) after using the Optional DNS process in WAC 197-11-355. There is no further comment period on this DNS.

For further information, contact the City of Anacortes' Department of Planning, Community, & Economic Development at (360) 299-1984. The issuance of this Determination of Non-significance should not be interpreted as acceptance or approval of the proposal as presented. The City of Anacortes reserves the right to deny or approve said proposal subject to conditions if it is determined to be in the best interests of the city and/or necessary for the general health, safety and welfare of the public to do so.

Responsible Official: Don Measamer, Director/SEPA Responsible Official
Planning, Community, & Economic Development Department
Address: P.O. Box 547
Anacortes, WA 98221
Phone: 360-299-1942

Signature:  **Issue Date:** 11/15/21

SEPA APPEAL PROCEDURE

This environmental threshold determination may be appealed in accordance with the procedures outlined in AMC Chapter 18.04 and 19.20. Appeals must be on forms provided by the Planning, Community & Economic Department (PCED), contain the information specified in AMC 19.20.180.F, be accompanied by a filing fee of \$200, and be delivered to the City Clerk by mail or personal delivery by **5:00 PM, 14 days from the above issue date**. Additional information regarding the appeal process may be obtained from City of Anacortes PCED, (360) 299-1984.